
CATALOGUE
2025
PROFI MESS GMBH

Profimess GmbH
Purchase control

Welcome to the Profimess catalog.

We are pleased to present our freshly printed, completely revised and expanded 2024/25 product catalog. In this catalog you will find our extensive product portfolio from the areas of flow, level, pressure and temperature clearly compiled. Our range includes a diverse selection of sensors, actuators and indicators for these process variables.
Regardless of whether it is a matter of standard applications or demanding tasks at the limits of what is physically possible, we offer you effective and cost-effective solutions.

The catalog contains detailed technical data on the devices, explanations of how they work and practical application examples.
If you have any further questions, our competent team will be happy to help you by phone or email.
Even if you do not find the right product straight away, you can trust that we will work together to develop a suitable solution for your measuring task.

We look forward to your inquiries and a successful collaboration.

Your Profimess Team

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LR-56

Radar level transmitter with two-wire technology



Features

/ Robust St. Steel Construction

/ 78 GHz high frequency

/ Beam angle

/ Aimer flange for adjustment

/ Purge plug for cleaning

/ LDI for on-site maintenance

Description:

The LR-56 is a 78 GHz FMCW-radar level-sensor based on two-wire technology for ranges up to 100m. Different than an impulse radar, a FMCW-radar sends out a continuous, modulated frequency. The reflected waves are received by the device and, using the time difference between the send and received signals, the level in the tank is being calculated. At this high frequency of 78 GHz, the signal, prior to being send, has to be transformed into an almost time-linear saw-tooth-frequency, to make calculations easier. As a radar sends out electromangetic waves, the pulses are not slowed down on their way to the medias surface, regardless of the nature of gas between transmitter and media. The LR-56 offers a 4. . .20 mA two-wire output which displays the level, distance to media surface or capacity in a linear way. A purge plug for self-cleaning from extremely sticky materials is available. An aimer flange can be chosen to adjust the beam angle more precisely, eg. on the outlet. Programming and diagnosis on site is made possible through a local display and input-possibilities, while a remote hand-held unit could also be used for easier access from a distance.

Application:

The range of application for the LR-56 radar-level sensor starts where the ultrasonic- and common radar-pulse level measuring reach their capabilities. As electromagnetic instead of sonic waves are used, temperature, pressure and material of the gasphase above the media do not influence the measuring quality. Foam or dust on the medias surface do not change the quality much either, or can at least be easily overcome, without significant damping of the signal. The quick response of the LR-56 is ideal for most applications with bulk goods, even for extreme dust generating materials and high temperatures up to 200 °C (+392 °F). Bulk goods can be measured to a height of 100 m. The main application areas are: pulverized cement, plastics (pulverized or granulated), grains, coal, woodchips or flue ash.

Technical Specifications:

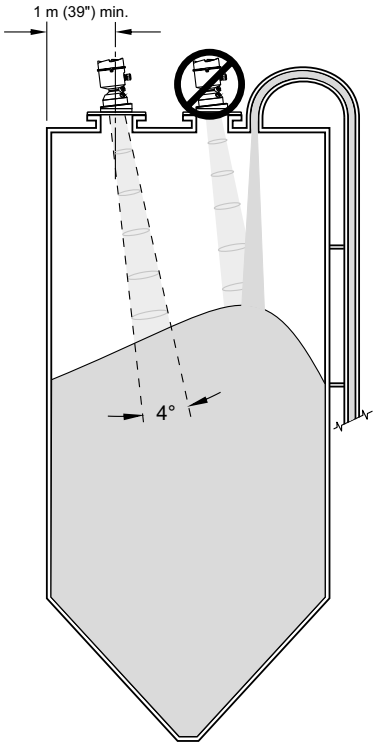
Meas. principle /	radar-level monitoring	
Frequency /	78 GHz	
min. Distance /	400 mm from sensor	
max. Distance /	40 m or 100 m	
Output /		
Analogue:	4. . .20 mA	
Communication:	Standard: HART Optional: PROFIBUS PA	
Fail safety:	programmable for max, min or hold (loss of echo), NE43	
Ambient temp. /	-40. . .+80 °C	
Processtemp./pressure/	**40m**	**100m**
Stainless steel: **-1 ... 0.5 bar** **-1 ... 3.0 bar**	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +200 °C (-40 ... +392 °F)
Aimer flange: **-1 ... 0.5 bar**	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +200 °C (-40 ... +392 °F)
Aimer flange: **-1 ... 3.0 bar**	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +120 °C (-40 ... +248 °F)
Accuracy /	5 mm	
Performance (according to reference conditions IEC60770-1) /	Maximum measured error (including hysteresis and non-repeatability)[1]: 5 mm (0.2 inch)	
Dielectric constant ε_r/	> 1.6	
Housing /		
Material:	stainless steel 1.4404	
Cable gland:	M20 x 1.5 or ½" NPT via adapter	
Purge plug:	1/8" NPT, 30 cfm at max 100 psi	
Antenna:	40 m version: PEI 100 m version: PEEK a cleansing of only a few seconds every hour is recommended	
Protection class:	Typ 4X/NEMA 4X, Typ 6/NEMA6, IP68 with closed lid	
Weight:	3.15 kg incl. 3" flange	
Display:	graphic-LCD with bar-graph for the portrayal of level	
Process connection /		
Universal-flanges:	80, 100, 150 mm st. steel 1.4301; 80, 100, 150 mm st. steel 1.4404 or 1.4435 fitting EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/JIS 2220 (10K)	
Aimer flange:	80, 100, 150 mm aluminium with polyurethane-powder coating	

[1] Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)

Electrical Specifications:

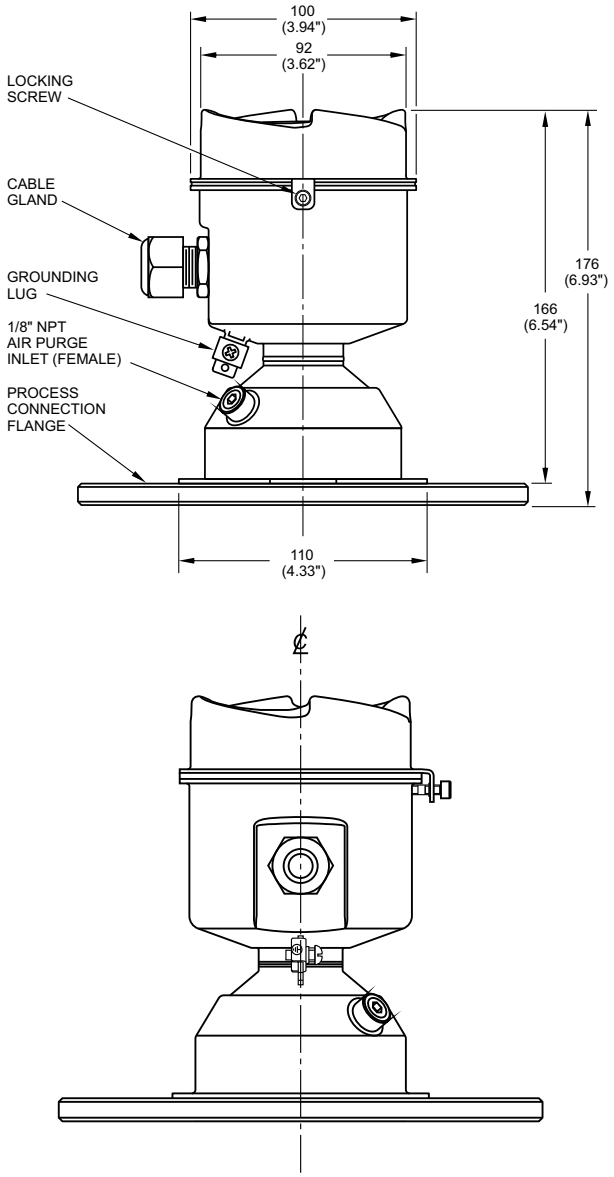
Power supply /	
4. . .20 mA/HART:	nominal DC 24 V (max. DC 30 V) with max. 550 Ω
PROFIBUS PA/ Foundation Field Bus:	13.5 mA DC 9. . .32 V, via IEC 61158-2
Certificates/approvals /	
General:	$CSA_{US/C}$, CE, FM
Radio:	Europe (RED), FCC, Industry Canada, RCM
Ex-Zones:	IECEx SIR 09.0149X ATEX II 1D, 1/2D, 2D Ex ta IIIC T139 °C DA IP68 ATEX II 3G Ex nA II T4 Gc Ex nL IIC T4 Gc
Handheld Unit /	
Approvals:	intrinsically safe version ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C T_a = -20. . .+50 °C
Field communicator:	375/475 field communicator for HART
PC:	SIMATIC PDM, AMS, PACTware
Display (local):	Graphic local user interface including quick start wizard and echo profile displays

Installation Position:

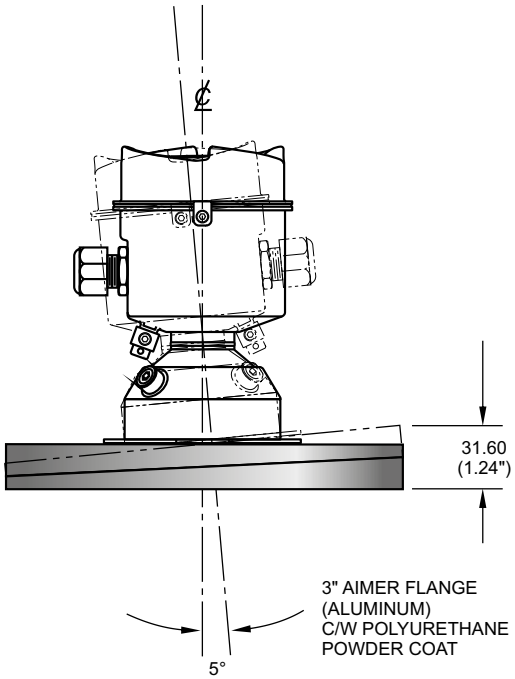


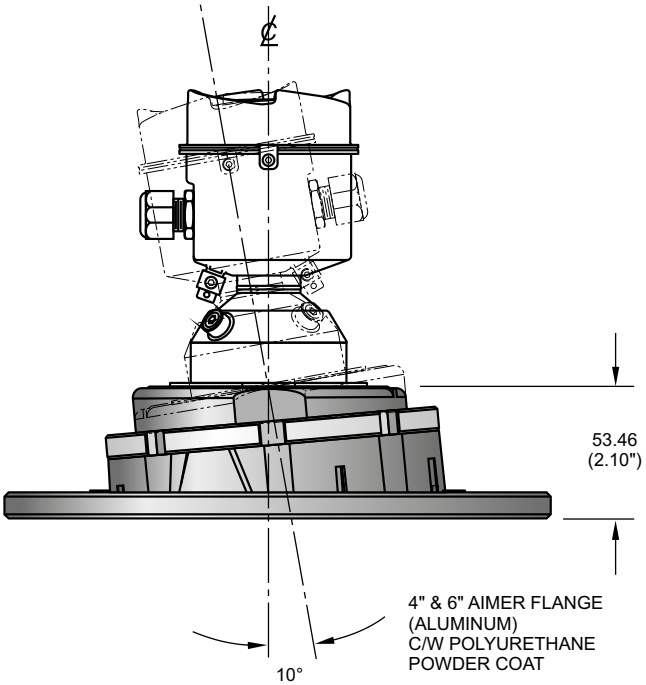
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Dimensions in mm:



Aimer flanges:





Ordering Codes:

Order number	LR-56.	2.	4.	1.	A.	1.	3.	0.	1

LR-56 Radar Level Transmitter

Measuring range /
1 = 40 m max. measuring range, -40. . .+100 °C
2 = 100 m max. measuring range, -40. . .+200 °C

Process connection /
1 = 80 mm, st. steel 1.4301
2 = 100 mm, st. steel 1.4301
3 = 150 mm, st. steel 1.4301
4 = 80 mm, st. steel 1.4404
5 = 100 mm, st. steel 1.4404
6 = 150 mm, st. steel 1.4404
7 = 80 mm, painted aluminium with aimer flange[1)]
8 = 100 mm, painted aluminium with aimer flange[1)]
9 = 150 mm, painted aluminium with aimer flange[1)]

Housing (with cable glands) /
1 = st. steel, 1 x ½" NPT
2 = st. steel, 1 x M20 x 1,5 (incl. plastic mounting)

Nominal pressure /
A = 0.5 bar g max.
B = 3 bar g max.

Output /
1 = 4. . .20 mA, HART
2 = PROFIBUS PA

Approvals /
1 = general use,FM, $CSA_{US/C}$, Industry Canada, FCC, CE, RED, RCM
2 = CSA/FM Class I, Div. 2, groups A, B, C, D, Class II, Div. 1; groups E, F, G, Class III
3 = ATEX II 3G Ex nA/nL, 1D, 1/2D, 2D Ex ta, INMETRO CE, RED, RCM

Local display interface /
0 = without LDI (Local Display Interface)
9 = with LDI (Local Display Interface)

Accessories /
0 = none
1 = hand-held access unit
9 = please specify custom wishes

[1)]for max. 120 °C with nominal pressure option B

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SE-02

Ultrasonic Level Sensors in 2-wire Technology



Features

/ Fluids and bulk solids

/ Non-contacting

/ 4. . .20 mA output

/ HART ® communication

/ Low energy consumption

/ Cable lengths up to 1000 m

/ PLC connection

/ IP68

/ ATEX approval optional

Description:

The operating principle of SE-02 level sensors is based on ultrasonic technology. Piezoelectric crystals are electrically incited to emit ultrasonic pulses, which run from the sensor to the surface of the fluid or bulk solid and back again. The SE-02 measures the time, the pulse needs for this distance and evaluates herefrom the distance between sensor and surface. The integrated transmitter generates a 4. . .20 mA output signal, that is proportional to distance, level, space or volume, whatever has been programmed while setting up the SE-02 via any HART modem and the PC software, which is part of the shipment. The unit provides also a `fault condition´ alarm of either 3.8 mA or 22 mA. The low blanc distance of 0.125 meter demonstrates the high performance of SE-02 series. Not only the intelligent electronic of the sensors, but the extremely narrow sound beam, and the insensibility against clutter due to inbuilt components of the container predestine the sensors for a wide range of industrial applications. The SE-02 units are available with a cable-sided 1" male thread, with front threads or front flanges, thus allowing convenient assembly.

Application:

Wherever non-contacting measurement is required, the Profimess´ ultrasonic level sensors of the SE-02 series may be used. The units are able to output a signal, that is proportional to level, distance, free space or volume, thus the user can teach in the relation between the shape of the container and the distance between sensor and surface via 16 pair of values. Due to its protection class of IP68 the SE-02 is particularly demanded for water and wastewater applications.

Technical Specifications:

Functions /	level, distance, empty space, volume and linearisation using 16 breakpoints
Material housing /	Valox 357 PBT Optional: PVDF
max. Ambient pressure /	5 bar
Operating temp. /	-40. . .+80°C
Connection /	1" NPT / BSP male thread on cable device side (front thread or flange optional)
Operating range /	Typ A = 0.125. . .3 m Typ B = 0.3. . .6 m Typ C = 0.3. . .10 m Typ D = 0.5. . .15 m **Higher ranges on request**
Frequency /	Typ A = 125 kHz Typ B = 75 kHz Typ C = 50 kHz Typ D = 41 kHz
Sound exiting cone /	< 10°
Measurement uncertainty /	0.25 % of measuring range
Resolution /	Typ A = 2.0 mm Typ B = 2.0 mm Typ C = 2.0 mm Typ D = 2.0 mm
Options /	- sensor face soft foam coating for - type B, C and D or PTFE for unting flange - 1.5" NPT front male thread - 2" NPT front male thread - flood protection head - flange version: DN 50 / DN80 / DN 100 / DN 150 DN 200 ANSI 2" / 3" / 4" / 6" / 8" - ATEX version

Ordering Codes:

Order no.	SE-02.	1.	1.	0.	000.	0.	0.	0

SE-02 Ultrasonic Level Sensor

Sensor type/Op. range /
1 = type A / 0.125 m to 3 m
2 = type B / 0.3 m to 6 m
3 = type C / 0.3 m to 10 m
4 = type D / 0.5 m to 15 m

Cable length /
1 = 5 m cable
2 = 10 m cable
3 = 20 m cable
4 = 30 m cable
5 = 50 m cable
6 = 100 m cable
9 = special cable lengths

Housing material /
0 = Valox 357 PBT (standard)
1 = PVDF (for sensor type B, C, D and without flange)

Frontal process connection /

Front thread:
000 = without front thread
015 = 1.5" NPT front thread (for sensor type A and B only)
020 = 2" NPT front thread (for sensor type C only)

Flange (incl. 0.25 mm PTFE coating):
000 = without flange
002 = 2" ANSI
003 = 3" ANSI
004 = 4" ANSI
006 = 6" ANSI
008 = 8" ANSI
050 = DN50
080 = DN80
100 = DN100
150 = DN150
200 = DN200

Sensor face coating /
0 = standard
1 = PTFE (for flange version only)
2 = foam-rubber (for sensor type B, C and D only)

EX approval /
0 = none
1 = II 2 GD Ex m IIC T4
2 = II 1 GD Ex ia IIC T4

Options /
0 = none
1 = flood protection head (all sensors without front thread, none coated only)

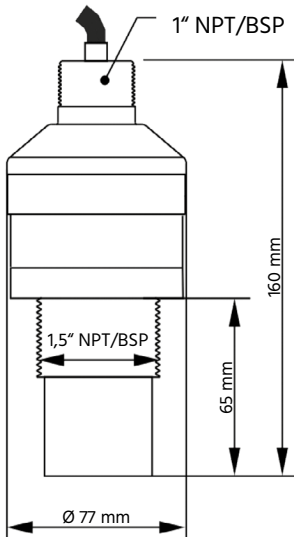
address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

Electrical Specifications:

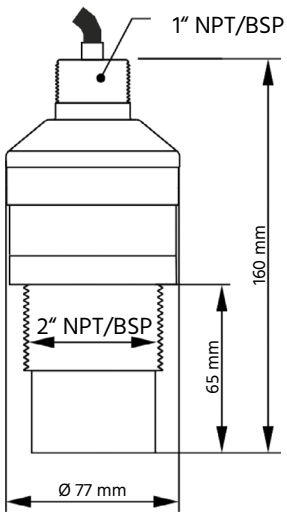
Supply voltage /	10. . .28 VDC
Output /	4. . .20 mA (3.8. . .22 mA) HART® - loop powered (2-wire)
Configuration /	PC software for parameter setting and linearisation via HART® communication (HART® - communicator not included).
Start up time /	4 sec. typical (9 sec. after 12 hours without activity)
Cable length /	5 m, 10 m 20 m, 30 m, 50 m or 100 m (special lengths optional)
Protection class /	IP68
Approvals for Ex-versions /	II 2 GD Ex m IIC T4 II 1 GD Ex ia IIC T4

Dim., Mounting Thread, front side:

Sensor Type A and Type B

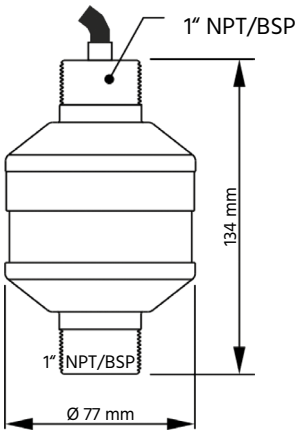


Sensor Type C

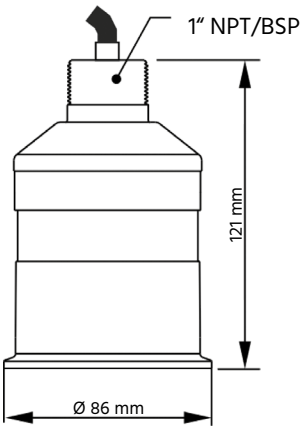


Dim., Mounting Thread, cable side:

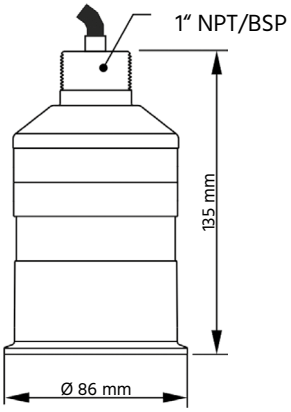
Sensor Type A



Sensor Type B and Type C

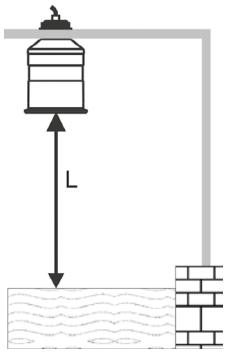


Sensor Type D

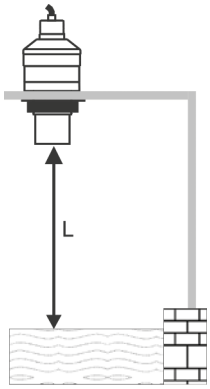


Outdoor and open Vessel installation:

Mounted via rear 1" NPT thread



Mounted via optional front thread



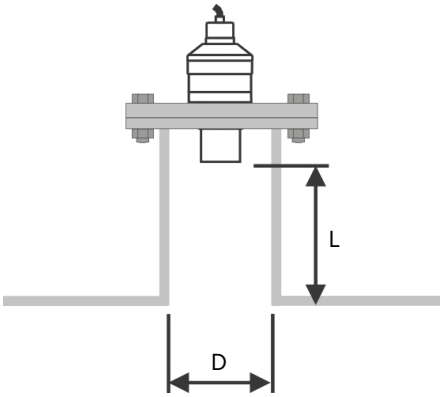
The SE-02 ultrasonic sensors can be simply mounted on a bracket, suitable for the application and secured using either the 1" NPT rear or via the 1.5" or 2" front thread, dependant on model. Care should be taken to ensure that the SE-02 sensor is not installed in direct sunlight, in order to avoid errors in the measurement of ambient temperature. Attention should also be taken, when mounting the unit, to ensure that strong windy conditions are avoided, wherever possible, to prevent abnormal operation.

Table 1: Minimum sensor distance

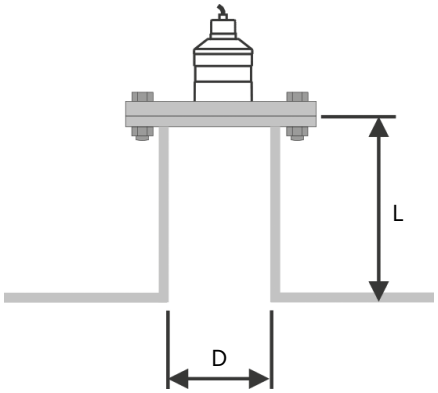
Sensor	Operating range	L = min. Distance
Type A	3 m	125 mm
Type B	6 m	300 mm
Type C	10 m	300 mm
Type D	15 m	500 mm

Closed Vessel installation:

Flange mounted via front thread to a stand pipe



Optional flange mounted to a stand pipe



When mounting the ultrasonic sensor to a stand pipe care should be taken to ensure that the standpipe is of sufficient diameter with reference to its length, see table 2 for details. When using a standpipe, fixed to the top of a vessel, ensure that the open end of the standpipe is clear of any obstructions such as weld seams, gaskets etc. in order to avoid unwanted signal returns.

Table 2: Dimensions standing pipe

Diameter (D)	max. Length (L)
80 mm	220 mm
100 mm	300 mm
150 mm	420 mm
200 mm	560 mm

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ECHO-N

Universal Ultrasonic Level-Sensor



Features

/ Contactless measurement

/ No mechanical parts

/ Maintenance and wear-free

/ Simple installation

/ Easy calibration

/ Temperature-compensated

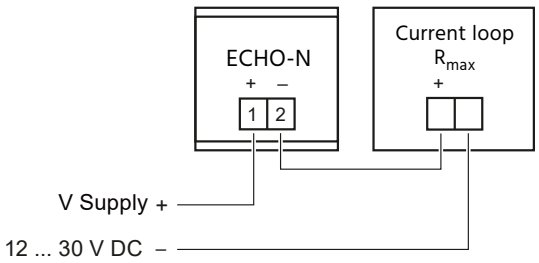
Description:

ECHO-N type ultrasonic level sensors are used when fluids and bulk goods need to be measured continually. The sensor works according to the principle of runtime method. It emits ultrasonic signals and subsequently measures the time elapsed until it receives again the echo reflected by the media surface. The echo runtime is proportional to the distance between the sensor and the medium and, therefore, to the level. Temperature influences are automatically compensated. By means of the Sonic Intelligence echo processing algorithms a filter discriminates between the true echo and false echos caused by electrical noises, acoustic or agitatords. The device is supplied as a compact unit in a water-proof plastic housing. A display unit, the connecting terminal and 2 programming keys are located below a cover flap.

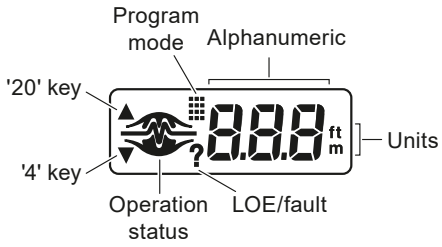
Application:

Ultrasonic level sensors are used wherever contamination and conditions of coldness, heat and humidity pose a problem to conventional measuring systems. By deploying ECHO-N, already occupied and soiled probes, hardened membranes, clogged floaters, leaking bubbling-through measuring systems and continual readjustments are a thing of the past. Key applications are: storage vessels, filter beds, waste water pits, food applications.

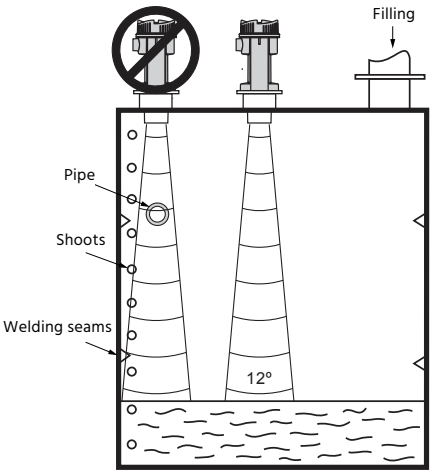
Electrical Connection:



Display



Mounting:



Location for installation

The ECHO-N must be installed in such a way to allow the sound without obstructions to reach at right angle to the surface of the medium. In any case, there must be a clearance of 250 mm between the lower edge of the sensor and maximum expected level. Distance must be maintained from obstructing structures like wires, tubes, strutting and strong welding seams.

Electrical Specifications:

Power supply /	12. . .30 VDC, 0.1 A peak
Consumption /	max. 0.75 W, (25 mA at 24 VDC)
Output signal /	4. . .20 mA, 2-wire
Load /	max. 600 Ω at 24 VDC
Electrical connection /	terminal block
Certificates /	CE, $CSA_{US/C}$

Technical Specifications:

max. Pressure /	ambient pressure
max. Ambient-temp. /	standard: -30. . .+60°C installation with metal-thread: -20. . .+60°C
Measuring range /	0.25. . .5 m at 54 kHz
Operating range /	proportional / inversibly proportional
Display /	3-digit LCD-display
Weight /	1.3 kg without flange adapter 1.5 kg with flange adapter
Accuracy /	0.25% of operating range (in air)
Resolution /	3 mm
Temp. compensation /	built in
Beam angle /	12°
Protection /	IP68 / NEMA 6 / TYPE 6
ATEX (on request) /	II 1G Ex ia IIC T4 Ga
Material /	electronic enclosure: PBT transducer: PVDF Copolymer
Process connection /	2" NPT (Taper), ANSI/ASME B1.20.1 R2" (BSPT) EN 10226 G2" (BSPP), EN ISO 228-1 4" sanitary
Flange adapter /	3" universal (fits DN65 PN10 and 3" ASME)
Cable inlet /	1 inlet for M20, optional 1/2" NPT

Ordering Codes:

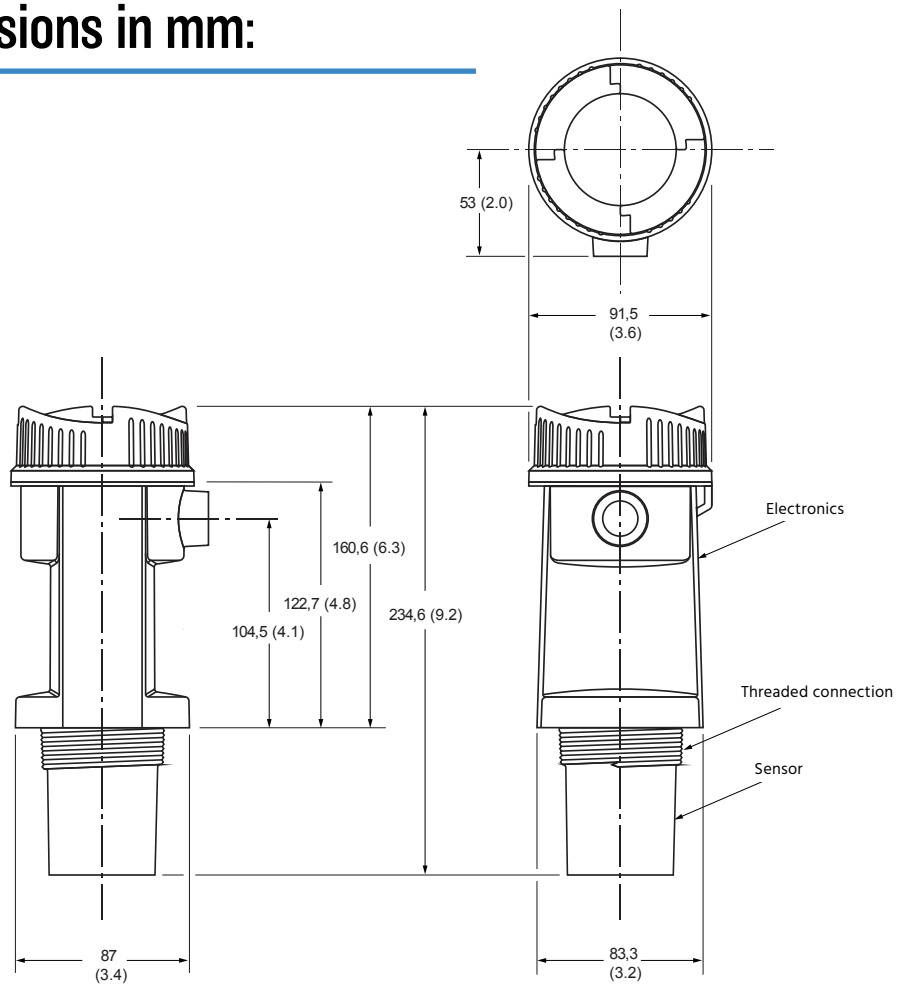
Order number	**ECHO-N.**	**1**
ECHO-N Univeral Ultrasonic Level-Sensor		

Process connection /

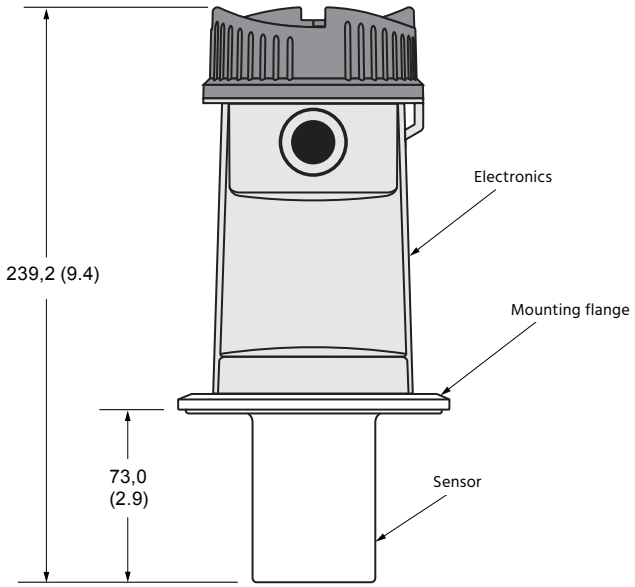
1 = 2" NPT
2 = G2" (BSPP)
3 = tri-clamp, sanitary flange 4"
4 = R2" (BSPT)

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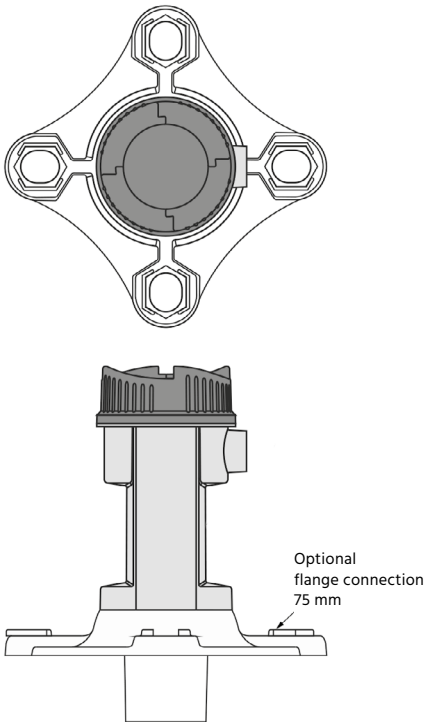
Dimensions in mm:



Sanitary connection in mm:



Flange connection:



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FU-01

Ultrasonic Level Limit Switch

Features

/ Contactless

/ Bulk goods and fluids

/ Simple commissioning

/ 2 relay contacts or 2 transistor outputs

/ Electronics provided with fail-safe function

Description:

The FU-01 is a level switch that works without contact to the media. The sensor and evaluating electronic components are located in a housing. Continually emitted ultrasonic signals strike the surface of the measuring medium, are reflected by it and again received as echo. The signal runtime is measured and interpreted as the distance. The device has two setpoints which can be programmed as alarm functions (e.g. Max/Max, Max, Min or Min/Min). As a standard, these outputs are designed as potential-free relay contacts. However, optionally, they can be supplied in transistor version. Complete parameterizing for the FU-01 is operator-friendly as only two keys need to be operated. Current measurement and operating status are displayed on an LCD display unit.

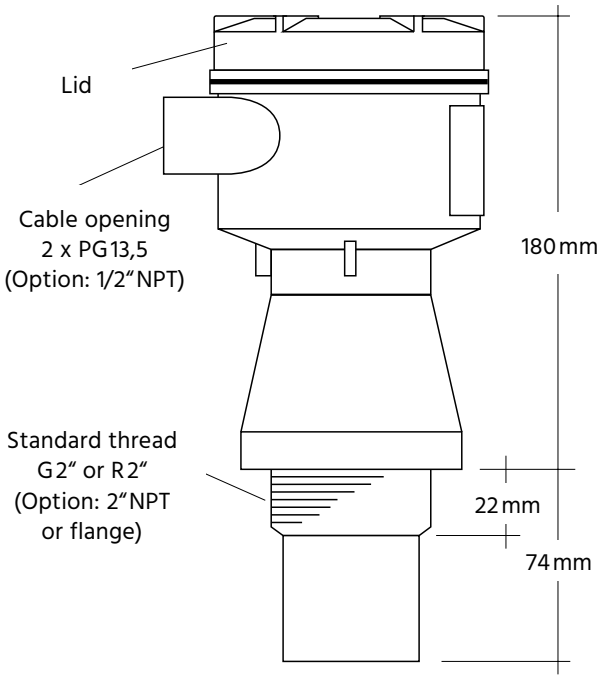
Application:

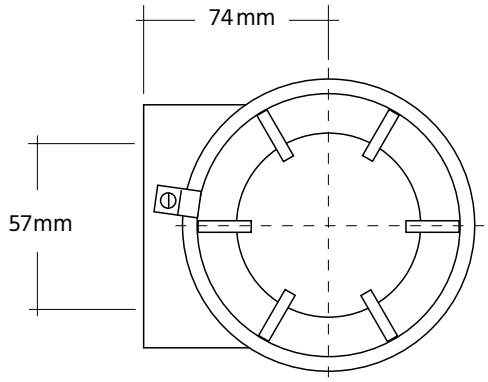
The FU-01 series of ultrasonic level switches is used wherever contactless measuring is advantageous. Typical applications are, for example, in water and effluent management, for bulk goods or in sewage treatment plants. As far as level monitoring is concerned, problems caused by soiling, blockages or corrosion belong therefore to the past.

Technical Specifications:

max. Pressure /	0.5 bar
max. Operating temp. /	-40. . .+60°C, (for mounting in metal bushing -20. . .+60°C)
Operating range /	0.25 m to 3 m for bulk goods, 0.25 m to 5 m for fluids and slurries
Operating modes /	Max, Min, Max/Max and Min/Min
Housing /	polycarbonate
Sensor /	Kynar (PVDF) or Tefzel (ETFE)
Weight /	1,5 kg (polycarbonate)
Accuracy /	0.25% of the operating range
Resolution /	3 mm
Beam angle /	12°

Dimensions in mm:



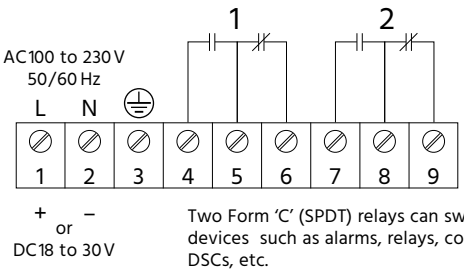


Electrical Specifications:

Display /	3-digit LCD, height 9 mm, to display the distance between sensor and medium, multi-segment graphic for showing the operating status
Operation /	two keys
Protection class /	IP67 / Typ 6 / NEMA 6

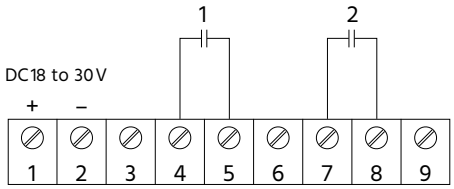
Outputs:

Relay output



Two Form 'C' (SPDT) relays can switch external devices such as alarms, relays, contractors, PLCs, DSCs, etc.

Transistor Output: DC version only



Two non-polarized transistor outputs are suitable for connection to PLCs, DSCs, or customer supplied relays.

Ordering Codes:

Order number	**FU-01.**	**1.**	**2.**	**1.**	**1**

FU-01 Ultrasonic Level Limit Switch

Material /
1 = Tefzel (ETFE)
2 = Kynar-Flex (PVDF)

Process connection /
1 = 2" NPT[(conic), ANSI/ASME B1.20.1]
2 = G2" [(BSPP), EN ISO 228-1]
3 = 4" Tri-Clamp, sanitary version (only for PVDF)
4 = flange assembly (specify flange in detailed text, min. DN80)
5 = R2" [(BSPT), EN 10226]

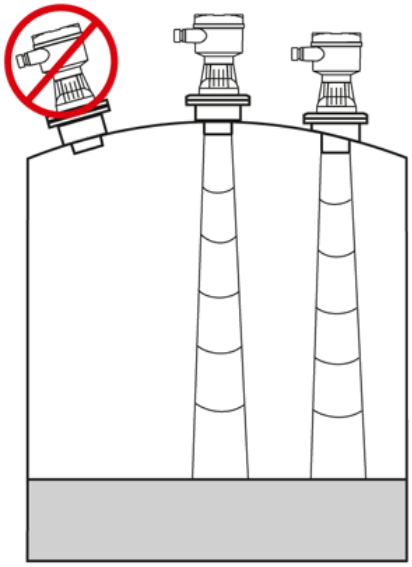
Housing /
1 = polycarbonate

Supply /
1 = 24VDC, with 2 potential-free relay outputs
2 = 24VDC, with 2 transistor outputs
3 = 100 to 230VAC, with 2 potential-free relay outputs

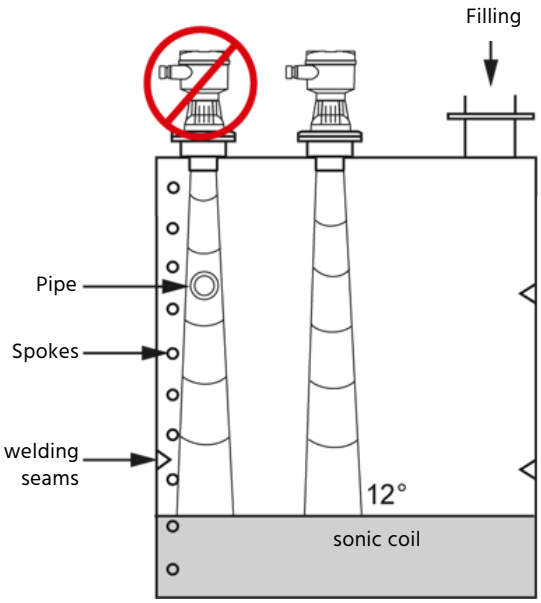
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Mounting:

Mounting on a parabolic roof



Mounting on a flat roof and sound cone



Please mind to install the FU-01 not in range of possible disturbances, like high-voltage- or motor-cables, noise protection or frequency converters. Also, make sure, the sound cone can reach the surface of your medium in an 90° angle, while keeping your distance to the filling, welding seams, ladder spokes and so on.

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Mobrey™ 003

Ultrasonic Liquid Level Switch with Dual Thread Mounting



Features

/ 1“ or 3/4“ threaded mounting

/ Relay or Transistor output

/ 24V AC or DC powered

/ Corrosion resistant

PPS construction

/ Small in-tank dimensions

/ No moving parts

Description:

The moulded body contains two piezo-electric crystals on each side of the gap at the tip of the sensor. An ultrasonic signal is transmitted from one crystal into the gap. If there is air or gas in the sensor gap, the signal is not received by the other crystal. If there is liquid present, the signal will be transmitted across the gap, and the integral electronics will switch the output circuitry to signal the presence of a liquid.

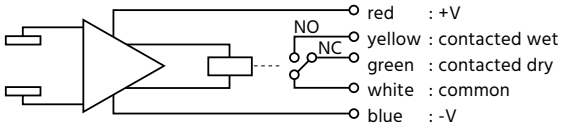
Application:

The Mobrey™ 003 is manufactured in Polyphenylene Sulphide (PPS). It is corrosion resistant in many liquids and can be used even in aggressive liquids such as acids and lyes. The sensor can be mounted in any position in a tank using the 1“ or 3/4“ BSPT or the 1“ NPT threads available. A thread is provided on each side of a hexagonal boss to allow external or internal pole mounting of the sensor. Comprising a one piece moulded body with integral pcb, the Mobrey™ 003 switch is factory sealed and supplied with 10ft (3m) flying lead for customer connection. The Mobrey™ 003 switch meets the EU regulation, is powered with 24 VAC or DC and can be used for high or low level alarm duties to give a voltage free changeover contact or dual solid state transistor output. Typical applications are: low level alarms in header tanks, pump control duty in feeder tanks, high and low alarms in storage tanks, level and pump control in storage tanks and small or thin wall tanks.

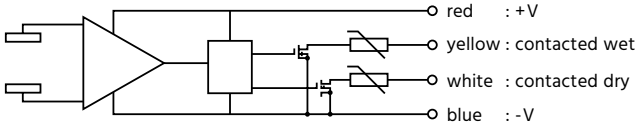
Technical Specifications:

Operating pressure /	5 bar
Operating temp. /	-20. . .+70°C (003S) -40. . .+105°C (003H)
Ambient temp. /	-20. . .+70°C (003S) -40. . .+70°C (003H)
min. liquid specific gravity /	0.50 g/cm³
max. Viscosity /	5000 cSt. at +20°C
Switching response /	50 ms dry - wet, 0.5 s wet - dry
Hysteresis /	< 4 mm
Repeatability /	± 2 mm
Overall length /	110 mm
Length into tank /	79 mm (ext. mount)
Body diameter /	22 mm
Body material /	Polyphenylene Sulphide (PPS Ryton)
Weight /	200g

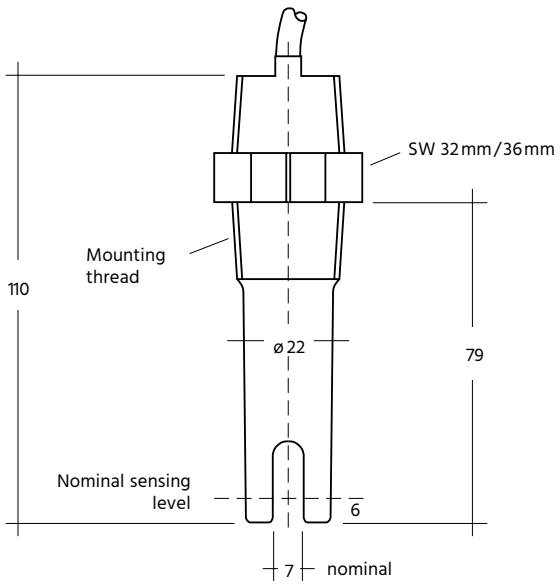
Schematic 003-S.x models



Schematic 003-H.x models



Dimensions in mm:



Electrical Specifications:

003.S.x Models /

Power supply:	18. . .30 VDC or AC
Switching function:	SPCO relay (energised wet)
max. Switched current:	1A bei 30 V res., 0.25 A bei 30 V ind.
max. Switched voltage:	30 V
Dry current drawn:	10 mA nom.
Wet current drawn:	25 mA max.
Cable length:	3 m: 5 core 7/0.2 mm
Cable sheathing:	PVC
IP rating of sensor:	IP66/IP68 (3 m)

003.H.x Models /

Power supply:	18. . .30 VDC
Switching function:	2 x FET open drain (short circuit protected)
max. Switched current:	100 mA
max. Switched voltage:	30 V
Dry current drawn:	8 mA nom. (4 mA min)
Wet current drawn:	16 mA nom. (20 mA max.)
Cable length:	3 m: 5 core 7/0.2 mm
Cable sheathing:	PVC
IP rating of sensor:	IP66/IP68 (3 m)

Ordering Codes:

Order number	**003.**	**S.**	**2.**	**1**

Mobrey™ 003 Ultrasonic Level Switch

Output /
S = integral SPCO relay energised when sensor wet
H = two open drain FET transistors

Process connection /
0 = R 3/4" BSPT dual
2 = R 1" BSPT dual
5 = 1" NPT

Cable /
1 = PVC sheathed, 3 m, 5-core 7 / 0.2 mm

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FM-01F

Magnetostrictive Level Sensor



Features

/ Simple installation and configuration

/ Insensitive against vibration

/ 2-wire connection 4 to 20 mA

/ HART®-protocol optional

/ ATEX- and IECEx zone 0

/ Up to 450°C

/ Up to 120 bar

/ Up to 13 meter insertion length

/ Inst. kits offer sensor protection

/ Additional measuring of interface

Description:

A float carrying a permanent magnet moves along a slider tube carried by the fluid level up and down. A magnetorestrictive wire is built into this tube through which the electronic components transmit short current impulses that are surrounded by a ring-shaped magnetic field. When this field strikes the static magnetic field of the floater magnet, it results into a torsion impulse that travels in the direction of the sensor head at ultrasonic speed and gets recognized. The time between transmission of current and arrival of the impulse is directly proportional to the distance of the floater which is, therefore, the level. This is measured and converted into a 4-20 mA current signal and is available at the output of the device. On request, the FM-01F can also interrogate two floats at the same time and so the additional interface measurement via HART ®-Protocol can be realized, even if the interface is an emulsion or a low difference in DK value is present.

Application:

The sensor is used where small and medium levels of even hostile media are measured. The magnetostrictive principle of measurement guarantees maximum accuracy and excellent resistance and strength due to its hermetically sealed stainless steel construction. For applications in liquified gas, in extremely aggressive liquids or mechanically harsh environments, installation kits are available that can be permanently installed with the container. In these fittings, the actual sensor is simply inserted from the outside and has no contact to the interior. Versions with sliding tube of twelve millimeters or six millimeters in diameter which are arranged centrally, laterally or angled at 90 degrees and a flexible design with installation lengths up to13 meters qualify the FM-01F particularly for use in the chemical and pharmaceutical industry, in biotechnology plants, and pulp, paper and food industries. In case of an installation in hazardous areas, the sensor can be supplied with ATEX and IECEx approval for zone 0.

Technical Specifications:

Material sensor head / stainless steel 1.4305

Material sliding tube / st. steel 1.4571, (Hastelloy® C4/C22 or Titan on request)

Ambient temperature / -40. . .+85 °C

Diameter sliding tube /
FM-01F.12M: 12 mm
FM-01F.12S: 12 mm
FM-01F.06M: 6 mm
FM-01F.06S: 6 mm
FM-01F.90G: 12 mm
FM-01F.FLEX: 12 mm or 13 mm (depending on sensor length)

min. Process connection /
FM-01F.12M: G3/8" or Fl. DN25
FM-01F.12S: n.a.
FM-01F.06M: G1/4"
FM-01F.06S: G1/4"
FM-01F.90G: G3/8"
FM-01F.FLEX: G3/8"

Accuracy /
FM-01F.12M:
standard: ±0.5 mm or ±0.025 %
precision: ±0.3 mm or ±0.010 %
(precision only at standard temperature NT)
FM-01F.12S:
standard: ±0.5 mm or ±0.025 %
FM-01F.06M:
standard: ±0.75 mm or ±0.025 %
FM-01F.06S:
standard: ±0.75 mm or ±0.025 %
FM-01F.90G:
standard: ±0.75 mm or ±0.025 %
FM-01F.FLEX:
standard: ±2.0 mm or ±0.025 %

Resolution / 0.1 mm (HART®)

poss. insertion lengths /
FM-01F.12M:
100 mm to 6000 mm
(highest temperature version HH to 3000 mm)
FM-01F.12S:
200 mm to 6000 mm
(highest temperature version HH to 3000 mm)
FM-01F.06M:
100 mm to 1000 mm
FM-01F.06S:
100 mm to 1000 mm
FM-01F.090G:
150 mm to 1000 mm
FM-01F.FLEX:
1500 mm to 10000 mm
(to 15000 mmon request)

Pressure /
FM-01F.12M:
-1. . .+120 bar (20°C)
-1. . .+ 95 bar (250°C)
-1. . .+82 bar (450°C)
FM-01F.12S: n.a.
FM-01F.06M:
-1. . .+16 bar (125°C)
FM-01F.06S:
-1. . .+16 bar (125°C)
FM-01F.90G:
-1. . .+120 bar (20°C)
FM-01F.FLEX:
-1. . .+2 bar (85°C)

Temperature /
FM-01F.12M:

st. temperature	-40. . .+125°C
high temperature	-40. . .+250°C
highest temp.	-40. . .+450°C
low temperature	-65. . .+125°C

FM-01F.12S:

st. temperature	-40. . .+125°C
high temperature	-40. . .+250°C
highest temp.	-40. . .+450°C
low temperature	-65. . .+125°C

FM-01F.06M:

st. temperature	-40. . .+125°C

FM-01F.06S:

st. temperature	-40. . .+125°C

FM-01F.90G:

st. temperature	-40. . .+85°C

FM-01F.FLEX:

st. temperature	-40. . .+85°C

Option / lowest temperature
-200. . .+85°C
(only plug connection,
only -1. . .+3 bar, on request)

Electrical Specifications:

Supply voltage / 8. . .30 VDC

Supply voltage Ex / 10. . .30 VDC

Current output / 4. . .20 mA, 2-wire, (optional HART®) failure mode acc. NAMUR NE43

HART®-Function / float position in mm, cm, m, inch or foot, position of a second float, interface (distance between floats), sensor status, configuration

Protection class / IP68

El. connection / cable gland M16 x 1.5 für cable diameters 5. . .10 mm, plug M12 or conduit connection with female thread 1/2-NPT or M20 x 1.5

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Ordering Codes:

Order number	FM-01F.	12M.	1500.	KE01.	G10.	SV.	M12.	NT.	HA/EG/EPF

FM-01F Magnetostrictive Level Sensor

Version /

12M = centrally arranged sliding tube 12 mm
12S = laterally arranged sliding tube 12 mm
06M = centrally arranged sliding tube 6 mm
06S = laterally arranged sliding tube 6 mm
90G = angled sliding tube 12 mm
FLEX = flexible sliding tube

Insertion length in mm /

[ ][ ][ ][ ][ ]

Float (Type acc. Table „Floats“) /

[ ][ ][ ][ ][ ]

Process connection /

000 = none, when laterally arranged sliding tube
G08 = G1/4“ (only for 6 mm sliding tubes)
G10 = G3/8“
G15 = G1/2“
G15 = G3/4“
G50 = G2“ (only welded)
R50 = R2“ (only welded)
N08 = 1/4“-NPT (only for 6 mm sliding tubes)
N10 = 3/8“-NPT
N15 = 1/2“-NPT
N15 = 3/4“-NPT
N50 = 2“-NPT (only welded)
F25 = flange DN25 PN40 compatible to shape C and shape D DIN2527
F50 = flange DN50 PN40 compatible to shape C and shape D DIN2527
F65 = flange DN65 PN40 compatible to shape C and shape D DIN2527
F80 = flange DN80 PN40 compatible to shape C and shape D DIN2527
F101 = flange DN100 PN16 compatible to shape C and shape D DIN2527
F104 = flange DN100 PN40 compatible to shape C and shape D DIN2527
F2Z = 2“ ANSI / ASME flange 150 lbs
F3Z = 3“ ANSI / ASME flange 150 lbs

Version process connection /

000 = none, when laterally arranged sliding tube
SV = adjustable via cutting ring joint
(up to 40 bar @ 12 mm sliding tubes, up to 16 bar @ 6 mm sliding tubes)
KV = adjustable via compression ring joint (up to 1.5 bar)
VS = welded (from 3/8“, 120 bar @ 12 mm sliding tube, 16 bar @ 6 mm sl. tube)

Electrical connection /

KV = standard cable gland for 5 mm up to 10 mm cable diameters
IGM = M20 x 1.5 female thread
IGN = 1/2“-NPT female thread
M12 = plug connection M12

Temperature range /

NT = standard temperature -40. . .+125°C
HT = high temperature -40. . .+250°C (only for 12 mm non-angled sliding tubes)
HH = highest temperature -40. . .+450°C (only for 12 mm non-angled sliding tubes)
LT = low temperature -65. . .+125°C (only for 12 mm non-angled sliding tubes)

Options (multipie choices as e.g. HA/EG/ possible) /

HA = HART®-protocol additional to 4 to 20 mA-signal
EX = ATEX- and IECEx-approval for zone 0
EG = increased accuracy up to ±0.3 mm or ±0.010 % (depends on version, only at -40°C to +125°C)
PO = electro-polished surface
LPG = with additional installation kit for liquid gas containers
EHD = with additional heavy-duty installation kit for applications in rough areas
EP2 = with additional installation kit made from polypropylene with thread G2“
EP3 = with additional installation kit made from polypropylene with thread G3“
EPF = with additional installation kit made from polypropylene with flange DN65 up to DN100 (clear text)
EV2 = with additional installation kit made from PVDF with thread G2“
EV3 = with additional installation kit made from PVDF with thread G3“
EVF = with additional installation kit made from PVDF with flange DN65 up to DN100 (clear text)

Versions & installation kits:

FM-01F Magnetostrictive Level Sensor

The standard version of the FM-01F has a centrally arranged sliding tube of 12 mm diameter and a float which is selected according to the specific weight of the medium and resistance to the medium. This sensor is mounted with a compression fitting with stainless steel cutting ring up to 40 bar or a compression fitting with PTFE-clamping ring up to 1.5 bar, making it adjustable in the immersion depth.

For higher process pressures the FM-01F is supplied with a hermetically welded thread or flange and thus can be used up to 120 bar. For limited space a variant with 90 degrees angled sliding tube is available. Mounting to magnetic level gauges (e.g Profimess MA-400) is enabled by the execution with laterally arranged sliding tube. When the FM-01F is mounted with pipe clamps closely attached to the measuring chamber of the magnetic level indicator the internal float of the magnetic level gauge is detected. Appearances in small laboratory containers with little mounting space are possible by using the variant of the FM-01F with 6 mm sliding tube, which may be arranged centrally or sideways, depending on requirements.

On particularly high containers no gauges with rigid sliding tubes can be used, because on the one hand they can no longer be transported on trucks, but also the assembly effort is very high. In this case, the variants of the FM-01F provide the flexible design (FLEX). The sensor is simply rolled up for transport and unrolled again for installation, so that installation lengths up to 15 meters can be achieved. A load weight on the end of the probe ensures a taut position of the probe, so that the float can move freely.

Function:
As accessories installation kits are available. They consist of a casing pipe with process connection and a float. They are installed in the tank and the magnetostrictive transmitters are introduced from outside. The FM-01F now detects the magnets of the inner float through the pipe wall of the installation kits and measures the level of the liquid inside. In this case, the FM-01F does not come into contact with the medium.

Aggressive liquids:
To detect the level of aggressive fluids installation kits made from PP or PVDF are available. The liquid to be measured here comes in contact exclusively with the selected plastic.

Portable tanks:
Installation kits offer an optimal solution for applications where containers or barrels have to be delivered from supplier to customer. The level can be monitored here both on the supplier side during filling, as well as on the customer side when emptying, without the need of opening the container.

Pressure tanks:
When using installation kits, the FM-01F is in unpressurized area. A pressure test may thus be carried out without the mounted FM-01F. The level sensor can be retrofitted or replaced without opening the container once more.

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Installation kits:

Installation kit for LPG-Tanks

Length /	150 mm to 4500 mm
Material /	st. steel 1.4571
Temperature /	-40. . .+85 °C
Pressure /	max. 16 bar
Product float /	cylinder 40 x 120 mm Buna®
spec. Weight /	> 0.45 g/cm³

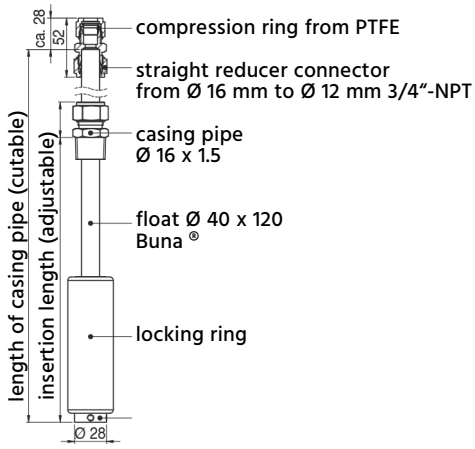
Heavy-Duty installation kit

Length /	1000 mm to 6000 mm
Material /	st. steel 1.4571
Sliding tube Ø /	18 x 2 mm
Process connection /	welded flange or thread
Temperature /	-40. . .+450°C
Pressure /	max. 60 bar
Product float /	according to order
spec. Weight /	according to order

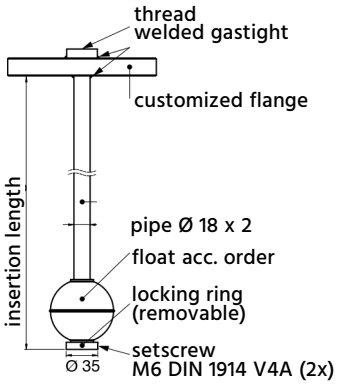
Plastic inst. kit from PVC, PP or PVDF

Length /	150 mm to 5000 mm
Material /	PP or PVDF, (PVC on request)
Sliding tube Ø /	16 mm
Process connection /	thread G2“ or G3“ flange DN65 to DN100
Temperature /	Polypropylene: -20. . .+85°C PVDF: -20. . .+100°C PVC: -20. . .+60°C
Pressure /	max. 1 bar
Product float /	cylinder 55 x 69 mm
spez. Gewicht /	> 0.82 g/cm³

LPG-installation kit



Heavy-Duty-installation kit



Plastic-installation kit

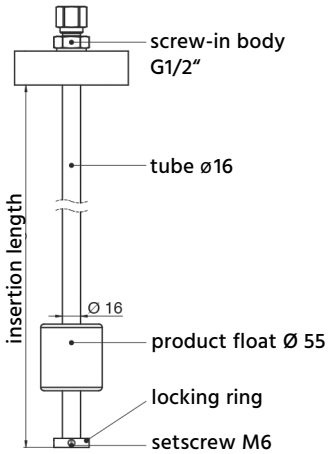
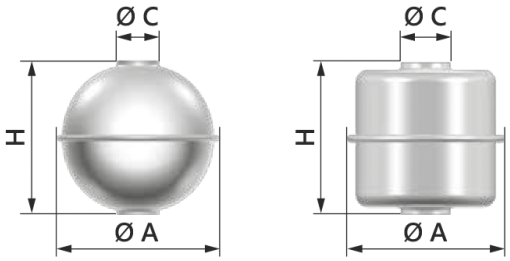


Table Floats:

Depending on the application, different types of floats are available. The necessary ring magnet for the contactless transmission of the level is installed in the float and thus has no contact with the medium. The selection of the float depends on the process conditions (medium, pressure and temperature).



Media spec. weight	min. spec weight	Temperature range	Operat. press. max.	A (mm)	H (mm)	C (mm)	Shape*	Type
Stainless steel 1.4571								
≥ 0.95 g/cm³	< 0.85 g/cm³	-200. . .+250°C	50 bar	43.0	40.0	15.0	K	KE01
≥ 0.85 g/cm³	< 0.75 g/cm³	-200. . .+250°C	20 bar	43.0	40.0	15.5	K	KE02
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	40 bar	52.0	52.0	15.5	K	KE03
≥ 0.60 g/cm³	< 0.50 g/cm³	-200. . .+250°C	20 bar	52.0	49.0	15.5	K	KE04
≥ 0.45 g/cm³	< 0.36 g/cm³	-40. . .+250°C	25 bar	83.0	82.0	15.0	K	KE05
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	16 bar	43.0	43.0	15.5	Z	ZE01
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	5 bar	29.5	40.0	12.5	Z	ZE02
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	1 bar	29.5	40.0	12.5	Z	ZE03
≥ 0.78 g/cm³	< 0.67 g/cm³	-20. . .+100°C	16 bar	27.0	31.0	10.0**	Z	ZE04
Stainless steel 1.4571 with conical spring for detection of remaining quantity								
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	16 bar	43.0	43.0	15.5	Z	ZEF01
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	5 bar	29.5	40.0	12.5	Z	ZEF02
≥ 0.78 g/cm³	< 0.67 g/cm³	-20. . .+100°C	16 bar	27.0	31.0	10.0**	Z	ZEF03
Stainless steel 1.4571 precision float								
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	drucklos	54.0	31.0	13.0/23.4	Z	ZEP01
Titanium								
≥ 0.50 g/cm³	< 0.40 g/cm³	-200. . .+250°C	20 bar	50.0	48.0	15.4	K	KT01
≥ 0.40 g/cm³	< 0.30 g/cm³	-40. . .+125°C	25 bar	83.0	81.0	15.0	K	KT02
≥ 0.50 g/cm³	< 0.42 g/cm³	-40. . .+125°C	25 bar	98.0	96.0	23.0	K	KT03
≥ 0.69 g/cm³	< 0.59 g/cm³	-200. . .+450°C	200 bar	60.0	59.0	14.5	K	KT04
Hastelloy® C 276								
≥ 0.70 g/cm³	< 0.60 g/cm³	-200. . .+250°C	10 bar	46.0	48.0	15.2	Z	ZH01
BUNA®								
≥ 0.45 g/cm³	< 0.38 g/cm³	-40. . .+80°C	16 bar	40.0	120.0	18.0	Z	ZB01
≥0.45 g/cm³	< 0.38 g/cm³	-40. . .+80°C	16 bar	30.0	45.0	13.0	Z	ZB02
Plastic float (POM with graphite)								
≥ 0.65 g/cm³	< 0.55 g/cm³	-40. . .+80°C	1 bar	55.0	14.0	12.5	T	TP01

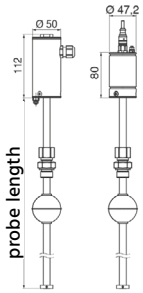
** only for versions FM-01F.06M and FM-01F.06S

* K = sphere; Z = cylinder; T = disk

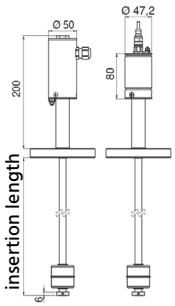
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Dimensions in mm:

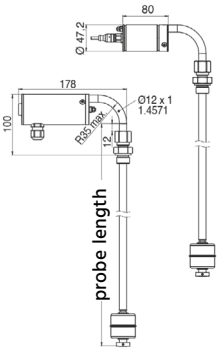
FM-01F.12M - thread version



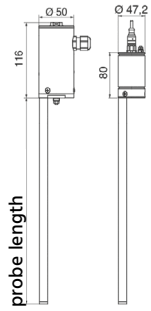
FM-01F.12M - flange version



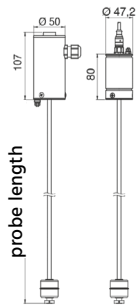
FM-01F.90G - angled version



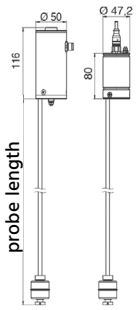
FM-01F.12S - bypass version



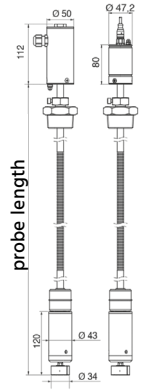
FM-01F.06M - 6 mm central



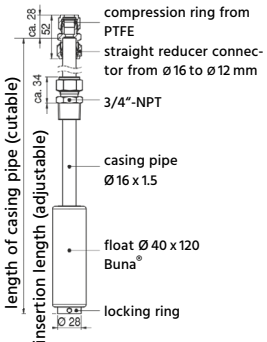
FM-01F.06S - 6 mm lateral



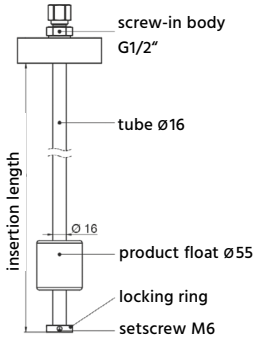
FM-01F.FLEX - flexible version



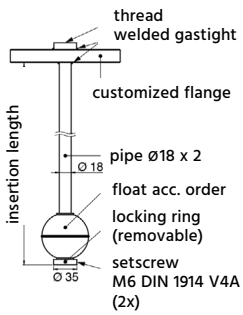
Installation kit for LPG-tanks



Installation kit from PP or PVDF



Heavy-Duty installation kit



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FM-02N

Level Measuring Transmitter for Continual Level Recording

Features

/ Level meas. irrespective of foam, conductivity, pressure and temperature
/ Remote display over extremely large distances
/ Simple assembly, only one-time balancing on commissioning
/ Separation layer measurement of fluids of diff. densities possible
/ Level recording even in narrow spaces, semi-flexible transmitter
/ Measuring transmitter for food applications in 3-A version

Description:

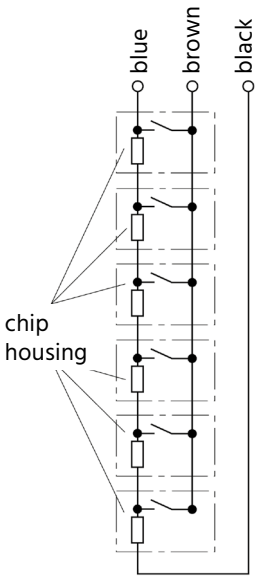
The FM-02N series of level measuring transmitters operates according to the principle of float with magnetic transmission. The float is raised by increasing fluid level in the vessel; subsequently due to the magnetic field of a permanent magnet located within the float it actuates the contacts of a reed contact/resistance chain in the sliding tube. The output signal is therefore a potentiometer value or a 4. . .20 mA-signal proportional to the level.

Application:

The FM-02N level measuring transmitters are suited for measuring and monitoring the level of nearly all types of fluid media that are not hostile to the materials being used in vessels up to a height of 10 m.

Function:

A ring magnet mounted inside the float actuates with its magnetic field passing through the sliding tube's wall tiny reed contacts which continually tap the measuring voltage on a resistance measuring chain (voltage dividers). This is proportional to the height of the level. The resistance measuring chain is very closely stepped and consists of small chips that are soldered on a PCB. Due to this type of construction the resulting measuring voltage is almost continual. Depending on the design of the measuring transmitter grids (distance from chip to chip) of 5 to 15 mm are available.



internal circuit diagram
level measurement emitter

Accuracy:

Due to the functioning principle of the level measuring transmitter the measuring accuracy cannot be specified as a constant. It rather depends on the measuring length and the grid measuring chain being used. The maximum measuring error can by calculated on the basis of the following equation

$$\frac{\text{Grid}}{\text{Meas. length in mm}} \times 100 \quad \text{e. g.} \quad \frac{12.7\ \text{mm}}{2000\ \text{mm}} \times 100 = 0.635\%$$

Versions:

Every level measuring transmitter consists of following 4 main component groups which are available in different versions depending on the technical requirements:

- sliding tube
- measuring chain
- float
- process connection

Secondary instrumentation such as measuring transmitter, limit value emitter, displays and isolated transmitters (Zener barrier) complete the entire measuring system.

Sliding tube:

The sliding tube is the core of the level measuring transmitter as it holds the measuring chain and it can be supplied in a number of materials, diameters and grid dimensions. Material and diameters:

- st. steel (Ø 12 mm, 14 mm, 16 mm, 18 mm, 40 mm)
- st. steel ECTFE-coated (Ø 11 mm, 17 mm)
- st. steel PFA-coated (Ø 11 mm, 17 mm)
- Titanium (Ø 12 mm, 14 mm, 18 mm)
- Alloy C (Ø 12 mm, 18 mm)
- PVC (Ø 12 mm, 16 mm, 20 mm)
- PP (Ø 12 mm, 16 mm, 20 mm)
- PVDF (Ø 12 mm, 16 mm, 20 mm)

Grid:

Depending on the diameter and the length of the sliding tube and the version of the FM-02N the following grids of the measuring chain can be supplied: 5 mm, 10 mm, 12.7 mm and 15 mm. The steps 5 mm, 10 mm and 15 mm can additonally be supplied as high-temperature- version HTF and HT (please check table below)

Grid	Resolution (mm)	Temp. range (mm)
5	5 mm	-30. . .+130°C
5HTF	5 mm	-30. . .+200°C
5HT	5 mm	-40. . .+250°C
10	10 mm	-30. . .+130°C
10HTF	10 mm	-30. . .+200°C
10HT	10 mm	-40. . .+250°C
12.7	12.7 mm	-30. . .+130°C
15	15 mm	-30. . .+130°C
15HTF	15 mm	-30. . .+200°C
5HT	5 mm	-40. . .+250°C
0.2	0,2 mm	-30. . .+125°C
0.2HT	0,2 mm	-40. . .+250°C

Float:

Each version has a matching float. However, if the application requires other values in terms of maximum pressure, temperature or low specific gravity, an alternative float can also be fitted in as far as it fits with its bore on the sliding tube of that version. The table 1 and 2 provides an overview of spherical and cylindrical floats, their dimensions, weights and immersion depths.

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Ordering Codes:

Order number	FM-02N.	[ ][ ][ ][ ][ ][ ][ ].	[ ][ ][ ][ ][ ][ ][ ].	S.	15.	S.	R.	0.	0.	0.	0

FM-02N Level Measuring Transmitter

Version (e.g. VAG38PVC) /
[ ][ ][ ][ ][ ][ ][ ]

Insertion length (L)* or center distance for lateral connections (M) in mm /
[ ][ ][ ][ ][ ][ ][ ] (*measured from the sealing edge of relevant connection joint)

Electrical connection /

S	= acc. to version standard
K	= cable connection, cable length and cable material in clear text
E	= aluminium terminal box flat
F	= aluminium terminal box high
DA	= aluminium terminal box, flameproof enclosure for Ex d
VA	= stainless steel terminal box, flameproof enclosure for Ex d
ADI	= aluminium terminal box with digital display
PA	= polyester terminal box
BA	= ABS terminal box

Grid /

5	= 5 mm (-30. . .+130°C)
10	= 10 mm (-30. . .+130°C)
12.7	= 12.7 mm (-30. . .+130°C)
15	= 15 mm (-30. . .+130°C)
5HTF	= 5 mm (-30. . .+200°C)
10HTF	= 10 mm (-30. . .+200°C)
15HTF	= 15 mm (-30. . .+200°C)
5HT	= 5 mm (-40. . .+250°C)
10HT	= 10 mm (-40. . .+250°C)
15HT	= 15 mm (-40. . .+250°C)

Float /
S = float acc. to version standard
[ ][ ][ ][ ][ ][ ][ ] = special float acc. to table spherical or cylindrical float (table 1 or 2)

Output signal /

R	= potentiometric, 3-wire
S	= 4. . .20 mA, 2-wire by head transmitter
SH	= 4. . .20 mA HART©, by head transmitter
SAH	= 4. . .20 mA HART©, ATEX, by head transmitter

Level switching contact /

0	= none
NCSN	= 1 NC increasing level, position in mm from sealing edge at the top in clear text
NOSN	= 1 NO increasing level, position in mm from sealing edge at the top in clear text
USN	= 1 change-over increasing level, position in mm from sealing edge at the top in clear text

Temperature switching contact /

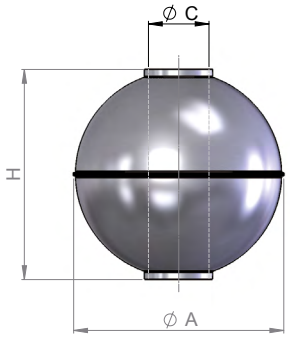
0	= none
NCST	= 1 NC increasing temperature, temperature setpoint in °C in clear text
NOST	= 1 NO increasing temperature, temperature setpoint in °C in clear text

Temperature sensor /

0	= none
PT100	= with built-in resistor Pt100, 2-, 3- or 4-wire in clear text
PT1000	= with built-in resistor Pt1000, 2-, 3- or 4-wire in clear text

Approvals /
0 = none
1 = with (please specify in clear text e.g. Ex i, Ex d, WHG, GOST, PED, GL, BV, ABS)

Table 1: Spherical Float - Dimensions

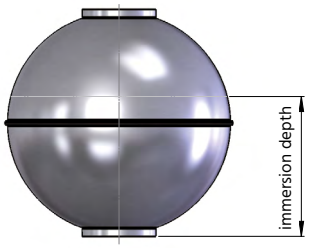


* = Design temperature 200°C, higher temperatures must be calculated
** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Weight
		(mm)	(mm)	(mm)	(kg/m3)	(bar)	(°C)	(mm)	(mm)	(mm)	(g)
K52G15E	st. steel	52	52	15	700	-1. . .+40*	-156. . .+250	55	45	70	37
K62G15E	st. steel	62	62	15	600	-1. . .+25*	-156. . .+250	60	50	80	58
K72G15E	st. steel	72	71.5	15	530	-1. . .+25*	-156. . .+250	65	50	90	83
K83G15E	st. steel	83	82	15	400	-1. . .+25*	-156. . .+250	70	55	100	88
K72G24E	st. steel	72	70	24	620	-1. . .+25*	-156. . .+250	60	60	90	86
K80G23E1	st. steel	80	75	23	620	-1. . .+25*	-156. . .+250	70	60	95	105
K80G23E2	st. steel	80	73	23	750	-1. . .+40*	-156. . .+250	50	55	100	145
K98G23E	st. steel	98	96	23	570	-1. . .+25*	-156. . .+250	80	70	115	210
K205G56E	st. steel	205	198	56	400	-1. . .+6	-156. . .+200	110	140	250	1260
K300G56E	st. steel	300	110	56	500	-1. . .+3	-156. . .+200	70	90	160	1700
K44G12T	Titanium	44	44	12	780	-1. . .+100*	-10. . .+250	50	40	60	25
K52G14T	Titanium	52	52	14	600	-1. . .+25	-10. . .+150	55	45	70	32
K52G15T	Titanium	52	52	15	780	-1. . .+150*	-10. . .+250	55	45	70	42
K62G14T	Titanium	62	62	14	450	-1. . .+25	-10. . .+150	60	50	80	41
K82G14T	Titanium	82	80	14	500	-1. . .+16	-10. . .+150	70	55	100	108
K62G15A	Alloy C	62	62	15	700	-1. . .+25*	-196. . .+250	60	50	80	65
K82G15A	Alloy C	82	81	15	500	-1. . .+16*	-196. . .+250	70	55	100	95
K72G24A	Alloy C	72	70	24	830	-1. . .+25*	-196. . .+250	60	60	90	116
K80G23A	Alloy C	80	75	23	730	-1. . .+18*	-196. . .+250	70	60	95	125
K98G23A	Alloy C	98	96	23	550	-1. . .+16*	-196. . .+250	80	70	115	208
K53G14EC1	ECTFE coat.	53	53	14	850	-1. . .+30	-78. . .+150	70	70	80	46
K53G14EC2**	ECTFE coat.	53	53	14	850	-1. . .+30	-78. . .+150	70	70	80	46
K73G23EC1	ECTFE coat.	73	71	23	750	-1. . .+25	-78. . .+150	70	70	105	105
K73G23EC2**	ECTFE coat.	73	71	23	750	-1. . .+25	-78. . .+150	70	70	105	105
K81G22EC1	ECTFE coat.	81	76	22	700	-1. . .+25	-78. . .+150	75	75	110	127
K81G22EC2**	ECTFE coat.	81	76	22	700	-1. . .+25	-78. . .+150	75	75	110	127
K53G14PF1	PFA coat.	53	53	14	900	-1. . .+30*	-100. . .+250	70	70	80	49
K53G14PF2**	PFA coat.	53	53	14	900	-1. . .+30*	-100. . .+250	70	70	80	49
K73G23PF1	PFA coat.	73	71	23	800	-1. . .+25*	-100. . .+250	70	70	105	110
K73G23PF2**	PFA coat.	73	71	23	800	-1. . .+25*	-100. . .+250	70	70	105	110
K81G22PF1	PFA coat.	81	76	22	750	-1. . .+25*	-100. . .+250	75	75	110	132

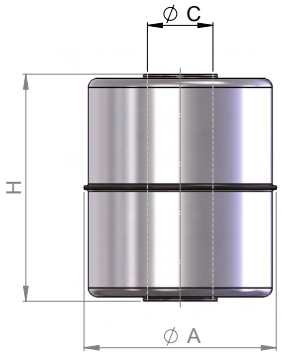
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Spherical Float Immersion depth



	specific weight of the medium (kg/m³)											
Type	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**
	Immersion depth (mm)											
K52G15E				41.3	35.8	32.4	29.9	28.0	26.4	25.1	23.9	23.0
K62G15E			50.6	42.7	38.2	35.0	32.6	30.5	28.9	27.5	26.3	25.2
K72G15E			51.1	44.8	40.5	37.3	34.8	32.8	31.0	29.6	28.3	27.2
K83G15E	61.3	50.2	44.1	39.7	36.5	33.9	31.8	30.1	28.6	27.3	26.2	25.2
K72G24E				50.6	45.2	41.4	38.6	36.2	34.3	32.7	31.3	30.1
K80G23E1				52.1	46.8	43.0	40.0	37.6	35.7	34.0	32.5	31.2
K80G23E2					54.5	49.7	46.0	43.1	40.7	38.7	37.0	35.5
K98G23E			71.4	62.3	56.3	51.8	48.3	45.4	43.0	41.0	39.2	37.7
K205G56E	149.5	123.8	108.8	98.4	90.6	84.5	79.4	75.3	71.7	68.6	65.9	63.5
K300G56E		70.0	60.0	55.0	50.0	45.0	43.0	40.0	38.0	37.0	36.0	35.0
K44G12T					34.0	30.0	27.5	25.6	24.0	22.7	21.7	20.7
K52G14T			40.8	34.9	31.3	28.7	26.7	25.1	23.8	22.6	21.7	20.8
K52G15T					40.9	36.1	33.0	30.6	28.8	27.2	25.9	24.8
K62G14T		41.9	36.2	32.5	29.7	27.6	25.9	24.5	23.2	22.2	21.3	20.5
K82G14T		59.7	51.0	45.5	41.5	38.4	35.9	33.9	32.1	30.6	29.3	28.2
K62G15A				43.0	42.0	38.1	36.2	33.0	31.1	29.5	28.2	27.0
K82G15A		53.5	46.5	41.8	38.3	35.6	33.3	31.5	29.9	28.6	27.4	26.3
K72G24A						53.0	48.1	44.5	41.8	39.5	37.6	36.0
K80G23A					54.0	48.9	45.1	42.2	39.8	37.8	36.1	34.6
K98G23A			70.7	61.8	55.9	51.5	48.0	45.2	42.8	40.7	39.0	37.4
K53G14EC1						37.1	33.9	31.4	29.5	27.9	26.6	25.4
K53G14EC2**						37.1	33.9	31.4	29.5	27.9	26.6	25.4
K73G23EC1					51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0
K73G23EC2**					51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0
K81G22EC1				60.3	52.8	48.0	44.4	41.6	39.3	37.3	35.6	34.2
K81G22EC2**				60.3	52.8	48.0	44.4	41.6	39.3	37.3	35.6	34.2
K53G14PF1						39.6	35.7	33.0	30.9	29.2	27.7	26.5
K53G14PF2**						39.6	35.7	33.0	30.9	29.2	27.7	26.5
K73G23PF1					53.8	48.3	44.5	41.5	39.1	37.1	35.4	33.9
K73G23PF2**					53.8	48.3	44.5	41.5	39.1	37.1	35.4	33.9
K81G22PF1					54.7	49.5	45.7	42.7	40.3	38.3	36.5	35.0
K81G22PF2**					54.7	49.5	45.7	42.7	40.3	38.3	36.5	35.0

Table 2: Cylindrical Float - Dimensions

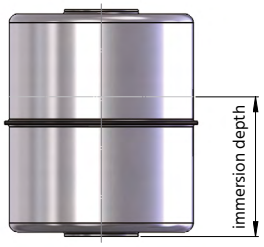


* = Design temperature 200°C, higher temperatures must be calculated
** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Weight
		(mm)	(mm)	(mm)	(kg/m3)	(bar)	(°C)	(mm)	(mm)	(mm)	(g)
Z44G15E	st. steel	44	52	15	800	-1. . .+25*	-156. . .+250	50	45	70	42
Z44G14T	Titanium	44	52	14	750	-1. . .+15	-10. . .+150	50	45	70	35
Z44G15A	Alloy C	44	52	15	1000	-1. . .+45*	-196. . .+250	50	45	70	52
Z30G13NB	NBR	30	45	13	700	-1. . .+6	-20. . .+80	20	65	60	16
Z40G14NB	NBR	40	120	14	420	-1. . .+6	-20. . .+80	25	140	150	45
Z40G15NB	NBR	40	30	15	700	-1. . .+6	-20. . .+80	25	50	45	17
Z50G20NB	NBR	50	45	20	1000	-1. . .+6	-20. . .+80	30	70	60	65
Z42G14PC	PVC	42	44	14	800	-1. . .+1	-15. . .+60	50	40	65	32
Z54G22PC	PVC	54	55	22	750	-1. . .+1	-15. . .+60	65	50	75	64
Z78G25PC	PVC	78	80	25	600	-1. . .+1	-15. . .+60	80	65	100	164
Z44G13PP	PP	44	43	13	700	-1. . .+1	-10. . .+80	50	40	65	25
Z44G21PP	PP	44	69	21	800	-1. . .+1	-10. . .+80	50	55	90	45
Z56G21PP	PP	56	54	21	600	-1. . .+1	-10. . .+80	65	50	75	50
Z80G24PP	PP	80	79	24	500	-1. . .+1	-10. . .+80	80	65	100	126
Z44G13PD	PVDF	44	55	13	850	-1. . .+1	-10. . .+100	50	55	70	46
Z56G21PD	PVDF	56	69	21	800	-1. . .+1	-10. . .+100	65	60	90	90
Z80G24PD	PVDF	80	79	24	700	-1. . .+1	-10. . .+100	80	65	100	192
Z45G14EC1	ECTFE coat.	45	53	14	950	-1. . .+25	-78. . .+150	70	70	80	53
Z45G14EC2**	ECTFE coat.	45	53	14	950	-1. . .+25	-78. . .+150	70	70	80	53
Z45G14PF1	PFA coat.	45	53	14	1000	-1. . .+25*	-100. . .+250	70	70	80	56
Z45G14PF2**	PFA coat.	45	53	14	1000	-1. . .+25*	-100. . .+250	70	70	80	56

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Cylindrical Float Immersion depth



	specific weight of the medium (kg/m³)											
Type	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**
	Immersion depth (mm)											
Z44G15E					43.4	38.6	34.7	31.6	29.0	26.7	24.8	23.2
Z44G14T					35.5	31.6	28.4	25.8	23.7	21.9	20.3	18.9
Z44G15A							43.0	39.1	35.9	33.1	30.7	28.7
Z30G13NB				39.8	34.8	31.0	27.9	25.3	23.2	21.4	19.9	18.6
Z40G14NB	103.0	86.7	72.2	61.9	54.2	48.1	43.3	39.4	36.1	33.3	31.0	28.9
Z40G15NB				22.5	19.7	17.5	15.7	14.3	13.1	12.1	11.1	10.5
Z50G20NB							39.4	35.8	32.8	30.3	28.1	26.3
Z42G14PC					32.5	28.9	26.0	23.6	21.7	20.0	18.6	17.3
Z54G22PC					41.9	37.2	33.5	30.5	27.9	25.8	23.9	22.3
Z78G25PC			63.8	54.6	47.8	42.5	38.3	34.8	31.9	29.4	27.3	25.5
Z44G13PP				29.0	25.4	22.6	20.3	18.5	16.9	15.6	14.5	13.5
Z44G21PP					56.0	49.7	44.8	40.7	37.3	34.4	32.0	29.8
Z56G21PP			43.6	37.4	32.7	29.1	26.2	23.8	21.8	20.1	18.7	17.5
Z80G24PP		58.8	49.0	42.0	36.7	32.7	29.4	26.7	24.5	22.6	21.0	19.6
Z44G13PD						41.5	37.4	34.0	31.1	28.7	26.7	24.9
Z56G21PD					58.9	52.4	47.1	42.8	39.3	36.2	33.7	31.4
Z80G24PD				64.0	56.0	49.8	44.8	40.7	37.3	34.4	32.0	29.9
Z45G14EC1							40.8	37.1	34.0	31.4	29.2	27.2
Z45G14EC2**							40.8	37.1	34.0	31.4	29.2	27.2
Z45G14PF1							43.1	39.2	35.9	33.2	30.8	28.8
Z45G14PF2**							43.1	39.2	35.9	33.2	30.8	28.8

Output Signal:

In the basic version the FM-02N provides at its cable heads or terminals a potentiometer signal. The resistance change is proportional to filling or to empty level. By a head transmitter (firmly mounted in the terminal box) or a remote transmitter in a cabinet or wall mounted as the proven Profimess UM-01, the resistance reading can be converted into a 4. . .20 mA 2-wire signal. This transmitter can also be approved according to ATEX for use in explosion-proof areas upon request, and provides in this case an intrinsically safe circuit. It can also be HART©-capable or satisfy the Fieldbus Foundation©- or the Profibus© protocol on request. A flameproof enclosure for Ex-d applications can also be installed.

Switching contacts Level:

In addition to the level-proportional output signal the FM-02N can be equipped with a level switching contact. This is defined as NO or NC with increasing level. The following switching values are based on:

Function	Closer - NO	Opener - NC	Switch
Switch. voltage	230 V	230 V	230 V
Switch. current	1.0 A	0.5 A	0.5 A
Switch. load	100 VA	40 VA	40 VA

Switching Contacts Temp.:

In addition to the level-proportional output signal the FM-02N can be equipped with a temperature switching contact. This is defined as NO or NC with increasing temperature. The following switching values are based on:

Function	Closer - NO	Opener - NC
Switch. rating	230 V / 0.5 A / 40 VA	230 V / 0.5 A / 40 VA
Range	+80. . .+160°C	+50. . .+160°C
Graduation	all 5 K	all 5 K
Accuracy	± 5 K	± 5 K
Hysteresis	30 K ± 15 K	30 K ± 15 K

Temperature Sensors:

In the sliding tube of the FM-02N an additional temperature sensor can be installed as a Pt100 or Pt1000. The measuring resistors meet the following specifications:

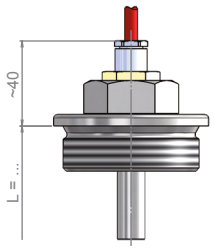
Function	Pt100	Pt1000
Operating temperature	-70. . .+400°C	-70. . .+400°C
Tolerance	Class B	Class B
Properties	acc. to IEC 751	acc. to IEC 751
Wiring	2-, 3-, or 4-wire	2-, 3-, or 4-wire

Process Connection:

Various options are available as mechanical and electrical connections to the transducer. The following pages offer an overview about which version suits to which process connections. Depending on whether the float fits through the threaded bore or not, the connecting threads are directed in different versions. “Up” installation through the interior, or “down” for the installation from the outside.
If the electrical connection is realized via a cable, the maximum temperature on the cable sheath must be taken into account. Standard cable with PVC sheath ranges from-20. . .+80°C, the version with silicone sheath ranges from -60. . .+180°C. Other materials such as Teflon cord can also be offered on request for temperatures up to +200°C.

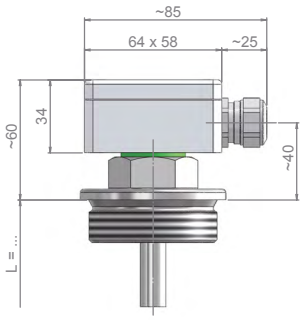
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Conn. Type K
connecting cable



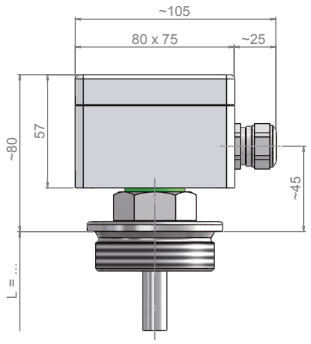
Material: acc. to cable definition
Cable gland: PG or M
Protect. cl.: IP55 (optional IP68)
Amb.temp.: -40. . .+200°C

Conn. Type E
Aluminium terminal box



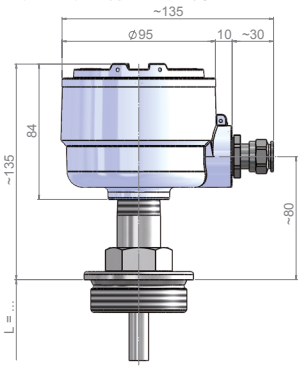
Material: Al coated RAL 7001
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40. . .+100°C

Conn. Type F
Aluminium terminal box



Material: Al coated RAL 7001
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40. . .+100°C

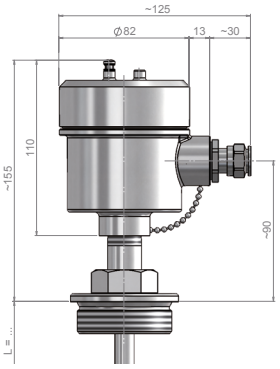
Conn. Type DA (Exd)
Aluminium terminal box



Material: Al coated RAL 9006
Cable gland: M20 x 1.5
Protection class: IP68
Amb.temp.: -40. . .+100°C

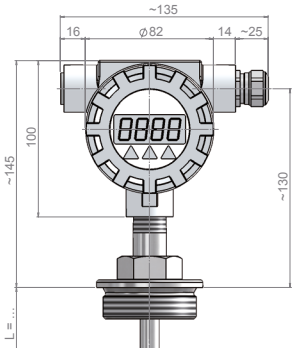
Version	● = combinable			○ = not combinable
VAG38PVC	●	●	●	●
VAG38SIL	●	●	●	●
VAG112G	●	●	●	●
VAG2G	●	●	●	●
VAF80D18	●	●	●	●
VAF80D40	●	●	●	●
VAF80FLEX	●	●	●	●
VAG25FLEX	●	●	●	●
VAWG38SIL	●	●	●	●
VAWF80G	●	●	●	●
VABHH	●	●	●	●
VABHV	●	●	●	●
VASG38SIL	●	●	●	●
VASMRG	●	●	●	●
MG38PVC	●	●	●	○
MG112G	●	●	●	○
PAFG112G	○	●	●	○
PAFG2G	○	●	●	○
TG38SIL	●	●	●	●
TG2G	●	●	●	●
ALCG38SIL	●	●	●	●
ALCG112G	●	●	●	●
PVCG1PVC16	●	●	●	○
PVCG1PVC20	●	●	●	○
PPG1PVCD16	●	●	●	○
PPG1PVCD20	●	●	●	○
PPG2PVCD16	●	●	●	○
PPF80GD20	●	●	●	○
PPFG112G	●	●	●	○
PPFG2G	●	●	●	○
PVDFG1SILD16	●	●	●	○
PVDFG1SILD20	●	●	●	○
VAEBF50G	○	●	●	●
VAEBF80G	○	●	●	●
VAPBF50G	○	●	●	●
VAPBF80G	○	●	●	●

Conn. type VA (Exd)
st. steel terminal box



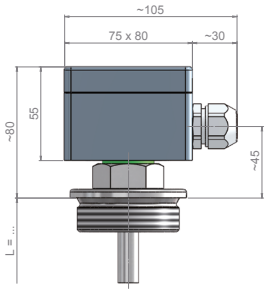
Material: st. steel A4 (SS316)
Cable gland: M20 x 1.5
Protect. class: IP67 (Exd / IP68)
Amb.temp.: -40. . .+85°C

Conn. type ADI
Aluminium terminal box



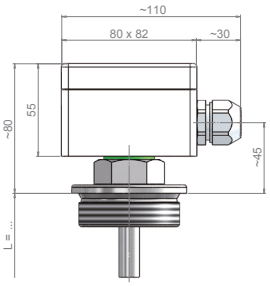
Material: aluminium
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40. . .+60°C
Display: 7-Segment LED red

Conn. type PA
Polyester terminal box



Material: Polyester
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -10. . .+100°C

Conn. type BA
ABS terminal box



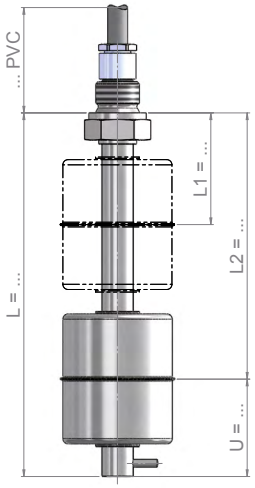
Material: ABS
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -10. . .+80°C

Version	● = combinable		○ = not combinable	
VAG38PVC	●	●	○	○
VAG38SIL	●	●	○	○
VAG112G	●	●	○	○
VAG2G	●	●	○	○
VAF80D18	●	●	○	○
VAF80D40	●	●	○	○
VAF80FLEX	●	●	○	○
VAG25FLEX	●	●	○	○
VAWG38SIL	●	●	○	○
VAWF80G	●	●	○	○
VABHH	●	●	○	○
VABHV	●	●	○	○
VASG38SIL	●	●	○	○
VASMRG	●	●	○	○
MG38PVC	○	●	●	●
MG112G	○	●	●	●
PAFG112G	●	●	●	●
PAFG2G	●	●	●	●
TG38SIL	●	●	○	○
TG2G	●	●	○	○
ALCG38SIL	●	●	○	○
ALCG112G	●	●	○	○
PVCG1PVC16	○	●	●	●
PVCG1PVC20	○	●	●	●
PPG1PVCD16	○	●	●	●
PPG1PVCD20	○	●	●	●
PPG2PVCD16	○	●	●	●
PPF80GD20	○	●	●	●
PPFG112G	○	●	●	●
PPFG2G	○	●	●	●
PVDFG1SILD16	○	●	●	●
PVDFG1SILD20	○	●	●	●
VAEBF50G	●	●	●	○
VAEBF80G	●	●	●	○
VAPBF50G	●	●	●	○
VAPBF80G	●	●	●	○

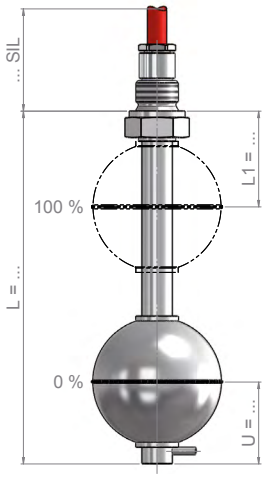
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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

Level transmitter made of st. steel with thread facing upwards

Version: VAG38PVC



Version: VAG38SIL



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	PVC connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+25 bar
Design temp. /	-20. . .+80°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7

Option

Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B

Option

Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 50 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	K52G15E
sp. Weight /	≥ 700 kg/m³
Design press. /	-1. . .+40 bar
Design temp. /	-40. . .+180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF

Option

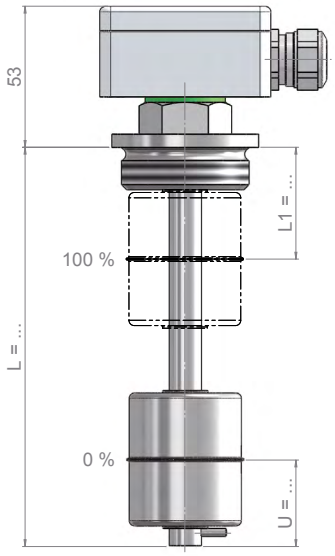
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B

Option

Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 55 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

Level transmitter made of st. steel with downward facing thread

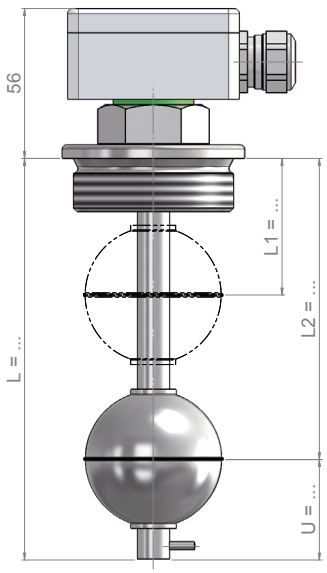
Version: VAG112G



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1 1/2"-male downwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+25 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 50 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

Version: VAG2G



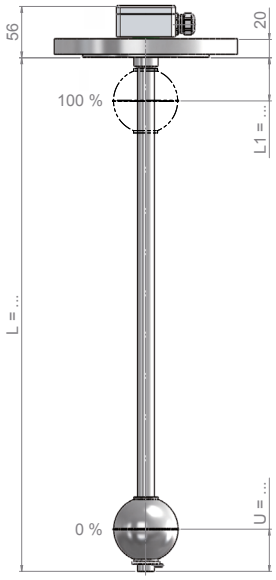
Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	G2"-male downwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	K52G15E
sp. Weight /	≥ 700 kg/m³
Design press. /	-1. . .+40 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 55 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

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Level transmitter made of st. steel with flange connection

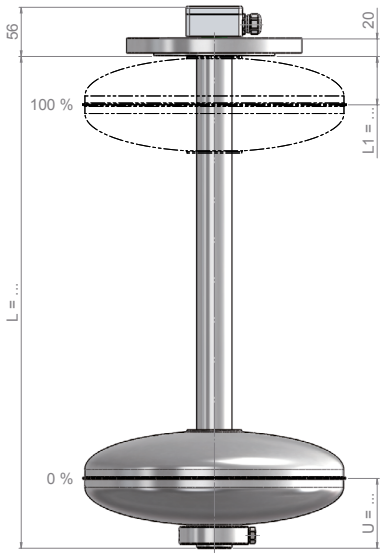
Version: VAF80D18



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
insert. Length /	≤ 6000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 60 mm, U = 60 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

Version: VAF80D40

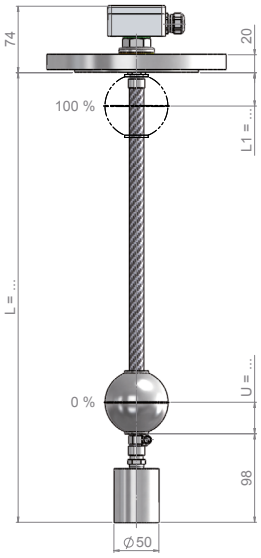


Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 40 mm
insert. Length /	≤ 10.000 mm
Float /	K300G56E
sp. Weight /	≥ 500 kg/m³
Design press. /	-1. . .+3 bar
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 70 mm, U = 90 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

Level transmitter made of st. steel - flexible

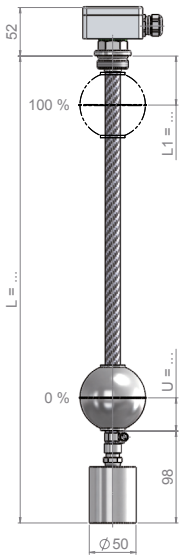
Version: VAF80FLEX



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 16 mm
insert. Length /	≤ 10.000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	12.7
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 60 mm, U = 60 mm
poss.	
Approvals/	ATEX, PED, GOST

Version: VAG25FLEX



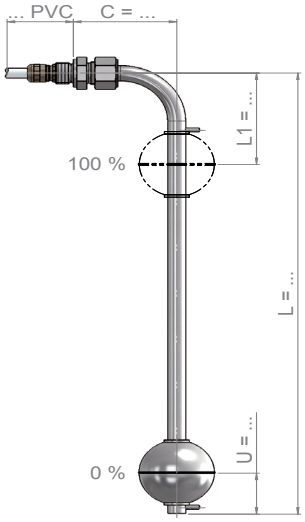
Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1“-male downwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 10.000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m³
Design press. /	-1. . .+25 bar
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	12.7
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 60 mm, U = 60 mm
poss.	
Approvals/	ATEX, PED, GOST

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Level transmitter made of st. steel - angled

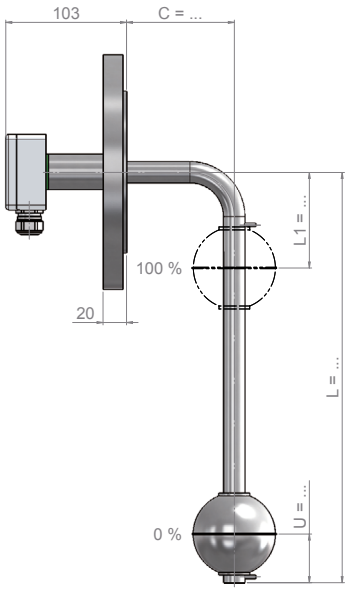
Version: VAWG38SIL



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 3000 mm
Float /	K52G15E
sp. Weight /	≥ 700 kg/m³
Design press. /	-1. . .+40 bar
Design temp. /	-40. . .+180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 55 mm, U = 45 mm, C ≥ 70 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS

Version: VAWF80G

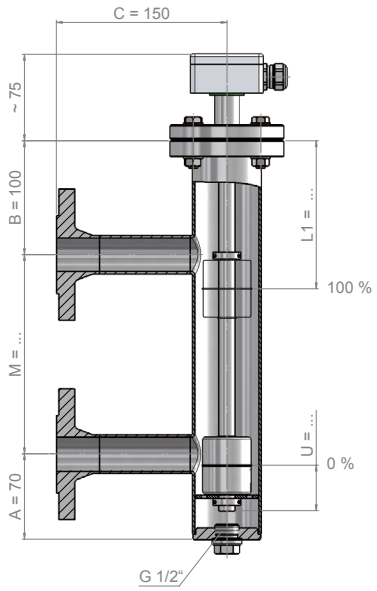


Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
insert. Length /	≤ 6000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 60 mm, U = 60 mm, C ≥ 70 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS

Level transmitter made of st. steel - with bypass housing

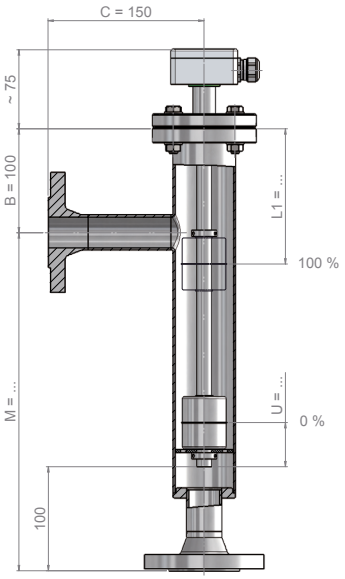
Version: VABHH



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN25 / PN16 / Form B1
Bypass /	ø 60.3 mm
Mittenabstand /	M ≤ 1000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 130 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS

Version: VABHV



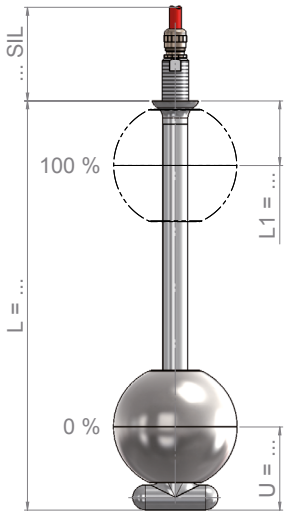
Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN25 / PN16 / Form B1
Bypass /	ø 60.3 mm
Mittenabstand /	M ≤ 1000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 130 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, GL, BV, ABS

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Level transmitter made of st. steel - 3A sanitary standard

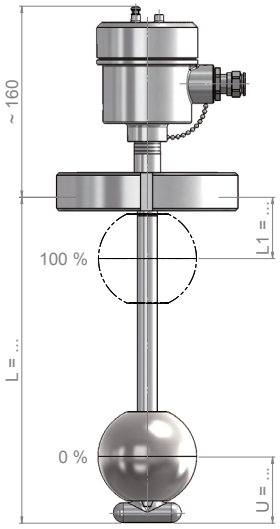
Version: VASG38SIL



Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
	roughness depth wetted ≤ 0.4 µm
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 5000 mm
Float /	K80G23E2
sp. Weight /	≥ 750 kg/m³
Design press. /	-1. . .+40 bar
Design temp. /	-40. . .+180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT,
	5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 50 mm, U = 55 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS, 3A

Version: VASMRG

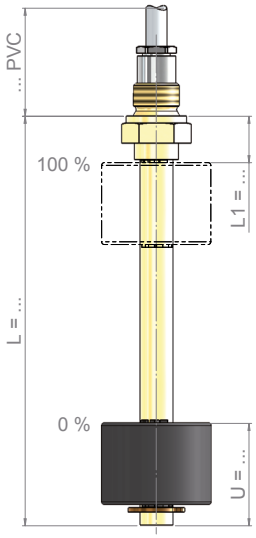


Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
	roughness depth wetted ≤ 0.4 µm
El. Connection /	Type VA st. steel terminal box
Process conn. /	cone acc. to 11851 with groove nut
Sliding tube /	ø 16 mm
insert. Length /	≤ 5000 mm
Float /	K80G23E2
sp. Weight /	≥ 750 kg/m³
Design press. /	-1. . .+6 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP67
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT,
	5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 50 mm, U = 55 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS, 3A

Level transmitter made of brass

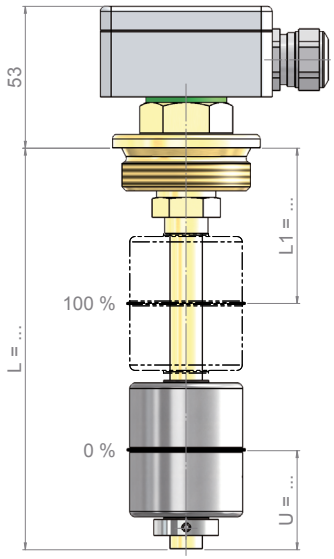
Version: MG38PVC



Technical Specifications:

Material /	brass, float made of BUNA
El. Connection /	PVC connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z40G15NB
sp. Weight /	≥ 700 kg/m³
Design press. /	-1. . .+6 bar
Design temp. /	-10. . .+80°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 30 mm, U = 50 mm
Approvals/	PED, GOST, GL, BV, ABS

Version: MG112G



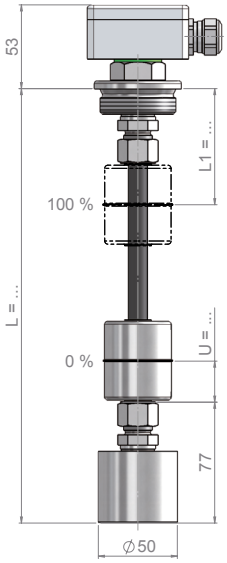
Technical Specifications:

Material /	brass, float made of BUNA
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1 1/2"-male downwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+25 bar
Design temp. /	-10. . .+150°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 65 mm, U = 45 mm
Approvals/	PED, GOST, GL, BV, ABS

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Level transmitter made of Polyamide - flexible

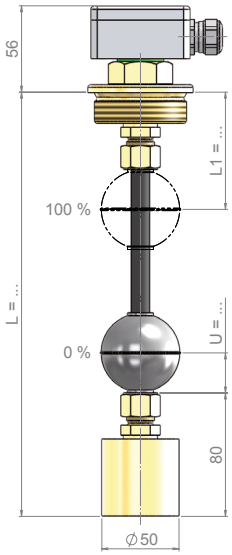
Version: PAFG112G



Technical Specifications:

Material /	Polyamide / st. steel
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1 1/2"-male downwards
Sliding tube /	ø 12 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	12.7
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 45 mm
poss.	
Approvals/	GOST

Version: PAFG2G

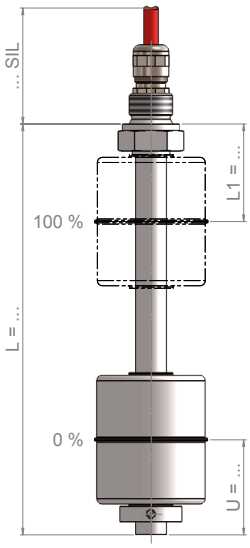


Technical Specifications:

Material /	Polyamide / brass / st. steel
El. Connection /	Type E Aluminium terminal box
Process conn. /	G2"-male downwards
Sliding tube /	ø 12 mm
insert. Length /	≤ 5000 mm
Float /	K52G15E
sp. Weight /	≥ 700 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	12.7
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 45 mm
poss.	
Approvals/	GOST

Level transmitter made of Titanium

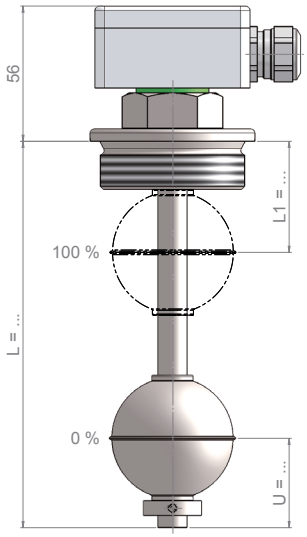
Version: TG38SIL



Technical Specifications:

Material /	Titanium
El. Connection /	silicone connecting cable
Process conn. /	G3/8“-male upwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G14T
sp. Weight /	≥ 750 kg/m³
Design press. /	-1. . .+15 bar
Design temp. /	-10. . .+150°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 50 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, WHG

Version: TG2G



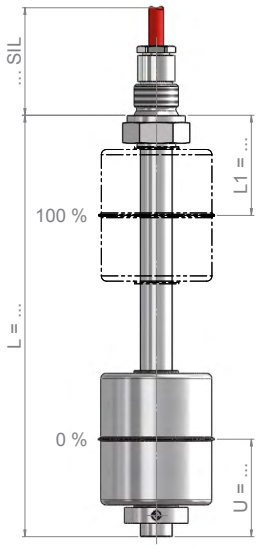
Technical Specifications:

Material /	Titanium
El. Connection /	Type E Aluminium terminal box
Process conn. /	G2“-male downwards
Sliding tube /	ø 12 mm for grid 10 mm, 12.7 mm & 15 mm, ø 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	K52G14T
sp. Weight /	≥ 600 kg/m³
Design press. /	-1. . .+25 bar
Design temp. /	-10. . .+150°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 55 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, WHG

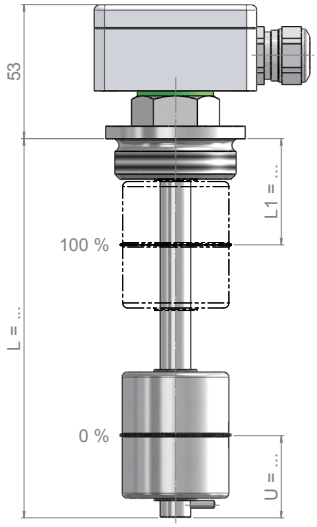
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Level transmitter made of Alloy C

Version: ALCG38SIL



Version: ALCG112G



Technical Specifications:

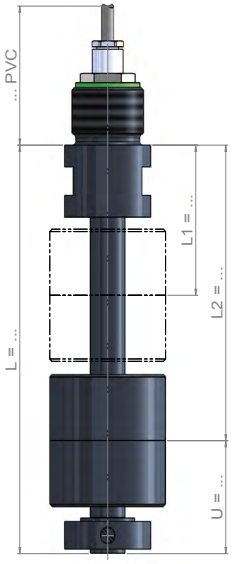
Material /	Alloy C
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 12 mm
insert. Length /	≤ 3000 mm
Float /	Z44G15A
sp. Weight /	≥ 1000 kg/m³
Design press. /	-1. . .+45 bar
Design temp. /	-40. . .+180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HTF, 10HTF, 15HTF, 10HT, 15HT
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 50 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, WHG

Technical Specifications:

Material /	Alloy C
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1 1/2"-male downwards
Sliding tube /	ø 12 mm
insert. Length /	≤ 3000 mm
Float /	K52G15A
sp. Weight /	≥ 1000 kg/m³
Design press. /	-1. . .+45 bar
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HTF, 10HTF, 15HTF, 10HT, 15HT
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. / poss.	L1 ≥ 50 mm, U = 45 mm
Approvals/	ATEX, PED, GOST, WHG

Level transmitter made of PVC

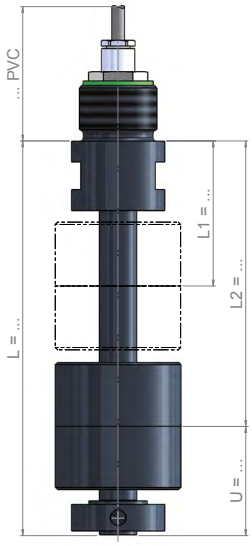
Version: PVCG1PVC16



Technical Specifications:

Material /	PVC
El. Connection /	PVC connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 3000 mm
Float /	Z54G22PC
sp. Weight /	≥ 750 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-15. . .+60°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 65 mm, U = 50 mm
poss.	
Approvals/	PED, WHG

Version: PVCG1PVC20



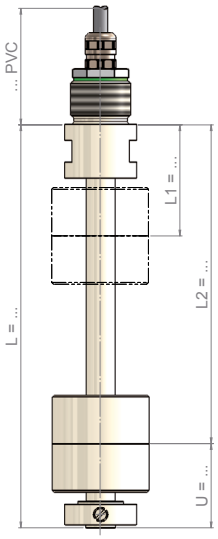
Technical Specifications:

Material /	PVC
El. Connection /	PVC connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	ø 20 mm
insert. Length /	≤ 6000 mm
Float /	Z78G25A
sp. Weight /	≥ 600 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-15. . .+60°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 80 mm, U = 65 mm
poss.	
Approvals/	PED, WHG

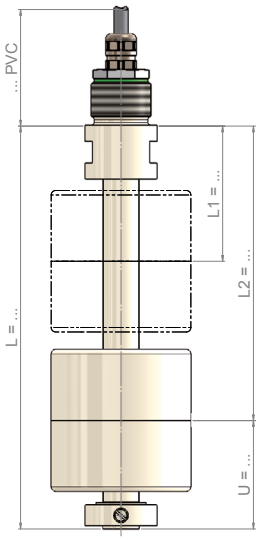
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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

Level transmitter made of Polypropylene

Version: PPG1PVCD16



Version: PPG1PVCD20



Technical Specifications:

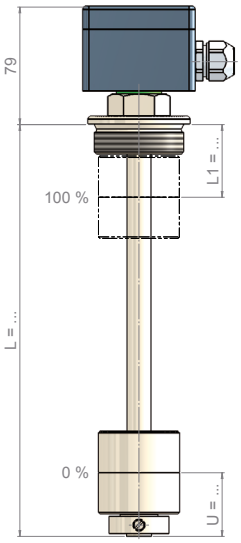
Material /	Polypropylene
El. Connection /	PVC connecting cable
Process conn. /	G1“-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PP
sp. Weight /	≥ 600 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 65 mm, U = 50 mm
poss.	
Approvals/	PED, WHG

Technical Specifications:

Material /	Polypropylene
El. Connection /	PVC connecting cable
Process conn. /	G1“-male upwards
Sliding tube /	ø 20 mm
insert. Length /	≤ 6000 mm
Float /	Z80G24PP
sp. Weight /	≥ 500 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 80 mm, U = 65 mm
poss.	
Approvals/	PED, WHG

Level transmitter made of Polypropylene

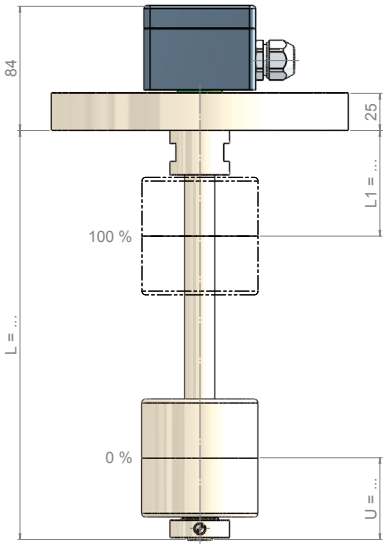
Version: PPG2PVCD16



Technical Specifications:

Material /	Polypropylene
El. Connection /	Type PA Polyester terminal box
Process conn. /	G2"-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PP
sp. Weight /	≥ 600 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 65 mm, U = 50 mm
poss.	
Approvals/	PED, WHG

Version: PPF80GD20



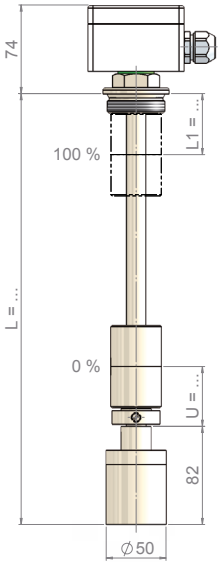
Technical Specifications:

Material /	Polypropylene
El. Connection /	Type PA Polyester terminal box
Process conn. /	Flange EN DN80 / PN10 / Form A
Sliding tube /	ø 20 mm
insert. Length /	≤ 6000 mm
Float /	Z80G24PP
sp. Weight /	≥ 500 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 80 mm, U = 65 mm
poss.	
Approvals/	PED, WHG

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Level transmitter made of Polypropylene - flexible

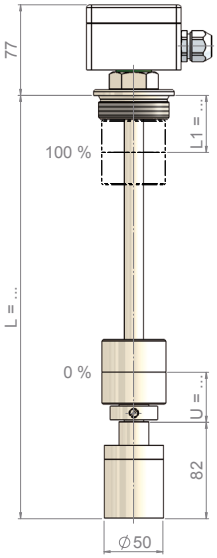
Version: PPFG112G



Technical Specifications:

Material /	Polypropylene
El. Connection /	Type PA Polyester terminal box
Process conn. /	G1 1/2"-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 3000 mm
Float /	Z44G21PP
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	12.7
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 50 mm, U = 55 mm
poss.	
Approvals/	PED, WHG

Version: PPFG2G

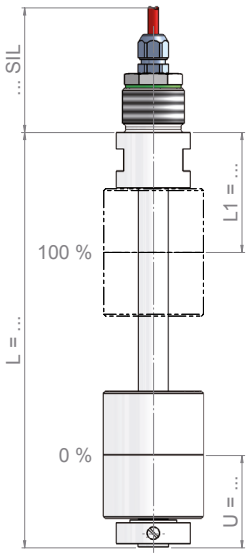


Technical Specifications:

Material /	Polypropylene
El. Connection /	Type PA Polyester terminal box
Process conn. /	G2"-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PP
sp. Weight /	≥ 600 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	12.7
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 65 mm, U = 50 mm
poss.	
Approvals/	PED, WHG

Level transmitter made of PVDF

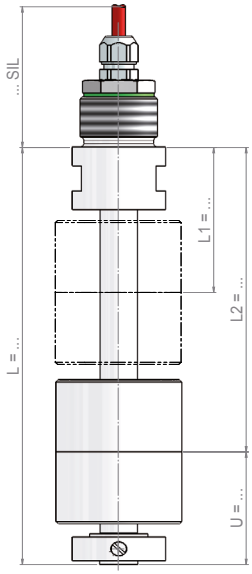
Version: PVDFG1SILD16



Technical Specifications:

Material /	PVDF
El. Connection /	silicone connecting cable
Process conn. /	G1“-male upwards
Sliding tube /	ø 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PD
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+100°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 65 mm, U = 60 mm
poss.	
Approvals/	PED, WHG

Version: PVDFG1SILD20



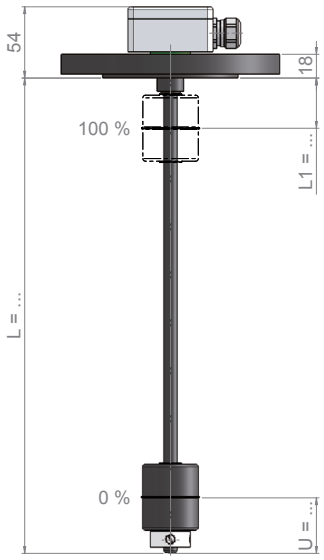
Technical Specifications:

Material /	PVDF
El. Connection /	silicone connecting cable
Process conn. /	G1“-male upwards
Sliding tube /	ø 20 mm
insert. Length /	≤ 3000 mm
Float /	Z80G24PD
sp. Weight /	≥ 700 kg/m³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+100°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 80 mm, U = 65 mm
poss.	
Approvals/	PED, WHG

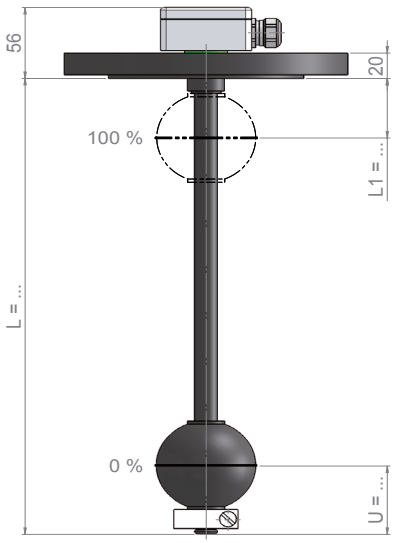
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Level transmitter made of st. steel - ECTFE coated

Version: VAEBF50G



Version: VAEBF80G



Technical Specifications:

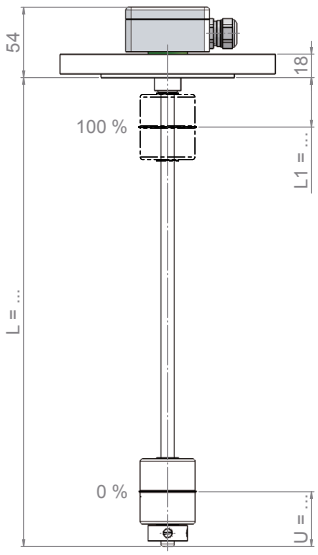
Material /	st. steel ECTFE-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 11 mm
insert. Length /	≤ 3000 mm
Float /	Z45G14EC1
sp. Weight /	≥ 950 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	-40. . .+150°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	10, 10HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 70 mm
poss.	
Approvals/	ATEX, PED, GOST, WHG

Technical Specifications:

Material /	st. steel ECTFE-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 17 mm
insert. Length /	≤ 3000 mm
Float /	K73G23EC1
sp. Weight /	≥ 750 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	-40. . .+150°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 70 mm
poss.	
Approvals/	ATEX, PED, GOST, WHG

Level transmitter made of st. steel - PFA coated

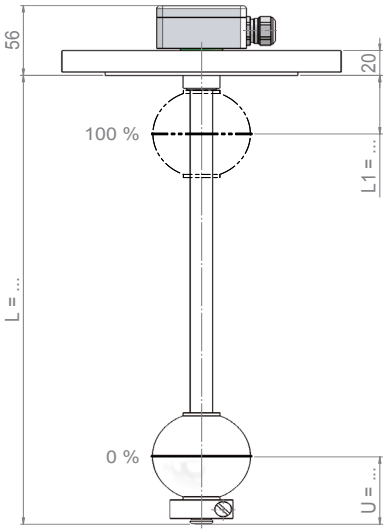
Version: VAPBF50G



Technical Specifications:

Material /	st. steel PFA-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 11 mm
insert. Length /	≤ 3000 mm
Float /	Z45G14PF1
sp. Weight /	≥ 1000 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	10, 10HTF, 10HT
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 70 mm
poss.	
Approvals/	ATEX, PED, WHG

Version: VAPBF80G



Technical Specifications:

Material /	st. steel PFA-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 17 mm
insert. Length /	≤ 3000 mm
Float /	K73G23PF1
sp. Weight /	≥ 800 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12.7, 15, 5HT, 10HT, 15HT, 5HTF, 10HTF, 15HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 70 mm
poss.	
Approvals/	ATEX, PED, WHG

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MA-400

Bypass-Magnetic Level Gauge

Features

/ Up to 25 meter measuring length

/ Up to +400 bar

/ Up to +400°C liquid temperature

/ Stainless steel, titanium,
Alloy C, PVC, PP, PVDF, ECTFE, PFA

/ Flange, thread and welded connections

/ Switching contacts
and measuring transmitter

/ Electrical trace heating
and insulation possible

/ Customized designs

Description:

A stainless steel measuring tube has two lateral connecting sleeves, which are joined with the vessel to be monitored. Since in this reference vessel the same fluid level is found as that in the tank, a cylindrical float is located always at the height with the liquid level. The float is counter-balanced exactly to the density of the medium and it carries a specially designed disc shaped magnetic system that acts through the stainless steel wall of the measuring tube on an indicator bar which is sensitive to magnetic force. Due to the magnetic force of the float, its pre-magnetized rollers are turned by 180° in such a matter, that all rollers below the float turn their red and the remaining rollers above the float turn their white side to the front. Thus, the observer obtains a precise visual statement of the level in the container. Optionally, the reference tube can be equipped with bistable, magnetic sensitive limit contacts which emit a binary signal when the float has passed the level where the sliding contacts are mounted. Another alternative to the remote transmission of value is adding a reed contact chain FM-02N externally to the measuring tube that would convert the float movement into a stepped resistance or current signal. Instead of the reed contact chain, also a magnetostrictive sensor can be used which breaks up the level at a higher accuracy and provides a 4. . .20 mA power signal in 2-wire circuit.

Application:

The MA-400 series of magnetic level gauges has been long in use in large numbers in the entire industry, thus Bypass Float Level technology has a proven record of accurately measuring level in field for over 30 years. Meanwhile, the technology of remote transmission, for example, by using magnetostrictive sensors has been perfected to such extent that it is no way inferior to other methods of level measurement and monitoring. Moreover, the advantage here is that the level can be identified at one glance directly at the measuring point. The electrical signals in the control room can be verified visually without much assembling work. Besides pressure levels up to PN400, also all conceivable variants of draining and ventilation such as valves, ball-cocks or compression and cutting ring fittings are available with us. Just contact us for more details.

Ordering Codes:

Order-no.	MA-400.	03192.	E.	60.	1.	DN15PN16.	0000.	ZVA52PN16-200mm.	BA.	UA.	MVA-01N.	0.	1/5

MA-400 Magnetic Level Gauge

Center distance of lateral connections (M) or length of instrument (instr. without side connections) in mm /
[ ][ ][ ][ ][ ] mm (150 mm to 25000 mm)

Bypass chamber material /
E = stainless steel
EP = stainless steel electropolished/ Ra ca. 0.8 µm
T = titanium
A = Alloy C
EEB = stainless steel ECTFE-coated
EPB = stainless steel PFA-coated
PV = PVC
PP = polypropylene
PF = PVDF
99 = special, please specify in detailed text

Bypass chamber outside diameter /
32 = Ø 32.00 mm (PV only)
60 = Ø 60.30 mm (E, EP, T only)
61 = Ø 60.33 mm (E, EP, A only)
63 = Ø 63.00 mm (PV, PP, PF only)
635 = Ø 63.50 mm (E, EP, EEB, EPB only)
73 = Ø 73.03 mm (E, EP, T, A only)
76 = Ø 76.10 mm (E, EP only)
88 = Ø 88.90 mm (E, EP only)
114 = Ø 114.30 mm (E, EP only)

Process connection /
0 = none
1 = flange acc. to EN
2 = flange acc. to ANSI
3 = female thread G
4 = female thread NPT
5 = male thread G
6 = male thread NPT
7 = weld-on end
99 = customized special, please specify in detailed text

Nominal diameter, pressure level and sealing face /
[ ][ ][ ][ ] e.g. DN15 PN16 B1 or 1" 300 lbs RF
(0000 for weld-on end and thread connection)

Weld-on end size elsewise thread size for screw neck or bushing /
[ ][ ][ ][ ] e.g. G3/4" or M18x1.5 (0000 for flange connection)

Float type and length acc. to appendix A „Cylindrical floats" /
[ ][ ][ ][ ] e.g. ZVA52PN16-200 mm

Chamber end top acc. to appendix H „Chamber end top" /
[ ][ ]= e.g. BA (welding cap)
99 = customized special, please specify in detailed text

Chamber end bottom acc. to appendix I „Chamber end bottom" /
[ ][ ]= e.g. UB (flat top with drain plug G)
99 = customized special, please specify in detailed text

Indicator bar /
0 = none
[ ][ ][ ][ ] e.g. MVA-01N

Approvals /
0 = none
[ ][ ][ ][ ] e.g. ATEX II 1G2D/2GD c

Options (multiple names like 7/8 possible) /
[ ][ ][ ][ ] z.B. 1 / 10 / 12 (3 x MRK-S01)

Indicator bar /

Aluminium housing - colorless mattfinished
MA-01 = standard
MA-01N = standard, over-roll-protected
MA-01EX = with ATEX approval
MA-01NEX = with ATEX approval, over-roll-protected
MA-01K = with ceramic rollers, up to +400°C
MA-01KN = with ceramic rollers, up to +400°C, over-roll-protected

Aluminium housing - stainless steel covered
MVA-01 = standard
MVA-01N = standard, over-roll-protected
MVA-01EX = with ATEX approval
MVA-01NEX = with ATEX approval, over-roll-protected
MVA-01K = with ceramic rollers, up to +400°C
MVA-01KN = with ceramic rollers, up to +400°C

Options /
1 = switching contacts, specify quantity and type in detailed text
2 = switch protective circuit with 22 Ω / 0.21 W
3 = switch protective circuit acc. to NAMUR EN 60947
4 = remote transmitter REED contact chain with resistance output acc. to data sheet FM-02N
5 = remote transmitter REED contact chain with power output 4 to 20 mA acc. to data sheet FM-02N
6 = remote transmitter magnetostrictive with linear power output 4 to 20 mA acc. to data sheet FM-01F
7 = mounting bracket for lengths above 2000 mm
8 = float damping spring top mounted
9 = float damping spring bottom mounted
10 = rock-wool insulation SW (removeable)
11 = Armaflex® insulation ART up to TU = +105°C
12 = Armaflex® insulation ARH up to TU = +150°C
13 = electrical trace heating HA up to TU = +75°C
14 = electrical trace heating HB up to TU = +150°C
15 = angle scale WK-AK, mounted on the indicator bar (please specify scale in detailed text)
16 = angle scale WK-AG, mounted on the indicator bar (please specify scale in detailed text)
17 = angle scale WK-EG, mounted on the indicator bar (please specify scale in detailed text)
18 = sight extension PV for indicator bar

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Versions:

Measuring range (ME):
The distance between the upper and the lower lateral connection is specified in millimeters. The maximum length of a measuring tube is 6000 mm for greater lengths up to 25000 mm, however, several reference tubes must be used. For a length of 2000 mm and above, we recommend equipping the magnetic level gauge with a welded bracket for additional securing (Option /7). If the free space (dugout) between the lower connecting piece and the base or the space (projection) between the upper connecting piece and the ceiling are in one way or the other restricted, the relevant maximum parameter must be specified in detailed text at the time of placing an order. In an empty vessel, the float for the MA-400 is located in the so-called float-sack below the connection and in a full tank in the projection above the connection. This means that these dimensions must correspond with at least the float length. However, since the float's mounting length also depends on the media density, special materials like titanium must be used in case of space constraints, if necessary, in order to reduce the float length.

Measuring tube material:
The measuring tube can be selected from the following materials: stainless steel, coated stainless steel, titanium, Alloy C and various plastics. The decision basis are here the medium, maximum measuring range, pressure and temperature.

Measuring tube diameter:
Depending on the material execution and the pressure in the tank different measuring tube diameter are chosen. The corresponding options are the variants taken from the datasheet.

Process connection:
Flanges as per EN or ANSI, female and male threads or welded ends are the most commonly used features for connecting the MA-400 to the side of the vessel. Customized solutions like aligning the connecting piece on top/ below or on top/laterally or at the bottom/laterally are available on request.

Nominal diameter and pressure level for flange:
The precise name of the connecting flange on the vessel must be specified in a detailed text. Some examples are flange DIN EN 1092-1 DN25 PN16 form B1 or ANSI 1" 300 lbs RF. Standard flanges are DIN EN 1092-1 DN15 PN16 with sealing bar form B1.

Thread for screw neck or bushing:
If a screw neck or a bushing is selected as a variant for the connection, the thread size must be specified in detailed text. Here the standard is G3/4". All normally used inch or metric thread systems are available on request.

Measuring tube connection top:
An overview of the various possible variants of the upper measuring tube connection, such as with ventilation screw, valve or flange, is located on the last page of this data-sheet.

Measuring tube connection bottom:
An overview of the various possible variants of the lower measuring tube connection, such as with drain plug, valve or flange is located on the last pages of this data sheet.

Float type and length:
The matching float is selected from the float tables of this datasheet.The criterias are material resistance to the medium, pressure, temperature and diameter of the float (must fit into the selected measuring tube). From the float length the user determines the surfacing volume of the float at a known specific gravity of the medium being measured. The ideal surfacing volume at which liquid level and magnet system are on one level is shown in bold. Also, the length of the float-sack below the lower connection and in a full tank the projection above the upper connection depends on the selected float length. Should the application be subject to space limitations, it is advisable to choose a lighter float material such as titanium, thus saving on float length.

Indicator bar:
Depending on the ambient temperature at the measuring tube outer wall, indicator bars are chosen with ceramic rollers for temperatures up to 400°C or standard rollers for temperatures up to 200°C. Rotary secured versions guarantee a clean turn around of the magnetic rollers even due to vibration. For rough atmospheres versions with stainless steel jacketed housings are available.

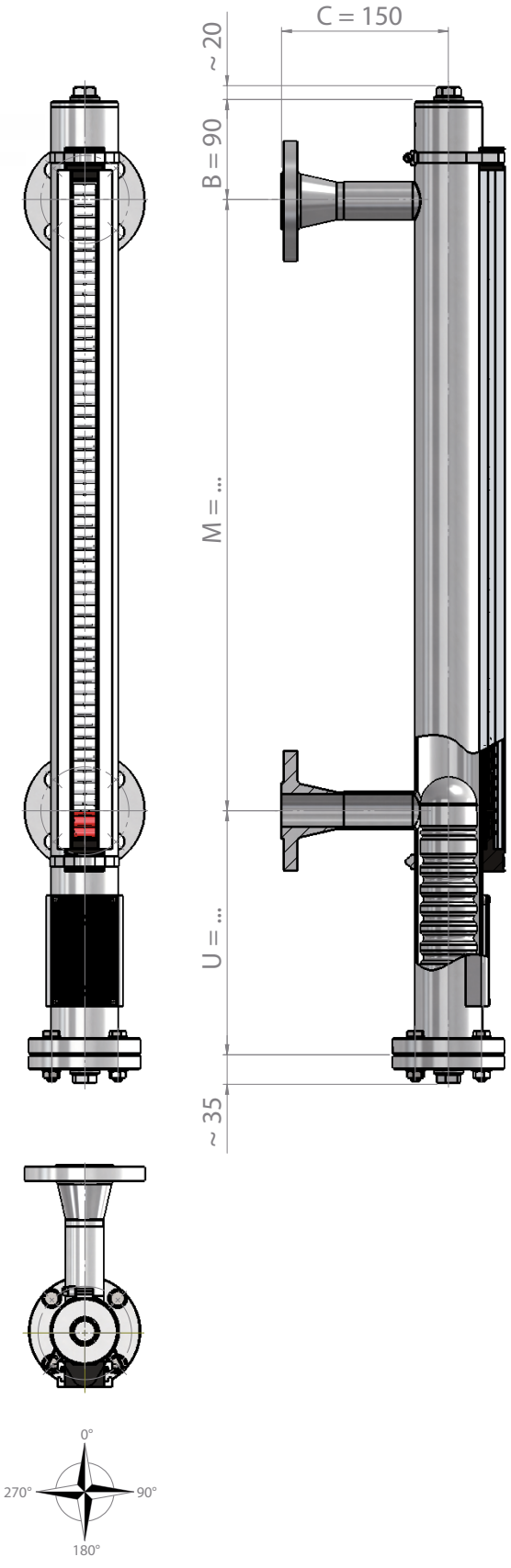
Approvals:
Various approvals are available for the magnetic level gauge type of MA-400 such as ATEX, GL, DNV, GOST, BV, ABS and, if necessary, they are tested with regard to the Pressure Equipment Directive. Since the devices are modular assembled (contacts, sensors, indicator bar etc.) it must be ensured, that all components used meet the required approval.

Options:
With regard to options, specifiy in detail whether the MA-400 should be provided with electrical limit contacts and as to how many (option /1). A circuit with a protective resistor or a combination of resistors, which offers a behavior according to NAMUR, is available for the contacts (option /2 and /3). Optionally, for remoute transmission of level value a reed contact measuring transmitter (option /4 and /5) or a magnetostrictive sensor (option /6) can be mounted externally to the MA-400 which provides a 4 to 20 mA signal at the output (see also FM-01F and FM-02N for details). Mounting brackets stabilize the magnetic level gauge for lengths above 2 meters (option /7). With strong shocks in the container damping springs are recommended at the top and bottom of the measuring tube (option /8 and /9). Solid and removable insulation against cold and heat (option /10 , /11 and /12), trace heating against frost (option /13 and /14), angular scales with various engravings (option /15, /16 and /17) and a cover for concealed or isolated indicator bars (option /18) round off the equipment possibilities.

Bypass-Magnetic Level Gauge made of st. steel PN16

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 400 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

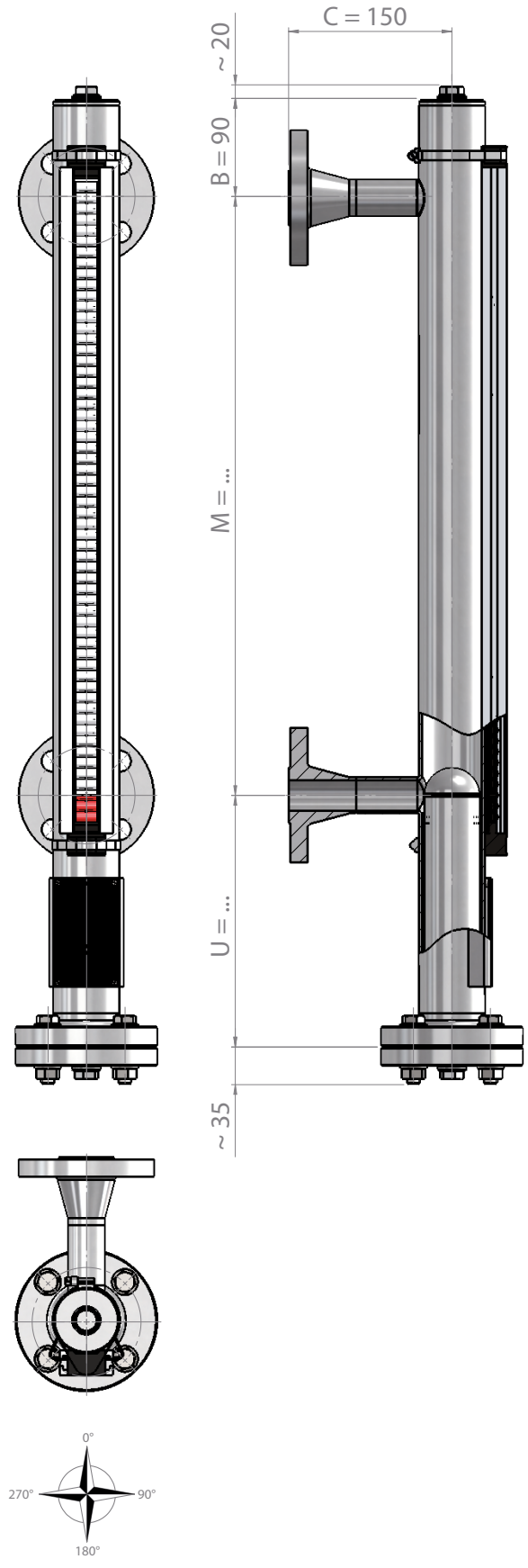


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Bypass-Magnetic Level Gauge made of st. steel PN40

Technical Specifications:

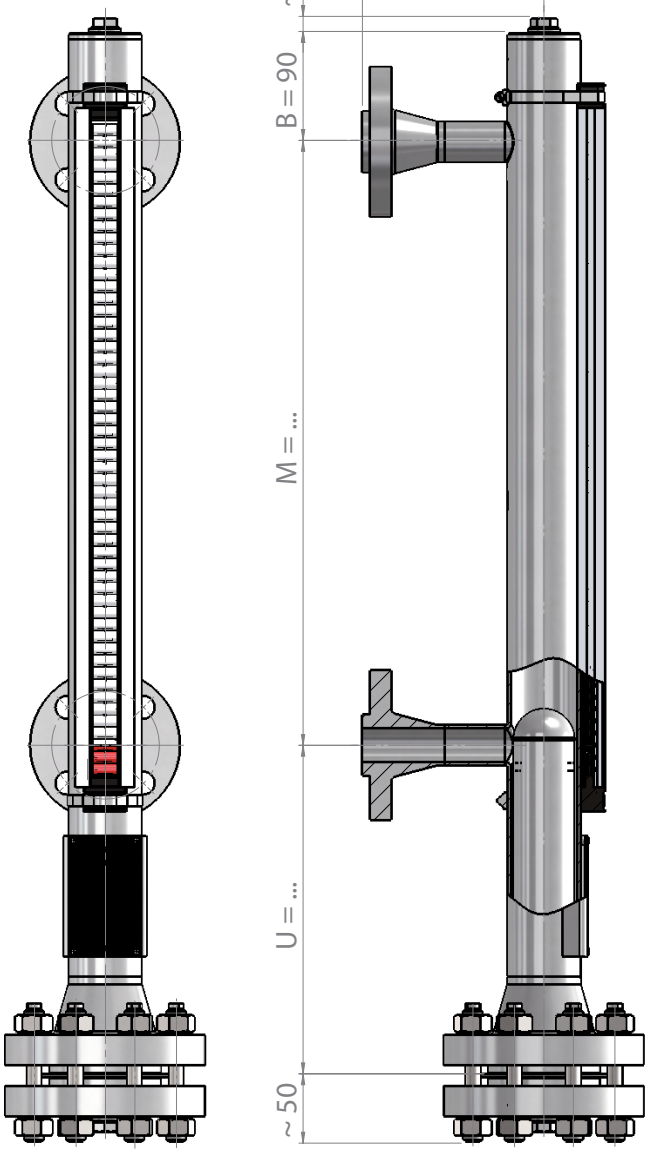
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 480 kg/m³
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

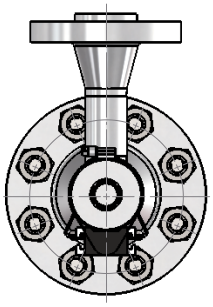


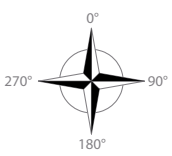
Bypass-Magnetic Level Gauge made of st. steel PN63

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 480 kg/m³
Design pressure /	-1. . .+63 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 60,30 x 3 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST





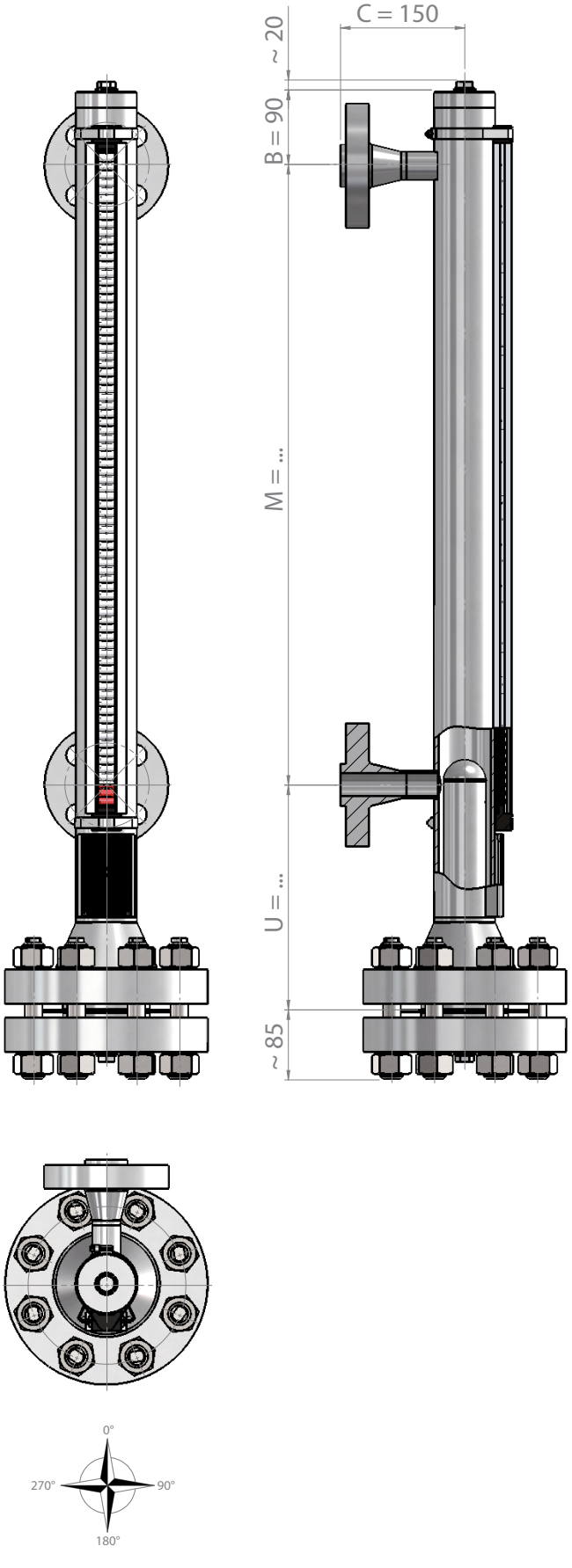


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Bypass-Magnetic Level Gauge made of st. steel PN100

Technical Specifications:

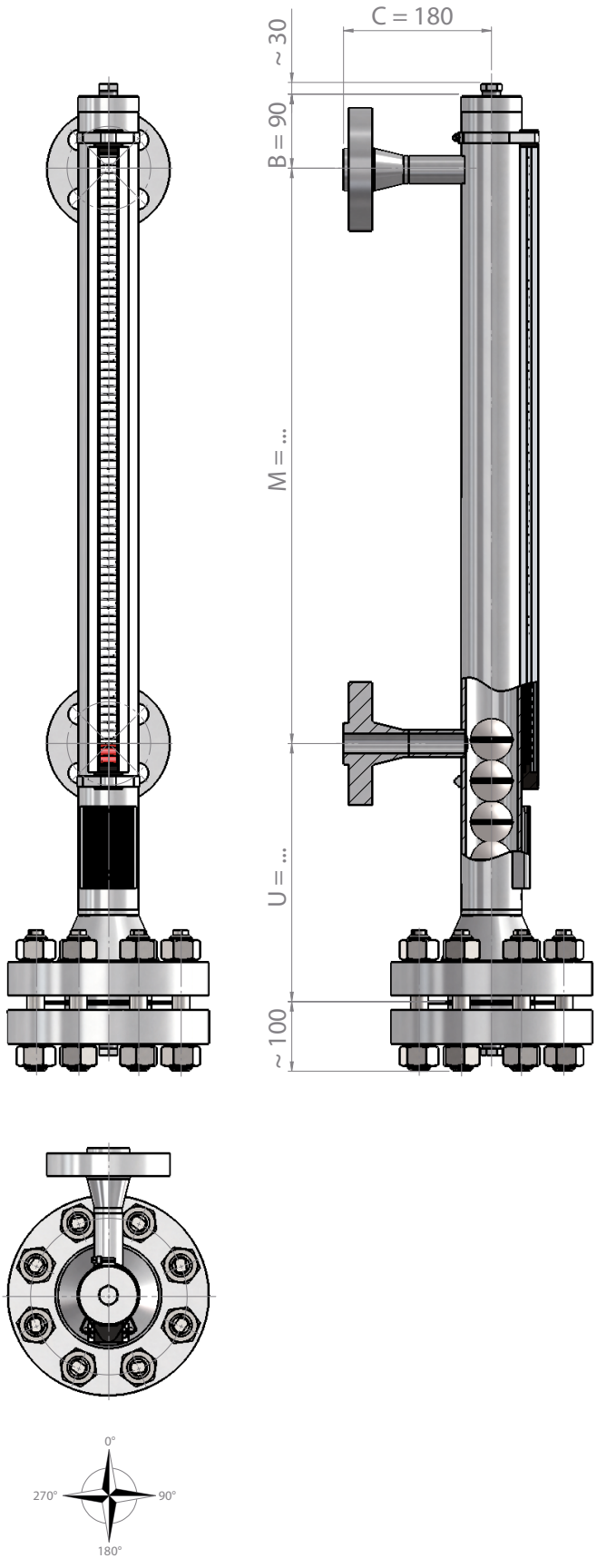
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 390 kg/m³
Design pressure /	-1. . .+100 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 3 mm Ø 60,33 x 2,77 mm / NACE Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST



Bypass-Magnetic Level Gauge made of st. steel PN160

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 480 kg/m³
Design pressure /	-1. . .+160 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST

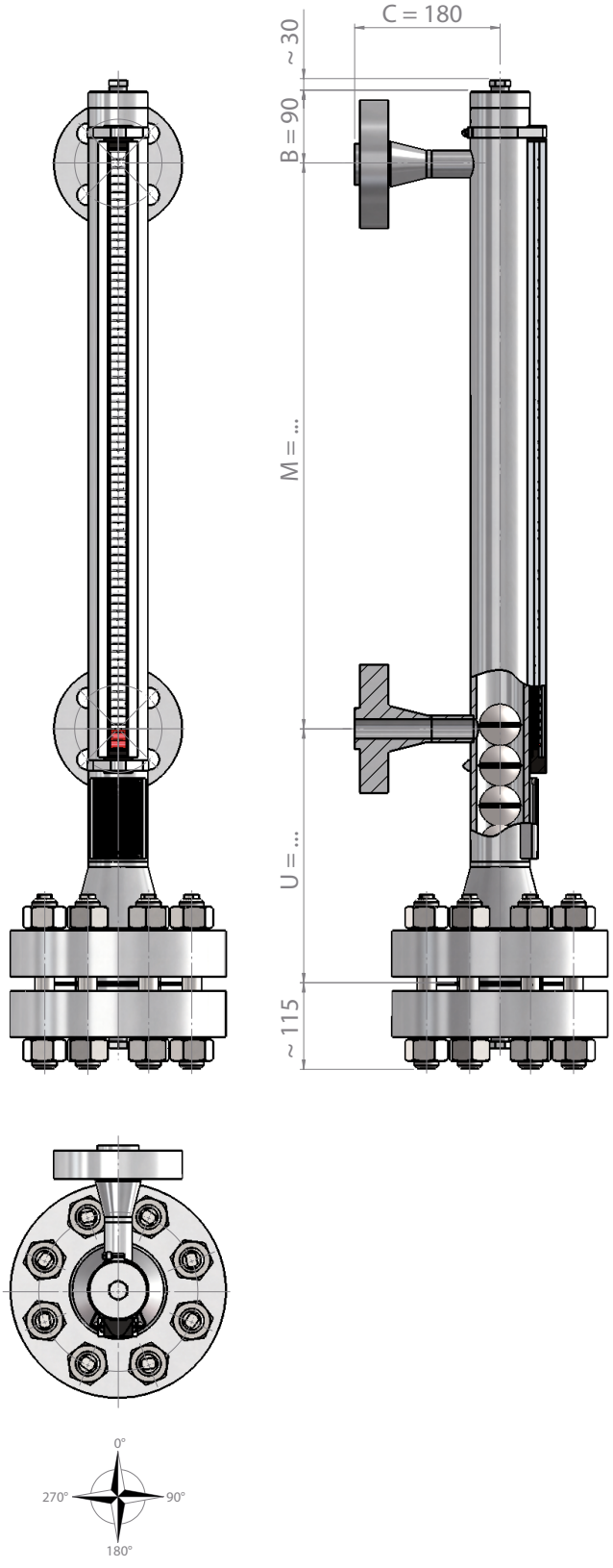


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Bypass-Magnetic Level Gauge made of st. steel PN250. . .PN400

Technical Specifications:

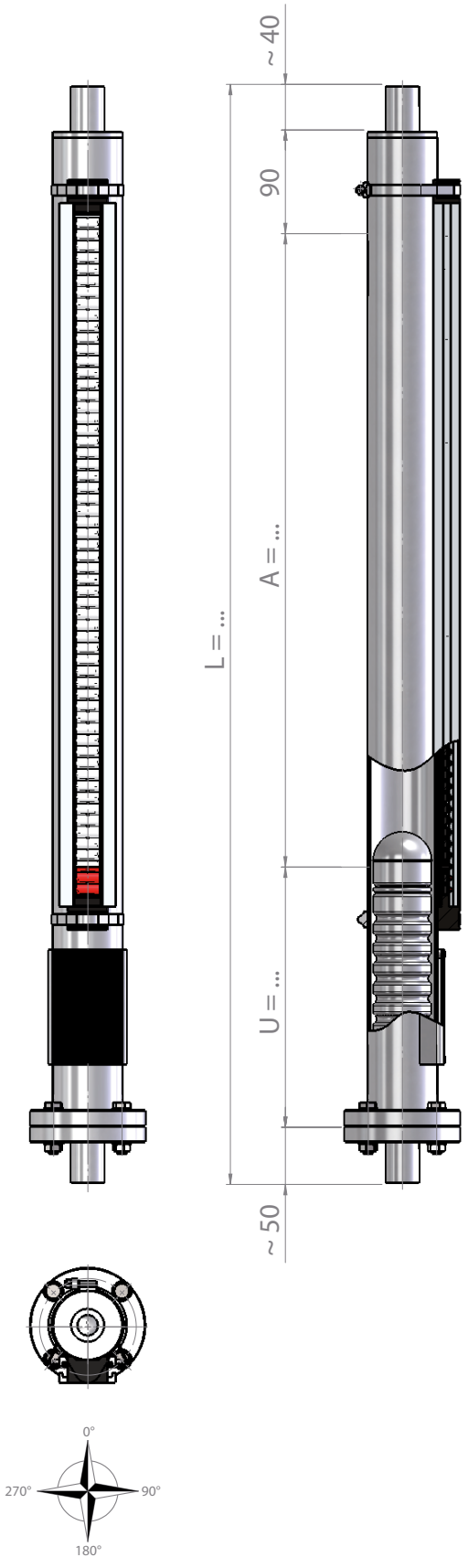
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 690 kg/m³
Design pressure /	-1. . .+250 / +400 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST



Bypass-Magnetic Level Gauge made of Stainless Steel without lateral Connections

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 400 kg/m³
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

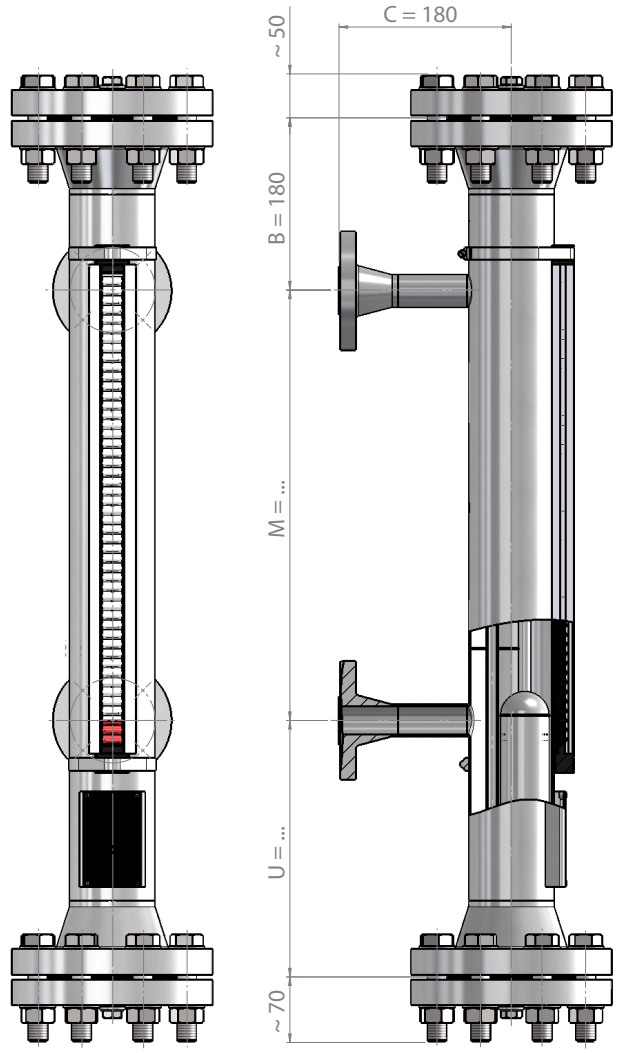


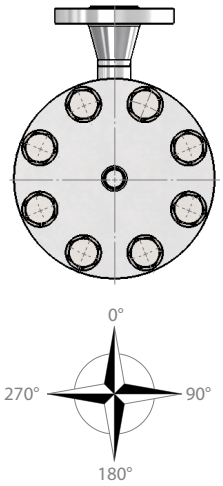
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Bypass-Magnetic Level Gauge made of Stainless Steel in Liquid Gas Design

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 460 kg/m³
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 88,90 x 2 mm Ø 88,90 x 3,05 mm / NACE Ø 88,90 x 2,60 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

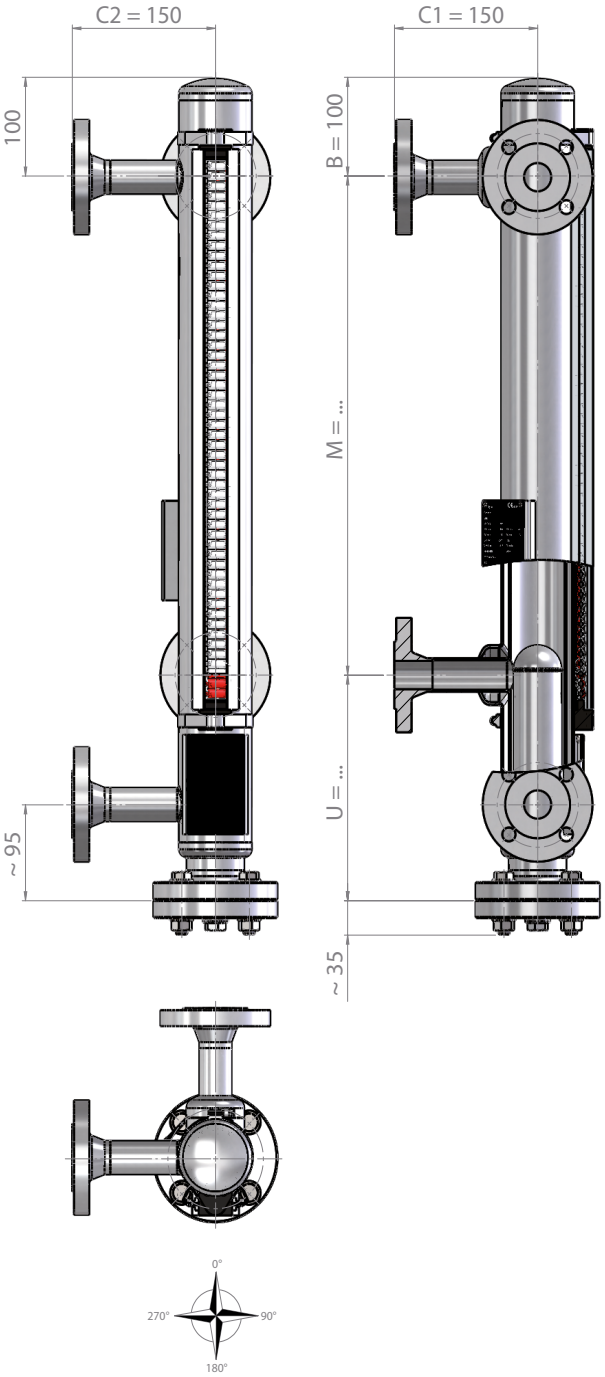




Bypass-Magnetic Level Gauge made of Stainless Steel with Steam Tracing System

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 460 kg/m³
Design pressure /	-1. . .+ bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Heating coat /	Heating coat pipe Ø 76,10 x 2 mm
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

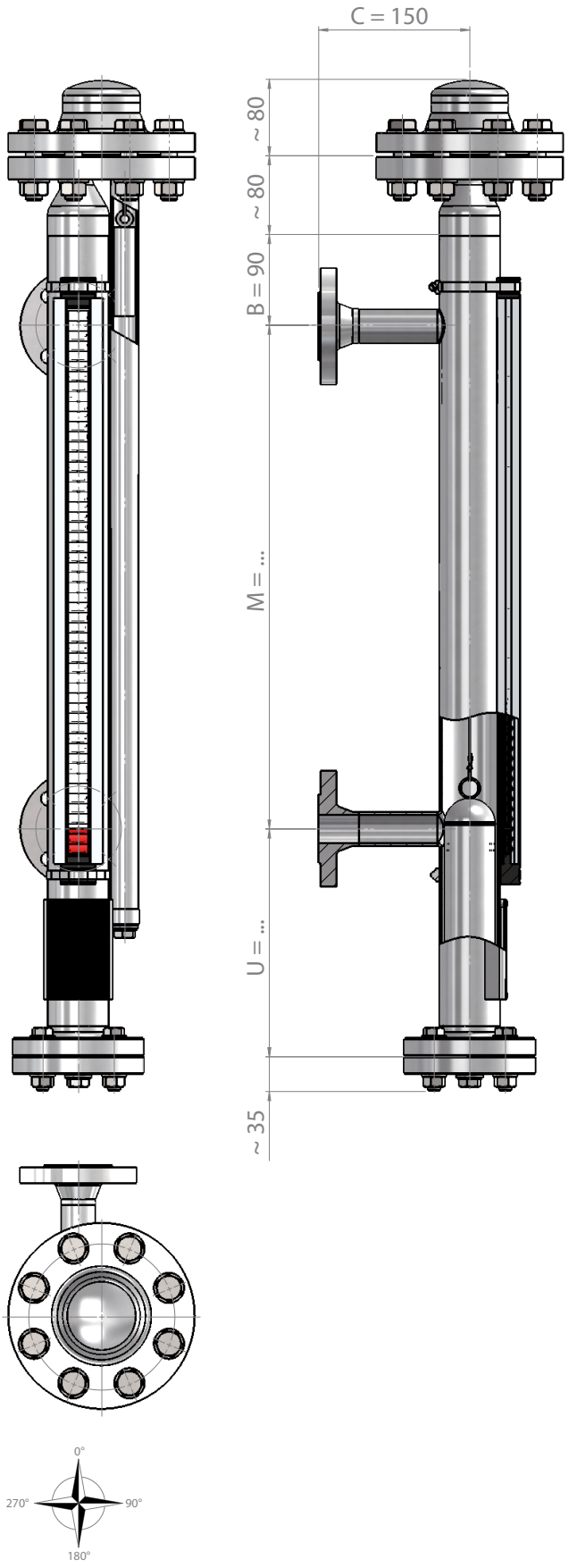


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Bypass-Magnetic Level Gauge made of Stainless Steel, differential compensated

Technical Specifications:

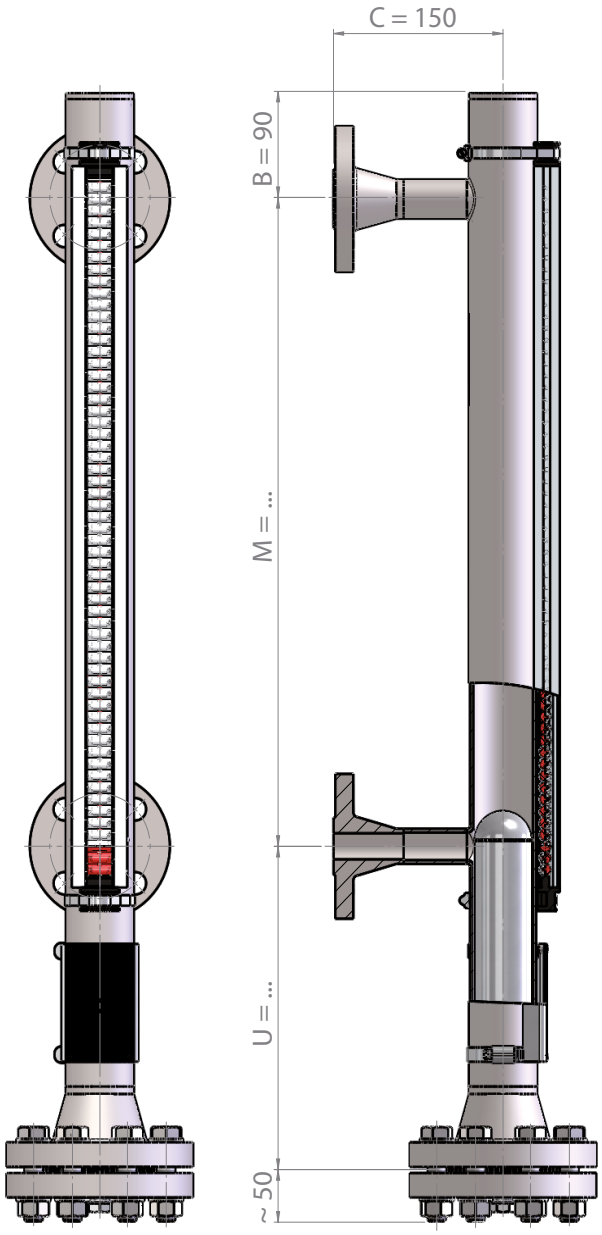
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 350 kg/m³
Design pressure /	-1. . .+250 bar
Design temp. /	-10. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST

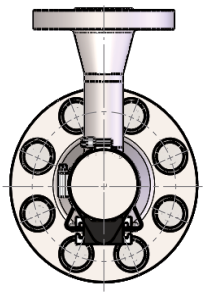


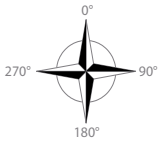
Bypass-Magnetic Level Gauge made of Titanium PN16. . .PN40

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 400 kg/m³
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS





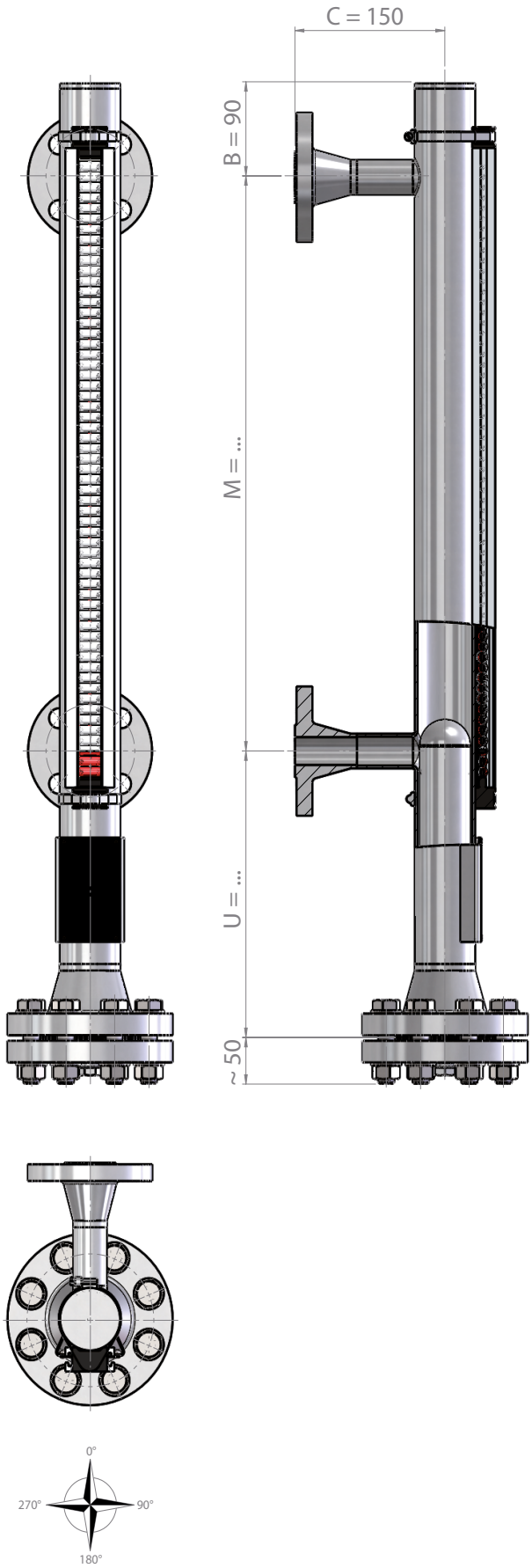


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Bypass-Magnetic Level Gauge made of Alloy C PN16. . .PN40

Technical Specifications:

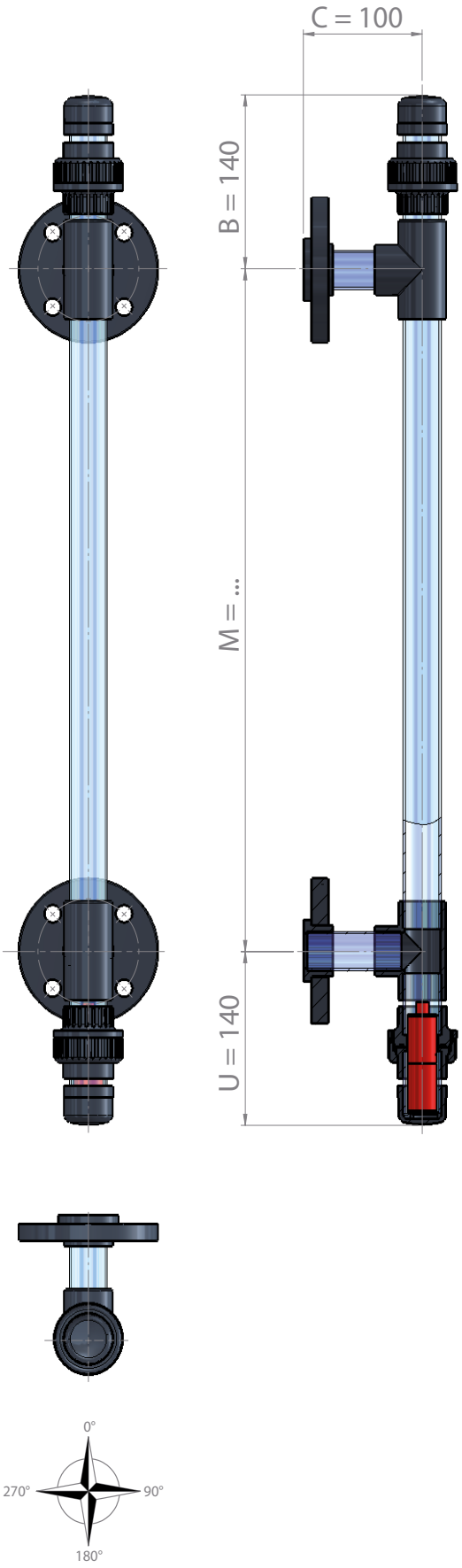
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 610 kg/m³
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+200°C
Chambers /	Ø 60,30 x 2,77 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 200°C, PED, GOST



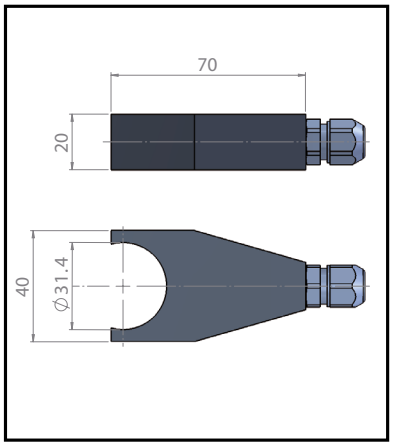
Bypass-Transparent Level Indicator made of PVC

Technical Specifications:

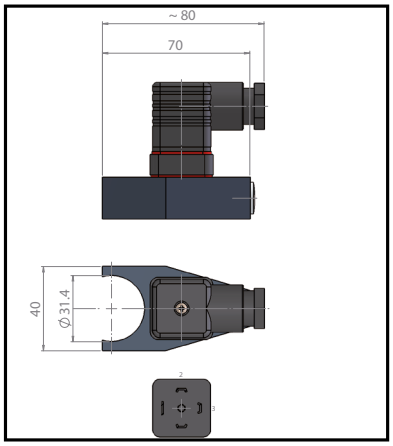
Material /	PVC transparent
Flange center dist. /	200. . .4000 mm
specific Weight /	≥ 600 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-15. . .+60°C
Chambers /	Ø 32,0 x 1,8 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	screw joint
Chamber end bttm. /	screw joint
opt. Insulation /	Ø 24 mm 80 mm long for spec. weight ≥ 900 kg/m³ 120 mm long for spec. weight ≥ 600 kg/m³
Switching contacts /	normally open, normally closed or co-contacts, 230 V, 0.5 A, 40 VA electrical connection: PVC cable or plug Hirschmann DIN 43650



Cable connection:



Plug connection:

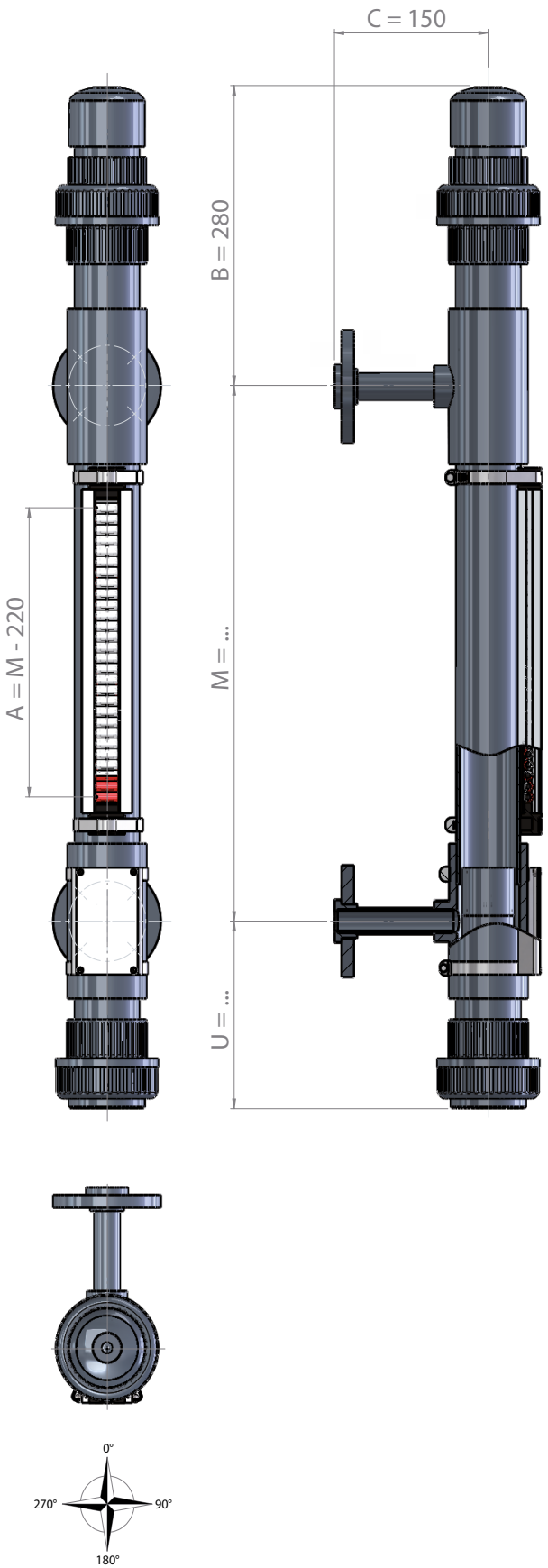


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Bypass-Magnetic Level Gauge made of PVC

Technical Specifications:

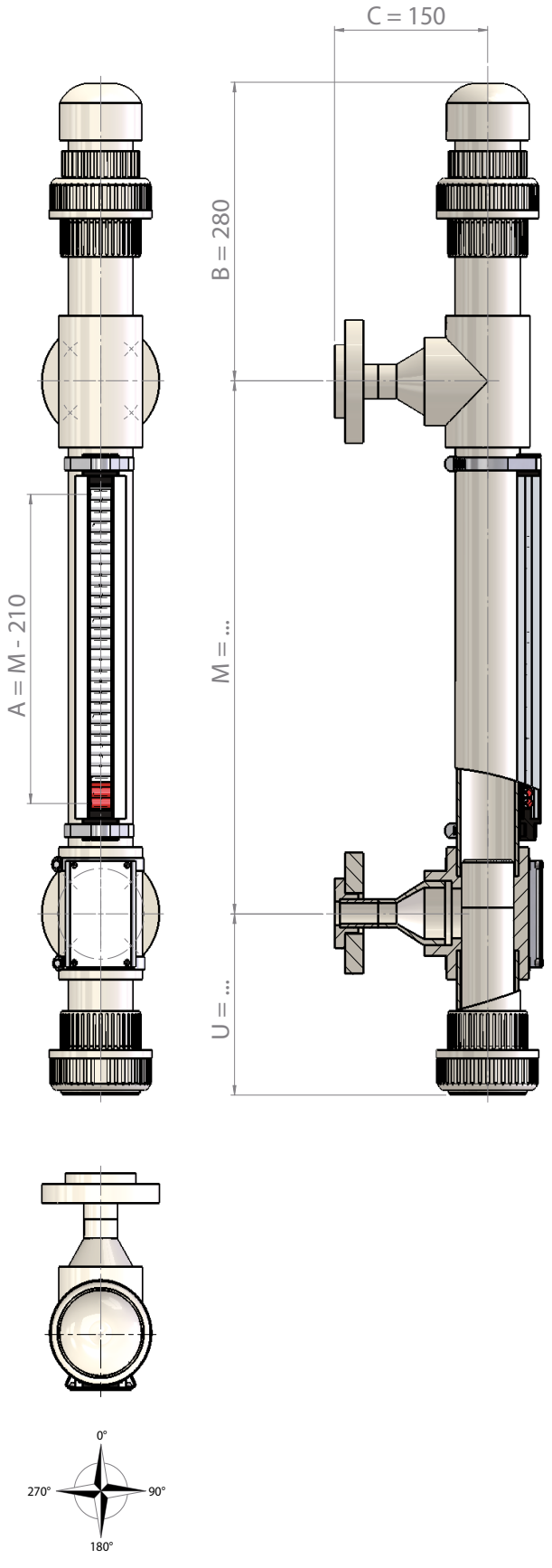
Materials /	PVC
Flange center dist. /	300. . .4000 mm
specific Weight /	≥ 740 kg/m³
Design pressure /	-1. . .+4 bar
Design temp. /	-15. . .+40°C
Chambers /	Ø 63,0 x 3 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	screw joint
Chamber end bttm. /	screw joint
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
available Approvals /	PED, GOST



Bypass-Magnetic Level Gauge made of Polypropylene

Technical Specifications:

Material /	Polypropylene
Flange center dist. /	300. . .4000 mm
specific Weight /	≥ 640 kg/m³
Design pressure /	-1. . .+4 bar
Design temp. /	-10. . .+60°C
Chambers /	Ø 63,50 x 3,60 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	screw joint
Chamber end bttm. /	screw joint
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
available Approvals /	PED, GOST

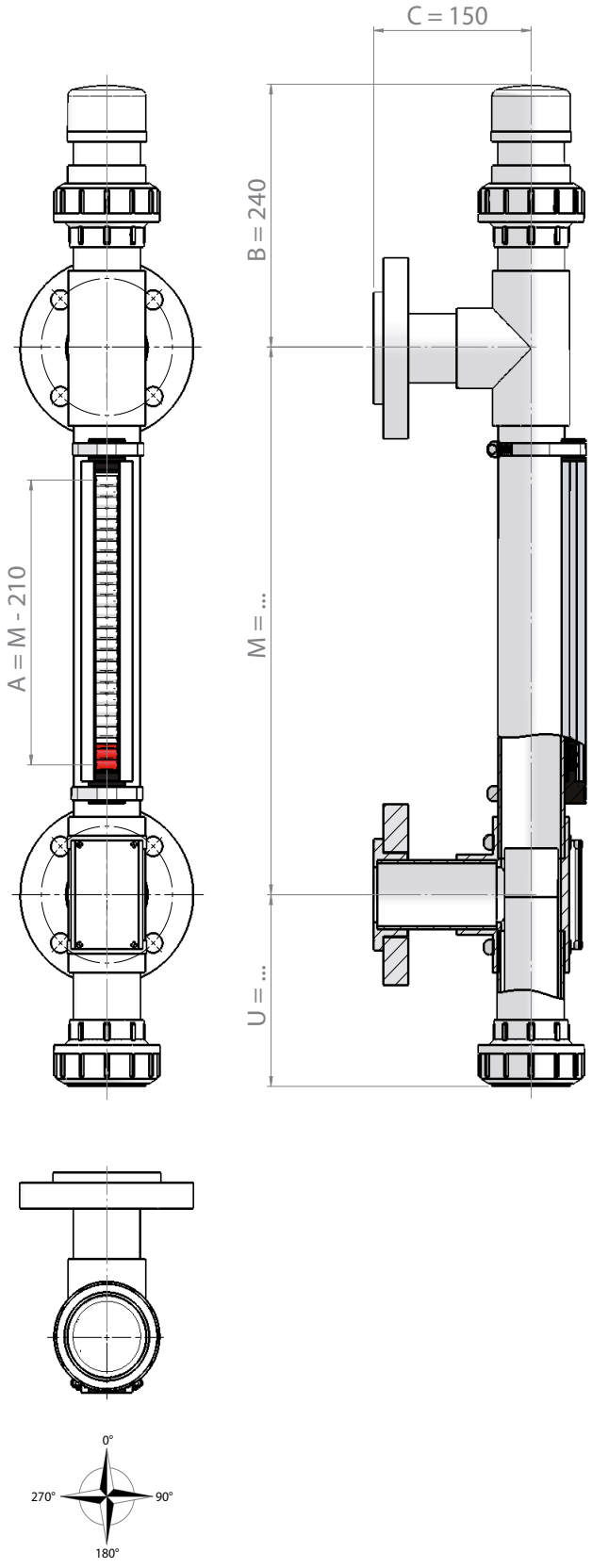


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Bypass-Magnetic Level Gauge made of PVDF

Technical Specifications:

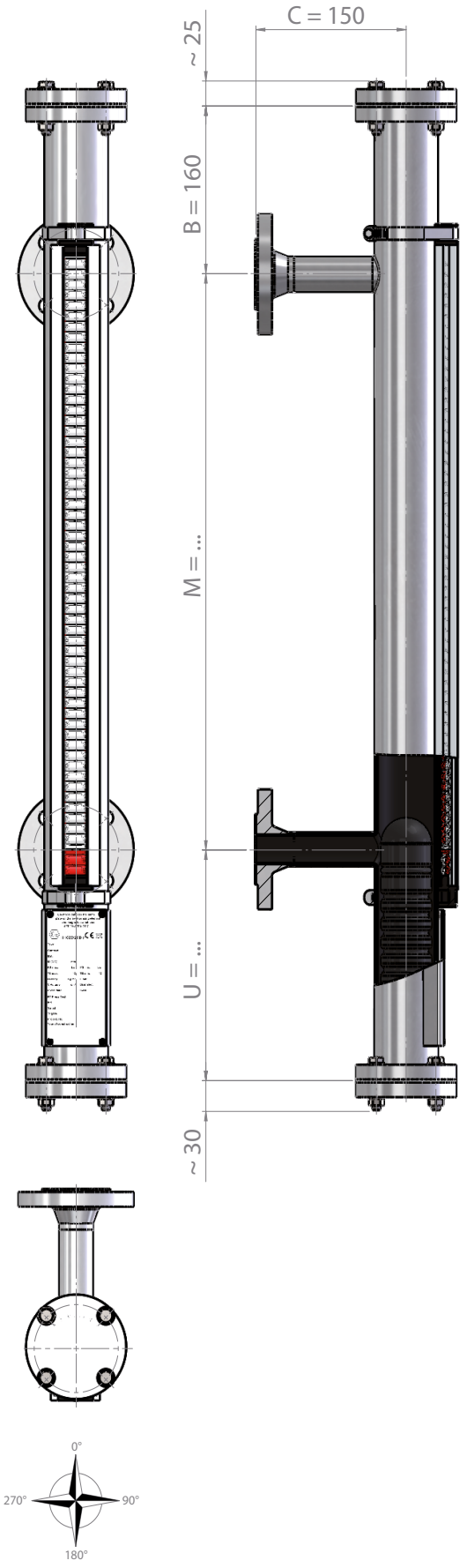
Material /	PVDF
Flange center dist. /	300. . .4000 mm
specific Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+4 bar
Design temp. /	-10. . .+80°C
Chambers /	Ø 63,00 x 3 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	screw joint
Chamber end bttm. /	screw joint
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
available Approvals /	PED, GOST



Bypass-Magnetic Level Gauge made of st. steel, ECTFE-coated

Technical Specifications:

Material /	st. steel, ECTFE-coated
Flange center dist. /	150. . .3000 mm
specific Weight /	≥ 690 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-78. . .+150°C
Chambers /	Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	flange connection
Chamber end bttm. /	flange connection
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 150°C, PED, GOST

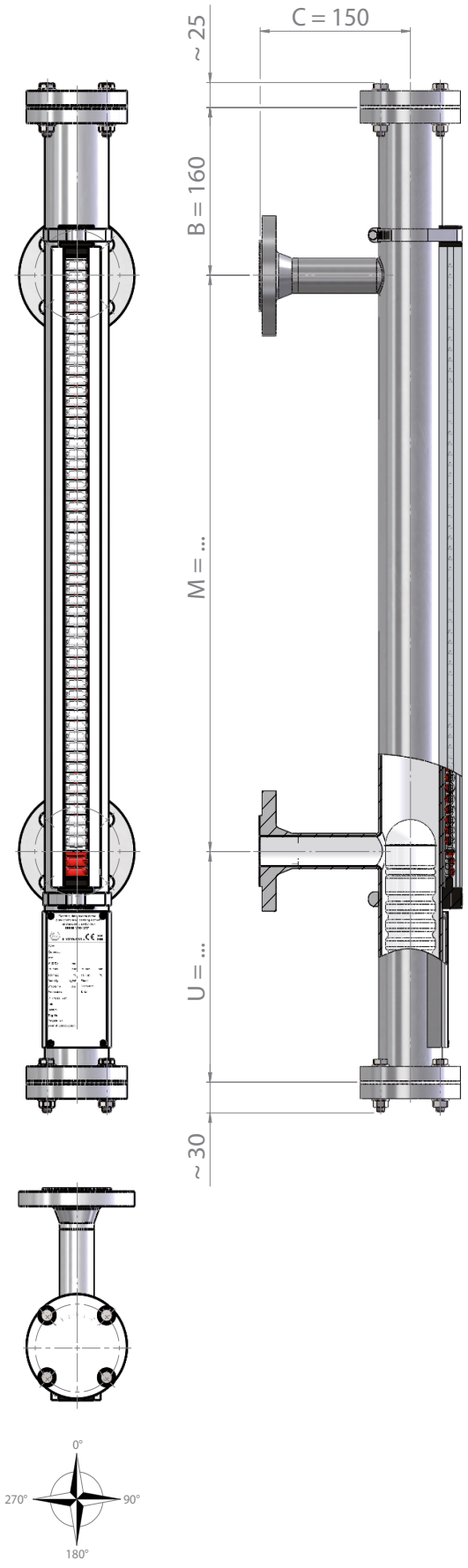


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Bypass-Magnetic Level Gauge made of st. steel, PFA-coated

Technical Specifications:

Material /	st. steel PFA-coated
Flange center dist. /	150. . .3000 mm
specific Weight /	≥ 715 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-100. . .+250°C
Chambers /	Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	flange connection
Chamber end bttm. /	flange connection
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 250°C, PED, GOST



Appendix A - Cylindrical float:

Cylindrical float made of PVC, PN4, Type ZPVC50PN4:

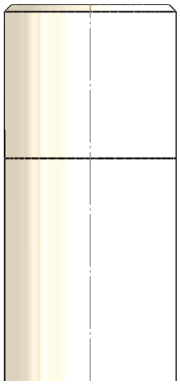
Float length (mm)		150	200	250	300	350
Float weight (g)		275	316	356	397	437
emerged float height (mm)		specific weight of media (kg/m³)				
10	10	-	-	-	-	-
20	20	-	-	-	-	-
30	30	1170	950	820	750	700
40	40	1270	1010	860	780	720
50	**50**	**1400**	**1070**	**910**	**810**	**740**
60	60	1560	1150	950	840	770
70	70	1750	1240	1010	880	790
80	80	2000	1340	1070	920	820
90	90	2330	1460	1130	960	860
100	100	2800	1610	1210	1010	890



Float diameter:	50 mm
Design temperature:	-15. . .+40°C
Design pressure:	-1 bar. . .+4 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 25 mm

Cylindrical float made of PP, PN4, Type ZPP50PN4:

Float length (mm)		150	200	250	300	350
Float weight (g)		246	279	311	344	376
emerged float height (mm)		specific weight of media (kg/m³)				
10	10	-	-	-	-	-
20	20	-	-	-	-	-
30	30	1040	840	720	650	600
40	40	1140	890	750	670	620
50	**50**	**1250**	**950**	**790**	**700**	**640**
60	60	1390	1010	830	730	660
70	70	1570	1090	880	760	680
80	80	1790	1180	930	800	710
90	90	2090	1290	990	830	740
100	100	2510	1420	1060	880	770



Float diameter:	50 mm
Design temperature:	-10. . .+60°C
Design pressure:	-1 bar. . .+4 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 25 mm

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Cylindrical float made of PVDF, PN4, Type ZPVDF50PN4:

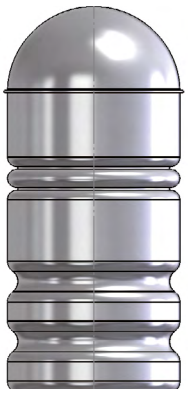
Float length (mm)		150	200	250	300	350
Float weight (g)		278	319	360	401	442
emerged float height (mm)		specific weight of media (kg/m³)				
10	10	-	-	-	-	-
20	20	-	-	-	-	-
30	30	1180	960	830	760	700
40	40	1290	1020	870	790	730
50	**50**	**1420**	**1080**	**920**	**820**	**750**
60	60	1570	1160	960	850	780
70	70	1770	1250	1020	890	800
80	80	2020	1350	1080	930	830
90	90	2360	1480	1150	970	870
100	100	2830	1620	1220	1020	900



Float diameter:	50 mm
Design temperature:	-10. . .+80°C
Design pressure:	-1 bar. . .+4 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 25 mm

Cylindrical float made of st. steel 1.4571 (316Ti), PN16, Type ZVA52PN16:

Float length (mm)		150	200	250	300	350	400	450
Float weight (g)		253	297	327	362	399	440	472
emerged float height (mm)		specific weight of media (kg/m³)						
10	10	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-
30	30	1170	950	800	720	680	640	600
40	40	1280	1010	840	740	700	660	610
50	**50**	**1420**	**1080**	**880**	**780**	**720**	**680**	**630**
60	60	1600	1160	930	810	750	700	650
70	70	1820	1260	980	850	780	720	660
80	80	2110	1370	1050	890	810	740	680
90	90	2520	1500	1110	930	840	770	700
100	100	-	1670	1190	980	870	790	720



Float diameter:	52 mm
Design temperature:	-40. . .+250°C (+300°C)
Design pressure:	-1 bar. . .+20 bar (+18,5 bar)
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 24 mm
Distance U with dampening spring:	float length minus 10 mm

Cylindrical float made of st. steel ECTFE-coated, PN16, Type ZVAE53PN16:

Float length (mm)		150	200	250	300	350	400	450
Float weight (g)		277	329	367	410	456	505	545
emerged float height (mm)		specific weight of media (kg/m³)						
10	10	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-
30	30	1200	1000	850	770	730	700	660
40	40	1350	1070	900	800	760	720	670
50	**50**	**1490**	**1140**	**940**	**840**	**780**	**740**	**690**
60	60	1680	1230	1000	870	810	760	710
70	70	1910	1330	1050	910	840	780	730
80	80	2220	1450	1120	960	870	810	750
90	90	2650	1590	1190	1000	910	830	770
100	100	-	1770	1280	1060	950	860	790



Float diameter:	53 mm
Design temperature:	-40. . .+150°C
Design pressure:	-1 bar. . .+20 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	Float length minus 24 mm
Distance U with dampening spring:	Float length minus 10 mm

Cylindrical float made of st. steel PFA-coated, PN16, Type ZVAP53PN16:

Float length (mm)		150	200	250	300	350	400	450
Float weight (g)		284	338	378	424	471	523	565
emerged float height (mm)		specific weight of media (kg/m³)						
10	10	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-
30	30	1250	1035	885	805	750	715	680
40	40	1385	1105	930	835	775	735	695
50	**50**	**1535**	**1185**	**975**	**870**	**800**	**760**	**715**
60	60	1725	1275	1030	905	830	780	735
70	70	1965	1375	1090	950	860	805	755
80	80	2285	1500	1160	995	890	830	775
90	90	2730	1650	1235	1040	925	860	795
100	100	-	1830	1325	1095	965	890	820



Float diameter:	53 mm
Design temperature:	-40. . .+250°C
Design pressure:	-1 bar. . .+20 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	Float length minus 24 mm
Distance U with dampening spring:	Float length minus 10 mm

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Cylindrical float made of Titanium, PN16, Type ZT52PN16:

Float length (mm)		150	200	250	300	350	400	450
Float weight (g)		197	245	289	338	381	430	474
emerged float height (mm)		specific weight of media (kg/m³)						
10	10	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-
30	30	645	535	475	430	410	395	380
40	40	710	570	500	450	425	405	390
50	**50**	**785**	**610**	**525**	**470**	**440**	**415**	**400**
60	60	885	655	555	490	455	430	410
70	70	1005	710	585	510	470	440	420
80	80	1170	775	625	535	490	455	435
90	90	1400	850	665	560	510	470	445
100	100	1735	945	710	590	530	485	460



Float diameter:	52 mm
Design temperature:	-30. . .+150°C (+200°C)
Design pressure:	-1 bar. . .+16 bar (+10 bar)
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	Float length minus 24 mm
Distance U with dampening spring:	Float length minus 10 mm

Cylindrical float made of Alloy C, PN16, Type ZA52PN16:

Float length (mm)		150	200	250	300	350	400	450
Float weight (g)		197	245	289	338	381	430	474
emerged float height (mm)		specific weight of media (kg/m³)						
10	10	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-
30	30	900	770	695	660	625	605	585
40	40	985	825	730	685	645	625	600
50	**50**	**1095**	**880**	**770**	**710**	**665**	**640**	**615**
60	60	1230	950	810	745	690	660	635
70	70	1400	1025	855	775	715	680	650
80	80	1625	1115	910	815	740	705	665
90	90	1940	1225	970	855	770	725	685
100	100	2410	1360	1040	900	805	750	705



Float diameter:	52 mm
Design temperature:	-196. . .+200°C
Design pressure:	-1 bar. . .+16 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	Float length minus 24 mm
Distance U with dampening spring:	Float length minus 10 mm

Cylindrical float made of st. steel 1.4571 (316Ti), PN40, Type ZVA52PN40:

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	197	258	300	342	389	431	472	519	561	603	645



emerged float height (mm)	specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	900	815	720	665	635	605	585	575	560	545	535
40	40	985	865	760	690	655	625	600	585	570	555	545
50	**50**	**1095**	**930**	**795**	**720**	**680**	**640**	**615**	**600**	**580**	**565**	**555**
60	60	1230	1000	840	750	705	660	630	610	595	580	565
70	70	1400	1080	890	785	730	680	645	625	605	590	575
80	80	1625	1175	945	825	755	705	665	640	620	600	585
90	90	1940	1290	1005	865	785	730	685	660	635	610	595
100	100	2410	1435	1080	910	820	755	705	675	645	625	605

Float diameter:	52 mm
Design temperature:	-196. . .+250°C
Design pressure:	-1 bar. . .+40 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 24 mm
Distance U with dampening spring:	float length minus 10 mm

Cylindrical float made of Titanium, PN40, Type ZT52PN40:

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	175	219	258	298	337	376	420	460	499	538	578



emerged float height (mm)	specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	775	670	600	560	535	515	505	490	480	475	465
40	40	850	715	630	585	550	530	515	505	490	480	475
50	**50**	**945**	**765**	**665**	**610**	**570**	**545**	**530**	**515**	**500**	**490**	**480**
60	60	1060	820	700	635	590	560	545	525	510	500	490
70	70	1205	890	740	665	610	575	560	540	520	510	500
80	80	1405	970	790	695	635	595	575	550	535	520	510
90	90	1675	1065	840	730	660	615	590	565	545	530	515
100	100	2080	1180	900	770	690	635	605	580	560	540	525

Float diameter:	52 mm
Design temperature:	-30. . .+200°C
Design pressure:	-1 bar. . .+40 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 24 mm
Distance U with dampening spring:	float length minus 10 mm

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Cylindrical float made of Alloy C, PN40, Type ZA52PN40:

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	216	264	313	361	414	463	511	565	613	661	710

emerged float height (mm)		specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	985	830	755	705	675	650	630	625	610	600	590
40	40	1080	885	790	730	700	670	650	635	620	610	600
50	**50**	**1200**	**950**	**830**	**760**	**725**	**690**	**665**	**650**	**635**	**620**	**610**
60	60	1345	1020	875	795	750	710	680	665	650	635	620
70	70	1535	1105	930	830	775	735	700	680	660	645	635
80	80	1785	1205	985	870	805	755	720	700	675	660	645
90	90	2130	1320	1050	910	840	780	740	715	690	670	655
100	100	2640	1465	1125	960	870	810	760	735	705	685	670

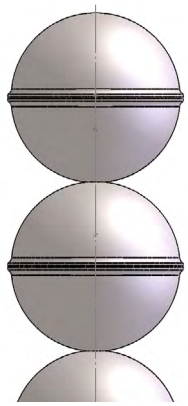


Float diameter: 52 mm
Design temperature: -196. . .+200°C
Design pressure: -1 bar. . .+40 bar
Distance U: see figure of magnetic level gauge
Distance U with float stop: float length minus 24 mm
Distance U with dampening spring: float length minus 10 mm

Cylindrical float made of Titanium, for chambers up to 63.5 mm, PN160, Type ZT52PN160K:

Number of balls	3	4	5	6	7	8	9	10	11	12	13	14
Float length (mm)	146	194	243	291	340	388	437	485	534	582	631	679
Float weight (g)	134	159	184	209	234	258	283	308	333	358	382	407

emerged float height (mm)		specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	870	725	645	595	565	535	520	505	490	480	475	465
40	40	975	785	685	625	585	555	535	515	505	493	480	475
50	**50**	**1025**	**810**	**705**	**640**	**595**	**565**	**540**	**525**	**510**	**497**	**485**	**478**
60	60	1080	840	720	650	605	570	550	530	515	502	490	482
70	70	1240	915	770	685	635	595	565	545	525	515	500	492
80	80	1515	1035	840	735	670	620	590	565	545	530	515	505
90	90	1855	1155	905	780	700	645	610	580	560	540	525	515
100	100	2045	1215	935	800	715	655	620	590	565	545	530	520



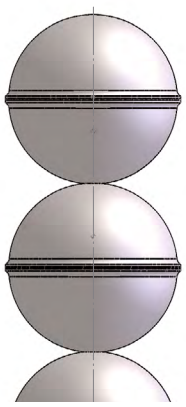
Design temperature:	-90. . .+400°C	-90. . .+350°C	-90. . .+300°C	-90. . .+250°C	-90. . .+200°C	-90. . .+150°C
Design pressure:	-1. . .+125 bar	-1. . .+135 bar	-1. . .+150 bar	-1. . .+155 bar	-1. . .+165 bar	-1. . .+175 bar

Float diameter: 52 mm
Distance U: see figure of magnetic level gauge
Distance U with float stop: float length minus 28 mm
Distance U with dampening spring: float length minus 13 mm

Cylindrical float made of Titanium, for chambers from 73.03 mm, PN160, Type ZT52PN160G:

Number of balls	3	4	5	6	7	8	9	10	11	12	13	14
Float length (mm)	146	194	243	291	340	388	437	485	534	582	631	679
Float weight (g)	174	199	224	249	274	298	323	348	373	398	422	447

emerged float height (mm)		specific weight of media (kg/m³)											
10	10	-	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-	-
30	30	1130	905	785	710	660	620	590	570	550	535	520	510
40	40	1265	980	835	745	685	640	610	585	565	550	533	520
50	**50**	**1330**	**1015**	**855**	**760**	**700**	**650**	**615**	**590**	**570**	**555**	**537**	**525**
60	60	1400	1050	880	775	710	660	625	600	575	560	542	530
70	70	1615	1150	940	820	740	685	645	615	590	570	555	540
80	80	1965	1295	1020	875	780	715	670	635	610	585	570	555
90	90	2410	1445	1105	925	820	745	695	655	625	600	580	565
100	100	2660	1520	1140	950	835	760	705	665	635	610	585	570



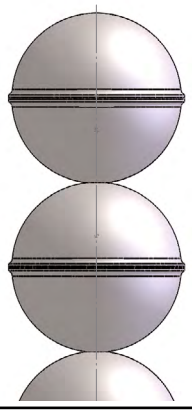
Design temperature:	-90. . .+400°C	-90. . .+350°C	-90. . .+300°C	-90. . .+250°C	-90. . .+200°C	-90. . .+150°C
Design pressure:	-1. . .+125 bar	-1. . .+135 bar	-1. . .+150 bar	-1. . .+155 bar	-1. . .+165 bar	-1. . .+175 bar

Float diameter: 52 mm
Distance U: see figure of magnetic level gauge
Distance U with float stop: float length minus 28 mm
Distance U with dampening spring: float length minus 13 mm

Cylindrical float made of Titanium, for chambers from 73.03 mm, PN320, Type ZT52PN320G:

Number of balls	3	4	5	6	7	8	9	10	11	12	13	14
Float length (mm)	146	194	243	291	340	388	437	485	534	582	631	679
Float weight (g)	204	239	274	308	343	378	412	447	482	516	551	586

emerged float height (mm)		specific weight of media (kg/m³)											
10	10	-	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-	-
30	30	1325	1090	960	880	825	785	755	730	710	695	680	670
40	40	1480	1175	1020	920	860	815	775	750	730	710	695	685
50	**50**	**1560**	**1215**	**1045**	**940**	**875**	**825**	**785**	**760**	**735**	**715**	**700**	**690**
60	60	1645	1260	1075	960	890	840	795	770	745	725	710	695
70	70	1890	1380	1150	1010	930	870	825	790	765	740	725	710
80	80	2305	1555	1250	1080	980	910	855	820	785	760	740	725
90	90	2825	1735	1350	1145	1025	945	885	845	810	780	760	740
100	100	3115	1825	1395	1175	1050	965	900	855	820	790	765	745



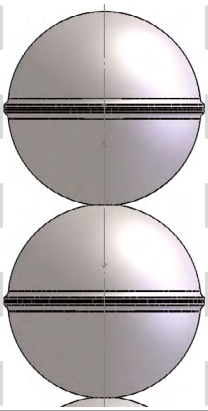
Design temperature:	-90. . .+400°C	-90. . .+350°C	-90. . .+300°C	-90. . .+250°C	-90. . .+200°C	-90. . .+150°C
Design pressure:	-1. . .+212 bar	-1. . .+235 bar	-1. . .+258 bar	-1. . .+270 bar	-1. . .+282 bar	-1. . .+300 bar

Float diameter: 52 mm
Distance U: see figure of magnetic level gauge
Distance U with float stop: float length minus 28 mm
Distance U with dampening spring: float length minus 13 mm

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Cylindrical float made of Titanium, for chambers from 73.03 mm, PN63, Type ZT62PN63G:

Number of balls	3	4	5	6	7	8	9	10	11	12	13	14	15
Float length (mm)	180	240	300	360	420	480	540	600	660	720	780	840	900
Float weight (g)	197	226	255	284	313	342	371	400	429	458	487	516	545



emerged float height (mm)	specific weight of media (kg/m³)												
10	10	-	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-	-
30	30	696	570	500	456	426	404	386	374	362	350	345	339	333
40	40	770	614	530	478	442	418	398	382	370	360	352	345	338
50	50	838	650	554	496	456	428	406	390	378	366	357	349	343
60	**60**	**872**	**666**	**564**	**500**	**462**	**432**	**410**	**394**	**380**	**368**	**359**	**351**	**345**
70	70	906	684	576	512	468	438	414	398	382	370	361	353	347
80	80	1000	730	604	530	482	450	424	406	390	378	367	359	351
90	90	1162	800	646	558	504	466	438	418	400	386	375	366	357
100	100	1382	884	692	590	528	484	452	428	410	396	383	373	364

Design temperature:	-90. . .+400°C	-90. . .+350°C	-90. . .+300°C	-90. . .+250°C	-90. . .+200°C	-90. . .+150°C
Design pressure:	-1. . .+50 bar	-1. . .+55 bar	-1. . .+60 bar	-1. . .+66 bar	-1. . .+66 bar	-1. . .+70 bar

Float diameter: 62 mm
Distance U: see figure of magnetic level gauge
Distance U with float stop: float length minus 36 mm
Distance U with dampening spring: float length minus 21 mm

Z.Float made of st. steel 1.4571 (316Ti) for heat-coat vers., PN16, Type ZVA52PN16H:

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	279	321	358	400	437	479	516	553	595	632	674



emerged float height (mm)	specific weight of media (kg/m³)											
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	1270	1010	860	780	715	675	640	610	590	575	560
40	40	1400	1080	905	810	740	695	655	625	605	585	570
50	50	**1550**	**1155**	**950**	**845**	**765**	**715**	**670**	**640**	**615**	**595**	**580**
60	60	1740	1240	1005	880	790	735	690	650	630	605	590
70	70	1985	1345	1060	920	820	760	705	670	640	615	600
80	80	2305	1465	1130	960	850	785	725	685	655	630	610
90	90	2750	1610	1200	1010	885	810	745	700	670	640	620
100	100	3410	1785	1285	1085	920	835	770	720	685	655	635

Float diameter: 52 mm
Design temperature: -196. . .+250°C
Design pressure: -1 bar. . .+16 bar
Distance U: see figure of magnetic level gauge
Distance U with float stop: float length minus 24 mm
Distance U with dampening spring: float length minus 10 mm

Cylindrical float made of Titanium for heat-coat vers., PN16, Type ZT52PN16H:

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	251	281	310	340	369	399	433	462	489	521	550



emerged float height (mm)	specific weight of media (kg/m³)											
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	1110	860	725	640	585	545	520	495	470	460	445
40	40	1220	915	760	665	605	560	530	505	480	485	450
50	**50**	**1355**	**980**	**800**	**695**	**625**	**575**	**545**	**515**	**490**	**475**	**460**
60	60	1520	1055	845	725	645	595	560	530	500	485	465
70	70	1730	1140	890	755	670	610	575	540	510	495	475
80	80	2015	1245	945	795	695	630	590	555	525	505	485
90	90	2405	1365	1010	830	725	655	610	570	535	515	490
100	100	2980	1515	1080	875	755	675	625	580	545	525	500

Float diameter:	52 mm
Design temperature:	-30. . .+200°C
Design pressure:	-1 bar. . .+16 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 24 mm
Distance U with dampening spring:	float length minus 10 mm

C.Float made of st. steel 1.4571 (316Ti) for heat-coat vers., PN40, Type ZVA52PN40H:

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	298	359	401	443	490	532	573	620	662	704	746



emerged float height (mm)	specific weight of media (kg/m³)											
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	1360	1130	965	860	800	750	710	685	660	640	620
40	40	1495	1205	1015	895	825	770	725	700	670	650	630
50	**50**	**1655**	**1290**	**1065**	**935**	**855**	**795**	**745**	**715**	**685**	**660**	**640**
60	60	1860	1390	1125	975	885	815	765	730	700	675	655
70	70	2120	1505	1190	1020	920	840	785	750	715	685	665
80	80	2460	1635	1265	1065	955	870	805	765	730	700	675
90	90	2935	1800	1345	1120	990	900	830	785	745	715	690
100	100	3640	1995	1440	1175	1035	930	855	805	765	730	700

Float diameter:	52 mm
Design temperature:	-196. . .+250°C
Design pressure:	-1 bar. . .+40 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 24 mm
Distance U with dampening spring:	float length minus 10 mm

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Cylindrical float made of Titanium) for heat-coat vers., PN40, Type ZT52PN40H:

Float length (mm)		150	200	250	300	350	400	450	500	550	600	650
Float weight (g)		276	320	359	399	438	477	521	561	600	639	679
emerged float height (mm)		specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	1220	975	835	755	695	650	625	600	580	560	550
40	40	1340	1040	880	785	715	670	640	615	590	570	555
50	**50**	**1490**	**1115**	**925**	**815**	**740**	**690**	**655**	**625**	**600**	**580**	**565**
60	60	1670	1200	975	850	770	710	675	640	615	595	575
70	70	1905	1300	1035	890	795	730	690	655	630	605	585
80	80	2215	1415	1095	930	825	755	710	675	640	615	595
90	90	2640	1555	1170	975	860	780	730	690	655	630	605
100	100	3280	1725	1250	1030	895	805	755	705	670	640	620



Float diameter:	52 mm
Design temperature:	-30. . .+200°C
Design pressure:	-1 bar. . .+40 bar
Distance U:	see figure of magnetic level gauge
Distance U with float stop:	float length minus 24 mm
Distance U with dampening spring:	float length minus 10 mm

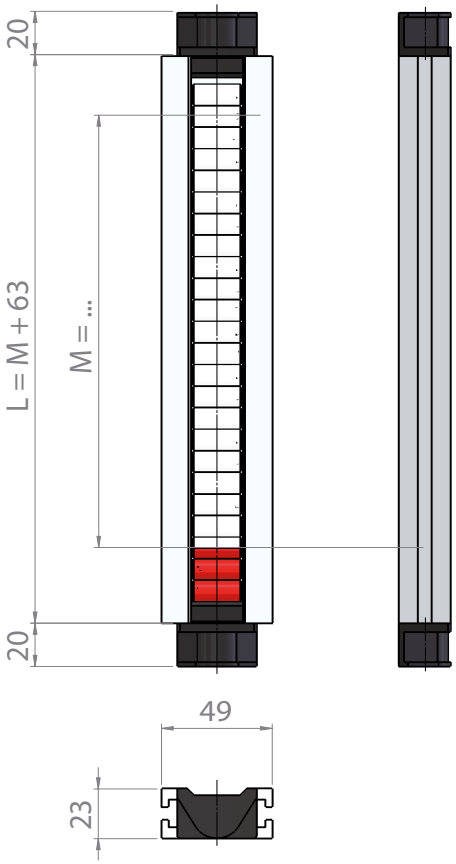
Appendix B - indicator bars:

Versions

MA-01	**Standard**
MA-01N	**Standard turn proof**
MA-01EX	**EX**
MA-01NEX	**EX turn proof**
MA-01K	**Ceramic rollers up to 400°C**
MA-01KN	**Ceramic rollers up to 400°C, turn proof**

Technical Specifications

Housing /	Aluminium colorless matted
Prot. class /	IP67
Rollers /	Pocan® white / red, MA-01K and MA-01KN ceramic weiss / blue
End part /	Ryton®, black, MA-01K and MA-01KN Aluminium
Viewing glass /	MA-01 and MA-01N Makrolon, else glass
Ambient temp. /	-40. . .+200°C, MA-01K and MA-01KN -40. . .+400°C
Media temp. /	-40. . .+300°C
Turn protect. /	MA-01N, MA-01EXN and MA-01KN max. 180°
poss.	
Approvals /	ATEX, GOST, GL, BV, DNV, ABS

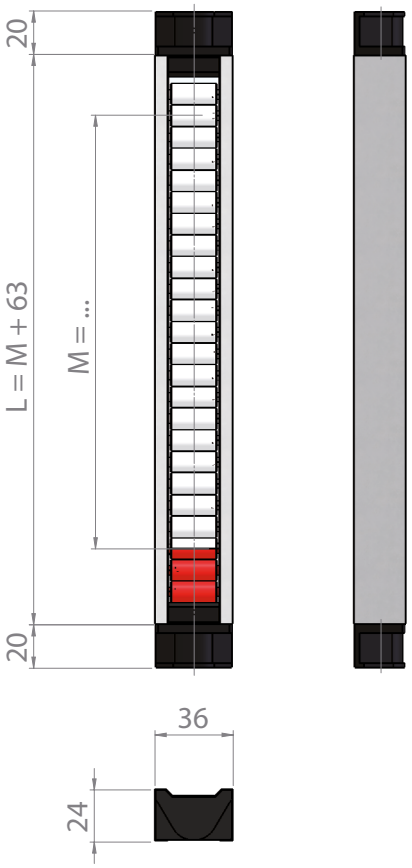


Versions

MVA-01	**Standard**
MVA-01N	**Standard turn proof**
MVA-01EX	**EX**
MVA-01NEX	**EX turn proof**
MVA-01K	**Ceramic rollers up to 400°C**
MVA-01KN	**Ceramic rollers up to 400°C, turn proof**

Technical Specifications

Housing /	Aluminium coated with st. steel
Prot. class /	IP67
Rollers /	Pocan® white / red, MVA-01K and MVA-01KN ceramic weiss / blue
End part /	Ryton®, black, MVA-01K and MVA-01KN Aluminium
Viewing glass /	MVA-01 and MVA-01N Makrolon, else glass
Ambient temp. /	-40. . .+200°C, MVA-01K and MVA-01KN -40. . .+400°C
Media temp. /	-40. . .+300°C
Turn protect. /	MVA-01N, MVA-01EXN and MVA-01KN max. 180°
poss.	
Approvals /	ATEX, GOST, GL, BV, DNV, ABS



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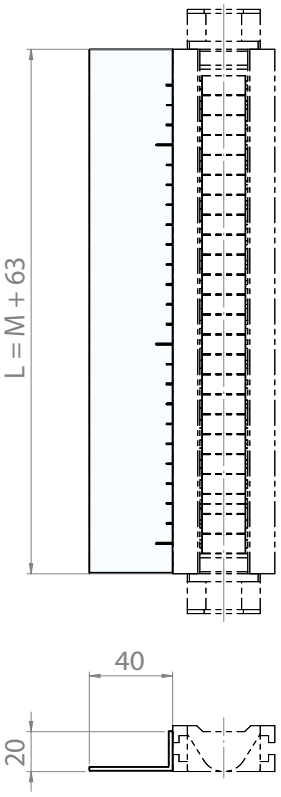
Appendix C - Angular scales and Sight extension:

Angular scale Versions

WK-AK	**Aluminium with adhesive foil (black)**
WK-AG	**Aluminium engraved**
WK-EG	**st. steel engraved**

Technical Specifications

Angle profile /	WK-AK: Aluminium WK-AG: Aluminium WK-EG: st. steel
Scaling /	WK-AK: in cm (0 cm. . .10 cm. . .20 cm. . .) WK-AG: blank / % / cm / inch WK-EG: blank / % / cm / inch
Width /	40 mm
Ambient temp. /	WK-AK: -40. . .+200°C WK-AG: -40. . .+200°C WK-EG: -40. . .+400°C
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS

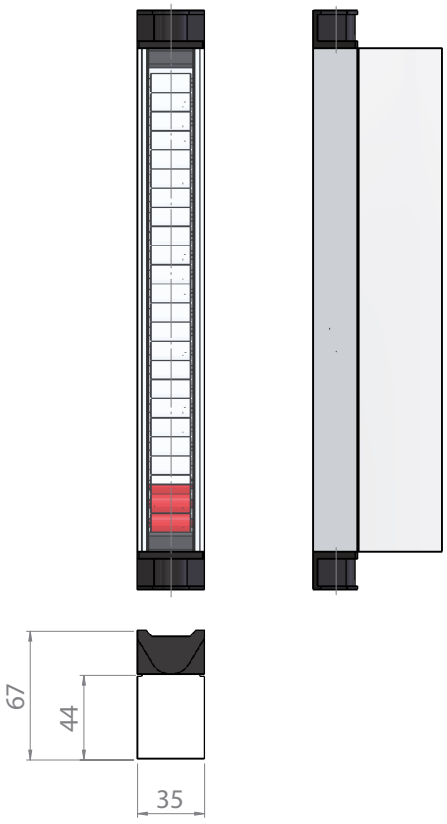


Sight extension Versions

PV	**Extension for indicator bars**

Technical Specifications

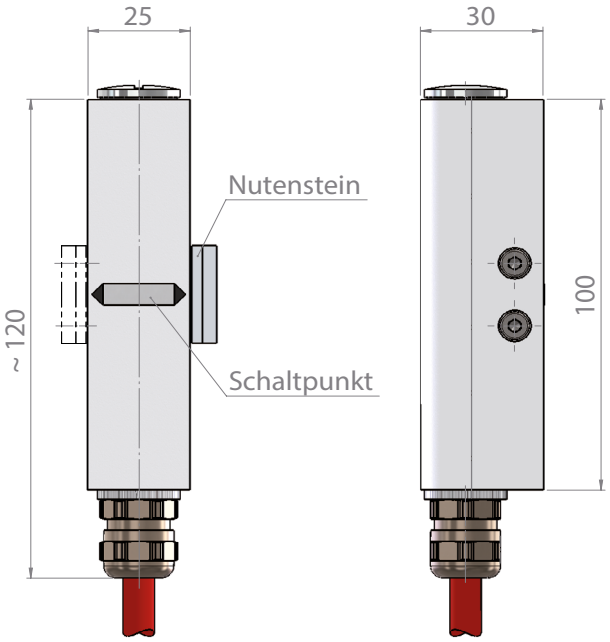
Material /	Acrylglas
Width /	35 mm
Depth /	67 mm
Ambient temp. /	-40. . .+100°C
Mounting /	with indicator bar
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS



Appendix D - Switching contacts:

Versions fitted to the indicator bar

MRK-S01 **Standard with Cable connection**
MRK-S01EXI **Intrinsically safe acc. to ATEX**

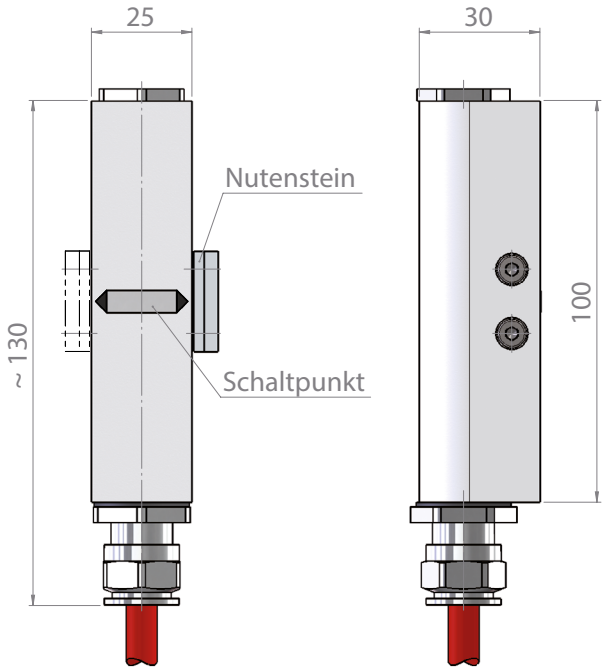


Technical Specifications

Housing /	Aluminium anodised
Mounting /	right or left side to the indicator bar
Prot. class /	IP65
Ambient temp. (ATEX) /	PVC -20. . .+80°C (-20. . .+80°C) SIL -60. . .+180°C (-25. . .+180°C) PUR -40. . .+80°C (-25. . .+80°C) Radox® -35. . .+120°C (-25. . .+120°C)
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1

Versions fitted to the indicator bar

MRK-S01EXD **press.-proof encapsulation from ATEX**



Technical Specifications

Housing /	Aluminium anodised
Mounting /	right or left side to the indicator bar
Prot. class /	IP65
Ambient temp. /	PVC -20. . .+80°C SIL -25. . .+120°C PUR -25. . .+80°C Radox® -25. . .+120°C
Function /	co-contact, increasing level, bistable
Switch rating /	U_N 250 V / P_{FN} 50 W/VA / P_{PN} 700 mW with Namur switch U_N 15 VDC / I_N 60 mA with protective resistor U_N 250 V / I_N 100 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1

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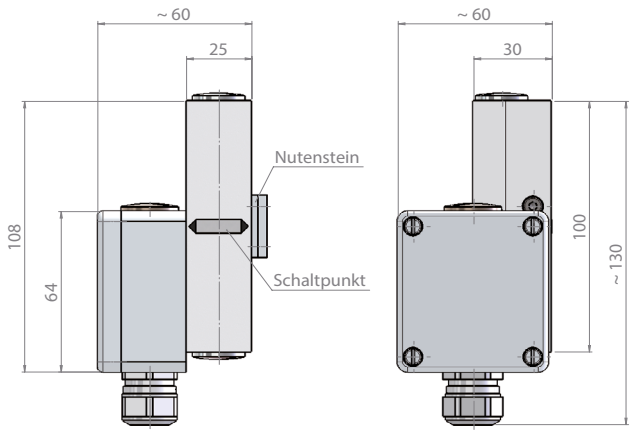
Switching contacts:

Versions fitted to the indicator bar

MRV-S01 Standard with cable gland
MRV-S01EXI Intrinsically safe acc. to ATEX

Technical Specifications

Housing /	Aluminium anodised
El. conn. /	cable gland M20 x 1,5
Mounting /	right or left side to the indicator bar
Prot. class /	IP65
Ambient temp. (ATEX) /	-40. . .+130°C (-25. . .+130°C)
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1

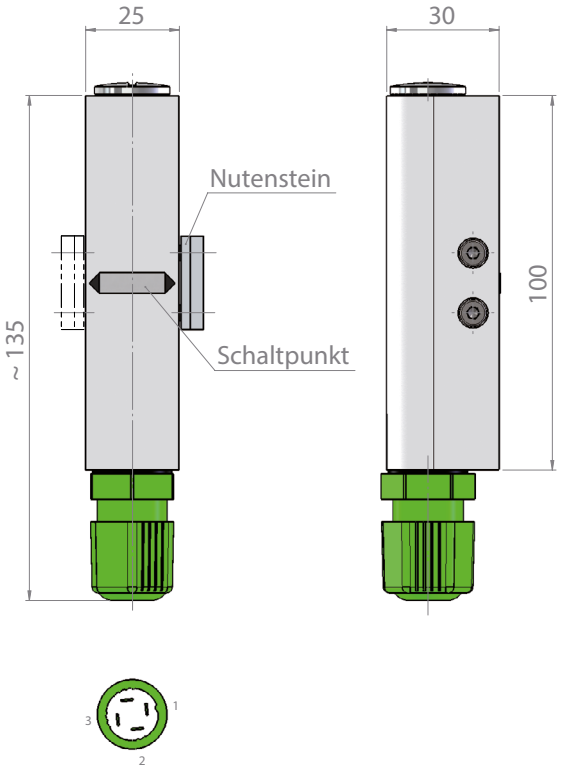


Versions fitted to the indicator bar

MRQ-S01 Standard with QuickOn-connection
MRQ-S01EXI Intrinsically safe acc. to ATEX

Technical Specifications

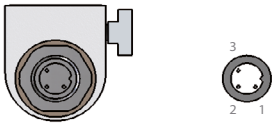
Housing /	Aluminium anodised
El. conn. /	QuickOn
Mounting /	right or left side to the indicator bar
Prot. class /	IP65
Ambient temp. /	-25. . .+50°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST



Switching contacts:

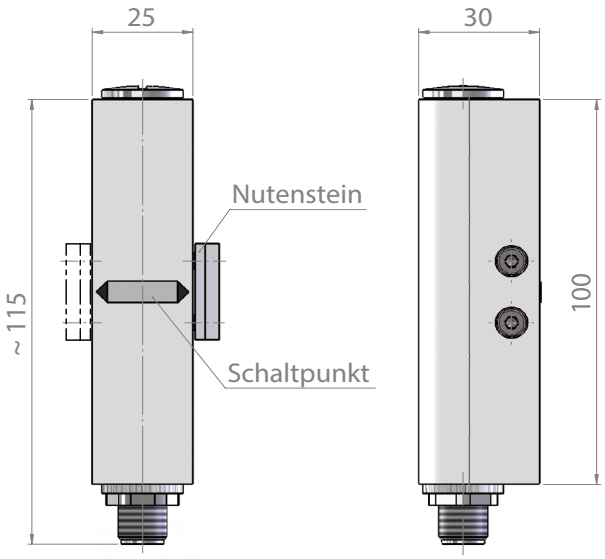
Versions fitted to the indicator bar

MRM-S01 **Standard with M12-Plug connection**
MRM-S01EXI **Intrinsically safe acc. to ATEX**



Technical Specifications

Housing /	Aluminium anodised
El. conn. /	plug M12
Mounting /	right or left side to the indicator bar
Prot. class /	IP65
Ambient temp. /	-25. . .+90°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, SIL1

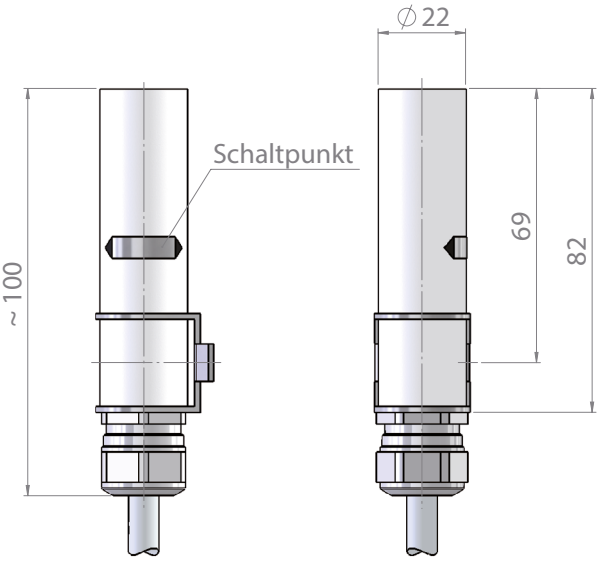


Aluminium Versions fitted to the indicator bar

MGK-A60 **Chambers up to 73 mm, Cable connection**
MGK-A60EXI **Intrinsically safe acc. to ATEX**
MGK-A73 **Chambers ab 73 mm, Cable connection**
MGK-A73EXI **Intrinsically safe acc. to ATEX**

Technical Specifications

Housing /	Aluminium anodised	
Mounting /	can be positioned freely	
Prot. class /	IP65	
Ambient temp. /	PVC	-20. . .+80°C
	SIL	-40. . .+180°C
	PUR	-40. . .+80°C
	Radox®	-35. . .+120°C
Function /	co-contact, increasing level, bistable	
Switch rating /	230 V / 0.5 A / 40 VA	
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA	
Hysteresis /	5. . .7 mm	
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	



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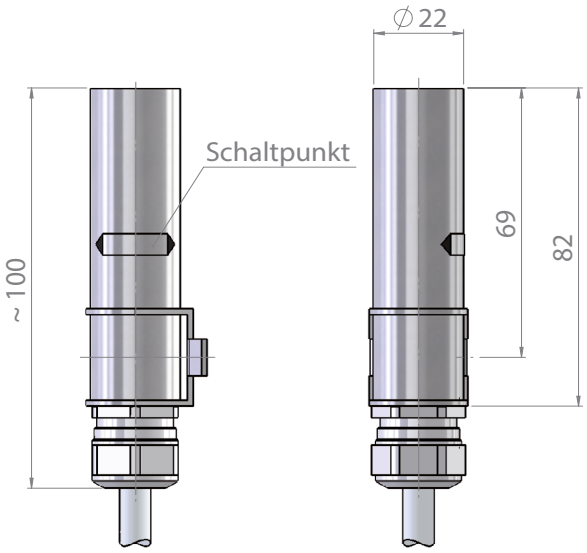
Switching contacts:

St. steel version fitted to the indicator bar

MGK-E60	**Chambers up to 73 mm, Cable connection**
MGK-E60EXI	**Intrinsically safe acc. to ATEX**
MGK-E73	**Chambers ab 73 mm, Cable connection**
MGK-E73EXI	**Intrinsically safe acc. to ATEX**

Technical Specifications

Housing /	st. steel	
Mounting /	can be positioned freely	
Prot. class /	IP68	
Ambient temp. /	PVC	-20. . .+80°C
	SIL	-40. . .+180°C
	PUR	-40. . .+80°C
	Radox®	-35. . .+120°C
Function /	co-contact, increasing level, bistable	
Switch rating /	230 V / 0.5 A / 40 VA	
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA	
Hysteresis /	5. . .7 mm	
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	

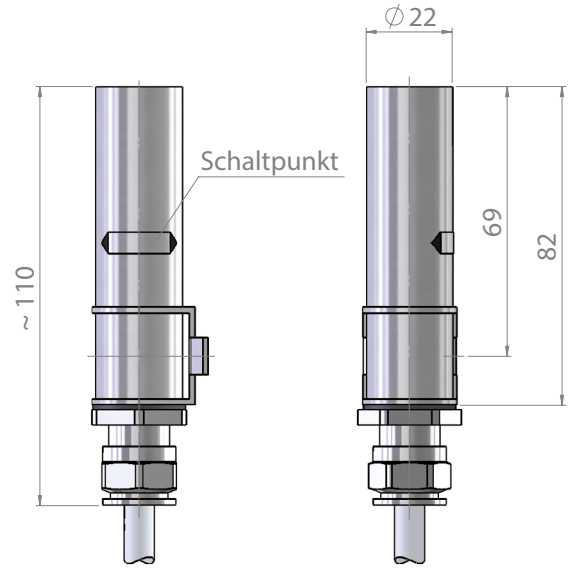


St. steel version fitted to the indicator bar

MGK-E60EXD	**press.-proof encapsulation from ATEX**
MGK-E73EXD	**press.-proof encapsulation from ATEX**

Technical Specifications

Housing /	st. steel	
Mounting /	can be positioned freely	
Prot. class /	IP68	
Ambient temp. /	PVC	-20. . .+80°C
	SIL	-40. . .+120°C
	PUR	-40. . .+80°C
	Radox®	-35. . .+120°C
Function /	co-contact, increasing level, bistable	
Switch rating /	U_N 250 V / P_{FN} 50 W/VA / P_{PN} 700 mW with Namur switch U_N 15 VDC / I_N 60 mA with protective resistor U_N 250 V / I_N 100 mA	
Hysteresis /	5. . .7 mm	
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	



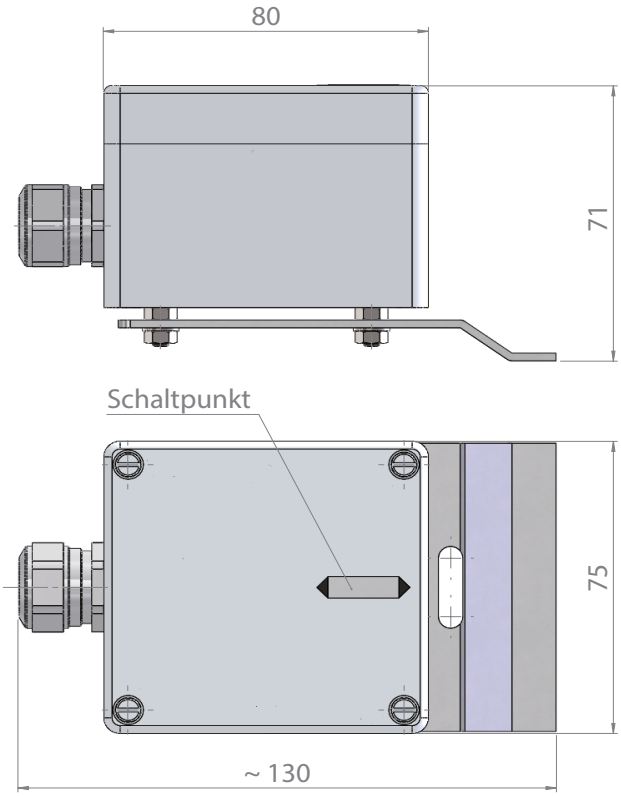
Switching contacts:

High-temp. co-contact fitted to the indicator bar

MGV-HTU **Standard with cable gland**
MGV-HTUEXI **Intrinsically safe acc. to ATEX**

Technical Specifications

Housing /	Aluminium anodised
El. conn. /	cable gland M20 x 1,5
Mounting /	can be positioned freely
Prot. class /	IP65
Ambient temp. /	-40. . .+300°C with Namur switch -40. . .+220°C with protective resistor -40. . .+220°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST

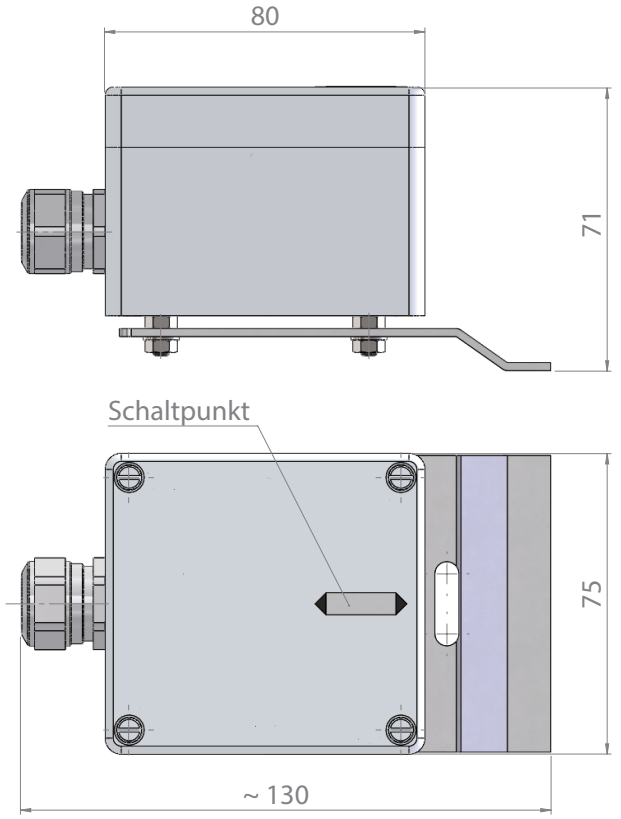


Proximity switch acc. to NAMUR fitted to the indicator bar

MGV-NC **Standard with cable gland**
MGV-NCEXI **Intrinsically safe acc. to ATEX**

Technical Specifications

Housing /	Aluminium coated RAL 9006
El. conn. /	cable gland M20 x 1,5
Mounting /	can be positioned freely
Prot. class /	IP65
Amb.temp.-(ATEX) /	-40. . .+100°C (-40. . .+73°C)
Function /	nc-contact, bistable
Supply /	5. . .25 VDC
Nominal-voltage /	8 VDC
Self-inductance & capacity /	100 mH / 30 nF
Intrinsic safety data /	U = 16 VDC, I = 25 mA, P = 34 mW
poss. Approvals /	ATEX, GOST, SIL1



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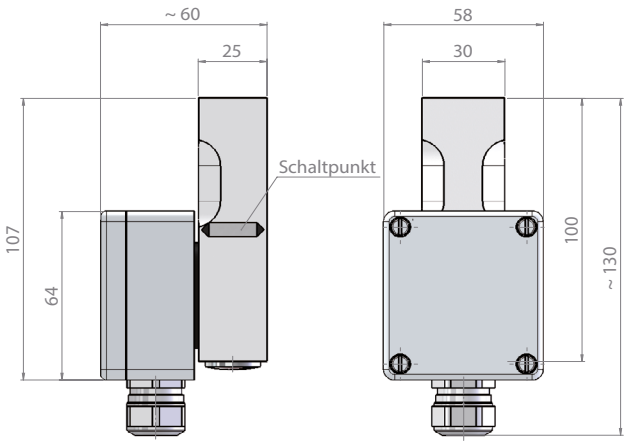
Switching contacts:

Standard co-contact fitted to the indicator bar

MGV-U **Standard with cable gland**
MGV-UEXI **Intrinsically safe acc. to ATEX**

Technical Specifications

Housing /	Aluminium anodised
El. conn. /	cable gland M20 x 1,5
Mounting /	can be positioned freely
Prot. class /	IP65
Ambient temp. /	-40. . .+130°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1

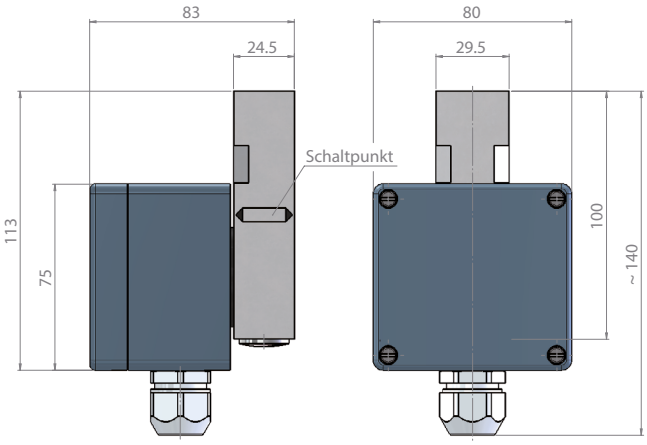


Co-contact in plastic housing fitted to the indicator bar

MGV-PU **Standard with cable gland**
MGV-PUEXI **Intrinsically safe acc. to ATEX**

Technical Specifications:

Housing /	Polyester / st. steel
El. conn. /	cable gland M20 x 1,5
Mounting /	can be positioned freely
Prot. class /	IP65
Ambient temp. /	-10. . .+100°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, SIL1



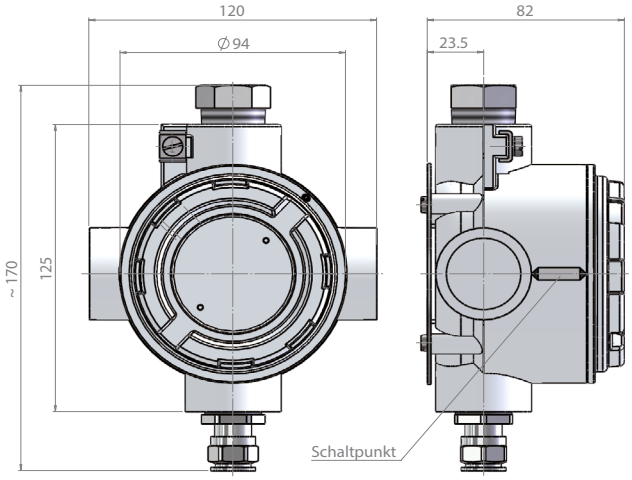
Switching contacts:

Co-contact in industrial housing fitted to the indicator bar

MGV-AUEXD press.-proof encapsulation from ATEX

Technical Specifications

Housing /	Aluminium coated RAL 9006
El. conn. /	cable gland M20 x 1,5
Mounting /	can be positioned freely
Prot. class /	IP65
Ambient temp. /	-40. . .+100°C
Function /	co-contact, increasing level, bistable
Switch rating /	U_N 250 V / P_{SN} 50 W/VA / P_{PN} 700 mW with Namur switch U_N 15 VDC / I_N 60 mA with protective resistor U_N 250 V / I_N 100 mA
Hysteresis /	5. . .7 mm
poss. Approvals /	ATEX, GOST, SIL1



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Appendix E - Armaflex® insulation and electrical trace heating:

ART Armaflex® insulation Standard

Technical Specifications

Material /	foam plastics based on synthetic rubber
Fire behaviour /	self-extinguishing, not drippy, not flamable
Nom. thickness /	32 mm
Amb.temp. /	-50. . .+105°C
UV-resistance /	no

ARH Armaflex® insulation High temperature

Technical Specifications

Material /	foam plastics based on synthetic rubber
Fire behaviour /	self-extinguishing, not drippy, not flamable
Nom. thickness /	25 mm
Amb.temp. /	-50. . .+150°C
UV-resistance /	yes

HA Electr. trace heating up to TU = 75°C

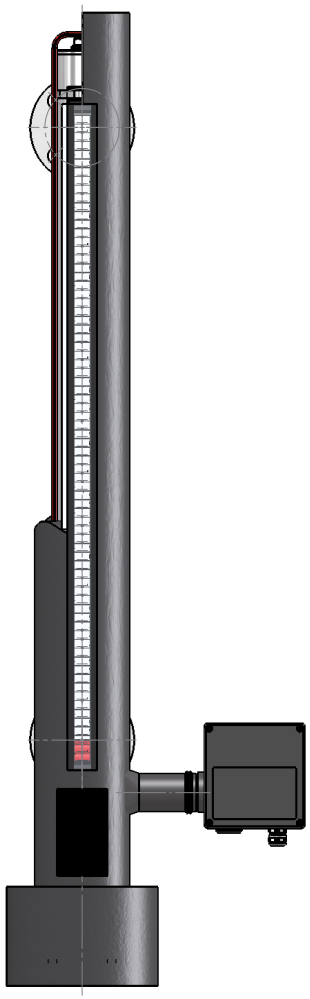
Technical Specifications

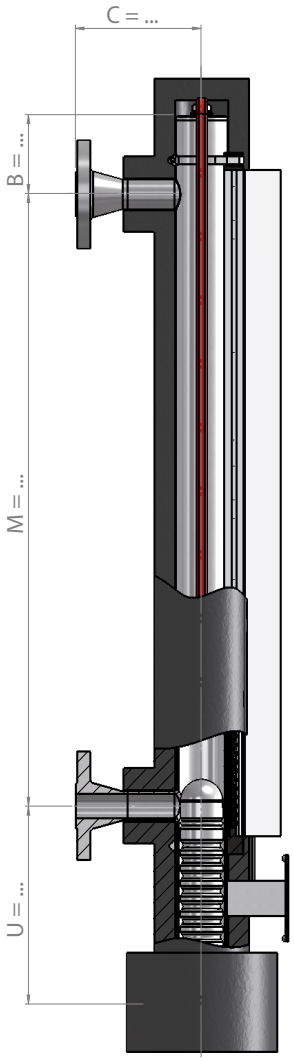
Housing /	GFK black with cable glands M25
Protective shell /	Fluorpolymer
Supply voltage /	230 VAC
Power output /	76 W per meter for 10°C
Holding temp. /	-10°C / frost protect. (32 mm insulation)
Steam flushing /	no
Amb.temp. /	-40. . .+75°C
poss. Approvals /	ATEX EExe T4, DNV

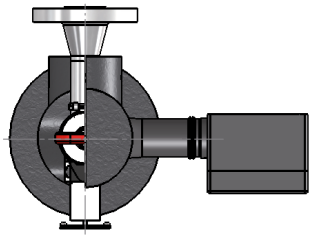
HB Electr. trace heating up to TU = 150°C

Technical Specifications

Housing /	GFK black with cable glands M25
Protective shell /	Fluorpolymer
Supply voltage /	230 VAC
Power output /	50 W pro Meter for 10°C
Holding temp. /	-10°C / frost protect. (32 mm insulation)
Steam flushing /	yes
Amb.temp. /	-40. . .+150°C
poss. Approvals /	ATEX EExe T4, DNV







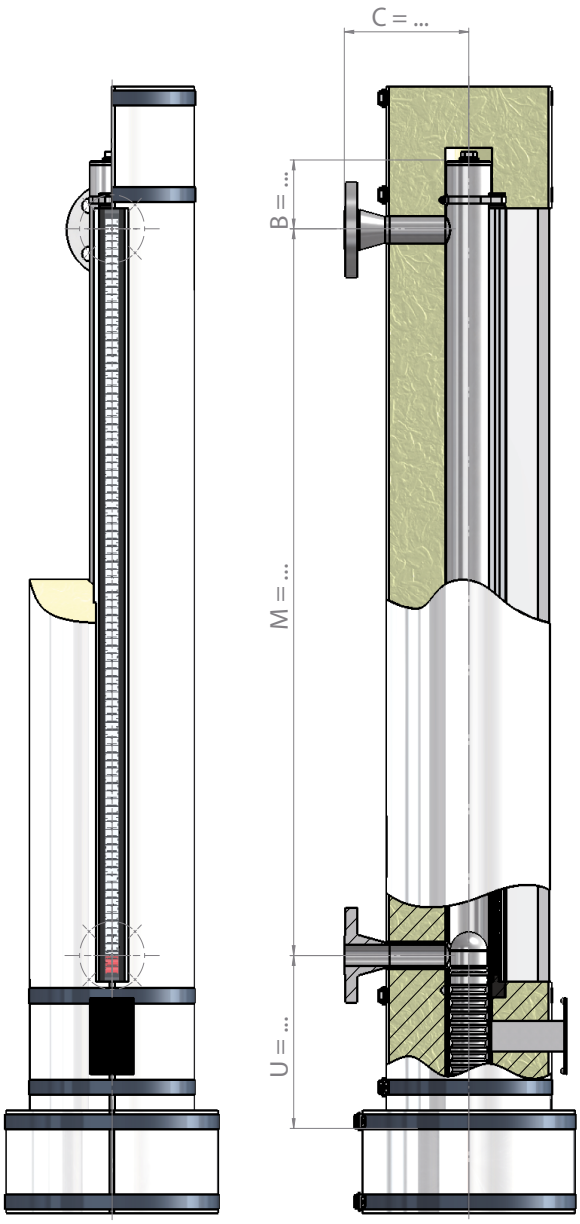


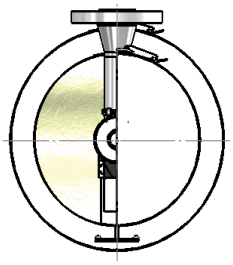
Appendix F - Rock-wool insulation:

SW Rock-wool insulation (removable)

Technical Specifications

Material /	rock-wool with a chrome-nickel cover (removable)
Nom. thickness /	-50 mm
Ambient temp. /	-50. . .+750°C
UV-resistance /	yes

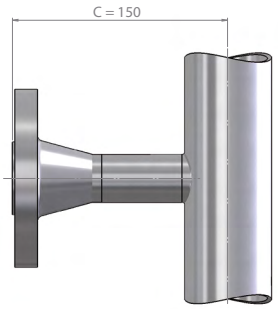




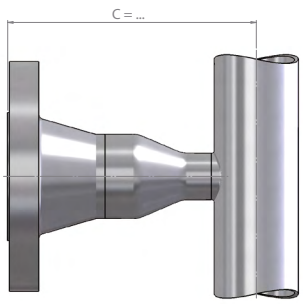


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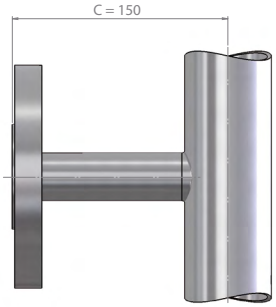
Appendix G - Prozessanschlüsse, Dämpfungsfedern and Haltelasche:



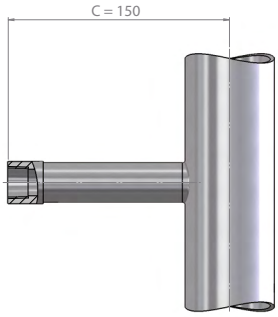
welding neck flange (standard)



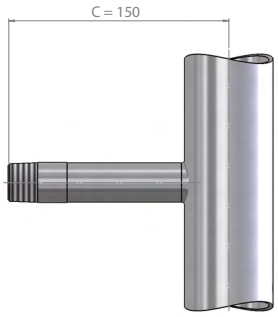
welding neck flange (reduced)



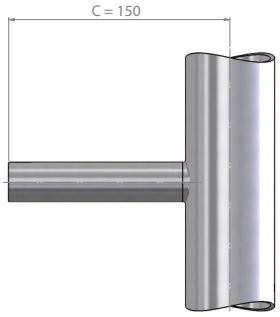
blind flange



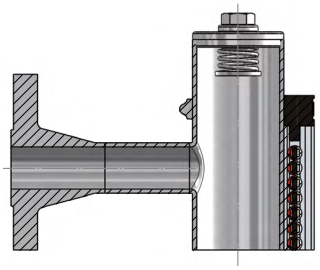
thread socket (female)



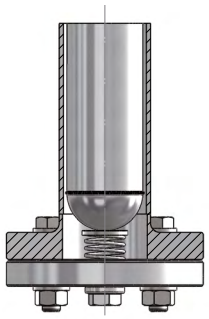
thread socket (male)



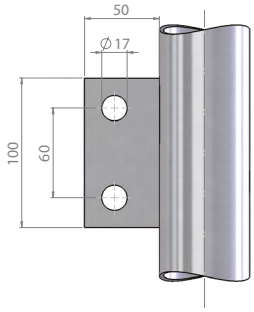
weld-on socket



upper dampening spring



lower dampening spring



mounting bracket

Welding neck flange, reduced from DN50 (2“) to DN25 (1“)

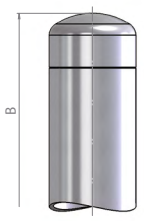
Pressure level	16 / 150#	40 / 300#	63 / 600#	160 / 1500#	250-400 / 2500#
OD chamber (mm)	C (mm)	C (mm)	C (mm)	C (mm)	C (mm)
60.30	154 / 172	156 / 179	170 / 188	-	-
63.50	155 / 174	158 / 180	172 / 190	-	-
73.03	160 / 179	163 / 185	177 / 195	190 / 223	225 / 248
88.90	168 / 186	171 / 193	185 / 203	198 / 231	233 / 256
114.30	181 / 199	184 / 206	198 / 215	211 / 244	246 / 269

Material - Process connections

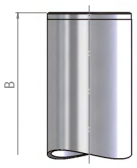
	Welding neck flange	Welding neck flange reduced	Blind flange	Female thread	Male thread	Weld-on socket
St. steel	x	x	x	x	x	x
Titanium	x	x	x	x	x	x
Alloy	x	x	x	x	x	x
PVC	o	o	x	o	o	o
PP	o	o	x	o	o	o
PVDF	o	o	x	o	o	o
ECTFE-coated	x	x	x	o	o	o
PFA-coated	x	x	x	o	o	o
redundant System	x	x	x	x	x	x
Reference vessel	x	x	x	x	x	x

o **= not combinable** x **= combinable**

Appendix H - Chamber end top:



BA: welding cap



BB: flat top



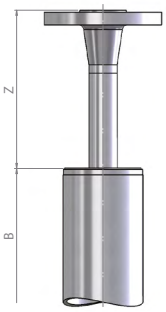
BC: flat top with vent plug G



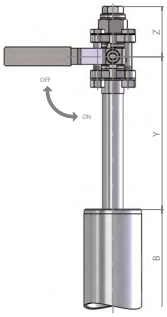
BD: flat top with vent plug NPT



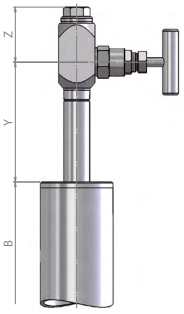
BE: flat top with vent nozzle



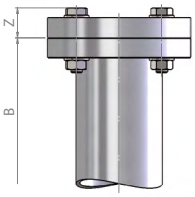
BF: flat top with vent flange



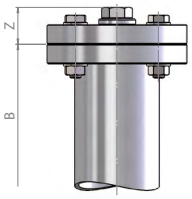
BG: flat top with vent ball valve



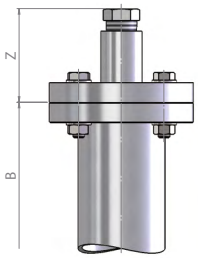
BH: flat top with needle valve



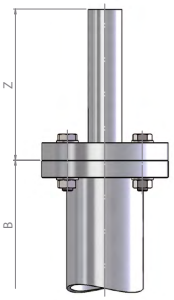
BI: flanged connection



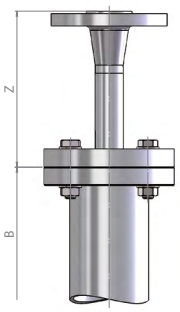
BJ: flanged connection with vent plug G



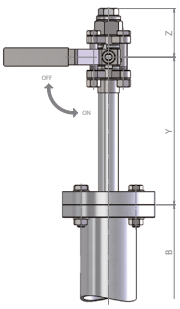
BK: flanged connection with vent plug NPT



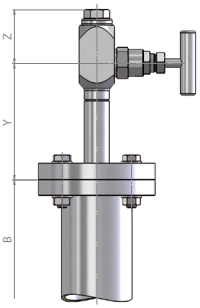
BL: flanged connection with vent nozzle



BM: flanged connection with vent flange



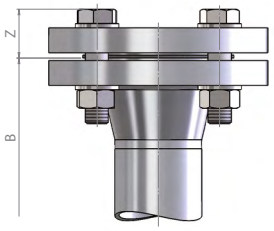
BN: flanged connection with vent ball valve



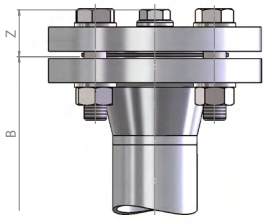
BO: flanged connection with vent needle valve

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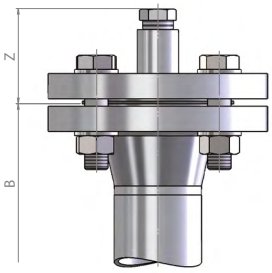
Chamber end top:



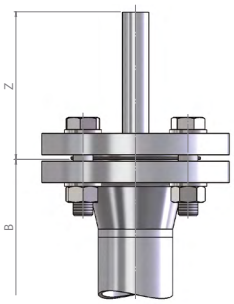
BP: welding neck flange EN / ANSI



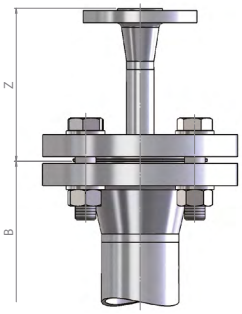
BQ: welding neck flange EN / ANSI with vent plug G



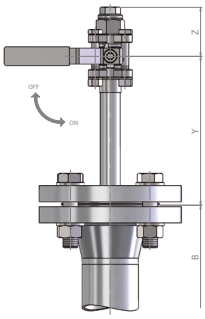
BR: welding neck flange EN / ANSI with vent plug NPT



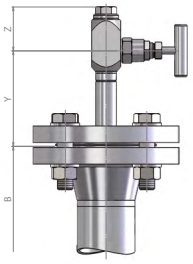
BS: welding neck flange EN / ANSI with vent nozzle



BT: welding neck flange EN / ANSI with vent flange



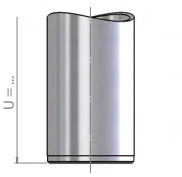
BU: welding neck flange EN / ANSI with vent ball valve



BV: welding neck flange EN / ANSI with vent needle valve

Pressure Level	16 / 150#			40 / 300#			63 / 600#			160 / 1500#			250-400 / 2500#		
	B	Y	Z	B	Y	Z	B	Y	Z	B	Y	Z	B	Y	Z
	Dimensions in mm														
Welding cap	90	-	-	90	-	-	-	-	-	-	-	-	-	-	-
Flat top	90	-	-	90	-	-	90	-	-	90	-	-	90	-	-
Flat top with vent plug G ½	90	-	20	90	-	20	90	-	20	-	-	-	-	-	-
Flat top with vent plug NPT ½	90	-	30	90	-	30	90	-	30	90	-	30	90	-	30
Flat top with vent nozzle	90	-	120	90	-	120	90	-	120	90	-	120	90	-	120
Flat top with vent flange	90	-	120	90	-	120	90	-	120	90	-	120	90	-	120
Flat top with vent ball valve G	90	180	55	90	180	55	90	180	55	-	-	-	-	-	-
Flat top with vent needle valve G	90	120	50	90	120	50	90	120	50	-	-	-	-	-	-
Flanged connection	120	-	30	120	-	30	-	-	-	-	-	-	-	-	-
Flanged connection with vent plug G ½	120	-	35	120	-	35	-	-	-	-	-	-	-	-	-
Flanged connection with vent plug NPT ½	120	-	65	120	-	65	-	-	-	-	-	-	-	-	-
Flanged with vent nozzle	120	-	120	120	-	120	-	-	-	-	-	-	-	-	-
Flanged connection with vent flange	120	-	120	120	-	120	-	-	-	-	-	-	-	-	-
Flanged connection with vent ball valve G	120	180	55	120	180	55	-	-	-	-	-	-	-	-	-
Flanged connection with vent needle valve G	120	120	50	120	120	50	-	-	-	-	-	-	-	-	-
Welding neck flange EN/ANSI	160	-	35	160	-	35	160	-	50	200	-	100	250	-	115
Welding neck flange EN/ANSI with vent plug G ½	160	-	35	160	-	35	160	-	50	-	-	-	-	-	-
Welding neck flange EN/ANSI with vent plug NPT ½	160	-	65	160	-	65	160	-	70	200	-	100	250	-	115
Welding neck flange EN/ANSI with vent nozzle	160	-	120	160	-	120	160	-	120	200	-	120	250	-	120
Welding neck flange EN/ANSI with vent flange	160	-	120	160	-	120	160	-	120	200	-	200	250	-	200
Welding neck fl. EN/ANSI with vent ball valve G	160	200	55	160	200	55	160	200	55	-	-	-	-	-	-
Welding neck fl. EN/ANSI with vent needle valve G	160	120	50	160	120	50	160	120	50	-	-	-	-	-	-
Welding neck fl. EN/ANSI w. vent needle valve NPT	160	120	50	160	120	50	160	120	50	200	200	55	250	200	55

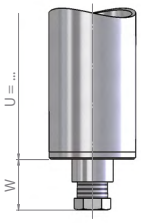
Appendix I - Chamber end bottom:



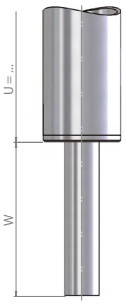
UA: flat top



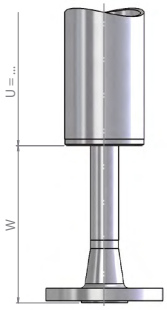
UB: flat top with drain plug G



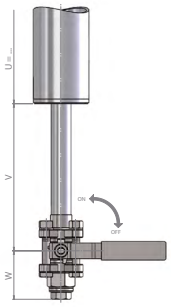
UC: flat top with drain plug NPT



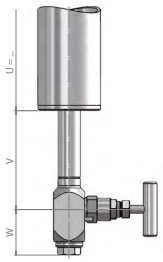
UD: flat top with drain nozzle



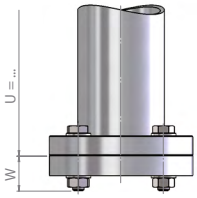
UE: flat top with drain flange



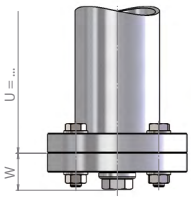
UF: flat top with drain ball valve



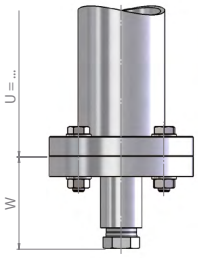
UG: flat top with drain needle valve



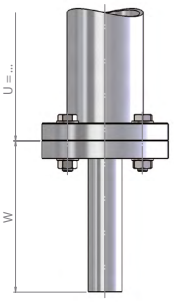
UH: flanged connection



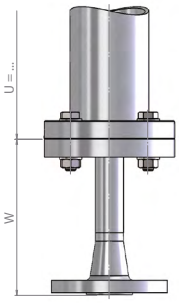
UI: flanged connection with drain plug G



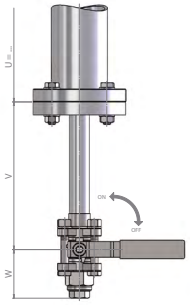
UJ: flanged connection with drain plug NPT



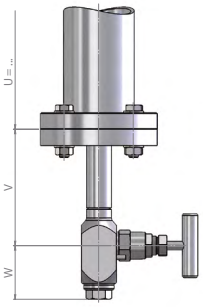
UK: flanged connection with drain nozzle



UL: flanged connection with drain flange



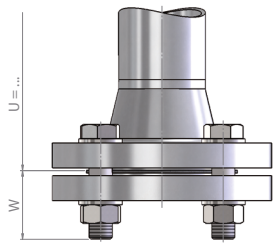
UM: flanged connection with drain ball valve



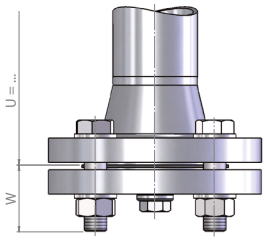
UN: flanged connection with drain needle valve

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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

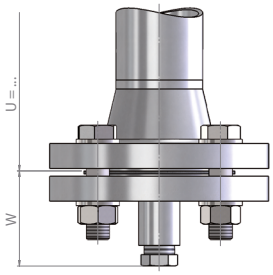
Chamber end bottom:



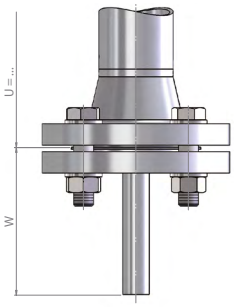
UO: welding neck flange EN / ANSI



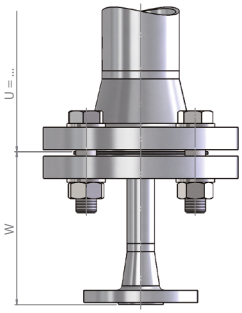
UP: welding neck flange EN / ANSI with drain plug G



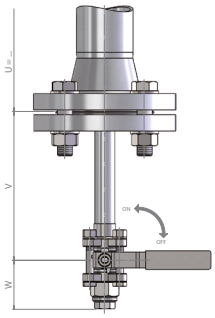
UQ: welding neck flange EN / ANSI with drain plug NPT



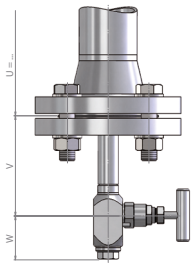
UR: welding neck flange EN / ANSI with drain nozzle



US: welding neck flange EN / ANSI with drain flange



UT: welding neck flange EN / ANSI with drain ball valve



UU: welding neck flange EN / ANSI with drain needle valve

Pressure Level	16 / 150#			40 / 300#			63 / 600#			160 / 1500#			250-400 / 2500#		
	U	V	W	U	V	W	U	V	W	U	V	W	U	V	W
	Dimensions in mm														
Flat top	-*	-	-	-*	-	-	-*	-	-	-*	-	-	-*	-	-
Flat top with drain plug G ½	-*	-	20	-*	-	20	-*	-	20	-*	-	-	-*	-	-
Flat top with drain plug NPT ½	-*	-	30	-*	-	30	-*	-	30	-*	-	30	-*	-	30
Flat top with drain nozzle	-*	-	120	-*	-	120	-*	-	120	-*	-	120	-*	-	120
Flat top with drain flange	-*	-	120	-*	-	120	-*	-	120	-*	-	120	-*	-	120
Flat top with drain ball valve G	-*	180	55	-*	180	55	-*	180	55	-	-	-	-	-	-
Flat top with drain needle valve G	-*	200	50	-*	200	50	-*	200	50	-	-	-	-	-	-
Flanged connection	-*	-	30	-*	-	30	-	-	-	-	-	-	-	-	-
Flanged connection with drain plug G ½	-*	-	35	-*	-	35	-	-	-	-	-	-	-	-	-
Flanged connection with drain plug NPT ½	-*	-	65	-*	-	65	-	-	-	-	-	-	-	-	-
Flanged connection with drain nozzle	-*	-	120	-*	-	120	-	-	-	-	-	-	-	-	-
Flanged connection with drain flange	-*	-	120	-*	-	120	-	-	-	-	-	-	-	-	-
Flanged connection with drain ball valve G	-*	180	55	-*	180	55	-	-	-	-	-	-	-	-	-
Flanged connection with drain needle valve G	-*	200	50	-*	200	50	-	-	-	-	-	-	-	-	-
Welding neck flange EN/ANSI	-*	-	35	-*	-	35	-*	-	50	-*	-	100	-*	-	115
Welding neck flange EN/ANSI with drain plug G ½	-*	-	35	-*	-	35	-*	-	50	-*	-	-	-*	-	-
Welding neck fl. EN/ANSI with drain plug NPT ½	-*	-	65	-*	-	65	-*	-	70	-*	-	100	-*	-	115
Welding neck flange EN/ANSI with drain nozzle	-*	-	120	-*	-	120	-*	-	120	-*	-	120	-*	-	120
Welding neck flange EN/ANSI with drain flange	-*	-	120	-*	-	120	-*	-	120	-*	-	200	-*	-	200
Welding neck fl. EN/ANSI with drain ball valve G	-*	200	55	-*	200	55	-*	200	55	-	-	-	-	-	-
Welding neck fl. EN/ANSI with drain neddle valve G	-*	120	50	-*	120	50	-*	120	50	-	-	-	-	-	-
Welding neck fl. EN/ANSI w. drain needle valve NPT	-*	120	50	-*	120	50	-*	120	50	-*	200	55	-*	200	55

-* depending on the float length

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MA-400M

Mini-Bypass Magnetic Level Gauge

Features

/ Low-cost design

/ For simple applications

/ Up to 5 meter measuring length

/ Up to +6 bar

/ Up to +150°C liquid temperature

/ Flange, thread and welded connections

/ Switching contacts and measuring transmitter

/ Electrical trace heating and insulation possible

/ Customized designs

Description:

A measuring tube made from a non-magnetizable material has two lateral connecting sleeves, which are joined with the vessel to be monitored. Since in this reference vessel the same fluid level is found as that in the tank, a cylindrical float is located always at the height with the liquid level. The float is counterbalanced exactly to the density of the medium and it carries a specially designed disc shaped magnetic system that acts through the stainless steel wall of the measuring tube on an indicator bar which is sensitive to magnetic force. Due to the magnetic force of the float, its pre-magnetized rollers are turned by 180° in such a matter, that all rollers below the float turn their red and the remaining rollers above the float turn their white side to the front. Thus, the observer obtains a precise visual statement of the level in the container. Optionally, the reference tube can be equipped with bistable, magnetic sensitive limit contacts which emit a binary signal when the float has passed the level where the sliding contacts are mounted. Another alternative to the remote transmission of value is adding a reed contact chain FM-02N externally to the measuring tube that would convert the float movement into a stepped resistance or current signal. Instead of the reed contact chain, also a magnetostrictive sensor can be used which breaks up the level at a higher accuracy and provides a 4 to 20 mA power signal in 2-wire circuit.

Application:

The MA-400M series of mini-bypass magnetic level gauges has been long in use in large numbers in the entire industry, thus bypass float level technology has a proven record of accurately measuring level in field for over 30 years. Meanwhile, the technology of remote transmission, for example, by using magnetostrictive sensors has been perfected to such extent that it is no way inferior to other methods of level measurement and monitoring. Moreover, the advantage here is that the level can be identified at one glance directly at the measuring point. The electrical signals in the control room can be verified visually without much assembling work. The main fields of application include the level monitoring and level controlling in tanks, agitator- and open vessels with media such as acids, alkalis, fuels, oils etc.

Ordering Codes:

Order no.	MA-400M.	1800.	E.	40.	1.	DN15PN6.	0000.	ZVA34PN6-200mm.	BA.	UB.	MMA-01.	0.	1/5

MA-400M Mini-Bypass Magnetic Level Gauge

Center distance of lateral connections (M) or length of instrument (instr. without side connections) in mm /
[ ][ ][ ][ ] mm (150 mm to 5000 mm)

Bypass chamber material /
E = stainless steel

Bypass chamber outside diameter /
40 = Ø 40.00 mm

Process connection /
0 = none
1 = flange acc. to EN
2 = flange acc. to ANSI
3 = female thread G
4 = female thread NPT
5 = male thread G
6 = male thread NPT
7 = weld-on end
99 = customized special, please specify in detailed text

Nominal diameter, pressure level and sealing face /
[ ][ ][ ][ ] e.g. DN15 PN16 B1
(0000 for weld-on end and thread connection)

Weld-on end size elsewise thread size for screw neck or bushing /
[ ][ ][ ][ ] e.g. G3/4" or M18x1.5
(0000 for flange connection)

Float type and length acc. to appendix D „Cylindrical floats" /
[ ][ ][ ][ ] e.g. ZVA34PN6-200 mm

Chamber end top acc. to appendix H „Chamber end top" /
[ ][ ] = e.g. BA (welding cap)
99 = customized special, please specify in detailed text
(00 for process connection located at the top of the chamber)

Chamber end bottom acc. to appendix I „Chamber end bottom" /
[ ][ ] = e.g. UB (flat top with drain plug G)
99 = customized special, please specify in detailed text
(00 for process connection located at the bottom of the chamber)

Indicator bar /
0 = none
[ ][ ][ ][ ] e.g. MMA-01

Approvals /
0 = none
[ ][ ][ ][ ] e.g. ATEX II 1G2D/2GD c

Options (multiple names like 7/8 possible) /
[ ][ ][ ][ ] e.g. 1 / 10 / (3 x MGK-A70)

Indicator bar /

Aluminium housing - colorless mattfinished

MMA-01 = standard
MMA-01N = standard, over-roll-protected
MMA-01EX = with ATEX approval
MMA-01NEX= with ATEX approval, over-roll-protected

Aluminium housing - stainless steel covered

MMV-01 = standard
MMV-01N = standard, over-roll-protected
MMV-01EX = with ATEX approval
MMV-01NEX= with ATEX approval, over-roll-protected

Options /
1 = switching contacts, specify quantity and type in detailed text
2 = switch protective circuit with 22 Ω / 0.21 W
3 = switch protective circuit acc. to NAMUR EN 60947
4 = remote transmitter REED contact chain with resistance output acc. to data sheet FM-02N
5 = remote transmitter REED contact chain with power output 4 to 20 mA acc. to data sheet FM-02N
6 = remote transmitter magnetostrictive with linear power output 4 to 20 mA acc. to data sheet FM-01F
7 = mounting bracket for lengths above 2000 mm
8 = float damping spring top mounted
9 = float damping spring bottom mounted
10 = rock-wool insulation SW (removeable)
11 = Armaflex® insulation ART up to TU = +105°C
12 = Armaflex® insulation ARH up to TU = +150°C
13 = electrical trace heating HA up to TU = +75°C
14 = electrical trace heating HB up to TU = +150°C
15 = angle scale WK-AK, mounted on the indicator bar (please specify scale in detailed text)
16 = angle scale WK-AG, mounted on the indicator bar (please specify scale in detailed text)
17 = angle scale WK-EG, mounted on the indicator bar (please specify scale in detailed text)
18 = sight extension PV for indicator bar

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Versions:

Measuring range (ME):
The distance between the upper and the lower lateral connection is specified in millimeters. The maximum length of a measuring tube is 5000 mm. For a length of 2000 mm and above, we recommend equipping the magnetic level gauge with a welded bracket for additional securing (Option /7). If the free space (dugout) between the lower connecting piece and the base or the space (projection) between the upper connecting piece and the ceiling are in one way or the other restricted, the relevant maximum parameter must be specified in detailed text at the time of placing an order. In an empty vessel, the float for the MA-400M is located in the so-called float-sack below the connection and in a full tank in the projection above the connection. This means that these dimensions must correspond with at least the float length.

Measuring tube material and diameter:
As a standard the measuring tube is made of stainless steel (V4A) with a tube outer diameter of 40mm and a wall thickness of 2mm.

Process connection:
Flanges as per EN or ANSI, female and male threads or welded ends are the most commonly used features for connecting the MA-400M to the side of the vessel. Customized solutions like aligning the connecting piece on top/ below or on top/laterally or at the bottom/laterally are available on request.

Nominal diameter and pressure level for flange:
The precise name of the connecting flange on the vessel must be specified in a detailed text. Some examples are flange DIN EN 1092-1 DN25 PN16 form B1 or ANSI 1" 300 lbs RF. Standard flanges are DIN EN 1092-1 DN15 PN16 with sealing bar form B1.

Thread for screw neck or bushing:
If a screw neck or a bushing is selected as a variant for the connection, the thread size must be specified in detailed text. Here the standard is G 3/4". All normally used inch or metric thread systems are available on request.

Measuring tube connection top:
An overview of the various possible variants of the upper measuring tube connection, such as with ventilation screw, valve or flange, is located on the last pages of this data-sheet.

Measuring tube connection bottom:
An overview of the various possible variants of the lower measuring tube connection, such as with drain plug, valve or flange is located on the last pages of this data sheet.

Indicator bars:
Standard versions are colorless mattfinished aluminium and for rough atmospheres with stainless steel coated housing. Optionally rotating backed versions are available (they guarantee clean turnover of the magnetic rollers even due to vibration).

Float type and length:
The matching float is selected from the float tables of this data sheet. The criterias are material and temperature resistance to the medium. From the float length the user determines the surfacing volume of the float at a known specific gravity of the medium being measured. The ideal surfacing volume at which liquid level and magnet system are on one level is shown in bold. Also, the length of the float-sack below the lower connection and in a full tank the projection above the upper connection depends on the selected float length. Should the application be subject to space limitations, it is advisable to choose a lighter float material such as buna, thus saving on float length.

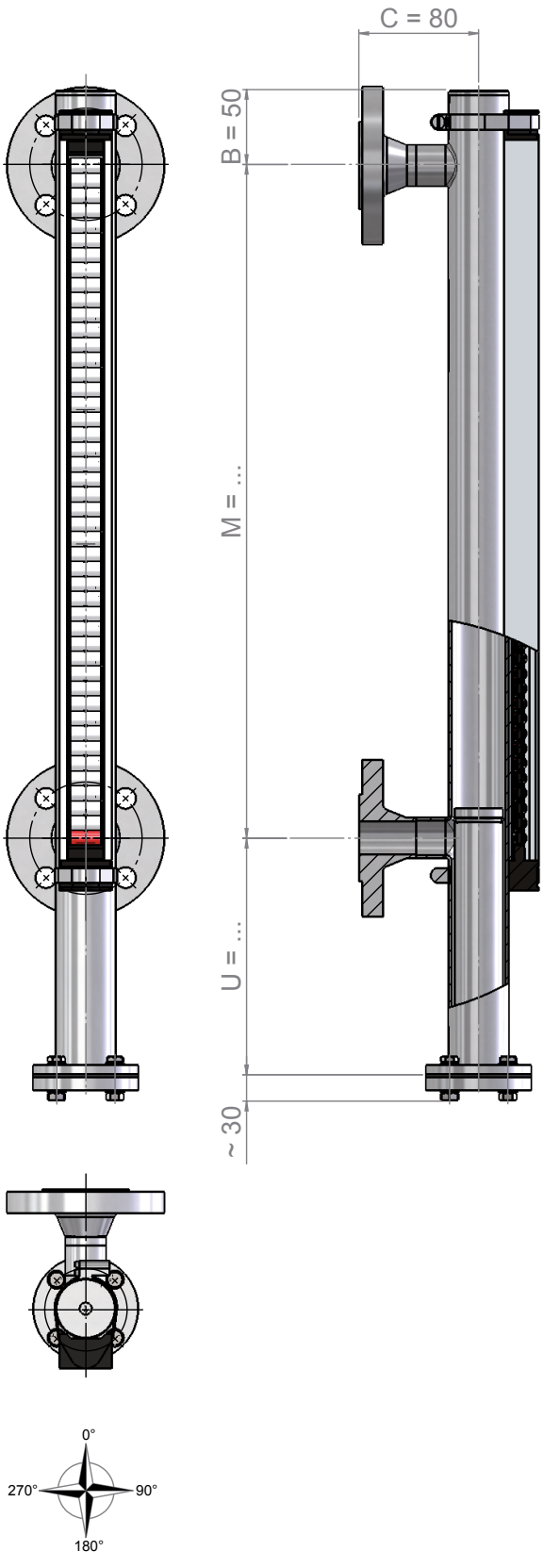
Approvals:
Various approvals are available for the magnetic level gauge type of MA-400M such as ATEX, GL, DNV, GOST, BV, ABS and, if necessary, they are tested with regard to the Pressure Equipment Directive. Since the devices are modular assembled (contacts, sensors, indicator bar etc.) it must be ensured, that all components used meet the required approval.

Options:
With regard to options, specifiy in detail whether the MA-400M should be provided with electrical limit contacts and as to how many (option /1). A circuit with a protective resistor or a combination of resistors, which offers a behavior according to NAMUR, is available for the contacts (option /2 and /3). Optionally, for remote transmission of level value a reed contact measuring transmitter (option /4 and /5) or a magnetostrictive sensor (option /6) can be mounted externally to the MA-400M which provides a 4 to 20 mA signal at the output (see also FM-01F and FM-02N for details). Mounting brackets stabilize the magnetic level gauge for lengths above 2 meters (option /7). Solid and removable insulation against cold and heat (option /10 , /11 and /12), trace heating against frost (option /13 and /14), angular scales with various engravings (option /15, /16 and /17) and a cover for concealed or isolated indicator bars (option /18) round off the equipment possibilities.

Mini-Bypass Magnetic Level Gauge made of Stainless Steel PN6 with lateral Process Connection

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center distance /	150. . .5000 mm
spec. Weight /	≥ 560 kg/m³
Design pressure /	-1. . .+6 bar
Designtemp. /	-40. . .+150°C
Chamber /	Ø 40 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bottom /	see appendix I „Chamber end bottom“
Float /	see appendix D „Cylindrical floats“
Magnetic roller indicator /	aluminium or st. steel / Pocan® temp. -40. . .+200°C
Scale /	aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	aluminium / st. steel -40. . .+150°C
Option level transmitter /	FM-02N
Option El. heat tracing /	holding temperature -10°C / frost protect.
Option insulation /	Armaflex® or rock-wool
poss. Approvals*/	ATEX II 1G2D/2GD c or ATEX II 2GD c liquid temperature max. +150°C, PED, GOST, GL, BV, DNV, ABS

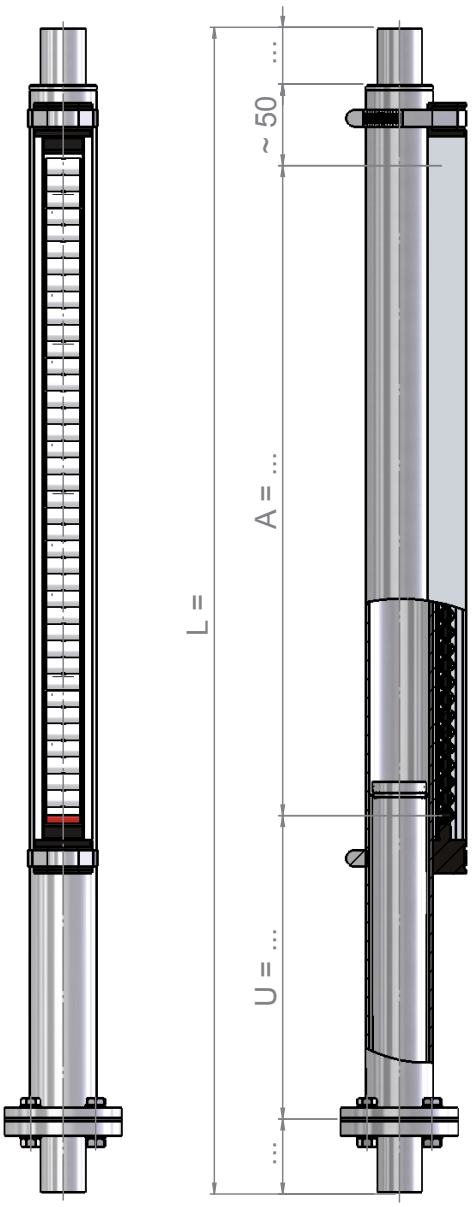


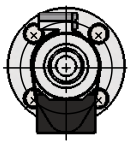
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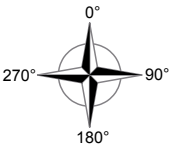
Mini-Bypass Magnetic Level Gauge made of Stainless Steel PN6 with top and bottom Process Connection

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center distance /	150. . .5000 mm
spec. Weight /	≥ 560 kg/m³
Design pressure /	-1. . .+16 bar
Designtemp. /	-40. . .+150°C
Chamber /	Ø 40 x 2 mm
Process connection /	see appendix G „Process connections“
Float /	see appendix D „Cylindrical floats“
Magnetic roller indicator /	aluminium or st. steel / Pocan® temp. -40. . .+200°C
Scale /	aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	aluminium / st. steel -40. . .+150°C
Option level transmitter /	FM-02N
Option El. heat tracing /	holding temperature -10°C / frost protect.
Option insulation /	Armaflex® or rock-wool
poss. Approvals*/	ATEX II 1G2D/2GD c or ATEX II 2GD c liquid temperature max. +150°C, PED, GOST, GL, BV, DNV, ABS







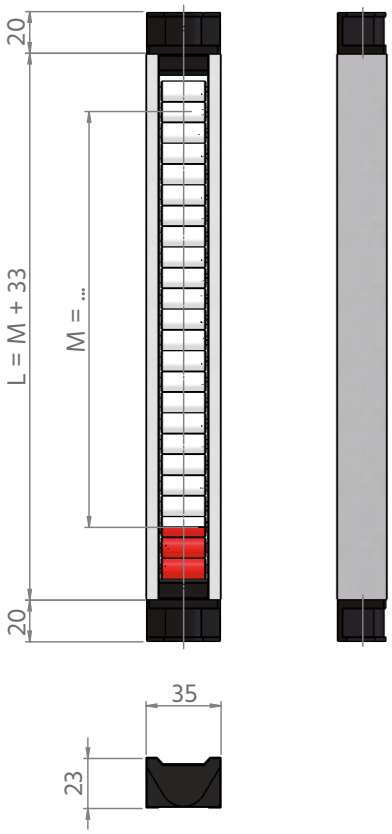
Appendix A - Indicator bars:

Versions

MMA-01	**Standard**
MMA-01N	**Standard, over-roll-protected**
MMA-01EX	**ATEX approval**
MMA-01NEX	**ATEX approval, over-roll-protected**

Technical specifications

Housing /	aluminium - colorless mattfinished
Prot. class /	IP67
Rollers /	Pocan® (ø 10 mm), white / red
End part /	Ryton®, black
Inspec. glass /	MMA-01 and MMA-01N Makrolon®, MMA-01EX and MMA-01NEX glass
Ambient temp. /	-40. . .+200°C,
Roller rotation /	MMA-01N and MMA-01NEX max. 180°
poss. Approvals /	ATEX, GOST, GL, BV, DNV, ABS

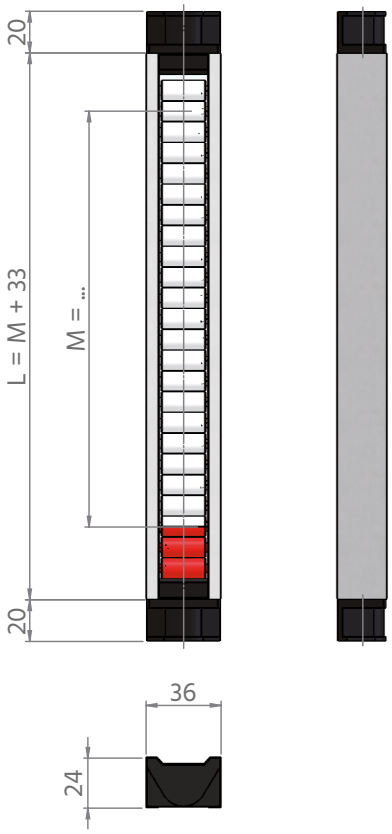


Versions

MMV-01	**Standard**
MMV-01N	**Standard, over-roll-protected**
MMV-01EX	**ATEX approval**
MMV-01NEX	**ATEX approval, over-roll-protected**

Technical Specifications

Housing /	aluminium - stainless steel covered
Prot. class /	IP67
Rollers /	Pocan® (Ø 10 mm), white / red
End part /	Ryton®, black
Inspec. glass /	MMV-01 and MMV-01N Makrolon®, MMV-01EX and MMV-01NEX glass
Ambient temp. /	-40. . .+200°C,
Roller rotation / available	MMV-01N and MMV-01NEX max. 180°
Approvals /	ATEX, GOST, GL, BV, DNV, ABS



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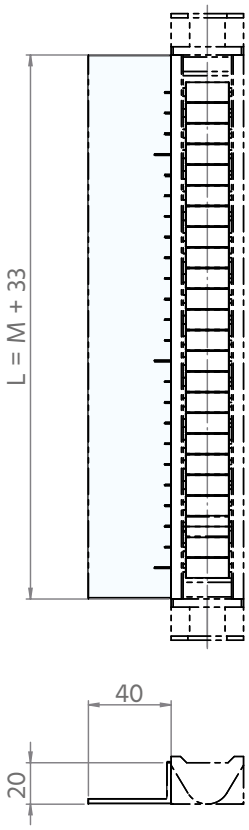
Appendix B - Angle scales and sight extension:

Angle scale versions

WK-AK	**Aluminium with adhesive foil (black)**
WK-AG	**Aluminium with engraving**
WK-EG	**Stainless steel with engraving**

Technical specifications

Angle profile /	WK-AK: aluminium WK-AG: aluminium WK-EG: stainless steel
Scaling /	WK-AK: in cm (0 cm. . .10 cm. . .20 cm. . .) WK-AG: blank / % / cm / inch WK-EG: blank / % / cm / inch
Width /	40 mm
Ambient temperature /	WK-AK: -40°C up to +200°C WK-AG: -40°C up to +200°C WK-EG: -40°C up to +400°C
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS

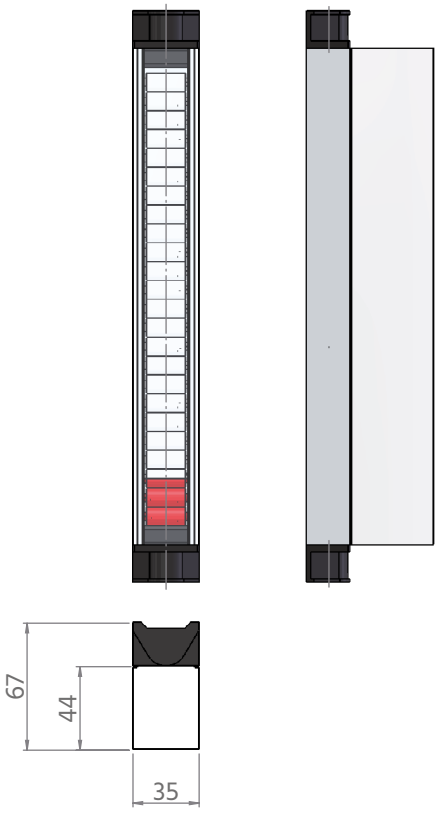


Sight extension version

PV	**Sight extension for indicator bar**

Technical specifications

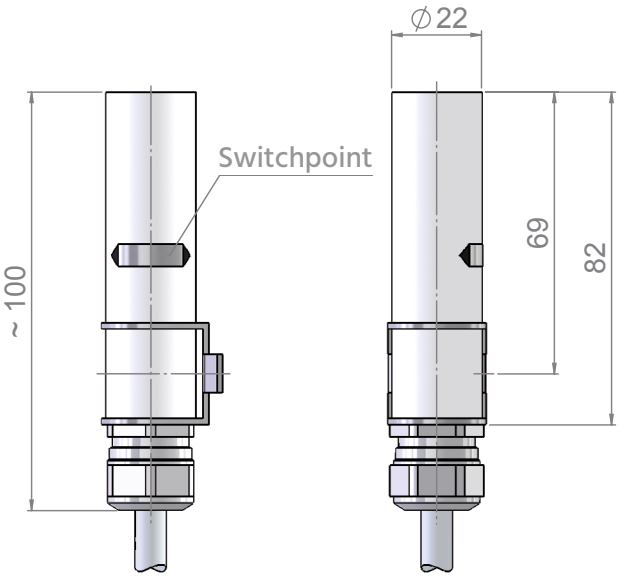
Material /	acrylic glass
Width /	35 mm
Depth /	67 mm
Ambient temperature /	-40°C up to +100°C
Mounting /	on indicator bar
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS



Appendix C - Switching Contacts:

Aluminium versions for chamber mounting

MGK-A40 **Standard with cable connection**
MGK-A40EXI **Intrinsically safe acc. to ATEX**

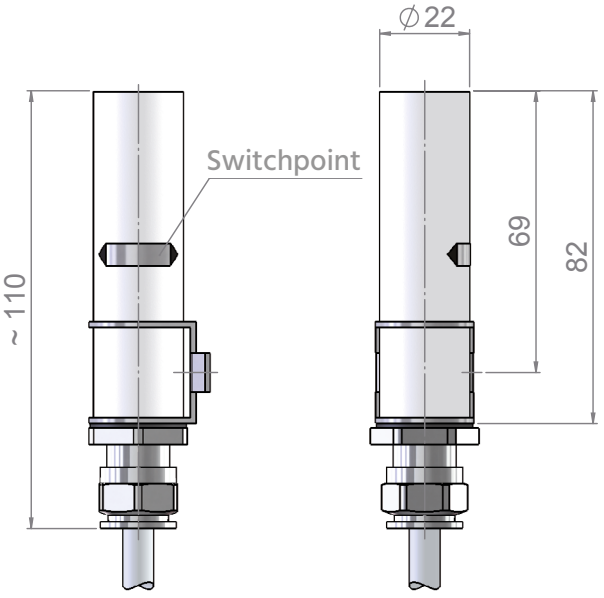


Technical specifications

Housing /	aluminium anodised	
Mounting /	free positionable on the chamber	
Prot. class /	IP68	
Ambient temperature /	PVC	-20. . .+80°C
	SIL	-40. . .+150°C
	PUR	-40. . .+80°C
	Radox®	-35. . .+120°C
Function /	co-contact, increasing level, bistable	
Switch rating /	230 V / 0.5 A / 30 VA	
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA	
Hysteresis /	5. . .7 mm	
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	

Aluminium versions for chamber mounting

MGK-A40EXD Explosion-proof enclosure acc. to ATEX



Technical specifications

Housing /	aluminium anodised	
Mounting /	free positionable on the chamber	
Prot. class /	IP68	
Ambient temperature /	PVC	-20. . .+80°C
	SIL	-40. . .+120°C
	PUR	-40. . .+80°C
	Radox®	-35. . .+120°C
Function /	co-contact, increasing level, bistable	
Switch rating /	U_N 250 V / P_{FN} 50 W/VA / P_{PN} 700 mW NAMUR EN 60947: U_N 15 VDC / I_N 60 mA with protective resistor: U_N 250 V / I_N 100 mA	
Hysteresis /	5. . .7 mm	
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	

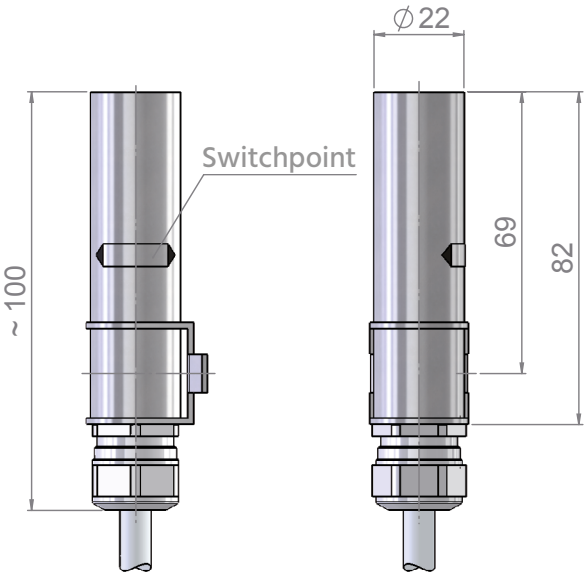
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Stainless steel versions for chamber mounting:

MGK-E40 **Standard with cable connection**
MGK-E40EXI **Intrinsically safe acc. to ATEX**

Technical specifications

Housing /	stainless steel	
Mounting /	free positionable on the chamber	
Prot. class /	IP68	
Ambient temperature /	PVC	-20. . .+80°C
	SIL	-40. . .+150°C
	PUR	-40. . .+80°C
	Radox®	-35. . .+120°C
Function /	co-contact, increasing level, bistable	
Switchrating /	230 V / 0.5 A / 30 VA	
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA	
Hysteresis /	5. . .7 mm	
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	

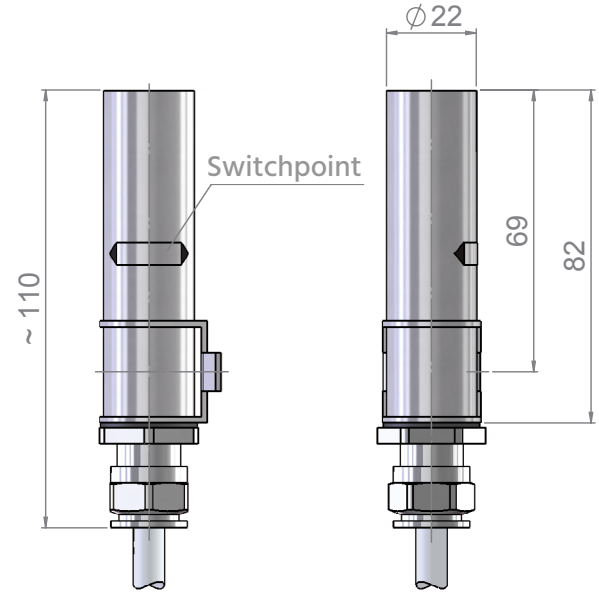


Stainless steel versions for chamber mounting:

MGK-E40EXD **Explosion-proof enclosure acc. to ATEX**

Technical specifications

Housing /	stainless steel	
Mounting /	free positionable on the chamber	
Prot. class /	IP68	
Ambient temperature /	PVC	-20°C up to +80°C
	SIL	-25°C up to +120°C
	PUR	-40°C up to +80°C
	Radox®	-35°C up to +120°C
Function /	co-contact, increasing level, bistable	
Switch rating /	U_N 250 V / P_{FN} 50 W/VA / P_{PN} 700 mW NAMUR EN 60947: U_N 15 VDC / I_N 60 mA with protective resistor: U_N 250 V / I_N 100 mA	
Hysteresis /	5. . .7 mm	
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1	



Aluminium versions for chamber mounting

MGV-ABF **Standard with cable gland**
MGV-ABFEXI **Intrinsically safe acc. to ATEX**

Technical specifications

Housing /	aluminium anodised
Electrical connection /	terminal box flat with cable gland M20 x 1.5
Mounting /	free positionable on the chamber
Prot. class /	IP65
Ambient temperature /	-40. . .+130°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 30 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1

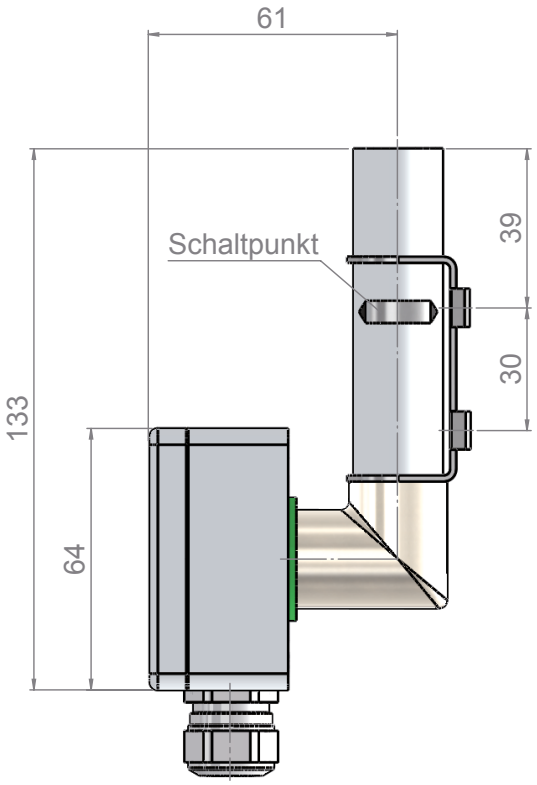


Fig. 1) with terminal box - flat

Aluminium versions for chamber mounting

MGV-ABF **Standard with cable gland**
MGV-ABFEXI **Intrinsically safe acc. to ATEX**

Technical specifications

Housing /	aluminium anodised
Electrical connection /	terminal box flat with cable gland M20 x 1.5
Mounting /	free positionable on the chamber
Prot. class /	IP65
Ambient temperature /	-40. . .+130°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 30 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis /	5. . .7 mm
available Approvals /	ATEX, GOST, GL, BV, DNV, ABS, SIL1

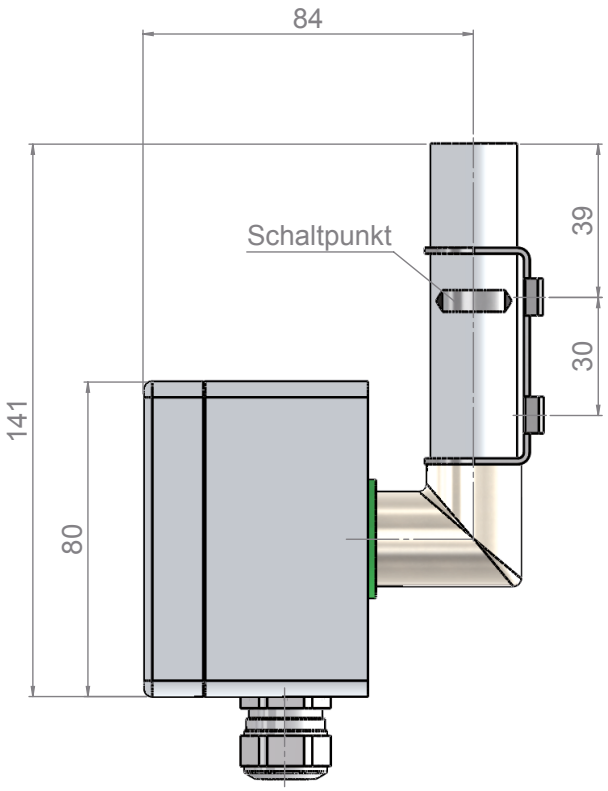


Fig. 2) with terminal box - high

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Appendix D - Cylindrical floats:

Cylindrical float made of stainless steel 1.4571, PN6, Type ZVA34PN6:

Float length (mm)		180	200	230	250	280	300	340	420	480	580
Float weight (g)		127	135	148	156	168	177	194	227	252	294
emerged float height (mm)		spec. weight of the media (kg/m³)									
0	0	-	-	-	-	-	-	-	-	-	-
10	10	940	900	850	820	790	770	740	690	670	650
20	**20**	**1000**	**950**	**900**	**850**	**820**	**800**	**760**	**710**	**690**	**660**
30	30	1070	1000	940	890	850	830	790	730	710	670
40	40	1140	1070	990	940	890	860	820	750	720	680
50	50	1230	1140	1040	990	920	900	840	770	740	700
60	60	1340	1220	1100	1030	960	930	870	790	760	710
70	70	1460	1320	1170	1090	1010	970	900	820	770	720
80	80	1600	1430	1250	1150	1060	1010	940	840	790	740
90	90	1780	1550	1340	1230	1110	1060	980	860	810	750
100	100	2000	1710	1440	1310	1180	1110	1020	890	830	770



Float diameter:	34 mm
Design temperature:	-40. . .+150°C
Design pressure:	-1 bar. . .+6 bar
Distance U:	check figure of magnetic level gauge
Distance U with float stop:	float length minus 20 mm
Distance U with damping spring:	float length minus 10 mm

Cylindrical float made of Buna, PN6, Typ ZBU35PN6:

Float length (mm)		90	100	105	115	120	135	150	170	195	225
Float weight (g)		73	76	77	80	81	85	89	96	103	110
emerged float height (mm)		spez. Gewicht des Mediums (kg/m³)									
0	0	-	-	-	-	-	-	-	-	-	-
5	5	-	-	-	-	-	-	-	-	-	-
10	10	950	850	840	790	770	710	660	620	580	530
15	15	1000	950	900	850	800	750	700	650	600	550
20	**20**	**1080**	**990**	**940**	**870**	**840**	**770**	**710**	**670**	**610**	**560**
25	25	1170	1050	1000	920	890	800	740	690	630	570
30	30	1260	1130	1070	980	940	840	770	710	650	590
35	35	1380	1220	1140	1040	990	880	800	740	670	600
40	40	1520	1320	1230	1160	1050	930	840	770	690	620
45	45	1690	1440	1330	1190	1120	980	880	800	710	640
50	50	1900	1580	1460	1280	1200	1040	930	830	740	650



Float diameter:	35 mm
Design temperature:	-20°C up to +80°C
Design pressure:	-1 bar up to +6 bar
Distance U:	check figure of magnetic level gauge
Distance U with float stop:	float length minus 20 mm
Distance U with damping spring:	float length minus 10 mm

Appendix E - Armaflex® insulation and electrical trace heating

ART Armaflex® insulation - standard

Technical specifications

Material /	foam plastics based on synthetic rubber
Fire behaviour /	self-extinguishing, not drippy, not flamable
Nom. thickness /	32 mm
Ambient temp. /	-50. . .+105°C
UV resistance /	no

ARH Armaflex® insulation - high temp.

Technical specifications

Material /	foam plastics based on synthetic rubber
Fire behaviour /	self-extinguishing, not drippy, not flamable
Nom. thickness /	25 mm
Ambient temp. /	-50. . .+150°C
UV resistance /	yes

HA Electr. trace heating up to TU = 75°C

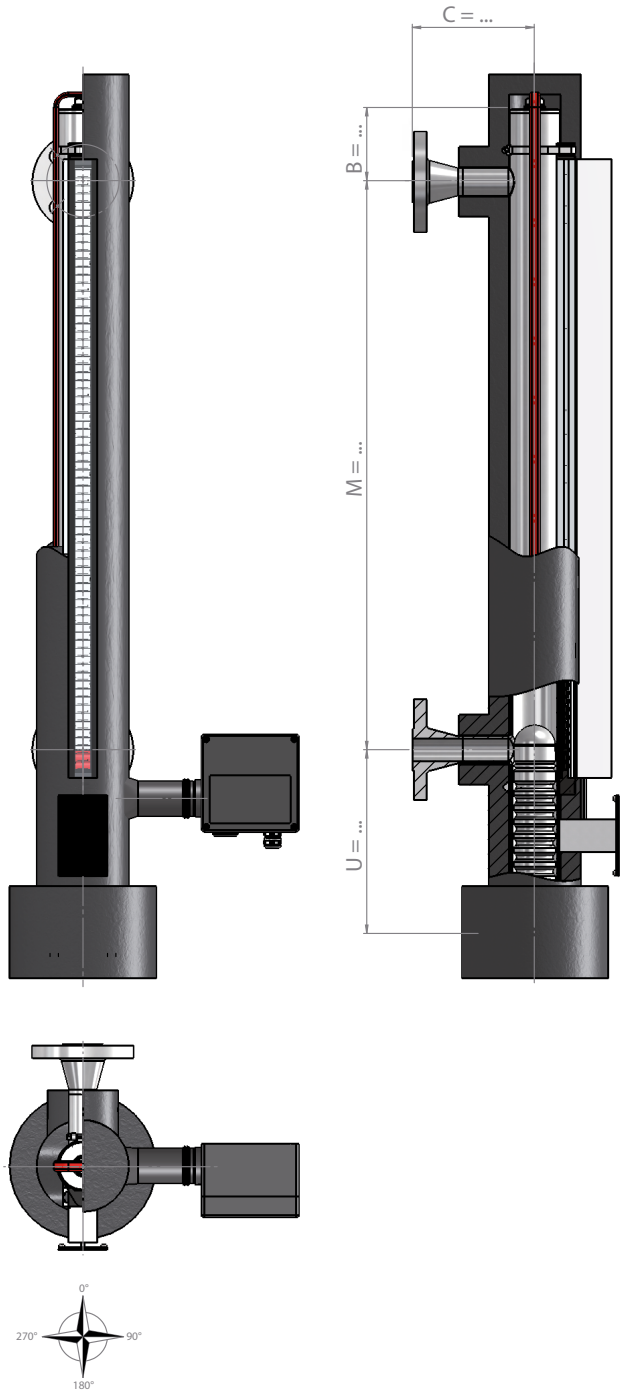
Technical specifications

Housing /	GFK black with cable gland M25
Protective shell /	fluoropolymer
Supply voltage /	230 VAC
Power output /	76 W / m at 10°C
Holding temp. /	-10°C / frost protect. (32 mm insulation)
Steam flushing /	no
Ambient temp. /	-40. . .+75°C
poss. Approvals /	ATEX EExe T4, DNV

HB Electr. trace heating up to TU = 150°C

Technical specifications

Housing /	GFK black with cable gland M25
Protective shell /	fluoropolymer
Supply voltage /	230 VAC
Power output /	50 W / m at 10°C
Holding temp. /	-10°C / frost protect. (32 mm insulation)
Steam flushing /	yes
Ambient temp. /	-40. . .+150°C
avail. Approvals /	ATEX EExe T4, DNV



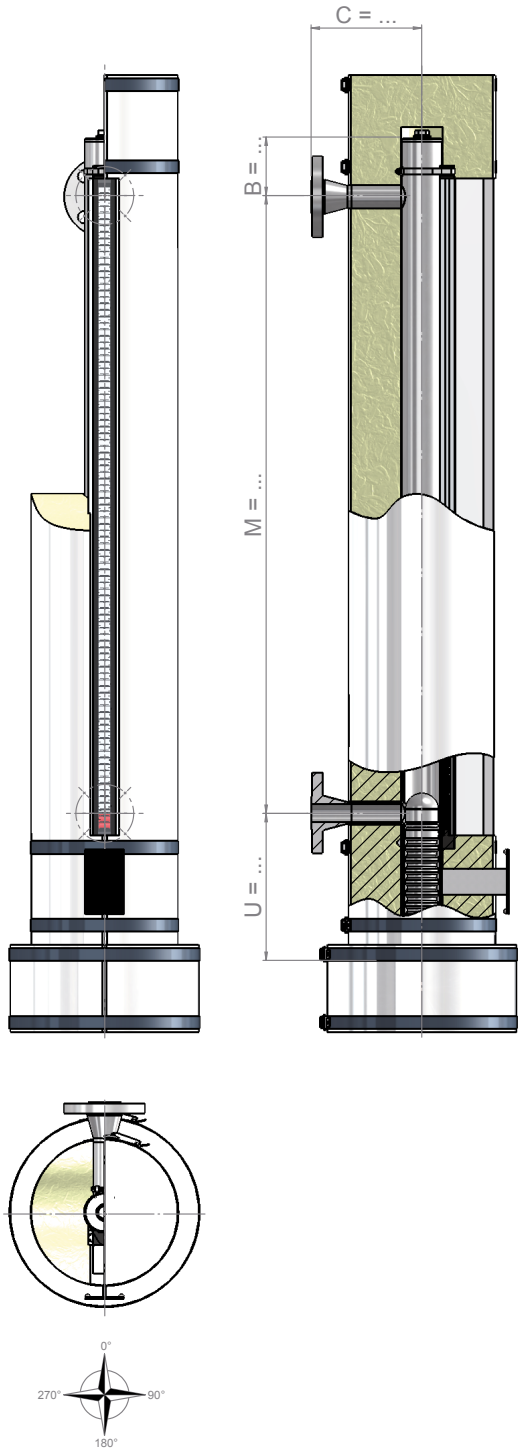
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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

Appendix F - rock-wool insulation

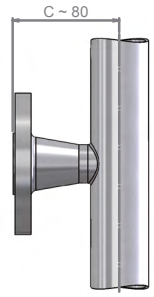
SW **Rock-wool insulation (removable)**

Technical specifications

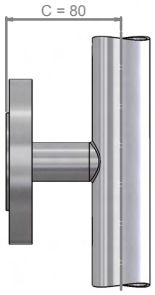
Material /	rock-wool with a crome-nickel cover (removable)
Nom. thickness /	-50 mm
Ambient temperature /	-50. . .+750°C
UV resistance /	yes



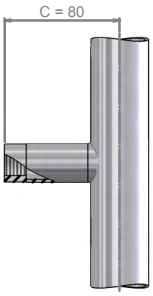
Appendix G - Process connections and the mounting bracket



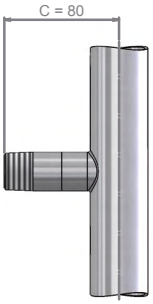
welding neck flange (standard)



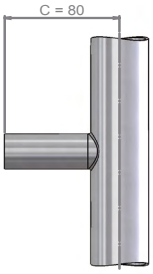
blind flange



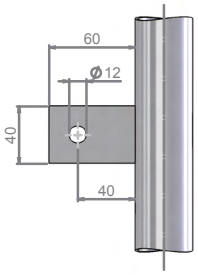
thread socket (female)



thread socket (male)

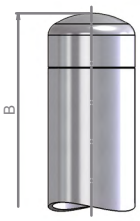


weld-on socket

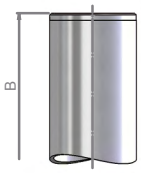


mounting bracket

Appendix H - Chamber end top



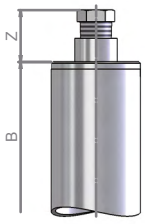
BA: welding cap



BB: flat top



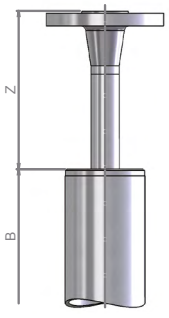
BC: flat top with vent plug G



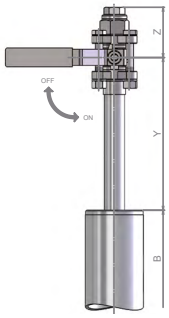
BD: flat top with vent plug NPT



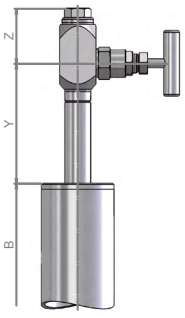
BE: flat top with vent nozzle



BF: flat top with vent flange



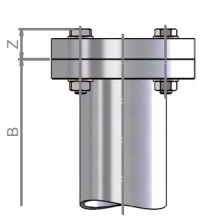
BG: flat top with vent ball valve



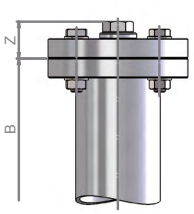
BH: flat top with needle valve

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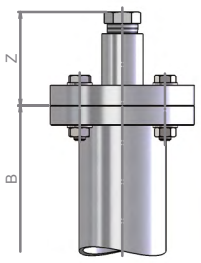
Appendix H - Chamber end top



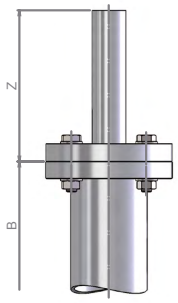
BI: flanged connection



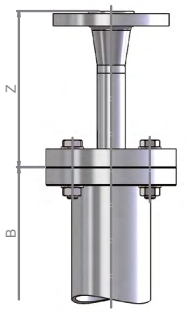
BJ: flanged connection with vent plug G



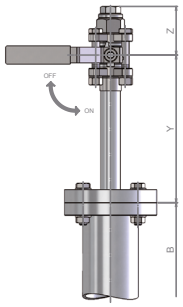
BK: flanged connection with vent plug NPT



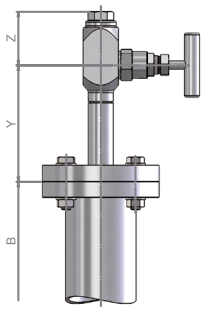
BL: flanged connection with vent nozzle



BM: flanged connection with vent flange



BN: flanged connection with vent ball valve

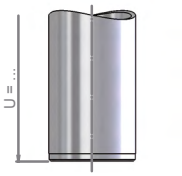


BO: flanged connection with vent needle valve

Chamber end top

Pressure level	6 / 150#		
	B	Y	Z
	Maße in mm		
Welding cap	-	-	-
Flat top	50	-	-
Flat top with vent plug G ¼	50	-	20
Flat top with vent plug NPT ½	50	-	30
Flat top with vent nozzle	50	-	100
Flat top with vent flange	50	-	100
Flat top with vent ball valve G	50	120	55
Flat top with vent needle valve G	50	120	50
Flanged connection	50	-	30
Flanged connection with vent plug G ¼	50	-	35
Flanged connection with vent plug NPT ½	50	-	65
Flanged connection with vent nozzle	50	-	100
Flanged connection with vent flange	50	-	100
Flanged connection with vent ball valve G	50	120	55
Flanged connection with vent needle valve G	50	120	50

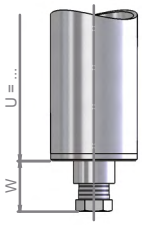
Appendix I - Chamber end bottom



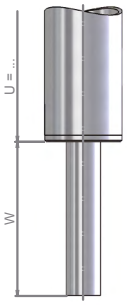
UA: flat top



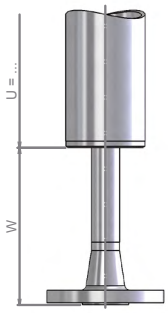
UB: flat top with drain plug G



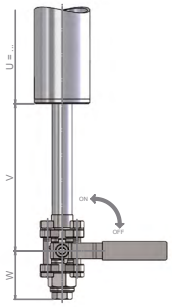
UC: flat top with drain plug NPT



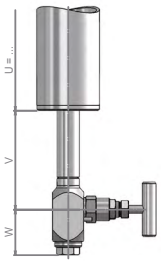
UD: flat top with drain nozzle



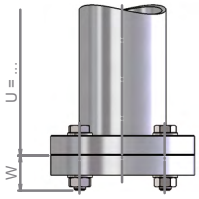
UE: flat top with drain flange



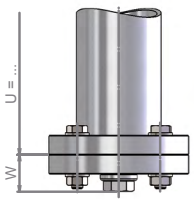
UF: flat top with drain ball valve



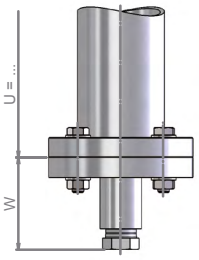
UG: flat top with drain needle valve



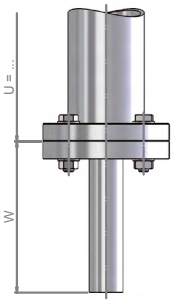
UH: flanged connection



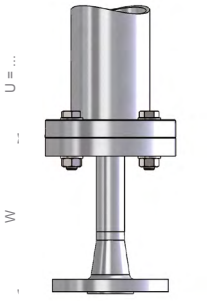
UI: flanged connection with drain plug G



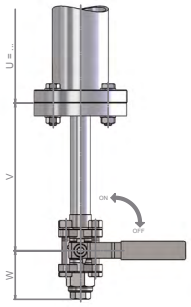
UJ: flanged connection with drain plug NPT



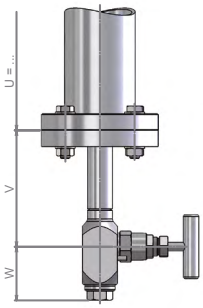
UK: flanged connection with drain nozzle



UL: flanged connection with drain flange



UM: flanged connection with drain ball valve



UN: flanged connection with drain needle valve

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Chamber end bottom

Pressure level	6 / 150#		
	U	V	W
	Maße in mm		
Flat top	-*	-	-
Flat top with drain plug G ¼	-*	-	20
Flat top with drain plug NPT ½	-*	-	30
Flat top with drain nozzle	-*	-	100
Flat top with drain flange	-*	-	100
Flat top with drain ball valve G	-*	120	55
Flat top with drain neddle valve G	-*	120	50
Flanged connection	-*	-	30
Flanged connection with drain plug G ¼	-*	-	35
Flanged connection with drain plug NPT ½	-*	-	65
Flanged connection with drain nozzle	-*	-	100
Flanged connection with drain flange	-*	-	100
Flanged connection with drain ball valve G	-*	120	55
Flanged connection with drain needle valve G	-*	120	50

-* depending on the float length

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FD-01

Hydrostatic Level Measurement



Features

/ Capacitive sensor element with high resistance against overpressure
/ 2- or 3-wire technology
/ 39.5 mm probe diameter
/ Optionally available with ATEX-approval

Description:

Hydrostatic level sensors measure the hydrostatic pressure of the fluid column present above the sensor and therefore the fluid level. A ceramic sensor element at the sensor underside picks up this pressure so that the electronic components inside can generate a 4. . .20 mA or 0. . .10 VDC signal that is proportional to the level. The suspension on the self-supporting 10 m cable and the design in proven 2-wire technology help perceptibly minimize the cost of installation.

Application:

The FD-01 series of level meters is used at measuring points that require an accurate and stable output signal in regard to the level even under extreme conditions. The high degree of protection IP 68 and corrosion resistance enable the use of the probe universally in vessels, basins, ducts and tanks. The large surface of the membrane, that has a diameter of 25 mm, is particularly suitable for sewage applications.

Electrical Specifications:

Output signal /	4. . .20 mA, 2-wire or 0. . .10 VDC, 3-wire
Supply /	2-wire: 9. . .32 VDC, Ex-version: 14. . .28 VDC 3-wire: 12.5. . .32 VDC
Permissible load /	R_{max} = [(U_B-U_{Bmin}) / 0.02] Ohm
Current consumption /	max. 21 mA
Influence effects /	
Supply:	0.05% FSO / 10 V
Load:	0.05% FSO / kOhm
Long term stability /	≤ ± 0.1 % FSO / year at reference conditions
Turn-on time /	700 ms
avg. Response time /	< 200 ms
max. Response time /	380 ms
Measuring rate /	5/s
Electrical protection /	
Short-circuit protection:	permanent
Reverse polarity protection:	no damage, but also no function
EMC:	Emitted interference and interference immunity as per EN 61326
Option Ex-protection (only for 4...20 mA / 2-wire) /	ATEX II 1G Ex ia IIB T4 Ga (ATEX II 1G Ex ia IIC T4 Ga for version “pipe mounting“) ATEX II 1D Ex ia IIIC T85°C Ga
Safety rel. technical maximum values /	U_i = 28 VDC, I_i = 93 mA, L_i = 0 µH P_i = 660 mW, C_i = 14 nF, C_{gnd} = 27 nF
Recommended Ex-amplifier /	KFD2-STC4-EX1
Permissible media temperature in Ex-Zones /	Zone 0 (-10. . .+60°C) for $p_{atm.}$ 0.8. . .1.1 bar from Zone 1 (-10. . .+70°C)
Connecting cables /	capacitance signal line/shield also signal line/signal line 160 pF/m inductance signal line/shield also signal line/signal line 1 mikroH/m
CE-Conformity /	EMC-Guideline 2014/30/EU

Technical Specifications:

Accuracy /	standard: ≤ ± 0.35% FSO option: ≤ ± 0.25% FSO acc. to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)
Thermal effects (offset and span) /	
Tolerance band in compensated range	≤ ± 0.1 % FSO -20. . .+80°C
Storage temperature /	-25. . .+125°C
Media temperature /	-25. . .+125°C (-10. . .+60°C Ex-version Zone 0, -10. . .+70°C Ex-version Zone 20)
Materials /	
Housing:	stainless steel 1.4404 (316L)
Seals:	FKM (Viton), EPDM or FFKM (other materials on request)
Diaphragm:	standard: ceramic Al_2O_3 96% option: ceramic Al_2O_3 99.9%
Cable coating /	PVC (-5. . .+70°C) grey PUR (-25. . .+70°C) black FEP (-25. . .+70°C) black TPE (-25. . .+125°C) blue (cable with integrated air tube for atmospheric pressure reference)
Protection cap /	POM-C
Wetted parts /	housing, gasket, diaphragm, cable coating and nose cone (if necessary)
Weight /	aprox. 400 g (without cable)
Protection class /	IP 68

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Ordering Codes:

Order number	FD-01.	1a.	0.	1.	1.	1.	2.	1.	A.	1

FD-01 Hydrostatic Level Meter

Operating range /

0a = 0.4 m water column, overload 2 bar
0b = 0.6 m water column, overload 2 bar
1 = 1.0 m water column, overload 4 bar
1a = 1.6 m water column, overload 4 bar
2a = 2.5 m water column, overload 6 bar
3 = 4.0 m water column, overload 6 bar
4 = 6.0 m water column, overload 8 bar
5 = 10 m water column, overload 8 bar
5a = 16 m water column, overload 15 bar
6a = 25 m water column, overload 25 bar
6b = 40 m water column, overload 25 bar
7a = 60 m water column, overload 35 bar
8 = 100 m water column, overload 35 bar
9 = 160 m water column, overload 45 bar
10 = 200 m water column, overload 45 bar

Output version /

0 = 4. . .20 mA, 2-wire
1 = 4. . .20 mA, 2-wire with ATEX-approval
2 = 0. . .10 VDC, 3-wire

Seals /

1 = FKM
2 = EPDM
3 = FFKM

Diaphragm /

1 = ceramic Al_2O_3 96%
2 = ceramic Al_2O_3 99.9% (only for meas. ranges 1 to 5)

Cable coating /

1 = PVC (-5. . .+70°C) grey
2 = PUR (-25. . .+70°C) black
3 = FEP (-25. . .+70°C) black
4 = TPE (-25. . .+125°C) blue

Cable length in m /

1 = 10 m (standard)
2 = please specify in detailed text

Mounting connection /

1 = none (directly by cable)
2 = R 1"- male (for mounting in a stainless steel pipe)
3 = probe flange
4 = mounting flange

Flange /

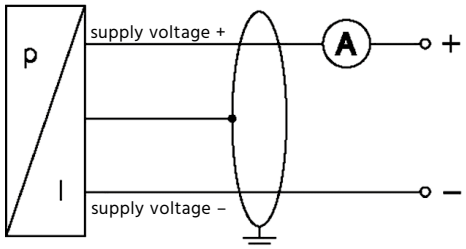
A = none
B = DN25 - PN40
C = DN40 - PN40 (only probe)
D = DN50 - PN40
E = DN80 - PN16

Accuracy /

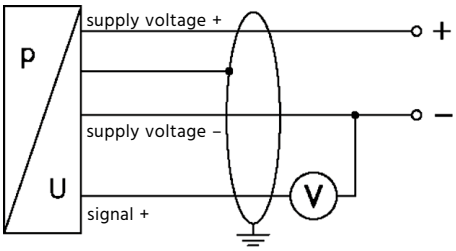
1 = ≤ ± 0.35% FSO
2 = ≤ ± 0.25% FSO

Wiring Diagrams:

2-wire system (power):



3-wire system (voltage):



El. Connection table:

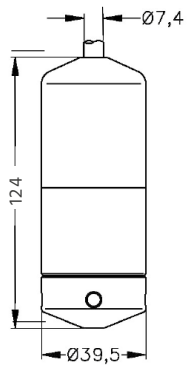
El. Connection		Cable (DIN 47100)
2-wire	supply +	white
	supply –	brown
3-wire	signal +	green
	shield	yellow/green

Ranges & Overpressure:

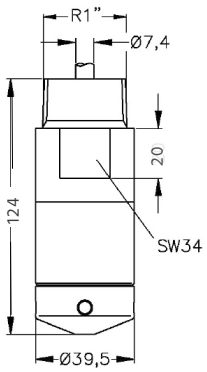
Value															
Nom. pressure [bar]	0,04	0,06	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10	16	20
Level [mH2O]	0,4	0,6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	200
Perm. overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45

Dimensions in mm:

standard:

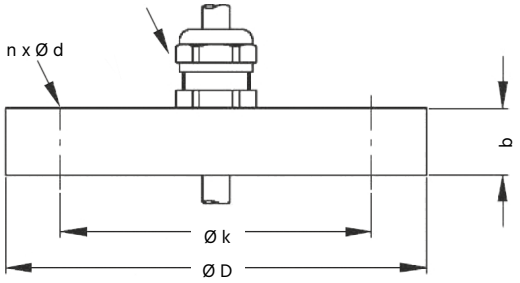


prepared for mounting inside a stainless steel pipe:



Mounting flange with threaded cable connection for probes (DIN 2501 EN 1092-1):

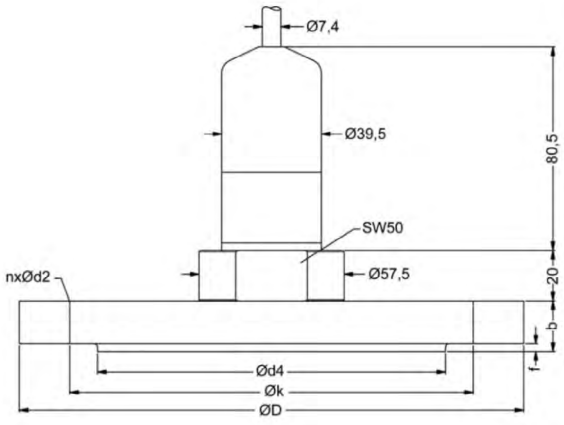
cable connection M16x1.5 with seals
(for cables-Ø 4. . .11 mm)



Flange	Dimensions [mm]				
	ØD	**Øk**	**b**	**n**	**Ød**
DN25 / PN40	115	85	18	4	14
DN50 / PN40	165	125	20	4	18
DN80 / PN16	200	160	20	8	18

DN80/PN16 possible for nom. pressure ranges PN ≤ 16 bar

Probe-flange for flange-probes (DIN 2501 EN 1092-1):



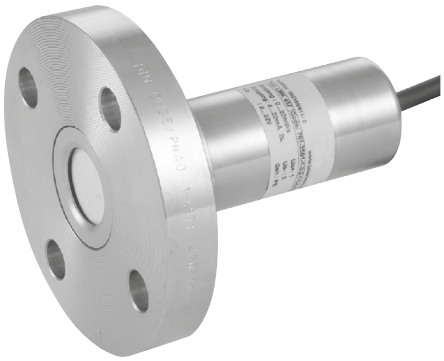
Flange	Dimensions [mm]						
	ØD	**Øk**	**Ød4**	**b**	**f**	**n**	**Ød2**
DN25 / PN40	115	85	68	18	2	4	14
DN40 / PN40	150	110	88	18	3	4	18
DN50 / PN40	165	125	102	20	3	4	18
DN80 / PN16	200	160	138	20	3	8	18

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FD-GL

Hydrostatic Level Measurement in Shipping and Offshore Applications





Features

/ Capacitive ceramic measuring cell

/ 4. . .20 mA output

/ 2-wire technology

/ Materials 1.4404 or CuNiFe

/ Excellent linearity

/ Negligible temperature errors

/ High long-term stability

/ Option: Pt100 for standard version

Description:

Hydrostatic level sensors measure the hydrostatic pressure of the fluid column that is present above the sensor and therefore the liquid level. A flush-mounted ceramic measuring cell at the bottom of a stainless steel or CuNiFe housing picks up this pressure in such manner that, out of this, the internal electronic element can generate a 4. . .20 mA signal that is proportional to the level. The installation costs for the suspension at the self-supporting cable and the reliable 2-wire technology design are kept perceivably low. The FD-GL level sensor meets the standard requirements of Lloyds´s Register, the Germanischer Lloyd (German Lloyd) and of DNV (Det Norske Veritas), ABS and CCS. The device can optonally also be supplied with ATEX approval or integrated temperature measurement via PT100 in 3-wire-technology.

Application:

The FD-GL hydrostatic level probe has been developed for deployment in shipping and offshore industries. Thanks to its robust and reliable capacitive ceramic measuring cell and the optionally available sea-water resistant CuNiFe housing, the probe is well-suited for using it in ballast tanks. In addition, in the shipping industry it can be deployed, among other things, in fuel and oil tanks as well as in utility and sewage tanks. The built-in electronic element is triple encapsulated in order to prevent condensate entering into the electronic elements through the ventilation hose. The FD-GL hydrostatic level probe can be supplied as suspension type probe, srew-in probe or as flange probe with fixing flange as per DIN DN25 to DN80.

Electrical Specifications:

Output signal /	4. . .20 mA, 2-wire
Supply voltage /	Standard 10. . .32 VDC Ex-Version 12. . .28 VDC
Permissible load /	R_{max} = [(U_B-U_{Bmin}) / 0.02] Ω
Current consumption /	max. 21 mA
Influencing factors /	
Supply voltage:	0.05% FSO / 10 V
Load:	0.05% FSO / kΩ
Long time stability /	≤ + 0.1% FSO / year at reference conditions
Turn-on time /	700 ms
mean Response time /	< 200 ms
max. Response time /	380 ms
Measuring rate /	5/s
Thermal effects (offset and span) /	
Tolerance band in compensated range	≤ + 0.1% FSO -20. . .+80°C
Electrical protection /	
Short-circuit:	permanent
Polarity reversal:	no damage, no function
EMC:	interference signal and interference proof as per: - EN 61326 - Germanischer Lloyd (GL) - Det Norske Veritas (DNV)
CE-Conformity /	EMC guideline 2014/30/EU
Option Ex-Protection /	Zone 0 : II 1G Ex ia IIB T4 Ga (ATEX II 1G Ex ia IIC T4 for option „mounting in st. steel pipe“)
Safety related technical maximum values /	U_i = 28 VDC, I_i = 93 mA, P_i = 660 mW, C_i = 105 nF, L_i = 0 µH; 140 nF connections opp. housing
max. Ambient temperature for ATEX /	Zone 0 : -20. . .+60°C with $p_{atm.}$ = 0.8 bar to 1.1 bar from Zone 1 : -25. . .+70°C
Connecting cables (factory-provided) /	capacitance signal line/shield also signal line/signal line 160 pF/m inductance signal line/shield also signal line/signal line 1 mikroH/m

Option Pt 100-Temperature Element:

(only with standard version)

Temperature range /	-25. . .125°C
Output signal /	3-wire
Resistance /	100 Ω at 0°C
Temperature coefficient /	3850 ppm/K
Supply I_s /	0.3. . .1.0 mA DC

Technical Specifications:

Accuracy /	standard: ≤ ± 0.25% FSO option: for P_N ≥ 0,6 bar[1]: ≤ ± 0,1 % FSO [1] Under the influence of disturbance burst according to EN 61000-4-4 (2004) +2 kV accuracy decreased to ≤ ± 0.25 % FSO
Mechanical resistance /	vibration 4g (according to DNV-GL: Class B, curve 2 / basis DIN EN 60068-2-6)
Storage temperature /	-40. . .+125°C
Media temperature /	-25. . .+125°C (depending on cable sheath and seal)
Ex-Version /	for use in Zone 0: -20. . .60°C for use in Zone 1: -25. . .70°C
Weight /	min. 650 g (without cable)
Protection class /	IP 68
Materials /	
Housing:	st. steel 1.4404 or $CuNi_{10}Fe_1Mn$ (seawater resistant)
Seals (wetted):	FKM (Viton), EPDM or FFKM (from T > -15°C), (other materials on request)
Dieaphragm:	standard: ceramic Al_2O_3 96% option: ceramic Al_2O_3 99.9%
Cable coating:	TPE-U (flame-resistant, halogen-free, increased resistance against oil and gasoline, resistant against salt and seawater, heavy oil)
Protection cap:	POM-C
Wetted Parts:	cable, housing, seals, diaphragm

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Ordering Codes:

Order number	FD-GL.	1.	2.	1.	2.	4.	1.	2.	1.	1.	[][].	1.	A.	1.

FD-GL Hydrostatic Level Measurement

Housing /
1 = stainless steel 1.4404
2 = copper nickel alloy (CuNi10Fe1Mn)

Output /
1 = 4. . .20 mA, 2-wire
2 = 4. . .20 mA, 2-wire, Ex-Version
3 = 4. . .20 mA, 2-wire and PT100, 3-wire

Measuring element /
1 = ceramic Al_2O_3 96%
2 = ceramic Al_2O_3 99,9%

Mounting variation /
1 = suspension type probe with self-supporting cable
2 = suspension type probe with self-supporting cable and flange
3 = screw-in probe
4 = sensor-flange

Measuring range /
1 = 0.40 mH_2O, 0.04 bar
2 = 0.6 mH_2O, 0.06 bar
3 = 1.0 mH_2O, 0.10 bar
4 = 1.6 mH_2O, 0.16 bar
5 = 2.5 mH_2O, 0.25 bar
6 = 4.0 mH_2O, 0.40 bar
7 = 6.0 mH_2O, 0.60 bar
8 = 10 mH_2O, 1.0 bar
9 = 16 mH_2O, 1.6 bar
10 = 25 mH_2O, 2.5 bar
11 = 40 mH_2O, 4.0 bar
12 = 60 mH_2O, 6.0 bar
13 = 100 mH_2O, 10.0 bar
14 = 160 mH_2O, 16.0 bar
15 = 200 mH_2O, 20.0 bar
XX = other (please specify in detailed text)

Measuring unit /
1 = in bar, relative
2 = in bar, absolute
3 = in mH_2O

Seals /
1 = FKM
2 = EPDM
3 = FFKM (media temperature must be higher than -15°C)

Electrical connection /
1 = cable with TPE-U coating
2 = other

Accuracy /
1 = standard 0.25 %
2 = optional 0.10 % (only for ranges ≥ 0.6 bar)

Cable length /
[][] = please specify in meters

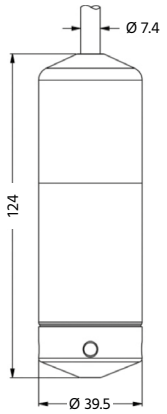
Special design /
0 = standard
1 = prepared for mounting inside a st. steel pipe

Flange /
A = none
B = DN25 - PN40
C = DN50 - PN40
D = DN80 - PN16

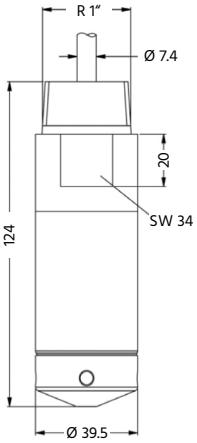
Mounting bracket /
0 = none
1 = stainless steel
2 = out of CuNiFe

Dimensions in mm:

Suspension probes:



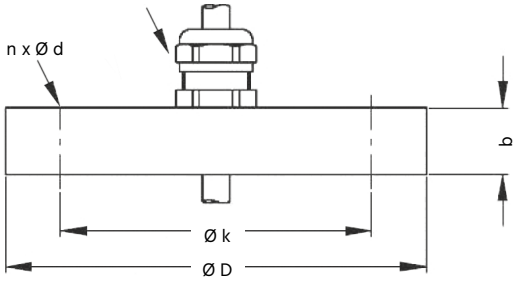
st. steel / CuNiFe



prepared for mounting inside
a stainless steel pipe
st. steel / CuNiFe

Mounting flange with cableglands for probe-mounting (DIN 2501 EN 1092-1):

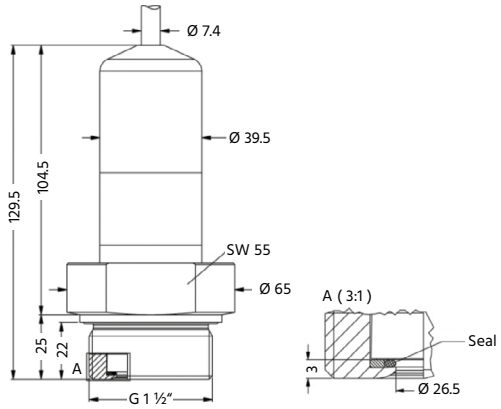
Cable gland M16x1,5 with seals
(for cables Ø 4. . .11 mm)



Flange	Dimensions				
	ØD	Øk	b	n	Ød
DN25 / PN40	115	85	18	4	14
DN50 / PN40	165	125	20	4	18
DN80 / PN16	200	160	20	8	18

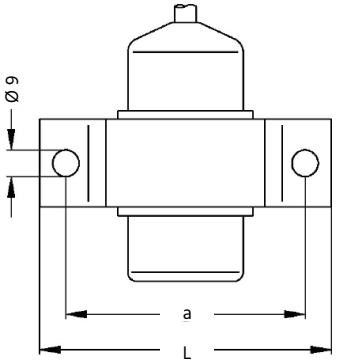
DN80/PN16 possible for NP ranges ≤ 16 bar

Screw-in probe:



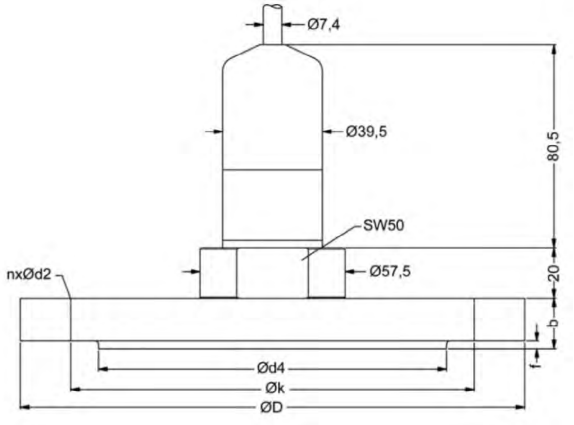
st. steel / CuNiFe

Mounting clamp:



Material clamp	Dimensions	
	a	L
CuNiFe	82	100
St. steel	100	130

Flange-probes (DIN 2501 EN 1092-1):



Flange	Dimensions						
	ØD	Øk	Ød4	b	f	n	Ød2
DN25 / PN40	115	85	68	18	2	4	14
DN50 / PN40	165	125	102	20	3	4	18
DN80 / PN16	200	160	138	20	3	8	18

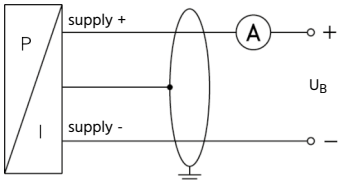
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Measuring Ranges:

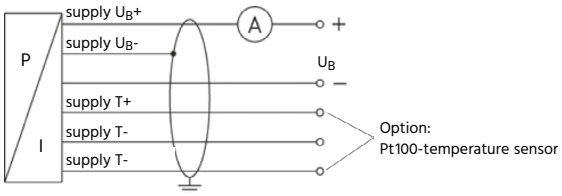
Ranges and Overload															
Nominal pressure [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Height of fluid [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
perm. Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
perm. Vacuum [bar]	-0.2		-0.3		-0.5				-1.0						

Electrical Connection:

Wiring diagram: 2-wire-system (current)



Wiring diagram: 2-wire-system (current) with Pt 100



Electrical connection	Cable colors (DIN 47100)
supply UB +	white
supply UB -	brown
Option Pt 100 sensor, 3-wire	
supply T+ (for Pt100)	yellow
supply T - (for Pt100)	grey
supply T - (for Pt100)	pink
Weight	yellow / green (shield)

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FD-03

Hydrostatic Level Measurement





Features

/ 4. . .20 mA or 0. . .10 VDC output

/ 2- or 3-wire technology

/ ATEX approval for zone 0 and 20

/ Ceramic sensor element

/ High accuracy

/ Connections stainless steel or PVDF

Description:

The FD-03 series of hydrostatic level sensors processes the static pressure of a fluid by means of a capacitive ceramic sensor element. It is designed with front-alignment and hence avoids nearly all faults due to sediments which is particularly important in the wastewater sector. The measuring transmitter is integrated into the probe and emits, at factory-set operating range, a 4. . .20 mA output signal based on the 2-wire system or a 3-wire 0. . .10 VDC output signal.

Application:

The pressure probes FD-03 have been developed for deployment in harsh industrial conditions. They have been extremely efficient especially in the management of sewage plants for obtaining levels in tanks and vessels. The devices are selectable for all DIN ranges up to 200 m water column. Special operating ranges are available on request. The process connection is constructed intentionally in the large surface 1 ½"-male version. Optionally, other connection types can also be supplied. Even when used in hostile media such as acids and alkalis, FD-03 were able to yield excellent results due to the consistency of the process connection made of stainless steel or PVDF and the capacitive ceramic sensor element made of 96% AL_2O_3 or the even higher resistant 99% AL_2O_3.

Electrical Specifications:

Output signal /	4. . .20 mA, 2-wire or 0. . .10 VDC, 3-wire
Supply /	for 4. . .20 mA output: 9. . .32 VDC, for Ex-Version: 14. . .28 VDC for 0. . .10 VDC output: 12,5. . .32 VDC
Permissible load /	4. . .20 mA, 2-wire: R_{max} = [(U_B - U_{Bmin}) / 0,02A] Ω 0. . .10 VDC, 3-wire: R_{min} = 10 kΩ
Current consumption /	for 4. . .20 mA max. 21 mA for 0. . .10 VDC max. 5 mA
Influence effects /	
Supply:	0.05% FSO / 10 V
Load:	0.05% FSO / kΩ
Long term stability /	≤ + 0,1% FSO / year at reference cond.
Turn-on time /	700 ms
mean Response time:	< 200 ms
max. Response time:	380 ms
mean Measuring rate:	5/s
Electrical protection /	
Short-circuit prot.:	permanent
Reverse polarity prot.:	no damage, but also no function
EMC:	Emitted interference and interference immunity EN 61326
Option Ex-protection SS process connection /	Zone 0: ATEX II 1G Ex ia IIC T4 Ga Zone 20: ATEX II 1D Ex ia IIIC T 85°C Da
Option Ex-protection PVDF connection /	**Zone 0/1:** ATEX II 1/2G Ex ia IIC T4 Ga/Gb for ≤ 60 mbar with „2G“ **Zone 20/21:** ATEX II 1/2D Ex ia IIIC T85°C Da/Db for >60 mbar and <10 bar item 17 of the type examination certificate must be attended!
Safety rel. technical maximum values /	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, L_i = 0 µH, C_{gnd} = 27 nF
max. Media-temp. in Ex-Zone /	Zone 0 (-20. . .+60°C) for $p_{atm.}$ 0,8. . .1,1 bar from Zone 1 (-25. . .+70°C)
Connecting cables (from manufacture) /	capacitance signal line/shield as well as signal line/signal line 160 pF/m inductance signal line/shield as well as signal line/signal line 1 mikroH/m
CE-conformity /	EMC guideline 2014/30/EU
Protection class /	IP65 - IP68 (depending on the el. connection, see ordering codes)

Technical Specifications:

Accuracy /	standard: ≤ ± 0.35% FSO option: ≤ ± 0.25% FSO just for operating ranges ≥ 0.6 bar (acc. to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability))
Thermal effects (offset and span) /	
Tolerance band in compensated range	≤ ± 0.1% FSO -20. . .+80°C
Storage temperature /	-40. . .+100°C
Temperature of electronics/environment /	-40. . .+85°C
Media temperature /	-40. . .+125°C (PVDF -30. . .+125°C) -20. . .+60°C Ex-version Zone 0, -25. . .+70°C Ex-version ≥ Zone 1
Materials /	
Housing:	st. steel 1.4404 or PVDF
Pressure port:	st. steel 1.4404 or PVDF
Diaphragm:	standard: ceramic Al_2O_3 96% option: ceramic Al_2O_3 99,9%
Seals:	FKM (-40. . .+125°C) FFKM (-15. . .+125°C) EPDM (-40. . .+125°C)
Wetted parts /	seals, diaphragm, pressure port
Weight /	approx. 200 g
Mounting position /	any
Operational life /	> 100 x 10^6 loading cycles
Vibration /	10 g RMS (20. . .2000 Hz) acc. to DIN EN 60068-2-6
Schock /	100 g / 1 ms acc. to DIN EN 60068-2-27

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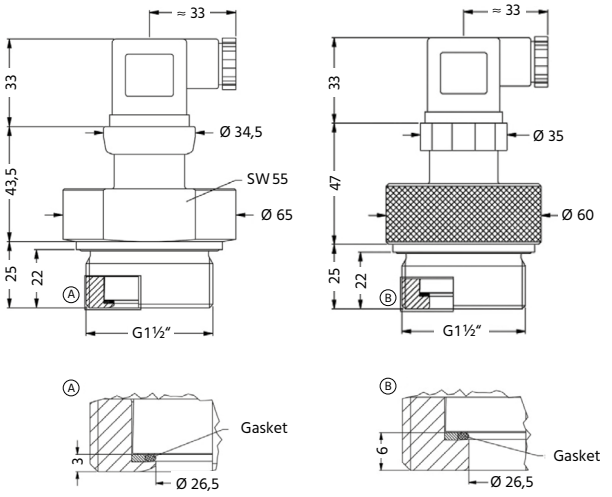
Operating ranges and Overload															
Nom. pressure [bar rel.]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Height of fluid [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
max. pressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
perm. vacuum [bar]	-0.2		-0.3		-0.5				-1.0						

Dimensions in mm:

Versions:

Process connection st. steel
G 1½" flush (DIN 3852)

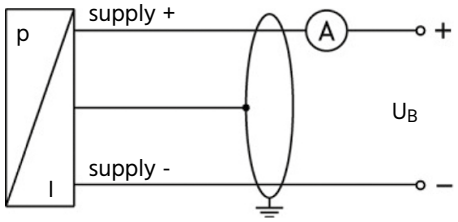
Process connection PVDF [1)]
G 1½" flush (DIN 3852)



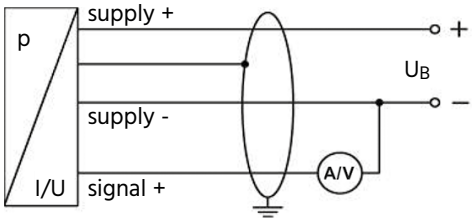
[1)] not possible in combination with field housing

Wiring Diagram:

2-wire system (current)



3-wire system (current / voltage)



Ordering Codes:

Order-no.	FD-03.	0.	1.	4.	1.	1.	2.	1.	1.	1

FD-03 Hydrostatic Level Measurement

Operating range /
0a = 0.4 m water column, overload 2 bar
0b = 0.6 m water column, overload 2 bar
0 = 1.0 m water column, overload 4 bar
1a = 1.6 m water column, overload 4 bar
1b = 2.5 m water column, overload 6 bar
2 = 4.0 m water column, overload 6 bar
3 = 6.0 m water column, overload 8 bar
4 = 10 m water column, overload 8 bar
4a = 16 m water column, overload 15 bar
5a = 25 m water column, overload 25 bar
7 = 40 m water column, overload 25 bar
8 = 60 m water column, overload 35 bar
9 = 100 m water column, overload 35 bar
10 = 160 m water column, overload 45 bar
11 = 200 m water column, overload 45 bar

Gaskets /
1 = FKM (-40. . .+125°C)
3 = EPDM (-40. . .+125°C)
4 = FFKM (-15. . .+125°C)

Process connection /
4 = G 1 ½"-A male DIN 3852
99 = special connection, please specify in detailed text

Ex-approval /
0 = none
1 = ATEX-approval (only for 4. . .20 mA / 2-wire)

El. connection /
1 = field housing, stainless steel 1.4404 (IP67)
4 = plug connector ISO 4400 (IP65)
5 = Binder series 723 (IP67)
6 = M12 x 1, 4-pin (IP67)
8 = cable outlet (IP68)
9 = cable outlet with ventilation tube (IP68)

Output signal /
1 = 4. . .20 mA, 2-wire
2 = 0. . .10 VDC, 3-wire

Diaphragm /
1 = ceramics Al_2O_3 96%
2 = ceramics Al_2O_3 99.9%

Accuracy /
1 = ≤ ± 0.35 % FSO
2 = ≤ ± 0.25 % FSO (only for pressure ranges ≥ 0.6 bar)

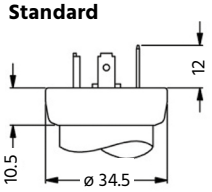
Material of process connection /
1 = stainless steel 1.4404
2 = PVC (on request)
3 = PVDF

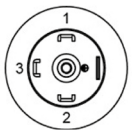
Wiring table:

Electrical connections	ISO 4400	Binder 723 (5-pin)	M12 x 1 (4-pin)	Field housing	Cable colours (IEC 60757)
Supply +	1	3	1	IN +	white (wh)
Supply -	2	4	2	IN -	brown (bn)
Signal + (only for 3-wire)	3	1	3	OUT	green (gn)
Shield	ground ⏚	5	4	⏚	green/yellow (gnye)

Electrical Connection (mm):

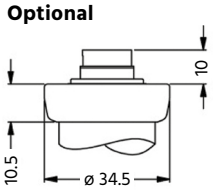
Standard

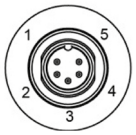




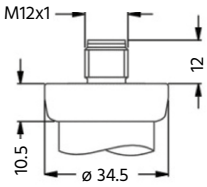
ISO 4400
(IP65)

Optional



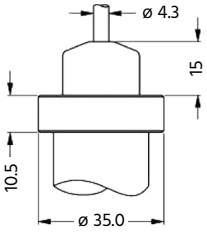


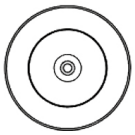
Binder Series 723 5-pin
(IP67)



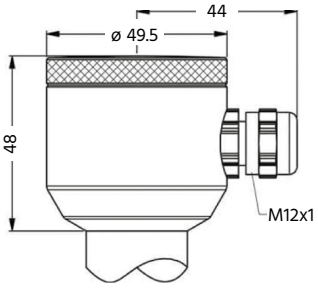


M12 x 1 4-pin
(IP67)

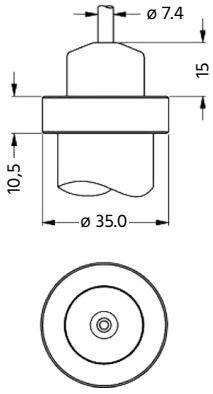




cable outlet with PVC-cable [4]
(IP67)



compact field-housing
(IP67)



cable outlet, cable with ventilation tube [5]
(IP 68)

[4] standard: 2 m PVC cable without ventilation tube;
Permissible temperature: -5. . .+70°C

[5] different cable types and lengths available,
permissible temperature depends on kind of cable

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FD-05

Miniature Hydrostatic Level Transmitter

Features

/ Slender 0.63" (16mm)

/ Accuracy 0.25% or 0.1%

/ Up to 200 m water-column

/ 2- or 3-wire-technology

/ <50 ms reaction time

/ Desiccant filter

Description:

This miniature hydrostatic level transmitter measures the height of a water-column, residing above a stainless-steel membrane, via the hydrostatic pressure. A piezoresistive probe converts the registered pressure into a 4. . .20 mA signal, proportional to the fluids level. The corresponding current output operates with 10 to 33 VDC power supply. The suspension can be caried over the cable and the proven 2- or 3-wire-technology keep the installation costs very low.

Application:

This level transmitter can be used everywhere, where an exact and stable output signal about the level is needed. The sensors very small diameter even enables mounting it through a hole in a tank. With its small membrane, the FD-05 is to be used best with clear fluids, and non-polluted liquids. Possible areas of application could be balalst tanks, remote maintenance, ground water monitoring, flood monitoring, surface-water monitoring, drainage systems, environment monitoring, tight pipes & narrow plants and drill hole monitoring.

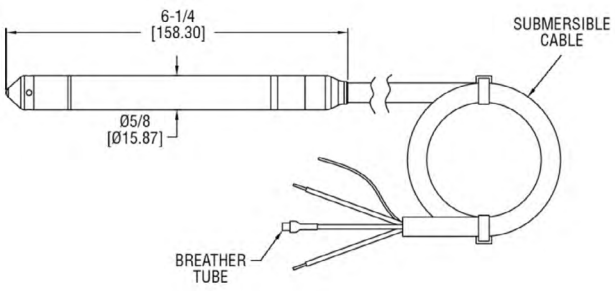
Technical Specifications:

Service /	compatible liquids
Accuracy /	±0.25% or ±0.10% FS. 4.3. . .4.9 psi (10. . .11.54 in w.c.) configured ranges are ±0.30% FS accuracy
max. Pressure /	2X FS
max. Media temperature /	-4 to 176°F (-20. . .80°C)
Compensated temperature limits /	0.25%: 32. . .158°F (0. . .70°C) 0.10% FS: 32. . .140°F (0. . .60°C)
Thermal effect /	0.25%: ±0.45% FS TEB 0.10%: ±0.30% FS TEB
Wetted materials /	
Body and nose:	316 ss
Cable:	Polyether polyurethane or ETFE
Seals:	Fluoroelastomer
Mounting connection /	Suspended below point being monitored
Weight /	Body: 0.235 lb (0.107 kg) Cable: 0.037 lb (0.17 kg) per foot

Electrical Specifications:

Power requirements /	
Current output:	10. . .33 VDC
Voltage output:	8. . .33 VDC
max. Current /	5 mA (no load)
Output signal /	4 to 20 mA DC 2-wire or 0. . .5 V
Response time /	< 50 ms
max. Loop resistance /	1000 Ω @ 30 VDC (current output)
Voltage output impedance /	10 Ω + 4.4 Ω / 100' cable (voltage output)
Electrical connections /	bare cable ends
Electrical protection /	Surge/lightning protected per EN61000-4-5, Class 5
Agency approvals /	CE

Dimensions:



Ordering Codes:

Order Number	FD-05.	1.	3.	1.	C.	X

FD-05 Miniature Hydrostatic Level Transmitter

Accuracy /
1 = 0.10% FS
2 = 0.25% FS

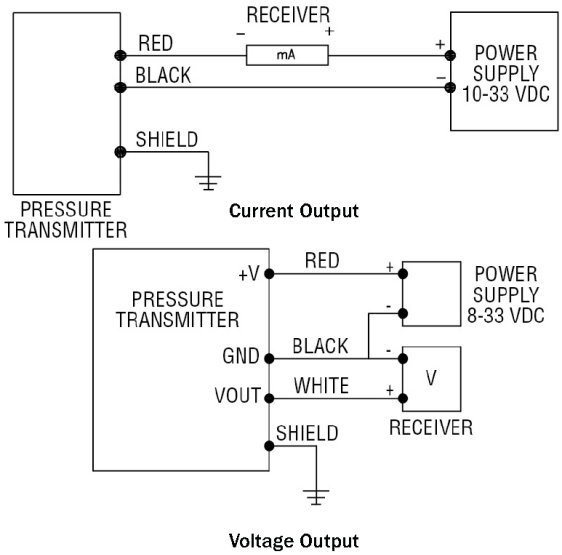
Output /
1 = 4. . .20 mA
2 = 0. . .2 V
3 = 0. . .2.5 V
4 = 0. . .3 V
5 = 0. . .4 V
6 = 0. . .5 V
7 = 1. . .5 V

Cable Material /
1 = ETFE
9 = polyurethane

Pressure range /
A = 5 m watercolumn, cable length 12.2 m (only ±0.25% FS)
B = 10 m watercolumn, cable length 15.2 m
C = 20 m watercolumn, cable length 26 m
D = 30 m watercolumn, cable length 36 m
E = 40 m watercolumn, cable length 46 m
F = 60 m watercolumn, cable length 66 m
G = 100 m watercolumn, cable length 106 m
H = 200 m watercolumn, cable length 206 m

Option /
X = none
Y = Desiccant filter for vent tube. Removes humidity for protection of the sensor. Changes color to show saturation.

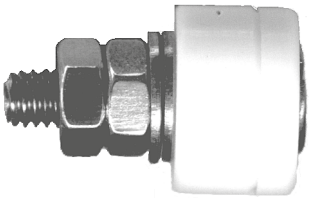
Wiring Diagram:

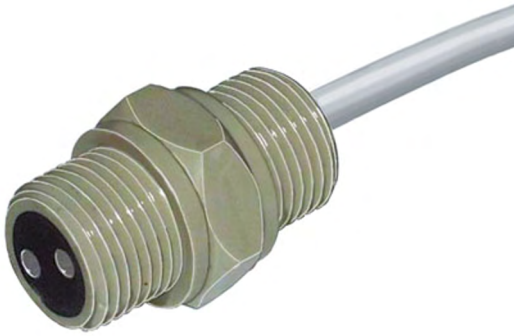


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KS-01/D

Conductive Level Switches





Features

/ Low-cost electrodes

/ sideways mounting

/ Easy to assemble

/ No mechanics

/ Low maintenance requirements

Description:

The KS-01/KS-01D series of conductive level switches is intended for obtaining the level of conductive fluids in combination with an electrode relay (e.g. ER-01). In case of no fluid between the two electrodes of the KS-01D or the vessel and the electrode of the KS-01, the circuit, provided by the electrode relay, is open and no current flows. As soon as liquid connects the electrodes, a flow of current is picked up by the electrode relay which transmits a switching signal. The KS-01 includes just one electrode, which is insulated against the vessel. The KS-01D contains two electrodes, both flush mounted in a plastic thread from polypropylene.

Application:

· for determining limit level in vessels with conductive fluids
· full or empty reporting
· level controlling between two levels
· overload security
· dry-run protection

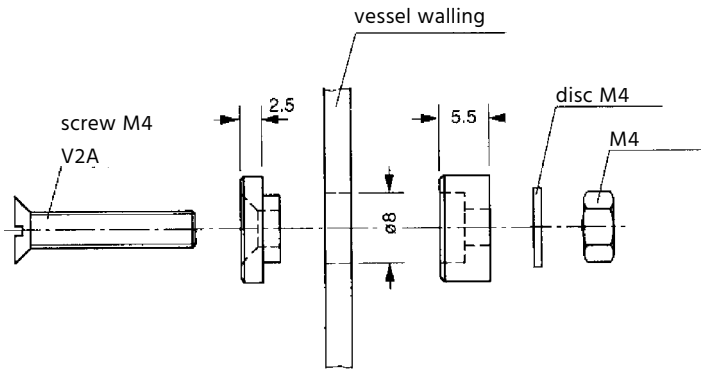
Technical Spec. KS-01:

Screw fit electrode / stainless steel V2A with Teflon socket

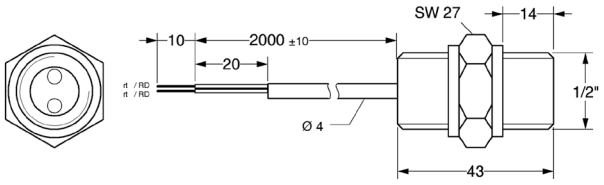
Technical Spec. KS-01D:

max. Pressure /	6 bar
max. Media temp. /	-5. . .+60°C
Process connection /	G 1/2"-male
Electrical connection /	2 m infused cable PVC, 2 wire, 0,25 mm² each

Dimensions KS-01 in mm:



Dimensions KS-01D in mm:



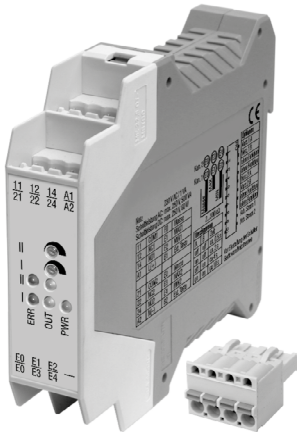
Ordering Codes:

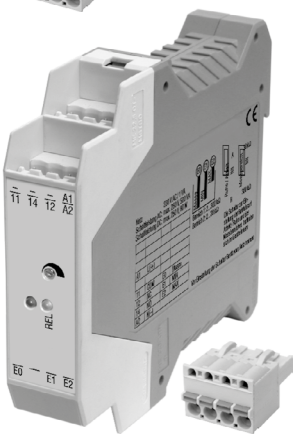
Order number	**KS-01.**	**1**
KS-01 Screw fit electrode		
Material / 1 = stainless steel / teflon		

Ordering Codes:

Order number	**KS-01D.**	**1**
KS-01D Level switch		
Material / 1 = stainless steel / polypropylene		

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ER-01

Conductive Electrode Relay

Features

/ Single or dual channels

/ 24 V DC or 230 V AC

/ Secured galvanic isolation

/ MIN-MAX control

/ Limit value identification in conductive fluids

/ Operating and closed-circuit switchable

Description:

The ER-01 electrode relay outputs a measuring voltage to a ground electrode and to one or more additional electrodes. While immersing the ground electrode and another electrode into the fluid that needs to be monitored, a low AC measuring current flows signaling the presence of a medium. Flow of this AC is intercepted by ER-01 and evaluated. Possible electrolytic disintegration of the medium and hazardous contact voltages are safely avoided, since the measuring current is very low and is not capable of generating any galvanic elements.

The ER-01 series of electrode relays can also be used as simple contact network relay in which, for example, potential-free REED contacts replace the electrodes. This is an important aspect if the maximum power rating of the REED emitter is insufficient for connecting the required heavy loads.

Application:

Electrode relays are used in combination with conductive rod screw type or suspended electrodes (see also Profimess' KS-...), if the level of conductive fluids needs to be registered, controlled or regulated. In this, limit level switching (overflow and dry run) as well as MIN-MAX controls can be implemented. In this case, the relay at the output is changed over when one of the two limit levels is activated, with the result that the filling level reciprocates between these two predefined levels.

Electrical Specifications:

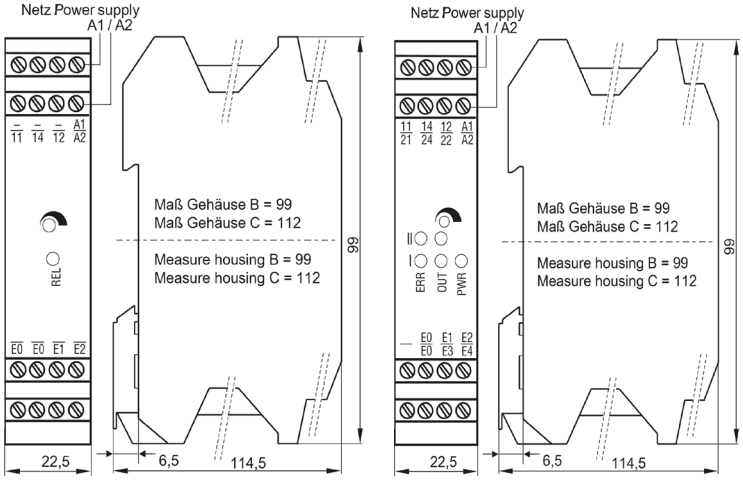
Supply voltage /	ER-01.x.24: 24 V DC ER-01.x.230: 230 V AC, 48-62 Hz (24 V AC, 42 V AC, 48 V DC, 115 VAC 240 V AC and 127 V AC on request)
Power consumption /	max. 1 W / VA
Input /	
Open-circuit voltage:	≤ 10 VAC
Short-circuit current:	≤ 5 mA
Switching delay:	fixed about 0.5 s (0.5 s to 10 s switchable in 4 respectively 16 steps on request)
Sensitivity range:	2. . .30 kΩ, 2. . .300 kΩ 10. . . 1000 kΩ, 0,2. . .3 kΩ
Output /	
Contacts:	one potential-free change-over-contact per channel (optionally additional change-over-contact for single channel version)
Switching voltage:	min. 5 Vmax. 250 VAC, max. 150 VDC
Switching current:	min. 5 mA **Single channel version:** max. 5 A bei cos φ = 1 max. 3 A/AC bei cos φ = 0,7 max. cos φ = 1 **Two channel version:** max. 3 A at cos φ = 1 max. 1 A/AC at cos φ = 0,7 max. cos φ = 1
Operating-/closed-circuit current /	switchable
Switching load:	min. 300 mW **Single channel version:** max. 1250 VA 150 W (30 VDC/5 A) **Two channel version:** max. 750 VA 150 W (30 VDC/5 A) 18 W (150 VDC/0.12 A)
Protection class / EN 60529	terminals IP20, housing IP40
CE marking /	as per low voltage directive EN61010-1 as per EMV directive EN61326-1
Options /	EX approval: interface detection for media of different conductivities approval for overfill protection as per German WHG (German Water Resources Act); SIL 2

Technical Specifications:

Operating temperature /	-20. . .+60°C
Storage temperature /	-30. . .+80°C
Weight /	ca. 150 g
Dimensions /	99.0 x 22.5 x 114.5 mm (L x B x T)
Connectors /	plug-in terminals

Dimensions in mm:

ER-01.1 **ER-01.2**



Ordering Codes:

Order number	**ER-01.**	**1.**	**24.**	**1**

ER-01 Conductive Electrode Relay

No. of Channels /
1 = 1 channel with one change-over-contact
2 = 2 channels with one change-over-contact per channel

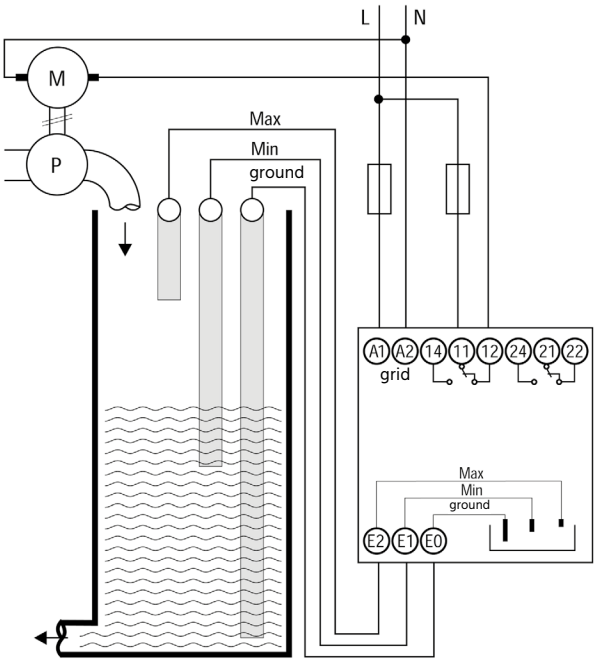
Supply voltage /
□□□ = specify other voltage in detailed text
24 = 24 VDC
230 = 230 VAC

Options /
0 = no special features
1 = specify special features in detailed text

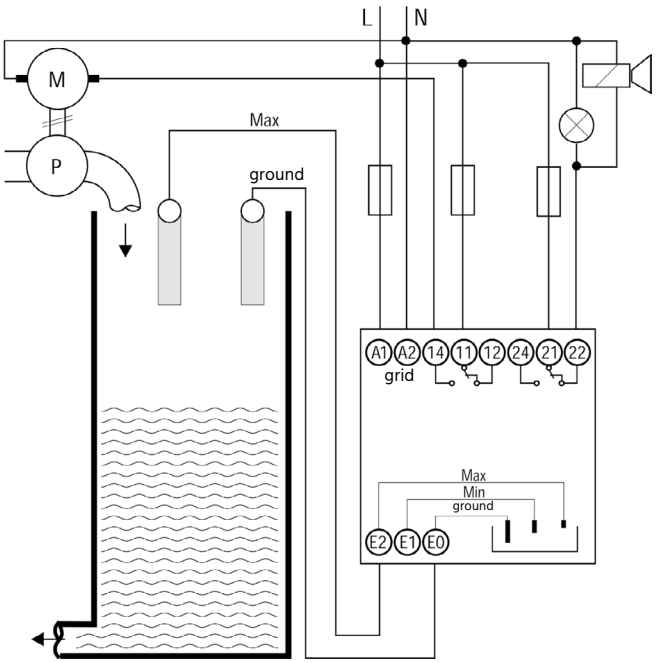
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Connection examples 1 channel relay

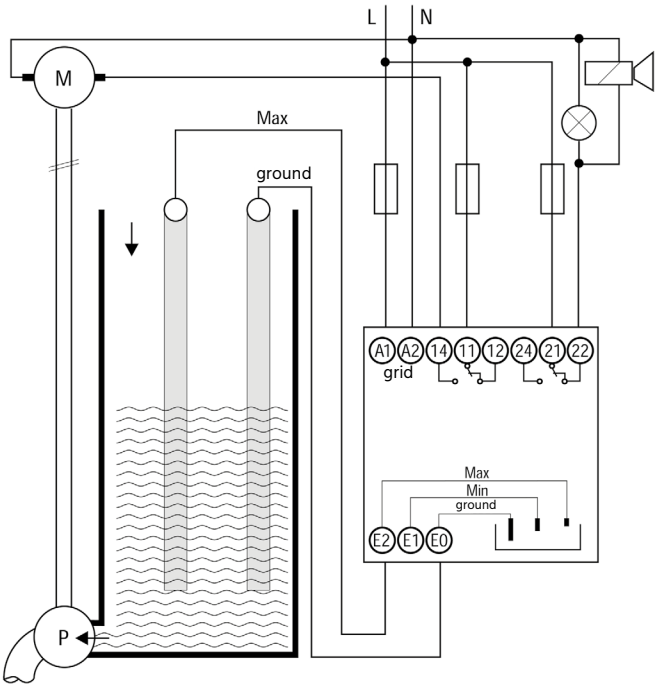
Connection example for filling
Limit level detection in active current operation
(min/max operation)



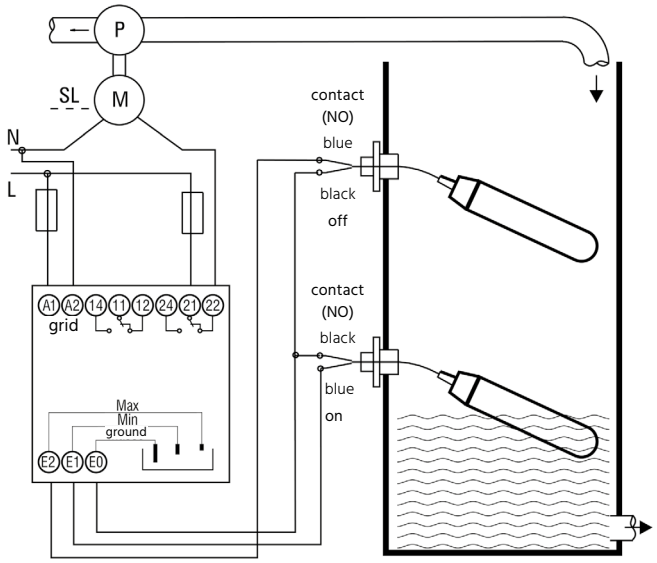
Connection example for overflow
Limit level detection in standby current operation
(Optional: 1 channel relay, 2 change-over contacts)



Connection example for dry run
Limit level detection in active current operation
(Optional: 1 channel relay, 2 change-over contacts)

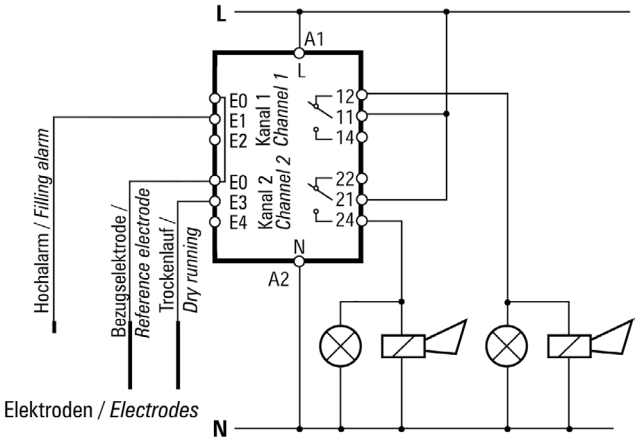


Connection example for filling
Limit level detection in active current operation
with float switches

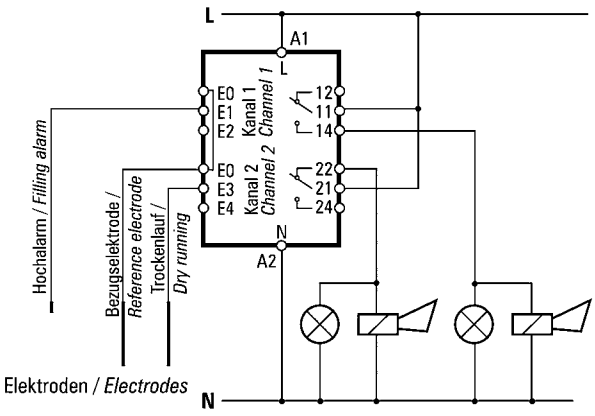


Connection examples 2 channel relay

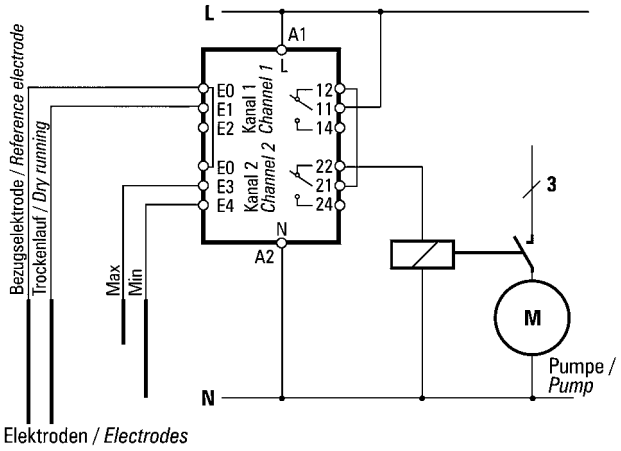
Channel 1: high alarm,
Channel 2: dry run standby current, high alarm, dry run



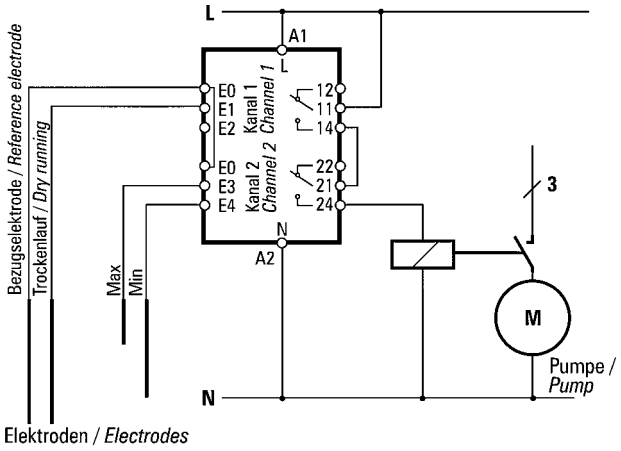
Channel 1: high alarm,
Channel 2: dry run active current, high alarm, dry run



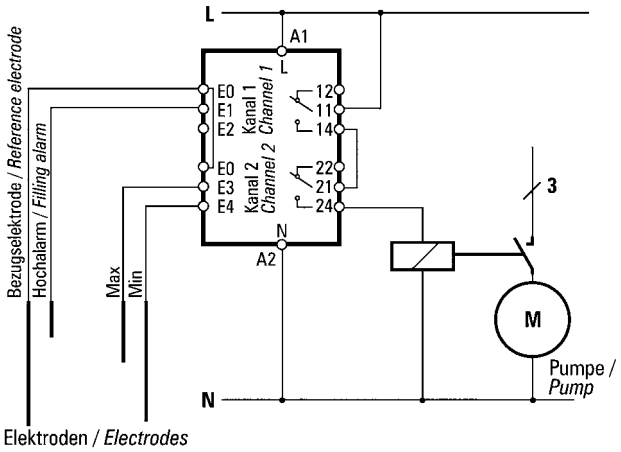
Channel 1: dry run,
Channel 2: min/max standby current, empty container



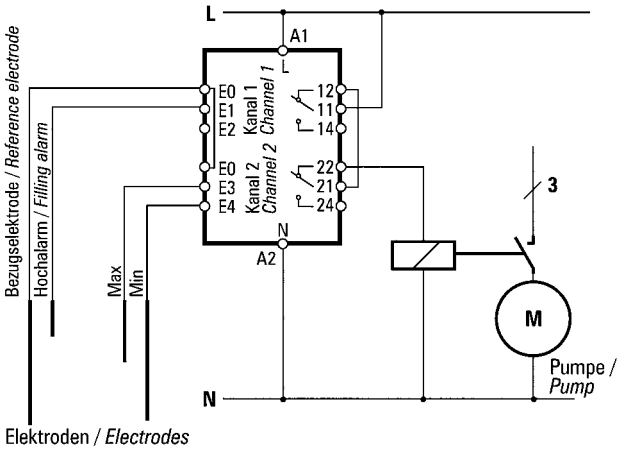
Channel 1: dry run,
Channel 2: min/max active current, empty container



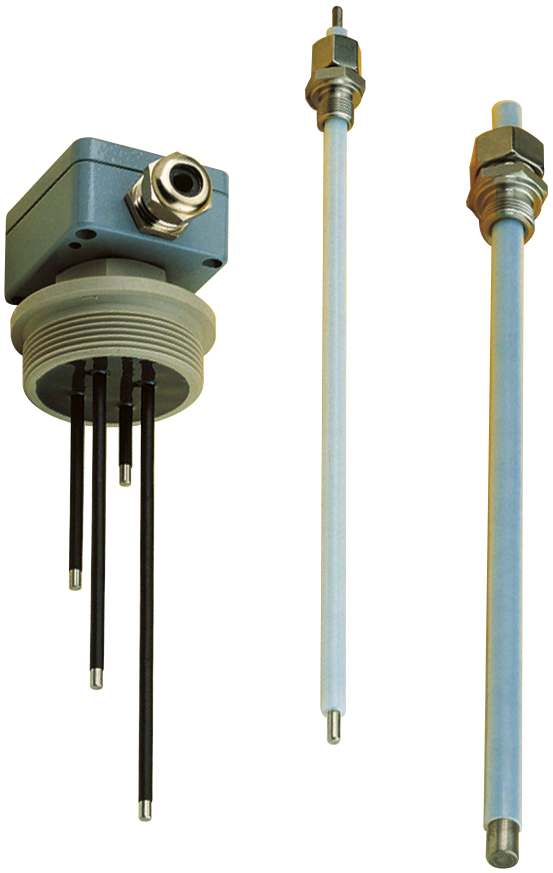
Channel 1: high alarm,
Channel 2: min/max standby current, fill container



Channel 1: high alarm,
Channel 2: min/max active current, fill container



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KS-02

Conductive Level Switch

Features

/ Single or multiple electrodes (up to 5 setpoints)

/ Easy to assemble

/ Electrode rods made of st. steel

/ Electrode relay for limit values, pump control or pump control with overfill and dry-run protection (see Data sheet ER-01)

Description:

The KS-02 series of conductive level switches is intended, in combination with the electrode relay ER-01, for obtaining the level of conductive fluids. An AC voltage is connected to an electrode insulated from the vessel. When the medium contacts this electrode, a small current flows from the electrode through the medium to the vessel wall (in the case of plastic vessels to a separate ground electrode). This flow of current is picked up by the electrode relay and transmitted as a switching signal.

Application:

- for determining limit level in vessels with conductive fluids
- full or empty reporting
- level control between two levels
- overfill protection
- dry-run protections

Benefits:

- no mechanical moving components
- independent of specific weight of medium
- compact design
- possible to mount vertically or horizontally

Versions:

KS-02.01. . .05: Single electrode with fixed screw on thread or with cutting ring joint for adjusting the electrode length
Electrical connection: PVC or silicon cable or polyester terminal housing

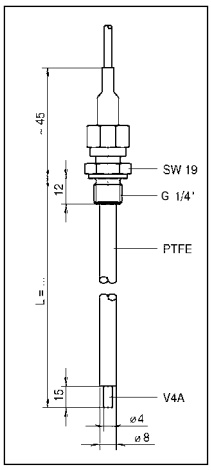
KS-02.25. . .28: Multiple electrodes
max. number of electrodes depends on size of joint
Electrical connection:
polyester terminal housing

Technical Specifications:

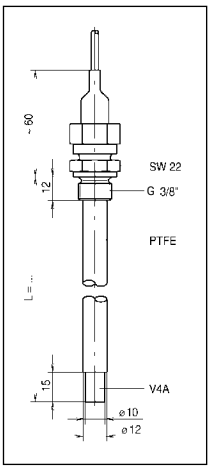
max. Pressure /	1 bar (single electrode), up to 100 bar, on request pressureless (multiple electrodes)
max. Media temp. /	+100°C (single electrodes) +80°C (single electrodes, adjustable and multiple electrodes)
Coating /	Teflon

Dimensions in mm:

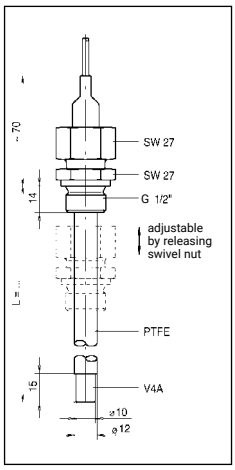
KS-02.01...



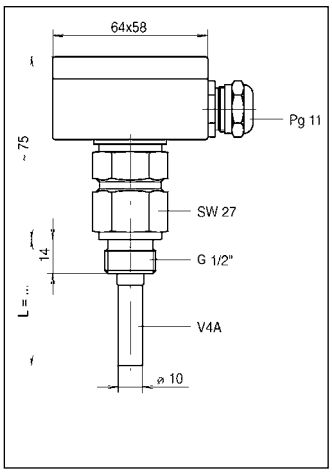
KS-02.02...



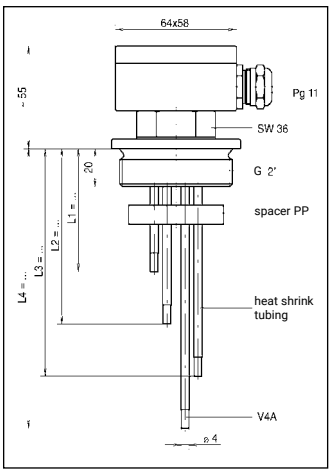
KS-02.03V...



KS-02.03.x.1.x.K



KS-02.28.x.4.x.K



Ordering Codes:

Order number	KS-02.	01.	2.	3.	1.	xP.	L1

KS-02 Conductive Level Switch

Process connection /

Single electrodes
01 = G ¼" male
01V = G ¼" male adjustable
02 = G 3/8" male
02V = G 3/8" male adjustable
03 = G ½" male
03V = G ½" male adjustable
05 = G 1" male

Multiple electrodes
25 = G 1" male (max. 2 Electrodes)
26 = G 1 ¼" male (max. 3 Electrodes)
27 = G 1 ½" male (max. 3 Electrodes)
28 = G 2" male (max. 5 Electrodes)
99 = special type connection

Material for process connection /
2 = stainless steel
3 = PP (starting from G 1 ½")

Number of electrodes /
1. . .5

Electrode material /
1 = stainless steel

Electrical connection /

Single electrodes only
xP = PVC cable, x = length in m (standard = 3 m) T = -5. . .+80°C
xS = Silicone cable, x = length in m (standard = 3 m) T = -5. . .+80°C

Single or multiple electrodes
K = polyester terminal connection housing (starting from G 3/8")
9 = special type connection

Other details /
L1, L2, L3... = length of individual electrodes from sealing edge of screw joint

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KS-03

Compact
Conductive Level Switch



Features

/ With integrated electronics

/ 24 V DC supply

/ One switching point or MIN/MAX control

/ Adjustable sensitivity

/ Electrode material SS, Titanium, Hastelloy or Tantalum

/ Plastic or stainless steel head

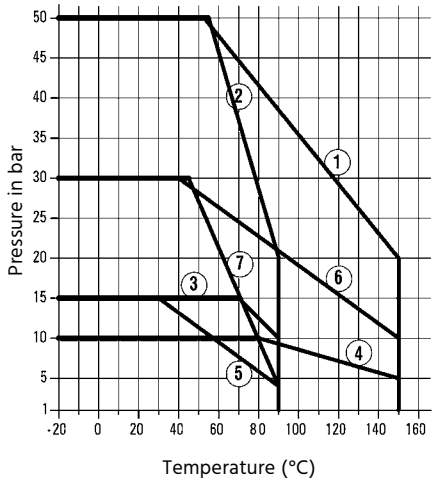
Description:

Inside the connector head of the KS-03 compact conductive switch is an electronic unit that is supplied with 24 V DC to provide a weak AC voltage to the switch's electrode rods. Whenever a conductive fluid establishes a connection between two of the electrodes, it results in an AC current which is recognized by the electronic components; subsequently it activates at the output an NO contact either as a limit switch or as MIN-MAX control. In this way, any excess or shortfall of allowed fill level can be monitored, or a particular level between two predefined levels (emptying or filling) can be maintained.

Application:

The compact conductive switch KS-03 is unbeatable in its versatility. The connector head and the screw joints can be made of plastics or stainless steel; the electrode rods can be made of Hastelloy, Titanium, Tantalum or stainless steel where the rods can be insulated partially or fully using different materials. The electronic component in the connector head of KS-03 offers the option of four different settings of sensitivity which enable under circumstances also capturing interfaces between two fluids with KS-03 if the fluids are adequately different in their conductivity. The attractive pricing and compact design of KS-03 make the device an ideal choice for a number of applications in practically every type of automation in the industry.

Pressure & Temp.-Curves:



Curve 1: stainless steel screw fitting with PTFE-coated electrodes

Curve 2: stainless steel screw fitting with PA-coated electrodes

Curve 3: PPH-screw fitting with PTFE-coated electrodes

Curve 4: PTFE-screw fitting with PTFE-coated electrodes

Curve 5: PA or PVDF-screw fitting (special design)

Curve 6: stainless steel screw fitting (special design) with PTFE-coated electrodes

Curve 7: stainless steel screw fitting (special design) with PA-coated electrodes

Technical Specifications:

Operating temp. /	see Pressure-Temperature curves
Connection thread /	G1"-male, G1 ¼"-male, G1 ½"-male or G2 ¾"-swivel nut
Screw con. material /	PPH, PTFE, PVDF, stainless steel 1.4571
Electrode material /	stainless steel 1.4571, Titanium, Hastelloy B, Hastelloy C or Tantalum
Coating material /	polyamide or PTFE
Coating length /	full (entire rod, 10 mm at the end blank) or partial (up to approx. 250 mm from top)
Rod diameter /	4 mm or 6 mm
Rod length /	max. 6000 mm
Spacer /	one spacer every 1000 mm required

Electrical Specifications:

Supply voltage /	20. . .30 VDC, potential-free (ungrounded)
Power consumption /	max. 2 W
Switching voltage /	max. 230 V AC / DC, min. 5 VDC (CMOS-Relay)
Switching current /	max. 0.1 A AC / DC, min. < 1 mA
Switching load /	max. 25 VA / W
Sensitivity /	3 k. . .100 kΩ kΩ in four levels (3, 10, 30, 100 selectable)
Operating temp. electronics /	-20. . .+85°C
Storage temp. electronics /	-30. . .+85°C
Protection class /	IP65

Ordering Codes:

Order no.	**KS-03.**	**PP.**	**3.**	**1.**	**2.**	**VA.**	**6.**	**TI.**	**1.**	**2**

KS-03 Compact Level Switch

Connector head /
PP = polypropylene
VA = stainless steel

No. of electrodes /
2 = 2 electrodes
3 = 3 electrodes

Screw fitting /
1 = standard (PPH for PP-head, VA for SS-head)
2 = PTFE (Polytetrafluorethylene)

Connecting thread /
1 = G 1"-male (only for 2 electrodes)
2 = G 1 ¼"-male
3 = G 1 ½"-male
4 = G 2 ¾"-swivel nut

Rod material /
VA = stainless steel 1.4571
HB = Hastelloy B
HC = Hastelloy C
TI = Titanium
TA = Tantalum
HB/TA = Tantalum tip 100 mm, basic rod Hastelloy B

Rod diameter /
4 = 4 mm
6 = 6 mm

Coating /
PA = Polyamide (only for VA rod)
TI = partially insulated PTFE
VI = fully insulated PTFE

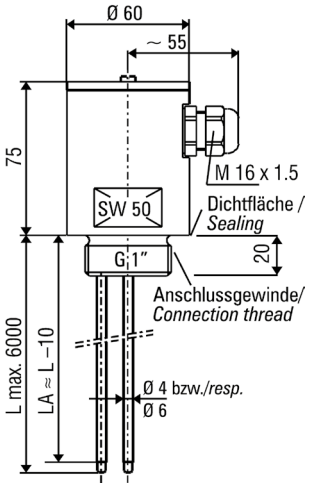
Sealing /
1 = Viton (standard)
2 = Kalrez

Electronic components /
0 = none
1 = 1 limit value (NC, opening when the level reachs the setpoint)
2 = MIN-MAX control (connecting thread ≥ G 1 ¼")

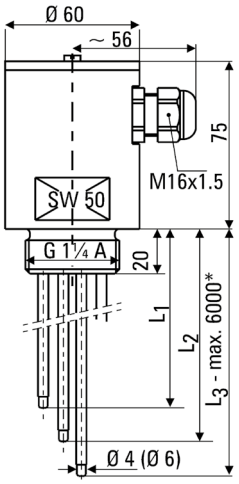
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Dimensions in mm:

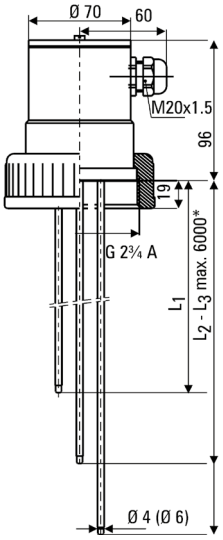
Dim. KS-03.PP.2.x.1



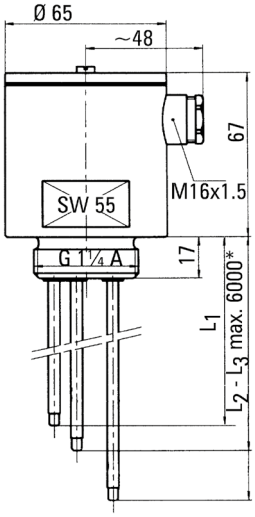
Dim. KS-03.PP.3.x.2



Dim. KS-03.PP.3.x.4



Dim. KS-03.VA.3.x.2



*greater lengths on request

Electrical Connection:

Switch 1	Switch 2	Measuring range
OFF	OFF	up to 3 kΩ
ON	OFF	up to 10 kΩ
OFF	ON	up to 30 kΩ
ON	ON	up to 100 kΩ

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WD-03

Water Leak Detector

Description:

The water-leak-detector WD-03 series detects conductive liquids e.g. water in drip pans beneath containers. The WD-03 reacts with visible and audible alarms, as soon as it detects a leak, therefore avoiding expensive damages. The operating principle of WD-03 bases on the conductivity of water or another concuctive liquid. The contacts at the bottom of WD-03 detect the restistance alteration that takes place, as soon as these contacts are wetted by the leaking fluid and get therefore galvanically connected. Model WD-03.B is battery powered and offers an audible alarm, a visible alarm by red LED and a solid-state-relay output. A yellow LED indicates also, when the battery is weak. Models WD-03.DN, and WD-03.DY are 11. . .27 V AC/DC line powered and include a DPDT-relay. An additional green LED indicates the active supply voltage. Mounting bracket MB is included. It enables the user to adjust the mounting height of WD-03, if it is placed at the bottom of a drip pan, and the unit shall be mounted in an increased position to avoid false alarms. The mounting height of WD-03 is therefore adjustable down to 0.8 mm ground clearance. The bracket can be attached to a flat surface by using either the attached adhesive strips or mounting screws. Of course, WD-03 may also be mounted to the side wall of a drip pan.

Features

/ Cost-effective
/ Protection against short-circuit
/ Protection against corrosion
/ Easy to install
/ Battery or line powered
/ Audible and visible alarms
/ Green LED indicates supply voltage
/ Relay output

Application:

The WD-03 series is used to detect water and other conductive, non-agressive liquids. The units are simply mounted beneath HVAC facilities, dishwashers, washing machines, refridgerators, compressors or electrical facilities to detect draining conductive fluids. The WD-03 series is very affordable and offers a relieable protection against the significant cost following the spilling of liquids into sensible areas.

Versions:

Supply voltage /

WD-03.B:	3 V CR2450 lithium metal battery, user replaceable, lifespan app. 5 years steady state, app. 48 hours during alarm condition
WD-03.DN:	11. . .27 V AC/DC
WD-03.DY:	11. . .27 V AC/DC

Alarms /

WD-03.B:	audible alarm:	min. 85 dB at one foot distance
	LED-Alarm:	red LED
WD-03.DN:	audible alarm:	none,
	LED-Alarm:	red LED
	low battery:	yellow LED
WD-03.DY:	audible alarm:	min. 85 dB at one foot distance
	LED-Alarm:	red LED

Relay outputs /

WD-03.B:	one SPST-Relay, normally opened, SSR (Solid-State-Relay)
WD-03.DN:	one DPDT Relay
WD-03.DY:	one DPDT Relay

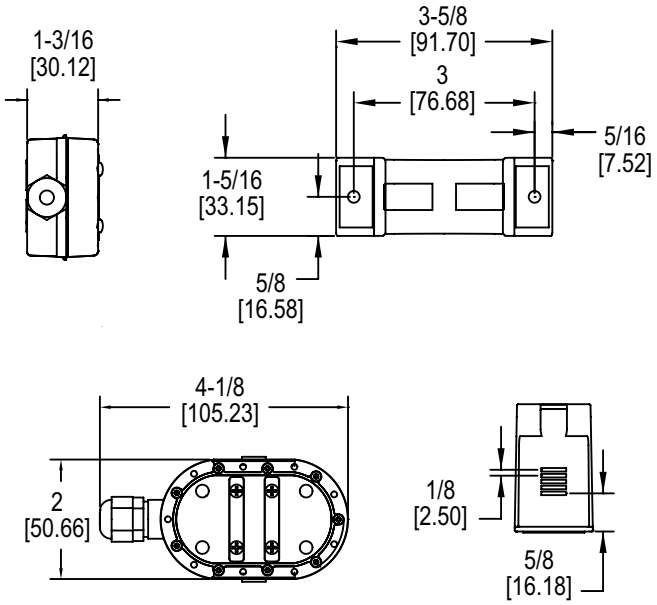
Electrical Specifications:

Switching load /	WD-03.B: max. 250 mA at 24 VDC WD-03.DN, WD-03.DY: max. 1 A at 24 VAC/DC
Power consumption /	WD-03.B: 0.9 mA steady state, 3.0 mA during alarm condition WD-03.DN, WD-03.DY: 30 mA steady state, 85 mA during alarm condition
Electrical connection /	1,5 m cable (other cable lengths on request), PVC-insulated, 22 AWG, UL plenum rated

Technical Specifications:

Materials /	ABS and Polycarbonat with flammability classification UL 94 V-0
Protection class /	WD-03.B and WD-03.DY: submersible up to ¾ of the body height. Beyond this point, water will penetrate into the loudspeaker. WD-03.DN: IP68, submersible
Temperature range /	0. . .50°C
Weight /	ca. 138 g;
Approvals /	CE, RoHS

Dimensions in inch [mm]:



Ordering Codes:

Order number	WD-03.	B.	MB

WD-03 Water Leak Detector

Version /

B = battery powered with SPST relay
DN = line powered with DPDT relay, 11. . .27 V AC/DC, no audible alarm
DY = line powered with DPDT relay, 11. . .27 V AC/DC, with audible alarm

Accessories /

0 = none
MB= additional mounting bracket, one piece is included

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FC-01

Limit Level Switch for Bulk Goods, Fluids, Slurries, Interface and Foam Detection



Description:

The FC-01 series of capacitive limit level switches utilizes the different dielectric constant between air and the medium being monitored in order to detect its presence. A plate capacitor, whose electrical properties depend on the dielectric number of the medium surrounding it, is situated within a protective tube made of plastic. The capacity C of this capacitor is captured by measuring the impedance of a circuit loaded with high-frequency current and evaluated. The response sensitivity of the FC-01 can be adjusted directly on the device by means of a simple potentiometer. In the event of a switching operation, the current in the supplying 2-wire loop drops from 20 mA to 4 mA (or increases inversely depending on the polarity) and a transistor or output switches through.

Features

/ Easy to mount

/ Maintenance-free

/ No moving components

/ Adjustable sensitivity

Application:

The FC-01 is suited for monitoring solid and fluid media including slurries and foam. Selectively, the sensor material is made out of Kynar or abrasion-resistant Ryton so that even hostile and abrasive materials can be detected without problem. The range for temperature is kept at a generous range of -30. . .+100°C or -10. . .+100°C in order to allow a maximum of 10 bar pressure in the entire range. Also with regard to the downstream evaluating electronics the user has no limits. The „Current Sink“ output operates along with 2-wire feeder devices and the transistor output can connect to DC and AC voltages up to 30 V. The FC-01 can be provided with terminal housing for harsh atmospheric conditions or with fixed cable cord and optionally as intrinsically safe version for Zone 0 or Zone 20 (barrier required). For applications in chemically aggressive areas a fully synthetic version is available, which offers a process connection made of PPS instead of stainless steel. The chemical resistance of the FC-01, its insensitivity to high vibrations, its accuracy and, not the least, it’s affordable price render the FC-01 into a universal device that is capable of replacing a tuning fork-switch, a rotating vane sensor or a float switch in many places.

Electrical Specifications:

Supply voltage /	standard 12. . .33VDC, intrinsically safe 10. . .30VDC
Output signal /	falling or rising current 20 on 4 mA or 4 on 20 mA, depending on connection
Switching output /	transistor: 30 V DC/AC, max. 82 mA
Repeatability /	2 mm
Dielectric constant /	min. 1.5
Protection class /	IP65 with cable cord IP68 with housing
Certificates /	Int. safe (barrier required): CSA/FM Class I, II und III, Div. 1, Groups A, B, C, D, E, F, G, T4 ATEX II 1 GD 1/2GD EEx ia IIC T4. . .T6 T107°C

Technical Specifications:

Measuring length /	100 mm
Ambient temperature /	-30. . .+85°C
Fully synthetic:	-10. . .+85°C
Storage temperature /	-40. . .+85°C
Fully synthetic:	-40. . .+85°C
Media temperature /	-30. . .+100°C
Fully synthetic:	-10. . .+100°C
Pressure /	-1. . .10bar
Media /	fluids, bulk goods, slurries, interfaces, foam
Process connection /	¾" NPT [(conical), ANSI/ASME B1.20.1 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Connection material /	st. steel 1.4404 or PPS
Sensor material /	PPS (PVDF optional)
Housing material /	thermoplastic Polyester
Lid material /	thermoplastic polycarbonat (PC), transparent
Cable /	1 m, 4 x 0,5 mm² shielded, polyester hood
Cable insertion /	½"-NPT (M20 x 1.5 on request)
Sealing /	FKM (optional FFKM)

Ordering Codes:

Order number	**FC-01.**	**1.**	**1.**	**1.**	**0.**	**0.**	**0**

FC-01 Limit Level Switch

Process connection /
1 = 3/4"-NPT thread
2 = R 1"- thread (BSPT)
3 = G 1"- thread (BSPP), not for fully synth. version

Device version /
1 = standard with cable cord (1 meter), process connection made of stainless steel
2 = version with housing and clamp block, process connection made of stainless steel
2 = fully synthetic version with housing and clamp block, process connection made of PPS

Sensor material /
1 = Ryton (PPS)
2 = Kynar (PVDF), not for fully synthetic version

Overfill protection /
0 = none
1 = with (as per German Federal Water act WHG)

Approvals /
0 = none
1 = ATEX, II 1 GD 1/2GD EEx ia IIC T4. . .T6 T107°C, not for fully synthetic version

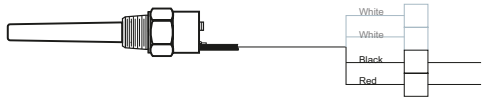
Additional protection sleeve (FC-01.1 with ¾"-NPT conn.) /
0 = none
1 = protection sleeve made of PPS with process connection 3/4"-NPT-male
2 = protection sleeve made of PPS with process connection R1"-male

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Electrical Connection:

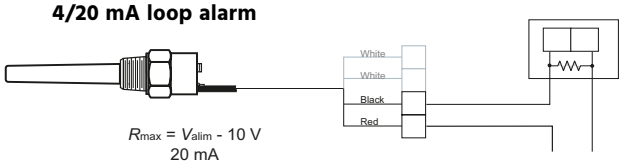
Cable Version (not intrinsically safe):

MIN / MAX alarm



polarity as required for
desired operation
DC 12. . .33 V

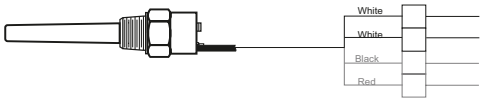
4/20 mA loop alarm



$R_{max} = V_{alim}$ - 10 V
20 mA

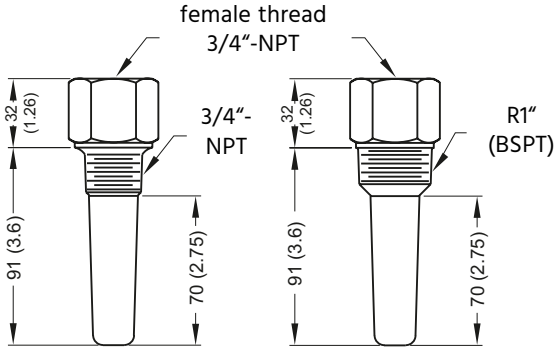
supply
DC 12. . .33 V

Solid state Switch

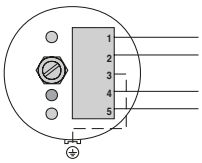


Transistor
DC 30 V / AC 30 V (peak)
82 mA max.
DC 12. . .33 VDC

Optionale separate prot. sleeve:



Housing and fully synthetic version



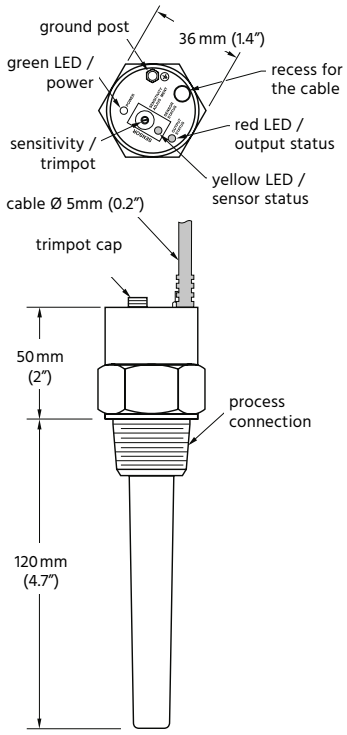
Terminal operations	Cable equivalent
mA current loop (+V or -V)	red wire
mA current loop (+V or -V)	black wire
ground	cable shield
solid state/relay	white wire
solid state/relay	white wire

solid state/relay normally open in unpowered state,
relay just available for fully synthetic version

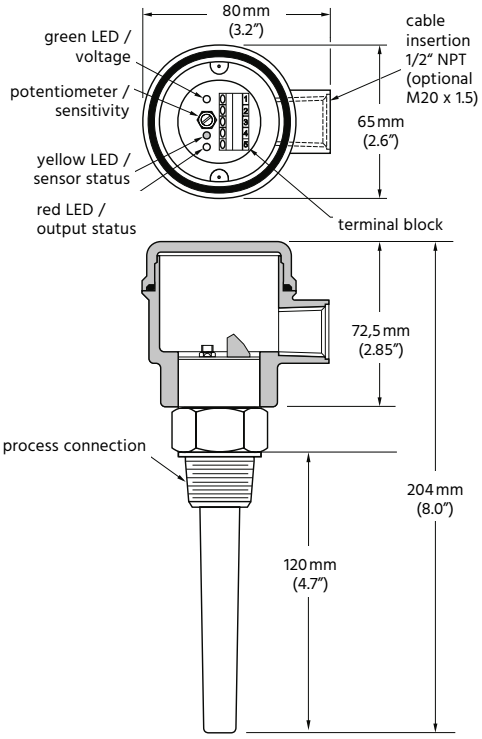
Note: use protection diode for inductive load!

Dimensions in mm:

Standard Version



Housing Version



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FS-01

Float Switch

Features

/ Easy to assemble

/ Cost-effective

/ No response lag

/ Maintenance-free

/ Reliable

/ High switching load

Description:

The FS-01 series of float switch operates according to the principle of buoyancy. A hollow float is lifted by the raising level of fluid as long as a switching operation is triggered at an angle of 25° to the horizontal line. The switch can be suspended by means of a screw joint directly in the vessel or, in the case of open vessels, from above. The setpoint is determined by the weight that is always included in the delivery package. The FS-01 consists of a extremely rough, nearly unbreakable polypropylene float. The switch is, therefore, almost unsinkable even due to excessive mechanical stress.

Application:

The FS-01 level switch is suited for level monitoring in fluids as in all types of industrial applications of direct pump controlling thanks to its high power rating. It can be used especially as control for MIN, MAX, FULL, EMPTY, OVERFILL and DRY-RUN.

Technical Specifications:

max. Pressure /	3.5 bar
max. Media temp. /	85°C
Float /	PP
Media density /	0.7. . .1.15 g/cm³
Float weight /	200 g without cable
Adjustable weight /	250 g movable on cable
Switching angle /	± 25° to the horizontal line

Electrical Specifications:

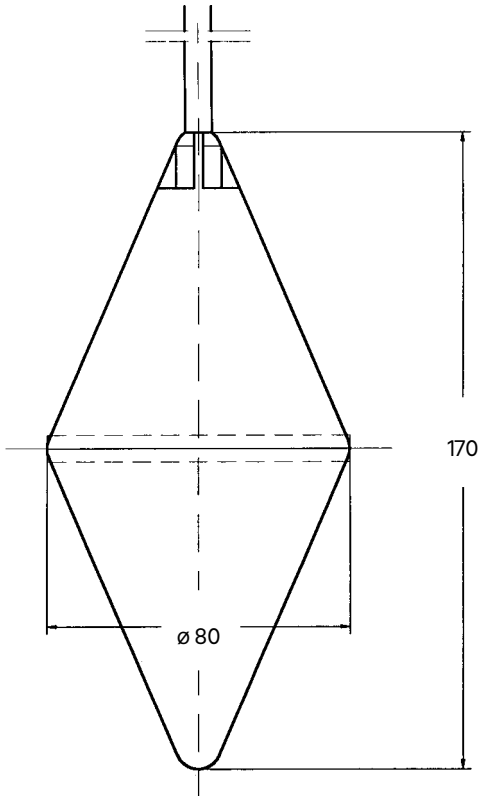
Contact /	micro-switch as change-over contact 12, 24, 48 VAC/VDC and 250 VAC - 50/60 Hz 16 A (resistive), 6 A (inductive)
Cable /	3 x 1 mm² Neoprene or HR HY
Cable weight /	Neoprene 115 g/m, HR HY 110 g/m
Protection class /	IP 68

Ordering Codes:

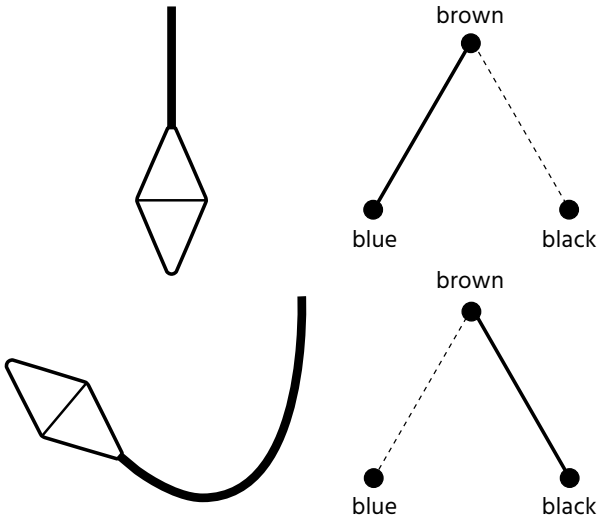
Order number	**FS-01.**	**1**
FS-01 Float Switch		
Cable length / 1 = 5 m cable 2 = 10 m cable		

specific lengths on request

Dimensions in mm:



Electrical Connection:



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FS-01EX

Float Switch



Features

/ ATEX approval for Zone 0 and 20, gases, dust and vapours
/ HR HY (Hypalon) -coated float for hostile media
/ HR HY (Hypalon) cable
/ Non-Ex-version with high switching load
/ Ex-version with gold contacts for intrinsically safe operation

Description:

In the same way as the simple FS-01, the FS-01EX operates according to the principle of buoyancy. A hollow float is lifted by the raising level of fluid as long as a switching operation is triggered at an angle of 25° to the horizontal line. The float switch can be inserted from the side by means of a screw joint directly in the vessel or, suspended from above with a weight as the pivot into the vessel or duct. The float of the FS-01EX is made of polypropylene as the basic material which is fully coated with HR HY (Hypalon). This material, also used for the FS-01EX cable, has excellent resistance to chemically hostile media. In the Ex version, the FS-01EX has gold-plated contacts instead of a standard micro-switch and must therefore be evaluated by an intrinsically safe power circuit.

Application:

The FS-01EX level switch is suited for level monitoring in chemically hostile fluids as they frequently occur, for example, in sewage treatment plants or pump sumps in contaminated soils. The switch is supplied always in the Hypalon-coated version and the standard version can be loadable with 16 (6) A at 250 VAC. In the ATEX approved variant, the mechanical design remains unchanged; however, the micro-switch is designed for an intrinsically safe power circuit.

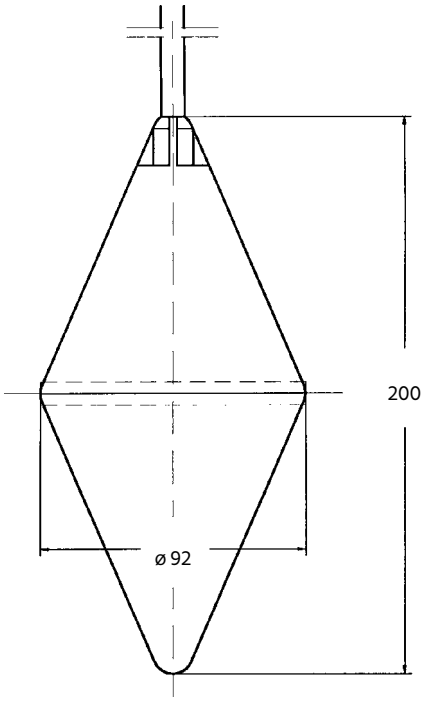
Technical Specifications:

max. Pressure /	4 bar
max. Mediatemp. /	**FS-01EX.x.1** - without approval: max. 90°C **FS-01EX.x.2** - with approval: T6 and Ta at ambient temperature from -20. . .+70°C
Float /	PP, fully HR HY (Hypalon) coated
Media density /	0,8. . .1,10 g/cm³
Float weight /	300 g without cable
Adjustable weight /	250 g movable on cable
Switching angle /	± 25° to the horizontal line

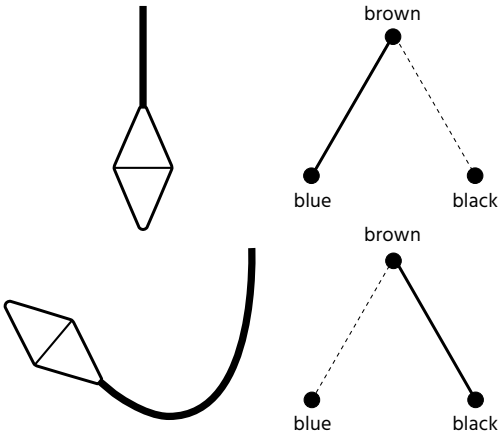
Electrical Specifications:

Switching element /	microswitch as change-over contact
Switching power /	**FS-01EX.x.1** - without approval 12, 24, 48 VAC/VDC und 250 VAC - 50/60 Hz 16 A (ohmic), 6 A (inductive) **FS-01EX.x.2** - with approval max. 24 VAC/VDC-10mA max. 12 VAC/VDC-100mA must be operated with intrinsically safe isolated switching amplifier
Ignition protection type /	ATEX II 1 GD Ex ia IIC T6 Ga Ex ta IIIC T70°C Da IP68
Cable /	3 x 1 mm², HR HY (Hypalon)
Cable weight /	110 g/m
Protection class /	IP 68

Dimensions in mm:



Electrical Connection:



Ordering Codes:

Order number	**FS-01EX.**	**1.**	**2**

FS-01EX Float Switch

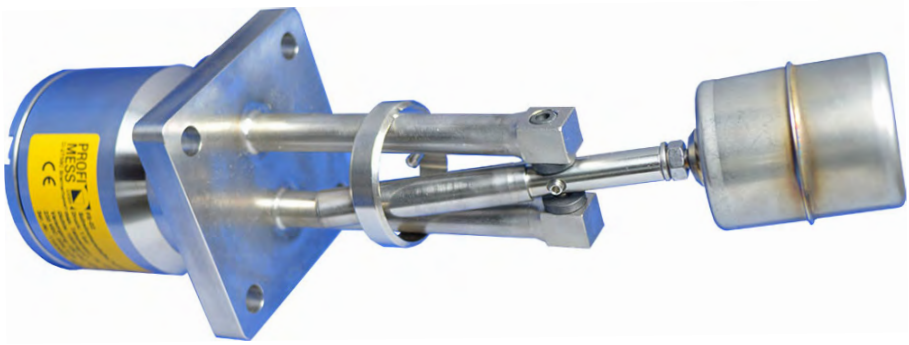
Cable length /
1 = 5 m cable
2 = 10 m cable

Approval /
1 = without
2 = ATEX Zone 0

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FS-02

Float Switch for Horizontal Mounting



Features

/ Suitable in ship-building

/ Max. pressure to 232 bar

/ Robust

/ Stainless steel- and plastic version

/ DN50. . .DN100 flange

/ Pump and level control

/ Explosion proof version

Description:

With the robust float switch of the FS-02 series, a float moves on a rotatable stainless steel lever at the level of the medium to be monitored. A reed contact inside the contact tube is actuated by a permanent magnet when a switching point is reached. This principle enables a contactless and wear-free switching process that does not require any auxiliary energy. The reed contact can be designed as a NO-, a NC- or a changeover contact, with signal processing being universal. A direct connection to a signal amplifier or a contact protection relay or many other evaluating circuits is possible without any problems.

Application:

The float switch FS-02 is used to monitor level limits and is designed for side installation on the tank. Various DIN- or ANSI- flange variants are available as process connections, as well as the square flange that is widely used on the market. The proven technology of this series has established itself in all areas of industry due to its extremely wide application limits with regard to pressure, temperature, media density and durability.
The switching technology via a magnetically controlled REED contact enables the device to be used in explosion-proof areas according to ATEX, insofar as the float switch is operated via an intrinsically safe isolating switching amplifier. The intended function of the FS-02 is not influenced by the conductivity of the medium, foaming, blistering or vibration.

Electrical Specifications:

Switching function / Reed contact, alternatively normaly open (NO), normaly closed (NC) or change-over (SPDT)
Ex version only change-over

Switching power / FS-02.x: 230 VAC, 40 VA 1 A
230 VDC, 20 W 0,5 A

Switching power Ex / FS-02.1: U_{max} = 36V, I_{max} = 100 mA
Only for connection to a certified intrinsically safe circuit.

Electrical connection / FS-02.1: connection housing, stainless st. 1.4571
FS-02.2: connection housing, Polypropylene

Protection class / FS-02.1: IP 67 according to IEC/EN 60529
FS-02.2 IP 65 according to IEC/EN 60529

Technical Specifications:

Housing material / FS-02.1: stainless steel 1.4571 (316Ti)
FS-02.2: plastic PP (Polypropylen)

Max. Pressure / FS-02.1: 232 bar
FS-02.2: 6 bar

Temperature range / FS-02.1: -50. . .+250 °C (standard version)
Option:
high-temperature version: +350 °C
low-temperature version: -120 °C
FS-02.1 Ex-version: -50. . .180 °C depending on temperature range
FS-02.2: -10. . .+80 °C

Min. density / FS-02.1: 600 kg/m³
FS-02.2: 750 kg/m³

Mounting position / horizontal

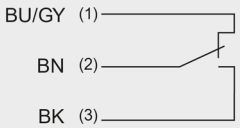
Certificate / ATEX, DNV GL, ABS

Option / FS-02.1 as an explosion-proof version
- Ex i II 1/2G Ex ia IIC T6-T2 Ga/Gb
II 2D Ex ia IIIC T80 °C Db

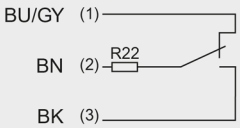
Electrical Connection:

Reed contact

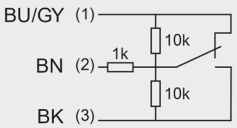
1 switch point



1 switch point
Wiring for operation with a PLC



1 switch point
NAMUR circuit per DIN EN 60947-5-6



Float Table:

Type	Cylinder	Ball	Oval	Floater for plastic version
Material	Stainless steele 1.4571	Titan 3.7035 Titan 3.7165	Stainless steele 1.4571	Polypropylen
Insertion length	190. . .990 mm	190. . .990 mm	240. . .990 mm	176 mm
Diameter	44 mm	52 mm	43 mm	44 mm
Length	52 mm	52 mm	100 mm	52 mm
Max. operating pressure	6 bar	Titan 3.7035: 100 bar Titan 3.7165: 232 bar	20 bar	4 bar
Min. density	600 kg/m³	600 kg/m³	500 kg/m³	750 kg/m³

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Ordering Codes:

Order number	FS-02.	1.	2.	1.	[50].	[6].	Z[300].	1.

FS-02 Float Switch

Material /
1 = stainless steel 1,4571
2 = plastic PP

Switching function /
1 = normally open (NO), none Ex-version
2 = normally closed (NC), none Ex-version
3 = change over (SPDT)

Process connection flange /
1 = DIN
2 = DIN EN
3 = ANSI
4 = square flange DN 80
5 = square flange DN 92

Nominal size [ ] /
50 = DN 50
65 = DN 65
80 = DN 80
100 = DN 100

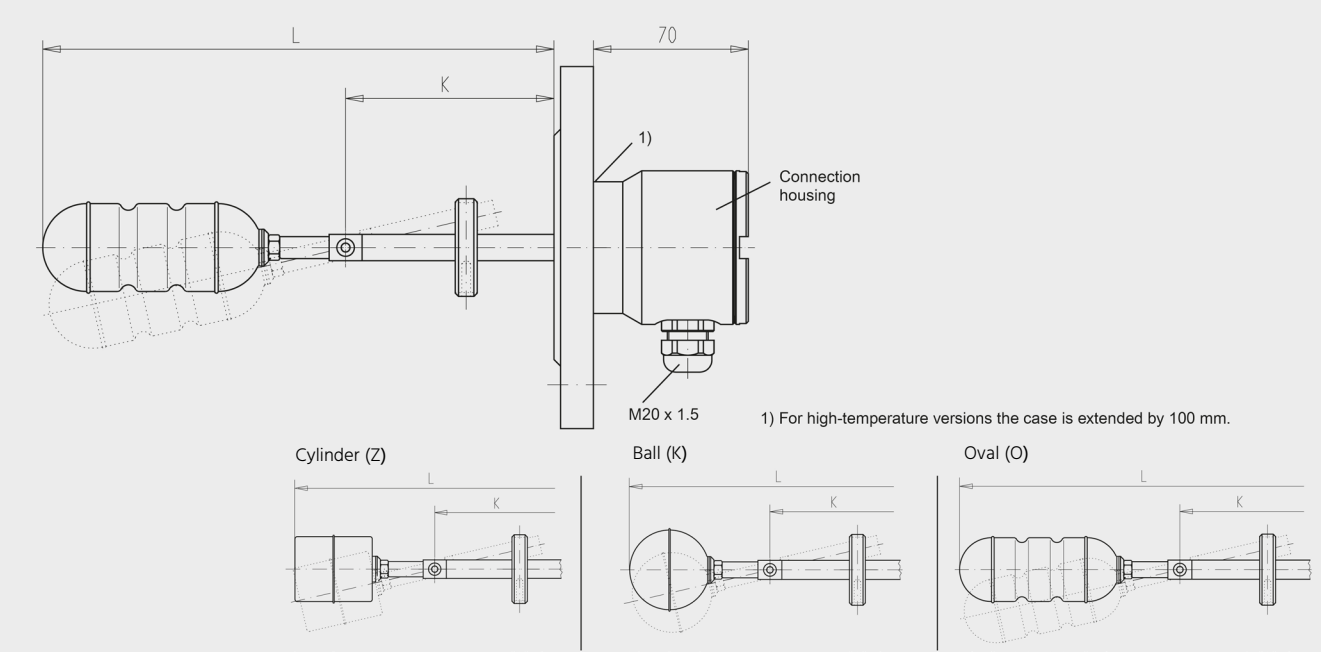
Pressure rating [ ] /
6 = PN 6
16 = PN 16
40 = PN 40
63 = PN 63
100 = PN 100
160 = PN 160

Floater and insertion lenght [ ] /
Z = cylinder (190. . .990 mm)*
K = ball GL (190. . .990 mm)*
O = oval (240. . .990 mm)*
* Please specify in plain text e.g. K[600]

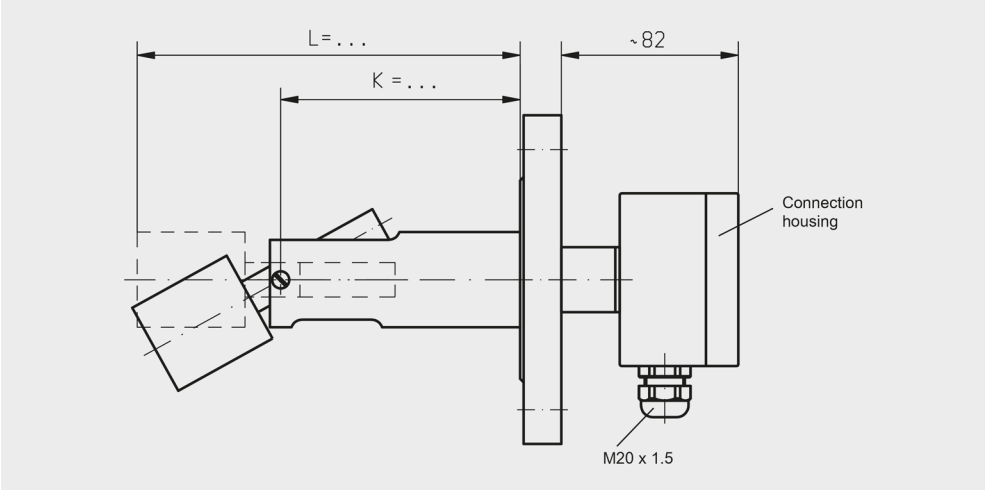
Approvals (multiple choices possible) /
0 = without
1 = EAC (FS-02.1 or FS-02.2)
2 = DNV GL (only FS-02.1)
3 = ABS (only FS-02.1)
4 = ATEX (only FS-02.1)

Dimenssions:

Stainless steel version FS-02.1:



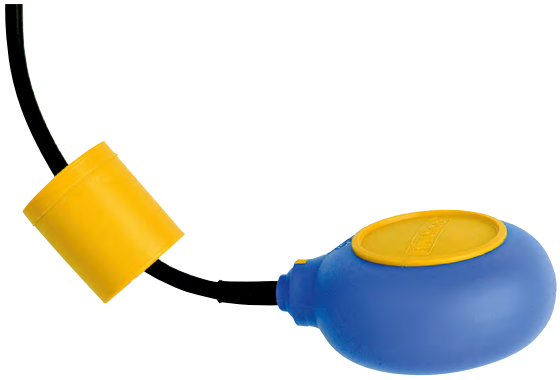
Plastic version FS-02.2:



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FS-03

Float Switch



Description:

The FS-03 float switch operates according to the principle of buoyancy. A hollow float is lifted by the raising level of fluid as long as a switching operation is triggered at an angle of 45° to the horizontal line. The switch can be suspended by means of a screw joint directly in the vessel or, in the case of open vessels, from above. The setpoint is determined by the counterweight that must be ordered separately. The FS-03 consists of a polypropylene float with a total of two hollow spaces sealed against each other. The switch is, therefore, unsinkable even due to mechanical damages. As regards the cable material, the user has a choice between PVC or Neoprene.

Features

/ Low-cost design

/ 2 chamber system

/ Compatible with drinking-water

/ Mercury-free

Application:

The FS-03 level switch is suited for level monitoring in fluids as in all types of industrial applications of direct pump controlling thanks to its high power rating. The switch is small in size and its switching behavior is individually adjustable through a variable weight. It can be used especially as control for MIN, MAX alarm, DRY-RUN and as pump control. The affordable price of FS-03 makes the switch highly recommendable for series deployment in large numbers.

Versions:

FS-03 Float Switch

Cable material: The FS-03 is selectively provided with a PVC or Neopren cable.

Cable length: The cable length can be selected from among 5, 10 and 20 meters.

Electrical Specifications:

Contact /	change-over, 10A ohmic (4A inductive) for 250VAC
Life span /	min. 10 million switching operations
Protection class /	IP 68
Electrical connection /	cable diameter 9 mm, 3-wire with a cross-section of 1 mm²

Technical Specifications:

Float material /	polypropylene
Float volume /	430 cm³
Float diameter /	106 mm
Float weight /	250 g without cable
Counterweight /	polystyrene
Media density /	at least 0,8 g/cm³
Media temperature /	0 bis +50°C
Pressure /	max. 1 bar
Switching angle /	± 45° to the horizontal line

Ordering Codes:

Order number	**FS-03.**	**P.**	**10.**	**1**

FS-03 Float Switch

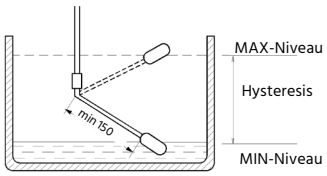
Cable material /
P = PVC
N = Neopren

Cable length /
05 = 5 m
10 = 10 m
20 = 20 m

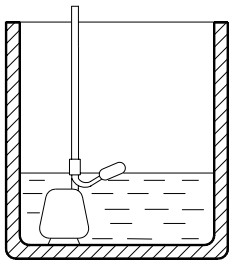
Counterweight /
0 = without counterweight
1 = with counterweight

Functionality:

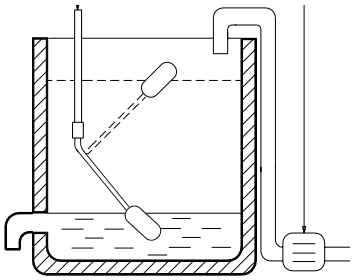
Pump control



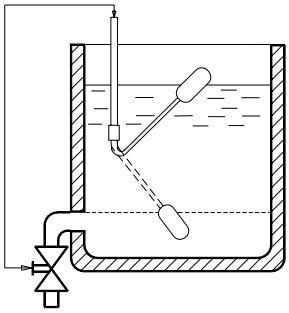
Dry-run protection



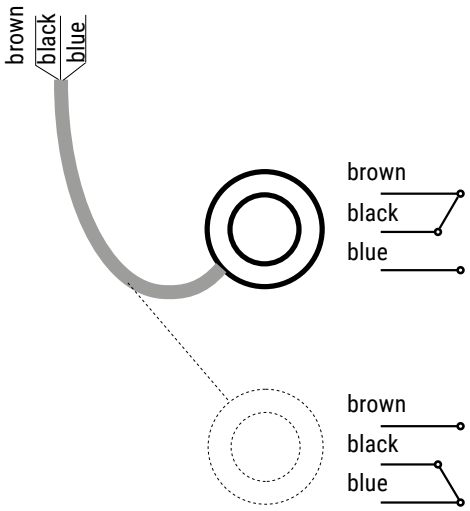
MIN-Alarm



Overfill protection



Electrical Specifications:



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FS-05

Float Switch for Mounting through 1“ Bushings



Features

/ High pressure resistance

/ Cost-effective

/ High switching load

/ Neoprene cable

/ Opt. available with counter weight

Description:

The FS-05 plastic float switch is a level switch in which a ball actuates a micro-switch depending on the inclination angle of the float cylinder. The single pole change-over contact changes its switching status depending on if the axis of the FS-05 is inclined by more than 20° positively or negatively to the horizontal line (fluid surface). On the basis of this action, the FS-05 is ideal suited for automating emptying and filling fluid vessels. The special feature of the cylindrical design of this series of float switch is that the maximum external diameter of the floating body does not exceed 29 mm, thereby allowing to insert the switch through an inch-system bushing into the vessel. The high switching capacity allows the user to switch pumps or large magnetic valves directly using the FS-05. In this, for safety-technical reasons, a contact protective relay such as the PROFIMESS MSR-10 should be deployed whenever there is a possibility of humans coming into contact with the measuring medium.

Application:

The FS-05 series of float switches is used in large numbers across several industries. Their excellent price to performance ratio often allows the user to decide in favor of such a plastic switch as against, for example, tuning fork switches or capacitive limit switches. Moreover, expensive downstream electronic units can be avoided since the FS-05 is capable of processing relatively high performance directly. Particularly, if ferrite particles in the measuring medium cause adhesions or float jamming with conventional float magnetic switches, the FS-05 with its non-magnetic switching element can be a dependable alternative.

The FS-05 can be mounted in two different ways. The float switch can be attached either sideways by means of a conventional cable joint so that the cable length projecting into the vessel determines the angle of switching and, therefore, the setpoints or, the FS-05 can be suspended vertically from above. The response points are determined by the position of the displaceable counter weight which is optionally available.

Electrical Specifications:

Switching element /	micro-switch as change-over contact
Electrical connection /	cable 3 x 0,75 mm²
Switching load /	250 VAC - 50/60 Hz 10 A (resistive), 2 A (inductive)
Contacts /	silver / nickel
Protection class /	IP68

Technical Specifications:

Function /	omni-directional float switch
Measuring medium /	fluid media
Density range /	0.75. . .1.5 g/cm³
max. Pressure /	5.5 bar
max. Media temperature /	85°C
Float material /	copolymer polypropylen
Cable material /	neoprene
Weight without cable /	60 g
Cable weight /	55 g per meter
Adjustable weight /	175g (optional)
Standard cable lengths /	5 m and 10 m (other lengths on request)
Switching angle /	± 20°

Ordering Codes:

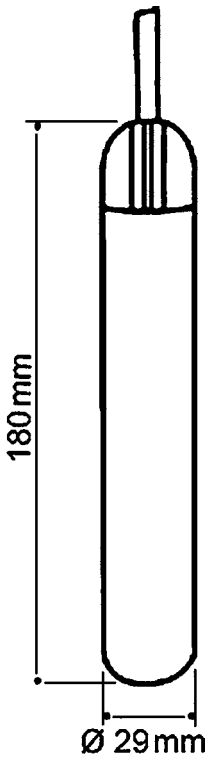
Order number	**FS-05.**	**05.**	**0**

FS-05 Float Switch

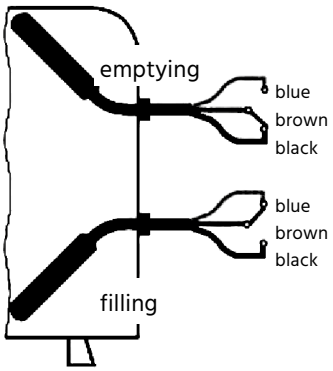
Cable length /
05 = 5 m neoprene-cable
10 = 10 m neoprene-cable

Adjustable weight /
0 = none
1 = with adjustable weight

Dimensions in mm:



Electrical Connections:



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FS-08

Suspended Float Switch with Internal Weight

Features

/ Cost-effective

/ Easy to assemble

/ No response delay

/ Maintenance-free

/ Reliable

/ Media temperatures up to 70°C

/ Small switching hysteresis

/ High switching capacity

Description:

The series FS-08 consists of robust plastic float switches for water applications in two different sizes. The main advantage of this series is its internal weight, which allows the float to pass through grease or oil layers that tend to form in wastewater pumping stations and ensure a reliable detection of levels below these layers. The rounded design of the float and the relocation of the external weight inside also reduces the sensitivity to impurities and deposits. A smaller manufactured size for applications in containers with limited spatial conditions, e.g. like shafts and wells, is available. The FS-08 float switch operates according to the principle of buoyancy. A hollow float is lifted by the raising level of fluid until a switching operation is triggered at an angle of 10° to the horizontal line. The switch can be suspended by means of a screw joint directly in the vessel or, in the case of open vessels, from above.

Application:

The FS-08 level switch is suited for level monitoring in fluids as in all types of industrial applications of direct pump controlling thanks to its high power rating. It can be used especially as high or low level alarm, as overflow or dry-running protection and as well as pump control. Compatible mediums are clear, clean fluids, rain water, sewage water, slightly aggressive fluids like oils and mud etc..

Electrical Specifications:

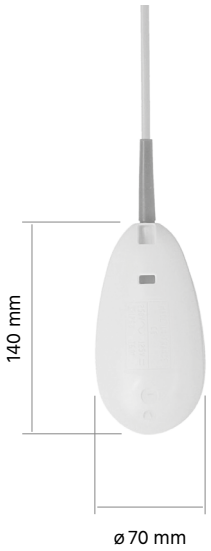
Switching element /	microswitch as changeover contact
Switching power /	
FS-08.1.x:	12, 24, 48 VAC / VDC and 250 VAC - 50/60 Hz 16 A (ohmic), 6 A (inductive)
FS-08.2.x:	250 VAC / VDC - 50/60 Hz 10 A (ohmic), 4 A (inductive)
Cable /	3 x 0.75 mm², PVC
Contacts /	silver / nickel
Protection class /	IP68

Technical Specifications:

Size /	
FS-08.1.x (small):	height 140 mm, Ø 70 mm
FS-08.2.x (large):	height 165 mm, Ø 100 mm
Function /	omni-directional float switch
Measuring medium /	fluid media
Media density /	0.95 to 1.05 g/cm³
max. Pressure /	
FS-08.1.x:	3.5 bar
FS-08.2.x:	2.0 bar
max. Media temp. /	+70°C
Float material /	polypropylen
Cable material /	PVC
Weight without cable /	
FS-08.1.x:	400 g
FS-08.2.x:	775 g
Cable weight /	65 g per meter
Counterweight /	internal
Switching angle /	app. 10° from the vertical line

Dimensions in mm:

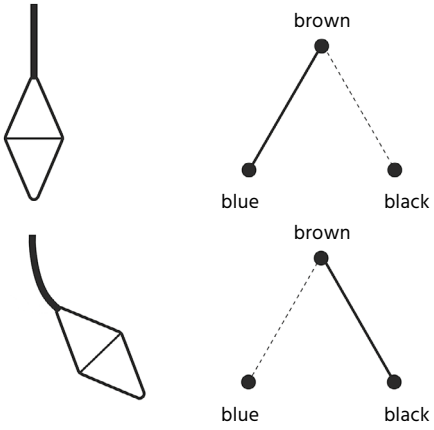
FS-08.1.x



FS-08.2.x



Electrical Connections:



Ordering Codes:

Order number	**FS-08.**	**1.**	**06**

FS-08 Float Switch

Size /
1 = small - 140 mm x 70 mm (height x diameter)
2 = large - 165 mm x 100 mm (height x diameter)

Cable length /
06 = 6 m cable
10 = 10 m cable
[][] = other lengths

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FS-16

PTFE Float Switch for Side Mounting

Description:

The FS-16 series comprises Teflon® float switches having both an excellent temperature and a brilliant chemical resistance. The body of the float switch is made of PTFE with an integrated built-in reed contact. In addition, the cable outlet of the FS-16 can be supplied with a PTFE bellows, so that the cable does not come into contact with the medium. Furthermore, custom-made float switch combinations of up to three floats in a rod version, with a maximum length of three meters are possible. The FS-16 float switch operates according to the principle of buoyancy. A hollow float is lifted by the raising level of fluid as long as a switching operation is triggered at an angle of 20° to the horizontal line. The determination of the setpoint is performed by the lateral installation of the float switch on the desired height.

Features

/ High chemical resistance

/ Media temperature up to 150°C

/ High switching load

/ Easy to assemble

/ Reliable

/ Mercury free

/ Rod versions

Application:

The main area of application is the detection of fluid levels (overflow and dry-running). By using at least two floats, one working as a maximum contactor and the other as a minimum contactor, in combination with a bistable contact protection relais from Profimess, automatic level control can be achieved. Design and material selection predestine this float switch for hot, extremely aggressive or contaminated liquids.

Contact protection relais:
We recommend the use of contact protection relays in combination with our float switches.

· Especially for protection of individuals with regard to liquid contact
· Control for automatic filling or emptying via bistable interval relay with locking feature (see also multifunction relay MSR in the section accessories)

Version:

FS-16 PTFE Float Switch for Side Mounting

FS-16.1.x.x - PTFE Float Switch - with bellows
FS-16.2.x.x - PTFE Float Switch - without bellows

Technical Specifications:

Process connection /	
FS-16.1.x.x:	G 1/2"- male thread
FS-16.2.x.x:	cable outlet
Float size /	Ø 55 mm, height 130 mm
Function /	omni-directional float switch
Measuring medium /	fluid media
Media density /	p ≥ 0.75 g/cm³
max. Pressure /	1 bar
max. Operating temp. /	+ 150°C
Float material /	PTFE (Teflon®)
Cable material /	SIL (silicone), FEP (Teflon®)
Cable length /	2000 mm (basic length)
Switching angle /	± 20° from the horizontal line
Switching hysteresis /	approx. 100 mm

Ordering Codes:

Order number	**FS-16.**	**1.**	**02.**	**1.**	**0**

FS-16 PTFE Float Switch for Side Mounting

Version /
1 = with bellows
2 = without bellows

Cable length /
02 = 2 m cable
[ ] [ ] = other lengths

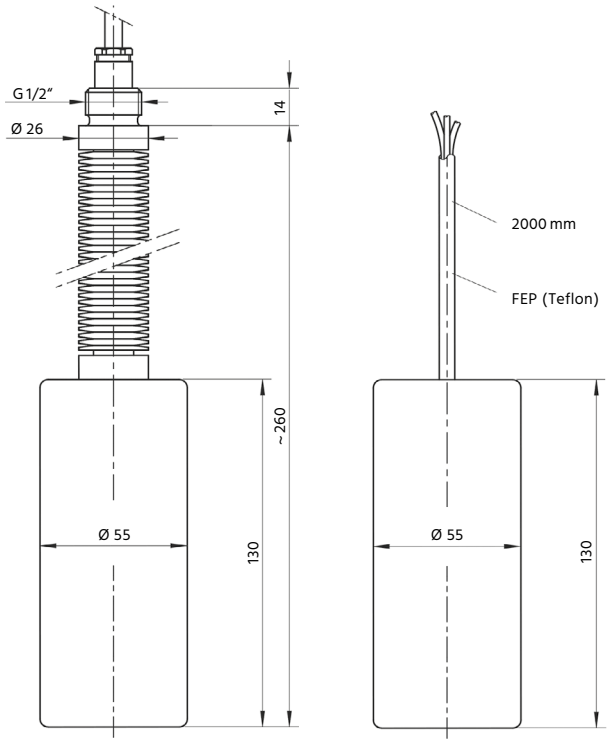
Cable material /
1 = FEP
2 = SIL (for versions with bellows only)

Options (multiple selection such as /1/99 possible) /
0 = none
1 = NAMUR switching (1 kΩ / 12 kΩ)
2 = PTFE cable gland, G 2", for version with bellows
3 = PTFE cable gland, G 2", for version without bellows
99 = Special (please specify in detailed text)

Electrical Specifications:

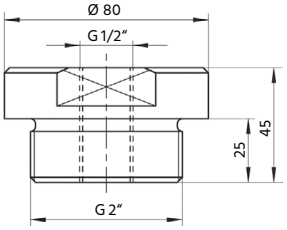
Switching element /	reed contact
Contact /	change-over
Switching voltage /	24. . .250 V AC/DC
Switching current /	1 mA. . .1 A
Switching power /	max. 1 A, 60 VA / 60 W
Protection class /	IP68
Option /	
Namur-switching:	1 kΩ / 12 kΩ (for connection at „Namur" relays only)

Dimensions in mm:

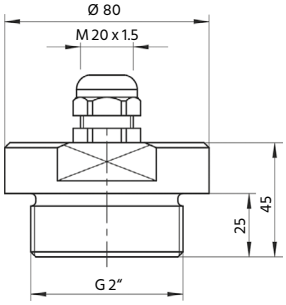


Accessories: 2" PTFE cable gland:

for FS-16.1



for FS-16.2



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Version:

FS-16S PTFE Float Switch Rod Version

Technical Specifications:

Process connection /	as per DIN EN 1092-1
with one float:	flange DN 65
with several floats:	flange DN 100
Float type /	with bellows (FS-16.1.)
Float size /	Ø 55 mm, height 130 mm
max. Number of floats /	3
Function /	omni-directional float switch
Measuring medium /	fluid media
Media density /	p ≥ 0.75 g/cm³
max. Operating temp. /	+ 150°C
max. Pressure /	1 bar
Float material /	PTFE (Teflon®)
Rod material /	stainless steel, PTFE coated
max. Rod length /	3000 mm
Switching angle /	± 20° from the horizontal line
Switching hysteresis /	approx. 100 mm

Ordering Codes:

Order number	**FS-16S.**	**1.**	**[].**	**[][][][].**	**0**

FS-16S PTFE Float Switch Rod Ver.

Float Type /
1 = with bellows

Number of floats /
[ ] = 1. . .3

Rod length L /
[ ] [ ] [ ] [ ] = in mm (max. 3000 mm, meas. from the bttm. edge of the flange)

Optionen (multiple selection such as /1/99 possible) /
0 = none
1 = NAMUR switch (1 kΩ / 12 kΩ)
99 = Special (please specify in detailed text)

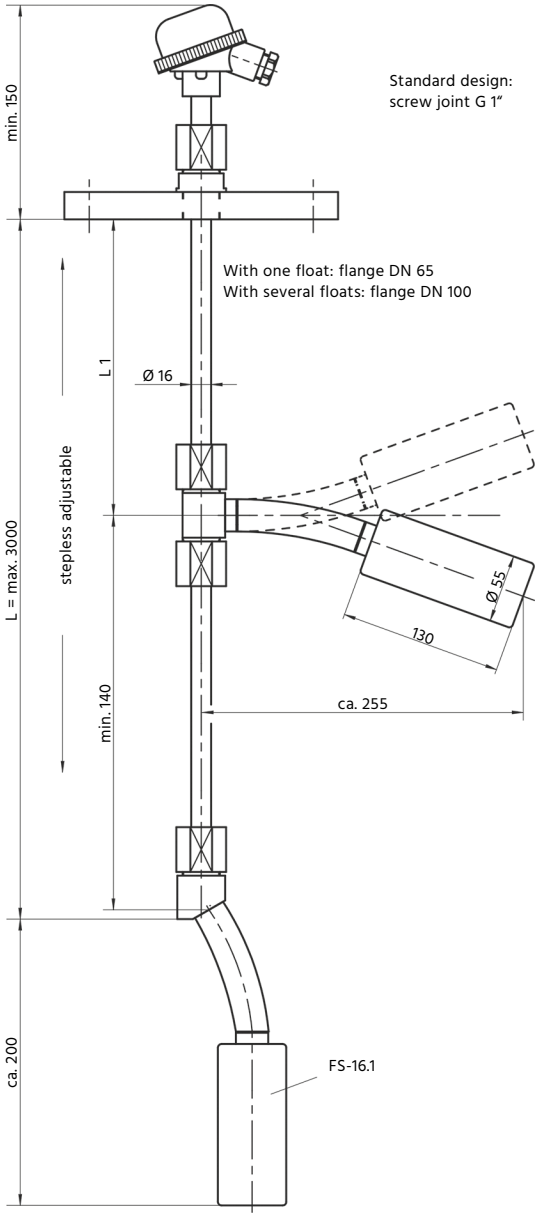
Other specifications:
- Position of the 1st float: L1 = xxxx mm
- Position of the x. float: Lx = xxxx mm

(All length specifications are measured from the bottom edge of the flange)

Electrical Specifications:

Switching element /	reed contact
Contact /	change-over
Switching voltage /	24. . .250 V AC/DC
Switching current /	1 mA. . .1 A
Switching power /	max. 1 A, 60 VA / 60 W
Protection class /	IP68
Option /	
Namur switching:	1 kΩ / 12 kΩ (for connection at „Namur" relays only)

Dimensions in mm:



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FS-17

Stainless Steel Float Switch for Side Mounting



Features

/ Wetted parts stainless steel
/ High chemical resistance
/ Media temperature up to 150°C
/ Up to 15 bar
/ High switching load
/ Easy to assemble
/ Reliable
/ Mercury free
/ Rod versions

Description:

The FS-17 series comprises rugged stainless steel float switches having both an excellent temperature and a high pressure resistance. This series is available in two different designs. Furthermore, custom-made float switch combinations of up to five floats in a rod version, with a maximum length of five meters are possible. The FS-17 float switch operates according to the principle of buoyancy. A hollow float is lifted up by the raising level of fluid until a switching operation is triggered at an angle of 20° to the horizontal line. The determination of the setpoint is performed by the lateral installation of the float switch on the hight of the desired position. The complete FS-17 is designed so that the float is hermetically sealed with the pipe inlet.

Application:

The main area of application is the detection of fluid levels (overflow and dry-running). By using at least two floats, one acting as a maximum contactor and the other as a minimum contactor and in combination with a bistable contact protection relais, automatic level control can be achieved. Design and material selection predestine this float switch for very aggressive, pasty or hot liquids.

Contact protection relais:
We recommend the use of contact protection relays in combination with our float switches.

· Especially for protection of individuals with regard to liquid contact
· Control for automatic filling or emptying via bistable interval relay with locking feature (see also multifunction relay MSR in the section accessories)

Versions:

FS-17 Stainless Steel Float Switch for Side Mounting

FS-17.1.x.x - Stainless Steel Float Switch - spherical shape
FS-17.2.x.x - Stainless Steel Float Switch - cylindrical shape

Technical Specifications:

Process connection /	R 1/2"-male thread
Float size /	
FS-17.1.x.x:	Ø 132 mm
FS-17.2.x.x:	Ø 80 mm, height 180 mm
Function /	omni-directional float switch
Measuring medium /	fluid media
Media density /	p ≥ 0.8 g/cm³
max. Pressure /	
FS-17.1.x.x:	15 bar
FS-17.2.x.x:	6 bar
max. Operating temp. /	+ 150°C
Float material /	stainless steel 1.4571
Hose material /	stainless steel corrugated hose (1.4404) with st. steel wire braid (1.4301)
Cable material /	silicone (non-wetted part)
Cable length /	2000mm (basic length), 270mm of which with a st. steel 1.4404 corrugated hose
Switching angle /	± 20° from the horizontal line
Switching hysteresis /	approx. 100 mm

Ordering Codes:

Order number	**FS-17.**	**1.**	**02.**	**0**

FS-17 Stainless Steel Float Switch for Side Mounting

Float type /
1 = spherical shape
2 = cylindrical shype

Cable length /
02 = 2 m cable
[ ] [ ] = other lengths

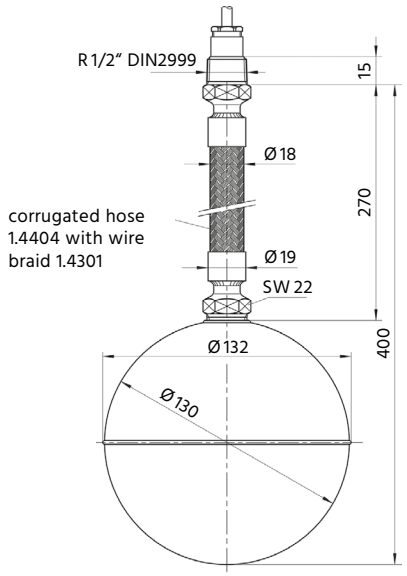
Options (multiple selection such as /1/99 possible) /
0 = none
1 = NAMUR switching (1 kΩ / 12 kΩ)
2 = PTFE-gland, G 2", for version with bellows
3 = PTFE-gland, G 2", for version without bellows
99 = special (please specify in detailed text)

Electrical Specifications:

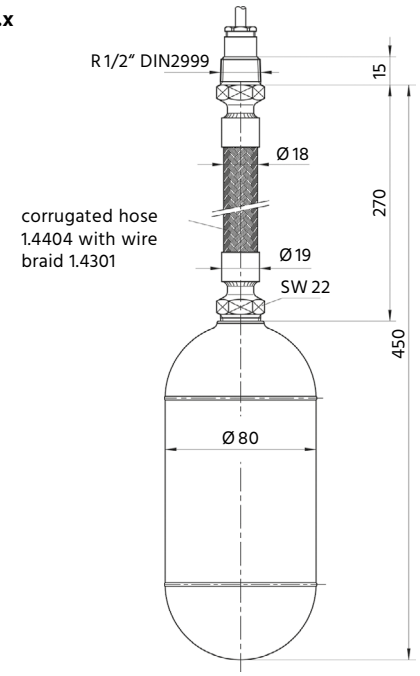
Switching element /	reed contact
Contact /	change-over
Switching voltage /	24. . .250 V AC/DC
Switching current /	1 mA. . .1 A
Switching power /	max. 1 A, 60 VA / 60 W
Protection class /	IP68
Option /	
Namur switching:	1 kΩ / 12 kΩ (for connection at „Namur" relays only)

Dimensions in mm:

FS-17.1.x.x



FS-17.2.x.x



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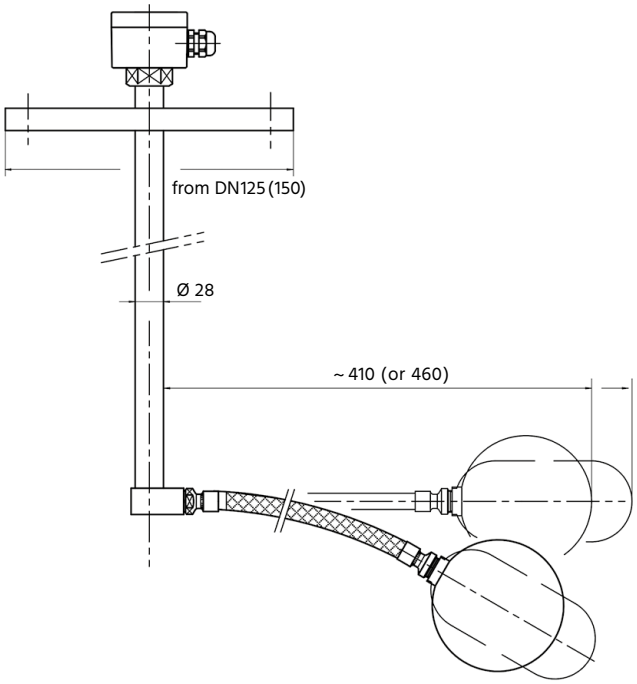
Versions:

FS-17S Float Switch - Rod Version

Electrical Specifications:

Switching element /	reed contact
Contact /	change-over
Switching voltage /	24. . .250 V AC/DC
Switching current /	1 mA. . .1 A
Switching power /	max. 1 A, 60 VA / 60 W
Protection class /	IP68
Option /	
Namur switching:	1 kΩ / 12 kΩ (for connection at „Namur" relays only)

Dimensions in mm:



Technical Specifications:

Process connection /	flange from DN 150 (FS-17.1) flange from DN 125 (FS-17.2)
Float /	sperical- or cylindrical shape
Float size /	
sphere (FS-17.1):	Ø 132 mm
cylinder (FS-17.2):	Ø 80 mm, height 180 mm
max. Number of floats /	max. 5
Function /	omni-directional float switch
Rod length /	max. 5000 mm
Measuring medium /	fluid media
Media density /	p ≥ 0.8 g/cm³
max. Operating temp. /	+ 150°C
max. Pressure /	
sphere (FS-17.1):	15 bar
cylinder (FS-17.2):	6 bar
Float material /	stainless steel 1.4571
Hose material /	stainless steel corrugated hose (1.4404) with st. steel wire braid (1.4301)
Rod material /	stainless steel
Switching angle /	± 20° from the horizontal line
Switching hysteresis /	ca. 100 mm

Ordering Codes:

Order number	**FS-17S.**	**1.**	**[].**	**[][][][].**	**0**

FS-17S St. Steel Float Switch with Rod

Float type /
1 = spherical shape
2 = cylindrical shype

Number of floats /
[ ] = 1. . .5

Rod length L /
[ ] [ ] [ ] [ ] = in mm (max. 5000 mm, from the bottom edge of the flange)

Options (multiple selection such as / 1/ 99 possible) /
0 = none
1 = NAMUR switching (1 kΩ / 12 kΩ)
99 = special (please specify in detailed text)

Other specifications:
- position of the 1st float: L1 = xxxx mm
- position of the x. float: Lx = xxxx mm

(All length specifications are measured from the bottom edge of the flange)

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FS-10

Float Switch for Bulk Solids

Description:

The FS-10 plastic float switch is a level switch in which, depending on the angle of inclination of the floating cylinder, a ball activates a microswitch. The switch works as soon as the vertical axis of the FS-10 is tilted by more than 10° towards right or left. Due to this action, the FS-10 is ideally suited for shutting down a filling operation for grain, flour, granulate material or powders in silos or other containers. There are three basic models of FS-10 available which are different with regard to their applicability in explosion-prone areas. The simplest design does not have the EX approval and is made of a polypropylene hollow body and a Neopren cable. This easily affordable device is capable of covering 80% of all applications. Both the ATEX approved models are allowed either only for dust materials or for gases and dust materials highly prone to explosions. In these devices the basic body is surrounded additionally by a shell made of HR HY (Hypalon), an excellent resistant material, where also the cable is made of this material. In the case of the purely EX variant for dust material, up to 240 V AC / 1A can be connected directly through FS-10 regardless of the EX-approval; the supply system for the gas and dust EX model of FS-10 is handled by an intrinsically safe isolated switching amplifier.

Application:

The FS-10 series of flow switches offers the ideal solution wherever a bulk material filling operation needs to be shut down in a container. These devices are cost-effective, extremely robust and water-proofed and can be installed easily. The three models of FS-10 cover nearly every type of applications as they comply with the highest requirements for protection against explosion and media resistance. The FS-10 is fixed directly to the cable and suspended into the silo, where optionally a counter weight on the cable acts as the pivot; alternatively FS-10 can be inserted by means of a cable gland. At the output point of FS-10 a potential-free changeover-contact is available which is capable of connecting up to 20A at 250 V AC depending on the design of the device.

Features

/ ATEX approval for dust and gases in zones 0 and 20
/ Double-shell housing with HR HY (Hypalon) coating
/ High switching capacity due to microswitches
/ Neopren or HR HY (Hypalon) cables
/ Optionally available with counter weights

Electrical Specifications:

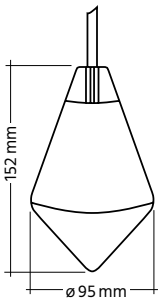
Switching element /	microswitch as changeover contact
Electrical conn. /	cable 3 x 1 mm²
Protection class /	IP68
Switching power /	**non-Ex version FS-10.xx.O:** 20 (8) A ohmic (inductive) at max. 250 V AC, 50/60 Hz **dust EX version FS-10.xx.1:** 1 A at max. 240 V AC, 50/60 Hz, must be operated with 1A/240 V fuse **gas- & dust EX version FS-10xx.2:** max. 24 V AC/DC with max. 10 mA or 12 V AC/DC with max. 100 mA, must be operated with intrinsically safe isolated switching amplifier, Uo ≤ 30 V, Io ≤ 100 mA, Po ≤ 0.75 W, Li ≤ 2 µHenry, Ci ≤ 203 pF at 2 m cable (additionally 0.36 mH per kilometer cable)
Contacts /	**non-Ex version FS-10.xx.O:** Ag/ Cd oxide **dust EX version FS-10.xx.1:** Ag **Gas- & dust EX version FS-10.xx.2:** gold-plated
Ignition protection class /	**dust EX version FS-10.xx.1:** ATEXEx ta IIIC T70°C Da IP68 **gas- & dust EX version FS-10.xx.2:** ATEX II 1 GD Ex ia IIC T6 Ga Ex ta IIIC T70°C Da IP68

Technical Specifications:

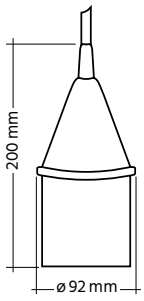
Function /	omni-directional float switch
Measuring medium /	bulk materials such as powders, granulates or grains
Media temperature /	non-EX version FS-10.xx.0: max. 85°C EX versions FS-10.xx.(1 or 2): Ta at ambient temperature from -20. . .+70°C
Float material /	Copolymer Polypropylene, in EX versions with HR HY coating
Cable material /	non-Ex version FS-10.xx.0: PVC EX versions FS-10.xx.(1 or 2): HR HY (Hypalon)
Weight without cable /	non-Ex version FS-10.xx.0: 462 g EX versions FS-10.xx.(1 or 2): 495 g
Cable weight /	non-Ex version FS-10.xx.0: 115 g per meter EX- versions FS-10.xx.(1 or 2): 110 g per meter
Load weight /	250 g
Standard cable lengths /	5 m and 10 m (other lengths on request)
Switching angle /	± 10° from the vertical line

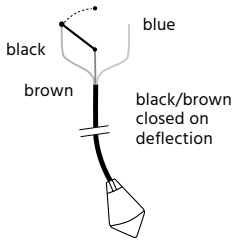
Dimensions in mm:

FS-10.xx.0



FS-10.xx.(1 & 2)





Ordering Codes:

Order number	FS-10.	10.	1.	1

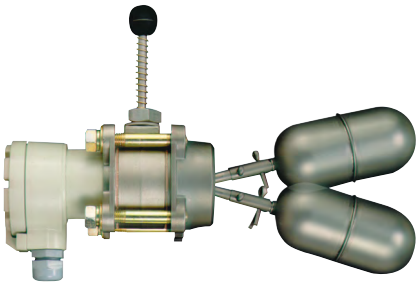
FS-10 Floating Switch

Cable length /
05 = 5 m cable
10 = 10 m cable
[][] = other lengths

Ignition protection class /
0 = none
1 = dust EX Zone 20, 21 oder 22
2 = dust EX and gas EX Zone 20, 21, 22 and Zone 0, 1, 2

Load weight /
0 = none
1 = with load weight

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FS-04

Float Switch for Horizontal or Vertical Mounting

Features

/ Suitable in ship-building

/ Cost-effective

/ Robust

/ Square flange or thread connection

/ DN80 to DN150 flange

/ Fixed and adjustable hysteresis

/ Explosion proof version

/ SIL 1

Description:

A float spatially completely separated from the outer side of the vessel moves up and down along with the fluid being monitored. This movement is transmitted by means of a permanent magnet at the end of the float to a change-over contact mounted in an aluminium switch housing which triggers a switching operation when the float reaches the center position. The float can be provided with a rod extension so as to generate different switching hystereses and switching points. The switch housing can be supplied with protection type IP68 so that also applications under water (up to 20 m water column) can be included. Optionally, PROFIMESS GMBH supplies a prefabricated proven counter-flange that is compatible with the standard connection of the FS-04 with square flange and test actuators for a „dry“ simulation of the switching operation.

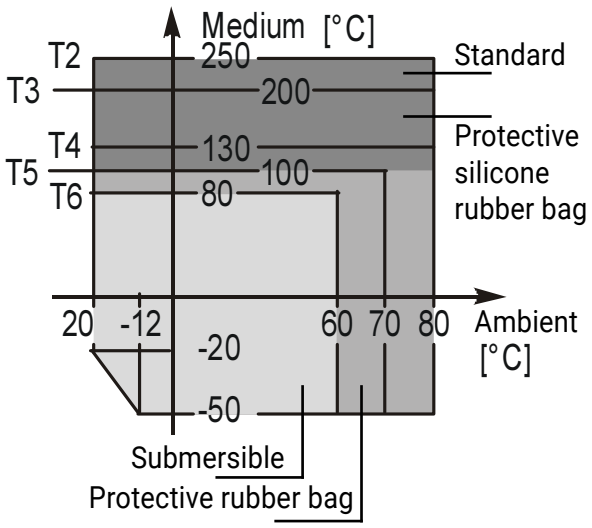
Application:

The FS-04 series of magnetic float switches is used for limit value switching in fluids. The switches are passive components and operate without any auxiliary power source. Thanks to the wide range of operating temperatures and pressure, including various mounting positions on top, on the side, under water or in potentially explosive areas as well as media-contacted components in stainless steel, the switches can be deployed in many ways. In ship-building, particularly, the FS-04 has gained a significant position since it has an extremely robust design and can be used for operation under the harsh conditions on board without a problem in contrast to many other types of switches.

Technical Specifications:

max. Pressure /	PN25
Weight /	1.8. . .3.5 kg
Wet components /	stainless steel (rubber or silicone for version with protective rubber bag)
Housing material /	Aluminium casting, paint coated
Ambient temp. /	-20. . .+80°C submersible ver. -20. . .+60°C
Media temperature /	standard version: -20. . .+250°C, protective rubber bag: -20. . .+100°C, prot. silicone rubber bag: -20. . .+200°C, submersible version: -20. . .+80°C
Media density /	0.7 g/ccm without extension 0.8 g/ccm to 300 mm extension for float diameter 64 mm 0.85 g/ccm to 300 mm extension for float diameter 52 mm
Certificates /	Atex, Germanischer Lloyd, SIL 1
Option /	Test actuator: with the test actuator the functioning of FS-04 can be checked without dismantling the switch and without changing the level. The test actuator is available as simple steel or stainless steel version.
Counter-flange /	92 mm square counter-flange can be supplied in steel or stainless steel versions which are prepared for direct welding on to the vessel. They can be provided with extended spacer bolts for using a test actuator.
Explosion protection /	The switch housing is available in pressure-compression encapsulation, in which case the protection against ignition is EEx dme IIC T2. . .T6.

Temperature diagramm:



Float Table:

	Rod length in mm			
Float Ø in mm	**0, 100**	**200**	**300**	**1000-3000**
52	0.7	0.8	0.85	-
64	0.7	0.8	0.8	-
124	-	-	-	0.7

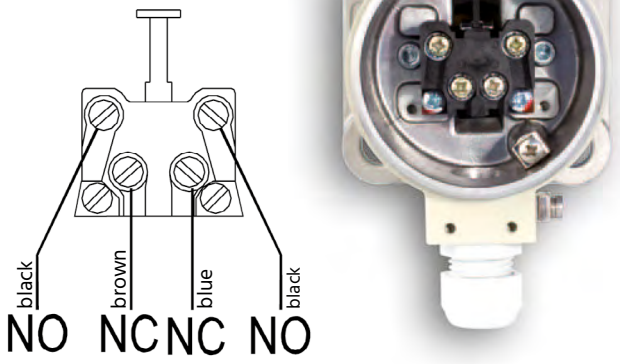
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Electrical Specifications:

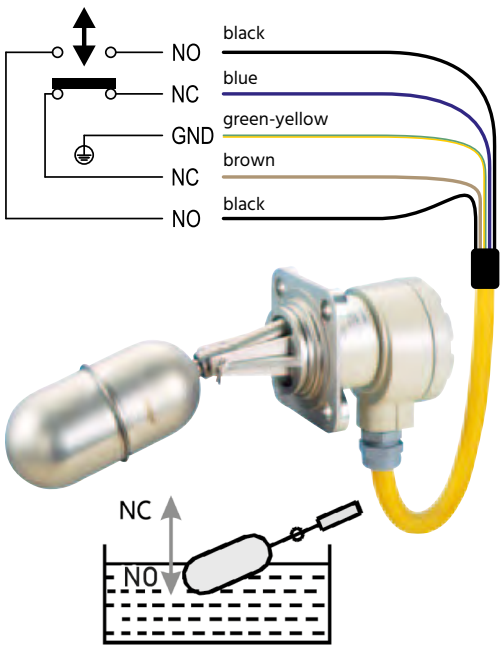
Switching element /	1 micro-switch with two switching contacts (NO and NC)
Switching load norm. /	250V AC12 10A, 220V DC13 0.6A
Switching load Ex /	250V AC12 2.5A, 220V DC13 0.3A
El. connection /	M20 x 1.5, in under water version molded cable with a cross-section of 5 x 1,5 mm² (please specify cable length while ordering)
Protection class /	IP 65 except for the under water version IP 68 to 20 meter water column

Electrical Connection:

Standard-Version:



Submersible version:



Ordering Codes:

Order number	**FS-04.**	**1.**	**A.**	**1.**	**1.**	**1.**	**0**

FS-04 Float Switch

Mounting position /
1 = horizontal
2 = vertical

Version /
A = standard
G = standard with protective rubber bag
S = standard with protective silicon rubber bag
U = under water (only with cable IP 68)*
V = under water with protective rubber bag
Z = under water with protective silicon rubber bag

Hysteresis /
1 = fixed hysteresis
2 = adjustable hysteresis (horizontal mounting pos. only, not with protective bag)

Process connection /
1 = 92 square flange PN 25
2 = DN 80 PN 25 steel
3 = DN 100 PN 25 steel
3a = DN 125 PN 25 steel
3b = DN 150 PN 25 steel
4 = DN 80 PN 25 stainless steel 1.4571
5 = DN 100 PN 25 stainless steel 1.4571
5a = DN 125 PN 25 stainless steel 1.4571
5b = DN 150 PN 25 stainless steel 1.4571
B = 2" BSP thread (horiz. mounting position and fixed hysteresis only)
N = 2" NPT thread (horiz. mounting position and fixed hysteresis only)

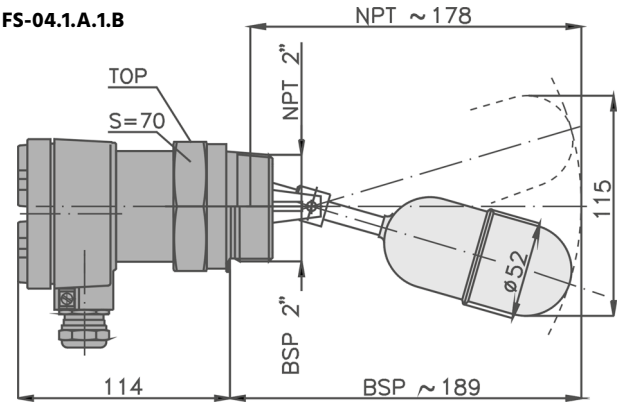
Rod length in [mm] /
1 = 0 mm
2 = 100 mm
3 = 200 mm
4 = 300 mm
5 = Z-shaped (not for adjustable hysteresis)
6 = L-shaped (not for adjustable hysteresis)

Counter flange /
0 = none
1 = with steel flange without test device
2 = with steel flange for test device
3 = with steel flange incl. test device
7 = with st. steel flange without test device
8 = with st. steel flange for test device
9 = with st. steel flange incl. test device

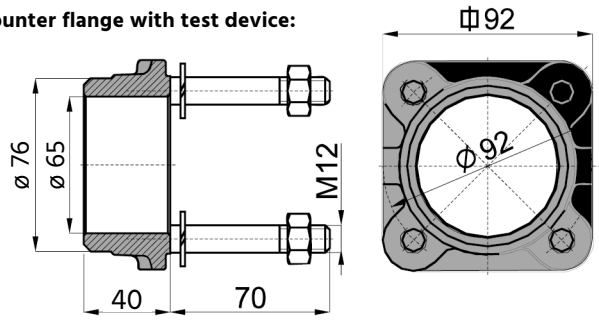
* please specify the desired cable length while ordering!

Dimensions in mm:

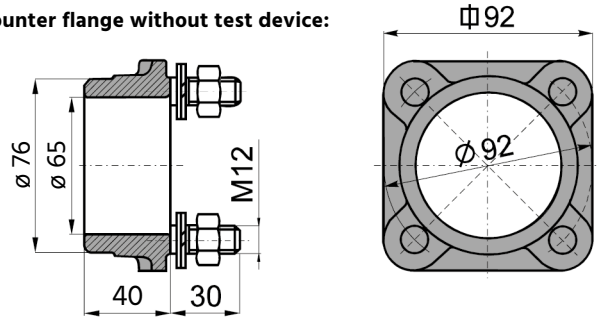
FS-04.1.A.1.B



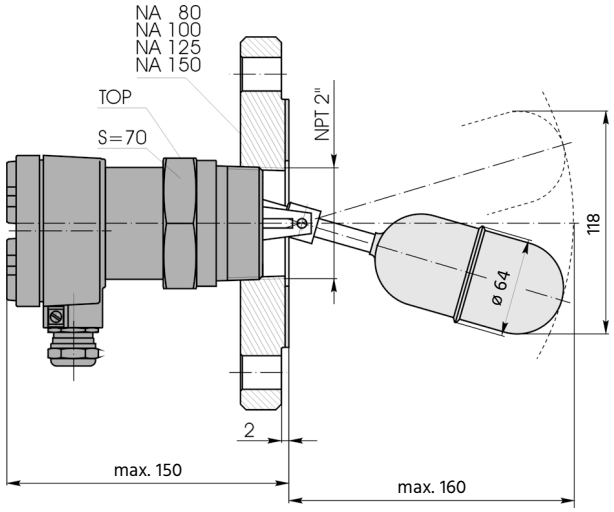
Counter flange with test device:



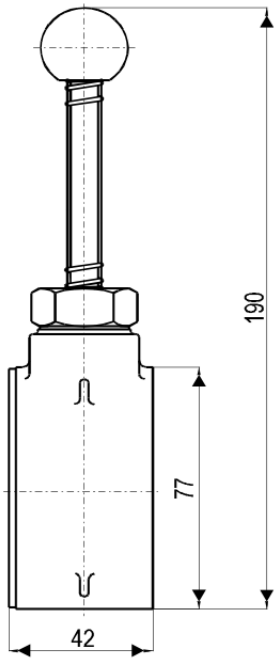
Counter flange without test device:



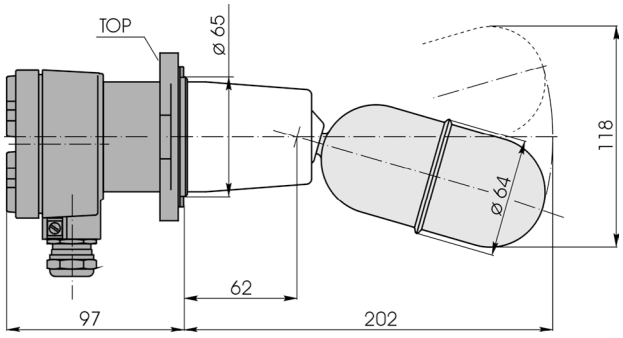
FS-04.1.A.1.2



Test device:

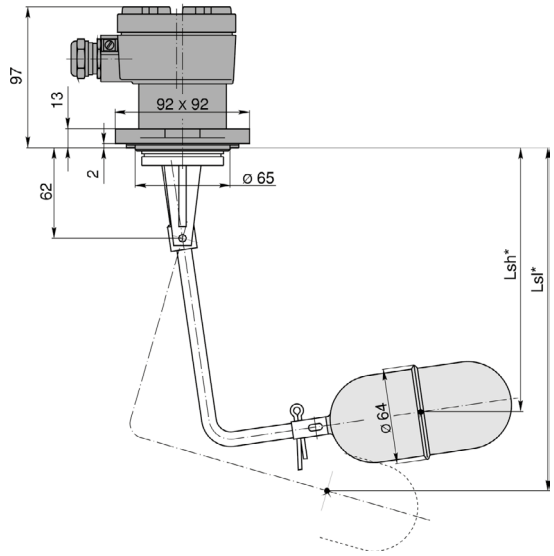


FS-04.1.G.1.1.1

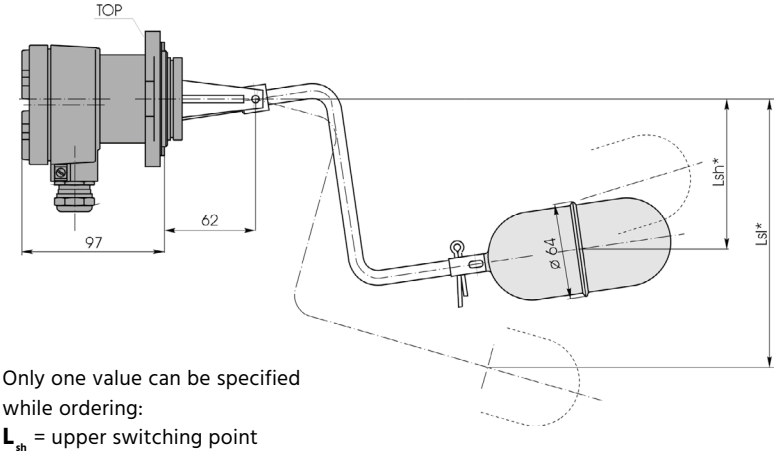


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FS-04.2.A.1.1.6

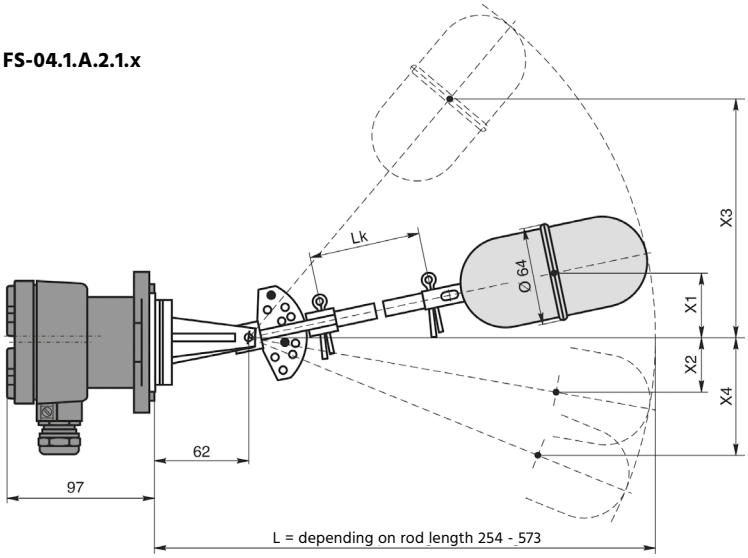


FS-04.1.A.1.1.5



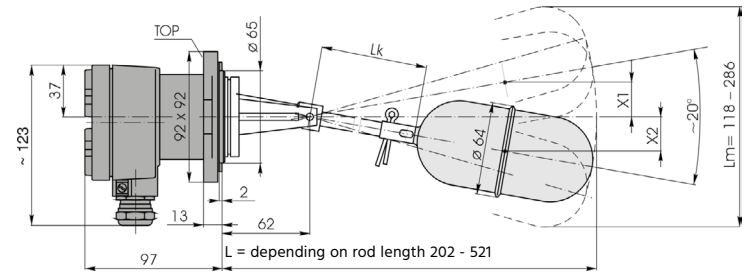
Only one value can be specified while ordering:
L_{sh} = upper switching point
L_{sl} = lower switching point

FS-04.1.A.2.1.x



FS-04.x.x.2.x.x Data refers to water 20°C; Tolerance: +/- 5mm				
Lk = rod length [mm]	0	100	200	300
L = mounting length [mm]	254	373	473	573
x1 = min. upper switching dist. [mm]	28	55	78	100
x2 = min. lower switching dist. [mm]	28	55	78	100
x3 = max. upper switching dist. [mm]	100	193	270	350
x4 = max. lower switching dist. [mm]	100	193	270	350

FS-04.1.A.1.1.x



FS-04.x.x.1.x.x Data refers to water 20°C; Tolerance: +/- 5mm				
Lk = rod length [mm]	0	100	200	300
L = mounting length [mm]	202	321	421	521
Lm= total deflection [mm]	118	180	234	286
x1 = switching point top [mm]	12	30	46	62
x2 = switching point bottom [mm]	12	30	46	62

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LS-10N

Float Switch for Level Detection

Features

/ Up to 15 m insertion length
/ Up to 150 bar and 250°C
/ Top, bottom or lateral mounting
/ Contacts available as NC-contact, NO-contact or change-over contact
/ High repeatability of set points
/ Optionally with temperature sensor
/ Customized designs
/ Stainless steel (ECTFE or PFA coated), Titanium, Alloy C, Brass, PVC, PP, PA, PVDF

Description:

The LS-10N series of level switches operates according to the principle of a float with magnetic transmission. The switch consists of a sliding tube with embedded reed contacts, one or more floats in which ring magnets are mounted, and a connecting module. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float through the sliding tube wall. The reed contact can be designed to function as a NC-contact, NO-contact or change-over contact.

Application:

The LS-10N level switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the level switches provide an ideal switching element in combination with PLC controls (apply PLC-contact or series resistor).

Ordering Codes:

Order number	LS-10N.	[ ][ ][ ][ ][ ].	[ ][ ][ ][ ][ ].	S.	S.	LNO[ ].LNO[ ]...	0.	0.	S.	S.	S.	0.	0

LS-10N Float Switch

Version /
[ ][ ][ ][ ][ ] (e.g. VAG2G)

Ins. length (L)* or center dist. for lateral connections (M) in mm /
[ ][ ][ ][ ][ ] (*measured from the sealing edge of relevant connection joint)

Electrical connection /
S = acc. to variant standard
K = connection cable; specify cable length and material in detailed text
E = aluminium terminal box flat
F = aluminium terminal box high
DA = aluminium terminal box, flameproof enclosure for Ex d
VA = stainless steel terminal box, flameproof enclosure for Ex d
PA = polyester terminal box
BA = ABS terminal box
S1A (B) = connector M12, 3-pole (B = connector M12, 8-pole)
S2A = plug Hirschmann DIN 43650
S3A (B) = plastic plug HTS straight (B = aluminium plug HTS straight)
S4A (B) = plastic plug HTS angulate (B = aluminium plug HTS angulate)

Float type /
S = acc. to variant standard
[ ][ ][ ][ ][ ] = special float type as per table spherical or cylindrical float (table 1 or 2)

Level switching contact [position in mm from the sealing edge of relevant connection joint] /
LNO [ ] = NO-contact [ ] increasing level
LNC [ ] = NC-contact [ ] increasing level
LUS [ ] = change-over-contact [ ] increasing level

Example: LNO [100] LNC [580] = 2 contacts in engaging sequence from the sealing edge of relevant connection joint
Contact No. 1 = NO-contact, position in 100 mm from the sealing edge of relevant connection joint
Contact No. 2 = NC-contact, position in 580 mm from the sealing edge of relevant connection joint

Temperature switching contact [temperature setpoint in °C] /
0 = none
TNO [ ] = NO-contact [ ] increasing temperature
TNC [ ] = NC-contact [ ] increasing temperature
Example: TNO [90] = NO-contact, setpoint at +90°C

Temperature sensor /
0 = none
A = with built-in resistor Pt100, 3-wire
B = with built-in resistor Pt1000, 3-wire
9 = special (please specify in detailed text)

Material sliding tube and process connection /
S = acc. to variant standard
9 = special (please specify in detailed text)

Sliding tube diameter /
S = acc. to variant standard
9 = special (please specify in detailed text)

Process connection /
S = acc. to variant standard
9 = special (please specify in detailed text)

Approvals /
0 = none
1 = with approval (please specify in detailed text e.g. Ex i, Ex d, WHG, GOST, PED, GL, BV, ABS)

Options (multiple selections possible e.g. B/D) /
0 = none
A = counter plug M12x1 for electrical connection S1A or S1B
B = contact function - protective circuit with 22 Ω / 0.21 W resistor
C = contact function - protective circuit according to NAMUR EN 60947
D = contact function - high temperature 180°C to 250°C
9 = special (please specify in detailed text)

When ordering, please specify in detailed text: medium, medium density, operating pressure, operating temperature and special issues

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Versions:

Every float switch consists of following three main component groups which are available in different versions depending on the technical requirements:

- sliding tube
- float
- process connection

Sliding tube:
The sliding tube is the core of the float switch as it holds the reed contacts and it can be supplied in a number of materials and diameters.

For example:
- stainl. steel (Ø 8 mm, 12 mm, 14 mm, 16 mm, 18 mm, 40 mm)
- stainless steel electropolished (Ø 8 mm, 12 mm, 14 mm, 16 mm, 18 mm, 40 mm) / Ra appr. 0.8 µm (not attestable)
- stainless steel ECTFE coated (Ø 11 mm, 17 mm)
- stainless steel PFA coated (Ø 11 mm, 17 mm)
- Titanium (Ø 12 mm, 14 mm, 18 mm)
- Alloy C (Ø 12 mm, 18 mm)
- PVC (Ø 8 mm, 12 mm, 16 mm, 20 mm)
- PP (Ø 8 mm, 12 mm, 16 mm, 20 mm)
- PVDF (Ø 12 mm, 16 mm, 20 mm)

Float:
Each variant has a matching float. However, if the application requires other values in terms of maximum pressure, temperature or low specific gravity, an alternative float can also be fitted in as far as it fits with its bore on the sliding tube of that variant. Table 1 and 2 provides an overview of spherical and cylindrical floats, their dimensions, weights and immersion depths.

Process connection:
Various options are available as mechanical and electrical connections to the float switch. The following pages offer an overview about which variant suits to which process connections. Depending on whether the float fits through the threaded bore or not, the connecting threads are directed in different versions. “Up” installation through the interior, or “down” for the installation from the outside. If the electrical connection is realized via a cable, the maximum temperature on the cable sheath must be taken into account. Standard cable with PVC sheath ranges from -20. . .+80°C, the version with silicone sheath ranges from -60. . .+180°C. Other materials such as Teflon cord can also be offered on request for temperatures up to +200°C.

Switching contacts level:

These contacts are defined as normally open, normally closed or change-over with increasing level. The following switching values[1] are based on:

Reed contact values - Sliding tube < 12 mm

Function	Normally open	N. closed	change over
Switching voltage	150 V	150 V	150 V
Switching current	0.5 A	0.5 A	0.5 A
Switching load	10 VA	10 VA	10 VA

Reed contact values - Sliding tube ≥ 12 mm

Function	Normally open	N. closed	change over
Switching voltage	230 V	230 V	230 V
Switching current	1.0 A	0.5 A	0.5 A
Switching load	100 VA	40 VA	40 VA

Switching Contact Temp.:

In addition, the float switch for level detection can be equipped with a temperature switching contact. This contact is defined as NO or NC with increasing temperature. The following switching values[1] are based on:

Function	Normally open	Normally closed
Switch rating	230 V / 0.5 A / 40 VA	230 V / 0.5 A / 40 VA
Operating range	+80. . .+160°C	+50. . .+160°C
Graduation	every 5 K	every 5 K
Accuracy	± 5 K	± 5 K
Hysteresis	30 K ± 15 K	30 K ± 15 K
Sliding tube	≥ Ø 11 mm	≥ Ø 11 mm

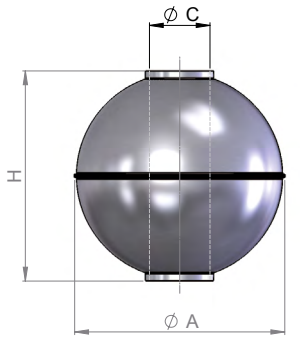
Temperature Sensors:

In the sliding tube of the LS-10N an additional temperature sen- sor can be installed as a Pt100 or Pt1000. The measuring resistors meet the following specifications:

Function	Normally open	Normally closed
Actuation temp.	-70. . .+400°C	-70. . .+400°C
Tolerance	Class B	Class B
Properties	from IEC 751	from IEC 751
Connection Type	2-, 3-, or 4-wire	2-, 3-, or 4-wire
Sliding tube	≥ Ø 8 mm	≥ Ø 8 mm

[1] The values shown are maximum values when using earth conductor. In some cases it is not always technically possible to provide an earth conductor, for example versions with cable- or plug connection and multiple number of contacts. Designs without earth connection should use low voltage only, for example contact protection relais or external protective earth. The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

Table 1: Spherical Float - Dimensions

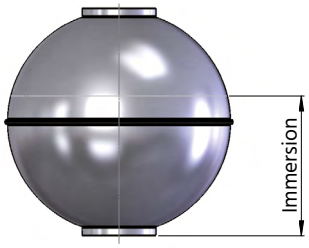


* = Design temperature 200°C, higher temperatures after calculating
** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Mass
		(mm)	(mm)	(mm)	(kg/m³)	(bar)	(°C)	(mm)	(mm)	(mm)	(g)
K29S9.4E	St. Steel	29	28	9.4	900	-1. . .+35	-156. . .+200	35	30	45	7
K42S9.4E	St. Steel	42	42	9.4	650	-1. . .+15	-156. . .+200	45	40	60	19
K52S15E1	St. Steel	52	52	15	680	-1. . .+30*	-156. . .+250	55	45	70	35
K52S15E2	St. Steel	52	52	15	750	-1. . .+50*	-156. . .+250	55	45	70	40
K62S15E	St. Steel	62	62	15	630	-1. . .+25*	-156. . .+250	60	50	80	60
K72S15E	St. Steel	72	71.5	15	530	-1. . .+25*	-156. . .+250	65	50	90	83
K82S15E	St. Steel	82	81	15	400	-1. . .+25*	-156. . .+250	70	55	100	88
K72S24.4E	St. Steel	72	70	24.4	620	-1. . .+25*	-156. . .+250	60	60	90	86
K80S23E1	St. Steel	80	75	23	630	-1. . .+25*	-156. . .+250	70	60	95	114
K80S23E2	St. Steel	80	73	23	750	-1. . .+40*	-156. . .+250	50	55	100	145
K98S23E	St. Steel	98	96	23	570	-1. . .+25*	-156. . .+250	80	70	115	222
K29S9.4T	Titan	29	28	9.4	700	-1. . .+15	-10. . .+150	35	30	45	6
K44S12T	Titan	44	44	12	780	-1. . .+100*	-10. . .+250	50	40	60	25
K52S14T	Titan	52	52	14	650	-1. . .+24	-10. . .+150	55	45	70	35
K52S15T	Titan	52	52	15	780	-1. . .+150*	-10. . .+250	55	45	70	42
K62S14T	Titan	62	62	14	450	-1. . .+25	-10. . .+150	60	50	80	41
K82S14T	Titan	82	80	14	500	-1. . .+16	-10. . .+150	70	55	100	108
K80S24T	Titan	80	76	24	600	-1. . .+16	-10. . .+150	70	60	95	103
K52S15A	Alloy C	52	52	15	1260	-1. . .+55*	-196. . .+250	55	45	70	68
K62S15A	Alloy C	62	62	15	700	-1. . .+25*	-196. . .+250	60	50	80	65
K82S15A	Alloy C	82	81	15	500	-1. . .+16*	-196. . .+250	70	55	100	95
K72S24.4A	Alloy C	72	70	24.4	830	-1. . .+25*	-196. . .+250	60	60	90	116
K80S23A	Alloy C	80	75	23	730	-1. . .+18*	-196. . .+250	70	60	95	125
K98S23A	Alloy C	98	96	23	550	-1. . .+16*	-196. . .+250	80	70	115	208
K53S14EC1	ECTFE coat.	53	53	14	900	-1. . .+40	-78. . .+150	70	70	80	49
K53S14EC2**	ECTFE coat.	53	53	14	900	-1. . .+40	-78. . .+150	70	70	80	49
K73S23EC1	ECTFE coat.	73	71	23	750	-1. . .+25	-78. . .+150	70	70	105	105
K73S23EC2**	ECTFE coat.	73	71	23	750	-1. . .+25	-78. . .+150	70	70	105	105
K53S14PF1	PFA coat.	53	53	14	950	-1. . .+40*	-100. . .+250	70	70	80	52
K53S14PF2**	PFA coat.	53	53	14	950	-1. . .+40*	-100. . .+250	70	70	80	52
K73S23PF1	PFA coat.	73	71	23	800	-1. . .+25*	-100. . .+250	70	70	105	110
K73S23PF2**	PFA coat.	73	71	23	800	-1. . .+25*	-100. . .+250	70	70	105	110

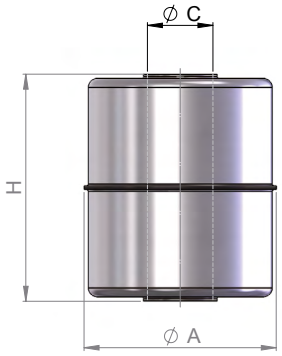
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Spherical Float Immersion depth



	Specific weight of the medium (kg/m³)											
Type	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**
	Immersion depth (mm)											
K29S9.4E						20.3	18.5	17.2	16.2	15.3	14.6	14.0
K42S9.4E				31.1	27.4	25.0	23.1	21.6	20.4	19.4	18.5	17.7
K52S15E1				38.6	34.1	31.1	28.8	27.0	25.5	24.2	23.1	22.2
K52S15E2					38.6	34.5	31.7	29.6	27.8	26.4	25.1	24.1
K62S15E				40.8	36.7	33.7	31.4	29.2	27.9	26.6	25.4	24.4
K72S15E			51.1	44.8	40.5	37.3	34.8	32.8	31.0	29.6	28.3	27.2
K82S15E	61.3	50.3	44.1	39.7	36.5	33.9	31.8	30.1	28.6	27.3	26.2	25.2
K72S24.4E				50.5	45.2	41.4	38.6	36.2	34.3	32.7	31.3	30.1
K80S23E1				56.2	49.9	45.6	42.3	39.7	37.5	35.7	34.1	32.8
K80S23E2					54.5	49.7	46.0	43.1	40.7	38.7	37.0	35.5
K98S23E			75.8	65.2	58.6	53.8	50.1	47.1	44.5	42.4	40.5	38.9
K29S9.4T				21.9	19.3	17.5	16.3	15.2	14.4	13.7	13.1	12.6
K44S12T					34.0	30.0	27.5	25.6	24.0	22.7	21.7	20.7
K52S14T				39.1	34.4	31.3	29.0	27.1	25.6	24.3	23.3	22.3
K52S15T					40.9	36.1	33.0	30.6	28.8	27.2	25.9	24.8
K62S14T		41.9	36.2	32.5	29.7	27.6	25.9	24.5	23.2	22.2	21.3	20.5
K82S14T		60.1	51.2	45.7	41.7	38.6	36.1	34.0	32.3	30.8	29.5	28.3
K80S24T			60.4	51.8	46.6	42.8	39.9	37.5	35.6	33.9	32.4	31.2
K52S15A										40.7	37.5	35.1
K62S15A				48.0	42.0	38.1	35.2	33.0	31.1	29.5	28.2	27.0
K82S15A		53.5	46.5	41.8	38.3	35.6	33.3	31.5	29.9	28.6	27.4	26.3
K72S24.4A						53.0	48.1	44.5	41.8	39.5	37.6	36.0
K80S23A				62.5	54.0	48.9	45.1	42.2	39.8	37.8	36.1	34.6
K98S23A			70.7	61.8	55.9	51.5	48.0	45.2	42.8	40.7	39.0	37.4
K53S14EC1						39.6	36.7	33.0	30.9	29.2	27.7	26.5
K53S14EC2**						39.6	36.7	33.0	30.9	29.2	27.7	26.5
K73S23EC1				59.8	51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0
K73S23EC2**				59.8	51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0
K53S14PF1							37.7	34.6	32.3	30.4	28.9	27.6
K53S14PF2**							37.7	34.6	32.3	30.4	28.9	27.6
K73S23PF1					54.4	48.7	44.8	41.8	39.3	37.3	35.6	34.1
K73S23PF2**					54.4	48.7	44.8	41.8	39.3	37.3	35.6	34.1

Table 2: Conical Float - Dimensions

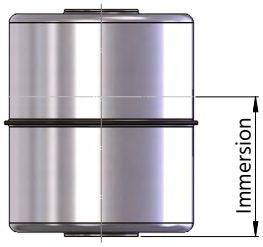


* = Design temperature 200°C, higher temperatures after calculating
** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Mass
		(mm)	(mm)	(mm)	(kg/m³)	(bar)	(°C)	(mm)	(mm)	(mm)	(g)
Z27S10E	St. Steel	27	31	10	800	-1. . .+6	-156. . .+200	30	30	45	7.8
Z44S15E	St. Steel	44	52	15	800	-1. . .+25*	-156. . .+250	50	45	70	43
Z44S14T	Titan	44	52	14	750	-1. . .+15	-10. . .+150	50	45	70	37
Z44S15A	Alloy C	44	52	15	1000	-1. . .+45*	-196. . .+250	50	45	70	52
Z18S11NB	NBR	18	25	11	800	-1. . .+6	-20. . .+80	15	40	40	2.5
Z19.5S8.4NB	NBR	19.5	20	8.4	850	-1. . .+6	-20. . .+80	15	35	35	3.3
Z23S8.4NB	NBR	23	25	8.4	800	-1. . .+6	-20. . .+80	15	40	40	5
Z25S09NB	NBR	25	14	9	800	-1. . .+6	-20. . .+80	15	30	30	3.5
Z30S13NB	NBR	30	45	13	700	-1. . .+6	-20. . .+80	20	65	60	14
Z40S15NB	NBR	40	30	15	700	-1. . .+6	-20. . .+80	25	50	45	17
Z50S20NB	NBR	50	45	20	700	-1. . .+6	-20. . .+80	30	70	60	41
Z42S14PC	PVC	42	44	14	800	-1. . .+1	-15. . .+60	50	40	65	32
Z54S22PC	PVC	54	55	22	750	-1. . .+1	-15. . .+60	65	50	75	64
Z78S25PC	PVC	78	80	25	600	-1. . .+1	-15. . .+60	80	65	100	164
Z28S08PP	PP	28	29	8	800	-1. . .+1	-10. . .+80	35	35	45	9
Z44S13PP	PP	44	43	13	700	-1. . .+1	-10. . .+80	50	40	65	25
Z44S21PP	PP	44	69	21	800	-1. . .+1	-10. . .+80	50	55	90	45
Z56S21PP	PP	56	54	21	600	-1. . .+1	-10. . .+80	65	50	75	50
Z80S24PP	PP	80	79	24	500	-1. . .+1	-10. . .+80	80	65	100	126
Z44S13PD	PVDF	44	55	13	850	-1. . .+1	-10. . .+100	50	55	70	46
Z56S21PD	PVDF	56	69	21	800	-1. . .+1	-10. . .+100	65	60	90	90
Z80S24PD	PVDF	80	79	24	700	-1. . .+1	-10. . .+100	80	65	100	192
Z45S14EC1	ECTFE coat.	45	53	14	950	-1. . .+25	-78. . .+150	70	70	80	54
Z45S14EC2**	ECTFE coat.	45	53	14	950	-1. . .+25	-78. . .+150	70	70	80	54
Z45S14PF1	PFA coat.	45	53	14	1000	-1. . .+25*	-100. . .+250	70	70	80	57
Z45S14PF2**	PFA coat.	45	53	14	1000	-1. . .+25*	-100. . .+250	70	70	80	57

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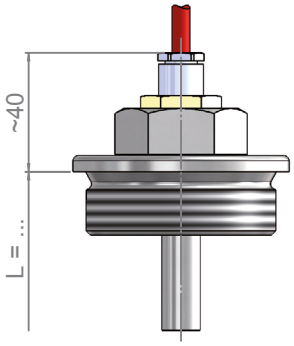
Conical Float Immersion depths



	Specific weight of the medium (kg/m³)											
Type	**400**	**500**	**600**	**700**	**800**	**900**	**1000**	**1100**	**1200**	**1300**	**1400**	**1500**
	Immersion depth (mm)											
Z27S10E					23.6	21.0	18.9	17.2	15.8	14.6	13.5	12.6
Z44S15E					44.5	39.5	35.6	32.3	29.6	27.4	25.4	23.7
Z44S14T					37.6	33.4	30.0	27.3	25.0	23.1	21.5	20.0
Z44S15A							43.0	39.1	35.9	33.1	30.7	28.7
Z18S11NB					19.6	17.4	15.7	14.3	13.1	12.1	11.2	10.5
Z19.5S8.4NB						15.2	13.6	12.4	11.3	10.5	9.7	9.1
Z23S8.4NB					17.4	15.4	13.9	12.6	11.6	10.7	9.9	9.3
Z25S09NB					10.2	9.1	8.2	7.4	6.8	6.3	5.9	5.5
Z30S13NB				34.8	30.5	27.1	24.4	22.2	20.3	18.8	17.4	16.3
Z40S15NB				22.5	19.7	17.5	15.7	14.3	13.1	12.1	11.1	10.5
Z50S20NB				35.5	31.1	27.6	24.9	22.6	20.7	19.1	17.8	16.6
Z42S14PC					32.5	28.9	26.0	23.6	21.7	20.0	18.6	17.3
Z54S22PC					41.9	37.2	33.5	30.5	27.9	25.8	23.9	22.3
Z78S25PC			63.8	54.6	47.8	42.5	38.3	34.8	31.9	29.4	27.3	25.5
Z28S08PP					24.1	21.4	19.3	17.5	16.0	14.8	13.8	12.8
Z44S13PP				29.0	25.4	22.6	20.3	18.5	16.9	15.6	14.5	13.5
Z44S21PP					56.0	49.7	44.8	40.7	37.3	34.4	32.0	29.8
Z56S21PP			43.6	37.4	32.7	29.1	26.2	23.8	21.8	20.1	18.7	17.5
Z80S24PP		58.8	49.0	42.0	36.7	32.7	29.4	26.7	24.5	22.6	21.0	19.6
Z44S13PD						41.5	37.4	34.0	31.1	28.7	26.7	24.9
Z56S21PD					58.9	52.4	47.1	42.8	39.3	36.2	33.7	31.4
Z80S24PD				64.0	56.0	49.8	44.8	40.7	37.3	34.4	32.0	29.9
Z45S14EC1							41.6	37.8	34.7	32.0	29.7	27.7
Z45S14EC2**							41.6	37.8	34.7	32.0	29.7	27.7
Z45S14PF1							43.9	39.9	36.6	33.8	31.4	29.3
Z45S14PF2**							43.9	39.9	36.6	33.8	31.4	29.3
K73S23EC1				59.8	51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0

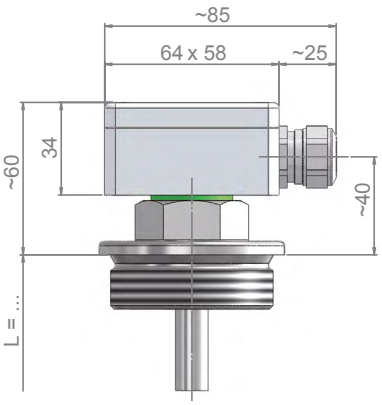
Table 3: Electrical Connection

Connection Type K
Connecting cable



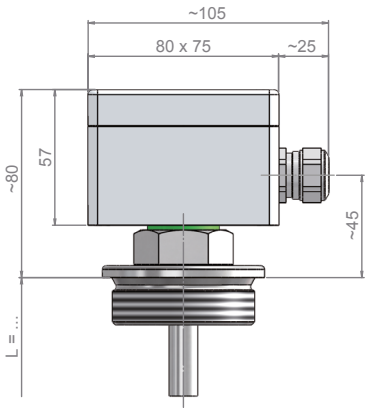
Material: as defined cable
Cable gland: PG or M
Prot. class: IP55 (optional IP68)
Ambient temp.: -40. . .+200°C
No. of contact clamps: max. -

Connection Type E
Aluminium socket



Material: Al coated RAL 7001
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -40. . .+100°C
No. of contact clamps: max. 8

Connection Type F
Aluminium socket

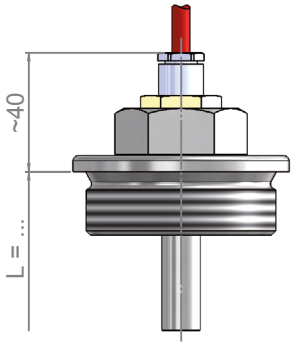


Material: Al coated RAL 7001
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -40. . .+100°C
No. of contact clamps: max. 12

Version	● = compatible / ○ = incompatible		
VAG18PVC	●	●	●
VAG18SIL	●	●	●
VAG38PVC	●	●	●
VAG38SIL	●	●	●
VAG112G	●	●	●
VAG2G	●	●	●
VAF80G	●	●	●
VAF100G	●	●	●
VAF80FLEX	●	●	●
VAG1FLEX	●	●	●
VAVG12SIL	●	●	●
VAVG2G	●	●	●
VAWG38PVC	●	●	●
VAWG2G	●	●	●
VAFBHHG	●	●	●
VAFBHVG	●	●	●
VASBHHS	●	●	●
VASBHHG	●	●	●
VAFOPAS	●	●	●
VAFOVAS	●	●	●
VASG38SIL	●	●	●
VASMRG	●	●	●
VAG2HGG	●	●	●
VAG2HKG	●	●	●
VAG112PSG	●	●	●
VAG112PPG	●	●	●
MG18PVC	●	●	●
MG18SIL	●	●	●
MG38PVC	●	●	●

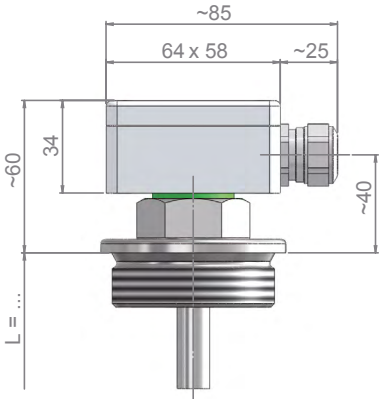
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Connection Type K
Connecting cable



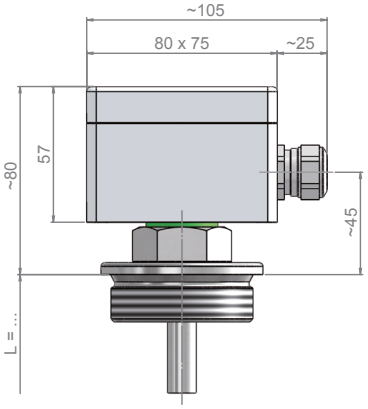
Material: as defined cable
Cable gland: PG or M
Prot. class: IP55 (optional IP68)
Ambient temp.: -40. . .+200°C
No. of contact clamps: max. -

Connection Type E
Aluminium socket



Material: Al coated RAL 7001
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -40. . .+100°C
No. of contact clamps: max. 8

Connection Type F
Aluminium socket

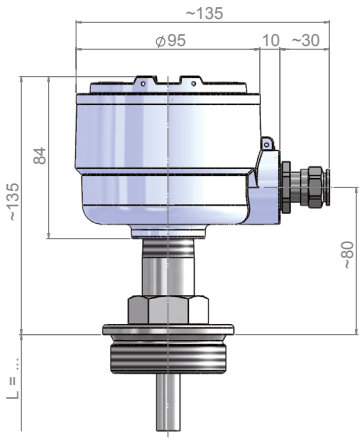


Material: Al coated RAL 7001
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -40. . .+100°C
No. of contact clamps: max. 12

Version	● = compatible / ○ = incompatible		
MG38SIL	●	●	●
MG112G	●	●	●
MG2G	●	●	●
PAG112FLEX	●	●	●
PAG2FLEX	●	●	●
VAF80GT	○	○	●
MG112GT	○	○	●
TG38PVC	●	●	●
TG38SIL	●	●	●
TG112G	●	●	●
TG2G	●	●	●
TF65G	●	●	●
TF100G	●	●	●
ALCG38SIL	●	●	●
ALCF80G	●	●	●
PVCG38PVC	●	○	○
PVCG1PVC	●	○	○
PPG18PVC	●	○	○
PPG38PVC	●	○	○
PPG1PVC16	●	○	○
PPG1PVC20	●	○	○
PPG2G	●	○	○
PPF65G	●	○	○
PVDFG38SIL	●	○	○
PVDFG1SIL	●	○	○
VAEBF50G	○	●	●
VAEBF80G	○	●	●
VAPBF50G	○	●	●
VAPBF80G	○	●	●

Connection Type DA (Exd)

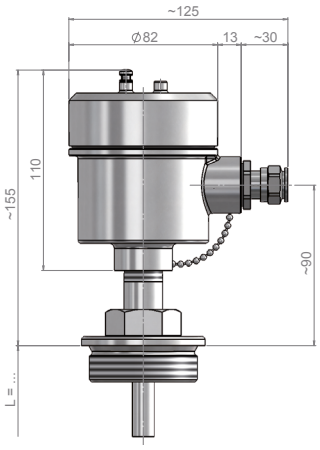
Aluminium socket



Material: Al coated RAL 9006
Cable gland: M20 x 1,5
Prot. class: IP68
Ambient temp.: -40. . .+100°C
No. of contact clamps: max. 8

Connection Type VA (Exd)

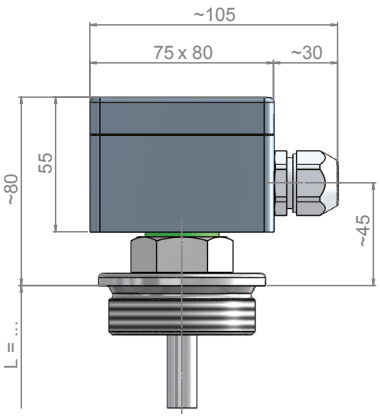
St. Steel socket



Material: St. Steel A4 (SS316)
Cable gland: M20 x 1,5
Prot. class: IP67 (Exd / IP68)
Ambient temp.: -40. . .+85°C
No. of contact clamps: max. 12

Connection Type PA

Polyester socket



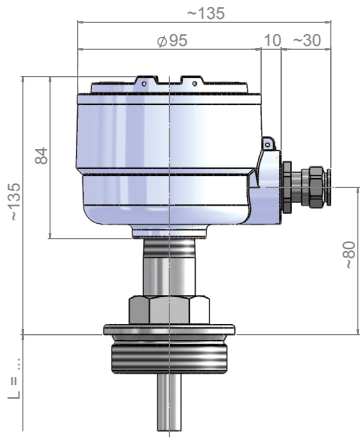
Material: Polyester
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10. . .+100°C
No. of contact clamps: max. 12

Version	● = compatible / ○ = incompatible		
VAG18PVC	●	●	○
VAG18SIL	●	●	○
VAG38PVC	●	●	○
VAG38SIL	●	●	○
VAG112G	●	●	○
VAG2G	●	●	○
VAF80G	●	●	○
VAF100G	●	●	○
VAF80FLEX	●	●	○
VAG1FLEX	●	●	○
VAVG12SIL	●	●	○
VAVG2G	●	●	○
VAWG38PVC	●	●	○
VAWG2G	●	●	○
VAFBHHG	●	●	○
VAFBHVG	●	●	○
VASBHHS	●	●	○
VASBHHG	●	●	○
VAFOPAS	●	●	○
VAFOVAS	●	●	○
VASG38SIL	●	●	○
VASMRG	●	●	○
VAG2HGG	●	●	○
VAG2HKG	●	●	○
VAG112PSG	●	●	○
VAG112PPG	●	●	○
MG18PVC	○	○	○
MG18SIL	○	○	○
MG38PVC	○	○	○

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Connection Type DA (Exd)

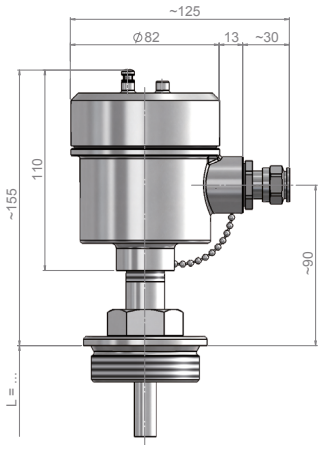
Aluminium socket



Material: Al coated RAL 9006
Cable gland: M20 x 1,5
Prot. class: IP68
Ambient temp.: -40. . .+100°C
No. of contact clamps: max. 8

Connection Type VA (Exd)

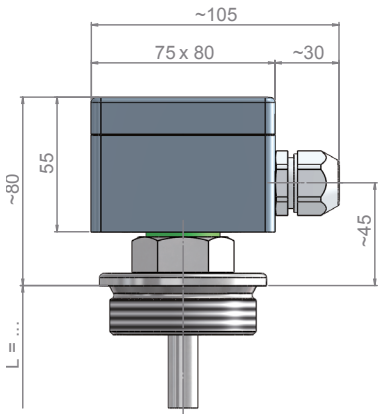
St. Steel socket



Material: St. Steel A4 (SS316)
Cable gland: M20 x 1,5
Prot. class: IP67 (Exd / IP68)
Ambient temp.: -40. . .+85°C
No. of contact clamps: max. 12

Connection Type PA

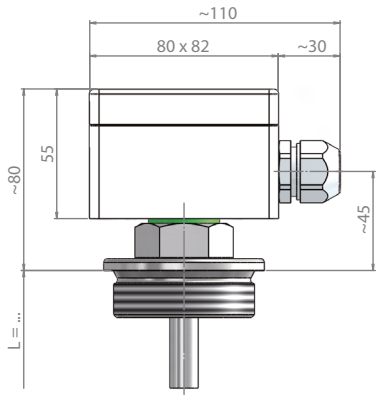
Polyester socket



Material: Polyester
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10. . .+100°C
No. of contact clamps: max. 12

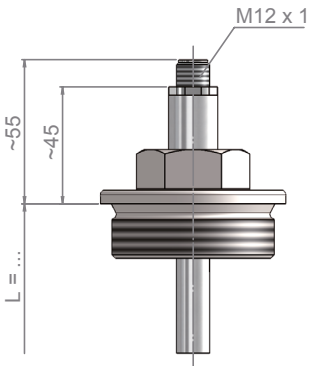
Version	● = compatible / ○ = incompatible		
MG38SIL	○	○	○
MG112G	○	○	○
MG2G	○	○	○
PAG112FLEX	○	○	●
PAG2FLEX	○	○	●
VAF80GT	○	●	●
MG112GT	○	●	●
TG38PVC	●	●	○
TG38SIL	●	●	○
TG112G	●	●	○
TG2G	●	●	○
TF65G	●	●	○
TF100G	●	●	○
ALCG38SIL	●	●	○
ALCF80G	●	●	○
PVCG38PVC	○	○	●
PVCG1PVC	○	○	●
PPG18PVC	○	○	●
PPG38PVC	○	○	●
PPG1PVC16	○	○	●
PPG1PVC20	○	○	●
PPG2G	○	○	●
PPF65G	○	○	●
PVDFG38SIL	○	○	●
PVDFG1SIL	○	○	●
VAEBF50G	●	●	●
VAEBF80G	●	●	●
VAPBF50G	●	●	●
VAPBF80G	●	●	●

Connection Type BA
ABS socket



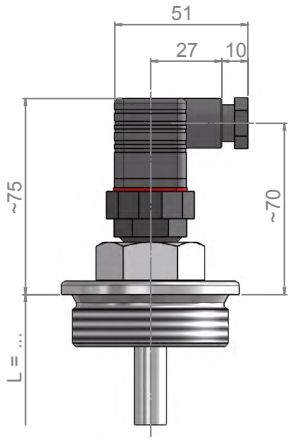
Material: ABS
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10. . .+80°C
No. of contact clamps: max. 12

Connection Type S1A(B)
Plug connection M 12 3-wire (8-wire)



Material: Brass / PA
Cable gland: PG9
Prot. class: IP67
Ambient temp.: -25. . .+90°C
Anz. Kontaktkl.: S1A max. 3 (S1B max. 8)

Connection Type S2A
Connector Hirschmann DIN 43650

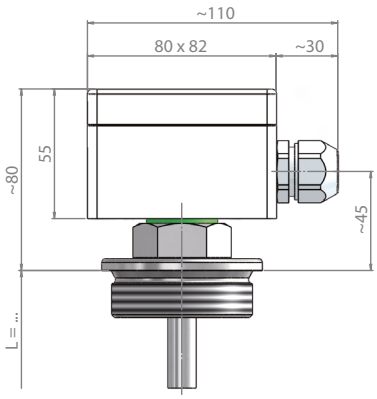


Material: PA
Cable gland: M16
Prot. class: IP65
Ambient temp.: -40. . .+125°C
No. of contact clamps: max. 3

Version	● = compatible / ○ = incompatible		
VAG18PVC	○	○	●
VAG18SIL	○	○	●
VAG38PVC	○	○	●
VAG38SIL	○	○	●
VAG112G	○	○	●
VAG2G	○	○	●
VAF80G	○	○	●
VAF100G	○	○	●
VAF80FLEX	○	○	●
VAG1FLEX	○	○	●
VAVG12SIL	○	○	●
VAVG2G	○	○	●
VAWG38PVC	○	○	●
VAWG2G	○	○	●
VAFBHHG	○	○	●
VAFBHVG	○	○	●
VASBHHS	○	○	●
VASBHHG	○	○	●
VAFOPAS	○	○	●
VAFOVAS	○	○	●
VASG38SIL	○	○	●
VASMRG	○	○	●
VAG2HGG	○	○	●
VAG2HKG	○	○	●
VAG112PSG	○	○	●
VAG112PPG	○	○	●
MG18PVC	○	●	●
MG18SIL	○	●	●
MG38PVC	○	●	●

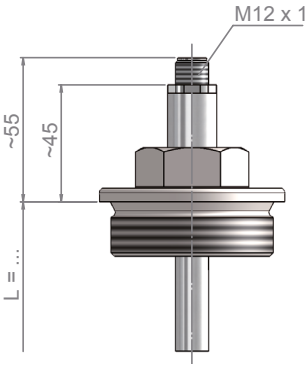
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Connection Type BA
ABS socket



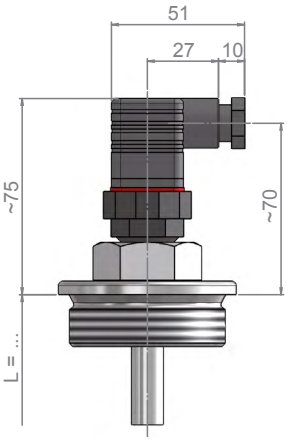
Material: ABS
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10. . .+80°C
No. of contact clamps: max. 12

Connection Type S1A(B)
Plug connection M 12 3-wire (8-wire)



Material: Brass / PA
Cable gland: PG9
Prot. class: IP67
Ambient temp.: -25. . .+90°C
Anz. Kontaktkl.: S1A max. 3 (S1B max. 8)

Connection Type S2A
Connector Hirschmann DIN 43650

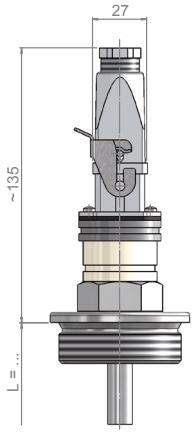


Material: PA
Cable gland: M16
Prot. class: IP65
Ambient temp.: -40. . .+125°C
No. of contact clamps: max. 3

Version	● = compatible / ○ = incompatible		
MG38SIL	○	●	●
MG112G	○	●	●
MG2G	○	●	●
PAG112FLEX	●	○	○
PAG2FLEX	●	○	○
VAF80GT	●	○	○
MG112GT	●	○	○
TG38PVC	○	○	●
TG38SIL	○	○	●
TG112G	○	○	●
TG2G	○	○	●
TF65G	○	○	●
TF100G	○	○	●
ALCG38SIL	○	○	●
ALCF80G	○	○	●
PVCG38PVC	●	○	●
PVCG1PVC	●	○	●
PPG18PVC	●	○	●
PPG38PVC	●	○	●
PPG1PVC16	●	○	●
PPG1PVC20	●	○	●
PPG2G	●	○	●
PPF65G	●	○	●
PVDFG38SIL	●	○	●
PVDFG1SIL	●	○	●
VAEBF50G	●	○	○
VAEBF80G	●	○	○
VAPBF50G	●	○	○
VAPBF80G	●	○	○

Connection Type S3A(B)

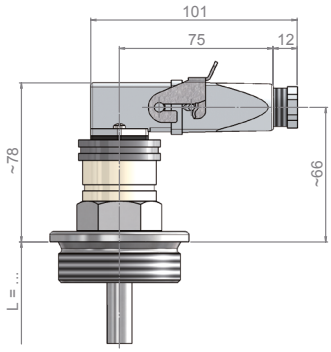
Connector HTS straight



Material: S3A = Plastic / S3B = Aluminium
Cable gland: PG11
Prot. class: IP65
Ambient temp.: -10. . .+80°C
No. of contact clamps: max. 6

Connection Type S4A(B)

Connector HTS angled



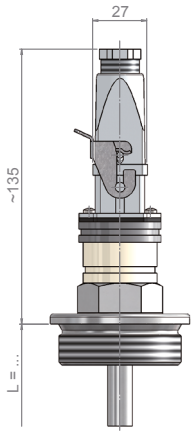
Material: S4A = Plastic / S4B = Aluminium
Cable gland: PG11
Prot. class: IP65
Ambient temp.: -10. . .+80°C
No. of contact clamps: max. 12

Version	● = compatible /	○ = incompatible
VAG18PVC	○	○
VAG18SIL	○	○
VAG38PVC	○	○
VAG38SIL	○	○
VAG112G	○	○
VAG2G	○	○
VAF80G	○	○
VAF100G	○	○
VAF80FLEX	○	○
VAG1FLEX	○	○
VAVG12SIL	○	○
VAVG2G	○	○
VAWG38PVC	○	○
VAWG2G	○	○
VAFBHHG	○	○
VAFBHVG	○	○
VASBHHS	○	○
VASBHHG	○	○
VAFOPAS	○	○
VAFOVAS	○	○
VASG38SIL	○	○
VASMRG	○	○
VAG2HGG	○	○
VAG2HKG	○	○
VAG112PSG	○	○
VAG112PPG	○	○
MG18PVC	○	●
MG18SIL	○	●
MG38PVC	○	●

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Connection Type S3A(B)

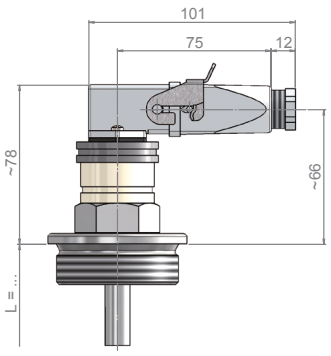
Connector HTS straight



Material: S3A = Plastic / S3B = Aluminium
Cable gland: PG11
Prot. class: IP65
Ambient temp.: -10. . .+80°C
No. of contact clamps: max. 6

Connection Type S4A(B)

Connector HTS angled

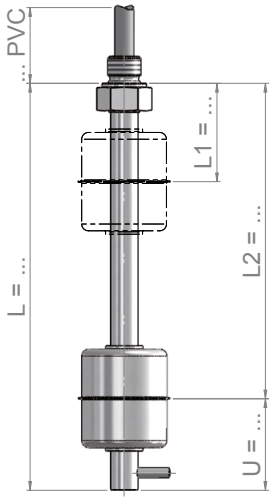


Material: S4A = Plastic / S4B = Aluminium
Cable gland: PG11
Prot. class: IP65
Ambient temp.: -10. . .+80°C
No. of contact clamps: max. 12

Version	● = compatible / ○ = incompatible	
MG38SIL	○	●
MG112G	○	●
MG2G	○	●
PAG112FLEX	○	●
PAG2FLEX	○	●
VAF80GT	○	○
MG112GT	○	○
TG38PVC	○	○
TG38SIL	○	○
TG112G	○	○
TG2G	○	○
TF65G	○	○
TF100G	○	○
ALCG38SIL	○	○
ALCF80G	○	○
PVCG38PVC	●	●
PVCG1PVC	●	●
PPG18PVC	●	●
PPG38PVC	●	●
PPG1PVC16	●	●
PPG1PVC20	●	●
PPG2G	●	●
PPF65G	●	●
PVDFG38SIL	●	●
PVDFG1SIL	●	●
VAEBF50G	○	○
VAEBF80G	○	○
VAPBF50G	○	○
VAPBF80G	○	○

Float switch made of stainless steel with upward thread connection

Version: VAG18PVC



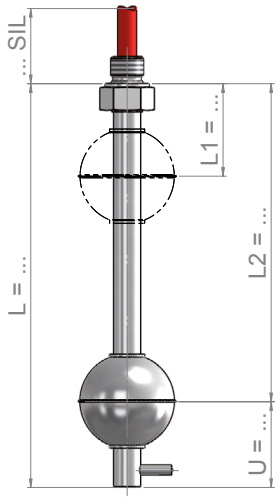
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 1/8“-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	Z27S10E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+6 bar
Design temp. /	-20. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 30 mm, U = 30 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	150 V / 0.5 A / 10 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	150 V / 0.5 A / 10 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	150 V / 0.5 A / 10 VA
max. Contacts:	2
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	-
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

Version: VAG18SIL



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 1/8“-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	K29S9.4E
spec. Weight /	≥ 900 kg/m³
Design pressure /	-1. . .+35 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 35 mm, U = 30 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

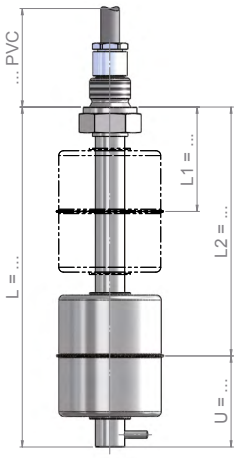
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	150 V / 0.5 A / 10 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	150 V / 0.5 A / 10 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	150 V / 0.5 A / 10 VA
max. Contacts:	2
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	-
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

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Float switch made of stainless steel with upward thread connection

Version: VAG38PVC



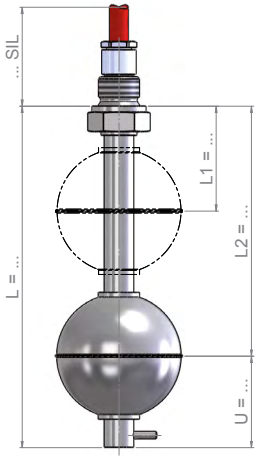
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+25 bar
Design temp. /	-20. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

Version: VAG38SIL



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm**
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+30 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

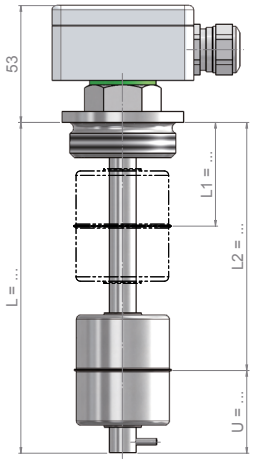
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

**** ATEX** = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

Float switch made of stainless steel with downward thread connection

Version: VAG112G



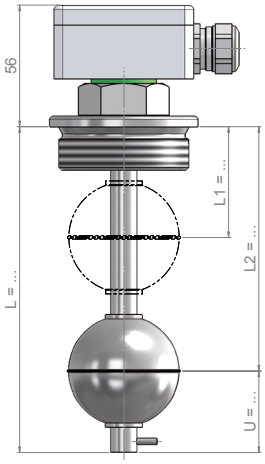
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 ½"-male downwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+25 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

Version: VAG2G



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm**
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+30 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

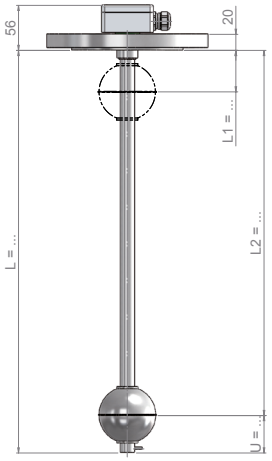
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

**** ATEX** = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

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Float switch made of stainless steel with flange connection

Version: VAF80G



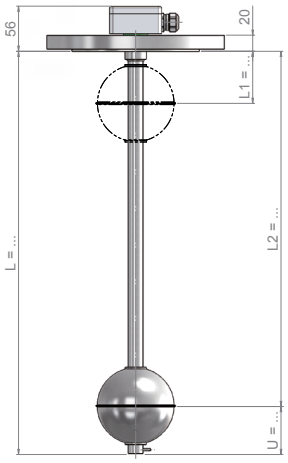
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
Insertion length /	≤ 6000 mm**
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

Version: VAF100G



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
Insertion length /	≤ 6000 mm**
Float /	K98S23E
spec. Weight /	≥ 570 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 80 mm, U = 70 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 115 mm

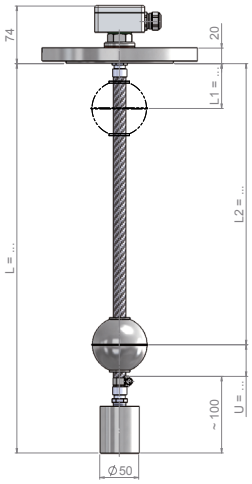
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

**** ATEX** = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

Float switch made of stainless steel - flexible

Version: VAF80FLEX



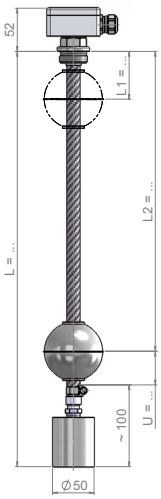
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 16 mm
Insertion length /	≤ 15000 mm**
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, SIL1

Version: VAG1FLEX



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1"-male downwards
Sliding tube /	ø 16 mm
Insertion length /	≤ 15000 mm**
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

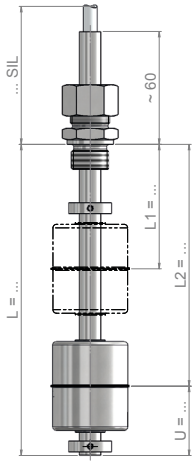
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, SIL1

**** ATEX** = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

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Float switch made of stainless steel - adjustable

Version: VAVG12SIL



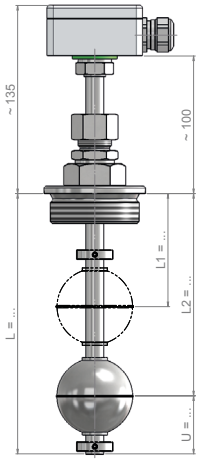
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Silicone connecting cable
Process conn. /	G ½"-male downwards
Sliding tube /	ø 12 mm, adjustable
Insertion length /	≤ 3000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+3 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Version: VAVG2G



Technical Specifications:

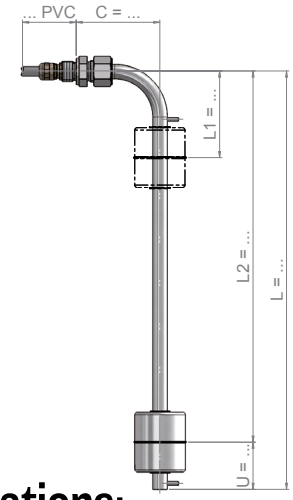
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	ø 12 mm, adjustable
Insertion length /	≤ 3000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+3 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Float switch made of stainless steel - angled

Version: VAWG38PVC



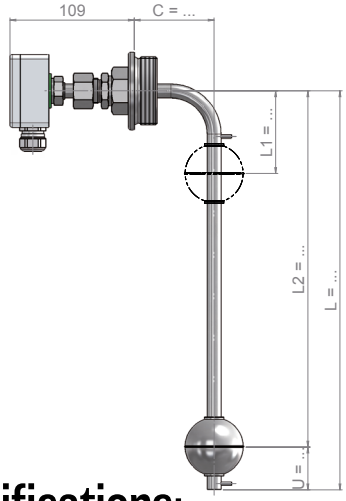
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 3/8“-AG
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 3000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+25 bar
Design temp. /	-20. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 75 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

Version: VAWG2G



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2“-AG
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 3000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+30 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 75 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

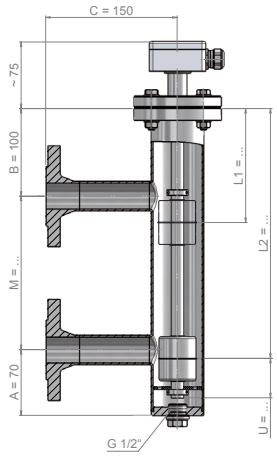
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

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Float switch with bypass tube made of stainless steel

Version: VAFBHHG



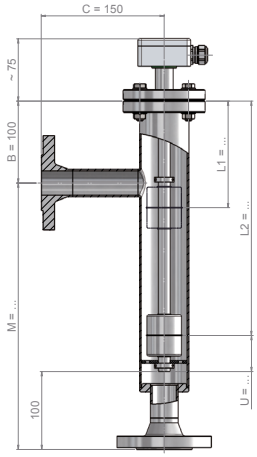
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN25 / PN16 / Form B1
Bypassgehäuse /	ø 60.30 x 2.00 mm
Mittenabstand /	M ≤ 1000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 130 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

Version: VAFBHVG



Technical Specifications:

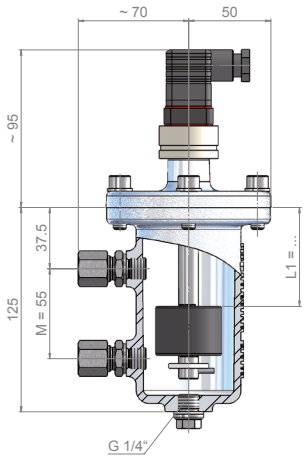
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN25 / PN16 / Form B1
Bypassgehäuse /	ø 60.30 x 2.00 mm
Mittenabstand /	M ≤ 1000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 130 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

Float switch with bypass tube made of aluminium

Version: VASBHHS



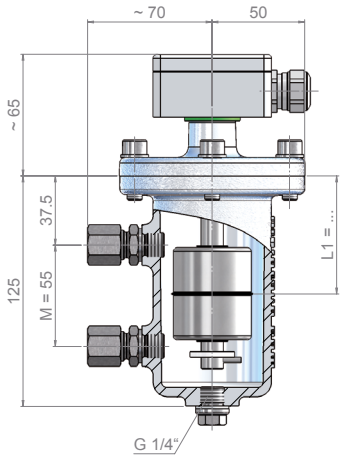
Technical Specifications:

Materials /	St. Steel/ Aluminium/ Buna
El. connection /	Connector Hirschmann DIN 43650
Process conn. /	Comp. type fitting / ø 10 mm
Bypassgehäuse /	ø 64.00 x 3.50 mm, Aluminium
Mittenabstand /	M = 55 mm
Float /	Z40S15NB
spec. Weight /	≥ 700 kg/m³
Design pressure /	-1. . .+6 bar
Design temp. /	-30. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 25 mm, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

Version: VASBHHG



Technical Specifications:

Materials /	St. Steel/ Aluminium
El. connection /	Type E - Aluminium socket
Process conn. /	Comp. type fitting / ø 10 mm
Bypassgehäuse /	ø 64.00 x 3.50 mm, Aluminium
Mittenabstand /	M = 55 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+6 bar
Design temp. /	-30. . .+150°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions	L1 ≥ 45 mm, U = - Contact clearance: - Float clearance: -

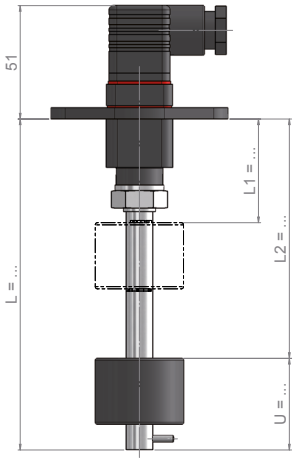
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

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Float switch made of stainless steel - with oval flange

Version: VAFOPAS



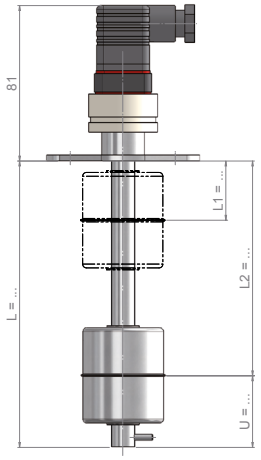
Technical Specifications:

Materials /	St. Steel/ Aluminium/ Buna
El. connection /	Connector Hirschmann DIN 43650
Process conn. /	Standard Oval flange 80 x 50 mm, PA
Sliding tube /	ø 12 mm (optional 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z40S15NB
spec. Weight /	≥ 700 kg/m³
Design pressure /	0. . .+0.5 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 50 mm, Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	2
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	NO or NC
Approvals:	PED, BV, SIL1

Version: VAFOVAS



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Connector Hirschmann DIN 43650
Process conn. /	Standard Oval flange 80 x 50 mm
Sliding tube /	ø 12 mm (optional 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-30. . .+150°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions	L1 ≥ 35 mm, U = 45 mm, Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

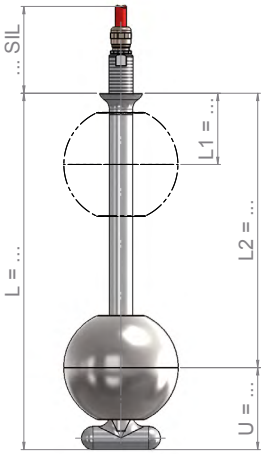
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	2
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	2
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

**** ATEX** = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

Float switch made of stainless steel - 3A sanitary standard

Version: VASG38SIL



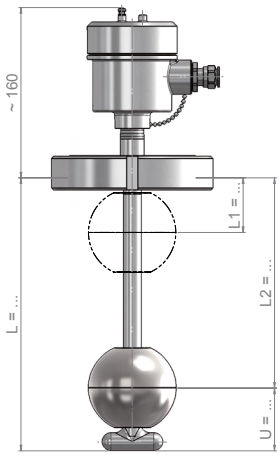
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti) roughness depth wetted ≤ 0,4 µm
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 16 mm
Insertion length /	≤ 5000 mm**
Float /	K80S23E2
spec. Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+40 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 55 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 100 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, 3A, SIL1

Version: VASMRG



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti) roughness depth wetted ≤ 0,4 µm
El. connection /	Type VA - St. Steel socket
Process conn. /	G 2"-AG
Sliding tube /	ø 16 mm
Insertion length /	≤ 5000 mm**
Float /	K80S23E2
spec. Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+6 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 55 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 100 mm

Electrical Specifications:

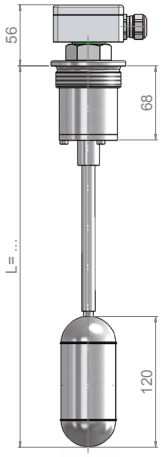
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, 3A, SIL1

**** ATEX** = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

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Float switch made of stainless steel - with hub float

Version: VAG2HGG



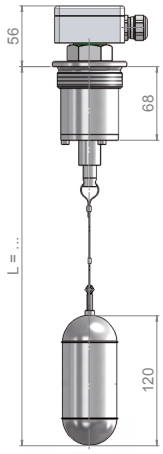
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-AG
Schw.-Gestänge /	ø 12 mm
Insertion length /	≤ 500 mm
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1: -, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	ATEX, PED, GOST, SIL1

Version: VAG2HKG



Technical Specifications:

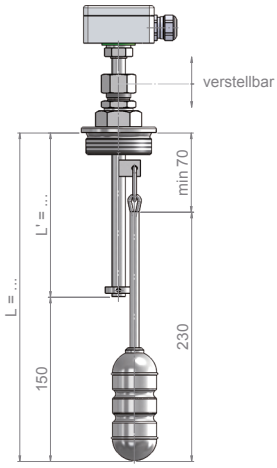
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-AG
Schw.-Gestänge /	-
Insertion length /	≤ 3000 mm
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions	L1: -, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	2
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	ATEX, PED, GOST, SIL 1

Float switch made of stainless steel - with pendulum switch

Version: VAG112PSG



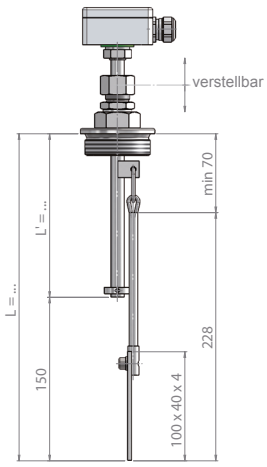
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 ½"-male downwards
Schw.-Gestänge /	ø 12 mm
Insertion length /	≤ 3000 mm
spec. Weight /	≥ 1000 kg/m³
Design pressure /	-1. . .+3 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L': ≥ 150 mm, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	PED, SIL1

Version: VAG112PPG



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 ½"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 3000 mm
Float /	Flat paddle 100 x 40 mm
spec. Weight /	-
Design pressure /	-1. . .+3 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L': ≥ 150 mm, U = - Contact clearance: - Float clearance: -

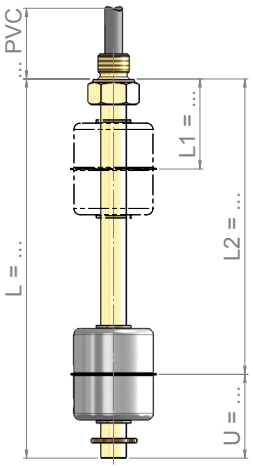
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	PED, SIL1

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Float switch made of brass with upward thread connection

Version: MG18PVC



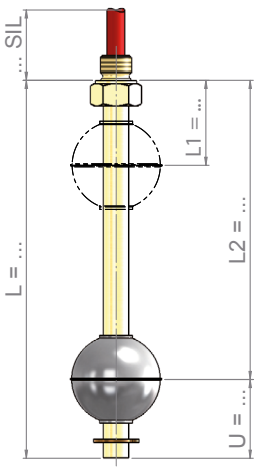
Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	PVC connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	Z27S10E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+6 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 30 mm, U = 30 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	-
Approvals:	PED, SIL1

Version: MG18SIL



Technical Specifications:

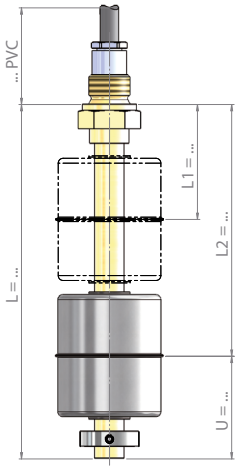
Materials /	Brass (Float St. Steel)
El. connection /	Silicone connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	K29S9.4E
spec. Weight /	≥ 900 kg/m³
Design pressure /	-1. . .+6 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions	L1 ≥ 35 mm, U = 30 mm, Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	-
Approvals:	PED, SIL1

Float switch made of brass with upward thread connection

Version: MG38PVC



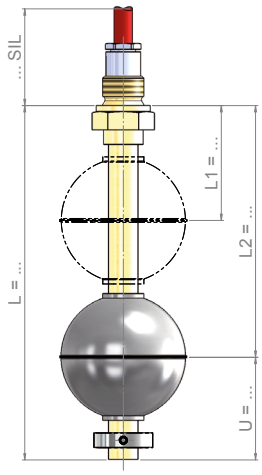
Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Version: MG38SIL



Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

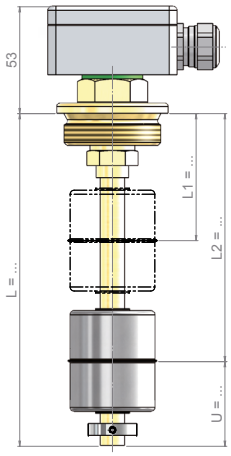
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

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Float switch made of brass with downward thread connection

Version: MG112G



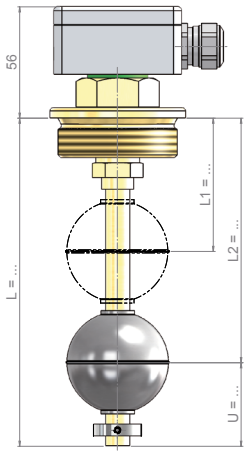
Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 ½"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Version: MG2G



Technical Specifications:

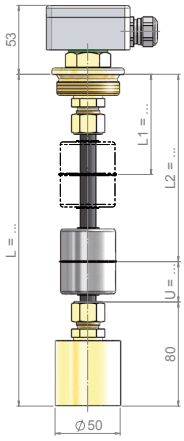
Materials /	Brass (Float St. Steel)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Float switch made of Polyamide - flexible

Version: PAG112FLEX



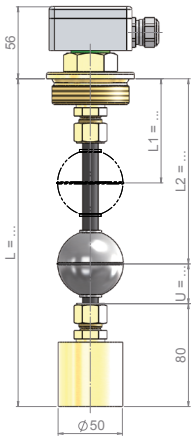
Technical Specifications:

Materials /	Polyamid, Brass, St. Steel
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 ½"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Version: PAG2FLEX



Technical Specifications:

Materials /	Polyamid, Brass, St. Steel
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

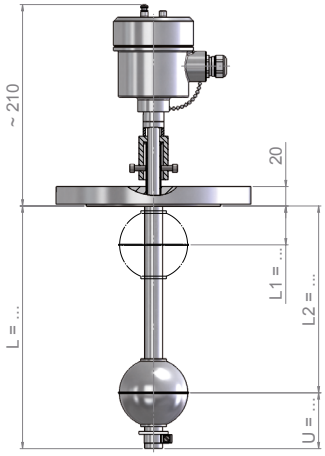
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

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Float switch made of stainless steel / brass - with test function

Version: VAF80GT



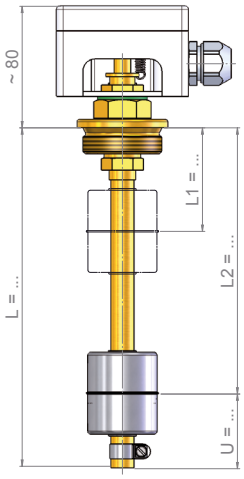
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
Insertion length /	≤ 6000 mm
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 90 mm Float clearance: ≥ 90 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

Version: MG112GT



Technical Specifications:

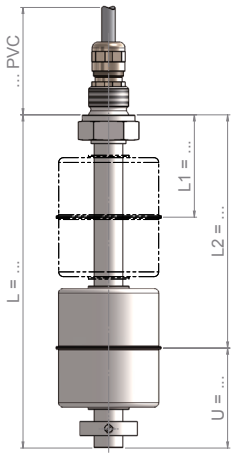
Materials /	Brass (Float St. Steel)
El. connection /	Type BA - ABS socket
Process conn. /	G 1 ½"-male downwards
Sliding tube /	ø 14 mm
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar
Design temp. /	-10. . .+100°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 45 mm Contact clearance: ≥ 70 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

Float switch made of Titanium with upward thread connection

Version: TG38PVC



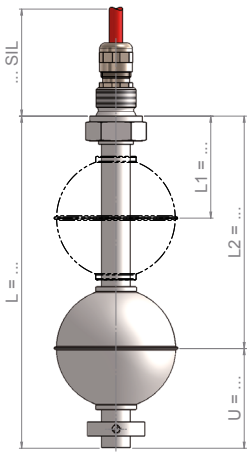
Technical Specifications:

Materials /	Titan
El. connection /	PVC connecting cable
Process conn. /	G 3/8“-male upwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S14T
spec. Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+15 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

Version: TG38SIL



Technical Specifications:

Materials /	Titan
El. connection /	Silicone connecting cable
Process conn. /	G 3/8“-male upwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S14T
spec. Weight /	≥ 650 kg/m³
Design pressure /	-1. . .+24 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

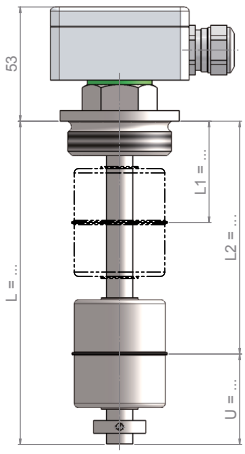
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

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Float switch made of Titanium with downward thread connection

Version: TG112G



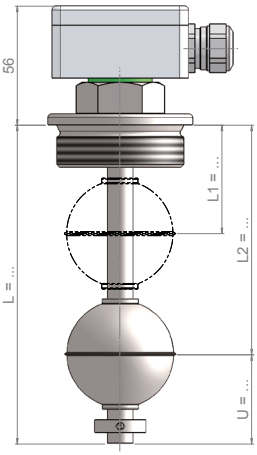
Technical Specifications:

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 ½"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S14T
spec. Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+15 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

Version: TG2G



Technical Specifications:

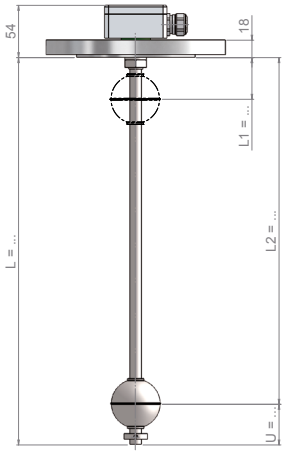
Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S14T
spec. Weight /	≥ 650 kg/m³
Design pressure /	-1. . .+24 bar
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

Float switch made of Titanium with flange connection

Version: TF65G



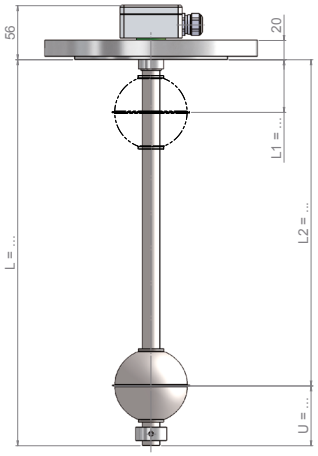
Technical Specifications:

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN65 / PN16 / Form B1
Sliding tube /	ø 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S14T
spec. Weight /	≥ 660 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

Version: TF100G



Technical Specifications:

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN100 / PN16 / Form B1
Sliding tube /	ø 18 mm
Insertion length /	≤ 6000 mm
Float /	K80S24T
spec. Weight /	≥ 600 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-10. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 95 mm

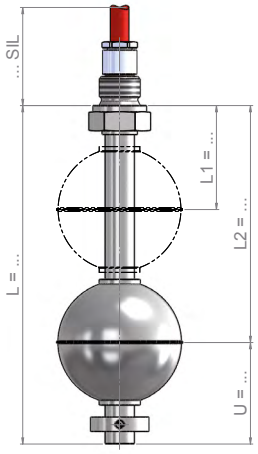
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

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Float switch made of Alloy C

Version: ALCG38SIL



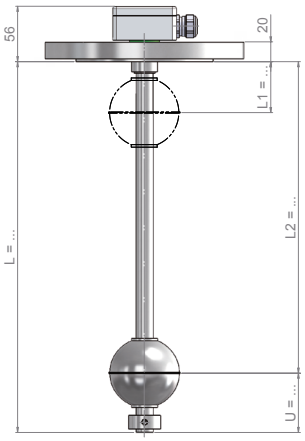
Technical Specifications:

Materials /	Alloy C
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 3000 mm
Float /	K52S15A
spec. Weight /	≥ 1260 kg/m³
Design pressure /	-1. . .+55 bar
Design temp. /	-40. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

Version: ALCF80G



Technical Specifications:

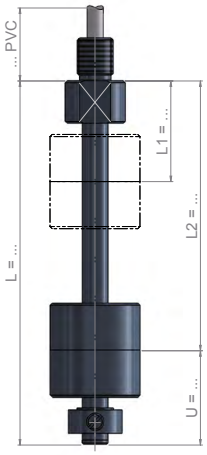
Materials /	Alloy C
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
Insertion length /	≤ 6000 mm
Float /	K72S24.4A
spec. Weight /	≥ 820 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-40. . .+200°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, SIL1

Float switch made of PVC with upward thread connection

Version: PVCG38PVC



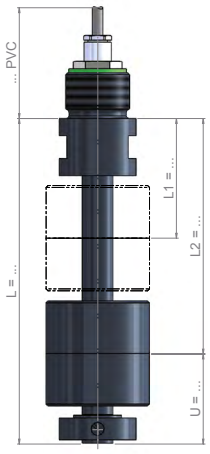
Technical Specifications:

Materials /	PVC
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 3000 mm
Float /	Z42S14PC
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-15. . .+60°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 40 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 65 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

Version: PVCG1PVC



Technical Specifications:

Materials /	PVC
El. connection /	PVC connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z54S22PC
spec. Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-15. . .+60°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

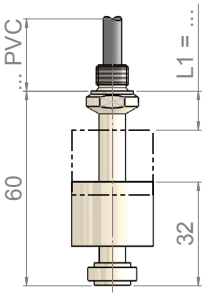
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP65 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

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Float switch made of Polypropylene with upward thread connection

Version: PPG18PVC



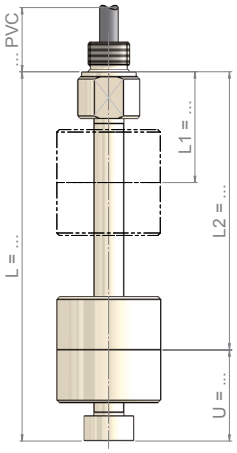
Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	60 mm
Float /	special
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 12 mm, U = 32 mm Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

Version: PPG38PVC



Technical Specifications:

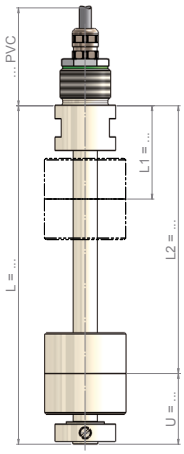
Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 3000 mm
Float /	Z44S13PP
spec. Weight /	≥ 700 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 40 mm, U = 40 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 65 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

Float switch made of Polypropylene with upward thread connection

Version: PPG1PVC16



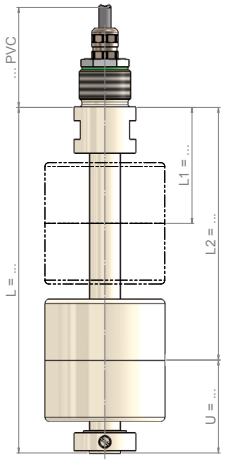
Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PP
spec. Weight /	≥ 600 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

Version: PPG1PVC20



Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	ø 20 mm
Insertion length /	≤ 6000 mm
Float /	Z80S24PP
spec. Weight /	≥ 500 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 80 mm, U = 65 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 100 mm

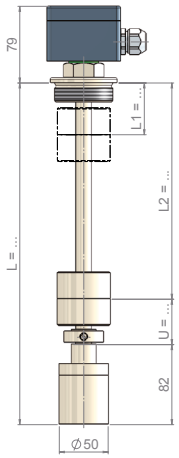
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

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Float switch made of Polypropylene

Version: PPG2G



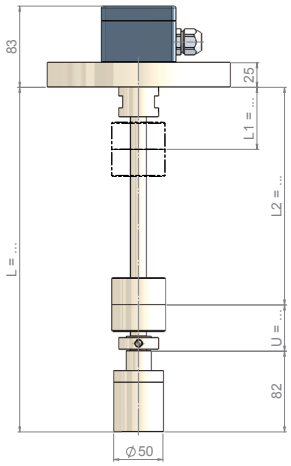
Technical Specifications:

Materials /	Polypropylene
El. connection /	Type A - Polyester socket
Process conn. /	G 2"-male upwards
Sliding tube /	ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PP
spec. Weight /	≥ 600 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	SIL

Version: PPF65G



Technical Specifications:

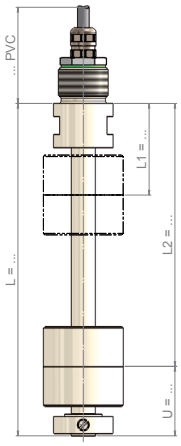
Materials /	Polypropylene
El. connection /	Type PA - Polyester socket
Process conn. /	Flange EN DN65 / PN10 / Form A
Sliding tube /	ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PP
spec. Weight /	≥ 600 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	SIL

Float switch made of PVDF with upward thread connection

Version: PVDFG38SIL



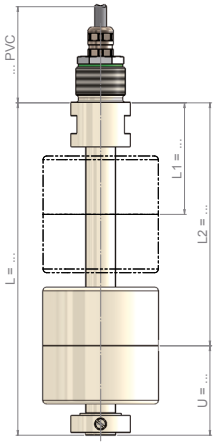
Technical Specifications:

Materials /	PVDF
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 3000 mm
Float /	Z44S13PD
spec. Weight /	≥ 850 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+100°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 55 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

Version: PVDFG1SIL



Technical Specifications:

Materials /	PVDF
El. connection /	Silicone connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PD
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+1 bar
Design temp. /	-10. . .+100°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

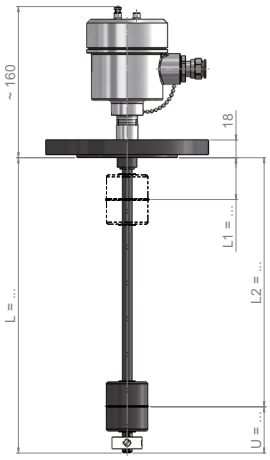
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

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Float switch made of stainless steel - ECTFE coated

Version: VAEBF50G



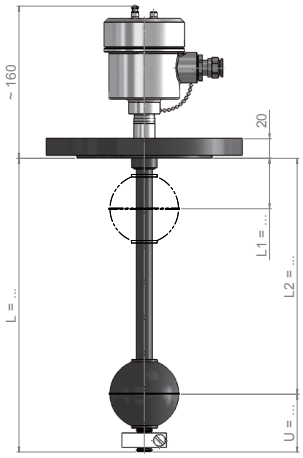
Technical Specifications:

Materials /	St. Steel ECTFE coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 11 mm
Insertion length /	≤ 3000 mm
Float /	KZ45S14EC1
spec. Weight /	≥ 950 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 80 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, BV, WHG, SIL1

Version: VAEBF80G



Technical Specifications:

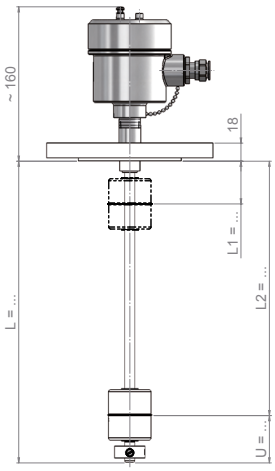
Materials /	St. Steel ECTFE coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 17 mm
Insertion length /	≤ 3000 mm
Float /	K73S23EC1
spec. Weight /	≥ 750 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 70 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 105 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, BV, WHG, SIL1

Float switch made of stainless steel - PFA coated

Version: VAPBF50G



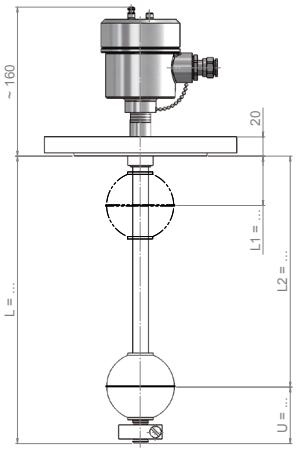
Technical Specifications:

Materials /	St. Steel PFA coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 11 mm
Insertion length /	≤ 3000 mm
Float /	Z45S14PF1
spec. Weight /	≥ 1000 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 80 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, SIL1

Version: VAPBF80G



Technical Specifications:

Materials /	St. Steel PFA coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 17 mm
Insertion length /	≤ 3000 mm
Float /	K73S23PF1
spec. Weight /	≥ 800 kg/m³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 70 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 105 mm

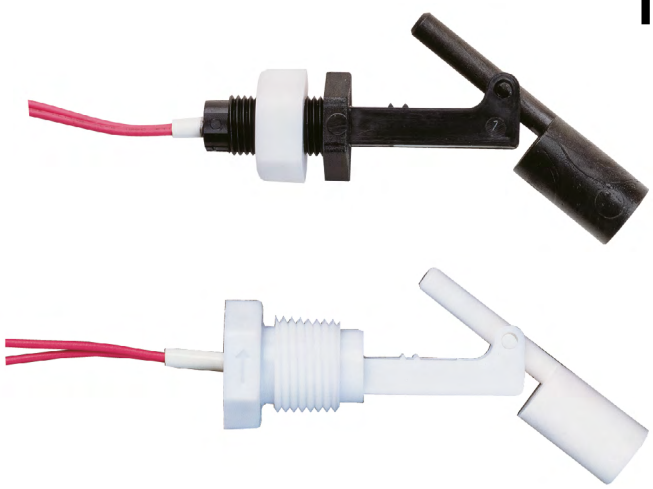
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, SIL1

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LS-14

Miniature Plastic Float Switch for Side Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Sideways mounting into vessel wall

/ PP or Nylon versions

Description:

The LS-14 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position of the float switch, the reed contact acts normally opened or normally closed.

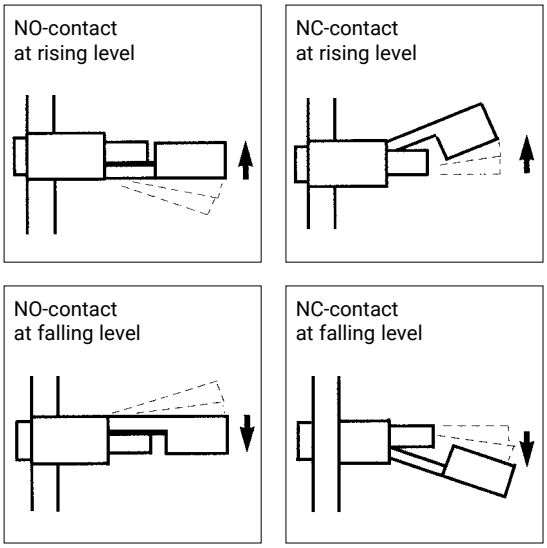
Application:

The LS-14 float switches are suited for monitoring the level of nearly all types of fluid media that are non-hostile to the material used as an alarm for full or empty levels, for controlling valves and pumps or for alert signals.

Technical Specifications:

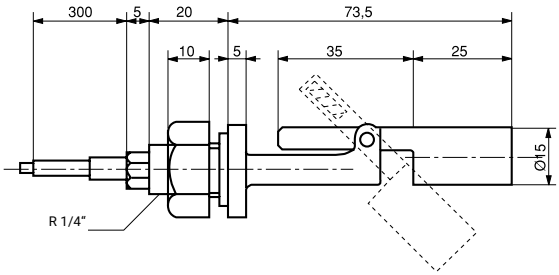
Connecting cable /	0,3 m PE stranded wire
Screw thread type /	LS-14.1: R 1/4" male with counter nut LS-14.2: 1/2" NPT male
Material /	LS-14.x.1: PP LS-14.x.2: Nylon (6-N)
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	2 bar rel.
max. Temperature /	LS-14.x.1: -10. . .+80°C LS-14.x.2: -10. . .+110°C
min. Media density /	0,8 kg/l (smaller on request)
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0,5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0,5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Installation variants:

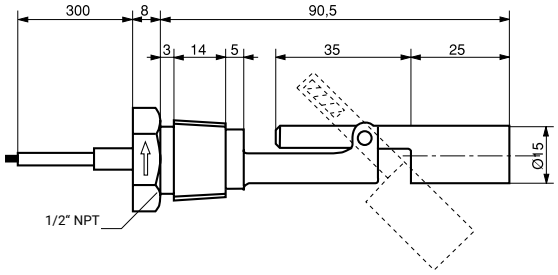


Dimensions in mm:

LS-14.1



LS-14.2



Handling:

/ It must be ensured that the values given for voltage, current, and power are not exceeded.

/ When switched on, a load must be connected in series.

/ The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

/ Not suitable for use in media with ferritic particles.

Ordering Codes:

Order number	**LS-14.**	**1.**	**1.**	**2**

LS-14 Miniature Plastic Float Switch

Connection /
1 = R 1/4" male
2 = 1/2" NPT male

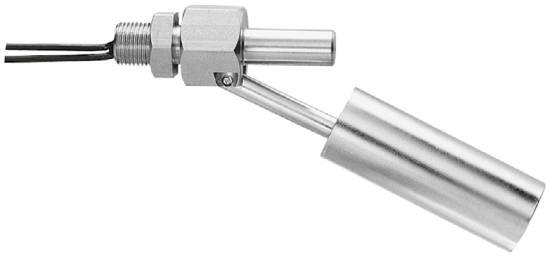
Material /
1 = Polypropylen
2 = Nylon (6-N)

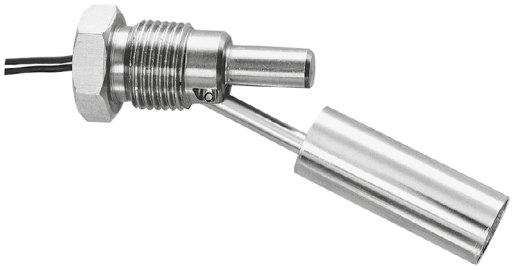
Contact /
2 = 50 V DC/AC, 0,5 A, 25 VA

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LS-15

Miniature Float Switch for Side Mounting





Features

/ Compact design

/ Only one mechanically moving part

/ Sideways mounting into vessel

/ Fully stainless steel version

Description:

The LS-15 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

The LS-15 float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.

Technical Specifications:

Connecting cable /	0.5 m FEP stranded wire
Screw thread type /	G 1/8“-male, G 1/2“-male, G 3/4“-male, 1/2“ NPT-male or 3/4“ NPT-male
Material /	float and float bracket are made of stainless steel 1.4301
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	5 bar
max. Temperature /	standard -40. . .+120°C high-temperature -40. . .+180°C
min. Media density /	0.8 kg/l (0.9 kg/l for special versions with extra short insertion length)
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0.5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0.5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Handling:

/ It must be ensured that the values given for voltage, current, and power are not exceeded.

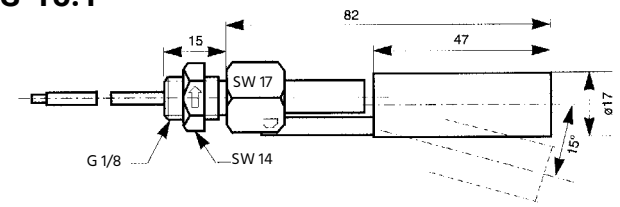
/ When switched on, a load must be connected in series.

/ The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

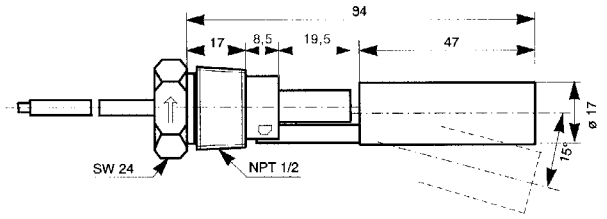
/ Not suitable for use in media with ferritic particles.

Dimensions in mm:

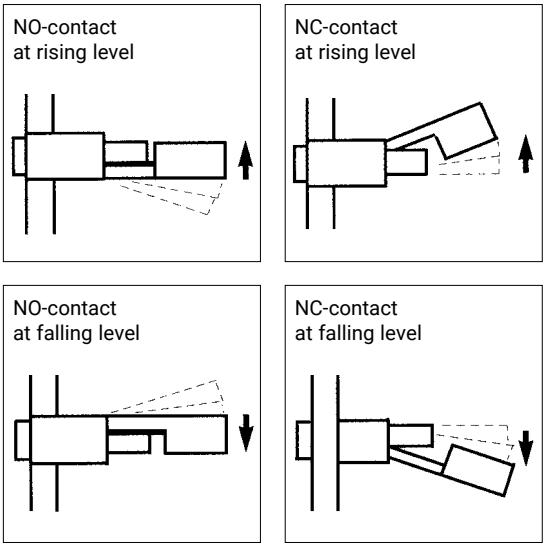
LS-15.1



LS-15.2



Installation variants:



Ordering Codes:

Order number	**LS-15.**	**1.**	**1**

LS-15 Miniature Float Switch for Side Mounting

Connection /

1 = G 1/8“ male to be mounted from inside (82 mm)
1a= G 1/8“ male to be mounted from inside (54,5 mm)*
2 = 1/2“ NPT male to be mounted from outside (94 mm)
3 = G 1/2“ male to be mounted from outside (94 mm)
4 = 3/4“ NPT male to be mounted from outside (54 mm)
5 = G 3/4“ male to be mounted from outside (54 mm)*

Temperature range /

1 = standard -40. . .+120°C
2 = high-temperature -40. . .+180°C

*Only standard temperature-range

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LS-15P

Miniature Float Switch for Side Mounting, Plug Version



Features

/ Compact design

/ Only one mechanically moving part

/ Sideways mounting into vessel wall

/ Fully stainless steel version

/ Electrical connection with DIN plug

Description:

The LS-15P series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

The LS-15P float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.

Technical Specifications:

Connecting cable /	plug EN175301-803 shape A
Screw thread type /	½" NPT male
Material /	float and float bracket are made of stainless steel
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	5 bar
max. Temperature /	Standard -40. . .+120°C
min. Media density /	0,8 kg/l
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0,5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0,5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Handling:

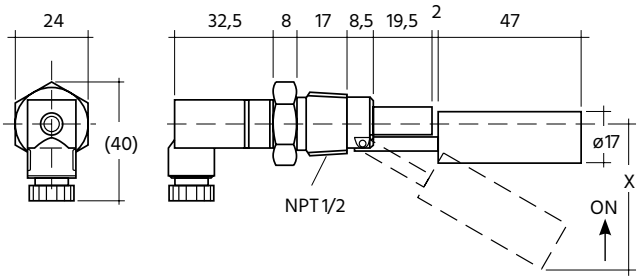
/ It must be ensured that the values given for voltage, current, and power are not exceeded.

/ When switched on, a load must be connected in series.

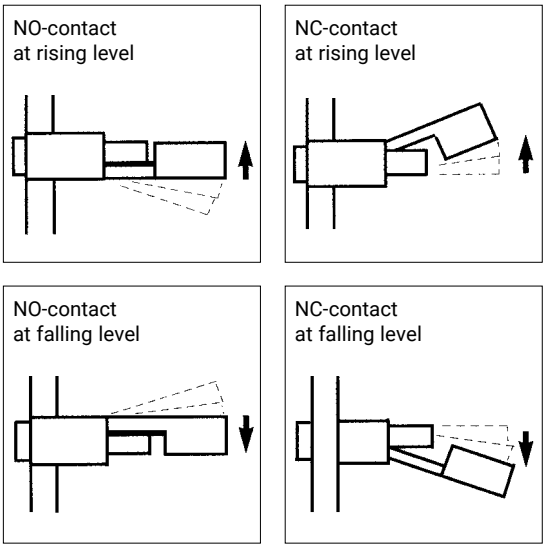
/ The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

/ Not suitable for use in media with ferritic particles.

Dimensions in mm:



Installation variants:



Ordering Codes:

Order number	**LS-15P.**	**1**
LS-15P Miniature Float Switch for Side Mounting, Plug Version		
Connection / 1 = 1/2" NPT male		

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LS-16

Miniature Plastic Float Switch for Vertical Mounting



Features

/ Compact design

/ Only one moving part

/ Mounting from top or bottom

/ PP version

Description:

The LS-16 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

The LS-16 float switches are suited for monitoring the level of nearly all types of fluid media that are non-hostile to the material used as an alarm for full or empty levels, for controlling valves and pumps or for alert signals.

Version:

LS-16 Miniature Plastic Float Switch for Vertical Mounting

Mechanical low-cost float switch made of PP, with contact-free triggering of a reed contact and a screw thread type G 1/8“

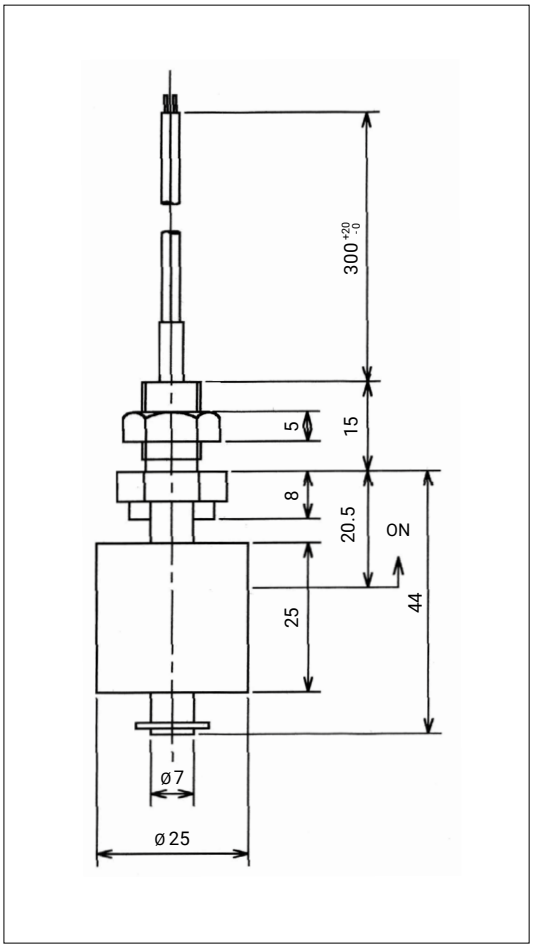
Technical Specifications:

Connecting cable /	0.3 m PVC stranded wire (AWG22)
Screw thread type /	G 1/8“-male with counter nut
Materials /	float, stem, counter nut and thread are made of PP, stainless steel 1.4301 stopper; tube made of vinyl (non wetted);
Function of contact /	NO-contact or NC-contact depending on installation of the float
max. Pressure /	2 bar
max. Temperature /	-10°C. . .+80°C
min. Media density /	0.8 kg/l
CE marking /	none, max. switching load is limited to 50 V AC/DC within area of application of low-voltage-directive
Switching load within CE area /	50 V AC/DC, 0.5 A, 25 VA
Switching load outside CE area /	300 V AC/DC, 0.5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Ordering Codes:

Order number	**LS-16**
LS-16 Miniature Plastic Float Switch for Vertical Mounting	

Dimensions in mm:



Handling:

/ It must be ensured that the values given for voltage, current, and power are not exceeded.

/ When switched on, a load must be connected in series.

/ The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

/ Not suitable for use in media with ferritic particles.

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LS-17

Miniature Stainless Steel Float Switch for Vertical Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Mounting from top or into vessel bottom

/ Fully stainless steel version

Description:

The LS-17 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

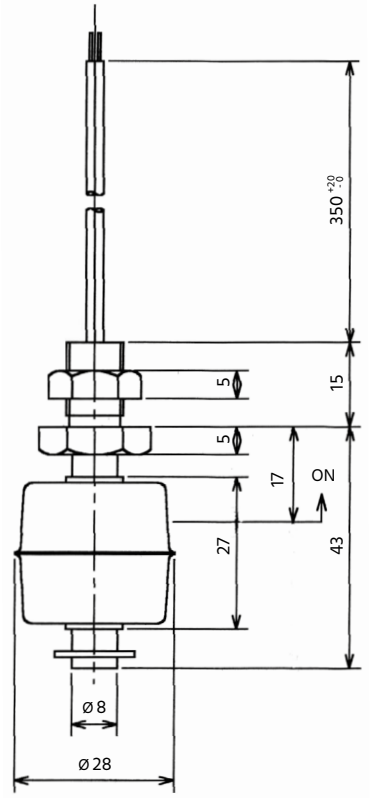
Application:

The LS-17 float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.

Technical Specifications:

Connecting cable /	0,35 m IRRAXTMB$_{32}$ stranded wire (AWG22)
Screw thread type /	G 1/8" male with counter nut
Material /	float, stem, stopper, counter nut and thread are made of stainless steel 1.4301
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	10 bar
max. Temperature /	-40...+120°C
min. Media density /	0,8 kg/l
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0,5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0,5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Dimensions in mm:



Handling:

/ It must be ensured that the values given for voltage, current, and power are not exceeded.

/ When switched on, a load must be connected in series.

/ The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

/ Not suitable for use in media with ferritic particles.

Ordering Codes:

Order number	**LS-17.**	**1**
LS-17 Miniature Stainless Steel Float Switch for Vertical Mounting		
Connection / 1 = G 1/8" male to be mounted from inside		

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LS-18

Miniature Stainless Steel Float Switch for Side Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Mounted from the side

/ Fully stainless steel version

Description:

The LS-18 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

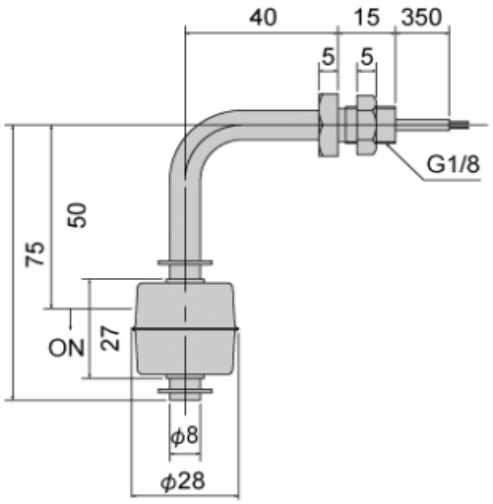
Application:

The LS-18 float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.

Technical Specifications:

Connecting cable /	0.35 m IRRAXTMB$_{32}$ stranded wire (AWG22)
Screw thread type /	G 1/8" male with counter nut
Material /	float, stem, stopper, counter nut and thread are made of stainless steel 1.4301
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	10 bar
max. Temperature /	-40. . .+120°C
min. Media density /	0.8 kg/l
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0.5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0.5 A, 50 VA
Initial contact resistance /	150 MΩ (max.)
Insulation resistance /	10 MΩ (min.)

Dimensions in mm:



Handling:

/ It must be ensured that the values given for voltage, current, and power are not exceeded.

/ When switched on, a load must be connected in series.

/ The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

/ Not suitable for use in media with ferritic particles.

Ordering Codes:

Order number	**LS-18.**	**1**
LS-18 Miniature Stainless Steel Float Switch for Side Mounting		

Connection /
1 = G 1/8" male to be mounted from inside

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FO-01

Optoelectronic Level Switch



Features

/ Small and compact

/ Easy to mount

/ No mechanical components

/ Easy to maintain

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a quartz glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the quartz glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a green LED.

Application:

The field of applications for the optoelectronic level switch is the detection of limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The extremely compact design guarantees minimum space; consequently, measurements in very small volumes becomes convenient. It can be mounted anywhere and the range of high pressure and temperature assure a broad spectrum of applications.

Technical Specifications:

max. Pressure /	0. . .50 bar
max. Media temp. /	-30. . .+135°C
max. Ambient temp. /	-25. . .+70°C
Electronic housing /	stainless steel
Sensor housing /	stainless steel
Lighting circuit /	quartz glass
Sealing /	graphite / PTFE
Weight /	approx. 75 g without cable
Accuracy /	± 0.5 mm
Light source /	IR light 930 nm
Ambient light /	max. 10.000 Lux
min. Clearance to opposite-side surface /	> 10 mm > 20 mm with electropolished surface
Assembling position /	any
Spanner width /	SW24 at M16 x 1.5 and ½"-NPT SW30 at G½"

Ordering Codes:

Order number	**FO-01.**	**1.**	**2.**	**1.**	**1.**	**0**

FO-01 Optoelectronic Level Switch

Process connection /
1 = M16 x 1.5 male
2 = ½" NPT male
3 = G ½" A male

Electrical connection /
1 = 3m PVC cable
2 = plug connection Binder 713 M12

Output /
1 = switching when immersing
2 = switching when surfacing

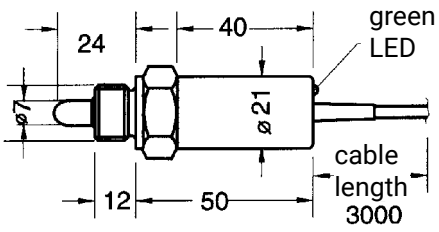
Sensor housing material /
1 = stainless steel
99 = special material on request

Options /
0 = no option
1 = counter plug 4-pole Series 713

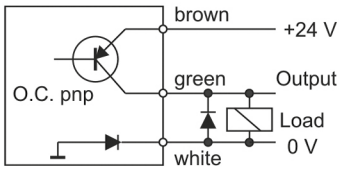
Electrical Specifications:

Supply voltage /	24 VDC -25. . .+30%
Consumption /	max. 40 mA
Output /	PNP open collector transistor, short-circuit protected, current, voltage and power limitation
Switching status /	green LED
Switching current /	For Tu = +70°C: 0.5 A
Electrical connection /	PVC cable 3 x 0.14 mm² or plug 4-pole Series 713, M12
Protection class /	with cable IP 66 per EN 60 529 with plug IP 65 per EN 60 529

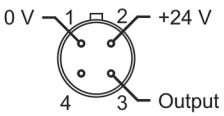
Dimensions in mm:



Connection diagram



pin assignment



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FO-02N

Optoelectronic Compact Level Switch

Features

/ Compact design

/ Integrated electronic switch

/ Low-maintenance

/ Sensorlengths from 65-3000 mm

/ No moving parts

/ Any mounting position

/ Accuracy ± 2 mm

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If the sensor tip is not immersed in the fluid, the infrared light will be fully reflected by the inside of the quartz glass. However, as soon as it is immersed into the medium, a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's transistor output.

Application:

The field of application for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is, that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The extremely compact design guarantees minimum space requirement. in contrast to the FO-01, the FO-02N can be supplied with measuring lengths of up to 3000 mm, so that the user can select the setpoint freely. The direction of switching for the high-performance transistor output on the device is reversible.

Versions:

FO-02N Optoelectronic Compact Level Switch

Power supply: The power supply of the FO-02N should be 12 to 32 VDC.
Sensor length: The sensor is available in six standard-lengths: 150, 300, 500, 750, 1000 and 1500 mm. Other lengths, up to 3000 mm are available on request.

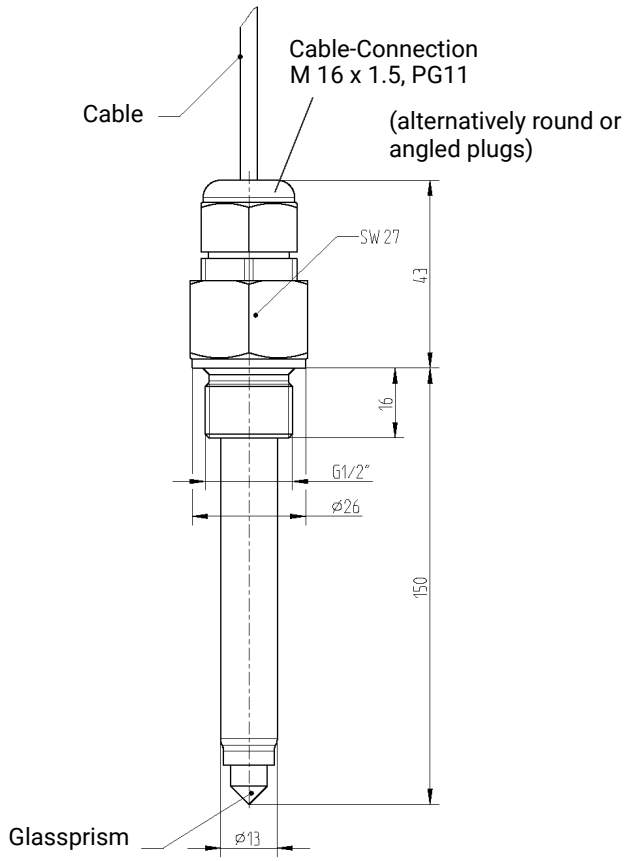
Technical Specifications:

Accuracy /	± 2 mm
Response sensitivity /	factory configured, please specify media, or alternatively with trimmer
Switching delay /	1 s (standard, 0. . .7s to choose)
max. Pressure /	0. . .25 bar
max. Mediatemp. /	-30°C to +100°C
max. Ambient-temp. /	-25°C to +70°C
Material /	
Light conductor:	Borosilicateglass
Body and process connection:	Stainless Steel 1.4571
Installation position /	any
min. Distance any opposing surface /	≥ 10 mm ≥ 20 mm with elektropolisch surface
Sensor length /	min. 65 mm - max. 3000 mm
Process connection /	G½"

Electrical Specifications:

Power supply /	DC 12. . .32V
max. Current consumption /	40 mA
Output /	PNP-Transistor, polarity assured, 200 mA switching current
Electrical connection /	
Round plug:	M12 x 1 (4-pin)
PUR-Cable:	Standard length: 2 m or 5 m Diameter: 3 x 0.25 mm² Cable-ends: open
Angled plug:	EN 175301-803 A
Switch /	NO (closed in the medium) or NC (open in the medium)
No. of switching points /	1
Protection class /	IP 65

Dimensions in mm:



Ordering Codes:

Order Number:	**FO-02N.**	**3.**	**4.**	**2.**	**0**

FO-02N Optoelectronic Compact Level Switch

Electrical connection /
1 = 2 m cable PUR
2 = 5 m cable PUR
3 = round plug M 12 (without counterplug)
4 = angled plug EN 175301-803 A

Sensor length* /
1 = 150 mm
2 = 300 mm
3 = 500 mm
4 = 750 mm
5 = 1000 mm
6 = 1500 mm

Output /
1 = switch when immersing
2 = switch when surfacing

Option /
0 = factory configured (please specify media)
8 = switching delay 0. . .7s (please specify)
9 = with Trimmer

*other lengths up to 3000 mm are available on request.

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FO-03

Optoelectronic Level Switch



Features

/ Compact design

/ Under pressure removable electronic part

/ Easy to mount

/ No moving parts

/ Easy to maintain

/ Cost-effective

Description:

The optoelectronic level switch is used for monitoring of liquid levels. An optical sensor is mounted in a glass fiber reinforced polyamide housing. It consists of a quartz glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If the sensor is not immersed in the fluid, the infrared light will be fully reflected by the inside of the quartz glass. However, as soon as it immerses into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the potential-free relay output, which is also indicated by a light emitting diode directly. The electronic part can be replaced without opening the process, due to the fact that the screw-in part including the glas prism remains installed.

Application:

The area of applications for the optoelectronic level switch is the detection of number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The extremely compact design guarantees minimum space; consequently, measurements in very small volumes becomes convenient. The high pressure and temperature ranges assure a broad spectrum of applications.

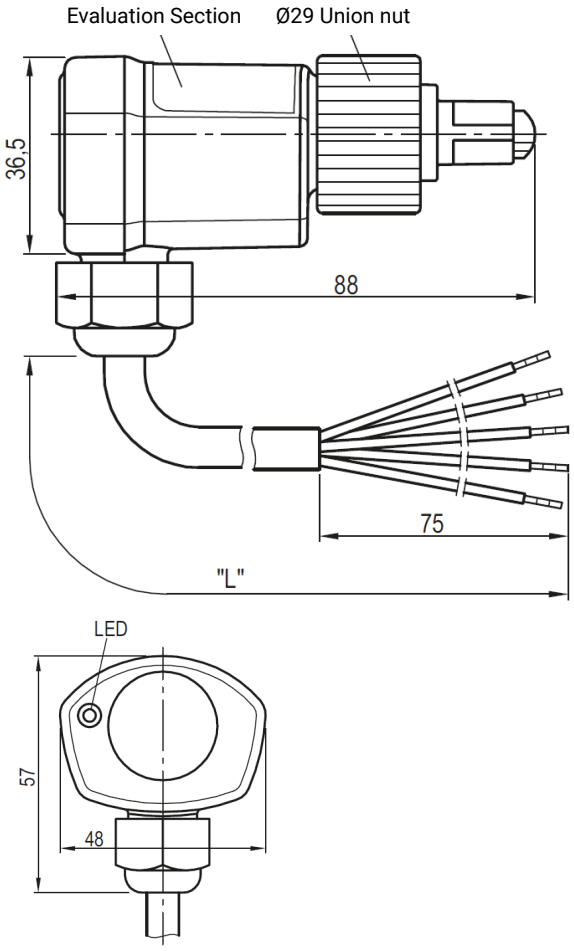
Technical Specifications:

max. Pressure /	46 bar (-10. . .+120°C) 31.5 bar (-30. . .-10°C)
max. Media temp. /	+120°C (<16000h) +100°C
max. Ambient temp. /	-30. . .+60°C
Electronic housing /	PA66/PA6, fiber reinforced
Screw-in part /	steel nickel-plated
Prisma /	borosilicate glass
Mounting of case to process connection /	union nut
opt. Setpoint indication /	red LED
Minimum distance sensor tip to any opposite wall /	> 10 mm
Switch-on delay time /	3 sec, ± 1 sec

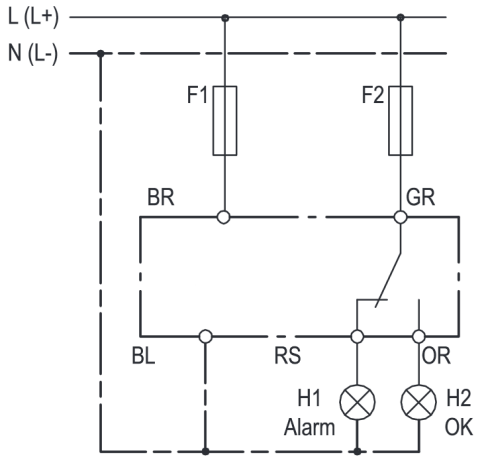
Electrical Specifications:

Supply voltage /	110. . .230 VAC ±10%, 3 VA or 24 DC/AC ±10%, 3 VA
allowed rel. Humidity /	10-95% r.H. without condensation
Output /	potential-free relay (change-over)
Switching voltage /	min. 24V, 20mA
Switching current /	max. 2.5 A C300
Mech. lifetime /	ca. 10^6 switch cycles
connection /	1 m PVC cable 5 x 0.75 mm^2
Protection class /	IP 54

Dimensions in mm:



Electrical Connection:



Ordering Codes:

Order number	**FO-03.**	**1.**	**1.**	**2.**	**[0][1].**	**0**

FO-03 Optoelectronic Level Switch

Process connection /
1 = M20 x 1,5
2 = ½" NPT
3 = G ½" A

Electrical connection /
1 = 1 m PVC cable with free cable ends

Supply voltage /
1 = 230 VAC ± 10 %
2 = 24 VDC ± 15 %

Switch-on delay time /
[0][5] = standard (approx. 5 s)
[X][X] = up to approx. 12 s

Options /
0 = none
9 = specify special features in detailed text

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FO-04

Optoelectronic Level Switch for General Applications



Features

/ Compact design

/ Accuracy ± 2 mm

/ Status LED

/ Easy to mount

/ No moving parts

/ Easy to maintain

/ Cost-effective

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the borosilicate glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a red LED.

Application:

The applications for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The compact design, the possibility of installation in any position as well as the attractive price level recommends the FO-04 especially for general industrial applications.

Typical applications:

- level detection of fluids, such as e.g. oil, water, aqueous media, etc.
- full or empty reporting
- overfill protection
- dry run protection

Technical Specifications:

Accuracy /	± 2 mm
Response sensitivity /	preset, for the detection of watery media and oils
max. Pressure /	0. . .25 bar
max. Media temp. /	-30. . .+100°C
max. Ambient temp. /	-25. . .+70°C
Materials /	
Light guide:	borosilicate glass
Housing and process connection G 3/8" and M 12 x 1:	stainless steel 1.4305
Housing and process connection G ½":	stainless steel 1.4571
Mounting position /	any
min. Clearance from the glass tip to an opposite surface /	≥ 10 mm, ≥ 20 mm (with electropolished surface)
Visual indication of the switching status /	1x yellow LED
Process connection /	G 3/8", G ½" or M12 x 1

Electrical Specifications:

Supply voltage /	12. . .32 VDC
max. Consumption /	40 mA
Output /	PNP-Transistor, protected against reverse polarity 200 mA switching circuit
Electr. connection /	
Circular connector:	M8 x 1, 3-pin
PUR cable:	standard lengths: 2 m or 5 m diameter: 3 x 0.25 mm² cable end: open
Switching function /	NO (closed when immersed) or NC (open when immersed)
Switch points /	1
Protection class /	IP 65 (counter plug screwed on)
Options /	adjustable responsiveness (Trimmer) for other liquids and foaming media
Cable configuration/	BN: U_+ WN: U_- GN: SP
M8 rounded plug configuration /	1: U_+ 3: U_- 4: SP



Ordering Codes:

Order number	FO-04.	1.	3.	1.	1.	1

FO-04 Optoelectronic Level Switch

Process connection /
1 = G 1/2" - male
2 = G 3/8" - male
3 = M 12 x 1 - male

Electrical connection /
1 = 2 m PUR cable
2 = 5 m PUR cable
3 = rounded plug M8 x 1, 3-pin (without counter plug)

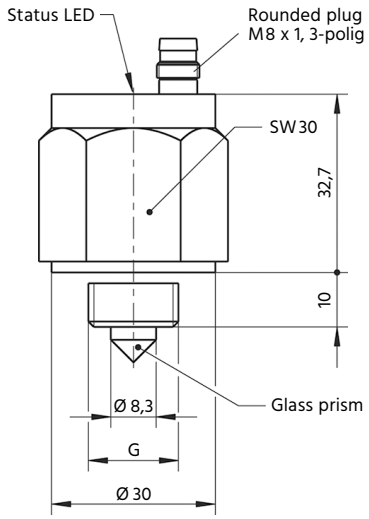
Output /
1 = NC (closed when immersed)
2 = NO (open when immersed)

Media /
1 = water
9 = other (please specify in text)

Options /
0 = none
1 = counter plug M8 x 1 with 2 m cable
2 = Trimmer
9 = other (please specify in text)

Dimensions in mm:

Version: FO-04.1.3.x.x.0



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FO-05

Optoelectronic Level Switch High-Temperature Version



Features

/ Up to +170°C media temperature

/ Accuracy ± 2 mm

/ Compact design

/ Easy to mount

/ No moving parts

/ Easy to maintain

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the borosilicate glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a red LED. For variants with trimmer, the switching status can be read directly on the sensor (internal red LED).

Application:

The applications for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The compact construction guarantees minimum space; consequently, measurements in very small volumes becomes convenient. The possibility of mounting in any position as well as the property for use with fluids at high temperatures of up to +170°C assure a broad spectrum of applications.

Typical applications:

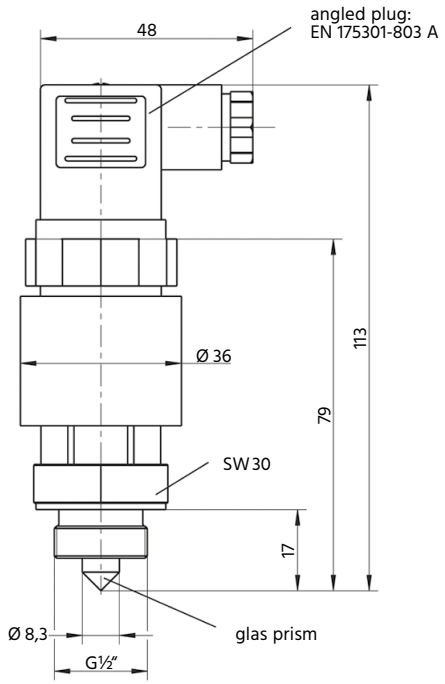
- level detection of fluids, such as e.g. oil, water, aqueous media, etc.
- full or empty reporting
- overfill protection
- dry run protection

Technical Specifications:

Accuracy /	± 2 mm
Response sensitivity /	preset, for the detection of watery media and oils
max. Pressure /	0. . .25 bar
max. Media temp. /	-40. . .+170°C
max. Ambient temp. /	-30. . .+80°C
Materials /	
Light guide:	borosilicate glass
Housing:	stainless steel 1.4305 (non wetted part)
Process connection:	stainless steel 1.4571
Mounting position /	any
min. Clearance from the glass tip to an opposite surface /	≥ 10 mm ≥ 20 mm (with electropolished surface)
Process connection /	G ½"-male

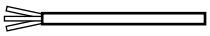
Dimensions in mm:

Pictured: FO-05.1.4.x.x.0



Electrical Specifications:

Supply voltage /	12. . .32 VDC
max. Current /	40 mA
Output /	PNP transistor, protected against reverse polarity, 200 mA switching current
Electric. connection /	
circular connector:	M 12 x 1, 4-pin
angular connector:	as per EN 175301-803 A
PUR cable:	standard lengths: 2 m and 5 m diameter: 3 x 0.25 mm² cable end: cut to length
Switching function /	NO (closed in medium) or NC (open in medium)
Switch points /	1
Protection class /	IP 65 (counter plug screwed on)
Cable configuration /	BN: U_+ WN: U_- GN: SP
M12 x 1 rounded plug configuration /	1: U_+ 3: U_- 4: SP
Angled plug configuration /	1: U_+ 3: U_- 4: SP







Ordering Codes:

Order number	**FO-05.**	**1.**	**3.**	**1.**	**1.**	**1**

FO-05 Optoelectronic Level Switch High-Temperature Version

Process connection /
1 = G ½" male thread

Electrical connection /
1 = 2 m PUR cable
2 = 5 m PUR cable
3 = circular connector M 12 x 1, 4-pin (without counter plug)
4 = angular connector as per EN 175301-803 A (with counter pl.)

Output /
1 = switching when immersing (closed in medium)
2 = switching when surfacing (open in medium)

Medium /
1 = water
9 = special (please specify in detailed text)

Option /
0 = none
1 = counter plug M 12 x 1, 4-pin
2 = counter plug M 12 x 1 with 2 m cable
9 = special (please specify in detailed text)

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2110 - Mini-SQUING

Mobrey™ Mini-Squing Compact Vibrating Fork Level Switch



Description:

The 2110 vibrates in the air according to the principle of a tuning fork at the frequency of resonance. When the switch is dipped into a fluid the frequency changes due to the higher inertia of the medium. The integrated electronic components capture this change and link to a load connected in series. For the first time, we succeeded in shortening the sensor element that is contacted by the media to 50 mm length and in keeping its size so narrow that a 3/4" thread is absolutely adequate. The same device can be operated with supply voltages of 21 to 264 V AC or DC, thereby reducing the storage of spare parts to a minimum. The device is provided with a microprocessor that is capable of self-monitoring and fail-safe functions. It triggers a user-defined alarm that indicates a dry-run or wet status through an LED which changes from continuous light to blinking and, in the event of malfunctioning, changes again its frequency.

Features

/ 3/4", 1" or 2" Tri-clamp

/ High operating frequency

/ 21. . .264V DC or AC voltage

/ Least depth for mounting

/ Diagnostic LED

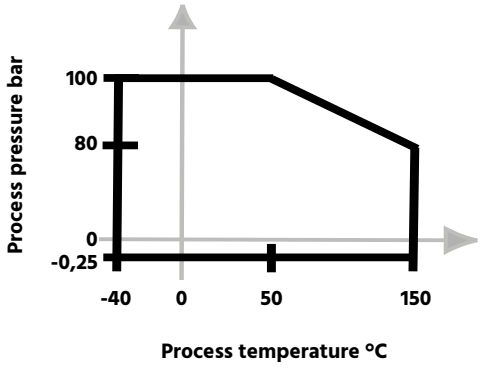
Application:

The 2110 series of limit switches is intended for recording limit levels in most of the fluids and slurries. The device can process also media with high viscosities or sticky properties without any problem since it is capable of „shaking away" adhesions by virtue of its function. Irrespective of whether for overfill protection, pump protection, leakage monitoring or pump control, the 2110 is universally applicable and, due to its small dimensions, it can be mounted even in narrow spaces. The switch has a fully stainless steel facing to the media and can be connected with an R3/4" or R1" thread to the process. Optionally, a fitting is available for applications in food-processing industry which enables, together with the 1" variant and an O ring, a smooth joint to the fluid.

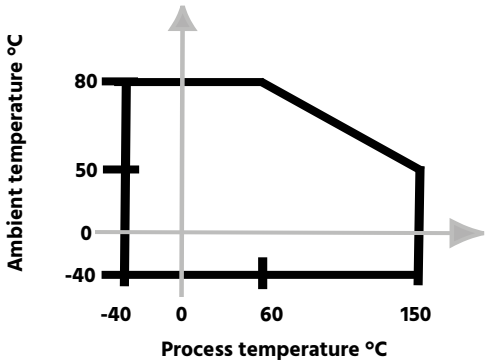
Technical Specifications:

Pressure range /	-0.25. . .+100 bar at 50°C
Temperature range /	-40. . .+150°C
Ambient temperature /	-40. . .80°C (50°C at 150°C on the wet side)
CIP-cleaning /	withstands steam cleaning routines up to max. 150°C
Medium specific weight /	600 kg/m³
Viscosity /	0.2. . .10000 cP
Switching point (water) /	approx. 13 mm immersion depth
Hysteresis (water) /	± 1 mm nom.
Switching delay /	1 sec.
Housing /	stainless steel 304
Fork /	stainless steel 316
LED-window /	anti-flammable polycarbonate
Plug /	polyamide, reinforced fiberglass
Plug sealing /	nitrile butadien rubber
Function test /	through magnetic test point during operation

Process pressure curve /



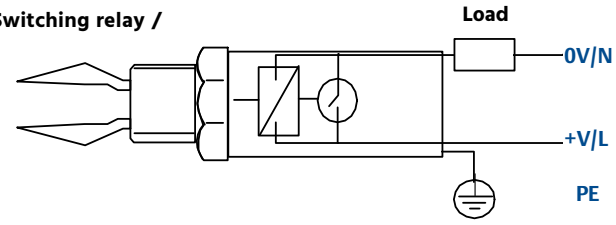
Process temperature curve /



Electrical Specifications:

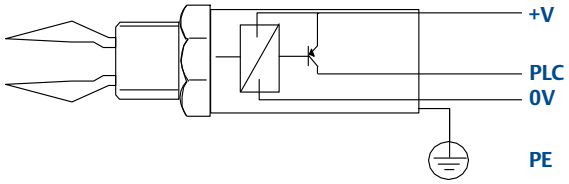
Supply voltage /	2-wire: 21. . .264 V (± 10%) DC or AC 3-wire: 18. . .60 VDC
Leakage current (without load) /	< 3.0 mA continuous (2-wire)
max. Load /	500 mA
max. Peak load /	5 A for max. 40 ms electr. protected
min. Switching load /	20 mA continuous (2-wire)
Voltage drop 2-wire /	6.5 V for 24 VDC, 5.0 V for 240 VAC
Voltage drop 3-wire /	< 3.0 V
Electr. Protection /	protection against polarity reversal and short-circuiting, protection when load is absent
Electr. Connection /	square plug as per DIN 43650
Cable diameter /	4. . .9 mm (PG9)
Protection class /	IP66/IP67 EN60529

Switching relay /



Switching relay	
Power supply	21. . .264 Vac (50. . .60 Hz)/dc
max. switching voltage	500 mA
max. peak voltage	5 A for 40 ms
min. switching voltage	20 mA continuous
Current drop	6.5 V at 24 VDC
Current consumption	< 3.0 mA continuous

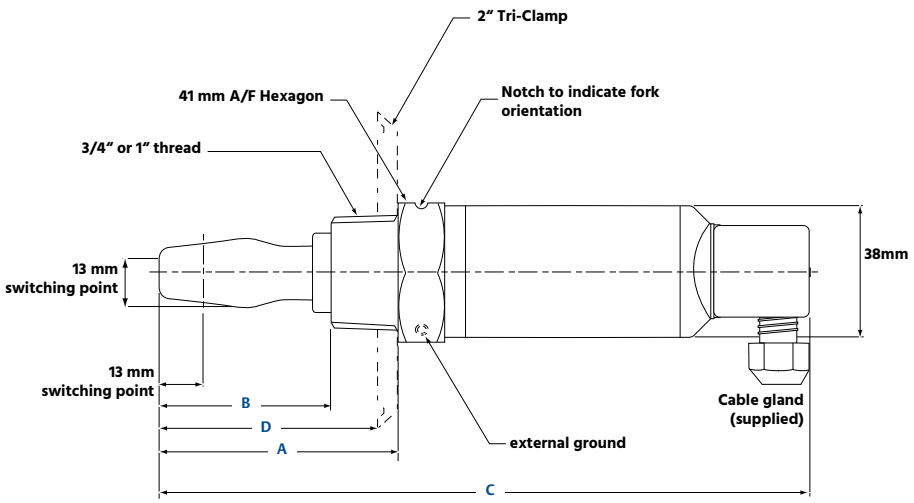
PNP Switch /



PNP Switch	
Power supply	18. . .60 VDC
max. switching voltage	500 mA
max. peak voltage	5 A for 40 ms
Current drop	< 3 V
Current supply	3 mA nominal
Current output	< 0.5 mA

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Dimensions in (mm):



Connection	A	B	C	D
R 3/4"-male	69 mm	50 mm	188 mm	-
NPT 3/4"-male	69 mm	50 mm	188 mm	-
R 1"-male	69 mm	50 mm	188 mm	-
G 1"-male	78 mm	60 mm	201 mm	-
2" Tri-clamp	69 mm	50 mm	188 mm	64 mm
R 1"-male extended	116 mm	98 mm	239 mm	-

Ordering Codes:

Order number	**2110.**	**1.**	**1A**

2110 Miniature Vibrating Fork

Electrical function /

0 = 2-wirein series to load
1 = PNP-3-wire for SPS-operation

Process connection /

0A = R 3/4"-male DIN2999
1A = R 1"-male DIN2999
0D = NPT 3/4"-male
2R = 2" Tri-clamp, hygiene fitting
1B = G 1"-male
1L = G 1"-male extended

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FV-01

Compact Tuning Fork Level Switch



Features

/ Proven vibration principle

/ Short immersion depth of 40 mm

/ Error monitoring

/ Integrated testing function to ensure fault-free operation

Description:

The FV-01 is a compact tuning fork level switch for fluids and slurry. It can be used as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces. The vibrating fork is piezoelectric driven and vibrates on a mechanical resonance frequency of approximately 1.100 Hz. When the fork is covered by media, this frequency changes. This change will be registered by the build in oscillator, transforming it into a switching signal. Then, the integrated electronic will send this signal to connected devices. The FV-01 works practically without interferences from chemical or physical qualities of the fluid media. It can even be used under harsh conditions, such as turbulences, air bubbles, foam and external vibratons.

Application:

The 40 mm long vibrating fork makes the FV-01 ideal for deployment in small pipes and confined installations. The compact level switch was created to be used in all industrial fields with process engineering. The preferred field of application includes liquids and slurries, level monitoring and overflow and dry-running protection.

Technical Specifications:

Accuracy /

Switching point:	about 13 mm from the tip
Hysteresis:	2 mm for installation from above
Delay:	about 500 ms (on/off)
Frequency:	about 1100 Hz

Pressure / -1. . .64 bar g

Ambient-temp. / -40. . .+70 °C

Media-temp. / -40. . .+100 °C (standard)
-40. . .+150 °C (raised)

Media density / 0,7. . .2,5 g/cm³

Materials /

Housing:	1.4404/316L and plastic PEI
Vibrating fork:	316L (1.4404 or 1.4435)
Process connection:	316L (1.4404 or 1.4435)
Seal:	klingersil C-4400

Process connection /

Thread (ISO 228 T1):	G ¾" A or G 1" A, others on request
Thread, conical:	¾" NPT or 1" NPT, others on request
Hygienic:	Pipe fitting DN 40, PN 40 Tri-clamp 1", 1½", 2" PN 10

Weight / 250 g (housing)

Ordering Codes:

Order number	FV-01.	1.	A.	2.	0.	1

FV-01 Compact Vibrating Switch

Process connection /
1 = thread G¾" A PN 64/316L
2 = thread ¾" NPT A PN 64/316L
3 = thread G1" A PN 64/316L
4 = thread 1" NPT A PN 64/316L
9 = other (please specify seperately)

Temperature /
A = -40. . .+100°C (standard)
B = -40. . .+150°C (raised)

Elektronik /
1 = 2-wire on load in series
2 = transistor output PNP DC 10. . .35 V

Approvals /
0 = none
1 = ship-building approval (DNV, GL) - only possible for 150°C version
2 = flooding protection from WHG (only with transistor output)

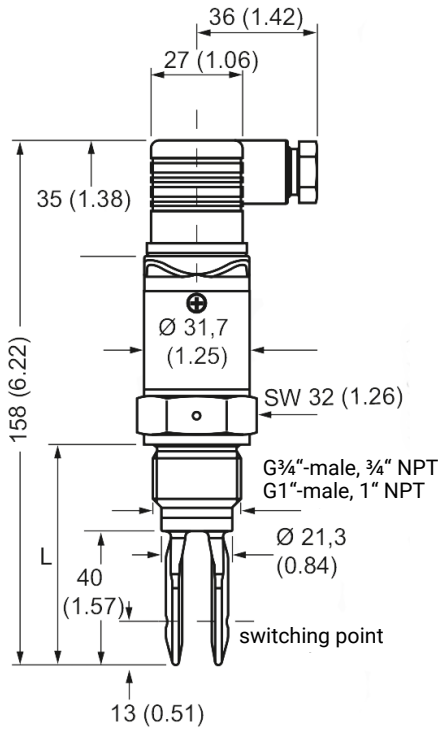
Electrical connection /
1 = M12 x 1/IP67 (only PNP-output)
2 = DIN 43650 incl. plug/IP65

Electrical Specifications:

Power supply /	AC 20. . .253 V, 50/60 Hz DC 20. . .253 V
Power consumption /	max. 0,5 W
Cable glands /	1 x M12 [IP66/IP67 or IP68 (0,2 bar)]
Electrical connection	
Protection class /	M12 x 1/IP67 acording to ISO 4400 incl. plug/IP65 acordind to DIN 43650 incl. plug with QUICKON-connection/IP65 M12 x 1 incl. 5 m cable/IP68 (0,2 bar)
Approvals /	overflow protection acc. to WHG Ship-building approvals

Dimensions in mm:

Thread G¾"-male, G1"-male
(DIN ISO 228/1),
¾" NPT, 1" NPT
(valve plug ISO 4400)



L =
Length with G¾"-male, ¾" NPT:66 (2.6)
Length with G1"-male, 1" NPT:69 (2.7)

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FD-02

Pressure Bell Switch

Features

/ Level monitoring for fluids

/ Filter and air-duct monitoring

/ Dry-run protection for pumps

Description:

In pressure bell switches, the static pressure of the fluid is converted into air pressure in suitable pressure transmitters (tube or hose). The rising level of fluid produces a locked up air space in the pressure transmitter as soon as the level reaches the locking edge. If the level continues to rise an overpressure builds up in the tube which on reaching a value of approx. 50 mm of water column actuates a pressure switch. The tube or the hose must be perfectly pressure-tight as, otherwise, the switching point may change due to air losses in the pressure transmitter tube. The FD-02 is factory-adjusted to a switching point of 50 mm of water column so that it is defined as the tube length minus 50 mm. Normally, the FD-02 is supplied without a pressure transmitter tube to allow the user to select the tube material as per his preference and thereby to customize it to the media to be monitored. In the case of warm, viscous or sticky materials, we suggest maintaining a constantly less air bubble formation over a T-piece connected to a pressurized air supply.

Application:

Pressure bell switches are simple and cost-effective devices for monitoring the level especially in open vessels, sumps and ducts. Since these switches do not have any mechanically moving parts, they are particularly dirt-insensitive. By correctly selecting the pressure transmitter material even hostile media can be monitored economically.

Versions:

FD-02 Pressure Bell Switch

Version:
FD-02.1 - no housing
FD-02.2 - with housing, R ½"-female
FD-02.3 - with housing, R ½"-female, R1 ¼"-male
FD-02.4 - with housing, hose joint 40 mm

Technical Specifications:

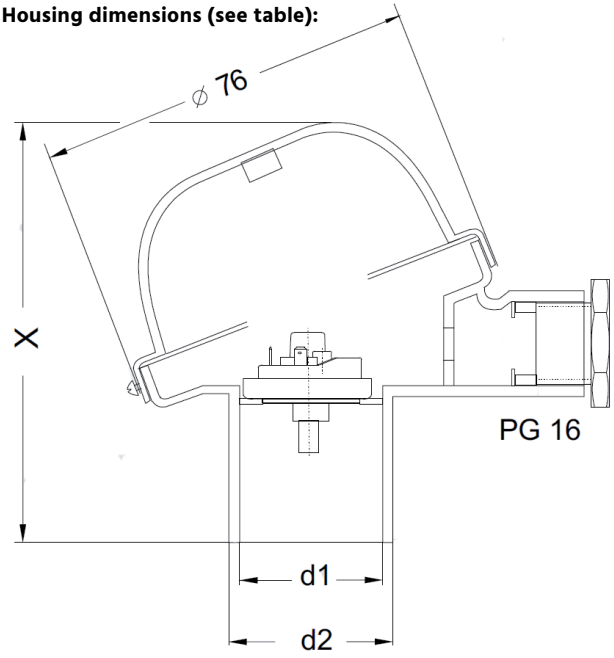
Pressure range /	0.05 to 1 m water column
Least switching pressure /	50 mm water column
Least switch back pressure /	20 mm water column
max. Temperature /	-10. . .+85°C
Materials /	
Housing:	polyamide
Membrane:	nitrile rubber
Pressure chamber:	polyamide, fiberglass reinforced
Hysteresis /	15%, min. 30 mm water column
Indexing tolerance /	± 10%, min. +7.5 mm water column

Electrical Specifications:

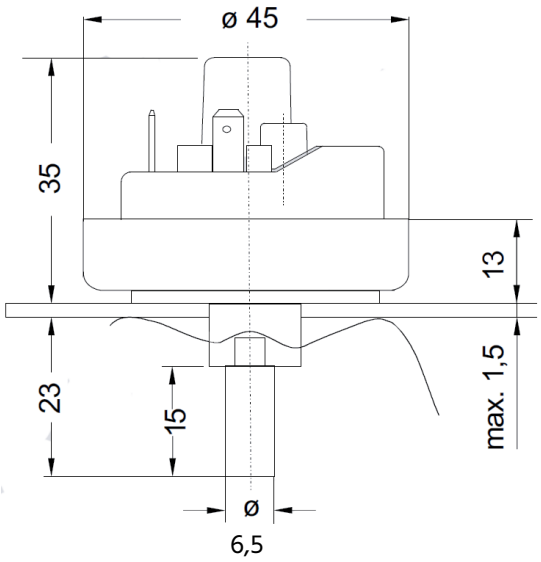
Switching load /	change-over 6 A, 250 V, 50 Hz, ohmic; tested as per VDE 0630
Electrical connection /	flat plug, 6.3 DIN 46248

Dimensions in mm:

Housing dimensions (see table):



Switch Dimensions FD-02.1 (without housing)



Housing Dimensions:

Version	d1	x	d2
FD-02.2	R ½" female	78 mm	-
FD-02.3	R ½" female	85 mm	R1 ¼" male
FD-02.4	hose	108 mm	40 mm

Ordering Codes:

Order number	**FD-02.**	**2**

FD-02 Pressure Bell Switch

Version /
1 = no housing
2 = with housing, R ½"-female
3 = with housing, R ½"-female, R1 ¼"-male
4 = with housing, hose joint 40 mm

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DF-02

Rotating Vane Level Switch for Industrial Applications

Features

/ Robust aluminium pressure cast or stainless steel housing

/ Easy to assemble

/ Can be used as full and empty alerter

/ Available optionally with shaft extension

/ Capacity of the contact: 1mA/4VDC up to 2A/250VAC

Description:

A gear motor situated at a certain rotatable angle in the extension of a shaft is held by means of a spring on a stopper. Over the shaft, the motor drives the vane projecting into a vessel. As soon as the filling material reaches the vane, it is prevented from its further rotation. The reverse torque twists the motor from its end position and actuates a switch. Subsequently, a second switch turns off the motor. If the level goes down, the vane is released and the motor is drawn back by the spring into its end position. In this, the motor is switched on again and the output signal is switched back. The gear motor and both the switches are mounted in an aluminium pressure housing. Precise running of the vane shaft is ensured by 2 encapsulated ball-bearings. In the event of a blockage, a retention coupling prevents damage to the motor. A special type sealing on the shaft prevents dust and humidity from infiltrating into the housing and the ball-bearing.

Application:

The device is suitable for all freely trickling or hardly flowing bulk goods and for goods that tend to bridge, felting or crusting.

Tehnical Specifications:

Materials /

Housing:	Alu pressure casting (Standard), stainless steel (Option)
Sealing ring:	NBR (optionally Viton or PTFE)
Shaft and Vane:	stainless steel 1.4301 (optionally 1.4571)
Nuts:	steel, Zn plated

Temperature range /

Ambient temp.:	-20. . .+70°C
Bulk goods temp.:	-25. . .+80°C (Standard) (up to +1000°C with high temp.-option)

Pressure range /	-0.5. . .+ 5 bar (Standard), (optional -0,9. . .+10 bar)
Consumption /	4 VA (AC), 4 W (DC)
Switching load /	potential-free change-over 1mA/4VDC to 2A/250VAC
Cable insertion /	1 x M20 x 1,5
RPM /	1rpm, 5 or 8 rpm on request
Protection class /	IP 66, IP65 with control lamp

Seelection guide for measuring vanes:

Lowest bulk weight ρ_b for which the measuring blade can be set.

bulk weight ρ_b in:

Filling level up to 100 mm above measuring blade	kg/l	t/m³
Filling level until blade is completely. covered	t/m³	kg/l

Measuring blade	Blade size	Spring force setting		Measuring vane for opening
		light	medium	
S2 Socket blade	130 x 30	0.2 / 0.35	0.3 / 0.5	G1 ¼", G1 ½" and all flanges
M1 Socket blade	90 x 28	0.15 / 0.3	0.2 / 0.5	G1", G1 ¼", G1 ½" and all flanges
M2 Socket blade	90 x 40	0.1 / 0.2	0.15 / 0.3	G1 ½" and all flanges
T0 Blade T200	68 x 220	0.15 / 0.3	0.25 / 0.5	F70, F100, DN32 PN16, DN100 PN6
T1 Blade T50	98 x 50	0.15 / 0.3	0.25 / 0.5	F100 and DN100 PN6
T2 Blade T100	98 x 100	0.1 / 0.2	0.2 / 0.45	F100 and DN100 PN6
X1 Blade X50	98 x 50	0.15 / 0.3	0.25 / 0.5	F100 and DN100 PN6
X2 Blade X100	98 x 100	0.1 / 0.2	0.2 / 0.45	F100 and DN100 PN6
X3 Blade X200	180 x 100	0.025 / 0.05	0.075 / 0.15	Must be fitted from inside after mounting the housing
K1 Hinged Blade T230	200 x 30	0.05 / 0.08	0.07 / 0.12	G1 ¼", G1 ½" and all flanges
SG Blade	126 x 8	0.45 / 0.55	0.65 / 0.75	G1 ¼", G1 ½" and all flanges
TG Blade	98 x 8	0.5 / 0.6	0.7 / 0.8	F100 and DN100 PN6

All values given are approximate values and depend on the characteristics of the bulk goods such as consistency and flow behaviour, for example.

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Ordering Codes:

Order number	DF-02.	1.	0.	1.	0.	1.	1.	1.	3.	1.	1.	0.	0

DF-02 Rotating Vane Level Switch

Housing /
1 = aluminium compact housing
2 = stainless steel round housing

Ex approval /
0 = none
1 = dust Ex ATEX II 1D T70°C IP66 (always with function or voltage monitoring)

Operating voltage /
1 = 220-240 VAC, 50-60 Hz
2 = 110-120 VAC, 50-60 Hz
3 = 48 VAC, 50-60 Hz
4 = 24 VAC, 50-60 Hz
5 = 24 VDC +10%/-15%

Self-monitoring /
0 = none
1 = function monitoring
2 = voltage monitoring

Signal lamps /
1 = standard with function LEDs on board
2 = calotte for function LEDs (not for Ex-version)
3 = signal lamps LED green (not for Ex-version)
4 = large signal lamps LED, green (not for Ex-version)

Bulk material temperature (max. -25°C to 45°C for dust Ex version) /
1 = standard -25. . .+80°C
2 = -40. . .+150°C
3 = -25. . .+200°C
4 = -25. . .+260°C
5 = -25. . .+500°C
6 = up to +1000°C on request

Vessel pressure /
1 = standard -0.5. . .+5 bar (-80. . .+80mbar for dust Ex version)
2 = -0.5. . .+10 bar
3 = -0.9. . .+10 bar

Process connection /
1 = G 1"-male
2 = G1 ¼"-male
3 = G1 ½"-male
4 = M30x1.5-male
5 = M32x1.5-male
6 = flange F70, diameter 110 mm, 4 holes with diameter of 9 mm, hole circle 90 mm
7 = flange F100, 150x150 mm, 4 holes with diameter of 18 mm, hole circle 170 mm
8 = flange DN32 PN10 (stainless steel only)
9 = flange DN100 PN6 (stainless steel only)

Material for process connection /
1 = aluminium
2 = stainless steel 1.4301

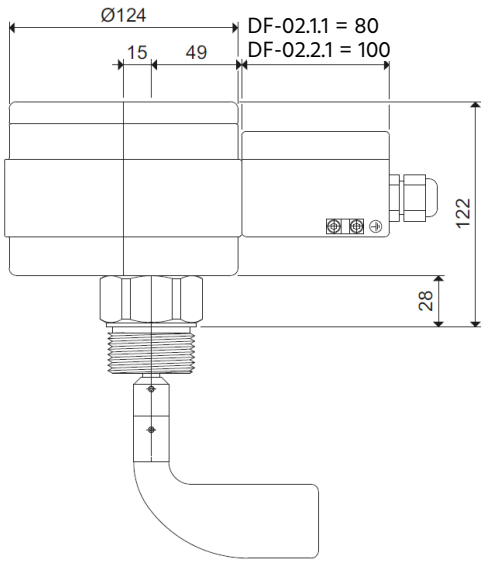
Measuring vane /
0 = no measuring vane
1 = S2 bushing vane 130x30 mm inclined, fits through G1 ¼" and G1 ½" and all flange variants
2 = M1 bushing vane 90x28 mm, fits through G1", G1 ¼" and G1 ½" and all flange variants
3 = M2 bushing vane 90x40 mm, fits through G1 ½" and all flange variants
4 = T50 vane 98x50 mm, fits through flanges F100 and DN100
5 = T100 vane 98x100 mm, fits through flanges F100 and DN100
6 = X50 vane 98x50 mm, fits through flanges F100 and DN100
7 = X100 vane 98x100 mm, fits through flanges F100 and DN100
8 = X200 vane 180x100 mm, must be fitted from inside after mounting the housing
9 = TO flat paddle 68x220 mm, fits through flanges F70, F100 and DN100
10= SG L rod vane for very rough bulk material mm, fits through G1 ¼" and G1 ½" and all flange variants
11 = TG T rod vane for very rough bulk material mm, fits through flanges F100 and DN100
12= T230 flap vane 200x30 mm, fits through G1 ¼", G1 ½" and all flange variants

Measuring vane reinforcement (for bushings and T vanes only) /
0 = no reinforcement
1 = with reinforcement

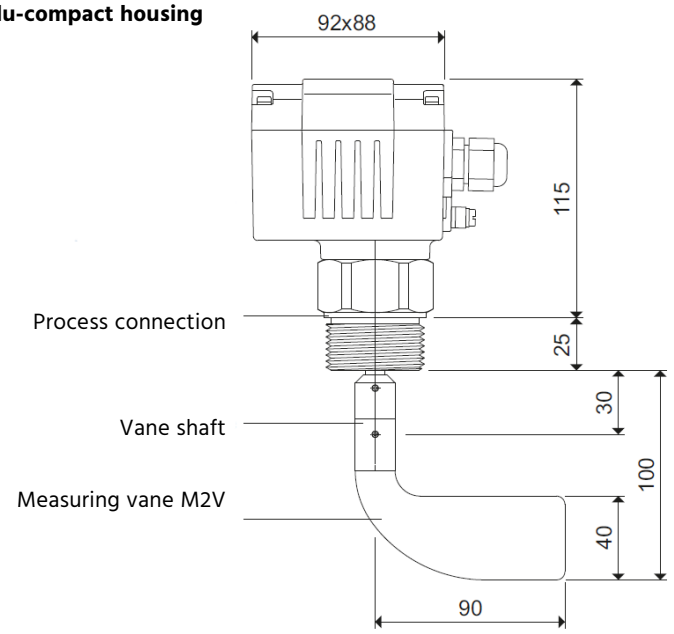
Options /
0 = no options
1 = sideways mounting with reinforced bearing
2 = with flexible wire rope extension (specify length in detailed text)
3 = with rigid shaft extension (specify length in detailed text)

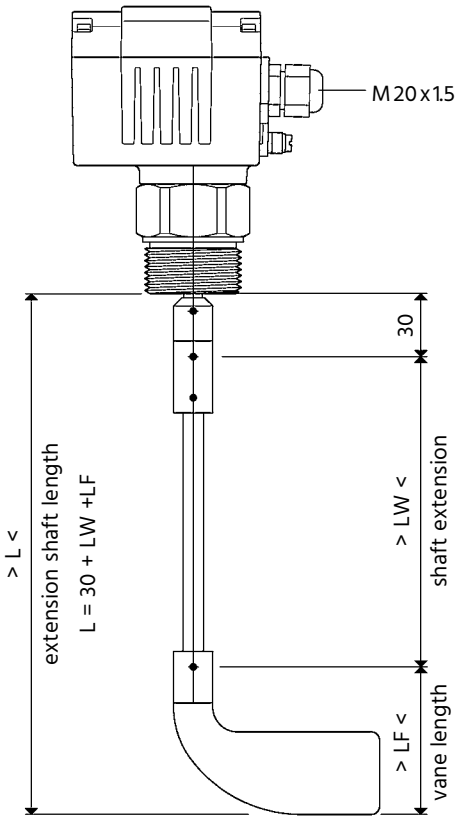
Dimensions and versions in mm:

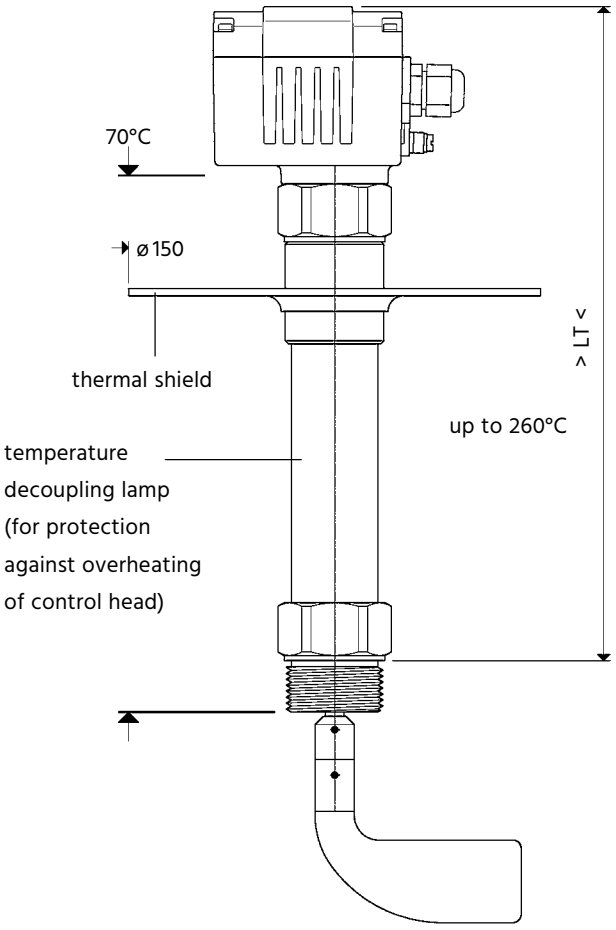
St. steel rounded housing



Alu-compact housing



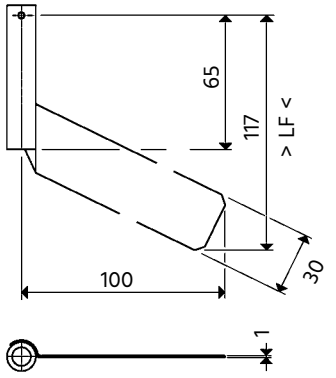




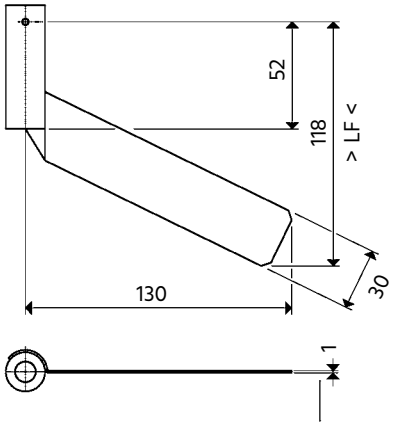
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Flame protection for all measuring vanes shown: **II 1GD c IIC TX**

S1 bushing blade

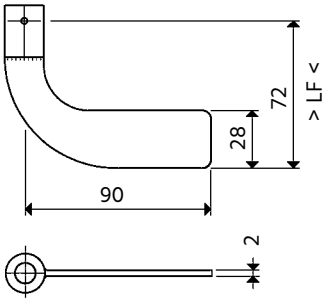


S2 bushing blade

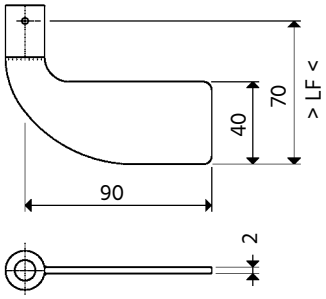


2mm for S2V bushing vane, reinforced

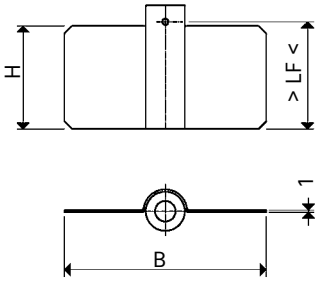
M1V bushing blade, reinforced



M2V bushing blade, reinforced



T - blade

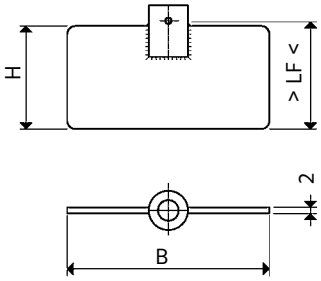


	B	H	LF
T1	98	50	52
T2	98	100	102
T3	200	100	102
T5	250	100	102
T8*	250	100	102

* vanes 10 mm thick

made of rubber NBR, black

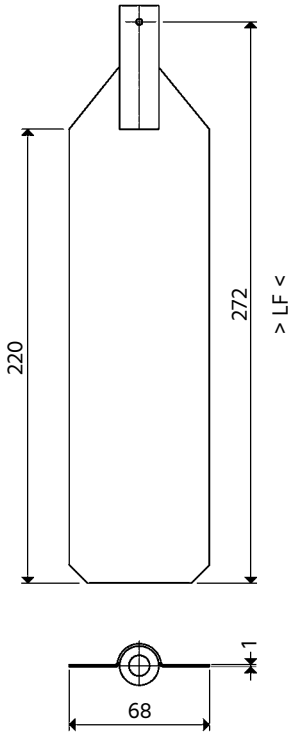
T - blade, reinforced



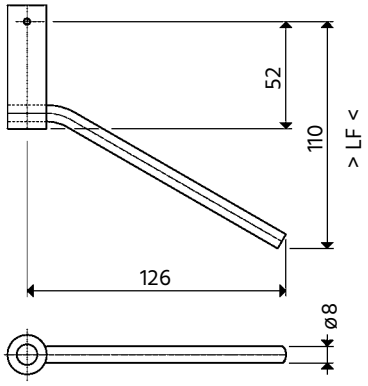
	B	H	LF
T1V	98	50	52
T2V	98	100	102

Flame protection for all measuring vanes shown: **II 1GD c IIC TX**

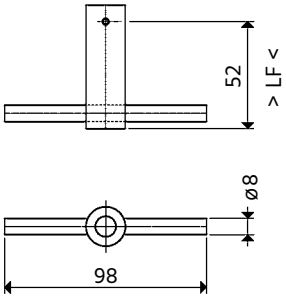
TO blade



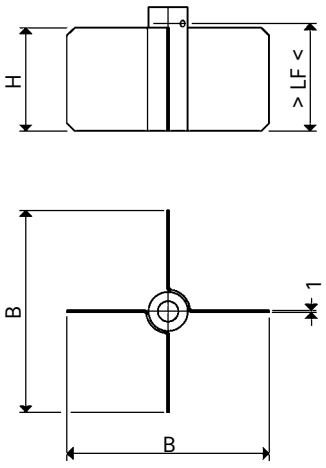
SG bushing blade, reinforced



TG blade, reinforced

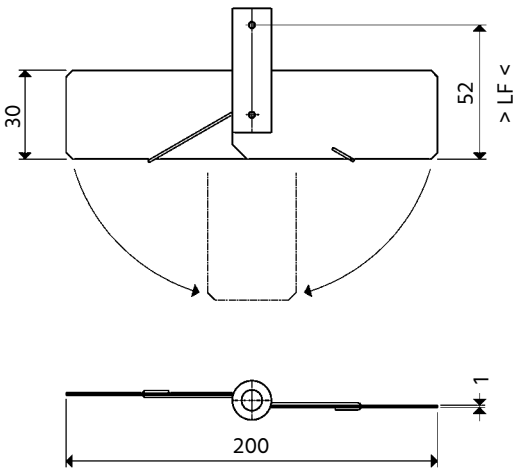


X blade



	B	H	LF
X1	98	50	52
X2	98	100	102
X3	180	100	102

K1 flap-blade



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MS-04

Membrane Level Switch for Bulk Goods

Description:

The MS-04 series of membrane level switches consists of a plastic or aluminium housing with a membrane held in place by a fastening ring. They are mounted aligned into the vessel wall and, therefore, do not project into the vessel. The bulk material applies pressure against the membrane which is prestressed by a spring and thereby actuates a micro-switch. Depending on the type of bulk material and its weight, the devices can be supplied with different membrane diameters and membrane material.

Application:

The device is suitable for all freely trickling or hardly flowing bulk materials in non-pressurized vessels.

Features

/ Can be used as full & empty detector
/ Easy to assemble
/ Does not require space in the vessel
/ Neopren, Viton or stainless steel membranes
/ High temp. version up to 200°C
/ Output signal: change-over contact with high switching cap. (4 A / 250 V)

Technical Specifications:

Material /

Housing:	plastic, fiber glass reinforced or aluminium
Membrane:	NBR, Viton or stainless steel
Mounting ring:	aluminium, Zn plated steel or st. steel

Mounting position / any

Pressure range / for non-pressurized vessels

Overpressure security / 1 bar

Switching load / potential-free change-over contact 4 A / 250 VAC

Switching voltage / 24 V. . .250 VAC or 12 V. . .125 VDC

Cable insert / screw joint M20 x 1.5

Protection class / IP 40
IP 53 if compensating filter is downwards
IP 65 with stainless steel membrane
IP 66 with aluminium housing and stainless steel membrane
(MS-04.B max. IP 65)

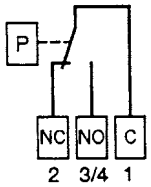
Temperature range /

Type	Membrane	Bulk temperature
MS-04.E	NBR / Viton stainless steel 1.4301	-20. . .+60 °C (housing aluminium +80°C)
MS-04.F	NBR / Viton	-20. . .+60 °C (housing aluminium +80°C)
MS-04.B	NBR Viton stainless steel 1.4301	-20. . .+80 °C -20. . .+150 °C -20. . .+200 °C
MS-04.D	NBR / Viton	-20. . .+70 °C

Possible Combinations:

Type	Membrane	Mounting ring	Housing
MS-04.E	NBR / Viton / SS	Zn-plated steel / SS	plastic
MS-04.E	SS	SS	aluminium
MS-04.F	NBR / Viton	Zn-plated steel / SS	plastic
MS-04.F	SS	SS	aluminium
MS-04.B	NBR / Viton / SS	aluminium / SS	aluminium
MS-04.D	NBR / Viton	Zn-plated steel / SS	plastic

Electrical Connection:



Ordering Codes:

Order number	MS-04.	E.	N.	N.	K

MS-04 Membrane Level Switch

Housing design /
E = Ø 128 mm, standard version
F = Ø 128 mm, construction for larger vessel wall thickness
B = Ø 187 mm, construction for high temperature
D = Ø 128 mm, construction with double-membrane

Membrane material /
N = NBR
V = Viton
E = stainless steel 1.4301 (with mounting ring in stainless steel only)

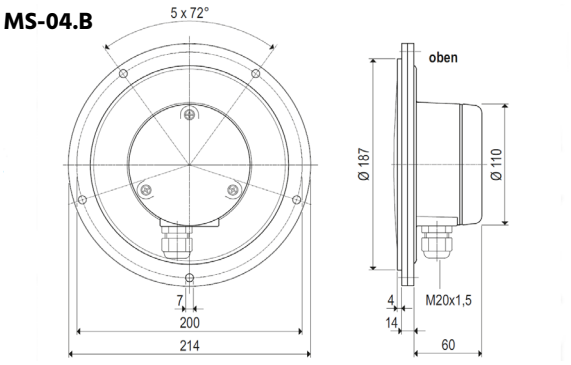
Mounting ring /
A = aluminium
N = Zn-plated steel
E = stainless steel 1.4301

Housing /
A = aluminium
K = plastic (fiberglass reinforced)

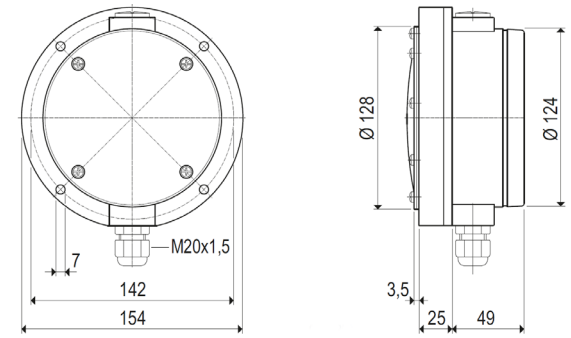
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Dimensions in mm:

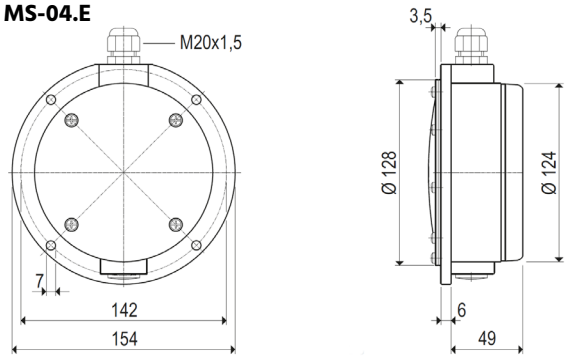
MS-04.B



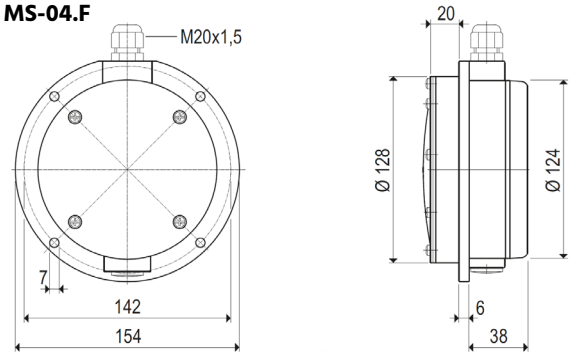
MS-04.D top



MS-04.E



MS-04.F



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HP-30

Pneumatic Manual Testing Pump for Pressure Device Calibration



Features

/ Complete with box and accessories

/ Can be combined with different testing devices

/ Wide range of pressure

/ Smooth-running precision adjustment

Description:

Calibration manual testing pump is intended for generating pressure for the purpose of inspection, adjustments and calibration of mechanical and electronic pressure gauges by using reference measurements. At the top end of the pump, an analogous or digital reference pressure gauge is screw mounted and, at the same time, the test piece is connected on the side by means of a hose included in the delivery. On activating the pump, equal pressure is exerted on both the devices. Subsequently, the test piece can be compared with the reference device and, if necessary, settings or calibration adjustments can be made. First, considerable amount of pressure is built up by a pincer mechanism; the testing pressure is then set accurately by means of an easily adjustable precision regulating valve.

Application:

Despite its compact size, the calibration manual testing pump HP-30 facilitates testing pressure generation easily and accurately. It features also a reversing switch for generating vacuum. Therefore, pressure switches, pressure gauges (manometers) and pressure sensors can be tested or set within the range of -0.95. . .+40 bar where air is used as the testing medium. As against hydraulic testing pumps, this offers a simple and neat solution.

Technical Specifications:

Pressure generation /	0. . .40 bar
Vacuum generation /	0. . .-0,95 bar
Delivery connections /	G1/2"-female (free-wheel swivel nut with sealing) for reference device. G1/4-female at the end of the testing hose for the test piece
Material /	Anodized aluminium, brass (partly nickel-plated)
Testing pressure settings /	Fine regulating valve (large volume variator)
Dimensions /	approx. 220 x 105 x 63 mm
Weight /	approx. 510 g
Series range of supply /	• Calibration manual pump HP-30 with selected reference device • test piece connecting hose • user manual • robust plastic material box with contoured foam-rubber padding
Optional accessories /	Adapter and sealing sets for test piece NO-contact, maintenance set for HP-30 (O rings, sealings etc.)
Higher pressures /	Hydraulic testing pumps on request

Ordering Codes:

Order number	**HP-30.**	**1.**	**1**

HP-30 Manual Testing Pump

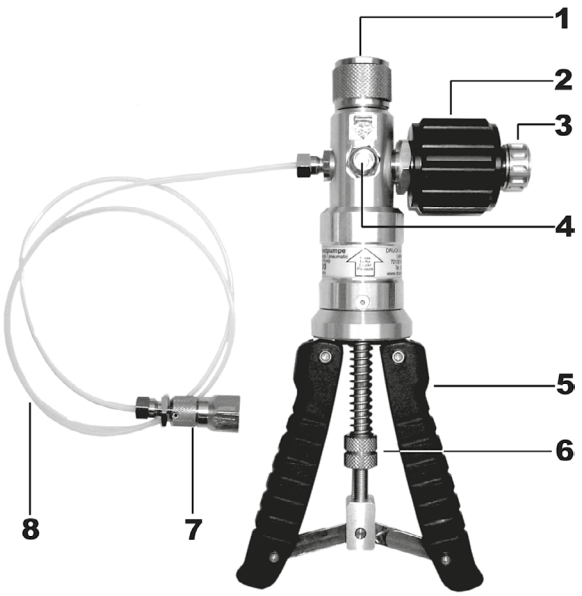
Reference Pressure Device /

0 = none
1 = p. gauge 63 mm Cl. 1.0 with fine grade from 0. . .+2 bar/ 0. . .+30 PSI
2 = p. gauge 63 mm Cl. 1.0 with fine grade from 0. . .+11 bar/ 0. . .+160 PSI
3 = p. gauge 63 mm Cl. 1.0 with fine grade from 0. . .+25 bar/ 0. . .+365 PSI
4 = p. gauge 63 mm Cl. 1.0 with fine grade from 0. . .+40 bar/ 0. . .+600 PSI
5 = p. gauge 63 mm Cl. 1.0 with fine grade from -1. . .0 bar/ -30. . .0 in HG
6 = p. gauge 63 mm Cl. 1.0 wfg from -1. . .+39 bar/ -30 in HG to +580 PSI
7a = digital precision pressure gauge from op. range of 0. . .+40 bar accuracy ± 0.25% FS (IEC 60770)
7b = digital precision pressure gauge from operating range of 0. . .+40 bar accuracy ± 0.5% FS (IEC 60770)
8a = digital precision pressure gauge from operating range of -1. . .+3 bar accuracy ± 0.25% FS (IEC 60770)
8b = digital precision pressure gauge from operating range of -1. . .+3 bar accuracy ± 0.5% FS (IEC 60770)
9a = digital precision pressure gauge from operating range of -1. . .+39 bar accuracy ± 0.25% FS (IEC 60770)
9b = digital precision pressure gauge from operating range of -1. . .+39 bar accuracy ± 0.5% FS (IEC 60770)

Accessories /

0 = none
1 = pipe thread adapter set for connecting the test piece
2 = NPT thread adapter set for connecting the test piece
3 = metric adapter and MINIMESS for connecting the test piece

Setup:



(1) Free-wheel reference device NO-contact G1/2"-female along with sealing
(2) Fine regulating valve
(3) Release valve
(4) Reversing switch for pressure/vacuum generation
(5) Pump handles
(6) Adjustable knurled nut for setting pump output
(7) Test piece NO-contact G1/4"-female, free-wheel with sealing
(8) Test piece connecting hose

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PM-63N

Bourdon Pressure Gauge



Features

/ Quality class 1.6

/ Brass or VA movement

/ Filled or unfilled

/ Protection class IP65 / IP54

Description:

Bourdon pressure gauges in the PM-63N series can be supplied in brass or stainless steel designs in filled or unfilled conditions. A drawn brass or stainless steel pipe shaped into a spiral is filled with the medium which deforms irrespective of the pressure. This movement is indicated by a measuring instrument which can be attenuated by the glycerin filling available optionally so that vibrations are heavily mellowed down. The natural lubricating action of glycerin reduces the wear and tear of moving parts and penetration of corrosive gases and prevents formation of water condensation. The stainless steel version allows measurement of pressure even in the most hostile fluids and gases. The pressure gauges are selectively equipped with a G1/4 B threaded connection at the bottom or centre respectively off-centre at the back.

Application:

Bourdon pressure gauges are used across all types of industrial applications. They are particularly suited for measuring points where no power supply is available. The PM-63N.1 series of pressure gauges is widely used in machine and equipment manufacturing, in pumps, compressors or block-type thermal power plants, since often the requirements on the consistency of media must necessarily be moderate. On the other hand, the PM-63N.2 series of chemical pressure gauges is capable of resisting more hostile media and, therefore, are used frequently in chemical and petrochemical industries, in the food-processing segment, in pharmaceutical production or in power stations where they a proven record of unfailing service for decades.

Technical Specifications:

Accuracy class / quality class 1.6

Protection class / PM-63N.x.1. . . - IP54 as per EN 60529 / IEC 529
PM-63N.x.2. . . - IP65 as per EN 60529 / IEC 529

Sealing + plug / EPDM and PUR

Damping / glycerine

Options / other attenuation fluids, special type scales with customer's logo, other process connections

Load /

Pressure	steady	dynamic	burst
PM-63N.1.1.x..	0.75 x FSV	0.70 x FSV	1.00 x FSV
PM-63N.1.2.x..	1.00 x FSV	0.90 x FSV	1.30 x FSV
PM-63N.2.1.x..	1.00 x FSV	0.90 x FSV	1.30 x FSV
PM-63N.2.2.x..	1.00 x FSV	0.90 x FSV	1.30 x FSV

Temperature /

Temperature	max. Media temperature	Ambient temperature
PM-63N.1.1..	+60°C	-25. . .+ 60°C
PM-63N.2.1..	+200°C	-40. . .+ 60°C
PM-63N.1.2..	+60°C (>100 bar +100°C)	-25. . .+ 60°C
PM-63N.2.2..	+ 100°C	-25. . .+ 60°C

Temperature error /

Temperature error, T_{Ref} 20°C
rising: + 0.3% FS / 10K
falling: - 0.3% FS / 10K

Materials /

Material	Housing	Window
PM-63N.1.1.x..	black carbon steel, plastic resp. st. steel	instrument acrylic glass
PM-63N.1.2.x..	st. steel	polycarbonate
PM-63N.2.1.x..	st. steel	laminated safety-glass
PM-63N.2.2.x..	st. steel	laminated safety-glass

Material	Sensor element	Dial
PM-63N.1.1.x..	up to 60 bar circular bourdon ab 60 bar helix bourdon	white aluminium / white plastic, black scale and lettering as per EN 837-1
PM-63N.1.2.x..	up to 100 bar, CuSn8, soft-soldered from 100 bar, st. steel - 1.4404, hard-soldered	white aluminium, black scale and lettering as per EN 837-1
PM-63N.2.x..	st. steel 1.4404	white aluminium, black scale and lettering as per EN 837-1

Material	Motion work	Pointer
PM-63N.1.x..	Bottom and cover-parts from brass, moving parts argentan	black aluminium / black plastic
PM-63N.2.x..	st. steel	black aluminium

Ordering Codes:

Order number	PM-63N.	2.	2.	1.	0.	Q

PM-63N Bourdon Pressure Gauge

Version /
1 = brass
2 = fully stainless steel for chemical applications

Damping /
1 = no glycerin filling
2 = with glycerin filling

Process connection /
1 = G1/4" B at the bottom
2 = G1/4" B back, centred (PM-63N.1.), back, off-centre (PM-63N.2)

Fastening rim (see table for possible combination) /
0 = none
1 = 3 hole front ring
2 = rear edge for wall-mounting
3 = 3 rimmed front ring with clamp

Operating range /
A = 0 . . . 0.6 bar (PM-63N.1.1 only)
B = 0 . . . 1 bar
C = 0 . . . 1.6 bar
D = 0 . . . 2.5 bar
E = 0 . . . 4 bar
F = 0 . . . 6 bar
G = 0 . . . 10 bar
H = 0 . . . 16 bar
I = 0 . . . 25 bar
J = 0 . . . 40 bar
K = 0 . . . 60 bar
L = 0 . . .100 bar
M = 0 . . . 160 bar
N = 0 . . . 250 bar
O = 0 . . . 400 bar
P = 0 . . . 600 bar
Q = 0 . . . 1000 bar (not for PM-63N.1.1)
S = -1 . . . 0 bar
T = -1 . . . +0.6 bar
U = -1 . . . +1.5 bar
V = -1 . . . +3 bar
W = -1 . . . +5 bar
X = -1 . . . +9 bar
Y = -1 . . . +15 bar

Front ring /

	3-hole Front ring	rear edge	3-rimmed-Front ring
PM-63N.1.1.1..	-	OK	-
PM-63N.1.1.2..	OK	-	OK
PM-63N.1.2.1..	OK	OK	-
PM-63N.1.2.2..	OK	-	OK
PM-63N.2.1.1..	OK	OK	-
PM-63N.2.1.2..	OK	OK	OK
PM-63N.2.2.1..	OK	OK	-
PM-63N.2.2.2..	OK	OK	OK

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PM-100N

Bourdon Pressure Gauge



Features

/ Quality class 1.0

/ Stainless steel housing

/ Brass or SS movement

/ Filled or unfilled

/ Protection class IP65 / IP54

Description:

Bourdon pressure gauges in the PM-100N series can be supplied in brass or stainless steel versions in filled or unfilled condition. A drawn brass or stainless steel pipe shaped into a spiral is filled with the medium which deforms irrespective of the pressure. This movement is indicated by a measuring instrument which can be attenuated by the glycerin filling available optionally so that vibrations are heavily mellowed down. The natural lubricating action of glycerin reduces the wear and tear of moving parts and penetration of corrosive gases and prevents formation of water condensation. The stainless steel design allows measurement of pressure even in the most hostile fluids and gases. The pressure gauges are selectively equipped with a G1/4 B threaded connection at the bottom or eccentrically at the back. On request, they can be fitted with up to two magnetic spring or inductive contacts. We supply also pressure gauges in larger nominal sized such as 6" (160 mm) or 10" (250 mm), or special designs of 4" (100 mm) and 2.5" (63 mm) devices. Please contact us in this regard.

Application:

Bourdon pressure gauges are used across all types of industrial applications. They are particularly suited for measuring points where no electrical power supply is available. The PM-100N.1 series of pressure gauges is widely used in machine and equipment manufacturing, in pumps, compressors or block-type thermal power plants, since often the requirements on the consistency of media must necessarily be moderate. On the other hand, the PM-100N.2 series of chemical pressure gauges is capable of resisting more hostile media and, therefore, are used frequently in chemical and petrochemical industries, in the food-processing segment, in pharmaceutical production or in power stations where they a proven record of unfailing service for decades. The PM-100N pressure gauges optionally equipped with switching contacts can also be used for electronic pressure monitoring.

Technical Specifications:

Accuracy class / Quality class 1.0

Protection class / PM-100N.x.1 - IP54 as per EN 60529
PM-100N.x.2 - IP65 as per EN 60529

Seal and Plug / PUR

Damping / glycerine

Options / other attenuation fluids, special type scales with customer's logo, other process connections

Load /

Pressure	steady	dynamic	burst
PM-100N.x.x..	1.00 x FSV	0.90 x FSV	1.30 x FSV

Temperature /

Temperature	max. Media temperature	Ambient temperature
PM-100N.1.1..	+80 (>100 bar +120°C)	-40. . . +60°C
PM-100N.2.1..	+200°C	-40. . .+60°C
PM-100N.1.2..	+60°C (>100 bar +100°C)	-25. . .+60°C
PM-100N.2.2..	+ 100°C	-25. . .+60°C

Temperature error /

Temperature error, T_{Ref} 20°C
rising: + 0.3% FS / 10K
falling: - 0.3% FS / 10K

Material /

Material	Housing	Window
PM-100N.1.1.x.	st. steel	instrument glass
PM-100N.1.2.x.	st. steel	laminated safety-glass
PM-100N.2.x.x.	st. steel	laminated safety-glass

Material	Sensor element	Dial
PM-100N.1.x..	up to 100 bar, CuSn8 - 2.1030, soft soldered from 100 bar, st. steel - 1.4404, hard soldered	white aluminium, black scale and lettering as per EN 837-1
PM-100N.2.x..	st. steel 1.4404	white aluminium, black scale and lettering as per EN 837-1

Material	Motion work	Pointer
PM-100N.1.x..	Bottom and cover-parts from brass, moving parts argentan	black aluminium (PM-100N.1.1 plastic)
PM-100N.2.x..	stainless steel	black aluminium

Ordering Codes:

Order number	PM-100N.	2.	2.	1.	0.	Q

PM-100N Bourdon Pressure Gauge

Version /
1 = brass measuring instrument
2 = full stainless steel version for chemical applications

Damping /
1 = no glycerin filling
2 = with glycerin filling

Process connection /
1 = G1/2 B at the bottom
2 = G1/2 B excentrically at the back

Fastening rim (see table for possible combination) /
0 = none
1 = 3 hole front ring
2 = rear edge for wall-mounting
3 = 3 rimmed front ring with clamp

Operating range /
A = 0. . .0.6 bar
B = 0. . .1 bar
C = 0. . .1.6 bar
D = 0. . .2.5 bar
E = 0. . .4 bar
F = 0. . .6 bar
G = 0. . .10 bar
H = 0. . .16 bar
I = 0. . .25 bar
J = 0. . .40 bar
K = 0. . .60 bar
L = 0. . .100 bar
M = 0. . .160 bar
N = 0. . .250 bar
O = 0. . .400 bar
P = 0. . .600 bar
Q = 0. . .1000 bar
R = 0. . .1600 bar*
R2 = 0. . .2500 bar*
S = -1. . .0 bar
T = -1. . .+0.6 bar
U = -1. . .+1.5 bar
V = -1. . .+3 bar
W = -1. . .+5 bar
X = -1. . .+9 bar
Y = -1. . .+15 bar

* only for chemical version (PM-100N.2.x.x.x)

Front ring /

	3-hole Front ring	rear edge	3-rimmed-Front ring
PM-100N.1.1.1..	OK	OK	-
PM-100N.1.1.2.	OK	OK	OK
PM-100N.1.2.1..	OK	OK	-
PM-100N.1.2.2..	OK	OK	OK
PM-100N.2.1.1..	OK	OK	-
PM-100N.2.1.2..	OK	OK	OK
PM-100N.2.2.1..	OK	OK	-
PM-100N.2.2.2..	OK	OK	OK

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PK-01

Capsule Element Pressure Gauge



Features

/ Quality class 1.6

/ Millibar range

/ Anti-corrosive

/ Zero point correction

Description:

The PK-01 capsule element pressure gauges are intended for measuring small, negative and positive overpressures in gaseous media. The measuring element in such a device comprises two diaphragm halves that are joined by welding. These actuate an indicator when pressure is exerted on them inside which is then display the system pressure on a scale made of aluminium. The standard versions of the devices supplied are made of brass; however, optionally they can be fitted with a stainless steel movement. Also another version with 10x overpressure safety can be delivered. The available housing sizes are 2.5" (63 mm), 4" (100 mm) or 6" (160 mm) with stainless steel housing provided with connections radially at the bottom or centrally at the back. On request, other versions can be supplied.

Application:

Capsule element pressure gauges are optimally suited for measuring very small pressures in gaseous media. Typical applications are found in medical engineering, air-conditioning, in production of gas or in laboratories. For example, the applications are for leak detection, filter status measuring, emission measuring or, using the stainless steel version, for monitoring hostile and corrosive media.

Technical Specifications:

Accuracy class / quality class 1.6

Zero point adjustment / adjusting screw in dial

Protection class / IP54 as per EN 60529 / ICE 529

max. Pressure / < 25 mbar, 6 x full scale value
≥ 25 mbar, 10 x full scale value
(the max. possible low pressure value for vacuum ranges is the specified value of the reading)

Sealing and plug / EPDM and PUR

Options /
- restrictor screw in connector
- vacuum safety
  < 25 mbar 3-times,
  > 25 mbar 10-times
- red mark on dial

Temperature /

Temperature	max. Media temp.	Ambient temp.
PK-01.x..	+100°C	-25. . .+ 60°C

Temperature error /

Temperature error, T_{Ref} 20°C
Rising temperature: + 0,3% FS / 10K
Falling temperature: - 0,3% FS / 10K

Materials /

Material	Housing	Window
PK-01.1.1-2..	round case, stainless steel	acrylic glass
PK-01.1.3-6..	round case, stainless steel	instrument glass
PK-01.2.1-2..	round case, stainless steel	acrylic glass
PK-01.2.3-6..	round case, stainless steel	laminated safety glass

Material	Measuring element	Instrument dial
PK-01.1.x..	capsule, copper alloy	white aluminium, black scale and lettering as per EN 837-1
PK-01.2.x..	laser welded capsule, st. steel 1.4571	white aluminium, black scale and lettering as per EN 837-1

Material	Motion work	Pointer
PK-01.1.x..	Bottom and cover-parts from brass, moving parts argentan	black aluminium
PK-01.2.x..	stainless steel	black aluminium

Ordering Codes:

Order number	PK-01.	2.	2.	0.	17

PK-01 Capsule Element Pressure Gauge

Version /
1 = brass
2 = chemical version completely st. steel

Nominal size /
1 = DN63, G 1/4" B radial, bottom
2 = DN63, G 1/4" B central, back
3 = DN100, G 1/2" B radial, bottom
4 = DN100, G 1/2" B central, back
5 = DN160, G 1/2" B radial, bottom
6 = DN160, G 1/2" B central, back

Fastening rim (see table for combinations) /
0 = none
1 = 3 hole front ring
2 = rear edge for wall-mounting
3 = 3 rimmed front ring with clamp

Operating ranges /
01 = -25. . .0. . .+15 mbar
02 = -20. . .0. . .+40 mbar
03 = -40. . .0. . .+20 mbar
04 = -6. . .0 mbar (only for nominal size 160)
05 = -10. . .0 mbar (only for nominal size 100 and 160)
06 = -16. . .0 mbar (only for nominal size 100 and 160)
07 = -25. . .0 mbar
08 = -40. . .0 mbar
09 = -60. . .0 mbar
10 = -100. . .0 mbar
11 = -160. . .0 mbar
12 = -250. . .0 mbar
13 = -400. . .0 mbar
14 = 0. . .6 mbar (only for nominal size 160)
15 = 0. . .10 mbar (only for nominal size 100 and 160)
16 = 0. . .16 mbar (only for nominal size 100 and 160)
17 = 0. . .25 mbar
18 = 0. . .40 mbar
19 = 0. . .60 mbar
20 = 0. . .100 mbar
21 = 0. . .160 mbar
22 = 0. . .250 mbar
23 = 0. . .400 mbar
24 = 0. . .600 mbar

Front ring /

	3-hole Front ring	rear edge	3-rimmed-Front ring
PK-01.x.1..	OK	OK	-
PK-01.x.2..	OK	OK	OK
PK-01.x.3..	OK	OK	-
PK-01.x.4..	OK	OK	OK
PK-01.x.5..	OK	OK	-
PK-01.x.6..	OK	OK	OK

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PF-01

Diaphragm Pressure Gauge



Features

/ Highly viscous media

/ Crystallizing media

/ Resistant to shocks and vibrations

/ Highly safe on overpressure

Description:

The diaphragm springs are thin, circular and wavy membranes that are fixed between two crimped rings and impacted by the media on one side. The membrane deflection due to pressure exerted by the media is utilized to display the pressure by means of an indicator element. Diaphragm pressure gauges are resistant to vibrations and, optionally, they are available with safeguards against high overpressure. As the diaphragms are suitably coated, the devices can be used even under very rough conditions and hostile materials.

Application:

Thanks to their design principle and product material, diaphragm pressure gauges meet any rigorous requirements that are encountered when deployed in industrial production plants. Open connecting flanges allow their use for highly viscous, crystallizing and polluted media since in this version there is no clearance volume which may cause build up of deposits. Diaphragm pressure gauges are widely used in food-processing and beverage industries as well as in the manufacturing of machines, installations and plants.

Technical Specifications:

Accuracy class / quality class 1.6

Protection class / IP54 as per EN 60529 / IEC 529

Plug / PUR

Connection / G1/2" B at the bottom per EN 837-3,
PF-01.A brass, PF-01.B-D of st. steel

Options /
- medium safe 200°C,
- glycerin filling,
- open flange,
- membrane coating,
- other connection threads,
- overload safe, 10 times,
  but maximum 40 bar

Pressure /

Pressure	steady	dynamic	burst
PF-01.x..	1.00 x ME	0.90 x ME	5.00 x ME max. 40 bar

Temperature /

Temperature	max. Media temp.	Ambient temp.
PF-01.x..	+100°C	-25. . .+ 60°C

Temperature error /

Temperature error, T_{Ref} 20°C
rising: + 0.5% FS / 10K

falling: - 0.5% FS / 10K

Material /

Material	Housing	Window
PF-01.A.x..	round case, st. steel	instrument glass
PF-01.B.x..	round case, st. steel with pressure relief	laminated safety glass
PF-01.C.x..	round case, st. steel with pressure relief	laminated safety glass
PF-01.D.x.. (safety version)	round case, st. steel, with solid baffle wall and blow-out back	laminated safety glass

Material	Sensor element	Dial
PF-01.A.x..	upper and lower flange: aluminium diaphragm: stainless steel 1.4571 diaphragm sealing ring: NBR	white aluminium, black scale and lettering as per EN 837-3
PF-01.B.x..	upper flange: aluminium lower flange: stainless steel 1.4571 diaphragm: stainless steel 1.4571 diaphragm sealing ring: FPM	white aluminium, black scale and lettering as per EN 837-3
PF-01.C.x..	upper and lower flange: 1.4571 diaphragm: stainless steel 1.4571 diaphragm sealing ring: FPM	white aluminium, black scale and lettering as per EN 837-3
PF-01.D.x.. (safety version)	upper and lower flange: 1.4571 diaphragm: stainless steel 1.4571 diaphragm sealing ring: FPM	white aluminium, black scale and lettering as per EN 837-3

Material	Motion work	Pointer
PF-01.A–B.x..	Bottom and cover-parts from brass, moving parts argentan	black aluminium
PF-01.C–D.x..	stainless steel	black aluminium

Ordering Codes:

Order number **PF-01. A. 1. 17**

PF-01 Diaphragm Pressure Gauge

Version /
A = Upper and lower flange made of aluminium
B = Upper flange in al., lower flange in st. steel 1.4571
C = Upper and lower flange made of st. steel 1.4571
D = Upper and lower flange made of st. steel 1.4571 Safety

Nominal size /
1 = DN100
2 = DN160

Operating range /
01a = -0.6. . .0 bar
02 = -1. . . 0 bar
03 = -0.6. . .0. . .+1.0 bar
04 = -1. . .0. . .+0.6 bar
05 = -1. . .0. . .+1.5 bar
06 = -1. . .0. . .+3 bar
07 = -1. . .0. . .+5 bar
08 = -1. . .0. . .+9 bar
09 = -1. . .0. . .+15 bar
10a = -1. . .0. . .+24 bar
11 = 0. . .0.6 bar
12 = 0. . .1 bar
13 = 0. . .1.6 bar
14 = 0. . .2.5 bar
15 = 0. . .4 bar
16 = 0. . .6 bar
17 = 0. . .10bar
18 = 0. . .16 bar
19 = 0. . .25 bar
20 = 0. . .40 bar
21 = 0. . .10 mbar
22 = 0. . .16 mbar
23 = 0. . .25 mbar
24 = 0. . .40 mbar
25 = 0. . .60 mbar
26 = 0. . .100mbar
27 = 0. . .160mbar
28 = 0. . .250mbar
29 = 0. . .400mbar

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PM-2000

Magnehelic® - Differential Pressure Gauge for Cases



Features

/ Proven and renowned technology

/ Resistant to shocks and vibrations

/ Accuracy class 2%

/ All common operating ranges and units

/ Ideally suited for filter monitoring

/ Panel mounting

Description:

The PM-2000 differential pressure gauge used in thousands operates according to the Magnehelic principle. In this, the rear side of a membrane is loaded with the positive while the front side of the membrane is loaded with the negative connection to a differential pressure which causes a mechanical deflection. The membrane is equipped with a U-shaped permanent magnet where its mechanical movement is transferred without touch to a similarly magnetic helix at the end of which directly the indicator of PM-2000 is located. The membrane deflection is, therefore, directly proportional to the indicator movement and the operating range only depends on the membrane's material properties. During such transfer of movement there are no losses due to friction; with the result even the smallest differences in pressure can be captured. The movement and the scale are located in an extremely robust aluminium housing that is suitable for mounting on a switch panel. The indicator made of aluminium has a red, clearly visible tip and is sapphire-mounted to withstand shocks. The housings are fitted with a overpressure plug made of silicon rubber for protection against overpressure in models capable up to 100 kPa. The indicator stoppers are made of rubber which prevent damage to the indicator in case of wide deflections. In every PM-2000, the user can readjust the zero point for the device by means of a setting screw that is mounted directly in the plastic cover.

Application:

The PM-2000 differential pressure gauges are used in large numbers for monitoring air filters and air speeds. Their unique construction allows measurement of even the smallest variations in pressures in fans and blowers, blood or respiratory pressures, overpressure in rows of chimneys, pressure drop in pressure plates and in many other situations. The extraordinarily robust construction with high degree of accuracy and variety of operating ranges and units are combined in an affordable product. Optionally, customer-specific scale types, adjustable marking indicators, limiting value display by means of LEDs and a wide choice of accessories are available. The delivery includes tube bushings for connecting to NPT-female of the housing and a complete set of accessories for mounting on a switch panel.

Operating Range Tables /

Model number	Range inch water column	Smallest setting
2000. . .00N[1, 2]	0.05. . .0. . .0.2	0.005
2000. . .00[1, 2]	0. . .0.25	0.005
2000. . .0[1, 3]	0. . .0.5	0.010
2001	0. . .1.0	0.020
2002	0. . .2.0	0.050
2003	0. . .3.0	0.100
2004	0. . .4.0	0.100
2005	0. . .5.0	0.100
2006	0. . .6.0	0.200
2008	0. . .8.0	0.200
2010	0. . .10	0.200
2012	0. . .12	
2015	0. . .15	0.500
2020	0. . .20	0.500
2025	0. . .25	0.500
2030	0. . .30	1.000
2040	0. . .40	1.000
2050	0. . .50	1.000
2060	0. . .60	2.000
2080	0. . .80	2.000
2100	0. . .100	2.000
2120	0. . .120	
2150	0. . .150	5.000
2160	0. . .160	
2180*	0. . .180	
2250*	0. . .250	

Model number	Range mm water column	Smallest setting
2000. . .6MM[1, 2]	0. . .6	0.200
2000. . .10MM[1, 3]	0. . .10	0.200
2000. . .15MM	0. . .15	
2000. . .25MM	0. . .25	0.500
2000. . .30MM	0. . .30	
2000. . .50MM	0. . .50	1.000
2000. . .80MM	0. . .80	2.000
2000. . .100MM	0. . .100	2.000
2000. . .125MM	0. . .125	
2000. . .150MM	0. . .150	
2000. . .200MM	0. . .200	
2000. . .250MM	0. . .250	
2000. . .300MM	0. . .300	

Model number	Range PSI	Smallest setting
2201	0. . .1	0.020
2202	0. . .2	0.050
2203	0. . .3	0.100
2204	0. . .4	0.100
2205	0. . .5	0.100
2210*	0. . .10	0.200
2215*	0. . .15	0.500
2220*	0. . .20	0.500
2230**	0. . .30	1.000

Model number	Range inch water column	Range Pa	Range kPa
2000. . .OOD[1, 2]	0. . .25	0. . .62 Pa	
2000. . .OD[1, 3]	0. . .0.5	0. . .125 Pa	
2001D	0. . .1.0	0. . .250 Pa	
2002D	0. . .2.0	0. . .500 Pa	
2003D	0. . .3.0	0. . .750 Pa	
2004D	0. . .4.0		0. . .1.0 kPa
2005D	0. . .5.0		0. . .1.25 kPa
2006D	0. . .6.0		0. . .1.5 kPa
2008D	0. . .8.0		0. . .2.0 kPa
2010D	0. . .10		0. . .2.5 kPa
2015D	0. . .15		0. . .3.7 kPa
2020D	0. . .20		0. . .5 kPa
2025D	0. . .25		0. . .6.2 kPa
2050D	0. . .50		0. . .12.4 kPa
2060D	0. . .60		0. . .15 kPa

Units with double scale for air speeds /

Model number	Range inch water column	Range air velocity F.P.M.
2000. . .00AV[1, 2]	0. . .0.25	300. . .2000
2000. . .0AV[1, 3]	0. . .0.50	500. . .2800
2001AV	0. . .1.0	500. . .4000
2002AV	0. . .2.0	1000. . .5600
2005AV	0. . .5.0	2000. . .8800
2010AV	0. . .10	2000. . .12500

Zero Center Ranges /

Model number	Range zero center mm water column	Smallest setting
2300. . . 6MM[1, 2]	3. . .0. . .3	
2300. . .10MM[1, 3]	5. . .0. . .5	
2300. . .20MM[1, 3]	10. . .0. . .10	

Model number	Range zero center inch water column	Smallest setting
2300. . .00[1, 2]	0.125. . .0. . .0.125	
2300. . .0[1, 3]	0.25. . .0. . .0.25	0.010
2301	0.5. . .0. . .0.5	0.020
2302	1. . .0. . .1	0.050
2304	2. . .0. . .2	0.100
2310	5. . .0. . .5	0.200
2320	10. . .0. . .10	0.500
2330	15. . .0. . .15	1.000

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Model number	Range cm water column	Smallest setting
2000. . .15CM	0. . .15	0.500
2000. . .20CM	0. . .20	0.500
2000. . .25CM	0. . .25	0.500
2000. . .50CM	0. . .50	1.000
2000. . .80CM	0. . .80	2.000
2000. . .100CM	0. . .100	2.000
2000. . .150CM	0. . .150	5.000
2000. . .200CM	0. . .200	5.000
2000. . .250CM	0. . .250	5.000
2000. . .300CM	0. . .300	10.000

Zero Center Ranges /

2300. . .4CM	2. . .0. . .2	0.100
2300. . .10CM	5. . .0. . .5	0.200
2300. . .30CM	15. . .0. . .15	1.000

Model number	Range kPascal	Smallest setting
2000. . .0.5KPA	0. . .0.5	
2000. . .1KPA	0. . .1	0.020
2000. . .1.5KPA	0. . .1.5	0.050
2000. . .2KPA	0. . .2	0.050
2000. . .2.5KPA	0. . .2.5	
2000. . .3KPA	0. . .3	0.100
2000. . .4KPA	0. . .4	0.100
2000. . .5KPA	0. . .5	0.100
2000. . .8KPA	0. . .8	0.200
2000. . .10KPA	0. . .10	0.200
2000. . .15KPA	0. . .15	0.500
2000. . .20KPA	0. . .20	0.500
2000. . .25KPA	0. . .25	0.500
2000. . .30KPA	0. . .30	1.000

Zero Center Ranges /

2300. . .1KPA	0.5. . .0. . .0.5	0.020
2300. . .2KPA	1. . .0. . .1	
2300. . .2.5KPA	1.25. . .0. . .1.25	
2300. . .3KPA	1.5. . .0. . .1.5	0.100

Model number	Range Pascal	Smallest setting
2000. . .60NPA[1, 2]	10. . .0. . .50	
2000. . .60PA[1, 2]	0. . .60	1.000
2000. . .100PA[1, 3]	0. . .100	2.000
2000. . .125PA[1, 3]	0. . .125	5.000
2000. . .250PA	0. . .250	5.000
2000. . .300PA	0. . .300	10.000
2000. . .500PA	0. . .500	10.000
2000. . .750PA	0. . .750	25.000
2000. . .1000PA	0. . .1000	

Zero Center Ranges /

2300. . .60PA[1, 2]	30. . .0. . .30	1.000
2300. . .100PA[1, 2]	50. . .0. . .50	2.000
2300. . .120PA	60. . .0. . .60	2.000
2300. . .200PA	100. . .0. . .100	
2300. . .250PA	125. . .0. . .125	5.000
2300. . .300PA	150. . .0. . .150	
2300. . .500PA	250. . .0. . .250	10.000
2300. . .1000PA	500. . .0. . .500	

1 Calibrated for vertical mounting

2 Accuracy ± 4%

3 Accuracy ± 3%

* Option MP

** Option HP

Versions:

Operating range /

A large number of operating ranges and physical units are available. All standard variants are listed in the table “Operating ranges”. Please enquire for special type operating ranges.

Options /

CB Chrome bezel option: A chrome plated aluminum bezel for an aesthetically pleasing finish when mounting on metal surfaces such as control panels

SB Stainless steel bezel option: 304 stainless steel electro polished Ra 16 finished bezel

SS Corrosion resistant brushed 304 stainless steel bezel

G Green Transparent Overlay
(to highlight and emphasize critical pressures)

R Red Transparent Overlay
(to highlight and emphasize critical pressures)

Y Yellow Transparent Overlay
(to highlight and emphasize critical pressures)

ASF Additional features for the indicator with an adjustable marking signal flag

HP Overpressure safety up to 80 psi (5.52 bar) ensured by a thicker housing. A 4 13/16” – board cutout is necessary for assembly as against the standard cutout (4 9/16”).

LT Media temperatures up to -28°C possible as against the standard up to -6.67°C.

MP Overpressure safety up to 35 psi (2.41 bar) ensured by a thicker housing. A 4 13/16” – board cutout is necessary for assembly as against the standard cutout (4 9/16”).

SP An LED on the scale alerts if the limiting value that can be set from the front exceeds. The unit requires a power supply of 12 to 24 VDC and an MP- or HP housing.

SSK A large number of special type scales are available on request.

HA High Accuracy Magnehelic© Gage. Accuracy within 1% and weatherproof. Also includes mirrored scale overlay and a six point calibration certificate.

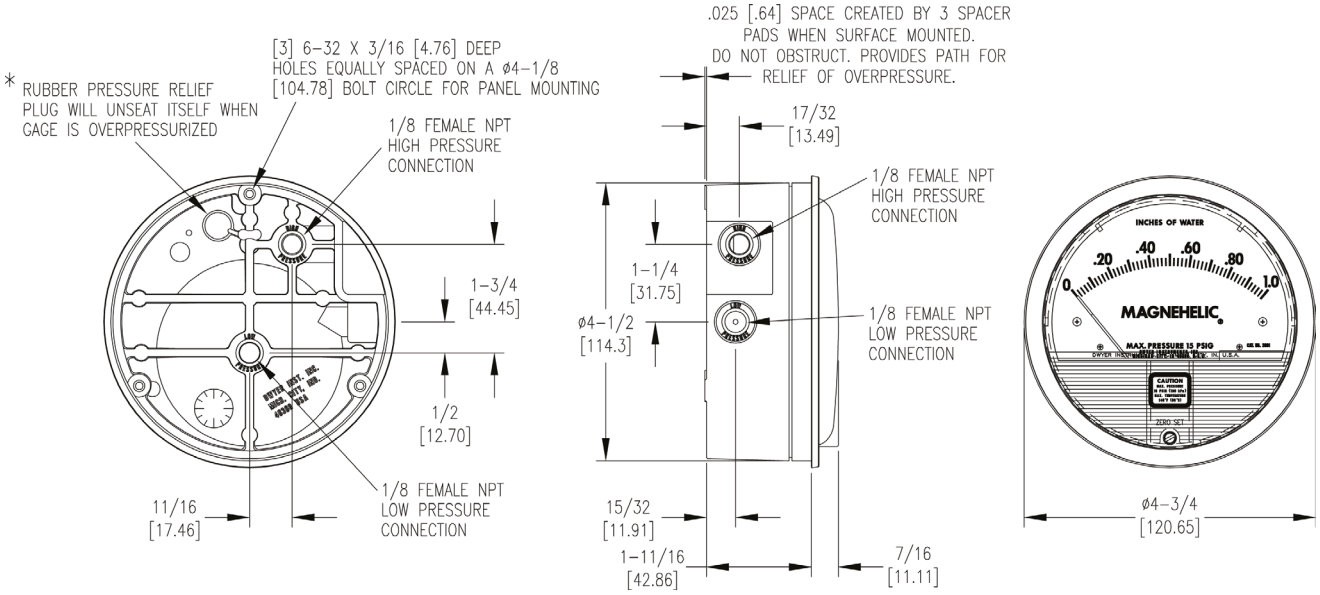
AHU1 Furnished with attached surface mounting plate.

AHU2 Furnished with attached surface mounting plate and including A-481 installer kit (2 plastic static pressure tips and 7' of PVC tubing).

M A mirrored scale overlay is also available to assist in reducing parallax error.

FC Factory calibration certificate.

NIST NIST traceable calibration certificate.



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Technical Specifications:

Media /	air and non-hostile and non-inflammable gases (optionally version for natural gases on request)
Housing /	aluminium casting, iridite-immersed external machining burnt-in dark gray forging
Accuracy /	± 2% F.S. in the entire range at 21°C (restrictions see operating range table)
Weight /	510 g (HP- and MP-models 963 g)
Pressure /	-0.677 bar to 1.034 bar maximum static pressure (2.41 bar in the MP option, 5.52 bar in the HP option)
Overpressure /	blow out plug opens at approx. 1.72 bar (only in standard devices)
Temperature /	-6.67. . .+60°C (-28°C for option LT)
Mounting posiiton /	vertical, scale towards the front
Process connection /	2 x 1/8"-NPT-female, one pair of connections on the side, one additionally at the back (closure plugs for one pair supplied)
Zero point /	can be set with the correction screw from the front

Ordering Codes:

Order number	**PM-2000.**	**2300-250PA.**	**ASF**

PM-2000 Magnehelic®

Operating range, refer to model number in the table for operating ranges:
□□□□-□□

Options /

CB	= Aluminium bezel, coated with chrome
SB	= st. steel bezel 304, electropolished
SS	= st. steel bezel 304, corrosion resistant, brushed
G	= green sight glass
R	= red sight glass
Y	= yellow sight glass
ASF	= marking indicator can be set
HP	= highly safe on overpressure
LT	= for lower temperatures down to -28°C
MP	= medium safe on overpressure
SP	= LED for setpoint display (no output)
SSK	= special type scale with coloured marking (ret, green, mirror) on request
HA	= high accuracy, weatherproof, mirrored scale 6 point calib. certificate
AHU1	= furnished with attached surface mounting plate
AHU2	= like AHU1, but additional 2 plastic static pressure tips and 7' of PVC tubing
M	= mirrored scale overlay
FC	= factory calibration certificate
NIST	= NIST traceable calibration certificate

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PS-00

Low-Cost Pressure Switch



Features

/ Settings can be made on location

/ Long mechanical life span

/ Small dimensions

/ Silver or gold contacts

/ Critical media version

(paint, grease etc.) on request

Description:

A spring-loaded membrane or (in higher ranges of pressure) a spring-loaded piston form the measurement technical basis for the Profimess' Low-Cost Pressure switch PS-00. Under the influence of pressure the operating element actuates an electrical micro-switch that is equipped with silver contacts and thus ensures a long life span. By means of a setting screw the pre-tension for the spring can be smoothly adjusted, with the result that the setpoint can be varied along entire range of setting.

Application:

Mechanical pressure switches are used in all areas where an electrical signal is required depending on the specified pressure parameters. These devices are predestined - thanks to small dimensions, high reliability and long life span – especially for applications in the construction of machines and installations. Due to excellent price to performance ratio, the PS-00 range of pressure switches are suited for OEM applications as well regardless of average to high numbers.

Technical Specifications:

Operating range / see ordering codes

Mode of setting / by setting screw, under pressure

Switch. hysteresis / 15. . .30% of set point value

Tolerance /
PS-00.1.: ± 0.2 bar
PS-00.2.: ± 0.5 bar
PS-00.3.: ± 3.0 bar
PS-00.4.: ± 5.0 bar
PS-00.5.: ± 100 mbar

max. Op. pressure / 1 x end of range

Bursting pressure /
PS-00.1.: 10 bar
PS-00.2.: 20 bar
PS-00.3.: 120 bar
PS-00.4.: 300 bar
PS-00.5.: 2 bar

Mech. Lifetime / 10^6 switching cycles

max. Media temp. / -25. . .+85°C

Housing / see Table 1

Process connection / G1/4"B for overpressure ranges, G1/8"B for neg. pressure ranges

Weight /
PS-00.1-2.: approx. 65 g
PS-00.3-4.: approx. 95 g
PS-00.5.: approx. 120 g

Electrical Specifications:

Reference voltage / max. 42 V

Reference frequenzy / not over 100 Hz

Switching load / max. 100 VA

Switching function / change-over (NO-contact or NC-contact on request)

Connection / flat plug 3 x 6.3 x 0.8

Protection class / IP65 on media side
IP00 on clamp side

Breaking capacity	AC		DC				
Voltage up to	125 V	250 V	30 V	50 V	75 V	125 V	250 V
Resistance load	4 A	4 A	2 A	2 A	1 A	0,5 A	0,25 A
Inductive load	1 A	1 A	1 A	1 A	0,5 A	0,2 A	0,2 A

Configuration Possibilities:

Auswahlmöglichkeit	PS-00.1	PS-00.2	PS-00.3	PS-00.4	PS-00.5
Contact silver	standard	standard	standard	standard	standard
Contact gold	option	option	option	option	option
Membrane material NBR	standard	standard	-	-	standard
Membrane materiall Viton	option	option	-	-	option
Membrane material EPDM	option	option	-	-	option
Seal material UR	-	-	standard	standard	-
Seal material Viton	-	-	option	option	-
Housing steel zinc plated	standard	standard	standard	standard	-
Housing st. steel 1.4305	option	option	option	option	-
Housing st. steel 1.4571	option	option	-	-	-
Housing material brass	option	option	-	-	standard

Ordering Codes:

Order number **PS-00. 2. 2. 1. 3. 1**

PS-00 Low-Cost Pressure Switch

Operating ranges /
1 = 0.5. . .2 bar
2 = 1. . .10 bar
3 = 10. . .70 bar
4 = 50. . .200 bar
5 = -800. . .-200 mbar

Contact /
1 = silver
2 = gold

Membrane material /
(ranges 1, 2 and 5 - refer to table 1)
1 = NBR
2 = Viton
3 = EPDM

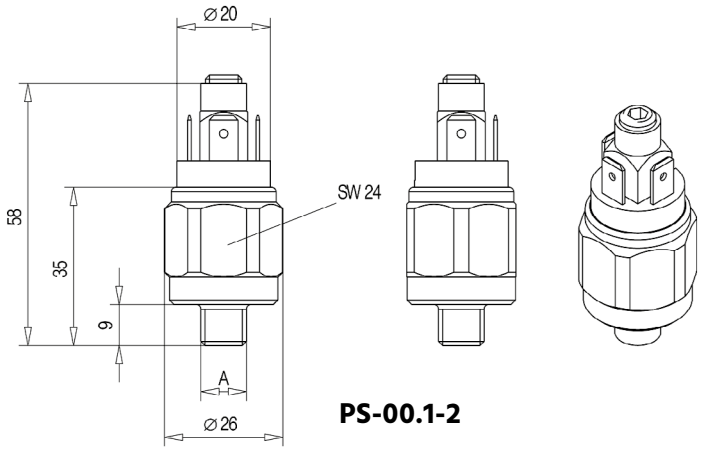
Seal material /
(ranges 3 and 4 - refer to table 1)
4 = UR
6 = Viton

Housing /
(all ranges - refer to table 1)
1 = steel zinc plated
2 = stainless steel 1.4305
3 = stainless steel 1.4571
4 = brass

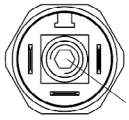
Protective cover /
0 = none
1 = NBR 55° Sh for Operating ranges 1-4
2 = NBR 55° Sh for Operating ranges 5

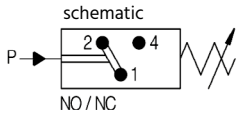
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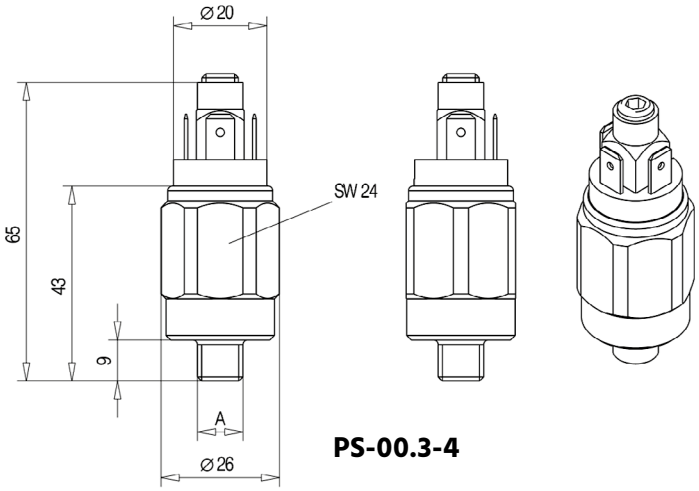
Dimensions in mm:



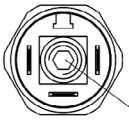
PS-00.1-2

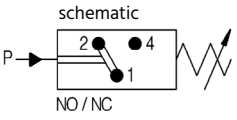


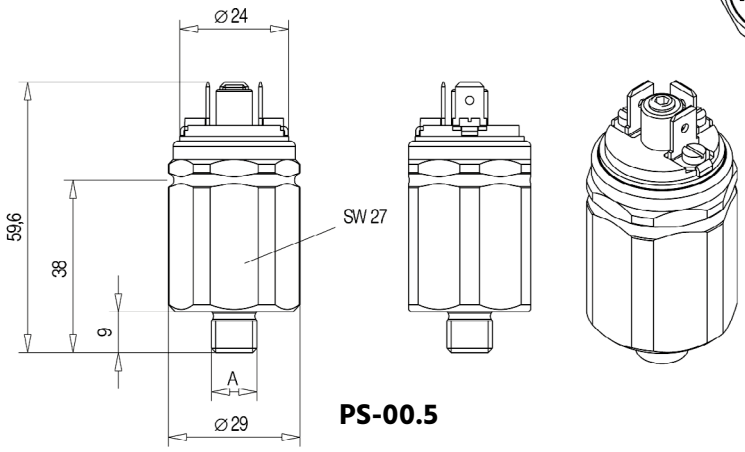




PS-00.3-4

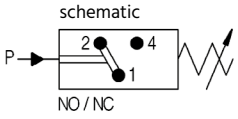






PS-00.5

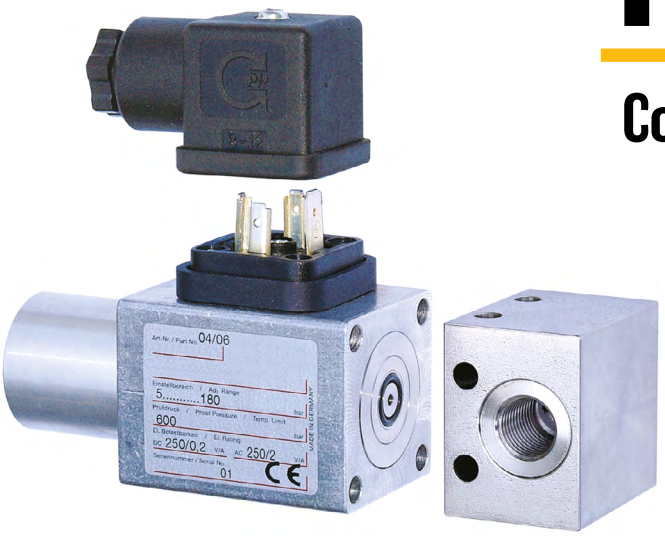




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PS-02N

Compact Pressure Switch



Features

/ Compact

/ Robust

/ 6 Pressure ranges

/ Up to 600 bar

/ Plug connection

Description:

Mechanical pressure switches are intended for pressure-dependent switching on and off an electrical circuit. A pressure switch can be used as a control device as well as for visual or acoustical control for an operating point. The PS-02N series of compact pressure switches is designed as piston or diaphragm pressure switches depending on the pressure range. Both the versions are similar in construction where, in the case of the former, a spring-loaded piston actuates the micro-switch while, in the case of the latter, a spring-loaded elastomer membrane assumes this function. The setpoints can be set by means of a female hexagon SW5. Fine adjustments are optionally possible depending on customer requirements. The contacts for the micro-switch can be gold-plated on request so as to minimize the electrical transitional resistance, if necessary.

Application:

Thanks to the compact design of the PS-02N series and the broad spectrum of pressure range of 1 bar to 600 bar in 6 levels, these switches are well-suited for machine and vehicle manufacturing, packaging industry, pneumatic and hydraulic technologies and for equipment manufacturing.

Electrical Specifications:

Switching Element / changeover contact (SPDT)

Electrical connection / plug DIN EN 175301-803A or
plug M 12x1, 4-pole or plug M 12x1,
4-pole with 2 m tipped cable or
cable gland with 0,7 m cable

Protection class / IP65 for plug connections
IP68 for cable gland with 0,7 m cable

EX-Versions / intrinsically safe design on request
EEx ia (U_{max} = 28 V, I_{max} = 50 mA)

Options / approval for shipping as per GL
US-approval as per UL
Low hysteris LH

Electrical Connection /

	Plug DIN EN 175301-803A	Plug M12x1, 4-pole	Cable gland with two meters cable
COMMON	1	1	BN
normally closed	2	2	BK
normally open	3	4	GY
PE	-	3	GN / YE

Electrical load capacity /

Ag contacts	ind. load	res. load	Au contacts	ind. / res. load
30 VDC	2.0 A	5.0 A	≤ 300 mVDC	- / ≤ 400 mA
250 VDC	0.03 A	0.2 A	≤ 30 VDC	- / ≤ 4 mA
250 VAC	2.0 A	5.0 A	AC	U x I = max. 0.12 VA
125 VAC	2.0 A	5.0 A		
minimum load	10 mA at 12 VDC		0 mA / 0 VDC	

Operating range /

Type	Setting range dropping pressure	Setting range rising pressure	max. Hysteresis (end of range)	max. op. Pressure [bar] (*test press.)
Diaphragm switch				
PS-02N.1	0.4. . .5.7 bar	0.6. . .6.0 bar	≤ 15%	50 (*80)
PS-02N.2	2.0. . .17 bar	3.0. . .20 bar	≤ 15%	50 (*80)
PS-02N.3	3.0. . .41 bar	4.0. . .45 bar	≤ 15%	50 (*80)
Piston switch				
PS-02N.5	3.0. . .160 bar	5.0. . .180 bar	≤ 15%, at LH ≤ 7.5%	250 (*600)
PS-02N.6	30. . .300 bar	50. . .350 bar	≤ 15%, at LH ≤ 7.5%	450 (*600)
PS-02N.7	55. . .520 bar	80. . .600 bar	≤ 15%, at LH ≤ 7.5%	600 (*900)

Technical Specifications:

Media temp. / -40. . .+80°C for piston switch
-20. . .+80°C for diaphragm switch
-50°C on request

Switching frequency / max. 60/min for piston switch
max. 30/min for diaphragm switch

Repeatability / ±1% for piston switch
±2% for diaphragm switch

Housing / Aluminium, st. steel 1.4305 on request

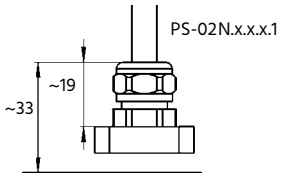
Wetted parts / NBR, PTFE with bronze and st. steel 1.4301;
for piston switch: steel FKM, EPDM, CR instead of NBR

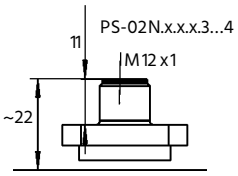
Setting Screw / st. steel 1.4305 (SW5)

Pressure connection / G1/4"-female, 1/4"-NPT-female straight or angular (others on request)

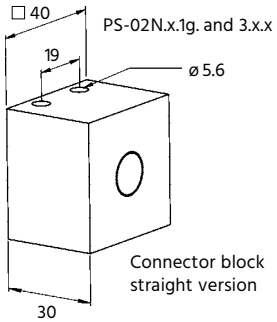
Total weight / approx. 350g

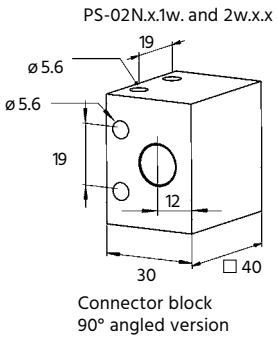
Electrical Connection /





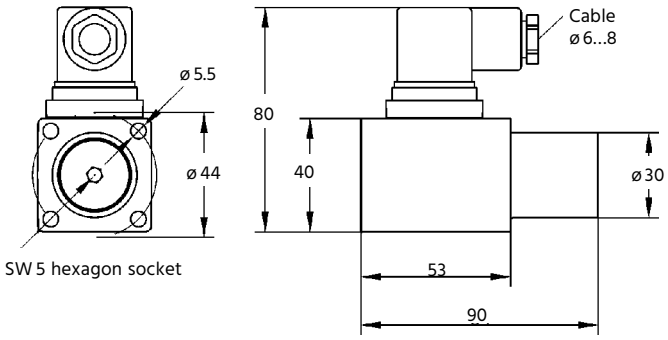
Process connection /





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Dimensions in mm:



Ordering Codes:

Order number	PS-02N.	7.	1w.	1.	1

PS-02N Compact Pressure Switch

Operating range /

1 = 0.4. . .5.7 bar falling, 0.6. . .6.0 bar rising
2 = 2.0. . .17 bar falling, 3.0. . .20 bar rising
3 = 3.0. . .41 bar falling, 4.0. . .45 bar rising
5 = 3.0. . .160 bar falling, 5.0. . .180 bar rising
6 = 30. . .300 bar falling, 50. . .350 bar rising
7 = 55. . .520 bar falling, 80. . .600 bar rising

Process connection /

1g = G1/4"-female straight
1w = G1/4"-female angular
2g = 1/4"-NPT-female straight
2w = 1/4"-NPT-female angular

Contacts /

1 = silver
2 = gold

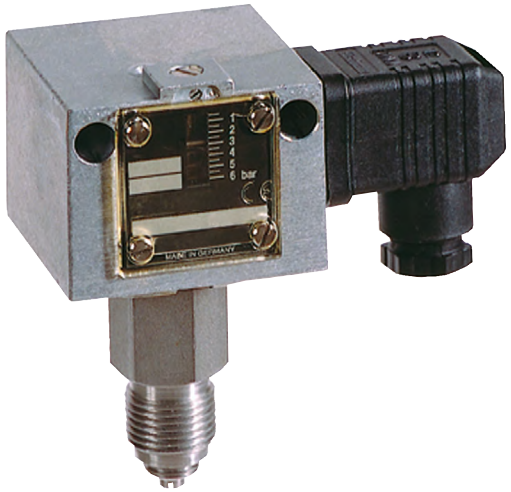
Electrical connection /

1 = Cable gland, 0,7 m cable, IP68
2 = Plug DIN EN175301-803A, IP65, with counterpart
3 = Plug M12, 4-pole, without counterpart, IP65
4 = Plug M12, 4-pole, with counterpart angular 90° with 2 m cable, IP65

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PDC-1

Pressure Switch for Non-Hostile Fluids and Gases



Features

/ Extremely resilient

/ Universal connection

/ Hysteresis can be set

/ Wide span of measuring

Description:

The PDC series of mechanical pressure switches is characterized by their extreme resilience. The PDC-1 has a robust housing made of sea-water resistant aluminium die casting. Depending on the pressure range, it has a connection fitting in copper and brass or stainless steel with a G1/2”-male and a G1/4”-female thread. Excrescent pressure changes at the connection act on an internal measuring diaphragm the movements of which are transferred to a high-performance micro-switch through a connecting bridge. The setpoint is set externally by rotating a spindle for nominal value that directly modifies the pre-tension of a spring. In addition, the construction has a counter-pressure spring that ensures a very stable connection even at low set-points. The PDC series of pressure switches can be provided with a terminal housing in IP65 and a blue cable gland, to allow the operation in hazardous areas (in connection with a suitable isolating switch amplifier) or even as an Ex-d version.

Application:

The PDC-1 series of pressure switches is used in applications where high requirements are placed on the switch’s life span and mechanical strength. Due to the fact that the pressure-sensing measuring diaphragms are only less loaded – considering their permissible values – the PDC-1 guarantees an excellent long-term stability at minimal setpoint drift. Consequent to its design, the upstroke of the pressure diaphragms is limited by means of a stopper so that high overpressure safety is ensured even in small operating ranges. A number of operating ranges are available of which also a version with adjustable hysteresis can be supplied. This enables the user to accurately control a span of pressures with only a single device. Thanks to its material quality, flexibility of connections and high switching load of the micro-switch, the PDC-1 is predestined for use across all sections of the industry.

Technical Specifications:

Operating range / refer to table

Mounting position / vertically upright and horizontal (operating range A and B only vertically upright)

max. Pressure / refer to table

max. Media temperature / -25°C to +70°C (-15°C. . .+60°C for ranges A, B and C) short spell up to +85°C. Cooling elements are recommended for higher temperatures

Setpoint / Can be set externally by means of screw-driver on the spindle

Repeatability / < 1% of working range (for pressure ranges > 1 bar)

Adjustment / The scales are calibrated for decreasing pressures. The reading corresponds therefore to lower setpoint, the upper setpoint is higher by the hysteresis

Lead sealing / On request, ex-factory; sealing can also be undertaken later

Vacuum / All PDC-1 besides the PDC-1.x.C can be impacted by vacuum; the device will not be damaged

Vibration / Up to 4g no significant deviations

Mechanical Life span / 10 x 10^6 for room temperature and sinusoidal pressure impact. Life span depends highly on the sort of pressue impact. This value is therefore just a guide value. For applications with pulsating pressure or pressure surges we recommend the use of a pressure surge reducer.

Electrical Life span / 100,000 switching cycles at nominal current 8 A, 250 VAC

Isolation / overvoltage category III, pollution degree 3, rated impulse voltage 4000V, fullfills DIN VDE 01 10

Hysteresis / In PDC-1.1.A to PDC-1.1.M the hysteresis cannot be set. In PDC-1.2.D to PDC-1.2.M the hysteresis can be set as specified in the following tables.

Process connection / G1/2"-male (pressure gauge connection acc. DIN 16288), G1/4"-female acc. ISO 228 part 1. Using the G1/2"-male the PDC-1 can be directly screwed on to the pressure pipe, alternatively fastening by means of 2 screws (4mm Ø) on a plane surface is also possible.

Housing material / Aluminium casting GD Al Si 12 (sea-water resistant)

Sensor material / refer to following tables

rel. Humidity / 15%. . .95%, non-condensing

Ordering Codes:

Order number	**PDC-1.**	**1.**	**B1.**	**4**

PDC-1 Pressure switch for non-hostile fluids and gases

Hysteresis /

1 = Hysteresis cannot be adjusted (A - M)
2 = Hysteresis can be adjusted (D - M)

Operating range /

A = 1. . .16 mbar
B = 4. . .25 mbar
B1 = 15. . .60 mbar
C = 10. . .100 mbar
D = 0.04. . .0.25 bar
E = 0.1. . .0.6 bar
F = 0.2. . .1.6 bar
G = 0.2. . .2.5 bar
H = 0.5. . .6 bar, overload up to16 bar
HD= 0.5. . .6 bar, overload up to25 bar
I = 1. . .10 bar
J = 3. . .16 bar
K = 4. . .25 bar
L = 8. . .40 bar
M = 16. . .63 bar
N = 40. . .75 bar

Options /

0 = without

Exi = gold-plated contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA; media temperature max. 60°C, ignition protection class II 1/2G Ex ia IIC T6 Ga/Gb, II 1/2D Ex ia IIIC T80 °C (1)

Exd = standard contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 250 VAC, 3 (2) A or 24 VDC, 3 A or 250 VDC, 0.1 A, min. 24 VDC, 2 mA, media temperature max. 60°C, ignition protection class II 2G Ex d e IIC T6 Gb, II 1/2D Ex ta/tb IIIC T80 °C Da/Db (1)

2 = gold-plated contacts, SPDT, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA. And others not available with adjustable hysteresis.

3 = two microswitches, switching in parallel or in succession, fixed switching interval (with the exception of PDC-1.1.A/B/C) (1)

4 = two microswitches, 1 plug, switching in succession, adjustable switching interval (with the exception of PDC-1.1.A/B/C)

5 = terminal connection housing, IP65

6 = protection class IP65 and switching housing with surface protection (chemical version)

(1) incl. terminal connection housing, IP65

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Electrical Specifications:

Connection / plug connection

Protection class / IP54 in vertical position

Switching load / 250 VAC, 8 A (ohmic), 5A (inductive)
250 VDC, 0.3 A (ohmic),
24 VDC, 8 A (ohmic),
min. 10 mA, 12 VDC

Contacts / SPDT

Units with fixed hysteresis (PDC-1.1):

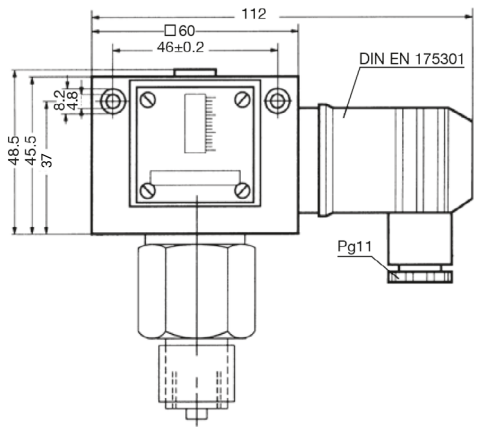
Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted materials	Sketch no.	Manufacturer number
PDC-1.1.A	1. . .16 mbar	2 mbar	1 bar	sensor housing 1.4301 + membrane perbunan	1 + 11	DCM4016
PDC-1.1.B	4. . .25 mbar	2 mbar	1 bar	sensor housing 1.4301 + membrane perbunan	1 + 11	DCM4025
PDC-1.1.C	10. . .100 mbar	12 mbar	10 bar	sensor housing brass + membrane perbunan	1 + 10	DCM1000
PDC-1.1.D	0.04. . .0.25 bar	0.03 bar	6 bar	sensor housing copper a. brass + bellow copper	1 + 14	DCM025
PDC-1.1.E	0.1. . .0.6 bar	0.04 bar	6 bar	sensor housing copper a. brass + bellow copper	1 + 14	DCM06
PDC-1.1.F	0.2. . .1.6 bar	0.04 bar	6 bar	sensor housing copper a. brass + bellow copper	1 + 14	DCM1
PDC-1.1.G	0.2. . .2.5 bar	0.1 bar	16 bar	sensor housing 1.4104 + bellow 1.4571	1 + 18	DCM3
PDC-1.1.H	0.5. . .6 bar	0.15 bar	16 bar	sensor housing 1.4104 + bellow 1.4571	1 + 18	DCM6
PDC-1.1.HD	0.5. . .6 bar	0.25 bar	25 bar	sensor housing 1.4104 + bellow 1.4571	1 + 17	DCM625
PDC-1.1.I	1. . .10 bar	0.3 bar	25 bar	sensor housing 1.4104 + bellow 1.4571	1 + 17	DCM10
PDC-1.1.J	3. . .16 bar	0.5 bar	25 bar	sensor housing 1.4104 + bellow 1.4571	1 + 17	DCM16
PDC-1.1.K	4. . .25 bar	1.0 bar	60 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCM25
PDC-1.1.L	8. . .40 bar	1.3 bar	60 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCM40
PDC-1.1.M	16. . .63 bar	2.0 bar	130 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCM63
PDC-1.1.N	40. . .75 bar	2,3 bar	130 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCM63-406

Units with adjustable hysteresis (PDC-1.2):

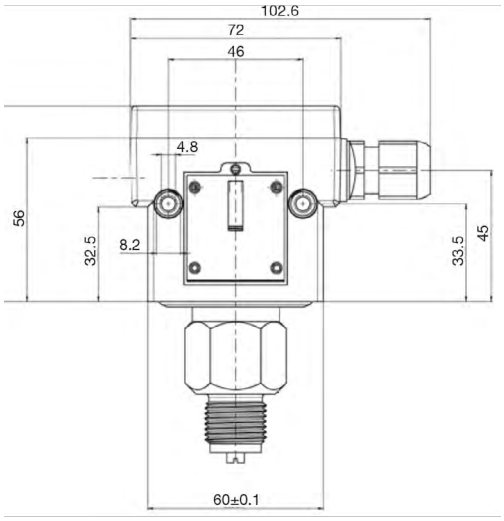
Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted materials	Sketch no.	Manufacturer number
PDC-1.2.D	0.04. . .0.25 bar	0.03 - 0.4 bar	6 bar	sensor housing copper a. brass + bellow copper	1 + 14	DCMV025
PDC-1.2.E	0.1. . .0.6 bar	0.04 - 0.5 bar	6 bar	sensor housing copper a. brass + bellow copper	1 + 14	DCMV06
PDC-1.2.F	0.2. . .1.6 bar	0.07 - 0.55 bar	6 bar	sensor housing copper a. brass + bellow copper	1 + 14	DCMV1
PDC-1.2.G	0.2. . .2.5 bar	0.15 - 1.5 bar	16 bar	sensor housing 1.4104 + bellow 1.4571	1 + 18	DCMV3
PDC-1.2.H	0.5. . .6 bar	0.25 - 2.0 bar	16 bar	sensor housing 1.4104 + bellow 1.4571	1 + 18	DCMV6
PDC-1.2.I	1. . .10 bar	0.5 - 2.8 bar	25 bar	sensor housing 1.4104 + bellow 1.4571	1 + 17	DCMV10
PDC-1.2.J	3. . .16 bar	0.7 - 3.5 bar	25 bar	sensor housing 1.4104 + bellow 1.4571	1 + 17	DCMV16
PDC-1.2.K	4. . .25 bar	1.3 - 6.0 bar	60 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCMV25
PDC-1.2.L	8. . .40 bar	2.6 - 6.6 bar	60 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCMV40
PDC-1.2.M	16. . .63 bar	3.0 - 10.0 bar	130 bar	sensor housing 1.4104 + bellow 1.4571	1 + 16	DCMV63

Housing dimensions:

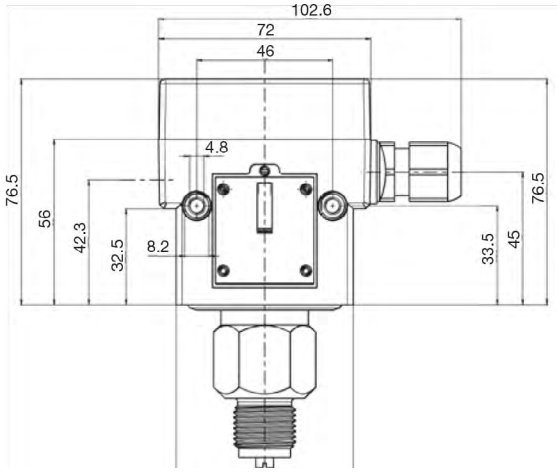
Standard housing with plug connection



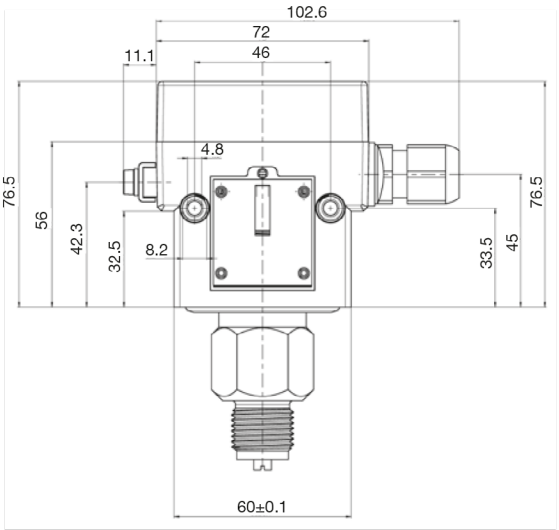
Standard housing with terminal connection (option 5)



③ Ex-i housing with blue cable gland

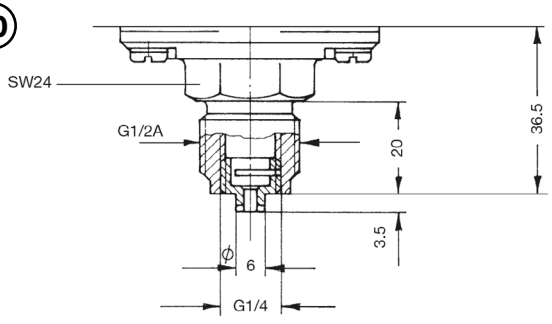


④ Ex-d housing with Ex-d cable gland

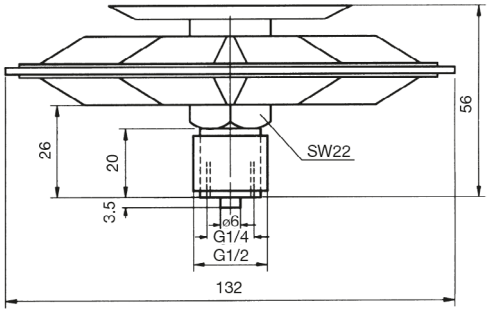


Pressure sensor dimensions:

⑩

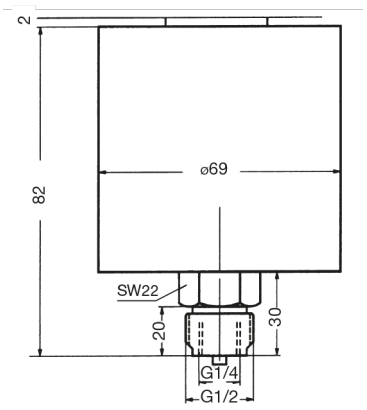


⑪

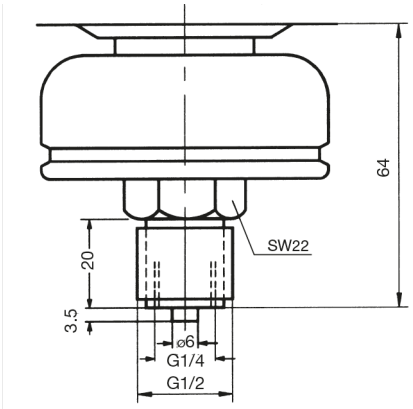


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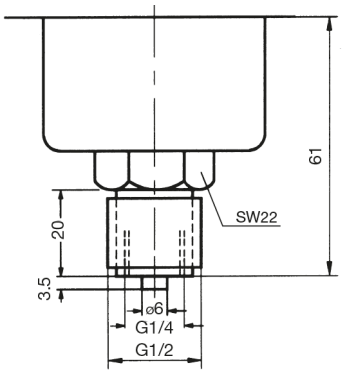
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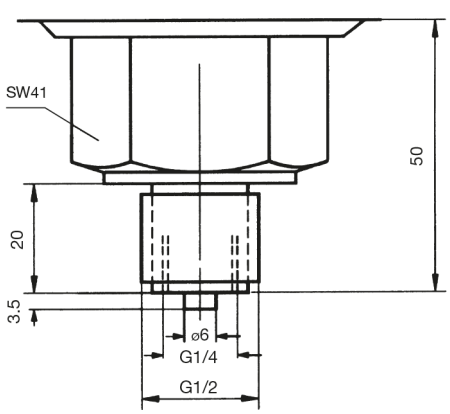
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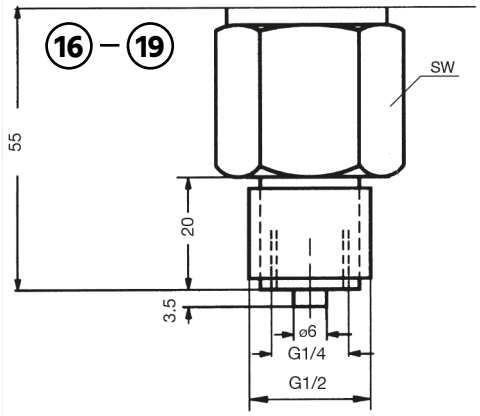
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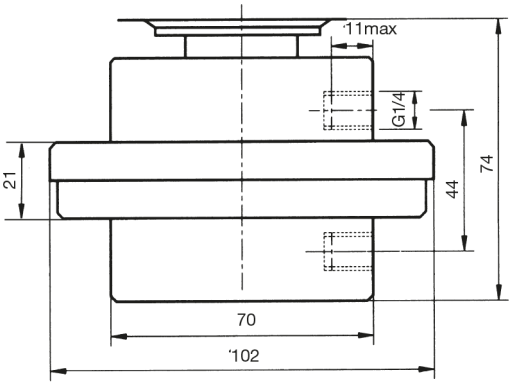


16 – 19

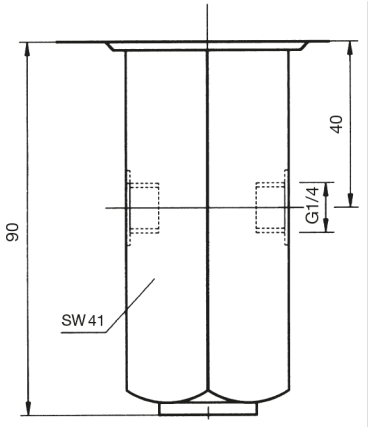


Housing no.	SW
16	22
17	24
18	30
19	32

20



21



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PDC-2

Vacuum Switch



Features

/ Robust design

/ 6 operating ranges under vacuum

/ Zero point excess deviation

/ Adjustable hysteresis

Description:

The PDC series of mechanical pressure switches is characterized by their extreme resilience. The PDC-2 has a robust housing made of sea-water resistant aluminium pressure casting. Depending on the pressure range, it has a pressure port made of brass or stainless steel and a membrane or a bellow made of Perbunan, Cu Zn or stainless steel and a G1/2"-male and a G1/4"-female thread. Excrescent pressure changes at the connection act on an internal measuring diaphragm the movements of which are transferred to a high-performance micro-switch through a connecting bridge. The setpoint is set externally by rotating a spindle for nominal value that directly modifies the pre-tension of a spring. In addition, the construction has a counter-pressure spring that ensures a very stable connection even at low set-points. The PDC series of pressure switches can be provided with a terminal housing in IP65 and a blue cable gland, to allow the operation in hazardous areas (in connection with a suitable isolated switch amplifier), or even as an EEx-d version.

Application:

The PDC-2 series of pressure switches is used in applications where high requirements are placed on the switch's life span and mechanical strength. Due to the fact that the pressure-sensing measuring diaphragms are only less loaded – considering their permissible values – the PDC-2 guarantees an excellent long-term stability at minimal setpoint drift. Consequent to its design, the upstroke of the pressure diaphragms is limited by means of a stopper so that high overpressure safety is ensured even in small operating ranges. A number of operating ranges are available of which also a version with adjustable hysteresis can be supplied. In the selection of a range, attention has been paid to cover smaller pressure spans close to the zero point as well as the entire range vacuum. Thanks to its material quality, flexibility of connections and high switching load of the micro-switch, the PDC-2 is predestined for use across all sections of the industry.

Technical Specifications:

Operating range / see table

Mounting position / vertically upright and horizontal (operating range A only vertically upright)

max. Pressure / see table

max. Media temperature / -25. . .+70°C (-15. . .+60°C for range A) short spell up to +85°C. Cooling elements are recommended for higher temperatures

Setpoint / can be set externally by means of screw-driver on the spindle

Repeatability / < 1% of working range (at pressure ranges > 1 bar)

Adjustment / The scales are calibrated for decreasing pressures. The reading corresponds therefore to lower setpoint, the upper setpoint is higher by the hysteresis

Lead sealing / On request, ex-factory; sealing can also be undertaken later

Vibration / Up to 4g no significant deviations

Mechanical Life span / 10 x 10^6 for room temperature and sinusoidal pressure impact. Life span depends highly on the sort of pressue impact. This value is therefore just a guide value. For applications with pulsating pressure or pressure surges we recommend the use of a pressure surge reducer.

Electrical Life span / 100,000 switching cycles at nominal current 8 A, 250 VAC

Isolation / overvoltage category III, pollution degree 3, rated impulse voltage 4000V, fullfills DIN VDE 01 10

Hysteresis / In PDC-2.1.A to PDC-2.1.F the hysteresis cannot be set. In PDC-2.2.B to PDC-2.2.F the hysteresis can be set as specified in the following tables.

Process connection / G1/2"-male (pressure gauge connection acc. DIN 16288), G1/4"-female acc. ISO 228 part 1. Using the G1/2"-male the PDC-2 can be directly screwed on to the pressure pipe, alternatively fastening by means of 2 screws (4mm Ø) on a plane surface is also possible.

Housing material / Aluminium pressure casting GD Al Si 12 (sea-water resistant)

Material of pressure sensor / refer to following tables

rel. Humidity / 15%. . .95%, non-condensing

Ordering Codes:

Order number	**PDC-2.**	**1.**	**D.**	**0**

PDC-2 Vacuum Switch

Hysteresis /

1 = hysteresis cannot be set (A - F)
2 = hysteresis can be set (B - F)

Operating range /

A = -15. . .+6 mbar
B = -250. . .+100 mbar
C = -1*. . .+0,1 bar
D = -0.9. . .+0,5 bar
E = -250. . .+100 mbar (3 bar max.)
F = -1* to +0.1* bar (6 bar max.)

* In case of high vacuum conditions, close to the theoretically possible low-pressure of -1 bar, use of the switch is subject to restrictions due to extraordinary conditions of vacuum technology. However, the vacuum switch itself will not be damaged at maximum low-pressure.

Options /

0 = without

Exi = gold-plated contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA; media temperature max. 60°C, ignition protection class II 1/2G Ex ia IIC T6 Ga/Gb, II 1/2D Ex ia IIIC T80 °C (1)

Exd = standard contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 250 VAC, 3 (2) A or 24 VDC, 3 A or 250 VDC, 0.1 A, min. 24 VDC, 2 mA, media temperature max. 60°C, ignition protection class II 2G Ex d e IIC T6 Gb, II 1/2D Ex ta/tb IIIC T80 °C Da/Db (1)

2 = gold-plated contacts, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA. And others not available with adjustable switching difference.

3 = two microswitches, switching in parallel or in succession, fixed switching interval (1) (with the exception of PDC-2.A)

4 = two microswitches, 1 plug, switching in succession, adjustable switching interval (with the exception of PDC-2.A)

5 = terminal connection housing, IP65

6 = protection class IP65 and switching housing with surface protection (chemical version)

(1) incl. terminal connection housing, IP65

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Electrical Specifications:

Connection / plug connection

Protection class / IP54 in vertical mounting

Switching load / 250 VAC, 8A (Ohmic), 5A (inductive)
250 VDC, 0,3A (Ohmic)
24 VDC, 8A (Ohmic)
min. 10 mA, 12 VDC

Contacts / SPDT

Units with fixed hysteresis (PDC-2.1):

Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted parts	Sketch Nr.	Manufacturer number
PDC-2.1.A	-15. . .+6 mbar	2 mbar	1 bar	Sensor housing 1.4301 + diaphragm Perbunan	1 + 11	VCM4156
PDC-2.1.B	-250. . .+100 mbar	25 mbar	1.5 bar	Sensor housing 1.4104 + diaphragm CuZn	1 + 13	VCM301
PDC-2.1.C	-1. . .+0.1 mbar *	45 mbar	3 bar	Sensor housing 1.4104 + diaphragm CuZn	1 + 14	VCM101
PDC-2.1.D	-0,9. . .+0.5 bar	50 mbar	3 bar	Sensor housing 1.4104 + diaphragm CuZn	1 + 14	VCM095
PDC-2.1.E	-250. . .+100 mbar	45 mbar	3 bar	Sensor housing 1.4104 + bellow 1.4571	1 + 15	VNM301
PDC-2.1.F	-1. . .+0.1 bar *	50 mbar	6 bar	Sensor housing 1.4104 + bellow 1.4571	1 + 15	VNM111

* In case of high vacuum conditions, close to the theoretically possible low-pressure of -1 bar, use of the switch is subject to restrictions due to extraordinary conditions of vacuum technology. However, the vacuum switch itself will not be damaged at maximum low-pressure.

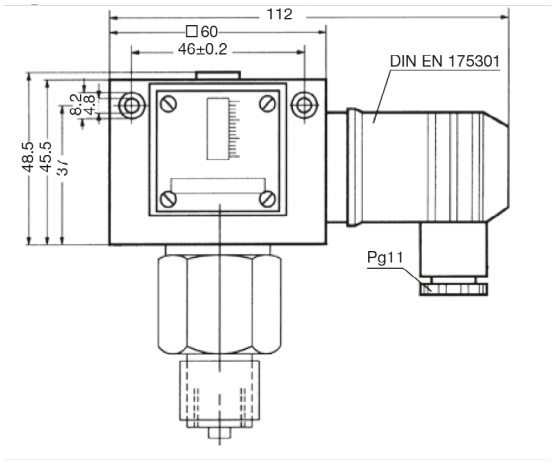
Units with adjustable hysteresis (PDC-2.2):

Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted parts	Sketch Nr.	Manufacturer number
PDC-2.2.B	-250. . .+100 mbar	30. . .200 mbar	1.5 bar	Sensor housing 1.4104 + diaphragm CuZn	1 + 13	VCMV301
PDC-2.2.C	-1. . .+0.1 mbar	80. . .350 mbar	3 bar	Sensor housing 1.4104 + diaphragm CuZn	1 + 14	VCMV101
PDC-2.2.D	-0.9. . .+0.5 bar	90. . .400 mbar	3 bar	Sensor housing 1.4104 + diaphragm CuZn	1 + 14	VCMV095

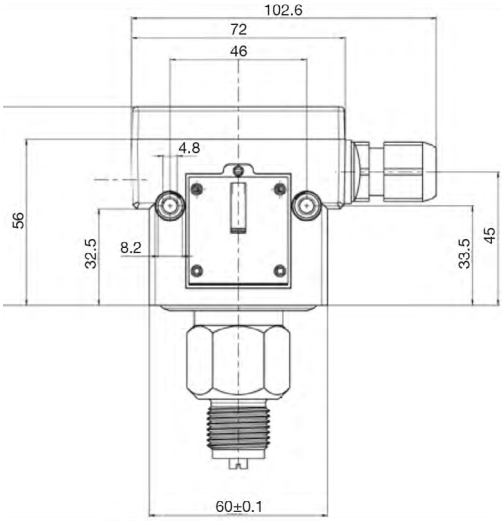
* In case of high vacuum conditions, close to the theoretically possible low-pressure of -1 bar, use of the switch is subject to restrictions due to extraordinary conditions of vacuum technology. However, the vacuum switch itself will not be damaged at maximum low-pressure.

Housing Dimensions:

(1) Standard housing with plug connection

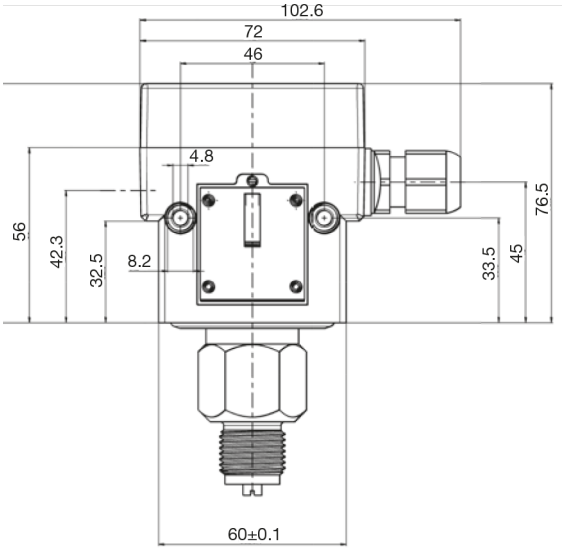


(2) Standard housing with terminal conn. (Option 5)

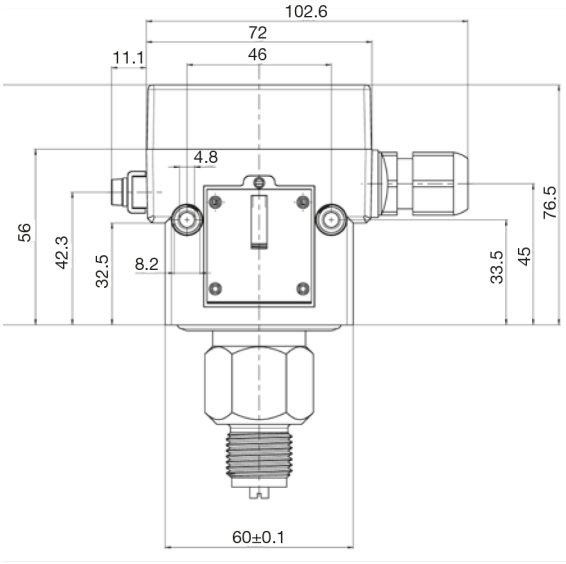


Housing Dimensions:

3 Ex-i housing with blue cable gland

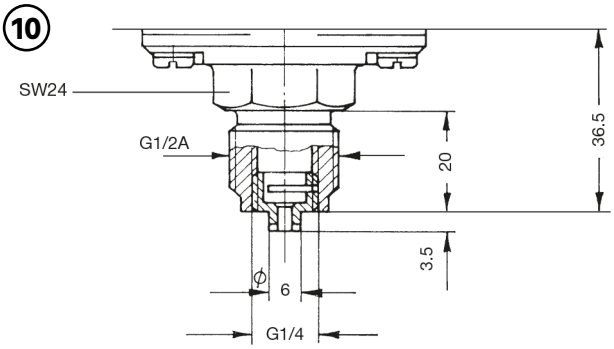


4 Ex-d housing with blue cable gland

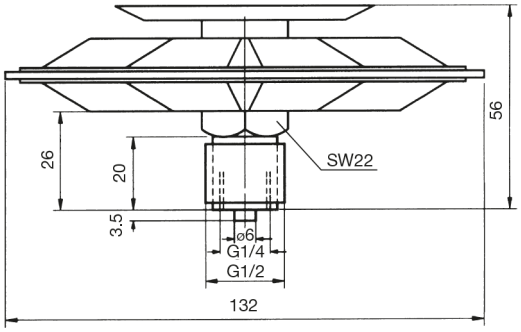


Pressure Port Dimensions:

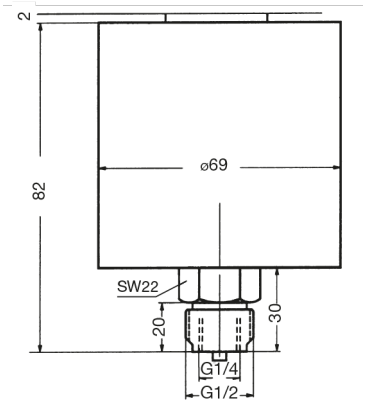
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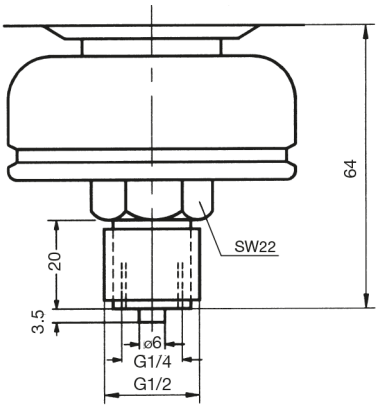
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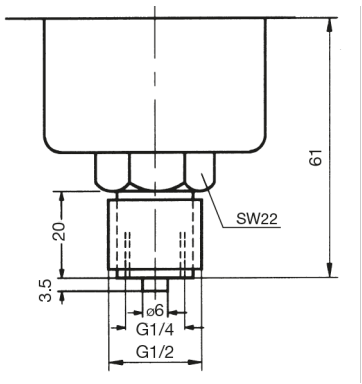


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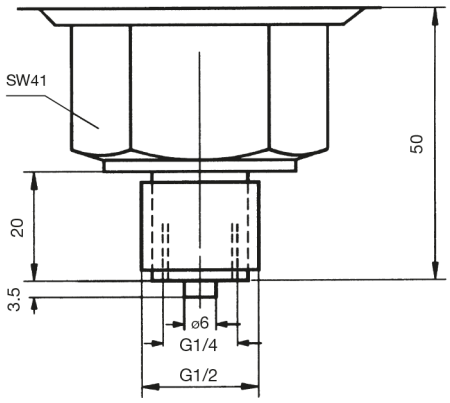


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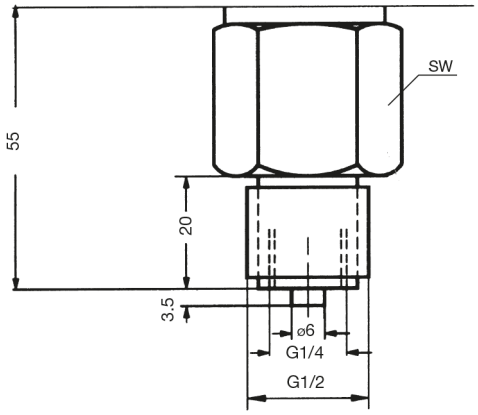
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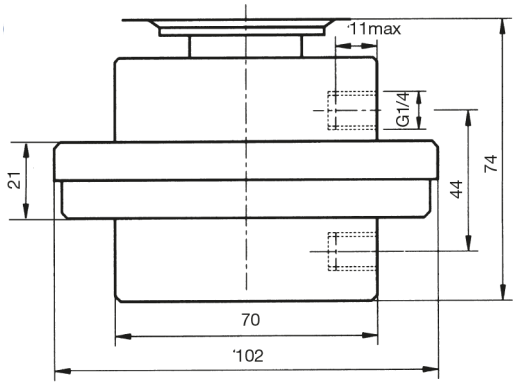


16 – 19

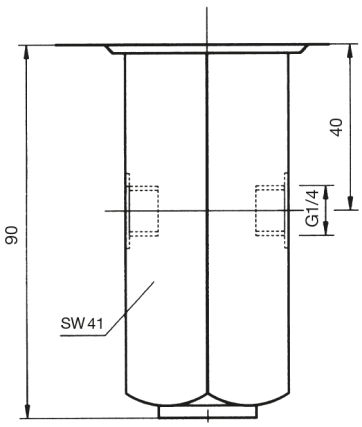


Housing No.	SW
16	22
17	24
18	30
19	32

20



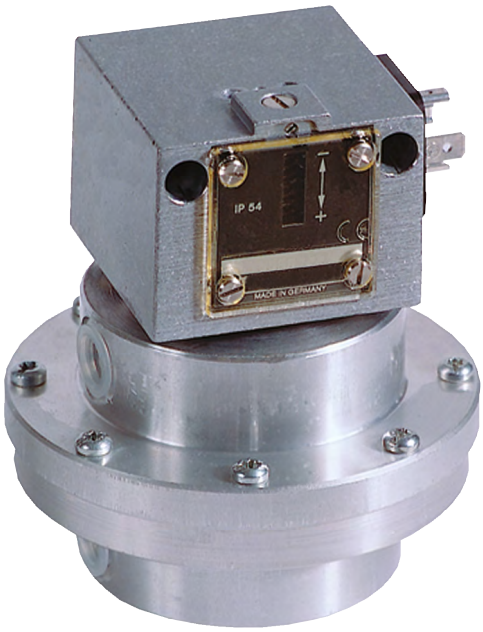
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PDC-3

Differential Pressure Switch



Features

/ Compact

/ Robust design

/ 9 different pressure ranges

/ Various materials

/ Plug connection

Description:

Mechanical pressure switches of the PDC series are characterized by their male mechanical resilience. The PDC-3 has a robust housing made of sea-water resistant aluminium pressure casting and, depending on the pressure range, it has an aluminium or stainless steel 1.4305 connection fitting. Both types of connections are provided with G1/4"-female thread. Excrescent pressure changes at the connections act on a double chamber system with stainless steel diaphragm or Perbunan membrane, the movements of which are transferred to a high-performance microswitch through a connecting bridge. The setpoint is set externally by rotating a spindle for nominal value that directly modifies the pre-tension of a spring. In addition, the construction has a counter-pressure spring that ensures a very stable connection even at low set-points. The PDC series of pressure switches can be provided with a terminal housing in IP65 and a blue cable gland, to allow the operation in hazardous areas (in connection with a suitable isolated switch amplifier) or even as an EEx-d version.

Application:

The PDC-3 series of pressure switches is suited for regulating and monitoring differential pressure from millibar range to 2-digit bar range. Due to the fact that the pressure-sensing measuring diaphragms are only less loaded – considering their permissible values – the PDC-3 guarantees an excellent long-term stability at minimal setpoint drift. Consequent to its design, the upstroke of the pressure diaphragms is limited by means of a stopper so that high overpressure safety is ensured even in small operating ranges. The PDC-3 can be mainly used for monitoring filters or gas and fluid flow across all sections of the industry.

Technical Specifications:

Operating range / see table

Mounting position / vertical to the top

max. Pressure / see table

max. Media temperature / -25. . .+70°C short spell up to +85°C, use cooling elements for higher temperatures

Setpoint / can be set externally by means of screwdriver on the spindle

Repeatability / < 1 % of working range (for pressure ranges > 1 bar)

Adjustment / The scales are calibrated for decreasing pressures. The reading corresponds therefore to lower setpoint, the upper setpoint is higher by the hysteresis

Lead sealing / On request, ex-factory; sealing can also be undertaken later

Vibration / Up to 4g no significant deviations

mechanical Life span / 10 x 10^6 for room temperature and sinusoidal pressure impact. Life span depends highly on the sort of pressue impact. This value is therefore just a guide value. For applications with pulsating pressure or pressure surges we recommend the use of a pressure surge reducer.

electrical Life span / 100.000 switching cycles at nominal current 8 A, 250 VAC

Isolation / overvoltage category III, pollution degree 3, rated impulse voltage 4000V, fullfills DIN VDE 01 10

Hysteresis / The hysteresis cannot be set

Process connection / 2 x G1/4"-female Using G1/4"-female connections the PDC-3 can be directly screwed to the pressure pipe; alternatively fastening by means of 2 screws (4 mm Ø) on a place surface is also possible. In pressurized tubes note always that
P (+) high pressure
S (-) low pressure

Housing material / Aluminium pressure casting GD Al Si 12 (sea-water resistant)

Material of pressure sensor / refer to switching ranges in table

Scale / The PDC-3.A. . .D and PDC-3.G have only a plus-minus scale; setting is performed using a pressure gauge or at factory.

rel. Humidity / 15%. . .95%, non-condensing

Ordering Codes:

Order number	**PDC-3.**	**B.**	**0**

PDC-3 Differential Pressure Switch

Operating range /
adjustable range
A* = 4. . .25 mbar
B* = 10. . .60 mbar
C* = 20. . .160 mbar
D* = 100. . .600 mbar
E* = -0.1. . .+0.4 bar
F = 0.2. . .1.6 bar
G* = 1. . .4 bar
H = 0.5. . .6 bar
I = 3. . .16 bar
* no scale divisions (only +/- scale)

Options /
0 = without

Exi = gold-plated contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA; media temperature max. 60°C, ignition protection class II 1/2G Ex ia IIC T6 Ga/Gb, II 1/2D Ex ia IIIC T80 °C (1)

Exd = standard contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 250 VAC, 3 (2) A or 24 VDC, 3 A or 250 VDC, 0.1 A, min. 24 VDC, 2 mA, media temperature max. 60°C, ignition protection class II 2G Ex d e IIC T6 Gb, II 1/2D Ex ta/tb IIIC T80 °C Da/Db (1)

2 = gold-plated contacts, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA. not available with adjustable switching difference.

3 = two microswitches, switching in parallel or in succession, fixed switching interval (1) (with the exception of PDC-3.A/B/C/D)

4 = two microswitches, 1 plug, switching in succession, adjustable switching interval (with the exception of PDC-3.A/B/C/D)

5 = terminal connection housing, IP65

6 = protection class IP65 and switching housing with surface protection (chemical version)

(1) incl. Terminal Connection housing (IP65)

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Electrical Specifications:

Connection / plug connection

Prot. class / IP54 in vertical mounting

Switching load / 250 VAC, 8A (Ohmic), 5A (inductive)
250 VDC, 0,3A (Ohmic)
24 VDC, 8A (Ohmic)
min. 10 mA, 12 VDC

Contacts / SPDT

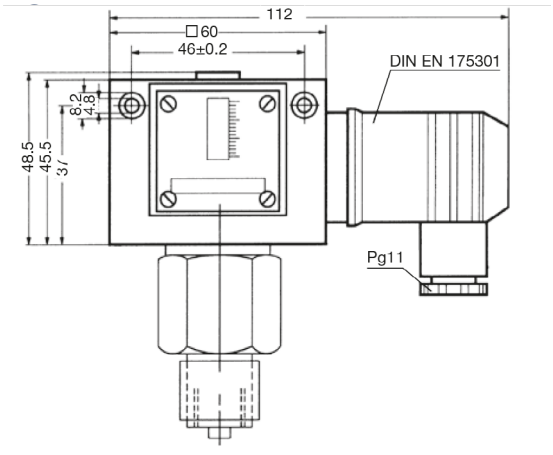
Operating Ranges and Hysteresis:

Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted parts	Sketch Nr.	Manufacturer number
PDC-3.A	4. . .25 mbar	2 mbar	0.5 bar	Sensor housing Aluminium + diaphragm Perbunan	1 + 20	DDCM252*
PDC-3.B	10. . .60 mbar	15 mbar	1.5 bar	Sensor housing Aluminium + diaphragm Perbunan	1 + 20	DDCM662*
PDC-3.C	20. . .160 mbar	20 mbar	3 bar	Sensor housing Aluminium + diaphragm Perbunan	1 + 20	DDCM1602*
PDC-3.D	100. . .600 mbar	35 mbar	3 bar	Sensor housing Aluminium + diaphragm Perbunan	1 + 20	DDCM6002*
PDC-3.E	-0.1. . .+0.4 bar	0.15 bar	15 bar	Sensor housing 1.4305 + bellow 1.4571	1 + 21	DDCM014
PDC-3.F	0.2. . .1.6 bar	0.13 bar	15 bar	Sensor housing 1.4305 + bellow 1.4571	1 + 21	DDCM1
PDC-3.G	1. . .4 bar	0.20 bar	25 bar	Sensor housing 1.4305 + bellow 1.4571	1 + 21	DDCM4*
PDC-3.H	0.5. . .6 bar	0.20 bar	15 bar	Sensor housing 1.4305 + bellow 1.4571	1 + 21	DDCM6
PDC-3.I	3. . .16 bar	0.60 bar	25 bar	Sensor housing 1.4305 + bellow 1.4571	1 + 21	DDCM16

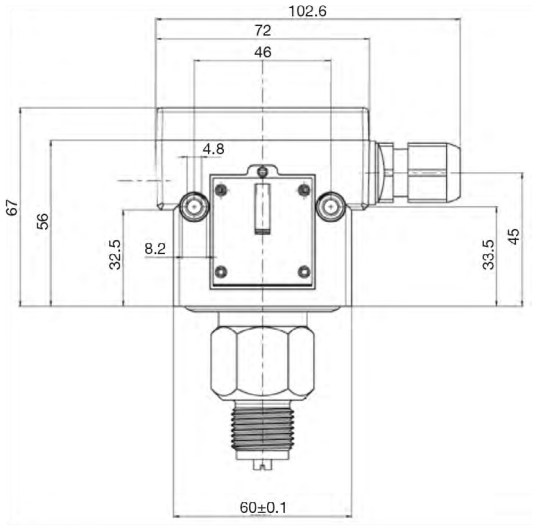
* no „mbar" or „bar" scale („±" scale only)
** could even be loaded only at one side

Housing Dimensions:

(1) Standard housing with plug connection

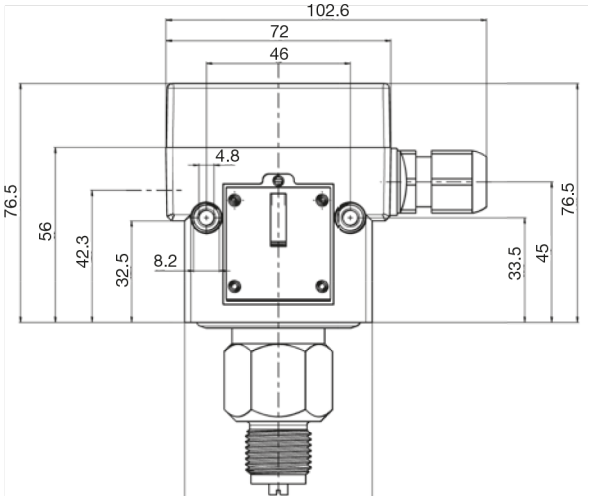


(2) Standard housing with terminal plug (Option 5)

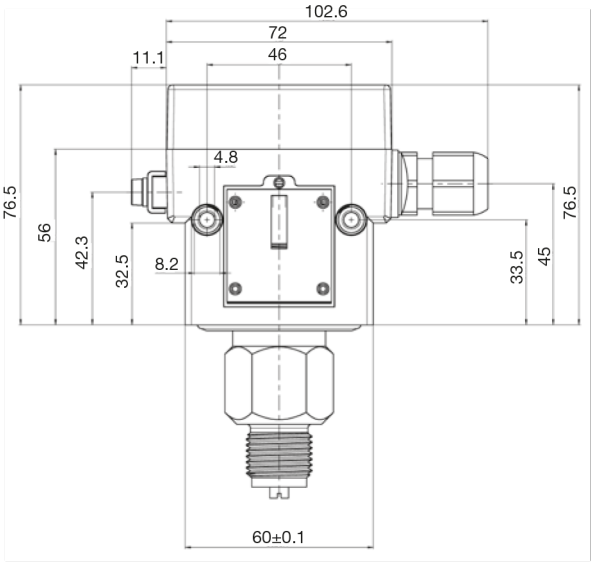


Housing Dimensions:

3 Ex-i housing with blue cable gland

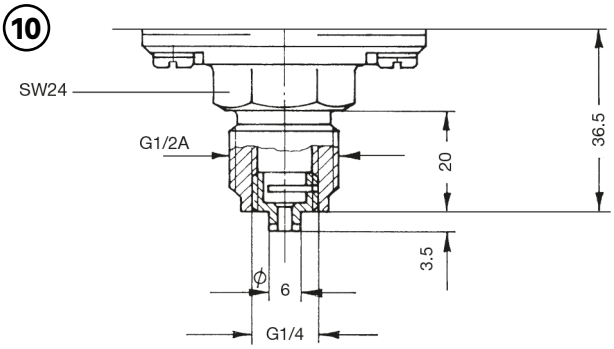


4 Ex-d housing with blue cable gland

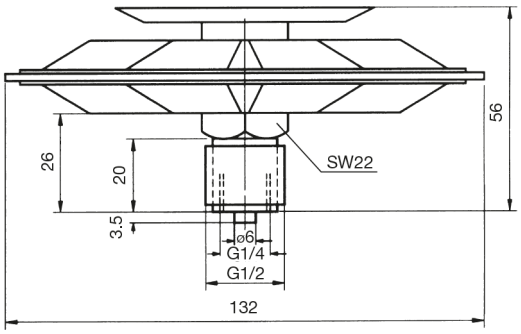


Pressure Port Dimensions:

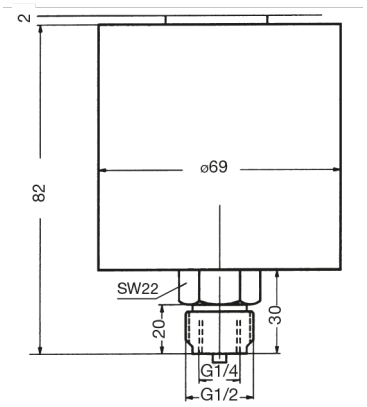
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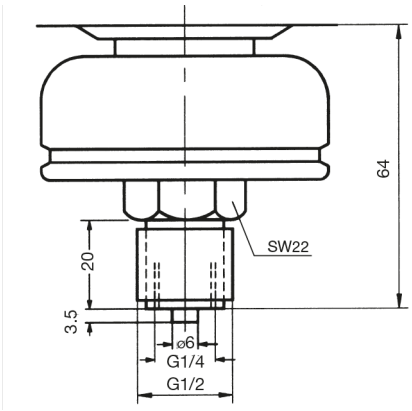
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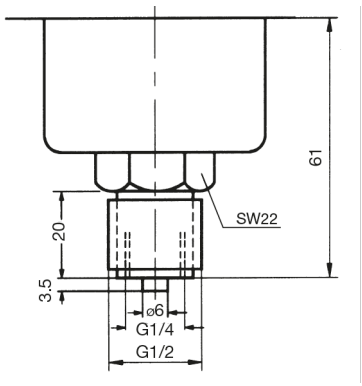


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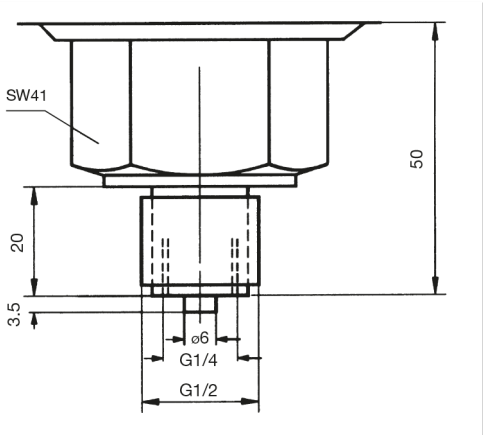


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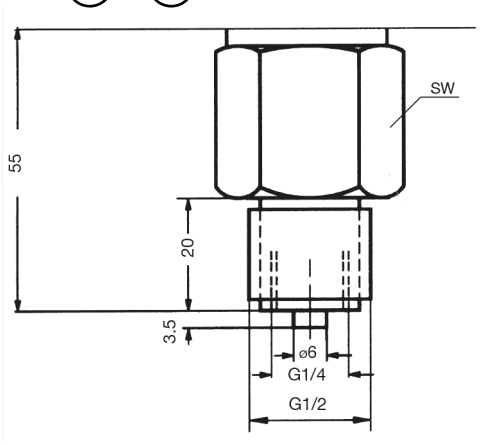
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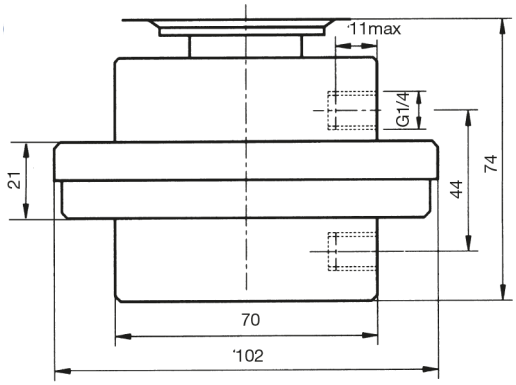


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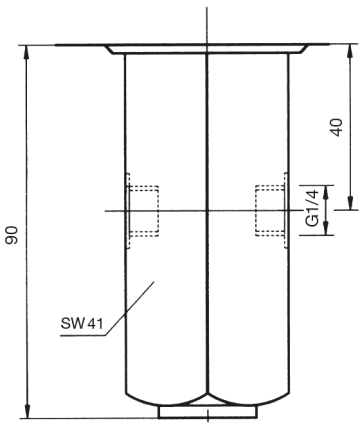


Housing Nr.	SW
16	22
17	24
18	30
19	32

20



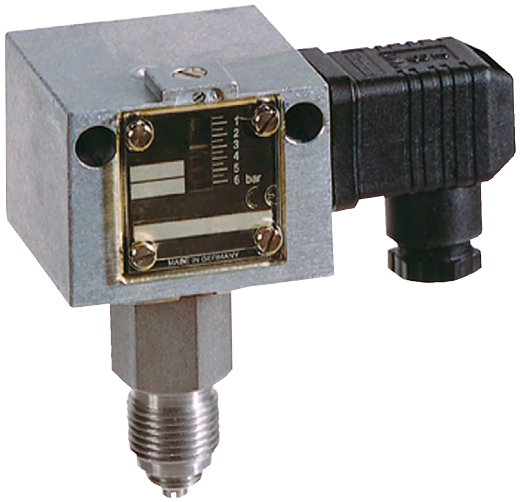
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PDC-4

Pressure Switch with Stainless Steel Sensor System



Features

/ Fully stainless steel 1.4571

/ Resistant to hostile media

/ Plug connection

/ Adjustable hysteresis

Description:

The PDC series mechanical pressure switches is characterized by their excellent mechanical strength. The PDC-4 has a robust housing made of sew-water resistant aluminium pressure casting. It has a stainless steel 1.4571 connection fitting provided with a G1/2"-male and a G1/4" female thread. Excrescent pressure changes at the connection act on an internal measuring diaphragm the movements of which are transferred to a high-performance micro-switch through a connecting bridge. The set-point is set externally by rotating a spindle for nominal value that directly modifies the pre-tension of a spring. In addition, the construction has a counter-pressure spring that ensures a very stable connection even at low set-points. The PDC series of pressure switches can be provided with a terminal housing in IP65 and a blue cable gland, to allow the operation in hazardous areas (in connection with a suitable isolated switch amplifier) or even as an EEx-d version.

Application:

The PDC-4 series of pressure switches is used in applications where high requirements are placed on the switch's life span and mechanical strength and where the PDC-1 is ruled out due to its limited resistance to the particular medium. Due to the fact that the pressure-sensing measuring diaphragms are only less loaded – considering their permissible values – the PDC-4 guarantees an excellent long-term stability at minimal setpoint drift. Consequent to its design, the upstroke of the pressure diaphragms is limited by means of a stopper so that high overpressure safety is ensured even in small operating ranges. A number of operating ranges are available of which also a version with adjustable hysteresis can be supplied. This enables the user to accurately control a span of pressures with only a single device. Thanks to its material quality, flexibility of connections and high switching load of the micro-switch, the PDC-4 is predestined for use across all sections of the industry.

Technical Specifications:

Operating range / see table

Mounting position / vertical to the top

max. Pressure / see table

max. Media temperature / -25. . .+70°C short spell up to +85°C, use cooling elements for higher temperatures

Setpoint / can be set externally by means of screwdriver on the spindle

Repeatability / < 1 % of working range (for pressure ranges > 1 bar)

Adjustment / The scales are calibrated for decreasing pressures. The reading corresponds therefore to lower setpoint, the upper setpoint is higher by the hysteresis

Lead sealing / On request, ex-factory; sealing can also be undertaken later

Vacuum / All PDC-4 besides can be impacted by vacuum; the device will not be damaged

Vibration / Up to 4g no significant deviations

mechanical Life span / 10 x 10^6 for room temperature and sinusoidal pressure impact. Life span depends highly on the sort of pressue impact. This value is therefore just a guide value. For applications with pulsating pressure or pressure surges we recommend the use of a pressure surge reducer.

electrical Life span / 100.000 switching cycles at nominal current 8 A, 250 VAC

Isolation / overvoltage category III, pollution degree 3, rated impulse voltage 4000V, fullfills DIN VDE 01 10

Hysteresis / In PDC-4.1x..A to PDC-4.1.x.I the hysteresis cannot be set. In PDC-4.2.x.B to PDC-4.2.x.D and in PDC-4.2.x.F to PDC-4.2.x.I the hysteresis can be set as specified in the following tables

Process connection / G1/2"-male (pressure gauge connection acc. DIN 16288), G1/4"-female acc. ISO 228 part 1. Using the G1/2"-male the PDC-4 can be directly screwed on to the pressure pipe, alternatively fastening by means of 2 screws (4mm Ø) on a plane surface is also possible.

Housing material / Aluminium pressure casting GD Al Si 12 (sea-water resistant)

Material of pressure sensor / refer to switching ranges in table

rel. Humidity / 15%. . .95%, non-condensing

Ordering Codes:

Order number	**PDC-4.**	**1.**	**1.**	**F.**	**0**

PDC-4 Pressure Switch with Sensor System

Hysteresis /
1 = hysteresis cannot be set
2 = hysteresis can be set

Housing /
1 = normal housing
2 = housing with plastic coating (chemical version) (PDC 4.1. only)

Operating ranges /
A = -250. . .+100 mbar
B = -1. . .+0.1 bar
C = 0.04. . .0.25 bar
D = 0.1. . .0.6 bar
E = 0.2. . .1.6 bar (only available with option 6)
F = 0.2. . .2.5 bar
G = 0.5. . .6 bar
H = 1. . .10 bar
I = 3. . .16 ba

Options /
0 = without
Exi = gold-plated contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA; media temperature max. 60°C, ignition protection class II 1/2G Ex ia IIC T6 Ga/Gb, II 1/2D Ex ia IIIC T80 °C [1]
Exd = standard contacts, SPDT, fixed hysteresis, IP65, switching capacity: max. 250 VAC, 3 (2) A or 24 VDC, 3 A or 250 VDC, 0.1 A, min. 24 VDC, 2 mA, media temperature max. 60°C, ignition protection class II 2G Ex d e IIC T6 Gb, II 1/2D Ex ta/tb IIIC T80 °C Da/Db [1]
2 = gold-plated contacts, SPDT, switching capacity: max. 24 VDC, 100 mA, min. 5 VDC, 2 mA. And others not available with adjustable hysteresis
3 = two microswitches, switching in parallel or in succession, fixed switching interval [1] (not for all operating ranges)
4 = two microswitches, 1 plug, switching in succession, adjustable switching interval (not for all operating ranges)
5 = terminal connection housing, IP65
6 = protection class IP65 and switching housing with surface protection (chemical version)

[1] inkl. Klemmenanschluss-Gehäuse (IP65)

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Electrical Specifications:

Connection / plug connection

Prot. class / IP54 in vertical mounting

Switching load / 250 VAC, 8A (Ohmic), 5A (inductive)
250 VDC, 0,3A (Ohmic)
24 VDC, 8A (Ohmic)
min. 10 mA, 12 VDC

Contacts / SPDT

Units with fixed hysteresis (PDC-4.1):

Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted parts	Sketch Nr.	Manufacturer number
PDC-4.1.1.A	-250. . .+100 mbar	45 mbar	3 bar	1.4571	1 + 15	VNS301-201
PDC-4.1.1.B	-1*. . .+0.1 bar	50 mbar	6 bar	1.4571	1 + 15	VNS111-201
PDC-4.1.1.C	0.04. . .0.25 bar	30 mbar	6 bar	1.4571	1 + 15	DNS025-201
PDC-4.1.1.D	0.1. . .0.6 bar	40 mbar	6 bar	1.4571	1 + 15	DNS06-201
PDC-4.1.1.E	0.2. . .1.6 bar	60 mbar	6 bar	1.4571	2 + 15	DNS1-201
PDC-4.1.1.F	0.2. . .2.5 bar	0.1 bar	16 bar	1.4571	1 + 18	DNS3-201
PDC-4.1.1.G	0.5. . .6 bar	0.15 bar	16 bar	1.4571	1 + 18	DNS6-201
PDC-4.1.1.H	1. . .10 bar	0.3 bar	16 bar	1.4571	1 + 16	DNS10-201
PDC-4.1.1.I	3. . .16 bar	0.5 bar	25 bar	1.4571	1 + 16	DNS16-201

* In case of high vacuum conditions, close to the theoretically possible low-pressure of -1 bar, use of the switch is subject to restrictions due to extraordinary conditions of vacuum technology. However, the vacuum switch itself will not be damaged at maximum low-pressure.

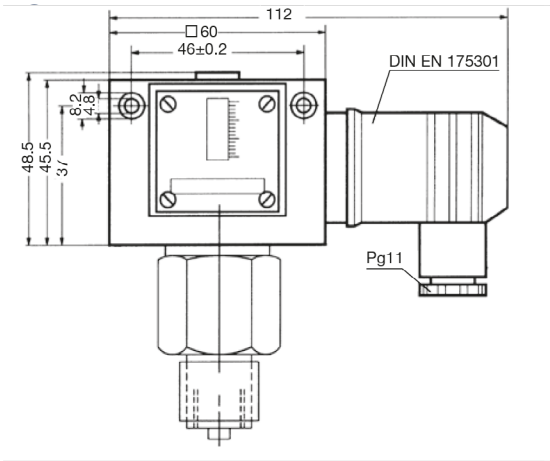
Units with adjustable hysteresis (PDC-4.2):

Type	Setpoint range	Hysteresis (average)	max. Pressure	Wetted parts	Sketch Nr.	Manufacturer number
PDC-4.2.2.G	0.5. . .6 bar	0.25. . .2 bar	16 bar	1.4571	1 + 18	DNS6-203
PDC-4.2.2.H	1. . .10 bar	0.45. . .2.5 bar	16 bar	1.4571	1 + 16	DNS10-203
PDC-4.2.2.I	3. . .16 bar	0.8. . .3.5 bar	25 bar	1.4571	1 + 16	DNS16-203

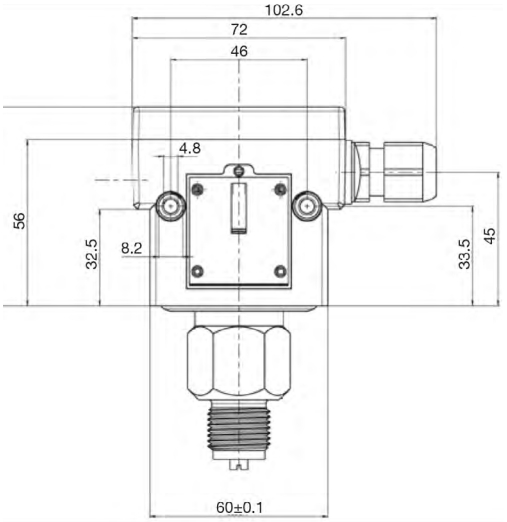
* In case of high vacuum conditions, close to the theoretically possible low-pressure of -1 bar, use of the switch is subject to restrictions due to extraordinary conditions of vacuum technology. However, the vacuum switch itself will not be damaged at maximum low-pressure.

Housing Dimensions:

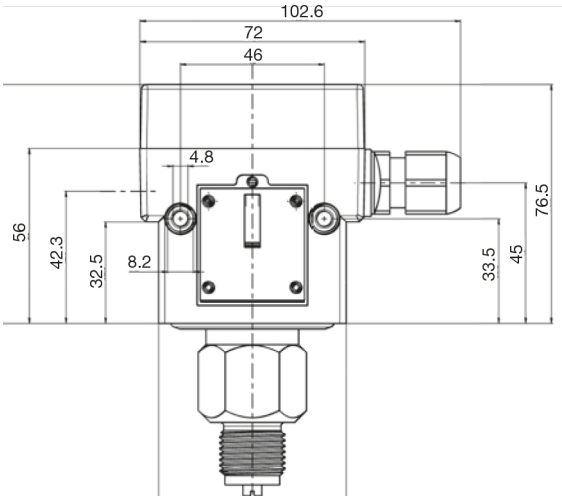
1 Standard housing with plug connection



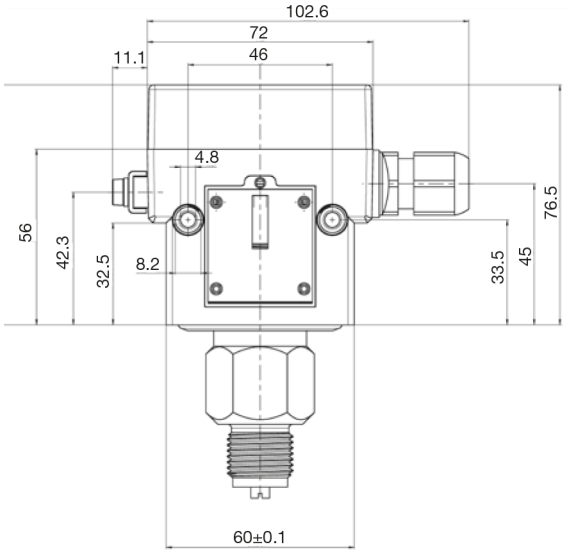
2 Standard housing with terminal conn. (Option 5)



3 Ex-i housing with blue cable gland

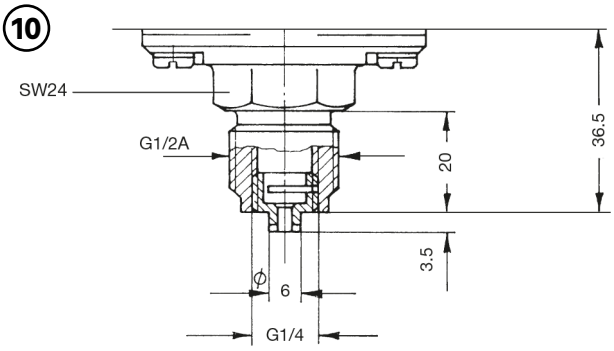


4 Ex-d housing with blue cable gland

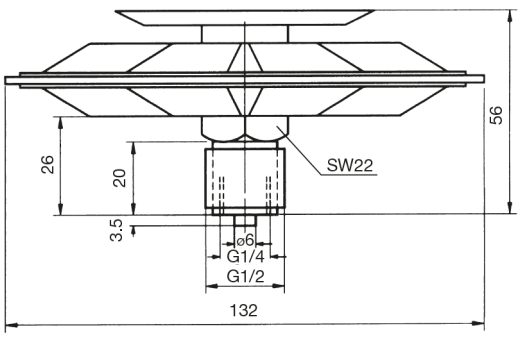


Pressure Port Dimensions:

10

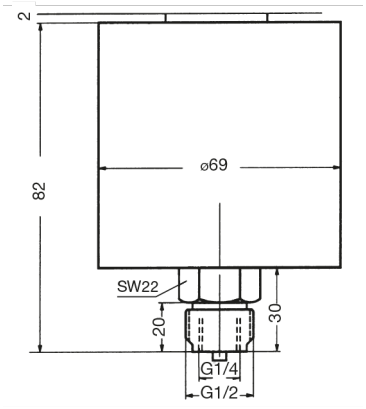


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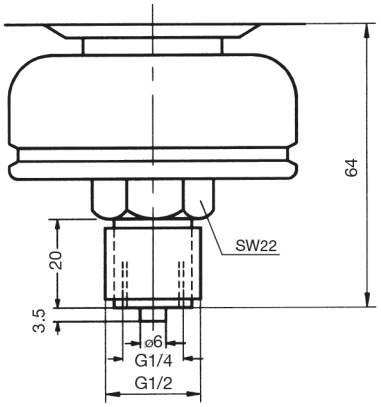


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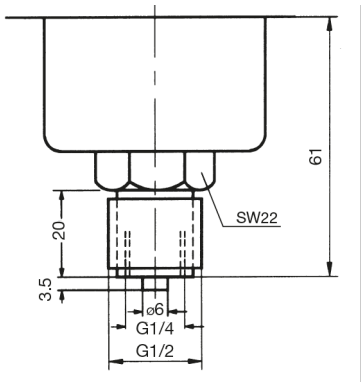
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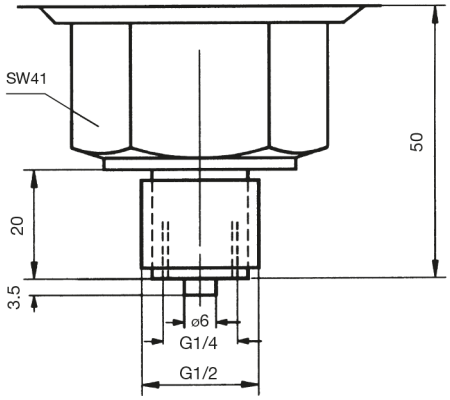
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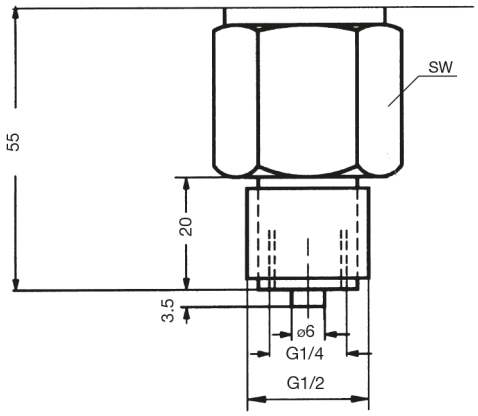
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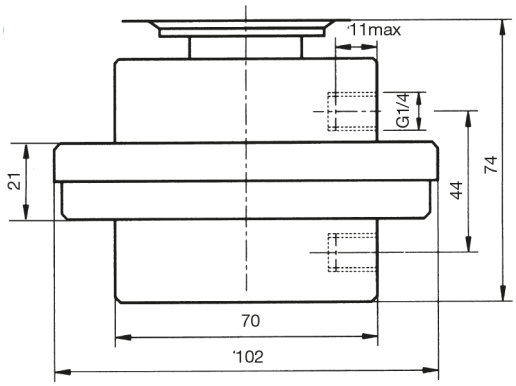


16 – 19

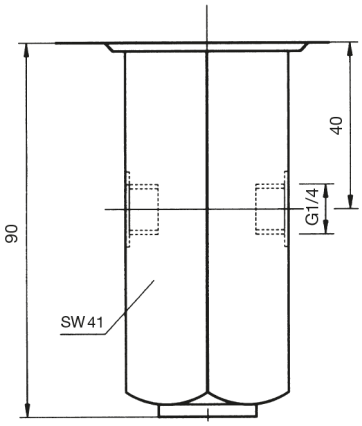


Housing Nr.	SW
16	22
17	24
18	30
19	32

20



21



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PS-04N

Dual Pressure Switch



Features

/ Stainless steel connection

/ Self-monitoring

/ Two setpoints

/ Analogue output

/ 4-digit 14-segment LED-display

/ Adjustable keypad lock

Description:

The PS-04N dual pressure switch consists of a pressure sensor with downstream electronic component. Built in a compact stainless steel housing, conceived for rough industrial conditions to make it stable against interference and shock and vibration-proof, it offers to the user everything that today's state-of-the-art pressure measurement and monitoring technology demands. The pressure is sensed by a ceramic or a piezoresistive sensor. Its accuracy rating is 0.5% of full scale value and the repeatability better than 0.1% full scale. This meets any requirement. The PS-04N is controlled by a microprocessor and capable of self-monitoring with error output. Its maximum configuration offers 2 transistor limiting contacts with adjustable setpoint, adjustable hysteresis and adjustable time lag. The measured value is legibly displayed on a digital connection display and, additionally, put out through a 4. . .20 mA or 0. . .10 VDC socket. All parameters can be easily programmed by means of a diaphragm keypad.

Application:

With its pressure range of 0 bar up to 600 bar, the PS-04N dual pressure switch covers a wide spectrum of applications and, therefore, is used across all types of industries. Typical applications are the accumulator charge connection, the locking pressure monitoring and the lubricant control, to name a few. For example, the additional analogous signal can be used for regulating pressure or for reporting functions. Using only one device, the user has simultaneously two setpoints, an onsite display an analogous output for remote transmission, thus replacing a pressure gauge, a mechanical pressure switch and a pressure sensor.

Technical Specifications:

max. Ambient temp. /	-10. . .+70°C
max. Storage temp. /	-30. . .+80°C
max. Media temp. /	-25. . .+100°C
Compensated range /	-10. . .+70°C
Temperature influence for zero-point /	< ± 0.2% of full scale / 10 K
Temperature influence on Measuring range /	< ± 0.3% of full scale / 10 K
Linearity error /	<± 0.5% of full scale at 25°C
Repeatability /	± 0.1% of full scale
Resolution /	12 Bit (4096 steps per meas. span)
Scan rate /	1000/s
Weight /	ca. 200 g
Dimensions /	110 x 41 mm without counter plug
Operating elements /	3 press keys with perceptible pressure point
Sensor element /	ceramics or piezoresistive
Process connection /	G- or NPT-1/4“-male thread or 1/2“-male thread front flush
Wetted parts /	st. steel 1.4301, brass MS58, FKM or EPDM

Electrical Specifications:

Display /	4-digit 14-segment LED-display, height of digits 9 mm, red
Connection /	plug connector M12 x 1, 4- or 5-wire
Protection class /	IP65, Class III (IP67 on request)
Supply voltage /	15 VDC up to 32 VDC, reverse polarity protected (SELV, PELV)
Power consumption /	ca. 50mA without load
Shock resistance /	50 g (11 ms) as per DIN EN 60028-2-27
Vibration /	20 g (10. . .2000 Hz) as per DIN EN 60028-2-26
Analogue outputs /	
Power output:	4. . .20 mA
Voltage output:	0. . .10 VDC
Load:	max. 10 mA
Adjusting range:	25. . .100% of full scale
Refreshing rate:	2 ms
PNP-Transistor-Switching-outputs /	
Switching function:	NO / NC, window and diagnostic modes adjustable
Load:	max. 500 mA, short-circuit safe
Adjustability of setpoint and resetpoint:	0. . .125% of full scale
Delay:	0. . .50s adjustable
Switching Frequency:	max. 100 Hz
Display:	LED(s) red

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Versions:

PS-04N Dual Pressure Switch

Electronic housing:
The electronic housing is made from the materials stainless steel V2A, FKM and PA/PC. The pressure connection is 320° turnable against the housing.

Sealing:
Depending on the media, choice is possible from among: FKM, e.g. for hydraulic oil and EPDM, e.g. for brake fluid.

Operating range:
The ranges from 0. . .0.2 bar up to 0. . .600 bar are standard ranges. Special operating ranges are available on request.

Outputs:
The full version of PS-04N provide two PNP transistor outputs and an additional analogue output at standard. Other versions are downgraded in several steps.

Process connection:
The user may choose between G1/4"-male thread, 1/4"-NPT-male thread, G1/2"-front flush diaphragm with male thread connection and 1/2"-NPT-frontflush diaphragm with male thread connection. Front flush versions are always equipped with a piezoresistive sensor element. UNF- and CETOP-connections are available on request.

Sensor:
The PS-04N is equipped with a piezoresistive sensor element at standard. Operating ranges from 0. . .10 bar rel. up to 0. . .400 bar rel. can also be equipped with a sensor element from ceramics.

Ordering Codes:

Order no.	PS-04N.	3.	1.	R100.	5.	1.	P

PS-04N Dual Pressure Switch

Electronic housing /
3 = st. steel

Sealing /
1 = FKM
3 = EPDM

Operating range /

A01	= 0. . .1 bar absolut	(piezoresistive Sensor)
A05	= 0. . .5 bar absolut	(piezoresistive Sensor)
A10	= 0. . .10 bar absolut	(piezoresistive Sensor)
RP02	= 0. . .0.2 bar rel.	(piezoresistive Sensor)
RP05	= 0. . .0.5 bar rel.	(piezoresistive Sensor)
R001	= 0. . .1 bar rel.	(piezoresistive Sensor)
R002	= 0. . .2 bar rel.	(piezoresistive Sensor)
R005	= 0. . .5 bar rel.	(piezoresistive Sensor)
R010	= 0. . .10 bar rel.	
R050	= 0. . .50 bar rel.	
R100	= 0. . .100 bar rel.	
R200	= 0. . .200 bar rel.	
R400	= 0. . .400 bar rel.	
R600	= 0. . .600 bar rel.	(piezoresistive Sensor)

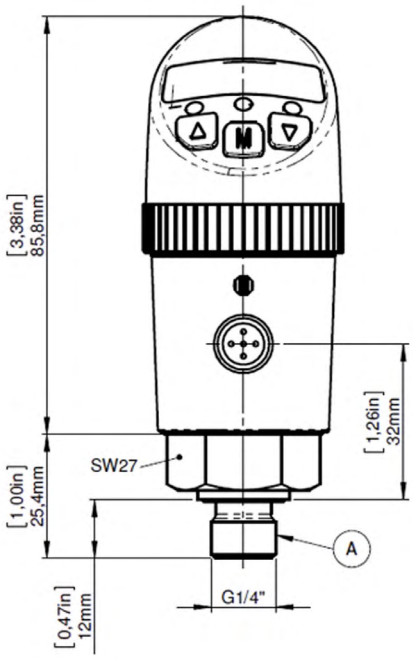
Outputs /
1 = 2 transistor outputs (PNP)
2 = 1 transistor output (PNP) and 1 analogue output 4. . .20 mA
3 = 1 transistor output (PNP) and 1 analogue output 0. . .10 VDC
4 = 2 transistor outputs (PNP) and 1 analogue output 4. . .20 mA
5 = 2 transistor outputs (PNP) and 1 analogue output 0. . .10 VDC

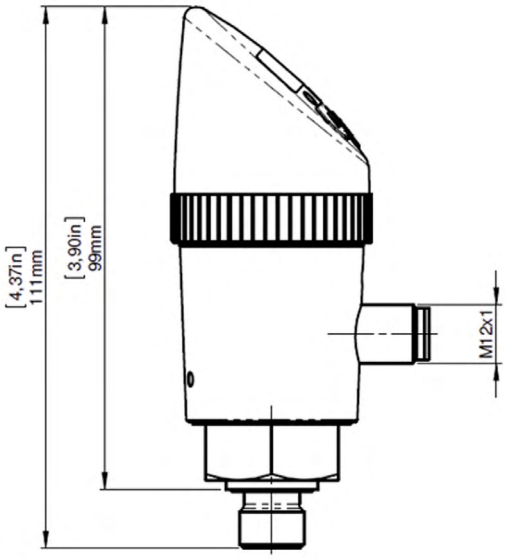
Process connection /
1 = G1/4"-male thread
2 = G1/2"-front flush diaphragm male thread (piezoresistive sensor)**
3 = 1/4"-NPT-male thread
4 = 1/2"-NPT-front flush diaphragm male thread (piezoresistive sensor)**

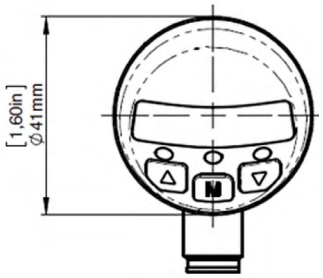
Sensor /
P = piezoresistive sensor element
K = sensor element from ceramics

** 10. . .600 bar only

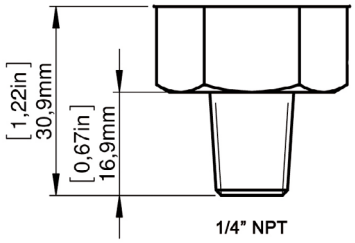
Dimensions in mm:

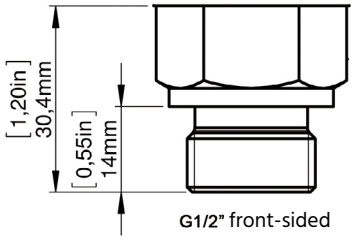






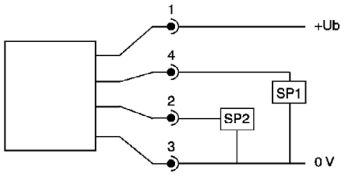
Process connection /



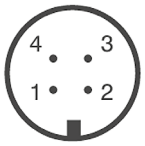


Electrical connection and plug connection /

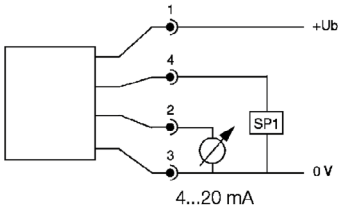
Version: 2 switching outputs



plug 4-pole

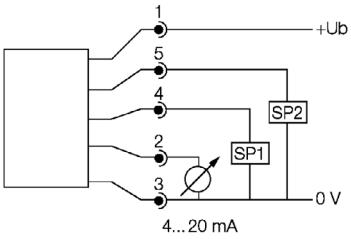


Version: 1 switching output + 1 Analogue



Version: 2 switching outputs + 1 Analogue

plug 5-pole





Plug connector M12x1, 4/5-wire	Version with 1 switching output	Version with 2 switching outputs	Version with 1 switching and 1 analogue output	Version with 2 switching and 1 analogue output
Pin 1 (brown)	+Ub 15. . .32 VDC	+Ub 15. . .32 VDC	+Ub 15. . .32 VDC	+Ub 15. . .32 VDC
Pin 2 (white)	not connected	SP2 (0,5A max.)	analogue 4. . . 20 mA or 0. . .10 VDC	analogue 4. . .20 mA or 0. . .10 VDC
Pin 3 (blue)	0V	0V	0V	0V
Pin 4 (black)	SP1 (0.5A max.)	SP1 (0.5A max.)	SP1 (0.5A max.)	SP1 (0.5A max.)
Pin 5 (grey)	not connected	not connected	not connected	SP2 (0.5A max.)

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PS-05

Electronic Pressure Switch with Stainless Steel Sensor



Features

/ Display and housing turnable

/ Accuracy up to 0,25%

/ Up to 4 switching outputs

/ Many different process connections

/ 2- or 3-wire

/ 4 digit LED-display

Description:

The PS-05 pressure switch and sensor combines a display with a pressure sensor. Four PNP switching outputs can be used, as well as a current and a voltage output. The switching points can be adjusted easily and completely boundless within the menu, because the display can be rotated in two directions, so virtually any orientation of the display is possible. Further adding to its versatility, a whole lot of different dimensions can be chosen for the PS-05, such as bar, mbar, mWC and so on. While being used in a difficult application, the PS-05 will be protected from the medium by a front-flush-diaphragm. This way, a clogging of the measuring unit will be avoided.

Application:

The PS-05 pressure switch can be used for liquids and gases alike. The pressure connection made from stainless steel makes it compatible with a variety of media. Should the media be very aggressive, thick or have a very high temperature and therefore require different configurations, the transmitters can be outfitted with isolating diaphragms. Especially the flexible display makes the PS-05 useful and versatile device for many areas e.g. for pneumatic, process engineering, environment technology and in general measurement technology.

Technical Specifications:

Switching output / 1 x PNP-output

Optional outputs / 2 x independend PNP-outputs
4 x independend PNP-outputs

Accuracy / Standard: P_N < 0,4 bar: ≤ ± 0,5 %,
or rather P_N ≥ 0,4 bar: ≤ ± 0,35 %
option for P_N ≥ 0,4 bar: ≤ ± 0,25 %

Repeatability / ≤ ± 0.1% FSO

Switch frequency / max. 10 Hz

Switching cycles / > 100 x 10^6 cycles

Delay / 0. . .100 s

Media temp. / -40. . .125°C

Ambient temp. / -40. . .85°C

Storage temp. / -40. . .100°C

Material /

- Pressure connection: SS 1.4404
- Housing: SS 1.4404
- Display housing: PA 6.6, Polycarbon
- Seals: FKM, weld-on version optional
- Membrane: SS 1.4435

Installation position / any

Weight / at least 160g

Mechanical strength /

- Vibration: 10g RMS (25. . .2000 Hz) from DIN EN 60068-2-6
- Shock: 500g / 1 ms from DIN EN 60068-2-27

Temperature errors /

Nominal pressure PN [bar]	-1. . .0	< 0.40	≥ 0.40
Error string [% FSO]	≤ ± 0.75	≤ ± 1	≤ ± 0.75
in compensated areas [°C]	-20. . .85	0. . .70	-20. . .85

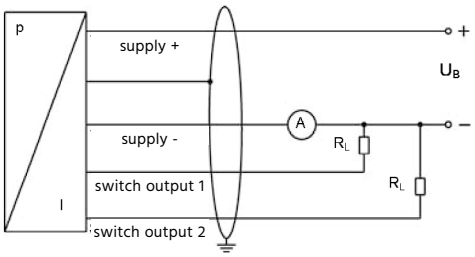
Vacuum protection / P_N ≥ 1 bar: infinite
P_N < 1 bar: on request

Inlet sizes:

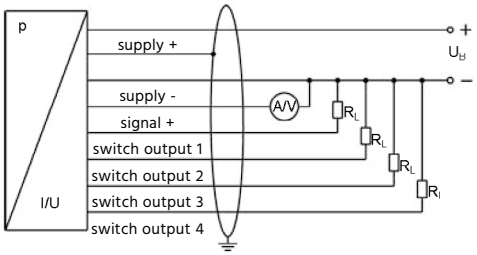
PN gauge	PN abs.	Overload	Burst pressure ≥
-1. . .0	-	5	7.5
0.10	-	0.5	1.5
0.16	-	1	1.5
0.25	-	1	1.5
0.40	0.40	2	3
0.60	0.60	5	7.5
1	1	5	7.5
1.6	1.6	10	15
2.5	2.5	10	15
4	4	20	25
6	6	40	50
10	10	40	50
16	16	80	120
25	25	80	120
40	40	105	210
60	60	210	420
100	100	210	420
160	160	600	1000
250	250	1000	1250
400	400	1000	1250
600	600	1000	1250

Connections:

2-wire-system (current)



3-wire-system (current / voltage)



Electrical connection	M12x1 plastic (5-pin)	M12x1 metal (5-pin)	M12x1 plastic (8-pin)	ISO 4400	Binder Series 723 (5-pin)	Kabelfarben (IEC 60757)
Supply +	1	1	1	1	1	wh (white)
Supply -	3	3	3	2	3	bn (brown)
Signal + (only for 3-wire)	2	2	2	3	2	gn (green)
Switch output 1	4	4	4	3	4	gy (grey)
Switch output 2	5	5	5	-	5	pk (pink)
Switch output 3	-	-	6	-	-	-
Switch output 4	-	-	7	-	-	-
Shield	over pressure connection	plug housing / pressure connection	over pressure connection	mass contact	plug housing / pressure connection	gnye (green-yellow)

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Electrical Specifications:

Analogue output /

2-wire current signal	4. . .20 mA / U_B = 13. . .36 V_{DC} max. load: R_{max} = [(U_B - $U_{B\ min}$) / 0.02A] Ω setting time: < 10 ms
3-wire current signal	4. . .20 mA / U_B = 19. . .30 V_{DC} adjustable (Turn-Down of range to 1:5) max. load: R_{max} = 500 Ω setting time: < 3 s
3-wire voltage signal	0. . .10 V / U_B = 15. . .36 V_{DC} max. load: R_{min} = 10 kΩ setting time: < 3 ms
without output	U_B = 15. . .36 V_{DC}

max. Current /

4. . .20 mA / 2- and 3-wire:	125 mA loadable, short circuit proof; U_{Switch} = U_B - 2V
0. . .10 V / 3-wire:	125 mA loadable, short circuit proof

max. Current (unloaded outputs) /

2-wire current:	max. 25 mA
3-wire current:	ca. 45 mA + signal stream
3-wire voltage:	ca. 45 mA

Display / 4-digit, red 7-segment-LED-display, digit height 7mm, display range -1999. . .+9999; Accuracy 0.1% ± 1 Digit; digital damping 0.3. . .30 s (adjustable); refreshrate 0.0. . .10 s (adjustable)

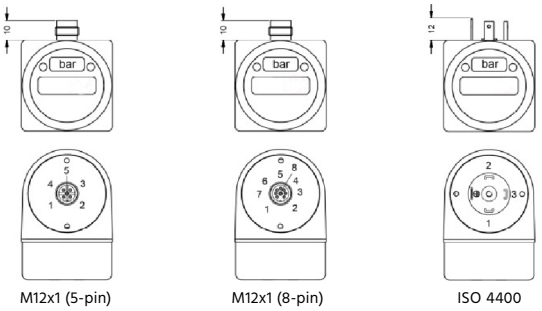
CE-Conformity / EMV-guideline: 2014/30/EU
Pressure Equipment directive: 2014/68/EU (module A) for devices with max. over-pressure > 200 bar

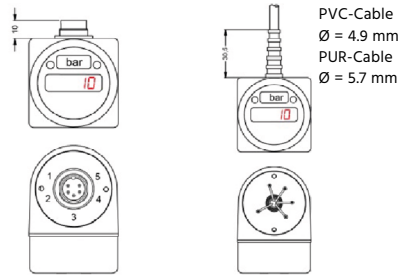
Protection /

Short circuit proof:	permanent
Pole reversion:	no damage, but also no functionality while reversing poles
Electromagnetic compatibility:	emitted interference and interference immunity according to EN 61326

Protection class / IP 65

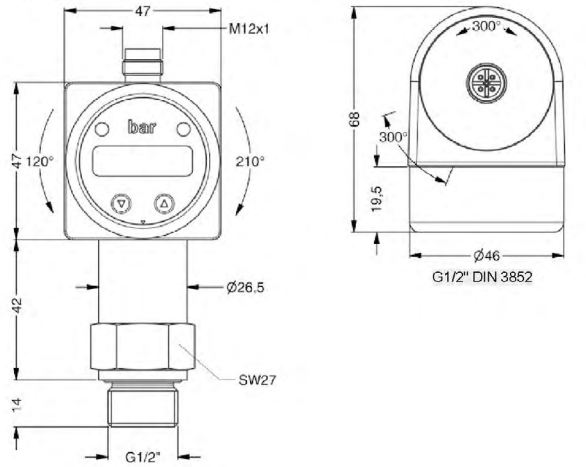
Electr. Connections:



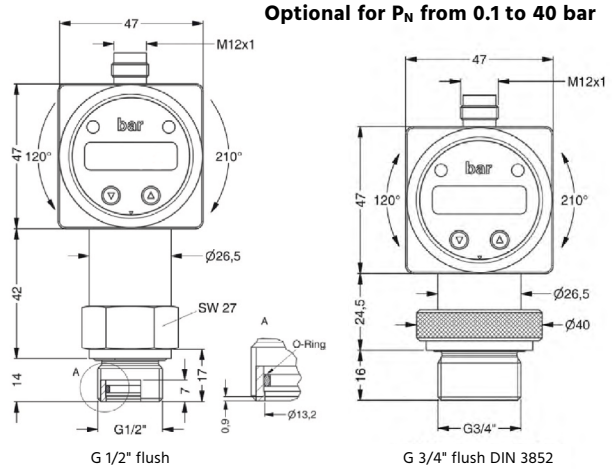


Mech. Connections:

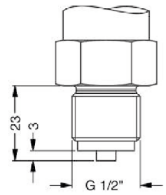
Standard (in mm)



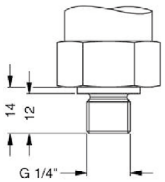
Optional for P_N from 0.1 to 40 bar



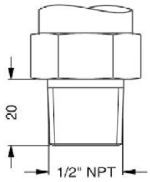
Mech. Connections:



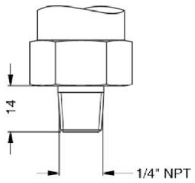
G1/2" EN 837



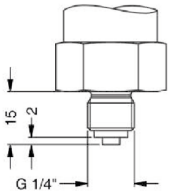
G1/4" DIN 3852



1/2" NPT



1/4" NPT



G1/4" EN 837

Ordering Codes:

Order number	PS-05.	1.	12.	1.	B.	1.	5.	3.	0

Electronic Pressure Switch with Stainless Steel Sensor

Measuring unit /
1 = gauge in bar
2 = absolute in bar

Measuring range /
1 = 0. . .0.10 bar
2 = 0. . .0.16 bar
3 = 0. . .0.25 bar
4 = 0. . .0.40 bar
5 = 0. . .0.60 bar
6 = 0. . .1.0 bar
7 = 0. . .1.6 bar
8 = 0. . .2.5 bar
9 = 0. . .4.0 bar
10 = 0. . .6.0 bar
11 = 0. . .10 bar
12 = 0. . .16 bar
13 = 0. . .25 bar
14 = 0. . .40 bar
15 = 0. . .60 bar
16 = 0. . .100 bar
17 = 0. . .160 bar
18 = 0. . .250 bar
19 = 0. . .400 bar
20 = 0. . .600 bar
21 = -1. . .0 bar

Analogue output /
1 = none
2 = 4. . .20 mA / 2-wire
3 = 0. . .10 V / 3-wire
4 = 4. . .20 mA / 3-wire, adjustable

Switching output / [1]
A = 1 switching output
B = 2 switching outputs
C = 4 switching outputs

Accuracy /
1 = standard: P_N < 0,4 bar: ≤ ± 0,5% or rather P_N ≥ 0,4 bar: ≤ ± 0,35%
9 = option for P_N ≥ 0,4 bar: ≤ ± 0,25% instead of ≤ ± 0,35%

Electrical connection /
1 = plug M12x1 (5-pin) - plastic
2 = plug M12x1 (8-pin) - plastic
3 = plug M12x1 (5-pin) - metal
4 = plug and cablebox ISO 4400
5 = plug Binder Series 723 (5-pin)
6 = cable output with PVC-Cable

Mechanical connection /
1 = G ½" DIN 3852
2 = G ½" EN 837 [2]
3 = G ¼" DIN 3852
4 = G ¼" EN 837 [2]
5 = G ½" DIN 3852 with front flush measuring cell
6 = G ¾" DIN 3852 with front flush measuring cell
7 = ½" NPT
8 = ¼" NPT

Sealing /
0 = standard FKM
9 = none (weld version)

[1] max. 1 switching output for 2-wire current signal and ISO-4400-plug as well as for 2-wire current signal with Ex-protection. No switching output possible for 3-wire with ISO 4400-plug

[2] Welded version only with pressure ports according to EN 837; possible for nominal pressure ranges PN ≤ 40 bar

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PAMU

Chemical Pressure Gauge with Integrated Pressure Measuring Transmitter



Features

/ Mechanical and electronic system

/ Independent

/ Display visible from distance

/ Fully stainless steel

/ Optionally Ex-version

Description:

In the PAMU type of devices two parallel systems measure the excrescent pressure at the process connection independent of each other. The first one is a Bourdon pressure gauge of proven stainless steel technology that is intended for clearly legible display of the measurement onsite. In case of high frequent pressure changes, we recommend optionally available silicon oil filling for the device, as this would counteract the quivering of the indicator. At the same time, a pressure measuring transmitter integrated into the housing of the pressure gauge functions as a remote encoder with its 4. . .20 mA 2-wire output and thus enables processing of the measurement in control or other display units.

Application:

Well-tested and long-standing pressure measuring technology in robust design combined with modern electronics, so as to unify the benefits of both the systems into a single device. Right under the roughest conditions of the equipment, the user obtains a measurement directly at the measuring point despite sensitive hi-tech devices and thus will be able to read into the operations in the system even if there is an outage of electrical power. Chemical pressure gauges with an integrated pressure measuring transmitter are used often in the chemical industry as well as in the manufacturing of machines and equipment.

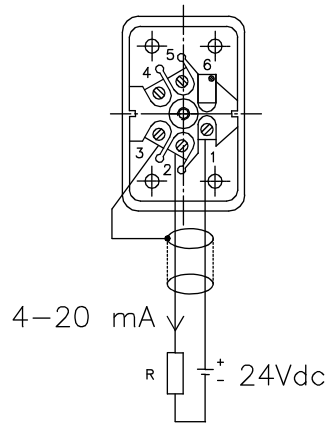
Technical Specifications:

Nominal size /	NG100 (NG160 on request)
Process connection /	Standard G 1/2" B male, CrNi-Steel 1.4571, facing downwards; optional G 1/4" B, 1/2" NPT and 1/4" NPT connections
Damping /	Manometer available with non-conductive insulating oil
Accuracy /	
Manometer:	< 1.0% of full scale value (Class 1.0 as per EN 837-1)
max. Temperature /	
Media temp.:	-40. . .+100°C
Ambient temp.:	-40. . .+60°C
Wetted parts /	AISI, 316 Ti / 1.4571
Dial /	white aluminium, black scale
Pointer /	black aluminium
Housing /	CrNi-steel with blow-out back
Window /	mineral glass
Ring /	bayonet ring, 1.4301
Prot. Class Housing /	IP 65
CE-marking /	pressure equipment directive 2014/68/EU, PS > 200 bar, module A, pressure accessory

Electrical Specs Transmitter:

Supply voltage /	12. . .30 VDC
Nominal voltage /	250 VDC
max. Curent /	16 A
Accuracy /	< 0.5%
Ranges /	-1. . .+0.6 bar to 0. . .600 bar
Output /	4. . .20 mA, 2-Leiter
max. Switch resistance /	≤ (Ub - 9.5 V) / 0.02 A
Connection /	Universal cable connection box Type B, 6-pole, adjustable at 180°
Contacts:	brass, gold plated
Connector type:	**Clamps:** M20 x 1.5 to 1.5 mm², wire protected **Device:** soldered conn. up to 2.0 mm²
Ambient temp. /	-40. . .+85°C
Material /	Polyamide 6
Ex-Version /	on request
EMV /	EN 50 081-1:1992
Protection class /	IP65 as per EN 60529 / IEC 529

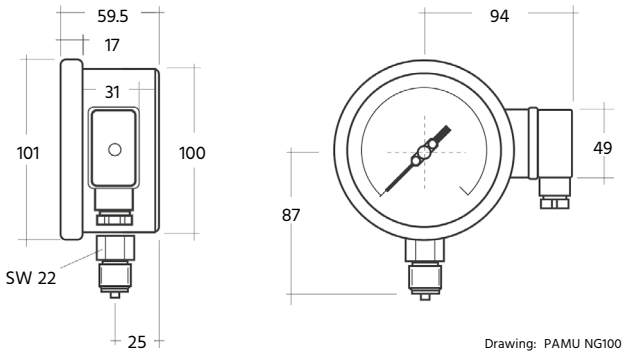
Pin-Assignment Transmitter:



PIN 1 = + 24 VDC
PIN 2 = -
PIN 3 = cable shield
6 = zero point adjustment

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Dimensions in mm:



Drawing: PAMU NG100

Ordering Codes:

Order number	PAMU.	1.	0.	0.	L

PAMU Chemical Pressure Gauge

Process connection /
1 = G 1/2" B male downwards (standard)
2 = NPT 1/2" male downwards
3 = NPT 1/4" male downwards
4 = G 1/4" B male downwards

Damping /
0 = none
1 = Glycerine filling

Option /
0 = none, standard
1 = oil- and fat-free for oxygen usage
2 = Ex-Version

Operating range /
A = -1. . .0 bar
B = 0. . .1 bar
C = 0. . .1.6 bar
D = 0. . .2.5 bar
E = 0. . .4 bar
F = 0. . .6 bar
G = 0. . .10 bar
H = 0. . .16 bar
I = 0. . .25 bar
J = 0. . .40 bar
K = 0. . .60 bar
L = 0. . .100 bar
M = 0. . .160 bar
N = 0. . .250 bar
O = 0. . .400 bar
P = 0. . .600 bar
Q = -1. . .0.6 bar
R = -1. . .1.5 bar
S = -1. . .3 bar
T = -1. . .5 bar
U = -1. . .9 bar
V = -1. . .15 bar
W = -1. . .24 bar

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PU-01N

Pressure Transmitter for OEM Applications



Features

/ Compact design

/ Integrated amplifier

/ Affordable price to performance ratio

/ Broad-based media compatibility

Description:

The PU-01N series of pressure measuring transmitters belongs to the top-class products among pressure sensors which are ideally suited for OEM applications considering their attractive price levels. In PU-01N, the close-lying pressure is measured, depending on the pressure range, by means of a piezo-resistive or a thin-film sensor element. The pressure-dependent resistance signal output by this sensor element is converted into a power or voltage signal through an amplifier. Alternatively, a power signal of 4. . .20 mA in 2-wire method or a voltage signal of 0. . .10 VDC in 3-wire method can be delivered from the transmitter. Other types of output signals are available on request.

Application:

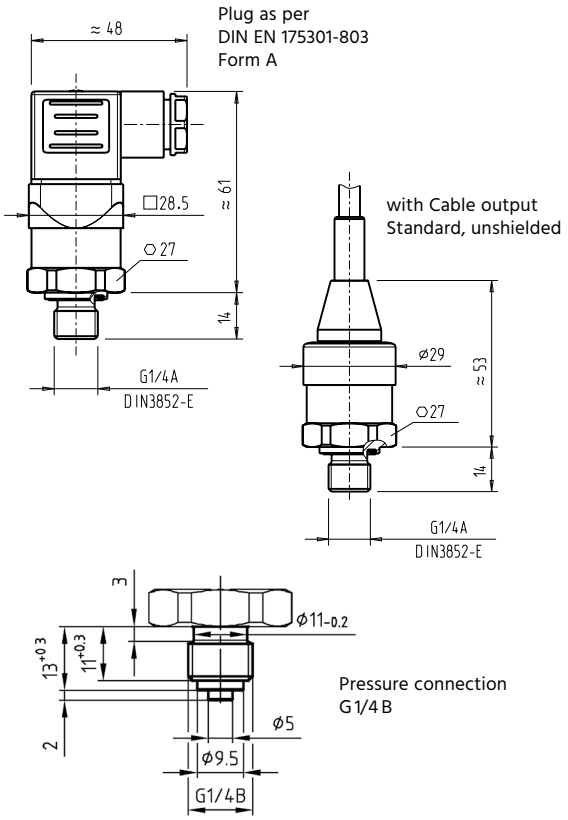
The PU-01N series of pressure measuring transmitters is always used for measuring pressure in fluid or gaseous media, if the process does not demand absolute accuracy but a fair repeatability is sufficient for it. All wetted parts are made of stainless steel in order to cover a wide range of media. In case of particularly difficult media, we recommend mounting the PU-01N along side a diaphragm seal (most used types on request). The high overload capacity of the devices, their resistance from corrosion, mechanical vibrations, mechanical shocks and temperature and their durable stability are highly valued for use in the entire industry.

Technical Specifications:

Process connection /	G1/4"B male
Wetted Parts /	stainless steel 316L (from 10 bar rel. st. steel 316 and 13-8PH)
max. Pressure /	overrange limit [bar]: 2-times operating range end value
max. Media temp. /	-30. . .+100°C with seal at process connection NBR[1] (standard)
max. Ambient temp. /	-30. . .+100°C
max. Storage temp. /	-40. . .+100°C
Compensated range /	0. . .80°C
Housing /	stainless steel 316L
Weight /	approx. 0.08 kg
Non linearity /	≤ 0.5% of span according to IEC 61298-2
Non repeatability /	≤ 0.2% of span
Set time /	≤ 4 ms within 10. . .90% of span
Temperature factor /	≤ ±1% typ., ≤ ±2.5% max. in range 0. . .+80°C

[1] Other seals on request
(FPM/FKM, EPDM, copper, stainless steele)

Dimensions in mm:

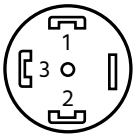


Electrical Specifications:

Output /	**4. . .20 mA (2-wire)** current output, load ≤ (U_B-8V) / 0,02A **DC 0. . .10V (3-wire)** voltage output, load, max. Output signal / 1 mA
Power supply /	8. . .30 VDC for (2-wire) 14. . .30 VDC for (3-wire)
max. Current consumption /	current: 25 mA, voltage: 8 mA
CE-Conformity /	2004/108/EWG interference emission and interference resistance to EN 61326 interference emission limit class B 97/23/EG pressure gauge code
Protection class /	IP65 EN 60529/IEC 529
Electrical protection /	protection against polarity reversal, excess voltage and short-circuiting. No polarity reversal protection for ratio-metric output.

Wiring Diagram:

Angled plug DIN 175301-803 A /



	2-wire	3-wire
U_B (Supply +)	1	1
0V (Supply -)	2	2
S+ Analogue output	-	3

Cable output, unshielded /



	2-wire	3-wire
U_B (Supply +)	brown	brown
0V (Supply -)	blue	blue
S+ Analogue output	-	black

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Ordering Codes:

Order number	PU-01N.	2.	2.	1.	G

PU-01N Pressure Transmitter

Output signal /
1 = 4. . .20 mA, 2-wire
2 = 0. . .10 VDC, 3-wire

Calibration /
1 = relative pressure
2 = absolute pressure (only up to operating range H)

Electrical Connection /
1 = plug connection
2 = with permanent fixed connecting cable (2m)

Operating range /
A = 0. . .1 bar
B = 0. . .1.6 bar
C = 0. . .2.5 bar
D = 0. . .4 bar
E = 0. . .6 bar
F = 0. . .10 bar
G = 0. . .16 bar
H = 0. . .25 bar
I = 0. . .40 bar
J = 0. . .60 bar
K = 0. . .100 bar
L = 0. . .160 bar
M= 0. . .250 bar
N = 0. . .400 bar
O = 0. . .600 bar

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PU-06

Pressure Measuring Transmitter for General Industrial Applications Class 0.25 or 0.35



Features

/ Accuracy class up to 0.25
/ Stainless steel sensor
/ Robust design
/ High precision and linearity
/ Excellent media compatibility
/ Excellent long-term stability
/ Variety of electrical and mechanical connections
/ Optional Ex- and SIL 2-version

Description:

The high quality pressure sensors of PU-06 series are accurate and reliable transmitters that measure the applied pressure by a piezo-resistive sensor element (not wetted). The pressure-dependent resistance signal output by this sensor element is converted into a current or voltage signal. Selectively, a current signal of 4 to 20 mA in 2-wire method or a current signal of 0 to 20 mA respectively a voltage signal of 0 to 10 VDC in 3-wire method can be supplied. Other types of output signals are available on request. The PU-06 with the front flush sensor element is particularly suited for sticky or tenacious media as the media cannot creep into the device and destroy or clog it.

Application:

The PU-06 pressure transmitters are used for measuring pressure in fluid or gaseous materials. The sensor element is made of stainless steel and therefore compatible with a variety number of media. If the measured media require other conditions due to hostile nature, viscosity or temperature of the media, the transmitters can be equipped with diaphragm seals to allow flange connections, milk tube joints or tri-clamp joints (other types on request). Due to its compact design, accuracy and material combination the PU-06 is perfectly suited for a wide range of industrial applications.

Version:

PU-06 Pressure Measuring Transmitter Class 0.35 or 0.25

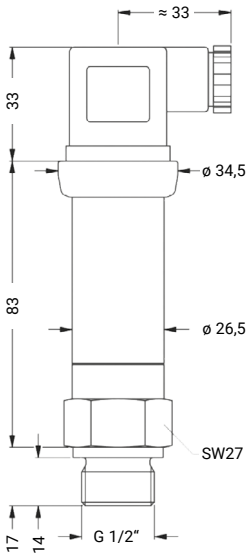
Output signal: Possible output signals are: 4. . .20 mA in 2-wire method (optional as SIL 2- or/ and intrinsically safe version) or 0. . .20 mA respectively 0. . .10 VDC in 3-wire method (other output signals on request).

Calibration: On request, the devices can be calibrated for operating ranges „E“ up to „U“ at absolute pressure.

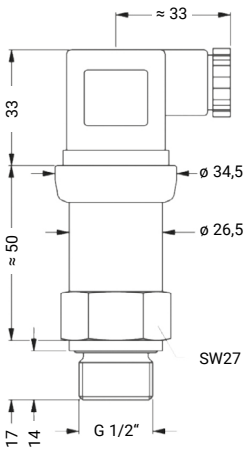
Process connection: On request, the devices can be supplied for operating ranges „B“ up to „O“ with a front flush sensor, that can even be welded to the pressure port. In this case wetted parts are fully stainless steel, because no gasket is necessary. This is recommended for viscous or sticky media.

Dimensions in mm:

SIL- and Ex-Version /



Standard- and Ex-Version /



Ordering Codes:

Order no.	PU-06.	1.	1.	1.	1.	1.	1.	L.	0

PU-06 Pressure Measuring Transmitter

Output signal /
1 = 4. . .20 mA, 2-wire
2 = 0. . .20 mA, 3-wire
3 = 0. . .10 VDC, 3-wire
4 = Intrinsically safe 4. . .20 mA, 2-wire
5 = SIL2 4. . .20 mA, 2-wire
6 = SIL2 intrinsically safe 4. . .20 mA, 2-wire

Calibration /
1 = gauge pressure[1]
2 = absolute pressure[2]

Accuracy /
1 = 0.35 % (0.5 % for PN < 0.4 bar)
2 = 0.25 % (PN ≥ 0.4 bar)

Electrical connection /
1 = male and female plug ISO 4400
2 = male plug Binder Series 723 (5-pole)
3 = cable outlet with 2m PVC cable
4 = male plug M12x1 (4-pole) / metal
5 = compact field housing stainless steel 1.4305

Process connection /
1 = G 1/2“ DIN 3852
2 = G 1/2“ EN 837
3 = G 1/4“ DIN 3852
4 = G 1/4“ EN 837
5 = G 1/2“ DIN 3852 with front flush sensor[3]
6 = G 1/2“ DIN 3852 open pressure port[3]
7 = 1/2“ NPT

Gasket /
1 = FKM
2 = EPDM (only for PN ≤ 160 bar)
3 = without (welded version)[4]

Operating range /
A = -1. . .0 bar
B = 0. . .0.10 bar
C = 0. . .0.16 bar
D = 0. . .0.25 bar
E = 0. . .0.40 bar
F = 0. . .0.60 bar
G = 0. . .1.0 bar
H = 0. . .1.6 bar
I = 0. . .2.5 bar
J = 0. . .4.0 bar
K = 0. . .6.0 bar
L = 0. . .10 bar
M = 0. . .16 bar
N = 0. . .25 bar
O = 0. . .40 bar
P = 0. . .60 bar[5]
Q = 0. . .100 bar[5]
R = 0. . .160 bar[5]
S = 0. . .250 bar[5]
T = 0. . .400 bar[5]
U = 0. . .600 bar[5]
9 = customized operating range (on request)

Options /
0 = none
1 = transmitter power supply for Zone 0 (on request)
9 = special (please specify in detailed text)

1 measurement starts with ambient pressure
2 absolute pressure possible from 0.4 bar
3 for operating range „A“ to „O“ only
4 welded version only with pressure ports according to EN 837
5 The ranges P to U are not available as welded version (gasket option 4)

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Technical Specifications:

Accuracy /	nach IEC 60770
Standard:	P_N ≥ 0.4 bar: ≤ ± 0.35 % FSO P_N < 0.4 bar: ≤ ± 0.50 % FSO
Option:	P_N ≥ 0.4 bar: ≤ ± 0.25 % FSO (≤ ± 0.10 % FSO on request)
Mechanical stability /	
Vibration:	10 g RMS (25. . .2000 Hz) as per DIN EN 60068-2-6
Shock:	500 g / 1 ms as per DIN EN 60068-2-27 (100 g / 11 ms operat. range Q-U)
max. Temperature /	
Medium:	-40. . .+125°C
Ambient / electronics:	-40. . .+85°C
Storage:	-40. . .+100°C
Ambient Ex-version:	in Zone 0: -20. . .+60°C (with p_{atm} 0.8 bar. . .1.1 bar) in Zone 1 or higher: -20. . .+70°C
Process connection /	G 1/2" DIN 3852 (standard), G 1/4" DIN 3852, G 1/2" EN 837, G 1/4" EN 837, 1/2" NPT and G 1/2" DIN 3852 with flush sensor or with open pressure port
Materials /	
Process connection:	stainless steel 1.4404
Housing:	stainless steel 1.4404
Compact field housing	stainless steel 1.4305, cable gland brass, nickel plated
Gaskets:	FKM (standard), EPDM (only for PN ≤ 160 bar)
Diaphragm:	stainless steel 1.4435
Wetted parts /	pressure connection, gaskets and diaphragm
Weight /	depending on the version approx. 140 g (without cable) or approx. 200 g (without cable)

Electrical Specifications:

Supply voltage /	
2-wire, 4. . .20 mA:	V_S = 8. . .32 VDC
2-wire, 4. . .20 mA, Ex:	V_S = 10. . .28 VDC
3-wire, 0. . .20 mA:	V_S = 14. . .30 VDC
3-wire, 0. . .10 V:	V_S = 14. . .30 VDC
Permissible load /	
2-wire, current:	R_{max} = [(V_S - V_{Smin}) / 0.02 A] Ω
3-wire, current:	R_{max} = 240 Ω
3-wire, voltage:	R_{max} = 10 kΩ
Current consumption /	
Signal output current:	max. 25 mA
Signal output voltage:	max. 7 mA
Influence effects /	
Supply:	0.05 % FSO / 10 V
Load:	0.05 % FSO / kΩ
Long term stability /	≤ ± 0.1 % FSO / year ar reference cond.
Response time /	
2-wire:	≤ 10 ms
3-wire:	≤ 3 ms
Electrical protection /	
Short-circuit prot.:	permanent
Reverse polarity prot.:	no damage, but also no function
Electromagnetic compatibility:	emission and immunity according to EN 61326
Option Ex-protection:	Zone 0: II 1G Ex ia IIC T4 Ga Zone 20: II 1D Ex ia IIIC T 85°C Da Safety technical max. values: U_i = 28 VDC, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF
Protection class /	
IP 65:	ISO 4400
IP 67:	Binder S. 723, 5-pole;Stecker M12x1, 4-pole; Compact field housing, Cable outlet PVC
IP 68:	Cable outlet with ventilation tube
ATEX Directive /	2014/34/EU
CE-conformity /	
EMC-Directive:	2014/30/EU
Equipment Directive:	2014/68/EU (module A) (this directive is only valid for devices with max. permissible overpressure > 200 bar)

Thermal effects:

Thermal effects (offset and span)				
Nominal pressure PN [bar]	-1. . .0	< 0,40	≥ 0,40	≥ 60
Tolerance band [% FSO]	≤ ± 0,75	≤ ± 1,00	≤ ± 0,75	≤ ± 0,75
in compens. range [°C]	-20. . .85	0. . .70	-20. . .85	0. . .70°C

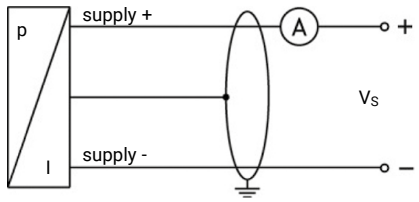
Operating ranges and permissible overpressure:

Vacuum resistance: $P_N \geq 1$ bar: unlimited resistance; $P_N < 1$ bar: on request

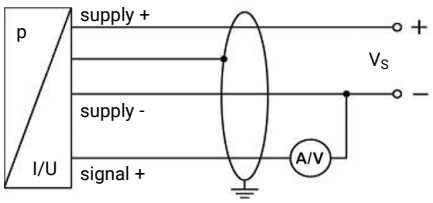
Nominal pressure gauge	Nominal pressure absolute	Permissible overpressure	Burst pressure ≥
-1. . .0 bar		5 bar	7.5 bar
0. . .0.10 bar		0.5 bar	1.5 bar
0. . .0.16 bar		1 bar	1.5 bar
0. . .0.25 bar		1 bar	1.5 bar
0. . .0.40 bar	0. . .0.40 bar	2 bar	3 bar
0. . .0.60 bar	0. . .0.60 bar	5 bar	7.5 bar
0. . .1.0 bar	0. . .1.0 bar	5 bar	7.5 bar
0. . .1.6 bar	0. . .1.6 bar	10 bar	15 bar
0. . .2.5 bar	0. . .2.5 bar	10 bar	15 bar
0. . .4.0 bar	0. . .4.0 bar	20 bar	25 bar
0. . .6.0 bar	0. . .6.0 bar	40 bar	50 bar
0. . .10 bar	0. . .10 bar	40 bar	50 bar
0. . .16 bar	0. . .16 bar	80 bar	120 bar
0. . .25 bar	0. . .25 bar	80 bar	120 bar
0. . .40 bar	0. . .40 bar	105 bar	210 bar
0. . .60 bar	0. . .60 bar	105 bar	210 bar
0. . .100 bar	0. . .100 bar	210 bar	1000 bar
0. . .160 bar	0. . .160 bar	600 bar	1000 bar
0. . .250 bar	0. . .250 bar	1000 bar	1250 bar
0. . .400 bar	0. . .400 bar	1000 bar	1250 bar
0. . .600 bar	0. . .600 bar	1000 bar	1800 bar

Wiring diagrams:

2-wire-system (current)

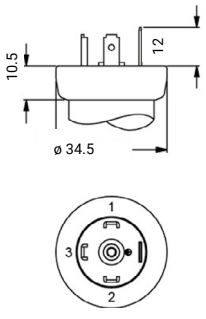


3-wire-system (current / voltage)



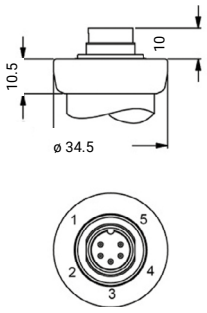
Electrical Connections:

Standard /

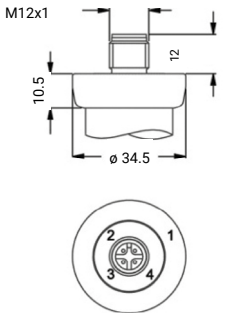


ISO 4400 (IP65)

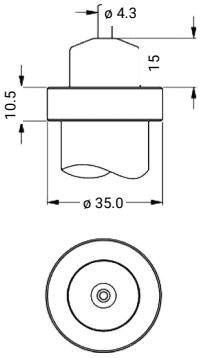
Optional /



Binder series 723 5-wire (IP 67)

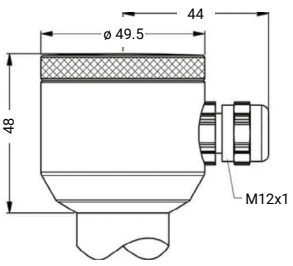


M12x1 4-wire (IP 67)

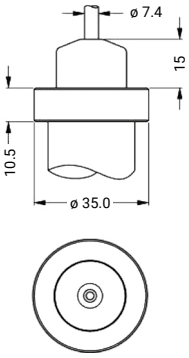


Cable outlet with PVC cable [4] (IP 67)

[4] standard: 2 m PVC cable without ventilation tube; Permissible temperature: -5. . .+70°C-



Compact field housing (IP 67)



Cable outlet, cable with ventilation tube [5] (IP 68)

[5] different cable types and lengths available, permissible temperature depends on kind of cable

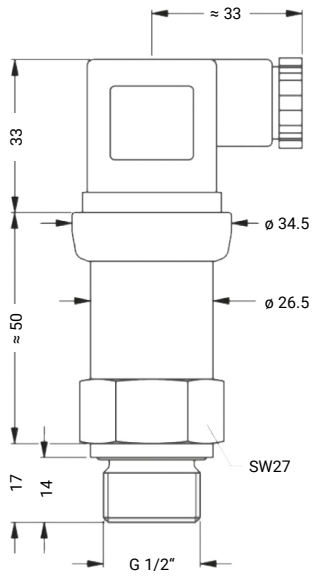
Electrical connections /

Electrical connections		ISO 4400	Binder 723 (5-wire)	M12x1 (4-wrire)	Field housing	Cable colours (DIN 47100)
2-wire	supply +	1	3	1	IN +	white
	supply -	2	4	2	IN -	brown
	load	load	5	4	load	yellow/green (shade)
3-wire	supply +	1	3	1	IN +	white
	supply -	2	4	2	IN -	brown
	signal +	3	1	3	out +	green
	load	load	5	4	load	yellow/green (shade)

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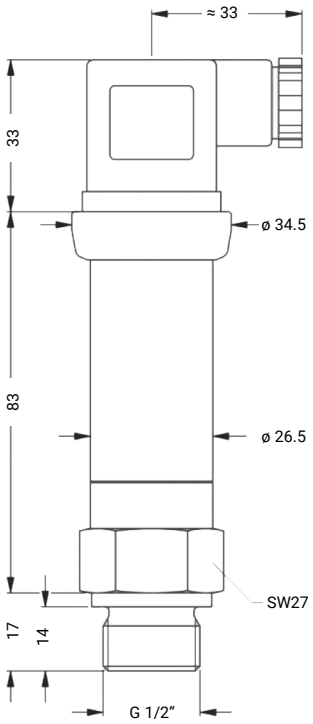
Mechanical connection:

Standard for accuracy 0.35 % / 0.25 % /



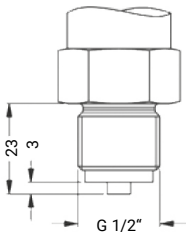
G 1/2" DIN 3852 with ISO 4400

Standard for SIL- and Ex-Version /

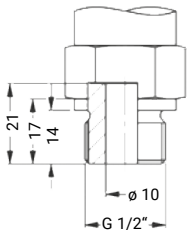


G 1/2" DIN 3852 with ISO 4400

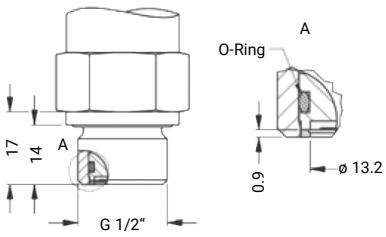
Optional /



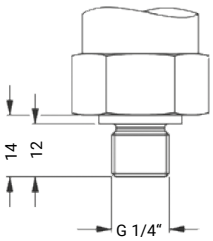
G 1/2" EN 837



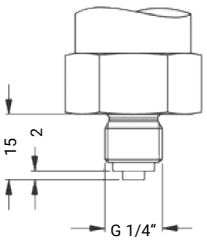
G 1/2" open port



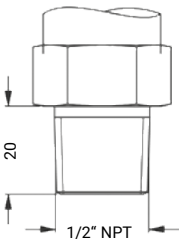
G 1/2" DIN 3852 with flush sensor



G 1/2" DIN 3852



G 1/4" EN 837



1/2" NPT

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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

PU-07

Pressure Measuring Transmitter with Ceramic Sensor Class 0.5



Features

/ High chemical resistance
/ Measuring cell from ceramics
/ Up to 600 bar
/ 4. . .20 mA or 0. . .10 VDC
/ Protection class IP 65 / IP 67
/ Variety of electrical and mechanical connections
/ Optional Ex- and SIL 2-version
/ Optional pressure port made from PVDF
/ Suitable for oxygen (on request)

Description:

Series PU-07 pressure transmitters are equipped with a chemical resistant thick-film ceramic measuring cell and are especially well suited for viscous, pasty, contaminated and aggressive media as well as for low-pressure oxygen applications. In this measurement method, depending on the measuring range, the applied physical pressure on the sensor is converted into a pressure-proportional electronic signal which is either available as 4 . . .20 mA in 2-wire technology or as 0. . .20 mA respectively as 0. . .10 VDC in 3-wire technology. Other options are Ex-, Sil2- and Ex-SIL2- as well as customized designs.

Application:

The PU-07 pressure transmitters are used for measuring pressure in fluid or gaseous materials. By the option with front flush diaphragm the devices are particularly suited for sticky or tenacious media as the media cannot creep into and destroy or clog them. Versions with the optional pressure port made from PVDF find their use in many aggressive media, to which stainless steel is not resistant. Due to compact design, accuracy and material combination, this series is recommended for a wide range of industrial applications.

Versions:

PU-07 Pressure Meas. Transmitter Class 0.5

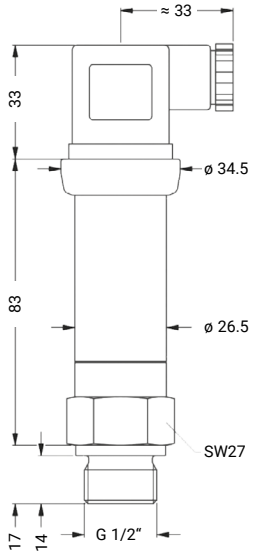
Output signal: Possible output signals are:
4. . .20 mA in 2-wire method (optional as SIL 2- or/ and intrinsically safe version)
or 0. . .20 mA respectively 0. . .10 VDC in 3-wire method (other output signals on request).

Calibration: On request, the devices can be calibrated for operating ranges „C“ up to „R“ at absolute pressure.

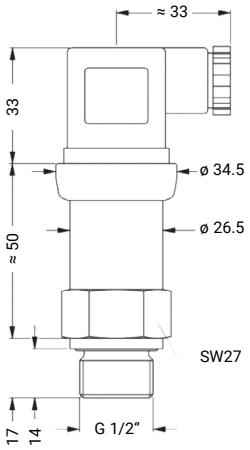
Pro**cess connection:** On request, the devices can be supplied for operating ranges „A“ up to „K“ with a semi-flush sensor. This is recommended for viscous or sticky media.

Dimensions in mm:

SIL- and Ex-Version /



Standard- and Ex-Version /



Ordering Codes:

Order no.	PU-07.	1.	1.	1.	1.	1.	1.	L.	0

PU-07 Pressure transmitter

Output signal /
1 = 4. . .20 mA, 2-wire
2 = 0. . .20 mA, 3-wire
3 = 0. . .10 VDC, 3-wire
4 = 4. . .20 mA, 2-wire, Ex-protection
5 = 4. . .20 mA, 2-wire, SIL2
6 = 4. . .20 mA, 2-wire, SIL2, Ex-protection
9 = other (on request)

Calibration /
1 = relative pressure
2 = absolute pressure[1]

Electrical Connection /
1 = male and female plug ISO 4400
2 = male plug Binder Series 723 (5-pole)
3 = cable outlet with 2 m PVC cable
4 = male plug M12x1 (4-pole) / metal
5 = compact field housing stainless steel 1.4305
9 = others (on request)

Process connection /
1 = G 1/2“ DIN 3852
2 = G 1/2“ EN 837
3 = G 1/4“ DIN 3852
4 = G 1/4“ EN 837
5 = G 1/2“ DIN 3852 with semi-flush sensor[2]
6 = G 1/2“ DIN 3852 open pressure port
7 = 1/2“ NPT
9 = other (on request)

Seal /
1 = FKM
2 = EPDM (for PN ≤ 160 bar only)
9 = other (on request)

Pressure connection /
1 = st. steel 1.4404 (316L)
2 = PVDF [3]
9 = other (on request)

Operating range /
A = -1. . .0 bar
B = 0. . .0.4 bar
C = 0. . .0.6 bar
D = 0. . .1.0 bar
E = 0. . .1.6 bar
F = 0. . .2.5 bar
G = 0. . .4.0 bar
H = 0. . .6.0 bar
I = 0. . .10 bar
J = 0. . .16 bar
K = 0. . .25 bar
L = 0. . .40 bar
M = 0. . .60 bar
N = 0. . .100 bar
O = 0. . .160 bar
P = 0. . .250 bar
Q = 0. . .400 bar
R = 0. . .600 bar
9 = other (on request)

Option /
0 = without
1 = transmitter power supply for Zone 0 (on request)
2 = oxygen application [4] (on request)
9 = special (please specify in detailed text)

[1] absolute pressure possible from 0.6 bar (operating range „C“)
[2] possible for nominal pressure ranges PN ≤ 25 bar, absolute pressure ranges on request
[3] PVDF only with G 1/2“ DIN 3852 open pressure port (up to 60 bar), min. permissible temp. is -30°C
[4] oxygen application with FKM-gasket up to 25 bar and with EPDM-gasket up to 15 bar possible

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Electrical Specifications:

Supply voltage /

2-wire, 4. . .20 mA:	U_B = 8. . .32 VDC
2-wire, 4. . .20 mA, Ex:	U_B = 10. . .28 VDC
3-wire, 0. . .20 mA:	U_B = 14. . .30 VDC
3-wire, 0. . .10 V:	U_B = 14. . .30 VDC

Load /

2-wire, current:	R_{max} = [(U_B - U_{Bmin}) / 0.02 A] Ω
3-wire, current:	R_{max} = 240 Ω
3-wire, voltage:	R_{max} = 10 kΩ

Current consumption /

Signal output current:	max. 25 mA
Signal output voltage:	max. 7 mA

Influence effects /

Supply:	005 % FSO / 10 V
Load:	0.05 % FSO / kΩ

Long term stability / ≤ ± 0.3 % FSO / year at ref. conditions

Response time /

2-wire:	≤ 10 ms
3-wire:	≤ 3 ms

Thermal error / ≤ ± 0.2% of full scale value / 10 K
or zero and span in compensated range
-25. . .+85°C

Short-circuit prot. / permanent

Reverse polarity prot. / no damage, but also no function

EMC / emission and immunity as per EN 61326

Protection class / acc. to diagrams of electrical contacts

Option Ex-Protection /

St. steel pres. port:	Zone 0: II 1G Ex ia IIC T4 Ga Zone 20: II 1D Ex ia IIIC T 85°C Da
Plastic pressure port:	Zone 1: II 2G Ex ia IIC T4 Gb Zone 21: II 2D Ex ia IIIC T 85°C Db Safety technical max. values: Ui = 28 VDC, Ii = 93 mA, Pi = 660 mW, Ci ≈ 0 nF, Li ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF

Option SIL 2 / as per IEC 61508 / IEC 61511

Option oxygen application / for PN ≤ 25 bar: O-ring in FKM Vi 567 (with BAM-approval); permissible max. values are 25 bar / 150°C

ATEX-Directive / 2014/34/EU

CE-conformity / EMV-Directive: 2004/108/EG; Pressure Equip. Directive: 2014/68/EU (module A)[8]

Technical Specifications:

Accuracy / ≤ ± 0.5 % FSO[5]

Mechanical stability /

Vibration:	10 g RMS (25. . .2000 Hz) as per DIN EN 60068-2-6
Shock:	500 g / 1 ms as per DIN EN 60068-2-27

max. Temperature /

Medium:	-40. . .+125°C
Ambient / electronics	-40. . .+85°C
Storage:	-40. . .+100°C
Ambient Ex-version:	in Zone 0: -20. . .+60°C (for p_{atm} 0.8 bar. . .1.1 bar) from Zone 1: -20. . .+70°C

Process connection / G 1/2" DIN 3852 (standard), G 1/4" DIN 3852, G 1/2" EN 837, G 1/4" EN 837, 1/2" NPT and G 1/2" DIN 3852 with semi-flush sensor or with open pressure port

Materials /

Process connection:	st. steel 1.4404 (standard), optional for G 1/2" open port with nominal pressure range up to 60 bar: PVDF[6]
Housing:	Edelstahl 1.4404
Compact field housing:	st. steel 1.4305, cable gland brass, nickel plated
Gaskets:	FKM (standard) and EPDM (only for PN ≤ 160 bar)
Diaphragm:	ceramics Al_2O_3 96 %

Wetted parts / pressure connection, gaskets and diaphragm

Weight / approx. 140 g (without cable)

[5] accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)
[6] for pressure port of PVDF the medium temperature range is -30°C. . .+60°C

Op. Ranges and Overpress.:

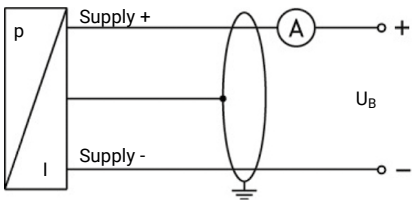
Vacuum resistance: $P_N \geq 1$ bar: unlimited resistance; $P_N < 1$ bar: on request

Nom. pressure relative	Nom. pressure absolute	Overpressure	Burst pressure ≥
-1. . .0 bar		4 bar	7 bar
0. . .0.40 bar		1 bar	2 bar
0. . .0.60 bar	0. . .0.60 bar	2 bar	4 bar
0. . .1.0 bar	0. . .1.0 bar	2 bar	4 bar
0. . .1.6 bar	0. . .1.6 bar	4 bar	5 bar
0. . .2.5 bar	0. . .2.5 bar	4 bar	7.5 bar
0. . .4.0 bar	0. . .4.0 bar	10 bar	12 bar
0. . .6.0 bar	0. . .6.0 bar	10 bar	18 bar
0. . .10 bar	0. . .10 bar	20 bar	30 bar
0. . .16 bar	0. . .16 bar	40 bar	50 bar
0. . .25 bar	0. . .25 bar	40 bar	75 bar
0. . .40 bar	0. . .40 bar	100 bar	120 bar
0. . .60 bar	0. . .60 bar	100 bar	180 bar
0. . .100 bar	0. . .100 bar	200 bar	300 bar
0. . .160 bar	0. . .160 bar	400 bar	500 bar
0. . .250 bar	0. . .250 bar	400 bar	750 bar
0. . .400 bar	0. . .400 bar	600 bar	1000 bar
0. . .600 bar[7]	0. . .600 bar[7]	800 bar	1100 bar

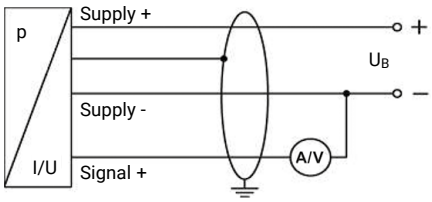
[7] nominal pressure 600 bar without UL certification

Wiring diagram:

2-Wire-System (current)

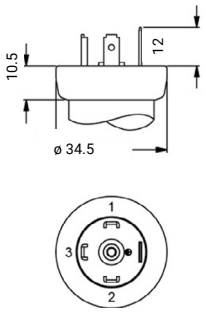


3-Wire-System (current / voltage)



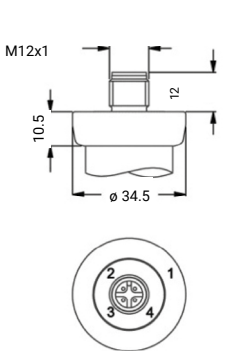
Electrical Connections:

Standard / **Optional /**



ISO 4400 (IP65)

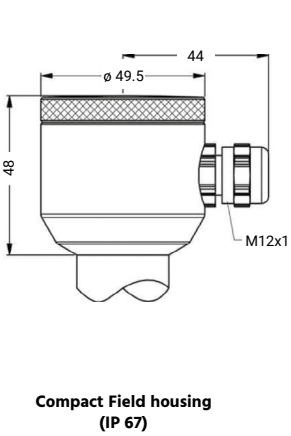
Binder Series 723 5-wire (IP 67)



M12x1 4-wire (IP 67)

Cable output with PVC-cable [9] (IP 67)

[9] standard: 2 m PVC cable without ventilation tube; permissible temperature: -5. . .+70°C



Compact Field housing (IP 67)

Cable output, cable with vent [10] (IP 68)

[10] different cable types and lengths available, permissible temperature depends on kind of cable

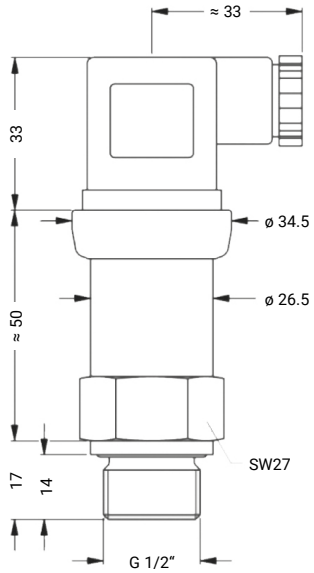
Electrical connections /

Electrical connections		ISO 4400	Binder 723 (5-wire)	M12x1 (4-wire)	Field housing	Cable colours (DIN 47100)
2-wire-system	supply +	1	3	1	IN +	white
	supply -	2	4	2	IN -	brown
	shield	ground	5	4	ground	yellow/green
3-wire-system	supply +	1	3	1	IN +	white
	supply -	2	4	2	IN -	brown
	signal +	3	1	3	Out +	green
	shield	ground	5	4	ground	yellow/green

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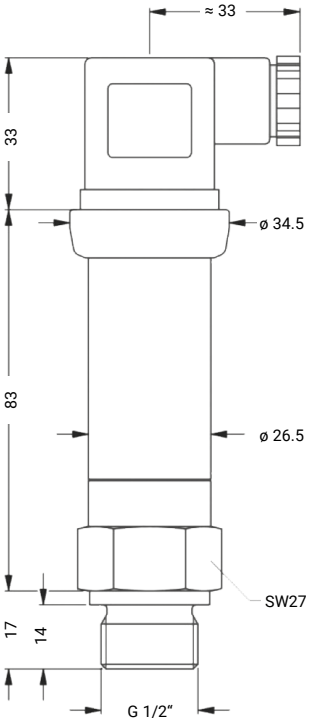
Mechanical Connections:

Standard for Accuracy 0.35 % / 0.25 %



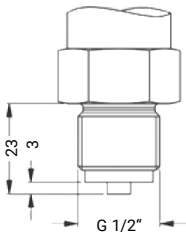
G 1/2" DIN 3852 with ISO 4400

Standard for SIL- and Ex-Version

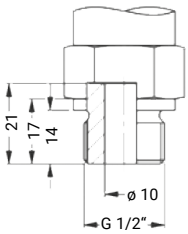


G 1/2" DIN 3852 with ISO 4400

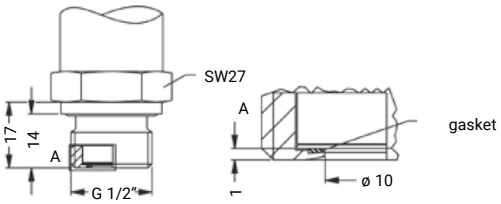
Optional



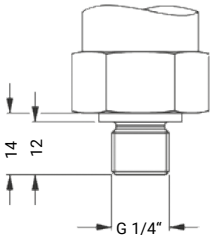
G 1/2" EN 837



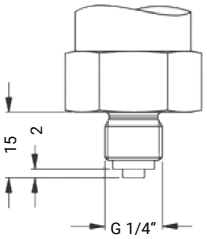
G 1/2" open port



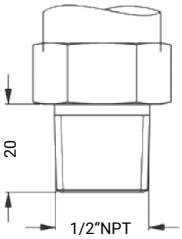
G 1/2"quasi-flush DIN 3852; M20x1,5[11]



G 1/4" DIN 3852



G 1/4" EN 837



1/2" NPT

[11] possible for nominal pressure ranges PN ≤ 25 bar; absolute pressure ranges on request

This data sheet contains product specifications, properties are not guaranted. Subject to change without notice.

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PU-08

Low Pressure Measuring Transmitter with Ceramic Sensor Class 0.25 or 0.35



Features

/ High chemical resistance
/ Ceramic measuring cell
/ Up to 20 bar
/ 4. . .20 mA or 0. . .10 VDC
/ Protection class up to IP 68
/ Variety of process connections
/ Optional pressure port made of PVDF
/ Optional intrinsically safe ver.

Description:

Series PU-08 pressure transmitters are equipped with a chemical resistant, capacitive ceramic measuring cell for detection of low system pressures. Optional configurations such as versions with a 99,9% Al_2O_3 ceramic diaphragm or a thermoplastic connection made of PVDF expand the wet-side area of applications. Depending on the selected operating range, physical pressure is converted into a proportional electrical signal, which is either available as 4. . .20 mA in 2-wire technology or as 0 . . .10 VDC in 3-wire technology. For applications in explosive areas, intrinsically safe versions are available.

Application:

Series PU-08 pressure transmitters are used in the measurement of low system pressure of liquid or gaseous media. Due to compact design, accuracy and high media resistance, PU-08 are ideal for a wide range of applications, for example in environmental technology, process technology, laboratory technology as well as in industrial technology. Preferred media are water, fuels, oils and gases.

Versions:

PU-08 Pressure Measuring Transm. Class 0.35 or 0.25

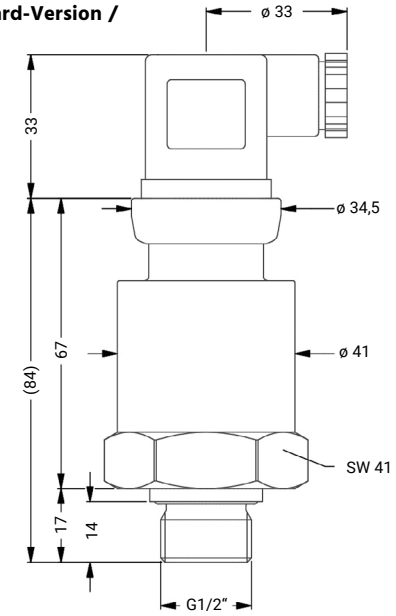
Output signal:
Possible output signals are: 4. . .20 mA in 2-wire method (optional as intrinsically safe version) or 0. . .10 VDC in 3-wire method (other output signals on request).

Calibration: On request, the devices can be calibrated for operating ranges „H" up to „O" at absolute pressure (other on request).

Process connection: Optional, the devices can be supplied with a G 1/2" DIN 3852 open pressure port made of PVDF. This is recommended for aggressive media, due to the hight chemical resistance.

Dimensions in mm:

Standard-Version /



Ordering Codes:

Order no.	PU-08.	1.	1.	1.	1.	1.	1.	1.	1.	H.	0

PU-08 Pressure Transmitter

Output signal /
1 = 4. . .20 mA, 2-wire
2 = 0. . .10 VDC, 3-wire
3 = 4. . .20 mA, 2-L, Ex-protection T4
4 = 4. . .20 mA, 2-L, Ex-protection T6
9 = Other (on request)

Calibration /
1 = relative pressure
2 = absolute pressure [1]

Accuracy /
1 = 0.35 %
2 = 0.25 % (Option for PN ≥ 0.6 bar)

Electrical connection /
1 = male and female plug ISO 4400
2 = male plug Binder Series 723 (5-pole)
3 = cable outlet with 2 m PVC cable [2]
4 = cable outlet, cable with ventilation tube [3]
5 = male plug M12 x 1 (4-pole) / metal
6 = compact field housing stainless steel 1.4305
9 = Others (on request)

Process connection /
1 = G 1/2" DIN 3852
2 = G 1/2" EN 837
3 = G 1/2" DIN 3852 open pressure port
4 = 1/2" NPT
9 = Other (on request)

Gasket /
1 = FKM
2 = EPDM
9 = Other (on request)

Pressure connection /
1 = stainless steel 1.4404 (316L)
2 = PVDF [4]
9 = Other (on request)

Diaphragm /
1 = ceramics Al_2O_3 96 %
2 = ceramics Al_2O_3 99,9 %
9 = Other (on request)

Operating range /
A = 0. . .0.04 bar
B = 0. . .0.06 bar
C = 0. . .0.10 bar
D = 0. . .0.16 bar
E = 0. . .0.25 bar
F = 0. . .0.40 bar
G = 0. . .0.60 bar
H = 0. . .1.0 bar
I = 0. . .1.6 bar
J = 0. . .2.5 bar
K = 0. . .4.0 bar
L = 0. . .6.0 bar
M = 0. . .10 bar
N = 0. . .16 bar
O = 0. . .20 bar
9 = Other (on request)

Options /
0 = none
1 = transmitter power supply for Zone 0 (on request)
9 = special (please specify in detailed text)

[1] absolute pressure possible from operating range „H" (less than operating range „H" on request)
[2] standard: 2 m PVC cable (permissible temperature: -5°C. . .+70°C), other cable lengths on request
[3] different cable types and lengths available, permissible temperature depends on kind of cable
[4] PVDF only with G 1/2" DIN 3852 open pressure port, minimum permissible temperature is -30°C

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Electrical Specifications:

Supply voltage /

2-wire, 4. . .20 mA:	U_B = 9. . .32 VDC
2-wire, 4. . .20 mA, Ex:	U_B = 14. . .28 VDC
3-wire, 0. . .10 V:	U_B = 12.5. . .32 VDC

Load /

current 2-wire:	R_{max} = [(U_B - U_{Bmin}) / 0.02 A] Ω
voltage 3-wire:	R_{min} = 10 kΩ

Current consumption /

signal output current:	max. 21 mA
signal output voltage:	max. 5 mA

Influence effects /

Supply:	0.05 % FSO / 10 V
Load:	0.05 % FSO / kΩ

Long term stability / ≤ ± 0.1 % FSO / year at reference cond.

Start-up time / 700 ms

Mean measuring time / 5 / s

Response time / mean response time: < 200 ms
max. response time: 380 ms

Thermal error / ≤ ± 0.1% of full scale value / 10 K for zero and span in compensated range -20. . .+80°C

Short-circuit prot. / permanent

Rev. polarity protection / no damage, but also no function

Emission and Immunity / as per EN 61326

Protection class /

ISO 4400:	IP 65
Binder S. 723, 5-wire:	IP 67
Plug M12 x 1, 4-wire:	IP 67
Compact field housing:	IP 67
Cable outlet PVC:	IP 67
Cable outlet with ventilation tube:	IP 68

Option Ex-Protection /

St. Steel-connection:	Zone 0: II 1G Ex ia IIC T4 Ga (option: II 1G Ex ia IIC T6 Ga) Zone 20: II 1D Ex ia IIIC T85°C Da Safety technical max. values U_i = 28 VDC, I_i = 93 mA, P_i = 660 mW, C_i ≤ 14 nF, L_i ≤ 0 µH, C_{GND} = 27 nF
Connecting cables: (by factory)	capacity: signal line / shield also signal line / signal line: 220 pF / m inductance: signal line / shield also signal line / signal line: 1,5 µH / m

ATEX-Directive / 2014/34/EU

CE-Conformity / EMC-Directive: 2014/30/EU

Technical Specifications:

Accuracy /

Standard:	≤ ± 0.35 % FSO[5]
Option:	≤ ± 0.25 % FSO[5] (for PN ≥ 0,6 bar)

Mechanical stability /

Vibration:	10 g RMS (20. . .2000 Hz) as per DIN EN 60068-2-6
Shock:	100 g / 1 ms as per DIN EN 60068-2-27

max. Temperature /

Media:	-40. . .+125°C
Ambient / Electronics:	-40. . .+85°C
Storage:	-40. . .+100°C
Ambient Ex-Version:	in Zone 0: -20. . .+60°C (at p_{atm} 0.8 bar. . .1.1 bar) from Zone 1: -25. . .+70°C for T6: -25. . .+60°C

Process connection / G 1/2" DIN 3852 (standard),
G 1/2" DIN 3852 open port,
G 1/2" EN 837 and 1/2" NPT

Materials /

Process connection:	st. steel 1.4404 (standard), opt. for G 1/2" open port in PVDF [6]
Housing:	st. steel 1.4404
Compact field housing:	stainless steel 1.4301, cable gland brass, nickel plated
Gaskets:	FKM (standard) or EPDM
Diaphragm:	ceramics Al_2O_3 96% (standard) and ceramics Al_2O_3 99,9%

Wetted parts / pressure connection, gaskets and diaphragm

Lifespan / > 100 x 10^6 load cycles

Weight / approx. 200 g (without cable)

[5] accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)

[6] for pressure port of PVDF the medium temperature range is -30°C. . .+60°C

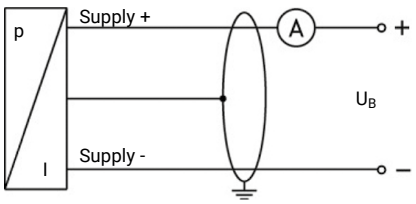
Op. Ranges & Overpressure:

Nominal press. relative	Nominal press. absolute	Permissible overpressure	Underpressure
0. . .0.04 bar		2 bar	- 0.2 bar
0. . .0.06 bar		2 bar	- 0.2 bar
0. . .0.10 bar		4 bar	- 0.3 bar
0. . .0.16 bar		4 bar	- 0.3 bar
0. . .0.25 bar		6 bar	- 0.5 bar
0. . .0.40 bar	(0. . .0.4 bar)[7]	6 bar	- 0.5 bar
0. . .0.60 bar	(0. . .0.6 bar)[7]	8 bar	- 0.5 bar
0. . .1.0 bar	0. . .1.0 bar	8 bar	- 0.5 bar
0. . .1.6 bar	0. . .1.6 bar	15 bar	- 1.0 bar
0. . .2.5 bar	0. . .2.5 bar	25 bar	- 1.0 bar
0. . .4.0 bar	0. . .4.0 bar	25 bar	- 1.0 bar
0. . .6.0 bar	0. . .6.0 bar	35 bar	- 1.0 bar
0. . .10 bar	0. . .10 bar	35 bar	- 1.0 bar
0. . .16 bar	0. . .16 bar	45 bar	- 1.0 bar
0. . .20 bar	0. . .20 bar	45 bar	- 1.0 bar

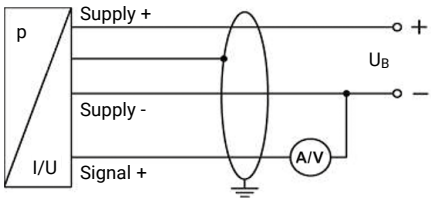
[7] on request

Wiring diagrams:

2-Wire-System (Current)

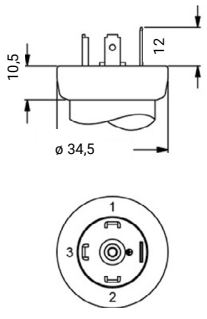


3-Wire-System (Current / Voltage)

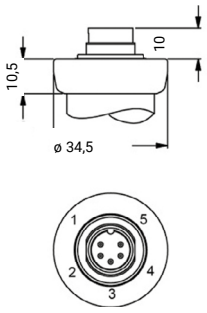


Electrical Connection:

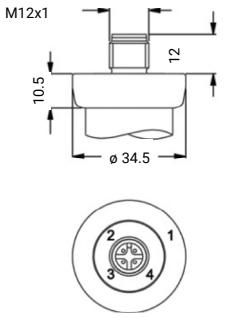
Standard / **Optional /**



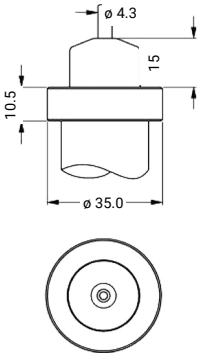
ISO 4400 (IP65)



Binder Series 723 5-wire (IP 67)

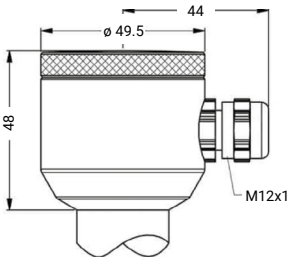


M12 x 1 4-wire (IP 67)

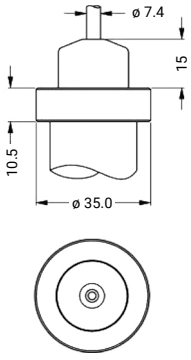


Cable output with PVC-cable [8] (IP 67)

[8] standard: 2 m PVC cable without ventilation tube; permissible temperature: -5. . .+70°C



Compact-Field housing (IP 67)



Cable output, cable with vent [9] (IP 68)

[9] different cable types and lengths available, permissible temp. depends on kind of cable

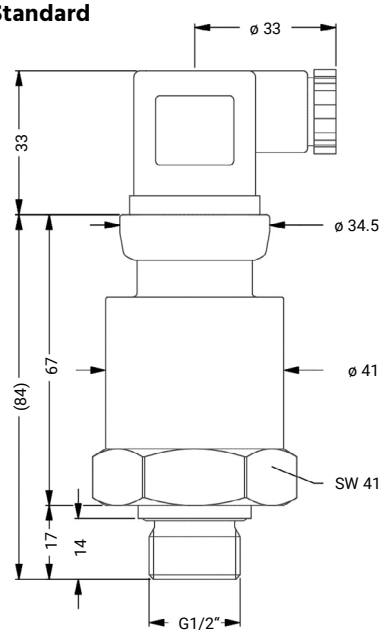
Electrical connections /

Electrical connections		ISO 4400	Binder 723 (5-wire)	M12x1 (4-wire)	Field housing	Cable colours (DIN 47100)
2-wire-system	Supply +	1	3	1	IN +	white
	Supply -	2	4	2	IN -	brown
	Shield	ground	5	4	ground	yellow/green
3-wire-system	Supply +	1	3	1	IN +	white
	Supply -	2	4	2	IN -	brown
	Signal +	3	1	3	Out +	green
	Shield	ground	5	4	ground	yellow/green

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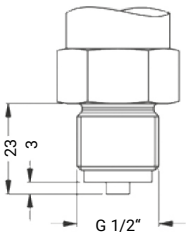
Mechanical Connection:

Standard

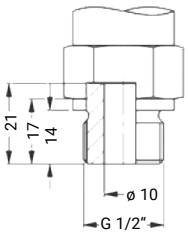


G 1/2"DIN 3852 with ISO 4400

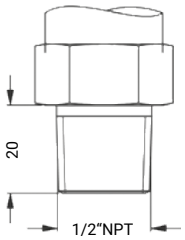
Optional



G 1/2" EN 837



G 1/2" open port

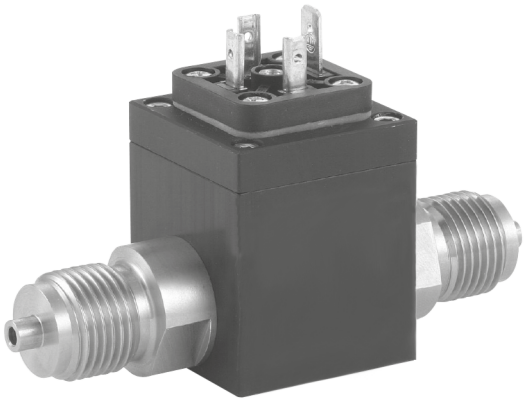


1/2" NPT

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PD-02

Differential Pressure Transmitter for Fluids and Gases



Features

/ Accuracy class 0.5%

/ 2 piezo-resistive st. steel sensors

/ Separation through diaphragms

/ Stainless steel 1.4535 diaphragms

/ Diff. pressure from 20 mbar to 16 bar

/ High static overpressure

/ Shock and vibration protection

Description:

The PD-02 differential pressure transmitter detects the pressure levels present at its two process connections by means of two piezo-resistive sensor elements and records the difference between their measuring signals. The generated signal proportional to the differential pressure is internally amplified and output to the pins of PD-02 either as a 4 to 20 mA 2-wire signal or as a 0 to 10 V DC 3-wire signal for further processing. For the wetted parts, only stainless steels 1.4404 and 1.4435 and FKM sealing material (others on request) are used in this design, whereby PD-02 can cater to a wide range of fluids or gasses when selecting the media.

Application:

The compact design of the PD-02 differential pressure transmitter allows integration of devices even in installations or machines with restricted conditions of space. The transmitters are stable for long periods, robust against shocks and vibrations and are secure against static pressure that can reach up to 30-times the differential pressure range. There are 12 standard operating ranges from 0. . .20 mbar to 0. . .16 bar differential pressure available to the user. As process connections, male as well as female thread systems can be used. If necessary, also the UNF thread system can be supplied which is mostly in demand in the refrigeration technology. The PD-02 differential pressure transmitters are used in areas such as:

/ Machine construction

/ Plant manufacturing

/ Filter monitoring

/ Hydraulics

/ Flow measurement with orifices or dynamic pressure sensors

Measuring ranges:

Nominal pressure [bar]	0.2	0.4	1	2.5	6	16
Differential pressure range [bar]	0. . .0.02 up to 0. . .0.2	0. . .0.04 up to 0. . .0.4	0. . .0.1 up to 0. . .1	0. . .0.25 up to 0. . .2.5	0. . .0.6 up to 0. . .6	0. . .1.6 up to 0. . .16
Permissible static pressure, one-sided [bar]	0.5	1	3	6	20	60

Technical Specifications:

Accuracy /

- ≤ ± 0.5 % FSO: Diff. pressure range with TD from 1:1 up to 1:5
- ≤ ± 1.0 % FSO: Differential pressure range with TD > 1:5 up to 1:10 (Characteristic line deviation as per IEC 60770 limiting point setting (non-linearity, hysteresis, repeatability)

Permissible load / Power output 2-wire:
Rmax = [(U_B-U_B min) / 0.02A] Ω
Voltage 3-wire: Rmin = 10 kΩ

Influencing factors / Voltage supply: 0.05% FSO / 10V
Load: 0.05% FSO / kΩ

Long period stability / ≤ ± 0.2 % FSO / year

Response time / < 5 ms

Temperature error / **(nominal pressure)**

- Tolerance band: 0.2 bar: ≤ ± 2.5 % FSO
  0.4 bar: ≤ ± 2.0 % FSO
  ≥ 1.0 bar: ≤ ± 1.5 % FSO
- TC average: 0.2 bar: ± 0.4 % FSO/10K
  0.4 bar: ± 0.3 % FSO/10K
  ≥ 1.0 bar: ± 0.2 % FSO/10K
- In compensated range: 0.2 bar: 0. . .50°C
  0.4 bar: 0. . .50°C
  ≥ 1.0 bar: 0. . .70°C

Mechanical stability / Vibration: 10 g RMS (20. . .2000 Hz)
Shock: 100 g / 11 ms

Storage temperature / -40. . .+100°C

Ambient temp. / -25. . .+85°C

Media temp. / -25. . .+125°C

Materials /

- Housing: aluminium, black anodized
- Pressure connection: stainless steel 1.4404
- Sealing (wetted): FKM (Viton®), other sealing materials on request
- Sep. membranes: stainless steel 1.4435
- Wetted parts: pressure connection, sealing, separation membranes

Weight / max. 250 g

Life span / > 100 x 10^6 load cycles

Electrical Specifications:

Output signal / 4. . .20 mA, 2-wire or
0. . .10 VDC, 3-wire

Supply voltage / 12. . .36 VDC at current output,
14. . .36 VDC at voltage output

Power consumption / max. 25 mA at current output,
max. 7 mA at voltage output

Electrical protection /

- Short-circuit stability: permanent
- Pole-reversal protection: no function if interchanged connections, but also no damage
- Electromagnetic compatibility: error signal and stability as per EN 61326

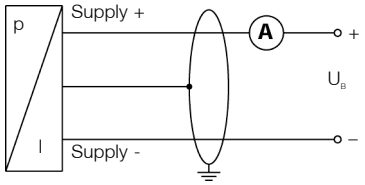
Electrical connections / cubic plug ISO 4400, others on request

Protection class / IP65

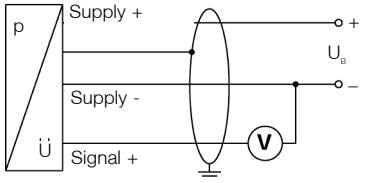
PIN-layout:

	2-wire-current output	3-wire-voltage output
Supply +	1	1
Supply -	2	2
Signal +	not used	3
Ground	Ground contact	Ground contact

2-wire-system (current)



3-wire-system (voltage)

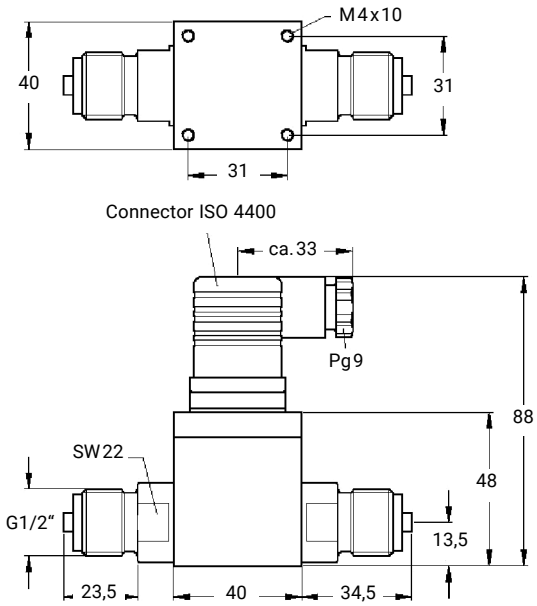


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Dimensions in mm:

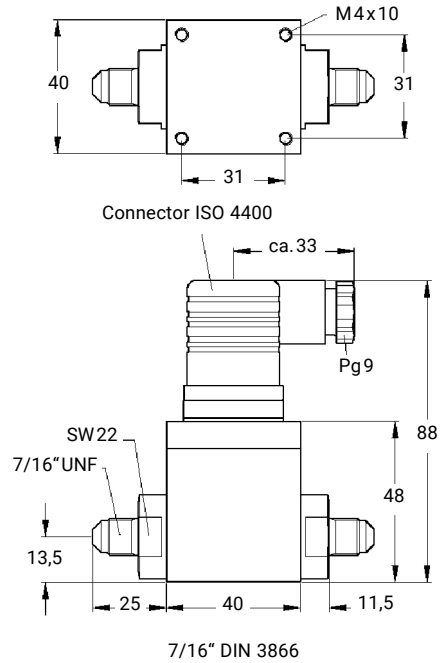
Mechanical connections:

2 x G 1/2“-male thread



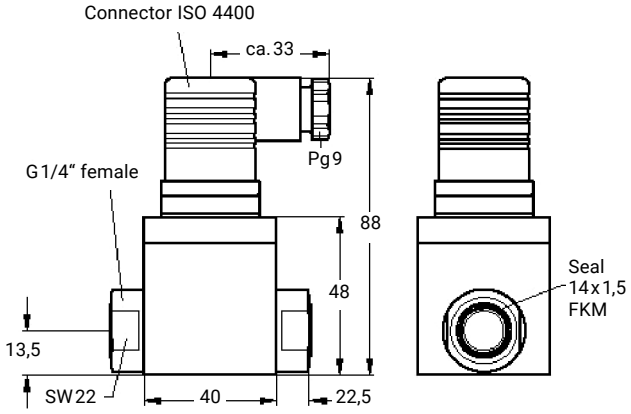
G 1/2“ EN 837 · M20 x 1,5

2 x 7/16-UNF“-male



7/16“ DIN 3866

2 x G 1/4“-IG



G 1/4“ female

Ordering Codes:

Order number	PD-02.	1.	2.	4.	B.	1

PD-02 Differential Pressure Transmitter for Fluids and Gases

Output /
1 = 4. . .20 mA, 2-wire
2 = 0. . .10 VDC, 3-wire

Process connection /
1 = G1/2“-male as per EN 837
2 = 7/16-UNF as per DIN 3866
3 = G1/4“-female

Nominal pressure range /
1 = 0.2 bar, max. one-sided static pressure 0.5 bar, Operating ranges A, B, C
2 = 0.4 bar, max. one-sided static pressure 1 bar, Operating ranges B, C, D, E
3 = 1 bar, max. one-sided static pressure 3 bar, Operating ranges C, D, E, F, G
4 = 2.5 bar, max. one-sided static pressure 6 bar, Operating ranges D, E, F, G, H
5 = 6 bar, max. one-sided static pressure 20 bar, Operating ranges F, G, H, I, J
6 = 16 bar, max. one-sided static pressure 60 bar, Operating ranges H, I, J, K, L

Operating range /
A = 0. . .0.02 bar Differential pressure
B = 0. . .0.04 bar Differential pressure
C = 0. . .0.1 bar Differential pressure
D = 0. . .0.25 bar Differential pressure
E = 0. . .0.40 bar Differential pressure
F = 0. . .0.60 bar Differential pressure
G = 0. . .1 bar Differential pressure
H = 0. . .2.5 bar Differential pressure
I = 0. . .4.0 bar Differential pressure
J = 0. . .6.0 bar Differential pressure
K = 0. . .10 bar Differential pressure
L = 0. . .16 bar Differential pressure

Special design /
0 = none
1 = please specify in detailed text

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PD-04

Differential Pressure Transmitter for Fluids and Gases

Description:

The Series PD-04 Differential Pressure Transmitters are suitable for measuring over-pressure, under-pressure, and differential pressure in compatible gases and liquids with 1% accuracy. The PD-04 is suitable for all measuring tasks in commercial, industrial or sanitary applications. Dual pressure sensors convert pressure changes into a standard 4 to 20 mA or 0 to 10 VDC output signal.

Features

/ Accuracy 1%

/ Compact and lightweight

/ Fast reaction

/ High reliability

/ Ranges from 1 bar to 6 bar

/ Easy installation

Application:

The compact design of the PD-04 differential pressure transmitter allows integration of devices even in installations or machines with restricted conditions of space. The transmitters are stable for long periods, robust The PD-02 differential pressure transmitters are used in areas such as:

/ Heat exchangers

/ Fan coils/air handlers

/ Core testing applications

/ Hydraulic systems

/ High line pressures/low DP

/ Pumps

/ Commercial/industrial processes

/ Sanitary process

Technical Specifications:

Accuracy /	± 1% from -5. . .+60° C
Stability /	± 1% FS / Year
Process connections /	1/4 female NPT 1/4 female BSPT
Relative humidity /	10% to 90% non condensig
Ambient temperature /	-10. . .+60°C
Process temperature /	-10. . .+80°C
Material /	
Housing:	ABS
Wetted:	304 SS
Installation position:	not position sensitive
Weight /	567 g
Approvals /	CE, RCM

Electrical Specifications:

Output signal /	4. . .20 mA 0. . .10 VDC
Rated supply voltage /	
4. . .20mA Output	8. . .36 VDC
0. . .10 VDC Output	12. . .36 VDC or 12. . .32 VAC (@ Max load of 2k Ω)
Power consumption /	V_{out} = 13 mA max. I_{out} = 24 mA max.
Max loop resistance (Supply voltage - 8 V)	0,02 für 4. . .20mA Output
Response time /	50 ms
Electrical connections /	Form A DIN 43650
Enclosure rating /	IP65

Pressure Range Limits:

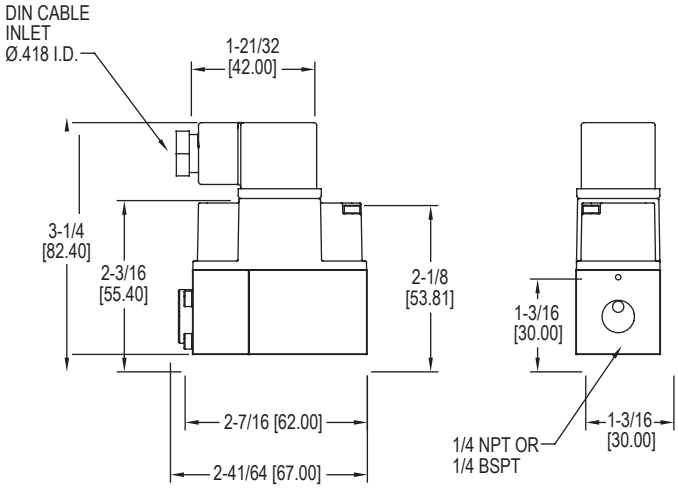
Druck

Pressure Range	Maximum Static Pressure	* Maximum Differential Over Pressure	** Burst Differential Pressure
0. . .1 bar	25 bar	5 bar	8 bar
0. . .2,5 bar	25 bar	5 bar	8 bar
0. . .4 bar	25 bar	12 bar	18 bar
0. . .6 bar	25 bar	12 bar	18 bar

Note: *The differential pressure limit, between high and low ports, that the transmitter can withstand without affecting transmitter performance

****Differential pressures between high and low ports that exceed overpressure limits will result in permanent diaphragm deformation, and any pressure higher than the burst pressure limits will rupture the diaphragm.**

Dimensions in Inch (mm):



Ordering Codes:

Order number **PD-04. 1. 2. B. 1. 1**

PD-04 Differential Pressure Transmitter for Fluids and Gases

Output /
1 = 4. . .20 mA
2 = 0. . .10 VDC

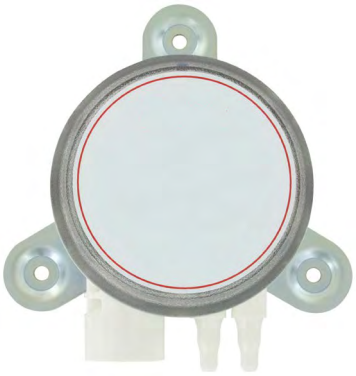
Process connection /
1 = 1/4" female NPT
2 = 1/4" female BPST

Operating range /
A = 0. . .1 bar Differential pressure
B = 0. . .2,5 bar Differential pressure
C = 0. . .4 bar Differential pressure
D = 0. . .6 bar Differential pressure

Options /
0 = without
1 = Factory calibration
2 = NIST certificate

Special design /
0 = without
1 = Mounting bracket kit
2 = 3-Valve Block Manifold

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PMMS

Differential Pressure Transmitter for non-combustible Gases

Features

/ Low-Cost

/ Accuracy class 1%

/ Selectables ranges from 0. . .7 kPa

/ Analogue output for current or voltage

/ Perfect for monitoring filter pressure and air velocity

/ Optionally with field upgradeable LCD-display

/ Optionally with Pitot tube

/ Display 180° rotatable

Description:

PMMS series of differential pressure transmitter is a versatile transmitter for monitoring differential pressure and air velocity. The plus- and minus inputs of the PMMS are connected to a differential pressure of a non-combustable gas. The electronic of the unit converts this pressure either into a 0. . .10 VDC- or a 4. . .20 mA-analogue output signal. This compact package is loaded with features such as field selectable english or metric ranges, a field upgradeable LCD display, adjustable damping of the output signal (with optional display) and the ability to select a square root output for use with Pitot tubes and other similar flow sensors (e.g. orifice plates) to measure air velocities.

Application:

The patented magnetic sensing technology of the series PMMS provides an exceptional long term performance and enables the transmitter to be the single solution for a huge amount of pressure- and airflow applications. Available are four models with different operating ranges from 0. . .60 Pa up to 0. . .7 kPa. All of the units provide four different selectable full scale values. Differential pressure transmitters of the series PMMS are the perfect solution to be used in cleanroom applications, monitoring of sluices or the detection of the grade of pollution of air filters. All models can be ordered with a duct mount static pressure probe, which can be mounted directly to the duct either with a split flange or with a mounting gland. Other typical applications for the PMMS are e.g. the monitoring of ventilators and blowers, air-filters, overpressure in rows of chimneys, the measuring of low respiratory and blood pressures and the recording of air velocity in building automation processes.

Technical Specifications:

Accuracy /	± 1% FSO
Stability /	± 1% FSO / year
max. Op. pressure /	ranges 0 and 1: 3.6 psi ranges 2 and 3: 6 psi
max. Burst pressure /	all ranges 6 psi
Media temperature /	-20. . .+70°C
Process connections /	1/8", 3/16“, 1/4", 5 mm and 6 mm ID tubing
Mounting orientation /	any
Response time /	0 or 3 s (selectable)
Zero and span /	adjustable with digital push button
Accessories /	Pitot tube PMMS160 in different lengths with installation kits on request
Weight /	approx. 230 g

Electrical Specifications:

Supply voltage /	
Current output:	10. . .35 VDC
Voltage output:	17. . .36 VDC and 21.6. . .33 VAC
Output signals /	
Current output:	4. . .20 mA, 2-wire
Voltage output:	0. . .5 VDC; 0. . .10 VDC, 3-wire
Load /	
Current output:	0. . .1250 Ω max.
Voltage output:	min. 1 kΩ
max. Power consumpt. /	21 mA max.
Display /	optionally available with 4-digit LCD-display, field upgradeable
Cable entry /	1/2“-NPS-female
Electrical connection /	european style terminal block
Protection class /	IP66 (NEMA 4X)

Measuring range table :

Range	in w.c.	Pa low	Pa high	mm w.c.
0	0.1	25	60	2.5
	0.15	30	75	5
	0.25	40	100	10
	0.5*	50	125*	12.5*
1	0.1	25	100	2.5
	0.25	40	150	5
	0.5	50	160	10
	1*	60	250*	25*
2	1	250	600	25
	2	300	750	50
	3	400	1000	100
	5*	500	1250*	125*
3	10	1000	1000	250
	15	1500	4000	350
	25	2000	5000	600
	28*	2500	7000*	700*

*Indicated values are the positive full scale output values per range.
Note: Ranges indicated in the table are the high end of the set range.
All ranges have a low end pressure value of 0.

Ordering Codes:

Order number | **PMMS.** | **W.** | **2.** | **0.** | **IN.** | **2**

PMMS Differential Pressure Transmitter for non-combustible Gases

Mounting /
W = wall mount
U = universal (wall or duct) mount
N = DIN rail mount

Operating range /
0 = max. 0,5 in w.c./ 125 Pa high/ 12.5 mm w.c.
1 = max. 1 in w.c./ 250 Pa high/ 25 mm w.c.
2 = max. 5 in w.c./ 1250 Pa high/ 125 mm w.c.
3 = max. 28 in w.c./ 7000 Pa high/ 700 mm w.c.

LCD-Display /
0 = none
1 = with LCD-Display

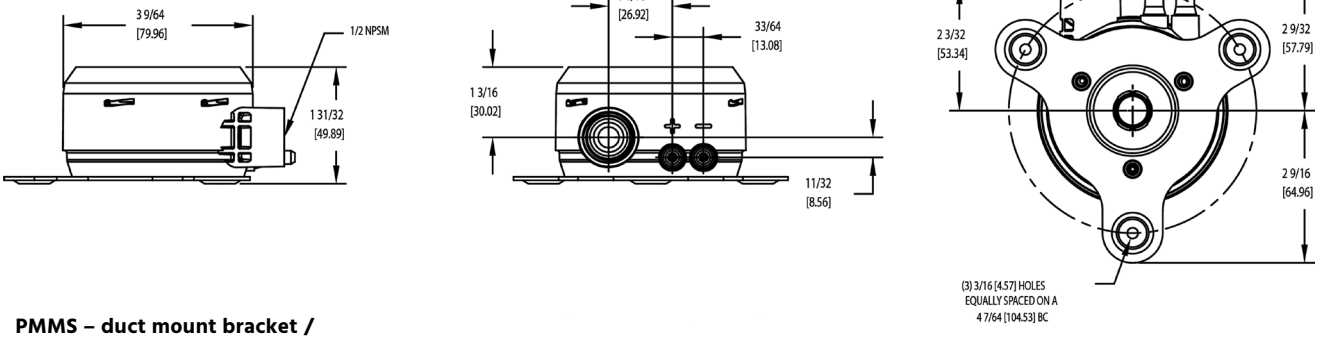
Units /
IN = inches water column
Pa = pascal
MM = millimeters water column

Option /
1 = installer kit, includes 2 plastic static pressure tips and 7 ft (2.1m) of PVC tubing
2 = factory calibration certificate
3 = filtered pickup with barb
4 = liquid tight cable gland fitting
5 = NIST traceable calibration certificate
6 = two (2) plastic static pressure tips
7 = toolless terminal block
8 = LCD cover without LCD display

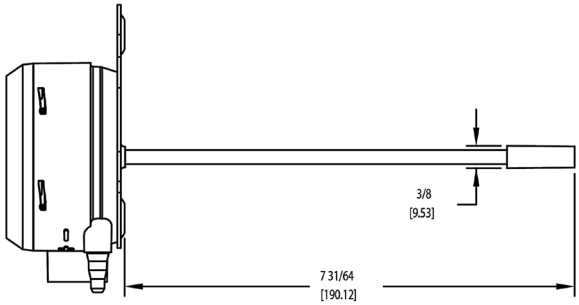
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Dimensions in Inch (mm):

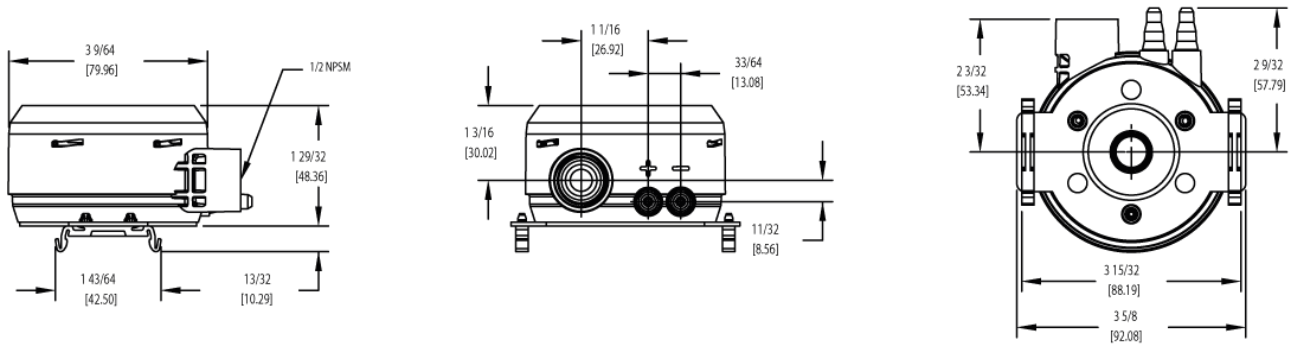
PMMS - Wall mount bracket /



PMMS – duct mount bracket /



PMMS – DIN mount bracket /



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AZ-01N

Attachable Display for Pressure and Temperature Transmitters



Features

/ Independent from auxiliary power

/ Freely scalable in seconds

/ Optionally with switching output

/ For 2- or 3-wire transmitters

/ 4-digit LED

/ Turnable display and housing

/ Available for hazardous areas

Description:

The AZ-01N attachable display unit is suited for all measuring transmitters with a 4. . .20 mA output in 2-wire or a 0. . .10 V output in 3-wire technology. The display is mounted only between the plug and the cable box and is instantaneously ready to operate. By default, the AZ-01N has a plug connector as per ISO4400. Optionally, other versions with plug connector M12x1, 5-pole and BINDER 723, 5-pole can also be supplied. Further versions are possible on request. The display unit is freely programmable. The parameters such as scaling, decimal point, attenuation, setpoint adjustment etc. can be set easily over the keypad on the front. The parameters are stored in an EEPROM and continue to be present even when there is an outage. Exceeding the range limits in both directions can be displayed as error messages. The integrated diagnostic system continuously monitors all functions of the display. The unit of measurement specified at the time of ordering will be imprinted below the display film ex factory to ensure protection against deletion. As a practical alternative, the customer can fix a label with another unit on the display film. A set of sticker labels is included in the delivery.

Electrical Specifications:

Analogue signal / 4. . .20 mA, 2-wire or 0. . .10 VDC, 3-wire

Auxiliary power / **2-wire system:** supply from the current loop (voltage drop <6 VDC) Ex-version max. 28 VDC for combination of transmitter and AZ-01N
3-wire system: unit is supplied parallel to the transmitter
U_{Bmin} = 8 VDC. . .U_{MUmin}
U_{Bmax} = U_{MUmax}. . .36 VDC
(U_{MU} = supply voltage of used transmitter)

Switching output / 0, 1, or 2 independent open collector PNP-outputs

Switching load / standard max. 125 mA load, protected against short-circuiting,
U_{switch} = U_B - 2 VDC
optionally ATEX-approval max. contact power at a setpoint of 70 mA, for two setpoints 70 mA as sum of both outputs

Repeatability: < ± 0.1% FSO

Switching frequency: max. 10 Hz

Switching cycles: > 100 x 10^6

Time delay: 0. . .100 s

Electric protection /

Short-circuit prot.: permanent

Polarity reversal: no function in case of interchanged connections but no damage

Electromagnetic compatibility: Interference signal and Interference-proof as per EN61326

Option Ex-approval: Zone 1: II 2G Ex ia IIC T4 Gb (only in combination with 4. . .20 mA, 2-wire)

Safety-related maximum values: U_i = 28 VDC, I_i = 93 mA, P_i = 660 mW, C ≈ 0 nF, L_i ≈ 0 µH, plus cable inductivites 1 µH/m and capacities 100 pF/m

Display /

Type: 4-digit, red LED-display,

Digits height: 7 mm

Digits width: 4.85 mm (angle 10°)

Range: -1999. . .+9999

Accuracy: 0.1% ± 1 Digit

Refreshing: new value every 0. . .10 s, adjustable

Digital damping: 0.3. . .30 s, adjustable

Technical Specifications:

Mechanical strength / Vibration 5 g RMS (20. . .2000 Hz) shock 100 g / 11 ms

Storage temperature / -40. . .+85°C

Ambient temperature / -25. . .+85°C (Ex-Schutz +70°C)

Material / housing out of PA 6.6, polycarbonate

Weight / approx. 150 g

Data-security / non-volatile EEPROM

Protection class / IP65

Programmable features /
- dezimal point
- zero and span
- damping
- updating time for displayed measuring value
- actuating and deactuating values of setpoints
- switching delay
- hysteresis or window mode
- password protection

Ordering Codes:

Order no.	AZ-01N.	2.	1.	2.	5.	0

Attachable Display for Pressure and Temperature Measuring

Analogue output of transmitter /
1 = 4. . .20 mA, 2-wire
2 = 0. . .10 VDC, 3-wire
3 = ATEX-approval zone 1 for 4-20 mA, 2-wire
4 = others

Switching output (not in EX-version or 3-wire with plug ISO 4400) /
0 = no switching output
1 = 1 switching output (not with plug ISO 4400 combined with 3-wire transmitter)
2 = 2 switching outputs (not with 3-wire transmitter, not with plug connector ISO 4400)

Electrical connection /
1 = plug DIN 43650
2 = plug BINDER series 723, 5-pole
3 = M12x1, 5-pole, metallic version

Unit /
1 = none
2 = bar
3 = mbar
4 = mWs
5 = %
6 = mA

Special version /
0 = none
1 = please specify in detailed text

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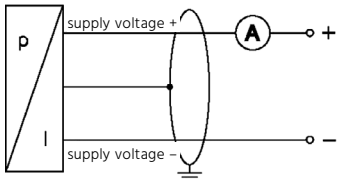
Connection Layout:

Connection layout table /

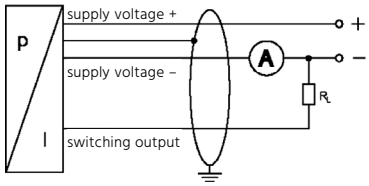
Electrical connections		ISO 4400	M12x1 (5-polig)	Binder 723 (5-polig)
2-wire-system	Supply +	1	1	3
	Supply -	2	2	4
	Switching output 1	3	5	2
	Switching output 2	not used	3	1
	Shield	Ground contact	4	Ground contact
3-wire-system	Supply +	1	1	3
	Supply -	2	2	4
	Signal +	3	3	5
	Switching output 1	not used	5	2
	Switching output 2	not used	not used	not used
	Shield	Ground contact	4	Ground contact

2-Wire-System (Current) (for Ex-Protection the supply is U = 20. . .28 VDC)

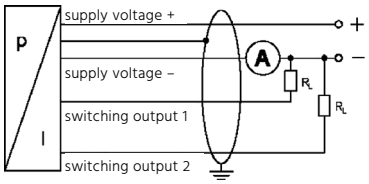
without Switching output



1 Switching output

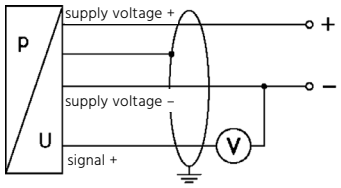


2 Switching outputs

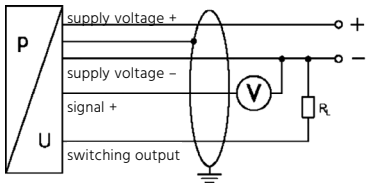


3-Wire-System (Voltage)

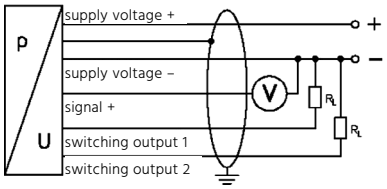
without Schaltausgang



1 Switching output

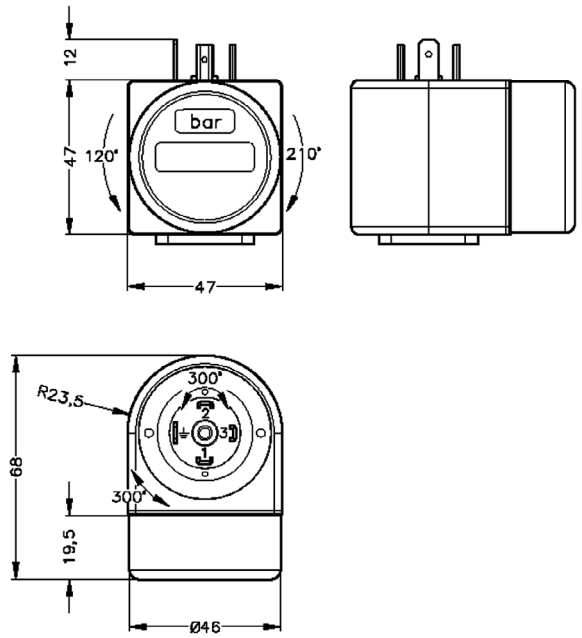


2 Switching outputs

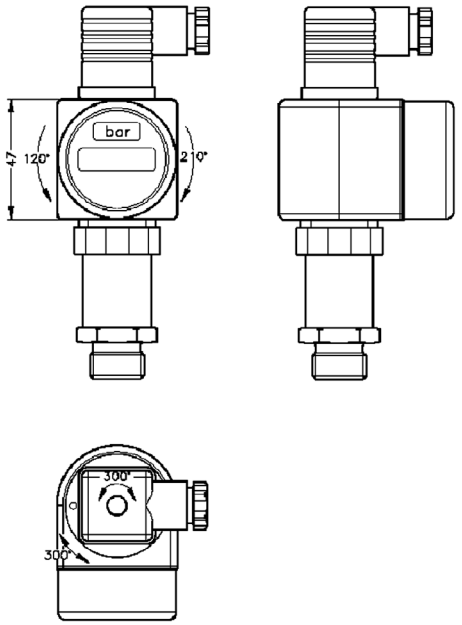


Dimensions in mm:

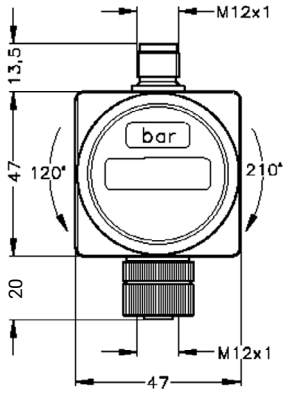
Standard



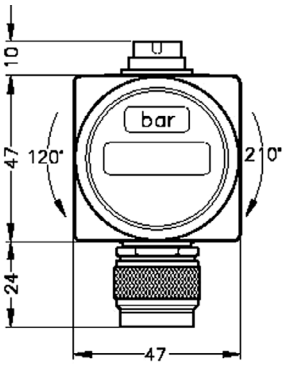
Example: AZ-01N on Profimess pressure measuring transmitter



Options

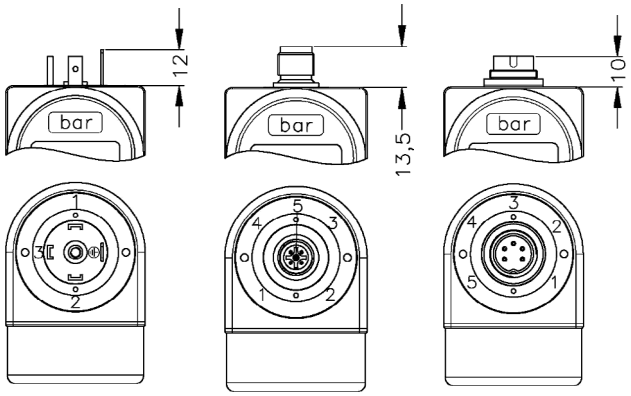


M12 x 1, 5-wire



Binder 723, 5-wire

Electrical Connection



ISO 4400 | M12 x 1, 5-wire | Binder 723, 5-wire

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PU-10K/E

Process Pressure Transmitter



Features

/ Acc. up to 0.1% FSO IEC 60770
/ HART®- communication
/ ATEX-approval
/ Up to 300°C media temperature
/ All common flange and thread connections
/ St. steel or ceramic sensor
/ LCD display
/ Adjustable offset, span, attenuation etc.

Description:

The PU-10 K/E process pressure transmitter has been developed to meet the highest demands in the processing industry. A piezo-resistive pressure sensor of high signal stability is used as a base element. The downstream amplifier electronic component linearizes the sensor signal and compensates the temperature errors. A 4 to 20 mA output signal is present in 2-wire method with a HART® frequency signal to make the PU-10 K/E into an intelligent device. In the version with display, parameters like offset, span and attenuation are programmable over a keypad. By means of the HART® component this information can be transmitted via a PC or hand-held programming device. A good readable visible LCD display (optional) shows the measuring value and displays it visually by means of an additional bar graph indicator. The PU-10 E (with stainless steel sensor) has an accuracy of 0.1% of the end value of the operating range. It can be equipped with two different variants of housing. By means of a temperature decoupler mounted between the process connection and the electronic component, measurements up to 300°C media temperature can be obtained.

Application:

Today's pressure measurement technology places high demands on measurement device manufacturers regarding the sealing materials used, material contacting components besides temperature and overload safety. In addition to this, accuracy and, not the least, the price to performance ratio, too, play a decisive role in the selection of a suitable measuring device. The PU-10 K/E signifies the development of a new series of pressure measuring transmitters which meets these requirements to justify their highest standards. Sensor elements are available from stainless steel or ceramic and are therefore compatible with nearly any type of medium, especially because the standard sealing material Viton is supplemented by a number of special designs. Optionally, connections from Hastelloy can also be supplied. Besides the normal inch-system thread, also flange and DRD connections are used as an interface with the processing, offering thus a wide range possibilities to meet any type of requirement. Intelligent electronics are embedded in one of the two robust connection housings that were especially conceived for use in harsh industrial environment. The PU-10 K/E is compatible with nearly any task of pressure measurement in the industry. Ask us for special customized versions in regard to process connections, sealing material and so on.

Electrical Specs. PU-10K:

Output signal /	4. . .20 mA, 2-wire with Hart®-communication; intrinsically safe version (option)
Auxillary power /	U_B = 12. . .28 VDC
Power consumption /	max. 25 mA
Accuracy [1] /	for nominal pressure: 0.16. . .0.4 bar ≤ ± (0.2 + (TD-1) x 0.02) % FSO for nominal pressure: 1. . .20 bar ≤ ± (0.1 + (TD-1) x 0.01) % FSO with turn-down = nominal pressure range / adjusted range
Permissible load /	$R_{max} \leq [(U_B-U_{Bmin}) / 0.02\ A]\ \Omega$, HART®: R_{min} = 250 Ω
Influencing factors /	
Auxillary power:	0.05 % FSO / 10 V
Load:	0.05 % FSO / kΩ
Long-time stability /	≤ ± 0.1% FSO / year at reference cond.
Response time /	200 ms - without consideration of electronic damping
Operating rate /	5/s
Settings /	
Attenuation:	0. . .100 s
Offset:	0. . .80 % FSO
Span:	turn-down of span: max. 1:5 (span min. 0.02 bar)
Electrical protection /	
Short-circuit protection:	permanent
Reverse polarity protection:	no damage, but also no function
Electromagnetic compatibility:	emission and immunity according to EN 61326
ATEX-Protection /	
St. steel Field-housing:	Zone 0/1[2]: II 1/2G Ex ia IIC T4 Ga/Gb Zone 20: II 1D Ex ia IIIC T85°C Da
Aluminium pressure-cast housing:	Zone 1: II 2G Ex ia IIB T4 Gb Zone 20: II 1D Ex ia IIIC T85°C Da
Pressure-resistant:	Aluminium pressure-cast housing Zone 1: II 2G Ex d IIC T5 Gb
Safety-related maximum values:	U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 27 nF
max. Ambient temp.:	- Zone 0: -20. . .+60°C at p_{atm} 0.8. . .1.1 bar - from Zone 1: -40. . .+70°C intr. safe - pressure-resistant encl. -20. . .+70°C
Display (Option) /	
Type:	LCD-display, visible range 32.5 x 22.5 mm
Operating display:	5-digit, 7-segment, digit height 8 mm, range ±9999
Additional display:	8-digit, 14-segment, digit height 5 mm
Bar graph:	52-segments
Accuracy:	0.1% ± 1 Digit
Protection class /	IP67
CE-Approval /	EMC-directive: 2014/30/EU

[1] Accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)
[2] The designation depends on the nominal pressure range. Nominal pressure ranges ≤ 60 mbar are marked with „2G". For nominal pressure ranges > 60 mbar and < 10 bar see the notes under the EC type-examination certificate.

Technical Specs. PU-10K:

Accuracy /	Nom. Press. < 1 bar ≤ ± 0.2 % FSV Nom. Press. ≥ 1 bar ≤ ± 0.1 % FSV
Operating ranges /	from 0. . .160 mbar to 0. . .20 bar
Mechanical strength /	
Vibration:	5 g RMS (20. . .2000Hz)
Shock:	100 g / 11 ms
Temperature range without Display /	
Storage:	-40. . .+80°C
Ambient:	-40. . .+70°C
Media:	-25. . .+125°C
Temperature range with Display /	
Storage:	-30. . .+80°C
Ambient:	-20. . .+70°C
Media:	-25. . .+125°C
Temperature error /	≤ ± (0.02 x Turn-Down) % FSO/10 K in comp. range -20. . .+80°C
Material /	
Housing:	aluminium pressure cast, powder coated or st. steel 1.4404
Cable gland:	brass, nickel plated
Window:	laminated safety glass
Pressure connection:	Standard: st. steel 1.4404; Option for G 1½" flush (DIN 3852): PVDF
Seals:	FKM (-25. . .+125°C), EPDM (-40. . .+125°C), others on request

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Diaphragm:	Al_2O_3 99,9 %
Wetted parts:	pressure connection, sealings, diaphragm
Weight /	min. 400 g (depending on process connection)
Mounting position /	any (standard calibration in a vertical position with the pressure port connection down; differing installation position have to be specified in the order)
Life span /	> 100 x 10^6 load cycles

Connection table /

Electrical layout	Aluminium pressure cast housing terminal clamps (clamp section 2,5 mm²)	Stainless steel field housing terminal clamps (clamp section 1,5 mm²)
Supply +	IN +	IN +
Supply -	IN -	IN -
Load	ground contact	ground contact
Test	Test	-

Ordering Codes PU-10K:

Order no.	PU-10K.	2.	1.	1.	0.	K01.	2.	K04.	1

Process Pressure Transmitter with Ceramic Sensor

Housing /
1 = st. steel field housing
1d = st. steel field housing with display
2 = aluminium pressure cast housing
2d = aluminium pressure cast housing with display

Communication /
0 = 4. . .20 mA, 2-wire, with Hart®-comm.
1 = 4. . .20 mA, 2-wire, ATEX-intrinsically safe version with Hart®-communication [A)]

Diaphragm /
1 = ceramics Al_2O_3 99,9 %

Temperature range /
0 = Media temperature up to 125°C

Process connection /
K01 = G 1/2"-male (DIN 3852)
K03 = G 1/2"-male (EN 837)
K04 = 1/2" NPT -male
K06 = G1 1/2"-male flush (DIN 3852)
K07 = DIN flange DN25 PN40 (DIN 2501)
K08 = DIN flange DN50 PN40 (DIN 2501)
K09 = DIN flange DN80 PN16 (DIN 2501)
K10 = ANSI flange DN 2" / 150 lbs (ANSI B16.5) [B)]
K11 = ANSI flange DN 3" / 150 lbs (ANSI B16.5) [B)]
K12 = DRD Ø 65 mm [C)]

Calibration /
2 = relative pressure

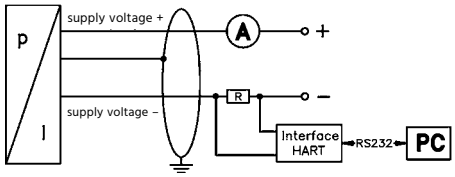
Operating range /
K02 = 0. . .+0.16 bar (overload up to 4 bar, perm. vacuum up to -0.3 bar)
K03 = 0. . .+0.40 bar (overload up to 6 bar, perm. vacuum up to -0.5 bar)
K04 = 0. . .+1 bar (overload up to 8 bar, perm. vacuum up to -0.5 bar)
K05 = 0. . .+2 bar (overload up to 15 bar, perm. vacuum up to -1.0 bar)
K06 = 0. . .+5 bar (overload up to 25 bar, perm. vacuum up to -1.0 bar)
K07 = 0. . .+10 bar (overload up to 35 bar, perm. vacuum up to -1.0 bar)
K08 = 0. . .+20 bar (overload up to 45 bar, perm. vacuum up to -1.0 bar)

Special design /
0 = none
1 = sealing EPDM (standard FKM)
9 = please specify in detailed text

[A)] only possible in combination with aluminium pressure case
[B)] DN 2"/150 and DN 3"/150 lbs only possible for nominal pressure ranges PN ≤ 10 bar
[C)] mounting flange is included in the delivery (already pre-assembled)

Wiring Diagram:

2-Wire-System (Current) HART®



Electrical Specs. PU-10E:

Output signal /	4. . .20 mA, 2-wire with Hart®-communication; Ex-intrinsically safe version (option)
Auxillary power /	U_B = 12. . .28 VDC
Power consumption /	max. 25 mA
Accuracy [9] /	≤ ± 0.1 % FSO **Turn-Down ≤ 1:5** no changes **Turn-Down > 1:5** ≤ 0.1 + 0.015 x (TD-5) % FSO
Permissible load /	$R_{max} \leq [(U_B-U_{Bmin}) / 0.02\ A]\ \Omega$, HART®: R_{min} = 250 Ω
Influencing factors /	
Auxillary power:	0.05 % FSO / 10 V
Load:	0.05 % FSO / kΩ
Long-time stability /	≤ ± 0.1% FSO / year at ref. conditions
Response time /	100 ms - without consideration of electronic damping
Operating rate /	10/s
Settings /	
Attenuation:	0. . .100 s
Offset:	0. . .90 % FSO
Span:	Turn-Down der Spanne bis 1:10
Electrical protection /	
Short-circuit protection:	permanent
Reverse polarity protection:	no damage, but also no function
Electromagnetic compatibility:	emission and immunity according to EN 61326
ATEX-Protection /	
St. steel Field-housing:	Zone 0: II 1G Ex ia IIC T4 Ga / II 1D Ex ia IIIC T85°C Da
Aluminium pressure-cast housing:	Zone 1: II 2G Ex ia IIB T4 Gb / II 1D Ex ia IIIC T85°C Da
Pressure-resistant:	aluminium pressure cast housing: Zone 1: II 2G Ex d IIC T5 Gb
Safety-related maximum values:	U_i = 28 V, I_i = 98 mA, P_i = 680 mW, C_i = 0 nF, L_i = 0 µH, C_{GND} = 27 nF
max. Ambient temp.:	- Zone 0: -20. . .+60°C bei p_{atm} 0.8. . .1.1 bar - from Zone 1: -40. . .+70°C intrins. safe - pressure resistant -20. . .+70°C
Connecting cables (from factory) /	capacitance: signal line/shield also signal line/signal line: 160 pF/m inductance: signal line/shield also signal line/signal line: 1 µH/m
Display (Option) /	
Type:	LCD-display, visible range 32.5 x 22.5 mm
Operating display:	5-digit, 7-segment, digit height 8 mm, range ±9999
Additional display:	8-digit, 14-segment, digit height 5 mm
Bar graph:	52-segments
Accuracy:	0.1% ± 1 Digit
Protection class /	IP67
CE-Approval /	EMC-Directive: 2014/30/EU Pressure equipment directive: 2014/68/EU (Modul A) [10]

[9] Accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)
[10] This directive is only valid for devices with max. permissible overpressure > 200 bar

Technical Specs. PU-10E:

Accuracy /	0.1 % FSO as per IEC 60770
Operating ranges /	from 0.4. . .0.4 bar up to -1. . .10 bar from 0. . .400 mbar up to 0. . .600 bar
Temperature range media [6] /	
Silicon oil:	-40. . .+125°C
Food compatible oil:	-10. . .+125°C
Temp. range for media with temperature decoupler /	
Silicon oil:	-40. . .+300°C - overpressure -40. . .+150°C - low pressure
Food compatible oil:	-10. . .+250°C - overpressure -10. . .+150°C - low pressure
Temperature range without Display [6] /	
Storage:	-40. . .+80°C
Ambient:	-40. . .+80°C
Temperature range with Display [6] /	
Storage:	-30. . .+80°C
Ambient:	-20. . .+70°C
Temperature error [7 + 8] /	≤ 0.2 FSO x Turn-Down in comp. range -20. . .+85°C

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Material /

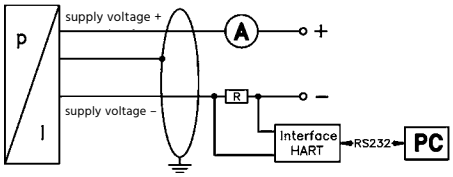
Housing:	aluminium pressure cast, powder coated or st. steel 1.4404
Cable gland:	brass, nickel plated
Window:	laminated safety glass
Pressure conn.:	st. steel 1.4435
Seals:	FKM (Standard); Option: FFKM (min. Temperature range from -15°C, possible for PN ≤ 100 bar)
Diaphragm:	st. steel 1.4435 (Standard); Option: Hastelloy® C-276, Tantal (possible from 1 bar)
Wetted parts:	pressure connection, sealings, diaphragm
Filling /	silicon oil (standard); option: food compatible oil, Halocarbon and others on request
Weight /	min. 400 g (depending on process connection)
Mounting position /	any (standard calibration in a vertical position with the pressure port connection down; differing installation position have to be specified in the order)
Lifetime /	> 100 x 10^6 load cycles

X) only possible in combination with aluminium pressure case
F) only possible with process connections
G) tantal diaphragm possible with nominal pressure ranges from 1 bar
H) not possible for vacuum ranges and pressure ranges > 40 bar
I) DN 2"/150 and DN 3"/150 lbs only possible for ranges PN ≤ 6 bar
J) mounting flange is included in the delivery (already pre-assembled)
K) min. permissible temperature from -15°C, possible for ranges PN ≤ 100 bar
6) max. temperature of the medium for PN gauge > 0 bar: 150°C for 60 min. with a max. environmental temp. of 50°C (without temp. decoupler)
7) an opt. temp. decoupler can influence thermal effects for offset and span depending on installation position and filling conditions
8) for flange- and DRD-version: tolerance band offset ≤ ± 1.6 % FSO / tolerance band span ≤ ± 0.6 % FSO

Connection table /

Electrical layout	Aluminium pressure cast housing terminal clamps (clamp section 2,5 mm²)	Stainless steel field housing terminal clamps (clamp section 1,5 mm²)
Supply +	IN +	IN +
Supply -	IN -	IN -
Load	ground contact	ground contact
Test	Test	-

2-Wire-System (current) HART®



Ordering Codes PU-10E:

Order no.	PU-10E.	2.	1.	2.	0.	E01.	2.	E04.	0

Process Pressure Transmit. with St. Steel Sensor

Housing /
1 = stainless steel field housing
1d = stainless steel field housing, display
2 = alum. pressure cast housing
2d = alum. pressure cast housing, display

Communication /
0 = 4. . .20 mA, 2-wire, with Hart®-communication
1 = 4. . .20 mA, 2-wire, intrinsically safe version with Hart®-communication X)

Diaphragm /
2 = stainless steel 1.4435 (316L)
3 = Hastelloy® F)
4 = Tantal F) G)

Temperature range /
0 = without temperature decoupler up to 125°C
1 = with temperature decoupler up to 300°C F)

Process connection /
E01 = G 1/2"-male (DIN 3852)
E02 = G 1/2"-male (DIN 3852) with flush sensor H)
E03 = G 1/2"-male (EN 837)
E04 = 1/2" NPT-male
E05 = G 1"-male with flush welded diaphragm (DIN 3852)
E07 = DIN-flange DN25 PN40 (DIN 2501)
E08 = DIN-flange DN50 PN40 (DIN 2501)
E09 = DIN-flange DN80 PN16 (DIN 2501)
E10 = ANSI-flange DN 2" / 150 lbs (ANSI B16.5) I)
E11 = ANSI-flange DN 3" / 150 lbs (ANSI B16.5) I)
E12 = DRD Ø 65 mm J)

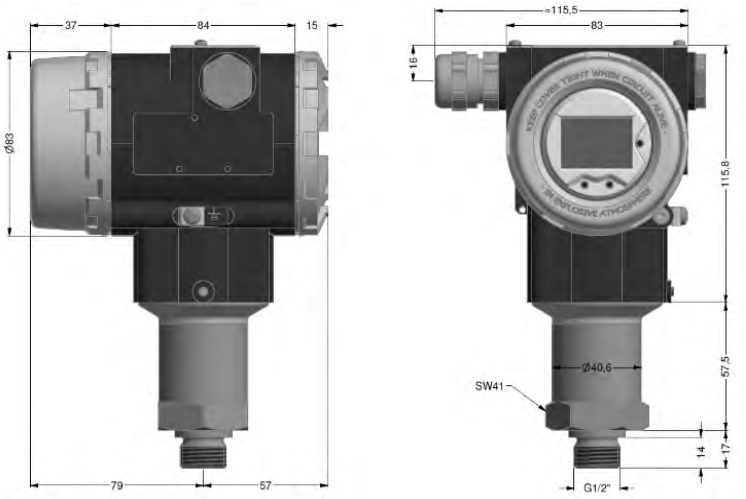
Calibration /
1 = absolute pressure (possible from 1 bar)
2 = gauge pressure

Operating range /

E01 =	-0,4. . .+0,4 bar	(overload up to	2,0 bar,	burst pressure 3,0 bar)
E02 =	-1. . .+1 bar	(overload up to	5,0 bar,	burst pressure 7,5 bar)
E03 =	-1. . .+2 bar	(overload up to	10,0 bar,	burst pressure 15,0 bar)
E04 =	-1. . .+4 bar	(overload up to	20,0 bar,	burst pressure 25,0 bar)
E05 =	-1. . .+10 bar	(overload up to	40,0 bar,	burst pressure 50,0 bar)
E06 =	0. . .+0,4 bar	(overload up to	2 bar,	burst pressure 3 bar)
E07 =	0. . .+1 bar	(overload up to	5 bar,	burst pressure 7,5 bar)
E08 =	0. . .+2 bar	(overload up to	10 bar,	burst pressure 15 bar)
E09 =	0. . .+4 bar	(overload up to	20 bar,	burst pressure 25 bar)
E10 =	0. . .+10 bar	(overload up to	40 bar,	burst pressure 50 bar)
E11 =	0. . .+20 bar	(overload up to	80 bar,	burst pressure 120 bar)
E12 =	0. . .+40 bar	(overload up to	105 bar,	burst pressure 210 bar)
E13 =	0. . .+100 bar	(overload up to	210 bar,	burst pressure 420 bar)
E14 =	0. . .+200 bar	(overload up to	600 bar,	burst pressure 1000 bar)
E15 =	0. . .+400 bar	(overload up to	1000 bar,	burst pressure 1250 bar)
E16 =	0. . .+600 bar	(overload up to	1000 bar,	burst pressure 1250 bar)

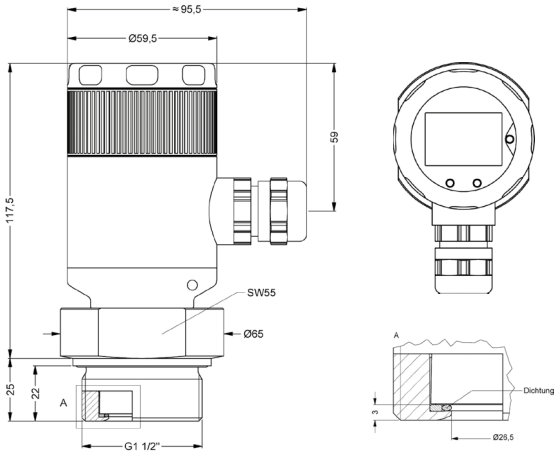
Special design /
0 = none
1 = sealing FFKM (standard FKM) K)
2a = filling fluid - food compatible oil (standard silicon oil) F)
2b = filling fluid - Halocarbon (standard silicon oil) F)
9 = please specify in detailed text

Dimensions PU-10K (mm):

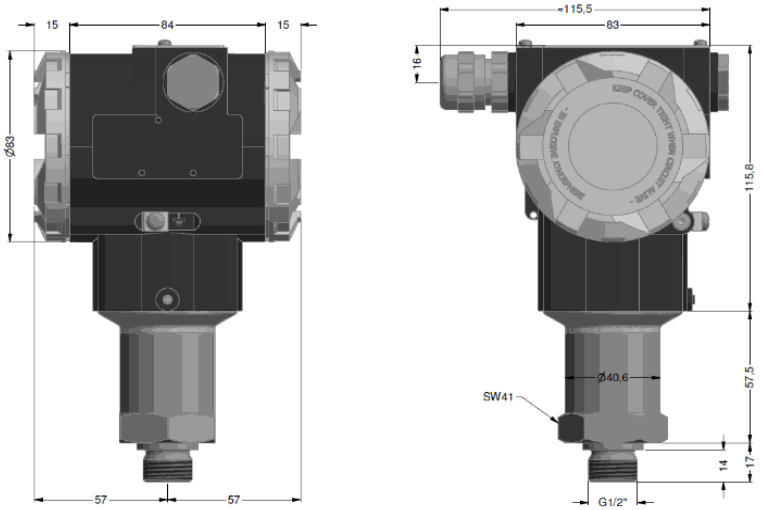


G 1/2"-male DIN 3852

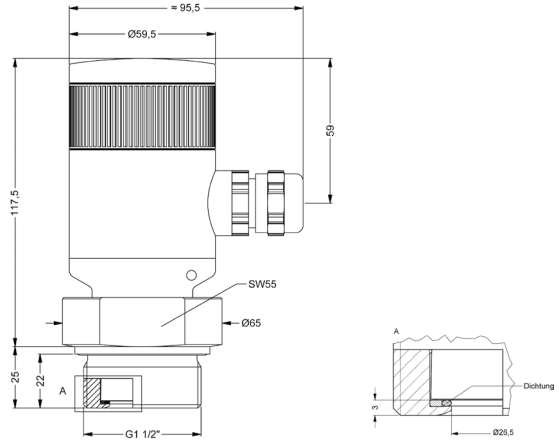
Stainless steel field housing with display



G1 1/2"-AG flush DIN 3852



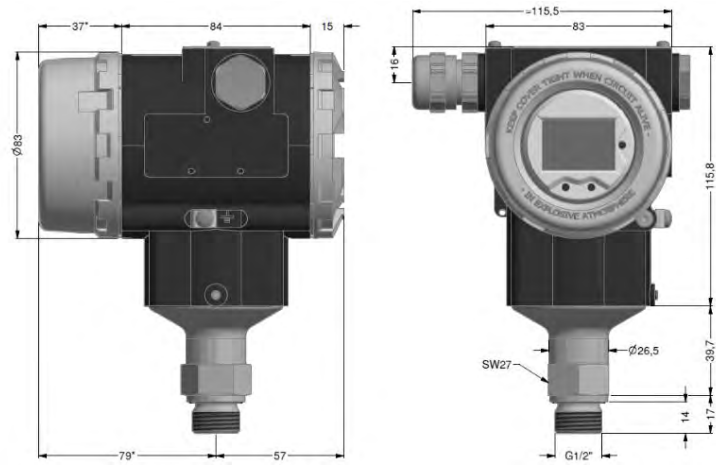
Stainless steel field housing without display



G1 1/2"-AG flush DIN 3852

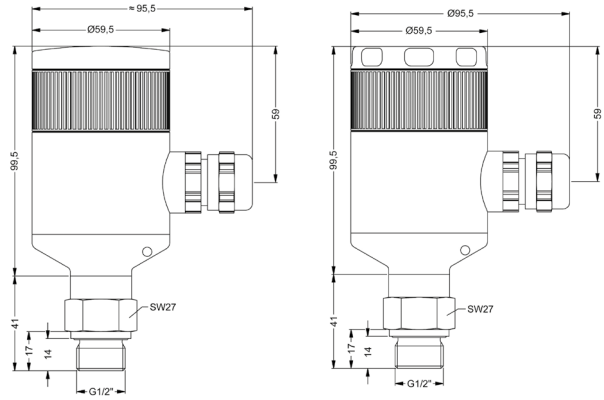
>> - aluminium pressure casting housing is horizontally rotatable as standard

Dimensions PU-10E (mm):



by 19 mm (with aluminium pressure casting housing

Stainless steel field housing

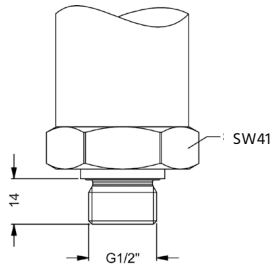


>> - for nominal pressure PN > 400 bar increases the length of devices by 39 mm

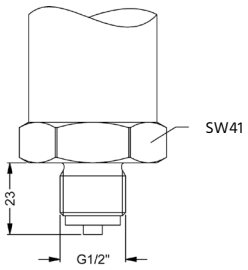
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Mechanical Connections (mm):

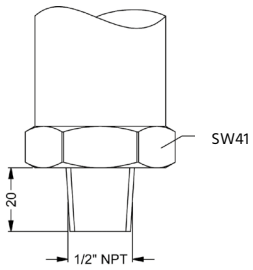
Inch-system thread



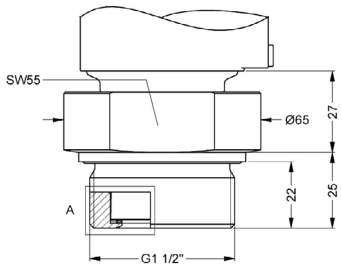
G1/2″ DIN 3852



G1/2″ EN 837

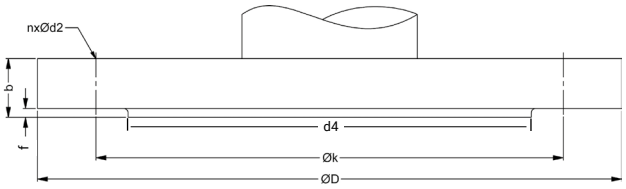


1/2″ NPT



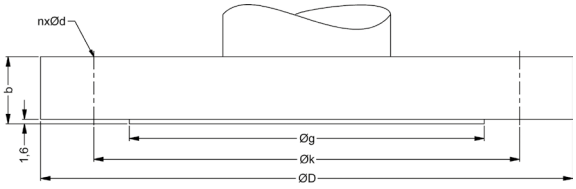
G11/2″ frontbündig DIN 3852

Flange (DIN 2501)



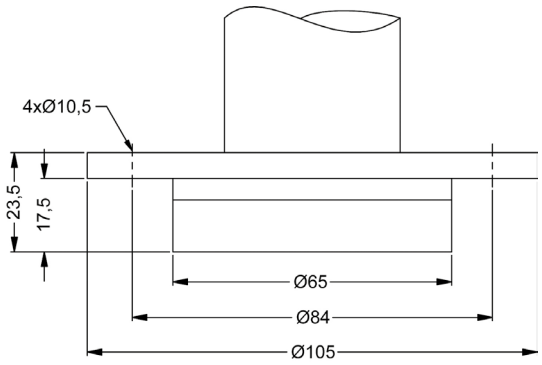
Size	DN25 / PN40	DN50 / PN40	DN80 / PN16
D	115	165	200
k	85	125	160
b	18	20	20
n	4	4	8
d2	14	18	18
f	2	3	3
d4	68	102	138
PN	≤ 40 bar	≤ 40 bar	≤ 16 bar

Flange (ANSI B16.5)

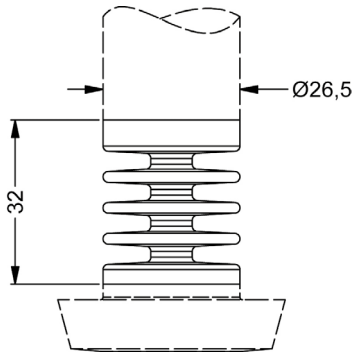


Size	2″ / 150 lbs	3″ / 150 lbs
D	152.4	190.5
g	91.9	127.0
k	120.7	152.4
b	19.1	23.9
n	4.0	4.0
d	19.1	19.1
PN	≤ 10 bar	≤ 10 bar
PN	≤ 40 bar	≤ 40 bar

DRD-connection



Temperature decoupler



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KE-01

Cooling Line for Pressure Metering Points up to 200°C



Features

/ Available in brass, steel or stainless steel
/ Pressure up to 600 bar
/ Temperature up to 200°C
/ Female thread for instrument
/ Gauge connection to measuring point

Description:

The full stainless steel cooling tower KE-01 connects a pressure measuring point, which is due to high media temperatures too hot for a direct connection, to a pressure instrument like a pressure gauge, a pressure switch or a pressure sensor. The cooling tower reduces the temperature of the pressure medium significantly by air circulation and thermal radiation, in order to avoid wrong measuring values or damages of the pressure instrument. It is recommended to use the cooling tower KE-01 at process temperatures in excess of 100°C.

Application:

Too high media temperatures at pressure metering points are frequently restricting the facility to display, measure and evaluate the process pressure accurately, thus pressure instruments are usually calibrated to a specified temperature range or the inaccuracy caused by higher or lower temperatures is compensated. Temperatures out of this range lead to disproportionate imprecision or damage of the internal electronic components. In this case the cooling tower KE-01 offers a priceworth and practical solution, which increases the measuring accuracy and the lifespan of such instruments.

Technical Specifications:

Materials / brass, steel or stainless steel 316Ti

max. Pressure /
brass: 250 bar
steel: 400 bar
st. steel: 600 bar

Temperature /
brass: 100°C
steel: 155°C
st. steel: 200°C

Connecting thread /
Instrument: G 1/2"-female
Process: G 1/2"B-male or G 1/4"B-male

Weight / G1/4"B: 100g
G1/2"B: 120g

Ordering Codes:

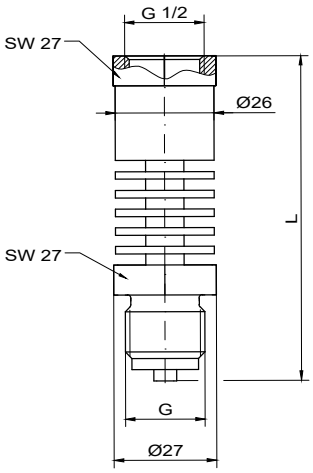
Order number	KE-01.	1.	2.

KE-01 Cooling Line

Material /
1 = brass
2 = steel
3 = stainless steel 361Ti

Process connection /
1 = G 1/2"B-male
2 = G 1/4"B-male

Dimensions in mm:



Version	Thread	mm
KE-01	G	L
KE-01.x.1	G 1/2B	87
KE-01.x.2	G 1/4B	79

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DM-250

Digital Pressure Gauge with Ceramic Sensor



Features

/ Accuracy ≤ ± 0.25 % FSO BFSL

/ Operating ranges up to 600 bar

/ Rotatable display housing

/ Min/Max function

/ Offset- and endpoint calibration

/ Switch-off automatic configuration

/ NPT or G thread

/ Selectable pressure units (bar, mbar, psi, InHg, cmHg, mmHG, hPa, kPa, MPa, mH2O, InH2O)

Description:

The battery-powered digital pressure gauge series DM-250 has been designed for pressure measurements in hydraulic and pneumatic systems. Characteristics such as accuracy, reliability and a good overload resistance forms the base for the use of this series in the entire industry. All models are equipped with a stable, rotatable plastic display housing with a 2-line LC display, which guarantees a good readability even under unfavorable mounting conditions. The handling and configuration is menu-driven via three miniature push buttons.

Besides showing information about the nominal pressure range (e.g. limit exceeding), several pressure units and the position of decimal point can be set as well as minimal and maximal pressure of the process can be read. Furthermore, the instruments zero and end point can be calibrated and the configuration of the power off function is possible. Factory defaults can be loaded via menu.

Application:

Today, in the industry, conventional Bourdon tube pressure gauges are increasingly replaced by digital manometers, since these devices are more accurate, long lasting and stable and possess additional characteristics that are impossible for mechanical manometers due to their design. Especially users from the areas listed below will profit from these facts:

· Environmental technology
· Laboratory technology
· Machine construction
· Plant manufacturing
· Pneumatic & Hydraulic
· Research & Development
· etc.

Technical Specifications:

Operating ranges /	see table 1
Measuring rate /	5 per sec.
Accuracy /	≤ ± 0.25 % FSO BFSL (accuracy according to IEC 60770 - minimum value setting (non-linearity, hysteresis, repeatability)
Thermal error /	≤ ±0.2 % FSO / 10 K for zero and span in compensated range -25. . .+85°C
max. Temperature /	
Medium:	-20. . .+85°C
Ambient:	-20. . .+70°C
Storage:	-30. . .+80°C
mech. Stability	
Vibration:	5 g RMS (25. . .2000 Hz) as per DIN EN 60068-2-6
Shock:	100 g / 1 ms as per DIN EN 60068-2-27
Process connection /	
Standard:	G 1/4" EN 837
Optional:	G 1/2" EN 837, 1/4" NPT, 1/2" NPT
Materials /	
Pressure port / housing:	st. steel 1.4404
Display housing:	PA 6.6, polycarbonate
Gaskets:	FKM
Diaphragm:	ceramics Al_2O_3 96%
Wetted parts /	pressure port, gaskets and diaphragm
Mounting pos. /	any
Weight /	approx. 300 g

Electrical Specifications:

Display /	LCD, visible range 40 x 30 mm; 4.5-digit 7-segment main display, digit height 11 mm, range of indication ±19999; 6-digit 14-segment additional display, digit height 7.5 mm
Power supply /	3.6 V Lithium-Battery; 2 Units (1/2 AA)
Operational life /	
Mechanical:	> 100 x 10^6 pressure cycles
Battery:	Standby mode: approx. 5 years
AD-converter /	14 Bit resolution
Data storage /	EEPROM (non volatile)
Protection class /	IP65
Emission /	as per EN 61326
Immunity /	as per EN 61326
CE-conformity /	
EMV-directive:	2004/108/EG
Pressure directive:	2014/68/EU (Module A) (this directive is only for devices with max. permissible overpressure > 200 bar)

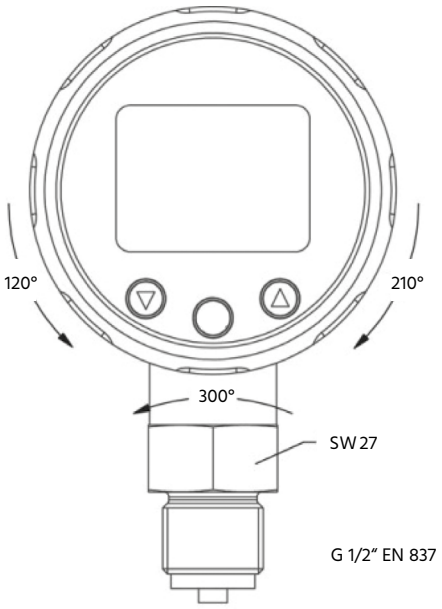
Ranges & Burst Pressure:

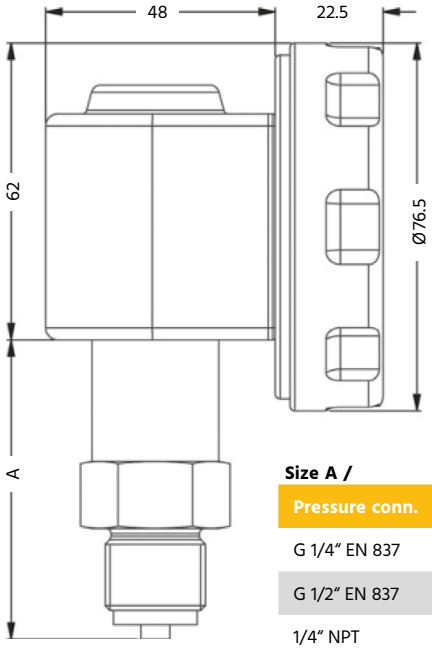
Nominal pressure	Nom. pressure abs.	overpressure	burst press. ≥
-1. . .0 bar		4 bar	7 bar
0. . .0.4 bar		1 bar	2 bar
0. . .0.6 bar	0. . .0.6 bar	2 bar	4 bar
0. . .1.0 bar	0. . .1.0 bar	2 bar	4 bar
0. . .1.6 bar	0. . .1.6 bar	4 bar	5 bar
0. . .2.5 bar	0. . .2.5 bar	4 bar	5 bar
0. . .4.0 bar	0. . .4.0 bar	10 bar	12 bar
0. . .6.0 bar	0. . .6.0 bar	10 bar	12 bar
0. . .10 bar	0. . .10 bar	20 bar	25 bar
0. . .16 bar	0. . .16 bar	40 bar	50 bar
0. . .25 bar	0. . .25 bar	40 bar	50 bar
0. . .40 bar	0. . .40 bar	100 bar	120 bar
0. . .60 bar	0. . .60 bar	100 bar	120 bar
0. . .100 bar	0. . .100 bar	200 bar	250 bar
0. . .160 bar	0. . .160 bar	400 bar	500 bar
0. . .250 bar	0. . .250 bar	400 bar	500 bar
0. . .400 bar	0. . .400 bar	600 bar	650 bar
0. . .600 bar	0. . .600 bar	800 bar	880 bar

Vacuum resistance: PN ≥ 1 bar: unlimited vacuum resistance; PN < 1 bar: on request

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Dimensions in mm:





Size A /

Pressure conn.	mm
G 1/4" EN 837	54.5
G 1/2" EN 837	62.5
1/4" NPT	54.5
1/2" NPT	60.5

Ordering Codes:

Order number	DM-250.	2.	2.	A.	0

DM-250 Digital Pressure Gauge

Process connection /
1 = G 1/4" EN 837
2 = G 1/2" EN 837
3 = 1/4" NPT
4 = 1/2" NPT

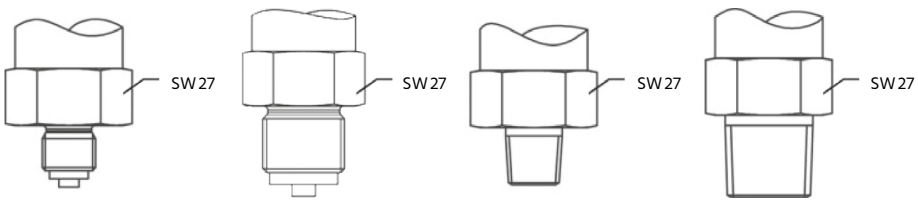
Calibration /
1 = relative pressure
2 = absolute pressure [1]

Operating range /
A = -1. . .0 bar [1]
B = 0. . .0.4 bar [1]
C = 0. . .0.6 bar
D = 0. . .1 bar
E = 0. . .1.6 bar
F = 0. . .2.5 bar
G = 0. . .4 bar
H = 0. . .6 bar
I = 0. . .10 bar
J = 0. . .16 bar
K = 0. . .25 bar
L = 0. . .40 bar
M= 0. . .60 bar
N = 0. . .100 bar
O = 0. . .160 bar
P = 0. . .250 bar
Q = 0. . .400 bar
R = 0. . .600 bar
9 = other

Option /
0 = none
9 = special (please specify in detailed text)

[1] absolute pressure possible from 0.6 bar (operating range „C")

Process connection /

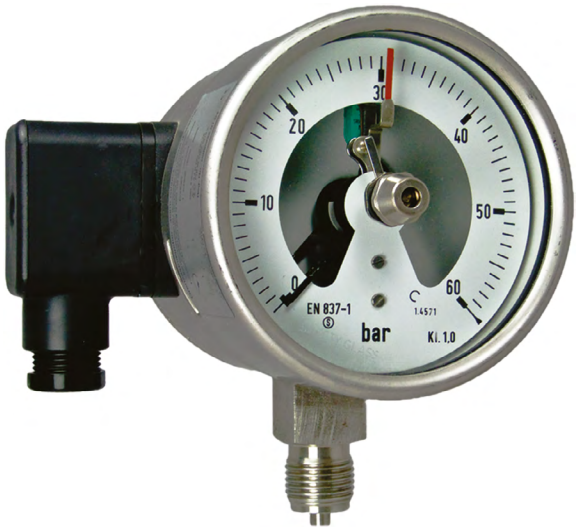


G 1/4"EN 837 | G 1/2"EN 837 | 1/4"NPT | 1/2"NPT

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KM-100N

Contact Pressure Gauge



Features

/ Brass and chemical versions

/ Nominal size 4” (100 mm)

/ Optional vibration attenuation

/ Up to 4 inductive or snap action contacts

/ All levels of pressure -1. . .2500 bar as per DIN

/ Negative pressure ranges

Description:

Contact pressure gauges are suited for controlling and regulating processes by means of excrescent processing pressure. In this, the switching contacts open or close depending on the indicator position in the pressure gauge. If the medium to be monitored does not tend to crystallize or harden, pressures from -1 bar up to 2500 bar can be displayed and monitored easily. In critical situations, optionally the pressure gauge is equipped with a diaphragm seal for the pressure. In KM-100N with oil filling, possible excrescent pressure pulsations or mechanical vibrations are subdued. This extends the life span and the quality of legibility in the devices significantly. Snap-action contacts are used under rough industrial conditions while switching high currents. In case of excess or below par electrical switching load at the contacts, we recommend using a protective relay for the contacts such as Profimess MSRx. On the other hand, touch less engaging of inductive contacts facilitates precise setting for the switching point and has no effect on the pressure measurement system. By using these contacts even applications in the hazardous areas can be covered. For controlling the inductive switching contacts, always a separate control device is necessary which normally has a control power circuit as per NAMUR.

Application:

The KM-100N series contact Bourdon pressure gauges is used in the whole industry. As against a simple pressure switch, they possess the major advantage of enabling visual inspection of the excrescent process pressure even if the power supply is interrupted due to power outage or cable failure. Snap-action contacts are engaged without potential, thus allowing the user maximum freedom to select the evaluator unit. The KM-100N is supplied with a standard G1/2”-male, however, optionally many other special type connections are feasible, assuring compatibility to a variety of processes.

Versions:

Movement: The process connection, the pressure gauge's tubular spring and the indicator element are available as brass or also fully stainless steel versions where the latter is recommended for applications with hostile media.

Oil filling: In case of pulsations or vibrations in the plants the KM-100N with polybutene oil filling can be ordered by which indicator trembling can be attenuated and thus extend the life span of the movement.

Process connection: The KM-100N has a standard G1/2"-male connection. Optionally, many other thread types can be manufactured as special versions. Position of the connection is either in the vertical to bottom direction or excentrically towards back.

Contact type: The choice can be a snap-action contact or an inductive contact.

Snap-action contacts are electromechanical alarm contacts that make or break electric circuits. A magnetic snap-action contact is a mechanical contact with a make/break capacity up to 30 W / 50 VA (without oil filling).

The signal output will be retarded or advanced and analog to the movement of the instrument pointer. Instruments with magnetic snap-action contacts can be used for all operating conditions, also with liquid-filled instruments.

Inductive alarm sensor contacts are inductive contacts to DIN 19234 resp. NAMUR. They are certified for use in hazardous areas of zone 1 and zone 2. The signal output is instantaneous and analog to the movement of the instrument pointer. Liquid filling in the instrument is possible.

Optionally, for the inductive contacts an integrated amplifier is available that is mounted directly into the housing of slit initiators.

This has a PNP- transistor output and can connect directly to small outputs, for example, in SP controls.

No. of contacts: Up to four contacts can be used. The use of a change-over-contact is considered as a double contact.

Contact function: It must be specified if the power circuit is expected to be contacted at increasing pressure (1 = NO-contact) or broken at increasing pressure (2 = NC-contact). In the case of snap-action contact the power circuit is broken or contacted mechanically, where as in inductive contacts the electrical resistance in the coils changes. Thereby, in the case of a NO-contact the current in the control circuit is set on "HIGH" state while it shifts to "LOW" as a NC-contact.

Operating range: Various DIN op. ranges from -1. . .+2500 bar are available. Please contact us for special operating ranges.

El. Specs magnet-spring Cont.:

Nominal voltage /	U_{eff} min: 24 V U_{eff} max: 250 V
Current rating /	inrush current: 1.0 A breaking current: 1.0 A continuous: 0.6 A
Load capacity /	P_{min}: 0.4 W / 0.4 VA
without oil filling:	P_{max}: 30 W / 50 VA
with polybutene filling:	P_{max}: 20 W / 20 VA
Set-point accuracy /	max. 4 contacts
Accuracy of switching /	2-5% FS
Creep and air distances /	acc. to DIN VDE 0110 Part 1 and 2 (degree of contamination 3)
Voltage testing /	
Circuit/ earth connection:	2000 VAC 1 min (DIN VDE 0660 part 200)
Circuit/Circuit:	2000 VAC 1 min (DIN VDE 0660 part 200)
Circuit /	In snap-action contacts, a single wire is used for all contacts as the common return line. In case of 3 contacts, consequently 4 pins and shielding are connected. Optionally, contact sets can be supplied with circuits separate according to contacts.
Contact arm bearing /	ruby bearing jewel
Contact material /	silver-nickel (Ag80 Ni20) 10 µm gold plated
No. of contacts /	max. 4 contacts, change-over-contacts will be counted as a double contact.
Contact function /	NO-contact and/or NC-contact and/or change-over-contact
Electrical connection /	Cable box, on the right side provided with 6 screw clamps +ground, cable gland M20x1.5 going downwards. Optionally, the cable box can be supplied with rear mounting instead of on the side.

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Loads for magnet-spring contact /

Voltage		ohmic load			
		dry gauges		filled gauges	
V DC	V AC	mA DC	mA AC	mA DC	mA AC
220	230	100	120	65	90
110	110	200	240	130	180
48	48	300	450	190	330
24	24	400	600	250	450

Voltage	inductive load	
	dry gauges	filled gauges
V AC	cos phi > 0,7mA AC	cos phi > 0,7mA AC
230	65	40
110	130	85
48	200	130
24	250	150

*Preferred contact rating with ohmic load; but at least 24 VDC / 20 mA

El. Specs Inductive contact:

Operating voltage / 5. . .25 VDC

Nominal voltage / 8 VDC (Ri ≈ 1k)

Current consumption: / active surface free: ≥ 3 mA
active surface damped: ≤ 1 mA

Accuracy / < 0.5% FS

Contact arm bearing / ruby bearing jewel

No. of contacts / max. 4 contacts

Contact function / NO-contact and/or NC-contact

Electrical connection / Cable box, on the right side provided with 6 screw clamps +ground, cable gland M20x1.5 going downwards. Optionally, the cable box can be supplied with rear mounting instead of on the side.

Front ring:

	3-hole Front ring	rear edge	3-rimmed-Front ring
KM-100N.1.1.1..	OK	OK	-
KM-100N.1.1.2..	OK	OK	OK
KM-100N.1.2.1..	OK	OK	-
KM-100N.1.2.2..	OK	OK	OK
KM-100N.2.1.1..	OK	OK	-
KM-100N.2.1.2..	OK	OK	OK
KM-100N.2.2.1..	OK	OK	-
KM-100N.2.2.2..	OK	OK	OK

Technical Specifications:

Accuracy / pressure gauge quality class 1.0 [2)]

Protection class / KM-100N.x.1. . . - IP54 as per EN 60529
KM-100N.x.2. . . - IP65 as per EN 60529

Plug / PUR

Damping / polybutene fillling

Options / separate circuits (for snap-action contact, standard for inductive contact), special type scales with customer's logo, other process connections

Pressure /

	steady	dynamic	burst
KM-100N.x.x..	1.00 x ME	0.90 x ME	1.30 x ME

Temperature /

Manometer	max. Media temp.
KM-100N.1.1..	+ 80°C
KM-100N.2.1..	+ 100°C (temporary 120°C)
KM-100N.1.2..	+ 80°C
KM-100N.2.2..	+ 100°C

Contacts /

Contant	max. Ambient temp.
magnet spring	- 20. . . + 140°C
inductive	- 25. . . + 100°C

Temperature error, T_{Ref} 20°C /

rising: + 0.3% FS / 10K
falling: - 0.3% FS / 10K

Material /

Material	Housing	Window
KM-100N.1.1.x.	st. steel	instrument glass
KM-100N.1.2.x.	st. steel	laminated safety glass
KM-100N.2.x.x.	st. steel	laminated safety glass

Material	Sensor element	Dial
KM-100N.1.x..	up to 100 bar, CuSn8 - 2.1030, soft-soldered from 100 bar, st. steel - 1.4404, hard-soldered	white aluminium, black scale and lettering as per EN 837-1
KM-100N.1.2.x.	st. steel 1.4404	white aluminium, black scale and lettering as per EN 837-1

Material	Motion work	Pointer
KM-100N.1.1.x.	Bottom and cover-parts from brass, moving parts argentan	black aluminium (KM-100N.1.1 plastic)
KM-100N.2.x..	st. steel	black aluminium

[2)] The addition of mechanical electric contacts affects the accuracy of instruments and corresponds to the DIN 16085, thus amounts to a max. of 50% of the pressure gauge accuracy quality class.

Ordering Codes:

Order no.	KM-100N.	2.	1.	1.	1.	1.	2.	[0][0][2][1]	D

Contact Pressure Gauge

Version /
1 = brass movement
2 = fully stainless steel chemical version

Oil filling /
1 = no oil filling
2 = with polybutene filling for cutailing vibrations

Process connection /
1 = G1/2 B at the bottom
2 = G1/2 B excentrically at the back

Fastening rim (see table) /
0 = none
1 = 3 hole front ring
2 = rear edge for wall-mounting
3 = 3 rimmed front ring with clamp

Contact type /
1 = snap-action contact
2 = inductive contact

No. of contacts /
1 = one contact
2 = two contacts
3 = three contacts
4 = four contacts

Contact function (1 = NO-contact, 2 = NC-Contact, 3 = change-over-contact (only for snap-action contact)) /
[ ][ ][ ][ ] = contact sequence for incrementing pressure, e.g. [0][1][1][2]

Operating range /
A = 0. . .0.6 bar
B = 0. . .1 bar
C = 0. . .1.6 bar
D = 0. . .2.5 bar
E = 0. . .4 bar
F = 0. . .6 bar
G = 0. . .10 bar
H = 0. . .16 bar
I = 0. . .25 bar
J = 0. . .40 bar
K = 0. . .60 bar
L = 0. . .100 bar
M = 0. . .160 bar
N = 0. . .250 bar
O = 0. . .400 bar
P = 0. . .600 bar
Q = 0. . .1000 bar
R = 0. . .1600 bar [1)]
R2 = 0. . .2500 bar [1)]
S = -1. . .0 bar
T = -1. . .+0.6 bar
U = -1. . .+1.5 bar
V = -1. . .+3 bar
W = -1. . .+5 bar
X = -1. . .+9 bar
Y = -1. . .+15 bar

[1] only possible for chemical version (KM-100N.2.x.x.x)

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GH-PM

Mounting Enclosure for Magnehelic PM-2000



Features

/ Robust enclosure made of ABS

/ Nonvolatile screws

/ Two bulkhead connectors

/ Protection class IP66

Description:

Enclosures of GH-PM series are particularly designed for differential pressure indicators and switches of Magnehelic PM-2000 series. They allow a simple and safe wall mounting, professionell wiring and offer two tight connections for both high and low pressure.

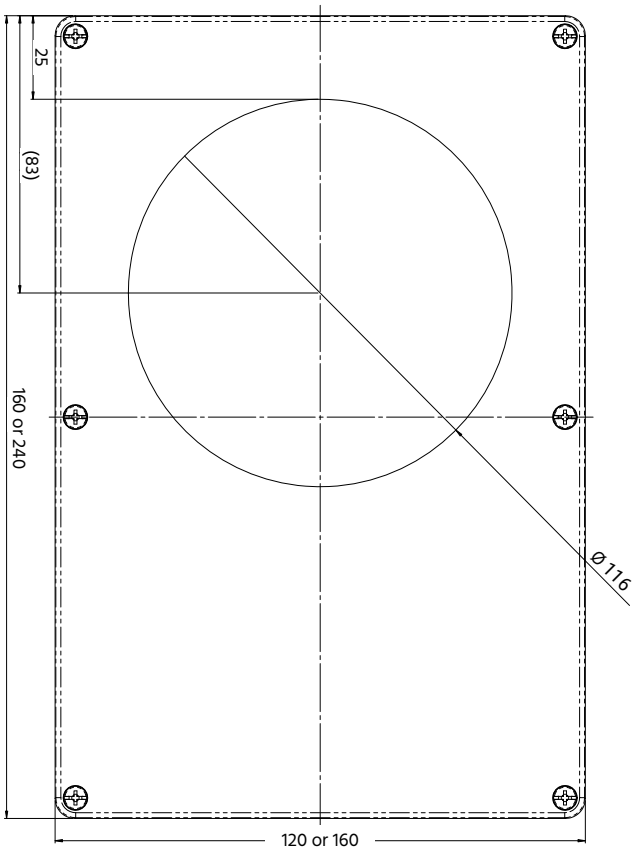
Application:

Differential pressure indicators for low differential pressure ranges are used in many, many industrial applications and in health technology worldwide. Wherever no panel with the particular cutout for Magnehelics is present, or where the Magnehelic offers an additional analog or relay output, Profimess supplies the indicators pre-mounted in the enclosure GH-PM. The pressure and electronic connections will therefore stay clean, dry and protected against incorrect operation.

Technical Specifications:

Dimensions (H x W x D)	
small /	160 x 120 x 90 mm (hole circle in the middle)
large /	240 x 160 x 120 mm
Material /	ABS
Colour /	RAL 7035, squirrel grey
Protection class /	IP 66 acc. to EN 60529 (09.08 23 09: IP 65)
Surface resistance /	4 x 10^{14} Ohm, IEC 60093
Disruptive strength /	24 KV/mm, IEC 60243-1
Impact resistance /	7 Joule acc. to EN 60079-0
Insulation /	fully insulated acc. to VDE 0100
Flammability /	UL 94 HB
Toxicity /	halogen-free
Temperature /	-40. . .+60°C
Seal /	CR-(Chloropren)
Bulkhead connections /	brass nickel-plated 6 x 4 mm
Cable glands /	M16 x 1.5 for cable diameters 5-10 mm or M20 x 1.5 for cable diameters 8-13 mm

Dimensions in mm:



Ordering Codes:

Order number	**GH-PM.**	**G**
GH-PM Mounting Enclosure		
Size / K = small G = large		

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SA-01

Flow Indicator with or without Rotor, with Wiper for Self-Cleaning



Features

/Cases

/Low viscous liquids

/ Small dimensions for assembly

/ Brass and stainless steel versions

/ Any mounting position

/ Optionally, with or without rotor

Visual indicating of flow

/ With internal wiper blades for internal cleaning of the sight glass

Description:

The SA-01 series of flow indicators is intended for visual indication of flow through a pipe. The medium passing through it can be viewed through a sight glass. Optionally, a rotor placed into the flow is set into motion by the medium which serves as an visual confirmation of the flow. Wiper blades mounted in the device get pressed inside against the sight glass. By simply rotating the sight glass manually. the inside can be cleaned of deposits. formation of algae or calcification without the need to interrupt the process. Thus, elaborate maintenance and cleaning operations can be dispensed with.

Application:

The SA-01 series of flow indicators is deployed for monitoring fluids of low and medium viscosities (up to 150 cSt) in pipes. Optionally the unit can indicate the flow of gases and is equipped with ball bearings in this case.

Technical Specifications:

max. Pressure / 16 bar

Pressure drop at Qmax. /

SA-01.1: on request

SA-01.2: 0.25 bar at Qmax

Media temperature / SA-01.1: 0. . .+100°C
SA-01.2: 0. . .+100°C

Ambient temperature / SA-01.1: 0. . .+100°C
SA-01.2: 0. . .+100°C

Materials /

Housing:

SA-01.x.x.1: brass CW614N nickel plated

SA-01.x.x.2: st. steel 1.4305

Sight glass: borosilicate glass

Wiper:

SA-01.x.x.1: NBR

SA-01.x.x.2: FKM

Media: water, oil, gases

O-ring:

SA-01.x.x.1: NBR

SA-01.x.x.2: FKM

Rotor (SA-01.2.x.x only): 1/4". . .1" POM red, 1¼" and 1½" Nylon white

Mounting position: any, not in down pipe

Bearing: sleeve bearing for fluids: peek; sleeve bearing for gases: steel 100 CR 6 chrome coated; ball bearing, greaseless, for gases

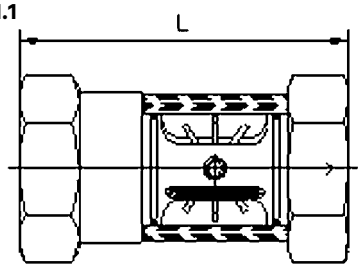
Devices for smaller flow volumes and higher operating temperatures on request.

Nominal diameters & flow values:

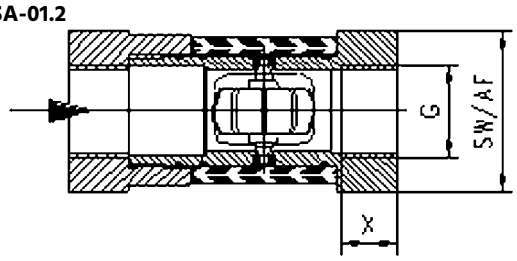
Con-nection G	L (mm)	with rotor				with rotor (air)		without rotor
	Qmax. (l/min)	Qmin. (l/min) 1 cST	Qmin. (l/min) 40 cST	Qmin. (l/min) 41-150 cST	Qmax. (l/min)	Qmin. (l/min 1 bar abs., 20°C)	Qmax. (l/min 1 bar abs.)	Qmax. (l/min)
1/4"	4	0,7	1,5	2,7	4	18	60	15
3/8"	8	0,8	1,5	2,8	8	20	150	20
1/2"	12	1,4	1,8	3,2	12	25	250	30
3/4"	25	1,4	2,7	5,9	25	25	250	60
1"	40	1,7	3	7	40	35	350	90
1 ¼"	80	8	5,9	7,9	80	60	600	150
1 ½"	100	8	7,3	7,9	100	70	700	220

Dimensions in mm:

SA-01.1



SA-01.2



SA-01.1 (without rotor)

Con-nection G	L (mm)	X (mm)	SW (mm)	weight (kg)
¼"	71	9	36	0.3
3/8"	71	9	36	0.3
½"	86	13	46	0.6
¾"	94	16	46	0.6
1"	104	16	46	0.6
1 ¼"	120	19	65	1.5
1 ½"	130	20	65	1.6

SA-01.2 (with rotor)

Con-nection G	L (mm)	X (mm)	SW (mm)	weight (kg)
¼"	71	9	36	0.35
3/8"	71	9	36	0.35
½"	86	13	46	0.65
¾"	94	16	46	0.65
1"	104	16	46	0.65
1 ¼"	120	19	65	1.6
1 ½"	130	20	65	1.7

Ordering Codes:

Order number SA-01. 2. 3. 1. 2. 1

SA-01 Flow Indicator

Version /
1 = without rotor
2 = with rotor

Process connection /
1 = female thread G ¼"
2 = female thread G 3/8"
3 = female thread G ½"
4 = female thread G ¾"
5 = female thread G 1"
6 = female thread G 1 ¼"
7 = female thread G 1 ½"

Material /
1 = brass
2 = stainless steel

Media /
1 = fluids
2 = air with ball bearings

Option /
0 = none
1 = wipers from EPDM

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DA-01

Sight Flow Indicator



Description:

The DA-01 series of flow indicators is meant for visual and quantitative control on fluid measuring substances. The device has large surfaced sight glasses fitted on both sides and provided with a graduated scale. A fine polished stainless steel flap fitted within the flow area gets lifted by the flow of media and, depending on the volume of flow, shows the current rate of flow on the scale. The flap is mounted on a stainless steel axis and operates with fine linearity purely depending on the gravitation. The DA-01 can be mounted vertically as well as horizontally. Due to its high temperature resistance it can be deployed in many ways.

Features

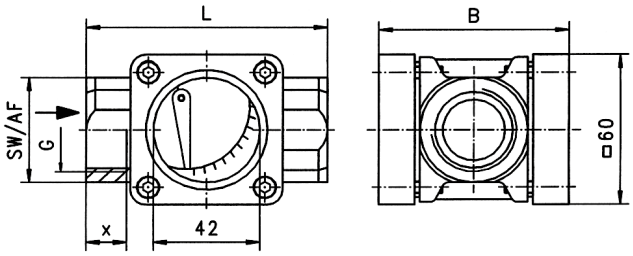
/ Buckle-free glass-mounting
/ Large inspection window
/ High temperature range
/ Reading possible on both sides
/Visual evaluation of media
/ Excellent media compatibility

Application:

Flow indicators are deployed for visual and quantitative control of fluid and gaseous media. The device has versatile applicability, especially in the construction of equipment, in process measurement technology or as general monitoring of compressors, cooling subassemblies, blowers and others.

DA-01 Flap Indicator:

Dimensions in mm



Type	G	L	B	X	SW	kg
DA-01.1/4/7	1/2"	85	68	14	38	1.0
DA-01.2/5/8	3/4"	85	68	14	38	1.0
DA-01.3/6/9	1"	95	74	16	42	1.

Process connection

Type	Nominal diameter	Range in l/min	Q_{max} in l/min
DA-01.1/4/7	15	2.1. . .17	25
DA-01.2/5/8	20	2.1. . .20	45
DA-01.3/6/9	25	2.1. . .24	65

Divisions

l/min H_2O	1	2	3	4	5	6	7	8	9	10
2.1. . .17	2.1	3.2	3.8	4.3	4.7	5	5.7	7.5	9.5	17
2.1. . .20	2.1	3.2	4.5	5.2	5.6	6.3	7.5	8.9	11.6	20
2.1. . .24	2.1	4.0	5.0	7.0	7.8	9.1	11.1	14.0	17.8	24

Technical Specifications

max. Pressure /	16 bar
Temperature /	200°C
Pressure drop /	0.09 bar for 2 m/s
Housing /	gunmetal BS 1400 LG 2
Flap /	stainless steel 1.4401
Axis /	stainless steel 1.4305
Window /	Soda-Lime-Glass BS 3463
Seals /	C 4400 (Klingersil®)
Rings /	brass
Scale plate /	stainless steel 1.4319
Mounting position /	vertically or horizontally

Odering Codes:

Order number	DA-01.	3.	1.

DA-01 Flap Indicator

Process connection /

1 = G ½" female
2 = G ¾" female
3 = G 1" female
4 = R ½" female
5 = R ¾" female
6 = R 1" female
7 = ½"-NPT female
8 = ¾"-NPT female
9 = 1"-NPT female

Option /

0 = none
1 = borosilicateglas for steam and condensate up to 6 bar

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DA-02

Sight Flow Indicator



Description:

The DA-02 series of flow indicators is intended for visual monitoring of fluid and gaseous media. The measuring medium lifts a Teflon® ball resting on the valve of the housing. As the volume of flow increases the ball becomes visible in the dome made of borosilicate glass. From its position, it is possible to draw a conclusion on the current volume of flow. The device is suited for mounting it horizontally with its dome showing upwards.

Application:

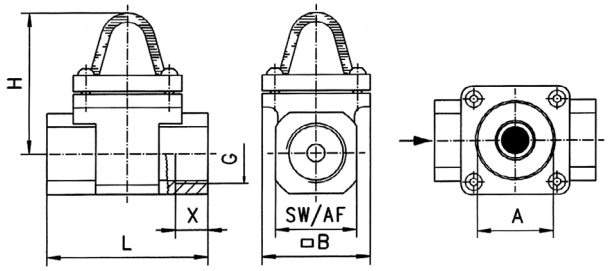
Flow indicators are deployed for visual and quantitative control of fluid and gaseous media. The device has versatile applicability, especially in the construction of equipment, in process measurement technology or as general monitoring of compressors, cooling subassemblies, blowers and others.

Features

/ Buckle-free glass-mounting
/ Large inspection window
/ High temperature range
/ Reading possible on both sides
/ Visual evaluation of media
/ Excellent media compatibility

DA-02 Ball Indicator:

Dimensions in mm



Type	G	L	A	B	H	SW	kg
DA-02.1	1/4"	76	42	60	81	28	0.8
DA-02.2	3/8"	76	42	60	81	28	0.7
DA-02.3	1/2"	76	42	60	81	28	0.7
DA-02.4	3/4"	89	42	60	100	45	1.4
DA-02.5	1"	89	42	60	100	45	1.3
DA-02.5a	1 1/4"	118	50	73	126	62	2.7
DA-02.6	1 1/2"	118	50	77	126	62	2.5

Process connection

Type	Connection	Range H_2O in l/min	Q_{max} H_2O in l/min
DA-02.1	G 1/4" IG	0.3. . .1.5	4
DA-02.2	G 3/8" IG	0.3. . .1.5	8
DA-02.3	G 1/2" IG	0.3. . .1.5	12
DA-02.4	G 3/4" IG	2.5. . .5.0	25
DA-02.5	G 1" IG	4.0. . .8.0	40
DA-02.5a	G 1 1/4" IG	11. . .23	60
DA-02.6	G 1 1/2" IG	11. . .23	60

Technical Specifications

max. Pressure /	16 bar
Temperature /	200°C
Pressure drop /	0.1. . .0,3 bar for 2 m/s
Housing /	stainless steel 1.4401, 1.4301
Ball /	PTFE
Dome /	borsosilicate glass
Seals /	Viton® and Klingersil® C4400
Mounting position /	horizontal

Odering Codes:

Order number	**DA-02.**	**3**

DA-02 Ball Indicator

Process connection /

1 = G ¼" female
2 = G 3/8" female
3 = G ½" female
4 = G ¾" female
5 = G 1" female
5a= G 1 ¼" female
6 = G 1 ½" female

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DA-04

Plastic Sight Flow Indicator



Features

/ Air and Gases

/ Small dimensions for assembly

/ Resistant to many chemicals

/ Any mounting position

/ Temperature max. 80°C

/ Pressure max. 10 bar

Description:

The DA-04 Series Flow Indicators are designed to provide a visual indication of flow through a pipeline and are very rugged with good structural integrity. The position and the centrifugal movement of the rotor and the liquid state of the medium can be observed through the polycarbonate outer wall. The rotor is used here as an indicator of how strong the flow is, since the number of revolutions of the rotor increases with increasing flow.

Application:

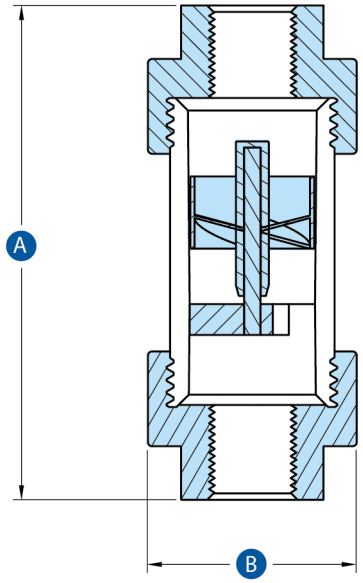
The DA-04 flow indicators are used to monitor gases or liquids with low and medium viscosities (up to 150 cSt) in pipelines.

Areas of application:
- Water
- Oil
- Coolants
- Chemicals
- Air and gases
- Corrosives

Technical Specifications:

max. Pressure /	10 bar
max. Media temperature /	80°C
Materials /	
Housing:	polycarbonate
Spindle:	stainless steel Ø 4mm
Impeller:	PPS
Seals:	Viton
Process connection:	bronze/ SS 316/ aluminium/ PVC
Mounting position:	any

Dimensions in mm:



Ordering Codes:

Order number	DA-04.	1.	3.	1

DA-04 Flow Indicator

Process connection /
1 = bronze
2 = stainless steel
3 = aluminium
4 = PVC

Size /
1 = 1/4“
2 = 3/8“
3 = 1/2“
4 = 3/4“
5 = 1“

Thread /
1 = BSP
2 = NPT

Size (mm)	Size (zoll)	Dim A Lenght (mm)	Dim B Width (mm)	Weight (kg)	Max. Flow LPM
8	1/4“	120	50,8	0,60	20
10	3/8“	120	50,8	0,60	20
15	1/2“	127	50,8	0,60	20
20	3/4“	127	50,8	0,60	40
25	1“	127	50,8	0,60	40

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SA-05

Sight Flow Indicator with Female Thread in Gray Cast Iron, Steel Casting or Stainless Steel



Features

/ Temperature up to 280°C

/ G1/4“ to G2“

/ PN16, PN25 or PN40

/ Indicator with flap, drip tube or rotor

/ Optionally with NPT connection

Description:

Flow indicators are intended for visualization of flows in pipes. In the case of SA-05, a drip tube or a rotating plastic rotor or a movable flap are viewed through two glasses mounted in a robust flow armature for visual control of flow. Air bubbles and solid particles flowing along or the rotor’s rotation speed and the position of the deflected flap enable the observer to quantitatively estimate the volume of flow.

Application:

The SA-05 series of flow indicators possesses a cylindrical female thread connection which can also be designed as a conical NPT thread. They can be deployed for up to 40 bar of maximum pressure and 280°C maximum temperature. The range of materials available includes gray cast iron, steel casting or stainless steel with soda-lime or borosilicate glass. Due to these properties the SA-05 is mainly deployed in the entire manufacturing and processing industry.

Technical Specifications:

Materials /	gray cast iron GG25 or steel casting GS-C25 or stainless steel 1.4408
Cover /	GG25 for gray cast iron version GS-C25 for steel casting version 1.4408 for stainless steel version
Screws /	4.6/5.6 vz for gray cast and steel casting A4-70 for stainless steel version
Optical display /	smooth passage, from G3/4" with drip tube or flap made of st. steel 1.4571 or rotor made of POM or rotor made of PTFE
Glass material /	NaCa glass DIN 8902 up to max. 150°C or borosilicate glass DIN 7080 up to max. 280°C
Seals /	graphite (others on request)
Process conn. /	G¼"-female to G2"-female (NPT on request)
Pressure /	PN16, PN25 or PN40 (gray cast iron max. 16 bar)
Media temperature /	SA-05.(1 or 2) max. 150°C for NaCa glass, 280°C for borosilicate glass SA-05.3 max. 120°C - SA-05.4 max. 260°C

Ordering Codes:

Order number	**SA-05.**	**1.**	**1.**	**1.**	**16.**	**08**

SA-05 Flow Indicator

Optical display /
1 = smooth passage (from 3/4" with drip tube)
2 = with flap
3 = with rotor made of POM (n.a. for G2")
4 = with rotor made of PTFE

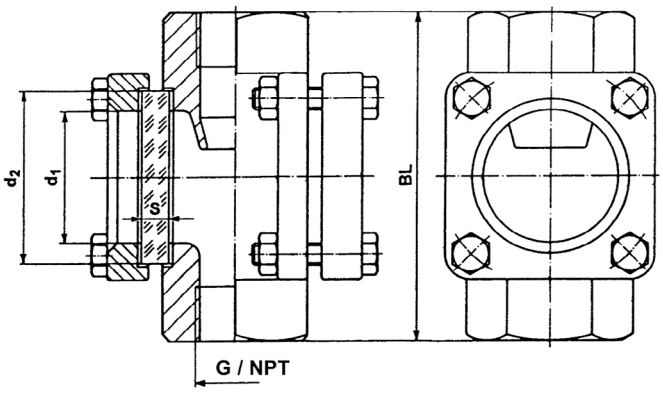
Housing material /
1 = gray cast iron (max. 16 bar)
2 = steel casting
3 = stainless steel

Glass material /
1 = NaCa glass (up to max. 150°C 6 max. PN16)
2 = borosilicate glass (up to max. 280°C)

Pressure level /
16 = PN16 (standard)
25 = PN25
40 = PN40

Process connection /
08 = G ¼"-IG
10 = G 3/8"-IG
15 = G ½"-IG
20 = G ¾"-IG
25 = G 1"-IG
32 = G 1 ¼"-IG
40 = G 1 ½"-IG
50 = G 2"-IG

Dimensions in mm:



Cast Iron SA-05.x.1

Connection	BL	d1	d2	S 16 bar
G ¼"	100	32	45	10
G 3/8"	100	32	45	10
G ½"	100	32	45	10
G ¾"	120	48	63	10
G 1"	120	48	63	10
G 1 ¼"	160	65	80	12
G 1 ½"	160	65	80	12
G 2"	180	80	100	15

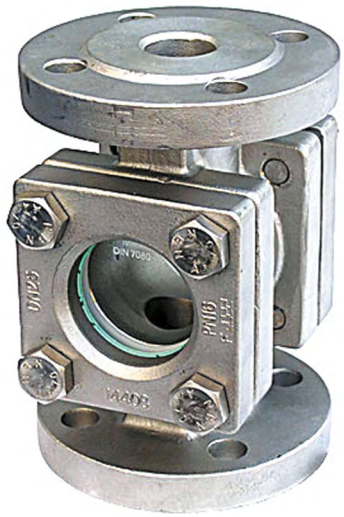
Cast Iron or St. Steel SA-05.x.2/3

Connection	BL	d1	d2	S 16 bar	S 25 bar	S 40 bar
G ¼"	100	32	45	10	10	10
G 3/8"	100	32	45	10	10	10
G ½"	100	32	45	10	10	10
G ¾"	120	48	63	10	12	15
G 1"	120	48	63	10	12	15
G 1 ¼"	160	65	80	12	15	20
G 1 ½"	160	65	80	12	15	20
G 2"	230	80	100	15	20	25

Option: SA-05 out of steel casting or stainless steel are available with NPT-thread on request

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SA-06



Sight Flow Indicator with Flange Connection from Gray Cast Iron, Steel Casting or Stainless Steel

Features

/ Temperature up to 280°C

/ Diameters DN15. . .DN200

/ PN16, PN25 or PN40

/ Display with flap, drip tube or rotor

/ Optionally with ANSI flanges

Description:

Flow indicators are intended for visualization of flows in pipes. In the case of SA-06, a drip tube or a rotating plastic rotor or a movable flap are viewed through two glasses mounted in a robust flow armature for optical control of flow. Air bubbles and solid particles flowing along or the rotor's rotation speed and the position of the deflected flap enable the observer to quantitatively estimate the volume of flow.

Application:

The SA-06 series of flow indicators possesses a flange connection of DIN or ANSI standards. They can be deployed for up to 40 bar of maximum pressure and 280°C maximum temperature. The range of materials available includes gray cast iron, steel casting or stainless steel with soda-lime or borosilicate glass. Due to these properties the SA-06 is mainly deployed in the entire manufacturing and processing industry.

Ordering Codes:

Order number	SA-06.	1.	1.	1.	16.	15.	0

SA-06 Flow Indicator

Visual display /
1 = with drip tube
2 = with flap
3 = with rotor from POM
4 = with rotor from PTFE

Housing material /
1 = gray cast iron (max. 16 bar / 150 lbs)
2 = steel casting
3 = stainless steel

Glass material /
1 = NaCa glass (up to max. 150°C)
2 = borosilicate glass (up to max. 280°C)

Connecting flanges /
16 = DIN PN16 (standard)
25 = DIN PN25 (not for gray cast iron)
40 = DIN PN40 (not for gray cast iron)
150 = ANSI 150 lbs
300 = ANSI 300 lbs (not for gray cast iron)

Nominal diameter /
15 = DN15 / ½"
20 = DN20 / ¾"
25 = DN25 / 1"
32 = DN32 / 1¼"
40 = DN40 / 1½"
50 = DN50 / 2"
65 = DN65 / 2½" (starting here and bigger sizes: rounded dome version)
80 = DN80 / 3"
100 = DN100 / 4" (not with ANSI flanges in grey cast iron)
125 = DN125 / 5" (not with ANSI flanges in grey cast iron)
150 = DN150 / 6" (with borosilicate glass only)
200 = DN200 / 8" (not w. ANSI flanges in grey cast iron, w. borosilicate glass only)
999 = Nominal diameter > DN200 on request only (special design)

Special design /
0 = none
1 = please specify in detail

Technical Specifications:

Materials / gray cast iron GG 25 or steel casting GS-C 25 or stainless steel 1.4408

Cover / GG 25 for gray cast iron version
GS-C 25 for steel casting version
1.4408 / 1.4301 for stainless steel version

Cover shape / DN15 to DN50 square
DN65 to DN200 round

Screws / 4.6 / 5.6 vz for gray cast iron and steel casting A4-70 for stainless steel version

Optical display / drip tube for display of least volumes or flap made of stainless steel 1.4571 or rotor made of POM or rotor made of PTFE

Glass material / NaCa (soda-lime) glass DIN 8902 up to max. 150°C or borosilicate glass DIN 7080 up to max. 280°C

Seals / Graphite (others on request)

Process connections / DN15 to DN200 flange as per DIN or ANSI

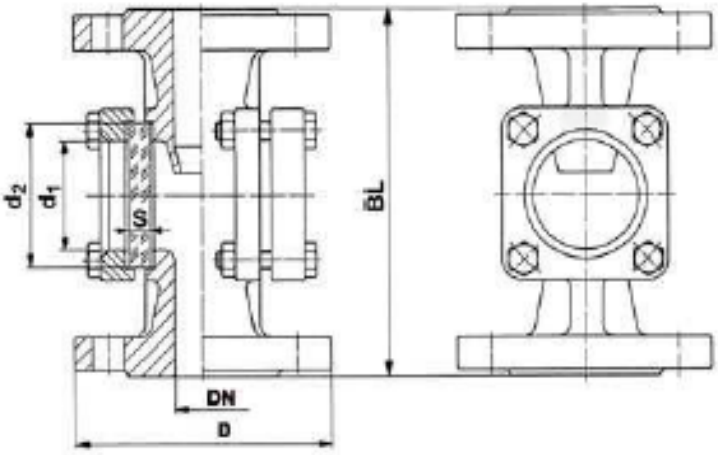
Pressure / PN16, PN25 or PN40 and 150 lbs./300 lbs. for ANSI standard

Media temp. / SA-06. (1 or 2) max. 150°C for NaCa glass, 280°C for borosilicate glass
SA-06.3 max. 120°C
SA-06.4 max. 260°C

Mounting / horizontally or vertically, for attention to flow direction

Dimensions in mm:

Con-nection	DW	D ANSI 150 lbs	D ANSI 300 lbs	BL	d1	d2	S 16 bar	S 25 bar	S 40 bar
15 / ½"	95	89	95,2	130	32	45	10	10	10
20 / ¾"	105	98	117,3	150	32	45	10	10	10
25 / 1"	115	108	123,8	160	48	63	10	12	15
32 / 1¼"	140	118	133,4	180	48	63	10	12	15
40 / 1½"	150	127	155,6	200	65	80	12	15	20
50 / 2"	165	152	165,1	230	80	100	15	20	25
65 / 2½"	185	178	190.5	290	80	100	15	20	25
80 / 3"	200	191	209,6	310	100	125	20	25	30
100 / 4"	220[1]	228*	254,0	350	125	150	25	30	35/32
125 / 5"	250[2]	254*	279,4	400	150	175	25	30	on request
150 / 6"	285[3]	279	317,5	480	175	200	30**	35	on request
200 / 8"	340[4]	343*	381,0	600	175	200	30**	35	on request



[1] 235 for PN25/40
[2] 270 for PN25/40
[3] 300 for PN25/40
[4] 360/375 for PN25/40

* in GG 25 not available
** 16 bar only available with borosilicate glass
> DN 100 & PN 40 in accordance with DIN 3237

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SA-10

Flow Indicator from Stainless Steel or Bronze



Features

/ Reasonable pricing

/ Up to 16 bar

/ Up to 200°C

/ Low pressure drop

/ Wide flow range

/ Nominal widths from DN8. . .DN40

Description:

Profimess' flow indicators SA-10 offer a cost-effective solution wherever it is important to recognize flow condition in pipes of nominal widths from 8. . .40 mm at a glance. The ratio between maximum and minimum flow is exceptional and the pressure drop is low even at the end of the recommended flow range. The sight flow indicators SA-10 work both horizontally and vertically and inverted flow can pass through them.

Application:

The selectable material combinations stainless steel and bronze predestine the flow indicators SA-10 for 'aggressive media applications'. Even the indication of a marine water flow or the operation within a saline environment is easily possible, because bronze, as against stainless steel, aluminium or brass, is one of the rare metals resistant against salt water and oceanic climate. The units serve of course also water, oil, lubricants, coolants and many more fluids. A further benefit of using sight flow indicators of SA-10 series is, that the user can not only estimate the flow velocity in the pipe, but also get an impression of fluid condition. This enables him to recognize at an early stage, if e.g. overheating or a leak cause a color change or a pollution of the flowing liquid.

Technical Specifications:

Materials /

Body:	stainless steel 316 ASTM-A-351-2000 GR CF8M or bronze BS EN1982 CuSn5Zn5PB5-C-GS (formerly LG2)
Clamp ring:	stainless steel or bronze
Glass dome:	hardened borosilicate glass
Rotor:	PPS plastic, canary yellow
Gasket:	Klingersil® (C-4400) or equivalent
O-ring:	Viton®
Clamps:	stainless steel
Connections:	thread female BSP (parallel) or NPT (taper)
max. Pressure /	16 bar
max. Temp. /	200°C

Ordering Codes:

Order number	**SA-10.**	**1.**	**1.**	**1**

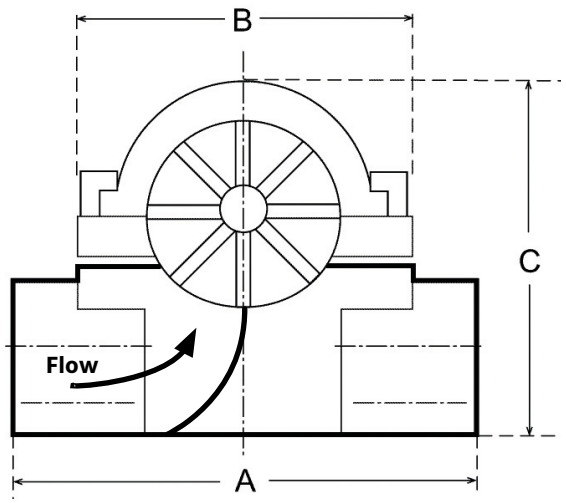
SA-10 Flow Indicator

Size /
1 = DN8
2 = DN10
3 = DN15
4 = DN20
5 = DN25
6 = DN32
7 = DN40

Material /
1 = bronze
2 = stainless steel

Thread /
1 = BSP (cylindrical), female
2 = NPT (conical), female

Dimensions in mm:



Attention: Mounting in direction of flow, as indicated with an arrow on the device.

Connection BSP o. NPT	A (mm)	B (mm)	C (mm)	weight (kg)
¼" IG	76	63	65	0.68
3/8" IG	76	63	65	0.65
½" IG	76	63	65	0.62
¾" IG	89	63	83	1.25
1" IG	89	63	83	1.20
1 ¼" IG	115	75	100	2.40
1 ½" IG	115	75	100	2.40

Flow range and Pressure drop

Connection BSP o. NPT	min. (l/min)	max. (l/min)	P. drop at 2 m/s (bar)
¼" IG	0.7	30	0.14
3/8" IG	0.8	40	0.16
½" IG	1.0	55	0.22
¾" IG	1.2	90	0.19
1" IG	1.5	140	0.50
1 ¼" IG	4.0	180	0.80
1 ½" IG	4.0	200	0.90

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SP-01

Vane operated Flowswitch

Description:

The SP-01 series of flowswitches operates according to the proven principle of a displaced vane. The flowing medium strikes the baffle disc mounted at the end of a pendulum. The resulting dynamic pressure deflects the pendulum. Subsequently, a permanent magnet mounted at the other end of the pendulum switches an adjustable reed contact. Different setpoints can be achieved by shifting the reed contact situated outside the medium.

Application:

The SP-01 series of vane flowswitch is suited for monitoring setpoints in low-viscosity fluids. Normally, the setpoint is adjusted during the process. As an option a version of the SP-01 flowswitch is available, that can be applied to explosion-proof areas. These units do not need any certification, because they are, according to the realised estimation of the risk of ignition, no ignition source and therefore not part of the ATEX directive. These switches are always equipped with a blue connection cable of 1.5 m length.

Features

/ With or without T-piece, for pipe sizes of 1/4“ to 6“

/ Brass, stainless steel and PVC designs with T-piece

/ Low pressure drop

/ Reed contact or micro-switch versions

Ver. and Operating ranges:

SP-01.1: with brass or stainless steel T-piece and REED contact

DN	Connect. (G")	ON at (l/min)(1)	OFF at (l/min)(1)	max. (l/min)(1)	max. Pressure	Temp.
8	1/4	2,1. . .2,7	1,8. . .2,4	45	25 bar	-25. . .+110°C
10	3/8	2,5. . .3,2	2,2. . .2,9	60	25 bar	-25. . .+110°C
15	1/2	3,4. . .4,2	3,0. . .3,8	67	25 bar	-25. . .+110°C
20	3/4	7,0. . .9,1	6,4. . .8,2	120	25 bar	-25. . .+110°C
25	1	13,5. . .17	12. . .15,5	195	25 bar	-25. . .+110°C
32	1 1/4	15,5. . .20,5	14,5. . .19	240	25 bar	-25. . .+110°C
40	1 1/2	26,5. . .34,5	25,5. . .32,5	400	25 bar	-25. . .+110°C
50	2	39,5. . .51	39. . .50	400	25 bar	-25. . .+110°C

SP-01.2: with PVC T-piece, REED contact and adhesive sleeve

DN	Connect.	ON at (l/min)(1)	OFF at (l/min)(1)	max. (l/min)(1)	max. Pressure	Temp.
15	DN15	5,1. . .6,9	4,9. . .6,5	50	10(2) bar	0. . .+60°C
20	DN20	9,4. . .12,3	9,1. . .11,9	100	10(2) bar	0. . .+60°C
25	DN25	10,7. . .15,2	10,4. . .14,8	100	10(2) bar	0. . .+60°C
32	DN32	17,0. . .22,6	16,8. . .22,5	150	10(2) bar	0. . .+60°C
40	DN40	21,8. . .30,1	21,6. . .29,9	200	10(2) bar	0. . .+60°C
50	DN50	29,0. . .39,9	28,6. . .39,9	260	10(2) bar	0. . .+60°C

SP-01.3: with brass T-piece and micro-switch

DN	Connect. (G")	Hysteresis	OFF at (l/min)(1)	max. (l/min)(1)	max. Pressure	Temp.
10	3/8 female	10. . .30%	4,0. . .5,0	10	25 bar	-20. . .+110°C
15	1/2 female	10. . .30%	5,0. . .6,0	20	25 bar	-20. . .+110°C
20	3/4 female	10. . .30%	8,0. . .10,0	40	25 bar	-20. . .+110°C
25	1 female	10. . .30%	17,0. . .20,0	60	25 bar	-20. . .+110°C
32	1 1/4 fem.	10. . .30%	24,0. . .28,0	80	25 bar	-20. . .+110°C
40	1 1/2 fem.	10. . .30%	43,0. . .50,0	100	25 bar	-20. . .+110°C
50	2 female	10. . .30%	69,0. . .83,0	150	25 bar	-20. . .+110°C

SP-01.4: no T-piece, thread 1/2", ins. length 51 mm, REED contact

DN	On at (m^3/h)(1)	OFF at (m^3/h)(1)	max. (m^3/h)(1)	max. Pressure	max. Temp.
50	1,9. . .2,7	1,8. . .2,6	30	25 bar	-25. . .+110°C
80	5,0. . .8,0	4,9. . .7,9	80	25 bar	-25. . .+110°C
100	8,3. . .12,5	8,2. . .12,4	150	25 bar	-25. . .+110°C
150	17,5. . .25,0	17,4. . .24,9	200	25 bar	-25. . .+110°C

(1) setpoints valid for water at 20°C, horizontal pipe, tolerance ±15%

(2) at media temperature 20°, only 2.5 bar at media ntemperature 60°C

Technical Specifications:

Ambient temperature /	SP-01.1: -25. . .+80°C SP-01.2: 0. . .+60°C SP-01.3: -20. . .+70°C SP-01.4: -25. . .+80°C
Reed switch (SP-01.1, SP-01.2, SP-01.4) /	switching function: NC / NO at increasing flow rate switching load: 230VAC/48VDC, 1A, 20W / 26VA
Micro switch (SP-01.3) /	switching function: change-over switching load: 250VAC, 5A, 1250VA
Type of protection /	IP65 acc. to EN 60529
Protection class /	Class II acc. to EN 60730-1
El. connection /	plug acc. to DIN EN 175301-803-A incl. junction Box

Ordering Codes:

Order number	SP-01.	1.	3.	25.	0.	0

SP-01 Vane Operating Flowswitch

Version /
1 = with T-piece, brass or stainless steel, REED contact
2 = with PVC T-piece (conn. are adhesive sleeves)
3 = with brass T-piece and microsw. (not as Ex-version)
4 = with 1/2" thread, brass or stainless steel, insertion length 51 mm

Material /
1 = brass (not SP-01.2)
2 = stainless steel (not SP-01.2, SP-01.3)
3 = PVC (SP-01.2 only)

Interior diameter /
SP-01.1 only
08 = 1/4"
SP-01.1 and SP-01.3
10 = 3/8"
SP-01.1, SP-01.2, SP-01.3
15 = 1/2"
20 = 3/4"
25 = 1"
32 = 1 1/4"
40 = 1 1/2"
50 = 2"
SP-01.4
00 = all diameters from 2" to 6" acc. to the tables

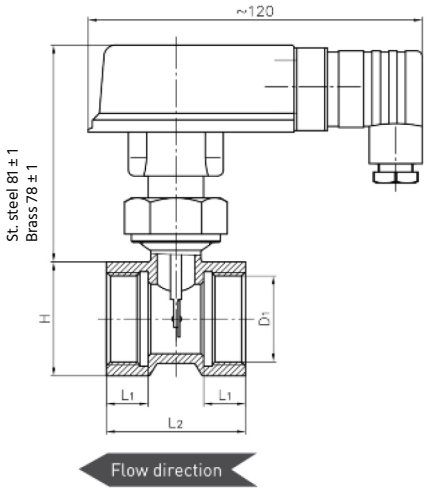
Factory-set setpoint /
0 = none
1 = on request

Options /
0 = none
1 = plug with optical indicators for flow and supply voltage (2 LED)
2 = plug M12 x 1, 4 pin acc. IEC 947-5-2
3 = version for applications in EX-areas, max. media temperature 100°C (only with blue connecting cable)

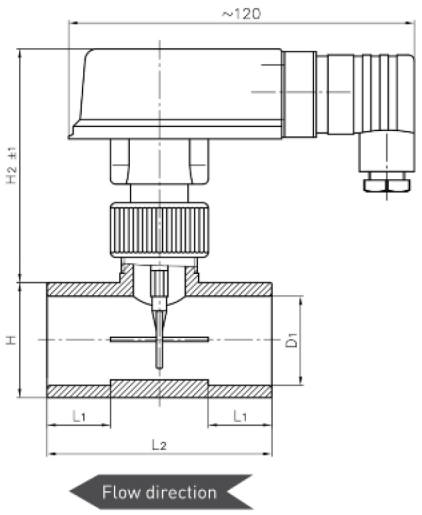
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Dimensions in mm:

SP-01.1



SP-01.2



Dimensions SP-01.1 [mm]

	Brass			St. Steel		
Thread D1	L1	L2	H	L1	L2	H
G 1/4"	11	50	27	11	50	27
G 3/8"	11	50	27	11	50	27
G 1/2"	11	50	27	11	50	27
G 3/4"	15	50	32	15	50	32
G 1"	15	50	41	15	50	41
G1 1/4"	15	50	48	15	50	46
G1 1/2"	15	50	55	15	50	55
G 2"	22	64	70	15	50	70

Wetted parts SP-01.1

Element	Brass	St. Steel
Body, Vane	Brass CW614N	St. steel 1.4571
T-piece	Brass CW617N	St. steel 1.4571
Bushing	PPE + PS Noryl™ 30% reinforced with fibre glass	PVDF
Rivet	Brass CW508L	St. steel 1.4303
Axis	St. steel 1.4571	St. steel 1.4571
Magnet	Hard ferrite	Hard ferrite
Gasket	NBR	NBR

Dimensions SP-01.2 [mm]

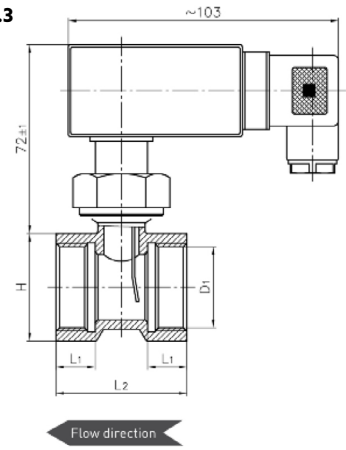
Diameter	D1	L1	L2	H1	H2
DN15	20	16	54	28	84
DN20	25	19	66	34	86
DN25	32	22	78	40	86
DN32	40	26	98	50	104
DN40	50	31	118	62	103
DN50	63	38	144	77	101

Wetted parts SP-01.2

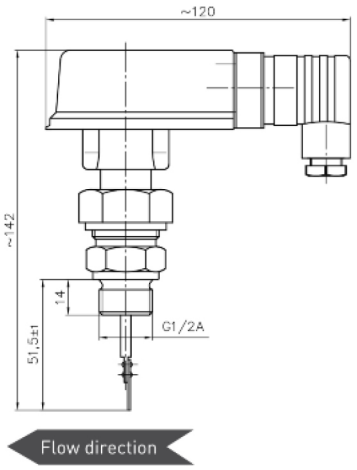
Element	
Body, Vane	PPE + PS Noryl™ 30% reinforced with fibre glass
T-piece	PVC
Axis*	St. steel 1.4571
Magnet	Hard ferrite
Gasket	EPDM

* DN25, 40 and 50 only

SP-01.3



SP-01.4



Dimensions SP-01.3 [mm]

Brass			
Thread D1	**L1**	**L2**	**H**
G 3/8"	11	50	27
G 1/2"	11	50	27
G 3/4"	15	50	32
G 1"	15	50	41
G1 1/4"	15	50	48
G1 1/2"	15	50	55
G 2"	22	64	70

Wetted parts SP-01.3

Element	
Body	Brass CW614N nickel coated
T-piece	Brass CW617N
Vane	St. steel 1.4310, 1.4301
Magnet	Hard ferrite
Gasket	NBR

Wetted parts SP-01.4

Element	Brass	St. steel
Body, Vane	Brass CW614N	St. steel 1.4571
Process connection	Brass CW614N	St. steel 1.4571
Bushing	PPE + PS Noryl™ 30% reinforced with fibre glass	PVDF
Rivet	Brass CW508L	St. steel 1.4303
Axis	St. steel 1.4571	St. steel 1.4571
Magnet	Hard ferrite	Hard ferrite
Gasket	NBR	NBR

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SP-03

Low-Cost Vane Operated Flowswitch with Cable Connection

Description:

The SP-03 series of vane operated flowswitches operates according to the proven dynamic pressure principle. If the flowing medium strikes the pressure plate at the lower end of the pendulum, the pendulum system is moved. This action is supported by a pretensioned leaf spring. Therefore it can be operated without friction. A permanent magnet attached to the upper end of the pendulum system operates a reed contact which is sealed against the flow medium. Different setpoints can be achieved by shifting the reed contact situated outside the medium.

Application:

The SP-03 device type has proven itself to be a simple, reliable and cost-effective solution for monitoring setpoints in low-viscosity liquids. Normally, the setpoint is adjusted during the process. However, on request fixed setpoints can be pre-set at factory for rising or falling flows.

Features

/ With T-piece or screw-in thread
/ For pipe sizes of 3/8“ up to 6“
/ T-pieces from brass, st. steel or PVC
/ Cost effective
/ Independent of pressure
/ Low pressure drop
/ Stainless steel pendulum system
/ Simple exchangeability of the entire pendulum system

Technical Specifications:

max. Pressure / SP-03.[1-3, 6-8]: 25 bar
SP-03.[4-5]: 2.5 bar

max. Media temp. / SP-03.[1-3, 6-8]: +100°C
+110°C on request
SP-03.[4-5]: +60°C

max. Ambient temp. / SP-03.[1-3, 6-8]: +70°C
SP-03.[4-5]: +60°C

Materials (wetted) /

- Housing: brass, brass nickel-plated, or st. steel 1.4571
- T-piece: brass, brass nickel-plated, st. steel 1.4571 or PVC
- Vane: st. steel 1.4410
- Magnet: ferrite OX 300
- Sealing: Viton ®
- Swivel nut: brass / brass nickel-plated (non-wetted part)

Electrical Specifications:

Electrical connection / 1.5 m cable PVC

Reed contact / NC- / NO-contact selectable

Switching load / 230 V; 1,5 A; 80 W; 90 VA max.

Switching hysteresis / approx. 5 %

Protection class / IP 65

Versions & Operating ranges:

SP-03.[1-5]: With T-piece made of brass, stainless steel or PVC

Nominal diameter	Connection	Switch-on at (l/min)(1)	Switch-off at (l/min)(1)	max. Flow (l/min)(1)
DN10	3/8	2.7. . .4.5	1.7. . .3.5	40
DN15	1/2	4.5. . .6.5	3.0. . .5.5	45
DN20	3/4	8.5. . .12.0	6.6. . .11.0	80
DN25	1	13.0. . .20.0	11.0. . .19.0	130
DN32	1 1/4	17.0. . .26.0	15.0. . .25.0	160
DN40	1 1/2	28.0. . .45.0	27.0. . .43.0	300
DN50	2	45.0. . .58.0	43.0. . .56.0	500

SP-03.[6-8]: With G 1/2" screw-in thread, brass or stainless steel

Nominal diameter		Switch-on at (l/min)(1)	Switch-off at (l/min)(1)	$Q_{max.}$ (l/min)(1)
DN50	2"	44.0. . .65.0	40.0. . .60.0	500
DN65	2 1/2"	78.0. . .115.0	70.0. . .105.0	750
DN80	3"	120.0. . .175.0	110.0. . .165.0	1400
DN100	4"	190.0. . .285.0	175.0. . .265.0	2500
DN125	5"	310.0. . .450.0	280.0. . .420.0	2900
DN150	6"	440.0. . .655.0	410.0. . .600.0	3300

(1) Switching ranges are applicable for water 20°C, horizontal pipe.

Ordering Codes:

Order number	SP-03.	1.	25.	0

SP-03 Vane Operated Flowswitch

Version /
1 = with T-piece made of brass
2 = with T-piece made of brass nickel-plated
3 = with T-piece made of stainless steel
4 = with T-piece made of PVC (thread)
5 = with T-piece made of PVC (adhesive sleeve)
6 = with G 1/2" screw-in thread (without T-piece), brass
7 = with G 1/2" screw-in thread (w/o T-piece), brass nickel-plated
8 = with G 1/2" screw-in thread (w/o T-piece), stainless steel

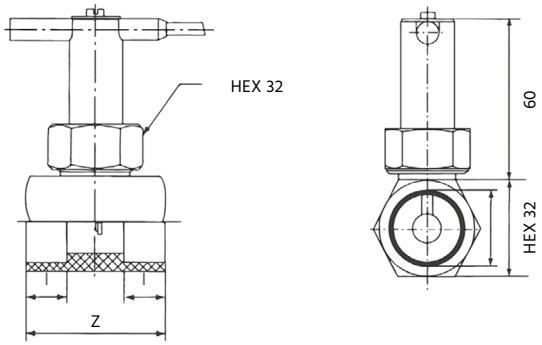
Nominal diameter /
SP-03. [1-5].x
10 = 3/8"
15 = 1/2"
20 = 3/4"
25 = 1"
32 = 1 1/4"
40 = 1 1/2"
50 = 2"
SP-03. [6-8].x
00 = all nominal diameters of 2" up to 6" as per table (screw-in thread)

Options /
0 = none
1 = please specify in detailed text

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Dimensions in mm:

SP-03.[1-2]: With T-piece made of brass or brass nickel-plated

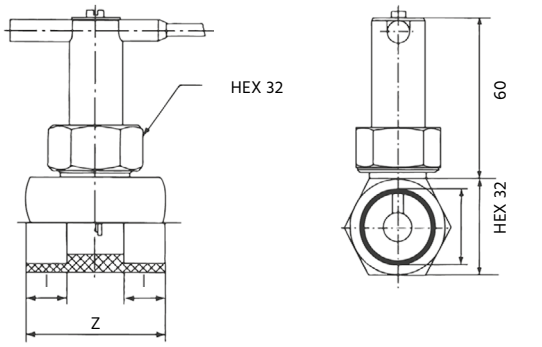


ND	Connection	HEX	Z (mm)	l (mm)
DN10	R 3/8"	30	50	11
DN15	R½"	30	50	11
DN20	R 3/4"	30	50	11
DN25	R1"	37	50	15
DN32	R1 ¼"	46	50	15
DN40	R1 ½"	52	50	15
DN50	R 2"	-	120	15

SP-03.1: Material combination
- Body housing - brass
- Contact housing - brass
- T-piece - brass
- Pendulum system - stainless steel
- Swivel nut - brass

SP-03.2: Material combination
- Body housing - brass nickel-plated
- Contact housing - brass
- T-piece - brass nickel-plated
- Pendulum system - stainless steel
- Swivel nut - brass nickel-plated

SP-03.3: With T-piece made of stainless steel

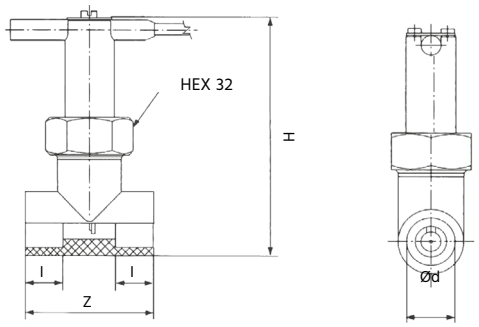


ND	Connection	HEX	Z (mm)	l (mm)
DN10	R 3/8"	30	50	11
DN15	R½"	30	50	11
DN20	R 3/4"	30	50	11
DN25	R1"	-	80	15
DN32	R1 ¼"	-	95	15
DN40	R1 ½"	-	115	15
DN50	R 2"	-	120	15

SP-03.3: Material combination
- Body housing - stainless steel
- Contact housing - brass
- T-piece - stainless steel
- Pendulum system - stainless steel
- Swivel nut - brass nickel-plated

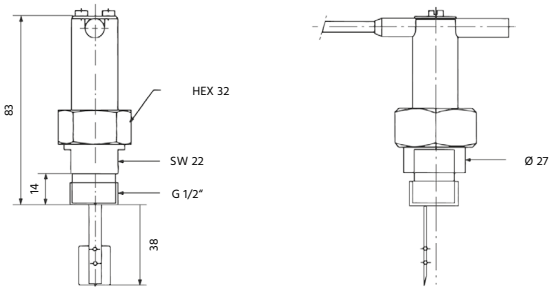
SP-03.[4-5]: Material combination
- Body housing - stainless steel
- Contact housing - brass
- T-piece - PVC
- Pendulum system - stainless steel
- Swivel nut - brass nickel-plated

SP-03.[4-5]: With T-piece made of PVC



ND	Connection	H (mm)	Z (mm)	l (mm)
DN10	R 3/8“	99	54	16
DN15	R½“	99	54	16
DN20	R 3/4“	109	66	19
DN25	R1“	113	79	22
DN32	R1 ¼“	126	96	26
DN40	R1 ½“	132	116	31
DN50	R 2“	149	143	38

SP-03.[6-8]: With G 1/2“ screw-in thread (without T-piece)



SP-03.6: Material combination
- Body housing - brass
- Contact housing - brass
- Pendulum system - stainless steel
- Swivel nut - brass

SP-03.7: Material combination
- Body housing - brass nickel-plated
- Contact housing - brass
- Pendulum system - stainless steel
- Swivel nut - brass nickel-plated

SP-03.8: Material combination
- Body housing - stainless steel
- Contact housing - brass
- Pendulum system - stainless steel
- Swivel nut - brass nickel-plated

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SP-04

Digital Flowmeter/Switch with Way-Deflection-System

Features

/ 4. . .20 mA or 0. . .10 V DC output

/ Optional RS 232 interface

/ Totalizer

/ 2 separately adjustable switching contacts

/ Soil-resistant

/ For pipes up to DN600

/ LCD display for flow & total volume

/ Operating range 1:10

Description:

Profimess' measuring device SP-04 is a flow transmitter with a digital display of the current flow, analogue output, totalizer, voltage output and two adjustable switching relays with display of the setpoints for monitoring the flow rate. An RS 232C interface is optionally available. The flowing medium moves a baffle plate mounted to a pendulum and thus generates the measured displacement. The spring-loaded pendulum alters its position depending on the flow. The position of a magnet fixed to the pendulum is recorded by a Hall sensor located outside the measuring chamber and transmitted to the microchip-controlled electronics where it is processed. This 2-chamber system ensures that no fluid can penetrate the electronics housing even if the device is defective.

Application:

The SP-04 series of flowmeters and -switches is used for detection of thin-bodied media in nominal diameter ranges up to DN600. Particularly in the range of DN50 upwards the extremely cost-effective price-performance ratio is perceptible. Measurement by means of a baffle plate is independent of the conductivity of the medium due to which also glycol, oils and other hydrocarbons can be captured without problems. The SP-04 can be adapted to a large number of processes thanks to different material combinations.

Technical Specifications:

max. Pressure /	SP-04.GW and SP-04.AU 25 bar SP-04.FL 16 bar
max. Media temp. /	-20. . .+100°C (others on request)
Accuracy /	± 2% of full scale value
Totalizer /	with EEPROM-memory
Display /	LCD DOT-Matrix-module 2 x 8 digits (illuminated)
Flow direction /	any

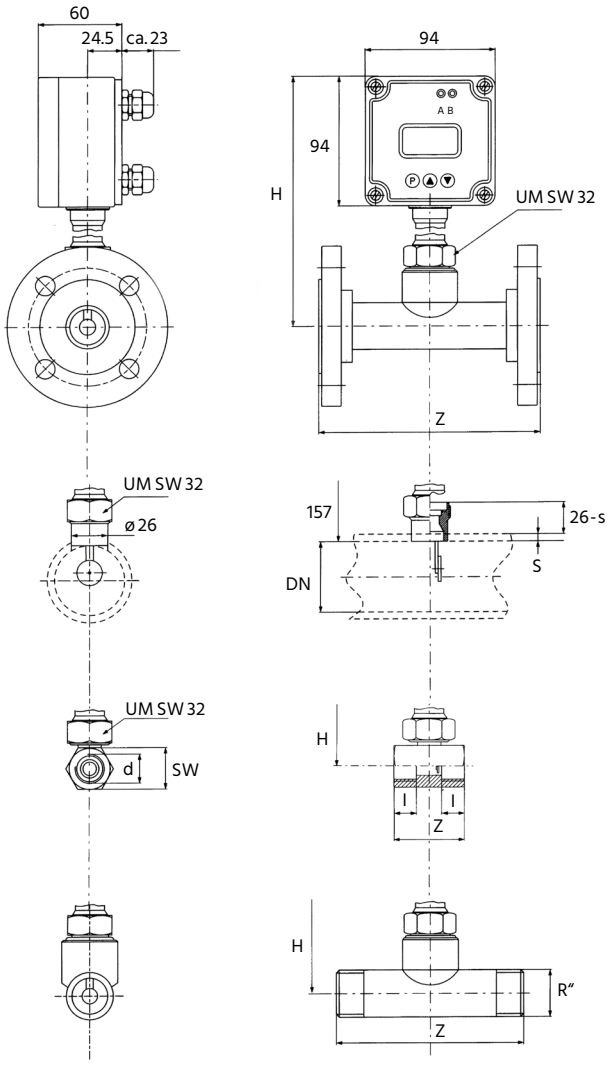
Electrical Specifications:

Contacts /	relay, 230 V, 1 A
Supply voltage /	24 VDC ± 10%, 200 mA max.
Protection class /	IP65
Analogue output /	4. . .20mA, load 500Ω; 0. . .10 VDC

Versions:

SP-04.GW...	with T-piece and pipe thread connection from R 3/8" to R 2"
SP-04.FL...	with T-piece and DIN flange from DN 10 to DN 50
Material combination A:	housing made of brass T-piece made of brass pendulum system, st. steel 1.4310 flange made of steel
Material combination B:	housing made of stainless steel 1.4571 T-piece made of stainless steel 1.4571 pendulum system, st. steel 1.4310 flange made of st. steel 1.4571
Material combination C:	T-piece made of PVC pendulum system, st. steel 1.4310 flange made of PVC
SP-04.AU...	IP65
Material combination A:	housing made of brass pendulum system, st. steel 1.4310 welding props made of steel
Material combination B:	housing made of stainless steel 1.4571 pendulum system, st. steel 1.4310 bellow made of stainless steel 1.4571 welding props made of st. steel 1.4571

Dimensions in mm:



Ordering Codes:

Order number	**SP-04.**	**GW25.**	**A.**	**2.**	**10-100**

SP-04 Baffle Disc Flowmeter

Process connection /
GW... = with thread (DN 10 to DN 50 only)
FL.... = with flange (DN 10 to DN 50 only)
AU... = with welding props (from DN 65 to DN 600)

Material combination /
A = brass / stainless steel / steel
B = fully stainless steel
C = PVC / stainless steel (not for SP-04.AU)

Switching output /
2 = 2 relays (230 V / 1A)

Operating range /
xxxx-xxxx = min. - max. flow (see table operating ranges)

Additional details /
· media density and viscosity (if different from water)
· operating pressure and temperature · **mounting position and direction of flow**

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Measuring Ranges:

Processconnection: SP.04.GW..., SP.04FL...

ND	Flow (l/min) min.	max.	Flow ratio
3/8"	1,5	25	1:10
1/2"	1,5	45	1:10
3/4"	5	100	1:10
1"	6	150	1:10
1 1/4"	10	250	1:10
1 1/2"	20	400	1:10
2"	50	600	1:10

Values are applicable for water, 20°C.
Within the specified limits, all operating ranges can be implemented, provided that the ratio max. to min. 1 : 10 is not exceeded.

Processconnection: SP-04.AU...

ND	Flow (m^3/h) min.	max.	Flow ratio
DN 65	4,8	60	1:10
DN 80	7,2	90	1:10
DN 100	12	144	1:10
DN 125	18	255	1:10
DN 150	24	330	1:10
DN 200	42	600	1:10
DN 250	72	900	1:10
DN 300	100	1200	1:10
DN 350	150	1800	1:10
DN 400	180	2400	1:10
DN 500	300	3600	1:10
DN 600	420	4500	1:10

Dimensions:

SP-04.GW...

Diameter		Mounting length Z in mm and (thread type)	
		Material A	Material B
3/8"	DN 10	50 (F)	50 (F)
1/2"	DN 15	50 (F)	50 (F)
3/4"	DN 20	50 (F)	50 (F)
1"	DN 25	50 (F)	135 (M)
1 1/4"	DN 32	50 (F)	170 (M)
1 1/2"	DN 40	50 (F)	170 (M)
2"	DN 50	170 (M)	170 (M)

SP-04.FL...

Diameter		Mounting length Z in mm	Mounting height H in mm	
			Material A	Material B
3/8"	DN 10	155 ± 2	157	157
1/2"	DN 15	155 ± 2	157	157
3/4"	DN 20	155 ± 2	157	157
1"	DN 25	155 ± 2	162	178
1 1/4"	DN 32	190 ± 2	167	178
1 1/2"	DN 40	190 ± 2	171	178
2"	DN 50	190 ± 2	179	188

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DP-10N

Vane operated Flowswitch



Features

/ Proven technology

/ Easy to install

/ Low pressure drop

/ Brass and stainless steel

/ Good repeatability

Description:

The DP-10N series of flowswitches transmits the movement of the vane mounted in the pipe which is proportional to the flow over a spring-supported rocker mechanically to a high-performance micro-switch. The setpoint can be modified by customizing the spring tension. The 3 standard vanes can be deployed for a nominal diameter range of 1“ to 3“. A fourth vane can be customized for larger nominal diameters or for reducing the switching values by shortening it to a desired length. In addition, the DP-10N can be supplied designed for a reduced adjustment range so that it can be deployed also for minimum switching values.

Application:

The DP-10N vane switches are used wherever fluid or air flows need to be reliably monitored. The switches are used for monitoring minimum as well as maximum flow. Typical areas of application include monitoring of coolant and lubricating circulation, protection against dry-runs in pumps or safeguard against defects. The DP-10N is designed as robust device to allow its use across the entire industry.

Technical Specifications:

max. Pressure /
DP-10N.1.1: 8 bar
DP-10N.1.2: 5 bar
DP-10N.2.1: 13 bar
DP-10N.2.2: 5 bar

max. Media temp. /
DP-10N.1/2.x: -20. . .+120°C
DP-10N.3.1: -20. . .+80°C

max. Ambient temp. /
DP-10N.1/2.x: -20. . .+85°C
DP-10N.3.1: -40. . .+80°C

Materials / see Table 1.2

Mounting position / any, vane to the top not recommended, mounting position affects setpoint

Process connection /
DP-10N.1/2.x: R1"-male,
DP-10N.3.1: flange 89 x 63.5 mm

Media /
DP-10N.1/2.x: water (lubricants and aggressive Media on request)
DP-10N.3.1: air and gases

Range of adjustment / see Table 1.1

Tolerance / ± 15% of FS

Weight /
DP-10N.1/2.x:
brass: 0.95 kg,
st. steel: 1.1 kg

DP-10N.3.1: 0.5 kg

Table 1.2 - Materials:

Type	DP-10N.1.x	DP-10N.2.x
cap	ABS	ABS
housing	brass CW614N	st. steel 1.4571
vane	st. steel 1.4571	st. steel 1.4571
bellow	tombac	st. steel 1.4571

Type	DP-10N.3.x
cap	ABS
vane	st. steel 1.4571
vane bracket	brass
mounting plate	zinc-plated steel

Electrical Specifications:

Electrical output / micro-switch, change-over contact, 250 VAC, 15 A (8 A inductive)

Cable gland /
DP-10N.1/2.x: M16 x 1,5
DP-10N.3.1: PG11

Protection class / IP65 with protective conductor conn.

Adjustment: untighten screws and remove cap, use screw to set to demanded setpoint, remount cap.

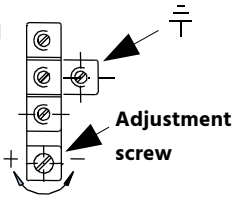


Table 1.1 - Adjustable range

DP-10N.1.x and DP-10N.2.x:

Pipe Ø DN	Qmax. in m³/h	Adjustable range in m³/h	Adjustable range reduced in m³/h	Vane
25	3.6	0.55. . .2.0	0.19. . .1.0	1
32	6.0	0.82. . .2.8	0.24. . .1.4	1
40	9.0	1.1. . .4.0	0.5. . .1.9	1
50	15	2.1. . .7.3	0.9. . .3.6	1, 2*
65	24	2.8. . .9.8	1.2. . .4.9	1, 2*
80	36	4.0. . .13.8	2.1. . .7.4	1, 2, 3*
100	60	10.4. . .32.0 7.0. . .21.7	4.9. . .17.1 3.3. . .11.6	1, 2, 3* 1, 2, 3, 4*
125	90	20.8. . .63.5 10.7. . .33.3	9.7. . .34.0 5.0. . .17.5	1, 2, 3* 1, 2, 3, 4*
150	120	29.2. . .89.1 13.1. . .39.9	13.6. . .47.6 6.1. . .21.4	1, 2, 3* 1, 2, 3, 4*
200	240	72.6. . .165.7 38.6. . .90.8	25.7. . .90.1 21.7. . .55.3	1, 2, 3* 1, 2, 3, 4*

Adjustable range is indicated for horizontally decreasing flow (medium water),
*have to be installed together.

DP-10N.3.1

min. cut-out value (m/s)	max. cut-out value (m/s)	min. cut-in value (m/s)	max. cut-in value (m/s)
1.0	8.0	2.5	9.2

Ordering Codes:

Order number	DP-10N.	1.	1

DP-10N Vane operated Flowswitch

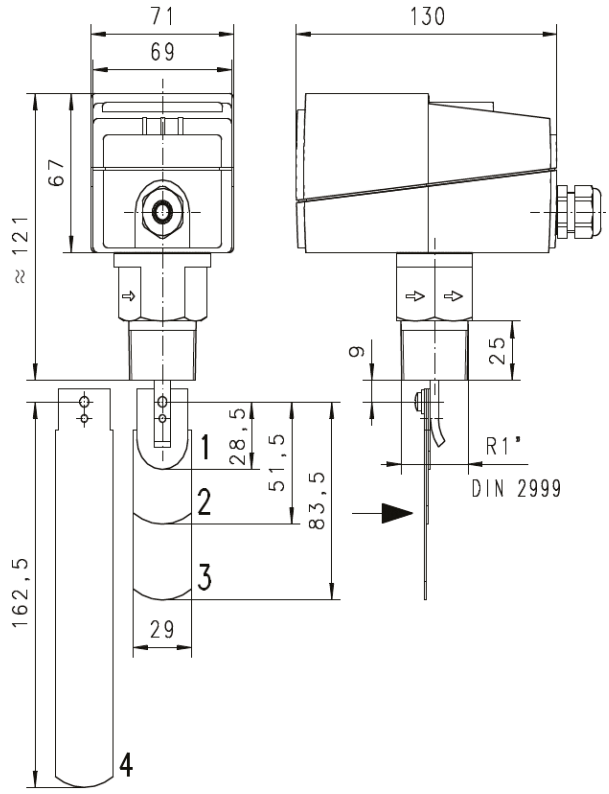
Version /
1 = for fluids (brass housing, stainless steel vane, cap ABS)
2 = for fluids (stainless steel housing, stainless steel vane, cap ABS)
3 = for air

Adjustment range /
1 = standard
2 = reduced (only for DP-10N.1 and DP-10N.2)

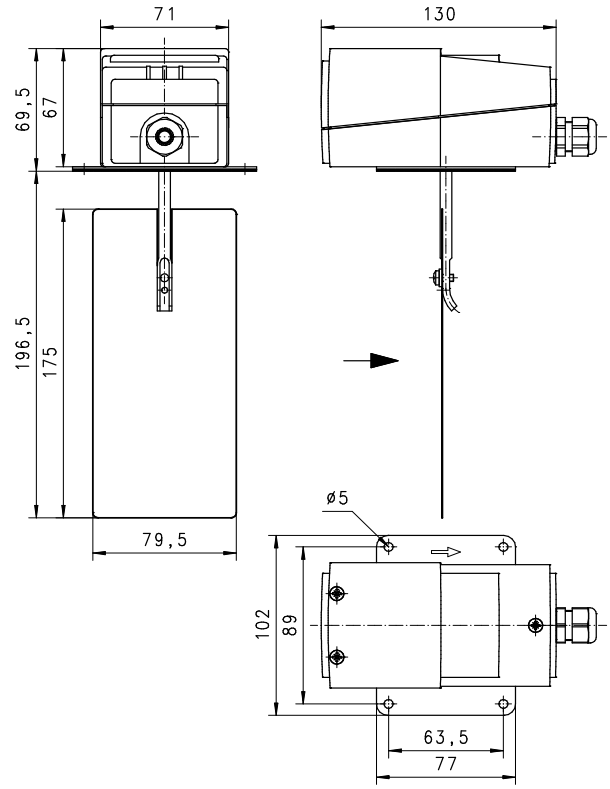
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Dimensions in mm:

Type: DP-10N.1.x and DP-10N.2.x:



Type: DP-10N.3.1



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DP-10LC

Vane operated Flowswitch

Features

/ Proven technology

/ Easy to install

/ Low pressure drop

/ Brass and stainless steel

/ Good repeatability

/ Low cost

/ For water or air

Description:

The DP-10LC series of flowswitches transmits the movement of the vane mounted in the pipe which is proportional to the flow over a spring-supported rocker mechanically to a high-performance micro-switch. The setpoint can be modified by customizing the spring tension. The 3 standard vanes can be deployed for a nominal diameter range of 1“ to 3“. A fourth vane can be customized for larger nominal diameters or for reducing the switching values by shortening it to a desired length. In addition, the DP-10LC can be supplied designed for a reduced adjustment range so that it can be deployed also for minimum switching values.

Application:

The DP-10LC vane switches are used wherever fluid or air flows need to be reliably monitored. The switches are used for monitoring minimum as well as maximum flow. Typical areas of application include monitoring of coolant and lubricating circulation, protection against dry-runs in pumps or safeguard against defects. The DP-10LC is designed as robust device to allow its use across the entire industry.

Technical Specifications:

max. Pressure / DP-10LC.1/3.x: 11 bar
DP-10LC.2.x: 30 bar

max. Media temp. / DP-10LC.1/2.x: -40. . .+120°C
DP-10LC.3.1: -10 . .+85°C

max. Ambient temp. / DP-10LC.1/2.x: -40. . .+85°C
DP-10LC.3.1: -10 . .+85°C

Materials / see table 1.2

Mounting position / any, vane to the top not recommended, mounting position affects setpoint

Process connection / DP-10LC.1/2.x: R1"-male
DP-10LC.3.1: flange 89 x 63,5 mm

Media / DP-10LC.1/2.x: water
DP-10LC.3.1: air

Range of adjustment / see table 1.1

Weight / DP-10LC.x.x: 0,95 kg

Table 1.1 - Adjustable range

DP-10LC.1.x and DP-10LC.2.x:

Pipe Ø DN	Qmax. in m³/h	Adjustable range in m³/h	Adjustable range reduced in m³/h	Vane
25	3,6	0,6. . .2,0	0,2. . .1,0	1
32	6,0	0,8. . .2,8	0,25. . .1,4	1
40	9,0	1,1. . .3,7	0,5. . .1,6	1
50	15	2,2. . .5,7	0,9. . .3,6	1, 2*
65	24	2,7. . .6,5	1,2. . .4,9	1, 2*
80	36	4,3. . .10,7	2,1. . .7,4	1, 2, 3*
100	60	11,4. . .27,7 6,1. . .17,3	4,9. . .17,1 3,3. . .11,6	1, 2, 3* 1, 2, 3, 4*
125	90	22,9. . .53,3 9,3. . .25,2	9,7. . .34,0 5,0. . .17,5	1, 2, 3* 1, 2, 3, 4*
150	120	35,9. . .81,7 12,3. . .30,6	13,6. . .47,6 6,1. . .21,4	1, 2, 3* 1, 2, 3, 4*
200	240	72,6. . .165,7 38,6. . .90,8	25,7. . .90,1 21,7. . .55,3	1, 2, 3* 1, 2, 3, 4*

Adjustable range is indicated for horizontally decreasing flow (medium water), *have to be installed together.

DP-10LC.3.1

min. cut-out value (m/s)	max. cut-out value (m/s)	min. cut-in value (m/s)	max. cut-in value (m/s)
1.0	8.0	2.5	9.2

If the switchpoint is above 5 m/s the paddle has to be cut off at the marking.
The lowest switch-off value will then increase to 2,5 m/s flow velocity.
Switch range for air at 1 bar abs. & 20°C m/s.

Table 1.2 - Materials:

Type	DP-10LC.1.x	DP-10LC.2.x
Device body	Brass	Stainless steel AISI 316L
Housing	ABS-lower part (VO) with polycarbonate cover	ABS-lower part (VO) with polycarbonate cover
Vane	Stainless steel AISI 316L	Stainless steel AISI 316L

Type	DP-10LC.3.1
Hausing	ABS-lower part (VO) with polycarbonate cover
Vane	Stainless steel 1.4571
Mounting plate	Brass

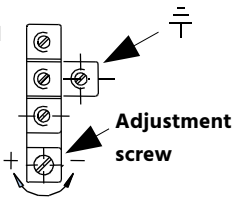
Electrical Specifications:

Electrical output / micro-switch, change-over contact, 250 VAC, 15 A (8 A inductive)

Cable gland / DP-10LC.x.x: M20 x 1,5

Protection class / IP65 with protective conductor conn.

Adjustment: untighten screws and remove cap, use screw to set to demanded setpoint, remount cap.



Ordering Codes:

Order number **DP-10LC. 1. 1**

DP-10LC Vane operated Flowswitch

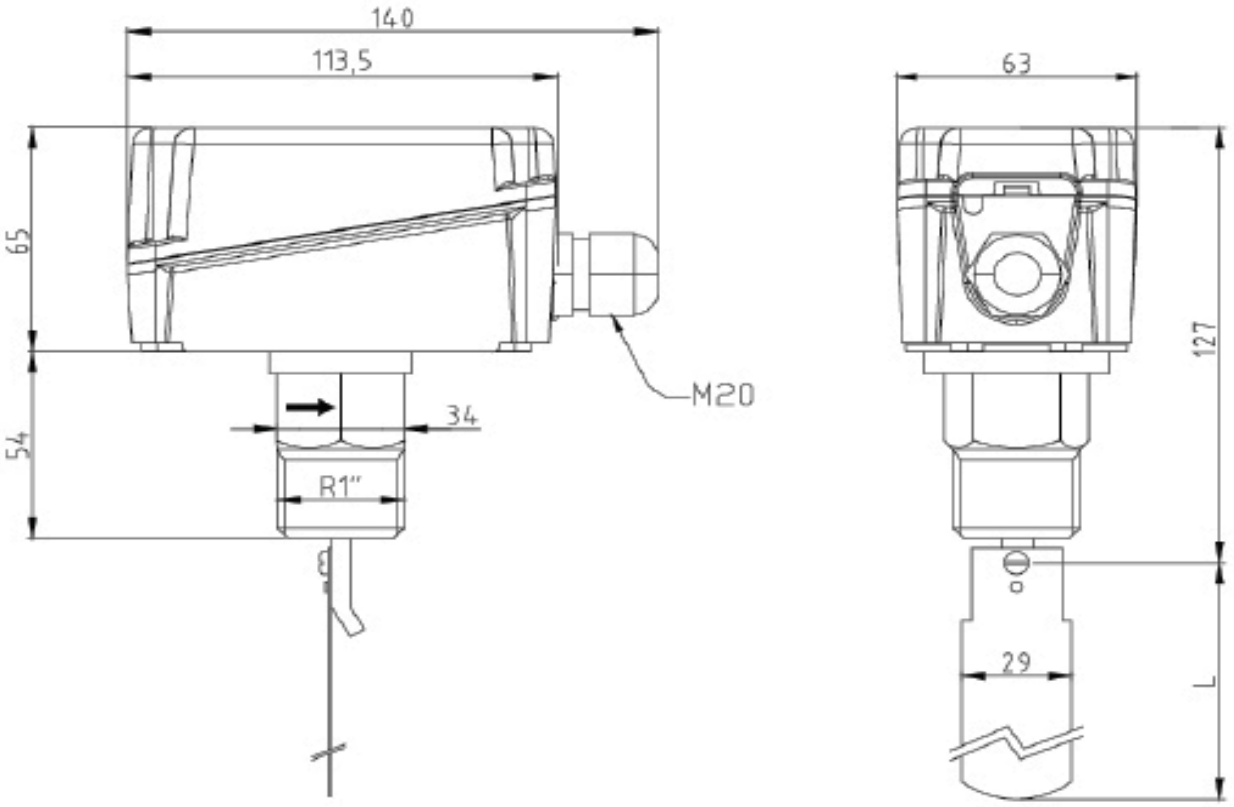
Version /
1 = brass
2 = stainless steel
3 = air

Adjustment range /
1 = standard
2 = reduced (only for DP-10LC.1 and DP-10LC.2)

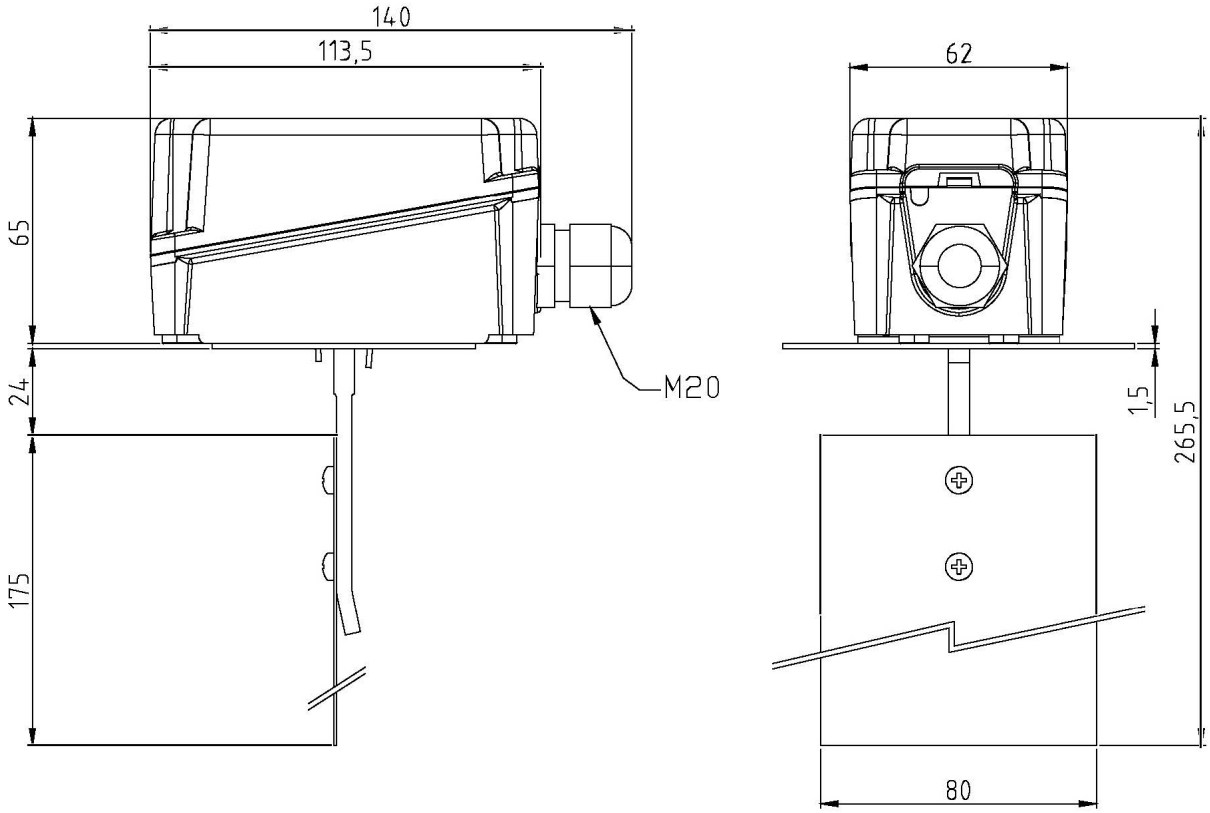
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Dimensions in mm:

Type: DP-10LC.1.x and DP-10LC.2.x:



Type: DP-10LC.3.1



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DP-20/30

Vane operated Flowswitch

Description:

The DP-20 model is unique due to its simple but reliable design. An external magnet actuates a switch that is fully protected within a leak-proof housing. The body and the vane are manufactured of chemically resistant polyphenylene sulphide. The vane which can be shortened has well-sculpted divisions for pipes of DN 25 to DN 150.

The DP-30 model is smaller and more compact than the DP-20 and it is available in brass or stainless steel versions on account of which the switch can be deployed for pressure levels up to 138 bar. A unique switch setting enables a quick change-over of the contact function. By releasing two screws and subsequently shifting the shedded reed contact either of the NC-contact or the NO-contact functions can be selected. The vane has a shortening pattern that indicates at which point it must be separated for the 6 pipe nominal diameters of 1/2" to 2".

The DP-20 as well as the DP-30 indicate the correct flow direction of the medium over an indexing arrow on the body side.

Features

/ Easy to assemble

/ Cost-effective

/ Reliable

/ Excellent strength

/ For fluids and air

Application:

Vane switches offer a simple and cost-effective method of monitoring the flow of a medium. The vane moved by dynamic pressure switches an electrical contact magnetically when the flow exceeds or falls a certain value. This type of monitoring flow is successfully used in the entire industry wherever the media being monitored do not indicate any significant levels of pollution or too high speeds of flow.

DP-20 Vane Operated Flowswitch made from Plastic

Technical Specifications:

Wetted materials /	
Vane and body:	PPS
Pin and spring:	316 SS or Inconel®
Magnet:	Ceramic 8
max. Pressure /	10 bar
max. Media-temp. /	+100°C
Process connection /	1" NPT-male
Weight /	130 g
Installation /	with arrow in direction of flow
Mounting position /	Actuation/deactuation flow rates are based on horizontal pipe position and are nominal values. The device can not be used vertically.

Electrical Specifications:

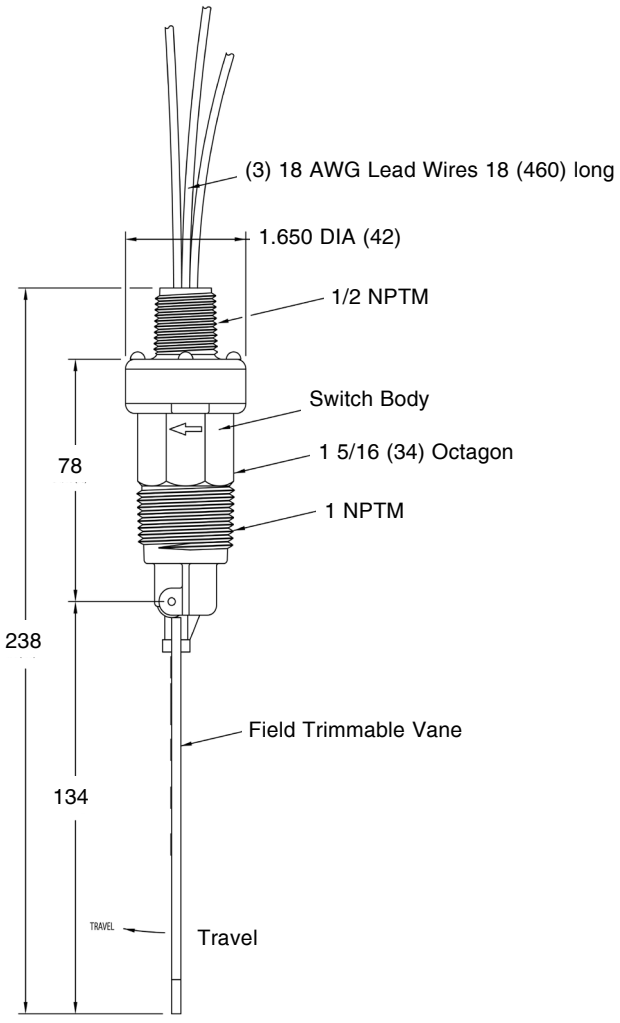
Contact /	
Standard	max. 5 A at 250 VAC resistive max. 3 A at 30 VDC inductive
Gold:	max. 1 A at 125 VAC resistive max. 0.5 A at 30 VDC conductive
Function /	single-pole change-over contact, optionally gold-plated
Connection /	three 18-AWG wires, 460 mm long

Flow range:

Pipe size	Flow range for cold water in l/min on-off	Flow range for air in l/min on-off
1"	40.9-34.6	1105-923
1 ¼"	37.2-31.4	1062-912
1 ½"	32.4-25.7	945-757
2"	41.2-33.4	1218-1042
3"	48.8-33.5	1493-1100
4"	79.7-52.2	2482-1802
6"	170.2-124.7	4775-3890

values measured on horizontal pipe

Dimensions in mm:



Ordering Codes:

Order Number	DP-20.	1.	2

DP-20 Vane Operated Flowswitch

Electrical connection /
1 = cable
2 = IP65 clamp-on housing

Contacts /
1 = standard
2 = gold

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DP-30 Vane Operated Flowswitch made from Metal

Technical Specifications:

Wetted materials /	
Vane:	301 SS
Body:	Brass or 303 SS
Pin and magnet:	Keramik 8
max. Pressure /	Brass: 69 bar, Stainless steel: 138 bar
max. Media-temp. /	+93°C
Weight /	160 g
Process connection /	½" male NPT or ½" male BSPT
Installation /	with arrow in direction of flow
Mounting position /	any, values values based on horizontal pipe position, in the same way as for the DP-20

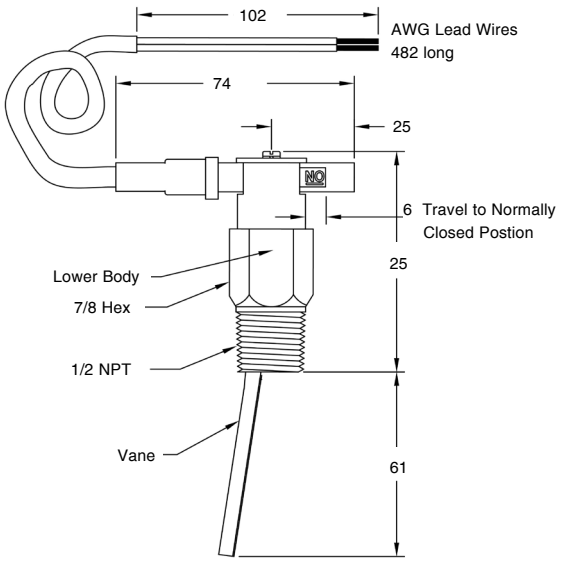
Electrical Specifications:

Contact /	max. 0.5 A/ 120 VAC or 1.5A/ 24VDC
Function /	NC-contact or NO-contact, hermetically sealed in PP
Electrical connection /	Two 18-AWG wires, 483 mm long
Protection class /	IP66

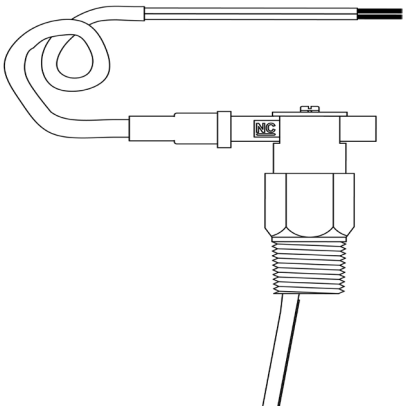
Flow range:

Pipe size	Flow range for cold water in l/min on-off, normally open	Flow range for cold water in l/min on-off, normally closed	Flow range for air in l/min on-off, normally open	Flow range for air in l/min on-off, normally closed
½"	9.8 - 8.7	9.8 - 9.5	291.7-250	288-260
¾"	11.7 - 10.2	11.7 - 10.6	368.3-328	365-328
1"	18.2 - 17	18.2 - 16.7	543.3-498	535-498
1 ¼"	23.5 - 21.2	23.1 - 21.2	701.7-628	693-637
1 ½"	31 - 29.1	31 - 29.1	946.7-883	935-867
2"	36 - 34.4	36 - 34.1	1422-1370	1422-1352

Dimensions in mm:



Normally open position



Normally closed position

Ordering Codes:

Order Number	DP-30.	1.	2

DP-30 Vane Operated Flowswitch

Material /
1 = brass
2 = stainless steel

Process connection /
1 = 1/2 male NPT
2 = 1/2 male BSPT

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DP-40

Vane operated Flowswitch for heavy-duty applications

Features

/ Leak proof body

/ Free-Swinging vane

/ Electrical unit can be replaced

/ Thread, tee or flange installation

/ Field adjustable multilayer vane

/ Up to 1000 or 2000 psig

/ 5000 psig on special request

/ Weatherproof NEMA4

/ ATEX or IECEx

Description:

The DP-40 Flow Switch is rugged and reliable, ideal for automatically protecting equipment and pipeline systems against damage from reduction or loss of flow. A unique magnetically actuated switching design gives superior performance. There are no bellows, springs, or seals to fail. Instead, a free swinging vane attracts a magnet within the solid metal switch body, actuating a snap switch by means of a simple lever arm. Time tested in thousands of pipeline installations and processing plants around the world this series is weatherproof, designed to meet NEMA 4 and explosion-proof (listing included in specifications). The DP-40 can be used in pipes 1 ½″ and up.

Application:

/ Protects pumps, motors and other equipment against low or no flow
/ Controls sequential operation of pumps
/ Automatically starts auxiliary pumps and engines
/ Stops liquid cooled engines, machines and processing when coolant flow is interrupted
/ Shuts down burner when air flow through heating coil fails
/ Controls dampers according to flow

Technical Specifications

Media /	Gases or liquids compatible with wetted materials.
max. Pressure /	Brass body 1000 psig (69 bar), 316 SS body 2000 psig (138 bar), optional 5000 psig (345 bar) available with 316 SS body and SPDT switch only.
max. Media.-temp. /	-4. . .+275°F (-20. . .+135°C) standard, MT high temperature option +400°F (+205°C) [MT option not UL, CSA, ATEX or IECEx]
max. Ambeint-temp. /	-4. . .+163°F (-20. . .+73°C)
Wetted materials /	
Vane:	316 SS
Body:	Brass or 316 SS standard
Magnet keeper:	430 SS standard, 316 SS optional
Options:	Other materials are also available on request.
Protection class /	Weatherproof and Explosion-proof. **Listed with UL and CSA for Class I, Groups C and D; Class II, Groups E, F, and G.
ATEX-Certificate No. /	KEMA 03 ATEX 2383
ATEX-Certified /	ATEX CE 2813 Ex II 2 G Ex db IIB T6 Gb -20°C ≤ Tamb ≤ 73°C, -20°C ≤ Process Temps ≤ 73°C
ATEX Standards /	EN60079-0: 2012+A11: 2013 EN 60079-1: 2014
IECEx-Certificate No. /	IECEx DEK 11.0071
IECEx-Certified /	Ex db IIB T6 Gb -20°C ≤ Tamb ≤ 73°C -20°C ≤ Process Temp ≤ 73°C
IECE-Standards /	IEC 60079-0: IEC 60079-0: 2011 IEC 60079-1: 60079-1: 2014

Electrical Specifications:

Switch type /	SPDT snap switch standard, DPDT snap switch optional.
Electrical rating /	
UL, FM, ATEX and IECEx models:	10A @ 125/250 VAC (V~)
CSA models:	5 A @ 125/250 VAC (V~) 5 A res., 3 A ind. @ 30 VDC (V)
MV option:	1 A @125 VAC (V~); 1 A res. 5 A ind. @ 30 VDC (V)
MT option:	5 A @ 125/250 VAC (V~)

[MT and MV option without UL, CSA, FM, ATEX or IECEx]

Electrical connections /	
UL and CSA models:	16 AWG, 6″ (152 mm) long
ATEX and IECEx unit:	Terminal block
Conduit connection:	¾″ female NPT or M25 (BSPT)
Process connection:	1½″ NPT-male, BSPT
Mounting orientation:	Within 5° of vertical for proper operation. Units for horizontal installation (vertical pipe with up flow) available.
Set point adjustment /	
For universal vane:	five vane combinations
Weight:	4 lb 8 oz (1.9 kg)
Agency approvals:	ATEX, CE, CSA, FM, IECEx, UL**

**No housing option (-NH) has no approvals

Ordering Codes:

Order Number	DP-40.	1.	2.	D

DP-40 Vane operated flow switch, for heavy-duty applications

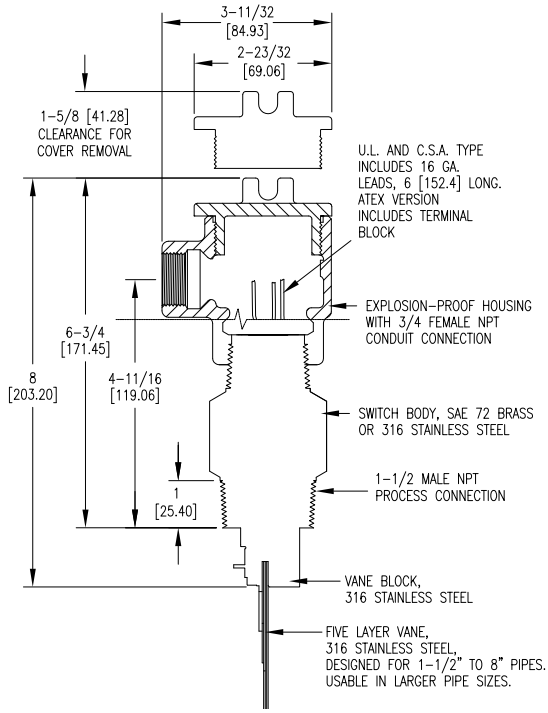
Housing /
1 = brass body
2 = 316 SS body

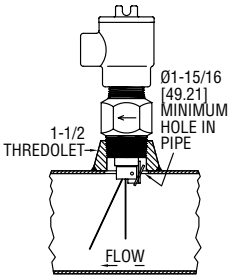
Process connection /
1 = 1½″ NPTM
2 = 1½″ BSPT

Options /
D = DPDT contacts
MV = gold plated contacts*
MT = high temperature, option rated 400°F (204°C)*
TRI = increasing flow time delay relay option with 2 SPDT contacts, adjustable from 0-1 to 0-31 minutes*
TRD = decreasing flow time delay relay option with 2 SPDT contacts, adjustable from 0-1 to 0-31 minutes*
316 = 316 SS magnet keeper
V = vertical up flow, option for upward flow in vertical pipe
AT = ATEX compliant construction
IEC = IECEx certified construction

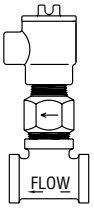
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Dimensions in mm:

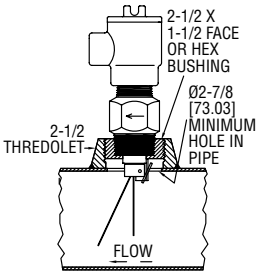




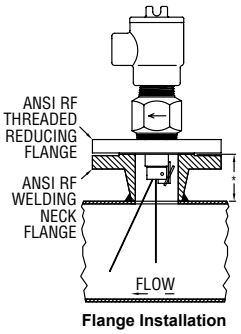
Standard Installation



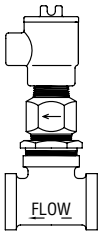
1-1/2˝ x 1-1/2˝x 1-1/2˝ Tee Installation



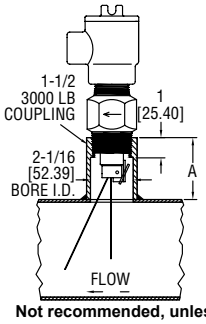
2-1/2˝ Threaded Branch Connection



Flange Installation
*Flange face to pipe O.D. specified by customer. Normally should not exceed 5˝ (172)



2˝ x 2˝ x 2˝ Tee Installation



Not recommended, unless coupling is bored out to 2-1/16˝ (52.4) as shown

Pipe Size	Dim. A
2˝	2-5/8 (66.7)
3˝	2-1/2 (63.5)
4˝	2-7/16 (61.9)

Approximate Actuation/Deactuation Flow Rates for Cold Water; GPM (LPM)

Vane Layers	1.5" Pipe	2" Pipe	3" Pipe	4" Pipe	6" Pipe	8" Rohr	10" Pipe	12" Pipe	14" Pipe	16" Pipe	18" Pipe	20" Pipe
1	7-3 (26.67-11.67)	15-8 (56.7-30)	45-22 (167-83.3)	95-40 (367-150)	210-120 (800-450)	375-175 (1417-667)	600-300 (2267-1133)	900-450 (3400-1700)	1200-600 (4550-2267)	1400-800 (5300-3033)	2000-1000 (7567-3783)	2400-1200 (9083-4550)
1 & 2		7-4 (26.7-15)	23-14 (86.7-53.3)	50-35 (190-132)	130-90 (500-333)	230-150 (867-567)	450-250 (1700-950)	650-350 (2467-1317)	900-500 (3400-1900)	1200-650 (4550-2467)	1450-800 (5483-3033)	1800-1000 (6817-3783)
1,2 & 3			11-7 (41.7-26.7)	27-19 (102-71.7)	80-60 (300-233)	160-115 (600-433)	300-180 (1133-683)	450-275 (1700-1033)	600-350 (2267-1317)	750-450 (2750-2083)	1000-600 (3783-2267)	1200-700 (4550-2650)
1,2,3 & 4				17-12 (65-45)	60-45 (233-167)	120-90 (450-333)	230-150 (867-567)	310-200 (1167-750)	430-280 (1633-1067)	550-360 (2083-1367)	700-450 (2650-1700)	850-550 (3217-2083)
1,2,3,4 & 5					40-30 (152-113)	80-65 (300-250)	135-100 (517-383)	200-140 (750-533)	290-200 (1100-750)	360-250 (1367-950)	460-325 (1733-1233)	575-400 (2183-1517)

Actuation rates are based on cold water at a specific gravity of 1.0.

For fluids of different specific gravity, actuation rates may be approximated by dividing the rate shown by the square root of the specific gravity.

Approximate Actuation/Deactuation Flow Rates for Cold Air; SCFM (LPS)

Vane Layers	1.5" Pipe	2" Pipe	3" Pipe	4" Pipe	6" Pipe	8" Pipe	10" Pipe	12" Pipe	14" Pipe	16" Pipe	18" Pipe	20" Pipe
1	32-17 (15-8)	65-32 (30-20)	210-105 (100-50)	400-200 (190-90)	950-475 (450-220)	1550-850 (730-400)	2400-1300 (1100-600)	3450-1900 (1600-900)	4700-2600 (2200-1200)	6400-3500 (3000-1700)	8000-4400 (3800-2100)	10000-5500 (4700-2600)
1 & 2		23-13 (10-6)	120-70 (60-30)	195-140 (90-70)	550-375 (260-180)	1100-700 (520-330)	1850-1200 (870-570)	2700-1750 (1300-800)	3400-2200 (1600-1000)	4800-3100 (2300-1500)	6000-3900 (2800-1800)	7400-4800 (3500-2300)
1,2 & 3			60-48 (30-20)	135-100 (60-50)	375-265 (180-130)	725-500 (340-240)	1200-850 (570-400)	1850-1300 (870-610)	2600-1800 (1200-800)	3350-2350 (1600-1100)	4300-3000 (2000-1400)	5300-3700 (2500-1700)
1,2,3 & 4				65-50 (30-20)	260-200 (120-90)	500-400 (240-190)	875-700 (410-330)	1250-1000 (590-470)	1900-1500 (900-710)	2500-2000 (1200-900)	3100-2500 (1500-1200)	3900-3100 (1800-1500)
1,2,3,4 & 5					130-100 (60-50)	310-250 (150-120)	650-525 (310-250)	1000-800 (470-380)	1600-1250 (760-590)	2200-1750 (1040-830)	2800-2250 (1300-1100)	3550-2850 (1700-1300)

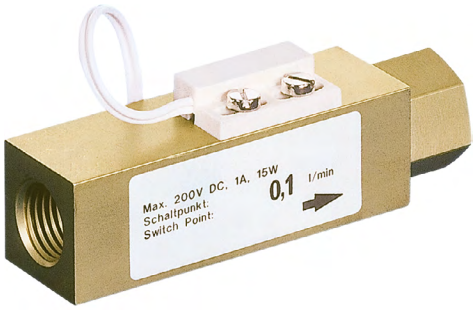
Actuation rates are based on air at standard conditions.

For gases at other pressures, temperatures, or specific gravities, consult factory for equivalent flow approximations.

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DK-01

Low-Cost Piston Type Flow Switch for Low Flow Volumes with Cable Connection





Features

/ For low-viscosity fluids

/ Fixed factory-set setpoint (between 0.1 and 2.5 l/min)

/ Compact construction

/ Easy to install

/ Cost effective

/ Mounting in any position

/ Reed contact output

Description:

The DK-01 series of compact piston type flowswitches operates according to a modified variable area principle and is used for monitoring the flow of low-viscosity fluids. In this method, a piston equipped with a built-in permanent magnet, is held in a defined position by a spring. Depending on the rate of flow, the medium slides the piston against the strength of the spring. If the flow exceeds or drops below of the present set-point, the reed switch outside the medium is activated without contact via the permanent magnet.

Application:

The DK-01 series is used for monitoring the flow of low-viscosity fluids in pipes. They offer a reliable solution for ensuring the minimum flow rate and thereby protecting high-quality systems and installations from damage. For applications with contaminated media or media with ferritic components, we recommend the use of strainers (for example the FT-01, a strainer with or without magnetic separator in the section accessories) of our catalogue.

Typical applications are:

/ Coolant circulation systems

/ Lubricant circulation systems

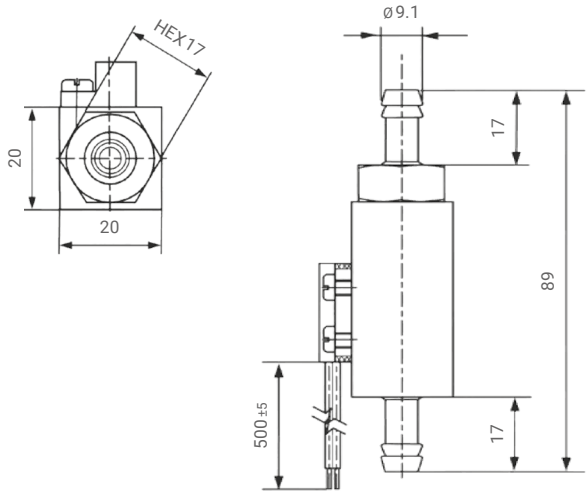
/ Water circulation systems

Technical Specifications:

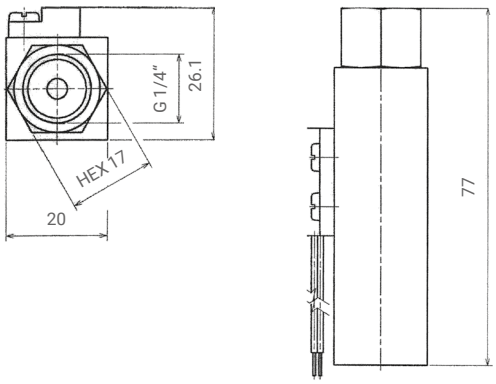
Set-point range /	0.1. . .2.5 l/min
Switching hysteresis /	ca. 0.1 l/min
max. Pressure /	25 bar, higher on request
max. Media temp. /	+100°C
max. Ambient temp. /	+70°C
Process connection /	R 1/4"-female thread or hose nozzle for 8 mm flexible tube, other on request
Mounting position /	any
Materials (wetted parts) /	
Body housing:	brass or stainless steel, other on request
Piston:	POM
Spring:	stainless steel 1.4410
Magnet:	hard ferrite OX 300

Dimensions in mm:

Piston type flowswitch with 8 mm hose nozzle at both sides



Piston type flowswitch with R 1/4" female thread at both sides



Electrical Specifications:

Electrical connection /	stranded wire 2-core, 0.5m cable
Contact /	reed contact, NO-contact
max. Switching voltage /	200 V
max. Switching current /	1 A
max. Switching load /	15 W

Handling:

/ It must be ensured, that the values given for voltage, current, and power are not exceeded.

/ When switched on, a load must be connected in series.

/ The electrical details apply to resistive loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.

/ An inflow section of 10 times and an outflow section of 5 times of the nominal pipe diameter is recommended. Therefore our „BE-01 - Inflow and Outflow Sections for Flowmeters" may be used.

Ordering Codes:

Order number	**DK-01.**	**4.**	**1.**	**S[1][,][2].**	**0**

DK-01 Piston-Type Flowswitch

Process connection /
1 = inlet G 1/4"-female thread, outlet G 1/4"-female thread
2 = inlet G 1/4"-female thread, outlet hose nozzle 8 mm
3 = inlet hose nozzle 8 mm, outlet R 1/4"-female thread
4 = inlet hose nozzle 8 mm, outlet hose nozzle 8 mm
9 = customer-specific

Material housing /
1 = brass
2 = stainless steel

Switching point (please specify) /
S [ ][.][ ] = 0.1. . .2.5 l/min - for increasing flow (1)
F [ ][.][ ] = 0.1. . .2.5 l/min - for decreasing flow (1)

Options /
0 = none
9 = please specify in detailed text

(1) Set-point ranges are applicable for water 20°C, vertical mounting position. Upward flow direction. Example:
Preset set-point at 1.2 l/min for increasing flow » S [1][.][2]

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FL-01

Diaphragm Flow Meter

Description:

The FL-01's body contains a thin, elastic diaphragm, made of stainless steel, which covers the entire flow cross-section. It is bent through the flowing liquid, until it touches a bow-shaped stopper. The magnetic field of a plastic-encapsulated magnet, sitting right on the diaphragm, is detected by an external sensor. The optional available measuring-transducer, installed on the outside of the housing, owns a back-lit, well-readable LCD-Display, which shows measured values and parameters in a clear and easy to understand way. The FL-01 has either a 0. . .10 VDC- or 4. . .20 mA-output-signal and two switching outputs which can be used as PNP- or NPN-transistor-outputs, if needed. The device can be controlled and programmed with a magnet ring. By turning the ring left or right, parameters, such as hysteresis or switching points, can easily be changed.
A further option, the electronic unit can be ordered as a counter, with external reset, antivalent switching-outputs and current-value display, or, as a current-value display with analogue output, volume-pulse-output and counter.

Features

/ Analogue output
/ 2 switching outputs
/ Well-readable, back-lit display
/ Changeable dimensions
/ For industrial applications
/ Small and compact in size
/ Easy installation

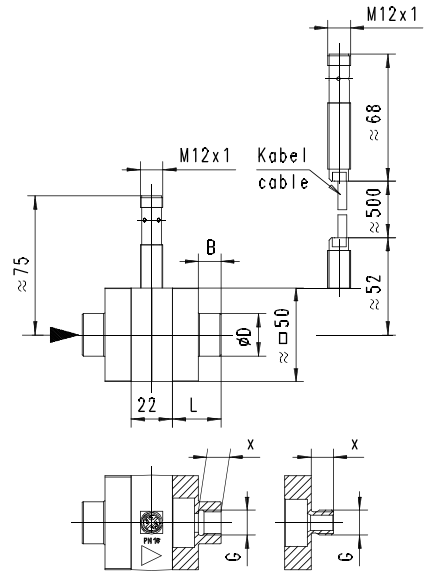
Application:

The new developed measuring-system of the FL-01 offers, by the fact, that it manages without any bearing a very good reproducibility and is practically free of hysteresis. In addition, the response time of the measurement is extremely small, due to the small mass of the spring diaphragm and the nearly complete coverage of the flow cross section. Therefore the instruments allows the detection of even the smallest starting values and a large measuring range of up to 1:100. Compared to some other principles of flow measurement, e.g. the calorimetric or the impeller system, the dynamics of the entire flow cross-section are detected in the FL-01 and not just a supposedly representative point in the center or at the edge of the flow profile. Straight inlet and outlet sections have a considerably less influence on the measurement result. The FL-01 connectors on the input and output sides are flanged to the measuring system at the factory, so if the device needs to be serviced, the connecting screws can be removed easily from the flange and the measuring-unit removed, without removing the connectors from the pipe. This flowmeter is a universally applicable, robust instrument, which is used in the entire industry. The excellent price-performance ratio and its multitude of technical advantages make it economically viable at many measuring points to replace old technologies, such as impeller or turbine flowmeters, with the FL-01.

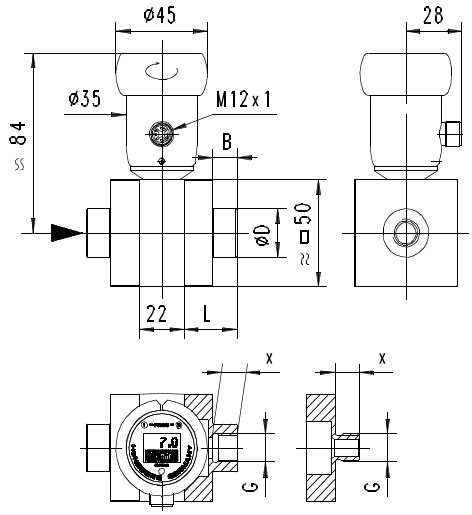
Technical Specifications:

Pressure resistance /	plastic: PN 16 metal: PN 100
Pressure drop /	max. 0.5 bar at scale-end
max. Mediatemp. /	0. . .+70 °C with opt. high-temp. 0. . .150 °C
max. Ambient-temp. /	0. . .+70 °C
Storage temp. /	-20. . .+80 °C
Sensor /	flow-dependent diaphragm
Pipe diameter /	DN 8. . .25
Connection Type /	female thread G¼ to G1, optional male thread or tube, NPT-thread and customer specific connectors on request
Switching range /	1. . .100 l/min (water)
Measuring range (water) /	1. . .100 l/min; small-volume-range 0.4. . .6 l/min on request
Measurement uncertainty /	Standard range: ±3 % from measured value, at least 0.25 l/min Small-volume-range: ±3 % from measured range, at least 0.1 l/min
Display /	graphic LCD-Display extended temperature range -20. . .+70°C, 32 x 16 pixels, back-lit, shows value and dimension, LED-signal blinking + message
Materials, wetted /	
Body:	PPS, brass nickel-coated CW614N or stainless steel 1.4404
Connections:	POM, brass nickel-coated CW614N or stainless steel 1.4404
Seals:	FKM
Diaphragm:	stainless steel 1.4031k
Magnetic holder:	PPS
Glue:	epoxy
Materials, not wetted /	
Sensorpipe:	brass nickel coated CW614N
Flange screws:	stainless steel or steel
with Display /	
Body:	stainless steel 1.4305
Glas:	hardened mineral glass
Magnet:	samarium-cobalt
Ring:	POM

Dimensions w/o Display:



Dimensions with Display:

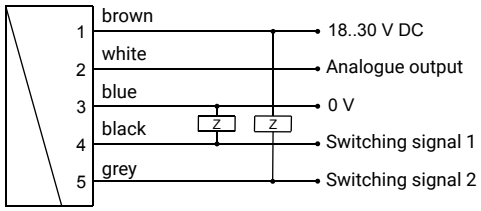


Range:

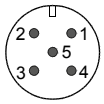
Pipe diameter	Switching range (l/min H_2O)
DN 8. . .25	0.4. . .6.0
DN 8. . .25	1.0. . .15.0
DN 10. . .25	1.0. . .25.0
DN 15. . .25	1.0. . .50.0
DN 20. . .25	1.0. . .80.0
DN 25	1.0. . .100.0

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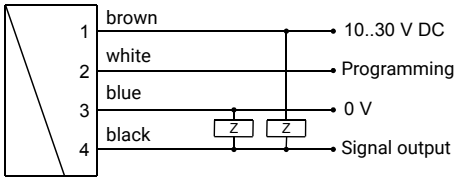
Elect. Connection:



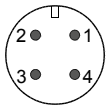
Connection examples: PNP NPN



Z=load



Connection examples: PNP NPN



Electrical Specifications:

Power supply /	10. . .30 VDC; 18. . .30 V DC with display: 15. . .30 V DC
Current output /	4. . .20 mA (0. . .20 mA on request max. 500 Ohm (only with display)
Voltage output /	0. . .10 V (2. . .10 V on request) current output max. 20 mA
Switching output /	transistor output „Push-Pull“ I_{out} = 100 mA max.
Frequency output /	output frequency in relation to the range, standard 500 pulse/l (corresponds to 833,3 Hz at 100 l/min) 5000 pulse/l (corresponds to 500 Hz at 6 l/min) (other frequencys on request)
Pulse output /	transistor output „Push-Pull“ I_{out} = 100 mA max. pulse-width 50 ms pulse/quantity, please specify when ordering
Power consumption /	< 1 W (for unloaded outputs)
Connection /	for round connectors M12x1, 4-pin
Protection class /	IP 67 (IP 68 with oil filling)
Conformity /	CE

Ordering Codes:

Order number	**FL-01.**	**1.**	**3.**	**1.**	**1.**	**08.**	**2.**	**3.**	**2.**	**1**

FL-01 Diaphragm Flow Meter

Housing material /
1 = PPS
2 = brass, nickel plated(CW614N)
3 = stainless steel

Process connection material /
1 = POM
2 = brass nickel plated (CW614N)
3 = stainless steel

Seal material /
1 = FKM
2 = EPDM
3 = NBR

Process connection thread /
1 = female
2 = male
3 = hose fitting

Nominal diameter / (see table)
08 = ¼“
10 = 3/8“
15 = ½“
20 = ¾“
25 = 1“

Measuring range /
1 = 0.4. . .6 l/min (on request)
2 = 1.0. . .15 l/min
3 = 1.0. . .25 l/min
4 = 1.0. . .50 l/min
5 = 1.0. . .80 l/min
6 = 1.0. . .100 l/min

Output configuration /
1 = switching output pushpull (PNP and PNP)
2 = power output 4. . .20 mA
3 = current output 0. . .10 V
4 = frequency output (500 pulse/l)
5 = pulse output (please specify pulse/volume)
6 = digital on-site display with 2 transistor switching-outputs, display and analogue output 4. . .20 mA
7 = digital on-site display with 2 transistor switching-outputs, display and analogue output 0. . .10 V

Options /
1 = none
2 = with backflow resistance
3 = high-temperatures up to 150°C [1]
4 = counter with external reset, antivalent switching-outputs and current-value display[2]
5 = current-value display with analogue output, volume-pulse-output and sum-counter[2]

Accessories /
0 = none
1 = counter plug M12x1, 4-pol.

[1] only with metal housing (with 300 mm cable separation)
[2] only with digital on-site indication

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FL-10

Flow Rate Indicator



Features

/ For liquid media

/ For media viscosities up to 600 cSt

/ Pressure up to 200 bar max.

/ Mechanical flow indication

/ Weatherproof enclosure box (IP65)

/ May be installed in any position

/ Size range from 1/4“ to 8“

/ Adjustable under operating conditions

/ ATEX approved Explosion-proof models avaible

Description:

A spring loaded stainless steel flap inside the FL-10 is rotated around a symmetrical axis due to the upcoming flow and opens therefore a variable aperture. This rotation moves the mechanically coupled pointer on the clearly visible flow scale of the FL-10 proportional to the flow. The rotary motion can be used for mechanical display only, for switching a microswitch when the adjusted setpoint is reached or even to put out a 4. . 20 mA analogue output. The FL-10 can easily be used within potentially explosive atmospheres thanks to its ATEX approvals for the switching unit and the output module. The unique construction of the FL-10 allows an installation in any mounting position.

Application:

The FL-10 side flow indicators with flap are among the most robust flowmeters on the market. In theory, the user can completely disassemble and reassemble the device on site without any functional restriction. The devices are durable, accurate, and versatile. There are many material combinations for a variety of liquid media and sizes from DN10 to DN200, as well as pressure levels up to 200 bar. Larger variants can be supplied for intermediate flange mounting (sandwich) on request. Various options for the electrical outputs of the indicators predestine the FL-10 series against many other sight flow indicators and offers the customer a perfect industrial product.

Technical Specification:

Materials /

AL /	aluminum
B /	bronze
CI /	cast iron
CIK /	cast iron nickel plated
S /	carbon
SS /	stainless steel
PTFE /	PTFE (only up to 4" and 7 bar max.)
PVC /	PVC (only up to 4" and 7 bar max.)

Seal material /

S1 /	NBR (-40. . .+110 °C)
S2 /	EPDM (-40. . .+150 °C)
S3 /	FKM (-20. . .+200 °C)
S4 /	PTFE (-100. . .+250 °C)
S5 /	Perlast (-15. . .+330 °C)

max. Pressure /

LP	20 bar
MP	50 bar
HP	200 bar (CI, CIK, S & SS only)

max. Media temperature /	-100. . .+330 °C (depending on the material and seal material)
Mounting position	any position

Electrical Specification:

Switch /

3EE /	SPDT 3 wire
Switching load:	15 A @ 125/250 or 480 VAC 0,5 A @ 125 VDC / 0,25 A - 250 VDC
3EEG /	SPDT 3 wire with gold contacts
Switching load:	on request
3EE (ATEX zone 2 / zone 3) /	SPDT micro switch (ATEX zone 2 / zone 3)
Switching load:	on request
6EE (ATEX zone 2) /	DPDT (ATEX zone 2)
Switching load:	2 micro switch, switching in parallel 10 A @ 125 or 250 VAC 0,3 A @ 125 VDC / 0,15 - 250VDC
AIR /	pneumatic switch
Switching load:	on request
POT /	potentiometer (specify rating)
Switching load:	on request

Analog out put /

OUT /	4. . .20 mA out put
Supply:	on request

Rate totaliser /

TOT /	digital rate totaliser
TOTX /	digital rate totaliser (ATEX)

Measuring ranges:

Process connection	Full scale values FML l/min	FMM m^3 / h	FMG U.S. Gallons / min	FMB imp. Gallons / min
Size small				
1/4" - 1"	4 - 70	0,24 - 4,2	1,0 - 18,5	0,88 - 15,4
Size middle				
3/4" - 2"	40 - 500	2,4 - 30	10,6 - 132	8,8 - 110
2 1/2"	50 - 800	3 - 48	13,2 - 211	11 - 176
Size large				
3"	120 - 1500	7,2 - 90	32 - 400	26,4 - 330
4"	120 - 2000	7,2 - 120	32 - 530	26,4 - 440
6"	120 - 3500	7,2 - 210	32 - 925	26,4 - 770
8"	120 - 5000	7,2 - 300	32 - 1325	26,4 - 1100

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Odering Codes:

Oder number	FL-10.	FML.	K.	B.	LP.	ME.	[20.]	2.	F10.	S1.	L

FL-10 Flow Rate Indicator

Series and flow rate /

FMC = up to 5 l/min (low flow)
FML = up to 5000 l/min
FMB = up to 1100 imp. Gallons / min
FMG = up to 1325 U.S. Gallons / min
FMM = up to 300 m^3/h

Size and ranges /

K = 1/4" to 1", ranges: 0...4 l/min bis 0...70 l/min
M = 3/4 to 2 1/2", ranges: 0...4 l/min bis 0...500 l/min
G = 3" to 8", ranges: 0...250 l/min bis 0---5000 l/min

Material /

AL = aluminum
B = bronze
CI = cast iron
CIK = cast iron nickel plated
S = carbon
SS = stainless steel
PTFE = PTFE (only up to 4" and 7 bar max.)
PVC = PVC (only up to 4" and 7 bar max.)

Pressure limit /

LP = max. 20 bar
MP = max. 50 bar
HP = max. 200 bar (only CI, CIK, S & SS)

Output signals /

ME = mechanical display only
3EE = micro switch
3EEG = micro switch with gold contacts
3EE(A2) = micro switch, ATEX zone 2
3EE(A1) = micro switch, ATEX zone 1
6EE(A2) = DPDT, ATEX zone 1
AIR = pneumatic switch
POT = potentiometer (spezify rating)
OUT = 4. . .20 mA output
TOT = digital totaliser
TOTX = digital totaliser (ATEX)

Media viscosity /

1. . .600 = please specify viscosity of media in cSt [mm^2/s]

Process connection size /

2 = 1/4" (only size K)
4 = 1/2" (only size K)
6 = 3/4" (only size K and M)
8 = 1" (only size K and M)
10 = 1 1/4" (only size M)
12 = 1 1/2" (only size M)
16 = 2" (only size M)
20 = 2 1/2" (only size M)
24 = 3" (only size G)
32 = 4" (only size G)
48 = 6" (only size G)
64 = 8" (only size G)

Process connection /

BSP = standard thread BSP (only connection size 1/4" up to 21/2")
NPT = standard thread NPT (only connection size 1/4" up to 21/2")

F10 = flange DIN2632-5 PN10
F16 = flange DIN2632-5 PN16
F25 = flange DIN2632-5 PN25
F40 = flange DIN2632-5 PN40

F150 = flange ANSI B16.5 150 lbs.
F300 = flange ANSI B16.5 300 lbs.
F600 = flange ANSI B16.5 600 lbs.

Seal material /

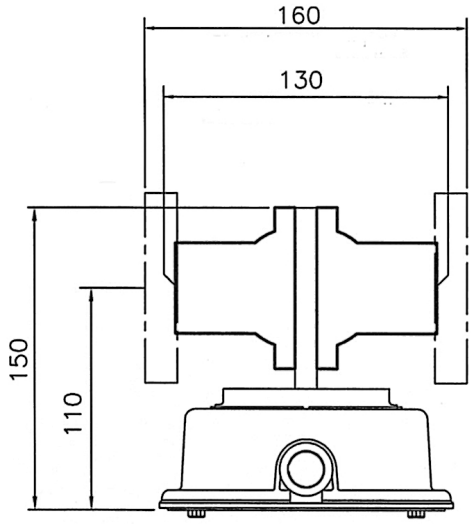
S1 = NBR (-40. . .+110 °C)
S2 = EPDM (-40. . .+150 °C)
S3 = FKM (-20. . .+200 °C)
S4 = PTFE (-100. . .+250 °C)
S5 = Perlast (-15. . .+330 °C)

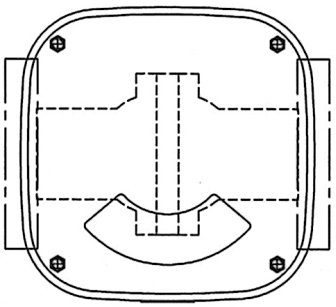
Flow directions /

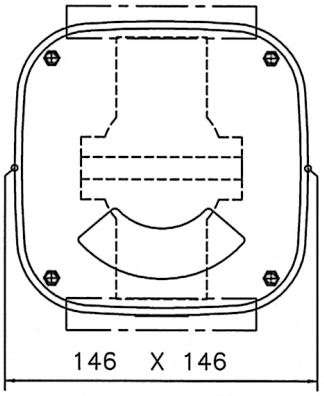
L = from left to right
R = from right to left
U = from bottom to top
O = from top to bottom

Dimensions FL-10 in mm:

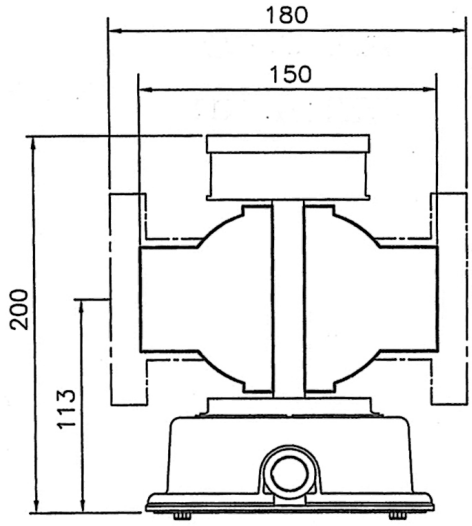
Size small (K)

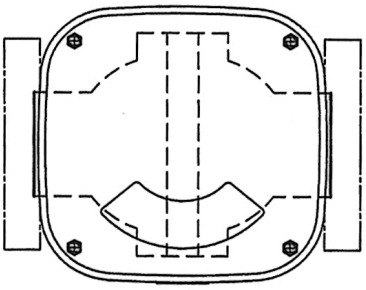


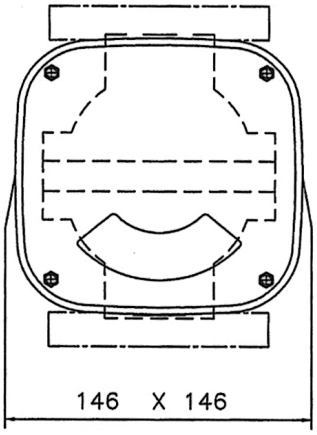




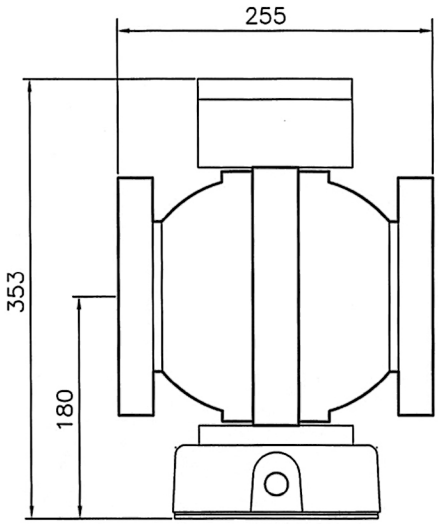
Size middle (M)

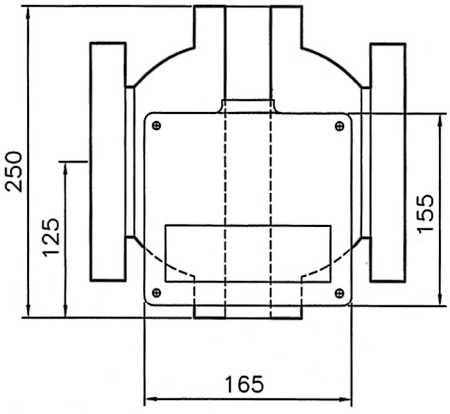


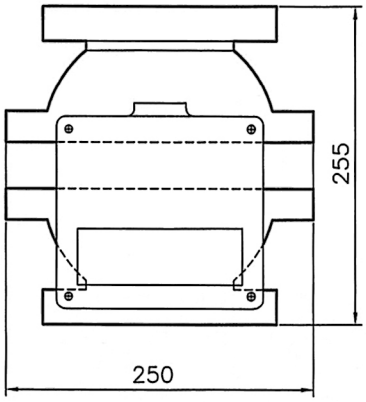




Size large (G)

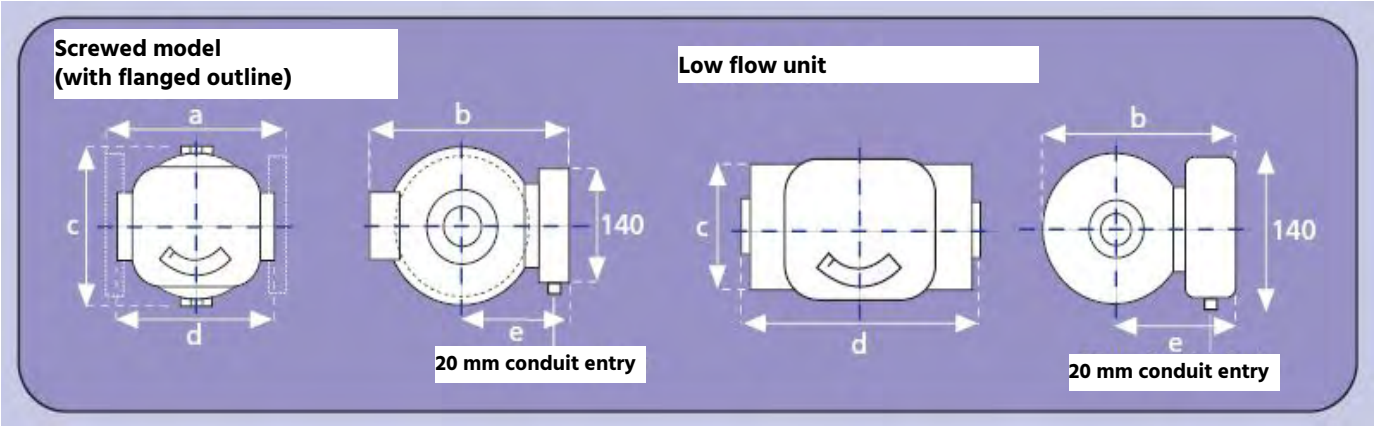






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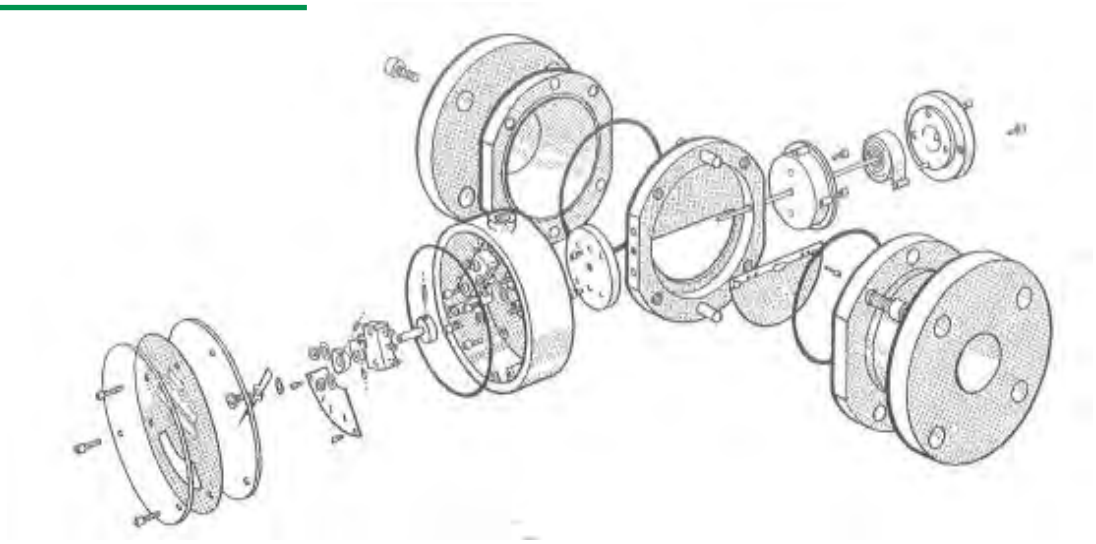
Dimensions and Weight:



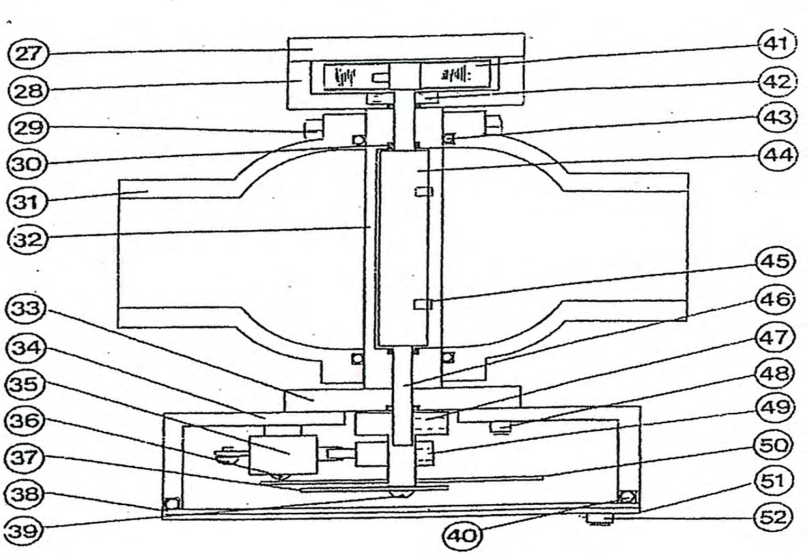
Pipe size	Overall dimension (mm)					Approximate Weight (kg)				
	a	b	c	d	e	AL	B	CI	S-SS	PVC
1/4" - 1"	n/a	155	100	188	110	3	8	-	8	3
1/4" - 1"	160	150	80	130	110	1	2	2	2	1
3/4 - 2"	180	200	120	150	115	3	7	7	7	3
2 1/2"	180	200	120	230*	115	5	10	10	10	4
3"	255	320	250	305*	160	20	54	50	54	15
4"	255	320	250	305*	160	23	60	56	60	17
6"	460	500	370	510*	280	60	200	175	200	n/a
8"	485	500	370	585*	280	68	225	200	225	n/a

***** obtained by mating flanges

Spares Data:



Item No.	Description
27.	Spring cover
28.	Spring housing
29.	Stud & nuts
30.	O-Ring (S1, S2, S3, S4)
31.	Bowl screwed/flanged AL, B, CI, CIK, S, SS, PVC
32.	Centre housing AL, B, CI, CIK, S, SS, PVC
33.	Mounting disc
34.	Enclosure Box
35.	Switch
36.	Screw
37.	Pointer
38.	Window
39.	Screw
40.	(a) Rear O-Ring (b) Front O-Ring
41.	Spring
42.	Bearing
43.	O-Ring (S1, S2, S3, S4)
44.	Valve plate
45.	Grub screw
46.	Spindle
47.	Indicator dial
48.	Screw
49.	Cam
50.	Dial plate
51.	Face plate
52.	Screw



Spares Kit

Item	Qty
30.	2 St
35.	1 St
36.	2 St
38.	1 St
40.	1 St
43.	2 St
52.	3 St

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SW-01

Miniature Variable Area Flowmeter and Switch

Features

/ Small dimensions for assembly

/ Brass and stainless steel versions

/ Scales for water and air

/ Mounting in any position

/ Highly accurate switching

/ Very low switching hysteresis

Description:

The SW-01 series of flowmeters and switches operates according to a modified variable area principle. Using a spring, the float is introduced into a cylindrical sight glass. The flowing medium moves the float in the direction of flow and the upper edge of the float indicates the flowing volume on the scale mounted on the sight glass. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move (maximum up to the stopper that prevents overriding of the operating range). This ensures a bistable switching action at any time.

Application:

The SW-01 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluid or gaseous media, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors and so on. In actual application, a switching hysteresis of only 0.5-1.5 mm float stroke has been achieved by careful selection of the reed contacts being used.

Ordering Codes:

Order number	SW-01.	1.	1.	1.	06.	1.	1.	1.	0

SW-01 Miniature Variable Area Flowmeter and Switch

Process connection /

1 = female thread G 1/4″
2 = female thread G 1/2″
3 = female thread G 3/4″
4 = female thread G 1″

Material /

1 = brass, spring stainless steel 1.4571
2 = stainless steel 1.4571

Scale /

1 = for water (20°C)
2 = for air (at 1.013 bar abs., 20°C)

Operating ranges / deactuation flow rates

	Water	Air
SW-01.1 only:		
00 =		0.2. . .1.3 Nl/min
01 =	5. . . 60 ml/min	0.5. . .2 Nl/min
02 =	25. . .130 ml/min	
02a =	60. . .300 ml/min	
03 =	0.1. . .0.6 l/min	0.8. . .3 Nl/min
04 =	0.2. . .1.2 l/min	1.5. . .5 Nl/min
05 =	0.4. . .2.0 l/min	2. . .8 Nl/min
06 =	0.5. . .3.0 l/min	3. . .12 Nl/min
07 =	1.0. . .5.0 l/min	3.5. . .14 Nl/min
08 =		5.5. . .20 Nl/min
09 =		7. . .24 Nl/min
10 =		10. . .35 Nl/min
10a =		10. . .42 Nl/min
SW-01.2 only:		
11c =	0.2. . .0.5 l/min	3. . .12 Nl/min
12c =	0.3. . .1.0 l/min	7. . .30 Nl/min
13c =	0.7. . .2.0 l/min	12. . .40 Nl/min
13d =		20. . .80 Nl/min
14c =	1.6. . .4.0 l/min	28. . .125 Nl/min
14a =		50. . .200 Nl/min
15c =	3.0. . .8.0 l/min	100. . .420 Nl/min
16c =	4.5. . .12.0 l/min	200. . .500 Nl/min
16d =	6.0. . .15.0 l/min	
17c =	8.0. . .20.0 l/min	
17d =	9.5. . .24.0 l/min	
17e =	12.0. . .28.0 l/min	
SW-01.3 or SW-01.4:		
18a =	8. . .30 l/min	
19 =	15. . .45 l/min	22.5. . .80 Nl/min
20 =	30. . .90 l/min	50. . .130 Nl/min
21 =		130. . .420 Nl/min
22 =		200. . .625 Nl/min
SW-01.4 only:		
21 =	60. . .150 l/min	

Number of contacts /

0 = none
1 = 1 contact
2 = 2 contacts

Contact functions /

0 = no contacts
1 = NO-contact
2 = change-over contact
3 = Ex m-change-over contact with 2 m infused cable
SW-01.3 and SW-01.4 only
4 = Ex m-NO-contact 2 m infused cable, SW-01.3 and SW-01.4 only
5 = change-over contact for PLC (not for SW-01.1)
6 = Ex ib-NO contact, SW-01.1 and SW-01.2 only
7 = Ex ib-change-over, SW-01.1 and SW-01.2 only

Electrical connection /

0 = none, if no contacts
1 = plug conn. DIN43650, counter plug incl.
2 = plug M12x1, counter plug incl. (-20. . .+85°C)
3 = 1 m infused cable (2 m for EX), (not for Ex ib-change-over contact)

Special issues /

0 = none
1 = please specify in detailed text

Technical Specifications:

Operating ranges /

H_2O: 5. . .60 ml/min to 60. . .150 l/min

air: 0.2. . .1.3 Nl/min to 200. . .625 Nl/min
(with refer. to 1.013 bar abs., 20°C)

Materials / brass- and stainless steel versions

Protection class / IP65 with plug DIN43650,
IP67 with cable connection or
plug M12x1, (ranges 18a-22, else IP65)

max. Pressure / SW-01.1 / SW-01.2: 16 bar
SW-01.3 / SW-01.4: 10 bar

Pressure drop / SW-01.1: 0.02. . .0.2 bar
SW-01.2: 0.02. . .0.3 bar
SW-01.3 / SW-01.4: 0.02. . .0.4 bar

max. Temp. / 100°C (160° optional)

El. Connection / plug as per DIN 43650 C

Accuracy / ± 10% of full scale value

Setpoint adjustment /

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

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Wetted parts:

Element	brass version	st. steel version
Window	Duran® 50	Duran® 50
Spring	st. steel 1.4571	st. steel 1.4571
Seals	NBR (optional FKM, EPDM)	NBR (optional FKM, EPDM)
Magnet	hard ferrite	hard ferrite
Other parts	brass nickel-plated	st. steel 1.4571

Dry parts:

Element	brass version	st. steel version
shell	aluminium, anodized	aluminium, anodized

Contacts (max. V):

Element	SW-01.1	SW-01.2	SW-01.3 / SW-01.4
NO-contact	150V, 1A, 20VA	230V, 1,5A, 60VA	250V, 3A, 100VA
Change-over	200V, 1A, 20VA (3)	230V, 1.5A, 50VA (2),(3)	250V, 1.5A, 50VA (2)
Ex m-NO (1)			250V, 2A, 60VA
Ex m-CO (1)			250V, 1A, 30VA
Change-over SPS		230V, 1A, 60VA	250V, 1A, 60VA
NO M12x1	125 V, 1A, 20VA	125 V, 1,5 A, 60VA	250V, 3A, 100VA
Change-over M12x1	125 V, 1A, 20VA	125 V, 1.5 A, 50VA (2)	250V, 1.5A, 50VA (2)
Ex ib-NO	see Table		
Ex ib-CO	see Table		

(1) ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db - (max. Amb.temp. 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db - (max. Amb.temp. 90°C)

(2) Minimum load 3VA

(3) Only with plug connection

EX ib NO contact and change-over contact

Gas			Dust		
Ui	Ii	Pi	Ui	Ii	Pi
< 12.1 V	1.0 A	3.0 W	< 12.1 V	0.25 A	0.75 W
< 20 V	0.309 A	1.55 W	< 20 V	0.25 A	0.75 W
< 25 V	0.158 A	0.99 W	< 25 V	0.25 A	0.75 W
< 30 V	0.101 A	0.76 W	< 30 V	0.25 A	0.75 W

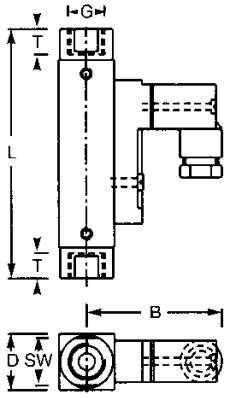
The switching units have to be connected only to intrinsically safe circuits.

Li = 0; Ci = 0
protection class with plug DIN 43650 C or plug M12: IP65
protection class with 1 m infused cable: IP67
marking: II 2G Ex ib IIC and II 2D Ex ib IIIC
operating temperature -5°C < TService < +45°C

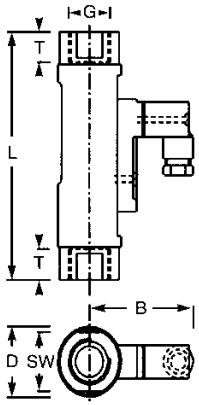
Dimensions in mm:

Type	SW	D	B	G	T	L	weight
SW-01.1	17	20	49	1/4"	10	90	140 g
SW-01.2	27	32	53	1/2"	14	114	300 g
SW-01.3	41	50	77	3/4"	18	139	850 g
SW-01.4	41	50	77	1"	18	158	900 g

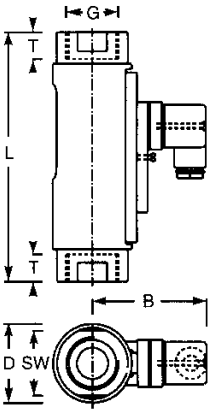
SW-01.1



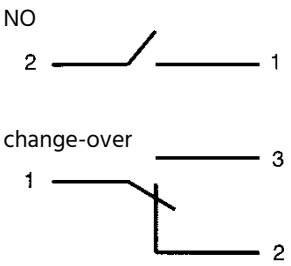
SW-01.2



SW-01.3/ SW-01.4

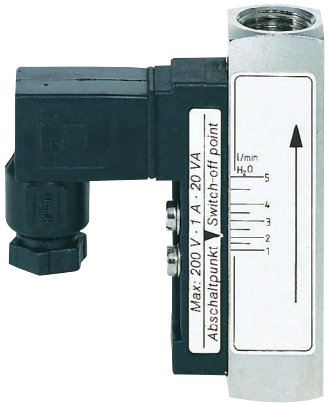


Electrical connection



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SW-02

Miniature Variable Area Flowswitch

Features

/ Small dimensions for assembly

/ Brass and stainless steel versions

/ Scales for water and air

/ Mounting in any position

/ Highly accurate switching

/ Very low switching hysteresis

Description:

The SW-02 series of flowswitches operates according to a modified variable area principle. Using a spring, the float is introduced into a cylindrical hole. The flowing medium moves the float in the direction of flow and the upper edge of the float corresponds to the scale mounted on the body of the SW-02. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move (maximum up to the stopper that prevents overriding of the operating range). This ensures a bistable switching action at any time.

Application:

The SW-02 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluid or gaseous media, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors, high-pressure cleaners and so on. In actual application, a switching hysteresis of only 0.5. . .1.5 mm float stroke has been achieved by careful selection of the reed contacts being used.

Ordering Codes:

Order number	SW-02.	1.	1.	1.	06.	1.	1.	1.	0

SW-02 Miniature Variable Area Flowswitch

Process connection /
1 = female thread G 1/4″
2 = female thread G 1/2″
3 = female thread G 3/4″
4 = female thread G 1″

Material /
1 = brass, spring stainless steel 1.4571
2 = fully stainless steel 1.4571

Scale /
1 = for water (20°C)
2 = for air (at 1.013 bar absolute, 20°C)

Operating ranges / deactuation flow rates

	Water	Air
SW-02.1 only:		
01 =	5. . .60 ml/min	0.6. . .2.2 Nl/min
02 =	40. . .130 ml/min	
03 =	0.1. . .0.6 l/min	1.7. . .6 Nl/min
04 =	0.2. . .1.2 l/min	2.5. . .8 Nl/min
05 =	0.4. . .2.0 l/min	3. . .12 Nl/min
06 =	0.5. . .3.0 l/min	3. . .22 Nl/min
07 =	1.0. . .5.0 l/min	7. . .24 Nl/min
08 =		12. . .34 Nl/min
09 =		16. . .56 Nl/min
10 =		20. . .80 Nl/min
SW-02.2 only:		
11 =	0.02. . .0.2 l/min	2.5. . .10 Nl/min
12 =	0.2. . .0.6 l/min	5.5. . .20 Nl/min
13 =	0.4. . .1.8 l/min	8. . .30 Nl/min
14 =	0.8. . .3.2 l/min	10. . .35 Nl/min
14b =		45. . .90 Nl/min
15 =	2. . .7 l/min	55. . .220 Nl/min
16 =	3. . .13 l/min	65. . .240 Nl/min
17 =	4. . .20 l/min	80. . .300 Nl/min
18 =	8. . .30 l/min	140. . .525 Nl/min
SW-02.3 or SW-02.4:		
18a =	10. . .30 l/min	
19 =	15. . .45 l/min	60. . .180 Nl/min
19a =	20. . .60 l/min	
20 =	30. . .90 l/min	100. . .300 Nl/min
21* =	60. . .150 l/min	200. . .650 Nl/min

Number of contacts /
1 = 1 contact
2 = 2 contacts

Contact function /
1 = NO-contact
2 = change-over contact
3 = Ex m-change-over contact, SW-02.2, SW-02.3 a. SW-02.4 only (always with 2m infused cable)
4 = Ex m-NO-contact, SW-02.2, SW-02.3 and SW-02.4 only (always with 2m infused cable)
5 = change-over contact for PLC (not SW-02.1)
6 = Ex ib-NO-contact, SW-02.1 and SW-02.2 only
7 = Ex ib-change-over-contact, SW-02.1 and SW-02.2 only

Electrical connection /
1 = plug DIN43650, counter plug incl.
2 = plug M12x1, counter plug incl. (-20. . .+85°C)
3 = 1 m infused cable (2 m for Ex), (not for Ex ib-change-over-contact)

Special issues /
0 = none

*** operating range 21 for water only as SW-02.4 with G1″-female threads**

Technical Specifications:

Operating ranges /	
H_2O:	5. . .60 ml/min to 60. . .150 l/min
Air:	0,6. . .2,2 Nl/min to 200. . .650 Nl/min (reference to 1,013 bar abs., 20°C)
Materials /	brass- and stainless steel versions
Protection class /	IP65 with plug DIN43650, IP67 with cable connection or plug M12 x 1, (ranges 18a-21, else IP65)
max. Pressure /	**Brass version:** 1/4″ 160 bar 1/2″ 100 bar (160 bar on request) 1/2″ 160 bar with flow indicator 3/4″ and 1″ 100 bar **Stainless steel version:** 1/4″ and 1/2″ 350 bar 3/4″ and 1″ 300 bar
Pressure drop /	SW-02.1: 0.02. . .0.2 bar SW-02.2: 0.02. . .0.3 bar SW-02.3: 0.02. . .0.4 bar SW-02.4: 0.02. . .0.4 bar
max. Temp. /	water 100°C air 120°C optional 160°C stainless steel only
Ambient temperature /	max. 70C°
El. connection /	plug as per DIN 43650
Accuracy /	± 10% of full scale value

Setpoint adjustment /

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

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Wetted Parts:

Element	brass version	st. steel version
Spring	st. steel 1.4571	st. steel 1.4571
Seals (1)	NBR (optional FKM, EPDM)	FKM (optional NBR, EPDM)
Magnet	hard ferrite	hard ferrite
Other parts	brass nickel-plated	st. steel 1.4571

(1) connection reductions only (SW-02.3)

Contacts (max. V):

Element	SW-02.1	SW-02.2	SW-02.3 / SW-02.4
NO-contact	200V, 1A, 20VA	230V, 1,5A, 60VA	250V, 3A, 100VA
Change-over	150V, 1A, 20VA (3)	230V, 1.5A, 50VA (2),(3)	250V, 1.5A, 50VA (2)
Ex m-NO (1)		250V, 2A, 60VA	250V, 2A, 60VA
Ex m-CO (1)		250V, 1A, 30VA	250V, 1A, 30VA (2)
Change-over SPS		230V, 1A, 60VA (3)	250V, 1A, 60VA
NO M12x1	125 V, 1A, 20VA	125 V, 1,5A, 60VA	250V, 3A, 100VA
Change-over M12x1	125 V, 1A, 20VA	125 V, 1.5A, 50VA (2)	250V, 1.5A, 50VA (2)
Ex ib-NO	see Table		
Ex ib-CO	see Table		

(1) ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db - (max. Amb.temp. 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db - (max. Amb.temp. 90°C)

(2) Minimum load 3VA

(3) Only with plug connection

EX ib NO and Change-over

Gas			Dust		
Ui	Ii	Pi	Ui	Ii	Pi
< 12.1 V	1.0 A	3.0 W	< 12.1 V	0.25 A	0.75 W
< 20 V	0.309 A	1.55 W	< 20 V	0.25 A	0.75 W
< 25 V	0.158 A	0.99 W	< 25 V	0.25 A	0.75 W
< 30 V	0.101 A	0.76 W	< 30 V	0.25 A	0.75 W

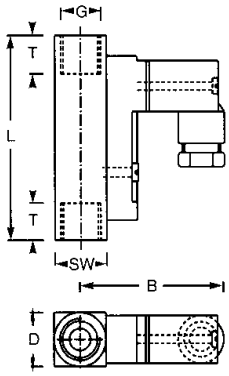
The switching units have to be connected only to intrinsically safe circuits.

Li = 0; Ci = 0
protection class with plug DIN 43650 C or plug M12: IP65
protection class with 1 m infused cable: IP67
marking: II 2G Ex ib IIC and II 2D Ex ib IIIC
operating temperature -5°C < TService < +45°C

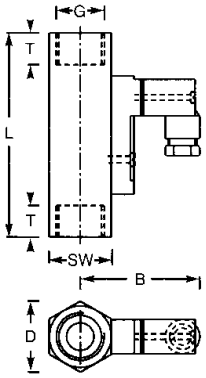
Dimensions in mm:

Type	SW	D	B	G	T	L	Weight
SW-02.1	18	18	48	1/4"	10	70	140 g
SW-02.2	27	31	52	1/2"	14	90	350 g
SW-02.3.1	34	47	79	3/4"	15	152	1240 g
SW-02.3.2	34	40	78	3/4"	15	152	1320 g
SW-02.4.1	41	47	79	1"	17	130	1030 g
SW-02.4.2	41	40	78	1"	17	130	1130 g

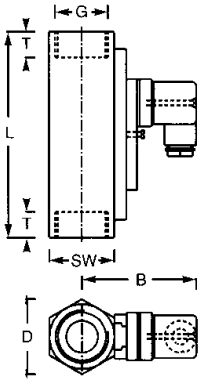
SW-02.1



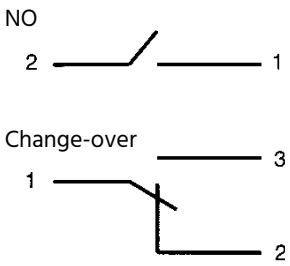
SW-02.2



SW-02.3 / SW-02.4



Electrical connection



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SW-03

Variable Area Flowmeter and Switch



Features

/ Compact design

/ Brass and stainless steel versions

/ Scales for water and air

/ Highly accurate switching

/ Very low switching hysteresis

/ Non-abrasive burnt-in scale on sight glass

Description:

The SW-03 series of flowmeters and switches operates according to a modified variable area principle. The float is introduced into a cylindrical slit nozzle. The flowing medium moves the float in the direction of flow and the upper edge of the float indicates the flowing volume on the scale mounted on the sight glass. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move maximum up to the stopper that prevents overriding of the operating range. This ensures a bistable switching action at any time.

Application:

The SW-03 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluid or gaseous media, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors and so on.

Ordering Codes:

Order number	SW-03.	1.	1.	1.	06.	1.	1.	1.	0

SW-03 Variable Area Flowmeter and Switch

Process connection /
1 = female thread G 1/4″
2 = female thread G 1/2″
3 = female thread G 3/4″
4 = female thread G 1″

Material /
1 = brass
2 = stainless steel 1.4571

Scale /
1 = for water (20°C)
2 = for air (at 1.013 bar abs., 20°C)

Operating ranges / deactuation flow rates

SW-03.1 and SW-03.2:	Water	Air
01 =	0.1. . .1.6 l/min	3. . .30 Nl/min
02 =	0.2. . .3 l/min	6. . .60 Nl/min
03 =	0.3. . .8 l/min	6. . .160 Nl/min
04 =	1. . .12 l/min	20. . .220 Nl/min
SW-03.2 and SW-03.3:		
05 =	2. . .18 l/min	40. . .360 Nl/min
SW-03.3 and SW-03.4:		
06 =	3. . .35 l/min	60. . .700 Nl/min
07 =	4. . .50 l/min	60. . .825 Nl/min
SW-03.4 only:		
08 =		200. . .1600 Nl/min

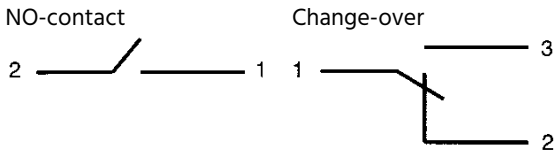
Number of contacts /
0 = none
1 = 1 contact
2 = 2 contacts

Contact function /
0 = no contacts
1 = NO-contact
2 = change-over contact
3 = Ex-change-over contact, (always with 2m infused cable)
4 = Ex-NO-contact, (always with 2m infused cable)
5 = change-over contact for PLC

Electrical connection /
0 = none, if no contacts
1 = plug DIN43650 shape A, counter plug incl.
2 = plug M12x1, counter plug incl. (-20. . .+85°C)
3 = 1 m infused cable (2 m for Ex)

Special issues /
0 = none
1 = please specify in detailed text

El. Connection:



Technical Specifications:

Protection class /	IP65 with plug IP67 with cable connection or with device plug M12x1
max. Pressure /	10 bar
Pressure drop /	0.01. . .0.2 bar
max. Temp. /	Water 100°C (160°C optional) Air 80°C
Ambient temperature /	max. 70 °C
El. Connection /	device plug as per DIN 43650 A
Accuracy /	Water ±5% of full scale value Air ±10% of full scale value
Op. ranges /	Water: 0.1. . .1.5 l/min up to 4. . .50 l/min Air: 3. . .30 Nl/min up to 200. . .1600 Nl/min (with reference to 1.013 bar abs., 20°C

Wetted parts:

Element	brass version	st. steel version
Window	Duran® 50	Duran® 50
Float	brass nickel-plated Air: POM	st. steel 1.4571 Air: POM
Seals	NBR (optional FKM, EPDM)	FKM (optional NBR, EPDM)
Other parts	brass nickel-plated	st. steel 1.4571

Dry parts:

Element	brass version	st. steel version
Shell	aluminium, anodized	aluminium, anodized

Contacts (max. V):

Contact function	
NO-contact, NO M12x1	250V, 3A, 100VA
Change-over, CO M12x1	250V, 1,5A, 50VA (2)
Ex m-NO (1)	250V, 2A, 60VA
Ex m-CO (1)	250V, 1A, 30VA (2)
Change-over PLC	250V, 1A, 60VA

(1) ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db
(max. Ambient temperature 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db
(max. Ambient temperature 90°C)

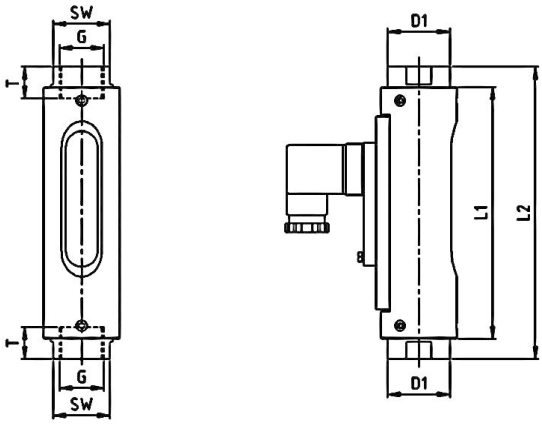
(2) Minimum load 3VA

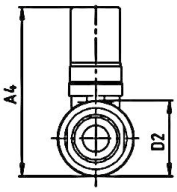
The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

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Dimensions in mm:

Type	SW	L1	L2	G	T	D1	D2	A4	Weight
SW-03.1.x.x.x	32	121	132	1/4"	10	35	43	96	800 g
SW-03.2.x.x.x	32	121	135	1/2"	14	35	43	96	800 g
SW-03.2.x.x.05	32	143	161	1/2"	14	35	43	96	800 g
SW-03.3.x.x.05	32	143	166	3/4"	15	35	43	96	960 g
SW-03.3.x.x.06/07	41	143	163	3/4"	15	45	50	104	1450 g
SW-03.4.x.x.06/07	41	143	181	1"	17	45	50	104	1450 g
SW-03.4.x.2.08	41	159	205	1"	17	45	50	104	1450 g





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SW-04

Variable Area Flowmeter and Switch

Features

/ Compact design

/ Brass and stainless steel versions

/ Scales for water and air

/ Highly accurate switching

/ Very low switching hysteresis

/ Robust design without glass measuring tube

/ Suitable for high operating pressures

Description:

The SW-04 series of flowmeters and switches operates according to a modified variable area principle The float is introduced into a cylindrical slit nozzle. The flowing medium moves the float in the direction of flow. An externally mounted indicator instrument is magnetically coupled with the float and indicates the flowing volume on the scale mounted on a scale. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move maximum up to the stopper that prevents overriding of the operating range. This ensures a bistable switching action at any time.

Application:

The SW-04 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluid or gaseous media, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors, pump circulation, high pressure installations and so on.

Ordering Codes:

Order number	SW-04.	1.	1.	1.	06.	1.	1.	1.	1.	0

SW-04 Variable Area Flowmeter and Switch

Process connection /
1 = female thread G 1/4″
2 = female thread G 1/2″
3 = female thread G 3/4″
4 = female thread G 1″

Material /
1 = brass
2 = fully stainless steel 1.4571

Scale /
1 = for water (20°C)
2 = for air (at 1.013 bar absolute, 20°C)

Operating ranges / deactuation flow rates

	Water	Air
SW-04.1 and SW-04.2:		
01 =	0,1. . .1,5 l/min	1. . .28 Nl/min
02 =	0,2. . .3 l/min	4. . .60 Nl/min
SW-04.2 only:		
03 =	0,3. . .8 l/min	6. . .160 Nl/min
04 =	1. . .12 l/min	20. . .240 Nl/min
SW-04.2 and SW-04.3:		
05 =	2. . .18 l/min	40. . .360 Nl/min
SW-04.3 and SW-04.4:		
06 =	3. . .35 l/min	60. . .700 Nl/min
07 =	4. . .50 l/min	
SW-04.4 only:		
08 =		200. . .1450 Nl/min

Flow display /
0 = only switch, no flow display
1 = flowmeter and switch with display instrument

Number of contacts /
0 = no contacts (for devices with display only)
1 = 1 contact
2 = 2 contacts

Contact function /
0 = no contacts (for devices with display only)
1 = NO-contact
2 = change-over contact
3 = Ex-change-over contact (always with 2m infused cable)
4 = Ex-NO-contact (always with 2m infused cable)
5 = change-over contact for PLC

Electrical connection /
0 = none, if no contacts
1 = plug DIN43650 shape A, counter plug incl.
2 = plug M12x1, counter plug incl. (-20°C...+85°C)
3 = 1 m infused cable (2 m for Ex)

Special issues /
0= none
1= please specify in detailed text

Technical Specifications:

Protection class /	IP65 with plug IP67 with cable connection or with device plug M12x1
max. Pressure /	brass version: 100 bar st. steel version: 300 bar
Pressure drop /	0,02. . .0,2 bar water 0,02. . .0,4 bar air
max. Temp. /	water 100°C (160°C optional stainless steel only) air 80°C
Ambient temp. /	max. 70°C
El. connection /	device plug as per DIN 43650 A
Accuracy /	water ±5% of full scale air ±10% of full scale
Measuring ranges /	**Water:** 0,1. . .1,5 l/min to 4. . .50 l/min **Air:** 1. . .28 Nl/min to 200. . .1450 Nl/min (for 1,013 bar abs., 20°C)

Contacts (max. V):

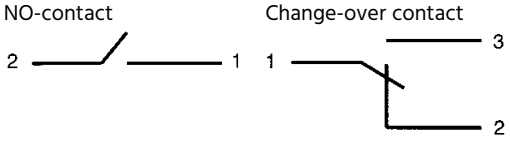
Contacts	
NO-contact, NO-contact M12x1	250V, 3A, 100VA
Change-over contact, COC M12x1	250V, 1,5A, 50VA (2)
Ex-NO-contact (1)	250V, 2A, 60VA
Ex-COC (1)	250V, 1A, 30VA (2)
Change-over contact PLC	250V, 1A, 60VA

(1) ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db (max. Ambient temperature 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db (max. Ambient temperature 90°C)

(2) minimum load 3VA

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

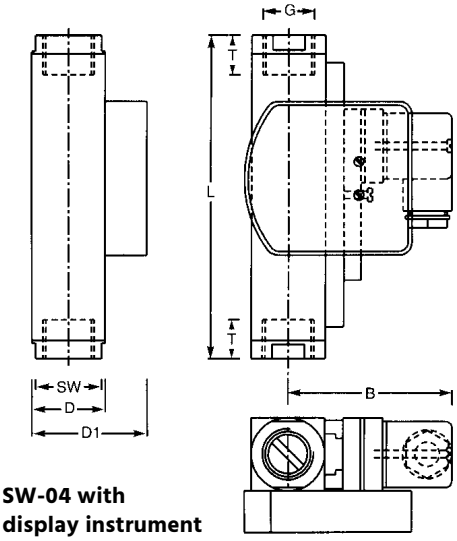
El. Connection:



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Dimensions in mm:

Type	SW	D	D1	B	G	T	L	weight	with Display
SW-04.1.x.x.x	27	32	47	71	1/4"	14	131	800 g	850 g
SW-04.2.x.x.x	27	32	47	71	1/2"	19	131	800 g	850 g
SW-04.2.x.x.05	27	32	47	71	1/2"	19	146	850 g	900 g
SW-04.3.x.x.05	32	35	47	71	3/4"	17	174	960 g	1010 g
SW-04.3.x.1.06	34	40	57	76	3/4"	18	182	1450 g	1500 g
SW-04.4.x.1.06	40	40	57	76	1"	19	156	1450 g	1500 g
SW-04.3.x.2.06	34	40	57	76	3/4"	18	182	1350 g	1400 g
SW-04.4.x.2.06	40	40	57	76	1"	19	156	1050 g	1100 g
SW-04.3.x.1.07	34	40	57	76	3/4"	18	182	1450 g	1500 g
SW-04.4.x.1.07	40	40	57	76	1"	19	156	1450 g	1500 g
SW-04.4.x.2.08	50	50	67	81	1"	20	200	2750 g	2800 g



SW-04 with display instrument

Wetted parts:

Element	brass version	st. steel version
Float	brass nickel-plated/POM	St. steel 1.4571/POM
Seals	NBR (optional FKM, EPDM)	FKM (optional NBR, EPDM)
Thread rings (SW-04.4)	brass	st. steel 1.4571
Centering washer	brass nickel-plated	st. steel 1.4571
Other parts	brass nickel-plated	st. steel 1.4571
Display instrument	macrolon	macrolon

Dry parts:

Element	brass version	st. steel version
shell	aluminium, anodized	aluminium, anodized

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SW-05

Variable Area Flowmeter and Switch, Mounting Position Independent



Features

/ Any mounting position, no need of recalibration
/ Compact design
/ Brass and stainless steel versions
/ Highly accurate switching
/ Very low switching hysteresis
/ Non-abrasive burnt-in scale on sight glass

Description:

The SW-05 series of flowmeters and switches operates according to a modified variable area principle. Using a spring, the float is introduced into a cylindrical slit nozzle. The flowing medium moves the float in the direction of flow and the upper edge of the float indicates the flowing volume on the scale mounted on the sight glass. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move maximum up to the stopper that prevents overriding of the operating range. This ensures a bistable switching action at any time.

Application:

The spring action and magnetic float ensure absolute functional safety. Due to the spring mounted inside that presses the float in the opposite direction of flow into its initial position, the device can be deployed in any mounting position. No readjustment is required as the artificially matured spring is under pretension. The SW-05 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluid, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors and so on.

Ordering Codes:

Order number	SW-05.	1.	1.	1.	06.	1.	1.	1.	0

SW-05 Variable Area Flowmeter and Switch

Connection /
1 = female thread G 1/4"
2 = female thread G 1/2"
3 = female thread G 3/4"
4 = female thread G 1"
5 = female thread G 1 1/4"

Material /
1 = brass, spring made of stainless steel 1.4571
2 = fully stainless steel 1.4571

Scale /
1 = for water (20°C)

Operating ranges / deactuation flow rates
SW-05.1 and SW-05.2:
01 = 0.2. . .4 l/min
02 = 0.5. . .6 l/min
03 = 0.5. . .8 l/min
04 = 0.5. . .14 l/min
SW-05.2 only:
04A = 2. . .22 l/min
05 = 1. . .28 l/min
SW-05.3 only:
06 = 1. . .45 l/min
SW-05.3 and SW-05.4:
07 = 2. . .80 l/min
07A = 6. . .90 l/min
SW-05.4 only:
08 = 6. . .110 l/min
SW-05.5 only:
09 = 15. . .150 l/min
10A = 50. . .220 l/min
11A = 50. . .250 l/min

Number of contacts /
0 = no contacts
1 = 1 contact
2 = 2 contacts

Contact function /
0 = none
1 = NO-contact
2 = change-over contact
3 = Ex-change-over contact (always with 2 m infused cable)
4 = Ex-NO-contact (always with 2 m infused cable)
5 = change-over contact for PLC

Electrical connection /
0 = none, if no contacts
1 = plug DIN43650 shape A, counter plug incl.
2 = plug M12x1, counter plug incl. (-20°C...+85°C)
3 = 1 m infused cable (2 m for EX)

Special issues /
0 = none
1 = please specify in detailed text

Technical Specifications:

Protection class /	IP65 with plug, IP67 with cable connection or with device plug M12x1
max. Pressure /	10 bar
Pressure drop /	0.02. . .0.8 bar
max. Temp. /	100°C (160°C optional)
El. connection /	device plug as per DIN 43650 A
Accuracy /	±5% of full scale value
Ranges /	0,2. . .4 l/min to 50. . .250 l/min water

Contacts (max. V):

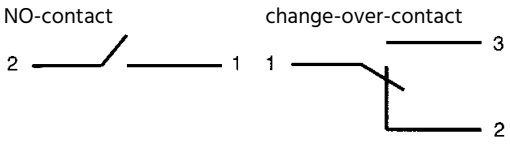
Contact function	
NO, NO M12x1	250V, 3A, 100VA
Change-over, change-over M12x1	250V, 1,5A, 50VA [2]
Ex-NO [1]	250V, 2A, 60VA
Ex-change-over [1]	250V, 1A, 30VA [2]
Change-over PLC	250V, 1A, 60VA

[1] ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db (max. Ambient temp. 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db (max. Ambient temp. 90°C)

[2] Minimum load 3VA

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

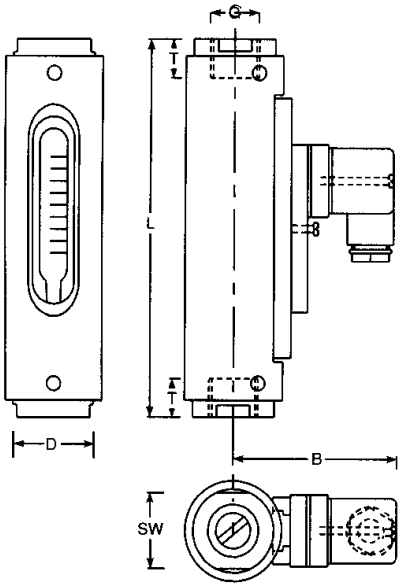
El. Connection:



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Dimensions in mm:

Type	SW	D	B	G	T	L	weight
SW-05.1.x.x.x	32	43	73	1/4"	14	132	625 g
SW-05.2.x.x.x	32	43	73	1/2"	15	135	625 g
SW-05.2.x.x.04A/05	32	43	73	1/2"	15	135	650 g
SW-05.3.x.x.06	32	43	73	3/4"	18	167	850 g
SW-05.3.x.1.07	41	50	76	3/4"	18	164	1000 g
SW-05.4.x.1.07A/08	41	50	76	1"	19	184	1000 g
SW-05.4.x.1.09	50	55	79	1 1/4"	21	216	1300 g
SW-05.5.x.1.10A	55	60	81	1 1/4"	21	210	1700 g
SW-05.5.x.1.11A	50	55	79	1 1/4"	21	222	1400 g



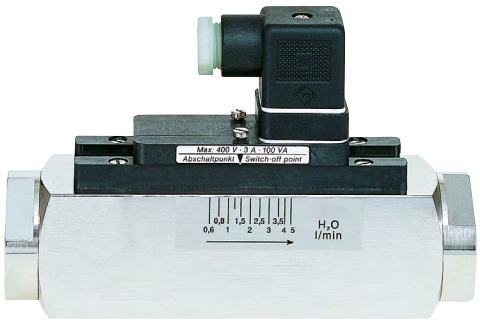
Wetted parts:

Element	brass version	st. steel version
Outer housing	aluminium, anodized	aluminium, anodized
Window	Duran® 50	Duran® 50
Spring	st. steel 1.4571	st. steel 1.4571
Seals	NBR (optional FKM, EPDM)	FKM (optional NBR, EPDM)
Other parts	brass nickel-plated	st. steel 1.4571

Dry parts:

Element	brass version	st. steel version
shell	aluminium, anodized	aluminium, anodized

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SW-06

Variable Area Flowmeter and Switch, Mounting Position Independent, High Pressure Type

Features

/ Any mounting position, no need of recalibration
/ Compact design
/ Brass and stainless steel versions
/ Highly accurate switching
/ Very low switching hysteresis
/ Robust design without sight glass
/ Suitable for high operating pressures

Description:

The SW-06 series of flowmeters and switches operates according to a modified variable area principle. The float is introduced into a cylindrical slit nozzle. The flowing medium moves the float in the direction of flow. An externally mounted indicator instrument is magnetically coupled with the float and indicates the flowing volume on the scale mounted on a scale. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move maximum up to the stopper that prevents overriding of the operating range. This ensures a bistable switching action at any time.

Application:

The spring action and magnetic float ensure absolute functional safety. Due to the spring mounted inside that presses the float in the opposite direction of flow into its initial position, the device can be deployed in any mounting position. No readjustment is required as the artificially matured spring is under pretension. The SW-06 series of variable area flowmeters and switches is intended for measuring and monitoring low-viscosity fluids, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors etc.

Ordering Codes:

Order number	SW-06.	1.	1.	1.	06.	1.	1.	1.	1.	0

SW-06 Variable Area Flowmeter and Switch

Process connection /
1 = female thread G 1/4″
2 = female thread G 1/2″
3 = female thread G 3/4″
4 = female thread G 1″
5 = female thread G 1 1/4″
6 = female thread G 1 1/2″

Material /
1 = brass, spring made of stainless steel 1.4571
2 = fully stainless steel 1.4571

Scale /
1 = for water (20°C)

Operating ranges / deactuation flow rates

SW-06.1 and SW-06.2:
01 = 0.2. . .4 l/min
03 = 0.6. . .5 l/min
04 = 0.5. . .8 l/min
05 = 1. . .14 l/min

SW-06.2 only:
06 = 1. . .28 l/min

SW-06.2 and SW-06.3:
07 = 2. . .40 l/min
08 = 4. . .55 l/min

SW-06.3 and SW-06.4:
09 = 1. . .70 l/min
10 = 8. . .90 l/min
11 = 5. . .110 l/min

SW-06.5 only:
12 = 10. . .150 l/min

SW-06.5 and SW-06.6:
13a = 35. . .220 l/min
14 = 35. . .250 l/min

Flow indicator /
0 = switch only, no flow indicator
1 = flowmeter and switch, with display instrument

Number of contacts /
0 = no contacts (for devices with indicator only)
1 = 1 contact
2 = 2 contacts

Contact function /
0 = no contacts (for devices with indicator only)
1 = NO-contact
2 = change-over contact
3 = Ex-change-over contact (always with 2 m infused cable)
4 = Ex-NO-contact (always with 2 m infused cable)
5 = change-over contact for PLC

Electrical connection /
0 = none, if no contacts
1 = plug DIN43650 shape A, counter plug incl.
2 = plug M12x1, counter plug incl. (-20°C...+85°C)
3 = 1 m infused cable (2 m for Ex)

Special issues/
0 = none
1 = please specify in detailed text

Attention: Please specify mounting position and direction of flow in detailed text.

Technical Specifications:

Protection class /	IP65 with plug, IP67 with cable connection or with device plug M12x1
max. Pressure /	brass version: 100 bar st. steel version: 300 bar
Pressure drop /	0.02. . .0.8 bar
max. Temp. /	100°C (160°C optional stainless steel only)
Ambient temp. /	max. 70°C
El. Connection /	device plug as per DIN 43650 A
Accuracy /	±5% of full scale value

Contacts (max. V):

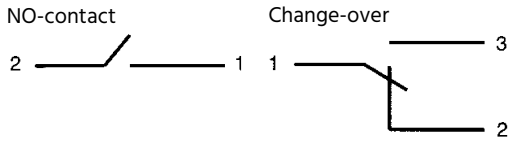
Contact function	
NO-contact	250V, 3A, 100VA
Change-over, CO M12x1	250V, 1.5A, 50VA [2]
Ex-NO [1]	250V, 2A, 60VA
Ex-Change-over [1]	250V, 1A, 30VA [2]
Change over PLC	250V, 1A, 60VA

[1] ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db (max. Ambient temperature 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db (max. Ambient temperature 90°C)

[2] Minimum load 3VA

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

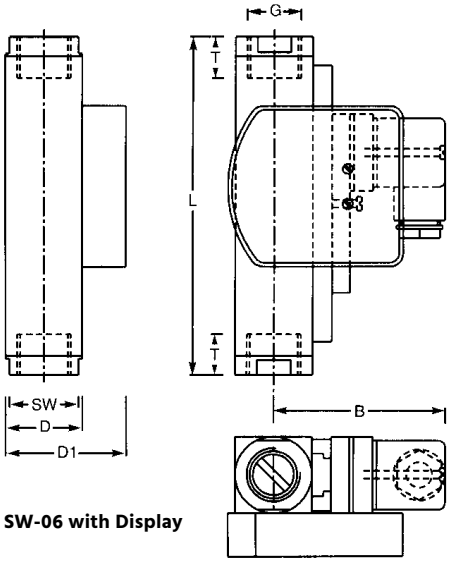
El. Connection:



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Dimensions in mm:

Type	SW	D	D1	B	G	T	L	Weight	with Display
SW-06.1.x.x.x	27	32	47	71	1/4"	14	131	850 g	900 g
SW-06.2.x.x.01-06	27	32	47	71	1/2"	14	131	850 g	900 g
SW-06.2.x.x.07/08	27	32	47	71	1/2"	14	146	900 g	950 g
SW-06.3.x.x.07/08	32	35	47	71	3/4"	16	174	900 g	950 g
SW-06.3.x.x.09-11	34	40	57	76	3/4"	18	182	1400 g	1450 g
SW-06.4.x.x.09-11	40	40	57	76	1"	19	156	1100 g	1150 g
SW-06.5.x.x.12	50	50	57	76	1 1/4"	21	200	2750 g	2800 g
SW-06.5.x.x.13a-14	50	50	67	81	1 1/4"	21	200	3000 g	3050 g
SW-06.6.x.x.13a-14	60	60	77	82	1 1/4"	24	200	3800 g	3850 g



SW-06 with Display

Wetted Parts:

Element	brass version	st. steel version
Outer housing	aluminium enodized	aluminium enodized
Spring	st. steel 1.4571	st. steel 1.4571
Seals	NBR (optional FKM, EPDM)	FKM (optional NBR, EPDM)
Other parts	brass nickel-plated	st. steel 1.4571
Thread rings (SW-06.4.x. . .SW-06.6.x)	brass	st. steel 1.4571
Centering washer (op. ranges 09. . .11)	brass nickel-plated	st. steel 1.4571
Display	macrolon	macrolon

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SW-07

Variable Area Flowmeter and Switch



Features

/ For viscous media from 30 cSt up to 600 cSt
/ Any mounting position, no need of recalibration
/ Compact design
/ Brass and stainless steel versions
/ Highly accurate switching
/ Very low switching hysteresis
/ Non-abrasive burnt-in scale on glass

Description:

The SW-07 series of flowmeters and switches operates according to a modified variable area principle. Using a spring, the float is introduced into a cylindrical slit nozzle. The flowing medium moves the float in the direction of flow and the upper edge of the float indicates the flowing volume on the scale mounted on the sight glass. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move maximum up to the stopper that prevents overriding of the connecting range. This ensures a bistable switching action at any time.

Application:

The spring action and magnetic float ensure absolute functional safety. Due to the spring mounted inside that presses the float in the opposite direction of flow into its initial position, the device can be deployed in any mounting position. No readjustment is required as the artificially matured spring is under pretension. The strong pretension of the spring in combination with an aperture in the float limit the effect of the medium's viscosity fluctuations to a minimum in comparison with other normal float flowmeters. The SW-07 series of variable area flowmeters and switches is intended for measuring and monitoring viscous fluids, for example, in centrally controlled lubrication systems, oil circulation lubrication systems, transformer oils and so on.

Ordering Codes:

Order number	SW-07.	1.	1.	1.	06.	1.	1.	1.	0

SW-07 Variable Area Flowmeter and Switch

Process connection /
1 = female thread G 1/4"
2 = female thread G 1/2"
3 = female thread G 3/4"
4 = female thread G 1"

Material /
1 = brass, spring made of stainless steel 1.4571
2 = fully stainless steel 1.4571

Scale /
1 = for viscous media from 30 cSt up to 600 cSt

Operating ranges / deactuation flow rates*

SW-07.2 only (small design):

03 =	0.5. . .1.7 l/min	
03a =	0.8. . .2.5 l/min	
04 =	1.3. . .4 l/min	
05 =	2.5. . .8 l/min	

SW-07.1 to SW-07.4:

06a =	0.1. . .0.8 l/min	(only up to 400 cSt)
07 =	0.5. . .1.5 l/min	
08 =	1. . .4 l/min	
09 =	2. . .8 l/min	(not 1/4")
10 =	3. . .10 l/min	(not 1/4")
11 =	5. . .15 l/min	(not 1/4")
12 =	8. . .24 l/min	(not 1/4")
13 =	10. . .30 l/min	(not 1/4" or 1/2")
14 =	15. . .45 l/min	(not 1/4" or 1/2")
15 =	20. . .60 l/min	(not 1/4" or 1/2")
16 =	30. . .90 l/min	(not 1/4" or 1/2")

Number of contacts /
0 = no contacts
1 = 1 contact
2 = 2 contacts

Contact function /
0 = no contacts
1 = NO-contact
2 = change-over contact
3 = Ex m-change-over contact, operating ranges 06a-16 (always with 2 m infused cable)
4 = Ex m-NO-contact, operating ranges 06a-16 (always with 2 m infused cable)
5 = change-over contact for PLC
6 = Ex ib-NO contact, operating ranges 03. . .05 only
7 = Ex ib-change-over, operating ranges 03. . .05 only

Electrical connection /
0 = none, if no contacts
1 = plug conn. DIN43650 shape A, counter plug incl.
2 = plug M12x1, counter plug incl. (-20. . .+85°C)
3 = 1 m fused cable (2 m for Ex), (not for Ex ib-change-over contact)

Special issues /
0 = none
1 = please specify in detailed text

*setpoints are valid for fluids with a specific weight of 0.9 kg/dm³

Technical Specifications:

Protection class /	IP65 with plug DIN43650, IP67 with cable connection or plug M12x1 (SW-07.3 and SW-07.4, else IP65)
max. Pressure /	16 bar operating ranges 03. . .05 10 bar operating ranges 06a. . .16
Pressure drop /	0.02. . .0.2 bar ranges 03. . .05 0.02. . .0.4 bar ranges 06a. . .16
max. Temp. /	120°C (160°C optional)
Ambient temperature /	max. 70°C
El. Connection /	device plug as per DIN 43650
Accuracy /	±10% of full scale value
Ranges /	0.1. . .0.8 l/min to 30. . .90 l/min for fluids with viscosity between 30. . .600 cSt

Contacts (max. V):

Contact function	
NO-contact ranges 03-05	230V, 1,5A, 60VA
NO-contact ranges 06a-16	250V, 3A, 100VA (1, 2)
CO-contact	230V, 1.5A, 50VA
Ex m-NO-contact ranges 06a-16	250V, 2A, 60VA (1, 2)
Ex m-CO-contact ranges 06a-16	250V, 1A, 30VA (1, 2)
CO-contact PLC	230V, 1A, 60VA (3)
NO-contact M12x1 ranges 03-05	125 V, 1,5A, 60VA
CO-contact M12x1 ranges 03-05	125 V, 1.5A, 50VA
NO-contact M12x1 ranges 06a-16	250 V, 3A, 100VA (1, 2)
CO-contact M12x1 ranges 06a-16	250 V, 1.5A, 50VA (1, 2)

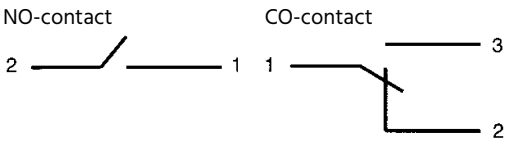
(1) ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db (max. Ambient temp. 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db (max. Ambient temp. 90°C)

(2) Minimum load 3VA

(3) ranges 03-05 only with plug connection

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

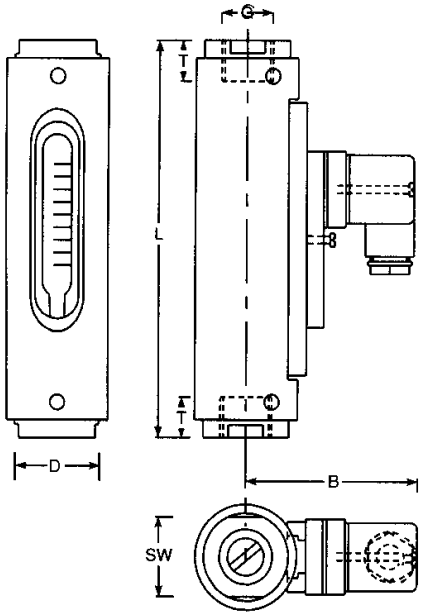
Electrical Connection:



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Dimensions in mm:

Type	SW	D	B	G	T	L	Weight
SW-07.1.x.x.x	41	45	74	1/4"	10	144.5	850 g
SW-07.2.x.x.03-05	27	30	54	1/2"	14	114	300 g
SW-07.2.x.x.06a-12	41	45	74	1/2"	14	144.5	850 g
SW-07.3.x.x.x	41	45	74	3/4"	15	138.5	850 g
SW-07.4.x.x.x	41	45	74	1"	17	158.5	850 g



Wetted parts:

Element	brass version	st. steel version
Magnets	hard ferrite	hard ferrite
Window	Duran® 50	Duran® 50
Spring	st. steel 1.4571	st. steel 1.4571
Seals	FKM (optional NBR, EPDM)	FKM (optional NBR, EPDM)
Other parts	brass nickel-plated	st. steel 1.4571

Dry parts:

Element	brass version	st. steel version
shell	aluminium, anodized	aluminium, anodized

EX ib NO contact and change-over contact

Gas			Dust		
Ui	Ii	Pi	Ui	Ii	Pi
< 12.1 V	1.0 A	3.0 W	< 12.1 V	0.25 A	0.75 W
< 20 V	0.309 A	1.55 W	< 20 V	0.25 A	0.75 W
< 25 V	0.158 A	0.99 W	< 25 V	0.25 A	0.75 W
< 30 V	0.101 A	0.76 W	< 30 V	0.25 A	0.75 W

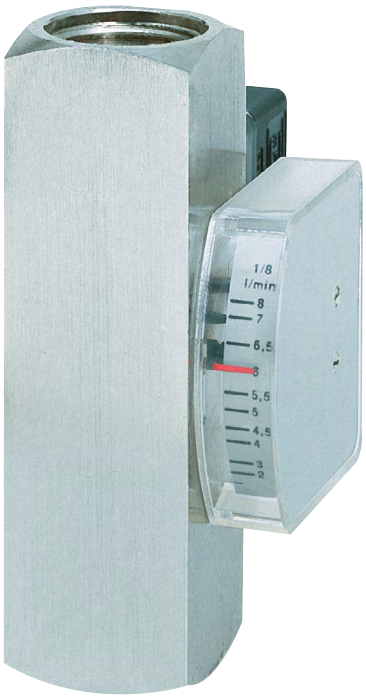
The switching units have to be connected only to intrinsically safe circuits.

Li = 0; Ci = 0
protection class with plug DIN 43650 C or plug M12: IP65
protection class with 1 m infused cable: IP67
marking: II 2G Ex ib IIC and II 2D Ex ib IIIC
operating temperature -5°C < TService < +45°C

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SW-08

Viscosity-Compensated Variable Area Flowmeter, independent of Mounting Position, High-Pressure Version



Features

/ For viscous media from 30 cSt up to 600 cSt
/ Any mounting position, no need of recalibration
/ Compact design
/ Brass and stainless steel versions
/ Highly accurate switching
/ Very low switching hysteresis
/ Robust design without sight glass
/ Suitable for high operating pressures

Description:

The SW-08 series of flowmeters and switches operates according to a modified variable area principle. The float is introduced into a cylindrical slit nozzle. The flowing medium moves the float in the direction of flow. An externally mounted indicator instrument is magnetically coupled with the float and indicates the flowing volume on a scale. A reed contact is situated outside the device. This reed contact is infused in a stepless adjustable housing and thus protected from external influences. When the float reaches along with its integrated magnet the position of the reed contact, the contact blades get closed. If the volume of flow is higher the float continues to move maximum up to the stopper that prevents overriding of the connecting range. This ensures a bistable switching action at any time.

Application:

The spring action and magnetic float ensure absolute functional safety. Due to the spring mounted inside that presses the float in the opposite direction of flow into its initial position, the device can be deployed in any mounting position. No readjustment is required as the artificially matured spring is under pretension. The strong pretension of the spring in combination with an aperture in the float limit the effect of the medium's viscosity fluctuations to a minimum in comparison with other normal float flowmeters. The SW-08 series of variable area flowmeters and switches is intended for measuring and monitoring viscous fluids, for example, in centrally controlled lubrication systems, oil circulation lubrication systems, transformer oils and so on.

Ordering Codes:

Order number	SW-08.	1.	1.	1.	06.	1.	1.	1.	1.	0

SW-08 Variable Area Flowmeter and Switch

Process connection /
1 = female thread G 1/4″
2 = female thread G 1/2″
3 = female thread G 3/4″
4 = female thread G 1″

Material /
1 = brass, spring stainless steel 1.4571
2 = stainless steel 1.4571

Scale /
1 = for viscous media from 30 cSt up to 600 cSt

Operating ranges / deactuation flow rates*
SW-08.2 only:
03 = 0.5. . .1.6 l/min (1/4" with adapter)
04 = 0.8. . .3 l/min
05 = 2. . .7 l/min
SW-08.4 only:
07 = 0.5. . .1.5 l/min (1/4", 1/2", 3/4" with adapter)
08 = 1. . .4 l/min (1/4", 1/2", 3/4" with adapter)
09 = 2. . .8 l/min (1/2" and 3/4" with adapter)
10 = 3. . .10 l/min (1/2" and 3/4" with adapter)
11 = 5. . .15 l/min (1/2" and 3/4" with adapter)
11a = 1. . .20 l/min (1/2" and 3/4" with adapter)
12 = 8. . .24 l/min (1/2" and 3/4" with adapter)
13 = 10. . .30 l/min (3/4" with adapter)
13a = 4. . .40 l/min (1/2" and 3/4" with adapter)
14 = 15. . .45 l/min (3/4" with adapter)
14a = 5. . .50 l/min (3/4" with adapter)
14b = 8. . .60 l/min (3/4" with adapter)
15 = 20. . .60 l/min (3/4" with adapter)
15a = 12. . .70 l/min
15b = 15. . .80 l/min
16 = 30. . .90 l/min
17 = 35. . .110 l/min
99 = Special operating range

Flow indicator /
0 = switch only, no flow indicator
1 = flowmeter and switch, with indicator

Number of contacts /
0 = none (for devices with indicator only)
1 = 1 contact
2 = 2 contacts

Contact function /
0 = no contacts (for devices with display only)
1 = NO-contact
2 = change-over contact
3 = Ex m-change-over contact (always with 2m infused cable)
4 = Ex m-NO-contact (always with 2m infused cable)
5 = change-over contact for PLC
6 = Ex ib-NO-contact, ranges 03. . .05 only
7 = Ex ib-change-over-contact, ranges 03. . .05 only

Electrical connection /
0 = none, if no contacts
1 = plug DIN43650, counter plug incl.
2 = plug M12x1, counter plug incl. (-20. . .+85°C)
3 = 1 m infused cable (2 m for Ex),(not for Ex ib-change-over-contact)

Special issues /
0 = none
1 = please specify in detailed text

*setpoints are valid for fluids with a specific weight of 0.9 kg/dm³

Technical Specifications:

Protection class /	IP65: plug conn. DIN 43650 IP67 with cable connection or plug connection M12x1 (SW-08.3 and SW-08.4, else IP65)
max. Pressure /	**Brass version:** 1/2" 100 bar (160 bar on request) 1/2" 160 with flow indicator 1" 100 bar **Stainless steel version:** 1/2" 350 bar 1" 300 bar
Pressure drop /	0.02. . .0.2 bar op. ranges 03. . .05 0.02. . .0.4 bar op. ranges 07. . .17
max. Temp. /	120°C (160°C optional stainless steel only)
Ambient temp. /	max. 70°C
El. connection /	device plug as per DIN 43650
Accuracy /	±10% of full scale value
Ranges /	0.5. . .1.5 l/min to 35. . .110 l/min with viscosity from 30. . .600 cSt

Contacts (max. V):

Element	SW-08.x.x.x.03-05	SW-08.x.x.x.07-17
NO-contact	230V, 1,5A, 60VA	250V, 3A, 100VA
Change-over	230V, 1.5A, 50VA (2) (3)	250V, 1.5A, 50VA (2)
Ex m-NO (1)	250V, 2A, 60VA	250V, 2A, 60VA
Ex m-CO (1)	250V, 1A, 30VA	250V, 1A, 30VA (2)
Change-over SPS	230V, 1A, 60VA (3)	250V, 1A, 60VA
NO M12x1	125 V, 1,5A, 60VA	250V, 3A, 100VA
Change-over M12x1	230V, 1.5A, 50VA (2)	250V, 1.5A, 50VA (2)

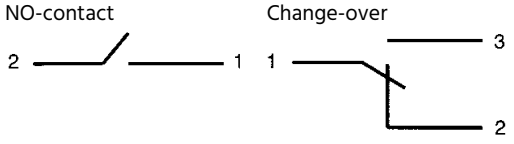
(1) ATEX II 2 G Ex mb IIC T6 Gb & ATEX II 2 D Ex tb IIIC T80°C Db (max. Amb.temp. 75°C)
ATEX II 2 G Ex mb IIC T5 Gb & ATEX II 2 D Ex tb IIIC T100°C Db (max. Amb.temp. 90°C)

(2) Minimum load 3VA

(3) ranges 03-05 with plug connection only

The contact opens respectively changes, when the upcoming flow falls below the adjusted setpoint.

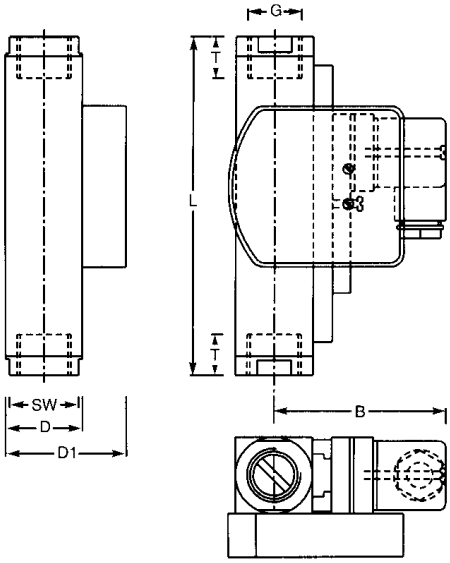
El. Connection:



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Dimensions in mm:

Type	SW	D	D1	B	G	T	L	weight	with display
SW-08.1.x.x.03.0	24	27,5	47	52	1/4"	10	98	400 g	620 g
SW-08.2.x.x.03-05.0	27	31	47	52	1/2"	14	90	350 g	570 g
SW-08.1.x.x.07-08.x	34	40	57	73	1/4"	10	152	1500 g	1590 g
SW-08.2.x.x.07-12.x	34	40	57	73	1/2"	14	152	1425 g	1515 g
SW-08.3.x.x.07-15.x	34	40	57	73	3/4"	15	152	1340 g	1430 g
SW-08.4.x.x.07-17.x	40	40	57	73	1"	17	130	1160 g	1250 g



Wetted parts:

Element	brass version	st. steel version
Window	brass nickel-plated	st. steel 1.4571
Spring	st. steel 1.4571	st. steel 1.4571
Seals	FKM (optional NBR, EPDM)	FKM (optional NBR, EPDM)
Other parts	brass	st. steel 1.4571
Magnet	hard ferrite	hard ferrite
Display instrument (non-wetted)	macrolon	macrolon

EX ib NO and Change-over

Gas			Dust		
Ui	Ii	Pi	Ui	Ii	Pi
< 12.1 V	1.0 A	3.0 W	< 12.1 V	0.25 A	0.75 W
< 20 V	0.309 A	1.55 W	< 20 V	0.25 A	0.75 W
< 25 V	0.158 A	0.99 W	< 25 V	0.25 A	0.75 W
< 30 V	0.101 A	0.76 W	< 30 V	0.25 A	0.75 W

The switching units have to be connected only to intrinsically safe circuits.

Li = 0; Ci = 0
protection class with plug DIN 43650 C or plug M12: IP65
protection class with 1 m infused cable: IP67
marking: II 2G Ex ib IIC and II 2D Ex ib IIIC
operating temperature -5°C < TService < +45°C

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ST-01

Analogue Transmitter for Variable Area Flowmeters from the SW series



Features

/ Additional analogue signal

/ Easy solution

/ Economic

Description:

The analogue transmitter ST-01 will be simply installed on the outside of a VA flowmeter. A hall-effect sensor detects the magnetic floaters position inside the measuring device and sends out an analog signal of 4. . .20 mA or 0. . .10 V. The signal can then be used by most common devices. The transmitter is installed and configured on new flowmeters from factory. It is available for any VA flowmeter of the SW-series (SW-01 to SW-08).

Application:

The ST-01 Signal can be used e.g. for alarm functions. Its main task, however, is to forward the current flow value with the signal.

Technical Specifications:

Accuracy /	± 1 % of full scale [1]
Operating temp. /	-20. . .70 °C
Storage temp. /	-20. . .80 °C
Repeatability /	tbd.
Housing /	aluminium, blue anodized (optional 1.4571)

[1] The actual accuracy depends on the flow sensor used. On request the accuracy of the flow sensor used can be significantly increased by a customized calibration.

Electrical Specifications:

Analog output /	4. . .20 mA or 0. . .10 V
Power supply /	24 VDC (19. . .30 VDC)
Power consumption /	< 1 W
Current output /	max. load 600 Ω
Power output /	max. current 10 mA
Connection /	round plug M12x1, 5-wire
Protection class /	IP 65 & IP 67

Connections:

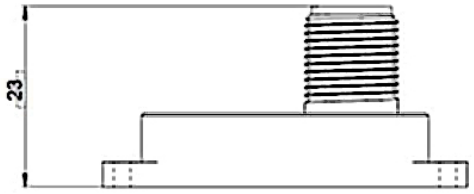


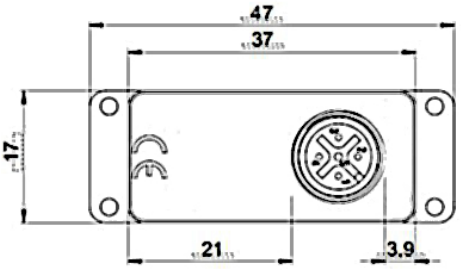
Attention: Pin 5 must not be electrically connected! We strongly recommend use of a four core cable.

Ordering Codes:

Order number	**ST-01**
ST-01 Analog transmitter	

Dimensions in mm:





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SM-06N

Variable Area Flowmeter made of Acrylic



Features

/ Local indication without auxiliary power supply
/ Excellent readability
/ Compact design
/ Scales for water and air
/ Process connection of brass or stainless steel
/ Optional with regulating valve
/ Accuracy class 3.0 or 5.0

Description:

SM-06 variable area flowmeters operate according to the variable area principle in which the measuring element such as a stainless steel ball can move in a conical flow tube in vertical direction. When the medium being measured begins to flow from bottom to top, the float, too, moves to top until a dynamic equilibrium of forces freezes it at a certain height. The position that the float reaches in this manner is proportional to the volume flow. The scale value that can be read at the center of the measuring ball, therefore, corresponds to the flow rate. If the excrescent volume of flow needs to be regulated, the SM-06 provides optionally a regulating valve to easily allow flow volume control.

Application:

Variable area flowmeters made of acrylic are a cost-effective alternative to glass-made devices. Especially users in the fields of:

- Machine construction
- Medical engineering
- Pharmaceutical industry
- Chemical industry and in
- Research & Development

Where flow indicators are used in large numbers for simple applications and maximum accuracy is not a decisive factor, stand to benefit from this. An important aspect while assembling these devices is that the flow must always be from bottom to top and the medium is free from abrasive solid particles which, otherwise, may cause scratches inside the plastic tube and render it opaque.

Technical Specifications:

Media / compatible gases and liquids

Process connection / 1/8"-IG NPT. Version 2: W80 and W81 GPM water have 1/4" NPT back-connections or 3/8" NPT end-connections. These versions aren't available with brass valves.

Mounting position / vertical

Weight / Version 1: 110. . .140g
Version 2: 200. . .250g

max. Pressure /

without valve: 6.9 bar at 65°C
10 bar at 38°C

with valve: 6.9 bar at 48°C

Accuracy / Version 1: 5% FS
Version 2: 3% FS

Wetted materials /

Housing: acrylic

O-ring: Buna-N (fluororubber on request)

Connections: depending on the valve, brass or stainless steel

Floating cone: depending on the range: st. steel, black glass, aluminium, monel K

Ordering Codes:

Order number	SM-06N.	1.	[][][].	A.	1

SM-06N Acrylic-Flow Meter

Version /
1 = 101.6 mm
2 = 165.1 mm

Operating Range /
[][][] = see table, depending on version

Valve /
0 = no valve (standard)
A = brass valve
B = stainless steel valve

Options /
9 = custom scale on request
1 = valve with PTFE seal
2 = wetted parts completely in st. steel
3 = fluororubber with O-rings

Meas. Ranges Version 1:

Measuring range SCFH air	Code
0.1. . .1	L10
0.2. . .2	L11
0.6. . .5	L12
1. . .10	L13
2. . .20	L14
4. . .30	L15
5. . .50	L16
10. . .100	L17
20. . .200	L18

Measuring range CC / min water	Code
6. . .50	W30
10. . .100	W31
20. . .200	W32

Measuring range LPM air	Code
0.06. . .0.5	L20
0.15. . .1	L21
0.6. . .5	L22
1. . .10	L23
3. . .25	L24
6. . .50	L25
10. . .100	L26

Measuring range GPH water	Code
0.6. . .5	W40
2. . .10	W41
3. . .20	W42
8. . .40	W43

Meas. Ranges Version 2:

Measuring range SCFH air	Code
0.3. . .3	L50
1. . .10	L51
2. . .20	L52
4. . .40	L53
10. . .100	L54
10. . .150	L55
20. . .200	L56

Measuring range SCFM air	Code
0,3. . .3	L57

Measuring range GPH water	Code
0.5. . .12	W70
1. . .20	W71
6. . .40	W72
6. . .60	W73

Measuring range LPM air	Code
0.2. . .4	L60
1. . .10	L61
1. . .20	L62
3. . .30	L63
4. . .40	L64

Measuring range GPM water	Code
0.2. . .2	W80*
0.5. . .5	W81*

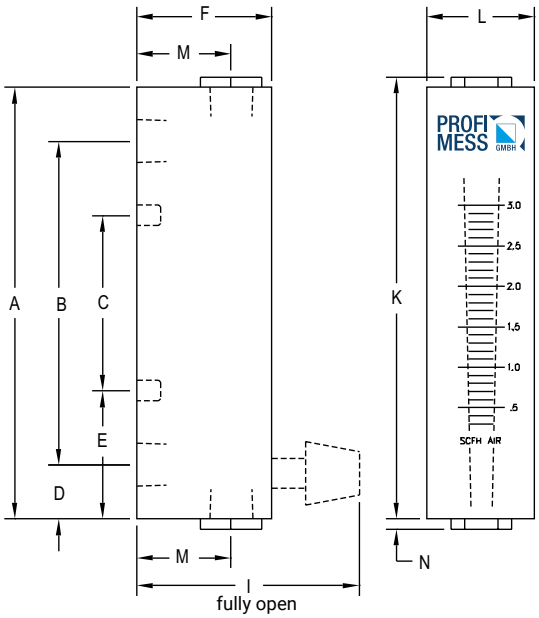
* not possible with brass valve or 1/4" NPT back-connection!

Measuring range CC / min water	Code
2. . .30	W99

Measuring range CC / min air	Code
100. . .1000	L99

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Dimensions in mm:



Length	Version 1	Version 2
A	101.6	165.1
B	76.2	139.7
C	41.28	88.9
D	12.7	12.7
E	30.16	38.1
F	31.75	31.75
I	52.39	52.39
K	104.0	169.9
L	25.40	34.93
M	22.23	22.23
N	2.381	2.381

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SM-10

Variable Area Flowmeter with Sight Glass for Small Flow Volumes



Features

/ Indication without power supply

/ For fluids and gases

/ Brass or stainless steel

/ With built-in needle valve

/ Alarm output on request

/ Accuracy class 1.0, 2.5 or 4.0

Description:

The SM-10 series of flowmeters operates according to the proven variable area principle. The flowing medium moves the float in a conical measuring tube in the opposite direction of gravitational force. The height of the float is a measure for the flow and it can be read from a non-abrasive and burnt-in scale. Optionally, inductive contacts fixed on the sight glass can be used for obtaining limit values. As a standard, all devices are equipped with a needle valve for precise regulation of flow.

Application:

The SM-10 series of variable area flowmeters is primarily intended for controlling and monitoring low-viscosity fluid or gaseous media. For standard conditions, scales for water or air are predefined and enable a quick and simple dimensioning of the devices. For other media or different process conditions specially customized scales are available.

Versions:

SM-10 Variable area Flowmeter with sight glas

SM-10.1: Design size 1, height: 111 mm, accuracy class 4.0

SM-10.2: Design size 2, height: 146 mm, accuracy class 2.5

SM-10.3: Design size 3, height: 196 mm, accuracy class 2.5

SM-10.4: Design size 4, height: 346 mm, accuracy class 1.0

Ordering Codes:

Order-no.	SM-10.	2.	1.	1.	1.	L01.	1.	1.	0

SM-10 Variable area Flow-meter with sight glass

Version /
1 = design size 1, accuracy class 4.0
2 = design size 2, accuracy class 2.5
3 = design size 3, accuracy class 2.5
4 = design size 4, accuracy class 1.0

Process connection /
1 = G 1/4"-female rear side
2 = NPT 1/4" rear side

Material /
1 = brass
2 = stainless steel

Gasket material /
1 = PTFE / FPM (standard)
2 = PTFE / FFKM

Operating range /
L01 - L22 = as per table „Operating ranges air"
W01 - W18 = as per table „Operating ranges water"
99 = special operating range

Valve /
0 = none
1 = valve at the inlet (standard)
2 = valve at the outlet (no backstroke ball)

Limit contacts /
0 = none
1 = 1 contact - Type A
2 = 2 contacts - Type A
3 = 1 contact - Type B
4 = 2 contacts - Type B

Options (multiple specs possible) /
0 = none
1 = switching panel assembly

/ Special type connections like hose spouts, SWAGELOK, ERMETO or others on request. For operating the limit contacts isolating circuit amplifiers KFA to SR2-Ex1.W for 1 contact or KFA to SR2-Ex2.W for 2 contacts are required. Technical specifications and prices on request.

Electrical Specifications:

Terminal connection /	connection box M16 x 1,5
Clamping range /	3 to 7 mm
Contact version /	2-wire
contact type A:	for ring diameter 10 mm
contact type B:	for ring diameter 15 mm
Contact function /	bistable
NAMUR /	yes
Nominal voltage U_0 /	8 VDC
Current consumption /	1 mA passage ↓ (1)
Current consumption /	3 mA passage ↑ (1)

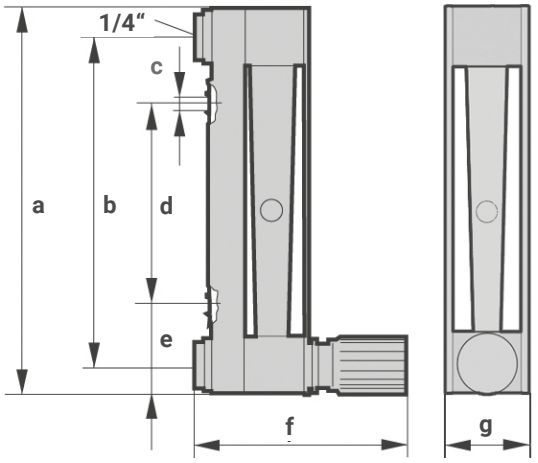
(1) For devices with the valve at the top (at the outlet), the function is inverted!

Technical Specifications:

Measuring principle /	variable area measuring principle
Measurement /	
primary:	float position
secondary:	operating and standard volumetric flow
Inflow, outflow lines /	none
max. Pressure /	10 bar
max. Media temperature /	
without contact:	-5. . .+100°C
with contact:	-5. . .+65°C
max. Ambient temp. /	
without contact:	-20. . .+100°C
with contact:	-20. . .+65°C
Accuracy /	SM-10.1: Class 4.0 SM-10.2: Class 2.5 SM-10.3: Class 2.5 SM-10.4: Class 1.0
Materials /	
Top/bottom fitting:	CrNi steel 1.4404 / 316 L or brass nickel-plated (Hastelloy ® optional)
Measuring tube:	borosilicate glass
Float (ball shape):	CrNi steel 1.4404 / 316 L (glass, POM, titanium, Hastelloy® C4 optional)
Float (cone shape):	CrNi steel 1.4404 / 316 L, alu, (PP)
Valve:	CrNi steel 1.4571 / 316 Ti
Valve spindle:	CrNi steel 1.4404 / 316 L
Gaskets:	PTFE / FPM (PTFE / FFKM optional)
Protective cover:	polycarbonate

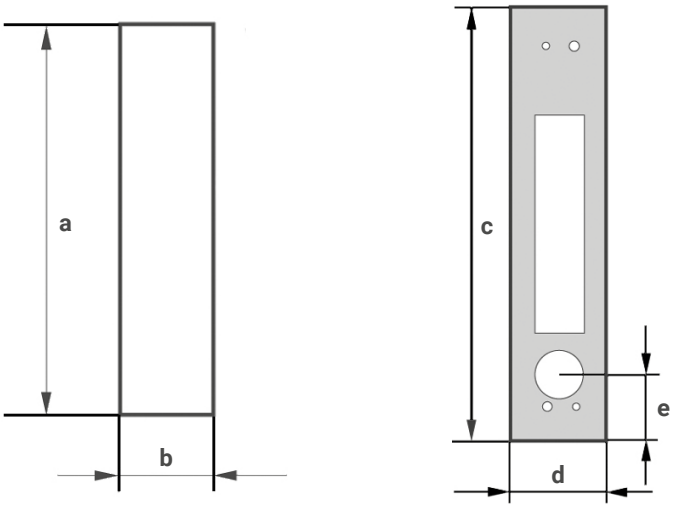
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Dimensions in mm:



Version	a	b ± 0,25	c	d	e	f ca.	g	weight (kg)
SM-10.1	111	90	4.3	45	33	82	28	0.4
SM-10.2	146	125	4.3	80	33	82	28	0.5
SM-10.3	196	175	4.3	130	33	82	28	0.6
SM-10.4	346	325	4.3	280	33	82	28	0.7

Dimensions of control-panel cutout and faceplate:



Version	a	b	c	d	e
SM-10.1	128	32	145	40	27.5
SM-10.2	163	32	180	40	27.5
SM-10.3	213	32	230	40	27.5
SM-10.4	363	32	380	40	27.5

Operating ranges Water and Contact option:

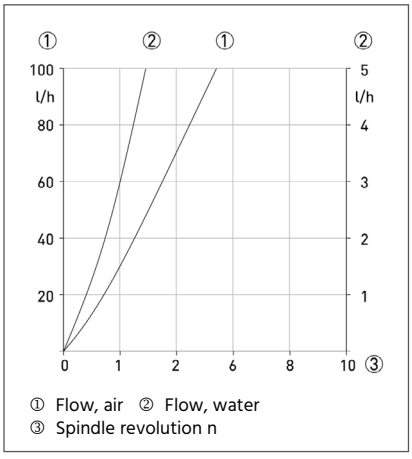
Operating range no.	Operating range l/h water	SM-10.1	Contact option	SM-10.2	Contact option	SM-10.3	Contact option	SM-10.4	Contact option
W01	0,04. . .0,4	-	-	-	-	-	-	$x^{2\,(1)}$	-
W02	0,063. . .0,63	-	-	-	-	-	-	x^2	-
W03	0,1. . .1	-	-	-	-	-	-	x^2	-
W04	0,16. . .1,6	-	-	-	-	-	-	x^2	A
W05	0,25. . .2,5	x	A	x	A	-	-	x^2	A
W06	0,4. . .4	-	-	-	-	-	-	x^2	A
W07	0,5. . .5	x	B	x	B	x	B	-	-
W08	0,63. . .6,3	-	-	-	-	-	-	x^2	A
W09	1. . .10	-	-	-	-	-	-	x^2	A
W10	1,2. . .12	x	B	x	B	x	B	-	-
W11	1,6. . .16	-	-	-	-	-	-	x^2	B
W12	2,5. . .25	x	B	x	B	x	B	x^2	B
W13	4. . .40	x	B	x	B	x	B	x^2	-
W14	6. . .60	x	B	x	B	x	B	-	-
W15	6,3. . .63	-	-	-	-	-	-	x^2	-
W16	10. . .100	x	B (min.)	x	B (min.)	x	B (min.)	x^2	-
W17	12. . .120	x	-	x	B (min.)	-	-	-	-
W18	16. . .160	x	-	x	B (min.)	-	-	-	-

x = available – = not available (1) = reduced accuray: 2.5 %
Contacts: The contact version is determined by the operating range.
(min.) = contact can be used as Min.-Contact only.

Float form: X =  X^1 =  X^2 = 

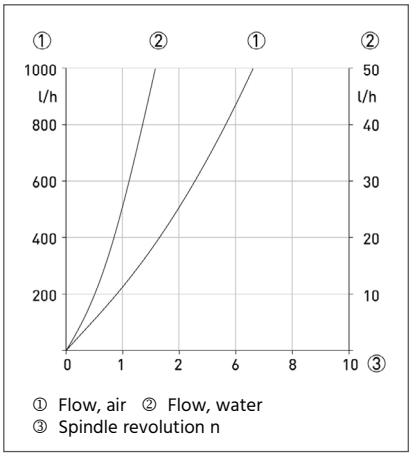
Valve characteristics:

Spindle Ø 1.0 mm



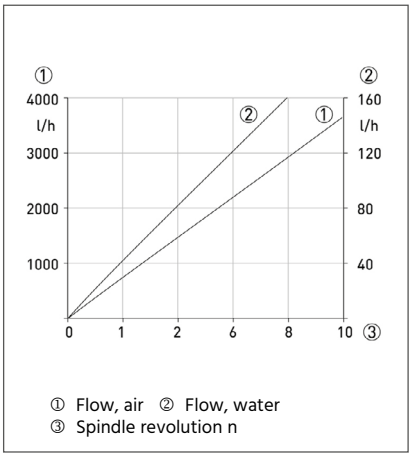
① Flow, air ② Flow, water
③ Spindle revolution n

Spindle Ø 2.5 mm



① Flow, air ② Flow, water
③ Spindle revolution n

Spindle Ø 4.5 mm

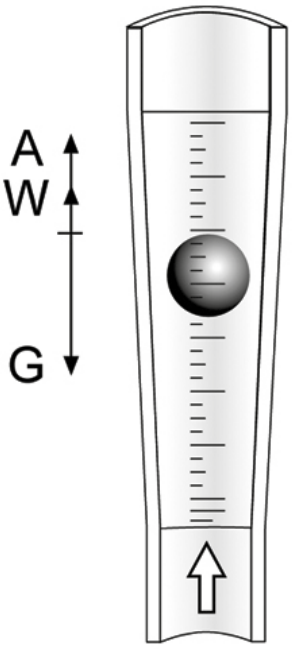


① Flow, air ② Flow, water
③ Spindle revolution n

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Operating ranges Air and Contact option:

Operating range no.	Operating range Nl/h air, 20°C, 1,2 bar abs.	SM-10.1	Contact option	SM-10.2	Contact option	SM-10.3	Contact option	SM-10.4	Contact option
L01	0,5. . .5	x[1]	A	x[1]	A	-	-	-	-
L02	0,8. . .8	x[1]	A	x[1]	A	-	-	-	-
L03	1,6. . .16	x	A	x	A	x[1]	A	x[2]	-
L04	2,5. . .25	-	-	-	-	-	-	x[2]	-
L05	4. . .40	x	A	x	A	x	A	x[2]	-
L06	6. . .60	x	A	x	A	x	B	x[2]	A
L07	9. . .90	-	-	-	-	-	-	x[2]	A
L08	10. . .100	x	B	x	B	x	B	-	-
L09	14. . .140	-	-	-	-	-	-	x[2]	A
L10	20. . .200	-	-	-	-	-	-	x[2]	A
L11	25. . .250	x	B	x	B	x	B	-	-
L12	30. . .300	-	-	-	-	-	-	x[2]	A
L13	50. . .500	x	B	x	B	x	B	x[2]	B
L14	80. . .800	x	B	x	B	x	B	x[2]	B
L15	100. . .1000	-	-	x	B	-	-	-	-
L16	120. . .1200	x	B (min.)	-	-	-	-	x[2]	-
L17	180. . .1800	-	-	x	B	-	-	-	-
L18	200. . .2000	-	-	-	-	-	-	x[2]	-
L19	240. . .2400	-	-	x	B	-	-	-	-
L20	300. . .3000	-	-	x	B (min.)	-	-	x[2]	-
L21	400. . .4000	-	-	x	B (min.)	-	-	-	-
L22	500. . .5000	-	-	x	B (min.)	-	-	-	-



Operating principle:

The flowmeter operates on the float measuring principle. The float adjusts itself so that the buoyancy force A, acting on it, the form drag W and its weight G are in balance:

G = A + W.

The height of the float is read on the scale of the measuring glass and indicates the flow rate. The top edge of the float marks the reading line for flow values.

Valve spindle	max. Flowrate		Valve characteristic value
	Water (20°C)	Air (20°C, 1.013 bar)	Cv
Ø [mm]	**[l/h]**	**[Nl/h]**	**[m³/h]**
1.0	5	100	0.018
2.5	50	1000	0.150
4.5	160	4300	0.480

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SM-12N

Conical Glass Flowmeter as per the Variable Area Principle



Features

/ For fluids and gases

/ Wide range of measuring

/ Easy to read scale

/ Low pressure drop

/ Turnable splinter shield

/ Optional limit switch

Description:

A float made of plastic or metal gets lifted by a fluid flowing vertically through a conical glass tube and set into rotation. Its upward movement stops at a point where the gravitational and dynamic forces become equal against each other. The body's position in the cone, therefore, depends of the flow with the result that the volume of flow can be read from the scale engraved on the sight glass.

Application:

Six different sight glass geometries and four different float materials allow a wide range of measuring with the SM-12N for all types of fluids and gases which are compatible with material being used. This data sheet provides an overview of possibilities for water and air at atmospheric state. Please ask us for different media, pressures or temperatures. The SM-12N series of variable area flowmeters is deployed wherever a volume of flow needs to be displayed without electrical means. Specially manufactured floats produce a negligible pressure drop. Often the advantage is that the characteristics of the material being measured can be assessed visually through the glass tube.

Technical Specifications:

Materials /

Process conn.:	AISI 316L - st. steel 1.4404
Housing:	AISI 304 - st. steel 1.4301
Nut:	AISI 316 - st. steel 1.4401 (or galvanized steel)
Stoppers:	PFA (tube L6, L7) PVDF, AISI 316L (tube P0-P4)
Measuring cone:	Borosilicate glass
Float: (see table 1+2)	Titan, PVDF (tube L6, L7) PTFE, PVDF (FDA conform), AISI 316Ti (1.4571) (tube P0-P4)
Sealing:	NBR (standard) FKM, EPDM (on request)

Pressure /

Measuring tube:	L6; L7	P0; P1	P2	P4
P_{max} [bar]:	16	10	8	6

Temperature /	-25. . .+100°C
Mounting length /	375 mm (thread, clamp), 425 mm (flange)
Weight /	1.7. . .7.1 kg (see Table 4)
Mounting position /	vertical, flow from bottom
Operating ranges /	0,002 l/h to 10 m^3/h water (20°C) 0,1 l/h to 160 m^3/h air (20°C, 1 bar abs.)
Range /	10:1 for P measuring tubes 20:1 for L measuring tubes
Accuracy / **(as per VDI 3513)**	Class 2.5 for tube L613-L623 Class 1.6 for tube L624-L747 Class 1.6 for tube P051-P471

Electrical Specifications:

Limit contact /	REED, bistable (potential-free)
Voltage /	230 V max.
Switching current /	2 A max.
Switching load /	40 VA or 40 W
Temperature /	-10. . .+70°C
Protection class /	IP65
Self-capacity /	0 nF
Self-inductivity /	0 mH
Connecting cable /	LIYY 2 x 0,34 mm^2, 1 m long
Housing /	Polystyrene
Weight /	35 g

Versions:

Operating range code: To determine the operating range code, the desired operating range is ascertained in the relevant tables (Table 1 for water and fluids; Table 2 for air and gases) and the code is determined according to the measuring tube, the float and the other listed criteria. For example, the code [P]-[0]-[51]-[SS]-[0]-[3]-[N] indicates the operating range of 10 to 100 l/h water, a float in stainless steel 1.4571 without preparation for a limit contact, this means, without magnets in the float.

Process connection: G female thread, NPT female thread, EN and ASME flanges in stainless steel are available as variants for the connection. The table 3 (Model specification) provides information as to which measuring tube can be fitted with which connection.

Valve: A number of device variants can be equipped with a regulating valve. Optionally, the valve can be made of brass or stainless steel. Depending on the version, the valve can be mounted at the inlet or outlet. The table 3 (Model specification) provides information as to which measuring tube can be combined with which valve. The valves are connected to the flowmeter on site.

Limit contact: All type P measuring tubes can be equipped with REED contacts which require a magnetic float (the operating range code takes this into regard). Optionally, MIN contacts (normally closed) or MAX contacts (normally open) are available.

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Table 1: Water/Fluids

Flow table		Operating range code (measuring tube and float combination)						
Water / Fluids 20°C		Measuring Tube			Float			
		-x	x	xx	-xx	x	x	x
max. Flow [l/h]	pressure drop *) [mbar]	Length Code	Diameter Code	Meas. tube conus Code	Material Code	Diameter Code	Flow ID Code	Insertion Code
0.025	1	L	6	13	TT	A 1)	L	N
0.04	1	L	6	14				
0.63	2	L	6	17				
0.1	2	L	6	21				
0.16	3	L	6	22				
0.25	4	L	6	23				
0.4	1	L	6	24	TT; PD	B	L	
0.63	1	L	6	27				
1	2	L	6	31				
1.6	3	L	6	32				
2.5	4	L	6	33				
4	2	L	7	34		C	L	
6.3	2	L	7	37				
10	3	L	7	41				
16	4	L	7	42				
25	5	L	7	43				
40	5	L	7	44		D	L	
63	10	L	7	47				
63	10	P	0	51	PD	0	2	M
100	16	P	0	52				
100	16	P	0	51	SS		3	M 2); N
160	24	P	0	52				
160	15	P	1	53	PD	1	2	M
250	16	P	1	54				
400	18	P	1	57				
630	26	P	1	61				
250	15	P	1	53	SS		3	M 2); N
400	16	P	1	54				
630	18	P	1	57				
1000	26	P	1	61				
1000	11	P	2	62	PD	2	2	M
1600	13	P	2	63				
1600	26	P	2	62	SS		3	M 2); N
2500	30	P	2	63				
2500	16	P	4	64	PD	4	2	M
4000	18	P	4	67				
6300	21	P	4	71				
4000	40	P	4	64	SS		3	M 2); N
6300	44	P	4	67				
10000	53	P	4	71				

Operating range Code		[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-
Tube length (Type)	300 mm	L						
	300 mm	P						
Tube diameter	10. . .81 mm		X					
Tube cone				XX				
Float material	st. Steel				SS			
	Titanium				TT			
	PTFE				PF			
	PVDF				PD			
Float Ø	1.6. . .54 mm					X		
Flow ID	for Fluids						L	
	for Water						2	
	for Water						3	
Float insertion	w/o Magnet							N
	with Magnet							M 2)

*) The specified pressure drop is merely a standard value and may be different depending on the diameter used.
1) Max. viscosity 2 mPas*s
2) For option limit switch

Table 2: Air/Gas

Flow table		Operating range code (measuring tube and float combination)						
Air / Gas 20°C, 1 bar abs.		Measuring Tube			Float			
		-x	x	xx	-xx	x	x	x
max. Flow [l/h]	pressure drop *) [mbar]	Length Code	Diameter Code	Meas. tube conus Code	Material Code	Diameter Code	Flow ID Code	Insertion Code
1.9	1	L	6	13	TT	A	G	N
3	1	L	6	14				
4.4	2	L	6	17				
6.5	2	L	6	21				
10	3	L	6	22				
14	4	L	6	23				
23	2	L	6	24	PD; TT	B	G	
33	2	L	6	27				
50	2	L	6	31				
70	3	L	6	32				
100	4	L	6	33				
180	3	L	7	34		C	G	
250	3	L	7	37				
400	3	L	7	41				
630	4	L	7	42				
1000	5	L	7	43				
1600	5	L	7	44		D	G	
2400	10	L	7	47				
1600	4	P	0	51	PF	0	6	
2500	6	P	0	52				
2400	8	P	0	51	PD	0	7	M 1)
3800	11	P	0	52				
6000	6	P	1	53	PD	1	7	M 1)
9300	7	P	1	54				
14500	8	P	1	57				
23000	10	P	1	61				
400	5	P	1	53	PF	1	6	N
6300	5	P	1	54				
10000	6	P	1	57				
16000	8	P	1	61				
35000	11	P	2	62	PD	2	7	M 1)
55000	13	P	2	63				
25000	8	P	2	62	PF	2	6	N
40000	10	P	2	63				
88000	29	P	4	64	PD	4	7	M 1)
140000	32	P	4	67				
220000	34	P	4	71				
63000	13	P	4	64	PF	4	6	N
100000	14	P	4	67				
160000	17	P	4	71				

Operating range Code		[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-	[ ]-
Tube length (Type)	300 mm	L						
	300 mm	P						
Tueb diameter	10. . .81 mm		X					
Tueb cone				XX				
Float material	Titanium				TT			
	PTFE				PF			
	PVDF				PD			
Float diameter Ø	1.6. . .54 mm					X		
Flow ID	for Gas						G	
	for Air						6	
	for Air						7	
Float insertion	w/o Magnet							N
	with Magnet							M 1)

*) The specified pressure drop is merely a standard value and may be different depending on the diameter used.
1) For option limit switch

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Ordering Codes:

Order number	SM-12N.	[]-[]-[]-[]-[]-[]-[].	1.	1.	1.	0.	0.	0

SM-12N Variable Area Flowmeter with Conical Glass

Operating range code from Table 1 or Table 2:

Process connection /
1 = female thread G (Code G0)
2 = female thread NPT (Code T0)
3 = flange EN-1092 B1 PN40 (Code D4)
4 = flange ASME B16.5 150 lbs (Code A1)
5 = on request: Clamp ISO 2852 (Code S4)

Process connection material /
1 = AISI 316L - stainless steel 1.4404 (Code SS)

Armature material /
1 = AISI 304 - stainless steel1.4301 (Code SS)

Valve /
0 = without valve (Code NNN)
1 = with valve, brass housing (Code VM) (1)
2 = with valve, stainless steel housing 1.4571 (Code VA) (1)

Limit contact /
0 = without contact
1 = MIN contact (NC, opening when the float reachs the setpoint) (2)
2 = MAX contact (NO, closing when the float reachs the setpoint) (2)

Options (multiple specifications possible) /
0 = none
1 = with isolated switching amplifier for limit contact 24 VDC
2 = with isolated switching amplifier for limit contact 230 VAC
3 = oil and grease free for applications with oxygen
4 = with flow table for conversion

(1) The valves are connected to the flowmeter on site (not for FDA). Other restrictions see table 3 (model specification).
(2) Only for tube P0 to P4 and float insertion code M (with magnet)

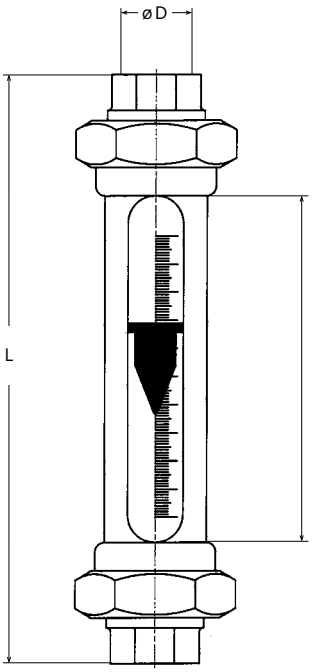
Table 3: Model specification

SM-12N without valve	Process connection				Connection material	Armature material	Valve	Measuring tube (length + diameter)
	Female thread		Flange					
	G	NPT	EN 1092-2 B1 PN40	ASME B16.5 150 lbs				
Diameter	Code	Code	Code	Code	Code	Code	Code	Code
1/2“	G0	T0	D4	A1	SS	SS	NNN	L6; L7; P0; P1
3/4“	G0	T0	-	-	SS	SS	NNN	L6; L7; P0; P1
1“	G0	T0	D4	A1	SS	SS	NNN	L6; L7; P0; P1; P2
1 1/2“	G0	T0	D4	A1	SS	SS	NNN	P2; P4
2“	-	-	D4	A1	SS	SS	NNN	P2; P4
2“	G0	T0	-	-	SS	SS	NNN	P4
2 1/2“	G0	T0	-	-	SS	SS	NNN	P4

SM-12N with valve	Process connection				Connection material	Armature material	Valve	Measuring tube (length + diameter)
	Female thread		Flange					
	G	NPT	EN 1092-2 B1 PN40	ASME B16.5 150 lbs				
Diameter	Code	Code	Code	Code	Code	Code	Code	Code
1/2“	G0	-	-	-	SS	SS	VM / VA	L6; L7; P0
1“	G0	-	-	-	SS	SS	VM / VA	P1
1 1/2“	G0	-	-	-	SS	SS	VM / VA	P2

Table 4: Installation lengths and weights

Conn. diameter	Process connection	Measuring tube	Length L [mm]	Weight [kg]
DN 15 (1/2“)	Female thread	L6; L7; P0; P1	375	1.7
	Clamp		375	1.9
	Flange		425	2.5
DN 20 (3/4“)	Female thread		375	1.7
DN 25 (1“)	Female thread	L6; L7; P0; P1	375	1.7
		P2		2.6
	Clamp	L6; L7; P0; P1		2.0
		P2		2.8
	Flange	L6; L7; P0; P1	425	3.3
		P2		3.9
DN 40 (1 1/2“)	Female thread	P2	375	2.6
		P4		7.1
	Flange	P2	425	5.2
		P4		8.7
DN 50 (2“)	Female thread	P4	375	7.1
	Flange	P2	425	6.6
		P4		11.1
DN 65 (2 1/2“)	Female thread	P4	375	7.1



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SM-15

Plastic Flowmeters as per the Variable Area Principle



Description:

The SM-15 series of flowmeters operates according to the proven variable area principle. The float gets lifted by the flowing medium and indicates the flow with its upper edge on the scale attached to the device. If floats with integrated magnets are used, optionally, alarm contacts or a measuring transmitter can be attached to the device. All devices possess a male thread on the measuring tube and are additionally equipped with standard PVC adhesive sleeves. As an option, also female threaded fittings made of PVC, PP, brass or stainless steel can be supplied.

Application:

Due to a wide variety of materials and easily interchangeable measurement scales, the SM-15 series plastic flowmeters can be deployed for most of media including hostile media. The main areas of application are water treatment, effluent technology, chemical and food-processing industries and many others.

Features

/ For every industrial application
/ For fluid and gaseous media
/ Simple and robust design with high operational safety
/ PVC, PA, PSU and PVDF versions
/ Low pressure drop
/ Easy to assemble
/ High resolution scale
/ Optional alarm contacts and analogue output

Technical Specifications:

Materials /

Measuring tube:	**PVC-U;** transparent **Polyamide;** transparent, with heavily reduced humidity absorption **Polysulfon;** transparent **PVDF;** opaque (yellowish-white)
Float:	PVDF, optional PVDF with integrated magnet (>1% lead of the REACH candidate list)
Seals:	EPDM, optional FPM
Tube connections:	PVC, optional PP, brass, st. steel

max. Pressure /

PVC:	10 bar at +20°C, 1 bar at +60°C
Polyamide:	10 bar at +30°C, 1 bar at +75°C
Polysulphone:	10 bar at +40°C, 1 bar at +100°C
PVDF:	10 bar at +40°C, 1 bar at +110°C

max. Temperature without joints at 1 bar /

PVC:	+60°C
Polyamide:	+75°C
Polysulphone:	+100°C
PVDF:	+110°C

max. Temperature with joints made of /

PVC:	+60°C
PP:	as per temperature parameters for the relevant measuring tube, but max. +80°C
Brass, st. steel:	as per temperature parameters for the relevant measuring tube

Mounting position /	vertical, flow from bottom to top
Assembly /	with moderation line 5-7 x DN before and after the device
Accuracy /	Cl. 4 as per VDI/VDE 3513, Bl. 2

Accessories /

Limit value switch:	bistable contacts, NO-contact or NC-contact function
Analogue output:	Measuring device with integrated measuring transmitter, 4. . .20 mA

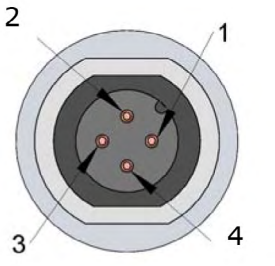
Attention: Limit contacts or measuring transmitters operate only in combination with a float with integrated magnet.

Meas. transmitter (optional):

Version /	reed chain
Housing material /	ABS
Assembly /	adjustable to dove-tail rail of the measuring tube
Supply voltage /	18. . .30 VDC
Analogue output signal /	4. . .20 mA, 2-wire (output can be calibrated/ set)
Electrical connection /	plug connection M12, 4-pole, with counter-plug angular 90°
Measuring length /	114 mm
Resolution /	3.5 mm
max. Operating temp. /	0. . .+70°C
max. Ambient temp. /	-20. . .+70°C
max. Ambient pressure /	atmospheric 0.8. . .1.1 bar
max. rel. Humidity /	20. . .85%
CE marking /	DIN EN 61326-1, DIN EN 55022/B
Protection class /	IP 65 (with plug)

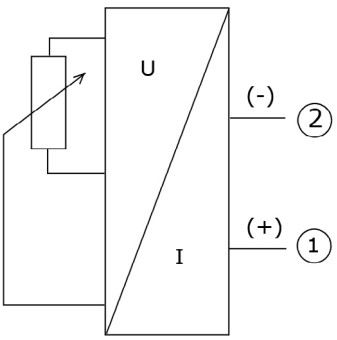
The optionally available measuring transmitter for the flowmeter SM-15 is clipped to the dove-tail rail mounted on the measuring tube. The unit comprises a reed chain, the respective evaluation and implementation. Thanks to the 2-wire technology voltage supply and output signal do not run separated from each other. The exact magnet field sensors of the receiver capture the height of the magnetic float and covert its position continually into a 4. . .20 mA output signal. This signal can be directly further processed.

M12 Plug



1. Signal (+)
2. Signal (-)
3. n.c.
4. n.c.

Wiring diagram



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Indicator Dimensions:

For the media water (in l/h) and air (in Nm^3/h) at relative operating pressures of 0, 1, 2 and 3 bar, standard scales are available.
For other media such as air at higher operating pressure, HCL (30%), NaOH (30%) and, for the units m^3/h, l/sec., l/min, USGPM or IGPM, special type scales can be supplied on request.

These supplementary special type scales can be attached later easily and reliably on the flowmeter. There is no need of any modifications to the measuring device.

For other media and/or operational conditions, special type scale can be offered on request.

For this, the following data is required:

- Medium
- Operating pressure
- Operating temperature
- Operating density
- Operating viscosity

Limit contacts (optional):

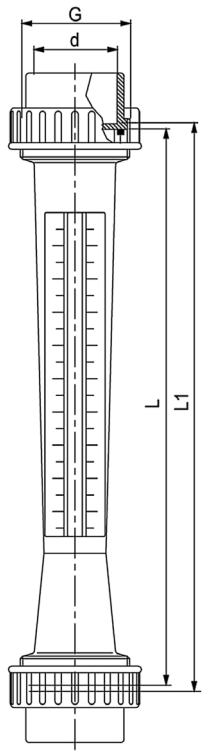
Version /	bistable reed contacts.
Contact function /	NO-contact or NC-contact for rising flow
Assembly /	adjustable to dove-tail rail of the measuring tube
Switching load /	max. 230 VAC, max. 0.5 A, max. 10 VA
Operating temp. /	0. . .+55°C
Hysteresis /	10 mm
Connection layout /	2-wire, irrespective of polarity

Operating Ranges (Table 1):

Measuring tube	Operating range					
		Water (l/h)	Air at +20°C (Nm^3/h) not for PVC measuring tubes			
			0 bar rel.	1 bar rel.	2 bar rel.	3 bar rel.
1	101	3. . .24	0.2. . .1	0.2. . .1.3	0.25. . .1.6	0.3. . .1.75
	102	5. . .60	0.2. . .2.5	0.4. . .3.2	0.2. . .3.8	0.3. . .4.4
	103	10. . .100	0.5. . .3.6	0.6. . .5	0.8. . .6	0.8. . .7
	104	25. . .250	0.5. . .9	1. . .13	1. . .16	1.5. . .18
2	201	5. . .50	0.4. . .2.8	0.4. . .3.2	0.5. . .4	0.5. . .4.5
	202	15. . .150	0.8. . .6.25	1. . .9	1. . .11	1.5. . .12
	203	25. . .250	0.9. . .9.5	1.5. . .13	2. . .17	2. . .20
	204	40. . .400	2. . .15	2. . .21	3. . .26	3. . .30
3	301	15. . .150	0.5. . .5.5	1. . .8.5	1. . .11	1. . .10.5
	302	40. . .400	2. . .14	2. . .20	3. . .26	4. . .30
	303	60. . .600	2.5. . .22	4. . .31	4. . .38	5. . .45
	304	100. . .1000	4. . .34	5. . .45	6. . .58	7.5. . .67.5
4	401	25. . .250	1. . .8	1.5. . .12	1.5. . .16	1.5. . .17
	402	40. . .400	2. . .14	2. . .20	3. . .26	3. . .30
	403	100. . .1000	4. . .34	4. . .46	5. . .55	6. . .66
	404	150. . .1500	5. . .50	6. . .70	7.5. . .90	7.5. . .100
6	603	60. . .600	2. . .21	3. . .30	4. . .36	4. . .40
	604	100. . .1000	3. . .34	5. . .50	5. . .60	5. . .70
	605	150. . .1500	5. . .50	5. . .70	7. . .85	8. . .100
	606	250. . .2500	7. . .80	10. . .110	10. . .140	15. . .160
	606a	200. . .2000	8. . .70	10. . .100	10. . .120	12. . .135
	606b	300. . .3000	10. . .100	14. . .125	20. . .160	20. . .190
	607	400. . .4000	14. . .125	20. . .170	15. . .220	20. . .250
	608	600. . .6000	20. . .200	30. . .280	30. . .380	40. . .400
	609	1000. . .10000	30. . .320	40. . .440	50. . .540	60. . .620
	610	1500. . .15000	50. . .500	80. . .800	80. . .800	102. . .880
	611	2500. . .25000	80. . .800	140. . .1240	140. . .1240	166. . .1400
	612	10000. . .50000	300. . .1600	600. . .2500	600. . .2500	700. . .2900

Types of connection (Table 2):

Measuring Tube



Measuring Tube (L in mm)	Pressure drop mbar Water / Air at 20°C	Range	AG (R)	Connecting joints					Conn. No.
				PVC-ad. sleeve standard (mm)	Female thread (G) PVC	PP	MS	VA	
					Material-No.				
			0	1	2	3	5	6	
1 **(165)**	3.3 / 4.8	101 102 103 104	3/4"	d: 16 DN: 10 L1: 171	3/8"	3/8"	3/8"	3/8"	**01**
2 **(170)**	2.5 / 4.3	201 202 203 204	1"	d: 20 DN: 15 L1: 176	1/2"	1/2"	1/2"	1/2"	**02**
3 **(185)**	6.1 / 8.3	301 302 303 304	1 1/4"	d: 25 DN: 20 L1: 191	3/4"	3/4"	3/4"	3/4"	**03**
4 **(200)**	6.1 / 8.3	401 402 403 404	1 1/2"	d: 32 DN: 25 L1: 206	1"	1"	1"	1"	**04**
6 **(350)**	12.3 / 15.9	603 604	1 1/2"	d: 32 DN: 25 L1: 356	1"	1"	1"	1"	**09**
	12.3 / 15.9	605 606	2"	d: 40 DN: 32 L1: 356	1 1/4"	1 1/4"	1 1/4"	1 1/4"	**10**
	12.3 / 15.9	606a 606b	2 1/4"	d: 50 DN: 40 L1: 356	1 1/2"	1 1/2"	1 1/2"	1 1/2"	**10b**
	22.2 / 27.1	607 608 609	2 3/4"	d: 63 DN: 50 L1: 356	2"	2"	2"	2"	**11**
	33.7 / 40	610 611 612	3 1/2"	d: 75 DN: 65 L1: 356	2 1/2"	2 1/2"	2 1/2"	2 1/2"	**12**

Other dimensions L and L1 for PVDF measuring tube

The connection code comprises Material and Connection No.

Example: PCV female thread G1 for measuring tube 6:
Material No. 2, Connection No. 09 · Connection code 209

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Ordering Codes:

Order number	SM-15.	2.	1.	202.	102.	1.	11

SM-15 Plastic Flowmeter

Material version (measuring tube) /
1 = PVC-U (only with scales for water)
2 = Polyamid
3 = Polysulfon
4 = PVDF

Scale /
1 = water
2 = air (0 bar rel.)
3 = air (1 bar rel.)
4 = air (2 bar rel.)
5 = air (3 bar rel.)
9 = Special scale type

Operating range /
101. . .612 = as per Table 1

Process connection /
as per Table 2

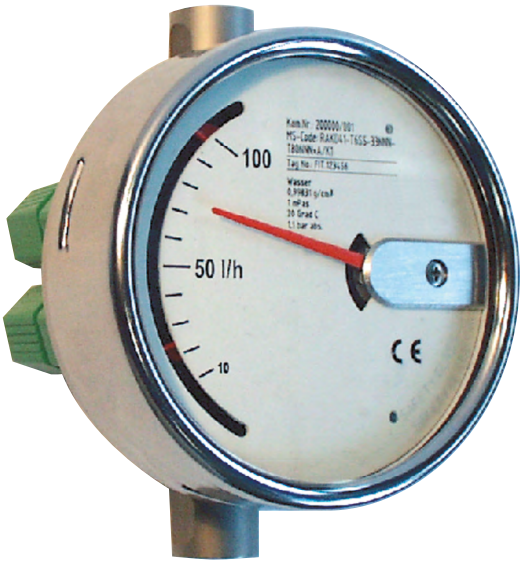
Float /
1 = PVDF (standard)
3 = PVDF with integrated magnet
(when using limit contacts or analogue output only)

Options /
00 = none
11 = 1 limit contact (NC-contact)
21 = 2 limit contacts (NC-contact)
12 = 1 limit contact (NO-contact)
22 = 2 limit contacts (NO-contact)
60 = measuring transmitter, 4. . .20 mA

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SM-20

Variable Area Flowmeter for Small Flow Volumes in Compact Design



Features

/ For fluids and gases
/ Operating pressures up to 400 bar
/ Operating temperatures up to 250°C
/ Scales for all operational conditions individually designed
/ Local display, MIN. MAX. contacts or analogue output
/ Measuring tube fully st. steel 1.4571
/ Optionally available with valve

Description:

The SM-20 series of flowmeters operates according to the proven variable area principle. The conical float is introduced into a cylindrical measuring tube. The flowing medium moves the float in the direction of flow. The movement of the float is magnetically transferred to a display unit situated outside the measuring tube. The display unit is provided with a scale that is designed to match the operational conditions. Additionally, it can also be equipped with contacts or an analogue output.

Application:

The SM-20 series of variable area flowmeters is intended for measuring and monitoring low-viscosity fluid or gaseous media, for example, in cooling systems for welding machines, laser and pipe installations, pump monitoring, compressors and so on. Due to the fact that for all wetted parts high quality stainless steel 1.4571 has been used, the device is excellently suited for even hostile media.

Technical Specifications:

Materials / wetted parts made of stainless steel 1.4571
housing made of 1.4301

max. Pressure / PN 100 (standard), PN 10, 40, as per ordering codes (higher pressures up to 400 bar on request)

max. Temperature /

- local display: -25. . .+250°C (+150°C with valve)
- with contacts: -25. . .+135°C
- with analogue output: -25. . .+ 65°C (lower temperatures on request)

Protection class / IP 66/67

Accuracy / ± 4% of operating range value

Options / Ex-approval, pulse output

Contact /

- Type: inductive (as per DIN EN 60947-5-6) SC2-NO
- Nominal voltage: 8 VDC
- Output signal: ≤ 1 mA or ≥ 3 mA
- Hysteresis: < 0.5mm

Analogue output /

- Supply: 14. . .30 VDC
- Output: 4. . .20 mA
- Load resistance: (U-14V) / 20 mA, 500Ω max.
- El. connection: quick connect QUICKON
- Pulse output: available on request
- Ex-Version: available on request

Ranges:

No. of operating range	Water 20°C - l/h	Air 20°C. 1.013 bar abs. Nl/h	Pressure drop mbar
1 (W/A)	0.1. . .1	4. . .40	6
2 (W/A)	0.16. . .1.6	6. . .60	6
3 (W/A)	0.25. . .2.5	10. . .100	6
4 (W/A)	0.4. . .4	15. . .150	6
5 (W/A)	0.6. . .6	20. . .200	6
6 (W/A)	1. . .10	32.5. . .325	8
7 (W/A)	1.6. . .16	50. . .500	8
8 (W/A)	2.5. . .25	80. . .800	8
9 (W/A)	4. . .40	140. . .1400	11
10 (W/A)	6. . .60	200. . .2000	11
11 (W/A)	10. . .100	325. . .3250	11
12 (W/A)	16. . .160	500. . .5000	13
13 (W/A)	25. . .250	800. . .8000	13

Attention: For versions without valve, operating ranges 12 and 13 come with connection joints 3/8" (Code 42...)

Ordering Codes:

Order number	SM-20.	41G4.	4W.	0.	1.	0

SM-20 Variable Area Flowmeter

Process connection /

41G4 =G 1/4 female, PN40
41G6 =G 1/4 female, PN100
41T4 = 1/4"NPT-female, PN40
41T6 = 1/4"NPT-female, PN100
53C4 = cutting ring joint 6 mm, PN40
53C6 = cutting ring joint 6 mm, PN100
53P1 = hose spout 6 mm, PN10
54C4 = cutting ring joint 8 mm, PN40
54C6 = cutting ring joint 8 mm, PN100
54P1 = hose spout 8 mm, PN10
55C4 = cutting ring joint 10 mm, PN40
55C6 = cutting ring joint 10 mm, PN100
56C4 = cutting ring joint 12 mm, PN40
56C6 = cutting ring joint 12 mm, PN100
01D4 = flanges DN15 PN40
02D4 = flanges DN25 PN40
01A1 = flanges ANSI 1/2", 150 lbs RF (only operating ranges 12 and 13 without valve)
02A1 = flanges ANSI 1", 150 lbs RF (only operating ranges 12 and 13 without valve)
01A2 = flanges ANSI 1/2", 300 lbs RF (only operating ranges 12 and 13 without valve)
02A2 = flanges ANSI 1", 300 lbs RF (only operating ranges 12 and 13 without valve)

Operating range, air (A) or water (W) /

1. . .13 = as per table, for example 4W (0.4. . .4 l/h water)
99 = special operating range

Valve /

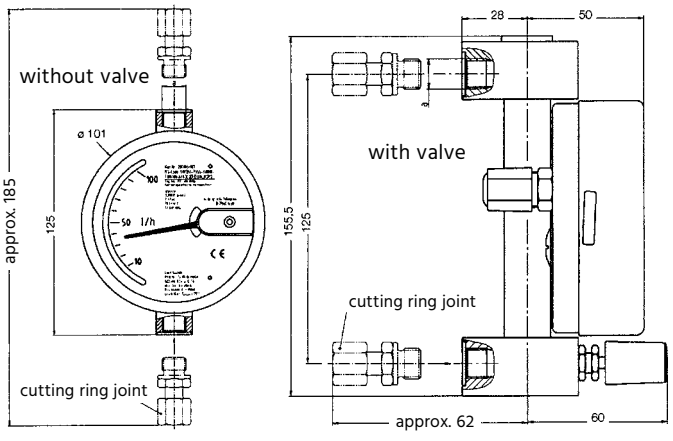
0 = none
1 = valve at inlet, valve seat silver
2 = valve at inlet, valve seat PCTFE
3 = valve at outlet, valve seat silver
4 = valve at outlet, valve seat PCTFE

Display unit /

1 = local indicator
2 = local indicator, 1 MIN contact
3 = local indicator, 1 MAX contact
4 = local indicator, 1 MIN, 1 MAX contact
5 = local indicator, analogue output 4. . .20 mA

Options /

0 = none
9 = please specify in detailed text



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SM-25

Variable Area Flowmeter with Flange Connection, Irrespective of Viscosity



Features

/ For fluids and gases

/ Operating pressures PN16, PN40, PN63, PN100 as standard, higher pressures up to 700 bar on request

/ Operating temperatures up to +370°C

/ Scales for all operational conditions, individually designed

/ Local display, MIN. MAX. contacts or analogue output

/ Measuring tube fully st. steel 1.4404

/ Optionally with PTFE lining

Description:

The SM-25 series of flowmeters operates according to the proven variable area principle. The float is introduced into a conical measuring tube where the medium's viscosity has nearly no effect on the float's movement. The flowing medium moves the float in the direction of flow. The movement of the float is magnetically transferred to a display unit situated outside the measuring tube. The display unit is provided with a scale that is designed to match the operational conditions. Additionally, it can also be equipped with contacts or an analogue output.

Application:

The SM-25 series of variable area flowmeters is intended for measuring and monitoring fluid or gaseous media of any type. Due to the fact that for all wetted parts high quality stainless steel 1.4404 has been used, the device is excellently suited for hostile media as well as for use in the food-processing industry (by using Tri-Clamp or milk tube joints).

How to order:

1. **Choose a version**
2. **Select the desired process connections from the Table „Process connections“**
3. **Select the operating range as per the Tables „Operating ranges“**
4. **Select the display component and the desired output signals**
5. **Determine the required options**

1. Versions

Depending on the medium the SM-25 series of flowmeters is available in fully stainless steel 1.4404 (SM-25.1) or with PTFE lining versions for all wetted parts (SM-25.2).

Other materials such as Monel, Hastelloy, tantalum are available on request (SM-25.9).

Technical specifications:

Measurable media /	fluids, steam and gases
Operating ranges /	see tables 3a and 3b
Ratio of op. range /	10 : 1
Accuracy /	
SM-25.1:	Class 1.6 (DN15 - DN100)
SM-25.1:	Class 2.5 (DN125 - DN150)
SM-25.2:	Class 2.5 (DN15 - DN100)
Process connection /	siehe Tabelle „Prozessanschlüsse“
max. Pressure /	see Table „Process connections“ (op. pressures up to 700 bar on request)
Operating temperature /	
SM-25.1:	-180. . .370°C
SM-25.2:	-80. . .130°C (Note max. operating temperatures of display unit and possible options)
Materials /	
SM-25.1:	all wetted parts are st. steel 1.4404, (AISI 316 L)
SM-25.2:	all wetted parts are st. steel 1.4404, (AISI 316 L) with PTFE coating
Mounting position /	vertical
Direction of flow /	from bottom
Mounting length /	see Table „Process connections“
Straight inlet /	
DN 15-65:	none
DN 80-100:	min. 5D
Protection class /	IP 66 with stainless steel housing IP 66 with aluminium housing IP 66/67 NEMA 4, 4x, 6 (not available for Ex d housings)

Ordering Codes:

Order no.	SM-25.	1.	121.	1.	321.	1.	0.	104

SM-25 Variable area flowmeter

Version /
1 = st. steel version
2 = wetted parts PTFE-coated

Process connection /
101. . .678 = process conn. as per Table 2
999 = special connection (please specify in detailed text)

Media /
1 = water / fluids
2 = air / gas
3 = steam (please specify operating conditions)

Operating range /
101. . .666 = operating range as per Table 3
999 = special range (please specify in detailed text)

Housing design /
0. . .2 = housing material as per Table 4a

Contact components /
0. . .5 = contacts as per Table 4b

Analogue output and Supply voltage /
1. No:
0. . .3 = analogue output as per Table 4c

2.-3. No:
00. . .13 = supply voltage as per Table 4d

Please specify optional specifications in detailed text /

Ordering details /

1. **Model number as per Ordering codes**
2. a. Name of the medium
   b. Temperature
   c. Pressure
   d. Viscosity
   e. Density
3. **For gases:** point of reference
4. **Options:**
   a. Model number as per list of options
   b. Customer-specific instructions

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2. Process Connections

DN	Process connection	Measuring-tube No.	Connection Code No.	Mount-length L (mm)
15 (½″)	Flange DN15 PN40 B1	1	101	250
	Flange ANSI ½″ 150 lbs.	1	102	250
	Flange ANSI ½″ 300 lbs.	1	103	250
	G ½″ female PN40	1	104	295
	½″ NPT female PN40	1	105	295
	Flange DN15 PN100 B2	2	206	250
	R ½″ female PN25	2	209	295
	½″ NPT female PN25	2	210	295
20 (¾″)	Flange DN20 PN40 B1	1	111	250
	Flange ANSI ¾″ 150 lbs.	1	112	250
	Flange ANSI ¾″ 300 lbs.	1	113	250
	R ¾″ female PN25	1	114	295
	¾″ NPT female PN25	1	115	295
	Flange ANSI ¾″, 150 lbs.	2	217	250
	Flange ANSI ¾″, 300 lbs.	2	218	250
	G ¾″ female PN40	2	219	295
	¾″ NPT female PN40	2	220	295
25 (1″)	Flange DN25 PN40 B1	1	121	250
	Flange ANSI 1″ 150 lbs.	1	122	250
	Flange ANSI 1″ 300 lbs.	1	123	250
	Thread socket DN25 PN40 (male) as per DIN 11851	1	126	275
	Tri-Clamp DN25 / 1	1	127	250
	Flange DN25 PN40 B1	2	228	250
	Flange ANSI 1″ 150 lbs.	2	229	250
	Flange ANSI 1″ 300 lbs.	2	230	250
	Thread socket DN25 PN40 (male) as per DIN 11851	2	233	275
	Tri-Clamp DN25 / 1″	2	234	250
	Flange DN25 PN40 B1	3	335	250
	Flange ANSI 1″, 150 lbs.	3	336	250
	Flange ANSI 1″, 300 lbs.	3	337	250
	R 1″ female PN16	3	338	310
	1″ NPT female PN16	3	339	310
32 (1 ¼″)	Flange DN32 PN40 B1	1	140	250
	Tri-Clamp DN32	1	141	250
	Flange DN32 PN40 B1	2	242	250
	Flange ANSI 1 ¼″ 150 lbs.	2	243	250
	Flange ANSI 1 ¼″ 300 lbs.	2	244	250
	Tri-Clamp DN32	2	245	250
	Flange ANSI 1 ¼″, 150 lbs.	3	347	250
	Flange ANSI 1 ¼″, 300 lbs.	3	348	250
	G 1 ¼″ female PN40	3	349	310
	1 ¼″ NPT female PN40	3	350	310

DN	Process connection	Measuring-tube No.	Connection Code No.	Mount-length L (mm)
40 (1 ½″)	Tri-Clamp DN40 / 1 ½″	1	151	250
	Tri-Clamp DN40 / 1 ½″	2	252	250
	Flange DN40 PN40 B1	3	353	250
	Flange ANSI 1 ½″, 150 lbs.	3	354	250
	Flange ANSI 1 ½″ 300 lbs.	3	355	250
50 (2″)	Flange DN50 PN40 B1	3	356	250
	Flange ANSI 2″ 150 lbs.	3	357	250
	Flange ANSI 2″ 300 lbs.	3	358	250
	Thread socket DN50 PN25 (male) as per DIN 11851	3	359	275
	Tri-Clamp DN50 / 2″	3	360	250
	Flange DN50 PN40 B1	4	461	250
	Flange ANSI 2″ 150 lbs.	4	462	250
	Flange ANSI 2″ 300 lbs.	4	463	250
	R 2″ female PN10	4	464	325
	2″ NPT female PN10	4	465	325
65 (2 ½″)	Thread socket DN65 PN25 (male) as per DIN 11851	4	466	275
	G 2 ½″ female PN40	4	467	325
	2 ½″ NPT female PN40	4	468	325
80 (3″)	Thread socket DN80 PN25 (male) as per DIN 11851	4	469	275
	Tri-Clamp DN65 / 3″	4	470	300
	Flange DN80 PN40 B1	5	571	250
	Flange ANSI 3″, 150 lbs.	5	572	250
	Flange ANSI 3″, 300 lbs.	5	573	260
	Flange DN100 PN16 B1	5	571a	
100 (4″)	Thread socket DN100 PN25 (male) as per DIN 11851	5	574	300
	Tri-Clamp DN100 / 4″	5	575	250
	Flange DN100 PN16 B1	6	676	250
	Flange DN100 PN40 B1	6	677	250
	Flange ANSI 4″, 150 lbs.	6	678	250
	Flange ANSI 4″, 300 lbs.	6	679	270

3. Operating ranges

a) SM-25.1 - Stainless Steel Version

		Water / Fluids (20°C)					Air / Gas (20°C, 1 bar abs.)			
Measuring tube Nr.	Operating range code	Operating range (m^3/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)	max. Viscosity (mPas)	Meas. cone (m^3/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)
1	101	**0.0025. . .0.025**	43	S0	40	10	**0.075. . .0.75**	43	S0	45
	102	**0.004. . .0.04**	44	S0	40	80	**0.12. . .1.2**	44	S0	45
	103	**0.0063. . .0.063**	47	S0	40	80	**0.18. . .1.8**	47	S0	45
	104	**0.01. . .0.1**	51	S0	40	80	**0.3. . .3**	51	S0	45
2	206	0.01. . .0.13	53	L1	12	50	**0.55. . .5.5**	53	M1	21
	207	**0.016. . .0.16**	53	M1	15	100	-	-	-	-
	208	0.022. . .0.22	54	L1	12	50	**0.65. . .6.5**	54	L1	13
	209	**0.025. . .0.25**	53	S1	40	100	0.9. . .9	54	M1	21
	210	0.032. . .0.32	57	L1	12	50	**1. . .10**	57	L1	13
	211	**0.04. . .0.4**	54	S1	40	50	1.4. . .14	57	M1	21
	212	0.05. . .0.5	61	L1	12	50	**1.6. . .16**	61	L1	13
	213	**0.063. . .0.63**	57	S1	40	50	2.2. . .22	61	M1	21
	214	-	-	-	-	-	**2.5. . .25**	62	L1	13
	214a	0.08. . .0.8	62	L1	12	50	-	-	-	-
	215	**0.1. . .1**	61	S1	40	100	3.4. . .34	62	M1	21
	216	0.1. . .1	62	M1	15	100	**5. . .50**	62	S1	45
	217	**0.16. . .1.6**	62	S1	40	100	-	-	-	-
	218	**0.22. . .2.2**	62	V1	45	50	-	-	-	-
3	319	0.13. . .1.3	63	L2	17	50	**4. . .40**	63	L2	19
	320	0.21. . .2.1	64	L2	17	50	5. . .50	63	M2	23
	321	**0.25. . .2.5**	63	S2	42	30	**6. . .60**	64	L2	19
	322	0.25. . .2.5	64	M2	17	10	**8.5. . .85**	64	M2	23
	323	**0.4. . .4**	64	S2	42	10	**12. . .120**	64	S2	47
	324	**0.6. . .6**	64	V2	43	50	-	-	-	-
4	425	0.32. . .3.2	67	L5	13	50	**10. . .100**	67	L5	16
	426	0.5. . .5	71	L5	13	50	13. . .130	67	M5	25
	427	**0.63. . .6.3**	67	S5	47	30	**16. . .160**	71	L5	16
	428	0.85. . .8.5	72	L5	13	30	**20. . .200**	71	M5	25
	429	**1. . .10**	71	S5	47	5	-	-	-	-
	430	-	-	-	-	-	25. . .250	72	L5	16
	431	1.6. . .16	72	S5	47	5	34. . .340	72	M5	25
	432	**2.5. . .25**	72	V5	63	5	50. . .500	72	S5	54
5	533	**2.5. . .25**	73	V8	60	10	**55. . .550**	73	L8	30
	534	**4. . .40**	74	V8	60	10	-	-	-	-
	535	**6.3. . .63**	77	V8	60	10	**85. . .850**	74	L8	30
	536	-	-	-	-	-	-	-	-	-
	537	-	-	-	-	-	140. . .1400	77	L8	30
6	638	**10. . .100**	81	11	70	10	-	-	-	-
6	639	**13. . .130**	82	11	70	10	-	-	-	-

Bold operating ranges are preferred.

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b) SM-25.2 - Wetted parts with PTFE-lining

		Water / Fluids (20°C)					Air / Gas (20°C, 1 bar abs.)			
Measuring tube Nr.	Operating range code	Operating range (m^3/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)	max. Viscosity (mPas)	Meas. cone (m^3/h)	Meas. cone Nr.	Float Nr.	Pressure drop (mbar)
2	250	0.01. . .0.1	51	A1	16	50	0.35. . .3.5	51	A1	20
	251	0.016. . .0.16	52	A1	16	50	0.5. . .5	52	A1	20
	252	0.025. . .0.25	53	A1	16	50	0.85. . .8.5	53	A1	20
	253	0.04. . .0.4	54	A1	16	50	1.3. . .13	54	A1	20
	254	0.063. . .0.63	57	A1	16	50	2. . .20	57	A1	20
	255	0.1. . .1	61	V1	18	50	3.4. . .34	61	V1	22
3	356	0.16. . .1.6	62	A2	20	30	5. . .50	62	A2	25
	357	0.25. . .2.5	63	A2	20	10	8.5. . .85	63	A2	25
	358	0.4. . .4	63	V2	22	50	-	-	-	-
4	459	0.4. . .4	64	A5	20	30	13. . .130	64	A5	25
	460	0.63. . .6.3	67	A5	20	30	20. . .200	67	A5	25
	461	1. . .10	71	A5	20	05	35. . .350	71	A5	25
	462	1.6. . .16	71	V5	22	10	-	-	-	-
5	563	1.6. . .16	72	V8	25	10	50. . .500	72	V8	27
	564	2.5. . .25	73	V8	25	10	85. . .850	73	V8	27
	565	4. . .40	74	V8	25	10	-	-	-	-
6	666	6.3. . .63	77	10	30	10	-	-	-	-

4. Display Unit

Basically, the display unit consists of a stainless steel or aluminium housing with an indicator magnetically coupled to the float. The scale may be designed for units of flow or in percentage. In the display unit, measuring transmitter and contact components can be mounted.

4a. Housing designs

Material	Code No.
st. steel 1.4301	0
Aluminium, coated yellow	2

4b. Contact components

Type of Contact	Code No.
none	0
1 min.-contact	1
1 max.-contact	2
1 min.-contact + 1 max.-contact	3
2 min.-contact	4
2 max.-contact	5

4c. Analogue outputs

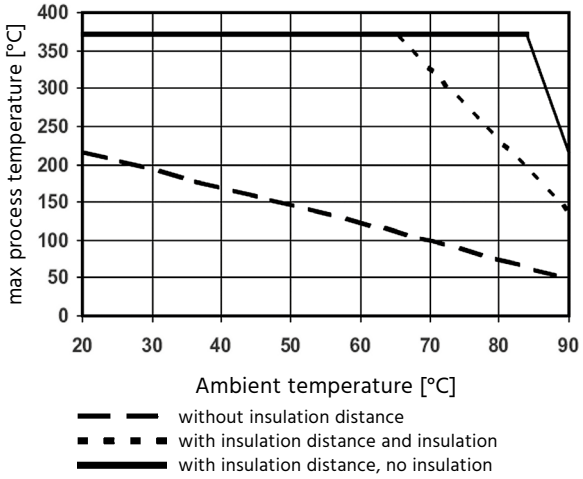
Type	Code No.
none	0
electrical measuring transmitter	1
electrical measuring transmitter (Ex)	2

4d. Supply voltage and output signal

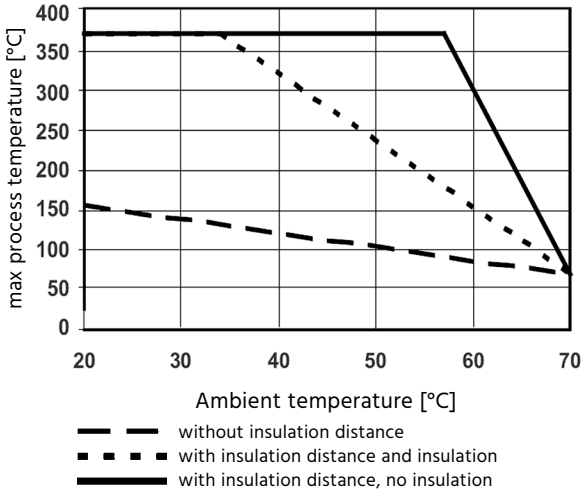
Type of Contact	Code No.
none	00
115 VAC, 0. . .20 mA, 4-wire	01
115 VAC, 4. . .20 mA, 4-wire	02
230 VAC, 0. . .20 mA, 4-wire	03
230 VAC, 4. . .20 mA, 4-wire	04
24 VDC, 0. . .20 mA, 3-wire	07
24 VDC, 4. . .20 mA, 2-wire	08
24 VDC, 4. . .20 mA, 3-wire	09

Temperature curves:
for metal versions, standard and Ex-i

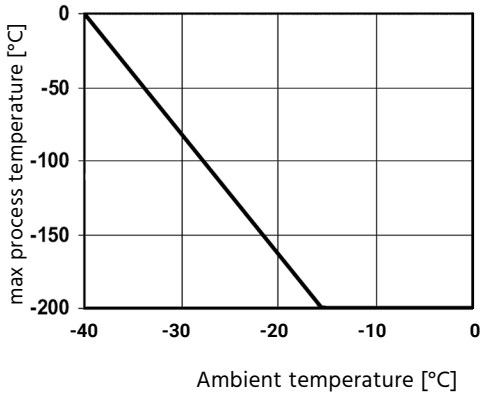
SM-25 – only with indicator



SM-25 – with limit switches
– with electronic transmitter



SM-25 – with limit switches
– with electronic transmitter



Technical Spec. (Display):

Indicator mechanical /

Media temp.:	-25. . .+110°C (for higher or lower operating temperatures from -80. . .+370°C order option „Insulation distance“)

Contacts /

Type:	inductive proximity switch SC3.5-NO as per DIN EN 60947-5-6 (NAMUR)
Media temp.:	-25. . .+120°C at T_{amb} = +60°C (outside this temperature range order option ‘Insulation distance”)
Nominal voltage:	8 VDC
Output signal:	≤ 1 mA or ≥ 3mA
Explosion prot.:	Ex ia IIC T6
Recomm. acc.:	isolated switch amplifier Type SE01 (see under ”Options”)

Electrical measuring transmitter /

Output signal:	0. . .20 mA, 4. . .20 mA
Display:	LCD, 8-digit (programmable for display of units of flow or as non-reversible total volume counter)
Auxiliary power:	see Table 4d
max. Load:	4-wire: ≤ 500 Ohm 2/3-wire: ≤ (U-14,0 V) / 20 mA, max. 500 Ω
Op. temperature:	-25. . .+70°C (outside this temperature range order option ‘Insulation distance”)
El. connection:	M16 x 1,5 or ½“ NPT

Intrinsically safe Electrical measuring transmitter /

Technical specifications like standard version, except:

Output signal:	4. . .20 mA
Op. temperature:	-25. . .+70°C (outside this temperature range order option ‘Insulation distance”)
Ex-protection:	Ex ia IIC T6 Gb acc. to Ex certificate
Recomm. acc.:	feeding device Type SE11 (see under ”Options”)
Pulse output:	on request

The temperature graphs are reference values for size DN100. They may be influenced negative by trapped heat, external heat sources or radiated heat and influenced positive for smaller sizes. Insulation means rock wool between tube aud indicator. Units with electronic transmitter can show the temperature of the internal transmitter on the display. Units with PTFE lining are usable up to 130°C. For units with exlosion proof certification the temperature limits according the certificate of conformity must be regarded. The minimum ambient temperature for indicators is -25°C (lower temperatures on request).

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5. Options:

5a. Insulation distance (SM-25.A):
For media temperatures outside the values specified under Technical specifications, an insulation distance of 95 mm is created between the measuring tube and display unit. With this the temperature resistance can be increased up to values as specified for the measuring tube.

5b. Attenuation (SM-25.D):
It is recommended to provide attenuation of the float for gas applications under the following conditions:

Float type	Operating pressure ≥
SM-25.D.1:	L 1 bar
SM-25.D.2:	M 5 bar
SM-25.D.3:	S 10 bar

(for SM-25.1 only (stainless steel)

5c. Heating:
Heating elements (steam cover) are meant for maintaining a certain media temperature in the measuring tube. Heating elements with 3 different process connections are available:

SM-25.H.1:	DIN-flange DN15 PN40
SM-25.H.2:	DIN-flange DN25 PN40
SM-25.H.3:	NPT 1/4" female thread

(see also Table 1, „Process connections")

5d. Oil and grease-free (SM-25.F):
For applications with oxygen the devices free of oil and grease can be supplied.

5e. Tests and certifications
on request

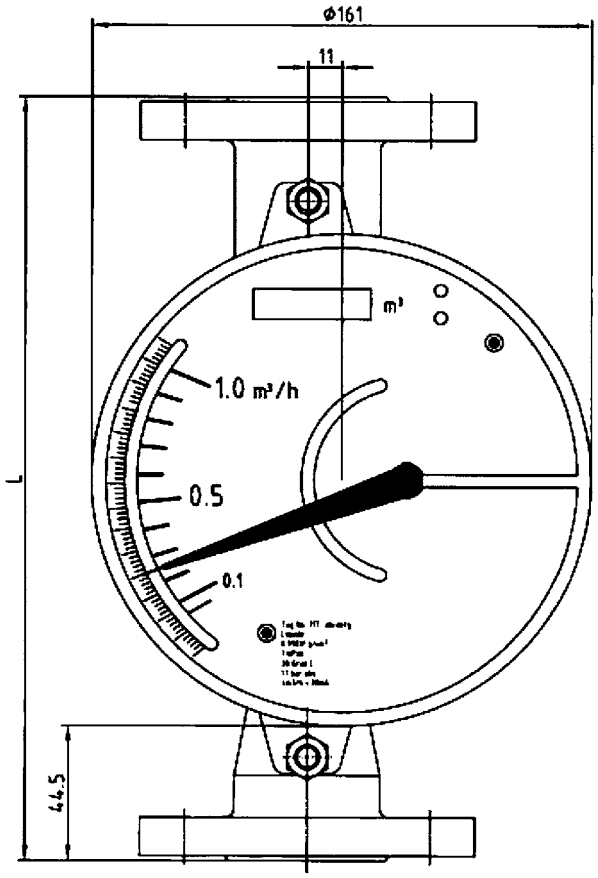
5f. Measuring point labels,
customer-specific scale labeling:
Please specify exact text for labels.

5g. Isolated switching amplifier (Type SE-01):
Version:
as per DIN EN 50227 (NAMUR)
Supply voltage output:
SE-21.1: 230VAC/DC, 1 channel, 1 change-over contact
SE-21.2: 230 VAC/DC, 2 chan., 2 change-over contact
SE-21.3: 24 VDC, 1 channel, 1 change-over contact
SE-21.4: 24 VDC, 2 channel, 2 change-over contact
Switching load:
max. 250 VAC, max. 2A
Control power circuit
intrinsically safe [EEx ia] IIC

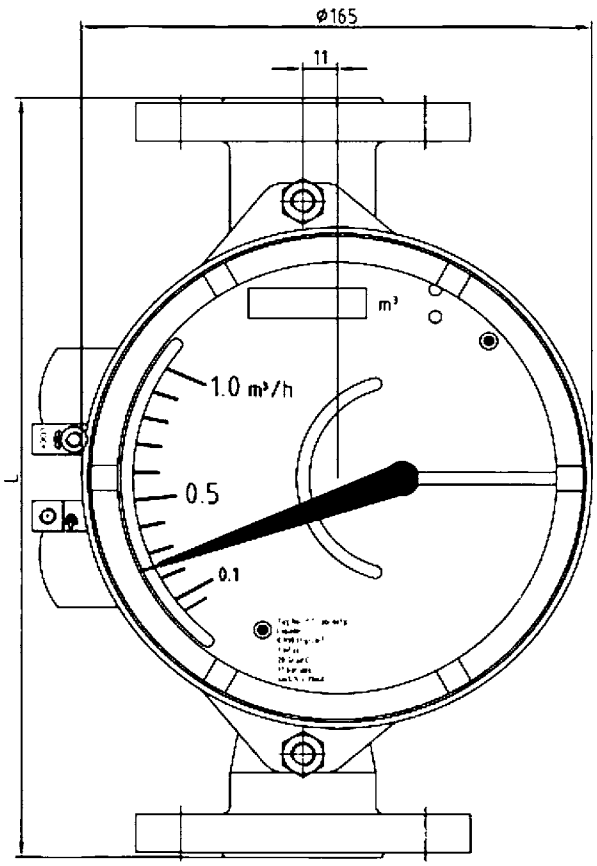
5h. Transm. power supply for intrinsically safe operation (Type SE-11):
Output:
0/4. . .20 mA, with galvanic
separation of inlet and outlet
Supply voltage:
SE-11.1: 230 VAC
SE-11.2: 24 VAC/DC
max. load:
750 Ohm
Control power circuit:
intrinsically safe [EEx ia] IIC

Dimensions in mm:

SM-25 – Housing Type 0 (st. steel)



SM-25 – Housing Type 2 (aluminium)



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SM-30

Variable Area Flowmeters for very low flow rates



Features

/ Indication without power supply

/ For fluids and gases

/ Stainless steel

/ High resistance to pressure and temperature

/ Compact design, no inlet and outlet sections

/ Optional: limit switch

Description:

The SM-30 flow meter works according to the proven float principle. The flowing medium moves from bottom to top to lift the float against gravity in a conical metal tube. The height of the float is a measure of the flow and can be read off directly.

Application:

Variable area flowmeters of the SM-30 series are mainly used to measure liquid and gaseous media. Due to their robust design, they are particularly suitable for difficult operating or environmental conditions.
The devices are particularly suitable for measuring small amounts of:
- Process or carrier gases
- Nitrogen, CO2 or other industrial gases
- Flushing media for measuring systems
- Air or water
- Chemicals and additives
- Lubricants, coolants and anti-corrosion agents

Technical Specification:

Measuring principle /	variable area measuring principle
Measurement /	
primary:	float position
secondary:	operating and standard volume flow, mass flow
Operating conditions	
max. Pressure /	130 bar
max. Test pressure PT /	202 bar
max. Media temperature /	
Standard version:	up to +150°C
HT version:	up to +200°C
Measurement accuracy /	
Max. permissible error :	3.0% of full scale range 4.0% of measured value according to VDI/VDE 3513-2 (q_G = 50%)
Measurement repeatability /	0,5%
Materials /	
Top/bottom fitting, cone:	stainless steel 1.4404 / 316 L
Lock srew:	stainless steel 1.4404 / 316 L
Float, standard:	stainless steel 1.4404 / 316 L or titanium
Dosing unit:	stainless steel 1.4571 / 316 Ti
Valve spindle:	stainless steel 1.4404 / 316 L
Gasket of lock srew:	PTFE
Gasket of dosing unit:	FPM/PTFE, PTFE, FFKM other on request
Housing:	die-cast aluminium with powder coating
Process connections /	
Standard:	1/4“ NPT female
Option:	G1/4“, Ermeto, Serto, Gyrolok, Swagelok, flanges, other on request

Elektrical Specification:

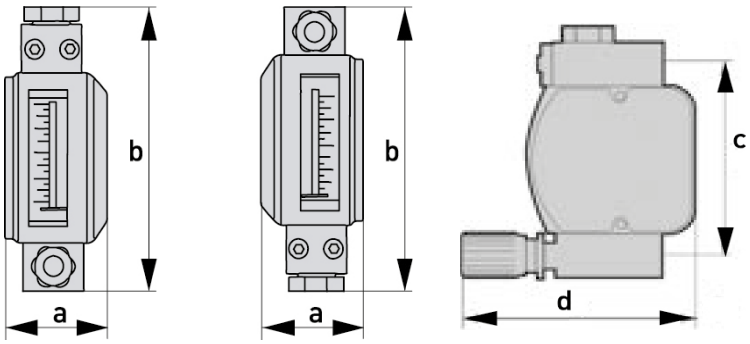
Electrical connection data for indicator

Cable gland /	M16 x 1,5
Terminal connection /	1,5 mm^2
Clamping range /	4,5. . .10 mm
Connection cable /	Ø 6,3 mm
Cable length /	approx. 1,7 m (other on request)

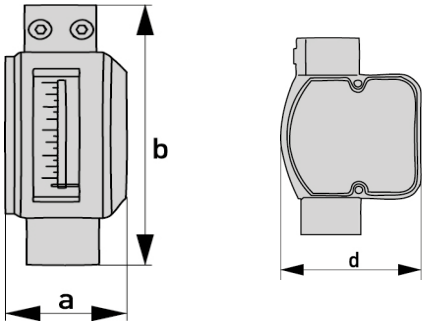
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Dimensions in mm:

SM-30 with valve top/bottom and rear process connection

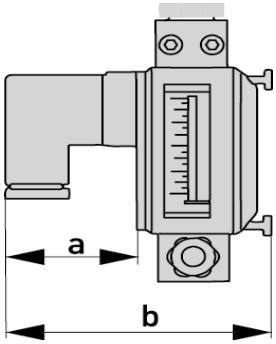


SM-30 without valve and vertical process connection

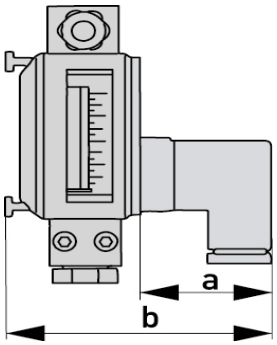


Version	a	b	c	d	Weight (kg)
SM-30 with valve	42	118	90	100	0,7
SM-30 without valve	42	110	-	75	0,6

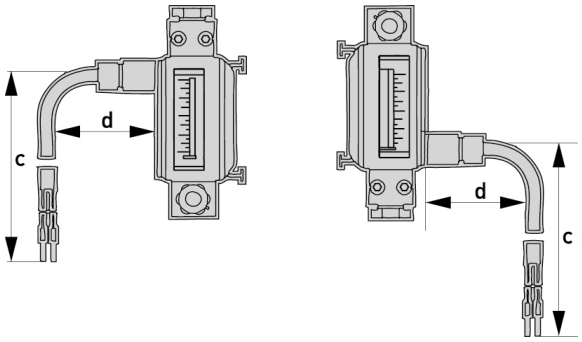
Version with limit switch with connector SM-30 with bottom valve / without valve



Version with limit switch with connector SM-30 with top valve



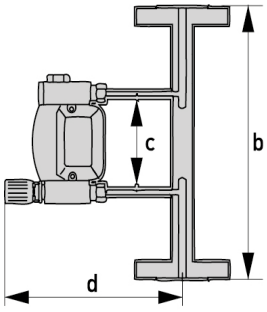
Version with limit switch with cable end SM-30 with bottom valve / without valve



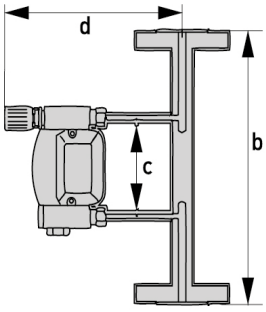
Version	a	b	c	d	Weight (kg)
SM-30 with valve	46	90	1500	50	0,7
SM-30 without valve	46	90	1500	50	0,6

Version with flange adapter

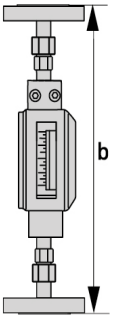
SM-30 with bottom valve



SM-30 with top valve



SM-30 without valve



Version	a	b	c	d
SM-30 with valve	-	250	90	195
SM-30 without valve	-	250	-	-

Extra weight for flange adapter dependent on pressure rating of flange: approx. 1,5. . .9 kg.

Ordering Codes:

Order-no.	SM-30.	2.	1.	1.	1.	L01.	1

SM-30
Variable Area Flowmeter

Version /
1 = without valve , vertical process connection
2 = with bottom valve, rear process connection
3 = with top valve, rear process connection
4 = with top valve, vertical flange connection
5 = with bottom valve, vertical flange connection

Contact /
1 = without
2 = with plug
3 = with cable end

Process connection /
1 = (standard) 1/4 NPT
2 = G1/4
3 = Ermeto
4 = Serto
5 = Gyrolok
6 = Swagelok
7 = flange adapter
8 = other process connections on request

Gasket material of the dosing unit /
1 = FPM/PTFE
2 = PTFE
3 = FFKM

Measuring range/
Water [l/h]
W01 = 0,15. . .1,5
W02 = 0,3. . .3
W03 = 0,5. . .5
W04 = 0,7. . .7
W05 = 1. . .10
W06 = 1,6. . .16
W07 = 2,5. . .25
W08 = 4. . .40
W09 = 6. . .60
W10 = 8. . .80
W11 = 10. . .100
Air [Nl/h]
L01 = 1,6. . .16
L02 = 2,5. . .25
L03 = 5. . .50
L04 = 7. . .70
L05 = 10. . .100
L06 = 15. . .150
L07 = 25. . .250
L08 = 40. . .400
L09 = 55. . .550
L10 = 80. . .800
L11 = 125. . .1250
L09 = 200. . .2000
L10 = 250. . .2500
L11 = 340. . .3400

Valve spindle /
1 = 1 mm (Measuring range: W01-W04 / L01-L06)
2 = 2,5 mm (Measuring range: W05-W10 / L07-L11)
3 = 4,5 mm (Measuring range: W11-W13 / L12-L15)

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DT-03

Calorimetric Flow Sensor in Compact Design with Optional Analogue Output

Features

/ No moving parts

/ Optionally with temperature output

/ Switch or transmitter

/ Mounting in T pieces of 3/8“ to 2“

/ Wetted stainless steel

Description:

The sensor system of the DT-03 series flow sensor is based on the calorimetric principle. A heated measuring resistance is mounted into a stainless steel sleeve in such a manner that the fluid carries the heat proportional to the inflow velocity. The heat output that must be fed to the sensor in order to maintain the resistance temperature constant is, therefore, a measure for the volume of flow. A second PT100 measuring resistance is located inside the sleeve within the flow to measure the temperature of the media. This will rule out temperature changes in the streaming fluid being interpreted erroneously as change of flow. The electronic components in the DT-03 receive information from the sensor about the flow and the temperature and convert them into a PNP or NPN switching output, a 0. . .10 V DC or 4. . .20 mA analogue output or an impulse output. At the 4-pole output plug of the DT-03 an analogue output and a switching output (on request as impulse output) are tapped that can be freely assigned ex factory to the parameters of volume and temperature.

Application:

The flow sensors of the DT-03 series are the logical consequence of Profimess‘ proven DT-01 and DT-02. Due to the new method of outputting flow and temperature also as analogue or impulse output and combining both the parameters, the application spectrum of the calorimetric technology has experienced a vast expansion in the technology of fluid measurement. The DT-03 sensors are used wherever flow and temperature of fluid media need to be tapped in narrow spaces and wherever it would be advantageous, due to the type of fluid, to use entirely stainless steel switches for the wetted parts without any moving components. In order to ensure maximum error sensitivity of the sensor, the DT-03 should be mounted for direction of flow from bottom to top as this will facilitate optimum ventilation even in extremely low flow speeds.

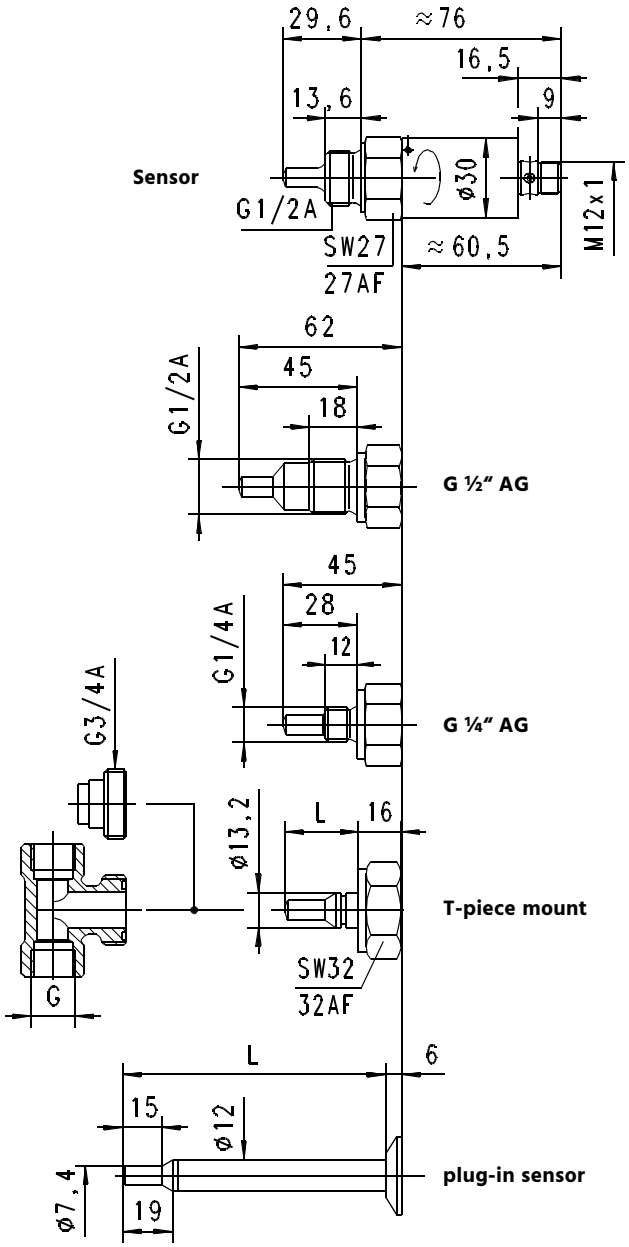
Technical Specifications:

Operating range velocity /	water 2. . .150 cm/s or 3. . .300 cm/s, oil on request
Accuracy /	± 10% set point value (tested on water with 10xD in inflow and outflow in rising tube)
Reproducibility /	± 1%
Switching hysteresis /	flow 4% set point, temp. approx. 2°C
Temperature gradient /	max. 4°C/s or rather 4 Kelvin/s
Op. range temp. /	0. . .70°C, 0. . .120°C with gooseneck
Storage temperature /	-20. . .+80°C
Materials /	wetted st. steel 1.4571, others 1.4305
Operating pressure /	max. 100 bar, 200 bar on request (if necessary, consider pressure level of T-piece)
Operating temp. /	0. . .70°C (electronics)
Weight /	approx. 200 g (standard version)
Assembly /	staved cross points to inflow
Programming the setpoints /	by means of magnet supplied along, the magnet is brought between 0.5 and 2 seconds to the marking on the label. The excrescent measuring value is stored as limit value, the LED changes to O.K. status. Longer or shorter magnetizing times than 0.5 or 2 seconds are ineffective (protection against external magnetic fields)

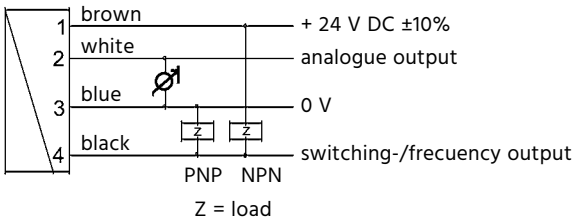
Electrical Specifications:

Power supply /	24 VDC ± 10%
Power consumption /	max. 100 mA
Connection /	round pin connector M12 x 1, 4-pole
Switching output /	Transistor output Push Pull, line short circuit and reverse polarity protected
Switching current /	max. 100 mA
As frequency output /	max. 2000 Hz
Analogue output /	4. . .20 mA max. load 500 Ohm or 0. . .10 VDC
Display /	yellow LED (ON = o.k., OFF = Alarm)
Setting /	through magnet
Protection class /	IP67

Dimensions in mm:



Electrical Connection:



Please use shielded cable, signal lines < 30m and power supply lines < 10m.

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Ordering Codes:

Order number	DT-03.	1.	1.	1.	1.	1.	3.	2.	2.	5

DT-03 Calorimetric Flowmeters and Switch

Connection size /
1 = G¼"-male
2 = G½"-male
3 = attachable sensor Ø 12 mm
4 = T-piece connector Ø 13,2 mm

Wetted material /
1 = stainless steel 1.4571

Sensor length /
0 = T-piece assembly (please specify nominal diameter of 3/8" to 2" and material in detailed text)
1 = 28 mm (G¼")
2 = 29.6 mm (G½")
3 = 45 mm (G½")
4 = plug-in sensor 50 mm
5 = plug-in sensor 70 mm
6 = plug-in sensor 100 mm
7 = plug-in sensor 150 mm
8 = plug-in sensor 200 mm

Analogue output /
0 = no analogue output
1 = current 4. . .20 mA
2 = voltage 0. . .10 VDC

Assignment for analogue output /
0 = no analogue output
1 = flow
2 = temperature

Switching output /
0 = no switching output
3 = PushPull (PNP and NPN)

Assignment for switching output /
0 = no switching output
1 = flow
2 = temperature

Switching signal /
0 = no switching output
1 = MIN switch
2 = MAX switch
3 = Frequency output

Options (multiple naming such as 3/5/6 possible) /
1 = special operating range for flow (max. 3 m/s)
2 = special operating range for temperature (max. 120°C, standard 70°C, min. -20°C, st. 0°C)
3 = Switch on delay from Alarm to O.K.
4 = Switch off delay from O.K. to Alarm
5 = Power-On-Delay (delay after switching on until the switching output becomes active)
6 = inverted switching output
7 = special hysteresis (standard 4% of full scale value)
8 = counter plug, M12x1, 4-pole

Please specify operating range full scale value, output frequency for impulse output and the setpoint in detailed text.

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DT-06

Calorimetric Air Flow Switch



Features

/ Titanium sensor surface

/ No moving parts

/ Simple assembly

/ DC- and AC version available

/ Protection class IP 65

/ Relay output

/ LED function display

/ Cost-effective

Description:

Electronic flow switches operate on the basis of the calorimetric prinziple. They use the physical effect that a flowing medium absorbs heat and conducts it away. The sensor tip contains two temperature-dependent resistors as well as a heat source. The heat source generates a local temperature rise in the medium which is detected by one of the PTCs. When the medium flows, energy is conducted away from the heat source, i.e. it is cooled. The resulting temperatue change is an indication of flow. To avoid a falsification of the result of the measurement by change of the medium temperature, a second PTC is used for temperature compensation. The difference in resistance of both PTCs is used for a temperature compensated statement by the electronic evaluation system „Medium flows“ or „medium does not flow“ as compared with a predefined set-point or limiting value.

Application:

The DT-06 series is intended for cost-effectively detecting and signalling of changing air flow within specified limits, it can be mainly used for monitoring air conditioners as well as ventilation systems. Typical applications are Function control of blowers and fans, Filter condition monitoring, Flap position monitoring for air distribution

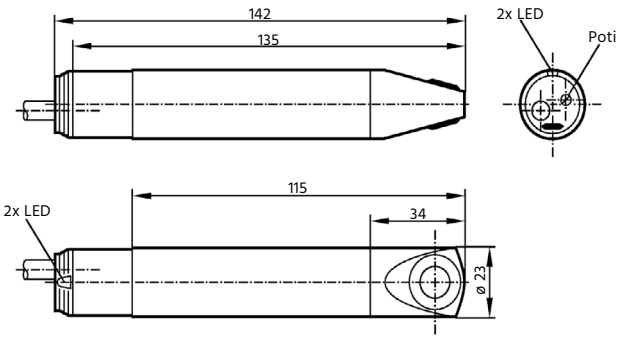
Technical Specifications:

Operating range /	100. . .1000 cm/s
Greatest sensitivity /	100. . .400 cm/s
Switch point adjustment /	potentiometer
Power-on delay time /	60 s
Response time /	3. . .60 s
max. Temperature Media /	-10. . .+50°C
Gradient temperature /	max. 5 k/min
max. Ambient temp. /	-10. . .+50°C
max. rel. Air humidity /	90%
max. Pressure /	1 bar
Process connection /	Ø 23 mm
Housing /	PBT (Pocan)
Sensor surface /	Titan
Immersion size /	min. 32 mm to max. 120 mm
Up- and Down- stream dimensions /	min. 5 x D in- and 3 x D outflow
Accessories /	mounting clamp (included)

Electrical Specifications

Supply voltage /	
DT-06.1.x.x.x.x:	80. . .250 V AC / 90. . .250 V DC
DT-06.2.x.x.x.x:	24 V AC ± 10%
DT-06.3.x.x.x.x:	24 V DC ± 25%
Overload protection /	no
El. connection /	
DT-06.1.x.x.x.x:	2m PVC-cable, 4 x 0,5 mm²
DT-06.1.x.x.x.x:	2m PUR-cable, 4 x 0,5 mm²
DT-06.1.x.x.x.x:	2m PUR (PVC)-cable, 4 x 0,5 mm²
Protection class /	IP 65
Contact function /	relay is energized during flow
Switching load /	3 A at 30 V DC / 250 V AC
Function display /	LED 1x red, 1x green
Short-circuit proof /	no
Overload protection /	no

Dimensions Sensor in mm:

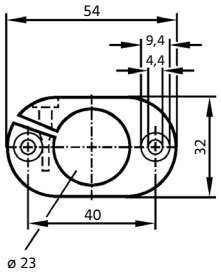


Ordering Codes:

Order number	**DT-06.**	**1**
DT-06 Calorimetric Air Flow Switch		

Supply voltage /
1 = 80. . .250 V AC / 90. . .250 V DC
2 = 24 V AC ± 10%
3 = 24 V DC ± 25%

Mounting Clamp in mm:



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SM-00

Impeller Flowmeter for Small Volumes of Fluid



Description:

The SM-00 is a universally applicable flowmeter for small to medium volumes of thin fluid. A rotor mounted on one side on a bearing pin is made to rotate by a flow obliquely directed through a nozzle where the rotor's blades are equipped with magnets. A Hall effect sensor mounted externally on the flow housing emits a small voltage impulse every time when one of the magnets passes by its front side. The electronics of the SM-00 are capable of receiving these impulses and translating them into an NPN Open-Collector rectangular signal that will be made available to the plug output.

Features

/ Arnite, Larton® G/40 or PVDF

/ Up to 100°C

/ Up to 20 bar

/ Wide choice of operating range

/ Excellent media resistance

Application:

The SM-00 is the ideal device especially for tapping small volumes of flow of chemically hostile fluids. The available material combinations are Arnite, Larton® G/40 and PVDF which can be deployed in many areas of the chemical industry. With its range of up to 100°C and 20 bar, for a plastic device the limits in regard to pressure and temperature are very outstretched and the Open-Collector signal in NPN form can be evaluated by any common control device. The available connection threads are G1/4" female thread as well as G1/2" male thread where the user has the option to place both the inlet and the outlet of flow on a single side of the SM-00 or, to have, preferably, one connection on the right side and another on the left side of the flowmeter.

The unique impeller bearing of the SM-00 ensures a long life for the SM-00. As against many other devices available in the market, the rotor is not mounted on both sides but it practically „floats" during operation over a one-sided bearing pin. Thus, the design of the device ensures durability and, consequently, maximum possible rotational speed of the impeller.

Technical Specifications:

Material /

SM-00.1:	Housing made of PBT 35%GF (Arnite) bearing pin made of stainless steel 1.4305 (1.4571 optional) O-Ring made of silicon (Viton or EPDM optional) rotor made of PVDF magnets made of ceramic Sr Fe O
SM-00.2:	Housing made of PPS 40%GF (Larton® G/40) bearing pin made of stainless steel 1.4305 (1.4571 optional) O-Ring made of silicon (Viton or EPDM optional) rotor made of PVDF magnets made of ceramic Sr Fe O
SM-00.3.1:	Housing made of PVDF Bearing pin made of st. steel 1.4305 (1.4571 or PCTFE (nozzle PTFE) optional) O-Ring made of Viton (EPDM optional) Rotor made of PVDF Magnets made of ceramic Sr Fe O
SM-00.3.(2. . .3):	Housing made of PVDF Bearing pin made of PCTFE O-Ring made of Viton (EPDM optional) Rotor made of PVDF magnets made of ceramic Sr Fe O (not wetted)
Flow volume /	depends on the version and nozzle, see Tables 1 and 2
Accuracy /	± 2% of MV
Reproducibility /	< ± 0.25%

Temperature range /

SM-00.1:	-10. . .+65°C
SM-00.2:	-10. . .+100°C
SM-00.3:	-10. . .+100°C
Pressure /	max. 20 bar at 20°C
Mounting position /	horizontal pos. recommended
Nozzle sizes /	see Tables 1 and 2
Process connection /	G1/4" female on one side or G1/4"male on both sides (left/right), or G1/2"male on both sides (for large operating ranges only)

Electrical Specifications:

Supply voltage /	4,5. . .24 VDC
Power consumption /	5. . .13 mA
Output /	rectangular impulse NPN open collector
Signal load /	20 mA max.
Current leakage /	10 µA max.
El. connection /	3Pin -AMP 2.8 x 0.8 mm (counter-plug available as accessory)
Duty Cycle /	50% ± 5%

Ordering Codes:

Order number	**SM-00.**	**1.**	**1.**	**1.**	**0**

SM-00 Impeller Flowmeter for Small Volumes

Material version /
1 = Arnite with bearing pin in stainless steel 1.4305, O-Ring in silicon and turbine in PVDF
2 = Larton® G/40 with bearing pin in stainless steel 1.4305, O-Ring in silicon and turbine in PVDF
3 = PVDF with bearing pin in stainless steel 1.4305 (PCTFE for thread on both sides), O-Ring in Viton and turbine in PVDF

Connections /
1 = 2 x G1/4" female on one side (not nozzle sizes 10 mm and 3 - 4 - 5.6 mm for PVDF)
2 = 2 x G1/4"male on both sides (not nozzle sizes 3.3 and 10 mm)
3 = 2 x G1/2"male on both sides (nozzle size 10 only)

Nozzle size /
1 = 1.0 mm
2 = 1.2 mm
3 = 1.5 mm
4 = 2.0 mm
5 = 2.5 mm
6 = 3.0 mm (both sides in G1/4" male thread only)
7 = 3.3 mm (both sides in G1/4" female thread only)
8 = 4.0 mm (both sides in G1/4" male thread only)
9 = 5.6 mm (both sides in G1/4" male thread only)
10= 10 mm (in G1/2" male thread only)

Optionen /
0 = none
1 = O-Ring in Viton instead of silicon for versions in Arnite and Larton® G/40
2 = O-Ring in EPDM instead of silicon for versions in Arnite and Larton® G/40
3 = O-Ring in EPDM instead of Viton for versions in PVDF
4 = Bearing pin in st. steel 1.4571 instead of 1.4305 for versions in Arnite and Larton® G/40
5 = Bearing pin in st. steel 1.4571 instead of 1.4305 for versions in PVDF with one-sided thread
6 = Bearing pin in PCTFE instead of st. steel 1.4305 for versions in PVDF with one-sided thread

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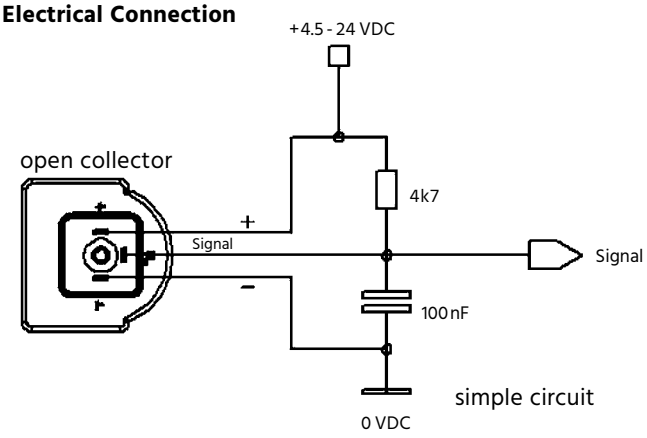
Versions:

Material version: The basic body of the SM-00 can be made of materials such as Arnite, Larton® G/40 or PVDF where the Arnite and Larton versions are intended for standard applications while the PVDF version has been developed for applications in the chemical industry.

Connections: The available thread connections are G1/4“ female thread and G1/2“ male thread which allow the user to decide placing both the flow inlet and outlet on the same side of the SM-00 or, preferably, one connection on the right side and another on the left side of the flowmeter. The possible operating ranges vary with different versions as detailed in the Tables 1 and 2.

Nozzle size: The nozzle at the inlet of the SM-00 enables an oblique direction flow within the body of the SM-00 and is largely responsible for the dynamic functioning of the flowmeter and, therefore, for the length and position of the linear operating range. The relationship between the nozzle size and operating range is detailed in the Tables 1 and 2. The operating ranges given in these tables indicate the linear range of the relevant version. The specified pressure drop occurs when the full scale value of the measuring range is reached.

Electrical Connection



Options: The bearing pin in the Arnite and Larton® G/40 versions of the SM-00 is made of stainless steel 1.4305 as a standard and the sealing ring is made of silicon. If the medium in question has special requirements in regard to the material, the bearing pin can be also supplied in stainless steel 1.4571 and the O-Ring in Viton or EPDM. The PDVF version of the SM-00 is used, especially when the requirements of strength on the flowmeter are very high. In the case of the variant with
thread connection, the bearing pin is made of stainless steel 1.4305 on the one side and, in those with thread connections on both sides it is made of PCTFE. Optionally, the stainless steel pin in the one-sided version can also be replaced by a PCTFE pin. In this „chemical“ version, the impeller magnets are fully infused and hence not wetted.

All given values are average and have been measured for water at room-temperature and horizontal position.
The actual values differ, depending on the application, by an accuracy of ± 2% of MV.

Table of operating ranges SM-00.1/2

Nozzle size	Version Arnite or Larton® G/40, connections G 1/4"-female one-sided			Version Arnite or Larton® G/40, connections G 1/4"-male both-sided			Version Arnite or Larton® G/40, connections G 1/2"-male both-sided		
[mm]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]
1.0	0.0274. . .0.5867	2223	1.0	0.0410. . .0.5670	2063	1.0			
1.2	0.0315. . .0.7777	1787	1.0	0.0505. . .0.8225	1700	1.0			
1.5	0.0417. . .1.3434	1386	1.0	0.0427. . .1.2504	1314	1.0			
2.0	0.1109. . .2.3268	1013	1.0	0.0911. . .2.4055	988	1.0			
2.5	0.0673. . .2.7421	754	0.6	0.1503. . .3.7478	760	1.0			
3.0	0.137. . .4.88	572	1.0	0.1022. . .5.6310	565	1.0			
3.3	0.1396. . .5.3606	509	1.0						
4.0	0.111. . .7.26	382	1.0	0.1235. . .8.3893	381	0.8			
5.6	0.180. . .8.30	256	0.9	0.3088. . .9.2647	236	0.45			
10.0							3.00. . .26.69	65	0.32

Table of operating ranges SM-00.3

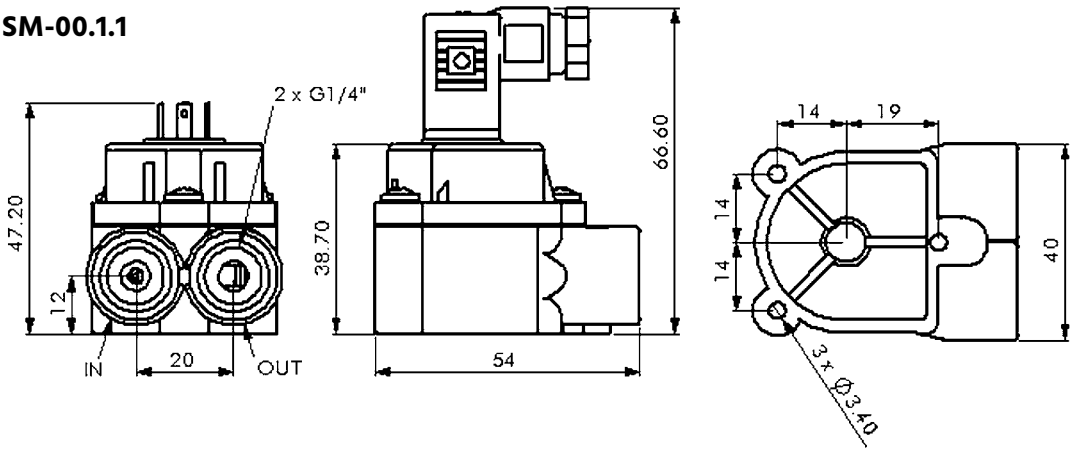
Nozzle size	Version PVDF with bearing pin in 1.4305, connections G 1/4"-female one-sided			Version PVDF with bearing pin in PCTFE, connections G 1/4"-female one-sided			Version PVDF, connections G 1/4"-male both-sided		
[mm]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]
1.0	0.0419. . .0.5899	2277	1.0	0.0551. . .0.4789	4962	1.0	0.0440. . .0.5498	4366	1.0
1.2	0.0343. . .0.8014	1834	1.0	0.0480. . .0.8273	3752	1.0	0.0532. . .0.8447	3485	1.0
1.5	0.0523. . .1.2731	1447	1.0	0.0784. . .1.1325	3020	1.0	0.0668. . .0.9314	2827	0.55
2.0	0.0692. . .2.3482	1010	1.0	0.1087. . .2.2155	2078	1.0	0.1170. . .2.2198	2049	1.0
2.5	0.0664. . .3.7142	739	1.0	0.0741. . .2.7640	1443	0.66	0.1147. . .2.7205	1544	0.64
3.0							0.1048. . .2.8494	1109	0.41
3.3	0.7173. . .6.0997	555	1.0	0.2571. . .5.0044	1033	1.0			
4.0							0.2098. . .9.2712	793	1.0
5.6							1.7820. . .10.7990	511	0.49

Nozzle size	Version PVDF, connections G 1/2"-male both-sided		
[mm]	Flow [l/min]	Impulse rate [Imp./l]	Pressure drop for FSV [bar]
10.0	3. . .26.69	130	0.32

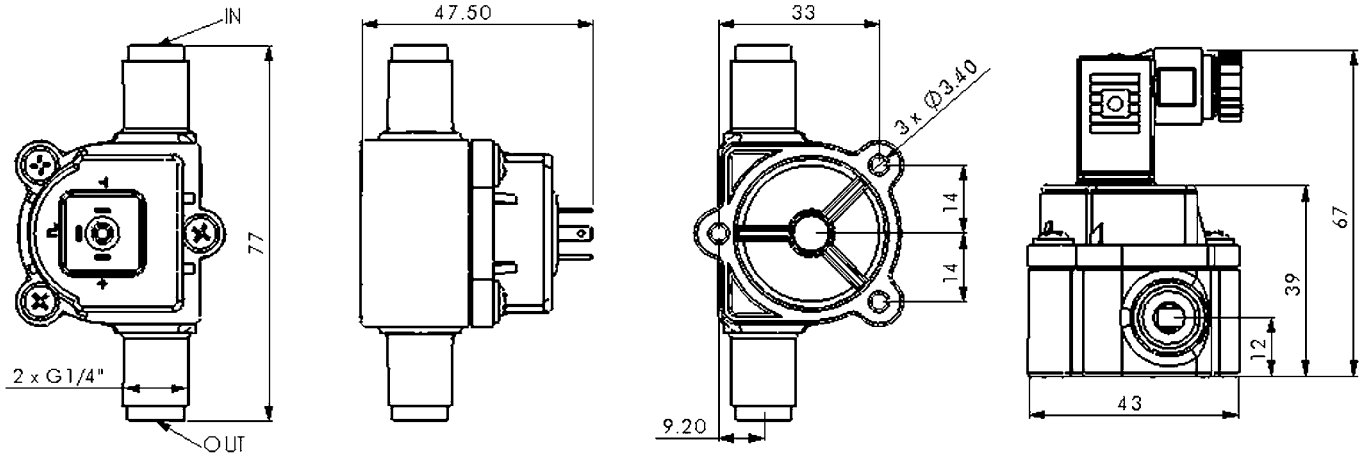
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Dimensions in mm:

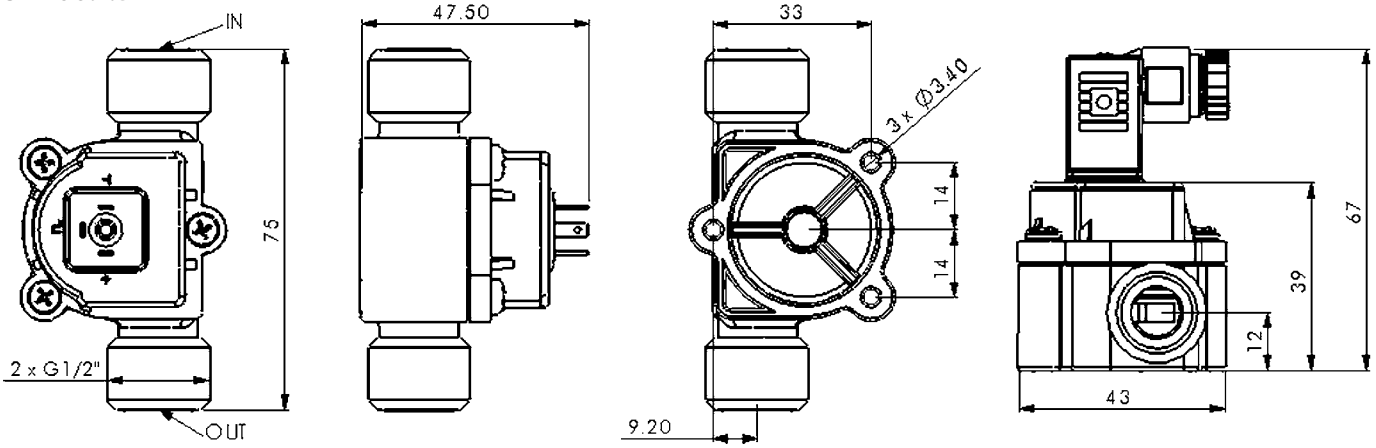
SM-00.1.1



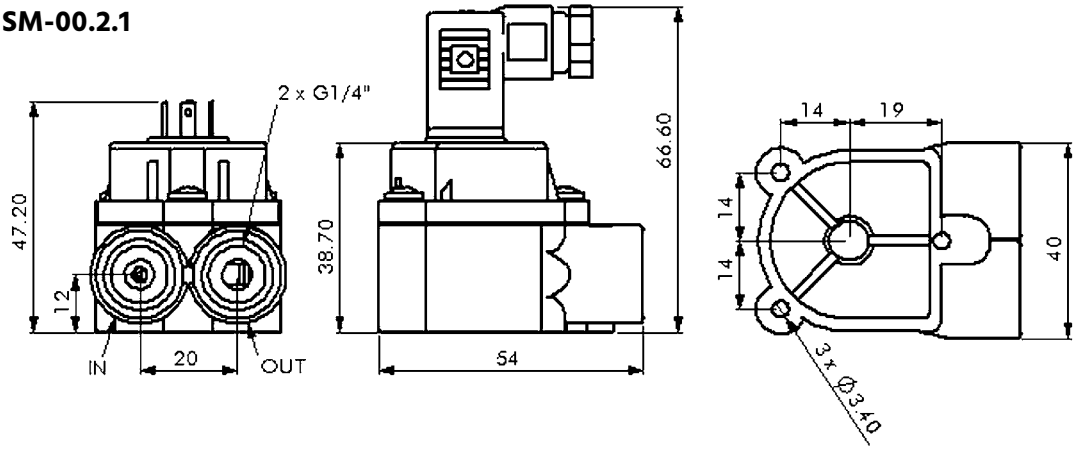
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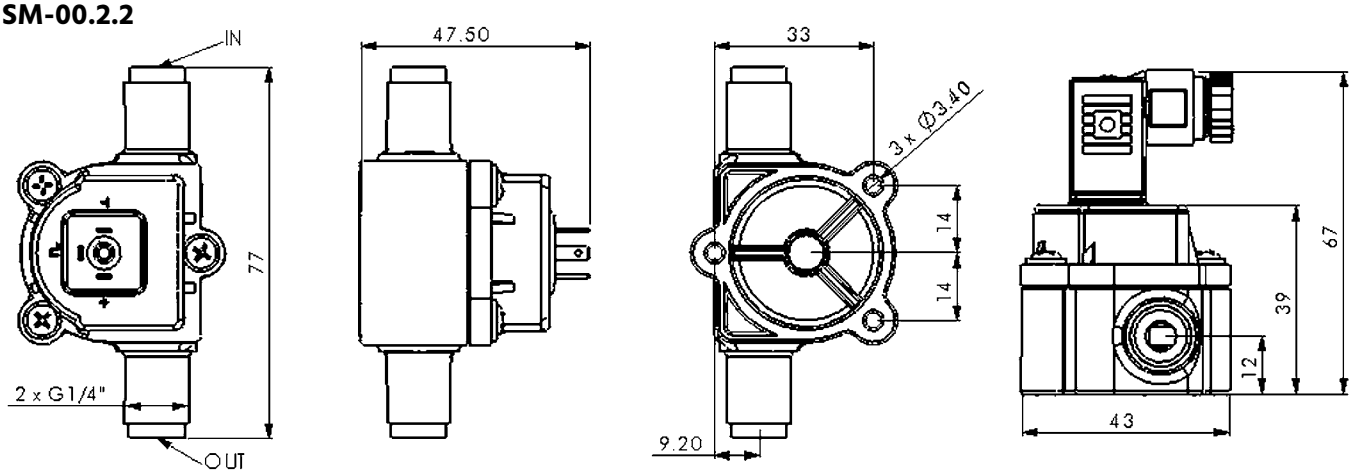
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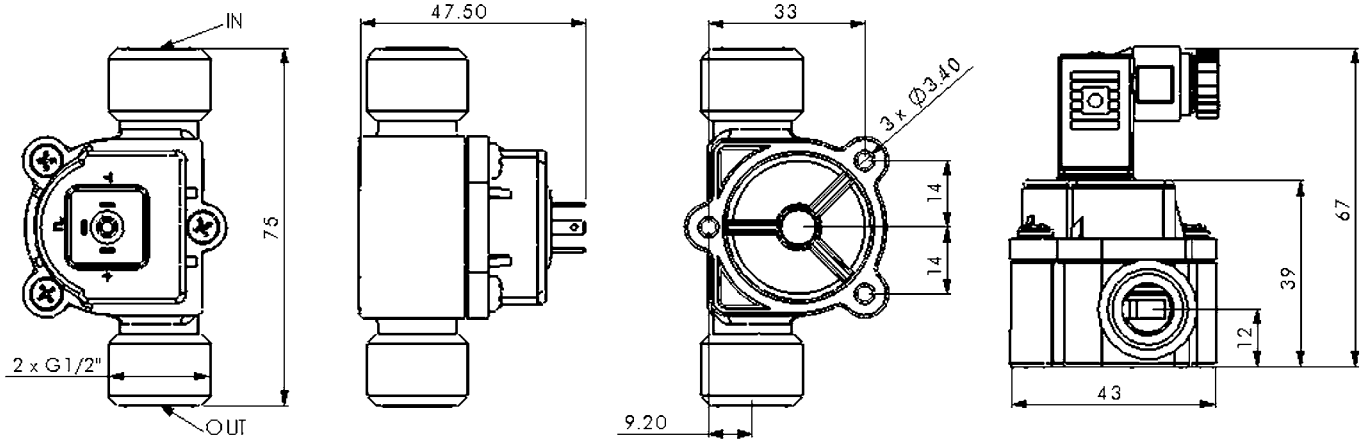
SM-00.2.1



SM-00.2.2

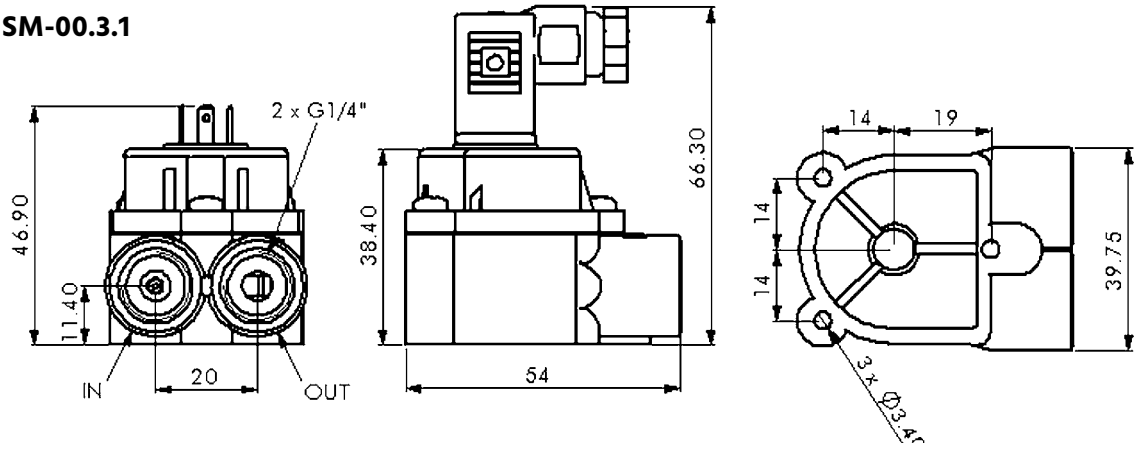


SM-00.2.3

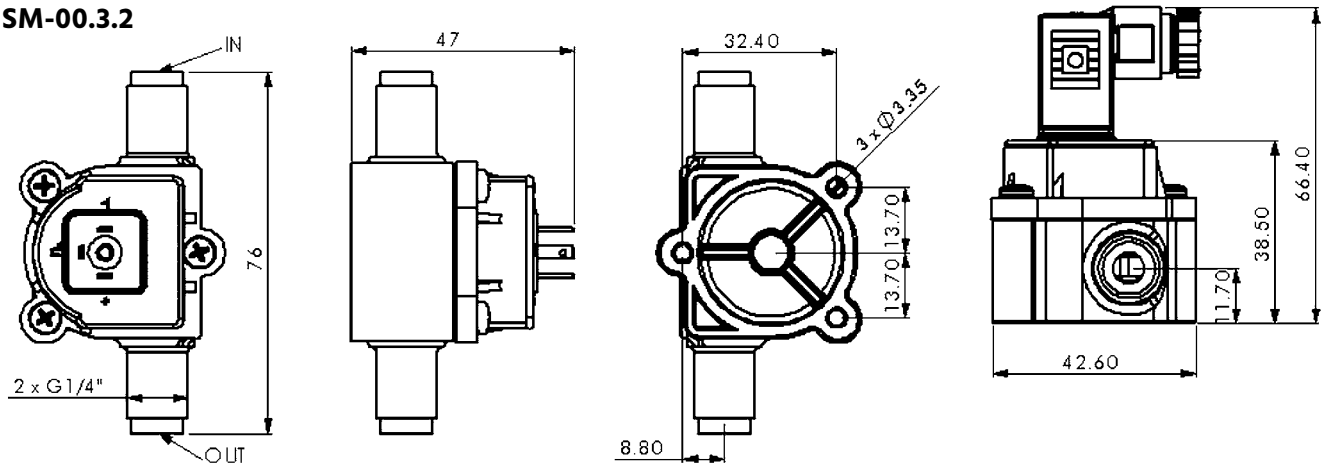


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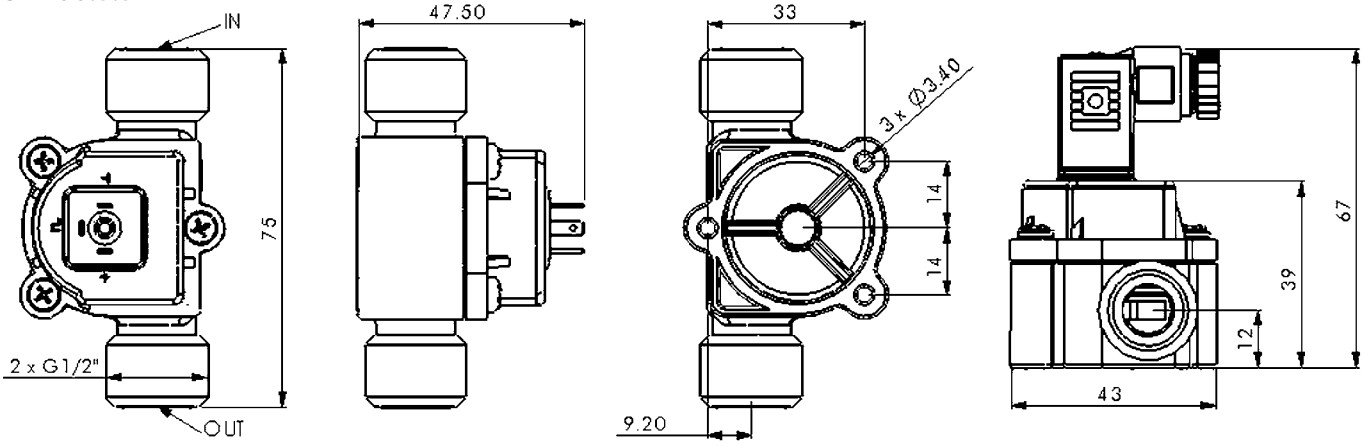
SM-00.3.1



SM-00.3.2



SM-00.3.3



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SM-04

Impeller Flowmeter, Switch and Indicator in Modular Design



Features

/ Robust and compact flow sensor

/ Variety of materials

/ Location-independent

/ Operating range ratios up to 40:1

/ No inflow outflow lines required

/ Different measuring transmitters can be mounted directly or are available for DIN rail mounting

Description:

The SM-04 series of impeller flowmeters consists of a sensor and an optionally available measuring transmitter. The sensor has an impeller that is fitted in a housing made of PPS, brass or stainless steel. The impeller is set into rotation by the streaming medium. Depending on the material version, this rotational movement is tapped by an inductive, optical or Hall sensor-system and output as a frequency signal which is proportional to the flow. For the evaluation of the signal, different types of measuring transmitters are available which can amplify, convert or display the impulse signal from the sensor.

Application:

Due to their modular design, the SM-04 series of impeller flowmeters represents a versatile measuring and monitoring system for all low-viscosity fluids that do not corrode the materials being used.

Technical Specs - Sensor:

max. Pressure /

SM-04.1:	16 bar
SM-04.3/4:	100 bar

max. Temperature /

SM-04.1:	0. . .+60°C
SM-04.3/4:	0. . .+100°C

Accuracy / ± 3 % of MV

Reproducibility / ± 1 % of FSV

Electrical Specs - Sensor:

Supply voltage /

PNP/NPN:	10. . .30 V DC
NAMUR:	7. . .12 V DC

Power consumption /

Inductive:	10 mA
NAMUR:	7 mA
Hall Sensor:	30 mA

Output current max. /

Inductive:	200 mA
NAMUR:	7 mA
Hall Sensor:	100 mA

Output circuit / PNP, NPN or NAMUR

Short-circuit proof / yes

Polarity-reversal proof / yes

El. connection / 2 m cable or plug connection

Protection class / IP 67

Electrical Specs - Display:

Supply voltage / 18. . .30 VDC

Power consumption / < 1 W

Output signal / 0/4. . .20 mA max. load 500 Ω (or 0/2. . .10 VDC, min. 1 Ω on request)

Switching outputs / 2 x transistor outputs „Push-Pull“safe against short-circuit and pole-reversal) max. I_{out} = 100 mA

Hysteresis / adjustable, direction of hysteresis depends on MIN and MAX

Technical Specs - Display:

Display / graphical LCD-display 32x16 pixels, backlight, indicates measuring value and unit

LED-indicator / flashes simultaneously with displayed message

Media temp. /

SM-04.1:	0. . .+60°C
SM-04.3/4:	0. . .+70°C (0. . .+100°C with optional gooseneck)

El. connection / for round plug connector M12x1, 5-pole

Protection class / IP 67 (IP 68 when oil-filled)

Materials /

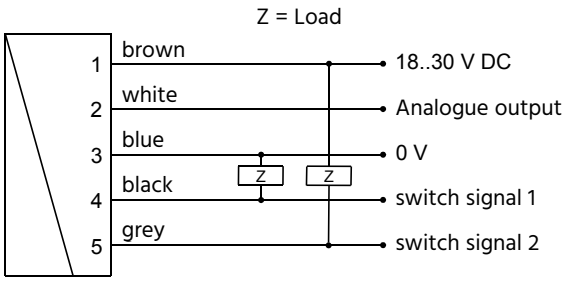
Clamps:	stainless steel (1.4301)
Housing:	stainless steel (1.4305)
Adapter:	CW614N nickel-plated
Glas:	mineralglas hardened
Magnet:	samarium-cobalt
Ring:	POM

El. Specs - Analogue Output:

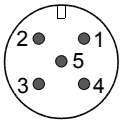
Output current / 4. . .20 mA at 10. . .30 VDC

Output voltage / 0. . .10 V at 15. . .30 VDC max. 20 mA

El. Connection Sensor:



Connection example: PNP NPN Optional: NAMUR



Plug connection M12x1

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Wetted Parts - Sensor:

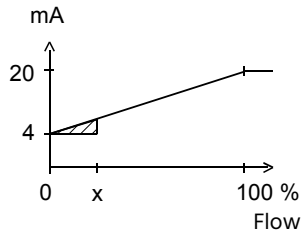
Type	SM-04.1	SM-04.3	SM-04.4
Housing	PPS (Fortron 1140L4)	brass (CW614N nickel-plated)	stainlees steel (1.4305)
Cover	PPS (Fortron 1140L4) (opt. PPS)	brass (CW614N nickel-plated)	stainlees steel (1.4305)
Connection	PVDF (opt. stainless steel (1.4305) or CW614N nickel-plated)	brass (CW614N nickel-plated)	stainlees steel (1.4305)
Rotor	PVDF with 10 clamps (opt. 2 or 5 clamps)	PVDF with 5 magnets, glued with epoxy resin (opt. 2 magnets)	PVDF with 5 magnets, glued with epoxy resin (opt. 2 magnets)
Clamps	stainless steel (1.4310) (opt. titanium or Hastelloy ®)	-	-
Bearing	Iglidur X	Iglidur X	Iglidur X
Axis	ceramic (Zr02-TZP)	Keramik ($Zr0_2$-TZP)	Keramik ($Zr0_2$-TZP)
Sealing	FKM (opt. EPDM or NBR)	FKM (opt. EPDM, NBR or Kemraz)	FKM (opt. EPDM, NBR or Kemraz)

Materials for not wetted parts:
PVC-cable, st. steel (1.4305, 1.4301) and CW614N nickel-plated

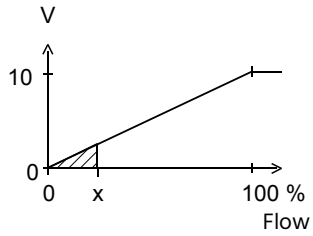
Signal characteristics curve:

Value x = Beginning of the specific range
= not specified

Current output



Voltage output



Other characteristics on request

Ordering Codes:

Order no.	SM-04.	1.	2.	1.	4.	1.	1.	0

SM-04 Flow Sensor with Impeller

Version /
1 = with PPS housing, inductive pickup
3 = with brass housing, Hall sensor
4 = with stainless steel housing, Hall sensor

Size of housing /
1 = 50 x 50 mm, for 3/8" tube
2 = 70 x 70 mm, for 1" tube

Process connection /
1 = female thread G
2 = male thread G
3 = hose spout
9 = other connection, please specify in detailed text

Operating ranges /(applicable for water 25°C):
SM-04.x.1 only:
1 = 0.1. . .1.5 l/min (0.1. . .0.5 l/min linearized)
2 = 0.2. . .10 l/min (0.2. . .2 l/min linearized)
3 = 0.4. . .12 l/min (0.4. . .2 l/min linearized)
SM-04.x.2 only:
4 = 2. . .30 l/min (2. . .3 l/min linearized)
5 = 3. . .60 l/min (3. . .5 l/min linearized)
6 = 4. . .100 l/min (4. . .6 l/min linearized)

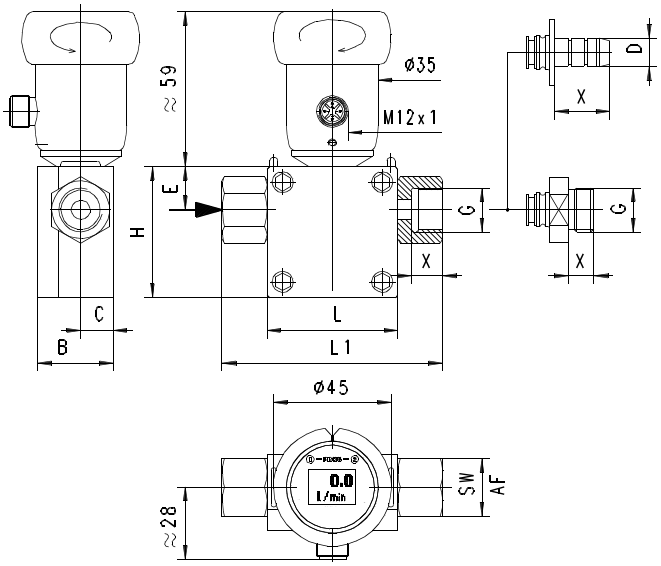
Electrical connection /
1 = 2 m cable (standard)
2 = plug connection M12x1

Output circuit /
1 = PNP impulses
2 = NPN impulses
3 = NAMUR (SM-04.1 only)
4 = mounted frequency receiver with a setpoint
5 = mounted frequency receiver with power output 4. . .20 mA, 3-wire
5a = mounted frequency receiver with voltage output 0. . .10V
6 = digital mounted transmitter with 2 transistor switching outputs, display and analogue output 4. . .20mA, 3-wire (0. . .10 VDC on request)

Options /
0 = none
1 = with transparent cover PSU (SM-04.1 only)

Dimensions Sensor:

Connection	DN	H/L	L1	B	C	E	X	SW
G 3/8" female	10	50	84	29	12.5	16.5	12	22
G 3/8" male	10	50	84	29	12.5	16.5	14	22
G 1" female	25	70	110	53	23.0	27.5	18	38
G 1" male	25	70	122	53	23.0	27.5	18	38
hose nozzle Ø 11	10	50	96	29	12.5	16.5	21	-
hose nozzle Ø 30	25	70	176	53	23.0	27.5	45	-



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SD-04

Impeller Flowmeter with Dosing or Switching Electronics



Features

/ Nominal diameters DN06 to DN50

/ Pressure-proof up to 16 bar

/ DC- or AC power supply

/ Variety of materials

/ Flanges and connections for food-processing applications

/ Available as NAMUR transmitter for ATEX zone 0 or 20 on request

Description:

An impeller made of PVDF is set into motion by a flowing medium. It generates through completely compound-filled magnets an impulse signal in the transmitter electronics proportional to the flow. Depending on the version the measuring transmitter, this signal is converted into different functions. In the simplest version, the complete unit is battery powered and displays the current flow rate and additionally two reset-table counters. The next level has a 4. . .20 mA signal and a pulse output, which is designed as a transistoroutput, and, in addition, two resettable totalizers that can be used as the main and day counters. Naturally, also the current flow rate can be displayed and furthermore two addi-tional relay outputs are available, if switchpoints are necessary. The full version of SD-04 includes a dosing device with 2 totalizers, 2 relays and 3 dosing modes. The dosing volume can be set through a keypad, binary inputs or pulse-modulated through a PLC. The dosing device is capable of determining the K factor of other flow sensors by means of „Teach-in“ or, in the same way, to enhance (litre-wise) the accuracy of the inbuilt own sensor. Moreover, for testing the system a flow can be simulated in a „dry“ run, thereby meeting the highest requirements of modern dosing technology. The sensor and electronics are connected to each other through a simple bayonet lock; therefore, the electronics are easily interchangeable. Pick-up sensors and transmitter variants can be interchanged in any manner.

Application:

Thanks to the variety of materials and connectivity in the flow pick-up sensor in the SD-04, the user has immense possibilities of application. Polypropylenes, PVDF and PVC offer a choice of synthetic materials that are resistant to nearly all hostile media and, materials such as brass and stainless steel logically supplement the choice favoring metals. All com-monly used thread variants, DIN and ANSI flanges in stainless steel and Tri-Clamp supports and welded ends are available as connectors and thus enable coupling the SD-04 to nearly any process. The nominal diameter ranges from DN06 to DN50 and covers, therefore, a wide range of flows.

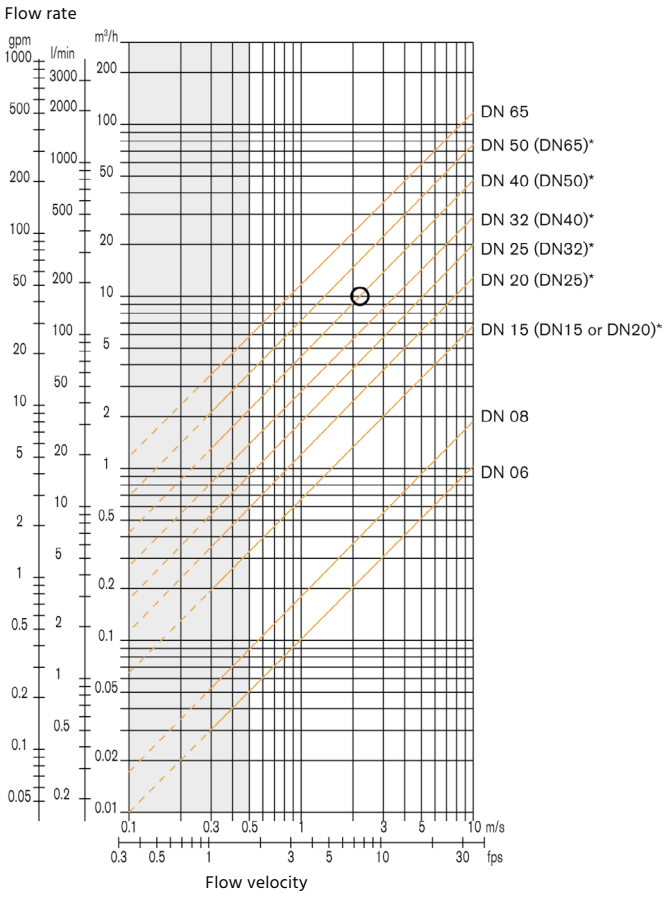
Technical Specifications:

Nominal diameter /	DN06 to DN50
Operating range /	0.5. . .1200 l/min
Flow velocity /	0,3. . .10 m/s (hall transducer version) 0,5. . .10 m/s (batterie version - coil transducer)
Accuracy /	
Teach-In:	± 1% of measured value
Standard K-Factor:	+ 2.5% of measured value (at 10 m/s)
Linearity /	± 0.5% of F.S. (at 10 m/s)
Repeatability /	± 0.4% MW
Viscosity & Pollution /	clean, neutral or aggressive fluids max. 300 cSt / 1% max. (particle size: 0.5 mm max.)
Media temperature /	
PVC:	0. . .+50°C
PP:	0. . .+80°C
PVDF, brass, st. steel:	-15. . .+100°C (high temperature on request)
Operating and storage temperature of sensor housing /	
PVC:	-15. . .+60°C
PP:	-15. . .+80°C
VA, Ms, PVDF:	-15. . .+100°C
Rel. humidity /	≤ 80%, non-condensed
max. Pressure Fitting /	
Plastic:	10 bar up to 20°C (see P-T diagram)
Metal:	16 bar (40 bar on request)
Materials Fitting /	
Seal:	FKM (EPDM)
Housing:	PVC, PP, PVDF, brass ($CuZn_{39}Pb_2$) stainless steel (316L - 1.4404)
Screws:	stainless steel (316L - 1.4404)
Impeller:	PVDF (PP or stainless steel on request)
Axis and bearing:	ceramics (Al_2O_3)
Materials Electronics /	
Housing, cover, lid, nut:	PC
Front film:	polyester
Screws:	stainless steel
Cable, plug or glands:	PA

Wetted parts /	fitting, impeller, axis, bearing and seal
Display /	15 x 60 mm, 8-digit LCD, alpha-numeric, 15 segments, 9 mm high
Norm /	2014/68/EU
Certificate /	EN-ISO 10204 DIN 4762 DIN 4768 ISO/4287/1

Impeller sensors ensure reliable operation in the range of 0.3 to 10 m/s flow velocity which means that their accuracy of 0.5% from one end of the range plus 2.5% of the measured volume is available for a range of 1:33.
In dosing technology, especially the SD-04 has hardly any match, considering its variety in respect to volume specifi-cations, resistance to different media and, not the least, its excellent price to performance ratio.

Nominal Diameter Options:



--- not recommended
* choose a pipe size DN40 [or DN50 for any * marked fitting] for the following fittings with process connector:
External Thread SMS 1145
Weld-on end SMS 3008, BS4825-1/ASME BPE/DIN 11866 Line C or DIN 11850 Line 2/DIN 11866 Line A/DIN EN 10357 Line A
Clamp SMS 3017, BS 4825-3/ASME BPE or DIN 32676 Line A

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Electrical Specifications:

Dosing unit /

Supply voltage:	12. . .36 VDC ± 10%, filtered and controlled, SELV circuit with non-dangerous energy-level, or 115 / 230 VAC 50/60 Hz
Cable:	50 m max., shielded, 1.5 mm² max.
Cable gland:	M20 x 1.5 or plug EN 175301-803
Reverse polarity protection DC:	yes
Current consumption:	≤ 100 mA at 12 VDC - with relay ≤ 50 mA at 36 VDC - with relay ≤ 55 mA at 115/230 VAC - with relay (without consumption of digital input and pulse output)
4 digital inputs:	switching threshold Von: 5 to 36 VDC switching threshold Voff: 2 VDC max. input impedance: 9.4 kΩ galvanic insulation, protected against polarity reversals and voltage spikes functions selections of dosing volume and Start/Stop actuation

Transistor output / 2x NPN or PNP, potential free;

default for output 1: pulse output

default for output 2: batch state

configurable and parameterizable 0.6-2200 Hz, 5-36 VDC, 100 mA max. line drop 2.7 VDC at 100 mA

duty cycle:
> 0.45 if 0.6 < frequency < 300 Hz
> 0.4 if 300 < frequency < 1500 Hz
< 0.4 if 1500 < frequency < 2200 Hz
galvanic insulation, protected against overvoltage, polarity reversals and short circuits

Relay output / 2 relays (currentless open), parameterizable

Switching load:	230 VAC, 3 A, or 40 VDC, 3 A (ohmic load) max. switching capacity 750 VA (ohmic load)

Protection class / IP65

EMC / EN 61000-6-2, EN 61000-6-3

Security / EN 61010-1

Vibration / EN 60068-2-6

Shock / EN 60068-2-27

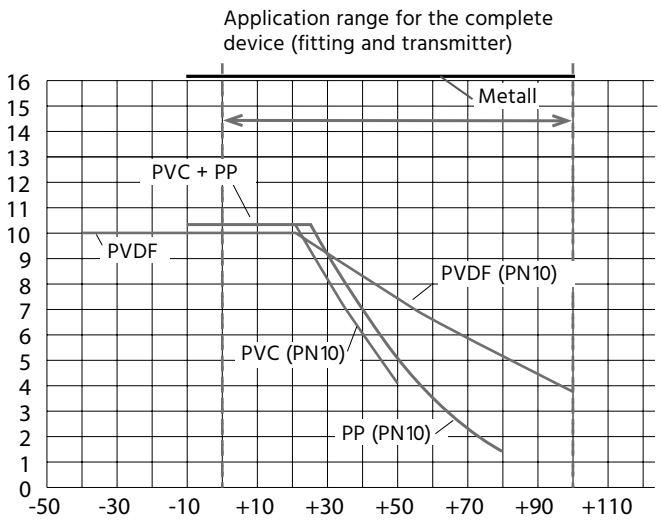
Approvals / CE; UL-Recognised for US & Canada

Flow transmitter /

Supply voltage:	12. . .36 VDC ± 10%, filtered and controlled, SELV circuit with non-dangerous energy-level, or 115 / 230 VAC 50/60 Hz
Cable:	50 m max., shielded, 1.5 mm² max.
Cable gland:	M20 x 1.5 or plug EN 175301-803
Reverse polarity protection DC:	yes
Current consumption:	≤ 70 mA at 12 VDC - with relay ≤ 25 mA at 12 VDC - without relay
Output signal:	4. . .20 mA, 3-wire - with relay 4. . .20 mA, 2-wire - without relay
Load:	max. 50 Ω at 12 VDC max. 600 Ω at 24 VDC max. 800 Ω at 115 / 230 VAC max. 900 Ω at 30 VDC
Pulse output:	polarized, potential free, 5 to 36 VDC, 100 mA, protected, line drop at 100 mA: 2.5 VDC
Relay:	2 relays freely configurable, 3 A, 230 VAC or 3A, 40 VDC
Protection class:	IP65
EMC:	EN 61000-6-2, EN 61000-6-3
Security:	EN 61010-1
Vibration:	EN 60068-2-6
Shock:	EN 60068-2-27

Battery power / batteries 4 x 1.5 VDC AA
lifespan min. 4 years at 20°C

P-T Diagram:



Ordering Codes:

Order number	SD-04.	2.	2.	2.	2.	0

SD-04 Flowmeter with Dosing or Switching Electronics

Sensor housing material /

1 = polypropylene with weld-on ends
1a = polypropylene with swivel nut and weld-on bushings
2 = PVDF with weld-on ends
2a = PVDF with swivel nut and weld-on bushings
2b = PVDF with male thread as per ISO 10931
3 = PVC with adhesive ends DIN 8063
3a = PVC with swivel nut and adhesive bushings DIN 8063
3b = PVC with BSPP-male thread DIN 8063
4 = brass with BSPP-female thread
4a = brass with BSPT-female thread
5 = brass with BSPP-male thread
5a = brass with BSPT-male thread
6 = brass with NPT-female thread
6a = brass with NPT-male thread
7 = stainless steel with BSPP-female thread
7a = stainless steel with BSPT-female thread
8 = stainless steel with BSPP-male thread
8a = stainless steel with BSPT-male thread
9 = stainless steel with NPT-female thread
9a = stainless steel with NPT-male thread
10 = stainless steel with welding studs EN ISO 1127 ISO 4200
11 = stainless steel with Tri-Clamp EN ISO 1127 ISO 4200
12 = stainless steel with flanges as per EN 1092-1
13 = stainless steel with flanges as per ANSI B16-5-1988

Nominal diameter /

0 = 06 mm
0a = 08 mm
1 = 15 mm
2 = 20 mm
3 = 25 mm
4 = 32 mm
5 = 40 mm
6 = 50 mm

Transmitter /

0 = battery operated measuring device, without outputs, with display for current flow and 2 resettable counters
1 = measuring device with 4 to 20 mA and pulse output (PNP and NPN), 2 totalizers and interchangeable flow display
2 = measuring device with 4 to 20 mA and pulse output (NPN and PNP), 2 additional relays, 2 totalizers and interchangeable flow display
5 = dosing device with 2 totalizers, dosing flow display and 2 relays

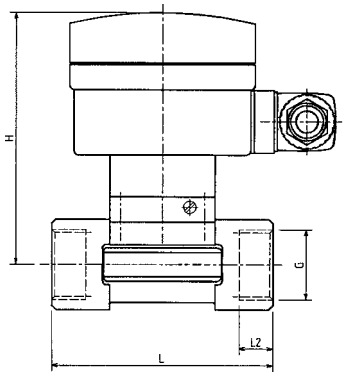
Supply voltage /

0 = battery 2 x 9 VDC (transmitter version 0 only)
1 = 12. . .36 VDC
2 = 115. . .230 VAC

Options /

0 = none
1 = measuring transmitter separately for panel-mounting
2 = measuring transmitter separately for wall-mounting

Dimensions MS and SS:



Brass and st. steel housing with f-thread G

ND [mm]	Thread	L [mm]	L2 [mm]	H [mm]
15	G ½"	84	16.00	139
20	G ¾"	94	17.00	137
25	G 1"	104	23.50	137
32	G 1 ¼"	119	23.50	140
40	G 1 ½"	129	23.50	144
50	G 2"	148.5	27.50	151

Brass and st. steel housing with NPT-f

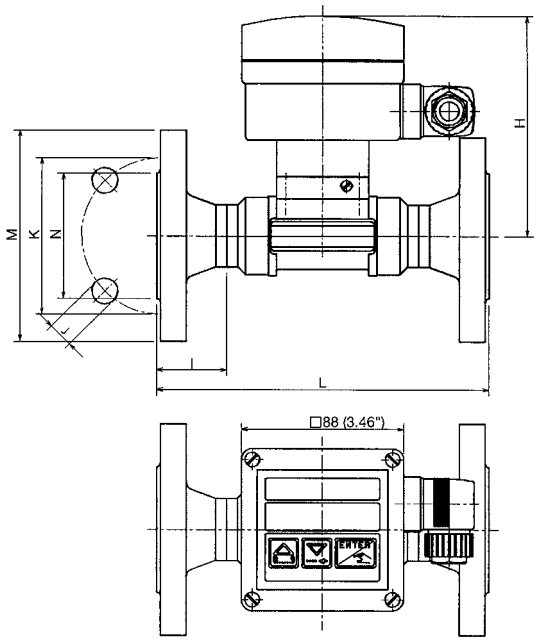
ND [mm]	Thread	L [mm]	L2 [mm]	H [mm]
15	NPT ½"	84	17.00	139
20	NPT ¾"	94	18.30	137
25	NPT 1"	104	18.00	137
32	NPT 1 ¼"	119	21.00	140
40	NPT 1 ½"	129	20.00	144
50	NPT 2"	148.5	24.00	151

Brass and st. steel housing with BSPT-f

ND [mm]	Thread	L [mm]	L2 [mm]	H [mm]
15	Rc ½"	84	15.00	139
20	Rc ¾"	94	16.30	137
25	Rc 1"	104	18.00	137
32	Rc 1 ¼"	119	21.00	140
40	Rc 1 ½"	129	19.00	144
50	Rc 2"	148.5	24.00	151

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Dimensions MS and SS:

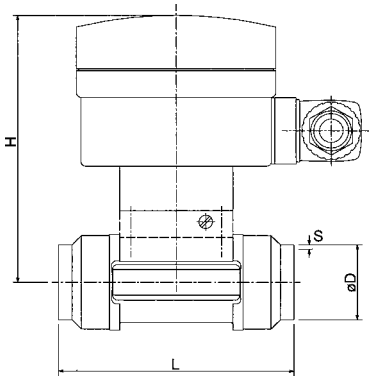


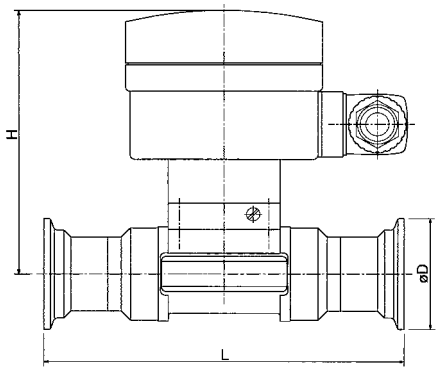
St. steel housing with flange as per EN 1092-1

ND [mm]	I [mm]	J amount x Ø	K [mm]	M [mm]	N [mm]	L [mm]	H [mm]
15	23.5	4 x 14 mm	65	95	45	130	139
20	28.5	4 x 14 mm	75	105	58	150	137
25	28.5	4 x 14 mm	85	115	68	160	137
32	31	4 x 18 mm	100	140	78	180	140
40	36	4 x 18 mm	110	150	88	200	144
50	41	4 x 18 mm	125	165	102	230	151

St. steel housing with flange as per ANSI B16-5

ND [mm]	I [mm]	J amount x Ø	K [mm]	M [mm]	N [mm]	L [mm]	H [mm]
15	23.5	4 x 15.8 mm	60.3	89.0	34.9	130	139
20	28.5	4 x 15.8 mm	69.8	99.0	42.9	150	137
25	28.5	4 x 15.8 mm	79.4	108.0	50.8	160	137
32	31	4 x 15.8 mm	88.9	117.0	63.5	180	140
40	36	4 x 15.8 mm	98.4	127.0	73.0	200	144
50	41	4 x 19.0 mm	120.6	152.0	92.1	230	151





Stainless steel housing with welding studs as per EN ISO 1127 ISO 400

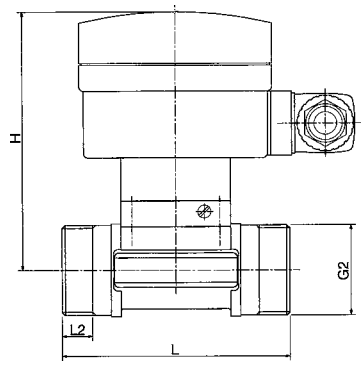
ND [mm]	D [mm]	L [mm]	S [mm]	H [mm]
08 DIN 11850	13	90	1.5	134
15	21.3	84	1.6	139
20	26.9	94	1.6	137
25	33.7	104	2.0	137
32	42.4	119	2.0	140
40	48.3	129	2.0	144
50	60.3	148.5	2.6	151

Stainless steel housing with Tri-Clamp connector as per EN ISO 1127/ISO 400

ND [mm]	D [mm]	L [mm]	H [mm]
08 DIN 32676	34.00	125	134
15	34.00	130	139
20	50.50	150	137
25	50.50	160	137
32	50.50	180	140
40	64.00	200	144
50	77.50	230	151

Other connections on request.

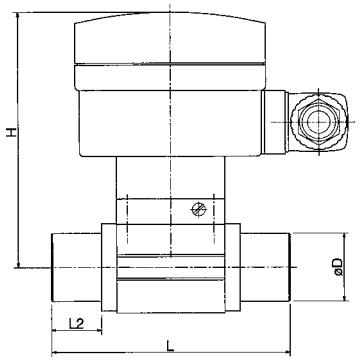
Dimensions MS and SS:



PVC, PVDF, Brass and stainless steel housing with male thread

PVC only available for DN6 and DN8, PVDF only available for DN8

ND [mm]	Thread	L [mm]	L2 [mm]	H [mm]
06	G ½"	90	14.00	134
08	G. NPT. R ½"	90	14.00	134
15	G ¾"	84	11.50	139
20	G 1"	94	13.50	137
25	G 1 ¼"	104	14.00	137
32	G 1 ½"	119	18.00	140
40	M 55 x 2	129	19.00	144
50	M64 x 2	148.5	20.00	151

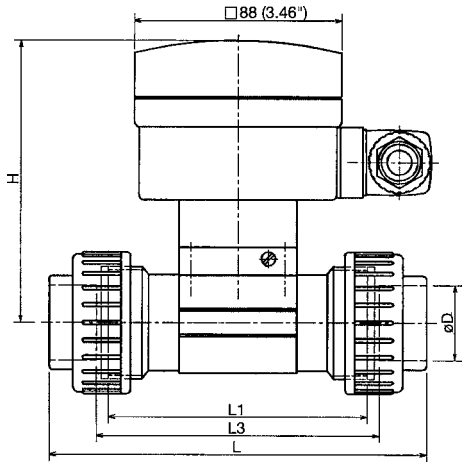


PP- and PVDF housing with weld-on ends ISO 10931 DIN 16962

ND [mm]	D [mm]	L [mm]	L2 [mm]	H [mm]
15	20	85	14	139
20	25	92	16	137
25	32	95	18	137
32	40	100	20	140
40	50	106	23	144
50	63	110	27	151

PVC housing with adhesive ends DIN 8063

ND [mm]	D [mm]	L [mm]	L2 [mm]	H [mm]
15	20	90	16.50	139
20	25	100	20.00	137
25	32	110	23.00	137
32	40	110	27.50	140
40	50	120	30.00	144
50	63	130	37.00	151

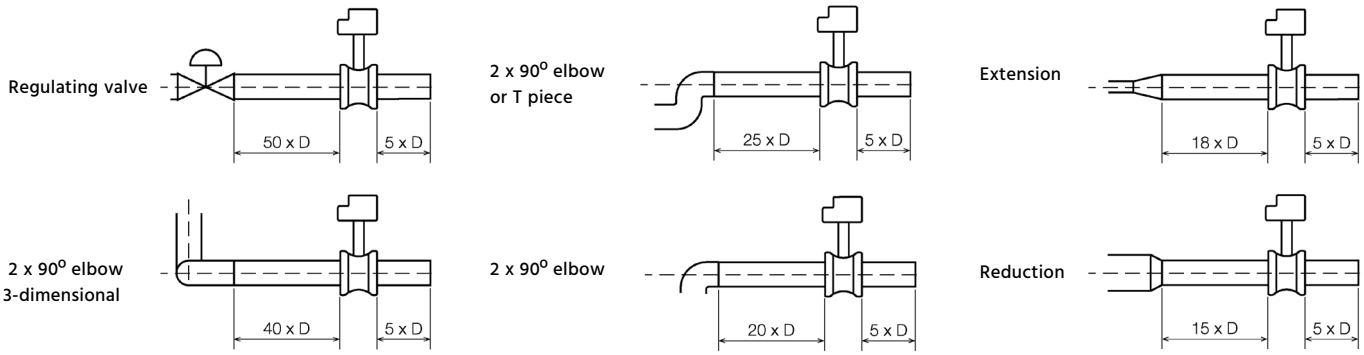


PVC housing with swivel nut and adhesion bushings; PP and PVDF housing with swivel nut and weld-on bushings

ND [mm]	D [mm]	L [mm]	L1 [mm]	L3 [mm]	H [mm]
08 [PVC only]	12	122	90	92	134
15	20	128	90	96	139
20	25	144	100	106	137
25	32	160	110	116	137
32	40	168	110	116	140
40	50	188	120	127	144
50	63	212	130	136	151

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Inlet and Outlet sections:



Nominal Diameter	DN06-1/4"	DN06 - ½"	DN08 - ½"	DN15	DN20	DN25	DN32	DN40	DN50
brass fitting									
BSPP female thread	o	o	o	x	x	x	x	x	x
NPT female thread	o	o	o	x	x	x	x	x	x
BSPT female thread ISO7	o	o	o	x	x	x	x	x	x
BSPP male thread	x	x	x	x	x	x	x	x	x
NPT male thread	o	o	x	o	o	o	o	o	o
BSPT male thread ISO7	o	o	x	o	o	o	o	o	o
stainless steel fitting									
BSPP female thread	o	o	o	x	x	x	x	x	x
NPT female thread	o	o	o	x	x	x	x	x	x
BSPT female thread ISO7	o	o	o	x	x	x	x	x	x
BSPP male thread	x	x	x	x	x	x	x	x	x
NPT male thread	o	o	x	o	o	o	o	o	o
BSPT male thread ISO7	o	o	x	o	o	o	o	o	o
weld-on ends ENISO1127 / ISO4200	o	o	x[1)]	x	x	x	x	x	x
Tri-clamp for pipe ISO1127 / ISO4200	o	o	o	x	x	x	x	x	x
flange EN 1092-1	o	o	o	x	x	x	x	x	x
flange ANSI B16-5-1988	o	o	o	x	x	x	x	x	x
PVC fitting									
bushing DIN 8063	o	o	x	x	x	x	x	x	x
socket DIN 8063	o	o	o	x	x	x	x	x	x
BSPP mal thread	o	x	x	o	o	o	o	o	o
PP fitting									
bushing DIN 16962	o	o	o	x	x	x	x	x	x
socket DIN DIN 16962	o	o	o	x	x	x	x	x	x
PVDF fitting									
bushing ISO 10931	o	o	o	x	x	x	x	x	x
socket ISO 10931	o	o	o	x	x	x	x	x	x
male thread ISO 10931	o	o	x	o	o	o	o	o	o

1) with EPDM gasket o = not available, * = available in this combination

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SD-05

Plastic Impeller Flowmeter



Features

/ DN25 to DN50

/ 5 to 1000 l/min in four operating ranges

/ Wetted parts out of PP, ECTFE, ceramic and Viton

/ 4 to 20 mA or pulse output

/ Optionally with switching contacts

/ Intended for operating pressures up to 10 bar

Description:

The SD-05 impeller flowmeter measures thin fluids according to the impeller wheel principle. An impeller wheel made of ECTFE that holds moulded magnetic pins on its five vanes projects into a polypropylene fitting. Since less flow velocity is present at the edge of the pipe than in the centre a torque causes the rotor to rotate proportionally to the flow on the axis made of ceramic. An externally mounted electronic element records the rotating speed of the impeller by means of a Hall effect sensor that emits a voltage impulse whenever a magnet crosses it and, through an amplifier, produces an NPN impulse signal at the PINs of connector. In the version with 2-wire output the impulse signal is readily converted internally into a power signal. In contrast to this, in the case of the 3-wire version, as also in a variant with impulse output and two additional threshold value relays, an SD-05 equipped with a “normal” impulse output can be easily converted into a flowmeter with 3-wire power output or one with a Push-Pull impulse output and threshold value relay by replacing the mating plug.

Application:

The most significant characteristic of flowmeters in the SD-05 series is that the materials used are plastics and, therefore, even the most hostile fluids do not pose any problems. This device offers particularly a dependable solution for deploying it in fully desalinated water where metallic components are often ruled out. The measuring range of all the four available nominal diameters of SD-05 scales at 1:50 which means that minimum 5 and maximum 1000 litres per minute can be recorded. By virtue of its design the SD-05 causes only a negligible pressure drop within the piping system and is, therefore, a cost-effective alternative for measuring low-viscous fluids.

Electrical Specifications:

Pulse output (SD-05.xx.x.x.IM) /

Function:	NPN-open-collector
Supply voltage:	4.5. . .24 VDC
Current:	max. 15 mA at 24 VDC
El. connection:	plug connector as per EN 175301-803A (cubical-shaped)
Protection class:	IP65

Analogue output 2-wire (SD-05.xx.x.x.A2) /

Supply voltage:	15. . .24 VDC
Current:	4. . .20 mA, 2-wire
Damping:	factory adjustable in steps of one second
El. connection:	plug connector as per EN 175301-803A (cubical-shaped)
Protection class:	IP65
Ambient temp. at the plug:	max. +55°C

Analogue output 3-wire (SD-05.xx.x.x.A3) /

Supply voltage:	15. . .24 VDC
Current:	10. . .40 mA
Damping:	factory adjustable in steps of one second
El. connection:	plug connector as per EN 175301-803A (cubical-shaped)
Protection class:	IP65
Ambient temp. at plug connector:	max. +55°C
Mounting:	The electronic modul is easily plugged between the plug connector and the mating plug of the SD-05 and transforms the pulse output into an analogue output. The correllation between analogue output and operating range is adjusted with a REED switch at the plug connector. This electronic modul can be field upgraded at any time.

Pulse output Push-Pull and two additional treshold value relays (SD-05.xx.x.x.FK) /

Supply voltage:	4.5. . .24 VDC
Current:	10. . .220 mA
Outputs:	1 x complementary final stage (11 mA, 24 VDC), 2 x semiconductor relays (0.1 A/24 VDC)
Damping:	factory adjustable in steps of one second
El. connection:	plug connector as per EN 175301-803A (cubical-shaped) with one meter cable
Protection class:	IP65
Ambient temp. at plug connector:	max. +55°C
Mounting:	The electronic module can be easily connected between the plug connector and the mating plug of the SD-05, transforming the pulse output into a push-pull pulse signal (suitable for PNP and NPN inputs). It also sets two limit switches on the semiconductor relay available. The measuring and limits are set via a REED switch on the connector. This model can be retrofitted on existing installations.

Technical Specifications:

Measuring principle /	rotating vane
Sensing system /	Hall effect, non-contacting
Operating ranges /	5. . .250 l/min, DN25 10. . .400 l/min, DN32 15. . .600 l/min, DN40 20. . .1000 l/min, DN50 at 0.15. . .10 m/s and 42 Hz per m/s
Accuracy /	± 3% on calibrated range
Repeatability /	< 1% on calibrated range
Operating pressure /	10 bar max. (at +22°C)
Burst pressure /	>15 bar (at +22°C)
Operating temperature /	0. . .+80°C
Viscosity range /	0.5. . .20 cSt
Housing material /	Polypropylene
Rotor /	5 blade rotor from ECTFE with encapsulated magnets
Axis/Bearing /	ceramic Al_2O_3
O-Ring /	FKM (optionally EPDM)

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El. Connection:

	SD-05. xx.x.x.IM	SD-05. xx.x.x.A2	SD-05. xx.x.x.A3	SD-05. xx.x.x.FK
Supply +	PIN 1	PIN 1	PIN 1	white
Signal	PIN 2	PIN 2	PIN 2	green
Load	PIN 3		PIN 3	brown
Relays 1-A				yellow
Relays 1-B				grey
Relays 2-A				pink
Relays 2-B				blue

Ordering Codes:

Order number	**SD-05.**	**25.**	**G.**	**VI.**	**A3.**	**0**

SD-05 Plastic Impeller Flowmeter

Size and Operating range /
25 = DN25 for 5. . .250 l/min
32 = DN32 for 10. . .400 l/min
40 = DN40 for 15. . .600 l/min
50 = DN50 for 20. . .1000 l/min

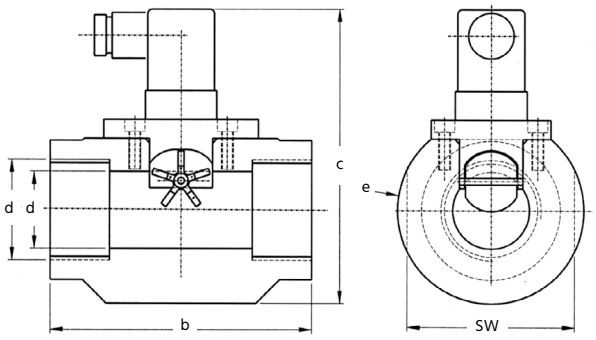
Process connection /
G = G-female thread, parallel
N = NPT-female thread, conical

Gasket /
VI = Viton
EP = EPDM

Output signal /
IM = pulse signal NPN open collector, 3-wire
A2 = analogue signal, 4 to 20 mA, 2-wire
A3 = analogue signal, 4 to 20 mA, 3-wire
FK = pulse signal Push-Pull and two setpoints (semiconductor relays)

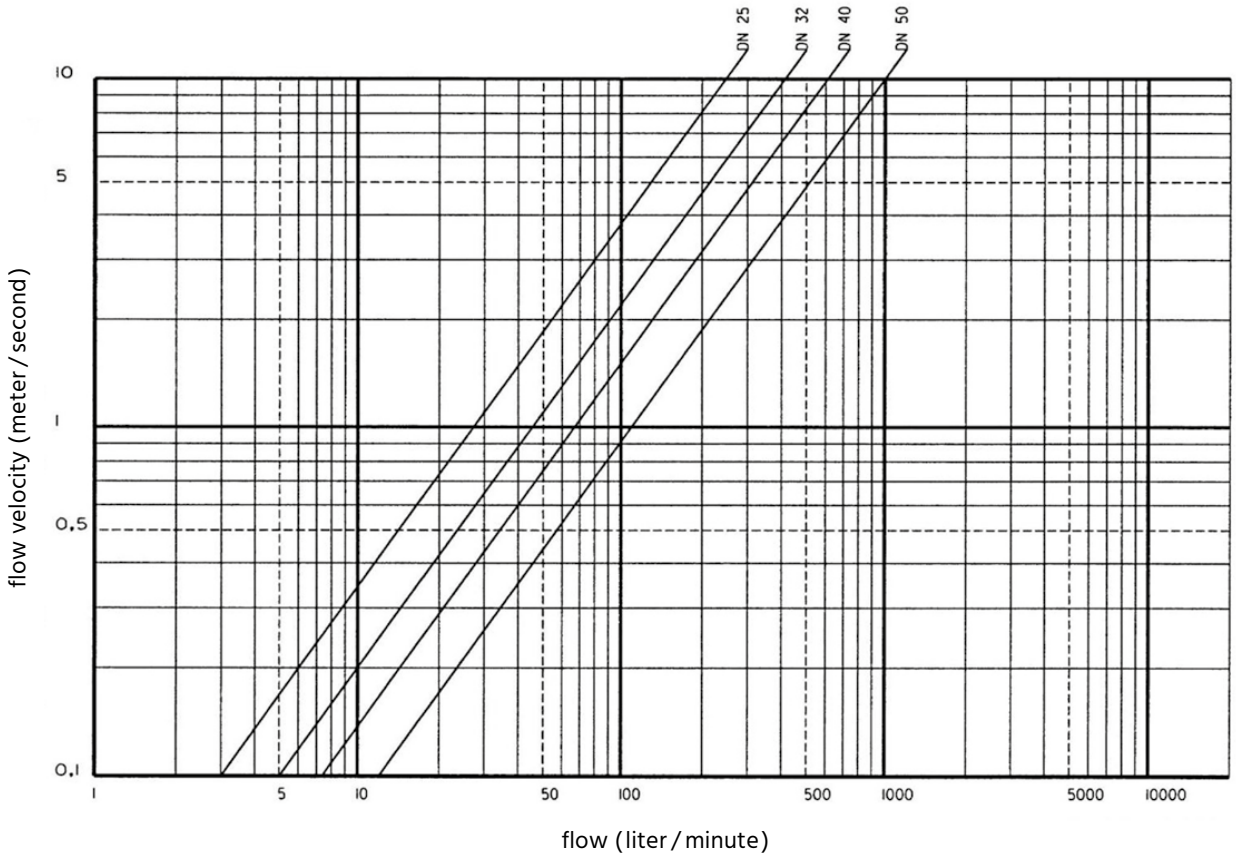
Options /
0 = none
1 = special issue, please specify in detailed text

Dimensions:



Diameter a	b [mm]	c [mm]	d [mm]	e [mm]	SW [mm]
DN25 / G1"	110	119	25	74	70
DN32 / G1 ¼"	110	123	32	78	70
DN40 / G1 ½"	120	125	40	80	75
DN50 / G2"	125	135	50	89	75

Impulse characteristic curve:



Calculation formula for the frequency determination of the flowmeter:

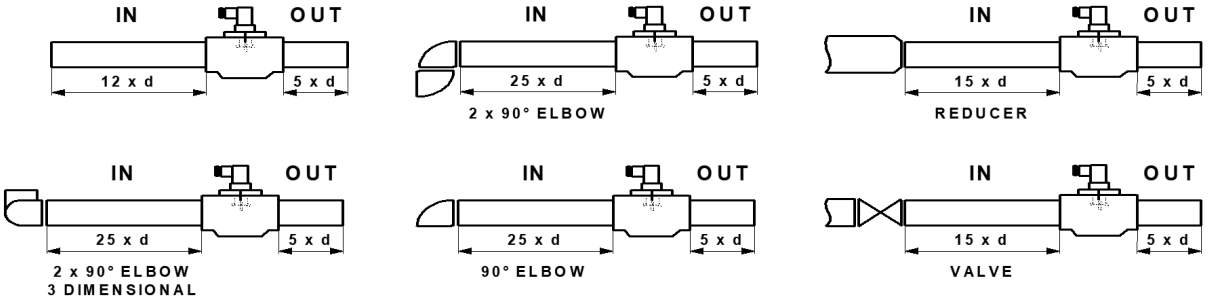
Frequency [Hz] = 42 x Flow [m/sec]

Example for Frequency determination:

500l/min at DN 50 › Frequency = 42 x 4.9 [m/sec] = 205.8 Hz

Installation Instructions:

Different types of piping and flow obstacles such as fittings, fittings, dirt traps, etc. cause different sized interference profiles whose smoothing is determined in line (pipe) lengths according to DIN 1952. In order to ensure optimum function, the installation should be made according to DIN 1952 as far as possible.



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SM-08

Miniature Turbine Flowmeter for Fluid Media

Features

/ High accuracy of measurement and resolution
/ Low deviation in mass-production
/ Plastic, brass or st. steel designs
/ Pressure-proof up to 300 bar
/ High temperature resistance
/ Convenient dim. for assembly
/ Affordable low-cost alternative

Description:

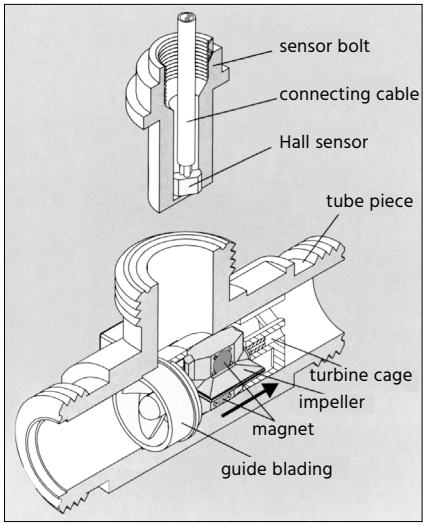
The SM-08 series of flowmeters operates according to the principle of a turbine wheel. In this the fluid flows into the turbine body and gets deflected by the guide blades at an angle of 90°. The resulting tangential flow sets a rotor into a rotation that is proportional to the flow. Depending on the device version, this rotational movement is converted into an output frequency by means of an inductive proximity sensor or a Hall sensor. A main feature of the turbine flowmeter SM-08 is that the deviation in mass-production is very low compared to other similar designs. Consequently, individual tuning for each turbine to match the particular downstream electronic unit becomes unnecessary; the SM-08 is thus ideally suited for use in series applications.

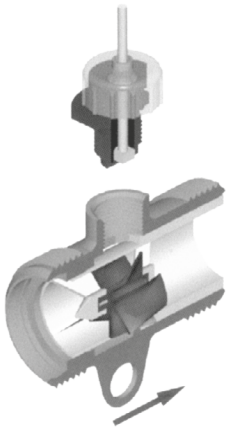
Application:

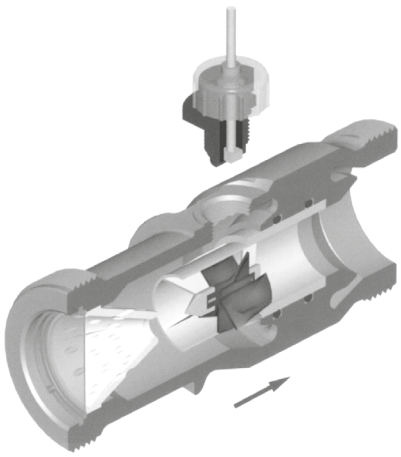
Due to their compact design, wide range of measurement and highly accurate measuring, the SM-08 series of turbine flowmeters is suitable for applications in the following areas:

- Cooling water measurement
- Medical engineering
- Plastics industry
- Solar installations
- Machine tools
- Photo laboratories
- Tapping and dosing installations
- Cooling and heating applications
- Heat volume logging
- and many more...

Measuring principle & Dimensions:







SM-08.15:
Op. range 2. . .20 (2. . .40) l/min
Axial turbine flowmeter
with guide blades

The fluid flowing into the flowmeter gets divided by the guide blades into four partial jets which strike the rotor from four directions and set it into rotation. Due to the uniform load on the bearing from four sides, the forces become largely neutralized and the wear is reduced to a minimum. In addition, extremely hard bearing material such as sapphire and carbide metal ensure extraordinary long life span.

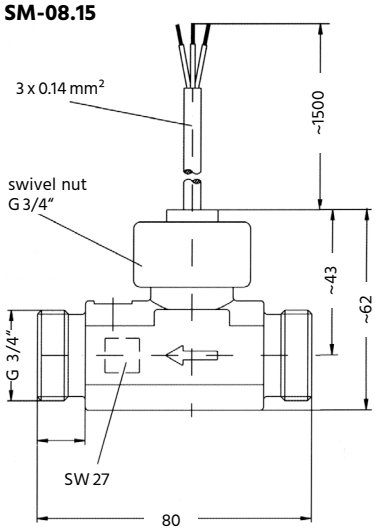
SM-08.25:
Op. range 4. . .80 (4. . .160) l/min
Axial turbine flowmeter

The fluid streaming into the flowmeter sets the turbine wheel into rotation. Due to the high-quality sapphire bearing and low RPM, the turbine has an extraordinarily long life span. The rotor RPM is converted into an electrical pulse signal (frequency).

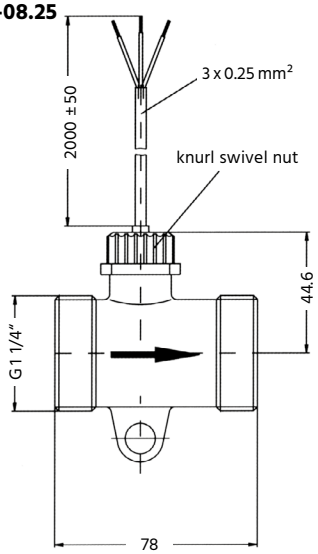
SM-08.40:
Op. range 0.4. . .25 m³/h
Axial turbine flowmeter
with partial stream evaluation

In the center of the brass-made turbine body a plastic turbine system is situated. An annular gap is designed around the turbine system. Part of the fluid stream sets the turbine into rotation while the other part of the stream is allowed to pass through the annular gap without obstruction. The rotor RPM is then converted into an electrical pulse signal (frequency). Due to high-quality sapphire bearing and low RPM, the turbine has an extraordinarily long life span.

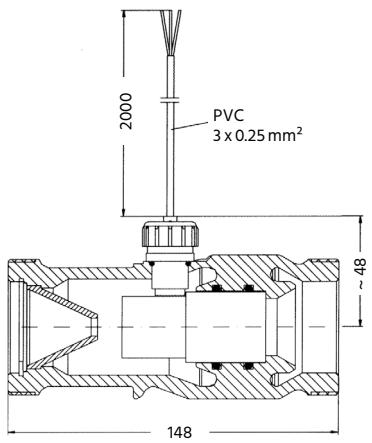
SM-08.15



SM-08.25



SM-08.40



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Materials SM-08.15:

	SM-08.15.V.K.H	SM-08.15.V.M.H	SM-08.15.V.K.I	SM-08.15.V.M.I	SM-08.15.V.M.P	SM-08.15.V.V.P
Pipe section	PPE+PS Noryl 30% fibre-reinforced	brass	PPE+PS Noryl 30% fibre-reinforced	brass	brass	st. steel 1.4571
Sensor housing	PPE+PS Noryl 30% fibre-reinforced		PPE+PS Noryl 30% fibre-reinforced		brass	st. steel 1.4571
Union nut	PA 66		PA 66		brass	without
Turbine cage & rotor	PEI ULTEM		PEI ULTEM		PEEK Victrex™	
O-Ring / seal	NBR		NBR		FKM	
Bearing system / shaft	Shaft Arcap AP1D with hard metal pins in sapphire bearings					
Bearing support	Arcap AP1D					
Rotor assembly	Hard ferrite magnet		st. steel pins		Hard ferrite magnet	
Temp. sensor (opt.)	brass or stainless steel 1.4571		brass or st. steel 1.4571		brass	brass or 1.4571
Sieve filter (optional)	POM / st. steel		POM / st. steel			

Ordering Codes:

Order number	**SM-08.15.**	**V.**	**K.**	**H.**	**N.**	**P.**	**2.**	**x.**	**VE**

SM-08 Axial Turbine Flowmeter with Guide Blades

Operating range /
V = 2. . .40 l/min - continuous flow max. 20 l/min

Material /
K = housing made of PPO Noryl (available for version „I" and „H")
M = housing made of brass (available for version „I", „H" and „P")
V = housing made of stainless steel (available for version „H" and „P")

Version /
H = with Hall sensor
I = with inductive pick-up
P = with Hall sensor up to 300 bar, 150°C

Output signal /
P = PNP (available for version „I" only)
N = NPN (available for version „I", „H" and „P")

Electrical connection /
O = none (with Option T only)
P = 1.5 m PVC cable (high-temperature version with silicon cable)
S = plug connection M12x1, 4-Pin (available for version „I" and „H")

Additional temperature sensor (not for Version P) /
0 = none
1 = PT-100 in brass sleeve
2 = PT-100 in stainless steel sleeve
3 = PT-1000 in brass sleeve
4 = PT-1000 in stainless steel sleeve

Process connection /
A = G 3/4"-male (standard)
I = G 3/4"-female (for high-pressure version in stainless steel only)
x = Connection adapter as per Table „Connection adapter"

Options /
H = with integrated sieve filter, mesh size 0.5 mm ($T_{max.}$ 60°C) (available for version „I" and „H")
Ax = with mounted measuring transmitter 4. . .20 mA (a)
(x = operating ranges full scale value 5, 10, 20 or 40 l/min)
VE = with mounted switching output (a)
VEP = with mounted switching output and additional impulse output (a) (5-Pin plug required)
T = prepared for mounted evaluator electronics TD-325 (must be ordered separately)

(a) Available for version „H" and „P" (with Hall sensor).

Tech. Specs SM-08.15:

max. Pressure /
SM-08.15.x.x.H: 10 bar
SM-08.15.x.x.I: 10 bar
SM-08.15.x.x.P: 300 bar

max. Temperature /
SM-08.15.x.x.H: 85°C
SM-08.15.x.x.I: 85°C
SM-08.15.x.x.P: 150°C (only for water)

Accuracy /
SM-08.15.x.x.H: ±0.8 l/min
SM-08.15.x.x.P: ±0.8 l/min at 2. . .20 l/min
SM-08.15.x.x.I: ±0.2 l/min

Repeatability /
SM-08.15.x.x.H: ±0.1 l/min
SM-08.15.x.x.P: ±0.1 l/min
SM-08.15.x.x.I: ±0.05 l/min

Supply /
SM-08.15.x.x.H: 4.5. . .24 VDC
SM-08.15.x.x.P: 4.5. . .24 VDC
SM-08.15.x.x.I: 10. . .30 VDC

Output signal /
SM-08.15.x.x.H: rectangular impulses, 855 ppl (1.2 ml/Puls)
NPN Open Collector, max. 10mA
SM-08.15.x.x.P: rectangular impulses, 915 ppl (1.1 ml/Puls)
NPN Open Collector, max. 10mA
SM-08.15.x.x.I: rectangular impulses, 1795 ppl (0.6 ml/Puls)
NPN or PNP Open Collector. max. 50mA

Cable sheat /
SM-08.15.x.x.H: PVC ($T_{max.}$ 70°C)
SM-08.15.x.x.I: PVC ($T_{max.}$ 70°C)
SM-08.15.x.x.P: silicone ($T_{max.}$ 150°C)

max. Particle size: 0.5 mm
Start-up: from 0.3 l/min
Protection class: IP54

SM-08.25:

Materials SM-08.25:

	SM-08.25.S.M.H	SM-08.25.S.K.H	SM-08.25.S.M.P	SM-08.25.S.V.P
Pipe section	brass, CW724R	PP	brass, CW724R	st. steel 1.4571
Turbine cage	PS-ST Xarec® 20% fibre-reinforced			
Rotor	PS-ST Xarec® 20% fibre-reinforced			
Rotor assembly	Hard ferrite magnete			
Axis	st. steel 1.4539			
Bearing	Sapphire / PA			
Housing for Hall sensor	PPE + PS Noryl™ 30% fibre-reinforced		brass, CW602N / CW614N	st. steel 1.4571
O-Ring	EPDM			
Sieve filter (optional) **associated O-Ring**	st. steel 1.4301 EPDM		st. steel 1.4301 EPDM	
Spacer		PP		

Ordering Codes:

Order number	**SM-08.25.**	**S.**	**K.**	**H.**	**P.**	**2.**	**x.**	**VE**

SM-08 Axial-Turbine flowmeter

Operating range /
S = 4. . .160 l/min - with continuous flow max. 80 l/min

Material /
K = housing made of PP (available for version „H“)
M = housing made of brass (available for version „H“ and „P“)
V = housing made of stainless steel (available for version „P“)

Version /
I = with inductive pick-up
H = with Hall sensor
P = with Hall sensor up to 50 bar, 85°C

Electrical connection /
O = none (with option T only)
P = 2 m PVC cable, Tmax. 75°C (available for version „H“ only)
S = plug connection M12x1, 4-Pin (available for version „P“ only)

Additional temperature sensor /
0 = none
5 = PT-100, 3-wire for SM-08.25.M/V see Table „Connection adapter“

Process connection /
A = G1 1/4“-male
x = connection adapter as per Table „Connection adapter“

Options /
H = with flat filter 0.63 mm, stainless steel, including O-Ring made of EPDM
Ax = with mounted measuring transmitter 4. . .20mA
(x = operating range full scale value 60, 100 or 160 l/min)
VE = with mounted switching output (a)
VEP = with mounted switching output and additional impulse output (a)
T = prepared for mounted evaluator electronics TD-325 (a) (must be ordered separately)

(a) Available for version „H“ and „P“ (with Hall sensor).

Tech. Specs SM-08.25:

max. Pressure /
SM-08.25.x.x.H: 10 bar
SM-08.25.x.x.P: 50 bar

max. Temperature /
SM-08.25.x.K.H: 80°C at 2 bar, 60°C at 5 bar, 30°C at 10 bar
SM-08.25.x.M.H: 85°C
SM-08.25.x.M.P: 85°C
SM-08.25.x.V.P: 85°C

Accuracy / ± 5% of measured value (up to 5 l/min 7% of measured value)

Repeatability / ± 0.5%

Supply /
SM-08.25.x.x.H: 10. . .30 VDC (optional 4.5. . .26.5 VDC)
SM-08.25.x.x.P: 6.5. . .24 VDC

Output signal /
SM-08.25.x.x.H: rectangular impulses, 65 ppl (15 ml/pulse) NPN Open Collector, max. 19 mA
SM-08.25.x.x.P: rectangular impulses, 65 ppl (15 ml/pulse) NPN Open Collector, max. 19 mA

max. Particle size: < 0.63 mm
Protection class: IP54
Start-up: ab 1 l/min

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SM-08.40:

Materials SM-08.40:

	SM-08.40.S.M.H	SM-08.40.S.M.P
Pipe section	brass, CW724R	
Turbine cage	PS-ST Xarec® 20% fibre-reinforced	
Rotor	PS-ST Xarec® 20% fibre-reinforced	
Rotor assembly	Hard ferrite magnets	
Axis	st. steel 1.4539	
Bearing	Sapphire / PA	
Housing for Hall sensor	PPE + PS Noryl™ 30% fibre-reinforced	brass, CW602N / CW614N
O-Ring	EPDM	
Flow guiding cone	POM	
Sieve filter	st. steel 1.4301	
Retaining ring	st. steel 1.4122	

Ordering Codes:

Order number	**SM-08.40.**	**S.**	**M.**	**H.**	**P.**	**5.**	**x.**	**VE**

SM-08 Axial Turbine Flowmeter with Partial Stream Evaluation

Operating range /
S = 0.4. . .25 m³/h

Material /
M = housing made of brass

Version /
H = with Hall sensor
P = with Hall sensor up to 50 bar

Electrical connection /
O = none (with Option T only)
P = 2 m PVC cable (available for version „H" only)
S = plug connector M12 x 1, 4-Pin (available for version „P" only)

Additional temperature sensor /
0 = none
5 = PT-100, 3-wire see Table „Connection adapter"

Process connection /
A = G 2"-male
x = connection adapter as per Table „Connection adapter"

Options:
Ax = with mounted measuring transmitter 4. . .20 mA
(x = operating range full scale value 150, 250 or 400 l/min)
VE = with mounted switching output (a)
VEP = with mounted switching output and additional impulse output (a)
T = prepared for mounted evaluator electronics TD-325 (a) (must be ordered separately)

(a) Available for version „H" and „P" (with Hall sensor).

Tech. Specs SM-08.40:

max. Pressure /
SM-08.40.x.x.H: 10 bar
SM-08.40.x.x.P: 50 bar

max. Temperature /
SM-08.40.x.x.H: 85°C
SM-08.40.x.x.P: 85°C

Accuracy / ± 7% of the measured value between 0.4. . .3 m³/h
±5 % of the measured value between 3. . .25 m³/h

Repeatability / ± 0.5%

Supply /
SM-08.40.x.x.H: 10. . .30 VDC (optional 4.5. . .26.5 VDC)
SM-08.40.x.x.P: 6.5. . .24 VDC

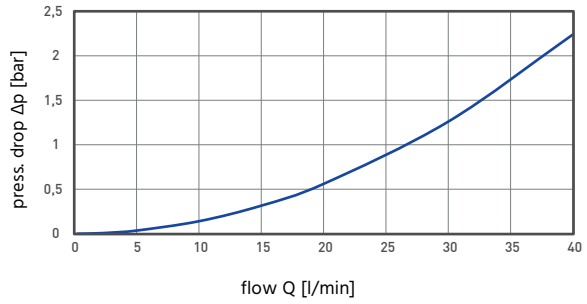
Output signal /
SM-08.40.x.x.H: rectangular imp., 26.6 ppl (37.6 ml/pulse) NPN Open Collector, max. 19 mA
SM-08.40.x.x.P: rectangular imp., 26.6 ppl (37.6 ml/pulse) NPN Open Collector, max. 19 mA

max. Particle size: < 0.63 mm

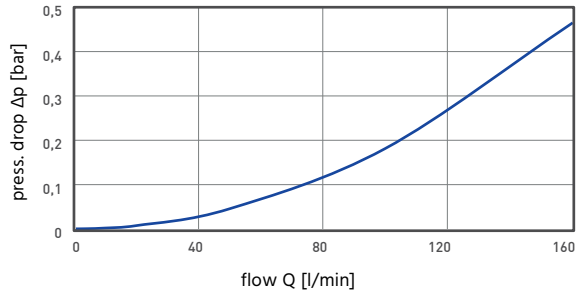
Filter: flat filter 0.63 mm, included
Protection class: IP54
Start-up: from 0.28 m³/h

Pressure drop:

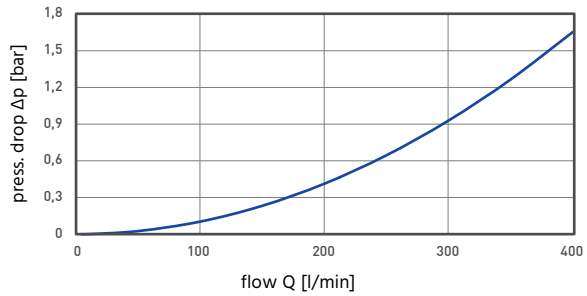
SM-08.15



SM-08.25

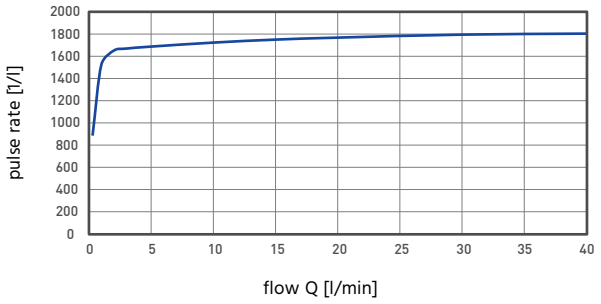


SM-08.40

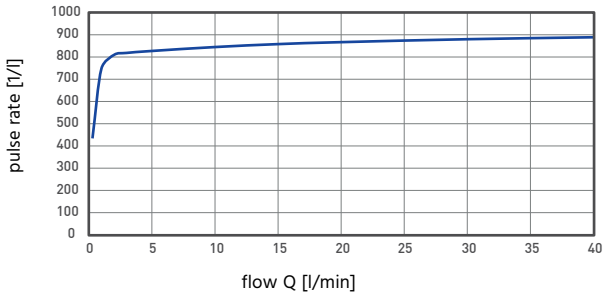


Pulse rates:

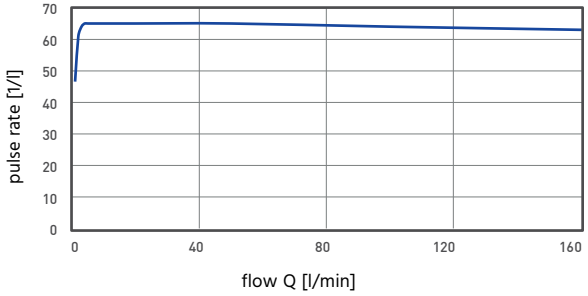
SM-08.15, inductive



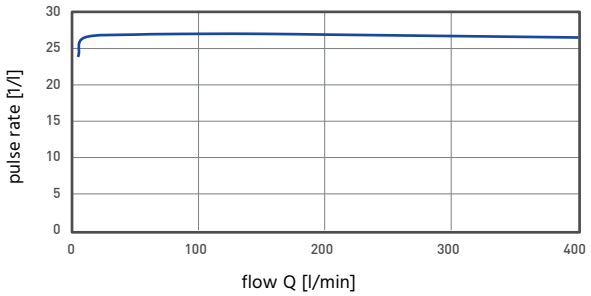
SM-08.15, Hall Sensor



SM-08.25



SM-08.40



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Connection Adapter incl. Sealing:

Connection Adapter – SM-08.15:

Type	Description	fits to:	$T_{max.}$ / $P_{max.}$
A15ST10K	hose spout, PA 6.6, d = 10 mm	SM-08.15	20°C at 10 bar, 60°C at 2.5 bar
A15ST12K	hose spout, PP, d = 12 mm	SM-08.15	20°C at 10 bar, 60°C at 2.5 bar
A15ST15K	hose spout, PP, d = 15 mm	SM-08.15	20°C at 10 bar, 60°C at 2.5 bar
A15ST19K	hose spout, HDPE, d = 19 mm	SM-08.15	20°C at 10 bar, 60°C at 2.5 bar
A15STW13K	hose spout, HDPE, angled, d = 13 mm	SM-08.15	60°C, PN10
A15STW13M	hose spout, brass d = 13 mm	SM-08.15	80°C, PN10
A15KM22K	adhesive sleeve, PVC, d = 22 mm, for pipes with outer diam. 16mm	SM-08.15	20°C at 10 bar, 60°C at 2.5 bar
A15SN20K	welded socket, PP, d = 20 mm	SM-08.15	20°C at 10 bar, 60°C at 2.5 bar
A15VA10M	joint, brass, G 3/8" male	SM-08.15	110°C, PN16
A15VA15M	joint, brass, G 1/2" male	SM-08.15	110°C, PN16
A15VI10M	joint, brass, Ni plated, G 3/8" female	SM-08.15	110°C, PN16
A15VI15M	joint, brass, G 1/2"	SM-08.15	110°C, PN16
A15KL18M	compression fitting, brass, for copper pipe d = 18 mm	SM-08.15	110°C, PN16
A15KL22M	compression fitting, brass, for copper pipe d = 22 mm	SM-08.15	110°C, PN16
A15LA15M	solder connection, brass, for copper pipe d = 15 mm	SM-08.15	90°C, PN16
A15LA18M	solder connection, brass, for copper pipe d = 18 mm	SM-08.15	90°C, PN16

Connection Adapter – SM-08.40:

Type	Description	fits to:	$T_{max.}$ / $P_{max.}$
A40VA40M-PT-100	joint, brass, with PT-100 in brass sleeve, G1 1/2" male	SM-08.40	85°C, PN16
A40VA40M	joint, brass, R1 1/2"male	SM-08.40	85°C, PN16
A40VA50M	joint, brass, G2" male	SM-08.40	85°C, PN16
A40LA42M	solder connection, brass, for copper pipe d = 42 mm	SM-08.40	85°C, PN16

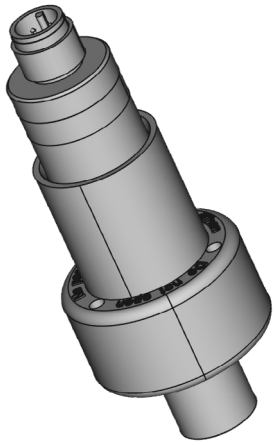
Connection Adapter – SM-08.25:

Type	Description	fits to:	$T_{max.}$ / $P_{max.}$
A25ST25K	hose spout, PP, d = 25 mm	SM-08.25	20°C at 10 bar, 60°C at 2.5 bar
A25ST30K	hose spout, PP, d = 30 mm	SM-08.25	20°C at 10 bar, 60°C at 2.5 bar
A25ST32K	hose spout, PP, d = 32 mm	SM-08.25	20°C at 10 bar, 60°C at 2.5 bar
A25SM25K	welded sleeve, PP, outer diameter. 25 mm	SM-08.25	20°C at 10 bar, 60°C at 2.5 bar
A25KM25K	adhesive sleeve, PVC, outer diameter. 25 mm	SM-08.25	20°C at 10 bar, 60°C at 2.5 bar
A25VA25M-PT-100	joint, brass, with PT-100 in brass sleeve, G1" male	SM-08.25	85°C, Centelen
A25VA25M	joint, Ms, R1" male	SM-08.25	85°C, Centelen
A25VA32M	joint, brass, R1 1/4" male	SM-08.25	85°C, Centelen
A25LA28M	solder connection, for copper pipe d = 28 mm	SM-08.25	85°C, PN 16, Centelen
A25VA25V	joint, VA, R1" male	SM-08.25	85°C, Centelen

Accessory – SM-08:

Type	Description
SM-08.Z.L3	connecting cord for turbine-flow-sensors with tipped coupling M12 x 1, 4-Pin, shielded, L = 3 m $T_{max.}$ = 70°C
SM-08.Z.L5	as above, however L = 5 m
SM-08.Z.L10	as above, however L = 10 m
SM-08.Z.S	coupling box M12 x 1, 4-Pin, for self-customization

Limit Value Emitter (optional) SM-08. . .VE(P)



Description: The SM-08 can be transformed into a flowswitch with the help of an optional limit value emitter. The turbine delivers a flow-proportional frequency signal to a microprocessor. This monitors the set minimum flow and activates the alarm contact without potential, if the flow falls short. Even a likely blockage in the turbine is reliably identified and signaled. Besides the switching output (contact), optionally, an impulse signal is available, so in addition to the safe monitoring, a continuous or temporary flow measurement can also be performed.

Areas of application: Monitoring of cooling circuits in high-end equipment such as laser installations, HF generators etc.

Switch position	Setpoint in l/min					
	SM-08.15		SM-08.25		SM-08.40	
	rising	falling	rising	falling	rising	falling
0	1	0.5	5	3	10	7
1	1.5	1	7	5	13	10
2	2	1.5	8	6	19	15
3	2.5	2	10	8	24	20
4	3	2.5	12	10	30	25
5	3.5	3	14	12	35	30
6	4	3.5	17	15	40	35
7	5	4.5	20	18	47	40
8	6	5.5	22	20	58	50
9	8	7.5	27	25	75	65
A	10	9.5	33	30	90	80
B	12	11.5	38	35	115	100
C	16	15.5	44	40	150	130
D	20	19.5	55	50	190	160
E	25	24.5	75	70	230	200
F	30	29.5	105	100	310	275

The specified setpoints refer to water, 20°C. Customer-specific setpoint tables can be implemented for above 25 devices.

Technical Specifications:

Setpoint range / see „Setpoint table“

Accuracy of switching if used with /

SM-08.15: 0.5. . .29.5 l/min
± 2% of Setpoint + x

SM-08.25: 3. . .100 l/min
± 4% of Setpoint + x

SM-08.40: 7. . .275 l/min
± 6% of Setpoint + x
x = accuracy of turbine flow sensor

Setpoint adjustment / 16 different Setpoints, usable by means of 16-digit rotary switch

Switching hysteresis /

SM-08.15: 0.5 l/min

SM-08.25: 2. . .5 l/min

SM-08.40: 3. . .35 l/min

Output /

Switching output: electrically insulated contact, opens in the case of lack of flow, max. contact rating 125 VAC/DC, 100 mA

Pulse- and switching output: switching output against power supply max. contact rating 100 mA
Pulse output: flow-proportional frequency signal, NPN, max. 100 mA

Display: 2 LED – yellow: flow OK, red: alarm

Electr. connection: 4-Pin plug, M12 x 1

Supply voltage: 12. . .24 VDC, max. 25mA

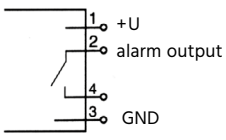
max. Media temp.: 80°C

Protection class: IP54 with closed sleeve and connected socket

Housing: PA transparent

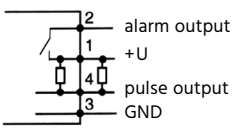
Electrical Connection:

Switching output only



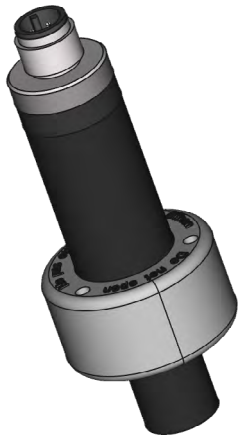
or

Switching output and Pulse output



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Measuring Transmitter (optional) SM-08. . .Ax

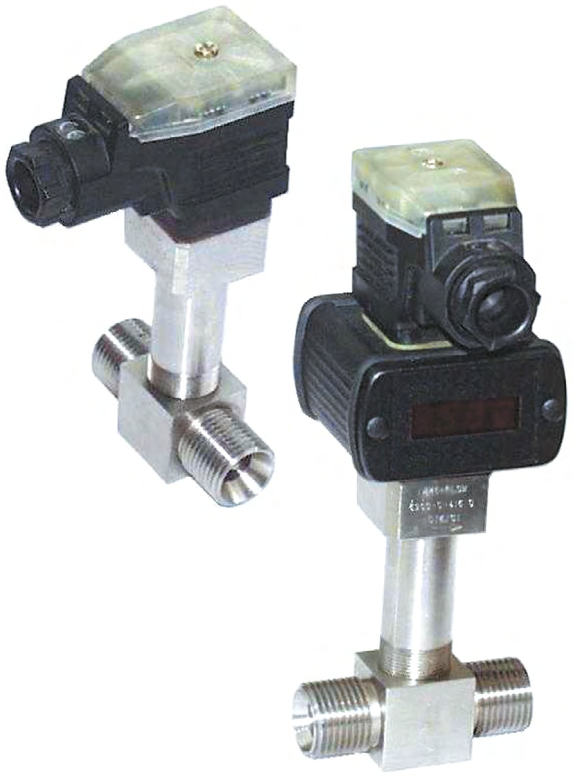


All SM-08 series of turbine flowmeters can be equipped with an integrated F/I measuring transmitter. With this they transmit an analogue signal output of 4. . ..20mA instead of the im-pulse output.

Technical Specifications:

Ouput /	4. . .20mA, power limiting at ~26mA
Scaling /	as per Ordering codes SM-08.15, SM-08.25, SM-08.40. other scaling on request
Supply voltage /	18. . .30VDC
max. Power /	30 mA
max. Load /	250 Ohm to GND
El. connection /	4-Pin plug, M12 x 1
max. Media temp. /	80°C
Residual ripple /	0.2 mA_{ss} over the entire range
Type /	3-wire, galvanically not separated
Casing material /	PA
Protection class /	IP54

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SM-11N

Stainless Steel Turbine Flowmeter

Features

/ Accuracy at ± 0.5% of measured value

/ Operating ranges up to 550 m3/h

/ Suitable for plug-in display SD-01

/ Up to 400 bar

/ Carbide metal or PTFE bearings

/ Flange or tube connection

Description:

The turbine wheel of the flow meter SM-11N is positioned concentrically on both sides and it rotates inside the housing proportionally to the mean flow velocity. An inductive Pick-Up screw-mounted on the housing wall deflects the turbine wheel's rotational movement and outputs a sinus-shaped power signal to the amplifier below the plug connector which in turn generates a square-shaped impulse signal in the PNP 3-wire circuit. Optionally, the bearings for the SM-11N can be made of PTFE or carbide metal, while all other wetted parts are made of stainless steel. This allows the SM-11N to conveniently measure a wide range of low viscosity fluids.

Application:

The turbine flow meter SM-11N is used if flow volumes of low viscosity fluids need to be measured highly accurately. The permissible temperature range up to 120°C and pressure levels up to 400 bar make the device capable of handling a wide range of applications covering the entire industry. Depending on the process, the user can opt for a tube or flange connector. At the output of SM-11N a PNP transistor impulse signal is available which is compatible with most downstream evaluation devices and, if required, can be easily converted into a 4. . .20 mA or 0. . .10 V DC analogue output. Moreover, the Profimess plug-in display SD-01, can be mounted directly between the plug and the cable box of the SM-11N and does not require additional power supply, offering an excellent way to visualize the measured value.

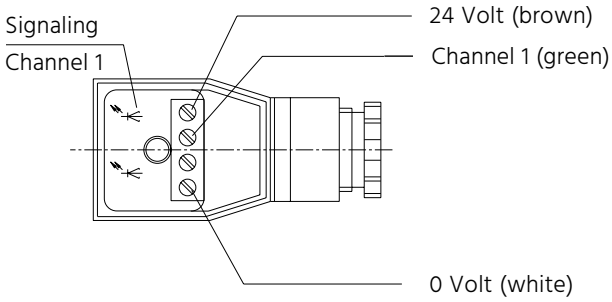
Technical Specifications:

Accuracy /	see table „Bearing types“
Mounting position /	horizontal ±5°
Housing material /	stainless steel 1.4541
Flange material /	steel 1.0566 or stainless steel 1.4541
Bearing material /	PTFE or carbide metal
Pressure /	see table for connector types
Media temperature /	-20°C to +120°C for steel flange connection -30°C to +120°C for stainless steel flange connection or tube connection
Ambient temp. /	-20°C to +60°C for steel flange connection -30°C to +60°C for stainless steel flange connection or tube connection
Required inlet section /	10 x pipe diameter to achieve the specified accuracy
Required outlet section /	5 x pipe diameter to achieve the specified accuracy

Electrical Specifications:

No. of measuring channels /	1
Operating voltage /	Ub = 12. . .30 VDC
Output signal /	voltage impulses PNP
Impulse amplitude /	$U_A \geq 0{,}8\ U_B$
Impulse form /	square
Duty cycle (Channel) /	1:1 ± 15 %
Power requirement /	max. 0.6 W
Output power /	max. 0.3 W short-circuit protected
Protection class /	IP65 DIN40050
Options /	ATEX approval for EX Zone 1, intrinsically safe

Electrical connection /

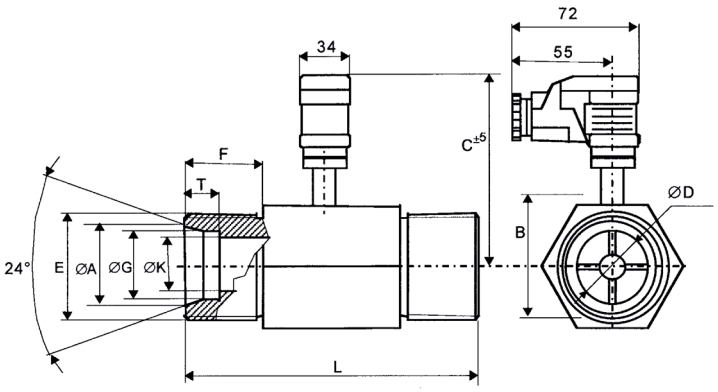


Bearing types:

Type	ND	Carbide metal		PTFE	
		Flow in l/min	Accuracy	Flow in l/min	Accuracy
SM-11N.1	6	0.92. . .4.58	± 1% of m.v.	0.92. . .4.58	± 1% of m.v.
SM-11N.2	6	1.83. . .9.17	± 1% of m.v.	1.83. . .9.17	± 1% of m.v.
SM-11N.3	12	3.67. . .18.3	± 1% of m.v.	3.67. . .18.3	± 1% of m.v.
SM-11N.4	15	7.33. . .36.7	± 0.5% v. MW.	7.33. . .36.7	± 0.5% of m.v.
SM-11N.5	15	13.3. . .66.7	± 0.5% v. MW.	13.3. . .66.7	± 0.5% of m.v.
SM-11N.6	18	26.6. . .133	± 0.5% v. MW.	13.3. . .133	± 0.5% of m.v.
SM-11N.7	25	53.4. . .267	± 0.5% v. MW.	26,7. . .267	± 0.5% of m.v.
SM-11N.8	37	113. . .567	± 0.5% v. MW.	56,7. . .567	± 0.5% of m.v.
SM-11N.9	50	227. . .1133	± 0.5% v. MW.	113. . .1133	± 0.5% of m.v.
SM-11N.10	75	450. . .2250	± 0.5% v. MW.	225. . .2250	± 0.5% of m.v.
SM-11N.11	100	900. . .4500	± 0.4% v. MW.	720. . .4500	± 0.4% of m.v.
SM-11N.12	150	1833. . .9167	± 0.4% v. MW.	1464. . .9167	± 0.4% of m.v.
SM-11N.13	200	3667 - 18333	± 0.4% v. MW.	2933 - 18333	± 0.4% of m.v.
SM-11N.14	250	6333 - 31667	± 0.4% v. MW.	5067 - 31667	± 0.4% of m.v.
SM-11N.15	300	9000 - 45000	± 0.4% v. MW.	7200 - 45000	± 0.4% of m.v.
SM-11N.16	400	13333 - 66667	± 0.4% v. MW.	10667 - 66667	± 0.4% of m.v.

Dimensions tube-connection:

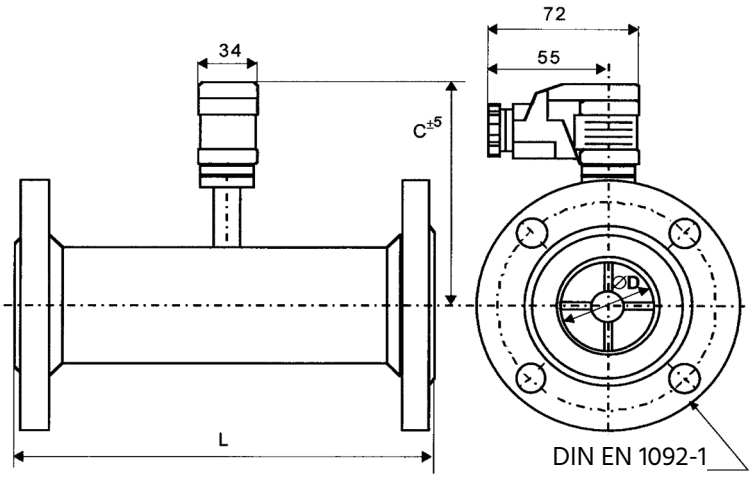
Type	Ø D [mm]	Ø A [mm]	B [mm]	C [mm]	L [mm]	E [mm]	F [mm]	Ø G [mm]	Ø K [mm]	Ø T [mm]
SM-11N.1	6	14.3	25	82	58	M20 x 1.5	12	12	8	7.5
SM-11N.2	6	14.3	25	82	58	M20 x 1.5	12	12	8	7.5
SM-11N.3	12	18.3	36	86	76	M24 x 1.5	14	16	12	8.5
SM-11N.4	15	22.9	41	87	76	M30 x 2	16	20	15	10.5
SM-11N.5	15	22.9	41	87	76	M30 x 2	16	20	15	10.5
SM-11N.6	18	27.9	48	89	130	M36 x 2	18	25	19	12
SM-11N.7	25	38	48	92	155	M52 x 2	16	35	27	10.5

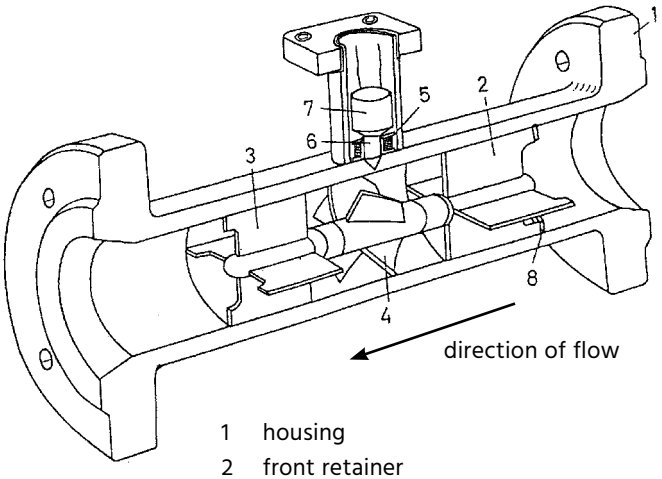


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Dim. flange-connection:

Type	Ø D [mm]	L [mm]	C [mm]	Connecting flange
SM-11N.1	6	114	95	DN10
SM-11N.2	6	114	95	DN10
SM-11N.3	12	127	102	DN15
SM-11N.4	15	127	115	DN15
SM-11N.5	15	127	115	DN15
SM-11N.6	18	141	115	DN20
SM-11N.7	25	153.5	126	DN25
SM-11N.8	37	179	126	DN40
SM-11N.9	50	198	132	DN50
SM-11N.10	75	228	140	DN80
SM-11N.11	100	355	154	DN100
SM-11N.12	150	368	180	DN150
SM-11N.13	200	458	236	DN200
SM-11N.14	250	458	265	DN250
SM-11N.15	300	458	290	DN300
SM-11N.16	400	610	345	DN400





1 housing
2 front retainer
3 rear retainer
4 turbine wheel
5 signal emitter coil
6 iron core
7 magnet
8 clamp ring

Connection types:

Type	ND	Available pressure levels in bar	
		Tube connection	flange
SM-11N.1	6	320	40/160/250/320/400
SM-11N.2	6	320	40/160/250/320/400
SM-11N.3	12	320	40/160/250/320/400
SM-11N.4	15	320	40/160/250/320/400
SM-11N.5	15	320	40/160/250/320/400
SM-11N.6	18	320	40
SM-11N.7	25	320	40/160/250/320/400
SM-11N.8	37		40/160/250/320/400
SM-11N.9	50		40/64/100/160/250/320/400
SM-11N.10	75		10/40/64/100/160/250/320/400
SM-11N.11	100		10/40/64/100/160/250
SM-11N.12	150		10/40/64/100/160
SM-11N.13	200		10/16/25/40/64
SM-11N.14	250		10/16/25/40/64
SM-11N.15	300		10/16/25/40/64
SM-11N.16	400		10/16/25/40/64

Ordering Codes:

Order number	SM-11N.	1.	2.	1.	4.

SM-11N Stainless Steel Turbine Flowmeter

Operating range end/

1 = 0,275 m^3/h
2 = 0,55 m^3/h
3 = 1,1 m^3/h
4 = 2,2 m^3/h
5 = 4 m^3/h
6 = 8 m^3/h
7 = 16 m^3/h
8 = 34 m^3/h
9 = 68 m^3/h
10 = 135 m^3/h
11 = 270 m^3/h
12 = 550 m^3/h
13 = 1100 m^3/h
14 = 1900 m^3/h
15 = 2700 m^3/h
16 = 4000 m^3/h

Bearing material /

1 = carbide metal
2 = PTFE

Process connection /

1 = tube connection
2 = stainless steel flange connection
3 = steel flange connection

Pressure levels /

1 = 10 bar
2 = 40 bar
3 = 64 bar
4 = 100 bar
5 = 160 bar
6 = 250 bar
7 = 320 bar
8 = 400 bar

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SM-16

Turbine Flowmeter for Fluid Media without Auxiliary Power Supply



Features

/ Counter and/or flowmeter versions
/ Local 6-digit LCD display
/ Battery-operated, replaceable
/ Aluminium, nylon or st. steel versions
/ Operating ranges up to 1135 l/min
/ Convenient dimensions for assembly
/ ATEX II 1G Ex ia IIC T6

Description:

The SM-16 series of turbine flowmeters consists of an interchangeable turbine which is built into a flow housing made of nylon, aluminium or stainless steel and a local evaluator and display electronic unit. This functions as a total and a partial volume counter and as a flowmeter. The turbine wheel is set into rotation by the streaming medium. The ferrites embedded into the turbine blades are scanned through an inductive pick-up system. The sequence of impulses generated thus is proportional to the flow and is displayed by means of a microprocessor controlled electronic unit.

Application:

Due to the interchangeable battery the devices do not depend on external power supply and, therefore, they can be deployed without extensive cabling wherever flow volumes need to be accurately measured or counted locally. The integrated microprocessor allows on-the-spot calibration with the result that accuracy is increased or the device can be adjusted, apart from water, for even highly viscous media.

Technical Specifications:

Medium / low-viscosity (higher viscosities with on-the-spot calibration)

Process connection / 1/2" ISO female thread
(only operating range 14)
3/4" ISO female thread
(only operating range 11, 12, 16)
1" ISO female thread
(only operating range 15)
1 1/2" ISO female thread
(only operating range 17)
2" ISO female thread
(only operating range 13, 18)

max. Temperature / -18. . .+60 °C

max. Pressure /

- Al-housing: 20 bar
- Nylon-housing: 10 bar
- St. steel-housing: 100 bar - A high pressure version up to 200 bar for the st. steel housing is available on request.

Supply / 2x lithium battery, approx. lbattery life: 5 years

Display / LCD, 6-digit automatic On and Off switching

Accuracy / **only applies to low-viscosity liquids:**

- Range 11: bis ± 5% ***
- Range 12,13,14: ± 1.5%
- Range 15,16: ± 1.0%
- Range 17,18: ± 0.75%
(± 1.0% possible with on-site calibration)

*** Accuracy can vary up to ± 5% depending on installation and fluid type. Field calibration is recommended for best accuracy.

Protection class / IP 44

Dimensions in mm:

Nylon- and Aluminium housing		Operating ranges
102 x 63 x 51 mm	1"	11, 12
152 x 114 x 76 mm	2"	13
St. Steel housing		
107 x 46 x 51 mm	1/2"	14
109 x 51 x 51 mm	3/4"	15
114 x 56 x 51 mm	1"	16
135 x 71 x 68 mm	1 1/2"	17
160 x 81 x 84 mm	2"	18

Ordering Codes:

Order number	SM-16.	Q9.	A.	11.	0

SM-16 Turbine Flowmeter

Version /
Q9 = counter for total and partial volume and flowmeter

Material /
A = aluminium housing
N = nylon housing
E = stainless steel housing

Operating range (nylon and aluminium housing) /
11 = 1 . . . 11 l/min
12 = 11 . . . 190 l/min
13 = 104 . . . 1135 l/min (only aluminium housing)

Operating range (stainless steel housing) /
14 = 3.8. . .37.9 l/min
15 = 7.6 . . . 75.7 l/min
16 = 18.9 . . . 190 l/min
17 = 38.0 . . . 380 l/min
18 = 76.0 . . . 760 l/min

Special issues /
0 = none
1 = please specify in detailed text
2 = ATEX approval, ATEX II 1G Ex ia IIC T6 Ta = -40. . .+60°C; IP65

Special Versions /

For the operating range 10. . .100 l/min, a low-cost version of the SM-16 for petrol, diesel and kerosene in aluminium or another version for water in nylon that operates with accuracy of 5 % and up to 20 bar for aluminium housing, 10 bar for nylon housing pressure is available (without ATEX approval). The max. operation temperature is from -10. . .+54°C. These versions function purely as flow counters.

Ordering Codes for this Version:
SM-16.Q9.A.99V (diesel)
SM-16.Q9.N.99V (water)

Electronic /

Counter for total volume (not resettable) and partial volume counter (resettable) and current value meter. Field calibration on EEPROM possible.

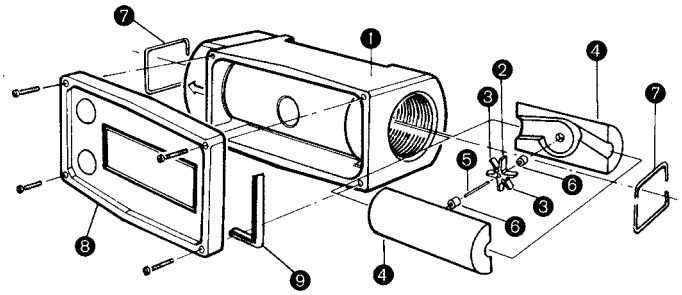
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Materials:

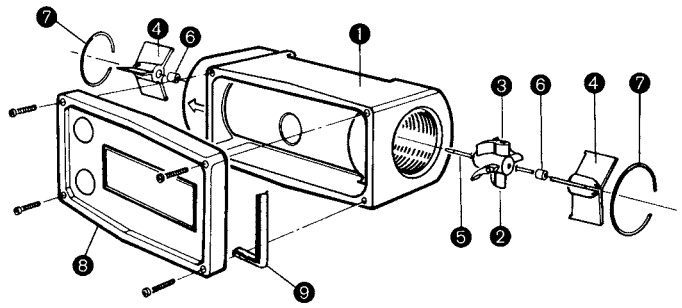
	Nr.	Al-Version	Nylon version	St. steel version
Housing	1	aluminium	nylon	st. steel
Turbine	2	nylon	nylon	PVDF
Rotor mounting	3	ferrit	ferrit	ferrit
Retainer	4	nylon	nylon	PVDF
Axis	5	tungsten-carbide	tungsten-carbide	tungsten-carbide
Bearing	6	ceramic	ceramic	ceramic
Lantern ring	7	st. steel	st. steel	st. steel
Ellectronics housing	8	nylon	nylon	nylon
Sealing	9	rubber	rubber	rubber

Layout:

1. . .11 l/min.



11. . .190 l/min. and 114. . .1135 l/min.



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PF-222

Portable Ultrasonic Liquid Flowmeter according to Transit-Time Difference Method

Features

/ Measurement through the pipe

/ Non-contacting

/ Easy to install

/ For pipes up to 1000 mm

/ Operating temp. up to 135°C

/ Reynoldsnumber correction

/ Cost effective

/ Ideally suited for difficult media

Description:

The portable ultrasonic liquid flow meters of the PF series measure the flow in a closed pipe according to the cross correlation method without the need for any mechanical parts to be inserted through the pipe wall. Two ultrasonic transducers are mounted to the pipe with a fastening rail. In the course of commissioning, individual data of the measuring point, like for example the medium, pipe material, pipe diameter, wall thickness etc., is entered into the transmitter. The ideal seperation distance of the two transducers is then calculated by the transmitter in response to the entered data concerning the pipe and fluid characteristics.In the measuring mode the transducers work alternating as emitter and receiver. The transit time of the ultrasound between the transducers is measured once in flow direction and once against the flow direction. Because the ultrasound transmitted in the same direction as the liquid flows is faster than against it, a time difference which is directly proportional to the flow velocity of the liquid and independent of the individual features of the fluid results. The PF-222 is capable to transmit the recorded flow data as analog output or pulse output and also in alphanumeric text on the built-in LCD backlit graphic display as flow rate or velocity together with totalized values. The internal battery of the PF-222 allows up to 14 hours of operating time, depending on the output utilisation and backlight usage. The PF-222 is delivered either with transducers A for pipe sizes 13 mm to 115 mm or with transducers B for pipe sizes 50 mm to 1000 mm.

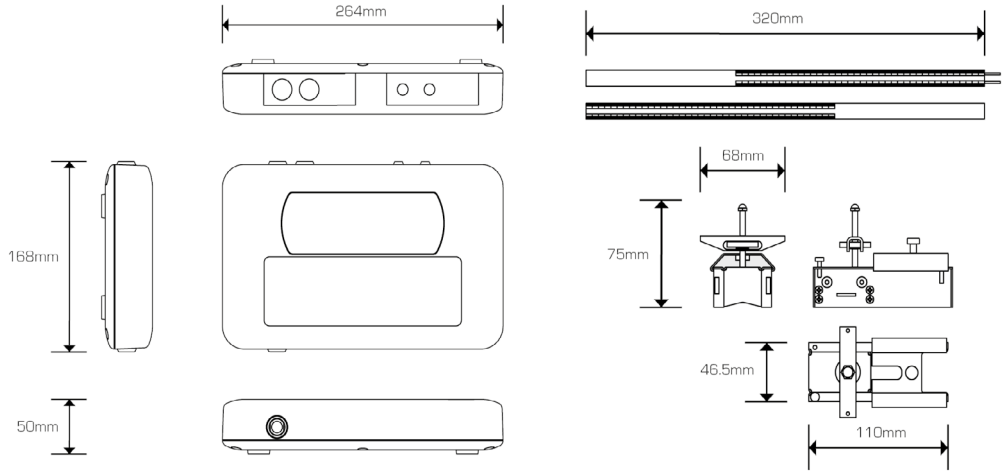
NEW: The PF-222 can now be operated with both sensor pairs A/B.

Application:

- Building services
- Pump verification
- Leak detection
- Fuel oil measurement
- Filter sizing and inspection
- Ultrapure water
- Hydraulik system testing
- Heavy fuel oil
- Balancing systems

and much more...

Dimensions in mm:



Technical Specifications:

Equipment

PF-222.A / evaluation unit with backlit graphic display

0/4. . .20 mA-output

language options:
German, English, French, Spanish

transducers A or
pipe outer diameter 13. . .115 mm
temperature range -20. . .+135°C

extra strong IP67 carrying case from
PP foam inlay and double walls, cable,
instruction manual, ancillary equipment

transducer guide rails with all mounting hardware

test piece for confirmation of correct system operation

The version PF-222.B contains the following:

transducers B for pipe outer diameter 50. . .1000 mm
temperature range -20. . .+135°C

instead of the transducers A. The rest of the equipment is identical.

The PF-222.A/B version contains both pairs of sensors, the rest of the version is identical.

Flow range / 0.1. . .20 m/s, bi-directional

Accuracy / ± 0.5% up to ± 2% of measuring value
for flow velocities > 0.2 m/s
and pipe inner diameters > 75 mm

± 3% of measuring value for
flow velocities > 0.2 m/s
and pipe inner diameters 13-75 mm

Electrical Specifications:

Outputs / 3 x Pulse Output: Pulse or Frequency.
Opto Isolated MOSFET relay.
4. . .20mA flow proportional output,
optically isolated 1500 volts 620 ohms
maximum load.
Frequency max. 200 Hz
Pulse > 100 V AC/DC, 150 mA

Display / 64 x 240 Pixel

Exposition / continuous display of battery status, signal strength and flow information (counter and flow)

Keypad / 16 keys

Supply voltage / rechargeable battery or line voltage

Battery capacity / 14 hours, 2,5 charge time

Line voltage / 110. . .240 VAC, 50 Hz ± 10%

Approval / CE

Ordering Codes:

Order number	**PF-222.**	**A**

PF-222 Portable Ultrasonic Liquid Flowmeter according to Transit Time Difference Method

Transducers /

A = with transducers A for pipe diameters 13. . .115 mm
B = with transducers B for pipe diameters 50. . .1000 mm
A/B = with transducers A/B

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PF-333

Portable Ultrasonic Liquid Flowmeter according to Transit Time Difference Method

Features

/NEW: Optional as heat meter

/ Measurement through the pipe

/ Non-contacting

/ Easy to install

/ For pipes up to 5000 mm

/ Operating temp. up to 200°C

/ Reynoldsnumber correction

/ Cost effective

/ Ideally suited for difficult media

Description:

The portable ultrasonic liquid flow meters of the PF series measure the flow in a closed pipe according to the transit-time difference method without the need for any mechanical parts to be inserted through the pipe wall. Two ultrasonic transducers are mounted to the pipe with a fastening rail. In the course of commissioning, individual data of the measuring point, like for example the medium, pipe material, pipe diameter, wall thickness etc. is entered into the transmitter. The ideal seperation distance of the two transducers is then calculated by the transmitter in response to the entered data concerning the pipe and fluid characteristics. In the measuring mode the transducers work alternating as emitter and receiver. The transit time of the ultrasound between the transducers is measured once in flow direction and once against the flow direction. Because the ultrasound transmitted in the same direction as the liquid flow is faster than against it, a time difference which is directly proportional to the flow velocity of the liquid and independent of the individual features of the fluid results. The PF-333 is capable to transmit the recorded flow data as analog output or pulse output and also in alphanumeric text or graph on the built-in LCD backlit graphic display as flow rate or velocity together with totalized values. The internal battery of the PF-333 allows up to 14 hours of operating time depending on the output utilisation and backlight usage. The internal logger can store up to 100.000k data points. By use of the provided Windows® based software the logged data can be output directly to a PC using the RS232/USB interface or stored in the instrument`s non-volatile memory for downloading at a later time.

Application:

- Building services
- Pump verification
- Leak detection
- Fuel oil measurement
- Filter sizing and inspection
- Ultrapure water
- Hydraulik system testing
- Heavy fuel oil
- Balancing systems

and much more...

Technical Specifications:

Equipment

PF-333.A/B/D / evaluation unit with backlit graphic display

RS232 and USB (both on board)

language options:
German, English, French, Spanish

transducers A for
pipe outer diameter 13. . .115 mm
temperature range -20. . .+135°C (-20. . .+200°C)

transducers B for
pipe outer diameter 50. . .2000 mm
temperature range -20. . .+135°C (-20. . .+200°C)

transducers D for
pipe outer diameter 1500. . .5000 mm
temperature range -20. . .+135°C

extra strong IP67 carrying case from
PP foam inlay and double walls, cable,
instruction manual, ancillary equipment

transducer guide rails with all mounting hardware

test piece for confirmation of correct system operation

WINDOWS® based software package which works with 2000/ XP/ Vista/ Windows 7 operating systems

Flow range / 0.1. . .20 m/s, bi-directional

Data logger / 100.000k memory points, up to 12 recording blocks with different names, data is displayed either as graph or as text in graphic display in Real Time or from the memory and can be transmitted to a WINDOWS®-based PC via RS232 or USB interface.

Accuracy / ± 0,5% up to ± 2% of measuring value
for flow velocities > 0,2 m/s
and pipe inner diameters > 75 mm
± 3% of measuring value for
flow velocities > 0,2 m/s
and pipe inner diameters < 75 mm

Option:

Heat meter / Measurement Technique: Ultrasonic, cross-correlation transit time method for flow measurement and PT100 Class B 4 wire for temperature measurement.

Heat measurement: The Heat/Energy calculation is designed to comply with EN1434 section 6.

Temperature sensors: Clamp-on PT100 Class B 4 wire, range 0. . .200°C (32. . .392°F), resolution 0.1°C (0.18°F). Minimum delta T is 0.3°C

Electrical Specifications:

Outputs / 3 x Pulse Output: Pulse or Frequency. Opto Isolated MOSFET relay. 4-20mA flow proportional output, optically isolated 1500 volts 620 ohms maximum load.
Frequency max. 200 Hz
Pulse > 100 V AC/DC, 150 mA

Display / 64 x 240 Pixel

Exposition / continuous display of battery status, signal strength and flow information (counter and flow)

Keypad / 16 keys

Supply voltage / rechargeable battery or line voltage

Battery capacity / 14 hours, 2,5 hours charge time

Line voltage / 110. . .240 VAC, 50 Hz ± 10%

Approval / CE

Ordering Codes:

Order number	**PF-333.**	**A**

PF-333 Portable Ultrasonic Liquid Flowmeter according to Transit Time Difference Method

Transducers /

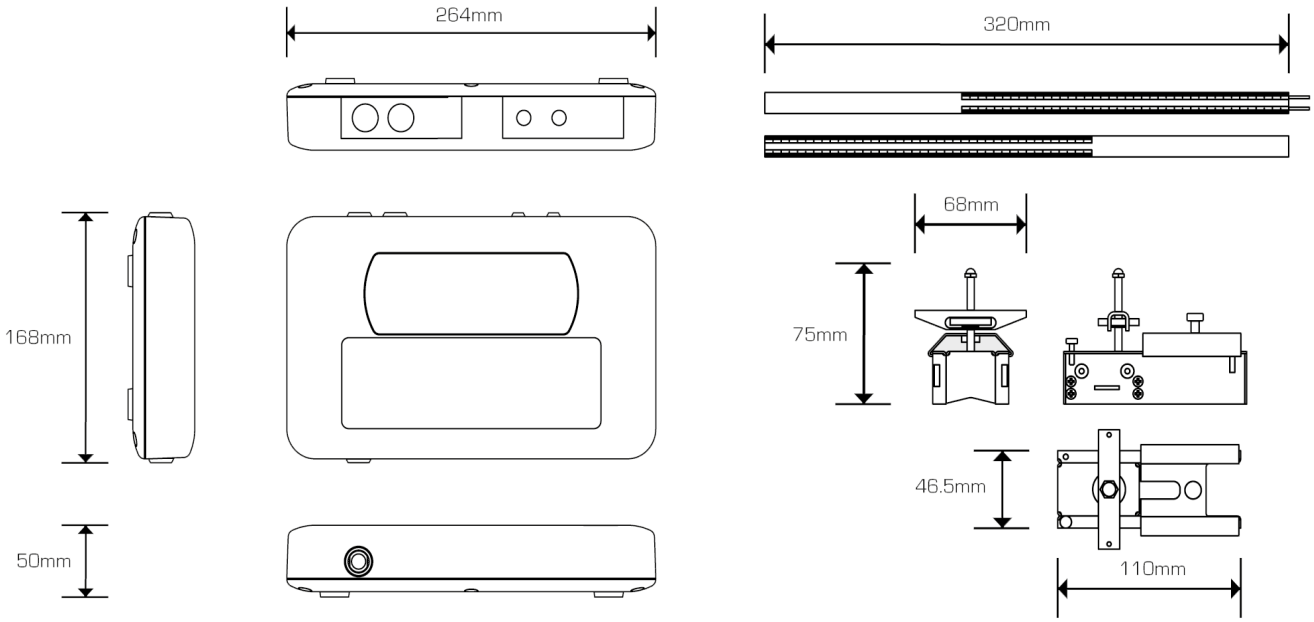
A = with transducers A for pipe diameters 13. . .115 mm
AH = high temperature version A for -20. . .+200°C
B = with transducers B for pipe diameters 50. . .2000 mm
BH = high temperature version B for -20. . .+200°C
D = with transducers D for pipe diameters 1500. . .5000 mm
AB = with both types
ABH = high temperature version A and B for -20. . .+200°C

Option /

0 = none
HM = heat meter

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Dimensions in mm:



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PF-D550

Portable Doppler Flow Meter for Dirty or Aerated Liquids



Features

/ Measurement through the pipe
/ Easy calibration
/ No pressure drop
/ Ideal for problem liquids
/ For pipes ½“ to 180“ ID
/ Operating temp. up to 120°C
/ 300,000 point data logger
/ 4. . .20 mA output (AC powered)
/ 10-Digit totalizer
/ AC/DC operation
/ Built-in rechargeable battery

Description:

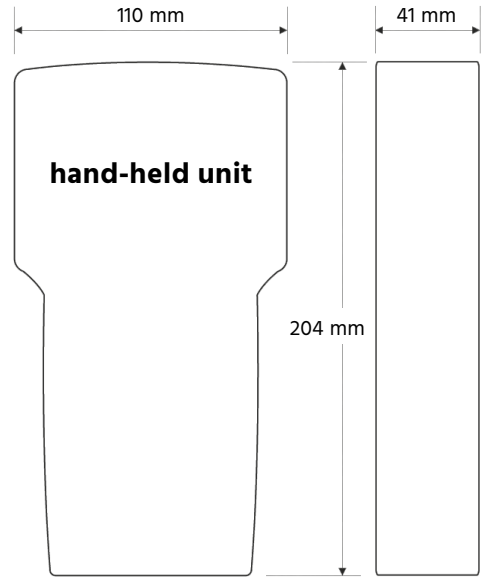
The PF-D550 ultrasonic sensor injects high frequency sound through the pipe wall and into the flowing liquid. Gas bubbles or solids suspended in the liquid reflect the ultrasonic signal back to the sensor. When this sound is reflected from moving bubbles or particles it is returned to the sensor at an altered frequency. This frequency shift is called the Doppler effect. The PF-D550 continuously measures the change from it's transmitted frequency to the received frequency to accurately calculate flow.

Application:

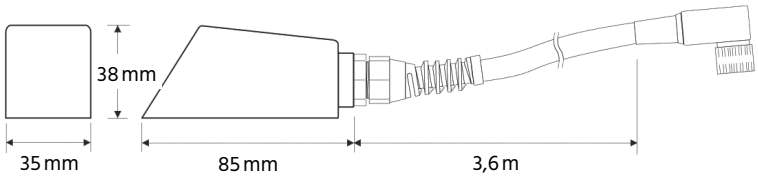
The PF-D550 works best with difficult liquids in applications that would damage regular flow meters. Because the sensor is mounted on the outside of the pipe, there is no contact with the moving fluid. The ultrasonic sensor straps onto the outside of pipes 12.5 mm (½“) ID or larger and measures flow in common pipe materials: PVC, carbon steel, stainless steel, cast iron, fiberglass and lined pipes... any pipe that conducts ultra-sound. Doppler signals cannot be transmitted through pipe walls which contain air pockets (materials like concrete and wood), or loose insertion liners (with an air gap between the liner and pipe wall). Because the sensor is so easy to install you can test any application and pipe material in a few minutes.

Recommended for: Sewage, Treated Wastewater, Aerated Water, Sludge and Slurries, Chemicals and Solvents, Viscous Liquids, Abrasives, Food Products, Pulp Stock, Acids and Caustics.

Dimensions in mm:



Sensor



Technical Specifications

Flow rate /	± 0.075. . .12.2 m/s
Accuracy /	± 2 % of full scale, requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm
Repeatability /	± 0.25 %
Linearity /	± 0.5 %
Sensitivity /	adjustable damping and cut-off
max. Temperature /	-23. . .+60°C (hand-held unit)
Outputs /	4. . .20 mA analogue output and USB
min. Ø-Pipe /	12.5 mm inner diameter 15.0 mm outer diameter
max. Ø-Pipe /	4500 mm inner diameter
max. Temperature sensor /	-40. . .+120 °C
Frequency /	640 kHz
Housing material /	st. steel
Sensor cable /	3.6 m shielded cable
Mounting kit /	stainless steel pipe clamp, silicone coupling compound (150 gr.)
Data logger /	300.000 points with time and date

Electrical Specifications:

Output /	4. . .20 mA (500 Ω) when AC-powered
Display /	4-digit white, backlit matrix
Exposition /	flow rate, totalizer, operating mode and calibration menu
Power supply /	built-in battery (NiMH) /supply voltage
Supply voltage /	100. . .240 VAC, 50. . .60 Hz
Battery capacity /	up to 18 hours continuous operation

Ordering Codes:

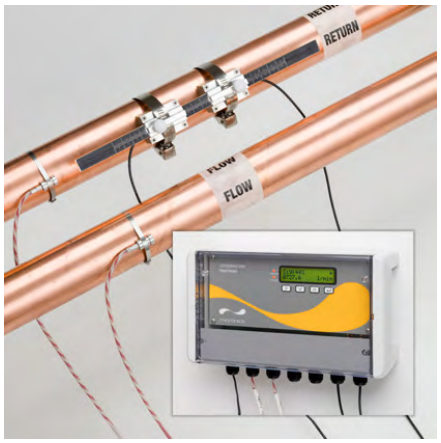
Order number	**PF-D550.**	**A**
PF-D550 Portable Doppler Flow Meter		

Version /

0 = basic version
1 = basic version with 15 m (50 ft) sensor cable extension, shielded

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U-1000

Ultrasonic Flow Meter based on Transit Time Difference Method for permanent Installation

Features

/ NEW: wall mounted display
/ Measurement through the pipe
/ Easy calibration
/ For steel-, plastic- or copperpipes
/ For 22 (25) mm to 115 mm OD
or 125 mm to 180 (225) mm OD
/ Operating temperatures up to 85°C
at wall mounted display up to 135°C
/ LCD display with backlights
/ Integrated pulse or frequency output
/ 4 to 20 mA output (optional)
/ Modbus (optional)
/ Supply 12 to 24V AC/DC (external)

Description:

The U-1000 is a clamp-on, ultrasonic flowmeter that uses a multiple slope transit time algorithm to provide accurate flow measurements. An ultrasonic beam of a given frequency is generated by applying a repetitive voltage pulse to the transducer crystals. This transmission goes first from the Downstream transducer to the Upstream transducer. The transmission is then made in the reverse direction, being sent from the Upstream transducer to the Downstream transducer. The speed, at which the ultrasound is transmitted through the liquid, is accelerated slightly by the velocity of the liquid through the pipe. The subsequent time difference is directly proportional to the liquid flow velocity. Having measured the flow velocity and knowing the pipe cross-sectional area, the volumetric flow can be easily calculated.
The U-1000 is scheduled for fixed installation, easy to install and requires the minimum of information to be entered by the user. The instrument displays the required seperation after the pipe internal diameter and material are entered. Both the electronics and guide rail housings form an integral unit that is attached to the pipe using the supplied jubilee clips. Power to the unit is provided by an external 12 - 24V AC/DC power supply. The U-1000 is intended to operate on steel, copper and plastic pipes with maximum 180 (225) mm OD. Compact, rugged and reliable, the U-1000 has been designed to provide sustained performance in industrial environments.

Application:

Flow-metering and monitoring as:
Hot water meter, heat meter, chilled water meter, drinking-water meter, ultrapure water meter and for process water

Version:

U-1000 Ultrasonic Flow Meter

/ Measurement of the flow velocity and flow rate
/ Recommended for hot water < 85°C, chilled water, portable water and demineralised water
/ Configurable pipe size between 22. . .115 mm or 125. . .180 mm outer diameter
/ Pipe materials: steel, plastic and copper
/ Simplified guide rail & sensor assembly
/ Clamp-on sensor
/ LCD display with backlight
/ Display: 2 line x 16 characters
/ Key pad: 4 key tactile feedback membrane keypad
/ Password controlled menu structure
/ Menu language: english
/ Selectable units: m/s, ft/s, l/s, l/min, gal/s, gal/min, USgal/s, USgal/min, m^3/min, m^3/h, litres, m3, gals, USgals
/ Integrated pulse- or frequency output and optional 4. . .20 mA output or Modbus

U-1000 Ultrasonic Flow Meter with wall mounted display

/ Measurement of the flow velocity and flow rate
/ Temperature range: 0. . .135°C
/ Configurable pipe size between 25. . .115 mm or 125. . .225 mm outer diameter
/ Pipe materials: steel, plastic and copper
/ Simplified guide rail & sensor assembly
/ Clamp-on sensor
/ LCD display with backlight
/ Display: 2 line x 16 characters
/ Key pad: 4 key tactile feedback membrane keypad
/ Password controlled menu structure
/ Menu language: english
/ Selectable units: m/s, ft/s, l/s, l/min, gal/s, gal/min, USgal/s, USgal/min, m^3/min, m^3/h, litres, m3, gals, USgals
/ Integrated pulse- or frequency output and optional 4. . .20 mA output or Modbus

Technical Specifications:

Measuring technique /	transit time
Measurement channels /	1
Timing resolution /	± 50 / sec.
Turn-down ratio /	100 : 1
Flow velocity range /	0.1. . .10 m/s
Pipe ranges Ø /	22. . .115 mm outer diameter 125. . .180 mm outer diameter
Pipe ranges Ø / Wall mounted display	25 . .115 mm outer diameter 125. . .225 mm outer diameter
Media /	clean water with < 3 % particle volume-content
Accuracy /	± 3 % of measured value for flow rate > 0.3 m/s
Repeatability /	± 0.15 % of measured value
max. Temperature /	
Media temperature:	0. . .+85°C 0. . .+135°C (wall mounted display)
Operating temperature:	0. . .+50°C (electronic)
Storage temperature:	-10. . .+60°C
Humidity /	90 % RH at 50°C max.

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Electrical Specifications:

Power supply /	12. . .24V ±10% AC/DC
Power consumption /	max. 7 watt
Elect. connection /	cable, 5 m x 6 core, for power input and data output
Output 1 /	Pulse or frequency, default values depending on pipe diameter
Pulse width:	default value 50 ms (choose from 3. . .99 ms)
Pulse repetition rate:	up to 166 pulses/sec (depending on pulse width)
Frequency mode:	max. 200 Hz for flow rate
Output 2 /	current (optional) for flow rate
Output:	4. . .20 mA
Resolution:	0.1 % of scale
max. Load:	620 Ω
Protection class /	IP 54 (casing) IP 68 (wall mounted display)
Modbus /	
Format	RTU
Baudrate	1200, 2400, 4800, 9600, 19200, 38400
Data-Parity-StopBits	8-none-2, 8-none-1, 8-odd-2, 8-even-1
Standards:	PI-MBUS-300 Rev. J
Physical connection:	RS485

Ordering Codes:

Order Number	**U-1000.**	**1.**	**1.**

U-1000 Ultrasonic Flow Meter

Version /

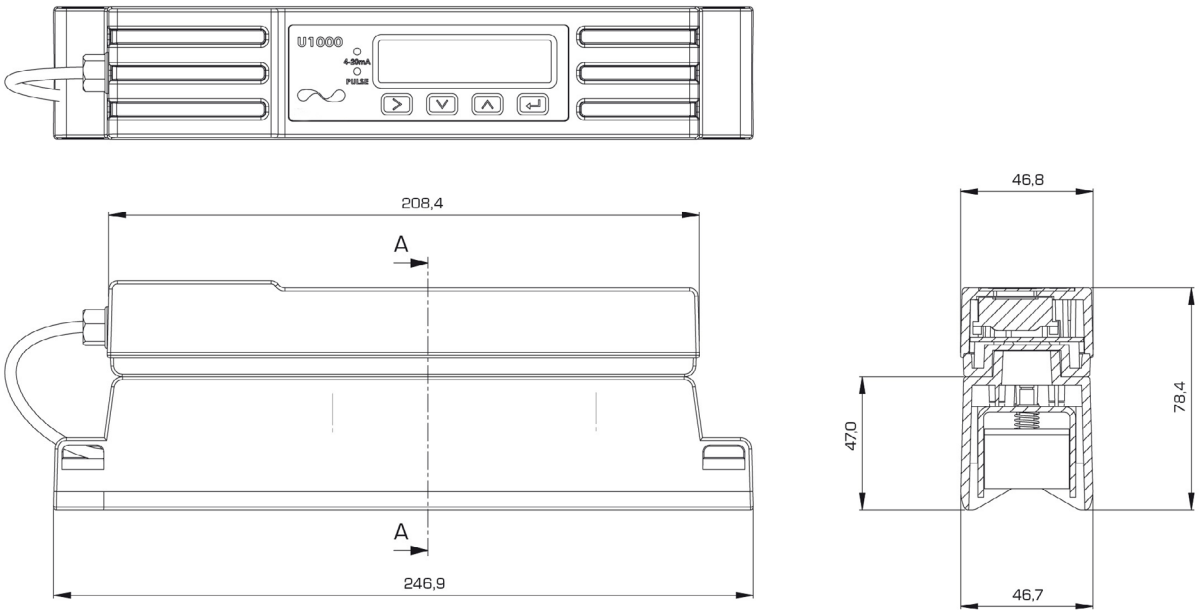
1 = with pulse output
2 = with pulse and 4. . .20 mA output
3 = with pulse and Modbus
4 = with pulse and M-bus
5 = with wall mounted display (For nominal sizes see technical data)

Nominal diameter /

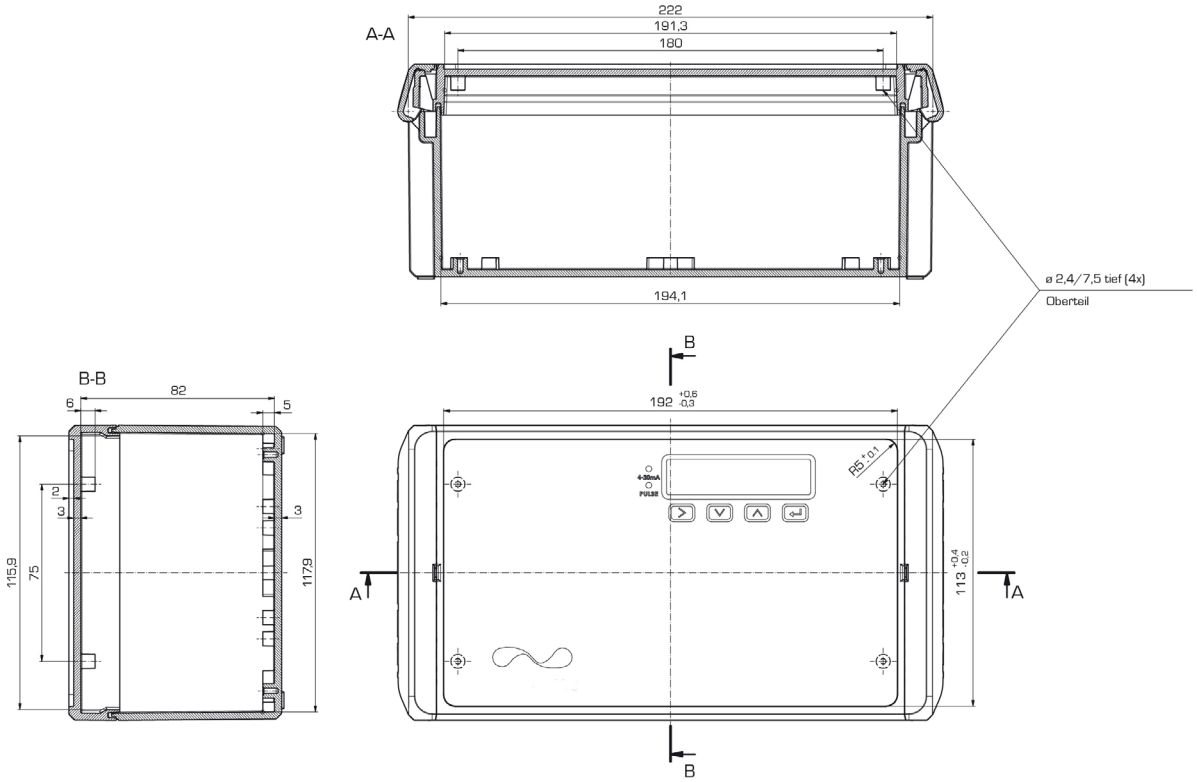
1 = 22. . .115 mm outer diameter
2 = 125. . .180 mm outer diameter

Dimensions in mm:

U-1000 for pipe mounting:

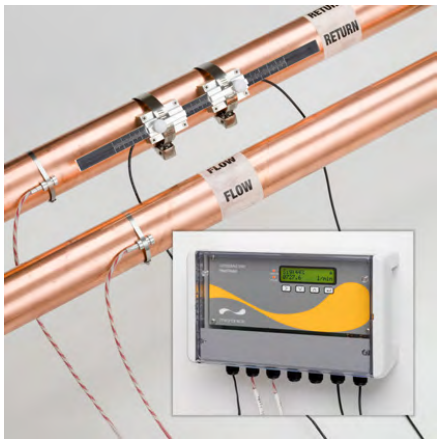


U-1000.5 Elektronic for wall mounting:



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U-1000 HM

Fixed Ultrasonic Heat/ Energy Meter with Modbus Communication

Features

/ NEW: wall mounted display
/ Heat- and Energy-measuring
/ Easy installation
/ For pipes with 22(25) - 115 mm OD
or 125 - 180(225) mm OD
/ Water temperature up to 85 °C
at wall mounted display up to 135°C
/ Modbus compatible
/ Single values and sums
/ Mbus (optional)

Description:

The U-1000 HM is a clamp-on thermo-, heat- and energy meter based on ultrasound which is installed on the outside of a pipeline without any complications. The device measures the flow and return temperatures via PT100 sensors and the flow rate with ultrasound. An ultrasonic beam of a given frequency is generated by applying a repetitive voltage pulse to the transducer crystals. This transmission goes first from the Downstream transducer to the Upstream transducer. The transmission is then made in the reverse direction, being sent from the Upstream transducer to the Downstream transducer. The speed, at which the ultrasound is transmitted through the liquid, is accelerated slightly by the velocity of the liquid through the pipe. The subsequent time difference is directly proportional to the liquid flow velocity. Having measured the flow velocity and knowing the pipe cross-sectional area, the volumetric flow can be easily calculated. The temperature sensors measure the heat difference at the inlet and the outlet point. Together with the flow rate, the U-1000 HM then calculates the corresponding amount of heat. The values can be output individually or summed. In addition, there is a Modbus compatibility so that the device can also be used as a component an an aM & T or BEM system. The U-1000 HM is designed like the U-1000 for fixed installations. It is easy to install and requires a minimum of information that must be entered by the user. The device requires 12-24V AC/DC from an external source. The U-1000 HM is designed to work on steel, copper and plastic pipes with an outside diameter up to 180(225) mm.

Application:

Heat-metering and monitoring as:
Warm water meter, heat meter, chilled water meter, drinking-water meter, ultrapure water meter and for process water.

Electrical Specifications:

Power supply /	12 V. . .24 V ± 10 % AC/DC at 7 watt
Protection class /	IP54 IP68 (Wall mounted display)
In-/Output-cable /	5 m x 6-core for power in and pulse out

Technical Specifications:

Measuring principle /	Transit time method & PT-100
Flow /	0.1. . .10 m/s
Watertemp. range /	0. . .85 °C 0. . .135 °C (Wall mounted display)
Measuring range dynamic /	100 : 1
Pipesize Ø /	22 . .115 mm OD 125. . .180 mm OD
Pipesize Ø / Wall mounted display	25 . .115 mm OD 125. . .225 mm OD
Media /	Coldwater (with glycol), warmwater
Accuracy /	± 3 % des Messwertes bei Strömungsgeschwindigkeiten > 0.3 m/s
Temperature sensors /	PT-100, clamp-on, class B, 4 cables, range 0. . .85 °C, resolution 0.1°C
Output /	Pulse or frequency, energy (kWh or BTU) or volume flow. The pulse output can also be configured as a loss of flow or low flow alarm for standalone meter or modbus communication applications.
Communication /	Modbus RTU slave, RS485 serial link hardware layer. Energy, power, temperature and flow. Optional with Mbus

Ordering Codes:

Order Number	**U-1000.HM**	**1.**	**1.**

U-1000 HM Heatflowmeter

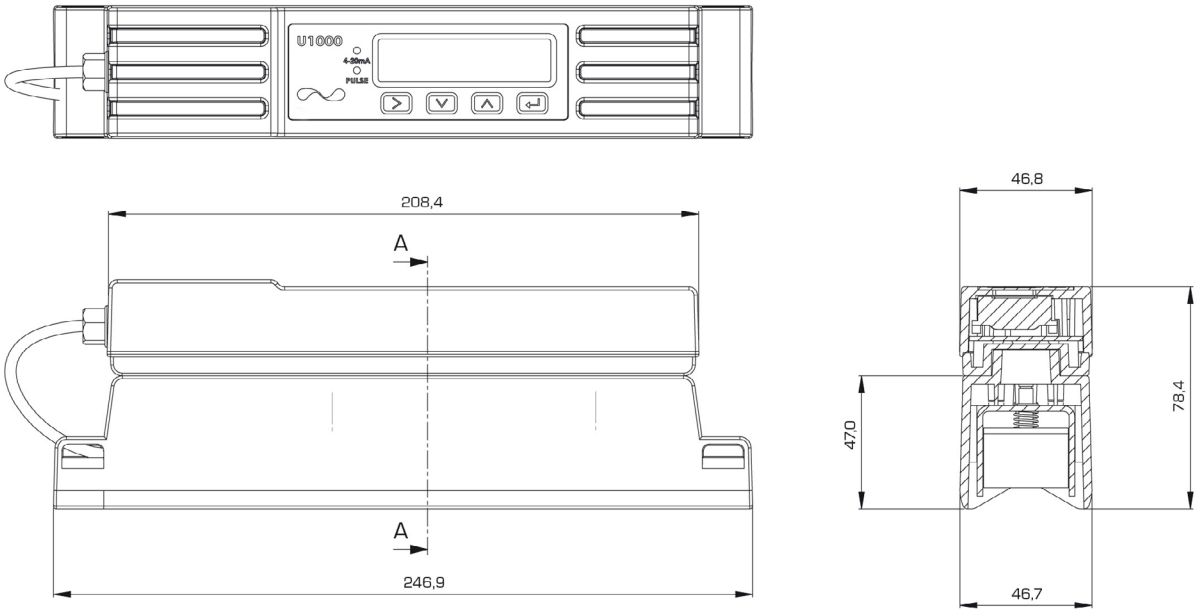
Version /
1 = with pulse output
2 = with pulse and Modbus
3 = with pulse and Mbus
4 = with wall mounted display (For nominal sizes see technical data)

Nominal diameter /
1 = 22. . .115 mm outer diameter
2 = 125. . .180 mm outer diameter

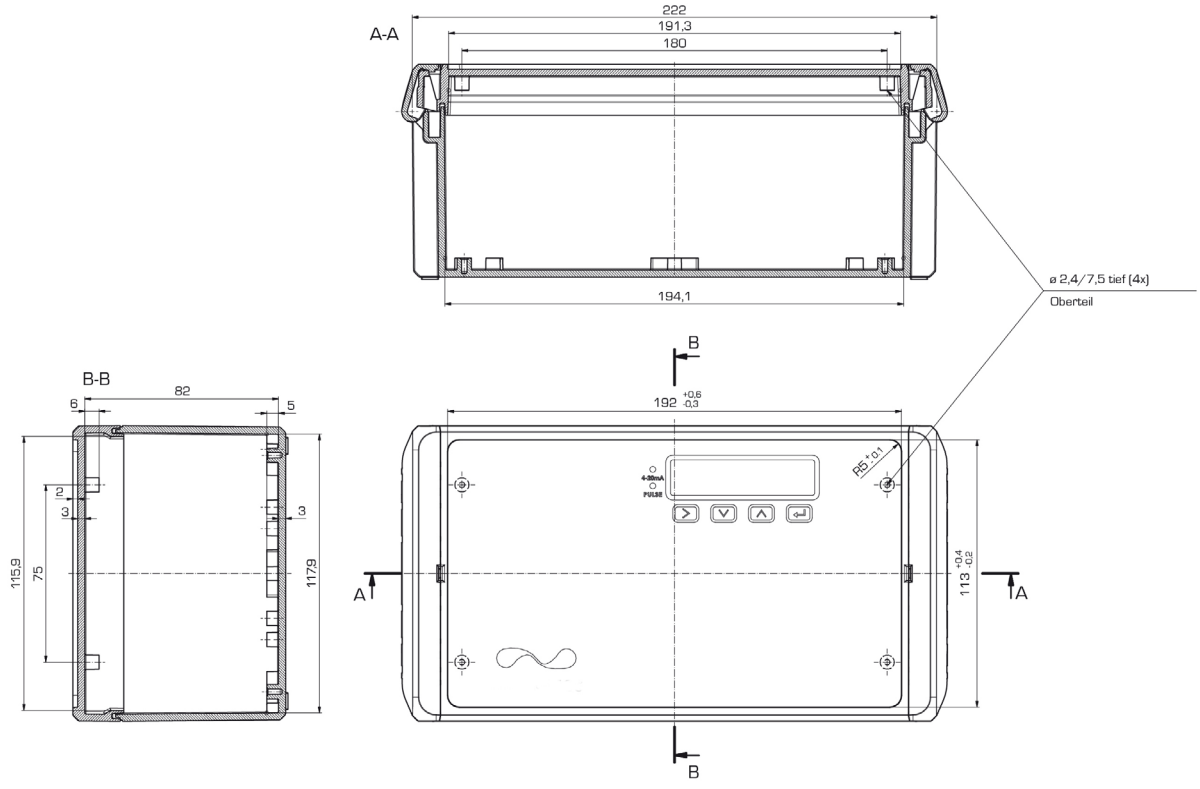
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Dimensions in mm:

U-1000 for pipe mounting:



U-1000.4 Elektronic for wall mounting:



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TG-01

Ultrasonic Thickness Meter



Description:

The ultrasonic wall thickness meter TG-01 can measure the layer thickness of a variety of materials because of their different sound speed ranges. There are 11 pre-configured materials. The device uses a specially developed, microprocessor controlled circuit to quickly calculate the run time of the reflected ultrasonic pulse with high accuracy. The TG-01s speed of sound can be adjusted between 500. . .9000 m/s to determine the layer thickness of any materials. This has also the advantage, that the coating of a pipe does not need to be removed (non-distructive measurement).

Features

/ 11 common materials pre-configured

/ Battery powered

/ Easy to use

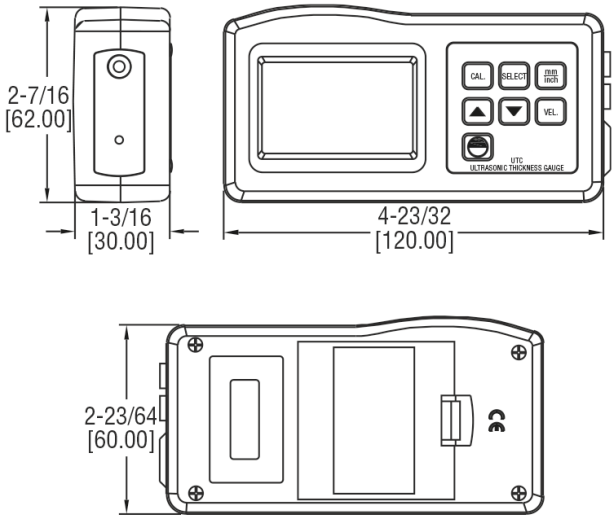
Application:

The TG-01s typical applications are to find the wall thickness of the pipe when programming a clamp-on ultrasonic transmitter without cutting or removing a section of the pipe. But it can also be used to test for wearing out of materials, corrosion and coating, for industrial applications, within the car- machine- or tool-industry, as well as for safety maintenance for any other kind of hollow body.

Technical Specifications:

Measuring range /	1.5. . .200 mm wall thickness
Resolution /	0.1 mm
Display /	10 mm, 4-digit, LCD
Battery /	4 x 1.5V AAA
Sound velocity /	500. . .9000 m/s (configurable)
Accuracy /	± 0.5%
Humidity /	< 80%
Temperature range /	0. . .50 °C
Materials /	steel, cast iron, aluminium, red copper, brass, zinc, quartz glass, polyethylene, PVC, gray cast iron, nodular cast iron
Dimensions /	120 x 60 x 30 mm
Weight /	approx. 170 g without battery
Certificate /	CE

Dimensions in inch [mm]:



Ordering Codes:

Order number	**TG-01**
TG-01 Ultrasonic thickness meter	

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SI-00

Miniature-
Electromagnetic Flowmeter



Features

/ Wetted parts out of st. steel 1.4404, PEEK and FKM

/ Displays flow bidirectionally

/ Op. range 0. . .600 l/min in 5 sizes

/ Additional temperature measurement from -20. . .+80°C

/ Minimum conductivity 20 µS/cm

/ Viscosity up to 70 mm²/s at 40°C

/ Two output channels for 4. . .20 mA or 0. . .10 VDC, pulse or alarm

/ Including totalizer and batching function

/ Operating pressure up to 16 bar

Description:

The measuring principle of the magnetic flow meter is based on Faraday`s law. The flow of a conductible liquid within a magnetic field causes an electrical voltage, which is proportional to the velocity of the flow. A measuring pipe out of the very rugged plastic material PEEK is installed in the stainless steel fitting of the SI-00. This construction is suitable to isolate the liquid from the metallic fitting to make the induced measuring voltage useable. Magnetic coils located on the outside generate a magnetic field inside the measuring pipe and small stainless steel electrods measure the voltage, which is then amplified and processed by the powerful electronic of the SI-00.

Application:

The electromagnetic flowmeter SI-00 combines the advantage of the electromagnetic measuring principle and an ultramodern amplifier electronic to a device of the latest generation. There are no wishes left regarding easy operation and versatility of the measuring value processing. The device detects and processes the medium temperature, the actual flow and the fluid consumption. Setpoints, as well as analogue and pulse signals in different combinations are provided by the SI-00 at two output connections. The setpoints can be programmed as N.O./N.C. or window function always with adjustable hysteresis. In case of activated start-up delay the setpoints work at the normal operating condition within the programmed period of time as soon as the flow reaches 0,5% of the full scale value after switch on, to ensure that no alarm occures if the flow value is under the threshold just because of the starting condition of the plant or machine.
The analogue output can be used as 4. . .20 mA- or 0. . .10 VDC-signal and can be assigned to the temperature or to the flowrate. Zero and span are free adjustable, but the minimum measuring span has to be 20% of the full scale value. The consumption is added or subtracted (depending on the flow direction) by the SI-00 and displayed. The positive flow direction is marked with an arrow on the unit. The outputs of the SI-00 always refer to the positive direction.

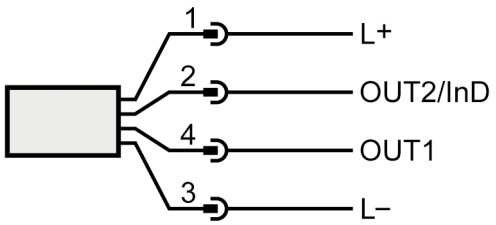
The counter is reset either through external pulse, through programmable automatic reset time from one hour to eight weeks or manually by the touch of a button. One of the outputs of the SI-00 can be used to realize a batching process. In this operating mode the switching output of the SI-00 is activated to control e.g. a solenoid valve after the preset amount has passed through the flowmeter. In case of not reaching the preset amount the user can choose either to wait for further flow or to reset the counter automatically.

Electrical Specifications:

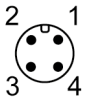
Supply voltage /	18. . .32 VDC acc. to EN50178, SELV, PELV
Current rating /	SI-00.08: 200 mA SI-00.15: 2 x 200 mA SI-00.20: 2 x 200 mA SI-00.25: 2 x 200 mA SI-00.50a: 2 x 250 mA SI-00.50b: 2 x 250 mA
Short-circuit protection /	pulsed
Reverse polarity protection /	yes
Overload protection /	yes
Voltage drop /	< 2 V
Current consumption /	SI-00.08: < 80 mA SI-00.15: 95 mA;(24 V) SI-00.20: 95 mA;(24 V) SI-00.25: 95 mA;(24 V) SI-00.50a: < 150 mA SI-00.50b: < 150 mA
Power-on delay /	5 s
Analogue output /	4. . .20 mA or 0. . .10 VDC, scaleable
Load for analogue output /	max. 500 Ω for 4. . .20 mA, min. 2000 Ω for 0. . .10 VDC
Pulse output /	flow rate meter
Pulse value /	SI-00.08: 0,001. . .3 l SI-00.15: 0,00001. . .30 000 m^3 SI-00.20: 0,00001. . .50 000 m^3 SI-00.25: 0,00001. . .100 000 m^3 SI-00.50a: 0,0001. . .300 x 10^3 m^3 SI-00.50b: 0,0001. . .600 x 10^3 m^3
Pulse length / (not adjustable)	SI-00.08: 0,008. . .2 s SI-00.15: 0.01. . .2 s SI-00.20: 0.005. . .2 s SI-00.25: 0.0025. . .2 s SI-00.50a: 0.016. . .2 s SI-00.50b: 0.008. . .2 s
Programming options /	
SI-00.08 /15 /20 /25:	Flow monitoring; volume counter; preselection counter; temperature monitoring; hysteresis / window function; start-up delay; output logic; current / voltage / pulse output; N.O./ N.C.; display can be deactivated; display unit;
SI-00.50a/ 50b:	Flow monitoring; volume counter; preselection counter; temperature monitoring; hysteresis / window function; start-up delay; output logic; current / voltage / pulse output; N.O./ N.C.; display can be deactivated; display unit; empty tube detection;
Protection class /	IP 65 / IP 67
Insulation resist. /	>100 MΩ (500 VDC)
EMC /	DIN EN 60947-5-9
Electrical connection /	M12 connector; gold-plated contacts
Display /	
Measuring unit:	6 LED green (l/min, m^3/h, l, m^3, 103, °C)
Switching status:	2 LED yellow
Measured values:	4-digit alphanumeric display
Programming:	4-digit alphanumeric display

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Wiring:



Plug connection /



OUT1 (SI-00.08 /15 /20 /25) /

4 selection options:

- switching output flow-detector
- pulse output flow
- switching output preset counter
- IO-Link

OUT1 (SI-00.50a / 50b) /

6 selection options:

- switching output empty pipe detection
- switching output flow-detector
- frequency output flow-detector
- pulse output flow
- switching output preset counter
- IO-Link

OUT2 / InD (SI-00.08 /15 /20 /25) /

5 selection options:

- switching output flow-detector
- switching output temperature-detector
- analogue output flow
- analogue output temperature
- input for an external reset signal

OUT2 / InD (SI-00.50a /50b) /

6 selection options:

- switching output empty pipe detection
- switching output flow-detector
- switching output temperature-detector
- analogue output flow
- analogue output temperature
- Input for an external reset signal

Technical Specifications:

Application /	conductive liquids, fluid group 2 (DGRL) conductivity from 20 µS/cm upwards and viscosity up to 70 mm^2/s at 40°C
Pressure drop /	max. 16 bar (max. 10 bar for SI-00.08)
Medium temp. /	-10. . .+70°C (0. . .+60°C for SI-00.08)
Ambient temp. /	-10. . .+60°C
Storage temp. /	-25. . .+80°C
Shock resistance /	DIN IEC 68-2-27: 20 g (11 ms)
Vibration resistance /	DIN IEC 68-2-6: 5 g (10. . .2000 Hz)
Housing material /	
SI-00.08 /15 /20 /25:	1.4404 (st. steel / 316L); PBT-GF20; PC; FKM; TPE
SI-00.50a /50b:	1.4404 (st. steel / 316L); 1.4571 (st. steel / 316Ti); PEI; FKM; PBT-GF20; TPE-U
Wetted parts /	
SI-00.08 /15 /20 /25:	V4A (1.4404), Viton (FKM), PEEK (Polyether-Etherketon)
SI-00.50a /50b:	V4A (1.4404), V4A (1.4571), FKM, PEEK (Polyether-Etherketon), Centellen

Ordering Codes:

Order number	**SI-00.**	**08.**	**0.**	**1**

SI-00 Miniature-Electromagnetic Flowmeter

Process connection and operating range /

08 = G1/4"-male for 0.005. . .3 l/min
15 = G1/2"-male for 0.1. . .25 l/min
20 = G3/4"-male for 0.2. . .50 l/min
25 = G1"-male for 0.2. . .100 l/min
50a = G2"-male for 5. . .300 l/min
50b = G2"-male for 5. . .600 l/min

Process connection, adapter /

0 = none
2 = incl. 2 pieces adapter R1/2"-male stainless steel 1.4571 incl. gaskets for SI-00.15

Options /

0 = no option
1 = counter plug 4-pole for M12

Setting range:

Setpoint /	
SI-00.08:	0.02. . .3 l/min
SI-00.15:	0.25. . .25 l/min
SI-00.20:	0.5. . .50 l/min
SI-00.25:	0.7. . .100 l/min
SI-00.50a:	6.5. . .300 l/min
SI-00.50b:	8.0. . .600 l/min
Resetpoint /	
SI-00.08:	0.005. . .2.984 l/min
SI-00.15:	0.1. . .24.9 l/min
SI-00.20:	0.2. . .49.8 l/min
SI-00.25:	0.2. . .99.5 l/min
SI-00.50a:	5. . .298.5 l/min
SI-00.50b:	5. . .597.0 l/min
Analogue start point /	
SI-00.08:	0. . .2.4 l/min
SI-00.15:	0. . .20 l/min
SI-00.20:	0. . .40 l/min
SI-00.25:	0. . .80 l/min
SI-00.50a:	0. . .240 l/min
SI-00.50b:	0. . .480 l/min
Analogue end point /	
SI-00.08:	0.6. . .3 l/min
SI-00.15:	5. . .25 l/min
SI-00.20:	10. . .50 l/min
SI-00.25:	20. . .100 l/min
SI-00.50a:	60. . .300 l/min
SI-00.50b:	120. . .600 l/min
in steps of /	
SI-00.08:	0.001 l/min
SI-00.15:	0.02 l/min
SI-00.20:	0.1 l/min
SI-00.25:	0.1 l/min
SI-00.50a:	0.5 l/min
SI-00.50b:	0.5 l/min

Damping /	0. . .5 sec, adjustable
Start-up delay /	0. . .50 sec, adjustable
Response time /	
SI-00.08:	< 0.15 s by damping 0 s
SI-00.15:	< 0.15 s by damping 0 s
SI-00.20:	< 0.15 s by damping 0 s
SI-00.25:	< 0.15 s by damping 0 s
SI-00.50a:	< 0.35 s by damping 0 s
SI-00.50b:	< 0.35 s by damping 0 s
Process connection /	
SI-00.08:	G1/4“-male
SI-00.15:	G1/2“-AG (available with adapter G3/4“ or R1/2“)
SI-00.20:	G3/4“-male
SI-00.25:	G1“-male
SI-00.50a:	G2“-male
SI-00.50b:	G2“-male
Accuracy /	
SI-00.08:	± (2% MW + 0.5% ME)
SI-00.15:	± (0.8% MW + 0.5% ME)
SI-00.20:	± (0.8% MW + 0.5% ME)
SI-00.25:	± (0.8% MW + 0.5% ME)
SI-00.50a:	± (0.8% MW + 0.5% ME)
SI-00.50b:	± (0.8% MW + 0.5% ME)
Repeatability /	± 0.2% ME

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Flow Measurement:

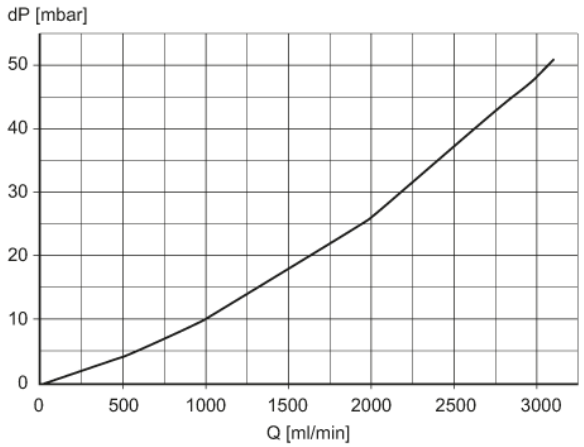
Display range /	
SI-00.08:	-1.999. . .3.6 l/min
SI-00.15:	-30. . .+30 l/min
SI-00.20:	-60. . .+60 l/min
SI-00.25:	-120. . .+120 l/min
SI-00.50a:	-360. . .+360 l/min
SI-00.50b:	-720. . .+720 l/min
Measuring range /	
SI-00.08:	0.005. . .3 l/min
SI-00.15:	0.1. . .25 l/min
SI-00.20:	0.2. . .50 l/min
SI-00.25:	0.2. . .100 l/min
SI-00.50a:	5. . .300 l/min
SI-00.50b:	5. . .600 l/min
Resolution /	
SI-00.08:	0.001 l/min
SI-00.15:	0.02 l/min
SI-00.20:	0.1 l/min
SI-00.25:	0.1 l/min
SI-00.50a:	0.5 l/min
SI-00.50b:	0.5 l/min

Temperature Measurement:

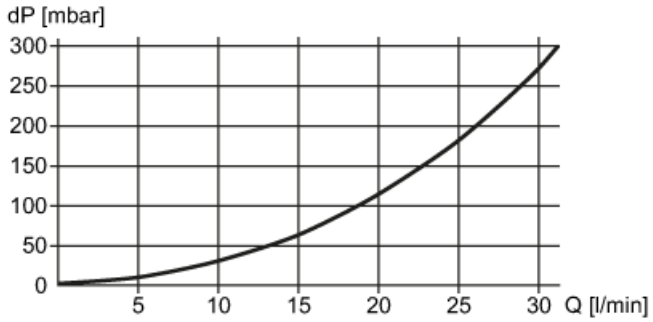
Temperature range /	-20. . .+80°C
Setpoint temp. /	-19.2. . .+80°C
Resetpoint temp. /	-19.6. . .+79.6°C
Analogue start point:	-20. . .+60°C
Analogue end point:	0. . .+80°C
in steps of:	0.2°C
Response time temp. /	
SI-00.08:	T09 = 40 s (Q > 1 l/min)
SI-00.15:	T09 = 20 s (Q > 1 l/min)
SI-00.20:	T09 = 20 s (Q > 5 l/min)
SI-00.25:	T09 = 20 s (Q > 5 l/min)
SI-00.50a:	T09 = 3 s (Q > 15 l/min)
SI-00.50b:	T09 = 3 s (Q > 15 l/min)
Accuracy temp. /	
SI-00.08:	± 1.5; 25°C (Q > 0.5 l/min)
SI-00.15:	± 2.5; 25°C (Q > 1 l/min)
SI-00.20:	± 2.5; 25°C (Q > 5 l/min)
SI-00.25:	± 2.5; 25°C (Q > 5 l/min)
SI-00.50a:	± 1.0; 25°C (Q > 15 l/min)
SI-00.50b:	± 1.0; 25°C (Q > 15 l/min)

Pressure drop curves:

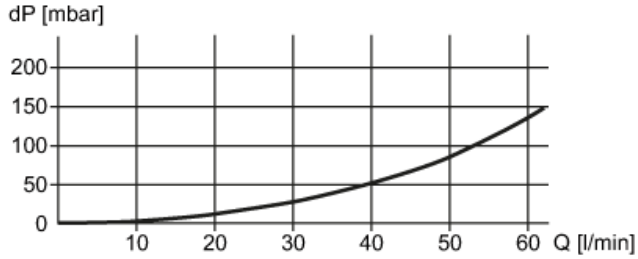
SI-00.08 /



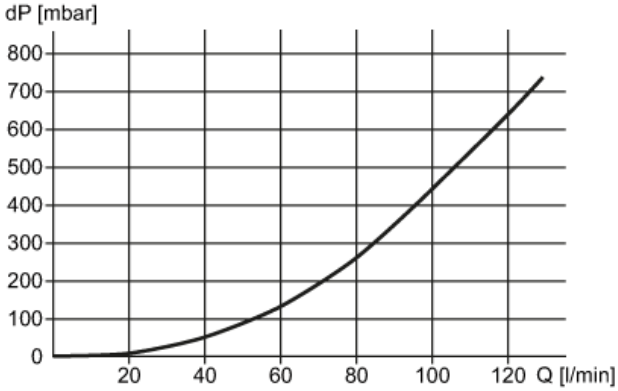
SI-00.15 /



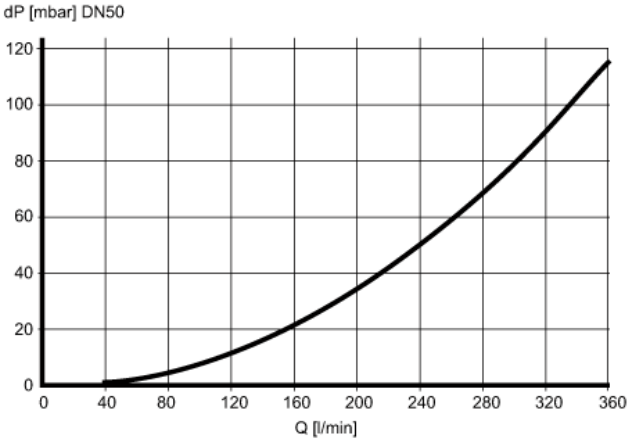
SI-00.20 /



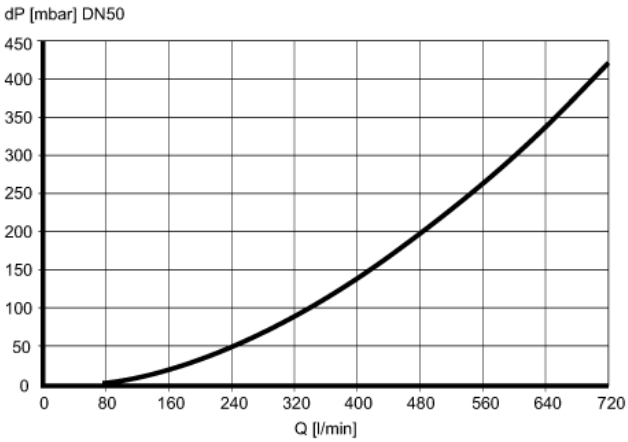
SI-00.25 /



SI-00.50a /



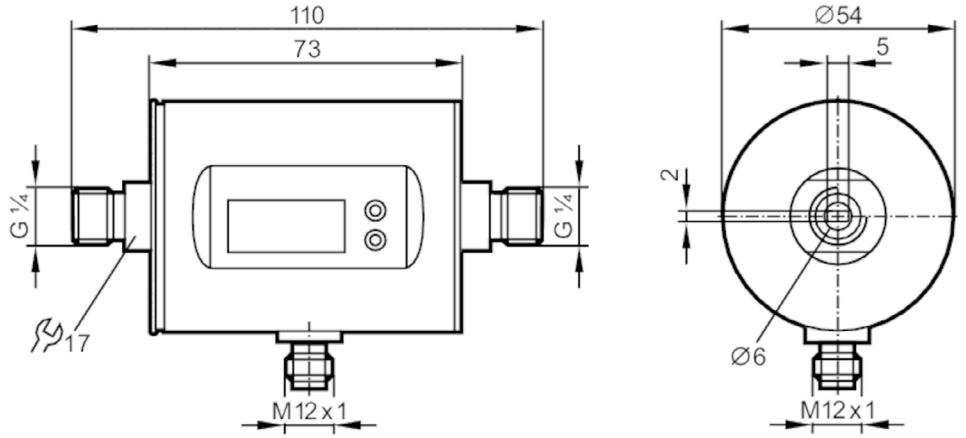
SI-00.50b /



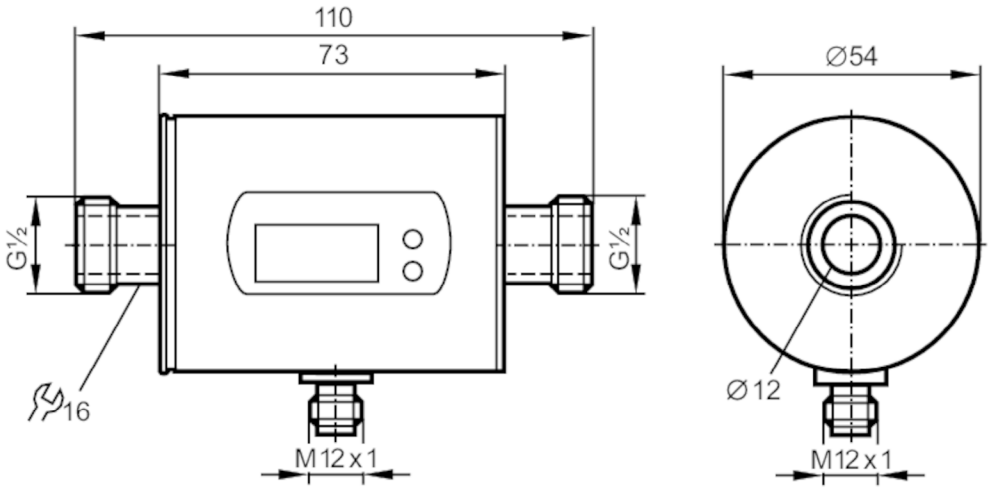
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Dimensions in mm:

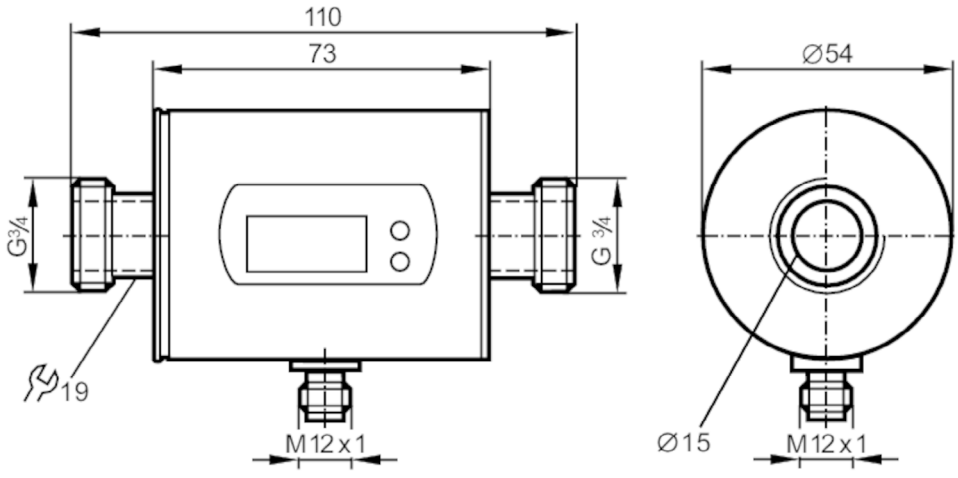
SI-00.08 /



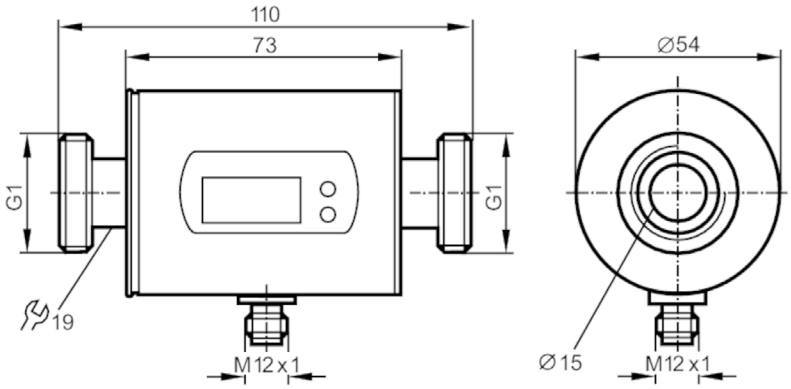
SI-00.15 /



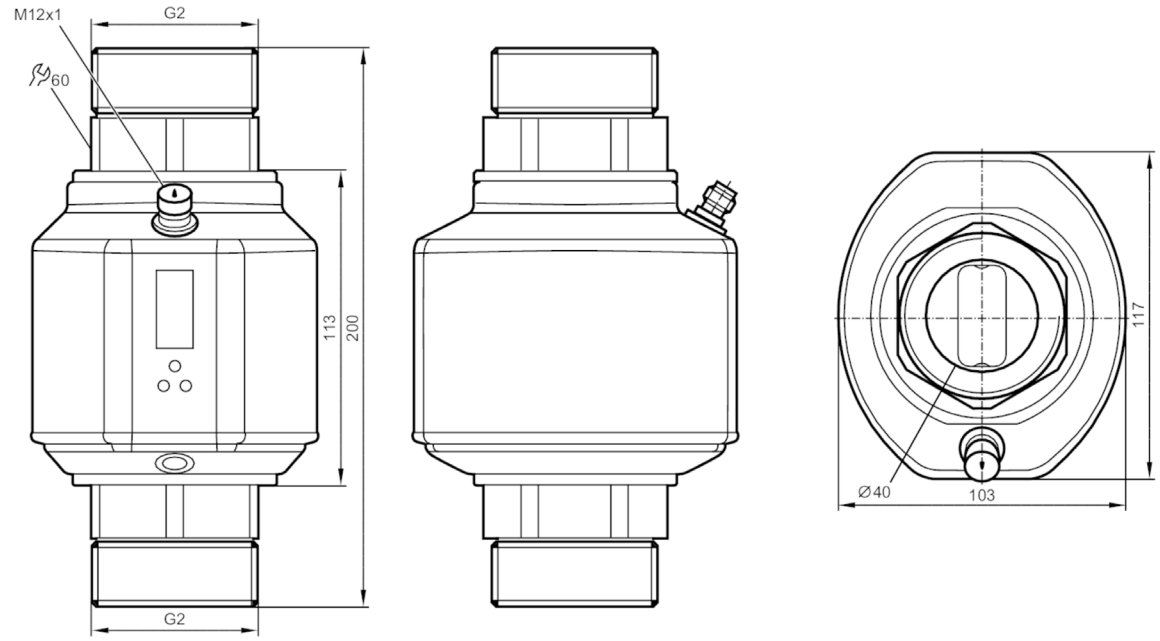
SI-00.20 /



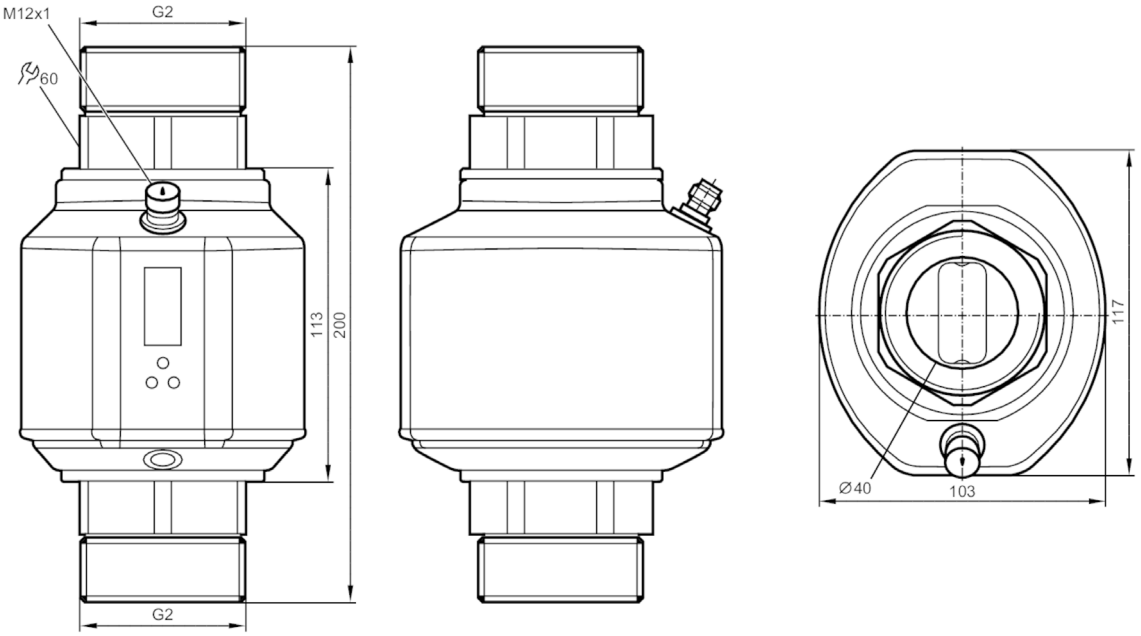
SI-00.25 /



SI-00.50a /



SI-00.50b /



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SI-01

Electromagnetic Flowmeter for Water Applications



Features

/ Cost-effective

/ Separate or compact measuring transmitter

/ NBR or EPDM lining

/ DN25 to DN1200

/ DIN or ANSI flange

Description:

The SI-01 series of electromagnetic flowmeters is always a combination of measuring pick-up SI-01 and measuring transmitter MU-5000 which can be either directly mounted on the pick-up or separately mounted on the wall by means of a fixing metal plate. The measuring pick-up consists of a magnetically non-conductive measuring tube with plastic lining, magnetic coils fastened diametrically on the tube and at least two electrodes which are inserted through the tube's wall and establish contact with the measuring medium. As current passes through the magnetic coils, a clocked magnetic field is generated which penetrates the magnetically non-conductive measuring tube and induces in the electrically conductive medium a voltage proportional to the flow velocity. The electrodes inside the tube tap this voltage and pass it on to the measuring transmitter MU-5000. Now the transmitter generates a current signal in the range of 4. . .20 mA which is linearly connected to the mean velocity of flow. The measuring pick-up has a SENSORPROM memory module in which its individual data is stored. The result is that nearly every measuring pick-up of the SI-01 series can be operate along with every MU-5000 measuring transmitter without the need for prior parameterization.

Application:

Electromagnetic flowmeters are suited for measuring nearly all electrically conductive fluids, pulp and slurry that have a conductivity of at least 5 micro-Siemens. Temperature, pressure, density and viscosity are of no consequence for the method of measurement so long as the measurement is performed within the velocity range of 0.25. . .10 m/s and the permissible material specifications do not fall short or are not exceeded. The main applications for the SI-01 series are found in the following areas, Water removal, Water treatment, Water distribution, Effluent treatment, Industrial water applications and Filtration installations. For applications that necessitate higher temperatures or pressure, more hostile media or other nominal diameter ranges, the high-quality measuring pick-up of the SI-02 offers a reliable solution.

Technical Specifications:

Measuring principle /	electromagnetic induction
Exciter frequency /	1.56 Hz. . .12,5 Hz depending on ND
Conductivity of medium /	at least 5 µS/cm (micro Siemens)
Operating range /	0.25. . .10 m/s for the specified accuracy, below and above this greater deviations
Accuracy /	± 0.4% ±1mm/s
Ambient temp. /	-40. . .+70°C -20. . .+60°C for directly mounted measuring transmitter
Media temperature /	-10. . .+70°C
Operating pressure /	DN 15. . .40 0.01. . .40 bar abs. DN 50. . .300 0.03. . .20 bar abs. DN 350. . .1200 0.01. . .16 bar abs. (note pressure level of the flange)
Lining /	NBR or EPDM
Materials /	
Flange and housing:	carbon steel, with corrosion-resistant two-component epoxy coat. (min. 150 µm)
Electrodes:	Hastelloy C
Grounding:	Hastelloy C
Process connection /	**DIN EN 1092-1:** PN 10 (145 psi): DN 200. . .300 (8“. . .12“) without nubbin PN 10 (145 psi): DN 350. . .1200 (14“. . .48“) with nubbin (Type 01 SORF) PN 16 (232 psi): DN 50. . .300 (2“. . .12“) w/o nubbin (DN ≤600 Typ 01; > 600 Typ 11) PN 16 (232 psi): DN 350. . .1200 (14“. . .48“) with nubbin PN 40 (580 psi): DN 15. . .40 (½“. . .1½“) without nubbin **ANSI B16.5:** Class 150: ½“. . .12“ without nubbin; 14“. . .24“ with nubbin **AWWA C-207:** Class D: 28“. . .48“, without nubbin **AS4087:** PN 16 (232 psi) DN 15. . .DN 300 (2“. . .12“) without nubbin DN 350. . .DN 1200 (14“. . .48“) with nubbin

Electrical Spec. Transmitter:

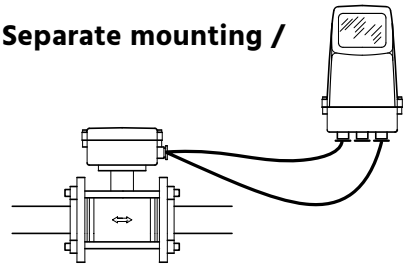
Cable insertion /	M20 x 1.5 or 1/2“-NPT
Protection class /	IP67 (IP68 on request)
EMC /	2014/30/EU

(see also Measuring transmitter MU-5000)

Measuring transmitter /

In principle, the SI-01 is suited for operations with a directly mounted measuring transmitter or for separate mounting. The MU-5000 measuring transmitter can be used universally (see data sheet MU-5000), hence it can be mounted directly on the measurement pick-up or positioned away from it by means of a wall fixture. If the SI-01 is required as a spare, since the MU-5000 measuring transmitter is already available, only the measurement pick-up can be ordered without the measuring transmitter.

Separate mounting /



Ordering Codes:

Order no.	**SI-01.**	**[0][0][1][5].**	**3.**	**2.**	**1.**	**2**

SI-01 Electromagnetic Flowmeter for Water

Nominal diameter DN15 to DN1200 /
[ ][ ][ ][ ] e.g. 0040 for DN40

Flange version and pressure level /
1 = DIN, PN10 for nominal diameters DN200. . .DN1200
2 = DIN, PN16 for nominal diameters DN50. . .DN1200
3 = DIN, PN40 for nominal diameters DN15 to DN40
4 = ANSI B16.5 Class 150 for nominal diameters 1“ to 24“
5 = AWWA C207 Class D for nominal diameters 28“ to 48“
6 = AS4087, for nominal diameters DN15. . .1200

Lining /
1 = NBR
2 = EPDM

Measuring transmitter /
0 = none
1 = with MU-5000, accuracy ±0.4% ±1mm/s

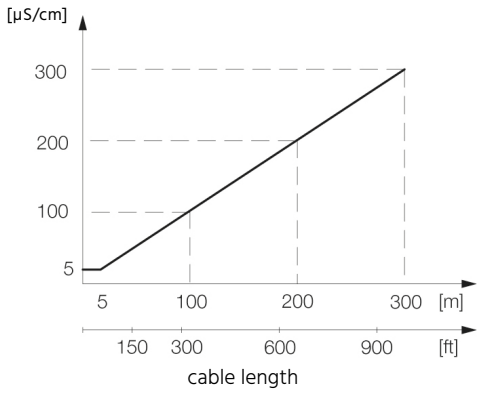
Cable gland /
2 = M 20x1.5 (not for ANSI flanges)
3 = 1/2“-NPT (for ANSI flanges only)

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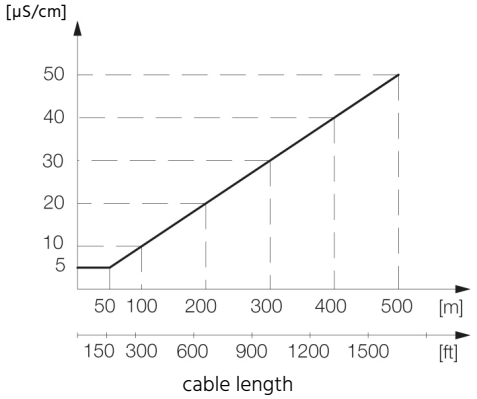
Dimensions SI-01:

Dimensions		A		D		L	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
15	½	177	7.0	77	3.0	200	7.9
25	1	187	7.4	96	3.8	200	7.9
40	1 ½	202	8.0	127	5.0	200	7.9
50	2	188	7.4	76	3.0	200	7.9
65	2 ½	194	7.6	89	3.5	200	7.9
80	3	200	7.9	102	4.0	200	7.9
100	4	207	8.1	114	4.5	250	9.8
125	5	217	8.5	140	5.5	250	9.8
150	6	232	9.1	168	6.6	300	11.8
200	8	257	10.1	219	8.6	350	13.8
250	10	284	11.2	273	10.8	450	17.7
300	12	310	12.2	324	12.8	500	19.7
350	14	382	15.0	451	17.8	550	21.7
400	16	407	16.0	502	19.8	600	23.6
450	18	438	17.2	563	22.2	600	23.6
500	20	463	18.2	614	24.2	600	23.6
600	24	514	20.2	715	28.2	600	23.6
700	28	564	22.2	816	32.1	700	27.6
750	30	591	23.3	869	34.2	750	29.5
800	32	616	24.3	927	36.5	800	31.5
900	36	663	26.1	1032	40.6	900	35.4
1000	40	714	28.1	1136	44.7	1000	39.4
	42	714	28.1	1136	44.7	1000	39.4
	44	765	30.1	1238	48.7	1100	43.3
1200	48	820	32.3	1348	53.1	1200	47.2

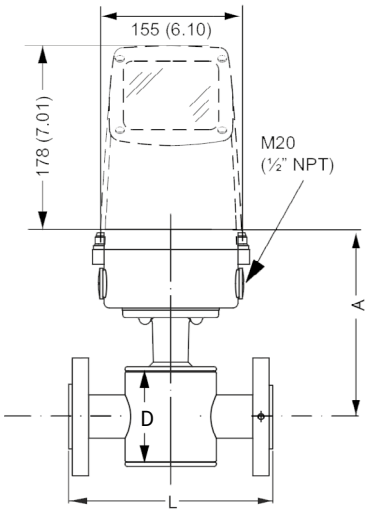
Connector length standard cable:



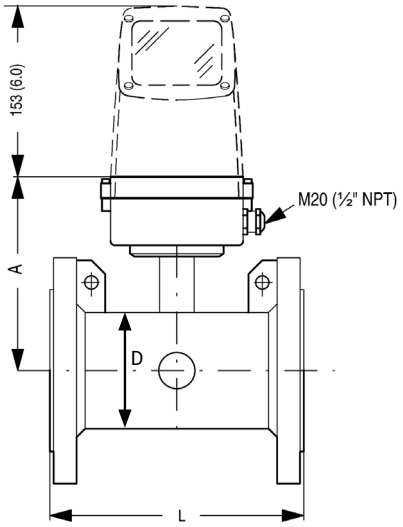
Connector length special cable:



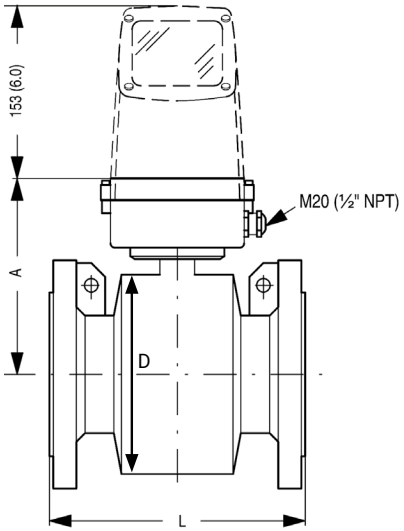
DN 15. . .40



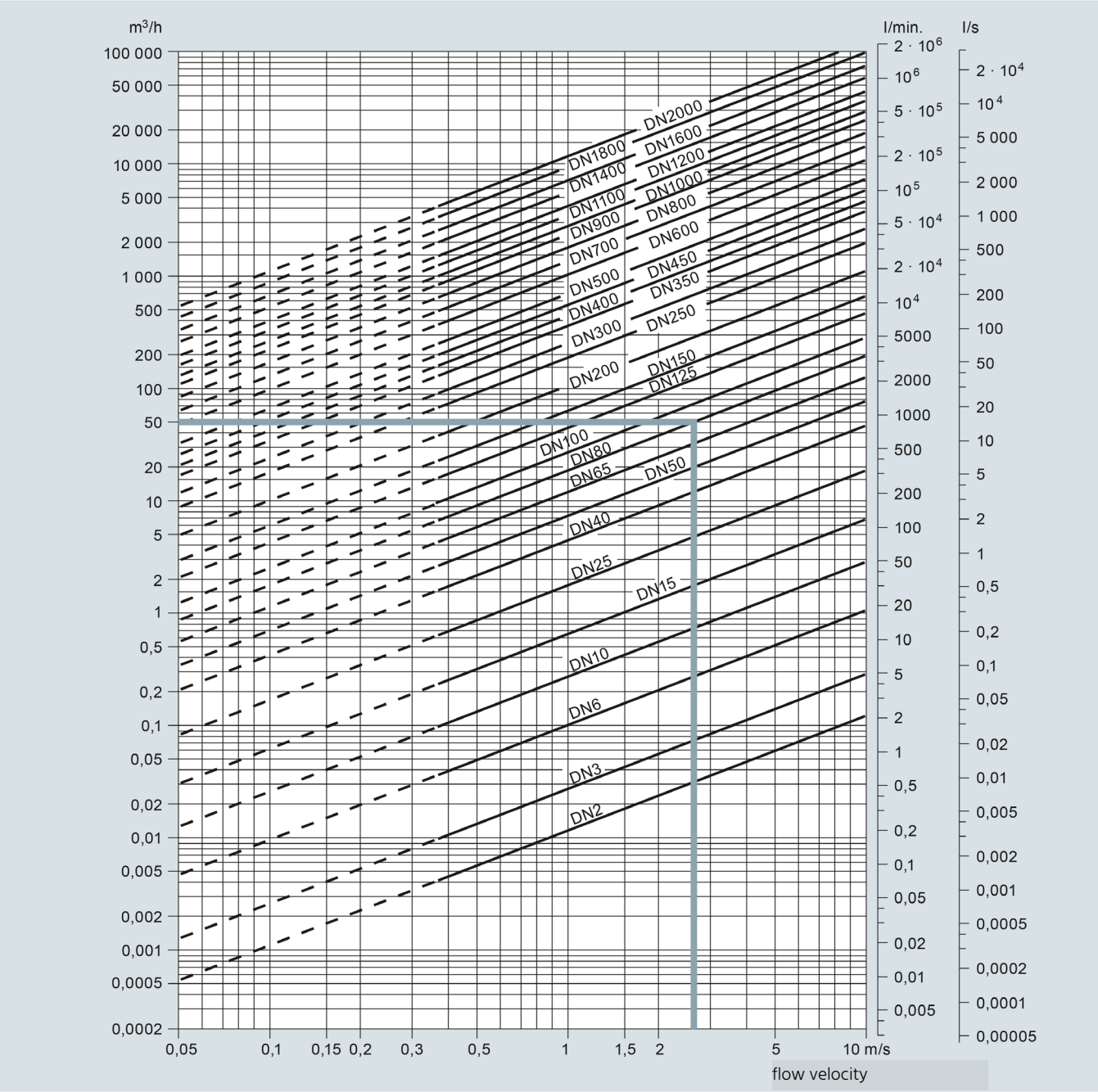
DN 50. . .300



DN 350. . .1200



Flow-Nomogram SI-01 / SI-02:



address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

SI-02

Electromagnetic Flowmeter for General Applications



Features

/ Universally applicable
/ Separate or compact measuring transmitter
/ Variety of lining material
/ DN15 to DN2000
/ DIN- or ANSI flanges
/ High-temperature version
/ Pressure level up to PN100

Description:

The SI-02 series of electromagnetic flowmeters is always a combination of measuring pick-up and measuring transmitter MU-5000 which can be either directly mounted on the pick-up or separately mounted on the wall by means of a fixing metal plate. The measuring pick-up consists of a magnetically non-conductive measuring tube with plastic lining, magnetic coils fastened diametrically on the tube and at least two electrodes which are inserted through the tube's wall and establish contact with the measuring medium. As current passes through the magnetic coils, a clocked magnetic field is generated which penetrates the magnetically non-conductive measuring tube and induces in the electrically conductive medium a voltage proportional to the flow velocity. The electrodes inside the tube tap this voltage and pass it on to the measuring transmitter MU-5000. Now the transmitter generates a current signal in the range of 0(4). . .20mA which is linearly connected to the mean velocity of flow. The measuring pick-up has a SENSORPROM memory module in which its individual data is stored. The result is that nearly every measuring pick-up of the SI-02 series can be operate along with every MU-5000 measuring transmitter without the need for prior parameterization.

Application:

Electromagnetic flowmeters are suited for measuring nearly all electrically conductive fluids, pulp and slurry that have a conductivity of at least 5 micro-Siemens. Temperature, pressure, density and viscosity are of no consequence for the method of measurement so long as the measurement is performed within the velocity range of 0.25. . .10 m/s and the permissible material specifications do not fall short or are not exceeded. Applications for the SI-02 series are found in a wide range of industrial segments since the material combinations ensure resistance to nearly all media in respect of different electrodes and lining materials.

Technical Specifications:

Measuring principle / electromagnetic induction

Exciter frequency / 12.5/15 Hz for DN15. . .DN65
6.25/7.5 Hz for DN80. . .DN150
3.125/3.75 Hz for DN200. . .DN1200
1.5625/1.875 Hz for DN1400. . .DN2000

Conductivity / at least 5 µS/cm (mikro Siemens)

Operating range / 0.25. . .10 m/s at specified accuracy, below and above this greater deviations

Accuracy / ± 0.4% ± 1mm/s (optional ± 0.2% ± 1mm/s)

Ambient temp. / -40. . .+100°C standard
-20. . .+60°C for directly mounted measuring transmitter

Media temperature / 0. . .+70°C for Neopren lining
-10. . .+70°C for EPDM lining
-40. . .+70°C for Linatex (rubber) lining
(for temperatures below -20°C stainless steel flanges must be used)
0. . .+95°C for Ebonite lining
-20. . .+100°C for standard PTFE lining
-20. . .+180°C for high-temp. PTFE lining
Attention: For stainless steel flanges note the pressure-temperature curve!

Operating pressure / 0.01 to 100 bar abs. for Neopren lining

0.01 to 40 bar abs. for EPDM lining

0.01 to 40 bar abs. for Linatex lining

0.01 to 100 bar abs. for Ebonite lining

0.3 to 50 bar abs. for standard PTFE lining **(DN15 to DN300 only)**

0.3 to 40 bar abs. for standard PTFE lining **(DN350 to DN600 only)**

0.6 to 50 bar abs.for high-temp. PTFE lining **(DN15 to DN300 only)**

Testing pressure / 1,5 x PN (where applicable)

Vibration-proof / 18. . .1000 Hz random in x, y, z, directions for 2 hours as per EN 60068-2-36, Sensor 3.17 grms

Lining / Neoprene, EPDM, Linatex, Ebonit, PTFE or PTFE for high temperature

Materials /

Flange and housing: **Standard:** carbon steel with anti-corrosive 2-component coating (min 150 micrometer)

Option 1: flanges made of st. steel AISI 304 (1.4301), housing carbon steel

Option 2 (on request): flanges and housing made of st. steel AISI 316L (1.4404), polished

Measuring tube: AISI 304 (stainless steel 1.4301) (if flanges and housing are from AISI 316 L, the measuring tube is also from 316 L)

Electrodes: AISI 316 Ti (1.4571)
Option: Hastelloy C-276, Platin/Iridium, Titan, Tantal

Grounding electrodes: similar to measuring electrodes excepting for PTFE lining or electrode material Platinum and Tantalum as well PN100 (use grounding rings)

Process connection / **DIN flanges**
DN15. . .DN2000:

PN40 at DN15. . .DN600
PN16 at DN65. . .DN2000
PN10 at DN200. . .DN2000
PN6 at DN65. . .DN2000
(Options see Ordering codes)

ANSI flanges B16.5
for nominal diameters 1/2". . .24"

pressure level 150 lbs. or 300 lbs.

AWWA flanges C-207
for nominal diameters 28" to 78"

Class D (10 bar)

Weight / see drawings

Ordering Codes:

Order no.	SI-02.	[0][0][1][5].	4.	1.	1.	1.	1.	2

SI-02 Electromagn.Flowmeter for Gen. Applications

Nominal diameter DN15. . .DN2000 /
[ ][ ][ ][ ] e.g. 0040 for DN40

Flange design and pressure level /
0 = as per EN 1092-1 (DIN flange)
PN6 for nominal diameters DN65 to DN2000
1 = as per EN 1092-1 (DIN flange)
PN10 for nominal diameters DN200 to DN2000
2 = as per EN 1092-1 (DIN flange)
PN16 for nominal diameters DN65 to DN2000**
3 = as per EN 1092-1 (DIN flange)
PN25 for nominal diameters DN200 to DN600
4 = as per EN 1092-1 (DIN flange)
PN40 for nominal diameters DN15 to DN600
5 = as per EN 1092-1 (DIN flange)
PN63 for nominal diameters DN50 to DN300, not for PTFE lining
6 = as per EN 1092-1 (DIN flange)
PN100 for nominal diameters DN25 to DN300, not for PTFE lining
7 = as per ANSI B16.5 Class 150
for nominal diameters 1/2" to 24"
8 = as per ANSI B16.5 Class 300
for nominal diameters 1/2" to 24"
9 = as per AWWA C207 Class D
for nominal diameters 28" to 78"

Flange material /
1 = flanges made of plain carbon steel ASTM A 105
2 = flanges made of stainless steel AISI 304 (1.4301)
3 = flanges and sensor made of stainless steel AISI 316L (1.4404), polished (on request)

Electrode material / ***
1 = AISI 316Ti (stainless steel 1.4571)
2 = Hastelloy C276 (2.4819)
3 = Platinum (no grounding electrodes) (DN ≤ 300/12")*
4 = Titanium (DN ≤ 600/24")
5 = Tantalum (no grounding electrodes) (DN ≤ 600/24")*

Lining /
1 = Neopren for media temperatures 0. . .+70°C, 0.01. . .100 bar
2 = EPDM for media temperatures -10. . .+70°C, 0.01. . .40 bar
3 = Linatex for media temperatures -40. . .+70°C, 0.01. . .40 bar
4 = Ebonite for media temperatures 0. . .+95°C, 0.01. . .100 bar
5 = PTFE for media temperatures -20. . .+100°C, 0.3. . .40 bar, DN15. . .DN600 only (max. 50 bar below DN300)
6 = PTFE for media temperatures -20. . .+180°C, 0.6. . .50 bar, DN15. . .DN300 only

Measuring transmitter /
0 = none
1 = with MU-5000, accuracy ± 0.4% ± 1 mm/s

Cable gland /
2 = M20 x 1.5 (not for ANSI flanges)
3 = 1/2"-NPT (for ANSI flanges only)

* not for Ebonite lining
** PN16, non PED (DN700 to DN1200) (pending)
*** Grounding electrodes not for PTFE liner or pressure PN100

Electrical Spec. Transmitter:

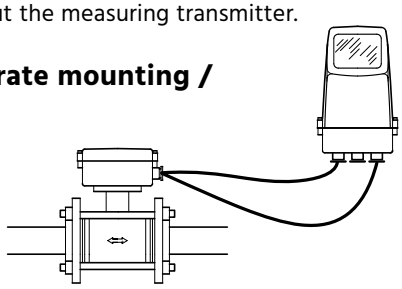
Cable insertion /	M20 x 1.5 or 1/2"-NPT
Protection class /	IP67 (IP68 on request)
EMC /	2014/30/EU

(see also Measuring transmitter MU-5000)

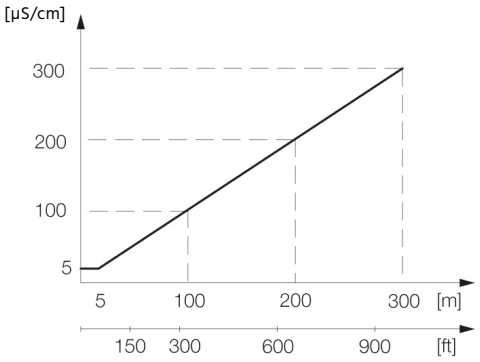
Measuring transmitter /

In principle, the SI-02 is suited for operations with a directly mounted measuring transmitter or for separate mounting. The MU-5000 measuring transmitter can be used universally (see data sheet MU-5000), hence it can be mounted directly on the measurement pick-up or positioned away from it by means of a wall fixture. If the SI-02 is required as a spare, since the MU-5000 measuring transmitter is already available, only the measurement pick-up can be ordered without the measuring transmitter.

Separate mounting /

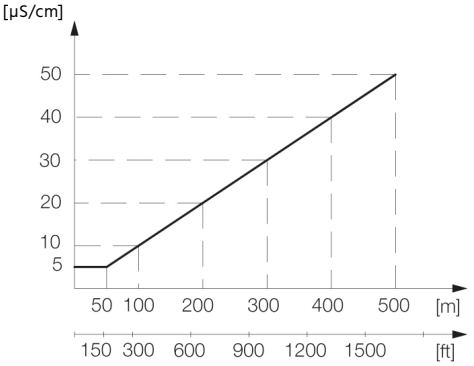


Connector length standard cable:



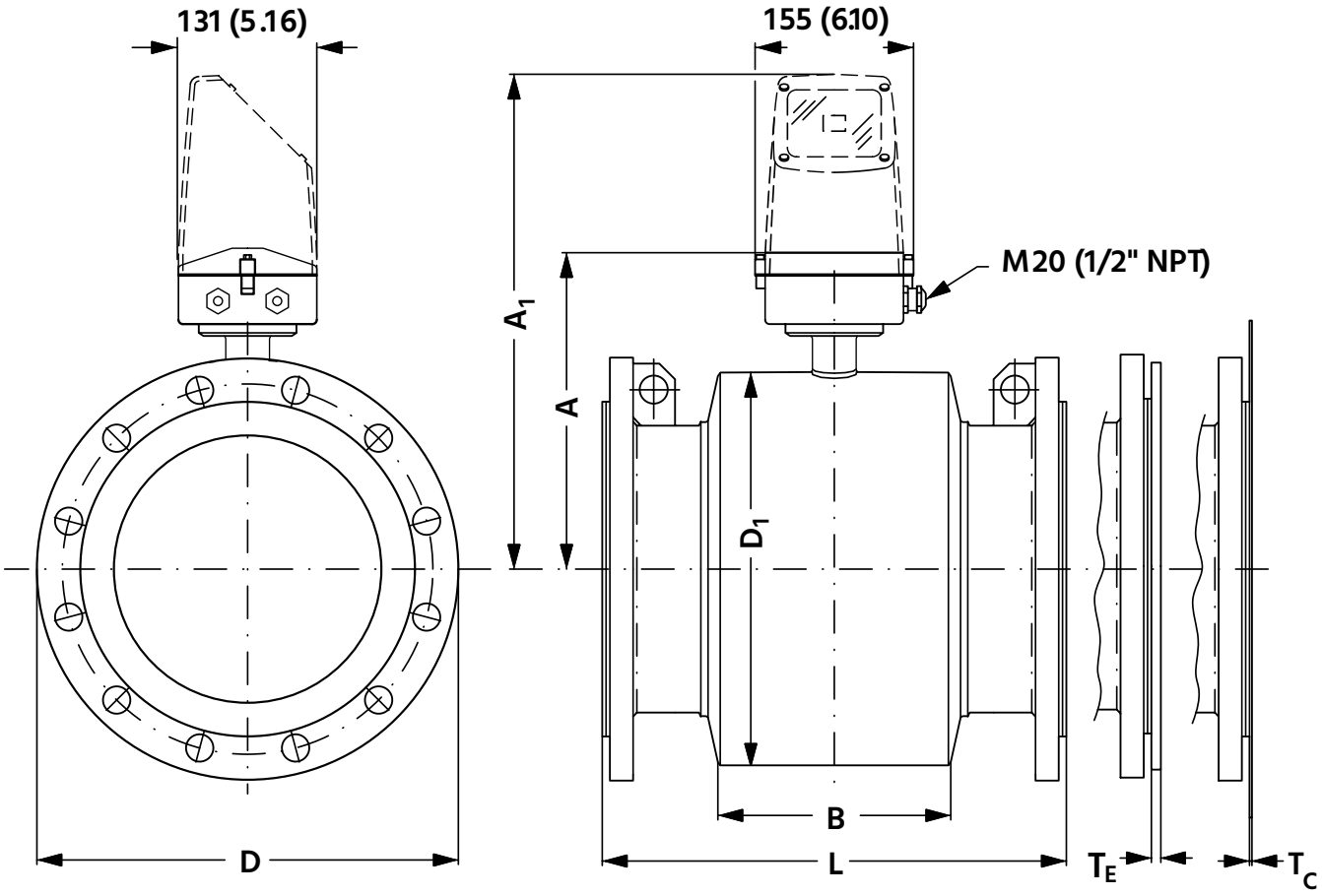
cable length

Connector length special cable:



cable length

Dimensions SI-02:



Dimensions SI-02:

DN	A[1)]	A[1]	B	D[1]	L[2)]								T_C[3)]	T_E[3)]	Weight[4)]
					EN1092-1-201					ANSI 16.5		AWWA C-207 Class D			
					PN6. 10. 16	PN25	PN40	PN64	PN100	Class 150	Class 300				
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	187	341	59	104	-	-	200	-	-	200	200	-	-	6	4
25	187	341	59	104	-	-	200	-	260	200	200	-	1.2	6	5
40	197	351	82	124	-	-	200	-	280	200	200	-	1.2	6	8
50	205	359	72	139	-	-	200	276	300	200	200	-	1.2	6	9
65	212	366	72	154	200	-	200	320	350	200	272	-	1.2	6	11
80	222	376	72	174	200	-	272*	323	340	272*	272*	-	1.2	6	12
100	242	396	85	214	250	-	250	380	400	250	310	-	1.2	6	16
125	255	409	85	239	250	-	250	420	450	250	335	-	1.2	6	19
150	276	430	85	282	300	-	300	415	450	300	300	-	1.2	6	27
200	304	458	137	338	350	350	350	480	530	350	350	-	1.2	8	40
250	332	486	157	393	450	450	450	550	620	450	450	-	1.2	8	60
300	357	511	157	444	500	500	500	600	680	500	500	-	1.6	8	80
350	362	516	270	451	550	550	550	-	-	550	550	-	1.6	8	110
400	387	541	270	502	600	600	600	-	-	600	600	-	1.6	10	125
450	418	572	310	563	600	600	600	-	-	600	640	-	1.6	10	175
500	443	597	350	614	600	625	680	-	-	600	730	-	1.6	10	200
600	494	648	320	715	600	750	800	-	-	600	860	-	1.6	10	287
700	544	698	450	816	700	-	-	-	-	-	-	700	2.0	-	330
750	571	725	556	869	-	-	-	-	-	-	-	750	2.0	-	360
800	606	760	560	927	800	-	-	-	-	-	-	800	2.0	-	450
900	653	807	630	1032	900	-	-	-	-	-	-	900	2.0	-	530
1000	704	858	670	1136	1000	-	-	-	-	-	-	1000	2.0	-	660
1100	755	904	770	1238	-	-	-	-	-	-	-	1100	2.0	-	1140
1200	810	964	792	1348	1200	-	-	-	-	-	-	1200	2.0	-	1180
1400	925	1079	1000	1675	1400	-	-	-	-	-	-	1400	2.0	-	1600
1500	972	1126	1020	1672	1500	-	-	-	-	-	-	1500	3.0	-	2460
1600	1025	1179	1130	1915	1600	-	-	-	-	-	-	1600	3.0	-	2525
1800	1123	1277	1250	1974	1800	-	-	-	-	-	-	1800	3.0	-	2930
2000	1223	1377	1375	2174	2000	-	-	-	-	-	-	2000	3.0	-	3665

1) 14.5mm shorter for AISI terminal boxes (Ex- and high-temperature version)

2) When using earth rings the flange thickness must be added to mounting length

3) TC = earth ring Type C,
TE = earth ring Type E
(included for PTFE measuring transmitter in high-temperature version and pre-mounted)

4) Weights are approximate values (for PN16) and applicable without measuring transmitter

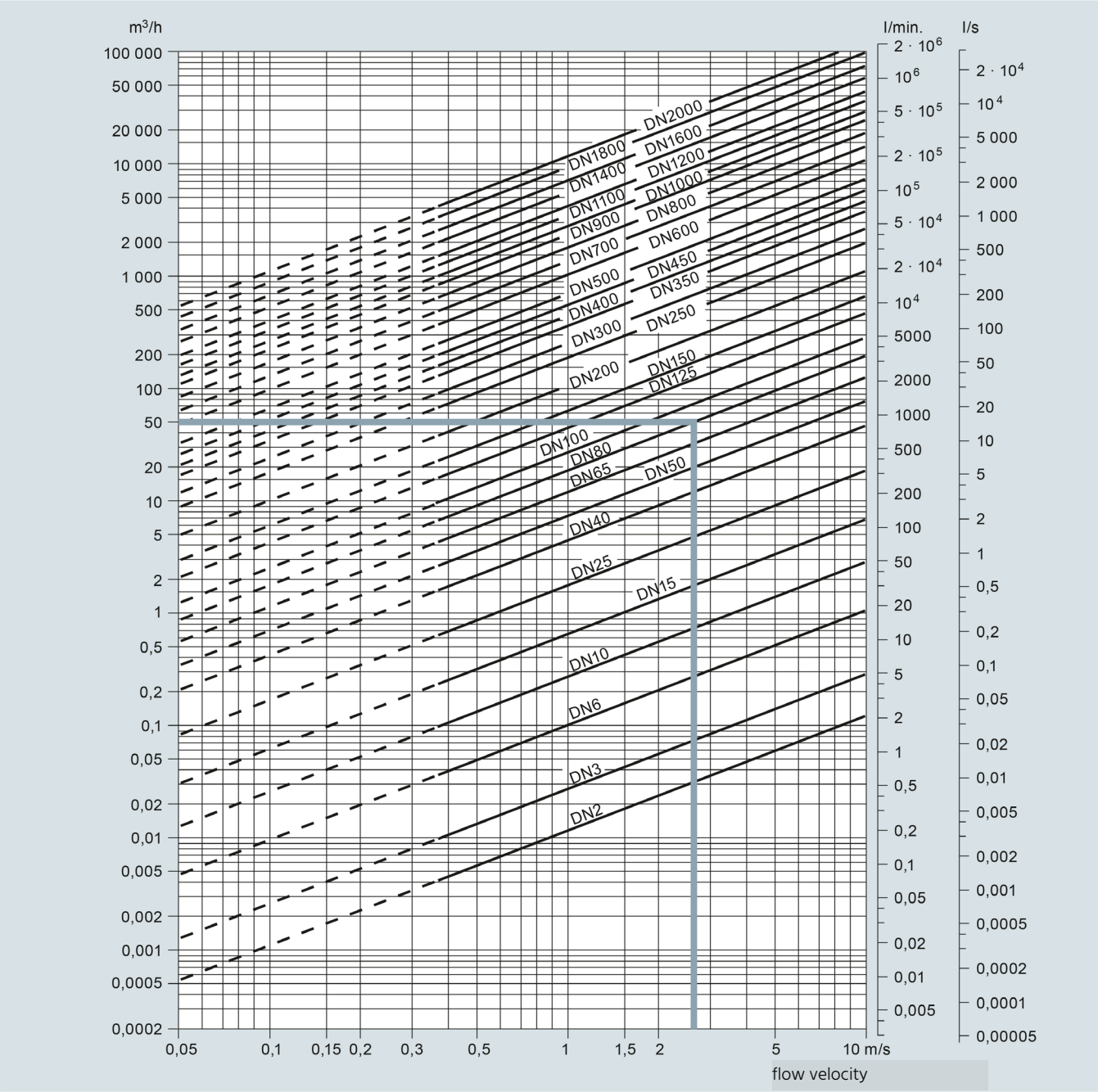
5) PN35 = 272 mm (not according to ISO 13359)

D = flange diameter see flange tables

\- not available

* Size is out to ISO 13359

Flow-Nomogramm SI-01 / SI-02:









MU-5000

Measuring Transmitter for Electromagnetic Flowmeters SI-01 and SI-02

Features

/ Easy to assemble

/ Separate or compact

/ Easy commissioning and maintenance

/ Optimal dynamics

/ Self-diagnostics

/ IP67

Description:

The MU-5000 is a high-performance measuring transmitter based on a micro-processor with built-in alphanumeric multi-language display. The MU-5000 is always a part of SI-01 or SI-02 series of measurement pick-up. It supplies power to its magnetic coils and evaluates the signal transmitted by the electrodes. On the output side, the device has a power output of a 0(4) to 20 mA signal as well as an active and a passive impulse output. All outputs can be adjusted in unidirectional (positive flow direction only) as well as bidirectional (forward and backward) way and, a parameterizable limit value can be evaluated with an additional relay. A programmable time-constant acts on the display and output signals. Moreover, the measuring transmitter has a digital input with which the internal counter can be set to zero or the output signal can be controlled or fixed. The measurement pick-ups of the SI-01 or SI-02 series possess a SENSORPROM memory module in which their individual data is stored. The result is that every measurement pick-up of the SI series can operate along with every MU-5000 measuring transmitter without the need for prior parameterizing. After connecting the MU-5000 to a measurement pick-up the specific data is read into the MU-5000 and it begins to function immediately. The standard accuracy of the MU-5000 is ±0.4% ±1 mm/s of the measured value. In combination with the SI-02, however, the system can also be supplied optionally with calibration set to ±0.2% ±1 mm/s.

Electrical Specifications:

Supply voltage /

AC/DC-Version: 11. . .30 VDC or 11. . .24 VAC

AC-Version: 115. . .230 VAC +10%-15% (50. . .60 Hz)

Power consum. /

AC/DC-Version: 9 VA at 24 VAC
(I_N = 380 mA, I_{ST} = 8A (30 ms))
or
11 W at 12 VDC
(I_N = 920 mA, I_{ST} = 4A (250 ms))

AC-Version: 17 VA at 230 VAC

Cable insertion / M20 x 1.5 at DIN-flanges or
1/2"-NPT at ANSI (AWWA)-flanges

Protection class /

Compact version: IP67

19"-slider: IP20

EMC-Function / IEC/EN 61326-1 (any environment)
IEC/EN 61326-2-5

Digital input / 11. . .30 VDC, activation time 50 ms,
current for 11 VDC I = 2,5 mA,
current for 30 VDC I = 7 mA
Ri = 4,4 kΩ

Digital output /

Frequency: 0. . .10 kHz, 50% scan ratio
(uni-/bidirectional)

Time-constant: 0.1. . .30 s, adjustable

Impulse (active): 24 VDC, 30 mA,
1 kΩ ≤ Ri ≤ 10 kΩ, short-circuit-proof

Impulse (passive): 3. . .30 VDC, max. 110 mA,
200 Ω ≤ Ri ≤ 10 kΩ

Time-constant: 0.1. . .30 s, adjustable

Relay output /

Time-constant: change-over realy,
as the current output

Load: 42 VAC at max. 2 A,
24 VDC at max. 1 A

Power output /

Output signal: 0. . .20 mA or 4. . .20 mA

Load: < 800 Ohm

Time-constant: 0.1. . .30 s adjustable

Galv. Isolation / All inputs and outputs are galvanic isolated.

Display and Keypad /

Counter: two 8-digit counter for
forward, backward and net flow

Display: back-lit alphanumeric text, 3x20 characters for display of flow rate, counter values, settings and errors, display of backward flow by minus symbol.

Time-constant: time-constant as current output time-constant

Technical Specifications:

Measuring principle / magnetic-inductive with clocked constant field

Empty tube / empty tube identification (special cable required for separate mounting)

Zero point setting / automatic

Creep vol. suppression / 0. . .9.9% of max. flow

Exciter frequency / depend on sensor size

Electrode input impedance / > 1 x 10^{14} Ohm

Accuracy / ±0,4% ±1 mm/s (optional ±0,2% ±1 mm/s)

Ambient temperature during operation / -20. . .+60°C with display
-20. . .+60°C without display

Storage temperature / -40. . .+70°C

Materials /

Compact version: fiberglass reinforced polyamide
(on request stainless steel AISI 316)

19"-slider: standard 19" slider (aluminium/steel) as per DIN 41494 width 21 TE, height 3 HE

Vibration-proof /

Compact version: 18. . .1000 Hz any, 3.17 g effectively, sinusoidal in all directions as per DIN IEC 68-2-36

19"-slider: 1. . .800 Hz, 1 g, sinusoidal in all directions as per DIN IEC 68-2-36

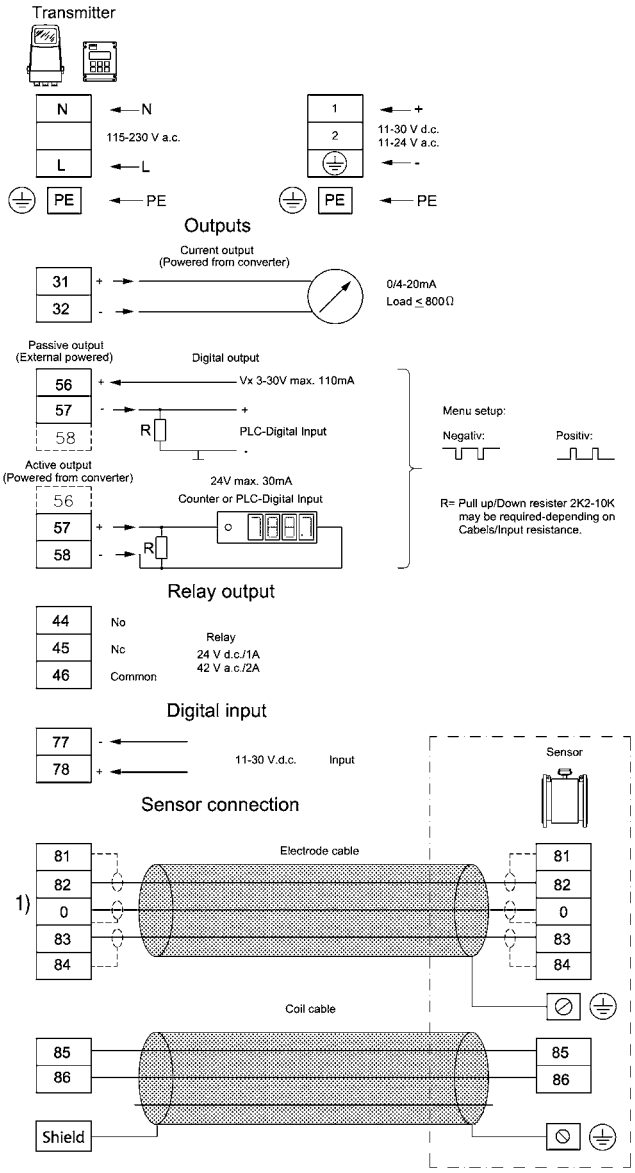
Weight /

Compact version: 0.75 kg

19"-slider: 0.8 kg

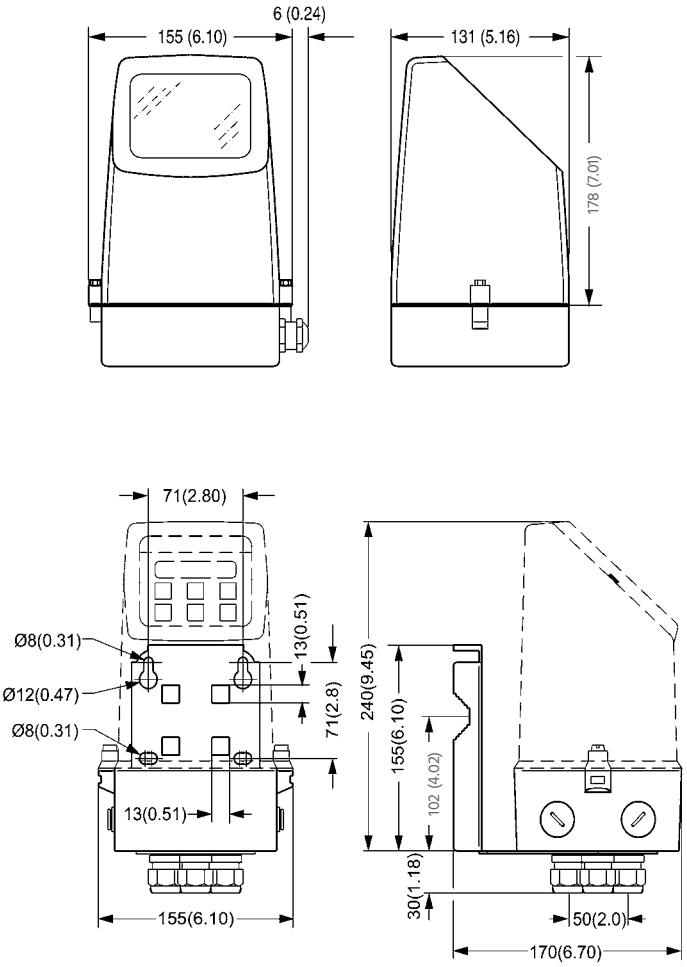
address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

Power supply:



1) Note
Special cable with individual wire shields (shown as dotted lines) are only required when using empty pipe function or long cables

Dimensions in mm (inch):



Ordering Codes:

Order number	MU-5000.	1.	1.	1

MU-5000 Measuring Transmitter for Electromagnetic Flowmeters SI-01 and SI-02

Display /
0 = without display
1 = with display

Assembly /
1 = for direct mounting on the measurement pick-up
2 = with wall-mounting unit for assembly separate from measurement pick-up
3 = measuring transmitter for mounting on the 19" component assembly carrier (HART protocol not possible)

Supply voltage /
1 = 11. . .30 VDC and 11. . .24 VAC
2 = 115/230 VAC 50/60 Hz
3 = 115/230 VAC 50/60 Hz with HART protocol for versions with display only

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com





VO-01

Low-Volume Oval Gear Flowmeter

Description:

The VO-01 low volume oval gear flowmeter measures fluids in the viscosity range of 5 to 200 cSt according to the principle of positive displacement. Two interlocked oval gear-wheels made of PEEK rotate inside the measuring chamber as a result of the flow and, effectively, defined volumes are channelled through the VO-01 proportional to the rotating speed. An externally mounted electronic element records the rotating speed of the oval gear-wheel pair by means of a non-contacting Hall effect sensor that emits a voltage impulse whenever a magnet crosses it and, through an amplifier, produces a rectangular impulse signal at the PINs of the plug connector. In the version with 2-wire output the impulse signal is readily converted internally into a power signal. In contrast to this, in the case of the 3-wire version, as also in a variant with impulse output and two additional threshold value relays, a VO-01 equipped with a "normal" impulse output can be easily converted into a flowmeter with 3-wire power output or one with a Push-Pull impulse output and threshold value relays by replacing the mating plug.

Features

/ Plastic or stainless steel housing

/ Measuring range from 8 l/h

/ Cost-effective

/ 4. . .20 mA or pulse output

/ Optionally with switching contacts

/ Intended for fluid viscosities from 5 to 200 cSt

Application:

Oval gear flowmeters of VO-01 series offer a cost-effective solution when low volume flows in the range of low to medium viscosities need to be measured and monitored. For the housing, the materials used can be polypropylene, ECTFE and stainless steel; however, the oval gear-wheels are always made of PEEK. Therefore, it is possible to design a device in a way that only plastics come into contact with the flow medium. The result is that the range of application of the VO-01 is extended to measuring even hostile fluids which, otherwise, are corrosive on metals. Typical applications for the VO-01 are, for example:

· monitoring lubrication points
· measuring consumption of fuel or lubricants
· manufacturing of paints and dyes
· processing of solvents.

Ordering Codes:

Order number	VO-01.	PP.	40.	EP.	ST.	IM.	0

VO-01 Oval Gear Flowmeter

Design /
PP = housing Polypropylen, oval gear-wheels PEEK
EC = housing ECTFE, oval gear-wheels PEEK
VA = housing st. steel, oval gear-wheels from PEEK

Operating range /
40 = 8. . .40 l/h
80 = 14. . .80 l/h

Gasket /
VI = Viton
KR = Kalrez
EP = EPDM

Electrical Connection /
ST = cubical plug EN 175301-803A
KA = 3 m cable connection

Output signal /
IM = pulses out of complementary final stage (suitable for NPN or PNP inputs)
A2 = analogue output 4. . .20 mA, 2-wire (with plug connection only)
A3 = analogue output 4. . .20 mA, 3-wire (with plug connection only)
FK = pulse output Push-Pull and two setpoints (semiconductor relays)

Options /
0 = none
AK = axis from ceramic instead of zirconium oxide
NPT= process connection 1/4"-NPT-female instead of G1/4"-female

Technical Specifications:

Operating principle /	positive displacement
Sensing system /	Hall-effect, non-contacting
Operating ranges / (start-up)	(2)8. . .40 l/h or (5)14. . .80 l/h
Accuracy /	± 2.5% full scale value
Repeatability /	< ± 0.8% full scale value
Flow direction /	in direction of arrow
Mounting position /	any (best result vertically with arrow to the bottom)
Straight inlet and outlet /	not necessary
Process connection /	2 x G1/4"-female
Operating pressure /	
PP-housing:	10 bar max.
ECTFE-housing:	10 bar max.
SS-housing:	20 bar max. (higher on request)
Burst pressure /	
PP-housing:	>18 bar
ECTFE-housing:	>18 bar
SS-housing:	>35 bar (higher on request)
Operating temp. /	0. . .80°C
Viscosity range /	5. . .200 cSt
Housing material /	Polypropylen, ECTFE or stainless steel 1.4571
Oval gear-wheels /	PEEK
Axis /	ZrO_2 (zirconium oxide), optionally ceramic Al_2O_3
Bearings /	PEEK
Magnets /	encapsulated in PEEK
O-ring /	Viton (optionally EPDM or Kalrez)

Dimensions in mm:

Range	Width	Height	Depth	Imp. per Litre*	Process connection
8. . .40 l/h	54	45	44	6000	2 x G 1/4"-female
14. . .80 l/h	54	45	44	3400	2 x G 1/4"-female

*The pulse-litre-correlation of each VO-01 is individually evaluated before shipment and can be read on the type label of each unit. A difference to the values above is possible.

Electrical Connection:

	VO-01.xx.xx.xx.xx.IM	VO-01.xx.xx.xx.xx.A2	VO-01.xx.xx.xx.xx.A3	VO-01.xx.xx.xx.xx.FK
Supply +	PIN 1	PIN 1	PIN 1	white
Signal	PIN 2	PIN 2	PIN 2	green
Ground	PIN 3		PIN 3	brown
Relay 1-A				yellow
Relay 1-B				grey
Relay 2-A				pink
Relay 2-B				blue

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Electrical Specifications:

Pulse output (VO-01.xx.xx.xx.xx.IM) /

Function:	complementary final stage (suitable for PNP- or NPN-inputs)
Supply voltage:	+4.5. . .+24 VDC
Current:	max. 11 mA at 24 VDC
El. connection:	plug connector as per EN 175301-803A (cubical-shaped) or round cable LiYY 3 x 1.4 mm^2, length 3 m
Protection:	IP65

Analogue output 2-wire (VO-01.xx.xx.xx.xx.A2) /

Supply voltage:	+15. . .+24 VDC
Current:	4. . .20 mA, 2-wire
Damping:	factory adjustable in steps of 1 sec.
El. connection:	plug connector as per EN 175301-803A (cubical-shaped)
Protection:	IP65
Ambient temp. at plug connector:	max. 55°C

Analogue output 3-wire (VO-01.xx.xx.xx.xx.A3) /

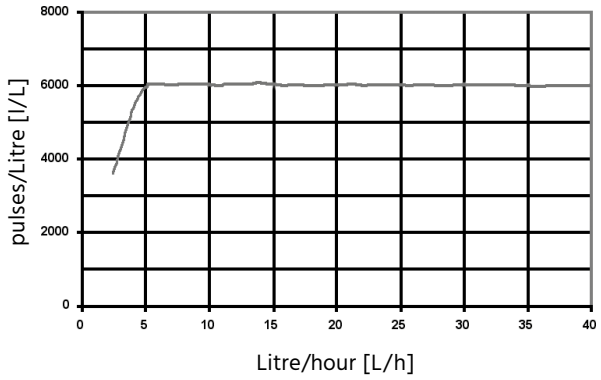
Supply voltage:	+15. . .+24 VDC
Current:	10. . .40 mA
Damping:	factory adjustable in steps of one sec.
El. connection:	plug connector as per EN 175301-803A (cubical-shaped)
Protection:	IP65
Ambient temp. at plug connector:	max. 55°C
Mounting:	The electronic modul is easily plugged between the plug connector and the mating plug of the SD-05 and transforms the pulse output into an analogue output. The correllation between analogue output and operating range is adjusted with a REED switch at the plug connector. This electronic modul can be field upgraded at any time.

Pulse output Push-Pull and two additional threshold value relays (VO-01.xx.xx.xx.xx.FK) /

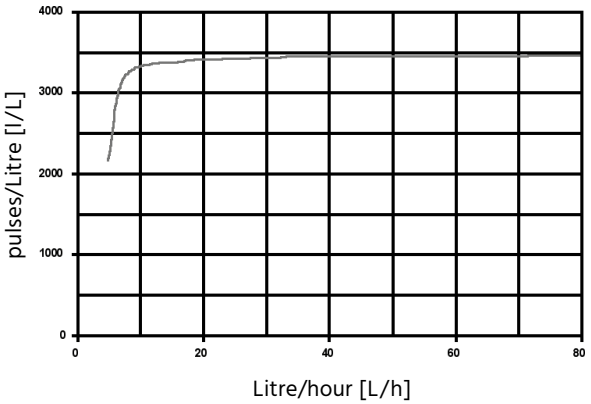
Supply voltage:	+4.5. . .+24 VDC
Current:	10. . .220 mA
Damping:	factory adjustable in steps of one second
Outputs:	1 x complementary final stage (11 mA, 24 VDC), 2 x semiconductor relays (0.1 A / 24 VDC)
El. connection:	plug connector as per EN 175301-803A (cubical-shaped) with one meter factory connected cable
Protection:	IP65
Ambient temp. at plug connector:	max. 55°C
Mounting:	The electronic modul is easily plugged between the plug connector and the mating plug of the SD-05 and transforms the pulse output into Push-Pull output (suitable for PNP and NPN inputs). Additionally two alarm outputs are provided. The correllation between analogue output and operating range and the setpoints are adjusted with a REED switch at the plug connector. This electronic modul can be field upgraded at any time.

Pulses per Litre:

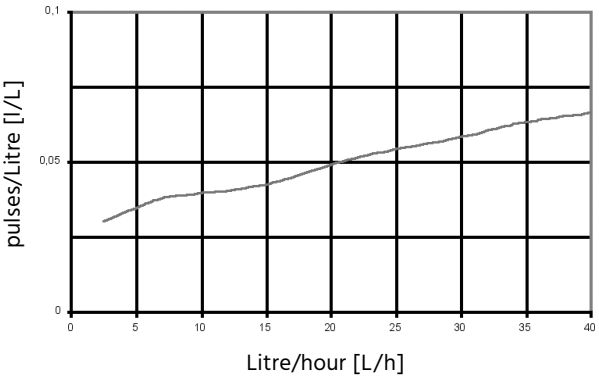
Range 8. . .40 l/h

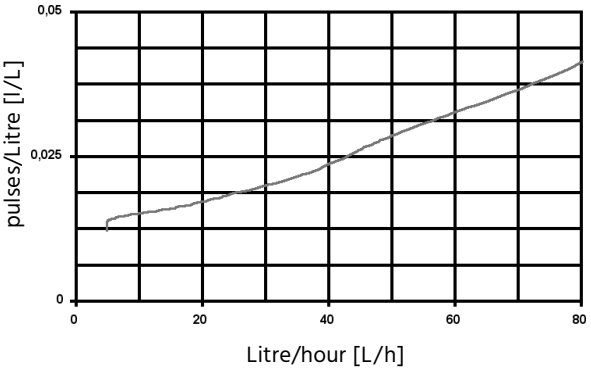


Range 14. . .80 l/h



Pressure Drop:





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VO-02

Miniature
Oval Gear Flowmeter



Features

/ Aluminium or st. steel

/ Small build

/ For ranges from 0,001 l/min

/ Up to 80 bar

/ From 0,5 mPas

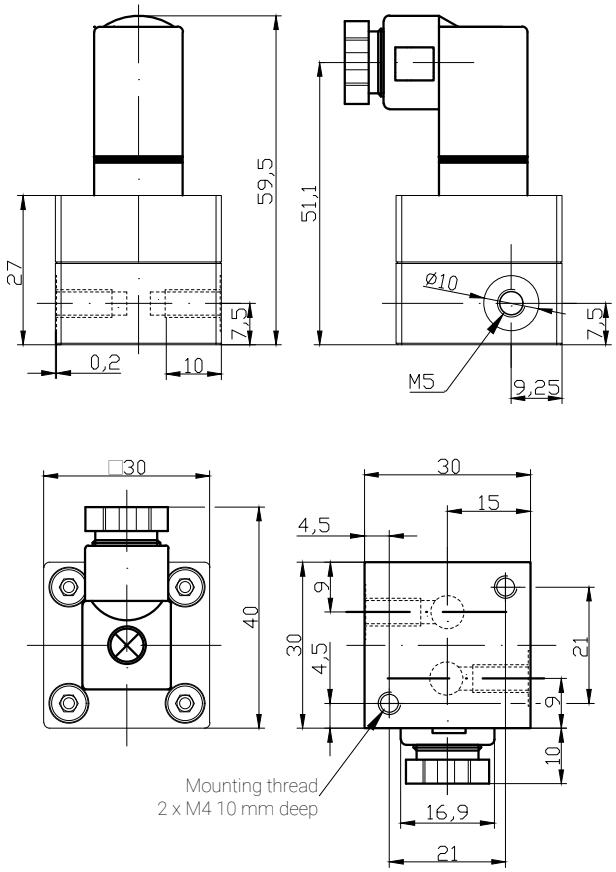
Description:

In addition to our proven oval gear flowmeters series VO-01, the new series VO-02 has been designed for tiny ranges (from 0,001 l/min). These meters are very precise and can measure the smallest amounts of fluid. These instruments are using the volume-measuring principle, where the media running through the housing sets gears into motion. Within those gears are magnets, which trigger a Hall-sensor. The sensor then sends out squarewaves, whose frequency is proportional to the flowing media. Whether the meter is used for low or highly viscose media, the volume of the tooth space remains the same, so the meters can be used either way. The VO-02 has a standard PNP impulse output, while the housing is available in either aluminium or stainless steel.

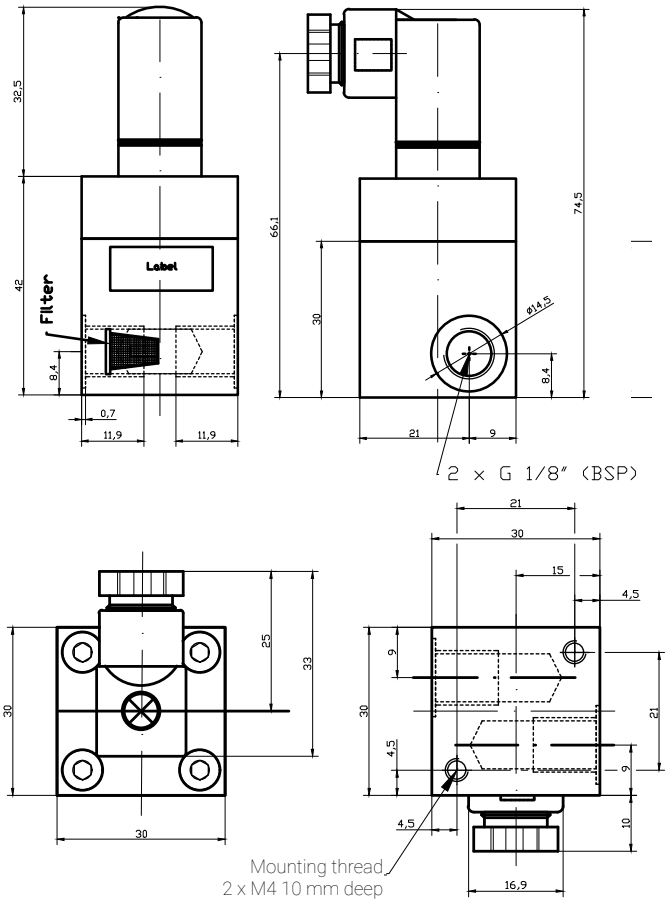
Application:

The VO-02 are perfectly designed for measuring the flow of oils. For example mineral- and plant-oils, plant based fuels, diesel and a variety of lubricants.

Flow range up to 0,3 l/min:



Flow range up to 1,75 l/min:

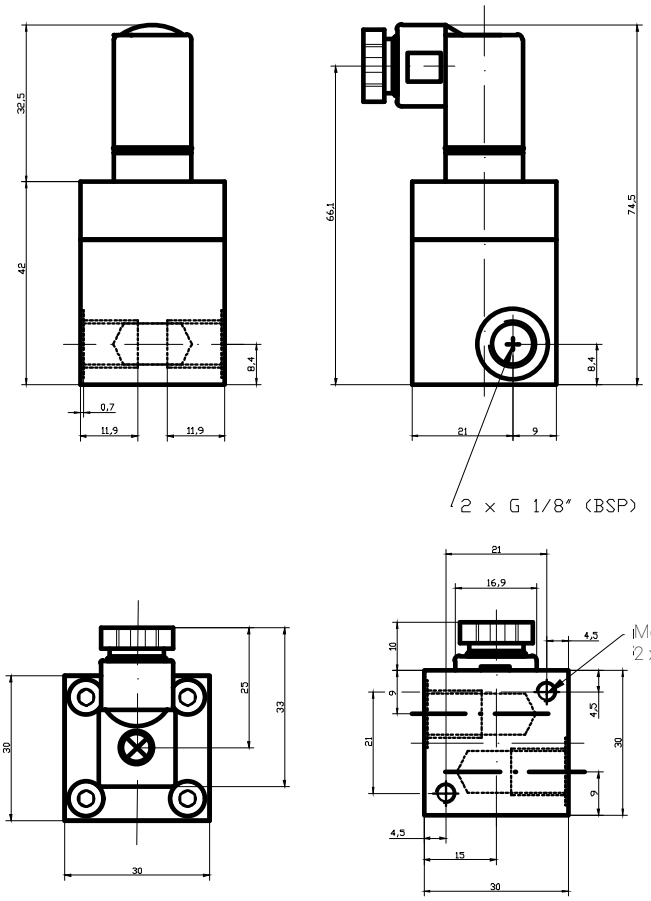


	VO-02.1.1	VO-02.2.1
Material	aluminium	stainless steel
Flow range	0.001. . .0.3 l/min for v > 3 mPas	0.001. . .0.3 l/min for v > 5 mPas
Output signal	PNP	PNP
Impulses / litre	14.000 imp/l (v > 3 mPas)	7.000 imp/l (v > 5 mPas)
Pressure range	-0.8 . . . 30 bar (20°C)	-0.8 . . . 30 bar (20°C)
Burst pressure	50 bar	50 bar
Connection	2 x M5 female	2 x M5 female
Material/rotor/O-ring	Alu-elox. / PPS / FPM 75.5	SS 316L / PPS / FPM 75.5
Pivot/bearing	SS 316 L / 1.4435	SS 316 L / 1.4435
Weight	70 g	165 g
Viscosity	from 0.7 mPas	from 0.7 mPas
max. Mediatemp.	-20. . .+100°C	-20. . .+110°C
Accuracy	± 1% at v > 3 mPas	± 1% at v > 5 mPas
Repeatability	± 0.5% (for constant service conditions)	± 0.5% (for constant service conditions)
Mounting position	any	any
Supply	5. . .24 VDC	5. . .24 VDC
max. Current	25 mA	15 mA

VO-02.1.2	VO-02.2.2
aluminium	stainless steel
0.005. . .1.75 l/min for v > 5 mPas	0.005. . .1.75 l/min
PNP	PNP
3.600 imp/l (20°C)	3.600 imp/l (v > 3 mPas)
-0.8 . . . 30 bar (20°C)	-0.8 . . . 30 bar (20°C)
50 bar	50 bar
2 x G 1/8" female	2 x G 1/8" female
Alu-elox. / PPS / FPM 75.5	1.4404 / PPS / FPM 75.5
SS 316 L / PTFE	1.4404 / PPS / PTFE
80 g	80 g
from 0.5 mPas	from 0.5 mPas
-20. . .+100°C	-20. . .+110°C
± 1% at v > 3 mPas	± 1% from 5 mPas
± 0.5% (for constant service conditions)	± 0.5% (for constant service conditions)
any	any
5. . .24 VDC	5. . .24 VDC
15 mA	25 mA

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Flow range up to 5,0 l/min:

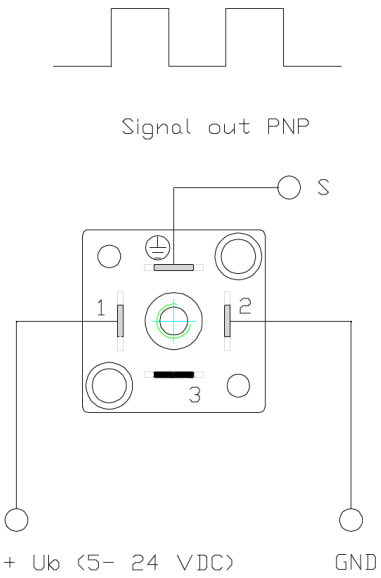


	VO-02.1.3	VO-02.2.3
Material	aluminium	stainless steel
Flow range	0.07. . .5.0 l/min for v = 5 mPas	0.07. . .5.0 l/min for v = 3 mPas
Output signal	PNP	PNP
Impulses / litre	1.800 imp/l (v > 3 mPas)	900 imp/l
Pressure range	-0.8 . . . 30 bar (20°C)	-0.8. . .60 bar (20°C)
Burst pressure	50 bar	80 bar
Connection	2 x G 1/8" female	2 x G 1/8" female
Material/rotor/O-ring	Alu. elox. / PPS / FKM	1.4435 / PPS / FKM
Pivot/bearing	SS 316 L / PPS, PTFE	1.4435
Weight	110 g	110 g
Viscosity	from 0.5 mPas	from 0.7 mPas
max. Mediatemp.	-40. . .+90°C	-20. . .+110°C
Accuracy	± 1% at v ≥ 5 mPas	± 1% at v ≥ 5 mPas
Repeatability	± 0.5% (for constant service conditions)	± 0.5% (for constant service conditions)
Mounting position	any	any
Supply	5. . .24 VDC	5. . .24 VDC
max. Current	15 mA	15 mA

Electrical Connection:

Pin arrangement /

Pin 1: 4.5. . .24VDC
Pin 2: GND (0V)
Mass-Pin: Signal



Ordering Codes:

Order number	**VO-02.**	**1.**	**2**

VO-02 Miniature Oval Gear Flowmeter

Material /
1 = aluminium
2 = stainless steel

Measuring range /
1 = 0.001. . .0.3 l/min and 7000 imp/l
2 = 0.005. . .1.75 l/min and 3600 imp/l
3 = 0.07. . .5 l/min and 1800 imp/l

For use with clean liquids only.
It is essential to ensure that the medium is filtered (approx. 5 µm). Metal/magnetic filtering is also ideal.
Never drive the device with compressed air !
Check the resistance of the used materials !

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VM-01

Gear-Wheel Volume Sensor for Viscous Fluids, for OEM Applications



Features

/ For media with viscosities between 20. . .4000 cSt
/ Excellent price/performance ratio
/ Aluminium housing, steel gear-wheels
/ Low pressure drop
/ High pressure resistance
/ Convenient dim. for assembly

Description:

The VM-01 series of the flowmeter measuring sensor consists of a par of toothed wheels which is driven by the flow of fluid according to the working principle of a gear-wheel pump. The bearing for the measuring sensor is designed as a radial and axial sliding contact bearing (VM-01.2: ball bearing). The gear-wheel movement is scanned by means of a magneto-resistive sensor that is hermetically separated from the measuring chamber. The gear-wheel diameter of the VM-01 is ideal due to its low resistance to flow and especially low sound level.

Application:

The gear-wheel flowmeters of the VM-01 series are mainly used for measuring consumption, control of filling operations and for monitoring lubrication points. Due to their small dimensions and, particularly, due to the low pricing, they are suitable for OEM applications.

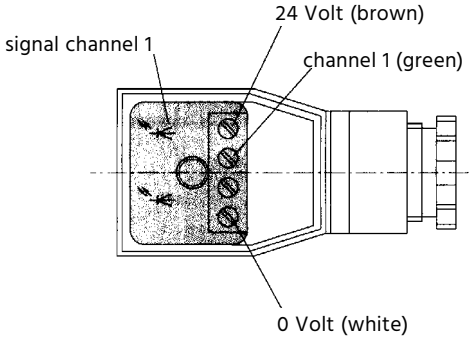
Versions and Ranges:

Type	Op. range (l/min)	Viscosity range (cSt)	Connection	Geo. tooth volume cm^3	Resolution (pulse/l)
VM-01.0	0.02. . .4	20. . .4000	G 1/4" IG	0.04	25,000
VM-01.1	0.25. . .10	20. . .4000	G 3/8" IG	0.2	5,000
VM-01.2	0.16. . .16	20. . .3000	G 3/8" IG	0.245	4,082
VM-01.3	1. . .65	20. . .4000	G 3/4" IG	2	500
VM-01.4	1. . .200	20. . .4000	G 1" IG	5.222	191.5

Materials:

Type	Housing	Gear-wheels	Bearing
VM-01.0.1	aluminium	st. steel 1.4462	ball bearing
VM-01.0.2	st. steel 1.4404	st. steel 1.4462	ball bearing
VM-01.1.1	aluminium (hartcoated)	st. steel 1.4462	plastic sliding bearing
VM-01.1.2	st. steel 1.4404	st. steel 1.4462	plastic sliding bearing
VM-01.2	aluminium	steel	ball bearing
VM-01.3	aluminium (hartcoated)	steel 1.7139	multi-layer sliding bearing
VM-01.4	aluminium (hartcoated)	steel 1.7139	ball bearing

Electrical Connection:



Technical Specifications:

Pressure /

	max. Pressure	Pressure peak
VM-01.0.1:	200 bar	240 bar
VM-01.0.2:	160 bar	190 bar
VM-01.1:	160 bar	200 bar
VM-01.2:	160 bar	200 bar
VM-01.3:	160 bar	200 bar
VM-01.4:	80 bar	100 bar

Temperature range / -10. . .+80°C

Accuracy /

VM-01.0:	± 2.0% ab 20mm^2/s
VM-01.1:	± 3.0% ab 20mm^2/s
VM-01.2:	± 0.3% ab 20mm^2/s
VM-01.3:	± 2.5% ab 20mm^2/s
VM-01.4:	± 1.0% ab 20mm^2/s

Weight /

VM-01.0.1:	0.5 kg
VM-01.0.2:	1.2 kg
VM-01.1.1:	0.5 kg
VM-01.1.2:	1.2 kg
VM-01.2:	0.7 kg
VM-01.3:	1.9 kg
VM-01.4:	6.0 kg

Supply voltage / 12. . .30 VDC, polarity-reversal-proof

Output signal / rectangular pulses, ≥ 0,8 U_B, scan ratio 1:1 (± 15%)

Protection class / IP 65

Power consumption / 0.9 $W_{max.}$

Mounting position / beliebig

Sound pressure level / L_A = < 60dB (A)

Ordering Codes:

Order number **VM-01.** **1.** **2**

VM-01 Gear-Wheel Volume Sensor

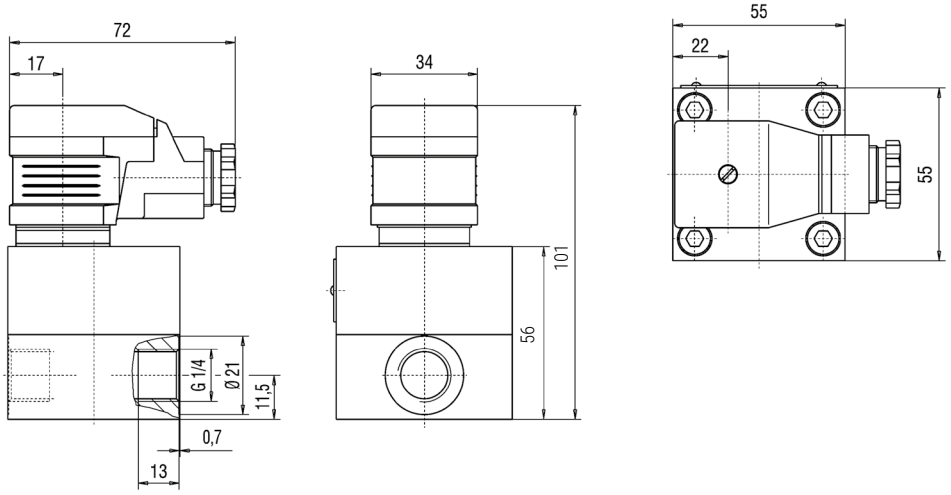
Operating ranges /
0 = 0.02. . .4 l/min
1 = 0.25. . .10 l/min
2 = 0.16. . .16 l/min
3 = 1. . .65 l/min
4 = 1. . .200 l/min

Material /
1 = aluminium
2 = stainless steel (VM-01.0 and VM-01.1 only)

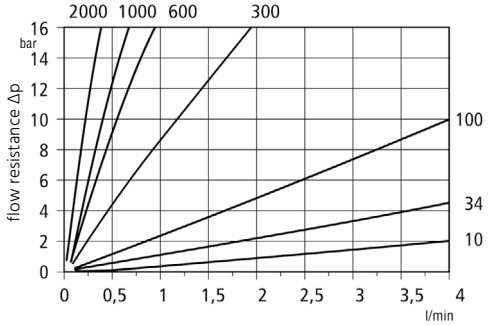
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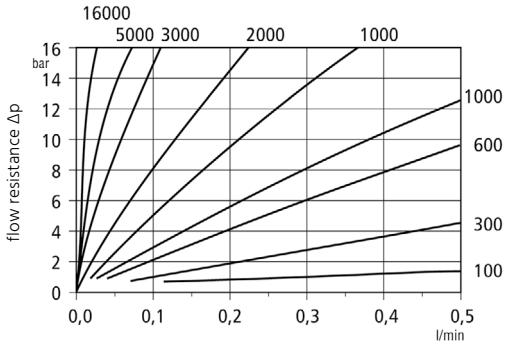
Dimensions in mm:

VM-01.0

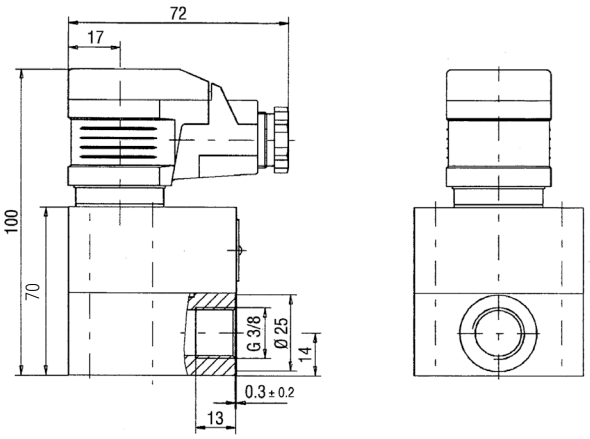


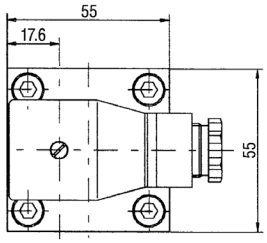
VM-01.0 Δp-curve – flow resistance at viscosity





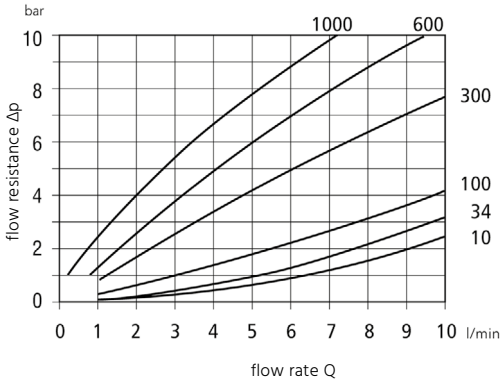
VM-01.1
VM-01.2



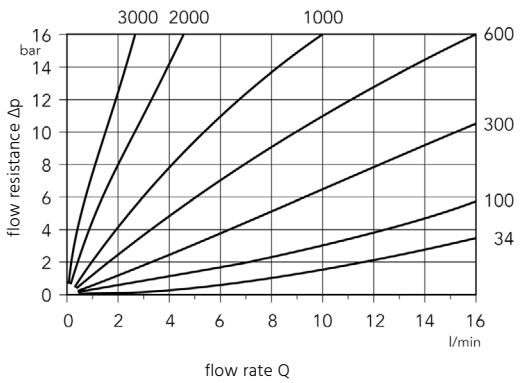


VM-01.2: same as VM-01.1, however, housing 55 x 65 mm, height 108 mm

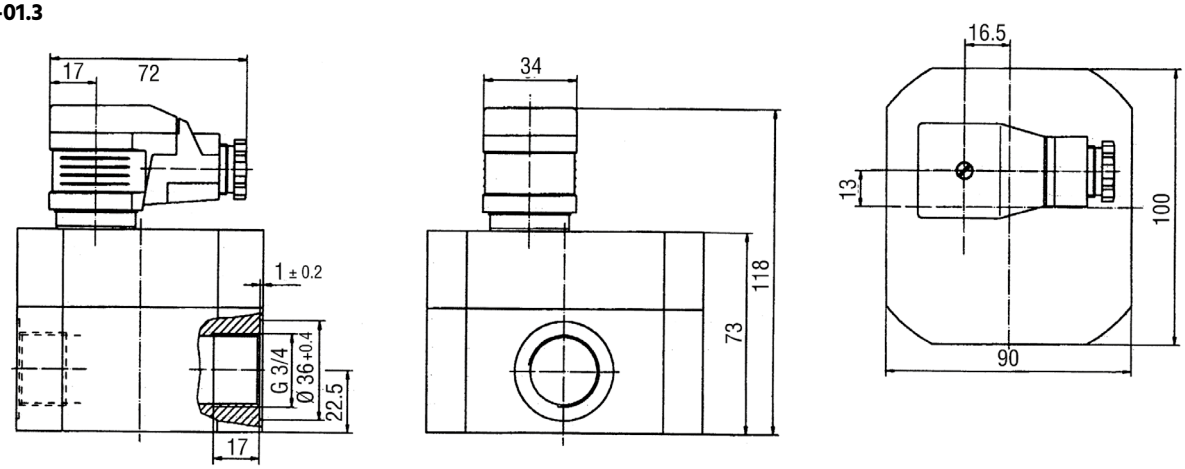
VM-01.1 Δp-curve – flow resistance at viscosity



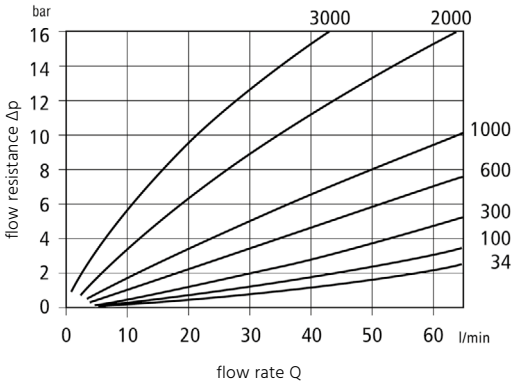
VM-01.2 Δp-curve – flow resistance at viscosity



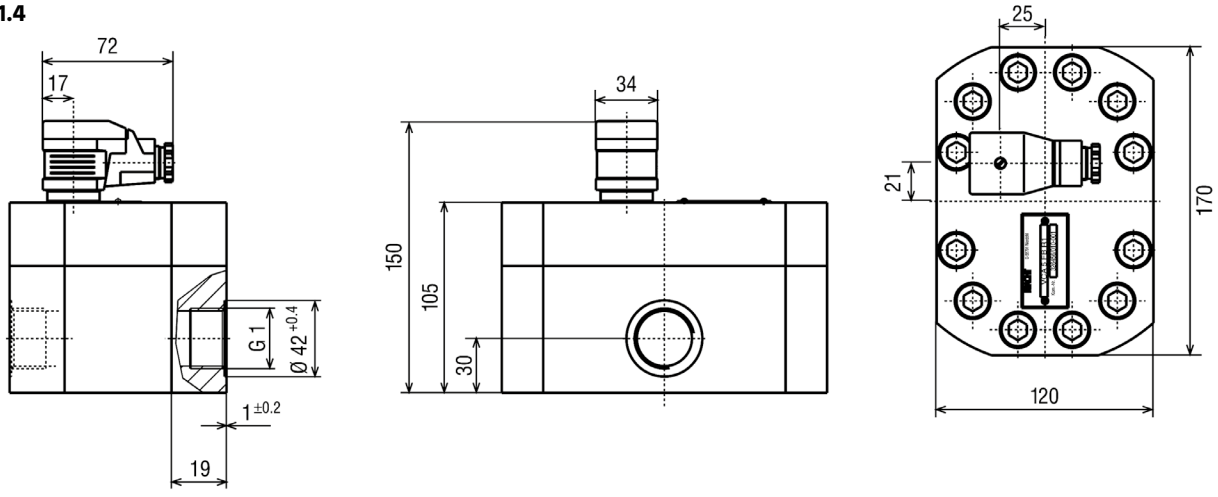
VM-01.3



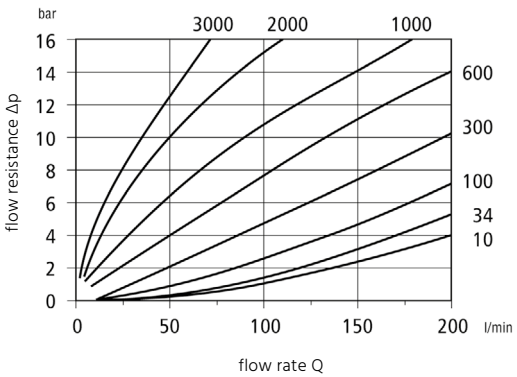
VM-01.3 Δp-curve – flow resistance at viscosity



VM-01.4



VM-01.4 Δp-curve – flow resistance at viscosity



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SD-01

Plug-In Display for Gear-Wheel Sensors



Description:

The SD-01 series is a universally applicable on-the-spot display for all gear-wheel volume sensors of Profimess GmbH provided with the plug connection as per DIN43650. The display is simply inserted between the plug and plug socket of the volume meter. Optionally, the display unit can display the flow as the current value or the accumulated volume as the sum. In the basic version, the SD-01 transmits the rectangular signal from the gear-wheel volume sensor without modifying it. In the next extended level, the device is equipped with a F/I converter which translates the rectangular signal in into a freely parametrizable 0(4) to 20mA signal. Another method is to equip the display unit with two relay contacts which can be used for monitoring MIN/MAX parameters of a flow volume or to implement a simple dosing function. All necessary settings for the SD-01 are stored in an EEPROM and are preserved even in the event of a power failure. If previously supplied gear-wheel volume sensors need to be upgraded with the SD-01, the user can remove just the plug PCB of the sensor and mount the display unit without much effort.

Features

/ Display and F/I converter

/ Capable to simple dosing

/ No additional auxiliary power supply

/ Upgrade for sensors already supplied

Application:

In practice, use of impulse emitting volume sensors is widely popular. Often the user wishes, on the one hand, to process the measured value within his guide system but, on the other hand, also make it available on-the-spot so as to optically monitor maintenance work or regulating operations. Also, many controls are capable of processing only analogue inputs but not impulse signals or, for this purpose, an expensive impulse input card must be added. The SD-01 plug-in display offers an ideal and cost-effective solution to this problem. This version with the display of the accumulated volume and two relay contacts is moreover capable of dosing through the connected volume sensor by connecting one of the relay outputs to a magnetic valve and by utilizing the second as the START/STOP input. This feature turns the volume sensor/SD-01 unit into a practical dosing system.

Electrical Specifications:

Supply voltage /	10. . .19 VDC or 18. . .28 VDC
Power consumption /	120 mA max.
Display /	7-segment LED, 7.62 mm, red
Range /	0,000. . .9999 with floating point, overflow >9999 display 9999
Keypad /	two keys behind the front aperture
Protection class /	IP65
El. connection /	angled connector DIN43650 (4-pole), polarity-reversal-proof
Impulse output (incremental signal) /	
Impulse amplitude:	approx. 0,8x Supply voltage, depends on load
Impulse form in symmetrical output signal:	rectangle, scan ratio for each channel 1:1, ± 15%
Impulse displacement between two channels:	90°, ± 30°
Output rating per channel:	0,3 W max., short-circuit-proof
Analogue output (Option) /	
Output:	0(4). . .20 mA, short-circuit-proof
Load:	≤ 250 Ohm at 18. . .28 VDC supply ≤ 50 Ohm at 10 VDC supply
Resolution:	10 Bit
Relay outputs /	
Load:	24 VDC, 1 A max.

Ordering Codes:

Order number	**SD-01.**	**2.**	**1.**	**1**

SD-01 Plug-In Display

Output signal /
1 = rectangular signals
2 = analogue output 0(4). . .20 mA
3 = 2 relay contacts 24 V DC 1 A

Supply Voltage /
1 = 24 VDC
2 = 12 VDC

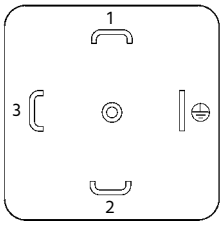
Display /
1 = current flow value
2 = volume (sum of flow), not for SD-01.1

Technical Specifications:

Operating temp. /	0. . .60°C
Storage temp. /	-25. . .+85°C
Housing /	aluminium
Dimensions /	height w/o plug approx. 35 mm, width approx. 60 mm, depth approx. 60 mm
Weight /	approx. 0,12 kg

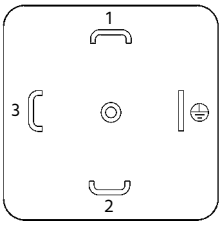
Electrical Connection:

Version: SD-01.1



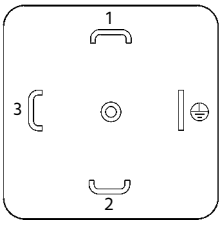
PIN 1 = 12/24 VDC
PIN 2 = GND
PIN 3 = channel 1
PIN ⏚ = channel 2

Version: SD-01.2



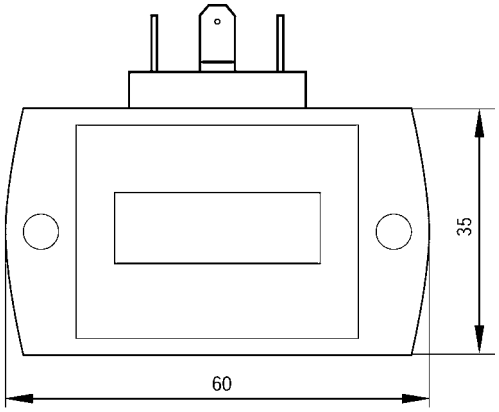
PIN 1 = 12/24 VDC
PIN 2 = GND
PIN 3 = 0/4-20 mA
PIN ⏚ = –

Version: SD-01.3



PIN 1 = 12/24 VDC
PIN 2 = GND
PIN 3 = relay 1
PIN ⏚ = relay 2

Dimensions in mm:



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VM-04

High-Precision Gear-Wheel Volume Sensor for Viscous Fluids



Features

/ For viscosities above 1 cSt

/ Excellent price to performance ratio

/ Cast or st. steel versions available

/ Accuracy better than 0.3% of MV

/ High resolution

/ Pressure-proof up to 400 bar

/ Convenient dim. for assembly

Description:

The VM-04 series of the flowmeters measuring sensor consists of a pair of toothed wheels which is driven by the flow of fluid according to the working principle of a gear-wheel pump. The bearing for the measuring sensor is designed as a radial or axial sliding contact bearing. The gear-wheel movement is scanned by means of two magneto-resistive sensors which are phase displaced by 90° and hermetically separated from the measuring chamber. The two-channel scanning enables a higher resolution of measurement and detection of direction of flow by means of suitable electronic devices. Optionally, all devices can be supplied with an explosion-proof design with separate switching amplifier. The gear-wheel flowmeter VM-04 is outstanding due to its low resistance to flow and especially low sound level.

Application:

Due to their excellent accuracy of measurement along with high resolution, these devices are especially suited for use in test beds for measuring small and least volumes of flow. Some of the areas of deployment are:

- Measurement of consumption
- Controlling filling operations
- Dosing oils and chemicals
- Measurement of flow for paints and varnishes
- Ratio regulation for polyol and isocyanate

Versions and Ranges:

Sealing material	Series	FKM	EPDM	FEP	FFKM
Ambient temperature		-15. . .+80°C	-30. . .+80°C	-30. . .+80°C	-15. . .+80°C
Medium temperature for standard version	1,2,6,7,8	-15. . .+120°C	-30. . .+120°C	-30. . .+120°C	-15. . .+120°C
	3,4,5	-15. . .+80°C	-30. . .+80°C	-30. . .+80°C	-15. . .+80°C
Medium temperature for high temperature version	1,2,6,7,8	-15. . .+150°C	-30. . .+150°C	-30. . .+150°C	-15. . .+150°C
	3,4,5	on request	on request	on request	on request
Medium temperature for high temp. PLUS version	1,2,6,7,8	-15. . .+150°C	not available	-30. . .+220°C*	-15. . .+220°C*
	3,4,5	not available	not available	not available	not available
Medium temperature for EX-Version	1,2,6,7,8	-15. . .+80°C	-30. . .+80°C	-30. . .+80°C	-15. . .+80°C
	3,4,5	-15. . .+80°C	-30. . .+80°C	-30. . .+80°C	-15. . .+80°C

*max. 200°C for VM-04.2

Technical Specifications:

Viscosity range / 1. . .1,000,000 mm²/s

Pressure drop / depending on viscosity and usage rate of the device, max. permissible pressure drop 16 bar

Materials /

Series 1-4 and 7: Housing EN-G75-400-15, measuring element 1.7139

Series 5, 6 and 8: Housing st. steel 1.4404 meas. element st. steel 1.4462

Electronics /

Standard: 2 sensors, phase displaced for detection of direction

Ex-Version: with separate switching amplifier

Supply voltage / 12. . .30 VDC, polarity-reversal-proof

Output signal / rectangular impulses, PNP (NPN on request), ≥ 0,8 U_B , scan ratio 1:1 (± 15%)

Protection class / IP 65 DIN 40050

Power consumption / 0.9 $W_{max.}$

Impulse offset between channels / 90° ± 30°

Output rating/channel / 0.3 $W_{max.}$ short circuit protected

Ordering Codes:

Order number | **VM-04.** | **3.** | **1.** | **F.** | **PS.** | **3.** | **S.** | **0**

VM-04 Gear Volume Sensor

Operating ranges /
2. . .16 = as per table 3

Series /
1. . .8 = as per table 2

Sealing /
F = Viton
E = EPDM
P = FEP, Viton core with PTFE mantle
K = FFKM

Connection type /
PS = with assembly plate, connection sideways
PU = with assembly plate, connection at bottom
R = without assembly plate, connection sideways (Series 5, 6 and 8 only)

Process connection /
2 = G 1/8"-female (operating range 2 only)*
3 = G 3/8"-female (operating ranges 3 and 4 only)
4 = G 1/2"-female (operating ranges 5 and 6 only)
6 = G 1"-female (operating ranges 7 and 8 only)
8 = G 1 1/2"-female (operating range 9 only)
9 = SAE flange 1 1/2-female (operating range 12-16 only)

Elektronics version /
S = standard
H = high-temperature version (Series 1, 2, 6, 7 and 8 only)
H+ = high-temperature-Plus version, with seperate amplifier (series 1, 2, 6, 7 and 8 only)
X = intrinsically safe with separate switching amplifier (EEx ia IIC)

Options /
0 = none
1 = please specify in detailed text

* for operating range 2 with connecting plate the thread size is G 3/8"-female

Versions (Table 1):

Depending on the application and media, the VM-04 is available in 8 different series:

Series	Material	min. Viscosity (mm^2/s)	Accuracy (% of MV)	Media properties		Particle size	Connection
				Viscosity	Lubrication		
1	EN-G75-400-15	20	± 0.3	low	well	20 µm max.	Plate mounting
2	EN-G75-400-15	50	± 0.5	middle	well	30 µm max.	Plate mounting
3	EN-G75-400-15	100	± 1.0	high	well	50 µm max.	Plate mounting
4	EN-G75-400-15	100	± 0.5	middle	low	30 µm max.	Plate mounting
5	st. steel 1.4404	100	± 0.5	middle	low	30 µm max.	Plate mounting or direct thread
6	st. steel 1.4404	20	± 0.3	low	well	20 µm max.	Plate mounting or direct thread
7	EN-G75-400-15	20	± 1	low	bad	20 µm max.	Plate mounting
8	st. steel 1.4404	20	± 1	low	bad	20 µm max.	Plate mounting or direct thread

Application Examples (Table 2):

Series	Application example	Media	Bearing	Bearing tolerance
1	flow measurement and counting	lubrication oils	ball bearing	small
2	filling	gear oils	ball bearing	expanded
3	consumption measurement	offset paint	bronze sliding bearing	big
4	ratio regulation	Polyol + Isocyanat	carbidemetal sliding bearing	expanded
5	dosing	clear varnish	carbidemetal sliding bearing	expanded
6	flow measurement	solvents	ball bearing made of st. steel	small
7/8		solvents	hybrid bearing	small

Ranges in l/min (Tab. 3):

Startup	Type	Series						
l/min		1	2	3	4	5	6	7/8
0.001	VM-04.2	0.008. . .2	-	-	-	0.02. . .2*	0.008. . .2	0.008. . .2
0.004	VM-04.3	0.02. . .4	-	-	-	-	0.02. . .4	0.02. . .4
0.008	VM-04.4a	0.04. . .8	-	-	0.04. . .8	-	0.04. . .8	0.04. . .8
0.01	VM-04.4	0.16. . .16	0.16. . .16	-	0.16. . .16	0.16. . .16	0.16. . .16	0.16. . .16
0.01	VM-04.5	0.2. . .40	-	-	0.2. . .30	0.2. . .30	-	-
0.02	VM-04.6	0.4. . .80	0.4. . .80	0.6. . .40	0.3. . .60	0.3. . .60	0.4. . .80	0.4. . .80
0.03	VM-04.7	0.6. . .160	0.6. . .160	-	0.6. . .100	0.6. . .100	0.6. . .160	-
0.04	VM-04.8	1. . .250	1. . .250	1.2. . .80	1. . .160	1. . .160	1. . .250	-
0.1	VM-04.12	2. . .600	-	-	-	-	-	-
0.2	VM-04.16	3. . .700	-	-	-	-	-	-

*Accuracy ± 3%; linear Accuracy ± 1.5%

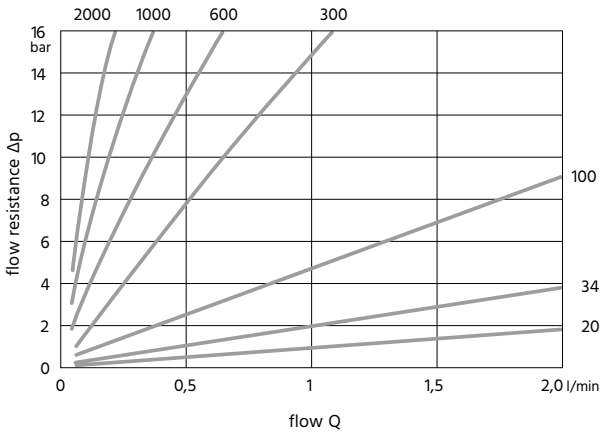
Parameters (Tab. 4):

Type	max. Pressure	Pressure Peaks	SPL in dB(A)	Resolution pulses/l
VM-04.2	400 bar	480 bar	< 60	40,000
VM-04.3	400 bar	480 bar	< 60	25,000
VM-04.4a	400 bar	480 bar	< 60	10000
VM-04.4	400 bar	480 bar	< 60	4,081.63
VM-04.5	400 bar	480 bar	< 70	2,500
VM-04.6	400 bar	480 bar	< 70	965.25
VM-04.7	315 bar	350 bar	< 70	333.33
VM-04.8	315 bar	350 bar	< 72	191.5
VM-04.12	400 bar	480 bar	< 80	83.33
VM-04.16	400 bar	480 bar	< 80	62.50

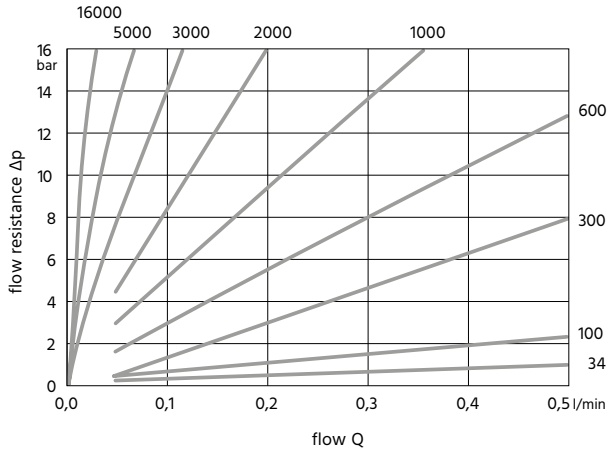
Flow resistance VM-04:

Series 1, 2, 6, 7, 8 – Parameter: Viscosity (mm^2/s)

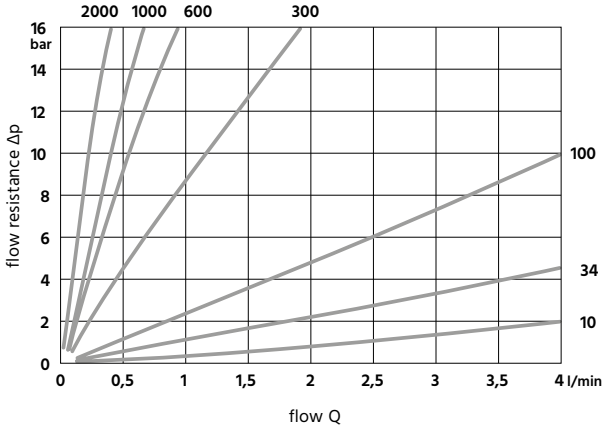
Operating range 2



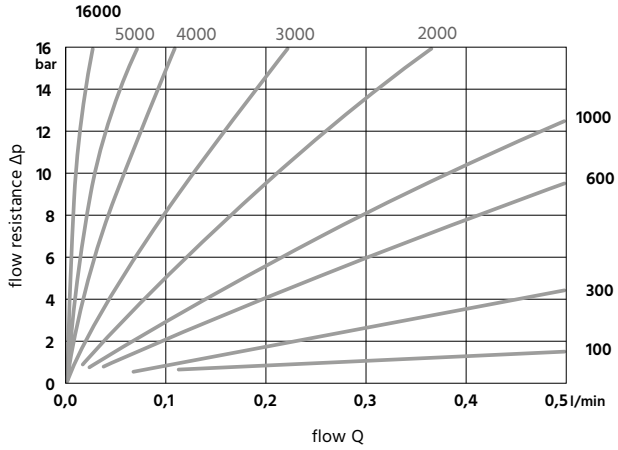
Operating range 2 (Ausschnitt)



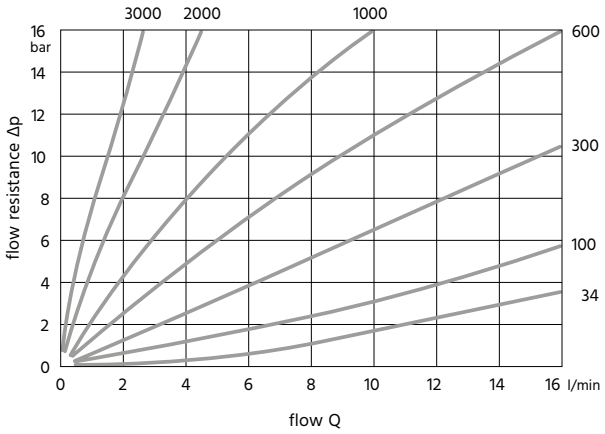
Operating range 3



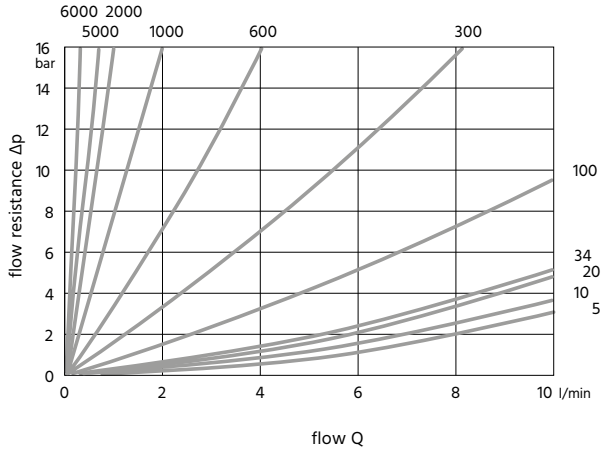
Operating range 3 (Ausschnitt)



Operating range 4

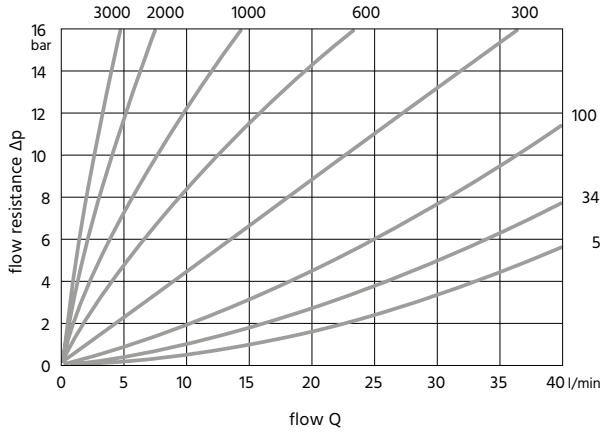


Operating range 4a

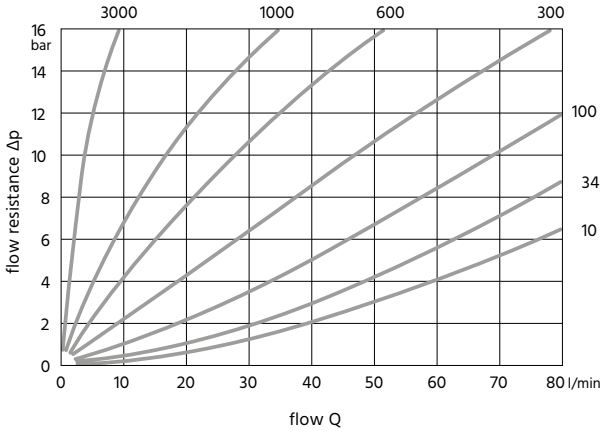


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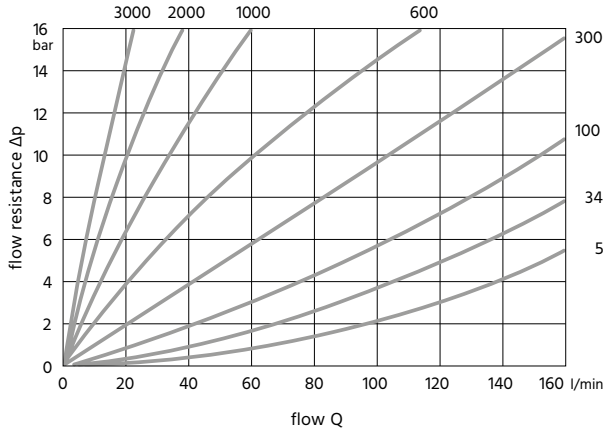
Operating range 5



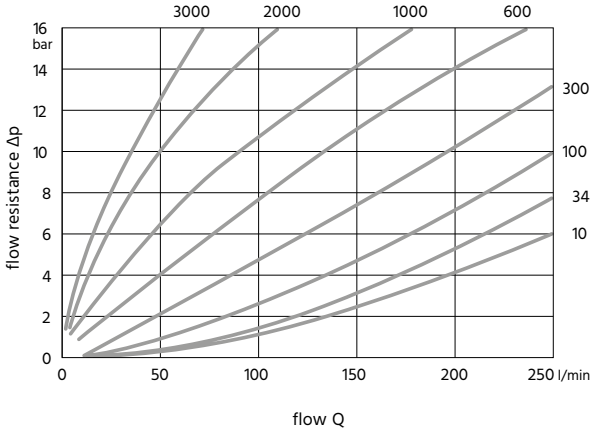
Operating range 6



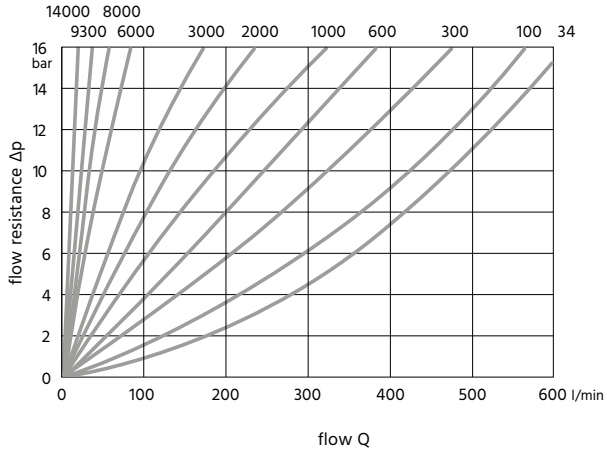
Operating range 7



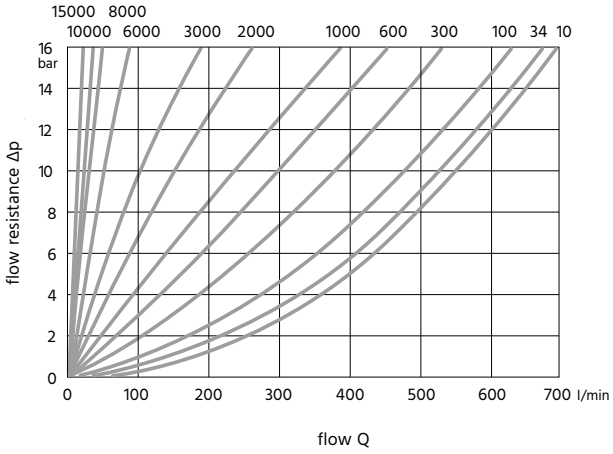
Operating range 8



Operating range 12



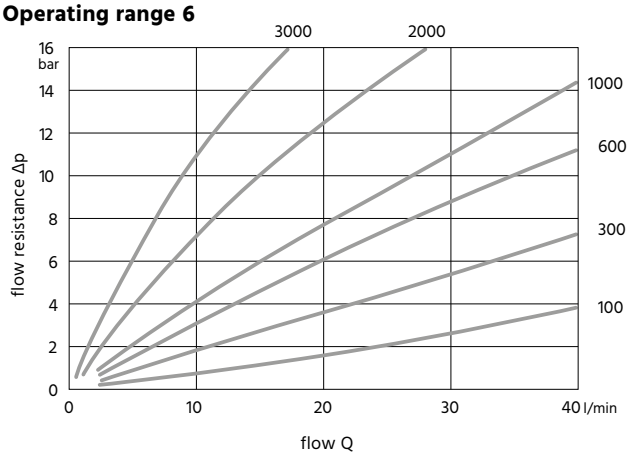
Operating range 16



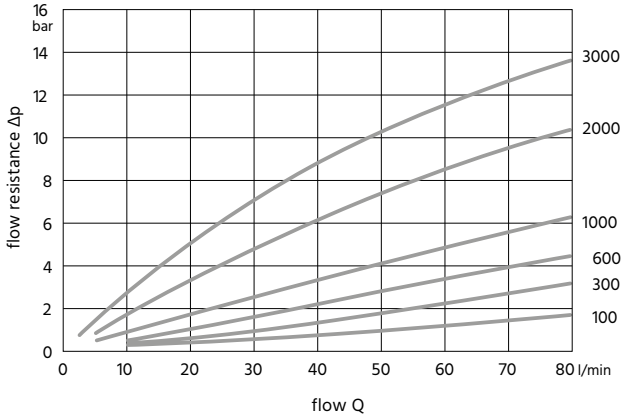
Flow resistance VM-04:

Series 3 – Parameter: Viscosity (mm²/s)

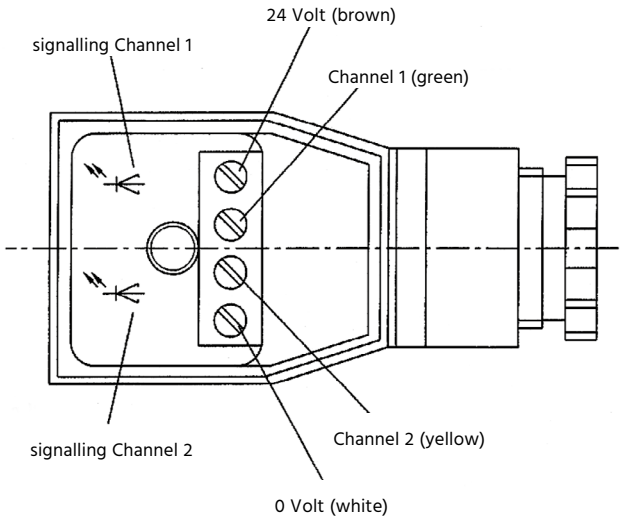
Operating range 6



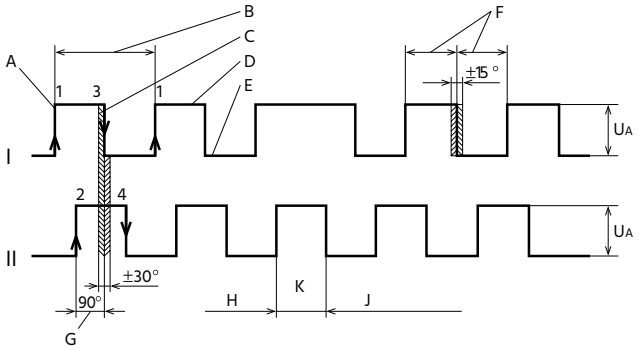
Operating range 8



Electric Cable Connection VM-04:



Signal Pattern VM-04:



Channel I

A rising flank

B one impulse (corresponds to the throughput of a geometrical tooth-volume Vgz)

C falling flank

D switch on phase

D switch off phase

F scan ratio 1:1 ± 15%

Channel II

G channel displacement

H flow direction 1

K reversal of direction of rotation

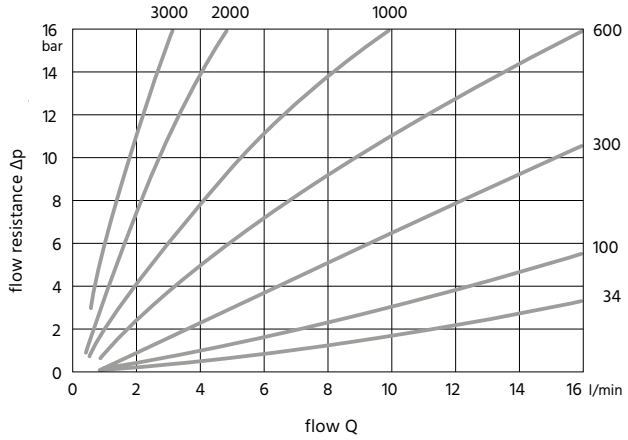
H flow direction 2

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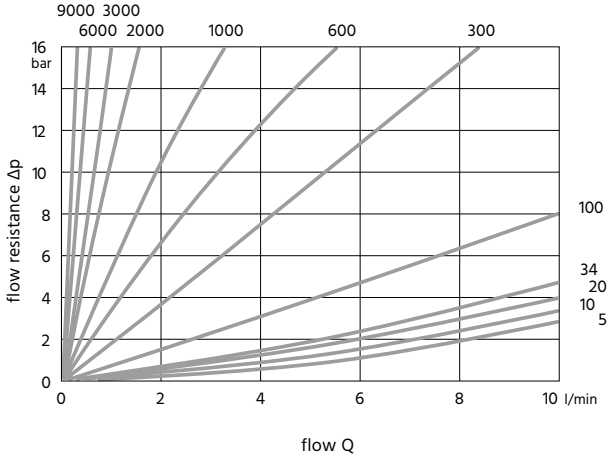
Flow resistance VM-04:

Series 4, 5 – Parameter: Viscosity (mm²/s)

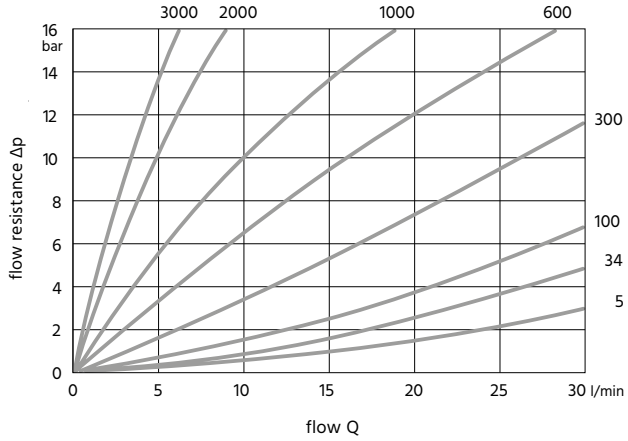
Operating range 4



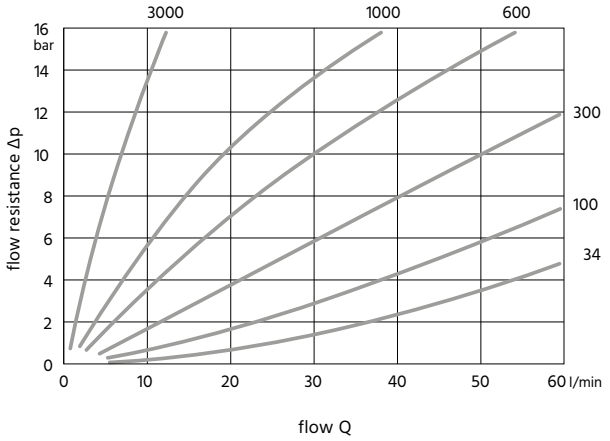
Operating range 4a



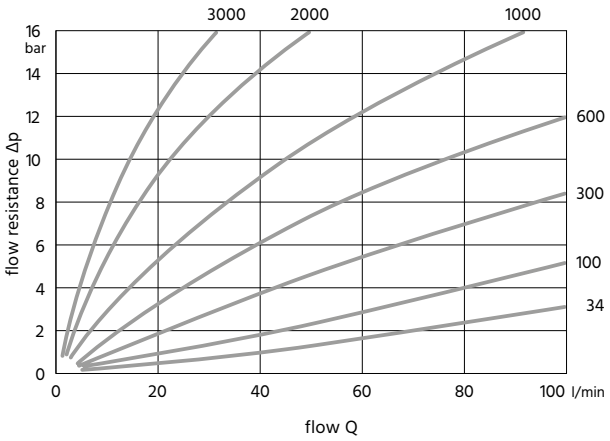
Operating range 5



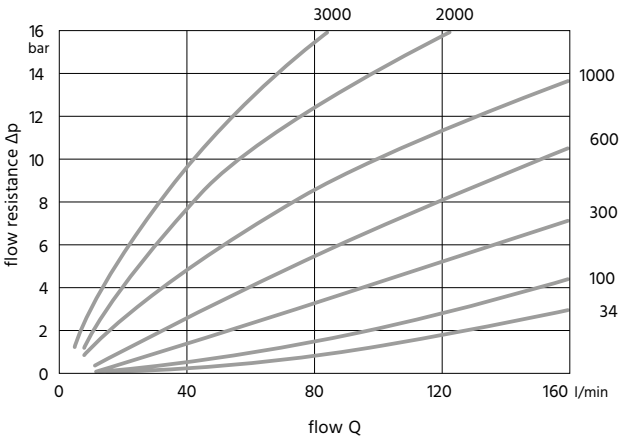
Operating range 6



Operating range 7



Operating range 8



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VS-02

Screw Spindle Flowmeter for Viscous Fluids

Features

/ Viscosity independent up to 40k cSt

/ Light and compact design

/ Bi-directional operation

/ Switching-, analogue- or pulse outputs

/ Cost-effective

/ Ranges up to 3800 l/min

/ Applicable up to 350 bar

/ Media temperature up to +150°C

Description:

The screw spindle flowmeter series VS-02 is developed for metering lubricating and viscous fluids in accordance with volumetric principle employing two cycloid steel spindles with a screw-shaped profile to rotate as the medium passes the flow chamber. The spindles form a geometric precise defined measuring chamber, through which accurately measured fluid is forwarded which is then detected by the Hall sensor outside the flow chamber. The output of the basic version VS-02.2 is pulse signal which may be connected to serve back-end PNP or NPN inputs, it supplies a square wave signal. With further options electronic housings can be screwed on the flowmeter body. These different electronics amplify the signal and deliver current or voltage outputs and/or drive the LCD-display.The electronic sensors are replaceable during active operation since the sensors never have contact to the medium.

Application:

Typical applications for the screw spindle flowmeter series VS-02 are cost-effective measurements of large volume flow of viscous fluids up to 3800 l/min. The flowmeters are also applicable for aqueous fluids like soap, paste or emulsions, and specially for oil, which show no abrasive behavior and which are compatible to the used materials of the flowmeter. Because of the volumetric principle of the VS-02 almost no viscosity depended error occurs up to 40 000 cSt. The units can be operated according to their corresponding versions up to 350 bar and +150°C.

Technical Specifications:

Operating ranges /

VS-02.1:	1.4. . .140 l/min
VS-02.2:	3.5. . .350 l/min
VS-02.3:	5.5. . .550 l/min
VS-02.4:	8.0. . .800 l/min
VS-02.5:	10. . .1000 l/min
VS-02.6:	15. . .1500 l/min
VS-02.7:	25. . .2500 l/min

max. Flow /

VS-02.1:	200 l/min
VS-02.2:	500 l/min
VS-02.3:	800 l/min
VS-02.4:	1200 l/min
VS-02.5:	1600 l/min
VS-02.6:	2200 l/min
VS-02.7:	3800 l/min

Accuracy / 1% of measured value (for 20 cSt 1% to 100% of nominal operating range, see also diagram „Accuracy“)

Repeatability / ± 0.25%

max. Pressure / connection material aluminium
› without steel SAE-flange 160 bar
› with SAE-flange 350 bar
connection material steel
› with or without steel SAE-flange 350 bar

max. Media-temp. / -25. . .+80°C, (+150°C possible with separated pick-up)

Materials /

body:	aluminium 6082 anodised
connection material:	aluminium 6082 anodised or steel
main screw:	steel 35SMnPb10 Uni 4838-80
subsidiary screw:	GHISA GJL-250 EN1561
ball bearing:	steel
screws:	steel, galvanised
positioning dowel:	steel
gaskets:	NBR (FKM on request)
SAE connection:	ASTM A216WCB

/ other materials are available on request.

Applicable fluids / oils and other none-hostile, self-lubricating liquids (a 30 µm mesh filter should be used)

Electrical Specifications:

Supply voltage / 10. . .30 VDC

Connection / round plug M12x1, 4-pol.; 5-pol. with display

Protection class / IP67

Conformity / CE

VS-02.x.x.x.1 (1 switching point) /

Power consumption:	< 1 W (without load)
Switching output:	transistor output „push-pull“ (short-circuit proved and polarity reversal protected) I_{out} = 100 mA max

VS-02.x.x.x.2 (pulse output „push-pull“) /

Current consumption:	approx. 20 mA (without load)
Signal output:	transistor output „push-pull“ (short-circuit proved and polarity reversal protected) I_{out} = 100 mA max

VS-02.x.x.x.3 (analogue output 0. . .10 VDC) /

Power consumption:	< 1 W (without load)
Analogue output:	0. . .10 VDC (short-circuit proved and polarity reversal protected)
Output current:	max. 20 mA

VS-02.x.x.x.4 (analogue output 4. . .20 mA, 3-wire) /

Power consumption:	< 1 W (without load)
Analogue output:	4. . .20 mA (short-circuit proved and polarity reversal protected)

VS-02.x.x.x.5 (display with analogue + switching output) /

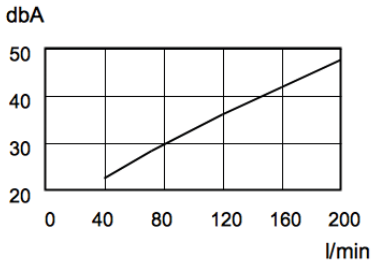
Supply voltage:	18. . .30 VDC
Power consumption:	< 1 W
Analogue output:	4. . .20 mA / load max. 500 Ω or 0. . .10 VDC / load min. 1 kΩ
Setpoints S1 + S2:	transistor output „push-pull“ (short-circuit proved and polarity reversal protected) I_{out} = 100 mA max
Hysteresis:	adjustable, position of the hysteresis depends on minimum or maximum
Display:	backlit graphical LCD-display 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message
Operating temperature:	-20°C. . .+70°C
Connection:	round plug M12x1, 5-pol.
Protection class:	IP67 (IP 68 for oil)
Conformity:	CE

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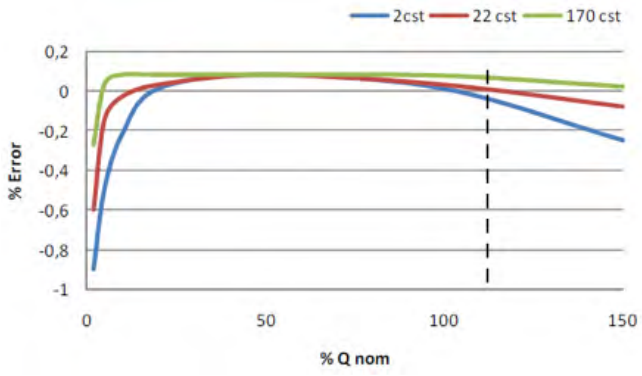
Selection table:

Type	Operating range 1. . .100% Q_{nom}	Volume / pulse	Pulse / litre	Output frequency at Q_{nom}	Output frequency at Q_{max}	Q_{max} (recomm.)	Body with aluminium connections	Body with steel connections	SAE-flanges (weight per pair)
	l/min	cm^3		Hz	Hz	l/min	kg	kg	kg
VS-02.1	1.4. . .140	13.10	76.340	178.1	254.5	200	3.44	4.76	5.76
VS-02.2	3.5. . .350	29.00	34.480	201.1	287.4	500	6.35	8.50	9.55
VS-02.3	5.5. . .550	48.58	20.590	188.7	274.5	800	10.50	13.60	15.10
VS-02.4	8.0. . .800	72.00	13.890	185.2	277.8	1200	14.20	18.50	18.80
VS-02.5	10.0. . .1000	103.63	9.650	160.6	257.3	1600	20.70	27.70	30.30
VS-02.6	15.0. . .1500	133.00	7.519	188.0	275.7	2200	25.00	33.20	34.60
VS-02.7	25.0. . .2500	238.82	4.187	174.5	265.2	3800	42.70	56.10	60.70

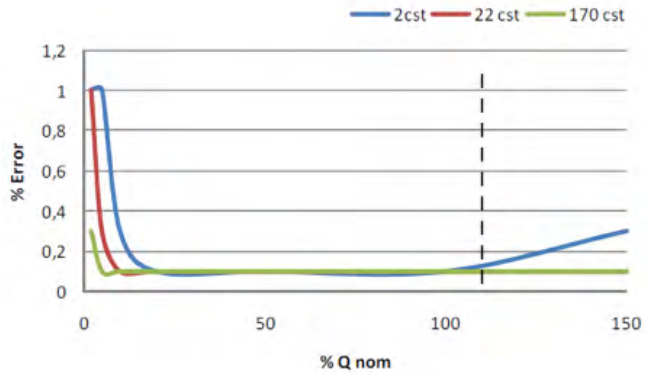
Sound level:



Linearity:



Accuracy:



Ordering Codes:

Order number **VS-02. 1. 2. 1. 4. 0**

VS-02 Screw Spindle Flowmeter for Viscous Fluids

Size and operating range /
1 = 1" up to 140 (200) l/min
2 = 1 1/4" up to 350 (500) l/min
3 = 1 1/2" up to 550 (800) l/min
4 = 1 1/2" up to 800 (1200) l/min
5 = 2" up to 1000 (1600) l/min
6 = 2" up to 1500 (2200) l/min
7 = 2 1/2" up to 2500 (3800) l/min

Process connection /
1 = female thread BSP
2 = steel SAE-flange* with female thread G

Connection material /
1 = aluminium, anodised
2 = steel

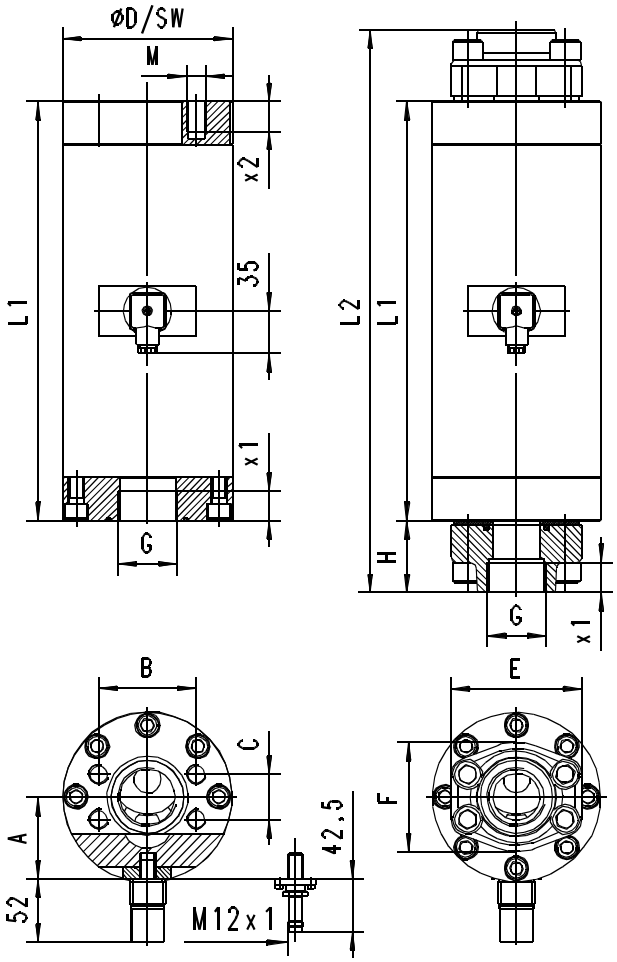
Output signal /
1 = screwed-in frequency pick-up with one Push-Pull switching output (Min or Max)
2 = pulse output Push-Pull
3 = screwed-in frequency pick-up with analog output 0 to 10 VDC
4 = screwed-in frequency pick-up with analog output 4 to 20 mA, 3-wire
5a = digital display unit with 2 transistor switching outputs, graphic display and 4 to 20 mA
5b = digital display unit with 2 transistor switching outputs, graphic display and 0 to 10 VDC-output

Options /
0 = none
HT = high-temperature up to +150°C

* The use of steel SAE flanges enables the sensor to be installed and removed more easily and increases the stability to pressure. In conjunction with connection material aluminum 6082 anodised only.

Dimensions in mm:

Female Thread **SAE-flange**



G	DN. . .range	L1	Ø D	SW	A	M	x2	B	C	L2	H	E	F
G 1	025. . .0140	220	88	78	49,0	12	20	57,1	27,8	324	52	80	69
G 1 ¼	032. . .0350	285	103	-	55,0	14	22	66,7	31,6	381	48	94	77
G 1 ½	040. . .0550	332	122	-	58,8	16	24	79,4	36,5	448	58	106	89
G 1 ½	040. . .0800	340	138	-	66,5	16	24	79,4	36,5	456	58	106	89
G 2	050. . .1000	396	155	-	71,0	20	35	96,8	44,4	544	74	135	116
G 2	050. . .1500	405	168	-	77,3	20	35	96,8	44,4	553	74	135	116
G 2 ½	065. . .2500	475	203	-	86,0	24	42	123,8	58,7	633	79	166	150

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VZ-01

Oil Counter for Light to Heavy Fuel Oil

Features

/ Mounting on pressure or suction side

/ Space-saving and flexible mounting

/ Temperature-independent

/ Viscosity-independent

Description:

The VZ-01 series of volume counters are rotary piston meters that function without auxiliary electrical power. A hollow slitted cylinder is situated in a cylindrical housing. Due to the guide slot, the cylinder makes oscillating movements as soon as the measuring chamber is flooded with the medium. The piston movement is transmitted magnetically to a totalizing roller counter which totalizes the volume of flow over a certain period. If necessary, the counter can be equipped with a remote value emitter designed as a reed or inductive contact which will transmit an electrical impulse for each defined volume.

Application:

Rotary piston meters are used wherever flow of oil or liquid fuel needs to be tapped in a simple but highly accurate method without depending on auxiliary electrical power. Some of the typical examples are in its deployment in the bunker piping in ships or as measurement of consumption in the forerun and return in diesel engines. Using the VZ-01 even simple dosing processes can be controlled where even hostile media can be measured by using special type of materials (Teflon or stainless steel pistons, stainless steel chamber). A major advantage of the volume counters is that the outcome of measurement does not depend on temperature and viscosity. This represents a plus point in some applications as against float devices or measuring turbines.

Technical Specifications:

Counter /	roller counter in litres
Process connection /	flange- or thread connection
Flow range /	0.5 up to 30000 l/h
Permissible media /	heating fuel (extra-light, light, medium and heavy), Naphta, Bunker C, gasoil and other lubricating media
Options /	display in US-gallons (1 gallon corresponds to 3.785 litres) outpaired units for differential measurement of fuel consumption approvals as per GL, LR and DNV

Electrical Specifications:

Switching element /	RE, RV = Reed-tubes with protective gas contact IN = inductive slit initiator as per IEC 60947-5-6
Switching voltage /	RE, RV = max. 48 V DC/AC protection class III (SELV) IN = 5 to 15 VDC
Switching current /	RE, RV = max. 50 mA (Ri = 47 Ω / 0.5 W) IN = > 3 mA bei 8 VDC / 1 kΩ
Standby current /	RE, RV = open contact IN = < 1 mA at 8 VDC / 1 kΩ
Switching load /	RE, RV = max. 2 W
Switching time /	RE = 40% to 60% (impulse value 1.0 and 0.1 l/Imp.) 30 to 70% (impulse value 0.00125 and 0.00311 l/Imp.) RV = 50% ± 10% IN = 50% ± 10%
Ambient temperature /	RE = -10°C to +60°C RV = -10°C to +70°C IN = -10°C to +70°C
Protection class /	RE = IP50 (IEC 60529) RV = IP65 (IEC 60529) IN = IP65 (IEC 60529)
Electrical connection /	RE = on plug connector with cable ø 3.5 mm to ø 5 mm RV = fixed cable 3 m length (2 x 0.14 mm²) IN = plug for cable (2 x 0.35 mm²)

Electrical Specifications of display with two selectable pulse- and analogue outputs FA:

Display /	8-character LCD with identification of the parameter, height of numbers 8 mm, flow rate (meter load) using bar indicator
Display values /	total volume, resettable volume, flow rate
Ambient temperature /	-25°C. . .+70°C
Power supply /	24 VDC (6. . .30 VDC)
Data preservation /	by non-volatile memory (EEPROM)
Protection class /	IP66 (IEC 60529)
Output versions /	**Version 1:** 1 potential free digital output (Rel. 1), adjustable and 1 passive analogue output 4. . .20 mA **Version 2:** 2 potential free digital outputs (Rel.1 + Rel. 2) each adjustable
Analogue output /	
Power supply:	6. . .30 VDC
Load RL:	max. (U-5) V / 0.0215 A [Ω]
Resolution:	16 Bit
Error:	max. ± 0.2 mA
Update interval:	< 1 s
Digital output /	
Update intervall:	< 1 s
max. Voltage:	48 V DC/AC
max. Current:	50 mA
ON - resistance:	≤ 100 Ω
OFF - resistance:	≥ 10 M Ω
Insulation voltage:	> 100 V DC/AC
max. Output frequency:	200 Hz

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Versions:

VZ-01 Oil Counter

max. Temperature: In case of oil counters belonging to the sizes 04M, 04 and 08 the media temperature must not exceed 60°C. And in case of sizes 15 to 50 the maximum media temperature is 130°C. Optionally, a high-temperature version up to 180°C is available.

Process connection: The VZ-01 of sizes 04M, 04 and 08 have only thread connections as per the table „Sizes" (on the following page). The sizes 15 to 40 offer a choice between thread or flange connections.

Nominal pressure: The nominal pressure for thread connections is PN 16 while for flange connections either PN 25 or PN 40 can be selected.

Impulse emitter: See table „Sizes" on the following page.

The electronic display FA is a top-mounted unit, that provides two selectable outputs, either as one adjustable pulse- and one additional 4 to 20 mA-analogue output or as two adjustable pulse outputs. The displayed values are total volume, resettable volume and flow rate.

Ordering codes:

Order number	VZ-01.	04.	2.	1.	2.	0

VZ-01 Oil Counter

Size /
04M = 04M (only without impulse emitter)
04 = 04
08 = 08
15 = 15
20 = 20
25 = 25
40 = 40
50 = 50

maximum Temperature in °C /
1 = 60°C only for Sizes 04M, 04 and 08
2 = 130°C only for Sizes 15 to 50
3 = 180°C only for Sizes 15 to 50

Process connection /
1 = thread
2 = flange

Nominal pressure for flanges /
0 = thread connection PN16
1 = PN 25
2 = PN 40 (for 180°C only)

Impulse emitter /
0 = none
1 = RE (only for Sizes: 04, 08 see table)
2 = RV (only for Sizes: 15. . .50 see table)
3 = IN (only for Sizes: 15. . .50 see table)
4 = FA-electronic display with 2 selectable pulse- and analogue outputs

Table of sizes:

Typ:	Einh.	VZ-01.04M	VZ-01.04	VZ-01.08	VZ-01.15	VZ-01.20	VZ-01.25	VZ-01.40	VZ-01.50
Diameter	Zoll	0.125	0.125	0.25	0.5	0.75	1	1.5	2
DN		4	4	8	15	20	25	40	50
Thread size		1/8"-f	1/8"-f	1/4"-f	3/4"-m	1"-m	1 1/4"-m	2"-m	-
PN thread	bar	25	25	25	16	16	16	16	-
PN on the flange	bar	-	-	-	25/40	25/40	25/40	25/40	25/40
max. Temperature	°C	60	60	60	130/180	130/180	130/180	130/180	130/180
max. Flow	l/h	40	80	200	600	1500	3000	9000	30000
Continuous flow	l/h	25	50	135	400	1000	2000	6000	20000
min. Flow	l/h	0.5	1	4	20	40	75	225	750
Start-up at approx.	l/h	0.3	0.4	1.6	4	12	30	90	300
Measuring error limit	± 1% of measured value (max. Deviation: VZO 4 Q_{min} 0.5: 0.5 l/h. . .2 l/h = +1 % / -2 % VZO 4: 1 l/h. . .2 l/h = +1 % / -2 %)								
Repeatability	± 0,2%								
Least readable volume	l	0.001	0.001	0.01	0.01	0.1	0.1	0.1	1
Registering ability	m^3	100	100	1000	1000	10.000	10.000	10.000	100.000
Registering duration	h	4000	2000	7400	2500	10.000	5000	1667	5000
Mesh width for safety filter	mm	0.125	0.125	0.15	0.4	0.4	0.4	0.8	0.8
Mesh width for strainer [1]	mm	0.08	0.08	0.1	0.25	0.4	0.4	0.6	0.6
Measuring chamber volume	ccm	5	5	12.5	12	36	100	330	1200
Housing surface		-	-	-	red, Ral 3013	red, Ral 3013	red, Ral 3013	red, Ral 3013	red, Ral 3013
Weight without joints	kg	0.65	0.65	0.75	-	-	-	-	-
Weight with thread	kg	-	-	-	2.2	2.5	4.2	17.3	-
Weight with flange PN 25	kg	-	-	-	3.8	4.5	7.5	20.3	41
Weight with flange PN 40	kg	-	-	-	4.4	5.5	7.8	20.5	42
Impulse emitter REED									
RE 1	l/Imp	-	-	1	-	-	-	-	-
RE 0.1	l/Imp	-	0.1	-	-	-	-	-	-
RE 0.01	l/Imp	-	-	-	-	-	-	-	-
RE 0.00125	l/Imp	-	0.00125	-	-	-	-	-	-
RE 0.00311	l/Imp	-	-	0.00311	-	-	-	-	-
IN inductive DIN 19234	l/Imp	-	-	-	0.01	0.01	0.1	0.1	1
RV RE	l/Imp	-	-	-	0.1	1	1	1	10
RV RE	l/Imp	-	-	-	1	-	-	10	100
Imp.frq. RE 0,00125 Q_{max}	Hz	-	17.777	-	-	-	-	-	-
Q_{min}	Hz	-	0.222	-	-	-	-	-	-
Imp.frq. RE 0,00311 Q_{max}	Hz	-	-	17.864	-	-	-	-	-
Q_{min}	Hz	-	-	0.357	-	-	-	-	-

[1] Recommended mesh width for optional strainer

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Table of Dimensions:

Size	Length	Width (incl. Imp.)	Height	Connec-tions	Height at 130 °C w/o emitter	Height at 130 °C with RV	Height at 130 °C with IN	Height at 180 °C w/o emitter	Height at 180 °C with RV	Height at 180 °C with IN
VZ-01.04M	68	68	79	bottom						
VZ-01.04	68	68 (89)	79	bottom						
VZ-01.08	68	68 (89)	79	bottom						
VZ-01.15	165	105		sideways	106	130	185	147	171	225
VZ-01.20	165	105		sideways	115	139	194	156	180	234
VZ-01.25	190	130		sideways	142	166	221	183	207	261
VZ-01.40	300	210		sideways	235	259	273	235	259	313
VZ-01.50	350	280		sideways	291	315	329	291	315	369

Materials Oil Counter:

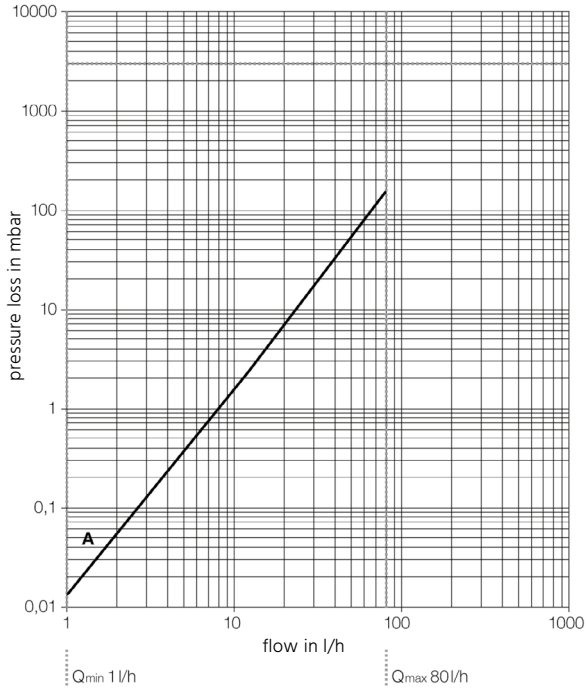
Part	Material	PN 4	PN 8	PN 15	PN 20	PN 25	PN 40	PN 50
Housing / Measuring unit	brass	x	x					
Housing with threaded ends	cast brass			x	x	x		
	spheroidal graphite iron GJS 40							x
Housing with flanges	spheroidal graphite iron GJS 40			x	x	x	x	x
Measuring chamber								
- PN 16 / 25	cast brass			x	x	x	x	
	alu-bronze							x
- PN 40	stainless steel			x	x	x	x	x
Seals	NBR butadiene-acrylnitril	x						
	FPM fluorelastomer	o	x	x	x	x	x	x
Rotary piston	aluminium anodized	x	x	x	x	x	x	x
Ancillaries	plastic			x	x	x	x	x
Cover of meter	plastic	x	x					

x = possible configuration o = on request

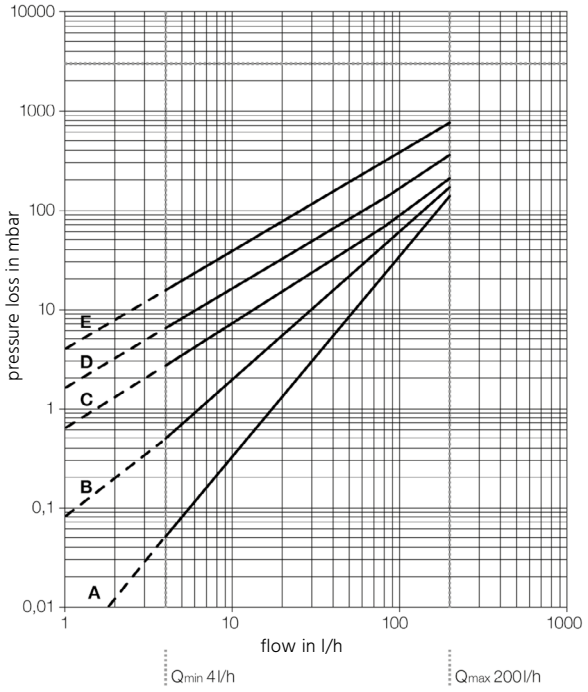
Pressure drop- / Viscosity-curves:

Kinematic viscosity /	Stokes, Centi-Stokes, mm^2/s	St, cSt, mm^2/s
Dynamic viscosity /	Pascal seconds, milli-pascal seconds Poise, Centipoise (obsolete)	Pas, mPa.s P, cP

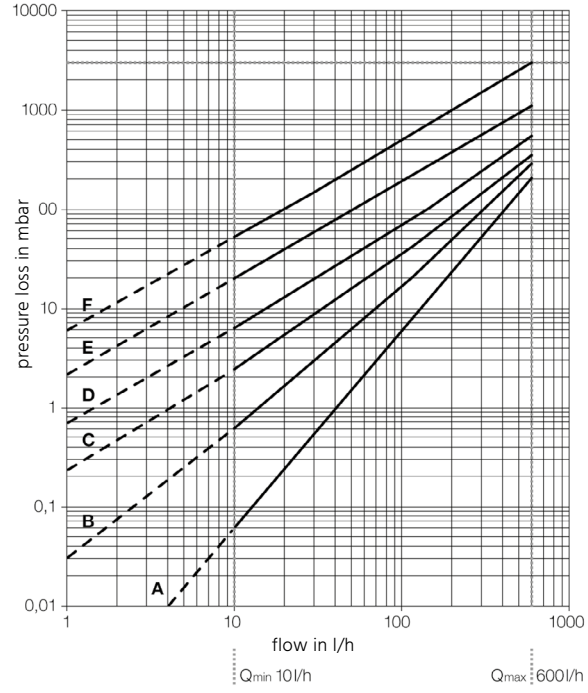
VZ-01.04



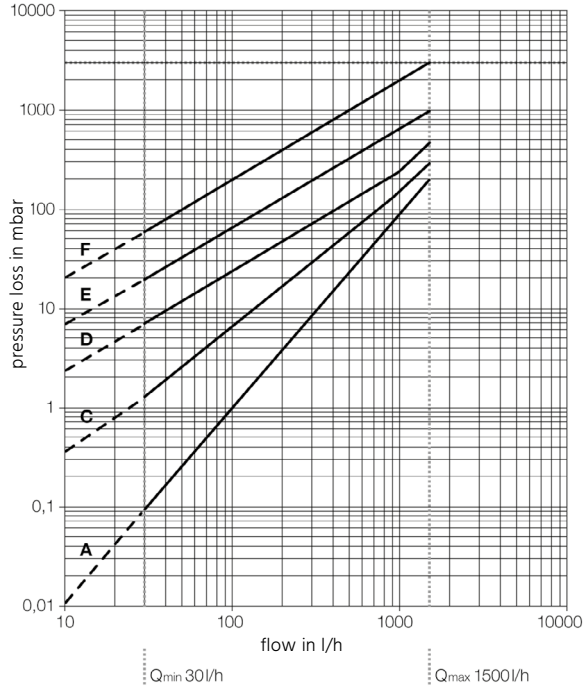
VZ-01.08



VZ-01.15

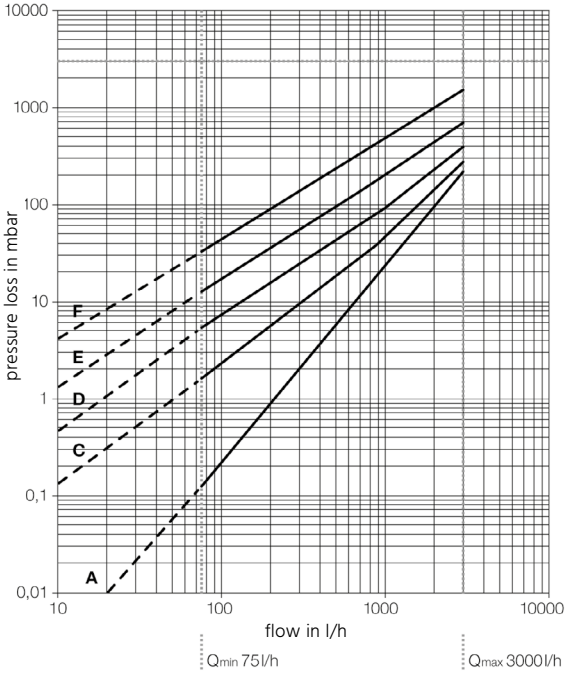


VZ-01.20

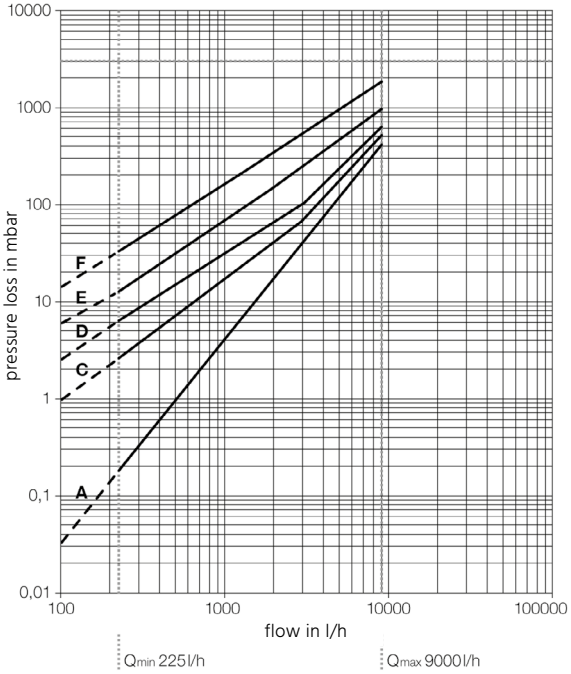


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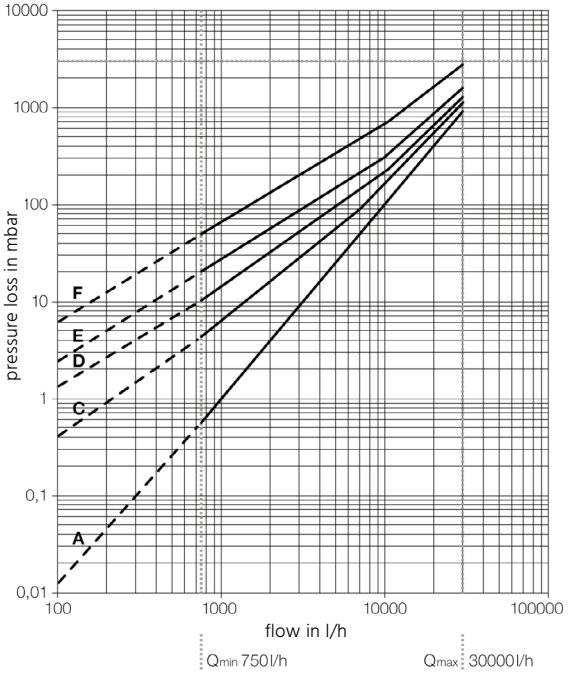
VZ-01.25



VZ-01.40



VZ-01.50



Conversion / cSt x density = mPa.s

Englergrade °E in mPa.s:
based on comparison table only

Saybold units in mPa.s:
based on comparison table only

Redwood units in mPa.s:
based on comparison table only

Rule of thumb / 1 cSt –> 1 mm2/s –> 1 mPa.s

Viscositylines for VZ-01.04 and VZ-01.08

A = 5 mPa.s	B = 50 mPa.s
C = 100 mPa.s	D = 200 mPa.s
E = 500 mPa.s	

Viscositylines for VZ-01.15 to VZ-01.50

A = 5 mPa.s	B = 25 mPa.s
C = 50 mPa.s	D = 100 mPa.s
E = 200 mPa.s	F = 500 mPa.s

If the pressure drop is above 1 bar, we recommend using the next greater nominal diameter for the counter. Maximum permissible pressure drop = 3 bar.

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GM-10N

Battery powered thermal Mass Flowmeter for Gases





Features

/ Standard AA battery powered

/ Touchscreen with password protection

/ Flow units changeable

/ Totalizer

/ High accuracy and dynamic

/ Extremely quick response time

/ No inflow and outflow lines required

/ Real gas calibration

/ Optional multigas

/ Optional 24 VDC supply

/ Optional regulating valve

/ Optional switching contacts

Description:

The GM-10N with its integrated touchscreen, offers thanks to autonomous operation with standard AA batteries and its insensitivity to pressure surges a highly accurate alternative to variable area flowmeters. The device has a CMOS flow sensor that enables a quick response speed due to its extremely small dimensions, while ensuring excellent accuracy. An all-metal body made of aluminium or stainless steel is equipped in its interior with a flow rectifier and subsequent resistance that divides the volume flow of gases into a defined main and an auxiliary flow. The auxiliary flow is guided through a measuring chamber in which the approximately 1 mm sensor is directly located. The sensor gets cooled by the mass flow of gas in such manner that its heat loss is proportional to the number of gas molecules flowing along regardless of their packing density. Consequently, the mass flow can be ascertained in a wide area without compensating for pressure and temperature. This principle of measurement is unique as against conventional methods like the variable area principle because no inflow and outflow lines are required. In its basic version, the GM-10N displays the standard and the total volume flow as a numerical value on its touchscreen. In addition to the numerical values, the standard volume flow is also shown graphically by a bar graph. The GM-10N can be supplied in its extended levels with additional precision regulating valve and / or adjustable switching contacts.

Application:

The GM-10N series of thermal gas mass flowmeters has been developed to replace on a longterm basis the variable area flowmeter that enjoyed a fine track-record for years for small gas flows. In contrast to this measurement system, it offers obvious advantages like higher accuracy and insensitive to pressure and temperature changes and it can be deployed even without auxiliary power supply. The device is suited for a number of various gases and covers the volume flow range up to 450 Nl/min air. Considering these advantages, the GM-10N can be used in different areas of the industry like, for example, gas supply systems, semi-conductor productions, welding technology, machine construction, supply

of compressed air, fuel cells, fermenters, chemical engineering, laboratories, ovens, burners, medical engineering, analyzing devices, laser technology, surface coating and so on. In the laboratory applications especially, the GM-10N is often deployed along with its optionally available integrated manual regulating valve since it permits adjustment of very low gas volume flows and maintenance of constant levels.

Alarm functions: In the version with contacts, the GM-10N provides three configurable alarms with 5 different selectable triggers (e.g. min. alarm, max. alarm, windows alarm, overflow alarm and totalizer alarm).

Options: Alternative sealing materials, external 24 VDC power supply instead of battery-operation, a housing for switch panel mounting, separately deliverable calibration protocols and a multigas calibration (e.g. one measuring device can be used for up to 3 different gases or gas mixtures) are available as options at additional charges.

Versions:

GM-10N Battery powered, thermal Mass Flowmeter for Gases

Normally, the GM-10N works as a battery-powered thermal mass flowmeter displaying the standard and the total volume flow as a numerical value on its touchscreen. In addition to the numerical values, the standard volume flow is also shown graphically by a bar graph. In the next extended level, a manual regulating valve is added to the device to accurately regulate the volume flow. Optionally, the GM-10N can be supplied with electrical switching contacts with or without a regulating valve. However, in this case an external 24 VDC power supply is necessary since the battery capacity is insufficient for operating the switching outputs.

Measuring tube material: The measuring tube can be made of anodized aluminium or electropolished stainless steel depending on the media. However, the CMOS sensor is wetted and deployment of the GM-10N is therefore limited to measuring and regulating non-hostile gases. The sealing material used is FKM, optionally it can be supplied in EPDM.

Accuracy and span: There are two versions of accuracies available. The more affordable standard variant measures at an accuracy of ± 2% of full scale value (ranges > 200 Nl/min ± 3% of full scale) and has a measuring span of 1:50.
The more accurate version has an accuracy of ± 1% of full scale and a measuring span of 1:100 (for units with process connection G 1/4“ and measuring ranges up to 50 Nl/min with real gas calibration only).

Medium: As measuring media all non-hostile and dry gases can be considered. Gases that are not listed in the ordering codes but comply with these requirements can be ordered
as special medium. All devices are supplied ex-factory in real gas calibration.

Flow units: It can be choosen between a large number of standardized and normalized flow units of the Imperial, US customary and SI measuring systems (with user adjustable reference conditions). The units are selectable from the integrated menu both for the actual and the totalized flow.

Ordering Codes:

Order number	GM-10N.	1.	2.	1/	N.	[].	T1

GM-10N Battery powered, thermal Mass Flowmeter for Gases

Version /
1 = flowmeter
2a = flowmeter with regulating valve
2b = flowmeter with regulating valve (flanged)
3 = flowmeter with switching contacts
4a = flowmeter with regulating valve and switching contacts
4b = flowmeter with regulating valve (flanged) and switching contacts

Measuring tube material /
1 = aluminium anodized
2 = stainless steel electropolished

Options (multiple selection such as 1/2/5 possible) /
0 = none
1 = seals EPDM instead of FKM
2 = external supply 24 VDC instead of battery for GM-10N.1/2
4 = switch panel mounting
5 = calibration protocol
6 = multigas (up to 3)

Medium /
L = air
N = nitrogen (N2)
O = oxygen (O2)
AR = argon (Ar)
HE = helium (He)
C = carbon dioxide (CO2)
P = propane (C3H8)
H = hydrogen (H2)
M = methane (CH4)
99 = please specify special type medium in detailed text

End value for measuring range /
[][][] = Please specify. Possible values from 0. . .50 Nml/min to 450 Nl/min (air). From 60 Nl/min on, the gas-connector is G ½“ female

Accuracy and span /
T1 = ± 1% of full scale (up to 50 Nl/min); span 1:100
T2 = ± 2% of full scale (> 200 Nl/min ± 3% of full scale); span 1:50

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Technical Specifications:

Media /	dry, non-hostile gases (see also list in ordering codes)
Accuracy & Dynamics /	
Type T1:	± 1% of full scale; dynamics 1:100 (for units with process connection G 1/4“ and measuring ranges up to 50 Nl/min with real gas calibration only)
Type T2:	± 2% of full scale; dynamics 1:50 (ranges > 200 Nl/min ± 3% of full scale)
Reaction time /	max. 300 msec (depending on filter configuration)
Response /	from 500 ms (depending on the application)
Repeatability /	± 0,5% of measured value
Longterm stability /	< 1% of measured value / year
Operating pressure /	0,2. . .11 bar abs.
Temperature /	0. . .50°C
Materials /	
Measuring tube:	aluminium anodized or stainless steel electropolished
Sensor:	silicon, silicon oxide and glass
Valve:	brass nickel-plated or stainless st.
Seals /	FKM, optional EPDM (FDA)
Pressure sensitivity /	< 0,2%/ bar of reading (typical N2)
Temperature sensitivity /	< 0,025% FS measuring range type / °C
Warm-up time /	< 1 sec. for full accuracy
Gas connection /	G¼"-female up to 60 Nl/min above this G½"-female (for air)
Inflow line /	not required
Mounting position /	up to 5 bar any, above this horizontal
Testing pressure /	16 bar abs.
Leakage rate /	<1 x 10-6 mbar l/s He
Display /	touchscreen 128 x 64 px backlighted with external power supply only (Micro-USB or 24 VDC)
Display units /	
Flow:	g/sec, g/min, g/h, kg/sec, kg/min, lb/sec, lb/min, lb/h, mln/min, mln/h, ln/sec, ln/min, nlpm, ln/h, m^3n/h mls/min, mls/h, sccs, sccm, ls/sec, ls/min, slpm, ls/h, scfm, scfh, m^3s/h, l/s, l/min, l/h, cc/sec, cc/min, cc/hr
Totalizer:	g, kg, lb, ln, mln, m3n, ls, mls, m^3s, scc, sf, scf, l, cc
Totalizer /	2 (1 x resettable, 1 x non-resettable)

Electrical Specifications:

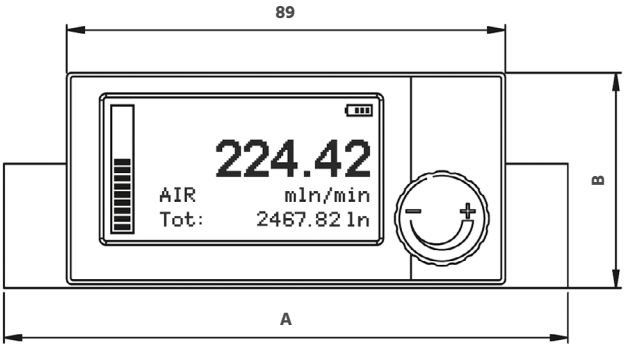
Supply voltage /	
GM-10N.1/2:	standard AA battery (lifetime in months depending on operation, approx. 56 h of continuous operation) or Micro-USB power supply (DIN 62684) Option: external supply +12 to 30 VDC (current consumption max. 100 mA)
GM-10N.3/4:	12. . .30 VDC (max. 200 mA) or Micro-USB (DIN 62684)
Connection cable /	for external power supply: 2 m with loose ends (special lengths on request)
Protection class /	IP 50
EMC /	EN 61326-1
Limit switch /	
Quantity:	3, freely adjustable
Function:	normally closed (NC), normally open (NO), hysteresis and auto / manual reset
Trigger:	min. alarm, max. alarm, windows alarm, overflow alarm and totalizer alarm

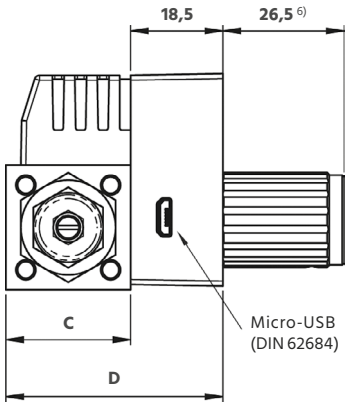
Possible Configurations:

Selection	GM-10N.1	GM-10N.2	GM-10N.3	GM-10N.4
Touchscreen	x	x	x	x
Totalizer (resettable)	x	x	x	x
Totalizer (not resettable)	x	x	x	
Multigas (max. 3 gases)		- optional -		
Regulating valve		x		x
Alarm functions			x	x

Selection	GM-10N.1	GM-10N.2	GM-10N.3	GM-10N.4
Battery supply	x	x		
24 VDC supply	- optional -		x	x
Micro-USB supply	x	x		

Dimensions in mm:





6) only with valve (GM-10N.2a/b and GM-10N.4a/b)

Operating range end ≤ 60 Nl/min (air)	Process-connection	A [mm]	B [mm]	C [mm]	D [mm]
GM-10N.1	G 1/4" IG	114	44	25	44
GM-10N.2a/b					
GM-10N.3					
GM-10N.4a/b					

Operating range end ≤ 60 Nl/min (air)	Process-connection	A [mm]	B [mm]	C [mm]	D [mm]
GM-10N.1	G 1/2" IG	160 / 207	54	35	54
GM-10N.3					
GM-10N.2a/b					
GM-10N.4a/b					

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GR-02

Thermal Mass Flowmeter and Controler for Gases



Features

/ Insensitive to pressure and temp.

/ Short response times

/ Highly accurate and dynamic

/ Low pressure drop

/ Serial interface

Description:

The GR-02 series of mass flowmeter for gases has a CMOS flow sensor that is capable of measuring at very high accuracy according to the thermal principle that applies to gas flow. The measurement pick-up is located directly within the gas flow and detects the quantum of heat that the passing gas molecules carry off a heating element. With its significantly small dimensions and direct contact to the medium, the GR-02 is capable of measuring at extremely fast speeds of response time. The measuring tube can be delivered in aluminium or stainless steel where the measuring chamber is always made of plastic. This limits its use to non-hostile gases or gaseous mixtures with only low hostile content. A major advantage of the thermal measuring principle is that the volume flow can be measured and put out under standard conditions, largely independent of the process pressure and the gas temperature. Selectively, the GR-02 can be supplied as a mere flowmeter with analogue output signal or as flowmeter and controller with integrated regulating valve. In the version with valve, the flow of gas volume is regulated proportionally to an analogue input signal while this unit can also be seen as a „constant gas source“. The parameters of the PI-controller, the operating range settings, selection of media and many other features can be verified and modified through suitable Windows software over the serial RS-485 interface.

Application:

The GR-02 series represents the new generation of thermal mass flowmeters for gases. The extremely cost-effective CMOS technology combines a dependable accuracy of up to ±0.3% of the full scale value + ±0.5% of measured value, fast response times and excellent dynamics to a flowmeter and controller that offers maximum operational convenience. Considering the advantages like modular construction of the measuring system, its assembly in any position and the convenience of cleaning the measuring pick-up without elaborate recalibration, the GR-02 can be deployed in various applications

Electrical Specifications:

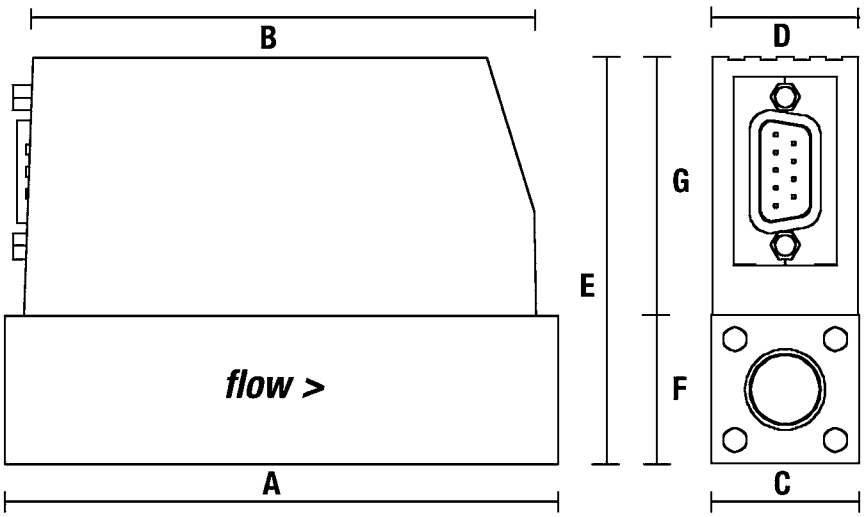
Supply voltage /	24 VDC (18-30 VDC) (15 VDC on request)
Power consumption /	meter max. 100 mA controller max. 250 mA
Electr. connection /	D-Sub plug 9-pole
Output signals analogue /	4. . .20 mA, 0. . .10 VDC, 0. . .5 VDC, 1. . .5 VDC, 2. . .10 VDC or 0. . .20 mA
Output signals digital /	RS-485; Modbus RTU (Slave); Lab View-VI´s available; optional: Profibus DP-V0, DP-V1
Set point value input for regulator /	4. . .20 mA, 0. . .10 VDC, 0. . .5 VDC, 1. . .5 VDC, 2. . .10 VDC or 0. . .20 mA
Starting time /	<1 sec.
EMC /	EN 61326-1
Protection class /	IP 50
Software /	- Reading of actual values for flow and temperature. - Specification of set point values - Entering regulator parameters - Changing gases - Optional recording of measuring data through logging function

Technical Specifications:

Measuring medium /	dry, non-hostile gases (see also listing in the Ordering codes)
Accuracy /	
GR-02.x.1:	± 1.0 % of full scale value
GR-02.x.2:	± 0.3 % of full scale value + ± 0.5% of full measured value
Pressure sensitivity /	< 0.2 % per bar (typically N2)
Repeatability /	± 0.2 % of full scale value
Dynamics /	
GR-02.x.1:	1:50
GR-02.x.2:	1:100
Response time /	80 ms; controller 500 ms
In- and outflow lines /	none
Pressure /	0.2. . .11 bar a (controller max. 8 bar)
Temperature /	0. . .50°C
Temp.-sensitivity /	< 0.025% per °C
Materials /	aluminium anodized, optional stainless steel electropolished
Seals /	Viton, EPDM, optional FFKM
Mounting position /	any (above 5 bar horizontal)
Gas connection /	G 1/4“-female up to 60 Nl/min, above G 1/2“-female
Testing pressure /	16 bar a
Longterm stability /	< 1% measured value / year
Leakage rate /	< 1x 10^{-6} mbar l/s He

Dimensions in mm:

Sizes	A	B	C	D	E	F	G
GR-02.1, 1/4“	94	87	25	25	69	25	44
GR-02.1, 1/2“	145	87	35	25	79	35	44
GR-02.2, 1/4“	124	117	25	25	69	25	44
GR-02.2, 1/2“	170	117	35	25	79	35	44



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Versions:

GR-02 Thermal Mass Flowmeter & Controller

The GR-02 is supplied as a mere flowmeter or as a flow controller with integrated regulating valve. The meter estimates the current volume flow and transmits it in the form of an analogue signal at the output. The controller functions like a „constant gas source". The device measures the volume flow as the actual value and transmits it as analogue output. At the same time, the set point value is fed to the input of the GR-02 in the form of another analogue signal. The electronics estimate the difference in the regulation and adjust the integrated valve by means of an interface-programmable PI controller.

Accuracy and span: There are two versions of accuracies available. The more affordable standard variant measures at an accuracy of ±1.0% of full scale value and has a measuring span of 1:50. The more accurate version has an accuracy of ±0.3% of full scale value + ±0.5% of measured value at a span of 1:100.

Basic body and seals: The measuring tube of the GR-02 is made of aluminium or stainless steel. The CMOS sensor is however, always made of plastic and constantly wetted. The standard sealing material is Viton; optionally also EPDM is available.

Output signals: The signal pattern over which the measured volume flow can be tapped at the output of the GR-02, is either 4. . .20 mA, 0. . .20 mA, 0. . .5 VDC, 1. . .5 VDC, 0. . .10 VDC or 2. . .10 VDC.

Set point value signal for controlling function: If the GR-02 is designed as a flowmeter and controller, the set point value of the flow must be set as an analogue signal. This is either 4. . .20 mA, 0. . .20 mA, 0. . .5 VDC, 1. . .5 VDC, 0. . .10 VDC or 2. . .10 VDC. The mere flowmeter version of the GR-02 has no set point value input.

Pressure ratios in regulating function: The integrated regulating valve of the GR-02.2 as a flowmeter and controller must be set for inlet and outlet pressure. For this reason, both these values must be specified as absolute pressure in [bar].

Medium: As measuring media all non-hostile, dry gases can be considered. Gases that are not listed in the Ordering codes but comply with the requirements can be ordered as special type medium. All devices are supplied ex factory with real gas calibration.

Operating range: There are various operating ranges from 0-25 Nml/min up to 0-450 Nl/min available. Customer-specific full scale values are available on request.

Ordering Codes:

Order no.	GR-02.	1.	2.	1.	1.	1.	P.	[]

GR-02 Thermal Mass Flowmeter & Controler for Gases

Version /
1 = flowmeter
2 = flowmeter & controler

Accuracy & span /
1 = ± 1.0% full scale value, span 1:50 (standard)
2 = ± 0.3% full scale value + ± 0.5% of measured value, span 1:100

Basic body and seals /
1 = aluminium with Viton (standard I)
2 = aluminium with EPDM
3 = stainless steel with Viton (standard II)
4 = stainless steel with EPDM

Output signals /
1 = current 4. . .20 mA
2 = current 0. . .20 mA
3 = voltage 0. . .5 VDC
4 = voltage 1. . .5 VDC
5 = voltage 0. . .10 VDC
6 = voltage 2. . .10 VDC

Set point value input signal for controlling function /
0 = no set point value input for meter only (GR-02.1)
1 = current 4. . .20 mA
2 = current 0. . .20 mA
3 = voltage 0. . .5 VDC
4 = voltage 1. . .5 VDC
5 = voltage 0. . .10 VDC
6 = voltage 2. . .10 VDC

Medium /
L = air
N = nitrogen
O = oxygen
HE = helium
AR = argon
C = carbon dioxide
P = propane (80Nl/min max.)
B = butane
H = hydrogen
M = methane
7 = please specify special type medium in detailed text

End value for measuring range /
[][][] = Please specify. Possible values from 0. . .50 Nml/min to 450 Nl/min (air). From 60 Nl/min on, the gas-connector is G ½" female

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GS-01N

Compressed Air Counter with Switching- and Analogue-Output

Description:

The GS-01N series compressed air counter is a thermal mass flow-meter for gases according to the principle of hot-wire anemometer that is equipped with an electronic unit that has been developed specifically for applications in the field of industrial compressed air. A calorimetric measuring unit consisting of a heated and a temperature measuring resistor form the sensor component of the GS-01N. A volume of compressed air passing through the measuring tube carries off the heat from the heated resistor that is proportional to the velocity. The resulting electrical change of the heated resistor is evaluated by means of the measuring bridge and the effect of media temperature is compensated by the measuring resistance. The extremely user-friendly designed electronic unit has two outputs which can be adjusted optionally as a PNP transistor output for incorporating a limit value switch or an impulse output or as an analogue output for transmitting a 4. . .20 mA signal (for flow, temperature or pressure). Thus, the possible combinations of outputs for the GS-01N are:

- **/ 2 x NO-contacts / NC-contacts**, adjustable with regard to position and hysteresis of the setpoint or as Window function
- **/ 1 x NO-contact / NC-contact** and an additional analogue output (scalable) or
- **/ 1 x NO-contact / NC-contact** and an additional impulse output (programmable).

The rotatable 4-digit digital display on the GS-01N displays either the accumulated sum of the compressed air flow (consumption of compressed air) in Nm^3 or the current value of the flow in Nm^3/min or in Nm^3/h optically. The maximum value that can be displayed is 4000 * $10^3 m^3$ where at such high values a yellow LED indicates that the displayed 4-digit value must be multiplied by the factor 1000. On pressing a button, the device can display the current media temperature and the accumulated sum after the last counter reset. Using a programming device, the display can be adjusted to let it remain switched off in RUN mode. An automatic Reset function of the totalizer can be programmed to different time intervals. In addition, the GS-01N has a minimum and a maximum memory that can store the lowest and the highest value measured until its next resetting.

Features

/ New:
Temperature monitoring and
pressure monitoring included
/ Analogue or pulse output
/ Display of current value or total
/ Can be used as preselection counter
/ Independent of pressure and temp.
/ Max. and min. value memory
/ Low pressure drop
/ Additonal temperature monitoring

Application:

Today, consumption of compressed air in machines and equipment is a cost factor that cannot be ignored at all. Due to this fact the consuming industry increasingly demands measuring devices which, on the one hand, help satisfactorily monitor consumption of compressed air and, on the other hand, do not cause additional pressure drop within the system which in turn would further escalate costs. The new compressed air counter GS-01N is our answer to this problem. It enables visual check of current consumption on a clearly readable display and, it can display the volume of compressed air consumed up to a point like a „water clock for air“ and store the value. Two programmable switching contacts trigger an alarm in the event of exceeding or falling short of a defined volume flow and, optionally, they can be programmed using window technology. It means that a defined range is considered as „good“ and, on escaping this Window alarm is sounded. Optionally, the user may avoid one of the switching outputs and, instead, opt for an impulse or analogue output or program the switching output as the preselection counter. The fact that the GS-01N is a mass flowmeter based on the thermal principle also underlines the advantages of measuring volume flow largely regardless of pressure and media temperature and implies a pressure drop in the range of only few millibars.

The accuracy of ±3% of measured value + ±0.3% of full scale value and the option of operating range up to 700 Nm^3/h round off a device that pays off within the shortest span of time, not the least, due to its excellent price to performance ratio.
The integrated temperature measurement enables temperature-sensitive processes, such as drying processes, to be monitored and the production quality to be ensured. The compressed air meter thus contributes to increasing process reliability.

Versions:

GS-01N Compressed Air Counter with Switching- and Analogue-Output

The GS-01N can be supplied in 5 versions with different nominal diameters and volume flow ranges measurable by them. The available connection sizes are:
G¼“, R½“, R1“, R1 ½“ and R2“. The tapping ranges are in the same sequence 0 - 18 Nm^3/h, 0 - 90 Nm^3/h, 0 - 270 Nm^3/h, 0 - 492 Nm^3/h and 0 - 840 Nm^3/h. The sizes G¼“ and R½“ are also available for argon. CO_2 and nitrogen.

Ordering Codes:

Order number	GS-01N.	1.	1.	1

GS-01N Compressed Air Counter with Switching- and Analogue-Output

Size /
0 = operating range 0.04 to 15 Nm^3/h, connections in G1/4“-female
1 = operating range 0.2 to 75 Nm^3/h, connections in R1/2“-male
2 = operating range 0.7 to 225 Nm^3/h, connections in R1“-male
3 = operating range 1.3 (1.5) to 410 Nm^3/h, conn. in R1 1/2“-male
4 = operating range 2.3 (3) to 700 Nm^3/h, connections in R2“-male

Medium /
0 = compressed air (all sizes)
1 = argon, CO_2, N_2 switchable (only GS-01N.0, GSN-01.1 and GS-01N.2)

Option /
0 = no option
1 = counter plug 4-pole series 713

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Technical Specifications:

Measuring/setting range for compressed air and gases (Ar, CO2, N2)

Values in Nm^3/h	GS-01N.0.0/1	GS-01N.1.0/1	GS-01N.2.0/1	GS-01N.3.0	GS-01N.4.0
Display-range	0. . .18	0. . .90	0 . .270	0. . .492	0. . .840
Operating-range	0,05. . .15	0,25. . .75	0,8. . .225	1,4. . .410	2,5. . .700
Setpoint	0,13. . .14,99	0,65. . .74,97	1,9. . .224,9	3,6. . .409,8	5,9. . .699,7
Reset point	0,06. . .14,92	0,28. . .74,6	0,8. . .223,8	1,6. . .407,8	2,5 . .696,3
Analogue startpoint	0. . .12	0. . .60	0. . .180	0. . .327,9	0. . .560
Analogue endpoint	3. . .15	15. . .75	45. . .225	82,1. . .410	140. . .700
In steps of...	0,01	0,01	0,1	0,1	0,1
Process connection	G ¼"-IG	R ½"-AG	R 1"-AG	R 1 ½"-AG	R 2"-AG

Measuring, display and setting ranges refer to the standard volume flow according to DIN ISO 2533.

Volumetric flow quantity monitoring

Values in Nm^3/h	GS-01N.0.0/1	GS-01N.1.0/1	GS-01N.2.0/1	GS-01N.3.0	GS-01N.4.0
Pulse value (m^3)	0,001. . .10000000	0,001. . .10000000	0,001. . .10000000	0,001. . .10000000	0,001. . .10000000
In steps of... (m^3)	0,0001	0,0001	0,0001	0,0001	0,0001
Pulse length (s)	0,01. . .2	0,002. . . 2	0,007. . .2	0,004. . .2	0,002. . .2

Media /	compressed air, process gas
Air quality (ISO 8573-1) at medium temperature 23°C /	class 141 (measuring errors value A) class 344 (measuring errors value B)
Measuring errors /	
Air quality A:	± (2% MW + 0,5% MEW)
Air quality B:	± (6% MW + 0,6% MEW)
Argon/ CO_2 / N_2:	± (6% MW + 0,6% MEW)
Temperature coefficient /	± 0,07 % MW 1/K
Repeatability /	± (0,4 % MW + 0,1 % MEW)
Response time /	< 0,1 s (dAP = 0 s)
Damping for the switching output /	0. . .5 s
Measuring dynamics /	1:300
Pressure rating /	16 bar
Min. bursting pressure /	64 bar

Medium temperature /	-10. . .60°C
Ambient temperature /	0. . .60°C
Storage temperature /	-20. . .+85°C
Max. rel. humidity /	90%
Vibration proof /	5 g (DIN EN 68000-2-6, 55-2000 Hz)
Housing materials /	
GS-01N.x.x.x:/	PBT+PC-GF30; PPS GF40; stainless steel (1.4301 / 304); stainless steel (1.4305 / 303); steel (1.5523) galvanised; 2.0401 (brass / CW614N); FKM
Sensor materials /	
GS-01N.x.x.x:/	stainless steel (1.4301 / 304); stainless steel (1.4305 / 303); FKM; ceramics glass passivated; PPS GF40; Al2O3 (ceramics); acrylate

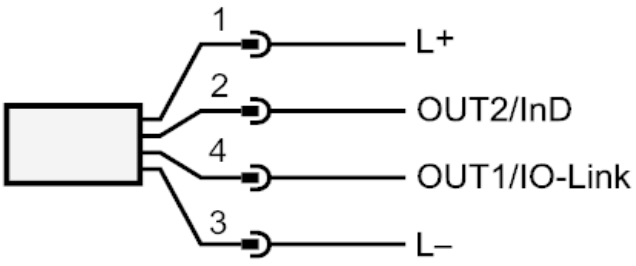
Electrical Spezification:

Supply voltage /	18. . .30 VDC (to EN 50178 SELV/PELV)
Protection class /	IP65, IP67
Current /	< 80 mA
Polarity reversal protection /	yes
Inputs / outputs	
Number:	2 digital outputs, 1 analog output
Inputs:	counter reset
Outputs /	
Output signal:	switching signal; analogue signal; pulse signal; IO-Link; (configurable)
Electrical version:	PNP/NPN
Output function:	normally open / normally closed; (parameterisable)
Max. voltage drop:	2,5 V
Power consumption:	150 mA; (per output)
Analogue current output:	4. . .20 mA (scalable)
Max. load:	500 Ω
Pulse output:	consumed quantity meter
Short-circuit protection /	yes; pulsed
Overload protection:	yes
Electrical connection /	connector: M12
Display /	
Colour display:	1,44“, 128 x 128 pixels 2 x LED, yellow

Pressure monitoring	
Measuring range /	-1. . .16 bar
Display range /	-1. . .20 bar
Resolution /	0,05 bar
Set point /	-0,92. . .16 bar
Reset point /	-1. . .15,92 bar
Analogue start point /	-1. . .12,8 bar
Analogue end point /	2,2. . .16 bar
In steps of /	0,01 bar
Response time /	0,05 s
Repeatability /	± 0,2% of the final value
Characteristics deviation /	< ± 0,5% of the final value, (BFSL = Best Fit Straight Line)

Temperature monitoring	
Measuring range /	-10. . .60°C
Display range /	-24. . .74°C
Resolution /	0,2°C
Set point /	-9,7. . .60°C
Reset point /	-10. . .59,7°C
Analogue start point /	-10. . .46°C
Analogue end point /	4. . .60°C
In steps of /	0,1°C
Accuracy /	± 0,5 K (medium flow in the limit area of the flow measurement range)
Dynamik T05 - T09 /	T09 = 0,5 s

Connection diagram:

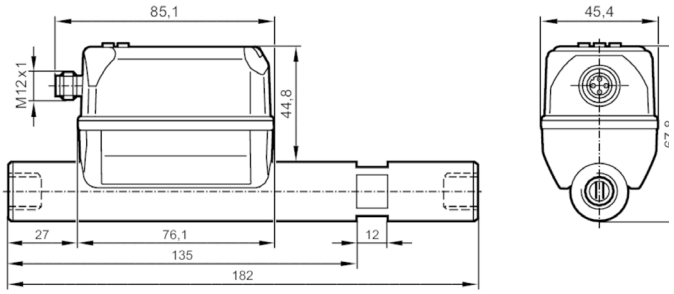


OUT1/I0-LINK /	**OUT2/InD**
switching output flow	switching output flow
switching output temperature	switching output temperature
switching output pressure	switching output pressure
pulse output quantity meter	analogue output flow
signal output preset counter	analogue output temperature
	analogue output pressure
	signal output preset counter
	pulse output quantity meter
	input counter reset

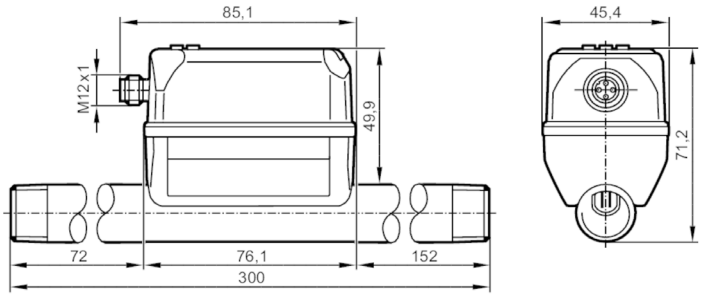
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Dimensions in mm:

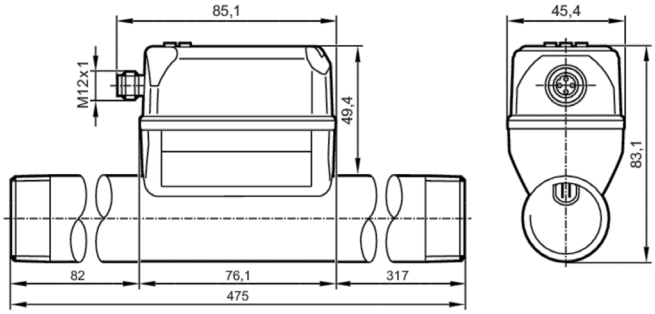
GS-01N.0



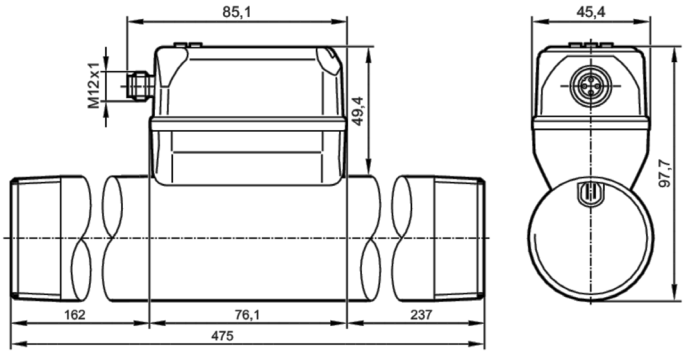
GS-01N.1



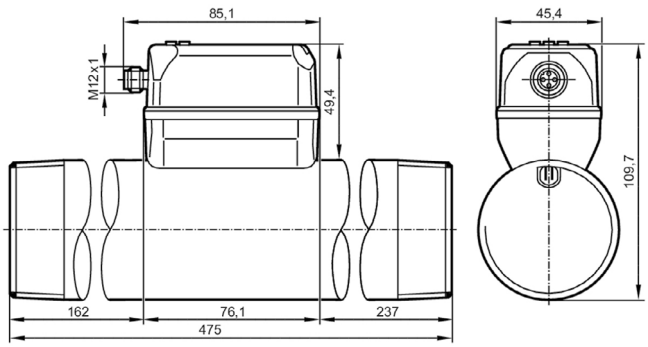
GS-01N.2



GS-01N.3



GS-01N.4



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GM-50

Air Velocity Transmitter

Features

/ Operating ranges up to 75 m/s (15000 ft/min) in 8 levels

/ Optional LED display

/ 6 different mounting lengths

/ 4. . .20 mA output

/ Digital filter

Description:

The GM-50 series of air velocity transmitter is the ideal instrument for measuring air velocities in large pipes and ducts. The device uses a mass flow sensor that allows accurate measurement at different flow velocities and temperatures. The rate of cooling in a heated measuring resistance is estimated which is directly proportional to the velocity of flow streaming along. At the output of the GM-50 the measured value can be tapped in the form of a 4 to 20 mA signal selectively in 3- or 4-wire system. In addition, the device has an optionally available LED display on which the measured value is displayed digitally, and an adjustable filter that attenuates the output with the time element of 0.5 to 15 seconds. The result is that a possible turbulent, restive flow does not lead to strong fluctuations in the output and the display. Since the GM-50 as a mass flowmeter always refers its measured values to air pressure and, in this respect, it is calibrated at factory to a standard status, it is possible to recalibrate the sensor to another pressure within the framework of parameterization.

Application:

The flow velocity of air or emission flow is often measured in the air-conditioning, ventilation and building technologies. Modern sensor elements of the GM-50 enable accurate and convenient measurement regardless of the air temperature at an enormously large span of operating range. Outmoded measuring instruments such as apertures, dynamic pressure probes or tubes can be conveniently replaced by the GM-50 with its principle of thermal mass flow measurement. In the course of commissioning, the user has a choice of eight different operating ranges between 0. . .1.25 and 0. . .75 m/s respectively 0. . .250 and 0. . .15000 ft/min, can customize to existing air pressure and adapt the 4. . .20 mA value of the output to his evaluator electronics. All settings for the device are performed through two keys and a potentiometer extremely easily.

Technical Specifications:

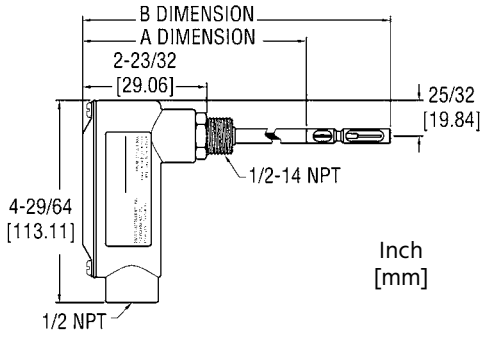
Media /	clean air and compatible, non-flammable gases
Operating range in m/s /	0. . .1,25; 0. . .2.5; 0. . .5; 0. . .10; 0. . .15; 0. . .25; 0. . .50; 0. . .75
Op. range in ft/min /	0. . .250; 0. . .500; 0. . .1000; 0. . .2000; 0. . .3000; 0. . .5000; 0. . .10000; 0. . .15000
Accuracy /	3% FS in the temp. range 0. . .+50°C 4% FS in the temp. range -40. . .0°C and +50. . .+100°C
Reaction time /	1.5 seconds to 95% of final value (outlet filter on minimum value)
Operating temp. /	-40. . .+100°C
Ambient temp. /	0. . .+60°C
Pressure /	6.89 bar max.
Mounting position /	independent
Humidity /	non-condensing
Process connection /	1/2"-NPT-male
Weight /	357.2 g (377g with Display)

Electrical Specifications:

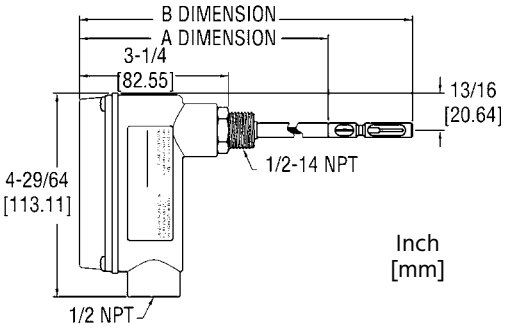
Supply voltage /	12. . .35 VDC or 10. . .16 VAC 1.5 A rating required due to initial power surge drawn by transmitter
Power consumption /	300 mA max.
Output /	4. . .20 mA, in 3- or 4-wire system
Output filer /	0.5. . .15 seconds, adjustable
Load /	600 Ohm max.
El. connection /	screw clamps
Protective switch /	IP66 (no display unit) IP23 (with display unit)
Display /	
Design:	4 1/2-digit 1/2" red LED
Resolution:	0.01 m/s

Dimensions in inch [mm]:

GM-50.0



GM-50.1



Ordering Codes:

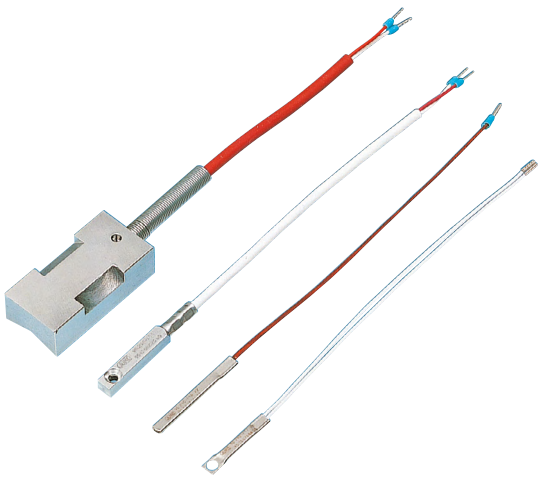
Order number	**GM-50.**	**1.**	**1**

GM-50 Air Velocity Transmitter

Digital display /
0 = no display
1 = with digital display

Mounting length /
1 = 152,4 mm (6")
2 = 304,8 mm (12")
3 = 457,2 mm (18")
4 = 609,6 mm (24")
5 = 762,0 mm (30") - (only on request)
6 = 914,0 mm (36") - (only on request)

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PT-00

Surface Resistance Thermometer

Features

/ Easy and fast assembly

/ For round and plane surfaces

/ Temp. range of -50. . .+260°C

/ Different protection fittings

/ Less thermal mass

Description:

The PT-00 series of resistance thermometers are surface temperature sensors on the basis of Pt100. Depending on the requirement, the devices can be supplied with permanent connecting cable or with housing and cable gland. A Pt100 temperature sensor is inserted into the protection fitting in 2-wire circuit which changes its ohmic resistance depending on the temperature. According to the version, the surface fittings are screw-mounted through a mounting hole or clamped by means of strap retainers to the surface to be measured. These thermometers are available in aluminium or stainless steel.

Application:

Thanks to their easy and fast assembly by means of strap retainers, hose band clips or screws, the PT-00 series of surface resistance thermometers well suited for a number of applications such as temperature measurement in closed pipelines as well as on plane surfaces. Since the temperature is measured indirectly, there is no interference with the process medium and, moreover, there is no or very less mechanical groundwork required at the location of measurement. The temperature transmitters in the PT-00 series are not affected by any operational pressure or chemical influences of the medium, thus ensuring their durability. Due to the less thermal mass of the PT-00, the object being measured is not at all affected which enormously simplifies a streamlined measurement of surface temperature.

Versions:

PT-00 Surface Resistance Thermometer

The PT-00 series of contact resistance thermometers is supplied with various fittings for screw-mounting or for fastening with strap retainers or hose clips. In PT-00.1 and PT-00.2 versions, the electrical connection is made through a clamp housing while, in all other versions, it is implemented through a 2.5 meter long cable that has silicon or PTFE sheathing depending the type of fittings.

Protection class: The various versions of PT-00 with clamp housing belong to the IP54 protection class as a standard. Optionally, IP65 protection class is also available.

Accessories: Installation kit (clamping band and thermal conductance paste) for pipes up to a max. diameter of 100 mm.

Technical Specifications:

Connection /	pipe ends Sn-plated, with wire sleeves
Connecting cables /	silicone, ambient temperature -50. . .+180°C PTFE, ambient temperature -50. . .+260°C
Sensor element /	Pt100 temperature sensor, DIN EN 60751, Cl. B, 2-wire
Protection fitting /	stainless steel 1.4571, aluminium, plastic
Process connection /	strap retainers, hose Binder or screw fastening
Cable length /	2500 mm standard, special lengths on request

Ordering Codes:

Order number	**PT-00.**	**1**

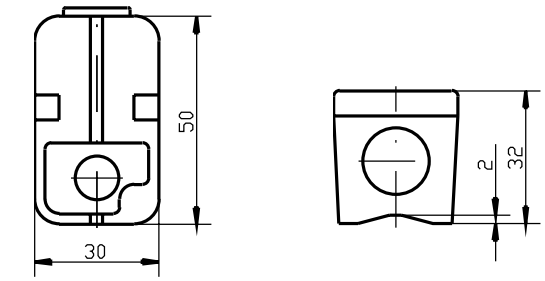
PT-00 Surface Resistance Thermometer

Version /

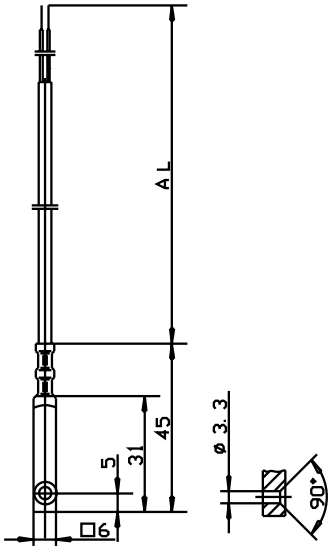
1 = tube contact sensor with clamp housing, (-50°C. . .+120°C)
2 = surface contact sensor with clamp housing, (-50°C. . .+120°C)
3 = with connecting cable PTFE, fixture hole, protective aluminium fittings (-190°C. . .+260°C)
4 = with connecting cable PTFE, fixture hole, protective stainless steel fittings (-190°C. . .+260°C)
5a = with connecting cable PTFE, no fixture hole, protective stainless steel fittings (-190°C. . .+260°C)
6 = with connecting cable Silicon, fixture by container strap, protective aluminium fittings (-50°C. . .+180°C)

Dimensions in mm:

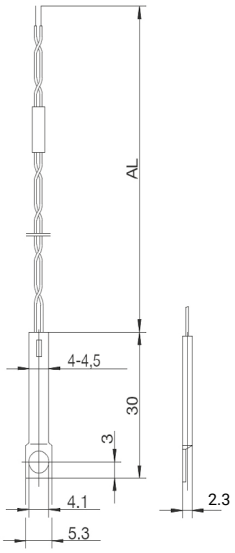
PT-00.1/2



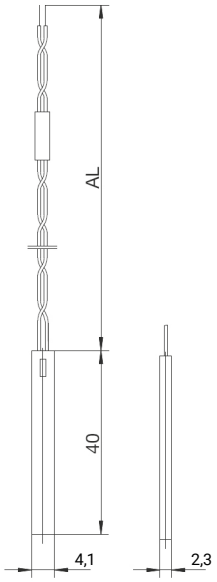
PT-00.3



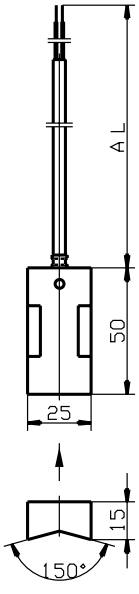
PT-00.4



PT-00.5



PT-00.6



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PT-01

Compact Resistance Thermometer

Features

/ Small design

/ Integrated transmitter

/ Power- or resistance output

/ Stainless steel

/ -200°C to +400°C

Description:

A temperature-dependent electrical resistance is integrated in a stainless steel protection tube. It changes its ohmic resistance in relation to the temperature of the media. In the version with a built-in transmitter, the measured value will be converted into a 4. . .20 mA current signal and made available at the connections of the square-type plug point in 2-wire system. In the version without a transmitter, the plain resistance can be tapped at the plug point. the sensor element is designed in 2-, 3- or 4-wire with a system in order to compensate for the measuring errors through the electrical leads.

Application:

The PT-01 series of Compact Thermometers is unbeatable in their versatility. A choice of 2 shaft diameters, 5 different shaft lengths and various connecting threads allow the user to customize them practically in any location of measurement. In addition, the wide range of temperatures of -200. . .400°C contributes its part to the fact, that these sensors are used nearly in the entire industry with great success. From a temperature of 120°C upwards, the thermometers are provided with an additional neck tube that serves as a cooling section and protects the sensitive electronic components against overheating.

Versions:

PT-01 Compact Resistance Thermometer

Output: Resistance outputs PT100 2-, 3- or 4-wire without a transmitter are possible. With transmitter the device gives a 4. . .20 mA current signal in 2-wire circuit.

Process connection: G½" B male, smooth shaft (others on request)

Shaft diameter: Protective pipes with 6 mm or 8 mm are available.

Shaft length: Depends on the required depth.

Technical Specifications:

Accuracy /	Transmitter: < 0.1% from the range Class A for DIN EN 60751 ±(0.15°C + 0.002°C x |t|) Class B for DIN EN 60751 ±(0.3°C + 0.005°C x |t|)
Material /	Stainless steel 1.4571
Process connection /	G½"B (others on request)
Shaft diameter /	6 mm or 8 mm (others on request)
Shaft length /	50. . .2000 mm
Neck tube /	55 ± 2 mm from 120°C
Storage temp. /	-40. . .85°C
Pressure /	max. 25 bar

Ordering Codes:

Order number	**PT-01.**	**1.**	**2.**	**[][][].**	**[][][].**	**[][][]**

PT-01 Compact Resistance Thermometer

Output /
1 = 1 x PT100 3-wire
2 = 4. . .20 mA 2-wire

Shaft diameter /
1 = 6 mm
2 = 8 mm

Desired shaft length /
[][][] mm (max. 2000mm)

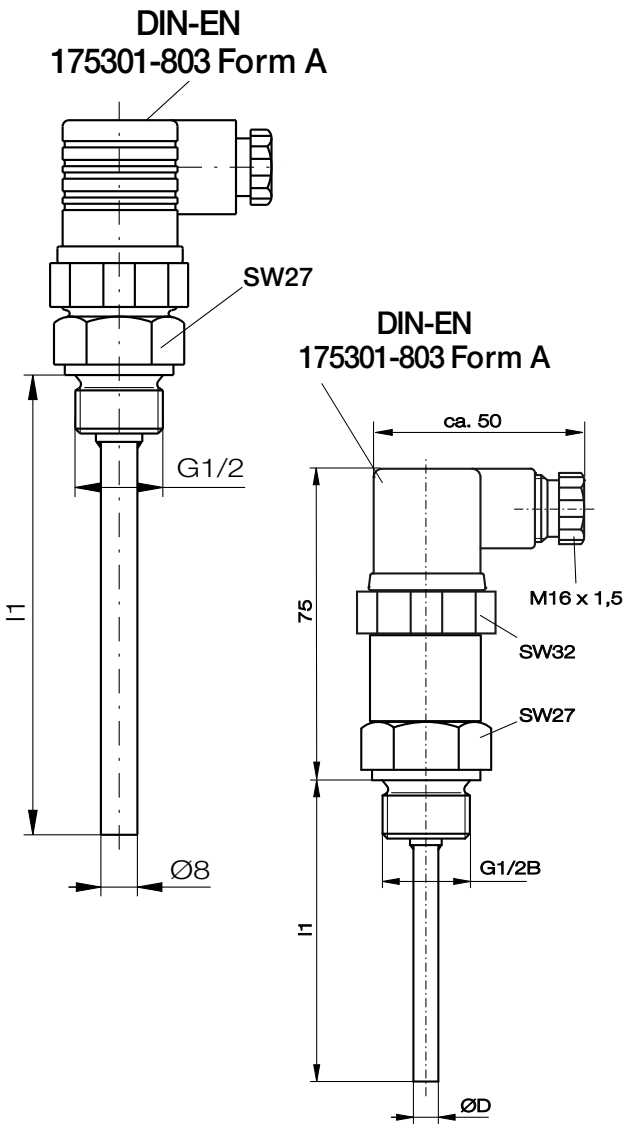
Temperature range /
[][][] = start value (from -200°C)

Temperature range /
[][][] = end vlaue (up to +400°C)

Electrical Specifications:

Output /	4. . .20 mA, 2-wire or 1 x PT100, 2-, 3- or 4-wire
Supply voltage /	7.5. . .35 VDC
max. Current /	0.3. . .1.0 mA
Connection /	angled plug from DIN EN 175301-803 A for 2-, 3- or 4-wire
Protection class /	IP65 ENC60529
EMC /	2004/108/EG, EN 61326 emission (Group 1 Class B) and immune to interference (industrial)

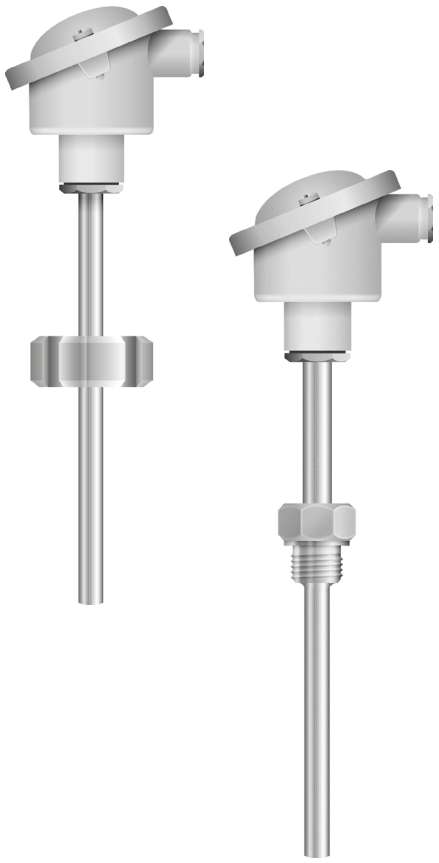
Dimensions in mm:



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PT-02

Insertion Resistance Thermometer



Features

/ All types of designs

/ Integrated transmitter

/ Current or resistance output

/ Stainless steel

/ -50. . .+550°C

/ Insertible into process- or protection tube

/ Special type connections

Description:

A temperature-dependent electrical Pt100 resistance is situated in a protective stainless steel tube as specified by the customer. It changes its ohmic resistance value proportionally to the temperature of the media and the same is tapped at the connecting head of the PT-02 in 2-, 3- or 4-wire system. This ensures compensation of measuring errors through the electrical feeder lines. If the device has an integrated head transmitter, it generates a 4. . .20 mA current signal, proportional to the temperature, directly from the tapped resistance value as per the proven 2-wire system. The transmitter can also be supplied as ex-version with intrinsically safe operation so that the head of the device can be used in Zone 1.

Application:

The PT-02 series of insertion resistance thermometers is manufactured as per the customer specifications with regard to process connection, shaft length and shaft diameter. They are ideally suited for use in protective tubes (in high pressure applications or hostile media) as well as for direct insertion into the process. The wide range temperatures from -50. . .+550°C contributes to the fact that these sensors are used nearly in the entire industry with great success. The thermometers for temperatures +120°C and up are provided with an additional neck tube that serves as a cooling line and protects the connecting head against overheating. In order to ensure maximum accuracy, only carefully tested measuring elements as per DIN are used, thus allowing the customer to select from Classes A and B.

Versions:

PT-02 Insertion Resistance Thermometer

Neck tube: From a temperature of +120°C upwards using a neck tube is recommendable which serves as a cooling line.

Process Connection: The process connection can be designed as male thread or swivel nut. For pharmaceutical or food-processing industries aseptic glands or clamp connections are available. Chemical and petro-chemical industries can be supplied with any type of flange connection.

Measuring element: The user can select from among elements of Classes A (± (0.15 + 0.002*t) °C) and B (± (0.3 + 0.005*t) °C).

Output: Depending on the further processing of the signal, the Pt 100 can be designed as 2-, 3- or 4-wire system. Also available is a version with two PT 100 measuring elements in one shaft. In this case the Pt100's must be connected as 2- or 3-wire. For integrated head transmitter a 4. . .20 mA 2-wire signal is generated.

Insertion length: Customer can specify the inserting length from the sealing surface.

Connecting head: 6 different connecting heads as per DIN are available. Please refer to "Drawing for connecting heads". In versions with integrated head measuring transmitter the head Form B is used as a standard.

Technical Specifications:

Pressure /	max. 6 bar for protective stainless tube (mounting in high-pressure protective tubes possible)
Temperature /	max. +70°C at head transmitter
Neck tube /	from media temperature +120°C upwards the standard is a 120 mm neck tube (customized manufacturing possible)
Temperature range /	-50. . .+550°C
Material /	shaft, neck tube and thread in stainless steel 1.4571
Accuracy /	Pt100 Class A or B as per DIN IEC 751
Electrical connection /	ceramic clamping block in connecting head
Process connection /	welded or screwed in bushing, protective tube, compression fitting

Electrical Specifications:

Supply voltage /	24 VDC (for head transmitter)
Output /	1 x Pt100 2-wire,1 x Pt100 3-wire, 1 x Pt100 4-wire, 2 x Pt100 2-wire, 2 x Pt100 2-wire or 4 to 20 mA 2-wire
Protection class /	IP54 EN 60529

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Ordering Codes:

Order number	PT-02.	1.	2.	1.	1.	[].	3.	2.	[].	[]

PT-02 Insertion Resistance Thermometers

Neck tube /
1 = no neck tube (up to +120°C)
2 = with neck tube (from +120°C upwards)

Process connection /
1 = smooth shaft
2 = G 1/2"-male
3 = G 1/2" swivel nut
4 = G 3/4"-male
5 = G 3/4" swivel nut
6 = G 1"-male
7 = G 1" swivel nut
8 = NPT 1/2"-male
9 = NPT 3/4"-male
10 = M 18 x 1.5-male
11 = M 18 x 1.5 swivel nut
12 = M 20 x 1.5-male
13 = M 20 x 1.5 swivel nut
14 = M 27 x 2-male
15 = M 27 x 2 swivel nut
16 = clamp 1"
17 = clamp 2"
18 = special connection (flange or aseptic gland) in detailed text

Measuring element:
1 = 1 x Pt100, Class A as per DIN EC 751
2 = 1 x Pt100, Class B as per DIN EC 751
3 = 2 x Pt100, Class A as per DIN EC 751 (2- or 3-wire only)
4 = 2 x Pt100, Class B as per DIN EC 751 (2- or 3-wire only)

Output:
0 = 2-wire
1 = 3-wire
2 = 4-wire
3 = 4 to 20 mA with head transmitter

Insertion length:
[][][][] shaft length from sealing surface in mm

Shaft diameter:
1 = 3 mm (for mounting in protection tube)
2 = 6 mm
3 = 8 mm
4 = 15 mm

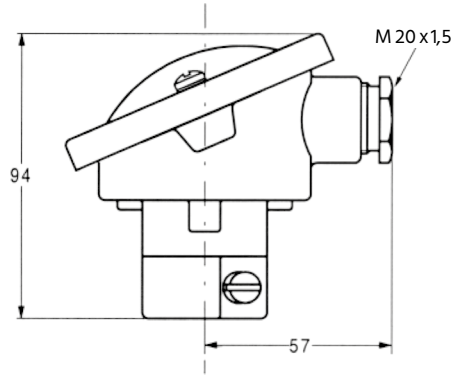
Connecting head /
1 = form A
2 = form B (standard for head transmitter)
3 = form BUZ (DAN)
4 = form BUZ-H (DANW)
6 = form BEG
7 = form GG

Temperature range /
[][][][] initial value

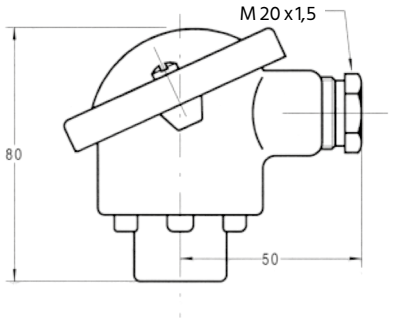
Temperature range /
[][][][] end value

Dimensions in mm:

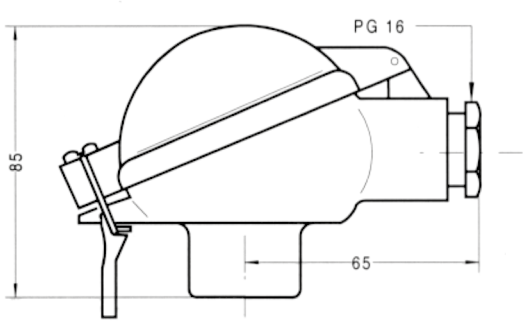
Form A – cover with 2 fastening screws
Material: aluminium pressure casting



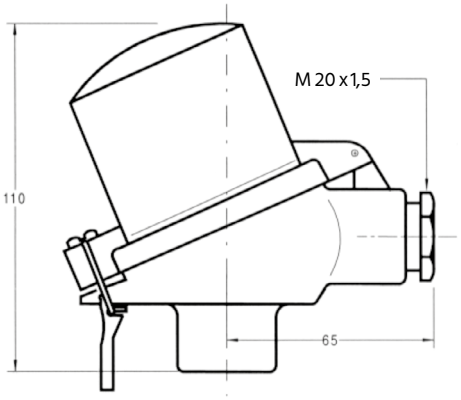
Form B – over with 2 fastening screws
Material: aluminium pressure casting



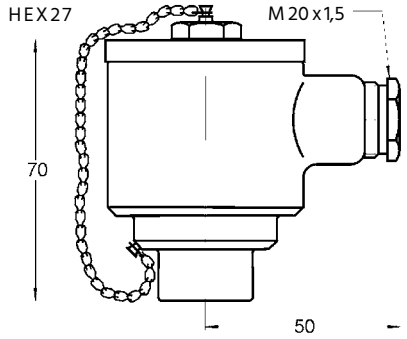
Form BUZ (DAN) – flap cover with bracket
Material: aluminium pressure castin



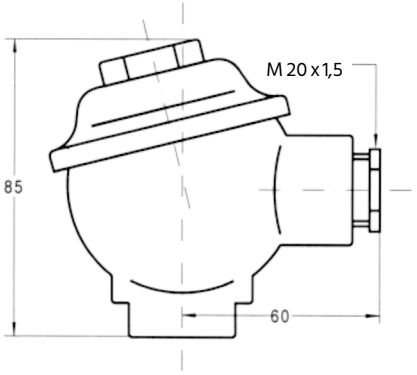
Form BUZ-H (DANW) – high flap cover with bracket



Form BEG – screw cap with chain
Material: stainless steel 1.4571



Form GG – cover with screw closure
Material: steel/cast iron



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PT-03

Resistance Thermometer or Thermocouples with Cable Connection



Features

/ With thread or smooth shaft

/ Cable tolerance up to 260°C

/ Sleeve -50 up to +1200°C

/ Pt-100, 2-, 3- or 4-wire

/ 3, 4 or 6 mm sensor diameter

/ Thermocouple K and J

/ Customer-specific solutions

Description:

The PT-03 cable thermometer is an universally applicable temperature sensor on the basis of Pt100 or a thermocouple. A temperature-sensitive measuring element is situated in a protective sleeve made of stainless steel which is permanently fixed to a cable. It can be supplied in different variants with regard to material and length. The measuring element is available as a PT100 class B (optional accuracy class A) in 2-, 3- or 4-wire technology or as a thermocouple type K or J. Using the PT-03, a temperature range of -50. . .+1200°C can be easily detected. However, the maximum temperature on the cable must not exceed 260°C. Customer-specific special solutions are available on request.

Application:

Cable thermometers are widely used in the industry in a variety of versions. Besides the versions with clamp connection housing or plug, the PT-03 exemplifies a simple and cost-effective method for measuring temperatures securely and accurately even in places which are difficult to access, e.g. shafts or narrow spaces, safely and accurately. By attaching an additional protective hose on the joint between the cable and protective sleeve, the protection class in some of the versions can be upgraded to IP68 so that the PT-03 is also suitable for measuring temperatures in wells. Basically, any type of fluid and gaseous media can be measured which are compatible with the material used.

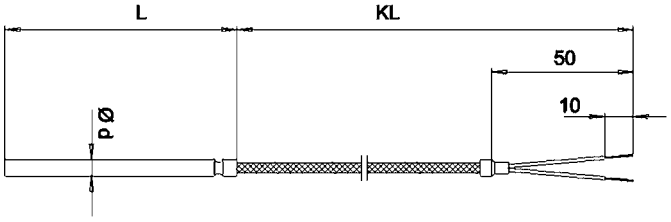
Technical Specifications:

Protection sleeve /	stainless steel 1.4571, optionally 1.4541 or 2.4816 Inconel
Shaft length /	25 mm, 50 mm, 100 mm, 150 mm, 200 mm, 250 mm, 400 mm, special types on request
Shaft diameter /	3 mm, 4 mm or 6 mm
Connecting thread /	G1/2"-male or smooth shaft, optionally G1/4"-male, 1/4"-NPT, 1/2"-NPT or slidable compression fitting, special type connections on request
Media-temperature /	-50. . .+550°C for resistance thermometer -50. . .+1200°C for thermocouples
Temperature ranges /	-20. . .+70°C (PVC-cable) -60. . .+180°C (Silicone-cable) -65. . .+200°C (Teflon-cable) -50. . .+260°C (glass fibre insulated cable)
Cable length /	1000 mm standard, special type lengths on request

Electrical Specifications:

Measuring element /	1 x Pt100 2-wire, 1 x Pt100 3-wire, 1 x Pt100 4-wire, 2 x Pt100 2-wire, or 2 x Pt100 3-wire, 1 or 2 thermocouples type K or J
Accuracy /	Class B, optionally Class A for Pt100, Class 1 for thermocouples type K or J
Prot. Class /	IP65 as per IEC 751 Class B, optionally IP68 (cable material glass fibre: IP50)
El. Connection /	bare cable ends, insulated, or core cable ends, optionally miniature plug for thermocouples

Dimensions in mm:



Ordering Codes:

Order number	**PT-03.**	**3.**	**2.**	**1.**	**1.**	**1.**	**3**

PT-03 Resistance Thermometer with Cable Connection

Version /
3 = ø 3 mm, for inserting
3a = ø 4 mm, for inserting
4 = ø 6 mm, for inserting

Insertion or sleeve length /
1 = 25 mm
2 = 50 mm
3 = 100 mm
4 = 150 mm
5 = 200 mm
6 = 250 mm
7 = 400 mm
□□□□ = special type length in mm

Cable material /
1 = -20. . .+70°C with PVC cable
2 = -60. . .+180°C with silicone cable
3 = -65. . .+200°C with PTFE cable
4 = -50. . .+260°C with glass fibre insulated cable
5 = -55. . .+180°C with shielded FEP cable
6 = -50. . .+260°C with SS-shielded glass fibre cable
7 = special material

Cable length /
1 = 1000 mm (standard)
□□□□ = special type length in mm

Measuring element /
1 = 1 x Pt100 Class B, 2-wire
2 = 1 x Pt100 Class B, 3-wire
3 = 1 x Pt100 Class B, 4-wire
4 = 2 x Pt100 Class B, 2-wire
4a = 2 x Pt100 Class B, 3-wire
5 = 1 x NiCr-Ni
6 = 1 x Fe-CuNi
7 = 2 x NiCr-Ni
8 = 2 x Fe-CuNi

Options / (multiple entries such as /2/9/10 are possible):
0 = none
1 = process connection G¼"-male fixed
2 = process connection G½"-male fixed
3 = process connection ¼"-NPT fixed
4 = process connection ½"-NPT fixed
5 = process connection G¼"-male slidable
6 = process connection G½"-male slidable
7 = process connection ¼"-NPT slidable
8 = process connection ½"-NPT slidable
8a = special connection, please specify in detailed text
9 = sensor class A instead of Class B
10 = material 1.4541 instead of stainless steel 1.4571
11 = material Inconel instead of stainless steel 1.4571
12 = miniature plug for thermocouples (only thermocouples)

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PT-05N

Resistance Thermometer in wall-mounted Housing



Features

/ Room temperature measurement

/ Wall-mounting

/ Class A or Class B

/ Optionally with analogue output

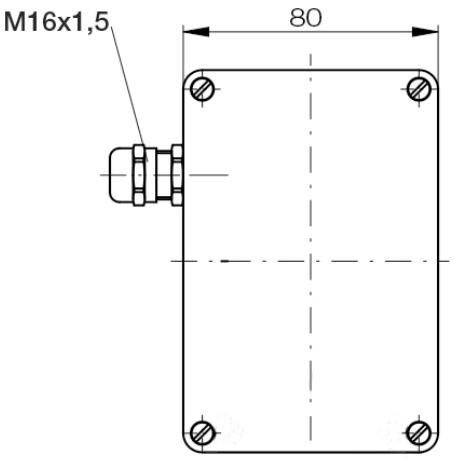
Description:

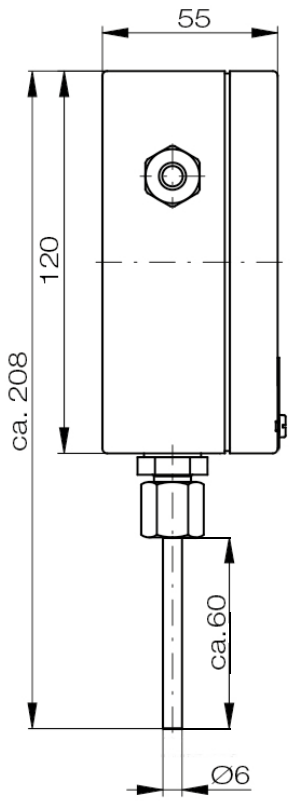
A Pt100 sensing resistor of accuracy class A or B is situated in a stainless steel tube; it changes its ohmic resistance according to the room temperature present outside the measuring tube. This resistance value is tapped either unaltered at the connecting terminals inside the wall-mounted housing of the PT-05 or, first, converted into a 4 to 20 mA output signal and then made available in 2-wire system.

Application:

The PT-05 resistance thermometer is used for simple measuring of room temperatures and is, therefore, used in building and air-conditioning technologies. Wherever room temperature plays an important role in regulating processes, it must be tapped accurately and output electrically. In this respect, PT-05 offers a cost-effective and yet robust solution.

Dimensions in mm:





Technical Specifications:

Housing /	120 x 80 x 55 mm (H x W x D)
Sensor length /	60 mm stainless steel (other lengths available on request)
Sensor diameter /	6 mm
Temperature range /	-50. . .+70°C
Accuracy of measurement /	Class A as per DIN EN 60751 ± (0.15°C + 0.002°C x |t|) Class B as per DIN EN 60751 ± (0.3°C + 0.005°C x |t|)
Output /	MU-410 4. . .20 mA
Measuring resistance /	Pt100 as per DIN EN 60751 Load capacity: 0.3. . .1.0 mA
Options /	PT1000 & Ni100

Electrical Spec.(Transmitter):

Protection class /	IP68
Cable gland /	M16 x 1.5
Power output /	4. . .20 mA, 2-wire technology
max. Load /	Rb ≤ (Ub–12V) 20 mA
Supply voltage /	12. . .30 VDC

Ordering Codes:

Order number	**PT-05N.**	**1B.**	**1.**	**0.**	**0**

PT-05N Resistance thermometer in wall-mounted housing

Sensing resistor /
1B = 1 x Pt100, Class B, 3-wire
1A = 1 x Pt100, Class A, 3-wire
2B = 2 x Pt100, Class B, 3-wire
2A = 2 x Pt100, Class A, 3-wire

Transmitter /
0 = none
1 = standard transmitter 4. . .20 mA, 2-wire, factory configured

Temperature range of power output /
0 = no power output
□□□ - □□□°C Assignment of power output to temp. range in detailed text

Special features /
0 = none
1 = please specify in detailed text

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PT-06

Resistance Thermometer for Pipes



Features

/ For round surfaces

/ Pt100, Pt1000, NiCr-Ni

/ Aluminium sensor

Description:

The PT-06 is a resistance temperature-sensor, specifically designed for round surfaces. The slightly angled form of the sensor helps to obtain the value from a greater area from rounded objects for a more accurate measurement of temperatures, as opposed to other, flat thermometers. A thermal-element (NiCr-Ni Typ K) or a resistance-temperature-sensor (Pt100/Pt1000) can be used for the measurement. The standard Version of the PT-06 comes with a 2 m silicone-cable with loose ends and end ferrules. Other lengths are available on request.

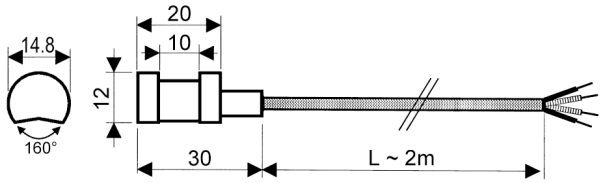
Application:

The PT-06 can be installed via tension belts or hose connectors, making it very easy to use. The indirect measuring does not disturb the media and only few to none mechanical work has to be done on the pipe itself. The PT-06 series thermometers are not subjected to any kind of process-pressures or chemical influences of the media, increasing their lifespan. To reach the highest efficiency, the use of thermal compund between sensor and pipe is strongly advised.

Technical Specifications:

Sensor /	Pt100 (4-wire) Pt1000 (4-wire) NiCr-Ni
Measuring range /	-50. . .+200 °C
Accuracy /	Pt100 / Pt1000: DIN class B NiCr-Ni: class 1
Sensor material /	aluminium
Cable connection /	silicone cable or rather silicone compensation-cable, loose ends length: 2 m (max. 200 °C) other lengths on request
Protection class /	IP54

Dimensions in mm:



Ordering Codes:

Order number	**PT-06.**	**1.**	**2**

PT-06 Surface-Sensor for pipes

Sensor /
1 = Pt100 (4-wire)
2 = Pt1000 (4-wire)
3 = NiCr-Ni

Cable length L /
1 = 2 m (Standard)
2 = any, please specify in m □□□

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PT-07

Resistance thermometer for Ambient Temperatures



Features

/ Efficient temperature measuring

/ Surface mounted

/ IP66 protection for outside areas

/ Economic alternative

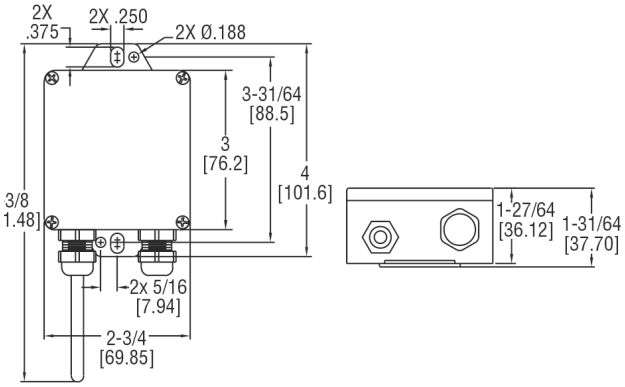
Description:

A Pt100 sensing resistor of accuracy class B is situated in a stainless steel tube, changing its ohmic resistance according to the room temperature present outside the measuring tube. This resistance value is tapped unaltered at the connecting terminals inside the wall-mounted housing of the PT-07, available as a 2-wire signal.

Application:

The resistance thermometer PT-07 supplies an easy way of measuring ambient temperatures and is best used within the fields of building- and climate-technologies. Whenever the room- or ambient-temperature is of concern for a process, it has to be measured accurately. The PT-07 offers a solution for that, while being very cost-effective but still resillient.

Dimensions in inch [mm]:



Technical Specifications:

Accuracy /	Thermistor temperature sensor: ±0.22°C @ 25°C (± 0.4°F @ 77°F); PT100 temperature sensor: DIN class B: ± 0.3°C @ 0°C (±0.54°F @ 32°F)
Operating temperature /	-40. . .+120°C
Probe diameter /	6 mm
Probe length /	88.9 mm
Probe material /	304 SS
Temperature sensor /	Pt100 Class B two wire DIN 385
Mounting /	Suspension or surface
Enclosure /	NEMA 4X (IP66)
Weight /	85 g

Ordering Codes:

Order number	**PT-07.**	**1**

PT-07 Resistance thermometer

Version /

1 = 10 kΩ thermistor, Type III
2 = 10 kΩ thermistor, Type II
3 = 3K Ω
4 = Pt100 Ω RTD
5 = Pt1000 Ω RTD
6 = 20K Ω thermistor

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TD-01

Digital Thermometer



Features

/ Large size LCD-display

/ Optional analogue output

/ Various process connections

/ Completely from stainless steel

/ Protection class IP65

Description:

A temperature-sensitive resistor is located in the stainless steel sensor TD-01, which responds to a change of the upcoming temperature. The electronic modul of the unit evaluates this process and either purely indicates the temperature on a large LCD display. The purely indicating version of the TD-01 is supplied via a 3.6 VDC long life lithium battery and doesn´t need any auxiliary energy. The version with power output however needs a 17 to 30 VDC supply voltage. To connect the TD-01 to the monitored process seven standard threads are available and can even be supplemented by customized versions. The electronic housing of the unit is either rigidly or cable connected to the stem and it is fixed either directly to the measuring spot by means of the process connection or wall or surface mounted by 3-hole flanges and wall brackets.

Application:

With the material-version (wetted parts stainless steel) and an IP65 protection class for the NG100 stainless steel housing, the TD-01 is well prepared for duty in common machine-, apparatus-, tank- or pipe-constructions, as well as in chemical- and food-production. Besides the standard versions (see ordering codes) special versions of the digital thermometer can be manufactured on demand. The advantage of this is that existing measuring points (protective tubes) as well as outdated, defective temperature indicators or transmitters can easily be replaced.

Technical Specifications:

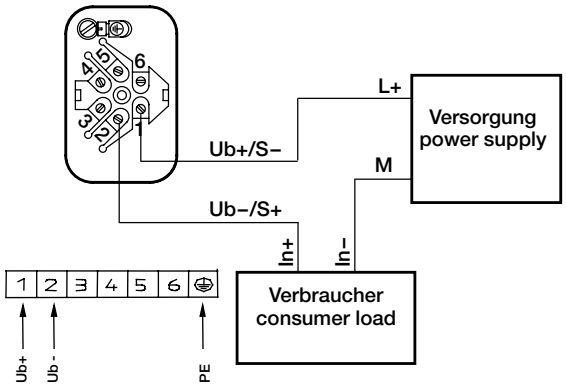
Temp. range /	-200. . .+600°C DIN EN 60751
Ambient temp. /	-10. . .+50°C
Storage temp. /	-20. . .+70°C
Protection class /	IP65 EN 60529
Neck tube /	beginning with medium temperatures of +120°C a 120 mm neck tube is standard (customized version e.g. for thicker pipe or vessel isolations are possible)
Accuracy /	Display: 0,3% FS ± 1 Digit Sensor: ± 0,3K at 0°C; ±(0,3 + 0,005*|t|) Version with transmitter: Pt 100 Class 0,5 Temperature indicator: Pt1000 Class B, DIN EN 60751
Display /	4-digit LCD display, character height 18 mm
Housing /	Ø 100mm, stainless steel 1.4301
Protective tube /	Stainless steel 1.4571
Cable material /	PTFE

Electrical Specifications:

Supply voltage /	Temperature indicator: 3.6 V lithium battery, AA, changeable, life span 5 year (lifespan in months, dep. on use, about 56h cont. operation) Temperature indicator with 2-wire transmitter: 17. . .30 VDC
Power consumption /	P max: 1 W
Output /	4. . .20 mA 2-wire
Load /	Temperature indicator with transmitter: $R_B = (U_B - 17V) / 20$ mA max. R_B = burden, U_B = supply voltage
El. connection /	Cable housing

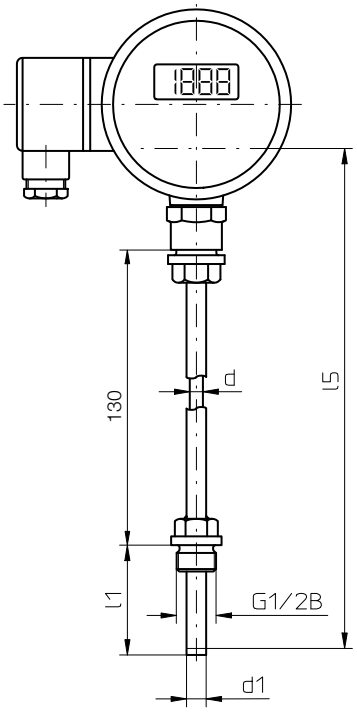
Electrical Connection:

2-Leitersystem / 2 wire-system

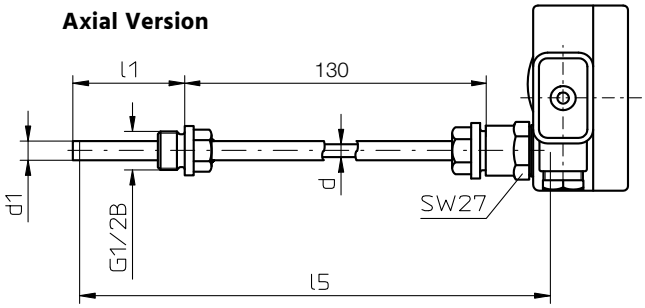


Dimensions in mm:

Vertical Version



Axial Version



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Ordering Codes:

Order number	TD-01.	1.	3.	B.	[].	1.	[].	[].	[].	A.	0.

TD-01 Digital Thermometer

Sensor /
1 = sensor directly mounted to the electronic housing (rigid)
2 = sensor cable mounted to the electronic housing (flexible)

Process connection /
1 = without thread
2 = G 1/2"-AG turnable
3 = G 3/4"-AG turnable
4 = G 1"-AG turnable
5 = M 18 x 1.5 turnable
6 = M 20 x 1.5 turnable
7 = M 24 x 1.5 turnable
8 = M 27 x 1.5 turnable

Version /
A = Batterieversion mit reinem Temperaturanzeiger (Pt1000)
B = Anzeige der Temperatur mit zusätzlichem 4. . .20 mA Ausgang (Pt100)

Insertion length L1 /
□□□□ insertion length from sealing surface in mm

Shaft diameter d1 /
1 = 6 mm
2 = 8 mm
3 = 10 mm

Cable length for flexible sensor /
0 = no cable, connected to the housing
□□□□ = cable length in meter

Temperature range start value /
□□□□ start value in °C (for transmitter = 4 mA)

Temperature range end value /
□□□□ end value in °C (for transmitter = 20 mA)

Mounting position /
F = flexible sensor with cable connection on the side of the electronic housing
A = rigid sensor mounted to the back of the electronic housing
V = rigid sensor mounted to the bottom of the electronic housing

Housing /
0 = standard housing without mounting flange
1 = prepared for wall mounting with separate wall bracket
2 = 3 hole front ring for flush mounting
3 = 3 hole ring at the back for surface mounting

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GT-04

Gas Expansion Thermometer with Nitrogen Filling



Features

/ Housing sizes from 2.5” to 10”
/ Stainless steel housing
/ Directly att. sensor or capillary tube
/ Temperature sensor and process connection, individually configurable
/ Measuring ranges up to +800°C
/ Optionally, alarm or analogue output
/ Measuring acc.: Cl. 1.0 and Cl. 0.6

Description:

The GT-04 series of gas expansion thermometers consists of a housing with integrated movement and a sensor system connected directly or through a capillary tube. The sensors are filled with neutral nitrogen gas that serves as a transmission medium for the temperature data. The nitrogen gas pressure in the sensor system is evaluated by the movement and mechanically displayed.

Application:

Thanks to a wide variety of possible versions, GT-04 gas expansion thermometers can be used in nearly any type of applications where the process temperature needs to be captured locally or by means of a remote display. Moreover, limit contacts, analogue output signals or optionally available temperature recorders enable evaluation of temperature data as well as controlling processes upstream or downstream.

Ordering Codes:

Order number	GT-04.	R.	X.	100.	L.	A.	37.	0.	0.	9x90.	BX1.	0.	0

GT-04 Gas Expansion Themometer

Version (table 1) /
R = with directly mounted sensor
C = with capillary tube
S = special design

Housing material /
X = stainless steel

Housing diameter /
63 = 2.5"(63 mm)
80 = 3" (80 mm)
100 = 4" (100 mm)
160 = 6" (160 mm)
250 = 10" (250 mm)
xxx = special design, please specify in detailed text

Damping /
X = unfilled (standard)
L = with glycerin filling
S = with silicone oil filling
K = with oil filling for devices with built-in limit contacts

Version /
A. . .H = as per table 1

Operating range /
1. . .47 = as per table 2

Capillary tube (in mm) /**
0 = none
X [. . .] = as per table 3
XP [. . .] = as per table 3

Capillary sheathing /
0 = none
SP. . .PB = as per table 4 (only for capillary tube X)

Sensor /
DxL = sensor diameter x sensor length as per table 5

Process connection /
BX1. . .CS3X6 = as per table 6

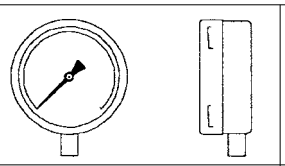
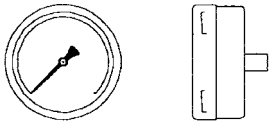
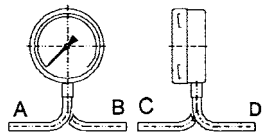
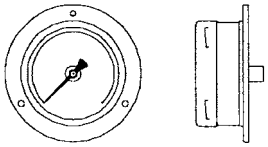
Electrical output signals /
0 = none
M. . .TT2 = as per table 7

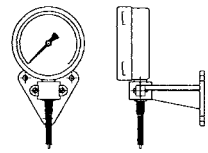
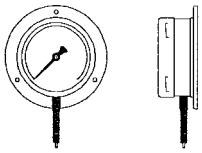
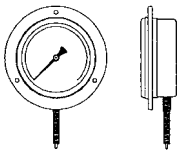
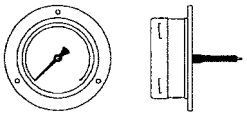
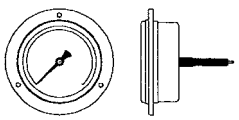
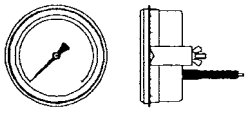
Options /
Multiple naming possible
0 = none
A. . .L = as per table 8

** Example: X [1000] = Capillary tube; Material: stainless steel 1.451; Length: 1000 mm;

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Version (table 1):

with directly mounted sensor		
	connection at the bottom	**A**
	connection at the back, in the center	**E**
	connection at the bottom, at 90° angle (A to D: direction of 90° angle)	**T**
	connection at the back, at the center with rim at the back	**F**

with capillary tube		
	connection at the bottom with wall holder	**A**
	connection at the bottom with rim at the back for surface-mounting	**B**
	connection at the bottom with rim in the front for flush mounting	**D**
	connection at the back with rim at the back	**F**
	connection at the back, in the center with rim in the front	**G**
	connection at the back, eccentric with triangular front ring and U-clamp for flush mounting	**H**

Technical Specifications:

Versions and material /	see the following pages
Limit contacts and analogue outputs /	see table 7
Options /	see table 8
max. Process pressure /	
without protection sleeve:	min. 16 bar (depending on temperature, sensor diameter and length)
with protection sleeve:	25 bar (special designs for higher pressure on request)
min. Sensor length /	see table 5 (shorter lengths on request)

Depending on the medium and the sensor diameter different minimum sensor lengths are recommended.

Example:

Sensor diameter: 10 mm
Medium:
water: L_{min} = 60 mm
oil: L_{min} = 100 mm
air: L_{min} = 160 mm

max. Sensor length /	3 m (greater lengths on request)
max. length of capillary tube /	30 m (greater lengths on request)
Accuracy /	
NG 63, 80, NG 100, 160, 250:	Cl. 1.0
Optional NG 100, 160, 250:	Cl. 0.6
Overload safety /	30 % of operating range end value however, max. +800°C (optionally 100 %)
Protection /	IP65

Versions:

GT-04 Gas Expansion Thermometer

R = Thermometer with directly mounted sensor

C = Thermometer with capillary tube

Materials:

X = housing stainless steel 1.4301, with bayonet ring, IP 65 mineral glass dial, 4 mm aluminium scale, white, lettering black aluminium indicator, black brass movement

Housing diameter:

Nominal size: diameters: 63, 80, 100, 160, 250 mm

Customized designs: (on request) rectangular housing: 72x72, 96x96, 144x144, 192x192, 72x144 vertical or horizontal, 96x192 vertical or horizontal temperature recorder rectangular: 192 x192, 288x288 mm, round: d = 260 mm

Damping:

X = unfilled

L = with glycerin filling for vibration attenuation

S = with silicon oil filling (increased vibration attenuation)

K = with oil filling (for devices with built-in limit contacts)

Sensor:

The temperature sensors are basically made of stainless steel 1.4541. Minimum sensor length is limited by the parameter Ls (see Table 5). This parameter indicates the sensitive part of the sensor which must be immersed into the medium in any case.

While specifying, please use the following format:

Sensor diameter x sensor length (in mm)
Example: 10x200

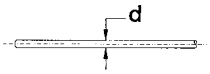
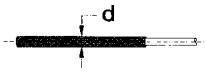
Operating ranges (table 2):

		Scale division in °C		
Nr.	Range in °C	Class 1.0	Class 0.6	Annotation
1	-200. . .+50	5	2	option
2	-120. . .+40	2	1	option
3	-110. . .+50	5	1	option
4	-100. . .+100	5	1	option
5	-100. . .+50	5	1	option
6	-80. . .+40	2	1	option
7	-60. . .+40	2	0.5	option
8	-60. . .+60	2	1	option
9	-50. . .+50	2	0.5	option
10	-40. . .+20	1	0.5	option
11	-40. . .+40	1	0.5	standard
12	-40. . .+60	2	0.5	option
13	-40. . .+80	2	1	option
14	-40. . .+110	5	1	option
15	-40. . .+120	2	0.5	option
16	-40. . .+160	5	1	option
17	-30. . .+30	1	0.5	standard
18	-30. . .+50	1	0.5	option
19	-30. . .+70	2	0.5	option
20	-30. . .+170	5	1	option
21	-20. . .+40	1	0.5	option
22	-20. . .+60	1	0.5	option
23	-20. . .+80	2	0.5	option
24	-20. . .+100	2	1	option
25	-20. . .+120	2	1	option
26	-20. . .+180	5	1	option
27	-15. . .+45	1	0.5	option
30	-10. . .+50	1	0.5	option
31	-10. . .+110	2	1	option
32	-10. . .+150	5	1	option
35	0. . .+60	1	0.5	standard
36	0. . .+80	1	0.5	option
37	0. . .+100	2	0.5	standard
38	0. . .+120	2	1	standard
39	0. . .+160	5	1	standard
40	0. . .+200	5	1	option
41	0. . .+250	5	2	option
42	0. . .+300	5	2	option
43	0. . .+400	10	2	option
44	0. . .+500	10	5	option
45	0. . .+600	10	5	option
46	0. . .+700	10	5	option
47	0. . .+800	10	5	option

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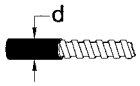
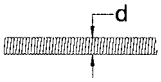
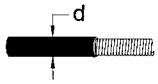
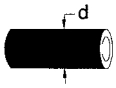
Capillary tube (table 3):

only for GT-04.C...

	Material	d (mm)	$T_{min.}$ (°C)	$T_{max.}$ (°C)	Code
	stainless steel 1.4541	2	-260	800	**X**
	stainless steel with PVC-coating	4	-60	120	**XP**

Capillary sheathing (tab. 4):

only for GT-04.C...

	Material	d (mm)	Tmin. (°C)	Tmax. (°C)	Code
	flexible, stainless steel1.4301 with PVC coating	8	-60	120	**SP**
	flexible, stainless steel 1.4401	7	-260	800	**X**
	flexible, stainless steel 1.4401 with PVC coating	7	-60	120	**XP**
	lead cladding	16	-20	200	**PB**

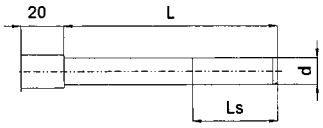
Limit contacts and analogous outputs:

Limit contacts are intended for alerting when certain threshold limits are crossed in either direction. The GT-04 thermometers in housing sizes 4" (100 mm) and 6" (160 mm) as well as the rectangular housing designs can be optionally equipped with up to 4 snap action contacts or inductive contacts integrated into the housing. The contacts will be designed as NO-contact or NC-contact (as the case may be, with reference to increasing temperature). In addition, micro-switches with higher switching load, contacts mounted on the housing or pneumatic contacts can be supplied on request.

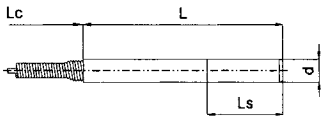
Analogue outputs are meant for transferring the measuring data to higher-level display, evaluation or control systems. Angle of rotation measuring transmitters mounted into the housing or PT-100 measuring transmitters with sensor integrated PT-100 sensor are available.

Sensor dimensions (table 5):

Possible sensor diameter and minimum sensor length Ls (in mm)* (see table)



GT-04.R
sensor directly mounted
min. sensor length:
L = Ls

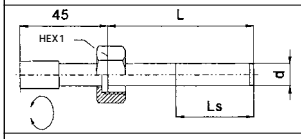
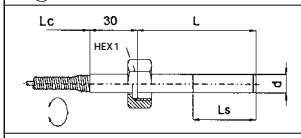
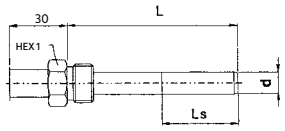
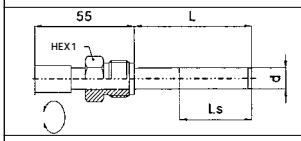
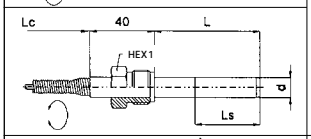
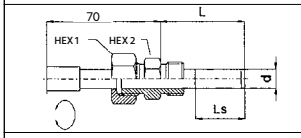
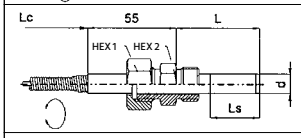
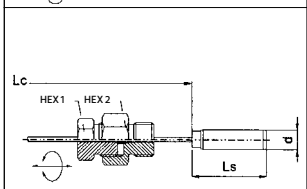
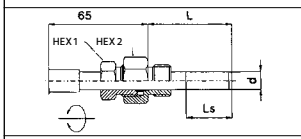
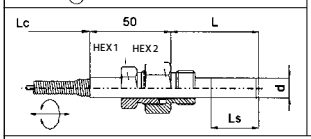


GT-04.C
with capillary tube
min. sensor length:
L = Ls

Sensor Diameter (in mm)	Standard Thermometer: GT-04.R sensor directly mounted	Standard Thermometer: GT-04.C with capillary up to 5 m	Standard Thermometer: GT-04.C with capillary above 5 m	Thermometer with alarm contact: GT-04.R sensor directly mounted	Thermometer with alarm contact: GT-04.C span: 80 °C above 5 m
6	120	---	---	120	---
6.35	96	---	---	96	---
7	80	190	---	80	---
8	60	135	---	60	---
9	45	100	190	45	190
10	35	80	150	35	150
11	30	65	120	30	120
12	25	55	95	25	95
12.5	25	50	90	25	90
13	25	50	90	25	90
14	20	40	70	20	70
15	20	35	60	20	60
16	17	30	55	17	55
18	16	30	50	16	50
20	15	20	43	15	43

* others on request

Process connection (tab. 6):

	Version	Connection	Material stainless steel 1.4301
	with swivel nut for GT-04.R and GT-04.C	1/2" BSP 3/4" BSP 1" BSP	BX1 BX2 BX3
			
	with permanent nipple for GT-04.R and GT-04.C	1/2" BSP 3/4" BSP 1" BSP 1/2" NPT 3/4" NPT 1" NPT	CX1 CX2 CX3 CX4 CX5 CX6
	with turnable nipple for GT-04.R & GT-04.C	1/2" BSP 3/4" BSP 1" BSP	A04X1 A04X2 A04X3
			
	with double nipple and swivel nut for GT-04.R and GT-04.C	1/2" BSP 3/4" BSP 1" BSP 1/2" NPT 3/4" NPT 1" NPT	B01X1 B01X2 B01X3 B01X4 B01X5 B01X6
			
	with double nipple and swivel nut, can be shifted to capillary for GT-04.C	1/2" BSP 3/4" BSP 1" BSP 1/2" NPT 3/4" NPT 1" NPT	CS2X1 CS2X2 CS2X3 CS2X4 CS2X5 CS2X6
	with double nipple and swivel nut, can be shifted to sensor for GT-04.R and GT-04.C	1/2" BSP 3/4" BSP 1" BSP 1/2" NPT 3/4" NPT 1" NPT	CS3X1 CS3X2 CS3X3 CS3X4 CS3X5 CS3X6
			

Other process connections:

Metric threads, aseptic glands, tri-clamp, surface sensors, helical sensors for air etc. on request

Versions (tab. 7):

snap action contacts		AC: 50 VA (max. 250V) DC: 30 W (max. 250V)
x = 1: NO-contact function x = 2: NC-contact function x = 3: change-over	for housing diameters 4", 6", rectangular housing 96x96, 144x144, 72x144 mm	
1 contact	NC-contact or NO-contact, change-over	**Mx**
2 contacts	NC-contact, NO-contact or 2 change-over	**Mxx**
3 contacts	NC-contact or NO-contact not meant for 72x144 housing	**Mxxx**
4 contacts	NC-contact or NO-contact, not meant for 72x144 housing	**Mxxxx**
Inductive contacts as per NAMUR (intrinsically safe contact protecting relay required for operation)		
1 contact	NC-contact or NO-contact	**Ix**
2 contacts	NC-contact, NO-contact	**Ixx**
3 contacts	NC-contact or NO-contact not meant for 72x144 housing	**Ixxx**
Analogue outputs:		
Angle of rotation measuring transmitter with 0. . .100 Ohm, 3-wire output	diameters 100, 160 mm 96x96, 144x144 mm	**R**
PT-100-Measuring transmitters with 4 to 20 mA, 2-wire output, including PT-100 element in the sensor and cable	diameters 100, 160 mm 96x96, 144x144, 72x144 mm	**TT2**

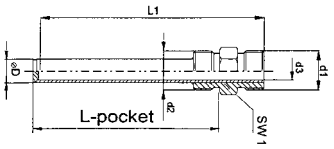
Options (tab. 8):

housing stainless steel 1.4401 instead of 1.4301	for GT-04...X...	**A**
dial made of safety glass		**B**
maximum indicator, can be reset with key	for devices without contact	**C**
maximum indicator, can be reset with key	for devices with contact	**D**
micrometer indicator		**E**
movement and indicator made of stainless steel 1.4301		**F**
double scale °C + °F		**G**
precision measuring version class 0.6	for 6" (160 mm), 10" (250 mm), 144x144, 192x192, 72x144 mm only	**H**
mirror scale	in combination with precision measuring version only for 6" (160 mm), 10" (250 mm) only	**I**
polished sensor		**K**
sensor HALAR coated	max. 1000 mm, max. 200°C	**L**

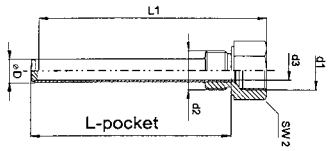
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Stainless steel sensor protection sleeves:

can be used for sensors with A04, B, C and CS3 connections
Versions (Table 9):



TS02...
with male thread
sensor-side



TS03...
with female
thread sensor-side

Typ	**.1**	**.2**	**.3**	**.4**	**.5**	**.6**
max. sensor diameter	10	10	10	12.5	12.5	12.5
L (mm) (min. length)	100	100	100	63	63	63
sensor connection d1 (mm)	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2	G 1/2
Process connection d2 (mm)	**G 1/2**	**G 3/4**	**G 1**	**G 1/2**	**G 3/4**	**G 1**
internal diameter d3 (mm)	10.5	10.5	10.5	13	13	13
external diameter D (mm)	12.5	12.5	12.5	15	15	15
HEX 1 (mm)	22	27	36	22	27	36
HEX 2 (mm)	27	32	36	27	32	36

Parameter L1: for sensor connections B, C, CS3: L1 = sensor length
for sensor connection A04: L1 = sensor length + 15

Example: TS02.2.120 protection sleeve with G1/2-male sensor-side, G 3/4male process-side, length 120 mm, for sensor diameter 10 mm

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BT-01

Bimetallic Thermometer



Features

/ Affordable price

/ Robust

/ Accuracy Class 1.0

/ Bayonet ring housing

/ Many possibilities of connection

/ Switching contacts

Description:

In bimetallic thermometers, varying thermal expansion of metals is utilized to measure and regulate temperatures. A spring element is present in an immersible brass or stainless steel tube that consists of two curved metallic strips rolled over each other, possessing different coefficients of thermal expansion. When the temperature rises the outer metallic strip expands more than the inner strip. The torsion of the spiral resulting from this action directly influences an indicator movement that displays the temperature on a dial.

Application:

The BT-01 series of precision bimetallic thermometers offers an excellent alternative to machine or glass thermometers considering the fact that they are just as cost-effective and accurate as their siblings, however, offer better reading comfort. The design of the bimetallic thermometer is extremely robust and the protection tubes which can be supplied in brass or stainless steel, are resistant to hostile media. These thermometers are available for direct mounting as well as for inserting into protection tubes, optionally with a smooth shaft, permanently fixed threaded stem or swivel nut in all commonly used thread variants. This makes the BT-01 compatible with nearly any type of processes. Starting from a minimum temperature of -50°C up to a maximum temperature of +500°C, the BT-01 series of thermometers is capable of recording a temperature range that covers a large section of all applications.

Versions:

BT-01 Bimetallic Thermometer

Mounting position: The mounting position of BT-01 can be selected between axial and vertical positions. For most of the versions a pivoted housing that can be tilted in both directions is available on request.

Nominal size: The housing diameters can be selected between 63, 80, 100 und 160 mm.

Process connection: All versions are available with smooth shaft, permanently fixed screw on pin, turnable screw on pin or with loose-fitting swivel nut where only the variants with permanently fixed pin can be provided with NPT thread.

Immersion tube diameter: The immersion tube diameters can be selected between 6, 8 and 10 mm to facilitate mounting in protection tube as well as for direct mounting.

Shaft length: The immersion shaft is manufactured as per customer's specification for length which must be indicated in mm from the point of sealing surface.

Neck tube: If the housing and process connection are separated, for example, by means of an insulating layer, the thermometer can be fitted with a neck tube. Normally, these extensions protect the display from extreme axcess heat. The lengths are displayed in a table.

Housing material: St. steel – other materials on request.

Operating range: The operating ranges are between -50°C and +500°C.

Additional features: For all devices marking or maximum value indicators and fluid filled housings are available (for 4" and 6" diameters only).

Connecting thread: With regard to connecting threads various cylindrical or conical thread standards can be selected.

Material: As materials for the immersion tube and thread brass or stainless steel can be selected.

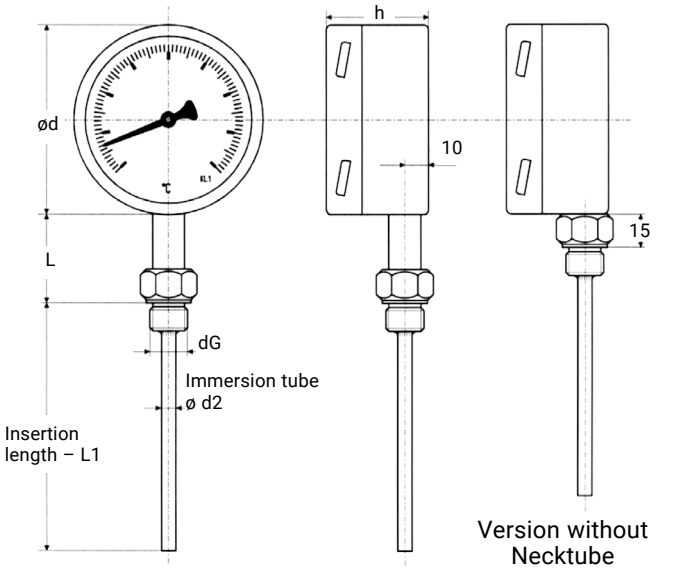
Neck tube lengths (standard):

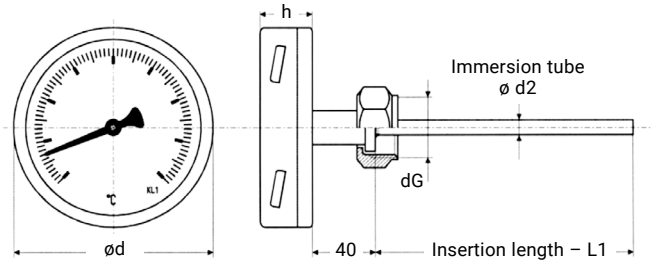
Temperature	Length for vertical thread	Length for axial thread	Length for immersion tube
< 300 °C	37 mm	12 mm	11 mm
> 300 °C	60 mm	37 mm	37 mm
500 °C	-	60 mm	57 mm

Technical Specifications:

Ambient temp. /	-25. . .+70°C
Pressure /	PN16 without immersion tube PN50 with immersion tube
Accuracy /	Class 1 according to DIN EN 13190
Housing /	Bayonet ringcap, 63, 80, 100, or 160 mm diameter
Housing material /	St. Steel 1.4301 – other materials on request
Protection class /	IP 65 according to EN 60529
Options /	· crimped ring housing with/without oil filling · Low-cost-version

Dimensions in mm:





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Ordering Codes:

Order number	BT-01.	A.	F.	80.	2.	1.	[][][][].	1.	E.	04.	B.	2.	1.	0

BT-01 Bimetallic Thermometer

Mounting position /
A = axial
V = vertikal
Z = tilted (special order)

Housing style /
B = bayonet ringcap
F = crimped ring

Nominal size /
63 = 63 mm diameter
80 = 80 mm diameter
100 = 100 mm diameter
160 = 160 mm diameter

Process connection /
1 = smooth shaft
2 = smooth with screw fitting
3 = fixed screw on pin
4 = turnable screw on pin
5 = loose swivel nut

Immersion tube diameter /
1 = 6 mm
2 = 8 mm
3 = 10 mm

Shaft length /
[][][][] please specify shaft length in mm

Neck tube /
1 = standard length (siehe Tabelle)
9 = special lengths on request

Housing material /
E = Stainless steel
9 = other materials on request

Measuring range /
01 = -50...+50 °C
02 = -30...+50 °C
03 = -20...+40 °C
04 = -20...+60 °C
05 = 0...+60 °C
06 = 0...+80 °C
07 = 0...+100 °C
08 = 0...+120 °C
09 = 0...+160 °C
10 = 0...+200 °C
11 = 0...+250 °C
12 = 0...+300 °C
13 = 0...+400 °C
14 = 0...+500 °C
99 = other ranges on request

Additional features /
A = none
B = marking indicator
C = flyback hand indicator with max. value pointer
D = oil filling (up to 200 °C)

Connecting thread /
1 = none (smooth shaft)
2 = G 1/2"
3 = G 3/4"
4 = G 1"
5 = 1/2"-NPT
6 = 3/4"-NPT
7 = M20 x 1,5
8 = M24 x 1,5
9 = special thread (please specify)

Material (immersion tube and thread) /
1 = st. steel

Immersion tube from st. steel /
0 = none
1 = screw-in
2 = weld-on

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MT-01

Industrial Thermometer



Description:

The immersion tube of the MT-01 series of industrial thermometers is either directly in contact with the medium or it is built into a protection tube to counter high processing pressure or chemically hostile environment. Within a short span of time it picks up the medium's temperature and transfers it to a glass capillary in its interior. The fluid filling in the capillary expands proportionally to the temperature. Its height is a reference for the measured temperature which can be read on a burned-in scale with an accuracy of 1% of the range end value.

Features

/ Long scale

/ Robust design

/ Scratch-proof lettering

/ Legible from any direction

/ Straight or angled immersion tube

/ Connectable to any type of protection tubes

Application:

The Profimess MT-01 Industrial Thermometers are deployed where temperatures need to be reliably measured without the use of electrical power. Their top portion is V-shaped and, therefore, can be comfortably read from any angle of view. It consists of brass-coloured anodized aluminium in which the lettering is placed below the anodized layer to ensure maximum mechanical strength. The prismatic capillary in the stem consists of solid glass material with a diameter of approx. 6 mm and has a black burned-in scale which is also absolutely resistant to scratches. The immersion tubes of the MT-01 series are made of brass for media temperatures up to 200°C. Moreover, steel or stainless steel tubes are also used. For special applications like sea-water, different suitable materials can be used.

Versions:

MT-01 Industrial Thermometer

Process connection: The thermometer can be connected to the process or to the protection tube without screw threads by insertion, with threads for screw mounting or by means of a brass swivel nut.

Immersion tube position: The top part and immersion tube are in vertical or rectangular position to each other. A third possibility is aligning it at 135°.

Scaling: The top part of MT-01 can have a single-side Celsius scale or a Celsius and a Fahrenheit scale on the right and left side of the capillary.

Filling: The capillary is white back with a wide, easy-to-read column with blue filling. The graduation is indelibly diffused into the glass. Other capillary fillings are available.

Insertion length: For MT-01 intended for insertion, the insertion length is according to the immersion tune length from "lower edge of the pin" and, in the screw on version and the variant with swivel nut it is the immersion tube length including the thread.

Connecting thread: Different thread types are available for the thread pin of MT-01.2 as well as for the swivel nut of MT-01.3.

Immersion tube material: The screw stems are available in brass, made from one piece, as per DIN Standard type B with threads for mounting lengths up to L1 = 63 mm. They are hard-soldered for other lengths.

Ordering Codes:

Order number	MT-01.	2.	2.	1.	1.	1.	4.	2

MT-01 Industrial Thermometer

Process connection /
1 = plug-in design, no thread (on request)
2 = screw on design
3 = brass swivel nut

Immersion tube position /
1 = immersion tube vertical
2 = immersion tube 90° angled
3 = immersion tube 135° angled

Operating range /
1 = -60. . .+40°C
2 = -30. . .+50°C
3 = 0. . .+60°C
4 = 0. . .+100°C
5 = 0. . .+120°C
6 = 0. . .+160°C
7 = 0. . .+200°C

Graduation /
1 = Celsius (°C)
2 = Celsius and Fahrenheit (°C + F)

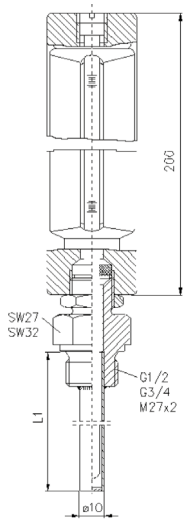
Insertion length /
1 = 40 mm
2 = 50 mm
3 = 63 mm
4 = 100 mm
5 = 160 mm
6 = 250 mm
7 = 400 mm

Connecting thread /
0 = no thread (on request)
1 = G1/2A, SW27
2 = G3/4A, SW32
3 = M20 x 1,5, SW27
4 = M27 x 2, SW32

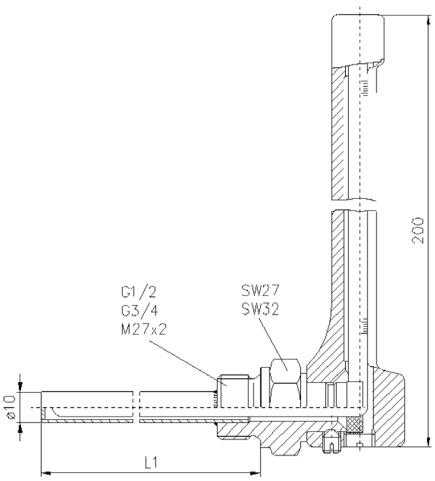
Immersion tube material /
1 = brass
2 = steel
3 = stainless steel 1.4571
4 = CuNi30Mn1Fe

Dimensions in mm:

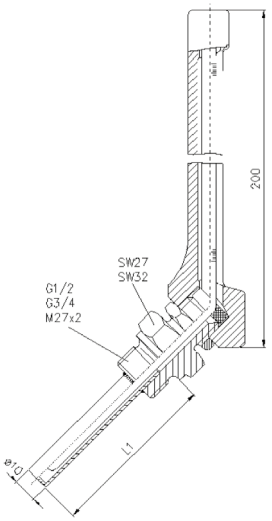
MT-01.2.1



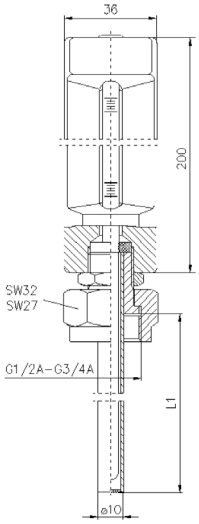
MT-01.2.2



MT-01.2.3



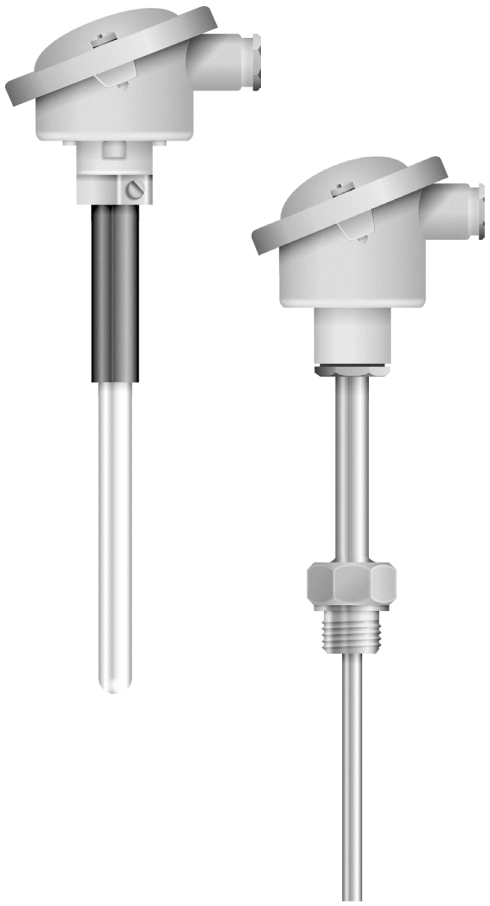
MT-01.3.1



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TE-01

Insertion-Thermocouple



Features

/ Temperatures up to 1600°C

/ Head-mounted measuring transmitter

/ Wide range of thread variants

/ Insertion length as per customer specification

Description:

In thermocouples, the temperature dependence of the electrical voltage between two wires of different materials is utilized to which a setpoint of the temperature to be measured and to which another point of a fixed reference temperature are subjected. In the TE-01 the welded ends of both wires being used are embedded in a metallic or ceramic protection tube which are insulated from each other. The reference point is situated in the connecting head of the device. When the temperature of the measuring point at the tip of the protection tube changes in relation to the reference temperature, a thermal voltage occurs which is proportional to the change in the temperature and the same can be tapped at the connecting head. For foolproof and accurate functioning of the thermoelements, the reference temperature must be constant and 0°C. In case of values like 20. . .50°C, the resulting errors can be balanced by generating a compensation voltage or by taking the ratios in the evaluating software outputs into consideration. However, if the TE-01 is used with a head-mounted measuring transmitter which is capable of converting the thermal voltage directly into a 4. . .20 mA current signal, the compensation will be generated internally and hence minimizes the measuring errors.

Application:

Thermoelements are used in the industry wherever conventional resistance thermometers reach their limitations. This is the case, mostly, if the media temperatures are too high or if space constraints exist. For operating the TE-01, the user has a choice of three mostly used elements (Type J, Type K and Type S) depending on the required working temperature and the extent of the resulting thermal voltage. Normally, only elements belonging to Class 1 are used which ensures the maximum accuracy. Depending on the media temperature and media properties protection tubes made of stainless steel or ceramic can be supplied. A wide range of connection variants offer maximum possible compatibility with the process. Insertion lengths and shaft diameters can be implemented directly according to customer specifications so that the TE-01 can be customized to any point of measurement.

Versions:

TE-01 Thermocouples in Protection Tube

Protection tube: For temperatures up to 800°C protection tubes made of stainless steel can be used. For higher temperatures, we recommend ceramic protection tubes with a metallic support tube that is capable of managing temperatures up to 1600°C.

Process connection: The versions with a metallic protection tube can be supplied with a variety of connecting thread types or with a smooth shaft. Linking to the process can be, for example, by means of a screw in bushing or compression fitting. In the case of variants with ceramic protection tube, the materials like C610 and C799 are available which can be supplied with 15 mm or 24 mm diameters. In this case, the process connection is on the metallic support tube over a stopper flange or a screw in bushing with compression fitting.

Output: Depending on the temperature range and the required thermal voltage, thermoelements of Types J (Fe-CuNi up to 750°C), K (NiCr-Ni up to 1200°C) or S (Pt10Rh-Pt up to 1600°C) are mounted. Other DIN types can be supplied on request. In the versions with integrated head-mounted measuring transmitter the resulting thermal voltage is converted directly into a 4 to 20 mA current signal in 2-wire system.

Insertion length: The insertion length is the length of the shaft from the sealing surface and is manufactured as per the customer specifications.

Shaft diameter: In the case of stainless steel protection tubes the diameters can be selected from 6 mm, 9 mm, 11 mm and 15 mm depending on the conditions of available space. In the case of ceramic protection tubes only 15 mm or 24 mm are used.

Connecting head: Six different connecting heads as per DIN are available. Please refer to "Drawings for connecting heads". For versions with integrated head measuring transmitters, we're using head form B by standard. The connecting head BUZ-H is optional.

Ordering Codes:

Order number	TE-01.	1.	2.	1.	[].	3.	2.	[].	[]

TE-01 Insertion Thermocouple

Protection tube /
1 = screw in version with stainless steel protection tube (up to 800°C)
2 = version with ceramic protection tube (up to 1600°C)

Process connection /
1 = smooth shaft (for version TE-01.1)
2 = G½" (for version TE-01.1)
3 = G¾" (for version TE-01.1)
4 = G1" (for version TE-01.1)
5 = NPT½" (for version TE-01.1)
6 = NPT¾" (for version TE-01.1)
7 = M18 x 1.5 (for version TE-01.1)
8 = M20 x 1.5 (for version TE-01.1)
9 = M27 x 2 (for version TE-01.1)
10 = Protection tube 15x2 of C610 capable up to 1500°C (for version TE-01.2), support tube 200 mm 22x2
11 = Protection tube 15x2 of C799 capable up to 1600°C (for version TE-01.2), support tube 200 mm 22x2
12 = Protection tube 24x2.5 of C610 capable up to 1500°C (for version TE-01.2), support tube 200 mm 32x2
13 = Protection tube 24x2.5 of C799 capable up to 1600°C (for version TE-01.2), Support tube 200 mm 32x2

Output /
1 = Type J (Fe-CuNi) as per DIN IEC 584 (up to 750 °C)
2 = Type K (NiCr-Ni) as per DIN IEC 584 (up to 1200 °C)
3 = Type S (Pt10Rh-Pt) as per DIN IEC 584 (up to 1600 °C)
4 = Type J (Fe-CuNi) with head-mounted transmitter
5 = Type K (NiCr-Ni) with head-mounted transmitter
6 = Type S (Pt10Rh-Pt) with head-mounted transmitter

Insertion length /
□□□□ Shaft length from sealing surface in mm

Shaft diameter of stainless steel protection tube /
1 = 6 mm
2 = 9 mm
3 = 11 mm
4 = 15 mm
5 = Ceramic protection tube

Connecting head /
1 = Form A (standard for ceramic protection tube)
2 = Form B (standard for stainless steel protection tube)
3 = Form BUZ (DAN)
4 = Form BUZ-H (DANW) (standard for head-mounted transmitter)
5 = Form BEG
6 = Form GG

Temperature range /
□□□□ Initial value

Temperature range /
□□□□ End value

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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

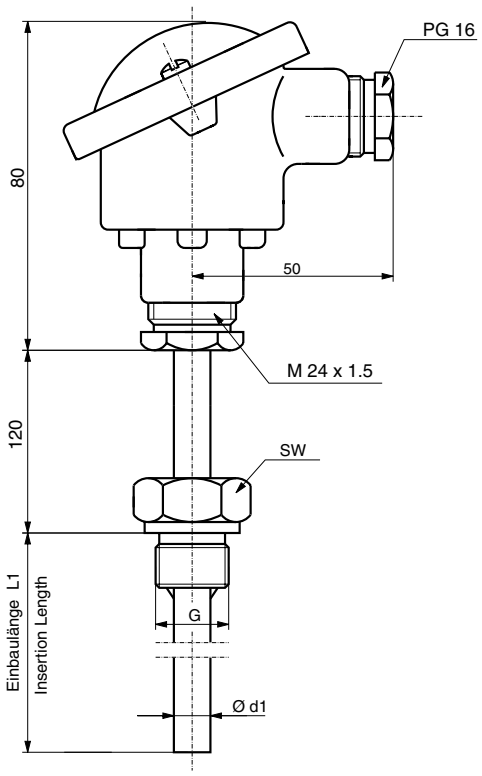
Technical Specifications:

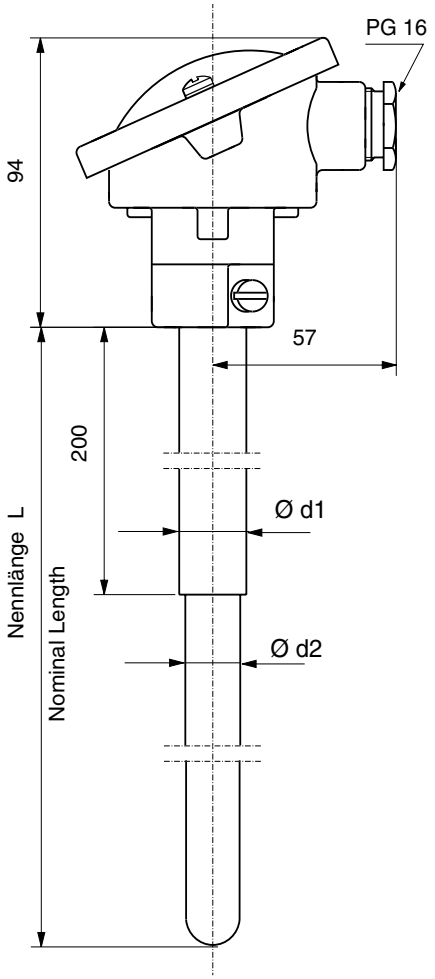
Pressure /	max. 6 bar for stainless steel protection tube (insertion into high-pressure protection tubes possible) pressureless for ceramic protection tube
Temperature /	max. 70°C at the connecting head for head-mounted transmitter
Neck tube /	120 mm (standard)
Temp. range /	up to 1600°C
Material /	Measuring unit: <600 °C: st. steel 1.4571 >600 °C: Inconel 600 2.4816 Protection tube: <600 °C: st. steel 1.4571 >600 °C: st. steel 1.4749
Accuracy /	Class 1 as per DIN IEC 584
El. Connection /	ceramic connection terminal in connection head
Process Connection /	stopper flange, welded or screw in bushing

Electrical Specifications:

Supply voltage /	24 VDC (for head transmitter)
Output /	Typ J, Typ K, Typ S or 4. . .20 mA
Protection class /	IP65

Dimensions in mm:

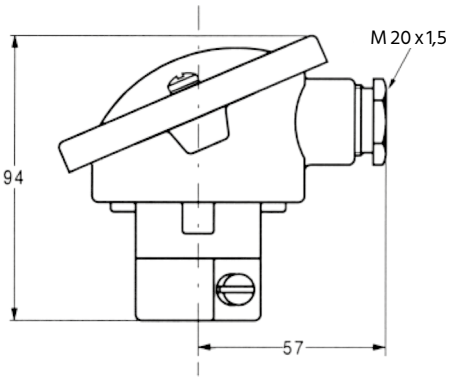




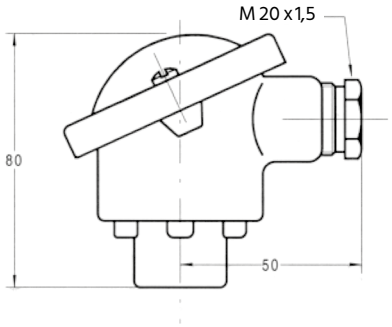
ø d2/ceramic	ø d1/tube
15 mm	22 mm
24 mm	32 mm

Connecting Heads for Insertion-Thermocouples:

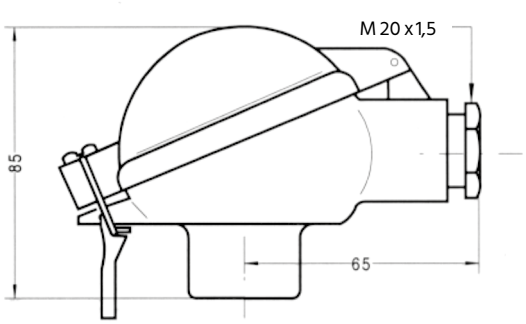
Form A – cover with 2 fastening screws
Material: aluminium pressure casting



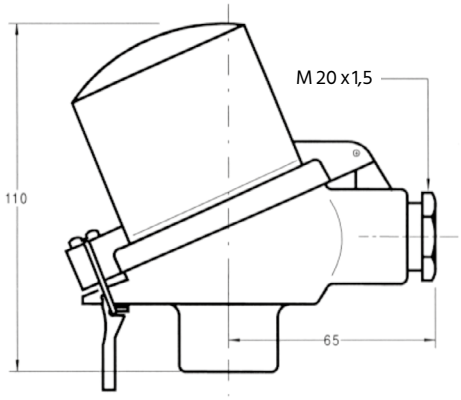
Form B – cover with 2 fastening screws
Material: aluminium pressure casting



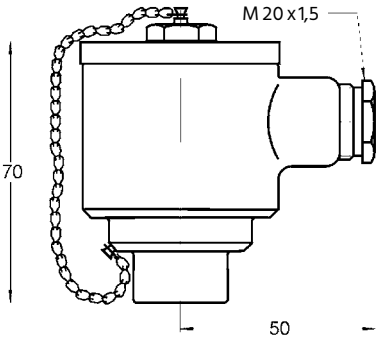
Form BUZ (DAN) – flap cover with bracket
Material: aluminium pressure casting



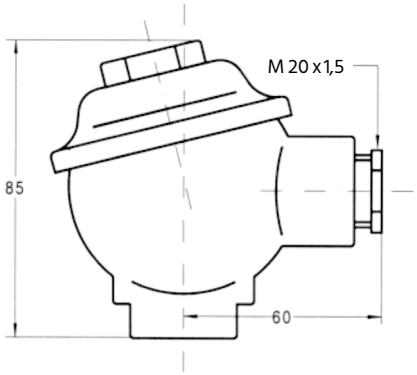
Form BUZ-H (DANW) – high flap cover with bracket Material: aluminium pressure casting



Form BEG – screw cap with chain
Material: stainless steel 1.4571



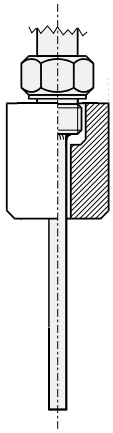
Form GG – cover with screw closure
Material: steel/cast iron



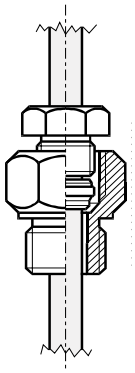
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Possibilities of Installation for Insertion-Thermocouples:

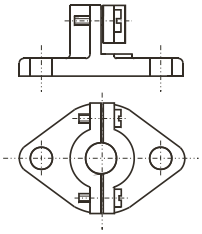
welded bushing for male thread



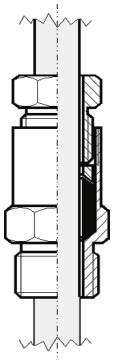
compression fitting for screwing in for smooth shaft



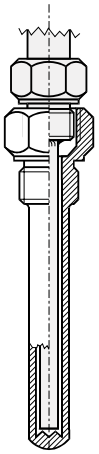
stopper flange for ceramic protection tube



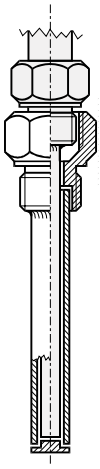
screw in bushing for ceramic protection tube



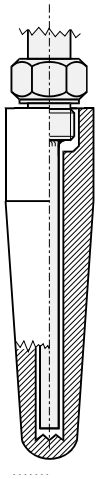
screw in protection tube for male thread, one-piece



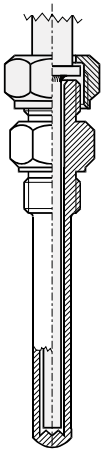
screw in protection tube for male thread, multi-piece



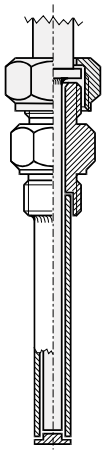
weld in protection tube for male thread



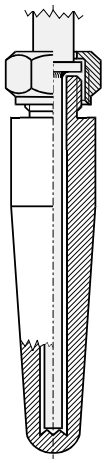
screw in protection tube for swivel nut, one-piece



screw in protection tube for swivel nut, multi-piece



weld in protection tube for swivel nut

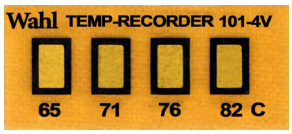


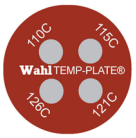
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fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

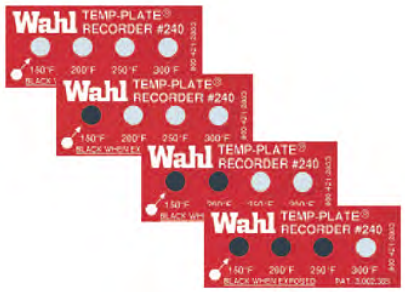
TA-17

Temperature-Labels for recording of overheating









Features

/ More security

/ Economic alternative

/ Secure documentation

/ Proof for warranty issues

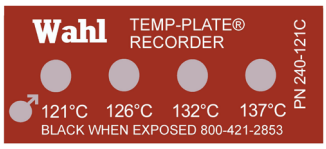
Description:

The self-adhesive temperature-labels Type TA-17 possess temperature-sensitive elements. On reaching the corresponding nominal temperature, they change their colour irreversibly. They can be chosen from a wide range of temperatures and special, resilient versions for harsher environments. The labels are manufactured and tested with a high quality in mind, after the NIST-standard (U.S.-Industry standard). Therefore, the TA-17 labels are superior in quality compared to the majority of other temperature-labels.

Application:

The temperature labels are directly applied to the object to be monitored. They are resilient against solvents, fuels, fats, oils, water and vaporized water. Irreversible labels are being used to rule out a sole and exclusive fault in warranty cases. They protect hydraulic systems, eletrical and mechanical equipment in an economic manner. Process temperatures can quickly be proved or measuring devices checked for accuracy. Lower temperature labels should be cooled until applied, to prevent an early discolouration through environmental influences. Because of the additional logistic requirements, all models with a working temperature of 48°C or less will be only available in reasonable quantities.

Standard Temperature-Labels:



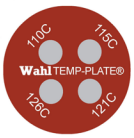
Standard-four

19 x 44 mm
A-Code: 400-



Mini-four

10 x 21 mm
A-Code: 401-



Mini-four round

Ø 14 mm
A-Code: 402-



Micro-four

3 x 11 mm
A-Code: 403-



Micro-four round

Ø 6 mm
A-Code: 404-



Neutral

Neutral labels have no temperature indicators, but each box comes with a chart, displaying the corresponding temperatures, thus preventing external manipulation.

Ø 6 mm
A-Code: 440-

Stand. A-Code	Mini A-Code	Mini round A-Code	Micro A-Code	Micro round A-Code	Neutral A-Code	B-Code	°C
400-					440-	-032F	32-37-43-48
400-					440-	-033F	32-35-37-41
400-	401-	402-	403-	404-	440-	-037F	37-43-48-54
400-	401-	402-	403-	404-	440-	-038F	37-48-60-71
400-	401-	402-	403-	404-	440-	-043F	43-48-54-60
400-	401-	402-	403-	404-	440-	-048F	48-60-71-82
400-	401-	402-	403-	404-	440-	-060F	60-71-82-93
400-	401-	402-	403-	404-	440-	-061F	60-82-104-126
400-	401-	402-	403-	404-	440-	-065F	65-71-76-82
400-	401-	402-	403-	404-	440-	-066F	65-93-121-148
400-	401-	402-	403-	404-	440-	-071F	71-82-93-104
400-	401-	402-	403-	404-	440-	-072F	71-76-82-87
400-	401-	402-	403-	404-	440-	-076F	76-82-87-93
		402-			440-	-077F	76-93-110-126
		402-			440-	-078F	76-98-110-132
		402-			440-	-079F	76-93-104-132
400-	401-	402-	403-	404-	440-	-082F	82-93-110-121
400-	401-	402-	403-	404-	440-	-087F	87-93-98-104
400-	401-	402-	403-	404-	440-	-093F	93-98-104-110
400-	401-	402-	403-	404-	440-	-094F	93-104-115-126
400-	401-	402-	403-	404-	440-	-095F	93-121-148-176
400-	401-	402-	403-	404-	440-	-110F	110-115-121-126
400-	401-	402-	403-	404-	440-	-121F	121-126-132-137
			403-		440-	-126F	126-132-137-143
400-	401-	402-	403-		440-	-132F	132-137-143-148
400-	401-	402-	403-	404-	440-	-137F	137-148-160-171
400-	401-	402-	403-	404-	440-	-154F	154-160-165-171
400-	401-		403-		440-	-176F	176-182-187-193
400-	401-		403-		440-	-177F	176-204-232-260
400-	401-		403-		440-	-182F	182-193-204-215
400-	401-		403-		440-	-198F	198-204-210-215
400-	401-		403-		440-	-199F	198-210-223-232
400-	401-		403-		440-	-215F	215-223-232-240
400-	401-		403-		440-	-223F	223-232-240-254

Ordering Codes:

Order number	TA-17.	A - B
TA-17 Temperature-Labels		
Article-Codes / Combine Codes A and B: eg. **443-037C** or **441-154F** **always 10 labels per box, if not mentioned otherwise!**		

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Mini-eight

10 x 38 mm
A-Code: 800-

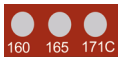
B-Code	°C
-043A	43-48-54-60-65-71-76-82
-087A	87-93-98-104-110-115-121-126
-132A	132-137-143-148-154-160-165-171
-176A	176-187-198-210-223-232-240-260



Mini-six

10 x 29 mm
A-Code: 600-

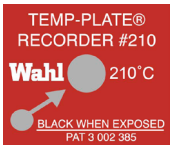
B-Code	°C
-043B	43-48-54-60-65-71
-076B	76-82-87-93-98-104
-110B	110-115-121-126-132-137
-143B	143-148-154-160-165-171
-176B	176-182-187-193-198-204
-215B	215-223-232-240-248-260



Micro-three

3 x 8 mm
A-Code: 300-

B-Code	°C
-043D	43-48-54
-060D	60-65-71
-076D	76-82-87
-082D	82-93-104
-093D	93-98-104
-104D	104-115-121
-110D	110-115-121
-121D	121-126-132
-126D	126-132-137
-143D	143-148-154
-160D	160-165-171



Standard-single

25 x 19 mm
A-Code: 210-

B-Code	°C
-043E	43
-054E	54
-071E	71



Mini-single

Ø 14 mm
A-Code: 110-
(20 labels per box)

B-Code	°C	B-Code	°C	B-Code	°C
-038S	38	-104S	104	-182S	182
-041S	41	-110S	110	-188S	188
-043S	43	-116S	116	-193S	193
-046S	46	-121S	121	-199S	199
-049S	49	-127S	127	-204S	204
-054S	54	-132S	132	-210S	210
-060S	60	-138S	138	-216S	216
-066S	66	-143S	143	-224S	224
-071S	71	-149S	149	-232S	232
-077S	77	-154S	154	-241S	241
-082S	82	-160S	160	-249S	249
-088S	88	-166S	166	-254S	254
-093S	93	-171S	171	-260S	260
-099S	99	-177S	177		

Robust Temperature Labels:

These labels are maufactured to be very resilient and can withstand even high temperatures, vacuum areas und corrosive gases. Therefore, they are used best within semiconductor environments.



Mini-four round

Ø 14 mm
A-Code: 405-

B-Code	°C	B-Code	°C	B-Code	°C
-037C	37-43-48-54	**-076C**	76-82-87-93	**-154C**	154-160-165-171
-038C	37-48-60-71	**-082C**	82-93-110-121	**-176C**	176-182-187-193
-043C	43-48-54-60	**-087C**	87-93-98-104	**-177C**	176-204-232-260
-048C	48-60-71-82	**-093C**	93-98-104-110	**-182C**	182-193-204-215
-060C	60-71-82-93	**-094C**	93-104-115-126	**-198C**	198-204-210-215
-061C	60-82-104-126	**-095C**	93-121-148-176	**-199C**	198-210-223-232
-065C	65-71-76-82	**-110C**	110-115-121-126	**-215C**	215-223-232-240
-066C	65-93-121-148	**-121C**	121-126-132-137	**-223C**	223-232-240-254
-071C	71-82-93-104	**-132C**	132-137-143-148		
-072C	71-76-82-87	**-137C**	137-148-160-171		



Mini-four

10 x 21 mm
A-Code: 406-

B-Code	°C	B-Code	°C	B-Code	°C
-037VQ	37-43-48-54	**-072VQ**	71-76-82-87	**-132VQ**	132-137-143-148
-038VQ	37-48-60-71	**-076VQ**	76-82-87-93	**-137VQ**	137-148-160-171
-043VQ	43-48-54-60	**-082VQ**	82-93-110-121	**-154VQ**	154-160-165-171
-048VQ	48-60-71-82	**-087VQ**	87-93-98-104	**-176VQ**	176-182-187-193
-060VQ	60-71-82-93	**-093VQ**	93-98-104-110	**-177VQ**	176-204-232-260
-061VQ	60-82-104-126	**-094VQ**	93-104-115-126	**-198VQ**	198-204-210-215
-065VQ	65-71-76-82	**-095VQ**	93-121-148-176	**-199VQ**	198-210-223-232
-066VQ	65-93-121-148	**-110VQ**	110-115-121-126	**-223VQ**	223-232-240-254
-071VQ	71-82-93-104	**-121VQ**	121-126-132-137		



Micro-four

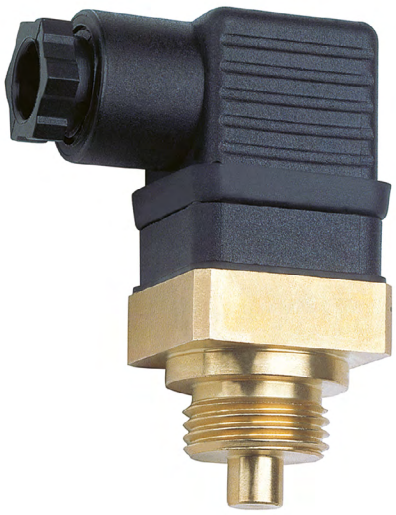
5 x 16,5 mm
A-Code: 407-

B-Code	°C	B-Code	°C
-043VC	43-48-54-60	**-115VC**	115-121-126-132
-065VC	65-71-76-82	**-132VC**	132-137-143-148
-087VC	87-93-98-104	**-154VC**	154-160-165-171
-110VC	110-115-121-126	**-176VC**	176-182-187-193

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TS-01

Temperature Switch



Description:

A fully compound-filled bimetallic thermostat is embedded in a fitting from brass or stainless steel. The thermostat has a temperature value set at the factory. On reaching this temperature when the sensor is fully immersed into the medium, the switch connects either as a NO-contact or a NC-contact between pins 1 and 2 of the DIN plug which is included in the delivery. On request, the plug can be provided with an additional LED which will display the switching status.

Features

/ Any mounting position

/ Compact design

/ Brass or stainless steel

/ Cost-effective

Application:

As a temperature switch, the TS-01 is unbeatable in its simplicity.
It is widely used in various applications and it is capable of reliably monitoring temperatures with fixed switch- and return points in the narrowest of space at a very affordable price. The version made of stainless steel 1.4305 is resistant to a number of extremely hostile media, thus making the TS-01 ideally suited for applications in the chemical and petrochemical industries without any problem.

Versions:

TS-01 Temperature Switches

Sensor material: Optionally the TS-01 is available in brass or stainless steel versions

Switching values: The switching point can be freely selected between 40 to 120°C at intervals of 10°C

Contact function: The TS-01 can be supplied as NC or NO.

Materials: Ni-plated brass CW614N or stainless steel 1.4305, plug material PA 6.6, NBR

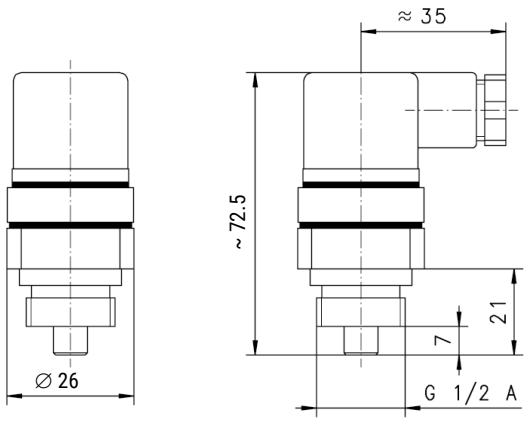
Technical Specifications:

Connection /	G1/2"-male (G3/4"-male on request)
Pressure /	PN100
Hysteresis /	10K to 20K
Tolerance /	+/-10K
Weight /	0.12 kg
Mounting /	sensor should be fully covered from media in front

Media temperature /

Switch	Media temperature
40 °C	- 20. . .+90 °C
50 °C	-20. . .+100 °C
60 °C	-20. . .+110 °C
70 °C	-20. . .+120 °C
80 °C	-20. . .+130 °C
ab 90 °C	-20. . .+140 °C

Dimensions in mm:



Electrical Specifications:

Electrical connection /	plug connection DIN 43650-A (plug type "Hirschmann")
Protection class /	IP65
Switching load /	250 VAC, 10 A
Media /	e.g. water, gas/air, oil
Option /	Tolerance selection from smaller hysteresis up to 10K

Ordering Codes:

Order number	**TS-01.**	**1.**	**[50].**	**1**

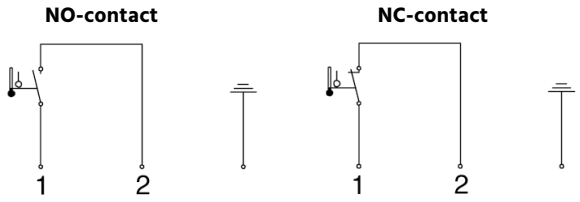
TS-01 Temperature Switch

Sensor material /
1 = brass
2 = stainless steel (on request)

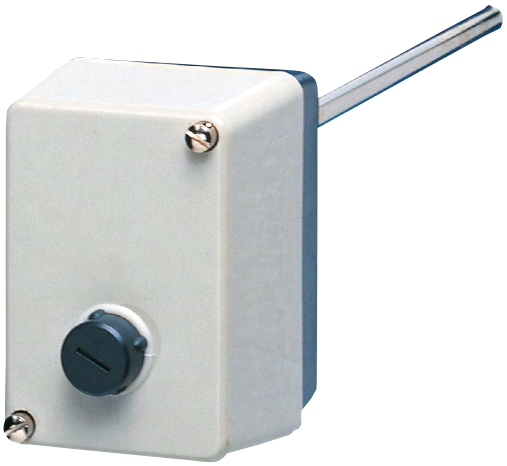
Setpoint in °C /
[040]
[050]
[060]
in 10°C steps up to 120°C
[120]

Contact function /
1 = NO-contact
2 = NC-contact

Electrical Connection:



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TS-03

Surface-Mounting Thermostat with Rigid or Flexible Connection

Features

/ Switch, controller or limiter

/ Optionally with safety engineering

/ Temperatures up to +500°C

/ Gas or fluid-filled

/ Brass, steel or stainless steel protection tube

Description:

Thermostats belonging to the TS-03 series are universally applicable temperature switches which, according to the mounted evaluating unit, are designed as temperature switches, temperature controllers or temperature limiters. The limiter and switch versions can also be supplied with safety engineering which means that, in the event of a defect in the measuring system in the TS-03, an a alarm signal triggers and cannot be reset again. Any contamination in the medium under surveillance with the filling in the TS-03 cannot escape undetected under any circumstances. In this, the principle of measuring is simple but very reliable. A fluid or gas is located within the sensor system of the TS-03 depending on the control range. When the temperature rises the filled medium expands. In turn, a micro-switch is activated by means of a mechanical transmission system on reaching the limiting temperature. Depending on the design as a controller, switch or limiter, this switch acts as a change-over or NC-contact which reverts to the initial position either automatically on returning to normal temperature value or manually by releasing the appropriate button. The TS-03 series is available with a rigid or flexible connection so that they can be directly screw mounted into the process or also installed away from the process. The delivery for thermostats with rigid connection includes suitable brass protection tubes, other materials and lengths are available.

Application:

Thermostats belonging to the TS-03 series are used wherever any fluid or gaseous medium needs to be reliably monitored for reaching a limiting temperature. The micro-switch used is capable of processing high degree of switching performance and, therefore, capable of switching pumps, magnetic valves or heating rods directly. Thanks to the wide range of connection variants designed for universal application of brass, steel or stainless steel protection tubes including rigid or flexible versions and the various temperature ranges up to +500°C, the limits for the TS-03 are very far fetched which has enabled the devices to achieve a strong market penetration.

Versions:

TS-03 Surface-Mounting Thermostat

Temperature controller: If the media temperature at the sensor of the temperature controller exceeds the externally adjustable limiting temperature, the micro-switch is actuated by means of the transmission mechanism and the power circuit gets opened or closed. On dropping below the limit (by hysteresis) the micro-switch is reset automatically to initial position.

Temperature switch: If the media temperature at the sensor of the temperature controller exceeds the limiting temperature adjustable internally by means of a screw-driver, the micro-switch is actuated by means of the transmission mechanism and the power circuit gets opened or closed. On dropping below the limit (by hysteresis) the micro-switch is reset automatically to initial position.

Safety temperature switch: If the media temperature at the safety temperature switch exceeds the limiting temperature adjustable internally by means of a screw-driver, the micro-switch is actuated by means of the transmission mechanism and the power circuit gets broken or closed. On dropping below the limit (by hysteresis) the micro-switch is reset automatically to initial position. In case of possible damage to the measurement system, that is, if the expansion fluid escapes, the pressure in the diaphragm drops and opens the power circuit continuously. Unlocking will no longer be possible. Similarly, if the sensor cools down to below approx. -20°C the power circuit gets opened. Subsequently, on reaching a temperature above approx. -20°C the power circuit is gets closed automatically.

Safety temperature limiter: If the media temperature at the safety temperature limiter exceeds the limiting temperature adjustable internally by means of a screw-driver, the micro-switch is actuated by means of the transmission mechanism and the power circuit gets opened or closed. On dropping below the limit (by hysteresis) the micro-switch is reset automatically to initial position. In case of possible damage to the measurement system, that is, if the expansion fluid escapes, the pressure in the diaphragm drops and interrupts the power circuit continuously. Unlocking will no longer be possible. Similarly, if the sensor cools down below approx. -20°C, the power circuit gets opens. Subsequently, on reaching a temperature above approx. -20°C the safety temperature limiter must be unlocked manually.

Ordering Codes:

Order number	**TS-03.**	**[-][T][R][S][1][6]**
TS-03 Surface-Mounting Thermostat		
Version as per table 1 (rigid shaft) or table 2 (flexible cord) / [ ][ ][ ][ ][ ] e.g TRS16 for temperature controller, rigid shaft 8 x 100 mm stainless steel, 20. . .150°C, G1/2"		

Technical Specifications:

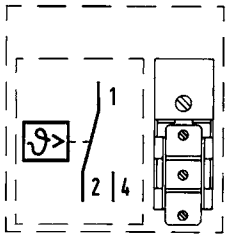
Control ranges /	see tables 1 and 2
Filling /	up to +350°C end value of the control range fluid, above this gaseous
Housing /	cover polycarbonate unbreakable, colour pebble gray RAL 7032, bottom part aluminium pressure casting painted, colour anthracite gray RAL 7015
Capillary material /	up to +350°C end value of the control range copper (CU-DHP), (Ø 1,5 mm) above this stainless steel 1.4571
Sensor material /	up to +200°C end value of the control range copper (CU-DHP), above this up to +350°C end value of the control range stainless steel 1.4571 hard soldered, above this stainless steel 1.4571 welded
Capillary length /	see table 2 (liquid filled – max. 5000 mm)
Bending radius of capillary /	max. 5 mm
Ambient temp. /	max. +80°C
Storage temperature /	-50°C. . .+80°C
Accuracy /	
TR, TW	± 1.5% in the upper 1/3 of the scale ± 6% at the start of scale
STW, STB	+ 0/-5% in the upper 1/3 of the scale + 0/-10% at the start of scale
Hysteresis /	see tables 1 and 2
Temperature error in rigid connection /	
TR, TW	0.08% / K for operating range: < +200°C 0.06% / K for operating range: > +200°C ≤ +350°C 0.14% / K for operating range: > +350°C ≤ +500°C in deviations of +22°C ambient temperature
STW, STB	0.17% / K for operating range: < +200°C 0.13% / K for operating range: > 200°C < +350°C 0.12% / K for operating range: > +350°C ≤ +500°C in deviations of +22°C ambient temperature

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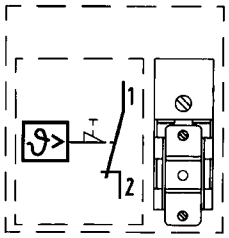
Additional temperature error in flexible connection /

TR, TW	0.047% / K for operating range: < +200°C 0.09% / K for operating range: > +200°C ≤ +350°C 0.04% / K for operating range: > +350°C ≤ +500°C in deviations of +22°C ambient temperature, per meter of capillary
STW, STB	0.054% / K for operating range: < +200°C 0.11 % / K for operating range: > +200°C ≤ +350°C 0.03% / K for operating range: > +350°C ≤ +500°C in deviations of +22°C ambient temperature, per meter of capillary
Process connect. /	see Tables 1 and 2
Typ A	plain cylindrical probe
Typ U	protective sleeve for screw mounting
Typ UZ	protective sleeve for screw mounting with intermediate piece
Typ UZO	protective sleeve for screw mounting with intermediate piece, open
Typ ES	welding sleeve for swivel nut, conical
Typ EZS	welding sleeve for swivel nut with intermediate piece, conical
Rated position /	as per DIN 16 257, NL 0. . .NL 90
Weight /	approx. 0.5 kg

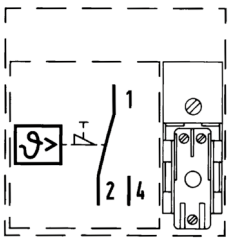
Electrical Connection:



TR
TW
STW



STB



STBxS

Electrical Specifications:

Connect. element /

TR, TW, STW	micro-switch with change-over contact
STB	micro-switch with NC-contact and restart lock
STBxS	micro-switch with NC-contact, restart lock and additional signal contact
Switching load /	for hysteresis > 2% max. 230 VAC +10%, 10 (2) A, cos Phi = 1 (0.6) or max. 230 VDC +10%, 0.25 A for hysteresis ≤ 2% max. 230 VAC +10%, 6 (1.2) A, cos Phi = 1 (0.6)
Cable insertion /	choke nipple M20 x 1.5 for 8. . .10 mm cable diameter
Protection class /	IP54

Table 1

Version Code	Shaft	Function	Control range in °C	Hysteresis in %	Process connection	Imm. tube Ø x length [mm]
TRS01	rigid	TR	-10°C. . .+40°C	3-4	U G1/2"	8 x 200
TRS03	rigid	TR	0°C. . .50°C	1.5	U G1/2"	15 x 100 CrNi
TRS09	rigid	TR	0°C. . .100°C	3-4	U G1/2"	8 x 120
TRS10	rigid	TR	0°C. . .100°C	3-4	U G1/2"	8 x 120 CrNi
TRS11	rigid	TR	0°C. . .100°C	3-4	U G1/2"	8 x 150
TRS12	rigid	TR	0°C. . .100°C	1.5	U G1/2"	8 x 200
TRS13	rigid	TR	0°C. . .100°C	3-4	U G1/2"	8 x 200
TRS16	rigid	TR	20°C. . .150°C	3-4	U G1/2"	8 x 100
TRS18	rigid	TR	20°C. . .150°C	3-4	U G1/2"	8 x 200
TRS19	rigid	TR	20°C. . .150°C	3-4	U G1/2"	8 x 300
TRS20b	rigid	TR	50°C. . .200°C	3-4	UZ G1/2"	8 x 200 CrNi
TRS21	rigid	TR	50°C. . .300°C	3-4	UZ G1/2"	8 x 150 CrNi
TRS22b	rigid	TR	20°C. . .500°C	5	UZ G1/2"	8 x 200 CrNi
TWS01	rigid	TW	-10°C. . .+40°C	3-4	U G1/2"	8 x 200
TWS03	rigid	TW	0°C. . .50°C	1.5	U G1/2"	15 x 100 CrNi
TWS04	rigid	TW	0°C. . .50°C	3-4	U G1/2"	8 x 200
TWS06	rigid	TW	20°C. . .90°C	1.5	U G1/2"	15 x 100
TWS07	rigid	TW	20°C. . .90°C	6-8	U G1/2"	15 x 100
TWS08	rigid	TW	20°C. . .90°C	3-4	U G1/2"	8 x 150
TWS10	rigid	TW	0°C. . .100°C	3-4	U G1/2"	8 x 120
TWS11	rigid	TW	0°C. . .100°C	3-4	U G1/2"	8 x 120 CrNi
TWS12	rigid	TW	0°C. . .100°C	3-4	U G1/2"	8 x 150
TWS13	rigid	TW	0°C. . .100°C	3-4	U G1/2"	8 x 200
TWS14	rigid	TW	0°C. . .100°C	3-4	U G1/2"	8 x 300
TWS16	rigid	TW	20°C. . .150°C	3-4	U G1/2"	8 x 100
TWS17	rigid	TW	20°C. . .150°C	3-4	U G1/2"	8 x 100 CrNi
TWS18	rigid	TW	20°C. . .150°C	3-4	U G1/2"	8 x 200
TWS19	rigid	TW	20°C. . .150°C	3-4	U G1/2"	8 x 200 CrNi
TWS20	rigid	TW	20°C. . .150°C	3-4	U G1/2"	8 x 300
TWS21	rigid	TW	50°C. . .200°C	3-4	UZ G1/2"	8 x 120 CrNi
TWS22	rigid	TW	50°C. . .200°C	3-4	UZ G1/2"	8 x 200 CrNi
TWS25	rigid	TW	50°C. . .300°C	3-4	UZ G1/2"	8 x 150 CrNi
TWS26	rigid	TW	20°C. . .500°C	5	UZ G1/2"	8 x 200 CrNi
STWS01	rigid	STW	20°C. . .150°C	4-6	U G1/2"	8 x 150
STWS02	rigid	STW	50°C. . .300°C	5	UZ G1/2"	8 X 200 CrNi
STWS03	rigid	STW	50°C. . .350°C	4-6	EZS G3/4"	170 steel conical
STWS04	rigid	STW	20°C. . .500°C	7	UZO G1/2"	8 X 200 CrNi
STBS01	rigid	STB	30°C. . .110°C	-	U G1/2"	8 x 150
STBS02	rigid	STB	30°C. . .110°C	-	U G1/2"	8 x 200
STBS03	rigid	STB	30°C. . .110°C	-	U G1/2"	8 x 300
STBS04	rigid	STB	60°C. . .130°C	-	U G1/2"	8 x 150
STBS05	rigid	STB	60°C. . .130°C	-	U G1/2"	8 x 200
STBS06	rigid	STB	20°C. . .150°C	-	U G1/2"	8 x 200
STBS07	rigid	STB	130°C. . .200°C	-	UZ G1/2"	8 x 150 CrNi
STBS08	rigid	STB	130°C. . .200°C	-	UZ G1/2"	8 x 300 CrNi
STBS09	rigid	STB	50°C. . .300°C	-	UZ G1/2"	8 x 200 CrNi
STBS10S	rigid	STB	30°C. . .110°C	-	U G1/2"	8 x 150
STBS11S	rigid	STB	20°C. . .150°C	-	U G1/2"	8 x 200
STBS12S	rigid	STB	50°C. . .300°C	-	UZ G1/2"	8 x 200 CrNi
STBS13S	rigid	STB	50°C. . .350°C	-	EZS G3/4"	170 steel conical
STBS14S	rigid	STB	20°C. . .500°C	-	UZO G1/2"	8 x 200 CrNi
STBS15S	rigid	STB	20°C. . .500°C	-	UZ G1/2"	8 x 200 CrNi

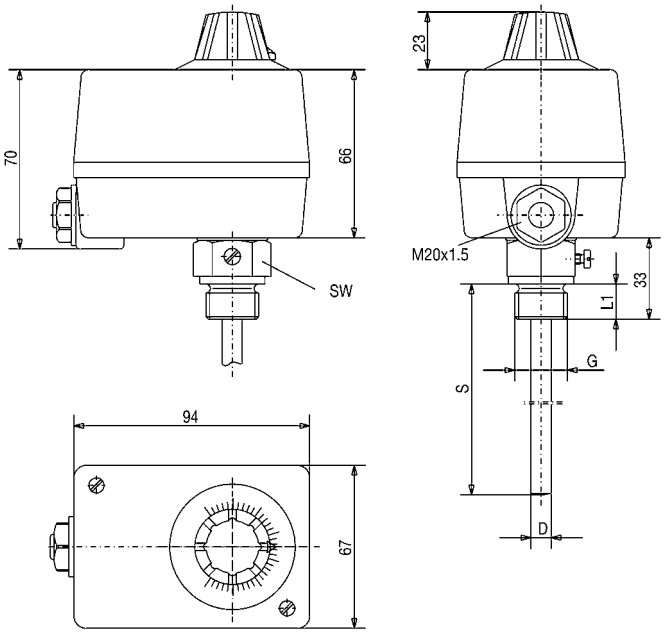
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Table 2

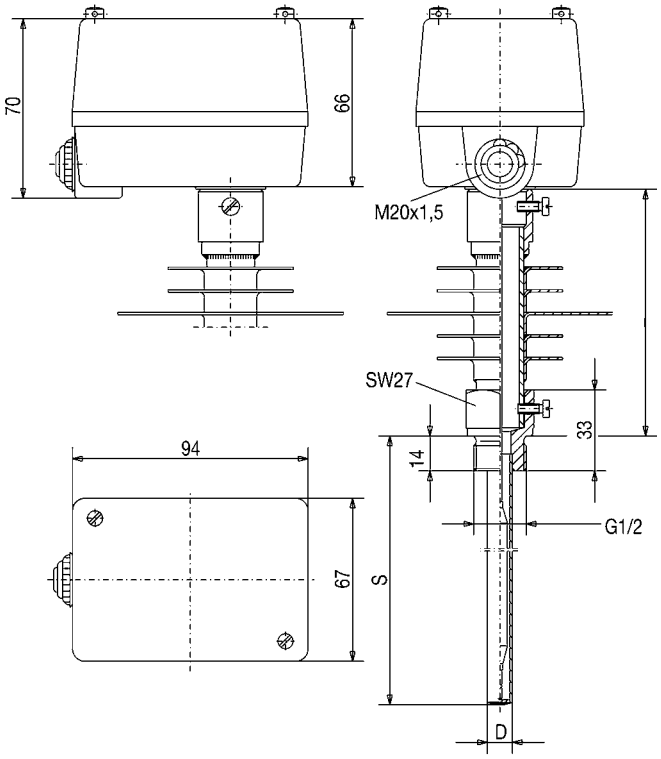
Version Code	Shaft	Function	Control range in °C	Hysteresis in %	Capillary in mm	Process connection	Sensor Ø x length [mm]
TRF01	flexible	TR	-10°C. . .+40°C	3-4	1000	A	6 x 185
TRF04	flexible	TR	0°C. . .100°C	3-4	1000	A	6 x 107
TRF05	flexible	TR	20°C. . .150°C	3-4	1000	A	6 x 88
TRF06	flexible	TR	50°C. . .300°C	3-4	1000	A	6 x 63
TRF07	flexible	TR	20°C. . .500°C	5	1000	A	6 x 148
TWF01	flexible	TW	0°C. . .50°C	3-4	1000	A	6 x 185
TWF04	flexible	TW	0°C. . .100°C	3-4	1000	A	6 x 107
TWF05	flexible	TW	0°C. . .100°C	3-4	2000	A	6 x 107
TWF06	flexible	TW	20°C. . .150°C	3-4	1000	A	6 x 88
TWF07	flexible	TW	20°C. . .150°C	3-4	2000	A	6 x 88
TWF08	flexible	TW	50°C. . .200°C	3-4	1000	A	6 x 101
TWF10	flexible	TW	50°C. . .300°C	3-4	1000	A	6 x 63
TWF11	flexible	TW	50°C. . .300°C	3-4	2000	A	6 x 63
TWF12	flexible	TW	20°C. . .500°C	5	1000	A	6 x 148
TWF13	flexible	TW	20°C. . .500°C	5	2000	A	6 x 148
STWF01	flexible	STW	20°C. . .500°C	7	4000	ES G3/4"	200
STBF02	flexible	STB	30°C. . .110°C	-	1000	A	6 x 108
STBF03	flexible	STB	30°C. . .110°C	-	2000	A	6 x 108
STBF05	flexible	STB	20°C. . .150°C	-	1000	A	6 x 77
STBF06	flexible	STB	20°C. . .150°C	-	2000	A	6 x 77
STBF07S	flexible	STB	20°C. . .150°C	-	1000	A	6 x 77
STBF08	flexible	STB	50°C. . .200°C	-	2000	A	6 x 85
STBF09S	flexible	STB	50°C. . .200°C	-	1000	A	6 x 85
STBF11	flexible	STB	50°C. . .300°C	-	1000	A	6 x 55
STBF12	flexible	STB	50°C. . .300°C	-	2000	A	6 x 55
STBF13S	flexible	STB	50°C. . .300°C	-	1000	A	6 x 55
STBF14	flexible	STB	20°C. . .500°C	-	1000	A	6 x 127
STBF15S	flexible	STB	20°C. . .500°C	-	1000	A	6 x 127
STBF16S	flexible	STB	20°C. . .500°C	-	2000	A	6 x 127
STBF17S	flexible	STB	20°C. . .500°C	-	4000	ES G3/4"	200

Dimensions in mm:

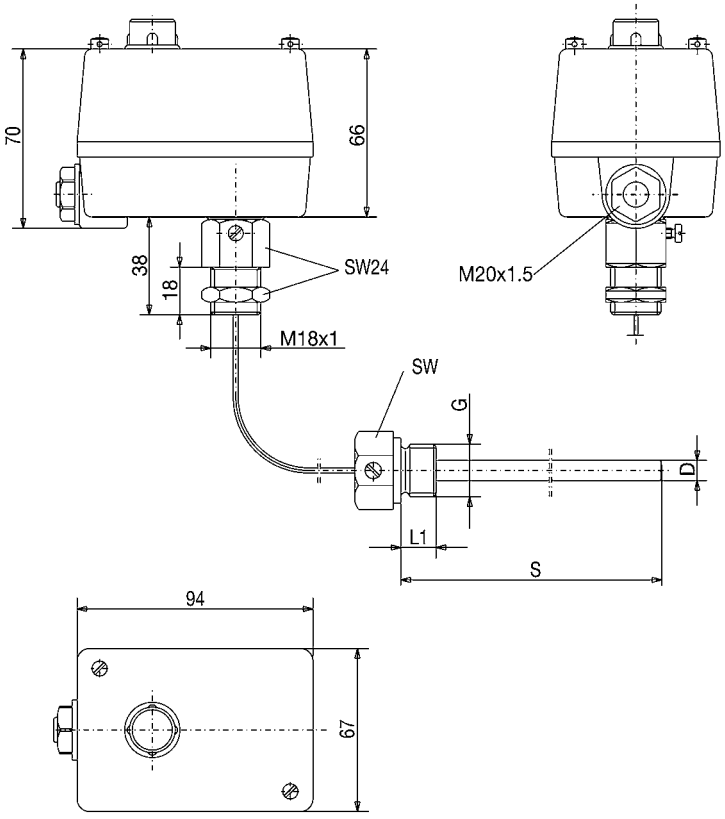
TR with sleeve „U“



TW/STW with sleeve „UZ“



STB, flexible, with sleeve „U“



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IR-03

Compact Infrared Thermometer



Description:

The IR-02 infrared thermometer is a pyrometer with a thermopile detector. It utilizes the spectral region of 8 to 14 micrometers so as to measure temperatures in the range of 0. . .+500°C at a distance ratio of 20:1 without contacting. The radiation of the object of measurement in this wavelength is constantly compared with the radiation of the sensor's surroundings and the current value of the object's surface temperature is delivered to the output of the IR-03 within at least 500 milliseconds. A 4. . .20 mA signal proportional to the temperature is available in 2-wire system.

Features

/ Compact, with integrated sensor

/ Low cost

/ IP 65 (NEMA 4)

/ 4. . .20 m analog output

/ Constructed of 304 stainless steel

/ Temperature range up to 500°C

/ 24V DC power

Application:

Non-contacting infrared thermometers are used in the industry whenever it is not possible to attach a conventional temperature sensor due to high temperature of the object being measured or due to its geometrical characteristics. Pyrometers recognize only surface temperatures; they are free from repercussions and can measure even objects of small specific heat capacity or less thermal conduction such as plastic or various types of glass. The dynamics are solely determined by the evaluation electronics, with the result that fast changing conditions of temperature can be captured. Typical applications are found, for example in the glass, paper and plastic industries as well as in Research & Development activities.

Technical Spezifications:

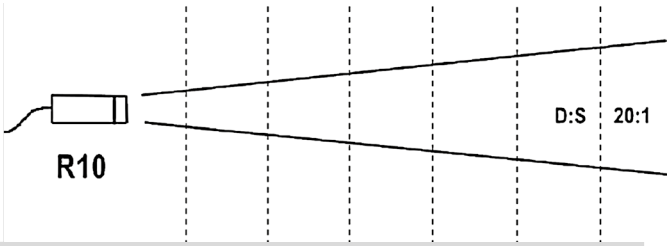
Range /	0°. . .500°C
D:S Ratio /	20:1
Spectral range /	8. . .14µm
Emissivity /	0,95 fixed
Accuracy /	0° to 500°C: ± 1% of reading or ±2°C, wichever is greather
Repeatability /	1% or ±1°C
Resolution /	120 µA, 0,3°C
Response time /	500 mS
Ambient /	0°. . .50°C
with air cooling	0°. . .90°C
with water cooling	0°. . .200°C
Storage /	-20°. . .70°C
Relative humidity/	10%. . .95% none-condensing
Hausing material /	304 stainless steel
Dimensions	18 x 120 mm / thread M18 x 1
Weight	270 g

Electrical Spezifications:

Output /	4. . .20 mA, 2-wire
Wiring /	3 m PVC-Kabel
Supply /	24 V DC
Protection Class /	IP65 (NEMA 4)

Optics:

Distance (mm)	0	200	400	600	800	1000
Target (mm)	8,9	10	20	30	40	50



Distance (in)	0	8	16	24	32	40
Target (in)	0,35	0,4	0,8	1,2	1,6	2

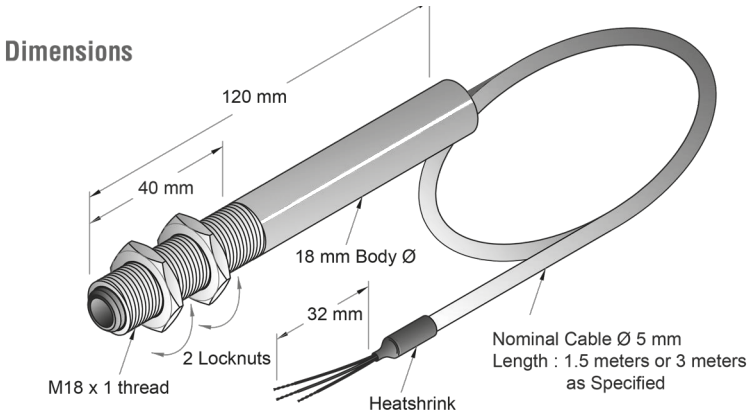
Ordering Codes:

Order number	**IR-03.**	**1**

IR-03 Compact Infraredthermometer

Option /
0 = none
1 = fixed 90° mounting bracket
2 = compact air purge collar
3 = air/water cooling jacket

Dimensions in mm:



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IR-04

Infrared Thermometer

Description:

The IR-04 series infrared thermometers measure temperatures in the range of -32°C to +1500°C at a distance ratio from 8:1 to 50:1 without contact to the object. The radiation of the object of measurement is constantly compared with the radiation of the sensor's surroundings and the current value of the object's surface temperature is displayed by the IR-04 within at least 500 milliseconds. An additional thermocouple probe can be attached to the IR-04 for measuring inside objects or fluids. The thermocouple can also be used to measure the emissivity of the target and automatically corrects the measurement accordingly. A version with USB adapter and data logging software can be used for easily recording the measured values or for stationary use over time, in intervals from 1 second to 999 hours. A tripod is optionally available. The data can be stored in a text file to be used with programs such as Excel™, Access™ or Word™ for further analysis, graphing and reports. All handheld devices use a 9 V battery as power source, offering continuous measuring up to 16 hours.

Features

/ For temperatures up to 1500°C

/ Very robust

/ Ranges up to 50:1 (D:S ratio)

/ Memory log

/ Continuous reading

/ USB connector

Application:

Handheld infrared thermometers are used in the industry whenever a quick measuring is needed. Because of their range and versatility, they can be used to measure the surface temperature of very hot and hard to reach objects from a safe distance. An additional probe expands the range of application even further, as well as various configuration options, like adjustable emissivity. The probe can be used for cooling chain testing in the food industry or automotive maintenance. The IR-04s recognize surface temperatures; they are free of repercussions and can measure even objects of small specific heat capacity or less thermal conduction such as plastic or various types of glass. The dynamics are solely determined by the evaluation electronics, with the result, that fast changing conditions of temperature can be captured.

Standard Thermometers:

Model	IR-04.85	IR-04.115	IR-04.115P	IR-04.125
Description	Close range (< 600mm)	Mid temperature, mid range (< 1000 mm)	Mid temperature, mid range (< 1000 mm), extended features	High temperature, mid range (< 1000 mm), extended features, probe*
Temperature range	-4°. . .+619°F -20°. . .+326°C	-25°. . .+999°F -32°. . .+535°C	-25°. . .+999°F -32°. . .+535°C	-25°. . .+1400°F -32°. . .+760°C
Distance to spot ratio	8:1	12:1	12:1	12:1
Spectral range	5. . .14µm	5. . .14µm	5. . .14µm	5. . .14µm
Emissivity	Fixed at 0.95	Fixed	Adjustable 0.10 to 1.00	Adjustable 0.1 to 1.0
Accuracy	± 2% of reading or 2°C whichever is greater	± 5.4°F (± 3°C) -25°. . .-4°F (-32°. . .-20°C) ± 3,6°F (± 2°C) -4°. . .+212°F (-20°. . .+100°C) ± 2% 212°. . .999°F (100°. . .535°C)		± 5°F (± 3°C) -25°. . .-4°F (-32°. . .-20°C) ± 3,6°F (± 2°C) -4°. . .+212°F (-20°. . .+100°C) ± 2% > 212°F (100°C)
Repeatability	± 2°F (± 1°C)	± 2°F (± 1°C)	± 2°F (± 1°C)	± 2°F (± 1°C)
Resolution	0.1°F (0.1°C)	0.1°F (0.1°C)	0.1°F (0.1°C)	0.1°F (0.1°C)
Response time	500 ms.	500 ms.	500 ms.	500 ms.
Operating temperature	32°. . .122°F (0. . .50°C) 10 - 90% RH	32°. . .122°F (0. . .50°C) 10 - 90% RH	32°. . .122°F (0. . .50°C) 10 - 90% RH	32°. . .122°F (0. . .50°C) 10 - 95% RH
Storage temperature	14°. . .140°F (-10°. . .60°C)	14°. . .140°F (-10°. . .60°C)	14°. . .140°F (-10°. . .60°C)	14°. . .140°F (-10°. . .60°C)
LCD backlight	Yes	Yes	Yes	Yes
Dual display	NA	NA	NA	Yes
°F & °C Selectable	Yes	Yes	Yes	Yes
Laser sight switchable	User selectable, class II laser, less than 1mW			
Auto power off	Automatically after approx. 6 seconds			
Max/Min/Avg/ΔT	No	No	Yes	Yes
Auto measuring	No	No	Yes	Yes
Audible alarm	No	Yes	Yes	Yes
10 Point memory	No	No	Yes	Yes
Electronic trigger lock	No	Yes	Yes	Yes
Tripod mount	Yes	No	No	Yes
USB data output	No	No	No	No
Type K thermocouple	No	No	No	Yes
Operating software	No	No	No	No
Power supply	9V Battery	9V Battery	9V Battery	9V Battery
Battery life (laser off)	16 hrs for continuous operation	15 hrs for continuous operation		15 hrs for continuous operation
Dimensions	5.9 x 5.2 x 1.8“ (150 x 133 x 45 mm)	6.8 x 3.6 x 1.8“ (173 x 93 x 45 mm)		7.09 x 5.12 x 1.57“ (180 x 130 x 40 mm)
Weight (with battery)	4.7 oz (135 g)	7.8 oz (220 g)	7.8 oz (220 g)	6.87 oz (195 g)
Included accessories	User manual, 9V battery	User manual, 9V battery, soft pouch		User manual, 9V battery, carrying case

*different kinds of probes are available, depending on the application. Please specify the desired use when ordering.

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High-Temperature Thermometers:

Model	IR-04.135	IR-04.215	IR-04.235
Description	High temperature, long range (< 1500 mm), extended features	High temperature, extra long range (> 1500 mm), extended features, USB, probe*	extra high temperature, extra long range, extended features
Temperature range	-58°. . .+1832°F -50°. . .+1000°C	-58°. . .+1832°F -50°. . .+1000°C	-58°. . .+2732°F -50°. . .+1500°C
Distance to spot ratio	30:1	50:1	50:1
Spectral range	8 to 14µm	8 to 14µm	8 to 14µm
Emissivity	Adjustable 0.10 to 1.00	Adjustable 0.10 to 1.00	Adjustable 0.10 to 1.00
Accuracy	± 5.4°F (± 3°C) -58. . .-4°F (-50. . .-20°C)	and ± 3,6°F (± 2°C) -4. . .+212°F (-20. . .+100°C)	and ± 2% > 212°F (100°C)
Repeatability	± 2°F (± 1°C)	± 2°F (± 1°C)	± 2°F (± 1°C)
Resolution	0.1°F (0.1°C)	0.1°F (0.1°C)	0.1°F (0.1°C)
Response time	500 ms.	500 ms.	500 ms.
Operating temperature	32. . .122°F (0. . .+50°C) 10 - 90% RH	32. . .122°F (0. . .+50°C) 10 - 90% RH	32. . .122°F (0. . .+50°C) 10 - 90% RH
Storage temperature	14. . .140°F (-10. . .+60°C)	14. . .140°F (-10. . .+60°C)	14. . .140°F (-10. . .+60°C)
LCD backlight	Yes	Yes	Yes
Dual display	Yes	Yes	Yes
°F & °C Selectable	Yes	Yes	Yes
Laser sight switchable	User selectable, class II laser, less than 1mW		
Auto power off	Automatically after approx. 6 seconds	Automatically after approx. 30 seconds	Automatically after approx. 6 seconds
Max/Min/Avg/ΔT	Yes	Yes	Yes
Auto measuring	Yes	Yes	Yes
Audible alarm	Yes	Yes	Yes
10 Point memory	Yes	Yes	Yes
Electronic trigger lock	Yes	Yes	Yes
Tripod mount	Yes	Yes	Yes
USB data output	No	Yes	No
Type K thermocouple	No	Yes	No
Operating software	No	Software included	No
Power supply	9V Battery	9V Battery	9V Battery
Battery life (laser off)	15 hrs for continuous operation	15 hrs for continuous operation	15 hrs for continuous operation
Dimensions	7.9 x 5.0 x 1.9" (200 x 127 x 47mm)	7.9 x 5.0 x 1.9" (200 x 127 x 47mm)	6.7 x 5.2 x 1.8" (200 x 132 x 45mm)
Weight (with battery)	12.7 oz (360 g)	12.7 oz (360 g)	11.6 oz (330 g)
Included accessories	User Manual, 9V Battery, Carrying Case, and Wrist Strap	User Manual, 9V Battery, Carrying Case, Wrist Strap & Software	User Manual, 9V Battery, Carrying Case, and Wrist Strap

Ordering Codes:

Order number	**IR-04.**	**115**
IR-04 Infrared Thermometer		
Model - see table / 85, 115, 115P, 125, 135, 215, 235		

*different kinds of probes are available, depending on the application. Please specify the desired use when ordering.

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RF-01N

Transmitter for relative humidity and temperature of Gases

Description:

A capacitance-based polymer sensor is used to measure relative humidity in the RF-01N. Polymer sensors consist of two electrods seperated by a film of thermoset polymer that absorbs or releases water as the relative humidity of the gas that surrounds the sensor changes. Capacitance measurements of the polymer film are used to determine the relative humidity. Polymer sensors can measure relative humidity from 0. . .100%, respond rapidly and exhibit no drift. Capacitance sensors are unaffected by most contaminants and are not damaged by freezing or inundation by water. Sofisticated integrated circuits provide a high level, fully conditioned and temperature compensated 4. . .20 mA or 0. . .10 VDC output signal. A temperature sensor is also integrated in the dual output combined humidity/temperature version transmitters.

Features

/ Duct mount or outdoor installation

/ Long term stability

/ Accuracy 2%, 3% or 5%

/ Recovers rapidly from 100% saturation

/ Analog output for humidity and optional for temperature

/ Local alpha-numeric display for duct mount models (optional)

Application:

The RF-01N is a two-wire transmitter with a 4. . .20 mA loop powered output or 0. . .10 VDC output.The sensor recovers rapidly from 100% saturation and is calibration free. The polymer capacitance sensor is not affected by condensation, fog, high humidity or contaminants. The RF-01N provides a stable, repeatable, and accurate means of measuring humidity only or both temperature and humidity in the harshest of environments. The combined humidity/temperatur version provides dual 4. . .20 mA or 0. . .10 VDC output signals to control both humidity and temperature with one sensor which reduces installation costs. The duct mount version is also available with an optional alpha-numeric LCD display to provide local indication of humidity and temperature simultaneously. Typical applications are monitoring of humidity and temperature such as exhaust, outside air and supply air.

Versions:

RF-01N Transmitter for relative humidity and temperature of Gases

The series RF-01N for relative humidity and temperature can be supplied as an outside air model or as a duct mount model. To protect the sensor from damage caused by particle bombardment and damaging deposits or even dust portions both models can be supplied fitted with a sintered filter. Duct mount models are available with an optional 2-line alpha numeric LCD-display.

Options:

LCD-Dispaly: 2-line alpha numeric LCD, 8 characters / line, display resolution: 0.1 % RH; 0.1°C
(for duct mount only)

PT100 / PT1000: RTD temperature sensor DIN Class B; ± 0.3°C at 0°C, (Option only for models with a single humidity output signal)

Ordering Codes:

Order number	RF-01N.	1.	2.	1.	1

RF-01N Temp. and Humidity Transmitter

Version /
1 = Duct mount
1a = Duct mount with sintered filter
2 = Outside air model
2a = Outside air model with sintered filter

Accuracy humidity sensor /
2 = 2 % accuracy
3 = 3 % accuracy
5 = 5 % accuracy

Output signal /
1 = 4. . .20 mA, humidity
2 = 4. . .20 mA, humidity and temperature
3 = 0. . .10 VDC, humidity
4 = 0. . .10 VDC, humidity and temperature

Options /
0 = none
1 = LCD display (Duct mount only)
2 = temperature sensor PT100 DIN class B *
3 = temperature sensor PT1000 DIN class B *

* Option only for models with a simple humidity output signal !

Technical Specifications:

Humidity sensor /	Capacitance polymer
Relative Humidity range /	0. . .100 % RH
Accuracy:	± 2 % for 10. . .90 % RH at 25°C or ± 3 % for 20. . .80 % RH at 25°C or ± 5 % for 20. . .80 % RH at 25°C depending on the sensor
Temperaturesensor /	RTD
Accuracy:	DIN Class B; ± 0.3°C at 0°C
Hysteresis /	± 1 %
Repeatability /	± 0.1 %
Temperature limits /	-40. . .+60°C (-40. . .+140°F)
Storage temp. /	-40. . .+80°C (-40. . .+176°F)
Compensated temperature range /	-20. . .+60°C (-4. . .140°F)
Response time /	15 seconds
Drift /	< 1 % RH / year
Enclosure rating /	IP66 for Duct mount (housing only) IP66 for OSA mount
Housing material /	Duct mount model: PBT Outside air model: Polycarbonate
Weight /	Duct mount model: 0.3 kg Outside air model: 0.45 kg
Agency approvals /	CE

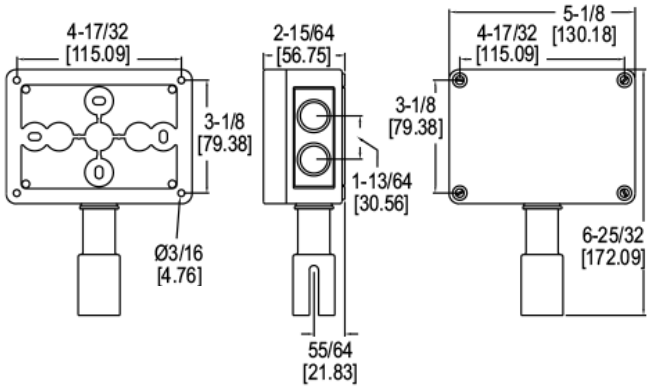
Electrical Specifications:

Supply voltage /	10. . .35 VDC
Output signal /	1x output: 4. . .20 mA for humidity 2x outputs: 4. . .20 mA for humidity and temperature
or Output signal /	1x output: 0. . .10 VDC @ max. 5 mA for humidity 2x outputs: 0. . .10 VDC @ max. 5 mA for humidity and temperature measurement
Electrical connection /	removable screw terminal block

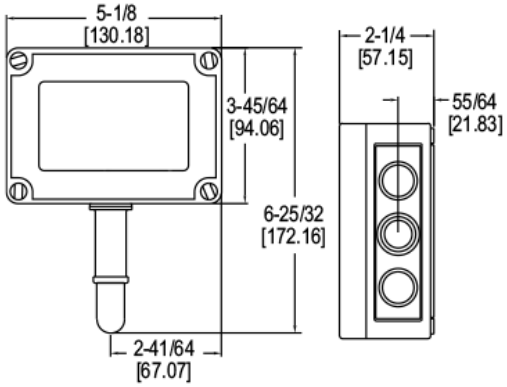
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Dimensions in mm:

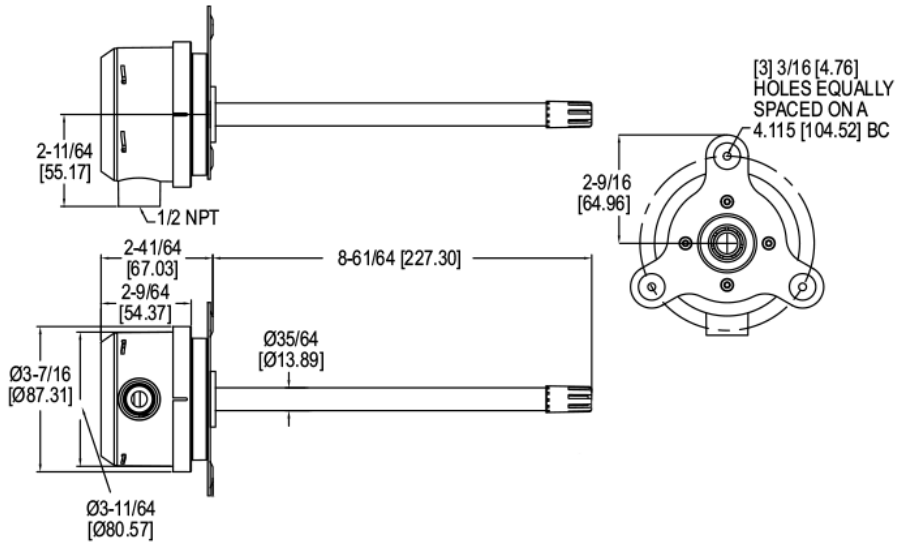
Outside air model [mm]



Outside ait model with sintered filter for poluted gases [mm]



Duct mount model (top without / bottom with sintered filter [mm]



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BE-01

Inflow and Outflow Calming-Section for Flowmeters



Features

/ Brass or stainless steel versions

/ O-Ring or flat seal

/ Inflow section length 10 x DN

/ Outflow section length 5 x DN

/ Easy to mount

/ Pressure up to PN 350

/ Temperature up to 160°C

/ High chemical resistance

/ Thread as per DIN EN ISO 228-1

Description:

The BE-01 inflow and outflow sections are developed to produce a rectification of the flow profile, as well as to reduce swirl effects and thus allow accurate and repeatable flow measurement. The series BE-01 is made of brass or high quality stainless steel (1.4571) and therefore has a high chemical resistance to a number of industrially used liquids and gaseous media. The process connection is made by connecting thread to DIN EN ISO 228-1 and ensures a quick and safe installation. When using commercially available pipes and fittings as inflow or outflow sections, the seal often poses a danger to the measuring instrument. Thus, for example, excessing sealing material, such as hemp or Teflon®tape, can wind around the sensor and cause a permanent damage. The inflow and outflow sections of the series BE-01 are neatly and securely sealed with O-rings or flat seals.

Application:

BE-01 inflow and outflow sections are suitable for liquids and gaseous media. They can be used everywhere in the industry, where asymmetrical flow affect the measurement. BE-01 are ideally suited as inflow and outflow section for flow sensors, flow meters or flow switches.

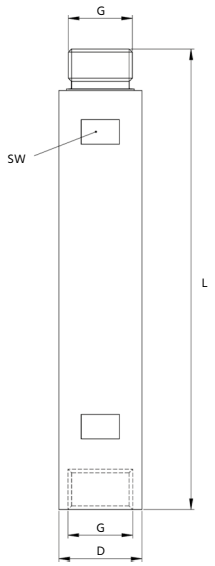
Technical Specifications:

Housing material /	brass or stainless steel 1.4571
Process connection /	as per DIN EN ISO 228-1
Seal /	O-ring or flat seal
Media /	liquids or gases
max. Temperature /	160 °C (depending on the O-ring material used)
O-ring NBR:	100 °C
O-ring FKM:	100 °C
O-ring EPDM:	160 °C
Flat seal PTFE:	160 °C
max. Operating pressure /	
with flat seal:	16 bar
with O-ring:	depending on the type (see table)

Op. pressure with O-Ring:

max. Operating pressure	Housing material brass		Housing material stainless steel	
	< 120 °C	< 160 °C	< 120 °C	< 160 °C
BE-01.1a (G ¼", inflow) **BE-01.1b (G ¼", outflow)**	**300 bar**	**140 bar**	**350 bar**	
BE-01.2a (G ½", inflow) **BE-01.2b (G ½", outflow)**	**260 bar**	**110 bar**		
BE-01.3a (G 1", inflow) **BE-01.3b (G 1", outflow)**	**210 bar**	**90 bar**	**300 bar**	

Dimensions in mm:



Sizes (mm)	G male	G female	DN	L	D	SW
BE-01.1a (G ¼", inflow)	¼"	¼"	8	80	18	16
BE-01.1b (G ¼", outflow)				40		
BE-01.2a (G ½", inflow)	½"	½"	15	150	27	24
BE-01.2b (G ½", outflow)				75		
BE-01.3a (G 1", inflow)	1"	1"	25	250	40	36
BE-01.3b (G 1", outflow)				125		

Ordering Codes:

Order number	BE-01.	2.	1.	1

BE-01 Calming section

Type /
1 = G ¼", full set (inflow and outflow)
1a = G ¼", 1x inflow
1b = G ¼", 1x outflow
2 = G ½", full set (inflow and outflow)
2a = G ½", 1x inflow
2b = G ½", 1x outflow
3 = G 1", full set (inflow and outflow)
3a = G 1", 1x inflow
3b = G 1", 1x outflow

Material /
1 = brass
2 = stainless steel 1.4571

Sealing /
1 = flat seal PTFE
2 = O-ring NBR (standard for housing material brass)
3 = O-ring FKM (standard for housing material stainless steel)
4 = O-ring EPDM

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WS-64

Adapter



Features

/ Economical

/ Temperature decoupling

/ Various materials

Description:

The WS-64 is an adapter according to DIN 16281 for the installation of pressure measuring instruments. Using an adapter could makes sense, wherever an instrument can not be connected directly to the pipe. This could be the case, when the plant offers not enough space or the operator wishes to observe all devices conveniently in one place. The WS-64 is also an economical, though not quite as effectve, alternative to conventional cooling lines and can be used for temperature decoupling to protect heat-sensitive devices from radiated heat.

Application:

The adapter can be mounted, for example, with a wall-mounting bracket, in order to securely connect a pressure gauge with a hose or pipe. The various materials and connection sizes make the WS-64 versatile for application.

Technical Specifications:

Process connection /	G ½" or G ¼"
max. Pressure /	400 bar / brass 250 bar
max. Temperature /	
Brass:	120°C
Steel:	200°C
Stainless Steel:	200°C
Material /	
Body:	brass, steel, SS 1.4571

Ordering Codes:

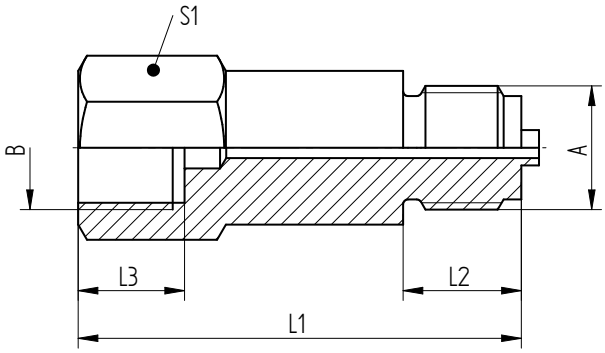
Order Number	**WS-64.**	**1.**	**2**

WS-64 Adapter

Process connection /
1 = G ½"
2 = G ¼"

Material /
1 = brass (G ½" only)
2 = steel
3 = stainless steel 1.4571

Dimensions in mm:



Version	L1 / mm	L2/ mm	L3 / mm	S1
Brass G½"	75	20	18	27
Steel G¼"	69	13	11	27
Steel G½"	75	20	18	27
SS 1.4571 G¼"	69	13	11	27
SS 1.4571 G½"	75	20	18	27

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SR-61

Siphon



Description:

Siphons can be used to protect pressure measuring devices, like pressure gauges, from high temperatures or pressure surges and pulsations. They are available with a straight, circular (DIN 16282 C) or U-shaped (DIN 16282 A) pipe with 90° turn.

Features

/ Cost-effective

/ Up to 400°C

/ Up to 160 bar

/ Cooling-line and particle-filtration

Application:

The large surface of the tube will cool the media with the ambient air temperature. Flowing through multiple curves or a circle dampens pressure surges and keeps the pressure at the device constant. A siphon can be used for fluids, gases and even steam. It can be installed with a G ½" connection. The curvature of the pipe also helps to protect the device from particles, since these can be deposited here.

Technical Specifications:

Process connection / G ½"

max. Pressure /

at 120°C: 160 bar

at 300°C: 120 bar

at 400°C: 100 bar

Material /

Body: steel, SS 1.4571

Ordering Codes:

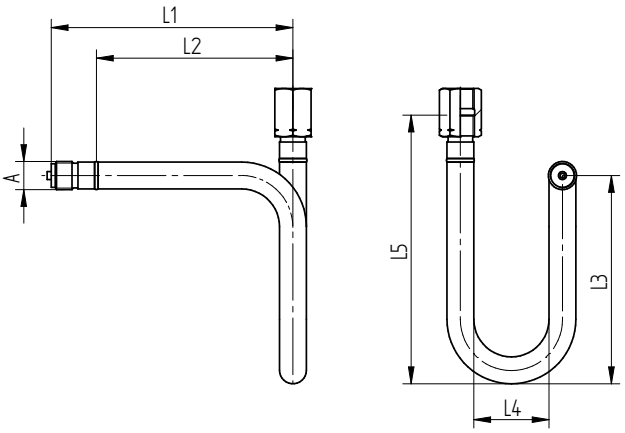
Order number	SR-61.	1.	2

SR-61 Siphon

Style /
1 = U-shape (DIN 16282 A)
2 = U-shape long (DIN 16282 A)
3 = circular (DIN 16282 C)

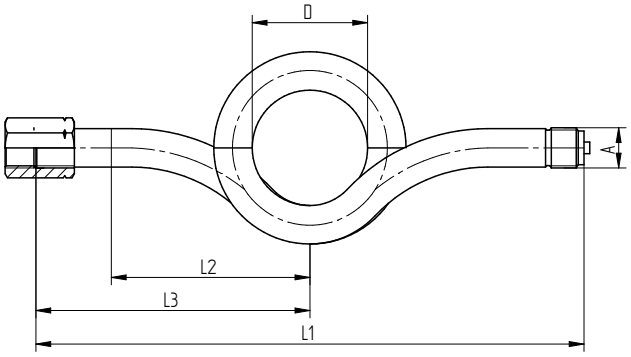
Material /
1 = steel
2 = SS 1.4571

Dimensions in mm (U-Shape):



Version	L1 / mm	L2 / mm	L3 / mm	L4 / mm	L5 / mm
Steel	180	145	155	56	200
Steel (long)	255	220	155	56	200
Stainless Steel	180	145	155	56	200
Stainless Steel (long)	255	220	155	56	200

Dim. in mm (circular):

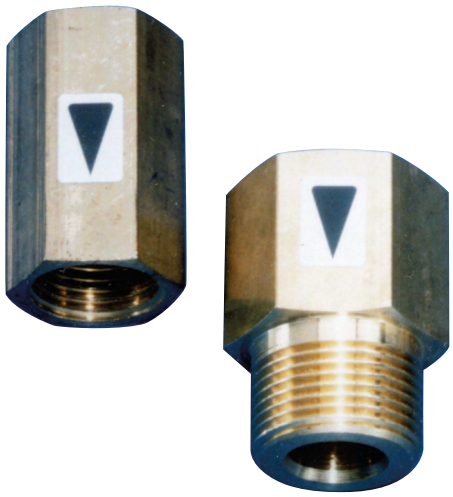


Version	L1 / mm	L2 / mm	L3 / mm	D
Steel	275	95	130	56
Stainless Steel	275	95	130	56

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BG-01

Flow Limiter



Features

/ Flow quantity regulation without auxiliary power supply

/ Power-saving by limiting of flow

/ Compact design

/ Easy to mount

/ All-metal version without plastics

/ Brass or stainless steel material

Description:

The BG-01 series of flow limiters has been developed for limiting the flow of water-like media to a particular value. They ensure that the flow value does not exceed even during fluctuating forward or reverse pressures. In contrast to most of the devices of this type normally available in the market, the BG-01 limiters have a stainless steel spring element instead of the commonly used plastic membrane. As a result of the differential pressure occurring over the limiter, the spring element gets pressed more or less against the sealing surface of the housing. The split opening between the sealing surface and the spring varies continually. As a result of the enlargement of the split opening when the pressure falls or, as the case may be, its decrease when the pressure rises, the quantity of fluid passing through the device is maintained at a constant rate.

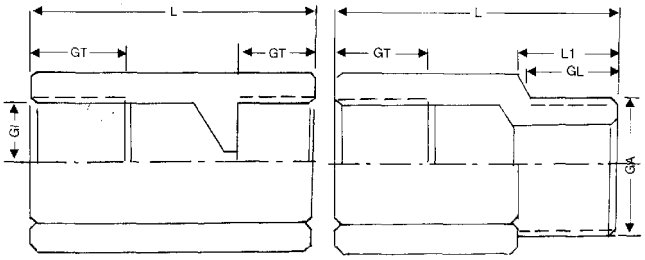
Application:

These devices are used for all water-like media. They can be deployed in water distribution systems in the industry, in sanitary and car-washing installations and in other fields.

Technical Specifications:

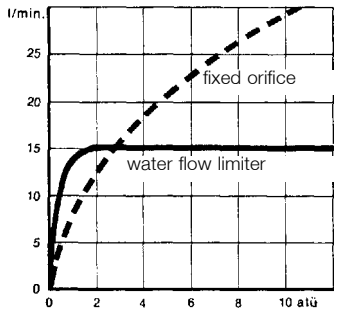
min. Regulating pressure /	2 bar
max. Differential pressure /	10 bar
max. Temperature /	200 °C
Accuracy for H_2O at 20°C /	up to 2l/min ± 15% from 3l/min ± 10%
Wetted materials /	
Body:	brass / st. steel 1.4305
Star:	st. steel 1.4310
Cone:	st. steel 1.4301
Rivet:	st. steel 1.4301
Locking ring:	1.4122

Dimensions:

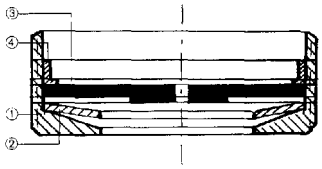


Type	L	GT	GL	GI	GA	SW	L1	Weight g
BG-01.1	43	14		G ½		27		72
BG-01.2	45	15		G ¾		30		125
BG-01.3	43	14	14	G ½	G ½	27	16	104
BG-01.4	45	15	15,5	G ¾	G ¾	30	18	135

Functioning and Structure:



Proportional to the pressure, the free cross section is decreased as the pressure increases. This ensures constant flow quantity.



1) housing
2) ring funnel
3) regulating orifice
4) clamp ring

Ordering Codes:

Order number **BG-01. 1. 2. [][]. 0**

BG-01 Flow Limiter

Process connection /
1 = G ½-female both sides
2 = G ¾-female both sides
3 = inlet G ½-female, outlet G 1/2-male
4 = inlet G ¾-female, outlet G 3/4-male

Material /
1 = brass
2 = stainless steel

Flow quantity /
[ ] [ ] = 01. . .30l/min in 1l/min steps

Special version /
0 = none
1 = please specify in detailed text

Flow quantities:

1 - 30 l/min water in 1 l/min steps.
The flow quantities are given according to the design of the devices and cannot be changed by the customer.
By adding several individual elements nearly any flow value can be achieved (see data sheet BG-03).

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BG-03

Flow Limiter for Large Quantities of Flow



Features

/ Regulation without ext. power supply
/ Power-saving
/ For diameters DN20 to DN100
/ For screw fitting in existing pipes
/ All-metal version
/ Brass or stainless steel material

Description:

The BG-03 series of flow limiters has been developed for limiting the flow of water-like media to a particular value. They ensure that the flow value does not exceed even during fluctuating forward or reverse pressures. In contrast to most of the devices of this type normally available in the market, the BG-03 limiters have a stainless steel spring element instead of the commonly used plastic membrane. As a result of the differential pressure occurring over the limiter, the spring element gets pressed more or less against the sealing surface of the housing. The split opening between the sealing surface and the spring varies continually. As a result of the enlargement of the split opening when the pressure falls or, as the case may be, its decrease when the pressure rises, the quantity of fluid passing through the device is maintained at a constant rate. A version for flanged installation is optionally available. In doing so, the BG-03 will be intermediated flange clamped (flanges/adapter not included).

Application:

These devices are used for all water-like media. They can be deployed in water distribution systems in the industry, in sanitary and car-washing installations and in sterilization and water treatment installations.

Technical Specifications:

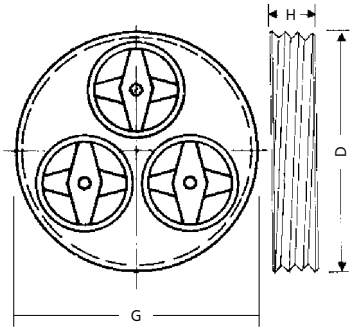
min. Regulating pressure / 2 bar

max. Differential pressure / 10 bar

max. Temperature / 200 °C

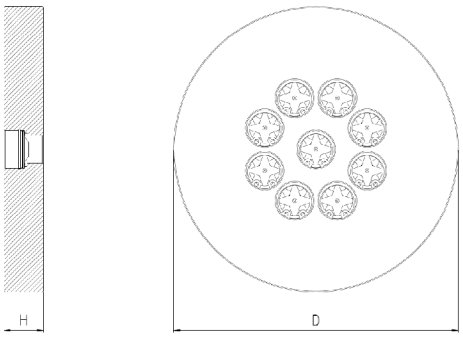
Accuracy / up to 2l/min ± 15%
up to 3l/min ± 10%

Dim. Threaded version:



Version (G)	H	Q_{min} l/min	Q_{max} l/min	Weight (g)
¾"	12	1	30	25
1 ½"	12	3	90	104
2"	15	5	150	190
2 ½"	15	7	210	290
3"	15	9	270	375

Dim. Flange version:



mm Nom. Diameter	Stars	Pressure rate adapter flange	Flowrate l/min. min.	Flowrate l/min. max.	H mm	D mm
ND40	2	PN 16 / 300 lbs	2	60	19.1	95
ND50	4	PN 16	4	120	18.0	110
ND50	4	300 lbs	4	120	23.9	113
ND65	7	PN 16 / 300 lbs	7	210	23.9	130
ND80	9	PN 16	9	270	20.0	145
ND80	9	300 lbs	9	270	23.9	150
ND100	14	PN 16	14	420	20.0	165
ND100	14	300 lbs	14	420	23.9	182

Flowrates flange:

Flowrate for H_2O at 20 °C in l/min

Type	Q_{min}	Q_{max}
DN40	2	60
DN50	4	120
DN65	7	210
DN80	9	270
DN100	14	420

Ordering Codes:

Order number **BG-03. 1. 3. [][][]**

BG-03 Flow limiter

Material /
1 = brass (not for flange)
2 = stainless steel

Size /

Threaded version
1 = G ¾"
2 = G 1 ½"
3 = G 2"
4 = G 2 ½"
5 = G 3"

Flange version
10 = DN40
11 = DN50
12 = DN65
13 = DN80
14 = DN100

Flowrate /
[][][] = in l/min. water (1-420 l/min.)

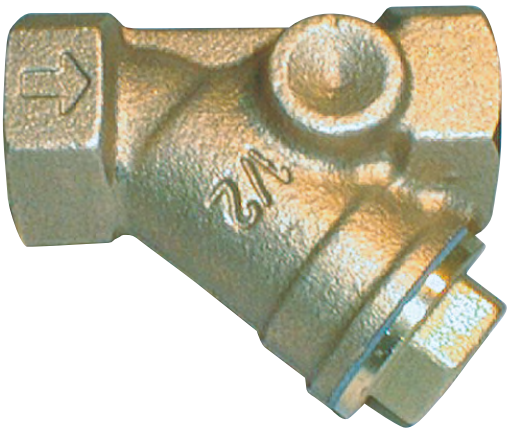
Flow quantities:

Various individual elements can be supplied for the following flow quantities:
1 - 420 l/min water in 1 l/min steps.
By adding several elements on one limiter disc, nearly any flow quantities can be achieved.

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FT-01

Strainer with and without Magnetic Separator



Features

/ For pipes of G 1/4“ to G 2“

/ Filter mesh from 0.25 to 1 mm

/ Compact design

/ Gunmetal or st. steel

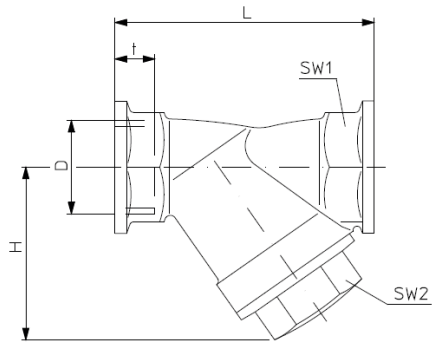
Description:

The FT-01 series of strainers is designed as slanted seat filter; they reliably prevent damages to the devices installed inside the pipe caused by impurities in the medium. Especially measuring devices with magnetic components can be protected by strainers with magnetic separators against malfunctioning due to ferrite particles.

Application:

The strainer has to be installed in the marked direction of flow and the filter should point downwards so particles can be deposited accordingly. The FT-01 can be used for fluids, gases (with the exception of fluids group 1 from guideline 2014/68/EU) and vapours up to 150°C, water, mineral, gear, heating and hydraulic oils etc. so as to protect pumps, gearboxes and flow measuring devices.

Dimensions Gunmetal:



Version: with magnetic separator, mesh 0,60 mm

D	L	t	H	SW1	SW2
¼"	56	11	34	21	17
3/8"	63,5	10,1	34	21	17
½"	66,5	13,2	42	27	22
¾"	76,5	14,5	52	32	27
1"	90	15	61	38	32
1 ¼"	112	18	73	47	41
1 ½"	120	18	82	54	46
2"	150	22	94	66	56

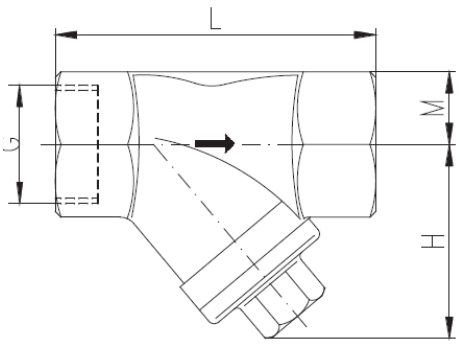
Version: without magnetic separator, mesh 0,25 mm

D	L	t	H	SW1	SW2
¼"	56	11	34	21	17
3/8"	63,5	10,1	34	22	17
½"	66,5	13,2	42	27	22
¾"	76,5	14,5	52	32	27
1"	90	15	61	38	32
1 ¼"	112	18	73	47	41
1 ½"	120	18	82	54	46
2"	150	22	94	66	56

Version: with magnetic separator, mesh 0,60 mm

D	L	t	H	SW1	SW2
½"	66,5	13,2	42	27	22
¾"	76,5	14,5	52	32	27
1"	90	15	61	38	32
1 ¼"	112	18	73	47	41
1 ½"	120	18	82	54	46
2"	150	22	94	66	56

Dimensions Stainless Steel:



Version: without magnetic separator, mesh 0,50 mm

D	L	M	H
½"	65	12,5	42,5
¾"	75	15,5	49
1"	90	18,5	57,5
1 ¼"	110	23	65
1 ½"	120	26,5	74
2"	150	33,5	85

Version: without magnetic separator, mesh 0,25 mm

D	L	M	H
½"	65	12,5	42,5
¾"	75	15,5	49
1"	90	18,5	57,5
1 ¼"	110	23	65
1 ½"	120	26,5	74
2"	150	33,5	85

Version: with magnetic separator, mesh 0,50 mm

D	L	M	H
½"	65	12,5	42,5
¾"	75	15,5	49
1"	90	18,5	57,5
1 ¼"	110	23	65
1 ½"	120	26,5	74
2"	150	33,5	85

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Technical Specifications:

Temperature / -10. . .+150 °C gunmetal
-30. . .+180 °C st. steel

Materials gunmetal /

Housing:	gunmetal
Sieve, strainer:	stainless steel
Magnetic system:	hard ferrite

Materials st. steel /

Housing:	SS 1.4408
Sieve, strainer:	SS 1.4301
Seal:	PTFE
Magnetic system:	hard ferrite

max. Pressure /

Gunmetal:	25 bar
Stainless steel:	40 bar (16 bar with magn. separator)

Ordering Codes:

Order number	**FT-01.**	**1.**	**3.**	**4.**	**2**

FT-01 Strainer

Version /
1 = without magnetic separator
2 = with magnetic separator
(for SS only ½" to 1"; for GM ½" to 2")

Material /
1 = gunmetal (for nominal diameters only ¼" to 2")
3 = stainless steel (for nominal diameters only ½" to 2")

Connection /
0 = female thread G ¼" (FT-01.x.1 only)
1 = female thread G 3/8" (FT-01.x.1 only)
2 = female thread G ½"
3 = female thread G 3/4"
4 = female thread G 1"
5 = female thread G 1¼"
6 = female thread G 1½"
7 = female thread G 2"

Filter mesh grade /
1 = 0.6 mm (only gunmetal)
2 = 0.25 mm
3 = 0.5 mm (only SS ½" to 2")

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NV-01

Needle valve



Description:

Profimess' needle valves are intended for precise regulation of the quantity of fluids flowing through pipes. The devices body is constructed in two parts. The upper part is screwed into the body. Designs available in brass, steel and stainless steel in nominal diameters of IG 1/8" to IG 2" allow a wide range of applications which is why these devices are used in the entire industry.

Features

/ Brass, steel or stainless steel

/ Usable up to 550°C

/ Up to PN 400

/ Compact Design

Application:

Profimess' needle valves are deployed wherever flowing fluids in industrial installations need to be shut off, reduced or regulated. The stainless steel version of the valves can be deployed up to 400 bar and 350°C, whereby the dependence of maximum pressure and the operating temperature must be taken into consideration. Higher temperatures, up to 550°C are available on request. They are particularly suitable to be used as shut-off devices in measuring operations in level and flow control.

Technical Specifications:

max. Pressure / 100 to 400 bar, see table

Pressure reduction /

Temperature:	50°C	100°C	200°C	300°C	400°C
Reduction:	6%	15%	37%	60%	84%

max. Media-temp. /
NV-01.1: -20°C to +100°C
NV-01.2: -20°C to +350°C
NV-01.3: -20°C to +250°C
up to 550°C on request

Material NV-01.1 /

Housing:	brass
Headpiece:	brass
Spindle:	brass
Gland base ring:	brass
Spindle sealing:	PTFE
Gland nut:	brass

Material NV-01.2 /

Housing:	steel
Headpiece:	steel
Spindle:	1.4104
Gland base ring:	1.4104
Spindle sealing:	graphite
Gland nut:	steel

Material NV-01.3 /

Housing:	1.4571
Headpiece:	1.4571
Spindle:	1.4571
Gland base ring:	1.4571
Spindle sealing:	PTFE
Gland nut:	1.4571

Ordering Codes:

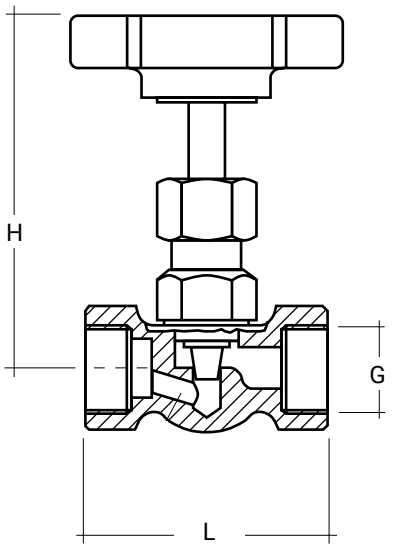
Order number	NV-01.	1.	3

NV-01 Needle Valve

Material /
1 = brass
2 = steel
3 = stainless steel

Process Connection /
1 = IG 1/8"
2 = IG ¼"
3 = IG 3/8"
4 = IG ½"
5 = IG ¾"
6 = IG 1"
7 = IG 1 ¼"
8 = IG 1 ½"
9 = IG 2"

Dimensions in mm:



NV-01.1									
G	1/8"	¼"	3/8"	½"	¾"	1"	1 ¼"	1 ½"	2"
L	50	50	50	50	67	75	110	110	112
H	78	78	78	78	90	90	110	110	120
Kv in m³/h	0,24	0,48	0,6	0,66	1,08	1,62	3,0	3,6	3,6
PN	100	100	100	100	100	100	100	100	100

NV-01.2 and NV-01.3									
G	1/8"	¼"	3/8"	½"	¾"	1	1 ¼"	1 ½"	2"
L	45	55	55	60	75	100	110	130	130
H	72	75	72	77	99	110	145	145	145
Kv in m³/h	0,24	0,48	0,6	0,74	1,35	1,66	3,10	5,56	5,56
PN	400	400	400	400	200	200	160	120	120

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PV-01

High-Precision Control Valve for Gases and Liquids

Description:

The PV-01 high-precision control valves are intended for precise fine-flow adjustment of gases or liquids flowing through pipes. The control valves consists of an inner valve and a body with straight or angled process connection. The PV-01 has a 15-turn spindle to fully open from a closed condition. The spindle operates practically without any hysteresis and closes leak-proof clockwise or optionally counterclockwise. The valve needle is non-rotating and thus provides a stable adjustment. Various Cv-values ensure optimal control ranges.

Application:

High-precision control valves are deployed wherever flowing gases or liquids in industrial installations require a very fine and accurate adjustment. They are especially suitable for measuring operations in the areas of chemical process engineering, analytical technology, biotechnology, chemical nuclear technology, medical engineering and environmental technology.

Features

/ High accurate flow-adjustment
/ Straight or angle designs
/ Cw- or ccw-closing
/ 15-turn spindl
/ Minimal hysteresis
/ Leak-proof when closed
/ Different Cv-values
/ Aluminium, brass or SS versions

Technical Specifications:

Design type /	straight valve, angled valve or valve cartridge for selfmounting (without body)
Rotating direction /	valve cw-closed (standard) or valve ccw-closed
Valve turns /	15-turn spindle, practically without hysteresis
Housing material /	aluminium anodized / brass nickel-plated or stainless steel 1.4305
Seal /	FKM, EPDM or FFKM
Process connection /	G 1/8"-IG, G 1/4"-IG, G 1/2"-IG, NPT 1/4"-IG or G 1/4"-IG female thread for compression fittings
Media /	5 µm filtered compressed air, non-corrosive gases or liquids
max. Operating pressure /	40 bar
min. Operating temp. /	-40 °C
max. Operating temp. /	+100 °C
Leak rate /	< 1 x 10^{-5} mbar l/s He
Options /	- standard knob with locking ring - locking nut (instead of standard knob) - digi-knob, 100 divisions and with display, only right-hand closing

Materials:

Component (wetted)	Aluminium / brass	Stainless Steel
Valve	aluminium anodized	St. Steel 1.4305
Valve insert / cartridge	brass nickel-plated	St. Steel 1.4305
Connections	brass nickel-plated	St. Steel 1.4305
Seals	FKM	FKM, EPDM or FFKM

Ordering Codes:

Order number	**PV-01.**	**1.**	**2.**	**2.**	**1.**	**3.**	**6.**	**0**

PV-01 High Precision Control Valve for Gases & Liquids

Design size /
1 = small
2 = large

Material (housing, seals) /
1 = aluminium anodized/brass nickel-plated, FKM
2 = stainless steel 1.4305, FKM
3 = stainless steel 1.4305, EPDM
4 = stainless steel 1.4305, FFKM

Design type /
1 = straight valve
2 = angled valve
3 = valve insert without body

Valve type /
1 = valve cw-closed (standard)
2 = valve ccw-closed

Process connection /
1 = G 1/8" - female thread
2 = G 1/4" - female thread
3 = G 1/4" - female thread, compression fitting
4 = G 1/2" - female thread
5 = NPT 1/4" - female thread

Valve size (needle size) /
1 = NG 1.0
2 = NG 1.5
3 = NG 2.0
4 = NG 2.5
5 = NG 3.0
6 = NG 4.0
7 = NG 6.5

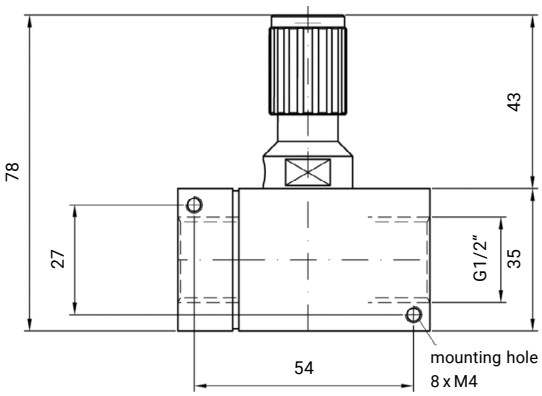
Optionen /
0 = without
1 = standard knob with locking ring
2 = locking nut (instead of standard knob)
3 = digi knob, 100 devisions (for cw-closed valve only)
9 = customer specific version (please specify in detailed text)

Possible Configurations:

Version	Design size - small	Design size - large
Material (body, seals)	aluminium / brass, FKM; st. steel 1.4305, FKM; st. steel 1.4305, EPDM; st. steel 1.4305, FFKM	aluminium / brass, FKM;
Straight valve	x	x
Angled valve	x	
Valve insert without body	x	x
Cw-closed	x	x
Ccw-closed	x	
Process connection	Standard: G 1/4" Options: G 1/8", NPT 1/4" or G 1/4" for compression fittings	Standard: G 1/2" Options: -
Valve size (needle size)	NG 1.0; NG 1.5; NG 2.0; NG 2.5; NG 3.0	NG 4.0; NG 6.5

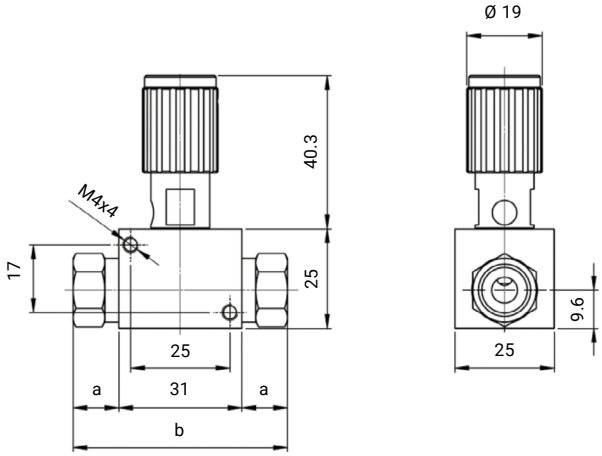
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Dimensions in mm:



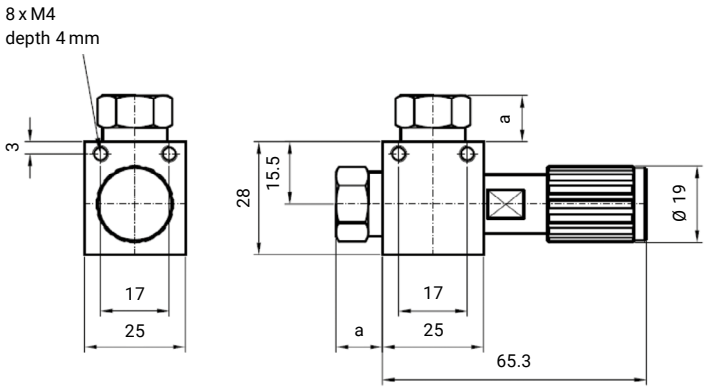
Straight valve - large size

Process connection	length	width
G 1/2" - female thread	62 mm	35 mm



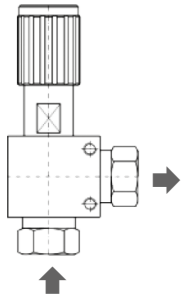
Straight valve - small size

Process connection	a	b	Thread depth
G 1/4" - female thread	12 mm	55 mm	7 mm
G 1/8" - female thread	12 mm	55 mm	8 mm
NPT 1/4" - female thread	16 mm	63 mm	9 mm
G 1/4" - female thread for compression fitting	17 mm	65 mm	12 mm

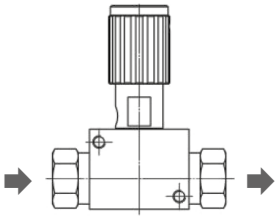


Angled valve - small size

Process connection	a	Thread depth
G 1/4" - female thread	12 mm	7 mm
G 1/8" - female thread	12 mm	8 mm
NPT 1/4" - female thread	16 mm	9 mm
G 1/4" - female thread for compression fitting	17 mm	12 mm



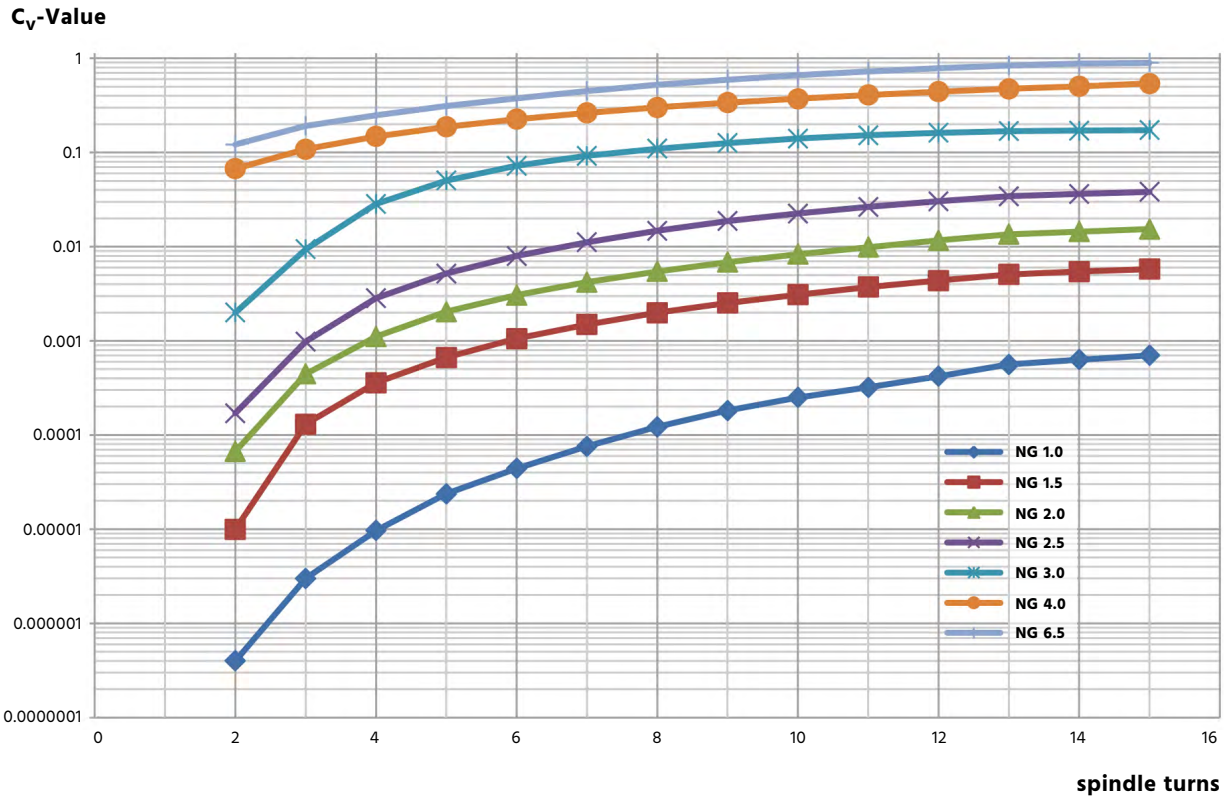
Angled valve



Straight valve

C_v-Values High-Precision Control Valve:

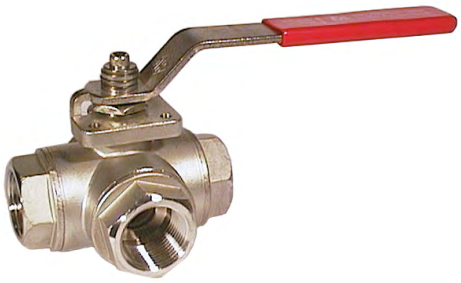
C_v-values for valves NG 1.0 to NG 6.5 (C_v-value 1 = 1 m3/h water at Δ p of 1 bar)

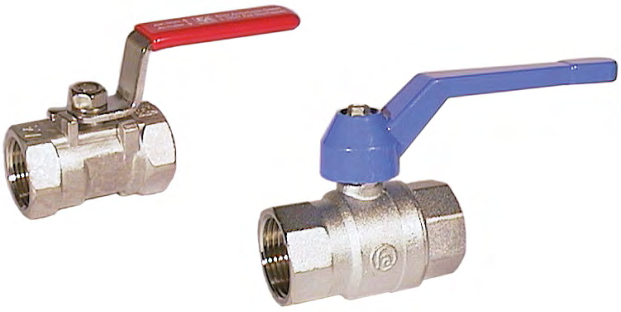


Process connection	1.0	1.5	2.0	2.5	3.0	4.0	6.5
C_v-Value (m^3/h)	0.0007	0.005	0.015	0.038	0.17	0.54	1.00

C_v-Value: For these flow values of water at 20 °C exactly 1 bar pressure will drop at the relevant valve.
These are taken into regard so as to assess the loss of pressure on the valve with reference to the entire range.

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KG-01

Ball Valve in Brass or Stainless Steel

Features

/ High temperature resistance

/ Up to PN64

/ 2 or 3-way versions

/ FKM and PTFE sealings

Description:

The KG-01 series of ball valves are suited for shutting-off the flow of various media. Due to the materials used, such as PTFE, FKM, brass or stainless steel, they are resistant to chemically hostile, gaseous, fluid, viscous, powdery and polluted substances. Permissible ranges of pressure and temperature allow them to be deployed in difficult processes, for example, in chemical and petrochemical industries, in metal and container construction or in the air-conditioning, ventilation and thermal technologies.

Application:

Ball valves have various uses in almost every industrial and private sector. The materials can be easily fitted to the customers needs and their toughness make the Type KG-01 ball valves to reliable devices for House- & Sanitary-technology, plants, oils, petrols, compressed air, chemical processes or heating technology.

Technical Specifications:

Brass version /

max. Testing pressure /	up to 80°C
2-way ball valve:	¼“ up to 2“ PN40 2½“ up to 3“ 4“ PN20 up to 50°C PN40
3-way ball valve:	¼“ up to ¾“ PN30 1“ up to1 ¼“ PN20 1 ½“ up to 2“ PN16
max. Temperature /	-20°C. . .+120°C
Housing /	brass chrome-plated
Ball /	
2-way ball valve:	brass hard chrome-plated
3-way ball valve:	brass chrome-plated
Ball sealing /	
2-way ball valve:	PTFE
3-way ball valve:	PTFE / FKM
Spindle sealing /	
2-way ball valve:	FKM
3-way ball valve:	PTFE / FKM

Stainless steel version /

max. Testing pressure /	up to 80°C
2-way ball valve:	PN40 (PN64 on request)
3-way ball valve:	PN63
max. Temperature /	-30°C. . .+180°C
Housing /	st. steel 1.4408
Ball /	st. steel 1.4401
Ball sealing /	
2-way ball valve:	PTFE
3-way ball valve:	PTFE reinforced w. 15% glassfibre
Spindle sealing /	
2-way ball valve:	PTFE
3-way ball valve:	PTFE/ FKM

Options: flange connection, emptying boring, tetrahedral cap, spindle extension, low-cost versions with reduced passage, pneumatic and electrical drives

Lever Positions:

Handhebel- bzw. Antriebs- montage / Handle or actuator- mou	T-Bohrung/ T-configuration				L-Bohrung/ L-configuration		
	 1	 2	 3	 4	 5	 6	 7
Stellung 0°/ 0°-position							
Stellung 90°/ 90°-position							

Ordering Codes:

Order number **KG-01. 1. 2. 1**

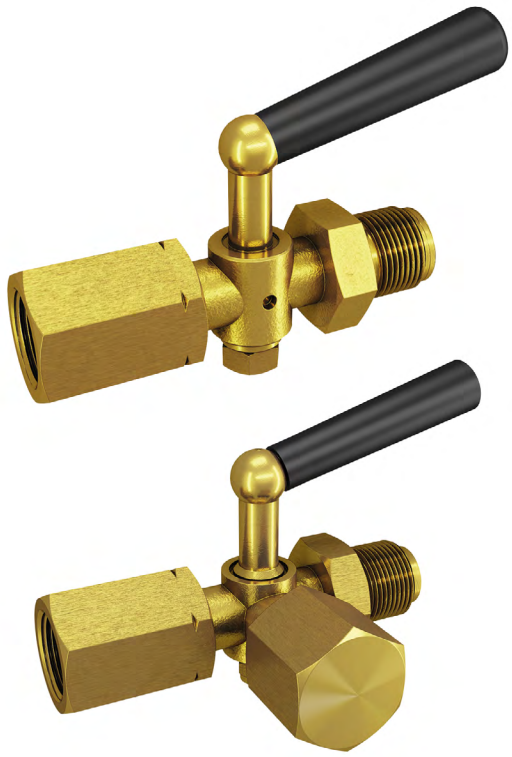
KG-01 Ball Valve

Type /
1 = 2-way, thread female/ femalen
2 = 2-way, thread female/ male
3 = 3-way L boring
4 = 3-way T boring

Material /
1 = brass
2 = stainless steel

Process connection /
1 = G ¼“ (not 3-way stainless steel)
2 = G 3/8“ (not 3-way stainless steel)
3 = G ½“
4 = G ¾“
5 = G 1“
6 = G 1 ¼“
7 = G 1 ½“
8 = G 2“

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AH-65

Manometer Gauge Stopcock According to DIN 16262 A/B & 16263

Features

/ Monitor and vent the pipe

/ Brass or stainless steel

/ -10°C to 50°C

/ Up to 25 bar

Description:

A stopcock is used for the inlet, flow or outlet in pipes to control liquids and gases. Depending on the switchs position, measuring devices can receive pressure (operating mode), or be relieved from it (de-pressuring mode). In the blow-out position, fluids and gasses can pass through the stopcock.

Application:

Stopcocks are available with or without an additional test connector (DIN 16263). This connector can be used for another measuring device, to test an installed pressure gauge. The stopcock can be installed via G¼" or G½" threads.

Technical Specifications:

Process connection / G ½" or G ¼"

max. Pressure /

G ½" Brass:	25 bar
G ½" SS:	16 bar
G ¼" Brass:	6 bar
G ¼" SS:	6 bar

max. Media temperature / -10°C to 50°C

Materials /

Body:	Brass, SS 1.4571
Handle:	PP

When connecting to a Manometer, please use flat gaskets DIN 1625!

Ordering Codes:

Order number	**AH-65.**	**1.**	**2.**	**0**

AH-65 Manometer Gauge Stopcock

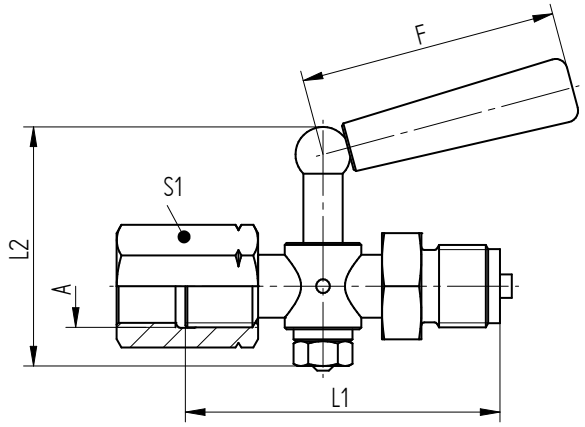
Connection /
1 = G ½"
2 = G ¼"

Material /
1 = brass
2 = stainless steel 1.4571

Test Connector for G½"/
0 = without (DIN 16262 A/B)
9 = with Test Connector M20 x 1.5 (DIN 16263)

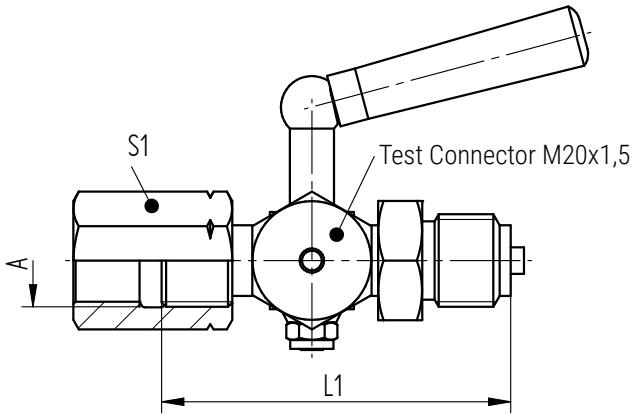
Please consider the pressure as indicated on the left.

Dimensions in mm:



Version	L1 / mm	L2/ mm	F / mm	S1
Brass G¼"	55	39	28	17
Brass G½"	79,5	60	62	27
SS 1.4571 G¼"	57	63	48	17
SS 1.4571 G½"	80	67	60	27

Dimensions (test connector):



Version	L1 / mm	S1
Brass	80	27
SS 1.4571	80	27

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AV-67

Manometer Gauge shut-off Valve according to DIN 16270 A & 16271 A



Features

/ Up to 400 bar and 200°C

/ Closing, opening and throttling

/ Additional test connector

Description:

This shut-off valve can also throttle the pressure in a pipe, instead of just opening and closing it. The AV-67 is, in its stainless steel version, very tough, and can resist pressures up to 400 bar and 200°C. An optional test connector can be used to replace measuring instruments or test the measurement result with another device, without removing it from the process or interrupting the actual operation.

Application:

Shut-off valves can be installed in front of devices operating only within a certain pressure range or a certain amount of media. This way, measuring devices can be started slowly and protected from pressure surges.

Technical Specifications:

Process connection / G ½"

max. Pressure / 400 bar; 250 bar (Brass)

max. Media temperature / -10°C to 200°C;
resp. -10°C to 120°C (Brass)

Materials /

Seal: Steel = Graphite
Brass and SS = PTFE

Body: Brass, Steel 1.0460, SS 1.4571

Handwheel: Bakelit

When connecting to a Manometer, please use flat gaskets DIN 1625!

Ordering Codes:

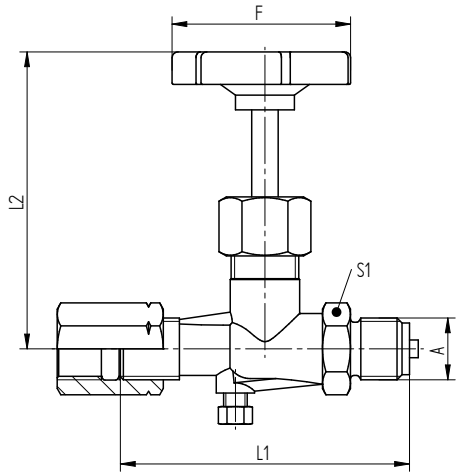
Order number	**AV-67.**	**B.**	**0**

AV-67 Manometer Gauge shut-off Valve

Version /
A = 250 bar - 120 °C - Brass
B = 400 bar - 120 °C - Steel 1.0460
C = 400 bar - 200 °C - SS 1.4571

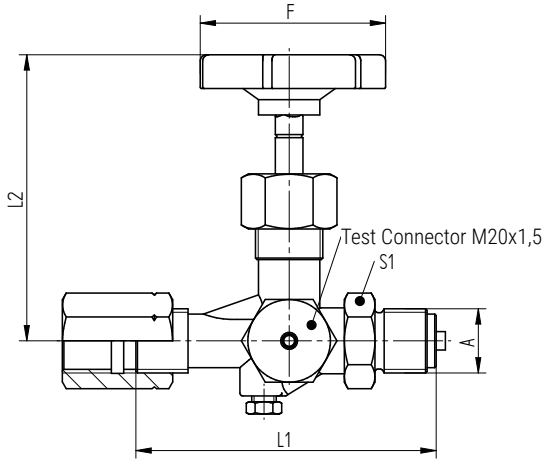
Test Connector /
0 = without (DIN 16270 A)
9 = with test connector M20 x 1,5 (DIN 16271 A)

Dimensions in mm:



Version	L1 / mm	L12/ mm	F / mm	S1
Brass	100	100	63	27
Steel 1.0460	100	94	63	27
SS 1.4571	100	94	63	27

Dimensions (test connector):

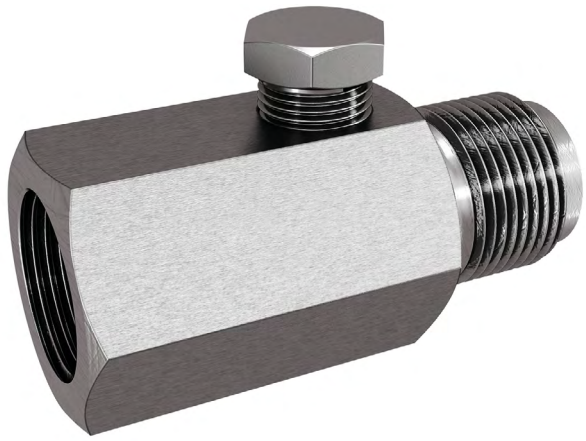


Variante	L1 / mm	L12/ mm	F / mm	S1
Brass	100	100	63	27
Steel 1.0460	100	94	63	27
SS 1.4571	100	94	63	27

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RS-68

Shock Preventer



Description:

The RS-68 is a shock preventer to limit pressure surges and pulsations from damaging pressure gauges and transmitters. It can also be integrated into any process easily, to protect a variety of other devices too. The throttling effect is generated through changing the flows inlet size with an adjusting screw.

Features

/ Variable configuration

/ Easy to handle

/ Different materials

/ PN 250 and PN 400

Application:

Whether in general mechanical endineering, hydraulics, compressors, pumps or plant engineering, the RS-68 is used everywhere, where pressure peaks may occur. The adjusting screw should be screwed in completely, before installing the reducer, because it has to be adjusted to the local measuring conditions. After starting the plant or process, the screw should be screwed outwards just as much as pressure surges can not be seen on the pressure gauges scale anymore. Only fluids without impurities should be used for the reducer to work. Otherwise a clogging of the flow opening can endanger the pressure impulse reducer.

Technical Specifications:

Process connection / G ½" or G ¼"

max. Pressure / 250 bar for brass
400 bar for steel & st. steel

max. Temperature /

Brass: -10°C up to 120°C

Steel: -10°C up to 200°C

Stainless Steel: -10°C up to 200°C

Material /

Body: brass, steel, SS 1.4571

Ordering Codes:

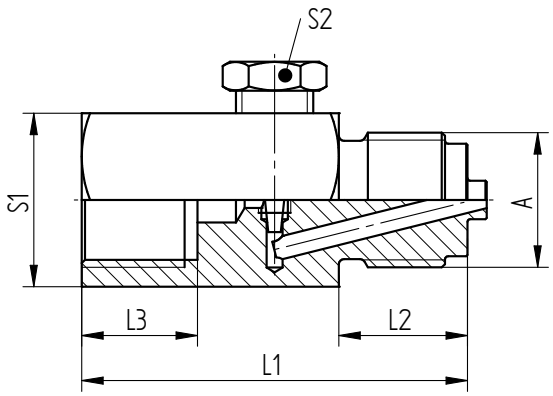
Order number:	**RS-68.**	**1.**	**2**

RS-68 Shock Preventer

Process connection /
1 = G ½"
2 = G ¼"

Material /
1 = brass
2 = steel
3 = stainless steel 1.4571

Dimensions in mm:



Version	L1 / mm	L2/ mm	L3 / mm	S1	S2
Brass G¼"	46	14	11	19	12
Brass G½"	60	20	18	27	14
Steel G¼"	47	13	11	19	14
Steel G½"	60	20	18	27	14
SS 1.4571 G¼"	47	13	11	19	12
SS 1.4571 G½"	60	20	18	27	14

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GH-01

IP66 Connection Box
55 x 55 x 37 mm



Features

/ Protection class IP66

/ Two or three cable glands

/ Self-extinguishing

/ Fully insulated

/ Halogen-free

/ Applicable from -20°C to +90°C

/ Impact resistance 7 Joule

Description:

The connection box GH-01 adds a rough outdoor enclosure to the range of accessories supplied by Profimess. Protection class of this compact housing is IP66, therefore it may even be mounted under harsh weather conditions or in facilities, where water jet cleaning takes place. Two or three pre-assembled M16x1,5 IP68 cable glands for cable diameters from 5 mm up to 10 mm offer enough space for most applications. Optionally two more cable glands (max. four) may be mounted to the free sides of the box.

Application:

GH-01 is used, where ever the interface between a simple switch or sensor in an outdoor area and the supply or signal circuits has to be protected against enviromental influences. The range of application is wide. GH-01 offers a quick, price-worth solution.

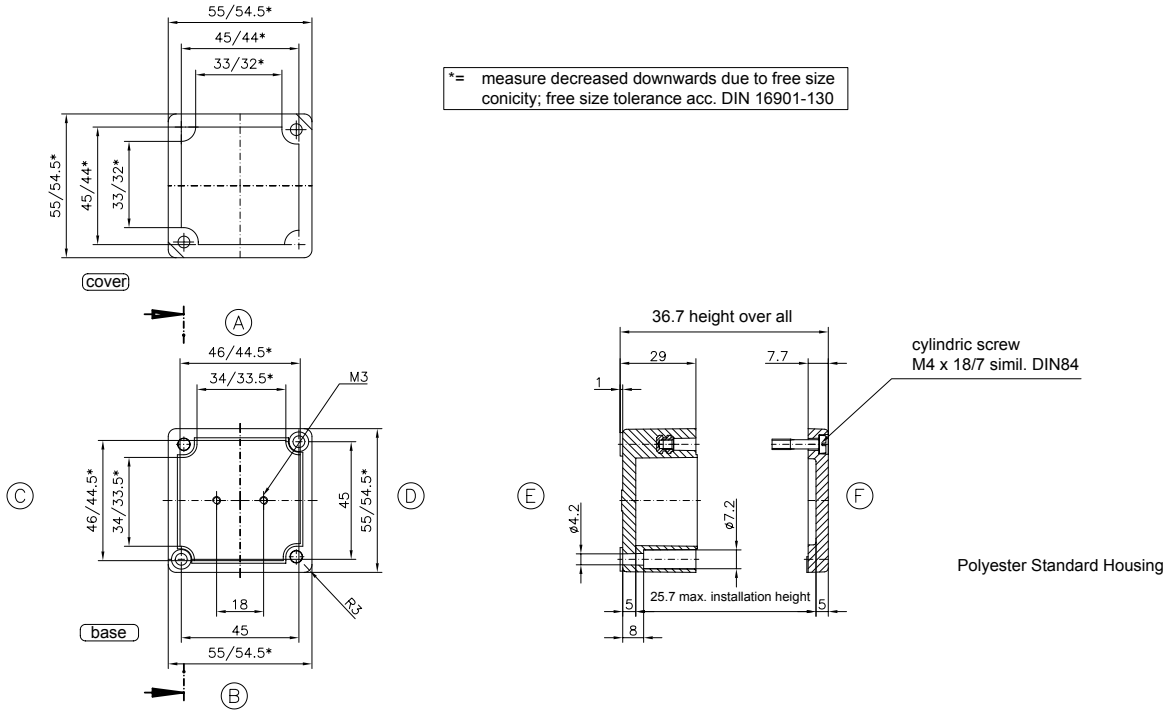
Technical Specifications:

Protection class /	IP66 acc. to EN60529
Material /	glass fibre reinforced, duroplastic polyester
Seal /	flat seal from chloroprene
Colour /	RAL7000, squirrel grey
max. Temperature without cable glands /	-40°C. . .+100°C
Impact resistance /	7 Joule acc. to EN60079-0
Surface resistance /	>10^{12} Ohm, IEC60093
Flammability /	self-extinguishing; UL94 V-0
Insulation /	fully insulated VDE 0100
Disruptive strength /	18 kV/mm, IEC60243-1
Toxicity /	halogen-free
Cable glands /	2 (3) pieces M16 x 1.5 acc. to DIN 5026, pre-assembled
Material:	polyamid 6 V2
Colour:	light grey, RAL 7035
Protection class:	IP68 5 bar
Temperature range:	-20°C. . .+100°C
Cable diameter:	5. . .10 mm
Thread length:	8 mm

Ordering Codes:

Order number	**GH-01.**	**1**
IP66 Connection Box		
Electrical connection / 2 = two cable glands 3 = three cable glands		

Dimensions in mm:



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UM-01

Universal Transmitter for RTD, TC, Ohm, Potentiometer, mA and V



Features

/ Ideal for evaluation of resistance thermometers or levelmeters
/ Galv. separation of analogue signals
/ Models with relay and analogue output
/ Optionally with DNV approval
/ Universal power supply through 21.6 - 253 V AC or 19.2 - 300 V DC
/ Including sensor power supply
/ Attachable display
/ SIL 2

Description:

The UM-01 universal transmitter is a module for assembling into a switchgear cabinet that can receive at the input measured values from resistance thermometers, thermo-elements, ohmic resistors, potentiometers or devices with analogue signals and translates them into a galvanically separated analogue signal. Optionally, the UM-01 can also be equipped with two additional programmable relay outputs; alternatively it can be supplied only as a cost-effective switching unit with relay outputs. The UM-01 is programmed through a separately available mountable display PE451 which is fixed on the front side of the measurement converter to display continuously the input signal, the units, the device TAG-No. and the relay or the output status, as required. The special feature of PE451 is, however, that the UM-01 operates even without it and that the program parameters in the PE451 remain saved. Programming more than one UM-01 is, therefore, a child's play. Once the configuration is done, the settings are easily read into any new measurement converter on mounting and pressing the button; cumbersome resetting of parameters is, therefore, unnecessary. The UM-01 measurement converter is powered universally by DC or AC voltages and is compatible with most common transmitter devices like thermo-elements of type B to type LR, resistance thermometers NI100 and PT100 as 2, 3 or 4-wire and transmitters with analogue output range of 0-20 mA or 0-10 V DC.
The UM-01 has been developed in accordance with the most stringent safety measures and hence can be used in installations with SIL 2.

Application:

Wherever temperatures are measured using thermo-elements or resistance thermometers or levels are output by levelmeters as a potentiometer signal, the UM-01 is the ideal supplement in the line of measuring devices. It converts the linear input signal into an analogue output signal and offers, additionally, the facility of tapping two setpoints as a potential-free relay NO contact. Since the transmitter connected at the input of UM-01 is powered directly by the UM-01, the measurement converter is perfectly suited as a signal separator that establishes a galvanic

separation between the measuring and analyzing circuits. The UM-01 has been conceived for universal application so as to enable the user to save costs on inventory, since he would only need a single device as against two to three variants earlier. Optionally, the UM-01 can be supplied with UL approval for markets in USA or with DNV approval for shipping applications.

Electrical Specifications:

Ambient temperature /	-20°C. . .+60°C
General specifications /	
Universal power supply:	21,6. . .253 VAC, 50. . .60 Hz or 19,2. . .300 VDC
Power consumption:	≤ 2,0 W (≤ 2,5 W, UM-01.3)
Fuse:	400 mA T / 250 VAC
Insulation voltage, Test/Operation:	2,3 kVAC / 250 VAC
Communication interface:	Programming front PE451
Signal/Noise ratio:	min. 60 dB (0. . .100 kHz)
Response time (0. . .90%, 100. . .10%):	
· Temperature input:	≤ 1 s
· mA-/V input:	≤ 400ms
Calibration temp.:	20. . .28°C
Compliance with directives /	
EMV:	2014/30/E4
LVD:	2014/35/E4
FM:	3025 177
UL, Standard f. Safety	UL 508
2-wire power supply (terminals 44, 43) /	25. . .16 VDC / 0. . .20 mA
Cable diameter /	1 x 2.5 mm² max. flex
Terminal joint torque /	0.5 Nm
Rel. humidity /	<95% RF (non-condensing)
Dimensions with PE451 /	109 x 23.5 x 116 mm (H x W x D)
Dimensions without PE451 /	109 x 23.5 x 104 mm (H x W x D)
Protection class Housing/Terminal /	IP50 / IP20
Weight /	Basic weight 145 g plus 25 g in relay outputs plus 15 g with PE451

Accuracy Basic Values:

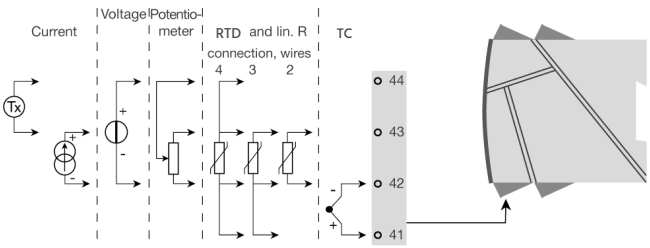
Input type	Basic accuracy	Temp. coefficient
mA	≤ ± 4 µA	≤ ± 4 µA / °C
Volt	≤ ± 20 µV	≤ ± 2 µV / °C
RTH	≤ ± 0.2°C	≤ ± 0.01°C / °C
Lin. R	≤ ± 0.1 Ω	≤ ± 0.01 Ω / °C
Potentiometer	≤ ± 0.1 Ω	≤ ± 0.01 Ω / °C
TE-Types E, J, K, L, N, T, U	≤ ± 1°C	≤ ± 0.05°C / °C
TE-Types R, S, W3, W5, LR	≤ ± 2°C	≤ ± 0.2°C / °C
TE-Type: B 85°C. . .200°C	≤ ± 4°C	≤ ± 0.4°C / °C
TE-Type: B 200°C. . .1820°C	≤ ± 2°C	≤ ± 0.2°C / °C

Accuracy in general /

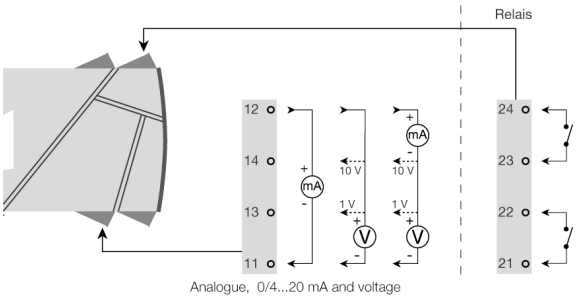
Absolute accuracy:	≤ ± 0.1% of operating range
Temperature coefficient:	≤ ± 0.01% of operating range per °C
EMV error voltage factor:	≤ ± 0.5% of measuring range
Extended EMV error stability:	NAMUR NE21, criterion A
Burst:	≤ ± 1% of measuring range

Applications

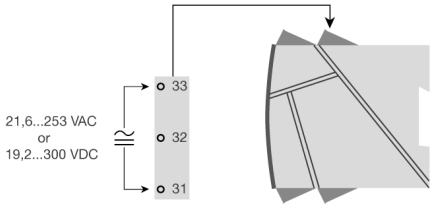
Input signals:



Output signals:



Power supply:



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Inputs:

RTD-, linear resistance and potentiometer /

Eingangsart	MIN-Wert	MAX-Wert	Norm
Pt100	-200°C	+850°C	IEC60751
Ni100	-60°C	+250°C	DIN 43760
Lin. R	0 Ω	10000 Ω	-
Potentiometer	10 Ω	100 kΩ	-

Cable resistance per wire for RTD:	50 Ω max.
Sensor current for RTD:	nom. 0.2 mA
Effect of wire resistance (3- or 4-wire RTD):	< 0.002 Ohm / Ohm
Sensor recognition RTD:	yes
Short-circuit detection RTD:	< 15 Ω

Thermo-element input /

Type	MIN-Value	MAX-Value	Standard
B	0°C	+1820°C	IEC 60584-1
E	-100°C	+1000°C	IEC 60584-1
J	-100°C	+1200°C	IEC 60584-1
K	-180°C	+1372°C	IEC 60584-1
L	-200°C	+900°C	DIN 43710
N	-180°C	+1300°C	IEC 60584-1
R	-50°C	+1760°C	IEC 60584-1
S	-50°C	+1760°C	IEC 60584-1
T	-200°C	+400°C	IEC 60584-1
U	-200°C	+600°C	DIN 43710
W3	0°C	+2300°C	ASTM E988-90
W5	0°C	+2300°C	ASTM E988-90
LR	-200°C	+800°C	GOST 3044-84

Compensations accuracy (CJC) through internal sensors:	± (2,0°C + 0,4°C * Δt)
Sensor detection all TC types:	yes
Sensor error current on detection:	nom. 2 µA, otherwise 0 µA

Power input /

Operating range:	0. . .20 mA
Programmable op. ranges:	0. . .20 and 4. . .20 mA
Input resistance:	nom. 20 Ω + PTC 50 Ω

Voltage input /

Operating range:	0 V. . .12 VDC
Programmable op. ranges:	0/0,2. . .1; 0/1. . .5; 0/2. . .10 VDC
Input resistance:	nom. 10 MΩ

Outputs:

Current output (UM-01.2 and UM-01.3 only) /

Signal range:	0. . .20 mA
Programmable operating ranges:	0/4. . .20 or 20. . .4/0 mA
Load:	800 Ω
Load stability:	≤ 0.01% of measuring range / 100 Ω
Sensor error detection:	0 / 3.5 / 23 mA / keine
NAMUR NE43 Up-/ Downscale:	23 mA / 3.5 mA
Power limiting:	≤ 28 mA

Voltage output (UM-01.2 and UM-01.3 only) /

Signal range:	0. . .10 VDC
Programmable operating ranges:	0/0,2. . .1; 0/1. . .5; 0/2. . .10; 1. . .0,2/0; 5. . .1/0; 10. . .2/0 VDC
Load:	≥ 500 kΩ

Relay outputs (UM-01.1 and UM-01.3 only) /

Relay function:	Setpoint value, Window, Sensor error, Power and Off
Hysteresis:	0. . .100%
On-/Off delay:	0. . .3600 s
Maximum voltage:	250 VRMS
Maximum current:	2 A / AC or 1 A / DC
Maximum AC power:	500 VA
Sensor error confirmation:	Close / Open / Hold

Ordering Codes:

Order number	**UM-01.**	**2.**	**1**

UM-01 Universal Transmitter

Output variants /

1 = Limit switch with two potential-free relays
2 = Transmitter with 4-20 mA- or 0-10 V DC output
3 = Transmitter with 4-20 mA- or 0-10 V DC output and two potential-free relays

Programming unit PE451 /

0 = none
1 = with programming unit PE451 for front-side mounting on the UM-01

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UM-05

Universal transmitter for top hat rail mounting

Description:

The Universal Transmitter UM-05 is a new development of our company and offers the possibility to convert all current sensor signals from the ranges flow, level, pressure and temperature to switching or analog signals, and to set new standards in price-performance ratio. On the input side, the device processes voltage and current signals, Pt100 and PT1000, thermocouples, frequencies and pulses. At the output, the user can use switching signals in the form of relay or PhotoMos outputs, or use the optionally installed analogue signals, the RS232 / 485 or the Bluetooth interface. The UM-05 has a standard 3-digit digital display and has become a DIN rail
assembly designed.

Application:

In the development of the UM-05, the main focus was on ease of use, the suitability for the largest possible number of signals and a very low price range. The configuration therefore also takes place either via three front pushbuttons or via the optional PC software PM-TOOL with CD or USB adapter. The UM-05 is powered by DC or AC voltage and provides as standard a red, 3-digit display, nine parameterizable interpolation points and a display flashing when the limit value is exceeded or undershot. An optionally available sensor supply saves the user the additional power supply for the sensor and an optional data logger saves the recorded measured values over time.

Features

/ 9 adjustable supporting points

/ Tara-function

/ Programming interlock via access code

/ Plug-in screw termina

/ Min/max value recording

/ PNP/NPN- or relay inputs

/ Current or voltage input

/ 3-digit digital display

/ Three front-taster

Technical Specifications:

Protection class /	IP20 / pluggable terminal
Dimensions /	W22,5 x H117,2 x D107 mm
Fixing /	top hat rail
Housing material/	PA6, black, UL94V-0
Connection /	plug-in terminal; wire cross section up to 1,5 mm^2
Display /	3-digits
Digit height /	7 mm
Segment colour /	red
Range of display /	-199 up to 999
Switching points /	LED S1, LED S2, LED S3, LED S4
Overflow/	horizontal bars at the top
Underflow/	horizontal bars at the bottom
Display time/Meas. time /	0,1 to 10,0 seconds
Temperature drift /	100 ppm/K
Measuring time/	0,01. . .2,0 seconds
Measuring rate /	approx. 1/s at temperature sensor, approx. 100/s with standard signals
Measuring principle /	U/F conversion
Resolution /	approx. 14 Bit at 1s measuring time
Working temperature /	-20 to +50°C
Storing temperature /	-30 to +70°C
Weathering resistance /	relative humidity 0-85% on years average without dew

Elektrical Specifications:

Supply 1 /	24 VDC ± 10% galvanic isolated, ≤ 5 VA
Supply 2 /	100-240 VAC 50/60 Hz DC ± 10%, ≤ 15 VA
Supply 3 /	15-40 VDC galvanic isolated / 20-30 VAC 50/60 Hz, ≤ 10 VA
Sensor supply /	24 VDC / 50 mA incl. digital input
Switching points /	**2 Relay outputs with nomally open contact**
Switching voltage /	30 VDC/AC, max. 2 A resistive load
Operating life /	< 30mV/< 10mA - min. 2,5x10^6 30 VDC / 1 A - minimum 5x10^5 30 VDC / 2 A - minimum 1x10^5
	2 PhotoMos-outputs with no. open contact
Switching voltage /	30 VDC/AC, max. 0,4 A
Analog output /	0-10 VDC / load min. 10 kOhm 0/4-20 mA / load max. 500 Ohm. 12 Bit
Interface /	Modbus with ASCII or RTU-protocol
	USB
	Bluetooth
	RS 323
	RS485
Memory /	EEPROM Data preservation ≥ 100 years at 25°C
EMV /	EN61326
CE-identification /	Conformität according to directive 2014/30/EU
Safety regulations /	according to low voltage directive 2014/35/EU EN 61010; EN 60664-1
Pulse input /	**TTL /** Low <2 V / High >3 V
	HTL/PNP / Low <6 V / High >8 V
	Namur / Low <1,5 mA/ High >2,5 mA
	NPN / Low <0,8 V / High via resistance
Reset input	activ <0,8 V
Measuring error/	
Standard	0,2% of measurement ± 1 Digit
Pt 100 / Pt 1000	0,5% of measurement ± 1 Digit
Thermocouple	0,3% of measurement ± 1 Digit

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Measuring Inputs:

Measuring Input	Measuring range	Measuring span	Resolution
Voltage	0. . .10 V (Ri > 100 kOhm)	0. . .12 V	≥ 14 bit
Voltage	0. . .2 V (Ri ≥ 10 kOhm)	0. . .2,2 V	≥ 14 bit
Voltage	0. . .1 V (Ri ≥ 10 kOhm)	0. . .1,1 V	≥ 14 bit
Voltage	0. . .50 mV (Ri ≥ 10 kOhm)	0,75 mV	
Current	4. . .20 mA (Ri = ~ 125 Ohm)	1. . .22 mA	
Current	0. . .20 mA (Ri = ~ 125 Ohm)	0. . .22 mA	
Pt 100-3-wire	-50. . .200°C	-58. . .392°F	0,1°C / 0,1°F
Pt 100-3-wire	-200. . .850°C	-328. . .1562°F	1°C / 1°F
Pt 1000-2-wire	-200. . .850°C	-328. . .1562°F	1°C / 1°F
Thermo K	-270. . .1350°C	-454. . .2462°F	1°C / 1°F
Thermo S	-50. . .1750°C	-328. . .3182°F	1°C / 1°F
Thermo N	-270. . .1300°C	-454. . .2372°F	1°C / 1°F
Thermo J	-170. . .950°C	-274. . .1742°F	1°C / 1°F
Thermo T	-270. . .400°C	-454. . .752°F	1°C / 1°F
Thermo R	-50. . .1768°C	-58. . .3214°F	1°C / 1°F
Thermo B	80. . .1820°C	176. . .3308°F	1°C / 1°F
Thermo E	-270. . .1000°C	-454. . .1832°F	1°C / 1°F
Thermo L	-200. . .900°C	-328. . .1652°F	1°C / 1°F
Frequency	0. . .10 kHz	0. . .10 kHz	0,001 Hz
NPN	0. . .3 kHz	0. . .3 kHz	0,001 Hz
PNP	0. . .1 kHz	0. . .1 kHz	0,001 Hz
Rotational speed	0. . .9999 1/min	0. . .9999 1/min	0,001 1/min
Counter	0. . .9999 (prescaler bis 1000)		

Odering Codes:

Order number **UM-05. 1. 1. 2. 1. 0.**

Universal transmitter

Supply /
1 = 24 VDC, ± 10%
2 = 100. . .240, VDC/AC
3 = 15. . .40 VDC, 20. . .30 VAC

Sensor supply /
0 = without
1 = 24 VDC / 50 mA incl. digital input

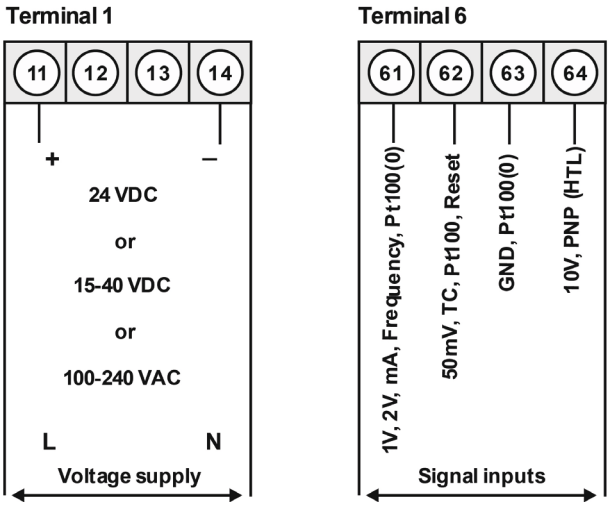
Digital input /
0 = without
1 = Interface RS232
2 = Interface RS485
3 = Bluetooth Interface
4 = Data logger
5 = Analog output

Switch points /
0 = without switch point
1 = 2 relay outputs
2 = 2 PhotoMos outputs
3 = 2 PhotoMos- and 2 relay outputs

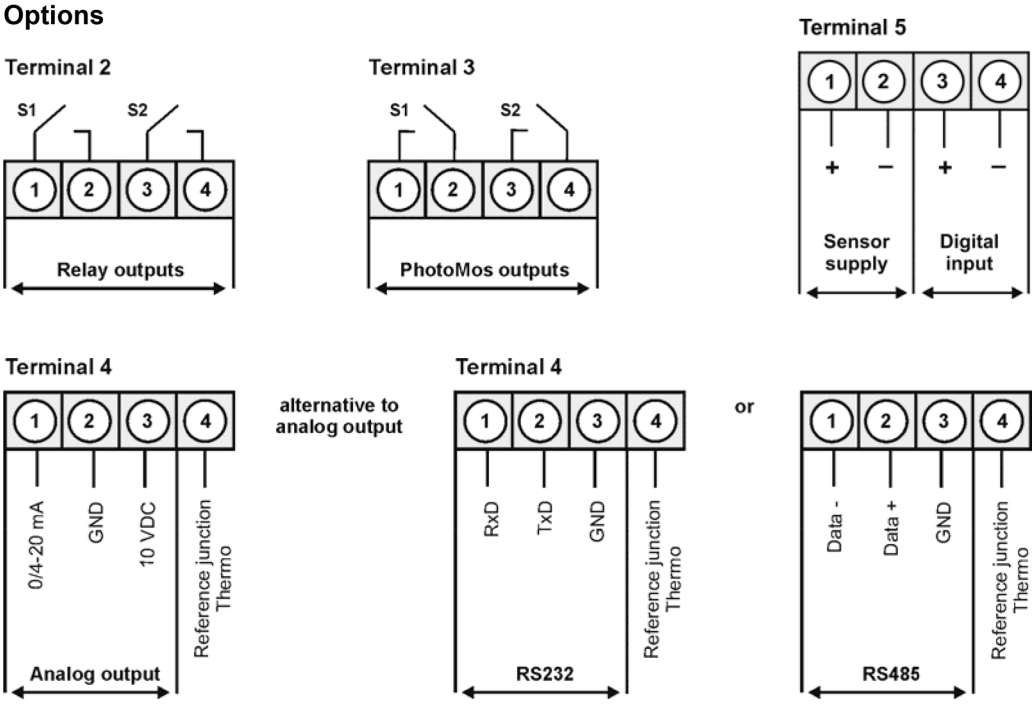
Options /
0 = without
9 = please specify in clear text

Connections:

• Multifunction measuring input



Options



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AZ-02N

5-digit Digital Display and Control Unit



Features

/ Direct voltage and direct current

/ Direct voltage (Shunt)

/ Potentiometer

/ Resistance

/ PT100

/ Thermocouple

/ Frequency

/ AC voltage & alternating current

/ DMS-4-wire

/ Weighing technology

Description:

The AZ-02N Digital Display offers to the user everything that the current process measuring technology demands from electronic evaluation devices. This device is freely scalable and capable of utilizing a wide spectrum of input signals. Equipped with a 5-digit LED display, it optionally provides an output for sensor power supply and a power or voltage output for further processing of the measurement as well as possible setpoints.

Application:

This universal display unit is capable of processing signals from all commonly used sensors in fill level, pressure, flow control or temperature measuring technology and displaying them visually. The relay and analogue outputs freely configurable for hysteresis and range optimally evaluate and process the measurement. The AZ-02N is, therefore, also capable of serving as a control unit for simple system operations. Particulary noteworthy is the easy handling and programming of the device, which is carried out on the frontside keys and leaves no questions open. Through the highlighted properties the universal display units are suitable for practically all applications in the industrial or laboratory operation.

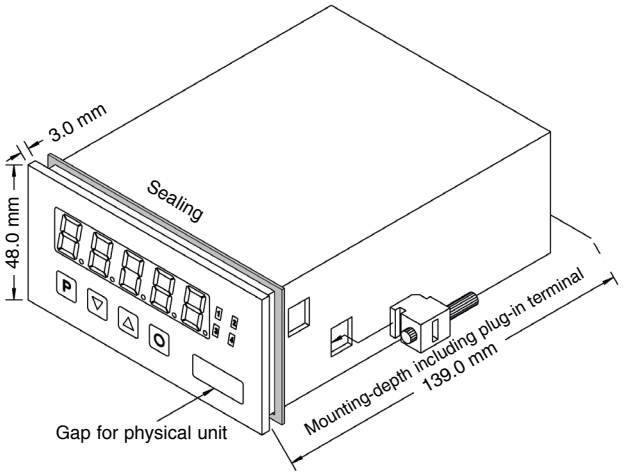
Technical Specifications:

Housing dim. /	W 96 x H48 x D120 mm incl. plug-in terminal D=139 mm
Panel cut-out /	$92.0^{+0,8}$ x $45.0^{+0,6}$ mm
Fastening /	screw elements for walls up to 15 mm thick
Housing material /	PC Polycarbonate, black
Sealing material /	EPDM, 65 Shore, black
Protection class /	front side IP65 standard back side IP00
Weight /	approx.. 350 g
Connection /	plug-in terminal; line cross-section up to 2.5 mm^2
Display /	5-digit
Digit height /	14 mm
Segment colour /	red (standard), optional available in green, blue and orange
Range of display /	-19999 to 99999
Threshold /	optical display flashing
Overflow /	horizontal bars at the top
Underflow /	horizontal bars at the bottom
Display time /	0.1. . .10 seconds
Working temp. /	0°C. . .+50°C
Storing temp. /	-20°C. . .+80°C
Climatic proof /	relative humidity 0 to 85% on years average without dew
On request /	devices for working temperatures of -20°C to +60°C or -40°C to +70°C

Electrical Specifications:

Supply 1 /	100-240 VAC 50/60 Hz, DC ±10% (max. 15 VA)
Supply 2 /	10-40 VDC galvanically insulated, 18-30 VAC 50/60 Hz (max. 15 VA)
Output /	
Relays:	with change-over contact 250 VAC/ 5 A, 30 VDC/ 5 A
Switching cycles:	30 x 10^3 at 5 A, ohmic load 10 x 10^6 mechanically separation as per DIN EN50178 / specifications as per DIN EN 60255
PhotoMos output:	NO-contact: 30 VDC/ AC 0.4 A
Impulse output:	max. 10 kHz (for frequency measurement)
Analog output:	0. . .10 VDC, load ≥ 10 kΩ, 0(4). . .20 mA, load ≤ 500 Ω, 16 Bit)
Sensor supply:	24 VDC/ 50 mA 10 VDC/ 20 mA
Bridge supply:	10 VDC/ 20. . .40 mA/ 250. . .500 Ω
Digital input /	< 2.4 V OFF; 10 V ON; max. 30 VDC, R_i ~5 kΩ
Interface /	
Protocol:	Modbus with ASCII or RTU
RS232:	9600 Baud, no parity, 8 DataBit, 1 StopBit
Wire length:	max. 3 m
RS485:	9600 Baud, no parity, 8 DataBit, 1 StopBit
Wire length:	max. 1000 m
Memory /	EEPROM Data life ≥ 100 years at 25°C
CE-sign /	Conformity to directive 2004/108/EG
EMC /	EN 61326, EN 5501
Safety standard /	according to low voltage directive 2006/95/EG EN 61010; EN 60664-1

Dimensions in mm:



Measuring inputs:

E1: Direct voltage / direct current		
Span	-12. . .12 V	-22. . .24 mA
Measuring range	0. . .10 VDC	0/4. . .20 mA
Input resistance	R_i at ~200 kΩ	R_i at ~100 Ω
Measuring fault	0.1% of measuring range ±1 Digit	0.1% of measuring range ±1 Digit
Temperature drift	100 ppm/K	
Measuring time	0.1. . .10.0 seconds	
Measuring principle	U/F-Converter	
Resolution	approx. 18 Bit at 1s measuring time	

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E2: Direct voltage/ Direct current H-Version (High Voltage)				
Span	-600. . .600 VDC	-300. . .300 VDC	-50. . .50 VDC	-1. . .1 ADC
Measuring range	0. . .600 VDC	0. . .300 VDC	0. . .50 VDC	0. . .1 ADC
Input resistance	R_i at ~2 MΩ	R_i at ~1 MΩ	R_i at ~200 kΩ	R_i at ~0,2 Ω
Measuring fault	0.5% of measuring range			
Temperature drift	100 ppm/K			
Measuring time	0.1. . .10.0 seconds			
Measuring principle	U/F-Converter			
Resolution	approx. 18 Bit at 1s measuring time			

E3: Direct voltage - Shunt				
Span	-5. . .75 mV	-15. . .180 mV	-30. . .360 mV	-100. . .1200 mV
Measuring range	0. . .60 mV	0. . .150 mV	0. . .300 mV	0. . .1000 mV
Input resistance	R_i at ~12 kΩ	R_i at ~30 kΩ	R_i at ~60 kΩ	R_i at ~200 kΩ
Measuring fault	0.5% of measuring range, ±1 Digit	0.5% of measuring range, ±1 Digit	0.5% of measuring range, ±1 Digit	0.5% of measuring range, ±1 Digit
Temperature drift	100 ppm/K			
Measuring time	0.1. . .10.0 seconds			
Measuring principle	U/F-Converter			
Resolution	approx. 18 Bit at 1s measuring time			

E4: Potentiometer	
Span	> 1 kΩ. . .< 1000 kΩ
Measuring range	0. . .100 %
Measuring fault	0.5% of measuring range, ±1 Digit
Temperature drift	100 ppm/K
Measuring time	0.1. . .10.0 seconds
Measuring principle	U/F-Converter
Resolution	approx. 18 Bit at 1s measuring time

E5: Resistance			
Span	0. . .1.1 kΩ	0. . .11 kΩ	0. . .110 kΩ
Measuring range	0. . .1 kΩ	0. . .10 kΩ	0. . .100 kΩ
Measuring fault	0.5% of measuring range, ±1 Digit	0.5% of measuring range, ±1 Digit	.,5% of measuring range, ±1 Digit
Temperature drift	100 ppm/K		
Measuring time	0.1. . .10.0 seconds		
Measuring principle	U/F-Converter		
Resolution	approx. 18 Bit at 1s measuring time		

E6: PT100 (3-/4-wire) (2-wire via Offset)		
Measuring range	-200.0. . .850.0 °C	-328.0. . .1562.0 °F
Measuring fault	0.1% of measuring range, ±1 Digit	0.1% of measuring range, ±1 Digit
Temperature drift	100 ppm/K	
Measuring time	0.1. . .10.0 seconds	
Measuring principle	U/F-Converter	
Resolution	0.1 °C or 0.1 °F	

E7: Thermal elements	
Measuring range	**Type L** -200. . .900°C **Type N**-270. . .1300°C **Type J** -210. . .1200°C **Type E** -270. . .1000°C **Type K** -270. . .1372°C **Type T** -270. . .400°C **Type B** 80. . .1820°C **Type R** -50. . .1768°C **Type S** -50. . .1768°C
Measuring fault	2 K, ±1 Digit
Temperature drift	100 ppm/K
Measuring time	0.1. . .10.0 seconds
Measuring principle	U/F-Converter
Resolution	0.1°C
Characteristic curve fault	< ± 1 K
Reference junction	Thermistor

E8: Frequency	
Signal	Pulse input, TTL, Namur, 3-wire initiator PNP/NPN
Input resistance	R_i at 24 V / 4 kΩ High/Low level > 15 V / < 4 V High/Low TTL-level > 4.6 V / < 1.9 V
Input frequency	0.01 Hz selectable up to 999.99 kHz
Measuring fault	0.05% of measuring range, ±1 Digit

E9: AC voltage, alternating current (true RMS)				
Measuring range	50 VAC	10 VAC	5 AAC	1 AAC
Input resistance	R_i at ~200 kΩ	R_i at ~40 kΩ	R_i at ~0,05 Ω	R_i at ~0,2 Ω
Measuring fault	at 50 Hz to 1 kHz up to crestfactor 4 for input signals of 1% to 100% of final value			
Temperature drift	100 ppm/K			
Measuring time	0.1. . .10.0 seconds			
Measuring principle	U/F-Converter			
Resolution	approx. 18 Bit at 1s measuring time			

E10: AC voltage, alternating current (true RMS) H-Version (High Voltage)				
Measuring range	600 VAC	300 VAC	5 AAC	1 AAC
Input resistance	R_i at ~2 MΩ	R_i at ~1 MΩ	R_i at ~0,05 Ω	R_i at ~0,2 Ω
Measuring fault	at 50 Hz to 1 kHz up to crestfactor 4 for input signals of 1% to 100% of final value			
Temperature drift	100 ppm/K			
Measuring time	0.1. . .10.0 seconds			
Measuring principle	U/F-Converter			
Resolution	approx. 18 Bit at 1s measuring time			

E11: DMS-4-wire with calibration	
Sensor sensitivity	1 mV/V, 2 mV/V, 3.3 mV/V, free up to 4 mV/V with 80% calibration

E12: Weighing technology	
Sensor sensitivity	1 mV/V, 2 mV/V, 3,3 mV/V mit Tara

Possible Configurations:

Selection / Measuring input	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
Supply voltage 100. . .240 VAC	x	x	x	x	x	x	x	x	x	x	x	x
Supply voltage 10. . .40 VDC	x		x	x	x	x	x	x	x		x	x
Sensor supply 10 VDC, 20 mA	x		x									
Sensor supply 24 VDC, 50 mA	x		x					x				
2x Relay output	x	x	x	x	x	x	x	x	x	x	x	x
4x Relay output	x	x	x	x	x	x	x	x	x	x	x	x
8x PhotoMos-output	x	x	x	x	x	x	x	x	x	x	x	x
1x Analog output 0(4). . .20 mA, 0. . .10 VDC	x	x	x	x	x	x	x	x	x	x	x	x
2x Analog output 0(4). . .20 mA, 0. . .10 VDC	x	x	x	x	x	x	x	x	x	x	x	x
1x Digital input	x	x	x	x	x			x	x	x	x	x
Interface RS232	x	x	x	x	x	x	x	x	x	x	x	x
Interface RS485	x	x	x	x	x	x	x	x	x	x	x	x

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Ordering Codes:

Order no.	AZ-02N.	2.	1.	1.	E1.	2.	1.	3.	1

AZ-02N Digital Display

Size /
2 = 96 x 48 mm

Supply Voltage /
1 = 100-240 VAC
2 = 10-40 VDC, galvanic insulated

Sensor supply (incl. digital input) /
0 = without
1 = 10 VDC, 20 mA
2 = 24 VDC, 50 mA
3 = 24 VDC, 50 mA (incl. impulse output)

Measuring input /
E1 = direct voltage / -current (0. . .10 VDC/ 0(4). . .20 mA)
E2 = direct voltage / -current H-Version
E3 = direct voltage (Shunt)
E4 = potentiometer 0 - 100% (> 1 kΩ. . .< 1000 kΩ)
E5 = resistance (1 kΩ, 10 kΩ or 100 kΩ)
E6 = Pt100 (3-/4-wire)
E7 = thermocouple (type L, J, K, B, S, N, E, T, R)
E8 = frequency (0.01 Hz. . .999.99 kHz)
E9 = AC voltage, alternating current (true RMS)
E10 = AC voltage, alternating current (true RMS) H-Version
E11 = DMS-4-wire with calibration
E12 = weighing technology

Digital input /
0 = without
1 = 1 digital input
2 = interface RS232 (galvanic insulated)
3 = interface RS485 (galvanic insulated)
4 = interface RS232 (incl. digital input)
5 = interface RS485 (incl. digital input)

Analog output /
0 = without
1 = 1 x 0(4). . .20 mA, 0. . .10 VDC
2 = 2 x 0(4). . .20 mA, 0. . .10 VDC

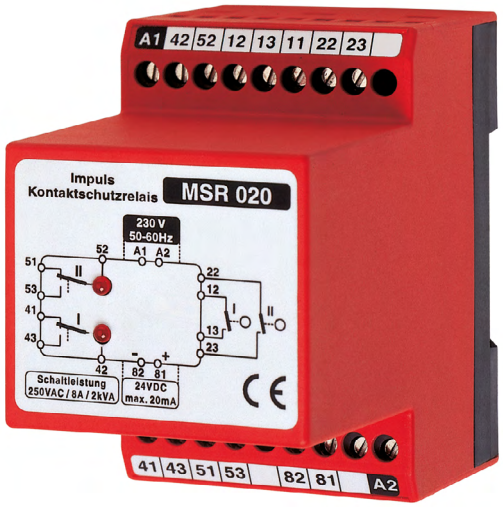
Switching output /
0 = without
1 = 2 relay outputs
2 = 4 relay outputs
3 = 8 PhotoMos-outputs (analog output 2 is not applicable)

Options /
0 = without
1 = display colour blue (red standard)
2 = display colour green
3 = display colour orange
4 = display colour tricolour (red-green-orange)
5 = physical unit (selectable)

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MSR

Multifunctional Relay



Features

/ Protects your sensor elements

/ Practical time response

/ Additional DC voltage output

Description:

The MSR series includes the range of multifunctional relays MSR 10, MSR 11 and MSR 20 that cover all commonly known applications. Thus, the MSR 10 and the MSR 20 are purely contact protecting relays for one or two control signals which protect the contacts in measuring devices against overload due to high switching operations especially in inductive or capacitive loads. In these units, a smartly selected drop-out delay ensures that highly frequent switching of sensor contacts is disregarded and, therefore, the switching points are unambiguously defined. The MSR 11 has a highly qualified bistable interval relay with self-preservation that is capable of controlling the pump completely in combination with two fill level switches.

Application:

Naturally, this unit also protects the contacts of the switch connected to it against overloads. The MSR series of devices is designed for a standard supply voltage of 230 V AC, but they possess also a 24 V DC DC voltage output. Optionally, they are available for connecting to 115 V AC, 24 V AC and 24 V DC. On request, the MSR 10, MSR 11 and MSR 20 can be provided with 24 V DC PNP electronic outputs. The polyamide housing has a housing of type IP 20 protection; however, it can be equipped with an outer housing in IP 65 available as accessory. The device can be assembled on a standard mounting rail as per DIN 50022 or by means of an adapter for individual mounting through screw fitting.

Versions:

MSR Multifunctional Relay

Type: MSR10
monostable contact protective relay for single contacts

Type: MSR11
bistable interval relay with locking feature

Type: MSR20
monostable contact protective relay for double contacts

Supply voltage:
standard 230 VAC;
optional 115 VAC, 24 VAC or 24 VDC

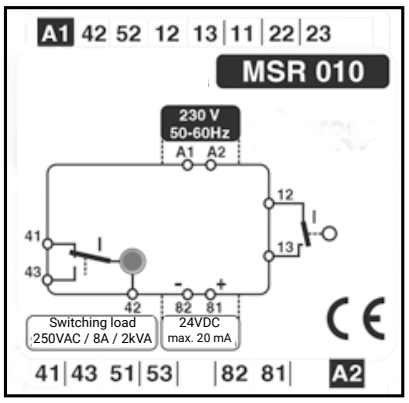
Electrical Specifications::

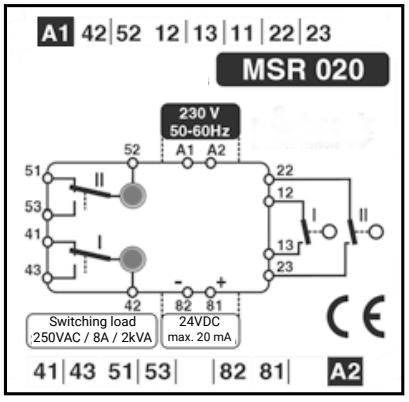
Standards /	
EN 50 178:	electrical safety
EN 61 000-6-2:	stability
EN 61 000-6-3:	fault reporting
EN 60 947-5-1:	low voltage switch-gear
Auxiliary power /	
Supply voltage /	230 VAC (standard), 50 to 60 Hz
Consumption /	MSR 10 typ. 6 VA MSR 11 typ. 6 VA MSR 20 typ. 6 VA
Control signals /	
Control voltage:	35 to 40 VDC Pulse
Pulse-Pause ratio:	0.5 ms / 50 ms (+/-20%)
Switching threshold:	9.7 VDC (+/-10%)
Input impedance:	3300 Ohm, 100 nF (+/-20%)
Line and contact resistance:	max. 4700 Ohm, 47 nF
Output /	
Relay output.:	1 or 2 potential-free change-over
Draw-up and drop-out delay:	10 ms / 450 ms +/- 20% + 50 ms
Contact material:	AgCdO or AgNi+Au
Switching load:	max. 250 VAC; 8 A min. 24 VDC; 100 mA
Short-circuit fuse element:	F 10 A (max. short-circuit current < 100 A)
Voltage output:	(cond. short-circuit protected)
Voltage:	24 VDC (+/-10%)
Load:	max. 20 mA

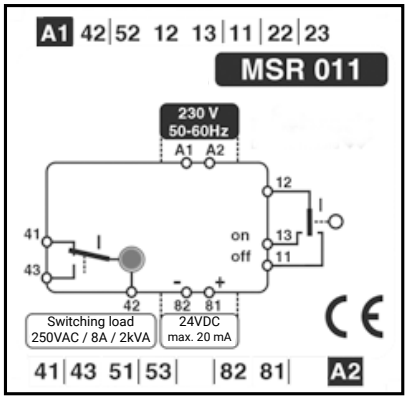
Technical Specifications:

max. Ambient temp. /	0°C to 70°C
Protection class /	IP 20
Assessed insulation voltage /	250 VAC
Housing /	polyamide 6.6
Fixture /	standard rail 35 x 7.5 DIN50022
Connection cross-sections /	0.5 bis 2.5 mm^2 (single or fine-wire)

(for individual fixture an adapter is provided)

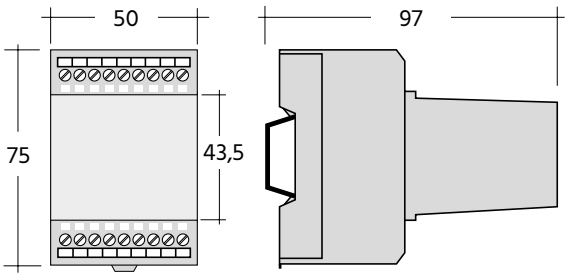






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Dimensions in mm:



Ordering Codes:

Order number	MSR.	10.	2

MSR Multifunctional Relay

Type /

10 = monostable contact protective relay for single contacts
11 = bistable interval relay with locking feature
20 = monostable contact protective relay for double contacts

Supply voltage /

1 = 230 VAC standard
2 = 115 VAC
3 = 24 VAC
4 = 24 VDC

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MV-01

2/2-way Solenoid Valve for Fluids



Features

/ Nominal diameters 1/4“-2“

/ Pressure up to 10 bar

/ 24 V DC and all common AC variants

/ Forced-lifting

Description:

The pilot-controlled full-way valve with servo membrane and forced-lifting is currentless closed. In this status, the core closes the pilot-control boring in the center of the membrane holder due to spring action. The media pressure above the membrane builds up over a membrane throttle boring and closes the valve. When the valve’s magnetic coil is supplied with current, the resulting magnetic field lifts up the core which first opens the pilot-control boring to let the closing pressure above the membrane weaken and the valve can open fully due to the excrescent media pressure and the coil’s magnetic force.

Application:

Magnetic valves are primarily used in processes in which flow of fluids need to be switched on or shut off frequently and at precisely defined point of time. The simple but reliable devices are very frequently deployed especially in the dosing technology. A variety of possible material combinations for the valve body are in brass or stainless steel and the membrane materials like NBR, FKM or EPDM, as well as the available operating voltages in the AC and DC range, render the MV-01 into one of the most universally applicable solenoid valve in the market.

Versions:

MV-01 Solenoid Valve

Housing material: As materials for the housing brass or stainless steel can be selected. In addition, other materials such as brass nickel-plated are available on request.

Cv-value: For these flow values of water as the medium at 20°C (from 1.3 to 30.0 m3/h) exactly 1 bar pressure will drop at the relevant valve. These are taken into regard so as to assess the loss of pressure on the valve with reference to the entire range.

Connection: All cylindrical thread sizes between G1/4" and G2" are available. However, the relationship between the Cv- value and the thread must be taken into consideration.

Supply voltage: Besides 24 V DC also all commonly used variants of AC voltage can be supplied.

Membrane material: Among plastic materials, NBR (Perbunan®), FKM (Viton®) and EPDM are available. Depending on the medium and the required temperature any of the alternatives can be supplied. NBR is used for neutral fluids like water, hydraulic oil and oils and greases without additives. FKM is used for Per-solutions and hot oils with additives and EPDM should be used for oil- and greaseless fluids like hot water and alkaline washing and bleaching lye.

Accessories: Besides the required standard plug socket also sockets with LED for switching status display, varistor for surge voltage protection or integrated rectifier can be supplied.

Ordering Codes:

Order number	**MV-01.**	**[][][][][].**	**2**

MV-01 Solenoid Valve

Type-ID (see table) /
Example A041M:
brass housing, NBR diaphragm, polyamide coil,
process connection G 1/2", Cv-value 3.6 m^3/h, voltage 24 VDC

Accessories /
0 = none
1 = device plug socket DIN EN 175301-803 Form A
2 = device plug socket DIN EN 175301-803 Form A with LED
3 = device plug socket DIN EN 175301-803 Form A with LED and varistor
4 = device plug socket DIN EN 175301-803 Form A with LED, varistor and rectifier

Technical Specifications:

Housing material /	brass acc. to DIN EN 50930-6, stainless steel 1.4408 (316), brass nickel-plated (5µ)
Intern. components /	
Brass housing	brass, stainless steel and PPS
St.-steel housing:	stainless steel and PPS
max. Pressure /	10 bar
Medium /	
NBR:	neutral fluids, water, hydraulic oil, oil without additives
FKM:	Per-solutions, hot oils with additives
EPDM:	oil- and greaseless fluids
max. Temperature /	
NBR:	-10°C. . .+80°C
FKM:	with polyamid coil 0°C. . .+90°C, with epoxy coil 0°C. . .+120°C
EPDM:	with polyamid coil -30°C. . .+90°C, with epoxy coil -30°C. . .+100°C
max. Ambient temp. /	+55°C
Mounting position /	any, preferably with drive towards top

Electrical Specifications:

Supply /	24 VDC or 24 VAC (50 Hz) and 230 VAC (50 Hz), others on request
Voltage tolerance /	± 10%
Protection class /	IP65 with cable plug
El. connection /	plug DIN EN 175301-803 Form A
Response time[1] /	0.1. . .4 seconds (depending on nominal diameter and differential pressure)

[1] Measured at valve outlet at 6 bar and +20°C

Opening	pressure build-up	0. . .90%
Closing	pressure drop	100. . .10%

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Table 1: Solenoid valves with brass housing, DN 10-40 mm

1a: Brass housing, NBR diaphragm, polyamide coil, medium temperature: -10°C. . .+80°C

Thread	ND	Cv-Value [3) 5)]	Pressure [4)]	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 1/4"	10	1.3	0 - 10	0.3	0.5	A011M	A012M	A013M
G 3/8"	10	1.9	0 - 10	0.3	0.5	A021M	A022M	A023M
G 1/2"	10	1.9	0 - 10	0.4	0.5	A031M	A032M	A033M
G 1/2"	13	3.6	0 - 10	0.4	0.5	A041M	A042M	A043M
G 3/4"	13	3.6	0 - 10	0.5	0.6	A051M	A052M	A053M
G 3/4"	20	8.3	0 - 10	0.7	0.8	A061M	A062M	A063M
G 1"	20	8.3	0 - 10	0.9	1.0	A071M	A072M	A073M

1b: Brass housing, NBR diaphragm, epoxy coil, medium temperature: -10°C. . .+80°C

Thread	ND	Cv-Value [3) 5)]	Pressure [4)]	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 1"	25	11	0 - 10	1.6	2.2	B011M	B012M	B013M
G 1 1/4"	25	11	0 - 10	1.7	2.3	B021M	B022M	B023M
G 1 1/4"	40	23	0 - 10	2.9	3.4	B031M	B032M	B033M
G 1 1/2"	40	30	0 - 10	3.2	3.7	B041M	B042M	B043M
G 2"	40	30	0 - 10	3.4	3.9	B051M	B052M	B053M

1c: Brass housing, FKM diaphragm, epoxy coil, medium temperature: 0°C. . .+120°C

Thread	ND	Cv-Value [3) 5)]	Pressure [4)]	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 1/4"	10	1.3	0 - 10	0.3	0.5	C011M	C012M	C013M
G 3/8"	10	1.9	0 - 10	0.3	0.5	C021M	C022M	C023M
G 1/2"	10	1.9	0 - 10	0.4	0.5	C031M	C032M	C033M
G 1/2"	13	3.6	0 - 10	0.4	0.5	C041M	C042M	C043M
G 3/4"	13	3.6	0 - 10	0.5	0.6	C051M	C052M	C053M
G 3/4"	20	8.3	0 - 10	0.7	0.8	C061M	C062M	C063M
G 1"	20	8.3	0 - 10	0.9	1.0	C071M	C072M	C073M
G 1"	25	11	0 - 10	1.6	2.2	C081M	C082M	C083M
G 1 1/4"	25	11	0 - 10	1.7	2.3	C091M	C092M	C093M
G 1 1/4"	40	23	0 - 10	2.9	3.4	C101M	C102M	C103M
G 1 1/2"	40	30	0 - 10	3.2	3.7	C111M	C112M	C113M
G 2"	40	30	0 - 10	3.4	3.9	C121M	C122M	C123M

1d: Brass housing, EPDM diaphragm, polyamide coil, medium temperature: -30°C. . .+90°C

Thread	ND	Cv-Value [3) 5)]	Pressure [4)]	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC. 50 Hz	230 VAC. 50 Hz
G 1/4"	10	1.3	0 - 10	0.3	0.4	D011M	D012M	D013M
G 3/8"	10	1.9	0 - 10	0.3	0.4	D021M	D022M	D023M
G 1/2"	10	1.9	0 - 10	0.4	0.5	D031M	D032M	D033M
G 1/2"	13	3.6	0 - 10	0.4	0.5	D041M	D042M	D043M
G 3/4"	13	3.6	0 - 10	0.5	0.6	D051M	D052M	D053M
G 3/4"	20	8.3	0 - 10	0.7	0.8	D061M	D062M	D063M
G 1"	20	8.3	0 - 10	0.9	1.0	D071M	D072M	D073M

1e: Brass housing, EPDM diaphragm, epoxy coil, medium temperature: -30°C. . .+100°C

Thread	ND	Cv-Value 3) 5)	Pressure 4)	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 1"	25	11	0 - 10	1.6	2.2	**E011M**	**E012M**	**E013M**
G 1 1/4"	25	11	0 - 10	1.7	2.3	**E021M**	**E022M**	**E023M**
G 1 1/4"	40	23	0 - 10	2.9	3.4	**E031M**	**E032M**	**E033M**
G 1 1/2"	40	30	0 - 10	3.2	3.7	**E041M**	**E042M**	**E043M**
G 2"	40	30	0 - 10	3.4	3.9	**E051M**	**E052M**	**E053M**

Table 2: Solenoid valves with st. steel housing, DN 10-40 mm

2a: Stainless steel housing, NBR diaphragm, polyamide coil, medium temperature: -10°C. . .+80°C

Thread	ND	Cv-Value 3) 5)	Pressure 4)	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 3/8"	10	1.9	0 - 10	0.3	0.4	**A021E**	**A022E**	**A023E**
G 1/2"	13	3.6	0 - 10	0.4	0.5	**A041E**	**A042E**	**A043E**
G 3/4"	20	8.3	0 - 10	0.7	0.8	**A061E**	**A062E**	**A063E**
G 1"	20	8.3	0 - 10	0.9	1.0	**A071E**	**A072E**	**A073E**

2b: Stainless steel housing, NBR diaphragm, epoxy coil, medium temperature: -10°C. . .+80°C

Thread	ND	Cv-Value 3) 5)	Pressure 4)	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 1"	25	11	0 - 10	1.6	2.2	**B011E**	**B012E**	**B013E**
G 1 1/4"	25	11	0 - 10	1.7	2.3	**B021E**	**B022E**	**B023E**
G 1 1/2"	40	30	0 - 10	3.2	3.7	**B041E**	**B042E**	**B043E**
G 2"	40	30	0 - 10	3.4	3.9	**B051E**	**B052E**	**B053E**

2c: Stainless steel housing, FKM diaphragm, epoxy coil, medium temperature: 0°C. . .+120°C

Thread	ND	Cv-Value 3) 5)	Pressure 4)	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 3/8"	10	1.9	0 - 10	0.3	0.4	**C021E**	**C022E**	**C023E**
G 1/2"	13	3.6	0 - 10	0.4	0.5	**C041E**	**C042E**	**C043E**
G 3/4"	20	8.3	0 - 10	0.7	0.8	**C061E**	**C062E**	**C063E**
G 1"	20	8.3	0 - 10	0.9	1.0	**C071E**	**C072E**	**C073E**
G 1"	25	11	0 - 10	1.6	2.2	**C081E**	**C082E**	**C083E**
G 1 1/4"	25	11	0 - 10	1.7	2.3	**C091E**	**C092E**	**C093E**
G 1 1/2"	40	30	0 - 10	3.2	3.7	**C111E**	**C112E**	**C113E**
G 2"	40	30	0 - 10	3.4	3.9	**C121E**	**C122E**	**C123E**

2d: Stainless steel housing, EPDM diaphragm, polyamide coil, medium temperature: -30°C. . .+90°C

Thread	ND	Cv-Value 3) 5)	Pressure 4)	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC. 50 Hz	230 VAC. 50 Hz
G 3/8"	10	1.9	0 - 10	0.3	0.4	**D021E**	**D022E**	**D023E**
G 1/2"	13	3.6	0 - 10	0.4	0.5	**D041E**	**D042E**	**D043E**
G 3/4"	20	8.3	0 - 10	0.7	0.8	**D061E**	**D062E**	**D063E**
G 1"	20	8.3	0 - 10	0.9	1.0	**D071E**	**D072E**	**D073E**

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2e: Stainless steel housing, EPDM diaphragm, epoxy coil, medium temperature: -30°C. . .+100°C

Thread	ND	Cv-Value [3] [5]	Pressure [4]	Weight		Ordering code: Type-ID		
	[mm]	[m³/h]	[bar]	[kg] AC	[kg] DC	24 VDC	24 VAC, 50 Hz	230 VAC, 50 Hz
G 1"	25	11	0 - 10	1.6	2.2	**E011E**	**E012E**	**E013E**
G 1 1/4"	25	11	0 - 10	1.7	2.3	**E021E**	**E022E**	**E023E**
G 1 1/2"	40	30	0 - 10	3.2	3.7	**E041E**	**E042E**	**E043E**
G 2"	40	30	0 - 10	3.4	3.9	**E051E**	**E052E**	**E053E**

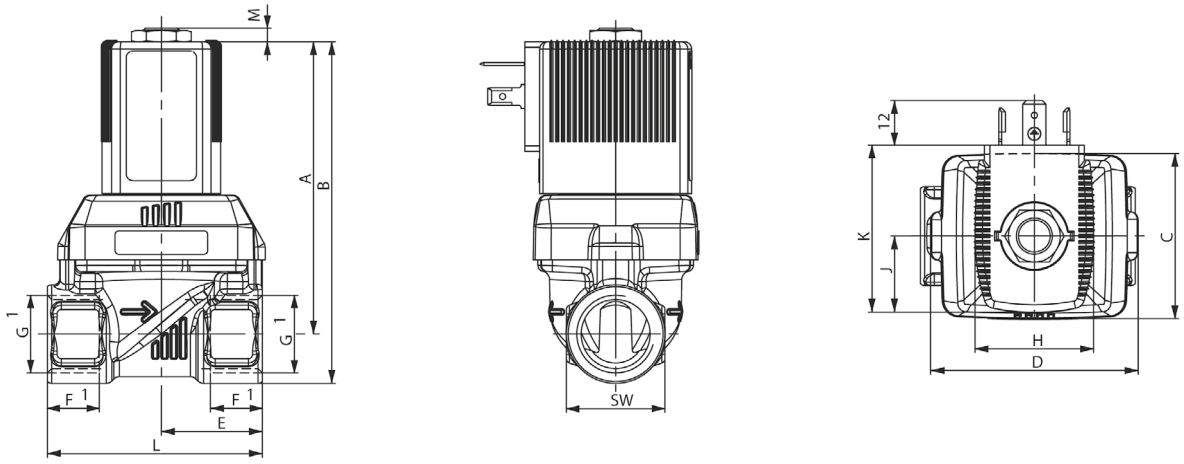
[3] Measured at +20°C, 1 bar pressure at valve inlet and free outlet
[4] Pressure data [bar]: Overpressure with respect to atmospheric pressure
[5] A minimum differential pressure of 0.5 bar is required for full (100%) opening

Table 3: Power consumption

ND	Thread	Coil size width [mm]		Power consumption [6]			Insulation class coil [7]		Weight [kg]	
				Inrush AC [VA]	Operating hot coil		Seal material FKM	Seal material NBR & EPDM	Brass coil AC	Brass coil DC
		AC	DC		AC [VA/W]	DC [W]				
10	**G 1/4"**	32	40	34	14/8	10 (11)	H	B	0.33	0.41
10	**G 3/8"**	32	40	34	14/8	10 (11)	H	B	0.33	0.41
10	**G 1/2"**	32	40	34	14/8	10 (11)	H	B	0.37	0.44
13	**G 1/2"**	32	40	36	14/8	10 (11)	H	B	0.46	0.54
13	**G 3/4"**	32	40	36	14/8	10 (11)	H	B	0.49	0.57
20	**G 3/4"**	32	40	38	14/8	10 (11)	H	B	0.74	0.82
20	**G 1"**	32	40	38	14/8	10 (11)	H	B	0.95	1.03
25	**G 1"**	42	65	150	37/16	28 (29)	H	H	1.6	2.2
25	**G 1 1/4"**	42	65	150	37/16	28 (29)	H	H	1.7	2.3
40	**G 1 1/4"**	42	65	190	37/16	28 (29)	H	H	3.2	3.7
40	**G 1 1/2"**	42	65	190	37/16	28 (29)	H	H	3.2	3.7
40	**G 2"**	42	65	190	37/16	28 (29)	H	H	3.38	3.9

[6] Values in brackets applies at coil temperature +20°C
[7] H epoxy coil, B polyamide coil

Table 4: Dimensions (mm)



3a: Dimensions (AC-coil, 32 mm)

DN	A	B	C	D	E (MS)	E (VA)	F1	G1	H	J	K	L (MS)	L (VA)	SW	M
	67.4	78.4			22	22	12	G 1/4"				50	50	22	
10	67.4	78.4	36	46	22	22	12	G 3/8"	32	20.5	45	50	50	22	3.7
	69.4	82.9			24.5	24.5	14	G 1/2"				50	55	27	
13	78.9	92.4	44.5	56	27.2	32.5	14	G 1/2"	32	20.5	45	58	65	27	3.7
	80.9	96.9			32.5	32.5	16	G 3/4"				65	65	32	
20	93.4	109.4	65	76.6	37	37	16	G 3/4"	32	20.5	45	80	80	32	3.7
	95.9	116.4			37.5	37.5	18	G 1"				80	80	41	

3b: Dimensions (DC-coil, 40 mm)

DN	A	B	C	D	E (MS)	E (VA)	F1	G1	H	J	K	L (MS)	L (VA)	SW	M
	67.4	78.4			22	22	12	G 1/4"				50	50	22	
10	67.4	78.4	36	46	22	22	12	G 3/8"	40	23.5	51	50	50	22	3.7
	69.4	82.9			24.5	24.5	14	G 1/2"				50	55	27	
13	79.3	92.8	44.5	56	27.2	32.5	14	G 1/2"	40	23.5	51	58	65	27	3.7
	81.3	97.3			32.5	32.5	16	G 3/4"				65	65	32	
20	93.8	109.8	65	76.6	37	37	16	G 3/4"	40	23.5	51	80	80	32	3.7
	96.3	116.8			37.5	37.5	18	G 1"				80	80	41	

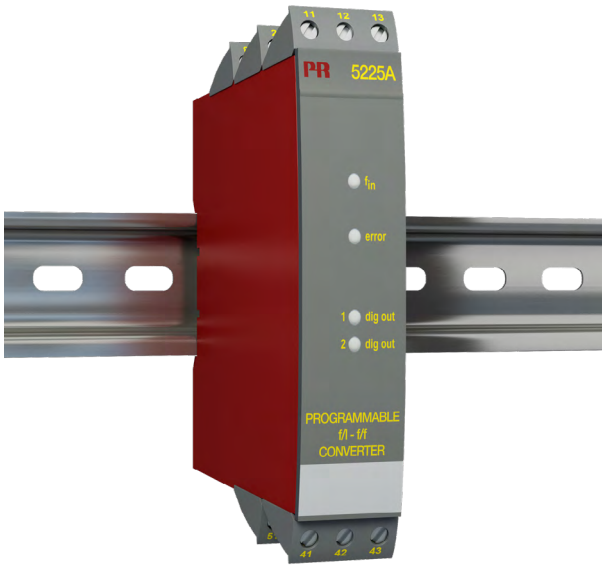
3c: Dimensions (AC-coil, 42 mm / DC-coil 65 mm)

DN	A	B	C	D	E (MS)	E (VA)	F1	G1	H	J	K	L (MS)	L (VA)	SW	M
	158.3	193.3			64	64	24	G 2"				132	132	70	
40	152.3	182.3	104.5	117	61	61	22	G 1 1/2"	65	37.5	72	126	126	60	7
	146.8	171.8			61	61	20	G 1 1/4"				126	126	50	
25	141.3	166.3	77	88	46	46	20	G 1 1/4"	65	37.5	72	95	95	50	7
	136.3	156.8			46	46	18	G 1"				95	95	41	
	158.3	193.3			64	64	24	G 2"				132	132	70	
40	152.3	182.3	104.5	117	61	61	22	G 1 1/2"	42	27	55.5	126	126	60	7
	146.8	171.8			61	61	20	G 1 1/4"				126	126	50	
25	141.3	166.3	77	88	46	46	20	G 1 1/4"	42	27	55.5	95	95	50	7
	136.3	156.8			46	46	18	G 1"				95	95	41	

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PR-5225

Railmounted
F/F- or F/I-converter



Features

/ Pulse conditioning

/ Frequency generator

/ Freq. division or multiplication

/ Buffer for fast pulse trains

/ 4. . .20 mA or 0. . .10 VDC output

/ PNP/NPN- or Relay outputs

/ Input range 0. . .20 kHz

/ Namur, Tacho, NPN, PNP, TTL

/ Four front-LEDs

Description:

PR-5225 converts the output frequency of nearly all Profimess flow-meters or any other units with pulse output, to an analogue output, which may be a power signal of any span between 0 mA and 20 mA with a minimum width of 5 mA or a voltage signal of either 0. . .1 VDC or 0. . .10 VDC gripped of at an internal shunt. Alternatively PR-5225 may be operated as a frequency converter, which either transforms the signal of too slow sensors up or the signal of too fast sensors down to a usable frequency. Even an operation mode as frequency generator e.g. as clock generator or time base is possible. If the FIFF-mode is chosen, PR-5225 outputs the evaluated frequency and the analogue signal simultaneously.

Application:

Pulse signals of flowmeters in practice often have to be converted into analogue outputs, because the downstream evaluating units do usually not possess any slots for frequency-based signals. Also a frequency adaption is frequently necessary, whenever the inputs of the PLC do not work with too high frequencies. PR-5225 offers there-fore a reliable, cost-effective solution. The emitted pulses of PR-5225 are usually much cleaner than those of the connected flowmeters, nevertheless a 50 Hz low-pass filter can be factory-set, to fade out high-frequent interfering signals.

Technical Specifications:

Protection class /	IP20
Temperature range /	-20°C. . .+60°C
Calibration temperature /	+20°C. . .+28°C
rel. Humidity /	< 95 % RH (non-cond.)
Dimensions (HxWxD) /	109 x 23.5 x 130 mm
Weight /	app. 190 g
DIN rail type /	DIN 46277
Wire size /	max. 1 x 2.5 mm^2 stranded wire
Screw terminal torque /	0,5 Nm

Electrical Specifications:

Supply voltage /	19.2. . .28.8 VDC
Power consumption /	max. 3.5 W
Internal consumption /	1.7 W
Warm-up time /	30 s
Power-up delay digital outputse /	0. . .999 s factory adjustable
Signal-noise ratio /	min. 60 dB
Response times /	
analogue output:	< 60 ms + 1 period
digital output:	< 50 ms + 1 period
concurrent f/i and f/f:	< 80 ms + 1 period
Effect of supply voltage /	≤ 0.002 % of span per %V
Temperature coefficient /	< ± 0.01% of span per °C
Linearity error /	< ± 0.1% of span
EMC-immunity influence /	< ± 0.5%
Auxiliary voltages /	
Supply NAMUR:	8.3 V ± 0.5 VDC / 8 mA
Supply S0:	17 V / 20 mA
Supply NPN / PNP:	17 V / 20 mA
Additional supply:	5. . .17 V / 20 mA factory adjustable

Inputs:

Common specifications /	
Input range:	0. . .20 kHz
max. Offset:	50% of selected max. frequency
min. Frequency:	0.001 Hz
Low cut-off frequency:	0.001 Hz
min. Pulse width:	25 µs
min. Period time:	50 µs
max. Frequency:	20 kHz
Trigger level:	0.025. . .6.5 V (nom.), factory adjustable
Trigger level LOW:	50 % of trigger HIGH
NAMUR-input acc. to DIN 19234 /	
Trigger level LOW:	≤ 1.2 mA
Trigger level HIGH:	≥ 2.1 mA
Input impedance:	1000 Ω
Sensor break:	≤ 0.1 mA
Short-circuit:	≥ 7 mA
Response time:	≤ 400 ms
Tacho-input /	
Trigger level LOW:	≤ -50 mV
Trigger level HIGH:	≥ +50 mV
Input impedance:	≥ 100 kΩ
max. Input voltage:	80 V AC pp
NPN-/PNP-input /	
Trigger level LOW:	≤ 4,0 V
Trigger level HIGH:	≥ 7,0 V
Standard input impedance:	3.48 kΩ
Input impedance special version:	13.3 kΩ / NPN
TTL-input /	
Trigger level LOW:	≤ 0.8 V DC
Trigger level HIGH:	≥ 2.0 V DC
Input impedance:	≥ 100 kΩ
S0-input acc. to DIN 43864 /	
Trigger level LOW:	≤ 2.2 mA
Trigger level HIGH:	≥ 9.0 mA
Input impedance:	800 Ω

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Outputs:

Digital outputs (PNP/NPN) /

max. Current source:	30 mA
max. Current sink:	130 mA
max. Voltage:	28.5 V

Power output /

Signal range:	0. . .20 mA
min. Span:	5 mA
Signal dynamics:	16 bit
max. Offset:	50% of selected max. value
Updating time:	max. 20 ms
Updating time for concurrent f/f and f/i:	max. 40 ms
max. Load:	20 mA / 600 Ω/ 12 VDC
Load stability:	≤ 0.01% of span per 100 Ω
Current limit:	< 23 mA

Voltage output through internal shunt /

Signal range:	0. . .10 VDC
min. Span:	250 mV
max. Offset:	50% of selected max. value
Load:	min. 500 kΩ

FF-converter output /

Signal range:	0. . .1000 Hz
Multiplicator / Divisor:	1. . .1000000
min. Pulse width:	500 µs
max. Pulse width:	999 ms
max. Duty Cycle:	50 %

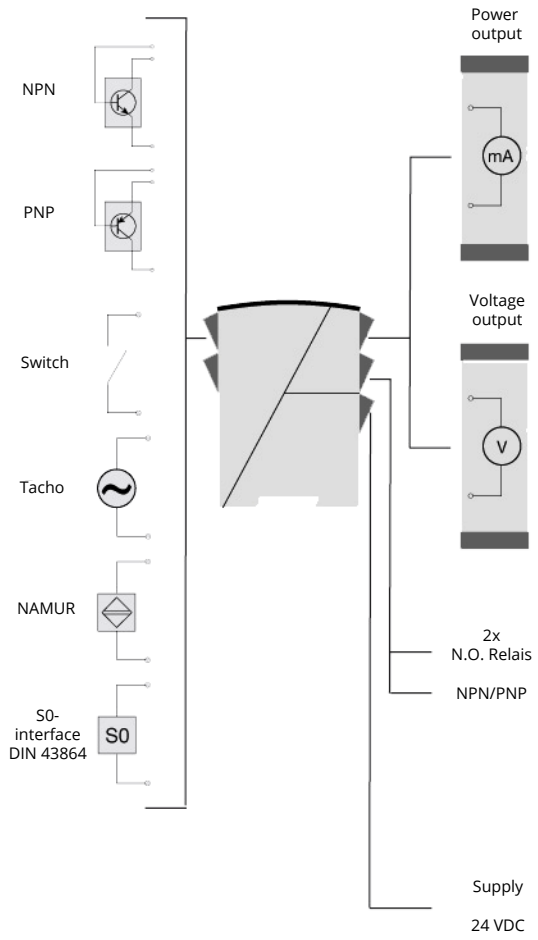
Frequency generator /

min. Periodic time:	50 µs
max. Frequency:	20 kHz
Duty Cycle:	50 %

Relay outputs /

max. Output frequency:	20 Hz
Isolation voltage test / operation:	3.75 kV AC / 250 V AC
max. Voltage:	250 VRMS
max. Current:	2 A AC
max. Power (AC):	500 VA
max. Relay load at 24 VDC:	1 A

Connections:



Ordering Codes:

Order number	PR-5225.	1.	FI

PR-5225 Railmounted F/F- or F/I-Converter

Digital outputs /

1 = two PNP / NPN-outputs
2 = two relay outputs (max. 20 Hz)

Mode of operation /

FI = F/I-converter
digital outputs are configuered as setpoint outputs
analogue output is switched on

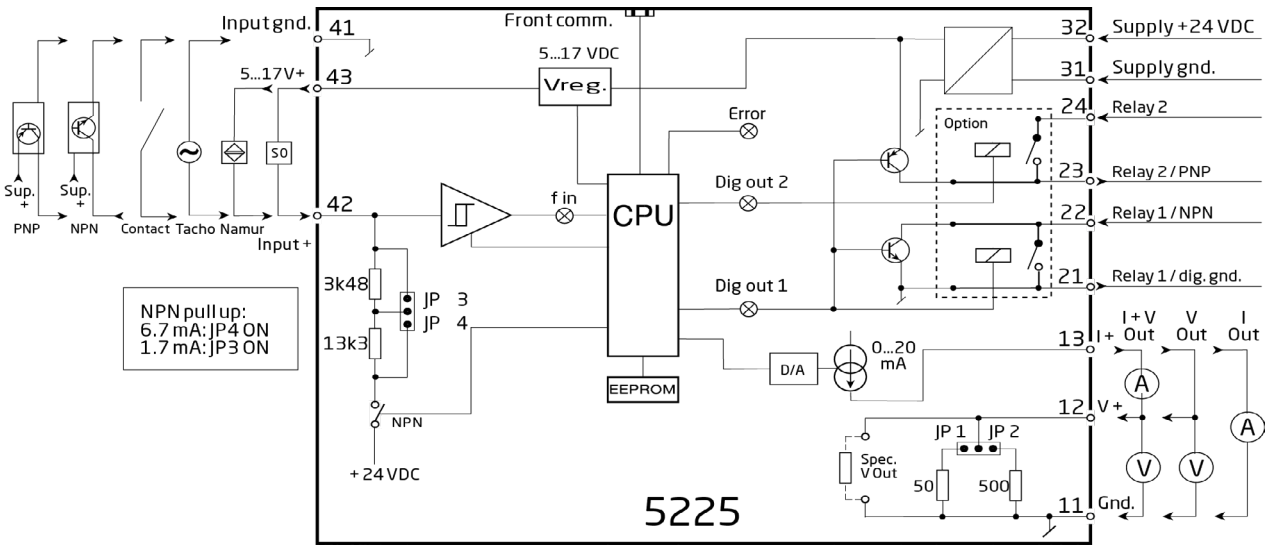
FF = F/F-converter
digital output 1 outputs the evaluated frequency
analogue output is switched off

FG = Frequency generator
digital output 1 outputs the selected freqency
analogue output is switched off

FIFF = F/I and F/F-converter
digital output 1 outputs the evaluated frequency,
digital output 2 is configuered as setpoint
analogue output is switched on

Please specify the analogue output range (how many mA at what frequency) and the setpoints for increasing or decreasing values in % (for FI or FIFF), the divisior or multiplicator (for FF or FIFF) respectivily the generated frequency (for FG) in clear text. Please specify additionally the mode of the digital outputs (PNP or NPN for transistor outputs respectivily open-circuit current or closed current for relay outputs).

Electrical Connections:



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General Terms and Conditions

1. General

The following terms & conditions apply to all transactions, superseding hereby all other terms & conditions governing business, sales and purchase by the client. Deviations from these terms & conditions require prior approval in writing. On conclusion of a contract, latest by receipt of goods or part thereof, the client acknowledges these terms & conditions as the solely valid terms & conditions. Agreements, assurances and additional agreements by our employees and representatives shall have no collecting powers. These terms & conditions may be supplemented by the „General Terms & Conditions of Supply for Products and Services in the Electrical Industry".

2. Offers

2.1 Offers by the seller refer to customary qualities in the trade and are non-binding The seller shall not undertake any guarantee for the ownership of his deliveries for a special purpose of use unless expressly agreed upon in writing.

2.2 Drawings and descriptions of the offered goods are only approximately authoritative. The seller is at liberty to deliver the goods, as the case may be, as per his own latest status of manufacturing of goods in question.

2.3 Purchase Orders, additional agreements and assurances are only deemed to be accepted by the seller on confirmation in writing. The same shall also apply to actions by employees or representative of the seller.

3. Prices

3.1 Pricelists are non-binding, while mutually agreed prices in writing are authoritative.

3.2 Hikes in public and private charges and in freight charges after submission of the offer shall be borne by the client.

3.3 Dead freight is at the expense of the client unless the seller is at fault.

4. Delivery

4.1 Confirmation of the order by the seller shall be authoritative for the scope of delivery. The scope of services concerns only the delivery of goods as specified in the confirmation of order. Additional services such as commissioning, assembly or instructions of in respect of the goods to be delivered require express agreements in writing.

4.2 On handing over the goods to the forwarding agent or freight agent, the risk is commuted to the client even in the case of carriage-paid deliveries, latest, however, as soon as the goods leave the premises of the seller. Should the insurance risk be covered by the client, it shall not have effect on the above clause defining risk. As the case may be, the client must incorporate such condition at his expense that is imposed on the seller by the forwarding agency and insurance company.

4.3 Acceptance and certification by experts are not part of the delivery by the seller. At the most, the seller may engage the services of an expert on behalf of the client.

5. Delivery schedules

5.1 The conditions of delivery as indicated in the confirmation of order by the seller shall apply under following clauses:
5.1.1 The confirmation of order shall not have any ambiguities in respect of the delivery and characteristics of the goods. The client shall be responsible for acquiring all necessary documents, details, approvals, releases and similar.

5.1.2 The client shall not modify his order after dispatch of confirmation of his order.

5.1.3 Under normal circumstances, manufacturing and dispatches shall not be deferred due to force majeure, for example, mobilization, war, uprisings and so on. Such events may entitle the seller to fully or partially withdraw from the contract. The client may request the seller to explain whether he intends to deliver goods within a reasonable time or withdraw from the contract. Should he fail to provide an explanation, then the client is entitled to withdraw from the contract. If necessary, the client shall be obligated to extend the period of specified letters of credit, instructions and similar.

5.2 If the seller is in default, the rights and obligations of the client shall be in accordance with Articles 281 ff of the German Civil Code. The liability of the seller is limited to such instances of intention or gross negligence, in all other cases a liability is ruled out.

5.3 The date of delivery as indicated by the seller shall be assumed to have been complied with, when the goods are handed over to a forwarding agent or freight agent on that date for dispatch to the address as indicated by the client. The seller shall not be liable for delays during transportation.

5.4 The seller is entitled to partial deliveries.

6. Payments

6.1 Payments to the seller shall be made as per scheduled date without any deductions and surcharges even before the due date.

6.2 The seller shall accept checks and bills of exchange eligible for discounts only for the sake of settlement without affecting the maturity of his claims. Commitment of bills of exchange shall require an agreement in writing.

6.3 If the client defaults the targeted payment as indicated in the invoice, the seller may claim interest on delayed payment in accordance with Article 288 of the German Civil Code.

6.4 If the financial position of the client deteriorates or his payment are irregular, the seller shall be entitled to demand immediate payment or securities for his claims and/or advance payment for further deliveries or to withdraw from the contract fully or partially; the same shall also apply if the seller has accepted bills of exchange. In the event of a withdrawal, claim on the client shall be due immediately regardless of the accepted bills of exchange. The seller shall receive compensation for his costs arising from such withdrawal and for other damages. Claims of compensation by the client on this account shall be ruled out. Moreover, the rights of the seller shall be in accordance with the law in the event of default by the client.

6.5 The client may exercise his right of retention or right to set-off in respect of claims by the seller only in regard to an undisputed or legally tenable claim. All other rights of retention or set-off of the client are ruled out.

7. Retention of title

7.1 The seller shall reserve the rights on his deliveries, which may only be offered for sale in the normal course of business, until payments for all claims arising from the relevant business transaction including those arising from bills of exchange are duly settled.

7.2 The client shall not acquire any ownership of fully or partially manufactured goods as a result of processing such goods; the processing shall be exclusively for the seller without payment. If, however, the right of retention should lapse due to any factual or legal circumstances, the seller and the client agree even at this point that the ownership of the items following their processing shall be commuted to the seller who shall accept the conveyance.

7.3 In the case of processing involving goods that are under ownership of a third party, the seller shall acquire co-ownership of the new items proportionate to the value of goods supplied by him under retention of title.

7.4 The client is only entitled to sell goods to others under retention of title. The receiv- ables arising from the sale of goods, regardless of whether processed, unpro- cessed or conveyed to him as security, shall be deemed ceded to him fully along with all subsidiary rights. Sale to buyers who may rule out cession or stipulate their approval shall be prohibited. The client shall exclude a provision where his buyers exercise rights (such as set-off) in respect of accounts receivable arising from sale of goods under retention of title.

7.5 For determining the garnishees as per first and last names, address and sum of accounts receivable, the books maintained by the client shall be authoritative.

Cessions shall be hereby excluded by the seller in advance. Any other cession or pledging shall be excluded. If through such cession the total accounts receiv able of the seller are unequivocally ensured for more than 120%, the excess of the accounts receivable shall be released on demand by the client as per choice of the seller.

7.6 The client may, as long as he fulfills his obligation of payments to the seller, indent the accounts receivable for himself until revocation of the same. The right of resale, processing of unpaid goods and indent of accounts receivable shall expire in the event of suspension of payments, proposal for opening of solvency proceedings, judicial or non-judicial litigation of settlement of debts, protest of a check or a bill. Accounts receivable conveyed and received thereafter shall be collected immediately into a special account under the title of „Accounts Receivable of Profimess GmbH". The conveyed accounts receivable shall be intimated to the seller with details of first and last names, address and amount of receivables from the garnishees and the garnishees shall be informed about the transacted conveyance. At the same time, a list of remaining goods shall be forwarded to the seller.

7.7 The seller shall be entitled, for good reasons, to demand immediate return of goods under retention of title particularly in the event of default of payments or difficulty to comply with payments by the client. Until settlement of payments, the client shall store the goods under retention of title separately from other goods, mark them as property of the seller, not dispose of them and, on request hand over a list of goods under retention of tile to the seller.

7.8 Pledging of seller's goods for the purpose of conveyance as security to third parties and cession or pledging of deferred benefits shall be excluded. In the event of pledging and confiscation by third parties, for example, on the basis of laws governing lessor or lien, the seller shall be informed of the same immediately. The cost of an intervention shall be borne by the client in any case.

8. Warranty and complaints

8.1 The seller shall be liable for the use of fault-free materials, faultless processing and trouble free functioning and the special characteristics of his goods as assured in his confirmation of order in writing.

8.2 The liability shall exclusively extend to improvement or redelivery of defective components as per the option of the seller. In the event of failure of improvement or replacement of goods, the client shall reserve the right to demand decrease of payment or annulment of the contract. In principle, any improvement activity shall take place at the premises of the seller, as chosen by the seller even at his place of residence or at the commercial branch office of the receiver at the time of signing of the contract. The modalities of bearing the costs for such improvement shall adhere to statutory regulations. The seller shall not be liable for damages occurring at the client's location or, in the case of transfer of risk, at the location of third party due to incorrect handling of the goods.

8.3 Claims by the client from the seller or his service personnel beyond the scope of the above-mentioned liability shall be excluded unless they are based on intention or gross negligence on the part of the seller.

8.4 The duration of liability shall adhere to statutory regulations. In the case of delivery of used items, the seller shall only be liable for the presence of assured characteristics. In such cases, all other claims of warranty shall be excluded.

9. Minimum wage

9.1 The vendor complies with the provisions of the minimum wage law and is obliged to exempt every purchaser from any employees' claims, which result from his liability in conformity with § 13 of the minimum wage law and to compensate any damages incurred by this liability.

10. Place of performance and jurisdiction

10.1 Place of performance in regard to payments and deliveries shall be the location of our company. In the event of disputes arising from or in connection with the business relationship including those relating to litigations on checks or bills of exchange, the place of jurisdiction for both the parties shall be the location of the seller, provided the businessman is a full-time businessman, a legal person of the public law or a public fund asset or a general court of jurisdiction is absent locally. In any case, the statutory provisions shall be applicable. If the seller so desires, also the court of jurisdiction at the location of the client shall be responsible. If the seller so desires, even a court of arbitration shall be appointed for mediation in case of disputes. If the seller exercises his right to vote, he shall inform the client about the same in writing. In that case, each party shall nominate an arbitrator within four weeks after notice by the other party. Within four additional weeks both the parties shall agree on a chairman. If agreement cannot be reached on the person of chairman or, if a party delays nomination of its arbitrator, then the chairman or the arbitrator shall be nominated by the president of the provincial high court of Bremen. The court of arbitration shall decide on the basis of the mutually agreed conditions of delivery including in accordance with the applicable laws of the Federal Republic of Germany. At the proceedings of the court of arbitration, the rules § 1025 to § 1048 of the civil law shall be applied.

10.2 The relationship of the contract shall adhere to the laws of the Federal Republic of Germany.

10.3 The legal inefficacy of individual clauses of the contract shall not affect the efficacy of the remaining clauses. An invalid clause shall be interpreted in such manner to fulfill the intended business purpose.

10.4 Without permission by the seller in writing, the rights of the client arising from this contract shall not be commutable.
10.5 This version of terms & conditions of the seller shall abrogate all previous versions of the same.

11 Creditworthiness Check

11.1 We will forward your information (name, address, date of birth - if neccessary) for the sole purpose of checking for your creditworthiness, to gain access to mathmatic-statistical information concerning the risks of a potential payment default, by using address information supplied by LEGIAL AG, Thomas-Dehler-Str. 2, 81737 Munich, to the infoscore Consumer Data GmbH, Rheinstr. 99, 76532 Baden-Baden. Legal basis for these transfers are article 6 paragraph 1 letter b and arcticle 6 paragraph 1 letter f of the GDPR. Transfers based on this legal conduct can only be made, as long as the attendance of justified interests of our company or third parties is neccessary, and no interests or legal rights and legal freedom of the affected person, all of which would require the protection of personal data, outweigh the initial reason. Detailed information on the ICD in the sense of article 14 European General Data Protection Regulation („EU GDPR"), that is, information on the object of business, about the purpose of data storage, about the data recipients, about the rights of self-disclosure, about the right of deletion, etc. can be found in the privacy policy.

12 Software Usage

12.1 If software is contained in the scope of supply, the orderer shall be granted a non-exclusive right to use the supplied software, including its documentation. It is provided for use together with the delivered item. Use of the software on more than one system is not permitted.

12.2 The orderer may only copy, revise, translate or convert the software from object code to source code to the extent permitted by law (§§ 69 a ff. UrhG (German Copyright Act)). The orderer agrees not to remove the manufacturer´s data, in particular the copyright notice, nor to change any of this data without our express consent.

12.3 Any other rights associated with the software and documentation including copies thereof remain vested with us or the software manufacturer. Granting sublicenses is prohibited.

13 E-commerce

13.1 If the orderer purchases products or services from us through a website or other e-commerce process, the following stipulation applies additionally:

13.2 The orderer is responsible for the protection of his password and acknowledges that purchases carried out using his password are binding for him.

13.3 An order can be placed after completion of the registration process. By entering your log-in data and clicking the "Order" button in the final step of the order process you then place a binding order for the products in the shopping cart.
You will receive a confirmation of receipt immediately after sending your order. The sales contract is not valid until you receive our order confirmation. The order confirmation is sent in electronic form. The decision to declare an order confirmation is within our discretion.

13.4 We have made all reasonable efforts to ensure that all websites and access points are secure; however, we refuse to accept any liability in the event of misuse of the information that was transmitted to or from these websites and / or access points, namely by outside parties who are not our employees.

13.5 The orderer agrees to our use of cookies through the website of the orderer or other ecommerce processes.

Last updated: 05/2018