TANK EQUIPMENT
HEATING SYSTEMS
ACCESSORIES
ALARM UNITS
SMART HOME
WATER TECHNOLOGY

Complete catalogue 2023 / 2024

PRESSURE
TEMPERATURE
LEVEL
GAS ANALYSIS

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 domestic technology
Tank. Heating. Water Technology.

Germany:	North	-121
	West	-169
	East	-446
	South	-124
	Gas analysis	-255/-455
Export:		-125

Sales Group Industrial Technology
Pressure. Temperature. Level.

Germany:	North	-297
	Centre	-300
	South	-228
	South-East	-235
	Gas analysis	-166
Export:		-405

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.

Our complete catalogue covers all DOMESTIC TECHNOLOGY products for safety and measuring equipment for heating systems, solutions for energy savings and water technology. In addition, it contains alarm units, sensors, actuators and smart home systems for wireless building automation.

The area 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 level and tank monitoring as well as stationary gas analysis. PORTABLE MEASURING INSTRUMENTS can be found in a sperate catalogue.

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

How to work with this catalogue

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

Finding information
The complete catalogue is divided into 17 chapters. A chapter overview is provided on pages II and III. The blue chapter tabs on the side of the page let you 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 a single page.

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.com/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 product overview tables 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 € 150 a handling fee of € 25 plus shipping costs will be charged. No other minimum order conditions apply.

Return of goods
Goods can only be returned with return note and only up to 3 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 Ex 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
A separate gross price list is available for this catalogue. 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 € 15.– to a maximum of € 100.– 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 and approvals designate special features and application areas of the products. For certificates and manufacturer's declarations, please refer to chapter 17 or to www.afriso.com, INFO CENTRE > Downloads or to the directly to the product on the website.

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

The **Green Production** label distinguishes AFRISO products that make a special contribution to sustainability as a result of their production processes or application. Many of these products have an extremely low CO_2 footprint, since they are entirely manufactured according to ecological criteria at the respective AFRISO production site.

The **Bio-Oil** label certifies chemical resistance, and full performance and functionality of the products even if biodiesel or biofuel are used. The percentage shown corresponds to the maximum permissible FAME admixture (EN 14214).

The **Green Fuels Ready** label of the Federation of German Heating Industry (BDH) marks AFRISO products that are suitable for use with synthetically produced paraffinic fuels such as HVO or GTL.

In flood hazard areas, oil must be kept from escaping from oil tank systems as a result of buoyancy, flooding, or damage due to floating refuse. AFRISO products with the label **Suitable for Use in Flood Hazard Areas** meet this requirement.

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.

The **PED (Pressure Equipment Directive 2014/68/EU)** specifies the requirements for selling pressure equipment within the European Union. See chapter 17 for detailed information.

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.

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

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

3-A Sanitary Standards, Inc. is a non-profit organisation in the USA, dedicated to product safety in processes in the pharmaceutical and food industries.

The European Ecodesign Directive covers Energy-related Products (ErP) and is implemented in German law as the Energiebetriebene-Produkte-Gesetz, EBPG. ErP-Ready means that the electronic equipment bearing this mark complies with this directive and has an increased energy efficiency.

EnOcean is a battery-less wireless technology which allows for maintenance-free sensor solutions. These sensors deliver data for intelligent networks in buildings. The basic idea 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. Visit www.enocean.com for details.

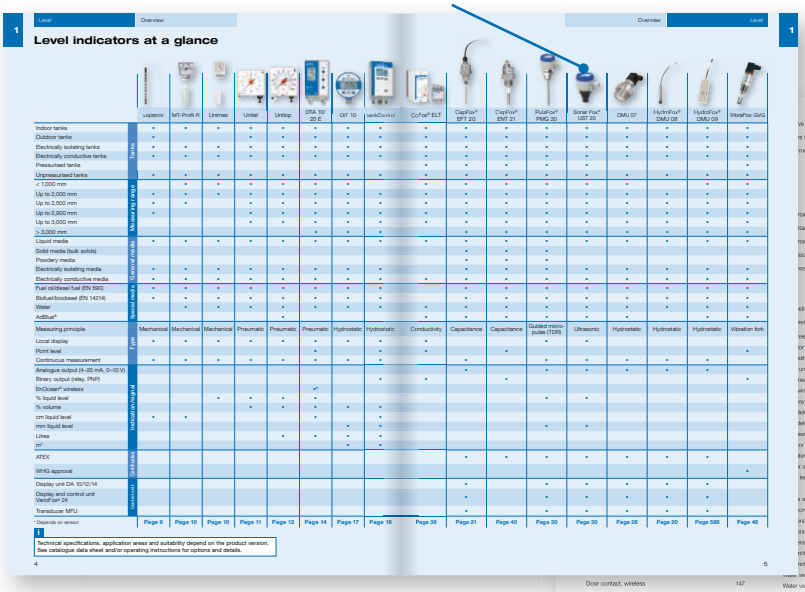
Suitable devices for any application. In order to be able to optimally focus on the requirements of the individual target markets, we have divided our product portfolio into the areas of **DOMESTIC TECHNOLOGY**, **INDUSTRIAL TECHNOLOGY** and **PORTABLE MEASURING INSTRUMENTS**. The corresponding icons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

How to work with this catalogue

AFRISO complete catalogue: Clear structure and layout

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

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



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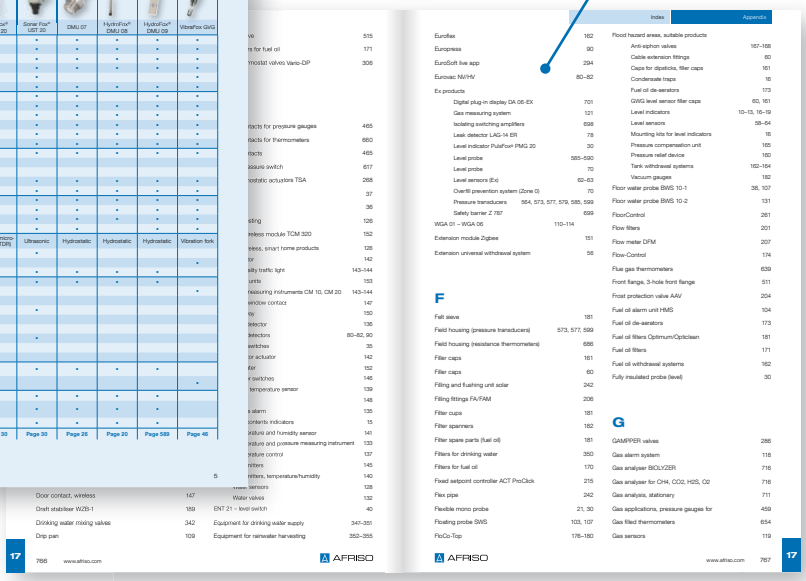


Navigation bar organised according to relevant selection criteria for fast orientation even when browsing through the catalogue.

Tab

Product advantages and **main benefits**

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

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

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

Appropriate **accessories** with page reference.

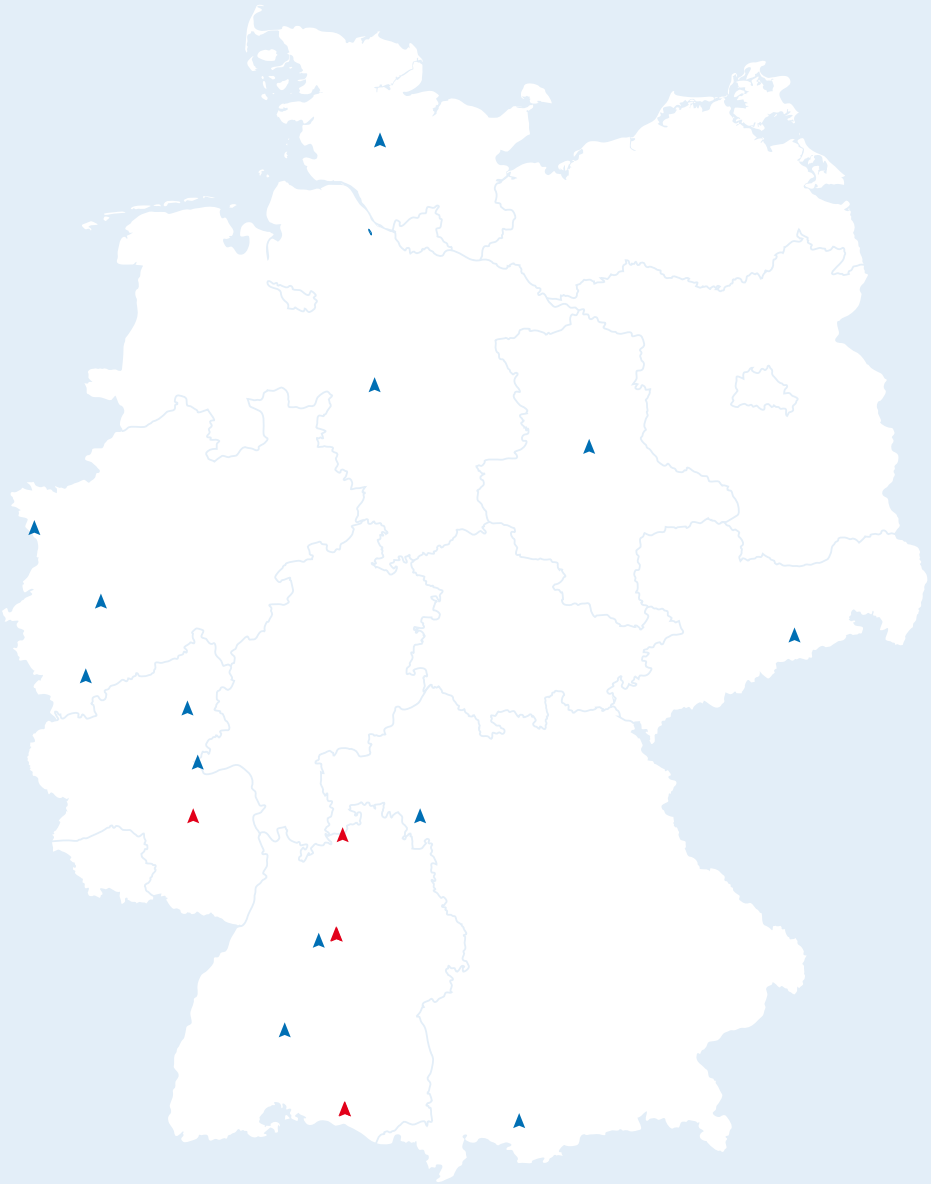
The **Info box** provides you with important information, e.g. about order processing, cross references and much more.

Order information table with part numbers, packing unit details plus options. Refer to the latest AFRISO gross price list for prices.

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.com/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.

AFRISO production sites in Germany.

Made in Germany

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

A staff of more than 650 are at work for you in our four German production sites.

AFRISO training centre

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 1,600,000 individual devices and instruments are available ex stock.

With a storage and logistics area of more than 3,750 m^2 and a storage capacity of over 3,500 bin locations, the storage and service centre, which went into operation in 2021, offers sufficient space for current and future requirements.

AFRISO development centre for portable measuring instruments

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

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

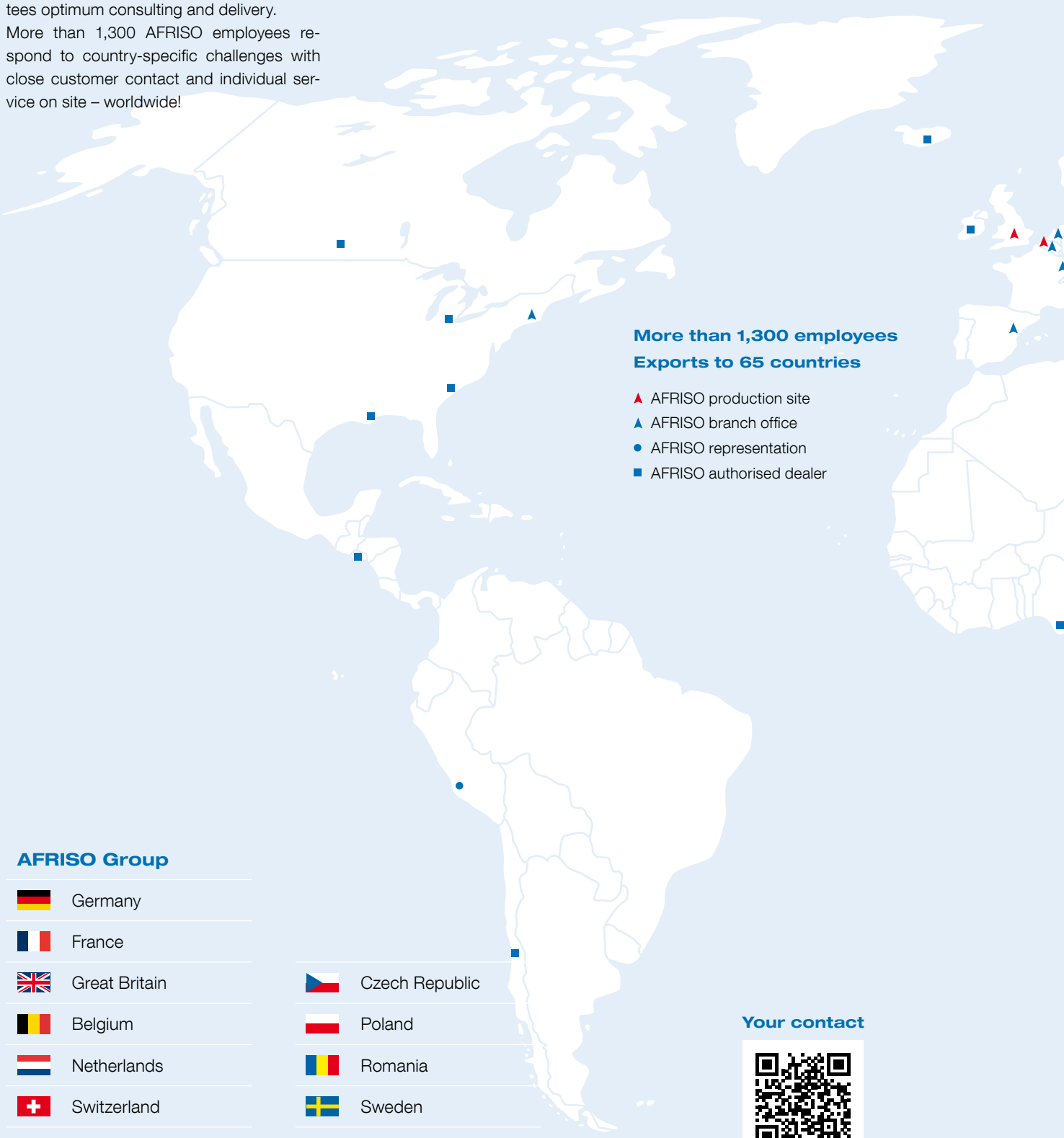
Plant Amorbach – Production of linings
AFRISO-EURO-INDEX GmbH
Von-Stein-Straße 17
63916 Amorbach
Odenwald/Bavaria

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

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 1,300 AFRISO employees respond to country-specific challenges with close customer contact and individual service on site – worldwide!



More than 1,300 employees
Exports to 65 countries

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

AFRISO Group

- Germany
- France
- Great Britain
- Belgium
- Netherlands
- Switzerland
- Austria
- Spain
- Italy
- Hungary
- Czech Republic
- Poland
- Romania
- Sweden
- Russia
- China
- India
- USA

Your contact

www.afriso.com/worldwide

AFRISO

AFRISO production sites

- Germany
- Belgium
- Great Britain
- Sweden
- Romania
- China

AFRISO representations

- Norway
- Finland
- Denmark
- Lithuania
- Latvia
- Belarus
- Italy
- Croatia
- Iran
- United Arab Emirates
- Egypt
- Peru
- Thailand
- Vietnam
- South Korea

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 units 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, for example, 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, associations and guilds. We tap our employees' know-how and expertise in the industry to make our customers' processes simpler, safer and more com-

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 testers and apps for flue gas analysis and technical building equipment 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

petitive. 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

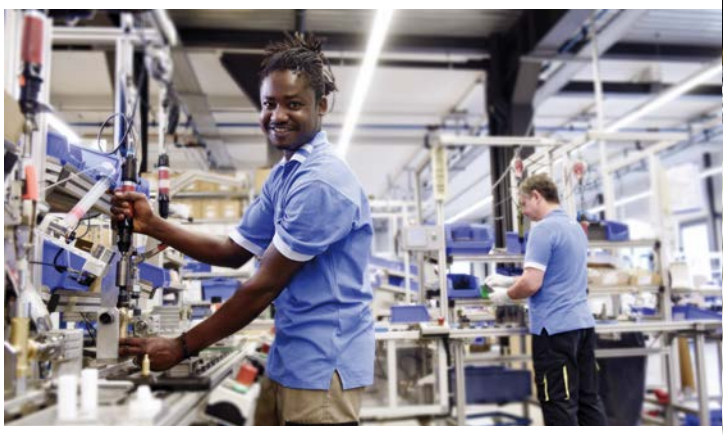
The guarantee for high-quality products.

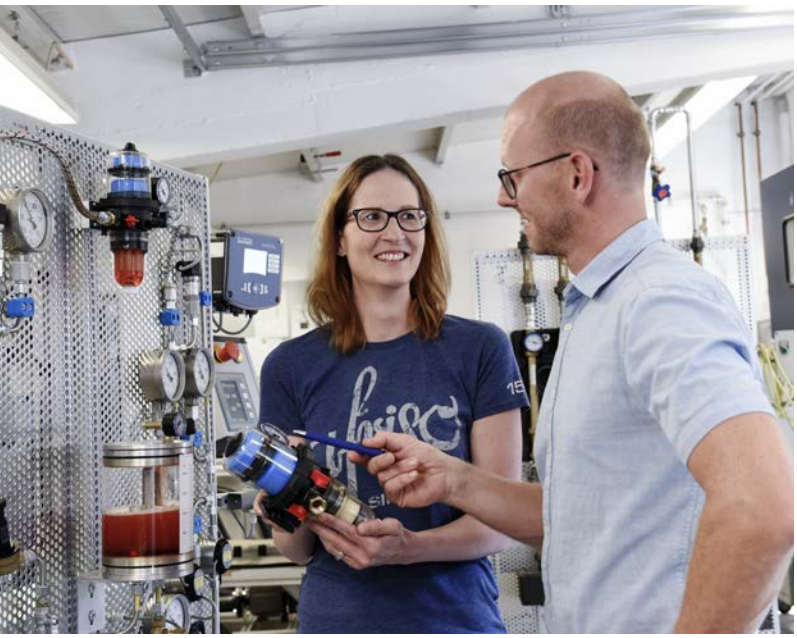
AFRISO quality

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.






AFRISO

For us, ecological responsibility along the entire value chain is not a hype.

Together, we make the world more sustainable

For many, sustainability is trendy. Many companies have now jumped on the sustainability bandwagon. We were instrumental in putting this train on the track more than 50 years ago. Today, ecological thinking is firmly anchored in our products and corporate processes. For us, sustainable business means securing business success in the long term while protecting natural resources.

Short transport routes are beneficial for the environment.

Green Production

The "Green Production" label underpins that sustainability takes centre stage. Using plastic as an essential raw material allows us to manufacture our products with low material input and energy consumption. We control most of the processes ourselves and are not dependent on suppliers. This dramatically reduces transport. For example, in the Güglingen plant, everything from tool design to plastic injection molding to final assembly is performed within a distance of 250 m in a production hall. Therefore, our products have always had an extremely small CO_2 footprint. Replacing metal with plastic accelerates this.

In the new logistics and service centre, building technology operational processes are perfectly aligned: Electricity from the 2,078 m² photovoltaic area is used to operate the forklift trucks, heat pumps and electric vehicles for shuttling between the plant halls.

Mission: Optimisation

For decades, our commitment to "Technology for Environmental Protection" has been both a requirement and an obligation to constantly put products and processes to the test. When new products are developed or existing ones are revised, ecological aspects are also a part of the focus: What is the required product size? How much weight can be saved? How do we ensure a long service life? Or: Which environmentally compatible raw materials and packaging materials can be used? The objective is to find partners in the region and, of course, to manage projects with others in a digitised, paperless way. Using LED lighting or concepts for optimum heating of office space conserve resources and contribute to increasingly CO_2-reduced operations.

Answers to today's pressing questions

Our corporate values of independence and reliability are pillars on which the AFRISO brand is based. The fact that our products are manufactured in the middle of the main sales regions with a high degree of vertical integration attest to this. On our way to becoming an energy self-sufficient company, we have remained true to Germany and do not need any "re-globalization". In this way, we can remain flexible even in times of crisis and respond quickly to changing challenges.

On the company site with a size of four hectares, 30 % green area with over 160 trees and 270 bushes create a "green lung". Our employees like to relax in the park-like area during breaks. In addition, orchard trees matching the cultural landscape, flower meadows as well as green roof areas are available as habitat and food supply for insects and our own AFRISO bee colonies.

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 an internationally 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 17 branches. Together with more than 15 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 and Jürgen Fritz

AFRISO milestones

1869: Foundation of the company by Adelbert Fritz in Schmiedefeld am Rennsteig (Thuringia).

AFRISO became a globally renowned brand for temperature and pressure measurement.

1924: A new era commenced with the patent and the production of capsule elements: 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.

Up to 1945: Production of glass thermometers and glass instruments for medical applications and laboratory equipment.

In the Germany-wide spirit of optimism of the 1950s, Franz and Georg Fritz began rebuilding the company in Kleingartach and Güglingen/Baden-Württemberg.

The capsule element was also key in the development of pneumatic level indicators which marked the entry to the fuel oil market **in 1955**. This was followed by mechanical level indicators, overfill prevention systems and leak monitoring systems for the safe storage of oil products.

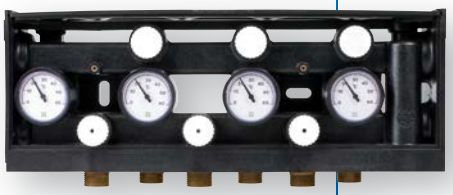
1958: Products for electronic level measurement extended the range for industrial applications.

Market launch of the first portable electronic flue gas analyser.

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.

Market launch of the first compact plastic manifold for surface heating systems.



1960 **1972** **1974** **1981**

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

2021 **2020** **2019** **2016**

Commissioning of logistics and service centre Güglingen, total investment: 6.5 million Euros.

Acquisition of the majority of shares in Belparts N.V., Rotselaar (Belgium).

150 YEARS

Anniversary year

Wireless AFRISO smart home system for building automation.

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

1994

1996

Internationalisation: Founding of subsidiaries in Eastern Europe.

Presentation of the first modular plastic manifold for brine.

2006

Founding of subsidiaries in China and India.

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

2008

Market launch: Product portfolio for solar thermal systems.

solar

2009

Acquisition of the start-up CODEATELIER for further development of the smart home solutions

CODEATELIER

Innovative products for the heat pump sector complete the OEM range.

2014

AFRISO

Expansion and new brand identity of the AFRISO group: Introduction of the new company logo.

2012

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

2011

Acquisition of Gampper Technik GmbH – Control units and fittings for hydraulic balancing extended the product portfolio.

Gampper ARMATUREN

2015

Complete Catalogue

Measuring, Control and Monitoring Technology for Domestic, Industrial and Environmental Applications

SonarFox® UST 20

TankControl

HydroFox DMU 08

CHAPTER 1

Level indicators and level controllers

OVERVIEW

LEVEL – CONTINUOUS

LEVEL – POINT LEVEL

Level indicators at a glance

		Dipstick	MT-Profil R	Unimes	Unitel	Unitop	DTA 10/ 20 E	DIT 10	TankControl
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	Mechanical	Mechanical	Pneumatic	Pneumatic	Pneumatic	Hydrostatic	Hydrostatic
Local display		•	•	•	•	•	•	•	•
Point level							•		•
Continuous measurement		•	•	•	•	•	•	•	•
Analogue output (4–20 mA, 0–10 V)	Indication/signal								
Binary output (relay, PNP)									•
EnOcean® wireless							•*		
% liquid level				•	•	•	•		
% volume					•	•	•	•	•
cm liquid level		•	•				•		•
mm liquid level								•	•
Litres						•	•	•	•
m³								•	•
ATEX	Certificates								
WHG approval									
Display unit DA 10/12/14	Control unit								
Display and control unit VarioFox® 24									
Transducer MFU									
* Depends on version		Page 9	Page 10	Page 10	Page 11	Page 12	Page 14	Page 17	Page 18

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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.

								
CoFox® ELT	CapFox® EFT 20	CapFox® ENT 21	PulsFox® PMG 20	Sonar Fox® UST 20	DMU 07	HydroFox® DMU 08	HydroFox® DMU 09	VibraFox GVG
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
•	•	•	•	•	•	•	•	•
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•	•	•	•	•	•	•	•	•
•	•	•	•	•	•		•	•
Conductivity	Capacitance	Capacitance	Guided micro-pulse (TDR)	Ultrasonic	Hydrostatic	Hydrostatic	Hydrostatic	Vibration fork
•			•	•				
•		•						•
	•		•	•	•	•	•	
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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	CapFox® EFT 20	CapFox® ENT 21	VibraFox GVG
Agriculture	Fertilizer (aqueous solution)	Liquid	78	●	o	o	o	●	–
	Manure	Liquid	78	●	●	o	o	●	●
	Grain and seeds	Solid	3.0–5.0	●	o	–	●	●	o
	Animal feed mixtures	Solid	3.0–5.0	●	o	–	●	●	o
	Vegetable oil	Liquid	2.5	●	●	●	●	●	●
Construction materials	Calcium carbonate aqueous solution	Liquid	78	o	●	o	o	o	–
	Cement	Solid	1.5–10	●	–	–	●	●	–
	Ground, stone, sand, gravel	Solid	2.5–5.0	o	–	–	●	●	–
	Powdered lime (CaO)	Solid	1.6–2.2	●	–	–	●	●	–
	Slacked lime (lime hydrate) / lime milk ($Ca(OH)_2$)	Liquid	–	o	●	–	o	●	–
	Gravel	Solid	5.5	●	o	–	o	●	–
	Liquid asphalt	Liquid	2.8	●	–	–	●	●	–
	Bitumen	Liquid	2.8	●	–	–	●	●	–
Chemical Industry	Ammonia (NH_3)	Liquid	17–25	●	–	o	o	●	●
	Ammonium hydroxide (NH_4OH) 25 %	Liquid	30–32	●	o	o	o	–	●
	Ammonium chloride (NH_4Cl) aqueous solution 33 %	Liquid	35–40	o	o	o	o	–	●
	Boric acid (H_3BO_3), aqueous solution	Liquid	> 25	o	o	o	o	o	●
	Carbon tetrachloride (CCl_4)	Liquid	2.3	o	o	–	o	o	●
	Ether, diethyl-ether $(CH_3CH_2)_2O$	Liquid	3.1–4.4	o	o	o	o	–	●
	Formaldehyde (HCHO) in H_2O, formalin	Liquid	23	●	o	–	o	–	●
	Fluorosilicic acid [(H_2SiF_6)in H_2O)]	Liquid	> 35	o	o	o	o	–	●
	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	5.0	o	o	o	–	–	–
	Ferric chloride [($FeCl_3$) in H_2O)]	Liquid	1.9	o	o	o	–	–	–
	Formic acid (HCO_2H)	Liquid	57.9	o	o	o	o	o	–
	Phosphoric acid (H_3PO_4)	Liquid	3.2	o	o	–	o	o	–
	Sodium chloride [(NaCl) in H_2O)]	Liquid	> 25	o	o	o	–	o	–
	Sodium carbonate, soda (Na_2CO_3)	Solid	5.3–8.4	o	–	o	o	o	–
	Sodium hydroxide, caustic soda [(NaOH) in H_2O)]	Liquid	> 25	o	o	–	–	–	–
	Sodium bicarbonate, baking soda ($NaHCO_3$)	Solid	5.7	o	–	–	–	–	–
	Sodium hypochlorite [(NaOCl) in H_2O)], bleach	Liquid	> 25	o	o	–	–	o	●
	Potassium permanganate [($KMnO_4$) in H_20)]	Liquid	> 25	o	o	o	–	–	o
	Potassium hydroxide [(KOH) in H_2O)]	Liquid	> 25	o	o	o	–	–	o
	Sodium hydroxide [(NaOH) in H_2O)]	Liquid	> 25	o	o	o	–	–	o
	Sodium bisulphite [($NaHSO_3$) in H_2O)]	Liquid	> 25	o	●	o	–	–	o
	Sulphuric acid (H_2SO_4), low concentrated	Liquid	84	o	o	–	–	o	–
				P. 30	P. 26	P. 583/585/587	P. 21	P. 40	P. 46

– Not suitable o Limited suitability ● Suitable

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	CapFox® EFT 20	CapFox® ENT 21	VibraFox GVG
Chemical Industry	Sulphuric acid (H_2SO_4), low concentrated	Liquid	21.9	o	o	–	–	o	–
	Chloroform ($CHCl_3$)	Liquid	3.7–5.5	●	o	–	–	–	–
	Trichloroethane (CH_3CCl_3)	Liquid	7.2	o	–	–	–	o	●
	Acetic acid (CH_3COOH), vinegar	Liquid	6.2	●	o	–	–	o	–
	Painting and varnish agents diluted with water (non-explosive)	Liquid	> 25	●	●	–	o	o	o
Food and beverage	Beer	Liquid	25.0	o	o	●	●	●	●
	Citric acid [(C_6H_8O7) in H_2O)]	Liquid	–	o	o	o	o	o	●
	Coconut oil	Liquid	2.9	●	●	o	o	●	●
	Palm oil	Liquid	1.75	●	●	o	o	–	●
	Animal fat	Liquid	2.7	●	●	o	o	●	–
	Lumpy fruit or vegetable	Solid	–	–	–	–	–	–	–
	Cream, yogurt	Liquid	5–7.5	●	●	–	–	–	–
	Milk	Liquid	> 80	o	●	o	o	o	●
	Sugar syrup	Liquid	–	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	o	●	●
	Fruit juice	Liquid	> 10	●	●	o	o	●	●
	Potato (whole)	Solid	1.7	o	–	–	–	–	–
	Sodium chloride (NaCl), table salt, rock-salt	Liquid	3.3	o	–	–	●	o	●
	Wine	Liquid	25.0	●	●	o	●	●	●
	Colza oil	Liquid	2.0	●	●	●	o	o	●
	Sunflower oil	Liquid	2.0	●	●	●	o	o	●
	Olive oil	Liquid	2.0	●	●	●	o	o	●
	Alcohol	Liquid	25.8	●	●	●	●	●	–
	Flour	Solid	2.5	●	●	–	●	●	o
	Coffee, ground	Solid	2.4–2.6	●	●	–	●	●	o
	Coffee, raw	Solid	4.0–4.3	●	o	–	●	●	●
Power Plants	Fuel oil	Liquid	2.1	o	●	●	●	●	●
	Mazut	Liquid	2.2	●	o	–	o	o	–
	Hot water in high pressure vessels	Liquid	81	●	–	o	o	●	●
	Water in condensing vessels	Liquid	81	o	o	o	o	●	●
	Water level in supply water basin	Liquid	81	●	●	●	●	●	●
	Cooling lubricant emulsion	Liquid	25–60	●	●	o	●	●	●
	Coolant	Liquid	40	●	●	o	●	●	●
	Wood pellets	Solid	1.8–2.5	●	o	–	–	o	–
	Wood chips	Solid	2.0–3.5	●	o	–	–	o	–
	Wood, dry	Solid	2.0–3.5	●	o	–	–	o	–
Oil Industry	Crude oil	Liquid	1.7–2.2	o	●	o	o	o	o
	Shale oil	Liquid	2.1	●	o	o	o	o	o
	Grease (lubricant)	Liquid	3.15	o	o	o	–	–	–
	Diesel oil	Liquid	2–2.5	o	o	●	●	●	●
	Lubricating oil	Liquid	2–2.5	o	o	●	o	o	–
	Transformer oil	Liquid	2–2.5	●	o	●	●	o	●
– Not suitable o Limited suitability ● Suitable				P. 30	P. 26	P. 583/585/589	P. 21	P. 40	P. 46

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	CapFox® EFT 20	CapFox® ENT 21	VibraFox GVG
Paper Mill	Paper pulp	Liquid	1.2	–	o	o	o	–	–
	Water	Liquid	81	●	●	●	●	●	●
Plastic Industry	Granular plastic materials	Solid	1.1–2.8	o	–	–	o	o	–
	Polyvinyl chloride (PVC)	Solid	3.4	●	–	–	o	o	–
	Polyethylene pellet	Solid	1.5–1.8	–	–	–	o	–	–
	Polystyrene	Solid	2.2–2.6	–	–	–	–	–	–
	Plastic powder	Solid	1.3–1.8	o	–	–	o	o	–
	Silicone oil	Liquid	2.7	o	●	●	o	●	●
Water / waste water	Drinking water in reservoirs	Liquid	81	●	●	●	●	●	●
	Thermal water in cooling reservoirs	Liquid	81	o	o	●	●	●	●
	Water level in rivers for flood control	Liquid	81	o	o	●	●	●	●
	Water level in well	Liquid	81	–	o	●	●	–	–
	Seawater	Liquid	81	o	●	●	o	–	o
	Rainwater reservoir	Liquid	81	●	●	●	●	●	●
	Waste water in reservoirs or channels	Liquid	81	o	●	●	●	●	●
	Distilled water	Liquid	80	●	●	o	o	o	–
– Not suitable o Limited suitability ● Suitable				P. 30	P. 26	P. 583/585/589	P. 21	P. 40	P. 40

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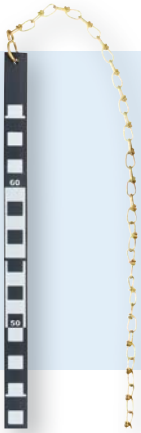
Important note: This table is only intended for general information. The values are provided on an "as is" basis for which AFRISO does not assume liability. Verify the values of the substance you want to measure when determining the suitability for your application. The suitability of a specific type of measuring device for an application is determined by a great variety of factors – the experts at AFRISO will be happy to help you with your selection.

Dipstick, pipe for dipstick



Plastic dipstick

Application

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

Description

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

Technical specifications

Material
Plastic

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

Pipe for dipstick

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

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

Material
Steel, galvanised

Connection

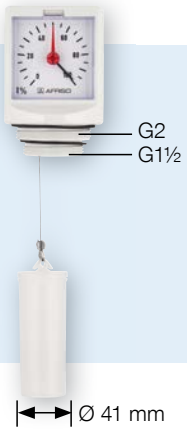
Pipe for dipstick	Dipstick
Length 160 cm	Length 170 cm
Length 200 cm	Length 210 cm
Length 250 cm	Length 260 cm
Length 290 cm	Length 300 cm

Cap for dipstick with connection thread G1 female, Zamak

DG: G	PG			Part no.
Plastic dipstick:				
Length 170 cm, measuring range 160 cm*	1	1	-	**20010**
Length 210 cm, measuring range 200 cm*	1	1	-	**20011**
Length 260 cm, measuring range 250 cm*	1	1	-	**20012**
Length 300 cm, measuring range 290 cm*	1	1	-	**20013**
Cap for pipe for dipstick G1 female x G1¼	2	1	140	**20464**
Pipe for dipstick 160 cm*	3	1	-	**71315**
Pipe for dipstick 200 cm*	3	1	-	**71320**
Pipe for dipstick 250 cm*	3	1	-	**71330**
Pipe for dipstick 290 cm*	3	1	-	**71335**

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

Mechanical level indicators



MT-Profil R – G1½ and G2

Application

For continuous level measurement in tanks containing fuel oil EL (DIN 51603-1), diesel fuel (EN 590), water, liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.
For tanks heights from 0 to 250 cm.

Description

Universal, mechanical level indicator with plastic planetary gear. Measuring range is adjustable from 0 to 250 cm by reversible scale.

With reversible scale 0–150 cm and 0–250 cm for fast adaptation to the tank height. Odour-tight. Watertight up to 10 m water column.

Technical specifications

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

Operating temperature range
Medium: –20/+60 °C
Ambient: –20/+40 °C
Storage: –20/+60 °C

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

Connection thread
G1½ or G2

Housing / float
Window: SAN
Housing: ABS, impact-resistant
Float: PE-HD, Ø 41 mm

Unimes

For continuous level measurement in tanks containing fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214) or other low-viscosity media which do not attack materials used. This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100%.
For tank heights from 900 to 2,000 mm.

Universal mechanical level indicator with fully adjustable brass and nickel silver movement. The pointer deflection amounts to 280° at tank heights from at least 900 mm to 2,000 mm maximum. The contents is indicated in % liquid level. With reference pointer for consumption monitoring.

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

Operating temperature range
Medium: –20/+60 °C
Ambient: –20/+40 °C
Storage: –20/+60 °C

Displayed values
0/100 % liquid level

Connection thread
G1½ and G2

Housing / float
Housing: ABS, impact-resistant
Window: SAN
Float: PE-HD, Ø 41 mm

DG: G, PG: 1			Part no.
Unimes	1	-	**11500**
MT-Profil R – G1½	1	50	**16500**
MT-Profil R – G2	1	50	**16540**
Reducer G2 x G1½	1	-	**20903**

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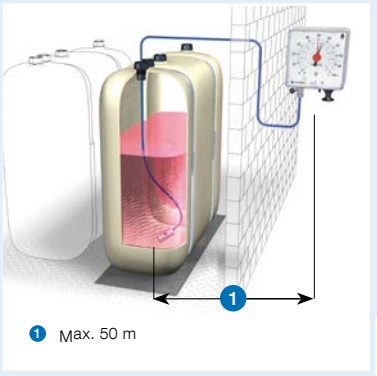
See page 16 for suitable reducers.

Pneumatic level indicator Unitel

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



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Application

For level measurement in tanks containing fuel oil EL (DIN 51603-1), diesel fuel (EN 590), rainwater, liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.
For tank heights from 900 to 3,000 mm (depends on version).

Description

Universal, pneumatic level indicator with capsule movement. The tank height is fully adjustable. Measuring accuracy ±3 % of full scale value. In the case of use with paraffinic fuels or mixtures, the measuring accuracy may be different due to the lower density. A dual scale facilitates measurements in rectangular tanks (= linear tanks) and cylindrical tanks. Indication in % volume (Unitel) or % liquid level (Unitel for water). Impact-resistant plastic housing for wall mounting. With zero correction and integrated overpressure safety device. Reference pointer for easy consumption monitoring. Connection for pipe or hose (6 mm outside diameter, universal) for tight mounting of the measuring line (e.g. Pneumofix). Watertight up to 10 m water column.

Technical specifications

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

Measuring range (tank height)
0/900 to 0/3,000 mm (part no. 72500, fuel oil)
0/900 to 0/2,500 mm (part no. 72511, water)

Measuring accuracy
±3 % of full scale value

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

PVC hose (accessory)
For measuring line extension. (e.g. Pneumofix).
20 m PE measuring line 4 x 1 mm
with hose extension piece

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

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

Scope of delivery
Level indicator with connection kit and screws

DG: G, PG: 1			Part no.
Unitel for fuel oil tanks	1	-	**72500**
Unitel for water tanks	1	-	**72511**
Accessories			
PVC hose Ø 4 x 1 mm, 20 m	1	-	**20696**
Hose connector 4 x 4 mm	1	25	**43945**

i See chapter 10 for more products for rainwater harvesting.

Pneumatic level indicator Unitop

Discontinued product available up to approx. end of 2023

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

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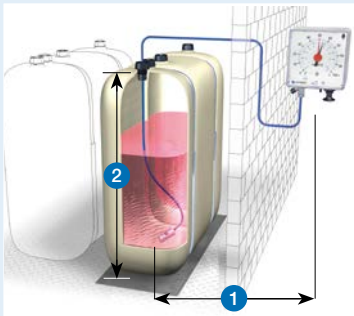

1 Max. 50 m
2 Tank height H

Application

For level measurement in tanks containing fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.
For tank heights from 900 to 3,000 mm (depends on version).

Description

Universal, pneumatic level indicator with capsule movement. The tank height is fully adjustable. Measuring accuracy ±2 % of full scale value. In the case of use with paraffinic fuels or mixtures, the measuring accuracy may be different due to the lower density. A dual scale facilitates measurements in rectangular tanks (= linear tanks) and cylindrical tanks. The basic version indicates % of volume so that it is independent of the tank shape. Impact-resistant plastic housing for wall mounting. With zero correction at the front side, reference pointer and date indication for easy consumption monitoring; with integrated pressure relief device. The mechanism carrier of extremely rugged plastic is separated from the housing for stable zero point and high measurement accuracy. Sturdy brass connector with pressure screw for pipe or hose (Ø 6 mm) for tight installation of the measuring line. A vent screw, integrated in the connector, allows you to check the zero setting of the pointer. Watertight up to 10 m water column.

Technical specifications

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

Measuring range (tank height)
0/900 to 0/3,000 mm (part no. 28000)

Measuring accuracy
±2 % of full scale value

Operating temperature range
Ambient: –5/+55 °C
Storage: –5/+55 °C

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

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

Scope of delivery
Measuring instrument, litre scales for cylindrical tanks 3,000/5,000, 7,000/10,000, 16,000/20,000

DG: G, PG: 1			Part no.
Unitop 3000	1	-	**28000**

Pneumatic level indicator for AdBlue® – Unitop-Set AdBlue

Discontinued product available up to approx. end of 2023

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

A
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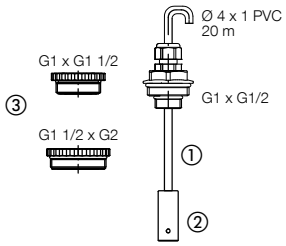
Pneumofix type 2



① PVC hose
② Balance chamber stainless steel
③ Reducers

Application

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

Description

Universal, pneumatic level indicator with capsule movement. Specially adjusted to the specific weight (density) of AdBlue® = 1.09 g/cm³. Fully adjustable from 700 to 2,300 mm tank height. Measuring accuracy ±2 % of full scale value. Indication in percentage of level. With zero correction at the front side, reference pointer and date indication for easy consumption monitoring; with integrated overpressure safety device. Universal measuring line connection for pipe or hose with an outside diameter of 6 mm. Easy mounting by means of a mounting kit specially designed for AdBlue®. Process connection G1 and G½, standpipe PVC 2.5 m with stainless steel balance chamber, 10 m measuring line PVC 4 x 1 mm, reducer G1 x G1½ x G2. Watertight up to 10 m water column.

Technical specifications

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

Measuring accuracy
±2 % of full scale value

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

Scale (displayed values)
0/100 % liquid level

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

Process connection
G½ and G1, reducer G1 x G1½ x G2

Standpipe
Plastic PVC
Length 2.5 m balance chamber stainless steel

Measuring line
PVC hose 4 x 1 mm
Length approx. 17 m

Scope of delivery
Level indicator and mounting kit consisting of screw fittings G½ and G1, reducers G1 x G1½ x G2, 20 m hose with bottom part

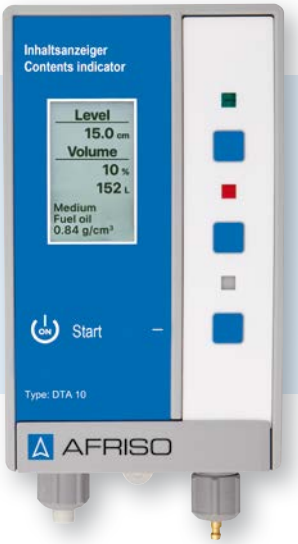
i

Make sure to observe all pertinent legislation concerning selection of materials and construction when building storage facilities for AdBlue®.

See chapter 2 for suitable overfill prevention systems and chapter 3 for inner tank linings.

DG: G, PG: 1			Part no.
Unitop-Set AdBlue	1	-	**28040**

Digital tank contents indicator DTA 10



- **For fuel oil EL, L, diesel fuel, biodiesel, HVO, GTL, water and other media with a density from 0.5 to 1.5 g/cm³**
- **Universal application in tanks of a height of up to 4 m**
- **Push-to-Read function: Fast start with just a push of a button**
- **Remote measurements up to 15 m**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Application

Location-independent level measurement with digital display and minimum level signal (reserve level alarm) with a single measurement. For tanks with fuel oil EL, L (DIN 51603-1), diesel fuel (EN 590), water (no drinking water!), AdBlue®, liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. For maximum accuracy of the displayed measured value, determine the density of the medium and set it at the DTA when using these fuels. In addition, DTA 10 can be used for level measurement with all non-corrosive liquids with a density from 0.5 to 1.5 g/cm³.
Suitable for tanks up to 400 cm liquid level. Remote measurements (measuring line) up to 15 m.

Description

The electro-pneumatic tank contents indicator DTA 10 consists of a battery-operated control unit with digital display and a measuring line. Measured values are displayed in litres, % and liquid level (cm). Simple operation and setup via three function keys. Measurements are requested by means of pressing the control key (Push-to-Read function). If the level falls below a minimum level that is freely adjustable as a percentage, the backlight of the display flashes red to indicate an alarm during the measurement. Standard tank shapes (linear and cylindrical, horizontal) are stored. Measuring line connection for hose with 4 mm inside diameter.

Technical specifications

Functions
Push-to-Read level measurement

Measuring range (tank height)
0/400 cm (fuel oil)
0/350 cm (water)

Measuring accuracy
±3.0 cm

Operating temperature range
Ambient: 0/50 °C
Storage: –20/+65 °C
Medium: 0/50 °C

Display
Multi-coloured, backlit
graphical display (30 x 50 mm):
- Blue = Operation
- Red = Alarm
- Green = Setup

Indication of litres (5 digits),
% or liquid level in cm

Measuring line
PVC hose 4 x 1 mm
Length 20 m
Balance chamber stainless steel

Supply voltage
9 V monobloc battery

Minimum alarm
Backlight flashes red
during measurement process

Housing
Wall mounting housing made of
impact-resistant plastic (PC/ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 20 (EN 60529)

Scope of delivery
- Control unit with 9 V monobloc battery
- Pneumofix type 2:
  20 m measuring line with bottom part,
  connection kit for G½, G1, G1½ and G2,
  30 nail cable clips, hose connector (4 x 4 mm),
  mounting accessories

PG: 4, DG: M	Part no.
DTA 10 with Pneumofix type 2	**52145**
DTA 10 without Pneumofix type 2	**52155**

Digital tank contents indicator DTA 20 E

- **Plug & play level indicator for smart home systems based on EnOcean® wireless**
- **Daily measurement and worldwide access to consumption data**
- **Local display and push message (adjustable) when minimum level is reached**
- **For fuel oil, (bio) diesel, water and other media with a density between 0.5 and 1.5 g/cm³**

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Application

Location-independent level measurement with digital display and minimum level signal (reserve level alarm). If the product is operated in conjunction with the AFRISOhome gateway, the tank operator/owner can also read the level on a mobile device. For tanks with fuel oil EL, L (DIN 51603-1), diesel fuel (EN 590), water (no drinking water!), AdBlue®, liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). Also for systems that use the paraffinic fuels HVO or GTL as an admixture or 100 %. For maximum accuracy of the displayed measured value, determine the density of the medium and set it at the DTA when using these fuels. DTA can be used with all non-corrosive liquids with a density from 0.5 to 1.5 g/cm³.
Suitable for tanks up to 400 cm liquid level. Remote measurements (measuring line) up to 15 m.

Description

The electro-pneumatic tank contents indicator DTA 20 E consists of a control unit, an EnOcean® wireless module, a digital display and a measuring line. Measured values are displayed in litres, % and liquid level (cm). Simple operation and setup via three function keys at the device. DTA 20 E measures the level (adjustable interval) and transmits it to the AFRISOhome gateway via EnOcean® wireless. In addition, measurements can be taken by means of pressing the control key (Push-to-Read function). If the level falls below a minimum level that is freely adjustable as a percentage, the backlight of the display flashes red to indicate an alarm during the measurement. In addition to indication on the local display, the tank owner/operator can receive a push message on the smartphone or tablet. Standard tank shapes (linear and cylindrical, horizontal) are stored.

Technical specifications

Functions
Periodic level measurement (1 to 240 hours) with wireless transmission to master systems such as AFRISOhome gateway
Push-to-Read level measurement

Measuring range (tank height)
0/400 cm (fuel oil)
0/350 cm (water)

Measuring accuracy
±3.0 cm

Operating temperature range
Ambient: 0/50 °C
Storage: –20/+65 °C
Medium: 0/50 °C

Display
Multi-coloured, backlit graphical display (30 x 50 mm):
- White = Operation
- Red = Alarm
- Green = Setup

Indication of litres (5 digits), % or liquid level in cm

Measuring line
PVC hose 4 x 1 mm
Length 20 m
Balance chamber stainless steel

Supply voltage
9 V monobloc battery

Minimum alarm
Backlight flashes red
Push message to mobile devices

Housing
Wall mounting housing made of impact-resistant plastic (PC/ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 20 (EN 60529)

EnOcean® wireless
EEP: Generic Profile (GP)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Control unit with battery
- Pneumofix type 2: 20 m measuring line with bottom part, connection kit for G½, G1, G1½ and G2, 30 x nail cable clips, hose connectors (4 x 4 mm), mounting accessories

DG: L, PG: 4	Part no.
DTA 20 E with Pneumofix 2	**52146**
DTA 20 E without Pneumofix 2	**52156**

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

Mounting accessories pneumatic level indicators

Pneumofix type 2

Description Complete, universal mounting kit for pneumatic level indicators (Unitel, Unitop, DTA). Can be used for tanks of up to 4,000 mm in height or diameter. Consisting of screw fitting with dual thread G½ and G1, reducer G1 x 1½ x 2. Standpipe in tank with balance chamber. PVC measuring line (4 x 1 mm), 20 m with 30 x nail cable clips,
hose connector (4 x 4 mm) and mounting accessories.
Suitable for use in flood hazard areas. Watertight up to 10 m water column. If no connection socket is available at an individual tank, it is recommended to use Euroflex (see page 163).

Pneumofix

PVC hose Ø 4 x 1 mm

Description For extending the measuring line (Pneumofix) of pneumatic level indicators.
Consisting of: 20 m PE measuring line 4 x 1 mm with hose extension piece. Suitable for use in flood hazard areas. Watertight up to
10 m water column.

PVC hose with mounting accessories

Condensate trap KG 2

Description For protection of pneumatic level indicators against condensate. Made of high-grade, impact-resistant plastic. The condensate trap can be easily unscrewed for emptying. Universal connections for hose or pipe with 6 mm outside diameter. Suitable for use in flood hazard areas. Watertight up to 10 m water column.

Scope of delivery:
KG 2, incl. mounting material (screws, screwed connections)

Condensate trap KG 2

Reducers/adapters

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

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

Description **Flange adapter for battery tanks**
Flange adapter G1 made of black plastic (ABS).

Description **Mounting kit for battery tanks**
For mounting of Unitel, Unitop or DTA if all process connections at the tank are used.

PG: 1	DG			Part no.
Pneumofix type 2	G	1	-	**20142**
PVC hose Ø 4 x 1 mm, 20 m, with mounting accessories	G	1	-	**20696**
Hose connector 4 x 4 mm	G	1	25	**43945**
Condensate trap KG 2	G	1	5	**20320**
Reducer 2 x 1½	G	1	-	**20903**
Reducer 1½ x 1	G	1	-	**20905**
Flange adapter G1½ female	G	1	10	**20900**
Mounting kit for battery tanks	M	1	-	**52154**

Digital tank contents indicator DIT 10

- For fuel oil EL, L, diesel fuel, biodiesel and water
- Universal application in tanks of up to 4 m in height or diameter
- No external supply voltage required
- Push-to-read function for extremely long battery service life

Application

For level measurement in tanks containing fuel oil EL, L (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Specially suitable for underground tanks and basement tanks, also for use in flood hazard areas and flood risk areas. For filling levels from 900 mm to 4,000 mm.

Description

The hydrostatic level indicator consists of a control unit with digital display and a submersible probe with integrated pressure measuring cell. High measuring accuracy due to electronic sensor (pressure measuring cell). Simple operation due to device setup via menus. No bearing charts required since all standard tank shapes are stored. Watertight up to 10 m water column.

Technical specifications

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

Measuring range
0/400 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range
Medium: –5/+70 °C
Ambient: 0/45 °C
Storage: –5/+70 °C

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

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

Submersible probe
Housing: Stainless steel 304 (1.4301)
Cable: PVC, 6 m with breather tube
Diaphragm: Stainless steel 316 L (1.4435)
Seals: FKM (Viton)
Spacer: POM, PE

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

Housing
PA6, glass-fibre reinforced, blue, Ø 75 mm, wall mounting

Degree of protection
Control unit: IP 51 (EN 60529)
Submersible probe: IP 68 (EN 60529)

Scope of delivery
- Control unit with digital display
- 5 m connection cable to probe (can be extended by up to 10 m)
- Moisture-proof junction box (IP 54)
- Submersible probe with 6 m submersible cable
- Screw connector kit G1 x G1½ x G2
- Mounting kit for withdrawal flange (PG 9 gland)
- Wall mounting

DG: H, PG: 4	Part no.
DIT 10	**52150**
Spare submersible probe (0/400 mbar)	**52153**
Spare battery	**68309**

Hydrostatic indicator TankControl 10

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

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1 Additional probe differential alarm
2 Floating probe

Application

Continuous level measurement with graphical display for indication of consumption (history), calculation of remaining range (forecast) and signalling of minimum or maximum levels as well as for level control. Suitable for fuel oil EL, L (DIN 51603-1), diesel fuel (EN 590), water (no drinking water!), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as wells as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %.
For tanks from 1,000 to 4,000 mm liquid level.

In conjunction with an additional submersible probe for differential alarm also suitable for detecting level differences in communicating tanks (e.g. battery tanks) which may cause overfilling. It is also possible to connect a floating probe for backflow alarms (drain system, e.g. for rain water harvesting systems) or for additional minimum or maximum alarms. Suitable for use in flood hazard areas and flood risk areas.

Description

The hydrostatic level indicator consists of a control unit with numerical and graphical display and a submersible probe with integrated pressure measuring cell. Optionally with additional submersible probe for differential alarm or with floating probe. The system displays either litres, m^3, % or liquid level (mm). When the level falls below or exceeds an adjustable minimum or maximum value, the control unit triggers visual and audible (can be acknowledged) alarms. The value for submersible probe 2 is displayed in mm. If an adjustable level difference between submersible probe 1 and submersible probe 2 is exceeded, an alarm is triggered. Two additional relay contacts with selectable switching points are available for external alarm devices, for level control or for connection to telecommunication or building control systems. Easy operation due to device setup via menus. High measuring accuracy due to electronic sensing. Standard tank shapes are stored. Watertight up to 10 m water column.

Technical specifications

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

Measuring range
0/400 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range
Medium: –5/+70 °C
Ambient: 0/45 °C
Storage: –5/+70 °C

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

Submersible probe
Housing: Stainless steel 304 (1.4301)
Cable: PVC, 6 m with breather tube
Diaphragm: Stainless steel 316 L (1.4435)
Seals: FKM (Viton)
Spacer: POM, PE
Degree of protection: IP 68 (EN 60529)

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

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

Hydrostatic level indicator TankControl 10

Technical specifications

Visual alarm
Red LED

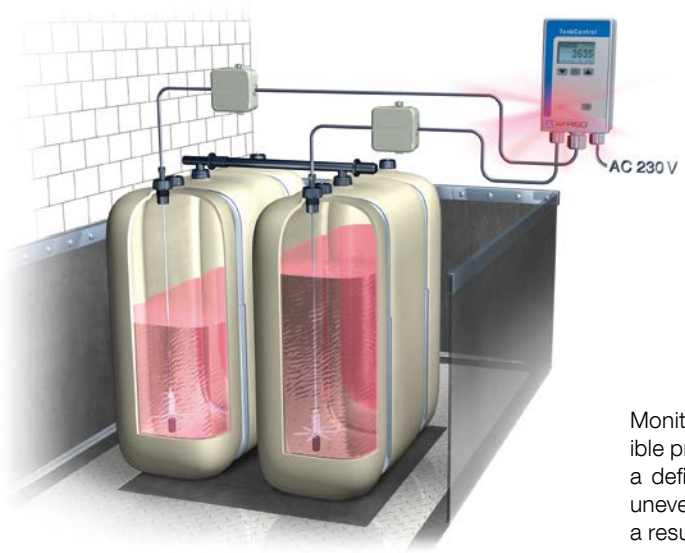
Audible alarm
Integrated piezo buzzer, can be acknowledged

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

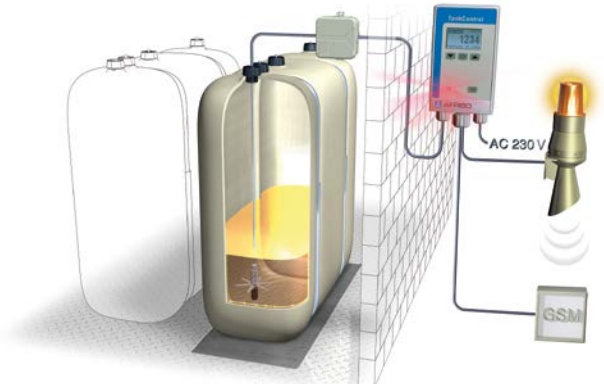
Scope of delivery
- Control unit with graphical display and 15 m connection cable to the probe (cannot be extended)
- Submersible probe with 6 m submersible cable
- Moisture-proof junction box (IP 54)
- Screw connector kit G1 x G1½ x G2
- Mounting kit for withdrawal flange at plastic battery tanks

Options
- Submersible probe for differential alarm
- Floating probe (spare probe Minimelder)

Application examples TankControl 10



Monitoring of the levels in two communicating tanks. A submersible probe is installed in each tank. If the level difference exceeds a defined value, the unit triggers an alarm. The causes of the uneven levels can be removed prior to filling. Potential damage as a result of different levels in the two tanks is avoided.



Monitoring of the level in a fuel oil tank with early signalling of minimum level. With combined alarm light and horn as additional alarm equipment outside of the building and transmission of alarm messages, level data and reaming range to a central building control system.

Monitoring of the level in an outdoor rain water tank. A combined alarm light and horn is connected in the vicinity of the tank; TankControl 10 is installed inside the building. It is also possible to connect a float switch to monitor for backflow from the drain.

PG: 4	DG	Part no.
TankControl 10	H	**52151**
Spare submersible probe (0/400 mbar)	H	**52153**
Additional probe differential alarm	H	**52152**
Floating probe (spare probe Minimelder)	G	**16703**

Hydrostatic level indicator HydroFox® DMU 08 – level probe

- **Compact and sturdy stainless steel design**
- **Special calibration for all standard pressure units possible**
- **Version with PUR or FEP cable**
- **Optional Ex version**

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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

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 13 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
- Ex version (see chapter 13)
- FEP cable (see chapter 13)

Accessories
- Screw connector kit
- Junction box
- Anchor clamp

i Complete range for "hydrostatic level measurement" see chapter 13: DMU 07 – DMU 09.

DG: H	PG	Part no.
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 applications

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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

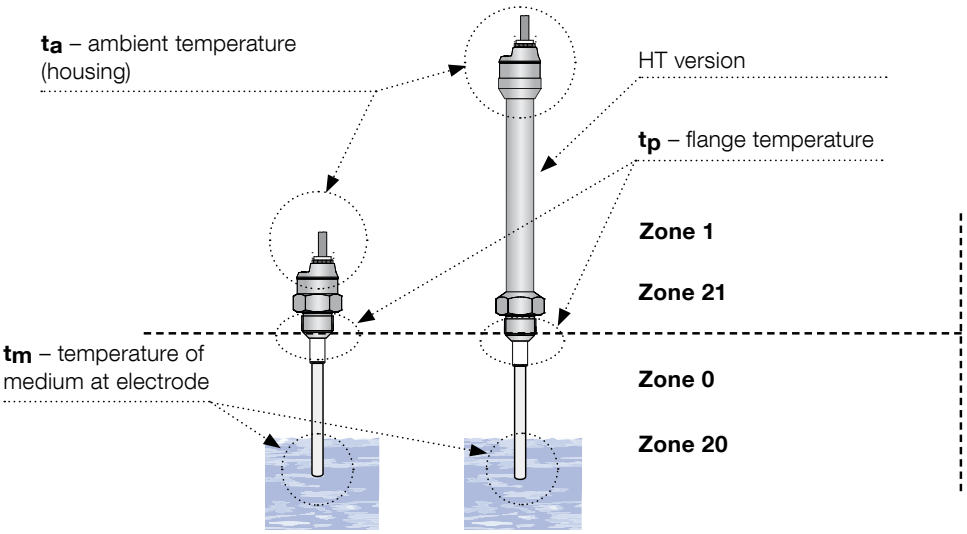
Probe material
Stainless steel 316 L (MS)
Stainless steel 316 (MF)
Stainless steel 304 (KX)

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

Connection diagram

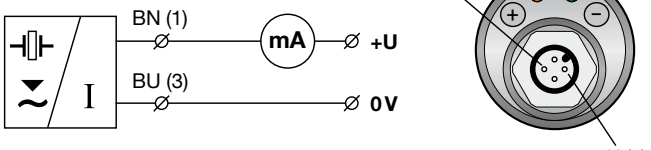


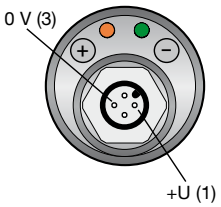
Pressure resistance

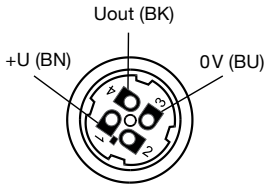
Version	Maximum operating pressure at temperature t_p				
	Up to 30 °C	Up to 85 °C	Up to 120 °C	Up to 150 °C	Up to 200 °C
EFT 20 MS – 20	50 bar	25 bar	–	–	–
EFT 20 MS – 21, 22 + KX	50 bar	20 bar	–	–	–
EFT 20 MF	1 bar	1 bar	–	–	–
EFT 20 MS – 20 HT	50 bar	25 bar	15 bar	10 bar	5 bar
EFT 20 MS – 21, 22 + 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

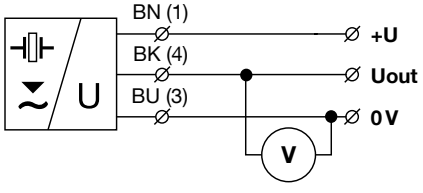


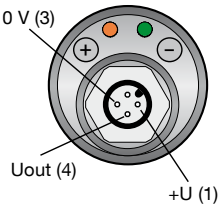




M 12 x 1, 4-pin
EN 61076-2-101

Electrical connection, 3-wire system



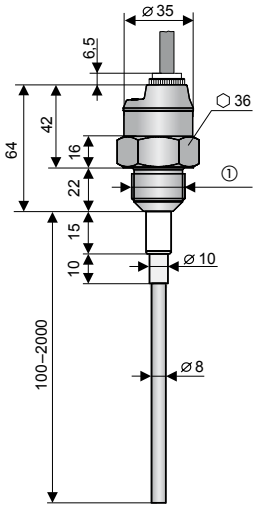


Legend:
(1...) – Terminal assignment in connector
BN – brown
BU – blue
BK – black

Capacitance level indicator CapFox® EFT 20

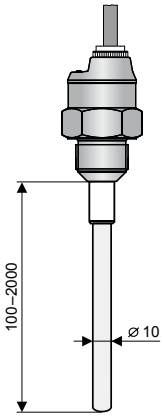
Types and dimensions (mm)

CapFox® EFT 20 MS – 20 with rigid mono probe

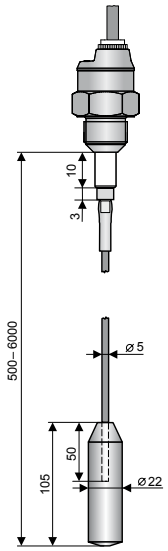


① Process connection

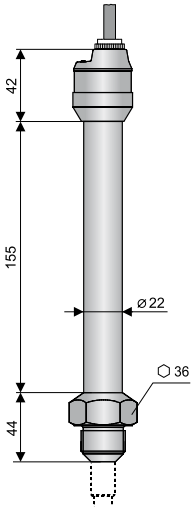
CapFox® EFT 20 MS – 21, 22 with rigid mono probe (FEP- or PFA-insulated)



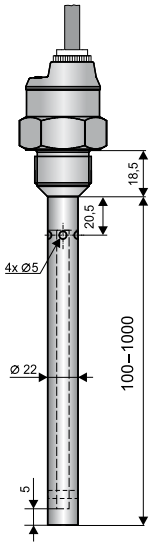
CapFox® EFT 20 MF – 60 with flexible mono probe



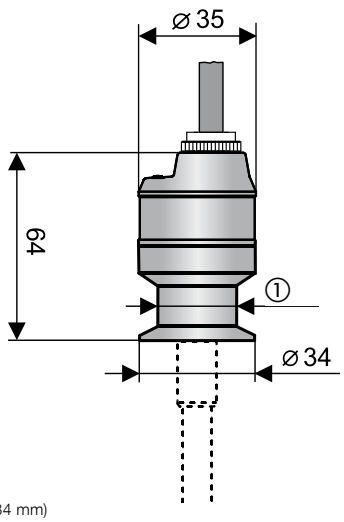
High temperature version



CapFox® EFT 20 KX – 40, 41 with coax probe



Process connection Tri-Clamp DIN 32676

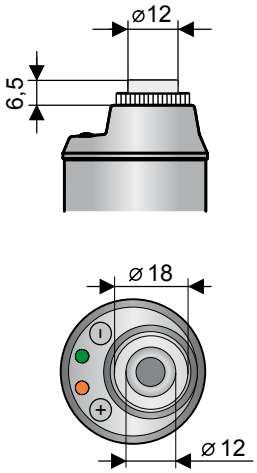


① Tri-Clamp (Ø 34 mm)
Tri-Clamp (Ø 50.5 mm)

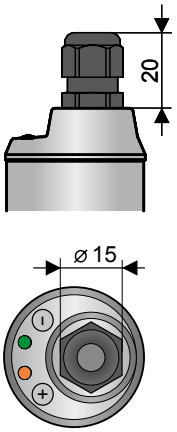
Capacitance level indicator CapFox® EFT 20

Electrical connections (mm)

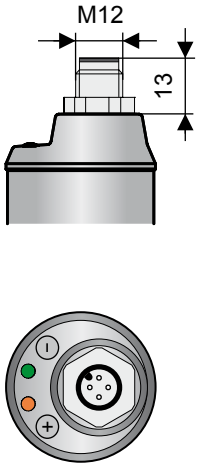
Version with short stainless steel cable gland



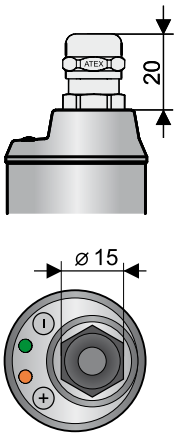
Version B with PVC cable gland M12 x 1.5



Version C with connector M12 x 1, 4-pin



Version D with dust-tight cable gland (Ex)



Capacitance level indicator CapFox® EFT 20

Ordering data

DG: H, PG: 4

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)
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
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
C	Connector M12 x 1, 4-pin
D	Dust-tight cable gland (Ex)

7	Output signal
01	4–20 mA / 2-wire / DC 9–34 V
02	0–10 V / 3-wire / DC 12–34 V
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 =1 0 mH
MEX	4–20 mA (ia) / 2-wire / DC 9–28 V (mining applications) 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

- Non-contact level measurement
- Easy adjustment even without medium
- Robust housing for rough ambient conditions
- Suppression of interference signals
- Optional Ex version

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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

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

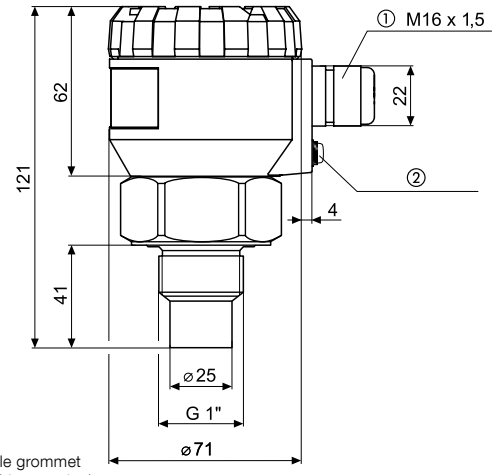
Weight
UST 20 – 01: 0.3 kg
UST 20 – 11: 0.4 kg
UST 20 – 21: 0.6 kg
UST 20 – 31: 3.1 kg

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 Gb (UST 20 – 31)

Ultrasonic level indicator SonarFox® UST 20

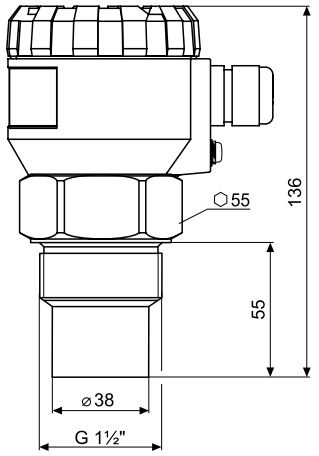
Types and dimensions (mm)

Housing UST 20 – 01

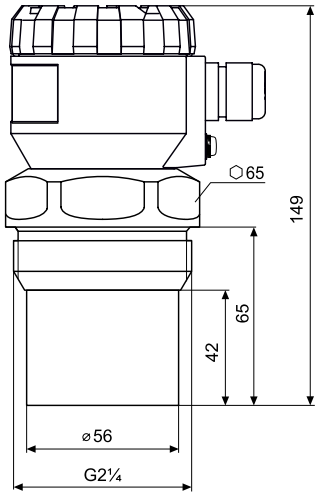


① Cable grommet
② Earthing terminal

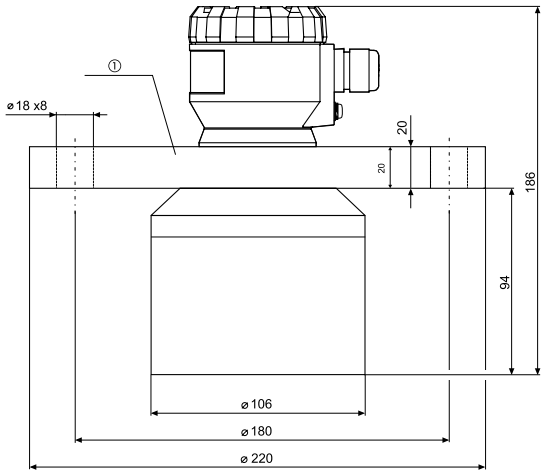
Housing UST 20 – 11



Housing UST 20 – 21



Housing UST 20 – 31



Ultrasonic level indicator SonarFox® UST 20

Ordering data

DG: H, PG: 4

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
4	**Output signal / interface**	
	01	4–20 mA + HART / 2-wire / DC 18–36 V
	02	RS-485 Modbus RTU
	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; T_{amb} = –30 °C ≤ +70 °C

Ordering code example

56220	11	D	01

DG: H, PG: 4	
Standard versions	Part no.
56220 11 D 01 measuring range 0.25 – 6 m, G1½B, with display	**33542**
56220 01 D 01 measuring range 0.15 – 2 m, G1B, with display	**33543**
56220 11 O 01 measuring range 0.25 – 6 m, G1½B, without display	33544
56220 01 O 01 measuring range 0.15 – 2 m, G1B, without display	33545
56220 21 D 01 measuring range 0.4 – 10 m, G2¼B, 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, G2¼B, 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

- **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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Application

For universal continuous level measurement in containers, tanks or silos. Suitable for liquid, powdery, electrically conductive or non-conductive media. Ideal for 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

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

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

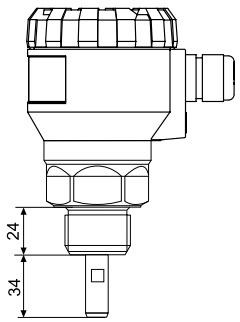
Probe material
Stainless steel 316 L (MF)
Stainless steel 316 Ti (MS/KX)

Options
- Other process connections
- PFA coating/FEP coating
- Ex version
  Ex II 1/2 G Ex ia IIB T5 Ga/Gb

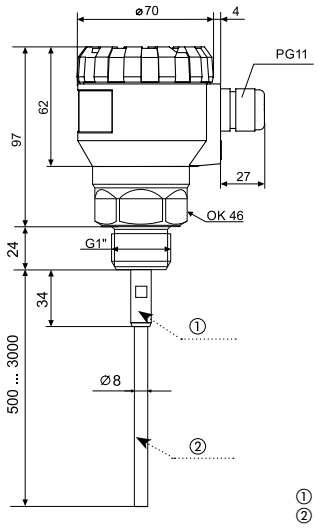
Guided micropulse level indicators PulsFox® PMG 20

Types and dimensions (mm)

PulsFox® PMG 20 MO – 00, mono probe without electrode

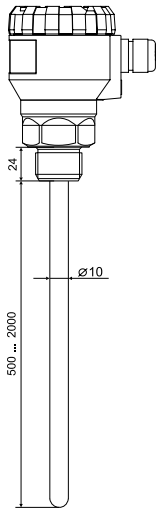


PulsFox® PMG 20 MS – 20-with rigid mono probe

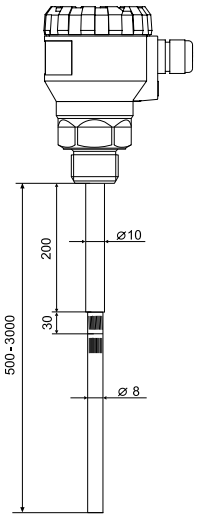


① Electrode holder
② Electrode

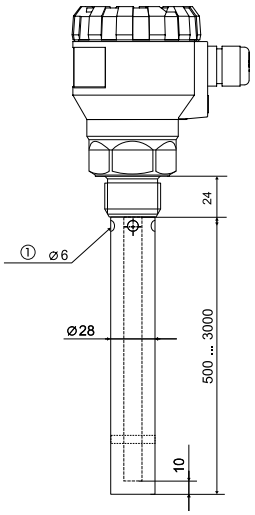
PulsFox® PMG 20 MS –22, 23 with mono probe (PFA-insulated or FEP-insulated)



PulsFox® PMG 20 MS – 21 with rigid mono probe (partially insulated)

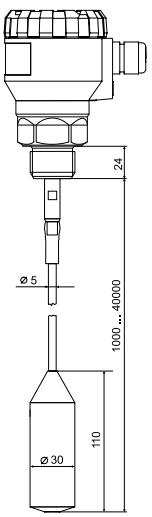


PulsFox® PMG 20 KX – 40 with coax probe



① 4 x opening

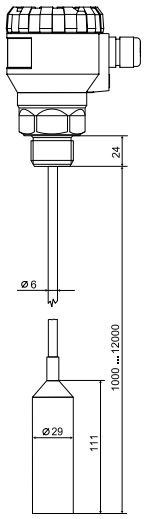
PulsFox® PMG 20 MF – 60, 62, 63 with flexible mono probe



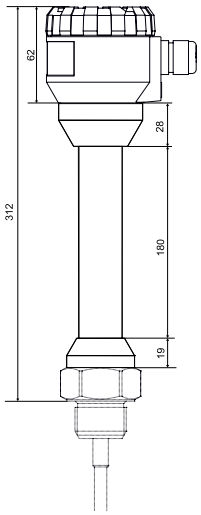
Guided micropulse level indicators PulsFox® PMG 20

Types and dimensions (mm)

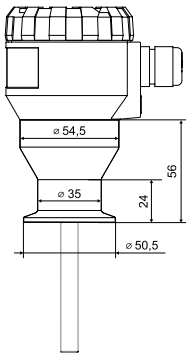
PulsFox® PMG 20 MF – 61 with flexible mono probe (PTFE-insulated)



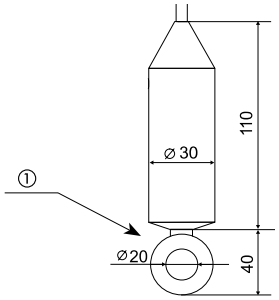
PulsFox® PMG 20 as high temperature version



PulsFox® PMG 20 with process connection TriClamp 1"



PulsFox® PMG 20 – 62, 63 mounting eyelet



① Mounting of version PMG 20-62 (63)

Guided micropulse level indicators PulsFox® PMG 20

Ordering data

DG: H, PG: 4

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 eyelet, 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
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
3	Tri-Clamp 1" (only possible with probe types 22, 23 and 61)

6	Output signal / interface
01	4–20 mA + HART / 2-wire / DC 18–36 V
02	RS-485 Modbus RTU
EX	4–20 mA (ia) + HART / 2-Leiter / DC 18–28 V Ui = 30 V DC; Ii = 132 mA; Pi = 0.99 W; Cl = 370 nF; Li = 0.9 mH; T_{amb} = –30 °C ≤ Ta ≤ +70 °C

Ordering code example

56540	22	D	01500	1	01

Accessories	DG	PG	Part no.
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

Level switches Minimelder-R and Maximelder-R

enocean®

- For fuel oil EL, L, M, oil/water mixtures and many other media
- With visual/audible alarms, Acknowledge key and 1 relay
- Wall mounting housing for fast, professional mounting
- EnOcean®-ready

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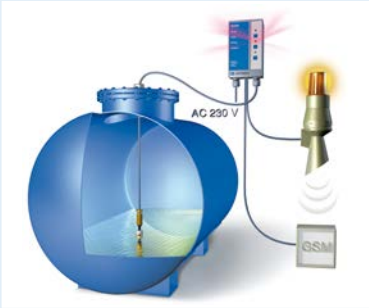

Application

Designed to signal minimum or maximum levels of water, heating oil EL, L, M, oil/water mixtures and neutral, non-viscous and non-adhesive liquids in tanks. System owners are alerted when the supply runs low or if there is a hazard of overfilling.

Description

Minimelder/Maximelder consist of a control unit and a height-adjustable float probe. The Minimelder probe is mounted in the bottom area of the tank and generates an alarm signal when the liquid level falls and the probe is no longer submerged in the liquid. The Maximelder probe is mounted in the top area of the tank and generates an alarm when the liquid reaches the probe. The liquid levels are adjustable. When these levels are reached, the units generate visual and audible alarms. The integrated relay can be used for transmission of the signal to external alarm equipment or for connection to telecommunication or building control systems.
Alarm units with the EnOcean-ready label can be integrated into your existing building automation systems at a later point in time. To do so, plug the EnOcean® wireless module TCM 320 into the EnOcean® interface (PCB of the device). The AFRISO gateway in conjunction with additional AFRISO products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.

Technical specifications

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

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

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

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

Supply voltage (control unit)
AC 230 V

Power input
5 VA

Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V, 2 A

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

Audible alarm
Integrated piezo buzzer, can be acknowledged

Function test
By means of Test key

Housing
Wall mounting housing made of impact-resistant plastic (PC/ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

DG: G, PG: 4			Part no.
Minimelder-R	1	-	**16701**
Maximelder-R	1	-	**16702**
Spare probe for Minimelder	1	-	**16703**
Spare probe for Minimelder, 50 m	1	-	**16719**
Spare probe for Maximelder	1	-	**16704**
Accessories (DG: G, PG: 1)			
Mounting frame	1	-	**43521**
Sealing kit (IP 54)	1	-	**43416**
EnOcean® wireless module TCM 320	1	-	**78082**

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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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
DC 24 V

Power input
2 VA

Probe circuit
Max. AC 3 V

Switching outputs
Relay contact: 2 voltage-free changeover contacts
Contact rating: AC/DC 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.
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 38 for probes 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.

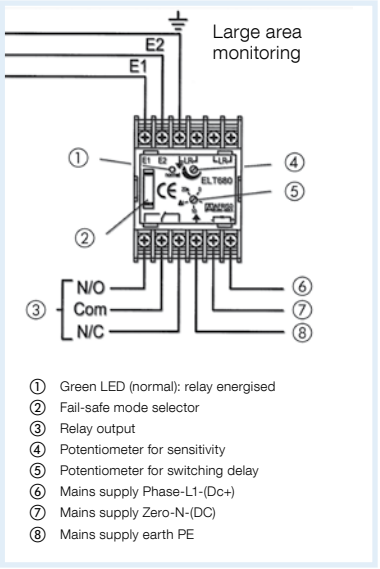
Technical specifications

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



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

i
See page 38 for probes for probes for level switches.

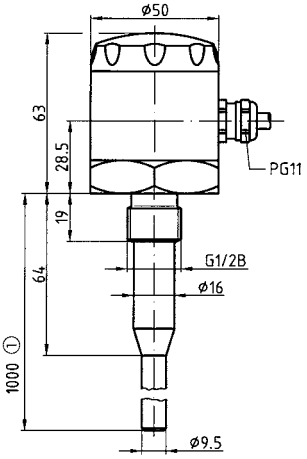
DG: H, PG: 4	Part no.
ELT 680 DC 24 V	**53682**
ELT 680 AC 230 V	**53681**
Accessories	
Additional alarm unit ZAG 01	**40633**

Blue part no. = in-stock items

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

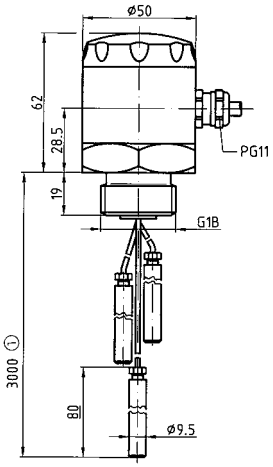
Types and dimensions (mm)

Single-rod probe LST 12



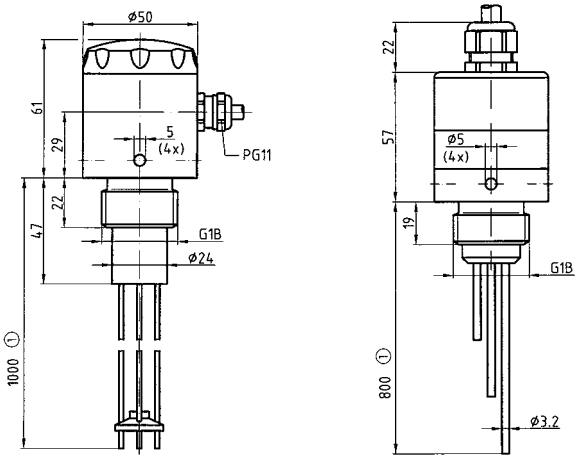
① Standard length (can be shortened)

Flexible probe LSE 23



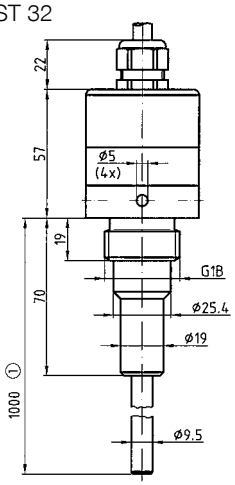
① Standard length (can be shortened)

Multi-rod probes LSM 01/LSM 02



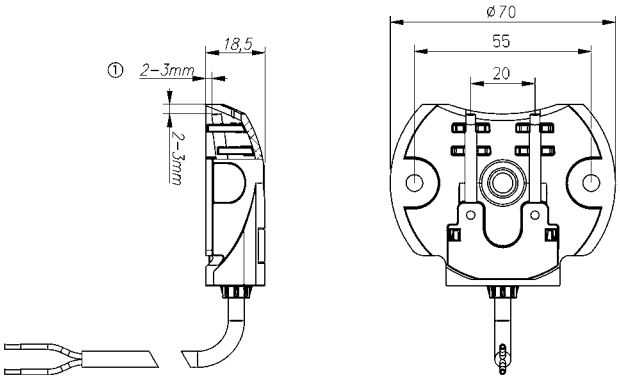
① Standard length (can be shortened)

Single-rod probe LST 32



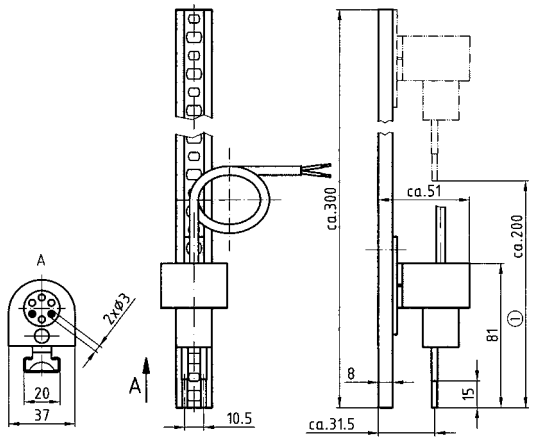
① Standard length (can be shortened)

Floor water probe BWS 10-1



① Response level

Wall mounting rail probe WSS

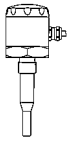
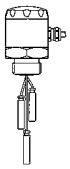
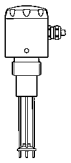
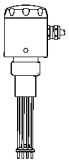
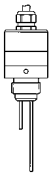
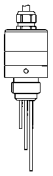
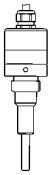


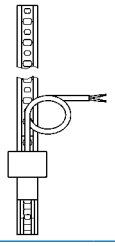
① Adjustment range

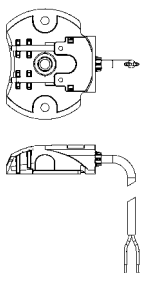
i Many other probe versions are available. Please enquire.

Probes for conductivity level switches, suitable for CoFox® ELT 8, ELT 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						
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 8 / CoFox® ELT 680
	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 8 / CoFox® ELT 680
	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 applications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Application

For point 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 point 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 point 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	+	+	+	o	o	+
Slightly polluted, non-conductive liquids such as lubricants, vegetable oil	-	+	+	o	o	+
Conductive liquids such as water solutions, sludge	-	-	-	+	+	-
Corrosive liquids	-	-	-	-	+	-
Non-adhesive bulk solids such as plastic granules, sand, sugar, grains, cleaning powder	-	+	o	+	+	+
Other bulk solids such as cement, hydrated lime, flour, fly ash, sawdust, animal feed mixtures	-	-	+	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

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

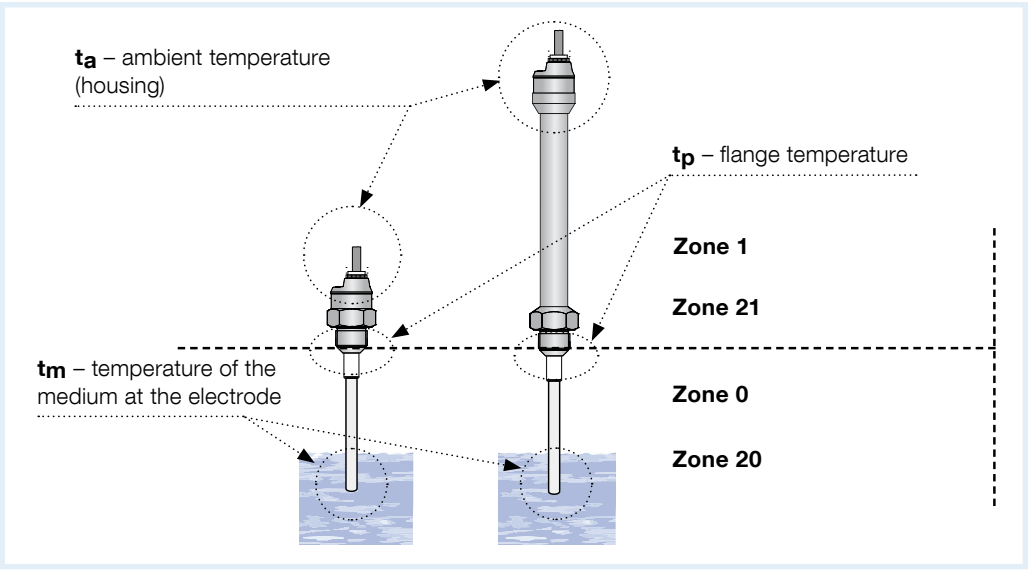
Operating temperature range

Operating temperature range

Version	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 version t_p = max. 75 °C.

Connection diagram



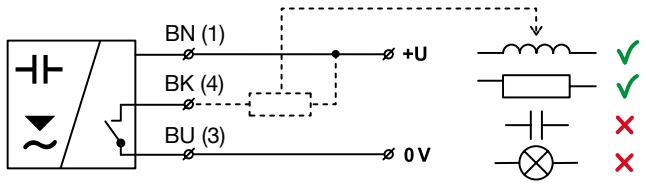
Capacitance level switch CapFox® ENT 21

Pressure resistance

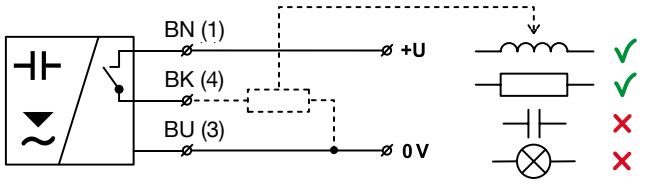
Version	Maximum operating pressure at temperature t_p				
	Up to 30 °C	Up to 85 °C	Up to 120 °C	Up to 150 °C	Up to 200 °C
ENT 21 – MS partially insulated	50 bar	25 bar	15 bar	10 bar	5 bar
ENT 21 – MK	75 bar	50 bar	45 bar	10 bar	35 bar
ENT 21 – MS fully insulated	50 bar	20 bar	15 bar	10 bar	1 bar
ENT 21 – MF	1 bar	1 bar	1 bar	1 bar	1 bar

Pin assignment output signals

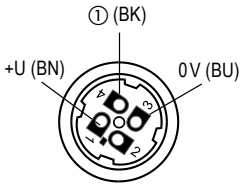
NPN output



PNP output

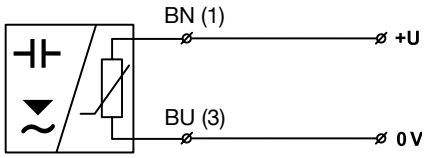


Connector assignment



① Switching output

Output as per NAMUR (DIN EN 60947)



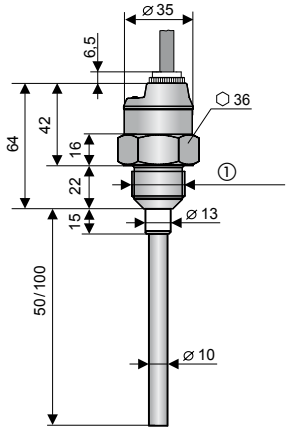
Legend:
BN – brown
BU – blue
BK – black

* The NPN or PNP output may only be used for resistive or inductive loads.

Capacitance level switch CapFox® ENT 21

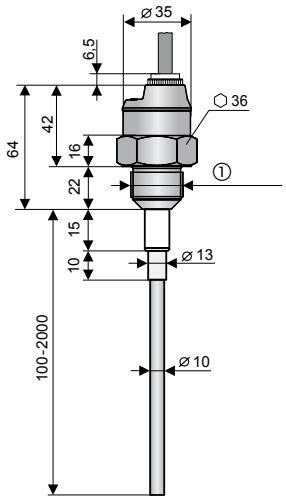
Types and dimensions (mm)

CapFox® ENT 21 MK – 05, 10



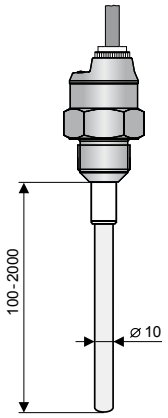
① Process connection

CapFox® ENT 21 MS – 20

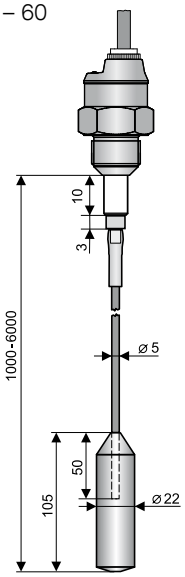


① Process connection

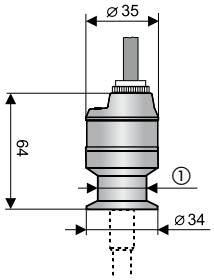
CapFox® ENT 21 MS – 21, 22



CapFox® ENT 21 MF – 60

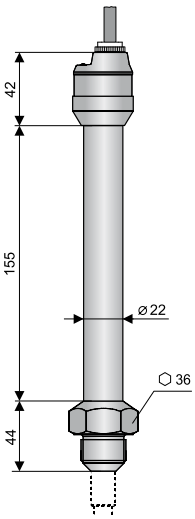


Process connection Tri-Clamp DIN 32676



① Tri-Clamp (Ø 34 mm)
Tri-Clamp (Ø 50.5 mm)

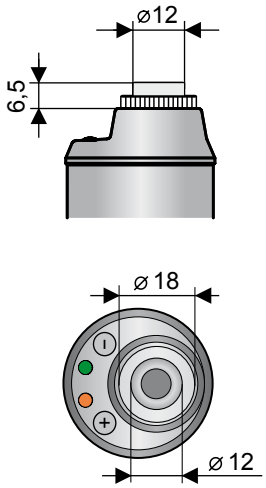
High temperature version



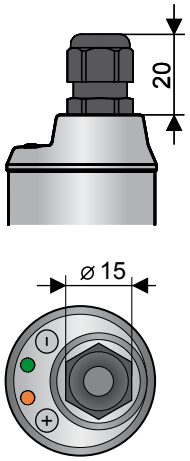
Capacitance level switch CapFox® ENT 21

Electrical connections

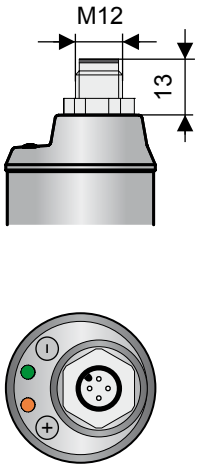
Version with short stainless steel cable gland



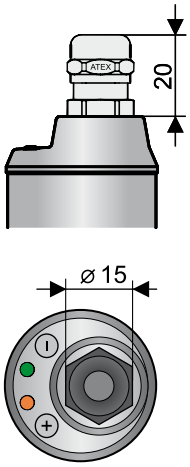
Version B with PVC cable gland



Version C with connector M12 x 1, 4-pin



Version D with dust-tight cable gland (Ex)



Capacitance level switch CapFox® ENT 21

Ordering data

DG: H, PG: 4

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 t_p 85 °C (Ex version 75 °C)
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
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
C	Connector M12 x 1, 4-pin
D	Dust-tight cable gland (Ex)

7 Output signal

01	3-wire PNP / DC 9–34 V
02	3-wire NPN / DC 9–34 V
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.
Magnetic pin MP-8	H	4	**56227**
Extra charge per metre PVC cable, grey (3 x 0.5 mm²)	H	4	On request
Extra charge per metre PVC cable, blue (2 x 0.75 mm²)	H	4	On request

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

Application

Suitable for point level detection 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
2 colour-LEDs 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

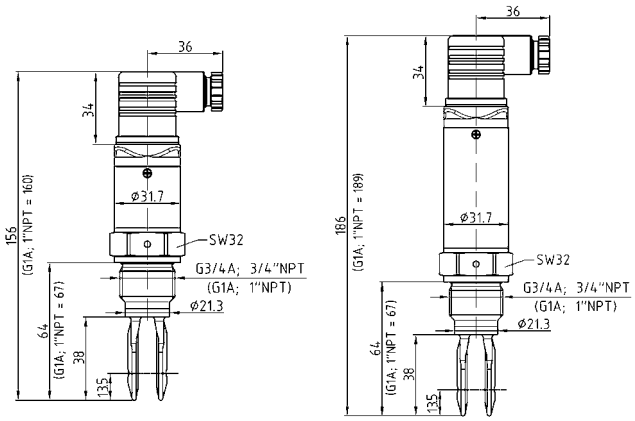
- Other process connections (e.g. NPT, Clamp, dairy fitting)
- Surface roughness Ra < 0.8 µm
- Other electrical connections
- Coupling relay (only for DC version)
- Extended operating temperature range -40/+150 °C (medium)

Vibration level switch for liquids VibraFox GVG

Electrical connections and dimensions (mm)

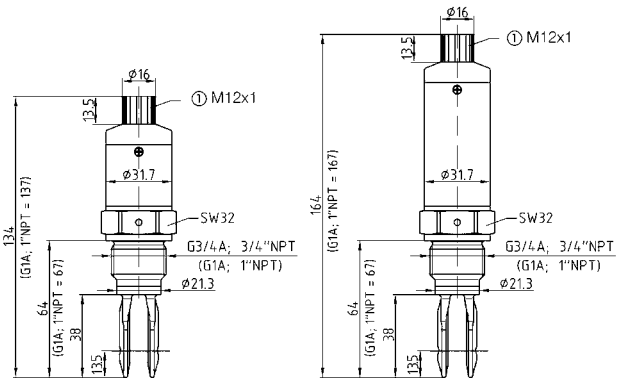
GVG 10/12
Standard version

GVG 10 HT/12 HT
High temperature version



GVG 11
Standard version

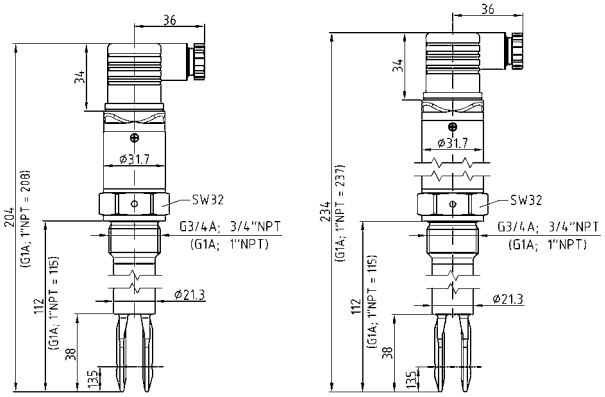
GVG 11 HT
High temperature version



① Protective cover thread

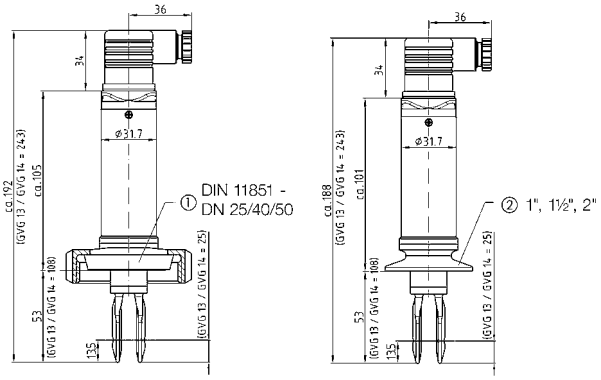
GVG 13/14
Standard version

GVG 13 HT/14 HT
High temperature version



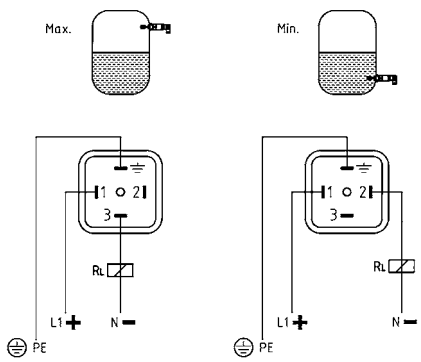
GVG 10 MR/GVG 12 MR
Dairy fitting

GVG 10 CP/GVG 12 CP
Tri-Clamp

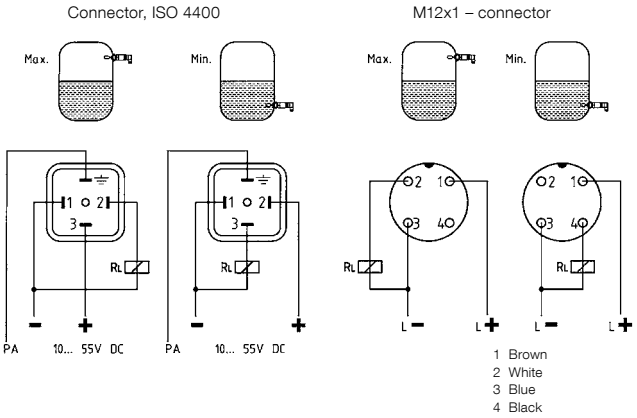


① Screwed pipe connection
② Tri-Clamp

Wiring diagram non-contact switch AC/DC

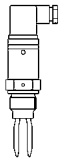
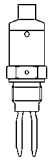
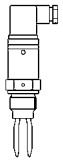
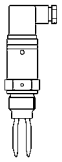
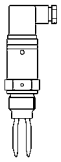


Wiring diagram transistor output (PNP) DC



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
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
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)
Options					
Extended operating temperature range (medium) -40 °C/+150 °C	•	•	•	•	•
Process connection*					
¾" NPT	•	•	•	•	•
1" NPT	•	•	•	•	•
Tri-Clamp 1", PN 16, Ra ≤ 0.8 µm, -40/+150 °C**	•	•	•	•	•
Tri-Clamp 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.
Coupling relay KR 100 ST (only for DC versions) output: 1 x voltage-free changeover contact	53700
Spare test magnet for function test	56155

* Option available with extra charge for version with process connection G¾ male.
** Options included extended operating temperature range -40/+150 °C.

Blue part no. = in-stock items

Customised solutions

Level measurement or point level detection

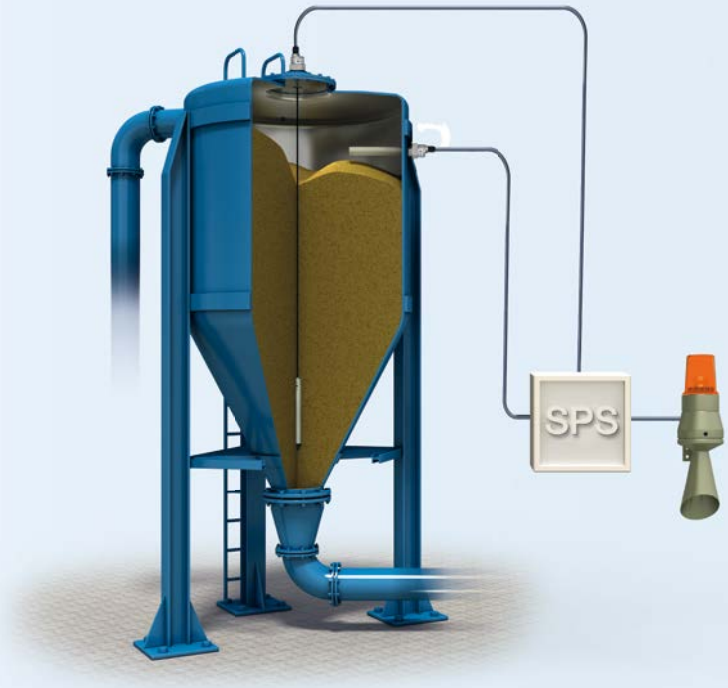
AFRISO level indicators allow for continuous measurement and point level detection in tanks, silos, mobile containers or pipes in industrial and process engineering applications. Depending on the application, the medium or the required approval, you can choose between different measuring principles.

On request, we develop and manufacture customised solutions according to your requirements and take care of the entire engineering for you, all the way to the production of the finished system.

Level/point level

Non-contact level measurement with ultrasonic measuring instrument UST 20 and digital display unit VarioFox® 24 as standalone complete solution for individual tanks and small tank farms.

Minimum/maximum level detection



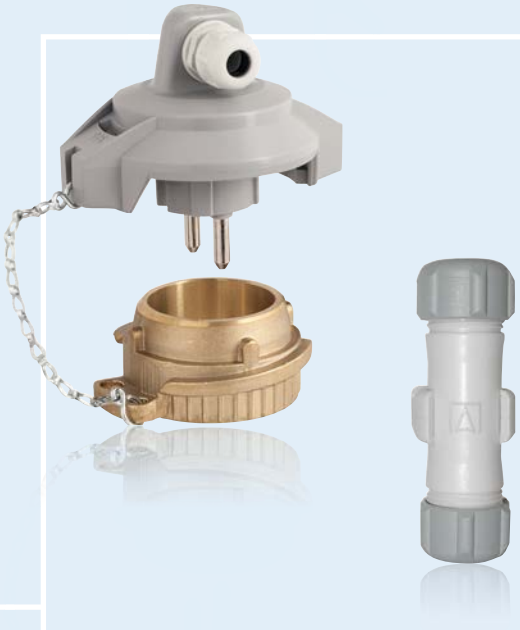
Min./max. level detection with CapFox® ENT 21. Calibration for the medium is performed via a magnetic pin in a very easy way.

Process visualisation, data logging and control cabinet engineering

Multi-channel process display with data logger and switching outputs in control cabinet, programmable according to customer requirements.

Overfill prevention systems

Level sensors



Accessories

CHAPTER 2

Level sensors, overfill prevention systems and PTC thermistor type level controllers

OVERVIEW

LEVEL SENSORS

TESTERS

OVERFILL PREVENTION SYSTEMS

LEVEL CONTROLLER

2

Level sensors/overfill prevention systems at a glance




		GWG 12 K/1	GWG 12 K/1C	GWG 12 K/MT	GWG 23-Ro
		Level sensors			
Rectangular tanks (DIN 6625-1)	Tanks	•	•	•	•
Cylindrical horizontal steel tanks (EN 12285-1, 12285-2, DIN 6624-1, 6608-2)	Tanks	•	•	•	•
Cylindrical vertical steel tanks (DIN 6618-1)	Tanks				•
Cylindrical vertical steel tanks (DIN 6619-1)	Tanks				•
Cylindrical vertical steel tanks (DIN 6623-1)	Tanks				•
Flat bottom tanks (DIN 4119-1)	Tanks				
Plastic tanks	Tanks	•	•	•	•
Other tank types*	Tanks	•	•	•	•
Fuel oil EL (DIN 51603-1)	Media	•	•	•	•
Diesel fuel (EN 590)	Media	•	•	•	•
Fuel oil EL (DIN 51603-1) with 30 % fatty acid methyl ester (FAME) as biofuel	Media	•	•	•	•
Fuel oil EL (DIN 51603-1) with 100 % fatty acid methyl ester (FAME) as biofuel	Media	•		•	•
Diesel fuel (EN 590) with 30 % fatty acid methyl ester (FAME) as biodiesel	Media	•	•	•	•
Diesel fuel (EN 590) with 100 % fatty acid methyl ester (FAME) as biodiesel	Media	•		•	•
HVO/GTL	Media	•	•	•	•
Petrol (EN 228)	Media				•**
Aviation petrol	Media				
Aviation/Gasoline	Media				
Aviation turbine fuels	Media				
Special grade fuels	Media				
Aliphatic hydrocarbons	Media				
Gearbox oils, motor oils and hydraulic oils	Media				
Transformer oil	Media				
Vegetable oils	Media				
Oil/water mixtures	Media				
Antifreeze agents	Media				
AdBlue®	Media				
Additional flammable and non-flammable liquids*	Media				
Approval: German Institute for Civil Engineering (DIBt)	Approvals				
Approval: CE as per EU Construction Products Regulation, EN 13616:2004	Approvals	•	•	•	•
ATEX type examination certificate	Approvals				•**
		Page 58	**Page 59**	**Page 59**	**Page 62**

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

GWG 23-T	GWG 23-Wa	UFS 01, type 76 A/AH	NB 220 H	LS 500
Level sensors		Overfill prevention systems		
•	•	•	•	•
•	•	•	•	•
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•	•	•	•	•
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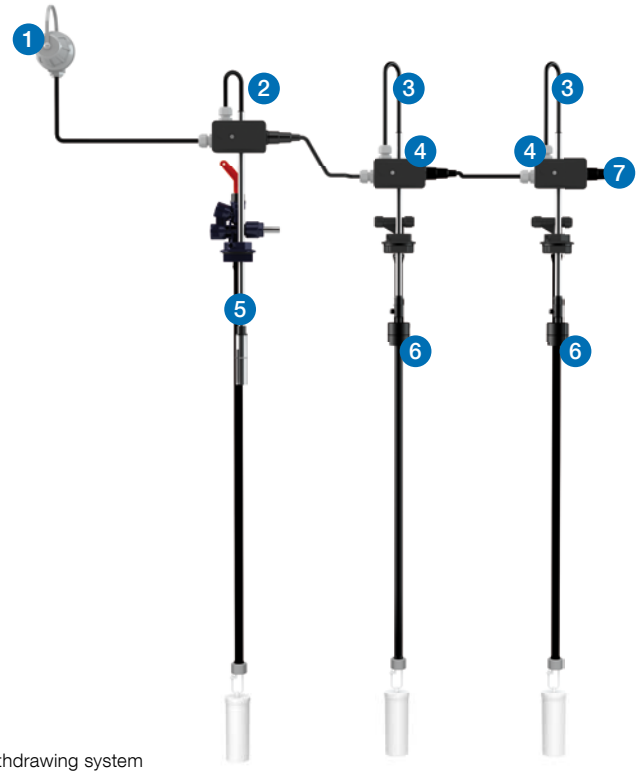
	•			•
Page 62	**Page 63**	**Pages 67/69**	**Page 68**	**Page 70**

Level sensor chain

Is the battery tank facility protected against overfill damage?

Level differences at the beginning of or during the filling process are not an uncommon phenomenon; there are various reasons for this. If this effect occurs, the causes must be identified and removed as quickly as possible. Possible causes include an insufficient flow rate during filling, pollution in the filling or withdrawal systems or leaks. When conventional tank facilities are filled and the first tank filled is not equipped with a level sensor, there is a high risk of overfilling and fuel oil spills. Possible fatal consequences: damage to the building, soil contamination, environmental damage (groundwater), long-term odour problems and immense consequential costs. The owner or operator is fully responsible for all damages.



Universal withdrawing system
with GWG level sensor chain for protection against overfilling.

1. GWG level sensor connection fitting
2. Universal base unit, communicating
3. Universal extension, communicating
4. Wiring box
5. Level sensor
6. Float switch
7. Terminating plug current circuit

Function principle of GWG level sensor chain

The current circuit of the level sensor which is supplied from the tank vehicle during the filling process and which serves as a safety shut-off system includes float switches if the GWG level sensor chain is installed. A terminating plug at the last tank closes the current circuit. During normal filling, the filling process is terminated when the level sensor is submerged. However, if a tank of the facility without a level sensor reaches its maximum level first, the float switch stops the filling process just as if the level sensor had responded. The additional volume caused by the shut off delay and the content of the filling line is considered. Since the filling level of all tanks must be visually detectable or indicated by means of a level indicator, the tank that has caused the shut off is easy to identify.

Level sensor chain

GWG level sensor chain – the best protection against damage caused by overfilling

The AFRISO GWG level sensor chain is used to protect battery tank facilities against overfilling. The system is available for communicating and non-communicating tank facilities. The first tank – in direction of filling – is equipped with the level sensor officially required (system with filling from the top). With the GWG level sensor chain, each additional tank of the facility contains a float switch to limit the filling level; this level switch is connected to the wiring box of the first level sensor by means of pre-assembled cables and connectors. A terminating plug is connected at the last tank.

Universal withdrawal system with GWG level sensor chain in non-communicating system for three battery tanks with level sensor, level limiters and floating withdrawal. Available for retrofitting of existing systems and for new systems of virtually all well-known tank manufacturers.

Picture: DEHOUST GmbH

Application example with Dehoust tanks: GWG level sensor chain as top filling system DE-A-01 with combined filling and vent line, withdrawal line, level sensor, level limiters and floating withdrawal.

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Universal withdrawing system with level sensor chain

- **Complete withdrawal system with level sensor chain**
- **Universal replacement for withdrawal systems of battery tank facilities**
- **Reliable protection against overfilling by means of monitoring of all tanks**
- **Level sensor with metallised sleeve for permanent operation even with biofuel/biodiesel**

Adapters for various tank connections

Application

Replacement for withdrawal system at battery tank facilities of almost all manufacturers. Depending on the version, available for communicating and non-communicating systems. One base unit per system and one extension for each additional tank. The level sensor chain is completely integrated. Suitable for fuel oil (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%.

Description

The base unit with the level sensor is mounted in the first tank (viewing in direction of filling). An extension is mounted in each additional tank of the battery tank facility. This applies to regular filling from the top. The level sensor and the level limiters are fully wired, the cables just need to be plugged in. The connector shipped with the base unit is plugged into the last extension. This closes the circuit. The connection cable to the level sensor fitting is connected in the junction box. The pipes for the withdrawal line can be connected with a diameter of 8 mm or 10 mm.
The connection pipes for the withdrawal line are not included. Adapters for the tank connections of tanks of virtually all manufacturers are included.

Technical specifications

Tank height
Up to 200 cm,
hose can be shortened as required

Connection thread (tank)
G1½
Enclosed adapters for tank connections:
G2, M60 x 4, S75 x 6, flange Ø 68 mm

Media
Fuel oil (DIN 51603-1) with up to 30 % FAME
Diesel fuel (EN 590) with up to 7 % FAME
biodiesel with up to 30 % FAME
HVO/GTL with up to 100 %

Approval
GWG: CE as per EU Construction Products Regulation (EN 13616:2004)
GWG chain, level limiter: Z-65.17-182 (DIBt)

Scope of delivery
- Base unit: Floating withdrawal unit, wiring box, terminating connector, level sensor, adapters for tank connection
- Extension: Floating withdrawal unit, wiring box, float switch, connection cable, adapters for tank connection

DG: G, PG: 3			Part no.
Universal base unit, communicating, level sensor chain	-	-	**20820**
Universal extension, communicating, level sensor chain	-	-	**20824**
Universal base unit, not communicating, level sensor chain	-	-	**20825**
Universal extension, not communicating, level sensor chain	-	-	**20826**
Withdrawal unit multi-way union Ø 8/10 mm	1	10	**20842**
Withdrawal pipe universal Ø 10 x 1 x 1000 mm, aluminium	10	-	**20843**

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See operating instructions for list of suitable tanks and tank connections.

Level sensor with metallised sleeve

With the GWG level sensors and the metallised sleeve, AFRISO offers maximum safety for the filling of tank facilities. In the case of conventional level sensors, a plastic sleeve provides mechanical protection of the PTC thermistor. The sleeve is open at the bottom and has a slot at the side so that the fuel oil can easily reach the PTC thermistor. However, the openings of the sleeve may get clogged due to the growth of microorganisms (such as bacteria and fungi) and an air cushion prevents the fuel oil from reaching the PTC thermistor. The rise in the use of biofuel with a certain percentage of FAME (fatty acid methyl ester) increases this risk. The higher the FAME content, the greater the water content in the fuel can be. This creates an environment even more susceptible to the growth of microorganisms. This may cause the level sensor to malfunction and ultimately disable the safety shut-off system. This may lead to overfill damage for which the owner/operator of the facility is liable.

Permanently reliable.

The metallised surface of the new sleeves and the new shape of the slot help to prevent the growth of microorganisms and improve the long-term reliability of the level sensor.

Level sensors GWG with metallised sleeve or stainless steel sleeve






Type	GWG 12 K/1	GWG 12 K/1C	GWG 12 K/MT	GWG 23-Ro	GWG 23-Wa	GWG 23-T
Application	For indoor tanks or plastic tanks, also battery tank systems			For all indoor or outdoor tanks (aboveground or underground), except for battery tank systems		
Media	Fuel oil EL (DIN 51603), diesel fuel (EN 590), FAME 100 % (EN 14214) as biofuel or biodiesel (up to 20 % FAME with GWG 12 K/1C), paraffinic fuels HVO and GTL with up to 100 %					
Approval	CE marking as per EC Construction Products Regulation 305/2011, EU 574/2014 (EN 13616:2004)					

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Level sensors for indoor tanks

GWG 12 K/1

- **Design as per EN 13616**
- **Metallised sleeve for permanent operation even with biopetroleum/biodiesel**
- **Universal use due to variable height adjustment**
- **Impact-resistant, shock-resistant and deformation-resistant GWG level sensor connection fitting (type 905 yellow)**
- **The right version for each application**

GWG 12 K/1 with bracket

Application

To be used as part of an overfill alarm system to avoid overfilling of tanks. For battery tank systems, rectangular tanks welded on site and other indoor tanks. Suitable for fuel oil (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

Description

PTC thermistor type level sensor consisting of probe, screw fitting, fitting for wall mounting as well as cable between probe and fitting. Watertight up to 10 m water column. Odour-tight. Metallised sleeve. The GWG level sensor connection fitting type 905 yellow is shock-resistant, impact-resistant and deformation-resistant. GWG 12 K/1 (bracket) with pre-mounted connection fitting type 905 made of grey plastic. The connection fitting is fixed to an aluminium bracket. The connection cable of the level sensor is factory-wired to the connection fitting. To be used for tanks with direct filling (without filling pipe from the outside). See the ordering table for the available versions, fitting colours, probe and cable lengths. GWG filler cap type 906 (part no. 20430) can also be used.

Technical specifications

Process connection
Screw fitting G1, plastic

Media
- Fuel oil EL (DIN 51603-1)
- Diesel fuel (EN 590) with up to 100 % FAME each
- HVO/GTL with up to 100 %

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

Approval
CE marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13616:2004

DG: G, PG: 3	Probe length	Fitting	Cable length			Part no.
GWG 12 K/1 yellow	360 mm	Yellow	1.5 m	1	25	**45100**
GWG 12 K/1 grey	360 mm	Grey	1.5 m	1	25	**45105**
GWG 12 K/1 grey	480 mm	Grey	1.5 m	1	25	**45102**
GWG 12 K/1/5 yellow	360 mm	Yellow	5.0 m	1	15	**45160**
GWG 12 K/1/5 grey	360 mm	Grey	5.0 m	1	15	**45165**
GWG 12 K/1	360 mm	Without	1.5 m	1	25	**45166**
GWG 12 K/1	360 mm	Without	5.0 m	1	20	**45167**
GWG 12 K/1 with bracket	360 mm	Grey	0.4 m	1	25	**45104**
GWG 12 K/1/5	As desired	Grey	As desired	1	-	45199

Level sensor combinations

Application

To be used as part of an overfill alarm system to avoid overfilling of tanks. For battery tank systems, rectangular tanks welded on site and other indoor tanks. Suitable for fuel oil (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 30 % for GWG 12 K/1C or 100 % FAME (EN 14214) for GWG 12 K/MT. This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture. Also for use in flood hazard areas and flood risk areas.

GWG 12 K/1C (Euroflex 312)

Description

Combination fitting exclusively for individual tanks. PTC thermistor type level sensor consisting of probe, screw fitting, fitting for wall mounting as well as cable between probe and fitting. Watertight up to 10 m water column. Odour-tight. Metallised sleeve. The screw fitting is a withdrawal system Euroflex 312 with quick-action shut-off valve with connection for flow, return and measuring lines. The GWG level sensor connection fitting type 905 yellow is shock-resistant, impact-resistant and deformation-resistant.

Technical specifications

Fitting
Type 905 yellow for wall mounting

Process connection
Screw fitting G1½

Medium
- Fuel oil EL (DIN 51603-1) with up to 30 % FAME
- Diesel fuel (EN 590) with up to 7 % FAME
- Biodiesel with up to 100 % FAME
- HVO/GTL with up to 100 %

Adjustment range
80 to 338 mm

Probe length
360 mm

Hose length
2.15 m

Cable length
5 m

Approval
CE marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13616:2004

GWG 12 K/MT

PTC thermistor type level sensor consisting of mechanical level indicator MT-Profil R, probe, screw fitting, fitting for wall mounting as well as cable between probe and fitting. Watertight up to 10 m water column. Odour-tight. Metallised sleeve. The GWG level sensor connection fitting type 905 yellow is shock-resistant, impact-resistant and deformation-resistant.

Fitting
Type 905 yellow for wall mounting

Process connection
Screw fitting G1½

Medium
- Fuel oil EL (DIN 51603-1) with up to 100 % FAME
- Diesel fuel (EN 590) with up to 7 % FAME
- Biodiesel with up to 100 % FAME
- HVO/GTL with up to 100 %

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

Adjustment range level sensor
80 to 338 mm

Probe length
360 mm

Cable length
5 m

Approval
CE marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13616:2004

i GWG filler cap see page 60.

DG: G	PG			Part no.
GWG 12 K/1 C with withdrawal system Euroflex	1	1	10	**20190**
GWG 12 K/MT with level indicator MT-Profil R	3	1	10	**45311**

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Accessories for level sensors

GWG filler cap

Application

For systems operated with fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel or biodiesel with up to 100 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%. Suitable for use in flood hazard areas and flood risk areas.

Description

GWG filler cap with bayonet connection G2 with integrated level sensor connection fitting. Brass male coupling as per EN 14420-6. Filler cap made of oil- and weather-resistant plastic. Watertight up to 10 m water column. Lockable with standard padlock.

GWG filler cap

Cable extension fitting KVA

Application

For 2-wire electrical cables (max. 42 V/4 A).
Suitable for flood hazard areas.

Description

Clamp connections (gland) at both ends for cable diameters between 6 and 8.3 mm. Watertight up to 10 m water column.

Wire cross section: max. 2.5 mm²
Degree of protection: IP 68 (EN 60529)


Cable extension fitting KVA

Reducers

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

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


Reducers

See page 161 for additional filler caps.
See page 65 for level sensor testers.
See page 64 for fittings for level sensors.

DG: G	PG			Part no.
GWG filler cap	2	1	10	**20430**
Reducer G1½ x G1	1	1	-	**20905**
Reducer G2 x G1½	1	1	-	**20903**
Cable extension fitting KVA	1	1	50	**40041**

Level sensors for outdoor tanks as per EN 13616:2004

Fittings for level sensors

1. Coupling plug type 902, part no. 40045
2. Coupling socket type 903, part no. 40030
3. GWG level sensor fitting for wall mounting type 905, part no. 40050 or 40052
4. Pipe fitting type 904 with flange plug type 901 (e.g. GWG 23)

Benefits

- **The right version for each application**
- **Compact, corrosion-proof design**
- **Adjustable for different tank sizes**
- **Universal use due to variable height adjustment**
- **Yellow fitting made of impact-resistant plastic with Ex approval (zone 0) and stainless steel sleeve**
- **Chemical resistance even if used with biodiesel, biofuel or or paraffinic fuels such as HVO and GTL as admixtures up to 100 %**
- **Metallised sleeve of grey fitting for permanent operation even with biofuel/biodiesel**
- **Easy and fast installation**

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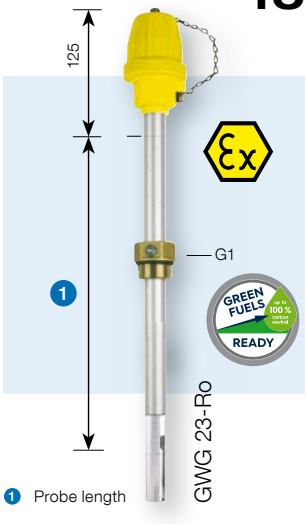
Level sensor GWG 23-Ro/T for outdoor tanks as per EN 13616:2004



- For fuel oil EL, diesel fuel, biofuel/biodiesel and petrol
- With metallised sleeve (with grey version) for permanent operation even with biofuel/biodiesel
- Yellow fitting with Ex approval (EU type examination certificate, zone 0) and stainless steel sleeve
- Variable height adjustment

Application

Part of a control chain for overfill alarm systems. The level sensor helps to prevent overfilling of tanks. For tanks as per EN 12285-1, 12285-2, DIN 6618, 6619, 6623, 6624, 6608, 4119 and tanks as per DIN 6620 and DIN 6625 or equivalent tanks.
Suitable for fuel oil (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO and GTL as an admixture or 100% or of petrol under certain conditions. See the operating instructions for additional information.

Description

PTC thermistor type level sensor consisting of height-adjustable probe and screw fitting. Pressure- and vacuum-tight. Watertight up to 10 m water column.

GWG 23-Ro with tube fitting made of **yellow plastic**, highly impact-resistant, deformation-resistant, with strong chain and flange gasket. Also suitable for petrol with **GWG level sensor sleeve made of stainless steel**.

GWG 23-Ro with tube fitting made of **grey plastic**. Suitable for the following media: fuel oil, diesel fuel, biofuel and biodiesel. **With metallised sleeve.**

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

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

Technical specifications

Probe length
From 400 to 1,000 mm, probe lengths up to 3,000 mm, see ordering table

Process connection
Screw fitting G1

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

Operating pressure in the tank
No pressure

Material
GWG level sensor fitting: Plastic
Probe tube: Steel, galvanised
Screw fitting: Brass
PTC thermistor: Glass-encapsulated
GWG sleeve: Plastic, metallised (grey version)
stainless steel (yellow version)

Approval
CE marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13616:2004
GWG with yellow fitting:
Ex II 1 G Ex ia IIB T3 Ga
Ex II 1/2 G Ex ia IIB T3 Ga/Gb

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Versions see page 64.

Level sensors GWG 23-Wa for outdoor tanks as per EN 13616:2004

1 Probe length

- Fitting for wall mounting
- For fuel oil, diesel fuel, biofuel/biodiesel
- Yellow fitting with Ex approval (EU type examination certificate, zone 0)
- Variable height adjustment
- Suitable for use in flood hazard areas
- Yellow fitting with high-grade stainless steel sleeve

GWG level sensor fitting for wall mounting

Application

Part of a control chain for overfill alarm systems. The level sensor helps to prevent overfilling of tanks. For tanks as per EN 12285-1, 12285-2, DIN 6618, 6619, 6623, 6624, 6608, 4119 and tanks as per DIN 6620 and 6625 or equivalent tanks whose diameters and volumes correspond to the EN 12285-1 design. Suitable for fuel oil (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO and GTL as an admixture or 100% or of petrol under certain conditions.
See the operating instructions for additional information

Description

PTC thermistor type level sensor consisting of height-adjustable probe, screw fitting, junction box at the upper end of the tube and fitting for wall mounting. Pressure- and vacuum-tight. Watertight up to 10 m water column.

Technical specifications

Probe length
From 400 to 700 mm,
probe lengths up to 3,000 mm possible, see ordering table

Process connection
Screw fitting G1

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

Operating pressure in the tank
No pressure

Material

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

Approval
CE marking as per EU Construction Products Regulation 305/2011,
EU 574/2014, EN 13616:2004
GWG with yellow fitting:
Ex II 1 G Ex ia IIB T3 Ga
Ex II 1/2 G Ex ia IIB T3 Ga/Gb

Versions see page 64.

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Level sensors for outdoor tanks as per EN 13616:2004

	Fitting	Probe length (mm)			DG	PG			Part no.
GWG 23-Ro 400	Yellow	400			G	3	1	-	**46115**
GWG 23-Ro 700	Yellow	700			G	3	1	-	**46116**
GWG 23-Ro 1000	Yellow	1,000			G	3	1	-	**46117**
GWG 23-Ro So, special lengths*	Yellow	Max. 3,000			G	3	1	-	46118
GWG 23-Ro 400	Grey	400			G	3	1	-	**46125**
GWG 23-Ro 500	Grey	500			G	3	1	-	**46185**
GWG 23-Ro 700	Grey	700			G	3	1	-	**46126**
GWG 23-Ro 1000	Grey	1,000			G	3	1	-	**46127**
GWG 23-Wa 400	Yellow	400			G	3	1	-	**46130**
GWG 23-Wa 700	Yellow	700			G	3	1	-	**46131**
GWG 23-Wa So, special lengths*	Yellow	Up to max. 3,000			G	3	1	-	46133
GWG 23-T 700	Grey	700	Min. length: 860	Max. length: 1,290	G	3	1	-	**47622**
GWG 23-T 1000	Grey	1000	1,160	1,750	G	3	1	-	**47623**

* Extra shipping charges may apply (bulk goods).

Accessories	Fitting	DG	PG			Part no.
GWG level sensor fitting 905-W	Grey	G	1	1	-	**40050**
GWG level sensor fitting 905-W	Yellow	G	1	1	-	**40052**
Coupling socket TW 903	-	G	1	1	-	40030
Coupling plug TW 902	-	G	1	1	-	40045

Level sensor tester GPG 01

- **Intuitive operation by means of step by step instructions**
- **For all level sensors as per EN 13616:2004 design B1 (formerly TRbF 511)**
- **For liquids with a flash point of > 55 °C such as fuel oil, diesel and other liquid fuels or oils**
- **High-resolution TFT colour display for optimum readings**
- **PDF report via QR-Code and Eurosoft® connect app**

Application

For full testing of level sensors which are not used in hazardous areas/potentially explosive atmospheres. It is possible to perform a simple electrical function test with the level sensor installed as well as a wet test with the level sensor uninstalled.

Description

Modern, robust housing with high-resolution TFT colour display and foil keypad with four keys and On/Off button. A 1.2 m connection cable with a coupling socket 903 for plugging in the level sensor is mounted at the top. A mini USB port for the power supply unit/battery charger is located at the bottom.
The electrical function test displays the heat-up time in seconds and filling release. When a wet test is performed, the switch off time in seconds after submersion in liquid is indicated. At the end of the test, the full test result is displayed in the form of a summary. In the case of error messages and malfunctions, the display colour changes to red and a corresponding text is shown. If the device is not in use, it is switched off automatically; the charging function remains active.
GPG 01 can display the measurement result as a QR code. The Eurosoft® connect app (iOS, Android) allows you to convert the QR code and generate a PDF report.

Technical specifications

Operating temperature range
Ambient: -10/+50 °C
Storage: -20/+50 °C

Hours of operation
Max. 38 hours

Weight
Approx. 360 g (device)

Dimensions
W x H x D: 67 x 144 x 37 mm
(without connection cable)

Connection level sensor
1.2 m connection cable with coupling socket 903

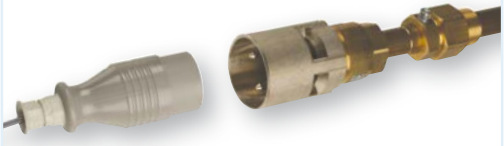
Display
TFT colour display, 2.8"
W x H: 45 x 60 mm

User interface language
German, English

Supply voltage
Lithium-ion battery (3.6 V/2,350 mAh)
or power supply unit (USB)

Scope of delivery
Tester with coupling socket 903,
USB power supply unit, mini USB cable,
a protective sleeve with magnet, case, instructions

Level sensor testers
with connector 903 – suitable for all level sensor fittings.



DG: H, PG: 4	Part no.
Level sensor tester GPG 01	**46200**
Spare parts	
Power supply unit NTE 5	523493
Charging cable mini USB USB	523506
Spare case	523372

Level sensor tester GPR 4

- For fast and easy function tests
- Battery operation
- A signal lamp indicates errors

Application

For fast and easy electrical function tests of level sensors. For use with storage tanks for fuel oils, lubricating oil or paraffinic fuels and diesel fuels. Not permitted for use in hazardous areas and not for level sensors which are installed in tanks containing hazardous media.

Description

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

Technical specifications

Operating temperature range
Operation: 0/40 °C
Storage: -10/+60 °C

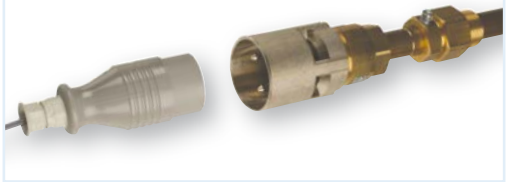
Weight
344 g (with connector)

Dimensions
W x H x D: 123 x 70 x 34 mm

Supply voltage
2 x 9 V monobloc battery (PP3)

Scope of delivery
Tester with coupling socket 903 and battery

Level sensor testers
with connector 903 – suitable for all level sensor fittings.



DG: H, PG: 4	Part no.
Level sensor tester GPR 4	**62301**

Transducer for overfill prevention system UFS 01 (WHG)

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

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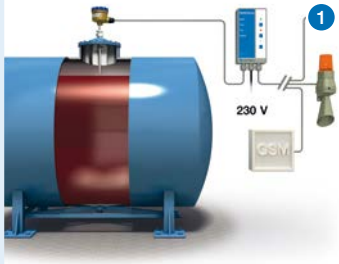

1 Pump

Application

To avoid overfilling of stationary tanks and stationary-use tanks.
Suitable for a wide range of flammable and non-flammable water-polluting liquids with a flash point > 55 °C.

Description

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

Media

- Fuel oil EL, biofuel
- Diesel/biodiesel mixtures
- Used gearbox oils and motor oils
- Unused motor oils, gearbox oils and hydraulic oils
- Transformer oil
- Hexanol 1
- Ethyl aceto-acetate (aceto-acetic ester)
- Acrylic acid 2-ethyl hexylene ester (2-ethyl hexylene acrylate)
- Cyclohexyl acetate, benzaldehyde
- Methyl aceto-acetate
- Nitrobenzene, 1.2 dichlorobenzene
- 2.4 dimethylaniline (N, N dimethylaniline)
- n octanol (n octyl alcohol)
- Diethyloxalate
- Aniline
- Vegetable oil (also as per EN 51605)
- Oil/water mixtures (e.g. drilling oil or lubricating oil)
- Perchloroethylene and trichloroethylene
- Antifreeze agents
- Cleaning agent/water mixtures
- AdBlue® (urea solution) as per DIN 70070 (only with level probe 76 N and 76 E)

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

Technical specifications

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

Supply voltage
AC 230 V or AC/DC 15–40 V
Power input: < 10 VA

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

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

Degree of protection
IP 40 (EN 60529)

Weight
0.6 kg

Approval
DIBt: Z-65.11-193

	DG	PG	Part no.
Transducer UFS 01, AC 230 V	H	4	**53202**
Transducer UFS 01, AC/DC 15–40 V	H	4	**53216**
Mounting frame	G	1	**43521**
Sealing kit (IP 54)	G	1	**43416**
Ancillary control unit type 907-Z, 230 V	H	2	53232
Ancillary control unit type 907-Z, DC 24 V	H	2	53262

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See page 69 for level probes.

2

Transducer NB 220 H for overfill prevention systems (WHG)

- **Compact design**
- **Either as 230 V or as 24 V version**

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Application

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

Description

Type-approved together with all level probes type series 76 as part of an overfill prevention system. When the level probe comes in contact with the liquid, the relay switches. Alarm units for visual and audible alarms are additionally required.

Technical specifications

Supply voltage
AC 230 V or DC 24 V

Power input
Max. 4 VA / 6 W

Output
Voltage-free changeover contact

Contact rating
AC 250 V, max. 500 VA

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

Approval
DIBt: Z-65.11-193

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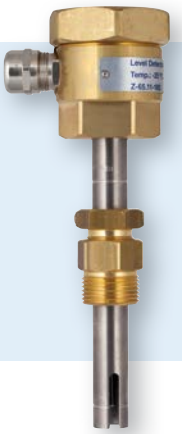
See page 67 for a list of liquids (substances).

See page 707 for additional alarm unit ZAG 01 with visual/audible alarms.

DG: H	PG			Part no.
Transducer NB 220 H – AC 230 V	4	1	-	**53210**
Transducer NB 220 H – DC 24 V	4	1	-	**53219**

Level probes for overfill prevention systems (WHG)



Application

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

Level probe type 76 A

Description

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

Technical specifications

Material

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

Process connection
Connection thread G¾

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

Degree of protection
IP 54 (EN 60529)

Approval
DIBt: Z-65.11-185

Level probe type 76 AH

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

Material

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

Process connection
Connection thread G¾

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

Degree of protection
IP 54 (EN 60529)

Approval
DIBt: Z-65.11-185

DG: H, PG: 3	Part no.
Level probe type 76 A	
100 mm	**53225**
200 mm	**53217**
300 mm	**53220**
400 mm	**53207**
500 mm	**53209**
Extra charge per 100 mm	On request
Level probe type 76 AH*	
500 mm	**53214**

* Please enquire for other response lengths.

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See page 67 for a list of liquids (list of substances).
Level probes type 76 N and 76 E for AdBlue® on request.

2

Overfill prevention system LS for hazardous areas (Ex) (WHG)

Transducer LS 500

Application

To avoid overfilling of stationary tanks and stationary-use tanks. Approved without list of substances for water-polluting liquids, also with flash point < 55 °C.
The overfill prevention system must be set up in such a way that visual and audible alarms are triggered when the maximum permissible level is reached. The transducer must be installed outside of the hazardous area.

Description

Transducer with Test key. Type-approved together with the level probes LS 300 EU, LS 300 FU or LS 300 ESPU as part of an overfill prevention system. The transducer supplies the level probe via an intrinsically safe circuit, evaluates the change in resistance of the PTC thermistor, continuously checks the PTC thermistor operation and monitors the system (power outage, short circuit, line interruption, etc.). Negative results cause the overfill prevention system to respond. The additional alarm unit ZAG 01 can also be connected.

Technical specifications

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

Operating temperature range
-25/+50 °C

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

Approval
DIBt: Z-65.11-228

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

Level probe LS 300 EU

Level probe for transducers as part of an overfill prevention system for stationary and stationary-use tanks. Suitable for installation in all tank versions. Approved without list of substances for water-polluting liquids, also with flash point < 55 °C.

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

Material

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

Process connection
Screw fitting G⅜

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

Degree of protection
IP 67 (EN 60529)

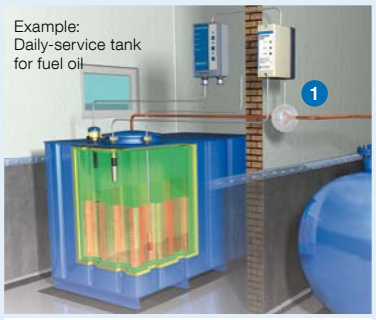
Approval
DIBt: Z-65.11-228

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

DG: H, PG: 4	Part no.
LS 500	**53310**
Level probe LS 300 EU, 500 mm	**53300**
Extra charge per 100 mm (from 500 mm)	On request

PTC thermistor level controller RG 210

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



1 Storage tank pump

Application

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

Description

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

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

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

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

Technical specifications

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

Supply voltage
AC 230 V

Power input
12 VA

Relay contact (output)
1 changeover contact voltage-free

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

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

Probe
PTC thermistor probe, type 937
Cable length: 3 m (max. 50 m)
Process connection: G½, G1
Medium: -25/+50 °C

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Note: Not to be used as an overfill prevention system according to WHG. Requires the connection of an overfill prevention system according to WHG.

DG: H, PG: 4			Part no.
Level controller RG 210	1	-	**53206**
Flexible PTC thermistor probe type 937	1	-	**53204**

Liquid-based leak detector LAG

Vacuum type leak detector EUROVAC

Inner tank linings

Leak detectors - sight glass principle

CHAPTER 3

Leak detectors, leak monitoring systems and leak protection linings

OVERVIEW

LEAK DETECTION

LEAK PROTECTION

Professional equipment and convincing solutions for tank protection

With a comprehensive range of building technology products, AFRISO prides itself in "Making Heating Systems Safe". In addition to this extensive range, a large selection of alarm units for the fast detection of level, liquid spillage, leakage, gas or smoke is available.

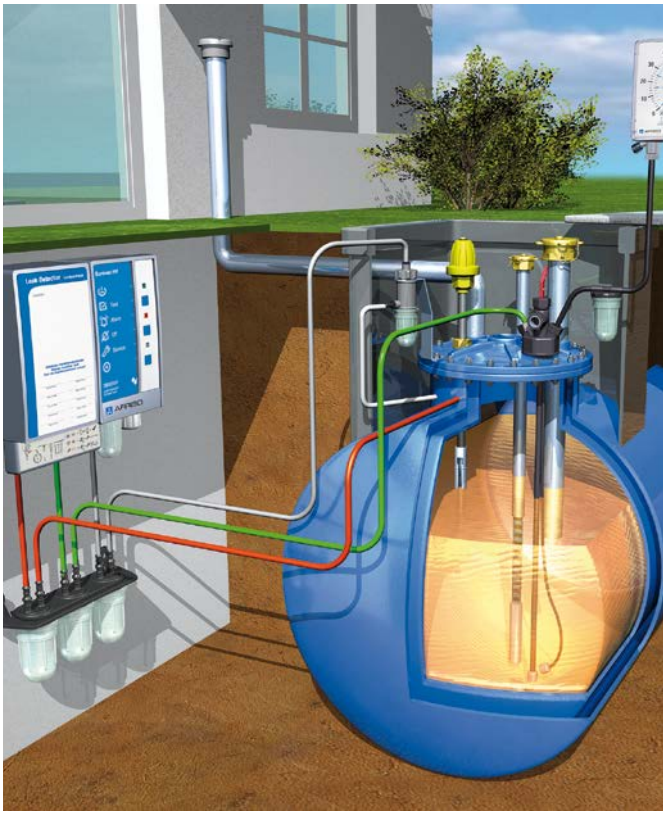
Advantages – your benefits

- Complete range of products for professional tank protection from a single supplier
- Maximum protection against fuel oil accidents with brand products with approval for construction products
- For fuel oil EL, biofuel, e-fuels, diesel (with up to 30 % FAME)
- Inner linings exactly made to size and ready for easy installation
- 10 years warranty on material and workmanship for plastic inner linings
- Fittings and devices ready to be installed, with all required mounting accessories

Leak protection lining

The installation of customised AFRISO leak protection linings turns single-walled steel tanks into double-walled tanks. Complex drip pans or collection facilities are no longer required. Oil cannot escape even if there is a leak in the outer tank wall. The Eurovac leak detector uses a vacuum in the interstitial space between the inner lining and the tank wall to monitor both walls for leaks. Malfunctions and leaks are immediately signalled.

Leak detectors and alarm units WATCHDOG-LINE
The uniform appearance not only ensures customer confidence, but also underpins the professionalism of the specialised company.



Leak monitoring

Application areas
- Cylindrical steel or plastic (glass-fibre reinforced plastic) tanks
- Double-walled steel tanks
- Steel tanks manufactured on site
- Spherical tanks
- Tanks with inner lining
- Inspection ducts
- Oil storage rooms/collection facilities
- Containers, cisterns, cesspits

Media
- Fuel oil EL
- Diesel fuel
- Biofuel
- E-fuels
- Paraffinic fuels
- AHL
- AdBlue®
- Rainwater
- Other liquids

Oil tank conversion kits

If oil tanks can no longer be used or if the heating system is converted to other types of energy or if old unused cesspits and cisterns are available, the containers can be equipped with a plastic inner lining for rainwater harvesting and integrated into a rainwater harvesting system.
Various conversion kits, inner linings and a complete range of accessories are available.

Leak detectors LAS – sight glass principle


LAS 230


LAS 72

LAS 24 EK

Application For aboveground double-walled tanks containing water-polluting liquids. Application under atmospheric conditions for steel tanks and double-walled tanks with approval for leak detectors. Types LAS 24 E, LAS 39 E and LAS 72 E for all water-polluting liquids. Types LAS 24, LAS 39, LAS 72 and LAS 230 for water-polluting liquids with a flash point of > 55 °C.

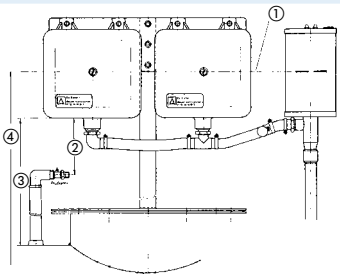
Description Leak detector for liquid systems consisting of a transparent acrylic glass cylinder, stainless steel housing covers and bottoms. Connection thread G1. Approval DIBt: Z-65.24-381.

Versions Version E with wire mesh cylinder. LAS 24 EK for mobile tanks with tilting valve to protect against loss of leak detection fluid during transport and for venting on site. LAS 72 with G1 connection at the side for up to 4 additional containers with 4.5 litres each. The additional containers allow for leak detection at tanks with a greater interstitial space (see overview).

Overview LAS 72 with additional containers

Number of additional containers	Active volume LAS 72 and additional containers in litres	Max. leak detection fluid in the interstitial space in litres	To be used for tanks with a volume in litres up to
0	2.1 l	Max. 72 l	Approx. 7,000 l
1	6.6 l	Max. 230 l	Approx. 30,000 l
2	11.1 l	Max. 387 l	Approx. 50,000 l
3	15.6 l	Max. 545 l	Approx. 80,000 l
4	20.1 l	Max. 700 l	100,000 l

Values for LAS 230 on request.



① Make sure to observe height
② Min. 100 mm
③ Min. 500 mm
④ Max. 5 m to tank bottom

DG: H, PG: 3	Active volume	Interstitial space of tank	Max. no. of additional tanks	Part no.
LAS 24	0.7 l	Max. 24 l	-	43515
LAS 24 E	0.7 l	Max. 24 l	-	**43516**
LAS 24 EK	0.7 l	Max. 24 l	-	**43517**
LAS 39	1.1 l	Max. 39 l	-	**43526**
LAS 39 E	1.1 l	Max. 39 l	-	43525
LAS 72	2.1 l	Max. 72 l	4	**43528**
LAS 72 E	2.1 l	Max. 72 l	4	**43527**
LAS 230	6.6 l	Max. 232 l	4	**43550**
Mounting kit LAS 0 (test valve)	-	-	-	**43529**
Mounting kit LAS 1*	-	-	-	43530
Mounting kit LAS 2*	-	-	-	43531
Mounting kit LAS 3*	-	-	-	43532
Mounting kit LAS 4*	-	-	-	43533

* Including the corresponding number of additional containers (Ex-Elstat I).

Leak detector LAG-13 KR

Class II, EN 13160-1/-3

- **Version as per German WHG/AwSV and BetrSichV**
- **For monitoring of aboveground, double-walled tanks**
- **With fail-safe mode**

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Application

For double-walled tanks with liquid in the interstitial space. For monitoring water-polluting liquids with a flash point of > 55 °C stored aboveground. Approved for all suitable tanks under atmospheric conditions.

Since July 2003, the LAG-13 KR leak detector may only be used for replacements of existing systems at underground, double-walled tanks as a result of the reclassification of water-polluting liquids in Germany!

Description

Leak detector class II (EN 13160-1/-3). The system consists of a control unit, a container for leak detection fluid (LAG container white) and a probe. Control unit with operating and alarm indicators, audible/visual alarm, test button and increased interference protection. The audible alarm can be muted with the Acknowledge key. The voltage-free relay contact is provided for connection of additional external alarm equipment (such as horns,) or an additional alarm unit ZAG 01. With fail-safe mode: Audible alarm if the probe fails. Suitable for panel mounting with a mounting frame; a sealing kit (IP 54) is available for rough application conditions. The LAG container serves as detection container and as expansion vessel at the same time. For aboveground tanks, the ratio between usable contents and total volume of leak detection fluid must be no more than 1:35. If the interstitial space has a greater volume, you must use additional containers.

Technical specifications

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

Supply voltage
AC 230 V
Nominal power 5 VA

Control unit
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Switching outputs
Relay output: 1 voltage-free changeover contact
Contact rating: AC 250 V, 2A

Tanks
Plastic, white
W x H x D: 300 x 325 x 145 mm
Usable contents / total contents: 4.5 l / 10 l
Outlet: G¾ female
Degree of protection: IP 20 (EN 60529)

Approval
CE-marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13160-1/-3 and ÜHP

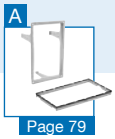
DG: G	PG			Part no.
LAG-13 KR, including container and probe	4	1	-	**43500**
LAG container white, without probe	1	1	-	**40730**
Control unit LAG-13 KR	4	1	-	**40630**
Accessories				
Mounting frame	1	1	-	**43521**
Sealing kit (IP 54)	1	1	-	**43416**
LAG mounting kit	1	1	-	**40540**
Mounting kit for 1 additional LAG container (without container)	1	1	-	**40539**
Leak detection fluid, concentrate Antifrogen N	1	1	-	**43645**

i See page 79 for a detailed product description LAG container.

Leak detector LAG-14 ER

Class II, EN 13160-1/-3

- **EU type examination certificate**
- **Version as per German WHG/AwSV and BetrSichV**
- **With fail-safe mode**
- **For monitoring of aboveground, double-walled tanks**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Application

For double-walled tanks with liquid in the interstitial space. For monitoring water-polluting liquids stored aboveground. The LAG container can be installed in hazardous areas zones 0, I and II (e.g. manhole of petrol tanks). Approved for all suitable tanks under atmospheric conditions.

Since July 2003, the LAG-14 leak detector may only be used for replacements of existing systems at underground, double-walled tanks as a result of the reclassification of water-polluting liquids in Germany!

Description

Class II leak detector (EN 13160-1/-3) with intrinsically safe probe circuit. The system consists of a control unit, a container for leak detection fluid (LAG container black) and a probe. Control unit with operating and alarm indicators, audible/visual alarm, test button and increased interference protection. The audible alarm can be muted with the Acknowledge key. The voltage-free relay contact is provided for connection of additional external alarm equipment (such as horns,) or an additional alarm unit ZAG 01. With fail-safe mode: Audible alarm if the probe fails. Suitable for panel mounting with a mounting frame; a sealing kit (IP 54) is available for rough application conditions. The LAG container serves as detection container and as expansion vessel at the same time. For aboveground tanks, the ratio between usable contents and total volume of leak detection fluid must be no more than 1:35. If the interstitial space has a greater volume, you must use additional containers.

Technical specifications

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

Supply voltage
AC 230 V
Nominal power 5 VA

Control unit
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Switching outputs
Relay outputs: 1 voltage-free changeover contact
Contact rating: AC 250 V, 2A

Tanks
Antistatic plastic, black
W x H x D: 300 x 325 x 145 mm
Usable contents / total contents: 4.5 l / 10 l
Outlet: G¾ female
Degree of protection: IP 20 (EN 60529)

Approval
CE-marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13160-1/-3 and ÜHP

EU type examination certificate
TPS 22 ATEX 015639 0019 x
Ex II (1) G [Ex ia] Ga IIC

DG: G	PG			Part no.
LAG-14 ER with relay, including container and probe	4	1	-	**43410**
LAG container black without probe	1	1	-	**40731**
Control unit LAG-14 ER	4	1	-	**40642**
Accessories				
Mounting frame	1	1	-	**43521**
Sealing kit (IP 54)	1	1	-	**43416**

Accessories for leak detectors

LAG container

Description

Detection container for LAG leak detectors. The LAG container also serves as an expansion vessel. For aboveground tanks, the ratio between usable contents and total volume of leak detection fluid must be no more than 1:35. If the interstitial space has a greater volume, you must use additional containers.

Technical specifications

LAG container black
Suitable for LAG-14 ER, for all stored liquids
W x H x D: 300 x 325 x 145 mm
Usable contents / total contents: 4.5 l / 10 l
Outlet: G¾
Degree of protection: IP 20 (EN 60529)

LAG container black

Technical specifications

LAG container white
Suitable for LAG-13 K,
for all liquids with a flash point > 55 °C
W x H x D: 300 x 325 x 145 mm
Usable contents / total contents: 4.5 l / 10 l
Outlet: G¾
Degree of protection: IP 20 (EN 60529)

LAG container white

LAG mounting kit

Description

For approved hydraulic mounting of leak detectors (LAG-13 KR, LAG-14 ER).

LAG mounting kit

Leak detection fluid, concentrate Antifrogen N

Description

For use with leak detectors for double-walled tanks. Concentrate for mixing the leak detection fluid for the interstitial space. 10 l container with 3.5 l leak detection fluid Antifrogen N (BAM no: 1.3/9790-5.1/3436), can be mixed with water to 10 l at up to -20 °C. Please enquire for larger containers.

Leak detection fluid – concentrate

Mounting frame and sealing kit

Description

Suitable for all wall mounting housings of the WATCHDOG-LINE alarm units series. Mounting frame for fast integration into control cabinet. Sealing kit for rough application conditions. The sealing kit is easy to mount between the housing cover and base. With this measure, the alarm unit reaches degree of protection IP 54 (not suitable for DTA 10/20, AFA 11 and RENA).

DG: G, PG: 1			Part no.
LAG container white, without probe	1	1	**40730**
LAG container black, without probe	1	1	**40731**
LAG mounting kit	1	-	**40540**
Mounting kit 1 additional LAG container (scope of delivery without container)	1	1	**40539**
Leak detection fluid, concentrate Antifrogen N	1	-	**43645**
Mounting frame	1	1	**43521**
Sealing kit (IP 54)	1	1	**43416**

Mounting frame and sealing kit

Vacuum type leak detector Eurovac

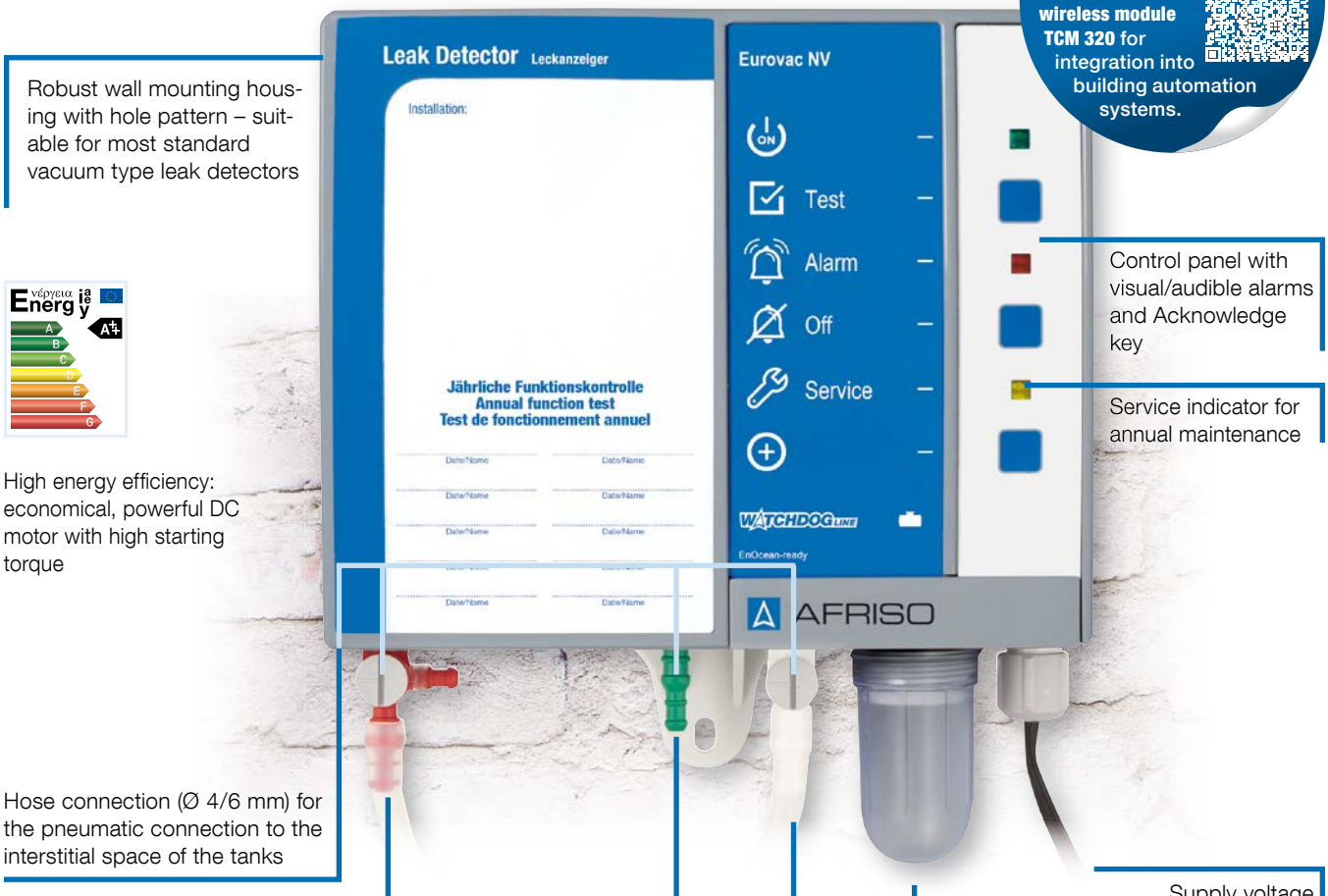
Your benefits

- Leak detector class I, EN 13160-1/-2
- Modern housing design, in line with WATCHDOG-LINE alarm unit series
- Large supply voltage range (AC 100–240 V) for worldwide application
- With power outage monitoring (with optional 9 V battery)
- Indication of pump operating time
- Low-noise operation
- Electronic pressure sensor for permanently stable switching points
- Drilling template included – for easy and fast installation
- Relay output for additional signalling devices, additional alarm units, event reporting systems or for integration into building control systems

Eurovac in protective housing (IP 65) with heating and horn

EnOcean-ready
Can be combined with **EnOcean® wireless module TCM 320** for integration into building automation systems.

Robust wall mounting housing with hole pattern – suitable for most standard vacuum type leak detectors



Control panel with visual/audible alarms and Acknowledge key

Service indicator for annual maintenance

High energy efficiency: economical, powerful DC motor with high starting torque

Hose connection (Ø 4/6 mm) for the pneumatic connection to the interstitial space of the tanks

Supply voltage

Connection measuring line

Connection exhaust line

Sintered plastic filter and condensate trap to indicate the current degree of pollution and to protect the pump

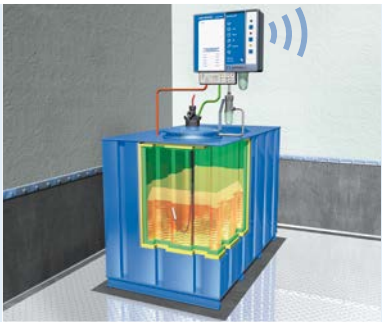
Connection suction line

Vacuum type leak detector Eurovac NV

as per WHG, AwSV and BetrSichV, EN 13160-1/-2, class I

enocean®

- With visual and audible alarms, Acknowledge key and switching output
- High energy efficiency: economical, powerful DC motor with high starting torque
- Service indicator for annual maintenance
- With power outage monitoring



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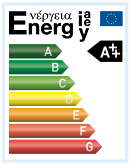

Application

Class I vacuum type leak detector according to EN 13160-1/-2 for safe monitoring of double-walled tanks and single-walled tanks with inner lining for the unpressurised storage of water-polluting liquids with a flash point > 55 °C, also AdBlue® (urea solution 32.5 %) according to DIN 70070 or other media (e.g. used hydraulic oil, cooling agent from grinding processes, etc). The broad voltage range (AC 100–240 V) allows for applications in a large variety of countries.

Description

Compact leak detector in a robust wall mounting housing with audible and visual alarms. The audible alarm can be muted with the Acknowledge key. Eurovac NV maintains a vacuum in the interstitial space of the tank in the low range. The vacuum pump is operated by an economical DC motor with a high starting torque (energy efficiency class AA++). Eurovac features a switching output for additional equipment (such as additional alarm unit ZAG 01) or integration into building control systems. The pump operating time can be displayed. Three hose connections (red, white, green) for the pneumatic connection to the interstitial space of the tank. The universal connection pieces can be used for 4 mm and 6 mm hoses.
With condensate trap to protect the electronics. Electrical connection from the top or from the bottom. An optional 9 V battery can be connected so that an alarm is triggered in the case of power outage. For outdoor applications, Eurovac NV is available in a protective housing (IP 65).
Alarm units with the EnOcean-ready label allow for wireless integration into a building automation system. To do so, plug the EnOcean® wireless module TCM 320 into the EnOcean® interface (PCB of the device). The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.

Technical specifications

Operating temperature range
Ambient: -5/+60 °C
Storage: -25/+60 °C
In protective housing with heating: -25/+60 °C

Supply voltage
AC 100–240 V

Nominal power
< 10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Interstitial space: Approx. -70 mbar

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 202 x 230 x 70 mm
Degree of protection: IP 30 (EN 60529)

Alarm sound
Min. 70 dB(A)

Approval
CE-marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13160-1/-2 and ÜHP

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See page 85 for inner linings and a complete range of mounting accessories.
See the catalogue PORTABLE MEASURING INSTRUMENTS for testers for vacuum type leak detectors.

PG: 4	DG	Part no.
Eurovac NV	H	**43755**
Eurovac NV in protective housing (IP 65)	H	43788
Eurovac NV in protective housing (IP 65) with horn	H	43782
Eurovac NV in protective housing (IP 65) with heating	H	43792
Eurovac NV in protective housing (IP 65) with heating and horn	H	43789
EnOcean® wireless module TCM 320	G	**78082**

Vacuum type leak detector Eurovac HV

as per WHG, AwSV and BetrSichV, EN 13160-1/-2, class I

- With visual and audible alarms, Acknowledge key and switching output
- High energy efficiency: economical, powerful DC motor with high starting torque
- Service indicator for annual maintenance
- With power outage monitoring


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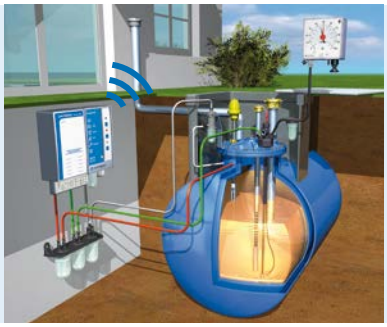

Application

Class I vacuum type leak detector according to EN 13160-1/-2 for safe monitoring of double-walled tanks and single-walled tanks with inner lining for the unpressurised storage of water-polluting liquids with a flash point > 55 °C, also AdBlue® (urea solution 32.5 %) according to DIN 70070 or other media (e.g. used oil, hydraulic oil, cooling agent from grinding processes, brake fluid, etc.). The broad voltage range (AC 100–240 V) allows for applications in a large variety of countries.

Description

Compact leak detector in a robust wall mounting housing with audible and visual alarms. The audible alarm can be muted with the Acknowledge key. Eurovac HV maintains a vacuum in the interstitial space of the tank in the high range. The vacuum pump is operated by an economical DC motor with a high starting torque (energy efficiency class A++). Eurovac features a switching output for additional equipment (such as additional alarm unit ZAG 01) or integration into building control systems. The pump operating time can be displayed.
Three hose connections (red, white, green) for the pneumatic connection to the interstitial space of the tank. The universal connection pieces can be used for 4 mm and 6 mm hoses. With condensate trap to protect the electronics. Electrical connection from the top or from the bottom. An optional 9 V battery can be connected so that an alarm is triggered in the case of power outage. For outdoor applications, Eurovac HV is available in a protective housing (IP 65).
Alarm units with the EnOcean-ready label allow for wireless integration into a building automation system. To do so, plug the EnOcean® wireless module TCM 320 into the EnOcean® interface (PCB of the device). The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.

Technical specifications

Operating temperature range
Ambient: -5/+60 °C
Storage: -25/+60 °C
In protective housing with heating: -25/+60 °C

Supply voltage
AC 100–240 V

Nominal power
< 10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Interstitial space: Approx. -400 mbar

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 202 x 230 x 70 mm
Degree of protection: IP 30 (EN 60259)

Alarm sound
Min. 70 dB(A)

Approval
CE-marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13160-1/-2 and ÜHP

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See page 85 for inner linings and a complete range of mounting accessories.
See the catalogue PORTABLE MEASURING INSTRUMENTS for testers for vacuum type leak detectors.

	PG	DG	Part no.
Eurovac HV	4	H	**43750**
Eurovac HV in protective housing (IP 65)	4	H	43774
Eurovac HV in protective housing (IP 65) with horn	4	H	43776
Eurovac HV in protective housing (IP 65) with heating	4	H	43793
Eurovac HV in protective housing (IP 65) with heating and horn	4	H	43781
EnOcean® wireless module TCM 320	4	G	**78082**
Connection piece G1 x ND 4/6 mm	1	H	**43698**

Protective equipment for Eurovac leak detectors

Liquid barrier

Application

For increased reliability and for the protection of vacuum type leak detectors.

Description

Liquid barrier with condensate trap for visual inspection, complete with fixing bracket for easy mounting to manhole cover. The liquid barrier is mounted directly into the suction line between the leak detector and the double-walled tank. The liquid carried in the suction line (condensate or, in the event of a leak, the medium or groundwater) is collected in the condensate trap of the liquid barrier. An integrated float shuts off the suction line if too much liquid is contained in the liquid barrier. The condensate trap can be easily unscrewed for emptying.

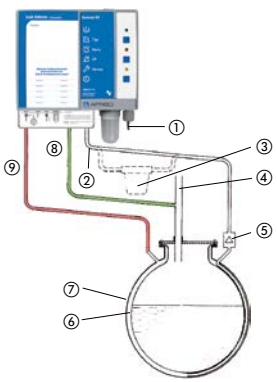
- Tightness-tested
- Compact, robust design made of high-strength plastic
- Compatible with hoses with 4/6 mm inside diameter

Technical specifications

Hose connection
Interchangeable Ø 4 or 6 mm

Housing
Plastic

Scope of delivery
- Liquid barrier with condensate trap
- Mounting bracket
- Hose connection Ø 4/6 mm



Mounting diagram

① Electrical connection
② Suction line (transparent)
③ Condensate trap/condensate bar
④ Tank vent
⑤ Liquid barrier
⑥ Interstitial space
⑦ Outer wall of tank
⑧ Exhaust line (green)
⑨ Measuring line (red)

Condensate bar

For the protection of vacuum type leak detectors used on double-walled tanks to avoid ingress of condensate liquid into the device or clogging of hoses.

Condensate bar with three condensate traps for visual inspection, with integrated bracket for easy wall mounting. If there is no steady gradient in the measuring, exhaust and suction lines from the leak detector to the tank, a condensate bar must be mounted at each lowest point of the lines. When condensate forms, the liquid is collected in the relevant condensate trap. The condensate traps can be easily unscrewed for emptying.

- Tightness-tested
- Compact, robust design made of high-strength plastic
- Compatible with hoses with 4/6 mm inside diameter

Hose connection
Ø 4 and 6 mm

Housing
Plastic

Scope of delivery
Condensate bar with 3 condensate traps

DG: H, PG: 1			Part no.
Liquid barrier	1	1	**43646**
Condensate bar	1	20	**43692**

Spare parts for leak detectors

When ordering spare parts, please specify the unit designation (refer to type designation plate on the control unit).
Spare parts for discontinued models are also listed.
Visit www.afriso.com for additional spare parts lists

LAG spare parts

DG: G	PG			Part no.
LAG probe, plug-in connection, for LAG 13 and LAG 14	1	1	-	**40510**
Foil keypad for control units year of manufacture 1996 and later	4	1	-	**43726**
Foil keypad for control units year of manufacture 2007 and later	4	1	-	**43727**
Spare parts LAG mounting kit				
Test valve plastic, complete	1	1	-	**40555**
Hose connection G1 (angled)	1	1	-	**40557**
Hose nipple G¾	1	1	-	**40558**
Hose EPDM 14 x 3 (reel with 10 m)	1	1	-	**40544**

Eurovac/Europress spare parts

DG: H	PG			Part no.
Pump with motor Eurovac HV	4	1	-	**43777**
Pump with motor Eurovac NV	4	1	-	**43783**
Foil keypad Eurovac / Europress	4	1	-	**43728**

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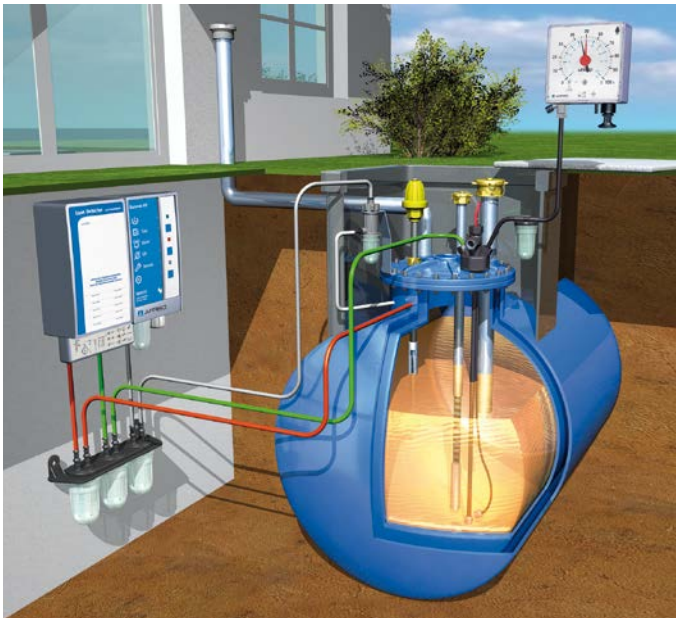
Contact our service department if you have questions concerning spare parts.

E-mail: service@afriso.de
Phone: +49 7135 102-211

Tank protection package AK-S for fuel oil and diesel

as per WHG/AwSV and EN 13160-7



Application

Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to a maximum of 30 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%.

Description

Tank protection packages for standardised cylindrical tanks. Enquire for rectangular and spherical tanks.

Approval

CE as per EU Construction Products Regulation ((EU) Nr. 305/2011 and no. 574/2014),
EN 13160-1:2003, EN 13160-7:2003
DIBt: Z-65.30-162

Scope of delivery

- Leak protection lining according to standard or made to size
- Vacuum type leak detector Eurovac
- Front wall lining made of fleece LSV2
- Intermediate layer made of fleece
- Mipoplast plate 800 x 800 mm
- Condensate bar triple 4/6 mm
- Liquid barrier 4/6 mm
- Angled nipple short 4/6 mm
- Angled nipple long 4/6 mm
- PVC suction line 3 x 6 mm perforated and not perforated
- Fastening ring 500 mm or 600 mm
- Hose connector 4 or 6 mm
- T piece hose connection 4 or 6 mm
- Hose connector kit G⅜ x G⅛ x G¼
- Warning sign with holder and felt overshoes

AK-S for cylindrical, standard tanks (EN/DIN)

DG: H, PG: 1	Part no.
3,000 l	43901.003
5,000 l	43901.005
7,000 l	43901.007
10,000 l	43901.010
13,000 l	43901.013
15,000 l	43901.015
16,000 l	43901.016
20,000 l	43901.020
25,000 l	43901.025
30,000 l	43901.030
40,000 l	43901.040
50,000 l	43901.050
60,000 l	43901.060
80,000 l	43901.080
100,000 l	43901.100

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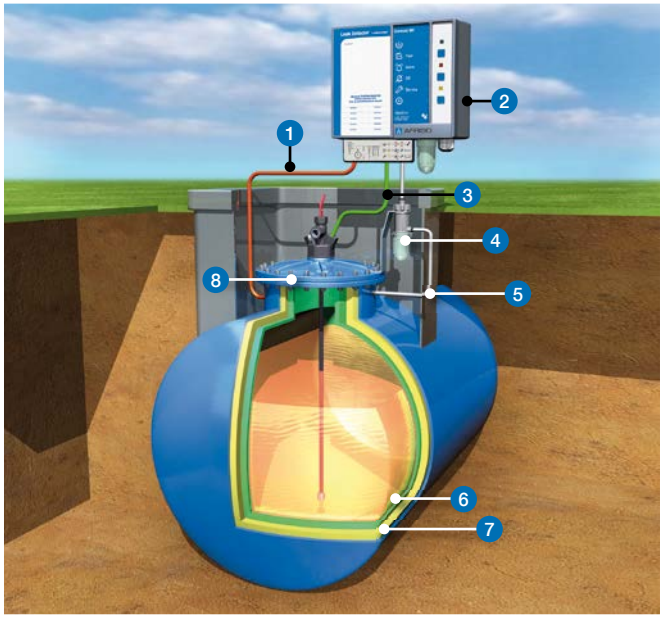
On request:
- Dimensional drawings for customised inner linings
- Tank protection packages for rectangular and spherical tanks
- Training seminars on installation of inner linings and leak detectors

Inner linings AF-S for the storage of liquid fertiliser AHL, AdBlue®



1 Measuring line
2 Leak detector Eurovac
3 Exhaust line
4 Liquid barrier
5 Suction line/suction line perforated
6 Inner lining
7 Intermediate layer (fleece)
8 Fastening ring

Application

For liquid fertiliser AHL and urea solution 32.5 % AdBlue®. Enquire for other liquids.

Description

Plastic inner linings, blue, with Technical Approval of the German Institute for Civil Engineering (DIBt) for cylindrical standard tanks and rectangular or spherical tanks. Made of PVC film WP6120, 0.8 mm thick.

When AdBlue® is stored, the surface temperature must not exceed 35 °C!

Approval

DIBt: Z-65.30-483

DG: H, PG: 1	Part no.
Inner linings AF-S for AHL and AdBlue® for rectangular tanks per m²	43870
Stainless steel fastening ring V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 500 mm diameter	43900N
Stainless steel fastening ring V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 600 mm diameter	43900O

Inner linings for AHL and AdBlue® for cylindrical standard tanks (EN/DIN)

DG: H, PG: 1	Part no.
3,000 l	43880.003
5,000 l	43880.005
7,000 l	43880.007
10,000 l	43880.010
13,000 l	43880.013
15,000 l	43880.015
16,000 l	43880.016
20,000 l	43880.020
25,000 l	43880.025
30,000 l	43880.030
40,000 l	43880.040
50,000 l	43880.050
60,000 l	43880.060
80,000 l	43880.080
100,000 l	43880.100

* Please enquire for larger linings and other shapes. Scope of delivery does not include accessories.

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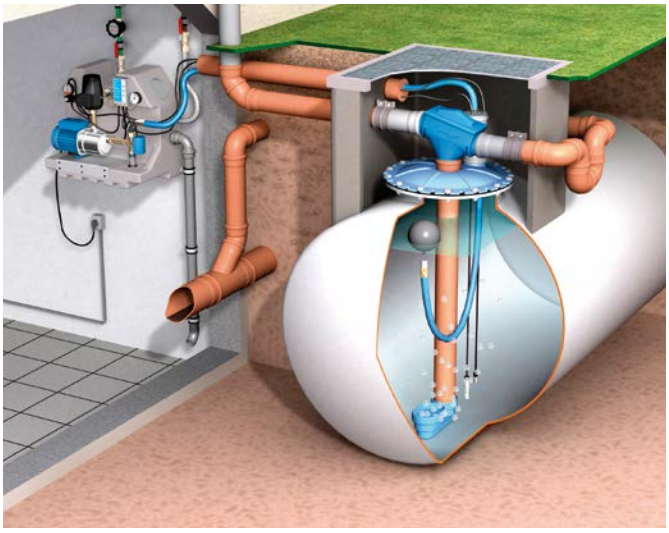
On request:
- Dimensional drawings for customised inner linings
- Complete tank protection packages
- Training seminars on installation of inner linings and leak detectors

Inner linings AR-S for rainwater harvesting



Application

When old heating oil storage tanks are taken out of service, for example due to corrosion, or if the heating system is converted to other types of fuel, the existing tanks can be used to collect rainwater. For integration into a rainwater harvesting system, the tank is cleaned and then fitted with a special inner lining suitable for water. The old, standardised manhole cover (Ø 500 mm) is replaced with a plastic cover specially designed for rainwater harvesting.

Description

Plastic inner linings for rainwater tanks. For hygienic sealing of cylindrical or rectangular tanks to be used in rainwater harvesting systems. Please enquire for inner linings for spherical tanks, cisterns, cesspits and other containers. It is advisable to install a vacuum type leak detector to monitor the rainwater storage tank for tightness, but this is not mandatory in the case of cylindrical tanks.

Inner lining for rainwater for cylindrical tanks*

DG: H, PG: 1	Part no.
3,000 l	43887.003
5,000 l	43887.005
7,000 l	43887.007
10,000 l	43887.010
13,000 l	43887.013
15,000 l	43887.015
16,000 l	43887.016
20,000 l	43887.020
25,000 l	43887.025
30,000 l	43887.030
40,000 l	43887.040
50,000 l	43887.050
60,000 l	43887.060
80,000 l	43887.080
100,000 l	43887.100

* Scope of delivery does not include accessories.

Other tanks, cisterns, cesspits, etc. can also be sealed and converted to hygienic storage facilities by means of internal linings. Please enquire.

Inner lining for rainwater for rectangular tanks *

DG: H, PG: 1	Part no.
3,000 l	43888.003
4,000 l	43888.004
7,000 l	43888.007
8,000 l	43888.008
10,000 l	43888.010
Enquire for other sizes	

* Scope of delivery does not include accessories.

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Se page 89 for, accessories, see page 353 for plastic manhole cover.

Rainwater inner lining AR-SM with magnets

- **Operation without vacuum type leak detector, no pressure, no current**
- **Easy and fast installation by means of powerful neodymium magnets**
- **Perfectly fitting, robust PVC lining**

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Application

For conversion of cylindrical steel DIN tanks such as decommissioned fuel oil tanks, diesel tanks or storage tanks into reliable, high-grade rainwater storage tanks. No pressure or flow required. The rainwater inner lining AR-SM with magnets is suitable for storing rainwater in cylindrical steel tanks (3,000 to 50,000 litres).
Please note: In the case of coated steel tanks, verify that the attractive force of the magnets is sufficient.

Description

The rainwater inner lining AR-SM with magnets allows owners to convert a decommissioned steel tank into a rainwater storage tank with very little effort.

The rainwater inner lining AR-SM is a PVC lining with flat, round, extremely powerful neodymium magnets welded into lateral and top areas. The lining is reliably held at the inner wall by the magnets - no pressure or power supply are required inside the tank. A tank can be conveniently converted into a rainwater storage tank: First, the tank is measured and then a precisely fitting lining is manufactured. The tank is prepared on the basis of a defined procedure (thorough cleaning of the tank, corrosion checks, etc.); then, a fleece layer is placed on the tank floor for impact protection.

Then the lining is fitted in the steel tank and inflated by means of a blower; if necessary, the final fit is achieved by means of a vacuum pump. When the PVC lining is inflated, the magnets click into place at the inner wall exactly where planned. The fit of the PVC lining is checked and then it is fastened in the manhole by means of a fastening ring. The tank is ready for storing rainwater immediately after the lining and the piping connections have been installed.

Scope of delivery

Rainwater inner lining AR-SM, made of plastic film Sikaplan® WP5140-08 black, film thickness 0.8 mm, for closed tanks, with all neodymium magnets welded into the film in the lateral and top areas, with film flange for the standard fastening ring.

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Not only cylindrical DIN steel tanks, but certain steel tanks with different geometrical shapes can be converted into rainwater storage tanks.
Please enquire separately.

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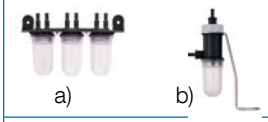
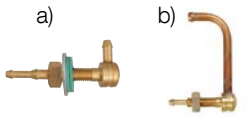
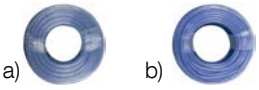
Depending on the local conditions and on the tank, a fleece lining may be required in the bottom area of the tank as an impact protection.
Different manhole distances and special dimensions are manufactured at the same conditions.

	PG	Part no.
Additional manhole		
500 mm	1	08027
600 mm	1	08024
Accessories (DG: H)		
Fastening ring, Ø 500 mm	3	43900A
Fastening ring, Ø 600 mm	3	43900C
Fleece plate LSV2, 1 x 2 m	1	43952
Bottom plate, 800 x 800 mm	1	43894

DG: H, PG: 1	Part no.
3,000 l	43889.003
5,000 l	43889.005
7,000 l	43889.007
10,000 l	43889.010
13,000 l	43889.013
15,000 l	43889.015
16,000 l	43889.016
20,000 l	43889.020
25,000 l	43889.025
30,000 l	43889.030
50,000 l	43889.050

Mounting accessories for inner linings

DG: H	Designation	Specification	PG			Part no.
 a) b)	a) Condensate bar	Connections 4/6 mm	1	1	-	**43692**
	b) Liquid barrier with condensate trap and fastening bracket	Connections 4/6 mm	1	1	-	**43646**
	Angled nipple with spacer	6 x 4/6 mm	2	1	-	**43904**
 a) b)	a) Angled nipple short	6 x 4/6 mm	2	1	25	**43906**
	b) Angled nipple long	6 x 4/6 mm	2	1	10	**43908**
 a) b)	a) Suction line perforated (reel 100 m)	6 x 3 mm	1	1	-	**43910**
	b) Suction line not perforated (reel 100 m)	6 x 3 mm	1	1	-	**43911**
	Fastening ring with round seal, foam rubber	Ø 500 mm	3	1	-	**43900A**
		Ø 550 mm	3	1	-	**43900B**
		Ø 600 mm	3	1	-	**43900C**
		Ø 620 mm	3	1	-	**43900D**
	Hose connector for suction hose	4 x 4 mm	1	1	25	**43945**
		6 x 6 mm	1	1	25	**43912**
	T piece for suction hose	4 x 4 x 4 mm	1	1	25	**43944**
		6 x 6 x 6 mm	1	1	25	**43913**
	Hose connector kit ND 4/6, G⅜ x G⅛	ND 4 x G⅛ ND 6 x G⅛ G⅜ x G⅛	1	1	25	**43914**
	Plate holder	with plate, clamp and label DE, FR/IT	3	1	-	**43918**
	PVC hose red 100 m	4 x 2 mm	1	1	-	**43648**
		6 x 2 mm	1	1	-	**43662**
	PVC hose green 100 m	4 x 2 mm	1	1	-	**43649**
		6 x 2 mm	1	1	-	**43663**
	PVC hose transparent 100 m	4 x 2 mm	1	1	-	**43650**
		6 x 2 mm	1	1	-	**43664**
	Sealing material 1,000 ml	Epple 28	1	1	-	**43919**
	Glue 0.8 kg	Epple 200 S	1	1	-	**44025**
	Stainless steel fastening ring	V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 500 mm diameter	3	1	-	**43900N**
	Stainless steel fastening ring	V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 600 mm diameter	3	1	-	**43900O**
	Flanges	KT NW 65	3	1	-	**44006**
		KT G2	3	1	-	**44007**
	Foam rubber roll 10 m	50 x 5 mm	1	1	-	**43926**
	Foam rubber roll 10 m	50 x 8 mm	1	1	-	**43942**
	Mipoplast bottom plate	800 x 800 mm	1	1	-	**43928**
	Connection piece G1 x ND 4/6 mm		1	1	-	**43698**

Pressure type leak detector Europress

as per WHG/AwSV and BetrSichV, EN 13160-1/-2, class I

- With visual and audible alarms, Acknowledge key and switching output
- Pump operating time can be displayed
- Service indicator for annual maintenance
- With power outage monitoring

Europress in protective housing

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Application

Class I pressure type leak detector as per EN 13160-1/-2 for safe monitoring of suitable double-walled tanks for unpressurised storage of numerous water-polluting liquids, also AdBlue® (urea solution 32.5 %). The flexible voltage supply (AC 100–240 V) allows for application in a large variety of countries.

Description

Compact leak detector in a robust wall mounting housing with audible and visual alarms. The audible alarm can be muted with the Acknowledge key. Europress indicates the pump operating time and features a switching output for additional equipment (such as additional alarm unit ZAG 01) or integration into building control systems. The pump operating time can be displayed.
Three hose connections (red, white, green) for the pneumatic connection to the interstitial space of the tank. The universal connection pieces can be used for 4 mm and 6 mm hoses. With condensate trap to protect the electronics. Electrical connection from the top or from the bottom. An optional 9 V battery can be connected so that an alarm is triggered in the case of power outage. For outdoor applications, Europress is available in a protective housing (IP 65).
Alarm units with the EnOcean-ready label can be integrated into your existing building automation systems at a later point in time. To do so, plug the EnOcean® wireless module into the EnOcean® interface (PCB of the device). The AFRISO home gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.

Technical specifications

Operating temperature range
Ambient: -5/+60 °C
Storage: -5/+60 °C
In protective housing with heating: -25/+60 °C

Supply voltage
AC 100–240 V

Nominal power
< 10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Interstitial space: Approx. 510 mbar

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 202 x 230 x 70 mm
Degree of protection: IP 30 (EN 60259)

Alarm sound
Min. 70 dB(A)

Approval
CE-marking as per EU Construction Products Regulation 305/2011, EU 574/2014, EN 13160-1/-2 and ÜHP

Drying filter TF 220

PU: 1	DG	PG	Part no.
Europress	H	4	**43790**
Europress in protective housing (IP 65) with horn	H	4	43795
Europress in protective housing (IP 65) with horn and heating	H	4	43796
Europress with filter, pipe clamp PG42 and drying beads	H	4	**43701**
Mounting kit (20 m PVC 6 x 2 red and transparent; 2 x connection piece G1 x ND 4/6 mm)	H	1	**43704**
Drying filter TF 220 with pipe clamp PG42	H	1	**43688**
Drying beads, 850 ml	H	1	**69226**
Connection piece G1 x ND 4/6 mm	H	1	**43698**
EnOcean® wireless module TCM 320	G	4	**78082**

Gas detectors

Liquid detector

Signalling devices

CHAPTER 4

Alarm units, probes and signalling devices

Alarm units for fast detection of levels, accumulations of liquids, leakage, gases or smoke

WATCHDOG-LINE – for maximum safety

1. Oil/water alarm unit OM 5 with EnOcean® wireless module TCM 320 for integration into smart home systems
2. Photoelectric probe for tank room monitoring
3. Photoelectric probe with drip pan
4. Wireless smoke alarm ASD 10
5. Digital tank contents indicator DTA 20 E (wireless)

In the building technology sector, there are many risks which should be monitored to avoid annoyance to home owners, janitors, property managers or maintenance personnel and to avert extensive damage. WATCHDOG-LINE alarm units report undesirable events, danger and emergency conditions early so that immediate measures can be taken.
The WATCHDOG-LINE devices excel with easy and intuitive operation. A large variety of probes and sensors enable fast detection of liquid levels, leakage and accumulations of liquids, gases or smoke. Integrated visual and audible alarms provide the appropriate signals in hazard conditions. For remote signalling and easy integration into AFRISO smart home systems, the devices are ready for the installation of an EnOcean® wireless module and feature a switching output contact. This way, the persons in charge can be notified of an alarm condition – whether or not they have a mobile device. Residential buildings, factories and facilities are protected and monitored.
From standard wall mounting to integration into control cabinets using mounting frames – WATCHDOG-LINE alarm units are easy and quick to install. With very little effort, the devices can also be retrofitted with seal kits for use in rough dirty and wet environments (IP 54).

DIN rail clip for fast and easy mounting of the alarm units.

Fast integration into control cabinets by means of mounting frames.

With seal kit IP 54 for rough application conditions.

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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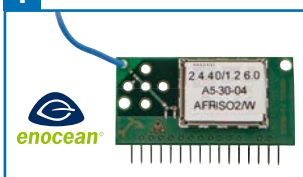
Typical application areas

- 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
- Paraffinic fuels
- Diesel fuels or low-viscosity lubricating oils
- 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

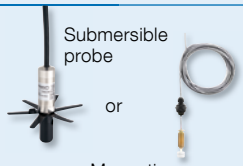
i



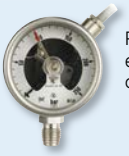
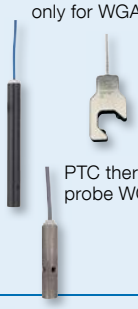
Pluggable EnOcean® wireless module TCM 320 for WATCHDOG-LINE PCBs, can be ordered separately for EnOcean®-ready products.

WATCHDOG-LINE alarm units at a glance

4

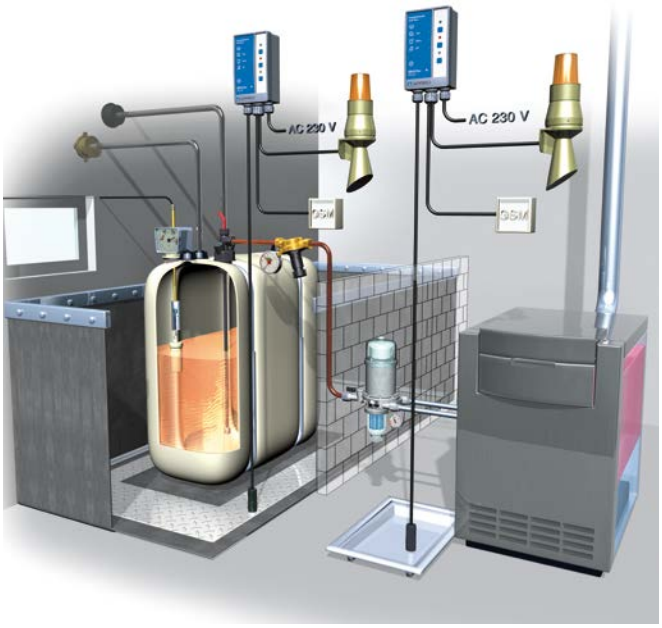
Alarm unit	Probe	Media	Application	Catalogue page
 **Water alarm unit WWG** enocean	Wall mounting rail probe **WSS**  or Floor water probe **BWS 10-1**	▪ Water ▪ Conductive water mixtures ▪ Electrically conductive liquids ▪ Emulsions	**Single-channel** Suitable for water, but also for electrically conductive liquids, emulsions and conductive water mixtures. **EnOcean®-ready**	Page 105
 **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 102
 **Liquid detector AFA 11*** enocean	 Photoelectric probe	▪ Fuel oil ▪ Diesel fuel ▪ Biodiesel ▪ Oils ▪ AdBlue® ▪ Water	**Single-channel** AFA 11 generates alarms in the event of accumulations of liquids caused by tank leaks, backflow, flooding, etc. **EnOcean®-ready** **Certificate:** DIBt: Z-65.40-214	Page 99
 **Oil/water alarm unit OM 5***	 Photoelectric probe	▪ Fuel oil ▪ Diesel fuel ▪ Biodiesel ▪ Oils ▪ AdBlue® ▪ Water	**5 channels** For collection facilities below oil equipment, pipe and cable ducts, pumps and control stations and tanks. **Certificate:** DIBt: Z-65.40-214	Page 101
 **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 103
 **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**	Pages 14/15
 **Level indicator TankControl 10**	 Submersible probe or Magnetic float switch	▪ Fuel oil ▪ Diesel fuel ▪ Biodiesel ▪ Water	**1 channel/2 channels** For continuous level measurement and alarms in the event of minimum or maximum levels, level differences, backwater and level control.	Page 18
 **Level switches Minimelder / Maximelder** enocean	 Magnetic float switch	▪ Water ▪ Fuel oil ▪ Oil/water mixtures ▪ Neutral liquids	**Single-channel** Suitable to signal minimum or maximum levels in tanks containing liquids. **EnOcean®-ready**	Page 35
 **Backup controller RENA**	 Level probe	▪ Rainwater	**Single-channel** Controls backup supply of mains water if the rainwater level is low.	Page 355

* Use as leak detection system class III as per EN 13160-1/-4

Alarm unit	Probe	Media	Application	Catalogue page
 **Water valve WaterControl 01**  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 132**
 **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, Z-65.11-185	**Page 67**
 **Leak detector LAG as per WHG/ AwSV and BetrSichV**	 Leak detection fluid container with probe	▪ Water-polluting liquids	**Single-channel** Leak detection system 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 77**
 **Alarm unit AG 10 Ex**	 Pressure gauges with electrical contacts	▪ Gases	**Single-channel** Alarm unit for low gas level for monitoring the pressure in gas-filled containers.	**Page 122**
Alarm units WGA 01/01 D 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.	**Pages 110/111**
Alarm unit WGA 02/03 for separators 	 WGA-AS (capacitance) WGA-SD 02 (conductivity)	▪ Oil ▪ Petrol ▪ Grease	**Single-channel WGA 02 / dual-channel WGA 03** Monitor the layer thickness and the maximum level (WGA 03) of separated liquid in oil, petrol and grease separators.	**Page 112**
Alarm unit WGA 04/05 for separators 	 WGA-SN (ultrasound) WGA-SD 02 (conductivity)	▪ Oil ▪ Petrol ▪ Grease ▪ (Sludge, sand)	**2 channels** Monitors sand or sludge accumulations in oil, petrol and grease separators as well as the layer thickness of the separated liquid.	**Page 113**
Alarm unit WGA 06 for separators 	WGA-ÖW (capacitance)  WGA-AS (capacitance)	▪ Oil ▪ Petrol ▪ Grease	**Single-channel** Monitors pump pits and inspection ducts in separator systems for accumulations of oil (oil on water) and for the maximum permissible level.	**Page 114**

i The WATCHDOG-LINE alarm units will successively be EnOcean®-enabled so that an EnOcean® wireless module can be retrofitted. Whether or not an alarm unit already features this technology is indicated by the labels "EnOcean-ready®" or "EnOcean®-inside" on the nameplate.

Application examples WATCHDOG-LINE alarm units



Leak detection in tank and boiler rooms with AFA 11.

When the maximum level in the catchment basin is reached, the WWG alarm unit controls the draining process by means of a connected pump.

AFRISO Smart Home: Monitoring and control of domestic equipment, apartments and buildings for function and leaks with the AFRISOhome gateway. Interconnected sensors, actuators and alarm units increase safety and convenience.
Application examples: Heating systems, laundry rooms, basements, utility rooms and drinking water installations.

Warning system (water leaks, flooding) for complete buildings with central alarm CoFox®.

Liquid detector AFA 11

Class III, EN 13160-1/-4

enocean® NEW

- For storage rooms, manholes, collection facilities, etc.
- With visual/audible alarms
- Test/Acknowledge keys and relay output
- Self-monitoring probe
- Power outage alarm with optional battery
- EnOcean®-ready

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Application

For visual and audible alarms if liquids with a flash point of > 55 °C are detected. AFA 11 is suitable for the following media: fuel oil, diesel fuel, paraffinic fuel s(GTL), AdBlue® urea solution, low-viscosity lubricating oils, motor oils, gearbox oils or hydraulic oils, vegetable oils, hydrogenated vegetable oils (HVO), transformer oils, water and other liquids. Application as leak detection system class III as per EN 13160-1/-4 as well as safety device as per worksheet DWA-A 791 and worksheet DWA-A779.

Description

The unit in a wall mounting housing triggers visual and audible alarms in the event of accumulations of liquids which can be caused by leaks, backflow, flooding, etc. AFA 11 consists of a control unit with visual/audible alarm, Test and Acknowledge keys, a relay output and a photoelectric probe. The probe is mounted at the lowest point of the area to be monitored. Alarm is triggered when escaped liquid is detected. The audible alarm can be muted with the Acknowledge key. The visual alarm remains active until the leak has been removed. The Test key allows you to simulate an alarm condition in order to perform a function test. The voltage-free relay contact is provided for connection of additional alarm equipment (such as additional alarm unit ZAG 01, horn) or building control technology. The alarm units are suitable for panel mounting with a mounting frame.

Power outage alarm: An optional 9 V battery can be connected so that an audible alarm is triggered in the case of power outage. The alarm cannot be acknowledged and is disabled once power is available again.

EnOcean®-ready: AFA 11 can be integrated into the AFRISO smart home system or other smart home systems based on EnOcean® wireless by means of the optional wireless module TCM 320. This allows for additional push messages to smartphones or via e-mail (further accessories required).

Technical specifications

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

Probe
L x Ø: 33 x 10 mm
Cable length: 10 m
Response level (EN 13160-4): ≥ 4 mm

Supply voltage
AC 100–240 V or AC/DC 15–24 V

Nominal power
1.5 VA at 230 V
1 VA at 24 V

Switching output
Relay contact: 1 voltage-free changeover contact
2 A, AC 250 V, DC 30 V

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)

Approval
DIBt: Z-65.40-214

Scope of delivery
Control unit with probe

Option
- EnOcean® wireless module (can be retrofitted)

DG: G, PG: 4	Part no.
Liquid detector AFA 11, AC 230 V	**40890**
Liquid detector AFA 11, 24 V	40894
Spare probe: photoelectric probe, 10 m	**44503**
EnOcean® wireless module TCM 320	**78082**
Mounting frame	**43521**

i Successor product of ÖWWG 3.

Liquid detector AFA 11 with burner connection kit

- Leak detection system class III, EN 13160-1/-4
- Connection pre-wired
- With visual/audible alarms, Test and Acknowledge buttons
- Automatic switching off of the burner in alarm conditions
- EnOcean®-ready

4

Application

For visual and audible alarms in the event of accumulations of liquids below the burner of an oil fuelled system and for switching off the burner in alarm conditions. Suitable for the following media: fuel oil, diesel fuel, paraffinic fuel s(GTL), AdBlue® urea solution, low-viscosity lubricating oils, motor oils, gear-box oils or hydraulic oils, vegetable oils, hydrogenated vegetable oils (HVO), transformer oils, water and other liquids. Application as leak detection system class III as per EN 13160-1/-4 as well as safety device as per worksheet DWA-A 791 and worksheet DWA-A779.

Description

The liquid detector AFA 11 with burner connection kit consists of a control unit with visual/audible alarm, Test and Acknowledge keys, a relay output and a photoelectric probe with 10 m connection cable. Cable and connector for connection of burner and boiler are fully wired and ready to be connected. In the event of an alarm, the unit triggers visual and audible alarms and switches off the burner. The audible alarm can be muted with the Acknowledge key. The visual alarm remains active until the leak has been removed. The burner then resumes operation. The Test key allows you to simulate an alarm condition in order to perform a function test. Alarm units with the EnOcean®-ready label can be integrated into your existing building automation systems, for example, AFRISO smart home, at a later point in time. To do so, plug the EnOcean® wireless module into the EnOcean® interface (PCB of the device). The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.
Power outage alarm: An optional 9 V battery can be connected so that an audible signal is triggered in the case of power outage. The audible signal cannot be acknowledged and is disabled once power is available again.

Technical specifications

Operating temperature range
Control unit : Ambient –10/+60 °C

Probe
L x Ø: 33 x 10 mm
Cable length: 10 m
Response level (EN 13160-4): ≥ 4 mm

Connector
Burner: 7-pin, female with 3 m cable
Boiler: 7-pin, male, with 3 m cable

Supply voltage
AC 230 V

Nominal power
2.5 VA

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Approval
DIBt: Z-65.40-214

Scope of delivery
- Control unit
- 1 connected photoelectric probe
- One connected plug each for burner and boiler connection

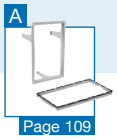
Option
- EnOcean® wireless module (can be retrofitted)

DG: G, PG: 4	Part no.
Liquid detector AFA 11 BAS 230 V	**40891**
EnOcean® wireless module TCM 320	**78082**

Oil/water alarm unit OM 5

Class III, EN 13160-1, -4

- **For storage rooms, manholes, drip pans, tanks with integrated collection facility**
- **With visual/audible alarms, Test/ Acknowledge buttons and relay output**
- **Self-monitoring probe**



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Monitors up to 5 tanks

4

Application

For visual and audible alarms if liquids with a flash point of > 55 °C are detected. OM 5 is suitable for the following media: fuel oil, diesel fuel or low-viscosity lubricating oils, motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils, water and other liquids.
Use as leak detection system class III as per EN 13160-1/-4 and as leak detection system as per TRWS 791.

Description

The unit in a wall mounting housing triggers visual and audible alarms in the event of accumulations of liquids which can be caused by tank leaks, backflow, flooding, etc. OM 5 consists of a control unit with visual/audible alarm, Test and Acknowledge buttons as well as a relay output. Up to five photoelectric probes can be connected. The probes are mounted at the lowest point of the object to be monitored. Alarm is triggered when there is contact with escaped liquid. The audible alarm can be muted with the Acknowledge key. The visual alarm is cleared once the leak has been fixed. The Test key allows you to simulate an alarm condition in order to perform a function test.
The voltage-free relay contact is provided for connection of additional alarm equipment (such as additional alarm unit ZAG 01, horn). The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.

OM 5/1 with additional probe for detection of minimum levels, e.g. in fuel oil tanks.

Technical specifications

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

Probe
L x Ø: 33 x 10 mm
Cable length: 10 m
Response level (EN 13160-4): ≥ 4 mm

Supply voltage
OM 5: AC 230 V or AC/DC 24 V
OM 5/1: AC 230 V

Nominal power
5 VA

Switching output
Relay contact: 1 voltage-free changeover contact 2 A, AC 250 V

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)

Approval
DIBt: Z-65.40-214

Scope of delivery
OM 5:
- control unit without probe

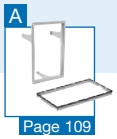
OM 5/1:
- control unit
- 1 photoelectric probe
- 1 Minimelder (minimum alarm) probe

i Please order the photoelectric probes separately.

DG: G, PG: 4	Part no.
Oil/water alarm unit OM 5	**44502**
Oil/water alarm unit OM 5, 24 V	44486
Oil/water alarm unit OM 5/1	**44517**
Photoelectric probe 10 m	**44503**

Oil/water alarm unit ÖWU

- **Combination probe for determination of leaking medium oil and water**
- **For storage rooms, manholes, drip pans and pumps**
- **With fail-safe mode**
- **With visual/audible alarms, Test/ Acknowledge buttons and relay output**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Application

For visual and audible alarms if liquids with a flash point of > 55 °C are detected. Suitable for the following media: Water, fuel oil, diesel fuel or low-viscosity lubricating oils, motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils. Separate detection of electrically conductive and non-conductive liquids.

Description

Alarm unit in wall mounting housing for early detection of accumulations of liquids. ÖWU consists of a control unit with visual/audible alarm, Test and Acknowledge buttons, two relay outputs as well as a combination probe with photoelectric and conductivity sensors. An integrated microprocessor determines whether the detected medium is oil or water. The probe is mounted at the lowest point of the object to be monitored. Alarm is triggered when there is contact with escaped liquid. The audible alarm can be muted with the Acknowledge key. The visual alarm is cleared once the leak has been removed. The Test key allows you to simulate an alarm condition in order to perform a function test.
The two voltage-free relay contacts are provided for connection of additional external alarm equipment or additional alarm units; e.g. 1 relay for water alarm and 1 relay for oil alarm. ÖWU features a "fail-safe" mode. The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.
Alarm units with the EnOcean®-ready label can be integrated into your existing building automation systems, for example, AFRISO smart home, at a later point in time. To do so, plug the EnOcean® wireless module into the EnOcean® interface (PCB of the device). The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.

Technical specifications

Operating temperature range
Medium: 5/50 °C
Ambient: -10/+60 °C

Wall mounting rail probe
W x H x D: 40 x 300 x 55 mm
Standard probe cable: 1.5 m

Supply voltage
AC 100–240 V

Nominal power
6 VA

Switching output
1 voltage-free changeover contact (water alarm)
1 changeover contact (oil alarm)

Switching over
Eco mode/fail-safe mode

Contact rating
Max. AC 250 V, 2 A

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Scope of delivery
- Control unit
- Wall mounting rail probe ÖWU

Option
- EnOcean® wireless module (can be retrofitted)

DG: G, PG: 4	Part no.
Oil/water alarm unit ÖWU	**40028**
EnOcean® wireless module TCM 320	**78082**

Oil-on-water detector ÖAWD-8

- For the detection of oil layers on water
- Alarm unit on conductivity principle
- With visual alarm, Test and Unlock pushbuttons
- Relay output for additional alarm

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Application

For visual and audible alarms in the event of oil layers on water. Especially suitable for catchment basins, floods and inspection ducts.

Description

Alarm unit in wall mounting housing for the detection of oil layers on water. ÖAWD consists of a control unit with visual/audible alarm, Test/Unlock buttons as well as a relay output. ÖAWD is based on the conductivity principle. The floating probe SWS is used for detection. If an oil layer (of at least 2 mm) is detected, the alarm unit triggers a visual alarm and stores the alarm condition. Once the cause of the alarm condition has been removed, press the Unlock button to reset ÖAWD. The visual alarm is deactivated. The Test key allows you to simulate an alarm condition in order to perform a function test. The voltage-free relay contact is provided for connection of additional signalling equipment (such as ZAG 01), actuators (pumps, valves), additional alarm units or event reporting systems. The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions. ÖAWD-8 features a delay of 8 s which helps to avoid false alarms in applications with turbulent surfaces.

Technical specifications

Operating temperature range
Medium: 0/50 °C
Ambient: 0/55 °C

Probe SWS
2-rod electrode, encapsulated cable connection
W x H x D: 200 x 140 x 200 mm
Cable length: 10 m
Adjustment range: 2/10 mm oil layer thickness
Also suitable for changing levels

Supply voltage
AC 100–240 V

Nominal power
5 VA

Switching output
Relay output: 1 voltage-free changeover contact

Contact rating
AC 250 V, 2 A

Response delay
ÖAWD-8: 8 s

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Scope of delivery
- Control unit without probe

DG: H, PG: 4			Part no.
Oil-on-water detector ÖAWD-8	1	-	**55105**
Floating probe SWS	1	-	**55100**

Fuel oil alarm HMS in connector housing

- Immediate switching off of monitored devices in the event of a leak alarm
- With visual alarm
- Ready-to-connect device for fast and easy installation

4

Application

For the detection of oil in drip pans below oil equipment, pipe and cable ducts, pumps and control stations and tanks. Suitable for the following media: water, fuel oil, diesel fuel, motor oils, machine oils, hydraulic oils and similar liquids with a flash point of > 55 °C. Liquids with a flash point of > 55 °C.

Description

The HMS fuel oil alarm unit consists of a transducer and a photoelectric probe. Devices to be monitored are connected directly to the socket of the transducer. If there is no leak, the green lamp is on. If the probe detects unwanted liquid, the alarm unit triggers a visual alarm (red lamp) and the socket in the transducer is automatically switched off.

Technical specifications

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

Photoelectric probe
Probe head: Polyamide
Cable: 2 m

Supply voltage
AC 230 V

Visual indication
Green lamp Operation
Red lamp Alarm

Housing
Connector housing
W x H x D: 65 x 120 x 92 mm
Degree of protection: IP 20 (EN 60529)

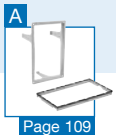
Approval
DIBt: Z-65.40-214

Scope of delivery
- Transducer
- Photoelectric probe with 2 m probe cable
- Bracket for probe with mounting accessories

DG: G, PG: 4	Part no.
Fuel oil alarm unit HMS	**44513**

Water alarm unit WWG

- **Ideal for laundry rooms, cellars/storage rooms, pump and inspection ducts**
- **With visual/audible alarms, Test and Acknowledge buttons and 2 relay outputs**
- **With floor probe or wall mounting rail probe**
- **EnOcean®-ready**



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Application

For visual and audible alarms in the event of accumulations of electrically conductive liquids such as rainwater, tap water, fresh water, waste water, cooling water and heating water.

Description

Alarm unit in wall mounting housing for the detection of even the smallest amounts of water caused by, for example, backflow due to clogged water pipes, water ingress from outdoors, broken pipes or failure of a waste water pump. WWG 1 consists of a control unit with visual/audible alarm, Test and Acknowledge buttons, two relay outputs as well as a special floor probe. The probe is mounted at the lowest point of the object to be monitored. Alarm is triggered when there is contact with escaped liquid. The audible alarm can be muted with the Acknowledge key. The visual alarm is cleared once the leak has been removed. The Test key allows you to simulate an alarm condition in order to perform a function test.
The two voltage-free relay contacts are provided for connection of additional external alarm equipment or alarm units. One relay can be acknowledged (e.g. for an external horn), the other relay cannot (e.g. for an external lamp, a solenoid valve, a pump). The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.
Alarm units with the EnOcean®-ready label can be integrated into your existing building automation systems, for example, AFRISO smart home, at a later point in time. To do so, plug the EnOcean® wireless module into the EnOcean® interface (PCB of the device). The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allow you to configure a whole range of fully customisable, extensible features for the protection of plants and buildings.

Water alarm unit WWG 2 like WWG 1, but with height-adjustable wall mounting rail probe.

Technical specifications

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

Floor probe BWS 10-1
Response level: Approx. 2–3 mm
Dimensions: Ø 70 mm

Wall mounting rail probe WSS
Height-adjustable by approx. 200 mm
W x H x D: 37 x 320 x 55 mm

Standard probe cables
1.5 m, max. length 50 m (shielded)

Function principle
Conductivity measurement

Supply voltage
AC 100–240 V

Nominal power
2.5 VA

Switching output
1 voltage-free changeover contact
1 voltage-free normally open contact
(can be acknowledged)

Contact rating
Max. AC 250 V, 2 A

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Scope of delivery
- Control unit
- Floor probe BWS 10-1 (for WWG 1)
- Wall mounting rail probe WSS (for WWG 2)

Option
- EnOcean® wireless module (can be retrofitted)

DG: G, PG: 4	Part no.
Water alarm unit WWG1	**40029**
Water alarm unit WWG 2	**40031**
EnOcean® wireless module TCM 320	**78082**

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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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 in conjunction with floor water probe BWS 10-1, for example, in control stations or IT rooms.

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
DC 24 V

Power input
2 VA

Probe circuit
Max. AC 3 V

Switching outputs
Relay contact: 2 voltage-free changeover contacts
Contact rating: AC/DC 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.
CoFox® 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**

i See page 38 for probes for level switches.

Probes for alarm units

Floor water probe BWS 10-1

Application
For the detection of conductive liquids such as flood water, rainwater, tap water, fresh water, waste water, cooling water and heating water.

Description
Floor probe suitable for WWG 1, ELT 8 and ELT 680. The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered by the alarm unit when the probe comes into contact with liquid.

Probe diameter: 70 mm
Cable length: 2 m
Response level: Approx. 2–3 mm

Floor water probe BWS 10-1

Wall mounting rail probe WSS

Application
For the detection of conductive liquids such as rainwater, tap water, fresh water, waste water, cooling water and heating water.

Description
Height-adjustable wall mounting rail probe suitable for WWG 2, ELT 8 and ELT 680. The probe is mounted to the wall at the object to be monitored. The desired response level (distance from probe to floor) is adjusted via the wall mounting rail. The alarm is triggered by the connected alarm unit when the probe comes into contact with liquid.

Dimensions: 37 x 320 x 55 mm
Cable length: 1.5 m
Height-adjustable by approx. 200 mm

Wall mounting rail probe WSS

Floating probe SWS

Application
For the detection of oil layers, emulsions or foam on water. Also suitable for changing levels (e. g. flowing bodies of water).

Description
Floating probe suitable for ÖAWD-8, ELT 8 and ELT 680. The probe floats on the water surface. The oil layer thickness (at least 2 mm) is set via the height-adjustable 2-rod probe. The alarm is triggered by the connected alarm unit when the probe comes into contact with the oil layer.

Dimensions
W x H x D: 200 x 140 x 200 mm

Cable
Encapsulated cable connection
Length: 10 m

Adjustment range
2/10 mm oil layer thickness

Floating probe SWS

DG: H, PG: 4			Part no.
Floor water probe BWS 10-1	1	-	**55112**
Wall mounting rail probe WSS	1	-	**55050**
Floating probe SWS	1	-	**55100**

i Many probe versions are available. Please enquire.

Probes and accessories for alarm units

Photoelectric probe

Application For the detection of liquids with a flash point of > 55 °C. Suitable for the following media: water, fuel oil, diesel fuel or low-viscosity lubricating oils, motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils.

Description Probe suitable for oil/water alarm unit OM and liquid detector AFA 11. The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered by the alarm unit when the probe comes into contact with liquid.

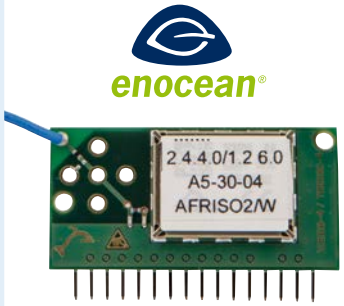
Probe diameter: 10 mm
Cable length: 10 m
Response level: 5 mm

Photoelectric probe

EnOcean® wireless module TCM 320

Application For remote indication and easy integration of WATCHDOG-LINE alarm units into smart home systems (such as AFRISO smart home) based on EnOcean® wireless. Users with mobile devices can immediately take appropriate action in response to an alarm.

Description EnOcean® wireless module for WATCHDOG-LINE alarm units. Can be plugged into PCBs of boards which are factory-equipped with a slot for the EnOcean® wireless module. Can be integrated into all AFRISO products with the label "EnOcean®-ready" on the front.



EnOcean® wireless module TCM 320

Wall mounting rail probe ÖWU

Application For detection and differentiation of oil and/or water accumulations (electrically conductive/non-conductive).

Description Height-adjustable wall mounting rail probe suitable for ÖWU.

Dimensions
W x L x D: 40 x 200 x 50 mm

Cable length
1.5 m

Wall mounting rail probe ÖWU

DG: G, PG: 4			Part no.
Photoelectric probe	1	-	**44503**
EnOcean® wireless module TCM 320	1	-	**78082**
Wall mounting rail probe ÖWU	1	-	55051
Spare probes ÖWWG 3			
Spare probe ÖWWG 3, length 3.2 m, year of manufacture 09/2013 and later			**44516**
Spare probe ÖWWG 3, length 10 m, year of manufacture 09/2013 and later			**44484**
Spare probe ÖWWG 3, length 3.2 m, year of manufacture up to 08/2013			**44481**
Probe fuse for ÖWWG3			**44495**

Accessories for alarm units

Drip pan

Application For the collection of, e. g., escaping oil. Drip pans should be mounted below all oil fittings such as filters, oil vents, burners in order to avoid damage resulting from escaping oil and in order to detect leaks as early as possible.

Description Drip pan made of white plastic (PE).
At the lowest part of the drip pan, the sensor of an oil alarm unit can be installed, e. g. the liquid detector AFA 11.
If the drip pan cannot be checked on a daily basis, oil alarms with audible and visual alarms are required.
Several independent drip pans can be monitored, e. g. with a single oil alarm unit OM 5 and up to 5 probes. A mounting clamp for the sensor is supplied with the drip pan.

Dimensions (W x D): 600 x 300 mm

Drip pan

Mounting frame

Description Mounting frame for wall mounting housings 100 x 188 x 65 mm (W x H x D) of the WATCHDOG-LINE alarm units from year of manufacture 10/2007.
For fast integration in control cabinets.

Mounting frame

Sealing kit (IP 54)

Description Sealing kit for rough application conditions. Suitable for all wall mounting housings of the WATCHDOG-LINE alarm units from year of manufacture 10/2007, with the exception of tank contents indicators DTA 10/20, liquid detector AFA 11 and backup controller RENA. The sealing kit is easy to mount between the housing cover and base. This increases the degree of protection of the alarm unit to IP 54.

Sealing kit (IP 54)

DIN rail clip

Description DIN rail clip for fast and easy mounting of WATCHDOG-LINE alarm units in the control cabinet or for side-by-side mounting of several units on the wall. The clip is mounted by means of screws so that the alarm unit can be clipped onto standard DIN rails.

DIN rail clip

DG: G, PG: 1			Part no.
Drip pan	1	-	**44512**
Mounting frame	1	-	**43521**
Sealing kit (IP 54)	1	-	**43416**
DIN rail clip	1	-	**43100**

Alarm unit for separators WGA 01

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

1 Oil
2 Water

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 key

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

DG: H, PG: 4	Part no.
WGA 01 incl. probe WGA-ES4 (layer thickness)	**53410**
Additional probe WGA-R6 (overflow)	**53419**
Spare probe WGA-ES4	**53418**

i Enquire for other probe cable lengths.

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 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. 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)

Ex approvals
Control unit: Ex II (1) G [Ex ia Ga] IIA

Scope of delivery
Control unit, probe WGA-ES4

Options

Probe WGA-R6
Probe WGA-ES8

DG: H, PG: 4	Part no.
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

Alarm unit for separators WGA 02/WGA 03

- For oil, petrol and grease separators
- Layer thickness/overflow alarm
- With Ex approval for zone 0

1 Oil
2 Water

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, petrol 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, WGA 02 only)
Contact rating: AC 250 V/5 A/100 VA

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

Audible alarm
Integrated piezo buzzer, can be acknowledged

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

Ex 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 LED: alarm
2 red LED: error

Ex 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.
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**

Alarm unit for separators WGA 04/WGA 05

- For oil, petrol and grease separators
- Sand alarm/sludge alarm/ layer thickness alarm
- With Ex approval for zone 0

1 Oil
2 Water
3 Sand/sludge

4

Application

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

Description

WGA 04 consists of a control unit and an ultrasonic probe (WGA-SN 01). The probe generates an alarm signal when it detects solid matter between the two probe tips.
The control unit is equipped with 2 relay outputs, visual and audible alarms as well as Test and Acknowledge buttons.

WGA 05 is additionally equipped with a conductivity probe (WGA-SD 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 WGA 04)
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 key

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)

Ex 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

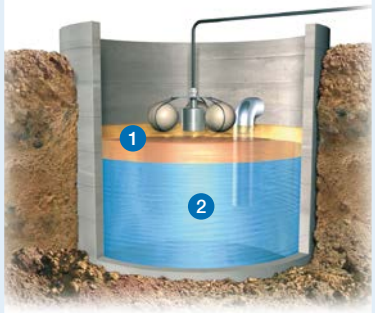
Ex approvals
Probe WGA-SD 03: Ex II (1) G [Ex ia] IIA T5 Ga

Scope of delivery
Like WGA 04, but with additional probe WGA-SD 03

DG: H, PG: 4	Part no.
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**

Alarm unit for separators WGA 06

- For oil, petrol and grease separators
- Oil-on-water alarm/overflow alarm
- With Ex approval for zone 0



1 Oil
2 Water

4

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 key

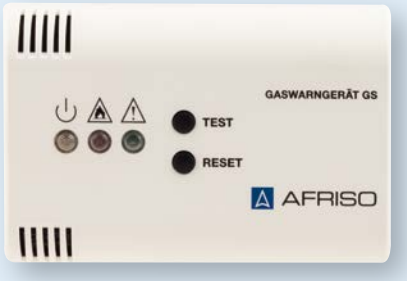
Housing
Wall mounting housing made of impact-resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm
Degree of protection: IP 65 (EN 60529)

Ex approvals
Control unit: Ex II (1) G [Ex ia] II C
Probes: WGA-ÖW: Ex II (1) G 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.
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**

Gas alarm units for the private home



Gas alarm unit GS 1.1

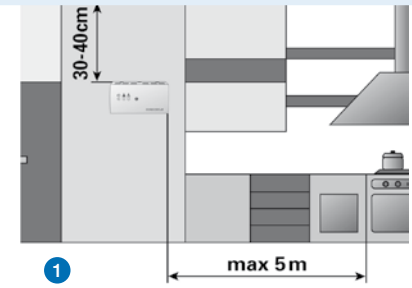
Gas alarm unit GS 2.1

Application

For the detection of flammable gases such as methane, propane, butane in ambient air in residential buildings.

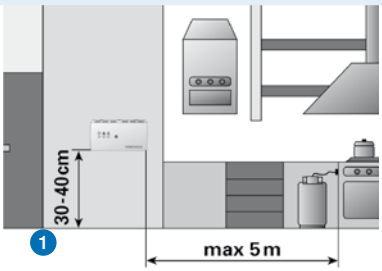
Description

Gas alarm unit with integrated semiconductor sensor and alarm buzzer. LEDs for operation (green), alarm (red), error (yellow), the Test key and the Reset button are located at the front side of the housing. The alarm is triggered when approx. 20 % of the LEL (lower explosive limit) is reached. The audible alarm can be muted with the Reset button. The visual alarm remains active until the alarm condition no longer exists.



Application example 1 Methane

Gas alarm unit with integrated semiconductor sensor, alarm buzzer and relay output for connection of additional external alarm equipment (e.g. horn, warning light). LEDs for operation (green), alarm (red), error (yellow), the Test key and the Reset button are located at the front side of the housing. The alarm is triggered when approx. 20 % of the LEL (lower explosive limit) is reached. The audible alarm can be muted with the Reset button. The visual alarm remains active until the alarm condition no longer exists. The unit features an additional input for connection of an external gas sensor GS 4 as a second measuring point, e.g. for monitoring different rooms.



Application example 1 Propane

Technical specifications

Supply voltage
AC 230 V

Housing
W x H x D: 120 x 80 x 35 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C; max. 75 % r.h.

Alarm value
Approx. 20 % LEL

Alarm tone
Internal buzzer, min. 50 dB(A)

Service life
Approx. 5 years

Supply voltage: AC 230 V

Housing
W x H x D: 120 x 80 x 35 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C; max. 75 % r.h.

Alarm value: Approx. 20 % LEL

Audible alarm: Internal buzzer, min. 50 dB(A)

Service life: Approx. 5 years

i

GS gas alarm units are cross-sensitive to hydrocarbons, lacquers, solvents, alcohols and similar media.

DG: H, PG: 4			Part no.
Gas alarm unit GS 1.1. Methane	1	-	**61184**
Gas alarm unit GS 1.1. Propane/butane	1	-	**61186**
Gas alarm unit GS 2.1 Methane	1	-	**61185**
Gas alarm unit GS 2.1 Propane/Butane	1	-	**61187**

External gas sensor GS 4 and test gas bag PGT 10 for gas alarm units/sensors

External gas sensor GS 4

Application

Additional gas sensor to be used with the gas alarm unit GS 2.1. Enables monitoring at two points in different rooms.

Description

Remote probe for gas alarm unit GS 2.1. Audible alarm is triggered by the gas alarm GS 2.1.

Detectable gases: Methane, propane, butane. LEDs at the sensor indicate the operating and alarm state of the gas alarm system:

- LED green: Operation
- LED yellow: Error
- LED red: Gas alarm

Technical specifications

Measured gas
Flammable gases and vapours in ambient air.

Measuring range: 0–50 % LEL

Measuring principle
Semiconductor (service life approx. 5 years, depending on the operating conditions)

Supply voltage: Via GS 2.1

Housing
W x H x D: 80 x 80 x 35 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C
max. 75 % r.h.

Alarm value: Approx. 20 % LEL

Service life: Approx. 5 years

Test gas bag PGT 10 for gas alarm units/sensors

For checking and servicing gas alarm systems during function tests and system checks. Nylon bag with test gas cap and sampling unit MiniFlo (valve, Perspex 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.

Sampling unit MiniFlo

DG: H, PG: 4	PG			Part no.
External gas sensor GS 4 Methane		1	-	**61188**
External gas sensor GS 4 Propane/Butane		1	-	**61189**
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.

i

GS gas alarm units and s ensors are cross-sensitive to hydrocarbons, lacquers, solvents, alcohols and similar media.

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 (option

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, errors, 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 errors 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 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 119–120

DG: H, PG: 4	Part no.
GW-S 2.1	**61146**
GW-S 4.1	**61145**
Version with data logger	On request

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 (option)

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, errors, 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.
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

Gas sensors for GW-S 2.1/GW-S 4.1/GW-SK 6.1

Description

For the detection of flammable, explosive gases. 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
0/500/1,000 ppm

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 (wEN 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.
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

Gas sensors for GW-S 2.1/GW-S 4.1/GW-SK 6.1

Description

For monitoring the oxygen concentration or 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 and 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).

Technical specifications

GS 600 ST	GS 700 ST	GS 800 ST
Measuring ranges 0/25 % O_2 by volume	**Measuring ranges** GS 700 ST-CO_2: 0/5 % by volume	**Measuring ranges** 0.1/25 % O_2 by volume
Measuring principle Electro-chemical (EC), service life 1–2 years	**Measuring principle** Infrared (IR)	**Measuring principle** Zirconium dioxide (Zr)
Supply voltage 24 V DC, ± 5 %	**Supply voltage** 24 V DC, ± 5 %	**Supply voltage** 24 V DC, ± 5 %
Ambient temperature -20/50 °C	**Ambient temperature** -10/+40 °C	**Ambient temperature** -20/+60 °C
Humidity 15/95 % rH	**Humidity** Max. 95 % rH	**Humidity** Max. 95 % rH
Atmospheric pressure 900/1100 hPa	**Atmospheric pressure** 900/1100 hPa	**Atmospheric pressure:** 800/1100 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)	**Housing** W x H x D: 90 x 85 x 65 mm Weight: Approx. 0.5 kg Degree of protection: IP 54 (EN 60529)	**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	**Output** 4–20 mA	**Output** 4–20 mA
Options RS-232 interface	RS-232 interface	RS-232 interface

PG: 4	DG			Part no.
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

Gas measuring system MF420-Ex-2.1 with Ex 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

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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

Ex approvals
Ex II 2G Ex db eb IIC T6/T4 Gb

Options
- RS-232 interface at control unit

PG: 4	DG			Part no.
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

Alarm unit AG 10 Ex

- **With visual/audible alarms, Test and Acknowledge buttons**
- **Relay output for event reporting systems**
- **Logistics made easy: For example, just in time information on empty gas cylinders**

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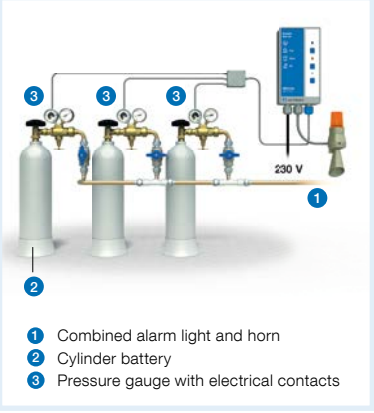


1 Combined alarm light and horn
2 Cylinder battery
3 Pressure gauge with electrical contacts

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. The alarm can also be configured as fail safe, so that an alarm is triggered even in the case of power outage.

Proper operation of the system can be checked at all times by means of pressing the Test key. If this button is pressed, the system triggers an alarm, i.e. the red alarm lamp lights up and the audible alarm sounds.

Description

The alarm system consists of one or several contacts connected in series, a control unit (alarm unit AG 10 Ex) and, if required, an additional alarm unit.
If contacts are to be monitored, the corresponding number of contacts can be connected in series and monitored by a single alarm unit. It is also possible to connect a separate alarm unit for each measuring point. The alarm is triggered when the contact opens.
An event reporting system can be connected to the relay output of the alarm unit for remote reporting.

Technical specifications

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

Supply voltage
AC 230 V ±10 %

Power input
5 VA

Switching input
For voltage-free connection, e.g. Bourdon tube pressure gauge with magnetic spring contact

Probe circuit
Intrinsically safe, maximum values:
U_0 = 16.8 V
I_0 = 57 mA
P_0 = 240 mW
C_0 = 180 nF for IIC
675 nF for IIB
L_0 = 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 II (1)G [Ex ia Ga] IIC

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

Degree of protection
IP 30 (EN 60529)

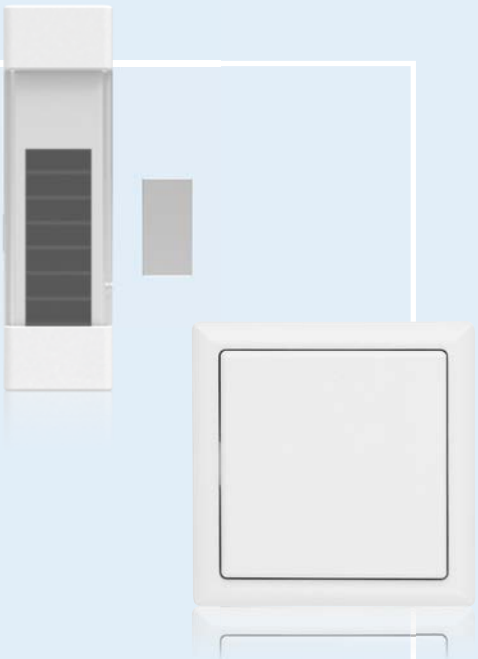
DG: M, PG: 4	Part no.
Alarm unit AG 10 Ex	**67000**

reddot award 2014
winner

Temperature control

Water sensors

AFRISOhome gateway

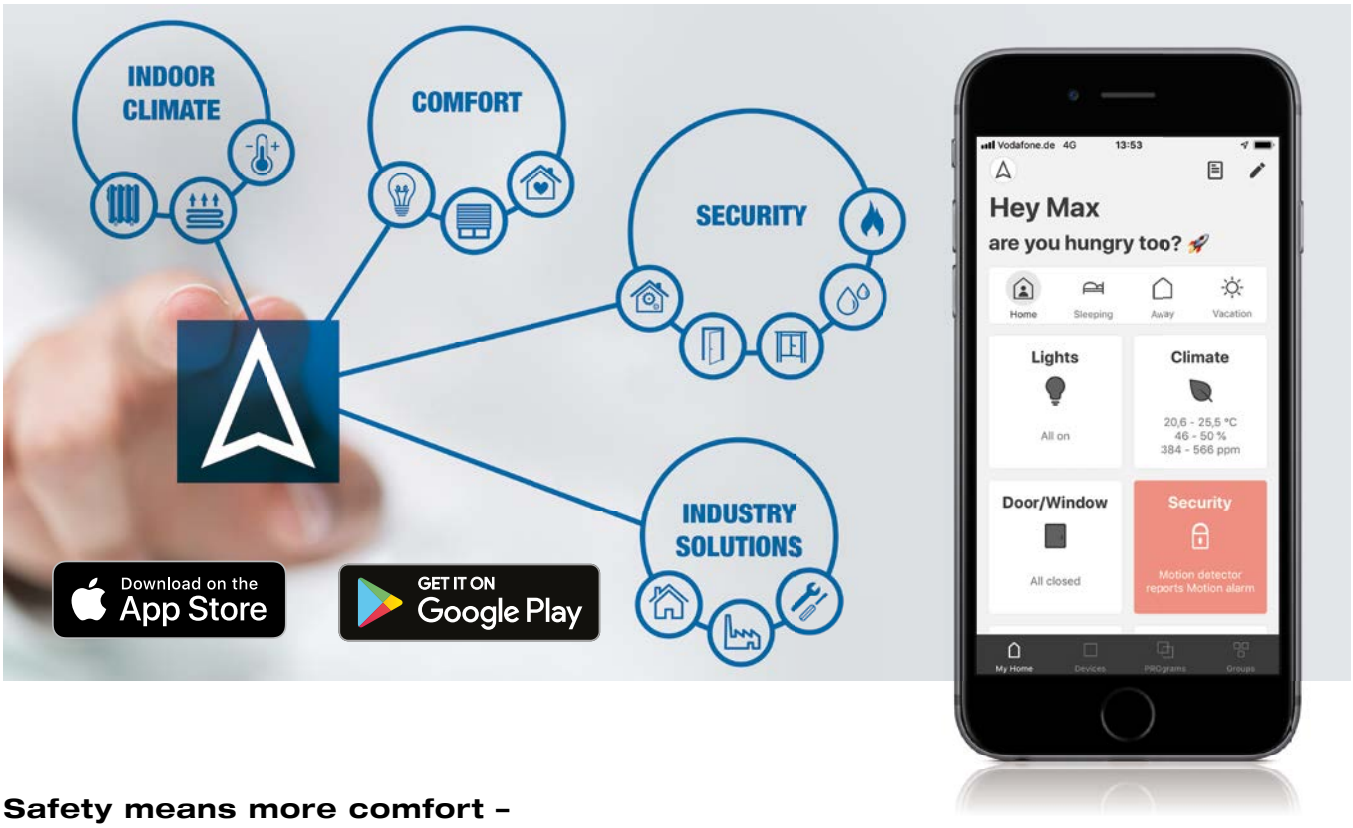


Wireless automation

CHAPTER 5

AFRISO Smart Home: Intelligent alarm units, sensors and actuators for building automation

Customised building automation with AFRISO Smart Home



Safety means more comfort – the intelligent, energy-saving building with AFRISO Smart Home

AFRISO has been manufacturing alarm units for the safe operation of tank facilities and heating systems for more than 60 years. So far, alarms were mainly signalled directly on site. Transferring alarm messages to building control systems was possible, but it involved considerable effort.
The wireless transmission standard EnOcean®, available for domestic technology since 2003, breaks new ground for a completely different approach to building automation. The transmission protocol allows a whole range of different products to be networked on the basis of EnOcean® wireless. This technological milestone breaks new ground for building automation not only in new buildings – reasonably priced intelligent networking becomes possible in existing buildings. Products with an EnOcean® wireless module do not require cable connections to a building control centre and can be used almost anywhere in buildings due to their compact design. Manufacturers from a great variety of areas have teamed up in the EnOcean® Alliance and offer a large range of products. With the smart home system, AFRISO has developed a portfolio of outstanding sensors and alarm units for reliable leakage protection (for example, water/oil) as well as devices for controlling heating systems in an economical way. AFRISO smart home products are cost-effective, reliable and practical.
Even for end customers, there are no more barriers to entry into the networked world of customised, modularly extensible building automation and security systems. The perfect approach to a flexible smart home solution.

No cables.
No cables are required for building automation systems on the basis of the EnOcean® wireless technology. Ten metres of power cable (NYY 3 x 1.5 mm) weigh approx. 2.3 kg – not using this cable saves money and is great for the environment.

No batteries.
Energy harvesting is the foundation of battery-less, maintenance-free and flexible building automation. The energy required for sending messages is derived from ambient sources – small movements, pressure, light, temperature or vibration are sufficient to allow for power-independent operation of the sensors.

No limits.
Renovation projects and new buildings benefit from the new, creative and innovative developments based on EnOcean® wireless technology. There are countless ways of combining EnOcean® products.

A fully featured smart home system on the basis of EnOcean wireless technology networks all light, heating and air conditioning control systems via a central gateway. The gateway processes sensor and consumption data, triggers control action and initiates other measures, and transmits the information to mobile devices such as smartphones, tablets, etc. via WLAN or Internet. Products from other members of the EnOcean® Alliance for controlling household appliances can also be integrated.

AFRISO Smart Home

1. Radio-controlled water valve WaterControl
2. Wireless conductivity water sensor WaterSensor BWS
3. Digital digital tank contents indicator DTA 20 E
4. Room air monitoring: CO_2 sensor wireless
5. Single room temperature controller CosiTherm® – wireless
6. Wireless room temperature sensor FT
7. Wireless rocker switch FT4F-rw
8. Indoor siren AIS 10
9. AFRISOhome gateway HG 02
10. Heat detector AHD 10
11. Wireless mechanical water alarm WaterSensor eco
12. Wireless smoke detector ASD 10
13. Wireless actuator for radiators AVD 30

Sensors for the detection of water leakage

					
Product type		**WaterSensor eco**	**WaterSensor con**	**WaterSensor BWS 10-2**	**WWG 1 with BWS 10-1**
Catalogue page		See page 129	See page 130	See page 131	See page 105
Typical applications		Inaccessible areas without light source or areas where battery replacement is difficult or impossible, e.g. below bathtubs, sinks, kitchen cabinets, refrigerators, shafts, etc.	Accessible areas subject to sunlight or areas where batteries can be replaced, in living spaces.	Accessible areas subject to sunlight or areas where batteries can be replaced, in basements or utility rooms.	Most robust and reliable version for industrial facilities, basements, storage rooms, etc.
Measuring principle		Fibre disks	Conductivity	Conductivity	Conductivity
EnOcean® wireless		•	•	•	Via additional module TCM 320
AFRISO HG 02	Can be connected to the following gateways	•	•	•	•
homee EnOcean® Cube		•	•	•	
wiButler		•	•	•	
alphaEos		•	•	•	
Digital Concepts		•	•	•	•
Eltako GFVS		•			
Standalone operation with AFRISO water valve WaterControl 01 or indoor siren AIS 10		•	•	•	•
Availability monitoring (heartbeat)			•	•	•
External power supply		Energy Harvesting	Energy harvesting via solar cell or optional battery	Energy harvesting via solar cell or optional battery	AC 230 V (mains voltage monitoring and alarm in the case of power outage)
Response level		1.5 mm	0.5 mm	2–3 mm	2–3 mm
Response delay		< 6 minutes	None	None	None
Non-breakable probe				•	•
Floor mounting		•		•	•
Wall mounting				•	•
Integrated temperature measurement			•	•	

Mechanical water sensor WaterSensor eco

- Flexible location-independent use anywhere in buildings
- No battery, no cables required
- Wireless transmission without power supply in the case of state transitions

Battery-less sensor system: Fibre disks generate the energy to signal events

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Application

For the detection of accumulations of water at defined horizontal surfaces or positions (e.g. below pipes, fittings and in the area of washing machines, below bath tubs or dishwashers, in utility rooms or basements). Suitable for water.

Description

WaterSensor eco is equipped with fibre disks that work as a sensor; it does not require an additional power supply. In the case of a leak, the fibre disks expand and generate the required power to send the event message to WaterControl or to the AFRISOhome gateway. The event message is sent when the fibre disks expand or shrink. WaterControl can be used, for example, to shut off the water pipe to keep further water from escaping. The AFRISOhome gateway transmits alarm messages and state transition messages via WLAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts). The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

Operating temperature range
Ambient: -25/+65 °C
Storage: -25/+65 °C
Medium: 1/65 °C

Response level
1.5 mm

Response delay
< 6 min (for the first 5 expansion processes)
up to 1 hour (for expansion processes 6 to 10)

Supply voltage
Energy harvesting (via fibre disks)

Housing
Plastic housing (PC)
Colour: White, similar to RAL 9003
W x H x D: 80 x 55 x 30 mm
Weight: 66 g
Degree of protection: IP 43 (EN 60529)

EnOcean® wireless
EEP: F6-05-01
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- WaterSensor eco
- Adhesive tape

Necessary additional components
- WaterControl
  and/or
  indoor siren AIS 10
  and/or
  AFRISOhome gateway

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Water sensor WaterSensor eco	**55080**

Conductivity water sensor WaterSensor con

- No cables required (operation via photovoltaic cell or battery)
- Shapely probe for use in living spaces, kitchens or business rooms
- Additional temperature measurement


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Immediate leakage detection via conductivity sensor surface

5

Application

For the detection of accumulations of water at defined horizontal surfaces or positions (e.g. in the area of fittings washing machines, coffee makers with water connection). Suitable for water.

Description

WaterSensor con features a conductivity sensor at the bottom.
The energy required to send an EnOcean® telegram is generated by means of an integrated photovoltaic cell. An optional battery can be used for application in darker rooms. An extension cable is available for separate mounting of sensor and wireless transmitter. WaterSensor con cyclically transmits the actual ambient temperature and the logical state of the conductivity sensor (conductive liquid present or not present) and also sends a telegram when the state changes via the integrated EnOcean® wireless module to the water valve WaterControl or to the AFRISOhome gateway.
WaterControl can close the water pipe in response to an event message to keep further water from escaping. The AFRISOhome gateway transmits alarm messages and state transition messages via WLAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts); the message includes information on which water sensor has signalled the state transition.
The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

Operating temperature range
Ambient: 0/40 °C
Storage: -20/+60 °C
Medium: 1/60 °C

Response level
0.5 mm

Temperature measuring range
Measuring range: 0/40 °C
Accuracy: ±1 K

Supply voltage
Energy harvesting (via photovoltaic cell) or 1/2 AA lithium battery, DC 3.6 V (with daylight less than 200 lx)

Housing
Plastic housing (PC)
Colour: White, similar to RAL 9003
W x H x D: 55 x 50 x 42 mm
Weight: 47 g
Degree of protection: P 42 (EN 60529)

EnOcean® wireless
EEP: A5-30-03
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- WaterSensor con
- Without battery

Necessary additional components
- WaterControl
  and/or
  indoor siren AIS 10
  and/or
  AFRISOhome gateway

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Water sensor WaterSensor con	**78146**

Conductivity water sensor WaterSensor BWS

- No cables required (operation via photovoltaic cell or battery)
- Robust, non-breakable probe especially for utility rooms
- Additional room temperature measurement via wireless transmitter

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Immediate leakage detection and stationary mounting.

Application

For the detection of accumulations of water at defined horizontal surfaces or positions (e.g. in the area of fittings, washing machines, below pipes).
Suitable for water.

Description

WaterSensor BWS consists of a probe with extension cable and a wireless transmitter with an integrated temperature sensor. The probe features a conductivity sensor at the bottom. The energy required to send an EnOcean® telegram is generated by means of a photovoltaic cell in the wireless transmitter. An optional battery can be used for application in darker rooms. WaterSensor BWS cyclically transmits the actual ambient temperature and the logical state of the conductivity sensor (conductive liquid present or not present) and also sends a telegram when the state changes via the integrated EnOcean® wireless module to the water valve WaterControl or to the AFRISOhome gateway.
WaterControl can close the water pipe in response to an event message to keep further water from escaping. The AFRISOhome gateway transmits alarm messages and status messages via WLAN or LAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts); the message includes information on which water sensor has signalled the state transition.
The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

Operating temperature range
Ambient: 0/40 °C
Storage: -20/+60 °C
Medium: 1/60 °C

Response level
Approx. 2–3 mm

Temperature measuring range
Measuring range: 0/40 °C
Accuracy: ±1 K

Supply voltage
Energy harvesting (via photovoltaic cell) or 1/2 AA lithium battery, DC 3.6 V (with daylight less than 200 lx)

Housing
Plastic housing (PC)
Colour: White, similar to RAL 9003
W x H x D: 52 x 40 x 17 mm
Weight: 22 g
Degree of protection: IP 54 (EN 60529)

Housing floor probe BWS 10.2
EEP: A5-30-03
Dimensions Ø x L: 75 x 40 mm
Cable length: 1.80 m

EnOcean® wireless
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Wireless transmitter
- Sensor BWS 10-2 with connection cable

Necessary additional components
- WaterControl
  and/or
  indoor siren AIS 10
  and/or
  AFRISOhome gateway

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

PG: 4	Part no.
Water sensor WaterSensor BWS	**55120**
Spare probe BWS 10-2	**55116**

Water valve WaterControl 01 with wireless control

- **Immediate shutting off of the water pipe in the case of a leak**
- **Reduced damage after pipe burst**
- **Shut-off valve with modular design, removable motor and ball valve with additional screw connection for easy mounting, also if mounting space is limited**

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5

Application

For manually or remotely controlled closing and opening of a water pipe in buildings in response to an event message from the water sensors WaterSensor eco, con or BWS.

Description

WaterControl 01 consists of a shut-off valve and a control unit with power supply and an EnOcean® wireless module. The shut-off valve features a drinking water-approved ball valve with an electric motor which is integrated in the water-carrying pipe. Two ball valves (G1 male / G1½ male) with corresponding screw connections
for G¾ female and G1 female / G1¼ female and G1½ female are available. There several ways to open and close the shut-off valve in the water pipe:

- Opening/closing the shut-off valve mechanically via the operating handle
- Opening/closing the shut-off valve electrically via buttons at the control unit
- Closing the shut-off valve via water sensors
- Opening/closing the shut-off valve via EnOcean® switch
- Opening/closing the shut-off valve via AFRISOhome gateway and smartphone

The control unit has a permanent wireless connection to the water sensors WaterSensor eco or WaterSensor con or WaterSensor BWS and/or the AFRISOhome gateway. An event message is triggered if the water sensors detect a leak, e.g. caused by a defective household appliance or a water pipe burst. WaterControl 01 can be used, for example, to shut off the water pipe to keep further water from escaping. The AFRISOhome gateway transmits alarm messages and state transition messages via WLAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts).

Technical specifications

Operating temperature range
Ambient: 0/50 °C
Storage: -10/+80 °C
Medium: 4/80 °C

Supply voltage
AC 100–240 V

Nominal power
Motor at standstill: < 2 VA
Motor running: < 5 VA

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Weight: 430 g
Degree of protection: IP 40 (EN 60529)

Ball valve (DVGW-tested) with motor
Weight: 800 g to 2 kg
Degree of protection: IP 40 (EN 60529)

EnOcean® wireless
EEP: D2-A0-01
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Devices to teach in
Teach in of up to 40 devices:

- 1 EnOcean® centre/gateway
- WaterSensor con (20 x)/BWS
- WaterSensor eco (10 x)
- EnOcean® rocker switch open/close (10 x)

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: G, PG: 4	Part no.
WaterControl 01 G¾	**42570**
WaterControl 01 G1	**42571**
WaterControl 01 G1¼	**42575**
WaterControl 01 G1½	**42576**

Temperature and pressure measuring instrument TDM 51 F

- **Ideal for measuring a great variety of values and parameters in domestic technology applications**
- **Pressure and temperature sensors can be connected**
- **Integrated mains voltage monitoring**
- **EnOcean®-inside**

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Application

For measuring pressure and temperature in domestic technology applications such as filling pressure in the heating system, level in fuel oil tanks or cisterns, layer temperature in hot water storage tanks or system temperatures (e.g. flow, return).

Description

The temperature and pressure measuring instrument TDM 51 F features five inputs for PT 1000 temperature sensors and an RS-485 Modbus connection for digital temperature sensors. The measured data is transmitted to the AFRISOhome gateway HG 01 via an integrated EnOcean® wireless module. The measured data is visualised on the AFRISOhome application. If the measured value is out of range, groups of persons (e.g. owner or janitor) can be notified selectively. TDM 51 F monitors the mains voltage and sends an alarm message in the case of a power outage. EnOcean® wireless technology allows for integration into building control systems.

Technical specifications

Operating temperature range
Ambient: -5/+55 °C
Storage: -10/+60 °C

Supply voltage
AC 100–240 V

Nominal power
5 VA

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Weight: 430 g
Degree of protection: IP 40 (EN 60529)

Inputs
- 5 x PT 1000 (2-wire), measuring range: -100/+300 °C
- 1 x Modbus RTU (RS 485)

Accuracy
Temperature: ±0.5 K
Pressure: Depends on sensor used

EnOcean® wireless
EEP: Generic Profile (GP)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Control unit with EnOcean® wireless module

i

See operating instructions for detailed information on the range of the EnOcean® wireless module.
See chapters 13 / 14, for temperature and pressure sensors.

PG: 4	DG	Part no.
Temperature and pressure measuring instrument TDM 51 F	G	**78089**
PT 1000 sensor	H	**78495**

Digital tank contents indicator DTA 20 E

- **Plug & play level indicator for smart home systems based on EnOcean® wireless**
- **Daily measurement and worldwide access to consumption data**
- **Local display and push message (adjustable) when minimum level is reached**
- **For fuel oil, (bio) diesel, water and other media with a density between 0.5 and 1.5 g/cm³**

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Application

Location-independent level measurement with digital display and minimum level signal (reserve level alarm). If the product is operated in conjunction with the AFRISOhome gateway, the tank operator/owner can also read the level on a mobile device. For tanks with fuel oil EL, L (DIN 51603-1), diesel fuel (EN 590), water (no drinking water!), AdBlue®, liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). Also for systems that use the paraffinic fuels HVO or GTL as an admixture or 100 %. For maximum accuracy of the displayed measured value, determine the density of the medium and set it at the DTA when using these fuels. DTA can be used with all non-corrosive liquids with a density from 0.5 to 1.5 g/cm³.
Suitable for tanks up to 400 cm liquid level. Remote measurements (measuring line) up to 15 m.

Description

The electro-pneumatic tank contents indicator DTA 20 E consists of a control unit, an EnOcean® wireless module, a digital display and a measuring line. Measured values are displayed in litres, % and liquid level (cm). Simple operation and setup via three function keys at the device. DTA 20 E measures the level (adjustable interval) and transmits it to the AFRISOhome gateway via EnOcean® wireless. In addition, measurements can be taken by means of pressing the control key (Push-to-Read function). If the level falls below a minimum level that is freely adjustable as a percentage, the backlight of the display flashes red to indicate an alarm during the measurement. In addition to indication on the local display, the tank owner/operator can receive a push message on the smartphone or tablet. Standard tank shapes (linear and cylindrical, horizontal) are stored.

Technical specifications

Functions
Periodic level measurement (1 to 240 hours) with wireless transmission to master systems such as AFRISOhome gateway
Push-to-Read level measurement

Measuring range (tank height)
0/400 cm (fuel oil)
0/350 cm (water)

Measuring accuracy
±3.0 cm

Operating temperature range
Ambient: 0/50 °C
Storage: –20/+65 °C
Medium: 0/50 °C

Display
Multi-coloured, backlit graphical display (30 x 50 mm):
- White = Operation
- Red = Alarm
- Green = Setup

Indication of litres (5 digits), % or liquid level in cm

Measuring line
PVC hose: 4 x 1 mm
Length: 20 m
Bottom part: Stainless steel

Supply voltage
9 V monobloc battery

Minimum alarm
Backlight flashes red
Push message to mobile devices

Housing
Wall mounting housing made of impact-resistant plastic (PC/ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 20 (EN 60529)

EnOcean® wireless
EEP: Generic Profile (GP)
Frequency: 868.3 MHz
Transmission power:Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

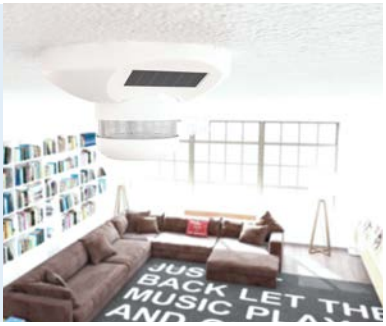
Scope of delivery
- Control unit with battery
- Pneumofix type 2: 20 m measuring line with bottom part, connection kit for G½, G1, G1½ and G2, 30 x nail cable clips, hose connectors (4 x 4 mm), mounting accessories

DG: L, PG: 4	Part no.
DTA 20 E with Pneumofix 2	**52146**
DTA 20 E without Pneumofix 2	**52156**

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

Wireless smoke alarm ASD

- **Immediate triggering of an alarm before a flue gas concentration becomes hazardous**
- **Wireless transmission, cyclically (function check) and in the case of state transitions**
- **Compact, unobtrusive design**
- **Design as per EN 14604**



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Application

For detection of fumes and smoke gas in living spaces. Audible alarm when a defined smoke concentration is exceeded.

Description

The photoelectric smoke alarm ASD consists of a sensor head and a mounting base with integrated EnOcean® wireless module. The sensor head features a permanently installed lithium battery with a service life of up to 10 years for reliable, long-term fire protection. A fire alarm is indicated by an alarm tone with approx. 85 dB and a flashing LED. The alarms are transmitted via the EnOcean® wireless module.
In addition, ASD 10 transmits the ambient temperature. A photovoltaic cell generates the required energy. A battery can be inserted in the base for use in darker environments.
Wireless smoke alarm ASD 10 with transmission of fire alarm and current room temperature.
Wireless smoke alarm ASD 20 with transmission of fire alarm and battery state of the mounting base for the EnOcean® wireless module.
The AFRISOhome gateway lets you program a great variety of scenarios for an alarm, for example, switching on the lights for the escape route, opening of shutters for escaping, push messages. The EnOcean® wireless module is not only used for transmission, but also for regular function checks.

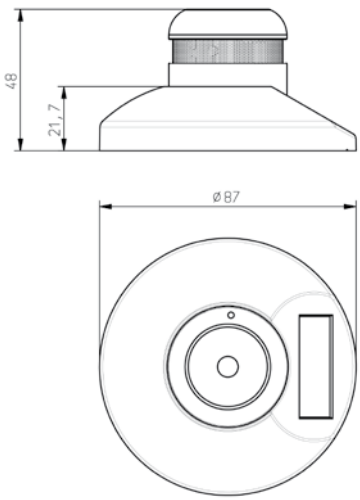
Technical specifications

Operating temperature range
Ambient: 0/+40 °C
Storage: -20/+60 °C
Max. humidity, non-condensing

Supply voltage
Sensor head: Permanently installed lithium battery
Base: Energy harvesting (via photovoltaic cell) or 1/2 AA lithium battery, DC 3.6 V (with daylight less than 200 lx)

Housing
Plastic housing (PC)
Colour: White, similar to RAL 9003
ø x H: 87 x 48 mm
Weight: 38 g
Degree of protection: IP 54 (EN 60529)

EnOcean® wireless
EEP: A5-30-03 (ASD10)
F6-05-02 (ASD20)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)



DG: L, PG: 4	Part no.
Wireless smoke alarm ASD 10	**61245**
Wireless smoke alarm ASD 20	**61249**
Spare part	
Sensor head smoke alarm ASD 10/20 SH	**61246**

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

Wireless heat detector AHD

- **Immediate triggering of an alarm if the temperature rises rapidly and if it exceeds 58 °C**
- **Wireless transmission, cyclically (function check) and in the case of state transitions**
- **Compact, unobtrusive design**
- **Design as per EN 54-5 class A1/R**

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Application

For detection of heat and fire in living spaces. Audible alarm and direct transmission to the AFRISOhome gateway if the temperature rises rapidly or if it exceeds 58 °C. AHD is ideal for use in rooms subject to generation of smoke or vapour (such as kitchens, bathrooms) or rooms in which dust, dirt and exhaust gases can develop (such as workshops, garages). Recommended if smoke alarms cannot be used due to possible false alarms.

Description

The heat detector AHD consists of a sensor head and a mounting base with integrated EnOcean® wireless module. The sensor head features a permanently installed lithium battery with a service life of up to 10 years for reliable, long-term fire protection. A fire alarm is indicated by a flashing LED and a sound sequence with the maximum alarm sound pressure of 85 dB. The alarm is also transmitted via the EnOcean® wireless module. A photovoltaic cell generates the required energy. A battery can be inserted in the base for use in darker environments. Each heat detector has a unique ID so that the recipient can distinguish the individual heat alarms if multiple sensors are used. The AFRISOhome gateway lets you program a great variety of scenarios for an alarm, for example switching on the lights for the escape route, opening of shutters for escaping, push messages, etc. The EnOcean® wireless module is not only used for transmission, but also for regular function checks.
AHD 10 with transmission of heat alarm and current room temperature.
AHD 20 with transmission of heat alarm and battery status of mounting base.

Technical specifications

Operating temperature range
Ambient: -10/+50 °C
Storage: -20/+60 °C
Max. humidity: 90 %, non-condensing

Supply voltage
Sensor head: Permanently installed lithium battery
Base: Energy harvesting (via photovoltaic cell) or 1/2 AA lithium battery, DC 3.6 V (with daylight less than 200 lx)

Housing
Plastic housing (PC/ABS)
Colour: White, similar to RAL 9003
ø x H: 86 x 45 mm
Weight: 38 g
Degree of protection: IP 30 (EN 60529)

EnOcean® wireless
EEP: A5-30-03 (AHD 10), F6-05-02 (AHD 20)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

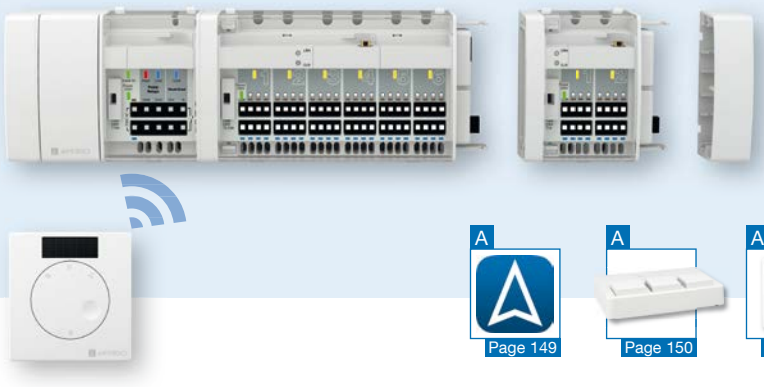
Approval
EN 54-5, class A1/R for heat detection systems

Scope of delivery
- Wireless mounting base
- Heat detector
- Mounting accessories

i
See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Wireless heat detector AHD 10	**61550**
Wireless heat detector AHD 20	**61553**
Spare part	
Sensor head heat detector AHD 10/20 SH	**61551**

Single room temperature controller CosiTherm® Wireless



- Controller terminal bar for connection of actuators
- For manifold systems for heating and cooling
- Worldwide access via AFRISOhome gateway

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Application

Controls the temperature of individual rooms in connection with manifold systems for heating or cooling. EnOcean® wireless technology for integration into building automation systems.

Description

The base version of the single room temperature controller CosiTherm® Wireless consists of a base module, at least one controller module with two or six independent control circuits and a corresponding number of room temperature sensors. The controller modules can be interconnected in a modular way to account for the number of control circuits/rooms. One room temperature sensor is required per control circuit; the standard version is battery-less and connected to the controller module via the EnOcean® wireless technology. The room temperature sensor measures the actual temperature in the room. The reference temperature is adjusted via the rotary knob of the room temperature sensor or via the app AFRISOhome. The controller module compares the actual temperature and the reference temperature and controls the volume flow of the heating/cooling water via the thermostatic actuators of the manifold system.
The base module features two independently programmable switching channels for temperature reduction, nine programmable memory blocks and a valve and pump protection function. The additional pump running time is adjustable. The terminals of the controller modules are colour-coded for easy assignment to the wires of the thermostatic actuators; in conjunction with the DIN rail snap connectors at the rear of the housing, this facilitates installation.
With an AFRISOhome gateway, it is possible to remotely check and, if necessary, adjust the room temperatures via the AFRISOhome app (for example, when coming back from winter vacation). This flexible remote control of the room temperature combines multiple benefits: you can increase living comfort and reduce energy costs.
In conjunction with additional AFRISO smart home products with EnOcean® wireless technology, the user can configure a whole range of fully customisable, extensible applications.

Functions

Base module BM
- Power supply of the thermostatic actuators (AC 230 V)
- Switchover of the system to "Heating" or "Cooling"
- Control of the heating/cooling pumps

Controller module
- Comparison of actual and reference temperatures
- Control of heating/cooling water via connected thermostatic actuators
- Connection of two or six control circuits, extensible
- Connection to room temperature sensors via EnOcean® wireless technology

Technical specifications

Connections

Base module BM
Max. 9 controller modules F2 or
3 controller modules F6

Controller module F2
Max. 2 room temperature sensors and
8 actuators as well as external antenna

Controller module RM F6
Max. 6 room temperature sensors
and 24 actuators as well as external antenna

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

EnOcean® wireless
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Single room temperature controller CosiTherm® – wireless

Technical specifications

Base module BM

Supply voltage
AC 230 V, 50–60 Hz

Nominal power
1 VA

Housing
Plastic housing PC/ABS
Colour: Light grey, similar to RAL 7047
W x H x D: 122 x 92 x 45 mm
Degree of protection: IP 20 (EN 60529)

Weight
215 g

Controller module

Supply voltage
AC 230 V (via base module BM)

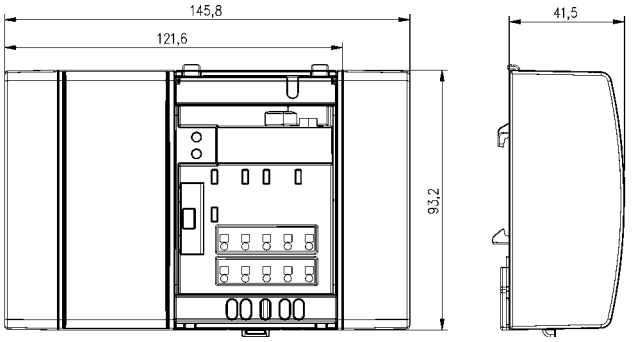
Nominal power
Controller module F2: 0.3 W
Controller module F6: 0.5 W

Housing (W x H x D)
Plastic housing PC/ABS
Controller module F2: 73 x 92 x 45 mm
Controller module F6: 162 x 92 x 45 mm
Degree of protection: IP 20 (EN 60529)

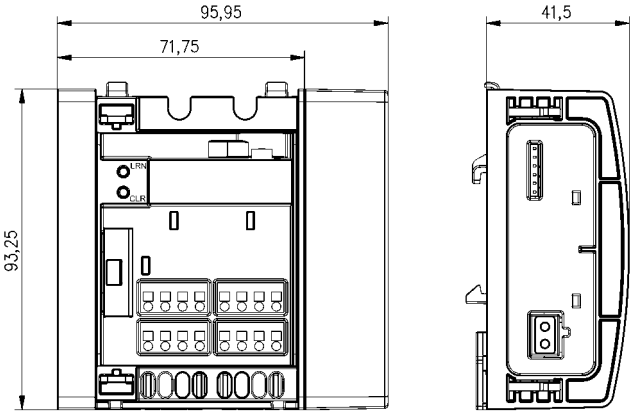
Weight
Controller module F2: 130 g
Controller module F6: 260 g

Types and dimensions (mm)

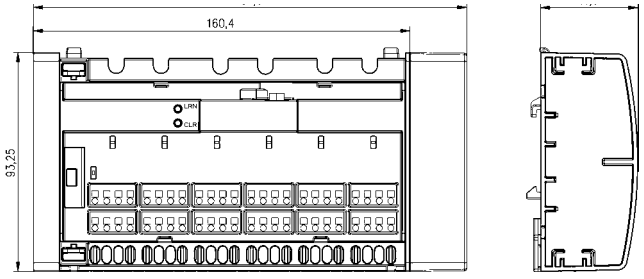
Base module BM



Controller module F2



Controller module F6



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See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: G, PG: 4	Part no.
Base module BM	**78112**
Controller module F2A with external antenna, for 2 control circuits	**78123**
Controller module F6A with external antenna, for 6 control circuits	**78124**

Room temperature sensor FT/FTF – wireless

- Extremely flat with a height of 12.5 mm
- No cables required (operation via photovoltaic cell or battery)
- Flexible location-independent use anywhere in buildings

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reddot award 2014 winner

Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature.

Description

The room temperature sensor FT transmits the actual ambient temperature as well as the reference room temperature via the integrated EnOcean® wireless module to the single room temperature controller CosiTherm® – Wireless or to the AFRISOhome gateway. The room temperature sensor FTF also transmits the current humidity value. The reference value for the room temperature is adjusted by means of the integrated rotary knob.
The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis. If there is a difference, the single room temperature controller CosiTherm® Wireless adapts volume flows of the heating/cooling water via the thermostatic actuators of the manifold system of the surface heating system. The energy required to send reference temperature and actual temperature values is generated by means of an integrated photovoltaic cell; it is also possible to use a standard battery.
The AFRISOhome gateway transmits alarm messages and changes in temperature and/or humidity via WLAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts); the message includes information on which room temperature sensor has signalled the change. The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

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

Temperature adjustment range
8/30 °C

Temperature measurement
0/40 °C
Accuracy: ±1 K

Humidity measurement
With room temperature sensor FTF only
Room humidity: 0/100 % r.h.
Accuracy: ±5 % r.h.

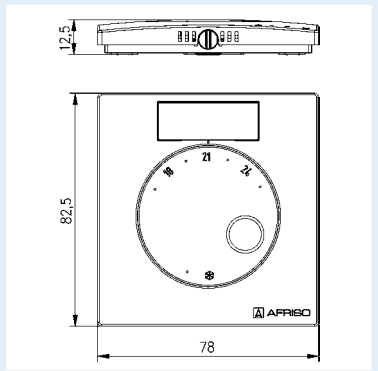
Supply voltage
Energy harvesting (via photovoltaic cell)
or type 1632 battery, DC 3 V
(with daylight less than 200 lx)

Housing
Plastic housing PC
Colour: White, similar to RAL 9003
W x H x D: 78 x 82.5 x 12.5 mm
Weight: 43 g
Degree of protection: IP 30 (EN 60529)

EnOcean® wireless
EEP: A5-10-03 (FT) or A5-10-12 (FTF)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Room temperature sensor FT/FTF
- 4 x adhesive dots

Necessary additional components
- CosiTherm® – wireless and/or
- AFRISOhome gateway



i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Room temperature sensor FT (temperature)	**78111**
Room temperature sensor FTF (temperature, humidity)	**78119**

Wireless transmitter FTM T/TF for temperature and/or humidity

- Flexible location-independent use anywhere in buildings
- Wireless transmission, cyclically (function check and transmission of values)
- No cables required (operation via photovoltaic cell or battery)
- Easy mounting via wall bracket

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Wall bracket FTM with snap-on mounting.

Application

Determination of the ambient temperature and air humidity at a defined location.

Description

The temperature sensor FTM T transmits the current ambient temperature via the integrated EnOcean® wireless module to the AFRISOhome gateway. The temperature and humidity sensor FTM TF also transmits the value of the current air humidity.
Based on the event message, the AFRISOhome gateway can trigger measures. The energy required to send a wireless telegram is generated by means of the integrated photovoltaic cell. An optional battery can be used for application in darker rooms. The ambient temperature can be readjusted via the single room temperature controller CosiTherm® – Wireless in order to keep the room temperature from rising or falling. The AFRISOhome gateway transmits alarm messages and changes in temperature and/or humidity via WLAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts); the message includes information on which temperature sensor has signalled the change.
The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

Operating temperature range
Ambient: 0/40 °C
Storage: -20/+60 °C

Measuring range
Temperature: 0/40 °C
Accuracy: ±1 K
Humidity: 0/100 % r.h.
Accuracy: ±5 % r.h.

Supply voltage
Energy harvesting (via photovoltaic cell) or 1/2 AA lithium battery, DC 3.6 V (with daylight less than 200 lx)

Housing
Colour: White, similar to RAL 9003
W x H x D: 52 x 40 x 17 mm
Weight: 24 g
Degree of protection: IP 30 (EN 60529)

EnOcean® wireless
EEP: A5-02-05 (FTM T) or A5-04-01 (FTM TF)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Temperature sensor
- Wall bracket
- 2 x adhesive dots

Necessary additional components
- CosiTherm® – Wireless
  and/or
- AFRISOhome gateway

i
See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Temperature sensor FTM T	**78144**
Temperature and humidity sensor FTM TF	**78145**

Temperature and humidity sensor FTM 20 TF

- Maintenance-free battery-less operation
- Solar-operated energy storage module for several days of operation even in darkness
- Either easy adhesive mounting or placement by means of base
- Battery operation optionally possible

FTM 20 TF with base and triangular cover.

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Application

Wireless sensor for determination of the ambient temperature and air humidity at a defined location and transmission to AFRISOhome gateway.

Description

The temperature sensor FTM 20 TF measures the ambient temperature and the humidity at regular intervals. Significant changes of the sensor data are immediately transmitted to the AFRISOhome gateway; they can be used as parameters to control actuators such as the radiator actuators AVD 30 or extractor fans with EnOcean® wireless technology.
The energy required to send a wireless telegram is generated by means of the integrated photovoltaic cell. The integrated energy storage module allows for several days of operation even in total darkness. In permanently dark environments (such as basements or warehouses) it is also possible to use a button cell battery.
A double-sided adhesive strip allows for extremely easy mounting of the compact housing to walls or furniture. It is possible to plug on a metal plate which serves as a base for placing the sensor on a shelf, a window sill or a sideboard.

The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

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

Measuring range
Temperature: -20/+60 °C
Accuracy: ±0.5 K
Humidity: 0/100 % r.h.
Accuracy: ±4.5 % r.h.

Supply voltage
Energy harvesting
(via photovoltaic cell)
or CR 1225 button cell

Housing
Colour: White, similar to RAL 9010
W x H x D: 76.2 x 22 x 15 mm
Weight: 20 g
Degree of protection: IP 40 (EN 60529)

Operation start up time with empty energy storage module
Typically: 2.5 min at 400 lx/25 °C

EnOcean® wireless
EEP: A5-04-03
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m
(depending on room arrangement and materials in the building)

Scope of delivery
- Temperature sensor
- Cap triangular or quadrangular
- Base
- 1 x adhesive tape/wall bracket
- Without battery

Necessary additional components
- AFRISOhome gateway

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Temperature and humidity sensor FTM 20 TF	**61255**

Bidirectional wireless radiator actuator AVD 30

- Battery-less control of radiators
- Maintenance-free without additional operating costs
- Connection M30 x 1.5: Easy replacement of existing thermostat heads
- Low-noise operation

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5

Application

For wireless and battery-less temperature control in individual rooms. Ideal for heating, ventilation and air conditioning systems. Adjustments are made exclusively via the AFRISOhome app or via a central operating unit.

Description

Wireless, bidirectional radiator actuator AVD 30 based on EnOcean® wireless with integrated frost protection function. AVD 30 requires no batteries; to generate the energy required for operation and communication between the AFRISOhome gateway it uses the temperature difference between the room and the radiator. An internal energy storage module helps to prevent conditions with insufficient energy supply during operation. If the energy storage module is empty, the actuator opens the radiator valve by 50 % and switches to idle state. Once a sufficient volume of heating water flows, AVD 30 starts automatically and resumes controlling the room temperature. In sparely heated rooms, it may be necessary to charge the energy storage module via the integrated micro USB port; the actuator triggers a corresponding alarm on time.

AVD 30 controls, for example, the room temperature in a room with radiators. For this purpose, the actual temperature is measured directly at the actuator or with an additional room temperature sensor. The reference temperature can be set, for example, via the AFRISOhome app in combination with an AFRISOhome gateway. The actual temperature and the reference temperature are compared in the AFRISOhome gateway and necessary change requests are transmitted to the actuator at regular intervals. Additional configurable conditions can be included in the temperature control (for example, temperature reduction if a window is open or in the case of absence). This flexible control of the room temperature combines multiple benefits: you can increase living comfort and reduce energy and operating costs.

Technical specifications

Drive
Valve stroke: Max. 4.5 mm
Adjustment time: 0.24 mm/s
Actuating force: Max. 80 N

Supply voltage
Energy harvesting via temperature difference radiator <> room

Housing
W x H x D: 60 x 63 x 59.5 mm
Weight: Approx. 225 g
Degree of protection: IP 30 (EN 60529)

Connection
M30 x 1.5 mm

EnOcean® wireless
EEP: A5-20-1
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m
(depending on room arrangement and materials in the building)

Necessary additional components
- AFRISOhome gateway

i
See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Bidirectional wireless actuator AVD 30	**75008**

CO_2 measuring instrument CM 10

enocean® NEW

- Monitoring of room air quality
- Compact, unobtrusive design
- Visual indication of concentration
- With or without EnOcean® wireless technology

Flexible use in buildings due to integrated Euro mains plug.

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Application

For continuous monitoring of the carbon dioxide (CO_2) concentration in the ambient air. Application in rooms in which many persons work, study or live and where carbon dioxide levels may consequently be elevated. High concentrations of carbon dioxide in the ambient air reduce the ability of persons to concentrate and perform. Ideal for educational institutions, training/meeting rooms, office areas and household.

Description

CO_2 measuring instrument with infrared technology in plastic housing, for connection to a standard Euro socket with PE contact. The CO_2 concentration in the room air is indicated directly at the device by a colour scale. From 1,000 ppm beep every 10 minutes; from 1,500 ppm double beep every 10 minutes (beep can also be disabled).

- LED green: No ventilation required
- LED yellow: Ventilation recommended
- LED red: Ventilation required

The version CM 10 E (with EnOcean® wireless module) sends the measured values to the AFRISOhome gateway for further processing and initiation of appropriate action. For example, it is possible to start a room ventilation system in order to reduce the CO_2 concentration. The current carbon dioxide concentration is also displayed by the app AFRISOhome. The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Version CM 10: Version without wireless transmission as stand-alone solution.

Technical specifications

Measuring range
0/2,000 ppm

Measuring accuracy
400/1,250 ppm: ±30 ppm or ±3 % of measured value
1,250/2,000 ppm: ±30 ppm or ±5 % of measured value

Operating temperature range
Ambient: 0/50 °C
Storage: -40/+70 °C
Humidity: Max. 95 % r.h.

Housing
Plastic housing (PC/ABS),
Colour: White, similar to RAL 9003
W x H x D: 69 x 69 x 31 mm
Weight: 108 g
Degree of protection: IP 20 (EN 60529)

Supply voltage
AC 100–240 V via Euro mains socket

Nominal power
2.5 VA

Visual indication
LED green: < 1,000 ppm CO_2
LED yellow: 1,000–1,500 ppm CO_2
LED red: > 1,500 ppm CO_2

EnOcean® wireless (Part no. 79131)
EEP: A5-09-09
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Necessary additional components
- AFRISOhome gateway

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
CO_2 measuring instrument CM 10E, with EnOcean® wireless module	79131
CO_2 measuring instrument CM 10	79132

CO_2 measuring instrument CM 20

- Monitoring of room air quality
- Compact design
- Visual indication of concentration via traffic light system
- Desktop unit with USB-C connection
- With or without EnOcean® wireless technology


LED green


LED yellow

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Application

For continuous monitoring of the carbon dioxide (CO_2) concentration in the ambient air. Application in rooms in which many persons work, study or live and where carbon dioxide levels may consequently be elevated due to breathing, or in rooms where a very high air quality is required (for example, bedrooms, children's' rooms). High concentrations of carbon dioxide in the ambient air reduce the ability of persons to concentrate and perform. In addition, the concentration of aerosols increases with the CO_2 concentration and, therefore, the risk of respiratory infections. Ideal for educational institutions, training/meeting rooms, office areas and household.

Description

Portable CO_2 sensor with infrared technology in a plastic housing with USB-C interface for power supply. The CO_2 concentration in the room air is indicated directly at the device by a colour scale:

- LED green: No ventilation required
- LED yellow: Ventilation recommended
- LED red: Ventilation required

When the device switches from green to yellow (approx. 1,000 ppm), a short signal tone sounds (<1 second) which is repeated every ten minutes. When the device switches from yellow to red (approx. 1,500 ppm), two short signal tones sound which are repeated every ten minutes. The signal tone can be disabled.

The version CM 20E (with EnOcean® wireless module) sends the measured values to the AFRISOhome gateway for further processing and initiation of appropriate action. For example, it is possible to start a room ventilation system in order to reduce the CO_2 concentration. The current carbon dioxide concentration and the history (day, week, month) is also displayed by the app AFRISOhome. This data is the ideal basis for ensuring healthy indoor ambient air. The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

Measuring range
0/2,000 ppm

Measuring accuracy
400/1,250 ppm: ±30 ppm or ±3 % of measured value
1,250/2,000 ppm: ±30 ppm or ±5 % of measured value

Operating temperature range
Ambient: 0/40 °C
Storage: -20/+60 °C

Housing
Plastic housing (PC/ABS),
Colour: White, similar to RAL 9003
W x H x D: 50 x 60 x 50 mm
Weight: 80 g
Degree of protection IP 20 (EN 60529)

Supply voltage
USB charger with mains plug

Visual indication
LED green: < 1,000 ppm CO_2
LED yellow: 1,000–1,500 ppm CO_2
LED red: > 1,500 ppm CO_2

EnOcean® wireless (CM 20E only)
EEP: A5-09-09
Frequency: 868.3 MHz
Transmission power: 10 mW

Scope of delivery
- CO_2 measuring instrument
- Power supply unit
- Operating instructions

PG: 4	DG	Part no.
CO_2 measuring instrument CM 20	-	**79134**
CO_2 measuring instrument CM 20E, with EnOcean® wireless module	L	**79133**

Universal wireless transmitter FTM

- Equipment can be integrated into building automation systems via voltage-free contact
- Transmitters for a wide range of AFRISO probes
- Compact design

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Connection cable for easy device connection.

Application

Monitoring of the switching states of voltage-free contacts. In addition, transmission of ambient temperature.

Description

The universal wireless transmitter can integrate any device with a voltage-free contact into a building automation system. Examples comprise the alarm relays of heating systems or status messages of alarm systems. The voltage-free contact is supplied with voltage by the universal wireless transmitter. A defined recipient is immediately notified of each state transition is via EnOcean® wireless. The universal wireless transmitter is used as a transmission unit for many AFRISO probes such as Minimelder or Maximelder, pressure gauges with electrical contact, etc. The energy required to send the message with the state transition is generated by means of an integrated photovoltaic cell; it is also possible to use a battery in dark rooms. The AFRISOhome gateway transmits alarm messages and state transition messages via WLAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts); the message includes information on which universal wireless transmitter FTM has signalled the state transition.
The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications:

- Floor water probe (for water detection)
- Minimelder (for signalling minimum levels in tanks)
- Maximelder (for signalling maximum levels in tanks)
- Pressure gauge with electrical contact (for signalling limit values)

Technical specifications

Operating temperature range
Ambient: 0/40 °C
Storage: -20/+60 °C

Temperature measuring range
Measuring range: 0/40 °C
Accuracy: ±1 K

Supply voltage
Energy harvesting (via photovoltaic cell) or 1/2 AA lithium battery, DC 3.6 V (with daylight less than 200 lx)

Housing
Colour: White, similar to RAL 9003
W x H x D: 52 x 40 x 17 mm
Weight: 22 g
Degree of protection:IP 54 (EN 60529)

EnOcean® wireless
EEP: A5-30-03
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

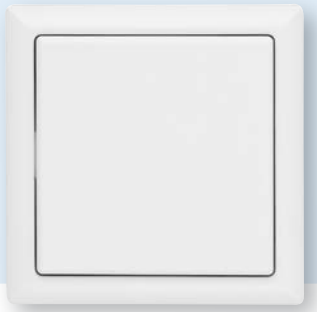
Scope of delivery
- Universal wireless transmitter FTM
- Wall bracket
- 2 x adhesive dots

Necessary additional components
- AFRISO probe with plug-in connector (see accessories)
- AFRISOhome gateway

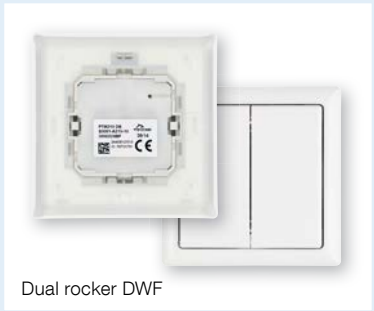
i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Universal wireless transmitter FTM	**78143**
Connection cable 2 m	**78974**

Wireless rocker switch FT4F-rw



- **Energy harvesting: Generates the energy for the wireless telegram when button is pressed**
- **No battery, no connection cable required**
- **Flexible and location-independent use**



Dual rocker DWF

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Application

For switching wireless actuators. The switch automatically generates the energy required for wireless telegrams when the switch is operated. Connection cables or batteries are not required.

Description

Flexible use with single or dual rocker. If a single rocker is used, two signals can be transmitted: top part of rocker pressed, bottom part of rocker pressed. Switches with dual rockers can transmit four signals: Two rockers, top and bottom parts pressed. The holding plate can be screwed to a plane surface or glued to walls, glass or furniture by means of the enclosed adhesive film. The unit can also be easily screwed to an existing 55 mm switch box using the existing screw sockets. It is possible to directly establish a wireless connection of the wireless rocker switch to many EnOcean® actuators such as the water valve WaterControl or the indoor siren AIS 10 PRO. The wireless rocker switch can also be operated as a component of the AFRISOhome gateway.

Technical specifications

Supply voltage
Energy harvesting (via press of button)

Housing
Colour: White, similar to RAL 9003
W x H: 80 x 80 mm, outside
63 x 63 mm, inside dimensions of frame
15 mm height

EnOcean® wireless
EEP: RPS
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Frame R1F
- 1 x rocker WF
- 1 x dual rocker DWF
- 1 x frame BRF
- 1 x plate HP
- 1 x wireless module
- 1 x adhesive film

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Rocker switch FT4F-rw	**78972**

Door and window contact AMC 20

- Maintenance-free battery-less operation
- Solar-operated energy storage module for several days of operation even in darkness
- Easy adhesive mounting at doors and windows
- Battery operation optionally possible

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Application

Magnetic contact sensor for monitoring the states OPEN and CLOSED and for transmission to the AFRISOhome gateway or to stand-alone wireless components such as the indoor siren AIS 10 PRO.

Description

The door and window contact AMC 20 is a battery-less, maintenance-free magnetic contact wireless module. The energy required to send an EnOcean® telegram is generated by means of an integrated photovoltaic cell. The integrated energy storage module allows for several days of operation even in total darkness. In permanently dark environments (such as basements or warehouses) it is also possible to use a button cell battery. The module monitors the presence of a magnet at the side by means of an integrated Reed contact and signals state changes. A double-sided adhesive strip or the enclosed backet allow for extremely easy mounting of the compact housing to windows, door frames or cabinet doors.

The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

Operating temperature range
Ambient: -25/+65 °C

Supply voltage
Energy harvesting (via photovoltaic cell)
or CR -1225 button cell

Housing
Colour: White, similar to RAL 9010
Grey, similar to RAL 7016
Reed contact: 76.2 x 22 x 15 mm
Magnet housing: 20 x 10 x 1.5 mm
Weight: 20 g
Degree of protection: IP 40 (EN 60529)

Reed contact
1 x integrated

Operation start up time with empty energy storage module
Typically: 2.5 min at 400 lx/25 °C

EnOcean® wireless
EEP: D5-00-01
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m
(depending on room arrangement and materials in the building)

Scope of delivery
- Door and window contact
- Magnet
- Adhesive tape/wall bracket
- 1 x mounting bracket

i
See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Door and window contact AMC 20, white, similar to RAL 9010	**61254**
Door and window contact AMC 20, grey, similar to RAL 7016	**61258**

Indoor siren AIS 10 PRO

- Ideal as a stand-alone device for setting up a modular alarm system without a gateway
- Compact, unobtrusive design
- Version with mains plug (Euro plug)
- Loud 90 dB alarm tone
- Integrated repeater function

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5

Application

Alarm siren as a stand-alone solution for EnOcean® wireless products. You can teach in up to 20 EnOcean® wireless smart home devices into the siren. AIS 10 PRO allows you to create a modular alarm system with or without a gateway or a mobile device.

Description

The indoor siren AIS 10 PRO allows for versatile use in building technology applications. As a mains plug version, you can plug it into any power outlet and the siren is ready for operation. The siren lets you connect up to 20 smart home sensors via EnOcean® wireless. This includes, among others, door and window contacts, water sensors, smoke alarms, switches, universal wireless transmitters, window handles, AFRISO WATCHDOG-LINE alarm units and additional AFRISO AIS 10 PRO series indoor sirens for alarm on additional floors. If one of the connected EnOcean® devices responds, a radio signal is sent to the indoor siren. The alarm signals from the corresponding sensor are repeated at intervals of one second to ensure reliable transmission. The indoor siren AIS 10 PRO emits a loud alarm tone and the LED lights red.

The following alarm scenarios can be distinguished:
Pre-alarm: LED red and beeping sound 1 x per second. After 5 seconds transition to main alarm.
Main alarm: LED red and 90 dB continuous alarm sound for 5 minutes. Finally, transition to post-alarm.
Post-alarm: LED red and beeping sound 1 x per 5 seconds.

Once the cause of the alarm has been removed, the alarm tone is muted and the LED lights green. In addition, AIS 10 PRO can be operated as a component of the AFRISOhome gateway. If the device is operated as a stand-alone alarm system, the wireless rocker switch FT4F-rw must be integrated as an activation switch. The alarm system can operate in the operating states ACTIVE and NOT ACTIVE, depending on the presence of the persons in the building. In the operating state NOT ACTIVE, the LED lights green, in the operating state ACTIVE, it lights yellow. In the operating state NOT ACTIVE, only safety-related sensors such as water sensors, smoke alarms, rocker switches (used as "panic buttons") or WATCHDOG-LINE alarm units trigger an alarm. In addition, AIS 10 can be operated as a component of the AFRISOhome gateway. The siren can be controlled via a mobile device. AIS 10 PRO also features a repeater function. When operated with an AFRISOhome gateway, the indoor siren also monitors the mains voltage. In the case of power outage, an alarm signal is sent to a master network.

Technical specifications

Operating temperature range
Ambient: 0/50 °C
Storage: -40/+70 °C
Humidity: Max. 95 % r.h., non-condensing

Housing
Plastic housing (PC/ABS)
Colour: White, similar to RAL 9003
W x H x D: 69 x 69 x 31 mm
Weight: 120 g
Degree of protection: IP 20 (EN 60529)

Supply voltage
AC 100–240 V via Euro mains socket

Nominal power
2.5 VA

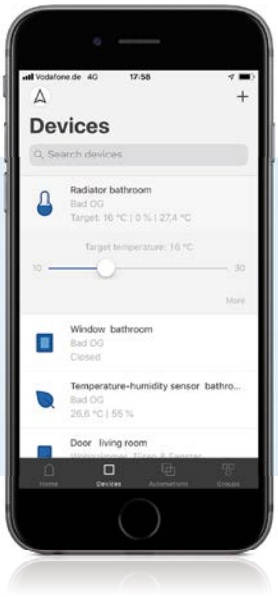
Alarm condition
Sound pressure: 90 dB

Visual indication
LED red: Alarm
LED yellow: Alarm system ACTIVE
LED green: Operation, alarm system NOT ACTIVE

EnOcean® wireless
EEP: Generic Profile (GP)
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depends on room arrangement and materials in the building)

i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Indoor siren AIS 10 PRO	**79135**



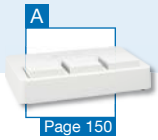
Mobile app AFRISOhome

- Intuitive mobile app for AFRISOhome gateways
- Location-independent status checks and operation of the building automation system
- Operating systems: iOS and Android
- Web App

Download on the App Store

GET IT ON Google Play

Available as Web App



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Application

User interface for mobile devices such as tablets or smartphones to control and visualise all AFRISO smart home building automation sensors and actuators.
The AFRISOhome app allows for integration and interoperation of devices based on the wireless standards EnOcean®, Z-Wave, WLAN and Zigbee. This allows for almost limitless automation. Visit www.afrisohome.de for a detailed list of devices.

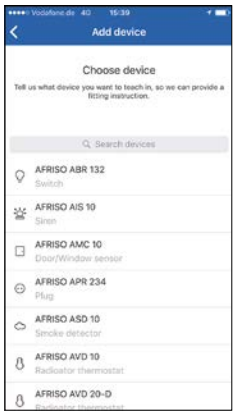
Description

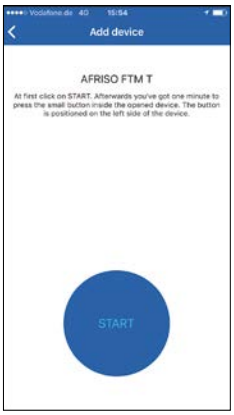
All wireless devices, sensors and actuators integrated into a smart home system can be easily divided into groups by means of AFRISOhome gateways. Actuators in rooms, buildings, etc. can be defined as groups.
The access rights for the various groups can be configured separately for mobile devices.
After selection of a group, the display of the mobile device shows the various wireless products. The user is provided with a clear overview of the current situation of the smart home system. Logic states, temperature values, information on the air quality and buttons for the actuators are displayed, among other things.

AFRISOhome gateways with the AFRISOhome app provide for countless combination possibilities in wireless building automation. AFRISO offers reliable, safe and innovative devices with EnOcean® wireless modules. It is also possible to integrate other products of the EnOcean® Alliance into your building automation system. With currently more than 80 compatible devices, the AFRISOhome gateway HG 02 provides great versatility. Along with the optional extension modules Z-Wave and Zigbee, the AFRISO smart home integrates more than 250 devices.

App structure

Teaching in devices





Function groups

Function automation

i Test the demo app.

AFRISOhome gateway HG 02

- Base module of your building management system
- Cross-vendor, versatile combinations of products of the EnOcean®, Z-Wave and Zigbee Alliance
- No data in the cloud
- Voice control with Alexa (Amazon Echo)

A
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5

Application

For controlling and managing wireless sensors and actuators with EnOcean® and WLAN technology. Events, messages and measured values are documented, and alarms are transmitted to mobile devices (smartphones), if necessary.
Ideal as control centre of a smart home system in apartments and single-family homes.

Description

The AFRISOhome gateway HG 02 is the control centre of your smart home. The app (iOS, Android and WebApp) allows you to add and control a large variety of compatible devices (see whitelist at www.afrisohome.de) to the smart home.
A WLAN interface is provided for Internet access and communication with routers and smartphones. All user data and passwords are stored and processed locally on the AFRISOhome gateway.
Three slots are available that allow you to integrated additional wireless standards by means of an extension module. Currently, Zigbee and Z-Wave are provided.
The free AFRISOhome app for iOS and Android allows for fast and easy operation of the gateway.
Smart home systems based on an AFRISOhome gateway excel with virtually unlimited customisability and extensibility.

Technical specifications

Operating temperature range
Ambient: 0/40 °C
Storage: -20/+60 °C

Supply voltage
AC 100–240 V
Frequency: 50–60 Hz

Housing
W x H x D: 205 x 46.1 x 146 mm

EnOcean® wireless
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Gateway HG 02 with neutral cubes as covers
- Power supply unit

i

Complete whitelist of all compatible products on www.afrisohome.com

AFRISOhome gateway HG 02

1 Mains connection, Micro USB
2 Reset
3 Docking station wireless standard extension via cubes
4 Extension module Z-Wave (option)
5 Cover for docking station

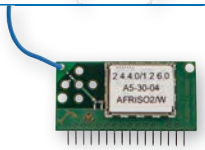
Smart Home with AFRISOhome gateway

i

See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
AFRISOhome gateway HG 02 with WLAN and wireless module EnOcean®	**78102**
Accessories	
Extension module Zigbee for HG 02	**78103**
Extension module Z-Wave V700/Gen 7 for HG 02	**78126**

Accessories and spare parts for AFRISO Smart Home

PG: 4	Description	Suitable for: WaterSensor con/ WaterSensor BWS	Room temperature sensor FT/FTF	Wireless transmitter FTM	Smoke alarm ASD 10/ASD 20	WATCHDOG-LINE alarm units	CosiTherm® – Wireless	AFRISOhome gateway HG 02	Part no.	DG
	**1/2 AA lithium battery**	•		•	•				78100	L
	**CR -1632 button cell**		•						78132	G
	**Extension cable** Cable length: 2 m	•		•					78141	L
	**Connection cable** Cable length: 2 m Connector: One end for FTM, other end flying leads			•					78974	L
	**Adhesive antenna** Cable length: 3 m Connector: Angular SMA connector						•		78175	G
	**Magnetic foot antenna** Connector: Angular SMA connector						•		78167	G
	**Conductivity floor water probe con**	•		•					78142	L
	**Conductivity floor water probe BWS 10-2**	•		•					55116	L
	**Probe Minimelder** Length: 10 m Connector: For FTM			•					78147	L
	**Probe Maximelder** Length: 10 m Connector: For FTM			•					78148	L
	**Repeater** Switchable level 1 and level 2 mode							•	75007	L
	**Pluggable EnOcean® wireless module TCM 320** For WATCHDOG-LINE PCBs, can be ordered separately for EnOcean-ready products					•			78082	G

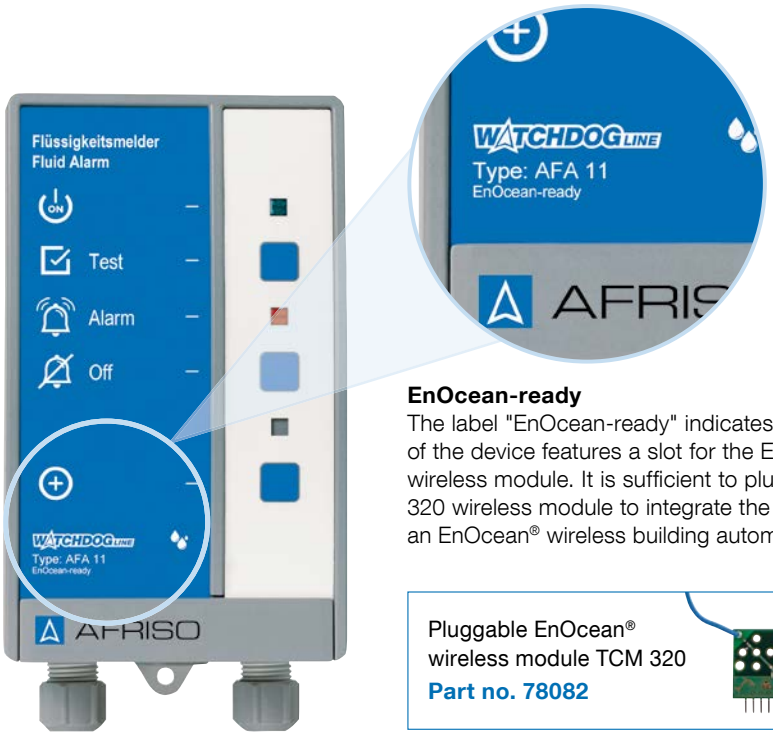
Alarm units with EnOcean® wireless at a glance

With the proven WATCHDOG-LINE alarm units, AFRISO has been offering devices for reducing a vast array of risks in buildings and homes for many years. The alarm units will now successively be EnOcean®-enabled so that an EnOcean® wireless module can be retrofitted. Whether or not an alarm unit already features this technology is indicated by the labels "EnOcean-ready" on the nameplate.

All devices of the WATCHDOG-LINE are compact units in wall mounting housings for professional and safe installation. Visual alarm and audible alarm that can be acknowledged ensure that the persons in a building are notified of the alarm condition. Residents with or without mobile devices can immediately take appropriate action. The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

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
- Oil depots, boiler rooms and rooms with mains water connection
- Heating systems
- Cable and pipe ducts
- Canal shafts, manholes and inspection ducts
- Pipes and hoses



EnOcean-ready
The label "EnOcean-ready" indicates that the PCB of the device features a slot for the EnOcean® wireless module. It is sufficient to plug in the TCM 320 wireless module to integrate the device into an EnOcean® wireless building automation system.

Pluggable EnOcean® wireless module TCM 320
Part no. 78082

Alarm unit	Probe	EnOcean®	Media	Application
 **Water alarm unit WWG**	Wall mounting rail probe WSS or   Floor water probe **BWS 10-1**	**EnOcean-ready**	■ Water ■ Conductive water mixtures ■ Electrically conductive liquids ■ Emulsions	**Single-channel** Suitable for water, but also for electrically conductive liquids, emulsions and conductive water mixtures. i See page 105
 **Oil/water alarm unit ÖWU**	 Wall mounting rail combination probe	**EnOcean-ready**	■ Oil + water	**Single-channel** ÖWU distinguishes oil alarms and water alarms and indicates the appropriate alarm condition. i See page 102

5

Alarm unit	Probe	EnOcean®	Media	Application
 **Liquid detector AFA 11***	 Photoelectric probe	**EnOcean-ready**	■ Electrically conductive and non-conductive liquids	**Single-channel** AFA 11 generates alarms in the event of accumulations of liquids caused by tank leaks, backflow, flooding, etc. **Certificate:** DIBt: Z-65.40-214 i See page 99
 **Level switches Minimelder / Maximelder**	 Minimelder/ Maximelder probe	**EnOcean-ready**	■ Water ■ Fuel oil EL, L, M ■ Oil/water mixtures ■ Neutral liquids	**Single-channel** Suitable to signal minimum or maximum levels in tanks containing liquids. i See page 35
 **Digital tank contents indicator DTA 20 E**	 Pneumatic Measuring line	**EnOcean-inside**	■ Fuel oil ■ Diesel fuel ■ HVO, GTL ■ 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. i See page 134
 **Leak detector Eurovac**	 High vacuum or low vacuum based	**EnOcean-ready**	■ Water-polluting liquids (flash point > 55 °C) ■ AdBlue® (urea solution 32.5 %)	For monitoring aboveground or underground double-walled tanks or single-walled tanks with inner lining. **Approval:** CE mark EU Construct Products Regulation PVO 305/2011, EU 574/2014, EN 13160-1/-2 and ÜHP i See page 81
 **Leak detector Europress**	 Pressure type	**EnOcean-ready**	■ Water-polluting liquids ■ AdBlue® (urea solution 32.5 %)	For monitoring aboveground or underground double-walled tanks. **Approval:** CE mark EU Construct Products Regulation PVO 305/2011, EU 574/2014, EN 13160-1/-2 and ÜHP i See page 90

* Use as leak detection system class III as per EN 13160-1/-4.

Automatic
Fuel oil de-aerators

Tank withdrawal systems

Fuel oil filters

Anti-siphon valves

CHAPTER 6

Equipment for fuel oil storage tanks and oil carrying pipes

OVERVIEW

WITHDRAWAL SYSTEMS

ANTI-SIPHON VALVES

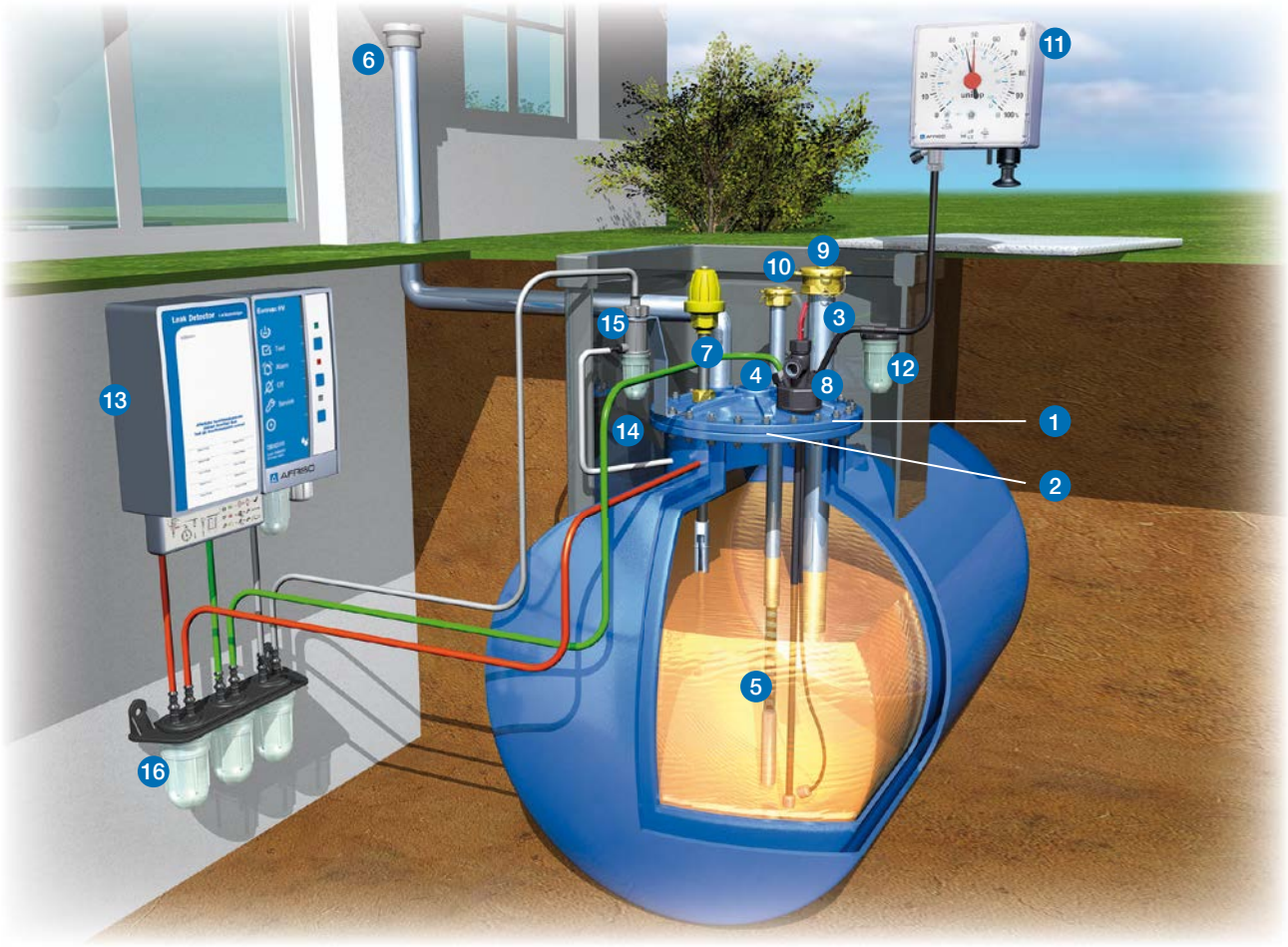
FUEL OIL FILTERS

FUEL OIL DE-AERATORS

ACCESSORIES

Equipment for double-walled underground tanks

Leak monitoring with vacuum



1. Manhole cover
2. Seal
3. Filling pipe with immersion pipe
4. Pipe for dipstick
5. Dipstick
6. Vent cap
7. Level sensor GWG 23
8. Combination fitting Euroflex made of plastic, also acts as isolating piece
9. Filler cap
10. Cap for dipstick pipe
11. Level indicator Unitop
12. Condensate trap
13. Leak detector Eurovac
14. LAZ mounting kit
15. Liquid barrier
16. Condensate bar

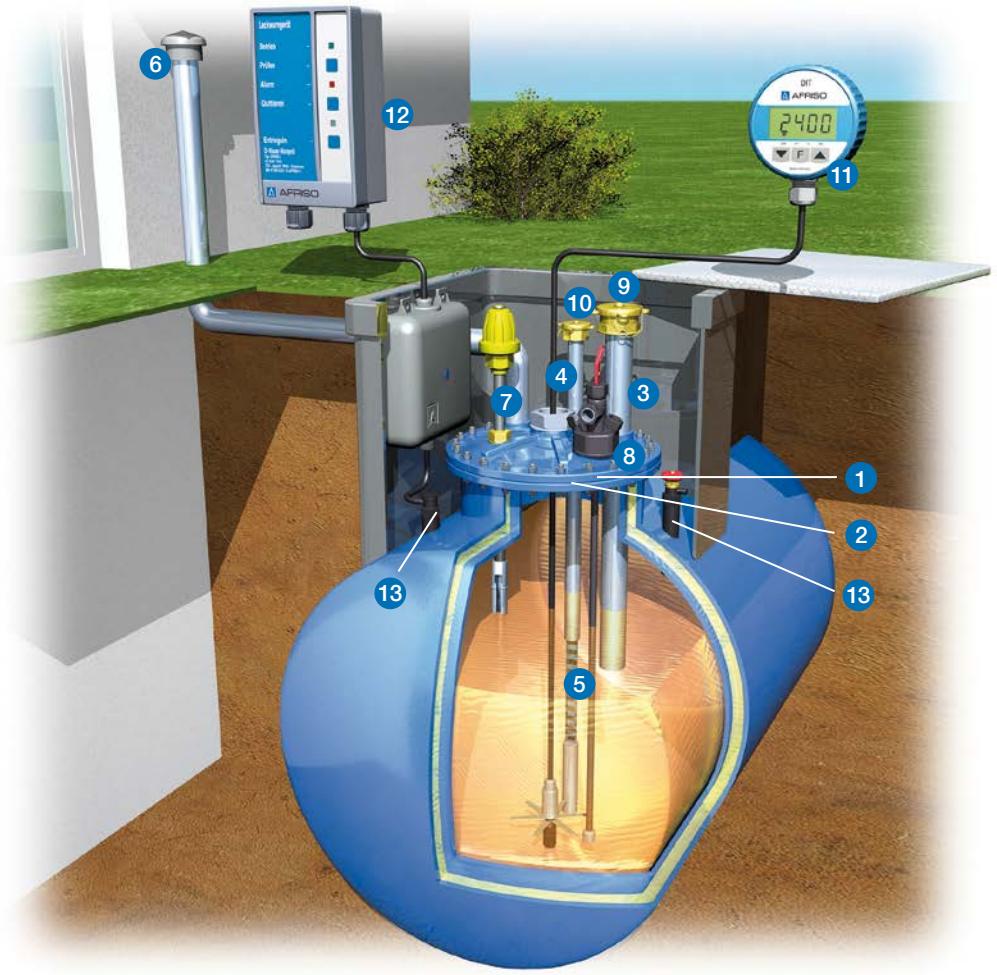
Our product portfolio for the safe operation of fuel oil systems and fuel oil tanks reduces operating costs, helps make optimum use of fuels, provides timely warnings if hazardous situations arise and contributes to the protection of the environment. Irrespective of the tank size or the fuel to be stored.

Application areas
- Cylindrical steel or plastic (glass-fibre reinforced plastic) double-walled tanks
- Double-walled steel tanks
- Steel tanks welded on site
- Spherical tanks
- Tanks with inner lining
- Oil storage rooms/collection facilities
- Containers, cisterns, cesspits

Media
- Fuel oil
- Diesel fuel
- Biofuel with up to 30 % FAME
- Biodiesel with up to 100 % FAME
- AdBlue®
- AHL
- Rainwater
- Many other media
- Paraffinic fuels (e.g. HVO/GTL)

Equipment for double-walled underground tanks

Leak monitoring with leak detection fluid



1. Manhole cover
2. Seal
3. Filling pipe with immersion pipe
4. Pipe for dipstick
5. Dipstick
6. Vent cap
7. Level sensor GWG 23
8. Combination fitting Euroflex 3 made of plastic, also acts as an isolating piece
9. Filler cap
10. Cap for dipstick pipe
11. Level indicator DIT
12. Leak detector
13. LAG mounting kit

Safety and protection of the oil storage system are the basis of our product development. Continuous adaptation to current standards and directives as well as intelligent products such as the piston type anti-siphon valve approved for use in manholes up to -25 °C ensure optimum safety concepts.

i

Since 2003, leak monitoring by means of systems with leak detection fluids is only permissible in the case of existing systems. New systems must be monitored with vacuum type or pressure type systems (such as Eurovac or Europress).

Accessories for GWG filler caps, pressure relief device

GWG filler cap

Application

For systems operated with fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel or biodiesel with up to 100 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%. Suitable for use in flood hazard areas and flood risk areas.

Description

GWG filler cap with bayonet connection G2 with integrated level sensor connection fitting. Brass male coupling as per EN 14420-6. Filler cap made of oil- and weather-resistant plastic. Watertight up to 10 m water column. Lockable with standard padlock.

GWG filler cap

Filler cap K

Application

For systems operated with fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel or biodiesel with up to 100 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%. Suitable for use in flood hazard areas and flood risk areas.

Description

Filler cap with bayonet connection G2. Brass male coupling as per EN 14420-6. Filler cap made of oil- and weather-resistant plastic. Lockable with standard padlock.

Filler cap K

Pressure relief device

Application

To avoid overpressure of storage tanks during filling. Suitable for flood hazard areas.

Description

Pressure relief device with male connection thread G1½.
Opening pressure approx. 25 mbar.
Two or more overpressure devices must be installed for filling rates of more than 300 l/min.
Watertight up to 10 m water column.

i

GWG filler caps are also used in building renovation projects since the existing GWG wall fitting can no longer be fixed to the outside insulation.

DG: G	PG			Part no.
GWG filler cap	2	1	10	**20430**
Filler cap K	2	1	10	**20440**
Pressure relief device	1	1	25	**20466**

Vent caps, dip stick pipe caps/filler caps

Vent caps

Application

To cover the vent line.

Description

Cap for vent line.

Metal version: Zamak alloy, thread G1½ or G2.
Plastic version: Plug-in type with fixing by means of screw or G2 male thread

Caps for dipsticks, filler caps

For closing dip stick pipes and filling pipes of systems operated with fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel or biodiesel with up to 100 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%. Suitable for use in flood hazard areas and flood risk areas.

Dip stick pipe cap/filler cap made of Zamak alloy. Watertight up to 10 m water column.

Lockable with standard padlock.

DG: G	PG			Part no.
Vent cap 2", plastic – plug-in version	1	1	25	**20460**
Vent cap 1½" plastic – plug-in version	1	1	25	**20450**
Vent cap G2, plastic – male thread	1	-	200	20462
Vent cap G2 metal	3	1	25	**20463**
Vent cap G1½ metal	3	1	25	**20455**
Cap for pipe for dipstick G1 x G1¼	2	1	140	**20464**
Filler cap G2 x G2½, fuel oil EL standard	3	1	55	**20445**

i See page 9 for pipes for dipsticks.

Tank withdrawal system Euroflex

Suitable for use in flood hazard areas and flood risk areas. Watertight up to 10 m water column.

Quick-action shut-off valve with lever for fast shutting off of the oil supply. Remote operation from outside of the tank room possible with pull cord.

Version Euroflex 3 with direct connection for pneumatic tank contents gauges. Ideal for retrofitting or for applications involving tanks with few connections.

Floating withdrawal as per DIN 4755 recommendation. Makes it possible to withdraw fuel oil in the clean area and thus supports optimum functionality of the downstream fittings (e.g. oil filters).

Version with special G1 screw connection to avoid twisting. Ideal for use with Euroflex with heating band for fast, simple mounting.

Fitting made of high-strength, weather-resistant plastic. Approved as an isolating piece.

Figure: Euroflex 3 with float

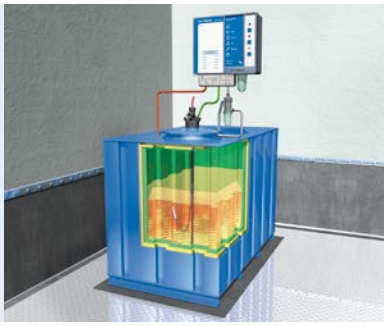
Flexible suction line for maximum variability – also in terms of hose length. The standard lengths 2.15 m and 3.15 m can be shortened as required without any problems.

Measuring line with balance chamber (for Euroflex 3).

All materials resistant to biofuel and biodiesel with max. 30 % FAME (fatty acid methyl ester). Also suitable for use with the paraffinic fuels HVO and GTL.

Tank withdrawal system Euroflex

- **Combination fitting made of high-strength plastic**
- **Integrated, TÜV-tested isolating piece**
- **Silent check valve**
- **Euroflex 3 for floating withdrawal,can also be converted for self-securing suction line**
- **Suitable for use in flood hazard areas**



Application

For withdrawal of fuel oil from underground and aboveground tanks in single-line or dual-line mode. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%. Suitable for flood hazard areas and flood risk areas.
No floating withdrawal in the case of underground tanks.

Description

Combination fitting made of plastic as a withdrawal system with measuring line (not Euroflex 2) and TÜV-tested isolating piece that screws into the tank. G⅜ stainless steel threaded female connections for suction and return lines. Universal compression fittings for pipes with 8 and 10 mm outside diameters for connecting the suction line are enclosed. The integrated check valve with elastic valve seat keeps the oil column in the suction line from being interrupted when the burner is off. Quick-action shut-off valve with lever for remote closing in emergency situations. Pressure- and vacuum-tight up to 1 bar. Available also without check valve for self securing suction line.
Euroflex 3 with float and special G1 screw connection for withdrawing oil in the clean area (as per TRWS 791 not permitted in underground tanks). Measuring line connection for hose or pipe with 6 mm outside diameter. Suction hose length 2.15 m or 3.15 m with additional float at the suction hose end.
Euroflex 312 (GWG 12 K/1C), combination of level sensor and withdrawal system. With measuring line connection for hose or pipe with 6 mm outside diameter. For battery tanks as per DIN 6620 and tanks as per DIN 6625 manufactured on site. Specially useful if there is no connection socket at the tank. Connection G1½.

Technical specifications

Connection
Tank: G1 male thread
(Euroflex 312: G1½ male thread)
Suction/Return line: G⅜ female thread
Measuring line: 6 mm

Length
Suction hose: 2.15 m or 3.15 m
Measuring hose: 2.15 m or 3.15 m (not Euroflex 2)

Test pressure
Max. 6 bar

Flow rate
Max. 150 l/h

Material
Screw fitting: Plastic (POM), blue
Suction hose: NBR/PVC
Balance chamber: Zamak (ZnAl4Cu1)

Approval
Conformity certificate (EN 12514), ÜHP
Euroflex 312: CE marking as per EC Construction Products Regulation 305/2011, EU 574/2014, EN 13616:2004

DG: G, PG: 1			Part no.
Euroflex 2 (2.15), suction hose 2.15 m, without measuring line connection	1	25	**20162**
Euroflex 3 (2.15), suction hose 2.15 m	1	25	**20160**
Euroflex 3 (3.15), suction hose 3.15 m	1	25	**20164**
Euroflex 3 with float, suction hose 2.15 m	1	25	**20130**
Euroflex 3 with float, suction hose 3.15 m	1	20	**20131**
Euroflex 3 (3.15) without check valve, suction hose 3.15 m for self-securing suction line	1	25	**20129**
Euroflex 312 (GWG 12 K/1C), suction hose 2.15 m	1	10	**20190**
Conversion kit float kit G1 for Euroflex and Miniflex	1	25	**20125**
Conversion kit float kit G1½ for single tanks and communicating withdrawal systems	1	-	**20120**
Conversion kit shut-off valve for Euroflex (10/98 and later), Miniflex and communicating AFRISO withdrawal systems for battery tanks for conversion to self-securing suction lines	1	-	**74305**

i Pull cord for remote closing See page 165.

Tank withdrawal system Miniflex

- **Combination fitting made of brass as a withdrawal system with measuring line that screws into the tank**
- **Quick-action shut-off valve with lever for remote closing in emergency situations**
- **Suitable for use in flood hazard areas**

Application

For withdrawal of fuel oil from underground and aboveground tanks in single-line or dual-line mode. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). Also suitable for use with the new paraffinic fuels HVO or GTL as an admixture or 100%. Suitable for use in flood hazard areas and flood risk areas.

Description

Combination fitting made of brass as a withdrawal system with measuring line that screws into the tank. Threaded female connection for suction and return lines. Universal compression fittings for pipes with 8 and 10 mm outside diameters for the suction line are enclosed.

Miniflex 3: With measuring line connection for hose or pipe with 6 mm outside diameter.

Quick-action shut-off valve with lever for remote closing in emergency situations. Pressure- and vacuum-tight up to 1 bar.

Technical specifications

Connection
Tank: G1 male thread
Suction/return line: G¾ female thread
Measuring line: 6 mm

Length
Suction hose: 2.15 m or 3.15 m
Measuring hose: 2.15 m or 3.15 m (not Miniflex 2)

Test pressure
Max. 6 bar

Flow rate
Max. 150 l/h

Material
Screw fitting: Brass
Suction hose: NBR/PVC
Bottom part: Zamak (ZnAl4Cu1)

DG: G	PG			Part no.
Miniflex 2, suction hose 2.15 m, without measuring line connection	2	1	25	**74200**
Miniflex 3, suction hose 2.15 m	2	1	25	**74300**
Miniflex 3, suction hose 3.15 m	2	1	25	**74310**
Conversion kit float kit G1 for Euroflex and Miniflex	1	1	25	**20125**
Conversion kit float kit G1½ for single tanks and communicating withdrawal systems	1	1	-	**20120**
Conversion kit shut-off valve for Euroflex (10/98 and later), Miniflex and communicating AFRISO withdrawal systems for battery tanks for conversion to self-securing suction lines	1	1	-	**74305**

Pull cord, pressure compensation unit

Pull cord

Description

Pull cord with handle and a sealable case for the remote activation of quick-action shut-off valves (e.g. Euroflex or Miniflex).

TÜV-tested. Consisting of:

- Pull cord (steel, plastic-coated), 10 m long
- Handle
- 4 eyelet screws for deflecting the pull cord
- Sealable case with wire and lead seal
- Dowels and screws

Pull cord

Pressure compensation unit DAE

Application

Used to limit pressure increases in closed pipe sections resulting from expansion caused by temperature changes. Suitable for fuel oil pipe sections which are closed at both ends (e.g. by means of solenoid valves or check valves) and which are subject to considerable temperature differences (e.g. due to pipe heating).

Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

Pressure compensation unit DAE

Description

G⅜ female thread connections at both ends. A pipe volume of 725 cm^3 can be buffered at a temperature difference of 40 °C. This corresponds to the following max. line lengths (depending on the line diameter):

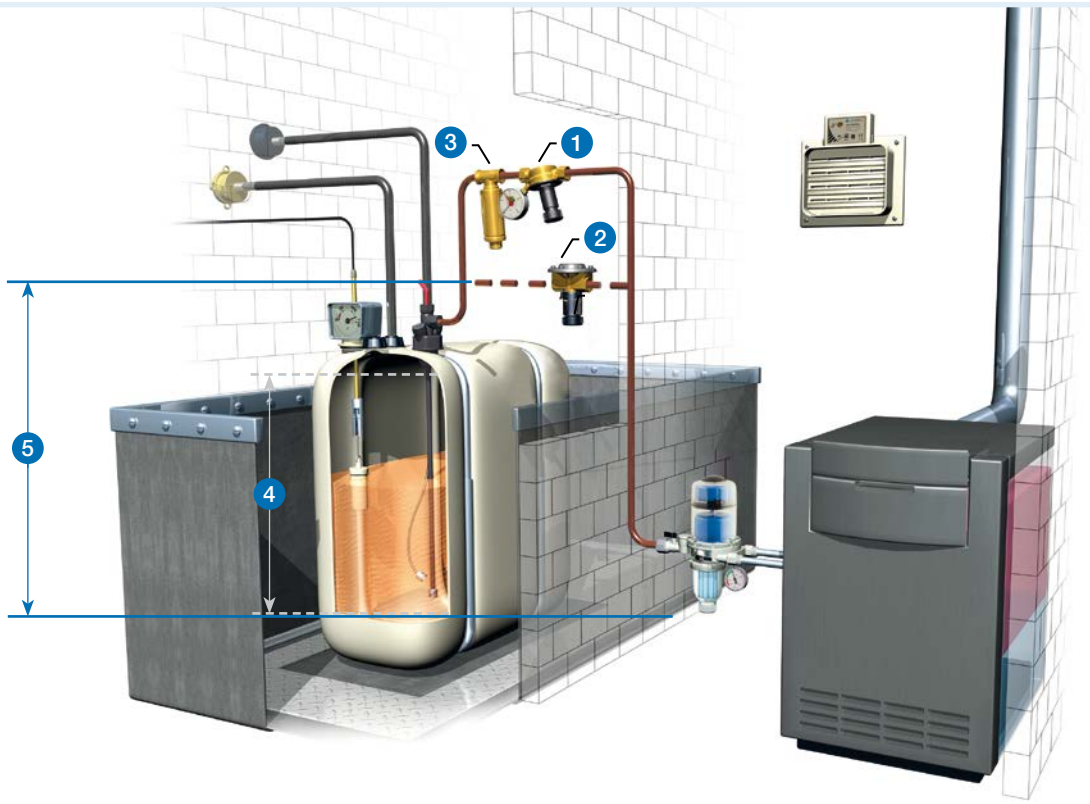
- 25.5 m ≥ Ø 8 x 1
- 14 m ≥ Ø 10 x 1
- 9 m ≥ Ø 12 x 1

Watertight up to 10 m water column.

Approval
Conformity certificate (ÜHP)
as per EN 12514

DG: G	PG	Part no.
Pressure compensation unit DAE	2	**20800**
Pull cord	1	**20475**

Safety-related equipment against siphoning: anti-siphon valves



1. Piston type anti-siphon valve KAV*
2. Diaphragm type anti-siphon valve MAV*
3. Pressure compensation unit DAE
4. For KAV: Set actual safe height
5. For MAV: Set max. height difference between MAV and the lowest line point at the system

* Mounting position (example), arrangement is variable and must be adapted to suit local conditions.

Legal and technical requirements concerning fuel oil consuming systems

Legislation for water pollution control (German Water Act WHG) stipulates that any adverse modification of the characteristics of water must be avoided. § 62 of the German Water Act specify the handling of water-polluting substances in facilities.

The regulations may be national and/or local.

In the case of oil consuming systems operating in suction mode where a pipe section is below the maximum tank level, fuel oil can be siphoned out if a leak occurs. Therefore, protection equipment against siphoning must be installed. Anti-siphon valves are used for this purpose; they are available as solenoid, diaphragm or piston type anti-siphon valves. Diaphragm or piston type anti-siphon valves are usually installed in smaller and medium sized facilities; the piston type anti-siphon valve offers a number of decisive advantages.

Depending on the applicable regulations, the valves must be approved.

Notes on installation

It must be ensured that the vacuum in the system does not exceed 0.4 bar.

Factors to be considered include:
- The maximum suction lift at minimum oil level
- The suction line length
- The viscosity of the oil in the storage tank at extreme winter temperatures
- Additional pressure losses caused by fittings (such as oil filters, shut-off valves, etc.) and lines

Piston type anti-siphon valve KAV

- Piston instead of diaphragm – for maximum safety even in case of pollution, ice or system overpressure
- Adjusted value corresponds to the safe height (reduced line resistance)
- Also for outdoor use (manhole)
- Sealed system for error-free operation
- Pressure relief mechanism in both directions

Page 169

With universal screw connections 6/8/10 mm and lead sealing kit

6

Application

For oil carrying suction lines in fuel oil consuming systems where a pipe section is below the maximum tank level. KAV keeps fuel oil from being siphoned out of the tank in the case of leaks.

Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

Description

Vacuum-controlled shut-off system with a completely new function principle. KAV is closed when the burner pump is not in operation. When the burner pump starts, a vacuum is generated in the suction line. This opens the KAV and fuel oil is pumped from the tank. If the suction line has a leak or if the burner pump stops, KAV closes and the suction line between the tank and the burner pump is closed. KAV features a pressure relief mechanism, i.e. if the fuel oil contained in the suction pipe heats up and therefore expands, KAV opens. The fuel oil can flow back into the tank, provided that a tank withdrawal fitting without backflow preventer is installed. The pressure relief is independent of the adjusted safe height and operates reliably at a response pressure as low as 300 mbar. KAV is continuously adjustable from 1–4 m. The adjusted value corresponds to the actual safe height and not the installation height (as, for example, in the case of diaphragm type anti-siphon valves). This results in reduced line resistance, which has a positive effect on the service life of the burner and the pump. KAV is designed as a sealed system. Therefore, no vent is required and water or dirt cannot get into the system. Since the sensitive diaphragm as the main actuating element has been replaced by a piston, malfunctions caused by pollution, ice or system overpressure (rupture of the diaphragm) are practically impossible. Watertight up to 10 m water column.

Technical specifications

Adjustment of safe height
Corresponds to actual safe height 1–4 m, continuously adjustable

Connection thread
$^{3}/_{8}$ female thread at both ends

Mounting position
Any

Oil flow rate
Max. 220 l/h

Operating temperature range
Medium/ambient: –25/+40 °C

Vacuum-tight
Up to –1 bar

Test pressure
Max. 10 bar

Response pressure
Pressure relief: 300 mbar

Housing material
Brass

Approval
DIBt: Z-65.50-415

Scope of delivery
Piston type anti-siphon valve with screw connector kit for pipes Ø 6, 8 and 10 mm and lead sealing kit

DG: G, PG: 2			Part no.
Piston type anti-siphon valve KAV	1	20	**20240**
Pressure gauge (–0.7/+0.9 bar) for indicating the KAV opening pressure	1	10	**70030**

Diaphragm type anti-siphon valve MAV

- **Safe height 1–4 m**
- **With shut-off and venting function**


Lead sealing kit

Page 169

6

Application

For oil carrying suction lines in fuel oil consuming systems where a pipe section is below the maximum tank level. MAV keeps fuel oil from being siphoned out of the tank in the case of leaks.

Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also suitable for use in flood hazard areas and flood risk areas.

Description

MAV is continuously adjustable to a safe height of 1–4 m for optimum adaptation to suit local conditions. The adjusted value corresponds to difference between the installation height and the lowest point of the oil line. MAV shuts off under spring pressure and opens under the vacuum caused by the pump. Watertight up to 10 m water column. If necessary, install a pressure compensation unit.

Technical specifications

Adjustment of safe height
1–4 m (corresponds to installation height), continuously adjustable

Connection thread
⅜ female thread at both ends

Mounting position
Any

Oil flow rate
Max. 220 l/h

Operating temperature range
Medium/ambient: –25/+40 °C

Vacuum
Up to –1 bar

Test pressure
Max. 6 bar

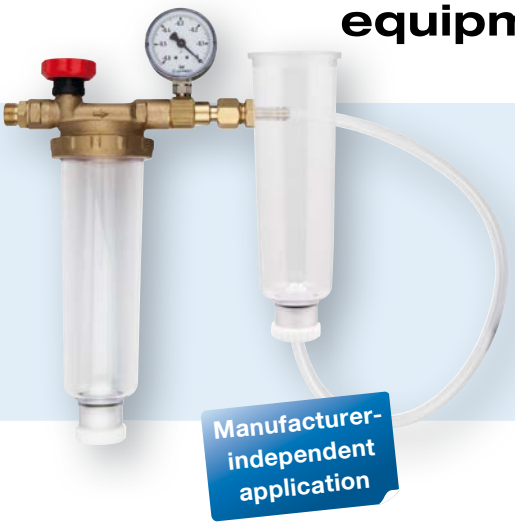
Housing material
Brass

Approval
DIBt: Z-65.50-415

Scope of delivery
Diaphragm type anti-siphon valve with lead sealing kit

DG: G	PG			Part no.
Diaphragm type anti-siphon valve MAV	2	1	20	**20139**
Screw connections with Cu flat gasket G⅜ x 6 (dual)	3	1	-	**20507**
Screw connections with Cu flat gasket G⅜ x 8 (dual)	3	1	-	**20504**
Screw connections with Cu flat gasket G⅜ x 10 (dual)	3	1	-	**20505**
Screw connections with Cu flat gasket G⅜ x 12 (dual)	3	1	-	**20506**

Tester for safety-related equipment against siphoning



- Reliable function tests of all diaphragm type/piston type anti-siphon valves
- Simple check and assessment of the system safety
- Test can be performed easily at all systems with standard filter combinations

Application

Tester for vendor-independent function tests of built-in mechanical "safety-related equipment against siphoning" (diaphragm type or piston type anti-siphon valves) in oil carrying pipes or withdrawal systems. Test can be performed at all systems with standard filter combinations. If no AFRISO filter cup with test and drain valve is available, it is sufficient to replace the existing filter cup with the filter cup of the tester. AFRISO recommends to replace all filter cups without drain valve so that the fuel oil filter can be drained rapidly and the function test performed easily during servicing. Suitable for testing fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 100 % FAME (EN 14214). Also suitable for the new paraffinic fuels HVO or GTL as an admixture or 100%.

Description

The tester for "safety-related equipment against siphoning" allows to quickly come to a sound conclusion concerning the correct operation of mechanical anti-siphon valves of third-party vendors. Mounting is simple: Screw the filter cup of the tester into the fuel oil filter of the facility (not necessary in the case of oil filter cups with test and drain system), plug the hose into the tester drain system, connect an oil suction pump to the other end of the tester and you are ready for testing. For the test, a vacuum must be generated which sucks in oil; the oil flows into the tester cup. The vacuum is maintained in the tester cup via the shut-off fitting and displayed by the pressure gauge. When no more oil flows into the tester cup, there is pressure equilibrium. The vacuum can now be read at the test pressure gauge and you can determine whether the siphoning protection works.

Technical specifications

Dimensions (W x H x D)
Tester: 180 x 286 x 71 mm
Case: 395 x 106 x 295 mm

Range
–0.6/0 bar

Connection
G⅜ with 60° cones

Operating temperature range
Ambient: –25/+40 °C
Storage: –25/+60 °C

Scope of delivery
- Tester with long filter cup
- Vacuum gauge
- Hose
- Long tester cup with drain system
- Plastic case
- Short test cup for FloCo-Top-C series

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Safety equipment against siphoning must be checked for correct operation at least every 5 years according to the approval.
Inspection certificate www.afriso.de > INFO CENTRE > Downloads

DG: G, PG: 1			Part no.
Tester anti-siphon valve	1	-	**20239**
Accessories			
Filter cup short with drain system	1	-	**20257**
Filter cup long with drain system	1	-	**20262**

Comparison of fuel oil filters

Paper filters

- Optimum ultra-fine filtration
- Specially for small and very small burner capacities
- Preferably for single-line mode

Opticlean MS-5/MC-7 ultra-fine filter
Optimum filter surface due to folded paper filter.

Mesh size
- 20–35 µm (MS-5)
- 5–20 µm (MC-7)

Filter surface: 500 cm² (MS-5)
700 cm² (MC-7)

Opticlean MC-18 ultra-fine filter
Optimum filter effectiveness and long service life.

Mesh size: 5–20 µm
Filter surface: 1,850 cm²

Can be used with long filter cup.

Replaceable filter cartridge
Excellent filtration.
Also suitable for pressure mode and temperatures of up to 80 °C.

Mesh size: 12–30 µm
Filter surface: 967 cm²

Can be used for all AFRISO filter types with additional adapter.

Sintered plastic sieves

- Excellent filtration
- For small and medium burner capacities
- Suitable for single- and dual-line mode
- Suitable for almost all standard filter combinations

Sintered plastic sieve, short
Star shape for large filter surface.

Colour code: Blue
Mesh size: 50–70 µm
Filter surface: 115 cm²

Optimum replacement characteristics:
Filter base does not swell.

Sintered plastic sieve Optimum
Excellent filtration and long service life.

Colour code: Blue
Mesh size: 50–70 µm
Filter surface: 200 cm²

Can be used with long filter cup, preferably for single-line mode.

Filter cup Optimum
Extra long filter cup provides for sedimentation volume and space for all standard, long filter inserts.

Version with drain system
- Removing the oil from the oil filter quickly
- No oil odour caused by oil dripping

Felt and stainless steel sieve

- Proven filtration technology

Felt sieve with internal tubular sieve
For medium and high burner capacities.
Suitable for single- and dual-line mode.

Mesh size: 50–75 µm
Filter surface: 15.3 cm² below the felt rings

Disadvantage: Filter fibres may come loose and get into the burner nozzles.

Stainless steel sieve
Good filtration, pollution visible. For medium and high burner capacities. Suitable for single- and dual-line mode.

Mesh size: 100 µm
Filter surface: 48 cm²

Single-line/dual-line filters for fuel oil

Dual-line filter Z 500 Si/St

Application

For dual-line systems. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

Description

Brass filter housing, filter cup made of transparent, impact-resistant plastic. With check valve in the return line and shut-off valve in the flow line. Universal compression fittings for pipes with 8/10 mm outside diameters included. Watertight up to 10 m water column.

Approval

Conformity certificate (ÜHP) as per EN 12514.

Single-line filter R 500 Si/St

For single-line systems with return line. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

Brass filter housing, filter cup made of transparent, impact-resistant plastic.
With shut-off valve in the flow line, vent valve with hose connector in the return line. Universal compression fittings for pipes with 8/10 mm outside diameters included.

Conformity certificate (ÜHP) as per EN 12514.

Single-line filter V 500 Si/St

For single-line systems. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

Brass filter housing, filter cup made of transparent, impact-resistant plastic.
With shut-off valve. Universal compression fittings for pipes with 8/10 mm outside diameters included. Watertight up to 10 m water column.

Conformity certificate (ÜHP) as per EN 12514.

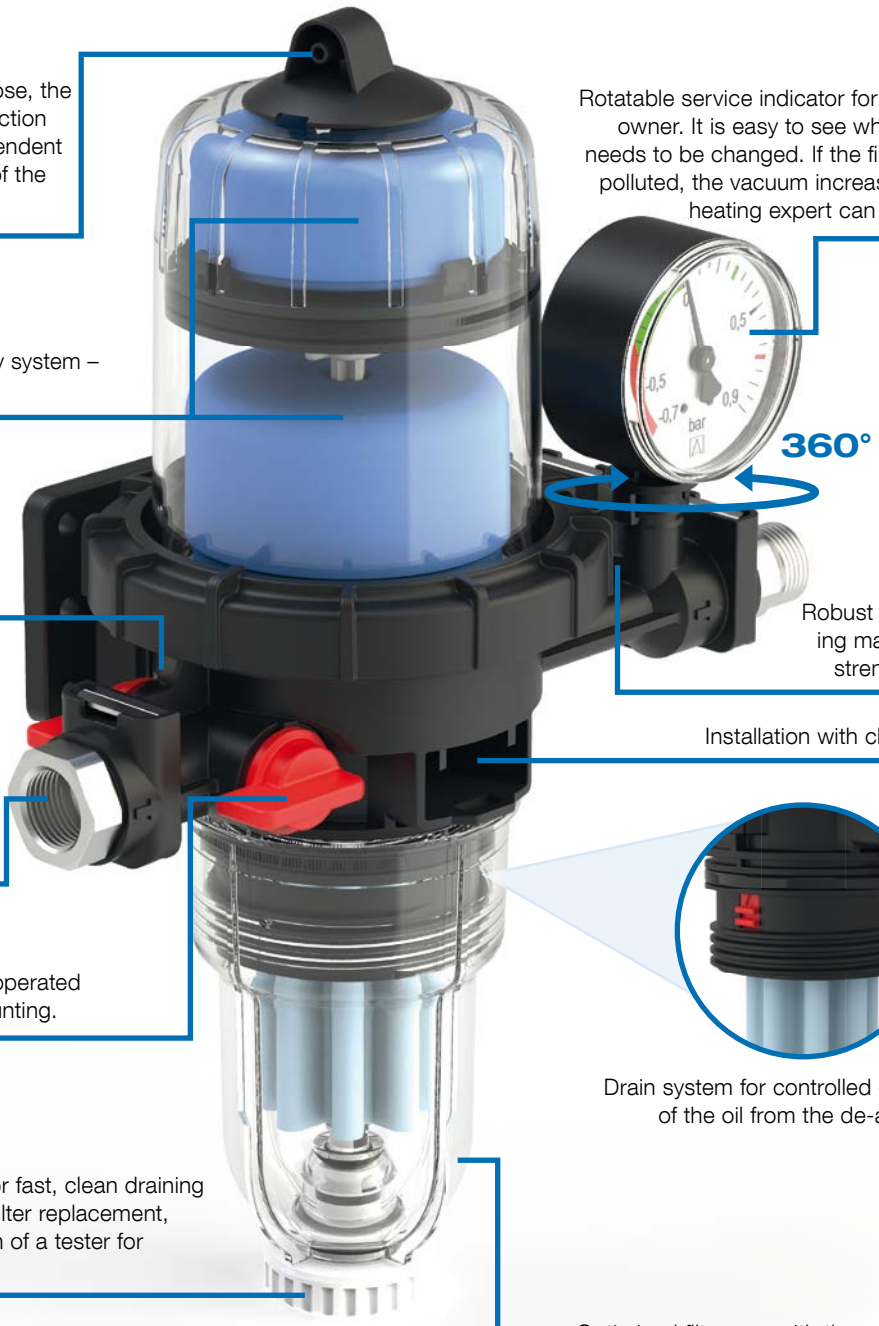
DG: G, PG: 2	Connection		Universal screw connection	Filter	* Oil throughput Δp=100 mbar			Part no.
	Tank	Burner						
Dual-line filter Z 500 Si	2 x G⅜ female	2 x G⅜ male	2 x 8/10 mm	Sintered plastic	200 l/h	1	25	**20429**
Dual-line filter Z 500 St	2 x G⅜ female	2 x G⅜ male	2 x 8/10 mm	Steel	220 l/h	1	25	**20425**
Single-line filter R 500 Si (return)	1 x G⅜ female	2 x G⅜ male	1 x 8/10 mm	Sintered plastic	210 l/h	1	20	**20281**
Single-line filter R 500 St (return)	1 x G⅜ female	2 x G⅜ male	1 x 8/10 mm	Steel	250 l/h	1	20	**20283**
Single-line filter V 500 Si	1 x G⅜ female	1 x G⅜ male	1 x 8/10 mm	Sintered plastic	250 l/h	1	25	**20292**
Single-line filter V 500 St	1 x G⅜ female	1 x G⅜ male	1 x 8/10 mm	Steel	320 l/h	1	25	**20294**
Dual-line filter Z ½-500 Si	2 x G½ female	2 x G½ female	---	Sintered plastic	310 l/h	1	25	20480
Single-line filter V ½-500 Si	1 x G½ female	1 x G½ female	---	Sintered plastic	390 l/h	1	25	20485
Single-line filter V ½-500 St	1 x G½ female	1 x G½ female	---	Steel	560 l/h	1	25	20487

* At filter insert pollution degree of 50 %.

Automatic fuel oil de-aerator
Product highlight: FloCo-Top-2CM

Advantages – your benefits

- **Reduced height facilitates installation if mounting space is limited**
- **Vacuum gauge for monitoring the system pressure and indicating when the filter needs to be replaced**
- **Proofed Barrier if installed with vent hose**
- **Suitable for use in flood hazard areas**
- **Green fuels ready: All materials resistant to biofuel and biodiesel (up to a maximum of 30 % FAME) and the new paraffinic fuels HVO and GTL**



The oil is de-aerated via the vent hose, the system remains odour-tight. Connection via supply air of the room air-independent ventilation or via the return supply of the tank withdrawal system Euroflex.

De-aerator unit with dual float safety system – keeps oil foam from escaping.

Backflow preventer with integrated pressure relief towards the tank.

Pipe connection for universal compression fitting or stand screwed connection with threaded connection G3/8.

Lateral dual shut-off valve, can be operated from both sides for left or right mounting.

Drain valve with hose connection for fast, clean draining of the oil from the filter cup during filter replacement, emergency operation or connection of a tester for tightness tests.

Rotatable service indicator for the system owner. It is easy to see when the filter needs to be changed. If the filter insert is polluted, the vacuum increases and the heating expert can be notified.

Robust base housing made of high-strength plastic.

Installation with click system.

Drain system for controlled discharging of the oil from the de-aerator unit.

Optimised filter cup with thread and radial O ring seal for easy loosening of screwed connection.

Automatic fuel oil de-aerator comparison

	Automatic fuel oil de-aerators		Automatic fuel oil de-aerators with filter				
							
Version	Flow-Control 3/K	Flow-Control 3/K HT	FloCo-Top-1K	FloCo-Top-1C	FloCo-Top-2KM Si	FloCo-Top-2 Optimum MC-18	FloCo-Top-2CM
Catalogue page	See page 174	See page 175	See page 176	See page 177	See page 178	See page 178	See page 180
Application area	Single-line systems with return line						
Media	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or bio-diesel with up to 30 % FAME ▪ HVO ▪ GTL	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or bio-diesel with up to 100 % FAME ▪ HVO ▪ GTL	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or biodiesel with up to 30 % FAME ▪ HVO ▪ GTL				
Function	Continuous de-aeration		Continuous de-aeration and oil filtration		Continuous de-aeration and multiple oil filtration		Continuous de-aeration and oil filtration
Filter	-	-	Sintered plastic filter		Sintered plastic filter	Opticlean ultra-fine filters	Sintered plastic or Opticlean filter
Vacuum gauge	-	-	-	-	-0.7/+0.9 bar		
Approval	Conformity certificate (ÜHP) as per EN 12514						

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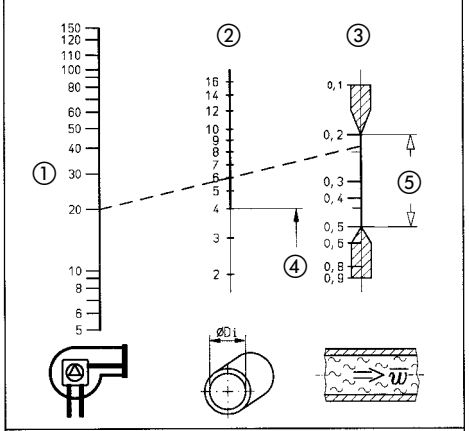
Nomograph for determining the internal pipe diameter (NW) of the fuel oil suction line in order to keep gas from accumulating in higher pipe sections and sections with downward gradients, or gas formation resulting from excessively high flow speeds.



Example: A pipe with Ø 8 x 1 mm (NW 6) is required for a volume of 20 l/h and an average flow rate of approx. 0.23 m/s.

Our tip

Installation by expert companies certified according to the applicable regulations is mandatory. For optimum combustion, longer nozzle and filter service life and reliable function, the expert determines the following prior to installation and compares the values with the nomograph:

- Oil throughput per hour at burner nozzle
- Inside diameter of the (installed) oil suction line
- Vacuum (overpressure) in the oil carrying pipe upstream of the burner

The oil suction line is often too large. The flow rates of 0.2/0.5 m/s, required according to DIN 4755, are often not reached in systems converted from dual-line to single-line mode. The nomograph shows the proper values for sizing the suction line.

① Nozzle consumption l/h
② Inside diameter of the suction line in mm
③ Flow rate of the fuel oil in m/s
④ Less than Ø 4 mm not advisable
⑤ Recommended range as per DIN 4755

Automatic fuel oil de-aerator Flow-Control 3/K

TÜV-tested

- **Trouble-free operation due to automatic de-aeration**
- **Dual float safety system keeps oil foam from escaping**
- **Increased fuel oil filter service life – the amount of oil drawn from the tank corresponds exactly to the oil actually burnt**
- **The suction line can usually have a smaller cross section**

"PROOFED BARRIER" if installed with vent hose.

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Application

For single-line systems with return line in oil-fired systems for continuous de-aeration. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also for use in flood hazard areas and flood risk areas.

The risk of a leak in the return line going unnoticed is removed with Flow-Control. It is no longer necessary to regularly check the return line for leaks.

Description

Automatic fuel oil de-aerator consisting of a diecast zinc housing with female G¼ connection thread at the tank end and male G⅜ connection threads with 60° cone at the burner end for connection of the burner hoses. Plastic or metal de-aerator hood. Flow-Control 3/K features two separate float chambers. The lower float chamber contains the operating float; the upper float chamber contains the safety float. The upper float chamber keeps oil foam from escaping via the vent opening (e.g. during commissioning/filter exchange) and indicates malfunctions of the vent valve. An oil hose with ball-shaped sealing for 60° cone and a G⅜ union nut is supplied for connection to the fuel oil filter. Watertight up to 10 m water column. All Flow-Control versions are TÜV-tested.

Flow-Control 3/K (G¼) with connections G¼ female instead of G⅜ male.

Technical specifications

Connection burner
G⅜ male with 60° cone
for burner hose or G¼ female (part no. 69978)

Connection tank
Part no. 69930:
G⅜ female with oil hose G¼ male x G⅜ female;
Part no. 69978:
G¼ female thread with oil hose G¼ male thread x G⅜ union nut for connection to filter

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium: Max. 60 °C
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Dimensions
W x H x D: 95 x 147 x 95 mm

Tests
TÜV-tested (S 556 2021 S1)

Approval
Conformity certificate (ÜHP)
as per EN 12514

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The devices must not be subjected to undiluted additives, alcohol and acids.

DG: G, PG: 1			Part no.
Flow-Control 3/K (G⅜ male)	1	-	**69930**
Flow-Control 3/K (G¼ female)	1	-	69978

Automatic fuel oil de-aerator Flow-Control 3/K HT

TÜV-tested

- **High temperature version: Up to a temperature of the medium of 80 °C**
- **Dual float safety system keeps oil foam from escaping**
- **Increased the fuel oil filter service life – the amount of oil drawn from the tank corresponds exactly to the oil actually burnt**
- **No unnoticed leakage in the return line**

"PROOFED BARRIER" if installed with vent hose.

6

Application

For single-line systems with return line in oil-fired systems for continuous de-aeration. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with up to 100 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also suitable for use in flood hazard areas and flood risk areas.

Flow Control 3/K HT is recommended for mounting below the max. fuel level in the tank and for any application requiring particular safety.

Description

Automatic fuel oil de-aerator consisting of a diecast zinc housing with female G¼ connection thread at the tank end and male G⅜ connection threads with 60° cone at the burner end for connection of the burner hoses. An oil hose with ball-shaped sealing for 60° cone and a G⅜ union nut is supplied for connection to the fuel oil filter. The de-aerator hood consists of glass-fibre reinforced plastic (not transparent), all seals are made of FKM. Flow-Control 3/K HT features two separate float chambers. The lower float chamber contains the operating float; the upper float chamber contains the safety float. The upper float chamber keeps oil foam from escaping via the vent opening (e.g. during commissioning/ filter exchange) and also indicates malfunctions of the vent valve. The risk of a leak in the return line going unnoticed is removed with the single-line system. It is no longer necessary to regularly check the return line. Also suitable for pressure mode up to 0.7 bar. Watertight up to 10 m water column.

Technical specifications

Connection burner
G⅜ male with 60° cone for burner hose

Connection tank
G¼ female or oil hose G¼ male x G⅜ union nut for connection to filter

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Seals
FKM

Operating temperature range
Medium: Max. 80 °C
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Dimensions
W x H x D: 95 x 147 x 95 mm

Tests
TÜV-tested (S 556 2021 S1)

Approval
Conformity certificate (ÜHP)
as per EN 12514

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The devices must not be subjected to undiluted additives, alcohol and acids.

DG: G, PG: 1			Part no.
Flow-Control 3/K HT	1	-	**69929**

Automatic fuel oil de-aerator FloCo-Top-1K TÜV-tested

- **Fuel oil de-aerator, filter and shut-off valve in a single, compact unit**
- **Safety system keeps oil foam from escaping**

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Application

For single-line systems with return line in oil-fired systems for continuous de-aeration. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also suitable for use in flood hazard areas and flood risk areas.

Description

Automatic fuel oil de-aerator, safety version, with integrated filter and shut-off valve. Zinc die cast housing with G⅜ female connection thread at the tank end and G⅜ male connection threads at the burner end with female cone for connection of the burner hoses. The de-aerator hood is made of transparent plastic and features two separate float chambers. The lower float chamber contains the operating float; the upper float chamber contains the safety float. The upper float chamber keeps oil foam from escaping through the vent opening. In addition, it is possible to detect malfunctions in the de-aeration system. Watertight up to 10 m water column.

Technical specifications

Connection burner
G⅜ male with 60° cone for burner hoses

Connection tank
G⅜ female

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium: Max. 60 °C
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Dimensions
W x H x D: 165 x 221 x 99 mm

Material
Housing: Zinc die cast
De-aerator hood: Transparent plastic
Filter cup: Transparent plastic

Tests
TÜV-tested (S 556 2021 S1)

Approval
Conformity certificate (ÜHP)
as per EN 12514

Scope of delivery
- Fuel oil de-aerators
- Bracket with mounting material
- Cover for connection of the vent hose

DG: G, PG: 1	De-aerator hood	Filter	Filter cup	Part no.
FloCo-Top-1K Si	Plastic	Sintered plastic sieve short, 50 µm	short	**69960**
Spare part				
Bracket FloCo-Top-1	-	-	-	**69946**

Automatic fuel oil de-aerator FloCo-Top-1C TÜV-tested

- **Fuel oil de-aerator, filter and shut-off valve in a single, compact unit**
- **Backflow preventer with integrated pressure relief towards the tank**
- **Safety system keeps oil foam from escaping**
- **Drain system for controlled discharging of the oil from the de-aerator unit**

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Application

For single-line systems with return line in oil-fired systems for continuous de-aeration. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also suitable for use in flood hazard areas and flood risk areas.

Description

Automatic fuel oil de-aerator, safety version, with integrated filter and lateral dual shut-off valve, can be operated from both sides. Housing made of high-strength plastic with backflow preventer and integrated pressure relief towards the tank. Female connection thread G⅜ and male connection thread G⅜ with female cone for connection of the burner hoses. The de-aerator hood is made of transparent plastic and features two separate float chambers.
The lower float chamber contains the operating float; the upper float chamber contains the safety float. The upper float chamber keeps oil foam from escaping through the vent opening. In addition, it is possible to detect malfunctions in the de-aeration system. Watertight up to 10 m water column.

Technical specifications

Connection burner
G⅜ male with 60° cone for burner hoses

Connection tank
G⅜ female

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium: Max. 60 °C
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Dimensions
W x H x D: 185 x 224 x 109 mm

Material
Housing: Plastic
De-aerator hood: Transparent plastic
Filter cup: Transparent plastic

Tests
TÜV-tested (S 556 2021 S1)

Approval
Conformity certificate (ÜHP)
as per EN 12514

Scope of delivery
- Fuel oil de-aerators
- Bracket with mounting material
- Cover for connection of the vent hose

DG: G, PG: 1	De-aerator hood	Filter	Filter cup	Part no.
FloCo-Top-1C Si	Plastic	Sintered plastic sieve short, 50 µm	short	**70155**
Spare parts				
Bracket FloCo-Top-2/-1C/-2C			-	**70127**
Filter cup FloCo-Top-1C/-2C			short	**20277**

Automatic fuel oil de-aerator FloCo-Top-2 TÜV-tested

- **Multiple filtration for maximum separation of dirt particles**
- **Backflow preventer with integrated pressure relief towards the tank**
- **Drain valve for fast and clean filter change**
- **Bypass valve for easy and clean burner hose replacement**

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Application

For single-line systems with return line in oil-fired systems for continuous de-aeration. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also suitable for use in flood hazard areas and flood risk areas. FloCo-TOP-2 can be installed in any system. Multiple filtration is recommended for burners with an oil consumption of < 20 l/h while larger systems should be operated with single filtration.

Description

Automatic fuel oil de-aerator, safety version, with integrated filter, shut-off valve and vacuum gauge. Housing with changeover valve for multiple filtration as well as backflow preventer with integrated pressure relief towards the tank. Compact de-aerator hood made of transparent plastic with dual float safety system to keep oil foam from escaping via the de-aerator opening. The vent hose is connected at the side in an unobtrusive way. For venting, the oil is guided via the float chamber and can then be added directly to the flow or it can be filtered again by switching a valve. In the case of multiple filtration, the return oil increases the flow rate so that the filter bowl is permanently filled with de-aerated oil. In service mode, the vacuum gauge indicates the pump vacuum. The suction capacity of the burner pump can be checked with closed shut-off valve. Increased vacuum provides information on the degree of pollution of the filter. The drain valve ensures that replacing the filter is easy and clean: Connect the hose, open the drain valve, loosen the union nut of the filter cup and drain the oil in a controlled way. When the burner hose needs to be replaced, it is sufficient to open a bypass valve so that the oil is drained from the float chamber via the filter cup and the drain system. Watertight up to 10 m water column.

Technical specifications

Connections burner
G⅜ male with 60° cone for burner hoses

Tank connection
G⅜ female

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
> 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium/ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Vacuum gauge
Range: –0.7/+0.9 bar

Dimensions (W x H x D)
Short cup: 183 x 254 x 103 mm
Long cup: 183 x 348 x 103 mm

Material
Housing: Zinc die cast
De-aerator hood: Transparent plastic
Filter cup: Transparent plastic

Tests
TÜV-tested (S 556 2021 S1)

Approval
Conformity certificate (ÜHP)
as per EN 12514

Scope of delivery
- Fuel oil de-aerators
- Universal screw connections for pipes Ø 6/8/10 mm
- Bracket with mounting material
- Cover for connection of the vent hose
- Drain hose

Automatic fuel oil de-aerator FloCo-Top-2 TÜV-tested

DG: G, PG: 1		Filter	Filter surface			Part no.
	**FloCo-Top-2KM Si**	Sintered plastic sieve short, 50 µm	115 cm²	1	-	**70110**
	**FloCo-Top-2KM Optimum Si**	Sintered plastic sieve Optimum, 50 µm	200 cm²	1	-	**70115**
	**FloCo-Top-2KM MC-7**	Opticlean MC-7 short, 5–20 µm	700 cm²	1	-	**70112**
	**FloCo-Top-2KM Optimum MC-18**	Opticlean MC-18 long, 5–20 µm	1,850 cm²	1	-	**70114**
Spare parts			PG			
	**Vacuum gauge**	-0.7/+0.9 bar	2	1	10	**70030**
	**Bracket** for FloCo-Top-2/-1C/-2C	-	1	1	-	**70127**

Automatic fuel oil de-aerator FloCo-Top-2CM TÜV-tested

- Backflow preventer with integrated pressure relief towards the tank
- Drain system and drain valve for fast and clean filter change
- Pressure gauge as service indicator (system pressure / filter change)

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Application

For single-line systems with return line in oil-fired systems for continuous de-aeration. Suitable for fuel oil EL (DIN 51603-1), diesel fuel (EN 590), liquid fuels as per DIN SPEC 51603-6 and DIN/TS 51603-8 as well as biofuel and biodiesel with a maximum of 30 % FAME (EN 14214). This product is therefore ideal for all ecologically upgraded fuel oil consuming systems that use the new paraffinic fuels HVO or GTL as an admixture or 100 %. Also suitable for use in flood hazard areas and flood risk areas.

Description

Automatic fuel oil de-aerator, safety version, with integrated filter and lateral dual shut-off valve, can be operated from both sides, with vacuum gauge. Housing made of high-strength plastic with backflow preventer and integrated pressure relief towards the tank. Compact de-aerator hood made of transparent plastic with dual float safety system to keep oil foam from escaping via the de-aerator opening. For venting, the oil is guided via the float chamber and can then be added directly to the flow. In service mode, the vacuum gauge indicates the pump vacuum. The suction capacity of the burner pump can be checked with closed shut-off valve. Increased vacuum provides information on the degree of pollution of the filter. The drain system and the drain valve ensure that replacing the filter and burner hoses is easy and clean: Connect the hose, open the drain valve and drain the oil in a controlled way. Watertight up to 10 m water column.

Technical specifications

Connections burner
G⅜ male with 60° cone for burner hoses

Connection tank
G⅜ female

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
> 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium/ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Vacuum gauge
Range: –0.7/+0.9 bar

Dimensions (W x H x D)
Short cup: 185 x 253 x 109 mm
Long cup: 185 x 341 x 109 mm

Material
Housing: Plastic
De-aerator hood: Transparent plastic
Filter cup: Transparent plastic

Tests
TÜV-tested (S 556 2021 S1)

Approval
Conformity certificate (ÜHP)
as per EN 12514

Scope of delivery
- Fuel oil de-aerators
- Universal screw connections for pipes Ø 6/8/10 mm
- Bracket with mounting material
- Cover for connection of the vent hose
- Drain hose

DG: G, PG: 1	Filter	Filter cup	Part no.
FloCo-Top-2CM Si	Sintered plastic sieve short, 50 µm	short	**70156**
FloCo-Top-2CM Optimum MC-18	Opticlean MC-18 long, 5–20 µm	Long	**70158**
FloCo-Top-2CM MS-5	MS-5 short, 20–35 µm	short	**70159**
Spare parts			
Vacuum gauge, –0.7/+0.9 bar		-	**70034**
Bracket FloCo-Top-2/-1C/-2C		-	**70127**

Spare parts for filters

DG: G	Description		PG			Part no.
	**Opticlean MC-7*** Ultra-fine filter 5–20 µm, short, filter surface: 700 cm²		1	1	240	**20319**
	Opticlean MC-18* Ultra-fine filter 5–20 µm, long, filter surface: 1,850 cm²		1	1	120	**20318**
	**Opticlean MS-5*** Ultra-fine filter 20–35 µm, short, filter surface: 500 cm²		1	-	25	**20308**
	**Replaceable filter cartridge** Mesh size: 12–30 µm, filter surface: 967 cm²		3	1	-	**70010**
	**Adapter replaceable filter cartridge** to AFRISO oil filter and FloCo-Top-1K/-2KM		1	1	-	**70020**
	**Sintered plastic sieve short, 50–70 µm blue** Filter base ABS white Box of 25 pieces		1	-	25	**20045**
	Sintered plastic sieve Optimum, 50–70 µm blue Filter base ABS white		1	-	10	**20053**
	**Felt sieve** individually packed in bag that can be closed, in box of 25 pieces		1	-	25	**20034**
	**Stainless steel sieve 100 µm** Box of 250 pieces		1	1	250	**20032**
	**Filter cup** Plastic, for suction mode for oil filter and FloCo-Top-1K/-2KM	**Short**	1	1	10	**20254**
		Short with drain valve and transparent drain hose Ø 6 x 500 mm	1	1	-	**20257**
	Filter cup Plastic, for suction mode for oil filter and FloCo-Top-1K/-2KM	**Optimum**	1	1	10	**20258**
		Optimum with drain valve and transparent drain hose Ø 6 x 500 mm	1	1	-	**20262**
	**Filter cup, brass** for pressure mode, without union nut. For oil filter and FloCo-Top-1K/-2KM		1	1	-	**20261**
	**O ring for filter cup** for oil filter and FloCo-Top-1K/-2KM		1	-	10	**20422**
	**Filter cup FloCo-Top-1C/-2C**					**20277**
	**Filter cup with drain valve FloCo-Top-1C/-2C**					**20288**
	**Filter cup Optimum with drain valve FloCo-Top-1C/-2C**					**20289**
	**O ring for filter cup** for FloCo-Top-C		1	10	-	**20267**

i

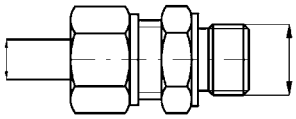
* The filter surface of **Opticlean ultra-fine filters** is up to 37 times greater than that of conventional filter inserts; they excel with an extremely high degree of filtration. Filter fineness of nominal 5 µm (absolute 20 µm) separation is possible.

Even the smallest drops of water and emulsion are retained with high reliability. Opticlean filter cartridges can be used in any standard fuel oil filter, they are metal-free and can be recycled in an environmentally protective way.

Accessories for fuel oil de-aerators/oil filters

Screw connections

Description For installation in the oil pipe. See ordering table for versions.



Screw connection

Vacuum gauge

Description For indication of the filter condition. Available for direct mounting to standard fuel oil filters. G⅜-union nut at filter end, G⅜ male thread with sealing cone 60° for burner hose. Or with G⅜ female thread x G⅜ male thread for mounting to filter with G⅜ female thread. Suitable for use in flood hazard areas. Watertight up to 10 m water column.

Vacuum gauge

Replaceable filter adapter

Description The replaceable fine filter cartridge can be fitted to all AFRISO filter types (except Z ½-500 and V ½-500) by means of an adapter and can then be operated both in pressure and suction mode.

Replaceable filter adapter

Oil filter spanner

Description To loosen the union nut of the filter cup of oil filters and automatic fuel oil de-aerators FloCo-Top-K und FloCo-Top series (not suitable for replaceable filter cartridge, part no. 70010).

Open end spanner

Description For easy and fast operation of the replaceable filter adapter.

Oil filter spanner Open end spanner

Hand-held suction pump for fuel oil

Description For commissioning and after problems in the suction pipe system. With check valve/vent valve.

Hand-held suction pump for fuel oil

DG: G	PG			Part no.
Screw connection G⅜ x 6 mm	3	1	-	**20509**
Screw connection G⅜ x 8 mm	3	1	-	**20508**
Screw connection G⅜ x 10 mm	3	1	-	**20510**
Screw connection G⅜ x 12 mm	3	1	-	**20512**
Vacuum gauge G⅜ with 60° cone, -0.7/+0.9 bar	2	1	-	**20400**
Hand-held suction pump for fuel oil, with hose	1	1	-	**70058**
Replaceable filter adapter	2	1	10	**70020**
Open end spanner for replaceable filter adapter	3	1	-	**70065**
Oil filter spanner	1	1	-	**70061**

Pump assemblies for heating and solar thermal systems

Boiler safety group assemblies

Safety equipment for heating systems

Motorised boiler room vent

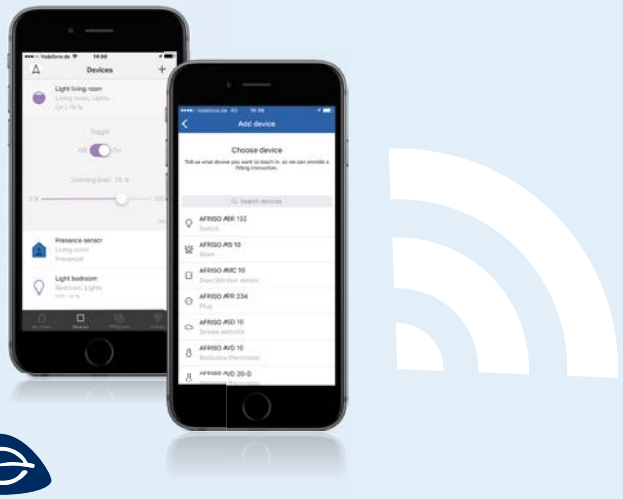
CHAPTER 7

Equipment for heating systems, boiler rooms and chimneys

Equipment for safe operation of heating systems

AFRISO offers a broad range of products for the safe operation of heating systems. Irrespective of whether the heating system uses renewable energy or fossil fuels.

Anti-siphon valves, withdrawal systems, level sensors, leak detectors and overfill prevention systems increase the safety of fuel oil storage facilities. Boiler safety group assemblies, solar and heating pump assemblies, connection assemblies for expansion vessels, anti-tamper cap valves, boiler safety group assemblies, diaphragm safety valves, control thermostats, thermal safety valves and boiler water low level alarms are provided as equipment for heating systems.



enocean®

The EnOcean® wireless technology allows you to easily integrate alarm units and sensors into building automation systems and operate them conveniently via smartphones or tablets.

AFRISO products in a heating system with oil burner and solar thermal system

1. Motorised boiler room vent Air-Control
2. Water valve for wireless control WaterControl 01
3. Wireless conductivity water sensor WaterSensor BWS
4. Water filter WAF 04-R
5. Boiler safety group assembly BFK 12
6. Solar pump assembly PrimoSol® 130-4
7. Collector tank for solar liquid
8. Heating pump assembly PrimoTherm®
9. Boiler water low level alarm WMS-WP6
10. Boiler safety group assembly KSG
11. Sludge separator
12. Air separator
13. Connection assembly for expansion vessel GAK
14. Automatic fuel oil de-aerator FloCo-Top-2CM
15. Piston type anti-siphon valve KAV
16. Tank contents gauge MT-Profil
17. Level sensor GWG with metallised sleeve
18. Withdrawal system Euroflex
19. Vent cap
20. Level sensor filler cap and GWG level sensor fitting for wall mounting type 905
21. Oil/water alarm unit OM 5
22. Digital tank contents indicator DTA 20 E (wireless)
23. Pneumatic level indicator for water
24. Pull cord

Oil tank conversion kits

25 Calmed inlet

26 Manhole cover

27 Cartridge filter

28 Rainwater inner lining AR-SM

29 Combination block for compact radiator with valve VarioQ Kombi

30 Thermostat control head 323

31 Indoor siren AIS 10

32 Single room temperature controller CosiTherm® wireless

33 Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP with dynamic control valve

34 Room air monitoring: CO_2 measuring instrument CM 10

35 Battery-less wireless water alarm unit WaterSensor eco

36 Wireless room temperature sensor FT

37 Wireless rocker FT4F-rw

38 AFRISOhome gateway HG 02

39 Wireless heat detector AHD 10

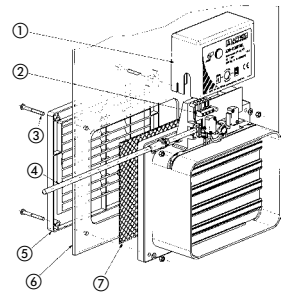
40 Thermostat combination block Vario THK

41 Wireless smoke alarm ASD 10

42 Air separator combination Solar LKS

Motorised boiler room vent Air-Control

- Saves heating costs, is reliable and silent
- System or room cannot cool down
- Sturdy, impact-resistant plastic
- Complete with accessories for easy installation



① Hood PC
② Terminal block
③ Fixing screw
④ Connection cable (4-core)
⑤ Protective grille
⑥ Window/wall (on site)
⑦ Insect protection Stainless steel mesh

Application

Suitable for installation in basement windows or ventilation ducts for burner-controlled oxygen supply of boiler rooms with oil and gas-fired burners of up to 50 kW. System or room cannot cool down.

Description

Burner-controlled motorised boiler room vent, consisting of a robust, impact-resistant plastic housing with injection-moulded mounting flange, a mating flange with a protective grille and a gear motor for actuating the slide. Can also be operated manually; with function indication.
Boiler rooms which are equipped with oil- or gas-fired burners must be supplied with a sufficient amount of oxygen (e.g. in accordance with the German FeuVo). This is often achieved by constantly open boiler room windows or by inlet air ducts. The cold air which constantly flows into the boiler room causes the boiler and the water supply as well as the pipes to cool down. As a result, the burner is switched on more frequently and consumes unnecessarily high amounts of fuel.
Air-Control is mounted onto the pane and is electrically connected to the boiler thermostat. Air-Control can also be mounted onto air ducts. The window remains closed and keeps the warmth inside. As soon as the boiler temperature drops, the boiler thermostat switches on Air-Control. Opening the vent activates a microswitch which closes the burner circuit. The burner starts to operate only when the motorised boiler room vent is open and is supplied with pre-warmed ambient air in the ignition phase. The motorised boiler room vent remains open during the entire combustion process and provides the boiler room with enough fresh air. The burner switches off when the preset temperature is reached. Air-Control closes automatically.

Technical specifications

Housing
Plastic (ABS)
W x H x D: 260 x 300 x 115 mm
Weight: 1.0 kg
Degree of protection: IP 20 (EN 60529)

Installation opening
216 x 166 mm

Cross section fresh air supply
150 cm²

Supply voltage
AC 230 V

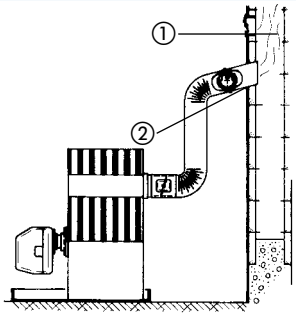
Contact rating
AC 250 V, 2 A

Burner capacity
Max. 50 kW. For larger installations, several motorised boiler room vents can be installed.

DG: G, PG: 1	Part no.
Air-Control	**69964**

Draft stabiliser WZB-1

- **Saves heating costs, optimises combustion and keeps the chimney draft constant**
- **Stabilises the chimney draft**
- **For oil, gas or solid fuel systems**



① "Chimney connection" always above flue connection
② "Flue gas connection" with pipe connection piece

Application

The draft stabiliser for oil, gas or solid fuel systems keeps chimney draft constant and the chimney dry. Suitable for connection to flue gas pipes with Ø 120 to 200 mm by means of pipe connection pieces or to brickwork chimneys or chimneys with several walls by means of special connection pieces.

Description

Draft stabiliser made of galvanised sheet steel with flap. The flap is set on site by means of a rotary knob acting on a weight for precise adjustment. Depending on the adjustment of the weight, the flap admits more or less secondary air into the chimney when the vacuum gets too high.

The natural chimney draft is approx. 20 to 50 Pa, depending on the height and the cross section of the chimney as well as the weather conditions. These values increase when the temperature increases. The draft stabiliser allows for setting the vacuum required by the manufacturer of the heating system (oil or gas burner/boiler combination, oil or gas furnace, etc.) and keeps this vacuum almost constant. Correct chimney draft is a prerequisite for an optimum combustion process and contributes to a reduction in heating costs.

The draft stabiliser performs the following functions:
- It limits the vacuum to the required value
- It keeps the chimney dry and prevents soot deposits

Technical specifications

Adjustment range (draft requirements):
10/26 Pa

Application area
Heights of up to 20 m and chimney group i/II up to 400 cm^2, chimney group III up to 500 cm^2

Operating temperature range
Flue gas: Max. 400 °C

Mounting position
Flap axis horizontal
Flap vertical

Tightness at Δp 10 Pa
< 3 m^3/h

DG: G, PG: 3			Part no.
Draft stabiliser WZB-1	1	-	**69760**
Mounting sleeves			
Chimney sleeve for WZB-1	1	-	**69761**

Boiler water low level alarm WMS-WP6 – mechanical

- For protection of the boiler when the water level is too low
- TÜV-tested as a water level limiter
- Direct mounting via welding socket or connection thread
- With Test key for function test

Version with connection thread R2 AG

Application

For sealed heating systems to protect the boiler as per EN 12828 in the case of low water levels.

Description

Mechanical boiler water low level alarm with float. Consisting of a cast brass body with welding sockets and a float mechanism, an electrical switch, test and unlock buttons. TÜV-tested as a water level limiter. If the water level in the boiler drops below a minimum level, a float activates a switch. The power supply to the boiler is interrupted. A locking mechanism keeps the burner from switching back on automatically. The Test key allows the float to be lowered to simulate a low water alarm condition.

Version WMS-WP6-R2 with male connection thread R2 for direct installation in the boiler.

Technical specifications

Operating temperature range
Medium: Max. 120 °C
Ambient: Max. 70 °C

Housing
Cast brass
Height: 358 mm
Degree of protection: IP 54 (EN 60529)

Float
Plastic

Connection
Welding socket DN 20
or male thread R2

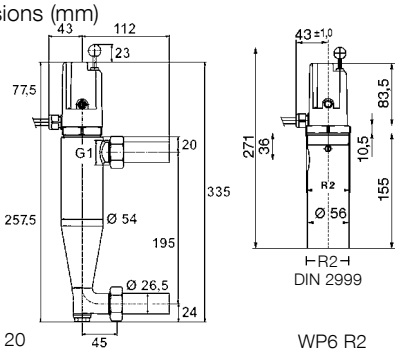
Operating pressure
Max. 10 bar

Test pressure
15 bar

Contact rating
AC 250 V, 6 (2) A

Type approval mark
TÜV.WBH.yy-232
"yy" represents the year of the approval

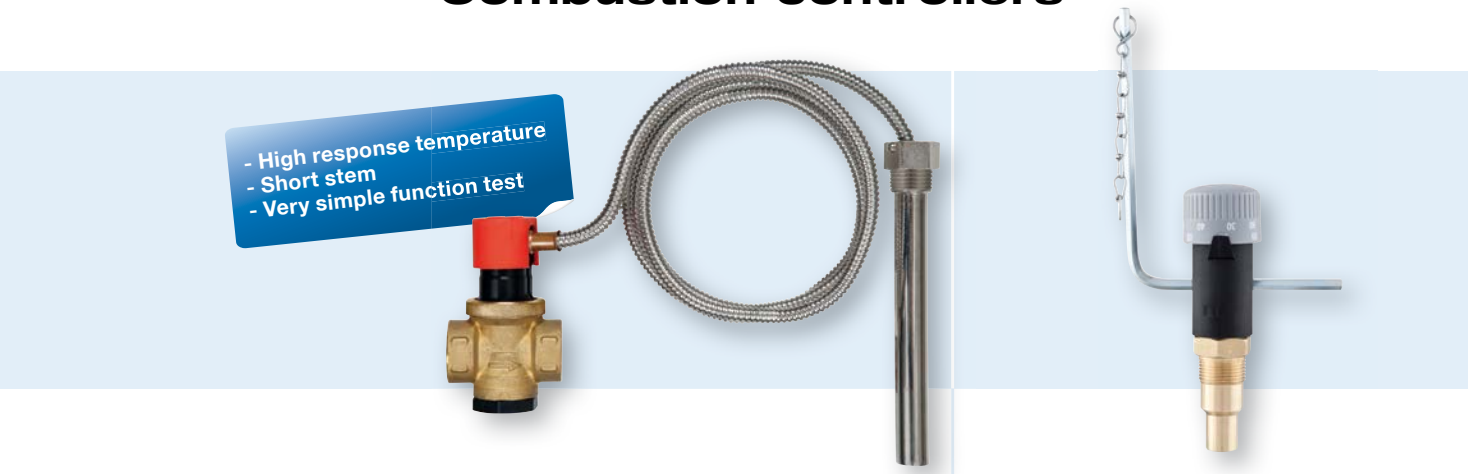
Dimensions (mm)



i According to EN 12828, sealed heating systems with capacities of more than 300 kW must be equipped with a TÜV-tested boiler water low level alarm.

DG: G, PG: 2			Part no.
WMS-WP6 with welding socket DN 20	1	-	**42300**
WMS-WP6 without locking, with welding socket DN 20	1	-	**42305**
WMS-WP6-R2 with connection thread R2 male	1	-	**42319**
Spare parts			
Upper part WMS-WP6 with locking	1	-	**42310**
Upper part WMS-WP6 without locking	1	-	**42311**
Probe body for WMS-WP6 DN 20	1	-	**42368**

Thermal safety valve
Combustion controllers



Thermal safety valve TAS 03

Application

To protect sealed or open solid fuel heating systems as per EN 12828 with a heating capacity of up to 86,000 kcal. Also required for dual-fuel boilers which can be operated with solid fuels.

Description

Thermal safety valve with two independent sensor systems. TAS consists of a valve housing, a valve, two independent bellow type displacement probes with liquid-filled temperature probes and a pocket. The capillary tube is protected by a flexible metal hose. TAS is connected to the water outlet of the water heater or to the inlet of the safety heat exchanger. If the response temperature is exceeded, the valve is opened by the thermal probe and cooling water is supplied to keep the system from exceeding the maximum operating temperature. Correct operation of TAS can be verified quickly and easily by simply pressing the valve head.

Technical specifications

Operating pressure: Max. 10 bar

Operating temperature range: Ambient: 80 °C

Response temperature: 99 °C

Blow-off capacity
At 110 °C and Δp = 1 bar > 2.4 m³/h

Connections: 2 x G¾ **female thread**

Connection stem: G½ male thread

Dimensions
Pocket length: 146 mm
Capillary tube length: 1,300 or 4,000 mm

Housing: Hot-pressed brass

Combustion controller FR 1

For temperature-dependent adjustment of the air supply damper of solid fuel and dual-fuel boilers.

Installation option FR 1

1 Chain
2 Air supply damper

The FR 1 combustion controller controls the combustion air supply. The temperature in the heat generator is detected by an integrated thermostat. The thermostat is connected to the air supply damper by means of a lever and a chain.
The air supply is controlled by means of opening or closing the air supply damper, depending on the boiler flow temperature.

Control range: 30/90 °C

Operating temperature range
Medium: Max. 115 °C
Ambient: Max. 70 °C (at switching button)

Connection: G¾

Dimensions: Stem length: 53 mm, chain length: 1.2 m

Chain load: 100 to 600 g

Mounting position: Horizontal or vertical

Materials
Housing: Plastic
Stem: Brass
Lever/chain: Galvanised steel

DG: G, PG: 2			Part no.
Thermal safety valve TAS 03, capillary tube 1.3 m	1	-	**42415**
Thermal safety valve TAS 03, capillary tube 4 m	1	-	**42418**
Screw connection for TAS 03 (1 piece)	1	20	**42450**
Pocket G½ for TAS 03	1	10	**42449**
Combustion controller FR 1	1	10	**42294**

i See chapter 14 for the complete range of temperature measuring instruments and controllers.

Automatic quick air vents PrimoVent

AQUA STOP

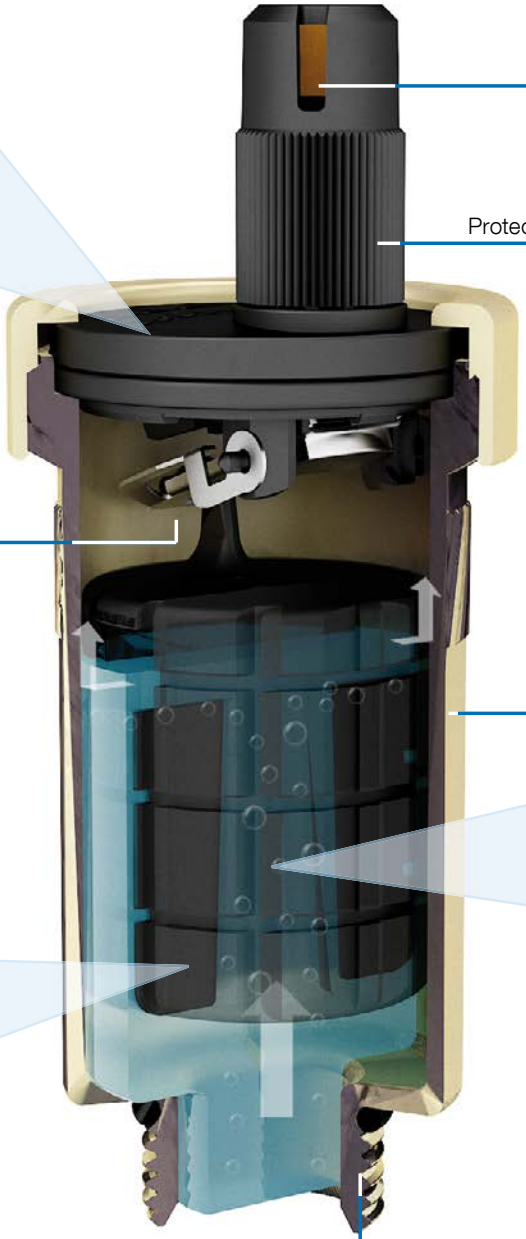
Air in the system is a frequent cause of malfunctions of heating, cooling and solar systems. The cause of "air in the system" should be able to removed. However, there are no systems that are always 100 % tight. The AFRISO PrimoVent product family continuously and automatically removes air from heating and solar systems, thus helping to avoid corrosion caused by air and inclusion of air in systems. AFRISO quick air vents are available as brass, plastic or hybrid versions and are always subjected to a 100 % function test prior to shipment.

Universal application for water and water-glycol mixtures (max. 50 % glycol)

Cover with patented nozzle geometry: The slot-shaped vent opening provides for a high venting capacity.

Integrated aqua stop for reliable operation without water leakage. The protective cap does not need to be removed even during initial filling or maintenance.

Protective cap for vent, cannot be lost.



Multifunctional lever for dependable opening and closing of the valve – directly connected to the float so that disconnection is not possible.

Slim design for low heat loss – ideal for installations where space is limited.

Two-way venting principle: separated air escapes via the central hole in the float in a defined way without taking along water.

Optimised float geometry for minimum capillary effect – avoids the formation of an air cushion to suppress undefined "jumps" of the float.

Depending on the version: Brass or plastic connection, G⅜ or G½ with O ring seal.

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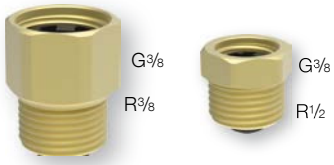
Mounting valves for quick air vents ensure easy, fast installation. Dismounting is possible at any time without draining the system.



Quick air vent PrimoVent

Quick air vent 12 bar

Application
For automatic venting of sealed heating systems as per EN 12828. Suitable for up to 12 bar/110 °C for water and water/glycol mixtures with up to 50 % glycol.

Description
Automatic quick air vent with mounting valve and aqua stop. The vent cap does not have to be removed during operation of the quick air vent, not even for initial filling or servicing. Its high, narrow design is perfect in terms of appearance and function. Self-sealing connection thread.

Technical specifications

Connection
G⅜ or G½

Operating temperature range
Max. 110 °C

Nominal pressure
Max. 12 bar

Housing
Brass

Cover
Glass-fibre reinforced plastic

Union ring
Brass

Angled quick air vent 12 bar

For automatic venting of radiators. Suitable up to 12 bar/110 °C for water and water/glycol mixtures with up to 50 % glycol.

Automatic quick air vent with aqua stop. The vent cap does not have to be removed during operation of the quick air vent, not even for initial filling or servicing.

Connection
R½ as per DIN 3858

Operating temperature range
Max. 110 °C

Nominal pressure
Max. 12 bar

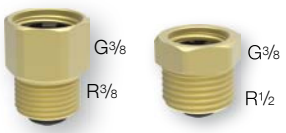
Housing
Brass, nickel-plated

Cover
Glass-fibre reinforced plastic

Union ring
Brass, nickel-plated

i

Mounting valves as accessories for quick air vents:



DG: G, PG: 2	Mounting valve			Part no.
Quick air vent G⅜	R⅜	1	25	**77700**
Quick air vent G⅜	R½	1	25	**77706**
Quick air vent G⅜	Without	1	25	**77710**
Quick air vent G½	Without	1	25	**77752**
Angled quick air vent R½, with aqua stop	Without	1	10	**77753**
Accessories				
Mounting valve R⅜ x G⅜		–	25	77720
Mounting valve R½ x G⅜		–	25	77723

Quick air vent PrimoVent

Plastic quick air vent

Quick air vent Hybrid

Application

For automatic venting of sealed heating systems as per EN 12828. Suitable for water and water/glycol mixtures with up to 50 % glycol.

For automatic venting of sealed heating systems as per EN 12828. Suitable for water and water/glycol mixtures with up to 50 % glycol.

Description

Automatic quick air vent made of high-grade glass-fibre reinforced plastic, with aqua stop. The vent cap does not have to be removed during operation of the quick air vent, not even for initial filling or servicing. Its high, narrow design is perfect in terms of appearance and function. Sealing by means of O ring. Mounting valves available as accessories.

Automatic quick air vent made of high-grade glass-fibre reinforced plastic, with aqua stop. The vent cap does not have to be removed during operation of the quick air vent, not even for initial filling or servicing. Its high, narrow design is perfect in terms of appearance and function. Sealing by means of O ring. Mounting valves available as accessories.

Technical specifications

Connection
G⅜ or G½ with O ring

Operating temperature range
Depending on nominal pressure
Max. 95/120 °C
See operating instructions

Nominal pressure
At 95 °C: Max. 8 bar
At 120 °C: Max. 3.5 bar

Housing
Glass-fibre reinforced plastic

Latching ring
Glass-fibre reinforced plastic

Connection
G⅜, brass with O ring

Operating temperature range
Depending on nominal pressure
Max. 95/120 °C
See operating instructions

Nominal pressure
At 95 °C: Max. 8 bar
At 120 °C: Max. 3.5 bar

Housing
Glass-fibre reinforced plastic

Latching ring
Glass-fibre reinforced plastic

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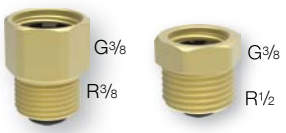
Mounting valves as accessories for quick air vents:



DG: G	Mounting valve	PG			Part no.
Plastic quick air vent G⅜	Without	1	1	25	**77766**
Plastic quick air vent G½	Without	1	1	25	**77761**
Quick air vent Hybrid G⅜	Without	1	1	25	**77729**
Quick air vent Hybrid G⅜	R⅜	1	1	25	**77730**
Accessories					
Mounting valve R⅜ x G⅜		2	–	25	77720
Mounting valve R½ x G⅜		2	–	25	77723

Boiler safety group assemblies KSG

KSG Mini – 2.5 bar/3 bar

Application

For sealed heating systems as per EN 12828 with a capacity of up to 50 kW.

Description

Complete, pre-assembled, tightness-tested boiler safety group assembly, lightweight design. Consisting of carrier, pressure gauge for indicating the system pressure, quick air vent and diaphragm safety valve MS, including form-fit heat insulation. With self-sealing mounting valve for easy replacement of the quick air vent.

Technical specifications

Connection boiler
G1 female thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 147 x 140 x 70 mm

Heat insulation
Polystyrene EPS

Carrier
Brass

Diaphragm safety valve MS
Inlet x outlet: G½ x G¾
Seal: EPDM sealing ring
Response pressure: 2.5 bar or 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 50 mm – with plug connection bottom back

Quick air vent with aqua stop
Inlet: G⅜
Nominal pressure: 12 bar

KSG – 3 bar

For sealed heating systems as per EN 12828 with a capacity of up to 50 kW.

Complete, pre-assembled, tightness-tested boiler safety group assembly. Consisting of carrier, pressure gauge for indicating the system pressure, quick air vent with aqua stop and diaphragm safety valve MS, including form-fit heat insulation. With self-sealing mounting valve for easy replacement of the quick air vent.

Connection boiler
G1 female thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 183 x 144 x 70 mm

Heat insulation
Expanded polypropylene EPP

Carrier
Brass

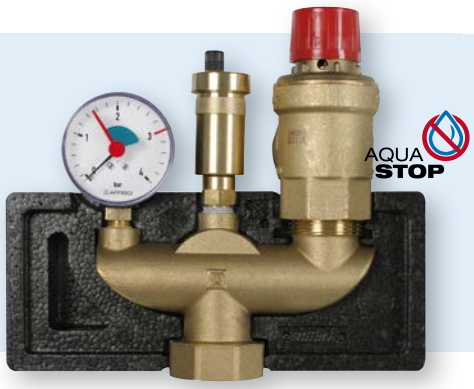
Diaphragm safety valve MS
Inlet x outlet: G½ x G¾
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 63 mm – G¼ bottom

Quick air vent with aqua stop
Inlet: G⅜
Nominal pressure: 12 bar

DG: G, PG: 2	kW	bar	Connection	Heat insulation			Part no.
KSG Mini, 2.5 bar	Max. 50	2.5	G1	Yes	1	10	**77351**
KSG Mini, 3 bar	Max. 50	3	G1	Yes	1	10	**77350**
KSG	Max. 50	3	G1	Yes	1	10	**77938**
Spare parts							
Pressure gauge for KSG Mini, 3 bar	–	3	Plug connection	–	1	–	**77352**
Pressure gauge for KSG Mini, 2.5 bar	–	2.5	Plug connection	–	1	–	**77353**

Boiler safety group assemblies KSG



KSG Maxi – 3 bar

Application

For sealed heating systems as per EN 12828 with a capacity of up to 100 kW.

Description

Complete, pre-assembled, tightness-tested boiler safety group assembly. Consisting of carrier, pressure gauge for indicating the system pressure, quick air vent with aqua stop and diaphragm safety valve MS, in form-fit heat insulation. With self-sealing mounting valve for easy replacement of the quick air vent.

Technical specifications

Connection boiler
G1 female thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 183 x 144 x 70 mm

Heat insulation
Expanding polypropylene EPP

Carrier
Brass

Diaphragm safety valve MS
Inlet x outlet: G¾ x G1
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 63 mm – G¼ centre back

Quick air vent with aqua stop
Inlet: G⅜
Nominal pressure: 12 bar

KSG Magnum – 3 bar

For sealed heating systems as per EN 12828 with a capacity of up to 200 / 350 kW.

Complete, pre-assembled, tightness-tested boiler safety group assembly. Consisting of carrier, pressure gauge for indicating the system pressure, quick air vent with aqua stop and diaphragm safety valve MS. With self-sealing mounting valve for easy replacement of quick air vent.

Connection boiler
Up to 200 kW: G1¼ with union nut
Up to 350 kW: G1½ with union nut

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 230 x 190 x 105 mm

Heat insulation
Expanding polypropylene EPP

Carrier
Brass

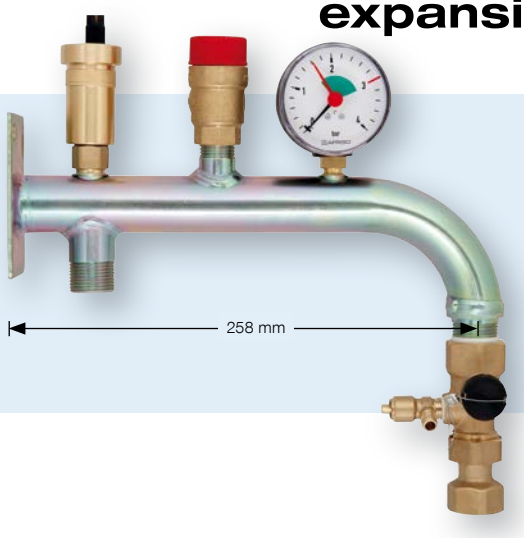
Diaphragm safety valve MS
Up to 200 kW (inlet x outlet): G1 x G1¼
Up to 350 kW (inlet x outlet): G1¼ x G1½
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 63 mm – G¼ bottom

Quick air vent with aqua stop
Inlet: G⅜
Nominal pressure: 12 bar

DG: G, PG: 2	kW	bar	Boiler connection	Heat insulation			Part no.
KSG Maxi	Max. 100	3	G1 female	Yes	1	10	**77581**
KSG Magnum G1¼	Max. 200	3	G1¼ female	Yes	1	10	**77627**
KSG Magnum G1½	Max. 350	3	G1½ female	Yes	1	10	**77628**

Connection assembly for expansion vessel GAK – steel



- **Time-saving installation with pre-assembled, tightness-tested assembly**
- **Service-friendly: Air vent and expansion vessel can be replaced without draining**

Application

For connection of diaphragm expansion vessels up to 50 l for sealed heating systems as per EN 12828 up to a capacity of 50 kW.

Description

Pre-assembled combination fitting consisting of:
- Steel carrier with enclosed anti-tamper cap valve for connection of the diaphragm expansion vessel
- Safety valve with type approval
- Pressure gauge for heating installations with red reference pointer
- Quick air vent (12 bar), mounted via self-sealing mounting valve

Technical specifications

Connections
Boiler: G¾ male thread
Expansion vessel: G¾ female thread

Operating temperature range
Medium: Max. 120 °C

Dimensions
W x H x D: 275 x 270 x 70 mm

Carrier
Steel, galvanised, protrusion 258 mm

Diaphragm safety valve MS
Inlet x outlet: G½ x G¾
Seal: Teflon ring, rotatable
Response pressure: 3 bar
Heat capacity: 50 kW

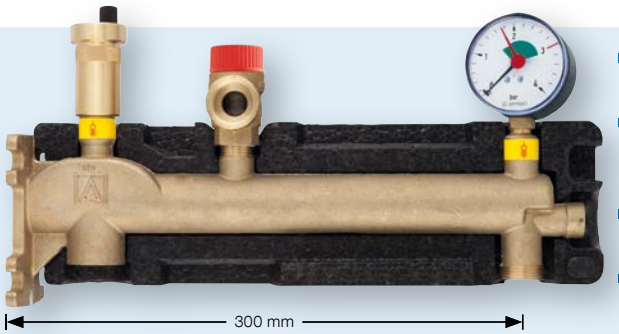
Pressure gauges for heating installations
Bourdon tube pressure gauge
Range: 0/4 bar, with red reference pointer
Diameter: 63 mm – G¼ bottom

Quick air vent with aqua stop
Inlet: G$^{3}/_{8}$
Nominal pressure: 12 bar

Scope of delivery
- GAK
- Mounting accessories: Screws, washers, dowels
- Anti-tamper cap valve (not mounted)

DG: G, PG: 3			Part no.
GAK-ST G¾ male 3 bar KV, steel	1	-	**77470**

Connection assembly for expansion vessel GAK



- **Time-saving installation with pre-assembled, tightness-tested assembly**
- **Service-friendly: Pressure gauge, air vent and expansion vessel can be replaced without draining**
- **Reliable venting due to top-mounted connection for quick air vent**
- **With heat insulation**

Application

For connection of diaphragm expansion vessels up to 50 l for sealed heating systems as per EN 12828 up to a capacity of 50 kW.

Description

Pre-assembled combination fitting consisting of:
- Carrier made of solid cast brass with integrated anti-tamper cap valve for connection of the diaphragm expansion vessel
- Safety valve with type approval
- Pressure gauge for heating installations with red reference pointer, mounted via self-sealing mounting valve
- Quick air vent (12 bar), mounted via self-sealing mounting valve
- Two form-fit shells for heat insulation

Technical specifications

Connections
Boiler: G¾ female thread
Expansion vessel: G¾ female thread

Operating temperature range
Medium: Max. 120 °C

Dimensions (with heat insulation)
W x H x D: 360 x 185 x 100 mm

Heat insulation
Expanded polypropylene EPP

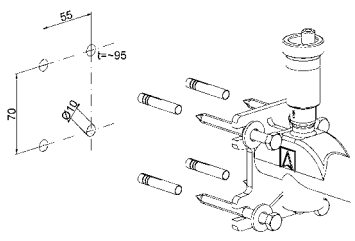
Carrier
Brass, protrusion 300 mm

Diaphragm safety valve MS
Inlet x outlet: G½ x G¾
Seal: Teflon ring, rotatable
Response pressure: 3 bar
Heat capacity: 50 kW

Pressure gauges for heating installations
Bourdon tube pressure gauge with self-sealing mounting valve
Range: 0/4 bar, with red reference pointer
Diameter: 63 mm – G⅜ bottom

Quick air vent with aqua stop
Inlet: G⅜
Nominal pressure: 12 bar

Scope of delivery
- GAK
- 2 heat insulation shells
- Mounting accessories: Screws, washers, dowels, seal, seal, screw connection G¾ female x G¾ union nut for connection of the expansion vessel

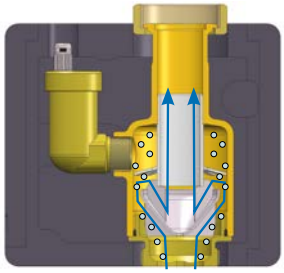


Easy wall mounting of the robust console with mounting accessories (included).

DG: G, PG: 2			Part no.
GAK-MS G¾ female thread 3 bar IL KV, with heat insulation	1	-	**77932**

Air separator

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **Continuous, automatic venting of the system**
- **Cost savings due to fewer malfunctions and longer service life of the system**
- **Fast and easy integration into existing pipes via reducer unions**



Function principle

Application

For removing air from heating systems. The air separator ensures reliable operation, better and faster heat transfer and thus contributes to reduced fuel consumption and emissions. Suitable for hot water heating systems and underfloor heating systems. Air is removed from the system without chemical additives.

Description

Compact air separator with integrated quick air vent in form-fit heat insulation. The new function principle with two separation chambers ensures a reduced flow speed for effective separation of air and water. The lower the flow rate in the separator, the better the air bubbles can be removed from the water due to the difference in density. The air bubbles rise, collect in the upper area in a calm zone and are automatically removed by means of the quick air vent without taking along water. The quick air vent features an aqua stop to keep water from escaping. The air separator can be installed in the flow (preferred) or return line. Reducer unions G1 female and G¾ female are available for renovation or retrofitting in existing pipes.

Technical specifications

Housing
Brass

Heat insulation
EPP

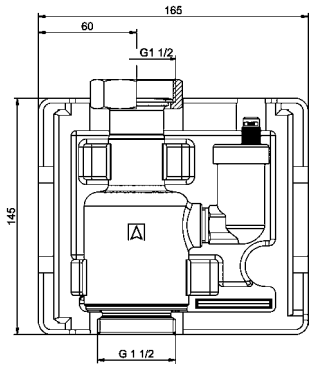
Operating pressure
Max. 10 bar

Operating temperature range
Max. 95 °C

Connections
Top G1½ female (union nut)
Bottom G1½ male

Mounting position
Vertical

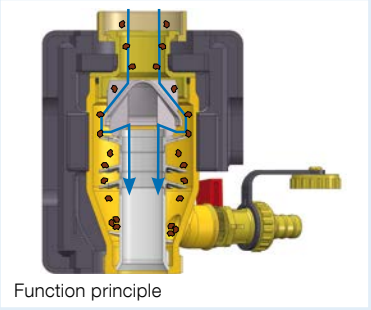
Dimensions (mm)



DG: G, PG: 2	Part no.
Air separator G1½	**40682**
Accessories	
Reducer union kit G1 female	**40684**
Reducer union kit G¾ female	**40685**

Sludge separator

- Pre-assembled, tightness-tested and heat-insulated assembly
- Single-operation cleaning while the system is running
- Energy savings due to improved heat transfer at system components
- Fast and easy integration into existing pipes via reducer unions



Function principle

Application

For removing dirt particles from heating systems. Particles can cause problems in fittings and control units. The sludge separator ensures clean water, reliable operation, better and faster heat transfer and thus contributes to reduced fuel consumption and emissions. Suitable for hot water heating systems and underfloor heating systems. Rust, lime particles, calcium, magnesium, oxides, carbonates and sludge as well as larger particles such as chips or construction residues are removed from the water – without the use of chemicals. Excellent for the renovation of system parts subject to sludge accumulation.

Description

Compact sludge separator with drain valve in form-fit heat insulation. The highly efficient concept removes sludge from the water. Plates in the separator deflect the particles into a separate area. From there, the dirt particles can be flushed out during normal operation by means of a valve. The sludge separator can be combined with the air separator and can be installed in the flow (preferred) or return lines. Reducer unions G1 female and G¾ female are available for renovation or retrofitting in existing pipes.

Technical specifications

Housing
Brass

Heat insulation
EPP

Operating pressure
Max. 10 bar

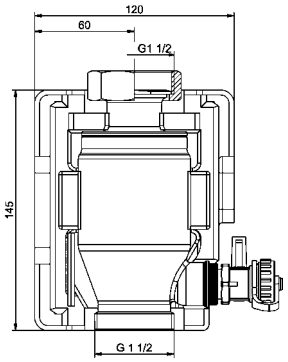
Flow coefficients NS
13.6 m³/h (flow top down)
14.7 m³/h (flow bottom up)

Operating temperature range
Max. 95 °C

Connections
Top G1½ female (union nut)
Bottom G1½ male

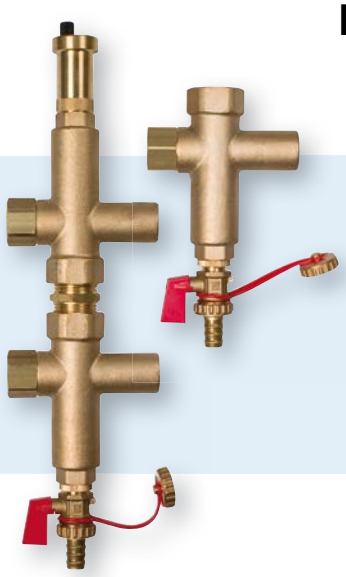
Mounting position
Vertical

Dimensions (mm)

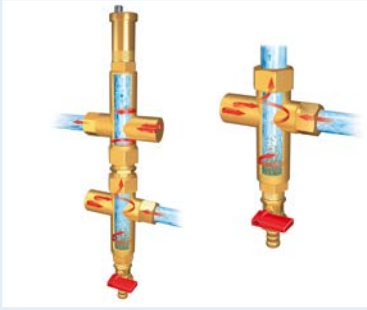


DG: G, PG: 2	Part no.
Sludge separator G1½	**40683**
Accessories	
Reducer union kit G1 female	**40684**
Reducer union kit G¾ female	**40685**

Flow filters, combined air/flow filters



- Dirt particle separator
- Suitable for open and sealed circuits
- Flushing possible during operation of the system
- Cost savings due to fewer malfunctions and longer service life of the system
- Energy savings due to improved heat transfer at clean system components



Application

Flow filters and combined air/flow filters remove lime, rust, sludge, dirt and gas from heating systems to provide clean water and trouble-free operation. Suitable for hot water heating systems, underfloor heating systems, fuel cells and renovation of system components (sludge removal).

Description

Most advanced heating systems use water for heat transmission. This water may also transport unwanted substances such as lime, calcium, magnesium, oxide, carbonates as well as larger particles such as welding or soldering residue, metal chips and dirt. These substances may cause malfunctions in fittings and control units. A compact flow filter (particle separator) removes these particles from the water. The particles settle in the collection chamber of the filter and can be flushed out via a valve with small amounts of water. Clean water supports trouble-free operation of systems and reduces the fuel and maintenance costs.

Clean system components have better thermal conduction, they provide for faster heating up and thus contribute to reduced fuel consumption and emissions.

The combined air/flow filter was developed for heating systems which are subject to problems caused by oxygen or other gases. The vent valve automatically removes the gases.

Technical specifications

Housing
Brass

Operating pressure
Max. 10 bar

Operating temperature range
Max. 95 °C

Dimensions (W x H x D)
Flow filter: 120 x 194 x 60 mm
Combined air/flow filter: 120 x 394 x 60 mm

Connections
Flow filter: Inlet G¾
Outlet G1
Combined air/flow filter: 2 x G¾

Scope of delivery
Flow filters and combined air/flow filters are delivered with form-fit heat insulation.

DG: G, PG: 2				Part no.
Flow filter – heating	28 kW	1	5	**78210**
Flow filter – heating	50 kW	1	5	**78211**
Combined air/flow filter – heating	28 kW	1	5	**78212**
Combined air/flow filter – heating	50 kW	1	5	**78213**

Anti-tamper cap valves

High draining capacity for easy and fast draining

Anti-tamper cap valve with integrated boiler filling and drain valve KFE

Anti-tamper cap valve with drain valve

Application

For connection, maintenance and checks of diaphragm expansion vessels in heating systems as per EN 12828 and in solar systems. To be installed at the water inlet of the expansion vessel.

Description

Anti-tamper cap valve with screw connection G¾ x G¾ or G1 x G1. The shut-off valve is secured against inadvertent closing by means of a cap and a lead seal. The integrated boiler filling and drain valve KFE (connection: G¾ eurocone) allows for easy draining of the expansion vessel. For this purpose, a hose can be connected by means of a union nut. The expansion vessel can be shut off from the heating system and drained with a high draining capacity (time saving) via the drain valve for the required function test or for replacement.

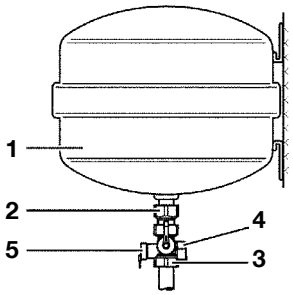
Anti-tamper cap valve with screw connection G¾ x G¾ or G1 x G1. The shut-off valve is secured against inadvertent closing by means of a cap and a lead seal. Valve operation via standard square spanner size 5 for radiator vent valves. The expansion vessel can be shut off from the heating system and drained via the drain valve for the required function test or for replacement.

Technical specifications

Operating pressure
Max. 10 bar

Operating temperature range
Operation: 0/120 °C

Drain capacity
Flow coefficient Kvs: 1.5 m³/h

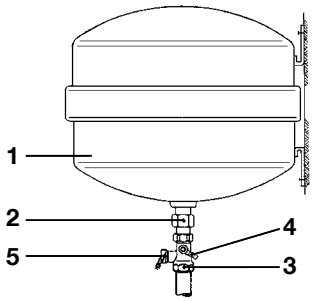


① Diaphragm expansion vessel
② Screw connection
③ Anti-tamper cap valve
④ Boiler filling and drain valve KFE, G¾ eurocone
⑤ Cap with seal and wire

Operating pressure
Max. 10 bar

Operating temperature range
Operation: 0/120 °C

Drain capacity
Flow coefficient Kvs: 0.5 m³/h



① Diaphragm expansion vessel
② Screw connection
③ Anti-tamper cap valve
④ Drain valve with hose connection
⑤ Cap with seal and wire

DG: G, PG: 2			Part no.
Anti-tamper cap valve G¾ x G¾ with integrated boiler filling and drain valve KFE G¾	1	25	**77949**
Anti-tamper cap valve G1 x G1 with integrated boiler filling and drain valve KFE G¾	1	25	**77950**
Anti-tamper cap valve G¾ x G¾ with drain valve	1	25	**77924**
Anti-tamper cap valve G1 x G1 with drain valve	1	25	**77934**
Spare part seal kit	1	-	**77493**

Diaphragm safety valves MS, MSM

- For protection against overpressure in heating systems
- For water and water-glycol mixtures
- MSM with pressure gauge for indication of the system pressure

MSM with pressure gauge for heating systems

Application

For sealed heating systems as per TRD 721; VdTÜV sheet Safety Valve 100 and 100/4 sheet 1; EN 12828. Also for water heating systems as per DIN 4751-2 with flow temperatures up to 120 °C and DIN 4751-3 with flow temperatures up to 95 °C. Suitable for water, water/glycol mixtures (with up to 50 % glycol).

Description

Safety valve with factory-adjusted opening pressure. MSM with pressure gauge for indicating the system pressure. The size of the valve inlet determines the unit type, the outlet is ¼" larger.

Technical specifications

Connection
See selection table

Operating temperature range
-20/+120 °C

Opening pressure
See selection table

Dimensions (W x H x D)
MS G½ x G¾: 48 x 60 x 35 mm
MS G¾ x G1: 52 x 60 x 40 mm
MSM G½ x G¾: 35 x 60 x 45 mm

Housing
Brass

Cap
PA6, red

Pressure gauge for heating installations (for MSM)
Diameter: 50 mm – G¼ back
Range: 0/4 bar
Connection: bottom back

Type approval mark
TÜV.SV.yy-2017.13.H
"yy" represents the year of the approval

DG: H, PG: 2	Maximum heating capacity	Opening pressure*	Pressure gauge			Part no.
MS G½ x G¾	50 kW	2.5 bar	–	1	84	**42385**
MS G½ x G¾	50 kW	3.0 bar	–	1	84	**42390**
MS G¾ x G1	100 kW	2.5 bar	–	1	84	**42386**
MS G¾ x G1	100 kW	3.0 bar	–	1	84	**42391**
MS Rp1 x Rp1¼	200 kW	2.5 bar	–	1	-	42383
MS Rp1 x Rp1¼	200 kW	3.0 bar	–	1	-	42378
MS Rp1¼ x Rp1½	350 kW	3.0 bar	–	1	-	42495
MSM G½ x G¾	50 kW	3.0 bar	0/4 bar	1	30	**42382**

* Enquire for other pressure ratings and connections.

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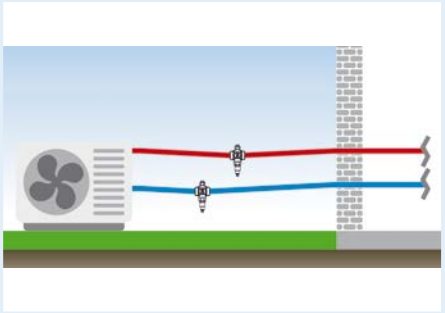
See pages 242, 351 for safety valves for solar liquid and drinking water.

Frost protection valve AAV for heat pumps

NEW

- For protecting monobloc air source heat pumps against frost damage in the case of malfunctions or power outage
- Helps to avoid damage to system components such as heat exchanger, pump or valves
- With integrated manual vent valve
- Maintenance-free



Application

For applications where monobloc air source heat pumps are connected directly to the heating circuit water outdoors. The system can freeze in such applications in the case of inoperable circulation – for example, as a result of a technical defect or power outage – at low outside temperatures. This may entail damage to sensitive system components (heat exchanger, pumps, valves, etc.) in the outdoor .

Description

Frost protection valve for installation outside the building, in the system flow and return. The valve must be installed as close as possible to the outdoor unit of the heat pump so that sensitive components of the heat pump are protected from damage caused by freezing of the medium.

Function

If the temperature of the medium in the system drops to 3°C, the thermostatic element inside the valve opens the flow of the medium to the outside, helping to prevent possible damage. If the temperature of the medium rises above 4 °C, the thermostatic element automatically shuts off the water flow from the system.
Prior to recommissioning, it is sufficient to check the system pressure, refill heating circuit water, if necessary, and vent the system.

Technical specifications

System connection
See selection table

Nominal pressure
Max. 10 bar

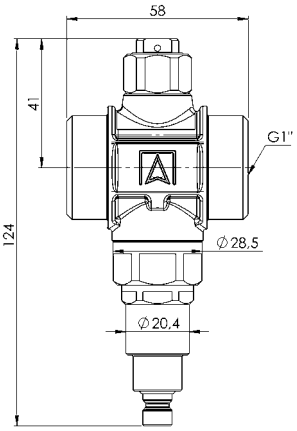
Opening temperature (medium)
3 °C (+/-1 °C)

Closing temperature (medium)
4 °C (+/-1 °C)

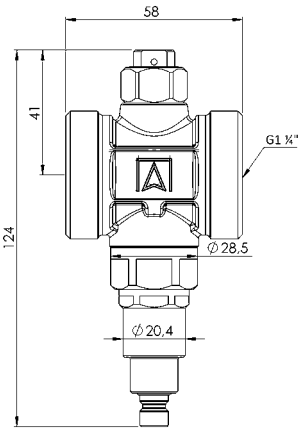
Operating temperature ranges
Medium: 0/70 °C
Ambient: -30/+60 °C

Material
Housing: CW 617 N
Spring: Stainless steel
Seals: EPDM

AAV 100



AAV 300



DG: G, PG: 2	Connection	Flow coefficient Kvs			Part no.
Frost protection valve AAV 100	G1 male	55 m²/h	1	-	81465
Frost protection valve AAV 300	G1¼ male	70 m²/h	1	-	81466

Differential pressure bypass valves DÜ

- For constant pump pressure in heating systems
- Reduction of flow noise
- With adjustment scale
- Differential pressure fully adjustable
- Either space-saving angled version or straight version

Application

For keeping the pump pressure in sealed heating systems as per EN 12828 constant and for reducing flow noise in the heating system.

Description

Differential pressure bypass valve with directly readable adjustment scale. Housing made of brass. Available as straight version or angled version for space-saving installation.
The differential pressure in the heating system at full load is set directly at the bypass valve. If the volume flow is reduced, the valve opens to keep the head of the circulation pump constant.

Technical specifications

Operating temperature range
Max. 95 °C, (short-term 120 °C)

Operating pressure
Max. 6 bar

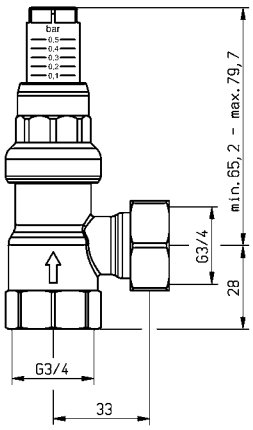
Differential pressure
Fully adjustable 0.1/0.5 bar

Housing
Angled version or straight version
Material: Brass

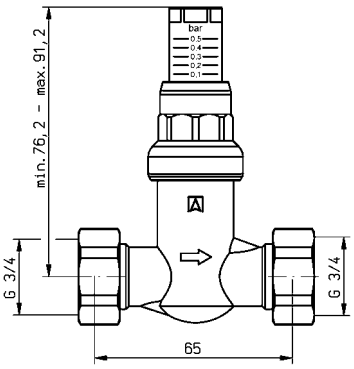
Connection angled version
Inlet: G¾ female thread
Outlet: Screw connection, flat-sealing with union nut G¾ or G1 male thread

Connection straight version
Screw connection at both sides, flat-sealing with union nut G¾

Differential pressure bypass valve
Angled version



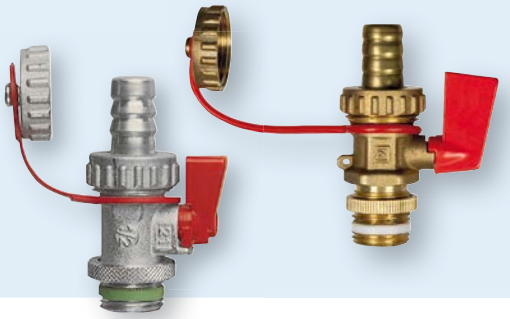
Differential pressure bypass valve
straight version



DG: G, PG: 2	Connection			Part no.
DÜ with screw connection, angled version	G¾ x G¾	1	10	**42379**
DÜ with screw connection, straight version	G¾ x G¾	1	-	42384
DÜ without screw connection, angled version	G¾ x G1	1	-	42308

Filling and drain fittings

Filling fitting FAM



Filling fittings FA / FAM

Application For sealed heating systems as per EN 12828.

Description Filling fitting with housing and spring cap made of brass. Inlet for hose inside diameter 12 mm, outlet G½ female thread.
With G¼ connection for pressure gauge for heating installations.
With pressure reducer, shut-off valve and backflow preventer. Inlet pressure 6 up to 10 bar, outlet pressure adjustable between 0.5 and 3 bar.
Version FAM with pressure gauge for heating installations
Ø 63 mm, 0/4 bar, G¼ bottom.

Filling fitting FA

Boiler filling and drain valve KFE, brass, plain
Boiler filling and drain valve KFE, brass, nickel-plated

For sealed heating systems as per EN 12828.

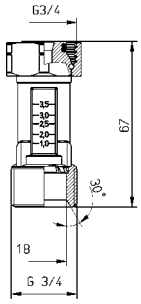
Boiler filling and drain valve. Ball valve version made of brass. One side G½ male thread with PTFE sealing ring, other side ½" hose connector with G¾ union nut and blind cap with chain or strap. Available in plain brass (drinking water) or nickel-plated brass (heating circuit water).

DG: G, PG: 2			Part no.
Filling fitting FA	1	5	**42405**
Filling fitting FAM	1	5	**42406**
Boiler filling and drain valve KFE, brass plain, in cardboard box	12	72	**42401**
Boiler filling and drain valve KFE, brass nickel-plated, in cardboard box	12	72	**42407**

Flow meter DFM 10-1M

- **Direct indication of the flow rate in l/min**
- **Compact design**

Dimensions (mm)



Application

For monitoring the flow in heating/cooling systems. Specially for direct mounting to heating circuit manifolds. Suitable for heating and cooling water as well as water mixtures with standard corrosion protection and antifreeze agents.

Description

Compact flow meter with scale. The flow meter can be installed in pipes in a horizontal, tilted or vertical position. The reading mark corresponds to the lower edge of the rotameter/float.

Technical specifications

Operating temperature range
Max. 100 °C

Operating pressure
Max. 10 bar

Measuring principle
Rotameter type with counter spring

Measuring range
1–3.5 l/min

Nominal diameter
DN 10

Housing
Brass

Connection
G¾ x G¾ (eurocone)
male thread x union nut

Mounting position
Horizontal, tilted or vertical

7

i Please enquire for other versions.

DG: G, PG: 2			Part no.
DFM 10-1M	-	10	**78619**

Flow meters
DFM 15-2M / DFM 20-2M

- **Integrated ball valve for adjustment and shutting off**
- **Direct indication of the flow rate in l/min**
- **Adjustment without diagram, table or measuring instrument**
- **Available with numerous connection versions**

Application

For hydraulic balancing and flow monitoring in heating/cooling systems, air conditioning systems, solar systems and geothermal systems. DFM allows for fast hydraulic balancing of the system or of system components without diagrams, tables or measuring instruments. Suitable for heating and cooling water as well as water mixtures with standard corrosion protection and antifreeze agents.

Description

Compact flow meter with scale and ball valve for shutting off and adjustment.
The flow meter can be installed in pipes in a horizontal, tilted or vertical position. Adjustments are made by means of a screwdriver via the adjustment screw. The reading mark corresponds to the lower edge of the rotameter/float.
Systems with correct hydraulic balancing provide for optimum energy distribution and cost-efficient operation.

Technical specifications

Operating temperature range
120 °C, short-term 160 °C

Operating pressure
Max. 10 bar

Measuring principle
Rotameter type with counter spring

Measuring range
See ordering table

Nominal diameter
DN 15, DN 20

Housing
Brass

System connections
G¾ x G¾, G1 x G1, G1¼ x G1¼
Male thread x male thread,
male thread x union nut

Mounting position
Horizontal, tilted or vertical

Options
- Other nominal diameters
- Other connections
- Other measuring ranges

Flow coefficients NS

Nominal diameter	Measuring range	Flow coefficient Kvs
DN 15	1–6 l/min	2.1 m³/h
DN 15	2–12 l/min	3.0 m³/h
DN 15	8–28 l/min	4.8 m³/h
DN 15	8–38 l/min	5.9 m³/h
DN 20	5–42 l/min	9.7 m³/h
DN 20	20–70 l/min	12.9 m³/h

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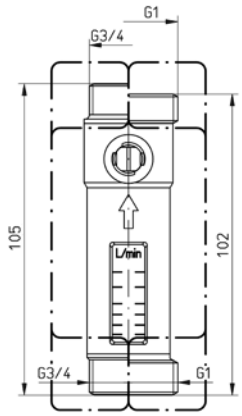
Please enquire for other versions.

Flow meters DFM 15-2M / DFM 20-2M

Types and dimensions (mm)

A



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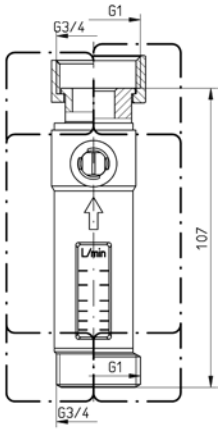
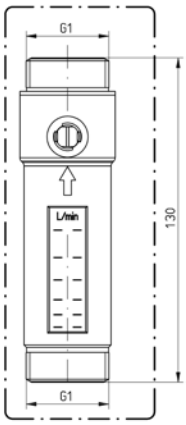
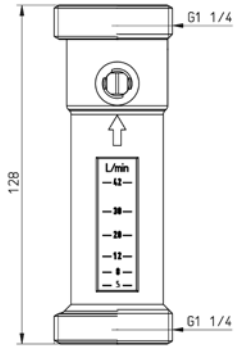


C



D



DG: G, PG: 2

Male thread x male thread

Type	Nominal diameter	Connections	Measuring range	Part no.
DFM 15-2M				
A	DN 15	G¾ x G¾	1–6 l/min	80958
	DN 15		2–12 l/min	**80963**
	DN 15		8–28 l/min	80968
	DN 15		8–38 l/min	80973
	DN 15	G1 x G1	1–6 l/min	80959
	DN 15		2–12 l/min	80964
	DN 15		8–28 l/min	**80969**
	DN 15		8–38 l/min	80974
DFM 20-2M				
C	DN 20	G1 x G1	5–42 l/min	**80978**
	DN 20		20–70 l/min	80983
D	DN 20	G1¼ x G1¼	5–42 l/min	80979
	DN 20		20–70 l/min	**80984**

Male thread x union nut

Type	Nominal diameter	Connections	Measuring range	Part no.
DFM 15-2M				
B	DN 15	G¾ x G¾	1–6 l/min	80960
	DN 15		2–12 l/min	80965
	DN 15		8–28 l/min	80970
	DN 15		8–38 l/min	80975
	DN 15	G1 x G1	1–6 l/min	80961
	DN 15		2–12 l/min	80966
	DN 15		8–28 l/min	80971
	DN 15		8–38 l/min	80976

3-/4-way mixing valves ARV ProClick

- For distribution and mixing
- Compact design
- Non-slip rotary knob
- Low torque for increased service life of actuator
- ProClick adapter system for motor mounting without tools

A

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Application

Universal mixing application in water-based heating and cooling systems (radiators, panel heating systems). The 3-way mixer can also be used as a distribution or zone mixer. Suitable for water and water/glycol mixtures with up to 50 % glycol. Not suitable for drinking water.

Description

Compact, low-loss 3-way or 4-way mixing valves with brass base and easy-to-handle rotary knob made of high-strength plastic. The rotary knob with scale allows for easy and accurate manual adjustment of the mixing valve. The elevated mark allows for fast position determination. Two scales with "0 to 10" for horizontal installation and "10 to 0" for vertical installation are included for maximum flexibility.

3-way mixing valve for distribution and mixing: The desired flow temperature is obtained via the precise mixing ratio of hot boiler water and cold water from the return line.

4-way mixing valve for dual mixing. The return temperature to the boiler can be high in order to avoid corrosion damage, for example.

The mixing valves are easy to automate with the AFRISO actuators. The new AFRISO ProClick adapter system allows for hassle-free mounting of the motor to the mixing valve without tools – snap on and done. The low torque ensures a low load on the valves and a long service life.

Technical specifications

Angle of rotation
90°

Operating temperature range
Medium: 5/110 °C

Nominal pressure
Max. 10 bar

Flow rate
See ordering table

Leak rate (Δp = 100 kPa)
DN 25 – DN 32 = Max. 0.2 % Kvs
DN 40 – DN 50 = Max. 0.5 % Kvs

Required torque
DN 20 / DN 25: Max. 0.5 Nm
DN 32: Max. 2 Nm
DN 40 / DN 50: Max. 3 Nm

Material
Housing: Brass (CW617N)
O rings: EPDM

i

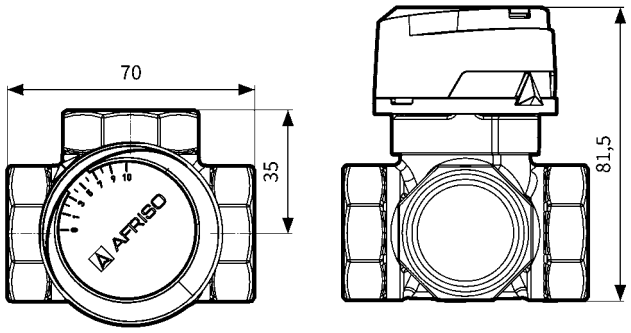
Only AFRISO ARM ProClick actuators can be mounted to ARV ProClick valves.

DG: G, PG: 2	DN	Connection	Flow coefficient Kvs	Part no.
3-way mixing valve ARV 382	20	Rp ¾	6.3 m³/h	78234
3-way mixing valve ARV 384	25	Rp 1	10 m³/h	78235
3-way mixing valve ARV 385	32	Rp 1¼	16 m³/h	78236
3-way mixing valve ARV 386	40	Rp 1½	25 m³/h	78237
3-way mixing valve ARV 387	50	Rp 2	40 m³/h	78238
4-way mixing valve ARV 484	25	Rp 1	10 m³/h	78239
4-way mixing valve ARV 485	32	Rp 1¼	16 m³/h	78241
4-way mixing valve ARV 486	40	Rp 1½	25 m³/h	78242
4-way mixing valve ARV 487	50	Rp 2	40 m³/h	78243

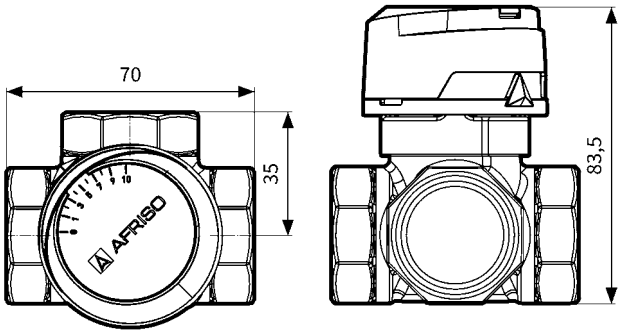
3-way mixing valves ARV ProClick

Housing types and dimensions (mm)

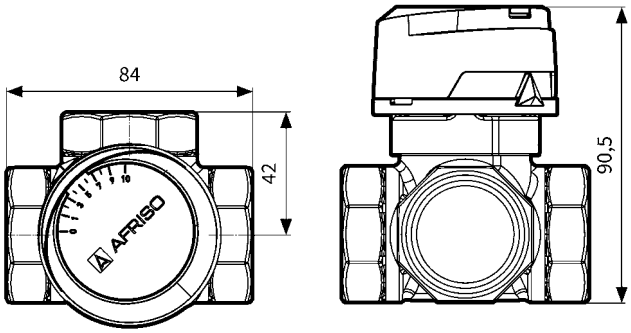
3-way mixing valve DN 20



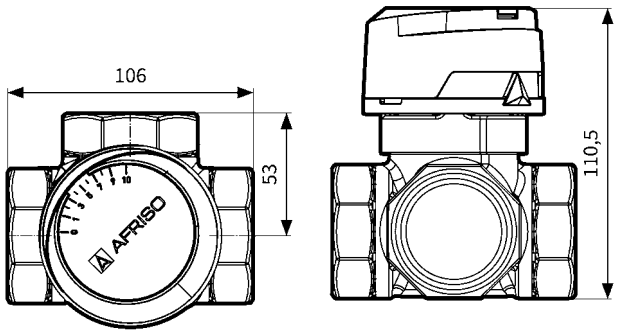
3-way mixing valve DN 25



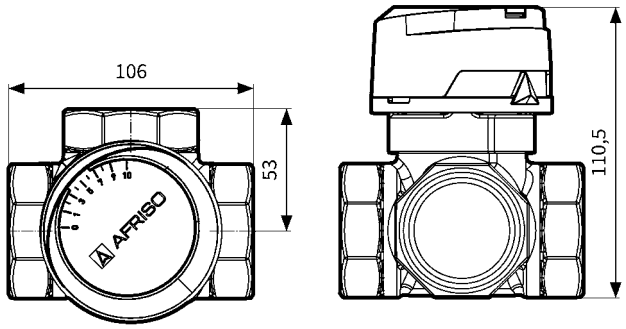
3-way mixing valve DN 32



3-way mixing valve DN 40



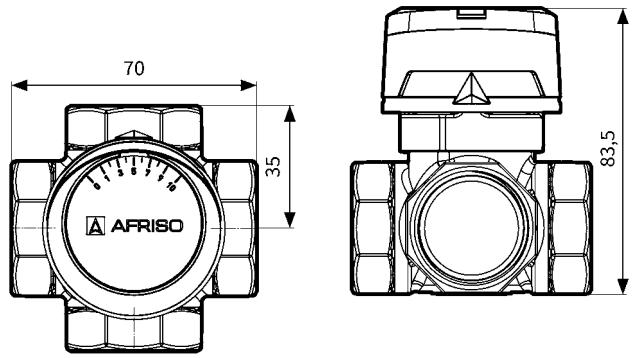
3-way mixing valve DN 50



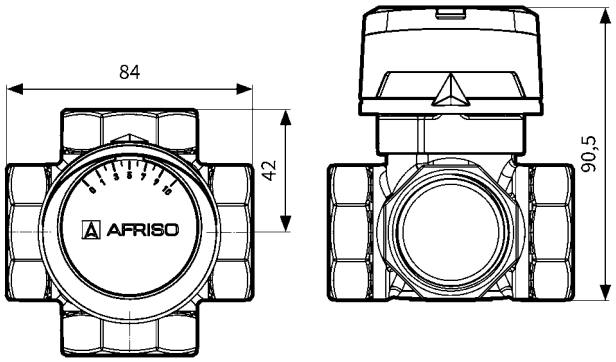
4-way mixing valves ARV ProClick

Housing types and dimensions (mm)

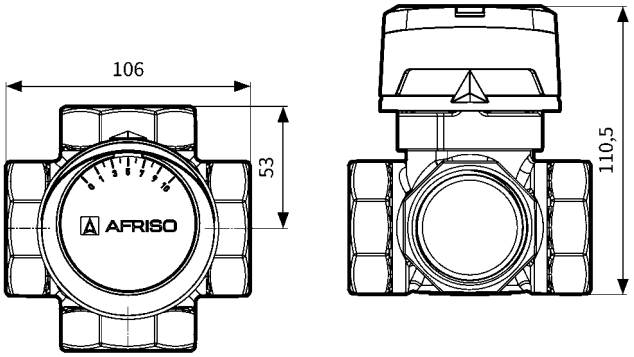
4-way mixing valve DN 25



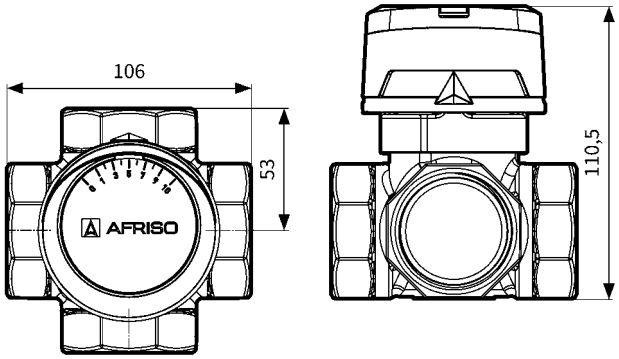
4-way mixing valve DN 32



4-way mixing valve DN 40



4-way mixing valve DN 50



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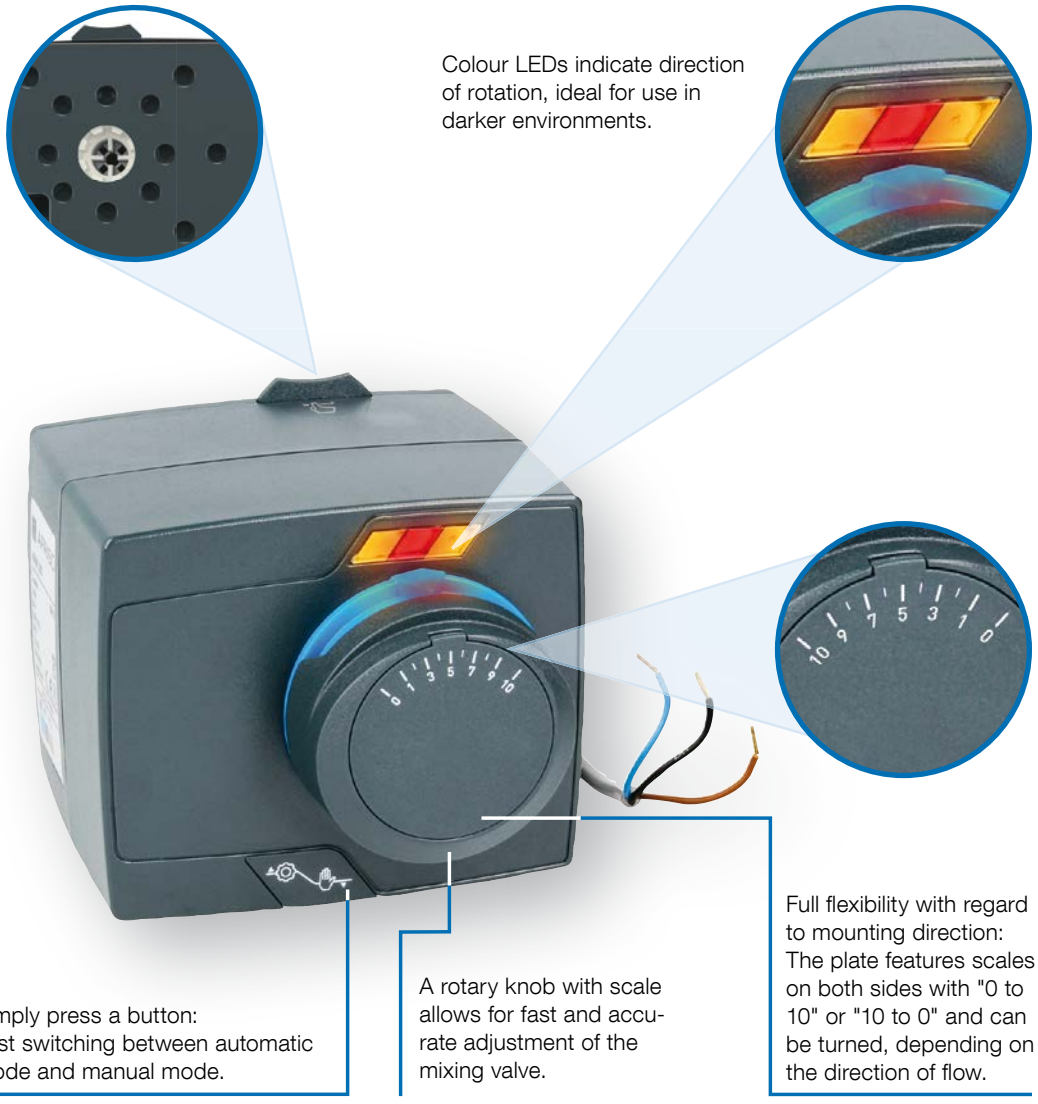
Actuator ARM ProClick

The new silent actuator ARM ProClick is the optimal solution for the automatic control of the return admixture. Thanks to the AFRISO ProClick adapter system, it can be easily mounted to the mixing valve in a matter of seconds: Snap on – done. This simplicity is also available for switching between automatic and manual mode – it is sufficient to press a button. The new actuator excels with smart features such as integrated protection against blocking of the mixing valve or maintenance-free operation for a long service life.

Mounting in a matter of seconds without tools: Simply snap the actuator onto the mixer, done. Dismounting at the push of a button.



Colour LEDs indicate direction of rotation, ideal for use in darker environments.

Simply press a button:
Fast switching between automatic mode and manual mode.

A rotary knob with scale allows for fast and accurate adjustment of the mixing valve.

Full flexibility with regard to mounting direction: The plate features scales on both sides with "0 to 10" or "10 to 0" and can be turned, depending on the direction of flow.

Advantages – your benefits

- **Compact, silent actuator with an angle of rotation of 90°**
- **With ProClick adapter system suitable for AFRISO mixing valves DN 25 and DN 32**
- **High reliability: An integrated protection unit keeps the actuator and mixing valve from blocking for a long service life**

Actuator ARM ProClick

- Compact, silent actuator with an angle of rotation of 90°
- Mounting without tools: Simply snap the actuator onto the mixer.
- Colour LEDs indicate direction of rotation
- Fast switching between automatic mode and manual adjustment

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Application

Can be used for controlling AFRISO series ARV ProClick mixing valves DN 20 to DN 50. Perfect solution for automated operation of water-based heating and cooling systems. Suitable for the AFRISO mixing valve series AVR with ProClick adapter system and for automating the AFRISO pump assemblies PrimoTherm® 180-2 with nominal diameters DN 25 and DN 32. The new AFRISO ProClick adapter system allows for hassle-free mounting of the motor to the mixing valve without tools – snap on and done.

Description

Compact, silent actuator with an angle of rotation of 90° and keys for switching from automatic mode to manual mode. The rotary knob with scale allows for a precise indication of the position in both modes. Three LEDs indicate the direction of rotation of the actuator. The pre-assembled connection cable with colour-coded wires as well as a wiring diagram on the nameplate simplify installation. For full flexibility during mounting, the plate features scales on both sides with "0 to 10" or "10 to 0" and can be turned, depending on the direction of flow. The integrated protection unit keeps the actuator and mixing valve from blocking for a long service life. ARM is maintenance-free.

Technical specifications

Angle of rotation
0/90°

Operating temperature range
Ambient: 0/50 °C

Cable length
2 m

Power input
AC 2.5/4 VA

Housing
Material: Plastic (PC)
W x H x D: 102 x 84 x 89 mm
Protection class: II
Degree of protection: IP 42 (EN 60529)

Input signal
ARM 323, 343, 443: 3-point, digital
ARM 992: 0–10 V, 2–10 V, 0–20 mA, 4–20 mA, PWM

Supply voltage
AC 230 V
ARM 992: AC/DC 24 V

Torque
6 Nm

Term
ARM 323: 60 s
ARM 343, 443: 120 s
ARM 992: 60/120 s

Scope of delivery
Actuator with AFRISO ProClick adapter system

DG: G, PG: 4	Input	Term	Torque	AC/DC	Part no.
ARM 323 ProClick	3-point	60 s	6 Nm	AC 230 V	77820
ARM 343 ProClick	3-point	120 s	6 Nm	AC 230 V	**77812**
ARM 992 ProClick	0–10 V, 2–10 V, 0–20 mA, 4–20 mA, PWM	60/120 s	6 Nm	AC/DC 24 V	78256

Fixed setpoint controller ACT 343 ProClick

NEW

- **Compact design, suitable for 3-/4-way mixing valve series ARV ProClick**
- **Mounting without tools: Simply snap the fixed setpoint controller onto the mixer.**
- **Temperature probe and mains cable already connected**
- **Colour display and navigation keys for easy setup**

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ProClick ADAPTER SYSTEM for AFRISO ARV (KVS Vario)

Application

Can be used for controlling AFRISO series ARV ProClick mixing valves DN 20 to DN 50, also available with the pump assembly PrimoTherm®. Ideally suited for controlling the return temperature (e.g. boiler) or to control the flow line in heating systems. The control temperature can be adjusted from 0 to 99 °C.

Description

Compact, silent motor with integrated control. The fixed setpoint controller features the AFRISO ProClick adapter system so that it can be click-mounted (no tools required) to the AFRISO mixing valves ARV or to the AFRISO pump assembly PrimoTherm® 180-2. Various applications and hydraulic schemes can be set via the display and the keys. The keys are covered to help prevent inadvertent modifications of the settings during operation.

Technical specifications

Operating temperature range:
Ambient: 0/50 °C

Temperature probe:
Probe element (L x Ø): 10 x 4 mm
Cable length: Approx. 1 m

Display:
Graphical colour display,
resolution 240 × 240 pixels

Housing:
Material: Plastic (PC)
W x H x D: 95 x 87 x 80 mm
Protection class: I
Degree of protection: IP 42 (EN 60529)

Supply voltage:
AC 230 V
Mains cable with connector, length 2 m

Torque:
6 Nm

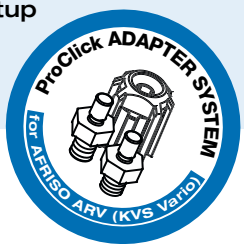
Scope of delivery:
Fixed setpoint controller with temperature probe with AFRISO ProClick adapter system

DG: G, PG: 2	Part no.
ACT 343 ProClick	**77823**

Weather-compensated controller ARC 345 ProClick

NEW

- Compact design, suitable for 3-/4-way mixing valve series ARV ProClick
- Mounting without tools: Simply snap ARC 345 onto the mixer
- Temperature probe, pump connection and mains cable already connected
- Colour display and navigation keys for easy setup



Application

Can be used for controlling AFRISO series ARV ProClick mixing valves DN 20 to DN 50 or with pump assembly PrimoTherm®. Controls the temperature of the medium based on the outdoor temperature and the set heating curve according to the time program.

Description

Compact, silent actuator with integrated control. ARC 345 features the AFRISO ProClick adapter system so that it can be click-mounted (no tools required) to the AFRISO mixing valves ARV or to the AFRISO pump assembly PrimoTherm® 180-2. The display and the keys allow you to set various applications and 6 pre-programmed hydraulic diagrams which control the temperature according to day and time.
The keys are hidden below the wheel to help prevent inadvertent modifications of the settings during operation.
It is possible to connect an additional controller with a 4-way valve (bus communication).

Technical specifications

Operating temperature range
Ambient: 0/50 °C

Display
Graphical colour display,
resolution 240 × 240 pixels

Housing
Material: Plastic (PC)
W x H x D: 95 x 87 x 80 mm
Protection class: I
Degree of protection:IP 42 (EN 60529)

Supply voltage
AC 230 V
Mains cable with connector, length 2 m

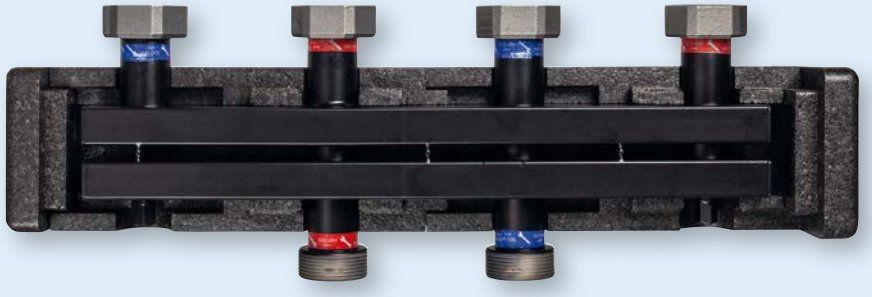
Torque
6 Nm

Scope of delivery
- Flow temperature sensor (1 m)
- Boiler sensor (3 m)
- Outdoor temperature sensor
- Circulation pump control cable (0.5 m)
- Mains cable with connector (2 m)

DG: G, PG: 2	Part no.
ARC 345 ProClick	**79130**

Boiler manifold KSV 125 for heating pump assemblies PrimoTherm®

NEW



KSV 125-2

Wall mounting bracket

Application

For distribution of the heating circuit water in sealed heating systems as per EN 12828 from the boiler to the heating pump assemblies PrimoTherm®.

Description

Boiler manifold as combination flow and return manifold for two, three, four or five heating pump assemblies. AFRISO boiler manifolds are tightness-tested in the factory; they are maintenance-free.

Technical specifications

System connections 70 kW version
Boiler end: Threaded socket G1½ male
Pump assembly: Union nut G1½, flat-sealing

System connections 160 kW version
Boiler end: Threaded socket G2 male
Pump assembly: Union nut G1½, flat-sealing

Axis distance
125 mm

Operating temperature range
Medium: Max. 110 °C

Flow
70 kW: 3.0 m³/h
160 kW: 7.0 m³/h

System pressure
Max. 6 bar

Heat insulation
Polypropylene EPP

Scope of delivery
Boiler manifold with 2 x wall mounting bracket and insulation

DG: G, PG: 3	Power	Heating circuits	Hydraulic separator	Part no.
Boiler manifold KSV 125-2	70 kW	2	No	**77310**
Boiler manifold KSV 125-3	70 kW	3	No	**77311**
Boiler manifold KSV 125-4	70 kW	4	No	**77312**
Boiler manifold KSV 125-5	70 kW	5	No	**77313**
Boiler manifold KSV 125-2	160 kW	2	No	**77319**
Boiler manifold KSV 125-3	160 kW	3	No	**77320**
Boiler manifold KSV 125-4	160 kW	4	No	77321
Boiler manifold KSV 125-5	160 kW	5	No	77322

Boiler manifold and hydraulic separator for heating pump assemblies PrimoTherm®

NEW

Boiler manifold KSV 125 HW

Hydraulic separator

Application

For distribution of the heating circuit water in sealed heating systems as per EN 12828 from the boiler to the heating pump assemblies PrimoTherm®.

Description

Boiler manifold as combination flow and return manifold for two or three heating pump assemblies.
With integrated hydraulic separator for separation of circuits. With two sockets G½ for drain/temperature probe. AFRISO boiler manifolds are tightness-tested in the factory; they are maintenance-free.

Hydraulic separator for retrofitting boiler manifold KSV (without hydraulic separator)

Technical specifications

System connections 70 kW version
Boiler end: Threaded socket G1½ male
Pump assembly: Union nut G1½, flat-sealing

Axis distance
125 mm for pump assembly

Operating temperature range
Medium: Max. 110 °C

Flow
70 kW: 3.0 m³/h

System pressure
Max. 6 bar

Heat insulation
Polypropylene EPP

Scope of delivery
Boiler manifold with 2 x wall mounting bracket and insulation

System connections 70 kW version
Boiler end: Threaded socket G1¼ female
Manifold: Union nut G1½, flat-sealing

System connections 160 kW version
Boiler end: G2 female
Manifold: G2 female

Operating temperature range
Medium: Max. 110 °C

Flow
70 kW: 3.0 m³/h
160 kW: 7.0 m³/h

System pressure
Max. 6 bar

Heat insulation
Polypropylene EPP

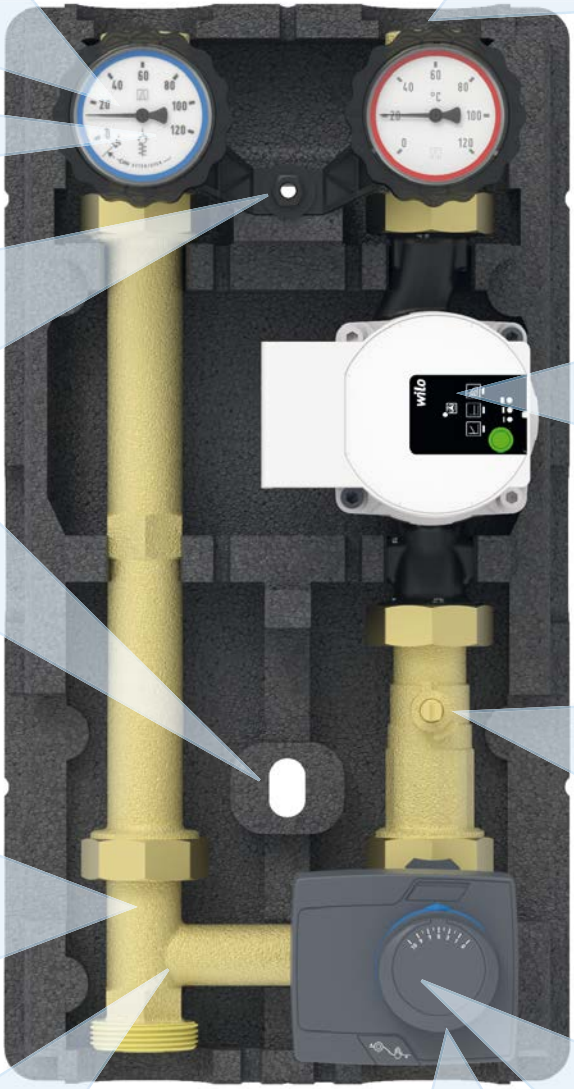
DG: G, PG: 3	Power	Heating circuits	Hydraulic separator	Part no.
Boiler manifold KSV 125-2 HW	70 kW	2	Yes	**77314**
Boiler manifold KSV 125-3 HW	70 kW	3	Yes	**77315**
Hydraulic separator for KSV 125, 70 kW	70 kW	-	Yes	**77317**
Hydraulic separator for KSV 125, 160 kW	160 kW	-	Yes	**77323**

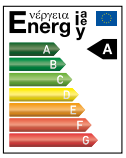
Heating pump assemblies
PrimoTherm® 180 DN 25 KVS Vario

Combination valves with thermometer in the hand wheel, range 0/120 °C. Red/blue mark facilitates the assignment of "supply/return" and function test through the owner/operator of the system. Additional temperature probes (for example, PT 100) can be integrated behind the ball valve.

System connection G1 female for rapid mounting in the heating circuit.

Integrated adjustable gravity brake.

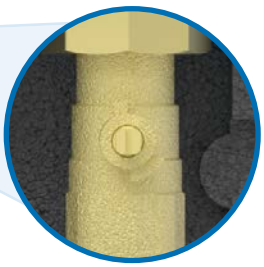




Sophisticated wall mounting kit for easy, fast installation.

Virtually any standard pump can be installed without refitting of the heat insulation.

Modular system with pump and return line left or right.



Ball valve below the pump for easy shutting off and increased safety.

System connection G1½ male for fast mounting to the boiler flow/return by means of flange and union nut. Suitable for KSV.

Cable routing in the heat insulation for professional installation of pump and actuator cables.

Snap on – done. New actuator with ProClick adapter system for lightning-fast mounting to the mixer without tools.

High-grade, robust mixer with adjustable flow coefficient Kvs (2.5 to 12) for maximum flexibility all the way to the construction site.

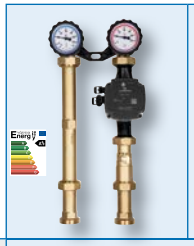
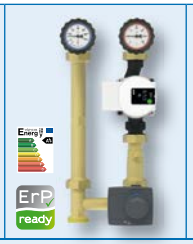
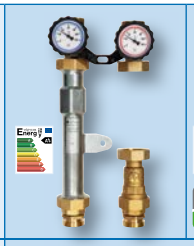
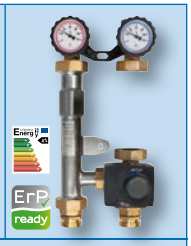
Product highlight: 3-way mixing valve ARV 325 KVS Vario with AFRISO ProClick adapter system

The flow coefficient is key in rating hot water heating systems and providing the right amount of heat at the radiators. Mixing valves in installations must be correctly rated before they are mounted and adjusted to the required flow coefficient Kvs of the system. If a selection error is made or the system is modified at a later point in time (for example, extended), the existing valve is usually no longer usable. If the flow coefficient Kvs is only estimated, the system will not operate in an efficient way.

Advantages – your benefits

- **A mixer for all cases: Simply set the required flow coefficient Kvs without draining the system**
- **No incorrect rating thanks to optimum adaptation to the control requirements of the system. This allows for:**
  - **Smaller volume jump V_{min} / smaller minimum controllable power Q_{min}**
  - **Higher valve authority PV (pressure ratio between mixer and pipe system with all consumers connected)**
  - **Complete use of mixer control range (0–100 %)**
  - **Improved controllability: No cycles, no flow noise**
  - **Positive effects on hydraulic balancing: Power required to heat the heating surfaces is available and can be used**
- **Long-lasting service life: Low torque for increased service life of actuator**
- **Reduces number of versions and warehousing efforts for mixers and pump assemblies**

Overview of versions heating pump assemblies PrimoTherm® 180

					
Nominal size	DN 25			DN 32	
Version	**(K) 180-1**	**(K) 180-2 KVS Vario**	**180-3**	**K 180-1**	**K 180-2 KVS Vario**
Without circulation pump	•	•	•	•	•
3-way mixer		Flow coefficient Kvs (fixed value)	Fixed value		Flow coefficient Kvs adjustable
With Grundfos UPM3 HYBRID 25–70/180	•	•		•	•
With Grundfos UPM3 HYBRID 3R-70 180				•	
With Wilo Para RS 25-180/6	•	•	•	•	•
With Wilo Para OPT 30-180/8-60/SC				•	
Return temperature increase		•	•		

7

Description

The heating pump assembly PrimoTherm® excels with its versatility and great number of possible combinations. The system assembly for the heating circuit is pre-assembled, tightness-tested, heat-insulated and available in three versions and two sizes, each with or without high energy efficiency pump. All circulation pumps offered by AFRISO meet the requirements of the European Ecodesign Directive (stage 2 as of 2015). The universal heat insulation allows for the installation of virtually any standard pump without reworking of the insulation. In addition, the system is modular so that the flow line can be mounted at the left or the right side; due to the slim design, it is also possible to mount several pump assemblies next to each other on AFRISO boiler manifolds. In addition, each pump assembly comprises a fastening kit for wall mounting in any position. All PrimoTherm® heating pump assemblies feature a gravity brake to avoid incorrect circulation. The DN -25 versions have the brake in the combination valve; it can be deactivated for servicing. It is also possible to mount temperature probes in the combination valve.

The versions **PrimoTherm® 180-1 DN 25 and 32** are used in non-mixed heating circuits, specially for storage tank charging.

The versions **PrimoTherm® 180-2 DN 25 and 32** are used in mixed heating circuits. With the 3-way mixer and the actuator, the flow temperature can be adjusted to a desired temperature by adding water from the return. PrimoTherm® 180-2 can also be used to increase the return temperature with solid fuel boilers which have a controller for increasing the return temperature. The opening temperature must be set at this controller.

i

We provide a great variety of customer-specific pump assemblies for OEMs. Please enquire.

The version **PrimoTherm® 180-3 DN 25** automatically controls the return temperature of the system water to the heat generator to the value adjusted in the valve. The integrated condensation protection valve is the connection between the solid fuel heating system and the heating circuit or the hot water storage tank.

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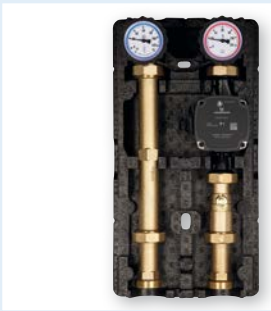
See the operating instructions of the pump assemblies for additional details, www.afriso.com/en/info-centre/download-center

Heating pump assembly PrimoTherm® 180-1 DN 25

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **Modular system with flow at left or right**
- **Easy and fast installation**
- **With high-efficiency pump class A**



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Application

Heating pump assembly for use in non-mixed heating circuits, specially for storage tank charging. It connects the heating boiler and the pipe system.

Description

Complete, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation and wall mounting unit.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Ball valve below the pump
- Pipe for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

Suitable for pumps DN 25 with G1½ x 180 mm.

The return line consists of:
- Combination valve with gravity brake, thermometer in the handle (blue mark, range 0/120 °C)
- Pipe for length compensation (pump/mixer) with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ males, heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 10 bar

Flow coefficient Kvs
4.8 m^3/h

Heat insulation
Polypropylene EPP

Dimensions
W x H x D: 250 x 475 x 152 mm

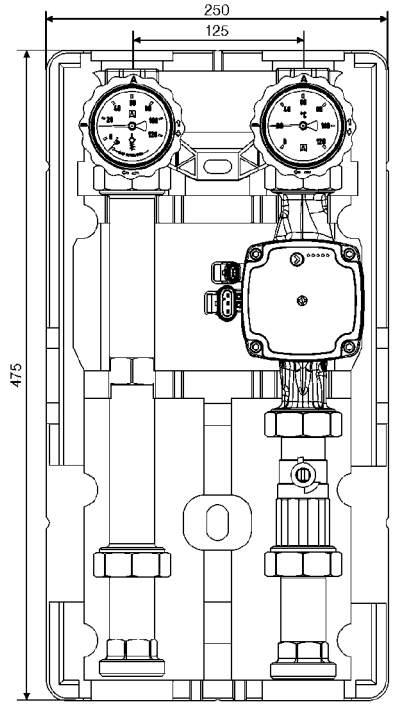
Options

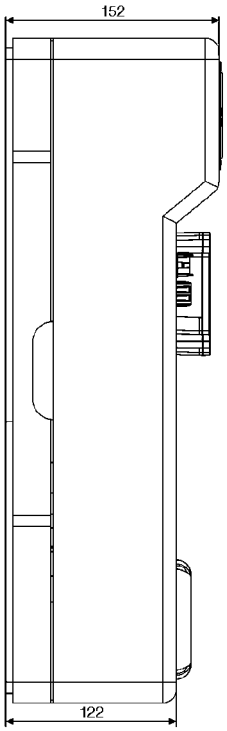
- Mixer and actuator, can be retrofitted
- Other circulation pumps

Heating pump assembly PrimoTherm® 180-1 DN 25

Dimensions (mm)

PrimoTherm® 180-1 with Grundfos pump





Technical specifications circulation pumps

Length
180 mm

Degree of protection
IP 44

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

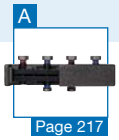
	Grundfos	Wilo
Type	UPM3 HYBRID 25-70/180	Para RS 25-180/6
Max. pumping volume	3.6 m³	3.2 m³
Max. pump head	7 M	6.7 m
Power input	2–52 W	3–43 W
Operating modes / power levels (technical data pump without guarantee)		
PWM-A	x/4	-/-
PWM-C	x/4	-/-
PP (constant volume flow)	x/3	x/3
CP (constant pressure)	x/3	x/3
CC (constant speed of rotation)	x/3	x/3

DG: G, PG: 2	Pump	Part no.
PrimoTherm® 180-1 DN 25	Without pump	**77643**
PrimoTherm® 180-1 DN 25 WP	With Wilo Para RS 25–180/6	**77507**
PrimoTherm® 180-1 DN 25 GP	With Grundfos UPM3 HYBRID 25-70/180	**77645**

Accessories and spare parts	Specification	Part no.
Connection kit G1½ female x 1 female	2 x connection piece G1 female thread, 2 x union nut G1½ female thread, 2 x flat gasket	77612
Connection kit G1½ female x 1 female	2 x O ring Ø 28 x 2.5 mm, 2 x reducer G1½ male x 1 male	77613
3-way mixer ARV 325 Vario with T piece	Axis distance 125 mm	77589

Heating pump assembly PrimoTherm® 180-2 DN 25 KVS Vario

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **Robust mixer with adjustable flow coefficient Kvs from 2.5 to 12 m³/h**
- **Adaptation of flow coefficient Kvs also possible during operation (under system pressure)**



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Application

Heating pump assembly for use in mixed heating circuits. With the 3-way mixer and the actuator, the flow temperature can be adjusted to a desired temperature by adding water from the return. The new mixer with adjustable flow coefficient Kvs offers the HVAC professional maximum flexibility in adapting the system to individual control requirements. The flow coefficient Kvs can be modified at any later point in time, even if the system is under pressure. This way, a great variety of mixer/pump assemblies can be covered with a single version. PrimoTherm® 180-2 is also available as version RTA. It can be used to increase the return temperature with solid fuel boilers which have a controller for increasing the return temperature.

Description

Complete, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Ball valve below the pump
- 3-way mixing valve ARV 325 KVS Vario with adjustable flow coefficient Kvs and ProClick adapter system
- Maintenance-free, silent actuator ARM 343 (6 Nm, 120 s, AC 230 V) with 0/90° angle of rotation, indication for direction of rotation, selector key "Manual/Automatic Mode" and ProClick adapter system
- System connection G1½ male (boiler), G1 female (heating circuit)

Suitable for pumps DN 25 with G1½ x 180 mm.

The return line consists of:
- Combination valve with gravity brake, thermometer in the handle (blue mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- T piece for mixer connection
- System connection G1½ male (boiler), G1 female (heating circuit)

Difference version RTA
- Interchanged colour codes of thermometers
- 3-way mixer wit flow coefficient Kvs 12 m3/h (not adjustable)
- System connection (storage) with additional connection flanges G1 female
- Additional mounting bracket for upside down or lateral mounting
- Scope of delivery does not include pump

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ male, heating circuit G1 female

Operating temperature range
Medium: T_{max} = 95 °C, short-term 120 °C

System pressure
Max. 10 bar

Flow coefficient Kvs
Adjustable: 2.5 – 4 – 5 – 6 – 8 – 12 m³/h

Leak rate mixing valve ARV 325 KVS Vario
< 0.1 % of value of flow coefficient Kvs (up to Δp 0.5 bar < 0.2 % of value of flow coefficient Kvs)

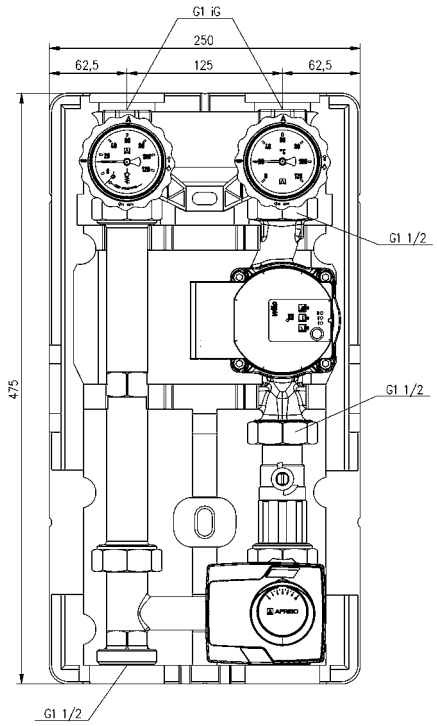
Heat insulation
Polypropylene EPP

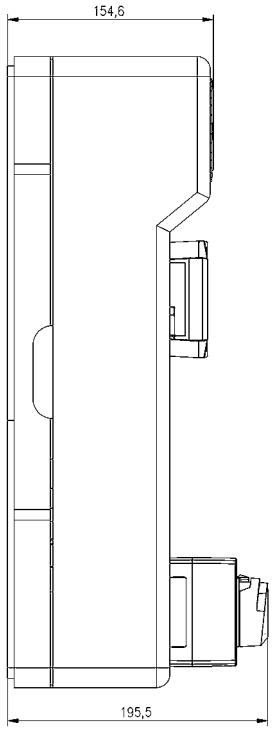
Dimensions
W x H x D: 250 x 475 x 152 mm

Heating pump assembly PrimoTherm® 180-2 DN 25 KVS Vario

Dimensions (mm)

PrimoTherm® 180-2 with Wilo pump





Technical specifications circulation pumps

Length
180 mm

Degree of protection
IP 44

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

	Grundfos	Wilo
Type	UPM3 HYBRID 25-70/180	Para RS 25-180/6
Max. pumping volume	3.6 m^3	3.2 m^3
Max. pump head	7 M	6.7 m
Power input	2–52 W	3–43 W
Operating modes / power levels (technical data pump without guarantee)		
PWM-A	x/4	-/-
PWM-C	x/4	-/-
PP (constant volume flow)	x/3	x/3
CP (constant pressure)	x/3	x/3
CC (constant speed of rotation)	x/3	x/3

DG: G, PG: 2	Pump	Part no.
PrimoTherm® 180-2 DN 25 3WM-SM Vario	Without pump	**77300**
PrimoTherm® 180-2 DN 25 WP 3WM-SM Vario	With Wilo Para RS 25-180/6	**77302**
PrimoTherm® 180-2 DN 25 GP 3WM-SM Vario	With Grundfos UPM3 HYBRID 25–70/180	**77301**
Version RTA:		
PrimoTherm® 180-2 DN 25 3WM-SM RTA	Without pump	**77304**

Accessories	Specification	Part no.
Connection kit G1½ female x 1 female	2 x connection piece G1 female thread, 2 x union nut G1½ female thread, 2 x flat gasket	77612

Heating pump assembly PrimoTherm® 180-3 DN 25 RTA

- For increased return temperature with solid fuel boilers
- With temperature-controlled condensation protection valve
- For reduced amounts of condensate in the combustion process
- Avoids deposits in the boiler and in the smoke vent

Application

Heating pump assembly for automatically controlling the return temperature of the system water to the heat generator to the value adjusted in the valve. An integrated, temperature-controlled condensation protection valve is the connection between the solid fuel heating system and the heating circuit or the hot water storage tank. Using PrimoTherm® 180-3 RTA keeps the temperature in the heating boiler above the condensation point in all operating states. This avoids deposits in the boiler and in the smoke vent and increases the service life of the system; corrosion damage of the heating boiler and chimney fires caused by soot deposits are avoided.

Description

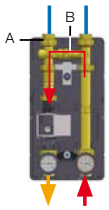
Complete, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation and wall mounting unit. With an additional mounting bracket, the unit can be mounted in any position (vertically/horizontally).

The return line consists of:
- Combination valve with thermometer in the hand wheel (blue mark, range 0/120 °C)
- Ball valve above the pump
- 3-way mixing valve with fixed mixing temperature 60 °C
- System connection G1 female (boiler), G1 female (storage)

Suitable for pumps DN 25 with G1½ x 180 mm.

The flow line (hot) consists of:
- Combination valve with gravity brake, thermometer in the handle (red mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- System connection G1 female (boiler), G1 female (storage)

Function principle



Start mode (heating up of boiler):
When the boiler heats up, the condensation protection valve is fully closed in the direction of the consumer. The liquid coming from the boiler is recirculated in the small circuit via the bypass, which causes the boiler temperature to increase more rapidly.

Transition phase:
When the opening temperature is reached (60 °C), the circuit to the consumer is opened proportionally and the bypass is reduced accordingly. However, the boiler temperature will not drop below the set temperature.

Regular operation:
During further operation, the temperature increases until the condensation protection valve is fully open (return storage A). The bypass (B) is closed correspondingly. If the inlet temperature (return storage A) drops to approx 10 °C above the set opening temperature, the admixture via the bypass (B) is increased proportionally and outlet A is closed proportionally.

Heating pump assembly PrimoTherm® 180-3 DN 25 RTA

Technical specifications

Axis distance
125 mm

System connections
G1 female thread at both ends

Operating temperature range
Medium: T_{max} = 100 °C

System pressure
Max. 10 bar

Opening temperatures
60 °C (fixed values)

Nominal size
DN 25

System capacity
Max. 32 kW at a flow rate of 1,400 l/h and a temperature spread of Δt 20 K

Leak rate
Water-tight between connections A->AB,
3 % leak rate of flow coefficient Kvs between B->AB
PN 10. A-AB = Flow coefficient Kvs: 2.94;
B-AB = 2.12

Heat insulation
Polypropylene EPP

Technical specifications circulation pump

Wilo Para 25/6 RKC

Length
180 mm

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

Power input
3–45 W

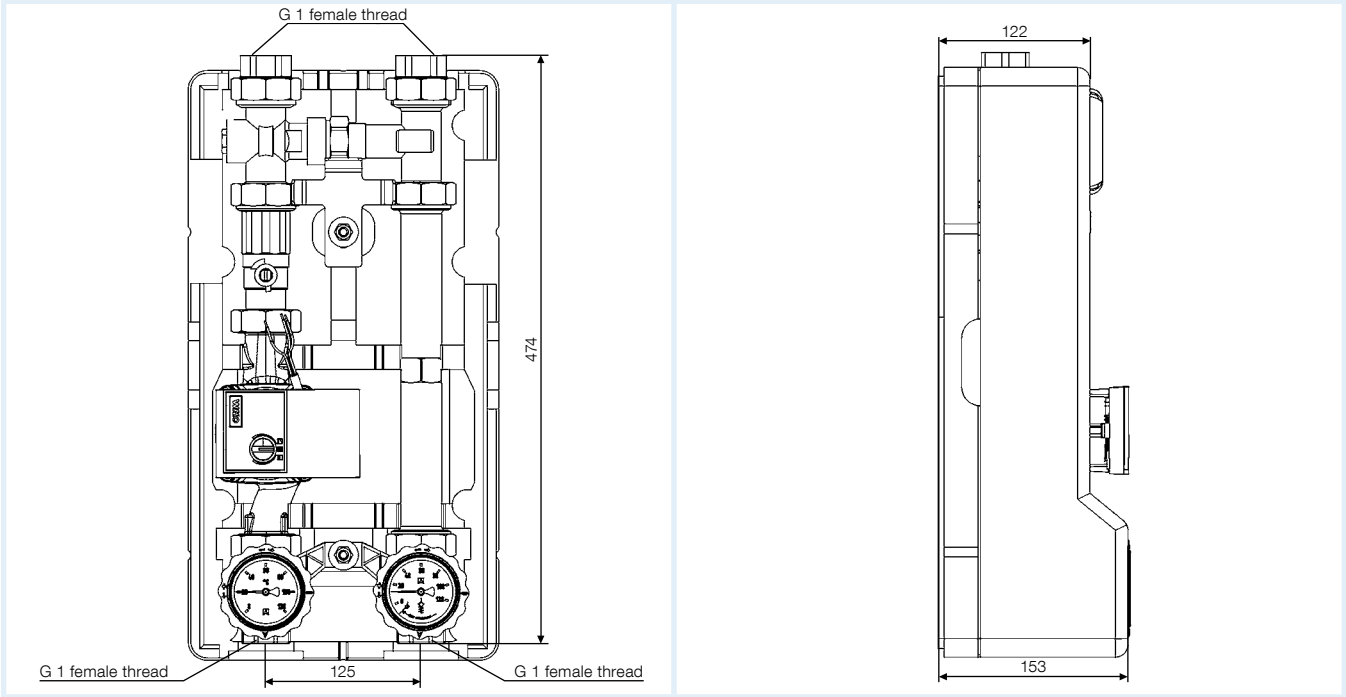
Pump head/rate
Max. 6.2 m / max. volume flow 3.3 m³/h

Options

- Other opening temperatures
- Other circulation pumps

7

Dimensions (mm)



DG: G, PG: 2	Opening temperature	Pump	Part no.
PrimoTherm® 180-3 DN 25 RTA 60	60 °C	Without pump	**77576**
PrimoTherm® 180-3 DN 25 RTA 60 WP	60 °C	Wilo Para RS 25-180-6	77570

Charging unit DN 25 RTA WP

NEW

- For storage tank charging with solid fuel boilers
- Compact unit for limited space conditions
- With 3-way mixer KVS Vario
- Avoids deposits in the boiler and in the smoke vent

Application

Charging unit for direct connection between a solid fuel boiler and a hot water storage tank. The compact design allows for mounting of RTA 60 to the pipes between the solid fuel boiler and the storage tank even if space is limited. Using the charging unit keeps the temperature in the heating boiler above the condensation point in all operating states. This avoids deposits in the boiler and in the smoke vent and increases the efficiency and the service life of the system. The risk of corrosion damage to the boiler and chimney fires resulting from soot deposits is reduced and the heat capacity of the boiler is stratified in the hot water storage tank. For the purpose, the 3-way mixer is controller via an ARM 343 actuator (connection to boiler control) or via an ACT 343 ProClick fixed setpoint controller (actuator not included in scope of delivery, please order separately). Since the flow coefficient Kvs is adjustable, the flow rate can be optimally adapted to the boiler capacity.

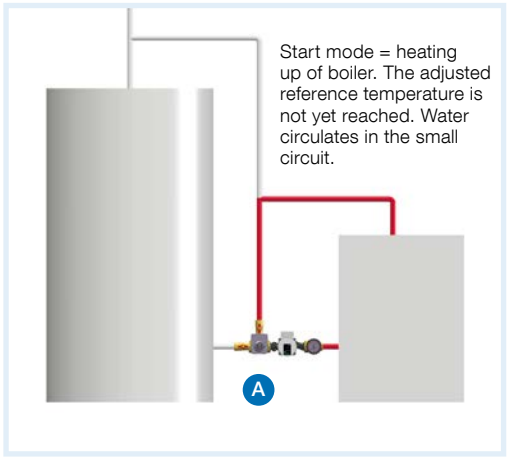
Description

Pre-assembled and tightness-tested assembly with 3-way mixer KVS Vario, storage tank charging unit and three ball valves with connection thread G1 female for system connection. Heat insulation is provided by the customer.

Function principle

Start mode (heating up of boiler)
When the boiler heats up, the mixer is fully closed in the direction of the consumer. The liquid coming from the boiler is recirculated in the small circuit via the bypass, which causes the boiler temperature to increase more rapidly.

A Mixer closed (B-AB)

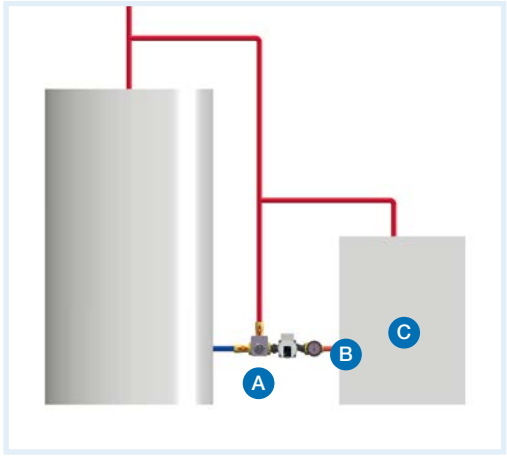


Mixing mode
When the adjusted return temperature is reached (e.g. 60 °C), the circuit to the consumer is opened proportionally and the bypass is reduced accordingly. However, the return temperature will not drop below the set temperature.

A Mixer partially opened, cold water from the storage tank is added

B Return temperature is controlled to the adjusted value.

C Boiler has reached operating temperature



Charging unit DN 25 RTA WP

NEW

Technical specifications

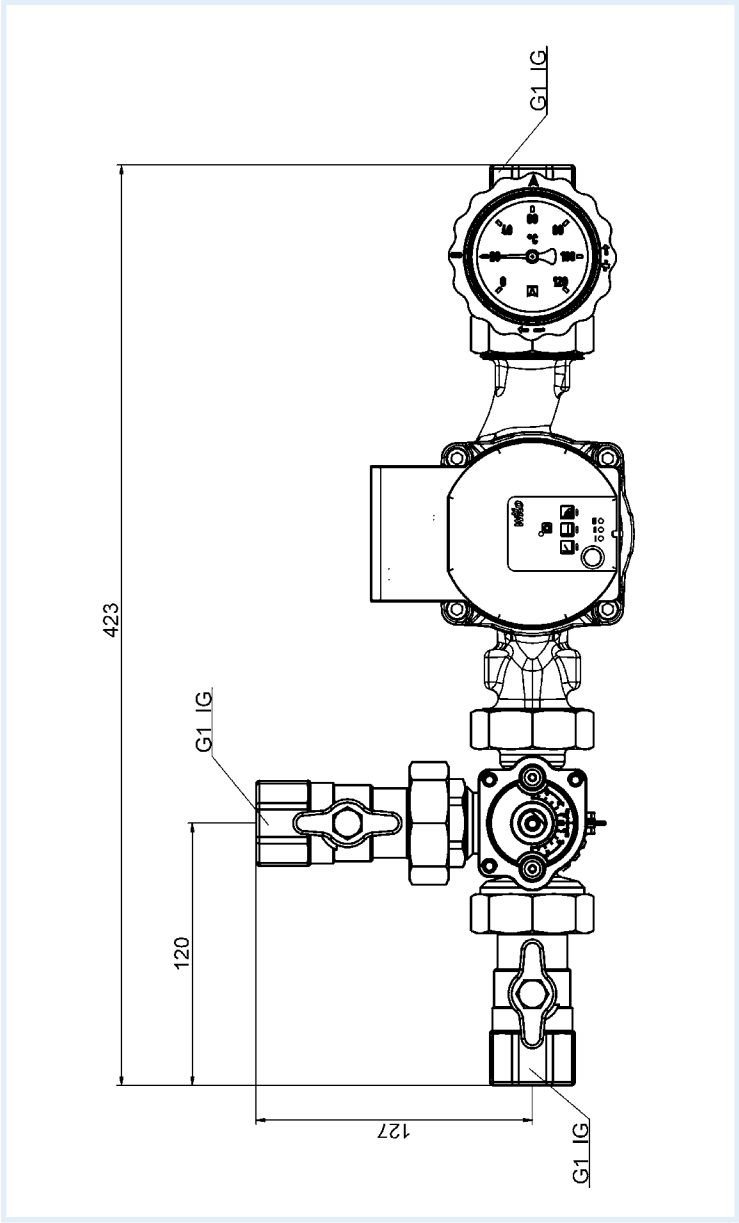
System connections
G1 female thread

Operating temperature range
Medium: T_{max} = 100 °C

System pressure
Max. 6 bar

System capacity
Max. 80 kW at a flow rate of 2,600 l/h and a temperature spread of Δt 20 K

Dimensions (mm)



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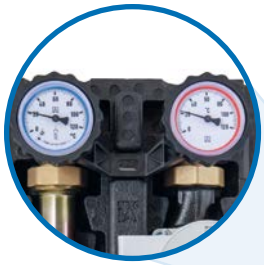
See pages 213–215 for suitable actuator and fixed setpoint controller. Please order probes separately.

DG: G	Pump	PG	Part no.
Charging unit DN 25 RTA WP	Wilo Para 25-180/6-43	2	77057
Accessories			
Actuator ARM 343 ProClick		4	**77812**
Fixed setpoint controller ACT 343 ProClick		4	**77823**

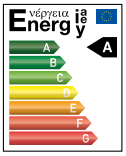
Heating pump assembly PrimoTherm® K 180 KVS Vario, short design



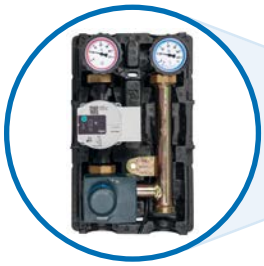
Combination valves with thermometer in the hand wheel, range 0/120 °C. Red/blue mark facilitates the assignment of "supply/return" and function test through the owner/operator of the system. Additional temperature probes (for example, PT 100) can be integrated behind the ball valve.

System connection G1 female for rapid mounting to the heating circuit.

Integrated adjustable gravity brake.



ErP ready



Modular system with pump and return line left or right.

Virtually any standard pump can be installed without refitting of the heat insulation.

Easy designation of the heating circuits by means of enclosed pictograms.

High-grade, robust mixer with adjustable flow coefficient Kvs (2.5 to 12) for maximum flexibility all the way to the construction site.

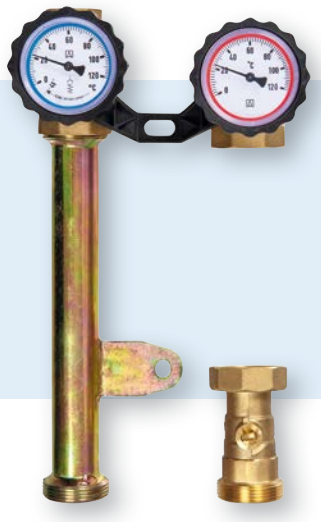
System connection G1½ male for fast mounting to the boiler flow/return by means of flange and union nut. Suitable for boiler manifold KSV.

Cable routing in the heat insulation for professional installation of pump and actuator cables.

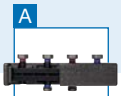
Snap on – done. New actuator with ProClick adapter system for lightning-fast mounting to the mixer without tools.

Heating pump assembly PrimoTherm® K 180-1 DN 25

NEW



- **Pre-assembled, tightness-tested and heat-insulated assembly (complies with German Energy Saving Regulation)**
- **Modular system with flow at left or right**
- **Easy and fast installation**
- **Available with high energy efficiency pumps class A (Wilo or Grundfos)**



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Application

Heating pump assembly for use in non-mixed heating circuits, specially for storage tank charging. It connects the heating boiler and the pipe system.

Description

Comact, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation (complies with German Energy Saving Regulation) and wall mounting unit. Adhesive labels with pictograms allow for easy designation of the heating circuits.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Ball valve below the pump
- System connection G1½ male (boiler), G1 female (heating circuit)

Suitable for pumps DN 25 with G1½ x 180 mm.

The return line consists of:
- Combination valve with gravity brake, thermometer in the handle (blue mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ males, heating circuit G1 female

Operating temperature range
Medium: T_{max} = 95 °C, short-term 120 °C

System pressure
Max. 10 bar

Flow coefficient Kvs
7.6 m^3/h

Heat insulation
Polypropylene EPP

Dimensions
W x H x D: 248 x 400 x 155 mm

Options

- Mixer and actuator, can be retrofitted
- Other circulation pumps

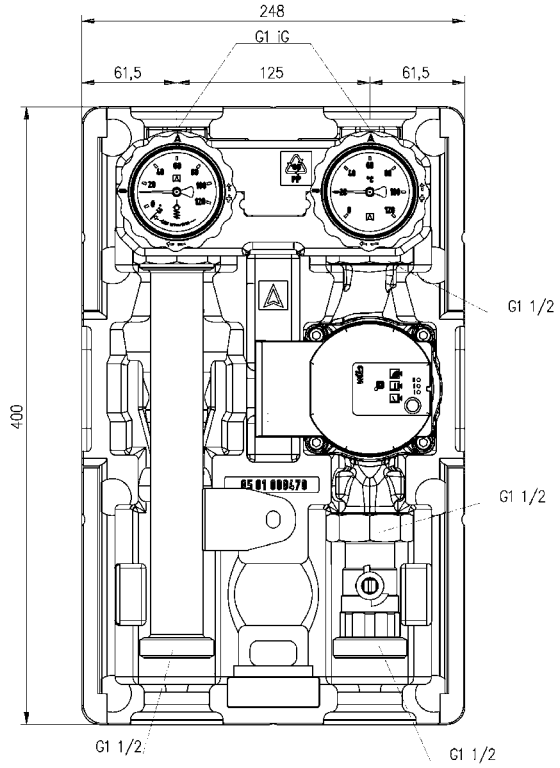
7

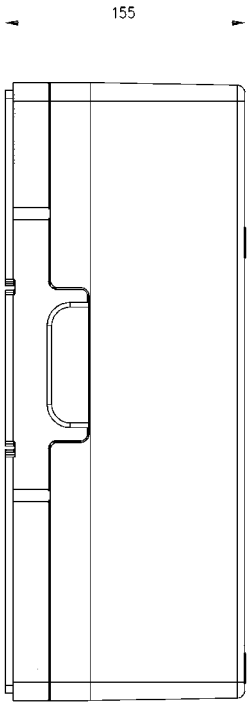
Heating pump assembly PrimoTherm® K 180-1 DN 25

NEW

Dimensions (mm)

PrimoTherm® K 180-1 with Wilo pump





Technical specifications circulation pumps

Length
180 mm

Degree of protection
IP 44

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

	Grundfos	Wilo
Type	UPM3 HYBRID 25-70/180	Para RS 25-180/6
Max. pumping volume	3.6 m³	3.2 m³
Max. pump head	7 M	6.7 m
Power input	2–52 W	3–43 W
Operating modes / power levels		
PWM-A	x/4	-/-
PWM-C	x/4	-/-
PP (constant volume flow)	x/3	x/3
CP (constant pressure)	x/3	x/3
CC (constant speed of rotation)	x/3	x/3

DG: G, PG: 2	Pump	Part no.
PrimoTherm® K 180-1 DN 25	Without pump	77811
PrimoTherm® K 180-1 DN 25 GP	With Grundfos UPM3 HYBRID 25-70/180	77818
PrimoTherm® K 180-1 DN 25 WP	With Wilo Para RS 25-180/6	77819

Accessories and spare parts	Specification	Part no.
Connection kit G1½ female thread x 1 female thread	2 x connection piece G1 female thread, 2 x union nut G1½ female thread, 2 x flat gasket	77612

Heating pump assembly PrimoTherm® K 180-2 DN 25

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **With high-grade, robust mixer**
- **Version with adjustable flow coefficient Kvs from 2.5 to 12 m³/h: Adjustment also possible during operation (under pressure) at any time**
- **Available with high energy efficiency pumps class A (Wilo or Grundfos)**

A
Page 217

Application

Heating pump assembly for use in mixed heating circuits. With the 3-way mixer and the actuator, the flow temperature can be adjusted to a desired temperature by adding water from the return. The mixer version with adjustable flow coefficient Kvs offers maximum flexibility in adapting the system to individual control requirements. The flow coefficient Kvs can be modified at any later point in time, even if the system is under pressure. This way, a great variety of mixer/pump assemblies can be covered with a single version.

Description

Comact, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation (complies with German Energy Saving Regulation) and wall mounting unit. Adhesive labels with pictograms allow for easy designation.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- 3-way mixing valve with ProClick adapter system, either ARV 325 with flow coefficient Kvs 12 m³/h or KVS Vario with adjustable flow coefficient Kvs
- Maintenance-free, silent actuator ARM 343 (6 Nm, 120 s, AC 230 V) with 0/90° angle of rotation, indication for direction of rotation, selector key "Manual/Automatic Mode" and ProClick adapter system
- System connection G1½ male (boiler), G1 female (heating circuit)
  Suitable for pumps DN 25 with G1½ x 180 mm.

The return line consists of:
- Combination valve with gravity brake, thermometer in the handle (blue mark, range 0/120 °C)
- Pipe for length compensation as T piece for mixer connection with screw connection for system connection
- System connection G1½ male (boiler), G1 female (heating circuit)

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ male, heating circuit G1 female

Operating temperature range
Medium: T_{max} = 95 °C, short-term 120 °C

System pressure
Max. 10 bar

Flow coefficient Kvs
ARV 325: 12 m³/h
ARV 325 KVS Vario:
Adjustable 2.5 – 4 – 5 – 6 – 8 – 12 m³/h

Leak rate mixing valve ARV 325 Kvs Vario
< 0.1 % of value of flow coefficient Kvs (up to Δp 0.5 bar < 0.2 % of value of flow coefficient Kvs)

Heat insulation
Polypropylene EPP

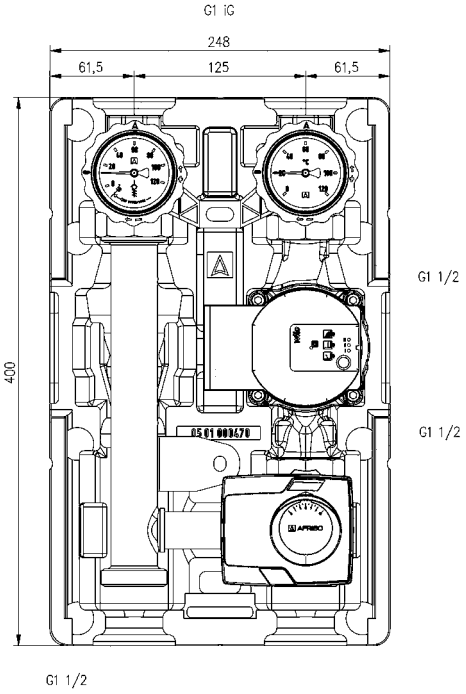
Dimensions
W x H x D: 248 x 400 x 155 mm

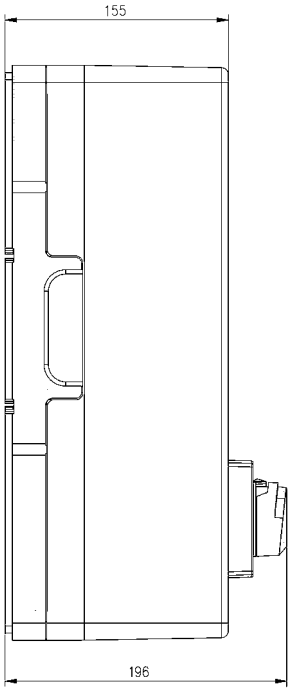
Heating pump assembly PrimoTherm® K 180-2 DN 25

NEW

Dimensions (mm)

PrimoTherm® K 180-2 with Wilo pump





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Technical specifications circulation pumps

Length
180 mm

Degree of protection
IP 44

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

	Grundfos	Wilo
Type	UPM3 HYBRID 25-70/180	Para RS 25-180/6
Max. pumping volume	3.6 m³	3.2 m³
Max. pump head	7 M	6.7 m
Power input	2–52 W	3–43 W
Operating modes / power levels		
PWM-A	x/4	-/-
PWM-C	x/4	-/-
PP (constant volume flow)	x/3	x/3
CP (constant pressure)	x/3	x/3
CC (constant speed of rotation)	x/3	x/3

DG: G, PG: 2	Pump	Part no.
PrimoTherm® K 180-2 DN 25 3WM-SM KVS Vario	Without pump	77817
PrimoTherm® K 180-2 DN 25 WP 3WM-SM KVS Vario	With Wilo Para RS 25-180/6	77816
PrimoTherm® K 180-2 DN 25 GP 3WM-SM KVS Vario	With Grundfos UPM3 HYBRID 25–70/180	77815
PrimoTherm® K 180-2 DN 25 3WM-SM KVS 12	Without pump	77810
PrimoTherm® K 180-2 DN 25 WP 3WM-SM KVS 12	With Wilo Para RS 25-180/6	77814
PrimoTherm® K 180-2 DN 25 GP 3WM-SM KVS 12	With Grundfos UPM3 HYBRID 25–70/180	77813

Accessories	Specification	Part no.
Connection kit G1½ female thread x 1 female thread	2 x connection piece G1 female thread, 2 x union nut G1½ female thread, 2 x flat gasket	77612

Heating pump assembly PrimoTherm® K 180-1 DN 32

NEW

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **Compact design**
- **Available with high energy efficiency pump class A**
- **Easy and fast installation**

Application

Heating pump assembly for use in non-mixed heating circuits, specially for storage tank charging. It connects the heating boiler and the pipe system.

Description

Complete, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation and wall mounting unit.
System connection: Primary end (consumer) G1¼ female

The flow line (flow/hot) consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Ball valve below the pump, suitable for use of pumps with 2" x 180 mm
- System connection G1¼ female (heating circuit)

The return line consists of:
- Combination valve with thermometer in the hand wheel (blue mark, range 0/120 °C)
- Pipe for length compensation with gravity brake
- System connection (boiler) G2 with screw connection G1¼ female (easy mounting and adapter G1½ AB for use with boiler manifold)

Technical specifications

Axis distance
125 mm

System connections
Boiler G1¼ female
Heating circuit G1¼ female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 10 bar (observe maximum pressure of circulation pumps used)

Supply voltage
AC 230 V, 50 Hz

Nominal size
DN 32

Flow coefficient Kvs
21.0 m³/h

Heat insulation
Polypropylene EPP

Options

- With high energy efficiency pump EEI 0.2

DG: G, PG: 2	Pump	Part no.
PrimoTherm® K 180-1 DN 32	Without pump	**79501**
PrimoTherm® K 180-1 DN 32 GP	With Grundfos UPM3(K) HYBRID 32-70 180 (N)	79503
PrimoTherm® K 180-1 DN 32 WP	With Wilo Para OPT 30-180/8-60/SC	**79504**

Heating pump assembly PrimoTherm® K 180-2 DN 32 KVS Vario

NEW

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **Compact design**
- **Robust mixer with adjustable flow coefficient Kvs from 12 to 22 m3/h**
- **Available with high energy efficiency pumps class A and high-grade, robust mixer as well as actuator**
- **Easy and fast installation**

Application

Heating pump assembly for use in non-mixed heating circuits. It connects the heating boiler and the pipe system. With the 3-way mixer KVS Vario and the actuator, the flow temperature can be adjusted to a desired temperature by adding water from the return. PrimoTherm® 180-2 can also be used to increase the return temperature with solid fuel boilers which have a controller for increasing the return temperature. The opening temperature must be set at this controller.

Description

Complete, pre-assembled and tightness-tested heating pump assembly with all required functional components, form-fit heat insulation and wall mounting unit.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- 3-way mixing valve ARV 332 KVS Vario with adjustable flow coefficient Kvs and ProClick adapter system
- Maintenance-free, silent actuator ARM 343 (6 Nm, 120 s, AC 230 V) with 0/90° angle of rotation, indication for direction of rotation, selector key "Manual/Automatic Mode" and ProClick adapter system
- System connection G1¼ female (heating circuit)

Suitable for pumps with 2" x 180 mm.

The return line consists of:
- Combination valve with thermometer in the handle (blue mark, range 0/120 °C), pipe for length compensation with gravity brake
- System connection (boiler) G2 with screw connection G1¼ female (easy mounting and adapter G1½ AB for use with boiler manifold)

Technical specifications

Axis distance
125 mm

System connections
Boiler G1¼ female
Heating circuit G1¼ female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 10 bar (observe maximum pressure of circulation pumps used)

Flow coefficient Kvs
Adjustable: 12 – 16 – 22 m³/h

Leak rate mixing valve ARV 325 KVS Vario
< 0.7 % of value of flow coefficient Kvs (up to Δp 0.5 bar < 0.3 % of value of flow coefficient Kvs)

Heat insulation
Polypropylene EPP

Dimensions
W x H x D: 248 x 480 x 170 mm

Options

- High energy efficiency pump Wilo Stratos Para 30 1-7 r. K.
- Other circulation pumps

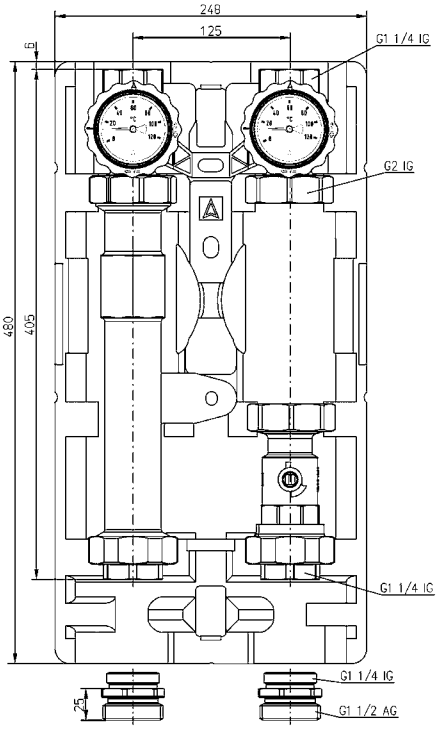
DG: G, PG: 2	Pump	Part no.
PrimoTherm® K 180-2 DN 32 3WM-SM Vario	Without pump	**79502**
PrimoTherm® K 180-2 DN 32 GP 3WM-SM Vario	With Grundfos UPM3 (K) HYBRID 32-70/180 (N)	79505
PrimoTherm® K 180-2 DN 32 WP 3WM-SM Vario	With Wilo Para OPT 30-180/8-60/SC	**79506**

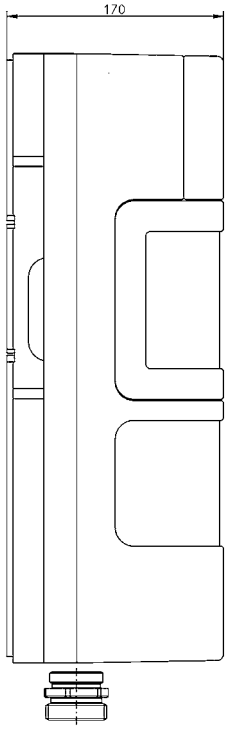
Heating pump assembly PrimoTherm® K 180-1/-2 DN 32

NEW

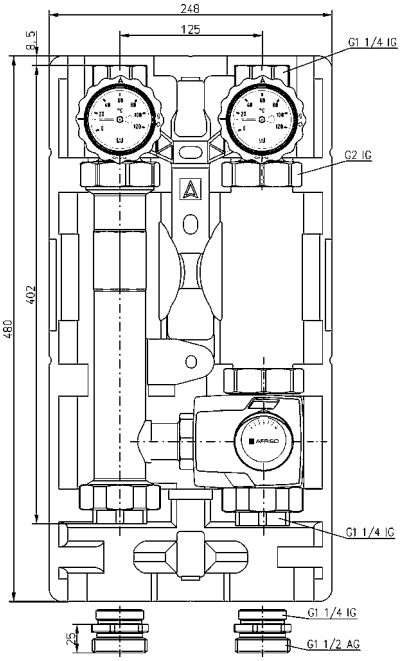
Dimensions (mm)

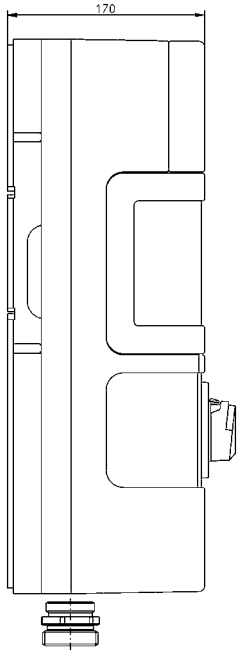
PrimoTherm® K 180-1 DN 32





PrimoTherm® K 180-2 DN 32 KSV Vario





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Spare parts heating pump assemblies PrimoTherm®

DG: G, PG: 2	Part no.	PrimoTherm® 180-1	PrimoTherm® 180-2	PrimoTherm® 180-2 RTA	PrimoTherm® 180-3	PrimoTherm® K 180-1	PrimoTherm® K 180-2	PrimoTherm® K 180-2 RTA	PrimoTherm® K 180-3	PrimoTherm® K 180-1	PrimoTherm® K 180-2
		DN 25				DN 25				DN 32	
Thermometer set (2 pieces)	77531	X	X	–	–	X	X	–	–	–	–
Thermometer set (2 pieces)	77530	–	–	X	X	–	–	X	X	–	–
Thermometer set (2 pieces)	79512	–	–	–	–	–	–	–	–	X	X
Ball valve VL PrimoTherm® DN 25	77537	X	X	X	X	X	X	X	X	–	–
Ball valve PrimoTherm® DN 32	79511	–	–	–	–	–	–	–	–	X	X
Ball valve RL PrimoTherm® DN 25	77539	X	X	X	X	X	X	X	X	–	–
Mixing valve ARV 325 KVS Vario, DN 25, with T piece	77589	X	X	X	–	–	X1	X1	–	–	–
Mixing valve ARV 332 KVS Vario, DN 32	79508	–	–	–	–	–	–	–	–	–	X
Ball valve below pump	77536	X	X	X	X	–	–	–	–	–	–
RTA mixing valve	77534	–	–	–	X	–	–	–	X1	–	–
Heat insulation with wall bracket long	77540	X	X	X	X	–	–	–	–	–	–
Heat insulation with wall bracket short	79514	–	–	–	–	X	X	X	X	–	–
Heat insulation with wall bracket short DN 32	79513	–	–	–	–	–	–	–	–	X	X
Internal parts Vario mixer DN 25	79510	–	X	X	–	–	X	X	–	–	–
Internal parts Vario mixer DN 32	79509	–	–	–	–	–	–	–	–	–	X

X = suitable
X1 = no T piece required

Solar pump assemblies PrimoSol®

Efficient solar thermal systems are taking centre stage in heating system design as a result of rising energy costs, new legislation and, most important, increasing environmental awareness. Advanced solar thermal systems can be easily integrated into the heating system concepts for new buildings and for the conversion of existing systems.

AFRISO offers a comprehensive range of components for solar thermal systems for maximum reliability – all from a single supplier. The innovative solar pump assemblies PrimoSol® are made to meet the requirements of the solar systems available on the market.

The pre-assembled, tightness-tested and heat-insulated assemblies are extremely easy and fast to install. The offer is complemented by a comprehensive range of accessories.

i

We provide a great variety of customer-specific solar pump assemblies for OEMs.

Please enquire.

Solar pump assembly PrimoSol® 130

- **Pre-assembled, tightness-tested and heat-insulated assembly**
- **Available with flow meter with ball valve, integrated filling and flushing unit and vent pot for degassing the heat transfer fluid in the flow line**


PrimoSol® 130-1

Application

Solar pump assembly/line for connection of collector and storage tank in intrinsically safe, sealed solar thermal systems. PrimoSol® 130 circulates heat transfer fluids such as water/glycol mixtures in the system.

Description

Complete, pre-assembled and tightness-tested solar pump assembly/line with all required safety and functional components, including form-fit heat insulation.

Depending on the version, the return line (return/cold) consists of:
- Circulation pump
- Flow meter with ball valve for shut-off, pump end with flange and union nut G1½. Measuring range: 2–12 l/min. With integrated filling and flushing unit, system connection: G¾ male thread.
- Combination valve with system connection G¾ male thread, pump end with flange and union nut G1½. With adjustable gravity brake and thermometer in the hand wheel (blue mark, range 0/120 °C).
- Safety group assembly with connection G¾ for expansion vessel. With solar safety valve 6 bar, outlet Rp¾ female thread, pressure gauge Ø 63 mm, 0/10 bar, mounting valve.

The flow line consists of (130-4 only):
- Combination valve with adjustable gravity brake and thermometer in the handle (red mark, range 0/120 °C) with system connection G¾ male
- Vent pot to remove the gas from the heat transfer fluid with system connection G¾ male. Transparent hose 200 mm as venting aid.

The heat insulation is also used to package the product for protected transport.
The safety valve of the safety group assembly complies with Pressure Equipment Directive 2014/68/EC.

Technical specifications

Axis distance
100 mm

System connections
G¾ male thread

Operating temperature range
Ambient: T_{max} = 40 °C
Medium: T_{max} = 120 °C,
short-term T_{max} = 160 °C

System pressure
Max. 6 bar

Flow meter
2–12 l/min

Heat insulation
Polypropylene EPP

Circulation pump
Grundfos UPM 3 Solar 25–75
Length: 130 mm
Degree of protection: IP 42
With PWM cable

Supply voltage
AC 230 V, 50 Hz

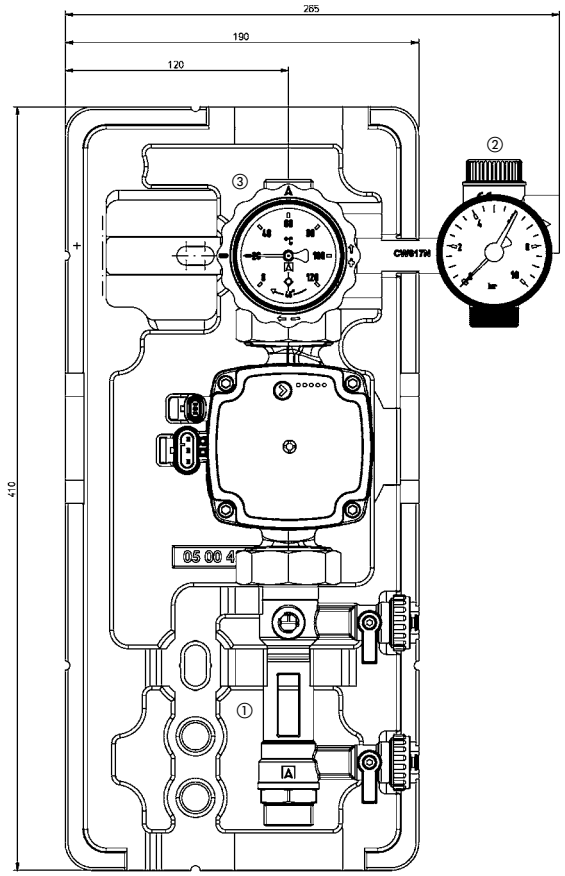
Power input/pumping head
19 W/4.5 m 28 W/5.5 m
35 W/6.5 m 45 W/7.5 m

DG: G, PG: 2	Pump	Part no.
PrimoSol® 130-1, 2–12 l/min	With Grundfos UPM3 HYBRID 25-70/130	**77886**
PrimoSol® 130-4, 2–12 l/min	With Grundfos UPM3 HYBRID 25-70/130	**77889**
PrimoSol® 130-4, 2–12 l/min	Without pump	77859
PrimoSol® 130-4, 8–38 l/min	With Grundfos UPM3 HYBRID 25-70/130	77018
PWM cable, length 1 m suitable for Grundfos UPM 3 HYBRID		**77015**

Solar pump assembly PrimoSol® 130

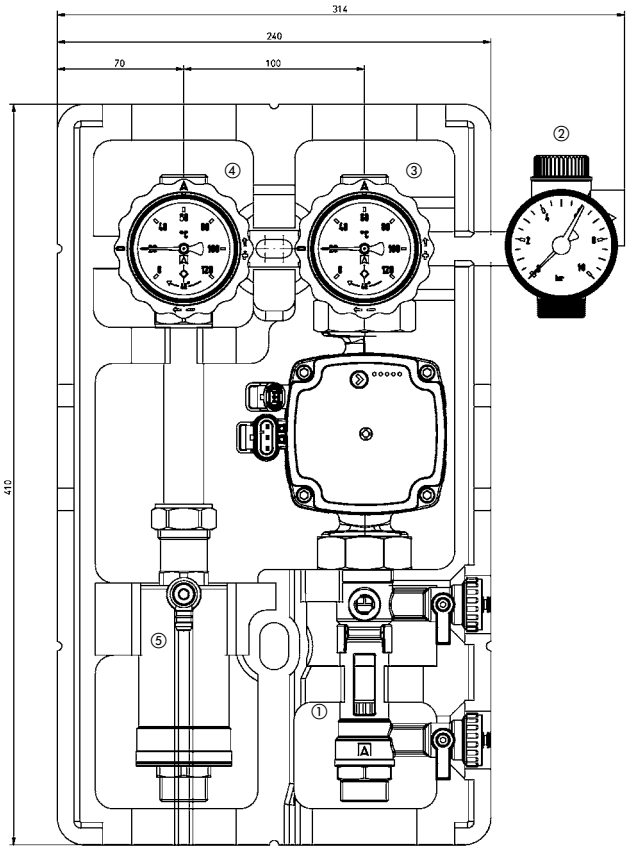
Dimensions (mm)

Solar pump line PrimoSol® 130-1



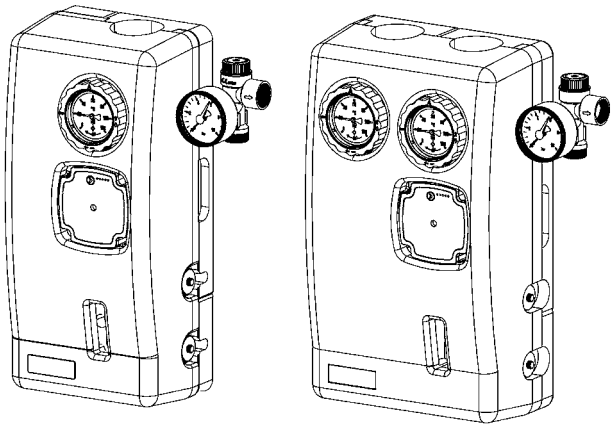
① Flow meter with ball valve as well as filling and flushing unit
② Safety group assembly
③ Combination valve with thermometer (return/cold)

Solar pump assembly PrimoSol® 130-4

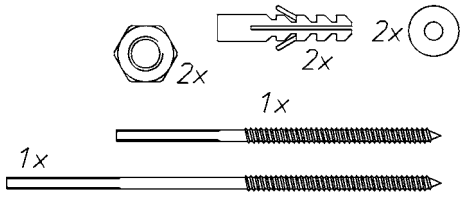


① Flow meter with ball valve as well as filling and flushing unit
② Safety group assembly
③ Combination valve with thermometer (return/cold)
④ Combination valve with thermometer (flow)
⑤ Vent pot for fast and easy venting, especially during filling of the system

Heat insulation 130-1 and 130-4
The heat insulation is also used to package the product for transportation.



Scope of delivery
PrimoSol® completely pre-assembled with circulation pump and mounting accessories.



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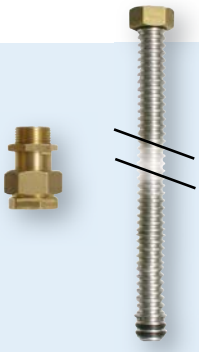
Accessories for solar thermal systems



Filling and flushing unit

Description

For solar systems as filling and flushing unit.
With ball valve, two boiler filling and drain valves KFE G¾, process connection G1 with union nut and compression fittings at both ends.

Technical specifications

Connections
G1, compression fitting at both ends Ø 22 mm

Dimensions
L: 108 mm

Housing
Brass

Diaphragm safety valve MSS

Description

For solar thermal systems to protect against overpressure. Suitable for water, water/Antifrogen mixtures and water/Tyfocor mixtures.

Technical specifications

Connections
Inlet: G½ female
Outlet: G¾ female

Cap
PA6, black

Opening pressure
6 bar

Dimensions
W x H x D: 35 x 60 x 45 mm

Housing
Brass CW617 N

Operating temperature range
Medium: -20/+160 °C

Heating capacity
Max. 50 kW

Type approval mark
TÜV.SV.yy-2017.13.SOL
"yy" represents the year of the approval

Connection kit

Description

For diaphragm expansion vessels (MAG) suitable for safety group assembly for PrimoSol®.

Consisting of:
- Bracket for wall mounting
- Flex pipe (500 mm, 1 union nut and seals)
- MAG mounting valve
- Mounting accessories

Technical specifications

Connections
Flex pipe: Union nut G¾
Mounting valve: G¾

Dimensions
Flex pipe (L): 500 mm
Bracket (W x L): 220 x 110 mm

i Please enquire for diaphragm safety valves with other pressure ratings.

DG: G, PG: 2			Part no.
Filling and flushing unit	1	1	**77781**
Diaphragm safety valve MSS, G½ female x G¾ female	1	84	**42330**
Connection kit G¾	1	1	77904

Vents for solar thermal systems

Quick air vents for solar systems

Description

Quick air vent for use in solar thermal systems with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. Housing made of high-precision turned brass, functional parts made of highly temperature-resistant plastic. Connection G3/8 with O ring seal.

Quick air vents for solar systems with ball valve

Quick air vent for use in solar thermal systems with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. Housing made of high-precision turned brass, functional parts made of highly temperature-resistant plastic. Completely assembled with ball valve as shut-off unit. Connection G3/8.

Air separator

Air separator for use in solar thermal systems or in sealed heating systems as per EN 12828 with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. The air separator removes the air from the heat transfer fluid. The air collects in the housing and can be released via a quick air vent or a manual vent valve connected at the G3/8 threaded connection. Compression fitting for Cu pipe Ø 22 mm at both ends.

DG: G, PG: 2	Connection			Part no.
Quick air vents for solar systems	G3/8	1	25	**77900**
Quick air vents for solar systems with ball valve	G3/8	1	25	**77996**
Air separator	Compression fitting Ø 22	1	-	**77851**

Air separator combination Solar LKS, collector tank for solar liquid

Air separator combination Solar LKS

Application

For use in thermal solar systems to remove air bubbles from the solar liquid.

Description

Air separator, completely pre-assembled with quick air vent for solar systems. The air separator removes the air contained in the heat transfer medium. The air collects in the housing and can be released via the quick air vent for solar systems connected at the G$^{3}/_{8}$ connection by actuating the ball valve.

Technical specifications

Operating temperature range
Medium: Max. 150 °C

System pressure
Max. 6 bar

System connections
Compression fitting for Cu pipe
Ø 22 mm at both ends

Collector tank for solar liquid

Collects groundwater polluting solar liquid in the case of system overpressure.

Collector tank for solar liquid with integrated drain valve. Volume 10 l. The collector tank for solar liquid is connected to the diaphragm safety valve MSS or to the safety group assembly PrimoSol® of the solar pump assembly via a pipe. In the case of system overpressure, it collects escaping solar liquid. A basic volume of 1 to 1.5 l of liquid is always contained in the collector tank to avoid overheating of the collector tank if solar liquid escapes suddenly from the solar thermal system.

Operating temperature range
Medium: Max. 95 °C
Short-term 120 °C (without basic liquid volume)

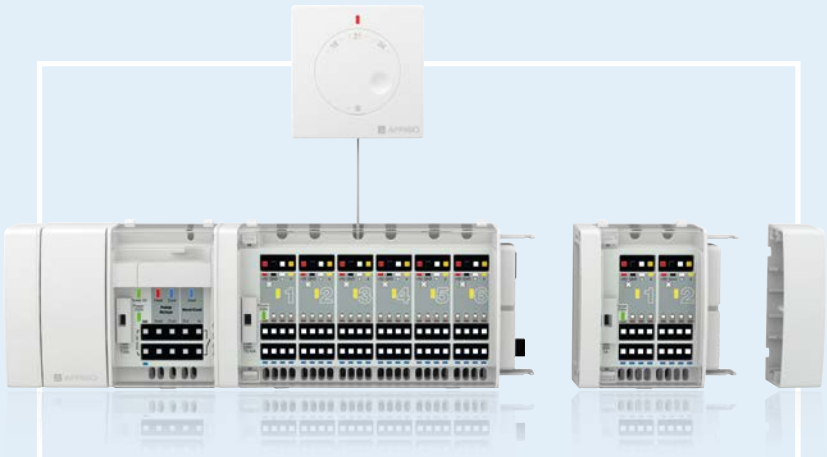
Dimensions
W x H x D: 300 x 390 x 145 mm

Weight
0.97 kg

Filling volume
Max. 10 l

Solar pump assembly PrimoSol® 130-4 with collector tank for solar liquid in a solar thermal system.

DG: G	PG			Part no.
Air separator combination Solar LKS, Connection: Compression fitting Ø 22	1	1	1	**77850**
Collector tank for solar liquid	1	1	1	**77796**



Single room temperature controllers

Terminal blocks for controllers

Manifold systems for heating and cooling

CHAPTER 8

Equipment for surface heating and cooling systems

SINGLE ROOM CONTROLLER

MECHANICAL SINGLE ROOM CONTROLLER

MANIFOLDS

Single room temperature controller CosiTherm®

Overview wired version

Base module with controller module for 6 control circuits

Base module with timer module and controller module for 8 control circuits

Base module with timer module and controller module for 12 control circuits

Room temperature sensor wired

Functions
- Adjustment of reference temperature 6/30°C
- Measurement of actual temperature

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The controller modules can be combined as required, subject to the conditions on site.

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Overview wireless version

Base module with controller module for 6 control circuits

Base module with controller module for 8 control circuits

Base module with controller module for 12 control circuits

Room temperature sensor wireless

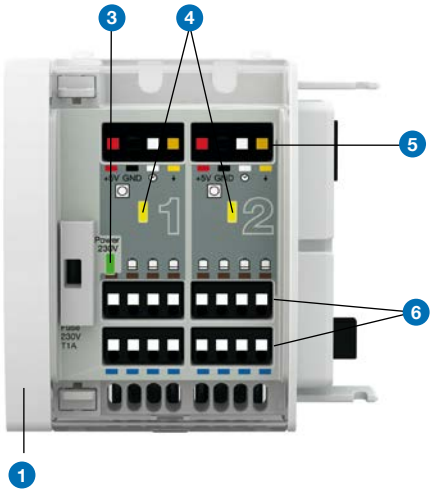
Functions
- Adjustment of reference temperature 6/30°C
- Measurement of actual temperature

Functions and connections
Single room temperature controller CosiTherm®

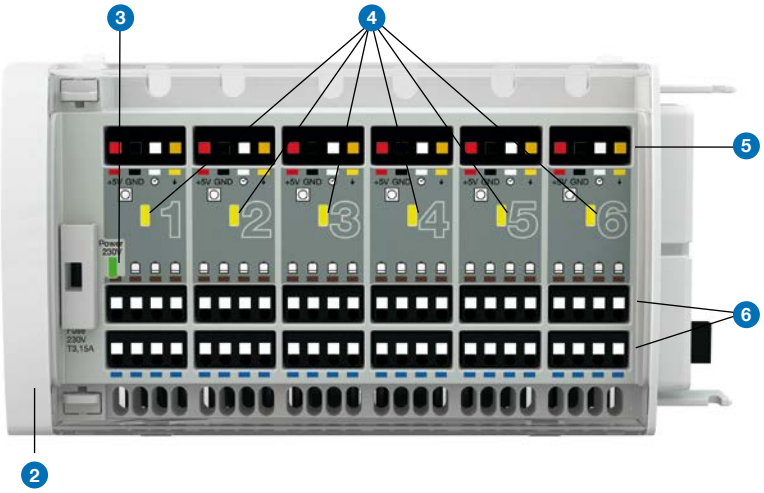
Base module BM

Base module BM

1 LED green: Operation mains voltage
2 LED green: Operation DC 5 V
3 LED red: Pump "Heating"
4 LED blue: Pump "Cooling"
5 LED blue: Indication program mode "Heating" or "Cooling"
6 Connection supply voltage AC 230 V
7 Relay contact pump "Heating"
8 Relay contact pump "cooling"
9 Cascading output "Heating/Cooling"
10 Input switchover "Heating/Cooling"



Controller module D2

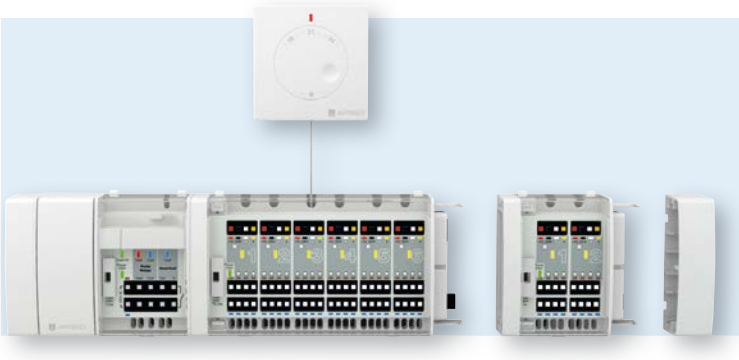


Controller module D6

Controller module wired

1 Controller module with two control circuits
2 Controller module with six control circuits
3 LED green:
Indication mains voltage for thermostatic actuators
4 LED yellow: Indication thermostatic actuator active
5 Terminal block for room temperature sensors
6 Terminal block for thermostatic actuators

Single room temperature controller CosiTherm® – wired



- Controller terminal bar for connection of actuators
- For manifold systems for heating and cooling
- Extremely flat room temperature sensor with a height of 12.5 mm
- Room temperature sensor with wire connection
- Timer module for programming temperature reduction, pump operating time and valve protection function

Application

Controls the temperature of individual rooms in connection with manifold systems for heating and cooling.

Description

The base version of the single room temperature controller CosiTherm® wired consists of a base module, at least one controller module with two or six independent control circuits and a corresponding number of room temperature sensors. The controller modules can be interconnected in a modular way to account for the number of control circuits/rooms. One room temperature sensor is required per control circuit; it is wired to the controller module. The room temperature sensor measures the actual temperature in the room. The reference temperature is adjusted via the rotary knob of the room temperature sensor. The controller module compares the actual temperature and the reference temperature and controls the volume flow of the heating/cooling water via the thermostatic actuators of the manifold system.
An optional timer module with display and an integrated hundred-year calendar can be plugged into the base module. It features two independently programmable switching channels for temperature reduction, nine programmable memory blocks and a valve and pump protection function. The additional pump running time is adjustable. The terminals of the controller modules are colour-coded for easy assignment to the wires; in conjunction with the DIN rail snap connectors at the rear of the housing, this facilitates installation.

Functions

Base module BM
- Power supply of the room temperature sensors (DC 5 V) and thermostatic actuators (AC 230 V)
- Switchover of the system to "Heating" or "Cooling"
- Control of the heating/cooling pumps

Controller module
- Comparison of actual and reference temperatures
- Control of heating/cooling water via connected thermostatic actuators
- Connection of two or six control circuits, extensible as required
- Wired connection of room temperature sensors

Timer module UM (option)
- Time data: Date, time, weekday (leap year detection)
- Automatic switching between daylight saving time and winter time (CEST)
- Temperature reduction adjustment
- Additional pump running time adjustment
- Valve and pump protection function adjustment

Timer module (option) for programming and display of date, time, weekday.

Single room temperature controller CosiTherm® – wired

Technical specifications

Connections
Base module BM
Max. 9 controller modules D2 or
3 controller modules D6
Controller module D2
Max. 2 room temperature sensors and 8 actuators
Controller module D6
Max. 6 room temperature sensors and 24 actuators

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

Base module BM

Supply voltage
AC 230 V, 50-60 Hz

Nominal power
1 VA

Housing
Plastic housing PC/ABS
W x H x D: 122 x 92 x 45 mm
Degree of protection: IP 20 (EN 60529)

Weight
215 g

Controller module

Supply voltage
AC 230 V, DC 5 V (via base module BM)

Nominal power
Controller module D2: 0.1 W
Controller module D6: 0.3 W

Housing (W x H x D)
Plastic housing PC/ABS
Controller module D2: 73 x 92 x 45 mm
Controller module D6: 162 x 92 x 45 mm
Degree of protection: IP 20 (EN 60529)

Weight
Controller module D2: 130 g
Controller module D6: 260 g

Timer module UM (option)

Automatic switching between daylight saving time and winter time (CEST)

Temperature reduction
4 K
Switching channels:
2, independently programmable
Memory blocks:
9, independently programmable

Valve and pump protection function/ additional pump running time
0/15 min, adjustable

Supply voltage
DC 3.3 V (via base module BM)

Nominal power
3 mW

Housing (W x H x D)
Plastic housing PC/ABS
Colour: Light grey, similar to RAL 7047
W x H x D: 37 x 93 x 28 mm
Degree of protection: IP 30 (EN 60529)

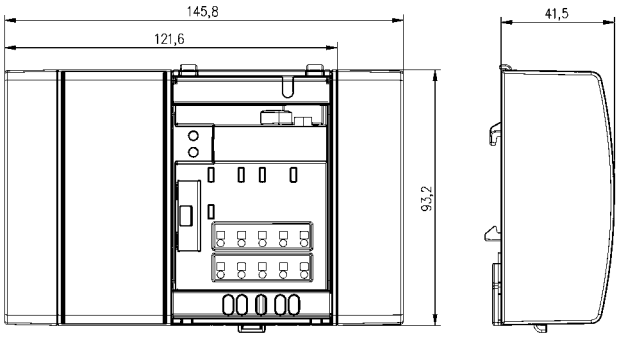
Weight
33 g

DG: G, PG: 4	Part no.
Base module BM	**78112**
Controller module D2 for 2 control circuits	**78114**
Controller module D6 for 6 control circuits	**78115**
Options	
Timer module UM for base module BM	**78113**

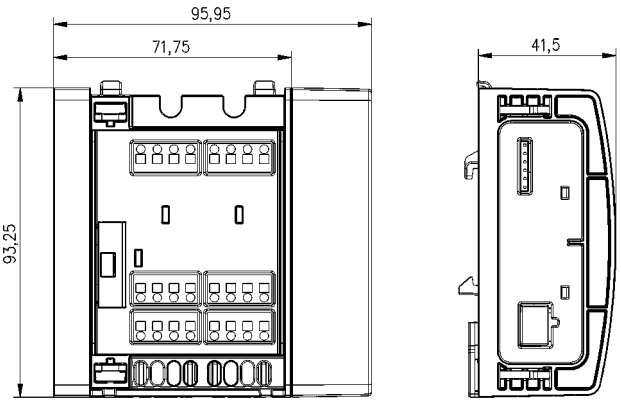
Single room temperature controller CosiTherm® – wired

Types and dimensions (mm)

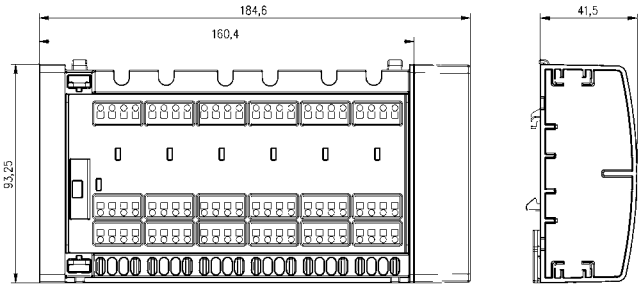
Base module BM



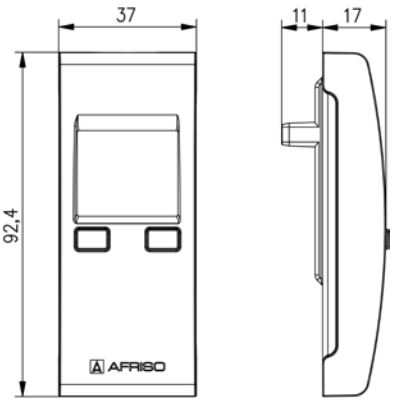
Controller module D2



Controller module D6



Timer module UM



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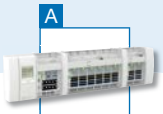
Room temperature sensor D – wired

- **Extremely flat with a height of 12.5 mm**
- **Easy surface mounting**



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Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature.

Description

The room temperature sensor D transmits the actual ambient temperature as well as the reference room temperature via the connection wire to the single room temperature controller CosiTherm®. The reference value for the room temperature is adjusted by means of the integrated rotary knob. The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis. If there is a difference, the single room temperature controller CosiTherm® adapts volume flows of the heating/cooling water via the thermostatic actuators of the manifold system of the surface heating system.

Technical specifications

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

Temperature adjustment range
6/30 °C

Temperature reduction
4 K

Supply voltage
DC 5 V, via controller module

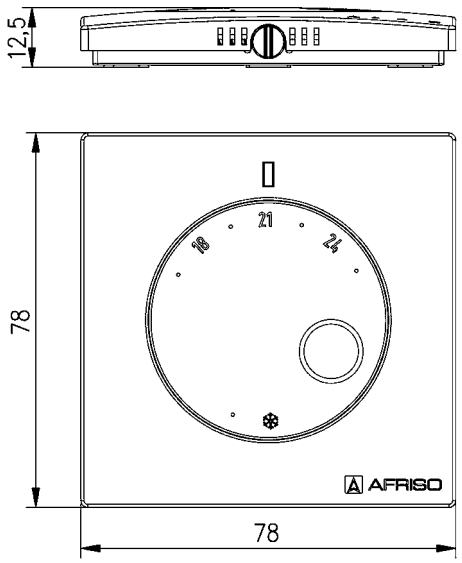
Nominal power
0.012 VA

Wired connection
Max. 100 m

Housing
Wall mounting housing made of PC
Colour: White, similar to RAL 9003
W x H x D: 78 x 78 x 12.5 mm
Weight: 30 g
Degree of protection:IP 30 (EN 60529)

Scope of delivery
- Room temperature sensor D
- Mounting kit (2 x screws, 2 x screws)

Dimensions (mm)



DG: G, PG: 4	Part no.
Room temperature sensor D	**78110**

Room thermostat RT 10 D 5 for CosiTherm® – wired

NEW

- Easy mounting on standard in-wall switch boxes
- 5 V version for CosiTherm® – wired
- Display
- Adjustable time programs
- Central switching between heating and cooling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Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature for use in water-based underfloor heating systems.

Description

The room thermostat measures the ambient temperature, compares it to the reference temperature and provides a control signal for CosiTherm®.

The reference value for the room temperature is adjusted by means of the function keys. The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis. If there is a difference, the single room temperature controller CosiTherm® opens or closes the actuators, thus controlling the heating circuits. In addition to the reference temperature, you can store timer programs (e.g. Day/Night).

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Technical specifications

Operating temperature range
Ambient/storage: 5/60 °C

Temperature adjustment range
5/35 °C
Accuracy: ±0.5 K

Supply voltage
5 V via CosiTherm® controller terminal bar

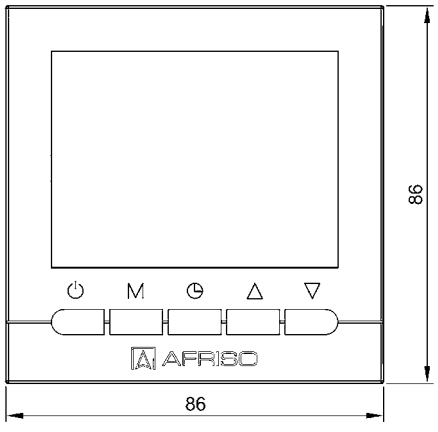
Housing
Plastic, PC
Colour: White (RAL 9003)
Degree of protection: IP 20 (EN 60529)

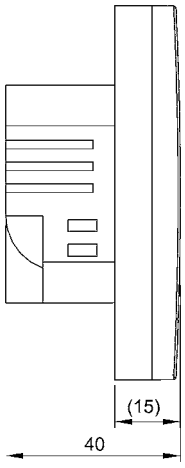
Weight
165 g

Scope of delivery
- RT 10 D 5
- Operating instructions

Necessary additional components:
- CosiTherm® base module BM
- CosiTherm® controller module D2 and/or D6

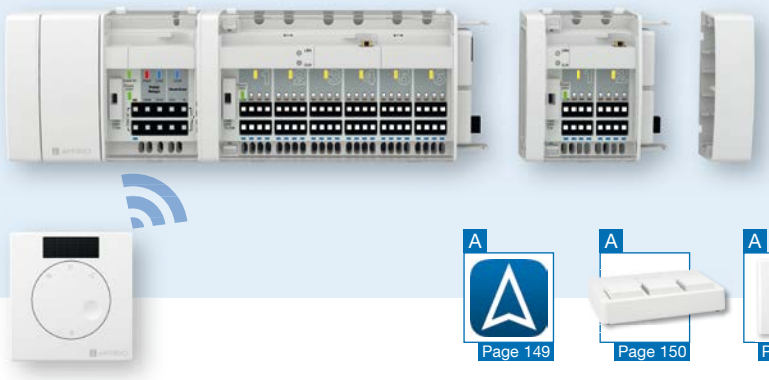
Dimensions (mm)





DG: G, PG: 4	Part no.
Room thermostat RT 10 D 5	**86061**

Single room temperature controller CosiTherm® – wireless



- Controller terminal bar for connection of actuators
- For manifold systems for heating and cooling
- Worldwide access via the AFRISOhome gateway

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Application

Controls the temperature of individual rooms in connection with manifold systems for heating or cooling. EnOcean® wireless technology for integration into building automation systems.

Description

The base version of the single room temperature controller CosiTherm® Wireless consists of a base module, at least one controller module with two or six independent control circuits and a corresponding number of room temperature sensors. The controller modules can be interconnected in a modular way to account for the number of control circuits/rooms. One room temperature sensor is required per control circuit; the standard version is battery-less and connected to the controller module via the EnOcean® wireless technology. The room temperature sensor measures the actual temperature in the room. The reference temperature is adjusted via the rotary knob of the room temperature sensor or via the app AFRISOhome. The controller module compares the actual temperature and the reference temperature and controls the volume flow of the heating/cooling water via the thermostatic actuators of the manifold system.
The base module features two independently programmable switching channels for temperature reduction, nine programmable memory blocks and a valve and pump protection function. The additional pump running time is adjustable. The terminals of the controller modules are colour-coded for easy assignment to the wires of the thermostatic actuators; in conjunction with the DIN rail snap connectors at the rear of the housing, this facilitates installation.
With an AFRISOhome gateway, it is possible to remotely check and, if necessary, adjust the room temperatures via the AFRISOhome app (for example, when coming back from winter vacation). This flexible remote control of the room temperature combines multiple benefits: you can increase living comfort and reduce energy costs.
In conjunction with additional AFRISO smart home products with EnOcean® wireless technology, the user can configure a whole range of fully customisable, extensible applications.

Functions

Base module BM

- Power supply of the thermostatic actuators (AC 230 V)
- Switchover of the system to "Heating" or "Cooling"
- Control of the heating/cooling pumps

Controller module

- Comparison of actual and reference temperatures
- Control of heating/cooling water via connected thermostatic actuators
- Connection of two or six control circuits, extensible
- Connection to room temperature sensors via EnOcean® wireless technology

Single room temperature controller CosiTherm® – wireless

Technical specifications

Connections
Base module BM
Max. 9 controller modules F2 or
3 controller modules F6
Controller module F2
Max. 2 room temperature sensors and 8 actuators as well as external antenna
Controller module RM F6
Max. 6 room temperature sensors and 24 actuators as well as external antenna

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

EnOcean® wireless
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Base module BM

Supply voltage
AC 230 V, 50–60 Hz

Nominal power
1 VA

Housing
Plastic housing PC/ABS
Colour: Light grey, similar to RAL 7047
W x H x D: 122 x 92 x 45 mm
Degree of protection: IP 20 (EN 60529)

Weight
215 g

Controller module

Supply voltage
AC 230 V, DC 5 V (via base module BM)

Nominal power
Controller module F2: 0.3 W
Controller module F6: 0.5 W

Housing (W x H x D)
Plastic housing PC/ABS
Controller module F2: 73 x 92 x 45 mm
Controller module F6: 162 x 92 x 45 mm
Degree of protection: IP 20 (EN 60529)

Weight
Controller module F2: 130 g
Controller module F6: 260 g

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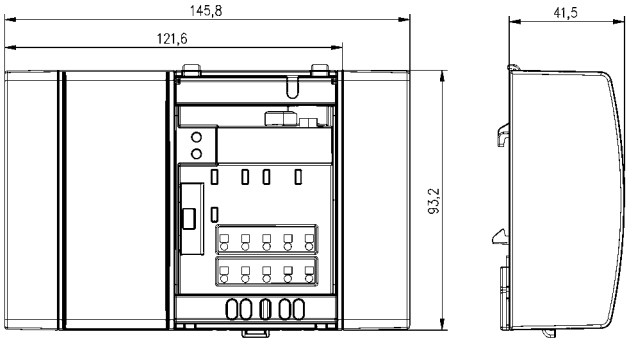
See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: G, PG: 4	Part no.
Base module BM	**78112**
Controller module F2A with external antenna, for 2 control circuits	**78123**
Controller module F6A with external antenna, for 6 control circuits	**78124**

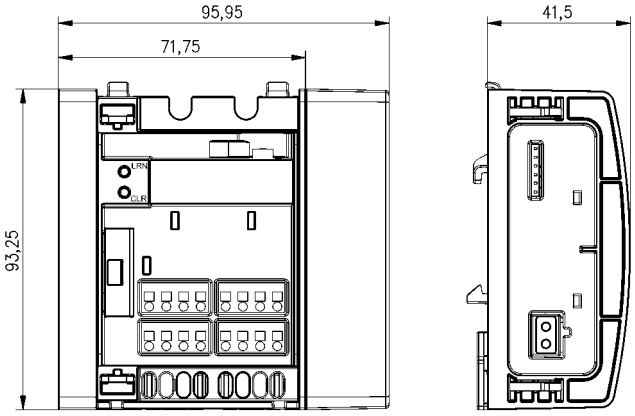
Single room temperature controller CosiTherm® – wireless

Types and dimensions (mm)

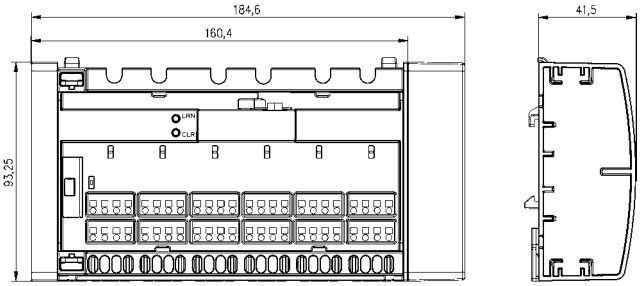
Base module BM



Controller module F2



Controller module F6



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Room temperature sensor FT – wireless

- Extremely flat with a height of 12.5 mm
- No cables required (operation via photovoltaic cell or battery)
- Flexible location-independent use anywhere in buildings

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Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature.

Description

The room temperature sensor FT transmits the actual ambient temperature as well as the reference room temperature via the integrated EnOcean® wireless module to the single room temperature controller CosiTherm® Wireless or to the AFRISOhome gateway. The reference value for the room temperature is adjusted by means of the integrated rotary knob.
The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis. If there is a difference, the single room temperature controller CosiTherm® – Wireless adapts the volume flows of the heating/cooling water via the thermostatic actuators of the manifold system of the surface heating system. The energy required to send reference temperature and actual temperature values is generated by means of an integrated photovoltaic cell; it is also possible to use a standard battery. The AFRISOhome gateway transmits alarm messages and changes in temperature and/or humidity via WLAN or LAN to the person in charge (for example, to the owner, the facility manager, the janitor or other configured contacts); the message includes information on which room temperature sensor has signalled the change. The AFRISOhome gateway in conjunction with additional AFRISO smart home products with EnOcean® wireless technology allows the user to configure a whole range of fully customisable, extensible applications.

Technical specifications

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

Temperature adjustment range
8/30 °C

Temperature measurement
0/40 °C
Accuracy: ±1 K

Supply voltage
Energy harvesting (via photovoltaic cell) or type 1632 battery, DC 3 V (with daylight less than 200 lx)

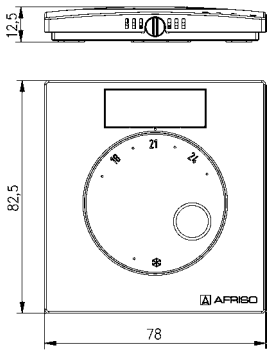
Housing
Wall mounting housing made of PC
Colour: White, similar to RAL 9003
W x H x D: 78 x 82.5 x 12.5 mm
Weight: 43 g
Degree of protection: P 30 (EN 60529)

EnOcean® wireless
EEP: A5-10-03
Frequency: 868.3 MHz
Transmission power: Max. 10 mW
Range: 10 to 30 m (depending on room arrangement and materials in the building)

Scope of delivery
- Room temperature sensor FT
- 4 x adhesive dots
- Without battery

Necessary additional components
- CosiTherm® – wireless and/or
- AFRISOhome gateway

Dimensions (mm)

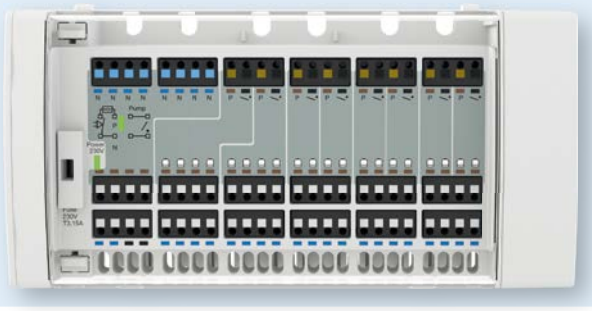


i See operating instructions for detailed information on the range of the EnOcean® wireless module.

DG: L, PG: 4	Part no.
Room temperature sensor FT (temperature)	**78111**

Single room temperature controller CosiTherm® Basic controller terminal bar WB 10 D – wired

NEW



- Controller terminal bar for connection of actuator and room thermostats
- For water-based underfloor heating systems
- Suitable for room thermostat RT 10 D 230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Application

For wiring of the room thermostats and actuators. The controller terminal bar supplies the actuators and room thermostats.

Description

Up to 8 room thermostats and up to 20 actuators can be connected to the controller terminal bar. The room thermostat measures the actual temperature in the corresponding rooms. The reference temperature is adjusted by means of the keys of the room thermostat. The room thermostat then switches the thermostatic actuator via the controller terminal bar to control the heating circuit at the manifold.

It is also possible to connect a pump. When all actuators are de-energised (closed), the pump is switched off.

Technical specifications

Connections
Max. 8 control circuits and 20 actuators
Max. 1 room thermostat per control circuit
Control circuits 1 + 2 = 4 actuators each
Control circuits 3 – 8 = 2 actuators each

Operating temperature range
Ambient/storage: 5/50 °C

Supply voltage
230 V

Nominal power
500 W

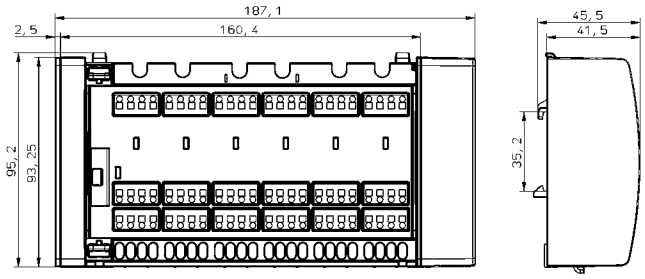
Housing
Plastic housing PC/ABS
W x H x D: 210 x 92 x 24 mm
Colour: Light grey (similar to RAL 7047)
Degree of protection: IP 20 (EN 60529)

Weight
275 g

Scope of delivery
- Controller terminal bar with connection cable/Euro plug
- Operating instructions

Types and dimensions (mm)

CosiTherm® Basic controller terminal bar WB 10-D 8-230

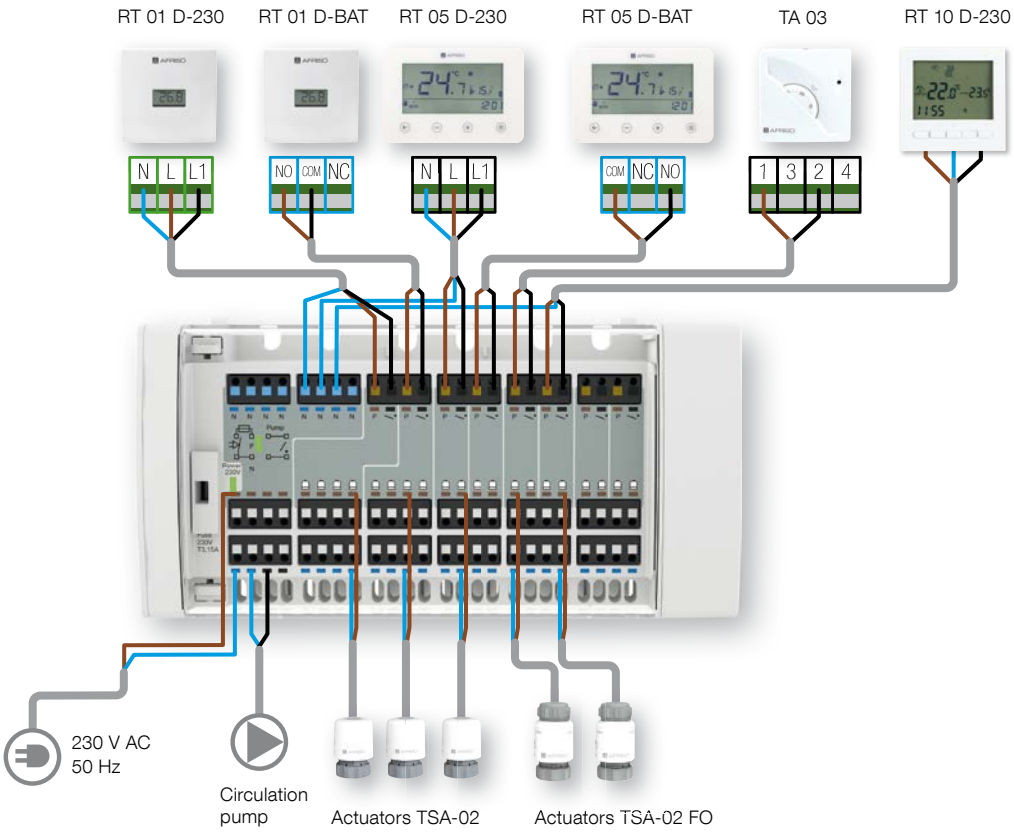


DG: G, PG: 4	Part no.
CosiTherm® Basic controller terminal bar WB 10 D-8-230	**80236**

Single room temperature controller CosiTherm®
Basic controller terminal bar WB 10 D – wired

NEW

Connection controller terminal bar WB 10 D-8-230



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Room thermostats D-BAT require a cable 2 x 0.5 mm², room thermostats D-230 a cable 3 x 0.5 mm².

AFRISO

Single room temperature controller FloorControl controller terminal bar WB 01 – wired

- Controller terminal bar for connection of actuators and room thermostats
- For manifold systems for heating and cooling
- Suitable for room temperature sensors series RT – wired


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Application

Controls the temperature of individual rooms in connection with manifold systems for heating (cooling function depends on room temperature sensor used).

Description

The single room temperature controller FloorControl is a complete system consisting of a terminal block with the corresponding number of room thermostats. The controller terminal bar has eight control circuits. One room thermostat is required per control circuit; it is wired to the controller terminal bar. Up to four thermostatic actuators can be connected to each of the control circuits 1 to 3; a maximum of two actuators can be connected to the thermostatic actuators 4 to 8.

The room thermostat measures the actual temperature in the corresponding rooms. The reference temperature is adjusted by means of the keys of the room thermostat. The room thermostat then switches the thermostatic actuator via the controller terminal bar to control the heating circuit at the manifold.

Functions and features

Controller terminal bar WB 01
For controlling the reference temperature. Versions:
- WB 01 D-8-24: Power supply for the thermostatic actuators (DC 24 V) and supply of the contacts of the room thermostat (battery operation only)
- WB 01 D-8-230: Power supply for the thermostatic actuators (AC 230 V) and supply of the contacts of the room thermostat (AC 230 V or battery operation only)

Technical specifications

Connections
Max. 8 control circuits and 22 actuators
Max. 1 room thermostat per control circuit

Operating temperature range
Ambient/storage: 5/50 °C

Supply voltage
WB 01 D-8-24: 24 V
WB 01 D-8-230: 230 V

Nominal power
4.948 VA

Housing
Plastic housing ABS
W x H x D: 335 x 106 x 72 mm
Colour: White (RAL 9003)
Degree of protection: IP 20 (EN 60529)

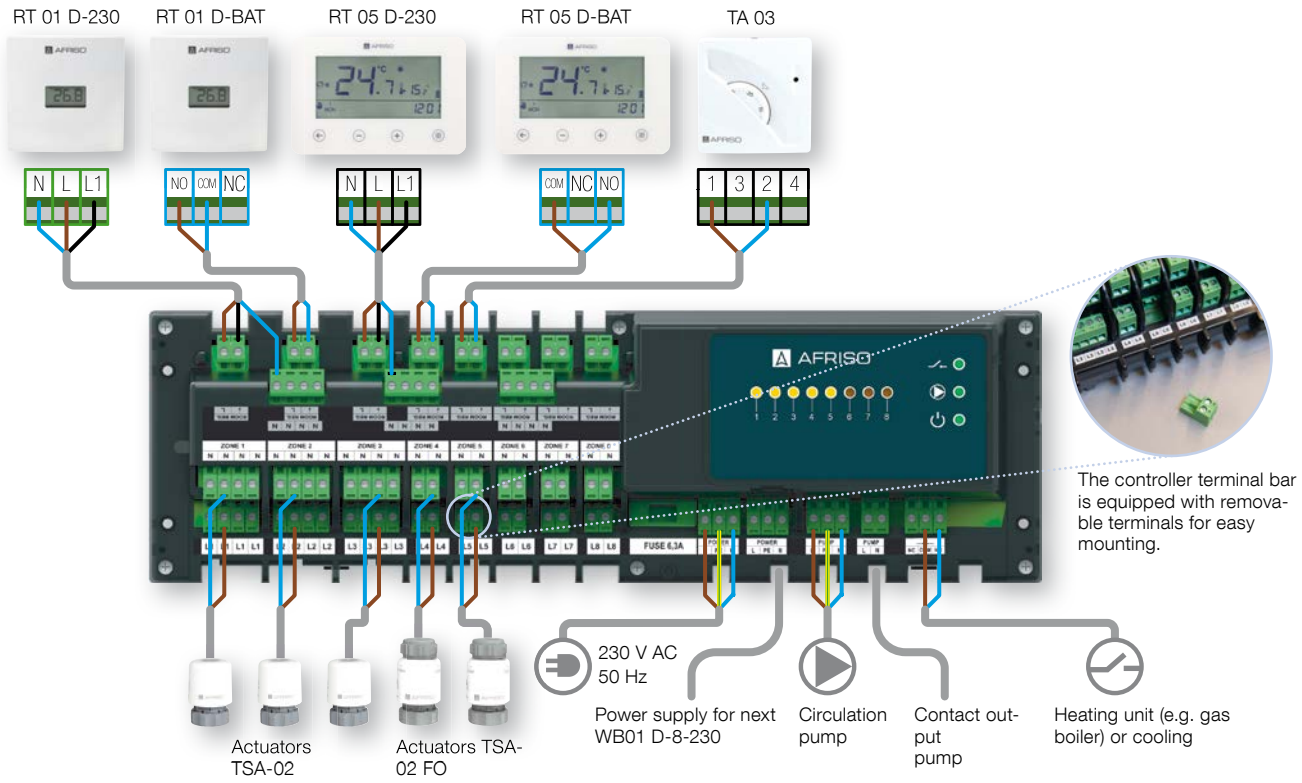
Weight
Without mains cable
WB 01 D-8-230: 766 g
WB 01 D-8-24: 751 g

Compatibility

	Controller terminal bar	
Room thermostat	**WB 01 D-8-230**	**WB 01 D-8-24**
TA 03	•	•
RT 01 D-230	•	
RT 01 D-BAT	•	•
RT 05 D-230	•	
RT 05 D-BAT	•	•
Actuators	230 V	24 V

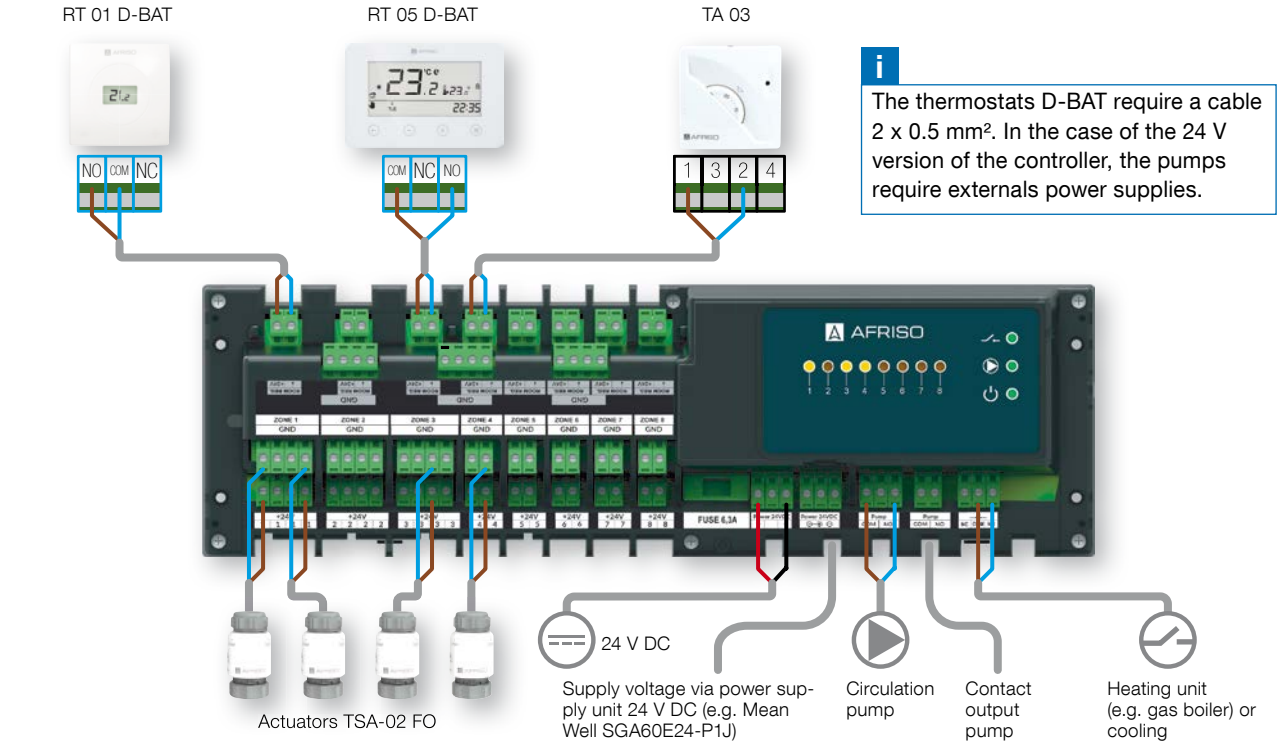
Single room temperature controller FloorControl controller terminal bar WB 01 – wired

Connection controller terminal bar WB 01 D-8-230



i Room thermostats D-BAT require a cable 2 x 0.5 mm², room thermostats D-230 a cable 3 x 0.5 mm².

Connection controller terminal bar WB 01 D-8-24

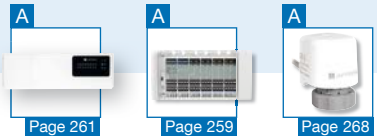


i The thermostats D-BAT require a cable 2 x 0.5 mm². In the case of the 24 V version of the controller, the pumps require externals power supplies.

DG: G, PG: 4	Part no.
Controller terminal bar WB 01 D-8-230 for 8 control circuits (230 V)	**86013**
Controller terminal bar WB 01 D-8-24 for 8 control circuits (24 V)	**86014**

Room thermostats TA 03 for controller terminal bar WB 01/WB 10 D

- Mechanical temperature controllers with lamp and on/off switch
- For room temperature control
- Switch-off function for the summer months
- Easy surface mounting
- Universal use, also for standard controllers



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Application

Mechanical room thermostats for domestic applications. On-wall wall mounting allows for retrofitting.

Description

The temperature measured at the probe causes a change in the volume of the measuring liquid. The force acting triggers electrical switching. For optimum temperature control, the room thermostat should be installed at an inside wall opposing radiators. Install the room thermostat away from heat source of all kinds and from draft and do not expose it to sunlight. The best installation height is approx. 1.5 m above the floor.

Technical specifications

Operating temperature range
Ambient: 0/50 °C
Storage: 0/50 °C

Temperature adjustment range
7/30 °C

Switching differential
ΔT ≤1 K

Temperature change rate
1 K/15 minutes

Setting
Externally adjustable

Probe element
Liquid-filled

Housing
Wall mounting housing made of PVC
Colour: White (RAL 9016)
W x H x D: 80 x 80 x 44 mm
Weight: 134 g
Degree of protection: IP 20 (EN 60529)

Electrical switching contact
Changeover contact

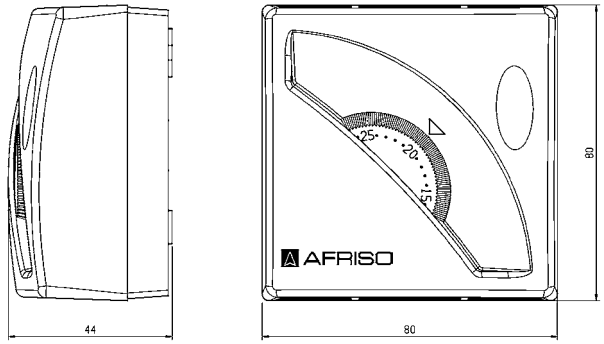
Contact rating
NC 16 (2.5) A 250 V AC
NO 16 (2.5) A 250 V AC

			Compatibility		
DG: G, PG: 4	Lamp	On/off switch	WB 01/10-D-8-230	WB 01-D-8-24	Part no.
TA 03	-	-	•	•	**42616X**
TA 03	•	-	•	-	**42617X**
TA 03	•	•	•	-	**42618X**
TA 03	•	Summer/winter	•	-	**42619X**

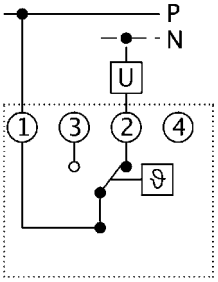
Room thermostats TA 03 for controller terminal bar WB 01/WB 10 D

Types and dimensions (mm)

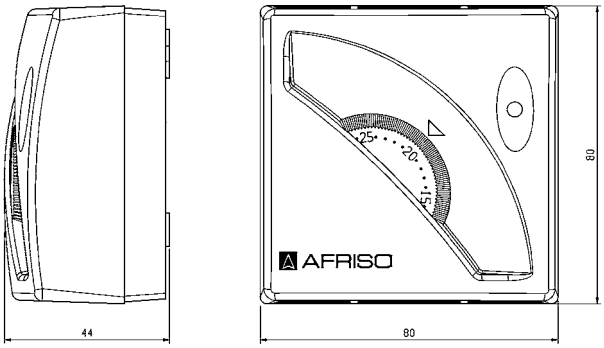
TA 03



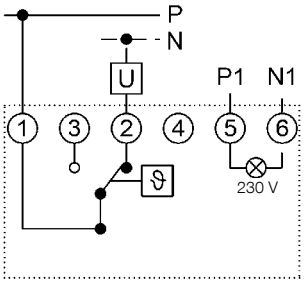
Wiring diagram



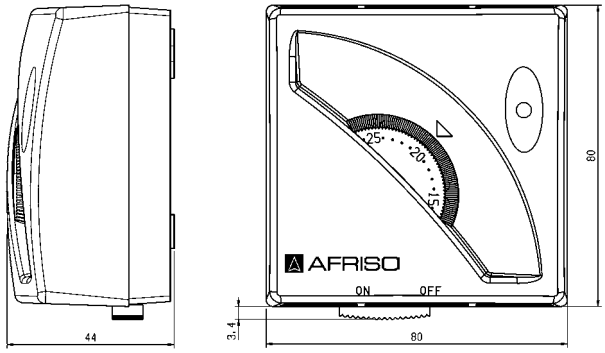
TA 03 without switch, with lamp



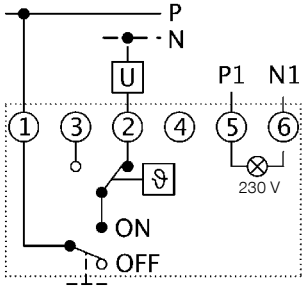
Wiring diagram



TA 03 with switch, with lamp

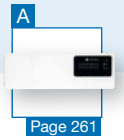


Wiring diagram



Room thermostats RT 01 for controller terminal bar WB 01/WB 10 D

- **Compact, modern design**
- **Easy surface mounting or mounting to standard in-wall switch boxes**
- **Either as 230 V or as battery version**
- **Suitable for heating and cooling**



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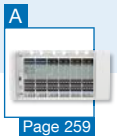

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Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature. Can also be used for cooling (manual switching).

Description

The room thermostat RT 01 is a part of the complete system FloorControl for single-room temperature control. Each room thermostat measures the actual ambient temperature and switches the output to obtain the required reference temperature. The reference value for the room temperature is adjusted by means of the keys. The integrated display shows the values. The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis.

Versions:
- RT 01 D-BAT: Version with battery, suitable for wall mounting
- RT 01 D-230: 230 V version, suitable for mounting to standard junction boxes/in-wall switch boxes

Technical specifications

Operating temperature range
Ambient/storage: 5/50 °C

Temperature adjustment range
5/35 °C
Accuracy: ±0.5 K

Supply voltage
Either AC 230 V or battery,
see ordering table

Nominal power
RT 01 D-230: 5.396 VA

Contact rating
NO/NC: Max. 1A 250 V AC

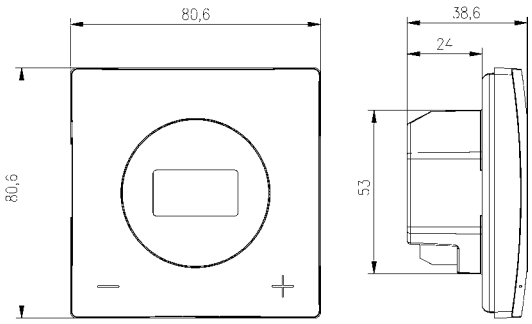
Housing
Plastic, PC-ABS
Colour: White (RAL 9003)
Degree of protection: IP 20 (EN 60529)

Weight
RT 01 D-230: 105 g
RT 01 D-BAT: 84 g

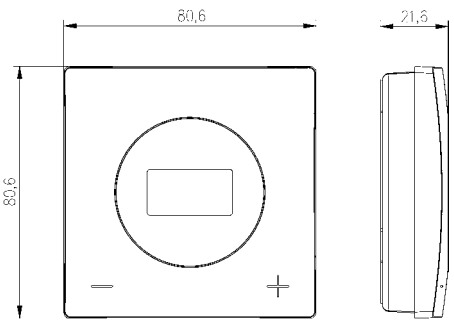
Scope of delivery
- RT 01 D-BAT: With battery

Types and dimensions (mm)

Room thermostat RT 01 D-230



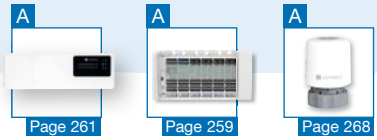
Room thermostat RT 01 D-BAT



	Compatibility		
DG: G, PG: 4	WB 01/10 D-8-230	WB 01 D-8-24	Part no.
Room thermostat RT 01 D-230 (230 V)	•		**86018**
Room thermostat RT 01 D-BAT (battery)	•	•	**86017**

Room thermostats RT 05 for controller terminal bar WB 01/WB 10 D

- Compact, modern design
- Easy mounting on standard in-wall switch boxes
- Either as 230 V or as battery version
- Large display with additional information
- Timer programs can be stored
- Suitable for heating and cooling



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Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature.
Can also be used for cooling (manual switching).

Description

The room thermostat RT 05 is a part of the complete system FloorControl for single-room temperature control. Each room thermostat measures the actual ambient temperature and switches the output to obtain the required reference temperature. The reference value for the room temperature is adjusted by means of the keys. The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis. In addition to the reference temperature, you can store timer programs (e.g. Day/Night). The display shows values such as temperature, time or battery status. Both versions are suitable for mounting to junction boxes or in-wall switch boxes.

Versions:
- RT 05 D-BAT: Version with battery
- RT 05 D-230: 230 V version

Technical specifications

Programs
- Day and night mode
- Week program:
  Same setting for all days
- Day program:
  Different setting for each day

Operating temperature range
Ambient/storage: 5/50 °C
Operation: Max. 50 °C

Temperature adjustment range
5/35 °C
Accuracy: ±0.5 K

Supply voltage
Either AV 230 V or battery

Nominal power
RT 05 D-230: 1.175 VA

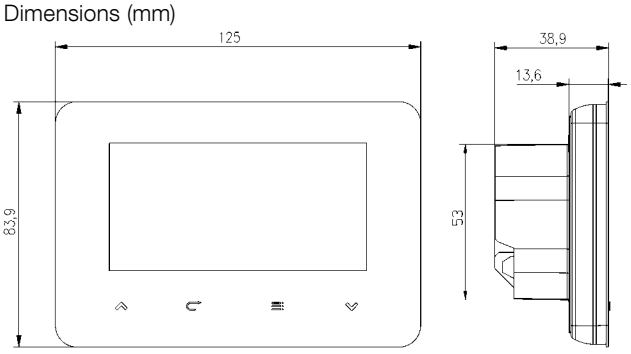
Contact rating
NO/NC: Max. 1A 250 V AC

Housing
Plastic, PC
Colour: White (RAL 9003)
Degree of protection: IP 20 (EN 60529)

Weight
RT 05 D-230: 189 g, RT 05 D-BAT: 166 g

Scope of delivery
- RT 05 D-BAT: With battery

Dimensions (mm)



	Compatibility		
DG: G, PG: 4	WB 01/10 D-8-230	WB 01 D-8-24	Part no.
Room thermostat RT 05 D-230 (230 V)	•		86019
Room thermostat RT 05 D-BAT (battery)	•	•	86020

Room thermostat RT 10 D 230

NEW

- Easy mounting on standard in-wall switch boxes
- 230 V version
- Display
- Adjustable time programs

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Application

Determination of the actual ambient temperature and adjustment of the reference value for the room temperature for use in water-based underfloor heating systems.

Description

The room thermostat RT 10 D 230 is used in water-based underfloor heating systems in conjunction with thermostatic actuators and/or controller terminal bars (e.g. CosiTherm® Basic WB 10 D-8-230 and WB 01 D). Each room thermostat measures the actual ambient temperature and switches the output to obtain the required reference temperature. The reference value for the room temperature is adjusted by means of the keys. The actual temperature in rooms with an underfloor heating system is compared to the reference temperature on an ongoing basis. In addition to the reference temperature, you can store timer programs (e.g. Day/Night). The display shows values such as temperature, time or heating mode.

Technical specifications

Programs
Adjustable for 5 + 2 or 6 + 1 or 7 days

Operating temperature range
Ambient/storage: 5/60 °C

Temperature adjustment range
5/35 °C
Accuracy: ±0.5 K

Supply voltage
AC 230 V

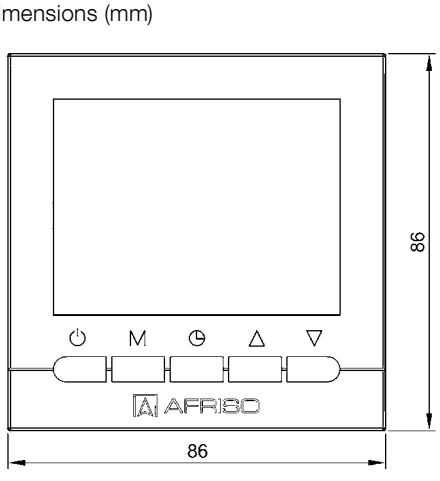
Contact rating
Max. 3 A 250 V AC

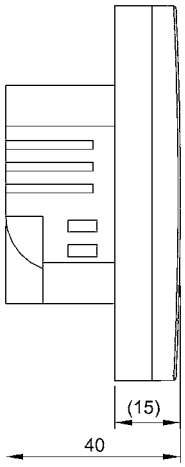
Housing
Plastic, PC
Colour: White (RAL 9003)
Degree of protection: IP 20 (EN 60529)

Weight
165 g

Scope of delivery
- RT 10 D 230
- Operating instructions

Dimensions (mm)

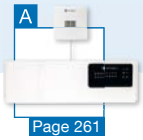




DG: G, PG: 4	Part no.
Room thermostat RT 10 D-230	**86062**

Thermostatic actuator TSA-02

- **Stroke indicator via grey rod on cap**
- **Either as 24 V or as 230 V version**
- **Slim design (Ø 39 mm)**



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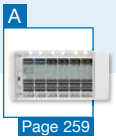

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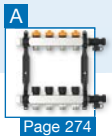

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Application

For controlling the hot water valves in radiators or AFRISO distribution manifolds such as heating/cooling circuit manifolds ProCalida® MC, EF and VA or industrial manifolds IN. Actuators convert the electrical signal received from room or timer thermostats into a valve stroke to control the set temperature via the flow rate.
The actuator is factory-closed and thus ready for automatic operation.

Description

Electro-thermostatic actuator with position indication, connection cable and union nut for direct connection to the valve or upper part of the manifold. Closed when de-energised; available as 24 V or as 230 V version.

Technical specifications

Operating mode
Closed when de-energised (NC)

Stroke
> 3.2 mm
Indication via rods on hood

Opening time
5–6 minutes

Operating temperature range
Ambient: Max. 60 °C

Supply voltage
AC/DC 24 V or AC 230 V
Power: 2 W

Connection
Union nut M30 x 1.5 mm

Closing dimension
10.8 mm

Cable length
1 m

Housing
Plastic
Degree of protection: IP 54 (EN 60529)

Dimensions
H x Ø: 56 x 39 mm

Actuating force
Approx. 90 N

i

AFRISO offers customer-specific versions of the actuators for many valve upper parts for OEMs. We look forward to your enquiry.

DG: G, PG: 4			Part no.
TSA-02, 230 V	1	10	**78882**
TSA-02, AC/DC 24 V	1	10	78883

Thermostatic actuator TSA-02 FO

- First Open function
- Manual Re-Open function without power applied
- Auto Spin function
- Stroke indicator
- Either as 24 V or as 230 V version
- Slim design (Ø 39 mm)

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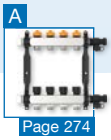

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Application

For controlling the hot water valves in radiators or AFRISO distribution manifolds such as heating/cooling circuit manifolds ProCalida® MC, EF and VA or industrial manifolds IN. Actuators convert the electrical signal received from room or timer thermostats into a valve stroke to control the set temperature via the flow rate.
The actuator is factory-opened (First Open function) so that the stroke vales at the heating circuit manifold remain open during initial commissioning. This facilitates mounting as well as filling and flushing of the system since, at this point in time, the control system is usually not yet operative. The First Open function (FO) is automatically disabled (Auto Spin function) as soon as the actuator is electrically connected and fully closed. The FO function can also be disabled manually by turning the upper hand wheel to the left by 90° to set automatic mode at the actuator.
For servicing, the factory setting "open" of the actuator can be restored manually via the hand wheel without power having to be applied (Re-Open function). The slim design (housing diameter 39 mm) allows for installation to manifolds with a heating circuit distance of 40 mm.

Description

Electro-thermostatic actuator with First Open and Re-Open functions, position indication, connection cable and union nut for direct connection to the valve or upper part of the valve. Closed when de-energised; available as 24 V or as 230 V version.

Technical specifications

Functions
First Open and Re-Open functions (adjustable via hand wheel),
Auto Spin function

Operating mode
Closed when de-energised (NC)
Condition as delivered: Open

Stroke
> 3.2 mm
Indication via rod
Actuating force 90 N or 110 N

Opening time
Approx. 5–6 minutes

Operating temperature range
Ambient: Max. 60 °C

Supply voltage
AC/DC 24 V or AC 230 V
Power: 2 W

Connection
Union nut M30 x 1.5 mm

Closing dimension
10.8 mm

Cable length
1 m

Housing
Plastic
Degree of protection: IP 54 (EN 60529)

Dimensions
H x Ø: 72 x 39 mm

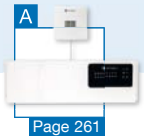
i
AFRISO offers customer-specific versions of the actuators for many valve upper parts for OEMs. We look forward to your enquiry.

DG: G, PG: 4	Actuating force			Part no.
TSA-02 FO, AC 230 V	90 N	10	100	**79014**
TSA-02 FO, AC/DC 24 V	90 N	10	100	79015
TSA-02 FO, AC 230 V	110 N	10	100	79016
TSA-02 FO, AC/DC 24 V	110 N	10	100	79017

Minimum order quantity for non-stock items = 100 pieces; delivery only in packing units.

Thermostatic actuator TSA-03

- **Stroke indicator via grey rod on cap**
- **With integrated limit switch for circulation pump**
- **Either as 24 V or as 230 V version**
- **Compact design**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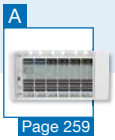
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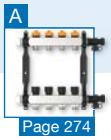
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Application

For controlling the hot water valves in radiators or AFRISO distribution manifolds such as heating/cooling circuit manifolds ProCalida® MC, EF and VA or industrial manifolds IN. Actuators convert the electrical signal received from room or timer thermostats into a valve stroke to control the set temperature via the flow rate.
The actuator is factory-closed and thus ready for automatic operation.

Description

Electro-thermostatic actuator with position indication, limit switch, connection cable and union nut for direct connection to the valve or upper part of the valve. Closed when de-energised. TSA 03 can be used to switch off the pump via the integrated limit switch when all valves are closed.

Technical specifications

Operating mode
Closed when de-energised (NC)

Stroke
> 3.2 mm
Indication via rods on hood

Opening time
Approx. 5–6 minutes

Operating temperature range
Ambient: Max. 60 °C

Supply voltage
AC/DC 24 V or AC 230 V
Power: 2 W

Switching output
1 voltage-free, normally open contact

Contact rating
AC/DC 24 V, max. 6 A / 2 A
AC 230 V, max. 6 A / 0.1 A

Connection
Union nut M30 x 1.5 mm

Closing dimension
10.8 mm

Cable length
1 m

Housing
Plastic
Degree of protection: IP 40 (EN 60529)

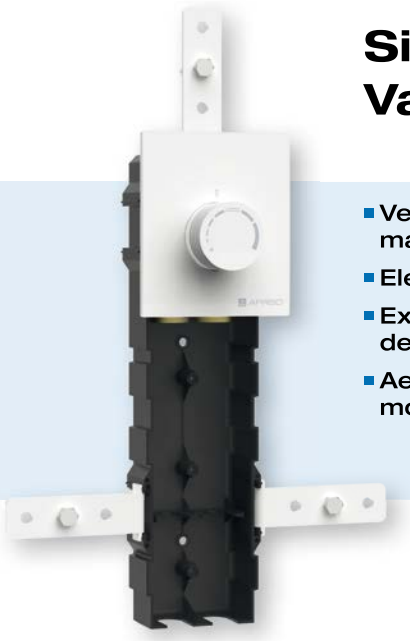
Dimensions
H x W x L: 57 x 39 x 52 mm

Actuating force
Approx. 90 N

i

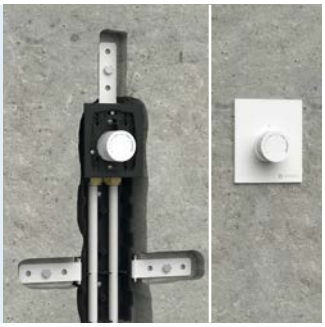
AFRISO offers customer-specific versions of the actuators for many valve upper parts for OEMs. We look forward to your enquiry.

DG: G, PG: 4			Part no.
TSA-03, AC 230 V with limit switch	1	10	78871
TSA-03, AC/DC 24 V with limit switch	1	10	78872



Single room controller RTL-Box 324 Vario with return temperature limiter

- Very compact visible plate (11.5 x 13.5 cm) made of high-gloss plastics
- Elegant, compact control head
- Exact alignment with mounting wall due to depth-adjustable mounting frame
- Aesthetic design allows for user-friendly mounting at the level of the light switches



Application

For decentralised temperature control in individual rooms with underfloor heating systems or wall heating systems in combination with radiator installation. Ideal for scenarios without radiator installation and if no centralised distribution is desired. The RTL-Box 324 Vario combines heating circuit, room temperature sensor and control in a single unit. The purely mechanical function of the room controller requires no additional electrical power for actuators or similar equipment. Due to the compact dimensions and the aesthetic design, the RTL-Box fits perfectly at the level of light switch installations. This ensures optimum control characteristics and excellent user-friendliness.

Description

The single room controller RTL-Box 324 Vario consists of a high-grade, high-gloss cover plate made of sturdy plastic, an aesthetic thermostat control head and a mounting frame. The mounting frame adapts to the wall and levels a height of up to 25 mm. The optional extension kit extends the thermostat head by 20 mm if the maximum wall level height is exceeded. The wall installation box with shell protection comprises an adjustable valve assembly consisting of a control valve, a thermostat valve and a return temperature limiter for limiting the radiator return temperature to a temperature level suitable for the underfloor heating system. The valve opens when the values falls below the adjusted limit value. The pipes of the underfloor heating system are mounted in the wall installation box by means of standard compression fittings.

Technical specifications

Temperature adjustment range
Reference: 8/28 °C (room temperature)
Return temperature: 20/48 °C

Operating temperature range
Medium: T_{max} = 90 °C

System connections
Connector with eurocone, can be fixed with spring clips

Pipe connection
Eurocone G¾

Nominal pressure
Max. 6 bar

Installation depth
Min. 63 mm
Max. 88 mm

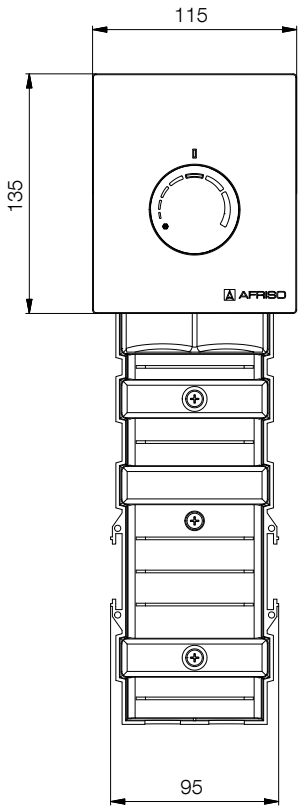
Housing
Plastic cover (PC/ABS)
High-gloss white
Plastic wall installation box (PP) black
Weight: 1.25 kg

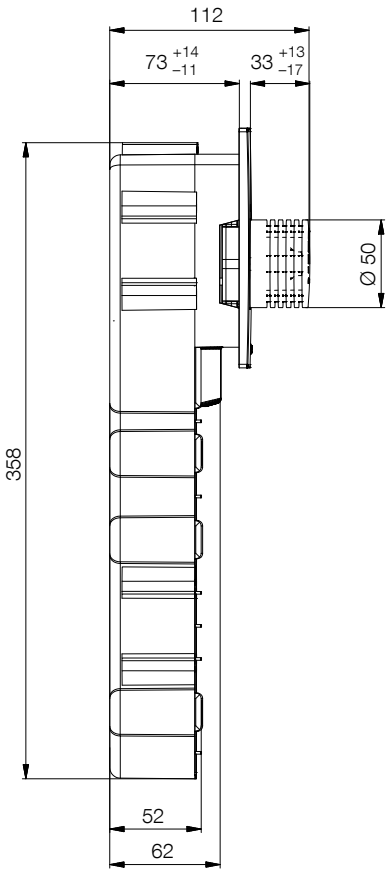
DG: G, PG: 4	Part no.
Single room controller RTL-Box 324 Vario	**78330**
Accessories	
Extension kit RTL-Box 324 Vario	**78331**

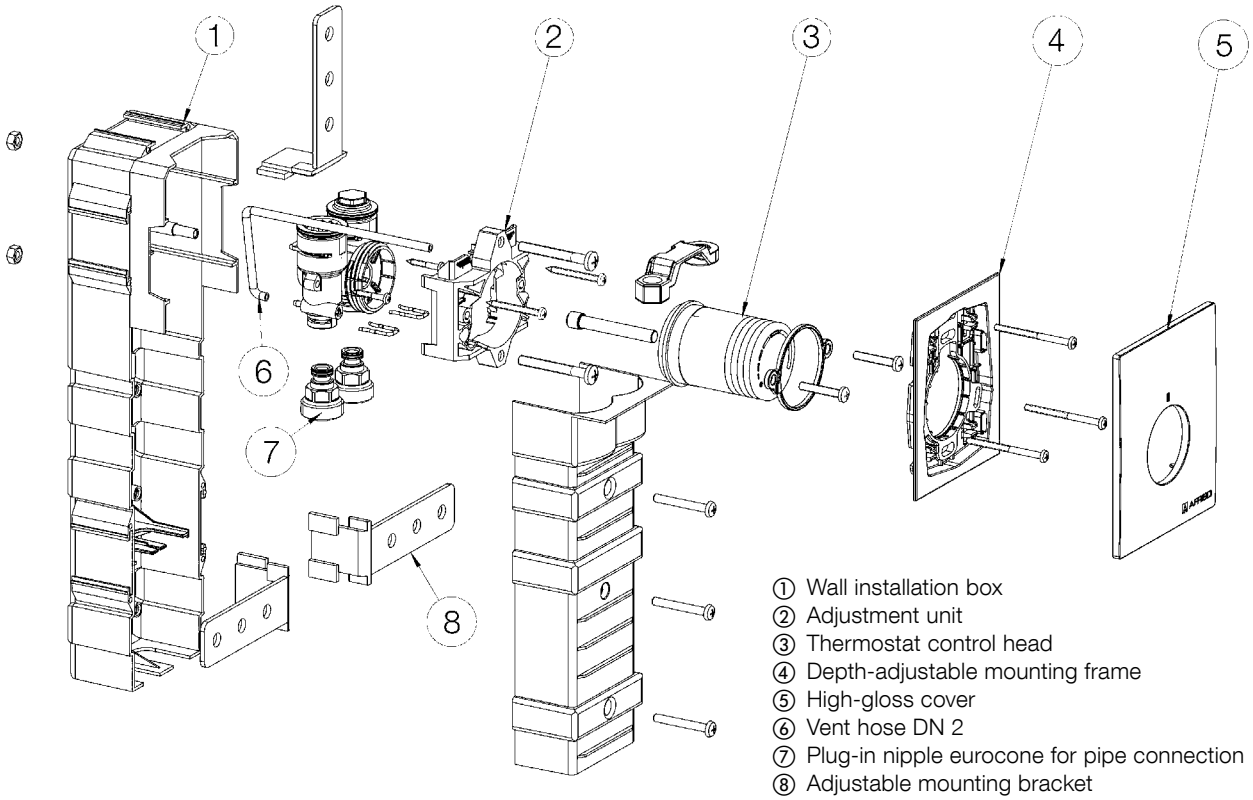
Single room controller RTL-Box 324 Vario with return temperature limiter

Types and dimensions (mm)

Cover with wall installation box



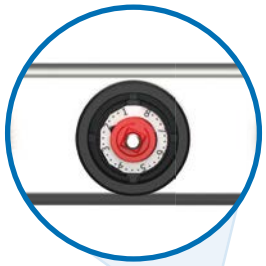




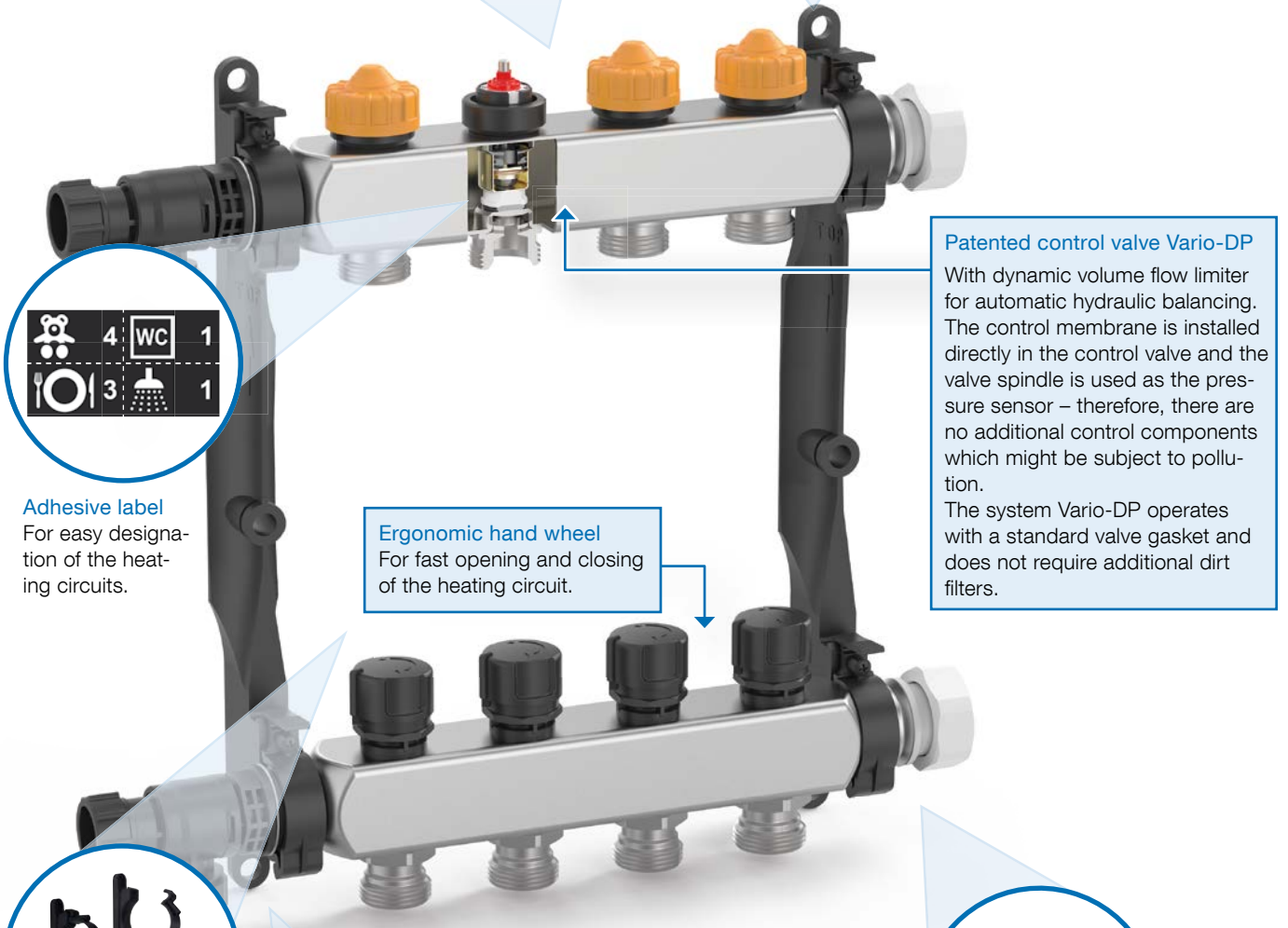
① Wall installation box
② Adjustment unit
③ Thermostat control head
④ Depth-adjustable mounting frame
⑤ High-gloss cover
⑥ Vent hose DN 2
⑦ Plug-in nipple eurocone for pipe connection
⑧ Adjustable mounting bracket

Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP with dynamic control valve for hydraulic balancing

Valve pre-adjustment
The dynamic control valve Vario-DP is fully adjustable with a standard radiator bleed screw key. The numerical scale with intermediate points allows for precise adjustment of the calculated values in the flow range from 20–340 l/h.



Thermostatic actuators TSA-02/03
For electronic control of the return valves. Actuators convert the electric signal they receive from room thermostats or thermostats with timers into a valve stroke to control the set temperature. With connection cable and union nut for direct connection to the return line.



Patented control valve Vario-DP
With dynamic volume flow limiter for automatic hydraulic balancing. The control membrane is installed directly in the control valve and the valve spindle is used as the pressure sensor – therefore, there are no additional control components which might be subject to pollution.
The system Vario-DP operates with a standard valve gasket and does not require additional dirt filters.

Adhesive label
For easy designation of the heating circuits.

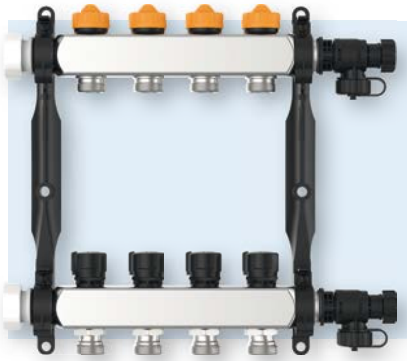
Ergonomic hand wheel
For fast opening and closing of the heating circuit.

Wall bracket
For fast, safe and easy installation of manifold systems.

End cap / end piece
The manifold end is equipped with a plastic end piece for filling and draining. The surface heating/cooling system can be subjected to a pressure test prior to commissioning via the opening of the end cap. For this purpose, AFRISO offers the CAPBs® set PT 70-FBH, a flexible testing system for tightness tests with a suitable adapter.

Ball valve
High-grade ball valve DN 25, with or without thermometer.

Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP



- Dynamic control valves for constant control of the water volume
- Fast and safe mounting with union nut (flat-sealing)
- Sound-absorbing plastic wall bracket with quick mounting function
- 100 % tightness-tested and function-tested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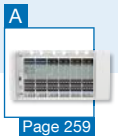
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Application

Manifold system for surface heating systems and cooling systems with dynamic control valves for constant control of the water volume. For distribution of heating and cooling circuit water as per VDI 2035 or of water/glycol mixtures in sealed systems. Suitable for 2–12 heating/cooling circuits.

Description

Stainless steel heating circuit manifold with polished surface. Return with dynamic control valve for constant control of the water volume in each heating circuit. Return valves with dual O ring seal at the valve axis. The control range is 20–340 l/h. The typical manual adjustment of the valves is therefore no longer required. Connection by means of angular connection pieces and/or ball valve G1. End module with filling and drain valve G¾ eurocone which can also be used for manual venting. Easy mounting by means of plastic wall bracket with excellent sound-absorbing characteristics and with quick mounting function – the manifold is snap-mounted to the wall bracket. Suitable for standard manifold cabinets. With a sufficient distance between the flow and return bars, for easy, collision-free mounting even in the case of large actuator and heating circuit pips up to 20 mm. AFRISO stainless steel manifold systems are 100 % tightness-tested and function-tested.

Technical specifications

Number of heating/cooling circuits
2–12

Medium
Heating circuit water and cooling water as per VDI 2035
(Water/glycol mixtures with an admixture of max. 50 %)

Test pressure
Max. 6 bar

Manifold pipe
Stainless steel 304 (1.4301)

Main connection
G1 flat-sealing, with union nut
Connection from the right or from the left

Connection heating/cooling circuit
G¾ male thread, eurocone, suitable for standard compression fittings

Operating temperature range
Medium: -20/+90 °C at 3 bar
-20/+80 °C at 4 bar
-20/+70 °C at 5 bar
-20/+60 °C at 6 bar

Wall bracket
Impact-resistant plastic with rubber support, complies with DIN 4109, suitable for standard manifold cabinets
Bar distance: 220 mm

Flow valves
Can be shut off

Dynamic return valves
Mating thread: M30 x 1.5 mm
Male thread
Closing force: < 80 N
Closing dimension: 12 +/- 0.6 mm
(open position 15 mm)
Adjustment range: 20 to 340 l/h
Operating range: 50 to 700 mbar
Dynamic control range: 150 to 700 mbar

Suitable for electro-thermostatic actuators TSA-02/-03 from AFRISO or for standard actuators with union nut M30 x 1.5 mm

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Customised versions (private label) available at a lot size of 2,000 manifolds per year.

Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP

Dynamic control valve – for automatic hydraulic balancing

Advantages – your benefits

- Automatic control of water volume per heating circuit
- Fast hydraulic balancing
- Adjusted flow rate is not exceeded
- High reserve due to very wide adjustment range up to 340 l/h
- Geometry of valve insert provides protection against unwanted pollution
- No additional line fittings required for balancing of the individual stations or floors

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Technical specifications manifolds, heating/cooling circuits

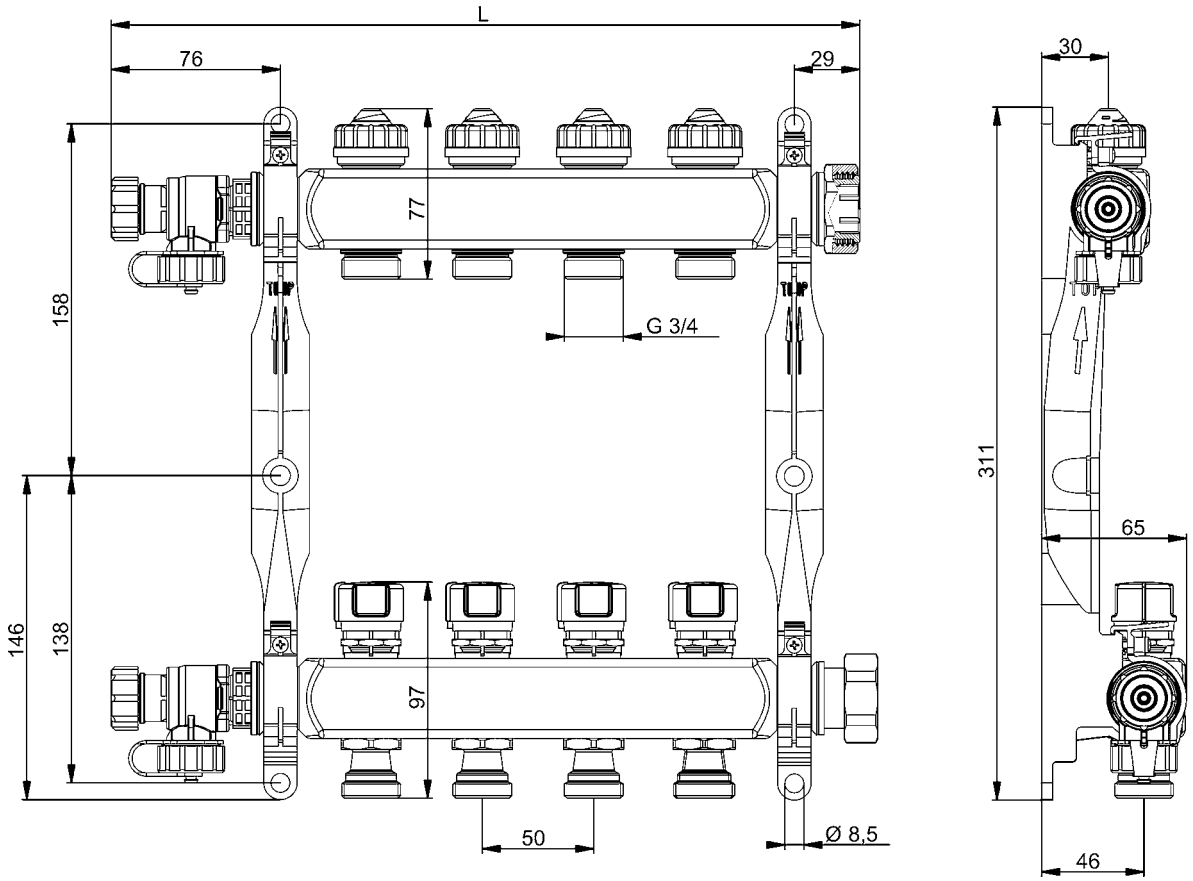
Heating circuits	2	3	4	5	6	7	8	9	10	11	12
Volume flow max. [m³/h]*	0.48	0.72	0.96	1.20	1.44	1.68	1.92	2.16	2.40	2.64	2.88
Kvs [m³/h]	2.65	3.95	4.96	6.04	6.82	7.77	8.29	9.08	9.52	10.02	10.42
Δp manifold [mbar]	33	33	37	40	45	47	54	57	64	69	76
Δp pipe e.g. [mbar]**	250	250	250	250	250	250	250	250	250	250	250
Δp total [mbar]	283	283	287	290	295	297	304	307	314	319	326
Heating capacity at 10 K max. [kW]	5.6	8.4	11.2	14.0	16.7	19.5	22.3	25.1	27.9	30.7	33.5
Heating capacity at 5 K max. [kW]	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.7

* Maximum volume flow per heating circuit: 4 l/min = 0.24 m³/h.
**Note: Use an appropriate pipe diameter.
Δp pipe at 0.24 m³/h approx.: Dim. 20 = 1.2 mbar/m; Dim. 17 = 3.1 mbar/m; Dim. 16 = 4.5 mbar/m.

Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP

Types and dimensions (mm)

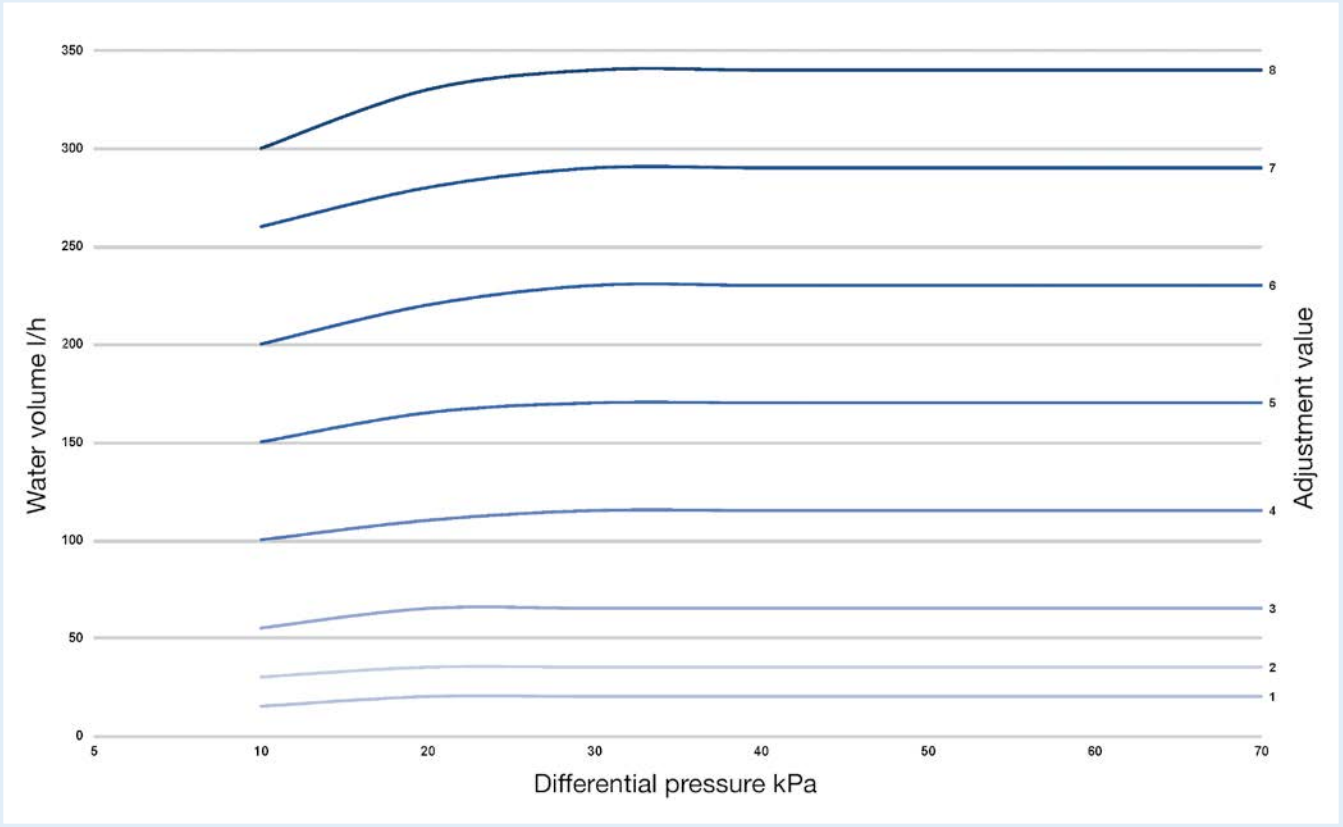
Dimensions wit 4 heating/cooling circuits with end module



Dimensions (mm)

Version	2 HK FM	3 HK FM	4 HK FM	5 HK FM	6 HK FM	7 HK FM	8 HK FM	9 HK FM	10 HK FM	11 HK FM	12 HK FM
Distance wall bracket	130	180	230	280	330	380	430	480	530	580	630
Total length L manifold	236	286	336	386	436	486	536	586	636	686	736

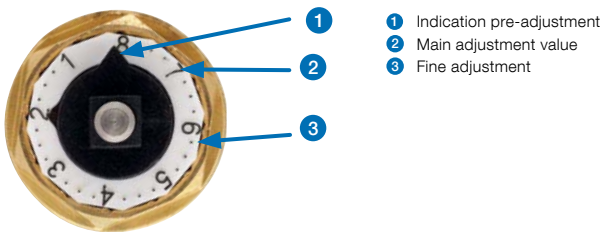
Pre-adjustment water volume for Vario-DP



Adjustment table

Pre-adjustment	1–	1•	1••	1•••	2	2•	2••	2•••	3	3•	3••	3•••	4	4•	4••	4•••	5	5•	5••	5•••	6	6•	6••	6•••	7	7•	7••	7•••	8
	Water volume in l/h:																												
Differential pressure: 15–70 kPa	20	20	25	25	35	40	45	55	65	80	90	100	115	135	145	160	170	185	200	215	230	245	260	275	290	300	315	330	340

Example valve pre-adjustment



1. Indication pre-adjustment
2. Main adjustment value
3. Fine adjustment

Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP

DG: G, PG: 3	Number of heating circuits			Part no.
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**2**	1	-	**86422**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**3**	1	-	**86423**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**4**	1	-	**86424**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**5**	1	-	**86425**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**6**	1	-	**86426**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**7**	1	-	**86427**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**8**	1	-	**86428**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**9**	1	-	**86429**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**10**	1	-	**86430**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**11**	1	-	**86431**
Stainless steel heating circuit manifold ProCalida® VA 1C Vario-DP	**12**	1	-	**86432**

DG: G, PG: 2					
Accessories	Description			DG	Part no.
	Ball valve kit with thermometer NG 50 G1 male x G1 female nickel-plated with indication, red/blue	1	-	G	**80460**

Pump assembly PrimoTherm® Floor 130 for manifold systems

- **Pre-assembled and tightness-tested assembly**
- **Flow temperature fully adjustable between 35 and 60 °C**
- **Mixing valve cap with window and scale, can be lead-sealed (ideal for public facilities)**
- **With shut-off ball valves**

Mixing valve control knob with temperature scale

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Application

Pump assembly for constant control of the flow temperature of water-based surface heating systems. With the integrated thermostatic mixing valve, the flow temperature can be adjusted to a desired temperature by adding water from the return. Due to the eccentrical screw connection with variable distance, PrimoTherm® is suitable for almost all manifold systems.

Description

Complete, pre-assembled and tightness-tested pump assembly with all required functional components, including shut-off ball valve DN 20. The required flow temperature is set within a range from 35 to 60 °C at the thermostatic mixing valve mixing valve ATM 563. A cover that can be lead-sealed protects the control knob against improper adjustments during operation. The selected adjustment is visible through the window in the cap. The special chamber geometry also helps to avoid damage caused by overpressure during closing (backflow preventer to return).

The circulation pump automatically switches off if a safety-related temperature limitation is exceeded. It is adjustable between 20 to 60 °C; the factory setting is 55 °C. This helps to prevent damage to the underfloor heating system. The pump features the following operating modes:
- Constant volume flow
- Constant pressure
- Venting function of pump housing

In venting mode, the entire surface heating/cooling system can be conveniently vented by means of the valve integrated in the pump assembly and the enclosed vent hose.

Technical specifications

System connections
Primary end: G¾ female thread
Manifold end: G1 male thread

Operating temperature range
Medium: Max. 90 °C
(short-term 110 °C)

System pressure
Max. 6 bar

Flow coefficient Kvs
2.5 m^2/h

Supply voltage
AC 230 V, 50 Hz

Dimensions
W x H x D: 200 x 370 x 88 mm

Thermostatic mixing valve ATM 563

Adjustment range:	35/60 °C
Housing:	Brass (CW626N), dezincification-resistant
Cap / control head:	Plastic ABS/PBT
Seals:	EPDM

Circulation pump WILO Yonos PARA 15/6 RKA 130

Length:	130 mm
Degree of protection:	IP 44
Max. capacity:	3.3 m^3/h
Max. pump head:	6 m

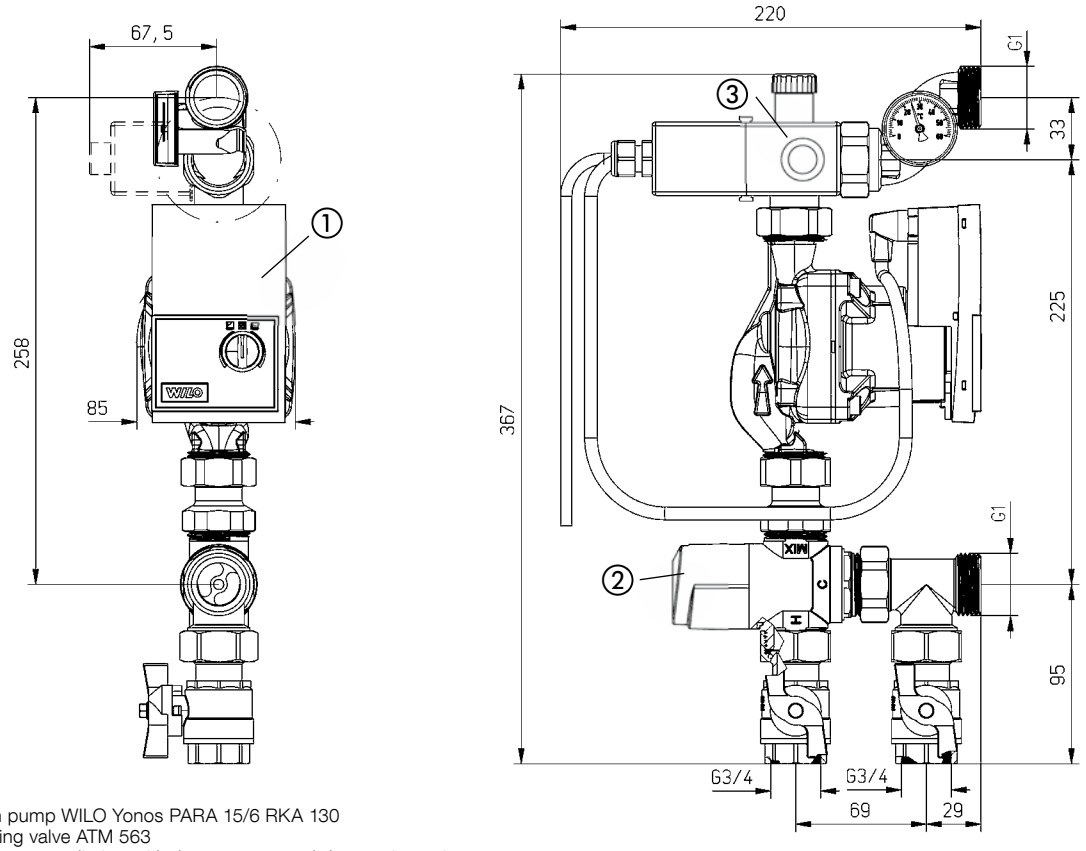
Options

- Other circulation pumps

DG: G, PG: 4	Part no.
Pump assembly PrimoTherm® Floor 130	**77490**

Pump assembly PrimoTherm® Floor 130 for manifold systems

Dimensions (mm)



① Circulation pump WILO Yonos PARA 15/6 RKA 130
② 3-way mixing valve ATM 563
③ Safety temperature limiter with thermometer and de-aeration unit

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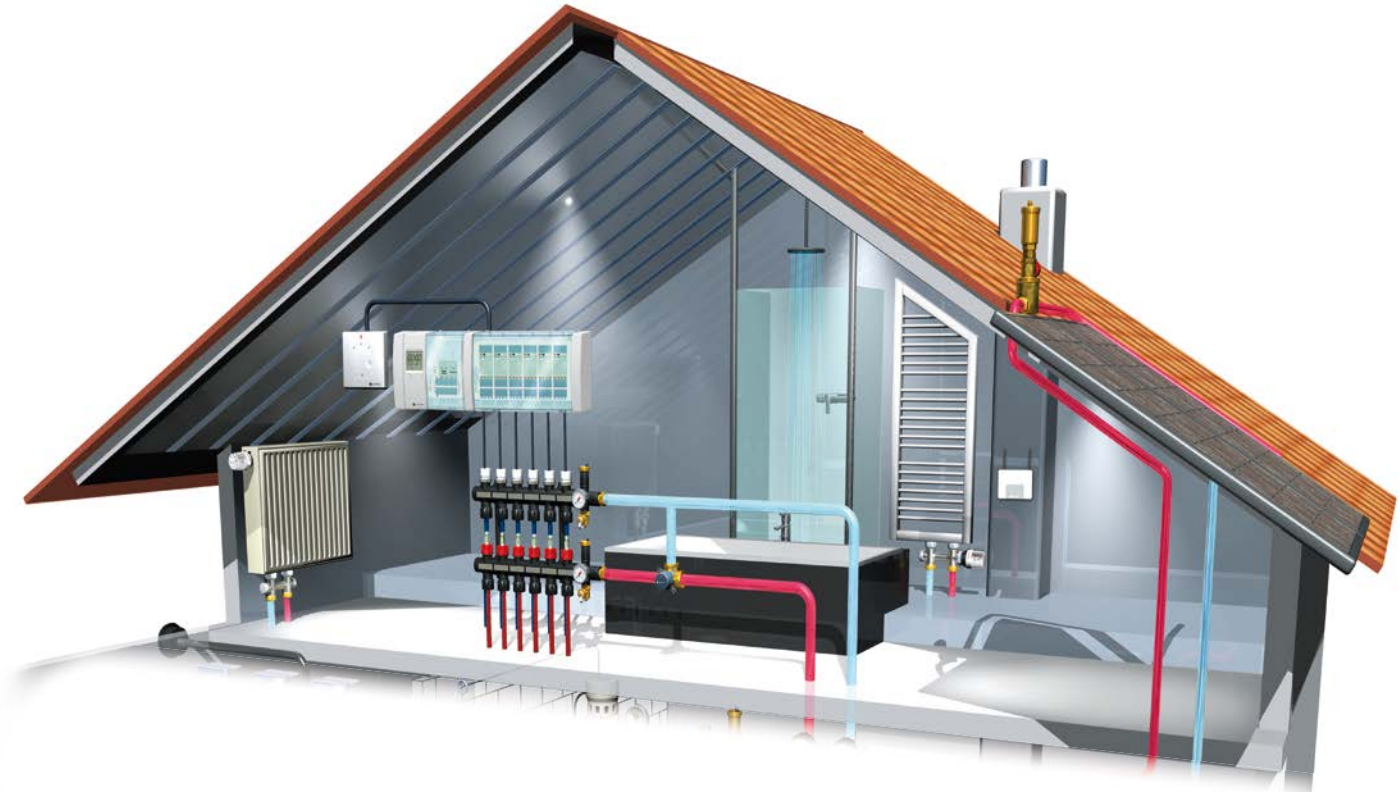
OEM manifold systems ProCalida® for heating/cooling and geothermal applications

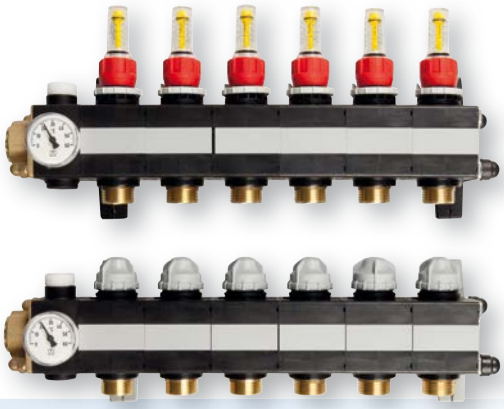
AFRISO has been manufacturing complex plastic manifolds for leading global vendors of floor heating, cooling and geothermal systems since 1981. The know-how, together with our exceptionally high degree of vertical integration including our own tool design allows us to implement even complex geometries to customer specifications.
High-grade plastic materials enable a great variety of technical features and optimum, practical designs. Plastic valves are not susceptible to corrosion and deposits. Thermometers, shut-off valves, vents and flow meters are easy to integrate. Our offering is complemented by a comprehensive range of accessories. For decades, experts from the fields of heating, ventilation and air conditioning have been working with AFRISO products under the brands of leading system providers.



Advantages – your benefits

- Complex, customised manifold systems made of high-grade plastic materials proven over many years
- For heating, cooling and geothermal systems
- Numerous combinations in terms of type and number of heating circuits
- Pre-assembled, tightness-tested and ready to be connected
- Excellent insulation properties (low heat emission and noise transmission; suppression of condensate)
- Corrosion-resistant for long service life
- Vast array of versions for numerous application scenarios and logistics concepts
- Can be combined with thermometers, flow meters, thermo-actuators, connection valves and many other components
- Low weight
- Simplified logistics
- Compatible control units

OEM manifold systems ProCalida® for heating/cooling and geothermal applications



ProCalida® MC 1

Heating circuit manifold ProCalida® MC 1

Modular, very short, robust plastic heating circuit or cooling circuit manifold with up to 12 heating circuits. Return with stroke valves for actuators, flow with shut-off valves or flow meters as required. Temperature indication at flow and return lines. Main connection with union nut G1. Manual vent, filling and drain valve or quick air vent can be mounted. With dove-tail guide at both ends for fast mounting to wall mounting bracket and for maximum installation flexibility.

Heating circuit
Distance: 50 mm
Connection: G¾ eurocone

Operating temperature range
Medium: Max. 60 °C at 6 bar
or max. 90 °C at 3 bar

ProCalida® EF 1

Heating circuit manifold ProCalida® EF 1

Modular, very short plastic heating circuit or cooling circuit manifold with up to 12 heating circuits. Return with stroke valves for actuators, flow with shut-off valves or flow meters as required. Temperature indication at flow and return lines. Main connection with union nut G1. Manual vent, filling and drain valve or quick air vent can be mounted. Flexible connection from left or right as well as from the bottom with a bracket kit.

Heating circuit
Distance: 50 mm
Connection: G¾ eurocone

Operating temperature range
Medium: Max. 60 °C at 6 bar
or max. 90 °C at 3 bar

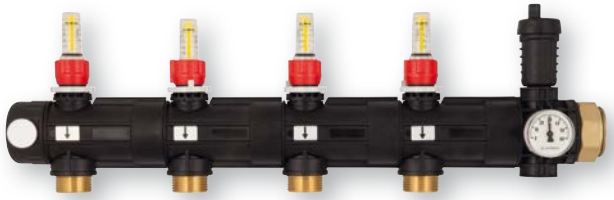
customised products
OEM
system solutions

We offer customised special products made exactly to your requirements – please enquire.

OEM manifold systems ProCalida® for heating/cooling and geothermal applications

Heating circuit/geothermal manifold ProCalida® IN 1½/GT 1½

Modular plastic manifold for industrial or geothermal applications with up to 20 heating circuits. Return either with stroke valves for actuators or with shut-off valves, flow either with shut-off valves or with flow meters as required. Main connection with union nut G1½. Individual installation of filling and drain valve, quick air vent, pressure gauge and thermometer via multi-way union. Easy snap-on mounting of manifold on wall bracket.



ProCalida® IN 1½

Heating circuit
Distance: 70 or 100 mm
Connection: G1 flat-sealing, compression fitting
for pipe Ø 25 x 2.3/2.5 or Ø 32 x 2.9 and
Ø 40 x 3.7 or G¾ eurocone

Operating temperature range
Medium: -20/+60 °C at 6 bar

Geothermal manifold ProCalida® GT 3

Modular manifold for brine, made of plastic, for any number of heating circuits. With one shut-off valve each in the flow and return (adjusted values can be locked via a ring) and integrated flow rate indication in the return. Main circuit connection and heating circuit connections can be made to customer specifications. Individual installation of filling and drain valve, quick air vent and pressure gauge via cross piece. Thermometer can be integrated in the line and/or in each individual heating circuit. Robust, easy-to-mount wall bracket.

ProCalida® GT 3

Heating circuit
Distance: 80, 90, 100, 110, 130, 140, 150 or 160 mm
Connection: Compression fitting for pipe Ø 25 x 2.3/2.5 mm
or Ø 32 x 2.9 mm and Ø 40 x 3.7 mm.
Customer-specific versions are also available.
Individual heating circuits can be rotated by 360°

Operating temperature range
Medium: -20/+60 °C at 6 bar

Range (flow meter)
2–12 l/min, 5–42 l/min, 35–70 l/min, 60–125 l/min

Radiator valves

Combination blocks

Measuring instruments for hydraulic balancing

CHAPTER 9

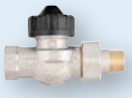
Valves and control technology for radiators and hydraulic balancing

OVERVIEW

HYDRAULIC BALANCING

RADIATOR CONNECTION

Valves and control technology for radiators and hydraulic balancing at a glance

		 Vario	 Vario-DP	 VarioQ	 Type 456	 Type 454Q
		Thermostat valve bodies			Radiator lockshield valves	
Radiators	Application areas	•	•	•	•	•
Underfloor/panel heating systems		•	•	•	•	•
Refrigeration/air conditioning		•	•	•	•	•
Hydraulic Balancing		•	•	•	•	•
Vario	Control insert	•	•	•		
Adjustment spindle					•	
Water volume adjustment range		**12–250 l/h or 55–350 l/h***	**20–340 l/h**	**6–80 l/h, 14–240 l/h or 39–300 l/h***	**405 l/h**	**120 l/h or 330 l/h***
Measuring function	Functions			•		•
Adjustable		•	•	•	•	
Can be shut off		•	•	•	•	•
Can be drained		•		•	•	•
Replaceable insert		•	•	•	•	•
Dimension (DN)	Connection	**10–20**	**10–20**	**10–20**	**10–25**	**10–15**
Thread		•	•	•	•	•
Screw connection		•	•	•	•	•
Thermostat head	Control / drive	•	•	•		
Thermostatic actuator 24 V, 230 V, 0–10 V		•	•	•		
Motor-driven actuator		•	•	•		
* Depends on product version.		**Page 314**	**Page 306**	**Page 298**	**Page 317**	**Page 301**

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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.

	Vario THK	Vario-DP Kombi	456-DP	VarioQ-Kombi	Q
					
	Combination blocks				Screw fittings with measuring function
	•	•	•	•	
					•
					•
	•	•	•	•	•
	•	•	•		
				•	
	6–95 l/h or 12–215 l/h*	**20–340 l/h**	**20–340 l/h**	**79 l/h or 185 l/h***	**330 l/h or 900 l/h***
				•	•
	•	•	•	•	
	•	•	•	•	
	•	•	•	•	
	•	•	•	•	
	15	**15**	**15**	**15**	**15**
	•	•	•	•	•
	•	•	•	•	•
	•	•			
	•	•			
	Page 319	**Page 309**	**Page 311**	**Page 303**	**Page 305**

Valves and control technology for radiators and hydraulic balancing

AFRISO offers a broad range of proven products comprising standard valve bodies with suitable thermostat control heads and lock-shield valves, combination blocks for compact radiators and adjustable radiator with measuring function for optimising existing heating systems and hydraulic balancing. Convincing solutions are also available for automatic hydraulic balancing with pressure-independent dynamic radiator valves.

GAMPPER Armaturen has been a member of the AFRISO group since 2012, contributing professional control technology and clever solutions for HVAC professionals to our product range. The brand GAMPPER has been a synonym for radiator fittings "Made in Germany" for more than 75 years.

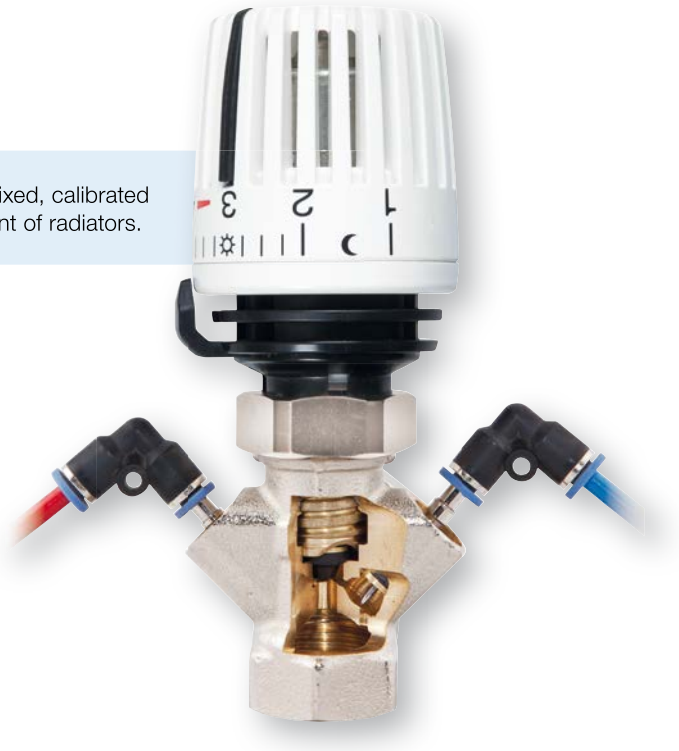
gampper
Member of AFRISO Group

Our comprehensive experience in the areas of domestic technology and building equipment and automation results from single-family home projects all the way to large-scale reference projects. GAMPPER assists planners with full-scale engineering in large projects: engineering data (such as VDI 3805 records), plant engineering or transparent project logistics via HVAC wholesalers. The OEM business covers the entire range from custom-specific development to production at the Alsenz site. Decades of cooperation in associations and institutions working on and preparing standards and legislation ensure that our products are state-of-the-art.

Gampper is:

- The first manufacturer who used virtually maintenance-free O rings instead of high-maintenance packings to seal the valve spindle of manual valves.
- The inventor of the radiator lockshield valve that can be shut off, adjusted and drained.
- The first manufacturer of thermostat valves to receive the top grade for control performance from "Stiftung Warentest", the renowned, independent German consumer organisation.
- The inventor of the patented, adjustable radiator thermostat valves VarioQ with measuring function that allow hydraulic balancing of existing heating, refrigeration and air conditioning systems.
- Numerous other innovations attesting to global success: patens for tap blocks and combination blocks for valve radiators or combined thermostat valves with integrated return temperature limiter for bathroom radiators and underfloor heating systems.

Patented thermostat valve VarioQ with fixed, calibrated orifice plate for high-precision adjustment of radiators.



Solutions for hydraulic balancing of existing systems:

1. Compact radiator with thermostat control head 323 and adjustable combination block VarioQ-Kombi with measuring function
2. Manifold system ProCalida® for underfloor heating system with screw fitting with measuring function Q
3. Valve radiator with adjustable thermostat valve body with measuring function VarioQ, thermostat control head 323 KH and radiator lockshield valve type 456

Hydraulic balancing: Highest efficiency, maximum energy saving and comfort

Has your heating system been balanced?

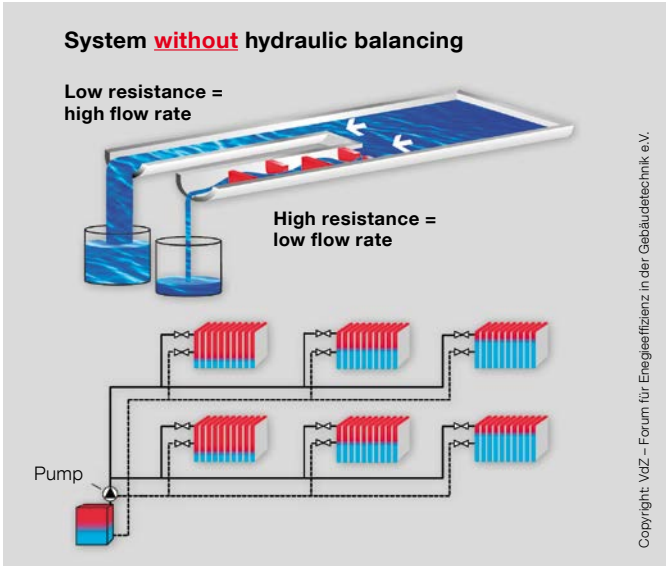
On its way to the radiators and back to the boiler, the hot water flow always chooses the path of least resistance. Due to this natural law, in heating systems without hydraulic balancing radiators further away from the pump are supplied with insufficient amounts of hot water while radiators close to the pump receive too much hot water. Typical countermeasures such as increased pump capacities or higher flow temperatures do not improve this situation, but rather amplify the negative effects. Such systems consume much more energy than necessary without providing the expected convenience.

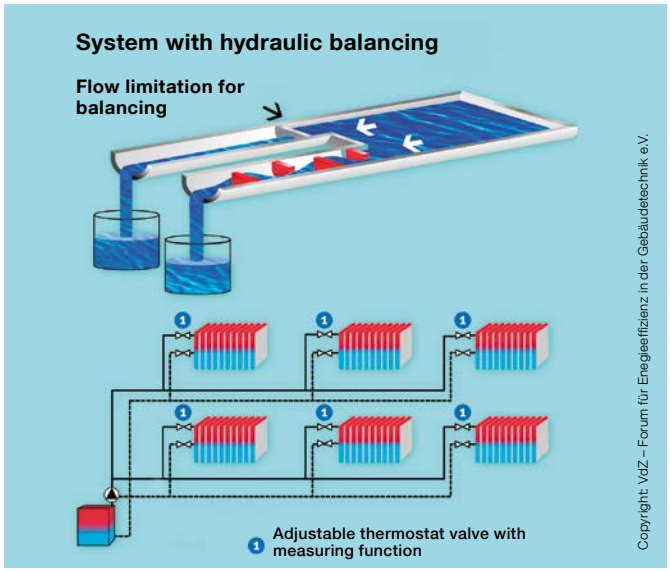
Consequences of lack of hydraulic balancing:

- Uneven heat release
- Heating times of rooms/apartments differ
- Thermostat valves cannot properly control the room temperature
- Limited frost protection
- Disturbing flow noise in valves and pipes
- Excessive power consumption due to oversized and/or incorrectly set circulation pumps
- High losses when the heating system starts or is not used
- Low efficiency of condensing systems: Excessive flow through radiators close to the pump leads to high return temperatures and reduces the condensation effect (energy recovery during condensation of the flue gas)
- Flow temperature is set to an unnecessarily high value to supply hydraulically unfavourable radiators with heat

What is hydraulic balancing?

Hydraulic balancing ensures optimum distribution of the water in the heating system. Based on the actual heat requirements of the building, the circulation pump, the control (flow temperature), the fittings and the valves are adjusted to change the volume flow in the pipes in such a way as to obtain the required flow resistance for all radiators. This forces the hot water to flow through the system exactly as required. The right method and suitable components allow for considerable savings. In individual cases, this may amount to as much as 15% and more of the annual heating capacity.





Advantages – your benefits

- Convenience: Rooms are heated evenly
- Radiators respond quickly to new thermostat valve settings
- Maximum frost protection safety
- No flow noise in the heating system
- Heating system/pump operate with maximum efficiency to save energy
- Increased system reliability
- Improved energetic quality of the building
- Reduced energy consumption saves money and protects the environment due to less emission
- Reduced flow temperature possible

Legal obligations hydraulic balancing

In Germany, hydraulic balancing is mandatory, as stipulated by the German VOB, part C (German Construction Contract Procedures), and DIN 18380. The German EnEV (Energy Savings Ordinance) also requires hydraulic balancing for all new and renovated heating systems.

Fast and easy hydraulic balancing

In existing buildings, hydraulic balancing often involves a lot of estimating and approximation since precise information on the pipe system is unavailable. In old buildings, the lengths and diameters of pipes are often not sufficiently documented, the pipe systems have been changed or there are different levels of renovation. In such cases, a fundament prerequisite is missing.

AFRISO offers two systems for hydraulic balancing. In both cases, the heating system expert adjusts the heat distribution directly at each radiator by limiting the amount of hot water at the adjustable thermostat valves – without additional adjustment fittings. The decision as to which system is most suitable for a given building depends on a variety of factors and requirements.

Automatic hydraulic balancing for the HVAC professional

The system Vario-DP

Pre-adjustable thermostat valves Vario-DP with patented dynamic valve insert for automatic limitation of the water volume set at the valve. Vario-DP controls the water volume independent of pressure variation in the heating system. This means that Vario-DP always supplies the right water volume to the radiator, regardless of the number of open or closed thermostat valves in the system.

Your benefits:

- Automatic control of water volume
- Adjusted flow rate is not exceeded
- Building type: Primarily for single-/two-family homes, residential buildings
- Fast hydraulic balancing without measuring instrument
- Wide range of products, easy planning
- High reserve due to very wide adjustment range up to 340 l/h
- Geometry of valve insert provides protection against unwanted pollution, failure due to blocking is practically impossible

Valve range Vario-DP

The control membrane is installed directly in the valve insert and the valve spindle is used as the pressure sensor – therefore, there are no additional control components which might be subject to pollution. The valve operates with a standard valve gasket and does not require additional dirt filters.

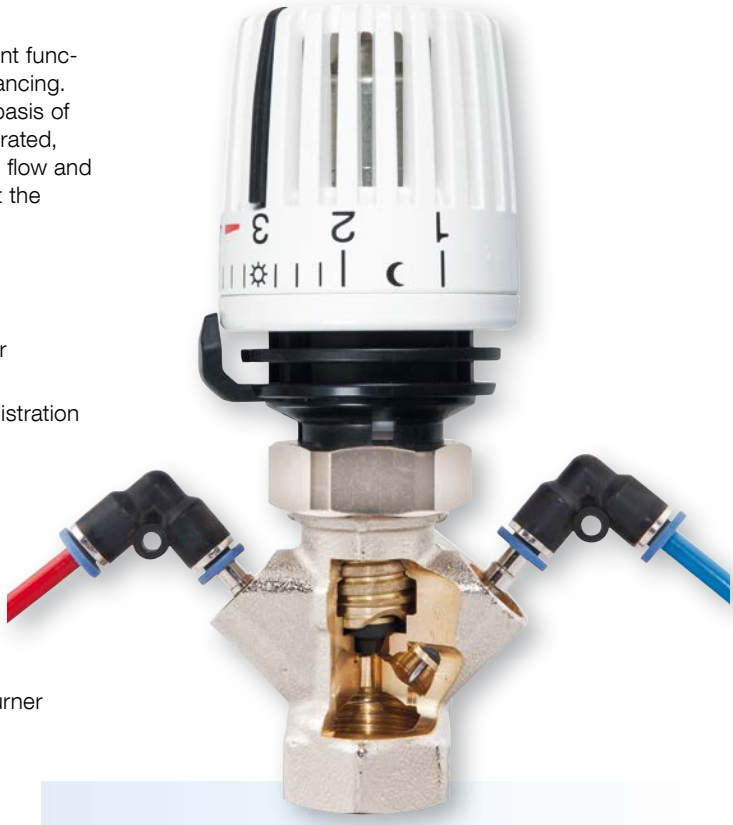
Hydraulic balancing with measurement function for the HVAC system planner

The triple-stage VarioQ system

The pre-adjustable VarioQ thermostat valves with measurement function allow for an even more precise approach to hydraulic balancing. The triple-stage system optimises the heating system on the basis of calculation, measurement and adjustment. Thanks to an integrated, fixed orifice plate, it is possible to directly measure the current flow and adjust the calculated water volume at each radiator valve or at the lockshield valve.

Your benefits:

- Precise measurement and adjustment of the required water volume per radiator
- Building type: Primarily for public buildings, schools, administration buildings and generally for larger heating systems
- Reliable procedure for larger and complex heating systems
- Measurement option at the valve for documentable and verifiable adjustment
- Time and cost savings: Neither dynamic valves nor line fittings are required
- Up to 80 % savings with regard to pump capacity as compared to automatically balanced heating systems
- Further optimisation potential due to, for example, fewer burner starts or increased condensing effect



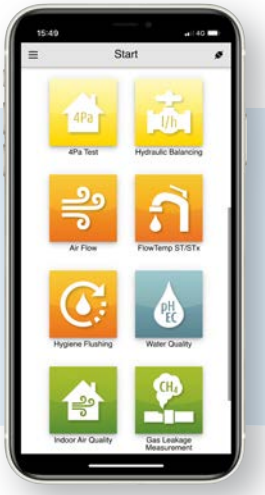
Valve range VarioQ

The fixed orifice plate of VarioQ allows for the precise adjustment of the water volume at the valve of the radiator.
The pre-adjustable thermostat valves feature a fixed, calibrated orifice plate for adjustment of the volume flow directly at the valve.

Measuring instrument
CAPBs® set PT 85

PT 85 measures the flow rate in litres per hour and the required water volume determined via the app can be easily set at the valve without conversion.

App EuroSoft live – Applet valve balancing



- **Free iOS and Android app for measurement and adjustment of radiator valves and line fitting during hydraulic balancing**
- **AFRISO valves can be directly selected – third-party valves can be measured after Kvs flow coefficient Kvs has been entered**
- **Menu-guided measuring procedure**
- **Building data and customer data can be entered**
- **Measurement records in PDF format**

Application

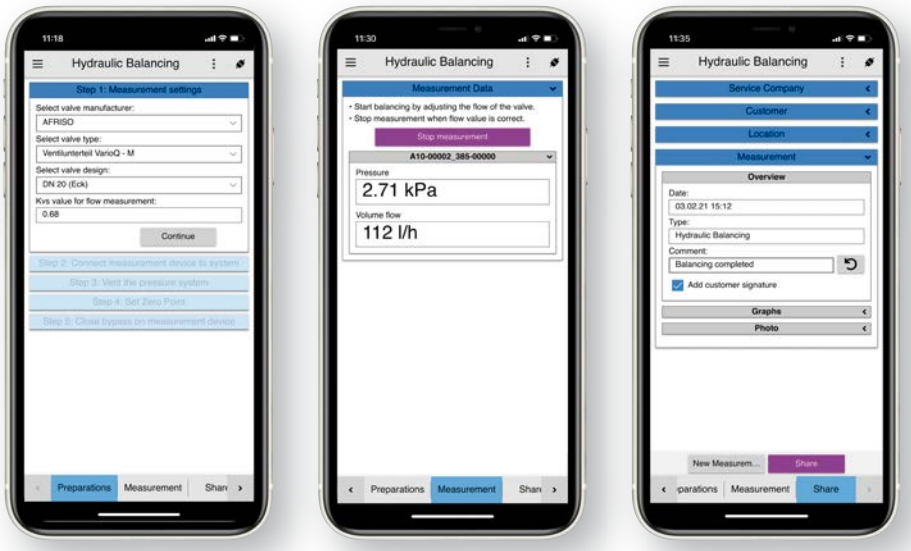
The applet valve balancing is the free in-app for measurements with the AFRISO CAPBs® sets valve balancing and line balancing.

Description

With the applet valve balancing, the app EuroSoft live allows for easy, menu-guided measurement of the volume flow directly at the valve of the heating surface. The AFRISO valve data stored in the applet facilitate the measuring process. In conjunction with the CAPBs® sets for hydraulic balancing, an intuitive and smart measuring system is created. Individual inspection measurements as well as a complete hydraulic balancing procedure can be carried out quickly and easily. Comment fields, photograph attachments and the signature function complete the final PDF documentation. With the familiar smartphone or tablet functions, the measurement reports can be processed or shared in a matter of seconds.

Functions

- "Step by step" instructions
- Selection of measurable AFRISO radiator valves and lockshield valves
- Creation of valves and line fittings based on valve type, design and flow coefficient Kvs
- Flow measurement and adjustment of the required volume flows in l/h
- PDF record with valve adjustment value, comment, photograph and customer signature
- Export and sharing via e-mail or messengers on the smartphone/tablet



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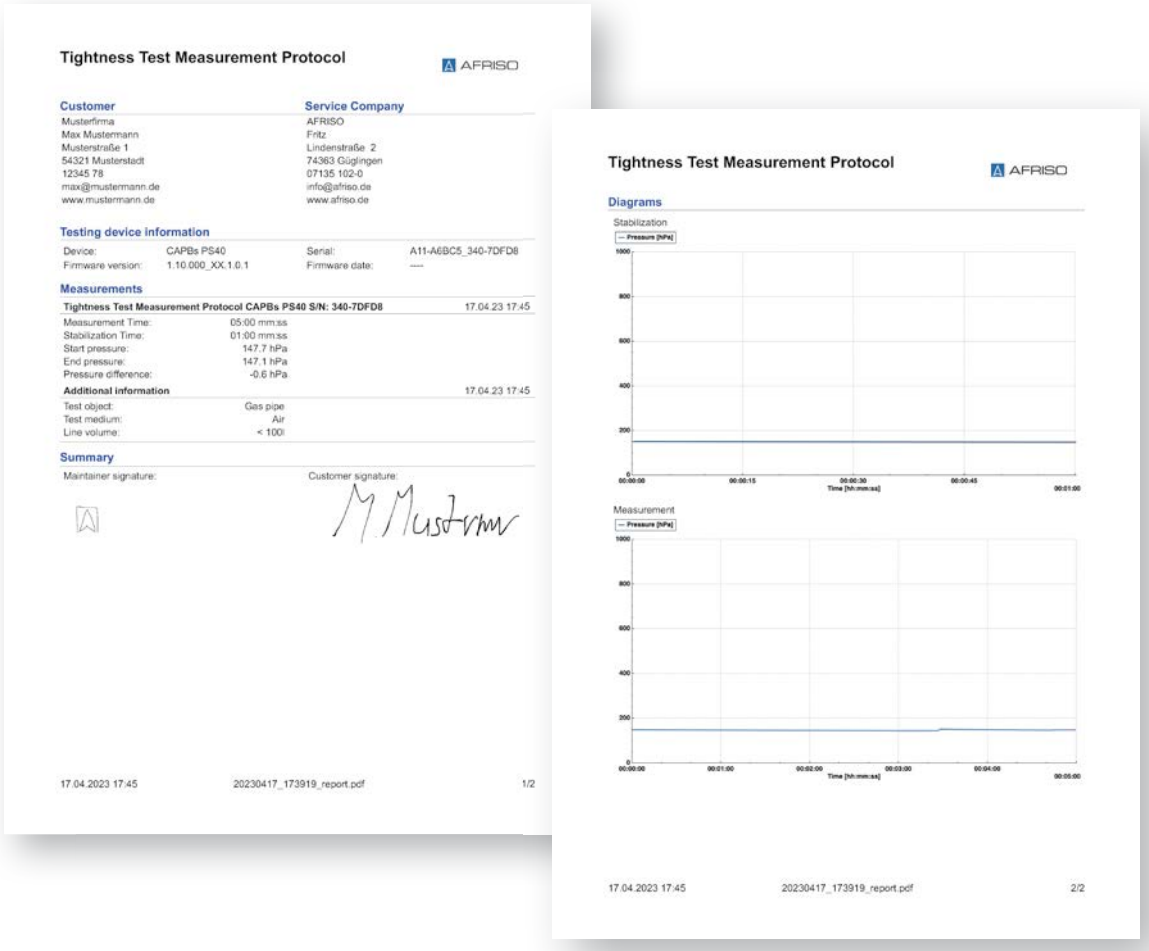
App EuroSoft® live for displaying the values measured by CAPBs® sensor modules

Sample report



Tightness Test Measurement Protocol

AFRISO

Customer
Musterfirma
Max Mustermann
Musterstraße 1
54321 Musterstadt
12345 78
max@mustermann.de
www.mustermann.de

Service Company
AFRISO
Fritz
Lindenstraße 2
74363 Güglingen
07135 102-0
info@afriso.de
www.afriso.de

Testing device information

Device:	CAPBs PS40	Serial:	A11-A6BC5_340-7DFD8
Firmware version:	1.10.000_XX.1.0.1	Firmware date:	----

Measurements

Tightness Test Measurement Protocol CAPBs PS40 S/N: 340-7DFD8		17.04.23 17:45
Measurement Time:	05:00 mm:ss	
Stabilization Time:	01:00 mm:ss	
Start pressure:	147.7 hPa	
End pressure:	147.1 hPa	
Pressure difference:	-0.6 hPa	
Additional information		17.04.23 17:45
Test object:	Gas pipe	
Test medium:	Air	
Line volume:	< 100l	

Summary

Maintainer signature: Customer signature:

17.04.2023 17:45 20230417_173919_report.pdf 1/2

Tightness Test Measurement Protocol

AFRISO

Diagrams

Stabilization

Measurement

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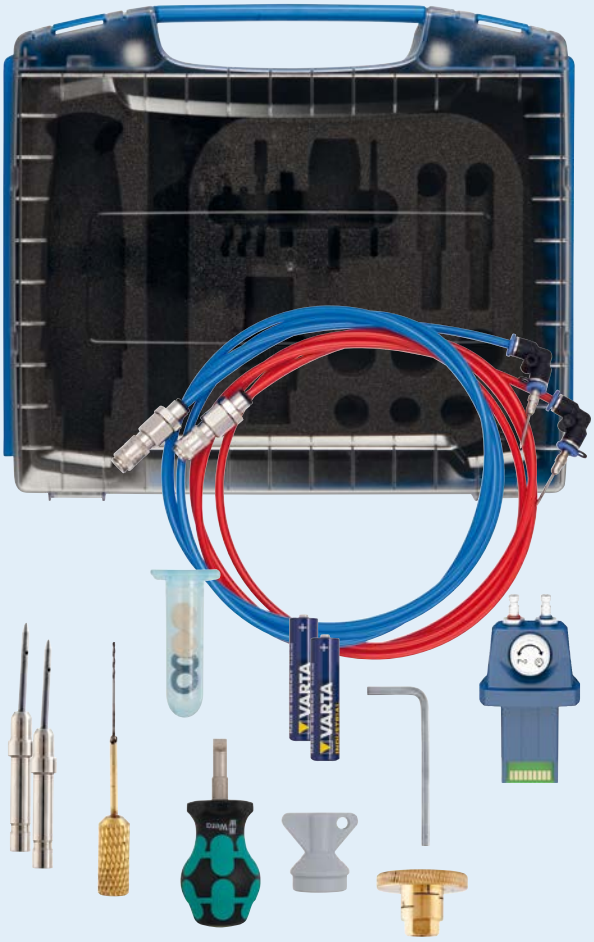
Download app

▪ Google Play:	▪ App Store:

CAPBs® set for hydraulic balancing at radiator valves



- Set for performing hydraulic balancing with the AFRISO valve ranges VarioQ and Vario-DP directly at the radiator
- Measurement and check of differential pressure and flow rate
- Can be used in conjunction with AFRISO BlueLine measuring instruments, smartphones or tablets as evaluation units
- Robust, modular system case M , suitable for box and shelf system Sortimo-BOXX
- Step by step measurements in conjunction with the app EuroSoft live
- Quickly create PDF documentation with signatures, photographs and additional notes and send them via smartphone or tablet

EuroSoft live app

live

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Download on the App Store

Application

- For differential pressure measurement and flow rate adjustment in heating and refrigerating systems during hydraulic balancing
- To be used in conjunction with VarioQ and Vario-DP thermostat valves, lockshield valves and combination blocks during hydraulic balancing directly at the radiator. It is neither necessary to know the pipeline system nor to perform complex calculations.

Description

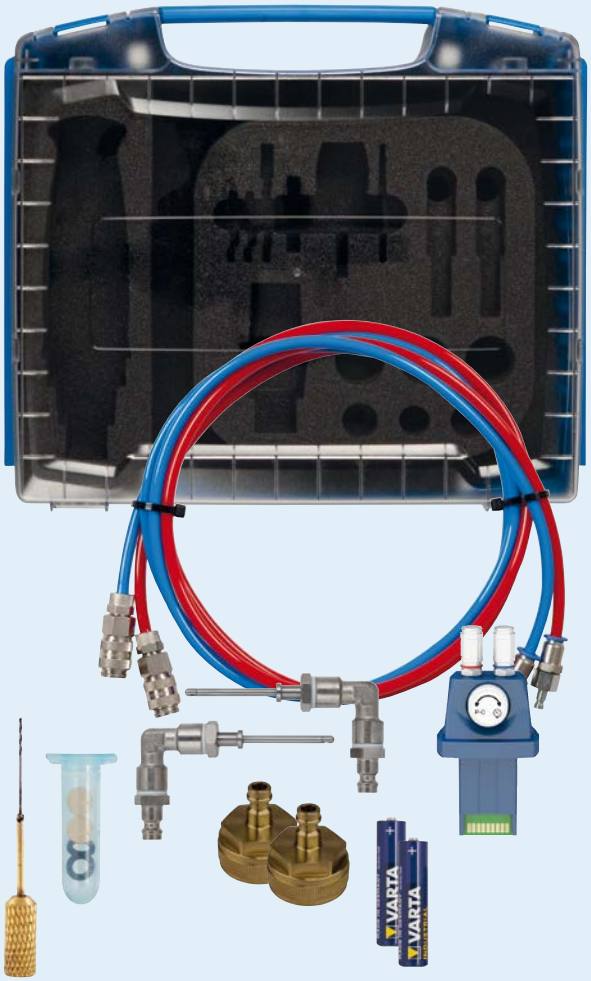
The CAPBs® set valve balancing is a measuring system for performing hydraulic balancing directly at the radiator or at the manifold of surface heating systems. The free app EuroSoft live facilitates the measurement with step-by-step operation of the measuring system. All standard AFRISO VarioQ/-DP valves are stored in the app. The valve data can also be entered manually. The water volumes can be easily set at the VarioQ valve without conversion. The measured flow rate and pressure values can be displayed in various units; the measurement results can be documented and shared in a matter of seconds.

Scope of delivery

- Pressure transmitter CAPBs® sens PT 85, 7 bar, connection 2 x DN 2.7 plug-in nipple
- Adjustment key for VarioQ und VarioQ-Kombi
- Pre-adjustment key VarioQ
- Measuring hose set for VarioQ Ø 4 mm (red and blue), 2 x measuring needle Q
- Measuring needle drill, screwdriver and hex key 4 mm
- Sintered filter with O ring, reaction container 2 ml (blue), 2 x 1.5-V AAA alkaline battery
- Modular system case M "valve balancing"

DG: B, PG: 4	Part no.
CAPBs® set valve balancing	**P00056**
Accessories	
CAPBs® extension set line balancing	**P00058**
Handle CAPBs® module BG 10	**M091000017**
Handle CAPBs® device with interface basic IF 10	**P00052**

CAPBs® set for hydraulic balancing at line fittings



- Set for performing hydraulic balancing at line fittings and line control valves
- Measurement and check of differential pressure and flow rate
- Can be used in conjunction with AFRISO BlueLine measuring instruments, smartphones or tablets as evaluation units
- Robust, modular system case M , suitable for box and shelf system Sortimo-BOXX
- Step by step measurements in conjunction with the app EuroSoft live
- Quickly create PDF documentation with signatures, photographs and additional notes and send them via smartphone or tablet

EuroSoft live app

live

GET IT ON Google Play

Download on the App Store

Application

- For differential pressure measurement and flow rate adjustment at line fittings and line valves during hydraulic balancing
- Can be used with all standard valves from all standard manufacturers

Description

The CAPBs® set line balancing is a measuring system for performing hydraulic balancing at line fitting and line valves. The free app EuroSoft live facilitates the measurement with step-by-step operation of the measuring system. All standard valves types can be stored in the app by entering the flow coefficient Kvs. The water volumes can be easily set at the valve without conversion. The measured flow rate and pressure values can be displayed in various units; the measurement results can be documented and shared in a matter of seconds.

Scope of delivery

- Pressure transmitter CAPBs® sens PT 86, 20 bar, connection 2 x coupling DN 2.7
- 2 x test adapter female thread ¾" with plug-in nipple DN 5
- Measuring hose set Ø 6 mm (red and blue) with 2 x angled measuring needle Ø 3.3 mm for line control valves
- Measurement needle drill
- Sintered filter with O ring, reaction container 2 ml (blue), 2 x 1.5-V AAA alkaline battery
- Modular system case M "Line balancing"

DG: B, PG: 4	Part no.
CAPBs® set line balancing	**P00057**
Accessories	
CAPBs® extension set valve balancing	**P00059**
Handle CAPBs® module BG 10	**M091000017**
Handle CAPBs® device with interface basic IF 10	**P00052**

Thermostat valve bodies VarioQ

- **Fixed, calibrated orifice plate for accurate adjustment of the radiator**
- **Fully adjustable**
- **Valve insert can be replaced without system having to be drained**
- **Lightning-fast hydraulic balancing with CAPBs® set valve balancing**

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Application

For measuring and adjusting the volume flow directly at the valve, e.g. with the CAPBs® set valve balancing as measuring instrument for hydraulic balancing. Suitable for small, medium and large water volumes. For installation in dual-pipe heating systems. Design as per standard, therefore, installation in existing systems without changes to the connection pipes.

Description

Patented, low-noise thermostat valve body with fixed, calibrated orifice plate for measuring and adjusting the volume flow directly at the valve. Mounting cap with valve shut-off function. Threaded connection M30 x 1.5 mm for thermostat control heads and actuators. Fully adjustable with ES-SV adjustment key. Valve spindle with double O ring seal. The valve insert can be replaced with the MGV mounting unit at operating pressure without the system having to be drained.

VarioQ is a triple-stage hydraulic balancing system which allows for optimisation of the heating pipe system by means of calculation, measurement and adjustment. The CAPBs® set valve balancing (measuring instrument) measures the flow rate in litres per hour and the water volume can be easily set at the valve without conversion. Even minimum flow rates can be set with this system.

Technical specifications

System connection
See ordering table

Thermostat head/actuator connection
Threaded connection M30 x 1.5 mm

Setting range
VarioQ S: 6–80 l/h
VarioQ M: 14–215 l/h
VarioQ L: 39–300 l/h

Nominal pressure
Max. 10 bar

Nominal diameter
DN 10, DN 15, DN 20

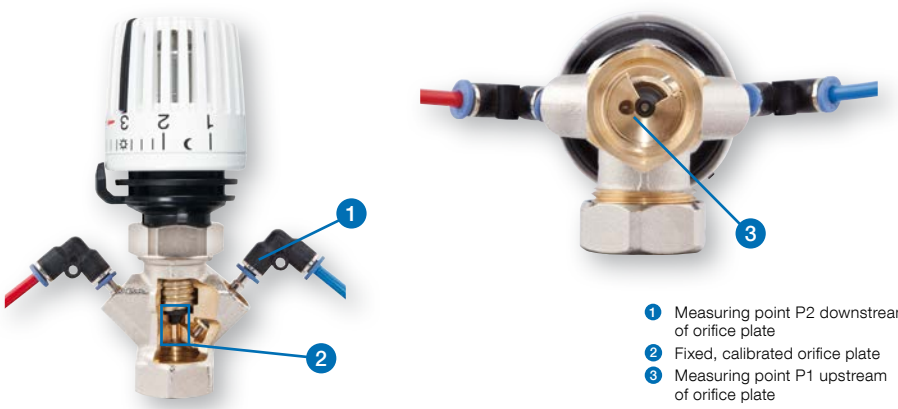
Operating temperature range
Medium: T_{max} = 120 °C

Housing
VarioQ S–L: Brass, nickel-plated

Option
- Version PN 16

In the case of axial version or angled-angled version (left/right), use valve body Vario (axial) or Vario angled-angled (left/right) with lockshield valve with measuring function 454 Q. See page 321 for accessories.

Measuring points volume flow – VarioQ section

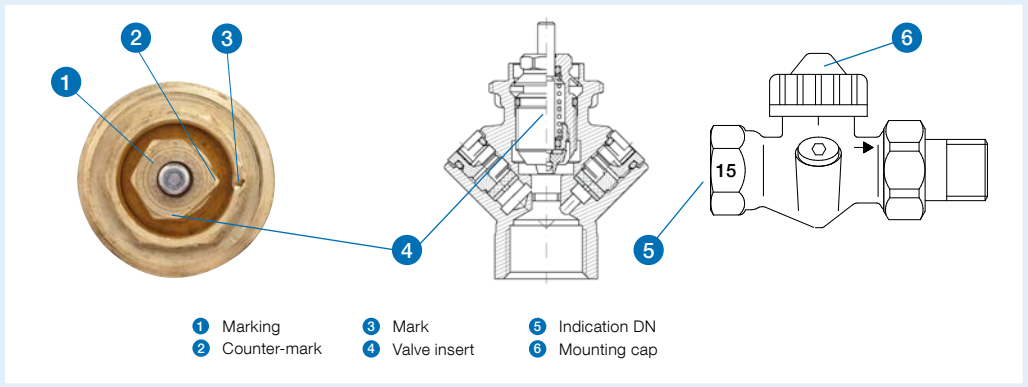


1. Measuring point P2 downstream of orifice plate
2. Fixed, calibrated orifice plate
3. Measuring point P1 upstream of orifice plate

Thermostat valve bodies VarioQ

Valve pre-adjustment

VarioQ thermostat valves are fully adjustable by means of the ES-SV adjustment key, starting with the open position (8 = open); the numbers 1–8 are shown on the adjustment key. Mark and counter-mark are aligned. Each 1/8 of a turn corresponds to one flow characteristic, shown in a diagram (see operating instructions).



Type overview

Valve type	Marking at valve insert	Colour of mounting cap	Flow rate range in l/h*	
			Min.	Max.
VarioQ S	1 ring/red	Red	6	80
VarioQ M	2 rings	Black	20	260
VarioQ L	3 rings/green	Green	20	400

* The measurable flow rate is much higher than the adjustable range of the valves. The flow rate ranges for the VarioQ valves are shown in the ordering table.

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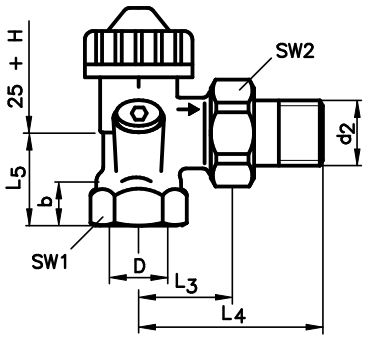
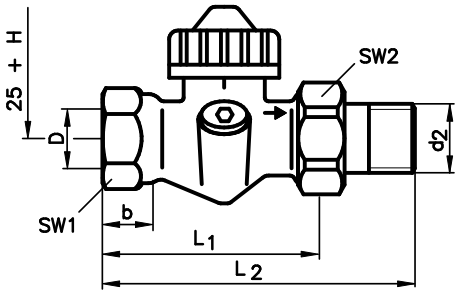
Types and dimensions as per EN 215, series D

VarioQ S, M, L – angled



VarioQ S, M, L – straight



Dimensions (mm) VarioQ S, M, L

DN	D	d_1	d_2	Spanner size SW_1	Spanner size SW_2	H	b min	L_1 ±2	L_2 ±2	L_3 ±1	L_4 ±1.5	L_5 ±1.5	L_6	L_7	L_8
10	Rp⅜	-	R⅜	22	27	= Height control-head	10.1	59	85	26	52	22	74	26	40
15	Rp½	G¾	R½	27	30		13.2	66	95	29	58	26	82	29	42
20	Rp¾	-	R¾	32	37		14.5	74	106	34	66	29	96	34	53

Thermostat valve bodies VarioQ

DG: V, PG: 2	Version	Nominal diameter	Connection	Flow coefficient* (m³/h)	Flow coefficient Kvs** (m³/h)			Part no.
VarioQ S for small water volumes								
	**Angled**	DN 10	Rp⅜ x R⅜	0.019–0.24	0.25	1	35	**181 110.101**
		DN 15	Rp½ x R½			1	30	**181 120.101**
		DN 20	Rp¾ x R¾			1	25	**181 130.101**
	**Straight**	DN 10	Rp⅜ x R⅜	0.019–0.24	0.25	1	35	**181 160.101**
		DN 15	Rp½ x R½			1	30	**181 170.101**
		DN 20	Rp¾ x R¾			1	25	**181 180.101**
VarioQ M for medium water volumes								
	**Angled**	DN 10	Rp⅜ x R⅜	0.044–0.46	0.68	1	35	**181 210.101**
		DN 15	Rp½ x R½			1	30	**181 220.101**
		DN 20	Rp¾ x R¾			1	25	**181 230.101**
	**Straight**	DN 10	Rp⅜ x R⅜	0.044–0.46	0.68	1	35	**181 260.101**
		DN 15	Rp½ x R½			1	30	**181 270.101**
		DN 20	Rp¾ x R¾			1	25	**181 280.101**
VarioQ L for large water volumes								
	**Angled**	DN 10	Rp⅜ x R⅜	0.125–0.51	0.94	1	-	181 310.101
		DN 15	Rp½ x R½			1	-	181 320.101
		DN 20	Rp¾ x R¾			1	-	181 330.101
	**Straight**	DN 10	Rp⅜ x R⅜	0.125–0.51	0.94	1	-	181 360.101
		DN 15	Rp½ x R½			1	-	181 370.101
		DN 20	Rp¾ x R¾			1	-	181 380.101

* The flow coefficient corresponds to the water flow in m³/h through the valve at a given valve stroke (proportional offset, e.g. 1 K or 2 K) and a differential pressure of 1 bar.
** The flow coefficient Kvs is the flow coefficient of the valve at nominal stroke (100 % open).

Radiator lockshield valves type 454Q

- **Fixed, calibrated orifice plate for accurate adjustment of the radiator**
- **Individual radiators can be shut off without the heating system having to be drained**
- **Lightning-fast hydraulic balancing with CAPBs® set valve balancing**

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Application

For measuring the volume flow directly at the screw fitting, e.g. with the CAPBs® set valve balancing for hydraulic balancing. Suitable for small and medium water volumes. For installation in single-pipe and dual-pipe heating systems. Adjustments are made e.g. via the adjustable dynamic thermostat valve Vario-DP in the flow.

Description

Radiator lockshield valve with measuring function type 454Q with drain and adjustment function. Measurement via an integrated, fixed and calibrated orifice plate. With cap to protect against incorrect operation. The optional filling and draining unit FEV 03 with hose connection ½" can be used for easy and fast draining.

The radiator lockshield valve is a part of the product range for the triple-stage balancing system VarioQ which allows for optimisation of the heating pipe system by means of calculation, measurement and adjustment. The CAPBs® set valve balancing (measuring instrument) measures the flow rate in litres per hour. Even minimum flow rates can be set with this system.

Technical specifications

System connection
See ordering table

Adjustment range at 10 kPa
454Q S: 120 l/h
454Q M: 330 l/h

Nominal pressure
Max. 10 bar

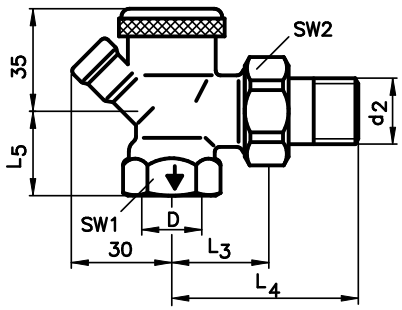
Nominal diameter
DN 10, DN 15

Operating temperature range
Medium: T_{max} = 120 °C

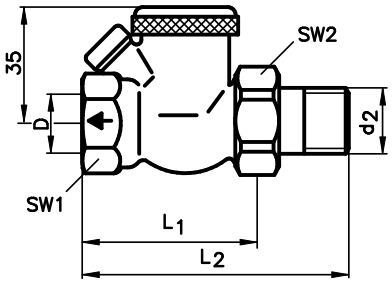
Housing
Gunmetal, nickel-plated

Types and dimensions (mm) as per DIN 3842

Type 454Q S, M – angled



Type 454Q S, M – straight



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Please use valve body to adjust the water volume.

See page 321 for accessories.

Dimensions (mm)

DN	D	d2	Spanner size SW1	Spanner size SW2	L1 ±2	L2 ±2	L3 ±1	L4 ±1.5	L5 ±1.5
10	Rp⅜	R⅜	22	27	49	75	26	52	22
15	Rp½	R½	27	30	51	80	29	58	26

Radiator lockshield valves type 454Q

DG: V, PG: 2	Version	Nominal diameter	Connection	Flow coefficient Kvs* (m^3/h)			Part no.
454Q S for small water volumes, measuring range 20–400 l/h							
	**Angled**	DN 10	Rp⅜ x R⅜	0.38	1	-	479 011
		DN 15	Rp½ x R½	0.38	1	40	**479 021**
	**Straight**	DN 10	Rp⅜ x R⅜	0.38	1	-	479 061
		DN 15	Rp½ x R½	0.38	1	40	**479 071**
454Q M for medium water volumes, measuring range 20–400 l/h							
	**Angled**	DN 10	Rp⅜ x R⅜	1.04	1	-	479 012
		DN 15	Rp½ x R½	1.04	1	40	**479 022**
	**Straight**	DN 10	Rp⅜ x R⅜	1.04	1	-	479 062
		DN 15	Rp½ x R½	1.04	1	40	**479 072**

* The flow coefficient corresponds to the water flow in m^3/h through the valve at a given valve stroke (proportional offset e.g. 1 K or 2 K) and a differential pressure of 1 bar. The flow coefficient Kvs is the flow coefficient of the valve at nominal stroke (100 % open).

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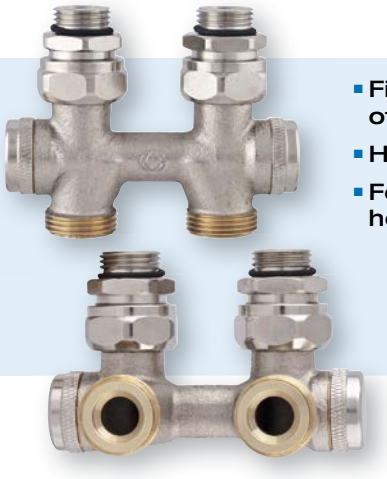
See page 321 for accessories.

Combination blocks VarioQ-Kombi for compact radiators with valve



- **Fixed, calibrated orifice plate for accurate adjustment of the radiator**
- **Hydraulic balancing with CAPBs® set valve balancing**
- **For wall or floor connection, also suitable for baseboard heating systems**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Application

For measuring the volume flow directly at the radiator, e.g. with the CAPBs® set valve balancing as measuring instrument for hydraulic balancing. Suitable for small and medium water volumes. For connection to compact radiators with valve with an axis distance of 50 mm in dual-pipe heating systems. Adjustments are made either via the adjustable valve insert in the compact radiator or via the VarioQ combination block.

Description

Adjustable combination block with measuring function VarioQ-Kombi with drain and shut-off feature. The volume flow is measured via an integrated, fixed and calibrated orifice plate. With cap to protect against incorrect operation.

VarioQ-Kombi is a part of the product range for the triple-stage balancing system VarioQ which allows for optimisation of the heating pipe system by means of calculation, measurement and adjustment. The CAPBs® set valve balancing as measuring instrument measures the flow rate in litres per hour. Even minimum flow rates can be set with this system.

Technical specifications

System connection (valve radiators)
G¾ eurocone or G½ female thread

Adjustment range
VarioQ-Kombi S: 79 l/h
VarioQ-Kombi M: 185 l/h

Nominal pressure
Max. 10 bar

Nominal diameter
DN 15

Operating temperature range
Medium: T_{max} = 120 °C

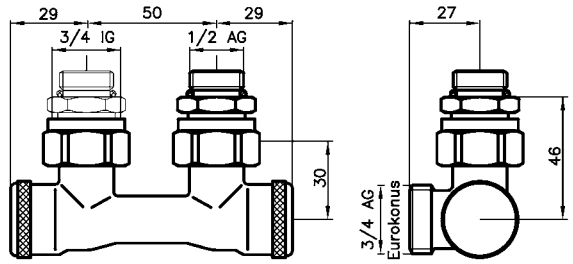
Housing
Gunmetal, nickel-plated

i
See page 321 for accessories.

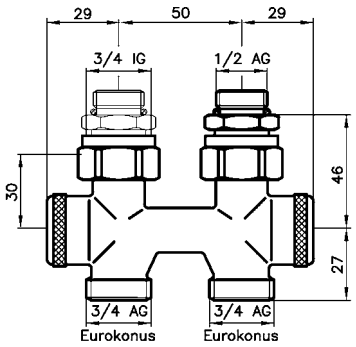
Combination blocks VarioQ-Kombi for compact radiators with valve

Types and dimensions (mm)

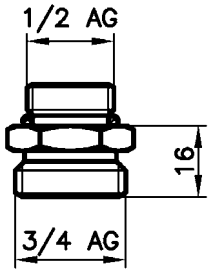
VarioQ-Kombi S, M – angled



VarioQ-Kombi S, M – straight



Adapter for radiators with R½ female thread



9

Screw fittings with measuring function Q

- **Measuring insert with fixed, calibrated orifice plate**
- **Ideal for hydraulic balancing of underfloor/heating circuit manifolds in existing buildings**


A
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Application

For measuring the volume flow, e.g. with the CAPBs® set valve balancing as measuring instrument for hydraulic balancing. The screw connection with measuring is ideal for underfloor heating manifolds/ heating circuit manifolds.

Description

Compact screw fitting with measuring function, straight design, with fixed calibrated orifice plate for measuring the volume flow.

The optimum volume flow is to be determined by means of a heating load calculation program and can then be directly measured and adjusted with the CAPBs® set valve balancing. Adjustments are made via standard adjustment valves.

Technical specifications

System connection
See ordering table

Max. flow rate at 10 kPa
Q M: 330 l/h
Q, L_{max}: 900 l/h

Nominal pressure
M, L_{max}: Max. 16 bar

Nominal diameter
DN 15

Operating temperature range
Medium: T_{max} = 120 °C

Housing
M, L_{max}: Gunmetal

9

DG: V, PG: 2	Version	Nominal diameter	Flow rate range (m^3/h)	Flow coefficient*			Part no.
	**Q M for medium water volumes,** PN 16, connection G¾ eurocone	DN 15	0.02 – 0.40	1.04	1	-	408 025
	**Q L_{max} for large water volumes** PN 16, connection G¾ eurocone	DN 15	0.06 – 1.20	2.85	1	-	408 026

* The flow coefficient corresponds to the water flow in m^3/h through the valve at a given valve stroke (proportional offset, e.g. 1 K or 2 K) and a differential pressure of 1 bar.

Dynamic thermostat valve bodies Vario-DP

- Automatic control of water volume
- Fast hydraulic balancing without calculation of pipe system and measuring instrument
- High reserve due to adjustment range up to 340 l/h
- Patented, simple valve insert provides protection against pollution

A  Page 322
A  Page 317
A  Page 301

Application

Suitable for small to large water volumes. For installation in dual-pipe heating systems. The dynamic valve range Vario-DP makes hydraulic balancing in single and two family homes an easy and fast job.

Description

Low-noise thermostat valve body with threaded connection M30 x 1.5 mm for thermostat control heads and actuators. Mounting cap with valve shut-off function. Adjustment range 20 to 340 l/h, fully adjustable with standard radiator bleed screw key. Pre-adjustment directly readable without scale.

The patented valve insert with automatic flow limiter automatically limits the water volume adjusted at the valves, independent of pressure variation in the heating system. This means that Vario-DP always supplies the right water volume to the radiator, regardless of the number of open or closed thermostat valves in the system. The valve insert can be replaced with the MGV mounting unit at operating pressure without the system having to be drained.

9

Technical specifications

System connection
See ordering table

Thermostat head/actuator connection
Threaded connection M30 x 1.5 mm

Setting range
20–340 l/h

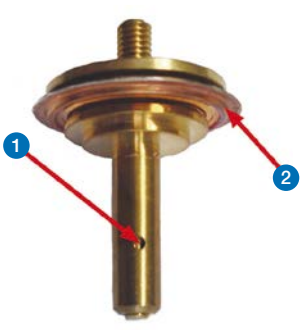
Nominal pressure
Max. 10 bar

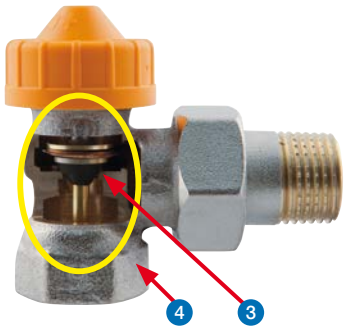
Differential pressure (Δp)
Max. 70 kPa
Min. 15 kPa

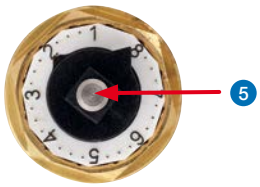
Nominal diameter
DN 10, DN 15, DN 20

Operating temperature range
Medium: T_{max} = 90 °C

Housing
Gunmetal, nickel-plated







1. P1 = pressure inlet
2. Membrane: Expands at increasing differential pressure
3. Vario-DP: Dynamic valve insert
4. Dimensions of valve housing as per EN 215
5. Fully adjustable with standard radiator bleed screw key

Patented valve insert with dynamic flow limiter
Since the control membrane is installed directly in the valve insert and since the valve spindle is used as the pressure sensor, there are no additional control components which might be subject to pollution. The valve operates with a standard valve gasket and does not require additional dirt filters.

i

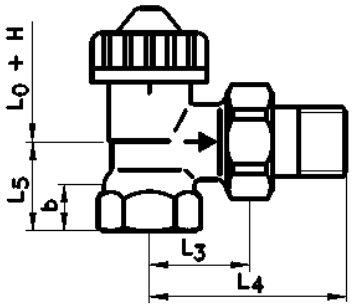
See page 313 for valve adjustment table (water volumes). See page 321 for accessories.

Please note the additional information on mounting in the operating instructions.

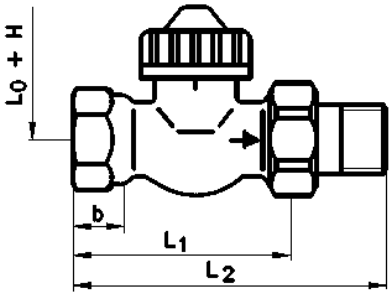
Dynamic thermostat valve bodies Vario-DP

Types and dimensions (mm)

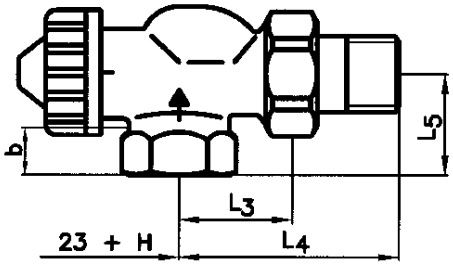
Vario-DP – angled



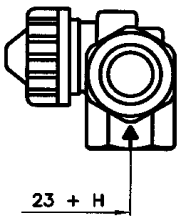
Vario-DP – straight



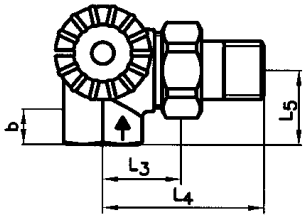
Vario-DP – axial



Vario-DP – angled-angled, left



Vario-DP – angled-angled, right



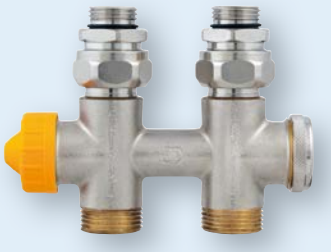
Dimensions (mm) Vario-DP

DN	D	B	L_0	L_1	L_2	L_3	L_4	L_5	L_6
10	Rp$^3/_8$	10.1	23	59	85	26	52	25	-
15	Rp½	13.2	23	66	95	29	58	26	55
20	Rp¾	14.5	23	74	106	34	66	29	-

Dynamic thermostat valve bodies Vario-DP

DG: V, PG: 2		Connection	Part no.
Thermostat valve body Vario-DP			
	**Angled**	Rp⅜ x R⅜	**161 010.100**
		Rp½ x R½	**161 020.100**
		Rp¾ x R¾	**161 030.100**
	**Straight**	Rp⅜ x R⅜	**161 060.100**
		Rp½ x R½	**161 070.100**
		Rp¾ x R¾	**161 080.100**
	**Axial**	Rp½ x R½	**163 020.100**
	**Angled-angled, right**	Rp½ x R½	**165 020.100**
	**Angled-angled, left**	Rp½ x R½	**167 020.100**

Dynamic thermostat combination blocks Vario-DP



- Automatic control of water volume
- Fast hydraulic balancing without calculation of pipe system and measuring instrument
- High reserve due to adjustment range up to 340 l/h
- Patented, simple valve insert provides protection against pollution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Application

Suitable for small to large water volumes. For mounting to compact or bathroom radiators with centre connection in dual-pipe heating systems. The dynamic valve range Vario-DP makes hydraulic balancing in single and two family homes an easy and fast job.

Description

Thermostat combination block with threaded connection M30 x 1.5 mm for thermostat control heads and actuators. Mounting cap with valve shut-off function. Adjustment range 20–340 l/h, fully adjustable with standard radiator bleed screw key. Pre-adjustment directly readable without scale.

The patented valve insert with automatic flow limiter automatically limits the water volume adjusted at the valves, independent of pressure variation in the heating system. This means that Vario-DP always supplies the right water volume to the radiator, regardless of the number of open or closed valves in the system. The valve insert can be replaced with the MGV mounting unit at operating pressure without the system having to be drained.

Technical specifications

System connection
See ordering table

Thermostat head/actuator connection
Threaded connection M30 x 1.5 mm

Setting range
20–340 l/h

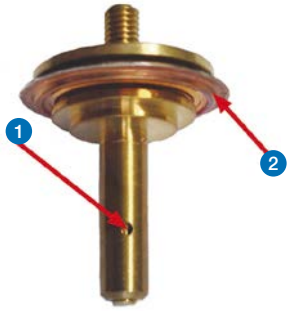
Nominal pressure
Max. 10 bar

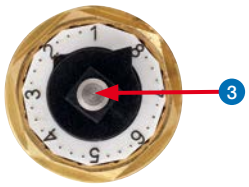
Differential pressure (Δp)
Max. 70 kPa
Min. 15 kPa

Nominal diameter
DN 10, DN 15, DN 20

Operating temperature range
Medium: T_{max} = 90 °C

Housing
Gunmetal, nickel-plated





1. P1 = pressure inlet
2. Membrane: Expands at increasing differential pressure
3. Fully adjustable with standard radiator bleed screw key

Patented valve insert with dynamic flow limiter
Since the control membrane is installed directly in the valve insert and since the valve spindle is used as the pressure sensor, there are no additional control components which might be subject to pollution. The valve operates with a standard valve gasket and does not require additional dirt filters.

i

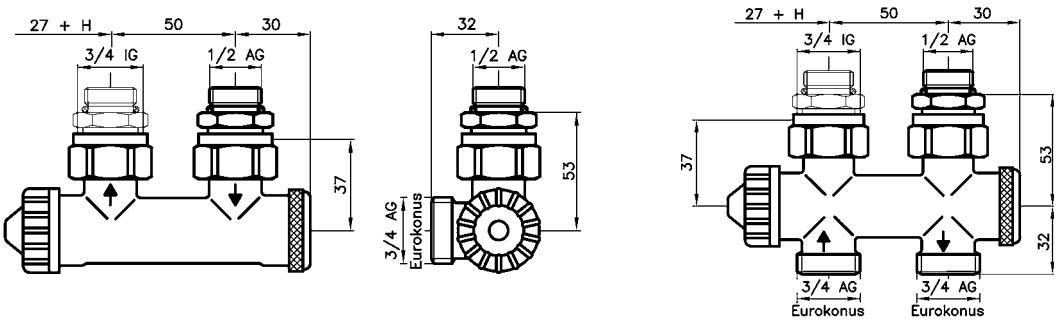
See page 313 for valve adjustment table (water volumes). See page 321 for accessories.

Please note the additional information on mounting in the operating instructions.

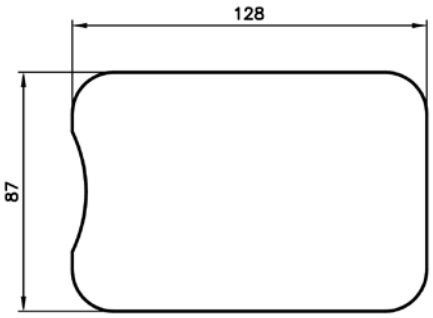
Dynamic thermostat combination blocks Vario-DP

Types and dimensions (mm)

Version for compact radiators/bathroom radiators with G½ female thread



Cover



DG: V, PG: 2		Connection	Part no.
Combination block Vario-DP for compact radiators/bathroom radiators with G½ female thread			
	**Straight**	G½ female thread	**221 075.100**
	**Angled**	R½ female thread	**221 025.100**

Dynamic combination blocks 456-DP

- Automatic control of water volume
- High reserve due to adjustment range up to 340 l/h
- Patented, simple valve insert provides protection against pollution
- Ideal for energetic renovation of older heating systems


A
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Application

Suitable for small to large water volumes. For installation in dual-pipe heating systems for consumers with integrated valve. The dynamic valve range Vario-DP makes hydraulic balancing in single and two family homes an easy and fast job.

Description

Low-noise, adjustable combination block with drain and shut-off feature. Adjustment range 20 to 340 l/h, fully adjustable with standard radiator bleed screw key. With cap to protect against incorrect operation.

The patented valve insert with automatic flow limiter automatically limits the water volume adjusted at the valves, independent of pressure variation in the heating system. This means that Vario-DP always supplies the right water volume to the radiator, regardless of the number of open or closed valves in the system. The valve insert can be replaced with the MGV mounting unit at operating pressure without the system having to be drained.

Technical specifications

System connection
See ordering table

Thermostat head/actuator connection
Threaded connection M30 x 1.5 mm

Setting range
20–340 l/h

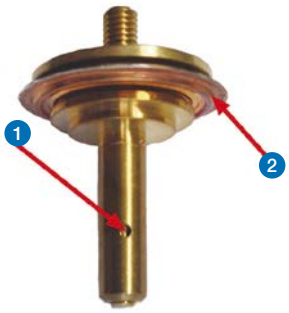
Nominal pressure
Max. 10 bar

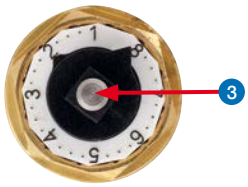
Differential pressure (Δp)
Max. 70 kPa
Min. 15 kPa

Nominal diameter
DN 15

Operating temperature range
Medium: T_{max} = 90 °C

Housing
Gunmetal, nickel-plated





1. P1 = pressure inlet
2. Membrane: Expands at increasing differential pressure
3. Fully adjustable with standard radiator bleed screw key

Patented valve insert with dynamic flow limiter
Since the control membrane is installed directly in the valve insert and since the valve spindle is used as the pressure sensor, there are no additional control components which might be subject to pollution. The valve operates with a standard valve gasket and does not require additional dirt filters.

i

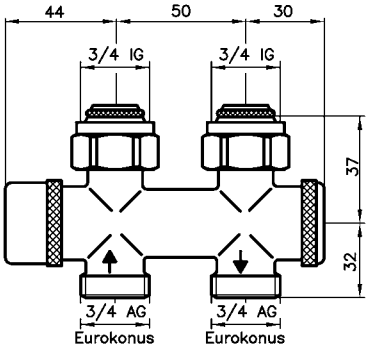
See page 313 for valve adjustment table (water volumes). See page 321 for accessories.

Please note the additional information on mounting in the operating instructions.

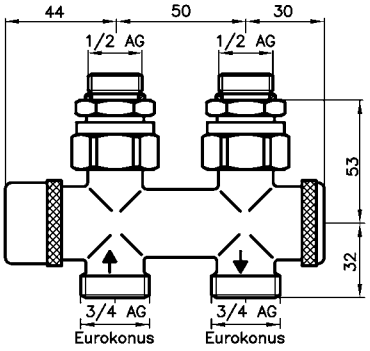
Dynamic combination blocks 456-DP

Types and dimensions (mm)

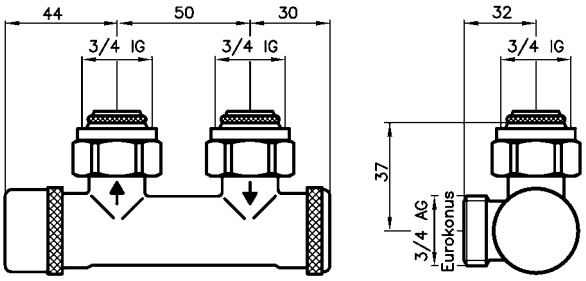
456-DP, straight – version G¾ female thread



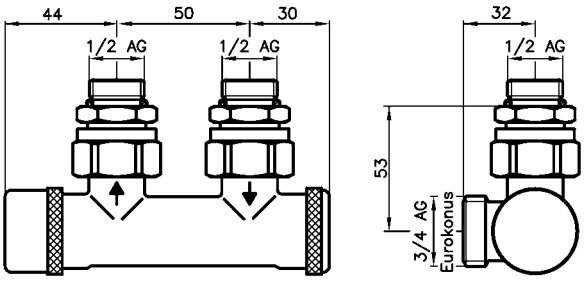
456-DP, straight – version G½ male thread



456-DP, angled – version G¾ female thread



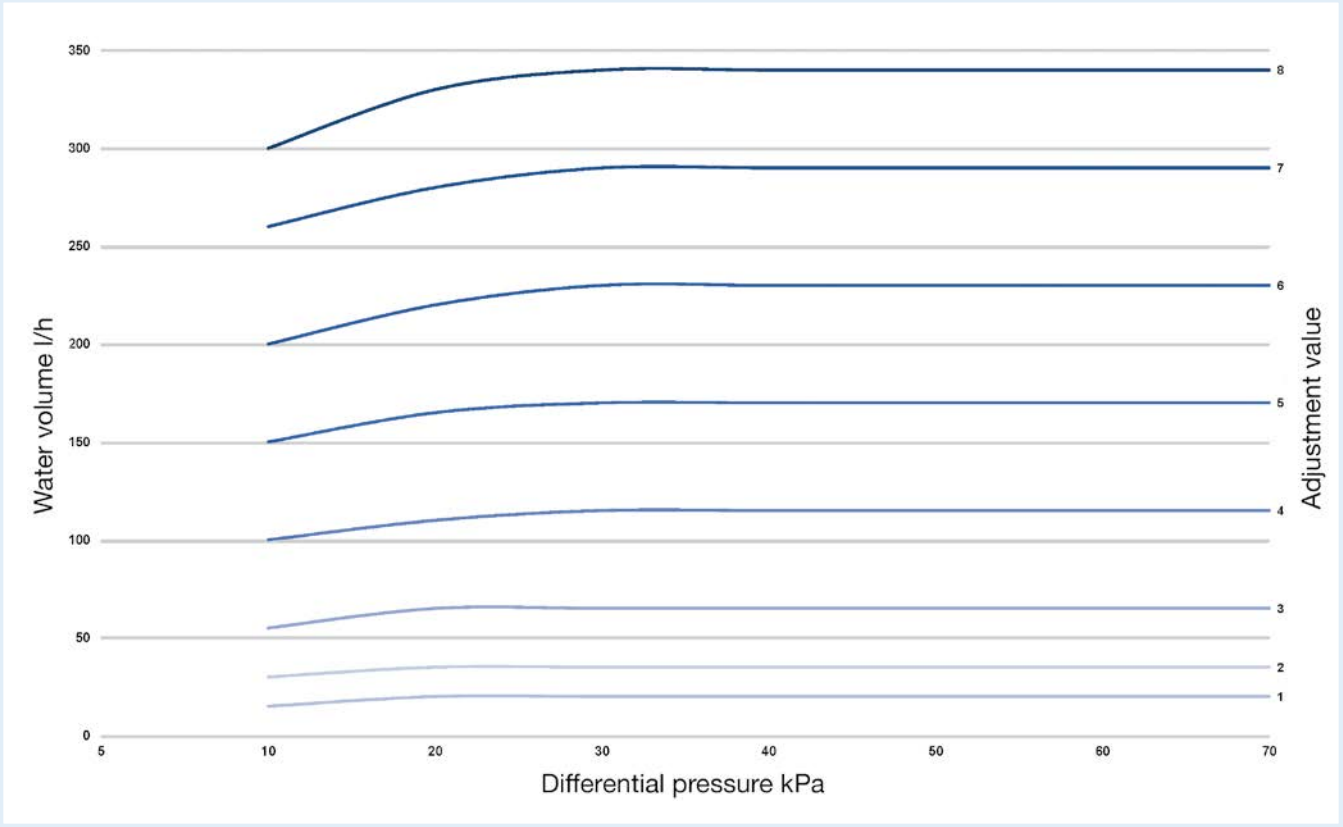
Außengewinde456-DP, angled – version G½ male thread



9

DG: V, PG: 2		Connection	Part no.
Combination block 456-DP for compact radiators with valve with G½ female thread			
	**Straight**	G3/4 eurocone	**423 070**
	**Straight**	G½ female thread	**423 071**
	**Angled**	R¾ eurocone	**423 020**
	**Angled**	R½ female thread	**423 021**

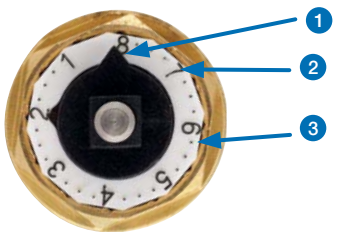
Pre-adjustment calculated water volume for Vario-DP valve bodies and combination blocks



Adjustment table

Pre-adjustment valve:	1	1•	1••	1•••	2	2•	2••	2•••	3	3•	3••	3•••	4	4•	4••	4•••	5	5•	5••	5•••	6	6•	6••	6•••	7	7•	7••	7•••	8
	Water volume in l/h:																												
Differential pressure: 15–70 kPa	20	20	25	25	35	40	45	55	65	80	90	100	115	135	145	160	170	185	200	215	230	245	260	275	290	300	315	330	340

Example valve pre-adjustment



1. Indication pre-adjustment
2. Main adjustment value
3. Fine adjustment

Thermostat valve bodies Vario

- **Fully adjustable**
- **Valve insert can be replaced without system having to be drained**
- **Various versions and sizes for virtually any application**

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Adjustment key ES-SV

Application

Suitable for medium water volumes. For installation in dual-pipe central heating systems.

Description

Low-noise thermostat valve body with threaded connection M30 x 1.5 mm for thermostat control heads and actuators. Mounting cap with valve shut-off function. Fully adjustable with ES-SV adjustment key. Valve spindle with double O ring seal. The valve insert can be replaced with the MGV mounting unit at operating pressure without the system having to be drained.

Technical specifications

System connection
See ordering table

Thermostat head/actuator connection
Threaded connection M30 x 1.5 mm

Adjustment range at 10 kPa
Vario M: 12–250 l/h
Vario L: 55–350 l/h

Nominal pressure
Max. 10 bar

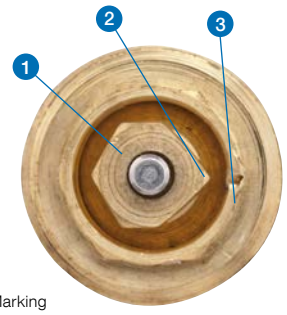
Nominal diameter
DN 10, DN 15, DN 20

Operating temperature range
Medium: T_{max} = 120 °C

Housing
Gunmetal, nickel-plated

Valve pre-adjustment

Vario thermostat valves are fully adjustable by means of the ES-SV adjustment key, starting with the open position (8 = open). The numbers 1–8 are shown on the adjustment key. Mark and counter-mark are aligned. Each ⅛ of a turn corresponds to one flow characteristic, shown in a diagram (see operating instructions).



1 Marking
2 Counter-mark
3 Mark

Type overview

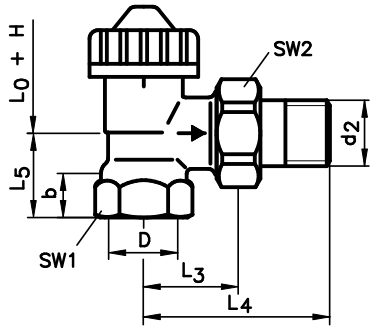
Valve type	Marking at valve insert	Colour of mounting cap
Vario M	2 rings	Black

i See page 321 for accessories.

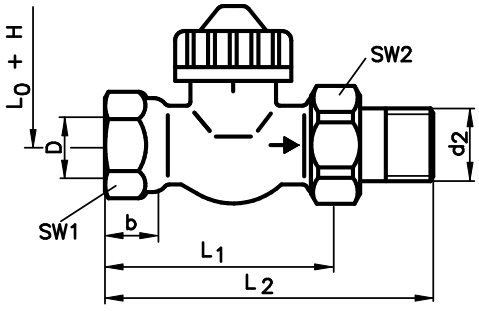
Thermostat valve bodies Vario

Types and dimensions as per EN 215, series D

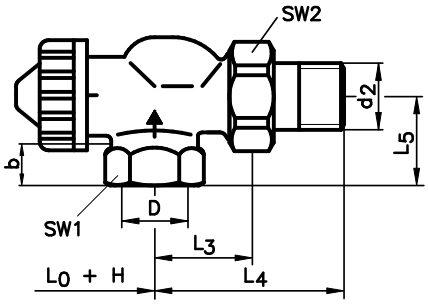
Vario M – angled



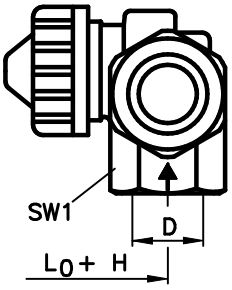
Vario M – straight



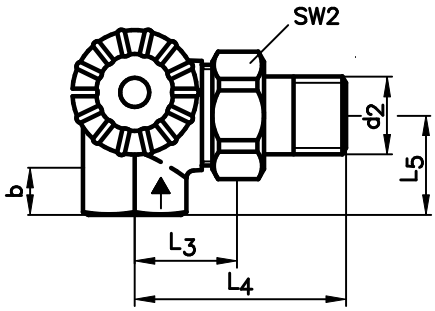
Vario M – axial



Vario M – angled-angled, left



Vario M, – angled-angled, right



Dimensions (mm)

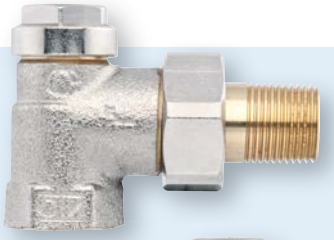
DN	D	d_2	Spanner size SW_1	Spanner size SW_2	H	L_0	L_1 ±2	L_2 ±2	L_3 ±1	L_4 ±1.5	L_5 ±1.5	b min
10	Rp⅜	R⅜	22	27	= Height control head	23	59	85	26	52	22	10.1
15	Rp½	R½	27	30		23	66	95	29	58	26	13.2
20	Rp¾	R¾	32	37		23	74	106	34	66	29	14.5

Thermostat valve bodies Vario

DG: V, PG: 2	Version	Nominal diameter	Connection	Flow coefficient* (m^3/h)	Flow coefficient Kvs** (m^3/h)			Part no.
Vario M for medium water volumes								
	**Angled**	DN 10	Rp⅜ x R⅜	0.038–0.40	0.79	1	-	141 210,101
		DN 15	Rp½ x R½			1	40	**141 220,101**
		DN 20	Rp¾ x R¾			1	25	**141 230,101**
	**Straight**	DN 10	Rp⅜ x R⅜	0.038–0.40	0.79	1	-	141 260,101
		DN 15	Rp½ x R½			1	40	**141 270,101**
		DN 20	Rp¾ x R¾			1	25	**141 280,101**
	**Axial**	DN 15	Rp½ x R½	0.038–0.40	0.79	1	-	143 220,101
	**Angled-angled**, right	DN 15	Rp½ x R½	0.038–0.40	0.79	1	-	145 220,101
	**Angled-angled**, left	DN 15	Rp½ x R½	0.038–0.40	0.79	1	-	147 220,101

* The flow coefficient corresponds to the water flow in m^3/h through the valve at a given valve stroke (proportional offset, e.g. 1 K or 2 K) and a differential pressure of 1 bar.
** The flow coefficient Kvs is the flow coefficient of the valve at nominal stroke (100 % open).

Radiator lockshield valves type 456



- **Fully adjustable**
- **Shutting off individual radiators**
- **Reproducible adjustment**

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Application

To shut off individual radiators so that maintenance work or painting can be performed without having to drain the entire heating system. Suitable for small, medium and large water volumes. For installation in single-pipe and dual-pipe heating systems.

Description

Radiator lockshield valve type 456 with drain, shut-off and adjustment function.
With cap (version M) to protect against incorrect operation. Adjustable according to flow diagram (see operating instructions). The selected setting is reproducible due to the integrated stroke limiter/stop (not version M Eco) and thus independent of draining. The optional filling and draining unit FEV with hose connection G½ can be used for easy and fast draining. Draining capacity equal to flow coefficient 1.1. Versions M Eco without stroke limiter.

Technical specifications

System connection
See ordering table

Adjustment range at 10 kPa
405 l/h

Nominal pressure
Max. 10 bar

Nominal diameter
DN 10, DN 15, DN 20

Operating temperature range
Medium: T_{max} = 120 °C

Housing
Gunmetal, nickel-plated
Version BG: not nickel-plated

i

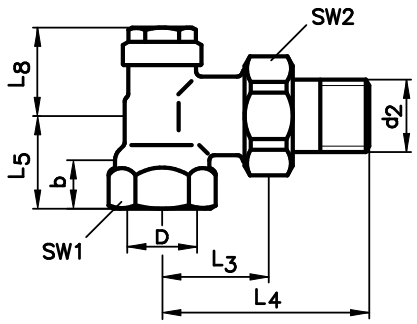
Please use valve body Vario, VarioQ or Vario-DP in the flow to adjust the required water volume.

See page 321 for accessories.

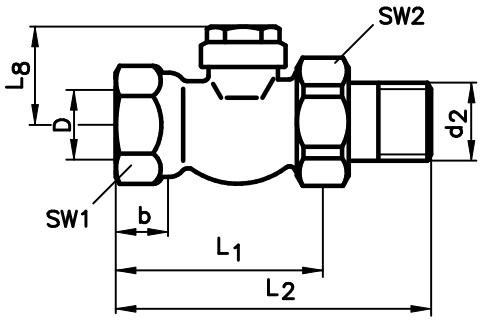
Radiator lockshield valves type 456

Types and dimensions (mm)

Type 456 M – angled



Type 456 M – straight



Dimensions (mm)

DN	D	d_2	SW1	SW2	b min	L_1 ±2	L_2 ±2	L_3 ±1	L_4 ±1.5	L_5 ±1.5	L_6	L_7	L_8
10	Rp⅜	R⅜	22	27	10.1	49	75	26	52	22	-	-	22
15	Rp½	R½	27	30	13.2	51	80	29	58	26	26.5	33.5	22
20	Rp¾	R¾	32	37	14.5	59	91	34	66	29	30.5	38	22

9

DG: V, PG: 2	Version	Nominal diameter	Connection	Flow coefficient Kvs* (m^3/h)			Part no.
Type 456 M Eco for medium water volumes (without stroke limiter)							
	**Angled**	DN 10	Rp⅜ x R⅜	1.28	1	50	**453 010**
		DN 15	Rp½ x R½	1.28	1	40	**453 020**
		DN 20	Rp¾ x R¾	1.28	1	30	**453 030**
	**Straight**	DN 10	Rp⅜ x R⅜	1.28	1	50	**453 060**
		DN 15	Rp½ x R½	1.28	1	40	**453 070**
		DN 20	Rp¾ x R¾	1.28	1	30	**453 080**
Type 456 M for medium water volumes (standard version with stroke limiter)							
	**Angled**	DN 10	Rp⅜ x R⅜	1.28	1	-	453 210
		DN 15	Rp½ x R½	1.28	1	-	453 220
		DN 20	Rp¾ x R¾	1.28	1	-	453 230
	**Straight**	DN 10	Rp⅜ x R⅜	1.28	1	-	453 260
		DN 15	Rp½ x R½	1.28	1	-	453 270
		DN 20	Rp¾ x R¾	1.28	1	-	453 280

* The flow coefficient corresponds to the water flow in m^3/h through the valve at a given valve stroke (proportional offset, e.g. 1 K or 2 K) and a differential pressure of 1 bar. The flow coefficient Kvs is the flow coefficient of the valve at nominal stroke (100 % open).

Thermostat combination blocks Vario THK

- Fully adjustable
- Valve insert can be replaced without system having to be drained
- Various versions and sizes for virtually any application


A Page 321


A Page 321


A Page 322

Application

Suitable for medium water volumes. For mounting to compact or bathroom radiators with centre connection in dual-pipe heating systems. Also for installations with copper pipes.

Description

Low-noise thermostat combination block with threaded connection M30 x 1.5 mm for thermostat control heads and actuators. Mounting cap with valve shut-off function. Fully adjustable with ES-SV adjustment key. Valve spindle with double O ring seal.

Technical specifications

System connection
G¾ eurocone or G½ female thread

Thermostat head/actuator connection
Threaded connection M30 x 1.5 mm

Adjustment range at 10 kPa
Vario THK S: 6–95 l/h
Vario THK M: 12–215 l/h

Nominal pressure
Max. 10 bar

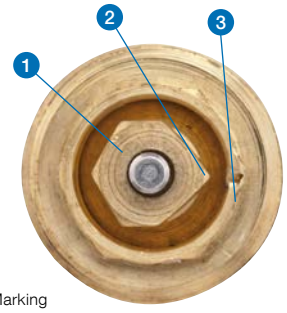
Nominal diameter
DN 15

Operating temperature range
Medium: T_{max} = 120 °C

Housing
Brass, nickel-plated

Valve pre-adjustment

Vario THK thermostat combination blocks are fully adjustable by means of the ES-SV adjustment key, starting with the open position (8 = open). The numbers 1–8 are shown on the adjustment key. Mark and counter-mark are aligned. Each ⅛ of a turn corresponds to one flow characteristic, shown in a diagram (see operating instructions).



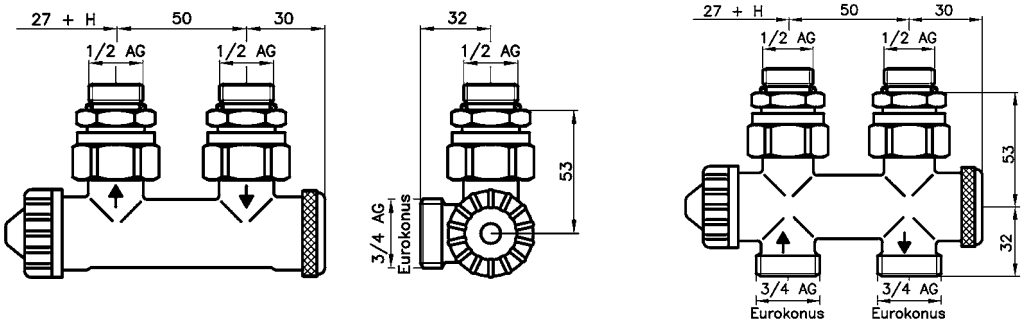
1 Marking
2 Counter-mark
3 Mark

i
See page 321 for accessories.

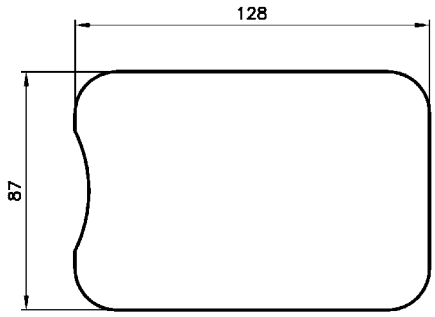
Thermostat combination blocks Vario THK

Types and dimensions (mm)

Vario THK M – version G½ male thread



Cover Vario combination block angled/straight



DG: V, PG: 2	Version	Nominal diameter	Radiator connection	Flow coefficient* (m^3/h)	Flow coefficient Kvs** (m^3/h)			Part no.
Vario THK M for medium water volumes								
	**Angled**	DN 15	G½ female thread	0.038–0.46	0.68	1	-	221 225.101
	**Straight**	DN 15	G½ female thread	0.038–0.46	0.68	1	-	221 275.101

* The flow coefficient corresponds to the water flow in m^3/h through the valve at a given valve stroke (proportional offset, e.g. 1 K or 2 K) and a differential pressure of 1 bar.
** The flow coefficient Kvs is the flow coefficient of the valve at nominal stroke (100 % open).

Accessories for valve bodies, lockshield valves and combination blocks

DG: V	Description	PG			Part no.
	**Adjustment key ES-SV**, for valve bodies Vario and VarioQ	1	1	40	**140 110.850**
	**Adjustment key Vario-DP**	1	1	-	910 199.800
	**Adjustment key for VarioQ-Kombi**				422 520.800
	**Valve insert S** for DN 10–DN 20	2	1	-	140 110.221
	Valve insert M for DN 10–DN 20	2	1	-	140 210.221
	Valve insert L for DN 10–DN 20	2	1	-	140 310.221
	**Mounting unit MGV** for replacing the valve inserts Vario, VarioQ and Vario-DP	2	1	2	140 110.860
	**Filling and draining unit FEV 03** For type 454Q S and M as well as VarioQ-Kombi		1	-	422 520.810
	**Filling and draining unit FEV 04** For valve bodies Vario/VarioQ and combination blocks THK	2	1	-	140 110.870
	**Adapter for radiator R½ female thread** Connection: ½" male x ¾" male eurocone	2	1	-	273 020.040
	Cover for thermostat combination blocks Vario THK angled or straight, DN 15	1	1	30	220 000.301

Thermostat control heads

- With liquid probe
- Adjustable eco setting
- Adjustment range can be limited and blocked with ring
- Fits onto many other valve radiators without adapter

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Scale*	Room temperature
❄	Approx. 6 °C (automatic frost protection)
0	Zero end
1	Approx. 14 °C
2	Approx. 17 °C
3	Approx. 20 °C
4	Approx. 23 °C
5	Approx. 26 °C

* Temperature difference to next dial marks is approx. 3 K.

Application

For setting and controlling the room temperature at the radiator. Version 323 suitable for valve body series Vario, VarioQ, Vario-DP, thermostat combination blocks Vario THK, VarioQ-Kombi, Twin and valve radiators with integrated valve insert with connection thread M 30 x 1.5 mm. Version 323 suitable for valve versions with Gampper clamp connection (valve bodies up to year of manufacture 1998). Version 323 KD suitable for Danfoss clamp connection (compatible series RA).

Description

Thermostat control head with liquid probe, consisting of hand wheel with scale and base in different colours (see ordering table). Optional version with remote probe or remote adjustment. The desired room temperature is set with the hand wheel. The temperature probe continuously checks the room temperature, compares the measured values to the set value and controls the flow rate by opening or closing the valve to obtain the set value. Adjustment range can be limited and blocked with ring. With optimum temperature position (eco position) adjustable via memory clip (helpful for persons with visual impairment). Frost protection position with snowflake symbol.

Tamper-proof version without zero position. Lower adjustment only to snowflake symbol. The adjustment range must be selected when the valve is mounted for the first time. A protective cap consisting of two parts which cannot be removed prevents disassembly and changes to the selected settings. The protective cap is secured by means of a screw.

Technical specifications

Connection valve body
323: Threaded connection M30 x 1.5 mm
323: Gampper clamp connection
323 KD: Danfoss clamp connection

Operating temperature range
Ambient: T_{max} = 50 °C

Material
Plastic

Option
- Personalised labels

i

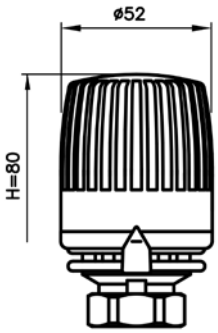
Special prints on the thermostat control heads are possible for purchase quantities > 100 pieces.

Please note the manufacturer information concerning the connection geometry.

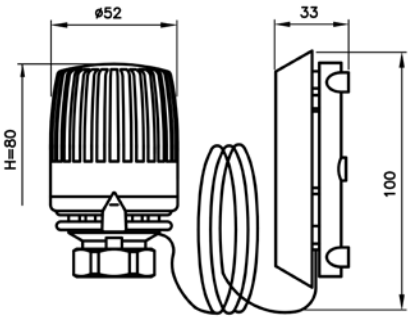
Thermostat control heads

Types and dimensions (mm)

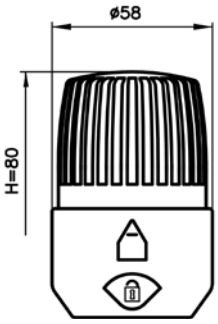
Thermostat control head 323 with fixed probe



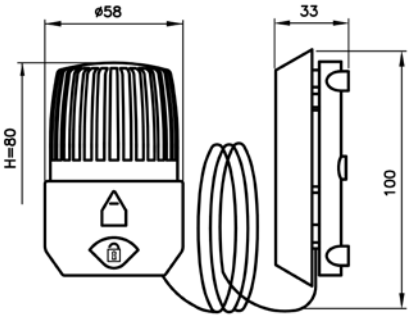
Thermostat control head 323 F with remote probe



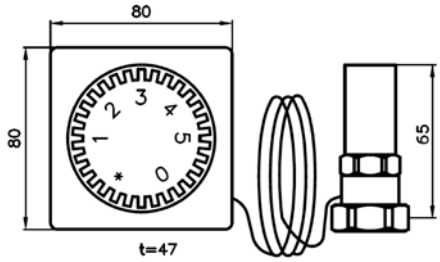
Thermostat control head 323 B with fixed probe, tamper-proof version with anti-theft system



Thermostat control head 323 BF with remote probe, tamper-proof version with anti-theft system



Thermostat control head 320 FV
with remote adjustment and remote transmission



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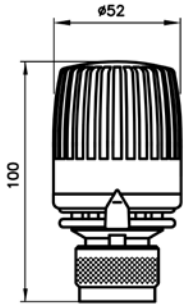
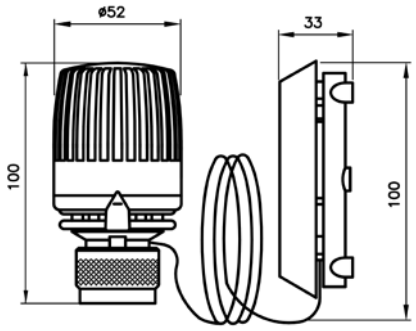
Thermostat control heads

Types and dimensions (mm)

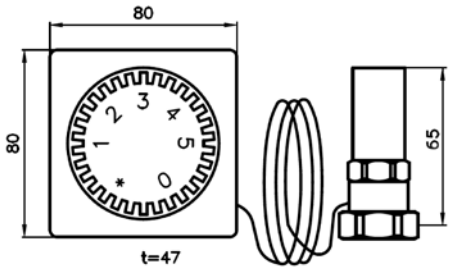
Thermostat control head 323 KD with fixed probe, Danfoss clamp connection



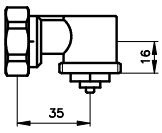
Thermostat control head 323 KD with remote probe, Danfoss clamp connection



Thermostat control head 320 KD FV with remote adjustment and remote probe, Danfoss clamp connection



Angle adapter



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Thermostat control heads with threaded connection

DG: V, PG: 1	Description	0 setting	Hand wheel/ base	Capillary			Part no.
	**Thermostat control head 323** With liquid probe, threaded connection M30 x 1.5 mm	With	White/black	-	1	50	**360 002,100**
		Without	White/black	-	1	-	**360 000.100**
	**Thermostat control head 323** With liquid probe, threaded connection M30 x 1.5 mm	With	White	-	1	-	**360 012,100**
		Without	White	-	1	-	**360 010,100**
	**Thermostat control head 323** With liquid probe, threaded connection M30 x 1.5 mm and personalised **company label**	With	White/black	-	1	200	360 002,109
		Without	White/black	-	1	200	360 000.109
	**Thermostat control head 323 F** With remote probe and bracket, threaded connection M30 x 1.5 mm	With	White/black	1.2 m	1	-	362 102,100
		With	White/black	2 m	1	30	**362 202,100**
		With	White	1.2 m	1	-	362 112,100
		With	White	2 m	1	-	362 212,100
		Without	White/black	1.2 m	1	-	362 100,100
		Without	White/black	2 m	1	-	362 200,100
		Without	White	1.2 m	1	-	362 110,100
		Without	White	2 m	1	-	362 210,100
	**Thermostat control head 323 B** Tamper-proof version, with anti-theft system, threaded connection M30 x 1.5 mm	Without	White/black	-	1	30	**364 000.100**
	**Thermostat control head 320 FV** With remote adjustment and remote transmission, threaded connection M30 x 1.5 mm	With	White	2 m	1	12	347 200,100

9

Thermostat control heads with clamp connection: GAMPPER, Danfoss

DG: V, PG: 1	Description	0 setting	Hand wheel/ base	Capillary			Part no.
	**Thermostat control head 323** with liquid probe, GAMPPER clamp onnection. For valves from 1980–1998 (and replacement for models 313, 314, 320)	With	White/black	-	1	50	**360 002**
		Without	White/black	-	1	50	360 000
	**Thermostat control head 323 F N** with remote probe and bracket, GAMPPER clamp connection. For valves from 1980–1998 (and replacement for models 313, 314, 320) Replacement for thermostat control heads series 312 up to 1980	With	White/black	1.2 m	1	30	362 102
		With	White/black	2 m	1	30	**362 202**
	**Thermostat control head 323 KD** with liquid probe, Danfoss clamp connection, compatible series RA	With	White/black	-	1	15	360 002.130
	**Thermostat control head 323 KD F** with remote probe, Danfoss clamp connection, compatible series RA	With	White/black	2 m	1	-	362 202.130
	**Thermostat control head 320 KD FV** with remote adjustment and remote transmission, Danfoss clamp connection, compatible series RA	With	White	2 m	1	-	347 200.130

9

Accessories for thermostat control heads

DG: V, PG: 1	Description			Part no.
	**Angle adapter** M30 x 1.5 mm, white	1	-	340 010.200
	**Tamper-proof cap 323 BK** for control heads 323	1	-	364 110

Thermostat control heads 316, 312

Gampper
Member of AFRISO Group

Conversion of thermostat control heads GAMPPER from year of manufacture 1975 up to date

Thermostat control head 316

Description

The thermostat control head 316 can be converted with the adapter 316 KH (part no. 100 010.663) so that the thermostat control heads series 323 (M30 x 1.5 mm) can be mounted to an adapter. Conversion is also possible by replacing the valve inserts. If this is done, the system must be emptied.

Thermostat control head 312

Description

The thermostat control head 312 can be replaced with the thermostat control head 323 N (part no. 360 002).

Thermostat control heads 313, 314, 320 S, 320 KH

Gampper
Member of AFRISO Group

Thermostat control head 313

Description The thermostat control head 313 can be replaced with the thermostat control head 323 N (part no. 360 002).

Thermostat control head 313 E

Description The thermostat control head 313 E can be replaced with the thermostat control head 323 N (part no. 360 002).

Thermostat control head 314

Description The thermostat control head 314 can be replaced with the thermostat control head 323 N (part no. 360 002).

Thermostat control head 320 S

Description The thermostat control head 320 S can be replaced with the thermostat control head 323 N (part no. 360 002).

Thermostat control head 320 KH

Description The thermostat control head 320 KH (M30 x 1.5 mm) can be replaced with the thermostat control head 323 N (part no. 360 002).

Thermostat control heads 323, adapter M30 x 1.5 mm

Gampper
Member of AFRISO Group

Thermostat control head 323

Description

The thermostat control head 323 is available with GAMPPER clamp connection, type 323 N (part no. 360 002) or with threaded connection M30 x 1.5 mm. All series 323 (M30 x 1.5 mm) thermostat control heads can be mounted to the thermostat valves with M30 x 1.5 mm threaded connection.

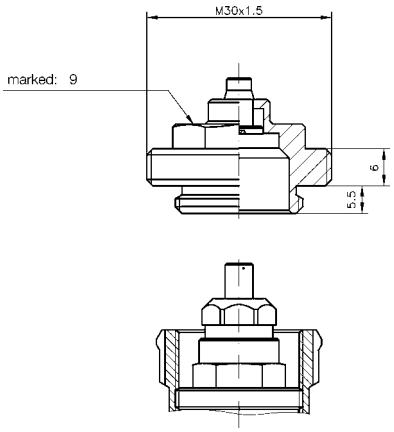
The thermostat control head 320 N can be replaced with the thermostat control head 323 N (part no. 360 002).

Conversion of GAMPPER clamp connection to threaded connection M30 x 1.5 mm

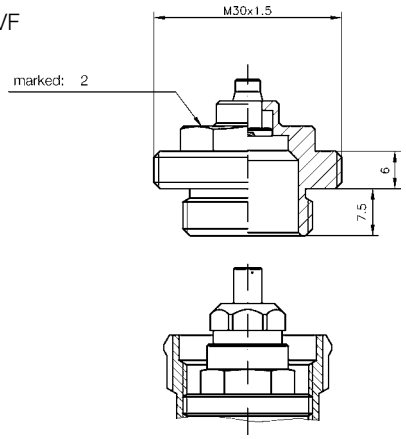
For thermostat valve bodies from year of manufacture 1978

Types and dimensions (mm)

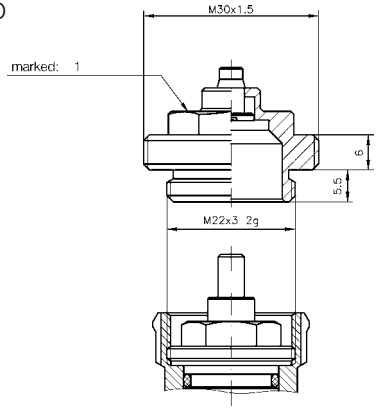
Adapter V



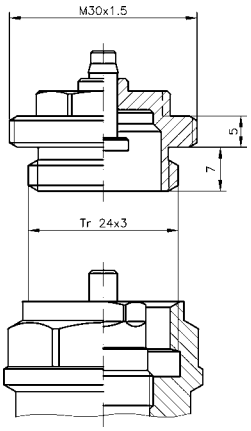
Adapter V.VF



Adapter VVO

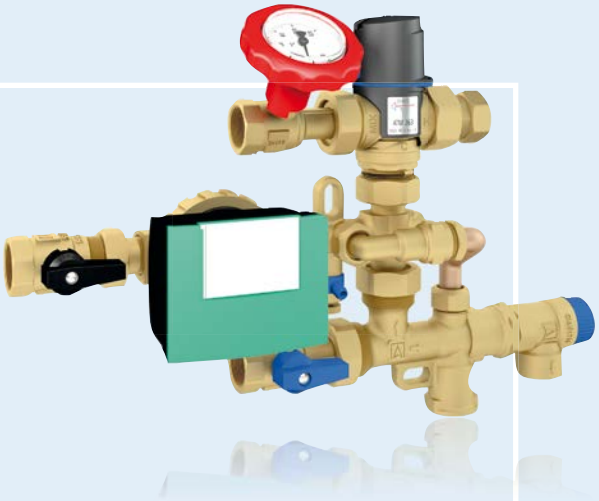


Adapter 316



DG: V, PG: 2	Part no.
Adapter V M30 x 1.5 mm	910 049
Adapter V.VF M30 x 1.5 mm	910 042
Adapter VVO M30 x 1.5 mm	910 041
Adapter 316 M30 x 1.5 mm	100 010.663

Rainwater harvesting



Hot water circulation systems

reddot design award
winner 2013

Domestic water system centre

CHAPTER 10

Equipment for drinking water supply, hot water treatment and rainwater harvesting

OVERVIEW

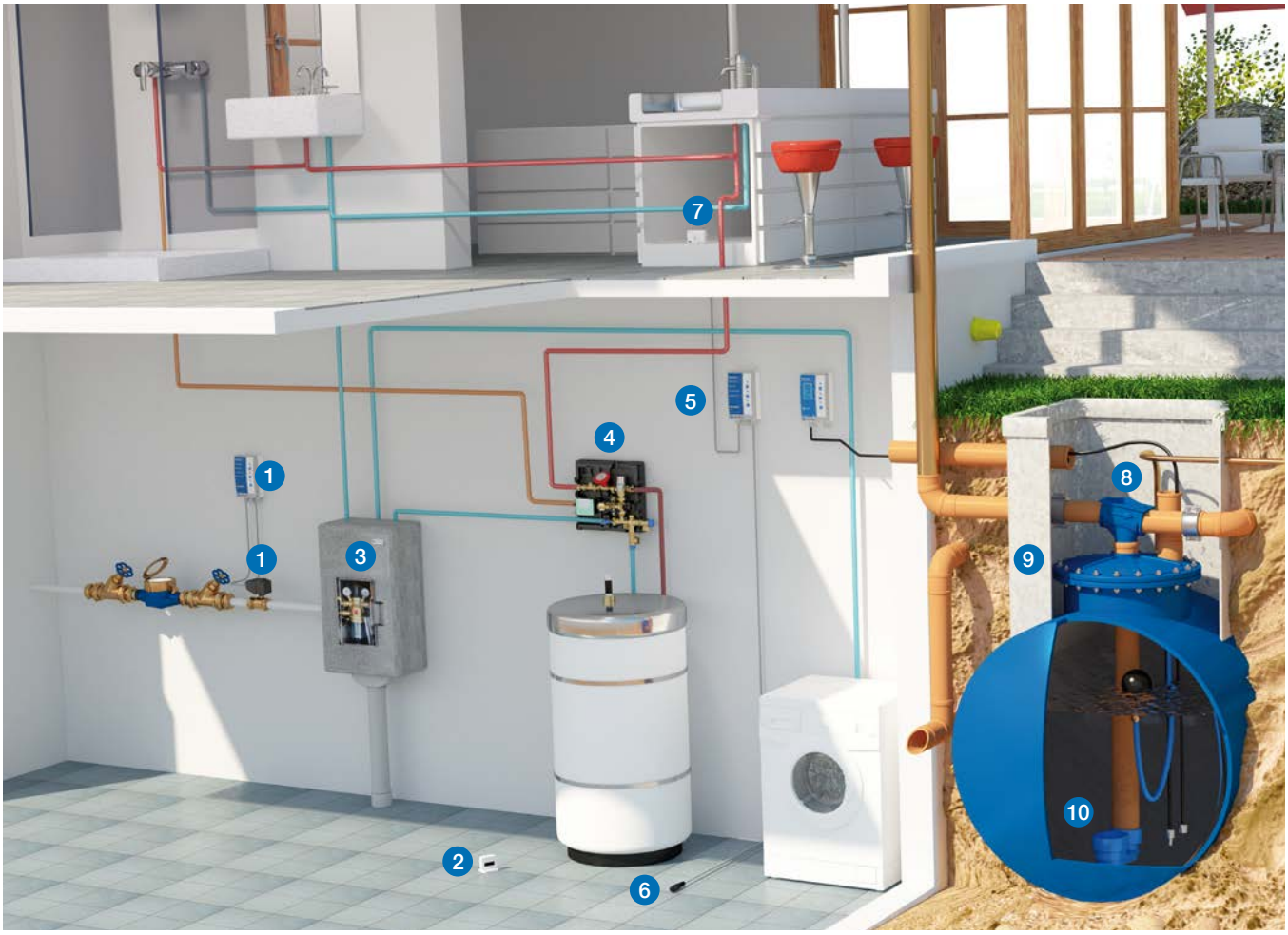
SAFETY EQUIPMENT

FILTER

DISTRIBUTION STATIONS

RAINWATER HARVESTING

Equipment for drinking water supply, water treatment and rainwater harvesting



Quality water technology products

1. Radio-controlled water valve WaterControl
2. Wireless conductivity water sensor WaterSensor con
3. Domestic water system centre HWSC
4. Hot water circulation system WZS 100
5. Oil/water alarm unit OM 5
6. Probe for OM 5
7. Battery-less wireless water sensor WaterSensor eco

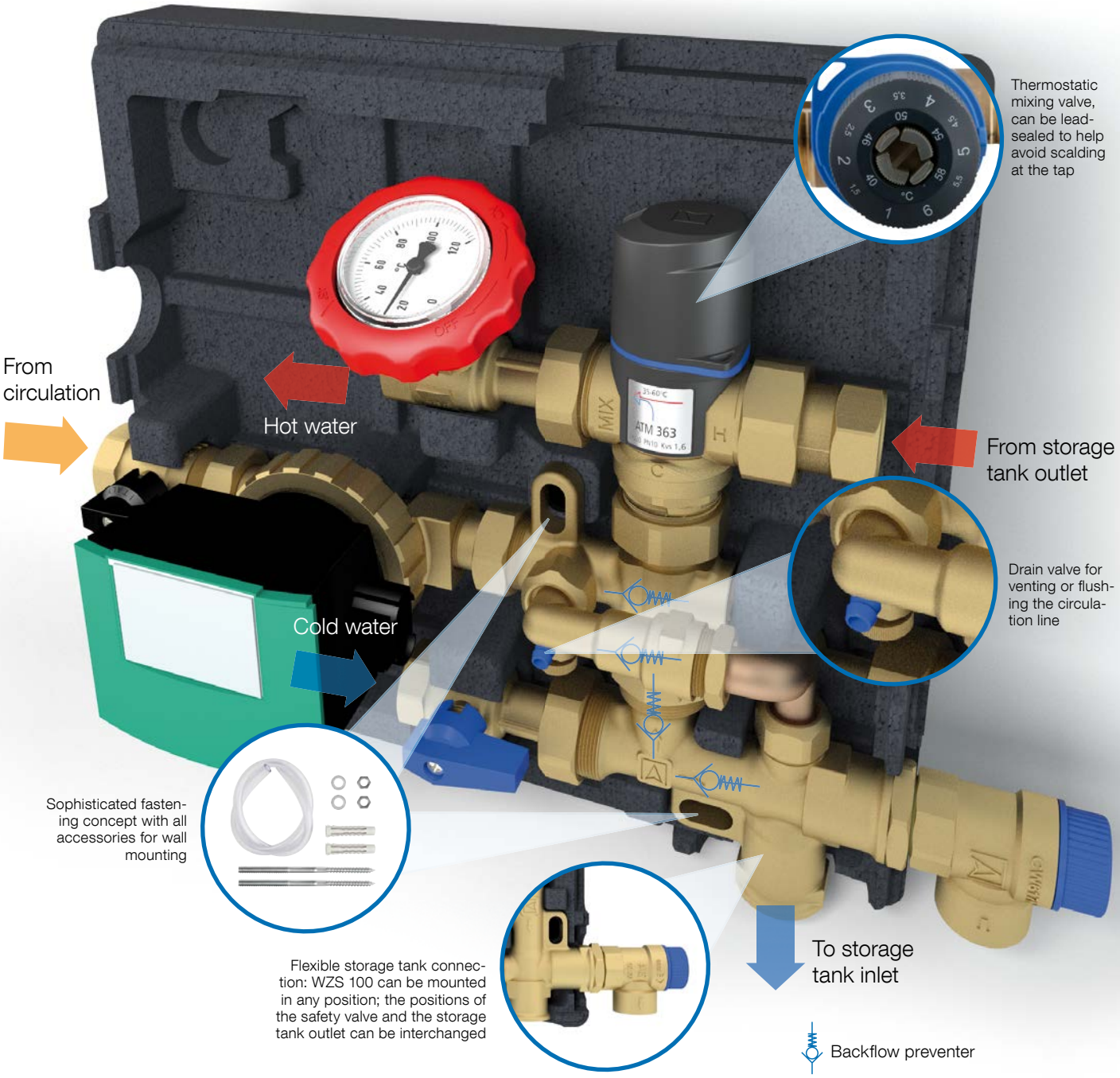
Oil tank conversion kit:

8. Cartridge filter PF for rainwater
9. Plastic manhole cover
10. Calmed inlet

Clean water

In the area of water technology, AFRISO offers equipment for drinking water supply and products for rainwater harvesting. The focus is the protection and cleanliness of the water, the supply pipes and the installations. AFRISO products are made to the most demanding hygienic requirements and the stringent demands of the German drinking water act as well as the recommendations of the leading associations and organisations.

Hot water circulation system WZS 100



Assembly for easy connection to solar, hot water, hygienic or combination storage tanks (with or without circulation connection at the storage tank)

- Pre-assembled, tightness-tested and heat-insulated assembly speeds up installation/commissioning and facilitates logistics
- Intelligent circulation distribution by means of integrated bypass: No back circulation, no "mixing" of thermal layers in the stratified storage tank
- Fully secured: diaphragm safety valve, backflow preventer and all shut-off valves integrated
- Integrated pump for plug & play operation
- Thermometer for easy on-site checks (range 0/120 °C)

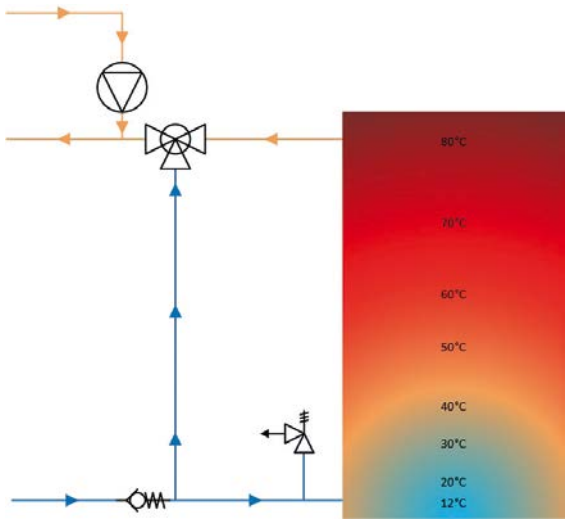
Unwanted, inefficient incorrect installations of stratified storage tanks

As a result of the increasing use of renewable energy in domestic technology applications, the number of hygienic stratified storage tanks with a temporary operating temperature of more than 60 °C is also on the rise. In order to connect such tanks in a more efficient way, to keep the thermal layers and to limit the outlet temperature of the hot water, the installation of the service water line involves several fittings and connection parts.
Optimum design of the circulation can often be a major challenge in terms of hydraulics and logistics. For example, the service water connections to the water heater have been made according to the old, inefficient logic or important parts have been "forgotten".

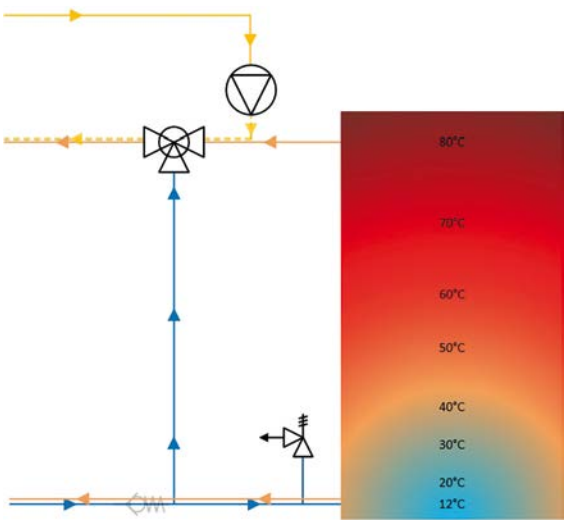
In most cases, the circulation line of stratified storage tanks is connected to the cold water inlet of the hot water tank. This way, the hot circulation water of the return flows through the lower area of the stratified storage tank which is usually cooler. In the lower area, the returning circulation water is cooled - only to be heated up again in the upper thermal layers.
The consequence: The storage medium is evenly heated – which destroys the important thermal layering. The high energy density in the upper thermal layers is lost. In the most adverse case, the function of a solar system is prevented or extremely limited in the transition period.

Typical implementation issues:

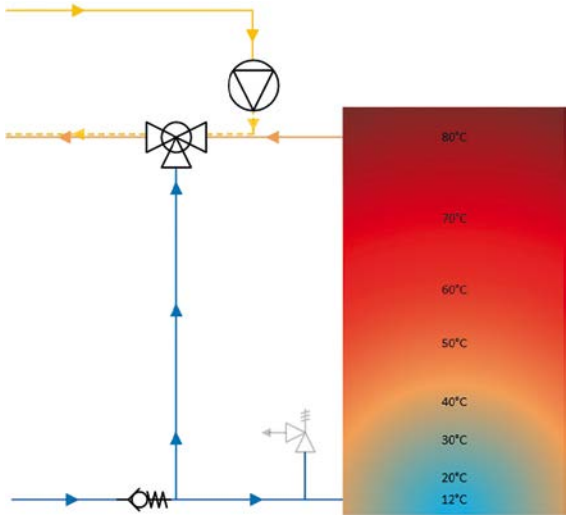
Incorrectly installed circulation pump



Incorrectly installed circulation pump and "forgotten" backflow preventer



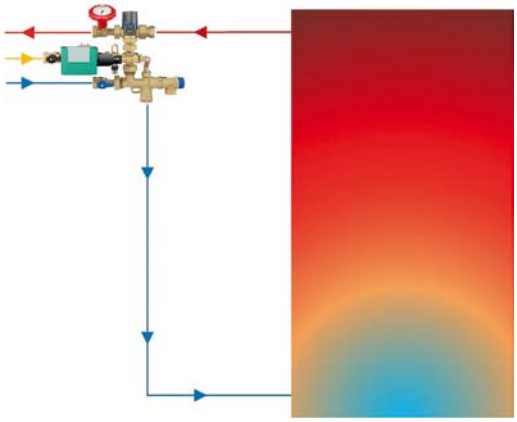
Incorrectly installed circulation pump and "forgotten" safety-related equipment

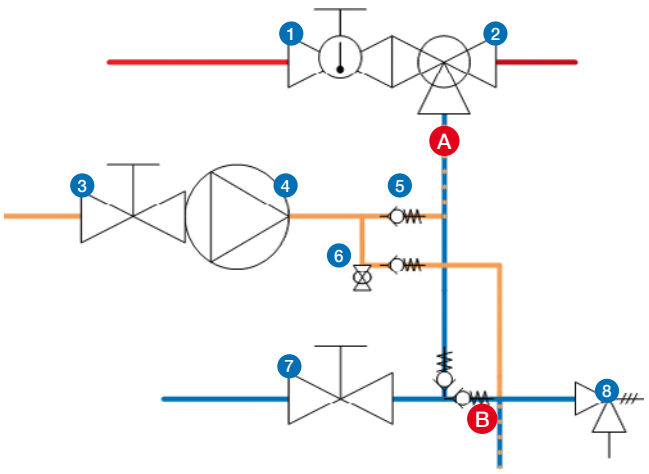


WZS 100 ensures reliable function and efficient operation

With the use of WZS 100, the return part of the circulation line has a direct connection to the cold water inlet of the thermostatic mixing valve. Depending on the water temperatures at the inlets of the mixing valve, they will open or close the hot water inlet and the cold water inlet to a higher or less high degree. A partial volume of the returning circulation water flows directly to the cold water connection of the mixing valve. Depending on the mounting situation (internal/external circulation), the other partial volume can be resupplied upstream of the tank. This allows for considerable energy savings.

WZS 100 thus allows for intelligent circulation distribution without back-circulation and without "mixing" of the temperatures in the stratified storage tank. With minimum installation effort, all possibilities of advanced stratified storage systems for efficient heating of water can used to their full potential.

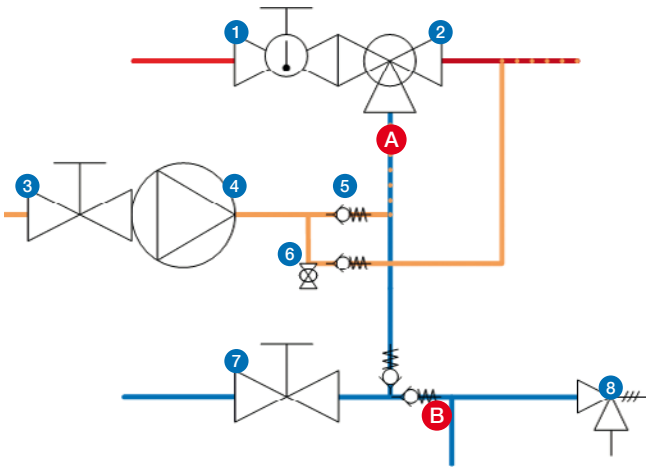




1 Shut-off valve with thermometer
2 Thermostatic mixing valve
3 Shut-off valve
4 Circulation pump
5 Check valve
6 Drain
7 Shut-off valve
8 Diaphragm safety valve

Function example 1 (internal circulation via bypass)

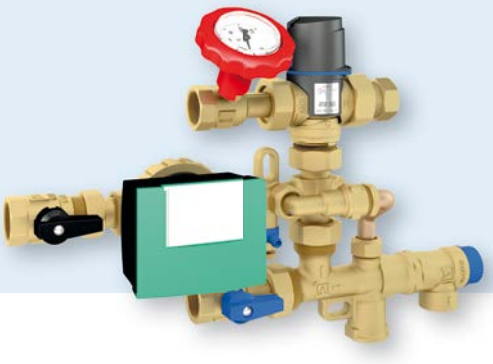
Cold water flows via the safety fitting of WZS 100 to the cold water end via line A to the mixing valve and via line B to the water heater. In the example, the temperature adjustment knob of the thermostatic mixing valve ATM 363 is set to a hot water temperature of 60 °C. The unmixed hot water temperature at the storage outlet is 80 °C due to the high buffer temperature as a result or solar or regenerative energy. The mixing valve now opens or closes the path to the hot and cold water end depending on the temperature. Due to the fast control characteristics of ATM 363, the adjusted temperature is reached at the valve outlet (mix). Only the amount of heating energy really required to ensure the desired water temperature is actually used. If the hot water has reached the last consumer or the point or re-entry (service water to circulation), it is pumped back to the circulation unit via the newly developed flow distributor. Depending on the temperature, it distributes the water via line A to the mixing valve or via line B to the water tank. What's best: Even though there are two flow lines, the pump has to overcome only one check valve. The circulation pump has to overcome less counterforce which results in enormous energy savings and a prolonged service life of the pump.



Function example 2 (operation with circulation lance)

Same system requirements as in function example 1, but with use of circulation lance ZL 2. In this configuration, the water can only flow the direct path via the circulation lance (as opposed to the bypass version). This results in doubled benefits: Increased comfort as well as energy and heating cost savings.
This is achieved by supplying the returning hot water of the circulation directly to the upper thermal layer of the water heater so that it does not have to flow through the complete tank. At the same time, there is always enough hot water available to supply the fittings without inconvenient delays.

Hot water circulation system WZS 100



- Dramatic energy savings in circulation mode compared to conventional circulation systems
- No mixing of the temperatures in the stratified storage tank
- Thermally controlled hot water temperature (with scald protection)
- Extremely low mounting effort and fast commissioning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Application

Circulation system for professional implementation of a service water circulation connection to an energy storage tank (hot water tank/stratified storage tank) which is operated at temperatures higher than 60 °C either permanently or temporarily. Also suitable for stratified hygienic storage and bivalent service water tanks. If used with older existing systems (for example, hot water tanks with wood, solar, gas, heat pump or oil-fired boiler), controlled circulation to meet actual demands results in high energy savings. The hot water circulation system is optimally suited for use with renewable energies in domestic technology applications, primarily in single and two family homes.

Description

Compact, pre-assembled and tightness-tested hot water circulation system in form-fit heat insulation part, consisting of thermostatic mixing valve with integrated scald protection, circulation pump with all necessary functional components such as shut-off valves, variable safety group assembly, backflow preventer and connection parts as per DIN 1988.

The hydraulic separation of the flow paths ensures correct operation of the circulation pump since it has to overcome only one backflow preventer in any operating condition and thus avoids mixing of the cold water inlet in the circulation path.

10

Technical specifications

System connections
G¾ female

Connection lance / bypass
G½ female

Operating temperature range
Medium: Max. 95 °C

Mixing temperature
35/60 °C

System pressure
Max. 10 bar

Flow coefficient Kvs
1.6 m³/h

Safety valve
Opening pressure: 6 bar

Heat insulation
Polypropylene EPP

Dimensions
W x H x D: 320 x 300 x 146 mm

Technical specification circulation pump Wilo-Star-Z NOVA

Degree of protection
IP 42

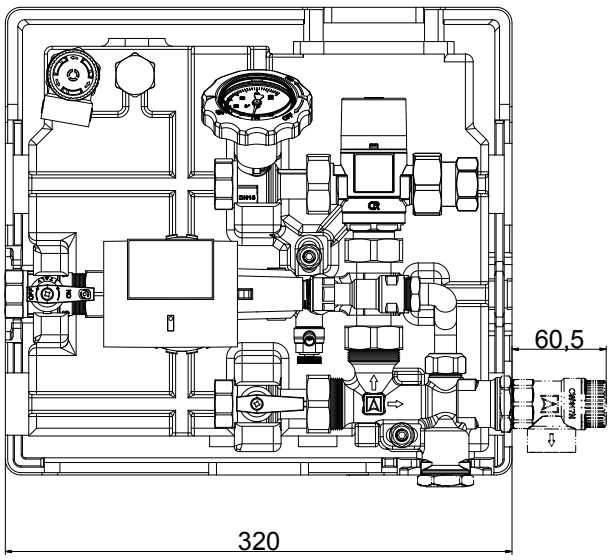
Supply voltage
AC 230 V, 50 Hz

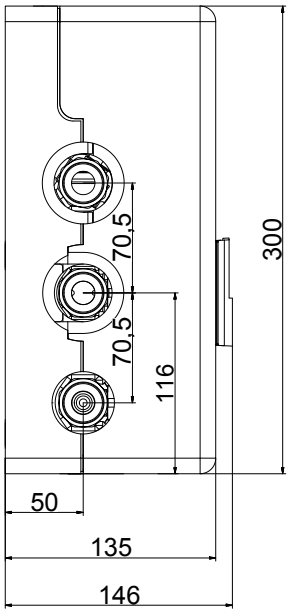
Power input
2–4.5 W

DG: G, PG: 2	Part no.
Hot water circulation system WZS 100	**68405**

Hot water circulation system WZS 100

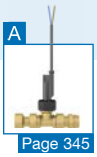
Dimensions (mm)





Hot water circulation system WZS 75

- Compact hydraulic assembly for storage tanks with existing safety-related equipment
- Easy connection of a circulation line with existing safety-related equipment
- Thermally controlled hot water temperature (with scald protection)
- Considerable time savings during mounting



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Application

Circulation system for professional implementation of a service water circulation connection to an energy storage tank with existing safety-related equipment (hot water tank/stratified storage tank) which is operated at temperatures higher than 60 °C either permanently or temporarily. WZS 75 is ideal for retrofitting existing systems, primarily in single-family and two-family homes.

Description

Compact, pre-assembled and tightness-tested hot water circulation system, consisting of thermostatic mixing valve with integrated scald protection, thermometer, shut-off valve, drain valve for venting or flushing the circulation line as well as connection parts as per DIN 1988. The hydraulic assembly is suitable for storage systems which are already fitted with safety-related equipment such a diaphragm safety vales or backflow preventers or where such equipment is to be installed in the form of conventional individual components. Storage systems without safety-related equipment can be retrofitted with the safety group assembly WSG 150.

WZS 75 optimises temperature control in the hot water circulation and ensures that the temperature in the storage system is not unnecessarily reduced. A partial volume of the returning circulation water flows directly to the cold water inlet of the thermostatic mixing valve via an internal connection and is added there.

10

Technical specifications

System connections
G¾ female thread, G1 female thread

Operating temperature range
Medium: Max. 95 °C

Mixing temperature
35/60 °C

System pressure
Max. 10 bar

Flow coefficient Kvs
1.6 m³/h

Technical specification circulation pump Wilo-Star-Z NOVA

Degree of protection
IP 42

Supply voltage
AC 230 V, 50 Hz

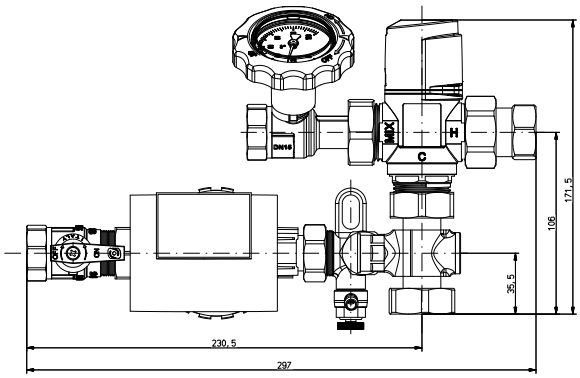
Power input
2–4.5 W

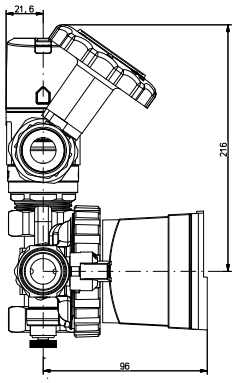
Scope of delivery
Assembly without heat insulation

DG: G, PG: 2	Part no.
Hot water circulation system WZS 75	**68416**

Hot water circulation system WZS 75

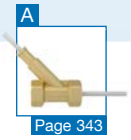
Dimensions (mm)





Thermostatic mixing valve ATM 363 WMG

- Compact assembly for storage tanks with existing safety group assembly and pump
- Thermally controlled hot water temperature (with scald protection)
- Easy mounting without time-consuming, extensive insulation work
- Circulation lance can be connected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Application

Mixing valve for control of hot water in drinking water systems, boilers or drinking water heaters as per EN 806. Suitable for implementing or retrofitting a service water circulation connection to an energy storage tank (hot water tank/stratified storage tank) with existing safety-related equipment and pump.

Description

Compact, pre-assembled and tightness-tested assembly in form-fit heat insulation. ATM 363 WMG consists of an adjustable thermostat mixing valve, connection pieces as per DIN 1988 and a flow distribution unit with backflow preventer, lance connection and drain valve for venting or flushing the circulation line. Mixing valve control knob with temperature scale (35/60 °C) for easy adjustment of the temperature of the water to be mixed. A cap protects the control knob against improper operation; it can be lead-sealed to help prevent unwanted adjustments. The selected adjustment is visible through the window in the cap. If the cold water line is interrupted, the mixing valve automatically closes the hot water supply to help protect against scalding.

Technical specifications

System connections
G¾ female thread, G1 female thread

Connection lance / bypass
G½ female

Operating temperature range
Medium: Max. 95 °C

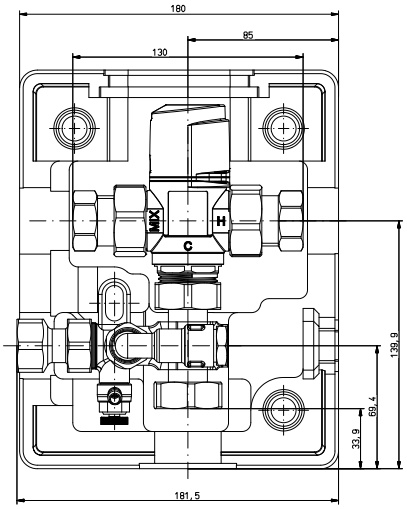
Mixing temperature
35/60 °C

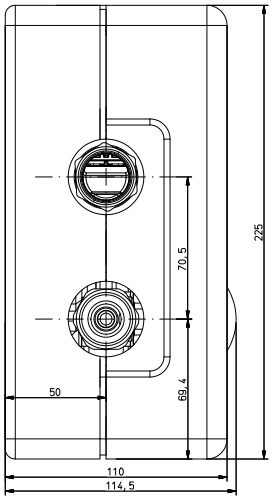
System pressure
Max. 10 bar

Flow coefficient Kvs
1.6 m³/h

Heat insulation
Polypropylene EPP

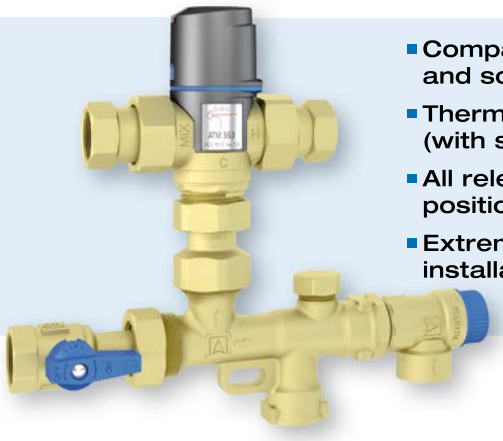
Dimensions (mm)





DG: G, PG: 2	Part no.
Thermostatic mixing valve ATM 363 WMG	**68417**

Thermostatic mixing valve ATM 363 WSG



- Compact assembly for tankless water heaters and solar-heated drinking water heaters
- Thermally controlled hot water temperature (with scald protection)
- All relevant backflow preventers at the correct positions
- Extremely time-saving as compared to installation consisting of many individual parts

Application

Mixing valve with boiler safety group assembly for controlling hot water at solar-heated drinking water heaters and hot water storage tanks with hot water heating according to flow principle, as well as drinking water storage units. Ideal for applications in which circulation is not necessary or if the water heater already has a circulation connection.

Description

Compact, pre-assembled and tightness-tested assembly consisting of adjustable thermostatic mixing valve, safety group assembly with integrated backflow preventers, shut-off valve and safety valve. Mixing valve control knob with temperature scale (35/60 °C) for easy adjustment of the temperature of the water to be mixed. A cap protects the control knob against improper operation; it can be lead-sealed to help prevent unwanted adjustments. The selected adjustment is visible through the window in the cap. If the cold water line is interrupted, the mixing valve automatically closes the hot water supply to help protect against scalding.

Technical specifications

System connections
G¾ female

Operating temperature range
Medium: Max. 95 °C

Mixing temperature
35/60 °C

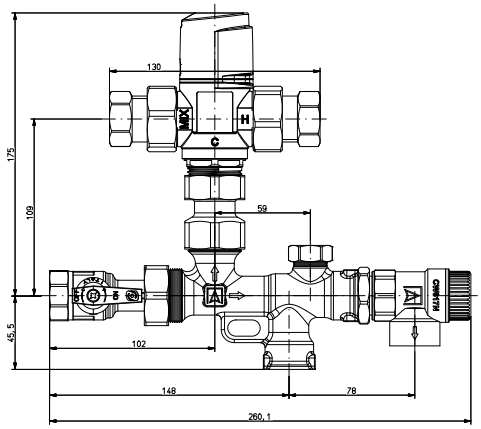
System pressure
Max. 10 bar

Flow coefficient Kvs
1.6 m³/h

Safety valve
Opening pressure: 6 bar

Scope of delivery
Assembly without heat insulation

Dimensions (mm)



DG: G, PG: 2	Part no.
Thermostatic mixing valve ATM 363 WSG	**68419**

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Thermostatic mixing valves ATM

- High accuracy, fast response
- With integrated scald protection
- Maintenance-free
- Ideal for showers and smaller underfloor heating circuits
- Cap with window and scale, can be lead-sealed (ideal for public facilities)

Control knob with temperature scale

Application

Universal units for controlling hot water in sanitary applications, solar-heated, tankless water heaters or for smaller underfloor heating circuits which are directly connected to the flow (max. 60 °C). Also for panel heating systems such as wall or underfloor heating systems which require a constant mixed water temperature to avoid damage to floors and pipes. Suitable for drinking water or water with up to 50 % glycol.

Description

Thermostatic mixing valve as per EN 1111 with base made of brass and cap and control knob made of high-strength plastic. With temperature scale (20/43 °C or 35/60 °C) for easy adjustment of the temperature of the water to be mixed. A cap protects the control knob against improper operation; it can be lead-sealed to help prevent unwanted adjustments. The selected adjustment is visible through the window in the cap. If the cold water line is interrupted, the mixing valve automatically closes the hot water supply to help protect against scalding. The new chamber geometry also helps to avoid damage caused by overpressure during closing (backflow preventer at cold water end). The internal geometry as well as the materials used at the control surfaces help to ensure that control errors (for example, caused by lime deposits on the sealing surfaces) are practically excluded. ATM is maintenance-free.

Technical specifications

Operating temperature range
Medium: Max. 90 °C
(short-term 110 °C)

Nominal pressure
Max. 10 bar
Dynamic operating pressure: Max. 5 bar

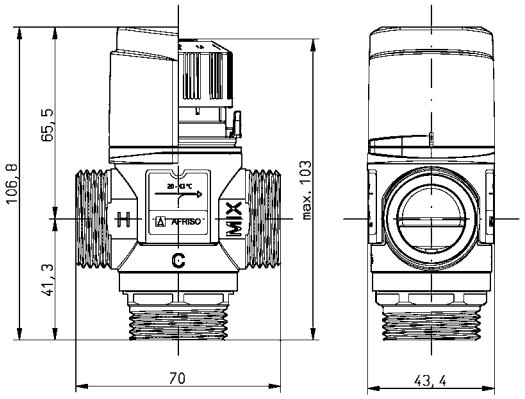
Flow rate
Flow coefficient 1.6 m³/h or 2.5 m³/h

Accuracy
±2 °C (EN 1111)

Material

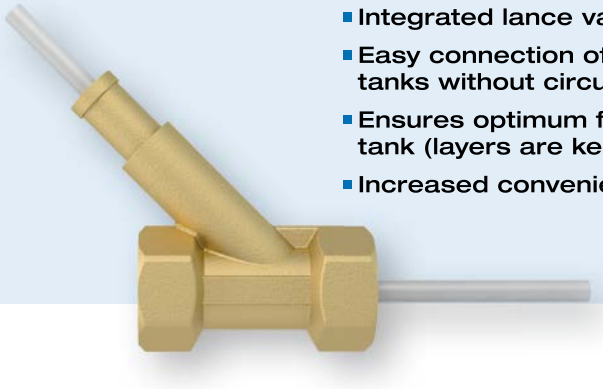
Housing:	Brass (CW626N), dezincification-resistant
Upper part:	Plastic (ABS)
Control knob:	Plastic (ABS)
Seals:	EPDM

Dimensions (mm)



DG: G, PG: 2	DN	Kvs	Connection	Temperature	Part no.
ATM 341	15	1.6 m³/h	G¾ male thread	20 / 43 °C	78247
ATM 343	15	1.6 m³/h	G¾ male thread	35 / 60 °C	78246
ATM 331	20	1.6 m³/h	Rp¾ female thread	20 / 43 °C	78249
ATM 333	20	1.6 m³/h	Rp¾ female thread	35 / 60 °C	78248
ATM 361	20	1.6 m³/h	G1 male thread	20 / 43 °C	78245
ATM 363	20	1.6 m³/h	G1 male thread	35 / 60 °C	78244
ATM 561	20	2.5 m³/h	G1 male thread	20 / 43 °C	78283
ATM 563	20	2.5 m³/h	G1 male thread	35 / 60 °C	78284
Screw connection kit DN 15			G¾ female thread x R¾ male thread	-	1220110
Screw connection kit DN 20			G1 female thread x R1 male thread	-	1220210

Circulation lance ZL 2



- Integrated lance valve, design with no dead space
- Easy connection of stratified combination storage tanks without circulation connection
- Ensures optimum function of the stratified storage tank (layers are kept)
- Increased convenience due to shorter lead time

Application

Hydraulic connection assembly for tanks with drinking water flow heating to allow circulation mode for the domestic drinking water supply. Can be used in conjunction with the hot water circulation system WZS 100.
A stratified combination storage tank (corrugated pipe tank) which heats up drinking water according to the flow principle usually does not have a circulation connection. This frequently results in a connection problem. With the circulation lance, the circulation connection is made via the hot water outlet end. Thus, correct function of the stratified storage tank is ensured; the thermal layers are kept. The results in heating cost savings and electrical energy savings.

Description

Circulation lance for mounting in hygienic tank, consisting of part SPP with sleeve Ø 8 mm and PE-Xc pipe Ø 8 mm. A part of the circulation return volume is resupplied to the tank via the lateral circulation connection of ZL 2, heated up by means of the counter flow method and removed via the hot water connection of ZL 2. This is done via the circulation hose located in the heat exchanger pipe of the tank. Returning the circulating hot water in an optimum way ensures that the layers in the stratified storage tank remain intact.

Technical specifications

System connections
Rp1 female

Connection circulation return
G¾ male

Operating temperature range
Medium: Max. 110 °C

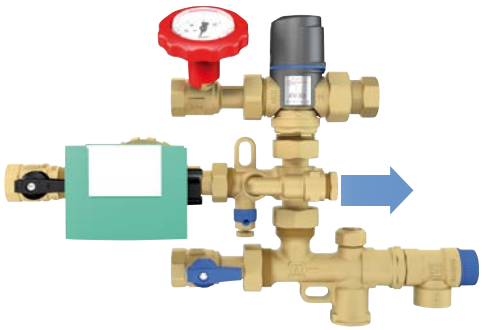
System pressure
Max. 6 bar

Material
Brass

Circulation hose
Ø 8 mm meshed polyethylene, 1 m long

Approval
Lance valve: SVGW certificate no. 0809-5419

Function principle external circulation



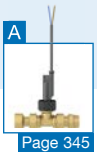
WZS 100 with circulation lance

In the case of external circulation, a partial volume is supplied to the stratified storage tank via the circulation connection and reheated in the upper area of the tank via the circulation lance. In the thermostatic mixing valve, the two partial flows are mixed together again to the adjusted reference temperature. Since only a part of the circulating water is heated directly in the top thermal layer of the tank, a mixing of the thermal layers is excluded.

DG: G, PG: 2	Part no.
Circulation lance ZL 2	68406

Circulation controller EC 1

- **Demand-controlled pump control for hot water circulation**
- **Legionellae protection function**
- **High energy savings due to intelligent pump control**
- **Intuitive use, reliable operation**



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Application

For demand-controlled optimum control of the hot water circulation in conjunction with the hot water circulation system WZS 100. Unnecessary periods of operation (time control or thermal control) and energy costs can be reduced.

Description

Circulation controller in wall mounting housing with controller adjustment via menus. A flow switch connected to EC 1 (for example, circulation switch ZS 2) monitors water withdrawal at the hot water end. After short opening of a tap in the hot water line, the circulation pump is switched on and stopped after an additional running time adjusted by the user has elapsed. This turns any standard fitting in the hot water system into a kind of "remote control".

This is energy savings in two ways: due to the demand-controlled pump, the storage tank is not cooled down unnecessarily by circulating the hot water, and the shorter running time of the circulation pump saves energy.

Technical specifications

Functions
- Circulation control
- Time control
- Additional pump running time

Operating temperature range
Ambient: 0/40 °C

Display
LC display, multifunctional combination display
Menu control with 3 pushbuttons

Supply voltage
AC 220–240 V

Inputs
1 x sensor input for circulation switch

Switching output
1 semiconductor relay

Housing
Wall mounting housing made of plastic (PC, ABS, PMMA)
Control panel mounting possible
W x H x D: 172 x 110 x 49 mm
Degree of protection: IP 20 (EN 60529)
Protection class II

Scope of delivery
- Circulation controller
- Mounting material

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For full functionality of the circulation controller, the circulation switch ZS 2 is required.

DG: G, PG: 2	Part no.
Circulation controller EC 1	68407

Accessories WZS series

Circulation switch ZS 2

Application

Can be used in conjunction with the circulation controller EC 1 for demand-controlled circulation control via opening and closing of a tap.

Description

Circulation switch in pipe piece for direct mounting in the heat insulation of the hot water circulation system WZS 100.
Mandatory for optimum operation of the circulation controller EC 1.

Technical specifications

Brass pipe piece
G¾ female, DN 20, PN 10

Operating temperature range
Medium: Max. 100 °C

Switching point
1.5 ± 0.7 l/min in horizontal mounting position
1.8 ± 0.75 l/min in other mounting position

Switching contact
Closes if value is exceeded

Output
Voltage-free contact

Sheathed cable
Length: 1.5 m PVC

Water safety group assembly WSG 150

Safety group assembly for sealed hot drinking water systems, boilers or drinking water heaters as per EN 806 to secure the inlet of the energy storage tank (hot water tank/stratified storage tank) and for protection against overpressure and back-circulation.

Compact, tightness-tested storage tank connection kit with integrated backflow preventers, shut-off valve and safety valve. Easy adaptation to on-site requirements by rotating the safety valve. WSG 150 is very easy to mount, even directly to a water heater. WSG 150 can be extended at the 1" connection (remove cap).

System connections
G¾ female

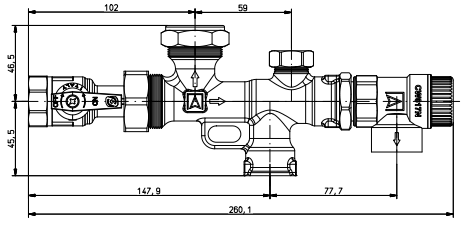
Operating temperature range
Medium: Max. 95 °C

System pressure
Max. 10 bar

Safety valve
Opening pressure: 6 bar
G¾ x G¾

Flow coefficient Kvs
4.97 m³/h

Dimensions (mm)



DG: G, PG: 2	Part no.
Circulation switch ZS 2	68408
Water safety group assembly WSG 150	**68412**

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Boiler safety group assemblies

Water safety group assembly WSG 75/10 and WSG 75/8

Application

For sealed hot drinking water systems or drinking water heaters as per EN 806, DIN 1988 and DIN 4753-1 and for protection against overpressure.

Description

Combination fitting with rotatable safety valve 8 bar or 10 bar, Bourdon tube pressure gauge 0/16 bar, shut-off fitting, check valve and test screw. Noise characteristics as per DIN 4109 class 1.

Technical specifications

Connections
Soldered screw connection Ø 18 mm at both ends

Safety valve
8 bar or 10 bar, rotatable
G½ x G¾
Max. heating capacity: 75 kW

Flow coefficient Kvs
2.8 m³/h

Operating pressure
8 bar or 10 bar

Dimensions
W x H: 95 x 95 mm

Housing
Brass

Bourdon tube pressure gauges
0/16 bar, Ø 50 mm, connection G¼

Options
Other connection types

Boiler safety group assembly BFK 12

For sealed hot drinking water systems or drinking water heaters as per EN 806, DIN 1988 and DIN 4753-1 and for protection against overpressure.

Combination fitting with safety valve 6 bar or 10 bar, shut-off fitting, check valve and test screw. Noise characteristics as per DIN 4109 class 1.

Connections
Compression fitting at both ends Ø 15 mm

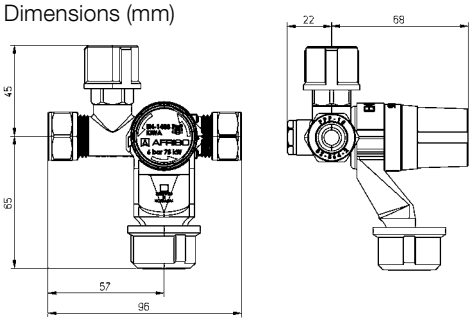
Safety valve
6 bar or 10 bar

Flow coefficient Kvs
2.2 m³/h

Operating pressure
6 bar or 10 bar

Housing
Brass

Dimensions (mm)



DG: G, PG: 2	Safety valve			Part no.
Boiler safety group assembly BFK 12/6	6 bar	1	-	**77986**
Boiler safety group assembly BFK 12/10	10 bar	1	-	**77988**
Water safety group assembly WSG 75/8	8 bar	1	-	**77978**
Water safety group assembly WSG 75/10	10 bar	1	-	**77976**

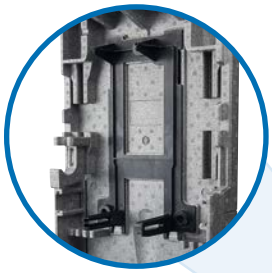
Domestic water system centre HWSC

reddot design award
winner 2013

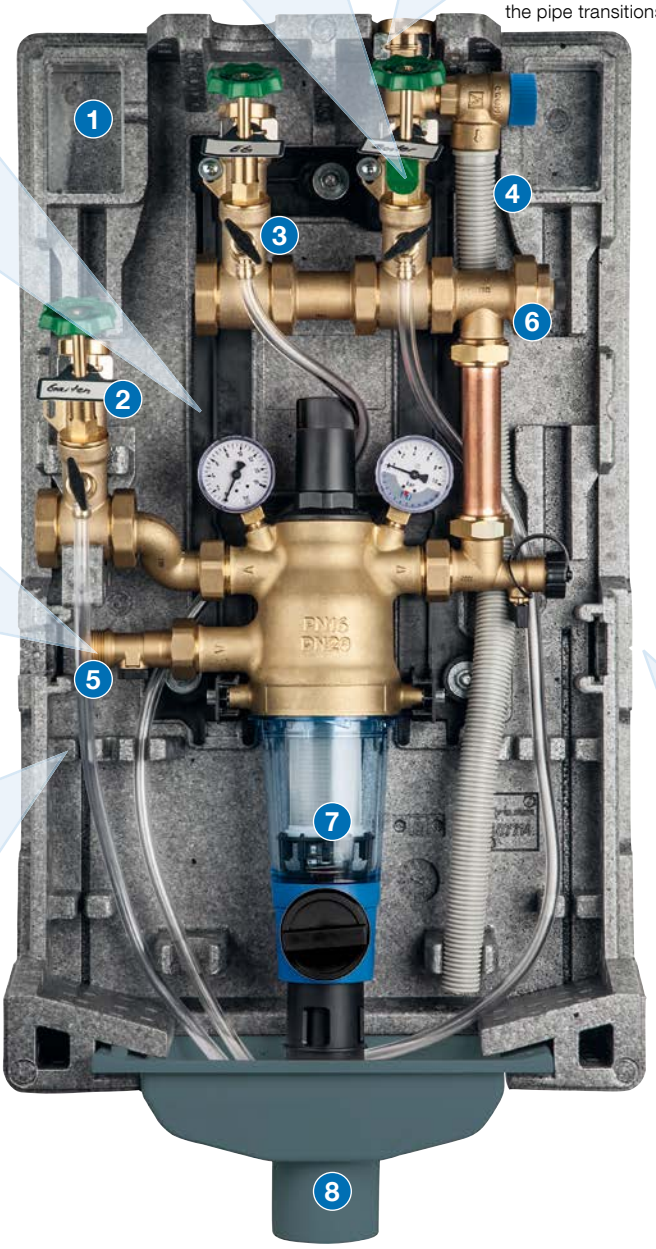
Pressure-reduced supply outlet with backflow preventer, safety valve and drain hose

CLIP connections for convenient mounting of the pipe transitions

Heat-insulated assembly with transparent door for easy monitoring and backwashing (mark via memory pointer)

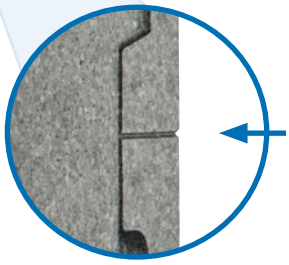


Sophisticated wall bracket with 3-point fixing via hanger bolts for fast and easy mounting, even if the wall is not level



Fast and easy conversion of connection from left to right. Only a few parts need to be dismounted. Interfaces are already defined in the heat insulation.

Guides in the heat insulation for professional installation of the drain and outlet hoses



Mark at standard height of water meter (0.90–1.10 m) as a mounting aid

10

1. Storage compartment for spare seals/silicone grease
2. Filtered high pressure outlet (as per DIN 1988), e.g. for garden line
3. Pressure-reduced supply outlets with drain hoses (1 outlet with backflow preventer)
4. Safety valve (6 bar) outlet hose
5. Backflow preventer, DVGW approval
6. Connection G¼ for sampling valve
7. Filter combination with fine filter and pressure reducer, DVGW approval
8. Drain unit consisting of funnel (DN 75) and reducing adapter (DN 75/DN 50)

Domestic water system centre HWSC

reddot design award
winner 2013

- **Extremely compact system centre 395 x 760 mm (W x H)**
- **Lightning-fast, easy installation**
- **Innovative backwashing system – fast and thorough cleaning of the filter element, low water consumption**
- **Modular design: Can be extended by additional pressure-reduced outlets, automatic backwashing unit, refill combinations, etc.**

Automatic backwashing unit RA 01 (accessory) for setting the time intervals.

Application

For drinking water installations as per EN 806, DIN 1988 and DIN 4753-1. The system centre combines all functions of conventional water distribution installations in a small-footprint unit: the pressure reducer reduces the inlet pressure to an even, system-specific pressure in order to protect the installation and to ensure economical water consumption. The water filter keeps pollutants such as rust particles or sand grains from reaching the domestic water installation, thus protecting valves, machines, boilers, etc. from malfunctions caused by dirt. With its straightforward design and unobtrusive colour, the domestic water system centre fits in perfectly with modern equipment rooms, basements and utility rooms.

Description

Compact, tightness-tested domestic water system centre as a complete solution for the distribution of drinking water in buildings. The base version of HWSC consists of a backflow preventer, filter combination with fine filter and pressure reducer, drain unit with connection possibility to the wastewater system, three supply outlets, safety valve and all function components. The individual components are DVGW-certified or comply with the DVGW regulations. The assembly is contained in a form-fit heat insulation for easy access and operation. The integrated transparent front door allows for checking the system pressure and the safety valves and provides easy access to start backwashing; it is not necessary to remove the upper part of the heat insulation. The memory pointer on the door lets you set the date for the next backwashing procedure.

HWSC excels with a dramatic reduction of the installation time: a drilling template is shipped with the unit for precise positioning of the three holes. Hanger bolts allow for precise adjustment of the domestic water system centre to the wall and enable easy horizontal and vertical alignment. HWSC features a variable height adjustment from 65 to 115 mm to allow for precise adaptation to the individual distance of the water meter from the wall. The default connection setting is intended for left-side connection, but HWSC can be converted to right-side connection in a matter of minutes.

The integrated filter combination features an innovative backwashing system with rotating impeller which ensures fast and thorough cleaning of the fine filter and low water consumption. The entire sieve surface of the filter insert is cleaned at high pressure. The pressure reducer reduces the inlet pressure to an even, system-specific pressure; part of the water flows directly and without pressure reduction to the high-pressure outlet for the garden line. If this is not required, it can be converted into an additional pressure-reduced supply outlet. The insulation can accommodate up to four supply outlets; any additional outlets must be mounted outside the heat insulation. Due to the modular design and the defined connections, it is easy to fit extensions with an automatic backwashing unit, a refill combination for filling heating systems and the connection of a sampling valve or a water softening system.

Door for fast checking the system pressure as well as the safety valve or for starting backwashing.

Domestic water system centre HWSC

Technical specifications

Medium
Drinking water

Inlet pressure
Max. 16 bar

Flow coefficient Kvs
4.2 m³/h

Operating temperature range
Medium: 5/30 °C

Mounting position
Vertical
Supply outlets to the top

Dimensions (housing)
W x H x D: 395 x 665 x 210 mm

Weight
Approx. 12 kg

Connection drinking water
Inlet: R1
Supply system: G¾ female thread

Connection waste water
DN 50, DN 75

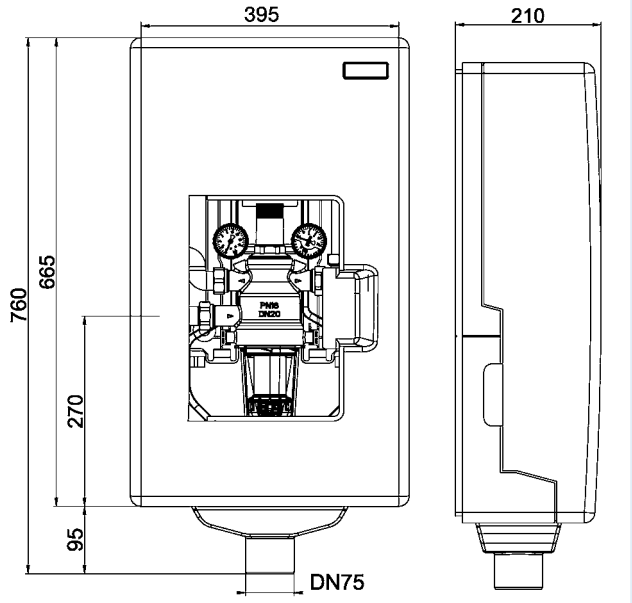
Material

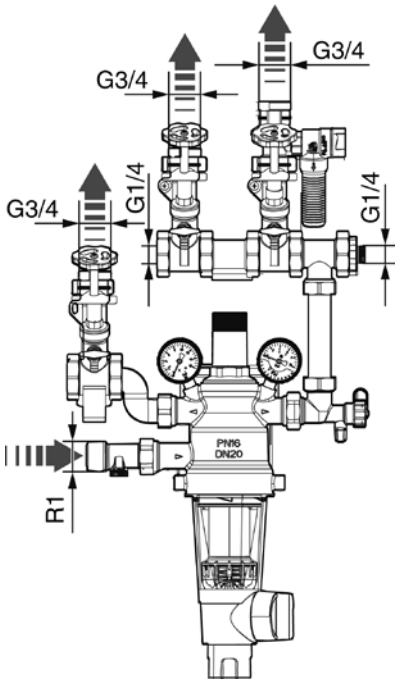
Fittings:	Brass (CW617N)
Heat insulation:	Polypropylene EPP
Filter housing:	Brass (dezincification-resistant)
Fine filter:	Stainless steel
Seals:	EPDM

DVGW approval
All components are DVGW-conform.
Components with DVGW approval: filter combination, backflow preventer, seals

SVGW approval
Components with SVGW approval:
Filter combination
Certificate no. 1310-6204

Dimensions (mm)





DG: M	PG	Part no.
Domestic water system centre HWSC	2	**42755**
Connection kit for refilling of heating system	2	42757
Connection kit for water softening	2	42756
Extension supply outlet G¾ female thread	2	42758
Automatic backwashing unit RA 01	4	42739

Water filter WAF 04 R with pressure reducer, backwashable

- With integrated pressure reducer
- Inlet pressure compensation for constant outlet pressure
- Rotatable cover to indicate the next backwashing date
- Transparent filter cup shows degree of pollution of the filter
- Innovative backwashing system: Thorough cleaning of the filter, low water consumption

Application

For the protection of drinking water installations against corrosion as per DIN 1988. The pressure reducer reduces the inlet pressure to an even, system-specific pressure in order to protect the installation and to ensure economical water consumption. Water filters help to keep pollutants such as rust particles and sand grains from reaching the domestic water installation and thus protect valves, machines, flow heaters, etc. from malfunctions caused by pollution. Ideal for modernisation of domestic water installations where an existing filter needs to be replaced.

Description

DVGW-tested water filter, compact plastic version with backwashable fine filter, integrated pressure reducer and pressure gauge for the outlet pressure. The fine filter insert consists of an upper part and a combined lower part. In the operating state "Filtration", the small upper filter is closed so that the water can only flow through the main filter from the outside to the inside. When the ball valve for "Backwashing" is opened, the filter is pressed down until the water supply to the outside of the main filter is interrupted. At the same time, the water flow through the upper filter is opened. The water required for cleaning the filter flows through the upper sieve, the rotating impeller and the main filter from the inside to the outside. This ensures effective cleaning of the filter across the entire surface of the sieve at full inlet pressure. When the ball valve is closed again, the filter automatically resumes normal operation.
The pressure reducer operates on the basis of a force comparison system, i.e. the force of a spring counteracts the force of a diaphragm. The inlet pressure neither acts in the opening nor in the closing direction. Therefore, pressure changes at the inlet pressure side do not affect the outlet pressure.

Technical specifications

Medium
Drinking water

Inlet pressure
Max. 16 bar

Outlet pressure
1.5–6 bar

Operating temperature range
Medium: Max. 30 °C

Mounting position
Vertical or horizontal with filter cup down

Connection
G¾, G1, G1¼ as required

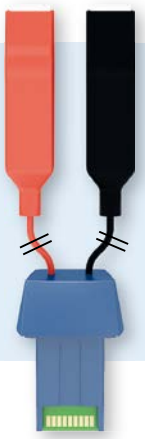
Material
Housing: High-grade plastic
Fine filter: Stainless steel, mesh size 110 µm
Filter cup: Shock-resistant, transparent plastic

DVGW approval
NW-9311AT2316

Automatic backwashing unit RA 01 (accessory) for setting the backwashing intervals.

DG: G	PG	Part no.
WAF 04 R – G¾	1	**42714**
WAF 04 R – G1	1	**42715**
WAF 04 R – G1¼	1	**42716**
Accessories		
Automatic backwashing unit RA 01	4	42739

Anode tester AT 10, diaphragm safety valves MSW



NEW

Anode tester CAPBs® sens AT 10

Application

CAPBs® sens AT 10 is used together with a CAPBs® handle to test sacrificial anodes installed in an isolated way at hot water tanks. To do so, disconnect the cable connection between the anode and the hot water tank and connect the terminals of the sensor module AT 10. AFRISO offers various conversion kits for isolated installation of standard sacrificial anodes (please enquire).

Description

The measured data is transmitted to a smartphone or a tablet via, for example, the integrated Bluetooth® interface of the handle. In the case of measurements with less than 0.3 mA, the applet "Anode Test" recommends an anode replacement. The measurement can be documented with the app EuroSoft®, including comprehensive additional documentation. Please note: Handle BG 10 or CAPBs® device required.

Technical specifications

Dimensions
W x H x D: 58 x 42 x 35 mm

Weight
93 g

Measuring range
0 / 60 mA

Resolution
0.01 mA

Connection anodes
Terminals with 0.5 m cable

Diaphragm safety valve MSW

For sealed drinking water heaters as per EN 806, DIN 1988 and DIN 4753-1 and for protection against overpressure.

The response pressure is factory-set.

Opening pressure/response pressure
See ordering table

Connection
See ordering table

Material
Housing: Brass (CW617N), cap: PA 6, blue

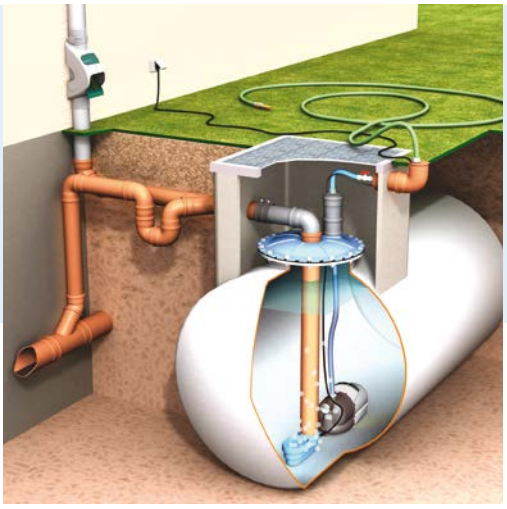
Operating temperature range
Medium: 4/110 °C

Type approval mark
TÜV.SV.yy-2017.13.W
"yy" represents the year of the approval

DG: H	Maximum heating capacity	PG			Part no.
Anode tester CAPBs® sens AT 10	-	4	1	-	**M090283910**
MSW G½ x G¾, 6 bar	75 kW	2	1	84	**42421**
MSW G½ x G¾, 8 bar	75 kW	2	1	84	**42422**
MSW G½ x G¾, 10 bar	75 kW	2	1	84	**42423**
MSW G¾ x G¾, 6 bar	100 kW	2	1	84	**42456**
MSW G¾ x G1, 6 bar	150 kW	2	1	84	**42425**
MSW G¾ x G1, 8 bar	150 kW	2	1	84	**42426**
MSW G¾ x G1, 10 bar	150 kW	2	1	84	**42427**
MSW Rp1 x Rp1¼, 6 bar	250 kW	2	1	10	**42442**
MSW Rp1 x Rp1¼, 8 bar	250 kW	2	1	10	**42443**
MSW Rp1 x Rp1¼, 10 bar	250 kW	2	1	10	**42444**

Further information:

Oil tank conversion kits II + III for rainwater usage in gardens



Application

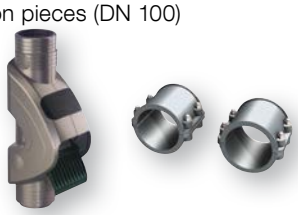
Oil tank conversion made easy. We supply a number of special rainwater components for quick and easy installation of rainwater harvesting systems. The tank cover is the most important component of the kit as it enables simple and clean piping through two openings. The pipe is routed from the downpipe to the tank top and connected to the filter system. Depending on the site conditions and the available space in the manhole, it is recommended to install a downpipe filter or a cartridge filter. Pipe couplers are used to connect the filter elements. The pipe to the sewage system must form a siphon using the drain pipe elbows. A self-priming jet pump with integrated pressure and dry run protection is ideally suited for water withdrawal.

Scope of delivery

Oil tank conversion kit II for rainwater usage in gardens (up to 75 m² roof area):

- Plastic manhole cover Ø 500 mm

- Rainus downpipe filter with 2 quick-action connection pieces (DN 100)

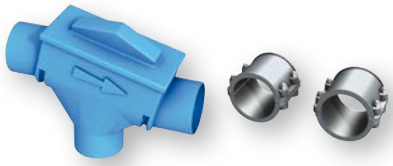


- Calmed inlet

Oil tank conversion kit III for rainwater usage in gardens (up to 210 m² roof area):

- Plastic manhole cover Ø 500 mm

- Cartridge filter PF with 2 quick-action connection pieces (DN 100)



- Calmed inlet

i

See page 354 for inner linings for rainwater. See pages 10, 11, 14–15 for level measurement.

DG: M, PG: 1			Part no.
Oil tank conversion kit II	1	-	**53076**
Oil tank conversion kit III	1	-	**53077**

Accessories rainwater harvesting

DG: M, PG: 1	Part	Description	Part no.
	**Plastic manhole cover Ø 500 mm**	With two connections for pipe diameter 100 mm	**53099**
	**Calmed inlet**	Supplies rainwater to the tank without turbulence. Connections for pipe diameter 100 mm and pipe diameter 125 mm	**53111**
	**Pipe couplers**	For simple mounting of filter and pipe diameter 100 mm. 1 pieces	**53080**
	**Downpipe filter Rainus**	For roof area up to approx. 75 m^2. Suitable for downpipe diameter 100 mm	**53081**
	**Cartridge filter PF**	For roof area up to approx. 210 m^2. Connections DN 100	**53091**

Rainwater inner lining AR-SM with magnets

- **Operation without pressure type leak detector, no pressure, no current**
- **Easy and fast installation by means of powerful neodymium magnets**
- **Perfectly fitting, robust PVC lining**

Application

For conversion of cylindrical steel DIN tanks such as decommissioned fuel oil tanks, diesel tanks or storage tanks into reliable, high-grade rainwater storage tanks. No pressure or flow required. The rainwater inner lining AR-SM with magnets is suitable for storing rainwater in cylindrical steel tanks (3,000 to 50,000 litres).
Please note: In the case of coated steel tanks, verify that the attractive force of the magnets is sufficient.

Description

The rainwater inner lining AR-SM allows owners to convert a decommissioned steel tank into a rainwater storage tank with very little effort.

The rainwater inner lining AR-SM is a PVC lining with flat, round, extremely powerful neodymium magnets welded into lateral and top areas. The lining is reliably held at the inner wall by the magnets – no pressure or power supply are required inside the tank. A tank can be conveniently converted into a rainwater storage tank: First, the tank is measured and then a precisely fitting lining is manufactured. The tank is prepared on the basis of a defined procedure (thorough cleaning of the tank, corrosion checks, etc.); depending on the condition of the tank, a fleece layer is placed on the tank floor for impact protection.

Then the lining is fitted in the steel tank and inflated by means of a blower; if necessary, the final fit is achieved by means of a vacuum pump. When the PVC lining is inflated, the magnets click into place at the inner wall exactly where planned. The fit of the PVC lining is checked and then it is fastened in the manhole by means of a fastening ring. The tank is ready for storing rainwater immediately after the lining and the piping connections have been installed.

Scope of delivery

Rainwater inner lining AR-SM, made of plastic film Sikaplan® WP5140-08 black, film thickness 0.8 mm, for closed tanks, with all neodymium magnets welded into the film in the lateral and top areas, with film flange for the standard fastening ring.

i

Not only cylindrical DIN steel tanks, but certain steel tanks with different geometrical shapes can be converted into rainwater storage tanks. Please enquire separately.

i

Depending on the local conditions and on the tank, a fleece lining may be required in the bottom area of the tank as an impact protection. Different manhole distances and special dimensions are manufactured at the same conditions.

	PG	Part no.
Additional manhole		
500 mm	1	08027
600 mm	1	08024
Accessories (DG: H)		
Fastening ring Ø 500 mm	3	43900A
Fastening ring Ø 600 mm	3	43900C
Fleece LSV2, 1 x 2 m Platte	1	43952
Bottom plate, 800 x 800	1	43894

DG: H, PG: 1	Part no.
3,000 l	43889.003
5,000 l	43889.005
7,000 l	43889.007
10,000 l	43889.010
13,000 l	43889.013
15,000 l	43889.015
16,000 l	43889.016
20,000 l	43889.020
25,000 l	43889.025
30,000 l	43889.030
50,000 l	43889.050

Backup controller kit RENA for rainwater storage tanks

- Microprocessor-controlled supply of drinking water to rainwater tanks with connected water station
- Dry run protection and safety shutdown
- 2 program times for normal or increased water consumption
- Easy handling – fast installation

1 Level probe
2 Solenoid valve

Application

For monitoring rainwater tanks for sufficient water level. The backup controller RENA, consisting of control unit RENA, probe and solenoid valve, is designed for fully automatic supply of drinking water to rainwater tanks with connected water station. Continuous operation without frequent on and off cycles, two selectable program times for normal or increased water consumption, with leak monitoring, dry run protection and protection against deposits.

Description

The complete backup controller kit consists of a control unit, indicators and controls and a socket with PE contact for connection of the water station, a probe for the water tank and a solenoid valve for connection to the water tap. If, as a result of insufficient precipitation or considerable water withdrawal, the level in the tank falls below a specific value, the solenoid valve is opened and fresh water from the drinking water mains system is supplied. 2 program times are selectable, depending on the water consumption (e.g. garden watering, car wash). In order to avoid the formation of deposits at the solenoid valve, the valve is opened and closed for one second three times in a row once per week. RENA features a safety shut-off system that responds to leaks in the tank or the pipes.

Technical specifications

Functions
Fully automatic backup controller for supplying drinking water to rainwater tanks with connected water station, with leak monitoring, dry run protection and protection against deposits

Control unit RENA
Control unit with microprocessor

Operating temperature range
Ambient: 0/40 °C

Isolated, earthed power outlet
AC 230 V (fuse T 10 A)

Supply voltage
AC 230 V

Dimensions
W x H x D: 100 x 188 x 65 mm

Degree of protection
IP 20 (EN 60529)

Solenoid valve
For drinking water and rainwater
W x H x D: 95 x 80 x 100 mm
Connection: G½ x G¾
Flow rate: Max. 50 l/min
(inlet pressure 4 bar, open outlet)
Supply voltage: AC 230 V
Mains cable: 3 m
Degree of protection: IP 65 (EN 60529)

Level probe
For drinking water and rainwater
Supply voltage: AC 6 V

Scope of delivery RENA backup controller kit
- Control unit RENA
- Level probe RENA with 15 m probe cable
- Solenoid valve (½ x ¾) with 3 m mains cable
- Operating instructions

DG: H, PG: 4			Part no.
RENA backup controller kit, complete	1	-	**53100**
Control unit RENA	1	-	**53101**
Level probe RENA with 15 m probe cable	1	-	**53102**
Level probe RENA with 25 m probe cable	1	-	**53122**
Solenoid valve G½ x G¾	1	-	**53134**

Pressure gauges for heating installations

Capsule pressure gauge/ pressure gauge accessories

Differential pressure gauge

Bourdon tube pressure gauge

CHAPTER 11

Mechanical pressure measuring instruments (pressure gauges)

Mechanical pressure measuring instruments at a glance




		Standard capsule pressure gauges	Capsule pressure gauges for chemical applications	Standard Bourdon tube pressure gauges/ Bourdon tube pressure gauges for industrial applications	Bourdon tube pressure gauges/stainless steel 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**
Operating temperature range -20/+60 °C	Application areas	•		•	
Operating temperature range -20/+100 °C			•		•**
Operating temperature range -20/+200 °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		•	•	•	•
Throttle screw		•	•	•	•
Reference pointer		•	•	•	•
Maximum pointer		**≥ 250 mbar**	**≥ 250 mbar**	•	•
Special scale		•	•	•	•
		Page 361	**Page 370**	**Pages 391/402**	**Pages 419/422**

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

11

			 MF  MFW	
Standard diaphragm pressure gauges	Stainless steel diaphragm pressure gauges/ pressure gauges for chemical applications	Standard spring-dia-phragm 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		•**
		•	•**	
				•
		•	•	
•	•	•	•	•
•	•	•	•	•
•	•	•	•	•
Page 488	Pages 482/486	Page 506	Page 508	Page 497

11

Pressure gauges – Mechanical pressure measuring instruments with elastic measuring elements

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 the diaphragm 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

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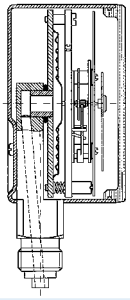


Application

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

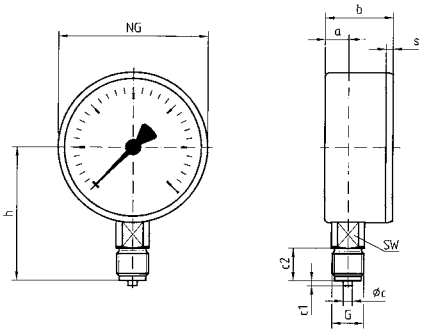
- Back flange
- Panel mounting bezel (D3)
- 3-hole fixing, panel mounting bezel
- Measuring system stainless steel (NG 100)
- Throttle screw
- Reference pointer
- Special scales
- Other process connections

Standard capsule pressure gauges

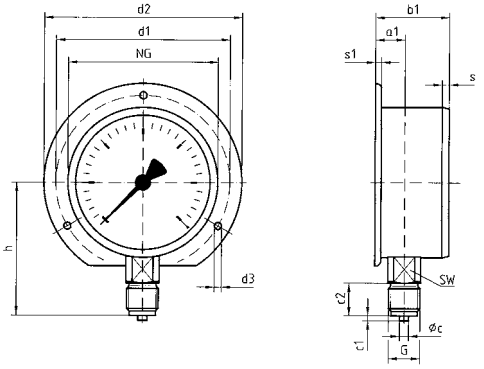
Type D 2/D 3 – NG 63/80/100

Housing types and dimensions

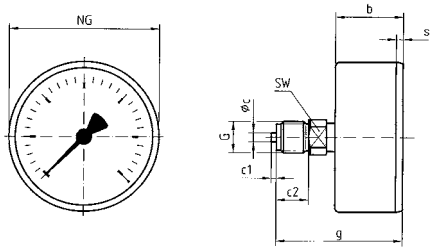
Bottom connection



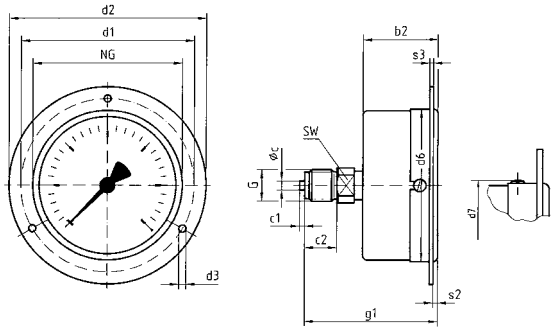
Bottom connection, back flange



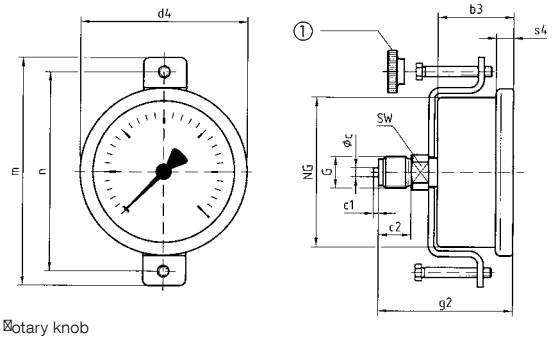
Centre back connection



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

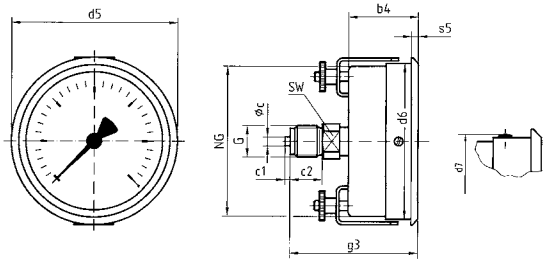


Centre back connection, crimped bezel housing with clamp fixing, NG 63



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

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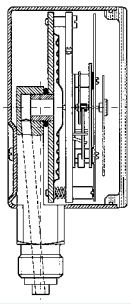


Application

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

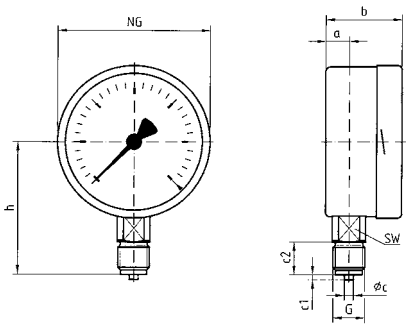
- Overpressure and underpressure safety 10 x FSD
- Back flange
- Panel mounting bezel, with window, plastic
- 3-hole fixing, panel mounting bezel with window, plastic
- Throttle screw
- Reference pointer
- Special scales
- Other process connections

Standard capsule pressure gauges

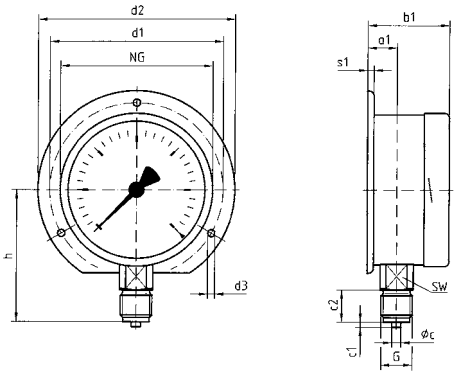
Type D 4 – NG 63/100/160

Housing types and dimensions

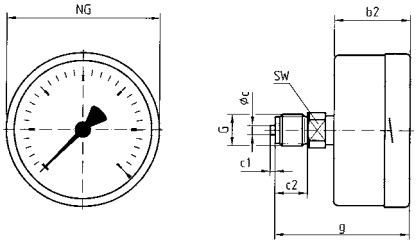
Bottom connection



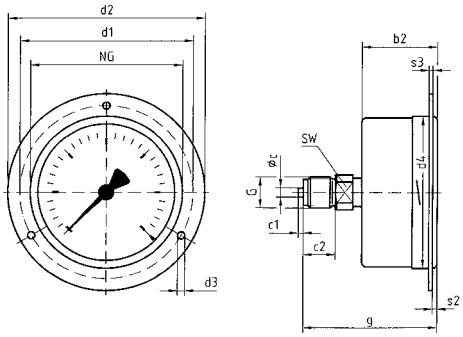
Bottom connection, back flange



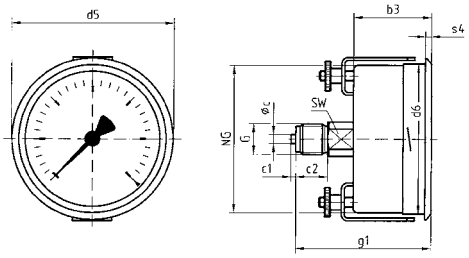
Centre back connection



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



Centre back connection, panel mounting bezel 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

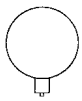
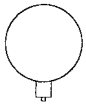
Nominal size (NG)	s3	s4	SW
63	2	3	14
100	2	4	22
160	2	4.5	22

* 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.**
-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
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

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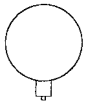
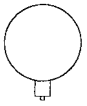
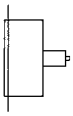
See page 374 for options.

Standard capsule pressure gauges

EN 837-3

DG: M, PG: 2

Type	KP100, D201	KP100, D211	KP63, D301	KP63, D311	KP63, D331	KP63, D351
Version						
Housing Ø	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
Connection	G½B	G½B	G¼B	G¼B	G¼B	G¼B
					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.**
-25/0	35104201	35104211	35004301	35004311	35004331	35004351
-40/0	35105201	35105211	35005301	35005311	35005331	35005351
-60/0	35106201	35106211	35006301	35006311	35006331	35006351
-100/0	35107201	35107211	35007301	35007311	35007331	35007351
-160/0	35108201	35108211	35008301	35008311	35008331	35008351
-250/0	35109201	35109211	35009301	35009311	35009331	35009351
-400/0	35110201	35110211	35010301	35010311	35010331	35010351
-600/0	35111201	35111211	35011301	35011311	35011331	35011351
-1,000/0	35112201	35112211	35012301	35012311	35012331	35012351
0/25	**35116201**	35116211	**35016301**	35016311	35016331	35016351
0/40	**35117201**	35117211	**35017301**	35017311	35017331	35017351
0/60	**35118201**	35118211	**35018301**	35018311	35018331	35018351
0/100	**35119201**	35119211	**35019301**	35019311	35019331	35019351
0/160	**35120201**	35120211	**35020301**	35020311	35020331	35020351
0/250	**35121201**	35121211	**35021301**	35021311	35021331	35021351
0/400	**35122201**	35122211	**35022301**	35022311	35022331	35022351
0/600	**35123201**	35123211	**35023301**	35023311	35023331	35023351
0/1,000	**35124201**	35124211	35024301	35024311	35024331	35024351

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

Blue part no. = in-stock items

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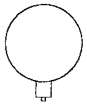
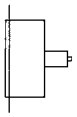
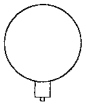
See page 374 for options.

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.**
-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
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.

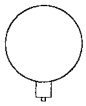
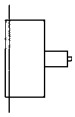
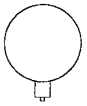
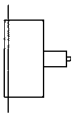
Blue part no. = in-stock items

See page 374 for options.

Standard capsule pressure gauges

EN 837-3

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.**
-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
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.

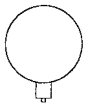
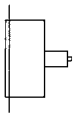
Blue part no. = in-stock items

See page 374 for options.

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.**
-6/0	35151401	35151411	35151431	35151451
-10/0	35152401	35152411	35152431	35152451
-16/0	35153401	35153411	35153431	35153451
-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
0/6	35163401	35163411	35163431	35163451
0/10	35164401	35164411	35164431	35164451
0/16	35165401	35165411	35165431	35165451
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 374 for options.

Capsule pressure gauges for chemical applications EN 837-3

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

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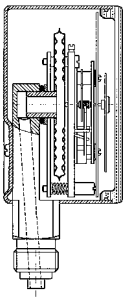


Application

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

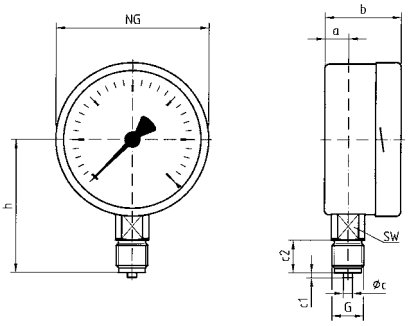
- Back flange
- Panel mounting bezel
- 3-hole fixing, panel mounting bezel
- Ex version
- Throttle screw
- Special scales
- Other process connections

Capsule pressure gauge for chemical applications

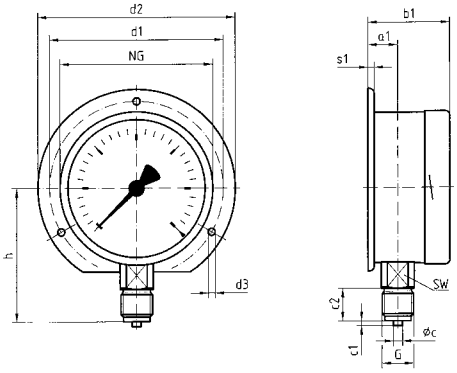
Type D 4 – NG 63/100/160

Housing types and dimensions

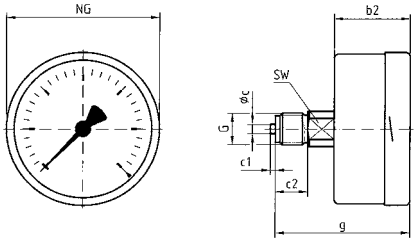
Bottom connection



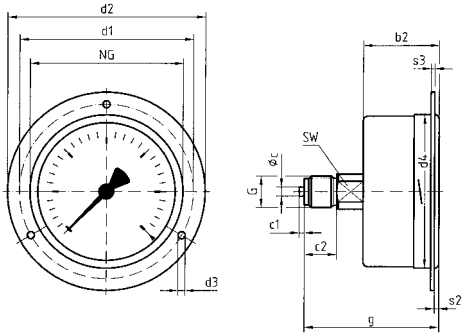
Bottom connection, back flange



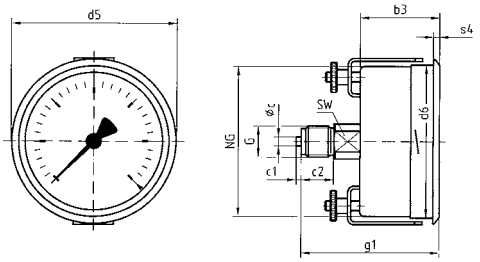
Centre back connection



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

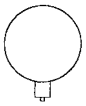
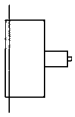
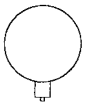
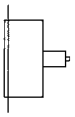
Nominal size (NG)	s3	s4	SW
63	2	3	14
100	2	4	22
160	2	4.5	22

* Dimensions for NG 100 according to DIN 16014.

Capsule pressure gauges for chemical applications

EN 837-3

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.**
-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
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

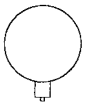
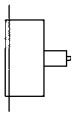
i

See page 374 for options.

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.**
-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
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 374 for options.

Options for capsule pressure gauges

DG: M

Housing diameter (mm)	PG	63	80	100	160
Description		Part no.	Part no.	Part no.	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)	0	---	---	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	0	37611	37612	37613	37614
Bayonet bezel stainless steel 304 polished	0	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
Throttle screw brass – hole 0.3 – 0.5 – 0.7 mm (please specify)	2	38097	38098	38099	38100
Throttle screw stainless steel 316 Ti – hole 0.3 – 0.5 – 0.7 mm (please specify)	3	38103	38104	38105	38106
Red mark on dial	0	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)	0	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)	0	38153	38154	38155	38156
Additional colour	0	38165	38166	38167	38168

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

Blue part no. = in-stock items

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See the overview "Accessories for panel mounting and wall mounting" on page 511.

Bourdon tube pressure gauges for boiler and heating system applications

- Design as per EN 837-1
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

Version: Plastic connection

Application

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

Technical specifications

Type
D 1

Nominal size
26 – 28

Accuracy class (EN 837-1/6)
4.0

Range (EN 837-1/5)
0/4 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
Axial
Plastic, integrated in housing:
RF 26 = G⅛B
RF 28 = M 10 x 1
Brass: G⅛B, M10 x 1

Measuring element
Bourdon tube, copper alloy
"C" type tube

Movement
Brass

Dial
Plastic (ABS), white
Dial marking black

Pointer
Plastic, black

Housing
RF 26 = Plastic (PA6), black
RF 28 = Plastic (PA6), white,
Back flange

Window
Clip-in plastic

Options

- Special scales
- Reference pointer
- Other brass connection

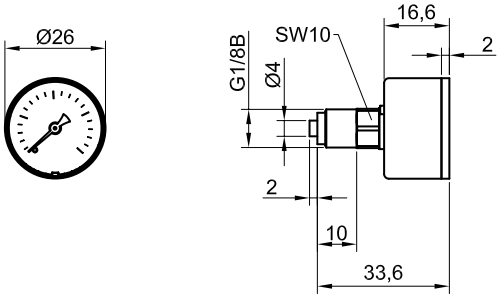
DG: G, PG: 4	Part no.
RF 26, plastic connection G⅛B	On request
RF 26, brass connection G⅛B	On request
RF 28, plastic connection M10 x 1	On request
RF 28, brass connection M10 x 1	On request

Minimum order quantity = 100 pieces per delivery.

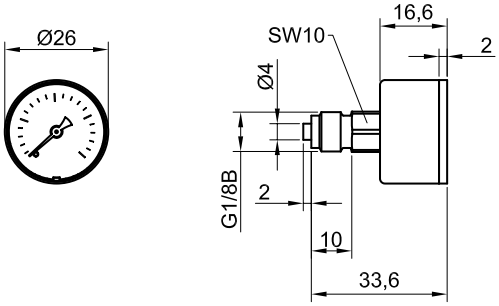
Bourdon tube pressure gauges for boiler and heating system applications Type D 1 – RF 26/28

Housing types and dimensions (mm)

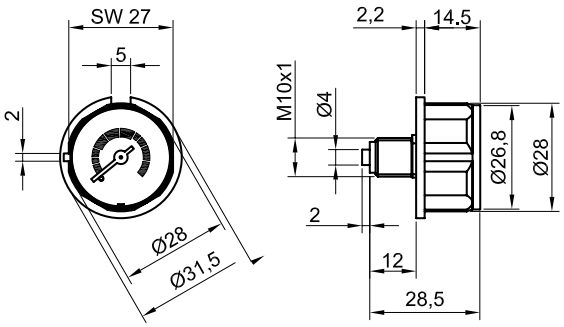
RF 26 plastic connection, integrated in housing



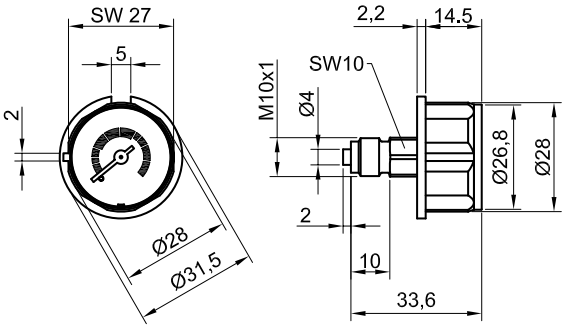
RF 26 Brass connection



RF 28 plastic connection, integrated in housing



RF 28 Brass connection



11

Bourdon tube pressure gauges for heating/plumbing applications

- With self-sealing connection thread (NG 50 and 63) for fast mounting
- Red maximum mark on dial (version HZ)
- Adjustable red reference pointer and green operation segment on window (version HZ)
- Corrosion-resistant housing

Mounting valves
with self-sealing coating, automatically close during replacement of gauge to enable fast and cost-effective servicing (see "Accessories for pressure gauges").


A
Page 512

Application

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

Technical specifications

Nominal size
50 – 63 – 80 – 100

Accuracy class (EN 837-1/6)
2.5

Ranges (EN 837-1/5)
-1/0 bar
0/0.6 to 0/25 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: full scale value

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

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
rising temperature approx. ±0.4 %/10 K
falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
NG 50–63 G¼B: Self-sealing thread with PTFE ring for safe and fast installation (Attention: Approx. 60° chamfer required at female thread)
Brass, bottom or back
NG 50–63 G¼B – spanner 14
NG 80–100 G½B – spanner 22

Measuring element
Bourdon tube, copper alloy; "C" type tube

Movement
Brass

Dial
Plastic, white
Dial marking black

Pointer
Plastic, black

Housing
Plastic (ABS), black, highly impact-resistant and corrosion-resistant

Window
Clip-in plastic NG 80–100 with adjustable red reference pointer

Special versions

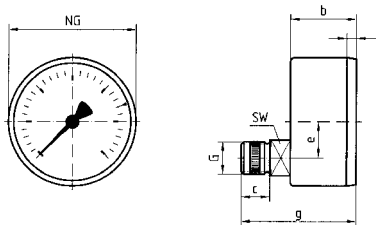
Pressure gauges for heating installations NG 50–63–80
for sealed heating systems
Range: 0/4 bar
Connection: NG 50 G¼B bottom back
NG 63 G¼B or G⅜B radial or centre back
NG 80 G½B bottom or G¼B centre back
(with valve G¼ x G½)
Dial with red mark at 2.5 or 3 bar and green sector from 1.5 to 2.5 or 3 bar, window with adjustable red reference pointer and green flag

Hydrometer NG 80–100
Water level indicator for open heating systems
Ranges: 0/0.6 to 0/10 bar
Connection: Brass G½B bottom – spanner 22
Dual scale: bar outer black
mWC inner black
Window with adjustable red reference pointer

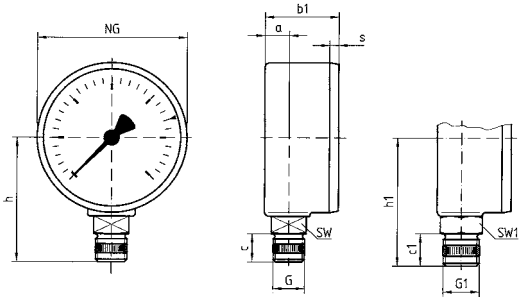
Bourdon tube pressure gauges for heating/plumbing applications

Housing types and dimensions

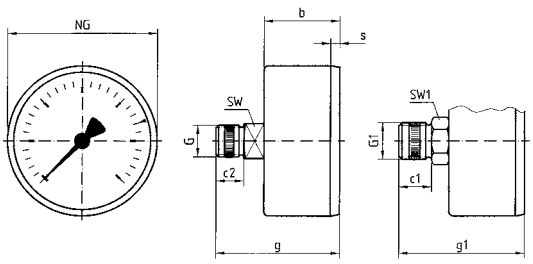
HZ 50 – bottom back connection



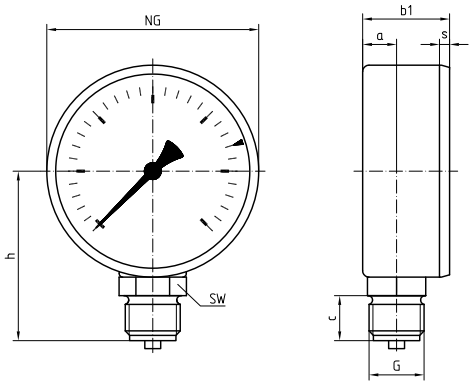
RF 50/63, HZ 63 – bottom connection



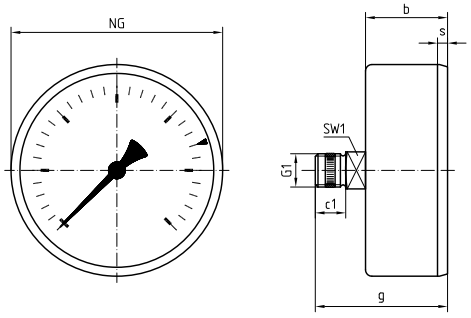
RF/HZ 63 – centre back connection



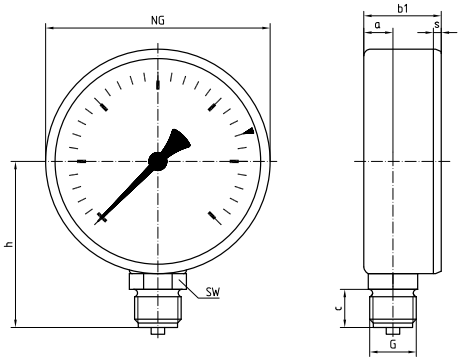
RF 80/HY 80/HZ 80 – bottom connection



HZ 80 – centre back connection



RF 100/HY 100 – bottom connection

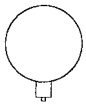
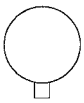
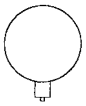
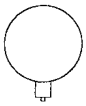
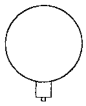
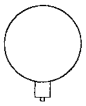


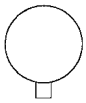
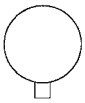
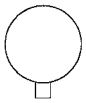
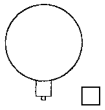
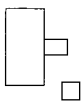
Dimensions (mm)

Nominal size (NG)	a	b	b_1	c	c_1	c_2	e	g	g_1	G	G_1	h	h_1	s	SW	Spanner size SW_1
50	-	25.8	-	11.2	-	-	14	43	-	G¼B	-	-	-	3.8	14	-
63	9.8	30.4	29.7	11.2	13	11.5	-	49.9	50.4	G¼B	G⅜B	49.5	51.5	3.7	14	17
80	12.8	31	32.8	17	11.5	-	-	50	-	G½B	G¼B	64	-	2.8	22	14
100	15.5	-	34.5	17	-	-	-	-	-	G½B	-	74	-	3.5	22	-

Bourdon tube pressure gauges for heating/plumbing applications

DG: G, PG: 2

Type	RF 50 rad	RF 50 ax	RF 63 rad	RF 63 ax	RF 80 rad	HY 80 rad*	RF 100 rad	HY 100 rad*
Version								
Housing Ø	50	50	63	63	80	80	100	100
Housing	Plastic (ABS), black, highly impact-resistant and corrosion-resistant							
Measuring element	Bourdon tube, copper alloy							
Accuracy class	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Connection	G¼B	G¼B	G¼B	G¼B	G½B	G½B	G½B	G½B
Thread	Self-sealing with PTFE sealing ring				-			
					With adjustable red reference pointer			
Range (bar)	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
-1/0	-	-	**63501**	-	**63551**	-	**63601**	-
0/0.6	-	-	-	-	-	-	-	**63281**
0/1	-	-	-	-	**63559**	63570	**63609**	**63282**
0/1.6	-	-	-	-	63560	63571	**63610**	**63283**
0/2.5	-	-	**63511**	**63536**	**63561**	-	**63611**	**63284**
0/4	-	-	**63512**	**63537**	**63562**	-	**63612**	**63285**
0/6	**63122**	**63127**	**63513**	**63538**	**63563**	**63574**	**63613**	**63286**
0/10	**63123**	**63128**	**63514**	**63539**	**63564**	**63575**	**63614**	**63287**
0/16	**63124**	**63129**	**63515**	**63540**	**63565**	-	**63615**	-
0/25	-	-	-	-	**63566**	-	**63616**	-

Type	HZ 50 back bottom	HZ 63 rad	HZ 63 ax	HZ 63 rad	HZ 63 ax	HZ 80 rad	HZ 80 rad	HZ 80 ax
Version								
Housing Ø	50	63	63	63	63	80	80	80
Housing	Plastic (ABS), black, highly impact-resistant and corrosion-resistant							
Measuring element	Bourdon tube, copper alloy							
Range	0/4 bar							
Dial	With red mark at 3 bar and green sector from 1.5 to 3 bar							
Window	Plastic with adjustable red reference pointer and green flag							
Accuracy class	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Connection	G¼B	G⅜B	G⅜B	G¼B	G¼B	G½B	G¼ with valve G¼ x G½	G¼ with valve G¼ x G½
Thread	Self-sealing with PTFE sealing ring					-	Self-sealing with PTFE sealing ring	
Range (bar)	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
Part no.	**63927**	**63910**	**63914**	**63911**	**63915**	**63918**	**63913**	**63919**
Dial	With red mark at 2.5 bar and green sector from 1.5 to 2.5 bar							
Part no.	-	**63908**	**63909**	-	-	-	-	-

* Dual scale bar/mWC.
Minimum order quantity for non-stock items = 25 pieces.

Blue part no. = in-stock items

Pressure gauges with capillary tube

For burners, boiler, hot water tanks and air conditioning/refrigeration systems, AFRISO offers different pressure and temperature measuring instruments with various housing versions and connection types. The portfolio covers cost-effective pressure gauges and thermometers with plastic or copper capillaries as well as combination instruments such as combined thermometer/pressure gauges. We also provide OEM versions for your specific applications. Please enquire.

Application examples

See page 626 for thermometers with capillary tube.

Pressure gauges with plastic capillary tube

- Ideal for boilers and burners, especially for wall-mounted boilers
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

Application

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

Technical specifications

Type
D 1

Nominal size
26 – 28 – 37 – 40 – 42 – 52 – 45 x 45

Accuracy class (EN 837-1/6)
4.0

Ranges (EN 837-1/5)
0/4 bar
0/6 bar

Application area
Static load: ¾ x full scale value
Dynamic load: 2/3 x full scale value
Short-term: full scale value

Operating temperature range
Medium: T_{max} = +80 °C
Ambient: T_{min} = -20 °C
T_{max} = +70 °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
Back, with plastic capillary
Brass disk G¼B

Measuring element
Bourdon tube, copper alloy
"C" type tube

Movement
Brass

Dial
Plastic (ABS), white or black
Dial marking black

Pointer
Plastic, black or white

Housing
Plastic (ABS), white, black or grey
Highly impact-resistant and corrosion-resistant
RFK 26, RFK 28 = Plastic (PA6)
glass-fibre reinforced

Window
Clip-in plastic, transparent
RFK 52 with bezel

Capillary length
Plastic capillary, R3, black
L = 500, 1,000, 1,500, 2,000 mm

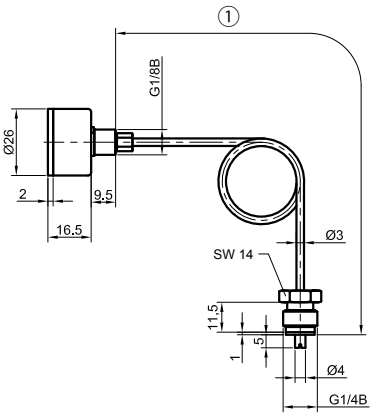
Options

- Window with reference pointer (RFK 28, 37, 45, 52)
- Special scale
- Dial with customer logo
- Other process connections
- Various capillary lengths
- Special colours for housing, dial, pointer

Pressure gauges with plastic capillary tube

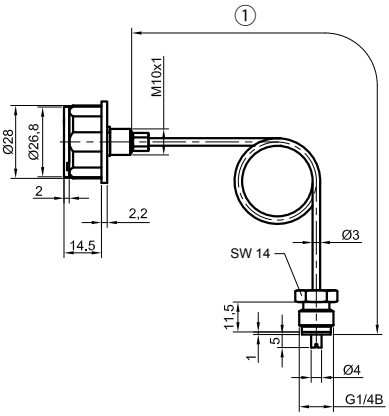
Dimensions (in mm)

Type RFK 26



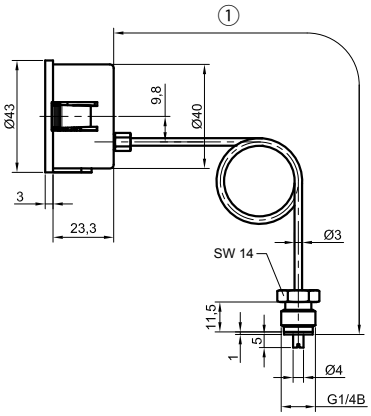
① Capillary length

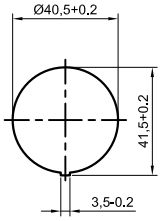
Type RFK 28



① Capillary length

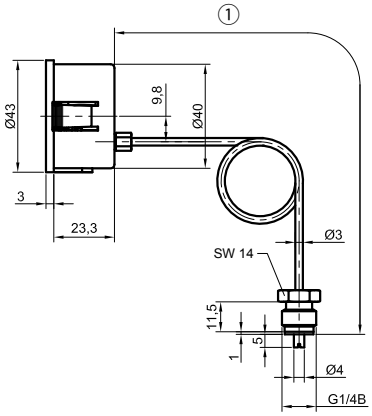
Type RFK 37

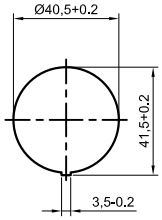




① Capillary length

Type RFK 40



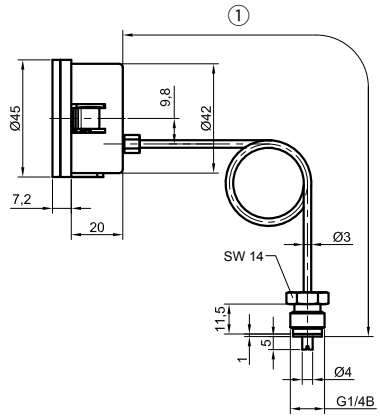


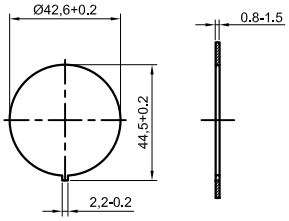
① Capillary length

Pressure gauges with plastic capillary tube

Dimensions (in mm)

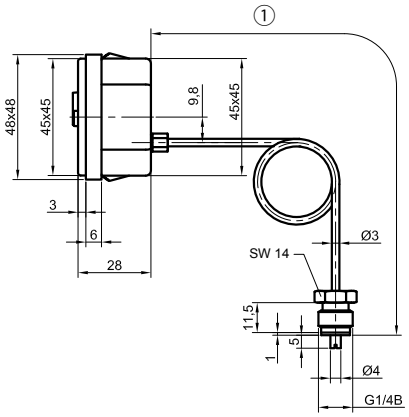
Type RFK 42

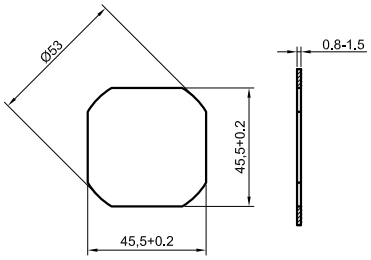




① Capillary length

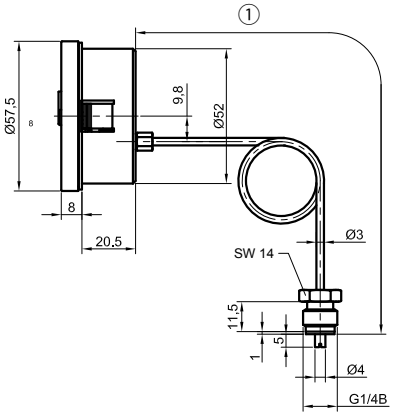
Type RFK 45

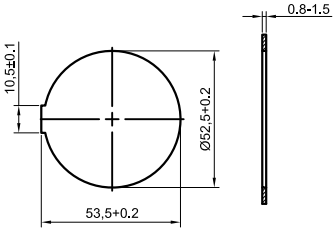




① Capillary length

Type RFK 52





① Capillary length

11

Pressure gauges with plastic capillary tube

DG: G, PG: 2

Type	RFK 26	RFK 28	RFK 37	RFK 40
Version				
Housing Ø	26	28	37	40
Housing	Plastic (PA6), black	Plastic (PA6), white	Plastic (ABS), white	
Pointer	Plastic, black			
Dial/scale	Dial white / scale black			
Packing unit**	72 pieces			
Range	**0/4 bar**	**0/4 bar**	**0/4 bar**	**0/4 bar**
Capillary length*	Part no.	Part no.	Part no.	Part no.
500 mm	On request	On request	On request	On request
1,000 mm	On request	On request	On request	On request
1,500 mm	On request	On request	On request	On request
2,000 mm	On request	On request	On request	On request
Range	**---**	**---**	**0/6 bar**	**0/6 bar**
Capillary length*	Part no.	Part no.	Part no.	Part no.
500 mm	---	---	On request	On request
1,000 mm	---	---	On request	On request
1,500 mm	---	---	On request	On request
2,000 mm	---	---	On request	On request

* Other capillary lengths on request.
** Minimum order quantity for non-stock items = 144 pieces per delivery.

Pressure gauges with plastic capillary tube

DG: G, PG: 2

Type	RFK 42	RFK 45	RFK 52
Version			
Housing Ø	42	45 x 45	52
Housing	Plastic (ABS), white	Plastic (ABS), black	Plastic (ABS), grey, with bezel, black
Pointer	Plastic, black	Plastic, white	
Dial/scale	Dial white / scale black	Dial white / scale black	
Packing unit**	72 pieces	72 pieces	50 pieces
Range	**0/4 bar**	**0/4 bar**	**0/4 bar**
Capillary length*	Part no.	Part no.	Part no.
500 mm	On request	On request	On request
1,000 mm	On request	On request	On request
1,500 mm	On request	On request	On request
2,000 mm	On request	On request	On request
Range	**0/6 bar**	**0/6 bar**	**0/6 bar**
Capillary length*	Part no.	Part no.	Part no.
500 mm	On request	On request	On request
1,000 mm	On request	On request	On request
1,500 mm	On request	On request	On request
2,000 mm	On request	On request	On request

* Other capillary lengths on request.
** Minimum order quantity = 2 packing units.

Pressure gauges with copper capillary tube

- Ideal for boilers and burners, especially for wall-mounted boilers
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

Application

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

Technical specifications

Type
D 1

Nominal size
26 – 28 – 37 – 40 – 42 – 52 – 45 x 45

Accuracy class (EN 837-1/6)
4.0

Ranges (EN 837-1/5)
0/4 bar
0/6 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} = +80 °C
Ambient: T_{min} = -20 °C
T_{max} = +70 °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
Back, with copper capillary
Brass disk G¼B

Measuring element
Bourdon tube, copper alloy
"C" type tube

Movement
Brass

Dial
Plastic (ABS), white or black
Dial marking black

Pointer
Plastic, black or white

Housing
Plastic (ABS), white, black or grey
Highly impact-resistant and corrosion-resistant
RFK 26, RFK 28 = Plastic (PA6)
glass-fibre reinforced

Window
Clip-in plastic, transparent
RFK 52 with bezel

Capillary length
Cu capillary with PVC coating, R3, grey
L = 500, 1,000, 1,500, 2,000 mm

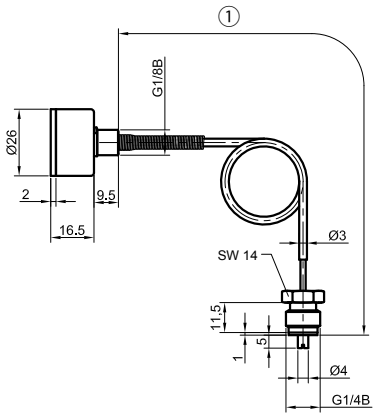
Options

- Window with reference pointer (RFK 28, 37, 45, 52)
- Special scales
- Dial with customer logo
- Other process connections
- Various capillary lengths
- Special colours for housing, dial, pointer

Pressure gauges with copper capillary tube

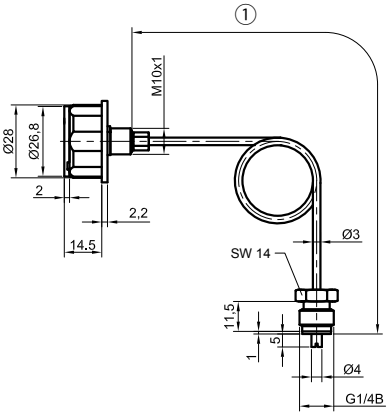
Dimensions (in mm)

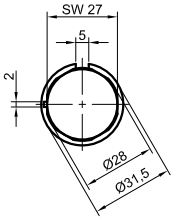
Type RFK 26



① Capillary length

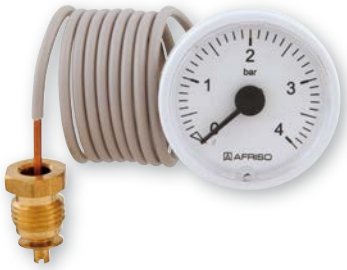
Type RFK 28

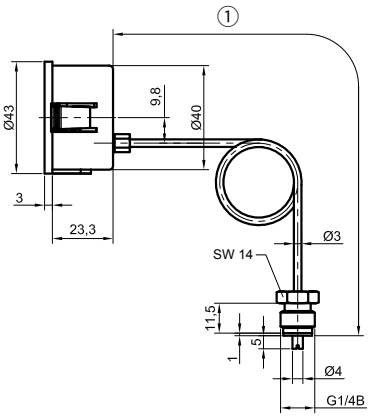


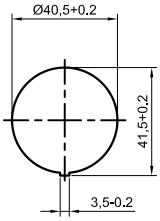


① Capillary length

Type RFK 37

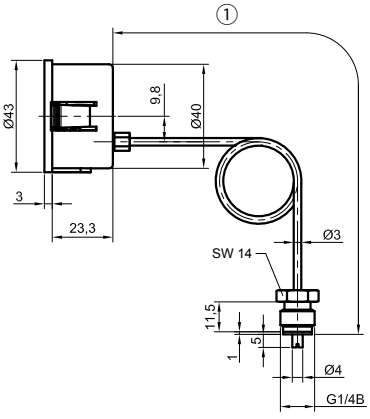


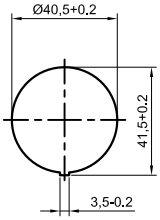




① Capillary length

Type RFK 40



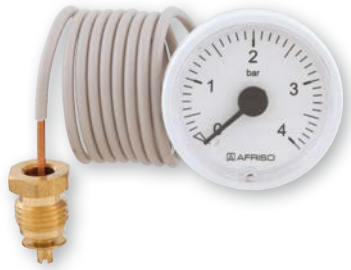


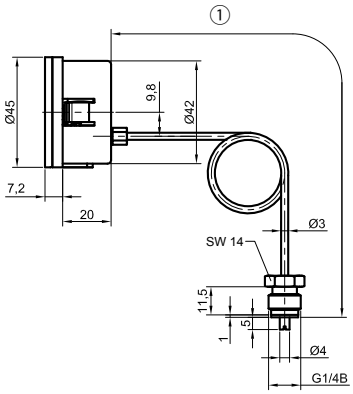
① Capillary length

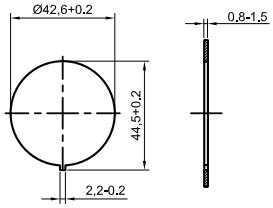
Pressure gauges with copper capillary tube

Dimensions (in mm)

Type RFK 42

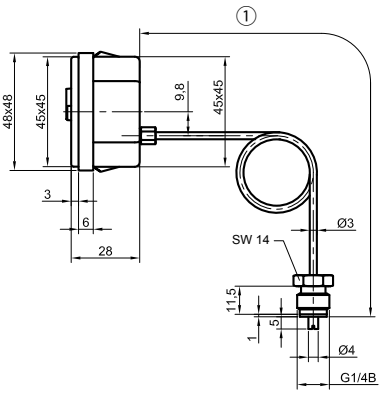


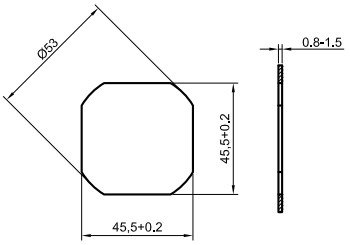




① Capillary length

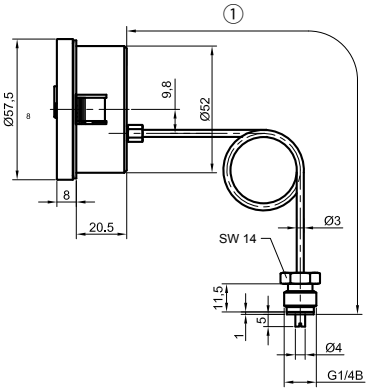
Type RFK 45

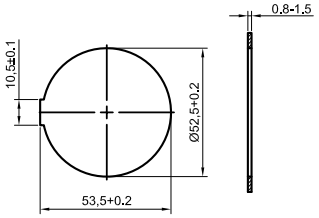




① Capillary length

Type RFK 52





① Capillary length

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Pressure gauges with copper capillary tube

DG: G, PG: 2

Type	**RFK 26**	**RFK 28**	**RFK 37**	**RFK 40**
Version				
Housing Ø	26	28	37	40
Housing	Plastic (PA6), black	Plastic (PA6), white	Plastic (ABS), white	
Pointer	Plastic, black			
Dial/scale	Dial white / scale black			
Packing unit**	50 pieces			
Range	**0/4 bar**	**0/4 bar**	**0/4 bar**	**0/4 bar**
Capillary length*	Part no.	Part no.	Part no.	Part no.
500 mm	On request	On request	On request	On request
1,000 mm	On request	On request	On request	On request
1,500 mm	On request	On request	On request	On request
2,000 mm	On request	On request	On request	On request
Range	**---**	**---**	**0/6 bar**	**0/6 bar**
Capillary length*	Part no.	Part no.	Part no.	Part no.
500 mm	---	---	On request	On request
1,000 mm	---	---	On request	On request
1,500 mm	---	---	On request	On request
2,000 mm	---	---	On request	On request

* Other capillary lengths on request.
** Minimum order quantity = 100 pieces per delivery.

Pressure gauges with copper capillary tube

DG: G, PG: 2

Type	RFK 42	RFK 45	RFK 52
Version			
Housing Ø	42	45 x 45	52
Housing	Plastic (ABS), white	Plastic (ABS), black	Plastic (ABS), grey, with bezel, black
Pointer	Plastic, black	Plastic, white	
Dial/scale	Dial white / scale black	Dial white / scale black	
Packing unit**	72 pieces	72 pieces	50 pieces
Range	**0/4 bar**	**0/4 bar**	**0/4 bar**
Capillary length*	Part no.	Part no.	Part no.
500 mm	On request	On request	On request
1,000 mm	On request	On request	On request
1,500 mm	On request	On request	On request
2,000 mm	On request	On request	On request
Range	**0/6 bar**	**0/6 bar**	**0/6 bar**
Capillary length*	Part no.	Part no.	Part no.
500 mm	On request	On request	On request
1,000 mm	On request	On request	On request
1,500 mm	On request	On request	On request
2,000 mm	On request	On request	On request
Range	**---**	**---**	**0/10 bar**
Capillary length*	Part no.	Part no.	Part no.
500 mm	---	---	On request
1,000 mm	---	---	On request
1,500 mm	---	---	On request
2,000 mm	---	---	On request

* Other capillary lengths on request.
** Minimum order quantity = 2 packing units.

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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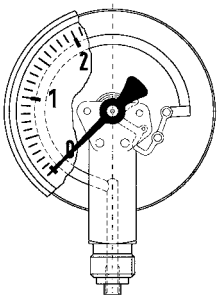


Application

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

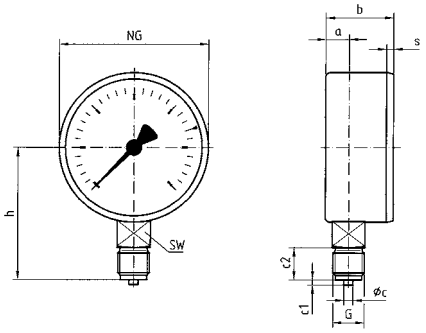
- Throttle screw
- Reference pointer
- Special scales
- Other process connections

Standard Bourdon tube pressure gauges

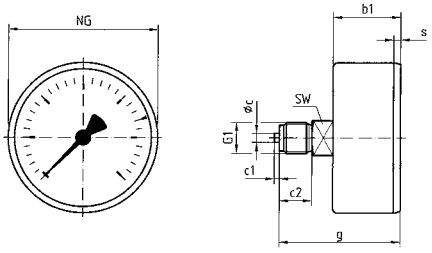
Type D 1 – NG 40/50/63/80/100

Housing types and dimensions

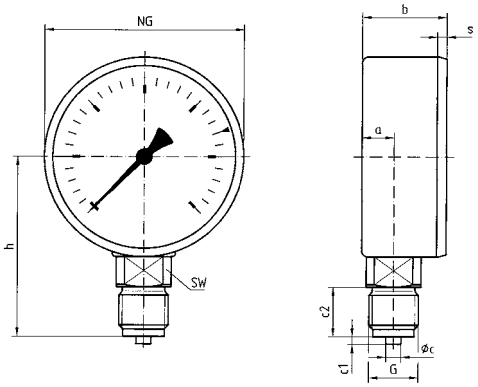
NG 40/50/63 – bottom connection



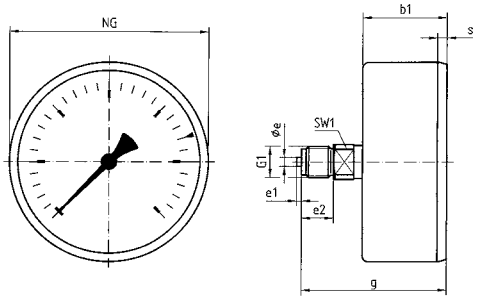
NG 40/50/63 – centre back connection



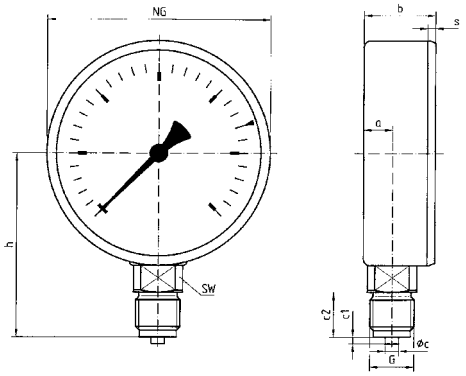
NG 80 – bottom connection



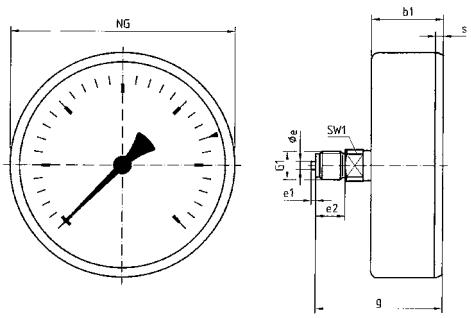
NG 80 – centre back connection



NG 100 – bottom connection



NG 100 – centre back connection



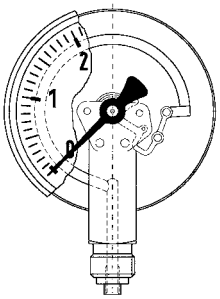
Dimensions (mm)

Nominal size (NG)	a	b	b_1	Øc	c_1	c_2	Øe	e_1	e_2	g	G	G_1	h	s	SW	Spanner size SW_1
40	9.5	25	25	4	2	10	-	-	-	41.5	G⅛B	G⅛B	36	3	12	-
50	10.3	26.8	27.1	5	2	13	-	-	-	47.1	G¼B	G¼B	45	3.8	14	-
63	9.8	29.7	30.4	5	2	13	-	-	-	50.4	G¼B	G¼B	51.5	3.7	14	-
80	12.8	32.8	32.8	6	3	20	5	2	13	55.8	G½B	G¼B	72	2.8	22	14
100	15.5	34.5	32	6	3	20	5	2	13	55	G½B	G¼B	82	3.5	22	14

Standard Bourdon tube pressure gauges

EN 837-1

- For pneumatic and heating system applications
- Robust steel or stainless steel housing
- Accuracy class 1.6
- Many customised versions available



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Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, 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: $^{3}/_{4}$ x full scale value
Dynamic load: $^{2}/_{3}$ 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

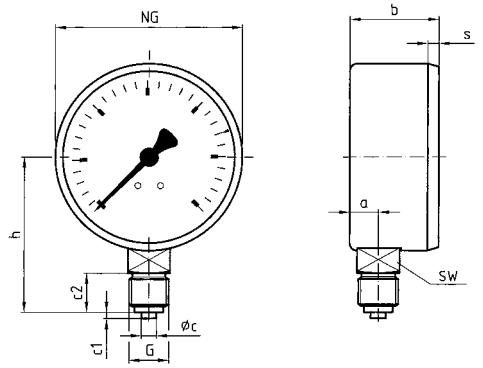
- Panel mounting bezel
- 3-hole fixing, panel mounting bezel
- Throttle screw
- Reference pointer
- Special scales
- Other process connections

Standard Bourdon tube pressure gauges

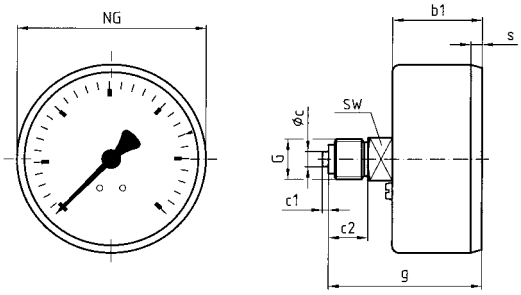
Type D 2/D 3 – NG 40/50/63

Housing types and dimensions

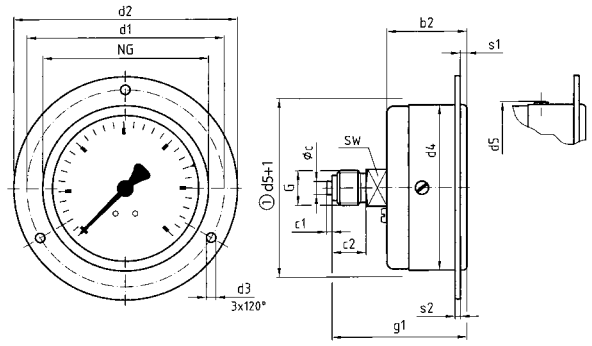
Bottom connection



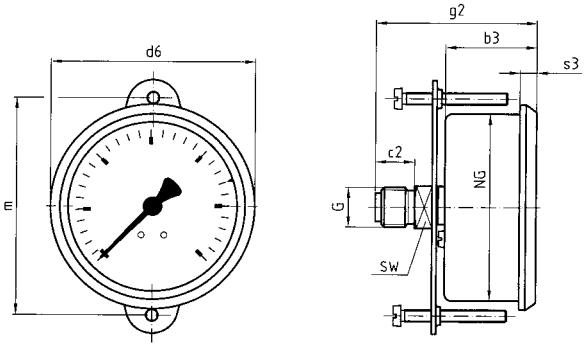
Centre back connection



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



Centre back connection, panel mounting bezel with clamp fixing



① Panel cut-out

Dimensions (mm)

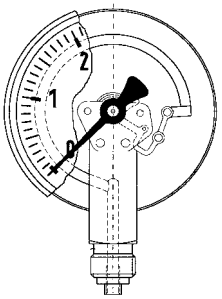
Nominal size (NG)	a	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	g	g1	g2	G	h	m
40	8.5	23.5	25	26	28	4	2	10	51	61	3.6	41	45	44	41.5	42.5	46.6	G⅛B	36	50
50	10.5	26	26	27.5	30.3	5	2	13	60	71	3.6	50	54	54	47	49	51.3	G¼B	45	58
63	9.5	29.4	29.4	30.3	30.3	5	2	13	75	85	3.6	63	66.5	67.8	50.4	51.3	53.3	G¼B	51.5	72

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



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Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, 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

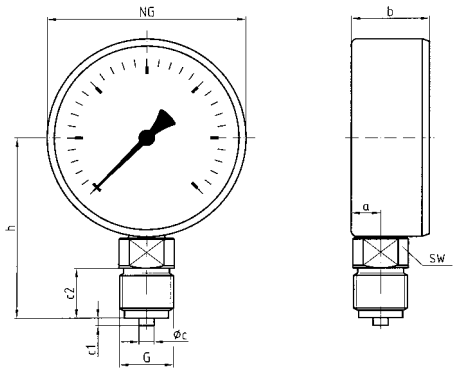
- Stainless steel housing (NG 100)
- Push on bezel
- Instrument glass window
- Throttle screw
- Special scales
- Other process connections

Standard Bourdon tube pressure gauges

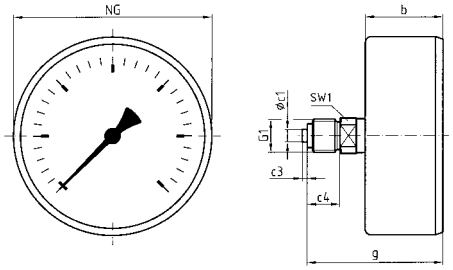
Type D 2 – NG 80/100

Housing types and dimensions

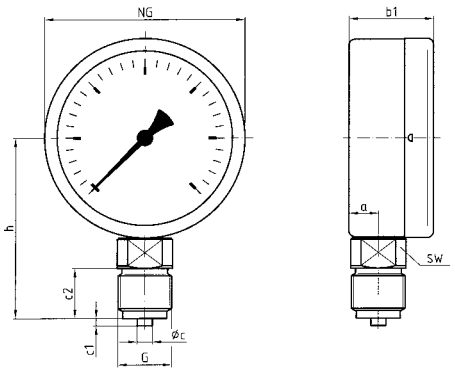
Bottom connection



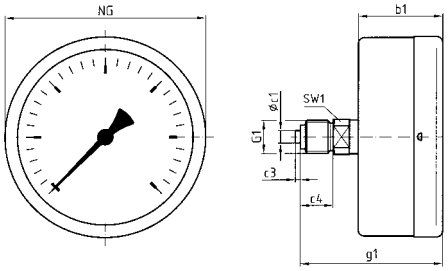
Centre back connection



Bottom connection, with push on bezel



Centre back connection, with push on bezel



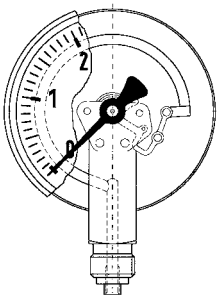
Dimensions (mm)

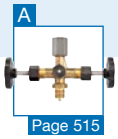
Nominal size (NG)	a	b	b_1	Øc	c_1	c_2	Øc1	c_3	c_4	g	g_1	G	G1	h	SW	Spanner size SW_1
80	11.7	31	33.5	6	3	20	5	2	13	54	56.5	G½B	G¼B	72	22	14
100	11	29.5	34	6	3	20	5	2	13	52.5	57	G½B	G¼B	82	22	14

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





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Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, 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

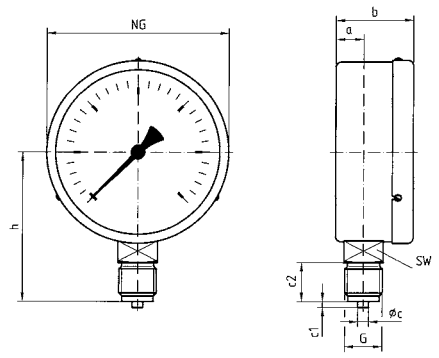
Pointer
Aluminium, black

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

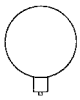
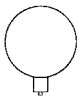
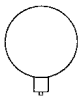
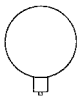
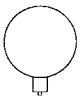
Options

- Throttle screw
- Special scales
- Other process connections

Standard Bourdon tube pressure gauges

EN 837-1

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	G1/8B	G1/8B	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.**
-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
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
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

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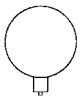
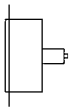
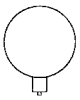
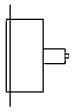
See page 401 for options.

Standard Bourdon tube pressure gauges

EN 837-1

DG: M, PG: 2

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.**
-1/0	**85001201**	**85001211**	85001231	85001251	85051201	85051211	85051231	**85051251**
-1/+0.6	---	---	---	---	---	---	---	---
-1/+1.5	---	---	---	---	---	---	---	---
-1/+3	---	---	---	---	---	---	---	---
-1/+5	---	---	---	---	---	---	---	---
-1/+9	---	---	---	---	---	---	---	---
-1/+15	---	---	---	---	---	---	---	---
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
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.

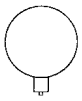
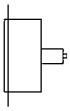
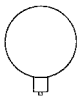
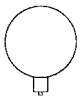
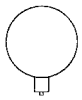
Blue part no. = in-stock items

See page 401 for options.

Standard Bourdon tube pressure gauges

EN 837-1

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.**
-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
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**
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

See page 401 for options.

Options for standard Bourdon tube pressure gauges

DG: M

Housing diameter (mm)	PG	40	50	63	80	100	160
Description		Part no.	Part no.	Part no.	Part no.	Part no.	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 DNV type approval, polished	3	38262	2.60 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
Throttle screw brass – hole 0.3 – 0.5 – 0.7 mm (please specify)	2	38095	38096	38097	38098	38099	38100
Red mark on dial	0	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)	0	38151	38152	38153	38154	38155	38156
Printing costs per additional colour	0	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

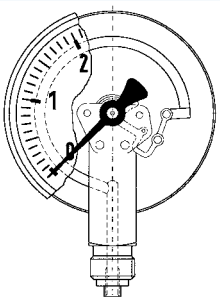
Housing diameter (mm)	40	50	63	80	100	160
Description	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Plastic window, clip-in, for plastic housing	38285	38271	38272	38273	38274	---
Plastic window, clip-in, for steel housing	38275	38276	38277	38317	38318	---
Instrument glass window	---	---	---	38278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

Blue part no. = in-stock items

Bourdon tube pressure gauges for industrial applications

EN 837-1

- For machine and plant engineering
- Robust, stainless steel housing with bayonet bezel
- Can be equipped with electrical contact
- DNV type approval and GOSSTANDART-certified



A

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Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For 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

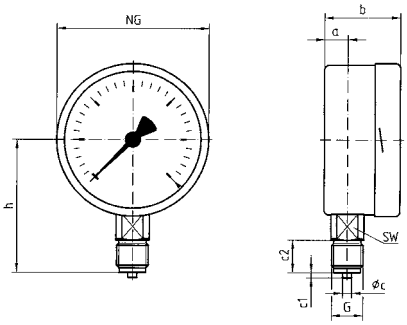
Options

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

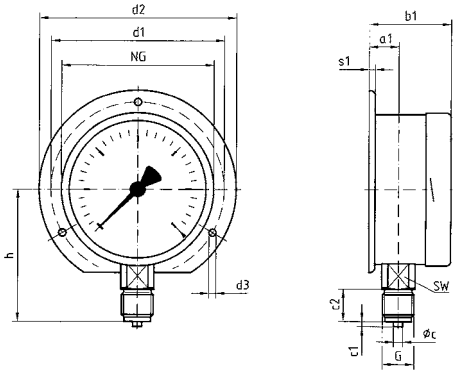
Bourdon tube pressure gauges for industrial applications Type D 4 – NG 100/160

Housing types and dimensions

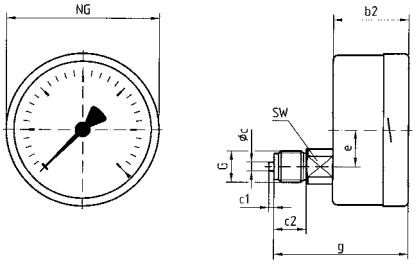
Bottom connection



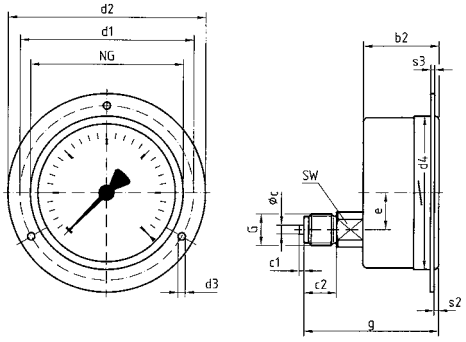
Bottom connection, back flange



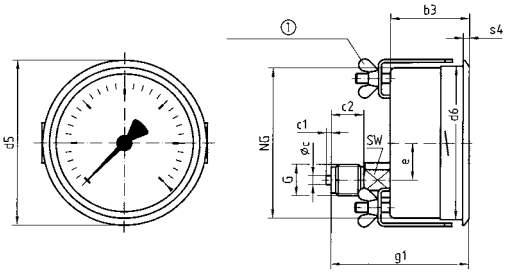
Centre back connection



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



Centre back connection, panel mounting bezel with clamp fixing



① 90° drawn staggered

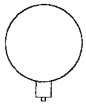
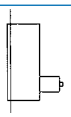
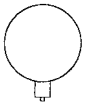
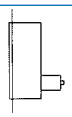
Dimensions (mm)

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
Nominal size (NG)	s2	s3	s4	SW																	
100	4	2	4	22																	
160	4	2	4.5	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.**
-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
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
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
0/600	85324401	85324411	85324431	85324451	85374401	85374411	85374431	85374451
0/1,000	85325401	85325411	85325431	85325451	85375401	85375411	85375431	85375451

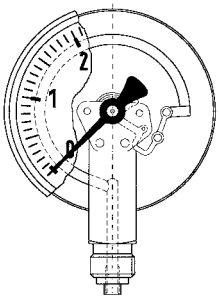
Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

See page 441 for options.

Glycerine filled Bourdon tube pressure gauges EN 837-1

- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications



Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas and vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 6

Nominal size
40

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
0/1 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 G⅛B – 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

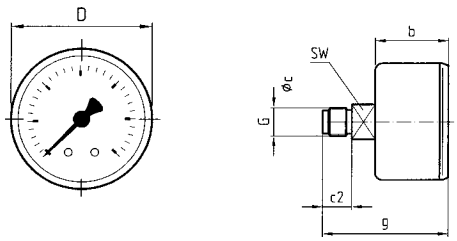
Pointer
Plastic, black

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

Window
Plastic, ultrasonically welded to housing

Filling liquid
Glycerine (99.5 %)

Centre back connection – NG 40



Dimensions (mm)

Nominal size (NG)	b	Øc	c2	-
40	25	4	10	-
Nominal size (NG)	D	G	g	SW
40	40	G⅛B	43	12

Options

- Special scales
- Throttle screw
- Other process connections

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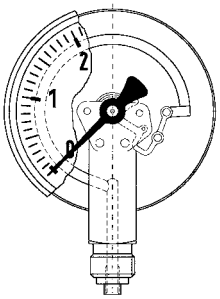
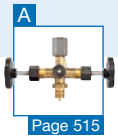
Glycerine filled Bourdon tube pressure gauges EN 837-1

- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications





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Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, 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

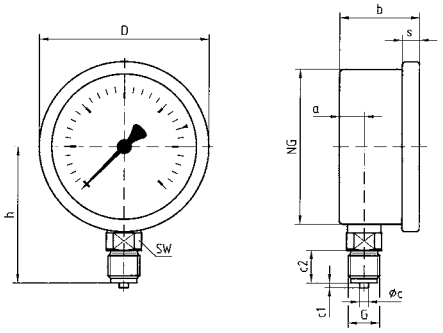
- Back flange (NG 63)
- Throttle screw
- Special scales
- Other process connections

Glycerine filled Bourdon tube pressure gauges

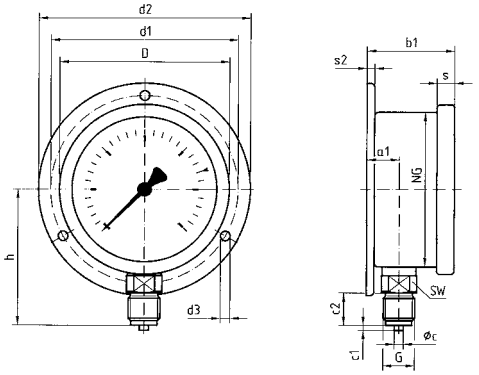
Type D 6 – NG 50/63

Housing types and dimensions

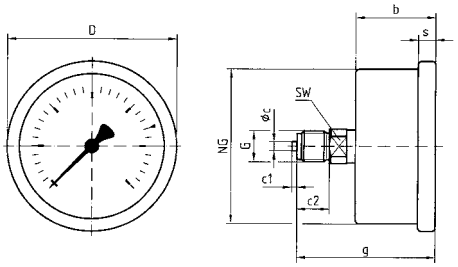
Bottom connection



Bottom connection, back flange



Centre back connection



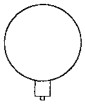
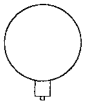
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d3*	D	G	g	h	s	SW
50	12	-	31.5	-	5	2	13	-	53	G¼B	54.5	47	5	14
63	10	13	32	35	5	2	13	3.6	68	G¼B	55	53	7	14

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M, PG: 2

Type	RF40Gly, D611	RF50Gly, D601	RF50Gly, D611	RF63Gly, D601	RF63Gly, D611
Version					
Housing Ø	40	50	50	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
Connection	G1/8B	G¼B	G¼B	G¼B	G¼B
Range (bar)	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
-1/0	85001611	**85051601**	85051611	85101601	85101611
-1/+0.6	---	85052601	85052611	85102601	85102611
-1/+1.5	---	85053601	85053611	85103601	85103611
-1/+3	---	85054601	85054611	85104601	85104611
-1/+5	---	85055601	85055611	85105601	85105611
-1/+9	---	85056601	85056611	85106601	85106611
-1/+15	---	85057601	85057611	85107601	85107611
0/0.6	---	85059601	85059611	85109601	85109611
0/1	85010611	85060601	85060611	85110601	85110611
0/1.6	85011611	85061601	85061611	85111601	85111611
0/2.5	85012611	85062601	85062611	85112601	85112611
0/4	85013611	85063601	85063611	85113601	85113611
0/6	**85014611**	85064601	85064611	85114601	85114611
0/10	**85015611**	85065601	85065611	85115601	85115611
0/16	**85016611**	85066601	85066611	85116601	85116611
0/25	85017611	**85067601**	85067611	85117601	85117611
0/40	85018611	85068601	85068611	85118601	85118611
0/60	85019611	85069601	85069611	85119601	85119611
0/100	85020611	85070601	85070611	85120601	85120611
0/160	85021611	85071601	85071611	85121601	85121611
0/250	85022611	85072601	85072611	85122601	85122611
0/400	85023611	85073601	85073611	85123601	85123611

* Minimum order quantity for non-stock items = 25 pieces

Blues part no. = in-stock items

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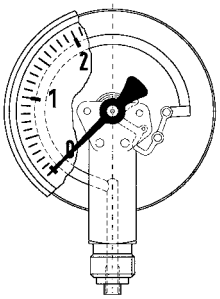
See page 441 for options.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

- Robust stainless steel housing
- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications



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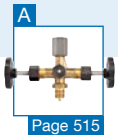

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Application

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
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

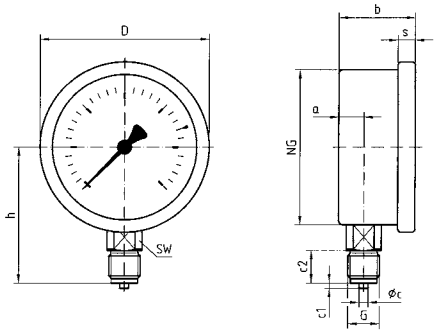
- Filling liquid silicone oil
- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing, panel mounting bezel
- Crimped bezel polished
- Special scales
- Clip reference pointer, red, adjustable (NG 63)
- Throttle screw
- Other process connections

Glycerine filled Bourdon tube pressure gauges

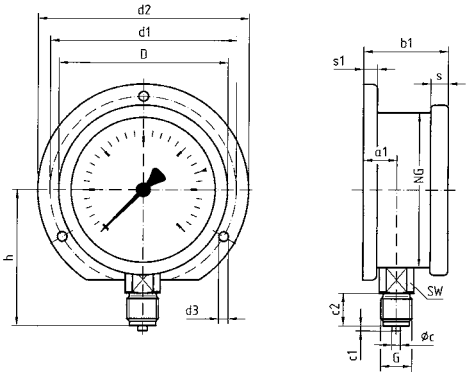
Type D 7 – NG 50/63

Housing types and dimensions

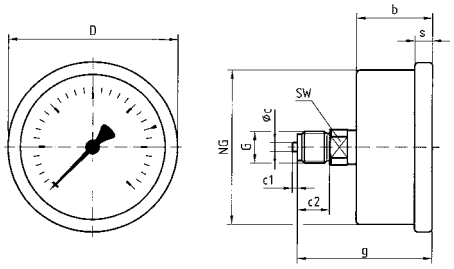
Bottom connection



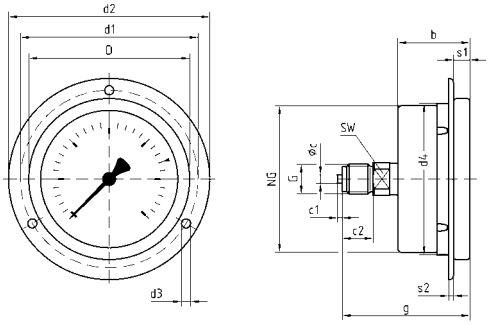
Bottom connection, back flange (NG 63)



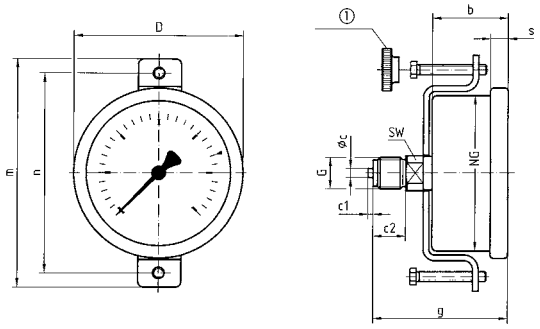
Centre back connection



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



Centre back connection, with clamp fixing



① Rotary knob

Dimensions (mm)

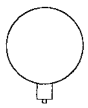
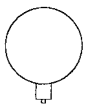
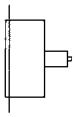
Nominal size (NG)	a	a_1	b	b_1	Øc	c_1	c_2	d_1*	d_2	d_3*	d_4	D	G	g	h	m	n	s	s_1	s_2	SW
50	11	-	28	-	5	2	13	-	-	-	-	53	G¼B	51	45.5	82	73	4.5	-	-	14
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	G¼B	53.3	53	94	82	7	5.5	2	14

* Dimensions as per DIN 16063.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

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.**
-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**
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**
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**
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.

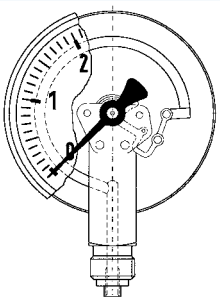
Blue part no. = in-stock items

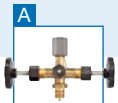
See page 441 for options.

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





Page 515

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

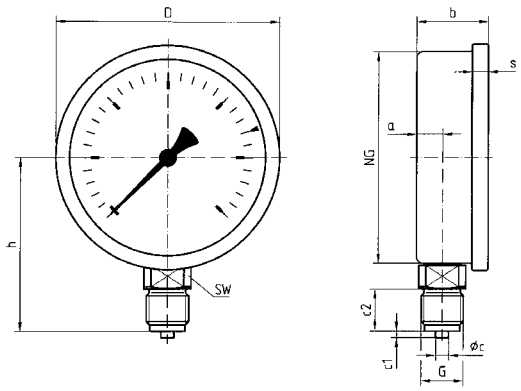
- Filling liquid silicone oil
- Clamp fixing
- 3-hole fixing, panel mounting bezel
- Back flange
- Crimped bezel polished
- Measuring system stainless steel (up to 1,000 bar)
- Special scales
- Throttle screw
- Other process connections

Glycerine filled Bourdon tube pressure gauges

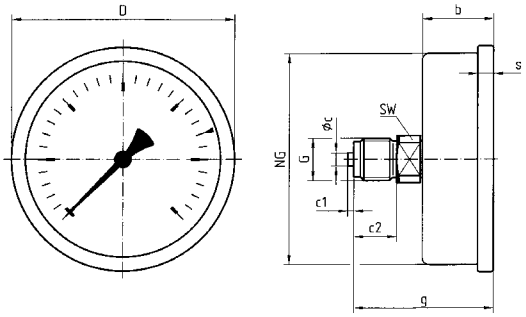
Type D 7 – NG 80/100

Housing types and dimensions

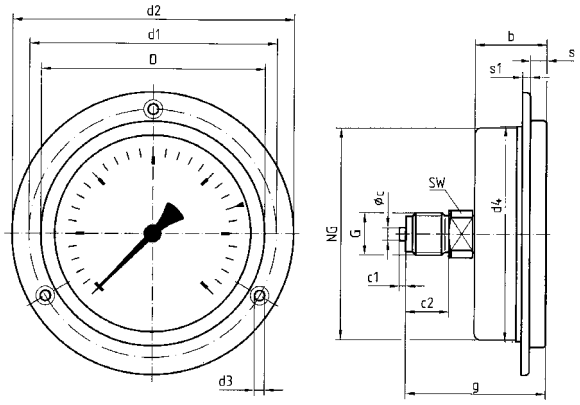
Bottom connection



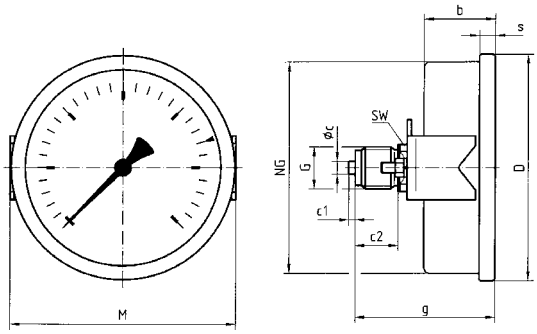
Centre back connection



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



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

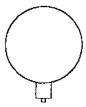
* Dimensions as per DIN 16064.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

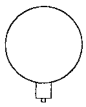
DG: M, PG: 2

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.**
-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
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
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
0/600	---	---	---
0/1,000	---	---	---
Options			
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
On request	On request	On request

Minimum order quantity = 10 pieces.

Blue part no. = in-stock items

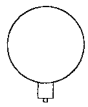
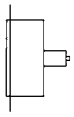
See page 441 for options.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

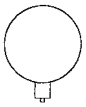
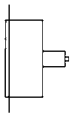
DG: M, PG: 2

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.**
-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
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
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
0/600	---	---	---	---
0/1,000	---	---	---	---
Options				
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
On request	On request	On request	On request

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

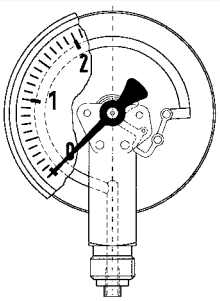
Blue part no. = in-stock items

See page 441 for options.

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**



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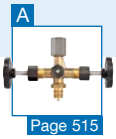


Page 515

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

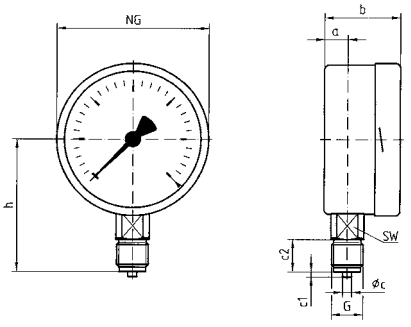
- Back flange
- 3-hole fixing, panel mounting bezel
- Special scales
- Other process connections

Glycerine filled Bourdon tube pressure gauges

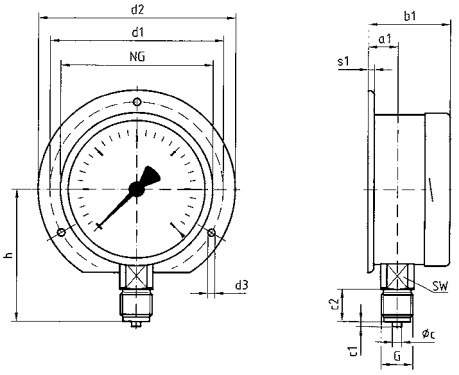
Type D 8 – NG 100/160; D 751 – NG 100

Housing types and dimensions

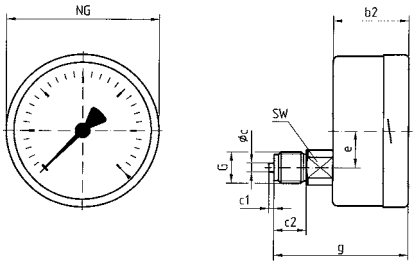
Bottom connection



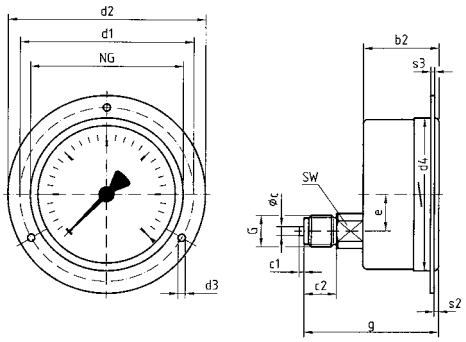
Bottom connection, back flange



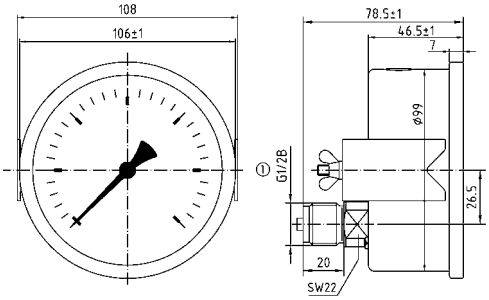
Centre back connection



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



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



① As per EN 837-1

Dimensions (mm)

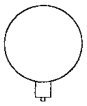
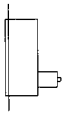
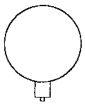
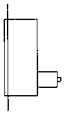
Nominal size (NG)	a	a1	b	b1	b2	Øc	c1	c2	d1*	d2	d3*	d4	e	G	g	h	s1
100	15.6	19.1	49	52.5	49	6	3	20	116	132	4.8	104	26.5	G½B	81	86	5.5
160	17.5	20	50	53	50	6	3	20	178	196	5.8	164	26.5	G½B	82	116	6
Nominal size (NG)	s2	s3	SW														
100	4	2	22														
160	4	2	22														

* Dimensions as per DIN 16064.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M, PG: 2

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.**
-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
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
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
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.

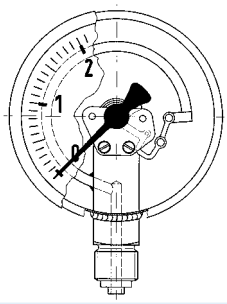
Blue part no. = in-stock items

See page 441 for options.

Stainless steel Bourdon tube pressure gauges

EN 837-1

- 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
G⅛B – 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

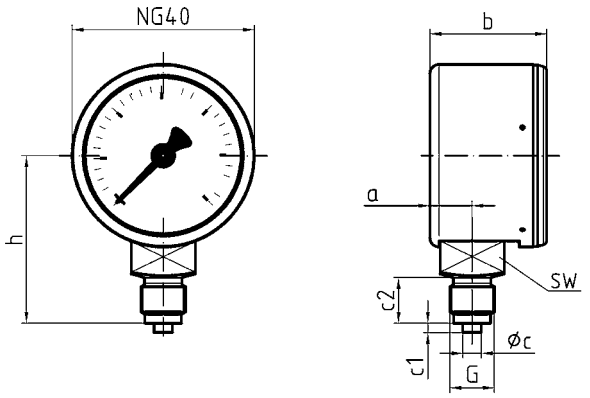
- Other process connections
- 3-hole fixing, panel mounting bezel
- Special scales
- Oil- and grease-free version

Stainless steel Bourdon tube pressure gauges

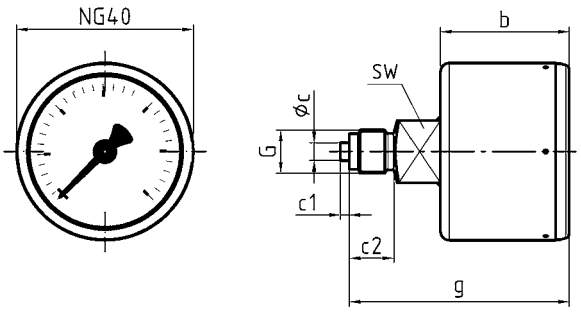
Type D3 – NG 40

Housing types and dimensions

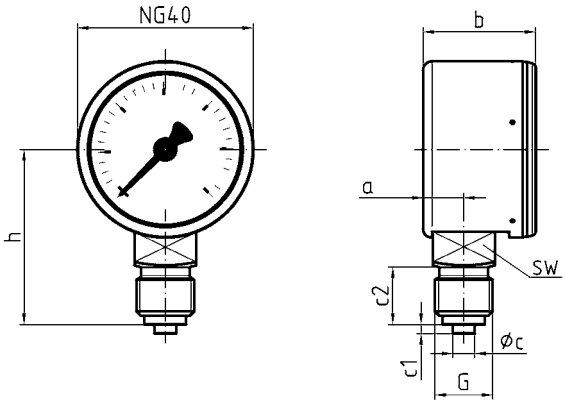
Bottom connection radial G⅛B



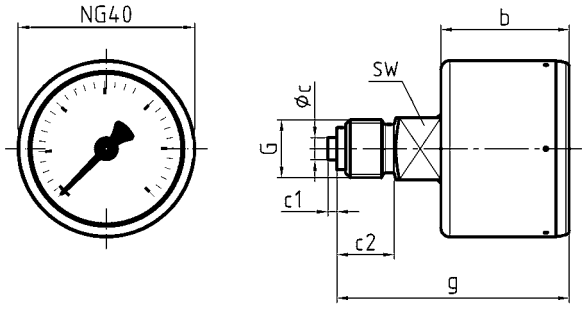
Centre back connection G⅛B



Bottom connection G¼B (optional)



Centre back connection G¼B (optional)



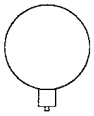
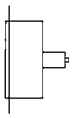
Dimensions (mm)

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

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	---	---	---
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
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
0/600	85024302	85024312	85024332

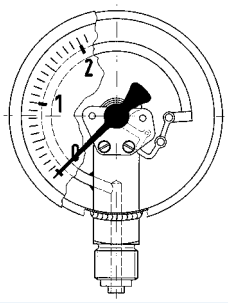
Minimum order quantity for non-stock items = 10 pieces. **Blue part no.** = in-stock items

See page 441 for options.

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

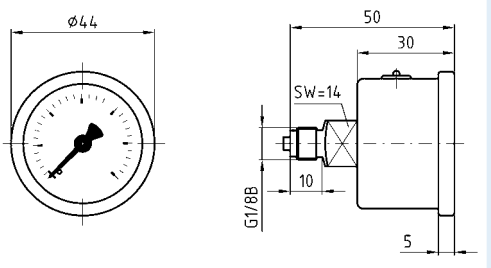
Crimped bezel
Stainless steel 304

Window
Plastic (PMMA)

Options

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

Dimensions (mm)



Bourdon tube pressure gauges for chemical applications

EN 837-1

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	G⅛B	G⅛B
Range (bar)	**Part no.**	**Part no.**
-1/0	---	---
-1/+0.6	---	---
-1/+1.5	---	---
-1/+3	---	---
-1/+5	---	---
-1/+9	---	---
-1/+15	---	---
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
0/60	85019912	85019712
0/100	85020912	85020712
0/160	85021912	85021712
0/250	85022912	85022712
0/400	85023912	85023712
0/600	---	---

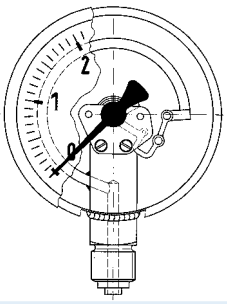
Minimum order quantity for non-stock items = 10 pieces. **Blue part no.** = in-stock items

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
- Temperatures of the medium up to 150 C or 200 C
- Tightness-tested with helium
- GOSSTANDART-certified
- Ex version (optional)

Page 512



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

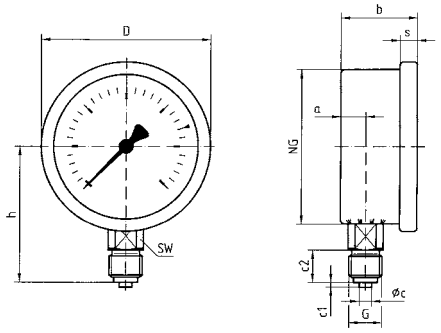
- Plastic window (NG 63)
- Back flange (NG 63)
- Clamp fixing
- Ex version

- Crimped bezel polished
- Special scales
- Other process connections

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

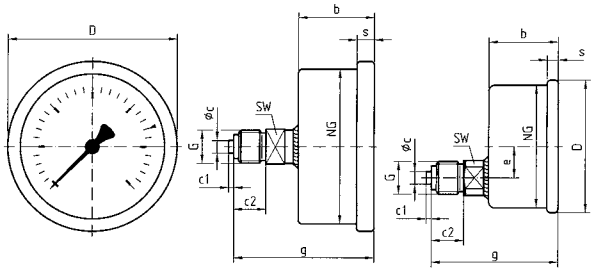
Housing types and dimensions

Bottom connection NG 50/63

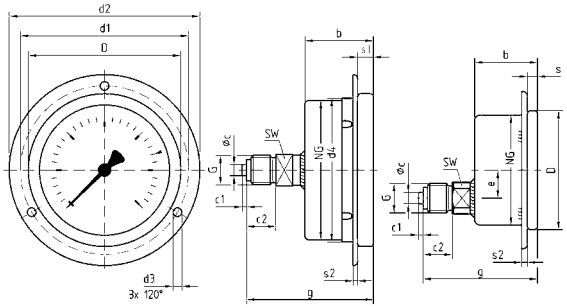


Centre back connection

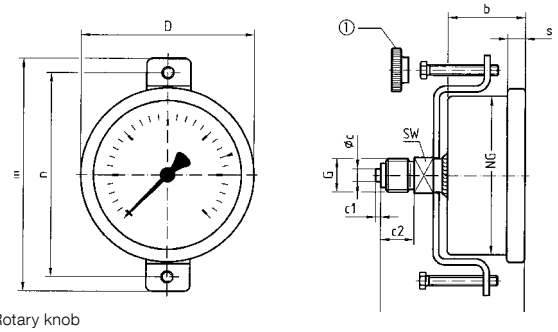
NG 63 NG 50



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

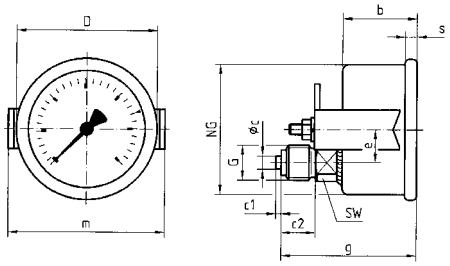


Centre back connection, with clamp fixing, NG 63

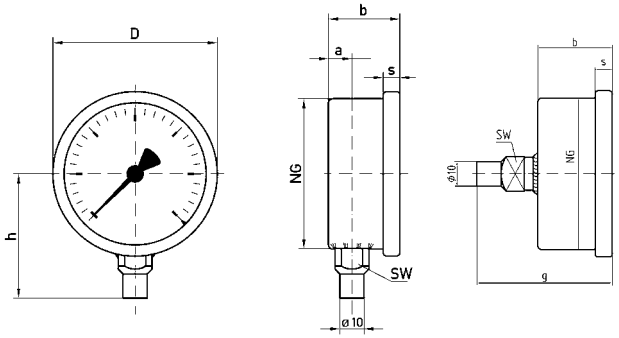


① Rotary knob

Centre back connection, with clamp fixing, NG 50



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



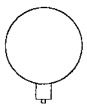
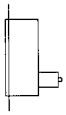
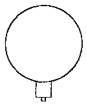
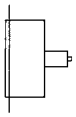
Dimensions (mm)

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.**
-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
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
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
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.

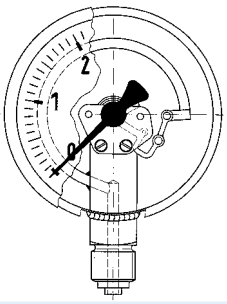
Blue part no. = in-stock items

See page 441 for options.

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 200 °C
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified
- Ex 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

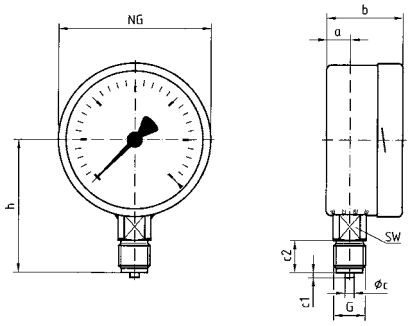
- Back flange
- Panel mounting bezel
- 3-hole fixing, panel mounting bezel
- Ex version
- Special scales
- Electrical contacts
- Other process connections

11

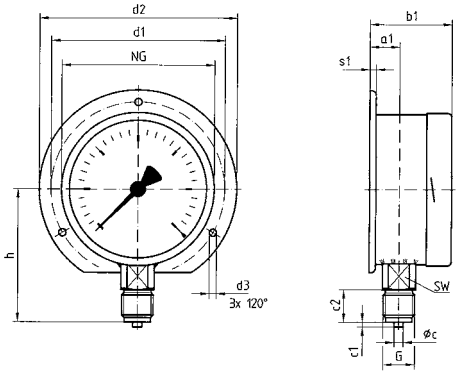
Bourdon tube pressure gauges for chemical applications Type D 4 – NG 100/160

Housing types and dimensions (mm)

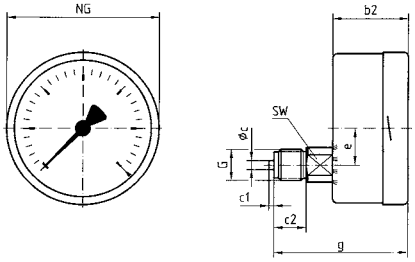
Bottom connection



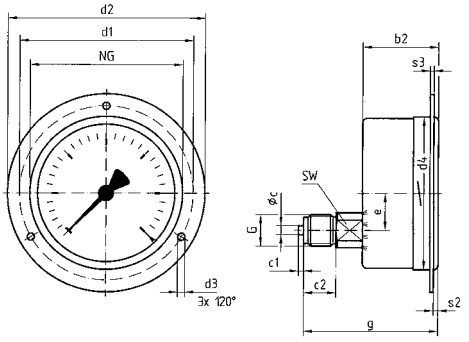
Bottom connection, back flange



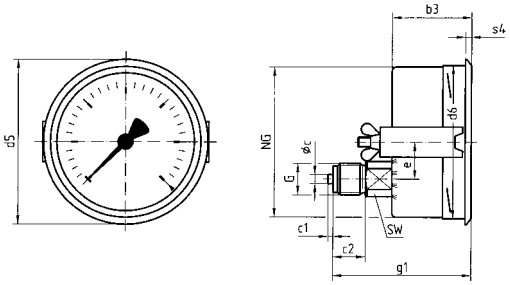
Centre back connection



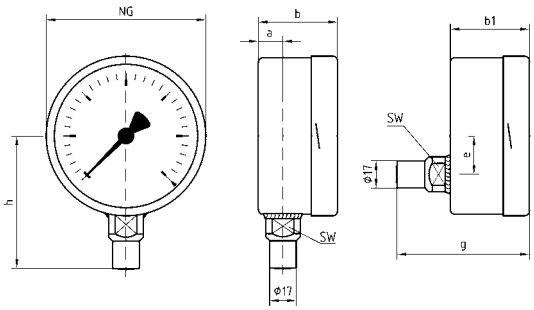
Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel with clamp fixing



Bottom connection, back for fitting of chemical seal



Dimensions (mm)

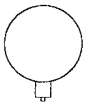
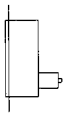
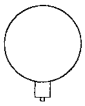
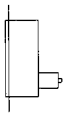
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2*	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	34.5	G½B	83	83	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	34.5	G½B	84	86	116	6

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

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.**
-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
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
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
0/600	85224402	85224412	85224432	85224452	85274402	85274412	85274432	85274452
0/1,000	85225402	85225412	85225432	85225452	85275402	85275412	85275432	85275452
0/1,600	---	---	---	---	85276402	85276412	85276432	85276452

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

Blue part no. = in-stock items

See page 441 for options.

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

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified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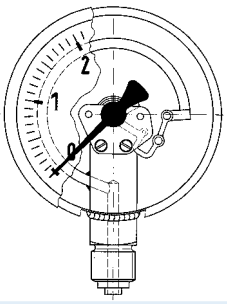


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, 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 %)

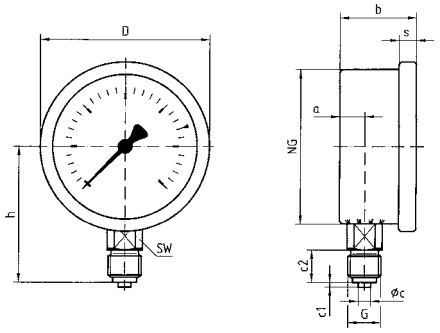
Options

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

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

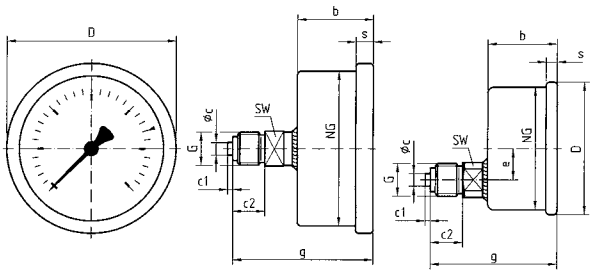
Housing types and dimensions

Bottom connection NG 50/63

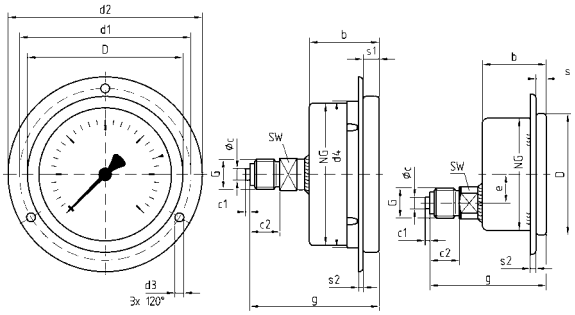


Centre back connection

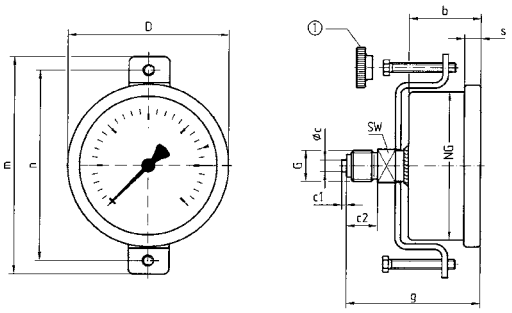
NG 63 NG 50



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

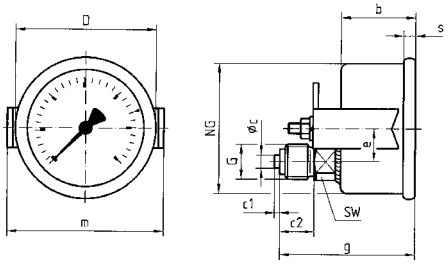


Centre back connection, with clamp fixing, NG 63

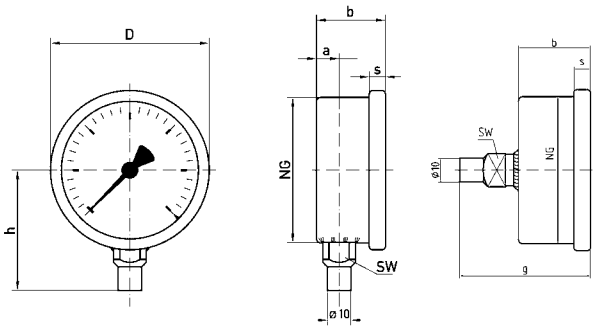


① Rotary knob

Centre back connection, with clamp fixing, NG 50



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



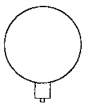
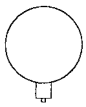
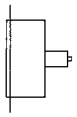
Dimensions (mm)

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.**
-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
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
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
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 441 for options.

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
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified
- Ex version (optional)

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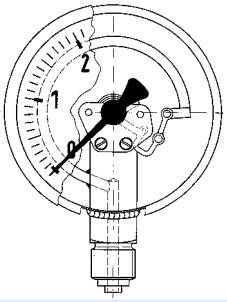


Application

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 = $^{3}/_{4}$ 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} = +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 %)

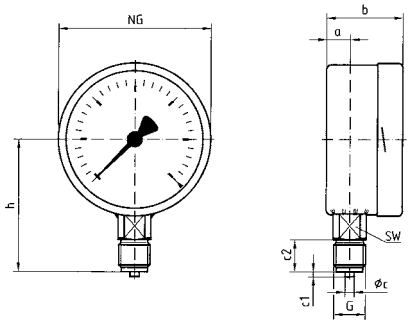
Options

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

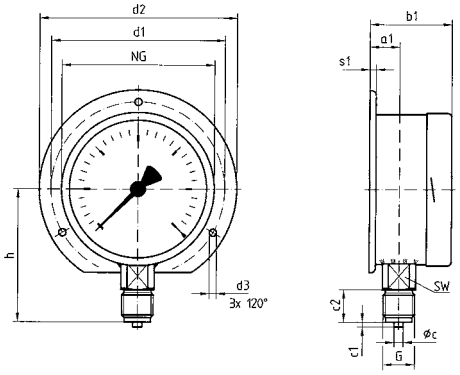
Bourdon tube pressure gauges for chemical applications with glycerine filling type D 8 – NG 100/160

Housing types and dimensions (mm)

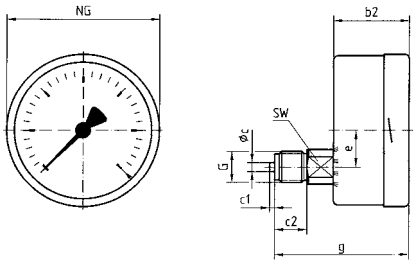
Bottom connection



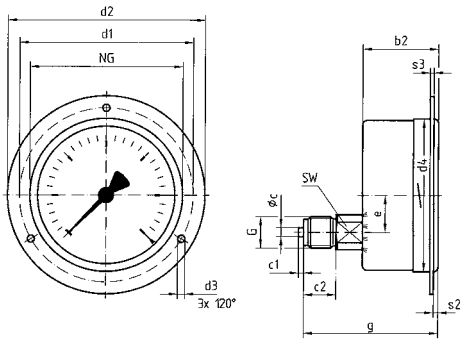
Bottom connection, back flange



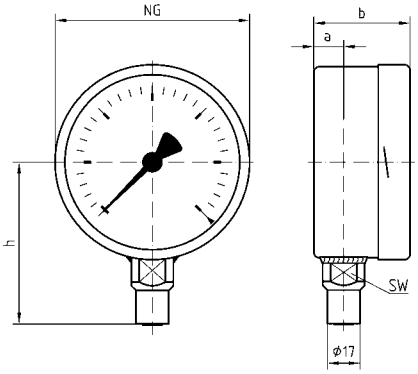
Centre back connection



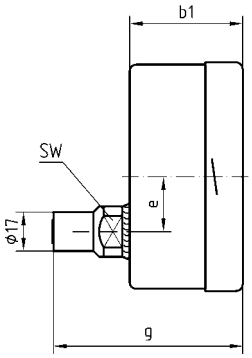
Centre back connection, 3-hole fixing, panel mounting bezel



Bottom connection for chemical seal mounting



Back connection for chemical seal mounting



11

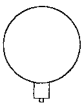
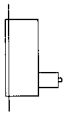
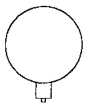
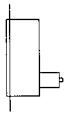
Dimensions (mm)

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

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.**
-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
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
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
0/600	**85224802**	85224812	85224832	85274802	85274812	85274832
0/1,000	85225802	85225812	85225832	85275802	85275812	85275832
0/1,600	---	---	---	85276802	85276812	85276832

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

Blue part no. = in-stock items

See page 441 for options.

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
- Ex version (optional)

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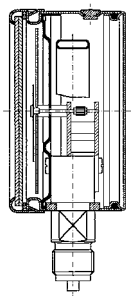


Application

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

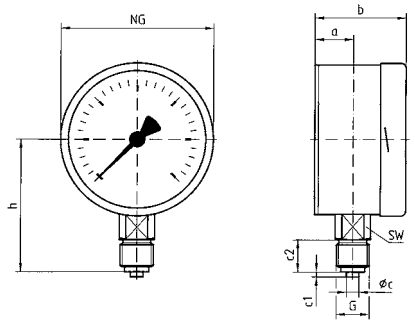
- Glycerine filling (bottom version type D8)
- 3-hole fixing, panel mounting bezel
- Ex version
- Special scales
- Other process connections

Bourdon tube safety pressure gauges

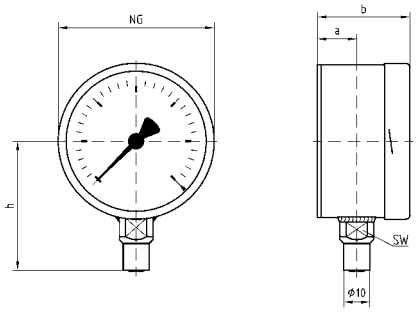
Type D 4/D 8 – NG 63

Housing types and dimensions

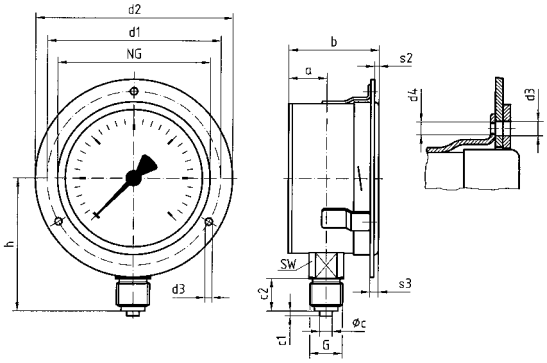
Bottom connection



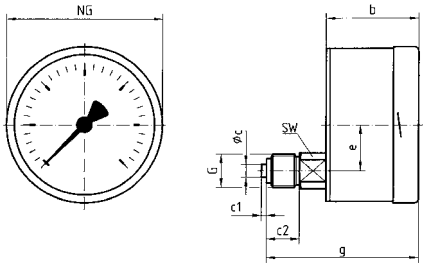
Bottom connection for chemical seal mounting



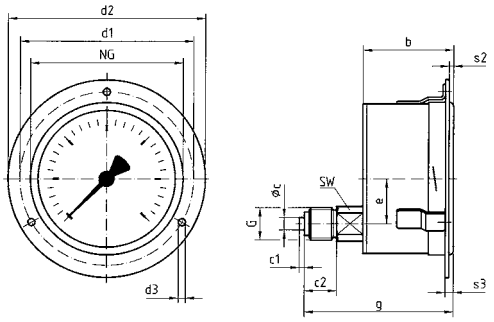
Bottom connection, 3-hole fixing, panel mounting bezel



Centre back connection



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



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1	d2	d3	d4	e	g	G	h	s1	s2	s3	SW
63	18	38	41	61	5	2	13	75	85	3.6	M3	18	60	G¼B	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
- Ex version (optional)

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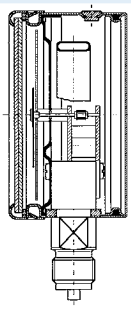


Application

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 = 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} = +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 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

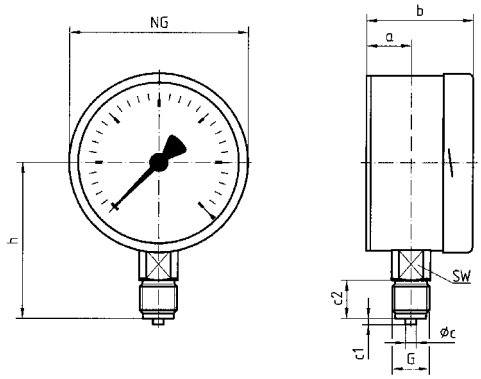
- Glycerine filling (bottom version type D8)
- 3-hole fixing, panel mounting bezel
- Ex version
- Special scales
- Other process connections

Bourdon tube safety pressure gauges

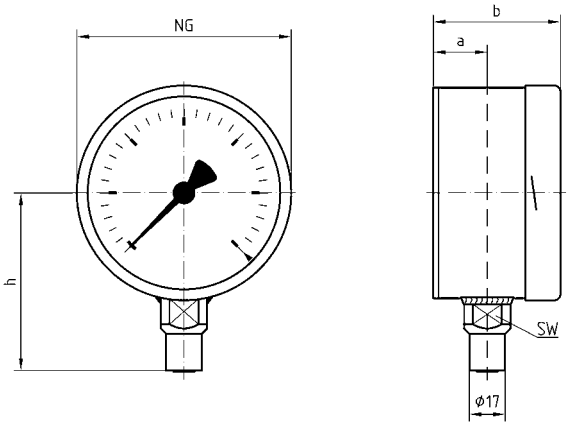
Type D 4/D 8 – NG 100/160

Housing types and dimensions

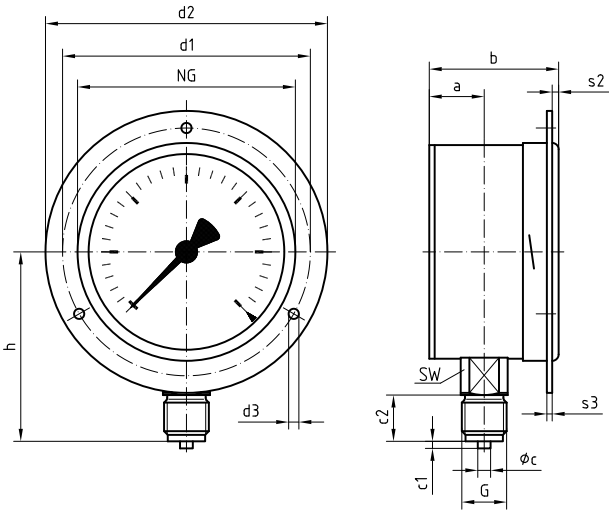
Bottom connection



Bottom connection for chemical seal mounting



Bottom connection, 3-hole fixing, panel mounting bezel



Dimensions (mm)

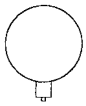
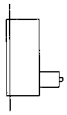
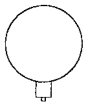
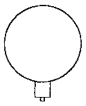
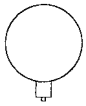
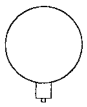
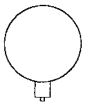
Nominal size (NG)	a	b	Øc	c_1	c_2	d_1*	d_2*	d_3*	G	h	s_2	s_3	SW				
100	25	57	6	3	20	116	132	4.8	G½B	86	4	2	22				
160	26	65	6	3	20	178	196	5.8	G½B	116	4	2	22				

* 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.**
-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
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
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
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 441 for options / see page 479 for options for electrical contact.

Options for Bourdon tube pressure gauges

(industrial, glycerine, chemical, safety versions)

DG: M

Housing diameter	PG	50	63	100	160
Description		Part no.	Part no.	Part no.	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	---
Housing 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
Throttle screw brass – hole 0.3 – 0.5 – 0.7 mm (please specify)	2	38096	38097	38099	38100
Throttle screw stainless steel 316 Ti – hole 0.3 – 0.5 – 0.7 mm (please specify)	3	38102	38103	38105	38106
Red mark on dial	0	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	---	On request	On request	On request
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	0	38146	38147	38149	38150
Wetted parts cleaned for oxygen[1] – label "Oxygen", symbol "Free from oil and grease" (gauges without filling only)	0	38138	38139	38141	38142
Printing block creation per scale and colour (scale design as per EN 837-1, others on request)	0	38152	38153	38155	38156
Additional colour	0	38164	38165	38167	38168
Stainless steel plate for TAG number, needled lettering incl. seal wire and aluminium seal	3	37625	37625	37625	37625

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

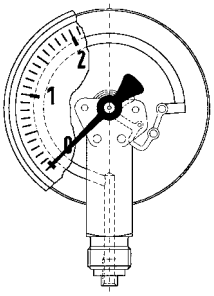
11

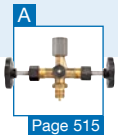
i

See the overview "Accessories for panel mounting and wall mounting" on page 511.

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 515

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 = 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 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

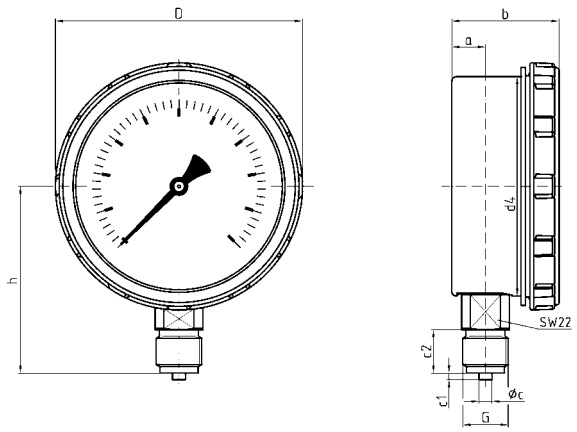
Options

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

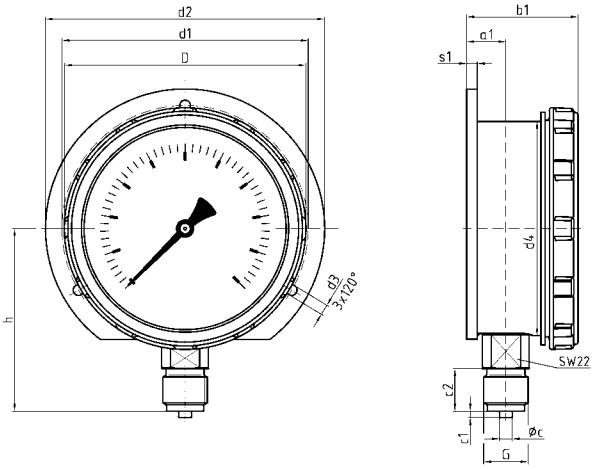
Bourdon tube pressure gauges with screw bezel housing type D1/D6 – NG 100

Housing types and dimensions

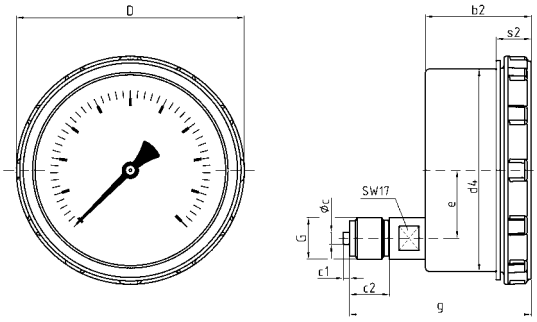
Bottom connection



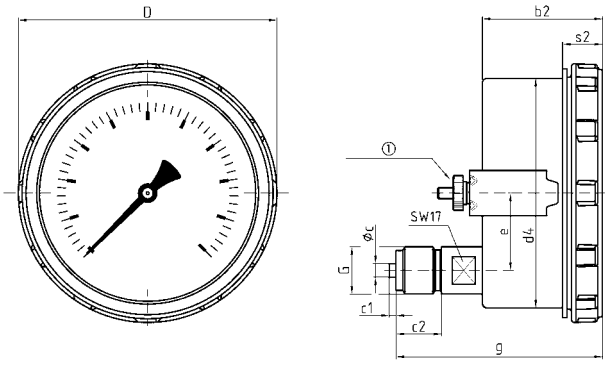
Bottom connection, back flange



Centre back connection



Centre back connection with clamp fixing



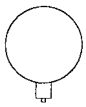
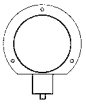
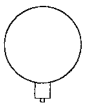
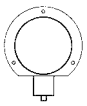
① Union nut

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

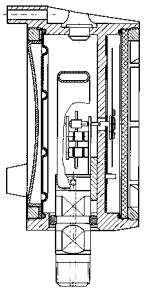
Type	RF100ISR, D101	RF100ISR, D111	RF100ISR, D141	RF100ISR, D171	RF100 GlySR, D601	RF100 GlySR, D611	RF100 GlySR, D641	RF100 GlySR, D671
					Version with glycerine filling			
Version								
Housing Ø	100	100	100	100	100	100	100	100
Housing	Plastic (PA 6.6 GB30) with screw type bezel, window: laminated 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.**
-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
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
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
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"

- 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)

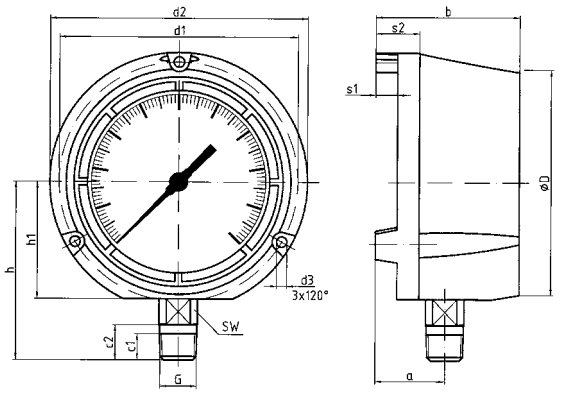
Options

- Glycerine filling (type D6)
- Silicone oil filling (type D 6)
- Special scales
- Measuring system copper alloy (type 1x1)
- Laminated safety glass window
- Reference pointer
- Maximum pointer
- Electrical contacts
- Other process connections

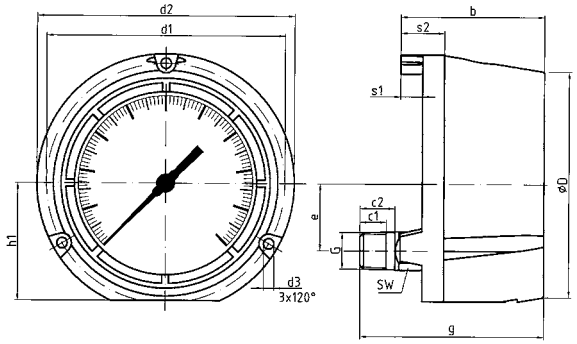
Bourdon tube pressure gauges type "Process Gauge" Type D 1/D 6 – NG 4½"

Housing types and dimensions

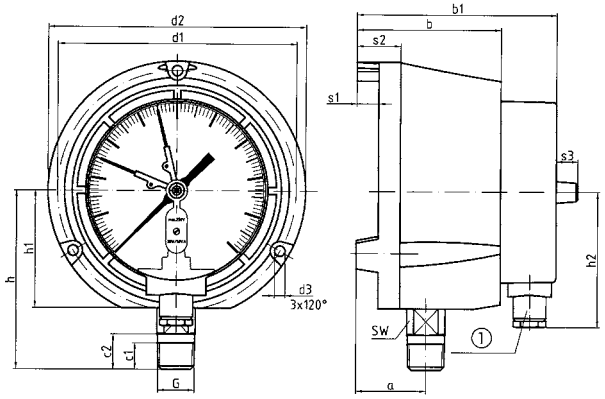
Bottom connection



Centre back connection

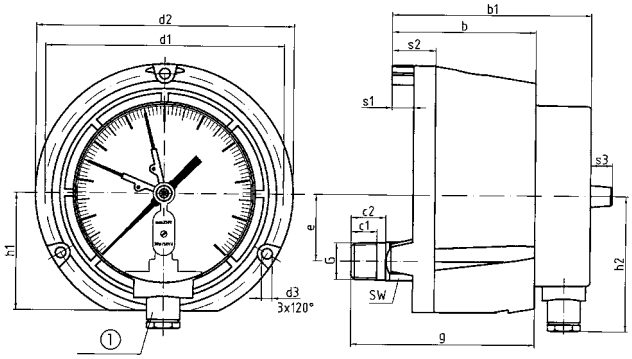


Bottom connection, with electrical contact



① Cable gland

Centre back connection, with electrical contact



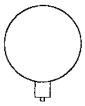
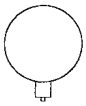
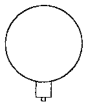
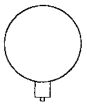
① Cable gland

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"

DG: M

Type	RF130PG, D101	RF130PG, D111	RF130PG, D102	RF130PG, D112	RF130PG Gly, D601	RF130PG Gly, D611	RF130PG Gly, D602	RF130PG Gly, D612
					Version with glycerine filling			
Version								
Housing Ø	4½"	4½"	4½"	4½"	4½"	4½"	4½"	4½"
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.**
-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
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
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
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

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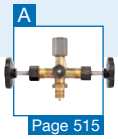
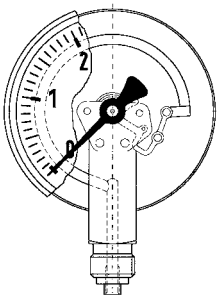
Precision Bourdon tube pressure gauges

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



Page 515



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

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
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/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

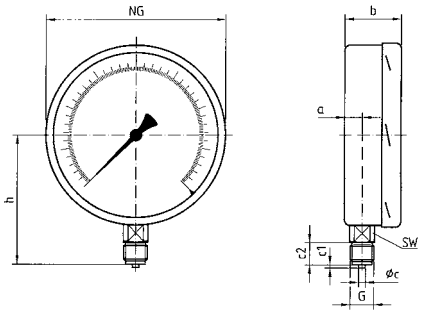
- Factory test certificates
- Glycerine filling (type D 8) > 2.5 bar
- Wetted parts stainless steel (type D 4x2)
- Laminated safety glass window
- Back flange
- 3-hole fixing, panel mounting bezel
- Throttle screw
- Special scales
- Other process connections

Precision Bourdon tube pressure gauges

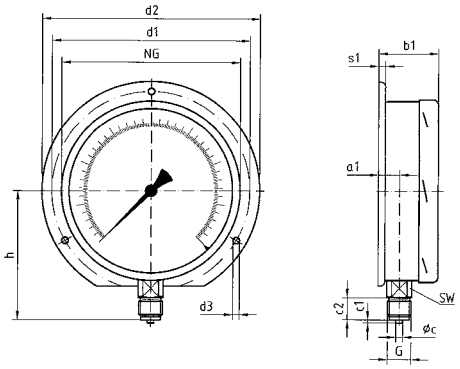
Type D 4 – NG 160

Housing types and dimensions

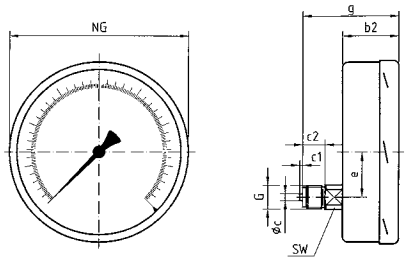
Bottom connection



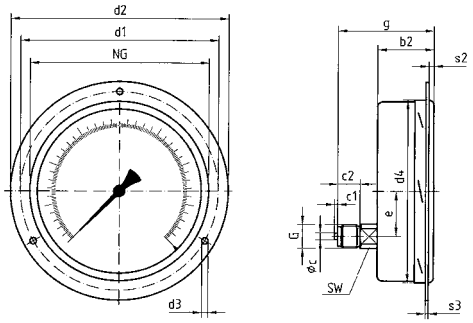
Bottom connection, back flange



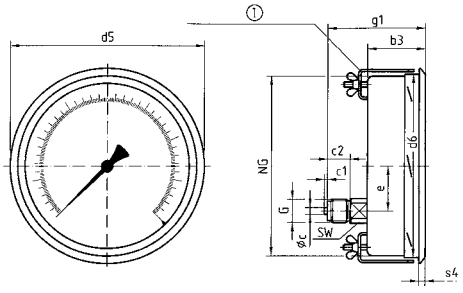
Centre back connection



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



Centre back connection, panel mounting bezel with clamp fixing



① 90° drawn staggered

Dimensions (mm)

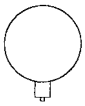
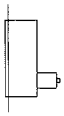
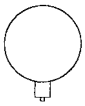
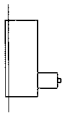
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	44.5	G½B	82	84	116	6

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

* Dimensions as per DIN 16070.

Precision Bourdon tube pressure gauges

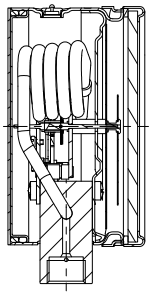
DG: M

Type	RF160F, D401	RF160F, D411	RF160F, D431	RF160ChF, D402	RF160ChF, D412	RF160ChF, D432
Version						
Housing Ø	160	160	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel					
Measuring element	Bourdon tube, copper alloy, (60 bar 316 Ti/316 L)			Bourdon tube, stainless steel 316 Ti/316 L		
Accuracy class	0.6	0.6	0.6	0.6	0.6	0.6
Connection	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
Range (bar)	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
-1/0	85701401	85701411	85701431	85701402	85701412	85701432
-1/+0.6	85702401	85702411	85702431	85702402	85702412	85702432
-1/+1.5	85703401	85703411	85703431	85703402	85703412	85703432
-1/+3	85704401	85704411	85704431	85704402	85704412	85704432
-1/+5	85705401	85705411	85705431	85705402	85705412	85705432
-1/+9	85706401	85706411	85706431	85706402	85706412	85706432
-1/+15	85707401	85707411	85707431	85707402	85707412	85707432
0/0.6	85709401	85709411	85709431	85709402	85709412	85709432
0/1	85710401	85710411	85710431	85710402	85710412	85710432
0/1.6	85711401	85711411	85711431	85711402	85711412	85711432
0/2.5	85712401	85712411	85712431	85712402	85712412	85712432
0/4	**85713401**	85713411	85713431	85713402	85713412	85713432
0/6	**85714401**	85714411	85714431	85714402	85714412	85714432
0/10	**85715401**	85715411	85715431	85715402	85715412	85715432
0/16	**85716401**	85716411	85716431	85716402	85716412	85716432
0/25	**85717401**	85717411	85717431	85717402	85717412	85717432
0/40	85718401	85718411	85718431	85718402	85718412	85718432
0/60	85719401	85719411	85719431	85719402	85719412	85719432
0/100	85720401	85720411	85720431	85720402	85720412	85720432
0/160	85721401	85721411	85721431	85721402	85721412	85721432
0/250	85722401	85722411	85722431	85722402	85722412	85722432
0/400	85723401	85723411	85723431	85723402	85723412	85723432
Glycerine filling (≥ 2.5 bar) on request						

Blue part no. = in-stock items

Bourdon tube pressure gauges for high pressure

- 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 M16 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

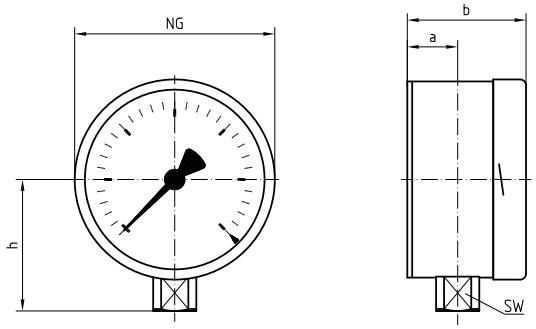
- Glycerine filling (type D802)
- 3-hole fixing, panel mounting bezel
- Other process connections

Bourdon tube pressure gauges for high pressure

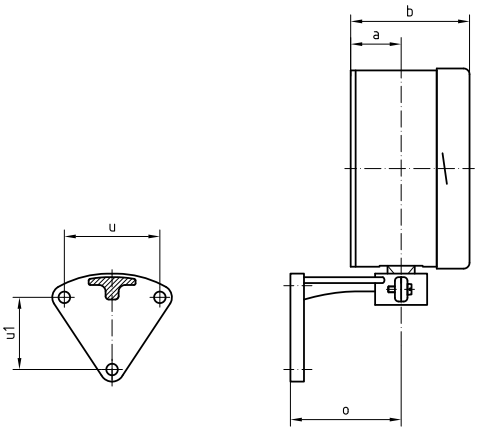
Type D 4 – NG 100 – 160

Housing types and dimensions

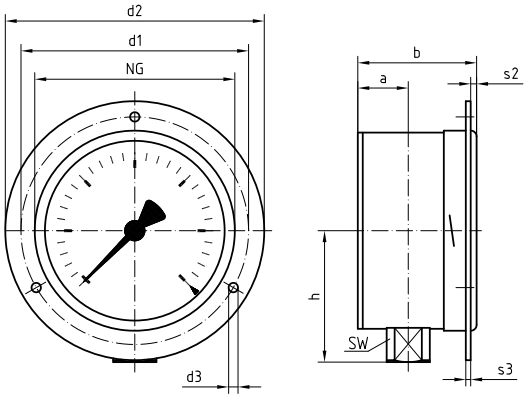
Bottom connection



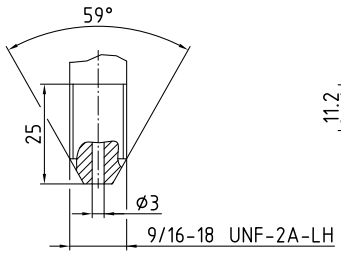
Bottom connection, with instrument bracket



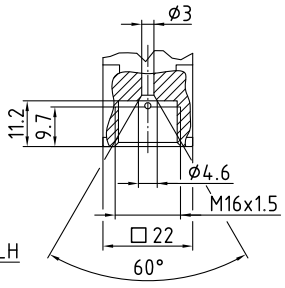
Bottom connection, 3-hole fixing, panel mounting bezel



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



HP connection
Female thread M16 x 1.5



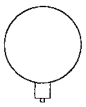
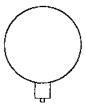
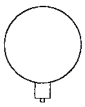
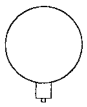
Dimensions (mm)

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 high pressure

DG: M

		Glycerine filling		Glycerine filling
Type	**RF100HD, D402**	**RF100HDGly, D802**	**RF160HD, D402**	**RF160HDGly, D802**
Version				
Housing Ø	100	100	160	160
Housing	Stainless steel 304			
Measuring element	NiFe alloy			
Accuracy class	1.0	1.0	1.0	1.0
Connection	HP connection ¼" with female thread M16 x 1.5 with sealing cone 60°			
PG	3	3	3	3
Range (bar)	**Part no.**	**Part no.**	**Part no.**	**Part no.**
-1/0	---	---	---	---
-1/+0.6	---	---	---	---
-1/+1.5	---	---	---	---
-1/+3	---	---	---	---
-1/+5	---	---	---	---
-1/+9	---	---	---	---
-1/+15	---	---	---	---
0/0.6	---	---	---	---
0/1	---	---	---	---
0/1.6	---	---	---	---
0/2.5	---	---	---	---
0/4	---	---	---	---
0/6	---	---	---	---
0/10	---	---	---	---
0/16	---	---	---	---
0/25	---	---	---	---
0/40	---	---	---	---
0/60	---	---	---	---
0/100	---	---	---	---
0/160	---	---	---	---
0/250	---	---	---	---
0/400	---	---	---	---
0/2,500	85247402	85247802	85277402	85277802
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

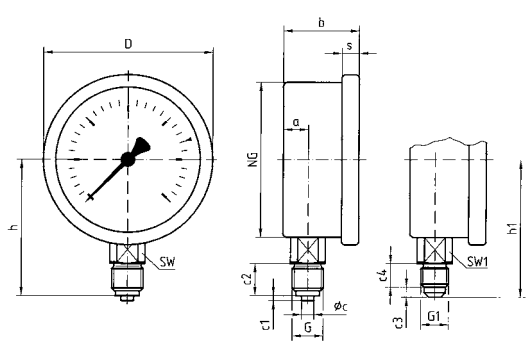
- Temperature scales for other refrigerants
- Back flange
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63/100)
- Throttle screw
- Special scales
- Other process connections
- 7/16 – 20 UNF SAE J513 (45°)

Bourdon tube pressure gauges for refrigeration engineering

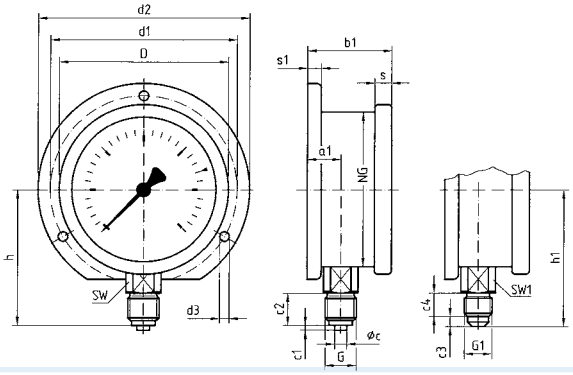
Type D 7/D 8 – NG 63/80/100

Housing types and dimensions

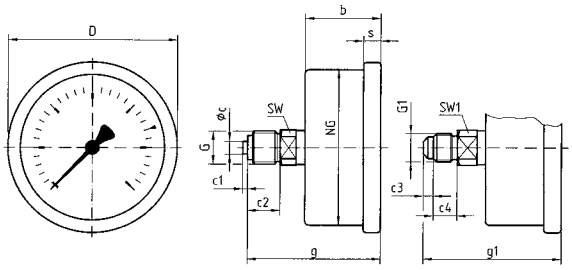
Type D 7 – bottom connection



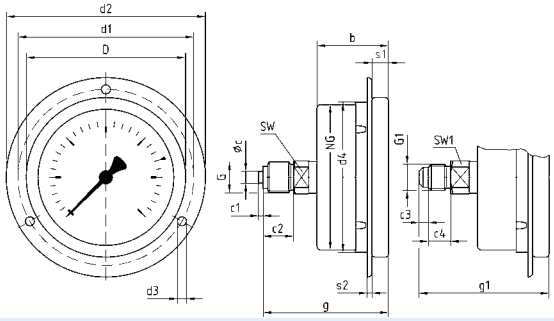
Type D 7 – bottom connection, back flange



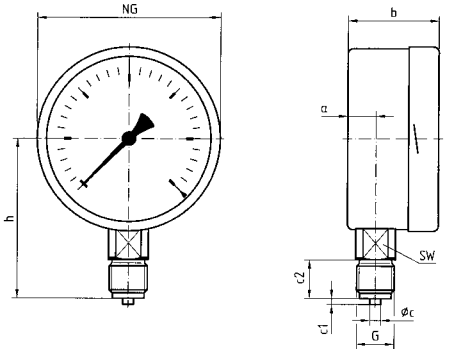
Type D 7 – centre back connection



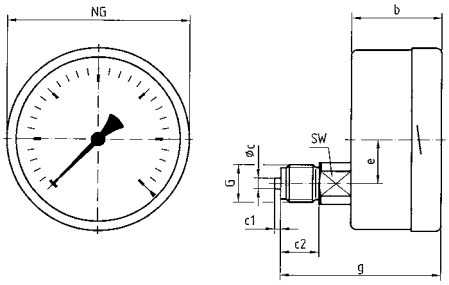
Type D 7 – centre back connection,
3-hole fixing, panel mounting bezel (NG 63/100)



Type D 8 – bottom connection



Type D 8 – centre back connection



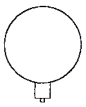
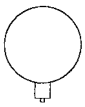
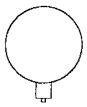
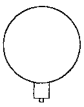
Dimensions (mm)

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.**
-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	–	–
Options	**PG**							
Wetted parts 316 Ti/316 L*	**3**	On request					–	

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

Blue part no. = in-stock items

See pages 441 and 479 for additional options.

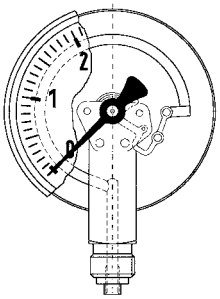
Selection table – temperature scales for refrigerants (see chapter 9 for examples)
Please specify the code of the required temperature scale along with the part number of the basic gauge. Temperature scales for other refrigerants on request.

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

- 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 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 throttling 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 3 – stainless steel 304 with rear blow-out

Window
Plastic, snap-in

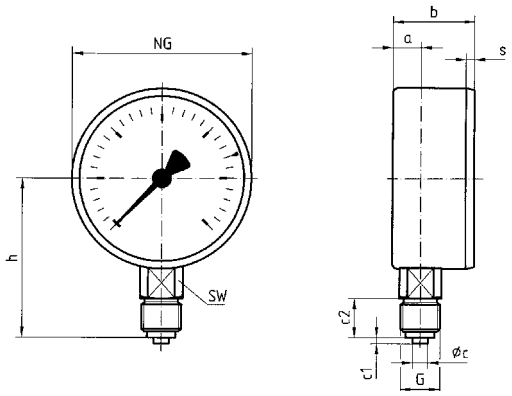
Options

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

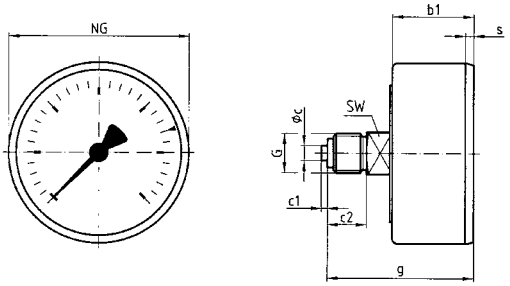
Bourdon tube pressure gauges for welding applications Type D 3 – NG 50/63

Housing types and dimensions

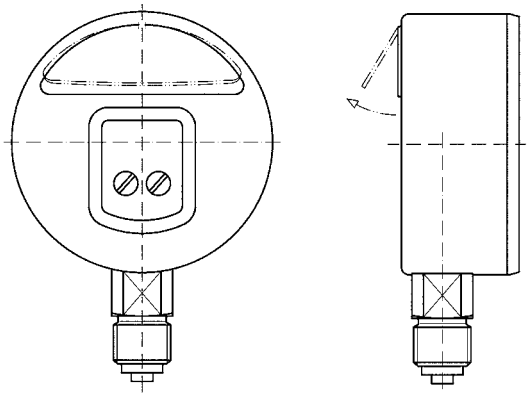
Bottom connection



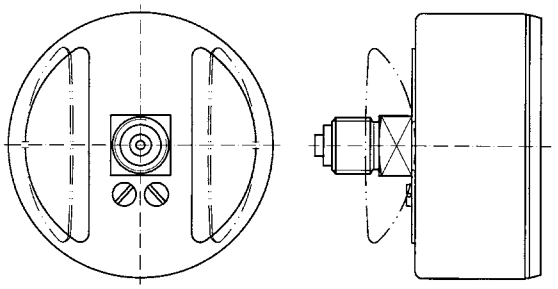
Centre back connection



Blow-out – bottom connection



Blow-out – centre back connection



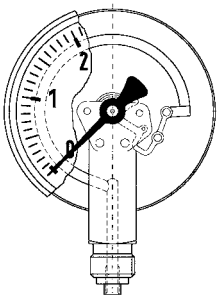
Dimensions (mm)

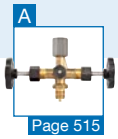
Nominal size (NG)	a	b	b_1	Øc	c_1	c_2	G	g	h	s	SW
50	10.5	29	26	5	2	13	G¼B	47	46	3.8	14
63	11	29.5	29.5	5	2	13	G¼B	50.5	53	3.7	14

Bourdon tube pressure gauges for gas applications

EN 837-1-S2

- 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





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Application

For gaseous and liquid media which are not highly viscous and do not crystallise. Specially designed for gas technology devices, fittings and installations.
! For measuring gas or vapour, 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

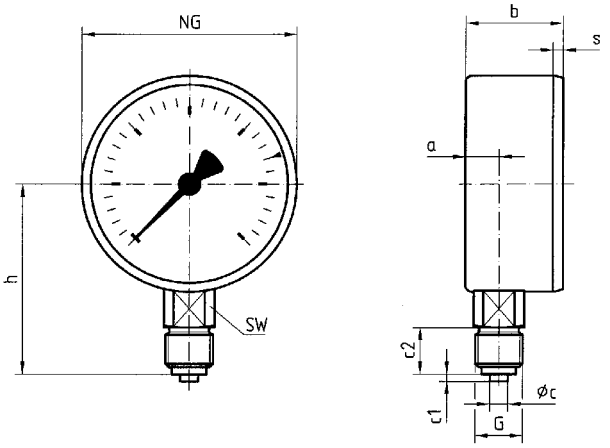
Options

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

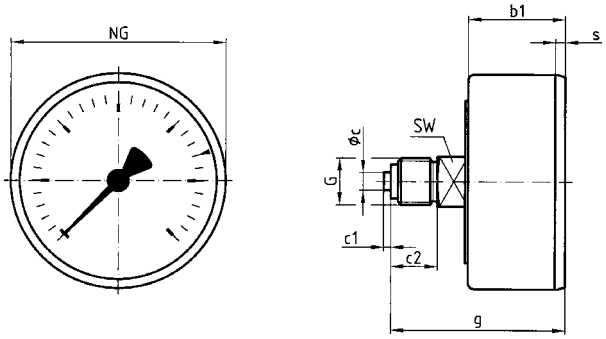
Bourdon tube pressure gauges for gas applications Type D 3 – NG 40/50/63

Housing types and dimensions

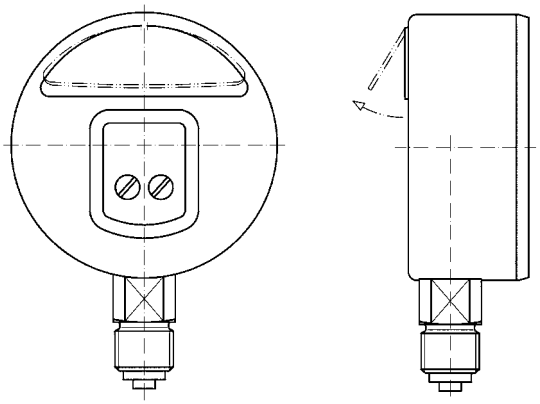
Bottom connection



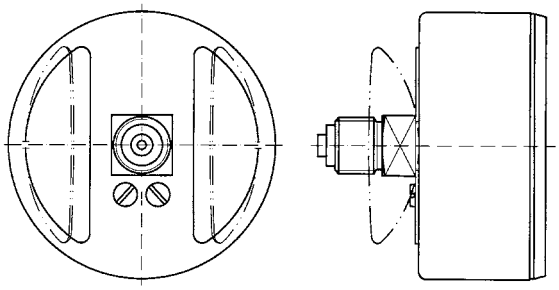
Centre back connection



Blow-out – bottom connection



Blow-out – centre back connection

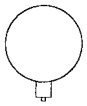
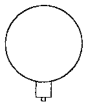
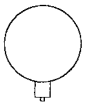
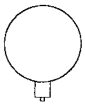
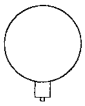
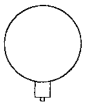


Dimensions (mm)

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

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	G⅛B	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.**
-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
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]	---	---	---	---	---	---	---
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

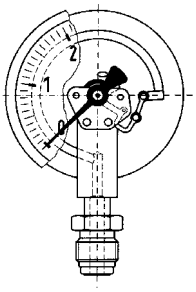
1) With label "acetylene". 2) With label "oxygen". 3) Scale 0/30 l/min "Argon" red, 0/28 l/min "CO_2" black.
4) Centre back connection on request (type D312). 5) Centre back connection on request (type D311).
Minimum order quantities: Type D301/D311 = 25 pieces, type D302/D312 = 10 pieces.

Blue part no. = in-stock items

See page 441 for options.

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

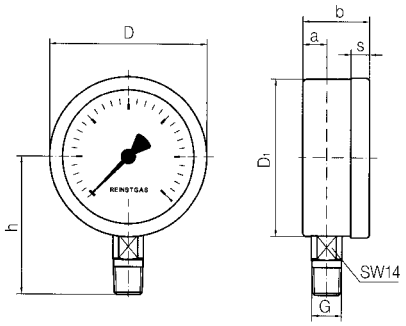
- Surface roughness Ra 0.4 µm
- Housing polished
- Push on bezel polished
- Electrical contacts
- Special scales
- NG 50
- Other process connections

Bourdon tube pressure gauges for ultra-pure gas applications

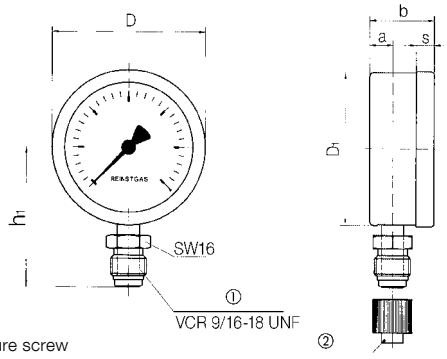
Type D 3 – NG 63

Housing types and dimensions

Bottom connection, ¼-18 NPT

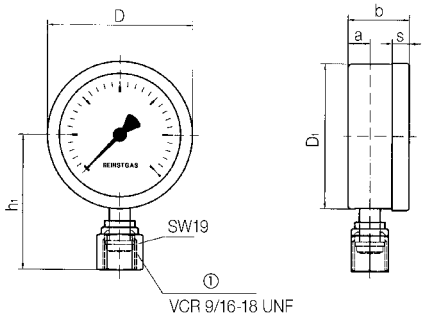


Bottom connection, 9/16-18 UNF, with pressure screw



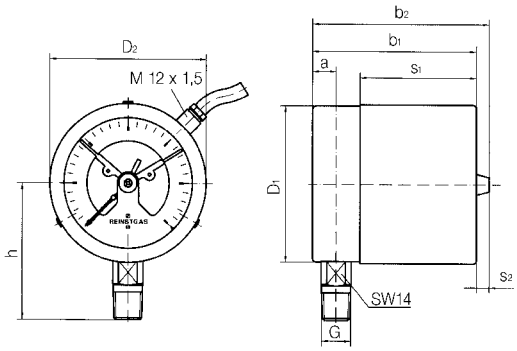
① Pressure screw
② Protective cap

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

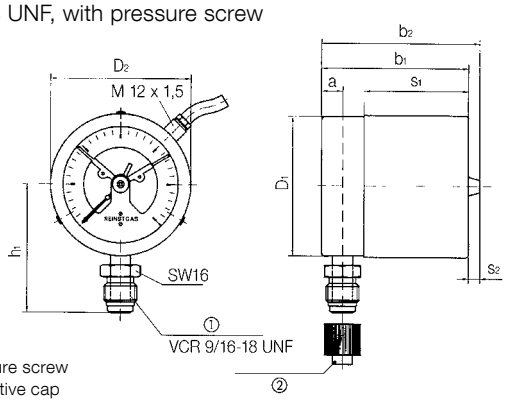


① Union nut

Version with contacts – bottom connection, ¼-18 NPT

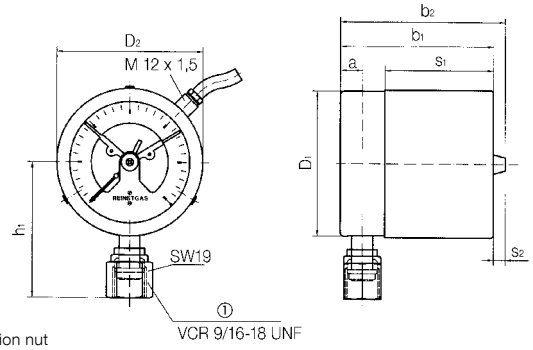


Version with contacts – bottom connection, 9/16-18 UNF, with pressure screw



① Pressure screw
② Protective cap

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



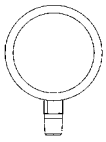
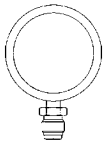
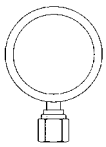
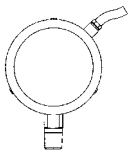
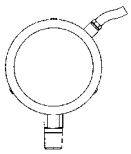
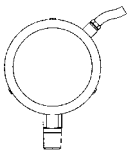
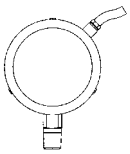
① Union nut

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

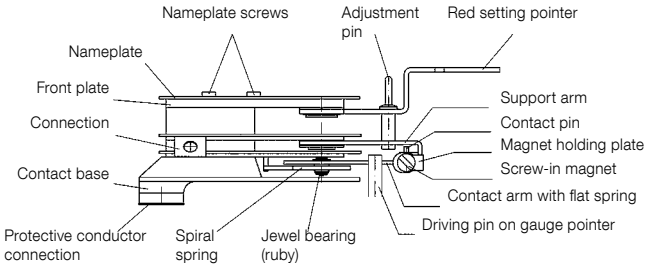
				Version with electrical contacts			
Type	**RF63RG, D302**	**RF63RG, D302**	**RF63RG, D302**	**RF63RG, MK1, D302**	**RF63RG, MK2, D302**	**RF63RG, IK1, D302**	**RF63RG, IK2, D302**
Version							
Housing Ø	63	63	63	63	63	63	63
Contact type				Single magnetic spring contact	Dual magnetic spring contact	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.**
-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
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
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
				Options 9/16-18 UNF pressure screw or union nut on request			

Blue part no. = in-stock items

Electrical contacts electromechanical

Precision contact system

Sectional view



Magnetic spring contact

Electrical contacts (electromechanical magnetic spring contacts) in measuring devices with pointers are auxiliary electrical switches which open or close electrical circuits at set limit values by means of a contact arm which is moved in accordance with the indicated value. 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

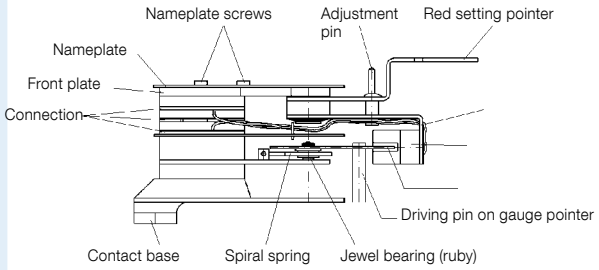
Operating temperature range
-20/+70 °C or corresponding to the respective gauges

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

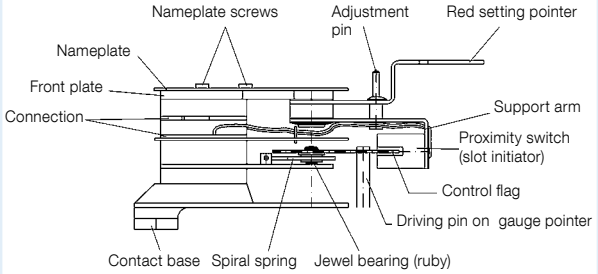
Operating temperature range
-25/+70 °C
or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Electrical contacts inductive

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

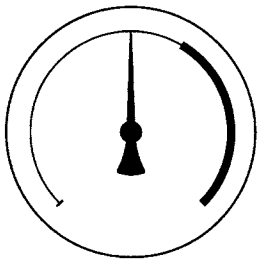


Figure 2

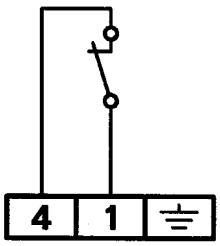
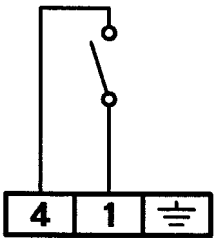


Figure 3



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.

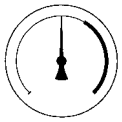
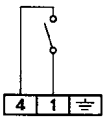
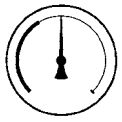
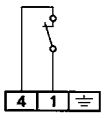
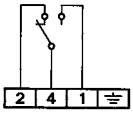
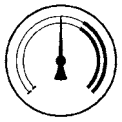
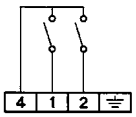
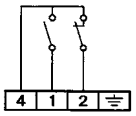
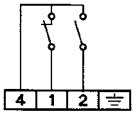
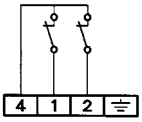
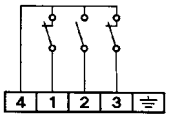
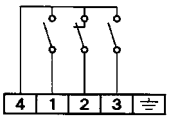
Example: MK 2.12
- Magnetic spring contact,
- double
- Contact 1 closes
- Contact 2 opens

Definition of complete gauge

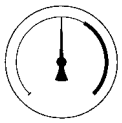
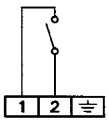
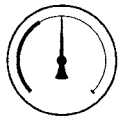
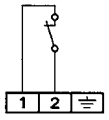
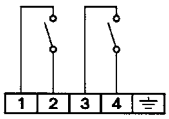
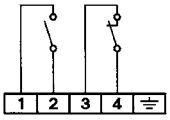
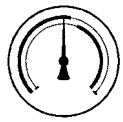
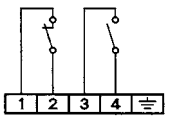
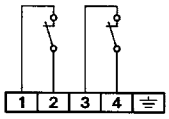
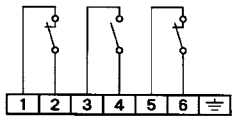
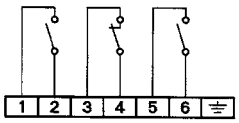
The code for the contact is appended to the type designation of the measuring instrument.

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

Switching functions of electrical contacts (electromechanical)

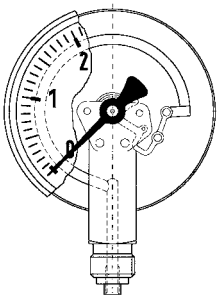
Switching scheme	Wiring diagram	Switching function (pointer moves clockwise)	Contact type	
			Magnetic spring contact	Sliding contact
Single contact				
		Contact closes	MK1.1	SK1.1
		Contact opens	MK1.2	SK1.2
		Contact switches over, i.e. 1 contact opens and 1 contact closes	MK1.W	SK1.W
Double contact				
		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

- 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: ⅔ full scale value
Short-term: full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 466 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 M12 x 1.5
Cable length: 1 m

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

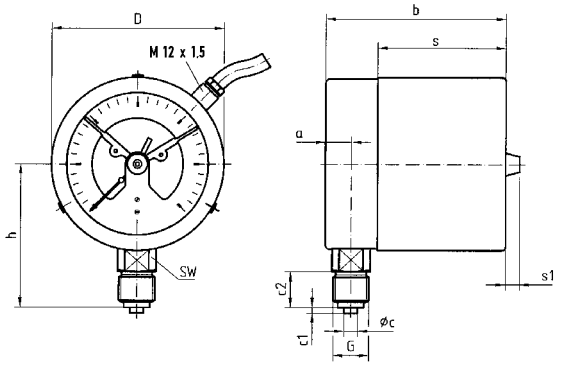
Options

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

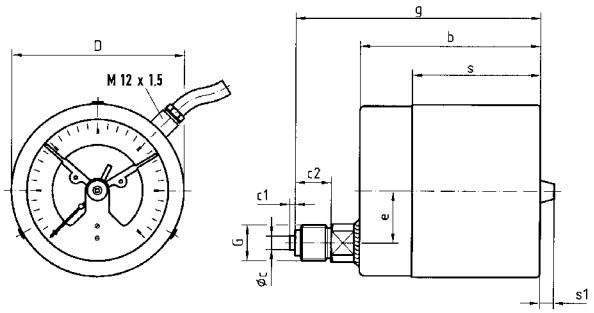
Bourdon tube pressure gauges with electrical contacts nominal size 63 type D3

Housing types and dimensions

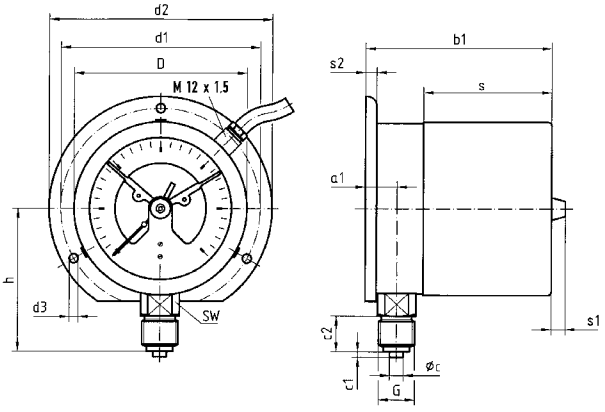
Bottom connection



Centre back connection



Bottom connection, back flange



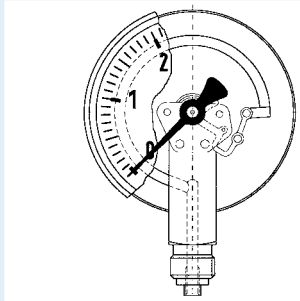
Dimensions (mm)

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

- Robust stainless steel housing
- Excellent readability
- Up to four switching 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 466 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 M12x1.5
Cable length: 1 m

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

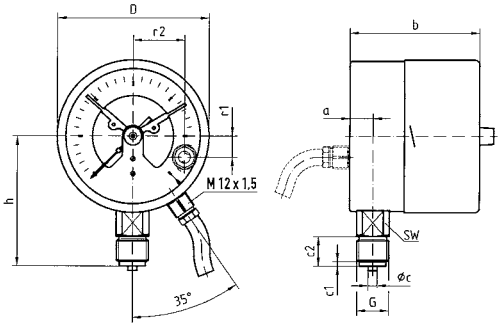
- Back flange
- 3-hole fixing, panel mounting bezel
- Throttle screw
- Junction box
- Connector
- Special scales
- Other process connections

Bourdon tube pressure gauge for industrial applications with electrical contacts

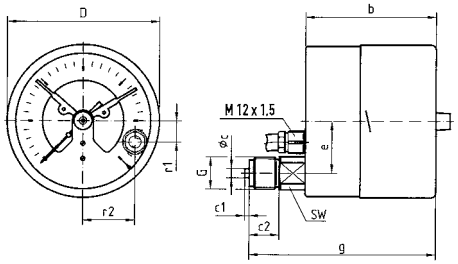
Type D 4 – NG 100/160

Housing types and dimensions

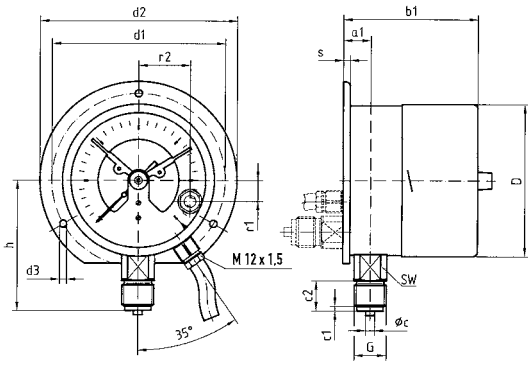
Bottom connection



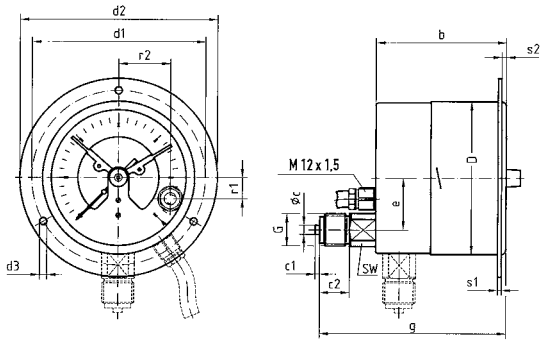
Centre back connection



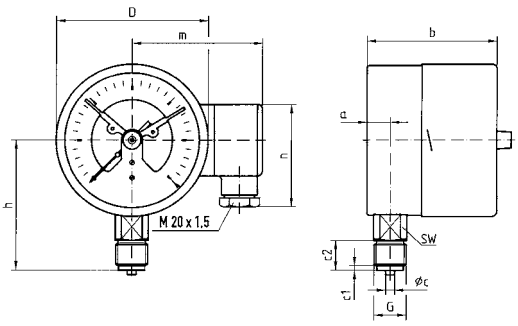
Bottom connection (centre back connection), back flange



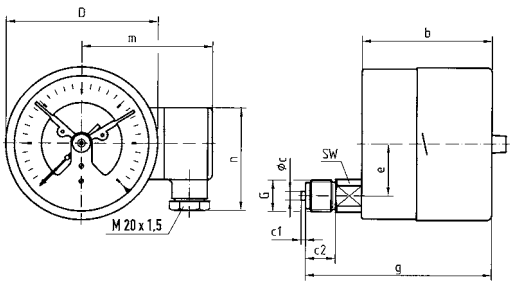
Centre back connection (bottom connection), 3-hole fixing, panel mounting bezel



Bottom connection, with junction box (option)



Centre back connection, with junction box (option)



Dimensions (mm)

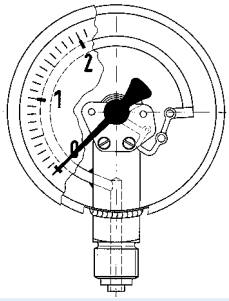
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	m	n	r1	r2	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	26.5	119	G½B	86	92	72	14	34.5	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	26.5	129	G½B	116	122	72	14	34.5	6	2

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

- Measuring system fully welded to housing
- Robust mechatronical pressure gauge
- Up to four switching 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 466 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

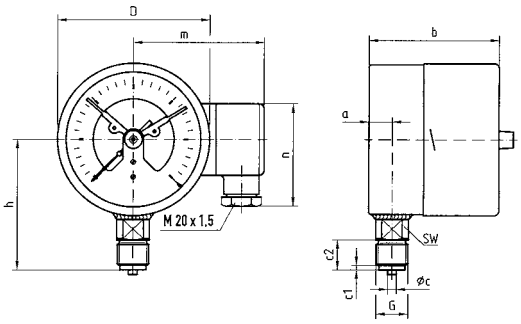
- Liquid filling (silicone oil)
- Back flange
- 3-hole fixing, panel mounting bezel
- Throttle screw
- Connector
- Special scales
- Other process connections

Bourdon tube pressure gauges with electrical contacts for chemical applications

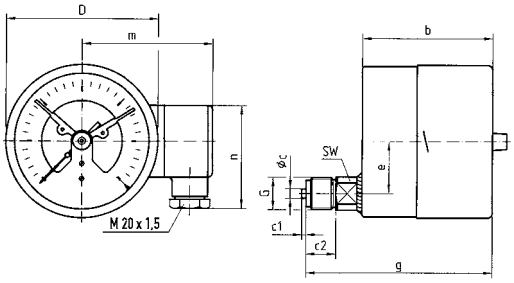
Type D 4 – NG 100/160

Housing types and dimensions

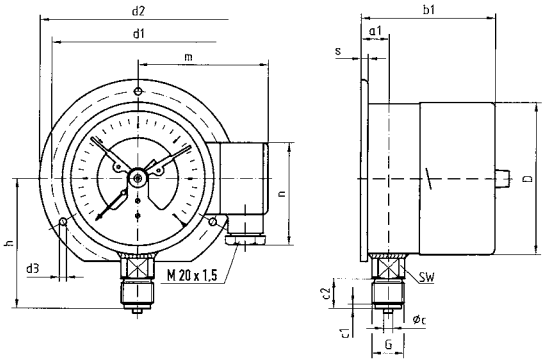
Bottom connection



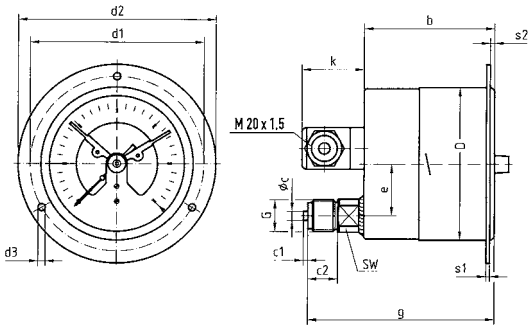
Centre back connection



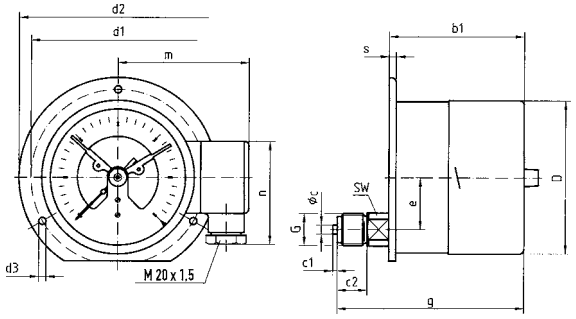
Bottom connection, back flange



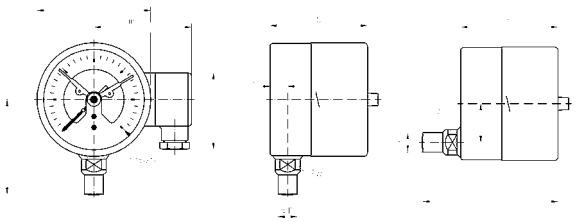
Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, back flange



Bottom connection, back for diaphragm seal mounting



Dimensions (mm)

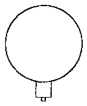
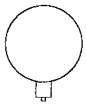
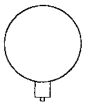
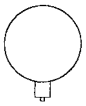
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	h1	k	m	n	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	34.5	121	G½B	86	83.5	40	92	72	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	34.5	131	G½B	116	116	40	122	72	6	2

Nominal size (NG)	S2	SW
100	4	22
160	4	22

* Dimensions as per DIN 16064.

Bourdon tube pressure gauges with electrical contacts

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.**
-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
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
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
0/600	87424302	87524302	87474302	87574302
0/1,000	---	---	---	---

Blue part no. = in-stock items

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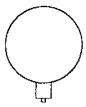
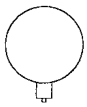
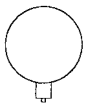
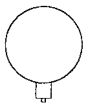
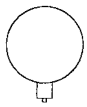
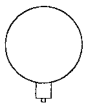
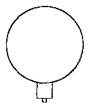
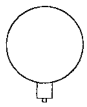
Please specify required switching function (normally closed/ normally open). See page 479 for other versions.

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.**
-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
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
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
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

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Please specify required switching function (normally closed/ normally open). See page 479 for other versions.

Options for electrical contacts

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 options indicated include mounting; pressure gauge not included								
Version	Nominal size	Housing	**Option available**	**Option available**	**Option available**	**Option available**	**Option available**	**Option available**
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 Stainless steel diaphragm pressure gauges type D4/D8	100	With filling	•	•	•	•	•	•
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	•	•	•	•	•	•

DG: M, PG: 4

Available options 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.

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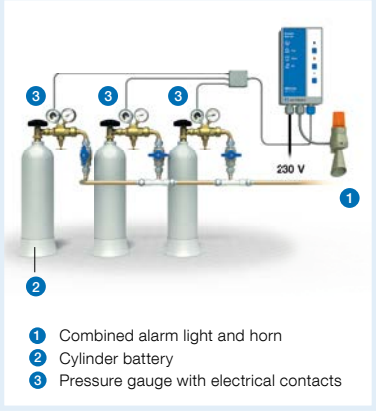
Versions with 4 electrical contacts on request.

Alarm unit AG 10 Ex

- With visual/audible alarms, Test and Acknowledge buttons
- Relay output for event reporting systems
- Logistics made easy: For example, just in time information on empty gas cylinders

A
Page 471



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

Application

For example, 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. The alarm can also be configured for fail-safe mode so that an alarm can also be triggered in the case of a power outage.

Proper operation of the system can be checked at all times by means of pressing the Test key. If this button is pressed, the system generates an alarm, i.e. the red LED lights up and the audible alarm sounds.

Description

The system consists of one or several pressure contacts (connected in series), a control unit (alarm unit AG 10 Ex) and, if required, an additional alarm unit.
If several contacts are to be monitored, the corresponding number of electrical contacts can be connected in series and monitored by a single alarm unit. It is also possible to connect a separate alarm unit for each measuring point. An alarm is triggered when the contact opens.
An event reporting system can be connected to the relay output of the alarm unit for remote monitoring.

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Technical specifications

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

Supply voltage
AC 230 V ±10 %

Power input
5 VA

Switching input
Voltage-free connection, e.g. Bourdon tube pressure gauge with magnetic spring contact

Probe circuit
Intrinsically safe, maximum values:
U_0= 16.8 V
I_0 = 57 mA
P_0 = 240 mW
C_0 = 180 nF for IIC
675 nF for IIB
L_0 = 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 II (1)G [Ex ia Ga] IIC

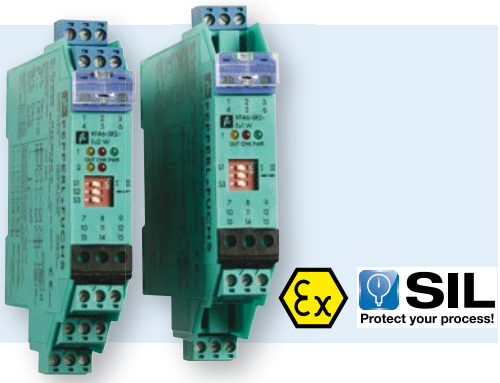
Housing
Wall mounting housing made of impact-resistant plastic (ABS) W x H x D: 100 x 188 x 65 mm

Degree of protection
IP 30 (EN 60529)

DG: M, PG: 4	Part no.
Alarm unit AG 10 Ex	**67000**

Blue part no. = in-stock items

Contact protection relays/isolating switching amplifiers for electrical contacts



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

Please enquire for complete data sheets for the individual versions.

DG: H, PG: 4	Part no.
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.
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
- Ex 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

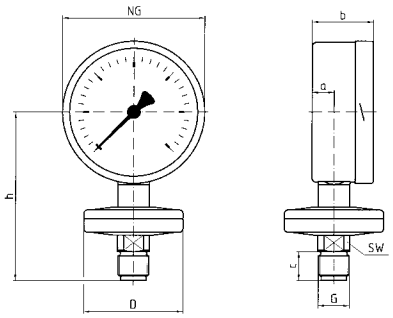
- Glycerine filling (≥ 1 bar)
- Wetted parts with special coating
- Clamp connection
- Varivent or BioControl connection
- Ex version
- Flush mounted connection flanges as per EN
- Open connection flanges as per EN/ANSI
- Other connection threads
- Electrical contacts (≥ 0/0.6 bar)

Stainless steel diaphragm pressure gauges

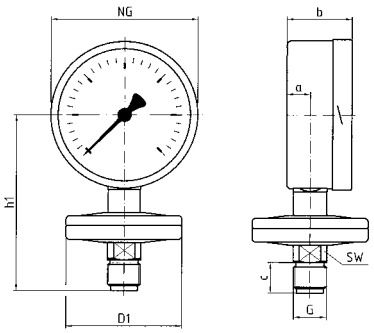
Type D 4 – NG 100/160

Housing types and dimensions

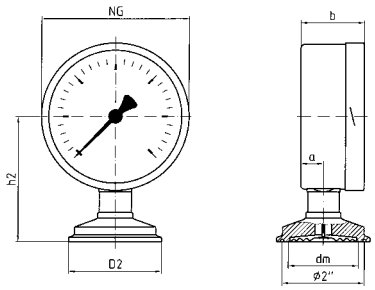
Bottom connection, 0/100 mbar to 0/2.5 bar



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



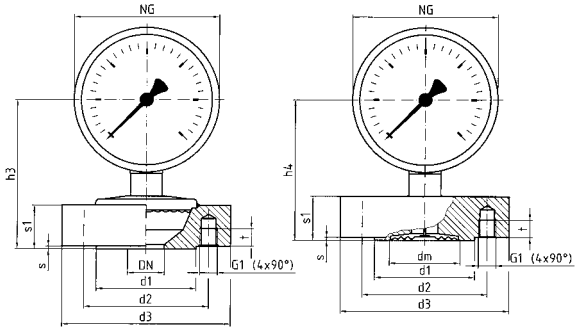
Clamp connection 2" according to ISO 2852, 0/1 bar to 0/6 bar



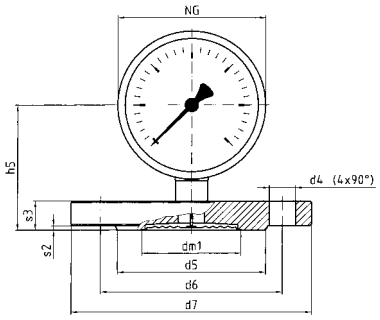
Connection flange as per EN 1092-1/B 1/DN 25/PN 40

Open, 0/100 mbar Up to 0/25 bar

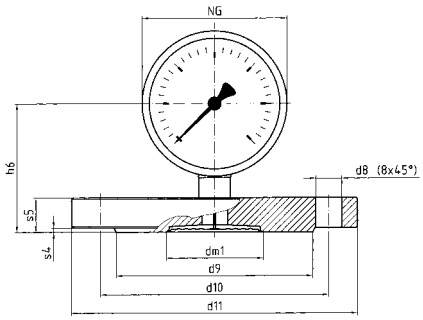
Flush mounted, 0/1 bar Up to 0/6 bar



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, 0/100 mbar to 0/25 bar



Dimensions (mm)

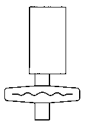
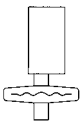
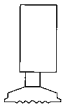
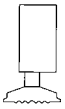
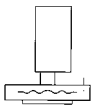
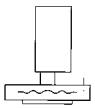
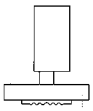
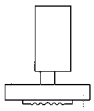
Nominal size (NG)	a	b	c	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	dm	dm1	D	D1	D2	DN
100	15.6	49	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25
160	17.5	50	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25

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.**
0/100	85886402	---	---	---	88906402	---	88946402	---
0/160	85887402	---	---	---	88907402	---	88947402	---
0/250	85888402	---	---	---	88908402	---	88948402	---
0/400	85889402	85929402	---	---	88909402	88929402	88949402	88969402
Range (bar)	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
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
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

Options for stainless steel diaphragm pressure gauges

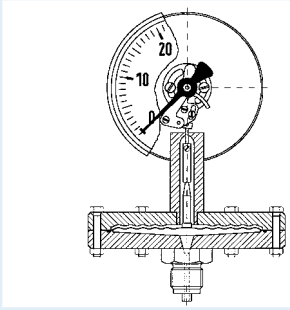
DG: H

Process connection			
Groove/tongue as per EN 1092-1			**Option**
Connection G¼B (channel hole Ø 6 mm)			**Option**
Connection ¼ NPT (channel hole Ø 6 mm)			**Option**
Connection ½ NPT (channel hole Ø 10 mm)			**Option**
Connection M20 x 1.5 (channel hole Ø 10 mm)			**Option**
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	
	DN 25 (0/1 bar to 0/6 bar)	PN 40	**Option**
	DN 50	PN 40	**Option**
	DN 80	PN 40	**Option**
Other connection flanges			**On request**
Glycerine filling (≥ 1 bar)			
Nominal size 100			**Option**
Nominal size 160			**Option**
Other			
Vacuum proof (≥ 0/4 bar)			**Standard**
Electrical contacts (≥ 0/0.6 bar)			**See page 471**

Diaphragm pressure gauges for chemical applications

EN 837-3

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



Page 512

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 L

Upper measuring flange
Stainless steel 304

Measuring element
Diaphragm
Measuring flange: Duratherm

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

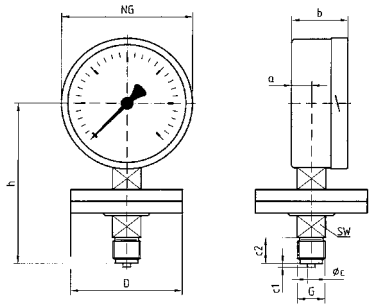
- Safety housing
- Overpressure safety 10 x FSD (measuring flange Ø 100 to max. 40 bar, measuring flange Ø 160 to max. 2.5 bar)
- Electrical contacts
- Glycerine filling (≥ 40 mbar, ≤ 250 mbar accuracy class 2.5)
- Wetted parts with special coating
- Open connection flanges as per EN/ASME

Diaphragm pressure gauges for chemical applications

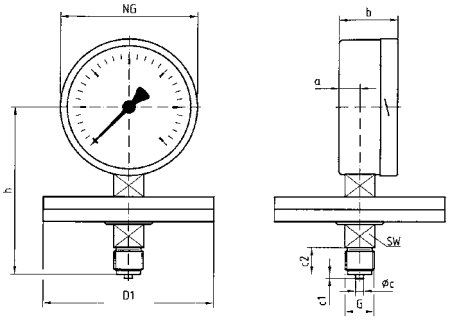
Type D 4 – NG 100/160

Housing types and dimensions

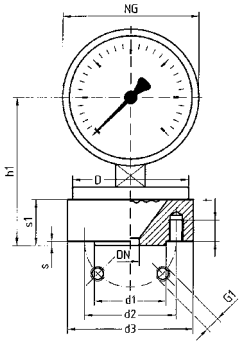
Bottom connection, measuring flange Ø 100



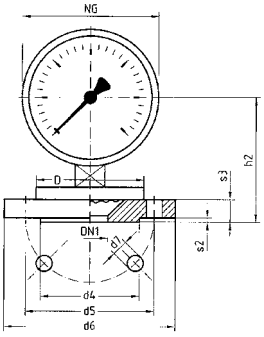
Bottom connection, measuring flange Ø 160



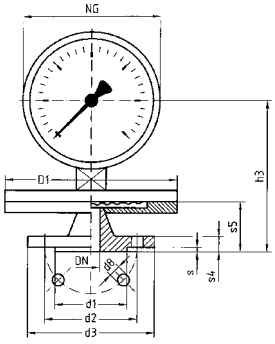
Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 100



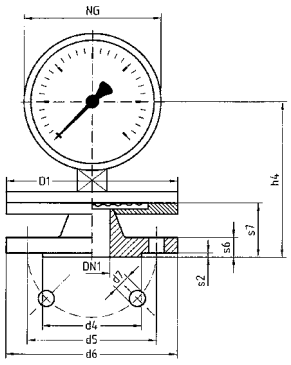
Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 100



Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 160



Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 160



Dimensions (mm)

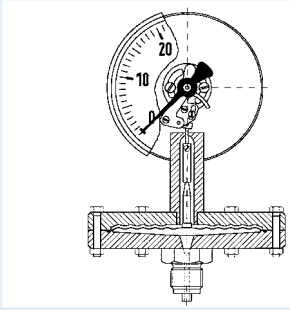
Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	156	141

Nominal size (NG)	h2	h3	h4	s	s1	s2	s3	s4	s5	s6	s7	t	SW
100	101	129	137	2	30	3	20	18	48	20	56	12	22
160	131	159	167	2	30	3	20	18	48	20	56	12	22

Standard diaphragm pressure gauges

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, galvanised

Upper measuring flange
Stainless steel 304

Measuring element
Diaphragm, measuring flange:
Stainless steel 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

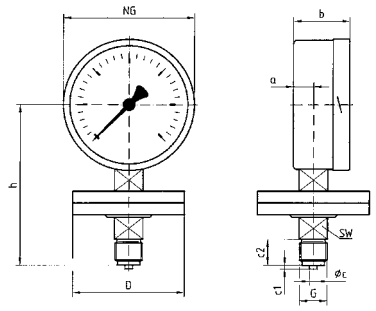
- Safety housing
- Overpressure safety 10 x FSD
  (measuring flange Ø 100 to max. 40 bar,
  measuring flange Ø 160 to max. 2.5 bar)
- Electrical contacts
- Glycerine filling
  (≥ 40 mbar, ≤ 250 mbar accuracy class 2.5)
- Wetted parts with special coating
- Open connection flanges as per EN/ASME

Standard diaphragm pressure gauges

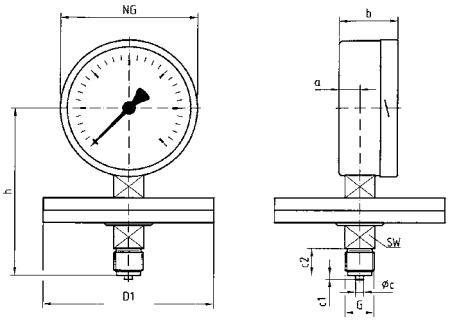
Type D 4 – NG 100/160

Housing types and dimensions

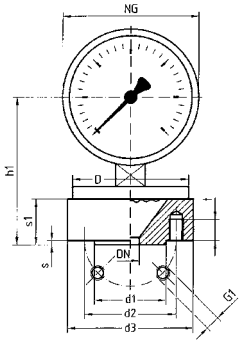
Bottom connection, measuring flange Ø 100



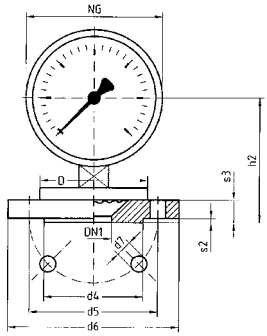
Bottom connection, measuring flange Ø 160



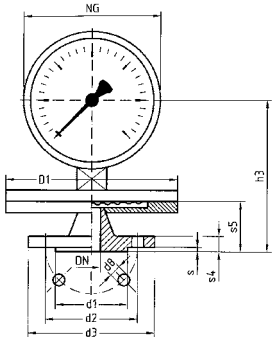
Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 100



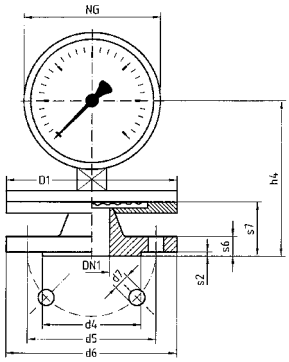
Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 100



Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 160



Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 160



Dimensions (mm)

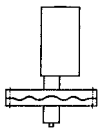
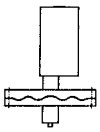
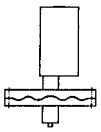
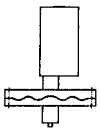
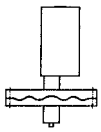
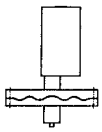
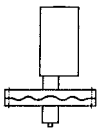
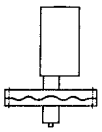
Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	156	141

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	Stainless steel 316 L				Duratherm			
Lower flange	Steel, galvanised				Stainless steel 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.**
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
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.**
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

11

i

* ≤ 250 mbar Cl. 2.5, see page 491 for options.

AFRISO

Options for standard diaphragm pressure gauges/ diaphragm pressure gauges for chemical applications

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				
EN 1092-1, PN 40	DN 15	**On request**	**On request**	**On request**	**On request**
	DN 20	**On request**	**On request**	**On request**	**On request**
	DN 25	**On request**	**On request**	**On request**	**On request**
	DN 50	**On request**	**On request**	**On request**	**On request**
ASME B 16.5 CL 150	DN ½"	**On request**	**On request**	**On request**	**On request**
	DN 1"	**On request**	**On request**	**On request**	**On request**
	DN 2"	**On request**	**On request**	**On request**	**On request**

Special connection	Material steel	Material stainless steel 316 L
Channel hole Ø 10 mm	**On request**	**On request**
Groove/tongue as per EN 1092-1	**On request**	**On request**
RJT groove ANSI B16.5	**On request**	**On request**

Special materials for diaphragms	Ranges 10 to 250 mbar Measuring flange Ø 160	Ranges 0.4 to 25 mbar Measuring flange Ø 100
Material		
PTFE film (≥ 40 mbar)	**On request**	**On request**
Silver foil (≥ 160 mbar)	**On request**	**On request**
Tantalum foil (≥ 160 mbar)	**On request**	**On request**
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						
PTFE lining	**On request**					
Other materials	**On request**					

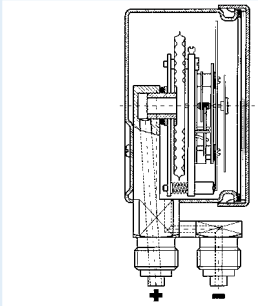
Overpressure safety 10 x FSD (measuring flange Ø 100 to max. 40 bar, measuring flange Ø 160 to max. 2.5 bar)	Ranges 10 to 250 mbar Measuring flange Ø 160	Ranges 0.4 to 25 mbar Measuring flange Ø 100
	On request	**On request**

Blue part no. = in-stock items

See page 479 for options 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

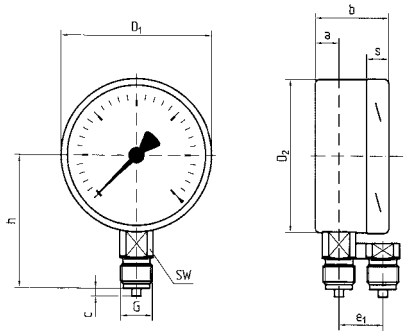
Options

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

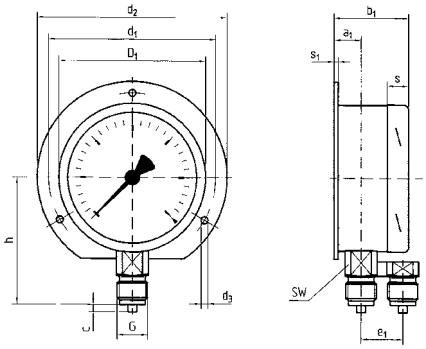
Standard capsule pressure gauges for differential pressure type D 9 – NG 63/type D 4 – NG 100/160

Housing types and dimensions

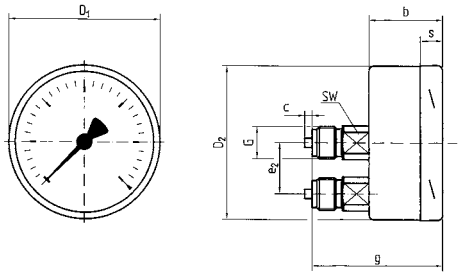
Bottom connection (NG 100/160)



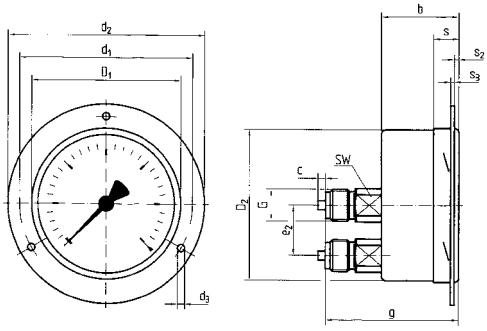
Bottom connection, back flange (NG 100/160)



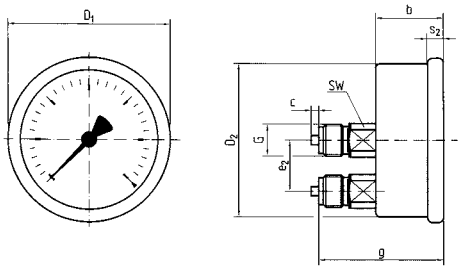
Centre back connection (NG 100/160)



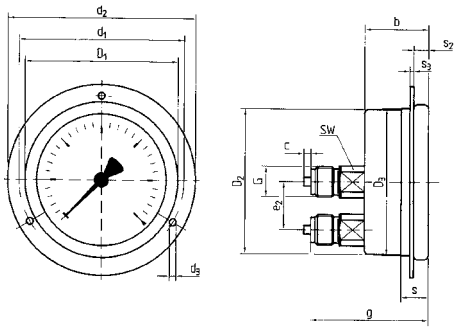
Centre back connection, 3-hole fixing, panel mounting bezel (NG 100/160)



Centre back connection (NG 63)



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



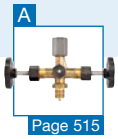
Dimensions (mm)

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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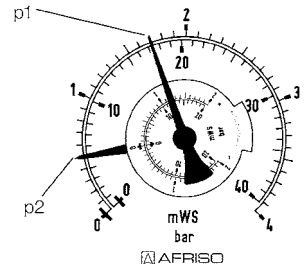
Reading example



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

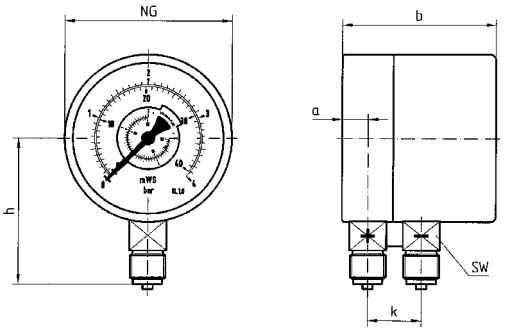
Options

- Wetted parts stainless steel
- Housing and push on bezel stainless steel
- Back flange
  (with stainless steel housing only)
- 3-hole fixing, panel mounting bezel
  (only with stainless steel housing)
- Throttle screw
- Special scales
- Other process connections

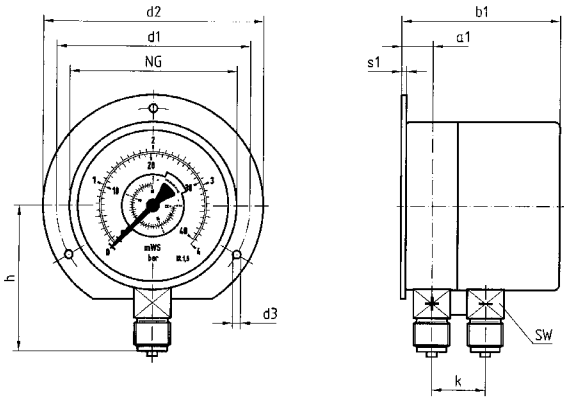
Standard Bourdon tube pressure gauges for differential pressure type D 2 – NG 100

Housing types and dimensions

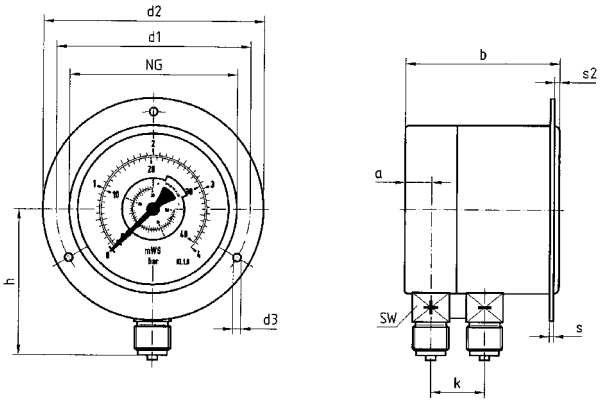
Bottom connection



Bottom connection, back flange (stainless steel housing, type D3)



Bottom connection, 3-hole fixing, panel mounting bezel (stainless steel housing, type D3)



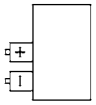
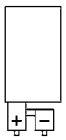
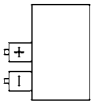
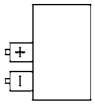
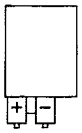
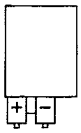
Dimensions (mm)

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.**
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	---	---
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
0/60 bar	---	---	---	---	---	85619201	85619301
0/100 bar	---	---	---	---	---	---	---
0/160 bar	---	---	---	---	---	---	---
0/250 bar	---	---	---	---	---	---	---
0/400 bar	---	---	---	---	---	---	---
Options							
Wetted parts stainless steel	---	---	---	---	---	•	•

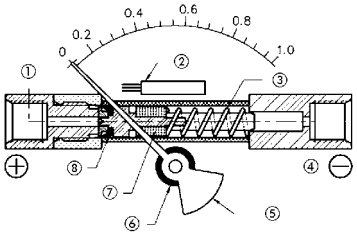
* ≤ 16 mbar = accuracy class 4.
Minimum order quantity for non-stock items = 10 pieces.

Blue part no.. = in-stock items

i
See page 511 for mounting accessories options.

Magnetic piston pressure gauge for differential pressure – high overload protection

- 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



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

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

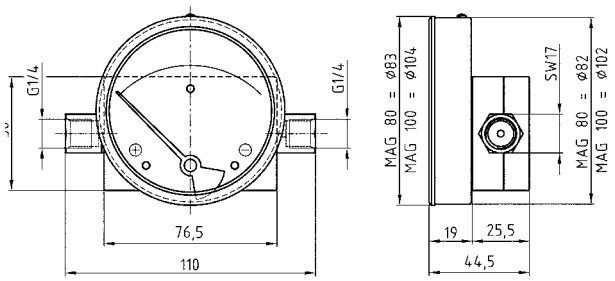
- Mounting plate with fixing clamp
- 3-hole fixing, panel mounting bezel
- Max. static pressure PN 250/400
- Other connection threads
- Other connection designs
- Window acrylic glass
- Electrical contacts (Reed contacts)
- Filter in "plus" connection
- Glycerine filling
- Maximum pointer
- Special scales

Magnetic piston pressure gauge for differential pressure – high overload protection

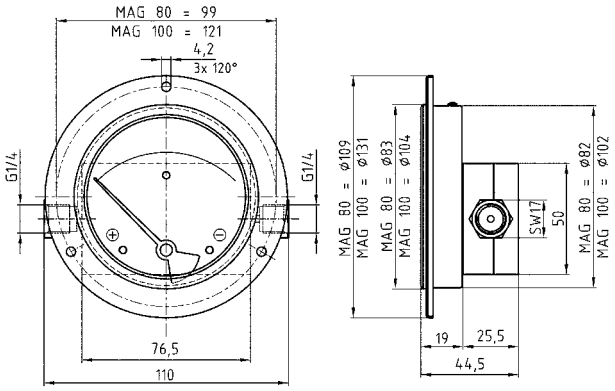
Type D 3 NG 80/100

Types and dimensions (mm)

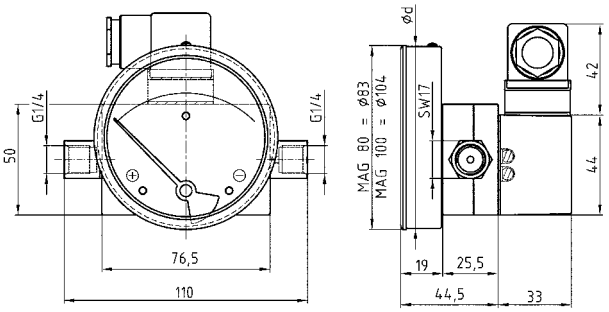
Lateral connection, right and left



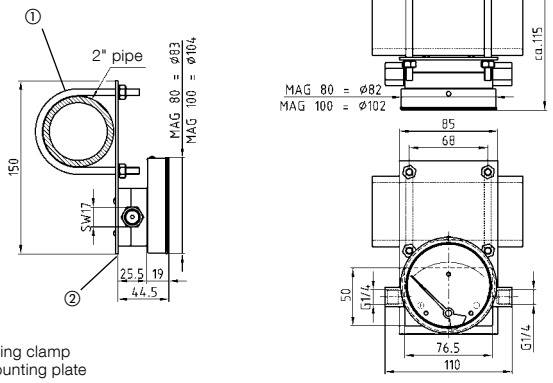
Connection on right and left sides 3-hole fixing, panel mounting bezel



Connection on right and left side, with electrical contact



Mounting plate and fixing clamp



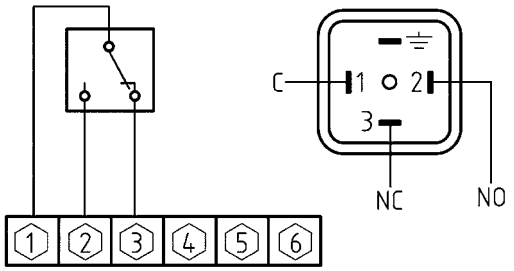
① Fixing clamp
② Mounting plate

Technical specifications electrical contact

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

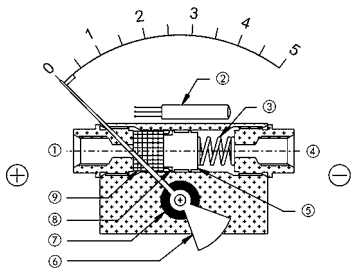
Max. switching voltage:	AC/DC 30 V
Max. switch rating:	AC 3 VA –- DC 3 W
Max. current:	AC/DC 300 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	20–80 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

Wiring diagram



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

- 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

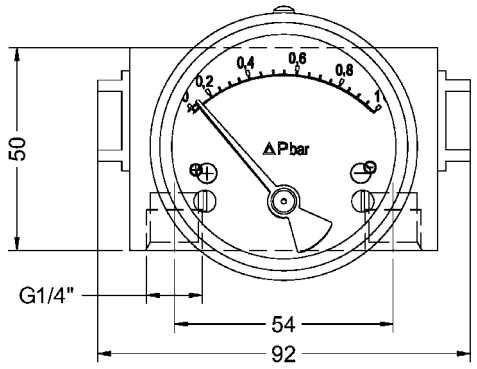
Options

- 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

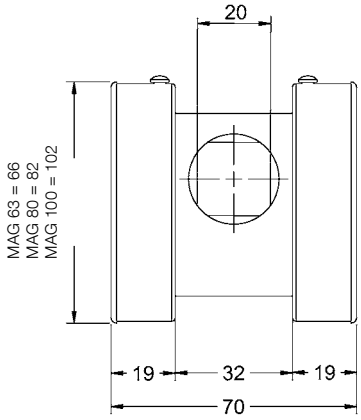
Magnetic piston pressure gauge for differential pressure – high overload protection type D 3 NG 63/80/100

Types and dimensions (mm)

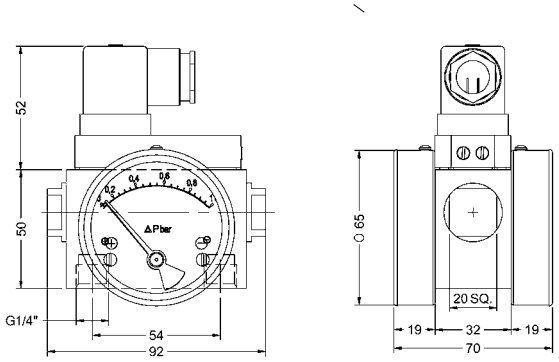
Lateral connection, right and left



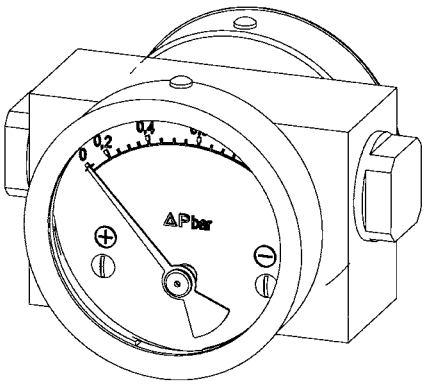
Lateral connection, right and left



Lateral connection, right and left
With electrical contact



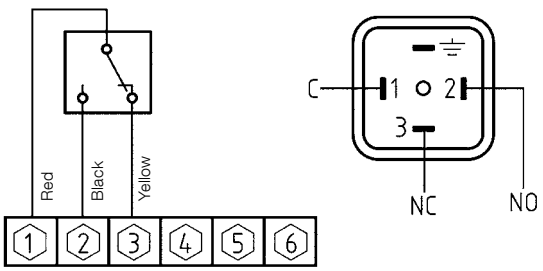
3D view



Technical specifications electrical contact

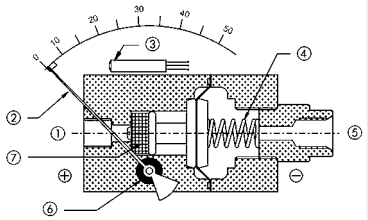
Version:	Reed contact, single, changeover contact (SPDT)
Max. switching voltage:	AC/DC 30 V
Max. switch rating:	AC 3 VA–DC 3 W
Max. current:	AC/DC 300 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	35–100 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

Wiring diagram



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

- 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 and diaphragm (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

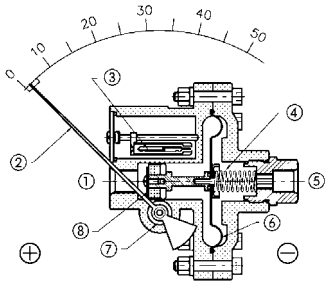
Fastening
Wall mounting via mounting plate (option) or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

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

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)

11

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

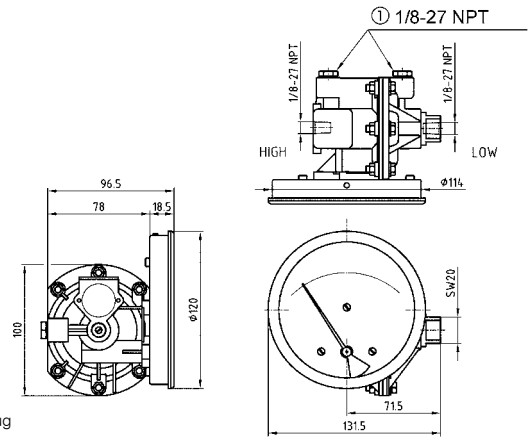
Options

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

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

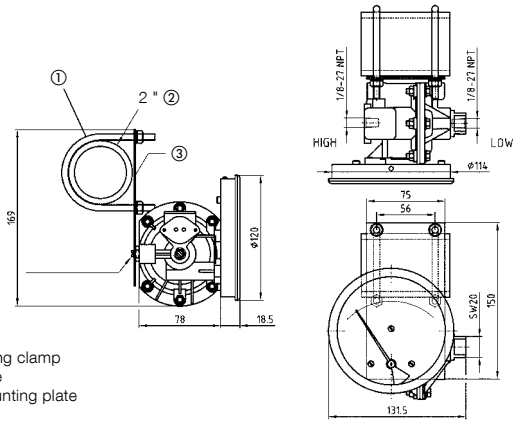
Types and dimensions (mm)

Connection on right and left sides or on rear



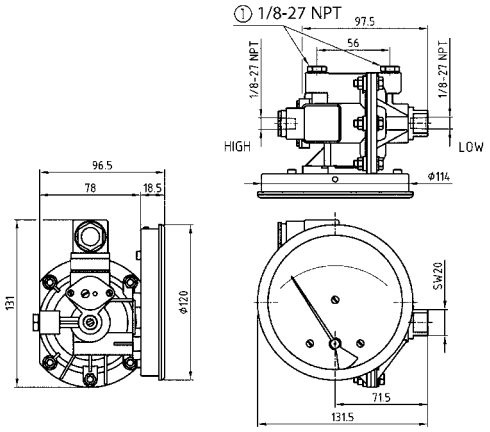
① Plug

Mounting plate and fixing clamp



① Fixing clamp
② Pipe
③ Mounting plate

Connection on right and left sides or on rear, with electrical contact



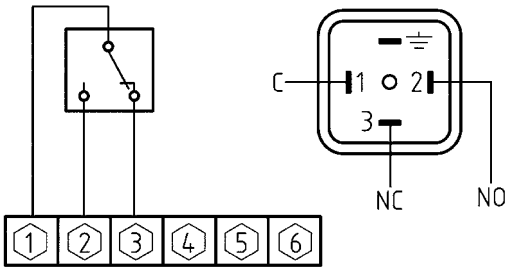
① Plug

Technical specifications electrical contact

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

Max. switching voltage:	AC/DC 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)

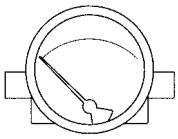
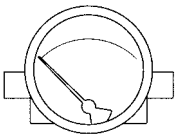
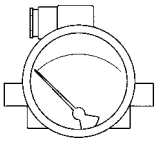
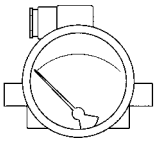
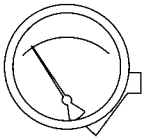
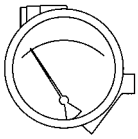
Wiring diagram



11

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

DG: M, PG: 3

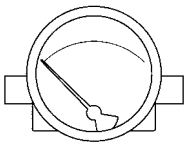
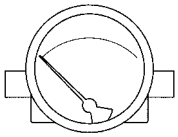
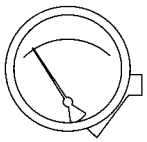
Type	MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 80 Dif, RK1.W, D 312	MAG 100 Dif, RK1.W, D 312	MAG 115 Dif, D 311	MAG 115 Dif, RK1.W, D 311
Version						
Housing Ø	80	100	80	100	115	115
Housing	Stainless steel 304 with rubber sealing ring at the front					
Measuring element	See data sheet					
Accuracy	±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.**
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	---	---	---	---	---	---
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

Options for magnetic piston pressure gauges/ magnetic diaphragm pressure gauges

DG: M

Type	MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 115 Dif, D 311
Version			
	Available options	**Available options**	**Available options**
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

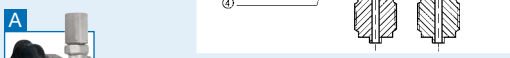
DG: M

Type		MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 115 Dif, D 311
	PG	Part no.	Part no.	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	---
Mounting kit for MAG 115 Dif. D311 (2 x connection adapter 1/4" NPT x hose connector ø 5 mm grey, 3 x angled brackets, 3 x screws)	1	---	---	38334

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 throttle



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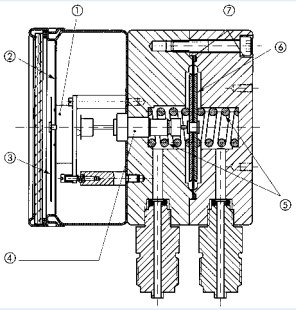


Function overview
① Movement
② Dial
③ Pointer
④ Transmission unit
⑤ Measuring spring
⑥ Diaphragm
⑦ Measuring flange

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 throttle 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

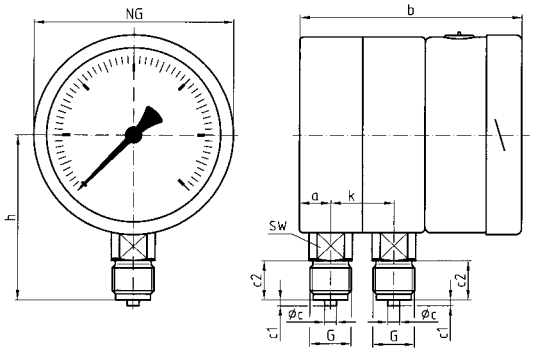
Options

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

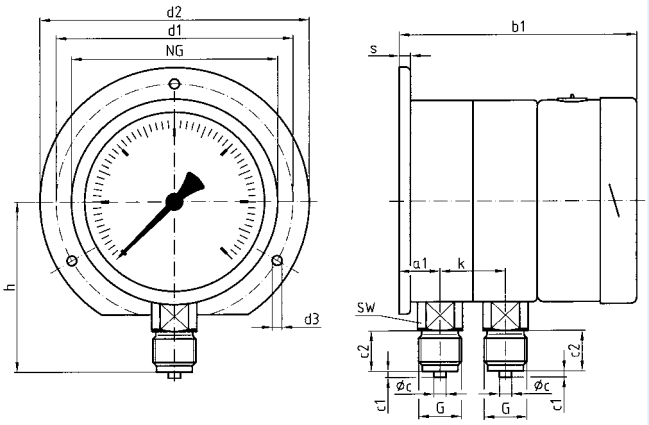
Standard spring-diaphragm pressure gauges for differential pressure type D 4 – NG 100

Housing types and dimensions

Bottom connection



Bottom connection, back flange



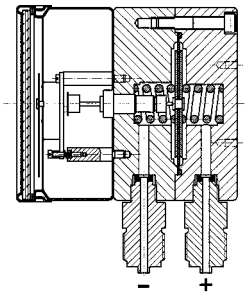
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2	d3*	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 throttle 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

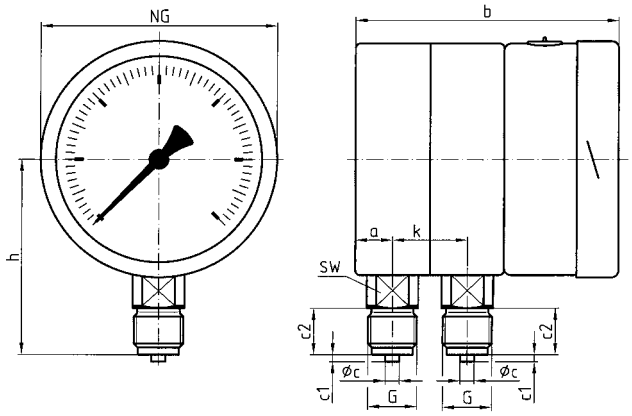
Options

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

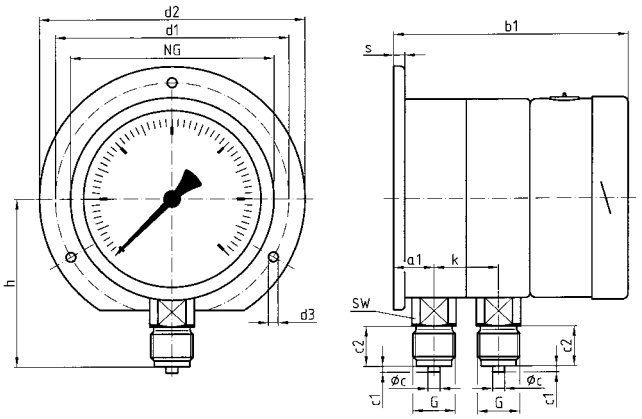
Spring-diaphragm pressure gauges for chemical applications for differential pressure type D 4 – NG 100

Housing type and dimensions

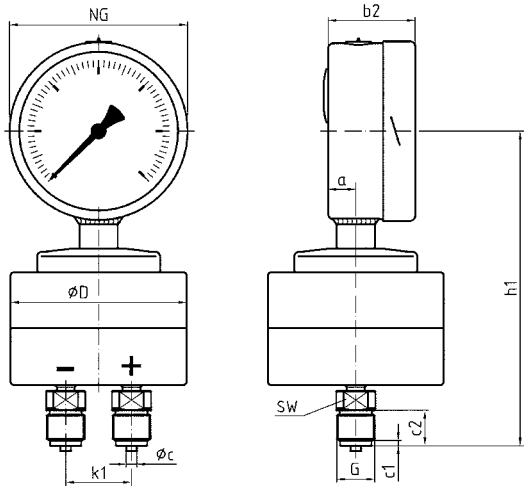
MF 100 Ch Dif D402
Bottom connection



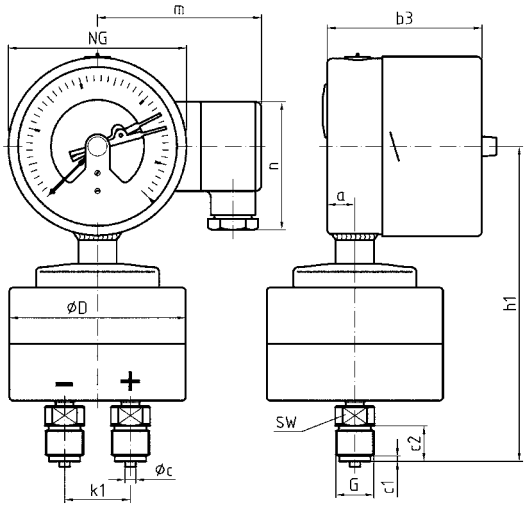
MF 100 Ch Dif D472
Bottom connection, back flange



MFW 100 Ch Dif D402
Bottom connection



MFW 100 Ch Dif D402
Bottom connection, with electrical contact



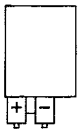
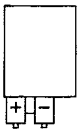
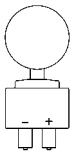
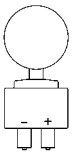
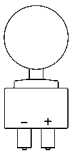
Dimensions (mm)

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

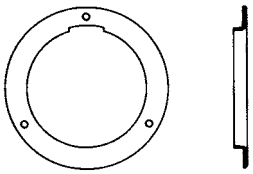
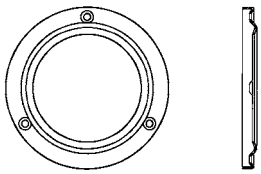
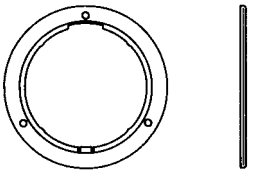
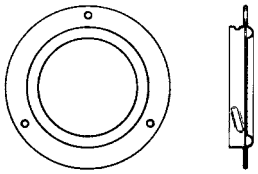
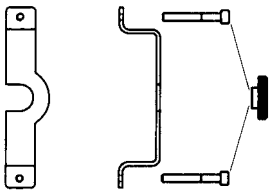
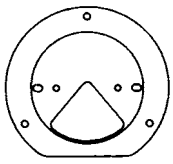
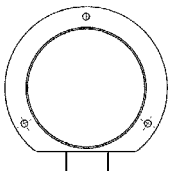
DG: M, PG: 3

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.**
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
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
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
Available options					
Max. static pressure PN 100	---	---	---	---	---
Glycerine filling	•	•	•	---	---
Silicone oil filling	---	---	---	•	•
Wall mounting	Back flange •		Connection piece for instrument bracket = standard. See page 517 for instrument brackets		

Blue part no. = in-stock items

Accessories for panel mounting and wall mounting

DG: M

Type	Housing diameter (mm)		50	63	80	100	160
	Description	PG	Part no.	Part no.	Part no.	Part no.	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

11

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.

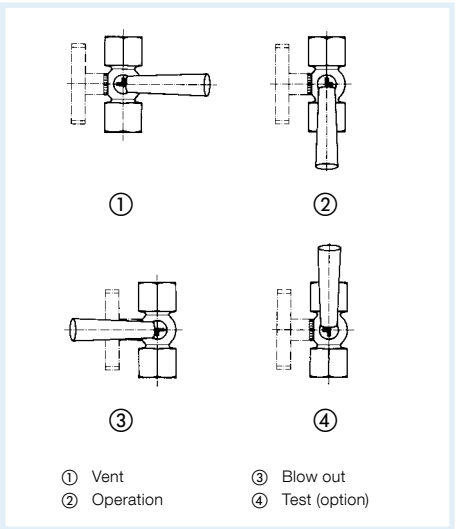
Technical specifications

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 connectionand 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 parts 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

Overpressure safety device, pressure gauge push-button stop cock

Overpressure safety device

Application

Adjustable overpressure safety device used to protect the system against peak pressures exceeding the range of the pressure gauge. At measuring points which are subject to great pressure variations, you can install different pressure gauges with different ranges in order to precisely measure even the lower pressures. The overpressure safety devices are adjusted according to the maximum permissible pressure ratings of the various pressure gauges installed.

Technical 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

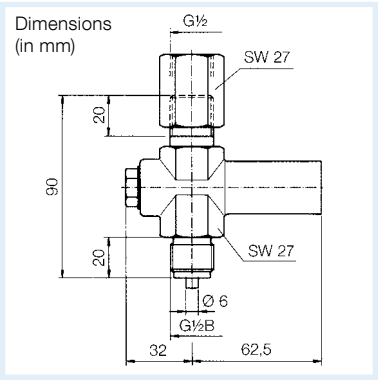
Overpressure safety
Brass: 600 bar
Stainless steel:1,000 bar
Max. vacuum range up to -1 bar, no adjustment function

Connection
G½ female/female connection x male connection

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

Overpressure safety device



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. With connection as per DIN EN 10226-1 suitable for gases as per DVGW G260 and SVGW.

Technical specifications

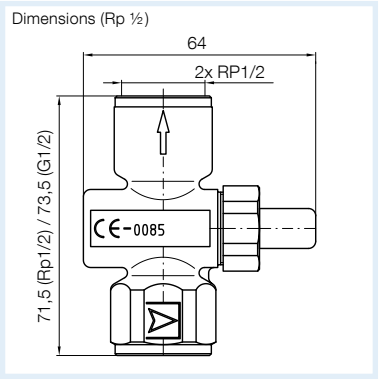
Test
DVGW- and SVGW-tested, with EU Type Examination Certificate, product ID number CE-0085AQ0985 for the version with connection as per DIN EN 10226-1.

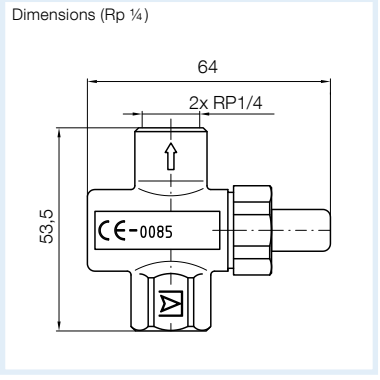
Operating temperature range
Medium: 0/70 °C
Ambient: -20/+60 °C

Connection
2 x female thread
Rp ½, EN 10226
Rp ¼, EN 10226
½ NPT (without test), no GAR conformity
¼ NPT (without test), no GAR conformity

Nominal pressure
5 bar (MOP 5)

Housing
Brass, nickel-plated

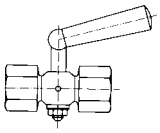


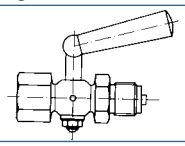


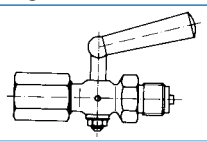
11

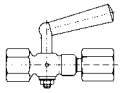
Accessories for pressure gauges

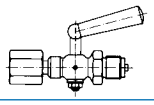
DG: H

Pressure gauge shut-off cock female x female					
	Connection	Nominal pressure	Material	PG	**Part no.**
	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**

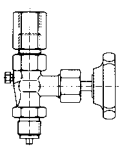
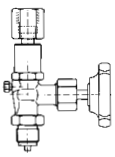
Pressure gauge shut-off cock female x male					
	Connection	Nominal pressure	Material	PG	**Part no.**
	G¼	PN 6	Brass	2	**63011**
	G⅜	PN 16	Brass	2	**63012**
	G½	PN 16	Brass	2	**63013**
With round test flange 40 x 5	G½	PN 16	Brass	2	63009
With test flange 60 x 25 x 10	G½	PN 16	Brass	2	63010

Pressure gauge shut-off cock female/female x male					
	Connection	Nominal pressure	Material	PG	**Part no.**
	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.**
	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.**
	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

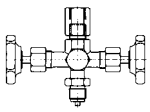
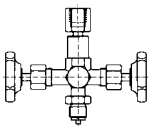
Type A	Type B	Connection	Nominal pressure	Material	PG	**Type A**	**Type B**
						Part no.	Part no.
		G¼	PN 125	Brass	2	**63094**	---
		G½	PN 250	Brass	2	**63092**	63046
		G½	PN 400	Steel	3	63040	63047
		G½	PN 400	1.4571	3	**63093**	63048
DVGW-tested		G½	PN 100	Brass	2	63189	---
DVGW-tested		G½	PN 100	1.4571	3	63194	---
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	63110
Extra charge DVGW-tested						On request	On request

* Only for brass and stainless steel.

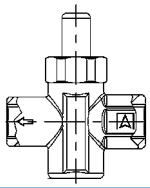
Accessories for pressure gauges

DG: H

Pressure gauge dual stop valve DIN 16272 with male test connection M20 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**	**Type B**
						**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	63118

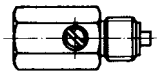
Pressure gauge push-button stop cock female x female



Connection	Nominal pressure	Material	PG	**Part no.**
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**

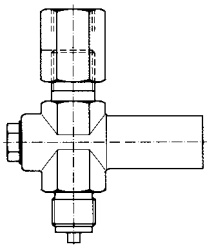
* Without DVGW and SVGW approval.

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



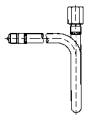
Connection	Nominal pressure	Material	PG	**Part no.**
G½	PN 400	Brass	2	**63074**
G½	PN 400	316 Ti	3	**63076**

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



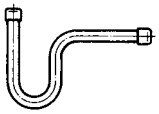
Adjustment range in bar	Material	PG	**Part no.**	Material	PG	**Part no.**
0.4–2.5	Brass	2	63131	316 Ti	3	63139
2–6	Brass	2	63132	316 Ti	3	63140
5–25	Brass	2	63133	316 Ti	3	63141
20–60	Brass	2	63134	316 Ti	3	63142
50–250	Brass	2	63135	316 Ti	3	63143
240–400	Brass	2	63136	316 Ti	3	63144
Extra charge oil-free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

Siphon DIN 16282 – outlet female/female connection G½

		Shape	Inlet	Material	Nominal pressure	PG	**Part no.**
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.

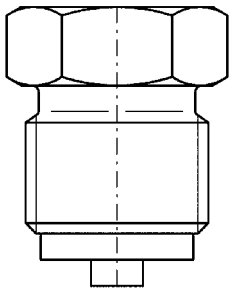
Siphon – standard – inlet G½

U shape	Circular shape	Shape	Outlet	Material	Nominal pressure	PG	**Part no.**
		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

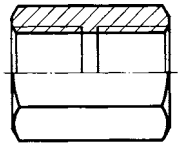
Blue part no. = in-stock items

Accessories for pressure gauges

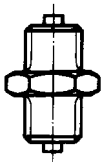
Reducers and adapters



Female connection	Male connection	Material	PG	Part no.
G1/8	G1/4	Brass	2	**63050**
G1/4	G1/8	Brass	2	**63052**
G1/4	G3/8	Brass	2	**63053**
G1/4	G1/2	Brass	2	**63054**
G1/4	G1/2	316 Ti	3	63051
G3/8	G1/4	Brass	2	**63056**
G3/8	G1/2	Brass	2	**63057**
G1/2	G1/4	Brass	2	**63058**
G1/2	G3/8	Brass	2	**63059**
G1/2	M20 x 1.5	Brass	2	63155

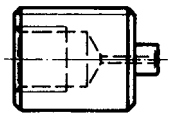


Female connection	Female connection	Material	PG	Part no.
G1/4	G1/4	Brass	2	63159



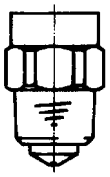
Male connection	Male connection	Material	PG	Part no.
G1/2	G1/2	Brass	2	63164
G1/2	G1/2	316 Ti	3	63165

Connection nipple – self-sealing



Female connection	Male connection	Material	PG	Part no.
G1/8	G1/4	Brass	2	**63067**
G1/4	G3/8	Brass	2	**63068**
G1/4	G1/2	Brass	2	**63069**
G3/8	G1/2	Brass	2	**63065**

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



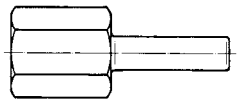
Female connection	Male connection	Material	PG			Part no.
G1/4	G1/4	Brass	2	1	–	**77907**
G1/4	G3/8	Brass	2	1	–	**77908**
G1/4	G1/2	Brass	2	1	–	**77914**
G3/8	G1/2	Brass	2	25	250	77918

Blue part no. = in-stock items

Accessories for pressure gauges

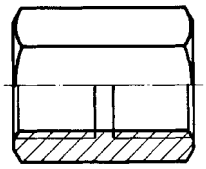
DG: H

Union nut + nipple DIN 16284



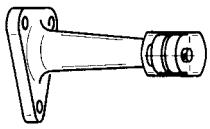
Female connection	Male connection	Material	PG	Part no.
G¼	6 mm	Brass	2	**63072**
G½	12 mm	Brass	2	**63084**
G½	12 mm	316 Ti	3	63070

Female/female connection DIN 16283



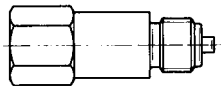
Female connection	Female connection	Material	PG	Part no.
G½ left	G½	Brass	2	63104
G½ left	G½	Steel	3	63105
G½ left	G½	316 Ti	3	63106

Instrument bracket DIN 16281 – type H



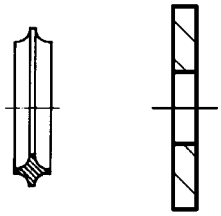
Female connection	Protrusion	Material	PG	Part no.
26 mm	60 mm	Aluminium	3	**63077**
26 mm	100 mm	Aluminium	3	**63078**
26 mm	100 mm	316 Ti	3	63080

Adapter DIN 16281



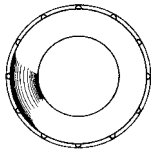
Female connection	Male connection	Material	PG	Part no.
G½	G½	Brass	2	**63095**
G½	G½	Steel	3	63097
G½	G½	316 Ti	3	63096

Seals



Shape	For thread	Material	PG	Part no.
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.
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

Piston type diaphragm seal

Diaphragm seal

In-line chemical seal

CHAPTER 12

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

OVERVIEW

DIAPHRAGM

PISTON

IN-LINE

ACCESSORIES

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 524**	**Page 528**	**Page 525**	**Page 525**	**Page 529**	**Page 530**

							
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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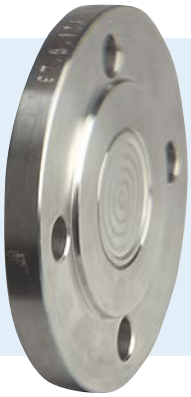
Page 532	**Page 537**	**Page 534**	**Page 539**	**Page 542**	**Page 547**	**Page 547**	**Page 548**

12

Chemical seals



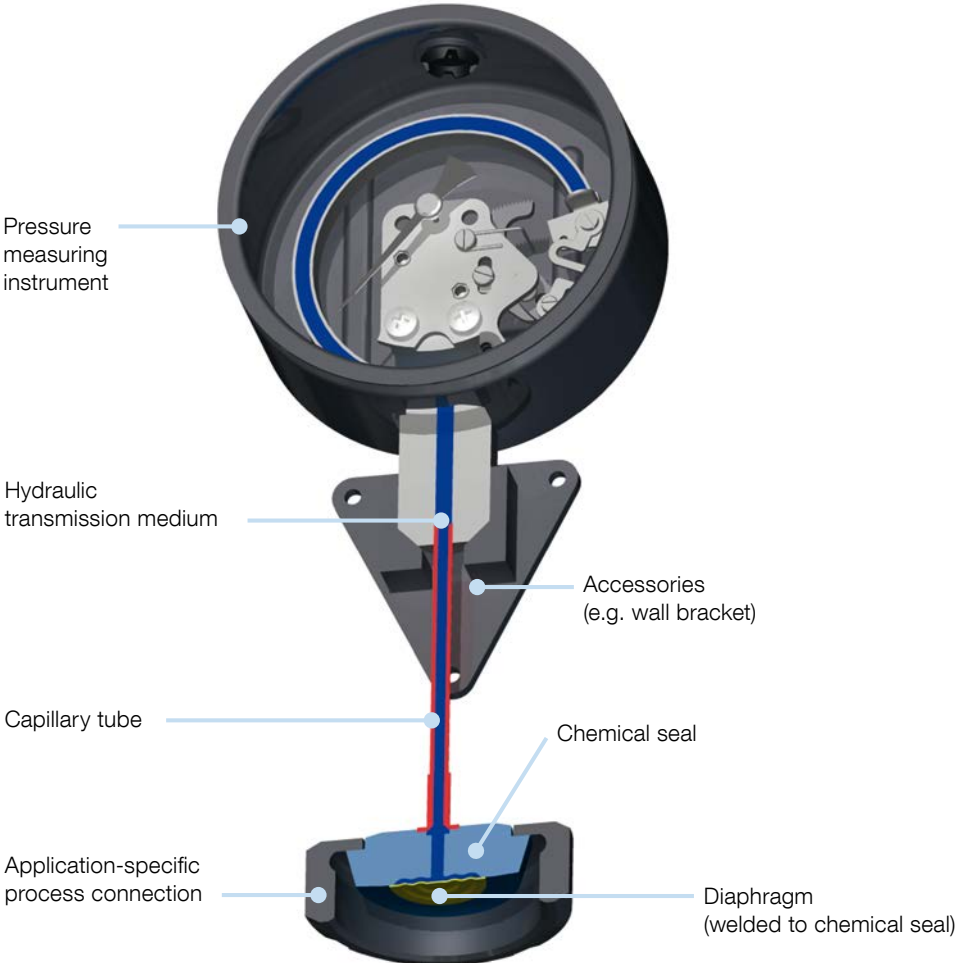
Application

Chemical seals are process connections with a separating diaphragm which separate the measuring system and the medium to be measured.
Chemical seals expand the application ranges of pressure gauges, pressure switches and pressure transducers.

Description

Chemical seals are used e.g. in the following situations:

- The medium must not come into contact with the measuring element, for example, because the medium is polluted, highly viscous, crystallises or hardens.
- The medium is corrosive and the special materials which are sufficiently corrosion-resistant cannot be used for elastic measuring elements.
- The ambient temperature at the measuring point or the temperature of the medium are extremely high.
- For hygienic reasons, there must be no dead space.
- The site conditions do not allow for direct installation of a pressure gauge.



Chemical seals

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 11

A Chapter 13

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

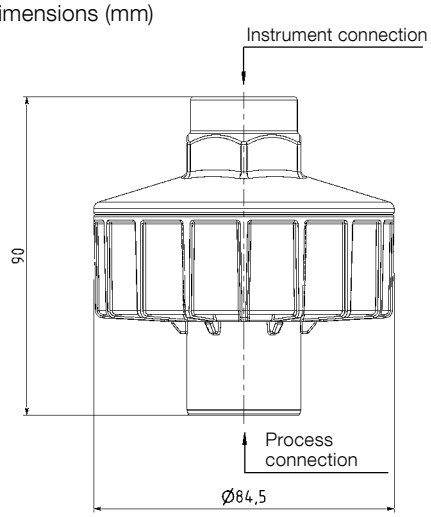
Instrument connection
Female thread G½ or G¼
PP GF 30

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

12

DG: M, PG: 1

MD 11 plastic version							
Chemical seal body	Process connection	Instrument connection	Minimum range (in bar) at nominal size				Part no.
			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 overview of versions

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 overview of versions

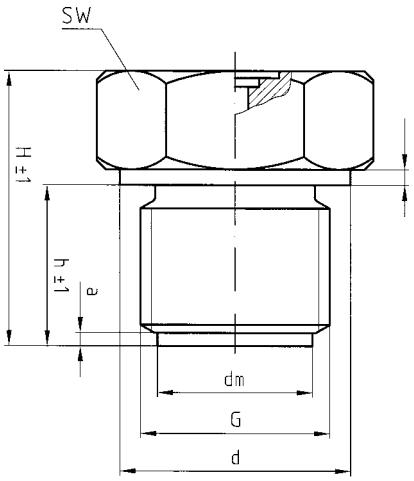
Nominal pressure
PN 40 to PN 250

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

Diaphragm seals MD 21/22

Types and dimensions (mm)

Type MD 21



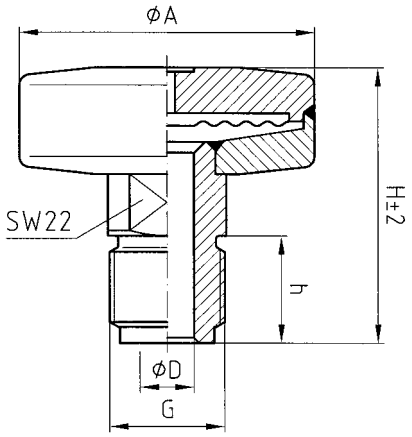
Pipe thread as per DIN 3852 type A
or ISO 228-1

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

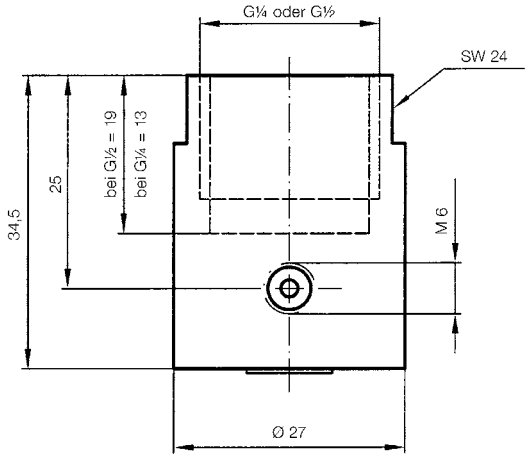
G	d	dm	h	H	a	b	SW
1"NPT	-	23.5	24	36	-	-	41
1½"NPT	-	35	25	45	-	-	55
2"NPT	-	48	26	50	-	-	70

Type MD 22

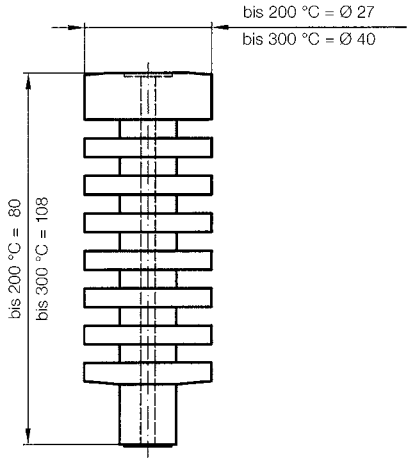


PN	G	ØA	ØD	h	H
40	G¼B	55	6	13	44.5
40	G$^{3}/_{8}$B	55	6	16	47.5
40	G½B	55	10	20	51.5
40	¼" NPT	55	6	15	46.5
40	½" NPT	55	10	20	51.5
250	G¼B	40	6	13	44.5
250	G$^{3}/_{8}$B	40	6	16	47.5
250	G½B	40	10	20	51.5
250	¼" NPT	40	6	15	46.5
250	½" NPT	40	10	20	51.5

Adapter for instrument connection G¼/G½
with filling port



Cooling element, can be welded at both ends



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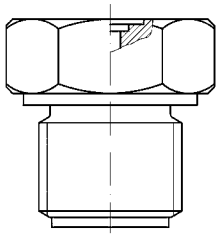
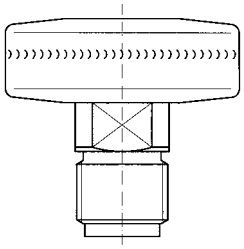
Diaphragm seals MD 21/22

DG: M, 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.
			63	100	160	DMU	DMU 13 Vario	
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	4	31328W
PN 600	G1½B	Welded	0.6	1.6	1.6	0.6	1.6	31329W
PN 600	G2B	Welded	0.6	0.6	0.6	0.6	0.6	31330W



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.
			63	100	160	DMU	DMU 13 Vario	
PN 40	G¼B	Welded	0.6	0.6	0.6	0.6	0.6	31997W
PN 40	G½B	Welded	0.6	0.6	0.6	0.6	0.6	31998W
PN 40	½-14 NPT	Welded	0.6	0.6	0.6	0.6	0.6	31999W
PN 250	G¼B	Welded	4	4	4	4	4	32000W
PN 250	G½B	Welded	4	4	4	4	4	32001W
PN 250	½-14 NPT	Welded	4	4	4	4	4	32002W

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) and an ambient 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

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See page 550 for options, mounting options and accessories.

Piston type chemical seals KD 21

- **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**

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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

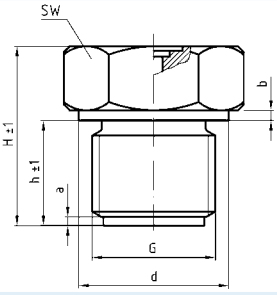
Nominal pressure
PN 600

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)
- Other measuring ranges



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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.
									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
PN 600	G2B	68	27	56	3	3.5	70	Welded	10	16	16	10	31424W
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
PN 600	1½–11½ NPT	-	25	45	-	-	55	Welded	10	16	16	10	31428W
PN 600	2–11½ NPT	-	26	50	-	-	70	Welded	10	16	16	10	31429W

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) and an ambient 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

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)

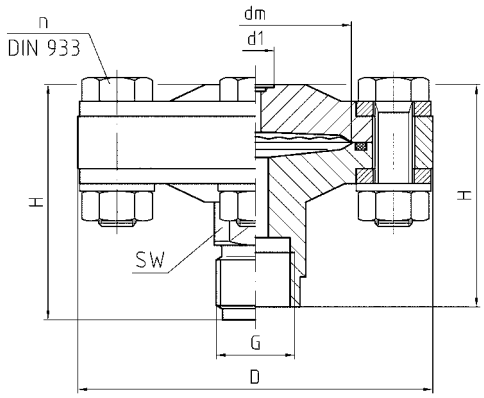
Screws and nuts
Stainless steel 304

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

Pressure ranges
See overview of versions

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
½-14 NPT	10	25	36	95	63	4xM10	22
G½	10	100	36	95	60	4xM10	22
G½B	10	100	36	95	63	4xM10	22
½-14 NPT	10	100	36	95	63	4xM10	22
G½	10	250	56	95	56	8xM10	22
G½B	10	250	56	95	79	8xM10	22
½-14 NPT	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

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 11

A Chapter 13

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

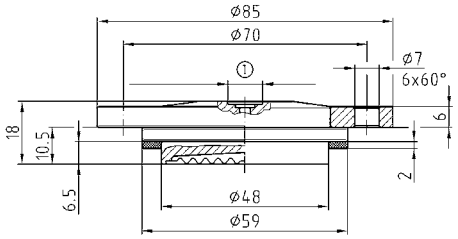
Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See overview of versions

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

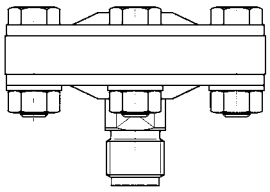
Diaphragm
- Special materials

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

Other
- Other filling liquids

Diaphragm seals MD 30/40

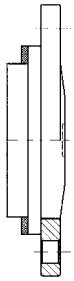
DG: M, PG: 3



MD 30 standard version

Nominal pressure	Process connection	Minimum range* (in bar) at nominal size					Part no.
		63	100	160	DMU	DMU 13 Vario	
PN 25**	Stainless steel 316 L, G½B	0.6	0.6	0.6	0.6	0.6	31417W
PN 100	Stainless steel 316 L, G½B	0.6	0.6	0.6	0.6	0.6	31331W
PN 250	Stainless steel 316 L, G½B	0.6	0.6	0.6	0.6	0.6	31332W

Possible options
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.
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 an ambient 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 connection (food)

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

A Chapter 11

A Chapter 13

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

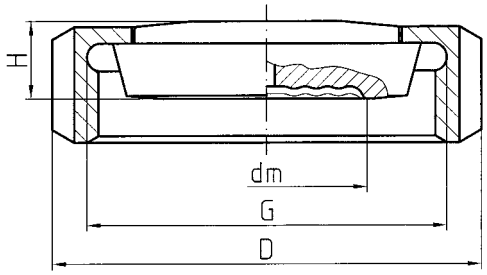
- Other designs (Südmo, Guth)
- Other materials
- Electropolished
- Cooling element
- Capillary
- Other pressure transmission liquids
- Accessories such as union nuts and seals
- Other process connections:

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"

Diaphragm seals MD 50/51

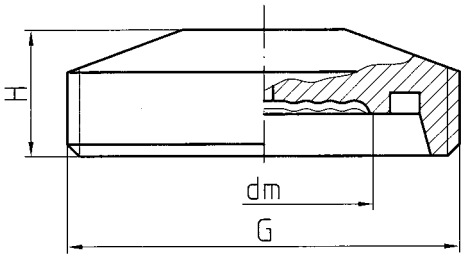
Types and dimensions (mm)

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



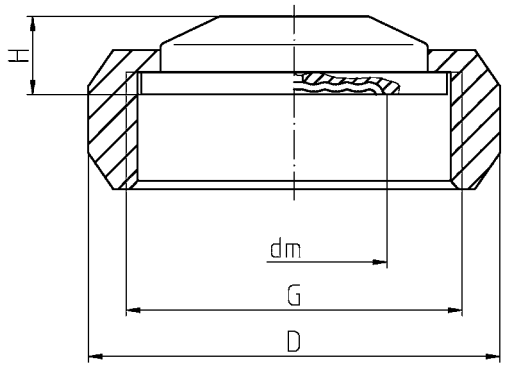
Type	DN	PN	dm	G	D	H
MD 50, DIN 11851	25	40	23.5	Rd52 x 1/6	63	14
	32	40	28	Rd58 x 1/6	70	14
	40	40	36	Rd65 x 1/6	78	14
	50	25	48	Rd78 x 1/6	92	15
	65	25	48	Rd95 x 1/6	112	16

Threaded socket DIN 11851 type C/DIN 11887 type A



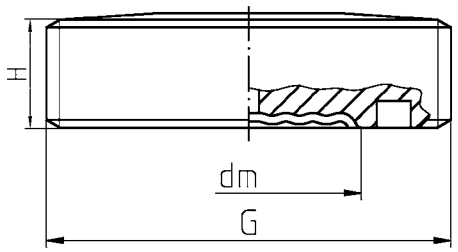
Type	DN	PN	dm	G	H
MD 50, DIN 11851	25	40	23.5	Rd52 x 1/6	21
	32	40	28	Rd58 x 1/6	21
	40	40	36	Rd65 x 1/6	21
	50	25	48	Rd78 x 1/6	21
	65	25	-	Rd95 x 1/6	-

Socket and union nut SMS 1147



Type	DN	PN	dm	G	D	H
MD 51, SMS standard	1½"	40	36	Rd60 x 1/6	74	14
	2"	40	48	Rd70 x 1/6	84	14
	2½"	25	48	Rd85 x 1/6	100	14

Threaded socket SMS 1147



Type	DN	PN	dm	G	H
MD 51, SMS standard	1½"	40	36	Rd60 x 1/6	17
	2"	40	48	Rd70 x 1/6	17
	2½"	25	48	Rd85 x 1/6	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")**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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 overview of versions

Nominal pressure
PN 25 to 40

Test
3-A-certified:
Nominal diameter 1½"– 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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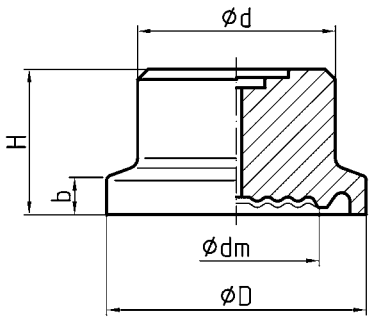
NovAseptic® is a registered trademark of Millipore AB.

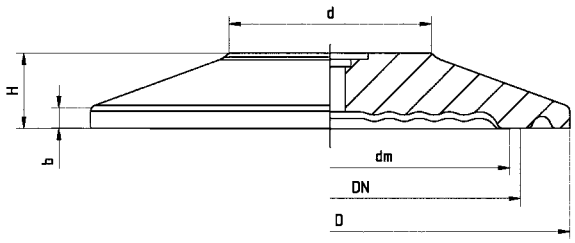
Diaphragm seals MD 60

Types and dimensions (mm)

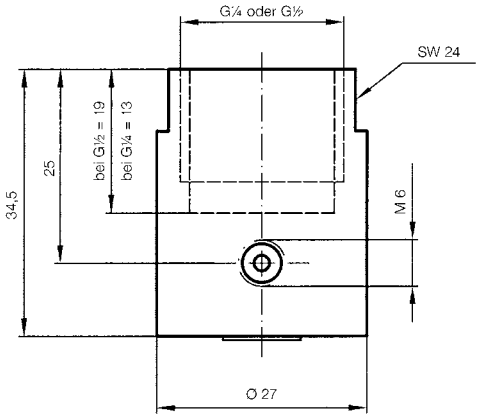
Clamp connection ¾" ISO 2852



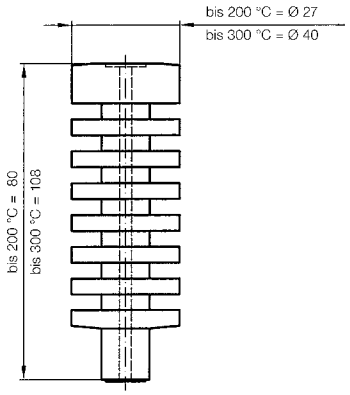
Clamp connection 1"–2½", ISO 2852



Adapter for instrument connection G¼B/G½B
with filling port



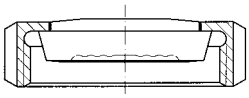
Cooling element,
can be welded at both ends



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

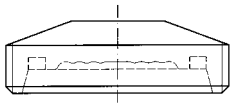
Diaphragm seals MD 50/51/60

DG: M, PG: 3



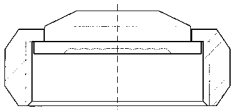
MD 50 for hygienic processes, grooved union nut DIN 11851

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size					Part no.
		63	100	160	DMU	DMU 13 Vario	
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	1	31302W
50	25	0.6	0.6	0.6	0.6	0.6	31303W
65	25	0.6	0.6	0.6	0.6	0.6	31304W



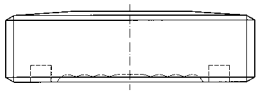
MD 50 for hygienic processes, threaded socket DIN 11851

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size					Part no.
		63	100	160	DMU	DMU 13 Vario	
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	1	31308W
50	25	0.6	0.6	0.6	0.6	0.6	31309W
65	25	0.6	0.6	0.6	0.6	0.6	31310W



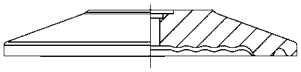
MD 51 for hygienic processes, grooved union nut SMS 1147

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size					Part no.
		63	100	160	DMU	DMU 13 Vario	
1½"	40	0.6	0.6	0.6	1	1	31314W
2"	40	0.6	0.6	0.6	0.6	1	31315W
2½"	25	0.6	0.6	0.6	0.6	0.6	31316W



MD 51 for hygienic processes, threaded socket SMS 1147

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size					Part no.
		63	100	160	DMU	DMU 13 Vario	
1½"	40	0.6	0.6	0.6	1	1	31320W
2"	40	0.6	0.6	0.6	0.6	1	31321W



MD 60 clamp connection ISO 2852

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size					Part no.
		63	100	160	DMU	DMU 13 Vario	
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	1	31324W
2"	40	0.6	0.6	0.6	0.6	0.6	31325W
2½"	25	0.6	0.6	0.6	0.6	0.6	31326W

* Valid for standard filling liquid with direct mounting (without capillary tube) at an ambient 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

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See page 550 for options, mounting options 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

A Chapter 11

A Chapter 13

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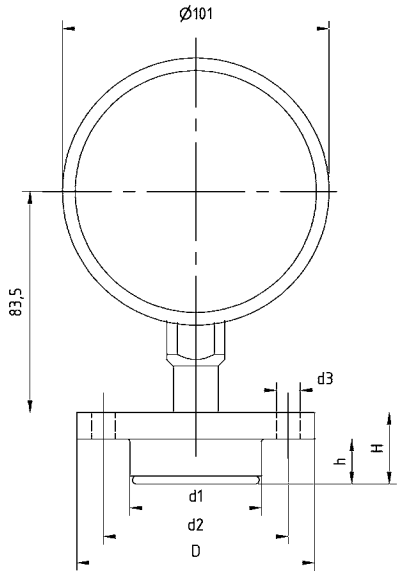
BioControl® is a registered trademark of NEUMO GmbH & Co.KG.

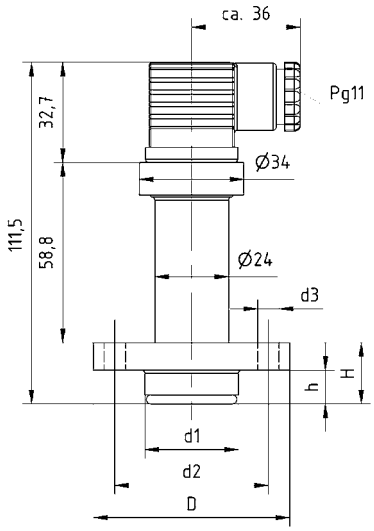
Diaphragm seals MD 56

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.
	63	100	160	DMU							
MD 56 BioControl® D25	4	4	4	1	64	30.4	50	4 x Ø 7	20	11	31410W
MD 56 BioControl® D50	0.6	0.6	1.6	1	90	49.9	70	4 x Ø 9	27	17	31411W
MD 56 BioControl® D65	0.6	0.6	0.6	0.6	120	67.9	95	4 x Ø 11	27	17	31412W
MD 56 BioControl® D80	0.6	0.6	0.6	0.6	140	87.4	115	4 x Ø 11	37	25	31413W

Blue part no. = in-stock items

Diaphragm seals MD 63 for VARINLINE® housing

- **Defined installation and press-fitting with metal stop**
- **Hygienic Design as per EHEDG recommendation**
- **Medium cannot get behind the seal**
- **SIP/CIP enabled**

A Chapter 11

A Chapter 13

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. 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

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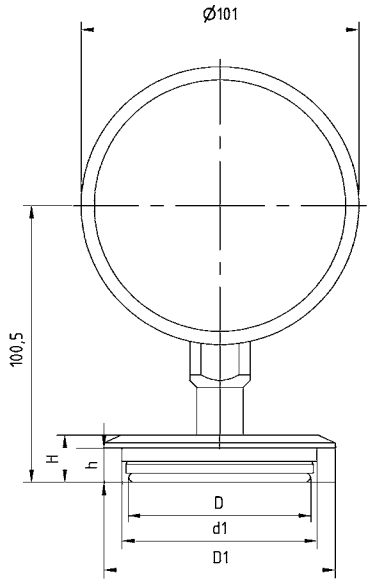
VARINLINE® and VARIVENT® are registered trademarks of GEA Tuchenhagen GmbH.

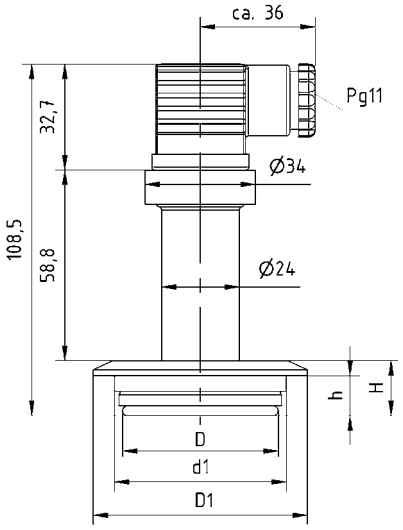
Diaphragm seals MD 63

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.
	63	100	160	DMU	DMU 13 Vario							
MD 63 VARIVENT® type F	4	4	---	1	1	50	66	53	17	12.3	DN 25; 1"	31340W
MD 63 VARIVENT® type N	0.6	0.6	0.6	0.6	0.6	68	84	71	17	12.3	DN 40-125; 1½"-6"	31341W

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

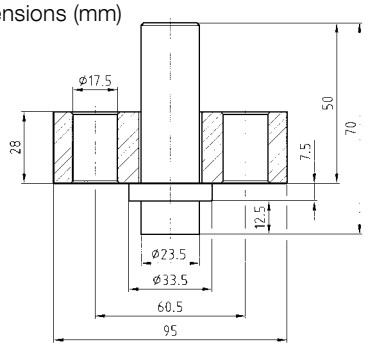
Instrument connection
Stainless steel 316 L
Welded connection

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

Pressure ranges
See overview of versions

Nominal pressure
PN 600

Dimensions (mm)



Options

- Other filling liquids

12

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 reduction without retaining flange	-	On request

*Valid for standard pressure transmission liquid with direct mounting (without capillary tube) **Blue part no.** = in-stock items and an ambient 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)**

A Chapter 11

A Chapter 13

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 overview of versions

Nominal pressure
PN 40
Class 150 to 300

Options

Process connection

- Special materials/coatings
- Other sealing surfaces
- Cell design

Diaphragm

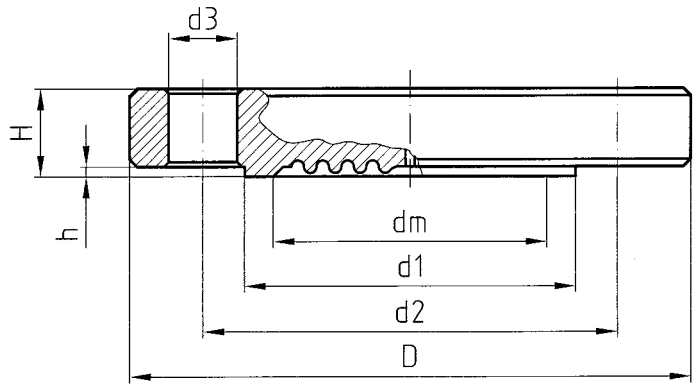
- Special materials: Hastelloy, Monel, nickel, Inconel, Incoloy, platinum, titanium, tantalum, zirconium other chrome-nickel-steel alloys
- Coatings/linings:
  PFA (up to 250 °C), ECTFE (up to 150 °C)
  PTFE (up to 150 °C, up to 100 bar)
  Silver (up to 150 °C), gold (up to 200 °C)

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

Diaphragm seals MD 80

Types and dimensions (mm)



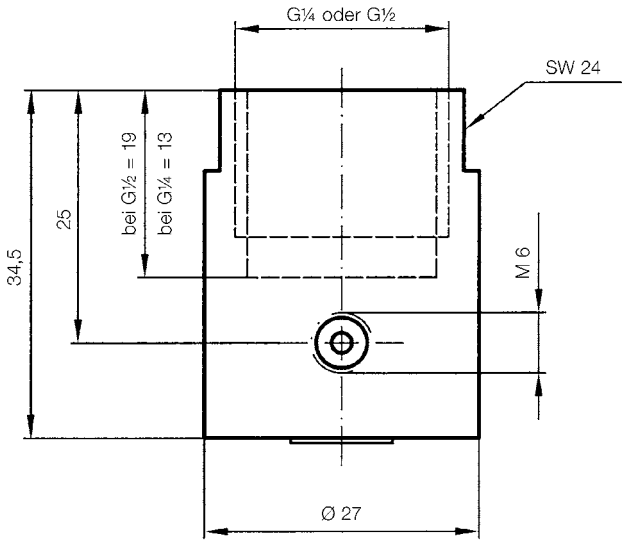
Flange connection as per EN 1092-1 type B 1

DN	PN	D	d1	d2	d3	H	h	dm
25	40	115	68	85	4 x 14	18	2	28
40	40	150	88	110	4 x 18	18	2	48
50	40	165	102	125	4 x 18	18	2	48
80	40	200	138	160	8 x 18	24	2	48
100	40	235	162	190	8 x 22	24	2	48

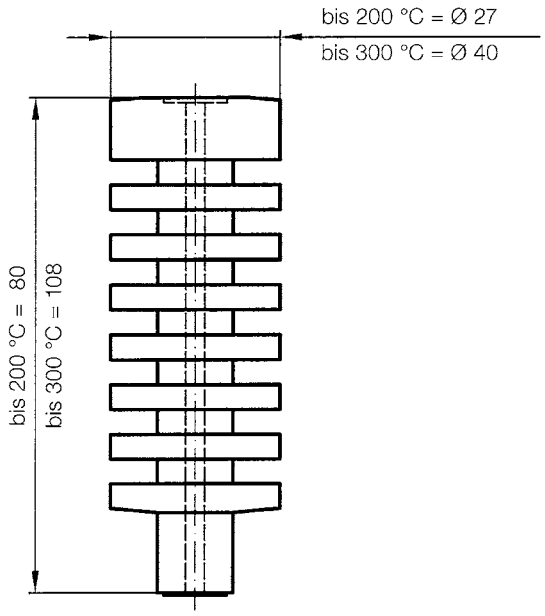
Flange connection as per ASME B 16.5 (Raised Face)

DN	CL	D	d1	d2	d3	H	h	dm
1"	150	108	50.8	79.4	4 x 15.9	14.3	1.6	28
	300	123.9	50.8	88.9	4 x 19.1	17.5	1.6	28
1½"	150	127	73.2	98.6	4 x 15.9	17.5	1.6	36
	300	155.6	73.2	114.3	4 x 22.4	22.4	1.6	36
2"	150	152.4	92.1	120.7	4 x 19.1	19.1	1.6	48
	300	165.1	92.1	127	8 x 19.1	25.4	1.6	48
3"	150	190.5	127	152.4	4 x 19.1	23.9	1.6	48
	300	209.6	127	168.3	8 x 22.4	31.8	1.6	48
4"	150	228.6	157.2	190.5	8 x 19.1	23.9	1.6	48
	300	254	157.2	200.1	8 x 22.3	31.7	1.6	48

Adapter for instrument connection G¼/G½
with filling port



Cooling element, can be welded at both ends



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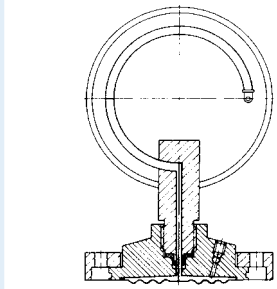
Diaphragm seals MD 81
Tubus flange version

- 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 11

A Chapter 13

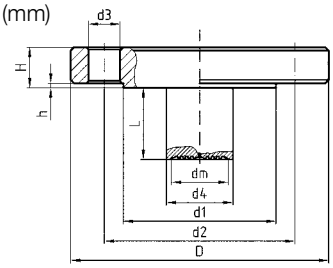
Application

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 overview of versions

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	4 x 18	48	20	3	50, 100, 150
80	40	200	138	160	8 x 18	76	24	3	
100	40	235	162	190	8 x 22	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	4 x 16	25	14.5	1.5	50, 100, 150
2"	150	152	92	121	4 x 19	48	19	1.5	
3"	150	190	127	152	4 x 19	76	24	1.5	

Options

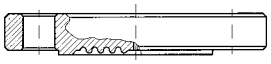
Process connection
- Other tubus lengths
- Special materials/coatings
- Other sealing surfaces

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

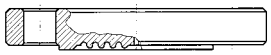
Diaphragm seals MD 80/81

DG: M



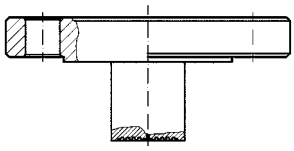
MD 80 flange version, flange connection as per EN 1092-1 type B 1

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size					PG	Part no.
		63	100	160	DMU	DMU 13 Vario		
25	40	4	4	-	0.6	-	3	31333W
40	40	4	4	-	0.6	0.6	3	31336W
50	40	0.6	0.6	0.6	0.6	0.6	3	31339W
80	40	0.6	0.6	0.6	0.6	0.6	3	31385W
100	40	0.6	0.6	0.6	0.6	0.6	3	31388W



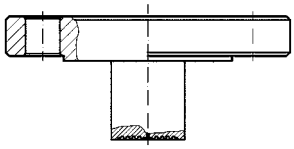
MD 80 flange version, flange connection as per ASME B 16.5 (Raised Face)

Nominal diameter DN	Nominal pressure CL	Minimum range*					PG	Part no.
		63	100	160	DMU	DMU 13 Vario		
1"	150	4	4	-	1	-	3	31393W
	300	4	4	-	1	-	3	31394W
1½"	150	4	4	4	1	1	3	31396W
	300	4	4	4	1	1	3	31397W
2"	150	0.6	0.6	0.6	0.6	0.6	3	31399W
	300	0.6	0.6	0.6	0.6	0.6	3	31400W
3"	150	0.6	0.6	0.6	0.6	0.6	3	31402W
	300	0.6	0.6	0.6	0.6	0.6	3	31403W
4"	150	0.6	0.6	0.6	0.6	0.6	3	31405W
	300	0.6	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.
		63	100	160	DMU	DMU 13 Vario		
50	40	1	2.5	-	1	On request	3	31917W
80	40	0.6	0.6	1	1	On request	3	31921W
100	40	0.6	0.6	1	1	On request	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.
		63	100	160	DMU	DMU 13 Vario		
1"	150	4	4	-	1	-	3	31938W
2"	150	1	2.5	-	1	On request	3	31929W
3"	150	0.6	0.6	1	1	On request	3	31931W

Options

	Nominal diameter DN		
Tubus length	50/2“	80/3“	100
100 mm	On request	On request	On request
150 mm	On request	On request	On request

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

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See pages 546/550 for options, mounting options and accessories.

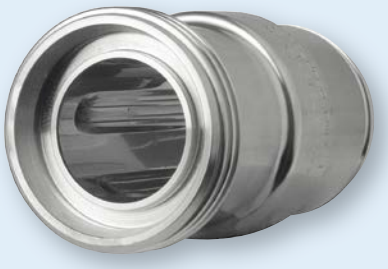
Options for diaphragm seals MD 80/81

DG: M

Type of sealing surface		**MD 80**	**MD 81**
Groove, type D EN 1092-1 (for stainless steel)		On request	On request
Tongue, type C EN 1092-1 (for stainless steel)		On request	On request
Groove, type RJF (Ring Joint Facings) ASME B 16.5		On request	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	On request
	DN 40	On request	On request
	DN 50	On request	On request
	DN 80	On request	On request
	DN 100	On request	On request
Tantalum	DN 25	On request	On request
	DN 40	On request	On request
	DN 50	On request	On request
	DN 80	On request	On request
	DN 100	On request	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	On request
	DN 40	On request	On request
	DN 50	On request	On request
	DN 80	On request	On request
	DN 100	On request	On request
PTFE, silver, gold	All nominal diameters	On request	On request

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

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



- For dairy fitting DIN 11851 and clamp connection ISO 2852
- No T piece required in pipe
- Easy, fast installation in pipe

Application

For 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

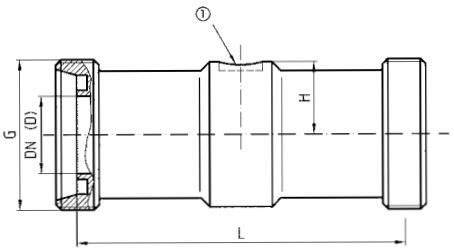
Pressure ranges
See overview of versions

Nominal pressure
See dimensions table

Options

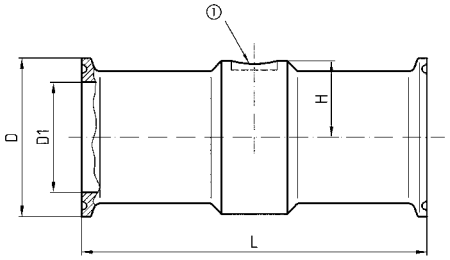
- Cooling element (> 100 °C)
- Capillary tube

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	Rd34 x 1/8"	240	16	20
25	40	Rd52 x 1/6"	110	26	24
32	40	Rd58 x 1/6"	110	32	29
40	40	Rd65 x 1/6"	110	38	31.5
50	25	Rd78 x 1/6"	110	50	37
65	25	Rd95 x 1/6"	110	66	45
80	25	Rd110 x ¼"	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

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 overview of versions

Nominal pressure
PN 4 to 400
Class 150 to 6000

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

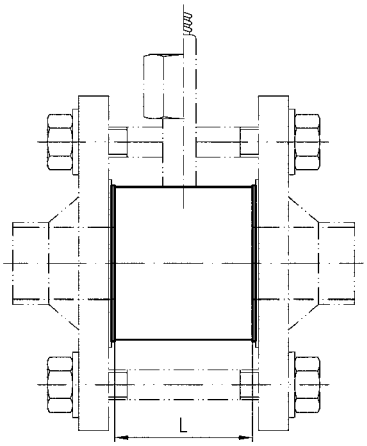
DN	Tue	PN	Da	L	H
25	28.5	4-400	68	100	29
40	43.1	4-400	88	100	29
50	54.5	4-400	100	100	29
65	70.3	4-400	120	100	29
80	82.5	4-400	138	60	29

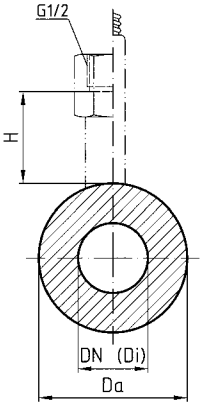
Flange connection as per ASME B 16.5

DN	Tue	CL	Da	L	H
1"	28.5	150–6000	50	100	29
1½"	43.1	150–6000	73.2	100	29
2"	54.5	150–6000	91.9	100	29
3"	82.5	150–6000	127	60	29
4"	107.1	150–6000	157.2	60	29

Options

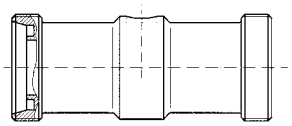
- Coatings
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids





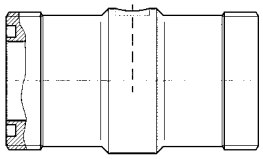
In-line chemical seals RD 50/51/60/80

DG: M, PG: 3



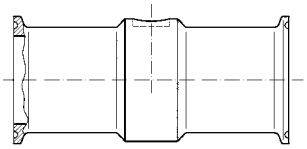
RD 50 for hygienic processes, male thread DIN 11851

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.
		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



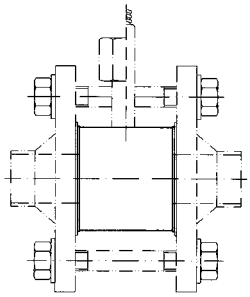
RD 51 for hygienic processes, threaded socket SMS 1147

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



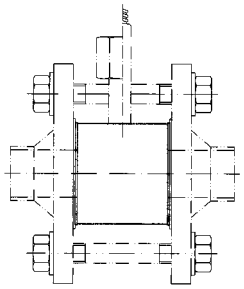
RD 60 clamp connection ISO 2852

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.
		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.
		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 DN	Nominal pressure CL	Minimum range*				Part no.
		63	100	160	DMU	
1"	150–6000	1.6	2.5	---	1.6	31360
1½"	150–6000	1.6	2.5	4	1.6	31361
2"	150–6000	1.6	2.5	2.5	1	31362
3"	150–6000	1.6	2.5	2.5	1	31363
4"	150–6000	1.6	2.5	2.5	1	31364

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

Blue part no. = in-stock items

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See page 550 for options, mounting options and accessories.

Chemical seals – mounting options and accessories

DG: M

The part number 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. Refer to the effective price list for details.

Mounting options[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.	Part no.
	---	3	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

Options			PG	**Available options**
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 / 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	-	---
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.	Version	PG	Part no.
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 = please order part no. twice.
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

Pressure transducers
for process engineering

HydroFox® for
level measurement

Pressure transducers
with local display

CHAPTER 13

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

		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								•
Temp. of the medium ≥ 100 °C	Application area		•	•	•	•	•	•	•
Temp. of the medium < 100 °C	Application area	•							
Temp. of the medium < -25 °C	Application area	•	•				•	•	•
Temp. 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	•	•	•	•	•	•	•	•
		P. 558	P. 559	P. 564	P. 566	P. 573	P. 577	P. 579	P. 583

* Depends on measuring range.
** Accuracy of mechanical local display.
*** Depends on version.

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	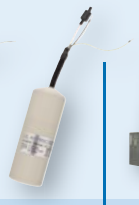									
DMU 08	DMU 09	DMU 10 D	DMU 11 D	DMU 13	DMU 14	DMU 20 D	DMU 21 D	DMU 30	DIM 20	DIM 30
0/100 mbar	0/40 mbar	0/6 mbar	0/20 mbar	0/600 mbar	0/400 mbar	0/0.25 mbar	0/1 bar	0/16 bar	0/1 bar	0/100 mbar
0/25 bar	0/10 bar	0/1 bar	0/16 bar	0/40 bar	0/600 bar	0/1,000 mbar	0/70 bar	0/1,000 bar	0/700 bar	0/400 bar
•/-	•/-	•/-	•/-	•/-	•/•	•/-	•/-	•/-		
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P. 585	P. 589	P. 591	P. 593	P. 597	P. 599	P. 602	P. 605	P. 608	P. 611	P. 613

13

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.

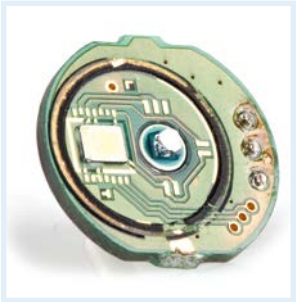
Measuring principle and measuring cell

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, DMU 13 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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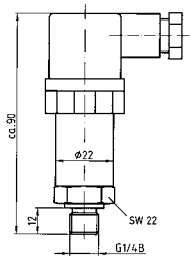
Dimensions (mm)



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.
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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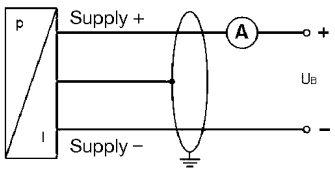
Wiring diagram
(4–20 mA, 2-wire)



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

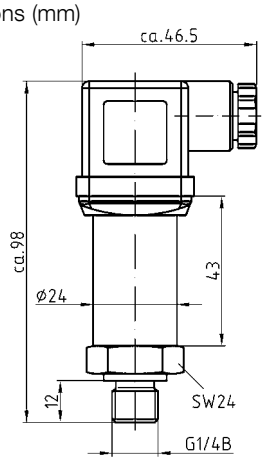
Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

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)



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Pressure transducers DMU 01
Standard version

- Proven ceramic technology
- No mechanical ageing of the measuring cell
- No transmission liquid
- Versions for relative pressure and absolute pressure
- Small temperature error


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Application

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

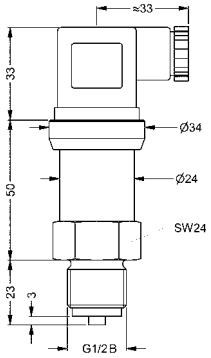
- Fixed cable connection
- Other output signals
- Other connection threads
- SIL 2 (IEC 61508/61511) 2-wire, for DMU 01 VM

SIL Protect your process!

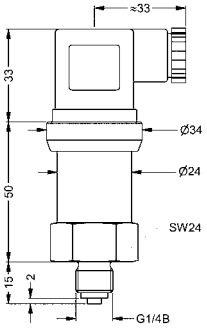
Pressure transducers DMU 01

Dimensions (mm) and electrical connections

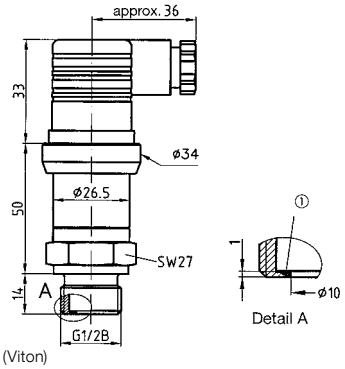
Connection G½B
EN 837



Connection G¼B
EN 837



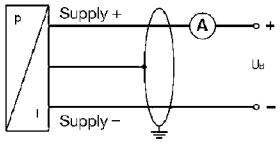
DMU 01 VM with connection G½B DIN 3852 type E
with protruding diaphragm DMU 01 VM



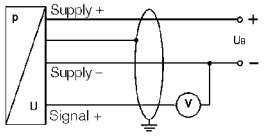
① Flat gasket FKM (Viton)

Wiring diagram

2-wire
4–20 mA



3-wire
0–10 V



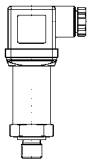
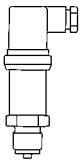
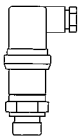
Pin assignment table

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

The units are shipped with a detailed connection diagram.

Pressure transducers DMU 01

DG: H, PG: 4

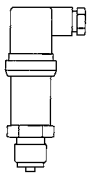
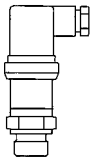
Type	DMU 01 K*	DMU 01	DMU 01 VM
Version			
Measuring principle	Piezo-resistive thick-film ceramic measuring cell		
Measuring accuracy (IEC 60770)	1 % FSO	0.5 % FSO (-1/0 bar 1 % FSO)	0.5 % FSO
Wetted parts	Ceramic/stainless steel 304/FKM		
Connection	G¼B DIN 3852 type E	G½B EN 837	G½ DIN 3852 type E 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.**
-1/0 bar	---	**31114**	31619
-1/+1.5 bar	31608	31616	31620
-1/+3 bar	31609	31617	31621
-1/+5 bar	31610	31618	31622
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	---
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

Options for pressure transducer DMU 01

DG: H

Type	DMU 01	DMU 01 VM
Version		
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 15 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

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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 304
Electr. measuring cell: Stainless steel 630/304
Seal: Without

Supply voltage
DC 10–32 V

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

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

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

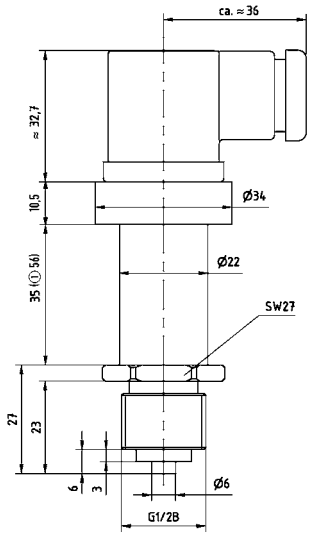
Options

- Other connection threads
- Fixed cable connection
- Other connectors
- Other output signals
- Cleaned for oxygen

Pressure transducers DMU 02

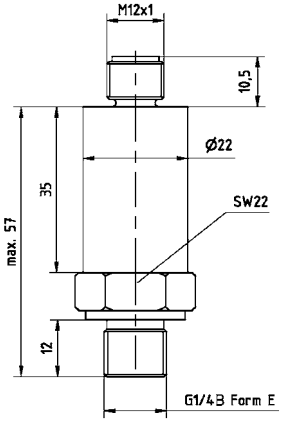
Dimensions (mm) and electrical connections

Connector ISO 4400 (DIN 43650-A)

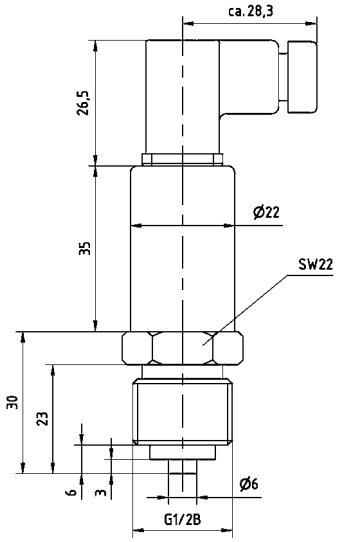


① Ex version

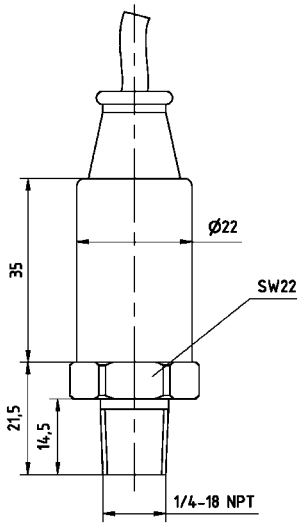
M12 connector



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 applied 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 316 Ti/316 L
Electr. measuring cell: Stainless steel 630/304
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 568 for dimensions.

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


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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 applied 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

Options

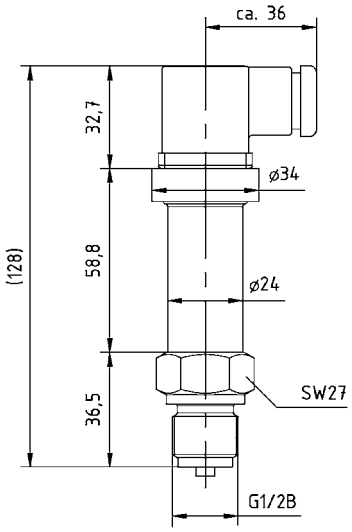
- Other process connections
- Other electrical connections
- Field housing (stainless steel)
- Filling for oxygen
- Other output signals
- Customer-specific setting (damping, unit)

i See page 568 for dimensions.

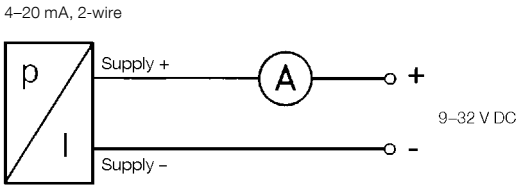
Pressure transducers DMU 02 Vario

Dimensions (mm) and electrical connections

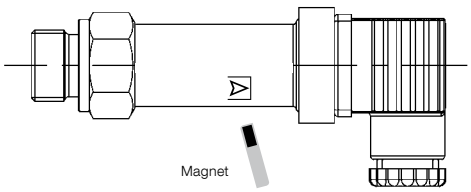
Connection G½B EN 837



Wiring diagram

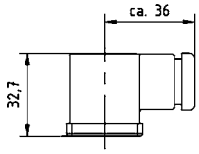


Setting the zero point

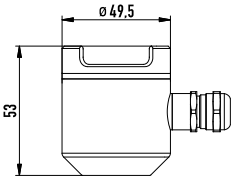


Modular system for great variety of versions

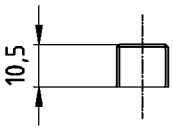
Plug



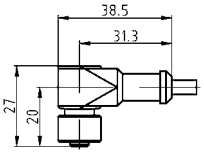
ISO 4400



Field housing



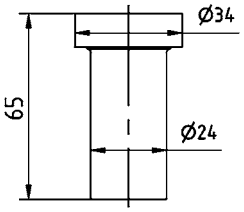
M12 x 1



M12 x 1 with junction box

Housing

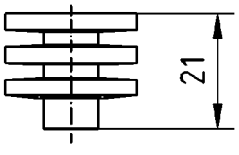
Transducer electronics



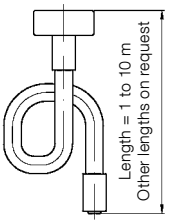
Thermal isolation

Direct mounting

Cooling element up to 180 °C

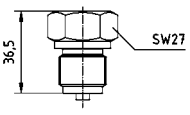


Capillary

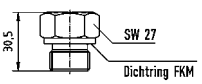


Process connections

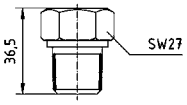
G½B EN 837



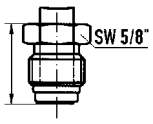
G½B DIN 3852-E



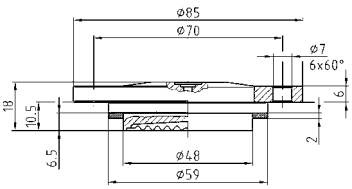
½–14 NPT



VCR 9/16-18 UNF



Chemical seals (e.g. MD 40)



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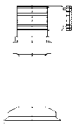
Pressure transducers DMU 02/DMU 02 Vario

DG: H, PG: 4

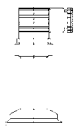
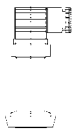
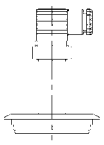
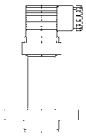
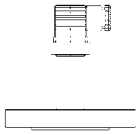
Type	DMU 02**	DMU 02 Vario Programmable*	DMU 02 Vario FBO flush with O ring	DMU 02 Vario CP Clamp
Version				
Measuring principle	Piezo-resistive polysilicon stainless steel measuring cell (thin-film)			
Measuring accuracy (IEC 60770)	0.5 % FSO	0.3 % FSO		
Wetted parts	Stainless steel 630/304	Stainless steel 630/316 L 316 Ti/304	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.**
-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
0/600 mbar	32807	32841	---	---
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	---
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).
** Minimum order quantity for non-stock items = 10 pieces

Blue part no. = in-stock items

Pressure transducers DMU 02 Vario

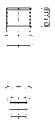
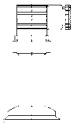
DG: H, PG: 4

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.**
-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
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

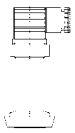
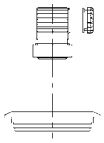
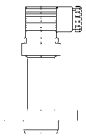
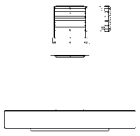
Options for DMU 02/DMU 02 Vario

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				
Connection G¼B EN 837	•	---	---	---
Connection G½B DIN 3852 type E	•	•	---	---
Connection G¼B DIN 3852 type E	•	---	---	---
Connection G½B DIN 3852 type A	On request	On request	---	---
Connection G¼B DIN 3852 type A	On request	---	---	---
Connection ¼–18 NPT	•	•	---	---
Connection ½–14 NPT	•	•	---	---
High pressure connection M20 x 1.5 female	---	---	---	---
Connection G½B (flush DIN 3852-A)	---	---	•	---
Connection G1B (flush DIN 3852 A)	---	---	•	---
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 page 550	---	---
Other materials	On request			
Coatings	---	---	On request	
Surface roughness ≤ 0.4 µm for diaphragm	---	---	•	•
High temperature version up to 180 °C	•	•	•	•
Capillary tube with spiral hose	---	See page 550	See page 550	See page 550
Cleaned for oxygen	•	•	---	---
Socket DIN EN 175301-803	•	---	---	---
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	•	---	---	---
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)	•	•	•	•

Options 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				
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"	---	On request	---	---
NEUMO BioControl® DN 50	---	---	On request	---
NEUMO BioControl® DN 65	---	---	On request	---
NEUMO BioControl® DN 80	---	---	On request	---
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	On request	On request	On request	On request
High temperature version up to 180 °C	•	•	•	•
Capillary tube with spiral hose	See page 550	See page 550	See page 550	See page 550
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)	On request	On request	On request	On request

* See options table DMU 04 for separate union nut.

Pressure transducers DMU 03
Industrial version

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


A Page 700


A Page 701


A Page 702

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
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 ≤ 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

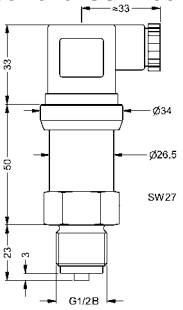
- Ex version Ex (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85°C Da)
- Other process connections
- Other electrical connections
- Field housing (stainless steel 303)
- Other seal materials
- Higher accuracy and overpressure safety
- Fitting of chemical seal
- SIL 2 (IEC 61508/61511) 2-wire

SIL Protect your process!

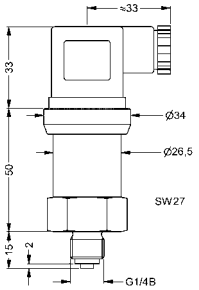
Pressure transducers DMU 03

Dimensions (mm) and electrical connections

Connection G½B
EN 837 and ISO 4400

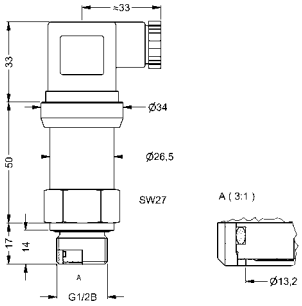


Connection G¼B
EN 837 and ISO 4400



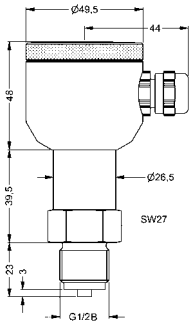
P_N 0/100 mbar to 0/40 bar: Length of housing 50 mm
P_N 0/60 bar to 0/600 bar: Length of housing 59 mm
Ex version: Length of housing 83 mm

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

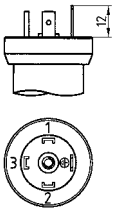
DMU 03 with G½B EN 837 and field housing



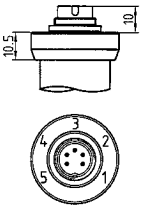
The Ex version is 26.5 mm longer.
(cable gland M12 x 1.5 brass, nickel-plated)

Electrical connections

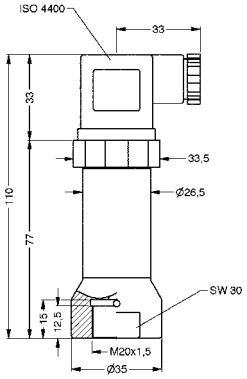
ISO 4400
(DIN 43650)



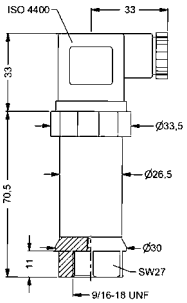
Binder 723



DMU 03 HD with M20 x 1.5 female thread and ISO 4400



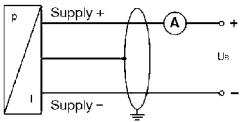
DMU 03 HD with 9/16-18 UNF female thread



Wiring diagram

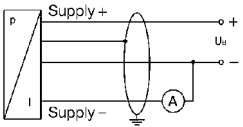
2-wire

4–20 mA

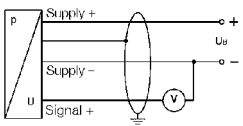


3-wire

0–20 mA



0–10 V



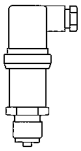
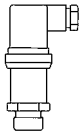
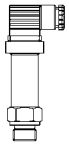
Pin assignment table

	Connector ISO 4400 (DIN 43650)	Binder Series 723	Cable colours (DIN 47100)	M12 x 1 4-pin
2-wire system:				
Supply +	1	3	White	1
(4–20 mA) Supply –	2	4	Brown	2
Earth	Earth pin	5	Yellow/green	4
3-wire system:				
Supply +	1	3	White	1
Supply –	2	4	Brown	2
Signal +	3	1	Green	3
Earth	Earth pin	5	Yellow/green	4

The units are shipped with a detailed connection diagram.

Pressure transducers DMU 03

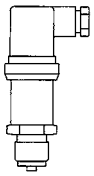
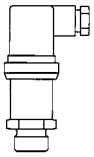
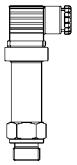
DG: H, PG: 4

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.**
-1/0 bar	31634	---	---
-1/+1.5 bar	31635	---	---
-1/+3 bar	31636	---	---
-1/+5 bar	31637	---	---
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	---
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	---	---
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

Options for pressure transducer DMU 03

DG: H, PG: 4

Type	DMU 03	DMU 03 VM	DMU 03 HD
Version			
Ex protection II 1G Ex ia IIC T4	•	•	•
Connection G¼B DIN 3852 type E	•	---	---
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	•
Connection 9/16 UNF female thread	---	---	•
Field housing (stainless steel 303)	•	•	•
Binder connector 723	•	•	•
M12 x 1, 4-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
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)	•	•	•

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i

See chapter 15 for digital display units and signal processing.

i

See chapter 12 for chemical seals.

Pressure transducers DMU 04 industrial version

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

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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

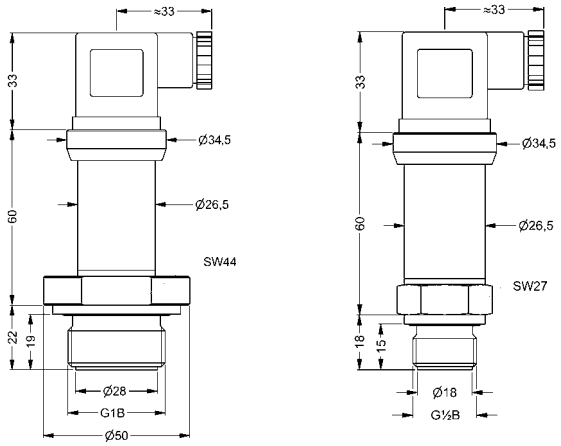
- Ex version Ex (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85°C Da)
- Other process connections
- Other electrical connections
- Field housing (stainless steel 303)
- High temperature version up to 300 °C
- Higher accuracy
- Union nut DN 25/40/50
- SIL 2 (IEC 61508/61511) 2-wire

SIL Protect your process!

Pressure transducers DMU 04

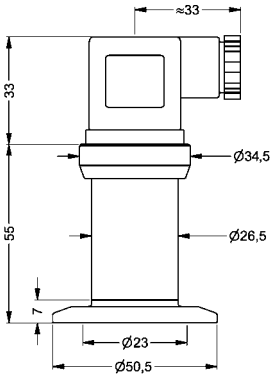
Dimensions (mm) and electrical connections

Threaded connections with flush diaphragm



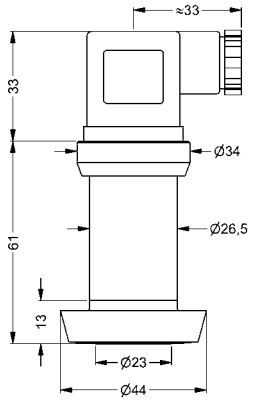
The SIL and Ex versions are 26.5 mm longer.

Clamp connection ISO 2852



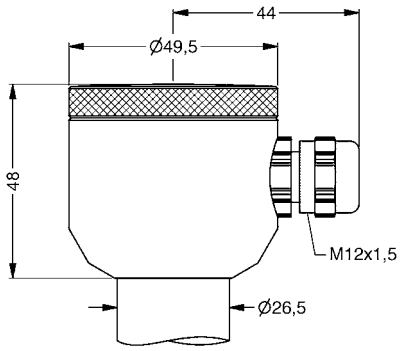
Clamp 1"

Conical dairy fitting DIN 11851



Conical dairy fitting DN 25

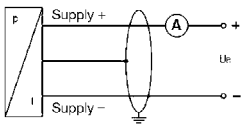
Field housing



Wiring diagram

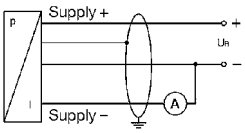
2-wire

4–20 mA

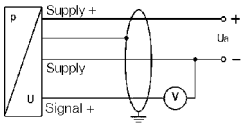


3-wire

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: Ex 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 DC 12–36 V
2-wire
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 (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T85°C Da)
- Other process connections
- Other electrical connections
- Other seal materials

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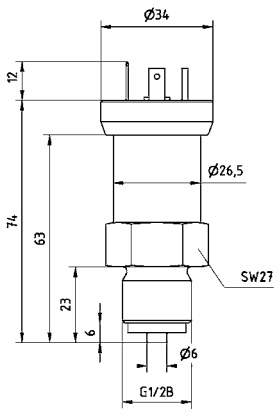
Pressure transducers DMU 05 P

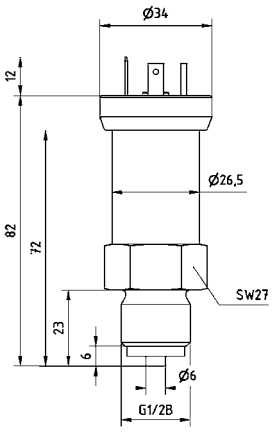
Dimensions (mm) and electrical connections

Connection G½B EN 837

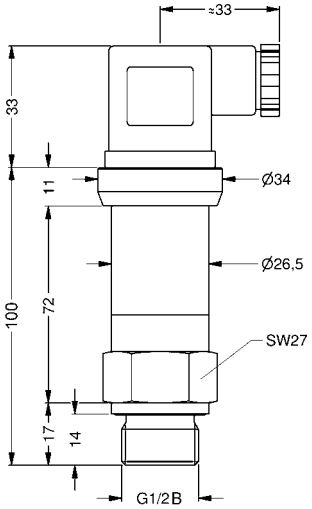
Version up to 0/40 bar:



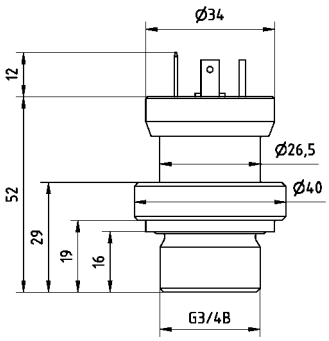
Version greater than 0/60 bar:



Connection G½B DIN 3852 type E with protruding diaphragm

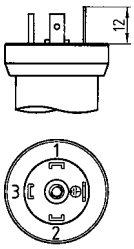


G¾B DIN 3852 type E
Screw-in version for level measurement

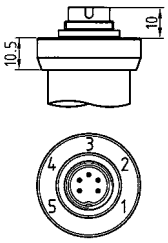


Electrical connections / cable outlet

ISO 4400
(DIN 43650-A)



Binder 723



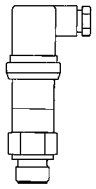
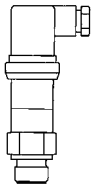
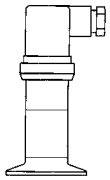
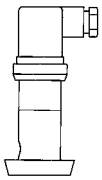
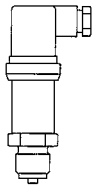
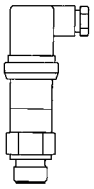
Pin assignment table

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

[1] Software, interface and cable must be ordered separately.
The units are shipped with a detailed connection diagram.

Pressure transducers DMU 04/DMU 05 P

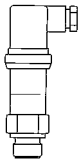
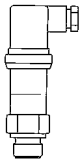
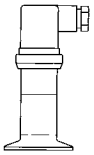
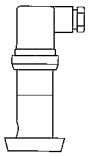
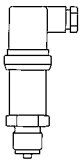
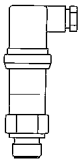
DG: H, PG: 4

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 flushdiaphragm	G1B DIN 3852-E with flushdiaphragm	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.**
-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	---
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
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
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

Options 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						
	Available options					
Ex protection II 1G Ex ia IIC T4	•	•	•	•	•	•
Clamp 1½" ISO 2852	---	---	•	---	---	---
Clamp 2" ISO 2852	---	---	•	---	---	---
Conical dairy fitting DIN 11851 DN 40	---	---	---	•	---	---
Conical dairy fitting DIN 11851 DN 50	---	---	---	•	---	---
Sep. union nut DIN 11851 DN 25	---	---	---	•	---	---
Sep. union nut DIN 11851 DN 40	---	---	---	•	---	---
Sep. union nut DIN 11851 DN 50	---	---	---	•	---	---
G1B with conical seal	---	•	---	---	---	---
Other process connections	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

i

See chapter 15 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
- Ex version (optional)

A
Page 700

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

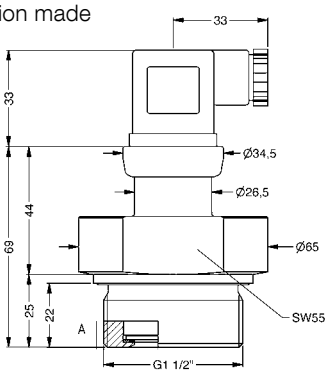
- Pressure connection made of PVDF
- Other seal materials
- Field housing (stainless steel 303)
- Higher accuracy
- Other output signals
- Ex version
  Ex II 1/2G Ex ia IIC T4 Ga/Gb
  Ex II 1G Ex ia IIC od. IIB T6 od. T4 Ga (metal housing)
  Ex II 1/2D Ex ia IIIC T 110° C Da/Db
  Ex II 10 Ex ia IIIC T 110° C (metal housing)

i
See chapter 1 for the complete "Level Measurement" range.

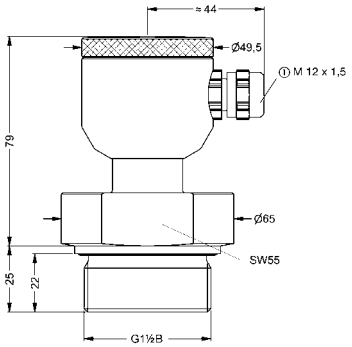
Pressure transducers HydroFox® DMU 07

Dimensions (mm) and electrical connections

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

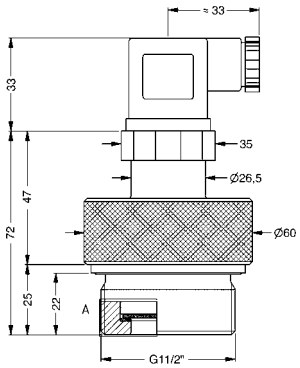


Connection G1½B – field housing



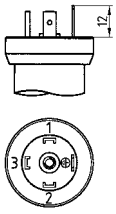
① Cable outlet

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

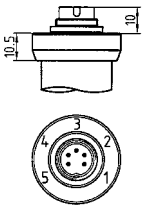


Electrical connections

ISO 4400 (DIN 43650-A)



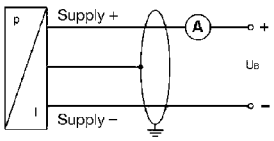
Binder 723



Wiring diagram

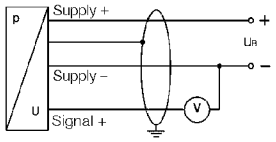
2-wire

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 Ex version optional

Page 702

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 589

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!

i See chapter 1 for the complete "Level Measurement" range.

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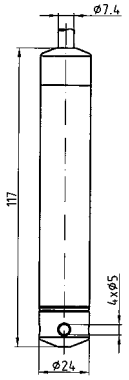
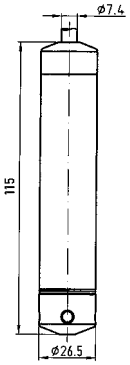
Pressure transducers HydroFox® DMU 08

Dimensions (mm) and electrical connections

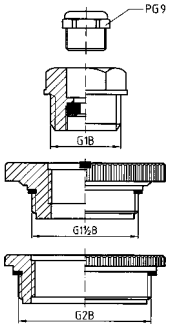
Standard version



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

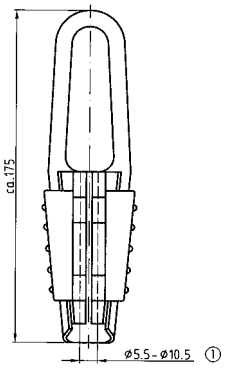


Screw connector kit

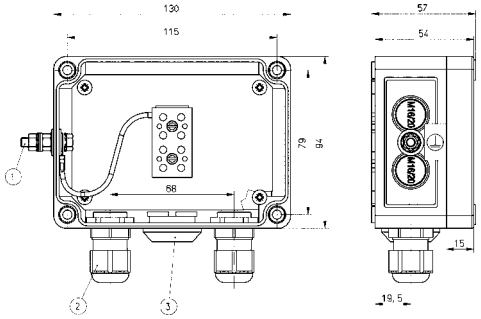


① Cable diameter

Anchor clamp



Junction box with pressure relief port

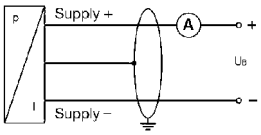


① Earth ② Cable gland ③ Pressure compensation element

Wiring diagram

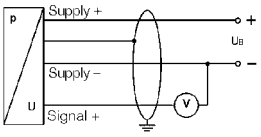
2-wire

4–20 mA



3-wire

0–10 V



Pin assignment table

	Cable colours (DIN 47100)
2-wire system: (4–20 mA) Supply +	White
Supply –	Brown
Earth	Yellow/green
3-wire system: (0–10 V) (0–20 mA) Supply +	White
Supply –	Brown
Signal +	Green
Earth	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	Quad-ruple	Triple	Quin-tuple	Octuple	Quin-tuple	Sex-tuple	Quad-ruple	Quad-ruple	Quin-tuple	Sex-tuple	Quad-ruple	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 589

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 12–30 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 1 for the complete "Level Measurement" range.

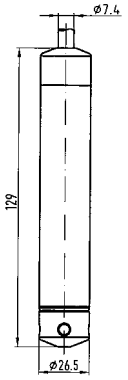
Options

- FEP cable
- Other measuring ranges on request

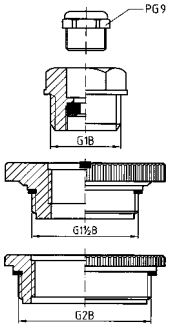
Pressure transducers HydroFox® DMU 08 T

Dimensions (mm) and electrical connections

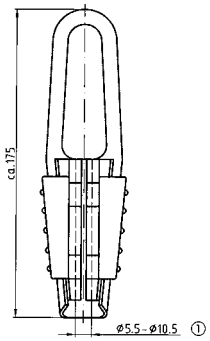
Standard version



Screw connector kit

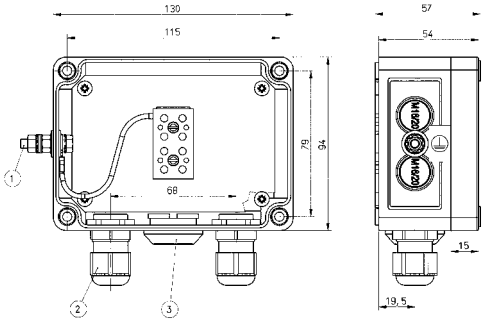


Anchor clamp



① Cable diameter

Junction box with pressure relief port

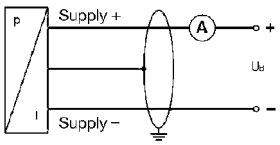


① Earth ② Cable gland ③ Pressure compensation element

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	Quad-ruple	Quad-ruple	Quad-ruple	Quin-tuple	Octuple	Quin-tuple	Sex-tuple	Quad-ruple	Quad-ruple	Quin-tuple	Sex-tuple	Quad-ruple	Quin-tuple	Triple	Triple
Max. pres-sure 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
- Ex 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 1/2G Ex ia IIC T4 Ga/Gb
  Ex II 1G Ex ia IIC od. IIB T6 od. T4 Ga (metal housing)
  Ex II 1/2D Ex ia IIIC T 110° C Da/Db
  Ex II 10 Ex ia IIIC T 110° C (metal housing)

i See chapter 1 for the complete "Level Measurement" range.

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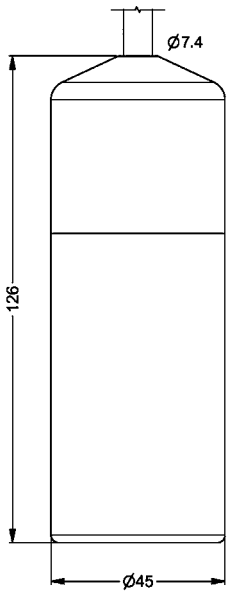
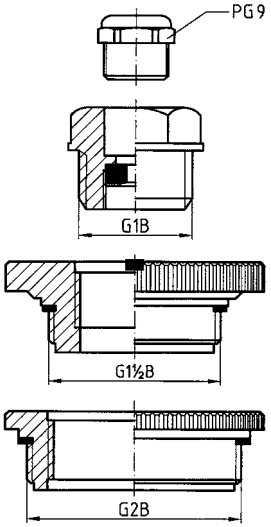
Pressure transducers HydroFox® DMU 09

Dimensions (mm) and electrical connections

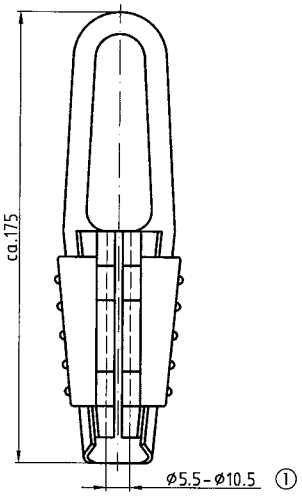
Standard version



Screw connector kit

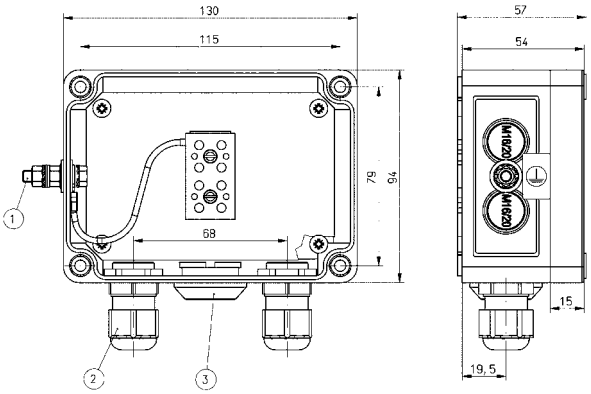


Anchor clamp



① Cable diameter

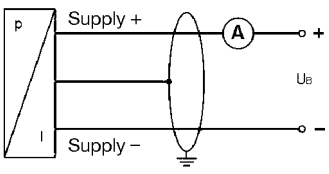
Junction box with pressure relief port



① Earth ② Cable gland PG 11 ③ Pressure compensation element

Wiring diagram

2-wire 4–20 mA



Pin assignment table

	Cable colours (DIN 47100)
2-wire system: Supply + (4–20 mA) Supply – Earth	White Brown 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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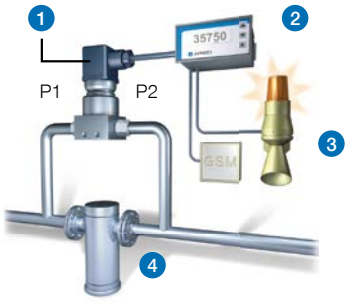


1 DeltaFox DMU 10 D
2 Digital display and control unit DA 14
3 Alarm filter replacement
4 Filter

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

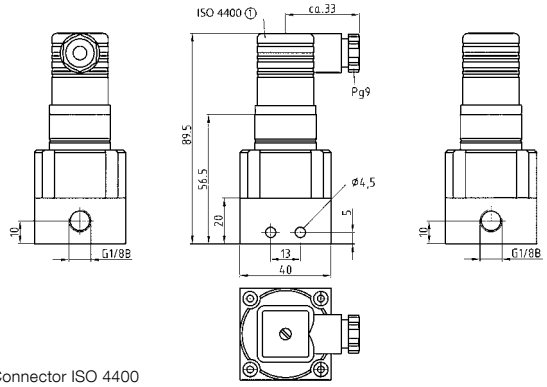
Options

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

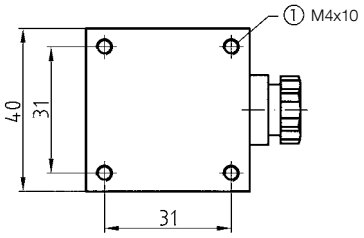
Pressure transducers DeltaFox DMU 10 D

Dimensions (mm) and electrical connections

Connection 2 x G¹/₈B female thread

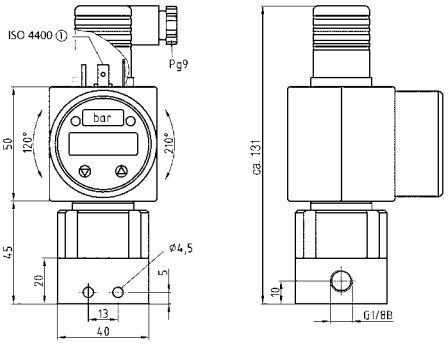


① Connector ISO 4400



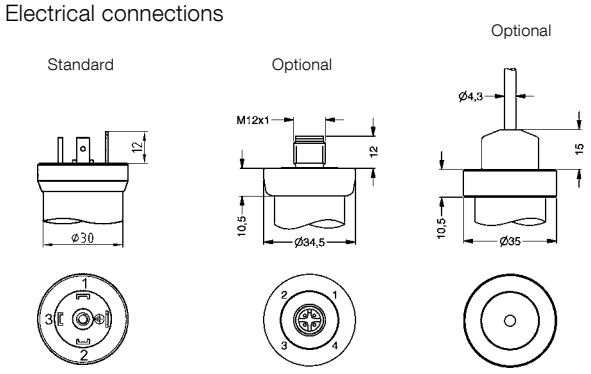
① Screw

DMU 10 D with plug-in display DA 06



① Connector ISO 4400

Electrical connections

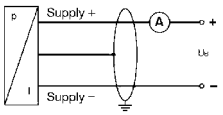


ISO 4400 (IP 65) | M12 x 1 4-pin (IP 67) | Cable outlet (IP 67)

Wiring diagram

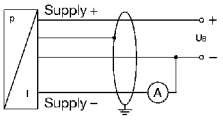
2-wire

4–20 mA

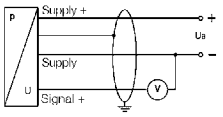


3-wire

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

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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 to 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

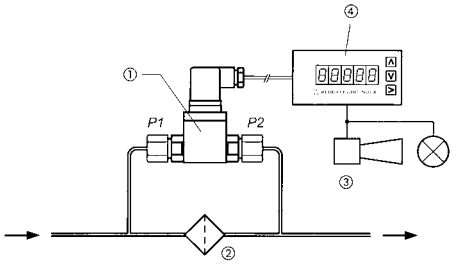
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

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

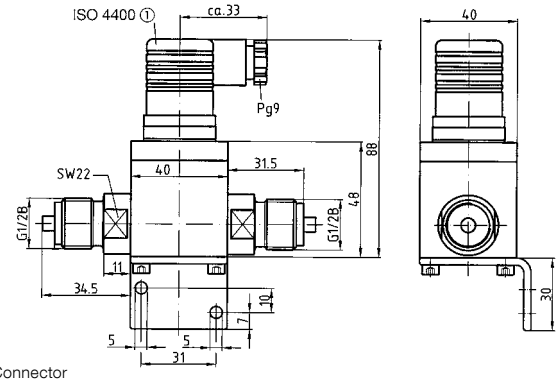
Options

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

Pressure transducers DeltaFox DMU 11 D

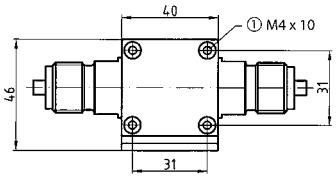
Dimensions (mm) and electrical connections

Connection 2 x G½B (EN 837)



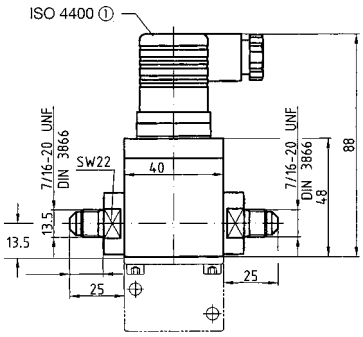
① Connector

Connection 2 x G½B (EN 837)



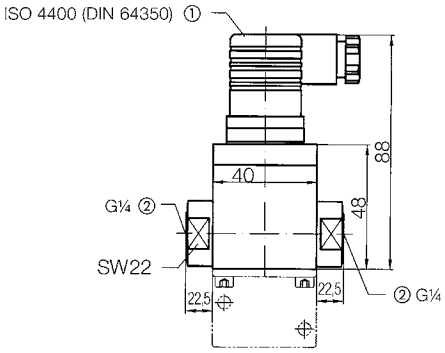
① Screw

Connection 2 x $^{7}/_{16}$ UNF



① Connector

Connection 2 x G¼ female thread

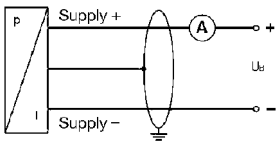


① Connector
② Pressure connection (female thread)

Wiring diagram

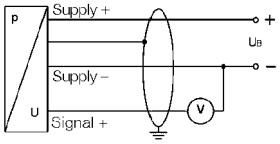
2-wire

4–20 mA



3-wire

0–10 V



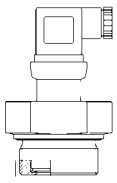
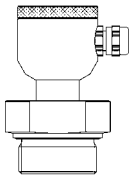
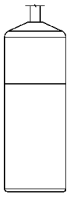
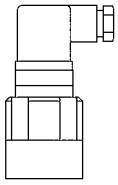
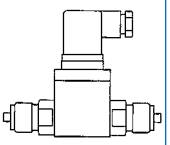
Pin assignment table

Pin assignment	ISO 4400 (DIN 43650)
2-wire system: Supply + (4–20 mA) Supply – Earth	1 2 Earth pin
3-wire system: Supply + Supply – (0...10 V) Signal + Earth	1 2 3 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 G$^{1}/_{8}$B female thread	2 x G½B EN 837
Supply voltage	DC 9–32 V	DC 9–32 V	DC 12–36 V	DC 10 (12)–30 V	DC 9–32 V	DC 8–32 V	DC 12–36 V
Output	4–20 mA	4–20 mA	4–20 mA	2x 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.
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	---	---	---

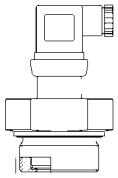
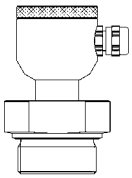
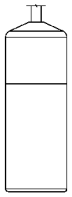
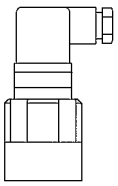
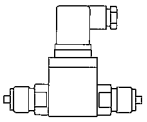
* Please specify required nominal pressure/maximum static pressure when ordering.
** 0–30 °C, designation: 0030/0–50 °C, designation: 0050/0–70 °C, designation: 0070, standard temperature range: 0–70 °C. Replace the designation of the part number, if necessary.
*** Electrical connection 15 m PUR cable.

Blue part no. = in-stock items

See page 596 for options and accessories.

Options/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							
	Available options						
Ex protection	•	•	•	---	•	---	---
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 0.25 % FSO)	•	•	---	---	---	---	---
SIL 2 (only for 4–20 mA)	---	---	•	---	---	---	---

Accessories for DMU 08/ DMU 09

DG: H	PG	Part no.
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 15 for digital display units and signal processing.

Pressure transducers DMU 13 Vario with local display

NEW

- Robust stainless steel housing
- High-precision measurements with integrated transducer
- Mechanical, power-independent local display
- Zero correction via magnet

DMU 13 Vario with cooling element and chemical seal

A Chapter 12

A Page 702

Application

For pressure measurements with a power-independent local display in combination with an electrical output signal.

Description

The DMU 13 Vario pressure transducers consist of a mechanical Bourdon tube measuring element and a piezo-resistive polysilicon thin-film 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. The zero point of the electronic sensor can be corrected from the outside via a permanent magnet after voltage has been applied and within a given time window.

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): < ± 0.3 % FSO

Measuring ranges
Relative pressure: -1/0 bar, 0/0.6 bis 0/400 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: -10/+85 °C
Ambient: -10/+60 °C
Storage: -10/+70 °C

Housing
Stainless steel 304 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)

Wetted parts
Pressure connection Stainless steel 316 L/316 Ti
Electr. measuring cell: Stainless steel 630/304
Seal: Without

Electrical connection
Junction box

Additional data transducer

Output signal/supply voltage
4–20 mA, DC 10–32 V
2-wire

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

Current input
4–20 mA < 25 mA

Temperature error band
In compensated range
-10/+80 °C ≤ 0.15 % FSO/10 K

Options

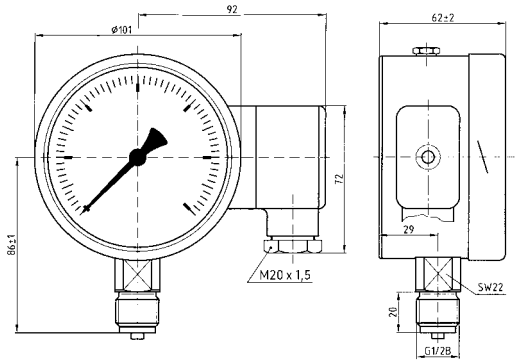
- Housing filling (paraffin oil)
- Electrical contacts
- Other process connections
- Fitting of chemical seal
- Range for positive and negative overpressure, e.g. -1/+3 bar

Pressure transducers DMU 13 Vario

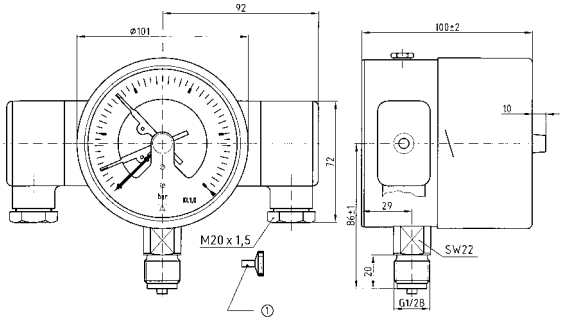
NEW

Dimensions (mm) and electrical connections

Bottom connection



Bottom connection, with electrical contact



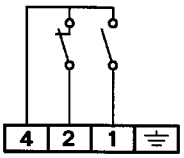
① Removable key, delivered loose with the unit.

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

Supply +	1
Supply –	2
Earth	Earth pin

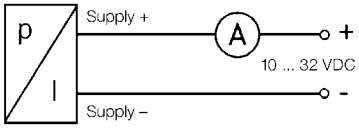
Pin assignment table for electrical contact (left junction box). Example: Magnetic spring contact MK2.12

Normally open contact	1
Normally closed contact	2
Supply	4



Wiring diagram

2-wire, 4–20 mA



13

Pressure transducers DMU 14 DG/FG Ex
Intelligent precision version

DMU 14 DG Ex

- **Version DMU 14 FG Ex with Ex 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)

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

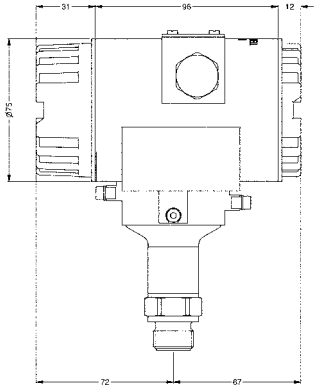
DMU 14 DG Ex
Ex II 2G Ex ia II B T4 Gb
and
Ex II 1D Ex ia III C T85 °C Da

Options

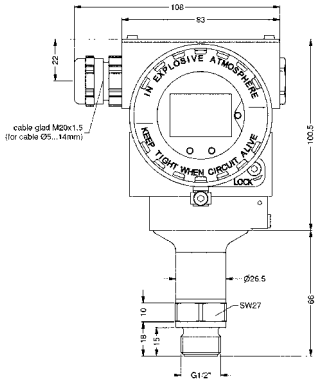
- Other process connections
- High temperature version up to 300 °C (only for connection G½ DIN 3852 with protruding diaphragm)

Dimensions (mm) and electrical connections

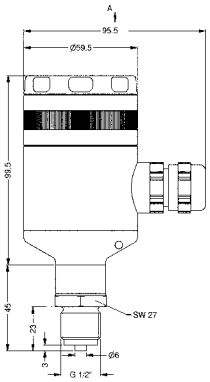
DMU 14 DG Ex



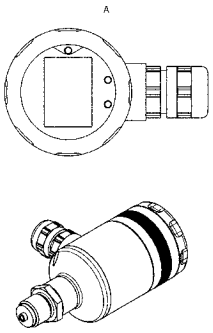
DMU 14 DG Ex



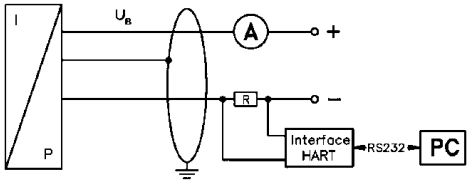
DMU 14 FG Ex



DMU 14 FG Ex



Wiring diagram

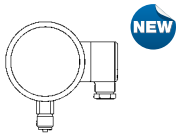
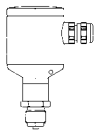
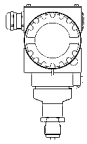


Pin assignment table

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 transducer DMU 13 – DMU 14

DG: H, PG: 4

Type	DMU 13 Vario	DMU 14 FG Ex	DMU 14 DG Ex
Version			
Housing Ø	100	60	75
Housing	Stainless steel	Stainless steel	Aluminium
Measuring accuracy	0.3 % FSO Pressure gauge: class 1.0	0.1 % FSO	0.1 % FSO
Wetted parts	Stainless steel 630/304/316 Ti/316 L	Stainless steel 316 L/FKM	Stainless steel 316 L/FKM
Connection	G½B	G½B	G½B
Supply voltage	DC 10–32 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.**
0/400 mbar	---	31977	31987
-1/0 bar	31200	---	---
0/0.6 bar	31201	---	---
0/1 bar	31202	31978	31988
0/2 bar	---	31979	31989
0/2.5 bar	31203	---	---
0/4 bar	31204	31980	31990
0/6 bar	31205	---	---
0/10 bar	31206	---	---
0/16 bar	31207	---	---
0/25 bar / 0/20 bar*	31208	31981	31991
0/40 bar	31209	31982	31992
0/60 bar	31210	---	---
0/100 bar	31211	31983	31993
0/160 bar	31212	---	---
0/250 bar / 0/200 bar*	31213	31984	31994
0/400 bar	31214	31985	31995
0/600 bar	---	31986	31996
Options en (without PG)	**Available options**		
Housing filling (paraffin oil)	•	---	---
Without display – reduced price	---	•	•
Fitting of chemical seal	See chapter chemical seals		
High-temperature version +300 °C	---	•	•
Measuring range -1/xx bar	On request	•	•
Pressure transmission liquid food oil	---	•	•
Absolute pressure (measuring ranges according to data sheet)	---	•	•
Magnetic pin MP 8	**56227**	---	---

* Applies to DMU 14 DG/FG Ex only.

Blue part no. = in-stock items

13

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

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)

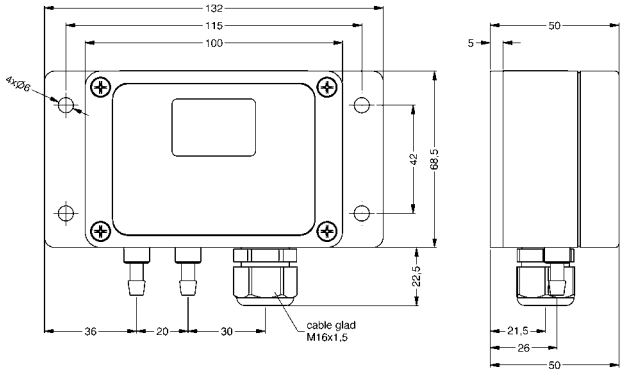
CE conformity
EMC Directive: 2014/30/EU
RoHS Directive 2011/65/EU

Options
- Other process connections
- Other output signals

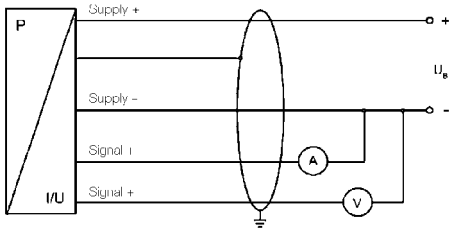
Pressure transducers DeltaFox DMU 20 D
Version for differential pressure measurement

Dimensions (mm) and electrical connections

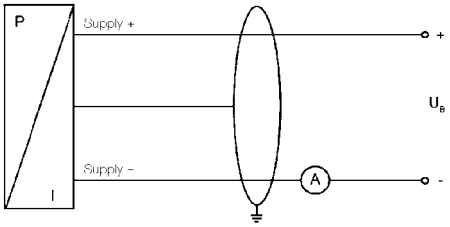
DMU 20 D



Wiring diagram

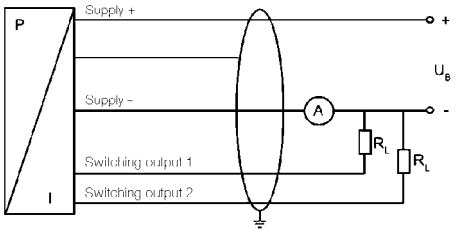


3-wire



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

DG: H, PG: 4

1 Pressure transducer DMU 20 D

33409	DMU 20 D

2 Pressure type

D	Differential pressure
R	Relative pressure

3 Output

01	Analogue output 0 (4)–20 mA and 0–10 (5) V / 3-wire
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
054	0/4
002	0/10
005	0/40
009	0/250
012	0/1,000

5 Process connection

1	Hose olive Ø 6.6 x 11 mm, for flexible hoses with inner diameter 6 mm
2	Hose olive Ø 4.4 x 10 mm, for flexible hoses with inner diameter 4 mm

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

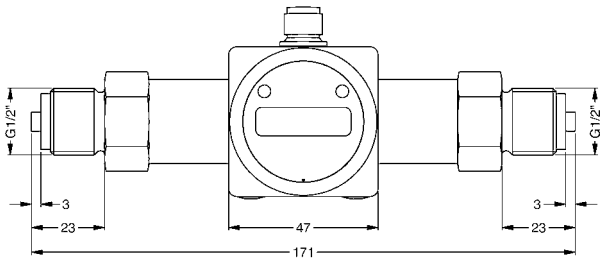
Scope of delivery
DMU 21 D, mounting bracket and 2 screws

Options
- Other process connections
- 2 x PNP open collector switching outputs
- Fixed cable connection with 2 metres PVC cable

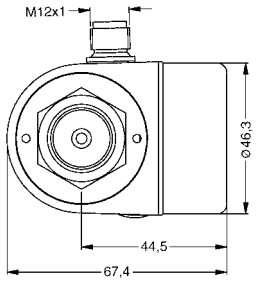
Pressure transducers DeltaFox DMU 21 D
Version for differential pressure measurement

Dimensions (mm) and electrical connections

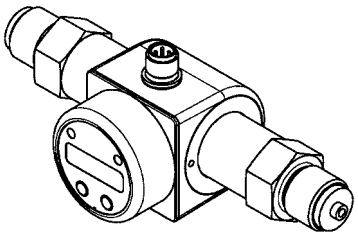
DMU 21 D



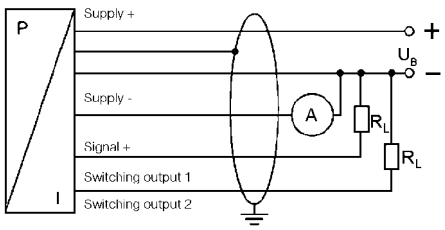
DMU 21 D



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

1 Pressure transducer for differential pressure DMU 21 D

33410	DMU 21 D

2 Electrical connection

1	Connector M12 x 1, 5-pin

3 Output

01	Analogue output 4–20 mA, 3-wire + 1 x PNP open collector switching output
02	Analogue output 4–20 mA, 3-wire + 2 x PNP open collector switching output

4 Measuring range in bar

109	0/1.0
150	0/2.0
151	0/3.5
152	0/7.0
153	0/20
154	0/35
155	0/70

5 Process connection

01	G½B (DIN 3852)
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
9	Others

Ordering code

Example: 0/20 bar, G½B (DIN 3852)

33410	1	01	153	01	1

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Pressure transducers DMU 30 industrial version

- For pressure ranges up to 1,000 bar
- Suitable for high overloads
- Insensitive to pressure peaks
- Ex version (optional)

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Application

For electronic pressure measurement in machines and systems with technical gases (e.g. oxygen, oil-free, grease-free) and for use in hydrogen applications.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 30 is equipped with a welded stainless steel 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

Long-term stability
≤ ±0.2 % FSO/year at reference conditions

Measuring ranges
Relative pressure: 0/16 bar to 0/1,000 bar

Overpressure safety
- 16 bar: Overload = 3 x FS
- > 16 bar: Overload = 2 x FS
- > 600 bar: Overload = at least 1.5

Burst pressure at least 5 x FS, except for
- 600 bar: Burst pressure = 2,000 bar
- > 600 bar: Burst pressure = at least 3 x FS
- 1,000 bar: Burst pressure = 3,000 bar
  UL-compliant, max. burst pressure = 2,420 bar
- Vacuum resistance: Unlimited

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

Temperature error band
- P_N ≥ 16 bar up to 1,000 bar ≤ ±0.2 % FSO/10K in compensated range -25/+85 °C

Dynamic characteristics
Response time: 2-wire ≤ 10 ms

Process connection
G¼B (EN 837-1/7.3) PN ≤ 600 bar
G½B (EN 837-1/7.3)
¼"-18 NPT

Materials
Housing: Stainless steel 316 L
Pressure connection: Stainless steel 316 L
Diaphragm: Stainless steel 316 L
Seal: Without (welded)
Degree of cleanliness:
Oil-free and grease-free version based on ISO 15001
Residual particles:
No particles > 100 µm (with reference to 10 dm^2)
Residual grease:
Residual grease content < 0.2 mg/dm^2

Output signal/supply voltage

4–20 mA, 2-wire	DC 8–32 V
Ex version	DC 10–28 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
M12 x 1, 4-pin (IP 67)

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

Options

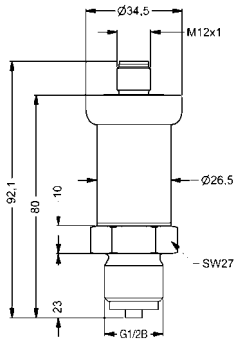
- Ex version Ex zone 0+20 (II 1G Ex ia IIC T4 Ga, II 1D Ex ia IIIC T135 °C Da)
- Other electrical connections
- Other output signal
- Fitting of chemical seal

Pressure transducers DMU 30 industrial version

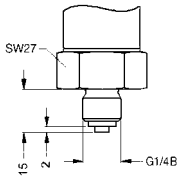
NEW

Dimensions (mm) and electrical connections

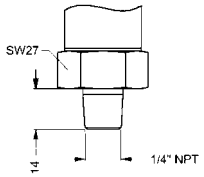
Connection G½B (EN 837-1/7.3)



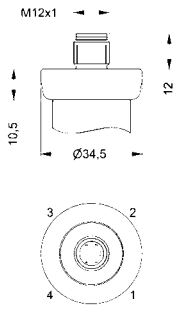
Connection G¼B (EN 837-1/7.3)



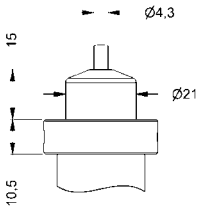
Connection ¼"-18 NPT



Electrical connections
M12 x 1, 4-pin (IP 67)



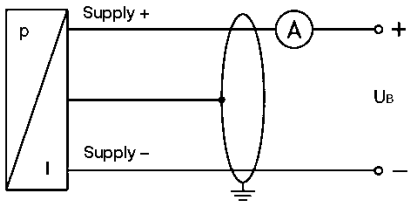
Electrical connections
Cable outlet with PVC cable (IP 67)



Wiring diagram

2-wire

4–20 mA



Pin assignment table

Electrical connections	M12 x 1 / metal (4-pin)	Wire colours (IEC 60757)
Supply + Supply –	1 2	White Brown
Shield	4	Yellow/green

The units are shipped with a detailed connection diagram.

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Pressure transducers DMU 30 industrial version

NEW

Ordering data

DG: H, PG: 4

DMU 30

1 Electrical connection

1	Connector M12 x 1, 4-pin (IP 67)
2	Cable outlet with PVC cable (IP 67)[1]

[1] Standard: 2 m PVC cable without vent hose (operating temperature range -5/+70 °C)

2 Standard version

1	Oil-free and grease-free – cleaned for oxygen

3 Measuring range in bar (relative)

115	0/16
116	0/25
117	0/40
118	0/60
119	0/100
120	0/160
121	0/250
122	0/400
123	0/600
124	0/1,000
125	Special measuring ranges

4 Process connection

02	G¼B (EN 837-1/7.3)
04	G½B (EN 837-1/7.3)
06	¼"-18 NPT

5 Output

01	2-wire: 4-20 mA / Ub = 8/32 VDC (standard)
02	2-wire: 4-20 mA / Ub = 10/28 VDC (Ex version)

Ordering key example

DMU 30	1	1	119	04	01

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 record.

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

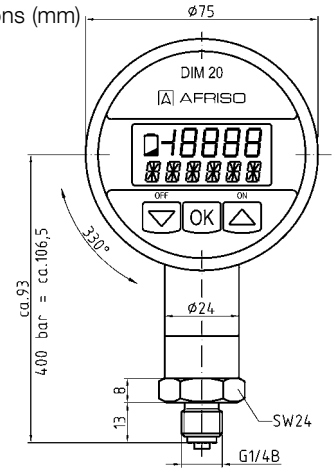
Materials
Housing: PA 6 glass-fibre reinforced
Pressure connection: Stainless steel 304
Diaphragm: Ceramic (Al_2O_3 96 %)
Seal: FKM

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.

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Digital pressure gauge DIM 20

DG: H, PG: 4

Type	**DIM 20**
Version	
Housing Ø	75
Housing	Plastic
Measuring accuracy	0.5 % FSO as per BFSL
Wetted parts	Stainless steel 304 ceramic/FKM
Connection	G¼B
Supply voltage	DC 3.6 V
Output	---
Measuring range	**Part no.**
0/400 mbar	---
-1/0 bar	**32500**
0/0.6 bar	---
0/1 bar	---
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**
0/60 bar	---
0/100 bar	**32511**
0/160 bar	**32512**
0/250 bar	**32513**
0/400 bar	**32514**
0/600 bar	---
0/700 bar	**32516**
Options	
Connection ¼-18NPT*	•
Accessories	
Spare battery	**68309**

* 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/cm²
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.
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
Storage: -20/+70 °C

Process connection
See table Ordering Data

Degree of protection
IP 67 (EN 60529)

Diaphragm
Stainless steel 316 L

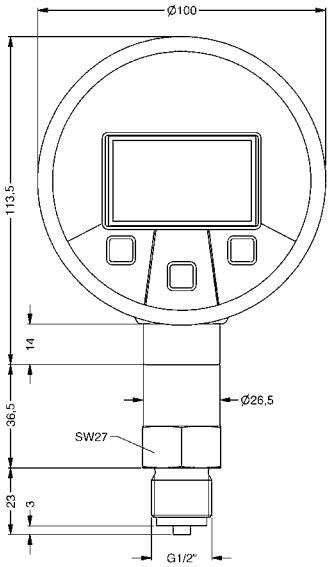
Seal
Without (weld version only for process connections as per EN 837)
FKM for all other process connections

Wetted parts
Pressure connection, diaphragm, seal

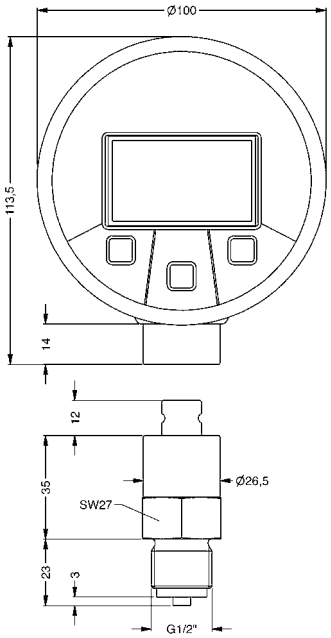
Measuring ranges
0/100 mbar to 0/400 bar
PN ≥ 1 bar, vacuum-tight without limitation

Dimensions (mm) and electrical connections

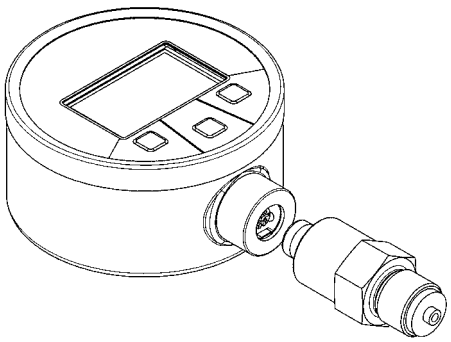
DIM 30



DIM 30



DIM 30



Precision digital pressure gauge DIM 30

Ordering data

DG: H, PG: 4

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
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 ½ (DIN 3852)
02	G ½B (EN 837-1)
03	G ¼ (DIN 3852)
04	G ¼B (EN 837-1)
05	½-14 NPT
06	¼-18 NPT

4 Seal

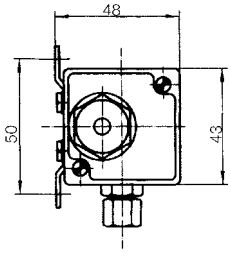
0	Without seal (only process connection as per EN 837-1)
1	FKM
9	Others

Ordering code
Example: 0/10 bar, G½B

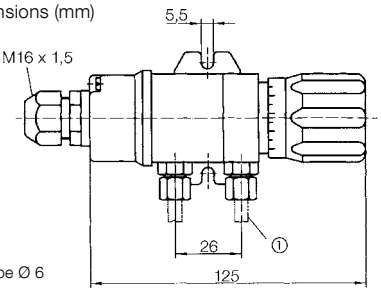
Pressure sensor DIM 30	R	114	02	0

Differential pressure switches DS 01

Dimensions (mm)



Dimensions (mm)



Application

Suitable for all practically neutral media such as process water, heating water, neutral gases, oils. Suitable for two-point control by means of a continuously adjustable switching point (between 10 and 100% of pressure range).

Description

A robust diaphragm type movement serves as the basis for this unit. It is suitable for overpressure, vacuum and differential pressure measurements. The unit uses the same principle of operation for all three measuring applications. The pressure or the differential pressure applies a force to one side of the diaphragm. This force displaces the diaphragm system and moves the measurement range spring. A switching pin mounted to the diaphragm actuates an electrical switching element. The switching point is adjusted by means of a knurled knob according to the scale.

Technical specifications

Pressure ranges
0/0.6 to 0/4 bar

Maximum static pressure
16 bar, device is overpressure-proof up to 16 bar and vacuum-proof

Operating temperature range
Medium: T_{max} = +80 °C
Ambient: T_{max} = +80 °C

Connection
2 x G⅛ 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.
0/0.6 bar	88103
0/1 bar	88104
0/1.6 bar	88105
0/2.5 bar	88107
0/4 bar	88106
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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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 is equipped with 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 M12 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

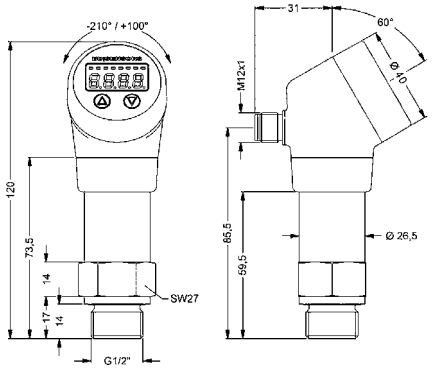
Options
- Other process connections
- Seal material (EPDM)
- Other switching and analogue outputs

13

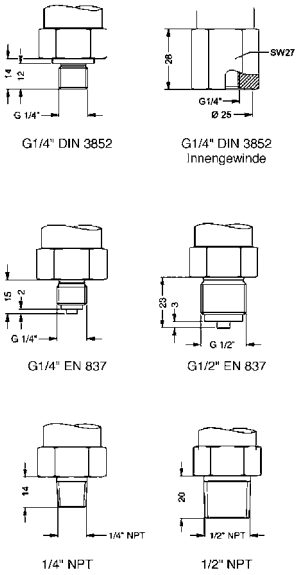
Electronic pressure switch EDS 10

Dimensions (mm) and electrical connections

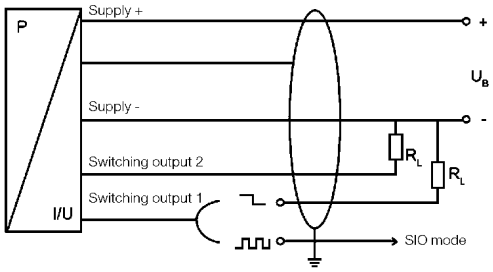
EDS 10



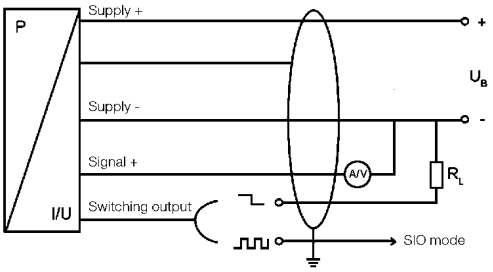
EDS 10, process connections



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

1	Electronic pressure switch
33405	EDS 10

2	Pressure type
R	Relative
A	Absolute (possible for 0.4 bar and higher)

3	Output
01	2 x PNP (SIO mode)
02	2 x NPN (SIO mode)
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
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
123	0/600

5	Process connection
01	G½ (DIN 3852)
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
3	EPDM

Ordering code

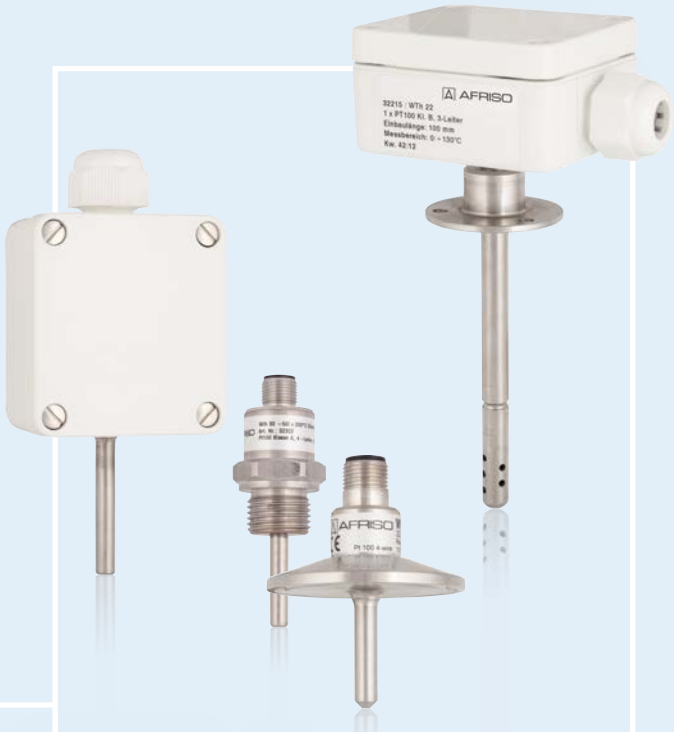
Example: 0/10 bar, G½B (DIN 3852)

33405	R	01	114	01	1

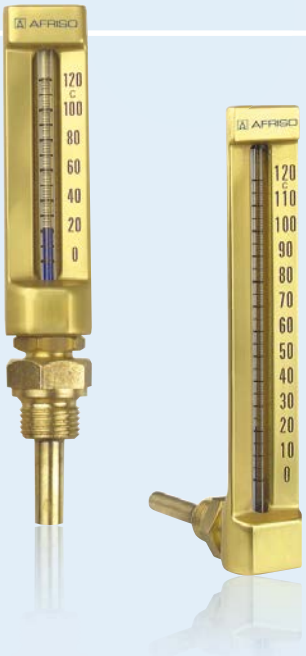
13

Bimetal thermometers

Thermometers with capillary tube



Resistance thermometers



Industrial thermometers

CHAPTER 14

Temperature measuring instruments and controllers

OVERVIEW

HEATING/PLUMBING

PLANT/VENTILATION ENGINEERING

INDUSTRIAL/CHEMICAL APPLICATIONS

CHEMICAL/PROCESS ENGINEERING APPLICATIONS

HYGIENIC PROCESSES

OPTIONS/ACCESSORIES

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						
		Page 627	Page 636	Page 639	Page 639	Page 639

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 thermom-eters for chemical applications	V-shaped industrial thermometers
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Page 644	Page 644	Page 649	Page 649	Page 654	Page 662

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 applications						•
Pharmaceutical applications/ 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			•	•	•	•
Connector						
Other designs	Options	•	•		•	
Other process connections				•	•	
Transmitter installation			•		•	•
* Optional		Page 681	Page 681	Page 682	Page 683	Page 684

14

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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Page 684	Page 686	Page 686	Page 686	Page 692

14

Thermometers with capillary tube

For burners, boiler, hot water tanks and air conditioning/refrigeration systems, AFRISO offers different temperature and pressure measuring instruments with various housing versions and connection types. The portfolio covers pressure gauges and thermometers with plastic or copper capillaries as well as combination instruments such as combined thermometer/pressure gauges. We also provide OEM versions for your specific applications. Please enquire.

Application examples

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See page 380 for pressure gauge with capillary tube.

Thermometers THK with capillary tube

- Ideal for boilers and water heaters
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

Page 669

Application

Heating and plumbing, e.g. boilers, water heaters, hot water storage tanks.

Technical specifications

Nominal size
37 – 40 – 52 – 45 x 45

Range
0/120 °C

Accuracy/test point
50 °C = ±3 °C

Measuring principle
Liquid filling

Operating temperature range
Medium: Full scale value
Ambient: T_{max} = +70 °C

Operating pressure
No pressure

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Back, with Cu capillary tube
Probe: Ø 6 x 30 mm, Cu
(see data sheet)

Dial
Plastic (ABS), white or black
Dial marking black

Pointer
Plastic, black or white

Housing
Plastic (ABS), white, black or grey
Highly impact-resistant and corrosion-resistant

Window
Clip-in plastic, transparent
RFK 52 with bezel

Capillary length
Cu capillary with PVC coating, R3, grey
L = 500, 1,000, 1,500, 2,000 mm

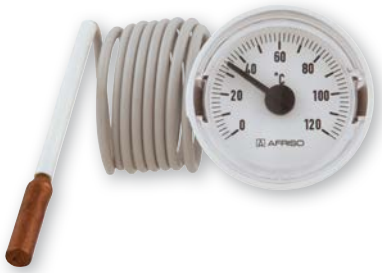
Options

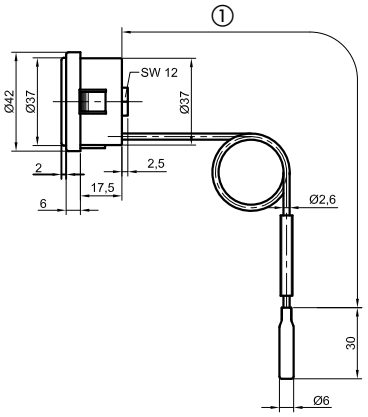
- Dial with customer logo
- Various capillary lengths
- Special colours for housing, dial, pointer

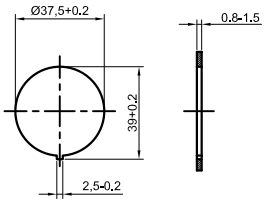
Thermometers THK with capillary tube

Dimensions (in mm)

Type THK 37

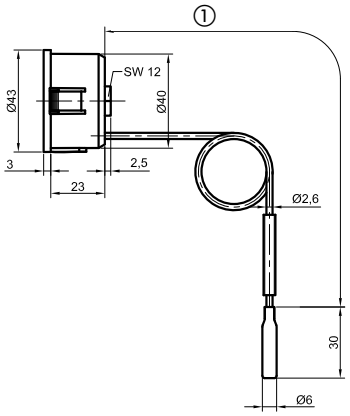


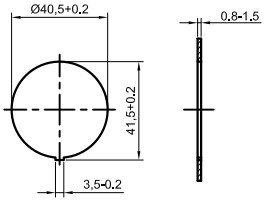




① Capillary length

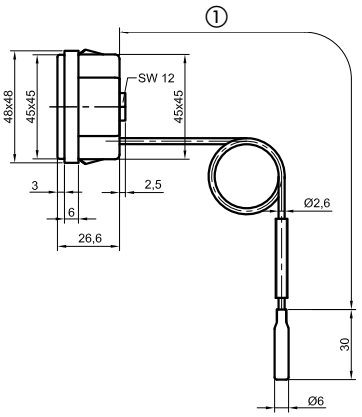
Type THK 40

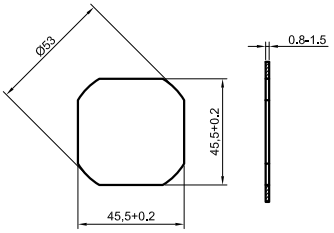




① Capillary length

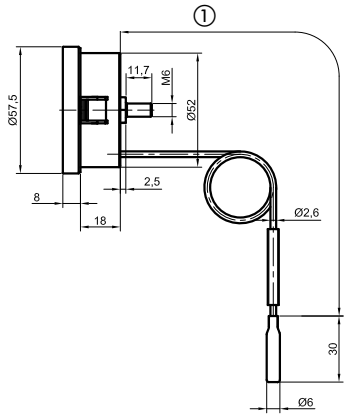
Type THK 45

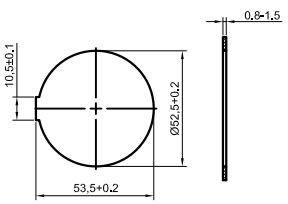




① Capillary length

Type THK 52





① Capillary length

Combined thermometer/pressure gauges THMK with capillary tube

- Ideal for boilers and hot water storage tanks
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

Page 669

Application

Heating, cooling and plumbing, e.g. boilers, hot water storage tanks.

Technical specifications

Nominal size
40 – 52

Ranges
0/120 °C – 0/4 bar
0/120 °C – 0/6 bar
0/120 °C – 0/10 bar

Accuracy/test point
For pressure: Cl. 4.0
For temperature: 0/120 °C: 50 °C = ±3 °C

Measuring principle
For pressure: Bourdon tube, copper alloy
For temperature: Liquid filling

Application area
For pressure:
Static load: ¾ x full scale value
Dynamic load: 2/3 x full scale value
Short-term: full scale value
For temperature: Full scale value

Operating temperature range
Medium: Full scale value
Ambient: T_{max} = +70 °C

Operating pressure
No pressure

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Back, with Cu capillary tube
For pressure: Brass disk G¼ B
For temperature: Probe Ø 6 x 30 mm, Cu (see data sheet)

Dial
Plastic (ABS), white or black
Dial marking black

Pointer
Plastic, black

Housing
Plastic (ABS), white or grey
Highly impact-resistant and corrosion-resistant

Window
THMK 40 = Clip-in plastic, transparent
THMK 52 = Plastic, transparent with reference pointer

Bezel
THMK 52 = Push-on bezel
Plastic (ABS), grey

Capillary length
Cu capillary with PVC coating, R3, grey
L = 500, 1,000, 1,500, 2,000 mm

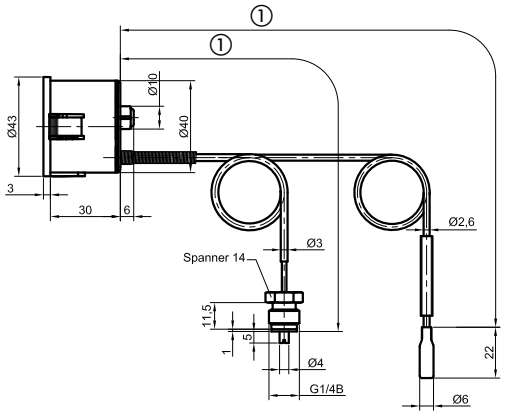
Options

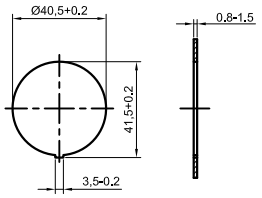
- Dial with customer logo
- Various capillary lengths
- Special colours for housing, dial, pointer

Combined thermometer/pressure gauges THMK with capillary tube

Dimensions (in mm)

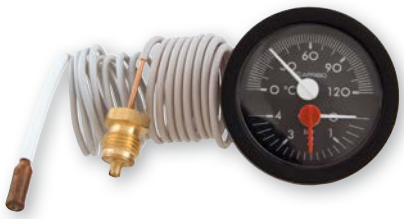
Type THMK 40

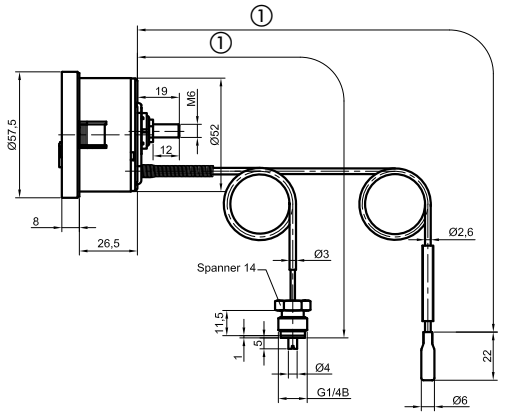


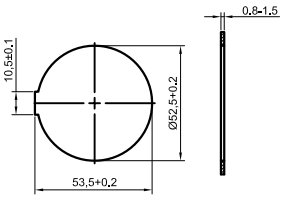


① Capillary length

Type THMK 52







① Capillary length

Thermometers with capillary tube

DG: G, PG: 2

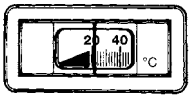
Type	THK 37	THK 40	THK 45	THK 52	THMK 40	THMK 52
Version						
Housing Ø	37	40	45 x 45	52	40	52
Housing	Plastic (ABS), grey	Plastic (ABS), white	Plastic (ABS), black	Plastic (ABS), grey, with bezel, black	Plastic (ABS), white	Plastic (ABS), grey, with bezel, black
Pointer	Plastic, black		Plastic, white		Plastic, black	Plastic, white
Dial/scale	Dial white / scale black		Dial black / scale white		Dial white / scale black	Dial black / scale white
Packing unit**	50 pieces					
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C – 0/4 bar	
Capillary length*	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
500 mm	67512105	67652105	67522105	67502105	On request	67635105
1,000 mm	**67512115**	67652115	67522115	67502115	On request	67635115
1,500 mm	**67512125**	**67652125**	**67522125**	**67502125**	On request	**67635125**
2,000 mm	**67512135**	67652135	67522135	67502135	On request	67635135
Range	---	---	---	---	0/120 °C – 0/6 bar	
Capillary length*	---	---	---	---	**Part no.**	**Part no.**
500 mm	---	---	---	---	On request	On request
1,000 mm	---	---	---	---	On request	On request
1,500 mm	---	---	---	---	On request	**67636125**
2,000 mm	---	---	---	---	On request	On request
Range	---	---	---	---	0/120 °C – 0/10 bar	
Capillary length*	---	---	---	---	---	**Part no.**
500 mm	---	---	---	---	---	On request
1,000 mm	---	---	---	---	---	On request
1,500 mm	---	---	---	---	---	On request
2,000 mm	---	---	---	---	---	On request

* Other capillary lengths on request.
** Minimum order quantity for non-stock items = 100 pieces per delivery.

Blue part no. = non-stock items

Thermometers THK with capillary tube

DG: G, PG: 2

Type	THK 58 S Cu	THK 58 Cu	THK 62 Cu	THK 62 Cu oval
Version				
Nominal size (W x H)	58 x 25 mm	25 x 58 mm	62 x 11 mm	62 x 11 mm
Housing	Plastic, black			
Dial/scale	Dial white / numbers black			
Mounting position	Horizontal	Vertical	Horizontal	Horizontal
Capillary	Cu capillary with PVC jacket (R3, grey), Cu probe Ø 6.5 x 30 mm		Cu capillary with PVC jacket (R3, grey), Cu probe Ø 6.5 x 25 mm	
Packing unit	100 pieces			
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Capillary length*	Part no.**	Part no.**	Part no.**	Part no.**
1,000 mm	67542115	67542115s	67562115	67582115
1,500 mm	**67542125**	**67542125s**	67562125	67582125
2,000 mm	67542135	67542135s	67562135	67582135
3,500 mm	**67542155**	---	---	---

* Other capillary lengths on request.
** Minimum order quantity for non-stock items = 300 pieces.

Blue part no. = non-stock items

14

Combined thermometer/pressure gauges TM / thermo-hydrometers TH

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

Bottom connection version

Application

For liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
For combined measurement of pressure and temperature, especially in heating systems and heating boilers.

Description

The combined thermometer/pressure gauge / thermo-hydrometer consists of a Bourdon tube measuring system for pressure measurement and a bimetal measuring system for simultaneous temperature measurement. Both values are measured and displayed by a single gauge. A self-closing mounting valve enables easy replacement of the gauge without the necessity to drain the system.
An optional M18 x 1 to G¼ adapter is available if the combined thermometer/pressure gauge has to be mounted into an existing thermowell with M18 x 1 female thread.

Technical specifications

Type
D 1/D 2

Nominal size
63 – 80

Accuracy class
Pressure gauge/hydrometer: 2.5 (EN 837-1/6)
Thermometer: 2 (EN 13190)

Application area
Pressure gauge/hydrometer:
Static load: ¾ x full scale value Dynamic load: ⅔ x full scale value
Short-term: full scale value
Thermometer: 20/120 °C

Ranges
Pressure gauge/hydrometer:
0/4 bar to 0/10 and 0/6 mWC to 0/60 mWC
Thermometer: 20/120 °C

Operating temperature range
Medium: T_{max} = +120 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Pressure gauge/hydrometer:
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
rising temperature approx. ±0.4 %/10 K
falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back G¼B
with mounting valve G¼ to R½

Measuring element
Pressure: Bourdon tube, copper alloy
Temperature: bimetal element

Dial
Plastic, white
Dial marking black with circular arcs (red/blue)

Pointer
Pressure gauge/hydrometer: plastic, black
Thermometer: plastic, red

Housing
D1 – plastic (ABS), highly impact-resistant
D2 – sheet steel black

Window
Clip-in plastic with adjustable red mark

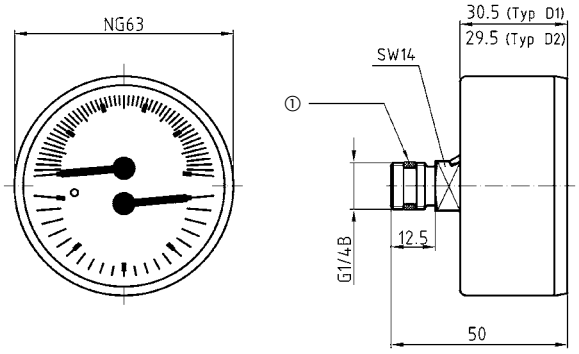
Options

- Adapter M18 x 1 to G¼
- Special scales
- Other process connections

Combined thermometer/pressure gauges TM / thermo-hydrometers TH

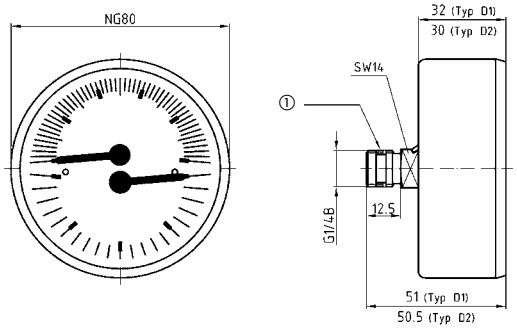
Housing types and dimensions (mm)

TM 63 ax



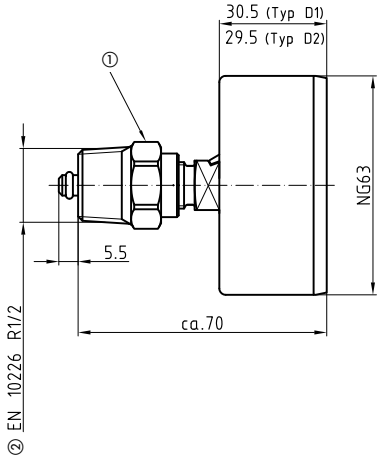
① PTFE sealing ring

TM 80 ax



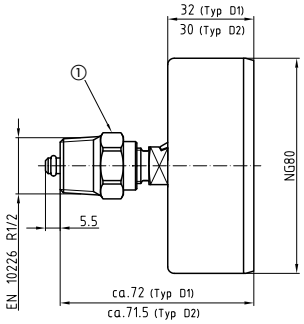
① PTFE sealing ring

TM 63 ax with mounting valve



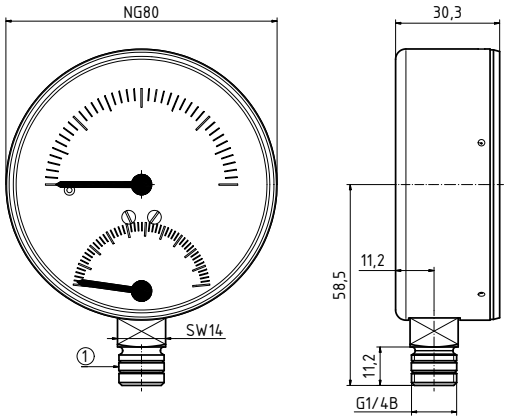
① Mounting valve
② Pipe thread

TM 80 ax with mounting valve



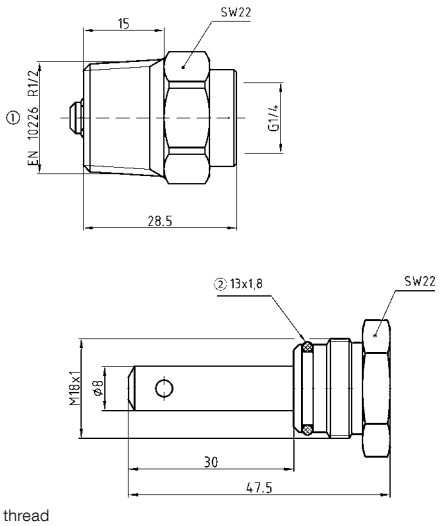
① Mounting valve
② Pipe thread

TM 80 rad



① PTFE sealing ring

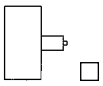
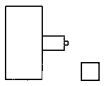
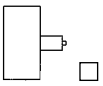
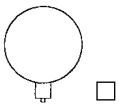
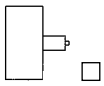
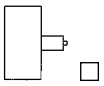
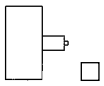
Mounting valve and adapter



① Pipe thread
② O ring (NBR)

Combined thermometer/pressure gauges TM / thermo-hydrometers TH

DG: G, PG: 2

Type	TM 63, D211	TM 63, D211	TM 80, D111	TM 80, D201	TM 80, D211	TM 80, D211	TH 80, D211
Version							
Housing Ø	63	63	80	80	80	80	80
Housing	Sheet steel, black		Plastic (ABS) highly impact resistant	Sheet steel, black	Sheet steel, black		
Accuracy class	Pressure gauge/hydrometer 2.5						
Connection	G¼B with mounting valve G¼ to R½						
Adapter	Without	With	Without	Without	Without	With	Without
Range	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
0/4 bar 20/120 °C	63318	**63346**	63317	**63337**	**63341**	63348	---
0/6 bar 20/120 °C	---	---	---	63338	**63342**	---	---
0/10 bar 20/120 °C	---	---	---	63339	**63343**	---	---
0/6 mWC 20/120 °C	---	---	---	---	---	---	**63311**
0/10 mWC 20/120 °C	---	---	---	---	---	---	**63312**
0/16 mWC 20/120 °C	---	---	---	---	---	---	**63313**
0/25 mWC 20/120 °C	---	---	---	---	---	---	**63314**
0/40 mWC 20/120 °C	---	---	---	---	---	---	**63315**
0/60 mWC 20/120 °C	---	---	---	---	---	---	**63316**

* Minimum order quantity for non-stock items = 100 pieces.

Blue part no. = in-stock items

Spare parts

DG: G, PG: 2	Part no.
Adapter G¼ to M18 x 1, brass	05 00 40 01

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See page 516 for mounting valves.

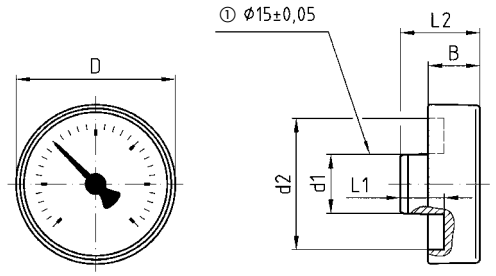
Bimetal thermometers with plastic housing for heating/plumbing applications

	BiTh 40 K with plug-on	BiTh 50 K with plastic thermowell	BiTh 63 K with brass thermowell
Application	Heating, plumbing, distribution systems, underfloor heating manifolds.	Heating, plumbing, distribution systems, underfloor heating manifolds	Heating, plumbing
Technical specifications	**Nominal size** 40 **Measuring element** Bimetal spiral **Ranges °C** 0/60 °C **Application area** Full scale value **Operating pressure** No pressure	**Nominal size** 50 **Measuring element** Bimetal helix **Ranges °C** 0/60 °C **Application area** Full scale value **Operating pressure at thermowell** 6 bar maximum	**Nominal size** 63 – 80 – 100 **Measuring element** Bimetal helix **Ranges °C** -20/+60, 0/60, 0/120 °C **Application area** Full scale value **Operating pressure at thermowell** 6 bar maximum
Standard version	**Connection** Plastic, plug-on, Ø 15 mm, no thermowell **Mounting position** Centre back **Dial** Plastic, white – dial marking black **Pointer** Plastic, black **Housing** ABS, white **Window** Clip-on plastic	**Connection** Stem plastic, Ø 9 mm, thermowell G½B, plastic, removable **Mounting position** Centre back **Dial** Plastic, white – dial marking black **Pointer** Plastic, black **Housing** ABS, white **Window** Clip-in plastic	**Connection** Stem plastic, brass or aluminium, Ø 9 mm, thermowell G½B, brass, removable, stem length 40 mm or thread, self-sealing, with PTFE sealing ring **Mounting position** Centre back (NG 63 bottom back optional) **Dial** Plastic, white – dial marking black **Pointer** Plastic, black **Housing** ABS, black **Window** Clip-in plastic

Bimetal thermometers for heating and plumbing applications

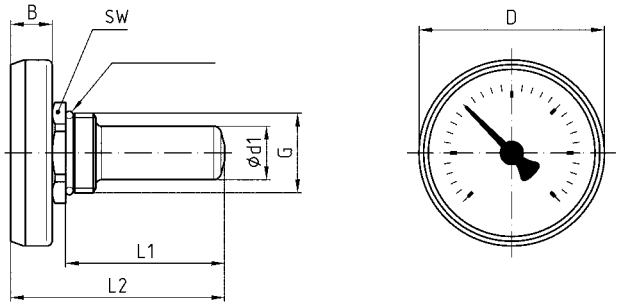
Housing types and dimensions (mm)

Centre back connection, NG 40

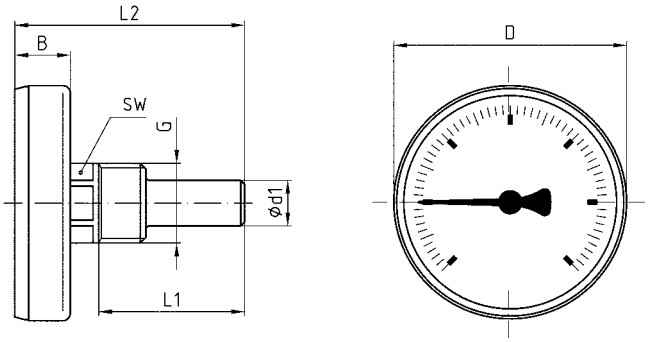


① Mounting hole

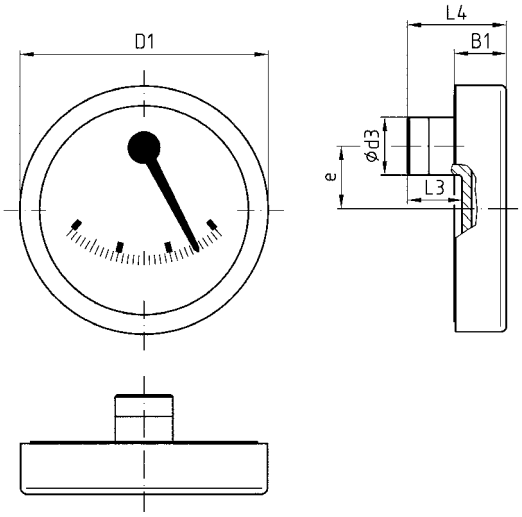
Centre back connection, NG 50



Centre back connection, NG 63 – 80 – 100



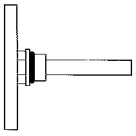
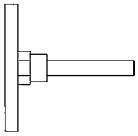
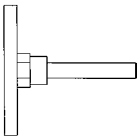
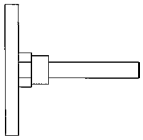
Bottom back connection, NG 63



Dimensions (mm)

Nominal size (NG)	B	B_1	D	D_1	d_1	d_2	d_3	e	G	L1	L_2	L_3	L_4	SW
40	13	–	40	–	14.8	33	–	–	–	11	50	–	–	–
50	11	–	49	–	14	–	–	–	G½B	42	56.5	–	–	24
63	14.7	13	62	63.5	12	–	15	16	G½B	40/63/100/ 150/200	61/85/122/ 172/222	14	25	19
80	14.8	–	79	–	12	–	–	–	G½B			–	–	19
100	15	–	100	–	12	–	–	–	G½B			–	–	19

Bimetal thermometers for heating and plumbing applications

DG: G, PG: 1					DG: G, PG: 2					
Type	**BiTh 40 K**		**BiTh 50 K**		**BiTh 63 K**		**BiTh 80 K**		**BiTh 100 K**	
Version										
Housing Ø	40		50		63		80		100	
Housing	Plastic (ABS), white				Plastic (ABS), black, window (plastic clip-in)					
Stem	Plastic, Ø 15 mm		Plastic, Ø 9 mm		Plastic, brass or aluminium, Ø 9 mm					
Connection	Plastic, plug-on, no thermowell		Thermowell G½B, plastic		Thermowell G½B brass, Ø 12 mm outside, removable					
Accuracy class	Class 2 as per EN 13190									
Range	-20/+60 °C		-20/+60 °C		-20/+60 °C		-20/+60 °C		-20/+60 °C	
Stem length		**PU***		**PU***	**Part no.**	**PU***	**Part no.**	**PU***	**Part no.**	**PU***
40 mm	---		---		**63763**	100	**63776**	100	**63676**	50
63 mm	---		---		**63769**	100	**63777**	100	**63677**	50
100 mm	---		---		63770	100	63778	50	**63678**	50
150 mm	---		---		63771	50	63779	40	63679	25
Range	0/60 °C		0/60 °C		0/60 °C		0/60 °C		0/60 °C	
Stem length	**Part no.**		**Part no.**		**Part no.**		**Part no.**		**Part no.**	
40 mm	64066 (See drawing for stem)	100	63749	100	**63760**	100	**63765**	100	**63698**	50
63 mm			---		**63761**	100	63766	100	**63699**	50
100 mm	---		---		63762	100	63767	50	**63700**	50
150 mm	---		---		63764	50	63768	40	63701	25
Range	0/120 °C		0/120 °C		0/120 °C		0/120 °C		0/120 °C	
Stem length	**Part no.**		**Part no.**		**Part no.**		**Part no.**		**Part no.**	
40 mm with PTFE sealing ring	---		----		**63702**	100	**63706**	100	**63684**	50
40 mm	---		---		**63704**	100	**63708**	100	**63997**	50
63 mm	---		---		**63710**	100	**63715**	100	**63695**	50
100 mm	---		---		**63711**	100	**63716**	50	**63696**	50
150 mm	---		---		**63714**	50	**63717**	40	**63697**	25
200 mm	---		---		---				**63671**	10

* Minimum order quantity for non-stock items 1 PU (packing unit); delivery only in packing units..

Blue part no. = in-stock items

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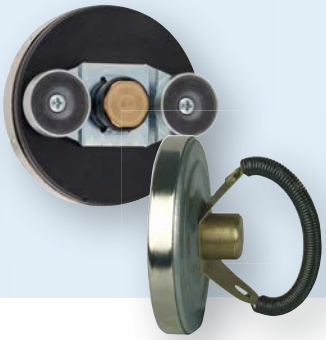
Spare thermowells

Connection G½B, brass		
Stem length	PG	Part no.
40 mm with PTFE sealing ring	2	**63685**
40 mm	2	**63856**
63 mm	2	**63686**
100 mm	2	**63687**
150 mm	2	**63688**

Standard bimetal thermometers/surface mount bimetal thermometers/flue gas thermometers

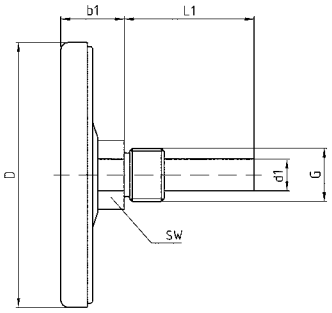


	Bimetal standard thermometers	Surface mount thermometer ATh	Flue gas thermometer RT/flue gas temperature controller RTC
Application	Heating, plumbing.	Heating, ventilation and plumbing Fastening by means of spring (ATh Ø F), magnet (ATh Ø M) or universal clamp (ATh Ø S).	Flue gas thermometer RT and flue gas temperature controller RTC for gas and oil-fired systems.
Technical specifications	**Nominal size** 50 – 63 – 80 – 100 **Measuring element** Bimetal helix **Accuracy class** 2 (EN 13190) **Ranges °C** -20/+60, 0/60, 0/120, 0/160 **Application area** Full scale value **Operating pressure at thermowell** 6 bar maximum	**Nominal size** 63 – 80 **Measuring element** Bimetal spiral **Ranges °C** -20/+40, 0/60, 0/120 **Application area** Full scale value	**Nominal size** 80 **Measuring element** Bimetal helix **Ranges °C** RT: 0/300, 0/500 RTC: 0/350 **Application area** Full scale value
Standard version	**Connection** Stem plastic, brass or aluminium, Ø 9 mm Thermowell G½B, brass, removable (160 °C and higher with locking screw) **Mounting position** NG 50 – 63 – 80 – 100 NG 63 – 80 – 100 bottom **Dial** Up to 120 °C plastic, greater than 160 °C aluminium, white Dial marking black **Pointer** Plastic, black **Housing** Sheet steel galvanised **Push on bezel** Sheet steel nickel-plated **Window** Plastic	**Connection** ATh Ø F: With heat-conducting element and fastening spring ATh Ø S: With universal clamp for pipes ⅜" to 1½" ATh Ø M: 2 x magnet, Ø 20 mm **Mounting position** NG 63 – 80 centre back **Dial** Plastic, white; dial marking black **Pointer** Plastic, black **Housing** ATh Ø F: Sheet steel, galvanised ATh Ø M: Plastic, black ATh Ø S: Sheet steel, galvanised **Push on bezel** Sheet steel nickel-plated **Window** Plastic	**Connection** RT: Stem stainless steel 316 L, plain, with adjustable cone, brass RTC: Stem stainless steel 316 L, plain, with ring magnet bracket **Mounting position** Back **Dial** Aluminium, grey dial marking black; RTC with green and red reference zones **Pointer** Aluminium, black RTC with additional max. pointer, red **Housing** Sheet steel galvanised **Push on bezel** Sheet steel nickel-plated **Window** Plastic
Options	▪ Other ranges ▪ Nominal size 34, 160	▪ Other ranges ▪ Plastic housing	

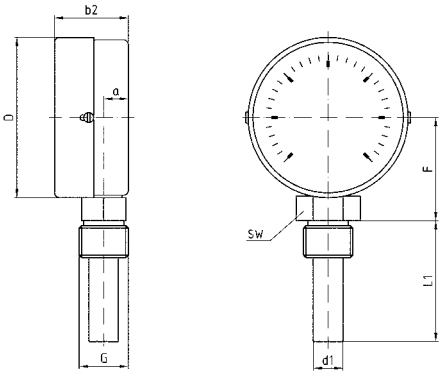
Bimetal standard thermometers/surface mount thermometers/flue gas thermometers

Housing types and dimensions (mm)

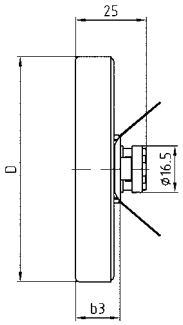
Bimetal standard thermometer
Centre back connection



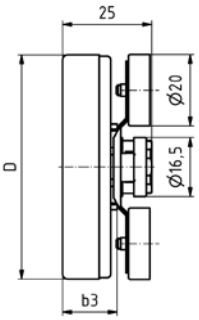
Bimetal standard thermometer
Bottom connection



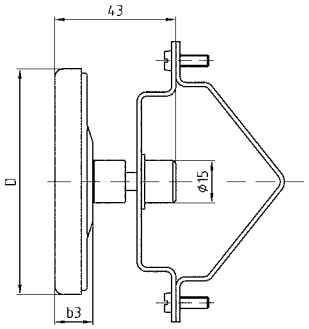
Surface mount thermometer, centre back connection,
with fastening springs



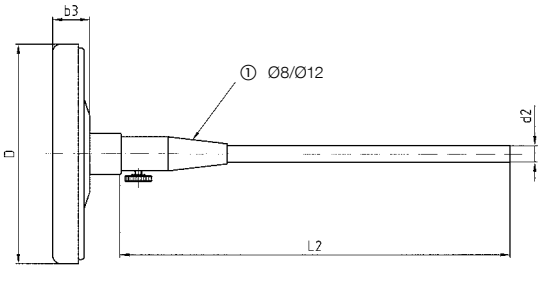
with magnets



Surface mount thermometers, centre back connection,
with universal clamp for pipes ¾" to 1½"

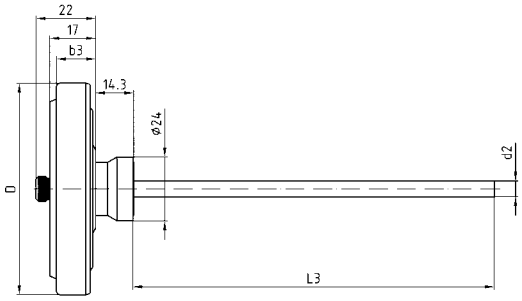


Flue gas thermometers RT
Centre back connection



① For hole

Flue gas temperature controller RTC
Centre back connection

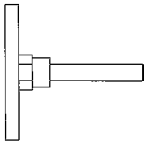
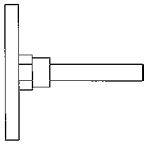
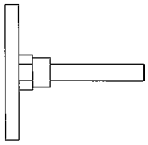
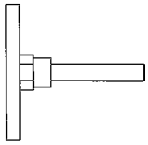


Dimensions (mm)

Nominal size (NG)	a	b1	b2	b3	D	d1	d2	F	G	L1	L2	L3	SW
50	–	18	–	–	50	12	–	–	G½B	40	141	86	19/22
63	10	20	35	15	63	12	–	29.3	G½B	63	191	136	19/22
80	10	21	33	15	80	12	6	47.3	G½B	100	291		19/22
100	10	23.7	40.5	–	100	12	–	59.3	G½B	150			19/22

Bimetal standard thermometer

DG: G, PG: 2

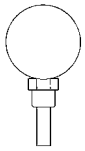
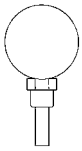
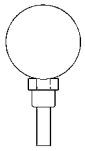
Type	BiTh 50 ST	BiTh 63 ST	BiTh 80 ST	BiTh 100 ST
Version				
Housing Ø	50	63	80	100
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic window			
Stem	Plastic, brass or aluminium, Ø 9 mm			
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable*			
Accuracy class	Class 2 as per EN 13190			
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length		**Part no.**	**Part no.**	**Part no.**
40 mm	---	**63951**	**63955**	**63959**
63 mm	---	**63952**	**63956**	**63960**
100 mm	---	63953	63957	**63961**
150 mm	---	63954	63958	**63962**
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	**Part no.**	**Part no.**	**Part no.**	**Part no.**
40 mm	**64027B**	**63860**	**63865**	63869
63 mm	64028B	63861	63866	63870
100 mm	64029B	63862	63867	**63871**
150 mm	64030B	63864	63868	**63872**
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	**Part no.**	**Part no.**	**Part no.**	**Part no.**
40 mm	**64031B**	**63801**	**63806**	**63811**
63 mm	64032B	**63802**	**63807**	**63812**
100 mm	64033B	**63803**	**63808**	**63813**
150 mm	64034B	**63804**	**63809**	**63814**
200 mm	---	---	63842	**63815**
Range	0/160 °C	0/160 °C**	0/160 °C**	0/160 °C**
Stem length		**Part no.**	**Part no.**	**Part no.**
40 mm	---	**63983*** **	63987	64015
63 mm	---	63984	63988	64016
100 mm	---	63985	63989	64017
150 mm	---	63986	63990	64018

Minimum order quantity for non-stock items = 25 pieces.
* NG 50 with O ring clamp connection.
** 160 °C and higher = Thermowell with locking screw.
*** Dial red = Part no. **63674**; on request / Dial blue = Part no. **63675**; on request.

Blue part no. = in-stock items

Bimetal standard thermometer

DG: H, PG: 2

Type	BiTh 63 ST	BiTh 80 ST	BiTh 100 ST
Version			
Housing Ø	63	80	100
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic window		
Stem	Brass or aluminium, Ø 9 mm		
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable		
Accuracy class	Class 2 as per EN 13190		
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	**Part no.**	**Part no.**	**Part no.**
40 mm	64039	**64055**	64073
63 mm	64040	64056	64074
100 mm	64041	64057	64075
150 mm	64042	64058	64076
Range	0/60 °C	0/60 °C	0/60 °C
Stem length	**Part no.**	**Part no.**	**Part no.**
40 mm	64043	64059	64077
63 mm	64044	64060	64078
100 mm	64045	64061	64079
150 mm	64046	64062	64080
Range	0/120 °C	0/120 °C	0/120 °C
Stem length	**Part no.**	**Part no.**	**Part no.**
40 mm	**64047**	**64063**	**64081**
63 mm	**64048**	**64064**	**64082**
100 mm	64049	64067	**64083**
150 mm	64050	64068	**64084**

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

Blue part no. = in-stock items

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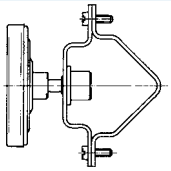
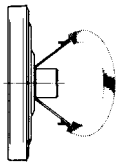
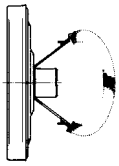
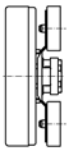
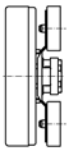
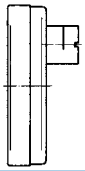
Spare thermowells

DG: G, PG: 2

Connection G½B, brass (only for bottom connection)	
Stem length	Part no.
40 mm	**63850**
63 mm	**63851**
100 mm	**63852**
150 mm	**63853**

Surface mount thermometers/ eccentric thermometers

DG: G, PG: 3

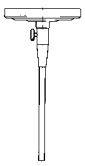
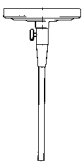
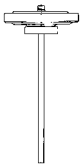
Type	ATh 63 S	ATh 63 F*	ATh 80 F*	ATh 63 M	ATh 80 M	BiTh 63 exz
Version						
Housing Ø	63	63	80	63	80	63
Housing	Sheet steel, galvanised, push on bezel nickel-plated, plastic window			Plastic, black, push on bezel nickel-plated, plastic window		Plastic
Connection	Universal clamp for pipes ⅜" to 1½"	Heat-conducting element with fastening spring for pipes ⅜" to 1½"		2 x magnet Ø 20 mm		Eccentric male connector Ø 15 mm
Accuracy class	Class 2 as per EN 13190					
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	20/100 °C
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
Dial black	**63820**	**63822**	**63821**	**63651**	**63653**	68895
Dial red	---	---	---	---	---	**63920**
Dial blue	---	---	---	---	---	**63921**
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	---	**63826**	63943	**63650**	**63652**	---
Range	---	-20/+40 °C	---	---	---	---
	---	**64339**				---

*ATh 63 F / ATh 80 F are also available with plastic housing (PG: 1).

Blue part no. = in-stock items

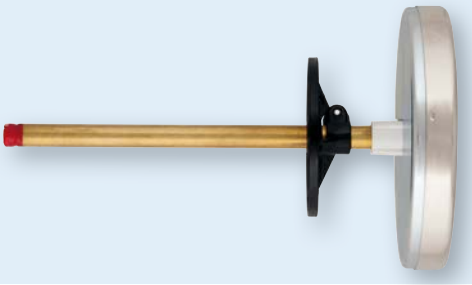
Flue gas thermometers/ flue gas temperature controllers

DG: G, PG: 3

Type	RT 80	RT 80	RTC 80
Version			
Housing Ø	80	80	80
Housing	Sheet steel galvanised, push on bezel nickel-plated, plastic window		
Connection	Plain stem Stainless steel 316 L Adjustable cone Brass, nickel-plated 8–12 mm	Plain stem Stainless steel 316 L Adjustable cone Stainless steel 12–18 mm	Plain stem stainless steel 316, magnet
Accuracy class	Class 2 as per EN 13190		
Range	0/300 °C	0/500 °C	0/500 °C	0/350 °C
Stem length	**Part no.**	**Part no.**	**Part no.**	**Part no.**
100 mm	---	---	---	**63833**
150 mm	**64238**	**63830**	**64164**	**63832**
300 mm	**64239**	**63831**	---	---

Blue part no. = in-stock items

Bimetal thermometers for industrial applications/ Bimetal air duct thermometer

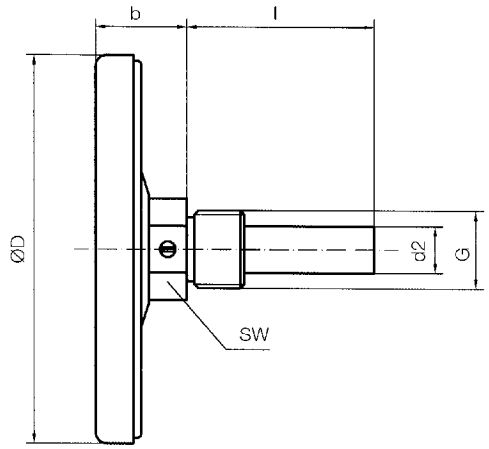


	Bimetal thermometers for industrial applications	Bimetal air duct thermometer
Technical specifications	Mechanical engineering, plant engineering, pipelines, boilers, heating technology	Air conditioning, ventilation
	Type D2	**Type** D2
	Nominal size 63 – 80 – 100 – 160	**Nominal size** 63 – 80 – 100
	Measuring element Bimetal helix	**Measuring element** Bimetal helix
	Accuracy class 1 (EN 13190)	**Accuracy class** 2 (EN 13190)
	Ranges °C -20/+60, 0/60, 0/120, 0/160	**Ranges °C** -30/+50, -20/+60, -20/+40, 0/60
	Application area (EN 13190) Continuous load: measuring range Short-term: range	**Application area** Full scale value
	Operating pressure at thermowell 10 bar maximum	
	Degree of protection IP 41 (EN 60529)	**Degree of protection** IP 41 (EN 60529)
Standard version	**Connection** Stem brass, Ø 9 mm Thermowell G½B, brass, removable	**Connection** Stem brass, Ø 9 mm, mounting flange, plastic Ø 60 mm, or back flange, steel
	Mounting position NG 63 – 80 – 100 – 160 centre back NG 63 – 80 – 100 – 160 bottom	**Mounting position** NG 63 – 80 – 100 centre back
	Dial Aluminium, white, Dial marking black	**Dial** Aluminium, white, Dial marking black
	Pointer Aluminium, black	**Pointer** Plastic, black
	Housing Sheet steel galvanised	**Housing** Sheet steel galvanised
	Push on bezel Sheet steel nickel-plated	**Push on bezel** Sheet steel nickel-plated
	Window Instrument glass	**Window** Version LKF: Plastic Version LKB: Instrument glass
Options	▪ Other connection types ▪ Other ranges ▪ Other stem lengths	▪ Other ranges ▪ Other stem lengths ▪ Accuracy class 1 ▪ Steel flange Ø 40/80 mm

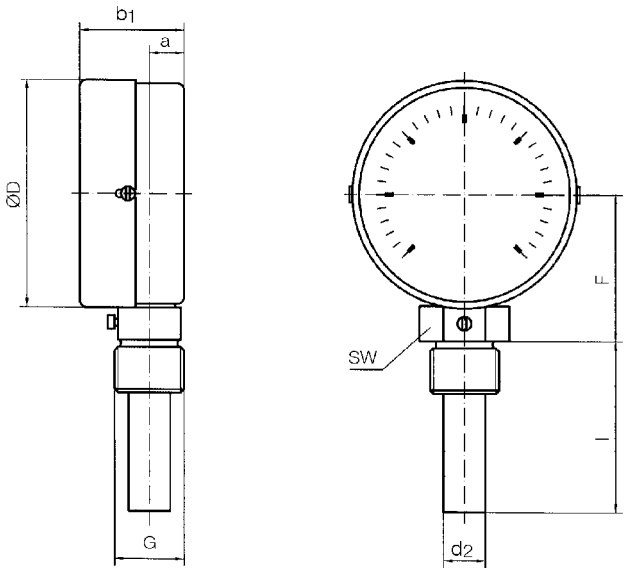
Bimetal thermometers for industrial applications/ Bimetal air duct thermometer

Housing types and dimensions (mm)

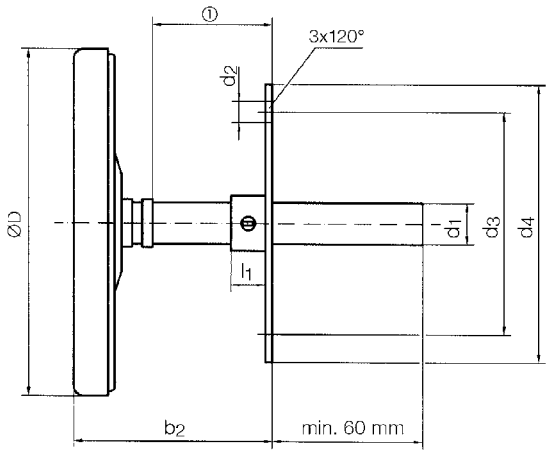
Bimetal thermometers for industrial applications
Centre back connection



Bottom connection



Bimetal air duct thermometer
Centre back connection



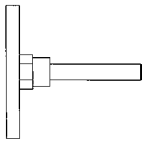
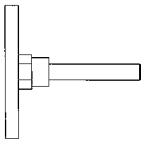
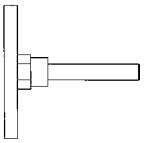
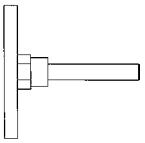
① Adjustable

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	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**
40 mm	**65146211**	65246211	65346211	65446211
63 mm	**65147211**	**65247211**	**65347211**	65447211
100 mm	**65148211**	**65248211**	**65348211**	65448211
150 mm	65149211	**65249211**	**65349211**	65449211
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	**Part no.**	**Part no.**	**Part no.**	**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

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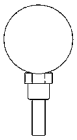
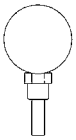
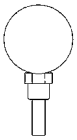
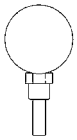
See page 659 for options.

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	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**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

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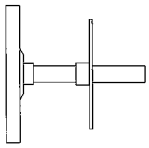
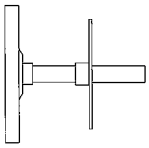
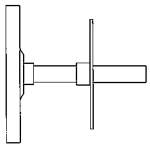
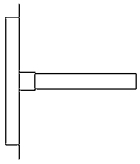
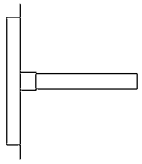
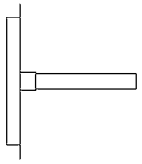
See page 659 for options.

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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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

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See page 659 for options.

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 mounting position back 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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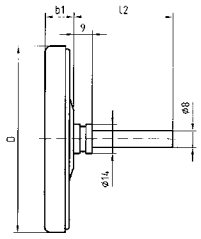
See page 661 for suitable thermowells.

Bimetal stainless steel thermometers/ Bimetal thermometers for chemical applications

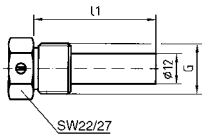
Housing types and dimensions (mm)

Bimetal stainless steel thermometers – centre back connection

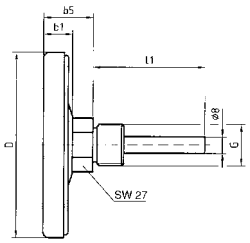
Plain stem (standard):



Separate thermowell (option):

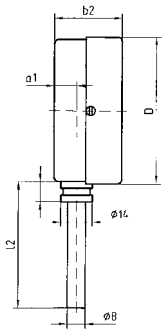


Fixed male connection (option):

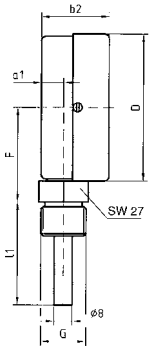


Bimetal stainless steel thermometers – bottom connection

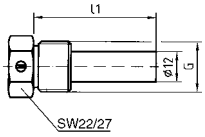
Plain stem (standard):



Fixed male connection (option):

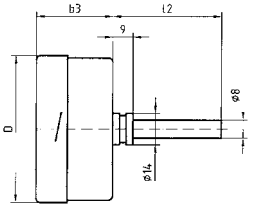


Separate thermowell (option):

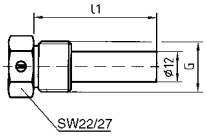


Bimetal thermometers for chemical applications – centre back connection

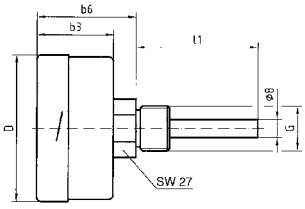
Plain stem (standard):



Separate thermowell (option):

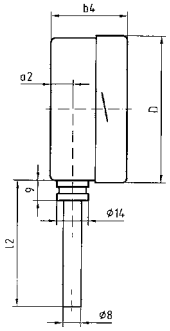


Fixed male connection (option):

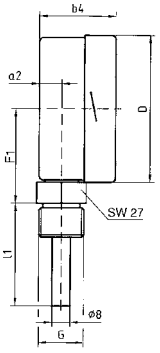


Bimetal thermometers for chemical applications – bottom connection

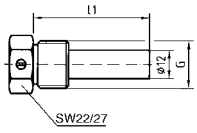
Plain stem (standard):



Fixed male connection (option):



Separate thermowell (option):

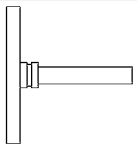
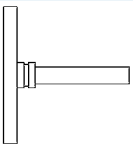
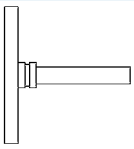
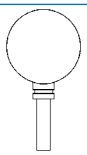
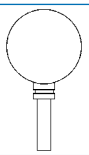


Dimensions (mm)

Nominal size (NG)	D	a_1	a_2	b_1	b_2	b_3	b_4	b_5	b_6	F	F_1	G	l_1	l_2
63	63	10	15.5	15	34	32	45	27	62	46.5	58.5	G½B	40	49
80	80	-	-	15	-	-	-	28	-	-	-	G½B	63	67
100	100	10	17.5	17	36	27.5	49.5	29	57.5	65	77.5	G½B	100	104
160	160	10	15.5	18	-	34	48	32	64	95	107.5	G½B	150	154
													200	204

Bimetal stainless steel thermometers

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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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

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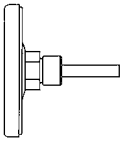
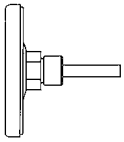
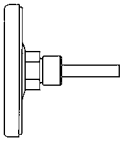
* See page 659 for other connection types and options.

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*	**Part no.**	**Part no.**	**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*	**Part no.**	**Part no.**	**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*	**Part no.**	**Part no.**	**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 optionally available.

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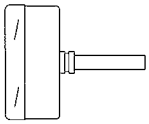
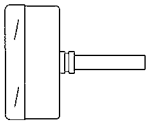
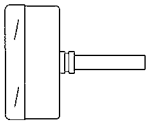
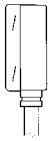
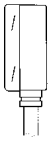
Bimetal thermometers for chemical applications

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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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

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* See page 659 for other connection types and options.

Gas filled thermometers for chemical applications

- For chemical, process engineering and food industry applications
- High measuring accuracy
- Fast response

A

Page 661

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

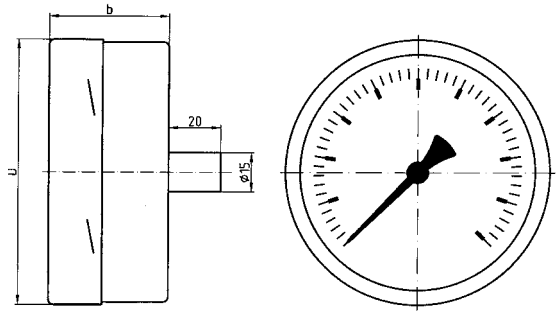
See page 661 for suitable thermowells.

Gas filled thermometers for chemical applications

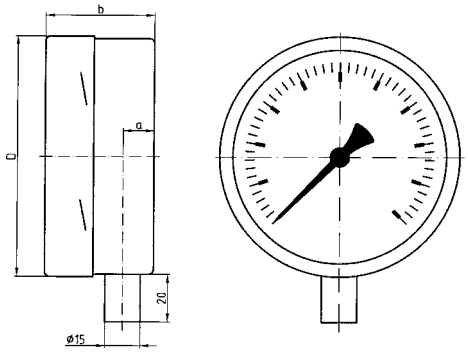
Type D4 – NG 100 / 160

Housing types and dimensions (mm)

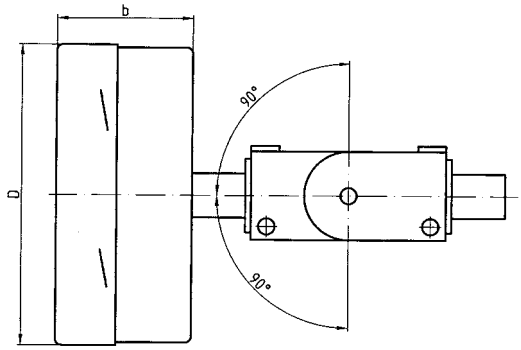
Centre back connection



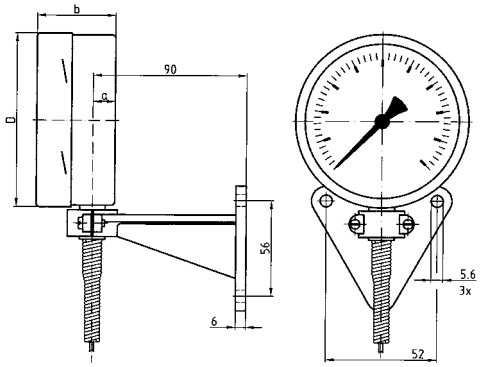
Bottom connection



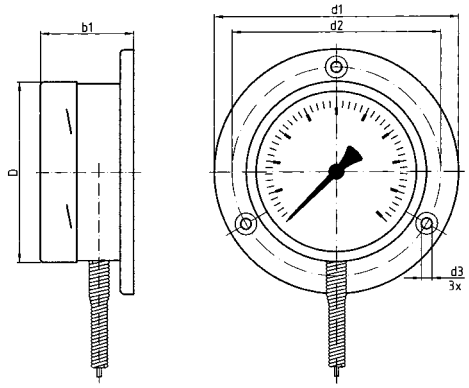
Every angle version



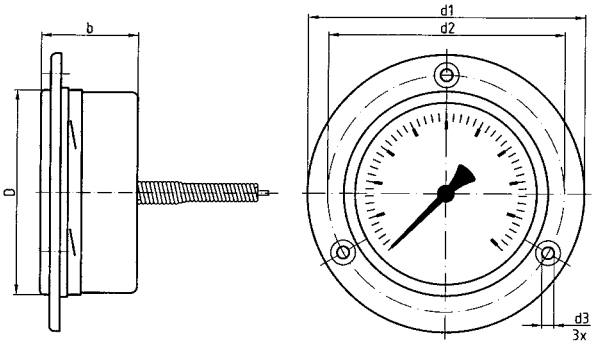
Version with capillary and wall bracket



Version with capillary and back flange



Version with capillary and 3-hole fixing, panel mounting bezel

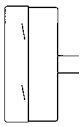
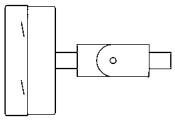
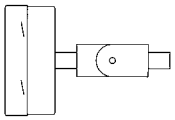


Dimensions (mm)

Nominal size	a	b	b1	Ø D	Ø d1	Ø d2	Ø d3
100	13	45	51	101	132	116	5.5
160	13	45	51	161	196	178	6

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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
	64401412	64403412	64401402	64403402	64401482	64403482

Blue part no. = in-stock items

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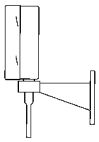
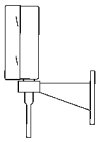
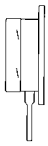
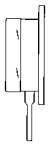
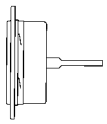
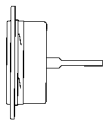
* See page 659 for other connection types and options.

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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
	Part no.	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**
	64401442	64403442	64401472	64403472	64401432	64403432

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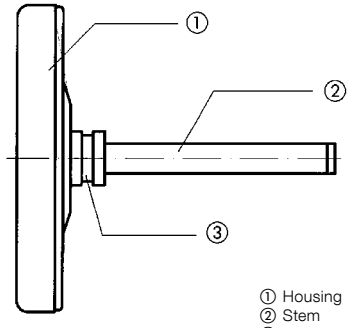
* See page 659 for other connection types and options.

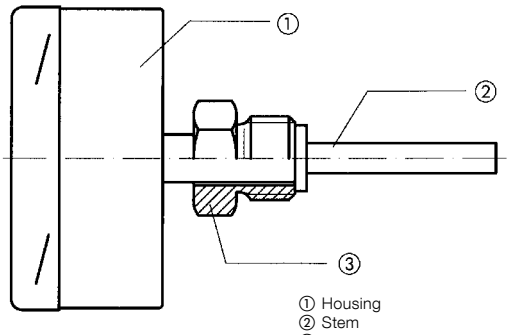
Connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical versions)

Plain



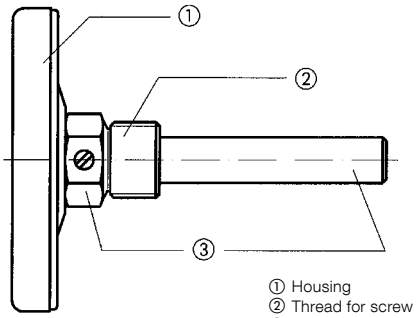
① Housing
② Stem
③ Recess for locking screw

Loose male connection



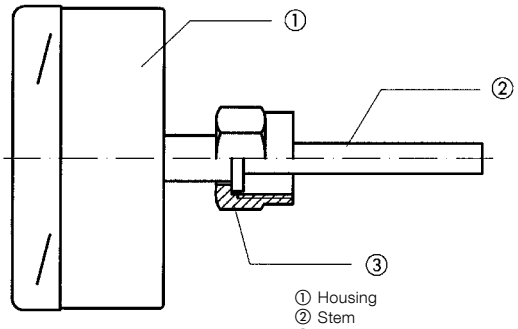
① Housing
② Stem
③ Loose connection with thread for screw connection

Separate screw-in thermowell (with locking screw)



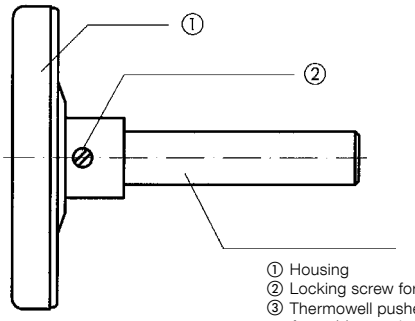
① Housing
② Thread for screw connection
③ Thermowell pushed on, fixed with locking screw

Loose union nut



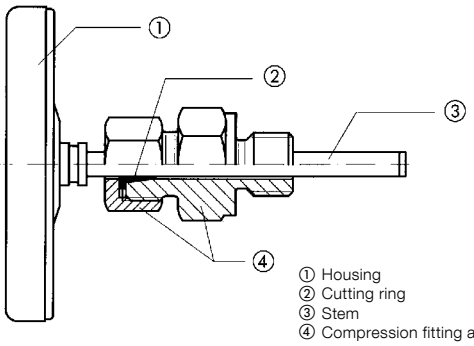
① Housing
② Stem
③ Loose female nut (seat on shoulder on stem)

Separate weld-in thermowell (with locking screw)



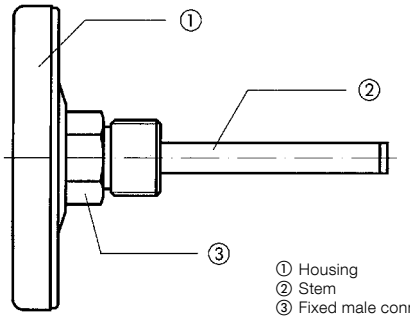
① Housing
② Locking screw for fixing
③ Thermowell pushed on, for weld mounting

Compression fitting, adjustable on stem



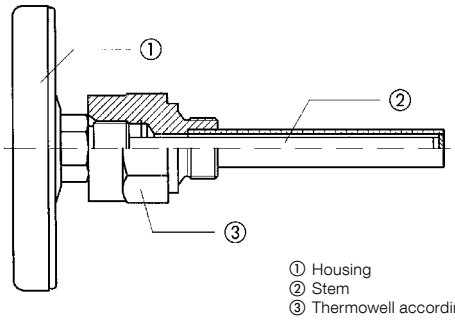
① Housing
② Cutting ring
③ Stem
④ Compression fitting adjustable

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

Options – 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	**Part no.**	**Part no.**	**Part no.**	**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	64531
Fixed male connection G¼B		---	---	64534	---
Fixed male connection G½B		---	---	64454	64460
Loose male connection G¼B		---	---	64541	---
Loose male connection G½B		---	---	64544	64545
Loose union nut G½, female		---	---	64455	64461
Loose union nut G¾, female		---	---	64553	64554
Compression fitting adjustable G½B		---	---	64556	64557
Compression fitting adjustable G¾B		---	---	64558	64559
Capillary per metre Stainless steel		---	---	---	64464
Stem Ø 6 mm[2]		On request	---	On request	---

1) Only applies to standard lengths 200/250/300 mm –enquire 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

Options 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
	Part no.	Part no.	Part no.	Part no.	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	---	64488	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
Glycerine filling (only for instruments with bayonet bezel housing)	---	64476	64484	64491	64496

Other ranges for bimetal thermometers (extra charge with reference to version 0/120 °C)	Minimum stem length back connection (in mm)	Minimum stem length bottom connection (in mm)	Available options	
-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.

Electrical contacts (only for gas filled thermometers)

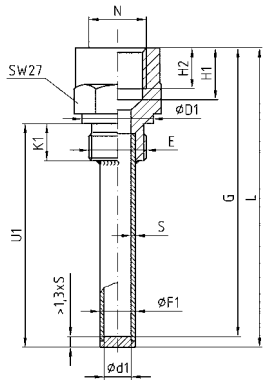
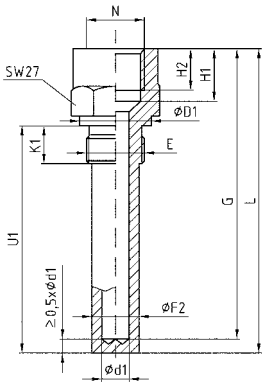
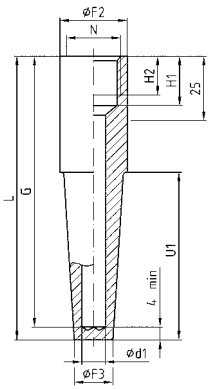
DG: H, PG: 4

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 options indicated include mounting, thermometer not included						
Version	Nominal size	Housing	Available options			
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 481 for contact protection relays and isolating switching amplifiers.

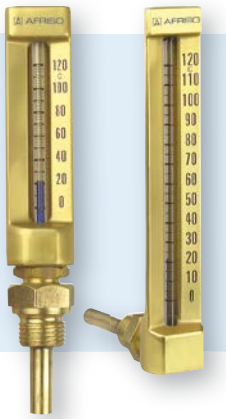
Thermowells according to DIN 43772

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		**Part no.**		**Part no.**					Lengths mm		**Part no.**		**Part no.**					Lengths mm		**Part no.**			**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		**Part no.**		**Part no.**					Lengths mm		**Part no.**		**Part no.**					Lengths mm		**Part no.**			**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.

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**

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.

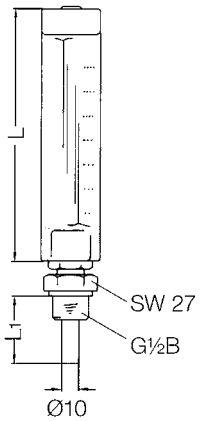
Accuracy
DIN 16195

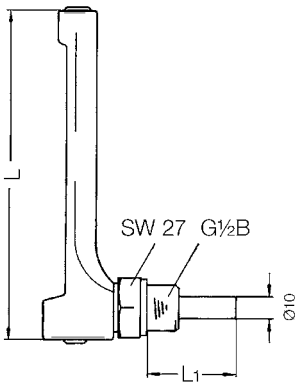
Ranges °C
-30/+50, 0/60, 0/100, 0/120, 0/160

Mounting position
Straight
Angled 90°
Angled 135°

Stem lengths (mm)
40, 63, 100, 160

Housing types and dimensions (mm)





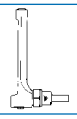
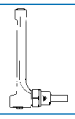
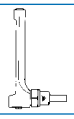
Options

- 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

	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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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] Screw-in socket (stem) stainless steel on request.
Minimum order quantity for non-stock items = 10 pieces.

Blue part no. = in-stock items

Temperature control thermostats TRT with capillary tube

- Mechanical temperature controllers
- For controlling and monitoring thermal processes
- Ideal for heat and process engineering
- Simple, robust design

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Application

Mechanical temperature controller and limiter without external power supply. The device is suitable for application areas in the field of heat and process engineering. With the liquid-filled measuring systems and the short response times, the devices lend themselves for controlling thermal processes in appliance engineering, ovens, heating and air conditioning and other industrial or domestic applications.

Description

The temperature measured at the probe causes a change in the volume of the measuring liquid in the probe-capillary system. Electrical switching is triggered by the force acting. A thermowell allows for pressure-tight installation of the probe in various types of pressurised tanks.

Technical specifications

Type
TR 2

Operating range
0/90 °C

Tolerance
±6 K at 20 °C

Influence of ambient temperature
-0.054 °C/°C

Switching differential
ΔT 4 ±1K

Adjustment angle
270°

Probe element
Liquid-filled
Ø 6.5 x 95 mm

Operating temperature range
Probe: Max. 130 °C
Housing: Max. 90 °C

Probe and capillary tube
Copper

Capillary length
Cu capillary tube with PVC coating, black
L = 1,000, 1,500 mm

Degree of protection
IP 00 (EN 60529)

Time constant
DIN-tested
DIN EN 14597:2012-09
Registration number TR/STB 1211

Electrical switching contact
Changeover contact

Contact rating
NC 16 (6) A 250 V AC
NO 6(4)A 250 V AC

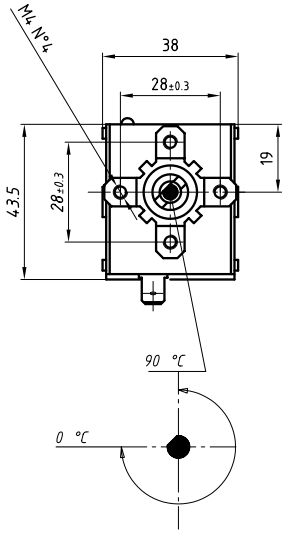
Options

- Other operating ranges
- Other capillary tube lengths
- Customised versions

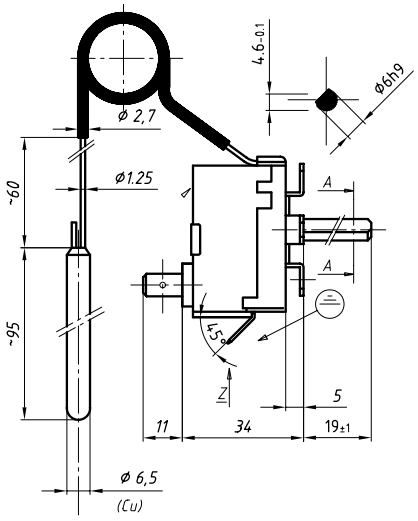
Temperature control thermostats TRT with capillary tube

Housing types and dimensions (mm)

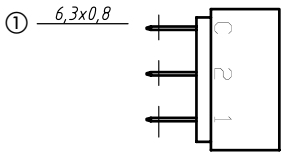
Temperature control thermostat TRT,
housing dimensions with adjustment angle



Temperature control thermostat TRT,
housing dimensions and probe dimensions

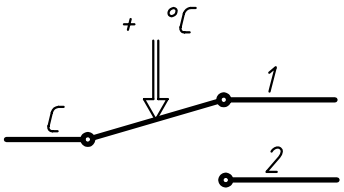


Connections (view Z)



① Connections

Switching scheme



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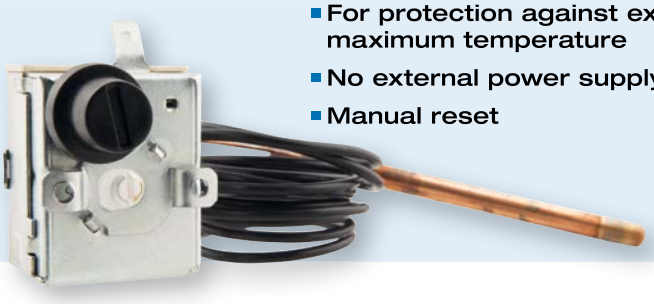
Safety temperature cut outs STB with capillary tube

- Ideal for heating and process industries
- For protection against exceeding the maximum temperature
- No external power supply
- Manual reset



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Application

There are many application areas for safety temperature cut outs in the heating and process industries. In conventional oil-fired or gas-fired boilers, these devices are used to monitor the boiler water. The safety temperature cut outs feature a manual reset button which must be actuated for unlocking.

Description

If the temperature at the probe increases, the measuring liquid in the measuring system expands. If the temperature exceeds a critical value, the device triggers, the voltage-free contact switches and the system is set to a defined safe state. When the temperature has decreased by approx. 15 K, the device can be unlocked and the system resumes operation.

Technical specifications

Type
LS1

Switching point
100 °C

Tolerance
+0 K
-6 K at 20 °C

Influence of ambient temperature
0.25 °C/°C

Switching differential
ΔT 15 ±8 K

Fail safe
Yes

Probe element
Liquid-filled
Ø 6.5 x 95 mm

Operating temperature range
Probe: Max. 125 °C
Housing: Max. 85 °C

Probe and capillary tube
Copper

Capillary length
Cu capillary tube with PVC coating, black
L = 1,000, 1,500 mm

Degree of protection housing
IP 00 (EN 60529)

Time constant
DIN-tested
DIN EN 14597:2012-09
Registration number TR/STB 1211

Electrical switching contact
Changeover contact

Contact rating
NC 16 (2.5) A 250 V AC
NO 0.5 A 250 V AC

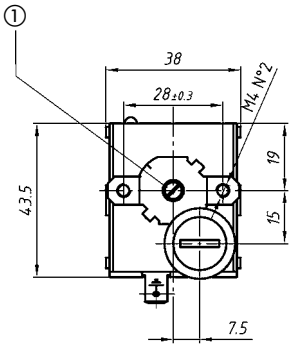
Options

- Other operating ranges
- Other capillary tube lengths
- Customised versions

Safety temperature cut outs STB with capillary tube

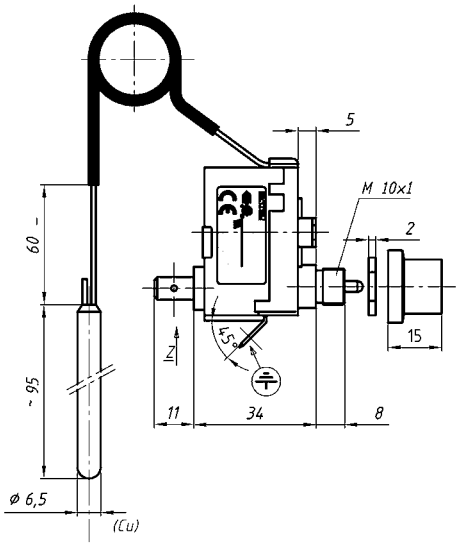
Housing types and dimensions (mm)

Housing dimensions STB

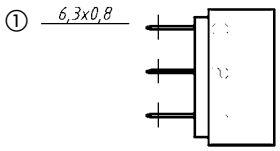


① Sealing wax

Housing and probe dimensions STB

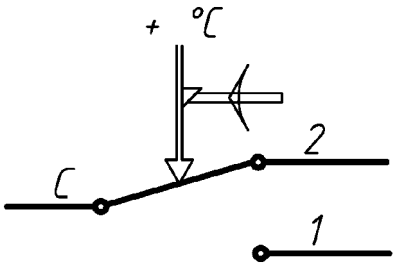


Connections (view Z)



① Connections

Switching scheme



Temperature control thermostats TRT and safety temperature cut outs STB with capillary tube

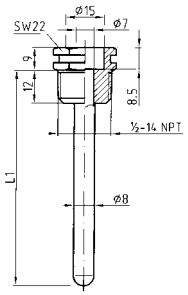
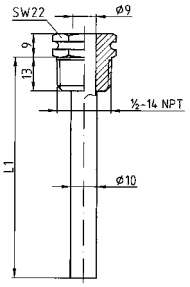
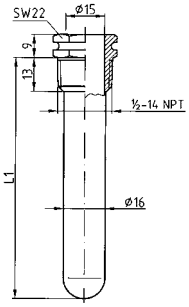
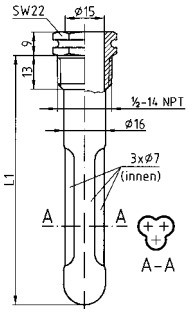
DG: G, PG: 4	Contact	Operating range/ switching point	Capillary length	Type	Part no.
Thermostats TRT					
	Changeover contact	0/90 °C	1,000 mm	TRT TR2/711 EU	**67216X**
	Changeover contact	0/90 °C	1,500 mm	TRT TR2/711 EU	**67217X**
	Changeover contact	10/200 °C	1,000 mm	TRT TR2/712 EU	**67609**
	Changeover contact	Stop/310 °C	1,000 mm without jacket	TRT TR2/711 EU	**67639**
Safety temperature cut out STB					
	Changeover contact	100 °C	1,000 mm	STB LS1/971 FU	**67276X**
	Changeover contact	100 °C	1,500 mm	STB LS1/971 FU	**67277X**
	Single	100 °C	1,000 mm	STB LS1/971 F1	**67273X**
	Single	90/110 °C	1,000 mm	ETB LS1/961 E1	**67619**
	Single	110 °C	1,500 mm	STB LS1/961 F1	**67288X**
	Changeover contact	75 °C	1,500 mm	STB LS1/971 FU	**67585X**
	Single 0.3 A/100 mV	100 °C	1,500 mm	STW LS3 F1 without manual reset	**67312X**
Accessories					
Designation					
Rotary knob 42 mm	---	0/40 °C	---	---	**67342**
Rotary knob 42 mm	---	0/90 °C	---	---	**67341**
Rotary knob 42 mm	---	0/120 °C	---	---	**67343**
Rotary knob 42 mm	---	0/210 °C*	---	---	67344
Rotary knob 42 mm	---	0/300 °C*	---	---	67345
Cover for thermostat, black	---	---	---	---	**67346**
Cover for thermostat, chrome-plated	---	---	---	---	**67347**
Fixing clamp	---	---	---	---	**67348**
Press-on spring for pockets	---	---	---	---	**67361**

* Minimum order quantity = 100 pieces per delivery.

Blue part no. = in-stock items

Pockets for thermometers and thermostats with capillary tube

DG: G, PG: 2

Type	Pocket ½" 7 x 8 mm		Pocket ½" 9 x 10 mm		Pocket ½" 15 x 16 mm		Profile pocket ½" 15 x 16 mm	
Dimensions (mm)								
Connection	½ NPT		½ NPT		½ NPT		½ NPT	
P_{max} *	4 bar		4 bar		4 bar		4 bar	
T_{max} *	200 °C		200 °C		200 °C		200 °C	
Material	Brass/Cu alloy							
Stem length L1	**Part no.**	**PU****	**Part no.**	**PU****	**Part no.**	**PU****	**Part no.**	**PU****
50 mm	**67320**	200	67326	200	---		---	
100 mm	**67321**	200	67327	200	67331	200	**67335**	200
120 mm	67322	200	67328	200	67332	200	67336	200
150 mm	**67323**	200	67329	200	67333	200	**67337**	200
200 mm	**67324**	200	67330	200	67334	200	**67338**	200
	As above, but nickel-plated							
Stem length L1	**Part no.**	**PU****	**Part no.**	**PU****	**Part no.**	**PU****	**Part no.**	**PU****
100 mm	**67321N**	200	On request	200	67331N	200	67335N	200
120 mm	67322N	200	On request	200	67332N	200	67336N	200
150 mm	**67323N**	200	On request	200	67333N	200	**67337N**	200
200 mm	**67324N**	200	On request	200	67334N	200	**67338N**	200

* Applies to static load (load always depends on medium, pressure and temperature of medium, flow rate, installation length and material of thermowell).
** Minimum order quantity manufactured goods = 1 packing unit (PU).

Blue part no. = in-stock items

Surface mounting thermostats with housing GAT

- Mechanical temperature controller
- Ideal for underfloor heating systems
- Temperature limitation at pipes
- Easy installation with strap

Application

Surface mounting thermostat for strap mounting at pipes from 16 to 100 mm diameter. The version with internal adjustment and temperature control range up to 60 °C is specially suited for underfloor heating systems.

Description

The surface mounting thermostat us a bimetal strip (element consisting of two metal strips with different heat expansion coefficients). When the temperature changes, the bimetal strip bends which triggers electrical switching.

Technical specifications

Type
GAT

Operating ranges
20/60 °C and 20/90 °C

Tolerance
+2 K/-8 K

Switching differential
ΔT 8 ±3 K

Setting
GAT/7RC: Externally adjustable
GAT/7HC: Internally adjustable

Probe element
Bimetal

Operating temperature range
Housing: Max. 85 °C

Housing
Upper part: Plastic (PVC), grey (RAL 7035)
Base plate: Galvanised sheet steel

Cable entry
Plastic (PVC), black
M20 x 1.5

Degree of protection housing
IP 20 (EN 60529)

Response time
1 K/minute

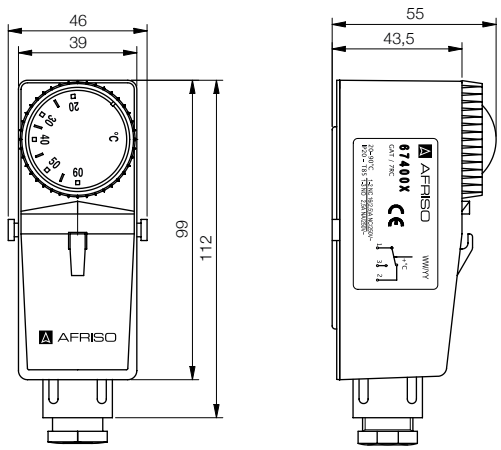
Electrical switching contact
Changeover contact

Contact rating
NC 16 (2.5) A 250 V AC
NO 2.5 A 250 V AC

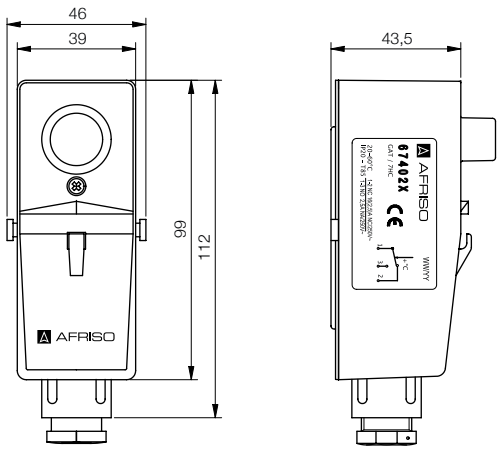
Surface mounting thermostats with housing GAT

Housing types and dimensions (mm)

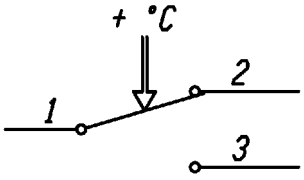
GAT/7RC, external adjustment



GAT/7HC, internal adjustment



Switching scheme



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Immersion thermostats with housing GTT

- Mechanical temperature controller
- For controlling heating and cooling processes
- Ideal for heat and process engineering
- Control directly at the process

Application

Mechanical temperature controller and limiter. The device is suitable for application areas in the field of heat and process engineering. Heating and cooling processes in industrial or domestic applications can be controlled directly at the process.

Description

The temperature measured at the probe causes a change in the volume of the measuring liquid. Electrical switching is triggered by the force acting. The pocket allows for direct installation in pressure-tight tanks.

Technical specifications

Type
GTT / TC2

Operating ranges
0/90 °C

Tolerance
±1 K at ambient temperature 20 °C

Switching differential
ΔT 4 ±1 K

Setting
GTT/7RG: Externally adjustable
GTT/7HG: Internally adjustable

Probe element
Liquid-filled

Pocket
Cu alloy, connection ½-14 NPT
Ø 8 mm
Lengths: 100, 150 or 200 mm

Operating temperature range
Probe: Max. 130 °C
Housing: Max. 85 °C

Process pressure
Max. 4 bar

Probe
Copper

Housing
Plastic (PVC), grey (RAL 7035)

Cable entry
Plastic (PVC), black
M20 x 1.5

Degree of protection housing
IP 40 (EN 60529)

Time constant
DIN-tested
DIN EN 14597:2012-09
Registration number TR/STB 1211

Electrical switching contact
Changeover contact

Contact rating
NC 10 (2.5) A 250 V AC
NO 6 (2.5) A 250 V AC

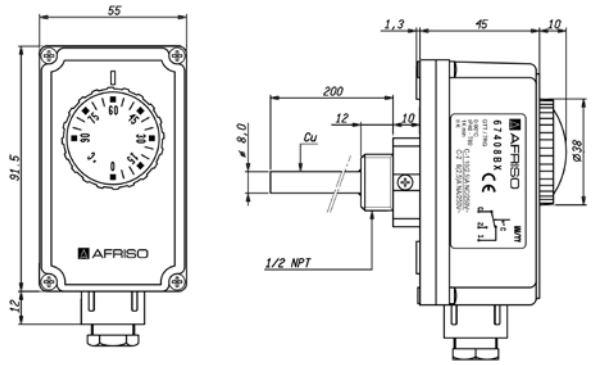
Options

- Customised versions

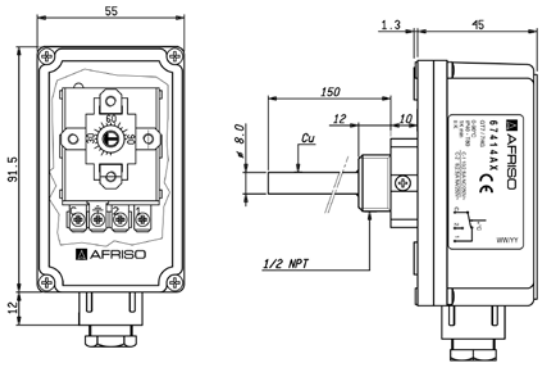
Immersion thermostats with housing GTT

Housing types and dimensions (mm)

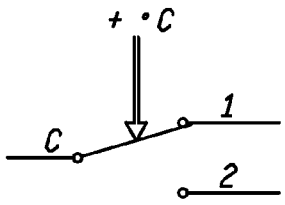
GTT/7RG, external adjustment



GTT/7HG, internal adjustment



Switching scheme



Thermostats with housing GTK with capillary tube

- Mechanical temperature controller for remote measurement
- For controlling heating and cooling processes
- Ideal for heat and process engineering

Page 669

Application

Mechanical temperature controller and limiter for remote measurement. The device is suitable for application areas in the field of heat and process engineering. Heating and cooling processes in industrial and domestic applications (in particular solar systems) are easy to control and monitor.

Description

The temperature measured at the probe causes a change in the volume of the measuring liquid in the probe-capillary system. Electrical switching is triggered by the force acting.
A thermowell allows for pressure-tight installation of the probe in various types of pressurised tanks.

Technical specifications

Type
GTK / TC2

Operating range
0/90 °C

Tolerance
+3 K at ambient temperature 20 °C

Switching differential
ΔT 4 ±1 K

Setting
Externally adjustable

Probe element
Liquid-filled
Ø 6.5 x 95 mm

Operating temperature range
Probe: Max. 150 °C
Housing: Max. 80 °C

Probe
Copper

Housing
Plastic (PVC), grey (RAL 7035)

Cable entry
Plastic (PVC), black
M20 x 1.5

Capillary length
Cu capillary tube with PVC coating, black
L = 1,000, 2,000 mm

Degree of protection housing
IP 40 (EN 60529)

Time constant
DIN-tested
DIN EN 14597:2012-09
Registration number TR/STB 1211

Electrical switching contact
Changeover contact

Contact rating
NC 10 (2.5) A 250 V AC
NO 6 (2.5) A 250 V AC

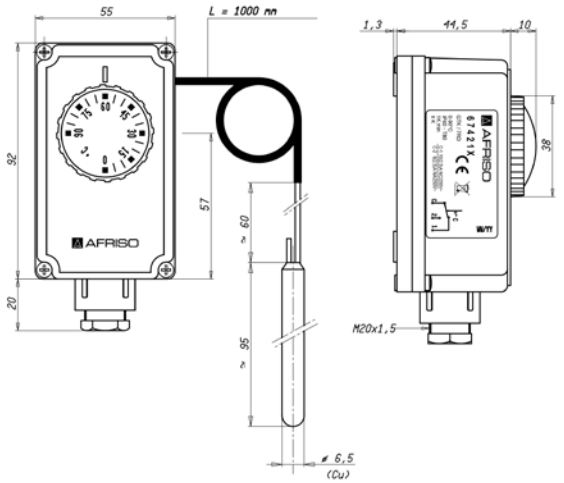
Options

- Customised versions

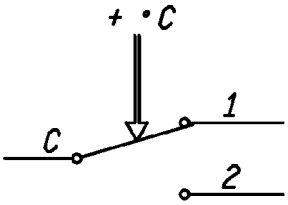
Thermostats with housing GTK with capillary tube

Housing types and dimensions (mm)

GTK/7RD, external adjustment



Switching scheme



Room thermostats with housing GRT

- Mechanical temperature controller
- For monitoring of greenhouses
- For use in animal breeding applications
- Easy wall mounting


Version 0–40 °C

Application

Mechanical room thermostat for industrial use. Due to the high degree of protection, the device can be used in humid rooms and in animal breeding applications. The room thermostats are also suitable for temperature monitoring in greenhouses.

Description

The temperature measured at the probe causes a change in the volume of the measuring liquid. Electrical switching is triggered by the force acting.

Technical specifications

Type
GRT

Operating ranges
0/40 °C and 0/55 °C

Tolerance
+2 K at ambient temperature 20 °C

Switching differential
0/40 °C ΔT 2 ±1 K
0/55 °C ΔT 3 ±1 K

Setting
GRT/7RT: Externally adjustable
GRT/7HT: Internally adjustable

Probe element
Liquid-filled

Operating temperature range
Probe: 0/40 °C, 50 °C
Housing: 0/55 °C, 85 °C

Probe
Copper, nickel-plated

Housing
Plastic (PVC), grey (RAL 7035)

Cable entry
Plastic (PVC), black
M16 x 1.5

Degree of protection housing
IP 54 (EN 60529)

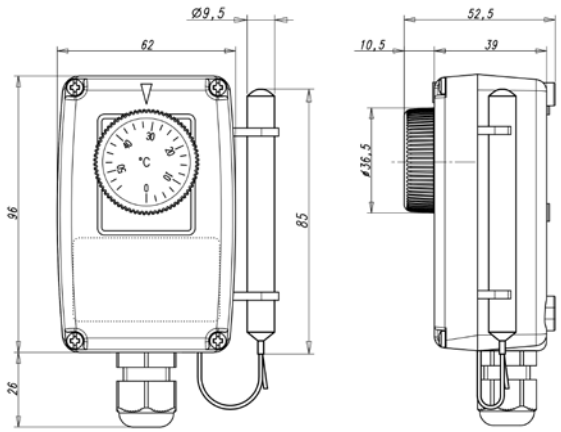
Electrical switching contact
Changeover contact

Contact rating
NC 16 (2.5) A 250 V AC
NO 6 (2.5) A 250 V AC

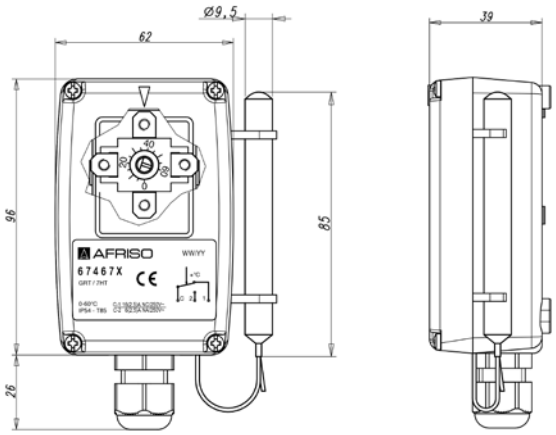
Room thermostats with housing GRT

Housing types and dimensions (mm)

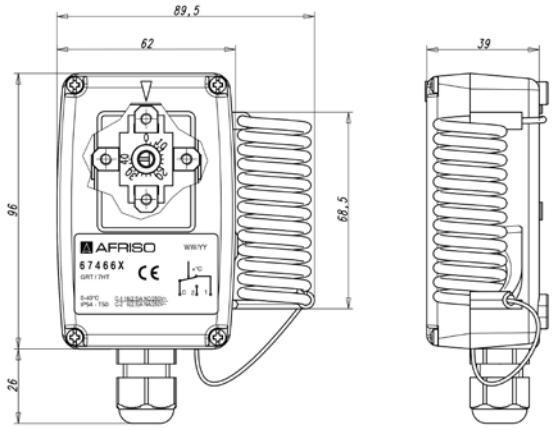
GRT/7RT, external adjustment (0–55 °C)



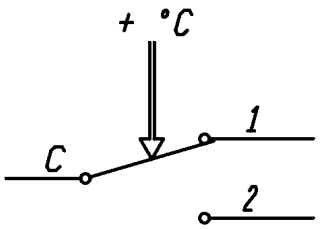
GRT/7HT, internal adjustment (0–55 °C)



GRT/7HT, internal adjustment (0–40 °C)



Switching scheme



Twin thermostats with housing GDT

- Mechanical temperature controller
- Ideal for all heat and process engineering applications
- With integrated safety temperature cut out
- Control directly at the process

Version TRT/STB with reset button

Application

Twin thermostat with housing with pocket. Available with two temperature control thermostats (TRT) for controlling heating and cooling processes in industrial and domestic applications. Also available as version with temperature control thermostat (TRT) and safety temperature cut out (STB) with manual reset button. The device is suitable for application areas in the field of heat and process engineering.

Description

The temperature measured at the probe causes a change in the volume of the measuring liquid. Electrical switching is triggered by the force acting. The pocket allows for direct installation in pressure-tight tanks.

Technical specifications

Type
GDT / TLSC

Operating range/switching point
TRT: 0/90 °C – 0/90 °C
STB: 100 °C

Tolerance
STB: +0 K/-6 K at ambient temperature 20 °C
TRT: ± 3 K

Switching differential
ΔT 4 ±1 K

Setting
TRT externally or internally adjustable

Probe element
Liquid-filled

Pocket
Cu alloy, connection ½-14 NPT
Ø 16 mm, profile version
Length: 100 mm

Operating temperature range
Probe: Max. 125 °C
Housing: Max. 80 °C

Process pressure
Max. 4 bar

Probe
Copper

Housing
Plastic (PVC), grey (RAL 7035)

Cable entry
Plastic (PVC), black
M20 x 1.5

Degree of protection housing
IP 40 (EN 60529)

Time constant
DIN-tested
DIN EN 14597:2012-09
Registration number TR/STB 1231

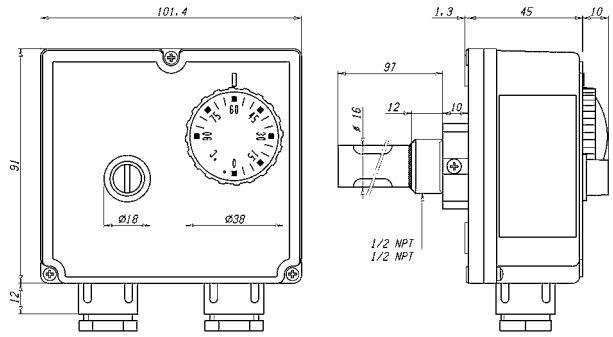
Electrical switching contact
2 x changeover contact

Contact rating
TRT
NC 10 (2.5) A 250 V AC
NO 6 (2.5) A 250 V AC
STB
NC 10 (2.5) A 250 V AC
NO 10 (2.5) A 250 V AC

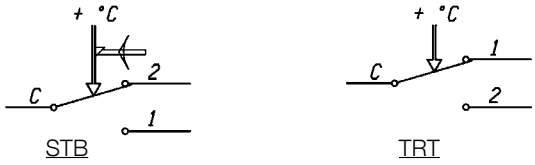
Twin thermostats with housing GDT

Housing types and dimensions (mm)

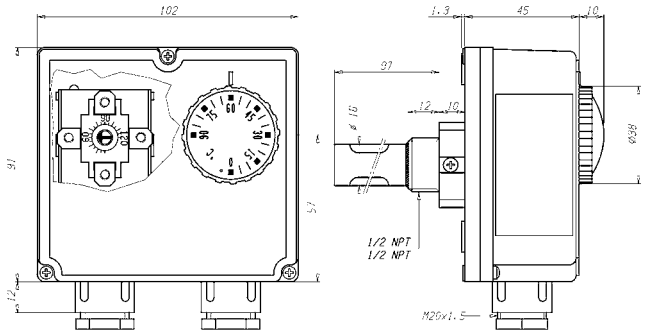
GDT/8RS, version TRT/STB



Switching scheme

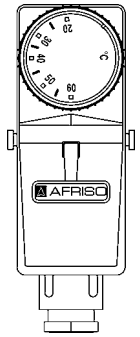
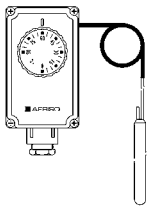
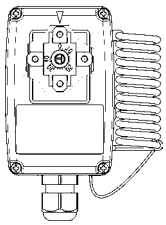
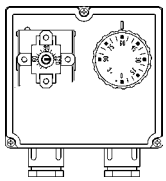


GDT/8HR, version TRT/TRT



Switching scheme

Thermostats with housing

DG: G, PG: 4	Adjustment	Operating range/ switching point	Capillary length	Stem length	**Type**	**Part no.**
Surface mounting thermostats with housing						
	External	20/60 °C	---	---	GAT/7RC	**67400X**
	External	20/90 °C	---	---	GAT/7RC	**67401X**
	Internal	20/60 °C	---	---	GAT/7HC	**67402X**
	Internal	20/90 °C	---	---	GAT/7HC	**67403X**
Immersion thermostats with housing						
	External	0/90 °C	---	100 mm	GTT/7RG	**67407X**
	External	70/210 °C	---	100 mm	GTT/7RG	**67708**
	External	0/90 °C	---	150 mm	GTT/7RG	**67408AX**
	External	0/90 °C	---	200 mm	GTT/7RG	**67408BX**
	Internal	0/90 °C	---	100 mm	GTT/7HG	**67413X**
	Internal	0/90 °C	---	200 mm	GTT/7HG	**67414BX**
Capillary type thermostats with housing/room thermostats with housing						
	External	0/90 °C	1,000 mm	---	GTK/7RD	**67421X**
	External	0/90 °C	2,000 mm	---	GTK/7RD	**67424X**
	External	0/40 °C	---	---	GRT/7RT	**67464X**
	External	0/55 °C	---	---	GRT/7RT	**67465X**
	Internal	0/40 °C	---	---	GRT/7HT	**67466X**
	Internal	0/55 °C	---	---	GRT/7HT	**67467X**
Twin thermostats with housing						
	Internal/external	0/90 °C – 0/90 °C	---	100 mm	GDT/8HR	**67447X**
	fixed/external	0/90 °C (100 °C)	---	100 mm	GDT/8RS	**67453X**
	Internal/external	0/60 °C – 30/120 °C	---	280 mm	GDT-TTCA	**67640**

* Minimum order quantity for non-stock items = 5 pieces

Blue part no. = in-stock items

Resistance thermometers WTh 20/21

WTh 20

Technical specifications

Version
Plug-in type resistance thermometer

Sensor
1 x PT 100
2-, 3- or 4-wire
Class B, IEC 751

Probe
Ø 6 mm, length 50 mm
Stainless steel 316 Ti

Electrical connection
Cable with wire ferrules

Cable
PVC (heat-resistant)

Measuring range
With installation type
Fixed: -40/+105 °C
Moving: -5/+105 °C

Options

- Coated measuring line
- Sensor class A
- Sensor Pt 1,000
- Process connection as adjustable compression fitting or fixed male connection
- Connector ISO 4400
- Miniature circular plug
- Lemosa connector
- Other probe diameters
- Other probe lengths
- Other cables:
  Silicone (-50/+180 °C)
  PTFE (-200/+260 °C)
  Glass fibre with stainless steel braiding (-50/+400 °C)
- Bending protection

WTh 21

Version
Indoor and outdoor resistance thermometer for wall mounting

Sensor
1 x PT 100
2-, 3- or 4-wire
Class B, IEC 751

Probe
Ø 6 mm, length 42 mm
Stainless steel 316 Ti

Electrical connection
Cable gland

Measuring range
-50/+90 °C

Housing
Impact-resistant plastic
W x H x D: 58 x 64 x 36 mm

Degree of protection
IP 65 (EN 60529)

Options

- Open probe
- Sensor class A
- Sensor Pt 1.000/Ni 1.000

i
See page 688 for wiring diagram.

Resistance thermometers WTh 22/23

WTh 22

Description

Version
Resistance thermometer especially for use in air ducts.

Technical specifications

Sensor
1 x PT 100
2-, 3- or 4-wire
Class B, IEC 751

Probe
Ø 8 x 1 mm, perforated
Stainless steel 316 Ti

Process connection
Mounting flange Ø 40 mm, adjustable, stainless steel

Installation lengths
100, 160, 250 mm

Housing
Impact-resistant plastic
W x H x D: 58 x 64 x 36 mm

Degree of protection
IP 54 (EN 60529)

Measuring range
0/130 °C

Options

- Process connection G½B (compression fitting or fixed male connection)
- Sensor class A
- Sensor Pt 1,000
- Transmitter installation (standard: 0/100 °C = 4–20 mA)

WTh 23

Version
Compact screw-in resistance thermometer specially for heating, ventilation and air conditioning applications.

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 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

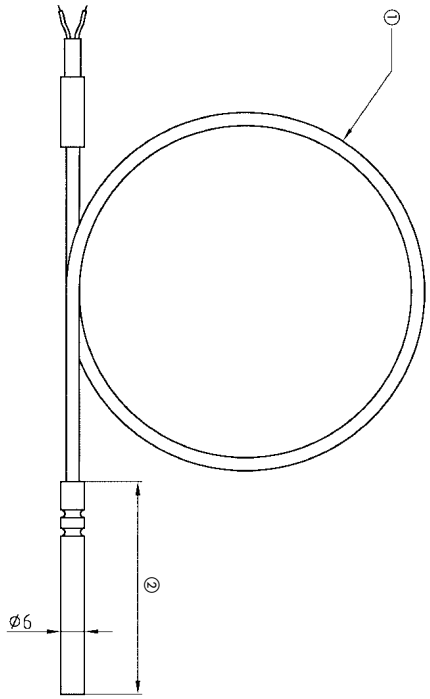
14

i
See page 688 for wiring diagram.

Resistance thermometers types WTh 20/21/22/23

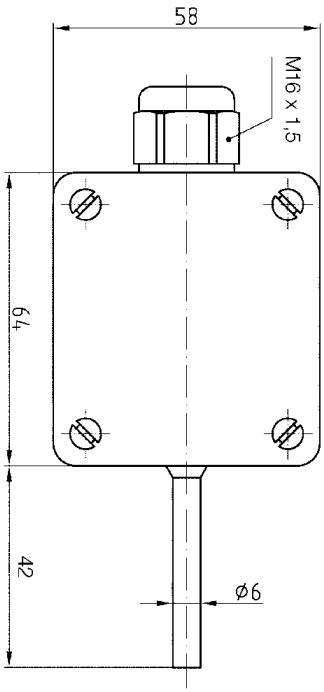
Dimensions (mm)

Type WTh 20

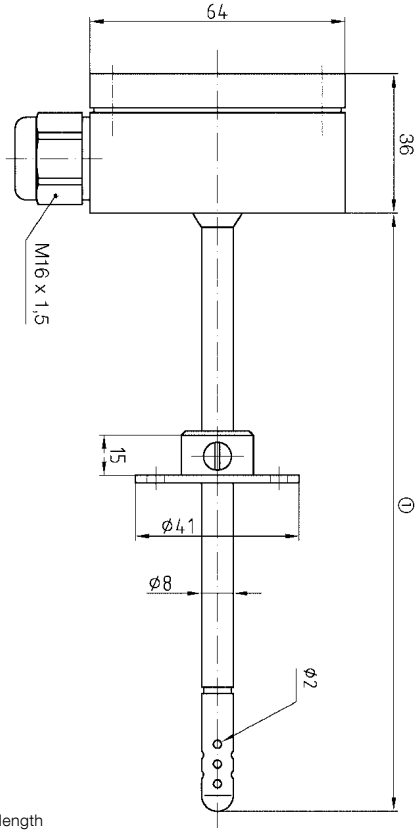


① Cable
② Probe length

Type WTh 21

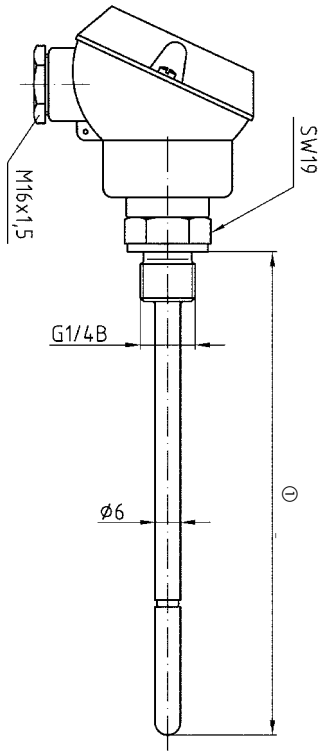


Type WTh 22



① Installation length

Type WTh 23



① Installation length

Resistance thermometers WTh 24/25

WTh 24

Description

Version
Screw-in resistance thermometer for medium pressure and flow loads, specially for mechanical engineering and plant engineering

Technical specifications

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

Options

- Sensor class A
- Sensor Pt 1,000
- Transmitter installation (standard: 0/100 °C = 4–20 mA)
- Other installation lengths

WTh 25

Version
Screw-in resistance thermometer for medium and high pressure and flow loads at high temperatures

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

- Sensor class A
- Sensor Pt 1,000
- Reduced measuring tip (6 mm)
- Transmitter installation
- Other thermowell materials, process connections, installation lengths

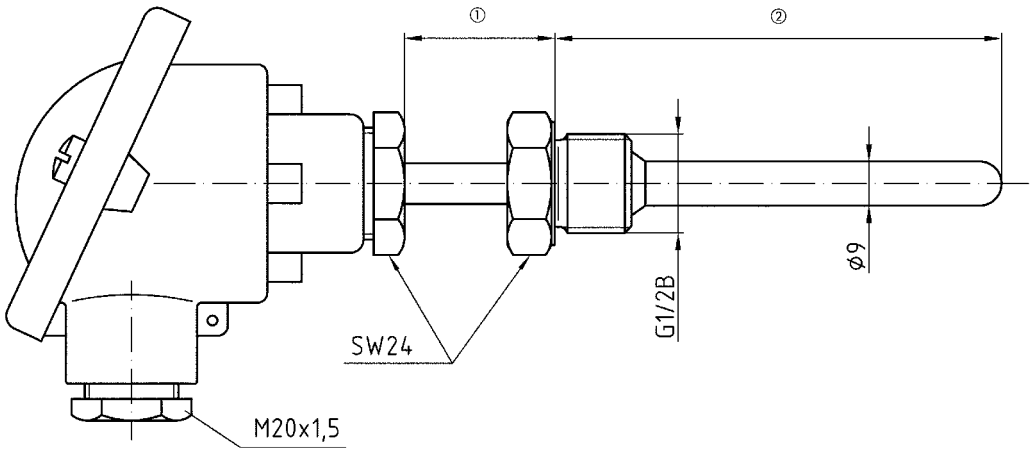
14

i
See page 688 for wiring diagram.

Resistance thermometers types WTh 24/25

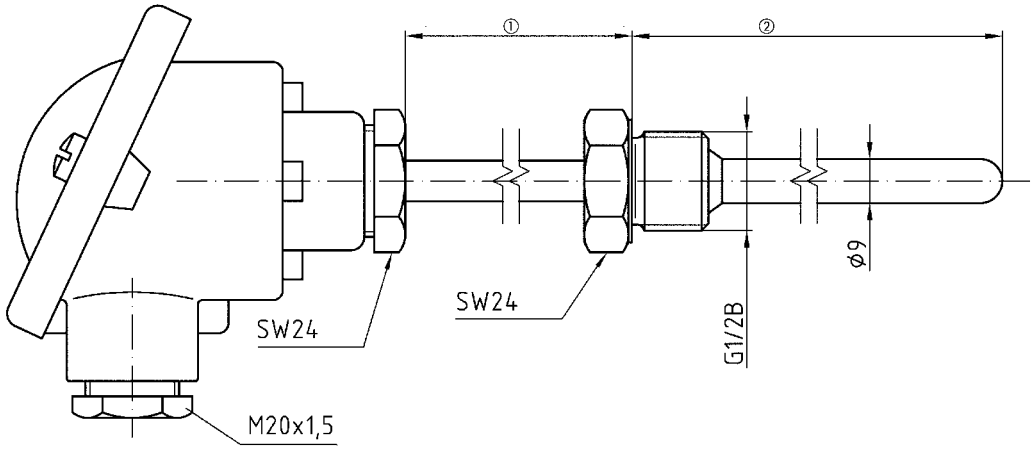
Dimensions (mm)

Type WTh 24



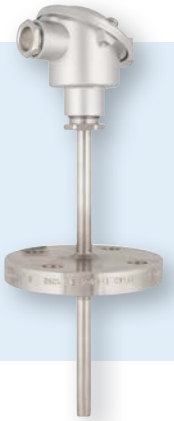
① Neck length (standard = 25)
② Installation length

Type WTh 25



① Neck length (standard = 140)
② Installation length

Resistance thermometers WTh 26/27/28



WTh 26

Technical specifications

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

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

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

- Sensor class A
- Reduced measuring tip (6 mm)
- Transmitter installation
- Other thermowell materials, process connections, installation lengths, connection heads

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

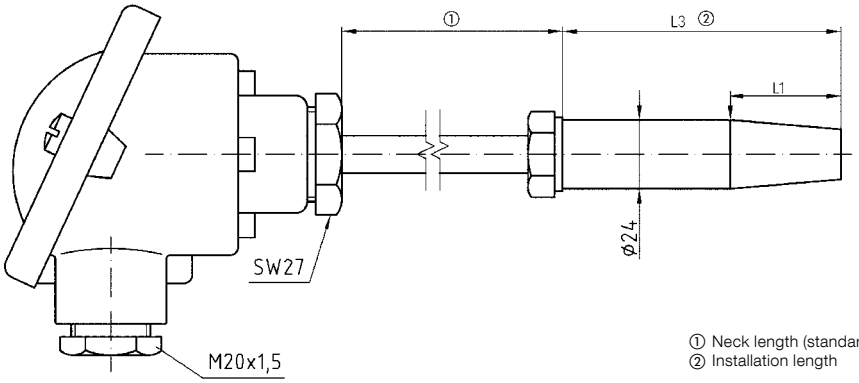
- Sensor class A
- Reduced measuring tip (6 mm)
- Other thermowell materials
- Other process connections
- Other installation lengths
- Transmitter installation
- Field housing

i
See page 688 for wiring diagram.

Resistance thermometers WTh 26/27/28

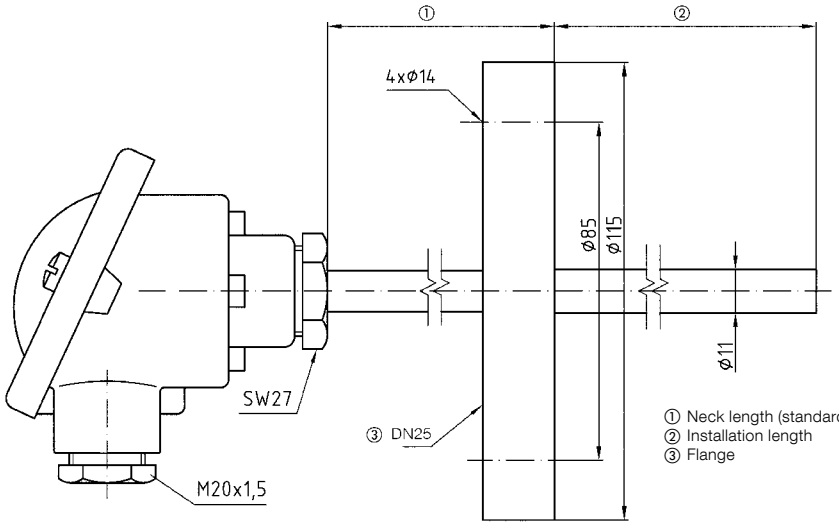
Dimensions (mm)

Type WTh 26



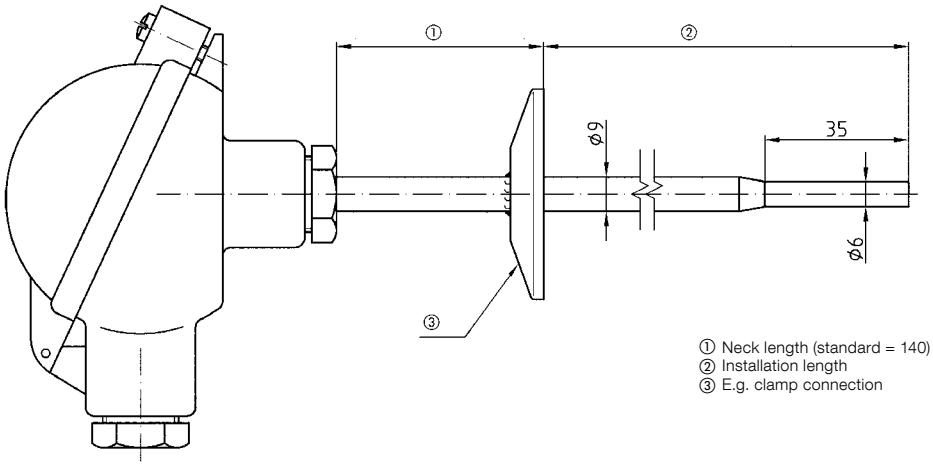
① Neck length (standard = 140)
② Installation length

Type WTh 27



① Neck length (standard = 120)
② Installation length
③ Flange

Type WTh 28



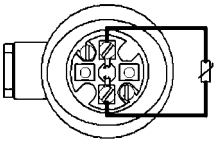
① Neck length (standard = 140)
② Installation length
③ E.g. clamp connection

14

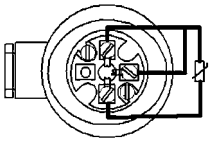
Electrical connection assignment for resistance thermometers WTh

Ceramic base in connection head, type J (WTh 23)

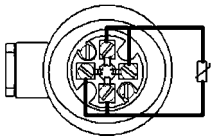
1 x two-wire



1 x three-wire

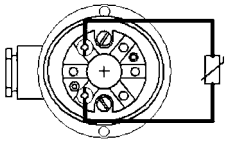


1 x four-wire

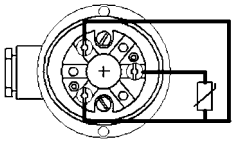


Ceramic base in connection head, type B (WTh 24 to WTh 28)

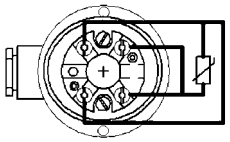
1 x two-wire



1 x three-wire

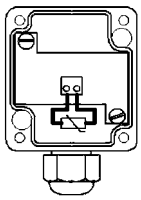


1 x four-wire

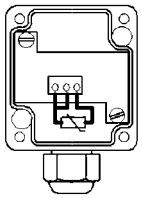


PCB in connection head, made of plastic (WTh 21 and WTh 22)

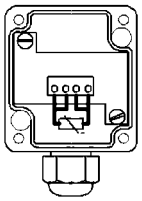
1 x two-wire



1 x three-wire

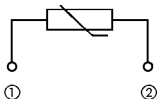


1 x four-wire

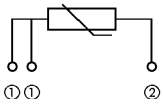


Cable probe (WTh 20)

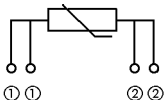
1 x two-wire



1 x three-wire

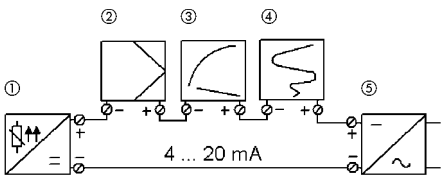


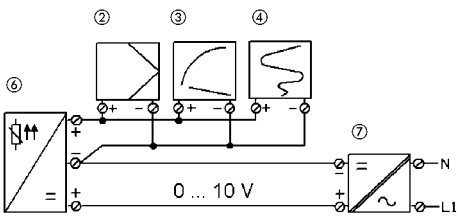
1 x four-wire



① Red
② White

Transducer

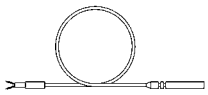
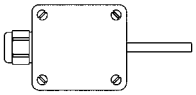
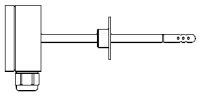




① Two-wire transducer
② Controller
③ Display unit
④ Recorder
⑤ Power supply unit DC 7.5 ... 30 V
⑥ Three-wire transducer
⑦ Power supply unit DC 15 ... 30 V

Resistance thermometers

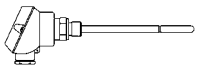
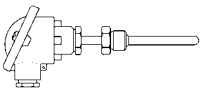
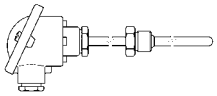
DG: H, PG: 4

Type	WTh 20	WTh 21	WTh 22
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	6 mm Stainless steel 316 Ti	Perforated 8 mm Stainless steel 316 Ti
Neck	---	---	---
Process connection	---	---	Mounting flange Ø 40 mm
Connection head/ electrical connection	PVC cable Wire ferrules	Plastic/ cable gland	Plastic/ cable gland
Measuring range fixed (moving)	-40/+105 °C (-5/+105 °C)	-50/+90 °C	0/130 °C
Installation length	**Part no.**	**Part no.**	**Part no.**
44 mm	Probe length 50 mm up to cable length 2,000 mm 32220 Cable extension per 500 mm possible	32400	---
100 mm		---	32215
160 mm		---	32216
250 mm		---	32217
400 mm		---	---
Options (without PG)	**Available options**		
Per additional 100 mm** installation length	---	---	•
1 x PT 100 4-wire	•	•	•
2 x PT 100 2-wire	---	---	---
Sensor class A	•	•	•
Connection head Type BBK	---	---	•
Transmitter installation* DC 7.5–30 V/4–20 mA	---	•	•

* Applies to standard measuring ranges (-50/+50, 0/50, 0/100, 0/120, 0/150, 0/200, 0/300 °C), enquire for others.
** Applies up to 1,000 mm, enquire for installation lengths greater than 1000 mm.

Resistance thermometers

DG: H, PG: 4

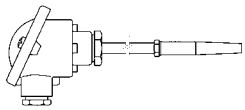
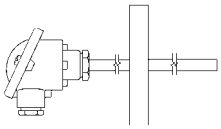
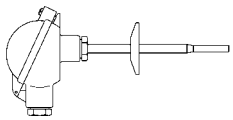
Type	WTh 23	WTh 24	WTh 25
Version			
Sensor	1 x PT 100 3-wire, class B	1 x PT 100 3-wire, class B	1 x PT 100 3-wire, class B
Thermowell/probe diameter Material	6 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti
Neck	---	25 mm	120 mm
Process connection	G¼B Stainless steel 316 Ti	G½B Stainless steel 316 Ti	G½B Stainless steel 316 Ti
Connection head/ Electr. connection	Design 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	**Part no.**	**Part no.**	**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
Options (without PG)	**Available options**		
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	---	---	•

* Applies to standard measuring ranges (-50/+50, 0/50, 0/100, 0/120, 0/150, 0/200, 0/300 °C), enquire for others.
** Applies up to 1,000 mm, enquire for installation lengths 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/ electrical 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	**Part no.**	**Part no.**	**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
Options (without PG)	**Available options**		
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), enquire for others.
*** Applies up to 1,000 mm, enquire for installation lengths 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 connector.

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
M12 connector, 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

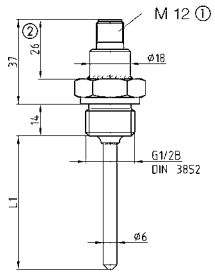
Options

- Integrated transducer
- Other process connections
- Electropolishing
- Replaceable measuring insert
- Other installation lengths
- Weld-in sockets

Resistance thermometers WTh 30

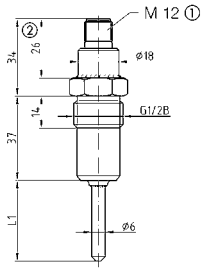
Electrical connections and dimensions (mm)

Connection G½B



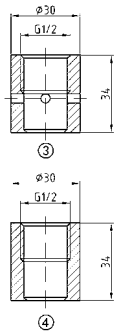
① Connector 4-pin
② Version with integrated transducer (um 24 mm longer)

Connection G½B, tapered, metallic seal



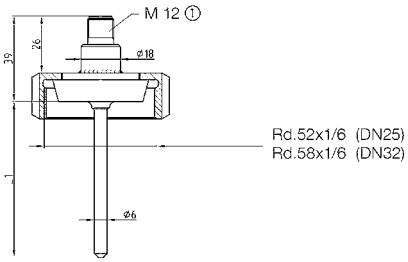
① Connector 4-pin
② Version with integrated transducer (um 24 mm longer)

Weld-in socket



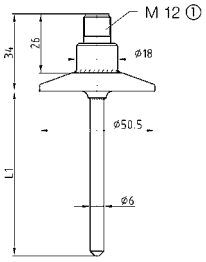
③ Socket with inspection hole
④ Socket without inspection hole

Tapered socket with grooved union nut DIN 11851



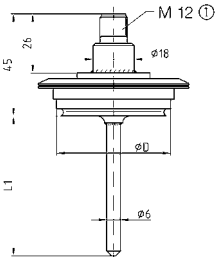
① Connector 4-pin

Clamp connection



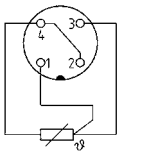
① Connector 4-pin
Clamp DIN 32676 DN 25, DN 40
Clamp ISO 2852 1", 1½"
TriClamp 1", 1½"

VARIVENT® connection



D = 68 for VARIVENT® type N

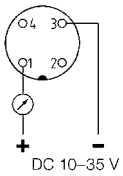
Pin assignment Without transducer



1 Braun
2 Weiß
3 Blau
4 Schwarz

1 x PT 100, 4-wire

Pin assignment With transducer



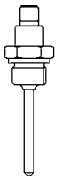
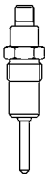
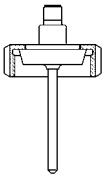
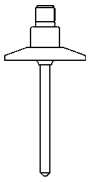
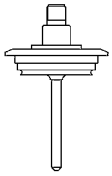
DC 10–35 V

4–20 mA, 2-wire

14

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 tapered, metallic 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	**Part no.**	**Part no.**	**Part no.**	**Part no.**	**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
Options (without PG)	**Available options**				
Installed transducer 4–20 mA*	•	•	•	•	•
Process connection					
DIN 11851 DN 32	---	---	•	---	---
ISO Clamp DN 38	---	---	---	•	---
DIN Clamp DN 25	---	---	---	•	---
DIN Clamp DN 40	---	---	---	•	---
Tri-Clamp 1"	---	---	---	•	---
Tri-Clamp 1½"	---	---	---	•	---

Accessories	Part no.
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	On request

* Please specify desired measuring range: 0/100 °C (standard), 0/150 °C, -50/+100 °C (corresponding to 4–20 mA each).

Display units

Transducer

Signalling devices

CHAPTER 15

Signalling devices/display units/signal processing, monitoring and communication systems

SIGNAL ISOLATION/AMPLIFICATION

DISPLAY/CONTROL

SIGNAL PROCESSING/EVENT REPORTING

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
DIN rail housing
W x H x D: 18 x 78 x 103 mm

Supply voltage
AC/DC 20–253 V

Input
0–20 mA or 4–20 mA

Output
0–20 mA or 4–20 mA
1:1 to input signal

Output load
Max. 400 Ohm

TV 200 GS

The TV 200 GS isolation amplifier is used for galvanic isolation, conversion and amplification of standard output signals (V/mA). Input and output are galvanically isolated with a high degree of isolation. The integrated high-efficiency electronic power supply unit helps to avoid overheating and allows for high output loads. Offset and gain can be set by means of two potentiometers on the front.

Housing
DIN rail housing
W x H x D: 23 x 78 x 103 mm

Supply voltage
AC/DC 20–253 V

Input
Part no. 53704: 4–20 mA
Part no. 53705: 0–10 V

Output
Part no. 53704: 0–10 V
Part no. 53705: 4–20 mA

Output load
Max. 500 Ohm current output
Min. 1 kOhm voltage output

STV 22 GL

The STV 22 GL supply isolation amplifier is used for galvanic isolation and amplification of DC signals (mA). The connected transducer is directly supplied by means of a galvanically isolated and limited supply voltage. Input and output are galvanically isolated with a high degree of isolation.
The integrated high-efficiency electronic power supply unit helps to avoid overheating and allows for high output loads.

Housing
DIN rail housing
W x H x D: 18 x 78 x 103 mm

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

Sensor supply
DC 24 V open circuit voltage
DC 18 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.
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 barrier

MK 330 GS

Description

The MK 330 GS trip amplifier compares the measurement signal at the input with the values set by means of the coding switches (0–99 %). If the measurement signal exceeds or falls below the set value, the corresponding output relay responds according to the selected function (relay energises or de-energises). The SMK 330 GS trip amplifier with supply also supplies the connected transducer.

Technical specifications

Housing
DIN rail housing
W x H x D: 23 x 78 x 103 mm

Supply voltage
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.

Z 787

The Zener barrier limits the amount of energy transferred from the non-hazardous area to the hazardous area. It is used for evaluation of up to 2 signals from the hazardous area. No separate supply voltage required.

If used in conjunction with AFRISO 2-wire Ex devices, only usable as a single-channel system.

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
Dual-channel
DC version
Positive polarity
With AFRISO devices: See description

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

EU Type Examination Certificate
IECEx BAS 09.0142
[Ex ia Ga] IIC
Ex [Ex ia Da] III C
[Ex ia Ma] I
-20°C ≤ Ta ≤ +60°C

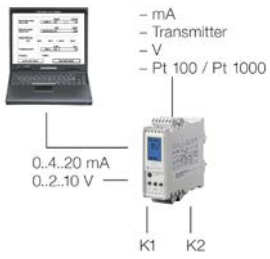
DG: H, PG: 4	Part no.
Trip amplifier MK 330 GS	53708
Trip amplifier with power supply SMK 330 GS	53709
Zener barrier Z 787	**31296**

Blue part no. = in-stock items

Multifunctional transducer MFU 12/14

- **Universal input (current, voltage, resistance)**
- **Integrated supply voltage for 2-wire/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
Removable screw terminals

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 1,000, Ni 1,000 and thermocouples)

DG: H, PG: 4	Part no.
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

A Chapter 13
A Page 548

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 (zone 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°.

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 rotated 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
(no external power may be supplied for Ex protection)
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 M12 x 1, 5-pin
- 3-wire 0–10 V

Pin assignment table

Electrical connections	ISO 4400	M12 x 1, metal (5-pin)
Supply + Supply – Signal + (for 3-wire) Switching output 1	1 2 3 3	1 2 3 5
Shield	Earth contact	4

DG: H	PG	Part no.
DA 06	4	**31278**
DA 06 Ex	4	31279
DA 06 – M12 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

Chapter 13

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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:
≥ 21 VDC at 20 mA

Sensor input
All analogue standard signals,
e.g 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 plug-in 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

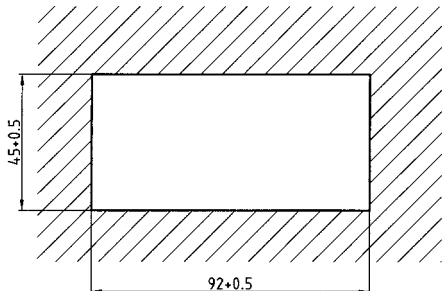
DG: H, PG: 4	Part no.
DA 10	**31281**
DA 12	**31282**
DA 14	**31283**
Accessories (PG: 3)	
Wall mounting housing WAG 01 for mounting of one DA	31287
WAG 02 for mounting of two DAs	31288
WAG 03 for mounting of three DAs	31289
WAG 04 for mounting of four DAs	31290

Blue part no. = in-stock items

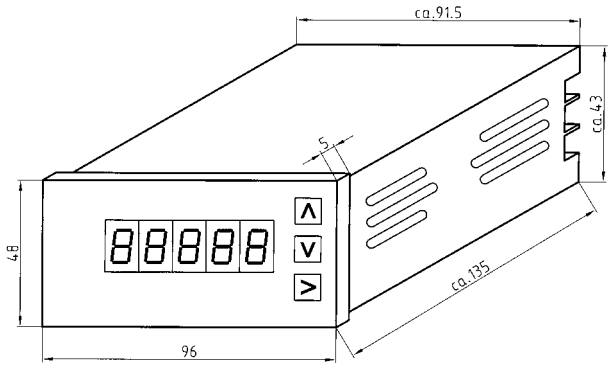
Digital display units DA 10/12/14

Dimensions (mm) and connection diagrams

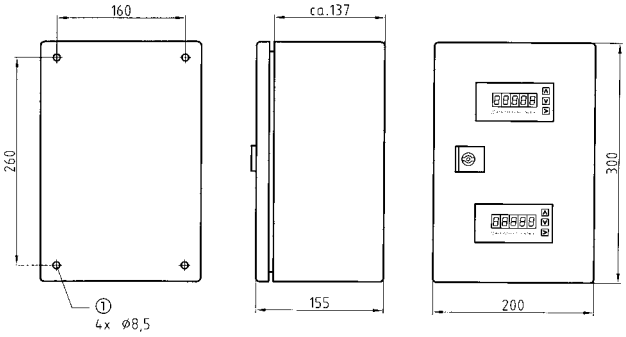
Panel cut out



DA 10/12/14

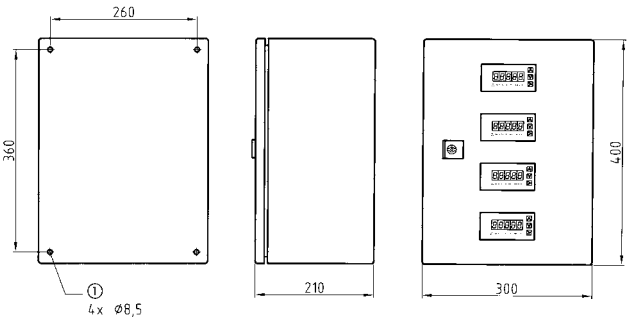


Wall-mounting housing WAG 01/02
for up to 2 DA 10/12/14



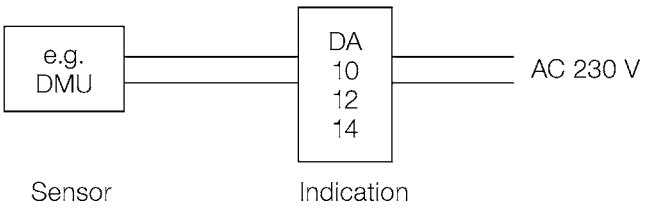
① Fixing holes

Wall mounting housing WAG 03/04
for up to 4 DA 10/12/14

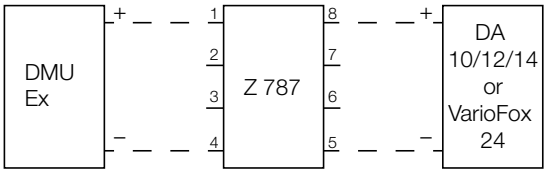


① Fixing holes

Connection diagram for standard application



Connection diagram for Ex application



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 13

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), VarioFox® forms an autonomous measuring and control system. VarioFox® is universally applicable and freely configurable.

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 (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.
VarioFox® 24 (4 relay contacts)	**31248**
SD memory card 1 GB, industrial version	31257

Blue part no. = in-stock items

Multi-channel process display MPA 20

NEW

- Up to 90 channels for inputs/outputs
- 35 mathematical/logical functions
- 8 integrated PID controllers with autotuning
- 8 time-controlled/event-controlled profiles
- Touchscreen operation and remote operation
- Multi-level password system
- Web server with HTML5 widgets
- E-mail function

Application

Universal application for displaying and logging up to 16 independent analogue input signals, 8 binary inputs, 4 resistance thermometer inputs (RTD), 4 thermocouple inputs (TC) with freely selectable scaling and units. MPA 20 is very well suited for applications in which several physical measured variables reflect the state of an object and the state is controlled by several parameters at the same time.

Description

Digital display unit with integrated data logger in plastic housing for control panel mounting which allows for simultaneous measurement, visualisation and controlling of multiple channels. MPA 20 can operate autonomously or in conjunction with external measuring equipment and actuators.
The multi-channel process display is designed as a modular device that consists of a base unit and optional input modules and output modules. The base unit comprises the main processor, a touch display, a switched-mode power supply (two available versions: 19–35 VDC and 85–260 VAC) as well as the communication interfaces (USB and RS 485).

Technical specifications

Display
5.7" TFT touchscreen
User interface languages:
German, English, French
Indication of vale, bar chart, diagram, pointer, groups

Selectable measuring ranges
Current inputs 4–20 mA
Voltage inputs 0–5 V, 1–5 V, 0–10 V, 2–10 V
Resistance thermometers
Thermocouple

Operating temperature range
Ambient: 0/50 °C

Supply voltage
AC 16–35 V / DC 19–50 V
Max. 35 VA

Input resistance
Current < 65 Ohm
Voltage > 100 kOhm

Housing
Panel housing 144 x 144 x 110 mm

Weight
Max. approx. 1.2 kg

Degree of protection
IP 65 (front), IP 20
(housing and connection terminal)
IP 40 (front, USB at front)
IP 20 (terminals)

Electrical connection
Plug-in screw terminals (1.5 mm²)

Interfaces
- RS 485 (Modbus RTU)
- RS 232
- USB host
- Ethernet (Modbus TCP)

Data memory
Internal memory 1.5 GB,
max. 125,000,000 values
Acquisition of measured values of up to 60 channels
2 selectable measurement frequencies (max. 10 Hz)
Comprehensive trigger functions
Data transmission via USB flash drive or Ethernet

Optional
- Software
- DIN rail adapter

Multi-channel process display MPA 20

NEW

Ordering data

DG: 4, PG: 0

1	Multi-channel process display
MPA 20	Base version MPA 20

2	Slot P
01	Supply 19–50 VDC, 16–35 VAC Output 24 VDC 200 mA Digital input 24 VDC, RS-485 Modbus RTU
02	Supply 85–260 VAC/DC Output 24 VDC 200 mA Digital input 24 VDC, RS-485 Modbus RTU

3	Slot D
01	Empty
02	USB host port rear
03	USB host port rear Ethernet 10 Mbit/s

4	Slot C / B / A
01	24 x current input (I)
02	16 x binary input (D)
03	4 x resistance thermometer input (RTD)
04	4 x thermocouple input (TC)
05	3 x universal input (I, U, RTD, TC)
06	4 x current output
07	12 x SPST relay 1A

5	Special version
01	Sealing frame IP 65
02	USB host port front

Ordering key example

MPA 20	01	02	01	01

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

DG: G, PG: 4			Part no.
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

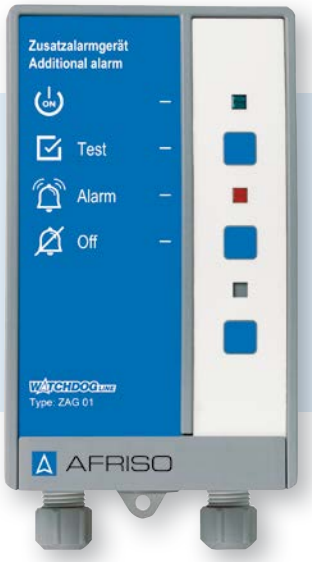
Degree of protection
IP 55 (EN 60529)

Weight
1.8 kg

Mounting position
Any

	PG	DG			Part no.
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 key 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 key 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 40 (EN 60529)

	PG	DG	Part no.
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

Oxygen analyser

Stationary gas analysis

Mobile and portable gas treatment systems

CHAPTER 16

Stationary gas analysers and plant engineering

STATIONARY GAS ANALYSIS

ANALYSERS

GAS TREATMENT

SERVICE INSTRUMENTS

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.

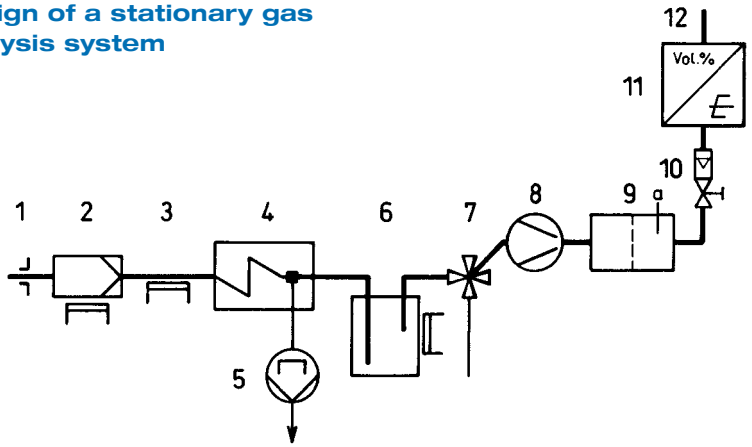
Such measuring principles include:
- **Absorption of infrared radiation** for measuring heteroatomic gases
- **Paramagnetism** for measuring oxygen concentrations
- **Ion conductivity** of solid electrolytes and liquid electrolytes

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.

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, O_2 and dust limit values. Monitoring of an existing oil fuelled plant was also integrated into the system. Data is acquired, calculated and visualised once a second.

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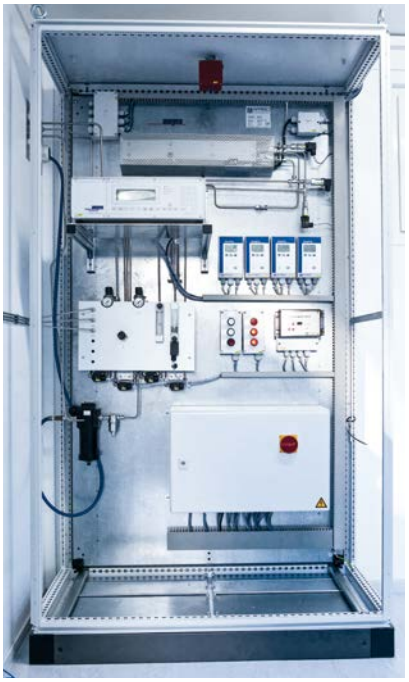
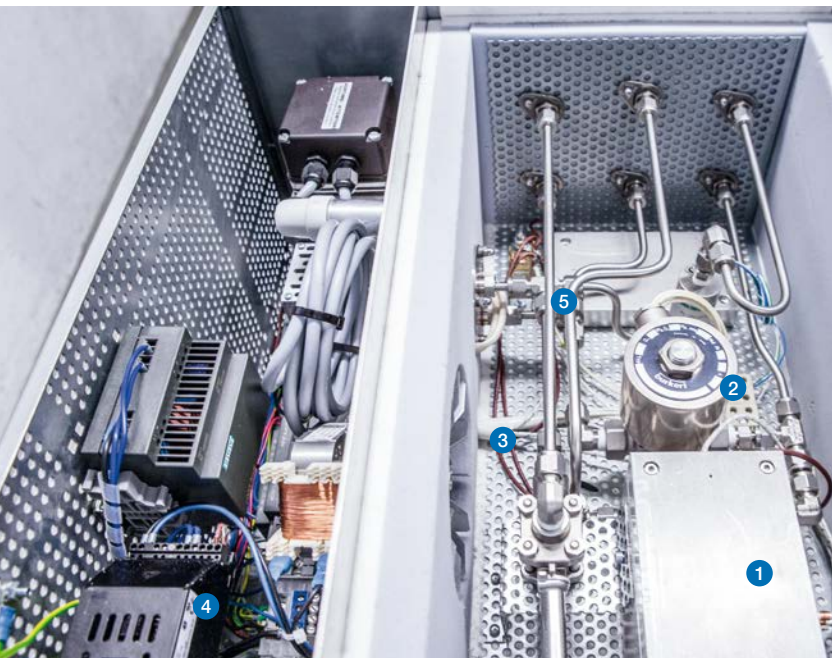
Custom-built systems to your specifications – please enquire.

Application examples: Gas analysis systems and components for gas treatment



Application examples: Heated zone



Typical components in a heated zone:

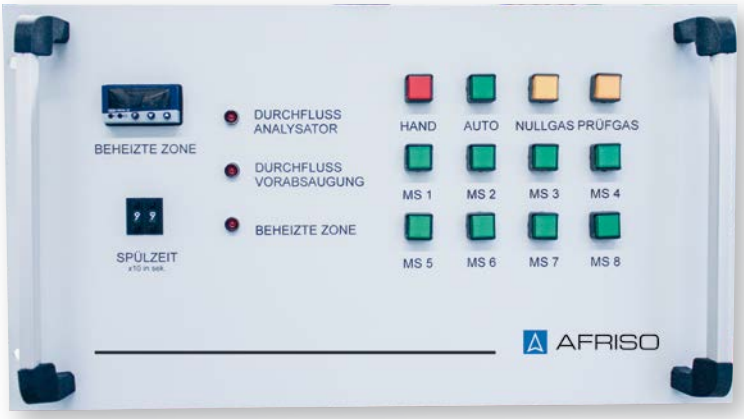
1. Heated filter
2. Solenoid valve, heated
3. Fan
4. Temperature controller
5. Gas pump, heated

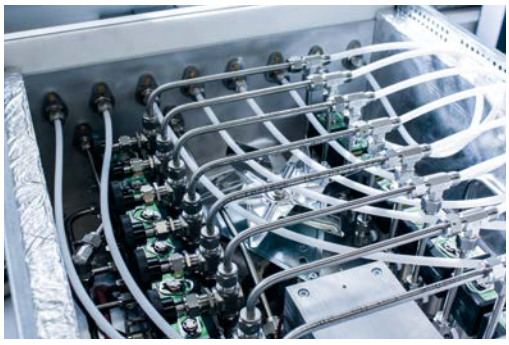
Heated gas treatment system

Application: Heated gas treatment systems are required in higher and constant operating temperatures (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.





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.
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	
Profibus DP for BIOLYZER	69637
Sampling point selector MSU	69636
Continuous measurement BIOLYZER	61850

Blue part no. = in-stock items

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.

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.
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

Mobile gas treatment system MAXISYSTEM ST

- **Automatic sensor regeneration via fresh air valve allows for convenient long-term measurements (< 12 hours)**
- **Smart system protection: Continuous monitoring of fresh air valve, heated line, cooler and humidity sensor**
- **Automatic zero point for convenient and fast measurement preparation**

Lateral connections/controls

Application

Gas treatment system specially for mobile applications. Whenever high-precision gas analysis is required where the flue gas may contain pollution and condensate, MAXISYSTEM ST is the system of choice. In the analysis of highly water-soluble gases such as NO_2 and SO_2, MAXISYSTEM ST must be used in order to be able to obtain reliable measurement results.

Description

The modular measurement concept allows to use the corresponding flue gas analyser MULTILYZER STx as a "stand-alone device" or in conjunction with MAXISYSTEM ST. With the integrated temperature controller, the temperature of the heated line can be optimally adjusted to the application between 100 °C and 180 °C. Flue gas analysis, draft/differential pressure and flue gas temperature are directly measured. Efficiency, flue gas loss and dew point are calculated in real time. The operating state of the measuring system can be checked via the status indication of the heated line and the gas cooler. The condensate outlet integrated in the housing reliably discharges condensate. MAXISYSTEM ST is designed for quasi-continuous operation with an operating time of up to 12 hours.

Technical specifications

Dimensions (W x H x D)
420 x 350 x 220 mm

Weight
7.5 kg

Material
Polypropylene (PP)

Operating temperature range
Ambient: 5/40 °C
Storage: -20/+50 °C

Pressure range
750 hPa/1,100 hPa

Humidity
20 % r.h./80 % r.h.

Main fuse
T 5 A / 250 V (4 x 20 mm)

Supply voltage
230 V / 50 Hz – 60 Hz

Approvals
2014/35/EU (Low Voltage Directive)

Gas cooler "cooling system"
5 °C, alarm at ±3 °C

Heated line "Heating"
100 – 180 °C, alarm at ±3 °C

Cooling capacity
72 kJ/h

PG: 4	Part no.
MAXISYSTEM ST docking	M05100210
Options	
MAXISYSTEM ST humidity sensor	511180
MAXISYSTEM ST heated line, length 3 m	524437

Gas treatment system TMA 65

- Compact version of a fully-featured gas treatment system
- Can be used as a portable or stationary gas treatment system
- Adjustable output dew point and alarm thresholds
- Gas cooler with 80 kJ/h nominal capacity
- Ready to operate after approx. 10 minutes

Application

Portable gas treatment system for performing accurate gas analyses at changing sites with different analysis devices. Especially for long-term or continuous measurements and measurements involving pollution and/or condensate. Decisive for precise and reproducible measurement results.

Description

The base version of TMA 65 consists of a gas cooler with condensate pump and filter. Irrespective of the ambient temperature, the gas cooler cools the gas down to the adjusted dew point. A safety circuit only releases the gas pump when the cooler has reached its point of operation. The gas cooler and the filter element are adapted to condition corrosive gases. With the optional gas pump with bypass valve and the flow meters, it is possible to supply up to two gas outlets individually. The function "cold start" enables fast use even at a storage temperature of less than 5 °C.

Technical specifications

Operating temperature range
Ambient: 5/50 °C

Gas outlet dew point:
Adjustable: 2/20 °C
Factory setting: 5 °C

Alarm thresholds
Adjustable, –3/–1 K and 1/7 K (around dew point)

Gas flow
Approx. 50/280 l/h

Operating pressure
0.2/2 bar absolute

Static dew point
0.1 K
In entire range: ±1.5 K

Input dew point
Max. 70 °C

Gas inlet temperature
Max. 140 °C
Nominal cooling capacity (at 25 °C): 80 kJ/h

Supply voltage
AC 230, 50/60 Hz

Current input
Max. 250 VA (without heated gas line)

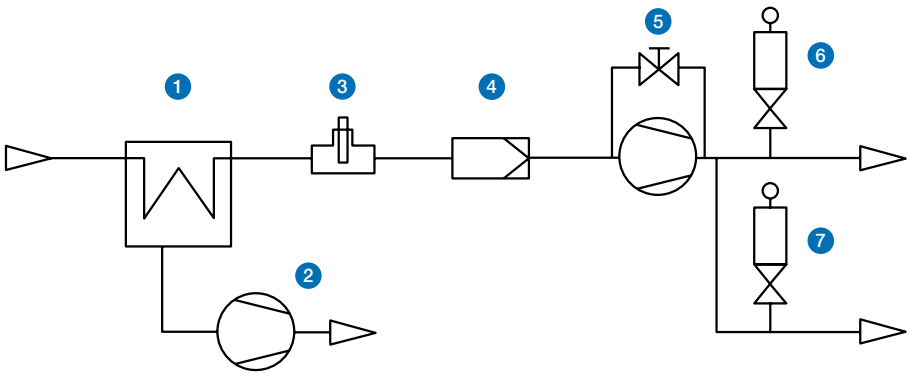
Wetted parts
PVDF, glass, stainless steel, PTFE, Norprene, Viton, epoxy resin, sintered PTFE

Housing
W x H x D: Approx. 360 x 460 x 260 mm
Connection length low temperature connector: 2.5 m
Weight: Approx. 13.5 kg (base device)
Degree of protection: IP 20

Options
- Other connections for gas inlet/gas outlet
- Supply voltage AC 115 V, 50/60 Hz
- Gas pump with bypass valve
- Humidity probe
- Rotameter

Gas treatment system TMA 65

Gas flow chart



1 Gas cooler
2 Condensate pump
3 Humidity probe (option)
4 Filter element
5 Gas pump with bypass (option)
6 Rotameter 1 (option)
7 Rotameter 2 (option)

PG: 4	Part no.
Portable gas treatment system TMA 65	69483
Options	
Gas pump MGP 65 BV, with bypass valve	69484
Humidity probe KFF 65	69494
Rotameter DFM 65 SK	69489

Gas treatment system TMA 75

MULTILYZER STx not included in scope of delivery

- Compact version of a fully-featured gas treatment system
- Can be used as a portable or stationary gas treatment system
- Adjustable output dew point
- With status alarm (changeover contact)
- Ready to operate after approx. 10 minutes

Application

Portable gas treatment system for performing accurate gas analyses at changing sites with different analysis devices. Especially for long-term or continuous measurements and measurements involving pollution and/or condensate. Decisive for precise and reproducible measurement results.

Description

The base version of TMA 75 consists of a gas cooler with condensate pump and a 2 µm fine particulate filter. Irrespective of the ambient temperature, the gas cooler cools the gas down to the adjusted dew point.

Lightweight, compact gas treatment unit, ideal for portable flue gas analysers.

Technical specifications

Operating temperature range
Ambient: 5/40 °C

Gas outlet dew point:
Adjustable: 2/20 °C
Factory setting: 5 °C

Status alarm
Changeover contact

Gas flow
75 l/h, without pre-separation

Operating pressure
Max. 1 bar

Pressure loss
< 1 mbar at 60 l/h

Flow meter
7/70 l/h air, 20 °C, 1 bar absolute

Pumps
Measured gas: $V_{max.}$ = 180 l/h
Condensate: $V_{max.}$ = 1 ml/min

Input dew point
40 °C, without pre-separation

Gas inlet temperature
Max. 120 °C

Connections
Measured gas/condensate:
Compression fitting Ø 4/6 mm

Supply voltage
AC 230 V, 60 Hz

Current input
Max. 150 VA

Contact rating
1 VA/24 VDC; 0.5 VA/120 VAC

Wetted parts
PA, PTFE, Viton, Duran glass, stainless steel 316

Housing
Aluminium
W x H x D: 360 x 415 x 220 mm
Degree of protection: IP 20

Options
- Supply voltage AC 115 V, 60 Hz

PG: 4	Part no.
Portable gas treatment system TMA 75	69503

The BlueLine measuring instrument series at a glance

See the **Catalogue Portable Measuring Instruments** for details on service instruments





		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 (up to 20,000 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			•	•		
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* See product description on the catalogue page or in the operating instructions.
** Depends on product version.
*** Optional.

	Series S2600	GSP 4	MFM 22	TMD 9	CAPBs®	BlueAir-STx
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16

Universal. Accurate. Flexible.

Suitable CAPBs® for any measuring task.

The AFRISO CAPBs® sensors constitute a modular measuring system for a vast array of physical measurands. In conjunction with a base handle, almost all tasks of HVAC experts, chimney sweeps or service technicians can be performed easily and with high accuracy. The applications consider technical rules and regulations to support the task at hand during the measurement.

Your measuring task:

Servicing air condition and ventilation systems

Ambient air quality in rooms

Assessment of the heating circuit water or the drinking water

Water quality

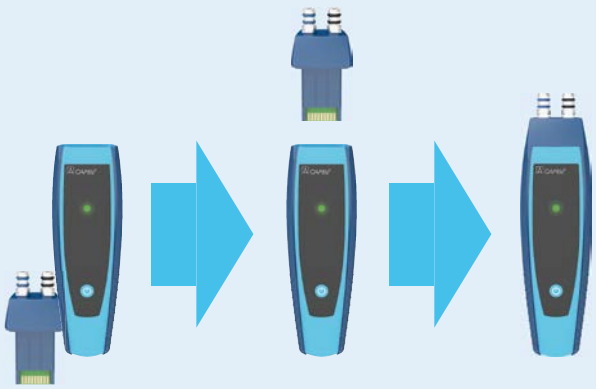
Thermal disinfection, flushing or temperature profile or drinking water installations

Drinking water hygiene

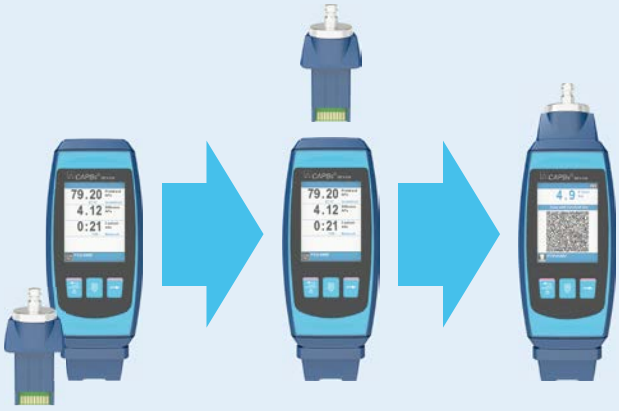
Tightness tests, for example, of gas lines, drinking water lines or heating system lines

Tightness

Select suitable CAPBs®



CAPBs® module BG 10 with sensor module



CAPBs® device with sensor module

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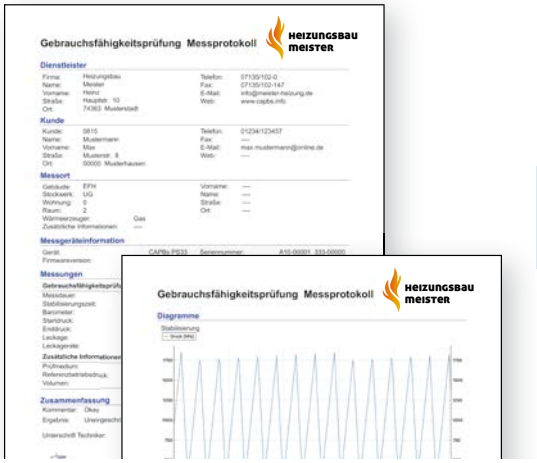
Snap the CAPBs® sensor module into the base handle: Depending on the model, settings such as zero point, data logger or start of the measurement can be made via the multi-purpose key or the adjustment keys.

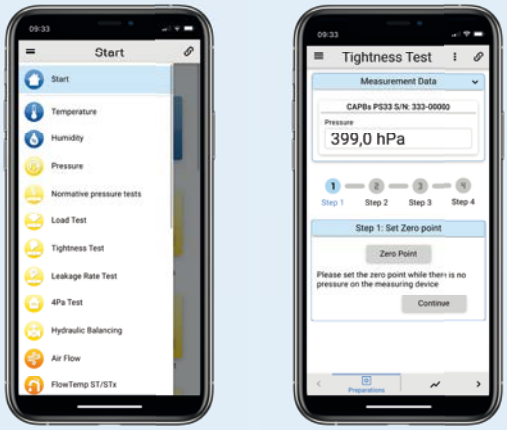
Your result:
Professional, compliant PDF report with your own company logo – ready to be sent via e-mail or messengers. The representation of the report is the same even in the case of different measuring tasks.



Google Play **App Store**

Test the free, comprehensive app with integrated demo apps.

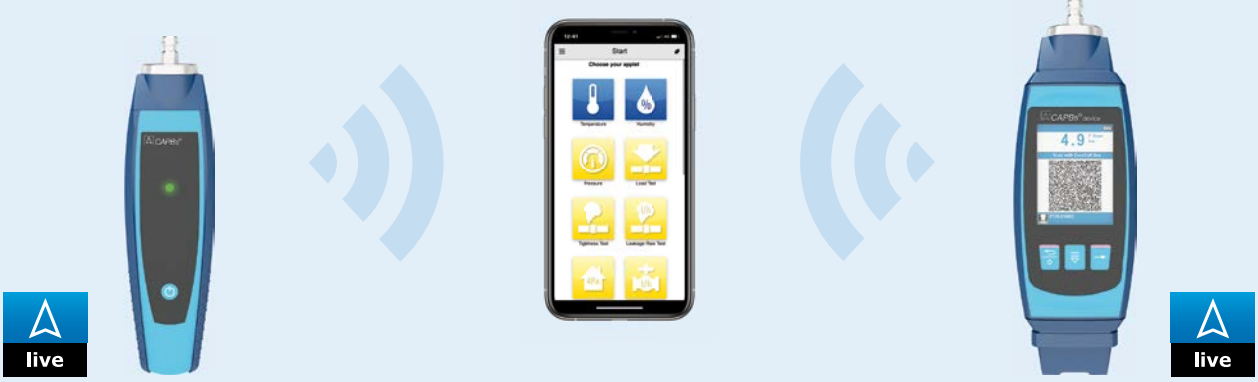
Start menu-guided measurement



Connect the CAPBs® system to the free app EuroSoft® live

Transmission of measurement data via Bluetooth®

Transmission of measurement data via Bluetooth® or QR code



CAPBs® sensor modules for pressure measurement and tightness test






		Pressure measure-ment	Pressure measurement	Pressure measure-ment	Pressure measure-ment	Pressure measure-ment	Pressure transmitter
CAPBs®		PS 10 (20 mbar)	PS 20 (180 mbar)	PS 33 (2 bar)	PS 40/4 (6 bar)	PS 60/61 (20 bar)	PT 70 (25 bar)
Application examples		Measurement of ultra-fine pressure (Pitot measurement)	Check of connection and flow pressure in gas-fired heating systems	Evaluation of serviceability (TRGI)	Tightness and load test of gas lines	Stress pressure test at pipe systems	Test of water pipes (test medium water) as per ZVSHK
Temperature	Parameters/measured values						
Pressure	Parameters/measured values	•	•	•	•	•	•
Dew point	Parameters/measured values						
Volume flow	Parameters/measured values	•*	•*				
Measurements of filters, ventilation systems, ducts	Typical applications areas		•	•	•	•	
Measurements of production facilities, tanks, gas pipes	Typical applications areas		•	•	•	•	•
Burner adjustment/servicing (gas, oil, solid fuel systems)	Typical applications areas	•	•	•	•		
Pressure measurement	Typical applications areas	•	•	•	•	•	•
Tightness test (gas)	Typical applications areas		•	•	•		
Load test (gas)	Typical applications areas			•	•		
Serviceability test (gas)	Typical applications areas			•			
Tightness test (ZVSHK)	Typical applications areas		•**	•	•**		•***
Strength test (ZVSHK)	Typical applications areas			•	•**		•***
Stress pressure test	Typical applications areas					•	•
Measurement of inlet pressure, flow pressure, static pressure, nozzle pressure	Typical applications areas		•		•		
Pressure / vacuum measurement	Typical applications areas	•	•		•	•	•
Differential pressure measurement	Typical applications areas	•	•				
Vacuum measurement	Typical applications areas	•	•		•	•	
Surface temperature measurement	Typical applications areas						
Draft/chimney draft measurement	Typical applications areas	•	•				
Ventilation loss measurement	Typical applications areas						
Heating system check	Typical applications areas						
4 Pa test	Typical applications areas						
Air velocity	Typical applications areas	•*	•*				
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* Accessories required, see catalogue page.
** With test medium air.
*** With test medium water.

Visit **capbs.info** or see the **Catalogue Portable Measuring Instruments** for details on the sensor modules; the page references at the bottom of the table gets you right there.







Pressure/ temperature	**Tightness test**	**Evaluation of serviceability**	**Tightness test underfloor heating system**	**Tightness test water pipe**	**Test set**	**Test set**
FP 10	DPK 60-6 sens	DPK 60-7 sens	PT 70 – FBH	ADS-WS	Heating system check 2.0	4 Pa test
Determination of ventilation loss (heating system check), 4 Pa test	Leak test set for gas, heating, oil or water pipes	Evaluation of serviceability of gas lines (TRGI)	Leak test set for underfloor systems for heating/cooling	Pressure tests at (drinking) water pipes	Determination of ventilation loss	Check of underpressure values in buildings
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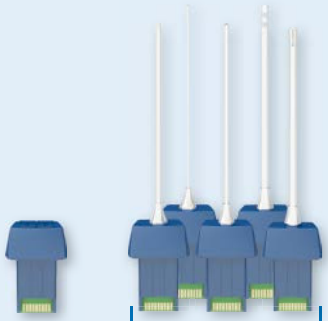
CAPBs® sensor modules for further application areas in the HVAC industry



		Temperature	Temperature	Humidity/ air temperature	Air quality	Air quality	Air quality
CAPBs®		TK 11 type K	TK 20 – TK 50	RH 80	AQ 20	AQ 35	AQ 36
Application examples		Determination of temperatures on surfaces, in liquids and in gases	Determination of temperatures on surfaces, in liquids and in gases	Monitoring or humidity in closed rooms	Fast and reliable detection of VOCs (volatile organic compounds) and CO_2	Assessment of ambient air quality in rooms, detection of CO_2	Assessment of ambient air quality in rooms, detection of CO_2, humidity and temperature
Methane	Parameters/measured values						
Propane (liquefied gas)							
Butane							
Temperature		•	•	•			•
Pressure							
Humidity in %				•			•
CO							
CO_2					•	•	•
VOC					•		
Volume flow							
TDS value in mg/l							
Salinity							
Electrical conductivity							
pH value							
Flow rate measurement (water)	Typical applications areas						
Thermal disinfection							
Measurements of filters, ventilation systems, ducts					•	•	•
Adjustment of ventilation/ air conditioning systems (EN 16798/TRGS 900)				•	•	•	•
Measurements of production facilities, tanks, gas pipes							
Heating water analysis (VDI 2035)							
Drinking water analysis (rapid test)							
Burner adjustment/servicing (gas, oil, solid fuel systems)							
Hydraulic Balancing							
Servicing of water heaters		•	•				
Temperature measurement (flue gas, air, external wall)		•	•				
Temperature measurement (water)		•	•				
Surface temperature measurement							
Gas leak detection							
Gas concentration measurement							
Moisture measurement (material/ moisture/indoor climate/mould)				•			
Air velocity							
		Page 29	Page 29	Page 30	Page 30	Page 30	Page 30

* Accessories required, see catalogue page.
** With test medium air.
*** With test medium water.

Visit **capbs.info** or see the **Catalogue Portable Measuring Instruments** for details on the sensor modules; the page references at the bottom of the table gets you right there.






Gas leak detection	CO detection	Flow rate/ temperature	Water quality	Hydraulic Balancing	
GS 10	CO 30	FlowTemp® STx	WQ 10 / WQ 11	PT 85	PT 86
Detection of leaking flammable gases (e.g. methane)	CO concentration measurement in boiler rooms	Function tests of drinking water heaters and connected pipe systems	On-site check of drinking water quality or quality of system water in heating systems	Balancing of radiator valves and lockshield valves with measurement function (AFRISO VarioQ)	Balancing of line fittings and control valves
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Page 32	Page 32	Page 36	Page 35	Page 26	Page 26

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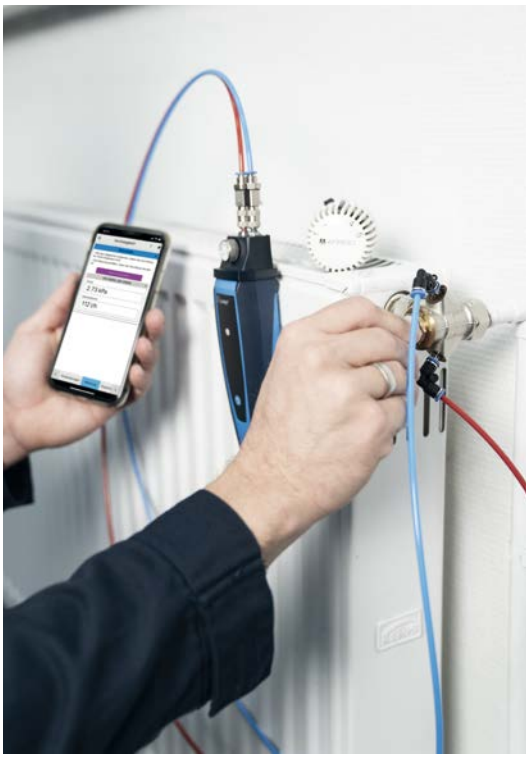
Eurovac NV

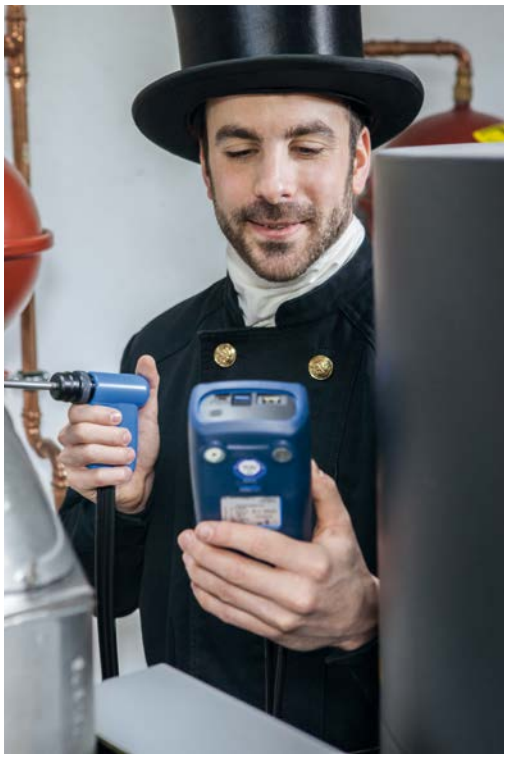
CHAPTER 17

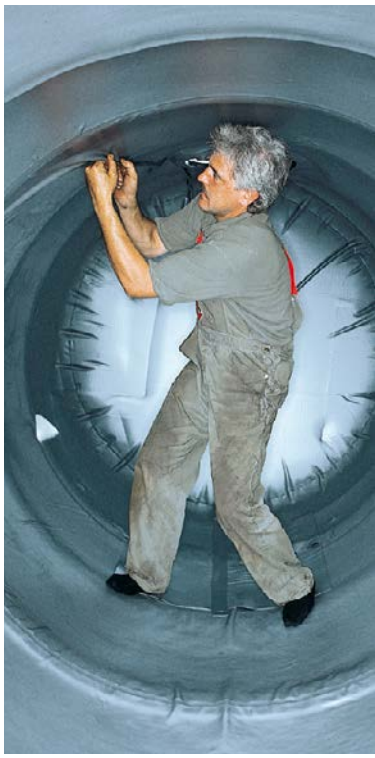
Appendix – Technical Information

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 working with 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
Phone: +49-7135-102-222

Our Service – Your Benefit

Flexible, cost-aware, on schedule, solution-oriented and fast – the AFRISO team always provides the decisive added value.

Information and presentation

Whether telephone support or on site: Our consultants speak your language – we provide you with personal and individual consulting worldwide. And if you have an in-house event for your customers, we will be glad to participate.

After sales service

Whether commissioning, professional maintenance, calibration or function checks – a network of service centres and our specialists in the plant support you in getting the maximum out of your AFRISO product. For safe processes, precise 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 via our returns portal, 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 department will be glad to answer your questions.
Please get in touch with us.
Phone: +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.

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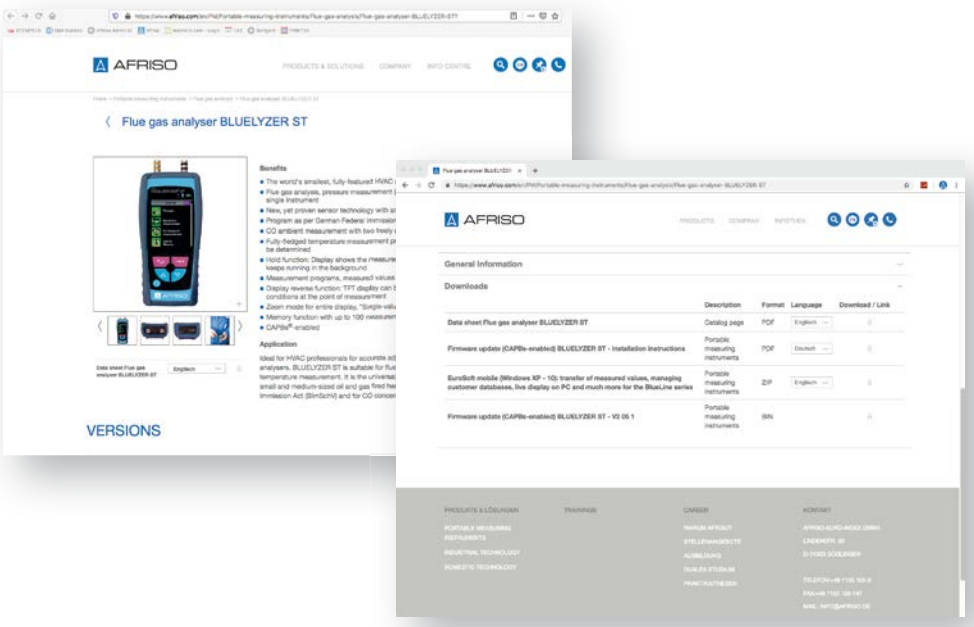
All information material can be downloaded from the download centre at www.afriso.com. If you want to order for free, simply specify the number of copies required in your e-mail to **marketing@afriso.de**

Downloads

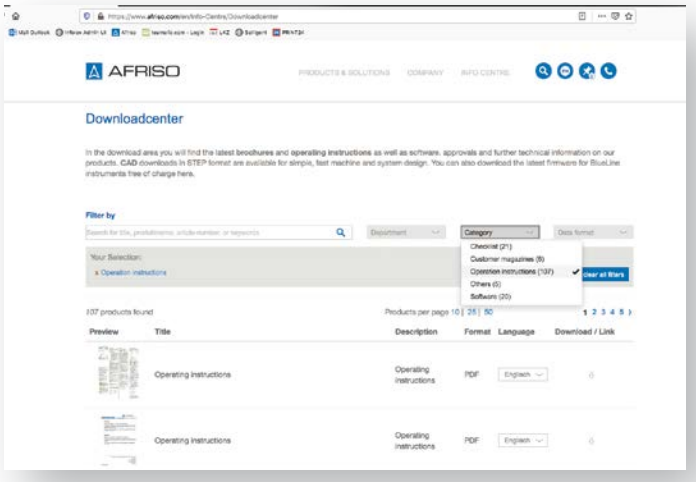
On www.afriso.com, you can find all product-relevant information such as operating instructions, brochures, special forms, certificates, CAD files or suitable software directly on the product page under Downloads.



Visit the INFO CENTRE on www.afriso.com for comprehensive information, technical specifications, General Terms and Conditions of Delivery (CTCD), valuable downloads and the latest news – all around the clock.

Operating instructions

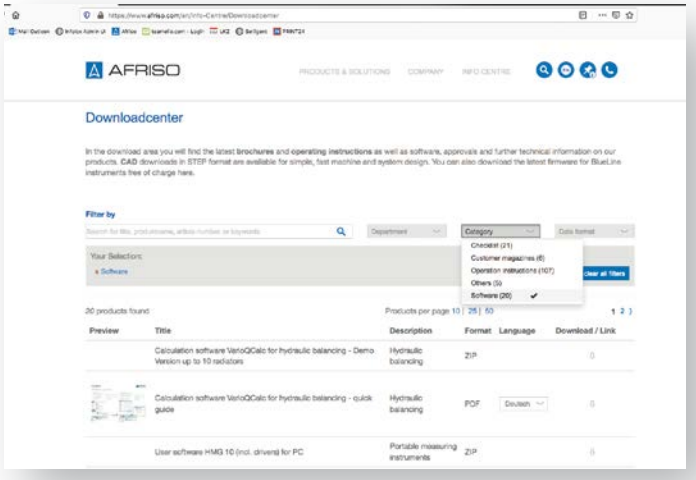
In addition to product descriptions, the operating instructions include detailed technical data, mounting, installation and safety information as well as information on approvals for all AFRISO products.



Download centre:

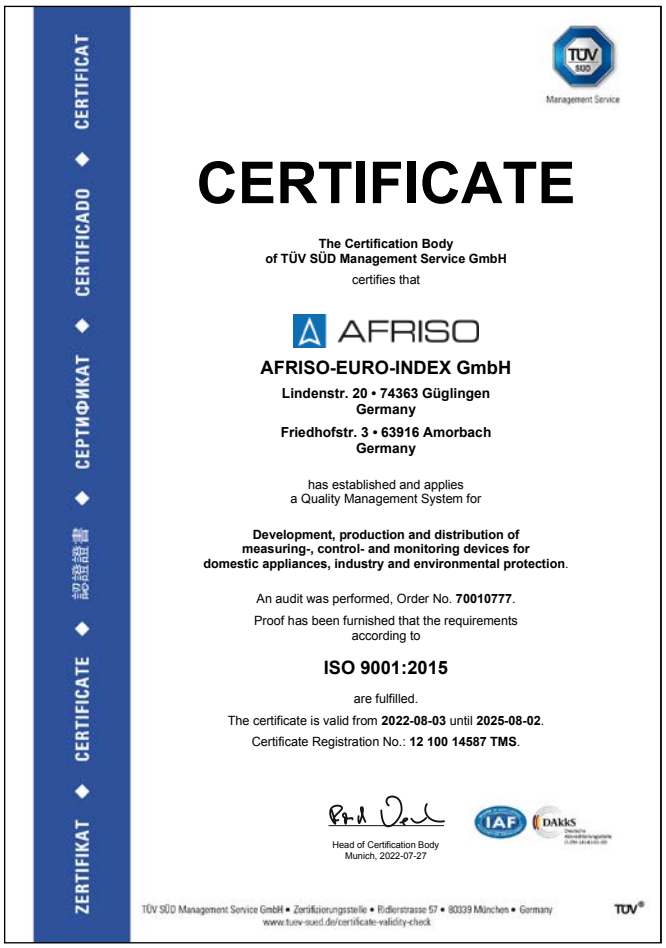
Software

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

You can find the latest certificates at www.afriso.com directly on the respective product page.



ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

AFRISO

AFRISO-EURO-INDEX GmbH
Lindenstr. 20 • 74363 Güglingen
Germany
Friedhofstr. 3 • 63916 Amorbach
Germany

has established and applies
a Quality Management System for

Development, production and distribution of measuring-, control- and monitoring devices for domestic appliances, industry and environmental protection.

An audit was performed, Order No. **70010777**.
Proof has been furnished that the requirements according to

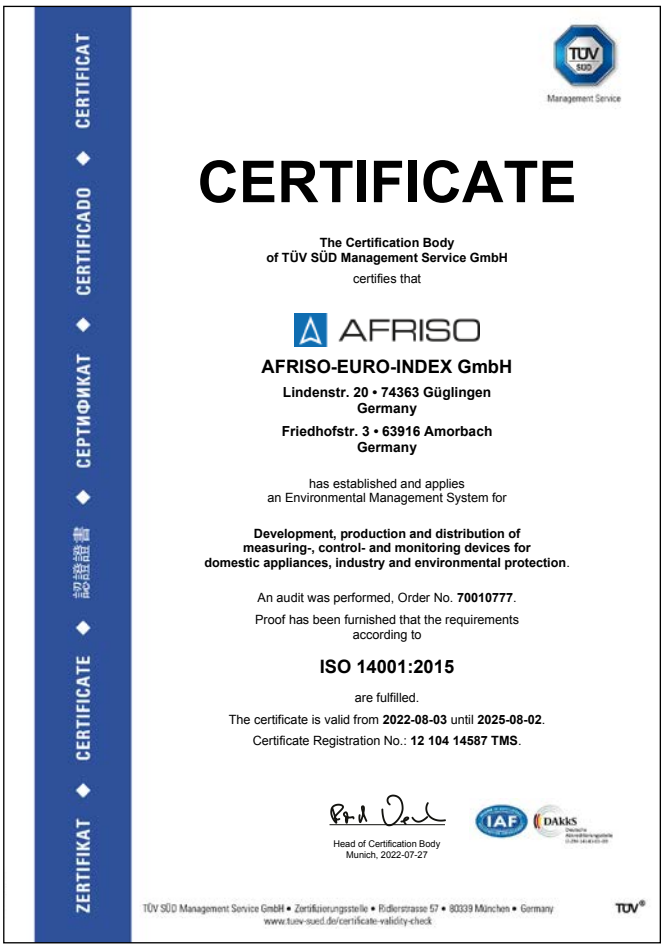
ISO 9001:2015

are fulfilled.

The certificate is valid from **2022-08-03** until **2025-08-02**.
Certificate Registration No.: **12 100 14587 TMS**.

Head of Certification Body
Munich, 2022-07-27

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstrasse 57 • 80339 München • Germany
www.tuev-sued.de/certificate-validity-check



ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Management Service

CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

AFRISO

AFRISO-EURO-INDEX GmbH
Lindenstr. 20 • 74363 Güglingen
Germany
Friedhofstr. 3 • 63916 Amorbach
Germany

has established and applies
an Environmental Management System for

Development, production and distribution of measuring-, control- and monitoring devices for domestic appliances, industry and environmental protection.

An audit was performed, Order No. **70010777**.
Proof has been furnished that the requirements according to

ISO 14001:2015

are fulfilled.

The certificate is valid from **2022-08-03** until **2025-08-02**.
Certificate Registration No.: **12 104 14587 TMS**.

Head of Certification Body
Munich, 2022-07-27

TÜV SÜD Management Service GmbH • Zertifizierungsstelle • Ridlerstrasse 57 • 80339 München • Germany
www.tuev-sued.de/certificate-validity-check

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Product Service

(1) **Certificate**
(2) **about the acceptance of the production quality assurance**

TRANSLATION

(3) Equipment and components intended for use in potentially explosive atmospheres – **Directive 2014/34/EU**
(4) Number of Certificate:
TPS 21 ATEX Q 015639 0018 Issue 00
(5) Product Category: Electrical equipment and components
Equipment group II, category 1, ignition protection concept "i"
(6) Manufacturer: AFRISO-EURO-INDEX GmbH

AFRISO

(7) Adress: Lindenstraße 20
74363 Güglingen
Deutschland
(8) TÜV SÜD Product Service GmbH notified body No. 0123 in accordance with Article 18 of the Council Directive 2014/34/EU of February 26th 2016, certifies that the manufacturer maintains a quality assurance for the production which conforms with Annex IV of the Directive.
(9) This certificate is based upon the Audit Report No. 713228702, issued at 2021-10-08, and is valid until 2024-10-05.
The certificate can be withdrawn if the manufacturer does not longer satisfy the requirements of appendix IV.
The result of the quality assurance re-assessment is part of the certificate.
(10) According to article 16 (3) of the Directive 2014/34/EU, the CE-marking shall be followed by the identification number 0123 identifying the notified body, involved in the production control stage. See also notes overleaf.

Certification Body Explosion Protection
Ridlerstrasse 65, 80339 München

CE 0123

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Quality Assurance Certificates without signature are not valid. The certificate may be circulated only without alteration. Extracts or alterations are subject to approval by TÜV SÜD Product Service GmbH. In case of dispute, the German text shall prevail. The document is internally administrated under the following number: EX2A 015639 0018 Rev. 00

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstrasse 65 • 80339 Munich • Germany

Certificate

Quality Assurance System
acc. to Directive 2014/68/EU

Certificate no.: 01 202 642/Q-18 0001

Name and address of the certificate holder: **Afriso-Euro-Index GmbH**
Lindenstr. 20
74363 Güglingen
Germany

Herewith we certify that the above -mentioned manufacturer operates a quality system according to the European Directive 2014/68/EU.
The manufacturer has the permission to affix the following CE marking to pressure equipment described and manufactured in accordance to the scope covered by this Quality-Assurance System:

CE 0035

Test basis: **Directive 2014/68/EU: QA-System (Module D)**
(the QS-Modules E1, E, D1 are covered by Module D)

Audit report no.: 01 202 642/Q-18 0001

Scope: **production of safety equipment, see annex to certificate**

Manufacturing plant: Afriso-Euro-Index GmbH
Lindenstr. 20
74363 Güglingen
Germany

Validity: **This certificate is valid from 2021-09-10 to 2024-10-24.**
Initial issuance: 2018

Cologne, 2021-09-10

Dipl.-Ing. (FH) Vera Ruff

TÜV Rheinland Industrie Service GmbH
Notified Body for Pressure Equipment, ID-No. 0035
Am Grauen Stein, D-51105 Cologne

MS-0037317 E-008-Rev01

© TÜV, TUEV und TUV sind eingetragene Marken. Eine Nutzung und Verwendung bedarf der vorherigen Zustimmung

www.tuv.com

TÜVRheinland®
Precisely Right.

PROOFED BARRIER®
Qualitätsgemeinschaft geruchsgesperrte Heizölanlagen e.V.

Zertifikat

Die Qualitätsgemeinschaft Geruchsgesperrte Heizölanlagen e.V.
verleiht der Fima

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.

ISSUE DATE: December 23, 2002 CERTIFICATE AUTHORIZATION NUMBER: 1252

3-A®

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**

DNV

TYPE APPROVAL CERTIFICATE

Certificate No: **TAA00010J**
Revision No: **2**

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 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.

Temperature	D
Humidity	B
Vibration	B, C
EMC	Not applicable
Enclosure	C

Issued at **Hamburg** on **2022-07-19**
This Certificate is valid until **2027-07-18**.
DNV local station: **Augsburg**

for **DNV**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

DNV

Job Id: **262.1-005533-4**
Certificate No: **TAA00010J**
Revision No: **2**

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, Oe	D	4	0 1
	50			7	1 2
	63			8	2
	80			9	3
	100				4
	160				5

Application/Limitation

Type Approval documentation
See annex

Tests carried out
Applicable tests according to Class Guideline DNV-CG-0339, August 2021

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 after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE

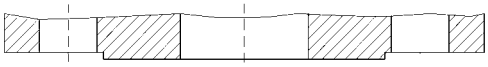
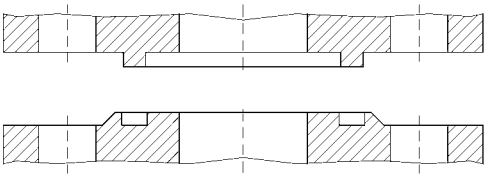
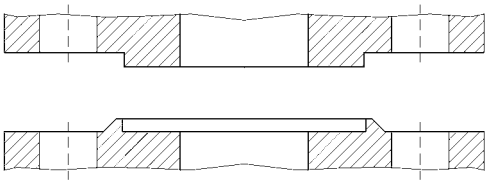
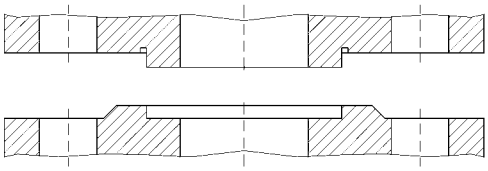
Information on the flange standard EN 1092 / international comparison of grades

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	1019.716	14.50377	401.463	29.53
1 mbar	0.001	1	100	0.1	0.0001	0.0001019716	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	0.0000010197	0.000010197	0.000009869	0.00750062	0.001019716	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	10197.16	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	0.0001333322	0.0001359951	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	0.009806665	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	0.0003453 12	0.0345312	0.03342104	25.4	0.345316	345.316	0.49115	13.595	1

Information on the Pressure Equipment Directive 2014/68/EU (PED)

The European Pressure Equipment Directive 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 greater than 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 greater than 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 in the download centre.
- 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 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.

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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

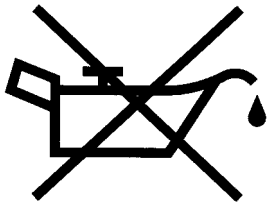
Pressure gauges for oxygen and acetylene

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

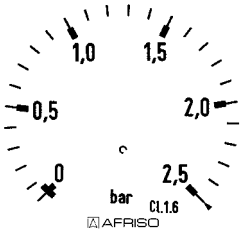
	NG 40 – 80 S2/S3	NG 100 – 250 S3
Version	RF 50 ST RF 50 GT RF 63 ST RF 63 GT RF 63 MK/IK D 3x2 RF 63 Si D 4x2	RF 100 Si D 4x2 RF 160 Si D 4x2

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					

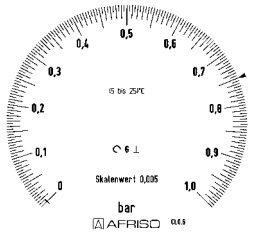
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 2.5 bar	0.05 bar	0 ... 25 mbar	0.5 mbar	0 ... 250 mbar	5 mbar	
-1 ... +1.5 bar	0.05 bar	-10 ... +15 mbar	0.5 mbar	-100 ... +150 mbar	5 mbar	
0 ... 25 bar	0.5 bar	-15 ... +10 mbar	0.5 mbar	-150 ... +100 mbar	5 mbar	
0 ... 250 bar	5 bar	-25 ... 0 mbar	0.5 mbar	-250 ... 0 mbar	5 mbar	

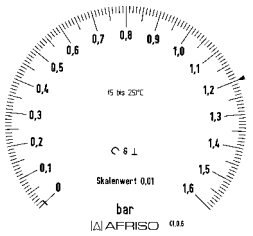
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.1 bar	0 ... 4.0 mbar	0.1 mbar	-25 ... +15 mbar	1 mbar	
-1 ... +3 bar	0.1 bar	-1.5 ... +2.5 mbar	0.1 mbar	-40 ... 0 mbar	1 mbar	
0 ... 40 bar	1 bar	-2.5 ... +1.5 mbar	0.1 mbar	0 ... 400 mbar	10 mbar	
0 ... 400 bar	10 bar	-4 ... 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	

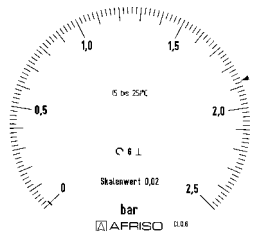
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 0.6 bar	0.01 bar	0 ... 6 mbar	0.1 mbar	-40 ... +20 mbar	1 mbar	
-0.6 ... 0 bar	0.01 bar	-2 ... +4 mbar	0.1 mbar	-60 ... 0 mbar	1 mbar	
0 ... 6 bar	0.1 bar	-4 ... +2 mbar	0.1 mbar	0 ... 600 mbar	10 mbar	
-1 ... +5 bar	0.1 bar	-6 ... 0 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	

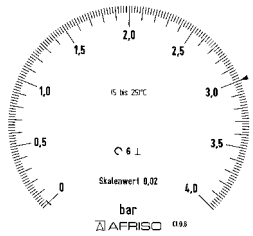
Dials for pressure gauges – graduation

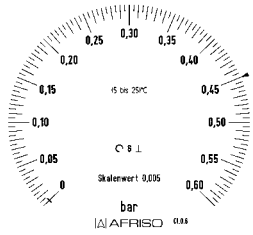
Housing diameter (NG) 160, 250 – accuracy class 0.6 – DIN 16123

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	0.0 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	

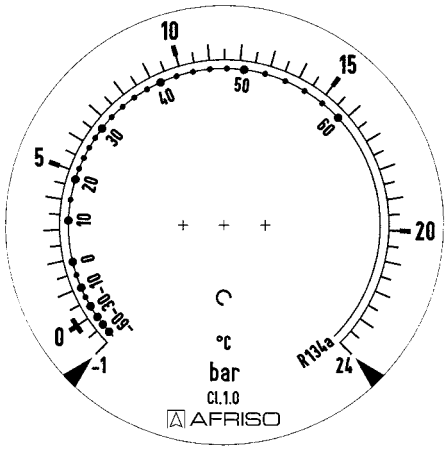
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.02 bar	0 ... 40 mbar	0.2 mbar	0 ... 400 mbar	2 mbar	
-1 ... +3 bar	0.02 bar	-15 ... +25 mbar	0.2 mbar	-150 ... +250 mbar	2 mbar	
0 ... 40 bar	0.2 bar	-25 ... +15 mbar	0.2 mbar	-250 ... +150 mbar	2 mbar	
0 ... 400 bar	2 bar	-40 ... 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	

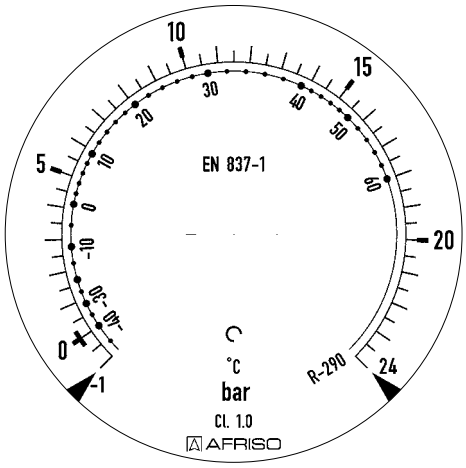
Temperature scales for refrigerant dew point temperature

Example range -1/+24 bar

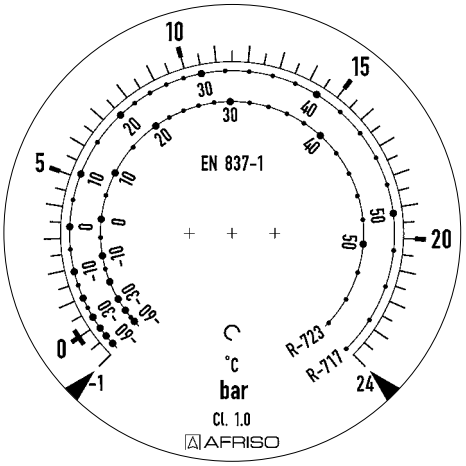
R 134a



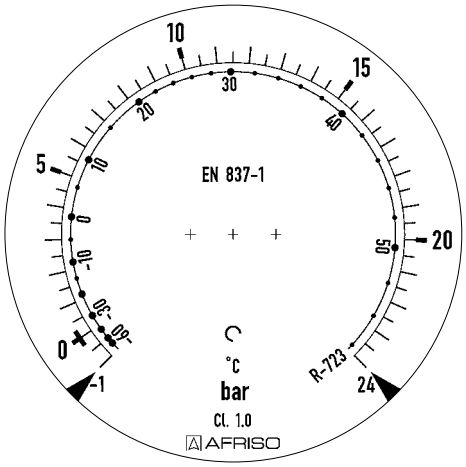
R 290



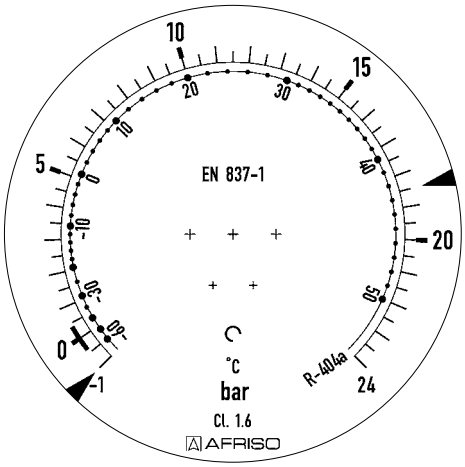
R 723 / R 717



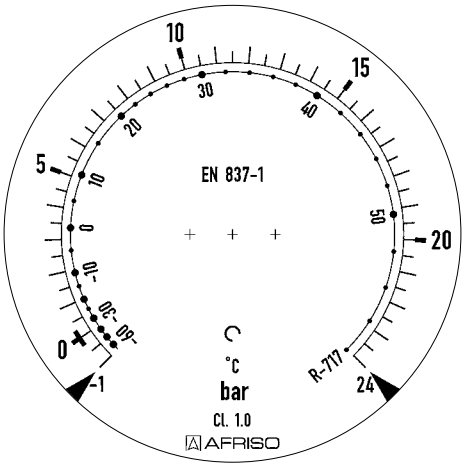
R 723



R 404A



R 717 (NH3)



Standard colours for temperature scales: R 717 = red

Checklist for enquiries – pressure gauges

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Temperatures	T_{max} Medium: T_{max} Ambient: T_{min} Medium: T_{min} Ambient:
Pressure loads	Static: Dynamic: from to
Measuring system	☐ Bourdon tube ☐ Capsule element ☐ Diaphragm ☐ Magnetic piston ☐ Other: ☐ Spring diaphragm
Housing diameter	☐ 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: T_{min} Medium: T_{min} 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 – thermometers

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Version	☐ Bimetal thermometer ☐ Gas filled thermometer
Housing diameter	☐ 34 ☐ 40 ☐ 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 – 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 ☐ G2½B ☐ 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)?		

Report
Function test level sensor/ level sensor chain

Site of facility

Company

First name / last name

Street

Postcode / city

Product Manufacturer/ type

☐ AFRISO GWG 12 — Approval: CE or Z-65.17-182 or PTB _____

☐ AFRISO GWG 23 — Approval: CE or Z-65.17-366 or PTB _____

☐ Manufacturer _____ Type _____

Measurement

☐ With level sensor tester GPG 01

☐ With level sensor tester ME 5/6

☐ With level sensor tester GPR 4

Electrical function test

☐ Filling released

☐ Heat-up time _____ seconds

Wet test

☐ Switching off

☐ Switch-off time _____ seconds

GWG level sensor chain

☐ Yes ☐ No

Adjustment dimension E _____ mm (in tank)

Check dimension Y_E _____ mm (above tank)

Adjustment dimensions

The level sensor was set to the following dimensions:

Adjustment dimension X _____ mm (in tank)

Check dimension Y _____ mm (above tank)

Notes _____

Date of test: _____

Specialised company (as per WHG (AwSV)):

Company

First name / last name

Street

Postcode / city

Signature/stamp

Report
Function test liquid based leak detector LAS

Site of facility

Company

First name / last name

Street

Postcode / city

Product LAS 24, 39, 72 and 230
Approval: Technical Approval of the German Institute for Civil Engineering (DIBt) Z-65.24-381

Checklist

- ☐ Results of visual inspection of the system: Installation as per instructions, no visible damage.
- ☐ The system was tested by opening the test valve.
- ☐ The leak detection fluid escaped at a flow rate of at least 0.5 l/min.
- ☐ The level of the leak detection fluid is correct.

Notes

Date of test:

Specialised company (as per WHG (AwSV)):

Company

First name / last name

Street

Postcode / city

Signature/stamp

Report
Function test liquid based leak detector LAG

Site of facility

Company

First name / last name

Street

Postcode / city

Product

☐ LAG-13 KR Approval: Z-65.24-380 or CE or ÜHP

☐ LAG-14 ER Approval: Z-65.24-1 or CE or ÜHP und ATEX Type Examination Certificate

Checklist

☐ Results of visual inspection of the system: Installation as per instructions, no visible damage.

☐ The system was tested by opening the test valve.

☐ The leak detection fluid escaped at a flow rate of at least 0.5 l/min.

☐ When the probe was removed, the device triggered visual and audible alarms.

☐ When the Test key was pressed, the device triggered visual and audible alarms.

☐ The audible alarm can be acknowledged.

☐ The operation and alarm lamps function properly.

☐ The level of the leak detection fluid is correct.

Notes

Date of test:

Specialised company (as per WHG (AwSV)):

Company

First name / last name

Street

Postcode / city

Signature/stamp

Report
Function test vacuum type leak detector

Site of facility

Company

First name / last name

Street

Postcode / city

Product

☐ LAZ-04/1 (HV) ☐ Eurovac HV Approval: Z-65.22-4 or CE or ÜHP

☐ LAZ-04/3 (NV) ☐ Eurovac NV Approval: Z-65.22-382 or CE or ÜHP

Serial number

Measurement Measurements of the switching points yielded the following results:

Alarm on: mbar Pump on: mbar

Alarm off: mbar Pump off: mbar

Checklist

☐ Results of visual inspection of the system: Installation as per instructions, no visible damage.

☐ When the pressure exceeded the alarm pressure, the device triggered visual and audible alarms.

☐ When the Test key was pressed, the device triggered visual and audible alarms.

☐ The audible alarm can be acknowledged.

☐ The operation and alarm lamps function properly.

☐ Condensate traps are installed at the lowest points of the hose lines. The condensate traps have been emptied, if necessary.

Date of test:

Specialised company (as per WHG (AwSV)):

Company

First name / last name

Street

Postcode / city

Signature/stamp

Report
Function test pressure type leak detector

Site of facility

Company

First name / last name

Street

Postcode / city

Product

☐ Europress LAD-10 Approval: Z-65.23-3

☐ Europress Approval: Z-65.23-3 or CE or ÜHP

Serial number

Measurement Measurements of the switching points yielded the following results:

Alarm on: mbar Pump on: mbar

Alarm off: mbar Pump off: mbar

Checklist

☐ Results of visual inspection of the system: Installation as per instructions, no visible damage.

☐ When the pressure dropped below the alarm threshold, the device triggered visual and audible alarms.

☐ When the Test key was pressed, the device triggered visual and audible alarms.

☐ The audible alarm can be acknowledged.

☐ The operation and alarm lamps function properly.

☐ The drying beads in the drying filter have been replaced when completely discoloured or they are still usable.

Date of test:

Specialised company (as per WHG (AwSV)):

Company

First name / last name

Street

Postcode / city

Signature/stamp

Report
Function test protection equipment against siphoning

Site of facility

Company

First name / last name

Street

Postcode / city

Product

☐ KAV, piston type anti-siphon valve — Approval: Z-65.50-415

☐ MAV, diaphragm type anti-siphon valve — Approval: Z-65.50-415

☐ Diaphragm valve against siphoning — Approval: _____

Measurement

The function test was performed by means of the anti-siphon valve tester:

Measurement result: _____ bar

☐ Siphoning protection **works**

☐ Siphoning protection **does not work**

☐ **KAV only: The adjustment value was adapted to the current level in the tank prior to the test and reset to the maximum possible level after the test.**

Measurement alternative: Test

☐ The function test was not performed. A test by simulation of a line leak was performed by opening at the lowest point of the oil line. No significant amount of oil escaped.

Checklist

☐ Results of visual inspection: Installation as per instructions, no visible damage.

☐ The adjustment height was tested and lead-sealed. The adjustment height was documented and attached to the system documentation.

☐ The fuel oil consumer was started to de-aerate the fuel line and then stopped.

Adjustment value

Adjustment value for safe height: _____

Notes

_____

_____

_____

_____

Date of test:

_____

Specialised company (as per WHG (AwSV)):

Company

First name / last name

Street

Postcode / city

Signature/stamp

General Terms and Conditions of Delivery (CTCD)

of AFRISO-EURO-INDEX GmbH · Lindenstraße 20 · 74363 Güglingen

§ 1 Validity

(1) All our business relations with our contractual partners (hereinafter referred to as "Customers") are exclusively based on these General Terms and Conditions of Delivery (GTCD), if the customer is a business person (§ 14 BGB, German Civil Code), a legal entity under public law or a special fund under public law. They shall also apply to all future business relations between us and our customers as an outline agreement, 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) 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, shall remain unaffected.

§ 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 (e.g. e-mail), including these General Terms and Conditions of Delivery. The purchase agreement and the General Terms and Conditions of Delivery contain all agreements between the parties with regard to the contract.

(3) Amendments and modifications to the agreements, including these General Terms and Conditions 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.

(4) 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 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 transport insurance; for export deliveries, customs duties as well as fees and other public charges are not included.

(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.

(3) Invoices shall be payable within 30 days from the invoice date without any deduction, unless otherwise agreed in writing (e.g. e-mail). The date of unconditional credit on our business account shall be decisive for payment in due time. Payment by check shall be excluded.

(4) Any set-off with counterclaims of the customer shall only be permissible if and to the extent that such counterclaims are undisputed or asserted by a court. The customer shall only be entitled to a right of retention if it is based on the same contractual relationship.

(5) We shall be entitled to deliver or provide outstanding deliveries or services only after advance payment 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 through 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 mentioned by us are only approximate, unless a fixed deadline or a fixed date has been explicitly 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 (e.g. pandemic-related restrictions), disruptions of operations of any kind, transport delays, strikes, lawful lockouts, labour, energy or raw materials shortages, lack of official permits or official measures, or incorrect or delayed supply by suppliers shall release us from our obligation to perform for the duration of the disruption and to the extent of its effect. If such events make performance substantially more difficult or impossible for us and the impediment is not only of temporary duration, we shall be entitled to withdraw from the contract. In the case of hindrances of a temporary nature, the performance periods shall be extended 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 service, the customer shall be entitled to withdraw from the contract, which withdrawal is to be performed immediately by an instrument in writing (e.g. e-mail). The customer shall not be entitled to any claims for damages.

(5) We shall be entitled to partial deliveries and partial services as well as to under-deliveries and over-deliveries to the amount of 10 %, if this does not conflict with substantial interests of the customer.

(6) If we are in default with a service or if a service is impossible for any reason whatsoever, our liability for compensation shall be limited pursuant to provision § 8 of these General Terms and Conditions 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 15.00 to a maximum of EUR 100.00 for each delivery.

(3) In cases of small orders with a net purchase value of less than EUR 150.00, we will charge a processing fee of EUR 25.00 in addition to shipping and packaging.

(4) 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 storage costs. The customer shall be entitled to prove lesser damage.

(5) We shall provide for transportation insurance of the consignment without recognising any legal obligation to this effect.

(6) If acceptance has to take place, the purchase item shall be deemed accepted if:
a) the delivery and, provided we also have to perform installation, the installation are completed, and we have set the customer a reasonable deadline for acceptance;
b) 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;
c) 12 working days have passed since delivery or installation and we have informed the customer of the delivery or installation, or
d) the customer has begun to use the purchased item (e.g. a delivered plant has been put into operation) and six workdays have passed since delivery or installation

§ 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. § 8 section 5 hereto shall remain unaffected.

(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 examination, they shall be deemed to be accepted by the customer if we do not receive written notification (e.g. e-mail) of defects within three 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 three workdays after the date of detection of the defect. Upon request by us, a rejected delivery item must be returned to us free of freight charges.

(3) In the case of material defects of the goods delivered, we shall first be entitled to rectify or replace the goods at our discretion within a reasonable period of time.

(4) Insignificant or typical variations in colour, dimensions, weight and quality shall not be considered to be defects of the delivery items.

(5) 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 and Conditions 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.

(6) 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.

(7) 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.

(8) 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 of the German Electronic Equipment Act (obligation of manufacturers to take back their products) 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 indemnification or reimbursement 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 of the customer stating that he has ceased to use the device.

§ 7 Infringement of intellectual property rights

(1) Pursuant to this provision § 7, we shall ensure that the delivery item is free from industrial property rights or third-party copyrights. Each party to this contract shall immediately notify the other party to this contract by an instrument 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.

(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, the customer shall be fully responsible for obtaining 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 or reimbursement of third parties.

§ 8 Liability for damages in case of fault

(1) Our liability shall be limited to intent and gross negligence, unless we are charged with the violation of an essential contractual obligation. In this case, our liability shall be limited to the damages typical for the contract and foreseeable by us.

(2) The amount of our liability shall limited to the amount of our liability insurance's customary coverage of € 12.5 million Euros.

(3) 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.

(4) 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.

(5) The limitations of this provision § 8 shall not apply to expressly guaranteed characteristics, to our liability under the German Product Liability Act (Produkthaftungsgesetz), or to damages arising from injury to life, body or health.

§ 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 (e.g. e-mail) 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) 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 provision (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. If our ownership expires due to combination, mixing or processing with other items not belonging to us, the ownership of the customer shall pass to us on a pro rata basis.
(b) The customer shall assign to us, as a security, the claims arising against third parties from the resale of the reserved goods or of the product. 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 n claim as long as the customer meets his payment obligations. 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 entity under public law or a special fund under public law or if the customer has no general court of jurisdiction in the Federal Republic of Germany, the exclusive place of jurisdiction for all disputes arising from the business relationship or in conjunction with the business relationship shall be court in charge at our registered office in Güglingen.

(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 a provision of the contract or in these General Terms and Conditions of Delivery is invalid or unenforceable or becomes invalid or unenforceable, the validity of the remaining provisions shall not be affected. If and to the extent a provision is invalid or unenforceable or that the contract or these General Terms and Conditions of Delivery contain gaps in the provisions, those 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 and Conditions of Delivery if they had been aware of such invalidity or gaps.

Notice

We collect and process the data of our customers necessary for the processing of the contract in compliance with the statutory provisions. Further details can be found in the data protection information available on our website.

December 2022

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