Catalogue Industrial Technology

21 / 22

AFRISO

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

Sales Group Industrial Technology

Pressure. Temperature. Level.

Germany:	North	-138
	Centre	-300
	South	-228
	South-East	-235
	Gas analysis	-166
Export:		-132

Service and repairs

Hotline -211

www.afriso.com/contact

The catalogue has been presented by:

Dear business partner

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

The catalogue DOMESTIC TECHNOLOGY covers all products for safety and measuring equipment for heating systems, solutions for energy savings and water technology as well as alarm units, sensors, actuators and smart building systems for wireless building automation.

The catalogue INDUSTRIAL TECHNOLOGY comprises the complete range of high-quality measuring instruments and system solutions for pressure, temperature and level as well as customised, industrial solutions for stationary gas analysis – for your specific industrial application.

The catalogue PORTABLE MEASURING INSTRUMENTS covers certified mobile service measuring instruments for flue gas analysis as well as testing and inspection equipment for maintenance and diagnostics. Ready to be used in any industry.

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. 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 and Distribution
AFRISO-EURO-INDEX GmbH

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Contents and Product Range

Capsule pressure gauges, Bourdon tube pressure gauges, diaphragm pressure gauges, pressure gauges with electrical contacts, differential pressure gauges, accessories for pressure gauges 1

Diaphragm seals, piston type chemical seals, in-line chemical seals 2

Pressure transducers, digital pressure gauges, differential pressure switches 3

Electronic and mechanical temperature measuring instruments, bimetal chemical, stainless steel and industrial thermometers, gas filled thermometer in chemical version, thermowells, industrial thermometers, resistance thermometers 4

Level – Continuous: Hydrostatic, capacitance, ultrasound, guided micropulse
Level – Switches: Conductive, capacitance, vibration 5

Alarm units for oil, petrol or grease separators for layer thickness alarm, overflow alarm, sand alarm or oil-on-water alarm
Gas alarm units in DIN rail housing, gas sensors, test gas bag 6

Gas sampling probes, heated analysis lines/frost protection lines, temperature controllers, universal filters, acid filters, gas treatment systems, gas purifiers, zero air generators, gas coolers, infrared gas analysers, oxygen measuring systems, gas analyser BIOLYZER, emission computer, screw fittings and accessories, measuring system for scrubbers 7

Isolation amplifiers, supply isolation amplifiers, trip amplifiers, EX safety barriers, EX supply isolation amplifiers, multifunction transducers, digital plug-in displays, digital display/control units, combined warning light and horns, additional alarm unit, event reporting systems, AFRISO Net web service 8

AFRISO service, training, 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, certificates, General Terms of Delivery 9

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 catalogues, we manufacture special versions to customer specifications.
Please enquire.

Finding information
The catalogue Industrial Technology is divided into 9 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 and level indicators.

Contact person
Our sales department is divided into three industry-specific sales groups. Please visit www.afriso.de/contact or see the second page of this catalogue for further information on your specific contact person.

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 products

Small order handling fee / minimum order value
For very small orders with net values below € 100 a handling fee of € 15 will be charged. No other minimum order conditions apply.

Return of goods
Goods can only be returned with return note and only up to three months after delivery, minimum value of goods for return is € 100,–. Please enquire for a return note at service@afriso.de.
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 30 % of the price for testing and handling or at least € 40. Shipping costs for returns are to be borne by the customer.

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. We will charge a fee of € 10,– per shipment for drop shipping.
Our Terms of Delivery apply (see www.afriso.com or appendix).
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.

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 9 or to www.afriso.com, INFO CENTRE > Downloads or directly to the product on the website.

Det Norske Veritas AS (DNV) is global, independent classification society organised as a foundation with the purpose of safeguarding life, property and the environment, specially in maritime applications. AFRISO products with the DNV-GL label have been tested, classified and certified for compliance with the DNV classifications and standards.

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 optionally available with Safety Integrity Level 2. The safety-related characteristics are provided via 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. All AFRISO products with the EHEDG certificate label are tested and certified for hygienic design.

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 PED (Pressure Equipment Directive 2014/68/EU) specifies the requirements for selling pressure equipment within the European Union. Please refer to chapters 1–3 for further details on our mechanical and electronic pressure gauges.

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 stringent safety requirements of the DVGW.

EnOcean – Green. Smart. Wireless. EnOcean is a battery-less wireless technology which allows for maintenance-free sensor solutions. These sensors deliver data for intelligent networks in buildings and for the Internet of Things. The basic idea behind the innovative EnOcean® technology is driven by a simple observation: Wherever sensors capture measured values, the energy state changes as well. A switch is pressed, the temperature changes or the illuminance varies. These processes provide sufficient energy to transmit wireless signals. www.enocean.com

The label "EnOcean-ready" on the WATCHDOG LINE alarm units indicates that the PCB of the device features a slot for the EnOcean® TCM 320 wireless module. It is sufficient to plug in the wireless module to integrate the device into a smart home system based on EnOcean®.

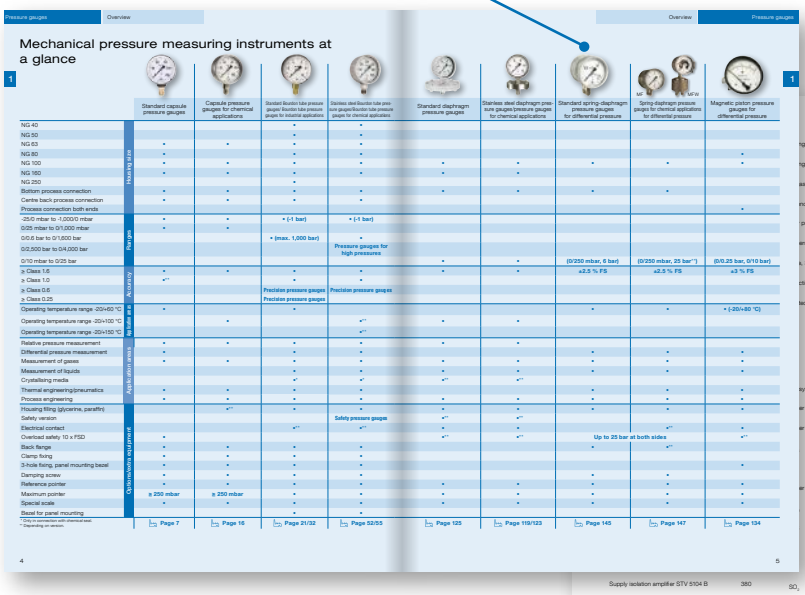
Suitable devices any application. In order to be able to optimally focus on the requirements of the individual target markets, we have divided our product portfolio into the areas of DOMESTIC TECHNOLOGY, PORTABLE MEASURING INSTRUMENTS and INDUSTRIAL TECHNOLOGY. The corresponding icons allow for easy assignment to main industries and provide for easy navigation in our complete range of products. In addition, we offer customised OEM solution in these areas.

How to work with this catalogue

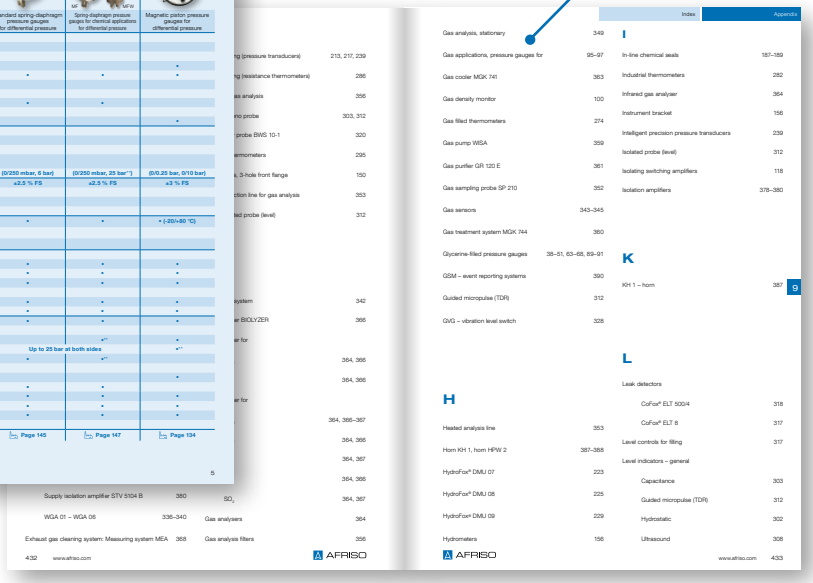
AFRISO catalogue INDUSTRIAL TECHNOLOGY: Clear structure and layout

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

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

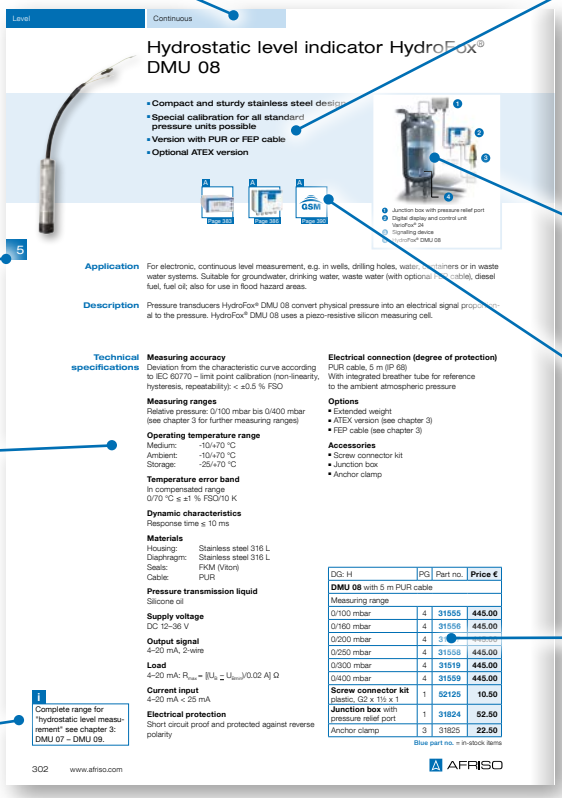


Index



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

Product advantages and **main benefits**



Tab

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

Appropriate **accessories** with page reference.

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

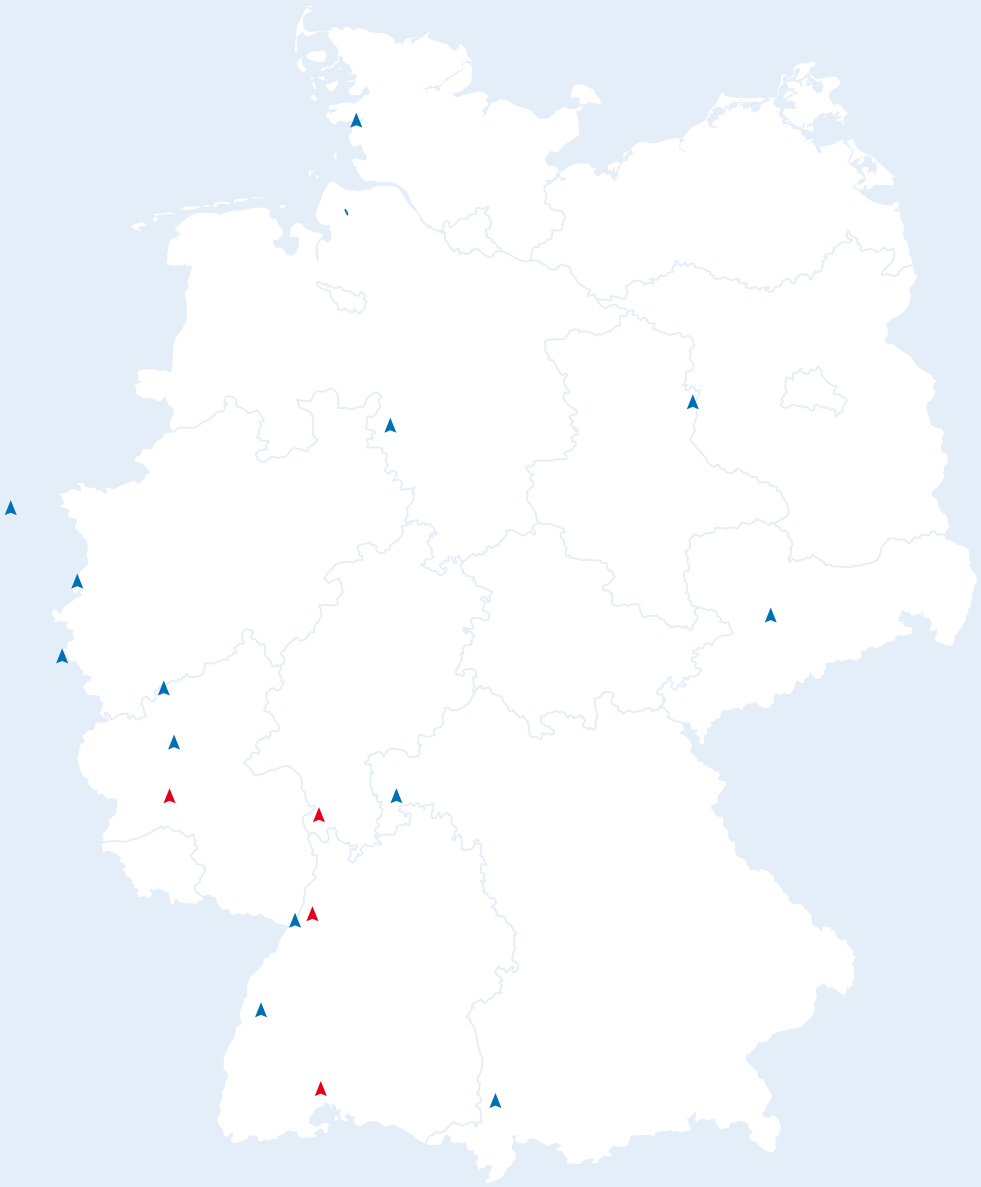
Order information table with part numbers, prices and packing unit details plus options/extra charges.

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

AFRISO support centres – close by, guaranteed.

Sites in Germany

- AFRISO sales office/field staff
- AFRISO production site



We ensure that you get professional, personal service.

With a staff of more than 80 field and internal experts! Please visit www.afriso.de/contact for further information on your specific contact person.

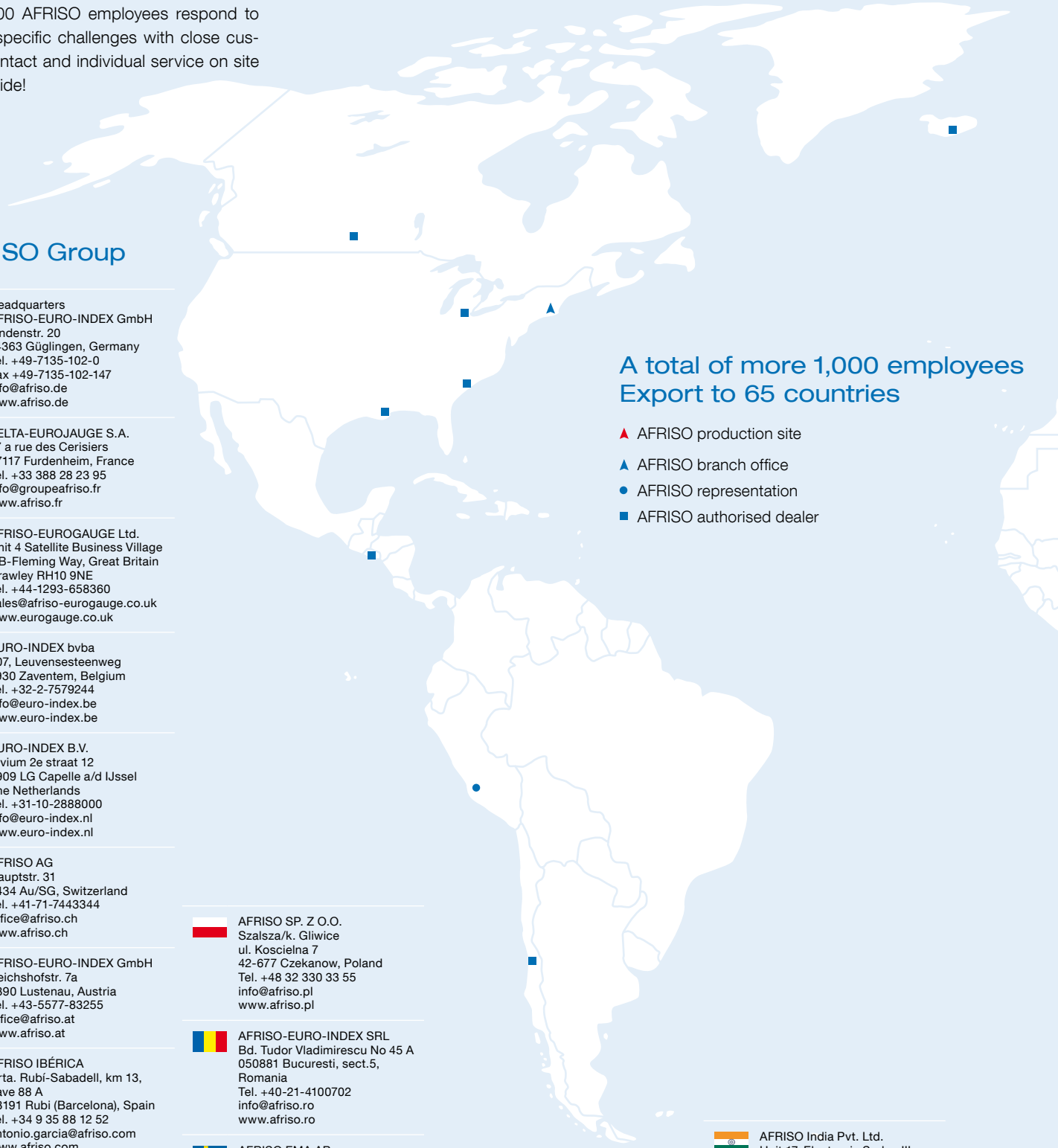
Business hours:

Monday – Thursday:	7.30 a.m. – 12.00 a.m. and 1.00 p.m. – 4.30 p.m.
Friday:	7.30 a.m. – 12.30 p.m.

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. More than 1,000 AFRISO employees respond to country-specific challenges with close customer contact and individual service on site – worldwide!



A total of more 1,000 employees
Export to 65 countries

- AFRISO production site
- AFRISO branch office
- AFRISO representation
- AFRISO authorised dealer

AFRISO Group

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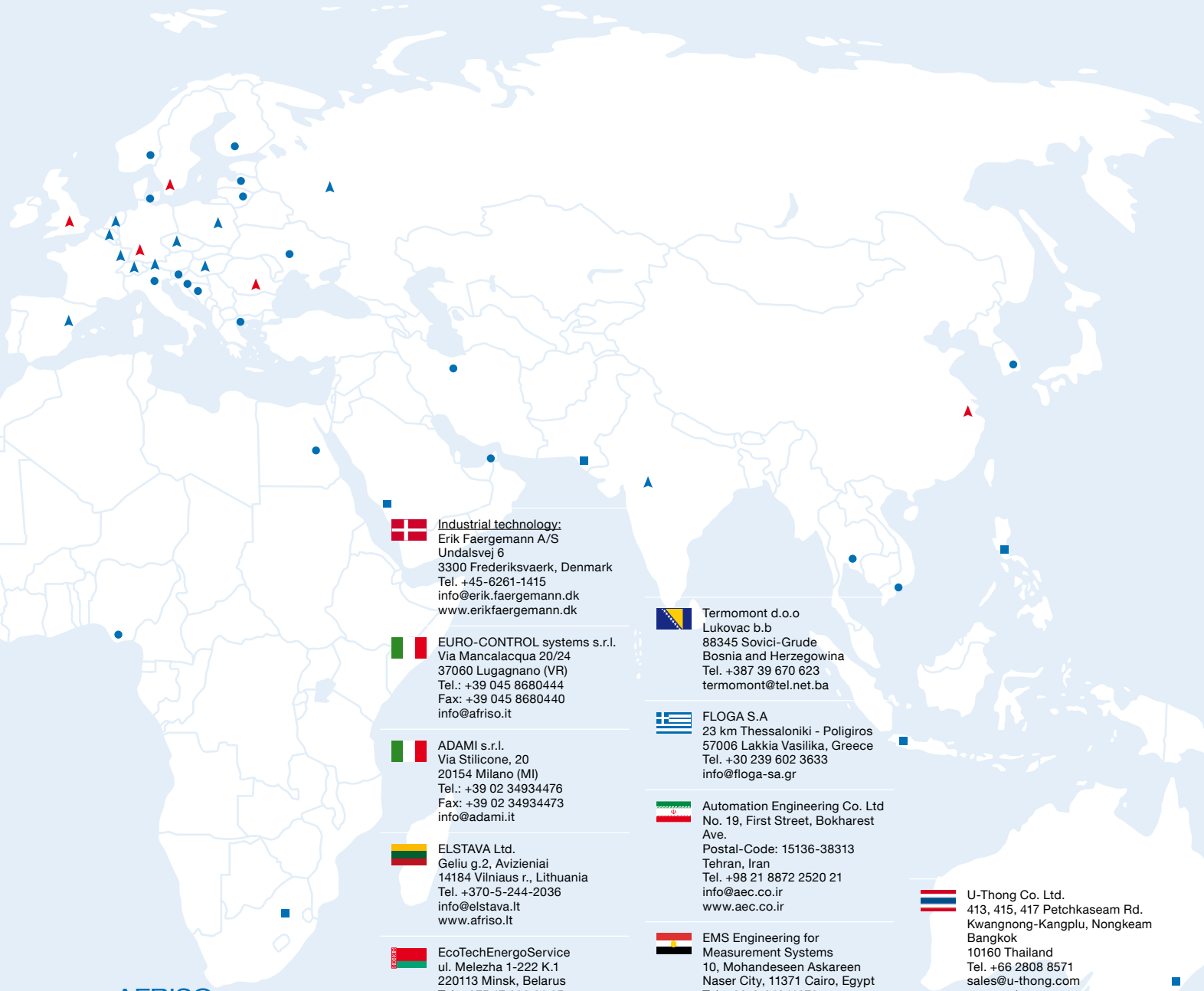
AFRISO



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Made in Germany

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74363 Güglingen
Baden-Württemberg

A staff of more than 550 are at work for you in our four German production sites.

Stocks and logistics

Maximum availability, short delivery times. Our range comprises more than 25,000 different products. More than 3,000 of them are on stock. A total of more than 1,500,000 individual devices and instruments are available ex stock.
The new logistics centre will start operations in 2021 as a global distribution centre to ensure fast access to AFRISO products with lean logistics processes.

AFRISO development centre
for portable measuring instruments

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

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

Plant Amorbach – Production of linings
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Von-Stein-Straße 17
63916 Amorbach
Odenwald/Bavaria

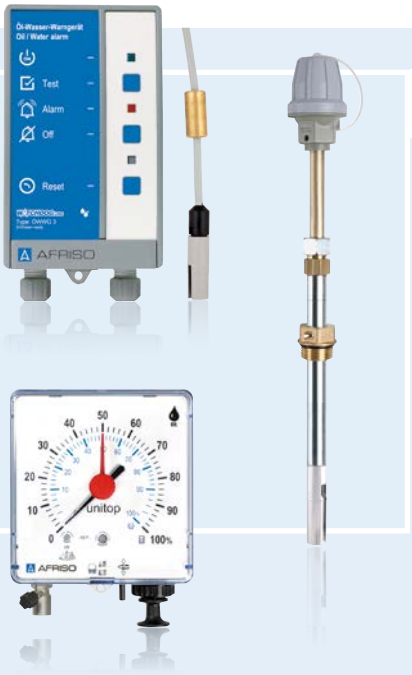
Alsenz plant
GAMPPER GmbH
Niedermoscheler Str. 2
67821 Alsenz
Rhineland-Palatinate

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
- Conservation of resources

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.

AFRISO provides "Safety for Heating Systems". With a comprehensive range of building technology products, AFRISO prides itself in "Making Heating Systems 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
- Smart home systems for building automation
- Valves and control technology for radiators and hydraulic balancing
- Equipment for drinking water supply

Gas analysis and service instruments

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
- Modular sensor module systems
- 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 0/4,000 bar
Temperature: -50 °C to +1,100 °C
Level: 0/20 cm to 0/250 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

Special designs and 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 control unit - ready for operation.

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, as-

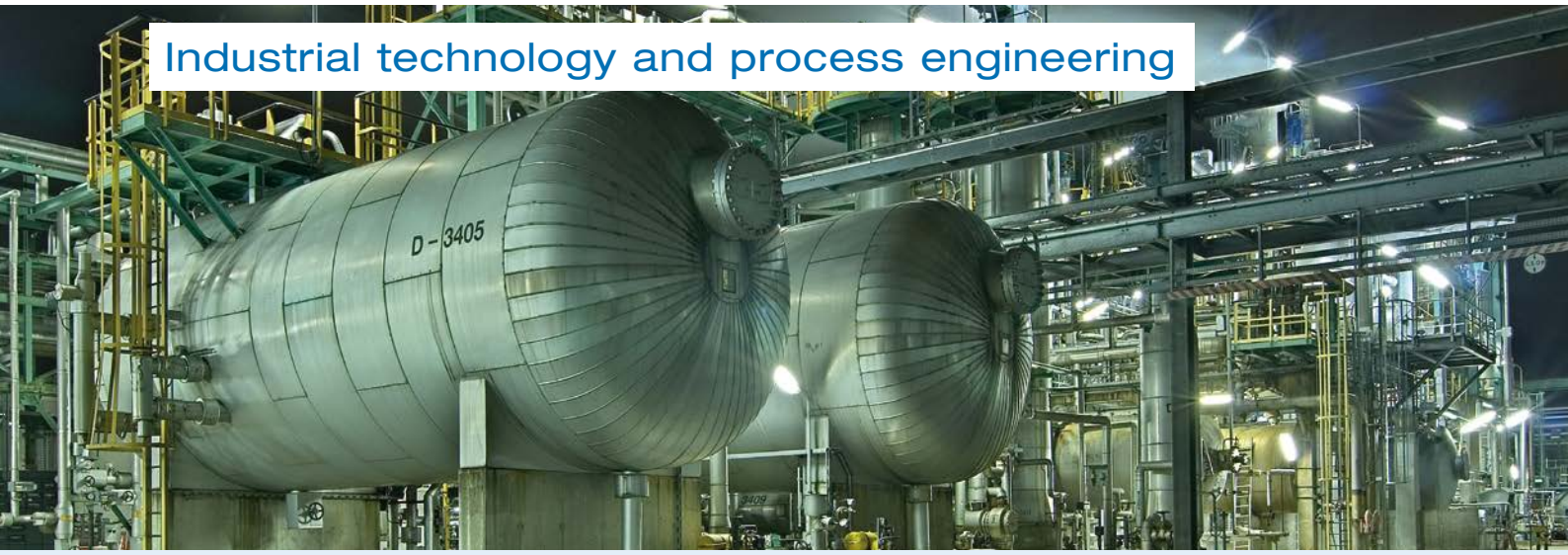
Building technology

The subject of saving energy has been our focus for more than 50 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 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. And we always respond to sustainable new technologies, for example, by providing compelling sensors and systems for increasing security and convenience in smart homes.

Target markets

- Manufacturer of heat generators
- Manufacturers of solar thermal systems
- System suppliers of surface heating systems
- Tank protection/revision
- Tank manufacturers
- Heating and plumbing system wholesalers
- Electrical wholesalers
- Engineering and planning consultancies
- Smart home and building automation
- Manufacturers of fittings
- Chimney sweeps
- Public institutions, municipalities

sociations 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.



Industrial technology and process engineering

Reliability, precision and a long service life are crucial when it comes to highly automated processes. Our robust measuring devices deliver perfect measurement results and reliably monitor and control simple to highly complex processes – even under the most adverse conditions. AFRISO solutions meet the pertinent 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
- Technical trade

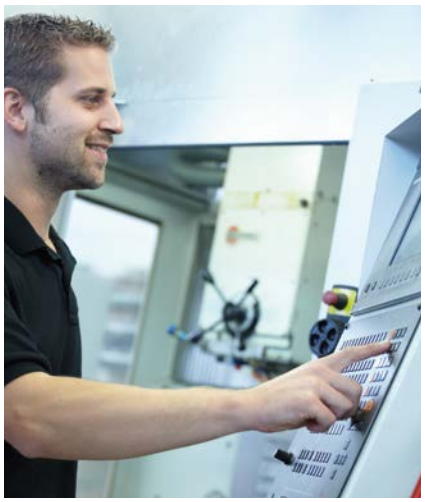
The guarantee for high-quality products.

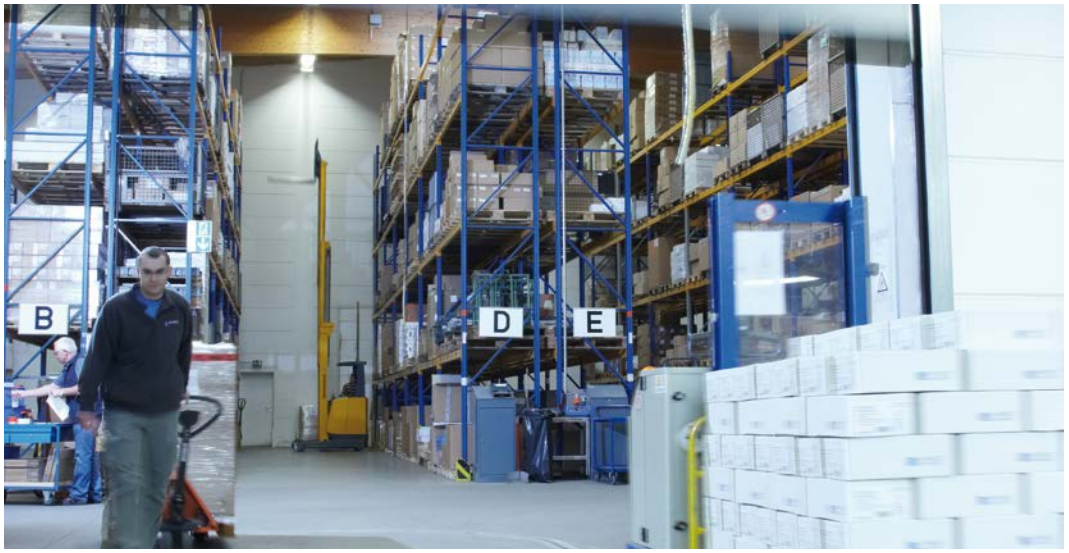
AFRISO quality

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. Numerous offers for ensuring an optimum work/life balance and continuous optimisation measures within the framework of the occupational health and safety management system 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 to by national and international approvals and certificates. Quality Assurance as per ISO 9001 and environmental management in accordance with ISO 14001 are a matter of course for us and implemented in every process.



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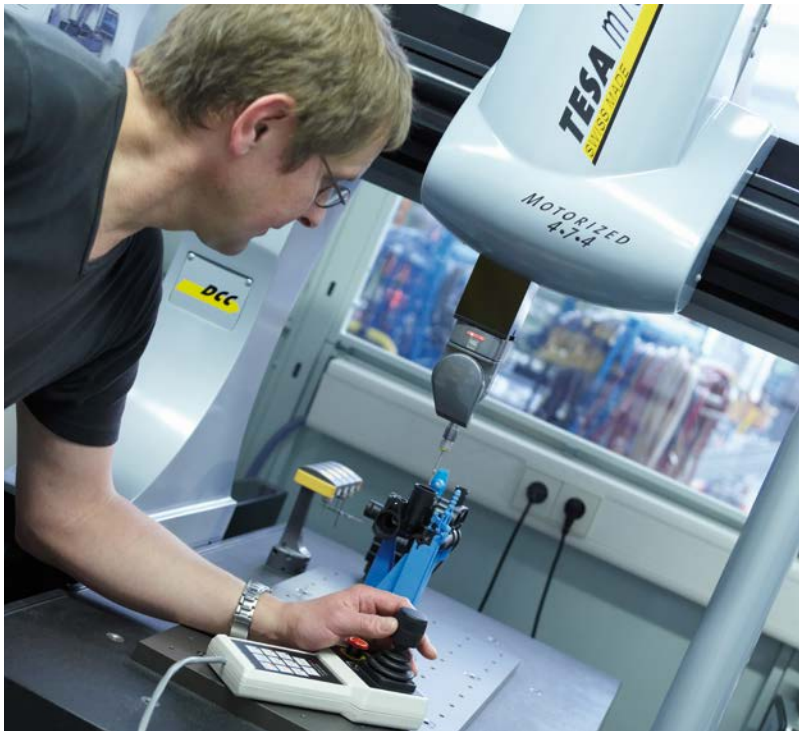
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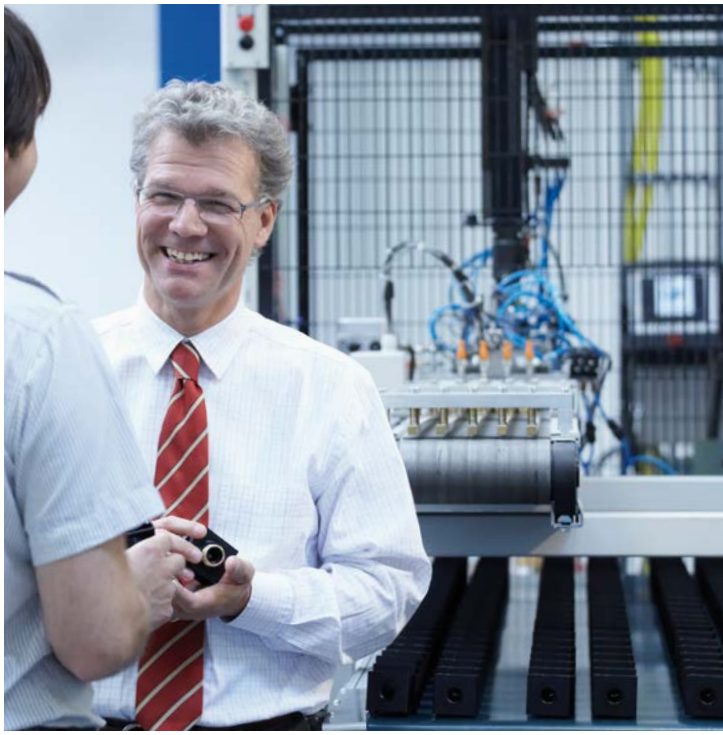
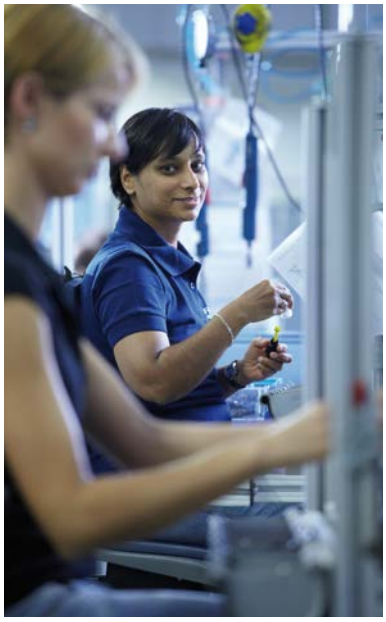




Success for more than 150 years.

Tradition and innovation perfectly in tune

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

In 1869, our great-grandfather Adelbert Fritz founded his company in Thuringia. When his son Franz Fritz, our grandfather, entered the company, the company name changed to "Adelbert Fritz & Sohn". AFRISO became a globally renowned brand for temperature and pressure measurement. For 50 years, the company focussed on glass thermometers, medical glass instruments and laboratory equipment; then, a small, thin-walled, circular and concentrically shaped metal sheet completely changed the AFRISO world in the 1920s. Two diaphragm half shells form a capsule element which expands or contracts depending on the pressure. This pioneering invention became the foundation for a host of innovative products: 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 in Württemberg. The capsule element was used in pneumatic level indicators which marked our entry to the fuel oil market. Back then, we developed overfill prevention systems and leak monitoring systems for the safe storage of mineral oil products, and technologies for environmental protection become the credo and mission for the future product portfolio. AFRISO secured the market leadership in this sector. Product development revolves around the motto "Technology for Environmental Protection" which is one of the key pillars of our corporate strategy.

Georg Fritz 1922 – 2004

Franz Fritz 1890 – 1968

Adelbert Fritz 1846 – 1918

The early 1960s marked the beginning of the internationalisation of AFRISO: sales and production companies were founded in almost all Western European countries. The oil crisis in 1973/1974 triggered the development of a comprehensive range of products for the efficient and environmentally friendly operation of heating systems. In 1972, we pioneered on the market with the first portable flue gas analyser and we have been a key driver in the development of mobile measurement technology ever since.

After the political change in Eastern Europe, subsidiaries were founded in Hungary, Romania, the Czech Republic, Poland, the Ukraine, Russia and China. Today, the AFRISO family comprises 19 branches. Together with more than 20 representations, we offer our customers optimum consulting and superior supplier's reliability all over the globe.

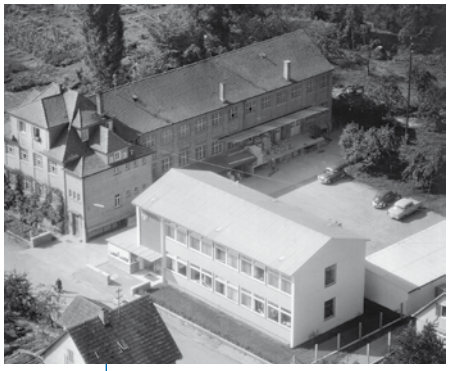
We are now the fourth Fritz generation to lead the company. We are very well aware of the benefits of a medium-sized company with a long tradition of innovation, run by its owners. The value of a handshake still applies in a figurative sense, and this is something everyone can count on – employees, suppliers and customers. For us, the past is not a closed chapter but an incentive to constantly adapt to changing market requirements. After more than 150 years, we are embracing a promising future, which we would like to shape with trend topics such as "smart home".

Elmar Fritz

Jürgen Fritz

AFRISO milestones

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



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

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

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

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

1869 1920 1950 1955 1958 1960 1972 1974

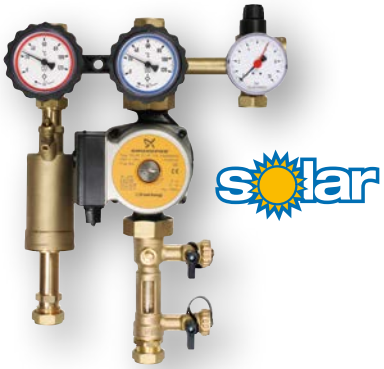
A new era begins: Production of capsule elements as the basis for precision pressure gauges, blood pressure measurement devices and temperature controllers.

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.

Market launch: Product portfolio for solar thermal systems.



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

Industry focus: Pressure transducer range DMU 02 Vario with high-flexibility connection technology.

Internationalisation: Founding of subsidiaries in Eastern Europe and Russia.

1981 1994 1996 2006 2008 2009 2011

Market launch of the first compact manifold made of plastic.

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

Innovation: AFRISO presents the EUROLYZER ST, the first all-in-one flue gas analyser.

Market launch: Product range for hydraulic balancing.

Expansion and new brand identity of the AFRISO group

- New company logo launched:

AFRISO

Measurement technology a step ahead: Modular sensor system AFRISO CAPBs® for BlueLine measuring instruments, smartphones and tablets.

Anniversary year
The family-owned company AFRISO celebrates its birthday.
www.afriso.de/150jahre

150 JAHRE

2012 2014 2016 2017 2019

Wireless AFRISO smart home system for building automation.

Turnkey solutions for air pollution control:
New limit value for air pollution control force naval operators to retrofit their vessels with exhaust gas cleaning systems. "Scrubbers" ensure compliance with the limit values – AFRISO emission control systems monitor, document and transfer the values to the vessel's control room.

Catalogue Industrial Technology

2021/2022

Capsule pressure gauge

Pressure gauges for special applications

Diaphragm pressure gauge

Bourdon tube pressure gauge

CHAPTER 1

Mechanical pressure measuring instruments (pressure gauges)

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Mechanical pressure measuring instruments at a glance

1

		Standard capsule pressure gauges	Capsule pressure gauges for chemical applications	Standard Bourdon tube pressure gauges/ Bourdon tube pressure gauges for industrial applications	Stainless steel Bourdon tube pressure gauges/Bourdon tube pressure gauges for chemical applications
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 -1,000/0 mbar	Ranges	•	•	**• (-1 bar)**	**• (-1 bar)**
0/25 mbar to 0/1,000 mbar		•	•		
0/0.6 bar to 0/1,600 bar				**• (max. 1,000 bar)**	•
0/2,500 bar to 0/4,000 bar					**Pressure gauges for high pressures**
0/10 mbar to 0/25 bar					
≥ Class 1.6	Accuracy	•	•	•	•
≥ Class 1.0		•**		•	•
≥ Class 0.6				**Precision pressure gauges**	**Precision pressure gauges**
≥ Class 0.25				**Precision pressure gauges**	
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					**Safety pressure gauges**
Electrical contact				•**	•**
Overload safety 10 x FSD		•			
Back flange		•	•	•	•
Clamp fixing		•	•	•	•
3-hole fixing, panel mounting bezel		•	•	•	•
Damping screw		•	•	•	•
Reference pointer		•	•	•	•
Maximum pointer		**≥ 250 mbar**	**≥ 250 mbar**	•	•
Special scale		•	•	•	•
Bezel for panel mounting				•	•
		Page 7	**Page 16**	**Page 21/32**	**Page 52/55**

* Only in connection with chemical seal.
** Depending on version.

			 MF MFW	
Standard diaphragm pressure gauges	Stainless steel diaphragm pressure gauges/pressure gauges for chemical applications	Standard spring-diaphragm pressure gauges for differential pressure	Spring-diaphragm pressure gauges for chemical applications for differential pressure	Magnetic piston pressure gauges for differential pressure
				•
•	•	•	•	•
•	•			
•	•	•	•	
				•
•	•	(0/250 mbar, 6 bar)	(0/250 mbar, 25 bar**)	(0/0.25 bar, 0/10 bar)
•	•	±2.5 % FS	±2.5 % FS	±3 % FS
		•	•	• (-20/+80 °C)
•	•			
•	•			
		•	•	•
•	•	•	•	•
•	•	•	•	•
•**	•**			
		•	•	•
•	•	•	•	•
•	•	•	•	•
•**	•**			
•	•		•**	•
•**	•**	Up to 25 bar at both sides		•**
		•	•**	
				•
		•	•	
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
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Pressure gauges – Mechanical pressure measuring instruments with elastic measuring elements

1

Bourdon tube pressure gauge

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 a maximum of 60 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 1,000 bar.

Capsule pressure gauge

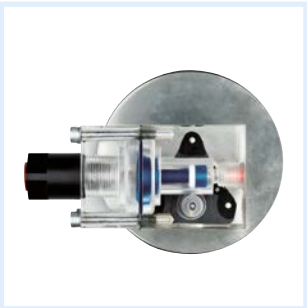
Capsule pressure gauges are used in gas technology applications for low pressure ranges. Two concentrically shaped diaphragms are connected at the outer edges by means of welding or soldering. One diaphragm has an opening in the centre through which the gas to be measured can flow in. The pressure in 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. As early as in the 1920s, 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 gauge

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. Diaphragm pressure gauges are used for liquids that are not highly viscous and for differential pressure from 250 mbar to 25 bar.



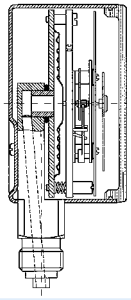
Magnetic piston and magnetic diaphragm pressure gauges

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
- GOSSTANDART-certified



A
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Application

For gaseous, dry media which do not attack copper alloys.

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 0/1,000 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
NG 63-80: IP 33 (EN 60529)
NG 100: IP 44 (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 (D3)
- 3-hole fixing, panel mounting bezel
- Measuring system stainless steel (NG 100)
- Damping screw
- Reference pointer
- Special scales
- Other process connections

i
See page 11 for prices.

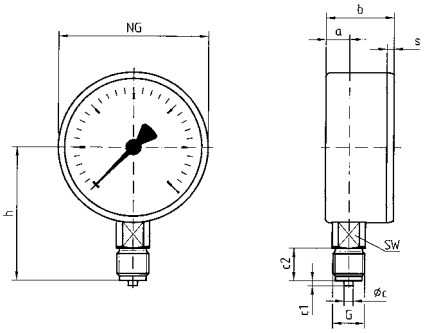
Standard capsule pressure gauges

Type D 2/D 3 – NG 63/80/100

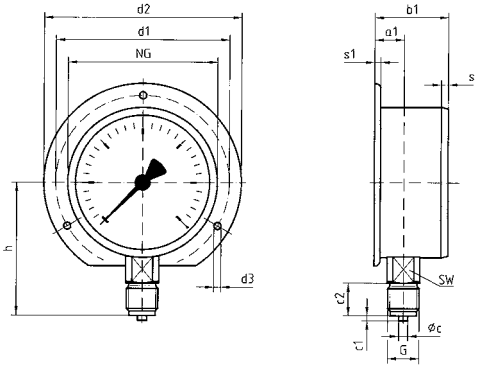
1

Housing types and dimensions

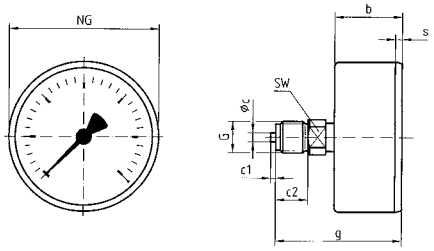
Bottom connection



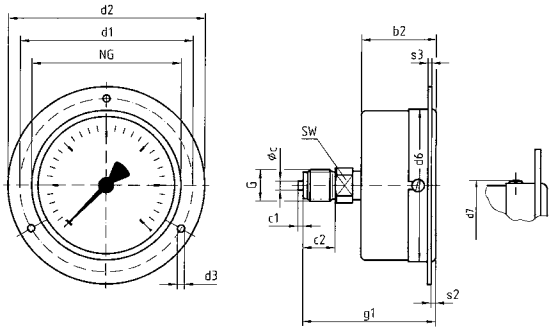
Bottom connection, back flange



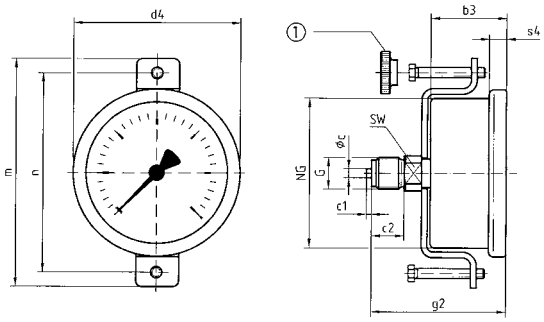
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel

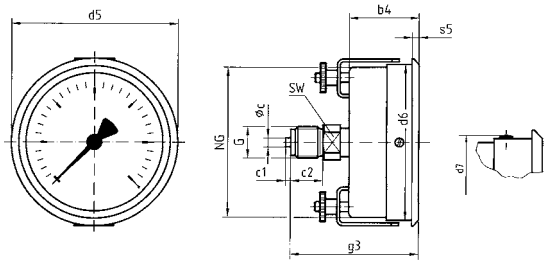


Centre back connection, crimped bezel housing with clamp fixing, NG 63



① Rotary knob

Centre back connection, panel mounting bezel with 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	-

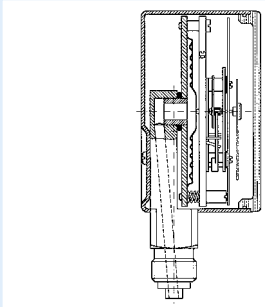
Nominal size (NG)	g3	h	m	n	s	s1	s2	s3	s4	s5	SW
63	-	52.7	94	82	3.7	5.5	3	2	7	4	14
80	78	69	-	-	3.8	5.5	3.5	2	-	4.5	22
100	79	87	-	-	3.5	5.5	3.5	2	-	4.5	22

* Dimensions for NG 100 according to DIN 16014.

Standard capsule pressure gauges

EN 837-3

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



A

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1

Application

For gaseous, dry media which do not attack copper alloys.

Technical specifications

Type
D 4

Nominal size
63 – 100 – 160

Accuracy class (EN 837-3/6)
1.6 (25 to 1,000 mbar)
4 at NG 160 (6 to 16 mbar)

Ranges (EN 837-3/5)
NG 63-100: 0/25 to 0/1,000 mbar
NG 160: 0/6 to 0/1,000 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
NG 63-160: IP 33 (EN 60529)
NG 100: IP 54 (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 type bezel
Stainless steel 304

Window
Instrument glass
Panel mounted devices (types D 431/451):
Plastic (PMMA)

Options

- Overpressure and underpressure safety 10 x FSD
- Back flange
- Panel mounting bezel, with window, plastic
- 3-hole fixing, panel mounting bezel with window, plastic
- Damping screw
- Reference pointer
- Special scales
- Other process connections

i

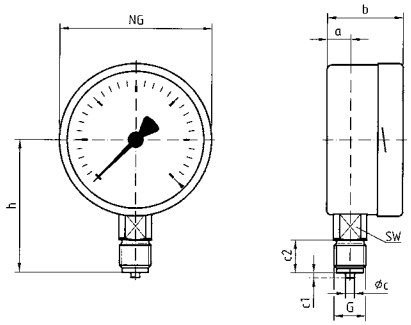
See page 14 for prices.

Standard capsule pressure gauges

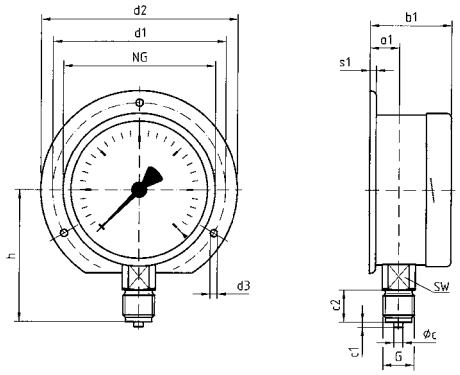
Type D 4 – NG 63/100/160

1 Housing types and dimensions

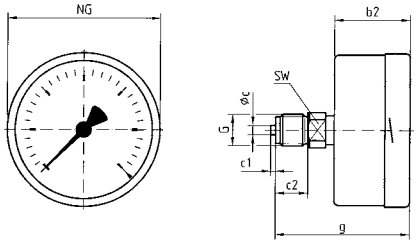
Bottom connection



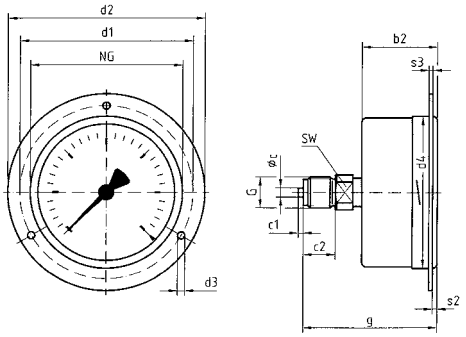
Bottom connection, back flange



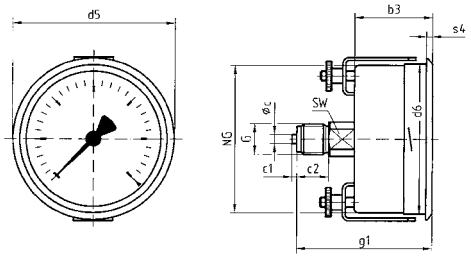
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel with 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

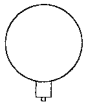
Nominal size (NG)	s3	s4	SW
63	2	3	14
100	2	4	22
160	2	4.5	22

* Dimensions for NG 100 according to DIN 16014.

Standard capsule pressure gauges

EN 837-3

DG: M, PG: 2

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
-1,000/0	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
0/1,000	**35024201**	35024211	35074201

Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

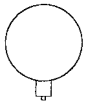
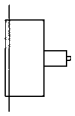
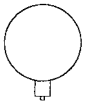
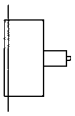
See page 20 for extra charges.

Standard capsule pressure gauges

EN 837-3

1

DG: M, PG: 2

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
-1,000/0	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
0/1,000	**35124201**	35124211	35124221	35024301	35024311	35024331	35024351

Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

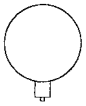
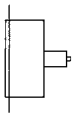
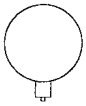
i

See page 20 for extra charges.

Standard capsule pressure gauges

EN 837-3

DG: M, PG: 2

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, with 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
-1,000/0	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
0/1,000	35074301	35074311	35074331	35074351	35124301	35124311

Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

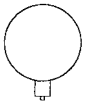
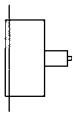
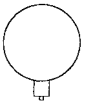
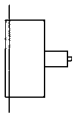
See page 20 for extra charges.

Standard capsule pressure gauges

EN 837-3

1

DG: M, PG: 2

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, window, see data sheet							
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, with clamp fixing			3-hole fixing, panel mounting bezel 304 polished	Panel mounting bezel, 304, polished, with 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
-1,000/0	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
0/1,000	35024401	35024411	35024431	35024451	35124401	35124411	35124431	35124451

Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

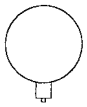
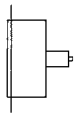
i

See page 20 for extra charges.

Standard capsule pressure gauges

EN 837-3

DG: M, PG: 2

Type	KP160, D401	KP160, D411	KP160, D431	KP160, D451
Version				
Housing Ø	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel			
Measuring element	Capsule element, CuBe alloy			
Accuracy class	1.6*	1.6*	1.6*	1.6*
Connection	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, with clamp fixing
Range (mbar)	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
-40/0	35155401	35155411	35155431	35155451
-60/0	35156401	35156411	35156431	35156451
-100/0	35157401	35157411	35157431	35157451
-160/0	35158401	35158411	35158431	35158451
-250/0	35159401	35159411	35159431	35159451
-400/0	35160401	35160411	35160431	35160451
-600/0	35161401	35161411	35161431	35161451
-1,000/0	35162401	35162411	35162431	35162451
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
0/40	35167401	35167411	35167431	35167451
0/60	35168401	35168411	35168431	35168451
0/100	35169401	35169411	35169431	35169451
0/160	35170401	35170411	35170431	35170451
0/250	35171401	35171411	35171431	35171451
0/400	35172401	35172411	35172431	35172451
0/600	35173401	35173411	35173431	35173451
0/1,000	35174401	35174411	35174431	35174451

* ≤ 16 mbar = accuracy class 4

Blue part no. = in-stock items

Minimum order quantity for non-stock items = 10 pieces.

See page 20 for extra charges.

Capsule pressure gauges for chemical applications EN 837-3

1

- With zero correction
- Robust stainless steel housing (with bayonet bezel)
- Wetted parts and movement made of stainless steel
- GOSSTANDART-certified
- ATEX version (optional)

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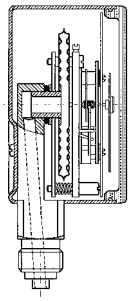


Application

For corrosive gaseous and dry media, also for use in corrosive environments.

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 0/1,000 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 type bezel
Stainless steel 304

Window
Laminated safety glass
Panel mounted devices (types D 432/452):
Plastic (PMMA)

Options

- Back flange
- Panel mounting bezel
- 3-hole fixing, panel mounting bezel
- ATEX version
- Damping screw
- Special scales
- Other process connections

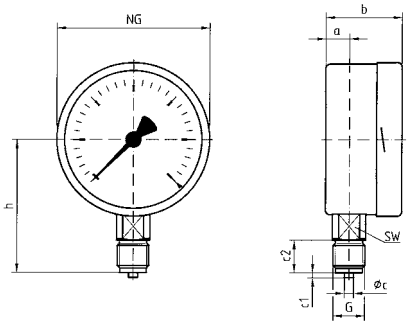
i
See page 18 for prices.

Capsule pressure gauges for chemical applications

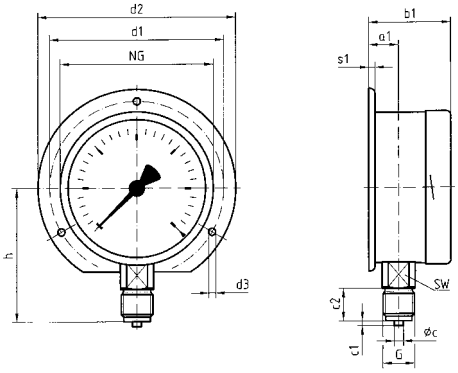
Type D 4 – NG 63/100/160

Housing types and dimensions

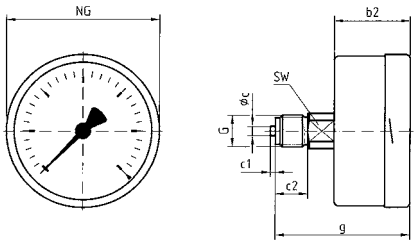
Bottom connection



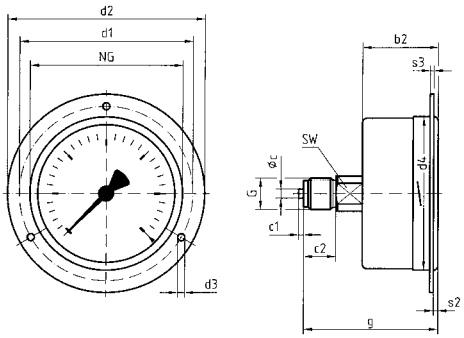
Bottom connection, back flange



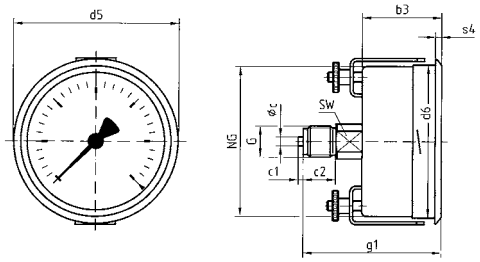
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel with 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

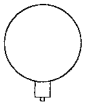
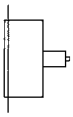
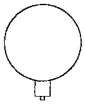
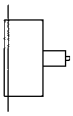
* Dimensions for NG 100 according to DIN 16014.

Capsule pressure gauges for chemical applications

EN 837-3

1

DG: M, PG: 3

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, window, see data sheet							
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 with clamp fixing			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.	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
-1,000/0	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
0/1,000	35024402	35024412	35024432	35024452	35124402	35124412	35124432	35124452

Minimum order quantity for non-stock items = 10 pieces.

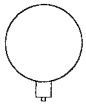
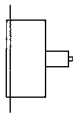
Blue part no. = in-stock items

See page 20 for extra charges.

Capsule pressure gauges for chemical applications

EN 837-3

DG: M, PG: 3

Type	KP160Ch, D402	KP160Ch, D412	KP160Ch, D432	KP160Ch, D452
Version				
Housing Ø	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel, window, see data sheet			
Measuring element	Capsule element, stainless steel 316 Ti/316 L			
Accuracy class	1.6	1.6	1.6	1.6
Connection	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.
Price €				
-25/0	35154402	35154412	35154432	35154452
-40/0	35155402	35155412	35155432	35155452
-60/0	35156402	35156412	35156432	35156452
-100/0	35157402	35157412	35157432	35157452
-160/0	35158402	35158412	35158432	35158452
-250/0	35159402	35159412	35159432	35159452
-400/0	35160402	35160412	35160432	35160452
-600/0	35161402	35161412	35161432	35161452
-1,000/0	35162402	35162412	35162432	35162452
Price €				
0/25	35166402	35166412	35166432	35166452
0/40	35167402	35167412	35167432	35167452
0/60	35168402	35168412	35168432	35168452
0/100	35169402	35169412	35169432	35169452
0/160	35170402	35170412	35170432	35170452
0/250	35171402	35171412	35171432	35171452
0/400	35172402	35172412	35172432	35172452
0/600	35173402	35173412	35173432	35173452
0/1,000	35174402	35174412	35174432	35174452

Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

See page 20 for extra charges.

Extra charges for capsule pressure gauges

1

DG: M

Housing diameter (mm)	PG	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)	2	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)	2	38197	---	38199	38200
Accuracy class 1.0 (only for Ms/CuBe measuring systems)	-	---	---	38180	38181
3-hole fixing, panel mounting bezel, stainless steel 304 (only for gauges with bayonet bezel, also for bottom connection)	3	37608	---	37609	37610
Back flange, stainless steel 304, bare metal surface (only for gauges with stainless steel housing)	3	38048	38049	38050	38051
Housing stainless steel 304 polished	-	37611	37612	37613	37614
Bayonet bezel stainless steel 304 polished	-	38052		38053	38055
Laminated safety glass window (only for gauges with bayonet bezel)	-	38072		38074	38075
Connection socket nickel-plated	3	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)	2	38097	38098	38099	38100
Damping screw stainless steel 316 Ti – hole 0.3 – 0.5 – 0.7 mm (please specify)	3	38103	38104	38105	38106
Red mark on dial	-	38184	38185	38186	38187
1 reference pointer red – external screwdriver adjustment (window = plastic)	1	38115	38116	38117	---
1 reference pointer red – external rotary knob adjustment (window = plastic)	1	38188	38189	38190	38191
Max pointer – for ranges greater than 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)	1	38127	38128	38129	38130
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/water filling, only for pressure gauges for chemical applications with positive ranges ≥ 60 mbar, accuracy class 2.5 at increasing pressure	-	37619	---	37620	37621
Higher degree of protection IP 54 (only for gauges with bayonet bezel)	1	---	---	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

Minimum order quantity for non-stock items = 10 pieces

Blues part no. = in-stock items

i

See the overview "Accessories for panel mounting and wall mounting" on page 150.

Standard Bourdon tube pressure gauges

EN 837-1

- For pneumatic and heating system applications
- 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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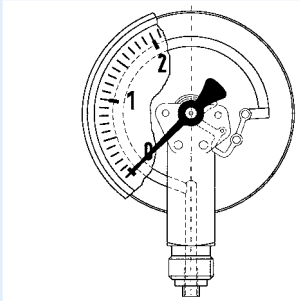


1

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, observe 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

i

See the catalogue DOMESTIC TECHNOLOGY for special heating and sanitary versions.

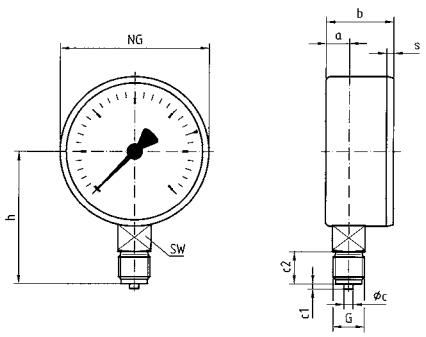
See page 28 for prices.

Standard Bourdon tube pressure gauges

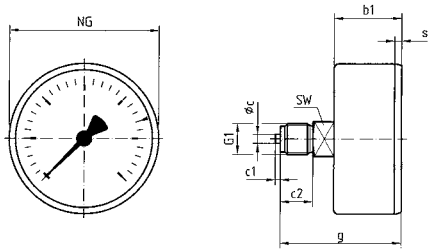
Type D 1 – NG 40/50/63/80/100

1 Housing types and dimensions

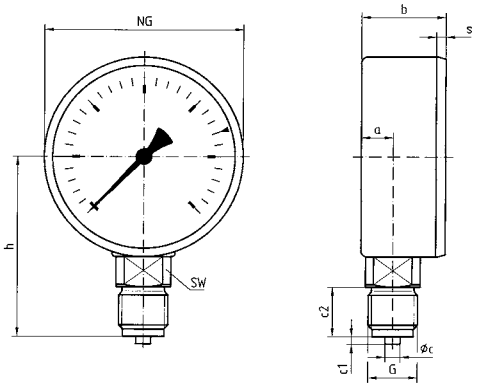
NG 40/50/63 – bottom connection



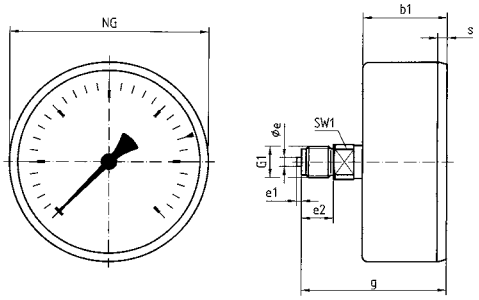
NG 40/50/63 – centre back connection



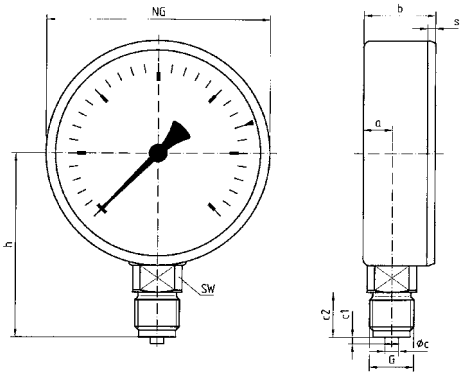
NG 80 – bottom connection



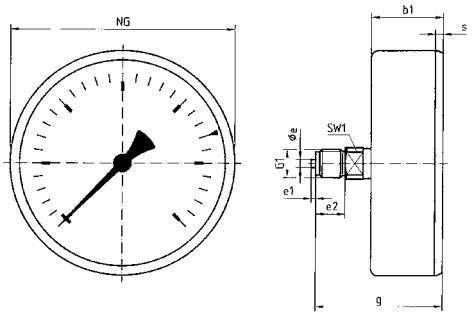
NG 80 – centre back connection



NG 100 – bottom connection



NG 100 – centre back connection



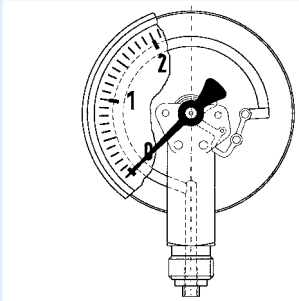
Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	Øe	e1	e2	g	G	G1	h	s	SW	Spanner size SW1
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
- Robust steel or stainless steel housing
- Accuracy class 1.6
- Many customised versions available



A
Page 151

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, observe 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
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Special scales
- Other process connections

i

See the catalogue DOMESTIC TECHNOLOGY for special heating and sanitary versions.

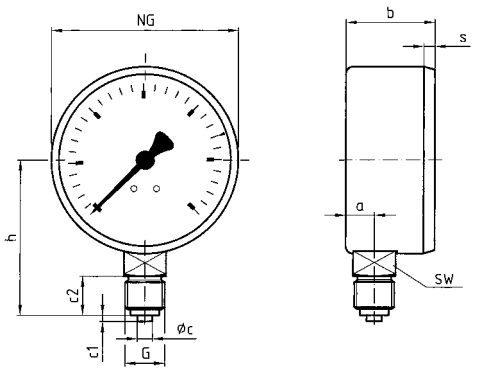
See page 29 for prices.

Standard Bourdon tube pressure gauges

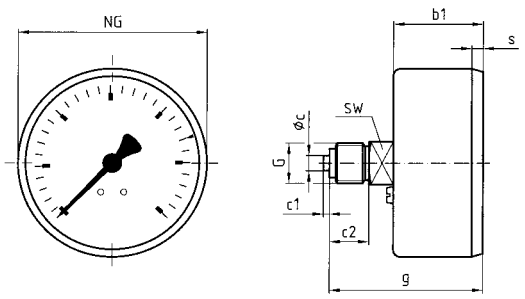
Type D 2/D 3 – NG 40/50/63

1 Housing types and dimensions

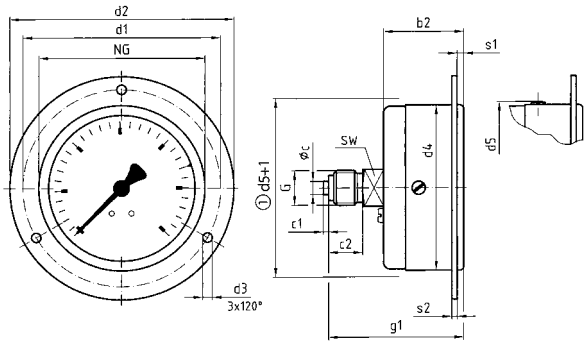
Bottom connection



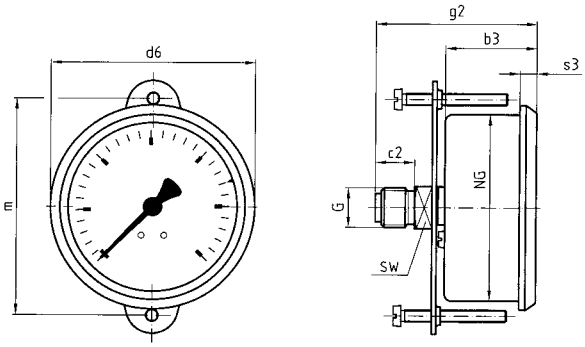
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel with clamp fixing



① Panel cut-out

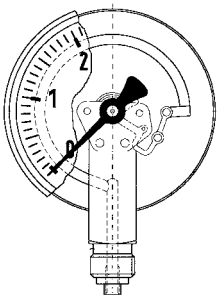
Dimensions (mm)

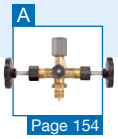
Nominal size (NG)	a	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	g	g1	g2	G	h	m
40	8.5	23.5	25	26	28	4	2	10	51	61	3.6	41	45	44	41.5	42.5	46.6	G⅛B	36	50
50	10.5	26	26	27.5	30.3	5	2	13	60	71	3.6	50	54	54	47	49	51.3	G¼B	45	58
63	9.5	29.4	29.4	30.3	30.3	5	2	13	75	85	3.6	63	66.5	67.8	50.4	51.3	53.3	G¼B	51.5	72

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 mechanical engineering applications
- Robust steel housing
- Window with adjustable reference pointer
- Many customised versions available




A
Page 154

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, observe 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, with adjustable red reference pointer

Options

- Stainless steel housing (NG 100)
- Push on bezel
- Instrument glass window
- Damping screw
- Special scales
- Other process connections

i

See the catalogue DOMESTIC TECHNOLOGY for special heating and sanitary versions.

See page 30 for prices.

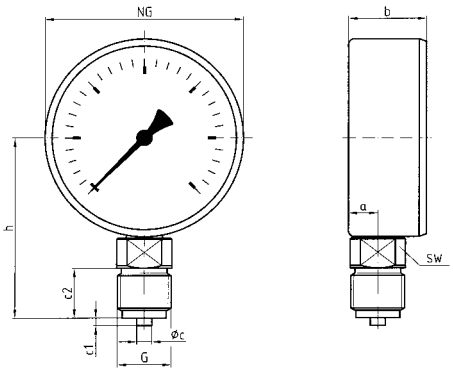
Standard Bourdon tube pressure gauges

Type D 2 – NG 80/100

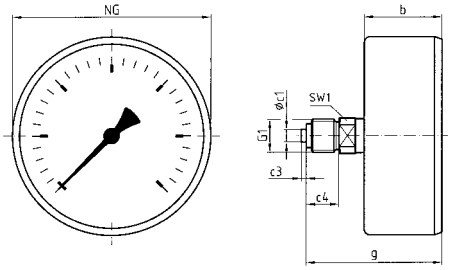
1

Housing types and dimensions

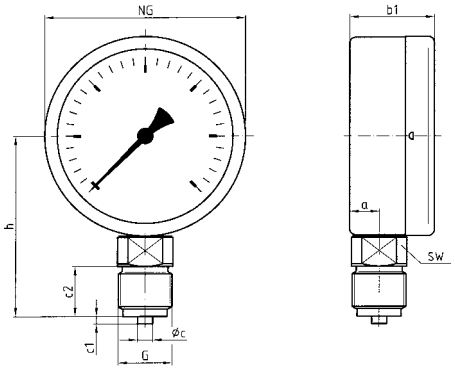
Bottom connection



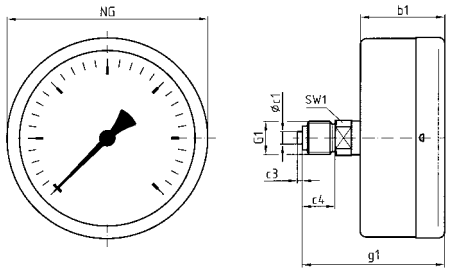
Centre back connection



Bottom connection, with push on bezel



Centre back connection, with push on bezel

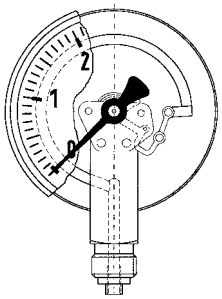


Dimensions (mm)

Nominal size (NG)	a	b	b_1	Øc	c_1	c_2	Øc1	c_3	c_4	g	g_1	G	G1	h	SW	Spanner size 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 mechanical engineering applications
- With reference pointer on dial
- Robust steel housing
- Many customised versions available



A
Page 154

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, observe 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 0/40 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

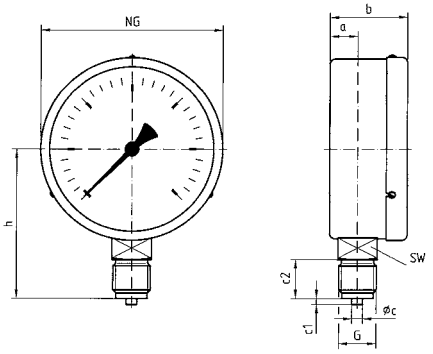
Pointer
Aluminium, black

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
- Special scales
- Other process connections

i

See the catalogue DOMESTIC TECHNOLOGY for special heating and sanitary versions.

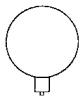
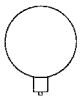
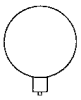
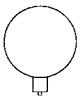
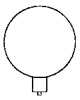
See page 30 for prices.

Standard Bourdon tube pressure gauges

EN 837-1

1

DG: M, PG: 2

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.

Blue part no. = in-stock items

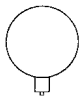
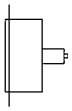
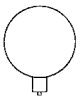
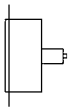
See page 31 for extra charges.

Standard Bourdon tube pressure gauges

EN 837-1

DG: M, PG: 2

1

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, stainless steel	Panel mounting bezel stainless steel, polished, with clamp fixing			3-hole fixing, panel mounting bezel, stainless steel	Panel mounting bezel stainless steel, polished, with 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.

Blue part no. = in-stock items

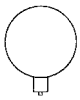
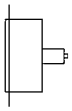
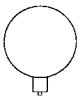
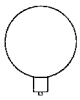
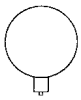
See page 31 for extra charges.

Standard Bourdon tube pressure gauges

EN 837-1

1

DG: M, PG: 2

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, stainless steel	Panel mounting bezel stainless steel, polished, with 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	---
0/100	85120201	85120211	85120231	85120251	85170201	85220201	85220211	---
0/160	85121201	85121211	85121231	85121251	85171201	85221201	85221211	---
0/250	85122201	85122211	85122231	85122251	85172201	85222201	85222211	---
0/400	85123201	85123211	85123231	85123251	85173201	85223201	85223211	---

* Dual scale, bar outer, black – psi inner, red.
Minimum order quantity for non-stock items = 100 pieces (RF 160, D 201 = 10 pieces)

Blue part no. = in-stock items

i

See page 31 for extra charges.

Extra charges* for standard Bourdon tube pressure gauges

DG: M

Housing diameter (mm)	PG	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	3	38064	38065	38066	---	---	---
Push on bezel nickel-plated	3	38250	38251	38252	38253	38254	---
Housing stainless steel 304, vibratory-finished (extra charge, instead of steel housing)	3	38256	38257	38258	---	38300	---
Housing stainless steel 304, polished (extra charge, instead of steel housing)	3	38259	38260	38261	---	38314	---
Push on bezel stainless steel 304, polished	3	38262	38263	38264	---	---	---
Connection socket nickel-plated	3	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)	2	38095	38096	38097	38098	38099	38100
Red mark on dial	-	38182	38183	38184	38185	38186	38187
1 reference pointer, red, printed on window	1	38315	38316	38109	Standard	Standard	---
2 reference pointers, red, on dial, adjustable	1	---	---	---	---	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.

Blue part no. = in-stock items

Spare windows for standard Bourdon tube pressure gauges

DG: M, PG: 1

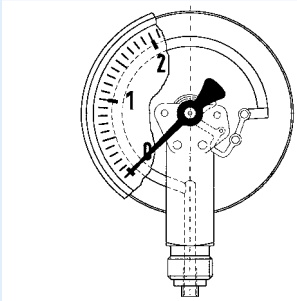
Housing diameter (mm)	40	50	63	80	100	160
Description	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Plastic window, clip-in, for plastic housing	38285	38271	38272	38273	38274	---
Plastic window, clip-in, for steel housing	38275	38276	38277	38317	38318	---
Instrument glass window	---	---	---	38278	38279	38280

Blue part no. = in-stock items

Bourdon tube pressure gauges for industrial applications EN 837-1

1

- For machine and plant engineering
- Robust steel or stainless steel housing
- Many customised versions available



A

Page 154

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, observe 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 0/1,000 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 bottom 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

- Damping screw
- Reference pointer
- Electrical contacts
- Special scales
- Other process connections

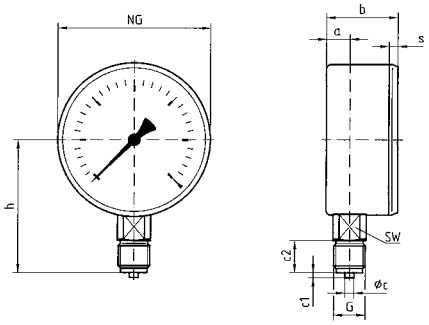
i

See page 34 for prices.

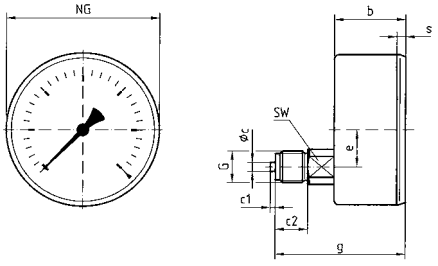
Bourdon tube pressure gauges for industrial applications Type D 2 / D 3 – NG 100

Housing types and dimensions

Bottom connection



Centre back connection



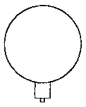
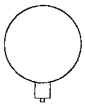
Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1	c2	e	G	g	h	s	SW			
100	15.6	44	6	3	20	26.5	G½B	76	86	3.5	22			

Bourdon tube pressure gauges for industrial applications EN 837-1

1

DG: M, PG: 2

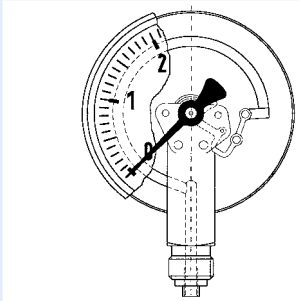
Type	RF100 I, D201	RF100 I, D211	RF100 I, D301	RF100 I, D311
Version				
Housing Ø	100	100	100	100
Housing	Black sheet steel, plastic, clip-in window		Stainless steel 304, plastic clip-in window	
Measuring element	Bourdon tube, copper alloy (> 60 bar stainless steel 316 Ti/316 L)			
Accuracy class	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B
Range (bar)	Part no.	Part no.	Part no.	Part no.
Price €				
-1/0	85301201	85301211	85301301	85301311
-1/+0.6	85302201	85302211	85302301	85302311
-1/+1.5	85303201	85303211	85303301	85303311
-1/+3	85304201	85304211	85304301	85304311
-1/+5	85305201	85305211	85305301	85305311
-1/+9	85306201	85306211	85306301	85306311
-1/+15	85307201	85307211	85307301	85307311
Price €				
0/0.6	85309201	85309211	85309301	85309311
0/1	85310201	85310211	85310301	85310311
0/1.6	85311201	85311211	85311301	85311311
0/2.5	85312201	85312211	85312301	85312311
0/4	85313201	85313211	85313301	85313311
0/6	**85314201**	85314211	85314301	85314311
0/10	**85315201**	85315211	85315301	85315311
0/16	85316201	85316211	85316301	85316311
0/25	85317201	85317211	85317301	85317311
0/40	85318201	85318211	85318301	85318311
Price €				
0/60	85319201	85319211	85319301	85319311
0/100	85320201	85320211	85320301	85320311
0/160	85321201	85321211	85321301	85321311
0/250	85322201	85322211	85322301	85322311
0/400	85323201	85323211	85323301	85323311
Price €				
0/600	85324201	85324211	85324301	85324311
0/1,000	85325201	---	85325301	---

Minimum order quantity for non-stock items = 10 pieces. **Blue part no.** = in-stock items

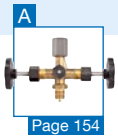
See page 74 for extra charges.

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



A



Page 154

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, observe 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 0/1,000 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 = ²/₃ 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 bottom 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 type bezel
Stainless steel 304

Window
Instrument glass

Options

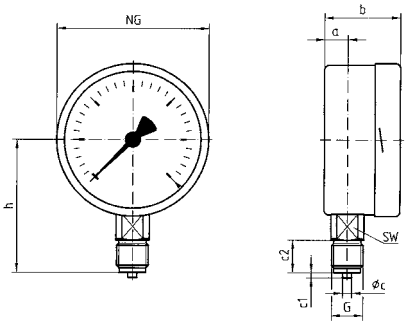
- Nominal size 250 (bottom connection)
- Back flange
- Panel mounting bezel
- 3-hole fixing, panel mounting bezel
- Laminated safety glass window
- Damping screw
- Reference pointer
- Electrical contacts
- Special scales
- Other process connections

See page 37 for prices.

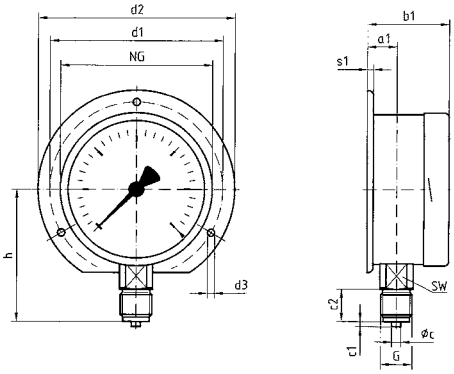
Bourdon tube pressure gauges for industrial applications Type D 4 – NG 100/160

1 Housing types and dimensions

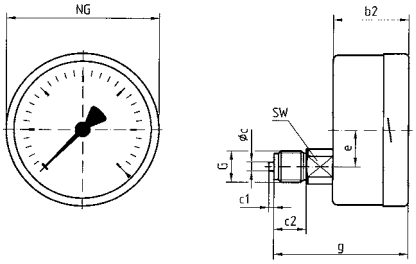
Bottom connection



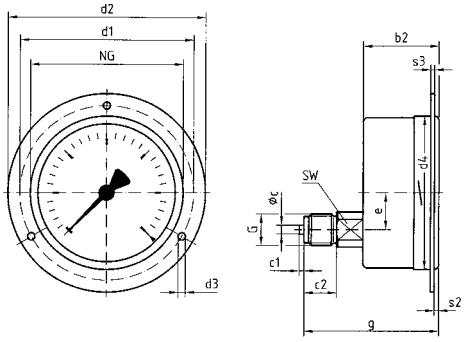
Bottom connection, back flange



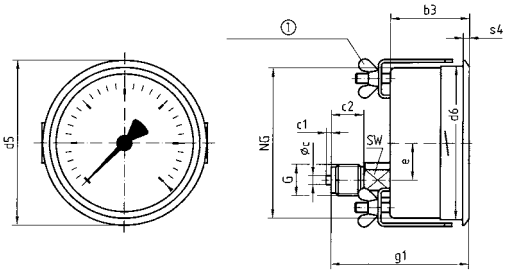
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel with clamp fixing



① 90° drawn staggered

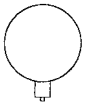
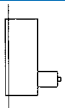
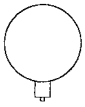
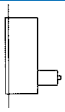
Dimensions (mm)

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, PG: 2

Type	RF100 I, D401	RF100 I, D411	RF100 I, D431	RF100 I, D451	RF160 I, D401	RF160 I, D411	RF160 I, D431	RF160 I, 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, with clamp fixing			3-hole fixing, panel mounting bezel 304 polished	Panel mounting bezel, 304, polished, with 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
0/1,000	85325401	85325411	85325431	85325451	85375401	85375411	85375431	85375451
Extra charge €								
Nominal size 250	---	---	---	---		---	---	---

Minimum order quantity for non-stock items = 10 pieces.

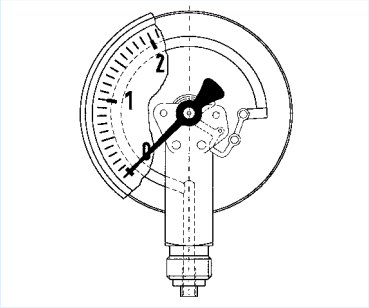
See page 74 for extra charges.

Blue part no. = in-stock items

Glycerine filled Bourdon tube pressure gauges EN 837-1

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)
0/1 bar to 0/400 bar
-1/0 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

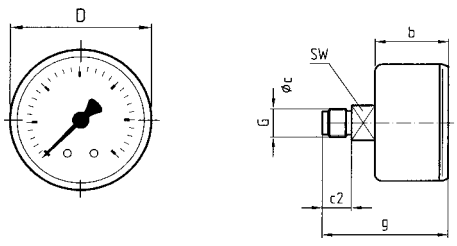
Pointer
Plastic, black

Housing
Plastic (ABS), black, with blow-out

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

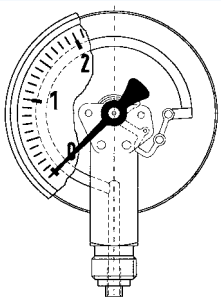
Options

- Special scales
- Damping screw
- Other process connections

i See page 41 for prices.

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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Page 154

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, observe 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
Aluminium, black

Housing
Polyamide black
With blow-out

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

i

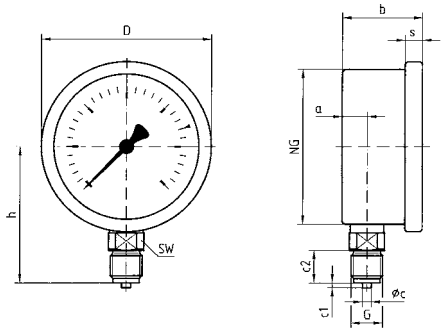
See page 41 for prices.

Glycerine filled Bourdon tube pressure gauges

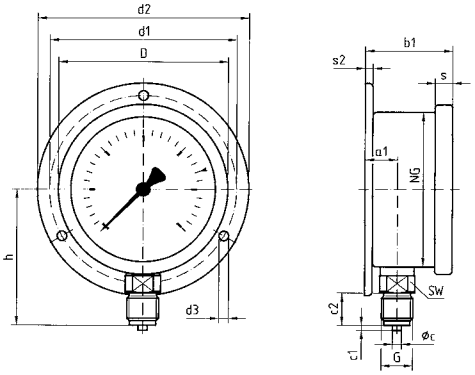
Type D 6 – NG 50/63

1 Housing types and dimensions

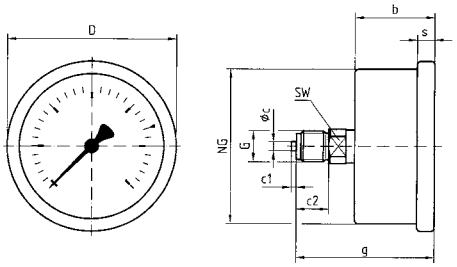
Bottom connection



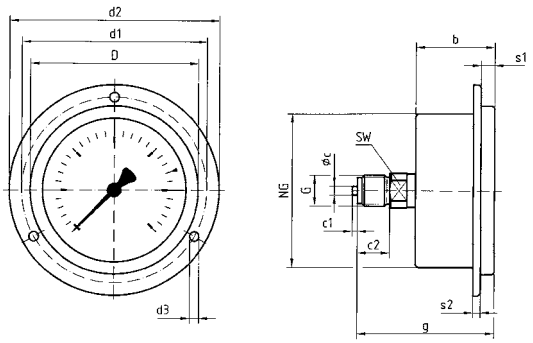
Bottom connection, back flange



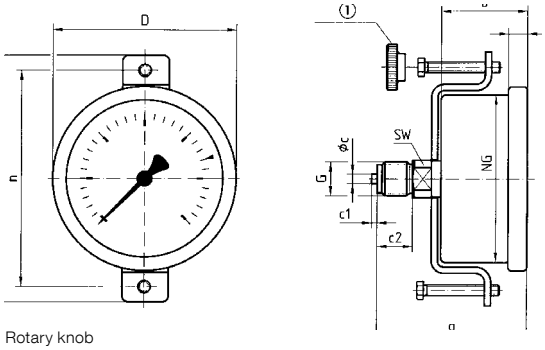
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, with clamp fixing



① Rotary knob

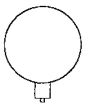
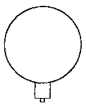
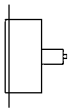
Dimensions (mm)

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

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M, PG: 2

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	85001611	**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	85010611	85060601	85060611	85060641	85110601	85110611	85110621	85110641
0/1.6	85011611	85061601	85061611	85061641	85111601	85111611	85111621	85111641
0/2.5	85012611	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 = 25 pieces

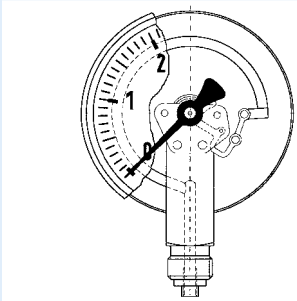
Blues part no. = in-stock items

See page 74 for extra charges.

Glycerine filled Bourdon tube pressure gauges EN 837-1

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



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Page 154

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, observe 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 blow-out

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
- Crimped bezel polished
- Special scales
- Clip reference pointer, red, adjustable (NG 63)
- Damping screw
- Other process connections

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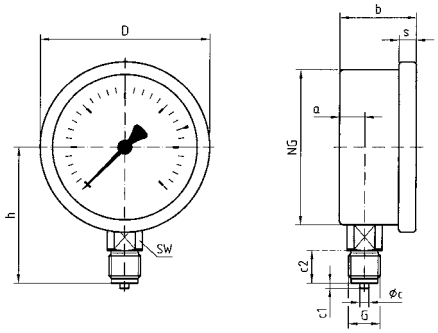
See page 44 for prices.

Glycerine filled Bourdon tube pressure gauges

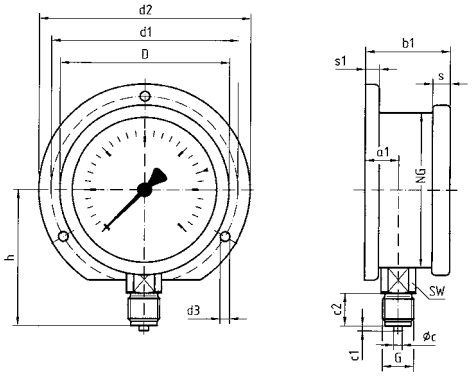
Type D 7 – NG 50/63

Housing types and dimensions

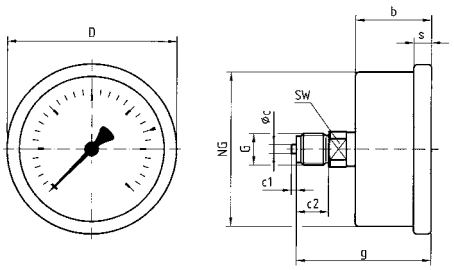
Bottom connection



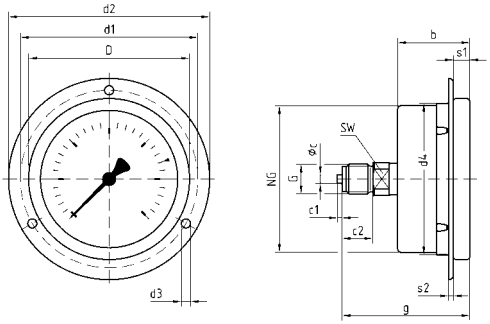
Bottom connection, back flange (NG 63)



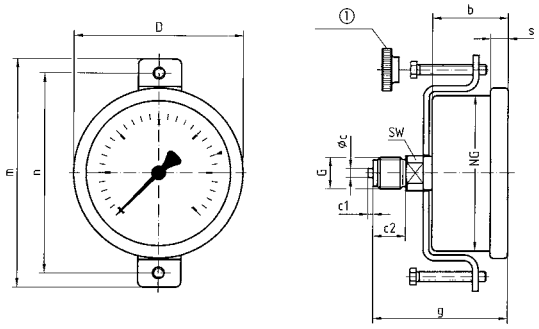
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, with clamp fixing



① Rotary knob

Dimensions (mm)

Nominal size (NG)	a	a_1	b	b_1	Øc	c_1	c_2	d_1*	d_2	d_3*	d_4	D	G	g	h	m	n	s	s_1	s_2	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

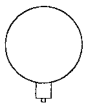
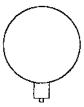
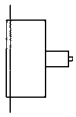
* Dimensions as per DIN 16063.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

1

DG: M, PG: 2

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.

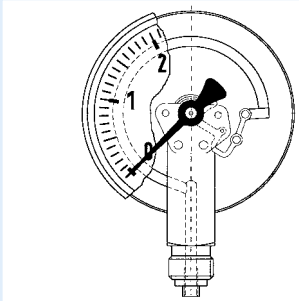
Blue part no. = in-stock items

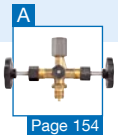
i

See page 74 for extra charges.

Glycerine filled Bourdon tube pressure gauges EN 837-1

- **Compact design**
- **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, observe 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 blow-out

Crimped bezel
Stainless steel 304

Window
Plastic

Filling liquid
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Clamp fixing
- 3-hole fixing, panel mounting bezel
- Back flange
- Crimped bezel polished
- Measuring system stainless steel (up to 1,000 bar)
- Special scales
- Damping screw
- Other process connections

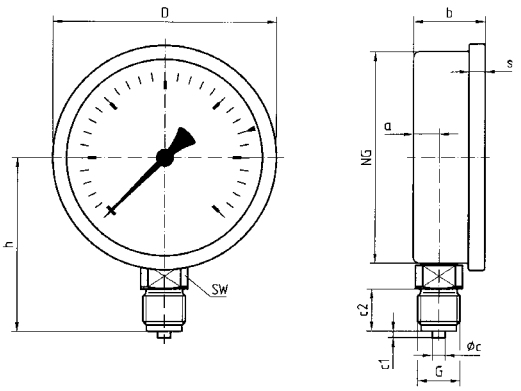
See pages 47–48 for prices.

Glycerine filled Bourdon tube pressure gauges

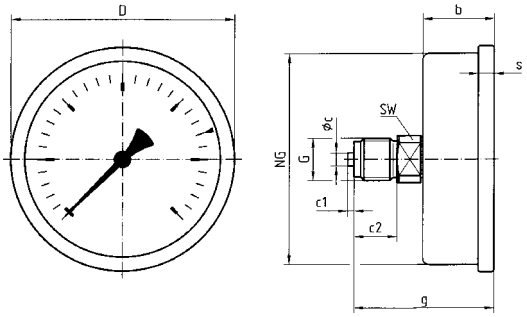
Type D 7 – NG 80/100

1 Housing types and dimensions

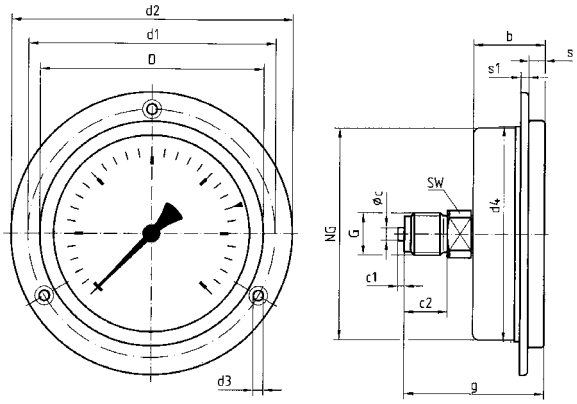
Bottom connection



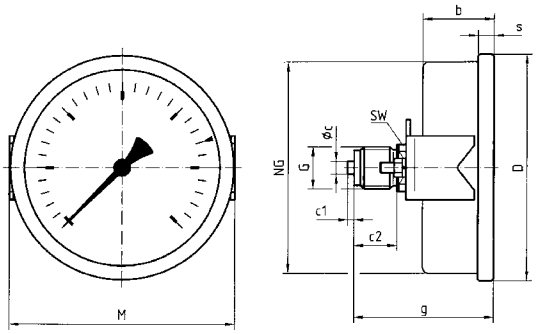
Centre back connection



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	95	110	5.2	-	85	56.5	G¼B	-	82	7	2	14
80 VA ax	-	33.5	5	2	13	95	110	5.2	-	85	59	G¼B	-	82	7	2	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

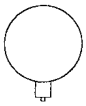
* Dimensions as per DIN 16064.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

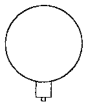
DG: M, PG: 2

Measuring system copper alloy

Type	RF80Gly, D701	RF80Gly, D711	RF80Gly, D751
Version			
Housing Ø	80	80	80
Housing	Stainless steel 304 with crimped bezel 304, plastic window		
Measuring element	Bourdon tube, copper alloy		
Accuracy class	1.6	1.6	1.6
Connection	G½B	G¼B	G¼B
			Clamp fixing
Range (bar)	Part no.	Part no.	Part no.
Price €			
-1/0	85151701	85151711	85151751
-1/+0.6	85152701	85152711	85152751
-1/+1.5	85153701	85153711	85153751
-1/+3	85154701	85154711	85154751
-1/+5	85155701	85155711	85155751
-1/+9	85156701	85156711	85156751
-1/+15	85157701	85157711	85157751
Price €			
0/1	85160701	85160711	85160751
0/1.6	85161701	85161711	85161751
0/2.5	85162701	85162711	85162751
0/4	85163701	85163711	85163751
0/6	85164701	85164711	85164751
0/10	85165701	85165711	85165751
0/16	85166701	85166711	85166751
0/25	85167701	85167711	85167751
0/40	85168701	85168711	85168751
Price €			
0/60	85169701	85169711	85169751
0/100	85170701	85170711	85170751
0/160	85171701	85171711	85171751
0/250	85172701	85172711	85172751
0/400	85173701	85173711	85173751
Price €			
0/600	---	---	---
0/1,000	---	---	---
Extra charges (without PG)			
Class 1.0	---	---	---

DG: M, PG: 3

Measuring system stainless steel

RF80EGly, D702	RF80EGly, D712	RF80EGly, D752
		
80	80	80
Stainless steel 304 with crimped bezel 304, plastic window		
Bourdon tube, stainless steel 316 Ti/316 L		
1.6	1.6	1.6
G½B	G¼B	G¼B
		Clamp fixing
Part no.	Part no.	Part no.
85151702	85151712	85151752
85152702	85152712	85152752
85153702	85153712	85153752
85154702	85154712	85154752
85155702	85155712	85155752
85156702	85156712	85156752
85157702	85157712	85157752
85160702	85160712	85160752
85161702	85161712	85161752
85162702	85162712	85162752
85163702	85163712	85163752
85164702	85164712	85164752
85165702	85165712	85165752
85166702	85166712	85166752
85167702	85167712	85167752
85168702	85168712	85168752
85169702	85169712	85169752
85170702	85170712	85170752
85171702	85171712	85171752
85172702	85172712	85172752
85173702	85173712	85173752
85174702	85174712	85174752
85175702	85175712	85175752
Price €	**Price €**	**Price €**

Blue part no. = in-stock items

Minimum order quantity = 10 pieces.

See page 74 for extra charges.

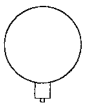
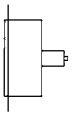
Glycerine filled Bourdon tube pressure gauges

EN 837-1

1

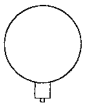
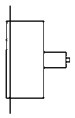
DG: M, PG: 2

Measuring system copper alloy

Type	RF100Gly, D701	RF100Gly, D711	RF100Gly, D731	RF100Gly, D751
Version				
Housing Ø	100	100	100	100
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
Connection	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, stainless steel	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.
Price €				
-1/0	**85201701**	85201711	85201731	85201751
-1/+0.6	85202701	85202711	85202731	85202751
-1/+1.5	85203701	85203711	85203731	85203751
-1/+3	85204701	85204711	85204731	85204751
-1/+5	85205701	85205711	85205731	85205751
-1/+9	85206701	85206711	85206731	85206751
-1/+15	85207701	85207711	85207731	85207751
Price €				
0/1	**85210701**	85210711	85210731	85210751
0/1.6	**85211701**	85211711	85211731	85211751
0/2.5	**85212701**	85212711	85212731	85212751
0/4	**85213701**	85213711	85213731	85213751
0/6	**85214701**	85214711	85214731	85214751
0/10	**85215701**	**85215711**	85215731	85215751
0/16	**85216701**	85216711	85216731	85216751
0/25	**85217701**	85217711	85217731	85217751
0/40	**85218701**	85218711	85218731	85218751
Price €				
0/60	**85219701**	85219711	85219731	85219751
0/100	**85220701**	85220711	85220731	85220751
0/160	**85221701**	85221711	85221731	85221751
0/250	**85222701**	85222711	85222731	85222751
0/400	**85223701**	85223711	85223731	85223751
Price €				
0/600	---	---	---	---
0/1,000	---	---	---	---
Extra charges (without PG)				
Class 1.0	---	---	---	---

DG: M, PG: 3

Measuring system stainless steel

RF100EGly, D702	RF100EGly, D712	RF100EGly, D732	RF100EGly, D752
			
100	100	100	100
Stainless steel 304 with crimped bezel 304, plastic window			
Bourdon tube, stainless steel 316 Ti/316 L			
1.6	1.6	1.6	1.6
G½B	G½B	G½B	G½B
		3-hole fixing, panel mounting bezel, stainless steel	Clamp fixing
Part no.	Part no.	Part no.	Part no.
85201702	85201712	85201732	85201752
85202702	85202712	85202732	85202752
85203702	85203712	85203732	85203752
85204702	85204712	85204732	85204752
85205702	85205712	85205732	85205752
85206702	85206712	85206732	85206752
85207702	85207712	85207732	85207752
85210702	85210712	85210732	85210752
85211702	85211712	85211732	85211752
85212702	85212712	85212732	85212752
85213702	85213712	85213732	85213752
85214702	85214712	85214732	85214752
85215702	85215712	85215732	85215752
85216702	85216712	85216732	85216752
85217702	85217712	85217732	85217752
85218702	85218712	85218732	85218752
85219702	85219712	85219732	85219752
85220702	85220712	85220732	85220752
85221702	85221712	85221732	85221752
85222702	85222712	85222732	85222752
85223702	85223712	85223732	85223752
85224702	85224712	85224732	85224752
85225702	85225712	85225732	85225752
Price €	**Price €**	**Price €**	**Price €**

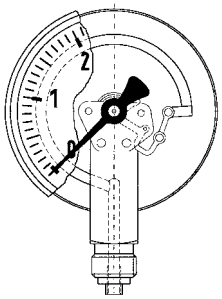
i See page 74 for extra charges.

Minimum order quantity for non-stock items = 10 pieces.

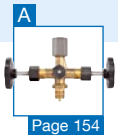
Blue part no. = in-stock items

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-GL-certified**



A



Page 154

1

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, observe the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 8
D 751

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 0/1,000 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 bottom 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 type bezel
Stainless steel 304
(D 751 = crimped bezel)

Window
Instrument glass
(D 751 = plastic)

Filling liquid
Glycerine (99.5 %)

Options

- Back flange
- 3-hole fixing, panel mounting bezel
- Special scales
- Other process connections

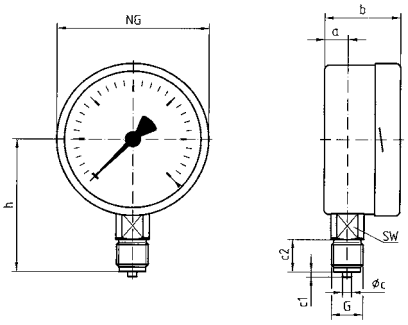
See page 51 for prices.

Glycerine filled Bourdon tube pressure gauges

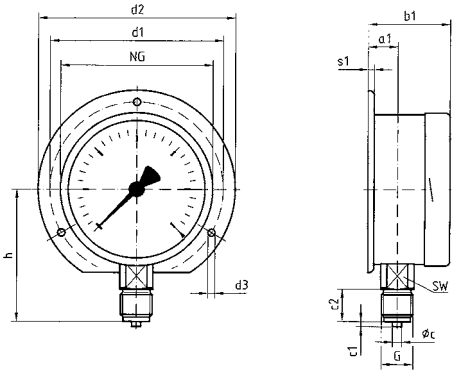
Type D 8 – NG 100/160; D 751 – NG 100

1 Housing types and dimensions

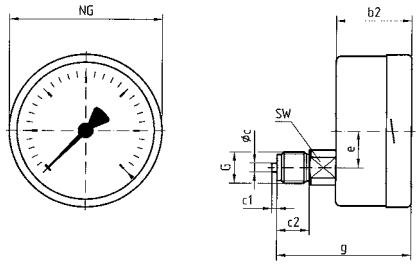
Bottom connection



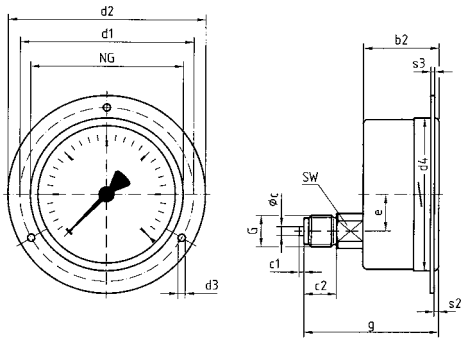
Bottom connection, back flange



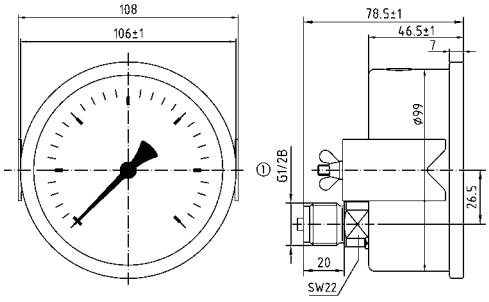
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, with clamp fixing (D 751 – NG 100)



① As per EN 837-1

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	Øc	c1	c2	d1*	d2	d3*	d4	e	G	g	h	s1
100	15.6	19.1	49	52.5	49	6	3	20	116	132	4.8	104	26.5	G½B	81	86	5.5
160	17.5	20	50	53	50	6	3	20	178	196	5.8	164	26.5	G½B	82	116	6
Nominal size (NG)	s2	s3	SW														
100	4	2	22														
160	4	2	22														

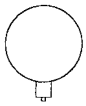
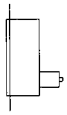
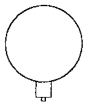
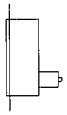
* Dimensions as per DIN 16064.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M, PG: 2

1

Type	RF100Gly, D801	RF100Gly, D811	RF100Gly, D831	RF100Gly, D751	RF160Gly, D801	RF160Gly, D811	RF160Gly, D831
Version							
Housing Ø	100	100	100	100	160	160	160
Housing	Stainless steel 304, window, see data sheet						
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, 304, polished	Crimped bezel 304 with clamp fixing			3-hole fixing, panel mounting bezel, 304, polished
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	**85201801**	85201811	85201831	85301751	85251801	85251811	85251831
-1/+0.6	85202801	85202811	85202831	85302751	85252801	85252811	85252831
-1/+1.5	**85203801**	85203811	85203831	85303751	85253801	85253811	85253831
-1/+3	85204801	85204811	85204831	85304751	85254801	85254811	85254831
-1/+5	**85205801**	85205811	85205831	85305751	85255801	85255811	85255831
-1/+9	85206801	85206811	85206831	85306751	85256801	85256811	85256831
-1/+15	85207801	85207811	85207831	85307751	85257801	85257811	85257831
Price €							
0/0.6	85209801	85209811	85209831	85309751	85259801	85259811	85259831
0/1	**85210801**	85210811	85210831	85310751	85260801	85260811	85260831
0/1.6	**85211801**	85211811	85211831	85311751	85261801	85261811	85261831
0/2.5	**85212801**	85212811	85212831	85312751	85262801	85262811	85262831
0/4	**85213801**	**85213811**	85213831	85313751	85263801	85263811	85263831
0/6	**85214801**	**85214811**	85214831	85314751	85264801	85264811	85264831
0/10	**85215801**	**85215811**	85215831	85315751	85265801	85265811	85265831
0/16	**85216801**	**85216811**	85216831	85316751	85266801	85266811	85266831
0/25	**85217801**	85217811	85217831	85317751	85267801	85267811	85267831
0/40	**85218801**	85218811	85218831	85318751	85268801	85268811	85268831
Price €							
0/60	**85219801**	85219811	85219831	85319751	85269801	85269811	85269831
0/100	**85220801**	85220811	85220831	85320751	85270801	85270811	85270831
0/160	**85221801**	85221811	85221831	85321751	85271801	85271811	85271831
0/250	**85222801**	85222811	85222831	85322751	85272801	85272811	85272831
0/400	**85223801**	85223811	85223831	85323751	85273801	85273811	85273831
Price €							
0/600	**85224801**	85224811	85224831	85324751	85274801	85274811	85274831
0/1,000	85225801	85225811	85225831	85325751	85275801	85275811	85275831

Minimum order quantity for non-stock items = 10 pieces.

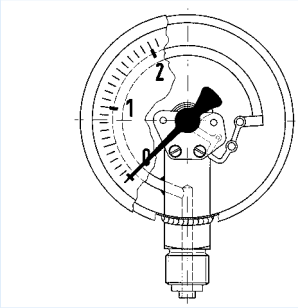
Blues part no. = in-stock items

See page 74 for extra charges.

Stainless steel Bourdon tube pressure gauges EN 837-1

1

- **Extremely compact design**
- **Wetted parts and movement made of stainless steel**
- **Housing welded to pressure connection**
- **Optional 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, observe 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)
0/1.6 bar 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} = +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

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

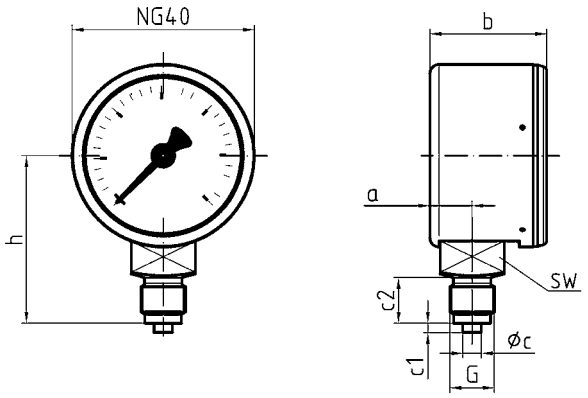
i
See page 54 for prices.

Stainless steel Bourdon tube pressure gauges

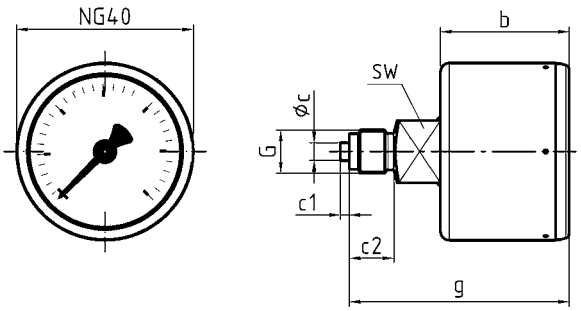
Type D3 – NG 40

Housing types and dimensions

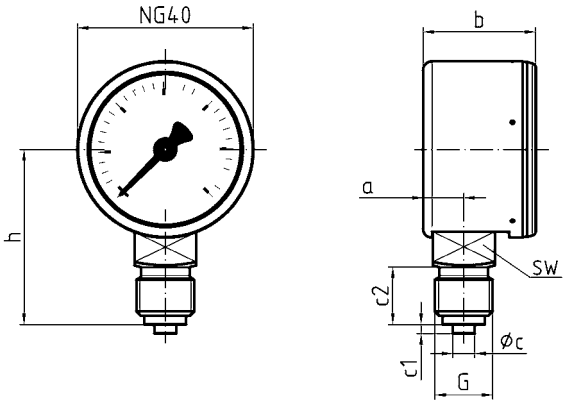
Bottom connection G⅛B



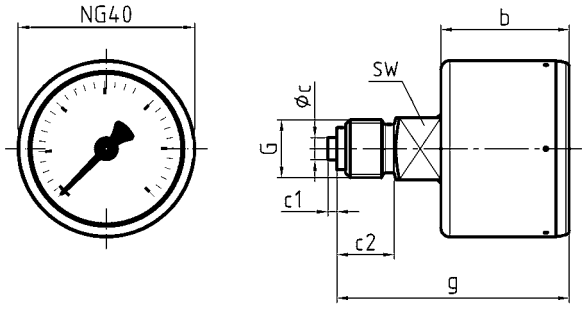
Centre back connection G⅛B



Bottom connection G¼B (optional)



Centre back connection G¼B (optional)



Dimensions (mm)

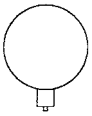
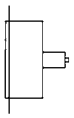
Connection (G)	a	b	Øc	c1	c2	g	h	SW
G⅛B bottom	9.2	25.5	4	2	10	-	36.5	14
G⅛B centre back	-	29	4	2	10	49.5	-	14
G¼B bottom	9.2	25.5	5	2	13	-	39.5	14
G¼B centre back	-	29	5	2	13	52.5	-	14

Stainless steel Bourdon tube pressure gauges

EN 837-1

1

DG: M, PG: 3

Type	RF40E, D302	RF40E, D312	RF40E, D332
Version			
Housing Ø	40	40	40
Housing	Stainless steel 304		
Measuring element	Bourdon tube, stainless steel 316 L		
Accuracy class	2.5	2.5	2.5
Connection	G1/8B	G1/8B	G1/8B
			3-hole fixing, panel mounting bezel 304
Range (bar)	Part no.	Part no.	Part no.
-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	85011332
0/2.5	85012302	85012312	85012332
0/4	85013302	85013312	85013332
0/6	85014302	**85014312**	85014332
0/10	85015302	**85015312**	85015332
0/16	85016302	**85016312**	85016332
0/25	85017302	85017312	85017332
0/40	85018302	85018312	85018332
Price €			
0/60	85019302	85019312	85019332
0/100	85020302	85020312	85020332
0/160	85021302	85021312	85021332
0/250	85022302	85022312	85022332
0/400	85023302	85023312	85023332
Price €			
0/600	85024302	85024312	85024332

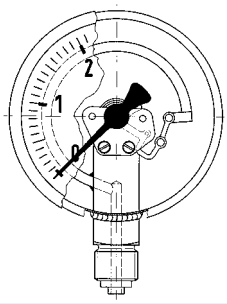
Minimum order quantity for non-stock items = 10 pieces. **Blue part no.** = in-stock items

i

See page 74 for extra charges.

Bourdon tube pressure gauges for chemical applications EN 837-1

- Extremely compact design
- For chemical and process engineering applications
- Wetted parts and movement made of stainless steel
- Housing welded to pressure connection
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified



Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise.
! For measuring gas or vapour, observe the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 9

Nominal size
40

Accuracy class (EN 837-1/6)
2.5

Ranges (EN 837-1/5)
0/1.6 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} = +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 L
G⅛B – spanner size SW 14 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

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

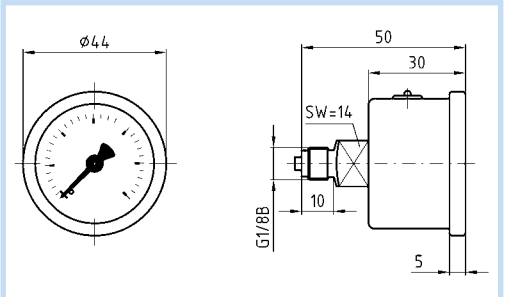
Crimped bezel
Stainless steel 304

Window
Plastic (PMMA)

Options

- Glycerine filling
- Other process connections
- Special scales
- Oil- and grease-free version

Dimensions (mm)



See page 56 for prices.

Bourdon tube pressure gauges for chemical applications EN 837-1

1

DG: M, PG: 3

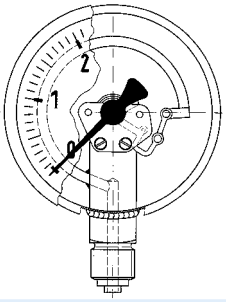
		Version with glycerine filling
Type	RF40Ch, D912	RF40ChGly, D712
Version		
Housing Ø	40	40
Housing	Stainless steel 304	
Measuring element	Bourdon tube, stainless steel 316 L	
Accuracy class	2.5	2.5
Connection	G1/8B	G1/8B
Range (bar)	Part no.	Part no.
-1/0	---	---
-1/+0.6	---	---
-1/+1.5	---	---
-1/+3	---	---
-1/+5	---	---
-1/+9	---	---
-1/+15	---	---
Price €		
0/0.6	---	---
0/1	---	---
0/1.6	85011912	85011712
0/2.5	85012912	85012712
0/4	85013912	85013712
0/6	85014912	85014712
0/10	85015912	85015712
0/16	85016912	85016712
0/25	85017912	85017712
0/40	85018912	85018712
Price €		
0/60	85019912	85019712
0/100	85020912	85020712
0/160	85021912	85021712
0/250	85022912	85022712
0/400	85023912	85023712
Price €		
0/600	---	---

Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

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
- ATEX version (optional)



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Page 151

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, observe 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 0/1,000 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 (NG 50)
	T_{max}	= +200 °C (NG 63)
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 L
NG 50 bottom or bottom 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

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

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
- ATEX version

- Crimped bezel, polished
- Special scales
- Other process connections

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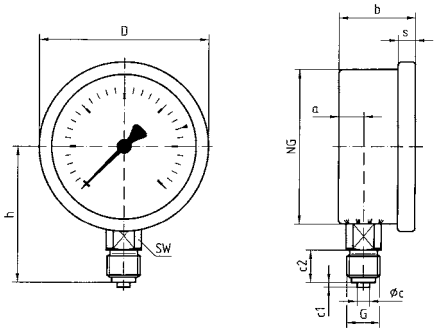
See page 59 for prices.

Bourdon tube pressure gauges for chemical applications Type D 9 – NG 50/63

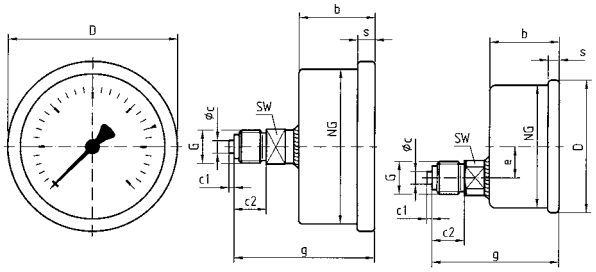
1 Housing types and dimensions

Bottom connection NG 50/63

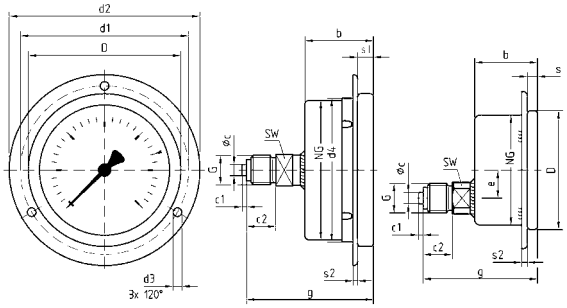


Centre back connection

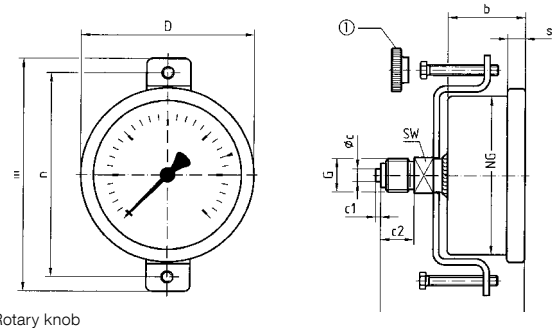
NG 63 NG 50



Centre back connection,
3-hole fixing, panel mounting bezel NG 63 NG 50

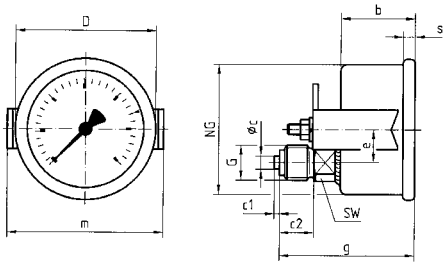


Centre back connection, with clamp fixing, NG 63

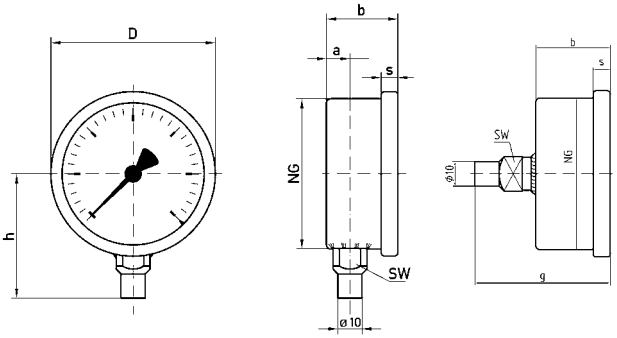


① Rotary knob

Centre back connection, with clamp fixing, NG 50



Bottom connection, back (NG 63) for fitting of chemical seal



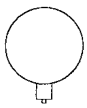
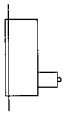
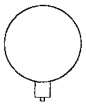
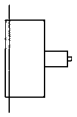
Dimensions (mm)

Nominal size (NG)	a	a1	b	Øc	c1	c2	d1*	d2*	d3*	d4	D	e	G	g	h	m	n	s	s1	s2	SW
50	10.5	-	28	5	2	13	60	70	3.6	-	53	12.5	G¼B	51	46	59	-	4.5	-	2.5	14
63	11.5	13	32	5	2	13	75	85	3.6	64	68	-	G¼B	56	53	94	82	7	5.5	2	14

* Dimensions as per DIN 16063.

Bourdon tube pressure gauges for chemical applications EN 837-1

DG: M, PG: 3

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
0/1,000	---	---	---	---	85125902	85125912	85125932	85125952

Minimum order quantity for non-stock items = 10 pieces.

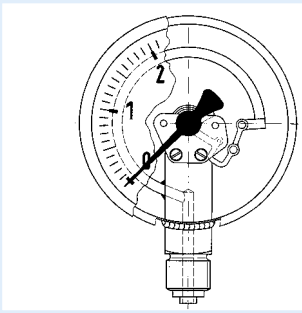
Blue part no. = in-stock items

See page 74 for extra charges.

Bourdon tube pressure gauges for chemical applications EN 837-1

1

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- For temperatures of the medium of up to 200 °C
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified
- ATEX version (optional)



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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, observe 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 0/1,000 bar
NG 160 0/0.6 to 0/1,600 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} = +200 °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 L,
bottom or bottom 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

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet type bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Back flange
- Panel mounting bezel
- 3-hole fixing, panel mounting bezel
- ATEX version
- Special scales
- Electrical contacts
- Other process connections

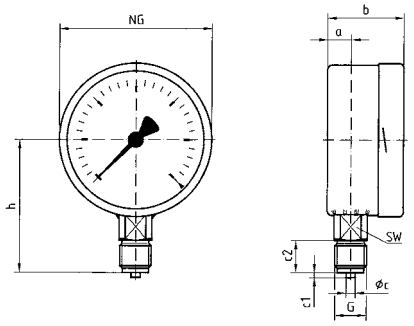
i

See page 62 for prices.

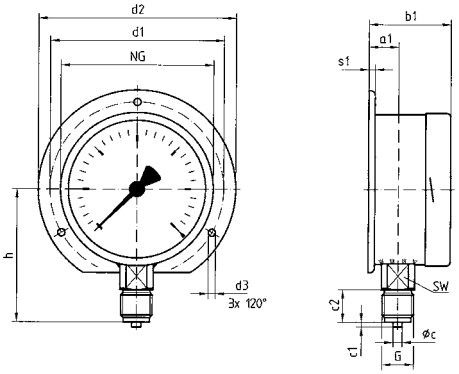
Bourdon tube pressure gauges for chemical applications Type D 4 – NG 100/160

Housing types and dimensions (mm)

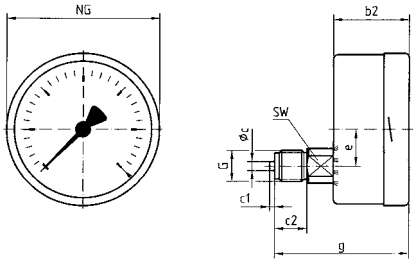
Bottom connection



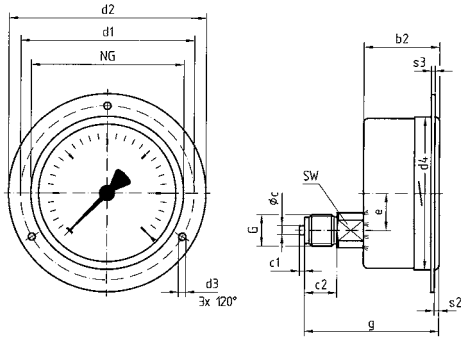
Bottom connection, back flange



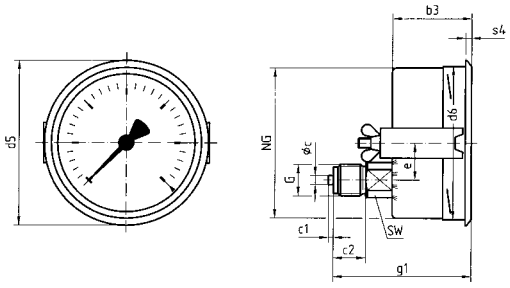
Centre back connection



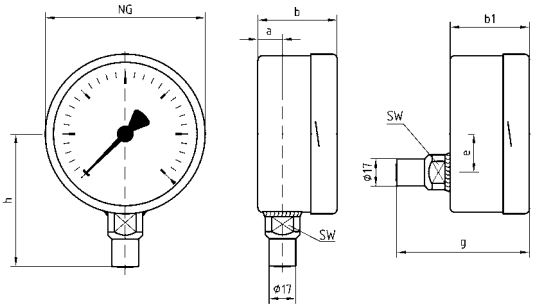
Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel with clamp fixing



Bottom connection, back (NG 63) for fitting of chemical seal



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

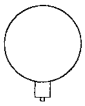
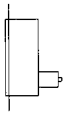
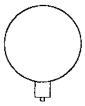
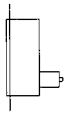
Nominal size (NG)	s2	s3	s4	SW
100	4	2	4	22
160	4	2	4.5	22

* Dimensions as per DIN 16064.

Bourdon tube pressure gauges for chemical applications EN 837-1

1

DG: M, PG: 3

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, with clamp fixing			3-hole fixing, panel mounting bezel 304 polished	Panel mounting bezel, 304, polished, with 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
0/1,000	85225402	85225412	85225432	85225452	85275402	85275412	85275432	85275452
Price €								
0/1,600	---	---	---	---	85276402	85276412	85276432	85276452

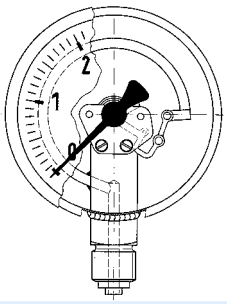
Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

i See page 74 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
- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified
- ATEX version (optional)



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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, observe 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 0/1,000 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 L
NG 50 bottom or bottom 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

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Crimped bezel
Stainless steel 304

Window
NG 50 plastic
NG 63 laminated safety glass

Filling liquid
Glycerine (99.5 %)

Options

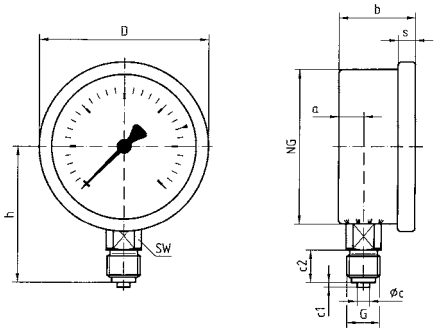
- Filling liquid silicone oil
- Plastic window (NG 63)
- Back flange (NG 63)
- Clamp fixing
- ATEX version
- Crimped bezel, polished
- Special scales
- Other process connections

See page 65 for prices.

Bourdon tube pressure gauges for chemical applications with glycerine filling type D 7 – NG 50/63

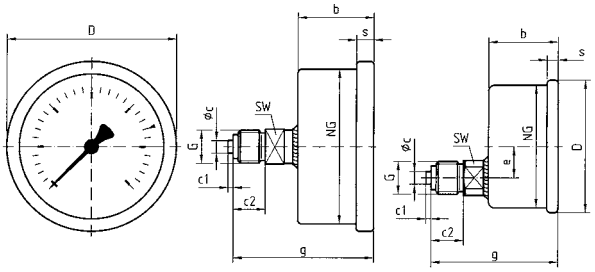
1 Housing types and dimensions

Bottom connection NG 50/63

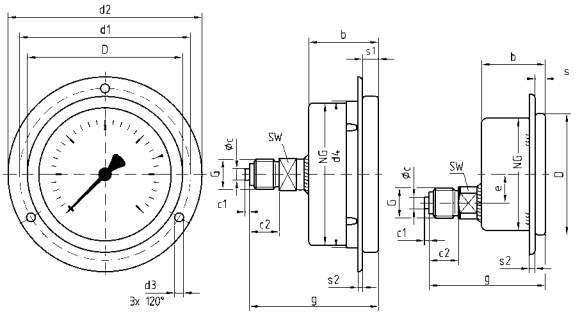


Centre back connection

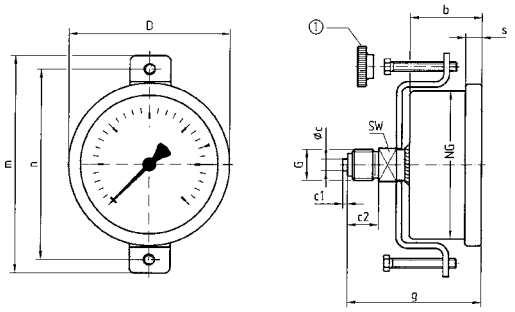
NG 63 NG 50



Centre back connection,
3-hole fixing, panel mounting bezel NG 63 NG 50

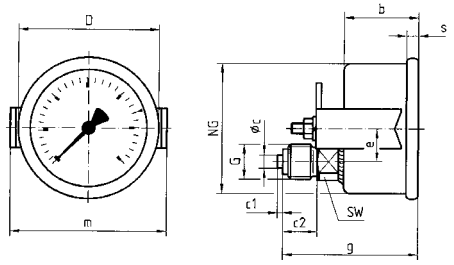


Centre back connection, with clamp fixing, NG 63

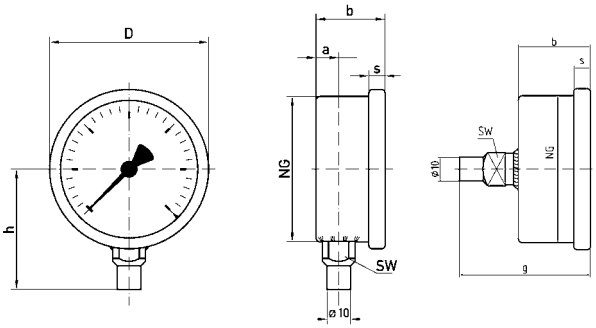


① Rotary knob

Centre back connection, with clamp fixing, NG 50



Bottom connection, back (NG 63) for fitting of chemical seal



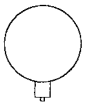
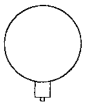
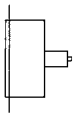
Dimensions (mm)

Nominal size (NG)	a	a1	b	Øc	c1	c2	d1*	d2*	d3*	d4	D	e	G	g	h	m	n	s	s1	s2	SW
50	10.5	-	28	5	2	13	60	70	3.6	-	53	12.5	G¼B	51	46	59	-	4.5	-	2.5	14
63	11.5	13	32	5	2	13	75	85	3.6	64	68	-	G¼B	56	53	94	82	7	5.5	2	14

* Dimensions as per DIN 16063.

Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

DG: M, PG: 3

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
0/1,000	---	---	---	---	**85125702**	85125712	85125732	85125752

Minimum order quantity for non-stock items = 10 pieces.

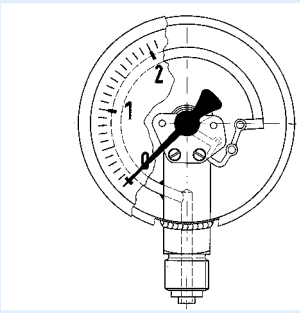
Blue part no. = in-stock items

See page 74 for extra charges.

Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

1

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified
- ATEX version (optional)



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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, observe 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 0/1,000 bar
NG 160 0/0.6 to 0/1,600 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 L,
bottom or bottom 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

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304
with blow-out

Bayonet type bezel
Stainless steel 304

Window
Laminated safety glass

Filling liquid
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Brass movement
- Back flange
- 3-hole fixing, panel mounting bezel
- ATEX version
- Electrical contacts
- Special scales
- Other process connections

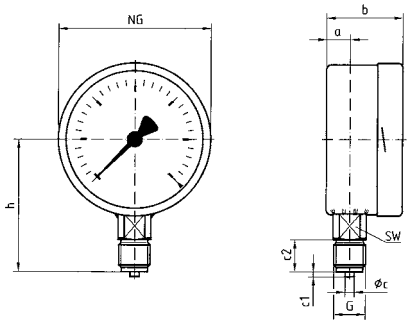
i

See page 68 for prices.

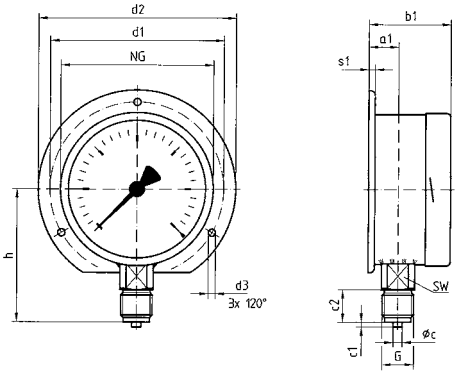
Bourdon tube pressure gauges for chemical applications with glycerine filling type D 8 – NG 100/160

Housing types and dimensions (mm)

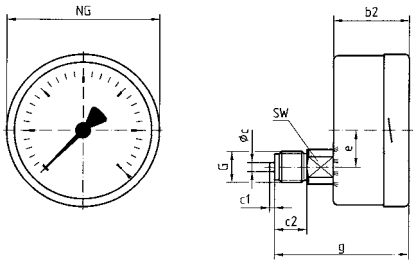
Bottom connection



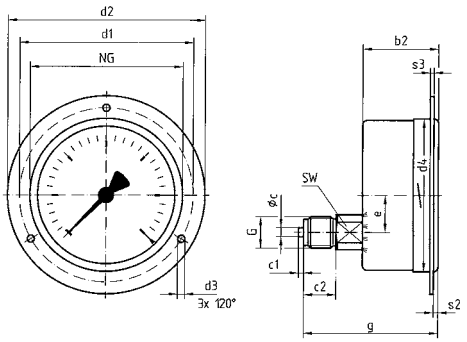
Bottom connection, back flange



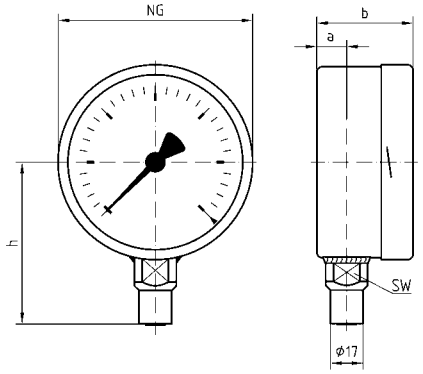
Centre back connection



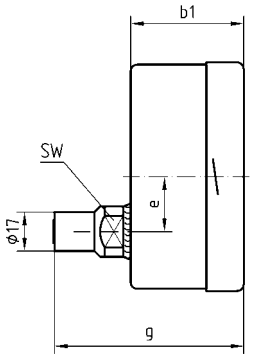
Centre back connection, 3-hole fixing, panel mounting bezel



Bottom connection for chemical seal mounting



Back connection for chemical seal mounting



Dimensions (mm)

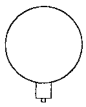
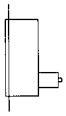
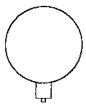
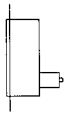
Nominal size (NG)	a	a1	b	b1	b2	Øc	c1	c2	d1*	d2*	d3*	d4	e	G	g	h	s1
100	15.6	19.1	49	52.5	49	6	3	20	116	132	4.8	104	34.5	G½B	83	86	5.5
160	17.5	20.5	50	53	50	6	3	20	178	196	5.8	164	34.5	G½B	84	116	6
Nominal size (NG)	s2	s3	SW														
100	4	2	22														
160	4	2	22														

* Dimensions for NG 100 according to DIN 16064.

Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

1

DG: M, PG: 3

Type	RF100ChGly, D802	RF100ChGly, D812	RF100ChGly, D832	RF160ChGly, D802	RF160ChGly, D812	RF160ChGly, D832
Version						
Housing Ø	100	100	100	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
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	**85201802**	85201812	85201832	85251802	85251812	85251832
-1/+0.6	85202802	85202812	85202832	85252802	85252812	85252832
-1/+1.5	85203802	85203812	85203832	85253802	85253812	85253832
-1/+3	85204802	85204812	85204832	85254802	85254812	85254832
-1/+5	85205802	85205812	85205832	85255802	85255812	85255832
-1/+9	85206802	85206812	85206832	85256802	85256812	85256832
-1/+15	85207802	85207812	85207832	85257802	85257812	85257832
Price €						
0/0.6	85209802	85209812	85209832	85259802	85259812	85259832
0/1	**85210802**	85210812	85210832	85260802	85260812	85260832
0/1.6	**85211802**	85211812	85211832	85261802	85261812	85261832
0/2.5	**85212802**	85212812	85212832	85262802	85262812	85262832
0/4	**85213802**	85213812	85213832	85263802	85263812	85263832
0/6	**85214802**	85214812	85214832	85264802	85264812	85264832
0/10	**85215802**	85215812	85215832	85265802	85265812	85265832
0/16	**85216802**	85216812	85216832	85266802	85266812	85266832
0/25	**85217802**	85217812	85217832	85267802	85267812	85267832
0/40	**85218802**	85218812	85218832	85268802	85268812	85268832
Price €						
0/60	**85219802**	85219812	85219832	85269802	85269812	85269832
0/100	**85220802**	85220812	85220832	85270802	85270812	85270832
0/160	**85221802**	85221812	85221832	85271802	85271812	85271832
0/250	**85222802**	85222812	85222832	85272802	85272812	85272832
0/400	**85223802**	85223812	85223832	85273802	85273812	85273832
Price €						
0/600	**85224802**	85224812	85224832	85274802	85274812	85274832
0/1,000	85225802	85225812	85225832	85275802	85275812	85275832
Price €						
0/1,600	---	---	---	85276802	85276812	85276832

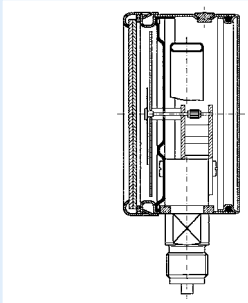
Minimum order quantity for non-stock items = 10 pieces

Blue part no. = in-stock items

i See page 74 for extra charges.

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**
- **GOSSTANDART-certified**
- **ATEX version (optional)**




A
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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 0/1,000 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 bottom 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

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 type bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Glycerine filling (bottom version type D8)
- 3-hole fixing, panel mounting bezel
- ATEX version
- Special scales
- Other process connections

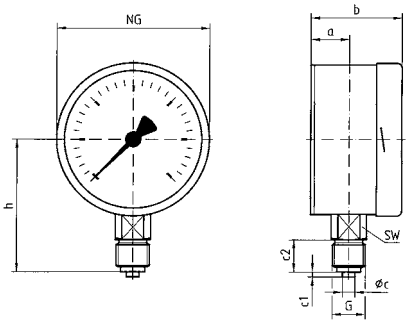
See page 73 for prices.

Bourdon tube safety pressure gauges

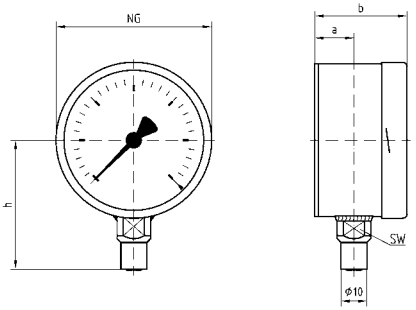
Type D 4/D 8 – NG 63

1 Housing types and dimensions

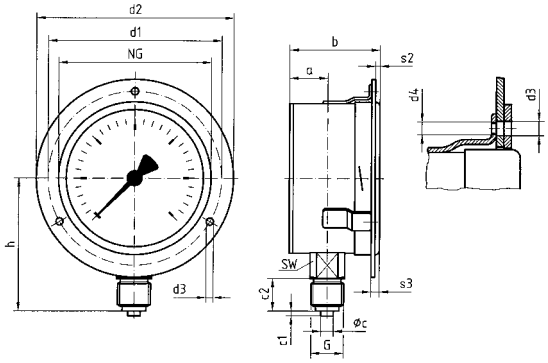
Bottom connection



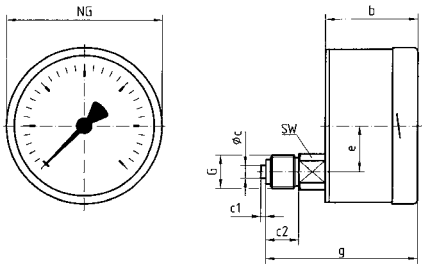
Bottom connection for chemical seal mounting



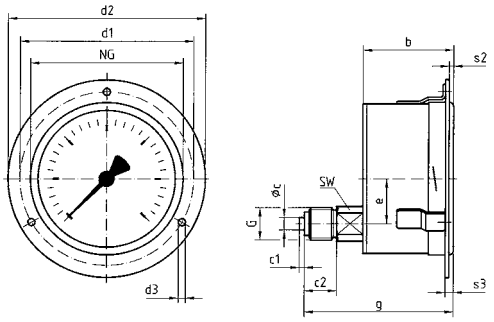
Bottom connection, 3-hole fixing, panel mounting bezel



Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Dimensions (mm)

Nominal size (NG)	a	a_1	b	b_1	Øc	c_1	c_2	d_1	d_2	d_3	d_4	e	g	G	h	s_1	s_2	s_3	SW
63	18	38	41	61	5	2	13	75	85	3.6	M3	18	60	G¼B	53	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**
- **GOSSTANDART-certified**
- **ATEX version (optional)**

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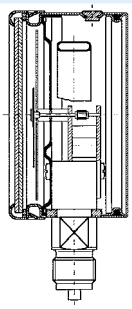


Application

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 0/1,000 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

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 type bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Glycerine filling (bottom version)
- 3-hole fixing, panel mounting bezel
- ATEX version
- Special scales
- Other process connections

See page 73 for prices.

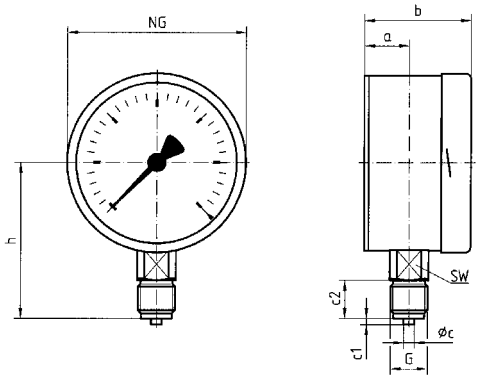
Bourdon tube safety pressure gauges

Type D 4/D 8 – NG 100/160

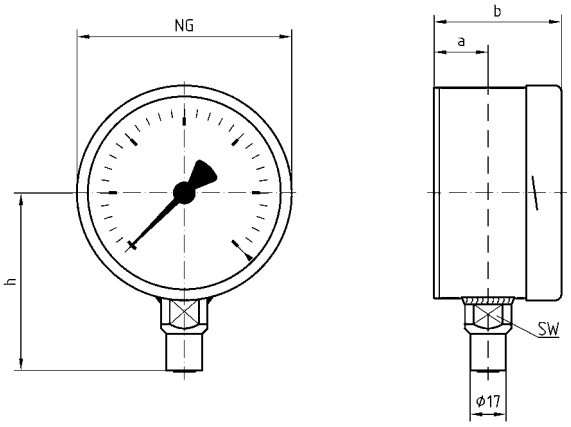
1

Housing types and dimensions

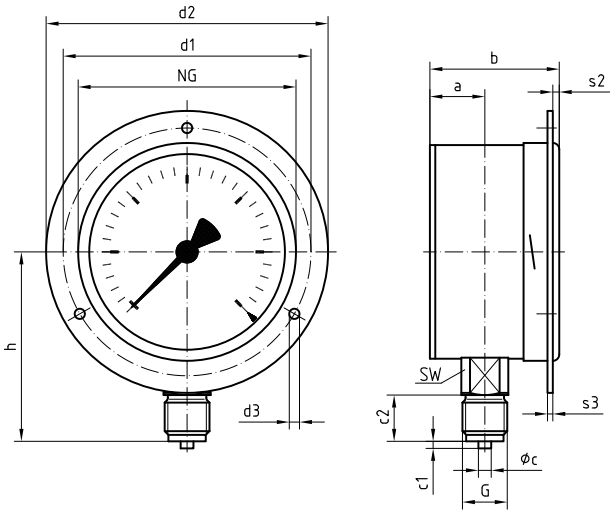
Bottom connection



Bottom connection for chemical seal mounting



Bottom connection, 3-hole fixing, panel mounting bezel



Dimensions (mm)

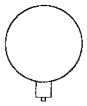
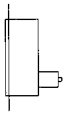
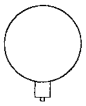
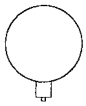
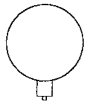
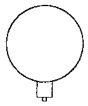
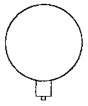
Nominal size (NG)	a	b	Øc	c1	c2	d1*	d2*	d3*	G	h	s2	s3	SW				
100	25	57	6	3	20	116	132	4.8	G½B	86	4	2	22				
160	26	65	6	3	20	178	196	5.8	G½B	116	4	2	22				

* Dimensions as per DIN 16064.

Bourdon tube safety pressure gauges

EN 837-1

DG: M, PG: 3

Type	RF63Si, D402	RF63Si, D412	RF63Si D432	RF100Si, D402	RF160Si, D402	**Version with glycerine filling** RF63SiGly, D802	RF100SiGly, D802	RF160SiGly, D802
Version								
Housing Ø	63	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 Ti/316 L					Bourdon tube, stainless steel 316 Ti/316 L		
Accuracy class	1.6*	1.6*	1.6*	1.0	1.0	1.6*	1.0	1.0
Connection	G¼B	G¼B	G¼B	G½B	G½B	G¼B	G½B	G½B
	-	-	3-hole fixing, panel mounting bezel, 304, polished	-	-	-	-	-
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85401402	85401412	85401432	85451402	85501402	85401802	85451802	85501802
-1/+0.6	85402402	85402412	85402432	85452402	85502402	85402802	85452802	85502802
-1/+1.5	85403402	85403412	85403432	85453402	85503402	85403802	85453802	85503802
-1/+3	85404402	85404412	85404432	85454402	85504402	85404802	85454802	85504802
-1/+5	85405402	85405412	85405432	85455402	85505402	85405802	85455802	85505802
-1/+9	85406402	85406412	85406432	85456402	85506402	85406802	85456802	85506802
-1/+15	85407402	85407412	85407432	85457402	85507402	85407802	85457802	85507802
Price €								
0/0.6	85409402	85409412	85409432	85459402	85509402	85409802	85459802	85509802
0/1	85410402	85410412	85410432	85460402	85510402	85410802	85460802	85510802
0/1.6	85411402	85411412	85411432	85461402	85511402	85411802	85461802	85511802
0/2.5	85412402	85412412	85412432	85462402	85512402	85412802	85462802	85512802
0/4	85413402	85413412	85413432	85463402	85513402	85413802	85463802	85513802
0/6	85414402	85414412	85414432	85464402	85514402	85414802	85464802	85514802
0/10	85415402	85415412	85415432	85465402	85515402	85415802	85465802	85515802
0/16	85416402	85416412	85416432	85466402	85516402	85416802	85466802	85516802
0/25	85417402	85417412	85417432	85467402	85517402	85417802	85467802	85517802
0/40	85418402	85418412	85418432	85468402	85518402	85418802	85468802	85518802
Price €								
0/60	85419402	85419412	85419432	85469402	85519402	85419802	85469802	85519802
0/100	85420402	85420412	85420432	85470402	85520402	85420802	85470802	85520802
0/160	85421402	85421412	85421432	85471402	85521402	85421802	85471802	85521802
0/250	85422402	85422412	85422432	85472402	85522402	85422802	85472802	85522802
0/400	85423402	85423412	85423432	85473402	85523402	85423802	85473802	85523802
Price €								
0/600	85424402	85424412	85424432	85474402	85524402	85424802	85474802	85524802
0/1,000	85425402	85425412	85425432	85475402	85525402	85425802	85475802	85525802

Minimum order quantity for non-stock items = 10 pieces
* > 0/600 bar class 2.5.

Blue part no. = in-stock items

See page 74 for extra charges. See page 116 for extra charges for electrical contacts.

Extra charges for Bourdon tube pressure gauges

(industrial, glycerine, chemical, safety versions)

1

DG: M

Housing diameter (mm)	PG	50	63	100	160
Description	-	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Housing stainless steel 304 polished	3	38281	38282	38283	38284
Bayonet bezel stainless steel 304 polished	3	---	38286	38287	38288
Crimped bezel stainless steel 304 polished	3	38289	38290	38291	---
Extra charges for bourdon tube pressure gauges: aHousing 316 Ti	3	---	On request	On request	---
Laminated safety glass window	-	38071	38072	38074	38075
Connection socket nickel-plated	3	38083	38084	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)	2	38096	38097	38099	38100
Damping screw stainless steel 316 Ti – hole 0.3 – 0.5 – 0.7 mm (please specify)	3	38102	38103	38105	38106
Red mark on dial	-	38183	38184	38186	38187
1 reference pointer red, external knob adjustment for unfilled gauges (plastic window)	1	---	38188	38190	38191
Clip reference pointer, red, adjustable for housing types D7/D9	1	---	38193	---	---
1 reference pointer red, external knob adjustment for filled gauges (plastic window)	1	---	38301	38302	38303
Max. pointer for unfilled gauges * (only for gauges with bayonet bezel, plastic window)	1	---	---	38129	38130
Max. pointer for filled gauges * (only for gauges with bayonet bezel, plastic window)	1	---	---	38306	38307
Knife edge pointer	3	---	38133	38135	38136
Micro-adjustable pointer for zero correction	3	---	38335	38308	38309
Damped movement, brass	3	On request	On request	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)	3	---	38295	38296	38297
Housing can be sealed, serial number on dial (only for housing with bayonet bezel). Conformity assessment by Board of Weights and Measures not possible.	3	---			
Range -1/0 bar to 0/600 bar (only for classes 0.6 and 1.0). Conformity assessment by Board of Weights and Measures as per module F1 with certification of conformity and declaration of conformity by AFRISO.	-	---	---	On request	On request
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 837-1, 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).
* Accuracy no longer classes 1 and 1.6, but possible from measuring range 6 bar.

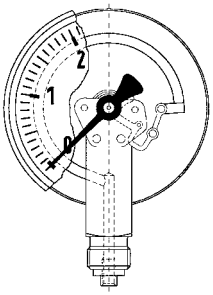
Blue part no. = in-stock items items

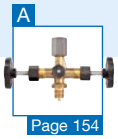
i

See the overview "Accessories for panel mounting and wall mounting" on page 150.

Bourdon tube pressure gauges with screw bezel housing EN 837-1

- For machine and plant engineering
- Available with or without glycerine filling
- Extremely robust plastic housing (PA 6.6 GB30)
- Laminated safety glass window
- Higher accuracy class optional





Page 154

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, observe the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 1

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 0/1,000 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

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
Plastic (PA 6.6 GB30)
with screw type bezel (PA 6.6 GB30)
with blow-out

Window
Laminated safety glass

Options

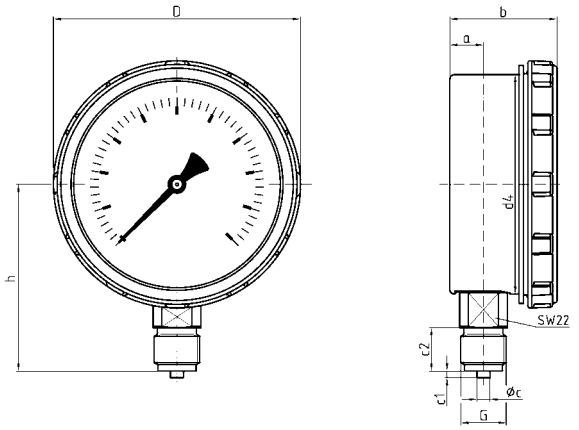
- Glycerine filling (type D 6)
- Higher accuracy class
- Damping screw
- Special scales
- Other process connections
- Micro-adjustable pointer

See page 77 for prices.

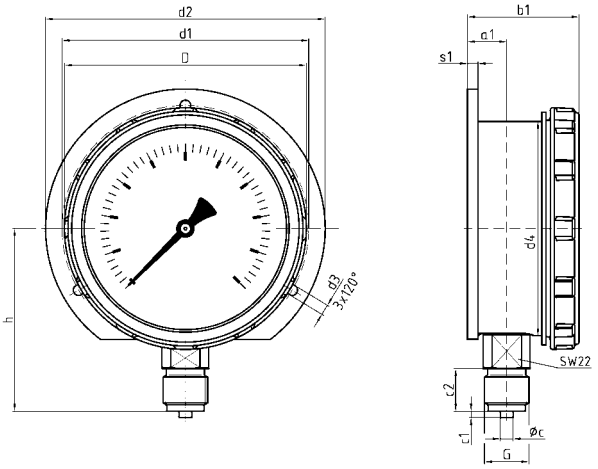
Bourdon tube pressure gauges with screw bezel housing type D1/D6 – NG 100

1 Housing types and dimensions

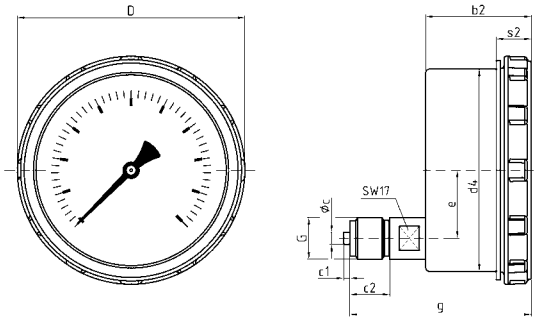
Bottom connection



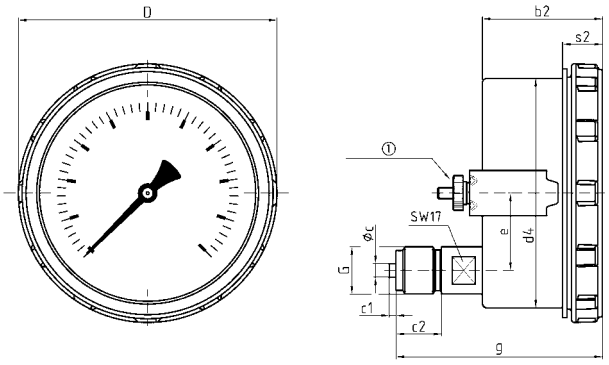
Bottom connection, back flange



Centre back connection



Centre back connection with clamp fixing



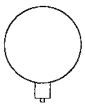
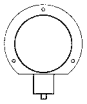
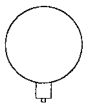
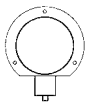
① Union nut

Dimensions (mm)

Connection (G)	a	a1	b	b1	b2	Øc	c1	c2	d1	d2	d3	d4	D	e	g	h	s1	s2
G½B	15.5	18.5	50	52.5	52.5	6	3	20	116	131.5	5	101	114	34	91	86	5	17.5

Bourdon tube pressure gauges with screw bezel housing type D1/D6 – NG 100

DG: M, PG: 2

Type	RF100ISR, D101	RF100ISR, D111	RF100 ISR, D141	RF100ISR, D171	RF 100 GlySR, D601	RF 100 GlySR, D611	RF 100 GlySR, D641	RF 100 GlySR, D671
					Version with glycerine filling			
Version								
Housing Ø	100	100	100	100	100	100	100	100
Housing	Plastic (PA 6.6 GB30) with screw type bezel, window: laminated safety glass				Plastic (PA 6.6 GB30) with screw type bezel, window: laminated safety glass			
Measuring element	Bourdon tube, copper alloy (> 60 bar stainless steel 316 Ti/316 L)				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	G½	G½B	G½B	G½B	G½B
			With clamp fixing	With back flange			With clamp fixing	With back flange
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85301101	85301111	85301141	85301171	85201601	85201611	85201641	85201671
-1/+0.6	85302101	85302111	85302141	85302171	85202601	85202611	85202641	85202671
-1/+1.5	85303101	85303111	85303141	85303171	85203601	85203611	85203641	85203671
-1/+3	85304101	85304111	85304141	85304171	85204601	85204611	85204641	85204671
-1/+5	85305101	85305111	85305141	85305171	85205601	85205611	85205641	85205671
-1/+9	85306101	85306111	85306141	85306171	85206601	85206611	85206641	85206671
-1/+15	85307101	85307111	85307141	85307171	85207601	85207611	85207641	85207671
Price €								
0/0.6	85309101	85309111	85309141	85309171	85209601	85209611	85209641	85209671
0/1	85310101	85310111	85310141	85310171	85210601	85210611	85210641	85210671
0/1.6	85311101	85311111	85311141	85171171	85611601	85611611	85611641	85611671
0/2.5	85312101	85312111	85312141	85312171	85212601	85212611	85212641	85212671
0/4	85313101	85313111	85313141	85313171	85213601	85213611	85213641	85213671
0/6	85314101	85314111	85314141	85314171	85214601	85214611	85214641	85214671
0/10	85315101	85315111	85315141	85315171	85215601	85215611	85215641	85215611
0/16	85316101	85316111	85316141	85316171	85216601	85216611	85216641	85216671
0/25	85317101	85317111	85317141	85317171	85217601	85217611	85217641	85217671
0/40	85318101	85318111	85318141	85318171	85218601	85218611	85218641	85218671
Price €								
0/60	85319101	85319111	85319141	85319171	85219601	85219611	85219641	85219671
0/100	85320101	85320111	85320141	85320171	85220601	85220611	85220641	85220671
0/160	85321101	85321111	85321141	85321171	85221601	85221611	85221641	85221671
0/250	85322101	85322111	85322141	85322171	85222601	85222611	85222641	85222671
0/400	85323101	85323111	85323141	85323171	85223601	85223611	85223641	85223671
Price €								
0/600	85324101	85324111	85324141	85324171	85224601	85224611	85224641	85224671
0/1,000	85325101	85325111	85325141	85325171	85225601	85225611	85225641	85225671

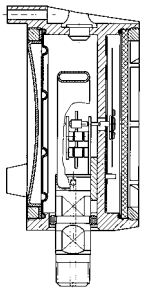
Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

Bourdon tube pressure gauges type "Process Gauge"

1

- **Extremely robust pressure gauge for offshore and onshore applications**
- **Glass-fibre reinforced safety housing with solid baffle wall and blow-out**
- **Integrated pressure compensation diaphragm**
- **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 ASME B 40.100
(corresponds to class 0.5)

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/600 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 67 (EN 60529)

Standard version

Connection
Stainless steel 316 L
bottom or bottom back
½-14 NPT – spanner size SW 22

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube tightness-tested with helium

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 (type 1x1)
- Measuring system Monel (type 1x3)
- Laminated safety glass window
- Reference pointer
- Maximum pointer
- Electrical contacts
- Other process connections

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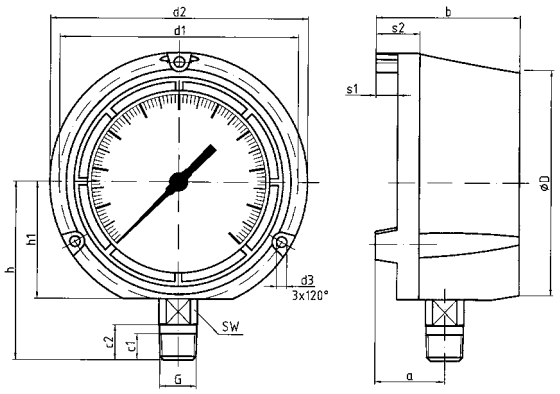
See page 80 for prices.

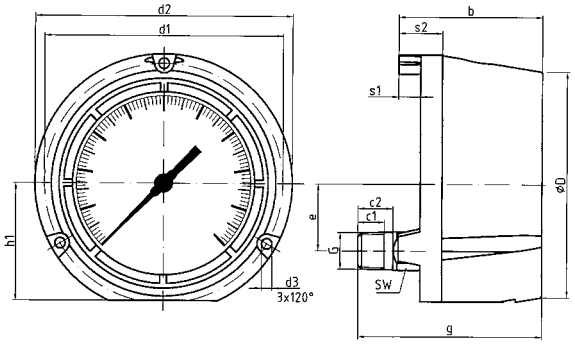
Bourdon tube pressure gauges type "Process Gauge" Type D 1/D 6 – NG 4½"

Housing types and dimensions

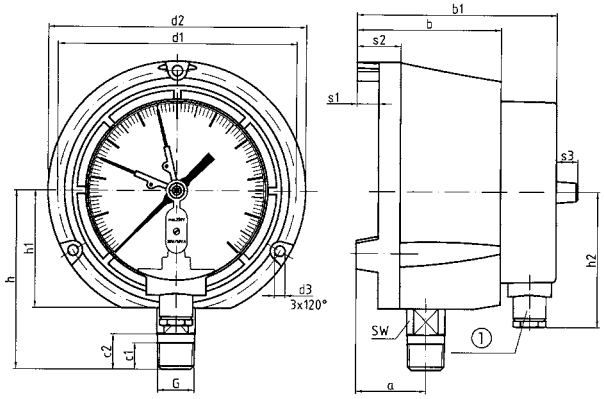
Bottom connection



Centre back connection

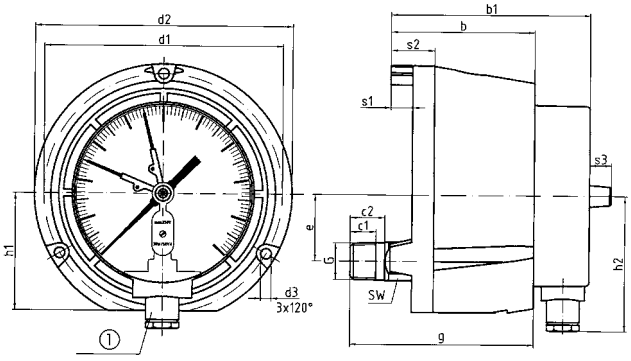


Bottom connection, with electrical contact



① Cable gland

Centre back connection, with electrical contact



① Cable gland

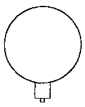
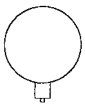
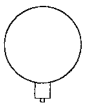
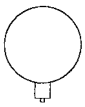
Dimensions (mm)

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 gauges type "Process Gauge"

1

DG: M

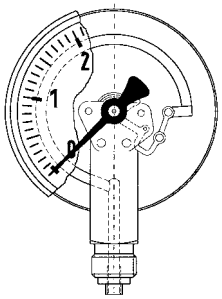
Type	RF 130PG, D101	RF 130PG, D111	RF 130PG, D102	RF 130PG, D112	RF 130PG Gly, D601	RF 130PG Gly, D611	RF 130PG Gly, D602	RF 130PG Gly, D612
					Version with glycerine filling			
Version								
Housing Ø	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"
Housing	PP-GF 20, black, with internal screw type bezel				PP-GF 20, black, with internal screw type bezel			
Measuring element	Copper alloy, (> 60 bar 316 Ti/316 L)		Stainless steel 316 Ti/316 L		Copper alloy (> 60 bar 316 Ti/316 L)		Stainless steel 316 Ti/316 L	
Accuracy class	Grade 2A as per ASME B 40.100 (corresponds to class 0.5)				Grade 2A as per ASME B 40.100 (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
PG	2	2	3	3	2	2	3	3
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

Minimum order quantity for non-stock items = 10 pieces.
* Pressure unit psi available at no extra charge.

Blue part no. = in-stock items

Precision Bourdon tube pressure gauges

- High accuracy (class 0.6)
- Housing can be sealed
- Serial number on dial
- Suitable as measuring equipment as per QA requirements
- DNV- and GOSSTANDART-certified



A
Page 154

Application

For gaseous and liquid media which are not corrosive and not highly viscous and which do not crystallise. For high measuring accuracy.
! For measuring gas or vapour, observe 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 0/400 bar

Calibration medium
≤ 40 bar: air
> 40 bar: water

Application area
Static load: full scale value
Dynamic load: 0.9 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. ±0.4 %/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 bottom 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

Dial
Aluminium, white
Dial marking black

Pointer
Knife edge pointer aluminium, black

Housing
Stainless steel 304

Bayonet type bezel
Stainless steel 304

Window
Plastic (PMMA)

Options

- Factory test certificates
- 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

i
See page 83 for prices.

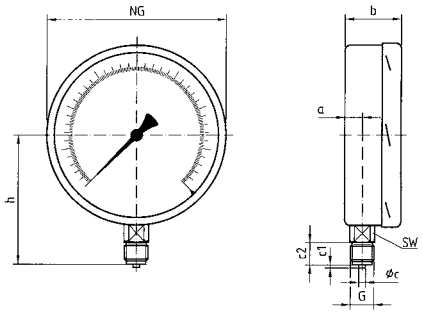
Precision Bourdon tube pressure gauges

Type D 4 – NG 160/250

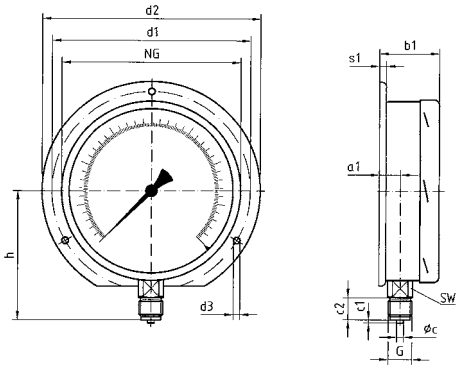
1

Housing types and dimensions

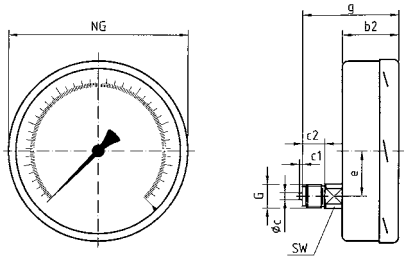
Bottom connection



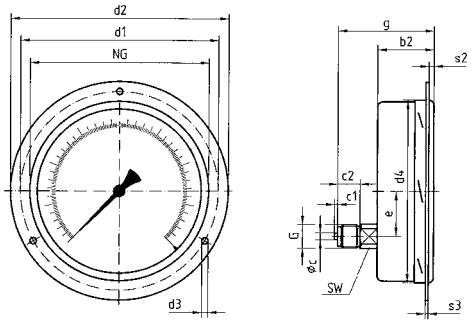
Bottom connection, back flange (NG 160 only)



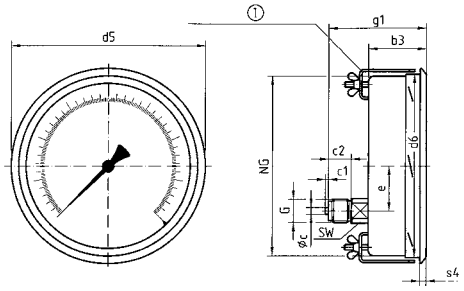
Centre back connection (NG 160 only)



Centre back connection, 3-hole fixing, panel mounting bezel (NG 160 only)



Centre back connection, panel mounting bezel with clamp fixing (NG 160 only)



① 90° drawn staggered

Dimensions (mm)

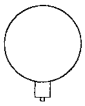
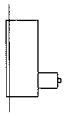
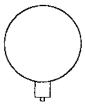
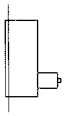
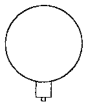
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	44.5	G½B	82	84	116	6
250	16	-	57	-	-	-	6	3	20	-	-	-	-	-	-	-	G½B	-	-	165	-

Nominal size (NG)	s2	s3	s4	SW
160	4	2	4.5	22
250	-	-	-	22

* Dimensions as per DIN 16070.

Precision Bourdon tube pressure gauges

DG: M

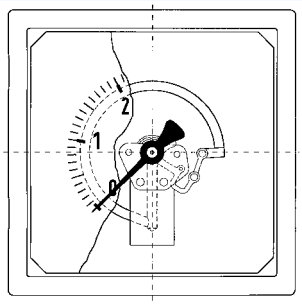
Type	RF160F, D401	RF160F, D411	RF160F, D431	RF160ChF, D402	RF160ChF, D412	RF160ChF, D432	RF250F, D401
Version							
Housing Ø	160	160	160	160	160	160	250
Housing	Stainless steel 304 with bayonet bezel						
Measuring element	Bourdon tube, copper alloy, (100 bar 316 Ti/316 L)			Bourdon tube, stainless 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	
PG	2	2	2	3	3	3	2
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
Extra charge glycerine filling (for NG 160 > 2.5 bar)							

Blue part no. = in-stock items

Bourdon tube pressure gauges for panel mounting

1

- **Suitable for various standard cut-out dimensions**
- **For installation in control panels**
- **For positive and negative pressure ranges**



A

Page 154

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, observe the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 3

Nominal size
72 x 72, 96 x 96

Accuracy class (EN 837-1/6)
1.6

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, bottom
G¼B – SW14
(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

Bezel
Aluminium, black

Window
Plastic

Options

- Zero correction (NG 96)
- Wetted parts stainless steel (NG 96)
- Special scales
- Damping screw
- Reference pointer
- Other process connections

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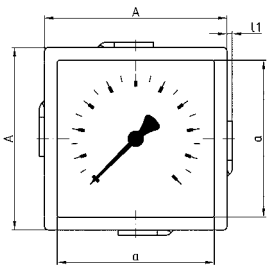
See page 88 for prices.

Bourdon tube pressure gauges for panel mounting

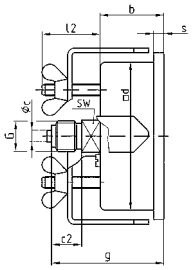
NG 72 x 72/96 x 96

Housing types and dimensions

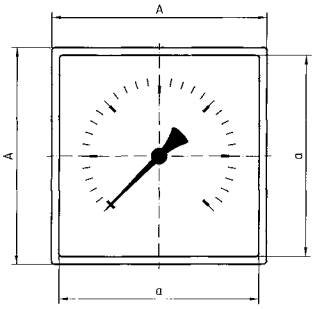
NG 72 x 72



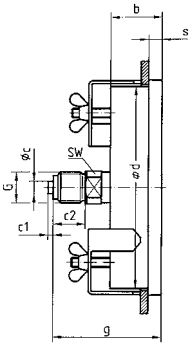
NG 72 x 72



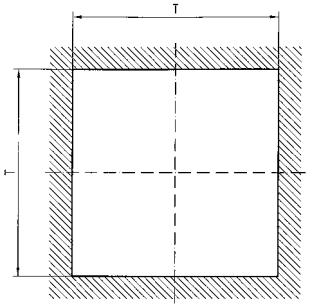
NG 96 x 96



NG 96 x 96



Panel cut out



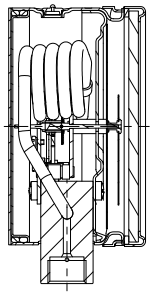
Dimensions (mm)

Nominal size (NG)	A	a	b	Øc	c_1	c_2	d	e	G	g	l_1	l_2	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

Bourdon tube pressure gauges for high pressure

1

- For pressure ranges up to 4,000 bar
- Housing with solid baffle wall and blow-out



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 (option)
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 type bezel
Stainless steel 304

Window
Laminated safety glass

Fastening
Wall mounting by means of instrument bracket, protrusion 60 mm (not included in scope of delivery) or panel mounting by means of 3-hole fixing, panel mounting bezel (option). Direct mounting to rigid measuring line possible.

Options

- Glycerine filling (type D802)
- 3-hole fixing, panel mounting bezel
- Other process connections

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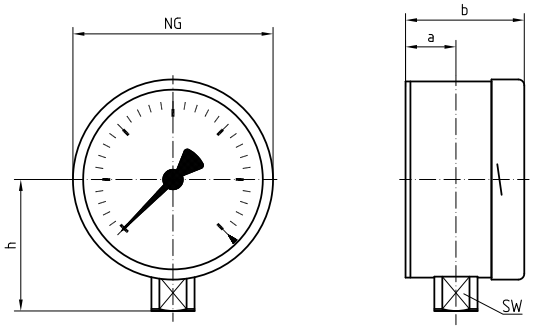
See page 88 for prices.

Bourdon tube pressure gauges for high pressure

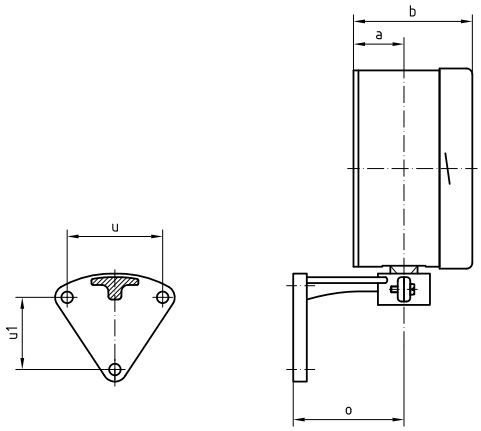
Type D 4 – NG 100 – 160

Housing types and dimensions

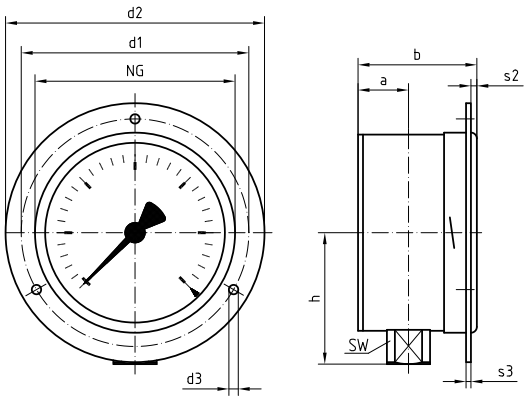
Bottom connection



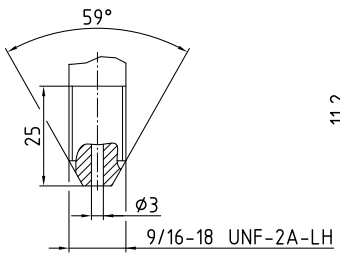
Bottom connection, with instrument bracket



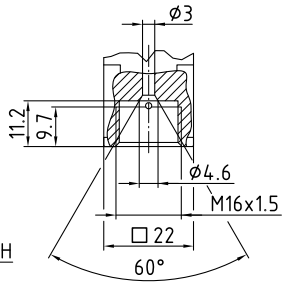
Bottom connection, 3-hole fixing, panel mounting bezel



HP connection
Male thread 9/16-18
UNF-2A-LH



HP connection
Female thread M 16 x 1.5



Dimensions (mm)

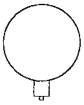
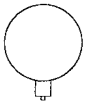
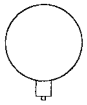
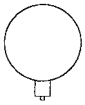
Nominal size (NG)	a	b	d1*	d2	d3*	d4	G	h	o	s2	s3	u	u1	SW					
100	25	57	116	132	4.8	M 4	M16 x 1.5	97	-	4	2	-	-	22					
160	26	65	178	196	5.8	M 5		127	63	4	2	65	56	22					

* Dimensions as per DIN 16064.

Bourdon tube pressure gauges for panel mounting
Bourdon tube pressure gauges for high pressure

1

DG: M

					Glycerine filling		Glycerine filling
Type	RF72, D311	RF96, D311	RF96, D312	RF100HD, D402	RF100HDGly, D802	RF160HD, D402	RF160HDGly, D802
Version							
Housing Ø	72 x 72	96 x 96	96 x 96	100	100	160	160
Housing	Stainless steel	Stainless steel	Stainless steel	Stainless steel 304			
Measuring element	Bourdon tube, copper alloy		Stainless steel	NiFe alloy			
Accuracy class	1.6	1.6	1.6	1.0	1.0	1.0	1.0
Connection	G¼B	G¼B	G¼B	HP connection ¼" with female thread M16 x 1.5 with sealing cone 60°			
PG	2	2	3	3	3	3	3
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85828311	85801311	85801312	---	---	---	---
-1/+0.6	85844311	85802311	85802312	---	---	---	---
-1/+1.5	85845311	85803311	85803312	---	---	---	---
-1/+3	85846311	85804311	85804312	---	---	---	---
-1/+5	85847311	85805311	85805312	---	---	---	---
-1/+9	85848311	85806311	85806312	---	---	---	---
-1/+15	85849311	85807311	85807312	---	---	---	---
Price €							
0/0.6	85829311	85809311	85809312	---	---	---	---
0/1	85830311	85810311	85810312	---	---	---	---
0/1.6	85831311	85811311	85811312	---	---	---	---
0/2.5	85832311	85812311	85812312	---	---	---	---
0/4	85833311	85813311	85813312	---	---	---	---
0/6	85834311	85814311	85814312	---	---	---	---
0/10	85835311	85815311	85815312	---	---	---	---
0/16	85836311	85816311	85816312	---	---	---	---
0/25	85837311	85817311	85817312	---	---	---	---
0/40	85838311	85818311	85818312	---	---	---	---
Price €							
0/60	85839311	85819311	85819312	---	---	---	---
0/100	85840311	85820311	85820312	---	---	---	---
0/160	85841311	85821311	85821312	---	---	---	---
0/250	85842311	85822311	85822312	---	---	---	---
0/400	85843311	85823311	85823312	---	---	---	---
Price €							
0/2,500	---	---	---	85247402	85247802	85277402	85277802
Price €							
0/4,000	---	---	---	85248402	85248802	85278402	85278802

Blue part no. = in-stock items

Bourdon tube pressure gauges for refrigeration engineering with glycerine filling

- 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

Application

For simultaneous measurement of vapour pressures and temperatures in refrigeration engineering.
! For measuring gas or vapour, observe 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 290
R 407A R 404A
R 744 R 717 (NH_3)
R 507

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 centre back
NG 63 – 100 D 7 centre back
NG 100 D 8 bottom back
7/16-20 UNF 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

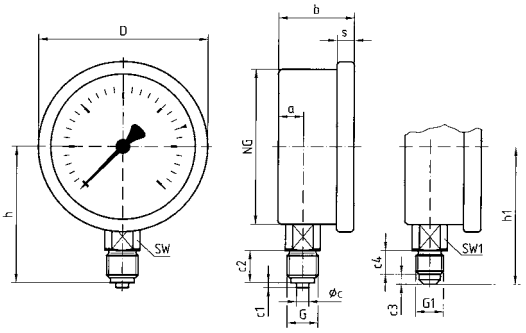
- Temperature scales for other refrigerants
- Back flange
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63/100)
- Damping screw
- Special scales
- Other process connections
- 7/16 – 20 UNF SAE J513 (45°)

i
See page 91 for prices.

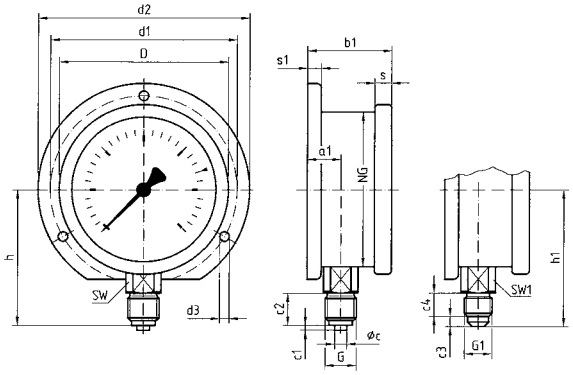
Bourdon tube pressure gauges for refrigeration engineering Type D 7/D 8 – NG 63/80/100

1 Housing types and dimensions

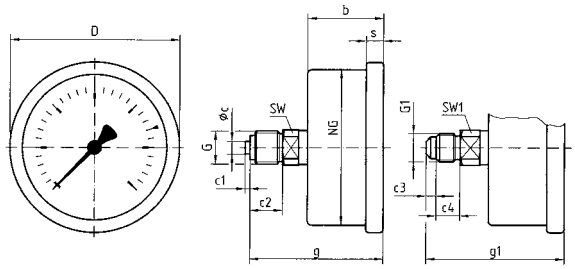
Type D 7 – bottom connection



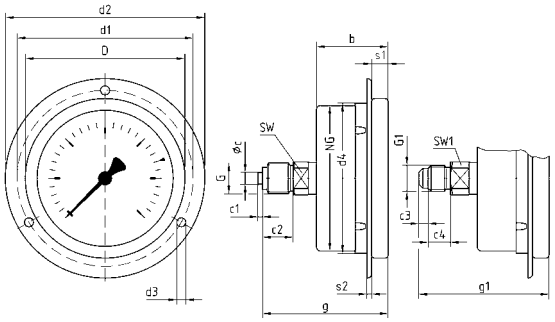
Type D 7 – bottom connection, back flange



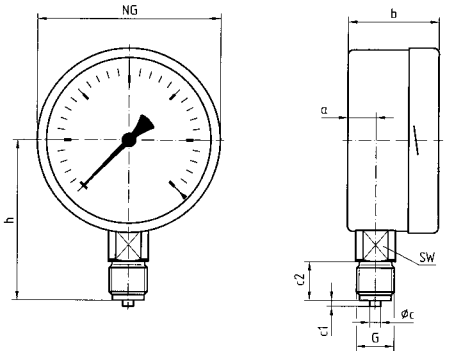
Type D 7 – centre back connection



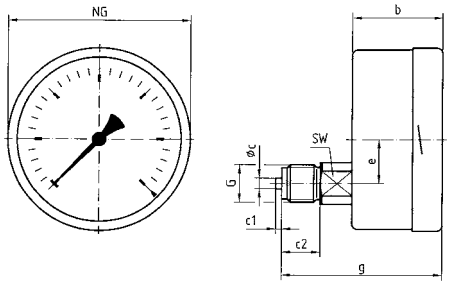
Type D 7 – centre back connection,
3-hole fixing, panel mounting bezel (NG 63/100)



Type D 8 – bottom connection



Type D 8 – centre back connection



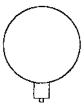
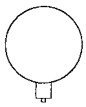
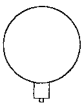
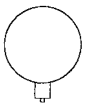
Dimensions (mm)

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)	11.5	13	32	35.5	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	Spanner size SW1																
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
PG	2	2	2	2	2	2	3	3
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	**PG**	**Price €**	
Wetted parts 316 Ti/316 L*	**3**		–

* Wetted parts stainless steel connection NG 63/80 = G¼B – NG 100 = G½B.

Blue part no. = in-stock items

i

See pages 74 and 116 for other extra charges.

Selection table – temperature scales for refrigerants (see chapter 9 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.

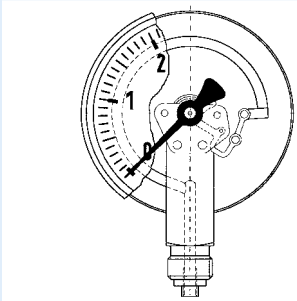
Temperature scale for refrigerant	**Code**
R 134a	A
R 404a/R 134a	B
R 502	C
R 404A	E
R 717 (NH3) – stainless steel with wetted parts only	F
R 407A	G
R 410A	H

Minimum order quantity = 10 pieces.

Bourdon tube pressure gauges for welding applications ISO 5171

1

- **Design as per ISO 5171**
- **Rear blow-out**
- **Measuring system cleaned, oil-free and grease-free**
- **Many customised versions available**



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
ISO 5171

Accuracy class
2.5

Ranges
-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-free and grease-free

Movement
Brass

Dial
Aluminium, white
Dial marking black

Designation
Label "Oxygen" and symbol "Free from oil and grease" for oxygen
Label "Acetylene" for acetylene

Pointer
Aluminium, black

Housing
D 2 – sheet steel, black
D 3 – stainless steel 304 with rear blow-out

Window
Plastic, snap-in

Options

- Litre scales for argon/CO_2
- Special scales
- Other connection threads

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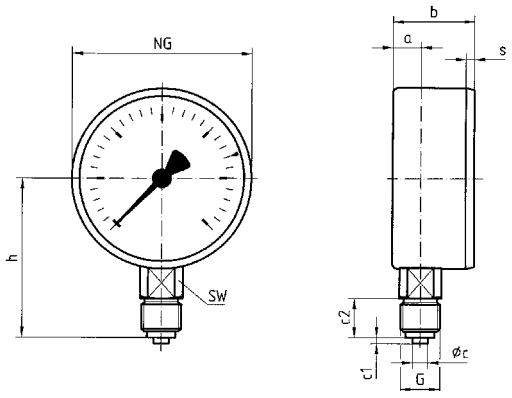
See page 96 for prices.

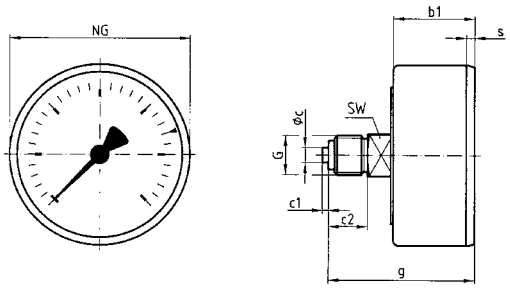
Bourdon tube pressure gauges for welding applications Type D 2/3 – NG 50/63

Housing types and dimensions

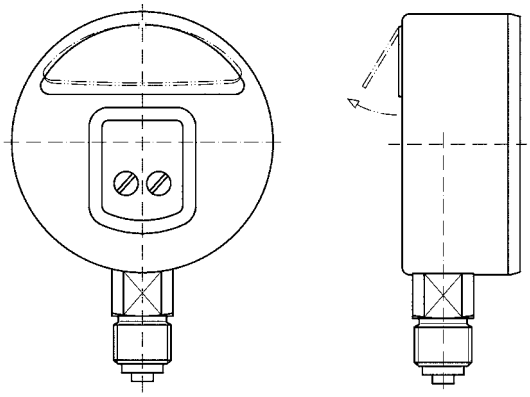
Bottom connection



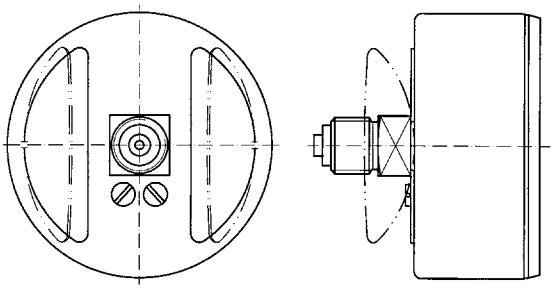
Centre back connection



Blow-out – bottom connection



Blow-out – centre back connection



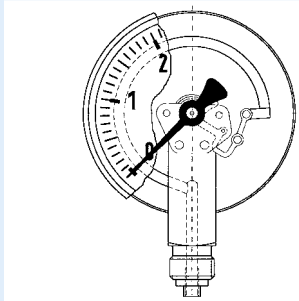
Dimensions (mm)

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 gas applications EN 837-1-S2

1

- **Version safety pressure gauge S2 as per EN 837-1**
- **Dual scale for measurement of different media (option)**
- **Rear blow-out**
- **Many customised versions available**



A

Page 154

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, observe the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 3

Nominal size
40 – 50 – 63

Version
EN 837-1 S2

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 – SW14 (EN 837-1/7.3)
NG 40: G⅛ B – SW12 (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

Window
Plastic, snap-in

Options

- Wetted parts stainless steel
- Wetted parts oil-free and grease-free
- Helium leak test
- Special scales
- Other connection threads
- Damping screw

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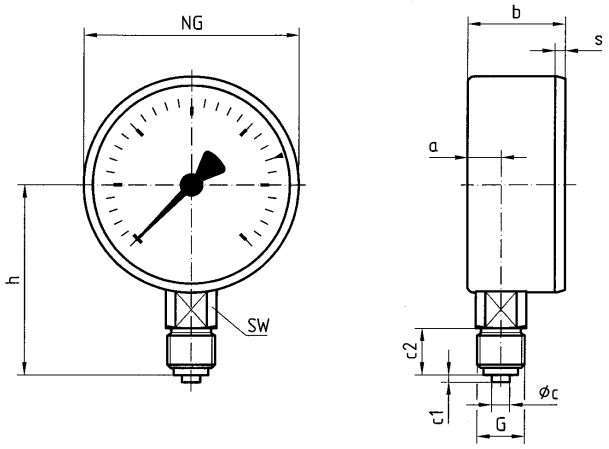
See page 96 for prices.

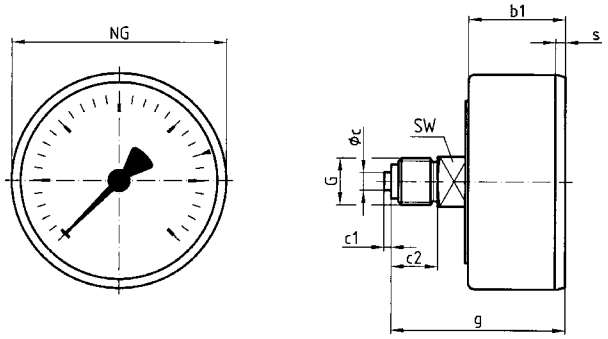
Bourdon tube pressure gauges for gas applications Type D 3 – NG 40/50/63

Housing types and dimensions

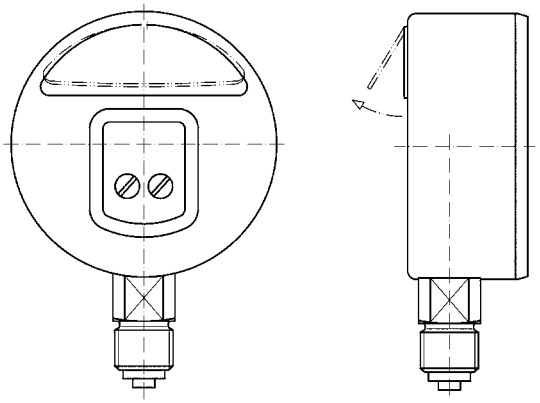
Bottom connection



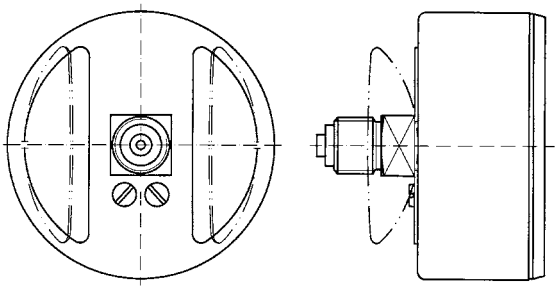
Centre back connection



Blow-out – bottom connection



Blow-out – centre back connection



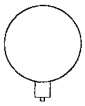
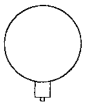
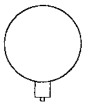
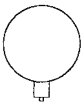
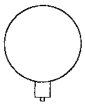
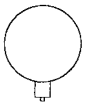
Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	G	g	h	s	SW
40	8.2	23.5	25	4	2	10	G⅛B	41.5	36	3	12
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

1

DG: M

	Version for welding applications ISO 5171							
Type	RF63ST, D301	RF40GT, D301 5)	RF50GT, D301	RF50GT, D311	RF63GT, D301	RF63GT, D311	RF50GT, D302 4)	RF63GT, D302 4)
Version								
Housing Ø	63	40	50	50	63	63	50	63
Housing	Stainless steel 304 with blow-out							
Measuring element	CU alloy, oil-free 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	1.6
Connection	G¼B	G1/8B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B
PG	2	2	2	2	2	2	3	3
Range (bar)	Part no.	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	85013301GT	85063301GT	85063311GT	85113301GT	85113311GT	85063302GT	85113302GT
0/6	88304301 2)	85014301GT	85064301GT	85064311GT	85114301GT	85114311GT	85064302GT	85114302GT
0/10	88305301	85015301GT	85065301GT	85065311GT	85115301GT	85115311GT	85065302GT	85115302GT
0/10	88306301 3)	---	---	---	---	---	---	---
0/16	88307301 2)	85016301GT	85066301GT	85066311GT	85116301GT	85116311GT	85066302GT	85116302GT
0/25	88308301	85017301GT	85067301GT	85067311GT	85117301GT	85117311GT	85067302GT	85117302GT
0/40	88309301 1)	85018301GT	85068301GT	85068311GT	85118301GT	85118311GT	85068302GT	85118302GT
0/40	88310301 2)	---	---	---	---	---	---	---
Price €								
0/60	---	85019301GT	85069301GT	85069311GT	85119301GT	85119311GT	85069302GT	85119302GT
0/100	---	85020301GT	85070301GT	85070311GT	85120301GT	85120311GT	85070302GT	85120302GT
0/160	---	85021301GT	85071301GT	85071311GT	85121301GT	85121311GT	85071302GT	85121302GT
0/250	88314301	85022301GT	85072301GT	85072311GT	85122301GT	85122311GT	85072302GT	85122302GT
0/315	88315301 2)	85023301GT	85079301GT	85079311GT	85129301GT	85129311GT	85079302GT	85129302GT
0/315	88316301	---	---	---	---	---	---	---
0/400	88317301	85024301GT	85073301GT	85073311GT	85123301GT	85123311GT	85073302GT	85123302GT

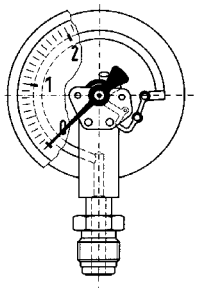
1) With label "Acetylene" 2) With label "Oxygen" 3) Scale 0/30 l/min "Argon" red, 0/28 l/min "CO_2" black
4) Extra charge centre back connection (type D312) 5) Extra charge centre back connection (type D311)
Minimum order quantity: type D301/D311 = 25 pieces, type D302/D312 = 10 pieces

Blue part no. = in-stock items

i See page 74 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**
- **Versatile connection technology**
- **GOSSTANDART-certified**



Application

Designed for highly demanding applications in terms of surface quality and purity of the wetted parts, particularly for measuring ultra-pure gases.

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

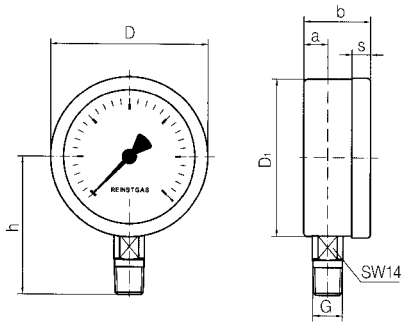
- Surface roughness Ra 0.4 µm
- Housing polished
- Push on bezel polished
- Electrical contacts
- Special scales
- NG 50
- Other process connections

See page 99 for prices.

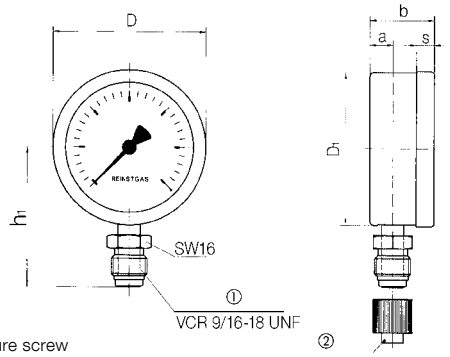
Bourdon tube pressure gauges for ultra-pure gas applications Type D 3 – NG 63

1 Housing types and dimensions

Bottom connection, ¼-18 NPT

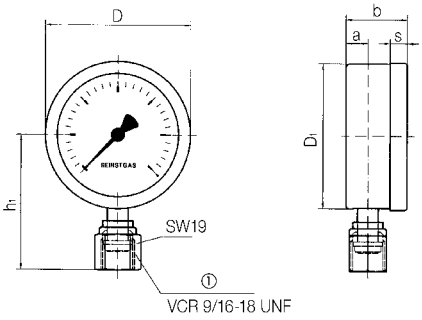


Bottom connection, 9/16-18 UNF, with pressure screw



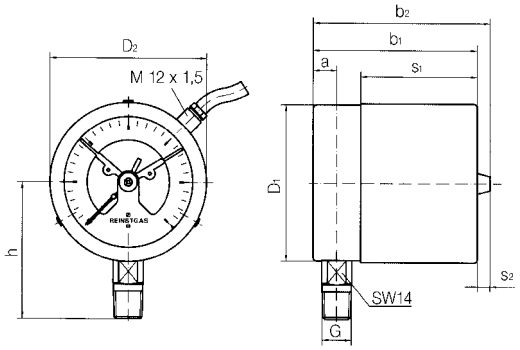
① Pressure screw
② Protective cap

Bottom connection, 9/16-18 UNF, with union nut

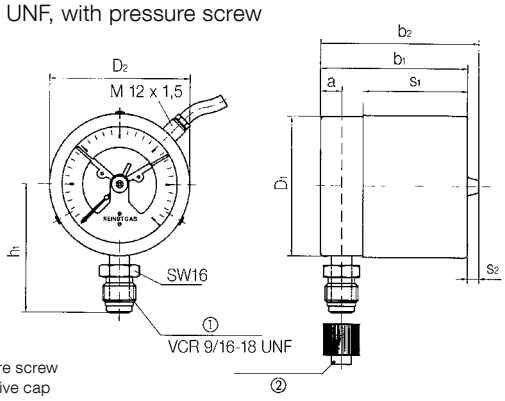


① Union nut

Version with contacts – bottom connection, ¼-18 NPT

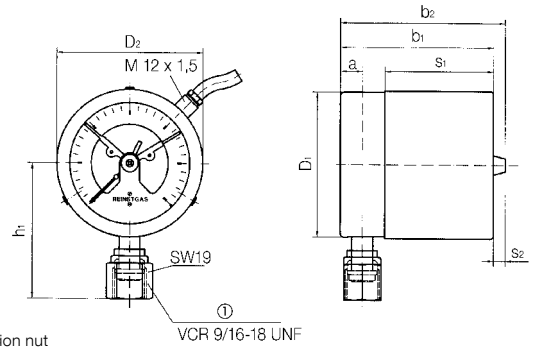


Version with contacts – bottom connection, 9/16-18 UNF, with pressure screw



① Pressure screw
② Protective cap

Version with contacts – bottom connection, 9/16-18 UNF, with union nut



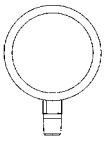
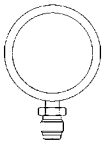
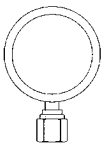
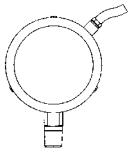
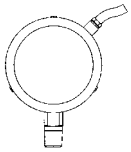
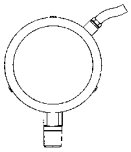
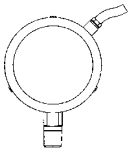
① Union nut

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, PG: 3

				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			

Blue part no. = in-stock items

SF6 gas density monitor

1

- **Housing permanently tight because welded and crimped**
- **Bimetal-compensated**
- **Robust and reliable**
- **With or without electrical contact**
- **With application-specific process connection**
- **GOSSTANDART-CERTIFIED**

Application

SF6 gas density monitors are designed to monitor the density of sulphur hexafluoride (SF 6) insulated high voltage switchgear (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 switchgear.

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)
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 L,
bottom or bottom 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

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)

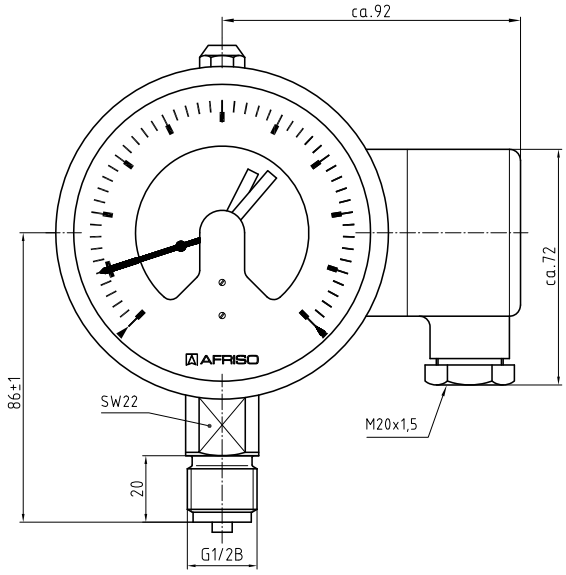
i Prices on request.

SF6 gas density monitor

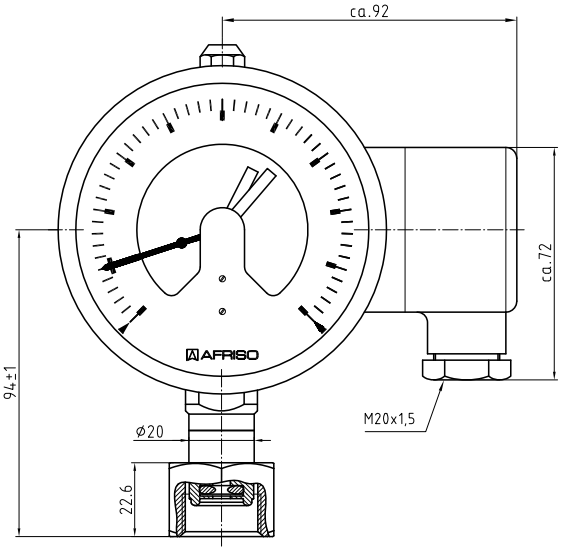
Type D 7 – NG 100

Housing types and dimensions

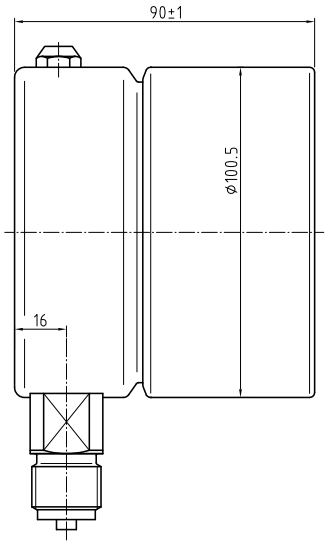
Bottom connection, G½B – spanner size SW 22



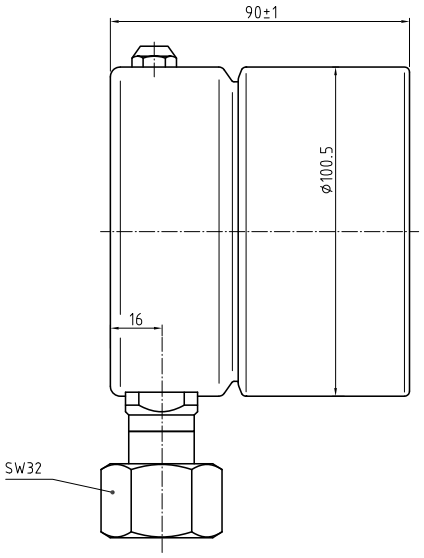
Connection DILO DN 8



Bottom connection, G½B – spanner size SW 22



Connection DILO DN 8

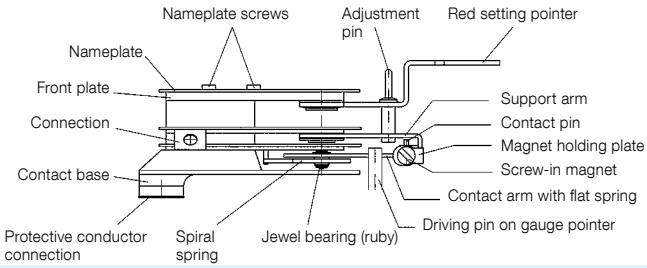


Electrical contacts electromechanical

1

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. They 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 (which are not described in detail here).

Type of action

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 (no filling)
Max. 15 W 20 VA (with filling)

Contact material
Ag80 Ni20 Au 10 µ
(extra charge for special materials)

Switching accuracy
Approx. 2–5 % of full scale value

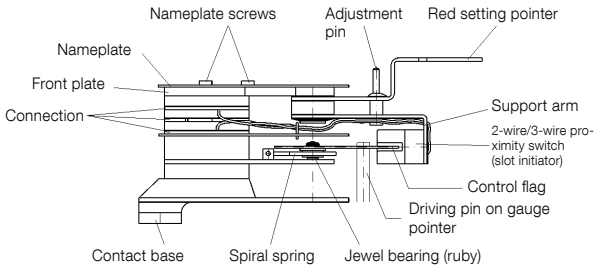
Operating temperature range
-20/+70 °C or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Electrical contacts electronic

Precision contact system

Sectional view



Electronic contact

Electronic contacts have non-contact electrical displacement pick-ups (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).

Type of action

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

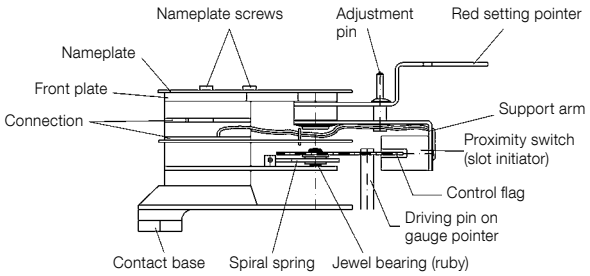
Adjustment range
5–95 % measuring range of gauge

Electrical contacts inductive

1

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).

Type of action

Inductive contacts are used together with an isolating switching amplifier. The switching 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 which 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 pressure gauge. 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, we recommend our cost-efficient isolating switching amplifiers KFA/KHA.

Version

Inductive contacts are shipped with a 2-wire initiator type Si2-K08-Y1.

Technical specifications

Nominal voltage
≈ DC 8 V = (Ri 1 kOhm)

Supply voltage
5–25 V

Current input
≥ 2.1 mA (active area free)
≤ 1.2 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 systems with safety integrity level SIL 2

SIL Protect your process!

Switching functions and definitions

Figure 1

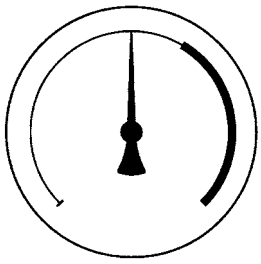


Figure 2

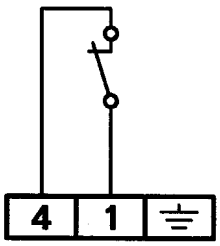
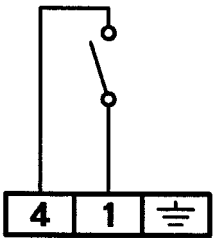


Figure 3



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 value 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 = magnetic spring contact
SK = sliding contact
EK = electronic contact
IK = inductive contact

Depending on the type of the pressure gauge, up to 4 contacts can be installed per gauge. The number of switching contacts is indicated by means of a figure (1 - 4) after the contact type.

Example: MK 2.12
- Magnetic spring contact,
- double
- Contact 1 closes
  Contact 2 opens

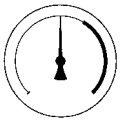
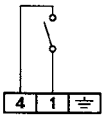
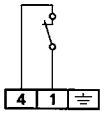
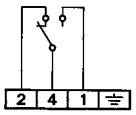
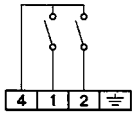
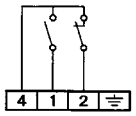
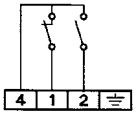
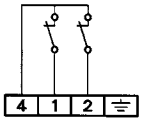
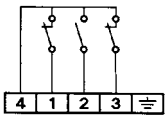
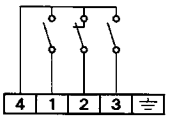
Definition of complete gauge

The code for the contact is appended to the type designation of the measuring instrument.

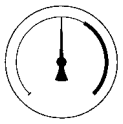
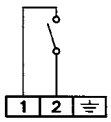
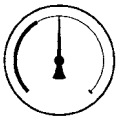
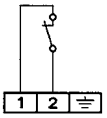
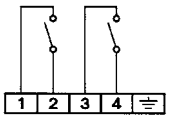
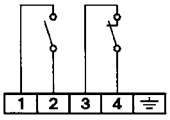
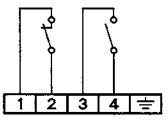
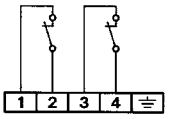
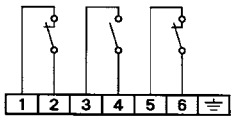
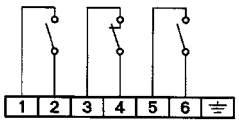
Example: RF100Ch IK1.2
- Bourdon tube pressure gauge,
- NG 100,
- Gauge for chemical applications
- Inductive contact single, Contact opens

Switching functions of electrical contacts (electromechanical)

1

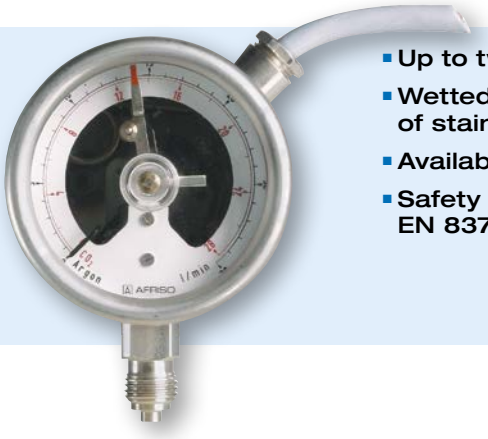
Switching scheme	Wiring diagram	Switching function (pointer moves clockwise)	Contact type	
			Magnetic spring contact	Sliding contact
Single contact				
		Contact closes	MK1.1	SK1.1
		Contact opens	MK1.2	SK1.2
		Contact switches over, i.e. 1 contact opens 1 contact closes	MK1.W	SK1.W
Double contact				
		Contact 1 closes Contact 2 closes	MK2.11	SK2.11
		Contact 1 closes Contact 2 opens	MK2.12	SK2.12
		Contact 1 opens Contact 2 closes	MK2.21	SK2.21
		Contact 1 opens Contact 2 opens	MK2.21	SK2.2
Triple contact				
		Contact 1 opens Contact 2 closes Contact 3 opens	MK3.212	SK3.212
		Contact 1 closes Contact 2 opens Contact 3 closes	MK3.121	SK3.121

Switching functions of inductive electrical contacts

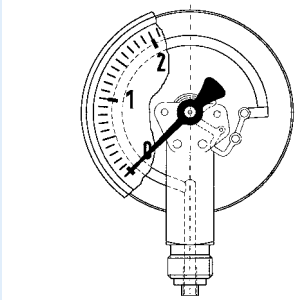
Switching scheme	Wiring diagram	Switching function	When the setpoint is exceeded, the gauge pointer moves the control flag ...	Contact type
		Pointer moves clockwise		**Inductive contact**
Single contact				
		Contact closes	out of the control head	IK1.1
		Contact opens	into the control head	IK1.2
Double contact				
		Contact 1 closes Contact 2 closes	of the 1st and 2nd contact out of the control head	IK2.11
		Contact 1 closes Contact 2 opens	of contact 1 out of the control head of contact 2 into the control head	IK2.12
		Contact 1 opens Contact 2 closes	of contact 1 into the control head of contact 2 out of the control head	IK2.21
		Contact 1 opens Contact 2 opens	of the 1st and the 2nd contact into the control head	IK2.22
Triple contact				
		Contact 1 opens Contact 2 closes Contact 3 opens	of the 1st and the 3rd contact into the control head of contact 2 out of the control head	IK3.212
		Contact 1 closes Contact 2 opens Contact 3 closes	of the 1st and the 3rd contact out of the control head of contact 2 into the control head	IK3.121

Bourdon tube pressure gauges with electrical contacts nominal size 63

1



- Up to two contacts possible
- Wetted parts and movement made of stainless steel
- Available with MK, EK, IK
- Safety housing S2 as per EN 837-1 (blow-out)

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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 in conjunction with an AFRISO alarm unit for low gas level.

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: $^2/_3$ x full scale value
Short-term: full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 103 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 L, bottom or bottom 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, safety housing S2 as per EN 837-1, with rear blow-out

Push on bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

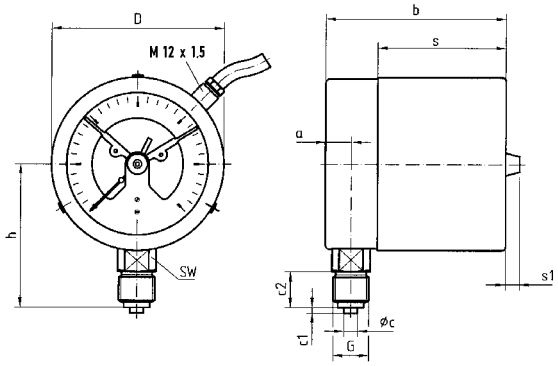
- Wetted parts oil-free and grease-free (≤ 0/400 bar)
- Ultra-pure gas version
- Back flange
- Damping screw
- Special scales
- Other process connections

i
See page 114 for prices.

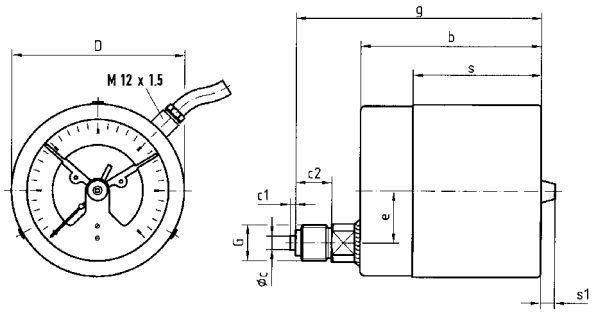
Bourdon tube pressure gauges with electrical contacts Nominal size 63 type D3

Housing types and dimensions

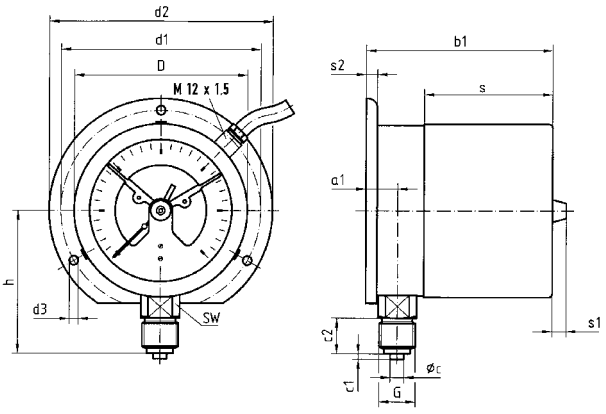
Bottom connection



Centre back connection



Bottom connection, back flange



Dimensions (mm)

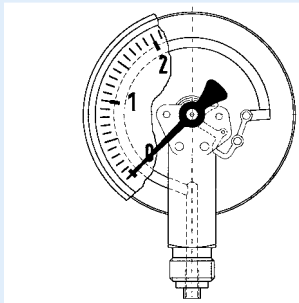
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	D*	d1*	d2*	d3*	g	G	h	s	s1	s2	SW
63	9.5	13	66	69.5	5	2	13	64	75	85	3.6	89	G¼B	46	47.5	8	5.5	14

* Dimensions as per DIN 16063

Pressure gauges for industrial applications with electrical contacts

1

- Robust stainless steel housing
- Excellent readability
- Up to three contacts
- 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.

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 0/1,000 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 103 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 bottom 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
Stainless steel 304 with blow-out

Bayonet type bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

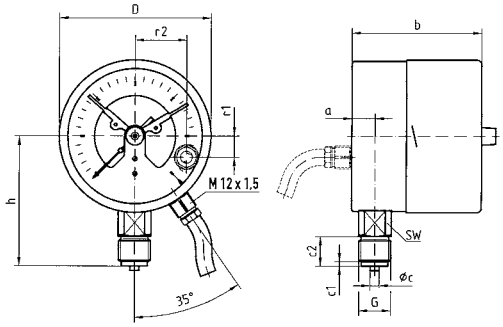
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Junction box
- Connector
- Special scales
- Other process connections

i
See page 115 for prices.

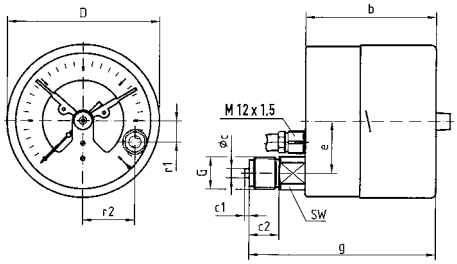
Pressure gauges for industrial applications with electrical contacts Type D 4 – NG 100

Housing types and dimensions

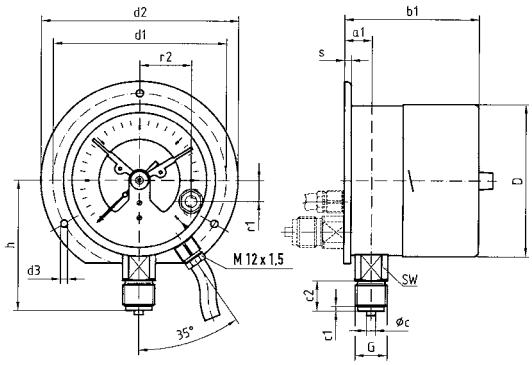
Bottom connection



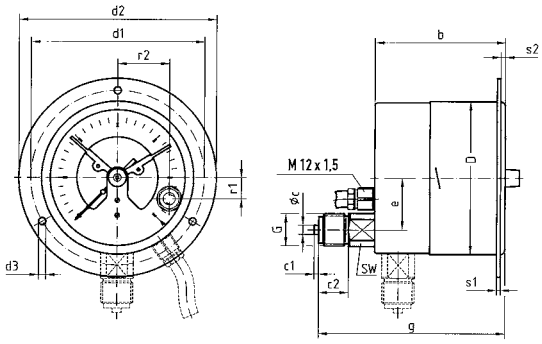
Centre back connection



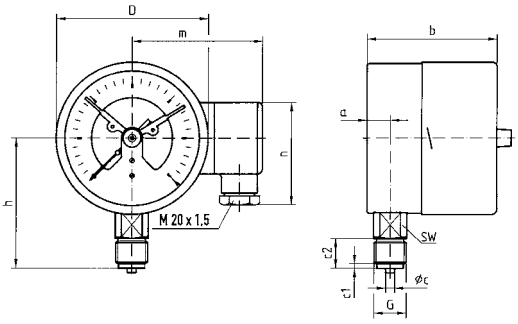
Bottom connection (centre back connection), back flange



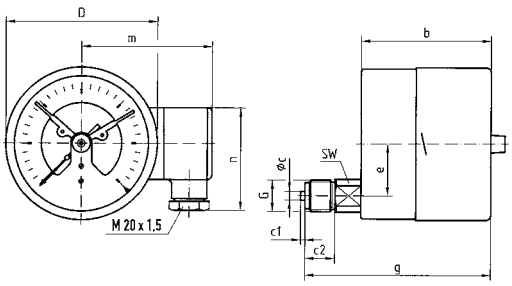
Centre back connection (bottom connection), 3-hole fixing, panel mounting bezel



Bottom connection, with junction box (option)



Centre 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 with electrical contacts for chemical applications

1

- Measuring system fully welded to housing
- Robust mechatronical pressure gauge
- Up to three contacts
- Tightness-tested with helium
- GOSSTANDART-certified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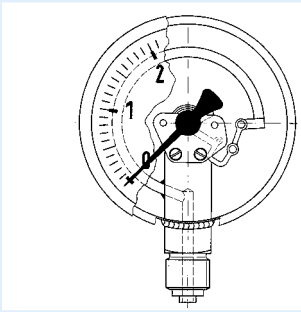


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments.

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 0/1,000 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 103 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 L, bottom or bottom 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 type bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

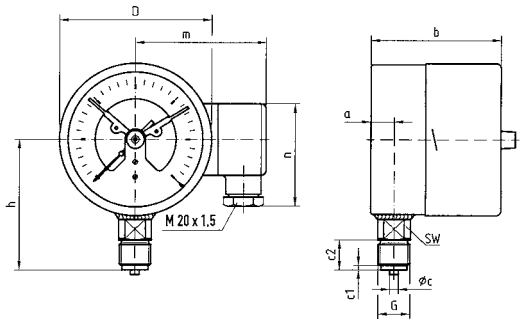
- Liquid filling (silicone oil)
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Connector
- Special scales
- Other process connections

i
See page 115 for prices.

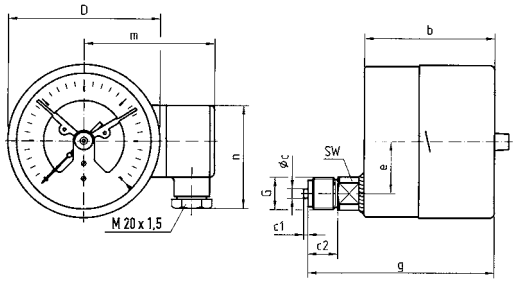
Bourdon tube pressure gauges with electrical contacts for chemical applications type D 4 – NG 100/160

Housing types and dimensions

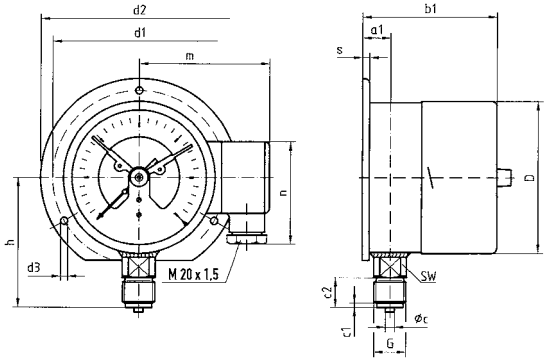
Bottom connection



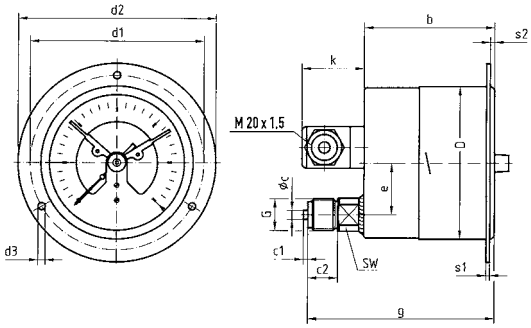
Centre back connection



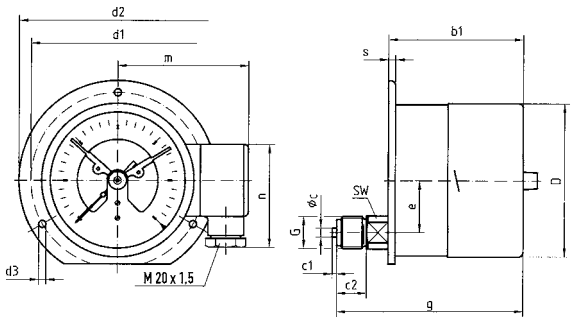
Bottom connection, back flange



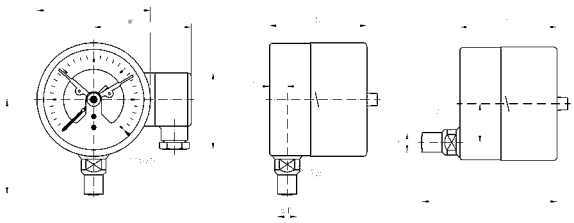
Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, back flange



Bottom connection, back for diaphragm seal mounting



Dimensions (mm)

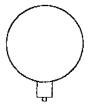
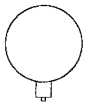
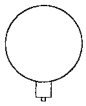
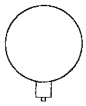
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	h1	k	m	n	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	34.5	121	G½B	86	83.5	40	92	72	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	34.5	131	G½B	116	116	40	122	72	6	2
Nominal size (NG)	S2	SW																			
100	4	22																			
160	4	22																			

* Dimensions as per DIN 16064.

Bourdon tube pressure gauges with electrical contacts

1

DG: M

Type	RF63MK1, D302	RF63MK2, D302	RF63IK1, D302	RF63IK2, D302
Version				
Housing Ø	63	63	63	63
Housing	Stainless steel 304 with push on bezel			
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L			
Accuracy class	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B
Contact type	Magnetic spring single	Magnetic spring double	Inductive, single	Inductive, double
PG	3	3	3	3
Range (bar)	Part no.	Part no.	Part no.	Part no.
Price €				
-1/0	---	---	---	---
-1/+0.6	87402302	87502302	87452302	87552302
-1/+1.5	87403302	87503302	87453302	87553302
-1/+3	87404302	87504302	87454302	87554302
-1/+5	87405302	87505302	87455302	87555302
-1/+9	87406302	87506302	87456302	87556302
-1/+15	87407302	87507302	87457302	87557302
Price €				
0/0.6	---	---	---	---
0/1	---	---	---	---
0/1.6	87411302	87511302	87461302	87561302
0/2.5	87412302	87512302	87462302	87562302
0/4	87413302	87513302	87463302	87563302
0/6	87414302	87514302	87464302	87564302
0/10	87415302	87515302	87465302	87565302
0/16	87416302	87516302	87466302	87566302
0/25	87417302	87517302	87467302	87567302
0/40	87418302	87518302	87468302	87568302
Price €				
0/60	87419302	87519302	87469302	87569302
0/100	87420302	87520302	87470302	87570302
0/160	87421302	87521302	87471302	87571302
0/250	87422302	87522302	87472302	87572302
0/400	87423302	87523302	87473302	87573302
Price €				
0/600	87424302	87524302	87474302	87574302
0/1,000	---	---	---	---

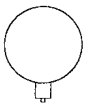
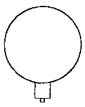
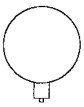
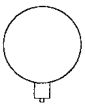
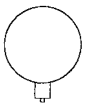
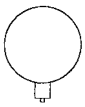
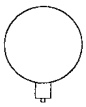
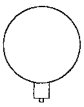
Blue part no. = in-stock items

Please specify required switching function (normally closed/normally open).
See page 116 for other versions.

AFRISO

Bourdon tube pressure gauges with electrical contacts

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 (> 60 bar stainless steel 316 Ti/316 L)				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
PG	2	2	2	2	3	3	3	3
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
0/1,000	87625401	87675401	87725401	87775401	87625402	87675402	87725402	87775402

Blue part no. = in-stock items

i

Please specify required switching function (normally closed/normally open).
See page 116 for other versions.

Extra charges for electrical contacts

1

DG: M, PG: 3

Type			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 D4 (only without filling)	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 MFW	160	With filling						
Standard diaphragm pressure gauges type D4/D8	100	No filling						
	160	No filling						
	100	With filling						
	160	With filling						
Diaphragm pressure gauges for chemical applications type D4/D8	100	No filling						
	160	No filling						
	100	With filling						
	160	With filling						

Blue part no. = in-stock items

DG: M, PG: 4

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 gauges 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)		

* Also available for nominal size 63, enquire for price.

Blue part no. = in-stock items

i

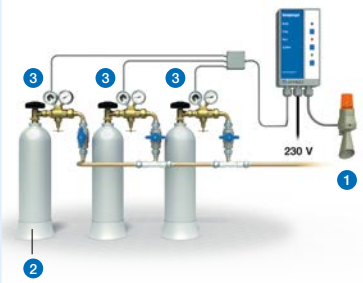
Versions with 4 electrical contacts on request.

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 GSM Page 390



1 Combined alarm light and horn
2 Cylinder battery
3 Pressure gauge with electrical contacts

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 outage, 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. Proper operation of the system can be checked at all times by means of pressing 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.

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: -20/+50 °C

Supply voltage
AC 230 V ±10 %

Power input
5 VA

Circuit to pressure gauge
Intrinsically safe, maximum values:
Ui = 16.8 V
Ii = 57 mA
P = 240 mW
c = 180 nF for IIC
675 nF for IIB
Li = 1 mH for IIC
8 mH for IIB

Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: Max. 250 V, 2 A,
(resistive load)

Response delay
None

Intrinsic safety
[Ex ia] IIC / Ex ia IIB

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)

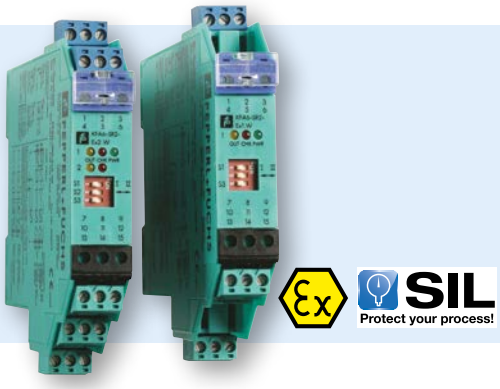
i See the catalogue DOMESTIC TECHNOLOGY for additional WATCHDOG-LINE alarm units for the detection of level, liquids, leaks, gases or smoke.

DG: M, PG: 4	Part no.	Price €
Alarm unit for low gas level	67006	

Blue part no. = in-stock items

Contact protection relays/isolating switching amplifiers for electrical contacts

1



Contact protection relay MSR

Application

Controlling the electromechanical contacts with pulse-shaped voltage avoids unwanted switching. This protects the contacts and prolongs their service life due to a dropout delay. Specially recommended for liquid-filled measuring instruments.

Technical specifications

Supply voltage
AC 230 V, 50–60 Hz
Power input approx. 6 VA

Control voltage
MSR DC 35–40 V pulses

Relay output
1 x voltage-free changeover contact
Switch rating max. 250 V/8 A

Supply voltage
DC 24 V, max. 20 mA for external devices or LED indicators

Housing
Polyamide 6.6, DIN rail mounting
35 x 7.5 as per EN 60715
W x H x D: 50 x 75 x 100 mm

Degree of protection
IP 20 (as per EN 60529)

Operating temperature range
0/70 °C

Isolating switching amplifier KFA/KHA

This isolation is suitable for intrinsically safe applications. The device transmits binary signals from SN/S1N proximity sensors and approved mechanical contacts from the hazardous area/Ex area to safe areas.

Supply voltage
AC 207–253 V, 45–65 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 II(1)G [Ex ia Ga] IIC
Ex II(1)D [Ex ia Da] IIIC
PTB 00 ATEX 2081

Housing
Makrolon, DIN rail mounting
35 x 7.5 mm as per EN 60715

Degree of protection
IP 20 as per IEC 529

Operating temperature range
-20/+60 °C

SIL
Up to SIL 2 as per IEC 61508/IEC 61511

i Please enquire for complete data sheets for the individual versions.

DG: H, PG: 4	Part no.	Price €
MSR 010, 1 contact	38201	
MSR 020, 2 contacts	38202	
MSR 011, interval	38203	

Blue part no. = in-stock items

DG: H, PG: 4	Part no.	Price €
KFA6-SR2-Ex1.W	38215	
KFA6-SR2-Ex2.W	38216	
KHA 6-SH-Ex 1	38217	

Blue part no. = in-stock items

Stainless steel diaphragm pressure gauges EN 837-3

- **Robust and compact design**
- **Various process connections possible**
- **Flush mounted versions without transmission liquid**
- **Welded, so no seals required in wetted area**
- **GOSSTANDART-certified**
- **ATEX version (optional)**

Application

For corrosive gaseous and liquid media, also for use in corrosive environments. With open connection flange also suitable for viscous and polluted media; with hygienic connections specially suitable for pharmaceutical processes.
! For measuring gas or vapour, observe 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
Overpressure safety 5 FSD,
however, max. 60 bar

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 65 (EN 60529)
with housing vent (≤ 25 bar): IP 54

Standard version

Connection
Stainless steel 316, bottom
G½B – spanner size SW 22 with channel hole 10 mm

Lower measuring flange
Stainless steel 316 Ti/316 L

Upper measuring flange
Stainless steel 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 type bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Glycerine filling (≥ 4 bar)
- Wetted parts with special coating
- Clamp connection
- Varivent or BioControl connection
- ATEX version

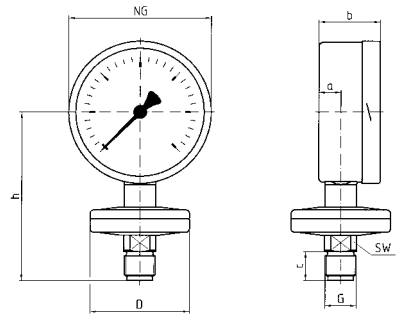
- Flush mounted connection flanges as per EN
- Open connection flanges as per EN/ANSI
- Other connection threads
- Electrical contacts (≥ 0/0.6 bar)

See page 121 for prices.

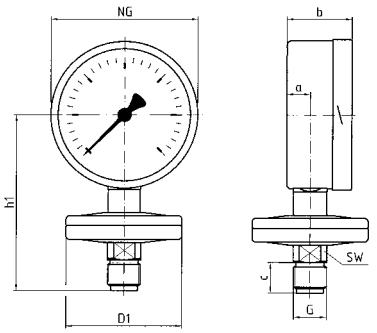
Stainless steel diaphragm pressure gauges Type D 4 – NG 100/160

1 Housing types and dimensions

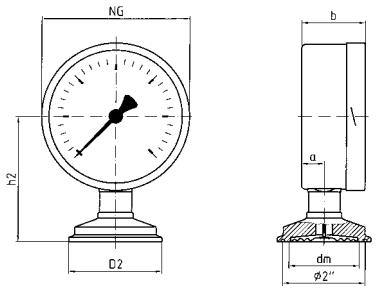
Bottom connection, 0/100 mbar to 0/2.5 bar



Bottom connection, 0/4 bar to 0/25 bar

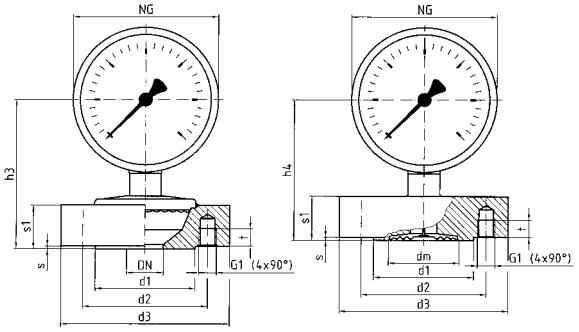


Clamp connection 2" as per ISO 2852, 0/1 bar to 0/6 bar

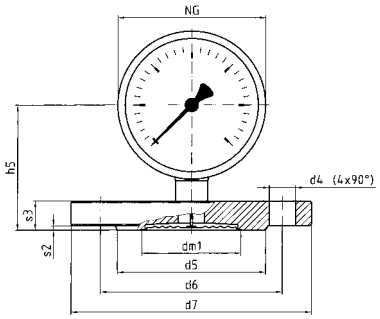


Connection flange as per EN 1092-1/B 1/DN 25/PN 40
Open, 0/100 mbar
Up to 0/25 bar

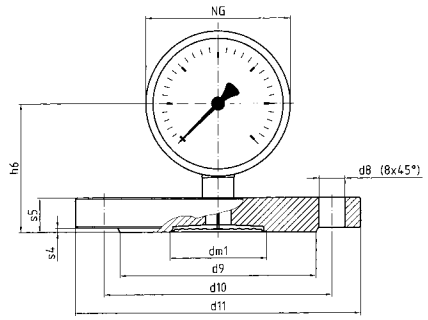
Flush mounted, 0/1 bar
Up to 0/6 bar



Flush mounted connection flange as per EN 1092-1/B 1
DN 50/PN 40, 0/100 mbar to 0/25 bar



Flush mounted connection flange as per EN 1092-1/B 1
DN 80/PN 40, 0/40 mbar to 0/25 bar



Dimensions (mm)

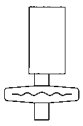
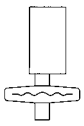
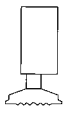
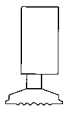
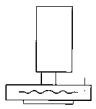
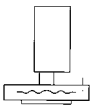
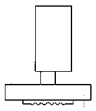
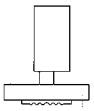
Nominal size (NG)	a	b	c	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	dm	dm1	D	D1	D2	DN
100	15.6	49	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25
160	17.5	50	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25

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, PG: 3

Type	PF100E, D402	PF160E, D402	PF100CP, D402	PF160CP, D402	PF100FLO, D402	PF160FLO, D402	PF100FL, D402	PF160FL, 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 L		Stainless steel 316 L, (4 bar and higher Duratherm)		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 mounted 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 €								
0/100	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	85944402	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

Blue part no. = in-stock items

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See page 128 for extra charges.

Extra charges for stainless steel diaphragm pressure gauges

1

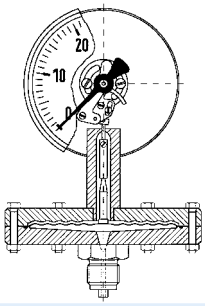
DG: H

Process connection			**Price €**
Groove/tongue as per EN 1092-1			
Connection G¼B (channel hole Ø 6 mm)			
Connection ¼ NPT (channel hole Ø 6 mm)			
Connection ½ NPT (channel hole Ø 10 mm)			
Connection M 20 x 1.5 (channel hole Ø 10 mm)			
Other connection threads			**On request**
Channel hole Ø 10 mm with connection G½B			**Standard**
VARIVENT®/VARINLINE®	Type N (D = 68 mm)	PN 25	**On request**
Neumo BioControl	D65 and D80	PN 25	**On request**
Flush mounted 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			**On request**
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			**On request**
Glycerine filling			**Price €**
Nominal size 100			
Nominal size 160			
Other			**Price €**
Vacuum proof (≥ 0/4 bar)			**Standard**
Electrical contacts (≥ 0/0.6 bar)			**See page 117**

Diaphragm pressure gauges for chemical applications EN 837-3

- For low pressure ranges
- High overload protection
- High resistance
- Optional flange connections

Page 151



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, observe 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
High overload: Up to 5 x FSD,
max. 40 bar / max. 2.5 bar
with measuring flange Ø 160 mm

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 304

Measuring element
Diaphragm
Measuring flange Ø 100: Duratherm
Measuring flange Ø 160: stainless steel 316 Ti/316 L

Seal
FPM (Viton)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet type 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/ASME

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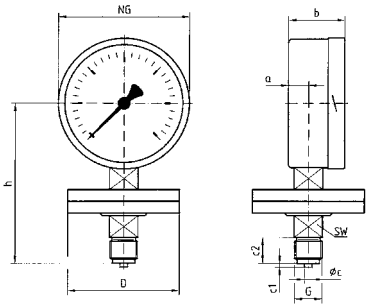
See page 127 for prices.

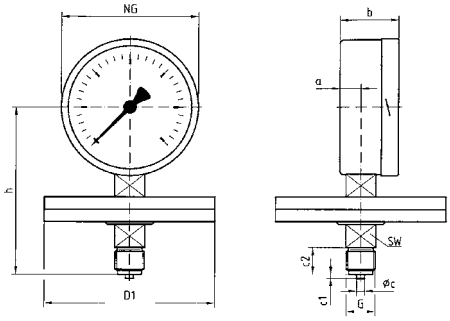
Diaphragm pressure gauges for chemical applications Type D 4 – NG 100/160

1 Housing types and dimensions

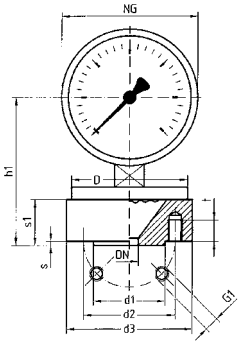
Bottom connection, measuring flange Ø 100



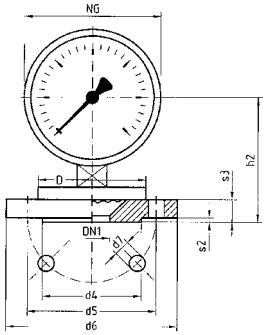
Bottom connection, measuring flange Ø 160



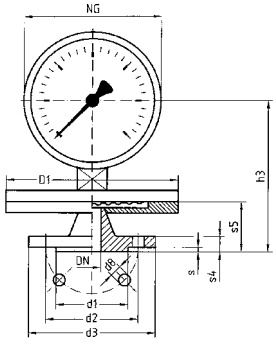
Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 100



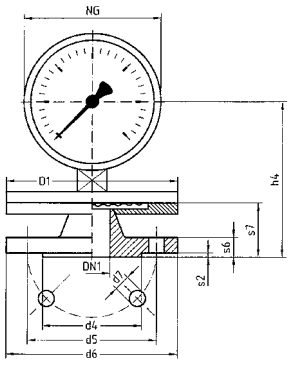
Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 100



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

EN 837-3

- For low pressure ranges
- High overpressure safety
- Robust design
- Optional flange connections

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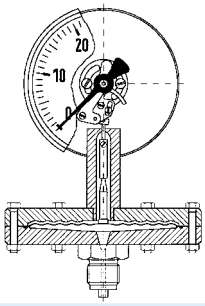

Application

For non-corrosive gaseous and liquid media. With open connection flange also suitable for viscous and polluted media.
! For measuring gas or vapour, observe 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
High overload: Up to 5 x FSD,
max. 40 bar / max. 2.5 bar
with measuring flange Ø 160 mm

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 304

Measuring element
Diaphragm, measuring flange Ø 100:
up to 1.6 bar Duratherm, ≥ 2.5 bar steel, galvanised.
Measuring flange Ø 160:
stainless steel 316 Ti/316 L

Seal
NBR (Perbunan)

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet type 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/ASME

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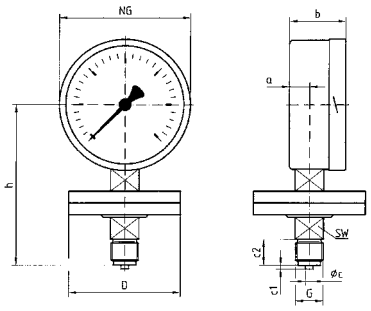
See page 127 for prices.

Standard diaphragm pressure gauges

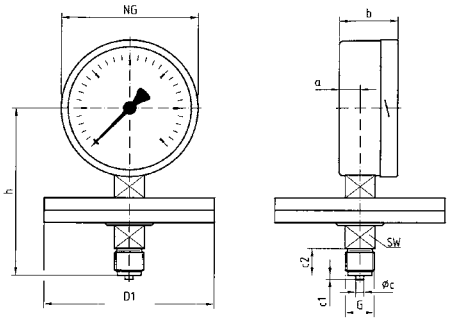
Type D 4 – NG 100/160

1 Housing types and dimensions

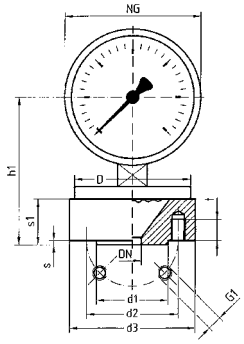
Bottom connection, measuring flange Ø 100



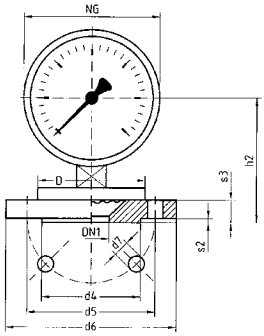
Bottom connection, measuring flange Ø 160



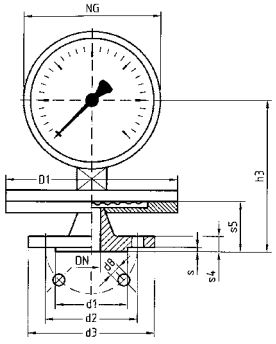
Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 100



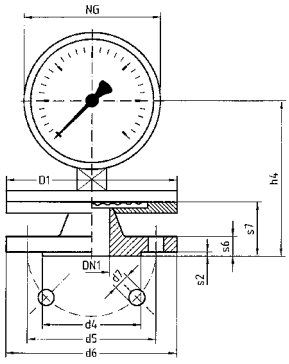
Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 100



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)

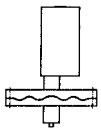
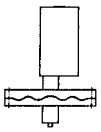
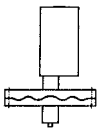
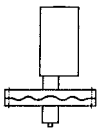
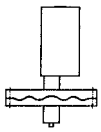
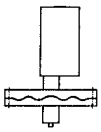
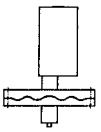
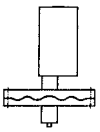
Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	156	141

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, PG: 3

			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

Blue part no. = in-stock items

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* ≤ 250 mbar Cl. 2.5, see page 74 for extra charges.

Extra charges for standard diaphragm pressure gauges / diaphragm pressure gauges for chemical applications

1

DG: H, PG: 3

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 CL 150	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)	**On request**	**On request**
Tantalum foil (≥ 160 mbar)		
Other materials	**On request**	

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	**On request**					
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 €**

Blue part no. = in-stock items

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See page 116 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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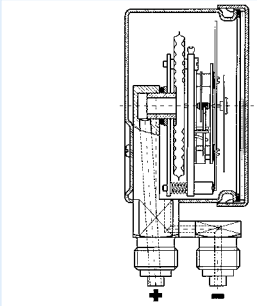


Application

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, observe 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 (25 to 400 mbar)
4 (4 to 16 mbar)

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&160:
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)
Perbunan (NBR)

Dial (wetted part)
Aluminium, white, dial marking black

Pointer (wetted)
Aluminium, black

Housing (wetted part)
Stainless steel 304

Bayonet type bezel/crimped bezel
Stainless steel 304

Window (wetted part)
Plastic (PMMA)

Fastening
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

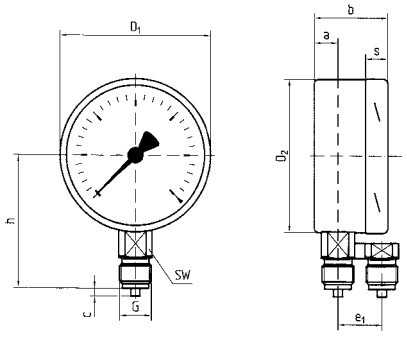
- Back flange
- 3-hole fixing, panel mounting bezel
- Hose connections
- Special scales
- Other process connections

See page 133 for prices.

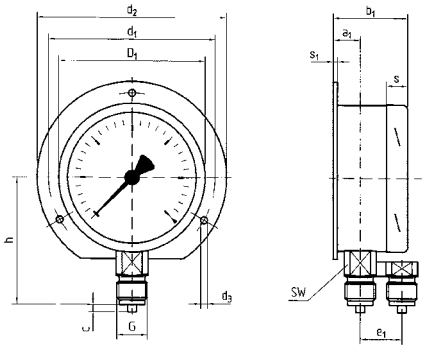
Standard capsule pressure gauges for differential pressure type D 9 – NG 63/type D 4 – NG 100/160

1 Housing types and dimensions

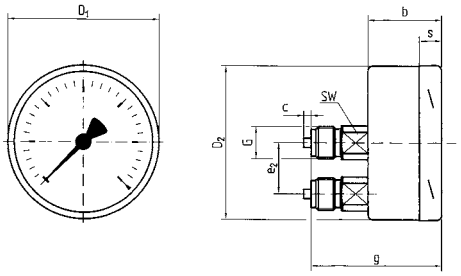
Bottom connection (NG 100/160)



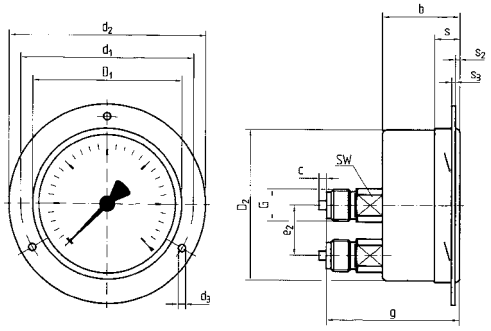
Bottom connection, back flange (NG 100/160)



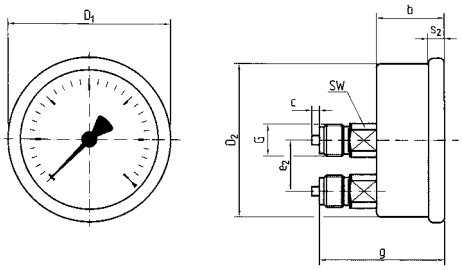
Centre back connection (NG 100/160)



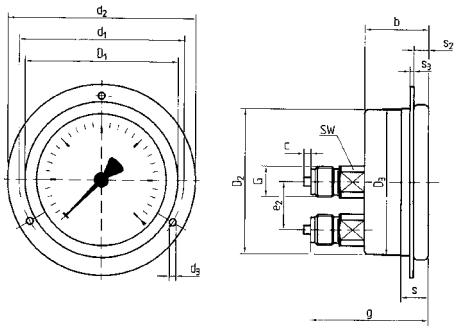
Centre back connection, 3-hole fixing, panel mounting bezel (NG 100/160)



Centre back connection (NG 63)



Centre back connection, 3-hole fixing, panel mounting bezel (NG 63)



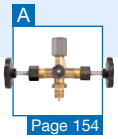
Dimensions (mm)

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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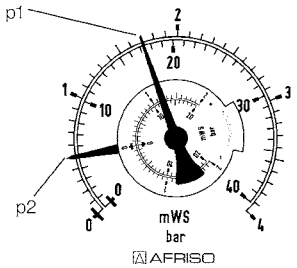
Reading example



p1 (+ connection)
p2 (- connection)
Δp (differential pressure)

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 (flow and return pipes).
! For measuring gas or vapour, observe 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 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
- Push on bezel sheet steel, black
- Nominal size 160 (type D1, housing plastic)
- Back flange
  (with stainless steel housing only)
- 3-hole fixing, panel mounting bezel
- Damping screw
- Special scales
- Other process connections

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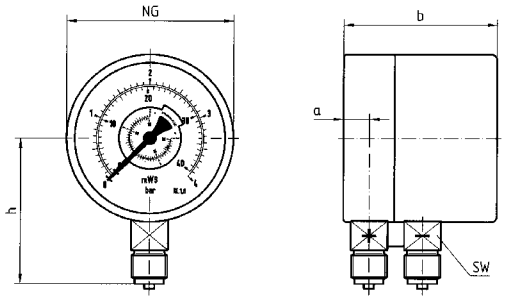
See page 133 for prices.

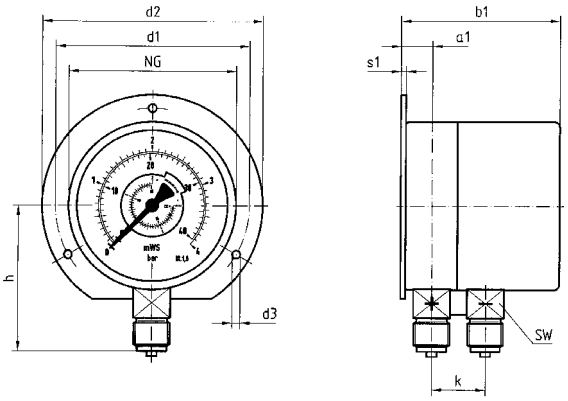
Standard Bourdon tube pressure gauges for differential pressure type D 2 – NG 100

1 Housing types and dimensions

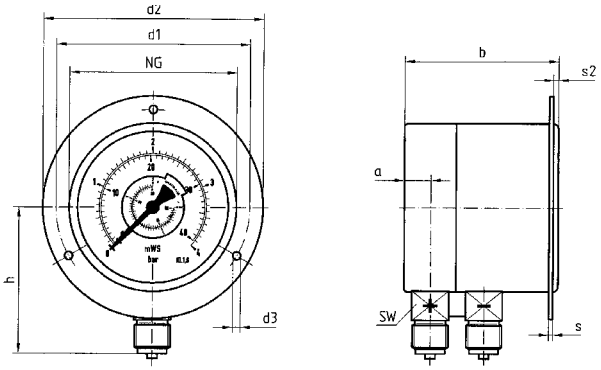
Bottom connection



Bottom connection, back flange (type D3)



Bottom connection, 3-hole fixing, panel mounting bezel



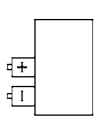
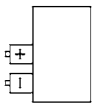
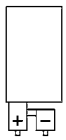
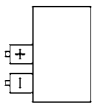
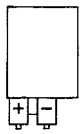
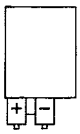
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	G	h	k	s	s1	s2	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, PG: 2

Type	KP63Dif, D 911	KP100Dif, D 401	KP100Dif, D 411	KP160Dif, D 401	KP160Dif, D 411	RF100Dif, D 201	RF100Dif, D 301
Version							
Housing Ø	63	100	100	160	160	100	100
Housing	Stainless steel 304, plastic window					Sheet steel	Stainless steel
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
Connection	G¼B	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.
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
0/1.6 bar	---	---	---	---	---	**85611201**	85611301
0/2.5 bar	---	---	---	---	---	**85612201**	85612301
0/4 bar	---	---	---	---	---	**85613201**	85613301
0/6 bar	---	---	---	---	---	**85614201**	85614301
0/10 bar	---	---	---	---	---	**85615201**	85615301
0/16 bar	---	---	---	---	---	**85616201**	85616301
0/25 bar	---	---	---	---	---	85617201	85617301
0/40 bar	---	---	---	---	---	85618201	85618301
Price €							
0/60 bar	---	---	---	---	---	85619201	85619301
0/100 bar	---	---	---	---	---	---	---
0/160 bar	---	---	---	---	---	---	---
0/250 bar	---	---	---	---	---	---	---
0/400 bar	---	---	---	---	---	---	---
Extra charges (PG: 3)						**Price €**	**Price €**
Wetted parts stainless steel	---	---	---	---	---		

* ≤ 16 mbar = accuracy class 4

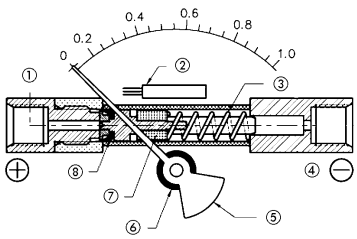
Blue part no. = in-stock items

See page 150 for extra charges for mounting accessories.

Magnetic piston pressure gauge for differential pressure – high overload protection

1

- **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.

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 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.

Technical specifications

Type
MAG 80/100 Dif D312

Nominal size
80–100 mm

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 ends

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)
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

Fastening
Wall mounting via mounting plate (option) or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

Options

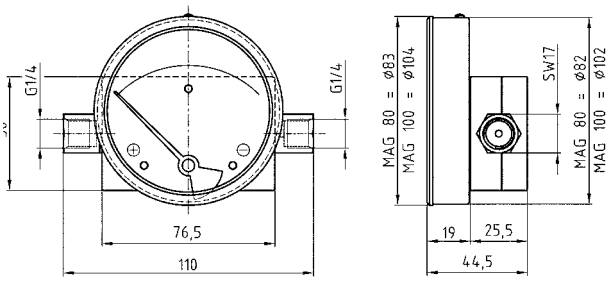
- Mounting plate with fixing clamp
- 3-hole fixing, panel mounting bezel
- Max. static pressure PN 250/400
- Other connection threads
- Other connection designs
- Window acrylic glass
- Electrical contacts (Reed contacts)
- Filter in "plus" connection
- Glycerine filling
- Maximum pointer
- Special scales

i
See page 143 for prices.

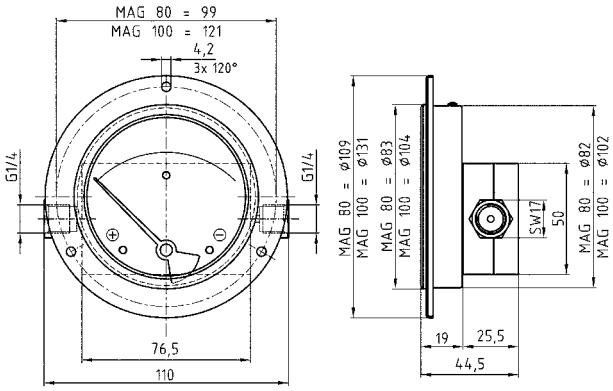
Magnetic piston pressure gauge for differential pressure – high overload protection type D 3 NG 80/100

Types and dimensions (mm)

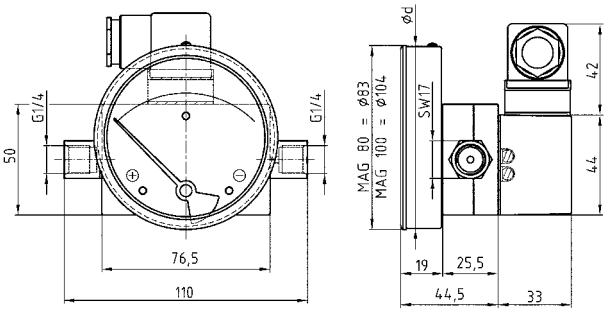
Lateral connection, right and left



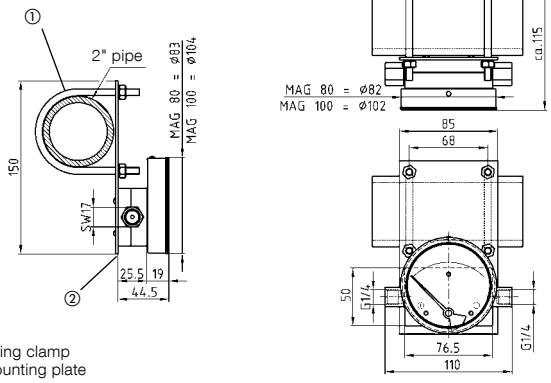
Connection on right and left sides
3-hole fixing, panel mounting bezel



Connection on right and left side,
with electrical contact



Mounting plate and fixing clamp



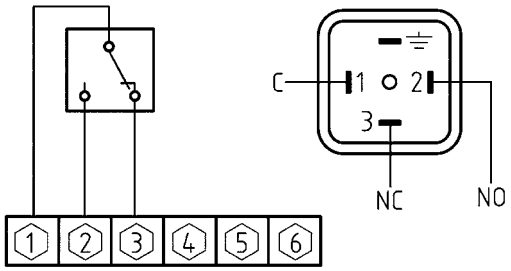
① Fixing clamp
② Mounting plate

Technical specifications electrical contact

Version: Reed contact, single, changeover contact (SPDT)

Max. switching voltage:	AC/DC 30 V
Max. switch rating:	AC 3 VA –- DC 3 W
Max. current:	AC/DC 300 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	20–80 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

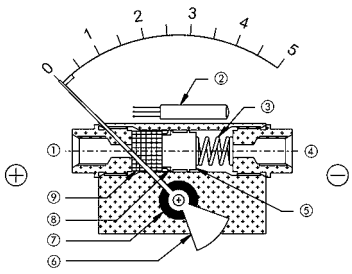
Wiring diagram



Magnetic piston pressure gauge with display at both sides – high overload protection

1

- **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**



① High pressure
② Reed switch
③ Measuring spring
④ Low pressure
⑤ Piston
⑥ Pointer
⑦ Ring magnet
⑧ Seal
⑨ Magnetic piston

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 technology applications. 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)
0/0.25 bar to 0/70 bar

Maximum static pressure
350 bar

Overpressure safety
Up to the maximum static pressure at both ends

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

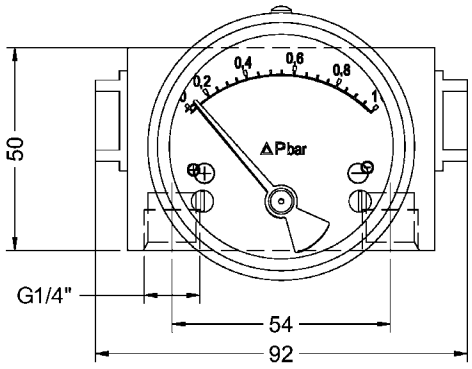
- Other connection threads
- Lateral connection, left and right
- Window acrylic glass
- Electrical contacts (Reed contacts)
- Filter in "plus" connection
- Glycerine filling
- Maximum pointer
- Special scales
- Connection block brass, stainless steel

i Prices on request.

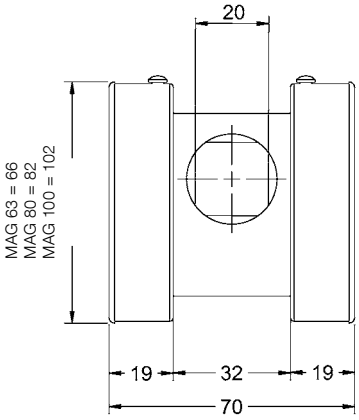
Magnetic piston pressure gauge for differential pressure – high overload protection type D 3 NG 63/80/100

Types and dimensions (mm)

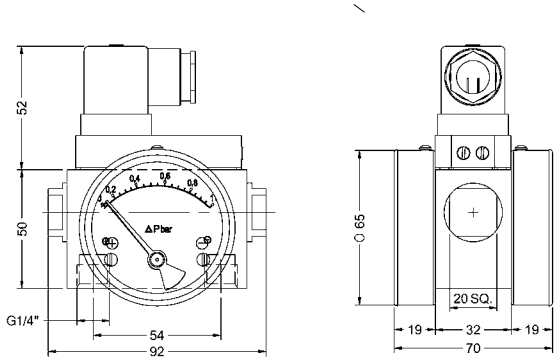
Lateral connection, right and left



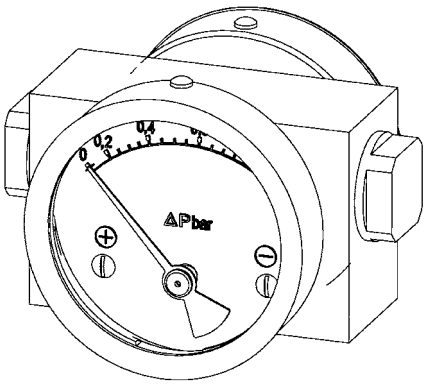
Lateral connection, right and left



Lateral connection, right and left
With electrical contact



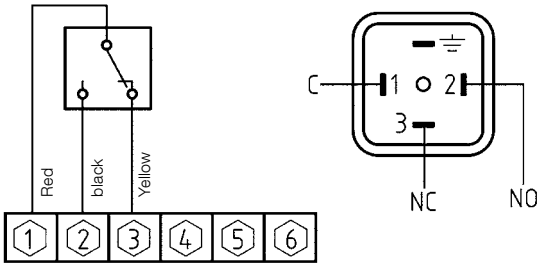
3D view



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)

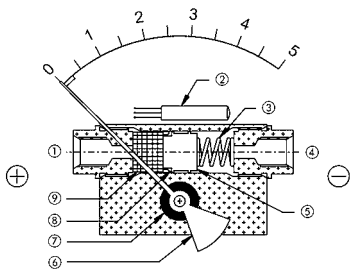
Wiring diagram



Magnetic piston pressure gauge for differential pressure – industrial version – high overload protection

1

- **Extremely compact and robust measuring system, can also be used for critical media**
- **Maximum static pressure PN 400**
- **High ranges up to 0/70 bar**
- **Leak-proof due to mechanical separation of pressure chamber and display**
- **Massive connection block for various mounting positions**



① High pressure
② Reed switch
③ Measuring spring
④ Low pressure
⑤ Piston
⑥ Pointer
⑦ Ring magnet
⑧ Seal
⑨ Magnetic piston

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 technology and pumping applications. Can also be used for corrosive media.

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. The complete mechanical separation of pressure chamber and display excludes the possibility of leaks.

Technical specifications

Type
MAG 80 I/100 I Dif

Nominal size
80–100 mm

Accuracy
±2 % of full scale value
(at increasing differential pressure)

Ranges (EN 837-3/5)
0/0.25 bar to 0/70 bar

Maximum static pressure
200 bar (aluminium, brass)
400 bar (stainless steel, Monel)

Overpressure safety
Up to the maximum static pressure

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 block (wetted part)
Aluminium, sides, opposite each other
2 x G¼ female thread (EN 837-3/7.3)

Measuring element (wetted part)
Compression spring stainless steel 301

Magnetic piston (wetted part)
Stainless steel 316/strontium ferrite

Seal (wetted part)
NBR

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

Fastening
Wall mounting via mounting plate (option)
or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

Options

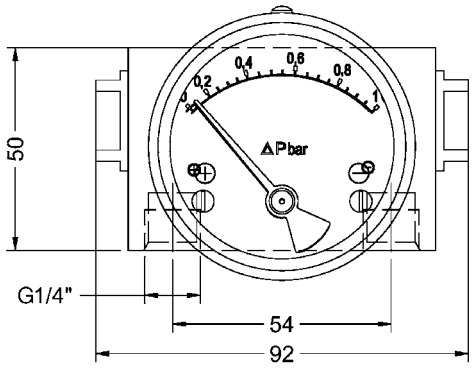
- Other connection threads
- Window acrylic glass
- Electrical contacts (Reed contacts)
- Connection block brass, stainless steel, Monel
- Mounting plate for wall mounting
- Mounting plate and fixing clamp for pipe mounting (2")
- Filter in "plus" connection
- Glycerine filling
- Maximum pointer
- Special scales
- 3-hole fixing, panel mounting bezel
- Other connection designs
- Other seal materials

i Prices on request.

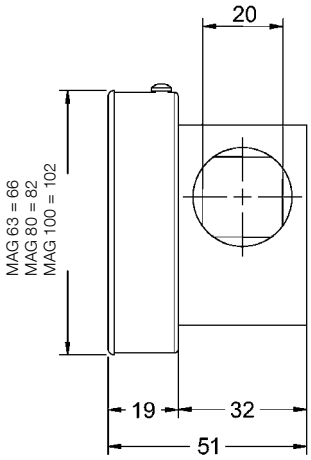
Magnetic piston pressure gauge for differential pressure – industrial version – high overload protection type D 3 NG 80/100

Types and dimensions (mm)

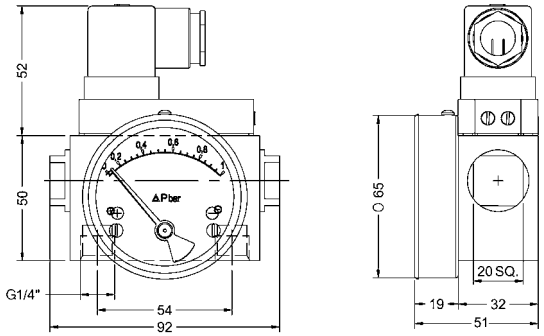
Lateral connection, right and left



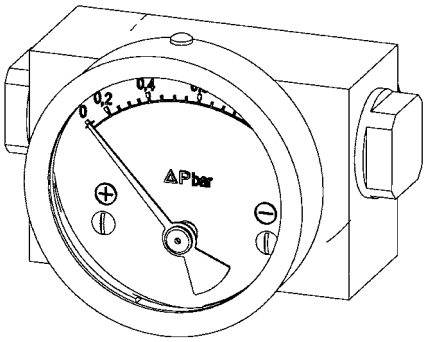
Lateral connection, right and left



Connection on right and left side, with electrical contact



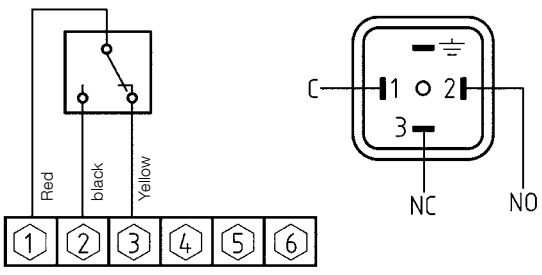
3D view



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)

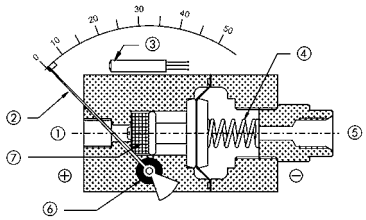
Wiring diagram



Magnetic piston diaphragm pressure gauges for medium differential pressure – high overload protection

1

- **Separating diaphragm between + and –**
- **Extremely compact and robust stainless steel measuring system**
- **Maximum static pressure PN 100**
- **IP 65 degree of protection for pressure gauge and switching contact**
- **Leak-proof due to mechanical separation of pressure chamber and display**



① High pressure
② Pointer
③ Reed switch
④ Measuring spring
⑤ Low pressure
⑥ Ring magnet
⑦ Magnetic piston

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 and checking backflow prevention systems.

Description

The pressures act on two pressure chambers separated by a magnetic piston and an additional diaphragm. 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. The complete mechanical separation of pressure chamber and display excludes the possibility of leaks.

Technical specifications

Type
MAG 80 M/100 M Dif

Nominal size
80–100 mm

Accuracy
±2 % of full scale value
(at increasing differential pressure)

Ranges (EN 837-3/5)
0/0.075 bar to 4 bar

Maximum static pressure
100 bar

Overpressure safety
Up to the maximum static pressure

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 block (wetted part)
Aluminium, sides, opposite each other
2 x ¼ NPT female thread (EN 837-3/7.3)

Measuring element (wetted part)
Compression spring stainless steel 301

Magnetic piston (wetted part)
Stainless steel 316/strontium ferrite

Seal (wetted part)
NBR

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

Fastening
Wall mounting via mounting plate (option) or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

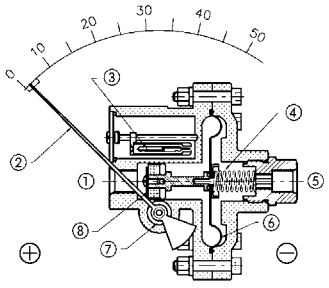
Options

- Other connection threads
- Window acrylic glass
- Electrical contacts (Reed contacts)
- Connection block brass, stainless steel
- Mounting plate for wall mounting
- Mounting plate and fixing clamp for pipe mounting (2")
- Filter in "plus" connection
- Glycerine filling
- Maximum pointer
- Special scales
- 3-hole fixing, panel mounting bezel
- Other connection designs
- Other seal materials

i Prices on request.

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.

Description

The pressures act on two pressure chambers separated by a diaphragm. If there are different pressures in the chambers, the diaphragm is axially displaced against a compression spring by a magnet. This displacement is transmitted to the pointer by means of a ring magnet mounted to the pointer hub. The differential pressure is directly indicated.

Technical specifications

Type
MAG 115 Dif D311

Nominal size
115 mm

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 ⅛ 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, white
Dial marking black
Scale angle 90° (first graduation mark after zero point at 15 % of full scale value)

Pointer
Aluminium, black

Housing
Stainless steel 304 with rubber sealing ring at the front

Window
Instrument glass

Fastening
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

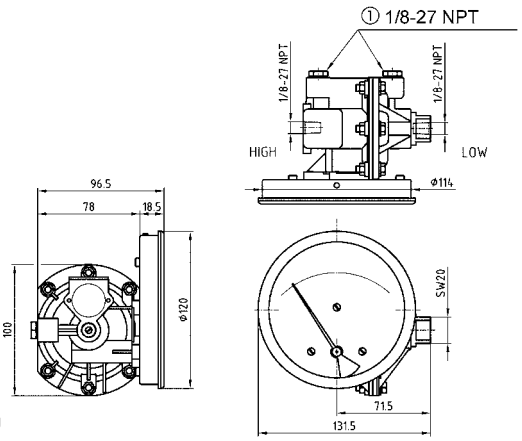
- Mounting plate with fixing clamp
- Window acrylic glass
- Electrical contacts (Reed contacts)
- Special scales

See page 143 for prices.

Magnetic diaphragm pressure gauges for very low differential pressure type D 3 NG 115

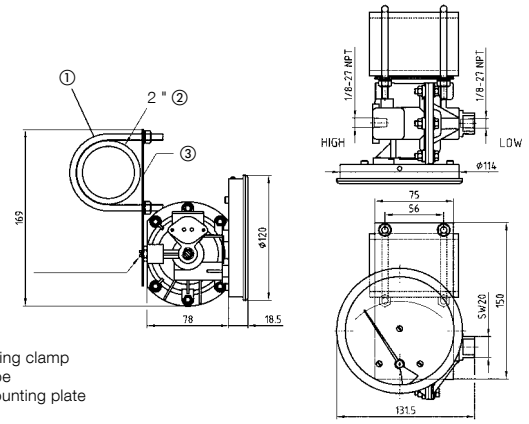
1 Types and dimensions (mm)

Connection on right and left sides or on rear



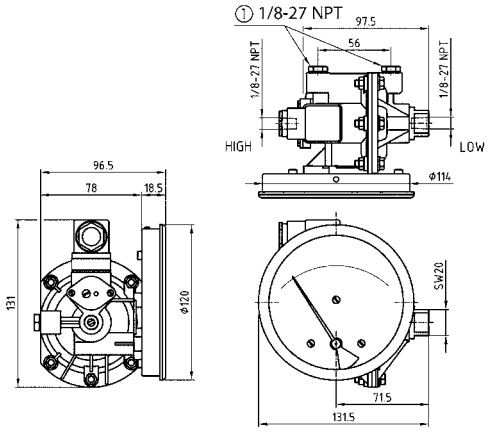
① Plug

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

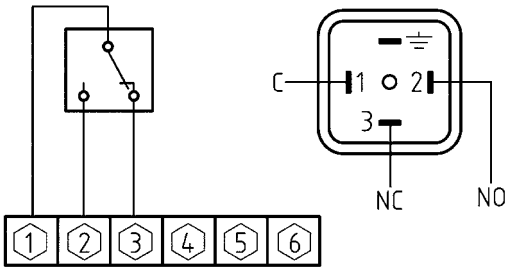


① Plug

Technical specifications electrical contact

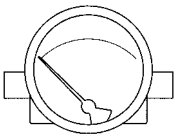
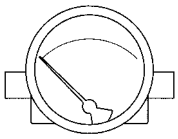
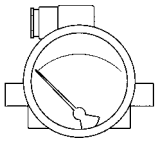
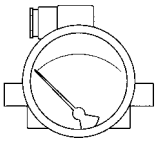
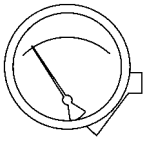
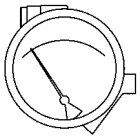
Version:	Reed contact, single, changeover contact (SPDT)
Max. switching voltage:	AC/DC 30 V
Max. switch rating:	AC 3 VA – DC 3 W
Max. current:	AC/DC 300 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	20–80 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

Wiring diagram



Magnetic piston pressure gauges/magnetic diaphragm pressure gauges for differential pressure

DG: M, PG: 3

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	100 bar				2.4 bar	
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!

Blue part no. = in-stock items

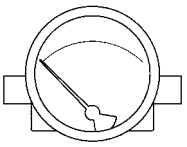
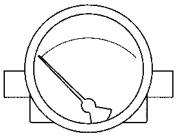
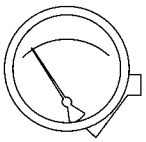
i

Please enquire for prices for magnetic piston pressure gauges.

Extra charges for Magnetic piston pressure gauges/magnetic diaphragm pressure gauges

1

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!)			---
Red / green colour strip			
Customer logo, monochrome			
Customer logo, bi-colour			

Blue part no. = in-stock items

Accessories

DG: M

Type		MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 115 Dif, D 311
	PG	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Aluminium mounting plate and fixing clamp for wall mounting or 2" pipe mounting	3	38001	38001	38304
Plastic mounting plate for wall mounting	1	38305	38305	---

Blue part no. = in-stock items

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**

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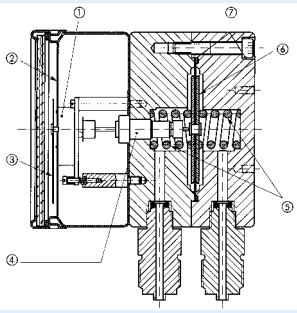


Function overview
① Movement
② Dial
③ Pointer
④ Transmission unit
⑤ Measuring spring
⑥ Diaphragm
⑦ Measuring flange

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 type bezel
Stainless steel 304

Window
Laminated safety glass

Options

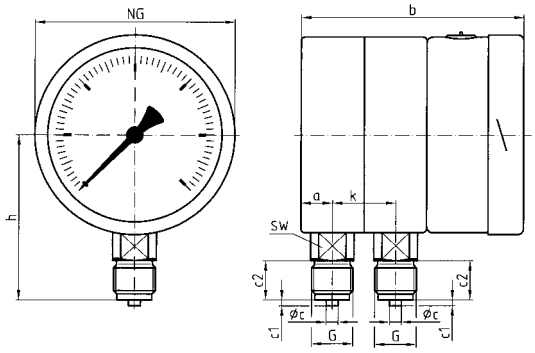
- Glycerine filling (type D 8)
- Back flange
- Special scales
- Other process connections

See page 149 for prices.

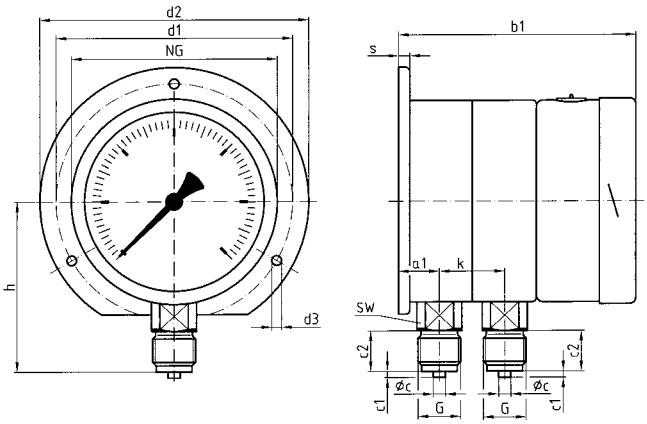
Standard spring-diaphragm pressure gauges for differential pressure type D 4 – NG 100

1 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.

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

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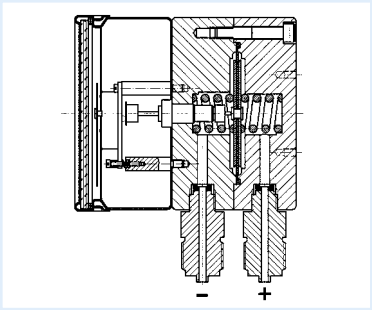


Application

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,
MF 100 = bottom parallel
in line/MFW 100 = parallel next to each other
2 x G½B – SW22 (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 type bezel
Stainless steel 304

Window
Laminated safety glass

Options

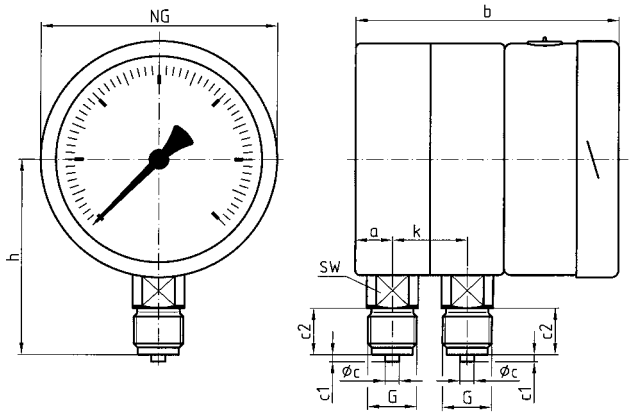
- Back flange (MF 100)
- Special scales
- Other process connections
- Electrical contacts (MFW 100)

See page 149 for prices.

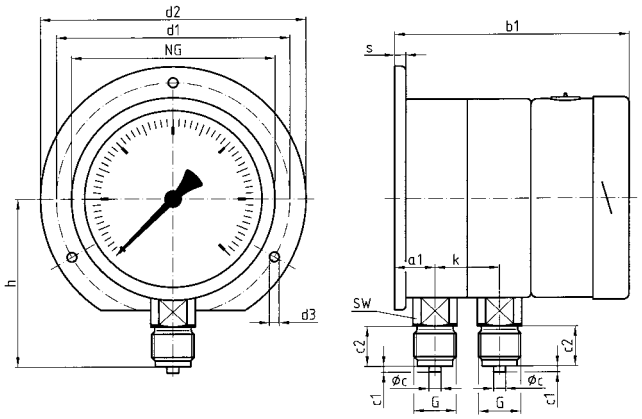
Spring-diaphragm pressure gauges for chemical applications for differential pressure type D 4 – NG 100

1 Housing type and dimensions

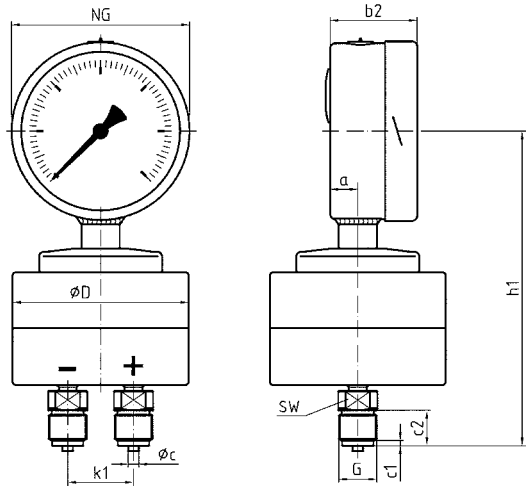
MF 100 Ch Dif D402
Bottom connection



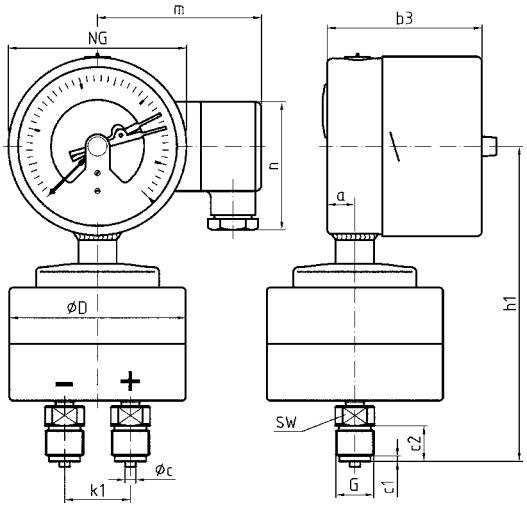
MF 100 Ch Dif D472
Bottom connection, back flange



MFW 100 Ch Dif D402
Bottom connection



MFW 100 Ch Dif D402
Bottom connection, with electrical contact



Dimensions (mm)

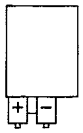
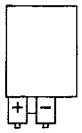
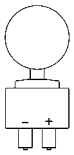
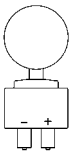
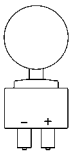
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	ØD	G	h	h1	k	k1	m
100	16	19	112.5	116.5	49	87	6	3	20	116	132	4.8	99	G½B	86	177	32	37	92

Nominal size (NG)	n	s	s1	s2	SW
100	72	2	5.5	3	22

* Dimensions as per DIN 16064.

Spring diaphragm pressure gauges for differential pressure

DG: M, PG: 3

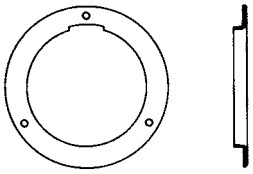
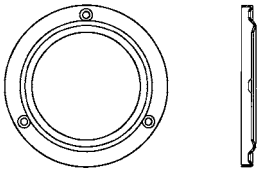
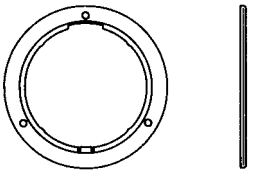
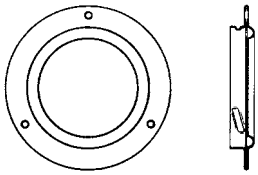
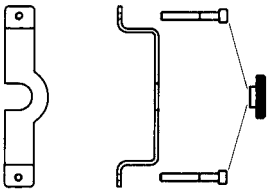
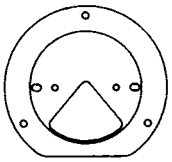
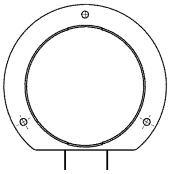
Type	MF 100 Dif, D401	MF 100 Ch Dif, D402	MFW 100 Ch Dif, D402	MFW 100 Ch Dif, MK1 D402	MFW 100 Ch Dif, IK1 D402
Version					
Housing Ø	100	100	100	100	100
Housing	Stainless steel 304, bayonet bezel stainless steel 304				
Measuring element	See data sheet				
Accuracy class	2.5	2.5	2.5	2.5	2.5
Connection	2 x G½B	2 x G½B	2 x G½B	2 x G½B	2 x G½B
Max. static pressure	25 bar	25 bar	25 bar	25 bar	25 bar
Range	Part no.	Part no.	Part no.	Part no.	Part no.
Price €					
0/40 mbar	---	---	---	---	---
0/60 mbar	---	---	---	---	---
0/100 mbar	---	---	---	---	---
0/160 mbar	---	---	---	---	---
0/250 mbar	88086401	88086402	88106402	88126402	88146402
0/400 mbar	88087401	88087402	88107402	88127402	88147402
0/600 mbar	88088401	88088402	88108402	88128402	88148402
Price €					
0/1 bar	88089401	88089402	88109402	88129402	88149402
0/1.6 bar	88090401	88090402	88110402	88130402	88150402
0/2.5 bar	88091401	88091402	88111402	88131402	88151402
0/4 bar	88092401	88092402	88112402	88132402	88152402
Price €					
0/6 bar	88093401	88093402	88113402	88133402	88153402
0/10 bar	---	---	88114402	88134402	88154402
0/16 bar	---	---	88115402	88135402	88155402
0/25 bar	---	---	88116402	88136402	88156402
Extra charges	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Max. static pressure PN 100	---	---	---	---	---
Glycerine filling				---	---
Silicone oil filling	---	---	---		
Wall mounting	Back flange		Connection piece for instrument bracket = standard. See page 156 for instrument brackets.		
Pipe mounting (2")	---	---	---	---	---

Blue part no. = in-stock items

Accessories for panel mounting and wall mounting

1

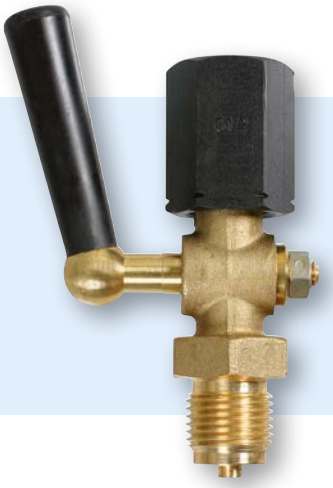
DG: M

Type	Housing diameter (mm)		50	63	80	100	160
	Description	PG	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	3-hole fixing, panel mounting bezel Stainless steel 304, for retrofitting (with mounting aid) to RF 50, 63, 100 centre back D7/D9 (stainless steel housing with crimped bezel), flat version	3	38014*	**38015****	---	38017*	---
	3-hole fixing, panel mounting bezel Stainless steel 304, for retrofitting (front side) to RF 63 centre back or bottom D6/D7/D9 (plastic or stainless steel housing with crimped bezel)	3	---	**38019****	---	---	---
	3-hole fixing, panel mounting bezel Plastic, black, for retrofitting to RF 63 back D611 (plastic housing with crimped bezel)	1	---	38003	---	---	---
	3-hole fixing, panel mounting bezel (bayonet type) Stainless steel 304, for factory-fitting to RF 100, 160 D4/D8 KP 63, 100, 160 D4 (stainless steel housing with bayonet bezel)	3	---	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, 80, 63 D711 (stainless steel housing)	3	38033	**38034**	38042	---	---
	Back flange Stainless steel 304, for factory-fitting to RF 63, 80, 100, 160 D3/D4/D7/D8/D9 KP 63, 80, 100, 160 D3/D4 (stainless steel housing)	3	---	38048**	38049**	38050**	38051**
	Back flange Stainless steel 304, for retrofitting to RF 63, D7/D9 (stainless steel housing with crimped bezel)	3	---	**38343****	---	---	---

* Polished
** Vibratory-finished

Blue part no. = in-stock items

Shut-off cocks and valves for pressure gauges



Shut-off cocks for pressure gauges

Application

Shut-off element between pipe and pressure gauge. Shut-off cocks with test port allow you to connect both pressure gauges and testers to the pipe. Suitable for liquids, gases and vapour.

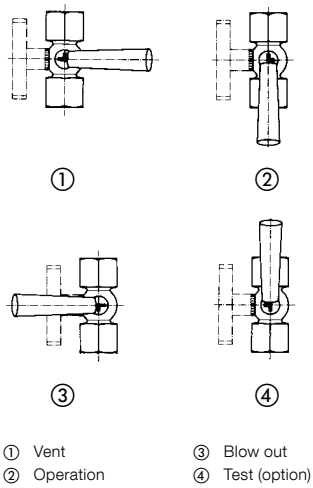
Technical specifications

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 gauges 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 M20 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 1.0460	-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	1.0460	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
Hand wheel	Plastic	Plastic	Plastic

i
See page 153 for prices.

Overpressure safety device, Pressure gauge push-button stop cock

1

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.

Overpressure safety device

Technical specifications

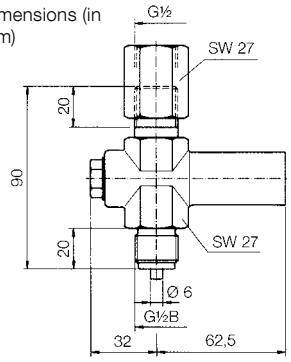
Function
When the set pressure is reached, a piston valve shuts off the port to the pressure gauge. After the pressure has dropped to a value of approx. 25 % below the closing pressure, the valve opens again.

Operating temperature range
Max. 80 °C

Overpressure safety
Brass: 600 bar
Stainless steel: 1,000 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

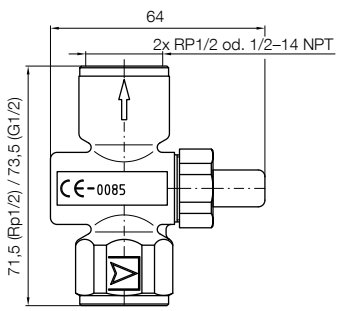
Pressure gauge push-button stop cock

Pressure gauge 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 and SVGW.

Dimensions (Rp ½ / ½-14 NPT)



Technical specifications

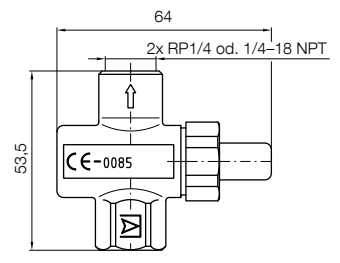
Test
DVGW- and SVGW-tested, with EC Type Examination Certificate, product ID number CE-0085AQ0985

Operating temperature range
Medium: 0/70 °C
Ambient: -20/+60 °C

Connection
2 x female thread
Rp ½, EN 10226
Rp ¼ EN 10226
½ NPT (without test)
¼ NPT (without test)

Nominal pressure
5 bar (MOP 5)

Dimensions (Rp ¼ / ¼-18 NPT)

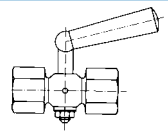


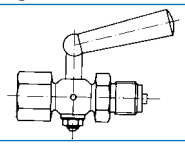
Housing
Brass, nickel-plated

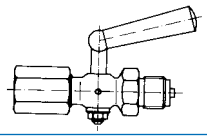
i
See page 154 for prices.

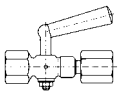
Accessories for pressure gauges

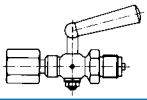
DG: H

Pressure gauge shut-off cock female x female						
	Connection	Nominal pressure	Material	PG	Part no.	**Price €**
	G¼	PN 6	Brass	2	**63001**	
	G⅜	PN 16	Brass	2	**63002**	
	G½	PN 16	Brass	2	**63003**	
With round test flange 40 x 5	G½	PN 16	Brass	2	63004	
With test flange 60 x 25 x 10	G½	PN 16	Brass	2	**63005**	
With sealing gland	G½	PN 16	Brass	2	**63006**	

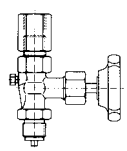
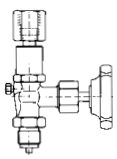
Pressure gauge shut-off cock female x male						
	Connection	Nominal pressure	Material	PG	Part no.	**Price €**
	G¼	PN 6	Brass	2	**63011**	
	G⅜	PN 16	Brass	2	**63012**	
	G½	PN 16	Brass	2	**63013**	
With round test flange 40 x 5	G½	PN 16	Brass	2	63009	
With test flange 60 x 25 x 10	G½	PN 16	Brass	2	63010	

Pressure gauge shut-off cock female/female x male						
	Connection	Nominal pressure	Material	PG	Part no.	**Price €**
	G¼	PN 6	Brass	2	63014	
	G½	PN 16	Brass	2	**63027**	
	G½	PN 16	1.4571	3	**63090**	
With test flange 60 x 25 x 10	G½	PN 16	Brass	2	**63028**	
With test flange 60 x 25 x 10	G½	PN 16	1.4571	3	63091	
With male test connection M20 x 1.5	G½	PN 16	Brass	2	63015	
With male test connection M20 x 1.5	G½	PN 16	1.4571	3	63016	

Pressure gauge shut-off cock loose female x female						
	Connection	Nominal pressure	Material	PG	Part no.	**Price €**
	G½	PN 16	Brass	2	63017	
With test flange 60 x 25 x 10	G½	PN 16	Brass	2	63018	

Pressure gauge shut-off cock loose female x male						
	Connection	Nominal pressure	Material	PG	Part no.	**Price €**
	G½	PN 16	Brass	2	63107	
With test flange 60 x 25 x 10	G½	PN 16	Brass	2	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	PG	Type A	**Price €**	Type B	**Price €**
						Part no.		Part no.	
		G¼	PN 125	Brass	2	**63094**		---	**---**
		G½	PN 250	Brass	2	**63092**		63046	
		G½	PN 400	Steel	3	63040		63047	
		G½	PN 400	1.4571	3	**63093**		63048	
Test connection male M20 x 1.5 **DIN 16271**		G½	PN 250	Brass	2	**63041**		63049	
		G½	PN 400	Steel	3	63042		63108	
		G½	PN 400	1.4571	3	63044		63109	
Extra charge oil-free and grease-free*						63045	**On request**	63110	**On request**
Extra charge DVGW-tested								---	

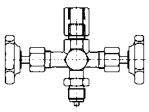
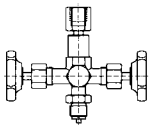
* Only for brass and stainless steel.

Accessories for pressure gauges

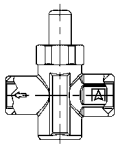
1

DG: H

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	PG	Type A	Price €	Type B	Price €
						Part no.		Part no.	
		G½	PN 250	Brass	2	63111		63115	
		G½	PN 400	Steel	3	63112		63116	
		G½	PN 400	1.4571	3	63113		63117	
Extra charge oil-free and grease-free (only for brass and stainless steel)					-	63114	**On request**	63118	**On request**

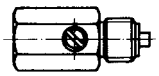
Pressure gauge push-button stop cock female x female – DVGW- and SVGW-tested/CE-0085AQ0985



Connection	Nominal pressure	Material	PG	Part no.	Price €
Rp ½, EN 10226	MOP 5	Brass, nickel-plated	2	**63031**	
Rp ¼, EN 10226	MOP 5	Brass, nickel-plated	2	**63191**	
¼-18 NPT*	MOP 5	Brass, nickel-plated	2	**63193**	
½-14 NPT*	MOP 5	Brass, nickel-plated	2	**63235**	

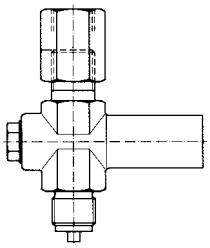
* Without DVGW and SVGW approval.

Damping device (pressure surge protection) female x male – adjustable



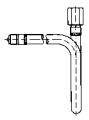
Connection	Nominal pressure	Material	PG	Part no.	Price €
G½	PN 400	Brass	2	**63074**	
G½	PN 400	316 Ti	3	**63076**	

Overpressure safety device G½ female/female connection x male – adjustable, vacuum-tight



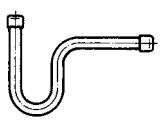
Adjustment range in bar	Material	PG	Part no.	Price €	Material	PG	Part no.	Price €
0.4–2.5	Brass	2	63131		316 Ti	3	63139	
2–6	Brass	2	63132		316 Ti	3	63140	
5–25	Brass	2	63133		316 Ti	3	63141	
20–60	Brass	2	63134		316 Ti	3	63142	
50–250	Brass	2	63135		316 Ti	3	63143	
240–400	Brass	2	63136		316 Ti	3	63144	
Extra charge oil-free and grease-free		-	63137	**On request**		-	63145	**On request**
Extra charge DVGW-tested		-	63138	**On request**		-	63146	**On request**

Siphon DIN 16282 – outlet female/female connection G½

	Shape	Inlet	Material	Nominal pressure	PG	Part no.	Price €
U shape 	A*	G½B	Steel	PN 100	3	63147	
	B	Without thread, welded end 20 x 2.6 mm	Steel	PN 100	3	**63148**	
	A*	G½B	316 Ti	PN 100	3	**63149**	
Circular shape 	C*	G½B	Steel	PN 100	3	63150	
	D	Without thread, welded end 20 x 2.6 mm	Steel	PN 100	3	**63151**	
	C*	G½B	316 Ti	PN 100	3	63152	

* Types A and C are no longer provided for in the new DIN edition.

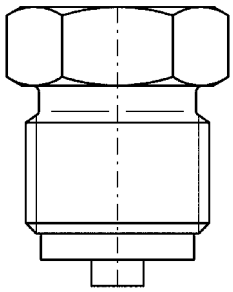
Siphon – standard – inlet G½

U shape	Circular shape	Shape	Outlet	Material	Nominal pressure	PG	Part no.	Price €
		U-	G½B	Steel	PN 25	3	**63085**	
		U-	Female/female connection G½B	Steel	PN 25	3	**63153**	
		Circular	G½B	Steel	PN 25	3	**63081**	
		Circular	Female/female connection G½B	Steel	PN 25	3	63154	

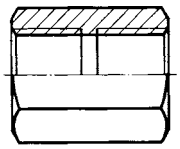
Blue part no. = in-stock items

Accessories for pressure gauges

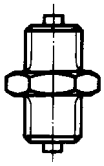
Reducers and adapters



Female connection	Male connection	Material	PG	Part no.	Price €
G1/8	G¼	Brass	2	**63050**	
G¼	G1/8	Brass	2	**63052**	
G¼	G3/8	Brass	2	**63053**	
G¼	G½	Brass	2	**63054**	
G¼	G½	316 Ti	3	63051	
G3/8	G¼	Brass	2	**63056**	
G3/8	G½	Brass	2	**63057**	
G½	G¼	Brass	2	**63058**	
G½	G3/8	Brass	2	**63059**	
G½	M20 x 1.5	Brass	2	63155	

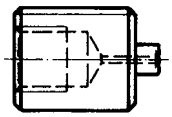


Female connection	Female connection	Material	PG	Part no.	Price €
G¼	G¼	Brass	2	63159	



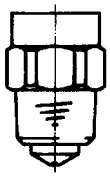
Male connection	Male connection	Material	PG	Part no.	Price €
G½	G½	Brass	2	63164	
G½	G½	316 Ti	3	63165	

Connection nipple – self-sealing



Female connection	Male connection	Material	PG	Part no.	Price €
G1/8	G¼	Brass	2	**63067**	
G¼	G3/8	Brass	2	**63068**	
G¼	G½	Brass	2	**63069**	
G3/8	G½	Brass	2	**63065**	

Mounting valve with self-sealing coating – automatically closes when the pressure gauge is replaced



Female connection	Male connection	Material	PG			Part no.	Price €
G¼	G¼	Brass	2	1	–	**77907**	
G¼	G3/8	Brass	2	1	–	**77908**	
G3/8	G3/8	Brass	2	1	–	**77917**	
G¼	G½	Brass	2	1	–	**77914**	
G3/8	G½	Brass	2	25	250	77918	

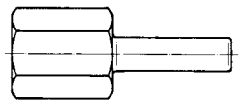
Blue part no. = in-stock items

Accessories for pressure gauges

1

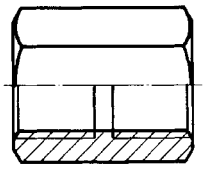
DG: H

Union nut + nipple DIN 16284



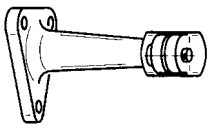
Female connection	Male connection	Material	PG	Part no.	Price €
G¼	6 mm	Brass	2	**63072**	
G½	12 mm	Brass	2	**63084**	
G½	12 mm	316 Ti	3	63070	

Female/female connection DIN 16283



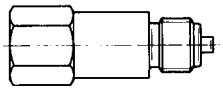
Female connection	Female connection	Material	PG	Part no.	Price €
G½ left	G½	Brass	2	63104	
G½ left	G½	Steel	3	63105	
G½ left	G½	316 Ti	3	63106	

Instrument bracket DIN 16281 – type H



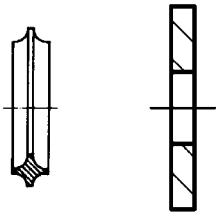
Female connection	Protrusion	Material	PG	Part no.	Price €
26 mm	60 mm	Aluminium	3	**63077**	
26 mm	100 mm	Aluminium	3	**63078**	
26 mm	100 mm	316 Ti	3	63080	

Adapter DIN 16281



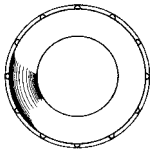
Female connection	Male connection	Material	PG	Part no.	Price €
G½	G½	Brass	2	**63095**	
G½	G½	Steel	3	63097	
G½	G½	316 Ti	3	63096	

Seals



Shape	For thread	Material	PG	Part no.	Price €
Profile seal for inner centering	G¼ M12 x 1.5	Copper	2	**39205**	
Profile seal for inner centering	G½ M20 x 1.5	Copper	2	**39206**	
Flat gasket DIN 16258	G¼ M12 x 1.5	Copper	2	**39209**	
Flat gasket DIN 16258	G½ M20 x 1.5	Copper	2	**39210**	
Flat gasket DIN 16258	G½ M20 x 1.5	316 Ti	3	39211	
Flat gasket DIN 16258	G½ M20 x 1.5	PTFE	1	**39212**	

Protective caps



Nominal size*	Colour*	Material	PG	Part no.	Price €
63	Blue	Rubber	1	**63029**	
63	Red	Rubber	1	**63100**	
63	Black	Rubber	1	63019	
100	Black	Rubber	1	**63030**	

* Other nominal sizes and colours on request.

Blue part no. = in-stock items

CATALOGUE DOMESTIC TECHNOLOGY

Pressure gauges for building technology

Bourdon tube pressure gauges for heating/ plumbing applications

- With self-sealing connection thread for fast mounting
- Special versions: pressure gauge for heating installations and hydrometers

Nominal sizes
50 – 63 – 80 – 100

Accuracy class
2.5

Page 319

Combined thermometer/pressure gauges / thermo-hydrometers

- Pressure and temperature measurement with at a single measuring point
- With self-sealing connection thread for fast mounting
- With mounting valve for easy replacement without downtime

Nominal sizes
63 – 80

Accuracy class
2.5

Page 361

Bourdon tube pressure gauges with capillary tube

- For burners, boilers, hot water tanks and refrigerating/air conditioning systems
- Corrosion-resistant, highly impact-resistant plastic housing
- With copper or plastic capillary
- Great variety of housing versions and connection types available

Nominal sizes
26, 37, 40 – 52 – 45 x 45

Accuracy class
4

Page 322

Pressure gauges for pump test set

- For checking the pressure and suction capacity at oil burner pumps
- With or without glycerine filling

Nominal size
50

Accuracy class
1.6

Page 98

i This and many other products can be found in the catalogues DOMESTIC TECHNOLOGY and PORTABLE MEASURING INSTRUMENTS

Piston type diaphragm seal

Diaphragm seal

In-line chemical seal

CHAPTER 2

Chemical seals: Diaphragm seals, in-line chemical seals and piston type chemical seals

OVERVIEW

Chemical seals at a glance 160

Technical information chemical seals 162

DIAPHRAGM

Diaphragm seals MD 11 – plastic version 164

Diaphragm seals MD 21/22 – compact version 165

Diaphragm seals MD 30 – standard version 169

Diaphragm seals MD 40 – for the paper and pulp industries170

Diaphragm seals MD 50/51 – for screwed pipe connections (food) 172

Diaphragm seals MD 60 – Clamp 174

Diaphragm seals MD 56 – NEUMO BioControl® 177

Diaphragm seals MD 63 – Für VARINLINE® housing 179

Diaphragm seals MD 70 – for homogenising machines 181

Diaphragm seals MD 80 – flange version 182

Diaphragm seals MD 81 – "tubus" flange version 184

PISTON

Piston type chemical seals KD 21 168

IN-LINE

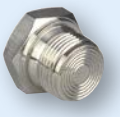
In-line chemical seals RD 50/51/60 – for hygienic processes 187

In-line chemical seals RD 80 – intermediate flange version 188

ACCESSORIES

Mounting options 190

Chemical seals at a glance

		 MD 11	 KD 21	 MD 21	 MD 22	 MD 30	 MD 40
Type		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 1,000				•			
With cooling element > 100 °C	Application area			•	•	•	•
With capillary tube > 100 °C				•	•	•	•
Paraffin oil (FDA)	Filling liquid		•	•	•	•	•
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.		Page 164	Page 168	Page 165	Page 165	Page 169	Page 170

							
MD 50/51	MD 56	MD 60	MD 63	MD 80/81	RD 50/51	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 BioControl®**	**Clamp ISO 2852 Clamp DIN 32676 Tri-Clamp**	**VARIVENT/ VARINLINE® Form N / F**	**Flange connection**	**DIN 11851 / 11887**	**Clamp ISO 2852**	**Intermediate flange connection**
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Page 172	Page 177	Page 174	Page 179	P. 182/184	Page 187	Page 187	Page 188

Chemical seal

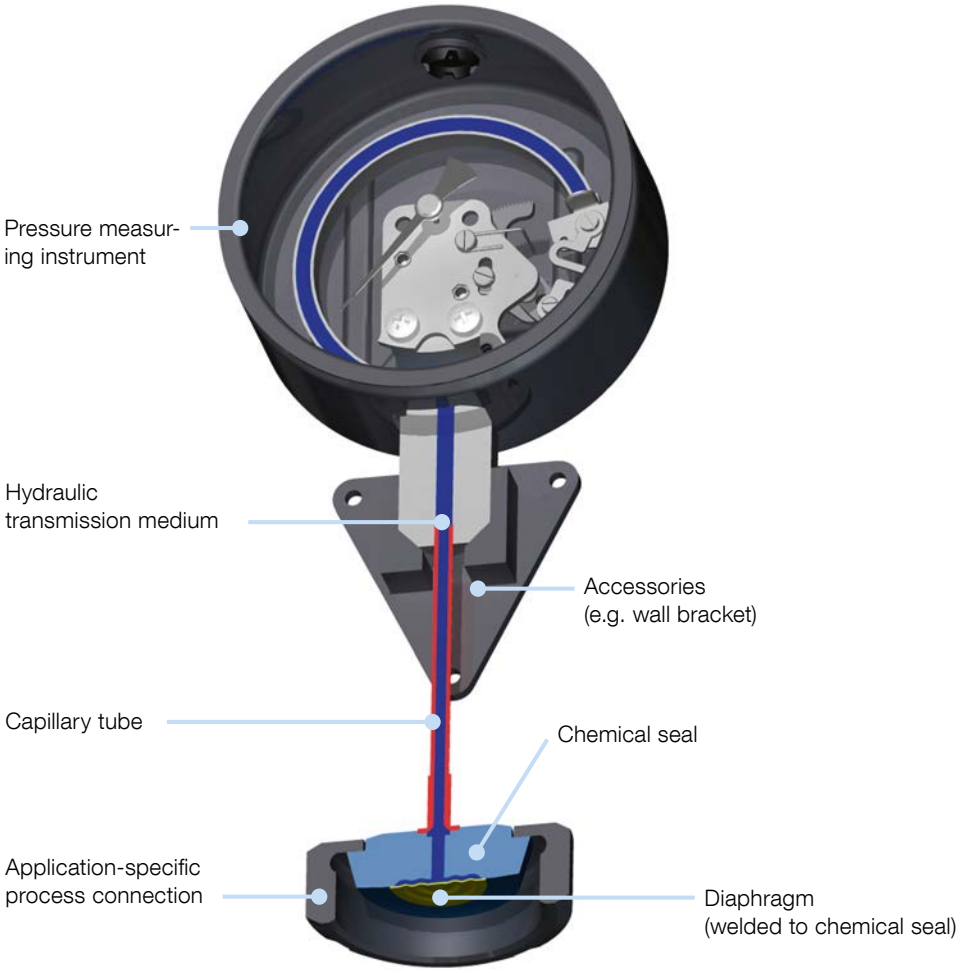
Application

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 seal

Type of action

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. 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.

Adjustment 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 pressure transmission liquid must be selected according to the minimum and maximum operating temperatures. In addition, the pressure transmission liquid and the medium must be compatible as it is possible that they will come into contact if the separating element is damaged.

Diaphragm seals MD 11 plastic version

- **Robust plastic version**
- **Suitable for many chemicals**
- **Perfect solution for waste water**
- **Different materials available**

A Chapter 1

A Chapter 3

Application

For mounting to 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, TFM-coated,
internal

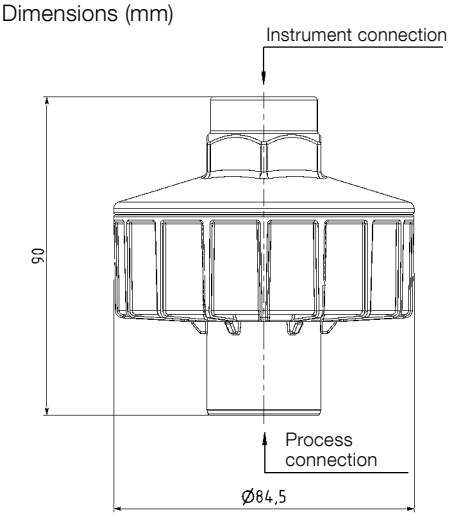
Instrument connection
Female thread G½ or G¼
PP GF 30

Pressure transmission liquid
Glycerine (FM 03)

Nominal pressure
PN 10

Operating temperature range
PVC 0/60 °C
PP -10/+80 °C
PVDF -20/+100 °C

Dimensions (mm)



Options

- Other process connections

DG: M, PG: 1

MD 11 plastic version								
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	---	33970	
PVC	G½	G½	1.6	1.6	1.6	---	33971	
PP	G¼	G¼	1.6	1.6	1.6	---	33972	
PP	G½	G½	1.6	1.6	1.6	---	33973	
PVDF	G¼	G¼	1.6	1.6	1.6	---	33974	
PVDF	G½	G½	1.6	1.6	1.6	---	33975	

Blue part no. = in-stock items

Diaphragm seals MD 21/22 compact version

Type MD 21

Application

For mounting to 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 Ti/316 L
G½B to G2B, DIN 3852 type A
Fixed male thread

Diaphragm
Stainless steel 316 Ti/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 1,000

Options

- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube
- Other threads
- Other materials
- Other filling liquids

Type MD 22

For mounting to Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, hot and polluted media at medium pressures. Specially suitable for mechanical engineering and chemical industry applications.

Process connection
Stainless steel 316 L
G½B, fixed male thread

Upper body and lower body
Stainless steel 316 L

Diaphragm
Stainless steel 316 Ti/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

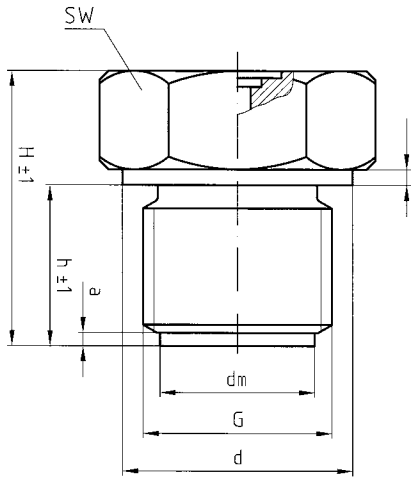
- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube
- Other threads
- Other materials
- Other filling liquids

i
See page 167 for prices.

Diaphragm seals MD 21/22

Types and dimensions (mm)

Type MD 21



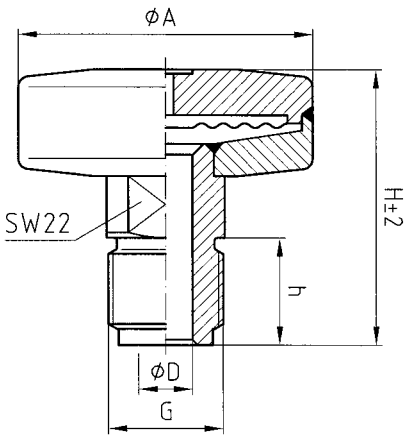
Pipe thread as per DIN 3852 type A
or ISO 228-1

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

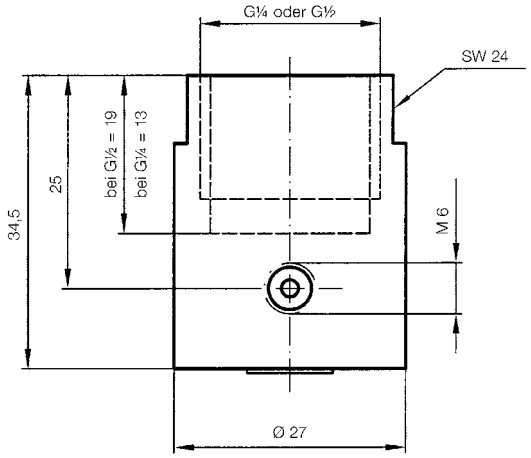
G	d	dm	h	H	a	b	SW
1"NPT	-	23.5	24	36	-	-	41
1½"NPT	-	35	25	45	-	-	55
2"NPT	-	48	26	50	-	-	70

Type MD 22

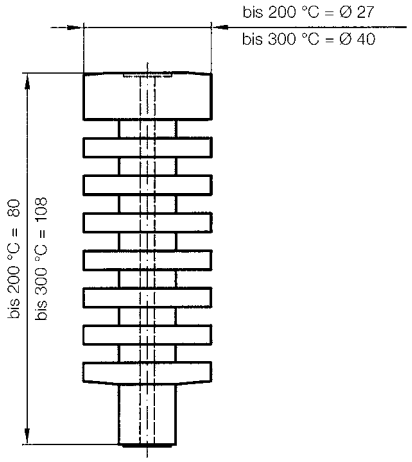


PN	G	ØA	ØD	h	H
40	G¼B	55	6	13	44.5
40	G⅜B	55	6	16	47.5
40	G½B	55	10	20	51.5
40	¼"NPT	55	6	15	46.5
40	½"NPT	55	10	20	51.5
250	G¼B	40	6	13	44.5
250	G⅜B	40	6	16	47.5
250	G½B	40	10	20	51.5
250	¼"NPT	40	6	15	46.5
250	½"NPT	40	10	20	51.5

Adapter for instrument connection G¼/G½
with filling port

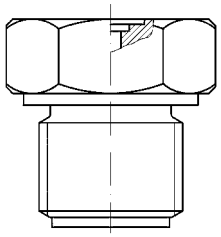


Cooling element, can be welded at both ends



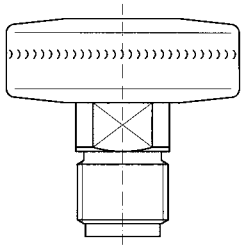
Diaphragm seals MD 21/22

DG: M, PG: 3



MD 21 compact version
diaphragm stainless steel 316 Ti/316 L, welded

Nominal pressure	Process connection	Instrument connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
			63	100	160	DMU		
PN 1,000	G½B	Welded	6	6**	-	1	31415W	
PN 1,000	G¾B	Welded	4	4	4	1	31416W	
PN 1,000	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 Ti/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) and a room temperature and a temperature of the medium of 20 °C.
** Version in bayonet bezel housing (cl 1.0) 6–40 bar, in crimped bezel housing (cl 1.6) 6–600 bar.

Blue part no. = in-stock items

See page 190 for extra charges for options, mounting and accessories.

Piston type chemical seals KD 21

2

- **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**

A Chapter 1

A Chapter 3

Application

For mounting to Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, polluted and abrasive suspensions at high pressures. Specially for pressure measurements in 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

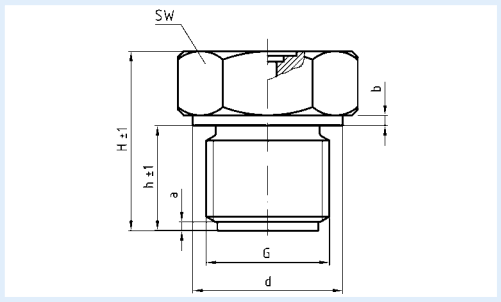
Nominal pressure
PN 600

Accuracy
With pressure gauge Cl. 2.5
With pressure transducer 1.0 % FSO

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, ASME, JIS
- Other process connections
- Other materials
- Other filling liquids, except for Neobee M20 (FM 10)



DG: M, PG: 3

Nominal pressure	Process connection	d	h	H	a	b	SW	Instrument connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
									63	100	160	DMU		
PN 600	G½B	26	17	33.5	3	3	27	Welded	10	16	16	10	31420W	
PN 600	G¾B	32	19	34	3	3	32	Welded	10	16	16	10	31421W	
PN 600	G1B	39	21	36	3	3	41	Welded	10	16	16	10	31422W	
PN 600	G1½B	55	25	48	3	3	55	Welded	10	16	16	10	31423W	**On request**
PN 600	G2B	68	27	56	3	3.5	70	Welded	10	16	16	10	31424W	**On request**
PN 600	½–14 NPT	-	20	33.5	-	-	27	Welded	10	16	16	10	31425W	
PN 600	¾–14 NPT	-	-	-	-	-	-	Welded	10	16	16	10	31426W	
PN 600	1–11½ NPT	-	24	36	-	-	41	Welded	10	16	16	10	31427W	**On request**
PN 600	1½–11½ NPT	-	25	45	-	-	55	Welded	10	16	16	10	31428W	**On request**
PN 600	2–11½ NPT	-	26	50	-	-	70	Welded	10	16	16	10	31429W	**On request**

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) and a room temperature and a temperature of the medium of 20 °C.

Blue part no. = in-stock items

Diaphragm seals MD 30 standard version with threaded connection

MD 30, PN 100

- Can be disassembled and cleaned
- Applications up to 250 bar
- Welded diaphragm
- Many process connections available

Chapter 1

Chapter 3

MD 30, PN 100

Application

For mounting to 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

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 (for PN 100)

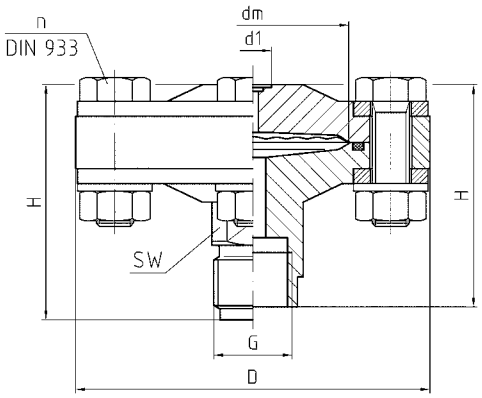
Screws and nuts
Stainless steel 304

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 25 to PN 250

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

Other
- Other filling liquids

i
See page 171 for prices.

Diaphragm seals 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 1

A Chapter 3

Application

For mounting to Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, highly viscous, polluted or hardening media. Typical application 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

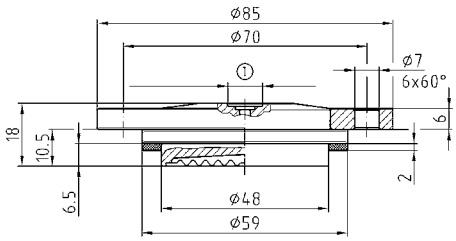
Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 40

Scope of delivery
- Diaphragm seal
- Screws M6 x 20 (galvanised steel)
- Seal (NBR) 59 x 48 x 2 mm

MD 40
Dimensions (mm)



① Welded connection Ø 10 for measuring instrument

Options

Process connection/tubus
- Extended tubus 18 mm (also suitable for O ring seal)
- Special materials
- Silicone-free version

Diaphragm
- Special materials

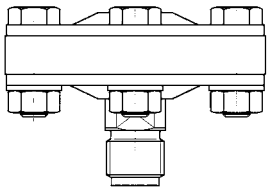
Instrument connection
- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube

Other
- Other filling liquids

See page 171 for prices.

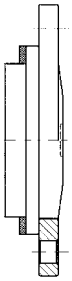
Diaphragm seals MD 30/40

DG: M, PG: 3



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							



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) and a room temperature and a temperature of the medium of 20 °C.
** Without spacer ring.

Blue part no. = in-stock items

Diaphragm seals MD 50/51 for screwed pipe connections (food)

- **All materials FDA-listed**
- **SIP/CIP enabled**
- **No dead space**
- **Various standards available**

A Chapter 1

A Chapter 3

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 mounting to Bourdon tube pressure gauges, pressure transducers and pressure switches. For installation in hygienic processes without dead spaces. Typical application areas:

- Food and luxury food 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 65
MD 51: SMS 1147 1" to 2½"

Material
Stainless steel 316 L, FDA-listed

Surface roughness
Ra ≤ 0.8 µm

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
- Electropolished
- Cooling element
- Capillary
- Other pressure transmission liquids
- Accessories such as union nuts and seals
- Other process connections:

MD 52-1: DIN 11864-1 GS or ÜM, design A/B, DN 25/80, H3
DIN 11853-1 GS or ÜM, DN 25/80, H3
MD 52-2: DIN 11864-2 NF or BF, design A/B, DN 25/80, H3
DIN 11853-2 NF or BF, DN 25/80, H3
MD 52-3 DIN 11864-3 NKS or BKS, design A/B, DN 25/80, H3
DIN 11853-3 NKS or BKS, DN 25/80, H3
MD 53: APV-RJT 1" to 3"
MD 54: IDF 1" to 3"
MD 55: APV-ISS 1" to 3"

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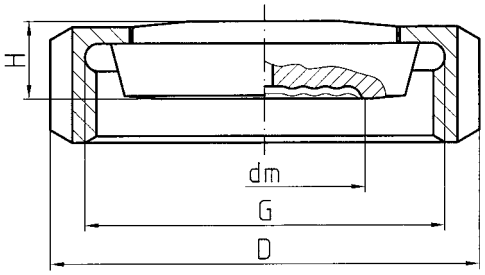
See page 176 for prices.

Diaphragm seals MD 50/51

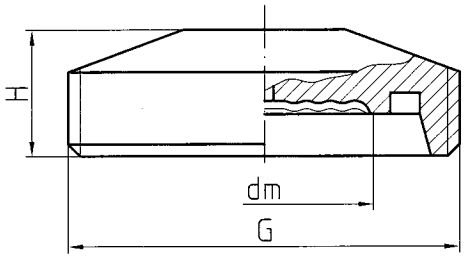
Types and dimensions (mm)

Tapered socket DIN 11851 type D/
DIN 11887 type B with grooved union nut DIN 11851 type F



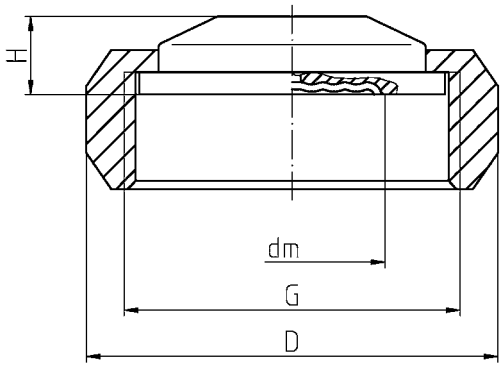
Type	DN	PN	dm	G	D	H
MD 50, DIN 11851	25	40	23.5	Rd52x1/6	63	14
	32	40	28	Rd58x1/6	70	14
	40	40	36	Rd65x1/6	78	14
	50	25	48	Rd78x1/6	92	15
	65	25	48	Rd95x1/6	112	16

Threaded socket DIN 11851 type C/DIN 11887 type A



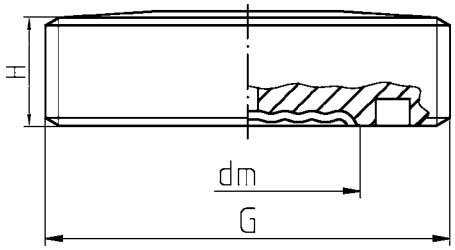
Type	DN	PN	dm	G	H
MD 50, DIN 11851	25	40	23.5	Rd52x1/6	21
	32	40	28	Rd58x1/6	21
	40	40	36	Rd65x1/6	21
	50	25	48	Rd78x1/6	21
	65	25	-	Rd95x1/6	-

Socket and union nut SMS 1147



Type	DN	PN	dm	G	D	H
MD 51, SMS stand-ard	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



Type	DN	PN	dm	G	H
MD 51, SMS stand-ard	1½"	40	36	Rd60x1/6	17
	2''	40	48	Rd70x1/6	17
	2½"	25	48	Rd85x1/6	17

Diaphragm seals MD 60 for hygienic processes

- **3-A-certified in conjunction with Bourdon tube pressure gauge RF 63/100 and chemical seal DMU 02 Vario**
- **All materials FDA-listed**
- **SIP/CIP enabled**
- **NovAseptic®-compatible (1" to 2½")**

A Chapter 1

A Chapter 3

Application

For mounting to Bourdon tube pressure gauges, pressure transducers or pressure switches. For viscous, perishable or hot media. Typical application areas:
- Food and luxury food 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

Process connection
Stainless steel 316 L
Clamp ¾" to 2½"

Diaphragm
Stainless steel 316 L,
welded to upper body, no dead space

Surface roughness
RA ≤ 0.8 µm

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

Test
3-A-certified:
Nominal diameter 1"–2½" for RF 63/100
(crimped bezel and bayonet bezel versions)
Nominal diameter 1"–2½" for DMU 02 Vario

Options

- Adapter for instrument connection G¼B/G½B
- Special materials/coatings
- Electropolished
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids
- Accessories (retainer ring, seal, socket)
- Other process connections:
  MD 61: Clamp DIN 32676
  MD 62: Tri-Clamp

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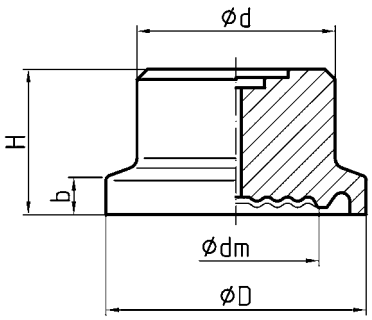
See page 176 for prices.

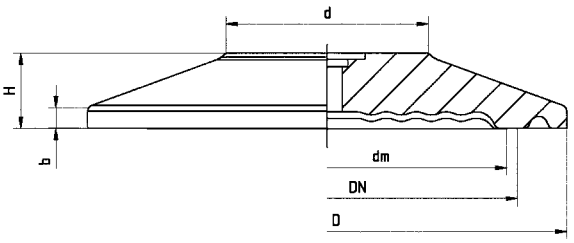
Diaphragm seals MD 60

Types and dimensions (mm)

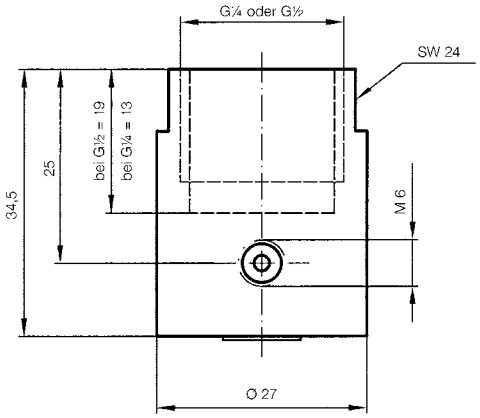
Clamp connection ¾" ISO 2852



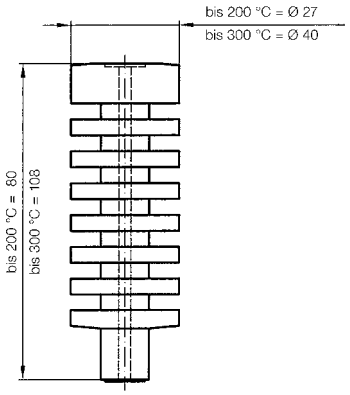
Clamp connection 1"–2½", ISO 2852



Adapter for instrument connection G¼B/G½B
with filling port



Cooling element,
can be welded at both ends

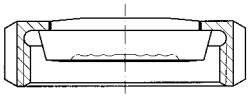


Type	DN	PN	D	dm	d	H	b
MD 60	¾"	40	25	17.2	19	14	3.6
MD 60 NovAseptic® design	1"	40	50.5	23.5	27	10	2.85
	1½"	40	50.5	36	27	10	2.85
	2"	40	64	48	27	10	2.85
	2½"	25	77.5	48	38.2	10	2.85

Diaphragm seals MD 50/51/60

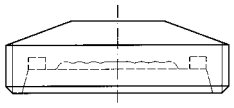
DG: M, PG: 3

2



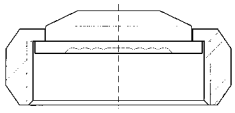
MD 50 for hygienic processes, grooved union nut DIN 11851

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	



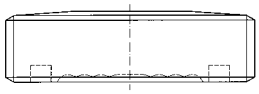
MD 50 for hygienic processes, threaded socket DIN 11851

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	**On request**



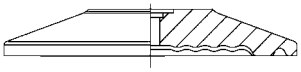
MD 51 for hygienic processes, grooved union nut SMS 1147

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	**On request**



MD 51 for hygienic processes, threaded socket SMS 1147

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	---	---	---	1.6	31914W***	
1"	40	4	4	---	1.6	31912W	
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.
** Not available with 3-A-approval.
*** DMU 02 Vario only.

Blue part no. = in-stock items

See page 190 for extra charges for options, mounting and accessories.

Diaphragm seals
MD 56 NEUMO BioControl®

- **Defined installation and press-fitting with metal stop**
- **Medium cannot get behind the seal**
- **SIP/CIP enabled**

Chapter 1

Chapter 3

Application

Flange type diaphragm seal MD 56 for sterile process separation of pressure measuring and control units in pipes or tanks. For mounting to Bourdon tube pressure gauges, pressure transducers and pressure switches. For installation in sterile processes without dead spaces. Typical application areas:

- Sterile applications in process engineering
- Pharmaceutical industry
- Biotechnology
- Food and luxury food industry
- Beverage machines
- Dairies
- Breweries

Description

All materials used are FDA-listed. Defined installation as per EHEDG hygienic design 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.

Technical specifications

Type
MD 56

Process connection
NEUMO BioControl®
D25, D50, D65, D80

Material
Stainless steel 316 L, seal EPDM
(USP CLASS VI classified; FDA-listed)

Surface roughness
Ra ≤ 0.8 µm

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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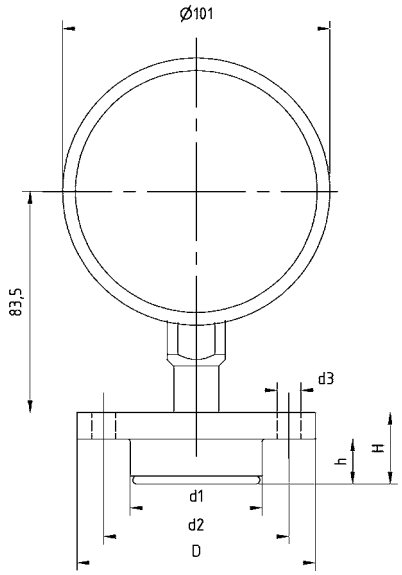
BioControl® is a registered trademark of NEUMO GmbH & Co.KG.

See page 178 for prices.

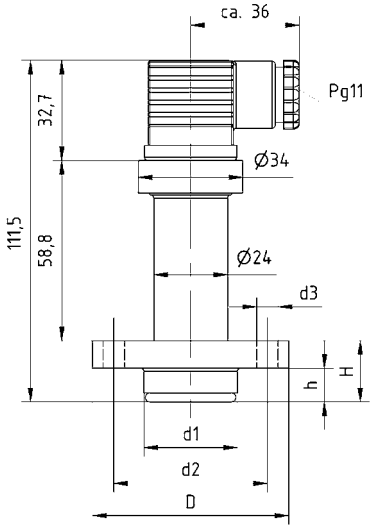
Diaphragm seals MD 56

Types and dimensions (mm)

Pressure gauge NG 100 with MD 56



Pressure transducer DMU 02 Vario BC



DG: M, PG: 3

Type	Minimum range* (in bar) at nominal size				D	d1	d2	d3	H	h	Part no.	**Price €**
	63	100	160	DMU								
MD 56 BioControl® D25	4	4	4	1	64	30.4	50	4 x Ø 7	20	11	31410W	**On request**
MD 56 BioControl® D50	0.6	0.6	1.6	1	90	49.9	70	4 x Ø 9	27	17	31411W	**On request**
MD 56 BioControl® D65	0.6	0.6	0.6	0.6	120	67.9	95	4 x Ø 11	27	17	31412W	**On request**
MD 56 BioControl® D80	0.6	0.6	0.6	0.6	140	87.4	115	4 x Ø 11	37	25	31413W	**On request**

Blue part no. = in-stock items

Diaphragm seals MD 63 for VARINLINE® housing

- **Defined installation and press-fitting with metal stop**
- **EHEDG-certified**
- **Medium cannot get behind the seal**
- **SIP/CIP enabled**

A Chapter 1

A Chapter 3

Application

Diaphragm seal MD 63 for sterile process separation of pressure measuring and control units in pipes or tanks. For mounting to Bourdon tube pressure gauges, pressure transducers and pressure switches. For installation in sterile processes without dead spaces. Typical application areas:

- Sterile applications in process engineering
- Pharmaceutical industry
- Biotechnology
- Food and luxury food industry
- Beverage machines
- Dairies
- Breweries

Description

All materials used are FDA-listed and comply with the EHEDG hygienic design recommendations and are EHEDG-certified. 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 EPDM
(USP CLASS VI classified, FDA-listed)

Surface roughness
Ra ≤ 0.8 µm

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
0.6 bar to 25 bar

Test
EHEDG-certified type EL-CLASS I
(re-certification in 2019)

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, electropolished (> 100 °C)
- Capillary tube
- Other filling liquids
- Accessories (brackets, housings and seals)

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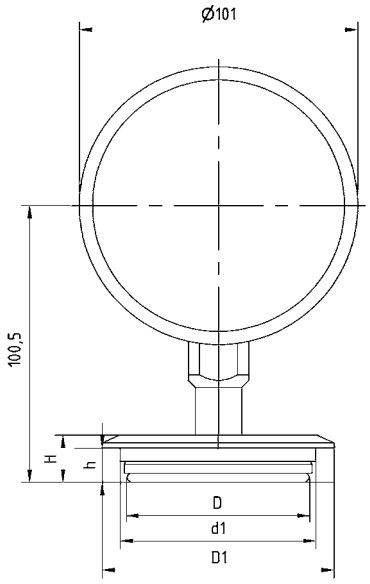
VARINLINE® and VARIVENT® are registered trademarks of GEA Tuchenhagen GmbH.

See page 180 for prices.

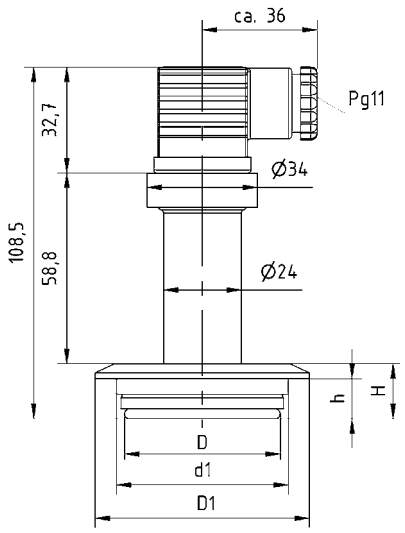
Diaphragm seals MD 63

Types and dimensions (mm)

Pressure gauge NG 100 with MD 63



Pressure transducer DMU 02 Vario VT



DG: M, PG: 3

Type	Minimum range* (in bar) at nominal size				D	D_1	d_1	H	h	DN VARILINE	Part no.	**Price €**
	63	100	160	DMU								
MD 63 VARIVENT® type F	4	4	---	1	50	66	53	17	12.3	DN 25; 1"	31340W	**On request**
MD 63 VARIVENT® type N	0.6	0.6	0.6	0.6	68	84	71	17	12.3	DN 40-125; 1½"-6"	31341W	**On request**

Blue part no. = in-stock items

Chemical seals MD 70 for homogenising machines

- **For high pressures**
- **Ideal for high dynamic loads**
- **Compact and robust design**
- **Easy integration into existing systems**

Application

For mounting to 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

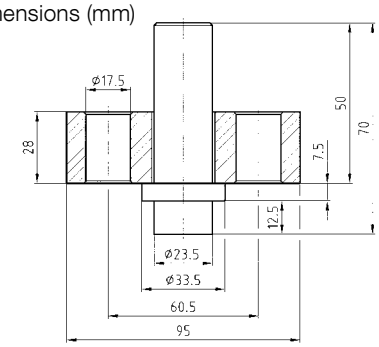
Instrument connection
Stainless steel 316 L
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 600

Dimensions (mm)



Options

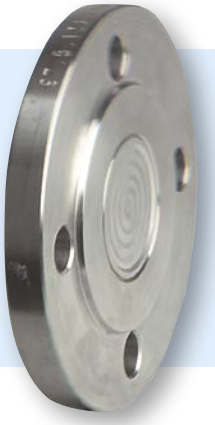
- Other filling liquids

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*	PG 3	Part no. 31352W	**Price €**
Price reduction without retaining flange	-	Net	

*Valid for standard pressure transmission liquid with direct mounting (without capillary tube) **Blue part no.** = in-stock items and a room temperature and a temperature of the medium of 20 °C.

Diaphragm seals MD 80
Flange version



- **Flush, welded diaphragm**
- **For DIN and ASME flange connections**
- **Numerous special materials and coatings (option)**
- **With bottom instrument connection as cell design (option)**

Application

For mounting to Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, highly viscous, polluted, crystallising or hot media. Typical application 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 (Raised Face) 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 250 °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)

Other

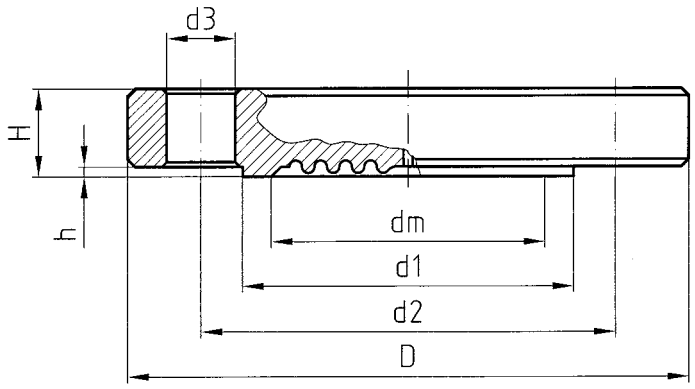
- Higher nominal pressures
- Cell design
- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube (back or bottom)
- Other filling liquids
- Customer-specific flanges
- Other nominal diameters

i

See page 185 for prices.

Diaphragm seals MD 80

Types and dimensions (mm)



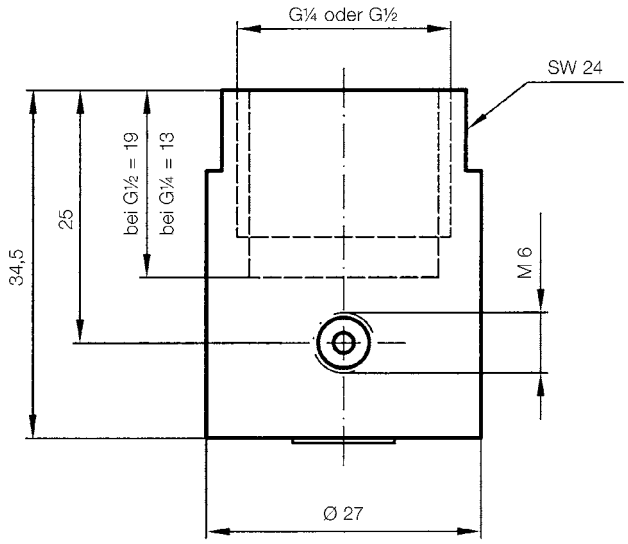
Flange connection as per EN 1092-1 type B 1

DN	PN	D	d1	d2	d3	H	h	dm
25	40	115	68	85	4x14	18	2	28
40	40	150	88	110	4x18	18	2	48
50	40	165	102	125	4x18	18	2	48
80	40	200	138	160	8x18	24	2	48
100	40	235	162	190	8x22	24	2	48

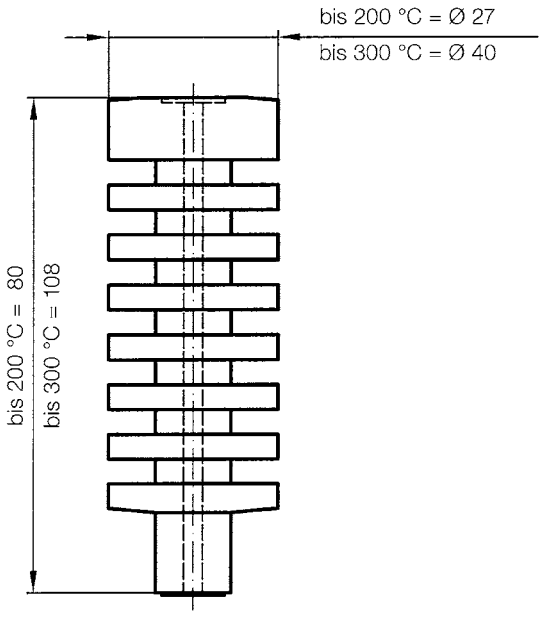
Flange connection as per ASME B 16.5 (Raised Face)

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

Adapter for instrument connection G¼/G½
with filling port

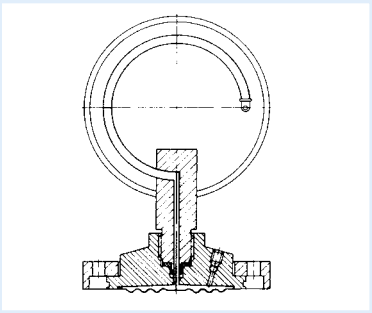


Cooling element, can be welded at both ends



Diaphragm seals 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



A Chapter 1

A Chapter 3

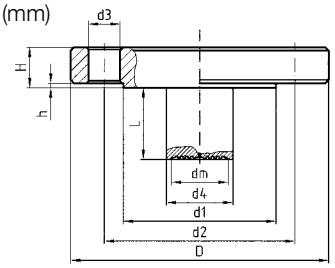
Application

For mounting to 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 (Raised Face) 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	L
50	40	165	102	125	4x18	48	20	3	50, 100, 150
80	40	200	138	160	8x18	76	24	3	
100	40	235	162	190	8x22	94	24	3	

Flange connection as per ASME B 16.5

DN	CL	D	d_1	d_2	d_3	d_4	H	h	L
1"	150	108	51	79.5	4x16	25	14.5	1.5	50, 100, 150
2"	150	152	92	121	4x19	48	19	1.5	
3"	150	190	127	152	4x19	76	24	1.5	

Options

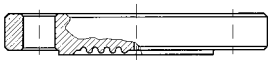
Process connection
- Other tubus lengths
- Special materials/coatings
- Other sealing surfaces

Diaphragm
- Special materials:
  Hastelloy, Monel, nickel, Inconel, Incoloy, platinum, titanium, tantalum, zirconium, other chrome-nickel-steel alloys
- Coatings/linings:
  PFA (up to 250 °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)

Other
- Adapter for instrument connection G¼B/G½B
- Capillary tube (back or bottom)
- Cooling element (> 100 °C)
- Other filling liquids
- Customer-specific flanges
- Other nominal diameters

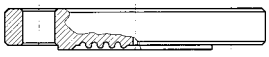
Diaphragm seals MD 80/81

DG: M



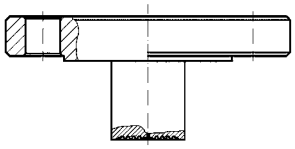
MD 80 flange version, flange connection as per EN 1092-1 type B 1

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				PG	Part no.	**Price €**
		63	100	160	DMU			
25	40	4	4	-	0.6	3	31333W	
40	40	4	4	-	0.6	3	31336W	
50	40	0.6	0.6	0.6	0.6	3	31339W	
80	40	0.6	0.6	0.6	0.6	3	31385W	
100	40	0.6	0.6	0.6	0.6	3	31388W	



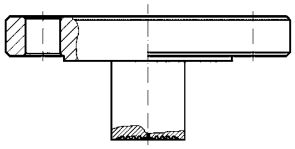
MD 80 flange version, flange connection as per ASME B 16.5 (Raised Face)

Nominal diameter DN	Nominal pressure CL	Minimum range*				PG	Part no.	**Price €**
		63	100	160	DMU			
1"	150	4	4	-	1	3	31393W	
	300	4	4	-	1	3	31394W	
1½"	150	4	4	4	1	3	31396W	
	300	4	4	4	1	3	31397W	
2"	150	0.6	0.6	0.6	0.6	3	31399W	
	300	0.6	0.6	0.6	0.6	3	31400W	
3"	150	0.6	0.6	0.6	0.6	3	31402W	
	300	0.6	0.6	0.6	0.6	3	31403W	
4"	150	0.6	0.6	0.6	0.6	3	31405W	
	300	0.6	0.6	0.6	0.6	3	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				PG	Part no.	**Price €**
		63	100	160	DMU			
50	40	1	2.5	---	1	3	31917W	
80	40	0.6	0.6	1	1	3	31921W	
100	40	0.6	0.6	1	1	3	31924W	



MD 81 tubus flange version, tubus length 50 mm,
flange connection as per ASME B 16.5 (Raised Face)

Nominal diameter DN	Nominal pressure CL	Minimum range* (in bar) at nominal size				PG	Part no.	**Price €**
		63	100	160	DMU			
1"	150	4	4	---	1	3	31938W	
2"	150	1	2.5	---	1	3	31929W	
3"	150	0.6	0.6	1	1	3	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) and a room temperature and a temperature of the medium of 20 °C.

Blue part no. = in-stock items

i
See pages 186/190 for extra charges for options, mounting and accessories.

Extra charges for diaphragm seals MD 80/81

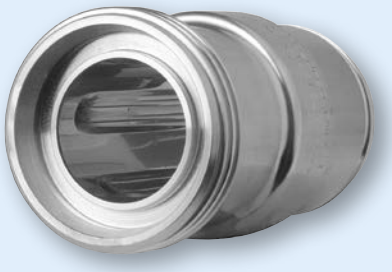
DG: M

Type of sealing surface		MD 80	MD 81
		Extra charges €	**Extra charges €**
Groove, type D EN 1092-1 (for stainless steel)			**On request**
Tongue, type C EN 1092-1 (for stainless steel)			**On request**
Groove, type RJF (Ring Joint Facings) ASME B 16.5			**On request**
Capillary connection			
Capillary connection centre back		**On request**	**On request**
Capillary connection bottom		**On request**	**On request**
Special materials for wetted parts*	Nominal diameter		
Hastelloy C276	DN 25		**On request**
	DN 40		**On request**
	DN 50		**On request**
	DN 80		**On request**
	DN 100		**On request**
Tantalum	DN 25		**On request**
	DN 40		**On request**
	DN 50		**On request**
	DN 80		**On request**
	DN 100		**On request**
Monel 400, nickel, Inconel, platinum, titanium		**On request**	**On request**
Coatings*			
PFA (up to 250 °C continuous temperature)	DN 25		**On request**
	DN 40		**On request**
	DN 50		**On request**
	DN 80		**On request**
	DN 100		**On request**
ECTFE (up to 150 °C)	DN 25		**On request**
	DN 40		**On request**
	DN 50		**On request**
	DN 80		**On request**
	DN 100		**On request**
PTFE, silver, gold	All nominal diameters	**On request**	**On request**

* Please enquire for special materials for groove or tongue versions.

Blue part no. = in-stock items

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**

2

Application

For mounting to Bourdon tube pressure gauges, pressure transducers or pressure switches. For flowing, corrosive and highly viscous media; designed for direct installation in pipes. Typical application areas:

- Biochemical applications
- Food and luxury food industry
- Beverages industry
- Pharmaceutical industry

Technical specifications

Process connection
RD 50: DIN 11851, 316 L,
male thread DN 15 to DN 80,
RD 51: SMS 1147 1" to 3"
RD 60: Clamp ISO 2852, 316 L 1" 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

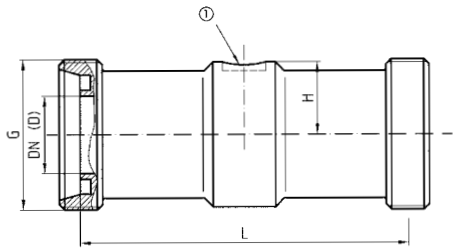
Pressure ranges
See price list section

Nominal pressure
See dimensions table

Options

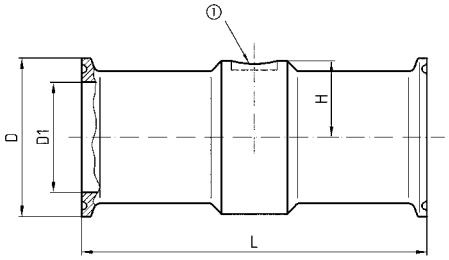
- Cooling element (> 100 °C)
- Capillary tube

Type RD 50 DIN 11851/DIN 11887



① Welded connection Ø 10 for measuring instrument

Type RD 60 Clamp ISO 2852



① Welded connection Ø 10 for measuring instrument

DN	PN	G	L	D	H
15	40	Rd34x⅛"	240	16	20
25	40	Rd52x⅙"	110	26	24
32	40	Rd58x⅙"	110	32	29
40	40	Rd65x⅙"	110	38	31.5
50	25	Rd78x⅙"	110	50	37
65	25	Rd95x⅙"	110	66	45
80	25	Rd110x¼"	60	81	51.5

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

i
See page 189 for prices.

In-line chemical seals RD 80 intermediate flange version

- Easy intermediate flange installation in the pipe
- Various nominal sizes
- Various nominal pressures
- Special materials (option)

Application

For mounting to 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 6,000

Dimensions (mm)
Flange connection as per EN 1092-1 type B 2

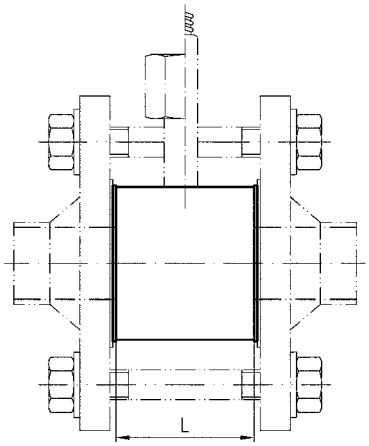
DN	Tue	PN	Da	L	H
25	28.5	4-400	68	100	29
40	43.1	4-400	88	100	29
50	54.5	4-400	100	100	29
65	70.3	4-400	120	100	29
80	82.5	4-400	138	60	29

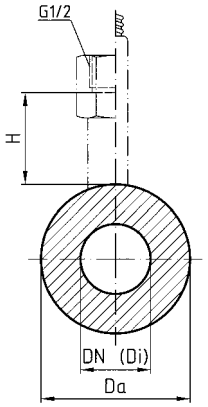
Flange connection as per ASME B 16.5

DN	Tue	CL	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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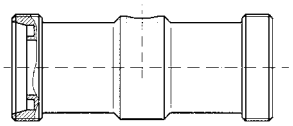
See page 189 for prices.

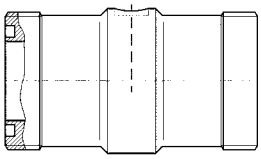
In-line chemical seals RD 50/51/60/80

DG: M, PG: 3



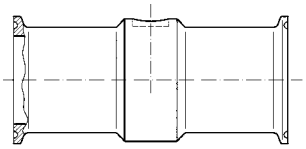
RD 50 for hygienic processes, male thread DIN 11851

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	



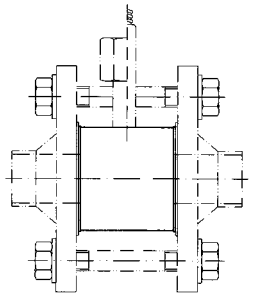
RD 51 for hygienic processes, threaded socket SMS 1147

Nominal diameter	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
1"	40	1.6	2.5	---	1.6	31371W	**On request**
1½"	40	1.6	2.5	4	1.6	31372W	**On request**
2"	40	1	1.6	2.5	1.6	31373W	**On request**
2½"	25	1	1.6	2.5	1.6	31374W	**On request**
3"	25	1	1.6	1.6	1.6	31375W	**On request**



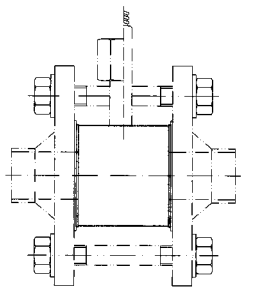
RD 60 clamp connection ISO 2852

Nominal diameter	Nominal pressure PN	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 PN	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 CL	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) and a room temperature and a temperature of the medium of 20 °C.

Blue part no. = in-stock items

i

See page 190 for extra charges for options, mounting and accessories.

Chemical seals - fitting prices and accessories

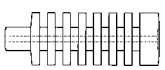
DG: M

2

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)		PG	Part no.	**Price €**	Part no.	**Price €**
	---	-	32007		32016	
Fitting with capillary tube Capillary tube stainless steel, screwed or welded to chemical seal, with bend protection and connection piece for instrument bracket	1 m	3	32008		32017	
	2 m	3	32009		32018	
	3 m	3	32010		32019	
	4 m	3	32011		32020	
	5 m	3	32012		32021	
	6 m	3	32013		32022	
	8 m	3	32014		32023	
	10 m	3	32015		32052	
	Others			**On request**		**On request**

Extra charges			PG	**Price €**
Spiral protection hose		Per metre	3	
Calibration of the filled system at operating temperatures other than +20 °C (between +20 and +100 °C), with dial marking tA = x °C			3	
Calibration of the filled system at operating temperatures other than +20 °C (between > 100 and +180 °C), with dial marking t_A = x °C			3	
Other pressure transmission liquids		Application area / operating temperature range [3]	3	
FM 01	Silicone oil	-20/+200 °C	3	
FM 02	Silicone oil	-90/+100 °C	3	
FM 03	Glycerine	0/230 °C	3	
FM 04	Glycerine/water	-10/+120 °C	3	
FM 05	Almond oil	-10/+250 °C	3	
FM 06	High-temperature oil	-10/+300 °C	3	
FM 07	High-temperature oil	-10/+400 °C	3	
FM 08	Halocarbon [4] (for oxygen or chlorine)	-40/+175 °C	3	
FM 09	Paraffin oil (FDA-compliant)	-20/+220 °C	-	**Standard**
FM 10	Neobee® M20 (FDA-compliant)	-20/+200 °C	3	

Accessories		Version	PG	Part no.	**Price €**	Version	PG	Part no.	**Price €**
Adapter for instrument connection with thread and filling port, for welding to chemical seal		Instrument connection G¼ female	3	32003		Instrument connection G½ female	3	32004	
Cooling element, can be welded at both ends (only suitable for factory-fitting)		Up to T_{max} medium 200 °C (Ø 27)	3	32005		Up to T_{max} medium 300 °C (Ø 40)	3	32006	
Cooling element, screw connection at both ends G½ female x male		Up to T_{max} medium 200 °C (Ø 27)	3	31420		Up to T_{max} medium 300 °C (Ø 40)	3	31421	

1) For differential pressure measuring instruments = 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.

Blue part no. = in-stock items

Pressure transducers
for process engineering

Pressure transducers

HydroFox® for
level measurement

Pressure transducers
OEM version

CHAPTER 3

Electronic pressure measuring instruments: Pressure transducers, digital pressure gauges, pressure switches

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Electronic pressure switch EDS 10 254

PROCESS ENGINEERING

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Pressure transducers DMU 02 Vario – flush 207

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Pressure transducers DMU 04 – industrial version 217

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Pressure transducers DeltaFox DMU 10 D – version for differential pressure measurement 231

Pressure transducers DeltaFox DMU 11 D – version for differential pressure measurement 233

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QUALITY ASSURANCE

Universal digital pressure gauges DIM 20 – service instrument 248

Digital precision pressure gauge DIM 30 250

		DMU 600/20	DMU 01	DMU 02	DMU 02 Vario	DMU 03	DMU 04	DMU 05 P	DMU 07
Smallest measuring range		0/4 bar	0/1 bar	0/600 mbar	0/1 bar	0/100 mbar	0/100 mbar	0/100 mbar	0/40 mbar
Largest measuring range		0/40 bar	0/400 bar	0/2,000 bar	0/1,000 bar	0/600 bar	0/400 bar	0/600 bar	0/20 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				•				
Submersible probes	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	•	•	•	•	•	•	•	•
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* Depends on measuring range.
** Accuracy of mechanical local display.
*** Depends on version.

									
DMU 08	DMU 09	DMU 10 D	DMU 11 D	DMU 13	DMU 14	DMU 20 D	DMU 21 D	DIM 20	DIM 30
0/100 mbar	0/40 mbar	0/6 mbar	0/20 mbar	0/600 mbar	0/400 mbar	0/0.25 mbar	0/1 bar	0/1 bar	0/100 mbar
0/25 bar	0/10 bar	0/1 bar	0/16 bar	0/40 bar	0/600 bar	0/1,000 mbar	0/70 bar	0/700 bar	0/400 bar
•/-	•/-	•/-	•/-	•/-	•/•	•/-	•/-		
•		•	•			•			
		•*		•**			•		
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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 application 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
- Machines and plants
- 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.

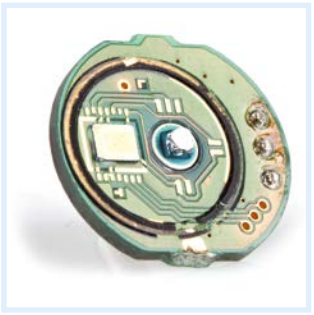
Measuring principle and measuring cell

Piezo-resistive polysilicon stainless steel measuring cell (thin film)
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 pressure; 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, 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, 14, 21 D, DIM 30, EDS 10
Pressure transducers with open silicon measuring cells:
DMU 10 D, 600/20, 20 D

Benefits
- High resistance to chemicals
- High output signal
- Very small measuring ranges possible
- High accuracy

Measuring principle and measuring cell

Piezo-resistive and capacitance 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 40 mbar to up to 20 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 ceramic measuring cells:
DMU 01K, 01, 01 VM and DIM 20, DMU 13
Pressure transducers with capacitance ceramic measuring cells:
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

- **Special OEM unit**
- **Compact design**
- **Superior price/performance ratio due to automated large-scale production**
- **High pressure resistance**
- **Without transmission liquid**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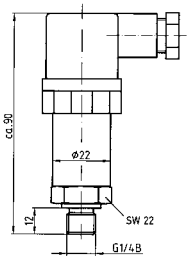
Dimensions (mm)



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 bar to 0/40 bar

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

Operating temperature range

Medium:	-25/+85 °C
Ambient:	-25/+85 °C
Storage:	-40/+85 °C

Temperature error band
In compensated range
-10/+70 °C < 0.2 % 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 9–32 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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- Other measuring ranges
- Other process connections
- Other electrical connections
- Fixed cable connection
- Other output signals
  e.g. 0–10 V, 1–5 V
- Absolute pressure version

DG: H, PG: 4

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	

Minimum order quantity 50 pieces
Blue part no. = in-stock items

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**
- **Without transmission liquid**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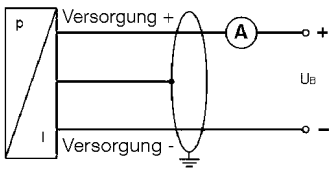
Wiring diagram
(4–20 mA, 2-wire)



Application

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 2 x FS
except for 250 bar: Overload max. 400 bar
(burst pressure at least 3 x FS)

Operating temperature range
Medium: -25/+125 °C
Ambient: -25/+85 °C
Storage: -40/+85 °C

Temperature error band
In compensated range
-25/+85 °C ≤ 0.5 % FSO/10 K (typ.)

Dynamic characteristics
Response time:
2-wire: ≤ 10 ms
3-wire: ≤ 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
2-wire: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

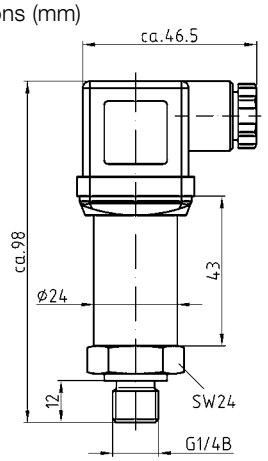
Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- Fixed cable connection
- Other output signals
- Other connection threads
- Output signal 0–10 V, 3-wire

Dimensions (mm)



i
See page 202 for prices.

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

3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Application

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 2 x FS, except for:
- 250 bar: Overload 400 bar
- 400 bar: 650 bar

(burst pressure at least 3 x FS,
except 400 bar: burst pressure = 1,000 bar)

Operating temperature range

Medium:	-25/+125 °C
Ambient:	-25/+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 G½B DIN 3852 type E with protruding diaphragm
(DMU 01 VM up to max. 0/25 bar, enquire for absolute pressure ranges)

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
2-wire: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$
3-wire: $R_{min} = 10\ k\Omega$

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, EN 175301-803), IP 65)

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- Fixed cable connection
- Other output signals
- Other connection threads
- SIL 2 (IEC 61508/61511) 2-wire, for DMU 01 VM

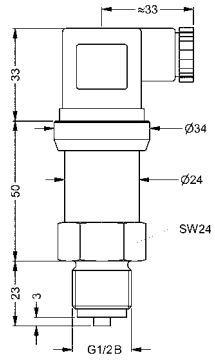
SIL Protect your process!

i See page 202 for prices.

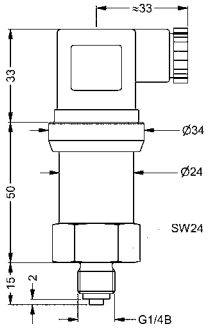
Pressure transducers DMU 01

Dimensions (mm) and electrical connections

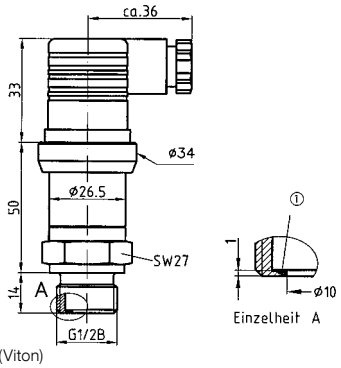
Connection G½B
EN 837



Connection G¼B
EN 837



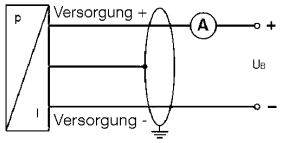
DMU 01 VM with connection G½B DIN 3852 type E
with protruding diaphragm DMU 01 VM



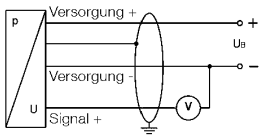
① Flat gasket FKM (Viton)

Wiring diagram

2-wire
4–20 mA



3-wire
0–10 V



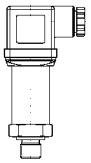
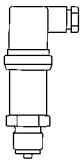
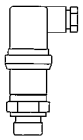
Pin assignment table

	Connector ISO 4400	Cable colours (DIN 47100)
2-wire system: (4–20 mA) Supply + / Supply – / Earth	1 / 2 / Earth pin	White / Brown / Green/yellow
3-wire system: (0–10 V) Supply + / Supply – / Signal + / Earth	1 / 2 / 3 / Earth pin	White / Brown / Green / Green/yellow

The units are shipped with a detailed connection diagram.

Pressure transducers DMU 01

DG: H, PG: 4

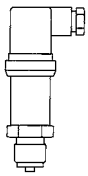
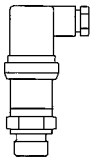
Type	DMU 01 K	DMU 01	DMU 01 VM
Version			
Measuring principle	Piezo-resistive thick-film ceramic measuring cell		
Measuring accuracy (IEC 60770)	1 % FSO	0.5 % FSO (-1/0 bar 1 % FSO)	0.5 % FSO
Wetted parts	Ceramic/stainless steel 304/FKM		
Connection	G¼B DIN 3852 type E	G½B EN 837	G½ DIN 3852 type E with protruding Diaphragm
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**	---
0/200 bar	---	**31878**	--
0/250 bar	31614	**31127**	---
0/400 bar	---	**31128**	---
0/600 bar	---	---	---

* Delivery only in packing units of 10 pieces per measuring range.

Blue part no. = in-stock items

Extra charges for pressure transducers DMU 01

DG: H

Type	DMU 01	DMU 01 VM
Version		
	Price €	**Price €**
Connection G½B DIN 3852 type E	**---**	**Standard**
Connection G¼B EN 837 type E		**---**
Connection ¼-18 NPT		**---**
Connection ½-14 NPT		**---**
Other connections	**On request**	**On request**
Suitable for oxygen (≤ 25 bar)		
Fixed cable connection 2 metres		
Cable extension per metre		
Output 0–10 V, 3-wire		
Other output signals	**On request**	**On request**
Absolute pressure (measuring ranges according to data sheet)		
SIL 2 (only for 4–20 mA)	**---**	

i

See chapter 8 for digital display units and signal processing.

Pressure transducers DMU 02
Industrial version

- **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**

3

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Application

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 0/1,000 bar

Overpressure safety
≤ 250 bar min. 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 min. 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 ≤ 0.15 % 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 10–32 V
EX version: DC 20–27 V

Output signal
4–20 mA, 2-wire
0–10 V, 3-wire

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

At least 100 Ohm with EX version
0–10 V > 5 kOhm

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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

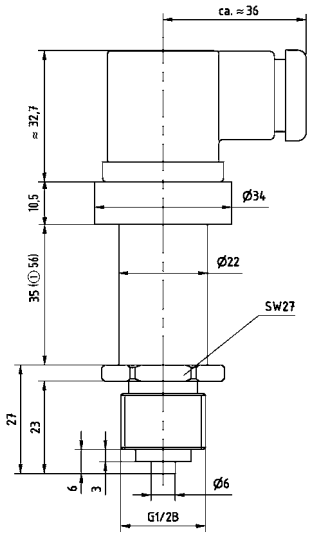
- Other connection threads
- Fixed cable connection
- Other connectors
- Other output signals
- Cleaned for oxygen
- EX version (II 1G Ex ia IIB T4)

i
See page 209 for prices.

Pressure transducers DMU 02

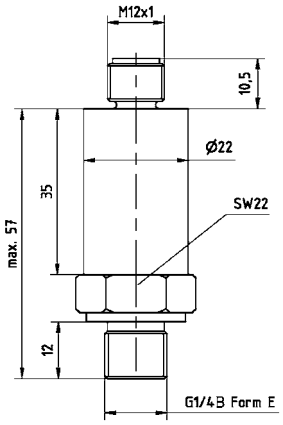
Dimensions (mm) and electrical connections

Connector ISO 4400 (DIN 43650-A)

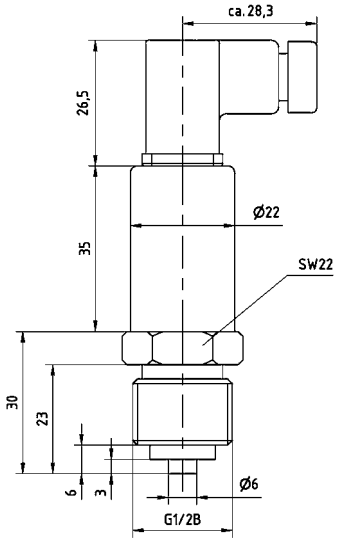


① EX version

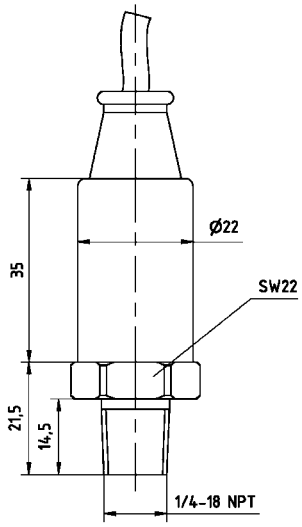
M12 connector



Connector DIN 43650-C



Fixed cable connection



Pin assignment table

		Electrical connections		
		ISO 4400 (DIN 43650-A, EN 175301-803)	M12 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)

- **Connection technology with numerous versions**
- **Extremely resistant to shock, pulsation and vibration**
- **Best dynamic pressure resistance at high load changes**
- **Measuring cell welded without seals**
- **Without transmission medium**
- **Turn Down 1:4**
- **Zero calibration via magnet**

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Application

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 min. 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
-10/+80 °C < 0.15 % FSO/10 K

Dynamic characteristics
Response time < 4 ms
(without flush diaphragm)

Process connection
G½B (EN 837-1/7.3)

Material

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 630/316 Ti/316 L
Seal:	Without

Supply voltage
DC 10–32 V

Output signal
4–20 mA, 2-wire

Load
4–20 mA < $\frac{U_B - U_{Bmin}}{0.02\ A}$

0–10 V > 5 kOhm

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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- Other process connections
- Other electrical connections
- Field housing (stainless steel)
- Cleaned for oxygen
- Other output signals
- Fitting of chemical seal
- Customer-specific setting (damping, unit)
- Programmable hardware and software
- Other operating temperature ranges

i See page 208 for dimensions. See page 209 for prices.

Pressure transducers
DMU 02 Vario (flush)

- **Ideal for hygienic processes**
- **Connection technology with numerous versions**
- **Extremely resistant to shock, pulsation and vibration**
- **Best dynamic pressure resistance at high load changes**
- **Zero calibration via magnet**

3


A Page 381


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A Page 383

Application

Electronic pressure measurement in mechanical and plant engineering applications, gas applications, medical technology. 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 min. 3 x FS)
> 250 bar at least 1.5 x FS
(burst pressure at least 2 x FS)

Operating temperature range

Medium:	-10/+125 °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
Diaphragm:	Stainless steel 316 L

Pressure transmission liquid
Multi-grade oil, FDA-compliant

Supply voltage
DC 10–32 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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

i
See page 208 for dimensions.
See page 209 for prices.

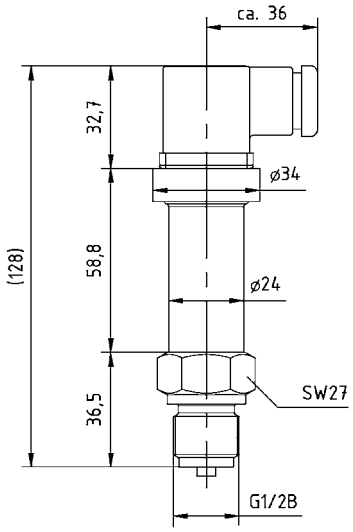
Options

- Other process connections
- Other electrical connections
- Field housing (stainless steel)
- Filling for oxygen
- Other output signals
- Customer-specific setting (damping, unit)

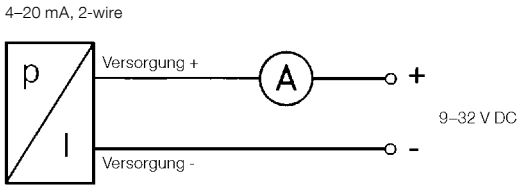
Pressure transducers DMU 02 Vario

Dimensions (mm) and electrical connections

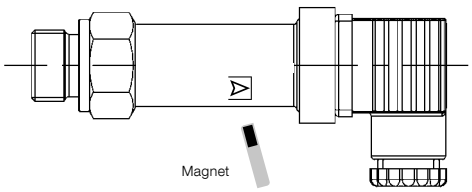
Connection G½B EN 837



Wiring diagram

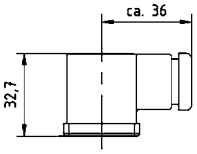


Setting the zero point

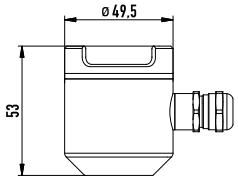


Modular system for great variety of versions

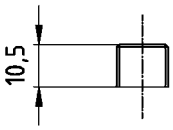
Plug



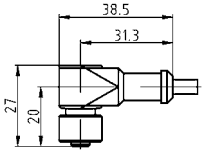
ISO 4400



Field housing



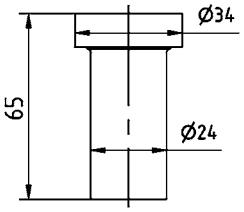
M12 x 1



M12 x 1 with junction box

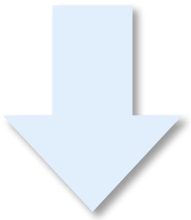
Housing

Transducer electronics

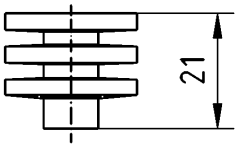


Thermal isolation

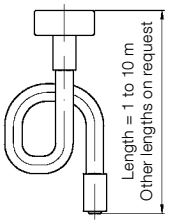
Direct mounting



Cooling element up to 180 °C

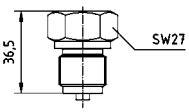


Capillary

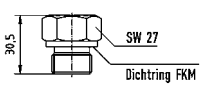


Process connections

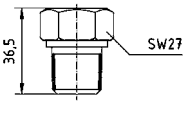
G½B EN 837



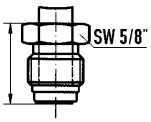
G½B DIN 3852-E



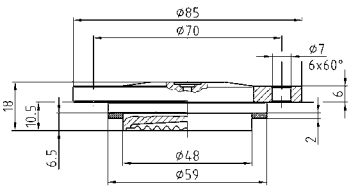
½–14 NPT



VCR 9/16-18 UNF

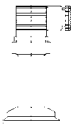


Chemical seals (e.g. MD 40)



Pressure transducers DMU 02/DMU 02 Vario

DG: H, PG: 4

Type	DMU 02	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	0.3 % FSO		
Wetted parts	Stainless steel 630	Stainless steel 630/316 L	Stainless steel 316 L/ FKM	Stainless steel 316 L
Connection	G½B EN 837	G½B EN 837	G½B DIN 3852-A	ISO 2852 1"
Supply voltage	DC 10–32 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 calibration via magnet from the outside		
Measuring range	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	---	---	---	---
0/2,000 bar	---	---	---	---

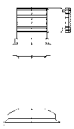
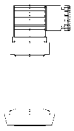
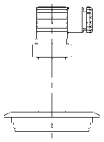
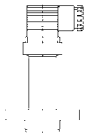
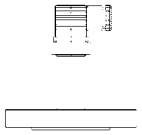
* Programmable turn down 1:4 via optional programming tool (no asterisk = fixed measuring range).

Blue part no. = in-stock items

See pages 211/212 for extra charges.

Pressure transducers DMU 02 Vario

DG: H, PG: 4

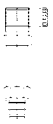
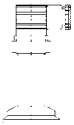
Type	DMU 02 Vario CP Clamp	DMU 02 Vario MR Dairy fitting	DMU 02 Vario VT VARIVENT®	DMU 02 Vario BC NEUMO BioControl®	DMU 02 Vario FL Flange
Version					
Measuring principle	Piezo-resistive polysilicon stainless steel measuring cell (thin-film)				
Measuring accuracy (IEC 60770)	0.3 % FSO				
Wetted parts	Stainless steel 316 L	Stainless steel 316 L	Stainless steel 316 L	Stainless steel 316 L	Stainless steel 316 L
Connection	ISO 2852 1½"	DIN 11851 DN 25	VARIVENT® F (DN 25 and 1")	NEUMO BioControl® DN 25	EN 1092-1 type B1 DN 25 PN 40
Supply voltage	DC 10–32 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 calibration via magnet from the outside				
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.
Price €					
-1/0 bar	33080	32915	32938	32960	32981
-1/+1.5 bar	33081	32916	32939	32961	32982
-1/+3 bar	33082	32917	32940	32962	32983
-1/+5 bar	33083	32918	32941	32963	32984
-1/+9 bar	33084	32919	32942	32964	32985
-1/+24 bar	33085	32920	32943	32965	32986
Price €					
0/1 bar	33089	32924	32947	32969	32990
0/1.6 bar	33090	32925	32948	32970	32991
0/2.5 bar	33091	32926	32949	32971	32992
0/4 bar	33092	32927	32950	32972	32993
0/6 bar	33093	32928	32951	32973	32994
0/10 bar	33094	32929	32952	32974	32995
0/16 bar	33095	32930	32953	32975	32996
0/25 bar	33096	32931	32954	---	32997
0/40 bar	33097	32932	---	---	32998
0/60 bar	---	---	---	---	On request
0/100 bar	---	---	---	---	On request
0/160 bar	---	---	---	---	On request
0/250 bar	---	---	---	---	On request

Blue part no. = in-stock items

See pages 211/212 for extra charges.

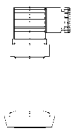
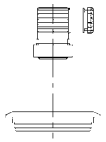
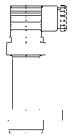
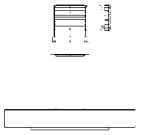
Extra charges for DMU 02/DMU 02 Vario

DG: H, PG: 4

Type	DMU 02	DMU 02 Vario Programmable	DMU 02 Vario FBO flush with O ring	DMU 02 Vario CP Clamp
Version				
	Price €	**Price €**	**Price €**	**Price €**
EX protection II 1G Ex ia IIC T4		---	---	---
Connection G¼B EN 837		---	---	---
Connection G½B DIN 3852 type E	**w/o extra charge**	**w/o extra charge**	---	---
Connection G¼B DIN 3852 type E			---	---
Connection G½B DIN 3852 type A	**On request**	**On request**	---	---
Connection G¼B DIN 3852 type A	**On request**	**On request**	---	---
Connection ¼–18 NPT			---	---
Connection ½–14 NPT			---	---
High pressure connection M20 x 1.5 female	---	---	---	---
Connection G½B (flush DIN 3852-A)	---	---	**w/o extra charge**	---
Connection G1B (flush DIN 3852 A)	---	---	**w/o extra charge**	---
Connection G1B (flush with O ring DIN 3852 A)	---	---	**On request**	---
Connection clamp ISO 2852 2"	---	---	---	
Connection clamp ISO 2852 2½"	---	---	---	
Other connections and designs (chemical seals)	---	**See chapter 2**	---	---
Other materials	**On request**			
Coatings	**On request**			
Surface roughness ≤ 0.4 µm for diaphragm	---	---		
Weld-in socket G½" for DMU 02 Vario FBO	---	---		---
High temperature version up to 180 °C				
Capillary tube with spiral hose	---	**See page 188**	**See page 188**	**See page 188**
Cleaned for oxygen			---	---
Socket DIN 43650-C	**w/o extra charge**	---	---	---
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	**On request**	---	---	---
Ratiometric 0.5–4.5 V @ 5 VDC		---	---	---
Other output signals	**On request**	**On request**	**On request**	**On request**
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

DG: H, PG: 4

Type	DMU 02 Vario MR 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	---	---	---	**On request**
Other materials	**On request**	**On request**	**On request**	**On request**
Coatings	**On request**	**On request**	**On request**	**On request**
Surface roughness ≤ 0.4 µm for diaphragm				
High temperature version up to 180 °C				
Capillary tube with spiral hose	**Page 190**	**Page 190**	**Page 190**	**Page 190**
Cleaned for oxygen	---	---	---	---
Field housing (stainless steel)				
Circular connector M12 x 1, 4-pin, A-coded EN 61076-2-101				
Other output signals	**On request**	**On request**	**On request**	**On request**
5-point calibration report (for measuring accuracy up to 0.3 % FSO)				

* See extra charges DMU 04 for sep. union nut.

Blue part no. = in-stock items

Pressure transducers DMU 03
Industrial version

- For low pressure ranges
- Versions for relative pressure and absolute pressure
- Excellent long-term stability
- ATEX version (optional)
- Option SIL 2

3


A Page 381


A Page 382


A Page 383

Application

Electronic pressure measurement in mechanical and plant engineering as well as process engineering applications. With protruding 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. The Safety Integrity Level of the pressure transducers DMU 03 is SIL 2 (IEC 61508/IEC 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 and 0/1,000 bar to 0/2,200 bar ≤ ±0.5 % FSO)

Long-term stability
≤ ±0.1 % FSO/year at reference conditions

Measuring ranges
Relative pressure: 0/100 mbar to 0/600 bar
Absolute pressure: 0/400 mbar to 0/600 bar
HP version: 0/1,000 bar to 0/2,200 bar

Overpressure safety
At least 3 x FS, except for
- 40, 60 bar: Overload = 105 bar
- > 400 bar: Overload = at least 1.5

Burst pressure at least 5 x FS, except for
- 25 bar: Burst pressure = 120 bar
- 400 bar: Burst pressure = 1,250 bar
- > 600 bar: Burst pressure = at least 3 x FS

Operating temperature range
Medium: -40/+125 °C
Ambient: -40/+85 °C
In EX zone 0: -20/+60 °C
EX zone 1 and higher: -20/+70 °C
Storage: -40/+100 °C

Temperature error band
- P_N < 0.4 bar ≤ ± 1 % FSO in compensated range 0/70 °C
- P_N ≥ 0.4 bar to 60 bar ≤ ± 0.75 % FSO in compensated range -20/+85 °C
- P_N ≥ 100 bar to 600 bar ≤ ± 0.75 % FSO in compensated range 0/70 °C

Dynamic characteristics
Response time: 2-wire ≤ 10 ms
3-wire ≤ 3 ms

Process connection
G½B (EN 837-1/7.3) / DIN 3852-E
with protruding diaphragm (0/100 mbar to 0/60 bar)

Materials
Housing: Stainless steel 316 L
Pressure connection: Stainless steel 316 L
Diaphragm: Stainless steel 316 L
Seal: FKM (Viton)
≥ 1,000 bar: connection and diaphragm made of stainless steel 630

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: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$
0–20 mA ≤ 240 Ω
0–10 V > 10 kΩ

Current input
4–20 mA < 25 mA
0–20 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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- EX version (Ex) (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85°C Da)
- Other process connections
- Other electrical connections
- Field housing (stainless steel 303)
- Other seal materials
- Higher accuracy and overpressure safety
- Fitting of chemical seal
- SIL 2 (IEC 61508/61511) 2-wire

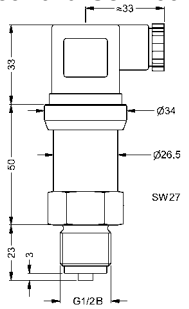
i See page 215 for prices.

SIL Protect your process!

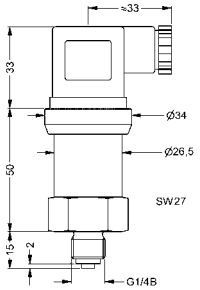
Pressure transducers DMU 03

Dimensions (mm) and electrical connections

Connection G½B
EN 837 and ISO 4400

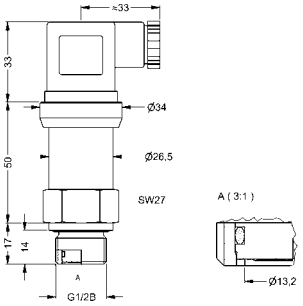


Connection G¼B
EN 837 and ISO 4400



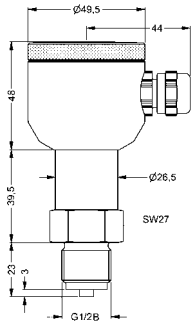
P_N 0/100 mbar to 0/40 bar: Length of housing 50 mm
P_N 0/60 bar to 0/600 bar: Length of housing 59 mm
EX version: Length of housing 83 mm

Connection G½B DIN 3852 type E with protruding diaphragm



P_N 0/100 mbar to 0/40 bar: Length of housing 50 mm
P_N 0/60 bar to 0/600 bar: Length of housing 59 mm
EX version: Length of housing 83 mm

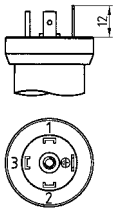
DMU 03 with G½B EN 837 and field housing



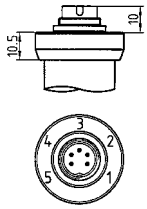
The EX version is 26.5 mm longer.
(cable gland M12 x 1.5 brass, nickel-plated)

Electrical connections

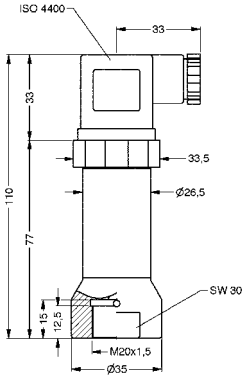
ISO 4400
(DIN 43650)



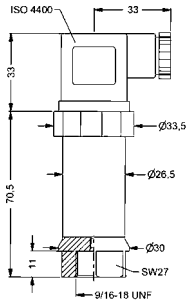
Binder 723



DMU 03 HD with M 20 x 1.5 female thread and ISO 4400



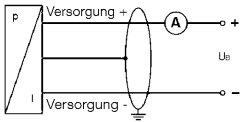
DMU 03 HD with 9/16-18 UNF female thread



Wiring diagram

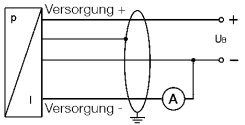
2-wire

4–20 mA

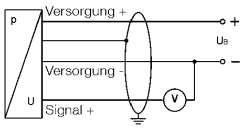


3-wire

0–20 mA



0–10 V



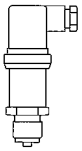
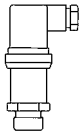
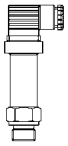
Pin assignment table

	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	Yellow/ green
3-wire system:			
Supply +	1	3	White
Supply –	2	4	Brown
Signal +	3	1	Green
Earth	Earth pin	5	Yellow/ green

The units are shipped with a detailed connection diagram.

Pressure transducers DMU 03

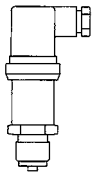
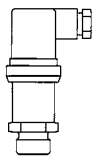
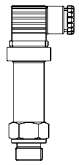
DG: H, PG: 4

Type	DMU 03	DMU 03 VM	DMU 03 HD
Version			
Measuring principle	Piezo-resistive stainless steel measuring cell		Thin film sensor
Measuring accuracy (IEC 60770)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.5 % FSO
Wetted parts	Stainless steel 316 L		Stainless steel 630
Connection	G½B EN 837	G½B DIN 3852 type E with protruding Diaphragm	M20 x 1.5 female thread
Supply voltage	DC 8–32 V	DC 8–32 V	DC 12–36 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	31634	---	---
-1/+1.5 bar	31635	---	---
-1/+3 bar	31636	---	---
-1/+5 bar	31637	---	---
Price €			
0/40 mbar	32024	---	---
0/60 mbar	32025	---	---
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	---	---
0/1,000 bar	---	---	33402
0/1,600 bar	---	---	33403
0/2,200 bar	---	---	33404

Blue part no. = in-stock items

Extra charges for pressure transducers DMU 03

DG: H

Type	DMU 03	DMU 03 VM	DMU 03 HD
Version			
	Price €	**Price €**	**Price €**
EX protection II 1G Ex ia IIC T4			
Connection G¼B DIN 3852 type E		---	---
Connection G½B DIN 3852 type E	**No extra charge**	**Standard**	---
Connection G¼B EN 837 type E		---	---
Connection ¼-18 NPT		---	---
Connection ½-14 NPT		---	---
Other connections	**On request**	**On request**	**No extra charge**
Connection 9/16 UNF female thread	---	---	
Field housing (stainless steel 303)			
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	**On request**	**On request**	**On request**
Calibration for special measuring range			
Absolute pressure (measuring ranges according to data sheet)			---
Measuring accuracy 0.25 % FSO			
5-point measurement report (for measuring accuracy up to 0.25 % FSO)			---
Fitting of chemical seal	All measuring ranges, minimum range depends on design of chemical seal	---	---
SIL 2 (only for 4–20 mA)			

i

See chapter 8 for digital display units and signal processing.

i

See chapter 2 for chemical seals.

Pressure transducers DMU 04 industrial version

- **DMU 04 CP/MR for hygienic processes**
- **Small temperature error**
- **Options: ATEX, field housing or high temperature version (up to 300 °C) and SIL 2**

3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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. The Safety Integrity Level of the pressure transducers DMU 04 is SIL 2 (IEC 61508/IEC 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 and > 40 bar < ±0.5 % FSO)

Measuring ranges
Relative pressure: -1/0 bar, 0/100 mbar to 0/60 bar
Absolute pressure: 0/400 mbar to 0/400 bar

Overpressure safety
At least 3 x FS, except for
- 40 bar: Overload = 105 bar

(burst pressure at least 5 x FS), except for
- 25 bar: Burst pressure = 120 bar

Operating temperature range
Medium: -10/+125 °C
Short-term (60 min) up to 150 °C
Ambient: -40/+85 °C
In EX zone 0: -20/+60 °C
EX zone 1 and higher: -20/+70 °C
Storage: -40/+100 °C

Temperature error band
In compensated range
-20/+85 °C ≤ ± 0.75 % FSO/10 K
(0–50 °C < 0.40 bar ≤ ± 1.5 % FSO/10 K)

Dynamic characteristics
Response time
2-wire ≤ 10 ms
3-wire ≤ 3 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, 3-wire	DC 14–30 V

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$
0–20 mA ≤ 500 Ω
0–10 V > 10 kΩ

Current input
4–20 mA < 25 mA
0–20 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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- EX version (Ex) (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85°C Da)
- Other process connections
- Other electrical connections
- Field housing (stainless steel 303)
- High temperature version up to 300 °C
- Higher accuracy
- Union nut DN 25/40/50
- SIL 2 (IEC 61508/61511) 2-wire

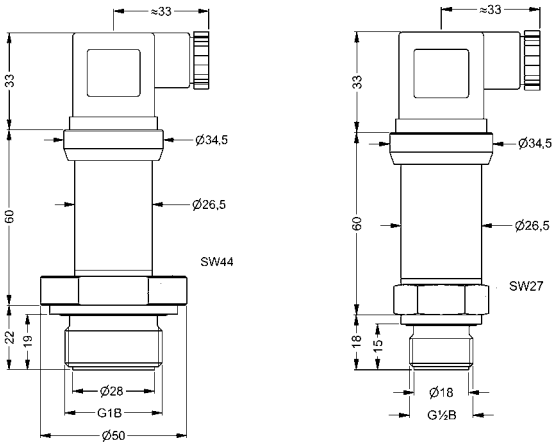
i See page 221 for prices.

SIL Protect your process!

Pressure transducers DMU 04

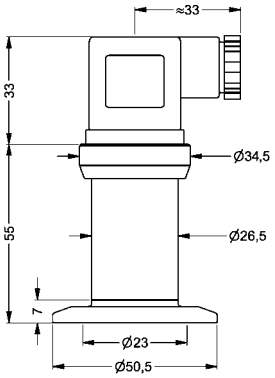
Dimensions (mm) and electrical connections

Threaded connections with flush diaphragm



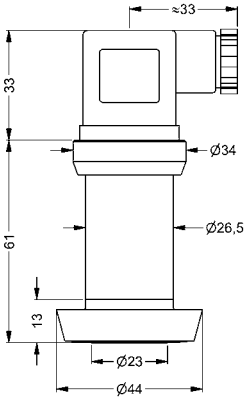
The SIL and EX versions are 26.5 mm longer.

Clamp connection ISO 2852



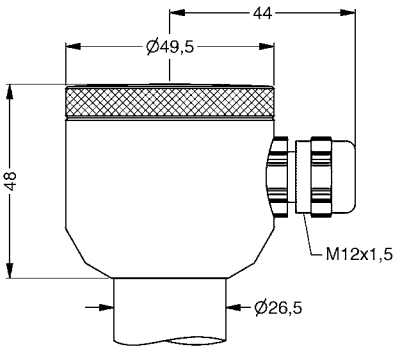
Clamp 1"

Conical dairy fitting DIN 11851



Conical dairy fitting DN 25

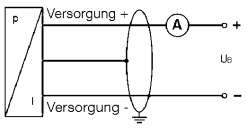
Field housing



Wiring diagram

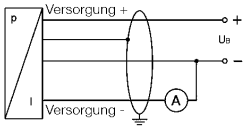
2-wire

4–20 mA

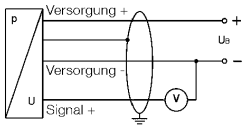


3-wire

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 Yellow/green
3-wire system: Supply + (0–10 V) Supply – (0–20 mA) Signal + Earth	1 2 3 Earth pin	White Brown Green Yellow/green

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**
- **Options: ATEX version or RS 232 interface**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Application

Electronic pressure measurement in applications requiring high measuring accuracy and long-term stability, such as process technology, 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 P 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 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: 0/400 mbar to 0/600 bar
Absolute pressure: 0/400 mbar to 0/600 bar

Overpressure safety
At least 2 x FS, 600 bar at least 3.5 x FS
(burst pressure at least 5 x FS,
≥ 400 bar at least 2 x FS)

Operating temperature range

Medium:	25/+125 °C
Ambient:	-25/+85 °C
In EX zone 0:	-20/+60 °C
EX zone 1 and higher:	-20/+65 °C
Storage:	-40/+100 °C

Temperature error band
In compensated range
-20/+80 °C ≤ 0.02 % FSO/10 K

Dynamic characteristics
Response time < 5 ms

Process connection
G½B (EN 837-1/7.3) or G½ DIN 3852 type E with protruding 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 12–36 V
EX version	DC 14–28 V

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$

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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- RS 232 interface in conjunction with Binder connector 723, 7-pin (interface and software required)
- EX version Ex
  (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85°C Da)
- Other process connections
- Other electrical connections
- Other seal materials

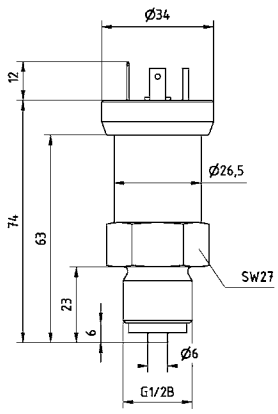
i See page 221 for prices.

Pressure transducers DMU 05 P

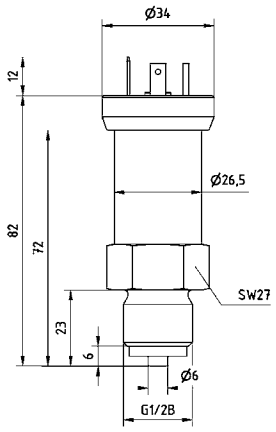
Dimensions (mm) and electrical connections

Connection G½B EN 837

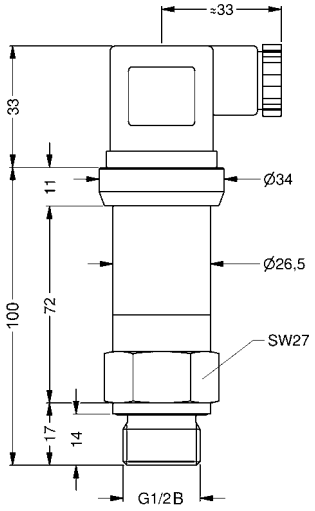
Version up to 0/40 bar:



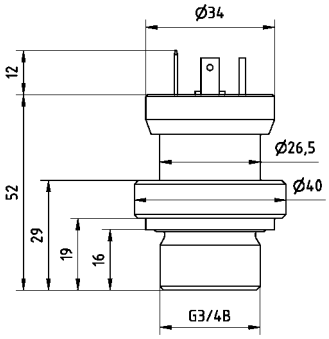
Version greater than 0/60 bar:



Connection G½B DIN 3852 type E with protruding diaphragm

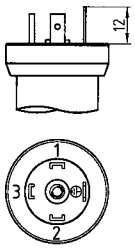


G¾B DIN 3852 type E
Screw-in version for level measurement

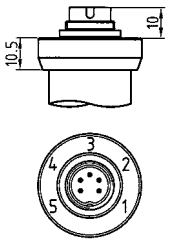


Electrical connections / cable outlet

ISO 4400
(DIN 43650-A)



Binder 723



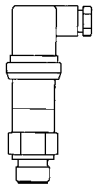
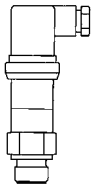
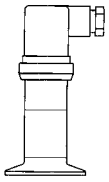
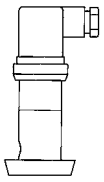
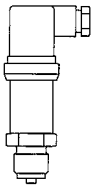
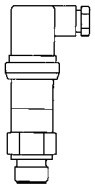
Pin assignment table

		Electrical connections			
		ISO 4400 (DIN 43650)	Binder 723 (5-pin)	Binder 723 (7-pin)	Cable outlet
2-wire system:	Supply + Supply – Earth	1 2 Earth contact	3 4 5	3 1 2	White Brown Green/yellow
RS 232 [1]:	RxD TxD GND	–	–	4 5 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

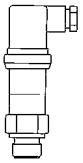
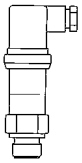
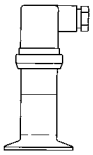
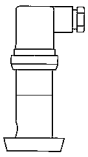
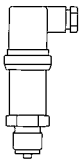
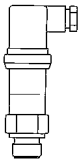
DG: H, PG: 4

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 (< 0.4 bar 0.5 % FSO > 60 bar 0.5 % FSO)	0.35 % FSO (< 0.4 bar 0.5 % 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/FKM		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 protruding diaphragm
Supply voltage	DC 8–32 V	DC 8–32 V	DC 8–32 V	DC 8–32 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 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	---	31669	33023	33025	31748	31772
0/400 mbar	---	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	---	31735	31758	31782
Price €						
0/40 bar	31657	31680	---	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	---

Blue part no. = in-stock items

Extra charges for DMU 04/DMU 05 P

DG: H, PG: 4

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 1G Ex ia IIC T4						
Clamp 1½" ISO 2852	---	---	**w/o extra charge**	---	---	---
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	**On request**	**On request**	**On request**	**On request**	**On request**	**On request**
High temperature version up to +300 °C					---	---
Field housing (stainless steel 303)					---	---
Binder connector 723, 5-pin						
Fixed cable connection 2 metres					---	---
Cable extension per metre						
Output 0–20 mA, 3-wire					---	---
Output 0–10 V, 3-wire					---	---
Other output signals	**On request**	**On request**	**On request**	**On request**	**On request**	**On request**
Absolute pressure (measuring ranges according to data sheet)						
Measuring accuracy 0.25 % FSO					---	---
5-point measurement report (for measuring accuracy up to 0.25 % FSO)					---	---
RS 232 interface*	---	---	---	---		
Programming interface and software	---	---	---	---	**On request**	**On request**
SIL 2 (only for 4–20 mA)					---	---

* Only in conjunction with Binder connector 723

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See chapter 8 for digital display units and signal processing.

Pressure transducer HydroFox® DMU 07 for level measurement

- Flush diaphragm
- Without transmission liquid
- Mechanically insensitive ceramic sensor
- Small temperature error
- ATEX version (optional)


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1 Digital display unit DA 12
2 Signalling device
3 Pressure transducers HydroFox® DMU 07

Application

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 25 x FS
> 400 mbar at least 3 x FS
≥ 16 bar at least 2 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 ≤ 0.1 % 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 / 2-wire	DC 9–32 V
EX version	DC 14–28 V
0–10 V	DC 14–32 V

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$

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 Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Options

- Pressure connection made of PVDF
- Other seal materials
- Field housing (stainless steel 303)
- Higher accuracy
- Other output signals
- EX version Ex
  (Ex II 1G or II ½G Ex ia IIC T4 Ga or Ga/Gb
  Ex II 1D Ex ia IIIC T85°C Da or Da/Db or Ex II ½D)

i

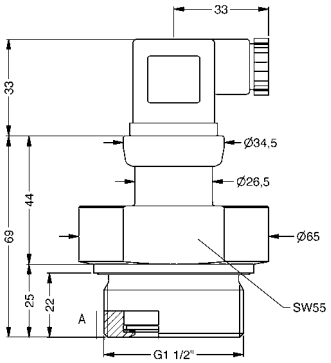
See chapter 5 for the complete "Level Measurement" range.

See page 235 for prices.

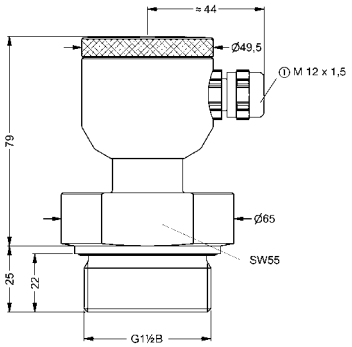
Pressure transducers HydroFox® DMU 07

Dimensions (mm) and electrical connections

Connection G1½B DIN 3852 type E – Connector and junction box ISO 4400, Pressure connection made of stainless steel

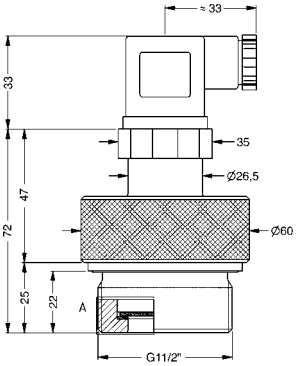


Connection G1½B – field housing



① Cable outlet

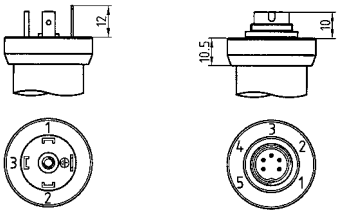
Connection G1½B DIN 3852 type E – Connector and junction box ISO 4400, Pressure connection made of PVDF



Electrical connections

ISO 4400 (DIN 43650-A)

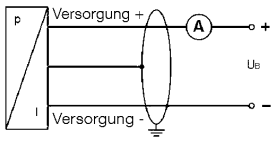
Binder 723



Wiring diagram

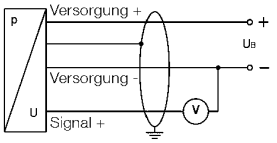
2-wire

4–20 mA



3-wire

0–10 V



Pin assignment table

	Electrical connections		
	Connector ISO 4400	Binder 723 5-pin	Cable colours (DIN 47100)
2-wire system:			
Supply +	1	3	White
(4–20 mA) Supply –	2	4	Brown
Earth	Earth pin	5	Yellow/green
3-wire system:			
Supply +	1	3	White
(0–10 V) Supply –	2	4	Brown
(0–20 mA) Signal +	3	1	Green
Earth	Earth pin	5	Yellow/green

The units are shipped with a detailed connection diagram.

Pressure transducers HydroFox® DMU 08 – level probe

- Compact and sturdy stainless steel design
- Integrated overvoltage protection
- Special calibration for all standard pressure units possible
- Optional ATEX version

A Page 383
A Page 384
A GSM Page 390

1 Junction box with pressure relief port
2 Digital display unit DA 10/12/14
3 Signalling device
4 Hydro Fox® DMU 08

Application

For electronic, continuous level measurement, e.g. in wells, drilling holes, water, containers or in waste water systems. Suitable for groundwater, 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.

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
See page 228

Operating temperature range

Medium:	-10/+70 °C
Ambient:	-10/+70 °C
Storage:	-25/+70 °C
For EX version	-20/+60 °C
at P_{atm}	0.8 to 1.1 bar

Temperature error band
In compensated range
0/70 °C ≤ 400 mbar ≤ ± 1 % FSO/10 K
≥ 400 mbar ≤ ± 0.75 % 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

4–20 mA	DC 12–36 V
EX version	DC 10–28 V
0–10 V	DC 14–32 V

Output signal
4–20 mA, 2-wire

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$

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)
With integrated breather tube for reference to the ambient atmospheric pressure

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Accessories
- Screw connector kit
- Junction box
- Anchor clamp

Options

- EX version (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85 °C Da)
- Measuring accuracy 0.1 % FSO
- FEP cable
- SIL 2 (IEC 61508/61511)

SIL Protect your process!

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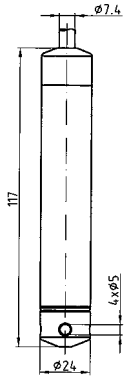
See chapter 5 for the complete "Level Measurement" range.

See page 235 for prices.

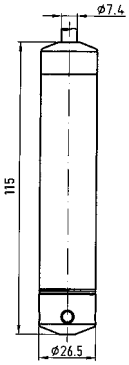
Pressure transducers HydroFox® DMU 08

Dimensions (mm) and electrical connections

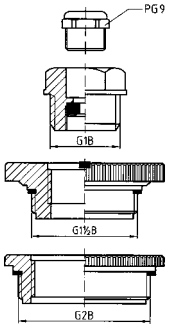
Standard version



EX version, SIL, 3-wire 0–10 V, accuracy 0.1 % FSO

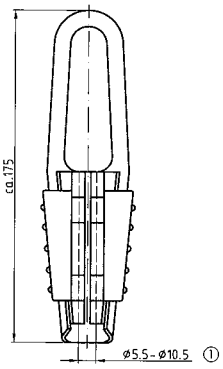


Screw connector kit

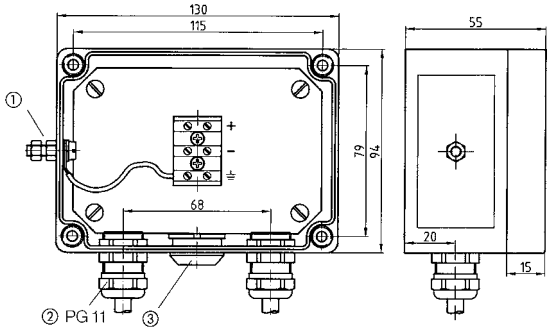


① Cable diameter

Anchor clamp



Junction box with pressure relief port

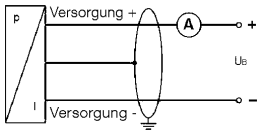


① Earth ② Cable gland ③ Pressure compensation element

Wiring diagram

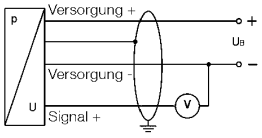
2-wire

4–20 mA



3-wire

0–10 V



Pin assignment table

	Cable colours (DIN 47100)
2-wire system: (4–20 mA) Supply + / Supply – / Earth	White / Brown / Yellow/green
3-wire system: (0–10 V) (0–20 mA) Supply + / Supply – / Signal + / Earth	White / Brown / Green / Yellow/green

The units are shipped with a detailed connection diagram.

Overpressure safety DMU 08

Measuring range	**100 mbar**	**160 mbar**	**200 mbar**	**250 mbar**	**300 mbar**	**400 mbar**	**600 mbar**	**1 bar**	**1.6 bar**	**2 bar**	**2.5 bar**	**4 bar**	**6 bar**	**10 bar**	**16 bar**	**20 bar**	**25 bar**
Overload	Quin-tuple	Sex-tuple	Quin-tuple	Qua-druple	Triple	Quin-tuple	Octuple	Quin-tuple	Sex-tuple	Qua-druple	Qua-druple	Quin-tuple	Sex-tuple	Qua-druple	Quin-tuple	Triple	Triple
Max. pressure load	40 bar																

Pressure transducer HydroFox® DMU 08 T – level probe

- With integrated temperature measurement
- Compact and sturdy stainless steel design
- Integrated overvoltage protection
- Special calibration for all standard pressure units possible

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Application

Electronic, continuous level and temperature measurement, e.g. in wells, drilling holes and for monitoring of rain overflow facilities, rivers and waters, for drinking water treatment in tanks or 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 T convert physical pressure and temperature into two independent, electrical signals. HydroFox® DMU 08 T uses a piezo-resistive silicon measuring cell; the temperature is measured by means of an integrated Pt 100 sensor.

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

Temperature (please specify when ordering):
1.) 0…30 °C (designation: 0030)
2.) 0…50 °C (designation: 0050)
3.) 0…70 °C (designation: 0070)

Overpressure safety
See page 230

Operating temperature range

Medium:	-10/+70 °C
Ambient:	-10/+70 °C
Storage:	-25/+70 °C

Temperature error band
In compensated range
0/70 °C < 400 mbar ≤ ± 1 % FSO
≥ 400 mbar ≤ ± 0.75 % FSO

Dynamic characteristics
Response time ≤ 10 ms
for output signal pressure

Materials

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

Pressure transmission liquid
Silicone oil

Supply voltage

Pressure:	DC 10–30 V
Temperature:	DC 10–30 V

Output signals
Pressure: 4–20 mA, 2-wire
Temperature: 4–20 mA, 2-wire

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$

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)
With integrated breather tube for reference to the ambient atmospheric pressure

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Accessories
- Screw connector kit
- Junction box
- Anchor clamp
- Extended weight

i
See chapter 5 for the complete "Level Measurement" range.

See page 235 for prices.

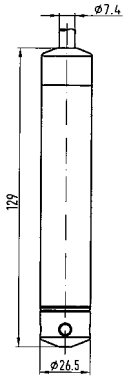
Options

- FEP cable
- Other measuring ranges on request

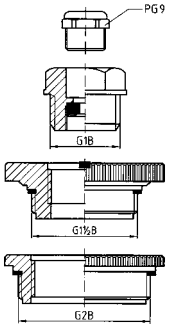
Pressure transducers HydroFox® DMU 08 T

Dimensions (mm) and electrical connections

Standard version

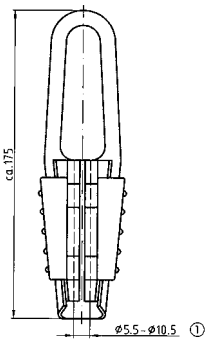


Screw connector kit

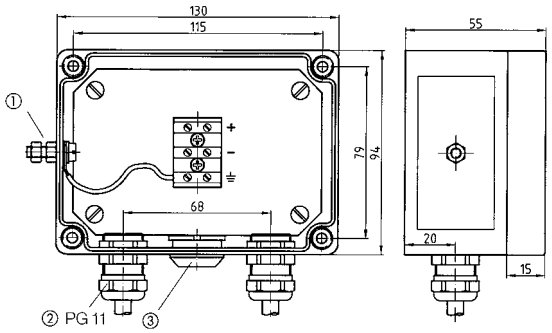


① Cable diameter

Anchor clamp



Junction box with pressure relief port

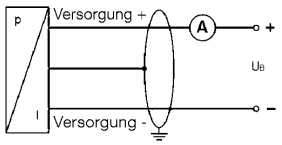


① Earth ② Cable gland ③ Pressure compensation element

Wiring diagram

2-wire

4–20 mA



Pin assignment table

Electrical connections	Cable colours (DIN 47100)
Supply P+	White
Supply P–	Brown
Supply T+	Grey
Supply T–	Pink
Earth	Yellow/green

The units are shipped with a detailed connection diagram.

Overpressure safety DMU 08 T

Measuring range	**100 mbar**	**160 mbar**	**200 mbar**	**250 mbar**	**300 mbar**	**400 mbar**	**600 mbar**	**1 bar**	**1.6 bar**	**2 bar**	**2.5 bar**	**4 bar**	**6 bar**	**10 bar**	**16 bar**	**20 bar**	**25 bar**
Overload	Quin-tuple	Sex-tuple	Quin-tuple	Qua-druple	Triple	Quin-tuple	Octuple	Quin-tuple	Sex-tuple	Qua-druple	Qua-druple	Quin-tuple	Sex-tuple	Qua-druple	Quin-tuple	Triple	Triple
Max. pressure load	40 bar																

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
- ATEX version (optional)

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1 Junction box with pressure relief port
2 Digital display unit DA 12
3 Signalling device
4 Hydro Fox® DMU 09

Application

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 3 x FS

Operating temperature range

Medium:	-25/70 °C
Ambient:	-25/70 °C
Storage:	-25/70 °C

Temperature error band
In compensated range
0/70 °C ≤ ± 0.1 % FSO/10 K

Dynamic characteristics
Response time < 200 ms

Materials

Housing:	PP
EX version:	Stainless steel 316 L
Diaphragm:	Ultra-pure ceramic (Al_2O_3 99.9 %)
Seals:	FKM (Viton)

Output signal/supply voltage

4–20 mA / 2-wire	DC 9–32 V
EX version	DC 14–28 V
0–10 V	DC 14–32 V

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$

Current input

4–20 mA	< 21 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
FEP cable (IP 68)
With integrated breather tube for reference to the ambient atmospheric pressure.

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Accessories
- Screw connector kit
- Junction box
- Anchor clamp

Options

- Housing PVDF
- Cable protection conduits
- FFKM seals
- EX version
  (Ex II 1G or II 1/2G Ex ia IIC/IIB T4 Ga or Ga/Gb
  Ex II 1D Ex ia IIIC T85°C Da)

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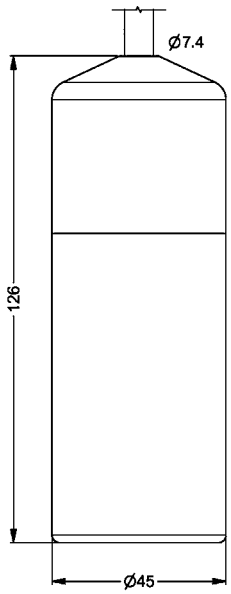
See chapter 5 for the complete "Level Measurement" range.

See page 235 for prices.

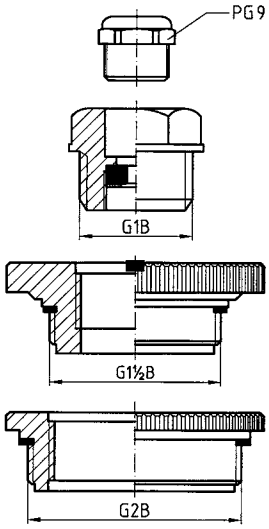
Pressure transducers HydroFox® DMU 09

Dimensions (mm) and electrical connections

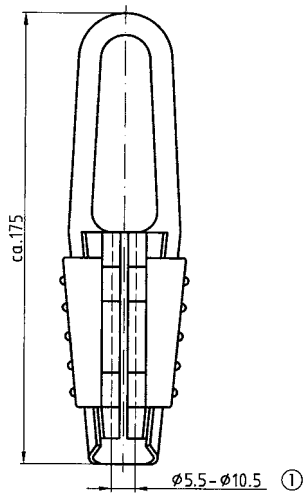
Standard version



Screw connector kit

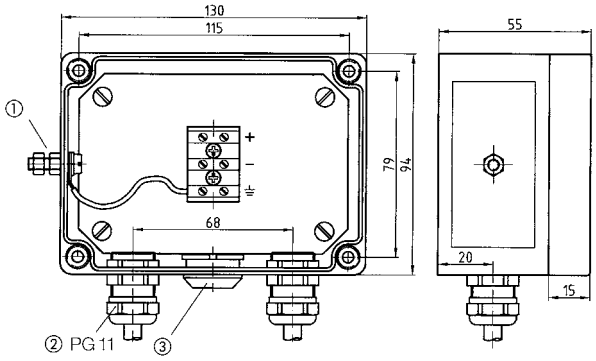


Anchor clamp



① Cable diameter

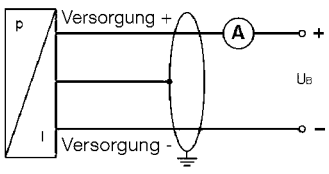
Junction box with pressure relief port



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: (4–20 mA) Supply +	White
Supply –	Brown
Earth	Yellow/green

The units are shipped with a detailed connection diagram.

Pressure transducers DeltaFox DMU 10 D
Version for differential pressure measurement

- Compact design
- Robust aluminium housing
- High long-term stability
- High overpressure safety
- Long service life

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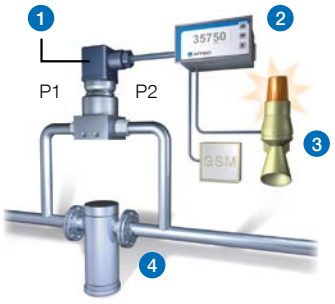


1 DeltaFox DMU 10 D
2 Digital display and control unit DA 14
3 Alarm filter replacement
4 Filter

3

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	Overload
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	1,000 mbar
0/600 mbar to 0/1,000 mbar	3,000 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 % FSO
≤ 0/25 mbar	≤ ±1.5 % FSO
≤ 0/250 mbar	≤ ±1 % FSO
> 0/250 mbar	≤ ±0.5 % FSO

Dynamic characteristics
Response time < 5 ms

Process connection
2 x G⅛B female thread

Materials
Housing: Aluminium, silver-coloured, anodised
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 8–32 V
0–20 mA, 3-wire DC 14–30 V
0–10 V, 3-wire DC 14–30 V

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$
0–20 mA < 240 Ω
0–10 V > 10 kΩ

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 Directive 2014/30/EU
RoHS Directive 2011/65/EU

Options

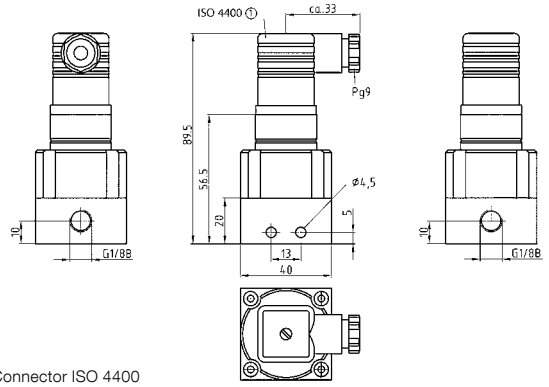
- Other process connections
- Other electrical connections
- Digital plug-in display DA 06

i See page 235 for prices.

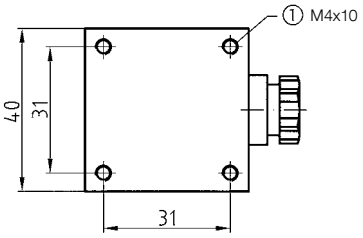
Pressure transducers DeltaFox DMU 10 D

Dimensions (mm) and electrical connections

Connection 2 x G1/8 female thread

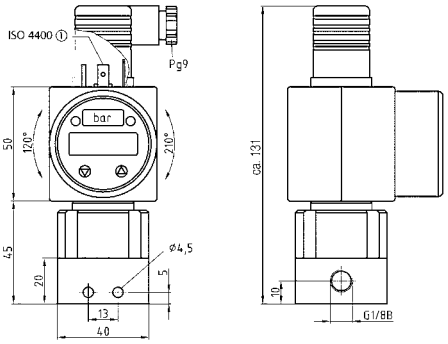


① Connector ISO 4400



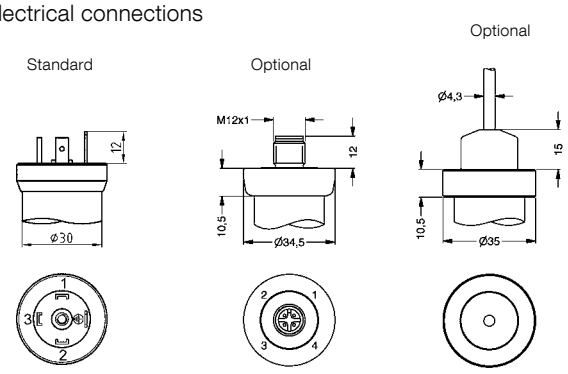
① Screw

DMU 10 D with plug-in display DA 06



① Connector ISO 4400

Electrical connections

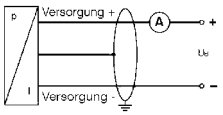


ISO 4400 (IP 65) | M12x1 4-pin (IP 67) | Cable outlet (IP 67)

Wiring diagram

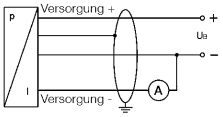
2-wire

4–20 mA

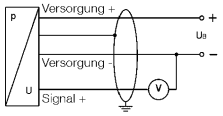


3-wire

0–20 mA



0–10 V



Pin assignment table

Pin assignment	ISO 4400 (DIN 43650)	M12 x 1	Cable colours
2-wire system:			
Supply +	1	1	White
(4–20 mA) Supply –	2	2	Brown
Earth	Earth pin	4	Yellow/green
3-wire system:			
Supply +	1	1	White
Supply –	2	2	Brown
Signal +	3	3	Green
Earth	Earth pin	4	Yellow/green

Pressure transducers DeltaFox DMU 11 D
Version for differential pressure measurement

- **Compact design**
- **High overload safety**
- **Mechanically robust and reliable, suitable for applications involving dynamic pressure changes as well as shock and vibration**

A Page 382 | A Page 383 | A GSM Page 390

1 Delta Fox DMU 11 D
2 Digital display and control unit DA 12
3 Pump

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 characteristic curve as per IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability):
P_N > 1 bar: ≤ ± 0.5 % FSO (differential pressure range with turn down from 1:1 to 1:5)
P_N ≤ 1 bar: ≤ ± 1 % FSO (differential pressure range with turn down from 1:2 bis 1:10)
≤ ± 0.5 % FSO (differential pressure range with turn down from 1:1 to 1:2)

Measuring ranges/overload safety

Nominal pressure (bar)	Differential pressure measuring range (bar)	Max. static pressure at one end (bar)
0.2	0/0.02 to 0/0.2	0.5
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
In compensated range
0/50 °C at nominal pressure 0.4 bar ≤ ± 2 % FSO
In compensated range
0/50 °C at nominal pressure 0.2 bar ≤ ± 2.5 % FSO

Dynamic characteristics

Response time < 5 ms

Process connection

2 x G½B (837-1/7.3)

Materials

Housing: Aluminium, black, anodised
Pressure connection: Stainless steel 316 L
Diaphragm: Stainless steel 316 L
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: $R_{max} = [(U_B - U_{Bmin}) / 0.02\ A]\ \Omega$
0–10 V > 10 kΩ

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

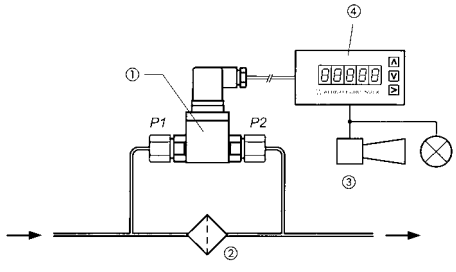
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity

EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

Scope of delivery

Pressure measuring instrument with mounting bracket



① Delta Fox DMU 11 D
② Filter
③ Alarm signal filter replacement
④ Digital display unit DA 12

Options

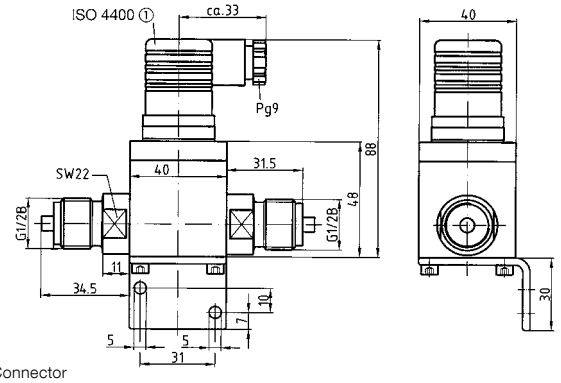
- Other process connections
- Other electrical connections
- Other seal materials
- Other output signals
- Fitting of chemical seal

i See page 235 for prices.

Pressure transducers DeltaFox DMU 11 D

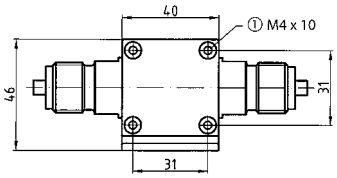
Dimensions (mm) and electrical connections

Connection 2 x G½B (EN 837)



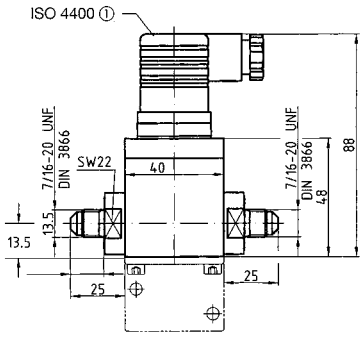
① Connector

Connection 2 x G½B (EN 837)



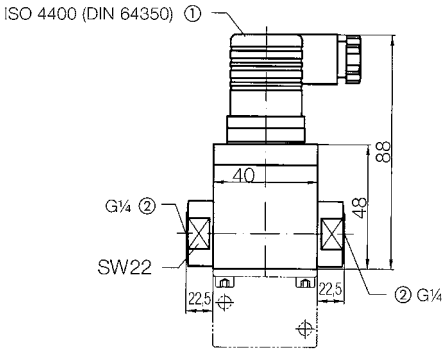
① Screw

Connection 2 x 7/16 UNF



① Connector

Connection 2 x G¼ female thread

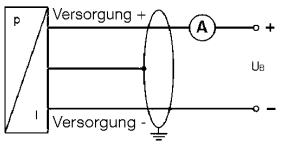


① Connector
② Pressure connection (female thread)

Wiring diagram

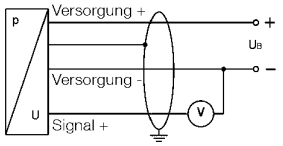
2-wire

4–20 mA



3-wire

0–10 V



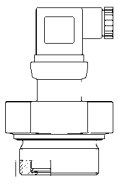
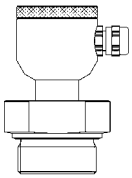
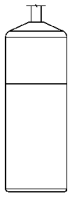
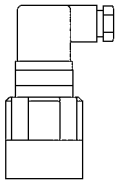
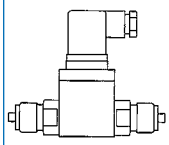
Pin assignment table

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, PG: 4

Type	DMU 07	DMU 07 FG	DMU 08	DMU 08 T**	DMU 09	DMU 10 D	DMU 11 D*
Version							
Measuring principle	Capacitance ceramic measuring cell		Piezo-resistive stainless steel measuring cell	Piezo-resistive stainless steel measuring cell	Capacitance 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 (≤ 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	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 G1/8B female thread	2 x G½B EN 837
Supply voltage	DC 9–32 V	DC 9–32 V	DC 12–36 V	DC 10–30 V	DC 9–32 V	DC 8–32 V	DC 12–36 V
Output	4–20 mA	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	2-wire
Electrical connection	Connector ISO 4400 (43650-A)	Field housing M12 x 1.5	5 m PUR cable	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.	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**	31555T0070	31571	31866	31813
0/160 mbar	31792	31806	**31556**	31556T0070	31572	31867	31814
0/200 mbar	31793	31548	**31557**	31557T0070	31573	---	---
0/250 mbar	31794	31807	**31558**	31558T0070	31574	31868	31815
0/300 mbar	---	---	**31519**	31519T0070	31812	---	---
0/400 mbar	31795	31549	**31559**	31559T0070	31575	31869	31832
0/600 mbar	31796	31808	31560	31560T0070	31576	31870	31833
0/1 bar	31797	31550	31561***	31561T0070	31577	31871	31816
0/1.6 bar	31798	31809	31562	31562T0070	31578	---	31834
0/2 bar	31799	31551	31563	31563T0070	31579	---	---
0/2.5 bar	---	---	31564	31564T0070	31580	---	31817
0/4 bar	31800	31552	31565	31565T0070	31581	---	31835
0/6 bar	31801	31810	31566	31566T0070	31582	---	31818
0/10 bar	31802	31553	31567	31567T0070	31583	---	31836
0/16 bar	---	---	31568	31568T0070	---	---	31837
0/20 bar	---	---	31569	31569T0070	---	---	---
0/25 bar	---	---	31570	31570T0070	---	---	---

* Please specify required nominal pressure/maximum static pressure when ordering. Standard temperature range: 0–70 °C Replace the designation of the part number, if necessary

** 0–30 °C, designation: 0030 / 0–50 °C, designation: 0050 / 0–70 °C, designation: 0070

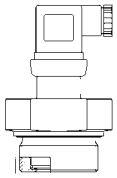
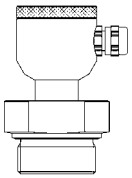
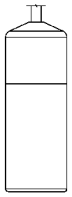
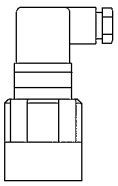
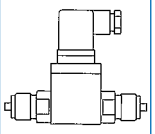
*** Electrical connection 15 m PUR cable

Blue part no. = in-stock items

i See page 236 for extra charges for and accessories.

Extra charges/accessories for DMU 07 – DMU 11 D

DG: H, PG: 4

Type	DMU 07	DMU 07 FG	DMU 08	DMU 08 T	DMU 09	DMU 10 D	DMU 11 D
Version							
	Price €	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
EX protection II 1G EEx ia IIC T4				---		---	---
2 x G¼ female thread	---	---	---	---	---	---	
2 x hose connection 6 mm	---	---	---	---	---		**On request**
2 x 7/16 UNF	---	---	---	---	---	---	
Other connections	**On request**	**On request**	---	---	---	**On request**	**On request**
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	**On request**	**On request**	**On request**	---	**On request**	**On request**	**On request**
Measuring accuracy 0.25 % FSO			---	---	---	---	---
5-point calibration report (for measuring accuracy up to 0.25 % FSO)			---	---	---	---	---
SIL 2 (only for 4–20 mA)	---	---		---	---	---	---

Accessories for DMU 08/ DMU 09

DG: H	PG	Part no.	**Price €**
Screw connector kit plastic G2" – 1½" – 1"	1	**52125**	
Screw connector kit stainless steel G1"	3	31822	
Junction box with pressure relief port (IP 65)	1	**31824**	
Anchor clamp	3	**31825**	

Blue part no. = in-stock items

i

See chapter 8 for digital display units and signal processing.

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 2

A Page 383

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

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 $\leq \frac{U_B - U_{Bmin}}{0.02\ A}$

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

Options

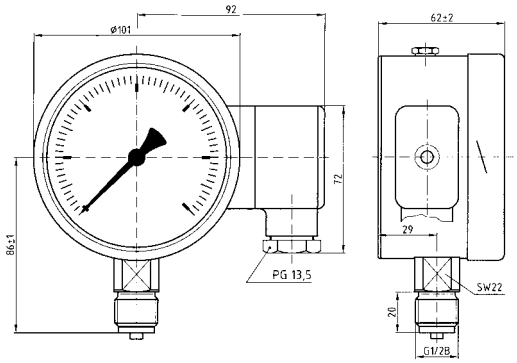
- Housing filling (paraffin oil)
- Electrical contacts
- Other process connections
- Fitting of chemical seal

i See page 241 for prices.

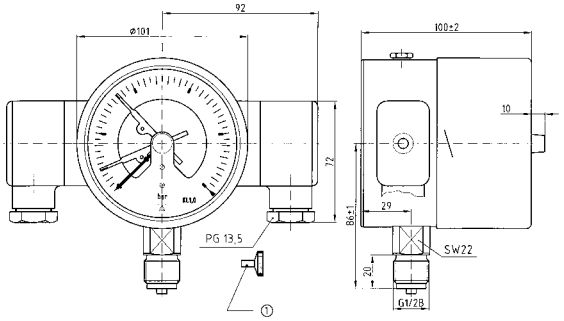
Pressure transducers DMU 13

Dimensions (mm) and electrical connections

Bottom connection



Bottom connection, with electrical contact



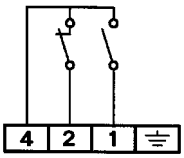
① Removable key, delivered loose with the unit.

Pin assignment table for pressure measuring cell (right junction box)

Supply +	1
Supply -	2
Earth	Earth pin

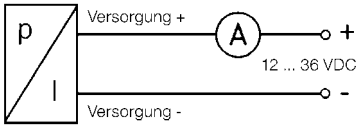
Pin assignment table for electrical contact (left junction box). Example: Magnetic spring contact MK2.12

Normally open contact	1
Normally closed contact	2
Supply	4



Wiring diagram

2-wire, 4–20 mA



Pressure transducers DMU 14 DG/FG Ex
Intelligent precision version

DMU 14 DG Ex

- **Version DMU 14 FG Ex with ATEX approval for zone 0**
- **Ideal for process engineering**
- **High accuracy of ±0.1 %**
- **Either die cast housing (DG) or field housing (FG)**
- **Turn down 1:10**
- **Local display**

DMU 14 FG Ex

Application

The intelligent pressure transducer DMU 14 DG EX with die cast aluminium housing provides very high accuracy and a turn down function for measuring range selection and is an ideal solution for process engineering applications. The version DMU 14 FG EX with a stainless steel field housing is perfectly suitable for applications in the pharmaceutical and food industries. The devices come with HART® communication.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 14 DG/FG EX 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)
≤ ± 0.1 % FSO
≤ ± 0.2 % FSO with turn down > 1:5

Long-term stability
≤ ± 0.1 % x FSO/year at reference conditions

Display
LC display, 5-digit 7-segment main display
Character height 8 mm, indication range ± 9,999
8-digit 14-segment additional display
Character height 5 mm
52-segment bar chart
Accuracy 0.1%, ±1 digit

Measuring ranges
Relative pressure: 0/0.4 to 0/600 bar
Absolute pressure possible from 0/1 bar
Vacuum ranges -1/+1; -1/+2; -1/+4 and -1/+10 bar

Overpressure safety
Up to 0/20 bar, at least 4 x FS
0/40 to 0/400 bar, at least 2 x FS
0/600 bar: Overload = 1,000 bar

Operating temperature range

Medium:	-40/+125°C Short-term (60 min) up to +150 °C
Ambient:	-20/+70 °C in EX zone 0 at p_{atm} 0.8 to 1.1 bar -20/+60 °C without display -40/+80 °C
Storage:	-30/+80 °C

Temperature error
≤ ± 0.2 % FSO x turn down
in compensated range -20/+85 °C

Dynamic characteristics
100 ms (without consideration of electronic damping)

Process connection
G½B (EN 837-1/7.3)

Materials

Housing DG:	Aluminium die cast, powder-coated
Housing FG:	Stainless steel 316 L
Pressure connection:	Stainless steel 316 L
Diaphragm:	Stainless steel 316 L
Seal:	FKM

Pressure transmission liquid
Silicone oil
(Option food oil – temp. of the medium -10/+125 °C)

Adjustable parameters

Electronic damping:	0/100 s
Offset:	0/90 %
Turn down (of span):	1:10

Output signal/ supply voltage
4–20 mA, 2-wire DC 12–28 V
with EX version/HART communication

Load
4–20 mA: $R_{max} = [(U_B-U_{Bmin})/0.02]$ Ω
HART® communication R_{min} = 250 Ω

Current input
Max. 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection
Cable gland M20 x 1.5

Degree of protection
IP 67 (EN 60529)

i
See page 241 for prices.

Pressure transducers DMU 14 DG/FG Ex
Intelligent precision version

Technical specifications

CE conformity
EMC Directive 2014/30/EU
Pressure Equipment Directive 2014/68/EU (module A)
ATEX Directive 2014/34/EU
RoHS Directive 2011/65/EU

EX approval
IBExU15ATEX1059 X
DMU 14 FG Ex:
Ex II 1G Ex ia II B T4 Ga
and
Ex II 1D Ex ia III C T85 °C Da

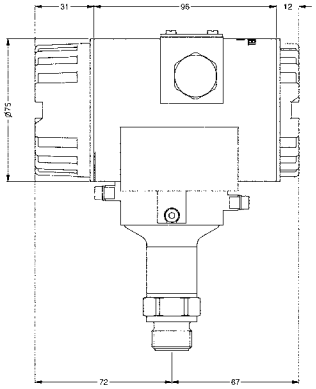
DMU 14 DG Ex
Ex II 2G Ex ia II B T4 Gb
and
Ex II 1D Ex ia III C T85 °C Da

Options

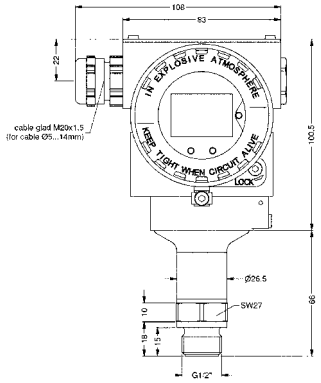
- Other process connections
- High temperature version up to 300 °C (only for connection G½ DIN 3852 with protruding diaphragm)

Dimensions (mm) and electrical connections

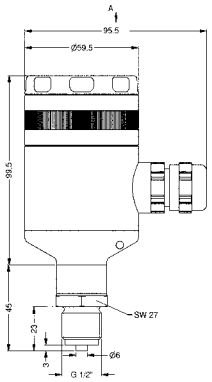
DMU 14 DG Ex



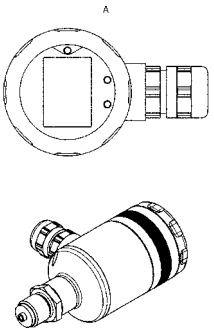
DMU 14 DG Ex



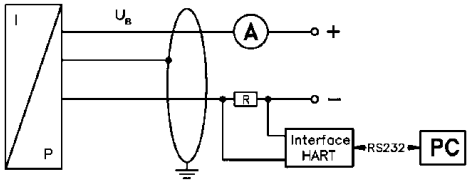
DMU 14 FG Ex



DMU 14 FG Ex



Wiring diagram

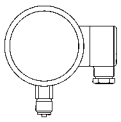
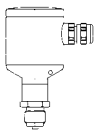
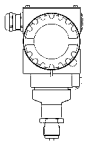


Pin assignment table

Electrical connections	**Aluminium die cast housing:** Connection terminals (terminal cross section 2.5 mm²)	**Stainless steel field housing:** Connection terminals (terminal cross section 1.5 mm²)
Supply + Supply – Test	IN + IN – Test	IN + IN – -
Shield	⏚	⏚

Pressure transducers DMU 13–DMU 14

DG: H, PG: 4

Type	DMU 13	DMU 14 FG Ex	DMU 14 DG Ex
Version			
Housing Ø	100	60	75
Housing	Stainless steel	Stainless steel	Aluminium
Measuring accuracy	0.5 % FSO Pressure gauge: class 1.0	0.1 % FSO	0.1 % FSO
Wetted parts	Stainless steel 316 Ti/316 L	Stainless steel 316 L/FKM	Stainless steel 316 L/FKM
Connection	G½B	G½B	G½B
Supply voltage	DC 12–36 V	DC 12–28 V	DC 12–28 V
Output	4–20 mA	4–20 mA	4–20 mA
Measuring range	Part no.	Part no.	Part no.
Price €			
0/400 mbar	---	31977	31987
Price €			
-1/0 bar	---	---	---
0/0.6 bar	---	---	---
0/1 bar	31077	31978	31988
Price €			
0/2 bar	31078	31979	31989
0/2.5 bar	31079	---	---
0/4 bar	31080	31980	31990
0/6 bar	31081	---	---
0/10 bar	31082	---	---
0/16 bar	31083	---	---
0/20 bar	31084	31981	31991
0/40 bar	31085	31982	31992
Price €			
0/60 bar	---	---	---
0/100 bar	---	31983	31993
0/160 bar	---	---	---
0/250 bar / 0/200 bar*	---	31984	31994
0/400 bar	---	31985	31995
0/600 bar	---	31986	31996
Price €			
0/700 bar	---	---	---
Extra charges (without PG)	**Price €**	**Price €**	**Price €**
Housing filling		---	---
Without display – reduced price	---		
Clamp connection 1" or 1½", PN = 16	---		
Clamp connection 2", P_{max} = 16 bar	---		
Dairy fitting DIN 11851 DN 25, PN = 40	---		
Dairy fitting DIN 11851 DN 40, PN = 40	---		
Dairy fitting DIN 11851 DN 50, PN = 25	---		
High-temperature version +300 °C	---		
Measuring range -1/xx bar	---		
Pressure transmission liquid food oil	---		
Absolute pressure (measuring ranges according to data sheet)	---		

* Applies to DMU 14 DG/FG Ex only

Blue part no. = in-stock items

Pressure transducers DeltaFox DMU 20 D
Version for differential pressure measurement

- **Multiple-range transmitter with up to 3 switchable measuring ranges**
- **Easy parameterisation via 2-line LC display**
- **Min./Max. value indication**
- **Ideal for clean room and filter monitoring**

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Application

The differential pressure transducer DMU 20 D can be used with all dry, gaseous, non-corrosive media. The device detects even smallest differential pressures and is particularly suitable for heating, air conditioning and ventilation applications. Clean rooms and filter monitoring are other application areas.

Description

The devices equipped with silicon sensors. 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.
The 2-line LC display shows the measured value and the unit and optionally the status of the switching outputs. The customer can parameterise up to three measuring ranges.

Technical specifications

Display
2-line LC display
Visible area: 32.5 x 22.5 mm
5-digit 7-segment main display
(character height 8 mm, ±9,999)
8-digit 14-segment additional display
(height 5 mm, 52-segment bar chart)
Accuracy: 0.1 % ±1 digit
Switchable pressure units: mbar, bar, Pa, hPa, kPa, psi, Atm, torr, mmHG

Supply voltage
DC 11–32 V / 2-wire
DC 19–32 V / 3-wire

Load
0(4)–20 mA, 3-wire, R_{max} = 330 Ω
4–20 mA, 2-wire, $R_{max} = [(U_B-U_{Bmin})/0.02\ A]$ Ω
0–10 V, R_{min} 10 kΩ

Output
0(4) – 20 mA / 3-wire
0 – 10(5) V / 3-wire

Housing
Plastic (ABS)
(H x W x D) 68.5 x 132 x 50 mm

Sensor:
Ceramic, silicone, epoxy, RTV

Process/pressure connection
Brass, nickel-plated
Hose olive Ø 6.6 x 11 mm,
for flexible hoses with Ø 6 mm

Wetted parts
Pressure connection, PVC/silicone hose, sensor

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability)
≤± 0.5 % FSO BFSL
(measuring ranges < 6 mbar = ≤± 1 % FSO BFSL)
Long-term stability ≤± 0.2 % FSO / year
(measuring ranges < 6 mbar =
≤± 0.5 % FSO / year)
Mounting position: Vertical

Measuring ranges/overload safety

Nominal pressure PN diff.	Switchable	Max. static pressure
1.6 mbar	1.0 mbar	200 mbar
4 mbar	2.5 mbar	200 mbar
10 mbar	6 mbar	200 mbar
40 mbar	25 mbar	345 mbar
250 mbar	60/160 mbar	1,000 mbar
1,000 mbar	400/600 mbar	3,000 mbar

Operating temperature range:
Medium: 0 / +50 °C
Ambient: 0 / +50 °C
Storage: -10 / +70 °C

Electrical connection
Cable gland M16 x 1.5

Electrical protection
Short circuit proof and protected against reverse polarity

Degree of protection
IP 54 (EN 60529)

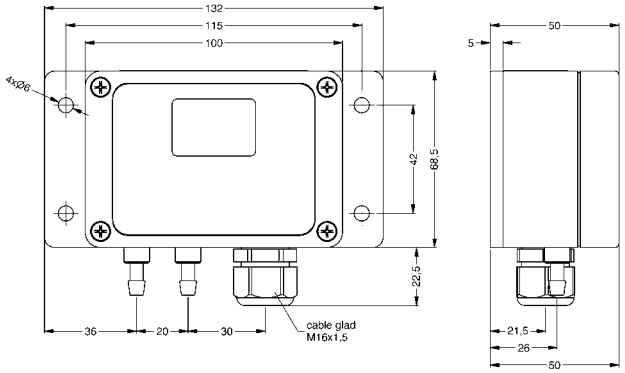
CE conformity
EMC Directive: 2014/30/EU
RoHS Directive 2011/65/EU

Options
- Other process connections
- Other output signals

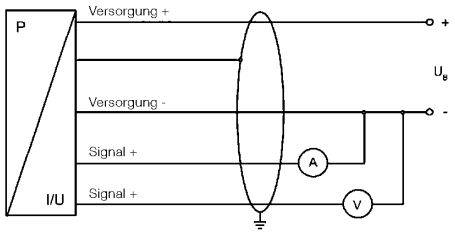
Pressure transducers DeltaFox DMU 20 D
Version for differential pressure measurement

Dimensions (mm) and electrical connections

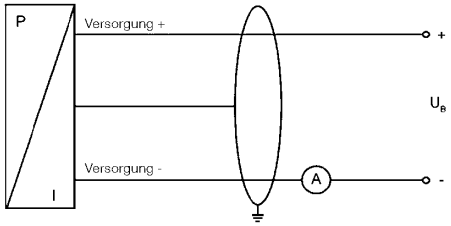
DMU 20 D



Wiring diagram

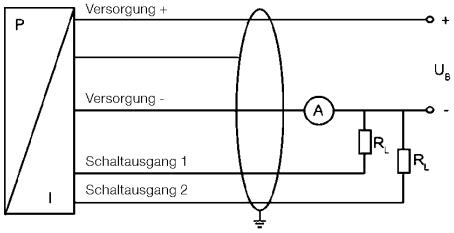


3-wire



2-wire

Wiring diagram 2-wire and 2 x PNP



Pin assignment table

Electrical connections	3-wire	2-wire
Supply +	VS +	IN +
Supply –	VS –	IN –
Signal + (for 3-wire only)	I_{out} / V_{out}	-
Switching output 1		S1
Switching output 2		S2

Pressure transducers DeltaFox DMU 20 D
Version for differential pressure measurement

Ordering data

DG: H, PG: 4

		Price €
1	**Pressure transducer DMU 20 D**	
33409	DMU 20 D	
2	**Pressure type**	
D	Differential pressure	**0.00**
R	Relative pressure	
3	**Output**	
01	Analogue output 0 (4)–20 mA and 0–10 (5) V / 3-wire	**0.00**
02	Analogue output 4–20 mA / 2-wire and 2 x PNP open collector switching output	
03	Analogue output 4–20 mA / 2-wire	
4	**Measuring range in mbar**	
053	0/1.6	**0.00**
054	0/4	**0.00**
002	0/10	**0.00**
005	0/40	**0.00**
009	0/250	**0.00**
012	0/1,000	**0.00**
5	**Process connection**	
1	Hose olive Ø 6.6 x 11 mm, for flexible hoses with inner diameter 6 mm	**0.00**
2	Hose olive Ø 4.4 x 10 mm, for flexible hoses with inner diameter 4 mm	**0.00**

Ordering code

Example: 0/10 mbar,
Connection Ø 6.6 x 11 mm

33409	D	01	002	1

Pressure transducers DeltaFox DMU 21 D
Version for differential pressure measurement

- **LED display and open collector switching output**
- **Turn down up to a maximum of 1:10 through customer**
- **Min./Max. value storage**
- **Housing can be rotated by 330° and pressure connections by 300°**

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Application

For electronic differential pressure measurement which requires a local display in addition to the analogue output, for example for monitoring filters and fans. The differential pressure transducer can be used with all liquid and gaseous, corrosive media which a not highly viscous and which do not crystallize.

Description

The DeltaFox DMU 21 D pressure transducers feature two oil-immersed piezo-resistive stainless steel measuring cells and a 4-digit, red LED display. When pressure is applied, the pressure difference between the positive pressure side and the negative pressure side is converted into a current signal which is proportional to the differential pressure. A menu and two keys allow for displaying the measured values and for configuring the individual parameters.

Technical specifications

Display
4-digit red 7-segment LED display
(character height 7 mm)
Range -1,999 / +9,999
Accuracy: 0.1 %, ±1 digit
Digital damping: 0.3 / 30 s (programmable)
Display housing can be rotated by 330°

Adjustments
Turn down 1:10
Reference point for switching and analogue output selectable on + connection, - connection or differential pressure

Supply voltage
DC 24 V ±10 %

Load
500 Ω

Analogue output
4 – 20 mA / 3-wire

Switching output
1 open collector (PNP), max. 125 mA
Status indication via LED
On/off delay 0 to 100 s
Switching accuracy ≤± 0.5 % FSO

Material
Housing: Plastic (PA 6.6, polycarbonate)
Diaphragm: Stainless steel 316 L
Pressure connection: Stainless steel 316 L
Seal: FKM

Wetted parts
Diaphragm, pressure connection, seal

Measuring ranges
0/1 bar to 0/70 bar

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability) ≤ ± 1 % FSO BFSL

Application area
The maximum pressure in the system (maximum static pressure, one end) must not exceed the full scale value (FS).

Operating temperature range
Medium: -40 / +125 °C
Ambient: -25 / +85 °C
Storage: -40 / +85 °C

Process connection
G½ (DIN 3852)
Both pressure connections rotatable by 300°

Electrical connection
Connector M12 x 1.5-pin

Electrical protection
Short circuit proof and protected against reverse polarity

Degree of protection
IP 65 (EN 60529)

CE conformity
EMC Directive: 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU

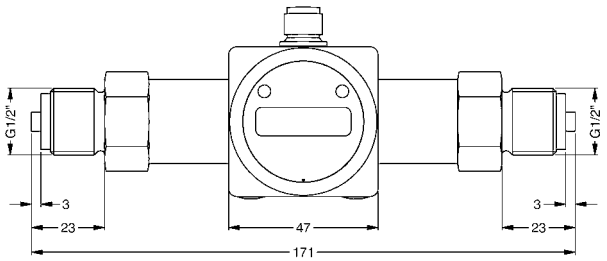
Scope of delivery
DMU 21 D, mounting bracket and 2 screws

Options
- Other process connections
- 2 x PNP open collector switching outputs
- Fixed cable connection with 2 metres PVC cable

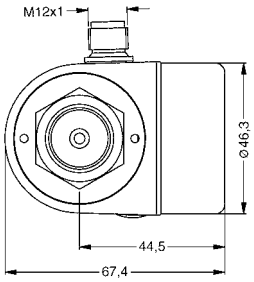
Pressure transducers DeltaFox DMU 21 D
Version for differential pressure measurement

Dimensions (mm) and electrical connections

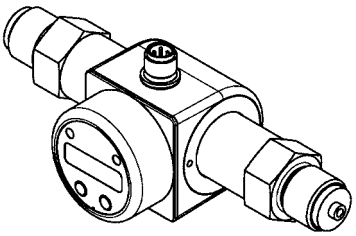
DMU 21 D



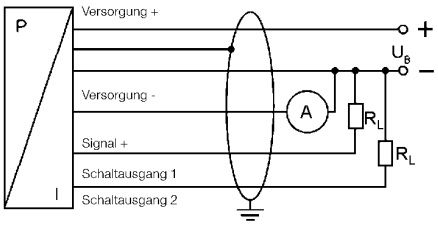
DMU 21 D



DMU 21 D



Wiring diagram



Pin assignment table

Electrical connections	M12 x 1 (5-pin), plastic	Cable outlet (IP 67)
Supply + Supply – Signal + Switching output 1 Switching output 2	1 3 2 4 5	White Brown Green Grey Pink
Shield	Via pressure connection	Yellow/green

Pressure transducers DeltaFox DMU 21 D
Version for differential pressure measurement

Ordering data

		DG: H, PG: 4	Price €
1	**Pressure transducer for differential pressure DMU 21 D**		
33410	DMU 21 D		
2	**Electrical connection**		
1	Connector M 12 x 1, 5-pin		**0.00**
3	**Output**		
01	Analogue output 4–20 mA / 3-wire + 1 x PNP open collector switching outputs		**0.00**
02	Analogue output 4–20 mA / 3-wire + 2 x PNP open collector switching outputs		
4	**Measuring range in bar**		
109	0 / 1.0		**0.00**
150	0 / 2.0		**0.00**
151	0 / 3.5		**0.00**
152	0 / 7.0		**0.00**
153	0 / 20		**0.00**
154	0 / 35		**0.00**
155	0 / 70		**0.00**
5	**Process connection**		
01	G½B (DIN 3852)		**0.00**
02	G½B (EN 837-1)		
03	G¼B (DIN 3852)		
04	G¼B (EN 837-1)		
05	½-14 NPT		
06	¼-18 NPT		
6	**Seal**		
1	FKM		**0.00**
9	Others		**On request**

Ordering code

Example: 0/20 bar,
G½B (DIN 3852)

33410	1	01	153	01	1

Universal digital pressure gauges DIM 20 service instrument

- High flexibility due to selectable units
- Min./max. value memory
- Intuitive operation via menus
- Display can be rotated by 330°
- Zero and full scale can be calibrated

Application

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 into the desired unit 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/cmHg/kPa/MPa/mWC

Display
Multi-line LC display
4.5 digit, numeric, for displaying the measured value (character height 9.5 mm) – line 1

6-digit, alphanumeric, for displaying additional information (character height 6.8 mm) and additional symbols – line 2

Display can be rotated by 330°

Measuring accuracy
±0.5 % FSO BFSL
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability)

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

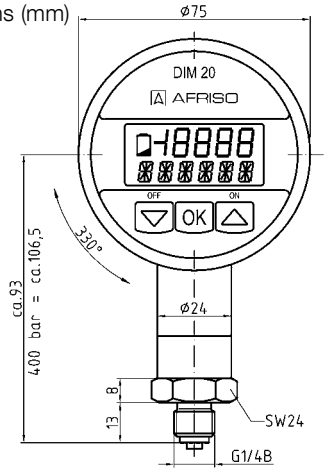
Housing:	PA6, glass-loaded
Pressure connection:	Stainless steel 304
Diaphragm:	Ceramic (Al_2O_3 96 %)
Seal:	FKM

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)

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU module A

Dimensions (mm)



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See the catalogue PORTABLE MEASURING INSTRUMENTS for additional test, inspection and service instruments for mobile use.

Digital pressure gauge DIM 20

DG: H, PG: 4

Type	DIM 20
Version	
Housing Ø	75
Housing	Plastic
Measuring accuracy	0.5 % FSO BFSL
Wetted parts	Stainless steel 304 ceramic/FKM
Connection	G¼B
Supply voltage	DC 3.6 V
Output	---
Measuring range	Part no.
Price €	
0/400 mbar	---
Price €	
-1/0 bar	**32500**
0/0.6 bar	---
0/1 bar	---
Price €	
0/1.6 bar	---
0/2.5 bar	**32503**
0/4 bar	---
0/6 bar	**32505**
0/10 bar	**32506**
0/16 bar	---
0/25 bar	**32508**
0/40 bar	**32509**
Price €	
0/60 bar	---
0/100 bar	**32511**
0/160 bar	**32512**
0/250 bar	**32513**
0/400 bar	**32514**
0/600 bar	---
Price €	
0/700 bar	**32516**
Extra charges (without PG)	**Spare battery PG: 4** **Part no.** **68309** **Price €**
	Connection ¼-18NPT **Price €**

* Extra charge; please append N2 to the part no. when ordering.
Blue part no. = in-stock items

Precision digital pressure gauge DIM 30

- **Accuracy ≤±0.05 % at 400 mbar and higher**
- **Suitable for on-site calibration or pressure transducers**
- **Graphical LC display**
- **Data logger function**

Application

For mobile electronic pressure measurement with high demands in terms of accuracy and long-term stability in process engineering as well as mechanical and plant engineering applications. Suitable for monitoring pressure and temperature behaviour as well as on-site calibration of pressure transducers.

Description

The battery-operated digital pressure gauge DIM 30 consists of two devices – the digital display with a graphical LC display and a pressure transducer with a piezo-resistive stainless steel sensor. The pressure transducer can be replaced without tools and without calibration for other measurement tasks or measuring ranges.
The integrated data logger can record pressure and temperature values linearly and cyclically. These measured values can be analysed with the enclosed PC evaluation software.

Technical specifications Display unit

Display
Backlit graphical LC display,
visible area 55 x 46 mm
Indication of measured values max. 7 digits
Temperature indication, time, 100-segment bar chart potential input value,
languages German/English
Duration and intensity of of backlight adjustable
Switchable pressure units: bar, mbar, hPa, kPa, MPa, psi, inHg, cmHg, mmHg, inH_2O, mmH_2O, mH_2O, kg/cm^2
Temperature indication:
Measuring ranges -10 / +55 °C
Resolution 0.1 °C
Accuracy ±2 K

Data logger
Stores pressure values and sensor temperature (sec., min., hour, daily at an adjusted time)
max. 600,000 values
Adjustable measurement interval

Zero adjustment
From the front via keypad

Supply voltage
3 x 1.5 V, battery AA (LR6)
Battery service life
Standard mode: > 2,000 h
Standby mode: At least 5 years

Current input
Without backlight: Approx. 1.3 mA
With backlight: Approx. 16 mA
(depends on adjusted intensity)
In standby mode: Approx. 1.2 µA

Housing:
Stainless steel 304, Ø 100 mm

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability)
≤± 0.05 % BFSL
(measuring ranges <0.4 bar = ≤± 0.125 % BFSL)
Long-term stability ≤± 0.1 % FSO / year

Mounting position
Any

Overload safety
At least 3 x FS, except
40 bar, overload = 105 bar
400 bar, overload = 1,000 bar

CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU (module A)
* Applies to devices with a maximum permissible overpressure of >200 bar only

Scope of delivery
- DIM 30 display unit
- Batteries
- PC connection cable
- Evaluation software on CD-ROM

DG: H, PG: 4

Accessories	Part no.	Price €
Service case with foam inlay, no content	33420	
Protective cap, rubber, blue NG 100	33407	
Manual calibration pump	33408	

Blue part no. = in-stock items

Precision digital pressure gauge DIM 30

Technical specifications Pressure sensor

Burst pressure
At least 5 x FS, except
400 bar, burst pressure = 1,250 bar

Operating temperature range
Medium: -10/+55 °C
Ambient: -10/+55 °C
Ambient: -20/+70 °C

Process connection
See table Ordering Data

Degree of protection
IP 67 (EN 60529)

Diaphragm
Stainless steel 316 L

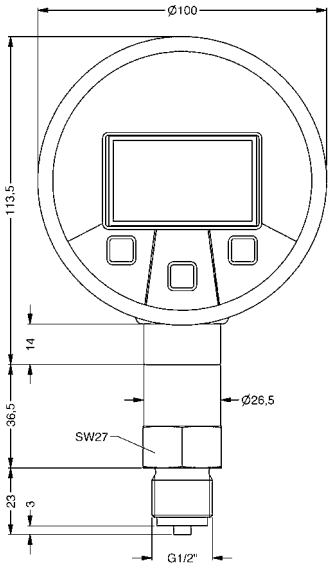
Seal
Without (weld version only for process connections as per EN 837)
FKM for all other process connections

Wetted parts:
Pressure connection, diaphragm, seal

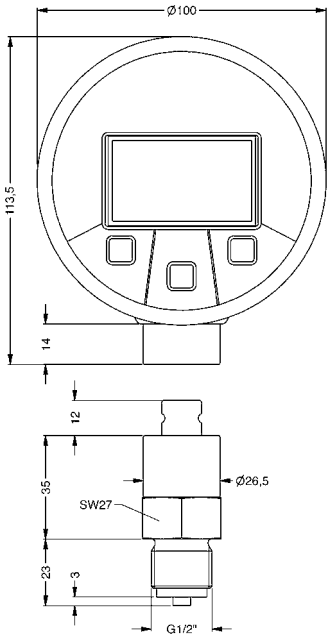
Measuring ranges:
0/100 mbar to 0/400 bar
PN ≥ 1 bar, vacuum-tight without limitation

Dimensions (mm) and electrical connections

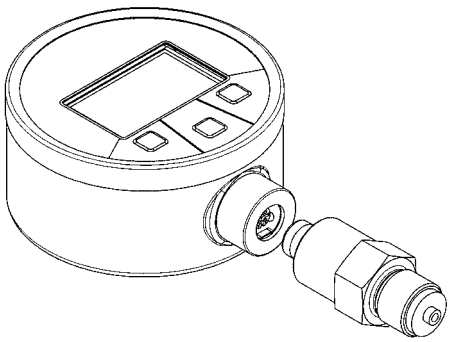
DIM 30



DIM 30



DIM 30



Precision digital pressure gauge DIM 30

Ordering data

DG: H, PG: 4

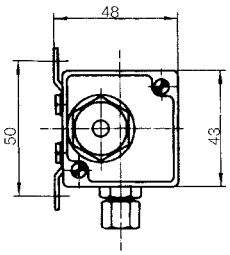
		Price €
Digital local display and evaluation software		
33406	Display unit DIM 30 with evaluation software (CD-ROM) and PC connection cable (USB)	
1	**Pressure sensor, pressure type**	
R	Relative	0.00
A	Absolute (possible for 0.4 bar and higher)	
2	**Measuring range in bar**	
100	-1/0	
102	-1/+1.5	
103	-1/+3	
104	-1/+5	
007	0/0.10	
008	0/0.16	
009	0/0.25	
010	0/0.40	
108	0/0.60	
109	0/1.0	
110	0/1.6	
111	0/2.5	
112	0/4.0	
113	0/6.0	
114	0/10	
115	0/16	
116	0/25	
117	0/40	
118	0/60	
119	0/100	
120	0/160	
121	0/250	
122	0/400	
3	**Process connection**	
01	G ½B (DIN 3852)	0.00
02	G ½B (EN 837-1)	0.00
03	G ¼B (DIN 3852)	
04	G ¼B (EN 837-1)	
05	½-14 NPT	
06	¼-18 NPT	
4	**Seal**	
0	Without seal (only process connection as per EN 837-1)	0.00
1	FKM	0.00
9	Others	On request

Ordering code
Example: 0/10 bar, G½B

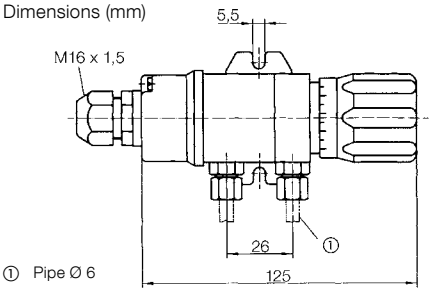
Pressure sensor DIM 30	R	114	02	0

Differential pressure switches DS 01

Dimensions (mm)



Dimensions (mm)



① Pipe Ø 6

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 M16 x 1.5

Switching point
10–100 % of pressure range, fully adjustable

Contact
Microswitch, normally open contact (normally closed contact available without extra charge)

Hysteresis
Approx. 2 %

Maximum rating
U ... AC 250 V, I ... 3 A, P ... 500 VA

DG: H, PG: 4

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 pipe, steel	88120	
2 x compression fitting for 6 mm pipe, brass	88108	
2 x compression fitting for 8 mm pipe, brass	88114	

Blue part no. = in-stock items

Electronic pressure switch EDS 10

- 4-digit LED display
- Display can be rotated and tilted to any position
- 2 PNP switching outputs
- Accuracy ≤±0.35 % at 400 mbar and higher
- Measuring range selection from 100 mbar to 600 bar

3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Application

Main application areas comprise monitoring of gaseous or liquid media in plant and mechanical engineering. The pressure switch lends itself to pneumatic or hydraulic systems requiring high switching accuracy. The display can be rotated and tilted to practically any position so that the device can be used under adverse mounting conditions.

Description

The device uses a piezo-resistive stainless steel measuring cell. The 4-digit LED display of the pressure switch EDS 10 can be rotated by 330° and tilted by 300°. The switching points (switching hysteresis) are via the menu and two keys. The status of the switching outputs is indicated by an LED each. At a nominal pressure of ≥1, the pressure switch is vacuum-tight without limitations.

Technical specifications

Display
4-digit, 7-segment, LED display, red
(-1,999 … +9,999, visible area 22.5 x 10.5 mm)
4 LEDs for switchable pressure units
(bar, mbar, psi, MPa)
Status indication switching output
Switching output 1: green LED
Switching output 2: yellow LED

Supply voltage
DC 18 – 30 V

Current input
< 40 mA

Switching outputs
2 x PNP (SIO mode), max. 200 mA
Delay time: 0 to 50 s
Repeatability: ≤± 0.1 % FSO
Switching cycles: >100 x 10^6
Switching frequency: max. 200 Hz

Material

Housing:	Plastic (PA 6.6) Highly impact-resistant and corrosion-resistant
Diaphragm:	Stainless steel 316 L
Seal:	FKM (Viton), wetted part
Pressure connection:	Stainless steel 316 L

Measuring accuracy
Deviation from characteristic curve as per IEC 60770
Limit point calibration (non-linearity, hysteresis, repeatability)
≤± 0.35 % FSO
(measuring ranges ≤ 0.4 bar = ≤± 0.5 % FSO)
Long-term stability ≤± 0.3 % FSO/year

Measuring ranges
Relative pressure: 0/100 mbar to 0/600 bar
Vacuum-tight without limitations at nominal pressure ≥ 1 bar
Absolute pressure: 0/400 mbar to 0/600 bar

Overpressure safety
At least 2 x FS, except
0/600 bar, overload = 1,000 bar
Burst pressure at least 3 x FS

Operating temperature range

Medium:	-40 / +125 °C
Ambient:	-40 / +85 °C
Storage:	-40 / +100 °C

Process connection
G½ (DIN 3852)

Electrical connection
Connector M 12 x 1 (4-pin), metal

Degree of protection
IP 67 (EN 60529)

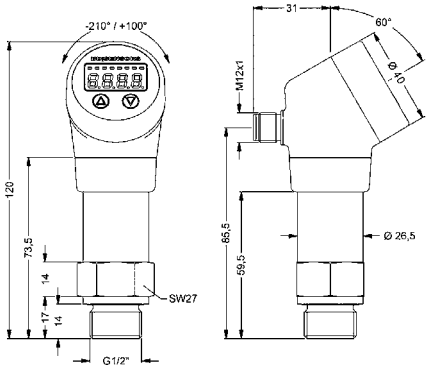
CE conformity
EMC Directive 2014/30/EU
RoHS Directive 2011/65/EU
Pressure Equipment Directive 2014/68/EU (module A)*
* Applies to devices with a maximum permissible overpressure of > 200 bar only

Options
- Other process connections
- Seal material (EPDM)
- Other switching and analogue outputs

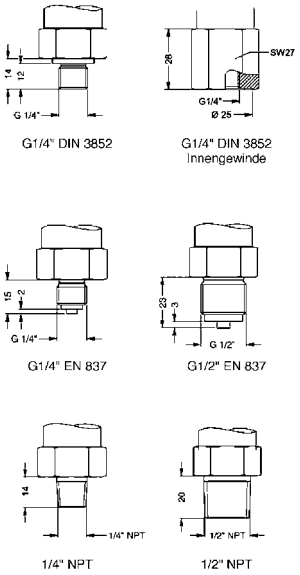
Electronic pressure switch EDS 10

Dimensions (mm) and electrical connections

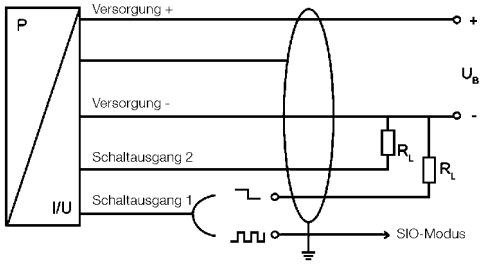
EDS 10



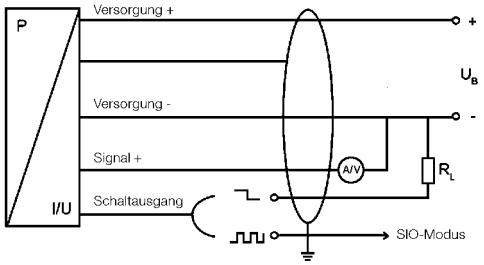
EDS 10, process connections



Wiring diagram
3-wire system (SIO with switching output)



Wiring diagram
3-wire system (SIO with analogue output)



Pin assignment table

Electrical connections	M12 x 1 (4-pin) Metal (without analogue output)	M12 x 1 (4-pin) Metal (with analogue output)
Supply + Supply – Signal + Communication/switching output 1 Switching output 2	1 3 - 4 2	1 3 2 4 -
Shield	Pressure connection	Pressure connection

Electronic pressure switch EDS 10

Ordering data

DG: H, PG: 4

		Price €
1 Electronic pressure switch		
33405	EDS 10	
2 Pressure type		
R	Relative	**0.00**
A	Absolute (possible for 0.4 bar and higher)	
3 Output		
01	2 x PNP (SIO mode)	**0.00**
02	2 x NPN (SIO mode)	**0.00**
11	Analogue output 4–20 mA + 1 x PNP (SIO mode)	
12	Analogue output 4–20 mA + 1 x NPN (SIO mode)	
4 Measuring range in bar		
100	-1 / 0	**0.00**
102	-1 / +1.5	**0.00**
103	-1 / +3	**0.00**
104	-1 / +5	**0.00**
007	0 / 0.10	**0.00**
008	0 / 0.16	**0.00**
009	0 / 0.25	**0.00**
010	0 / 0.40	**0.00**
108	0 / 0.60	**0.00**
109	0 / 1.0	**0.00**
110	0 / 1.6	**0.00**
111	0 / 2.5	**0.00**
112	0 / 4.0	**0.00**
113	0 / 6.0	**0.00**
114	0 / 10	**0.00**
115	0 / 16	**0.00**
116	0 / 25	**0.00**
117	0 / 40	**0.00**
118	0 / 60	**0.00**
119	0 / 100	**0.00**
120	0 / 160	**0.00**
121	0 / 250	**0.00**
122	0 / 400	**0.00**
123	0 / 600	**0.00**
5 Process connection		
01	G½ (DIN 3852)	**0.00**
02	G½B (EN 837-1)	
03	G¼ (DIN 3852)	
04	G¼B (EN 837-1)	
05	G¼ (DIN 3852) female thread	
06	½-14 NPT	
07	¼-18 NPT	
6 Seal		
1	FKM	**0.00**
3	EPDM	**0.00**

Ordering code

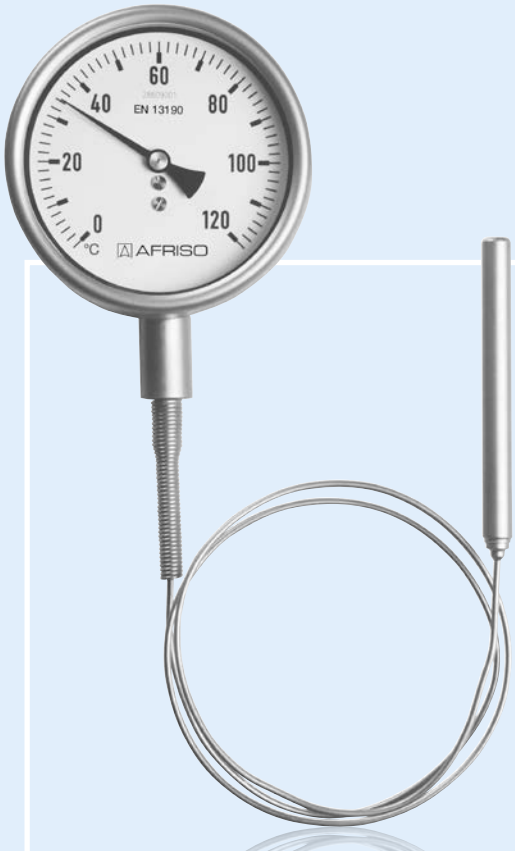
Example: 0/10 bar, G½B (DIN 3852)

33405	R	01	114	01	1

Bimetal thermometers for chemical applications

Bimetal thermometers for industrial applications

Resistance thermometers



Gas filled thermometers

CHAPTER 4

Temperature measuring instruments and controllers

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Mechanical temperature measuring instruments at a glance





		Thermometers with capillary	Bimetal thermometers	Bimetal standard thermometers	Surface mount thermometers	Flue gas thermometers
Heating and plumbing	Application areas	•	•	•	•	•
Mechanical and plant engineering						
Process engineering						
Chemical applications						
Food industry						
Hygienic processes						
Corrosive media						
NG 40		•	•			
NG 50			•	•		
NG 52		•				
NG 63			•	•	•	
NG 80			•	•	•	•
NG 100			•	•		
NG 160				•		
Profile housing		•				
-40/+40 °C	Ranges	•				
-30/+50 °C						
-20/+60 °C			•	•		
-20/+40 °C					•	
0/60 °C			•	•	•	
0/120 °C		•	•	•	•	
0/160 °C				•		
0/200 °C						
≥ 0/300 °C						•
Class 1 (EN 13190)	Accuracy					
Class 2 (EN 13190)			•	•	•	•
DIN 16195						
Plastic	Housing	•	•		•	
Sheet steel galvanised				•	•	•
Aluminium, eloxed						
Stainless steel 304						
Stem	Connection		•	•		•
Plug-on			•			
Mounting flange						
Flange						
Fastening spring/clip					•	
Magnetic holder					•	
Capillary tube		•				
Other ranges	Options	•		•	•	
Other connection designs		•				
Glycerine filling						
Electrical contacts						
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i

Technical specifications, application areas and suitability depend on the product version. See catalogue data sheet and/or operating instructions for options and details.






Bimetal thermometers for industrial applications	Bimetal air duct thermometers	Bimetal stainless steel thermometers	Bimetal thermometers for chemical applications	Gas filled thermometers for chemical applications	V-shaped industrial thermometers
•	•				•
•	•	•	•	•	•
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Electronic temperature measuring instruments at a glance





		Resistance thermometer WTh 20	Resistance thermometer WTh 21	Resistance thermometer WTh 22	Resistance thermometer WTh 23	Resistance thermometer WTh 24
Heating and plumbing	Application areas	•	•	•	•	
Air conditioning/ventilation			•	•	•	
Pipeline engineering				•	•	
Mechanical and plant engineering					•	•
Appliance engineering						•
Chemical / process engineering						•
Pharmaceutical / biotechnology						
Food industry / hygienic processes						
Corrosive media						•
High temperatures						
High pressure loads						
Cable probe	Version	•				
Fixed thread					•	•
Screwed pipe connection						
Flange connection						
Clamp connection						
Varivent connection						
Weld-in thermometer						
Pt 100, class A	Sensor				•	•
Pt 100, class B		•	•	•	•	•
100 mm	Installation lengths			•	•	•
125 mm						
160 mm				•		•
≥ 250 mm				•		•
Housing plastic	Material		•	•		
Housing aluminium					•	•
Wetted parts 316 Ti		•	•	•	•	•
Wetted parts 316 L						
Cable (wire ferrules)	Electr. connection	•				
Cable gland			•	•	•	•
Plug connection						
Other designs	Options	•	•		•	
Other process connections				•	•	
Transmitter installation			•	•		•
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i

Technical specifications, application areas and suitability depend on the product version. See catalogue data sheet and/or operating instructions for options and details.

				
Resistance thermometer WTh 25	Resistance thermometer WTh 26	Resistance thermometer WTh 27	Resistance thermometer WTh 28	Resistance thermometer WTh 30
				•
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Bimetal thermometers for industrial applications
Bimetal air duct thermometer

4

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

Application area (EN 13190)
Continuous load: measuring range
Short-term: range

Operating pressure at thermowell
10 bar maximum

Degree of protection
IP 41 (EN 60529)

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 glass

Options

- Other connection types
- Other ranges
- Other stem lengths

i
See page 266 for prices.

Bimetal air duct thermometer

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

Application area
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

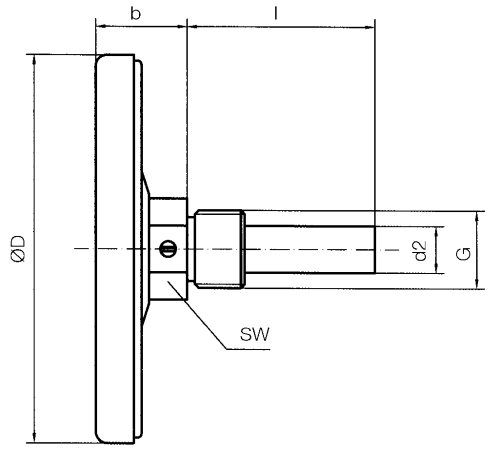
Window
Version LKF: Plastic
Version LKB: Instrument glass

- Other ranges
- Other stem lengths
- Accuracy class 1
- Steel flange Ø 40/80 mm

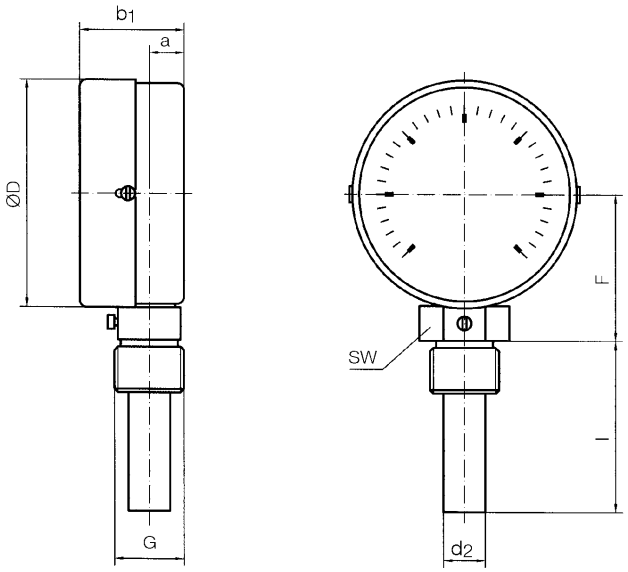
Bimetal thermometers for industrial applications/ Bimetal air duct thermometer

Housing types and dimensions (mm)

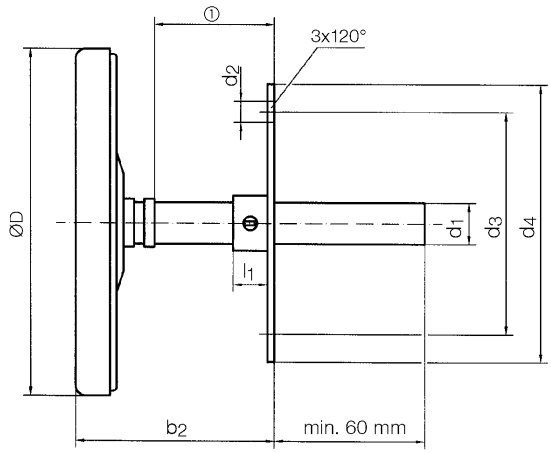
Bimetal thermometers for industrial applications
Centre back connection



Bottom connection



Bimetal air duct thermometer
Centre back connection



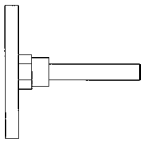
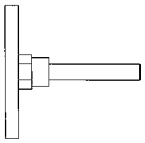
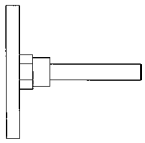
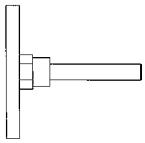
① Adjustable

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	12	51	60	43.5	G½B	40	10	22
80	10	24	36		80	9	12	51	60	52	G½B	63	10	22
100	10	26	36		100	9	12	51	60	62	G½B	100	10	22
160	-	32	37		160	-	-	-	-	92	G½B	150	-	22

Bimetal thermometers for industrial applications

DG: H, PG: 2

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 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**	**19.00** **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

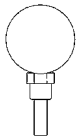
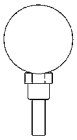
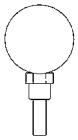
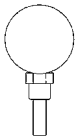
Minimum order quantity for non-stock items = 10 pieces

Blue part no. = in-stock items

See page 279 for options/extra charges.

Bimetal thermometers for industrial applications

DG: H, PG: 2

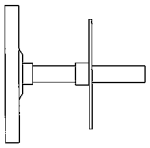
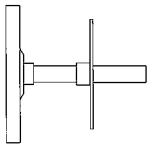
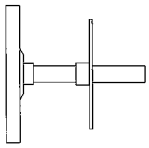
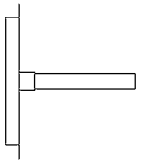
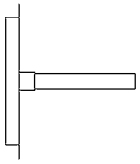
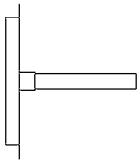
Type	BiTh 63 I D201	BiTh 80 I D201	BiTh 100 I D201	BiTh 160 I D201
Version				
Housing Ø	63	80	100	160
Housing	Sheet steel galvanised, push on bezel nickel-plated, instrument glass window			
Stem	Brass, Ø 9 mm			
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable			
Accuracy class	Class 1 as 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

Blue part no. = in-stock items

See page 279 for options/extra charges.

Bimetal air duct thermometer

DG: H, PG: 2

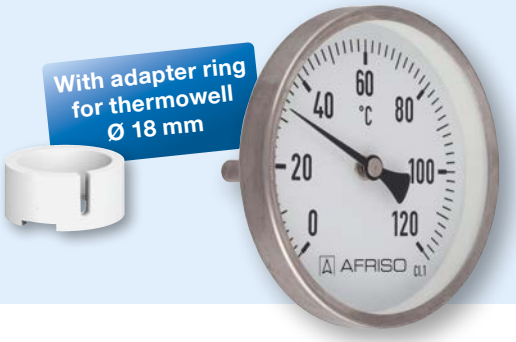
Type	BiTh 63 LKF D211	BiTh 80 LKF D211	BiTh 100 LKF D211	BiTh 63 LKB D271	BiTh 80 LKB D271	BiTh 100 LKB D271
Version						
Housing Ø	63	80	100	63	80	100
Housing	Sheet steel galvanised, push on bezel Nickel-plated, plastic window			Sheet steel galvanised, push on bezel Nickel-plated, with back flange Instrument 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

Minimum order quantity for non-stock items = 10 pieces

Blue part no. = in-stock items

See page 279 for options/extra charges.

Bimetal stainless steel thermometers/ Bimetal thermometers for chemical applications



	Bimetal stainless steel thermometer	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 **Application area (EN 13190)** Continuous load: measuring range Short-term: range **Operating pressure at thermowell (not included in scope of delivery)** 25 bar maximum **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 **Application area** Continuous: Full scale value Short-term: 1.1 x full scale value **Operating pressure at stem** 6 bar maximum **Degree of protection:** IP 65 (EN 60529)
Standard version	**Connection** Stem stainless steel 316 L, Ø 8 mm, plain **Adapter ring** Plastic, for thermowells with connection collar Ø 14, 18 mm (only for axial mounting position up to max. 120 °C) **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 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 glass
Options	▪ Thermowell G½B, stainless steel 316 Ti/316 L ▪ Other connection designs ▪ Other ranges ▪ Other stem lengths	▪ Thermowell G½B, stainless steel 316 Ti/316 L ▪ Grooved nut connection as per DIN 11851 ▪ Other connection designs ▪ Other ranges ▪ Other stem lengths ▪ Laminated safety glass window ▪ Glycerine filling ▪ Every angle version ▪ 3-hole fixing, panel mounting bezel ▪ Back flange ▪ Special materials

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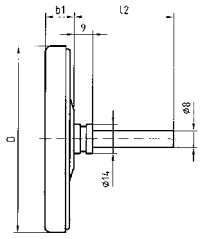
See page 281 for suitable thermowells.
See pages 271/273 for prices.

Bimetal stainless steel thermometers/ Bimetal thermometers for chemical applications

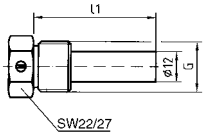
Housing types and dimensions (mm)

Bimetal stainless steel thermometers – centre back connection

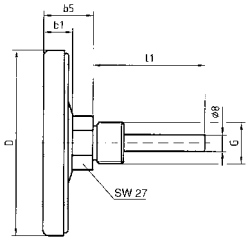
Plain stem (standard):



Separate thermowell (option):

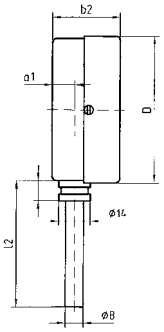


Fixed male connection (option):

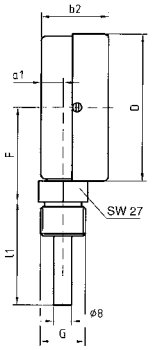


Bimetal stainless steel thermometers – bottom connection

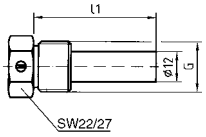
Plain stem (standard):



Fixed male connection (option):

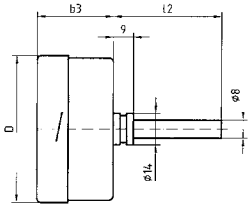


Separate thermowell (option):

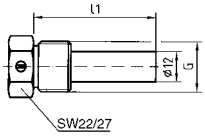


Bimetal thermometers for chemical applications – centre back connection

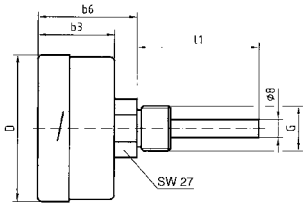
Plain stem (standard):



Separate thermowell (option):

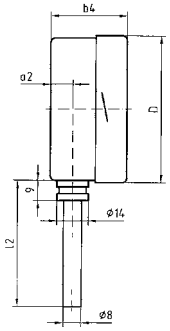


Fixed male connection (option):

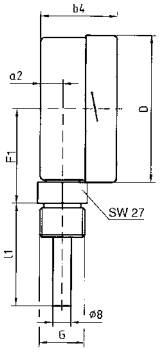


Bimetal thermometers for chemical applications – bottom connection

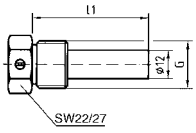
Plain stem (standard):



Fixed male connection (option):



Separate thermowell (option):

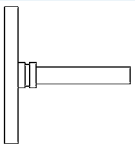
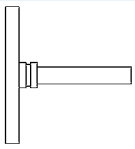
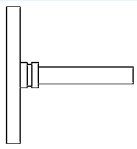
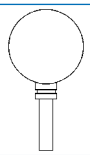
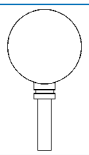


Dimensions (mm)

Nominal size (NG)	D	a1	a2	b1	b2	b3	b4	b5	b6	F	F1	G	l1	l2
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	154
													200	204

Bimetal stainless steel thermometer

DG: H, PG: 3

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 glass window				
Stem	Stainless steel 316 L, 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 stem length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66107312	66207312	**66307312**	66107302	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 stem 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 stem 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 stem length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66152312	66252312	66352312	66152302	66352302
100 mm	66153312	66253312	66353312	66153302	66353302
150 mm	66154312	66254312	66354312	66154302	66354302
200 mm	66155312	66255312	66355312	66155302	66355302

Minimum order quantity for non-stock items = 10 pieces

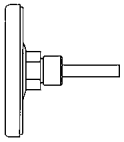
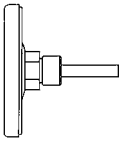
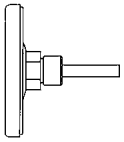
Blue part no. = in-stock items

i

* See page 279 for other connection types, options/extra charges.

Bimetal stainless steel thermometers with fixed connection thread

DG: H, PG: 3

Type	BiTh 63 E D312	BiTh 80 E D312	BiTh 100 E D312
Version			
Housing Ø	63	80	100
Housing	Stainless steel 304 with push on bezel 304, instrument glass window		
Stem	Stainless steel 316 L, Ø 8 mm		
Connection	Fixed male connection, fixed G½B**		
Accuracy class	Class 1 as per EN 13190		
Range	0/60 °C	0/60 °C	0/60 °C
Stem length L1*	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66132312AFG4D8	66232312AFG4D8	66332312AFG4D8
100 mm	66133312AFG4D8	66233312AFG4D8	**66333312AFG4D8**
150 mm	66134312AFG4D8	66234312AFG4D8	66334312AFG4D8
200 mm	66135312AFG4D8	66235312AFG4D8	66335312AFG4D8
Range	0/120 °C	0/120 °C	0/120 °C
Stem length L1*	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66147312AFG4D8	66247312AFG4D8	**66347312AFG4D8**
100 mm	66148312AFG4D8	66248312AFG4D8	**66348312AFG4D8**
150 mm	66149312AFG4D8	66249312AFG4D8	**66349312AFG4D8**
200 mm	66150312AFG4D8	66250312AFG4D8	**66350312AFG4D8**
Range	0/160 °C	0/160 °C	0/160 °C
Stem length L1*	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66152312AFG4D8	66252312AFG4D8	66352312AFG4D8
100 mm	66153312AFG4D8	66253312AFG4D8	66353312AFG4D8
150 mm	66154312AFG4D8	66254312AFG4D8	66354312AFG4D8
200 mm	66155312AFG4D8	66255312AFG4D8	66355312AFG4D8

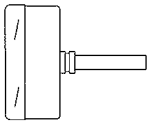
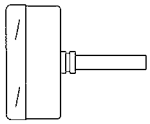
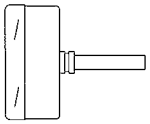
Minimum order quantity for non-stock items = 10 pieces

Blue part no. = in-stock items

* Maximum stem length = 300 mm
** ½–14 NPT available at no extra charge

Bimetal thermometers for chemical applications

DG: H, PG: 3

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 bezel, instrument glass window					
Stem	Stainless steel 316 L, 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 stem 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 stem 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 stem 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 stem 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

Blue part no. = in-stock items

* See page 279 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**

A

Page 281

4

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

Application area
Continuous: Full scale value
Short-term: 1.1 x full scale value

Operating pressure at thermowell (not included in scope of delivery)
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 glass

Options

- Every angle version
- Grooved nut connection as per DIN 11851
- Other connection designs
- Other nominal sizes
- Other ranges
- Special scales
- Glycerine filling (type D8)
- 3-hole fixing, panel mounting bezel
- Back flange
- Capillary (stainless steel 321)
- Special materials
- Electrical contacts

i

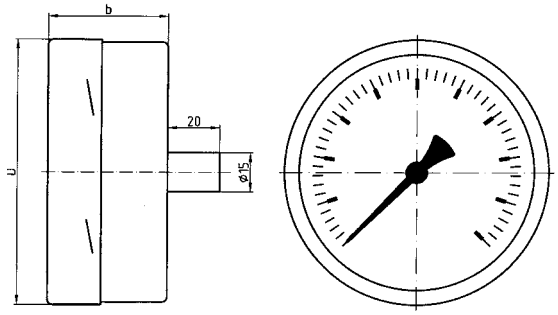
See page 281 for suitable thermowells.
See page 276 for prices.

Gas filled thermometers for chemical applications

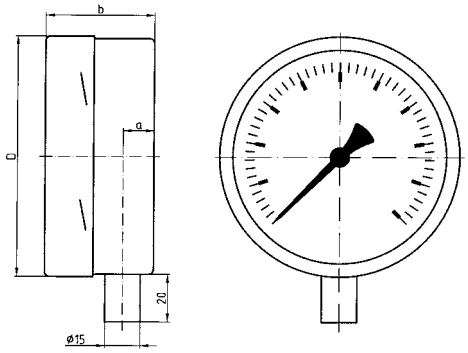
Type D4 – NG 100 / 160

Housing types and dimensions (mm)

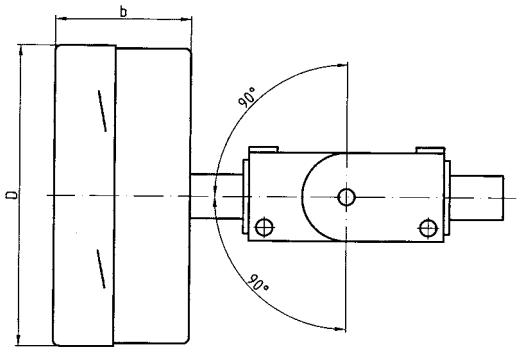
Centre back connection



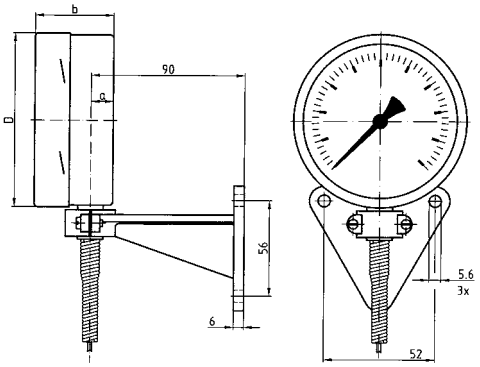
Bottom connection



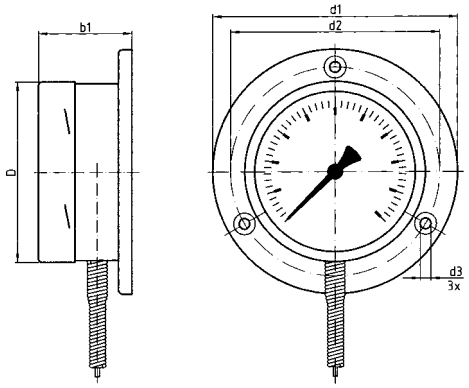
Every angle version



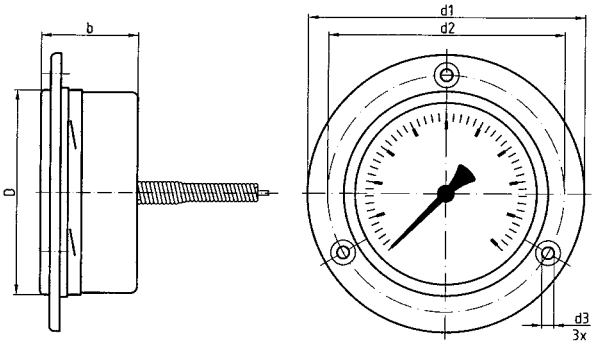
Version with capillary and wall bracket



Version with capillary and back flange



Version with capillary and 3-hole fixing, panel mounting bezel

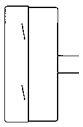
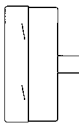
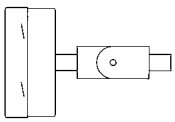
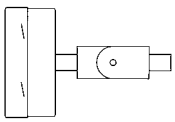


Dimensions (mm)

Nominal size	a	b	b_1	Ø D	Ø d_1	Ø d_2	Ø d_3
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, PG: 3

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 bezel, instrument 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

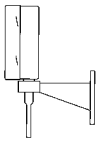
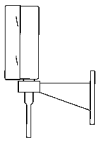
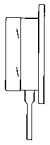
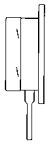
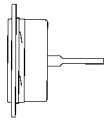
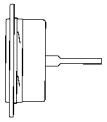
Blue part no. = in-stock items

i

* See page 279 for other connection types, options/extra charges.

Gas filled thermometers for chemical applications

DG: H, PG: 3

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 bezel, instrument 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

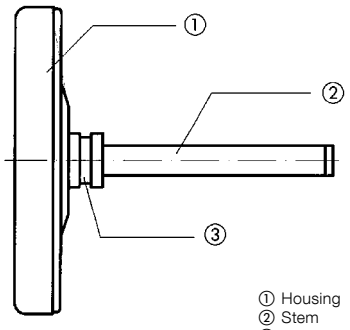
Blue part no. = in-stock items

i

* See page 279 for other connection types, options/extra charges.

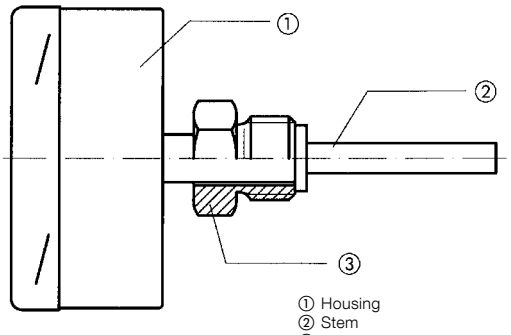
Connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical versions)

Plain



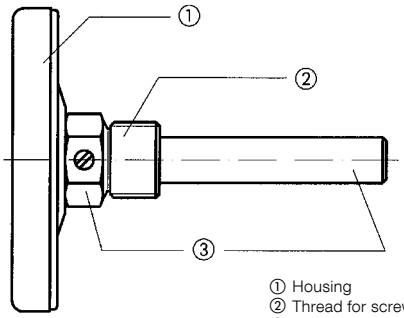
① Housing
② Stem
③ Recess for locking screw.

Loose male connection



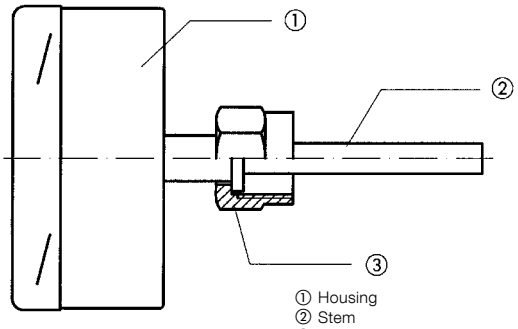
① Housing
② Stem
③ Loose connection with thread for screw connection

Separate screw-in thermowell (with locking screw)



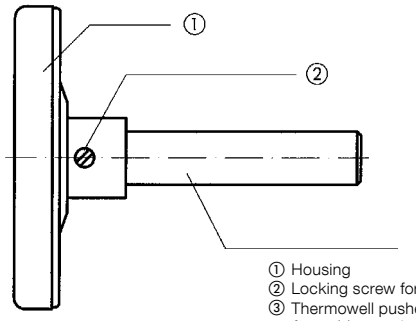
① Housing
② Thread for screw connection
③ Thermowell pushed on, fixed with locking screw

Loose union nut



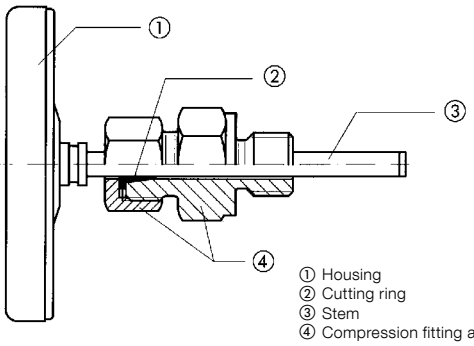
① Housing
② Stem
③ Loose female nut (seat on shoulder on stem)

Separate weld-in thermowell (with locking screw)



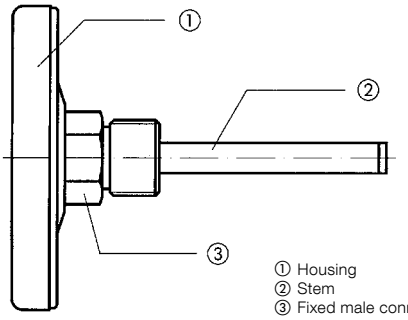
① Housing
② Locking screw for fixing.
③ Thermowell pushed on, for weld mounting

Compression fitting, adjustable on stem



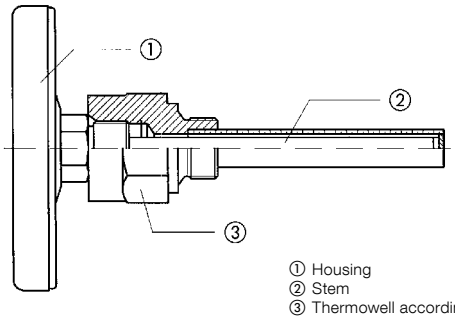
① Housing
② Cutting ring
③ Stem
④ Compression fitting adjustable

Fixed male connection



① Housing
② Stem
③ Fixed male connection, with thread for screw connection

DIN thermowell



① Housing
② Stem
③ Thermowell according to DIN 43772 with thread

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 ss	Stainless steel
PG		2	3	3	3
	Stem length mm	**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**	---
	250	**64722**	---	**64660**	---
	300	**64723**	---	64721	
Separate weld-in thermowell (with locking screw) for stem up to Ø 8 mm for BiTh Ø 10 mm for FTh	63	---	64517	64521	---
	100	---	64450	64453	64435
	150	---	64518	64522	---
	200	---	64519	64523	---
Stem extension per 100 mm [1]		64524	---	64526	64527
Thermowell extension per 100 mm		64528	---	64530	**On request** 64531
Fixed male connection G¼B		---	---	**On request** 64534	---
Fixed male connection G½B		---	---	64454	64460
Loose male connection G¼B		---	---	64541	---
Loose male connection G½B		---	---	64544	64545
Loose union nut G½, female		---	---	64455	**On request** 64461
Loose union nut G¾, female		---	---	64553	**On request** 64554
Compression fitting adjustable G½B		---	---	**On request** 64556	64557
Compression fitting adjustable G¾B		---	---	**On request** 64558	64559
Capillary per metre Stainless steel		---	---	---	64464
Stem Ø 6 mm [2]		**On request**	---		---

1) Only applies to standard lengths 200/250/300 mm – extra charge for special lengths: €
2) Only for centre back connection, limited measuring ranges (0–120° C, 0–300° C, 0–500° C).

Blue part no. = in-stock items

4

Extra charges for bimetal thermometers and gas filled thermometers (industrial, stainless steel, chemical application 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	---	**On request** 64488	**On request** 64493
Maximum pointer, external rotary knob adjustment (Window: BiTh 63, 100 = instrument glass; BiTh 160 = plastic; FTh 100, 160 = plastic) T_{max} 160 °C, only for gauges without filling and gauges with bayonet bezel housing	64468	64473	64481	64489	64494
Glycerine filling (only for instruments with bayonet bezel housing)	---	64475	64483	64490	64495
Silicone oil filling (only for instruments with bayonet 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	**On request**	---	
0/250 °C	100	100	**On request**	---	
0/300 °C	75	63	**On request**	---	
0/400 °C	75	75	**On request**	---	
0/500 °C	63	63	**On request**	---	
0/600 °C	75	175	**On request**	---	

* For version with separate thermowell.

Blue part no. = in-stock items

Electrical contacts (only for gas filled thermometers)

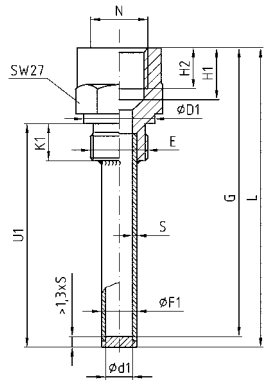
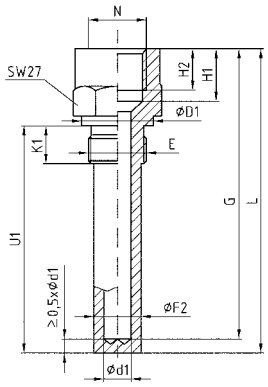
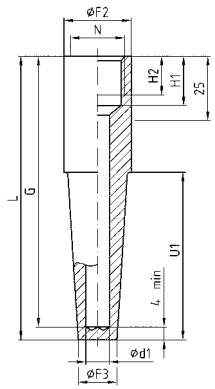
DG: H, PG: 3

Type			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 mounting, thermometer not included						
Version	Nominal size	Housing	**Price €**	**Price €**	**Price €**	**Price €**
Gas filled thermometers Version for chemical applications	100	No filling	**On request**	**On request**	**On request**	**On request**
	100	With filling	**On request**	**On request**	**On request**	**On request**
	160	No filling	**On request**	**On request**	**On request**	**On request**
	160	With filling	**On request**	**On request**	**On request**	**On request**

See page 118 for contact protection relays and isolating switching amplifiers.

Thermowells according to DIN 43772

DG: H

Type	Design 5									Design 6									Design 4							
																										
	d1	d2	E	N	D1	F1	K1	H1	H2	d1	d2	E	N	D1	F2	K1	H1	H2	d1	d2	F	N	F3	H1	H2	
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	
	d2 = probe diameter of instrument																									
Connection	To thermometer G½ female Process connection G½B																		To thermometer G½ female							
Version	Welded, screw-in									Bar stock, screw-in									Single part, weld-in							
Material			Brass		Stainless steel 316 Ti							Steel			Stainless steel 316 Ti						Steel				Stainless steel 316 Ti	
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	
PG			2		3							3			3						3				3	
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.

Blue part no. = in-stock items

Industrial thermometers VMTh

- **Extremely robust due to full metal housing**
- **Vibration-resistant glass thermometers**
- **Stem: Stainless steel version possible**
- **Excellent readability due to blue thermometer filling**

4

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 measuring range printed in black at the right part of the scale below the anodised layer. 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.

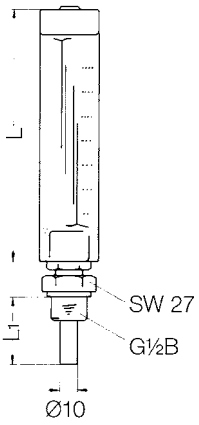
Accuracy
DIN 16195

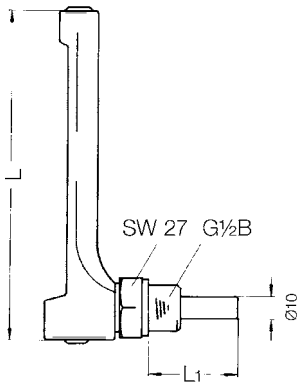
Ranges °C
-30/+50, 0/60, 0/100, 0/120, 0/160

Mounting position
Straight
Angled 90°
Angled 135°

Stem lengths (mm)
40, 63, 100, 160

Housing types and dimensions (mm)





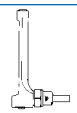
Options

- 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

Industrial thermometers VMTh

DG: H, PG: 2

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° [1]	Straight	Angled 90° [1]	Straight	Angled 90° [1]
Housing	Aluminium, anodised brass-coloured					
Stem	Brass, Ø 10 mm					
Connection	Version B with screw-in socket G½B, brass [2]					
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	0/100 °C	0/100 °C	0/100 °C	0/100 °C	0/100 °C	0/100 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	---	---	64330	64335	---	---
63 mm	---	---	64331	64336	---	---
100 mm	---	---	64332	64337	---	---
160 mm	---	---	64333	64338	---	---
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

[1] Version with mounting position 135° on request. [2] Extra charge for stainless steel screw-in socket: €.
Minimum order quantity for non-stock items = 10 pieces

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 **Protective pipe** 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 **Protective pipe** 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 **Protective pipe** 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 ▪ Sensor Pt 1,000 ▪ Transmitter installation ▪ Other thermowell diameters ▪ Thermowell with bend, measuring tip with spring ▪ Neck ▪ Other process connections ▪ Other installation lengths	▪ Sensor class A ▪ Sensor Pt 1,000 ▪ Transmitter installation (standard: 0/100 °C = 4–20 mA) ▪ Other installation lengths	▪ Sensor class A ▪ Sensor Pt 1,000 ▪ Reduced measuring tip (6 mm) ▪ Transmitter installation ▪ Other thermowell materials, process connections, installation lengths

i

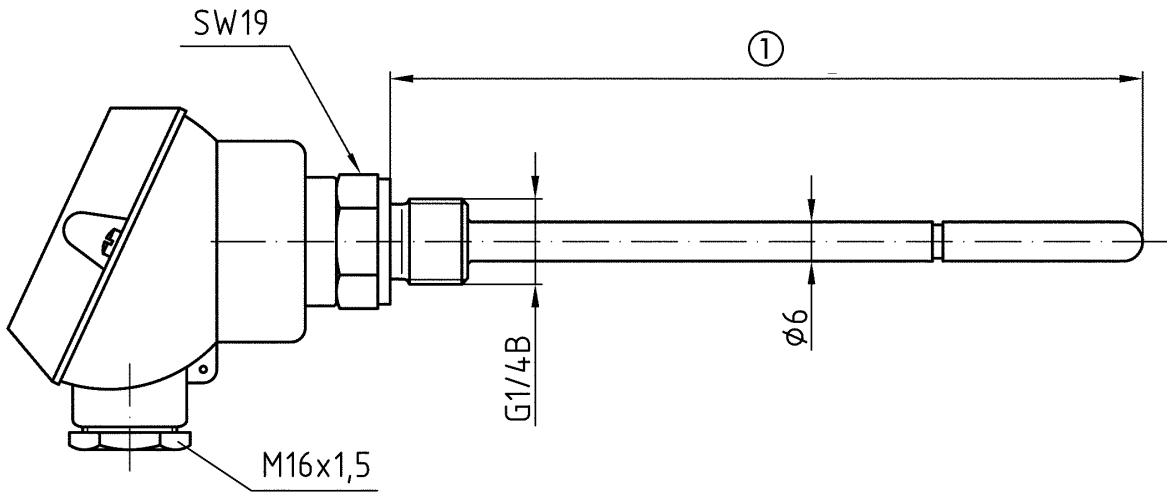
See page 288 for wiring diagram.

See the catalogue DOMESTIC TECHNOLOGY for versions as injection-type and outdoor resistance thermometers for use in air ducts.

Resistance thermometers types WTh 23/24/25

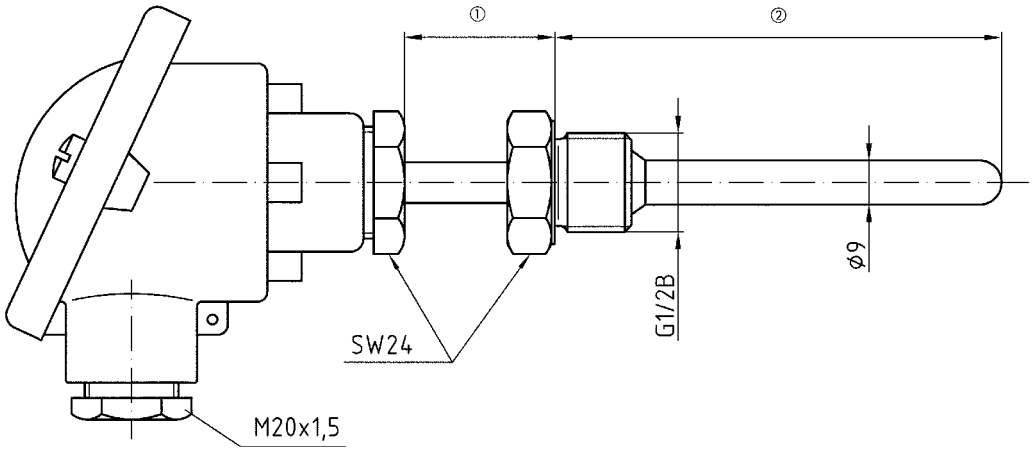
Dimensions (mm)

Type WTh 23



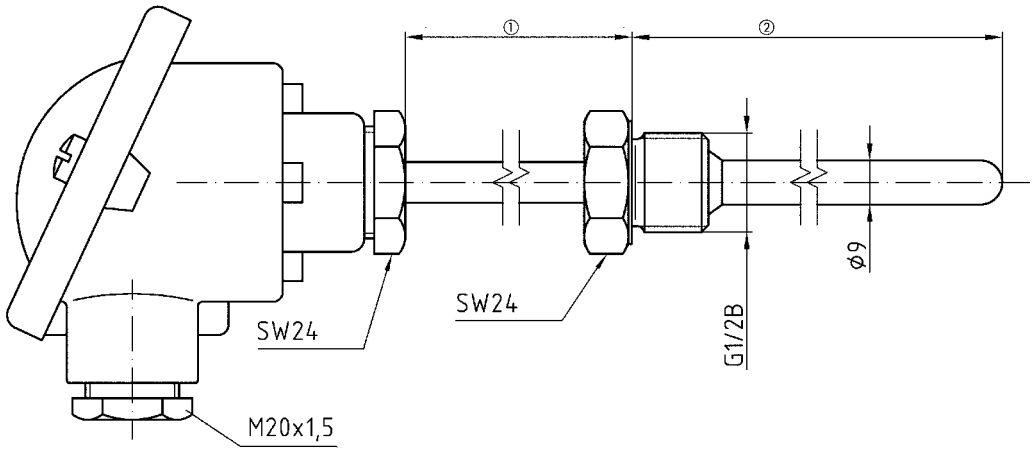
① Installation length

Type WTh 24



① Neck length (standard = 25)
② Installation length

Type WTh 25



① Neck length (standard = 140)
② Installation length

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

Protective pipe
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

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

Protective pipe
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 M18 x 1.5 or M14 x 1.5
- Transmitter installation
- Other thermowell materials, process connections, installation lengths, connection heads

- Sensor class A
- Reduced measuring tip (6 mm)
- Transmitter installation
- 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
- Field housing

i

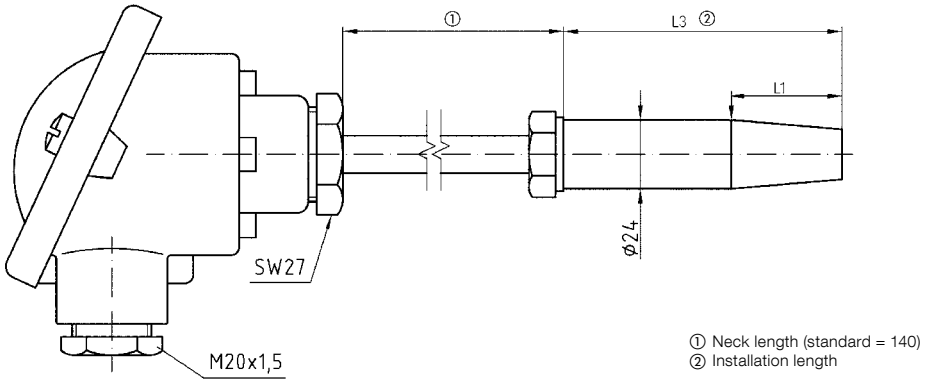
See page 288 for wiring diagram.

See the catalogue DOMESTIC TECHNOLOGY for versions as injection-type and outdoor resistance thermometers for use in air ducts.

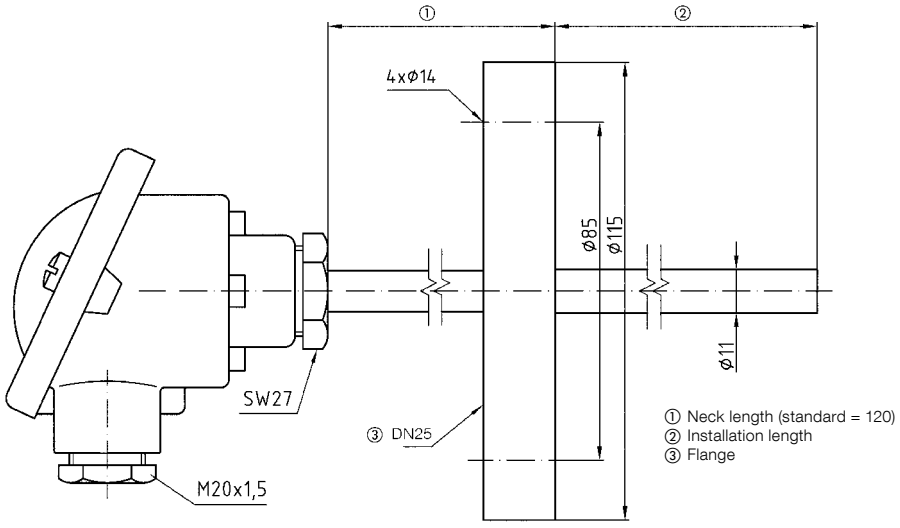
Resistance thermometers WTh 26/27/28

Dimensions (mm)

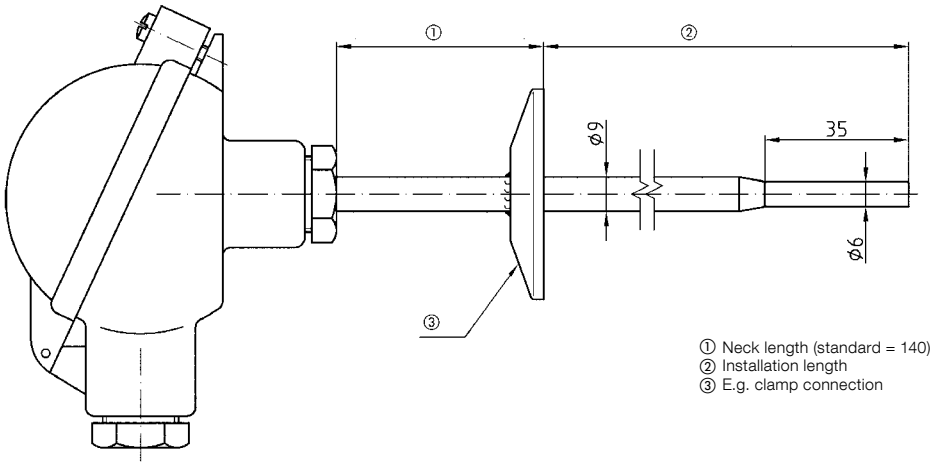
Type WTh 26



Type WTh 27



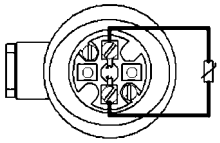
Type WTh 28



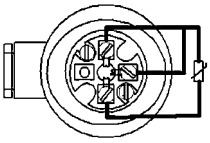
Electrical connection assignment for resistance thermometers WTh

Ceramic base in connection head, type J (WTh 23)

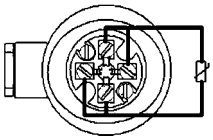
1 x two-wire



1 x three-wire

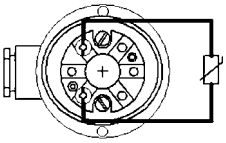


1 x four-wire

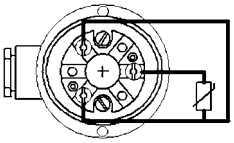


Ceramic base in connection head, type B (WTh 24 to WTh 28)

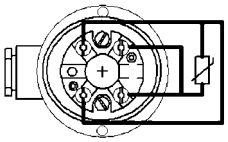
1 x two-wire



1 x three-wire

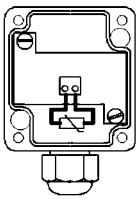


1 x four-wire

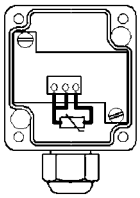


PCB in connection head, made of polyamide (WTh 21 and WTh 22)

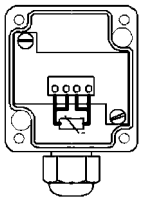
1 x two-wire



1 x three-wire

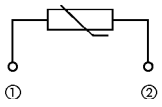


1 x four-wire

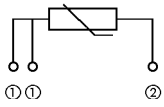


Cable probe (WTh 20)

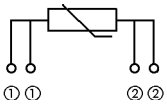
1 x two-wire



1 x three-wire

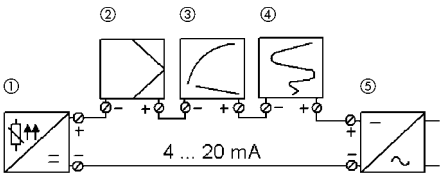


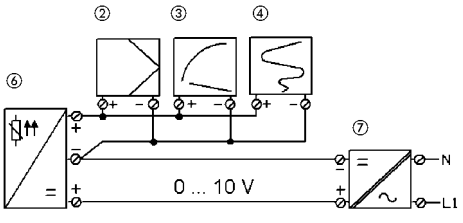
1 x four-wire



① Red
② White

Transducer

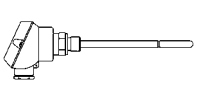
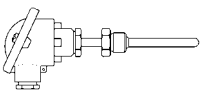
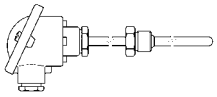




① Two-wire transducer
② Controller
③ Display unit
④ Recorder
⑤ Power supply unit DC 7.5 ... 30 V
⑥ Three-wire transducer
⑦ Power supply unit DC 15 ... 30 V

Resistance thermometers

DG: H, PG: 4

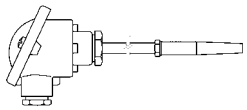
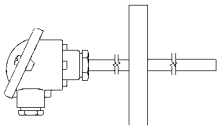
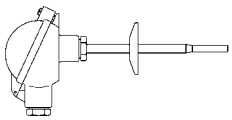
Type	WTh 23	WTh 24	WTh 25
Version			
Sensor	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B
Thermowell/probe diameter Material	6 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti
Neck	---	25 mm	120 mm
Process connection	G¼B Stainless steel 316 Ti	G½B Stainless steel 316 Ti	G½B Stainless steel 316 Ti
Connection head/ Electr. connection	Type J/cable gland	DIN 43729, type B Cable gland	DIN 43729, type B Cable gland
Measuring range fixed (moving)	-35/+180 °C	-35/+180 °C	-35/+400 °C
Installation length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
65 mm	---	---	---
100 mm	32225	32210	32240
125 mm	---	---	32241
160 mm	32226	32211	32242
250 mm	32227	32212	32243
400 mm	32228	---	32244
Extra charges (without PG)	**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) for 1 x Pt 100	---	---	
Connection head design BBK		---	---

* 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 €.
** Applies up to 1,000 mm, one-time extra charge for installation length greater than 1,000 mm: €

Blue part no. = in-stock items

Resistance thermometers

DG: H, PG: 4

Type	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
Thermowell/probe Diameter Material	Weld-in thermowell as per DIN 43772 Stainless steel 316 Ti	11 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti
Neck	140 mm	120 mm	140 mm
Process connection	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	Type B, type BUZ Cable gland
Measuring range	-35/+550 °C	-35/+400 °C	-35/+200 °C
Installation length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
65 mm	32250	---	---
100 mm	32251	32260	32230
125 mm	---	---	32231
160 mm	32253	32261	32232
250 mm	32254	32262	32233
400 mm	---	32263	32234
Extra charges (without PG)	**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) for 1 x Pt 100	---		
Clamp 1½'"	---	---	**On request**
DIN 11851, DN 40	---	---	**On request**
Hygienic, DN 40	---	---	**On request**
Weld-in ball	---	---	**On request**
Weld-in socket	---	---	**On request**

* Enquire for thermowells made of other 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 €
***Applies up to 1,000 mm, one-time extra charge for installation length greater than 1,000 mm €

Blue part no. = in-stock items

Resistance thermometer WTh 30 for hygienic processes

- Hygienic design as per EHEDG recommendations
- Compact design
- High accuracy
- Short response time
- 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
As per to EN 60751, test in flowing water (without transducer) T 90 = 5.5 s

Sensor
1 x Pt 100, 4-wire
Class A, IEC 751

Protective pipe
Stainless steel 316 L, 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 ranges
0/100° C (standard)
0/150 °C
-50/+100° C

Supply voltage
DC 8.5–36 V

Output signal
4–20 mA, 2-wire

Options

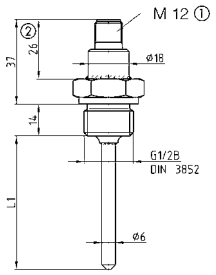
- Integrated transducer
- Other process connections
- Electropolishing
- Replaceable measuring insert
- Other installation lengths
- Weld-in sockets

See page 293 for prices.

Resistance thermometers WTh 30

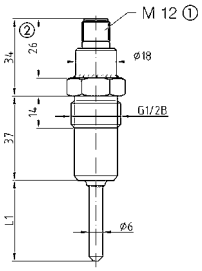
Electrical connections and dimensions (mm)

Connection G½B



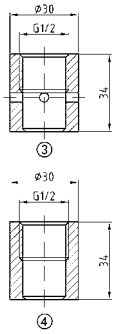
① Connector 4-pin
② Version with integrated transducer (um 24 mm longer)

Connection G½B, tapered, metallic seal



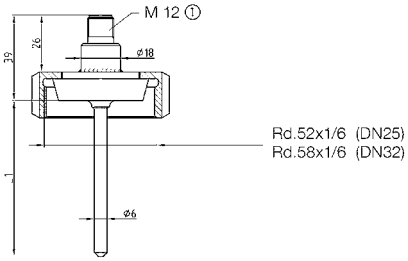
① Connector 4-pin
② Version with integrated transducer (um 24 mm longer)

Weld-in socket



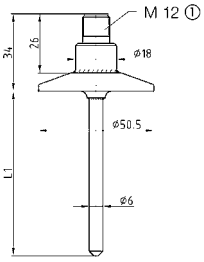
③ Socket with inspection hole
④ Socket without inspection hole

Tapered socket with grooved union nut DIN 11851



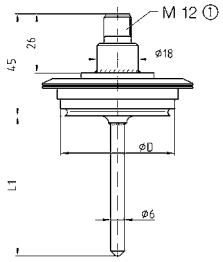
① Connector 4-pin

Clamp connection



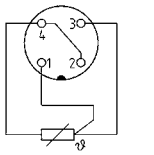
① Connector 4-pin
Clamp DIN 32676 DN 25, DN 40
Clamp ISO 2852 1", 1½"
TriClamp 1", 1½"

VARIVENT® connection



D=68 for VARIVENT® type N

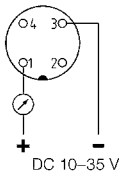
Pin assignment Without transducer



1 Braun
2 Weiß
3 Blau
4 Schwarz

1 x Pt 100, 4-wire

Pin assignment With transducer

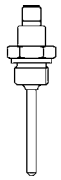
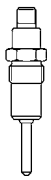
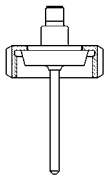
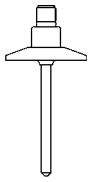
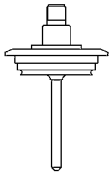


DC 10–35 V

4–20 mA, 2-wire

Resistance thermometers WTh 30

DG: H, PG: 4

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	M12 plug connection	M12 plug connection	M12 plug connection	M12 plug connection	M12 plug connection
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 (without PG)	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Installed transducer 4–20 mA*					
Process connection					
DIN 11851 DN 32	---	---		---	---
ISO Clamp DN 38	---	---	---	**No extra charge**	---
DIN Clamp DN 25	---	---	---	**No extra charge**	---
DIN Clamp DN 40	---	---	---	**No extra charge**	---
Tri-Clamp 1"	---	---	---	**No extra charge**	---
Tri-Clamp 1½"	---	---	---	**No extra charge**	---

Accessories	Part no.	**Price €**
Weld-in socket for G½B conical, metal seal, with inspection hole	32340	
Weld-in socket for G½B conical, metal seal, without inspection hole	32341	
Connector with cable, 5 metres		

* Please specify desired measuring range: 0/100 °C (standard), 0/150 °C, -50/+100 °C (corresponding to 4–20 mA each).

Blue part no. = in-stock items

CATALOGUE DOMESTIC TECHNOLOGY

Temperature measuring instruments and controllers for building technology

Bimetal thermometers with thermowells

- For heating/plumbing
- Plastic or brass thermowell
- Corrosion-resistant plastic housing

Nominal sizes
50 – 63 – 80 – 100

Ranges
0/60, -20/+60, 0/60, 0/120 °C

Page 364

Bimetal standard thermometers

- For heating/plumbing
- Sheet steel housing, galvanised

Nominal sizes
34 – 50 – 63 – 80 – 100 – 160

Ranges
-20/+60, 0/60, 0/120, 0/160 °C

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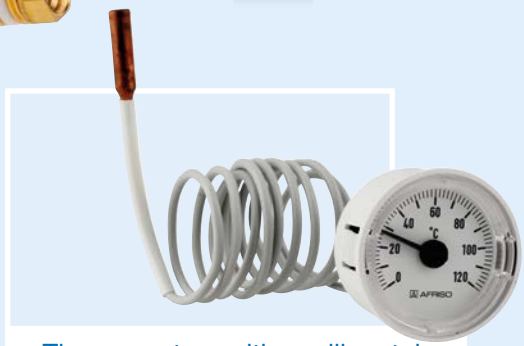

Thermometers with capillary tube

- For burners, boilers, hot water tanks and refrigerating/air conditioning systems
- Corrosion-resistant, highly impact-resistant plastic housing
- With copper or plastic capillary
- Great variety of housing versions and connection types available

Nominal sizes
37 – 40 – 52
45 x 45, 58 x 25, 25 x 58, 62 x 11

Range
0/120 °C

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Combined thermometer/ pressure gauges / thermo-hydrometers

- Pressure and temperature measurement with at a single measuring point
- With self-sealing connection thread for fast mounting
- Mounting valve for easy replacement without downtime

Nominal sizes
63 – 80

Accuracy class
2.5

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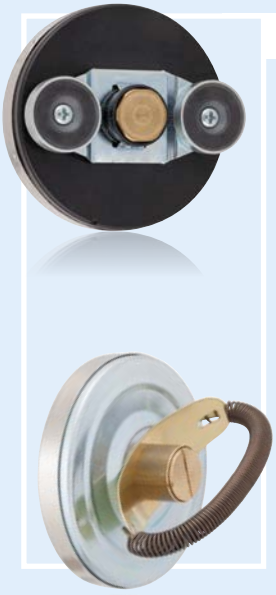

Surface mount thermometers

- For heating/plumbing
- Fastening by means of magnet, spring or universal clamp
- Either plastic or sheet steel housing, galvanised

Nominal sizes
63 – 80

Ranges
0/60, 0/120 °C

Page 367

Flue gas thermometers and flue gas temperature controllers

- For burner control for gas and oil burners
- Connection via stainless steel stem

Nominal size
80

Ranges
0/300, 0/350, 0/500 °C

Page 367

Pressure measuring instrument S4600 ST

- Measurement of pressure, vacuum and differential pressure
- Barometric pressure sensor and temperature compensation for highly accurate measured value
- Option data logger (data in XML format)
- Measurement logs as QR codes for smartphones, tablets or management software

JETZT BEI Google Play

Laden im App Store

EuroSoft connect app

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Resistance thermometers WTh 20–22

- Version as plug-in type resistance thermometer, also for use in air ducts, and as indoor and outdoor resistance thermometer for wall mounting
- Pt 100 sensor
- Many options:
  E.g. transmitter installation, sensor class A, etc.

From page 401

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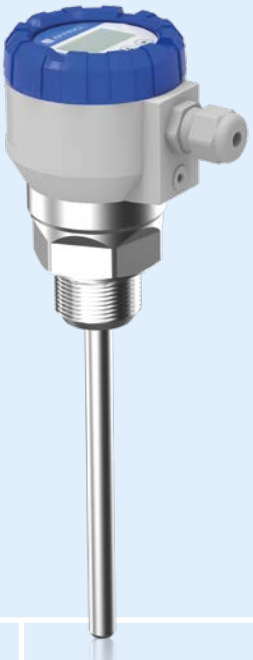
This and many other products can be found in the catalogues
DOMESTIC TECHNOLOGY
and
PORTABLE MEASURING INSTRUMENTS

HydroFox®



PulsFox®

CapFox®

SonarFox®

CHAPTER 5

Level indicators, level controllers, overfill prevention systems

OVERVIEW

Level indicators at a glance 298

Level indicators for process engineering: Selection table by medium used 300

Level indicators for domestic technology 331

LEVEL – CONTINUOUS

Hydrostatic level indicator HydroFox® DMU 08 302

Capacitance level indicator CapFox® EFT 20 303

Ultrasonic level indicator SonarFox® UST 20 308

Guided micropulse level indicator PulsFox® PMG 20 312

LEVEL – LIMIT LEVEL

Conductivity level switch CoFox® ELT 8 317

Conductivity alarm unit CoFox® ELT 500/4 318

Conductivity level switch CoFox® ELT 680 319

Probes for CoFox® ELT 320

Capacitance level switch CapFox® ENT 21 322

Vibration level switches for liquids VibraFox GVG 328

Level indicators at a glance

		 MT-Profil R	 Unitop	 DTA 10/20 E	 DIT 10	 TankControl	 CoFox® ELT	 CapFox® EFT 20
Indoor tanks	Tanks	•	•	•	•	•	•	•
Outdoor tanks			•	•	•	•	•	•
Electrically isolating tanks		•	•	•	•	•	•	•
Electrically conductive tanks		•	•	•	•	•	•	•
Pressurised tanks							•	•
Unpressurised tanks		•	•	•	•	•	•	•
< 1,000 mm	Measuring range	•	•	•	•		•	•
Up to 2,000 mm		•	•	•	•	•	•	•
Up to 2,500 mm		•	•	•	•	•	•	•
Up to 2,900 mm			•	•	•	•	•	•
Up to 3,000 mm			•	•	•	•	•	•
> 3,000 mm				•	•	•		•
Liquid media	General media	•	•	•	•	•	•	•
Solid media (bulk solids)								•
Powdery media								•
Electrically isolating media		•	•	•	•	•		•
Electrically conductive media		•	•	•	•	•	•	•
Fuel oil/diesel fuel (EN 590)	Special media	•	•	•	•	•		•
Biofuel/biodiesel (EN 14214)		•	•	•	•	•		•
Water		•	•	•	•	•	•	•
AdBlue®			•				•	•
Measuring principle	Type	Mechanical	Pneumatic	Pneumatic	Hydrostatic	Hydrostatic	Conductivity	Capacitance
Local display		•	•	•	•	•	•	
Limit level				•		•	•	
Continuous measurement		•	•	•	•	•		•
Analogue output (4–20 mA, 0–10 V)	Indication/signal							•
Binary output (relay, PNP)						•	•	
EnOcean® wireless				•*				
% liquid level			•	•				
% volume			•		•	•		
Liquid level in cm		•		•		•		
Liquid level in mm					•	•		
Litres			•	•	•	•		
m^3					•	•		
Approval for construction products	Certificates							
ATEX								•
WHG approval								
Display unit DA 10/12/14	Control unit							•
Display and control unit VarioFox® 24								•
Transducer MFU								•
* Depends on version		Page 7	Page 9	P. 12/100	Page 13	Page 14	Page 317	Page 303

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Technical specifications, application areas and suitability depend on the product version.
See catalogue data sheet and/or operating instructions for options and details.

 CapFox® ENT 21	 PulsFox® PMG 20	 Sonar Fox® UST 20	 DMU 07	 HydroFox® DMU 08	 HydroFox® DMU 09	 VibraFox GVG
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•				•
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•	•	•	•	•	•	•
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•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•	•	•	•
•	•	•	•		•	•
Capacitance	Guided micropulse (TDR)	Ultrasonic	Hydrostatic	Hydrostatic	Hydrostatic	Vibration fork
	•	•				
•						•
	•	•	•	•	•	
	•	•	•	•	•	
•						•
	•	•				
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5

Selection table level indicators for process engineering by medium



		State	Relative dielectric constant (εr)	PulsFox® PMG 20	SonarFox® UST 20	HydroFox® DMU 07/08/09
Agriculture	Fertilizer (watered solution)	Liquid	Conductive	●	○	○
	Manure	Liquid	Conductive	●	●	○
Construction materials	Calcium carbonate aqueous solution	Liquid	Conductive	○	●	○
	Cement	Solid	1.5–10	●	–	–
	Ground, stone, sand, gravel	Solid	2.5–5.0	○	–	–
	Powdered lime (CaO)	Solid	1.6–2.2	●	–	–
	Slacked lime (lime hydrate) / lime milk ($Ca(OH)_2$)	Liquid	Conductive	○	●	–
Chemical Industry	Ammonia (NH_3)	Liquid	17–25	●	–	○
	Ammonium hydroxide (NH_4OH)	Liquid	Conductive	●	○	○
	Ammonium chloride (NH_4Cl) aqueous solution	Liquid	Conductive	○	○	○
	Boric acid (H_3BO_3) aqueous solution	Liquid	Conductive	○	○	○
	Carbon tetrachloride (CCl_4)	Liquid	2.3	○	○	–
	Ether, diethyl-ether $(CH_3CH_2)_2O$	Liquid	3.1–4.4	○	○	○
	Formaldehyde (HCHO) in H_2O, formalin	Liquid	23	●	○	–
	Fluorosilicic acid ((H_2SiF_6)in H_2O)	Liquid	Conductive	○	○	○
	Glycerol (glycerine, propane 1,2,3-triol) $(HOCH_2CH(OH)CH_2OH)$	Liquid	42.5–47	●	●	●
	Ethylene glycol ($[CH_2OH]_2$)	Liquid	37–41.2	●	●	●
	Hydrochloric acid (HCl)	Liquid	Conductive	○	○	○
	Ferric chloride (($FeCl_3$) in H_2O)	Liquid	Conductive	○	○	○
	Formic acid (HCO_2H)	Liquid	Conductive	○	○	○
	Phosphoric acid (H_3PO_4)	Liquid	Conductive	○	○	–
	Sodium chloride ((NaCl) in H_2O)	Liquid	Conductive	○	○	○
	Sodium carbonate, soda (Na_2CO_3)	Solid	5.3–8.4	○	–	○
	Sodium hydroxide, caustic soda ((NaOH) in H_2O)	Liquid	Conductive	○	○	–
	Sodium bicarbonate, baking soda ($NaHCO_3$)	Solid	5.7	○	–	–
	Sodium hypochlorite ((NaOCl) in H_2O), bleach	Liquid	Conductive	○	○	–
	Potassium permanganate (($KMnO_4$) in H_20)	Liquid	Conductive	○	○	○
	Potassium hydroxide ((KOH) in H_2O)	Liquid	Conductive	○	○	○
	Sodium hydroxide ((NaOH) in H_2O)	Liquid	Conductive	○	○	○
	Sodium bisulphite (($NaHSO_3$) in H_2O)	Liquid	Conductive	○	●	○
	Sulphuric acid (H_2SO_4), low concentrated	Liquid	84	○	○	–
	Sulphuric acid (H_2SO_4), low concentrated	Liquid	Conductive	○	○	–
	Chloroform ($CHCl_3$)	Liquid	3.7–5.5	●	○	–
	Trichloroethane (CH_3CCl_3)	Liquid	7.2	○	–	–
	Acetic acid (CH_3COOH), vinegar	Liquid	Conductive	●	○	–
	Painting and varnish agents diluted with water (non-explosive)	Liquid	Conductive	●	●	–
				Page 312	Page 308	Page 223

– Not suitable
○ Limited suitability
● Suitable



		State	Relative dielectric constant (εr)	PulsFox® PMG 20	SonarFox® UST 20	HydroFox® DMU 07/08/09
Food and beverage	Beer	Liquid	Conductive	o	o	●
	Citric acid ((C_6H_8O7) in H_2O)	Liquid	Conductive	o	o	o
	Coconut oil	Liquid	2.9	●	●	o
	Palm oil	Liquid	1.75	●	●	o
	Animal fat	Liquid	2.7	●	●	o
	Lumpy fruit or vegetable	Solid	Conductive	–	–	–
	Cream, yogurt	Liquid	Conductive	●	●	–
	Milk	Liquid	Conductive	o	●	o
	Sugar syrup	Liquid	Conductive	o	●	–
	Margarine	Liquid	2.8–3.2	o	●	–
	Confectionery coating pastes, honey, jam, marmalade, liquid chocolate	Liquid	2.4; 23; ∞; 3	o	●	–
	Edible oil	Liquid	3.9	●	●	o
	Fruit juice	Liquid	Conductive	●	●	o
	Potato (whole)	Solid	Conductive	o	–	–
	Sodium chloride (NaCl), table salt, rock-salt	Liquid	3.3	o	–	–
	Wine	Liquid	Conductive	●	●	o
Power Plants	Fuel oil	Liquid	2.1	o	●	●
	Heated pakura (mazout)	Liquid	2.2	●	o	–
	Hot water in high pressure vessels	Liquid	Conductive	●	–	o
	Water in condensing vessels	Liquid	80	o	o	o
	Water level in supply water pool	Liquid	Conductive	●	●	●
Oil Industry	Crude oil	Liquid	1.7–2.2	o	●	o
	Shale oil	Liquid	2.1	●	o	o
	Grease (lubricant)	Liquid	3.15	o	o	o
	Diesel oil	Liquid	2–2.5	o	o	●
	Lubricant oil	Liquid	2–2.5	o	o	●
	Transformer oil	Liquid	2–2.5	●	o	●
Paper Mill	Paper pulp	Liquid	Conductive	–	o	o
	Water	Liquid	Conductive	●	●	●
Plastic Industry	Granulated plastic	Solid	1.1–2.8	o	–	–
	Polyvinyl chloride (PVC)	Solid	3.4	●	–	–
	Polyethylene pellet	Solid	1.5–1.8	–	–	–
	Polystyrene	Solid	2.2–2.6	–	–	–
	Plastic powder	Solid	1.3–1.8	o	–	–
	Silicone oil	Liquid	2.7	o	●	●
Water / waste water	Drinking water in reservoirs	Liquid	Conductive	●	●	●
	Thermal water in cooling reservoirs	Liquid	Conductive	o	o	●
	Travelling bar screen control with diff. measurements	Liquid	Conductive	–	–	–
	Water level in rivers for flood control	Liquid	Conductive	o	o	●
	Water level in well	Liquid	Conductive	–	o	●
	Seawater	Liquid	Conductive	o	●	●
	Rainwater reservoir	Liquid	Conductive	●	●	●
	Waste water in reservoirs or channels	Liquid	Conductive	o	●	●
				Page 312	Page 308	Page 223

– Not suitable
o Limited suitability
● Suitable

Hydrostatic level indicator HydroFox® DMU 08

- **Compact and sturdy stainless steel design**
- **Special calibration for all standard pressure units possible**
- **Version with PUR or FEP cable**
- **Optional ATEX version**

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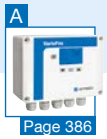

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1. Junction box with pressure relief port
2. Digital display and control unit VarioFox® 24
3. Signalling device
4. HydroFox® DMU 08

5

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; also for use in flood hazard areas.

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.

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: 0/100 mbar bis 0/400 mbar (see chapter 3 for further measuring ranges)

Operating temperature range
Medium: -10/+70 °C
Ambient: -10/+70 °C
Storage: -25/+70 °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)
Cable: PUR

Pressure transmission liquid
Silicone oil

Supply voltage
DC 12–36 V

Output signal
4–20 mA, 2-wire

Load
4–20 mA: $R_{max} = [(U_B - U_{Bmin})/0.02\ A]\ \Omega$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection (degree of protection)
PUR cable, 5 m (IP 68)
With integrated breather tube for reference to the ambient atmospheric pressure

Options
- Extended weight
- ATEX version (see chapter 3)
- FEP cable (see chapter 3)

Accessories
- Screw connector kit
- Junction box
- Anchor clamp

i Complete range for "hydrostatic level measurement" see chapter 3: DMU 07 – DMU 09.

DG: H	PG	Part no.	**Price €**
DMU 08 with 5 m PUR cable			
Measuring range			
0/100 mbar	4	**31555**	
0/160 mbar	4	**31556**	
0/200 mbar	4	**31557**	
0/250 mbar	4	**31558**	
0/300 mbar	4	**31519**	
0/400 mbar	4	**31559**	
Screw connector kit plastic, G2 x 1½ x 1	1	**52125**	
Junction box with pressure relief port	1	**31824**	
Anchor clamp	3	31825	

Blue part no. = in-stock items

Capacitance level indicator CapFox® EFT 20

- **Easy adjustment via magnetic pin**
- **Degree of protection IP 68 with fixed cable connection**
- **For tank heights of 100 mm and more**
- **EX version suitable for mining**

A Page 383
A GSM Page 390

Application

Capacitance level indicator with 2-wire or 3-wire technology for continuous level measurement of liquids and bulk solids (flour, sand, cement, plastic granules) in open and closed container, tanks or silos. Particularly suitable for low tank heights.

Description

The capacitance level indicator CapFox® EFT 20 detects the change in electrical capacitance caused by the change in level and converts the amount of change into a current signal (4–20 mA) or a voltage signal (0–10 V). The electronics module is contained in a robust stainless steel housing. Flexible probes or rod probes are available as measurement electrode. For level measurement of adhesive, corrosive or electrically conductive media, the electrodes are available with an insulating coating. If media are stored in tanks made of non-conductive materials or in open containers, the probes must be equipped with an additional coax reference pipe or an earth electrode.

Technical specifications

Indication
LED, green: Operation indication
LED, orange: Status indication

Min. measuring range
0/100 mm

Max. measuring range
MS: ≤ 2,000 mm
MF: ≤ 6,000 mm
KX: ≤ 1,000 mm
(please specify exact probe length when ordering)

Accuracy
Non-linearity: Max. 1 % of measured value
Temperature error: Max. 0.05 %/K

Operating temperature range
Medium (t_m): -40/+300 °C
Flange (t_p): -40/+85 °C
(EX version up to 75 °C)
(High temperature up to +200 °C)
Ambient (t_a): -30/+85 °C
(EX version up to 75° C)

Process pressure
See pressure resistance table

Process connection
Either G1B, G¾B, ¾"-NPT,
Tri-Clamp (Ø 34 or Ø 50.5 mm)

Supply voltage
DC 9–34 V / 2-wire
for Ex version DC 9–28 V
DC 12–34 V / 3-wire

Output signal
4–20 mA / 2-wire (standard)
0–10 V / 3-wire (option)

Current input
Max. 20.5 mA / 2-wire

Load
R_{max} = 700 Ω at 24 V

Housing
Stainless steel 304

Degree of protection
IP 68 (cable gland with fixed cable connection)
IP 67 (connector M12 x 1, 4-pin)

Electrical connection
Plastic cable gland M12 x 1.5
with fixed cable connection, 2 m

Weight
Approx. 0.3 kg
HT version approx. 0.6 kg

Probe material
Stainless steel 316 L (MS)
Stainless steel 316 (MF)
Stainless steel 304 (KX)

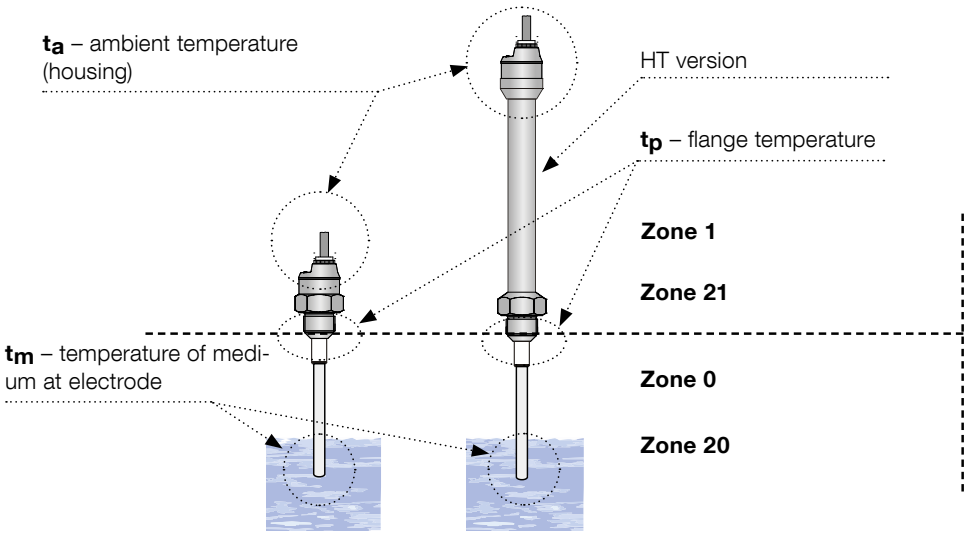
Scope of delivery
CapFox® EFT 20 according to configuration
with magnetic pin

Options
- Other process connections
- PFA coating/FEP coating
- EX version
- Ex II 1 G Ex ia IIB T4 Ga
- Ex II 1/2 D Ex ia IIIC T120°C Da/Db
- Ex M1 Ex ia I Ma

Capacitance level indicator CapFox® EFT 20

NEW

Connection diagram

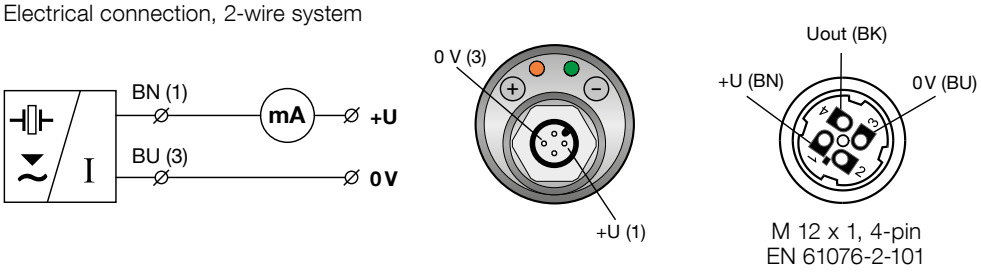


Pressure resistance

Version	Maximum operating pressure at temperature t_p				
	Up to 30 °C	Up to 85 °C	Up to 120 °C	Up to 150 °C	Up to 200 °C
EFT 20 MS – 20	50 bar	25 bar	–	–	–
EFT 20 MS – 21, 22 + KX	50 bar	20 bar	–	–	–
EFT 20 MF	1 bar	1 bar	–	–	–
EFT 20 MS – 20 HT	50 bar	25 bar	15 bar	10 bar	5 bar
EFT 20 MS – 21, 22 + KX HT	50 bar	20 bar	15 bar	10 bar	1 bar
EFT 20 MF – HT	1 bar	1 bar	1 bar	1 bar	1 bar

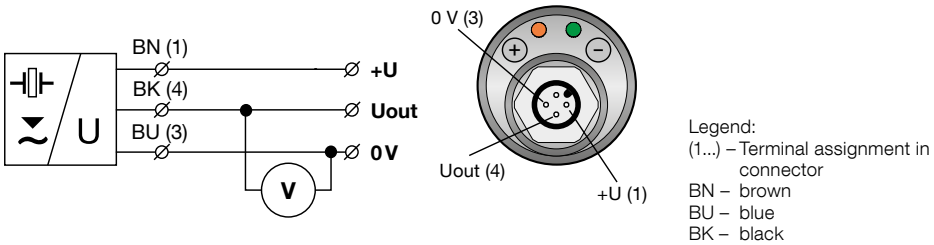
Pin assignment output signals

Electrical connection, 2-wire system



M 12 x 1, 4-pin
EN 61076-2-101

Electrical connection, 3-wire system



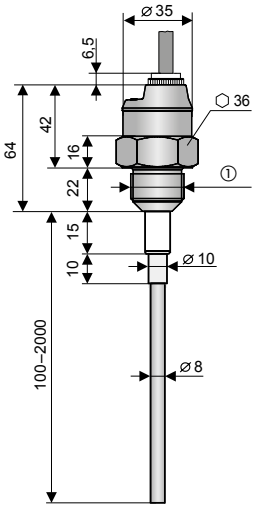
Legend:
(1...) – Terminal assignment in connector
BN – brown
BU – blue
BK – black

Capacitance level indicator CapFox® EFT 20

NEW

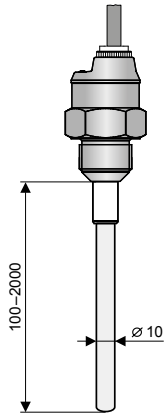
Types and dimensions (mm)

CapFox® EFT 20 MS – 20 with rigid mono probe

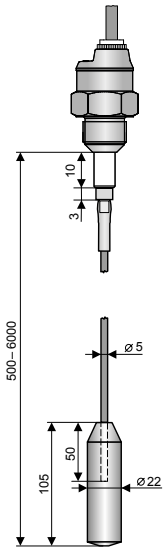


① Process connection

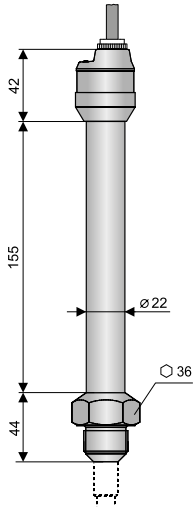
CapFox® EFT 20 MS – 21, 22 with rigid mono probe (FEP- or PFA-insulated)



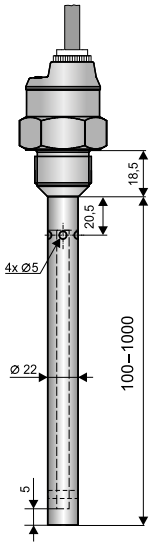
CapFox® EFT 20 MF – 60 with flexible mono probe



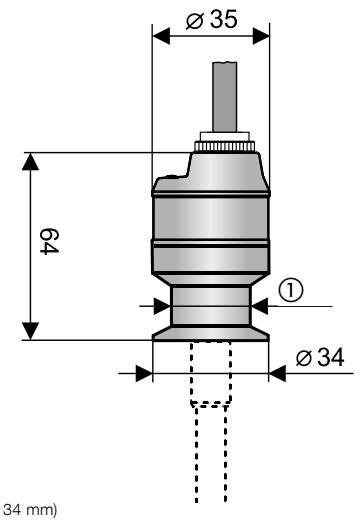
High temperature version



CapFox® EFT 20 KX – 40, 41 with coax probe



Process connection Tri-Clamp DIN 32676



① Tri-Clamp (Ø 34 mm)
Tri-Clamp (Ø 50.5 mm)

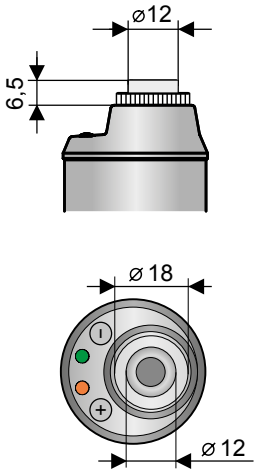
5

Capacitance level indicator CapFox® EFT 20

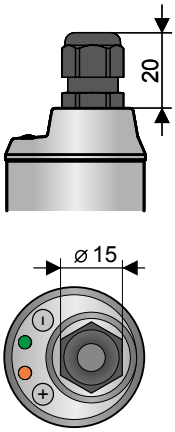
NEW

Electrical connections (mm)

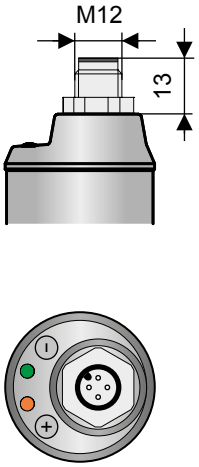
Version with short stainless steel cable gland



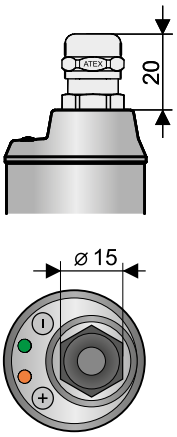
Version B with PVC cable gland M12 x 1.5



Version C with connector M12 x 1, 4-pin



Version D with dust-tight cable gland (ATEX)



Capacitance level indicator CapFox® EFT 20

NEW

Ordering data

DG: H, PG: 4

		Price €
1 Capacitance level indicator		
56550	CapFox® EFT 20	
2 Probe type / max. measuring range / application / base price incl. 1 m electrode		
20	Mono probe rigid with FEP insulation EFT 20 MS, max. 2,000 mm, for non-conductive media	
21	Mono probe rigid with FEP insulation EFT 20 MS, max. 2,000 mm, for conductive media	
22	Mono probe rigid with PFA insulation EFT 20 MS, max. 2,000 mm, for conductive media and food	
40	Coax probe without insulation, EFT 20 KX, max. 1,000 mm, for non-conductive liquids	
41	Coax probe with FEP-insulated measuring electrode, EFT 20 KX, max. 1,000 mm, for non-conductive liquids	
60	Mono probe flexible, with weight Ø 22 mm, EFT 20 MF, max. 6,000 mm, for bulk solids	
3 Temperature range		
ST	Standard for max. flange temperature t_p 85 °C (EX version 75 °C)	**0.00**
HT	High temperature version for max. flange temperature t_p 200 °C	
4 Probe length (L)	**Extra charge for each 100 mm probe length for lengths > 1,000 mm**	
2000	Length in mm e.g. 2,000 mm	
	Rigid mono probe without insulation for EFT 20 MS	
	Rigid mono probe with FEP insulation for EFT 20 MS	
	Rigid mono probe with PFA insulation for EFT 20 MS	
	Flexible mono probe without insulation for EFT 20 MF	
5 Process connection		
1	G1B	
2	G¾B	**0.00**
3	¾ NPT	
4	Tri-Clamp DIN 32676, Ø 34 mm	
5	Tri-Clamp DIN 32676, Ø 50.5 mm	
6 Electrical connection		
A	Short stainless steel cable gland	
B	Plastic cable gland M12 x 1.5	**0.00**
C	Connector M 12 x 1, 4-pin	
D	Dust-tight cable gland (ATEX)	
7 Output signal		
01	4–20 mA / 2-wire / DC 9–34 V	**0.00**
02	0–10 V / 3-wire / DC 12–34 V	**0.00**
EX	4–20 mA (ia) / 2-wire / DC 9–28 V (gas and dust EX) Ui=30 V DC; Ii=132 mA; Pi=0.99 W; Ci=35 nF; Li=10 mH	
MEX	4–20 mA (ia) / 2-wire / DC 9–28 V (mining) Ui=30 V DC; Ii=132 mA; Pi=0.99 W; Ci=35 nF; Li=10 mH	

Ordering code example

56550	21	ST	1000	1	A	01

Ultrasonic level indicator SonarFox® UST 20

NEW

- **Non-contact level measurement**
- **Easy adjustment even without medium**
- **Robust housing for rough ambient conditions**
- **Suppression of interference signals**

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5

Application

For continuous, non-contact level measurement in open or closed containers, tanks or silos. Suitable for liquid, mushy and pasty media. Ideal for sludge, adhesives, resins and waste water. The device can be easily adjusted even without a medium by means of the programming display with user-friendly menus. It also serves as a local display.

Description

The SonarFox® UST 20 level indicator uses the physical properties of ultrasonic waves to determine the level. An ultrasonic wave is emitted which is reflected by objects in the sound cone. The time up to the reception of the reflected echo is a measure of the distance. Since the mounting position is defined, it is possible to calculate the filling level of the medium. Type, density and temperature of the medium have no effect on the measurement – the only prerequisite is a reflecting surface. Acoustically diffuse surfaces such as foam or uneven surfaces of bulk solids are to be tested with regard to the application. An optional, additional alignment horn adapter can be used for such media. Installations or stirrers above the surface of the medium can be masked during empty setup.

Probe selection

Probe type	UST 20 – 01	UST 20 – 11	UST 20 – 21	UST 20 – 31
Measuring range	0.15 – 2 m	0.25 – 6 m	0.4 – 10 m	0.5 – 20 m
Low tanks < 1,000 mm	+	-	-	-
Tanks between 1,000 mm and 2,000 mm	+	+	-	-
Tanks between 2,000 mm and 6,000 mm	-	+	+	-
Tanks between 6,000 mm and 10,000 mm	-	-	+	+
High tanks > 10,000 mm	-	-	-	+
Liquids	+	+	+	+
Pastes and adhesives	+	+	+	+
High-viscosity or adhesive media	+	+	+	+
Low-viscosity media	+	+	+	+
Corrosive media	+	+	+	+
Conductive media	+	+	+	+
Non-conductive media	+	+	+	+
Foam on the medium*	o	o	o	o

* Use of alignment horn adapter advisable, see accessories.

- Not suitable
O Limited suitability
\+ Suitable

Ultrasonic level indicator SonarFox® UST 20

NEW

Technical specifications

Programming display (option)
5-digit, 9 mm high,
yellow Matrix OLED
Resolution 128 x 64 pixels

Status indicator
Level outside of measuring range, no echo, etc.
Adjustable in the modes:
3.75 mA, 22 mA, last measured value

Signal damping
Adjustable from 0 to 99 s

Delay of initial measurement at measurement start
Approx. 30 s

Measuring interval
1–4 s

Supply voltage
DC 18–36 V
for Ex version DC 18–28 V

Output signal
4–20 mA/HART, 2-wire

Current input
Max. 22 mA

Max. load
R_{max}= 270 Ω at: U= 24 V
R_{max}= 180 Ω at: U= 22 V
R_{max}= 90 Ω at: U= 20 V
R_{max}= 45 Ω at: U= 19 V

Measuring range
UST 20 – 01: 0.15 – 2 m
UST 20 – 11: 0.25 – 6 m
UST 20 – 21: 0.4 – 10 m
UST 20 – 31: 0.5 – 20 m

Adjustable measuring range
Min. 200 mm

Resolution
UST 20 – 01: <1 mm
UST 20 – 11: <2 mm
UST 20 – 21: <1 mm
UST 20 – 31: <2.5 mm

Accuracy
±0.15 % FS

Temperature error
Max. 0.04 %/K

Measuring frequency
UST 20 – 01: 120 kHz
UST 20 – 11: 75 kHz
UST 20 – 21: 50 kHz
UST 20 – 31: 30 kHz

Operating temperature range
UST 20 – 01, 11: -30/+70 °C
UST 20 – 21, 31 -30/+60 °C
at process connection up to 90 °C
(short-term up to 60 min)

Process pressure
Max. 1 bar

Process connection
UST 20 – 01: PP, G1B
UST 20 – 11: PP, G 1½B
UST 20 – 21: PP, G 2¼B
UST 20 – 31: Aluminium alloy, Flange EN 1092-1 DN100 PN16

Ultrasonic transducer
PVDF

Housing
Aluminium die cast

Degree of protection
IP 67 (EN 60529)

Electrical connection
Cable gland M16 x 1.5

Weight
UST 20 – 01: 0.3 kg
UST 20 – 11: 0.4 kg
UST 20 – 21: 0.6 kg
UST 20 – 31: 3.1 kg

Options
- Output RS-485 Modbus RTU
- EX version
  Ex II 1/2G Ex ia IIB T5 Ga/Gb
  Ex II 1/2G Ex ia IIA T5 Ga/Gb (UST 20 – 21)
  Ex II 2G Ex ia IIA T5 Ga/Gb (UST 20 – 31)

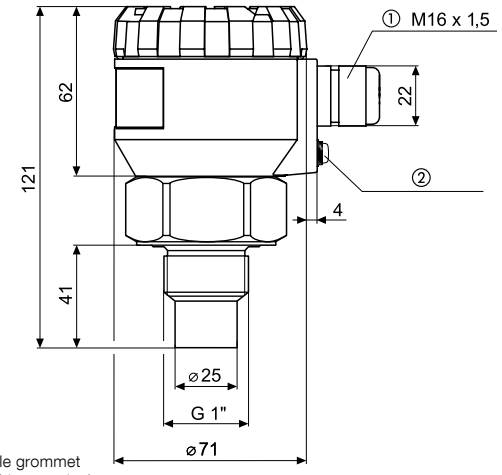
5

Ultrasonic level indicator SonarFox® UST 20

NEW

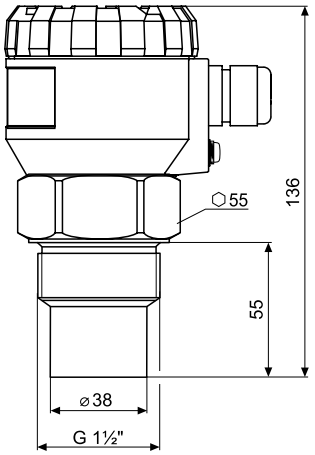
Types and dimensions (mm)

Housing UST 20 – 01

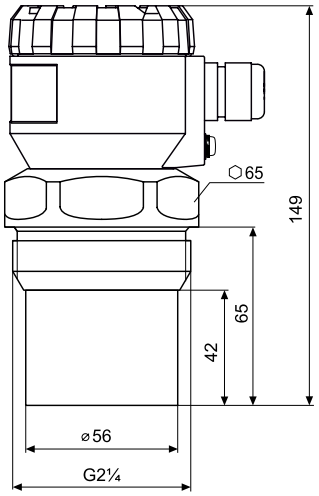


① Cable grommet
② Earthing terminal

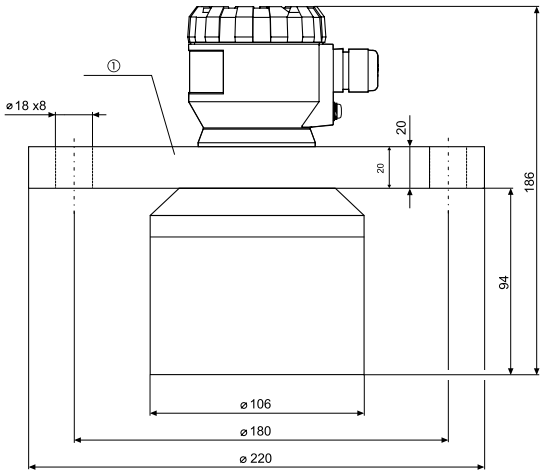
Housing UST 20 – 11



Housing UST 20 – 21



Housing UST 20 – 31



Ultrasonic level indicator SonarFox® UST 20

NEW

Ordering data

		DG: H, PG: 4	Price €
1	**Ultrasonic level indicator**		
56220	SonarFox® UST 20		
2	**Probe type / measuring range / measuring frequency / process connection**		
01	Measuring range 0.15–2 m, 120 kHz, PP G1B		
11	Measuring range 0.25–6 m, 75 kHz, PP G1½B		
21	Measuring range 0.4–10 m, 50 kHz, PP G2¼B		
31	Measuring range 0.5–20 m, 30 kHz, aluminium alloy EN 1092-1 DN 100 PN 16		
3	**Display (required for programming)**		
D	With local display, housing cover with window		
O	Without local display, housing cover without window		**0.00**
4	**Output signal / interface**		
01	4–20 mA + HART / 2-wire / DC 18–36 V		**0.00**
02	RS-485 Modbus RTU		**0.00**
EX	4–20 mA (ia) + HART / 2-wire / DC 18–28 V Ui=30 V DC; Ii=132 mA; Pi=0.99 W; Ci=370 nF; Li=0.9 mH		

Ordering code example

56220	11	D	01

DG: H, PG: 4		
Standard versions	Part no.	**Price €**
56220 11 D 01 measuring range 0.25 – 6 m, G1½ B, with display	**33542**	
56220 01 D 01 measuring range 0.15 – 2 m, G1 B, with display	**33543**	
56220 11 O 01 measuring range 0.25 – 6 m, G1½ B, without display	**33544**	
56220 01 O 01 measuring range 0.15 – 2 m, G1 B, without display	**33545**	
56220 21 D 01 measuring range 0.4 – 10 m, G2¼ B, with display	**33557**	
56220 31 D 01 measuring range 0.5 – 20 m, DN 100 PN 16, with display	**33558**	
56220 21 O 01 measuring range 0.4 – 10 m, G2¼ B, without display	**33559**	
56220 31 O 01 measuring range 0.5 – 20 m, flange DN 100, without display	**33560**	
Accessories		
Programming display/local display PD 20 UST/PMG	**56225**	
Alignment horn adapter made of plastic (PP) G1 female	**56221**	
Alignment horn adapter made of plastic (PP) G1½ female	**56222**	
Alignment horn adapter made of plastic (PP) G2¼ female	**56223**	
Housing cover with window	**56224**	
Housing cover without window	**56226**	

Blue part no. = in-stock items

Guided micropulse level indicators PulsFox® PMG 20

NEW

- **Level measurement independent of changes in pressure, temperature or density**
- **Stable, reliable measurement even with foam, vapour, dust or turbulent surfaces of the medium**
- **Robust housing for rough ambient conditions**
- **Maintenance-free, not subject to wear and tear**

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5

Application

For universal continuous level measurement in containers, tanks or silos. Suitable for liquid, powdery, electrically conductive or non-conductive media. Ideal fro changing media. FEP-coated and PFA-coated probes are available for corrosive, highly clean media or food. Also suitable for pressurised or vacuum tanks.
The device can be easily adjusted by means of the programming display with user-friendly menus; it also serves as a local display.

Description

PulsFox® PMG 20 level indicators operate on the basis of the guided micropulse principle (TDR, time domain reflectometry). A micropulse is emitted along a probe. The micropulse is surrounded by an electromagnetic field. Reflections of the pulses from objects and surfaces serve as the basis of distance measurement. The pulse's propagation time is directly proportional to the distance between the probe and the surface of the medium. The reflectance of materials depends on the dielectric constant εr. Changes of the medium such as, for example vapour, dust or a turbulent surface do not affect the measuring accuracy of this measuring principle. No recalibration is required when a different medium is used. Even if properties such as pressure, temperature and density change, the system operates with high reliability and precision. PulsFox® PMG 20 has no moving parts and is therefore maintenance-free and not subject to wear.

Application examples

- Cement silo
- Liquid bitumen
- Containers for construction materials such as mortar, plaster, gypsum
- Silos for additional fuels such as meat and bone meal or dried sewage sludge
- Tanks for liquefied gas such as LPG, LNG
- Tanks facilities for ethanol fuel
- Tank facilities for hydrochloric acid
- Storage of intermediate products, chemical industry
- Supply tanks for hydraulic oil
- Condensation tanks for liquids
- Water separators upstream of vacuum pumps
- Small in medium tanks for raw and finished products in refineries
- Level measurement in facilities for leachate treatment
- Supply water tanks of turbines
- Level measurement in bodies of water

Guided micropulse level indicators PulsFox® PMG 20

NEW

Probe selection

	Rigid mono probe MS	Flexible mono probe MF	Coax probe KX	Partially insulated probes	PFA Fully insulated probes	FEP Fully insulated probes
Low tanks ≤ 1,000 mm	o	-	+	-	-	-
Tanks > 1,000 mm / ≤ 2,000 mm	+	o	+	+	+	+
Tanks > 2,000 mm / ≤ 3,000 mm	-	+	-	+	-	+
High tanks > 3,000 mm	-	+	-	+	-	+
Liquids	+	+	+	+	+	+
Solids	+	+	-	-	-	+
High-viscosity or adhesive media	o	o	-	o	o	o
Low-viscosity media	+	+	+	+	+	+
Disturbing installations/ small distances	-	-	+	+	+	+
Conductive foam on the medium	+	+	-	+	+	+
Liquids in environments with condensing vapours	-	-	-	+	+	+
Corrosive and very clean liquids	-	-	-	-	+	-
Corrosive liquids and beverages	-	-	-	-	-	+

– Not suitable
O Limited suitability
\+ Suitable

5

Technical specifications

Display (option)
5-digit, 9 mm high,
yellow Matrix OLED
Resolution 128 x 64 pixels

Min. measuring range
0/100 mm, depending on probe

Max. measuring range
MS: ≤ 3,000 mm
with PFA-coating max. 2,000 mm
MF: ≤ 40,000 mm
with FEP coating max. 12,000 mm
KX: ≤ 3,000 mm
(please specify exact probe length when ordering)

Dielectric constant ε of medium
MS/MF: ≥ 2.1
KX: ≥ 1.8

Accuracy
MS/MF: ±4 mm ≤ 2 m
±2 mm ≥ 2 m
KX: ±3 mm ≤ 2 m
±2 mm ≥ 2 m

Operating temperature range
Medium: -40/+300 °C
(EX version up to +98 °C)
Flange: -40/+85 °C
(high temperature up to +200 °C)
Ambient: -30/+70 °C

Process pressure
MS/KX: Max. 100 bar
(high temperature and MF max. 10 bar)

Process connection
G1B, stainless steel 316 Ti (1.4571)

Supply voltage
DC 18–36 V / 2-wire
for Ex version DC 18–28 V

Output signal
4–20 mA/HART, 2-wire

Current input
Max. 22 mA

Housing
Aluminium die cast

Degree of protection
IP 67

Electrical connection
Cable gland M16 x 1.5

Probe material
Stainless steel 316 L (MF)
Stainless steel 316 Ti (MS/KX)

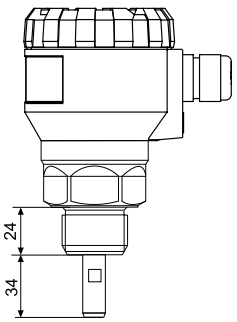
Options
- Other process connections
- PFA coating/FEP coating
- EX version
  Ex II 1/2 G Ex ia IIB T5 Ga/Gb

Guided micropulse level indicators PulsFox® PMG 20

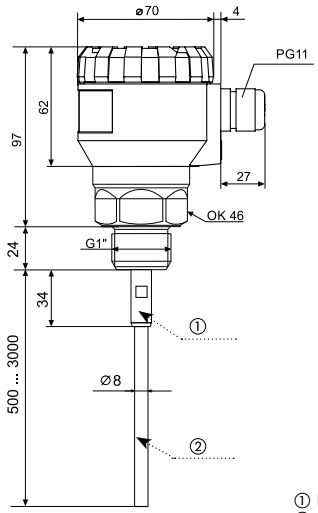
NEW

Types and dimensions (mm)

PulsFox® PMG 20 MO – 00, mono probe without electrode

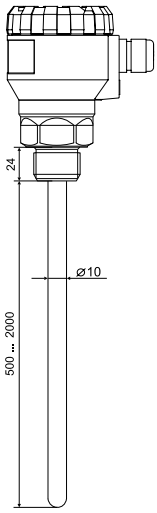


PulsFox® PMG 20 MS – 20-with rigid mono probe

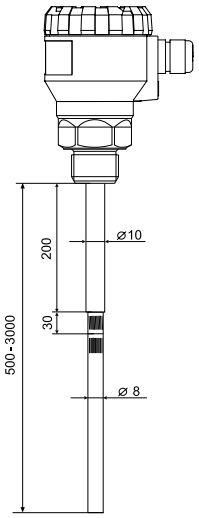


① Electrode holder
② Electrode

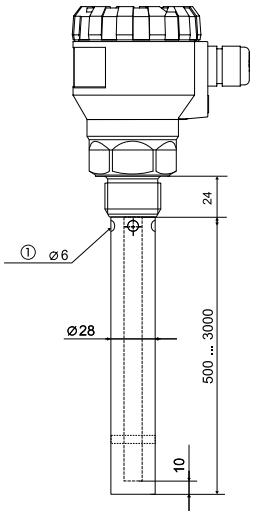
PulsFox® PMG 20 MS –22, 23 with mono probe (PFA-insulated or FEP-insulated)



PulsFox® PMG 20 MS – 21 with rigid mono probe (partially insulated)

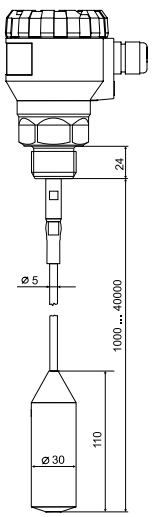


PulsFox® PMG 20 KX – 40 with coax probe



① 4 x opening

PulsFox® PMG 20 MF – 60, 62, 63 with flexible mono probe

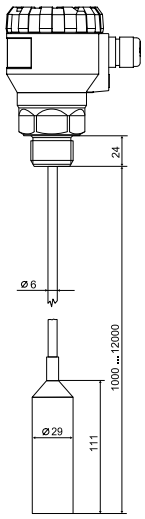


Guided micropulse level indicators PulsFox® PMG 20

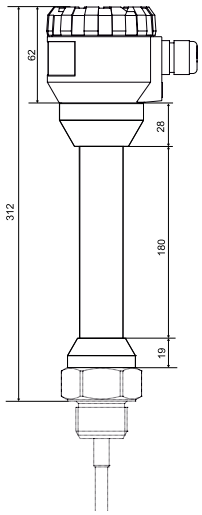
NEW

Types and dimensions (mm)

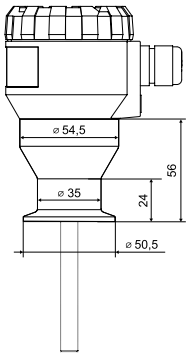
PulsFox® PMG 20 MF – 61 with flexible mono probe (PTFE-insulated)



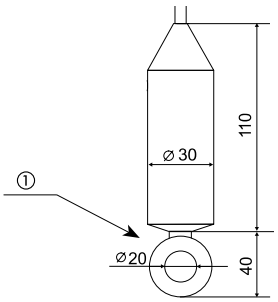
PulsFox® PMG 20 as high temperature version



PulsFox® PMG 20 with process connection TriClamp 1"



PulsFox® PMG 20 – 62, 63 mounting eye



① Mounting of version PMG 20-62 (63)

Guided micropulse level indicators PulsFox® PMG 20

NEW

Ordering data

DG: H, PG: 4

		Price €
1	**Guided micropulse level indicator**	
56540	PulsFox® PMG 20	
2	**Probe type / process connection / max. measuring range**	
00	Mono probe without electrode, PMG 20 MO, G1B, probe connection M8 female thread Electrode provided by customer, probe length max. 40,000 mm	
20	Mono probe rigid without insulation, PMG 20 MS, G1B, max. 3,000 mm	
21	Mono probe with partially insulated probe , PMG 20 MS, G1B, max. 3,000 mm	
22	Mono probe rigid with PFA insulation PMG 20 MS, G1B, max. 2,000 mm	
23	Mono probe rigid with FEP insulation PMG 20 MS, G1B, max. 2,000 mm	
40	Coax probe, PMG 20 KX, G1B, max. 3,000 mm	
60	Mono probe flexible, without insulation, with weight Ø 30 mm, PMG 20 MF, G1B, max. 40,000 mm	
61	Mono probe flexible, with FEP insulation and weight Ø 29 mm (PTFE insulation), PMG 20 MF, G1B, max. 12,000 mm	
62	Mono probe flexible, without insulation, with mounting eye, PMG 20 MF, G1B, max. 40,000 mm	
63	Mono probe flexible, with PA insulation and mounting eyelet (not insulated), PMG 20 MF, G1B, max. 40,000 mm	
3	**Display/temperature range**	
D	With local display, housing cover with window	
HTD	High temperature version with local display , housing cover with window (flange temperature: MS + KX up to 200 °C; MF up to 130 °C)	
O	Without local display, housing cover without window	**0.00**
HTO	High temperature version without local display, housing cover without window (flange temperature : MS + KX up to 200 °C; MF up to 130 °C)	
4	**Probe lengths (L)** **Extra charge for each metre probe length for lengths > 2,000 mm**	
02000	Length in mm, e.g. 2,000 mm	
	Rigid mono probe without insulation for PMG 20 MS	
	Rigid, partially insulated mono probe for PMG 20 MS	
	Coax electrode for PMG 20 KX	
	Flexible mono probe without insulation for PMG 20 MF	
	Flexible mono probe with FEP insulation or PFA insulation for PMG 20 MF	
	Flexible mono probe with PA insulation for PMG 20 MF	
5	**Process connection**	
1	G1B	**0.00**
2	1" NPT	
3	Tri-Clamp 1"	
6	**Output signal / interface**	
01	4–20 mA + HART / 2-wire / DC 18–36 V	**0.00**
02	RS-485 Modbus RTU	**0.00**
EX	4–20 mA (ia) + HART / 2-wire / DC 18–28 V Ui=30 V DC; Ii=132 mA; Pi=0.99 W; Ci=370 nF; Li=0.9 mH	

Ordering code example

56540	22	D	01500	1	01

Accessories	DG	PG	Part no.	Price €
Programming display/local display PD 20 UST/PMG	H	4	**56225**	
Housing cover with window	H	4	**56224**	
Housing cover without window	H	4	**56226**	

Blue part no. = in-stock items

Conductivity level switch CoFox® ELT 8

- For conductive media such as water, waste water, emulsions and many more
- Min. or max. fail-safe mode adjustable
- Two voltage-free relay outputs
- Low response threshold

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5

Application

Suitable for use with electrically conductive liquids whose level is to be limited or controlled. The liquids such as water, emulsions or waste water must neither foam excessively nor be viscous or adhesive (bridging). CoFox® ELT 8 can be operated with one probe as a level switch or with two probes for controlling pumps, valves, etc (start/stop). Can also be used as a water alarm unit, for example in control stations or IT rooms, in conjunction with floor water probe BWS 10-1.

Description

Level switch in wall mounting housing with visual alarm and operation indicator. CoFox® ELT 8 is designed for continuous operation and operates on the basis of conductivity. If a probe electrode is in contact with the liquid, this closes a circuit to the tank wall or to a second electrode via the liquid. The relay outputs switch. The sensitivity is adjustable. 2 voltage-free relay contacts are provided for switching functions.

Switching functions

Level switch: The relay can be set to either energise or de-energise when the probe rod comes into contact with or loses contact with the liquid. 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

Response threshold
2.5 kOhm – 60 kOhm
fully adjustable

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

Supply voltage
AC 230 V or DC 24 V

Power input
4 VA (AC 230 V)
2 VA (DC 24 V)

Probe circuit
Max. AC 3 V

Switching outputs
Relay contact: 2 voltage-free changeover contacts
Contact rating: AC 250 V, 2 A

Visual indication
Green LED: Mains 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 made of 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	PG	Part no.	Price €
ELT 8 AC 230 V	H	4	**53503**	
ELT 8 DC 24 V	H	4	**53503A**	
Accessories				
Additional alarm unit ZAG 01	H	4	**40633**	
Combined warning light and horn WLH 1	G	4	**61020**	
Cable extension fitting KVA	G	1	**40041**	

Blue part no. = in-stock items

i See page 320 for probes for level switches.

Conductivity alarm unit CoFox® ELT 500/4

- **For conductive media such as water, waste water, emulsions and many more.**
- **With visual alarm and reset key**
- **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

5

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

Wall mounting housing with visual alarm, operation indicator and reset key. 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 key on the device.

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

Technical specifications

Probe connections
4 probes

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

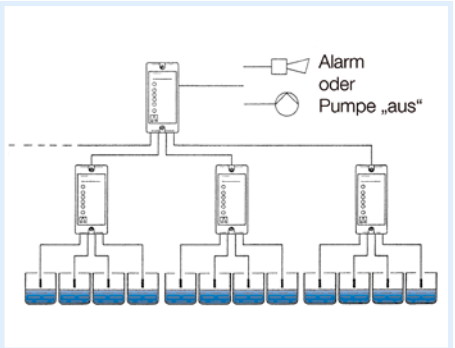
Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V, 2 A

Visual indication
Green LED: Mains operation
4 red LEDs: Alarm condition

Housing
Wall mounting housing with plug-in base made of 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	PG	Part no.	Price €
ELT 500/4 AC 230 V	H	4	53505	
Accessories				
Additional alarm unit ZAG 01	H	4	40633	
Combined warning light and horn	G	4	61020	
Cable extension fitting KVA	G	1	40041	

Blue part no. = in-stock items

i See page 320 for probes for level switches.

Conductivity level switch CoFox® ELT 680

- **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**

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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.

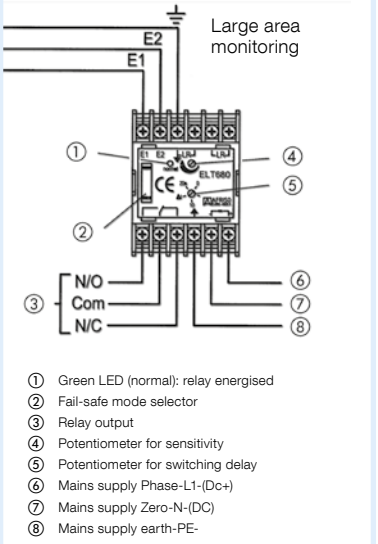
Technical specifications

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, 4 VA



① Green LED (normal): relay energised
② Fail-safe mode selector
③ Relay output
④ Potentiometer for sensitivity
⑤ Potentiometer for switching delay
⑥ Mains supply Phase-L1-(Dc+)
⑦ Mains supply Zero-N-(DC)
⑧ Mains supply earth-PE-

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

Time 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: H, PG: 4	Part no.	Price €
ELT 680 DC 24 V	53682	
ELT 680 AC 230 V	53681	
Accessories		
Additional alarm unit ZAG 01	40633	

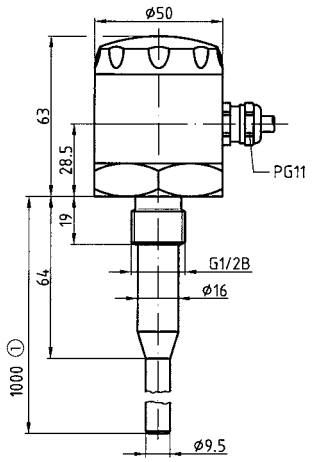
Blue part no. = in-stock items

i See page 320 for probes for level switches.

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

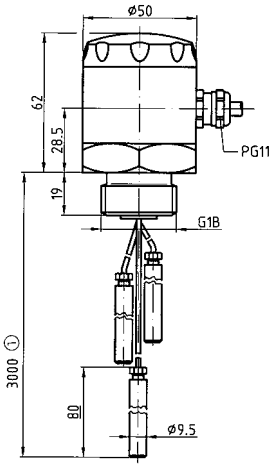
Types and dimensions (mm)

Single-rod probe LST 12



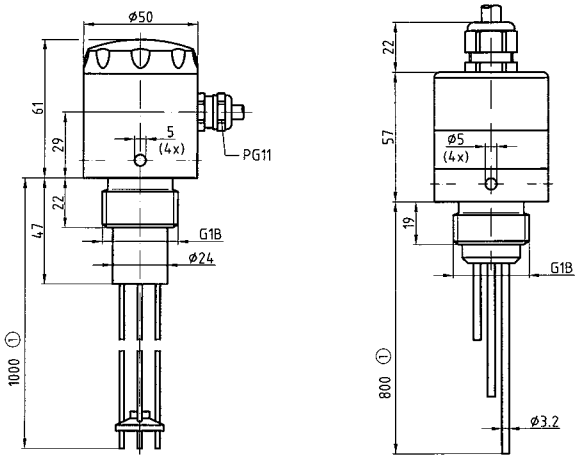
① Standard length (can be shortened)

Flexible probe LSE 23



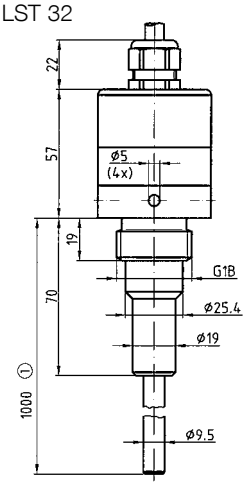
① Standard length (can be shortened)

Multi-rod probes LSM 01/LSM 02



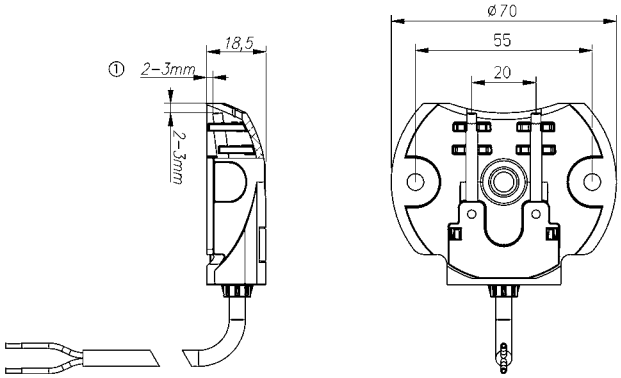
① Standard length (can be shortened)

Single-rod probe LST 32



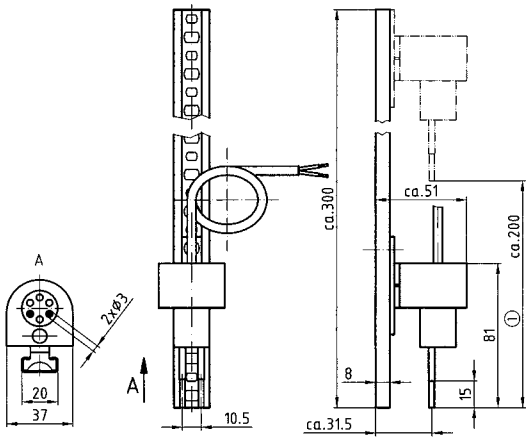
① Standard length (can be shortened)

Floor water probe BWS 10-1



① Response level

Wall mounting rail probe WSS



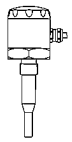
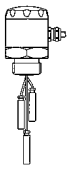
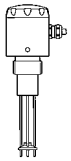
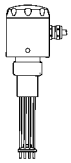
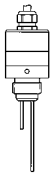
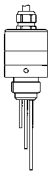
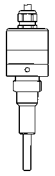
① ⊠Adjustment range

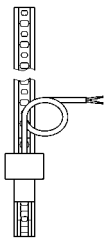
i

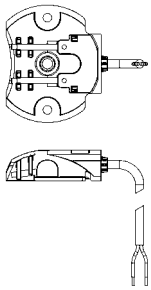
Many other probe versions are available. Please enquire.

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

DG: H, PG: 4

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 the medium	0/50 °C
	Adjustment range	Approx. 200 mm
	Electrical connection	Permanently installed cable, 150 cm

Floor water probe BWS 10-1		
	Application	Suitable for CoFox® ELT 500/4 / CoFox® ELT 8 / CoFox® ELT 680
	Price €	
	Part no.	**55112**
	Response level	Approx. 2–3 mm
	Temperature of the medium	0/50 °C
	Probe diameter	70 mm
	Material	Plastic, orange
	Electrical connection	Permanently installed cable, 200 cm

Blue part no. = in-stock items

i

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

Capacitance level switch CapFox® ENT 21

- Easy adjustment via magnetic pin
- Degree of protection IP 68
- For temperatures of the medium of up to 300 °C
- EX version suitable for mining

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5

Application

For level detection of conductive and non-conductive liquids in tanks, ducts, pipes or silos. Particularly suitable for application in the food, pharmaceutical and chemical industries. Also ideal for level detection of bulk solids such as sand, gravel, cement and granular material stored in open or closed containers.

Description

The capacitance level switch CapFox® ENT 21 consists of an electronics module integrated in a robust stainless steel housing and the measuring electrode. The electrode is partially or fully 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 (electric field) is no longer formed by a air or a different gas (free electrode), but by a liquid or the bulk solids, the capacitance changes. This is converted into a switching signal by the electronics. A 3-pin NPN or a PNP transistor output is available as electrical output. The sensor output of the EX version complies with EN 60947 (NAMUR).
Fully or partially insulated rigid probes or flexible probes are available, depending on the medium and the application. Only fully insulated electrodes are used for level detection of adhesive, corrosive or electrically conductive media.

Probe selection

	Rigid compact probe MK (50 mm)	Rigid compact probe MK (100 mm)	Rigid mono probe MS	Rigid mono probe MS (FEP-insulated)	Rigid mono probe MS (PFA-insulated)	Flexible mono probe MF
Clean, non-conductive liquids such as oil, diesel, petrol, etc.	+	+	+	o	o	+
Slightly polluted, non-conductive liquids such as lubricants, vegetable oil	-	+	+	o	o	+
Conductive liquids such as water solutions, sludge, etc.	-	-	-	+	+	-
Corrosive liquids	-	-	-	-	+	-
Non-adhesive bulk solids such as plastic granules, sand, sugar, grains, cleaning powder, etc.	-	+	o	+	+	+
Other bulk solids such as cement, hydrated lime, flour, fly ash, sawdust, animal feed mixtures, etc.	-	-	+	o	o	o
Horizontal mounting	+	+	+	+	+	-
Vertical mounting	o	+	+	+	+	+
Tilted vertical mounting	o	+	+	+	+	-
Mounting in non-metallic tanks, minimum surface of metal plate***	200 mm²	200 mm²	400 mm²			

– Not suitable
O Limited suitability
\+ Suitable

*** In the case of non-metallic storage tanks, it is recommended to mount the sensor to a metal plate.

Capacitance level switch CapFox® ENT 21

NEW

Technical specifications

Indication
LED, green: Operation indication
LED, orange: Status indication

Operating temperature range
See table operating temperature range

Process pressure
See pressure resistance table

Process connection
Either G1B, G¾B, ¾“ NPT,
Tri-Clamp (Ø 34 or Ø 50.5 mm)

Supply voltage
DC 7–34 V, load current max. 300 mA
EX version DC 8–9 V

Output
3-wire transistor (PNP and NPN) DC
2-wire as per EN 60947 (NAMUR)
≤ 1 mA (contact open); ≥ 2.2 mA
(contact closed)

Switching point adjustment
Adjustment via magnetic pin supplied with the unit

Current input
Max. 5 mA without load

Housing
Stainless steel 304

Degree of protection
IP 68 (cable gland with fixed cable connection)
IP 67 (connector M12 x 1, 4-pin)

Electrical connection
Plastic cable gland M12 x 1.5
with fixed cable connection, 2 m
PVC cable 3 x 0.5 mm²

Weight
Approx. 0.3 kg
HT version approx. 0.6 kg

Probe material
Stainless steel 316 L (MS)
Stainless steel 316 (MF)

Scope of delivery
CapFox® ENT 21 according to configuration, with magnetic pin

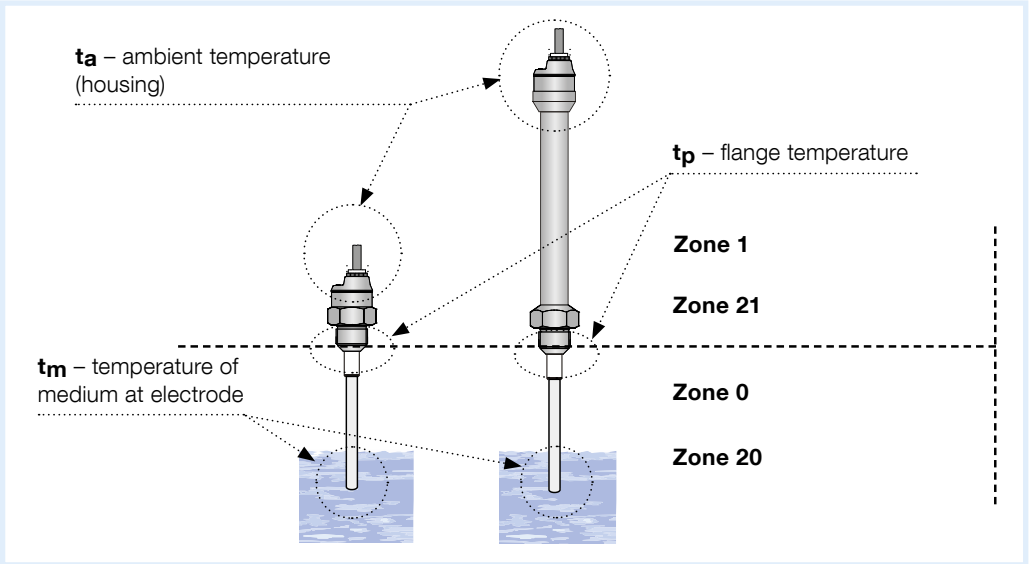
Options
- Other process connections
- PFA coating/FEP coating
- EX version
- Ex II 1 G Ex ia IIB T6 Ga
- Ex II 1 D Ex ia IIIC T80°C Da
- Ex I M1 Ex ia I Ma
- HT EX version
- Ex II 1/2 G Ex ia IIB T6 Ga/Gb
- Ex II 1/2 D Ex ia IIIC T80°C Da/Db

Operating temperature range

Version	Operating temperature range t_m	t_p	t_a
ENT 21 – MK	-40 °C ... +200 °C	-25 °C ... +85 °C*	-40 °C ... +85 °C
ENT 21 – MS partially insulated	-40 °C ... +300 °C	-40 °C ... +85 °C*	-40 °C ... +85 °C
ENT 21 – MS fully insulated	-40 °C ... +200 °C	-40 °C ... +85 °C*	-40 °C ... +85 °C
ENT 21 – MF	-40 °C ... +250 °C	-40 °C ... +85 °C*	-40 °C ... +85 °C
ENT 21 – MS – HT partially insulated	-40 °C ... +300 °C	-40 °C ... +200 °C	-40 °C ... +85 °C
ENT 21 – MK – HT	-40 °C ... +200 °C	-25 °C ... +200 °C	-40 °C ... +85 °C
ENT 21 – MS – HT fully insulated	-40 °C ... +200 °C	-40 °C ... +200 °C	-40 °C ... +85 °C
ENT 21 – MF – HT	-40 °C ... +250 °C	-40 °C ... +200 °C	-40 °C ... +85 °C

EX versions t_p = max. 75 °C.

Connection diagram



Capacitance level switch CapFox® ENT 21

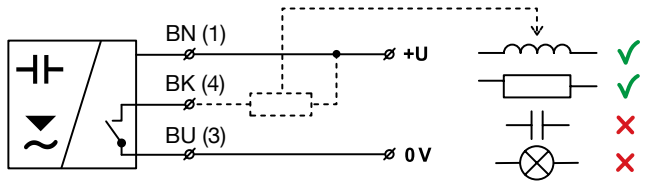
NEW

Pressure resistance

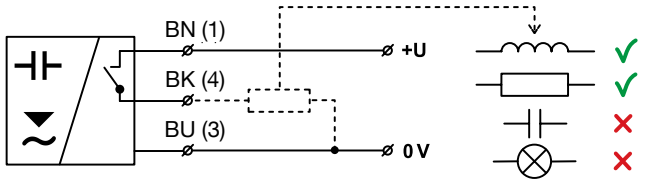
Version	Maximum operating pressure at temperature t_p				
	Up to 30 °C	Up to 85 °C	Up to 120 °C	Up to 150 °C	Up to 200 °C
ENT 21 – MS partially insulated	50 bar	25 bar	15 bar	10 bar	5 bar
ENT 21 – MK	75 bar	50 bar	45 bar	10 bar	35 bar
ENT 21 – MS fully insulated	50 bar	20 bar	15 bar	10 bar	1 bar
ENT 21 – MF	1 bar	1 bar	1 bar	1 bar	1 bar

Pin assignment output signals

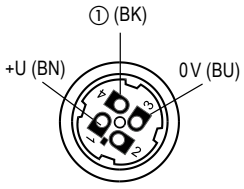
NPN output



PNP output

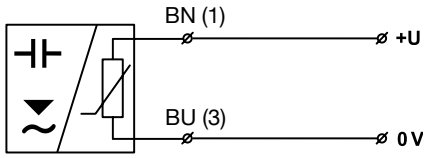


Connector assignment



① Switching output

Output as per NAMUR (DIN EN 60947)



Legend:
BN – brown
BU – blue
BK – black

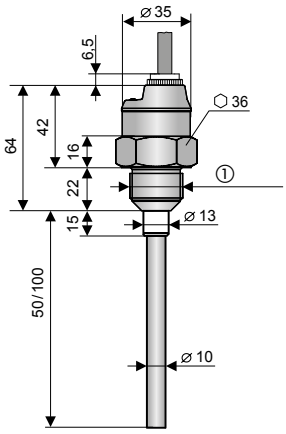
* The NPN or PNP output may only be used for resistive or inductive loads.

Capacitance level switch CapFox® ENT 21

NEW

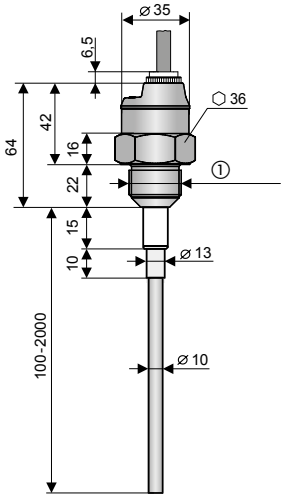
Types and dimensions (mm)

CapFox® ENT 21 MK – 05, 10



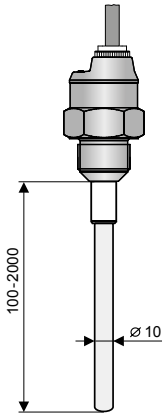
① Process connection

CapFox® ENT 21 MS – 20

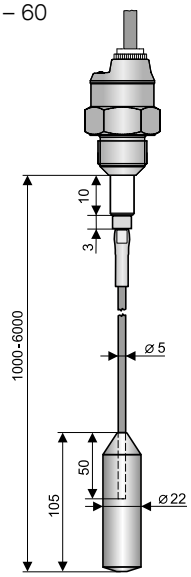


① Process connection

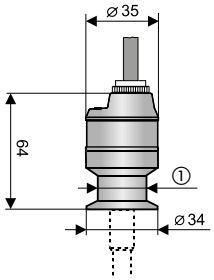
CapFox® ENT 21 MS – 21, 22



CapFox® ENT 21 MF – 60

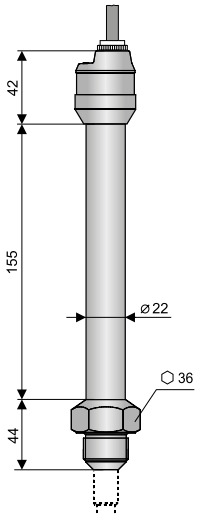


Process connection Tri-Clamp DIN 32676



① Tri-Clamp (Ø 34 mm)
Tri-Clamp (Ø 50.5 mm)

High temperature version

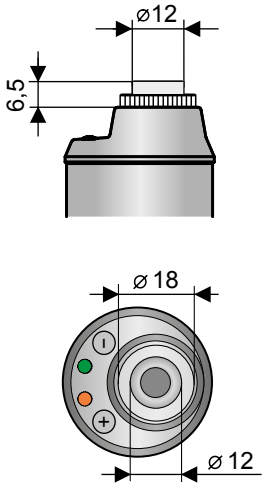


Capacitance level switch CapFox® ENT 21

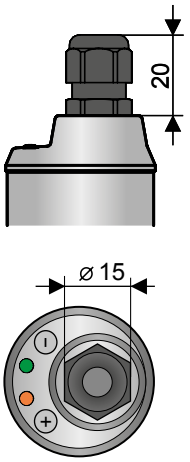
NEW

Electrical connections

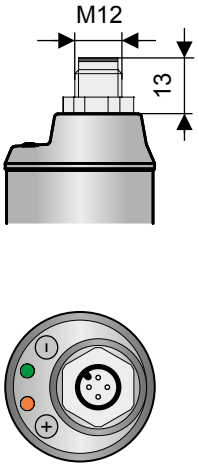
Version with short stainless steel cable gland



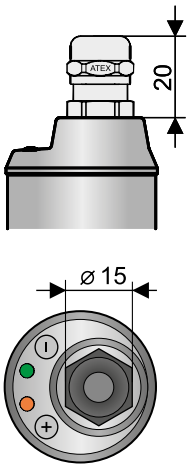
Version B with PVC cable gland



Version C with connector M12 x 1, 4-pin



Version D with dust-tight cable gland (ATEX)



Capacitance level switch CapFox® ENT 21

NEW

Ordering data

DG: H, PG: 4

		Price €
1 Capacitance level switch		
56560	CapFox® ENT 21	
2 Probe type / probe length / application		
05	Compact probe rigid with PPS partial insulation, ENT 21 MK, 50 mm, for non-conductive media	
10	Compact probe rigid with PPS partial insulation, ENT 21 MK, 100 mm, for non-conductive media	
20	Mono probe rigid with FEP partial insulation, ENT 21 MS, 100–2,000 mm, for non-conductive media	
21	Mono probe rigid with FEP insulation ENT 21 MS, 100–2,000 mm, for conductive media and food	
22	Mono probe rigid with PFA insulation, ENT 21 MS, 100–2,000 mm, for conductive, corrosive media	
60	Mono probe flexible, with weight Ø 22 mm, ENT 21 MF, 1,000–6,000 mm, for bulk solids	
3 Temperature range		
ST	Standard for max. flange temperature tp 85 °C (EX version 75 °C)	**0.00**
HT	High temperature version for max. flange temperature t_p 300 °C	
4 Probe length (L)	**Extra charge for each 100 mm probe length for lengths > 1,000 mm**	
2000	Length in mm e.g. 2,000 mm	
	Rigid mono probe, partially insulated for ENT 21 MS	
	Rigid mono probe with FEP insulation for ENT 21 MS – 21	
	Rigid mono probe with PFA insulation for ENT 21 MS – 22	
	Flexible mono probe without insulation for ENT 21 MF	
5 Process connection		
1	G1B	
2	G¾B	**0.00**
3	¾ NPT	
4	Tri-Clamp DIN 32676, Ø 34 mm	
5	Tri-Clamp DIN 32676, Ø 50.5 mm	
6 Electrical connection	**Extra charge for cable lengths > 2 m, see accessories table**	
A	Short stainless steel cable gland	
B	Plastic cable gland M12 x 1.5	**0.00**
C	Connector M 12 x 1, 4-pin	
D	Dust-tight cable gland (ATEX)	
7 Output signal		
01	3-wire-PNP / DC 9–34 V	**0.00**
02	3-wire-NPN / DC 9–34 V	**0.00**
EX	EN 60947 (NAMUR) / DC 8 V (gas and dust EX) Ui = 12 V; Ii = 15 mA; Pi = 45 mW; Ci = 15 nF; Li = 10 µH	
MEX	EN 60947 (NAMUR) / DC 8 V (mining) Ui = 12 V; Ii = 15 mA; Pi = 45 mW; Ci = 15 nF; Li = 10 µH	

Ordering code example

56560	05	ST	1000	1	A	01

Accessories	DG	PG	Part no.	Price €
Magnetic pin MP-8	H	4	**56227**	
Extra charge per metre PVC cable, grey (3 x 0.5 mm²)	H	4	---	
Extra charge per metre PVC cable, blue (2 x 0.75 mm²)	H	4	---	

Blue part no. = in-stock items

Vibration level switch for liquids VibraFox GVG

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

5

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

Density of medium
0.7 kg/dm³ ... 2.5 kg/dm³

Dynamic viscosity of the medium
0.1 ... 10,000 mPa • s

Flow rate
Max. 6 m/s (at a viscosity of 10,000 mPa • s)

Operating temperature range
Medium: -40/+100 °C
Medium HT version: -40/+150 °C
Ambient: -40/+70 °C

Process pressure
-1/+64 bar

Process connection
G¾A or G1A (PN 64)

Vibration fork
Stainless steel 316 L

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
Installation from top: 11 mm
Installation from bottom: 34 mm
(in water at 25 °C)

Switching hysteresis
Vertical installation:Approx. 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 316 L, cover PEI

Electrical connection
Connector and junction box as per ISO 4400 (DIN 43650-A) IP 65 or M12 x 1 (IP 67)

Approval for construction products
DIBt: Z-65.11-412

Options

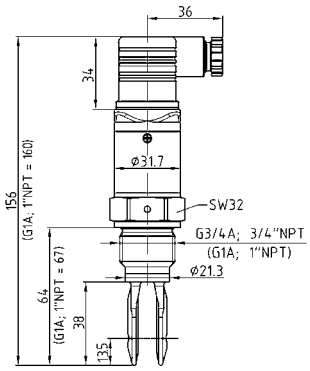
- Other process connections (e.g. NPT, Clamp, dairy fitting)
- Surface roughness Ra < 0.8 µm
- Other electrical connections
- Coupling relay (only for DC version)
- Extended operating temperature range -40/+150 °C (medium)

i
See page 330 for prices.

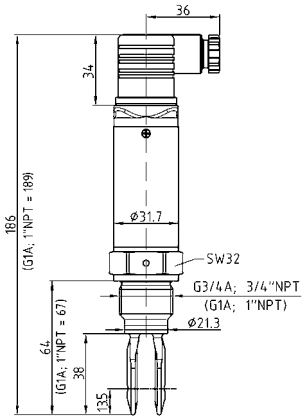
Vibration level switch for liquids VibraFox GVG

Electrical connections and dimensions (mm)

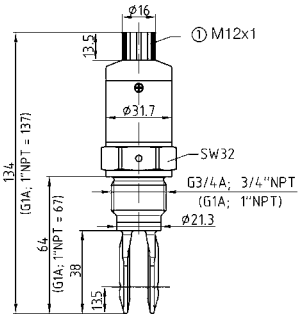
GVG 10/12
Standard version



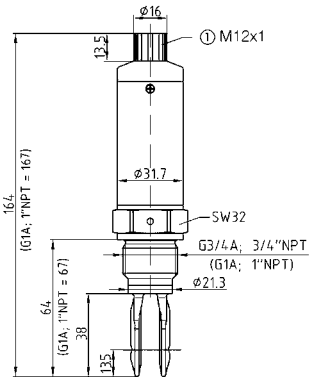
GVG 10 HT/12 HT
High temperature version



GVG 11
Standard version

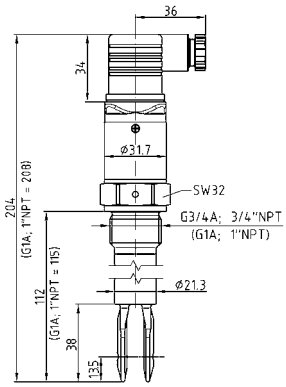


GVG 11 HT
High temperature version

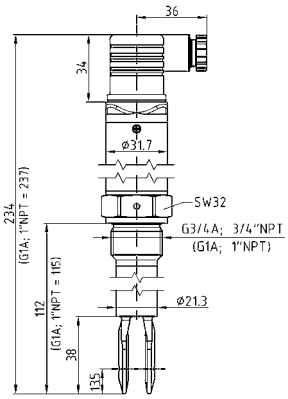


① Protective cover thread

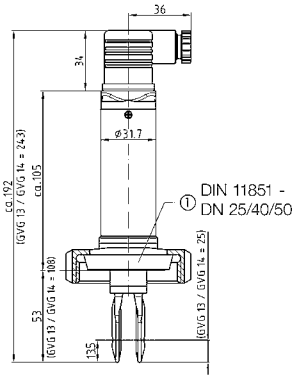
GVG 13/14
Standard version



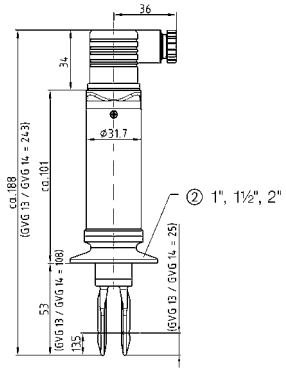
GVG 13 HT/14 HT
High temperature version



GVG 10 MR/GVG 12 MR
Dairy fitting

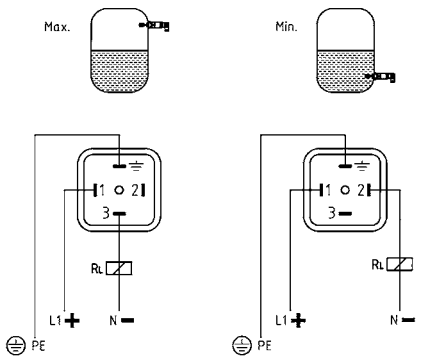


GVG 10 CP/GVG 12 CP
Tri-Clamp

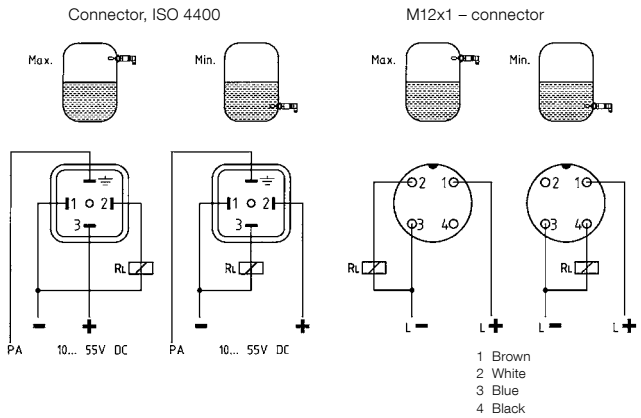


① Screwed pipe connection
② Tri-Clamp

Wiring diagram non-contact switch AC/DC

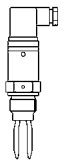
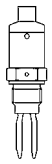
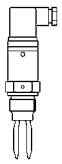
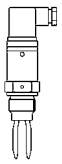
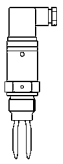


Wiring diagram transistor output (PNP) DC



Vibration level switch for liquids VibraFox GVG

DG: H, PG: 4

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
Installation length	64 mm	64 mm	64 mm	112 mm	112 mm
Process connection	G1A	G1A	G1A	G1A	G1A
Price €					
Part no.	**56165**	**56167**	**56169**	56171	56173
Installation length	67 mm	67 mm	67 mm	115 mm	115 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)	M12 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	**Without extra charge**	**Without extra charge**	**Without extra charge**	**Without extra charge**	**Without extra charge**
1" NPT					
Tri-Clamp 1", PN 16, Ra ≤ 0.8 µm, -40/+150 °C**					
Tri-Clamp 1½", 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 G¾ male.
** Extra charges already include extended operating temperature range -40/+150 °C.

Blue part no. = in-stock items

CATALOGUE DOMESTIC TECHNOLOGY

Level indicators and level controllers for domestic technology

TankControl 10

- Hydrostatic level indicator for fuel oil, diesel fuel, biodiesel and water
- Indication in litres, %, m^3 and mm liquid level
- Graphical indication of consumption and remaining range
- Visual and audible alarms, test and Acknowledge buttons and 2 relays
- High measuring accuracy due to electronic sensor

Nominal sizes
0/400 mbar

Measuring accuracy
±1.5 % FS

Page 14

Level controller RG 210

- Compact control unit for fuel oil, diesel fuel, emulsions, water and non-corrosive media
- Universal application due to selectable function: level switch (1 probe), level control for filling (2 probes) or level control for emptying (2 probes)

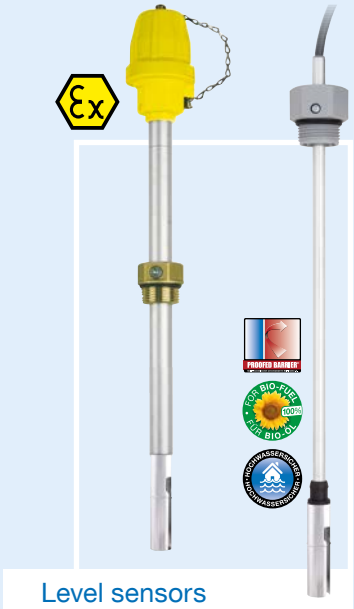
Page 43

i This and many other products can be found in the catalogue DOMESTIC TECHNOLOGY.

Overfill prevention system UFS 01 (WHG)

- 2 relay outputs for additional alarm equipment, EMS, etc.
- Fail-safe, self-monitoring system to avoid overfilling
- Suitable for a wide range of water-polluting liquids.

Page 39



Level sensors

From page 23

- For a wide array of media
- Versions with metallised sleeve: Permanent operation even with biofuel/biodiesel
- Versions for indoor and outdoor tanks
- Special versions for hazardous areas/potentially explosive atmospheres (zone 0)

Alarm units for oil, petrol and grease separators

Gas alarm units and systems

Probes for separator alarm units

CHAPTER 6

WATCHDOG-LINE alarm units and gas alarm systems

OVERVIEW

WATCHDOG-LINE alarm units at a glance 334

ALARM UNITS FOR OIL/PETROL/GREASE SEPARATORS

Alarm units (layer thickness/overflow alarm) WGA 01, WGA 02, WGA 03 336/338

Alarm unit (layer thickness/overflow/sand - sludge alarm) WGA 01 D 337

Alarm units (sand/layer thickness alarm) WGA 04, WGA 05 339

Alarm unit (oil-on-water alarm/overflow alarm) WGA 06 340

ALARM UNITS FOR GAS MONITORING

Gas alarm unit GW-S 2.1/GW-S 4.1 in wall mounting housing 341

Gas alarm system in DIN rail housing GW-SK 6.1 342

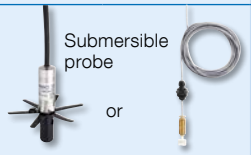
Gas sensors GS 400 ST, GS 500 ST, GS 600 ST, GS 700 ST and GS 800 ST 343

Gas measuring system MF420-Ex-2.1 with ATEX approval (zones 1 and 2) 345

ACCESSORIES

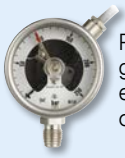
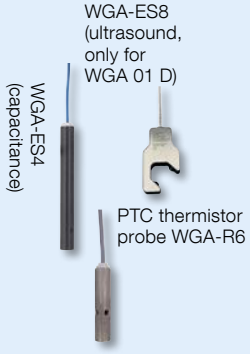
Test gas bag PGT, sampling unit MiniFlo 346

WATCHDOG-LINE alarm units at a glance

Alarm unit	Probe	Media	Application	Catalogue page
 **Water alarm unit WWG** enocean	Wall mounting rail probe **WSS**  or Floor water probe **BWS 10-1**	▪ Water ▪ Conductive water mixtures ▪ Electrically conductive liquids ▪ Emulsions	**Single-channel** Suitable for water, but also for electrically conductive liquids, emulsions and conductive water mixtures. **EnOcean®-ready**	Page 77
 **Oil/water alarm unit ÖWU** enocean	 Wall mounting rail combination probe	▪ Oil + water	**Single-channel** ÖWU distinguishes oil alarms and water alarms and indicates the appropriate alarm condition. **EnOcean®-ready**	Page 74
 **Oil/water alarm unit ÖWWG 3** enocean	 PTC thermistor probe	▪ Electrically conductive and non-conductive liquids	**Single-channel** ÖWWG 3 generates alarms in the event of accumulations of liquids caused by tank leaks, backflow, flooding, etc. **EnOcean®-ready** **Approval for construction products:** DIBt: Z-65.40-339	Page 71
 **Oil-on-water detector ÖAWD ÖAWD-8**	 Floating probe SWS	▪ Oil on water	**Single-channel** ÖAWD monitors standing water and calmly flowing bodies of water / water surfaces for pollution by oil.	Page 75
 **Oil/water alarm unit OM 5***	 Photoelectric probe	▪ Oil ▪ Water	**5 channels** For collection facilities below oil consuming equipment, pipe and cable ducts, pumps and control stations and tanks. **Certificate:** DIBt: Z-65.40-214	Page 73
 **Digital tank contents indicator DTA 10/ DTA 20 E** enocean	 Pneumatic measuring line	▪ Fuel oil ▪ Diesel fuel ▪ Water ▪ Non-corrosive media (density 0.5 to 1.5 g/cm³)	**Single-channel** For manual level measurement and signalling of a minimum level during measurements – battery-operated. **DTA 20 E EnOcean® inside**	Page 12 and Page 100
 **Level indicator TankControl 10**	 Submersible probe or Magnetic float switch	▪ Fuel oil EL, L ▪ Diesel fuel ▪ Biodiesel ▪ Water	**Single-channel/dual-channel** For continuous level measurement and alarms in the event of minimum or maximum levels, level differences, backwater and level control.	Page 14
 **Level switches Minimelder / Maximelder** enocean	 Magnetic float switch	▪ Water ▪ Fuel oil EL, L, M ▪ Oil/water mixtures ▪ Neutral liquids	**Single-channel** Suitable to signal minimum or maximum levels in tanks containing liquids. **EnOcean®-ready**	Page 19

* Use as leak detection system class III as per EN 13160-1/-4

6

Alarm unit	Probe	Media	Application	Catalogue page
 **Backup controller RENA**	 Level probe	▪ Rainwater	**Single-channel** Controls backup supply of mains water if the rainwater level is low.	Page 309
 **Water valve WaterControl 01.1**  enocean	 **WaterSensor con** **Water Sensor BWS**   **WaterSensor eco** Battery-less	▪ Water ▪ Rainwater	**Multi-channel** For manually or remotely controlled closing and opening of a water pipe in the case of a leak. Teach-in of up to 40 sensors. **EnOcean®-inside**	Page 98
 **Overfill prevention system UFS 01 according to WHG**	 Level probe Type 76 A	▪ Water-polluting liquids (flash point > 55 °C)	**Single-channel** Signals when the maximum level in stationary tanks is reached. **Certificate:** DIBt: Z-65.11-193	Page 39
 **Leak detector LAG as per German WHG and BetrSichV**	 Leak detection fluid container with probe	▪ Water-polluting liquids	**Single-channel** Leak detector for double-walled tanks with liquid in the interstitial space. **Approval:** CE marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13160-1,-3 and ÜHP	Page 49
 **Gas detector GM 2.1**	 Gas sensor GS 4.1	▪ Explosive gases ▪ Vapours	**Dual-channel** Suitable for monitoring rooms, buildings and public facilities.	Page 81
 **Alarm unit for low gas level**	 Pressure gauges with electrical contacts	▪ Gases	**Single-channel** Alarm unit for low gas level for monitoring the pressure in gas-filled containers.	Page 117
Alarm units WGA for separators 	 WGA-ES8 (ultrasound, only for WGA 01 D) WGA-ES4 (capacitance) PTC thermistor probe WGA-R6	▪ Oil ▪ Petrol ▪ Grease ▪ (Sludge, sand)	**Devices with 1 channel / 2 channels / 3 channels** Monitor, for example, the layer thickness and the maximum level of separated liquid in oil, petrol and grease separators.	Page 336

Alarm unit for separators WGA 01

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

1 Oil
2 Water

6

Application

Oil and petrol pose a great hazard 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 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 01 consists of a control unit, a capacitance probe (WGA-ES4) for monitoring the thickness of the oil or petrol 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 line interruptions.

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
Maximum 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 Ga] IIB

Scope of delivery
Control unit, probe WGA-ES4
Cable extension fitting, mounting accessories

Options

Probe WGA-R6

i Enquire for other probe cable lengths.

DG: H, PG: 4	Part no.	Price €
WGA 01 incl. probe WGA-ES4 (layer thickness)	53410	
Additional probe WGA-R6 (overflow)	53419	
Spare probe WGA-ES4	53418	

Blue part no. = in-stock items

Alarm unit for separators WGA 01 D

- For oil and petrol separators
- Up to 3 probes for layer thickness alarm, overflow alarm, sand - sludge alarm
- With LC display

1 Oil
2 Water
3 Sand/sludge

Application

Oil and petrol pose a great hazard to groundwater and waste water. WGA 01 D 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 avoids overfilling that may be caused by clogged outlets or other circumstances. The unit keeps harmful substances from reaching the sewage water system. It is also possible to signal impermissible sand or sludge accumulations.

Description

WGA 01 D consists of a control unit with LC display and a capacitance probe (WGA-ES4) to monitor the layer thickness of oil or petrol layers. The PTC thermistor probe WGA-R6 for monitoring the maximum level (overflow alarm) and/or the ultrasonic sludge probe WGA-ES8 for monitoring impermissible sand or sludge layer can also be connected. 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, petrol or grease 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 line interruptions. The device automatically detects the connected probes during commissioning.

Technical specifications

Operating temperature range
Medium: 0/40 °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

Probe WGA-ES8 (option)
Function principle: ultrasound
H x W x D: 85 x 160 x 32 mm
Cable length 5 m

Connection probe – control unit
Maximum 200 m

Supply voltage
AC 230 V

Power input
Approx. 4 VA

Switching outputs
Relay contacts: 2 x voltage-free changeover contacts
Contact rating: AC 250 V/5 A/ 100 VA

Visual indication
LC display, 3 lines

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 GA] II A

Scope of delivery
Control unit, probe WGA-ES4

Options
Probe WGA-R6
Probe WGA-ES8

DG: H, PG: 4	Part no.	Price €
WGA 01 D incl. probe WGA-ES4 (layer thickness)	**53409**	
WGA 01 D without probe	**53409A**	
Additional probe WGA-R6 (overflow)	**53419**	
Spare probe WGA-ES4	**53418**	
Additional probe WGA-ES8 (Sand - sludge)	53399	

Blue part no. = in-stock items

Alarm unit for separators WGA 02/WGA 03

- For oil, petrol and grease separators
- Layer thickness/overflow alarm
- With ATEX approval for zone 0

1 Oil
2 Water

6

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 03) 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 03 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 line interruptions.

Technical specifications

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

Probe WGA-SD 03 (layer thickness)
Function principle: conductivity
Length 216 mm, Ø 25 mm
Cable length 5 m, PVC, oil-resistant

Connection probe – control unit
Maximum 300 m

Supply voltage
AC 230 V

Power input
Approx. 2 VA

Switching outputs
Relay contacts: 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 LEDs alarm
1 red LEDs 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] IIC
Probe WGA-SD 03: Ex II 1 G Ex ia IIA T5 Ga

Scope of delivery
Control unit, probe WGA-SD 03, terminal 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 IIA T5 Ga

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

DG: H, PG: 4	Part no.	Price €
WGA 02 incl. probe WGA-SD 03	53540	
WGA 03 incl. probes WGA-SD, WGA-AS	53541	
Spare probe WGA-SD 03	53542	
Spare probe WGA-AS	53415	

Blue part no. = in-stock items

Alarm unit for separators WGA 04/WGA 05

- For oil, petrol and grease separators
- Sand - sludge alarm/layer thickness alarm
- With ATEX approval for zone 0

1 Oil
2 Water
3 Sand/sludge

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.

6

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 03) for monitoring the layer of oil, petrol or grease. The WGA-SD 03 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 line interruptions.

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, depth 21 mm
Cable length 5 m, PVC, oil-resistant

Connection probe – control unit
Maximum 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 LEDs alarm
1 red LEDs 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, terminal box, mounting material

Additional specifications WGA 05

Probe WGA-SD (layer thickness)
Function principle: conductivity
Length 216 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 03: Ex II 1 G Ex ia IIA T5 Ga

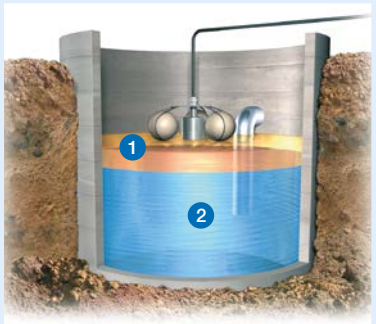
Scope of delivery
Like WGA 04, but with additional probe WGA-SD 03

DG: H, PG: 4	Part no.	Price €
WGA 04 incl. probe WGA-SN 01	53412	
WGA 05 incl. probes WGA-SN 01, WGA-SD 03	53543	
Spare probe WGA-SN 01	53416A	
Spare probe WGA-SD 03	**53542**	

Blue part no. = in-stock items

Alarm unit for separators WGA 06

- For oil, petrol and grease separators
- Oil-on-water alarm/overflow alarm
- With ATEX approval for zone 0



1 Oil
2 Water

6

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 line interruptions.

Technical specifications

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

Floating probe WGA-ÖW (oil-on-water)
Function principle: capacitance
3 PVC floating 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
Up to 300 m (depends on line resistance)

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 1G Ex ia IIA T5 Ga
WGA-AS: Ex II 1 G Ex ia IIA T5 Ga

Scope of delivery
Control unit: without probes
Probe: with terminal box, without mounting material

DG: H, PG: 4	Part no.	Price €
WGA 06 without probes	53414	
Floating probe WGA-ÖW (oil-on-water)	53417	
Probe WGA-AS (overflow)	53415	
Terminal box 1 x input/1 x output	53403A	
Terminal box 2 x input/1 x output	53403B	

Blue part no. = in-stock items

Gas alarm units GW-S 2.1 / GW-S 4.1 in wall mounting housing

- **For connection of 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 outage**
- **Data logger (data logger)**

Application

For continuous monitoring for flammable 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 up to four 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 tests of the relays, parameterisation (such as alarm group settings, limit values)

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 outage) and signals faults via LED and error relay. In addition, the display shows an "E". The alarm function can be tested without test gas.
Version GW-S 2.1 for connection of up to two gas sensors.
Version GW-S 4.1 for connection of up to four gas sensors.

Technical specifications

Sensor inputs
4–20 mA
GW-S 2.1: 2 gas sensors can be connected
GW-S 4.1: 4 gas sensors can be connected
Digital interface: RS 232 for configuration

Alarm thresholds
Max. 2, adjustable, memory mode or volatile mode

Switching outputs
4 voltage-free relay contacts AC 250 V, 1A

Controls
Keypad for alarm and horn reset, edit, menu selection, confirmation

Indication
Digital display for: concentration value, menu
LEDs for:
- Alarm and error 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: 240 x 120 x 190 mm
Weight: 1.3 kg
Degree of protection IP 54 (EN 60529)

Connectable sensors
Series 400, 500, 600, 700 and 800

Option
- Data logger

i
Suitable gas sensors (series 400–800) see pages 343–344.

DG: H, PG: 4	Part no.	Price €
GW-S 2.1	**61146**	
GW-S 4.1	**61145**	
Version with data logger		**On request**

Blue part no. = in-stock items

Gas alarm system GW-SK 6.1 in DIN rail housing

- **For connection of 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 outage**
- **Data logger (data logger)**

Application

For continuous monitoring for flammable 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-SK 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 tests of the relays, parameterisation (such as alarm group settings, limit values)

GW-SK 6.1 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 6.1 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 6.1 is self-monitoring (line interruption, short circuit and power outage) and signals errors via LED and error 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
RS 232 interface for configuration

Alarm thresholds
Max. 4, adjustable, memory or volatile mode

Switching outputs
6 voltage-free relay contacts

Controls
Keypad for alarm and horn reset, edit, menu selection, Enter

Indication
Digital display for concentration values, menu
LEDs for:
- Alarm and error for each measuring point
- Operational, horn and indicated measuring point

Supply voltage: 24 V DC, ± 5 %

Power input: 24 V max. 30 W,
Without measuring system approx. 3 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 71 x 90 mm
Weight: 650 g
Degree of Protection IP 20 (EN 60529)

Option
Serial interface, data logger, emergency power system

DG: H; PG: 4	Part no.	Price €
GW-SK 6.1	**61163**	
Options		
Power supply unit NTE 24 SK for AC 230 V operation	**69114**	
Emergency power supply NSV, 24 V operation	69115	
Data logger		**On request**

Blue part no. = in-stock items

Suitable gas sensors (series 400–800) see pages 343–344.

Gas sensors for GW-S 2.1/GW-S 4.1/GW-SK 6.1

Description

For the detection of flammable, 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, supply and return conductor (max. 100 Ohm line resistance).

Technical specifications

GS 400 ST

Measuring range
0/50 % LEL

Measuring principle
Semiconductor (HL)
(service life approx. 5 years)

Supply voltage
24 V DC, ± 5 %

Ambient temperature
-10/+50 °C

Humidity
40/50 % rH

Housing

W x H x D:	90 x 85 x 65 mm
Weight:	Approx. 0.5 kg
Degree of protection:	IP 54 (EN 60529)

Output
4–20 mA

GS 500 ST

Measuring range
0/100 % LEL

Measuring principle
Heat tone (WT)
(service life approx. 3 years)

Supply voltage
24 V DC, ± 5 %

Ambient temperature:
-20/+50 °C

Humidity
15/95 % rH

Atmospheric pressure
900/1100 hPa

Housing

W x H x D:	90 x 85 x 65 mm
Weight:	Approx. 0.5 kg
Degree of protection:	IP 54 (EN 60529)

Output: 4–20 mA

Option: RS 232 interface

DG: H, PG: 4			Part no.	**Price €**
Gas sensor GS 400 ST (HL) R134a	1	1	69148	
Gas sensor GS 500 ST (WT) methane	1	1	69109	
Gas sensor GS 500 ST (WT) propane	1	1	69120	
Gas sensor GS 500 ST (WT) butane	1	1	69124	
Gas sensor GS 500 ST (WT) LPG	1	1	69130	
Gas sensor GS 500 ST (WT) H_2	1	1	69137	
Gas sensor GS 500 ST (WT) ethanol	1	1	69138	
Gas sensor GS 500 ST (WT) n-heptane	1	1	69139	

Blue part no. = in-stock items

Gas sensors for GW-S 2.1/GW-S 4.1/GW-SK 6.1



Description For monitoring the oxygen concentration and toxic gases. Can also be used in dusty and dirty environments. For connection to the gas alarm units GW-S 2.1/GW-S 4.1/GW-SK 6.1. Aluminium version for wall mounting housing. Connection cable (shielded) 3 x 1.5 mm² Cu+ protective conductor, supply and return conductor (max. 100 Ohm line resistance).

6

	GS 600 ST	GS 700 ST	GS 800 ST
Technical specifications	**Measuring ranges** 0/25 % O_2 by volume **Measuring principle** Electro-chemical (EC), service life 1–2 years **Supply voltage** 24 V DC, ± 5 % **Ambient temperature** -20/50 °C **Humidity** 15/95 % rH **Atmospheric pressure** 900/1100 hPa **Housing** W x H x D: 90 x 85 x 65 mm Weight: Approx. 0.5 kg Degree of protection: IP 54 (EN 60529) **Output** 4–20 mA	**Measuring ranges** GS 700 ST-CO_2: 0/5 % by volume **Measuring principle** Infrared (IR) **Supply voltage** 24 V DC, ± 5 % **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. 0.5 kg Degree of protection: IP 54 (EN 60529) **Output** 4–20 mA	**Measuring ranges** 0.1/25 % O_2 by volume **Measuring principle** Zirconium dioxide (Zr) **Supply voltage** 24 V DC, ± 5 % **Ambient temperature** -20/+60 °C **Humidity** Max. 95 % rH **Atmospheric pressure:** 800/1100 hPa **Housing** W x H x D: 90 x 85 x 65 mm Weight: Approx. 0.6 kg Degree of protection: IP 54 (EN 60529) **Output** 4–20 mA
Options	RS 232 interface	RS 232 interface	RS 232 interface

PG: 4	DG			Part no.	**Price €**
Gas sensor GS 600 ST (EC) CO (0–300 ppm)	H	1	-	61180	
Gas sensor GS 600 ST (EC) O_2 (0.1–25 % by volume)	H	1	-	61179	
Gas sensor GS 600 ST (EC) H_2S (0–50/100 ppm)	H	1	-	61121	
Gas sensor GS 600 ST (EC) NH_3 (0–100 ppm)	H	1	-	61122	
Gas sensor GS 600 ST (EC) NO_2 (0–50 ppm)	H	1	-	61123	
Gas sensor GS 600 ST (EC) Cl_2 (0–10 ppm)	H	1	-	61124	
Gas sensor GS 600 ST (EC) SO_2 (0–100 ppm)	H	1	-	61126	
Gas sensor GS 700 ST (IR) CO_2 (0–5 % by volume)	H	1	-	69112	
Gas sensor GS 800 ST (Zr) O_2	H	1	-	69113	
Adjustment adjustment/programming costs for the alarm thresholds for standard gases (methane, propane/butane, O_2, CO, CO_2, hydrogen) per sensor	-	1	-	61177	
Adjustment adjustment/programming costs for the alarm thresholds for special gases per sensor	-	1	-	61183	

Blue part no. = in-stock items

Gas measuring system MF420-Ex-2.1 with ATEX approval for zones 1 and 2

- For monitoring of combustible gases and vapours or carbon monoxide
- On site calibration by one person (without opening the housing), indication of measured value and system info
- Measuring principle: Heat tone principle (WT) or electro-chemical principle (EC)
- Suitable for control units GW-S 2.1, GW-S4.1 and GW-SK 6.1

A  Page 341

A  Page 342

Application

For the detection and monitoring of flammable, explosive, toxic gases or oxygen. Can also be used in dusty and dirty environments. Can be used as standalone measuring system or in conjunction with the gas alarm systems GW-S 2.1, GW-S4.1 and GW-SK 6.1 as a complete gas alarm facility for hazardous areas. Approved for operation in potentially explosive atmospheres/EX areas zone 1 and zone 2.

Description

Gas sensor with digital display in compact wall mounting housing. Diverse gases can be monitored (see ordering table). Connection cable (shielded) 3 x 1.5 mm² Cu+ protective conductor, supply and return conductor (max. 100 Ohm line resistance). Thanks to the local display, it is possible to immediately read current measured values, perform calibration and set limit values. The concentration is output via the 4–20 mA interface for further processing.

Technical specifications

Measuring range
Version WT: 0/100 % LEL
Version EC: 0/300 ppm

Measuring principle
Version WT: Heat tone, catalytic sensor (pellistor)
Version EC: Electro-chemical sensor
(Service life approx. 3 years)

Supply voltage
DC 18–30 V

Current input
Approx. 105 mA at 24 V

Operating temperature range
Ambient: -40/+60 °C, temperature class T4
-40/+50 °C, temperature class T6

Humidity
10/95 % r. H. non-condensing

Atmospheric pressure
700/1300 hPa

Housing
Wall mounting housing made of aluminium alloy/stainless steel
Ø x H: 84 x 78 mm
Weight: 1.1 kg
Degree of protection: IP 65 (EN 60529)

Output signal
4–20 mA

ATEX approvals
Ex II 2G Ex de IIC T6/T4 Gb

Options
- RS 232 interface at control unit

PG: 4	DG			Part no.	Price €
Gas measuring system MF420-Ex-2.1-CH_4 (P) methane	H	1	1	69111	
Gas measuring system MF420-Ex-2.1-C_3H_8 (WT) propane	H	1	1	69004	
Gas measuring system MF420-Ex-2.1-C_4H_{10} (WT) n-butane	H	1	1	69007	
Gas measuring system MF420-Ex-2.1-C_3H_8 / C_4H_{10} (WT) LPG Liquefied Petroleum Gas	H	1	1	69009	
Gas measuring system MF420-Ex-2.1-H_2 (WT) hydrogen	H	1	1	69010	
Gas measuring system MF420-Ex-2.1-C_7H_{16} (WT) n-heptane	H	1	1	69013	
Gas gas measuring system system MF420-Ex-2.1-C_9H_{10} (WT) xylene	H	1	1	69014	
Gas measuring system MF420-Ex-2.1-C_2H_6O (WT) ethanol	H	1	1	69034	
Gas measuring system MF420-Ex-2.1-C_3H_8O (WT) i-propanol	H	1	1	69035	
Gas measuring system MF420-Ex-2.1-C_2H_2 (WT) acetylene	H	1	1	69036	
Gas measuring system MF420-Ex-2.1-CO (EC) carbon monoxide	H	1	1	69037	
Adjustment (adjustment/programming costs alarm thresholds and alarm relays)					
For standard gases (methane, propane/butane, O_2, CO, CO_2, hydrogen) per sensor	-	1	1	61177	
For special gases per sensor	-	1	1	61183	

Blue part no. = in-stock items

Accessories for gas alarm units/gas sensors

Test gas bag PGT 10

Application For checking and servicing gas alarm systems during function tests and system checks.

Description Nylon bag case with test gas cap and sampling unit MiniFlo (valve, flow meter with stainless steel float for gas flow regulation from 0.5–1.5 l/min and test gas hose). Can accommodate 1 to 3 test gas cylinders.

Calibration gas not included in scope of delivery; please order separately.

Test gas bag PGT 10

Sampling unit MiniFlo

Application For checking and servicing gas alarm systems during function tests and system checks.

Description Completely pre-assembled sampling unit consisting of brass valve, Perspex flow meter with stainless steel float for gas flow regulation from 0.5–1.5 l/min and test gas hose.

MiniFlo

6

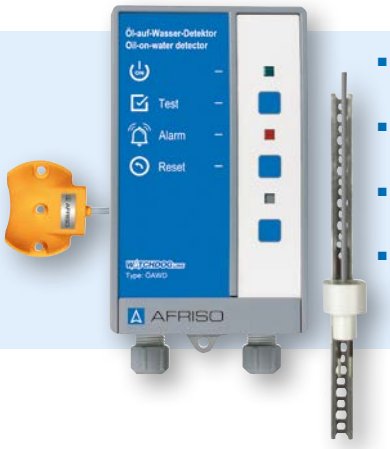
PG: 4	PG	DG			Part no.	**Price €**
Test gas bag PGT 10, incl. sampling unit MiniFlo (without test gas cylinders)	4	-	1	-	500542	
Sampling unit MiniFlo	3	-	1	-	**69050**	
Calibration gas methane 20 % LEL, non-recyclable cylinder containing 12 l	2	-	1	-	69060	
Calibration gas methane 40 % LEL, non-recyclable cylinder containing 12 l	2	-	1	-	69061	
Calibration gas propane 20 % LEL, non-recyclable cylinder containing 12 l	2	-	1	-	69062	
Calibration gas propane 40 % LEL, non-recyclable cylinder containing 12 l	2	-	1	-	69063	
Calibration gas carbon monoxide (300 ppm), non-recyclable cylinder containing 12 l	2	-	1	-	69064	
Synthetic air for zero point calibration, non-recyclable cylinder containing 12 l	2	-	1	-	69065	

Enquire for other calibration gases and concentrations.

Blue part no. = in-stock items

i Upon request, we design and build complete gas alarm systems for you and service them at regular intervals.

WATCHDOG-LINE alarm units



- **Audible and visual alarms for maximum safety**
- **Additional signalling devices (ZAG 01, horn, warning light) can be connected**
- **Ready-to-connect device for easy installation and commissioning**
- **High reliability and long service life**

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Typical application areas

- Collection facilities 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
- Drinking water installations
- 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 hazard areas
- Oil, petrol and grease separators
- Protective pipes and pipelines

Detectable media

- Water, waste water, groundwater
- Heating circuit water
- Cooling water
- Rainwater
- Fuel oil EL, L, M
- Diesel fuels or low-viscosity lubricating oils class A III
- Motor oils, gearbox oils and hydraulic oils
- Vegetable oils and transformer oils
- Beverages
- Antifreeze agents and fertilisers
- Emulsions
- Sludge, sand
- Oil, petrol and grease layers
- Conductive water mixtures and liquids
- Gases, vapours, smoke
- Many other liquids with a flash point of > 55 °C

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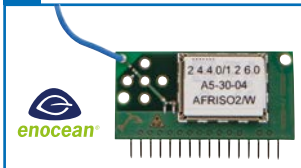

Pluggable EnOcean® wireless module TCM 320 for WATCHDOG-LINE PCBs, can be ordered separately for EnOcean-ready products.

Emission measurement

Oxygen analysers

Gas treatment systems and gas coolers

Stationary gas analysis

CHAPTER 7

Stationary gas analysers

STATIONARY GAS ANALYSIS

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FILTERS/GAS TREATMENT

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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

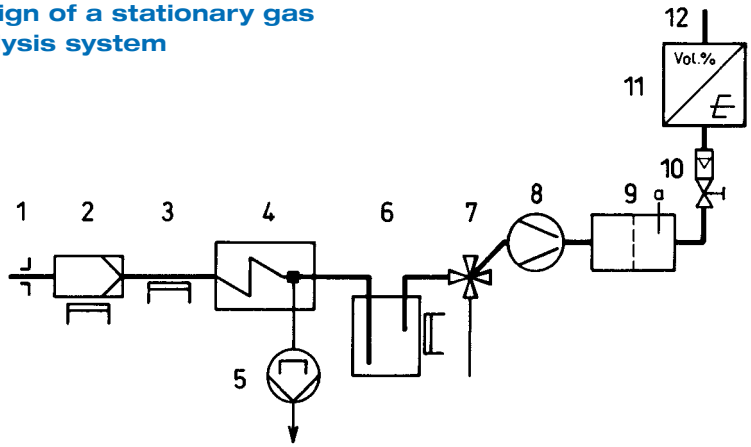
The selectivity of the component to be measured is a key factor in finding a suitable measuring system. Selectivity refers to the specific technical detectability of a certain component in the gas to be measured without it being influenced by other gases.

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 process 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, O2 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.

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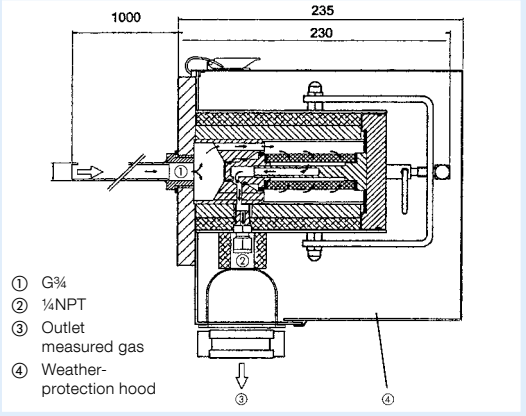
Custom-built systems to your specifications – please enquire.

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/measuring task**

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, a temperature controller or safety temperature cut out is 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
Medium: Max. 1,300 °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
Swagelok pipe connector Ø 6 x 1 mm

Supply voltage
AC 110–240 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 316 Ti, FPM, 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-H/W)

Degree of protection
SP 210-H: IP 54 (EN 60529)
SP 210-H/W: IP 55 (EN 60529)

PG: 4			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				
Steel sampling pipe SP 210 stainless steel Length 1 m (max. 600 °C)	1	1	68940	
Sampling pipe SP 210 titanium Length 1 m, for corrosive gases (max. 400 °C)	1	1	68941	
Sampling pipe SP 210 Kanthal (max. 1300 °C)	1	1	68942	
Pre-filter VFS-2 for dust admission 2–16 g/m³	1	1	68945	**On request**
Pre-filter VFS-10 for dust admission >10 g/m³	1	1	68946	**On request**
Filter element F-2K ceramic 2 µm	1	1	68950	

Blue part no. = in-stock items

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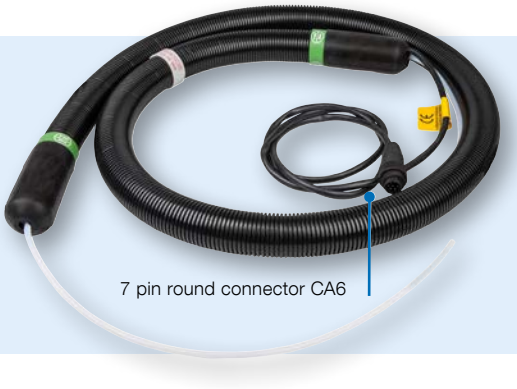
Please enquire for other gas sampling probes and heated gas sampling lines.

Heated analysis and frost protection lines series HL



- **Reliable analysis due to heating up to max. 200 °C**
- **Excellent insulation, low energy consumption, low heat loss**
- **Robust, resistant, suitable for thermal load**
- **Ready-to-connect with wire ferrules**
- **Outer jacket with high chemical resistance and UV protection**

Application

Electrically heated gas lines are used in gas analysis systems to transport gas samples from the sampling point to the gas treatment system and to keep the temperature from falling below the dew point. A temperature controller maintains a constant temperature.

Self-controlling heated gas lines are used as frost protection lines in gas analysis systems. They do not require a separate controller.

Description

Electrically heated analysis lines are made to customer specifications in different versions. The analysis line consists of several layers. The outer material is a corrugated polyamide hose with a thermal insulation layer at the inside (thermal fleece). The inside of the analysis line consists of a PTFE hose to transport the gas to be measured, a heating cable and a metal jacket to protect against damage. The PTFE is replaceable and available in various diameters (DN 4 / DN 6). The heated analysis lines feature end pieces (silicone cap), a Pt 100 sensor (with the exception of the frost protection line) and a 2 m connection line with wire ferrules.

Technical specifications

Heating capacity, specific
Analysis line: 100 W/m at T = 10 °C
Frost protection line: 30 W/m at T = 10 °C

Sensor
Analysis line: Pt 100, 2-wire

Operating temperature
Analysis line: $T_{max.}$ 200 °C
Frost protection line: $T_{max.}$ 45 °C

Supply voltage
AC 230 V, 50 Hz

Electrical connection
Connection line 2 m with wire ferrule

Material
Carrier: PTFE
Jacket: PA 12

Dimensions
Carrier: Inside Ø 4 mm / outside Ø 6 mm (DN 4) or inside Ø 6 mm / outside Ø 8 mm (DN 6)
Jacket: Outside Ø approx. 43 mm

Accessories

- Wall bushing
- Insulation sleeves
- Plug
- Temperature controller with solid state relay

Heated analysis and frost protection lines series HL

PG: 4	Part no.	**Base price €**	Part no.	**Price per metre €**
Analysis line HL 4 heated, DN 4 with Pt 100 sensor, connection caps and connection cable	61500		61501	
Analysis line HL 6 heated, DN 6 with Pt 100 sensor, connection caps and connection cable	61502		61503	
Analysis line HLA 4 heated, DN 4 with Pt 100 sensor, connection caps, connection cable and replaceable inner line	61504		61505	
Analysis line HLA 6 heated, DN 6 with Pt 100 sensor, connection caps, connection cable and replaceable inner line	61506		61507	
Analysis line HLE 4 heated, DN 4 with Pt 100 sensor, connection caps and connection cable and stainless steel jacket	61510		61511	
Analysis line HLE 6 heated, DN 6 with Pt 100 sensor, connection caps and connection cable and stainless steel jacket	61512		61513	
Analysis line HLAE 4 heated, DN 4 with replaceable inner line with Pt 100 sensor, connection caps, connection cable, replaceable inner line and stainless steel jacket	61514		61515	
Analysis line HLAE 6 heated, DN 6 with replaceable inner line with Pt 100 sensor, connection caps, connection cable, replaceable inner line and stainless steel jacket	61516		61517	
Heated frost protection line HLFR 4, DN 4, self-controlling, can be shortened at any interval (1 m)	61520		61521	
Heated frost protection line HLFR 6, DN 6, self-controlling, can be shortened at any interval (1 m)	61522		61523	
Accessories				
Insulating sleeve HL-M	61525		-	**-**

Please enquire for other heated analysis lines (e.g. EX versions, frost protection lines.

Blue part no. = in-stock items

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Heated analysis line and frost protection line are delivered ready to be connected. Please order the base price plus the desired meter price with separate part number to allow the lines to be made to your exact requirements.

Temperature controller ZPR

- On-off controller
- Ideal for heated gas sampling lines and gas sampling probes
- Version for DIN rail mounting or front panel mounting
- With relay output or analogue output

Version for front panel mounting.

Application Electronic on-off controllers for monitoring and controlling electrically heated gas sampling lines or gas sampling probes.

Description The electronic on-off temperature controllers are available in the following versions:
- DIN rail mounting
- Front panel mounting

The series ZPR temperature controllers control and monitor the temperature in gas lines. They are optionally available with analogue output.

	ZPR DR100	ZPR 32	ZPR 16	ZPR 16A
Outputs	2 x relay 1 x logic (0/5V)	1 x relay 1 x logic (0/5V)	2 x relay 1 x logic (0/14V)	2 x relay 1 x logic (0/14V) 1 x analogue 4–20 mA
Supply voltage	AC 110–240 V	AC 110–240 V	AC 110–240 V	AC 110–240 V
Dimensions (W x H x D)	22.5 x 109 x 125 mm	48 x 24 x 100 mm	48 x 48 x 91 mm	48 x 48 x 91 mm
Weight	200 g	75 g	125 g	125 g
Mounting	DIN rail	Front plate	Front plate	Front plate

i Enquire for controllers in wall mounting housings.

PG: 4	Part no.	Price €
Temperature controller ZPR DR100	61530	
Temperature controller ZPR 32	61531	
Temperature controller ZPR 16	61532	
Temperature controller ZPR 16A with analogue output	61533	

Blue part no. = in-stock items

Universal filter AF-U

- **Optimum filtration of particulate matter**
- **With or without liquid alarm sensors**
- **Easy, fast wall mounting**
- **Bypass function**

Evaluation electronics ELT 680 for liquid alarm sensor.

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. The filter housing acts as a buffer space so that the liquid cannot immediately reach other components if condensate breaks through. The universal filter can be equipped with various filter inserts (ceramic, glass fibre, PTFE, stainless steel). These inserts are available with different filter fineness ratings to cover all possible applications.

The liquid alarm sensor detects and signals moisture, e.g. is the upstream gas dryer is defective. The liquid sensor uses the conductivity measurement principle.

Technical specifications Universal filters

Operating temperature range
Medium filter: max. 100 °C
Ambient control unit: -5/+55 °C

Gas connections
2 x G¼ female thread
Inlet: Side
Outlet: Side

Gas pressure
Max. 1 bar

Filter insert
Teflon (PTFE), glass fibres or ceramic

Filter surface
70 cm²

Condensate outlet
GL 25

Material
Filter head: PTFE
Filter body: Duran glass
Weight: Approx. 0.31 kg (filter)
Approx. 0.35 kg (electronics)

Technical specifications Evaluation electronics

Switching output
Relay contact: 1 voltage-free changeover contact

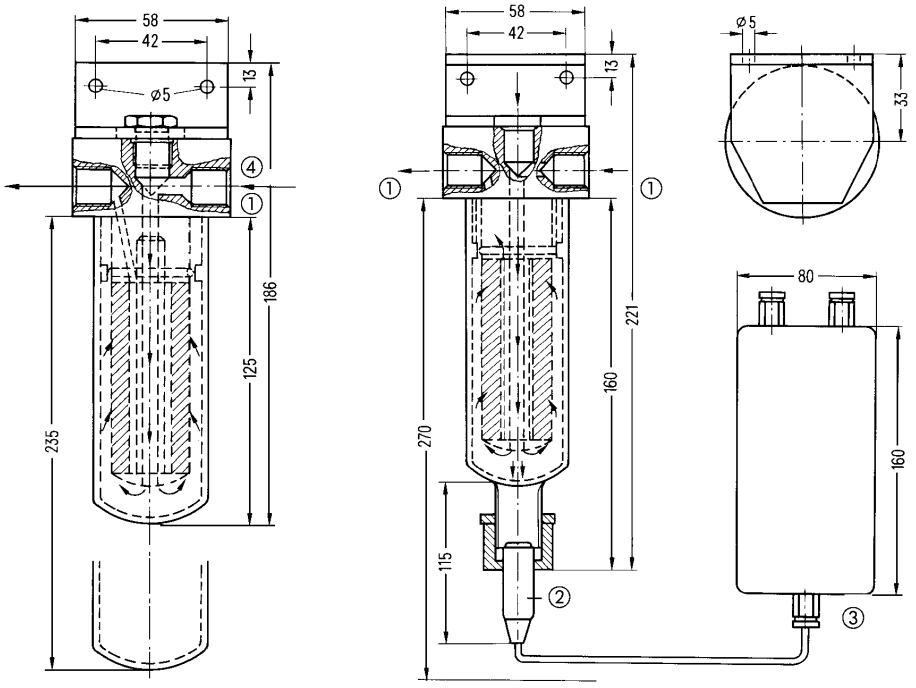
Contact rating
AC 250 V, 750 VA
DC 12 V, 1 A

Sensor cable length
1.5 m

Supply voltage
AC 230 V or AC 115 V

Power input
2 VA

Universal filter AF-U



① Gas connections
② Liquid alarm sensor
③ Control unit for liquid alarm sensor
④ Inlet

7

PG: 4	Part no.	**Price €**
Universal filter AF-U 75 with Teflon insert, filter fineness 2 µm	61605	
Universal filter AF-UK 75 with Teflon insert **and condensate drain,** filter fineness 2 µm	61610	
Accessories		
Liquid alarm sensor FAS with evaluation electronics	68965	
Filter insert FE-T 2-75 Teflon, filter fineness **2 µm**	61750	
Filter insert FE-T 20-75 Teflon, filter fineness **20 µm**	61751	
Filter insert FE-K 2-75 ceramic, filter fineness **2 µm**	61755	
Filter insert FE-K 20-75 ceramic, filter fineness **20 µm**	61756	
Filter insert FE-G 01-75 glass fibre, filter fineness **0.1 µm**	61745	
Screw connection VGL 25 with hose connection	68970	
Spare parts		
Filter head FK	61700	
Filter glass FG 75 for filter insert 75 mm	61710	
Filter glass FG-K 75 with condensate outlet for filter insert 75 mm	61720	

Please enquire for further filters (e.g. stainless steel filters or heated filters) and filter inserts.

Blue part no. = in-stock items

Water trap AF-W, acid filter AF-S

Water trap AF-W

Application

Additional protection of the analyser from condensate and aerosols.

Description

The water trap is installed directly upstream of the analyser in order to keep condensate and aerosols from entering the analyser.

Technical specifications

Operating temperature range
Medium: Max. 90 °C

Material
Filter element: PTFE
Housing: Polypropylene

Filter fineness
< 0.1 µm

Filter surface
20 cm²

Gas inlet/gas outlet
Compression fitting Ø 4 x 1 mm

Filling volume
Approx. 5 ml

Gas pressure
Max. 2 bar

Acid filter AF-S

For removing aerosols.

With the coalescing filter insert, the acid filter removes highly corrosive aerosols from the gas flow.

Operating temperature range
Ambient: -20/+140 °C
Medium: Max. 140 °C

Material
Filter insert: Glass fibre
Filter head: PTFE
Filter body: Duran glass

Gas inlet/gas outlet
G¼ female thread

Gas pressure
Max. 0.5 bar

Condensate outlet
GL 14 with hose connection Ø 4/6 mm (inner/outer)

Filter surface
70 cm²

PG: 4	Part no.	Price €
Water trap AF-W	61640	
Acid filter AF-S 75 with coalescing filter	61615	
Acid filter AF-S 150 with coalescing filter	61616	**On request**
Coalescing filter element	61651	

Blue part no. = in-stock items

Gas pump WISA
Condensate collector KS

Gas pump WISA

Benefits

- Reliable transport of the gas from the sampling point to the analyser
- Principle of operation: vibrating armature
- Adjustable pumping capacity

Application

The gas pump transports the gas from the sampling point to the analyser.

Description

The pump is a vibrating armature pump which transports the gas by means of a membrane and valves. The pumping capacity can be adjusted by means of a slide.

Technical specifications

Pumping capacity
5.5 l/min

Final vacuum
420 mbar abs.

Motor
Voltage: AC 230 V, 50 Hz
Nominal power: 8 VA

Gas inlet/gas outlet
Hose connection piece 8 mm

Dimensions
W x H x D: 194 x 100 x 102 mm

Weight
1.2 kg

Housing
aluminium

Condensate collector KS

- Highly corrosion-resistant
- Level alarm possible via floating probe

Used to buffer major amounts of condensate.

The 10 l condensate collector is used if automatic condensate removal is not possible or desired. It can be equipped with a float switch and the appropriate electronics.

Material
Plastic PE

Dimensions
H x Ø: 460 x 200 mm

Table of Contents
10 litres

Weight
500 g

Cover
Screw cap Ø 7 cm

Connections
Condensate: Compression fitting Ø 4 x 1 mm
Venting: Compression fitting Ø 4 x 1 mm

7

i Please enquire for other versions and high temperature version.

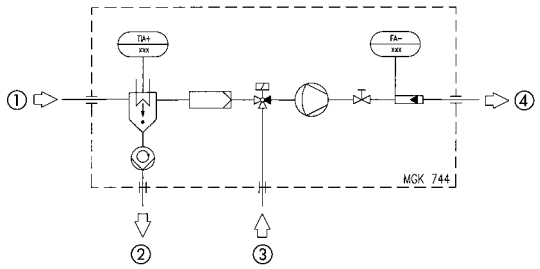
PG: 4	Part no.	Price €
Gas pump WISA	61800	
Condensate collector KS	61798	
Condensate collector KS-A with liquid level sensor	61799	

Blue part no. = in-stock items

Gas treatment system MGK 744

- **Compact design in ½ 19" housing**
- **Can be used as a portable or stationary gas treatment system**

Gas flow chart MGK 744



① Gas in
② Condensate out
③ Test gas in
④ Gas out

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 measurement results.

Description

Compact, portable and stationary gas treatment system in ½ 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 conditions
Dew point: Max. 40 °C
Gas temperature: Max. 80 °C at 50 l/h and 20 °C ambient temperature

Gas throughput and filtration
- 60 l/h at 200 mbar
- Fine particulate filter with glass fibre filter 2 µm

Indication
Gas cooler state via front LEDs
- Temperature ok
- Cooling active
- Problem

Gas inlet/gas outlet
Compression fitting Ø 4 x 1 mm

Wetted parts
Duran glass, PA, PC, Viton®

Supply voltage
AC 230 V/50 Hz, 60 VA

Housing
½ 19" housing 3 U
W x H x D: 213 x 128 x 255 mm
Weight: Approx. 3.5 kg
Degree of protection: IP 20 (EN 60529)

PG: 4	Part no.	**Price €**
Gas treatment system MGK 744	69640	
Options		
Extra charge for 3/2 way solenoid distribution valve	69641	
Extra charge for desk-top/portable housing	69642	

Blue part no. = in-stock items

Gas purifier GR 120 E

- **Generates constant, high-quality zero air.**
- **Principle of operation: catalytic oxidation**
- **Activated carbon filter as output filter for optimum zero air processing**
- **Easy catalyser replacement via the front panel**

Application

Gas purifiers supply devices and systems with synthetic air. They are used in stationary measuring systems or laboratories for the supply of gas chromatographs, and in analysis systems as test and operating air.

Description

From ambient air available via a compressor or from a central air supply system, the gas purifier GR 120 E generates zero air of a consistently high quality from which all hydrocarbons – including methane(CH4) – have been removed. The device operates on the basis of the principle of catalytic oxidation where all hydrocarbons and carbon monoxide are turned into water carbon dioxide.

The inlet filter element is a fine filter with a fineness of 0.3 µm. The outlet filter element is an activated carbon filter as outlet filter for optimum zero air processing.

Technical specifications

Operating temperature range
Ambient: 5/40 °C
Storage: 0/50 °C

Gas inlet conditions
Compressed air: 0.2 / 8 bar, oil-free and dry
Dew point: < -10 °C

Output concentration
<0.1 ppm, measured as methane

Gas inlet/gas outlet
G⅛ female thread

Supply voltage
AC 230 V, 50 Hz

Housing
19"- rack housing 3 U
W x H x D: 440 x 187 x 365 mm
Weight: Approx. 11.0 kg
Degree of protection: IP 20

PG: 4	Part no.	**Price €**
Gas purifier GR 120 E	61815	

Blue part no. = in-stock items

Zero air generator NLG 100

- **For flame ionisation detectors and infrared gas analysers**
- **Principle of operation: catalytic oxidation**
- **THC residual concentration < 100 ppb**

Application

Zero air generator for supply of flame ionisation detectors with zero air and as calibration gas for zero calibration of infrared gas analysers.

Description

The NLG 100 zero air generators generate pure, hydrocarbon-free zero air from normal, dry compressed air. Catalytic oxidation at the Pt/Pd catalyser converts at approx. 400 °C all hydrocarbons – including ca. (CH_4) – into carbon dioxide (CO_2) and water (H_2O). The generated air has a constant quality better than that of synthetic air from gas cylinders (with reference to organic compounds). With normal compressed air (3/8.5 bar, oil-free and dry, dew point < -10 °C), a THC residual concentration < 100 ppb is reached (measured as methane).

The zero air generator is shipped tested and ready for operation.

Technical specifications

Operating temperature range
Ambient: 5/40 °C
Storage: 0/50 °C

Gas inlet conditions
Compressed air: 3/8.5 bar, oil-free and dry
Dew point: < -10 °C

Output concentration
< 0.1 ppm, measured as methane

Gas inlet/gas outlet
G¼ female thread

Supply voltage
AC 230 V, 50 Hz

Housing
Wall mounting housing
W x H x D: 400 x 200 x 130 mm
Weight: Approx. 3.0 kg
Degree of protection: IP 20

PG: 4	Part no.	**Price €**
Zero air generator NLG 100	61830	

Blue part no. = in-stock items

Gas cooler MGK 741

- **Virtually maintenance-free – 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.

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Technical specifications

Operating temperature range
Ambient: 5/40 °C
Storage: -15/+55 °C

Heat exchanger
Single-stage Duran glass reverse unit

Gas inlet conditions
Dew point: Max. 40 °C
Gas temperature: Max. 120 °C at 50 l/h
Ambient temperature: 20 °C

Status alarm
Voltage-free changeover contact
AC 120 V, 0.5 A
DC 24 V, 1 A

Mounting
Wall mounting

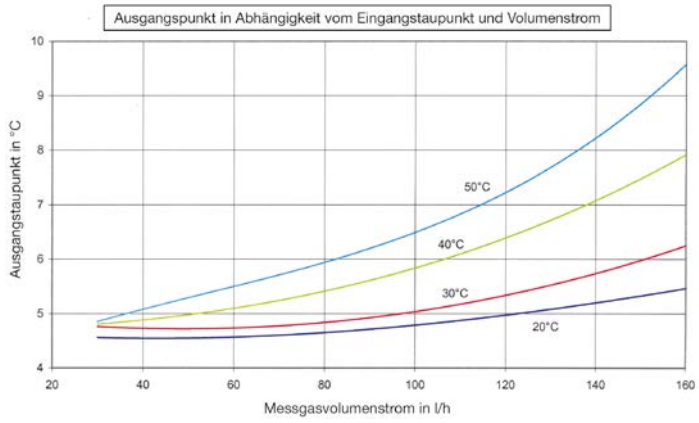
Gas inlet/gas outlet
Compression fitting 4 x 1 mm

Wetted parts
Duran glass, PVDF, Viton®, stainless steel

Supply voltage
AC 230 V, 50 Hz

Housing
W x H x W: 230 x 230 x 95 mm
Weight: Approx. 3.5 kg
Degree of protection: IP 20 (EN 60529)

Characteristic



i Please enquire for other gas coolers such as compressor type gas coolers.

PG: 4	Part no.	**Price €**
Gas cooler MGK 741 with hose pump	69510	

Blue part no. = in-stock items

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, difluorodichloromethane)
- 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 optional calibration unit is used, test gas cylinders are not required.

Technical specifications

Operating temperature range
Ambient 5/40 °C

Supply voltage
AC 230 V

Gas throughput
20/100 l/h

Analogue output
4–20 mA

Interface
RS 232

Display
4-digit lit LC display

Setup time
15 s

Heat-up time
30 min

Gas inlet/gas outlet
Compression fitting Ø 4 x 1 mm

Housing
19" rack housing 4 U
Weight: Approx. 10 kg

Approval
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

PG: 4	Part no.	Price €
Infrared gas analyser CO	69966	
Infrared gas analyser CO_2	69967	
Infrared gas analyser NO	69968	
Infrared gas analyser SO_2	69969	
Infrared gas analyser CO, CO_2	69971	
Infrared gas analyser CO, NO	69972	
Infrared gas analyser CO, SO_2	69973	
Infrared gas analyser NO, SO_2	69974	
Infrared gas analyser NO, CO_2	69975	
Infrared gas analyser NO, CO, SO_2	69976	
Extra charges (option)		
O_2 measurement 0–25 % by volume	69977	
Wall mounting housing WAG IR-A	69970	**On request**
Pneumatic unit (pump and flow monitoring)	69983	

Blue part no. = in-stock items

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We are continuously extending the product range of measured components and combinations. An AFRISO expert will be pleased to answer any questions you have concerning your application.

Oxygen measuring system Oxystem 250

Control unit

- **In situ measurement directly in the gas duct**
- **Compact design**
- **No gas treatment required**


Zirconium dioxide measuring probe

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 100 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 measurement results. Oxystem 250 is suitable for flue gas temperatures of up to 300 °C.

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Technical specifications

Measuring range
0/21 % O_2 by volume

Measuring accuracy
±0.1 % O_2 by volume

Operating temperature range
Medium: Max. 300 °C
Ambient: 0/50 °C

Sensor operating temperature
700 °C

Screw fitting
Ø 30 mm, L = 100 mm, G1, V2A

Display
2 line LC display
Indication of O_2 value and lambda

Supply voltage
Power supply unit: AC 230 V/12 V, 10 VA

Heat-up time
5 minutes

Output
4–20 mA
0–10 V on request

Housing
Impact-resistant plastic (ABS)
W x H x D: 250 x 185 x 125 mm
Weight: 2 kg
Degree of protection: IP 40 (EN 60529)

PG: 4	Part no.	**Price €**
Oxygen measuring system Oxystem 250 with control unit, power supply unit, probe	61840	
Spare parts		
Oxygen probe GSO 250 K	61841	
Power supply unit NTE 12	61842	
Control unit AWE 250	61843	

Blue part no. = in-stock items

Gas analysis system 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. The measuring instrument and all components are integrated in a robust wall mounting housing. BIOLYZER features LED displays, 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 suitable 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.

Indication

4-digit LED:	Status indicators for each channel
4 line LCD:	Data memory can be read via RS 232

Communication

RS 232, analogue output for each gas type, output 4–20 mA, linearised, data memory

Operating temperature range

Ambient: 10/40 °C

Supply voltage

230 V / 50 Hz
Optional: 115 V / 60 Hz
Power input: Max. 85 VA

Dimensions

W x H x D: Approx. 300 x 400 x 185 mm

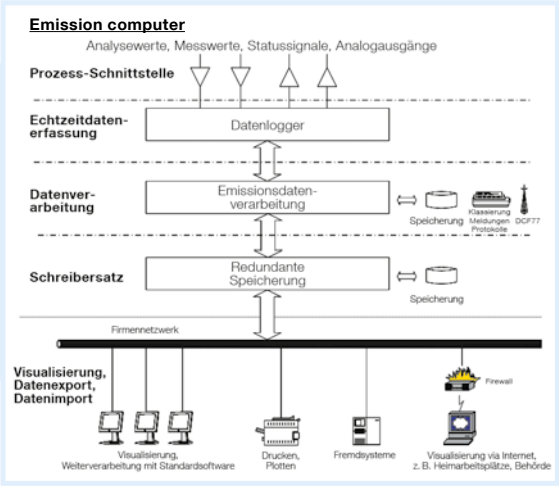
Degree of protection

IP 54 (EN 60529)

PG: 4	Part no.	Price €
Gas analyser BIOLYZER For CH_4, H_2S, O_2, CO_2	69643	
Gas analyser BIOLYZER For CH_4, H_2S, O_2	69644	
Gas analyser BIOLYZER For CH_4, H_2S	69645	
Gas analyser BIOLYZER LT For CH_4, H_2S, O_2, CO_2	69646	
Gas analyser BIOLYZER LT For CH_4, H_2S, O_2	69647	
Gas analyser BIOLYZER LT For CH_4, H_2S	69648	
Options (extra charges)		
Profibus DP for BIOLYZER	69637	
Sampling point selector MSU	69636	
Continuous measurement BIOLYZER	61850	

Blue part no. = in-stock items

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 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 legal minimum 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.

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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.

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Prices on request.

Measuring system MEA 3000 / 3300 for exhaust gas cleaning systems (scrubbers)

The complete system for continuous maritime emission measurement as per MARPOL regulations

- Continuous measurement of SO_2, CO_2 and NO_x (option) with a single measuring system
- Proven NDIR technology for reliable and accurate measurements
- Low-maintenance due to internal calibration and innovative filter technology
- Worldwide service
- Confirmation of Compliance as per MEPC.184(59)

Application

Since January 1, 2015, new limit values for SO2 and NOX are in effect to reduce air pollution caused by ships. The International Maritime Organization (IMO) has specified these new limit values in MARPOL Annex VI. If a vessel uses an exhaust gas cleaning system – a so-called scrubber – for compliance with the limit values, this system must be continuously monitored by means of an emission measurement system.
MEA 3000 / 3300 measures the SO_2 and CO_2 limit values upstream or downstream of the scrubber and transfers them to the vessel's main control system. Compliance or non-compliance with the specified limit values can be proven and documented this way. The measured ratio of SO_2 and CO_2 can be used to control the scrubber. Optionally, the measuring system can also measure and document the NO_X values and other components.

Description

The MEA 3000 / 3300 measuring system for continuous emission monitoring (CEMS) from AFRISO is based on proven NDIR measurement technology. This measurement technology allows for reliable measuring and monitoring of the limit values for SO_2, CO_2 and NO_X (optional) specified by the IMO. The accurate complete system allows for simultaneous monitoring of multiple measuring points and different measured values. The system's space-saving and robust design make it easy to install or retrofit on site. Due to the innovative filter technology, a practical calibration system and a self-cleaning probe, the system requires very little maintenance.

Technical specifications

Measuring range
Flue gas
temperature: 0/500 °C
SO_2: 0/250 to 0/500 ppm
CO_2: 0/20 % by volume
Other gases on request

Measuring principle
NDIR measuring technology
(non-dispersive infrared)
Extractive measurement (cold/dry)

Operating temperature range
Operation: 5/35 °C, with fan
5/45 °C, with air conditioning system
Storage: 2/60 °C

Supply voltage
AC 100–240 V (+/- 15 %)
50–60 Hz (+/- 3 HZ)

Power input
Approx. 1,200 VA without heated line
Additionally 100 W/m for the heated line

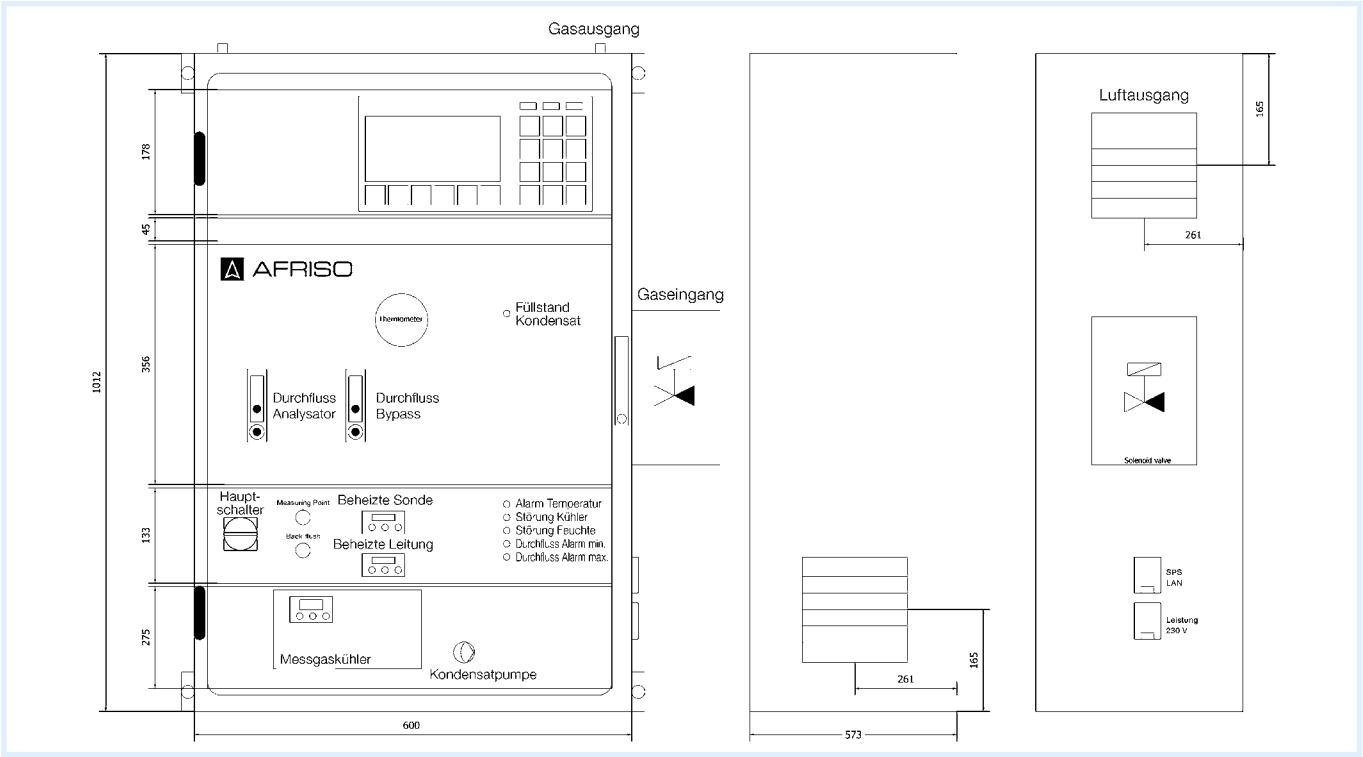
Analogue output
2 x 4–20 mA

Switching outputs
4 voltage-free contacts for status signals

Enclosure
Robust, metal analyser control cabinet
W x H x D: Approx. 750 x 1,100 x 640 mm
Weight: Approx. 110 kg
Degree
of protection: IP 54 (EN 60529)

Measuring system MEA 3000 / 3300 for exhaust gas cleaning systems (scrubbers)

Dimensions (mm)



	Part no.	Price €
Measuring system MEA 3000, CO_2 and SO_2 measurement downstream of scrubber	61090	**On request**
Measuring system MEA 3300, CO_2 measurement upstream and SO_2 measurement downstream of scrubber/CO_2 measurement and SO_2 measurement downstream of scrubber for 2 lines	61091	**On request**
Air conditioning system, 500 W	50000	**On request**
Gas sampling probe AFE 3000, with 2 2/2-way valves for automatic backflushing	61093	**On request**

Blue part no. = in-stock items

Application examples: gas analysis systems and components for gas treatment

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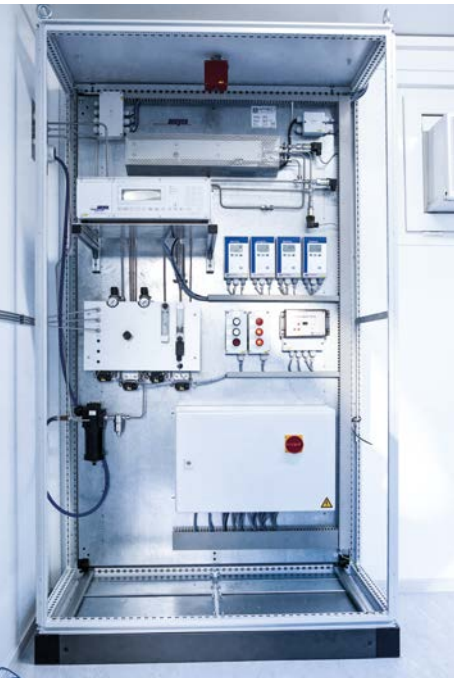
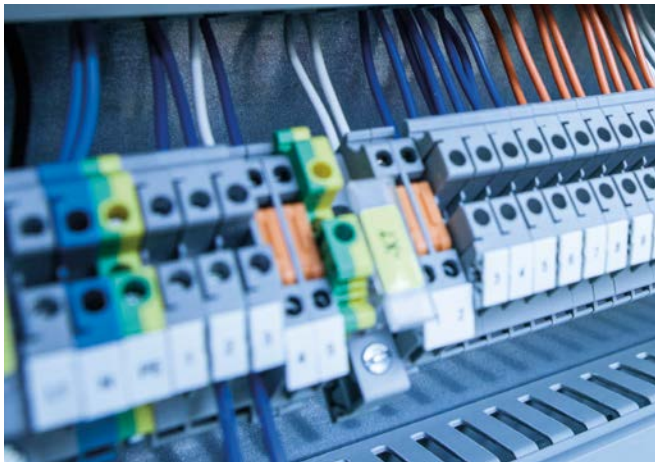




AFRISO

Application examples: Heated zone

Typical components in a heated zone:

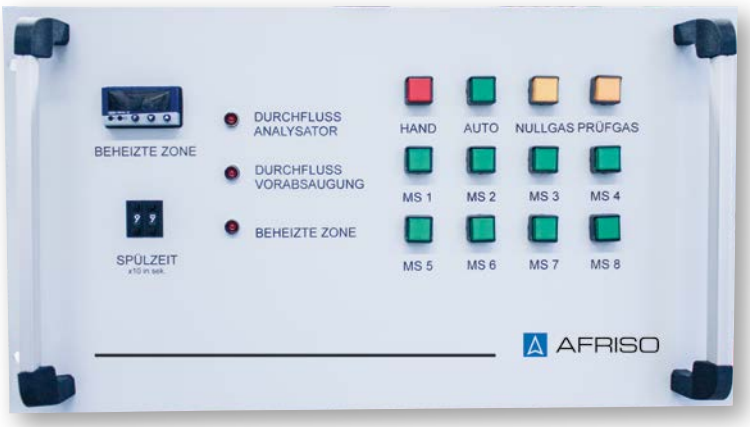
1. Heated filter
2. Solenoid valve, heated
3. Fan
4. Temperature controller
5. Gas pump, heated

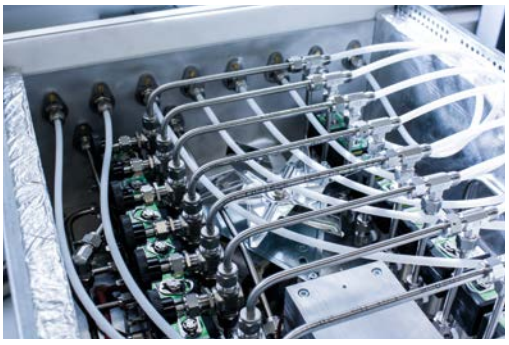
Heated gas treatment system

Application: Heated gas treatment systems are used in higher and constant operating temperatures are required (e.g. to keep the temperature from falling below the dew point). Heated gas treatment systems are available as 19" rack housing systems, portable systems and wall mounting systems. Various components such as filters, solenoid valves, flow monitoring units, pumps, etc. can be installed to meet specific application requirements.

Application examples: Sampling point switching

Sampling point selectors are used in gas analysis systems to measure the gas from different sampling points with a single analyser. Depending on the specific application requirements, different numbers of sampling points can be measured via a single unit. They are available as heated and unheated versions.





Innovative. Future proof. Simply powerful.

CAPBs® sensor modules: From a simple measuring instrument to an all-rounder.

You already own an AFRISO BlueLine measuring instrument* and want to use it for the majority of your daily measuring tasks, for example, tightness test, gas leak detection, flow rate measurement or temperature measurement? No problem with your AFRISO measuring instrument. In conjunction with the AFRISO CAPBs® base handle BG 10 and the sensor modules for a great variety of different applications such as pressure, temperature, gas leak detection or humidity, a whole range of typical service and maintenance tasks can be performed rapidly and with high accuracy. The compact CAPBs® can be connected wirelessly via Bluetooth® Low Energy to the measuring instruments of the AFRISO BlueLine series* or to mobile devices. The new CAPBs® device displays the determined value on the display in real-time and provides a QR code for mobile devices for data transmission. All measurement data can be further processed with the AFRISO apps on the smartphone or tablet and saved as clearly structed PDF records.

TOOLBOX live connect JETZT BEI Google Play Laden im App Store

See the catalogue Portable Measuring Instruments or visit www.capbs.info for detailed information on the available CAPBs®.

The CAPBs® excel with an unprecedented diversity of measuring possibilities with a single system. Numerous sensor modules CAPBs® sens can be easily plugged into the modular base handles. The ergonomic handles themselves are made of high-quality plastic. The compact base handle BG 10, for example, contains the power supply (battery, optionally rechargeable), a tripod socket, a multi-purpose key and a multi-colour LED. The multi-purpose key features customisable function assignments. For example, it can be used for zero calibration regardless of the measuring site. In addition, a device for audible signals is integrated into the handle. The AFRISO measuring instrument or the apps for smartphone and tablet provide numerous pre-installed measurement menus for the CAPBs®.

Bluetooth®

The following measuring instruments can be immediately used with a sensor module and the base handle CAPBs® BG 10:

* BLUELYZER ST, EUROLYZER STx, MULTILYZER STe/STx, pressure measuring instrument series S4600 ST and temperature measuring instrument TMD 9.

The BlueLine measuring instrument series at a glance





		BLUELYZER ST	EUROLYZER STx	MULTILYZER STx	STM 225 – BLACK EDITION	Series S4600 ST
O_2	Parameters/measured values	•	•	•		
CO (up to 6,000 ppm)		•				
CO (up to 10,000 ppm)			•	•		
CO_2 (calculated)		•	•	•		
NO			•***	•***		
NO_2				•***		
NO_x			•***	•***		
CO (40,000 ppm)				•***		
SO_2				•***		
Particulate matter					•	
Methane						
Propane (liquefied gas)						
Butane						
Lambda		•	•	•		
Eta efficiency / eta coefficient		•	•	•		
Flue gas loss qA		•	•	•		
Temperature		•	•	•		
Pressure		•	•	•		•
Dew point		•	•	•		
Humidity in %						
Volume flow			•***	•***		•***
Measurements of filters, ventilation systems, ducts	Typical applications areas					•
Measurements of production facilities, tanks						•
Burner servicing (gas, oil, solid fuel systems)		•	•	•	•	•
CO ambient measurement		•	•	•		
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 loss measurement						
Flue gas loss measurement		•	•	•		
Heating system check						
4 Pa test						
Gas leak detection						
Gas concentration measurement						
Flow rate measurement (water)						
Moisture measurement (material/moisture/indoor climate)						
Air velocity			•***	•***		•***
BImSchV	Approvals		•	•		
EN 50379-2			•	•		•
EN 15378						
KÜO			•	•		
		Page 14	Page 16	Page 18	Page 20	Page 32

* See product description on the catalogue page or in the operating instructions.
** Depends on product version.
*** Optional.








Series S2600	GSP 4	MFM 22	TM 7/ TMD 7	TMD 9	TM 8-IR	CAPBs®	BlueAir-STx
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Event reporting

Display units

Signalling devices

Transducer

CHAPTER 8

Signalling devices/display units/signal processing, monitoring and communication systems

SIGNAL ISOLATION/AMPLIFICATION

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Isolation amplifier

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
Standard 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
Standard 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 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
Standard rail housing
W x H x D: 18 x 78 x 103 mm

Supply voltage
DC 20–253 V
AC 50–253 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

DG: H, PG: 4	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	

* Other signals on request.

Blue part no. = in-stock items

Trip amplifiers, EX safety barriers

MK 330 GS

Z 787

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.

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.

Technical specifications

Housing
Standard rail housing
W x H x D: 23 x 78 x 103 mm

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

Input
0–10 V or (0)4–20 mA

Input resistance
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

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

Nominal resistance
300 Ohm

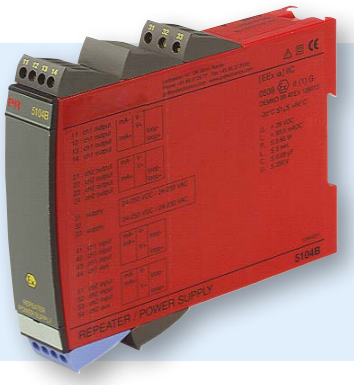
Operating temperature range
-20/+60 °C

EC Type Examination Certificate
IEC Ex BAS 09.0142
Ex II (1) GD [Ex ia] II C
II (1) GD [Ex ia Ga] II C,
[Ex ia Da] III C

DG: H, PG: 4	Part no.	Price €
Trip amplifier MK 330 GS	53708	
Trip amplifier with power supply SMK 330 GS	53709	
Zener barrier Z 787	**31296**	

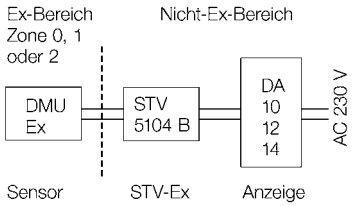
Blue part no. = in-stock items

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
Standard rail housing
W x H x D 23.5 x 109 x 130 mm

Degree of protection
IP 20 (EN 60529)

Supply voltage
AC 21.6–253 V
DC 19.2–300 V

Power input
≤ 3 W

Sensor supply
DC 18–28 V
(> 18 V at 20 mA)

Input
0(4)–20 mA
0–10 V

Output
0(4)–20 mA (galv. isolated)
0–10 V
1:1 with ref to input value

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
II (1) GD [EEx ia] II C,
applied to zones 0, 1 or 2 or
20, 21 or 22

Compliance

EMC:	2014/30/EU
Low Voltage Directive:	2014/35/EU
ATEX:	2014/34/EU
PELV/SELV:	IEC 364-4-41 and EN 60742
UL:	UL 913, UL 508
DNV Marine:	Vers. f. Certific. No. 2.4

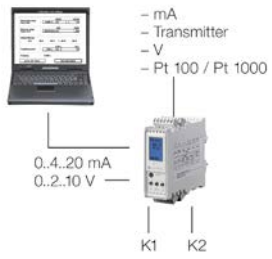
DG: H, PG: 4	Part no.	**Price €**
EX supply isolation amplifier STV 5104 B, 1 channel	53720	
EX supply isolation amplifier STV 5104 B, 2 channels	53721	

Blue part no. = in-stock items

Multifunctional transducer MFU 12/14

- **Universal input (current, voltage, resistance)**
- **Integrated supply voltage for 2/3-wire transmitter**
- **2 analogue outputs**
- **2 or 4 additional contact outputs**
- **Programming interface**
- **Universal power supply unit**

Application



Description

The digital multi-purpose transducers are freely programmable digital transducers with two analogue outputs and up to 4 relays. Current up to 20 mA (also bipolar), voltage up to 10 V (also bipolar) or a three-wire technology potentiometer are possible input signals. In addition, a supply for 2-wire or 3-wire transmitters is integrated. The inputs are galvanically isolated from the voltage and the outputs. The two analogue outputs can be used simultaneously.

Technical specifications

Display
Multi-line LCD, 42 x 64 pixels,
multi-colour backlight,
backlight can be switched off

Range
0 to 9,999 digits (start and end value freely configurable), free scaling unit,
3 languages (English, French, German)

Accuracy
± 0.2 % of maximum value

Resolution
Inputs 13 bits, outputs 10 bits

Inputs
Current: Max. -20.4/+20.4 mA, adjustable as required
Voltage: Max. -10.2/+10.2 V, adjustable as required
Potentiometer: 0.1/100 kOhm, adjustable as required
Transmitter supply 19.5 .. 24.5 V DC

Analogue output 1 (current)
Max. 0/4–20.4 mA; adjustable as required
Galvanically isolated from input

Analogue output 2 (voltage)
Max. 0/2–10.2 V; adjustable as required
Galvanically isolated from input

Switching outputs
Up to 4 voltage-free changeover contacts
Configurable as required, max. AC 250 V
Selectable functions energising/de-energising, hysteresis, window or trend function
selectable delays for energising/de-energising

Linearisation
Via 24 free x/y on characteristic curve
Characteristic curve mode table, cylinder, sphere

Additional functions
- Alarm message in the case of missing or defective sensor
- Zoom function, spreading, inverted mode, trend indication, teach functions
- Automatic or manual simulation mode
- Locking of parameters / editing lock
- Programming interface

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

Housing
DIN rail housing
W x H x D: 33 x 110 x 128 mm
Screw terminals can be pulled off

Accessories (options)

- Programming software MFU 03-S (Win XP, Vista, 7) with interface cable and USB adapter
- Device with identical functions, but for temperature inputs (Pt 100, Pt 1000, Ni 1000 and thermocouples)

DG: H, PG: 4	Part no.	**Price €**
Transducer MFU 12, 2 voltage-free changeover contacts	53722	
Transducer MFU 14, 4 voltage-free changeover contacts	53723	
Software MFU 03-S, with interface cable and USB adapter	53724	

Blue part no. = in-stock items

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
- 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) and connector M 12 x 1, 5-pin.

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 power 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 outage. 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°.

8

Technical specifications

Range
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, delay

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
For EX version: -25/+70 °C

Electrical connection
Adapter for connector as per ISO 4400 (DIN 43650-A)

Input signal/output 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

CE conformity (EMC)
EMC Directive 2014/30/EU

Options

- EX protection II 2G Ex ia IIC T4 Gb
- Electrical connection M 12 x 1, 5-pin
- 3-wire 0–10 V

Pin assignment table

Electrical connections	ISO 4400	M12 x 1, metal (5-pin)
Supply +	1	1
Supply –	2	2
Signal + (for 3-wire)	3	3
Switching output 1	3	5
Switching output 2	-	3
Shield	Earth contact	3

DG: H	PG	Part no.	Price €
DA 06	4	**31278**	
DA 06 Ex	4	31279	
DA 06 – M 12 x 1	4	33336	
DA 06 Ex – M12 x 1	4	33222	
Accessories			
Wall bracket for DA 06, black plastic	1	**31284**	

Blue part no. = in-stock items

Digital display units DA 10/12/14

- Grey display with excellent readability
- Text-based user interface
- Linearisation for volume indication (24 points)
- Scalable units, displayed as bar chart
- Integrated supply voltage for transducer

1 Digital display unit DA 12
2 Signalling device
3 Pressure transducer DMU 07

Application

Universal application for displaying measured values (DA 10), optionally with additional relay outputs (DA 12/14) for electronic transducers.

Description

Digital display unit in plastic housing for control panel mounting. With grey display and automatic off function for the backlight. The universal measurement input can be configured as a current input or a voltage input. Standard bearing charts for cylindrical horizontal tanks and spherical tanks are pre-programmed, additional units can be selected or set up. The units are scalable and shown as bar charts. Limit values can be displayed via a window and a trend function (rising/falling). With display message (flashing error text) if values are exceeded, parameter backup for restoring previous configurations and potentiometer for test purposes.

Technical specifications

Display
5-digit graphical LC display, backlit (white), text-based user interface, user interface language selectable (German/English/French/Italian), selectable units, custom units can be defined

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: 0/50 °C

Supply voltage
AC 50–253 V /DC 20–253 V
2.5 W / AC 4.4 V

Sensor supply
Integrated, galvanically isolated supply voltage for transducer: 17 VDC at 20 mA

Sensor input
All analogue standard signals, e.gB. 4–20 mA, 0–20 mA, 0–1 V, 0–10 V as well as potentiometer

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 / 14

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 2 x (DA 12) / 4 x (DA 14) voltage-free changeover contacts (adjustable switching hysteresis)
Contact rating: AC 250 V, 2A, 100 VA

DG: H, PG: 4	Part no.	Price €
DA 10	31281	
DA 12	31282	
DA 14	31283	
Accessories (PG: 3)		
Wall mounting housing WAG 01 for mounting of one DA	31287	
WAG 02 for mounting of two DAs	31288	
WAG 03 for mounting of three DAs	31289	
WAG 04 for mounting of four DAs	31290	

Blue part no. = in-stock items

Data logger with display DL 10

- Transmitter supply for 4 independent channels
- Freely adjustable scaling and maximum pointer function
- Linearisation via 24 x/y points
- Freely adjustable storing cycles
- Adjustable trigger thresholds for starting the storing function
- Wide range power supply

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Application

Universal application for displaying and saving up to 4 independent analogue input signals with freely selectable scaling and units; with comprehensive data logger function to memory card and integrated supply for 2-wire and 3-wire transmitters.

Description

Digital display unit with integrated data logger in plastic housing for control panel mounting. DL 10 is used for visualising four independently parameterisable analogue signals; it features a data logger function for all channels and provides an integrated supply for 2-wire and 3-wire transmitters. Each channel has a current/voltage input and can be scaled as required. There are several types of indication. For example, the measured value can be displayed as a quasi-analogue bar. The measured values can be acquired per channel in adjustable storing cycles and saved to an SD memory card. In addition, it is possible to adjust trigger thresholds to start the storing function (one channel can also trigger another channel). An integrated, electronic wide range power supply unit allows for operation in a supply range from DC 20–253 V or AC 50–253 V.

Technical specifications

Display
5-digit graphical LC display, backlit (white), text-based user interface, user interface language selectable (German/English/French), units selectable from list, custom units can be defined

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

Linearity
± 0.2 % of measuring range

Resolution
10 bits

Response time
< 0.2 s; additional damping can be activated

Operating temperature range
Ambient: 0/50 °C

Supply voltage
AC 50–253 V / DC 20–253 V
Approx. 7 VA / 5 W

Input resistance
Current: Approx. 120 Ohm
Voltage: Approx. 100 kOhm

Sensor supply
Approx. DC 20 V idle and
approx. DC 17 V at 20 mA
Limited to 25 mA/channel

Sensor input

Analogue:	0–20 mA, 4–20 mA, 0–10 V
Digital counter:	Max. 30 V, max. 2 Hz
Sensor supply:	17–20 V

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 and terminal area
IP 20 (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 for each channel. Bearing charts for cylindrical horizontal tanks and spherical tanks are pre-programmed.

Interfaces
AD-UART

Data memory
SD-/MM card (max. 2 GB), formatting: FAT, FAT 16 fastest saving cycle 1 second.

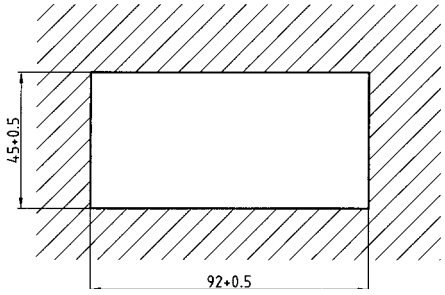
DG: H, PG: 4	Part no.	Price €
Data logger with display DL 10-4 SV, 4 channels	**31256**	
SD memory card 1 GB, industrial version	31257	

Blue part no. = in-stock items

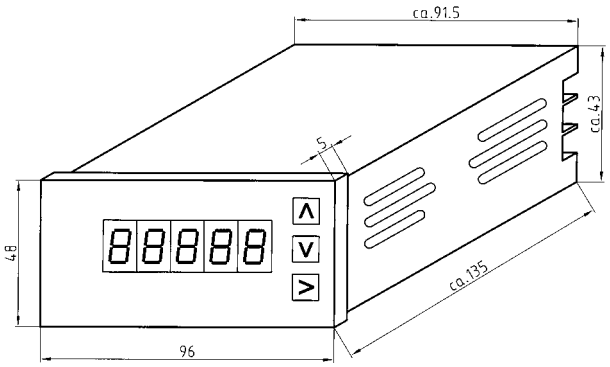
Digital display units DA 10/12/14
Data logger with display DL 10

Dimensions (mm) and connection diagrams

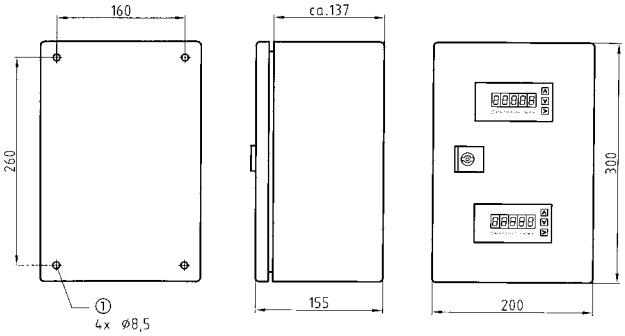
Panel cut out



DA 10/12/14, DL 10

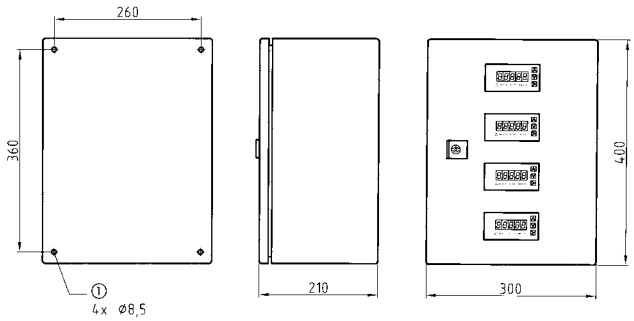


Wall-mounting housing WAG 01/02
for up to 2 DA 10/12/14



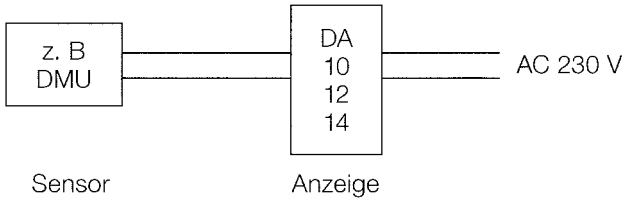
① Fixing holes

Wall mounting housing WAG 03/04
for up to 4 DA 10/12/14

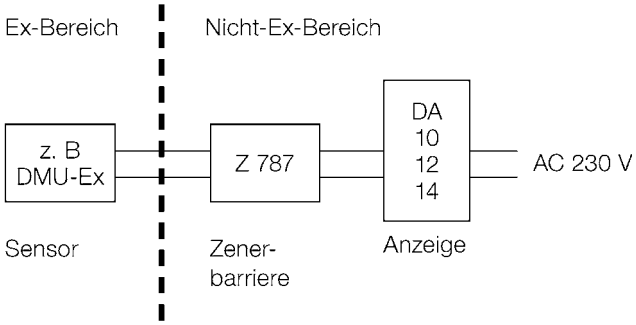


① Fixing holes

Connection diagram for standard application



Connection diagram for EX application



8

Digital display and control unit VarioFox® 24

- Can be used as compact, ready-to-connect filling or emptying controller
- Visual and audible alarms
- 4 switching outputs
- Data logger function via SD memory card or RS485 interface

A Chapter 3

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1 Junction box with pressure relief port
2 Digital display and control unit VarioFox® 24
3 Signalling device
4 pressure transducer DMU 08

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 4 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.

8

Technical specifications

Display
Multi-coloured, backlit graphical display (50 x 30 mm)
- Blue = Operation
- Red = Alarm
- Green = Setup

Display (5 digits)
User interface language selectable:
English, German, French, Italian
(start and end values
as well as comma scalable as required)

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: 0/50 °C
Storage: -20/+65 °C

Supply voltage
AC 50–253 V, 4.2 VA
DC 20–253 V, 2.7 W

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

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

Digital interface
RS485 (19200 Baud) with Baud rate adjustment

Switching outputs
Relay contacts: 4 voltage-free changeover contacts (adjustable switching hysteresis)
Contact rating: AC 250 V 2 A 250 VA
DC 250 V 1 A 100 W

Housing
Robust wall mounting housing made of impact-resistant plastic (PC)
W x H x D: 175 x 125 x 75 mm
Degree of protection: IP 65 (EN 60529)
Colour: RAL 7035 (grey)
Electrical connection:
5 x cable gland M16 x 1.5 mm

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.

DG: H, PG: 4	Part no.	Price €
VarioFox® 24 (4 relay contacts)	**31248**	
SD memory card 1 GB, industrial version	31257	

Blue part no. = in-stock items

Signalling devices

Combined warning light and horn WLH 1

Benefits

- Highly effective signal due to yellow light
- Loud 90 dB alarm tone
- Warning light and horn can be controlled separately

Application

For dry indoor spaces.

Technical specifications

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 KH 1

- Loud 90 dB alarm tone
- Horn with continuous tone

For dry indoor spaces.

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

8

DG: G, PG: 4			Part no.	Price €
Combined warning light and horn WLH 1	1	-	**61020**	
Horn KH 1	1	-	**61011**	

Signalling devices

Horn HPW 2

Benefits
- Loud 110 dB alarm tone
- Horn with continuous tone

Application
For humid rooms and for outdoor installation.

Technical specifications

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

Warning light with rotating reflector SLD 1

- Highly effective signal due to yellow light and rotating reflector
- Robust design with Al base
- Maintenance-free

For humid rooms and for outdoor installation.

Supply voltage
AC 230 V

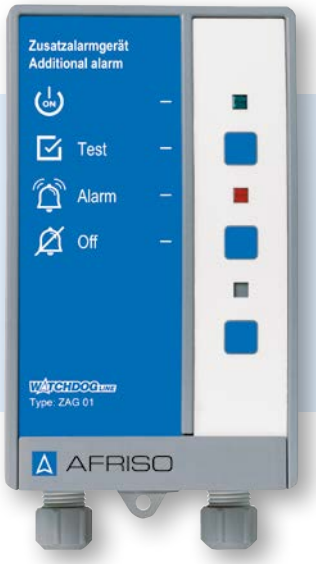
Degree of protection
IP 55 (EN 60529)

Weight
1.8 kg

Mounting position
Any

DG: G, PG: 4	PG	DG			Part no.	**Price €**
Horn HPW 2	4	G	1	-	**61012**	
Warning light with rotating reflector SLD 1	4	H	1	-	**61015**	

Additional alarm unit ZAG 01



- **Audible and visual alarms for maximum safety**
- **Can be connected to all WATCHDOG-LINE alarm units**
- **With 2 voltage-free changeover contacts (at output side)**
- **Ready-to-connect device for easy installation and commissioning**

Application

For indication and transfer of alarm signals from Watchdog LINE alarm units, AFRISO leak detectors or any other switching equipment. Suitable for triggering additional visual and audible alarms in buildings, e.g. in the case of underground tank facilities or in rooms which are far away from the dangerous location. Can be connected directly to the switching output of the alarm unit.

Description

The additional alarm unit in a wall mounting housing signals alarm conditions in conjunction with an alarm unit or a leak detector. ZAG 01 is connected to the voltage-free contact of the alarm unit. A 230 V alarm input is also available. The audible alarm can be acknowledged with the Acknowledge button in the case of an alarm. The visual alarm is cleared once the leak has been fixed or the cause of the event removed. The Test button allows you to perform a function test.

The voltage-free relay contacts allow for connection of additional external signalling equipment (such as horns), event reporting systems EMS, building control systems or similar equipment.
ZAG 01 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/storage: -10/+60 °C

Supply voltage
AC 230 V

Nominal power
3 VA

Alarm input
Input 1: Voltage-free
Input 2: AC 230 V

Switching outputs
Relay contact 1:
Voltage-free changeover contact, can be acknowledged
Relay contact 2:
Voltage-free changeover contact, cannot be acknowledged
Contact rating: 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 30 (EN 60529)

i

See the catalogue DOMESTIC TECHNOLOGY for additional WATCHDOG-Line alarm units for the detection of level, liquids, leaks or gases.

DG: H	PG	DG	Part no.	**Price €**
Additional alarm unit ZAG 01	4	H	**40633**	
Mounting frame	1	G	**43521**	
Sealing kit (IP 54)	1	G	**43416**	

Blue part no. = in-stock items

AFRISO event reporting systems EMS

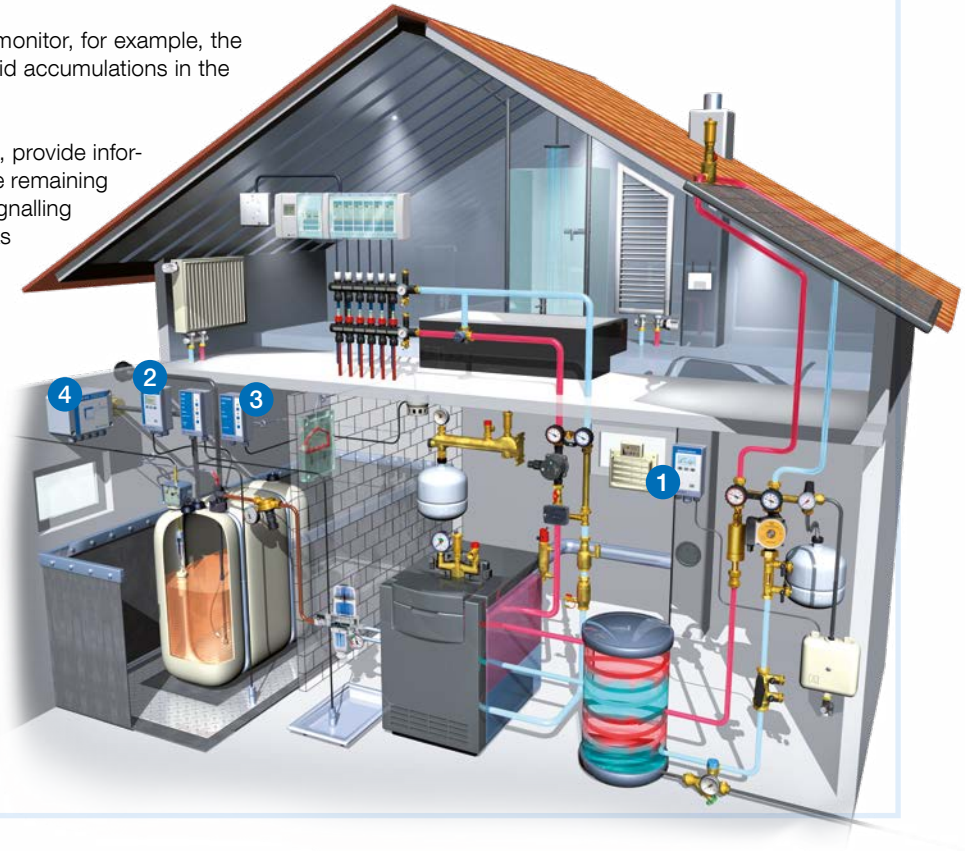
AFRISO event reporting systems EMS allow for remote monitoring of buildings or plants in domestic and industrial applications. Sensors and WATCHDOG-LINE alarm units monitor all the functions of the system and the security of the building around the clock. Alarms are reported to one or several recipients via GSM, Internet or E-mail. It is possible to send a general alarm message or to report different types of alarms to different recipients. AFRISO provides 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 as well as integration into building control systems.

Monitoring functions:

- Events such as leaks, heating system failure
- 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

Application example

1. **Solar controllers** or **liquid monitors** monitor, for example, the system pressure of solar systems or liquid accumulations in the collector tank for solar liquid.
2. **Level indicators** signal minimum levels, provide information on consumption and forecast the remaining range. Additional alarm units allow for signalling even in the case of remote tanks or tanks that are hard to access such as underground tank.
3. We provide suitable **leak detection systems** for all types of tanks and pipes.
4. 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.



Features of EMS event reporting systems

1. Event reporting
The system calls via GSM and reports the events.

2. Remote control
The event reporting system EMS can be called. You can send commands to control heating systems, ventilation, air conditioning systems, 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 outage; the system resumes processing when power is restored.

AFRISO event reporting systems EMS

Event reporting systems EMS 220/EMS 442

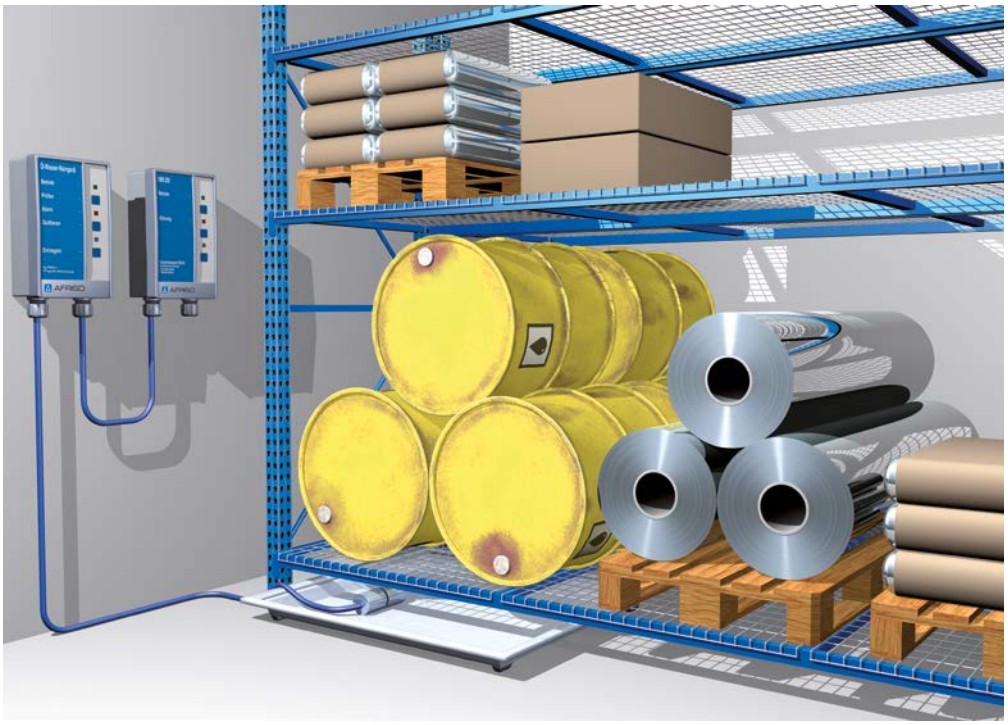
- Suitable for domestic and industrial applications
- 2 analogue, 2 digital inputs (EMS 220)
- 4 analogue, 4 digital inputs (EMS 442)
- Event reporting via text message or to the AFRISO Net server

In connection with the AFRISO Net web service, data can also be visualised, logged, managed and transferred via e-mail.

WATCHDOG-Line alarm units with event reporting system EMS 220

WATCHDOG-LINE alarm units for monitoring industrial buildings such as stockrooms, machine rooms, depots for hazardous substances, etc.

In conjunction with the EMS event reporting system, the WATCHDOG-LINE 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.



Event reporting system EMS 220

- **For domestic technology and 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 application 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, for example, be combined with the following AFRISO signal transducers:
- Level indicators
- Level switches
- Leak detection systems
- 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 the 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
DC 24 V, max. 25 mA

Alarm inputs
- 2 analogue input 4–20 mA, active or passive
- 2 digital inputs, for voltage-free assignment

Data transmission
GSM short message (SMS) with integrated 2G/3G modem
900/1,800/2,100 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

CE conformity
EMC Directive 2014/30/EU
RED Directive 2014/53/EU

i The AFRISO Net web service is a cost-effective way of requesting data online anywhere and at any time. See page 394 for a detailed description.

DG: H, PG: 4	Part no.	Price €
EMS 220	90220	
Setup on the AFRISO Net server (one-time fee)	90013	
Monthly base fee per SIM card	90014	

Blue part no. = in-stock items

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 application 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.

8

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 short message system (SMS) with integrated 2G/3G modem 900/1,800/2,100 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 M16

CE conformity
EMC Directive 2014/30/EU
RED Directive 2014/53/EU

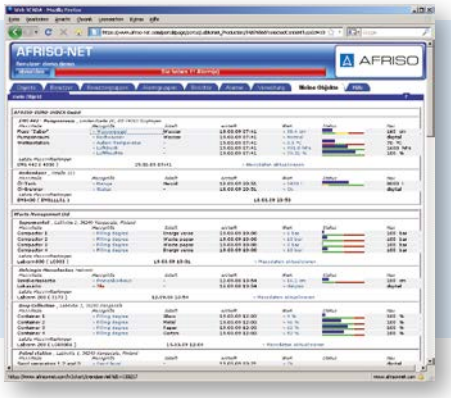
i

The AFRISO Net web service is a cost-effective way of requesting data online anywhere and at any time. See page 394 for a detailed description.

DG: H, PG: 4	Part no.	Price €
EMS 442	90442	
Setup on the AFRISO Net server (one-time fee)	90013	
Monthly base fee per SIM card	90014	

Blue part no. = in-stock items

AFRISO Net web service



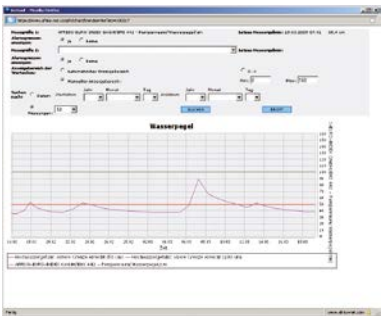
- **Internet-based remote monitoring system**
- **Continuous monitoring and logging, 24/7**
- **Automatic connection monitoring, alarm if connection is lost**
- **No separate application programs required**
- **Alarms can be transmitted via text message or e-mail**

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 application 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
- Waste control: 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

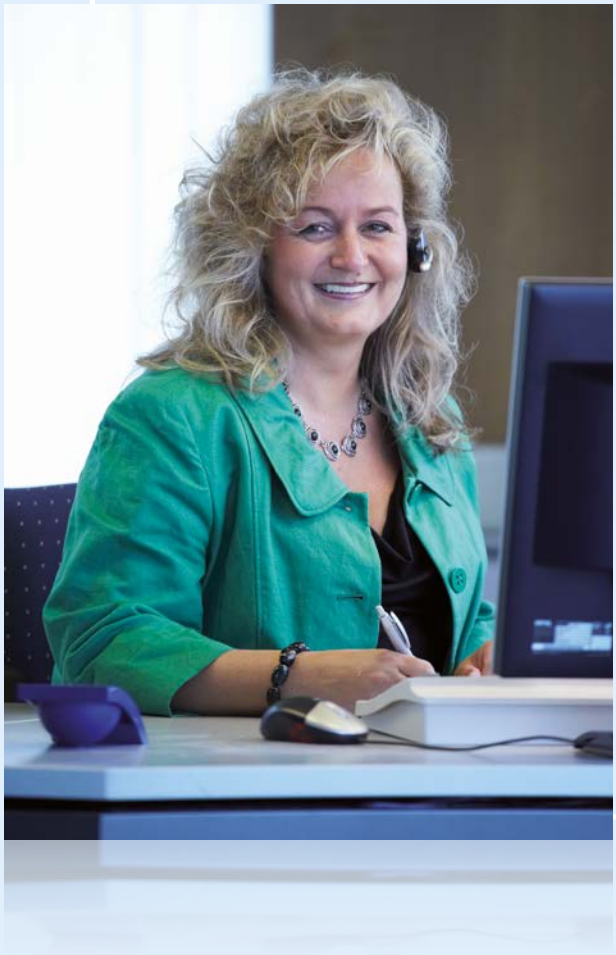
Data transmission protocols
GSM, text messages SMS, GPRS, TCP/IP

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 per SIM card	90014	

Blue part no. = in-stock items

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CHAPTER 9

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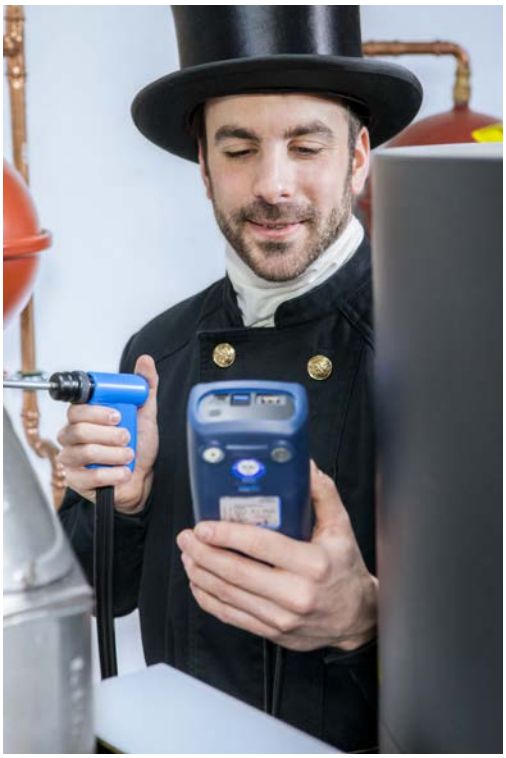
Courses and Training

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. All of our offers are based on current topics and standards as well as questions from our customers. Of course, it is also possible to arrange for individual in-house courses and seminars to be provided at your site.



AFRISO training programme

Smart Home expert
One-day seminars, overview and design of an AFRISO smart home system

Tank protection and leak protection lining
Two-day seminar on the installation of leak protection linings and leak detectors (theory and practice)

Fuel oil consuming systems – what's new?
One-day seminar on planning, modernising and converting fuel oil supply systems

Hydraulic Balancing
One-day seminar on hydraulic balancing with the VarioQ valve program with measuring function

Heating system check as per EN 15378
One-day seminar on the inspection and evaluation of heating systems

HVAC service with BlueLine, CAPBs® and apps
One-day seminar covering typical HVAC measuring tasks

Dust measurement at solid-fuel systems
One-day seminar on using the dust measuring instrument STM 225 – BLACK EDITION (theory and practice)

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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
Telephone: +49-7135-102-222

Visit us at www.afriso.com/training for our full training programme and additional information.

Our Service – Your Benefit

Flexible, cost-aware, on schedule, solution-orientated and fast – the AFRISO team always provides the decisive added value.

9

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 measurement results, compliance with legal requirements and a long service life.

Repair service

In the case of a malfunction, request a return slip at service@afriso.de and send us your AFRISO device along with a short description of the problem. We will deal with your request within a few workdays.

Renal devices

You cannot afford to do without your instrument? No problem, our rental service ensures that you remain on duty. When you send your device for maintenance or repair, you can indicate if you are interested in a rental device. We will immediately get in touch with you.

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Our service and repair department will be glad to answer your questions. Please get in touch with us.
Telephone:
+49 7135 102-211

AFRISO information material – brochures and flyers

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 and product overviews

Flyers, brochures, and product overviews provide information on individual products or complete product ranges for various application areas.

Product literature for end consumers

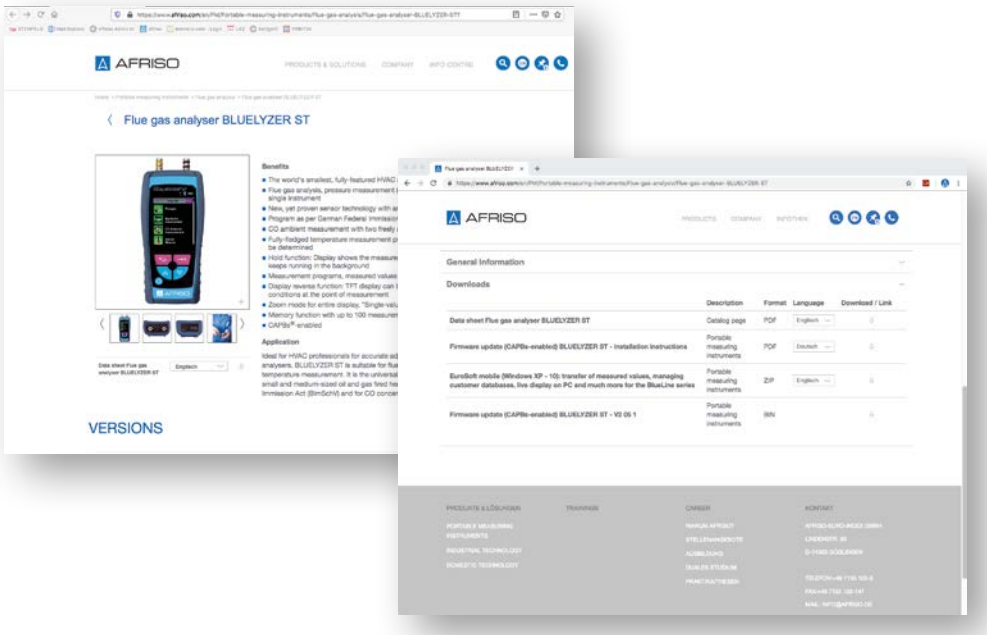
Product literature for end users is a great medium for fairs, exhibition rooms, mail campaigns and other activities. They present the benefits and applications of AFRISO products for building technology and tank protection in private households in a concise, easy-to-understand way.

i

All information material can be downloaded from the download centre at www.afriso.com. If you want to order for free, simply specify the number of copies required in your e-mail to **marketing@afriso.de.**

Downloads

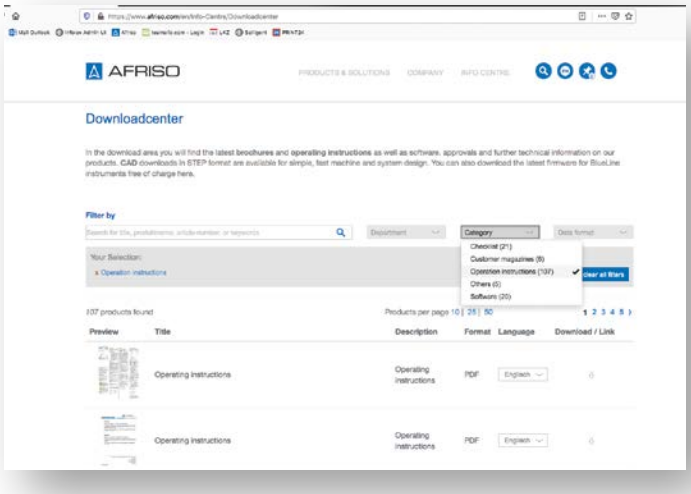
On www.afriso.com, you can find all product-relevant information such as operating instructions, brochures, special forms, certificates, CAD files or suitable software directly on the product page under Downloads.



Visit the INFO CENTRE on www.afriso.com for comprehensive information, technical specifications, terms and conditions, valuable downloads and the latest news – all around the clock.

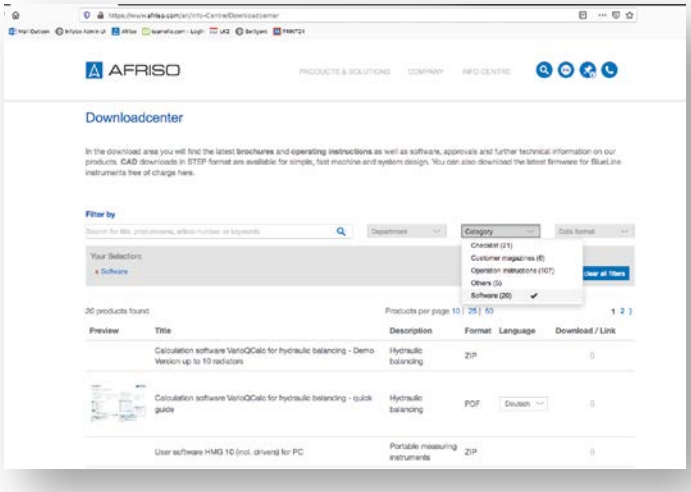
Operating instructions

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.



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 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 ensures maximum reliability.

You can find the latest certificates at www.afriso.com directly on the respective product page.

ZERTIFIKAT

Die Zertifizierungsstelle
der TÜV SÜD Management Service GmbH
bescheinigt, dass das Unternehmen

AFRISO-EURO-INDEX GmbH
Lindenstr. 20, 74363 Güglingen
Deutschland
Friedhofstr. 3, 63916 Amorbach
Deutschland

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, Auftrags-Nr. 70010777,
wurde der Nachweis erbracht, dass die Forderungen der

ISO 9001:2015

erfüllt sind.
Dieses Zertifikat ist gültig vom 03.08.2019 bis 02.08.2022.
Zertifikat-Registrier-Nr.: 12 100 14587 TMS.

Product Compliance Management
München, 14.05.2019

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstrasse 57 • 80339 München • Germany
www.tuev-sued.de/certificate-validity-check

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Product Compliance Management
München, 14.05.2019

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Mitteilung über die Qualitätssicherung Produktion
Nr. EX2A 015639 0016 Rev. 00

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
Eigenherstellung : Zündschutzart "i"
Handelsware/Zweitschein: Zündschutzart "i"

Die Zertifizierstelle der TÜV SÜD Product Service GmbH bescheinigt mit diesem Zertifikat, dass das oben genannte Unternehmen ein Qualitätssicherungssystem anwendet, das den Anforderungen gemäß Anhang IV der Richtlinie Nr. 2014/34/EU für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (ATEX) entspricht. Die Gültigkeit dieses Zertifikates setzt eine regelmäßige Überwachung voraus. Umseitige Hinweise sind zu beachten.

Bericht Nr.: 713142199
Gültig bis: 2021-10-31

Datum, 2018-12-21
(Klaus Lorenz)

Seite 1 von 1
TÜV SÜD Product Service GmbH ist notifizierte Stelle gemäß der Richtlinie Nr. 2014/34/EU für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen mit der Kennnummer 0123.

TÜV SÜD Product Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Deutschland

ZERTIFIKAT ◆ CERTIFICATE ◆ 合格证书 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Industrie Service

ZERTIFIKAT

Die Notifizierte 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

Herstellung und Vertrieb von
Wassermangelsicherungen, Wasserstandsbegrenzern und Sicherheitsventilen
als Ausrüstungsteile mit Sicherheitsfunktion
nach EU-Baumusterprüfungen (Baumuster), gemäß Anlage

ein Qualitätssicherungssystem nach der Druckgeräterichtlinie 2014/68/EU Anhang III, Modul D

eingeführt hat und anwendet.

Durch ein Audit, Bericht -Nr.: Q-IS-AN3-STG-PED-394-559-18, 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-805-18
gültig bis 14. November 2021
unter der Voraussetzung von bestandenen jährlichen Überwachungsaudits

Filderstadt, 20. August 2018

Peter Pek
Notified Body No.: 0036

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AFRISO-EURO-INDEX GmbH

D-74363 Güglingen

für folgende Produkte:

- Membran-Antiheberventil MAV
- Kolben-Antiheberventil KAV
- Autom. Heizölentlüfter Flow-Control (auch Hochtemp. Variante)
- Autom. Heizölentlüfter FloCo-Top-1/-2/-1C/-2C (auch mit Optimum-Filter)
- Filtertypen: Einstrang (ggf. mit Rücklaufzuführung) und Zweistrang
- Tankentnahmeeinrichtung Euroflex (alle Ausführungen) und Miniflex
- Grenzwertgeber GWG 12
- Füllstandanzeiger MT-Profil

und deren Materialien zur Geruchsdichtheit

das Recht die Marke PROOFED BARRIER® zu führen

Die Verleihung erfolgt auf Grund des positiven Berichtes des Qualitätsausschusses vom 27.09.2020 unter Zugrundelegung des Prüfungsberichtes des Fraunhofer Institutes für Verfahrenstechnik und Verpackung IVV, 85354 Freising vom 09.09.2020. Die Firma Afriso-Euro-Index GmbH unterwirft sich der laufenden Überwachung durch das Fraunhofer Institut IVV und den Regeln der Qualitätsgemeinschaft Geruchsgesperrte Heizölanlagen e.V. (QgH e.V.) sowie der Markensatzung der QgH e.V. in der jeweils geltenden Fassung.

Würzburg, den 28.09.2020

Wolfgang Dehoust
Vorsitzender der Qualitätsgemeinschaft Geruchsgesperrte Heizölanlagen e.V.

DNV·GL

TYPE APPROVAL CERTIFICATE

Certificate No:
TAA000010J
Revision No:
1

This is to certify:
That the Pressure Indicator

with type designation(s)
RF_ _, Series D4_ _, D7_ _, D8_ _, and D9_ _

Issued to
Afriso-Euro-Index GmbH
Amorbach, Germany

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :
Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

Temperature	D
Humidity	B
Vibration	B, C
EMC	Not relevant
Enclosure	C

Issued at **Hamburg** on **2017-06-08**
This Certificate is valid until **2022-05-31**.
DNV GL local station: **Augsburg**

for **DNV GL**

Approval Engineer: **Didier Girardin**

Joannis Papanuskas
Head of Section

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.

Form code: TA 251 Revision: 2016-12 www.dnvgl.com Page 1 of 2

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Job Id: **262.1-005533-3**
Certificate No: **TAA000010J**
Revision No: **1**

Product description
Type : RF_ _ Version designation, Series D4_ _, D7_ _, D8_ _ and D9_ _ in any combinations as follows:

	Type			Series		
RF	40	Version Designation Ch, ChGly, ChF, F, Gly, I, KTGly, Oil	D	4	0	1
	50			7	1	2
	63			8	2	
	80			9	3	
	100				4	
	160				5	

Application/Limitation

Tests carried out
Applicable tests according to Class Guideline DNVGL-CG-0339, Nov 2016

Marking of product
The products to be marked with:
- manufacturer name
- model name
- lot number (encoded - includes manufacturer name, model name, manufacturing date)

Manufacturing Places
- Afriso-Euro-Index GmbH Amorbach, Germany
- Afriso-Euro-Index SRL Bukarest, Romania
- Afriso Measurement & Control Technology Co.Ltd. Suzhou City, China

Periodical assessment
The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.
The main elements of the assessment are:
- Ensure that type approved documentation is available
- Inspection of factory samples, selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given
- Ensuring traceability between manufacturer's product type marking and the type approval certificate

Periodical assessment is to be performed at least every second year and at renewal of this certificate.

END OF CERTIFICATE

Form code: TA 251 Revision: 2016-12 www.dnvgl.com Page 2 of 2

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ISSUE DATE: December 23, 2002 CERTIFICATE AUTHORIZATION NUMBER: 1252

THIS IS TO CERTIFY THAT

Afriso Euro-Index GmbH

Lindenstrasse 20, 74363 Guglingen/Wurtt , Germany

is hereby authorized to continue to apply the
3-A Symbol to the models of equipment, conforming to 3-A Sanitary Standards for:

Number 74-07
74-07 (Sensors and Sensor Fittings and Connections)

set forth below

CIP Models: D702, D712, D902 and D912 with 63 and 100mm diameter gauges and Pressure Transmitter type DMU 02 Vario CP in sizes 1", 1½", 2", 2 ½" and 3" Clamp connections.

VALID THROUGH: **December 31, 2020**

Timothy R. Rugh
Executive Director
3-A Sanitary Standards, Inc.

The issuance of this authorization for the use of the 3-A Symbol is based upon the voluntary certification, by the applicant for it, that the equipment listed above complies fully with the 3-A Sanitary Standard(s) designated. Legal responsibility for compliance is solely that of the holder of this Certificate of Authorization, and 3-A Sanitary Standards, Inc. does not warrant that the holder of an authorization at all times complies with the provisions of the said 3-A Sanitary Standards. This in no way affects the responsibility of 3-A Sanitary Standards, Inc. to take appropriate action in such cases in which evidence of nonconformance has been established.

NEXT TPV INSPECTION/REPORT DUE: **January 2025**

reddot award 2014
winner

The award "Red Dot" for high design quality, expressing innovation in form and function in an exemplary manner, is presented to:
Die Auszeichnung „Red Dot" für hohe Designqualität, die in beispielhafter Weise Innovation in Form und Funktion ausdrückt, wird verliehen an:

FT
Room Temperature Sensor
Raumfühler

Manufacturer
AFRISO-Euro-Index GmbH,
Göglingen, Germany
In-house design
Eugen Mayer, Jürgen Fritz
Design
Kachel Industriedesign
(Markus Kachel),
Plein, Germany

Essen, 7 July 2014

Stefan Eckstein, Munich, Germany
Nils Toft, Copenhagen, Denmark
Professor Dr. Peter Zec, Founder & CEO of Red Dot, Essen, Germany

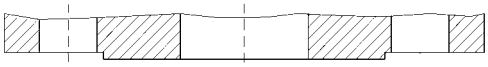
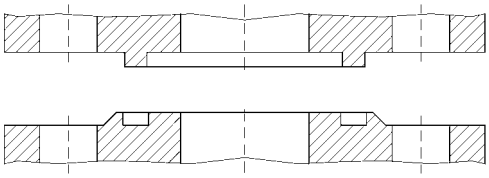
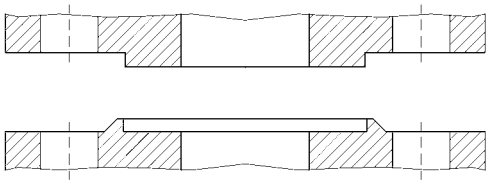
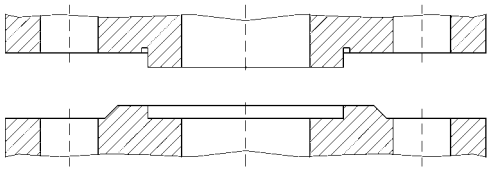
Information on the flange standard EN 1092 / international comparison of grades

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**	**Shape**	**Standard**	**R_z (µm)**	**Shape**	**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
Spring Groove		F N	DIN 2512		C D	3.2 – 12.5
Spigot Recess		V 13 R 13	DIN 2513		E F	12.5 – 50
Spigot Recess		V 14 R 14	DIN 2514 for O rings		H G	3.2 – 12.5

* 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
1.4305	x 8 CrNiS 18-9	303
1.4310	x 12 CrNi 177 / x 10 CrNi 188	301
1.4401	X 5 CrNiMo 17 123	316
1.4404	X 2 CrNiMo 17 132	316 L
1.4435	X 2 CrNiMo 18 143	316 L
1.4462	X 2 CrNiMoN 22 53	318 L
1.4542	X 5 CrNiCuNb 16-4	630
1.4571	X 6 CrNiMoTi 17 122	316 Ti
1.4541	X 6 CrNiTi 18-10	321

DIN: Deutsches Institut für Normung

AISI: American Iron Steel Institute

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	0.0001	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		0.01019716	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	0.000013951	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

AFRISO

Information on the Pressure Equipment Directive (PED) 2014/68/EC
Pressure Equipment Directive (PED)

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 4, 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-related function) are treated separately.
- Our pressure gauges comply with the European Standards EN 837-1 and EN 837-3 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 40/50/63 GT, 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 (for example, halocarbon) can be used 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 92 for pressure gauges for oxygen or acetylene.

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Silicone-filled pressure measuring instruments may not be used in production facilities for paint and lacquer and in paint shop environments.

Selection criteria/safety considerations for pressure gauges as per EN 837-2

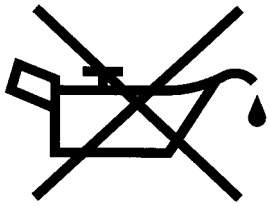
Pressure gauges for oxygen and acetylene

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 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

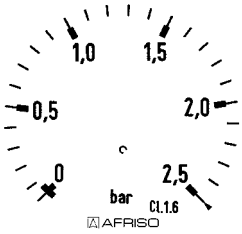
	NG 40 - 80 S 2/S 3	NG 100 - 250 S 3
Version	RF 50 ST RF 50 GT RF 63 ST RF 63 GT RF 63 MK/IK D 3x2 RF 63 Si D 4x2	RF 100 Si D 4x2 RF 160 Si D 4x2

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	5 bar					
0 ... 1600 bar	50 bar					

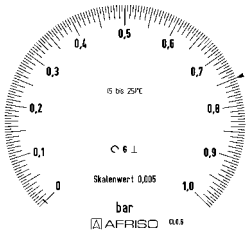
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 2.5 bar	0.05 bar	0 ... 25 mbar	0.5 mbar	0 ... 250 mbar	5 mbar	
-1 ... +1.5 bar	0.05 bar	-10 ... +15 mbar	0.5 mbar	-100 ... +150 mbar	5 mbar	
0 ... 25 bar	0.5 bar	-15 ... +10 mbar	0.5 mbar	-150 ... +100 mbar	5 mbar	
0 ... 250 bar	5 bar	-25 ... 0 mbar	0.5 mbar	-250 ... 0 mbar	5 mbar	

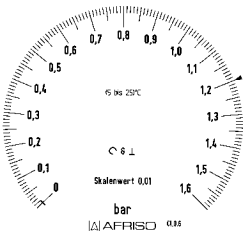
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.1 bar	0 ... 4.0 mbar	0.1 mbar	-25 ... +15 mbar	1 mbar	
-1 ... +3 bar	0.1 bar	-1.5 ... +2.5 mbar	0.1 mbar	-40 ... 0 mbar	1 mbar	
0 ... 40 bar	1 bar	-2.5 ... +1.5 mbar	0.1 mbar	0 ... 400 mbar	10 mbar	
0 ... 400 bar	10 bar	-4 ... 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	

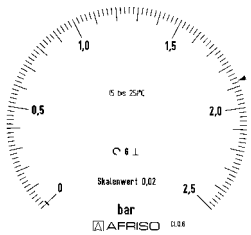
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 0.6 bar	0.01 bar	0 ... 6 mbar	0.1 mbar	-40 ... +20 mbar	1 mbar	
-0.6 ... 0 bar	0.01 bar	-2 ... +4 mbar	0.1 mbar	-60 ... 0 mbar	1 mbar	
0 ... 6 bar	0.1 bar	-4 ... +2 mbar	0.1 mbar	0 ... 600 mbar	10 mbar	
-1 ... +5 bar	0.1 bar	-6 ... 0 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	

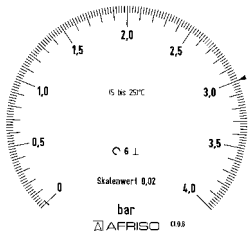
Dials for pressure gauges – graduation

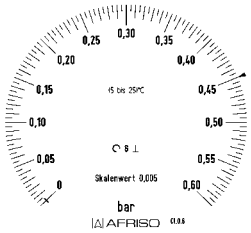
Housing diameter (NG) 160, 250 – accuracy class 0.6 – DIN 16123

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	

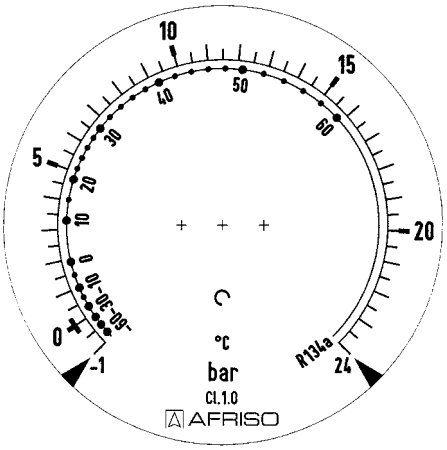
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.02 bar	0 ... 40 mbar	0.2 mbar	0 ... 400 mbar	2 mbar	
-1 ... +3 bar	0.02 bar	-15 ... +25 mbar	0.2 mbar	-150 ... +250 mbar	2 mbar	
0 ... 40 bar	0.2 bar	-25 ... +15 mbar	0.2 mbar	-250 ... +150 mbar	2 mbar	
0 ... 400 bar	2 bar	-40 ... 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	

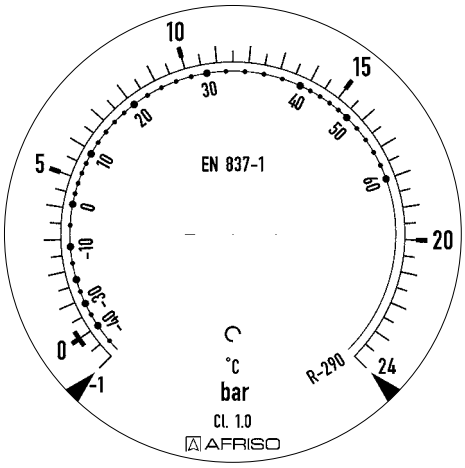
Temperature scales for refrigerant dew point temperature

Example range -1/+24 bar

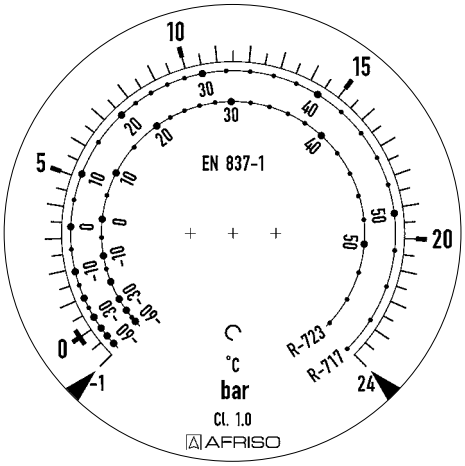
R 134a



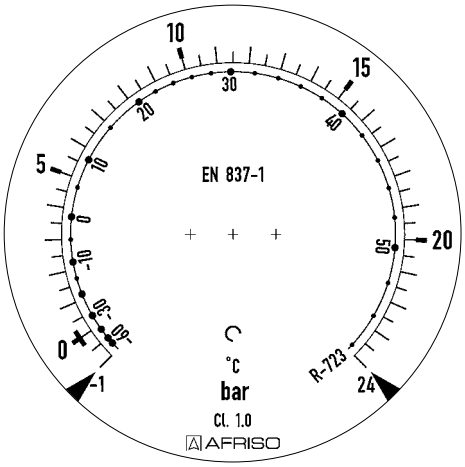
R 290



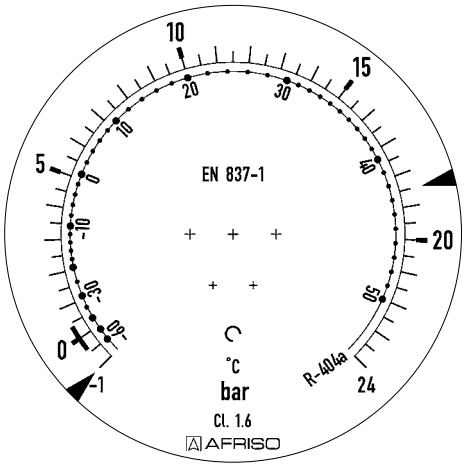
R 723 / R 717



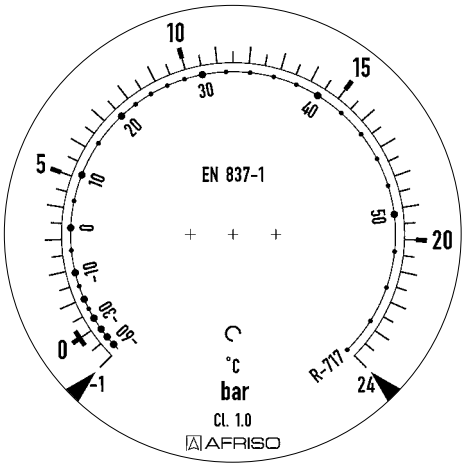
R 723



R 404A



R 717 (NH3)



Standard colours for temperature scales: R 717 = red

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 ☐ Capacitance Continuous measurement: ☐ Mechanical ☐ Pneumatic ☐ Capacitance ☐ Hydrostatic ☐ Ultrasonic ☐ Guided micropulse (TDR)
Required outputs	☐ 4–20 mA ☐ 0–10 V ☐ HART ☐ Digital ☐ Limit level contacts, no. ☐ Other:
Required accuracy	
Medium to be measured	
Viscosity/density/granule size	
Dielectric constant (ε_r)	
Surface medium	☐ Calm Foam ☐ Yes, Thickness:_____ ☐ Turbulent ☐ No Water content:_____
Changing media	☐ Yes ☐ No
EX protection	☐ No ☐ Yes, EX zone _____
Approved overfill prevention system required	☐ No ☐ Yes,_____
Temperatures	T_{max} medium: T_{max} ambient: T_{min} medium: T_{max} ambient:
Tank height / diameter	
Tank shape	☐ Cylindrical ☐ Rectangular ☐ Vertical ☐ Horizontal
Is the tank pressurised?	☐ Not pressurised ☐ Yes, max. pressure _____bar
Tank with 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 ☐ In building ☐ Outdoor
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 ☐ Gas filled thermometer
Housing diameter	☐ 34 ☐ 50 ☐ 63 ☐ 80 ☐ 100 ☐ 160 ☐ 250
Range	
Connection position	☐ Bottom ☐ Back ☐ Every angle version
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 ☐ Other:
Protective pipe material	☐ Brass ☐ Steel ☐ Stainless steel ☐ Other:
Dial	☐ Single scale as per EN ☐ Dual scale: ☐ Special scale: Customer logo ☐ Yes ☐ No
Accuracy class	Class ☐ 1 ☐ 2 as per EN 13190
Electrical contacts (only for gas filled thermometers)	☐ No ☐ Magnetic spring contact ☐ Inductive contact ☐ Single ☐ Dual 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 1000 ☐ Other: ☐ Class B ☐ Class A as per IEC 751 ☐ 2-wire ☐ 3-wire ☐ 4-wire
Neck	☐ No ☐ Yes, length _____mm ☐ Material stainless steel 316 Ti ☐ 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:
Protective pipe	☐ Weld-in thermowell as per DIN: ☐ Flanged thermowell, blind flange DN 25, PN 40 ☐ Other:
Material for process connection or thermowell	☐ Stainless steel 316 Ti ☐ 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:
Other	

Checklist for enquiries – pressure gauges

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Temperatures	T_{max} medium: T_{min} medium: T_{max} ambient: T_{min} ambient:
Pressure loads	Static: Dynamic: from to
Measuring system	☐ Bourdon tube ☐ Capsule element ☐ Diaphragm ☐ Magnetic piston ☐ Other: ☐ Spring diaphragm
Housing diameter	☐ 26 ☐ 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 ☐ Clamp fixing ☐ Back flange ☐ 3-hole fixing, panel mounting bezel
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	☐ No filling ☐ 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 316Ti/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
Accuracy class	☐ 0.6 ☐ 1.0 ☐ 1.6 ☐ 2.5 ☐ 4.0
Electrical contacts	☐ No ☐ Magnetic spring contact ☐ Inductive contact ☐ Reed contact ☐ Electronic contact ☐ 1 x ☐ 2 x ☐ 3 x ☐ 4 x Switching function:
Other	

Checklist for enquiries – chemical seals

Company:	Project/enquiry:	
Quantity		
Application		
Medium to be measured		
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 ☐ Piston type chemical seal ☐ In-line chemical seal ☐ Tongue type chemical seal	
Process connection (thread type and size / nominal diameter and nominal pressure)		
Material for wetted parts		
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 Height difference between pressure measuring instrument 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 ☐ Piezo-resistive thin film 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:
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 ☐ Window ☐ Burglary
	☐ Other parameters: _____		
Supply voltage	☐ Battery ☐ Mains		
Remote data transmission	☐ GSM ☐ Other:_____		
Required alarm inputs	☐ Digital Number:_____ ☐ Analogue Number :_____		
Required alarms	☐ 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 of Delivery

of AFRISO-EURO-INDEX GmbH · Lindenstraße 20 · 74363 Güglingen

§ 1 Validity

(1) All our deliveries, services and offers are exclusively made on the basis of the General Terms of Delivery. These General Terms of Delivery are part of all contracts with our contract partners (hereinafter referred to as "customers") we conclude pertaining to the deliveries or services provided by us. They also apply to all future deliveries, services or offers to the customer, even if they are not separately agreed again.

(2) General terms and conditions of the customer shall only become part of the contract if we expressly consent to their validity in writing. This consent requirement shall apply in any and all cases, even if, for example, we carry out deliveries to the customer without expressly rejecting the customer's general terms and conditions even though we are aware of such terms and conditions.

(3) Our General Terms of Delivery shall only apply if the customer is a business person (§ 14 BGB, German Civil Code), a legal person of public law or a public-law fund.

(4) The General Terms of Delivery shall apply in particular to contracts covering the sale and/or delivery of movable goods ("goods"), regardless of whether we manufacture the goods ourselves or purchase them from suppliers (§§ 433, 631 BGB, German Civil Code). Unless otherwise agreed, the General Terms of Sale in the version valid at the time of the customer's order shall be deemed to be an outline agreement for future contracts of the same kind; we shall not be obliged to state their validity for each and every individual case.

(5) Individual agreements with the customer (including supplementary agreements, amendments and modifications) which have been made in individual cases shall always take precedence over these General Terms of Delivery. The contents of such agreements shall be subject to a written contract and/or our written confirmation, subject to proof of the contrary.

(6) Legally relevant declarations and notifications by the customer in relation to the contract (e.g. setting of a deadline, notification of defects, withdrawal or reduction) must be made in writing (e.g. letter, e-mail, fax). Statutory formal requirements and other evidence, especially in the event of doubts about the legitimacy of the declaring party, remain unaffected.

(7) Any reference to the validity of statutory provisions is only for the purpose of clarification. Even without such a clarification, therefore, the statutory provisions shall apply if and to the extent that they have not been modified or expressly excluded in these General Terms of Delivery.

§ 2 Offer and conclusion of contract

(1) All our offers are free and non-binding, unless they are expressly marked as binding or contain a certain acceptance period. We shall have the right to accept orders within a period of fourteen days after receipt.

(2) The legal relationship between us and the customer shall be governed solely by the written purchase agreement, including these General Terms of Delivery. The written purchase agreement contains all agreements between the parties with regard to the contract. Any communication by us not made in writing prior to the conclusion of this contract is legally non-binding; any agreements of the contract parties not made in writing shall be replaced by the written contract, unless it is expressly stated that they shall be binding.

(3) Amendments and modifications to the agreements, including these General Terms of Delivery, must be made in writing in order to be effective. With the exception of managers or authorized signatories, our employees are not entitled to make any differing verbal agreements. Transmission via telecommunication systems, in particular via fax or via e-mail, shall be deemed to be a sufficient instrument in writing, provided that the copy of the signed declaration is transmitted.

(4) Any information or representation whatsoever on our part with regard to the delivery or service (such as, but not limited to weights, dimensions, performance values, loads, tolerances and technical data) shall be deemed to be approximate, unless the usability for the purpose provided by the contract requires accurate conformity. Such information or representations do not constitute guaranteed characteristics, but descriptions or markings of the delivery or service. Any standard deviations and deviations which are made according to statutory provisions or which represent technical improvements, as well as the replacement of components by equivalent parts, are permissible if they do not impair the usability for the purpose intended by the contract.

(5) We reserve the right to property or copyright to all offers and cost estimates submitted by us as well as to all drawings, illustrations, calculations, brochures, catalogues, models, tools and other documents and equipment provided to the customer. The customer shall not be permitted to disclose these objects, as such or in content, to third parties, to make them known, to use them himself or through third parties or to reproduce them. At our request, he shall be obliged to completely return such objects to us and to destroy any copies produced if they are no longer required by him in the normal course of business or if negotiations do not lead to the conclusion of a contract. Storage of data provided electronically for the purpose of standard data backup shall be the only exception to this.

§ 3 Prices and payment

(1) The prices apply to the scope of services and delivery specified in the order confirmations. Additional or special services will be charged separately. The prices are in EURO ex works plus packaging, the applicable value added tax, and, for export deliveries, customs duties as well as fees and other public charges.

(2) If the agreed prices are based on our list prices and if the delivery is to be effected more than four months after conclusion of the contract, our list prices valid at the time of delivery shall apply (minus any percentage discount or fixed discount that may have been agreed).

(3) Invoices shall be payable within 30 days from the invoice date without any deduction, unless otherwise agreed in writing. The date of unconditional credit on our business account shall be decisive for payment in due time. Payment by check shall be excluded, unless agreed separately, as the case may be. If the customer does not pay by the due date, an interest of 5 % per year shall be due on the amounts payable; we shall be entitled to claim higher interest and further damages.

(4) Any set-off with counterclaims of the customer or retention of payments due to such claims shall only be permissible if and to the extent that such counterclaims are undisputed or asserted by a court.

(5) We shall be entitled to deliver or provide outstanding deliveries or services after prepayment or provision of security if, after the conclusion of the contract, we become aware of circumstances which substantially reduce the creditworthiness of the customer and which jeopardise the payment of our outstanding claims arising from the contract against the customer (including claims from other individual contracts pursuant to the same outline agreement).

§ 4 Delivery and delivery period

(1) Deliveries are made ex works.

(2) Time limits and deadlines for deliveries and services indicated by us are only approximate, unless a fixed deadline or a fixed date has been explicitly assured or agreed. If shipping has been agreed, delivery periods and delivery dates refer to the date of transfer to the forwarding agent, freight carrier or to any other third party in charge of shipping.

(3) Without prejudice to our rights arising from default of the customer, we shall be entitled to demand from the customer an extension of delivery and performance periods or a postponement of delivery and performance dates for the period during which the customer does not meet his obligations pursuant to the contract.

(4) We shall not be liable for impossibility of delivery or for delays in delivery, if such impossibility or delay is caused by force majeure or other events unforeseeable at the time of the conclusion of the contract which are beyond our control or for which we cannot be held responsible or which we have not caused (e.g. disruptions of operations of any kind, difficulties in procuring materials or energy, transport delays, strikes, lawful lockouts, lack of labour, energy or raw materials, difficulties in procuring necessary regulatory approvals, governmental measures, or incorrect or delayed supply by suppliers. Insofar as such events make the delivery or service substantially more difficult or impossible and the hindrance is not only of temporary duration, we are entitled to withdraw from the contract. In the case of hindrances of a temporary nature, the delivery or performance periods shall be extended or the delivery or performance dates shall be postponed by the period of the hindrance plus a reasonable start-up period. If, as a result of the delay, the customer cannot reasonably be expected to accept the delivery or service, the customer shall be entitled to withdraw from the contract, which is to be performed immediately by an instrument in writing.

(5) We shall be entitled to deliver and provide partial deliveries and partial services only:
- if the partial delivery is reasonable for the customer and sufficient consideration is given to his legitimate interests,
- if the delivery of the remaining ordered goods is assured and
- if, as a result, the customer does not incur any substantial additional costs or additional efforts (unless we are willing to pay for such costs).

(6) If we are in default with a delivery or service or if a delivery or service is impossible for any reason whatsoever, our liability for compensation shall be limited pursuant to provision § 8 of these general Terms of Delivery.

§ 5 Place of performance, shipping, packaging, passage of risk, acceptance

(1) The place of performance for all obligations resulting from the contract shall be the registered office of our company in Güglingen, unless other agreements have been made. If the installation is part of the contract, the place of performance shall be the place at which the installation is to be performed.

(2) The type of shipping and packaging are subject to our discretion. The cost of shipping and packaging shall be borne by the customer. If the customer requires drop shipping delivery, we shall charge a processing fee of EUR 10.00 for each delivery.

(3) In cases of small orders with a net purchase value of less than EUR 100.00, we will charge a processing fee of EUR 15.00 in addition to shipping and packaging.

(4) The passage of risk to the customer shall be the point in time of the transfer of the good to be delivered (the beginning of the loading process being decisive) to the forwarding agent, freight carrier or to any other third party in charge of shipping. This shall also apply in the case of partial deliveries or if we have undertaken other obligations (e.g. shipping or installation). If the shipment or the transfer is delayed for a reason caused by the customer, the transfer of risk shall be the day on which the good to be delivered is ready for shipment and we have notified the customer to this effect.

(5) Storage costs incurred by us after transfer of risk shall be borne by the customer. If we store the goods to be delivered, the storage costs amount to 0.25% of the invoice amount of the delivered goods per completed week. We reserve the right to assert and prove further or lower storage costs.

(6) We will insure the shipment for transport without recognizing any legal obligation to this effect.

(7) If acceptance has to take place, the purchase item shall be deemed accepted if:
- the delivery and, provided we also have to perform installation, the installation are completed,
- we have communicated this to the customer with reference to the deemed acceptance in accordance with this provision § 5 (7) and have prompted the customer to accept the delivery,
- 12 business days have passed since the delivery or installation, or the customer has begun to use the purchased item (e.g. a delivered plant has been put into operation) and, in this case, six workdays have passed since delivery or installation, and
- within this period, the customer has refused acceptance for any reason other than for a defect of which the customer has notified us and which substantially impedes or make impossible the use of the purchased item .

§ 6 Warranty, material defects, acceptance of the disposal obligation by the customer

(1) The warranty period shall be one year from the date of delivery or, if acceptance is required, from the date of acceptance. This period shall not apply to claims for damages on the part of the customer resulting from injury to life, body or health or from wilful or grossly negligent breach of duty by us or our vicarious agents, which are subject to the limitation periods according to the statutory provisions.

(2) The goods delivered must be carefully inspected immediately after delivery to the customer or to the third party designated by the customer. With regard to obvious defects or other defects which would have been recognizable in the case of an immediate, careful examination, they shall be deemed to be accepted by the customer if we do not receive written notification of defects within seven workdays after delivery. With regard to other defects, the delivery items shall be deemed to have been accepted by the customer if the notice of defect does not reach us within seven workdays after the date of detection of the defect; if the defect was already recognizable by the customer at an earlier point in time in normal use, this earlier point in time shall be decisive for the beginning of the complaint period. Upon request by us, a rejected delivery item must be returned to us free of freight charges. In the case of a justified complaint, we shall reimburse the costs of the least expensive type of shipping; this shall not apply if the costs increase because the delivery item is located at a place other than the place of the intended use.

(3) In the case of material defects of the goods delivered, we shall first be obliged and entitled to rectify or replace the goods within a reasonable time. In case of failure, i.e. impossibility, unreasonableness, refusal or unreasonable delay of the improvement or replacement delivery, the customer shall be entitled to withdraw from the contract or to reasonably reduce the purchase price.

(4) Insignificant or typical variations in colour, dimensions, weight and quality shall not be considered to be defects of the delivery items.

(5) If a defect is the result of error on our part, the customer shall be entitled to claim damages under the conditions stipulated in provision § 8 hereto.

(6) In the case of defects of components of other manufacturers, which we cannot remedy for license or actual reasons, we will, at our discretion, assert our warranty claims against the manufacturers and suppliers on behalf of the customer or assign them to the customer. In the case of such defects, there shall only be warranty claims against us subject to the other conditions and according to the provisions of these General Terms of Delivery and only if the aforementioned claims against the manufacturer and suppliers could not be enforced or if such enforcement is futile, for example, due to insolvency. During the duration of the legal dispute, the period of limitation of the customer's warranty claims against us shall be suspended.

(7) The warranty shall be void if the customer modifies the delivery item without our consent or has it modified by a third party and such modification renders the rectification of the defect impossible or unreasonable. In any such case, the customer shall bear the additional costs arising from such modification for rectification of the defect.

(8) If, in individual cases, a delivery of used items is agreed with the customer, such delivery shall be performed under exclusion of any warranty for material defects.

(9) 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 pursuant to § 19, section 2 of the German Electronic Equipment Act (obligation of the manufacturer to take back the product) and from any claims of third parties related to 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 customer fails to contractually oblige third parties to which the customer transfers the delivered goods to take on the disposal obligation and to oblige his customers to take on such disposal obligation, the customer shall be obliged to take back the delivered goods at his own expense after the end of use and to dispose of them properly in accordance with the statutory provisions. Our claim to the above transfer of obligation/indemnification through the customer shall be extended by a period of limitation of two years after the final termination of the usage of the delivery item. The two-year period of suspension of the limitation shall not begin until we receive a written notice from the customer stating that he has ceased to use the device.

§ 7 Infringement of property laws

(1) Pursuant to this provision § 7, we shall ensure that the delivery item is free from industrial property rights or third-party copyrights. Each contract partner shall immediately notify the other contract partner in writing if claims with regard to the infringement of such rights are asserted against him.

(2) In the event that the delivery item infringes an industrial property right or copyright of a third party, we shall, at our discretion and at our expense, alter or replace the delivery item in such a way that no rights of third parties are infringed, but the delivery item continues to fulfil the contractually agreed functions; or we shall enter into a license agreement in order to obtain the right to use the delivery item for the customer. If we should not be able to succeed within a reasonable period, the customer shall be entitled to withdraw from the contract or to reasonably reduce the purchase price. Any claims for damages of the customer are subject to the restrictions of provision § 8 of these General Terms of Delivery.

(3) In the case of infringements of laws by products of other manufacturers delivered by us, we shall, at our discretion, assert our claims against the manufacturers and suppliers on behalf of the customer or assign such claims to the customer. In these cases, there shall only be claims against us subject to the provisions of this provision § 7 and only if the aforementioned claims against the manufacturer and suppliers could not be enforced or if such enforcement is futile, for example, due to insolvency.

(4) If an order is to be filled (designs, etc.) according to customer specifications, drafts or instructions, it is the sole responsibility of the customer to obtain all rights of commercial exploitation of the property rights that may be contained in his specifications, drafts or instructions. If the execution of an order according to specifications, etc. of the customer violates third-party property rights or labelling obligation, the customer shall undertake to indemnify us from any resulting claims for compensation, compensation for expenses and / or reimbursement of third parties.

§ 8 Liability for damages in case of fault

(1) Our liability for damages, irrespective of the legal grounds, in particular from impossibility, delay, defective or incorrect delivery, breach of contract, breach of obligations in the case of contractual negotiations and tort, shall be limited subject to the provisions of this provision § 8.

(2) We shall not be liable in the case of simple negligence on the part of our organs, legal representatives, employees or other vicarious agents, to the extent that this is not a violation of contractual obligations. Essential with regard to the contract are the obligation to deliver and/or install the delivery item in good time, its freedom from deficiencies in law and its freedom from defects which impair its functionality or usability more than insignificantly, as well as advisory, protection and custodial obligations which allow the customer to use the delivery item as per contract, or which serve the protection of the health or life of the customer's personnel or the protection of his property against substantial damage.

(3) To the extent that we are liable for damages pursuant to provision § 8 (2) hereto, such liability shall be limited to damages which we have foreseen at the time of conclusion of the contract as a possible consequence of an infringement of the contract, or which we should have foreseen applying due diligence. Indirect damages and consequential damages which are the result of defects of the delivery item shall only be subject to damages to the extent that such damage is typically to be expected when the delivery item is used as intended.

(4) In the case of liability for simple negligence, our obligation to indemnify for damage to property and consequential financial loss shall be limited to the amount covered by our liability insurance and standard in our industry, even in the case of a breach of essential contractual obligations. Upon request, we will provide the customer with a corresponding insurance confirmation stating the amount covered by the liability insurance carrier.

(5) The above exclusions and limitations of liability shall apply to the same extent on behalf of our organs, legal representatives, employees and other vicarious agents.

(6) If we provide technical information or consultancy services and such information or services are not a part of the scope of services agreed upon by contract and owed by us, this shall be free of charge and without any liability whatsoever.

(7) The limitations of this provision § 8 shall not apply to our liability for intentional conduct, for guaranteed characteristics, for injury to life, body or health or pursuant to the German Product Liability Act (Produkthaftungsgesetz).

§ 9 Retention of title

(1) We retain the title to the sold goods until we have received full payment of all our present and future receivables arising from the purchase contract and from an ongoing business relationship (secured claims).

(2) Prior to full payment of the secured claims, the goods subject to retention of title shall neither be pledged to third parties nor transferred to third parties for security. The customer shall notify us in writing immediately if an application for the opening of insolvency proceedings is filed or if third parties attempt to seize the goods under retention of title (e.g. by means of distraint or attachment).

(3) In the case of a breach of contract by the customer, in particular in the event of non-payment of the purchase price due, we shall be entitled to withdraw from the contract pursuant to the statutory provisions and to reclaim the goods as a result of retention of title and withdrawal. If the customer does not pay the purchase price due, we shall only be entitled to assert these rights if we have previously set the customer a reasonable deadline for payment without success, or if such a deadline is not required pursuant to the statutory provisions.

(4) The customer shall be entitled to resell and/or process the goods under retention of title in the ordinary course of business, subject to revocation pursuant to (c) below. In this case, the following provisions shall apply in addition.
(a) The retention of title shall cover the full value of the products resulting from processing, mixing or combining our products; we shall be deemed the manufacturer. If, in the case of processing, mixing or combining with goods of third parties, their rights of ownership remain, we shall acquire co-ownership to the ratio of the invoice amounts of the processed, mixed or combined goods. The same provisions that apply to the goods delivered under retention of title shall apply to the resulting new product.
(b) The customer shall assign to us, as a security, the claims arising against third parties from the resale of the goods or of the product in whole or to the amount of our possible co-ownership pursuant to the preceding paragraph. We accept the assignment. The obligations of the customer pursuant to provision § 9 (2) hereto shall also apply in respect of the assigned claims.
(c) The customer shall remain entitled to collect the claim in addition to us. We undertake not to collect the claim as long as the customer meets his payment obligations, as long as the customer performs and as long as we do not assert the retention of title by exercising a right pursuant to provision § 9 (3) hereto. If any of the above 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 the debtors (third parties) of such assignment. In this case, we shall also be entitled to revoke the customer's authorization to resell and process the goods subject to retention of title.

(d) If the liquidable value of the securities exceeds our claims by more than 10 %, we shall, at the customer's request, release securities at our discretion.

§ 10 Final clause

(1) If the customer is a merchant, a legal person under public law or a public-law fund or if the customer has no general court of jurisdiction in the Federal Republic of Germany, the place of jurisdiction for all disputes arising from the business relationship between us and the customer shall be our registered office in Güglingen or the registered office of the customer. However, in such cases, Güglingen shall be the exclusive place of jurisdiction for actions against us. This provision does not affect statutory provisions regarding exclusive places of jurisdiction.

(2) The relations between us and our customers are subject exclusively to the laws of the Federal Republic of Germany. The United Nations Convention on Contracts for the International Sale of Goods (CISG) of April 11, 1980 shall not apply.

(3) If and to the extent that the contract or these General Terms of Delivery contain gaps in the provisions, those statutory provisions shall be deemed to have been agreed upon which the contract parties would have agreed upon in view of the economic objectives of the contract and the purpose of these General Terms of Delivery if they had been aware of the gaps.

Note

The customer shall be deemed to have been notified that we store data relating to the contractual relationship pursuant to § 28 Bundesdatenschutzgesetz (German Federal Data Protection Act) for the purpose of processing such data and that we retain the right to disclose such data to third parties (e.g. insurance companies) if and to the extent such disclosure is required to perform the contract.

November 2020

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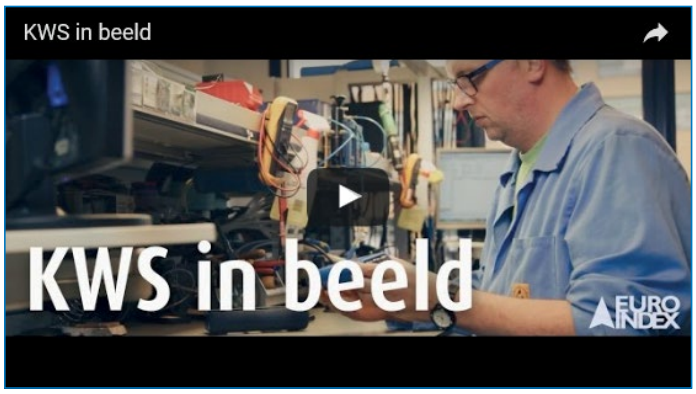

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Digitale toegang tot uw kalibratiecertificaten met Mijn KWS

Via het Mijn KWS webportal heeft u altijd en overal toegang tot uw kalibratiecertificaten en gerelateerde documenten.

MEER INFO

Verhuur van meetinstrumenten

- Uitgebreid assortiment
- Deskundig advies
- Instrumenten worden geleverd met accessoirepakket en herleidbaar kalibratiecertificaat

MEER INFO

EURO-INDEX Academy

- Producttrainingen (individueel en klassikaal)
- Seminars
- Demonstratie- en instructievideo's

MEER INFO

Servicebalie


Kalibratie rookgasanalyse


Seminars en workshops


Kalibratie thermografie

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