



fill level



water level



pressure



temperature



flow



visualization



signal converter



sensoric



Precont CT

Pressure transmitter for general applications

*Monitoring of absolute or relative pressure
in gases, vapors, liquids and dust*

Technical manual
07.17

Applications

General applications in

- Machinery and plant engineering
- Air-conditioning and refrigeration plant engineering
- Hydraulic and pneumatic systems
- Process industry
- Environmental technology
- Facility and building automation



Main features

Wide range of applications

- Finely graded measuring ranges from 100 mbar up to 16 bar
- Wide process temperature range -40°C to $+125^{\circ}\text{C}$
- Wide variety of process connections
- High protection class IP69K/IP67
- Wide environmental temperature range -40°C to $+85^{\circ}\text{C}$
- Certification ATEX II 1 G Ex ia IIB/IIC Tx Ga

Ceramic front-flush diaphragm

High accuracy – characteristic deviation to $\leq 0,1\%$ of measuring range

Integrated evaluation electronic

- Current output 4...20mA
- Voltage output 0...10V
- Connector plug M12
- Connector plug EN 175-301-803-C / -A
- Connection cable with integrated reference air capillary

ACS-CONTROL-SYSTEM
knowledge and systems



Your partner for measuring technology and automation

You have purchased a high-grade and modern measuring device of ACS-CONTROL-SYSTEM GmbH.

We want to give thanks for your purchase and for your confidence to us.

The actual technical manual includes instructions for installation, electrical connection and inauguration, as well as the technical data of the device.

Modifications, that answer the purpose of the technical progress, are reserved by ACS-CONTROL-SYSTEM GmbH without prior notice.

If a question occurs, that can't be answered by the listed informations, please call on our technicians team in Eggenfelden Tel: +49 8721/ 9668-0 or info@acs-controlsystem.de

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1 System description

1.1 Intended use

The device is an electronic pressure transmitter for monitoring, control as well as continuous measurement of pressures in gases, vapors, liquids and dusts.

The operational reliability of the device is ensured only at the intended use.

1.2 Field of application

Due to the device construction with

- Measuring ranges from -1 bar to 16 bar, gauge
- Measuring ranges from 0 bar to 16 bar, absolute
- Measuring spans from 100 mbar to 16 bar
- Process temperatures from -40°C to +125°C
- Environmental temperatures from -40°C to +85°C
- Process materials Al₂O₃-ceramic / CrNi-steel

as well as the availability of industrial standard process connections like

- thread ISO 228-1

the device is especially suitable for the use for

- Machinery and plant engineering
- Air-conditioning and refrigeration plant engineering
- Hydraulic and pneumatic systems
- Process industry
- Environmental technology
- Facility and building automation

The device is suitable for demanding measuring requirements.

Through its optimized design, the front-flush process connection enables the cleanability of the wetted diaphragm to be integrated into the process.

The device is suitable for the use at SIP cleaning processes.

Low-maintenance and trouble-free pressure measurement is thus also guaranteed in critical applications with frequently changing media.

The certification acc. to ATEX II 1 G Ex ia IIB/IIC Tx Ga allows the use in explosion hazardous areas.

The robust design and the high-quality workmanship turns the device into a very high quality product, which even the most adverse environmental conditions cannot affect, whether the lowest temperatures when used outdoors, extreme shock and vibration stress or aggressive media.

A captive laser marking of the type label ensures the identifiability throughout the entire lifetime of the device.

Obviously is the optional marking of a measurement point designation resp. TAG, a customer label or of a neutral type label, of course also per laser marking.

A LABS-free resp. silicone-free version, a factory calibration with calibration certificate and a customer specific configuration resp. preset is also optionally available like a material test certificate EN10204 3.1.

Customer specific special versions can be realized short-term on request, e.g.

- extended process temperature range up to 400°C
- special designs for the process connection
 - thread connection EN 837 manometer, EN 1179-2 E, inner thread
 - thread connection acc. to ANSI NPT, DIN 13 or JIS
 - flange acc. to EN 1092-1/DIN 2527, ASME or JIS
 - hygienic and aseptic connections, e.g. DIN 11864, Dairy coupling DIN 11851, DIN11853, Varivent®, Clamp ISO 2852 / BS 4825 / DIN 32676, DRD, SMS, APV-Inline, BioControl®, Aseptoflex, etc.
- other process materials, e.g. Hastelloy, Titan, PEEK, etc.
- special adjustment

1.3 System components

The device consists of the components:

- Process connection, for installation into the wall of the container or of the pipeline.
- Pressure measuring sensor with ceramic diaphragm, as junction point in direct contact with the applied medium.
- Temperature decoupler, for decoupling of the terminal enclosure from high process temperatures.
- Terminal enclosure, for protection of the integrated signal processing electronic and for the electrical connection.

The components cannot be separated by the user.

1.4 Function

1.4.1 Measuring principle

The system pressure is applied to the ceramic diaphragm of the pressure measuring sensor. A dry pressure measuring sensor is used, without using a fill fluid.

The pressure dependent deflection of the diaphragm is transferred to a high-precision capacitive sensor and causes there a change of the output voltage.

1.4.2 Signal processing

The pressure signal is converted by the pressure measuring sensor into an electrical signal and processed by the integrated evaluation electronic according to the respective preferences:

1.4.2.1 Electronic output – 2-wire, current 4...20mA

- The measuring value is converted into a continuous current signal 4...20mA.

1.4.2.2 Electronic output – 3-wire, voltage 0...10V

- The measuring value is converted into a continuous voltage signal 0...10V.

2 Safety notes

2.1 Operational safety

The device is safely built and tested according to state-of-the-art technology and has left the factory in perfect condition as regards technical safety.

The device meets the legal requirements of all relevant EU directives. This is confirmed by attaching the CE mark.

This measuring device meets article 4 (3) of the EU directive 2014/68/EU (pressure equipment device directive) and is designed and produced in good engineer practice.

2.2 Installation, connection, commissioning, operation

Installation, electrical connection, commissioning and operation of the device must be made by a qualified and authorized expert according to the information's in this technical manual and the relevant standards and rules. This expert must have read and understood this technical manual and especially the safety notes.

The device may only be used within the permitted operation limits that are listed in this technical manual. Every use besides these limits as agreed can lead to serious dangers.

The materials of the device must be checked for compatibility with the respective application requirements (contacting materials, process temperature) before use. An unsuitable material can lead to damage, abnormal behavior or destruction of the device and to the resulting dangers.

The sensors may not be used as sole device for prevention of dangerous conditions in machines and plants.

Using the device in a manner that does not fall within the scope of its intended use, disregarding this instruction, using under-qualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer's warranty null and void.

2.3 Operating supplies for explosive hazardous areas

If a device is installed and operated in explosive hazardous areas, the general Ex construction standards (EN/IEC 60079-14, VDE 0165), these safety notes and the enclosed EU type examination certificate incl. supplements must be observed.

The installation of explosive hazardous systems must be carried out principally by specialist staff.

The device meets the classification:

II 1 G Ex ia IIB/IIC Tx Ga II 1/2 G Ex ia IIB/IIC Tx Ga/Gb	$T_a = -20...+60^{\circ}\text{C}/+50^{\circ}\text{C}$
II 2 G Ex ib IIB/IIC Tx Gb	$T_a = -40...+85^{\circ}\text{C}/+50^{\circ}\text{C}$

The devices are conceived for measuring of pressures in explosive hazardous areas.

The measured medium may also be combustible liquids, gases, fogs or vapors.

The device can be mounted in explosive hazardous areas, where devices of category 1 resp. 1/2 are required. Devices of category 1 resp. 1/2 may be operated in hazardous explosive areas that require apparatus of category 1 only if atmospheric conditions are present (pressure from 0,8 bar to 1,1 bar). If the device is operated beyond these atmospheric conditions, the EU type examination certificate can be used as a guide. Additional tests for the special application conditions are recommended. Devices of category 1 resp. 1/2 must be connected to intrinsically safe circuits of protection level ia.

The device can be mounted in explosive hazardous areas, where devices of category 2 are required. Devices of category 2 can be connected to intrinsically safe circuits of protection level ib.

The intrinsically safe signal and supply circuits safe galvanically separated from parts, which can be connected with earthing potential.

The PA connection in the connector resp. the cable shield resp. the process connection must be connected with the potential compensation of the explosion hazardous area.

At the chargeable plastic parts of the device like plug or cable, there is a danger of ignition by electrostatic discharges. The operator has to ascertain the suitability of this equipment for his use. A warning marking points out to the safety measures, which must be applied because of the electrostatic charging in operation and especially in the case of maintenance activities:

- avoid friction
- no dry cleaning
- no assembling in pneumatic conveying stream

3 Installation

The correct function of the device within the specific technical data can only be guaranteed, if the permitted process and environmental temperatures (see chapter „Technical data“) will not be exceeded.

3.1 Installation place

The installation of the device at locations where high pressure blows can occur should be avoided.

At a pressure measurement in gases, the device should be installed above the tapping point, so that the condensate can flow into the process.

At a pressure measurement in steams, the device should be installed after a siphon and a shut-off device below the tapping point.

The siphon reduces the temperature to almost ambient temperature.

Fill the siphon with fluid before commissioning.

At a pressure measurement in liquids, the device should be installed after a shut-off device below or at the same level as the tapping point.

At a filling level measurement in liquids, the device should be installed below the lowest measuring point. Do not mount the device in the fill flow, in the suction area of a pump, in the tank outlet or at a point in the container which could be affected by pressure pulses from an agitator. Calibration and functional test can be carried out more easily if you mount the device after a shut-off device.

The installation position can have an influence on the measuring result of the kind of a zero value shift because of the deadweight of the measuring diaphragm. The correction of this deviation at the device is not possible.

3.2 Process and environmental temperature

The installation of the device should be made if possible at temperature calmed places to get a reliable measuring result.

Strong temperature steps, e.g. at filling of a hot liquid into a cold system, can produce a short-time higher measuring signal deviation.

At high process temperatures a heat transfer to the terminal enclosure can be reduced by isolation of the medium carrying part of the plant.

At underrun of the dew point, e.g. cold process medium at high environmental temperature, there is the possibility of condensate formation within the pressure measuring sensor, which can lead to increased measurement deviations resp. malfunctions.

These deviations are fully reversible by drying the condensate.

The use of a device with a strain gauge pressure measuring sensor is recommended.

3.3 Installation notes

Drive the system pressure free prior installation resp. deinstallation of the sensor.

The protective cap, which is attached at the diaphragm, must only be removed immediately before the installation.

The diaphragm must not be point loaded, because this can lead to diaphragm damage.

The installation of the device into a closed off completely with process liquid filled connection can lead to destruction of the measuring diaphragm. The reduction of the volume of the liquid at screw-in leads to a very high pressure boosting, which can exceed the permitted maximum value by a multiple. Thus, before installation, the connection must be sufficiently emptied.

The screw-in of the thread process connection by using the terminal enclosure, the connection plug resp. the connection cable is not permitted.

The tightening of the thread process connection may only be done at the hexagon by a suitable spanner and with the maximum permitted torque strength (see chapter „Technical data“).

3.4 Air pressure compensation

Avoid the damaging or pollution of the pressure compensation system.

The hindrance of the pressure compensation can lead to faulty measuring results.

The filter element of the pressure compensation system is positioned at the variant:

Plug M12	drill hole besides the plug
Plug EN 175-301-803-C	plug socket
Plug EN 175-301-803-A	plug socket
Cable	capillary inside the cable

At the version with cable, the environmental air pressure is lead to the measuring membrane by an integrated pressure compensation capillary.

This capillary may not be folded or sealed.

To avoid faulting, a micro air filter is placed at the end of the capillary. At an application conditioned cutting of the connected cable there must be especially paid attention that the micro air filter will be replaced to the end of the capillary after cutting.

4 Electrical connection

The electrical connection of the device must be carried out according to the respective country specific standards.

Incorrect installation or adjustment could cause applicationally conditioned risks.

4.1 Potential equalization - earthing

The device must be grounded.

The earthing can be carried out by the process connection.

4.2 Connection cable

Use only shielded signal and measurement wires and install these wires separated from power leading wires.

Connect the cable shield of a connected cable only at one side to earth, ideally at the installation place of the device.

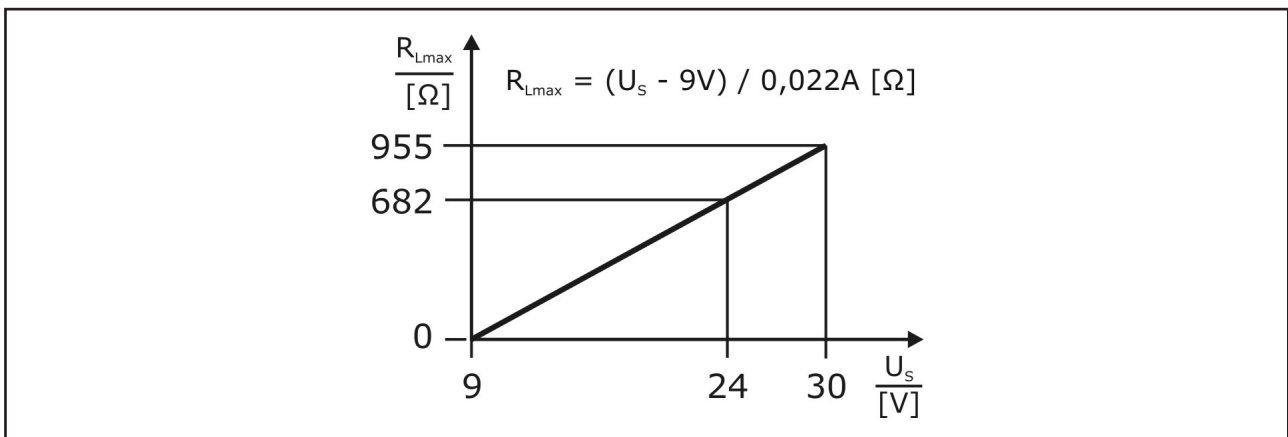
4.3 Supply voltage

The voltage applied to the terminal contacts may not exceed the maximum permitted supply voltage (see chapter „Technical data“) to avoid damage of the electronic. The connection is reverse polarity protected.

4.4 Load resistor

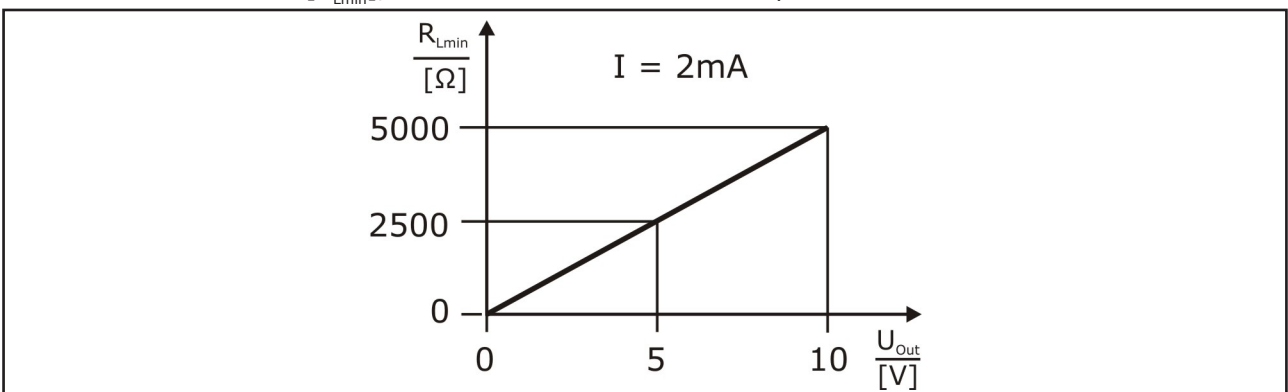
4.4.1 Electronic output – 2-wire, current 4...20mA

A load resistor, e.g. the measuring shunt of an evaluation device, requires a minimum supply voltage [U_{smin}]. Dependent on the connected supply voltage [U_s], it results in a maximum value for this resistor [R_{Lmax}], where a correct function is still possible.



4.4.2 Elektronik Ausgang – 3-Draht, Spannung 0...10V

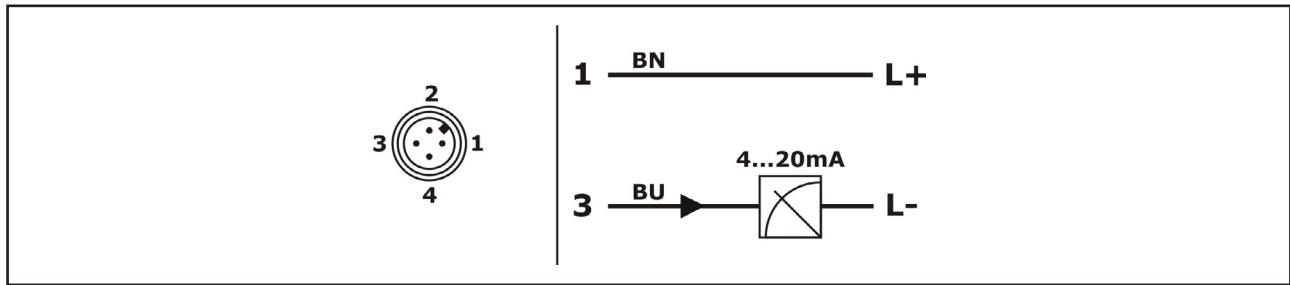
A load resistor, e.g. the measuring shunt of an evaluation device, requires at a definitive output voltage [U_{out}] an output current. Due to the limitation of that output current, it results in a minimum value for this resistor [R_{Lmin}], where a correct function is still possible.



4.5 Connection scheme

4.5.1 Electronic output – 2-wire, current 4...20mA

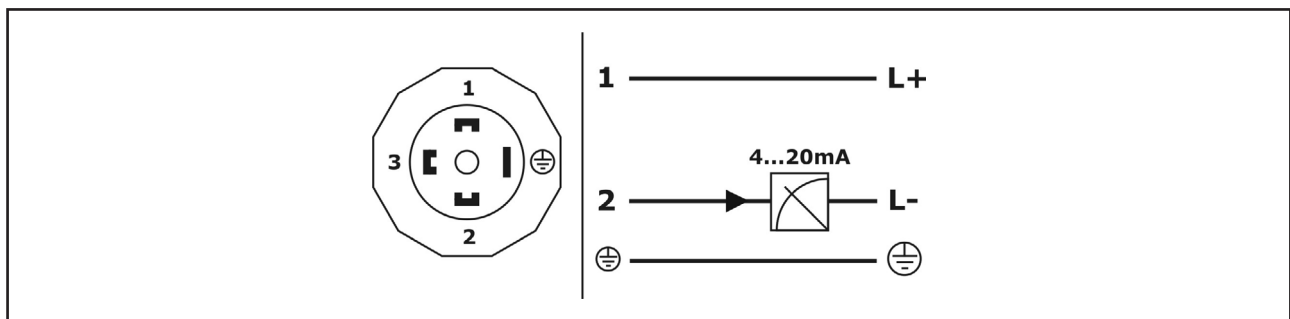
Plug M12



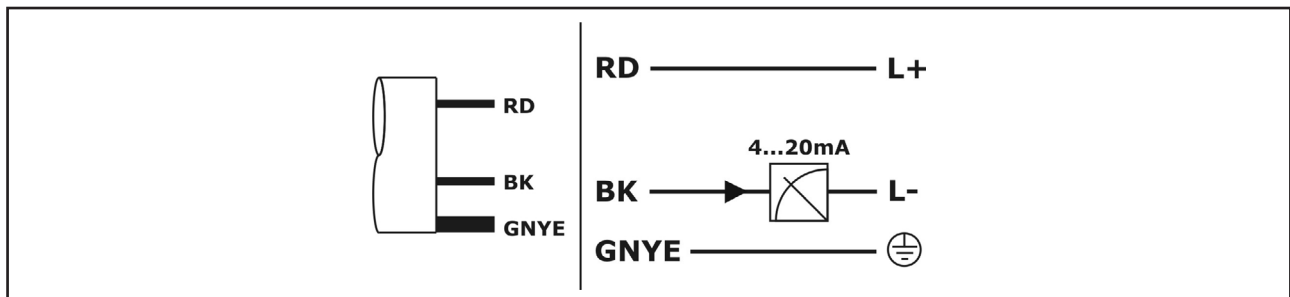
Conductor color standard connection cable M12 – A-coded:

BN = brown, BU = blue

Plug EN 175-301-803



Cable

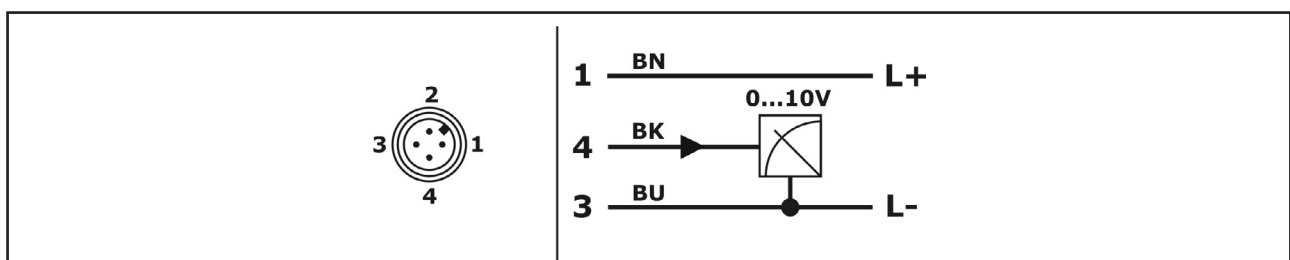


Conductor color cable:

RD = red, BK = black, GNYE = greenyellow

4.5.2 Electronic output – 3-wire, voltage 0...10V

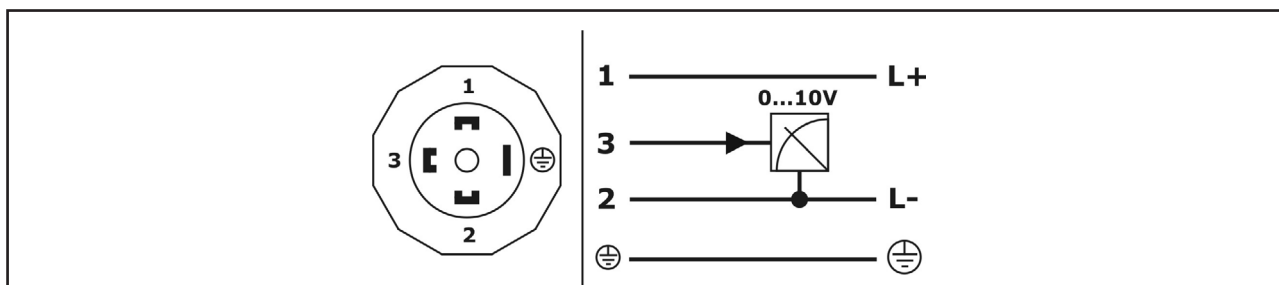
Plug M12



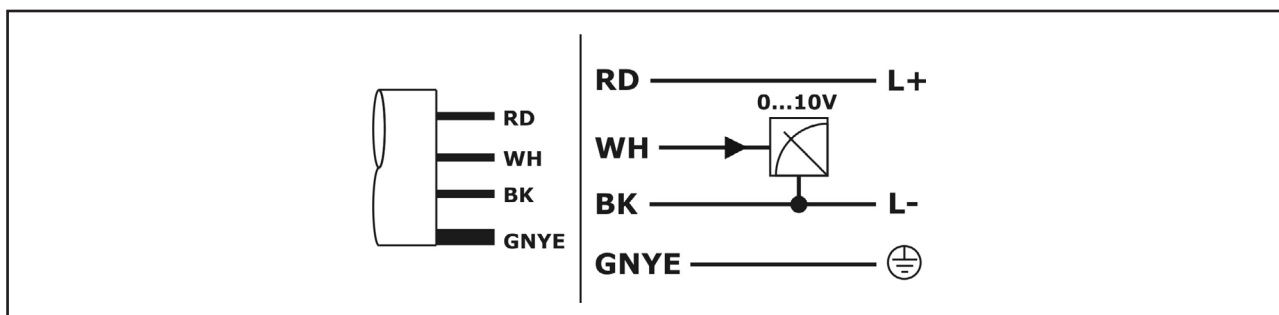
Conductor color standard connection cable M12 – A-coded:

BN = brown, BU = blue, BK = black

Plug EN 175-301-803



Cable



Conductor color cable:

RD = red, BK = black, WH = white, GNYE = greenyellow

5 Operation

An operation provided by user is not designated.

6 Service

6.1 Maintenance

The device is free of maintenance.

Special substances can lead to solid coatings on the sensor. Seized depositions can lead to faulty measurement results.

In the case of coat forming liquids the sensor must be regularly cleaned e.g. with clear water. Don't use sharp resp. hard tools or aggressive chemicals for cleaning.

6.2 Dismounting

Attention – Risk of burns!

Let the device cool down sufficiently fore dismounting it
During dismounting there is a risk of dangerously hot media escaping.

Attention – Risk of injury!

Dismount the device only when the system is pressureless.
During dismounting there is a risk of fast escaping media resp. pressure blow.

6.3 Repair

A repair may only be carried out by the manufacturer.

If the device is sent back for repair, the following information's must be enclosed:

- An exact description of the application.
- The chemical and physical characteristics of the product.
- A short description of the occurred error.

6.4 Return

Before returning the device, the following measures must be performed:

- All adhesive product residues must be removed. This is especially important, if the product is unhealthily, e.g. caustic, toxic, carcinogenic, radioactive etc.
- A returning must be refrained, if it is not possible by 100% to remove the unhealthily product completely, because e.g. it is penetrate into cracks or is diffused through plastic.

6.5 Disposal

Dispose of instrument components and packaging materials in an environmentally compatible way and in accordance with the country-specific waste disposal regulations.

This instrument is not subject to the WEEE directive and the respective national laws. Hence, pass the instrument directly on to a specialized recycling company and do not use the municipal collecting points. These may be used only for privately used products according to the WEEE directive.

7 Technical Data

7.1 Auxiliary power supply

Supply voltage U_s	<i>Electronic output type A – 2-wire, current 4...20mA</i> 10...30V _{DC} , reverse polarity protected
	<i>Electronic output type B – 3-wire, voltage 0...10V</i> 14...30V _{DC} , reverse polarity protected
Residual ripple U_{pp}	$\leq 2V_{pp} / U_{smin} \leq U_s \leq U_{smax}$
Supply current I_{in}	<i>Electronic output type A – 2-wire, current 4...20mA</i> $\leq 30mA$
	<i>Electronic output type B – 3-wire, voltage 0...10V</i> $\leq 6mA$

7.2 Output

7.2.1 Analogue output – current 4...20mA

Operating range I_{out}	3,8...21mA, min. 1,5mA, max. 30mA
Permitted load R_L	$\leq (U_s - 10V) / 22mA$
Step response time T_{90}	$\leq 6ms$
Start-up time t_{on}	$\leq 1s$

7.2.2 Analogue output – voltage 0...10V

Operating range I_{out}	0V ... $\geq 11V$, max. $U_s - 1,5V$
Permitted load R_L	$\geq U_{out} / 2mA$
Step response time T_{90}	$\leq 6ms$
Start-up time t_{on}	$\leq 1s$

7.3 Measuring accuracy

Reference conditions	EN/IEC 60770-1	
	Environmental temperature	15...25°C
	Environmental air pressure	860..1060kPa
	Air humidity	45...75% r.h.
	Warm-up time t_{on}	240s
	Supply voltage U_s	24V _{DC} $\pm 0,1V$
	Calibration position	Vertical Process connection bottom
Characteristic deviation ^{3) 5) 12)}	$\leq \pm 0,1\% / \pm 0,25\% FS$ ²⁾	
Nonlinearity ¹²⁾	$\leq \pm 0,1\% / \pm 0,25\% FS$ ²⁾	
Hysteresis ¹²⁾	negligible	
Influence of supply voltage	$\leq \pm 0,002\% FS$ ²⁾ / V	
Long term drift ¹²⁾	$\leq \pm 0,15\% FS$ ²⁾ / year	
Temperature deviation ¹²⁾	T_k ⁴⁾ <u>Zero</u> $\leq \pm 0,015\% FS$ ²⁾ / K max. $\pm 0,75\%$ (-20°C...+80°C)	
	T_k ⁴⁾ <u>Span</u> $\leq \pm 0,015\% FS$ ²⁾ / K max. $\pm 0,5\%$ (-20°C...+80°C / > 0,4 bar) max. $\pm 0,8\%$ (-20°C...+80°C / $\leq 0,4$ bar)	
Mounting position ¹⁰⁾	$\leq 0,18$ mbar	

²⁾ Referring to nominal measuring span resp. full scale (FS)

³⁾ Nonlinearity + Hysteresis + Reproducibility

⁴⁾ T_k = Temperature coefficient

⁵⁾ Limit value adjustment acc. to EN/IEC 60770-1

¹⁰⁾ Device rotated by 180°, process connection upside

¹²⁾ Higher values for special measuring range

7.4 Process conditions

Process temperature The permitted range results from the narrowest limitation of standard range resp. extended range.	-40°C...+100°C
	<u>Extension</u> Temperature decoupler -40°C...+125°C (+140°C - 1h)
	<u>Limitation</u> Gasket - FPM -25°C...+200°C Gasket - EPDM -40°C...+140°C Gasket - FFKM / FFKM hd -15°C...+315°C

Process pressure [R] Gauge pressure [A] Absolute pressure	Pressure range	Over/Burst pressure	Vacuum
	-100...+100 mbar [R]	5 bar	0 bar [A]
	-1...+1 bar [R]	10 bar	0 bar [A]
	0...100 mbar [R]	5 bar	0 bar [A]
	0...100 mbar [A]	4 bar	0 bar [A]
	0...200 mbar [R]	5 bar	0 bar [A]
	0...200 mbar [A]	4 bar	0 bar [A]
	0...400 mbar [R]	6 bar	0 bar [A]
	0...400 mbar [A]	4 bar	0 bar [A]
	0...600 mbar [R/A]	10 bar	0 bar [A]
	0...1 bar [R/A]	10 bar	0 bar [A]
	0...1,6 bar [R/A]	15 bar	0 bar [A]
	0...2,5 bar [R/A]	15 bar	0 bar [A]
	0...4 bar [R/A]	25 bar	0 bar [A]
	0...6 bar [R/A]	40 bar	0 bar [A]
	0...10 bar [R/A]	40 bar	0 bar [A]
	0...16 bar [R/A]	40 bar	0 bar [A]

7.5 Environmental conditions

Environmental temperature	-40°C...+85°C
	<u>Electrical connection type K – Cable</u> -40°C...+70°C
Protection	<u>Electrical connection type V – Plug M12</u> IP69K/IP67 (EN/IEC 60529)
	<u>Electrical connection type S/T – Plug EN 175-301-803</u> IP65 (EN/IEC 60529)
	<u>Electrical connection type K – Cable</u> IP69K (EN/IEC 60529) IP68 [≤ 10 mwc] (EN/IEC 60529)
Climatic classification	4K4H (EN/IEC 60721-3-4)
Shock classification	50g [11ms] (EN/IEC 60068-2-27)
Vibration classification	20g [10...2000 Hz] (EN/IEC 60068-2-6)
EM compatibility	Operation device class B / Industrial range (EN/IEC 61326)
Tightening torque	≤ 50 Nm
	<u>Process connection type 0 – Thread G'1/2", front-flush</u> ≤ 20 Nm
Weight	0,3kg
	<u>Electrical connection type K – Cable</u> 0,3kg + (L1 x 0,035kg/m)

7.6 Materials - process wetted

Membrane	<u>Measuring range $\leq 1\text{bar}$</u> Ceramic Al_2O_3 – 99,7% (SIP suitable)
	<u>Measuring range $\geq 1,6\text{bar}$</u> Ceramic Al_2O_3 – 96% (SIP suitable)
Process connection	Steel 1.4404/316L Steel 1.4571/316Ti
Gaskets	FPM – fluorelastomere (e.g. Viton®) EPDM – ethylene-propylene-dienmonomere, FDA-listed FFKM – perfluorelastomere (e.g. Kalrez®) FFKM hd – perfluorelastomere high density

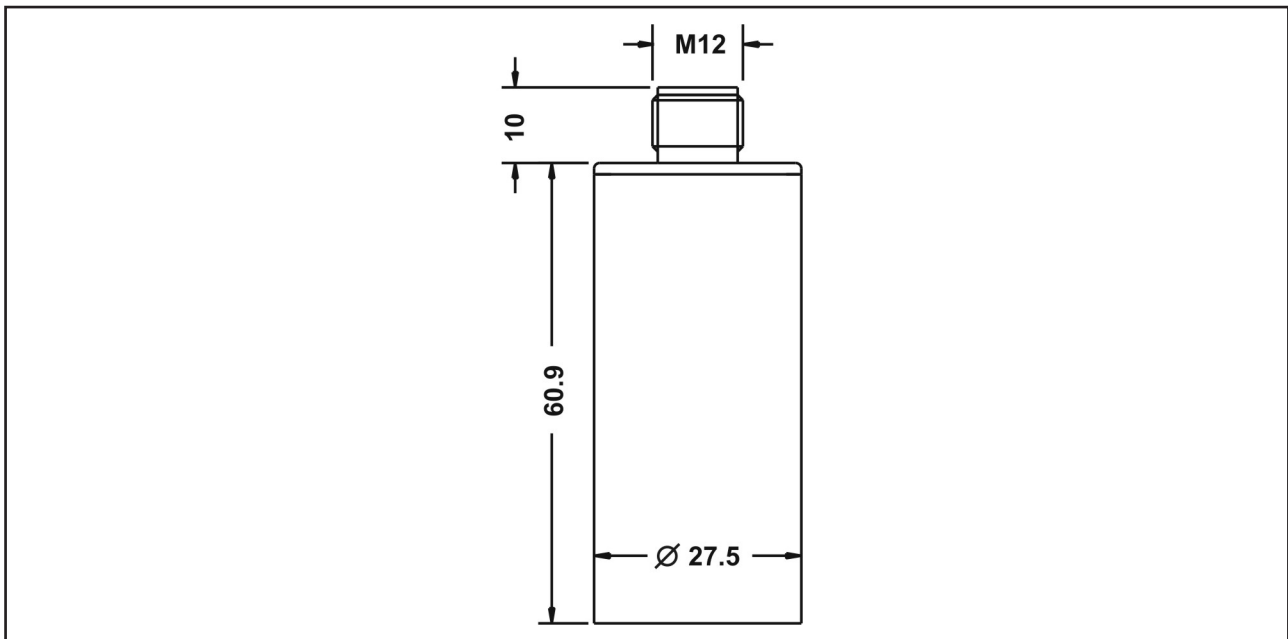
7.7 Materials - not process wetted

Terminal enclosure	CrNi-steel
Electrical connection part	<u>Electrical connection type V – Plug M12</u> Device plug PUR
	<u>Electrical connection type S/T – Plug EN 175-301-803</u> Device plug PA Gasket NBR
	<u>Electrical connection type K – Cable</u> Cable gland PA Gasket CR / NBR Cable sheath PE
Pressure compensation element	Acrylic copolymer
Gaskets	FPM – fluorelastomere (e.g. Viton®)

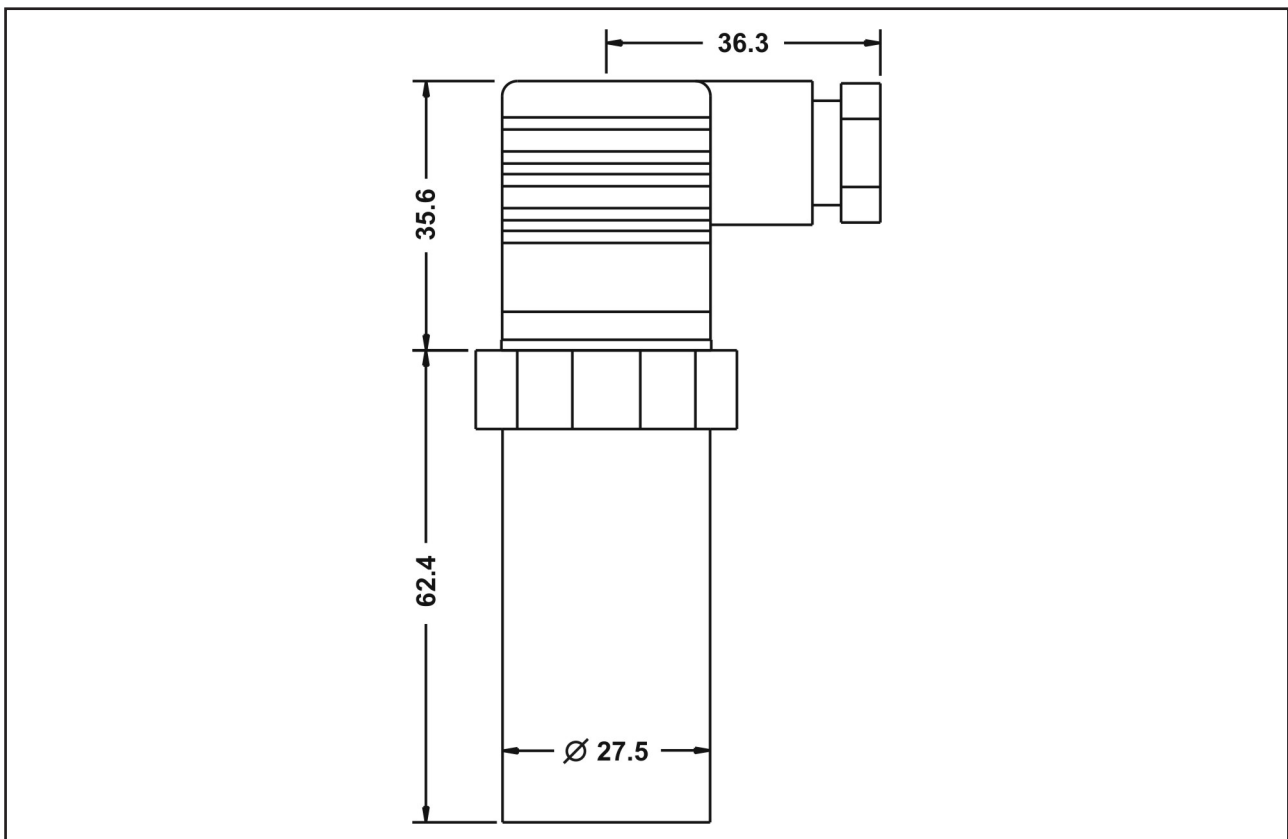
8 Dimension drawings

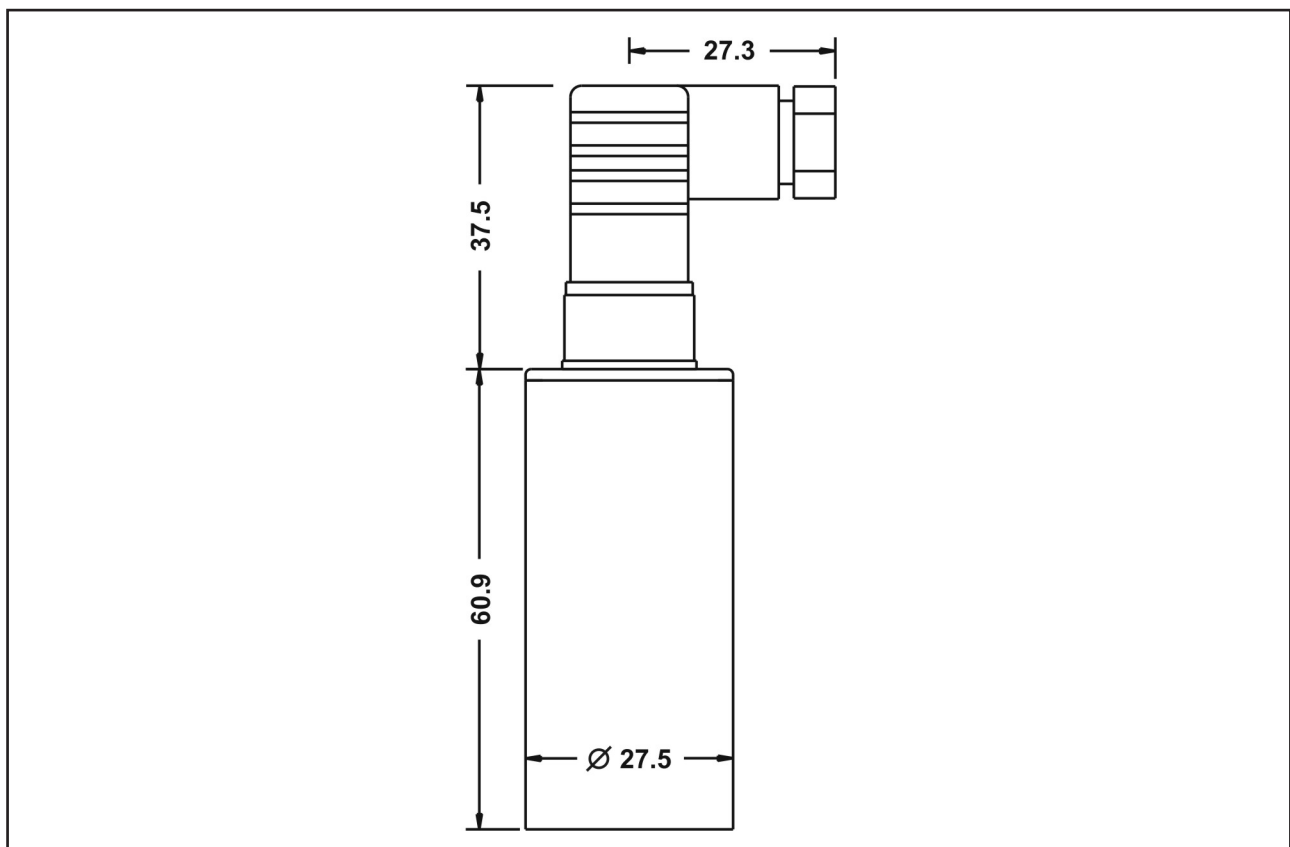
8.1 Terminal enclosure

Electrical connection type V - Plug M12

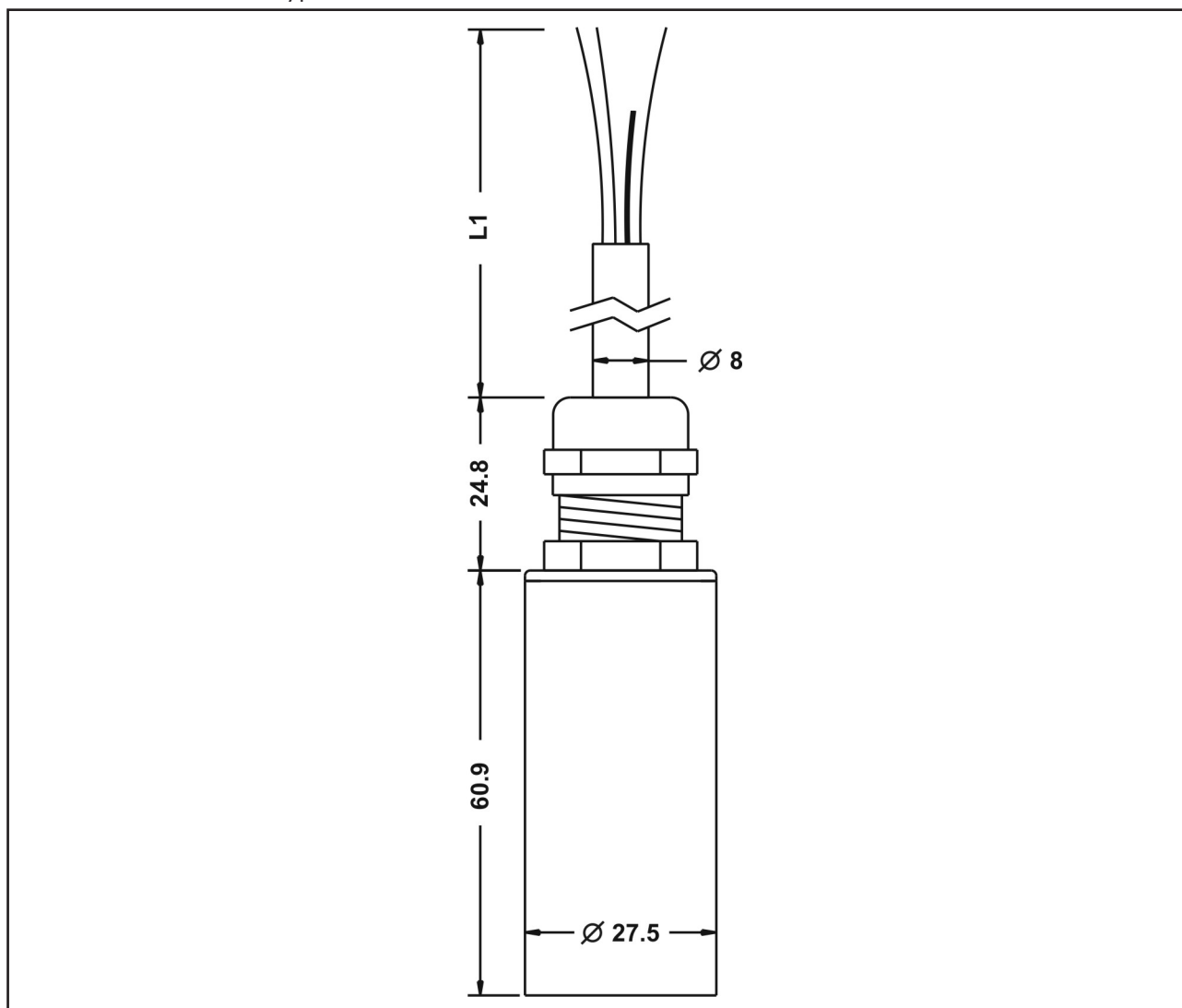


Electrical connection type T - Plug EN 175-301-803-A

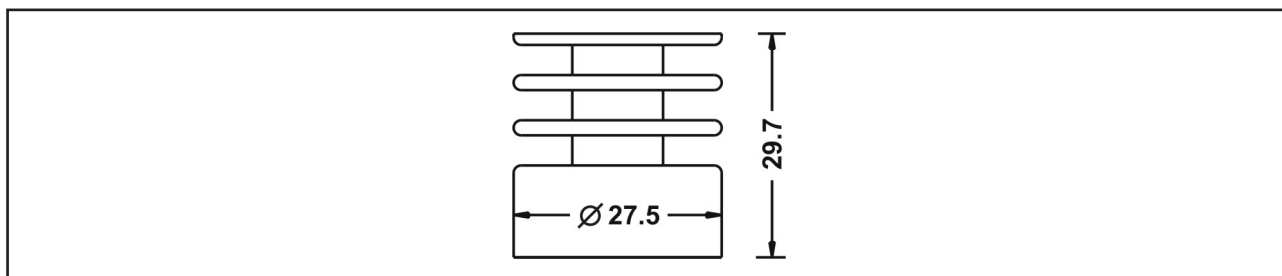




Electrical connection type K - Cable



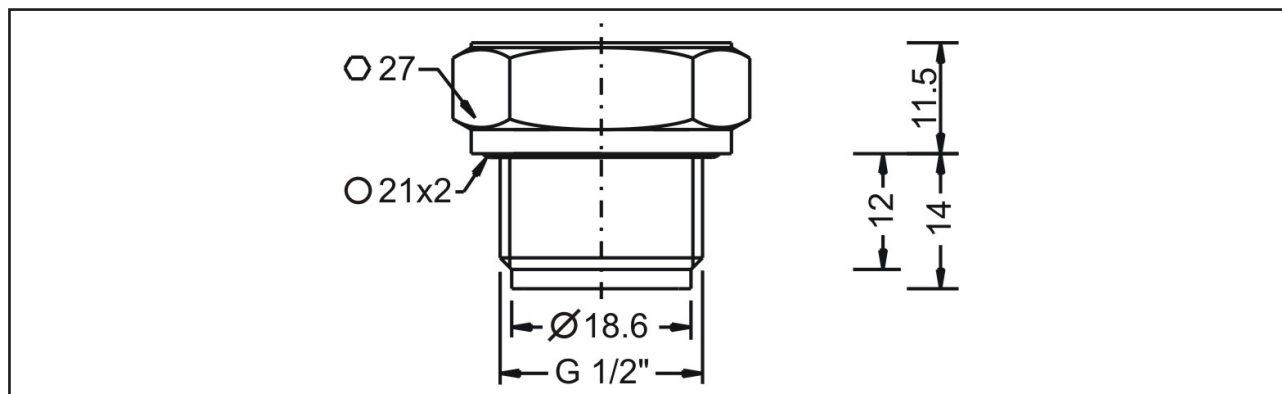
8.2 Temperature decoupler



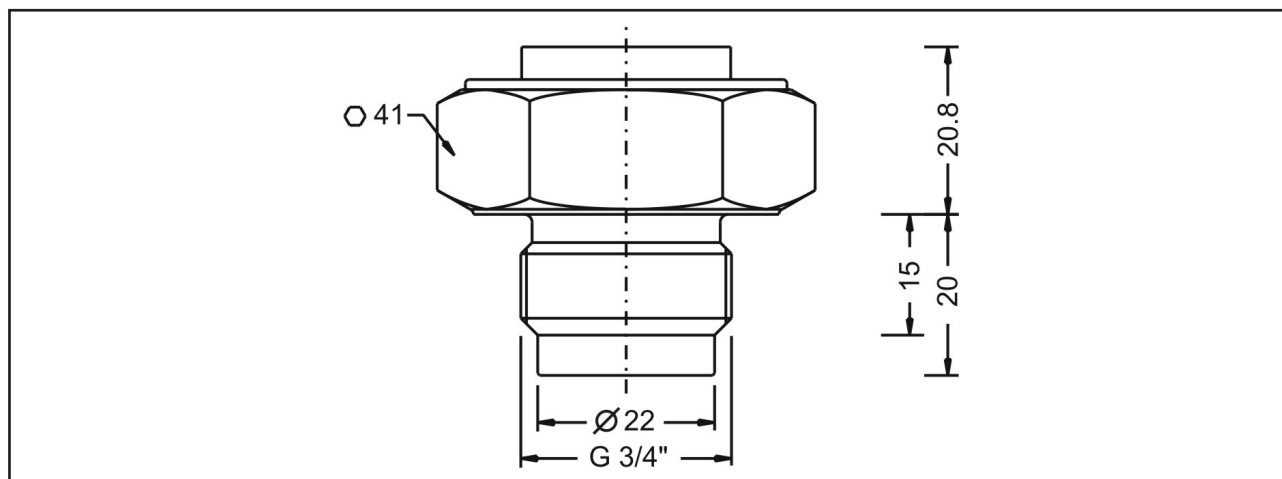
8.3 Process connection

8.3.1 Front-flush process membrane

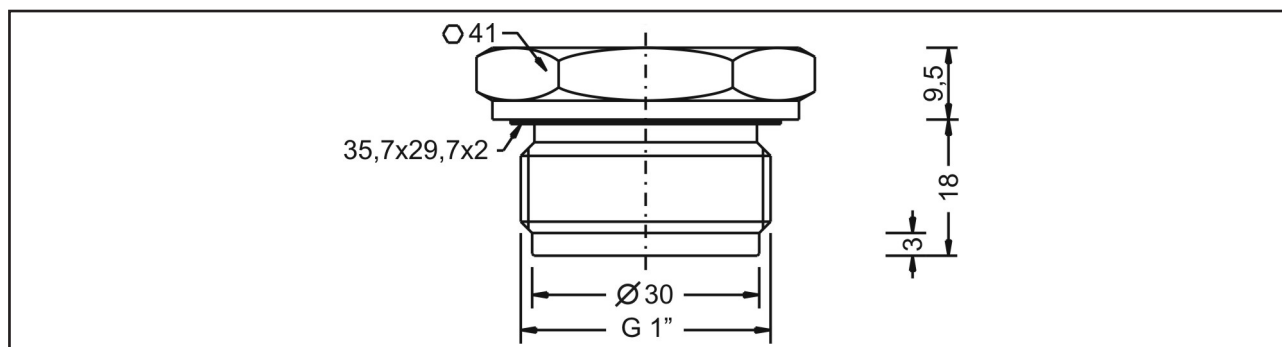
Type 0 – Thread ISO 228-1 – G $\frac{1}{2}$ "B, front-flush



Type 8 – Thread ISO 228-1 – G $\frac{3}{4}$ "A, front-flush



Type 5 – Thread ISO 228-1 – G1"A, front-flush



9 Ordering information

9.1 Order code

0	Type	
Ex	Standard ATEX II 1 G Ex ia IIB/IIC Tx Ga	
CT	Measuring system – material diaphragm (process wetted) / sensor type Ceramic Al ₂ O ₃ 96%/99,7% / capacitive	
0	Process connection Thread ISO 228-1 – G½" B, front-flush	
8	Thread ISO 228-1 – G¾" A, front-flush	
5	Thread ISO 228-1 – G1" A, front-flush	
Y	others	
1	Material process gaskets (process wetted) FPM – fluorelastomere (e.g. Viton®)	
3	EPDM – ethylene-propylene-dienmonomere, FDA-listed	
4	FFKM – perfluorelastomere (e.g. Kalrez®)	
6	FFKM hd – perfluorelastomere high density - gas applications	
Y	others	
V	Material process connection (process wetted) CrNi-steel	
C	Material terminal enclosure CrNi-steel	
01	Measuring range 0...100 mbar	
02	0...200 mbar	
03	0...400 mbar	
04	0...600 mbar	
05	0...1 bar	
06	0...1,6 bar	
07	0...2,5 bar	
08	0...4 bar	
09	0...6 bar	
10	0...10 bar	
11	0...16 bar	
17	-100...+100 mbar	
18	-1...+1 bar	
YY	Special measuring range	
A	Electronic – output 2-wire, current 4...20mA	
B	3-wire, voltage 0...10V	
0	Process temperature Standard -40°C...+100°C	
1	Extended -40°C...+125°C, temperature decoupler	
R	Pressure type Gauge pressure	
A	Absolute pressure	
2	Measuring system – accuracy 0,25%	
0	0,1%, linearization protocol	
V	Electrical connection Plug M12x1	
S	Plug EN 175-301-803-C (DIN 43650-C)	
T	Plug EN 175-301-803-A (DIN 43650-A)	
K	Cable, L1 ≥ 2m	

Precont®

CTV C

Precont®

CT

V

C

Installation material and connection cable are not enclosed in contents of delivery.

9.2 Additional options

For the device additional options are available.

The respective abbreviation subsequently follows the order code.

- SF LABS-free, silicone-free / paint compatible version
- ML Measurement point designation / TAG – Laser marking
- KL Customer label on device – Laser marking
- TN Type label neutral
- MZ Material test certificate – EN10204 3.1
- WT Factory certification – drink water suitability
- WL Factory certification – food suitability
- KF Configuration / Preset
- WK Factory calibration – calibration certificate

9.3 Accessories

Accessories are not content of delivery of the device and must be ordered separately.

9.3.1 Installation material

A wide range of accessories for device installation is constantly available, e.g.

- Welding sockets
- Welding flanges
- Blind flanges
- Flanges with thread
- Reductions
- Tube nuts
- Siphons
- Marking plate measuring point, laser marked
- etc.

9.3.2 Connection cable / Cable box

Connection cable M12x1, material PUR, shielded

- LKZ04##PUR-AS 4-pole, straight, ## = length 2...30m
- LKW04##PUR-AS 4-pole, angled, ## = length 2...30m

Other connection cables, e.g. other material or unshielded are available.

Cable box M12x1

- BKZ0412-VA 4-pole

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