
LEVEL
2025
PROFI MESS GMBH
LEVEL METER

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:

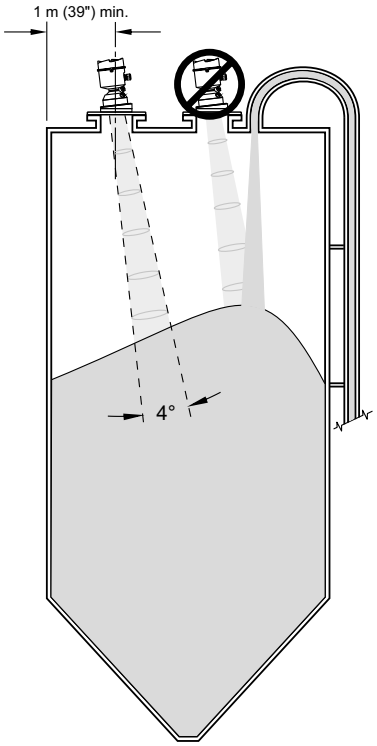
Meas. principle /	radar-level monitoring	
Frequency /	78 GHz	
min. Distance /	400 mm from sensor	
max. Distance /	40 m or 100 m	
Output /		
Analogue:	4. . .20 mA	
Communication:	Standard: HART Optional: PROFIBUS PA	
Fail safety:	programmable for max, min or hold (loss of echo), NE43	
Ambient temp. /	-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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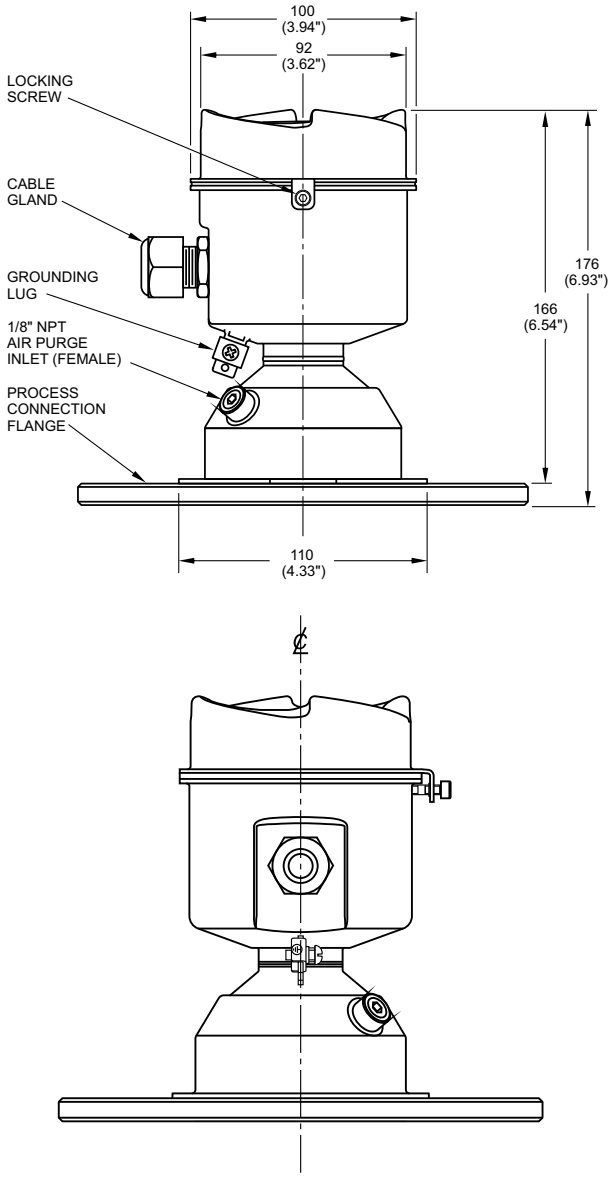
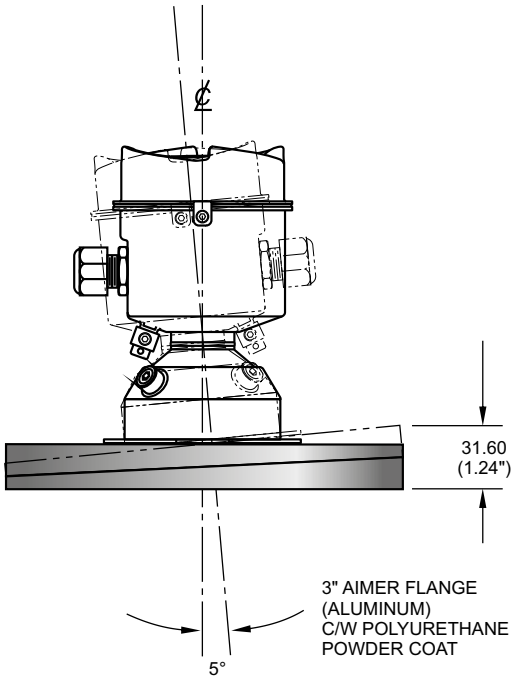
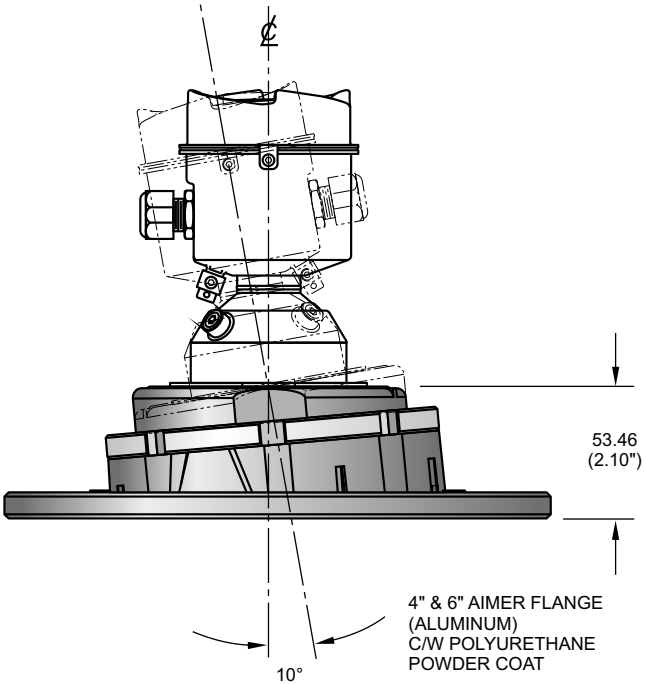
Dimensions in mm:



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)

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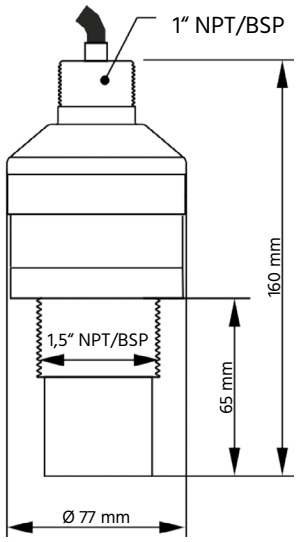
Electrical Specifications:

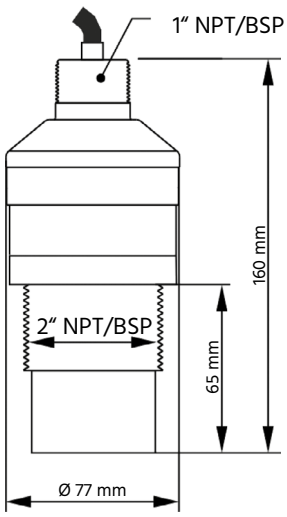
Supply voltage /	10. . .28 VDC
Output /	4. . .20 mA (3.8. . .22 mA) HART® - loop powered (2-wire)
Configuration /	PC software for parameter setting and linearisation via HART® communication (HART® - communicator not included).
Start up time /	4 sec. typical (9 sec. after 12 hours without activity)
Cable 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

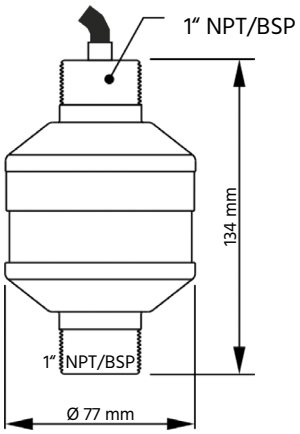


Sensor Type C

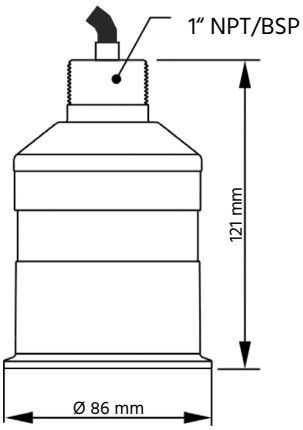


Dim., Mounting Thread, cable side:

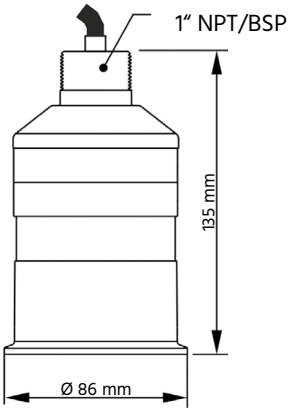
Sensor Type A



Sensor Type B and Type C

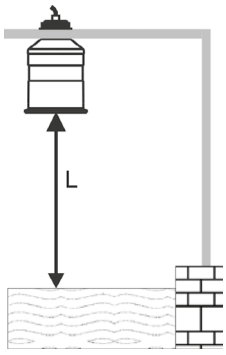


Sensor Type D

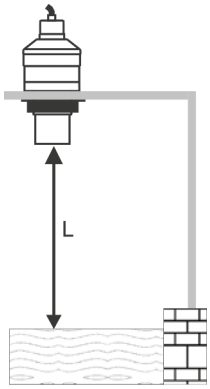


Outdoor and open Vessel installation:

Mounted via rear 1" NPT thread



Mounted via optional front thread



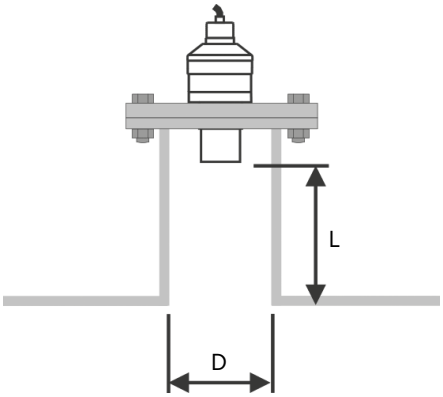
The SE-02 ultrasonic sensors can be simply mounted on a bracket, suitable for the application and secured using either the 1" NPT rear or via the 1.5" or 2" front thread, dependant on model. Care should be taken to ensure that the SE-02 sensor is not installed in direct sunlight, in order to avoid errors 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

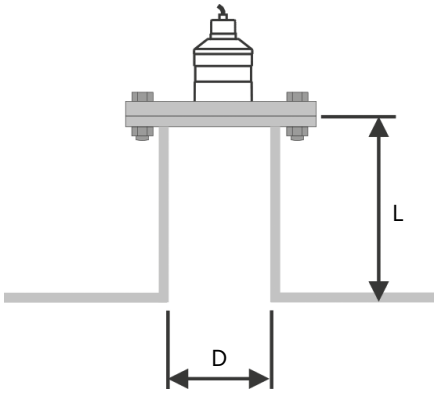
Sensor	Operating range	L = min. Distance
Type A	3 m	125 mm
Type B	6 m	300 mm
Type C	10 m	300 mm
Type D	15 m	500 mm

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

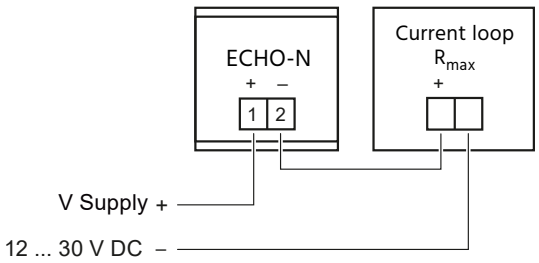
Description:

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.

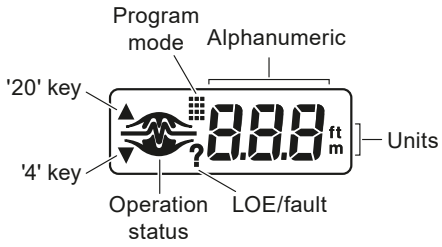
Application:

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.

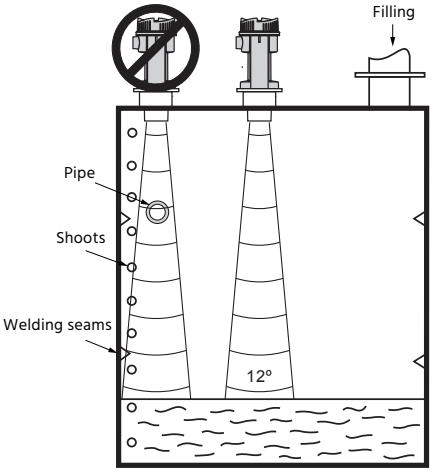
Electrical Connection:



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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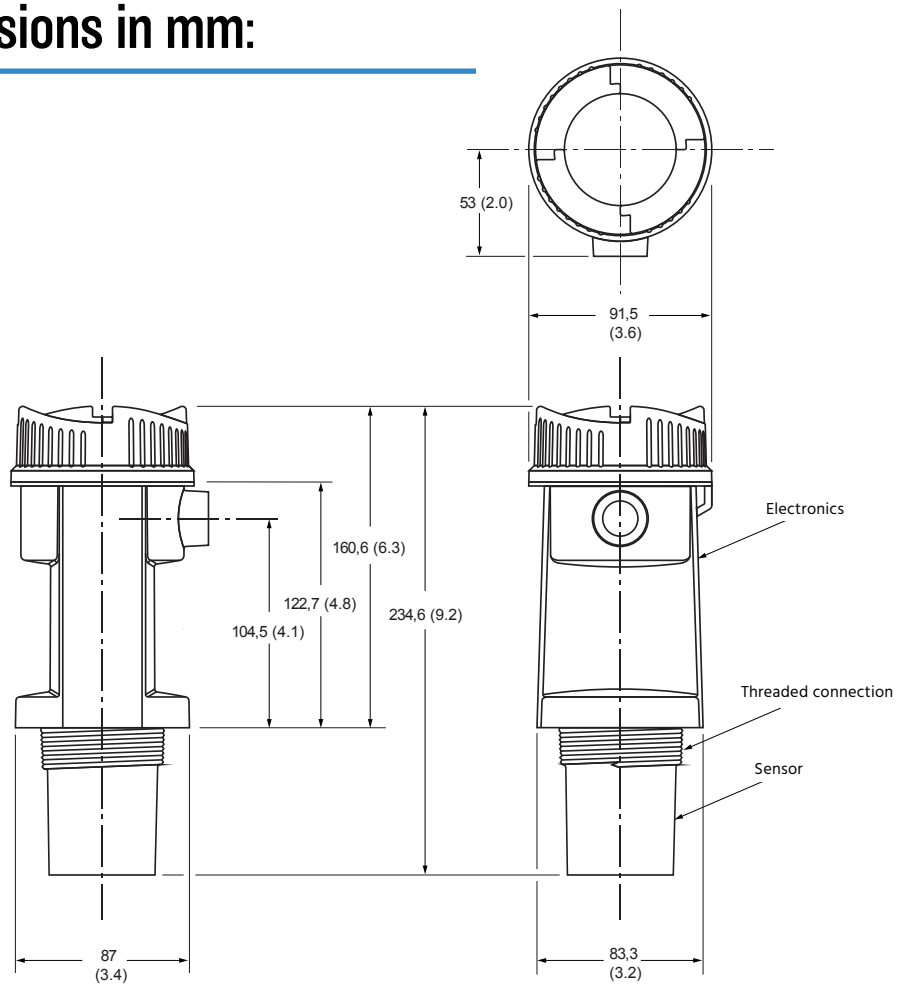
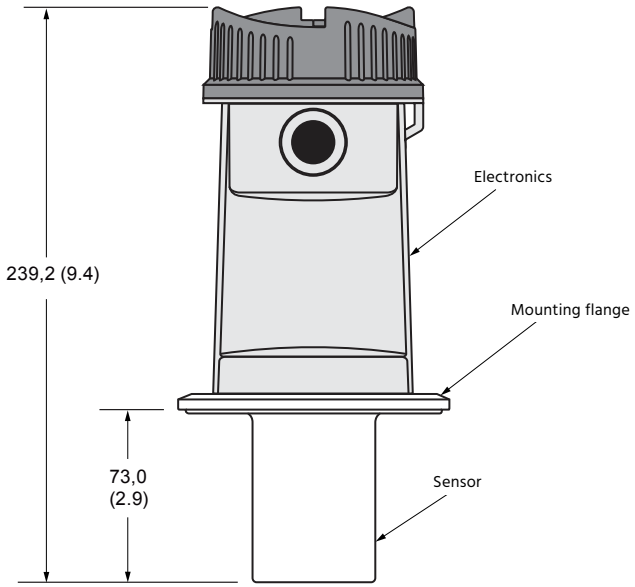
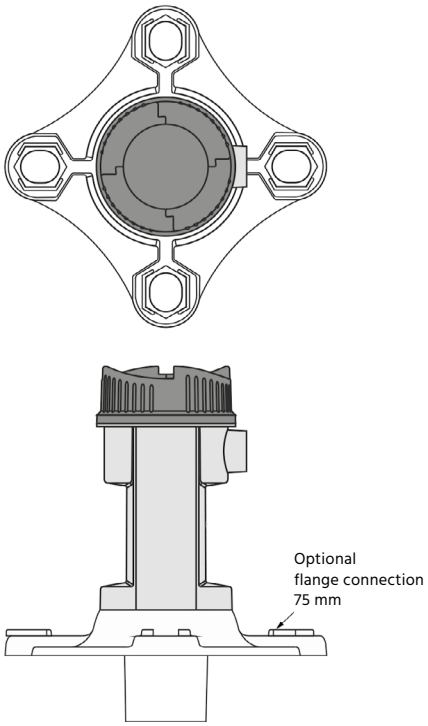
Dimensions in mm:



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.

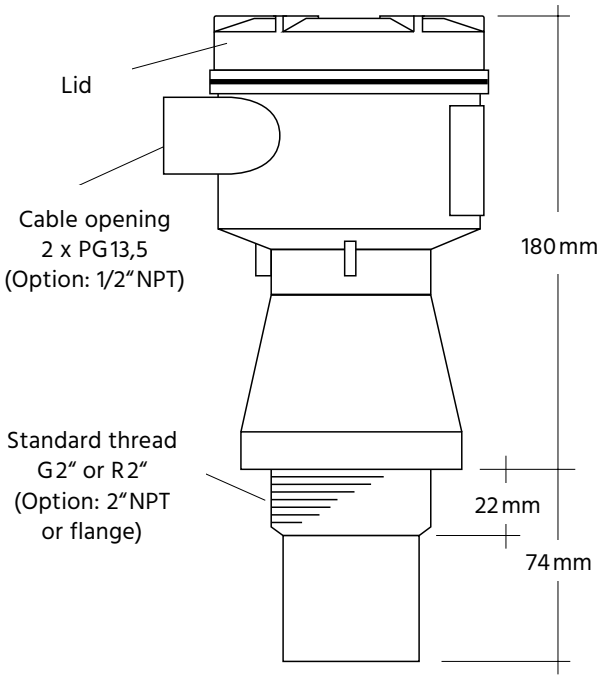
Application:

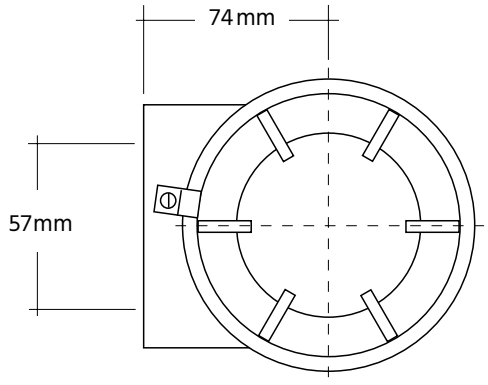
The FU-01 series of ultrasonic level switches is used wherever contactless measuring is advantageous. Typical applications are, for example, in water and effluent management, for bulk goods or in sewage treatment plants. As far as level monitoring is concerned, problems caused by soiling, blockages or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



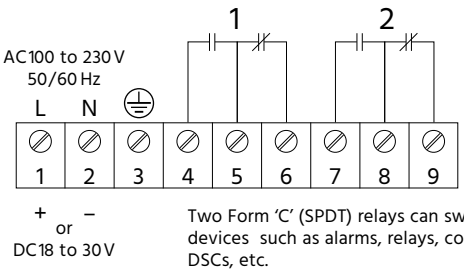


Electrical Specifications:

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

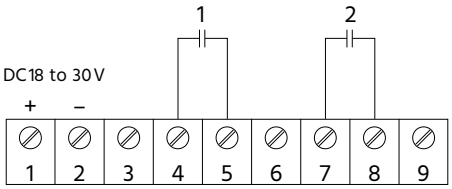
Outputs:

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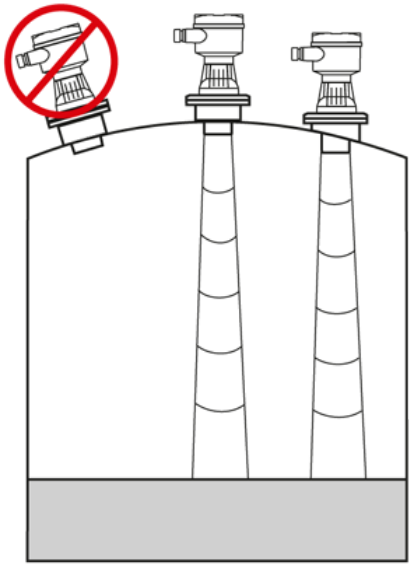
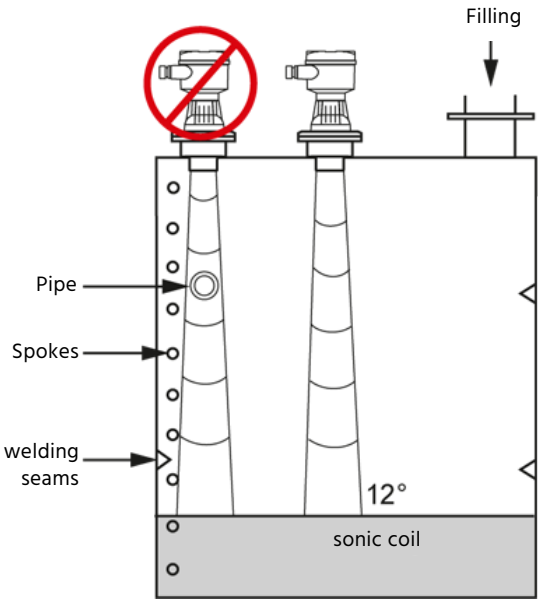
fax +49 (0)471 98 24 152 | **mail** info@profimess.de | **web** profimess.com

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.

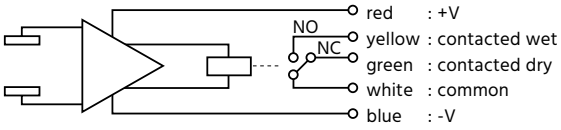
Application:

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.

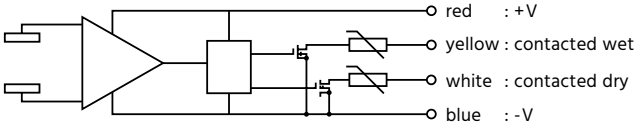
Technical Specifications:

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

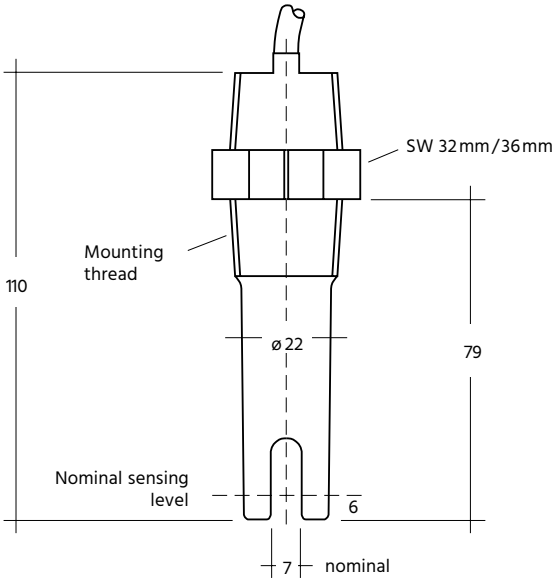
Schematic 003-S.x models



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

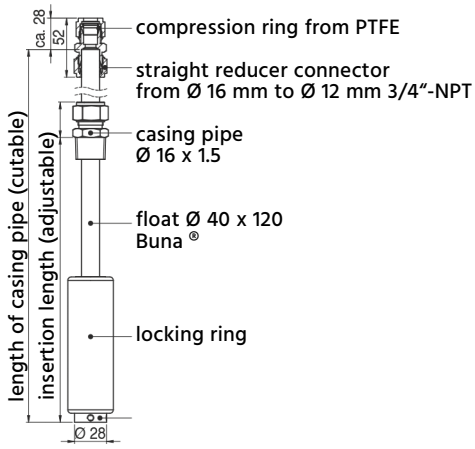
Heavy-Duty installation kit

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

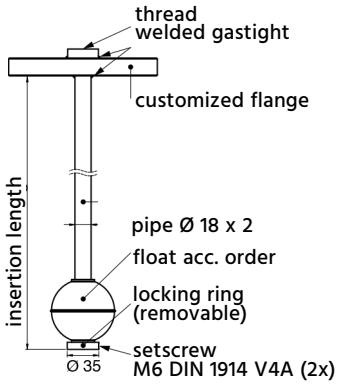
Plastic inst. kit from PVC, PP or PVDF

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

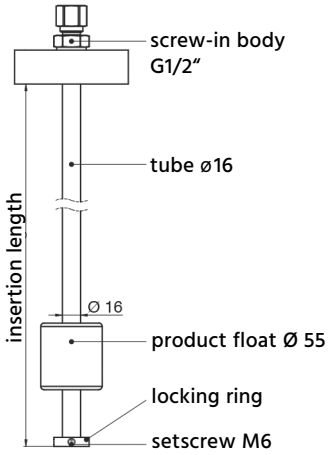
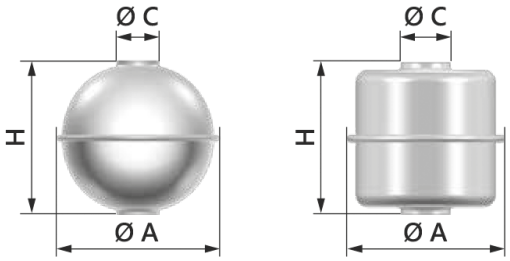


Table Floats:

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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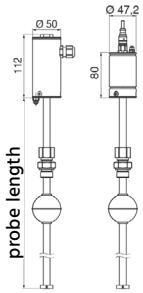
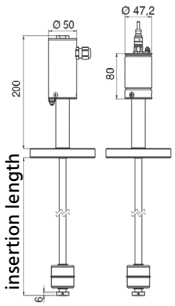
Dimensions in mm:

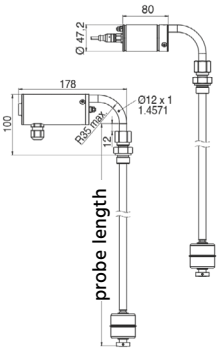
FM-01F.12M - thread version



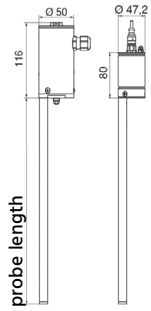
FM-01F.12M - flange version



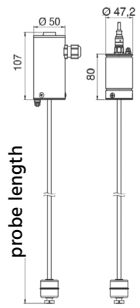
FM-01F.90G - angled version



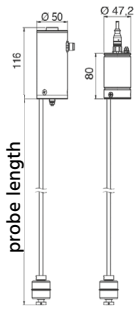
FM-01F.12S - bypass version



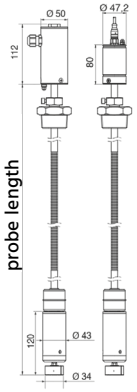
FM-01F.06M - 6 mm central



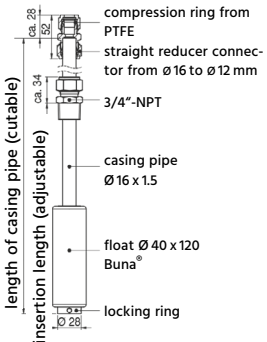
FM-01F.06S - 6 mm lateral



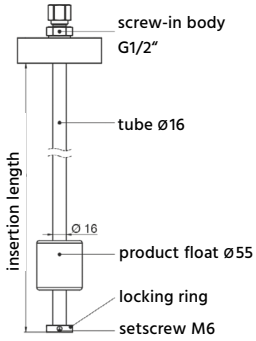
FM-01F.FLEX - flexible version



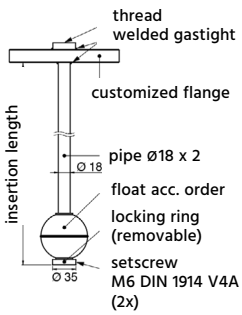
Installation kit for LPG-tanks



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:

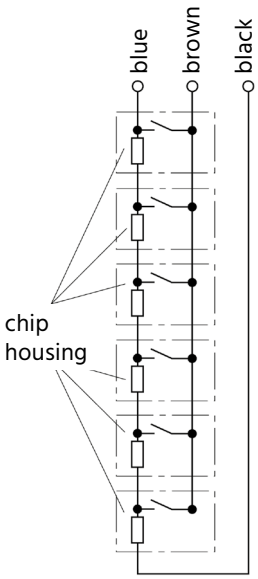
The FM-02N series of level measuring transmitters operates according to the principle of float with magnetic transmission. The float is raised by increasing fluid level in the vessel; subsequently due to the magnetic field of a permanent magnet located within the float it actuates the contacts of a reed 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 /

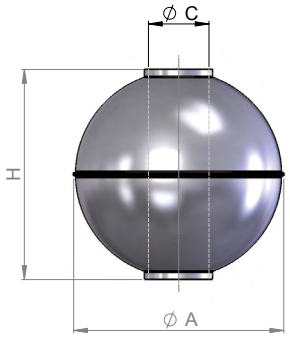
0	= none
NCST	= 1 NC increasing temperature, temperature setpoint in °C in clear text
NOST	= 1 NO increasing temperature, temperature setpoint in °C in clear text

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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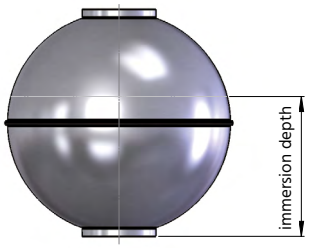
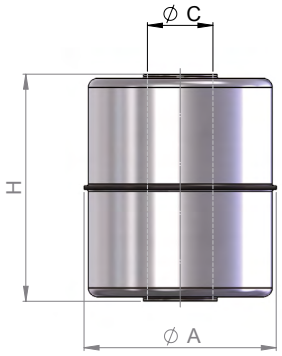
Spherical Float Immersion depth



	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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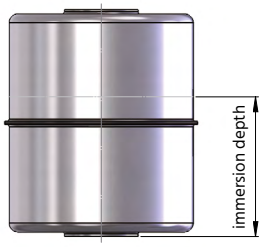
Cylindrical Float Immersion depth



	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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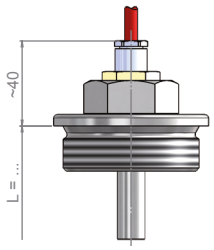
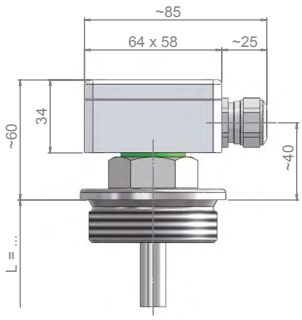
Conn. Type K
connecting cable



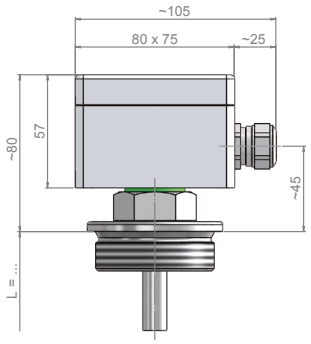
Material: acc. to cable definition
Cable gland: PG or M
Protect. cl.: IP55 (optional IP68)
Amb.temp.: -40. . .+200°C

Conn. Type E
Aluminium terminal box



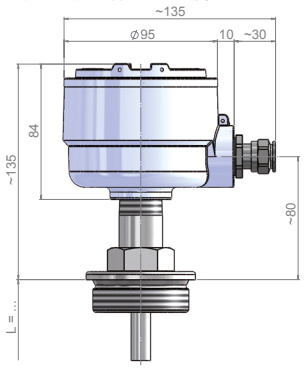
Material: Al coated RAL 7001
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40. . .+100°C

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

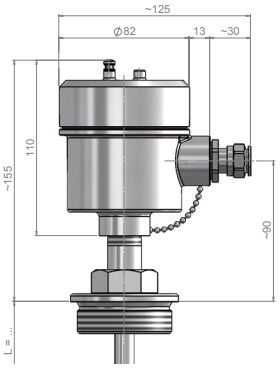
Conn. Type DA (Exd)
Aluminium terminal box



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

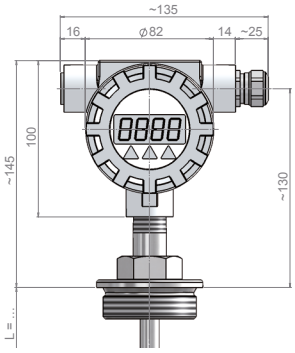
Version	● = combinable			○ = not combinable
VAG38PVC	●	●	●	●
VAG38SIL	●	●	●	●
VAG112G	●	●	●	●
VAG2G	●	●	●	●
VAF80D18	●	●	●	●
VAF80D40	●	●	●	●
VAF80FLEX	●	●	●	●
VAG25FLEX	●	●	●	●
VAWG38SIL	●	●	●	●
VAWF80G	●	●	●	●
VABHH	●	●	●	●
VABHV	●	●	●	●
VASG38SIL	●	●	●	●
VASMRG	●	●	●	●
MG38PVC	●	●	●	○
MG112G	●	●	●	○
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



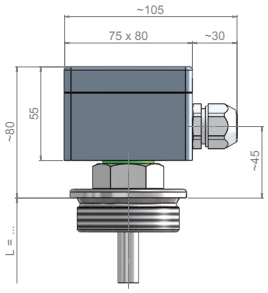
Material: st. steel A4 (SS316)
Cable gland: M20 x 1.5
Protect. class: IP67 (Exd / IP68)
Amb.temp.: -40. . .+85°C

Conn. type ADI
Aluminium terminal box



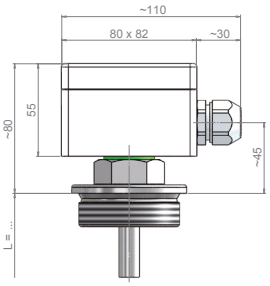
Material: aluminium
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40. . .+60°C
Display: 7-Segment LED red

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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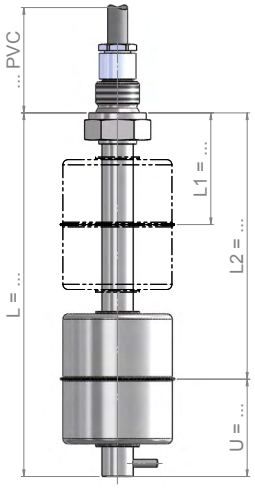
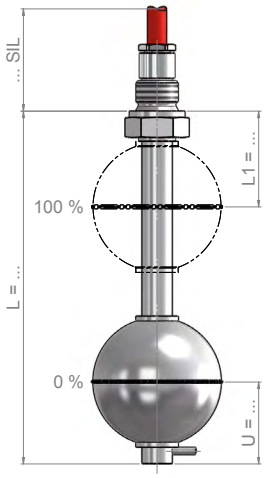
Level transmitter made of st. steel with thread facing upwards

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

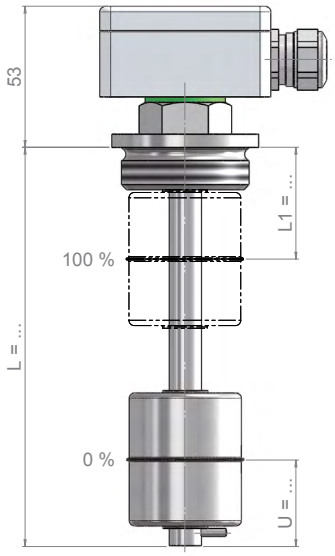
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B

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

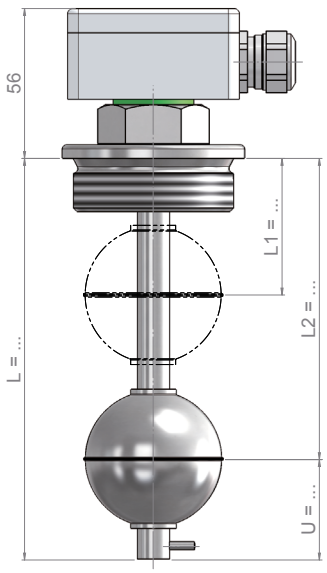
Version: VAG112G



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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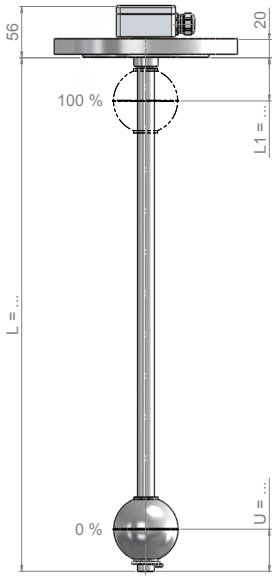
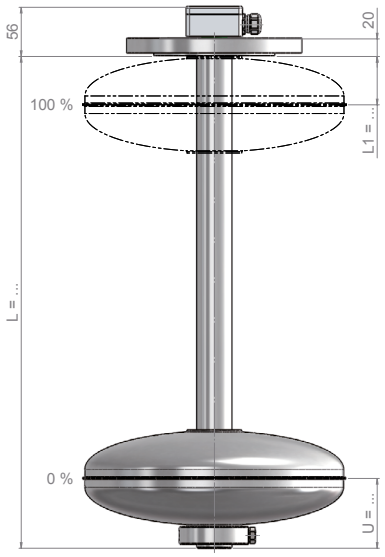
Level transmitter made of st. steel with flange connection

Version: VAF80D18



Version: VAF80D40



Technical Specifications:

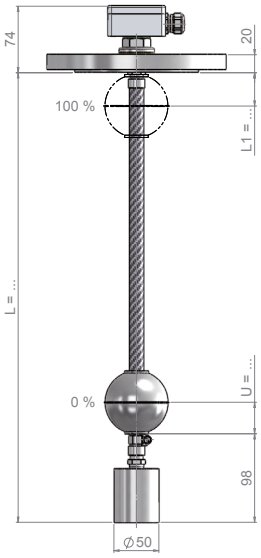
Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	ø 18 mm
insert. Length /	≤ 6000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m³
Design press. /	-1. . .+16 bar (depending on temp.)
Design temp. /	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

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

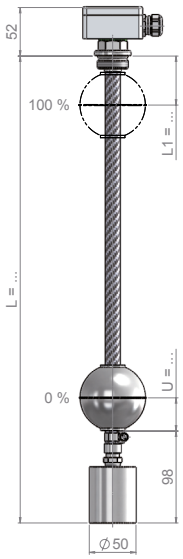
Version: VAF80FLEX



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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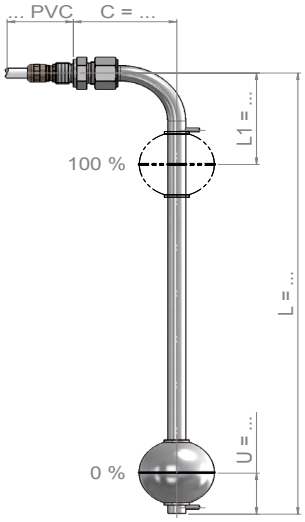
Level transmitter made of st. steel - angled

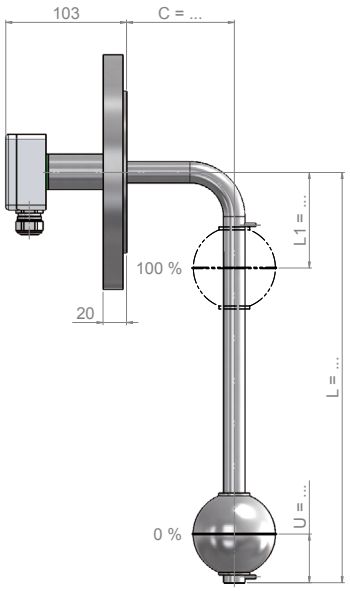
Version: VAWG38SIL



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

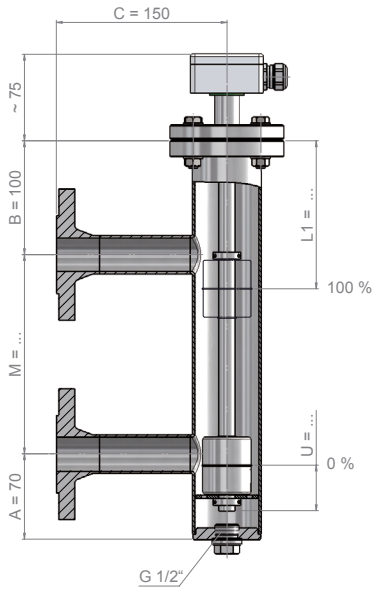


Technical Specifications:

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

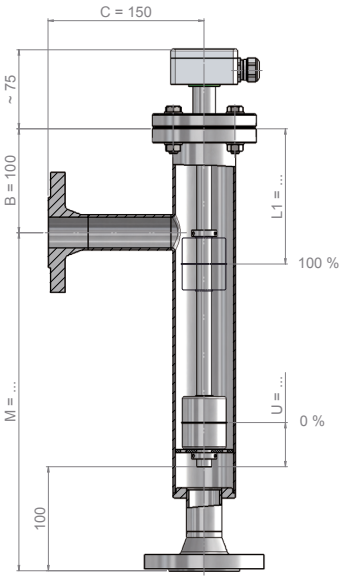
Version: VABHH



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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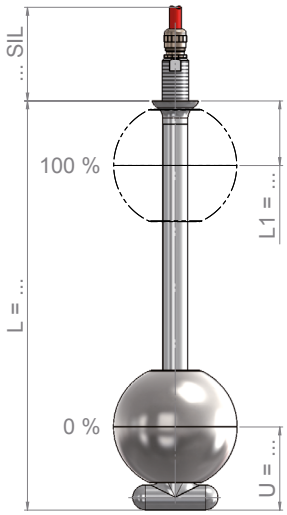
Level transmitter made of st. steel - 3A sanitary standard

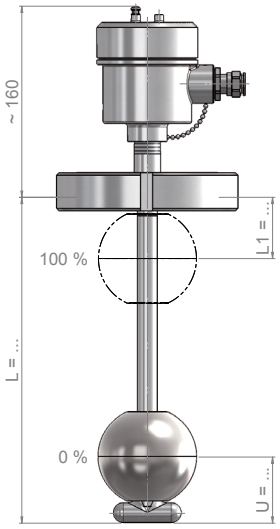
Version: VASG38SIL



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

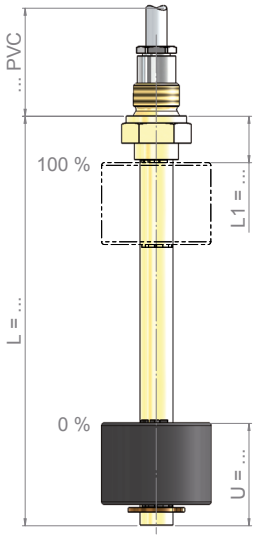


Technical Specifications:

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

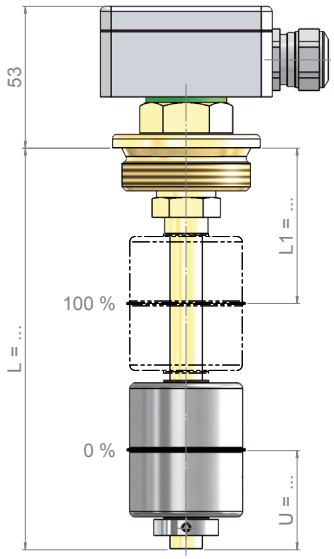
Version: MG38PVC



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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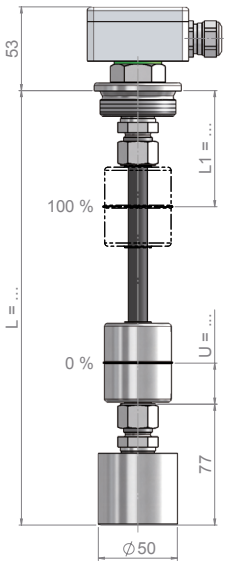
Level transmitter made of Polyamide - flexible

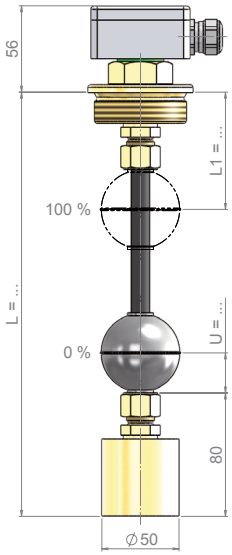
Version: PAFG112G



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

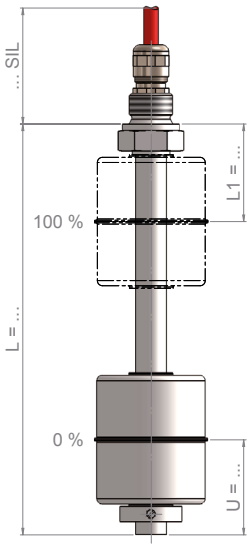


Technical Specifications:

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

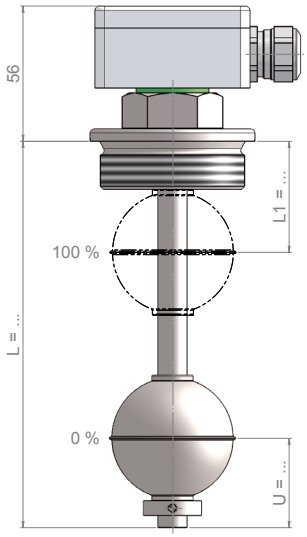
Version: TG38SIL



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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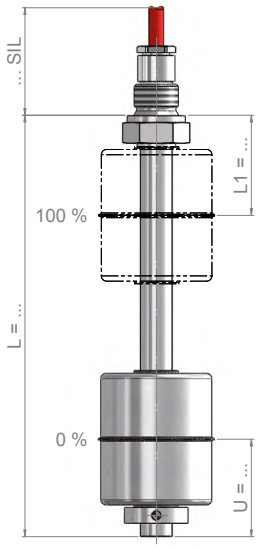
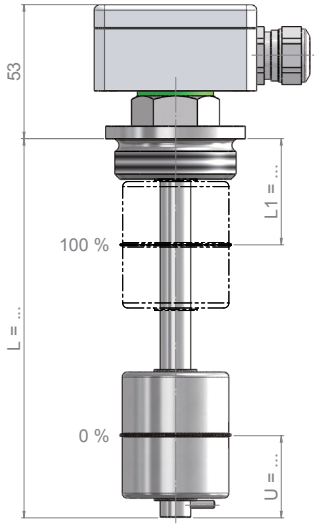
Level transmitter made of Alloy C

Version: ALCG38SIL



Version: ALCG112G



Technical Specifications:

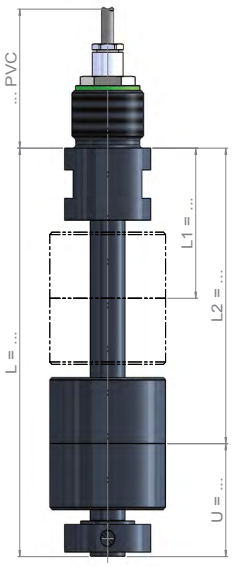
Material /	Alloy C
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	ø 12 mm
insert. Length /	≤ 3000 mm
Float /	Z44G15A
sp. Weight /	≥ 1000 kg/m³
Design press. /	-1. . .+45 bar
Design temp. /	-40. . .+180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	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. /	L1 ≥ 50 mm, U = 45 mm
poss.	
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. /	L1 ≥ 50 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, WHG

Level transmitter made of PVC

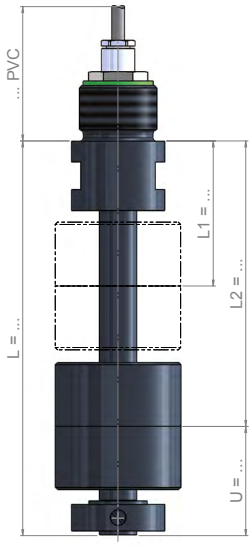
Version: PVCG1PVC16



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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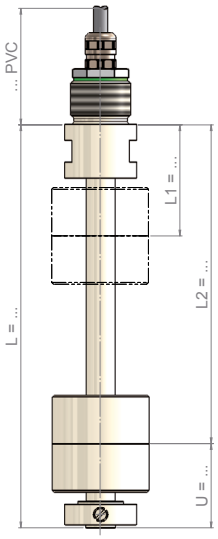
Level transmitter made of Polypropylene

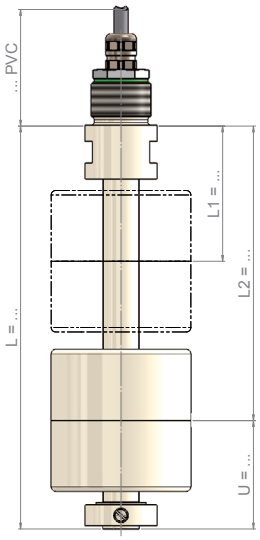
Version: PPG1PVCD16



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

Version: PPG1PVCD20

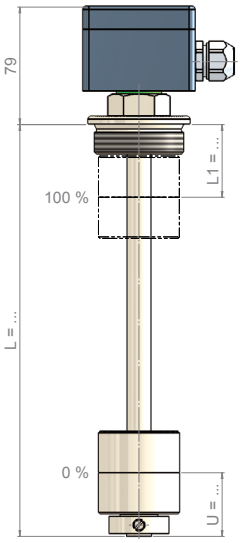


Technical Specifications:

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

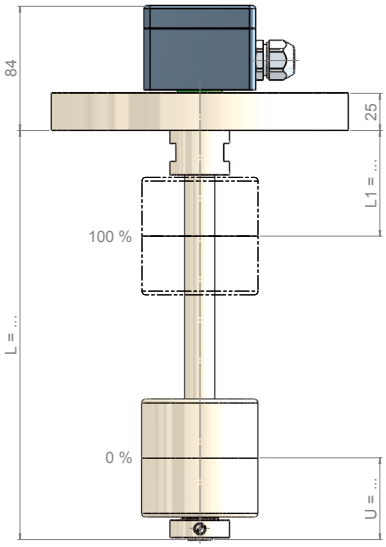
Version: PPG2PVCD16



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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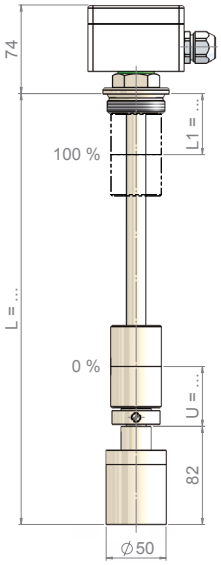
Level transmitter made of Polypropylene - flexible

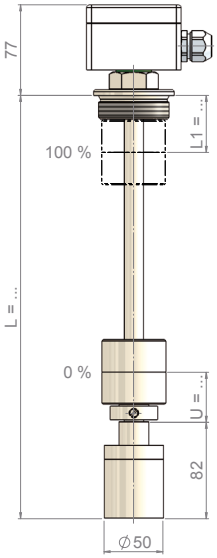
Version: PPFG112G



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

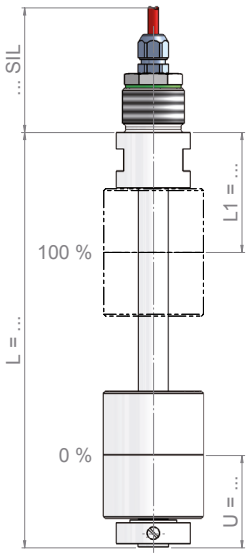


Technical Specifications:

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

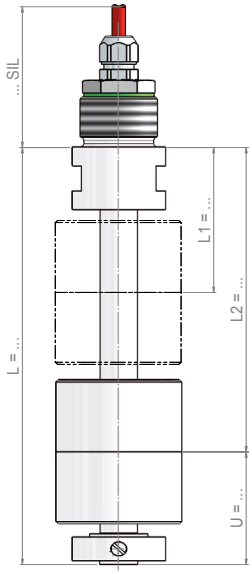
Version: PVDFG1SILD16



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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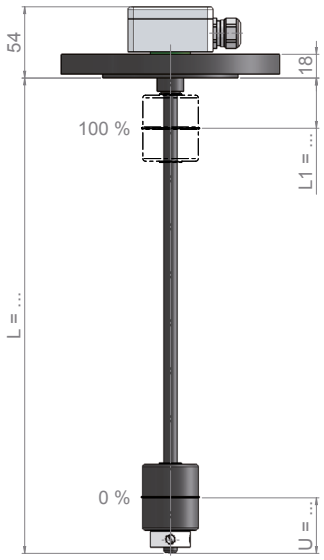
Level transmitter made of st. steel - ECTFE coated

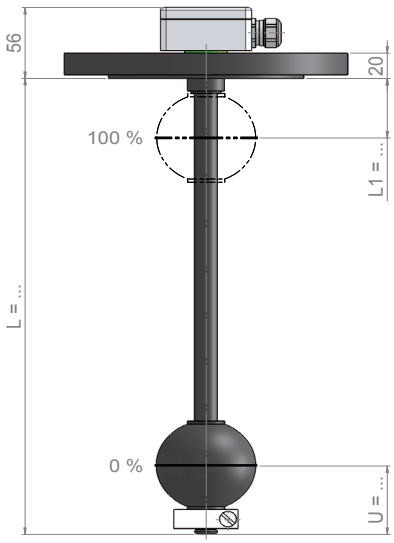
Version: VAEBF50G



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

Version: VAEBF80G

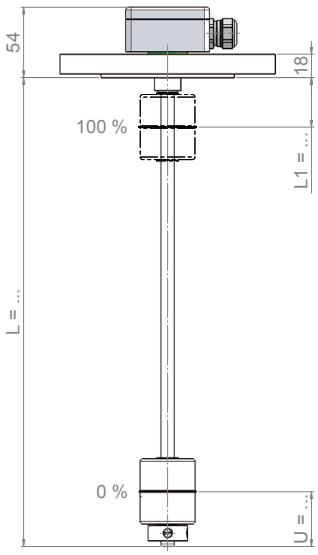


Technical Specifications:

Material /	st. steel ECTFE-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	ø 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

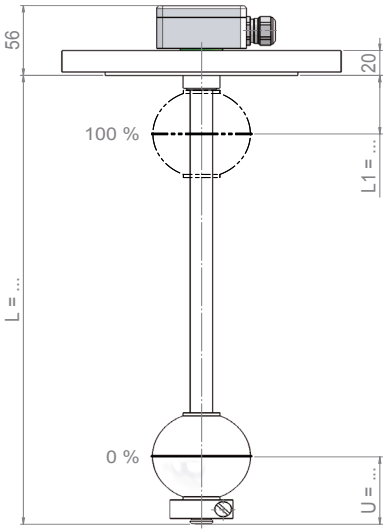
Version: VAPBF50G



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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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 /

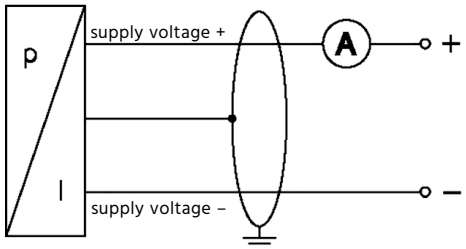
A = none
B = DN25 - PN40
C = DN40 - PN40 (only probe)
D = DN50 - PN40
E = DN80 - PN16

Accuracy /

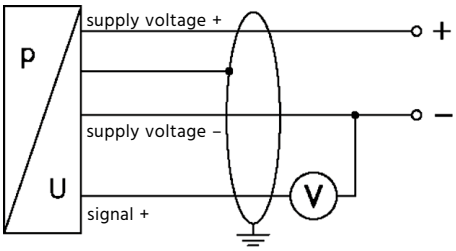
1 = ≤ ± 0.35% FSO
2 = ≤ ± 0.25% FSO

Wiring Diagrams:

2-wire system (power):



3-wire system (voltage):



El. Connection table:

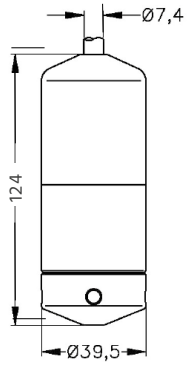
El. Connection		Cable (DIN 47100)
2-wire	supply +	white
	supply –	brown
3-wire	signal +	green
	shield	yellow/green

Ranges & Overpressure:

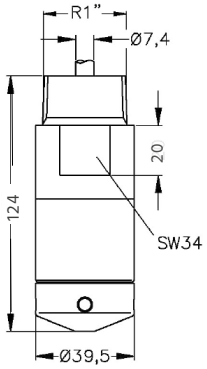
Value															
Nom. pressure [bar]	0,04	0,06	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10	16	20
Level [mH2O]	0,4	0,6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	200
Perm. overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45

Dimensions in mm:

standard:

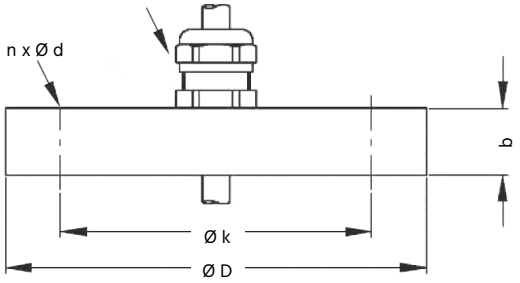


prepared for mounting inside a stainless steel pipe:



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

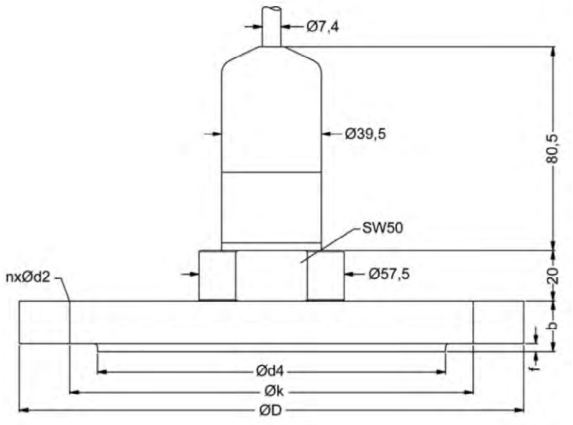
cable connection M16x1.5 with seals
(for cables-Ø 4. . .11 mm)



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

address Schleusenstraße 3 | D-27568 Bremerhaven | Germany | **tel** +49 (0)471 98 24 151
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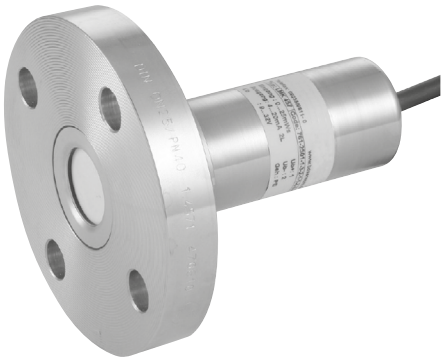
FD-GL

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

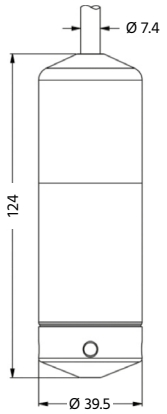
Special design /
0 = standard
1 = prepared for mounting inside a st. steel pipe

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

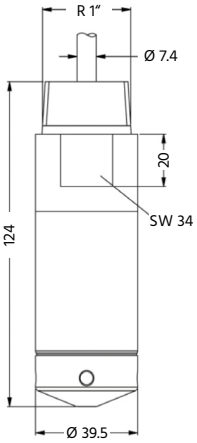
Mounting bracket /
0 = none
1 = stainless steel
2 = out of CuNiFe

Dimensions in mm:

Suspension probes:



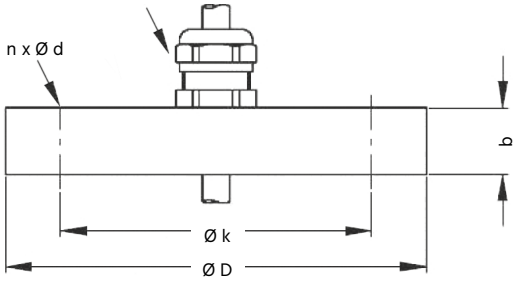
st. steel / CuNiFe



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

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

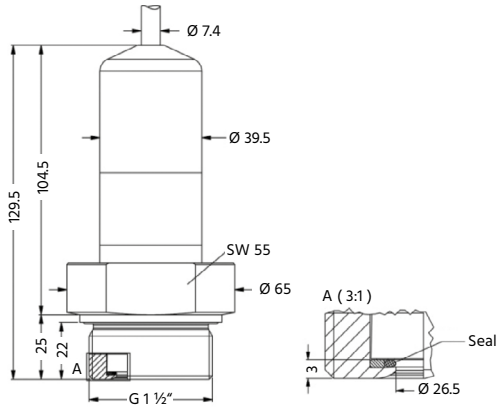
Cable gland M16x1,5 with seals
(for cables Ø 4. . .11 mm)



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

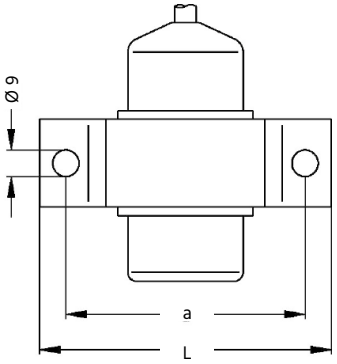
DN80/PN16 possible for NP ranges ≤ 16 bar

Screw-in probe:



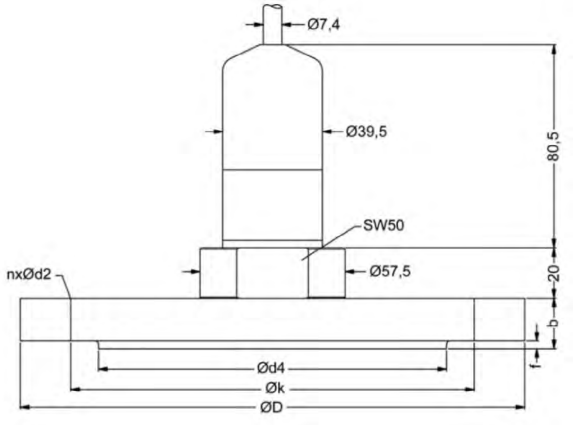
st. steel / CuNiFe

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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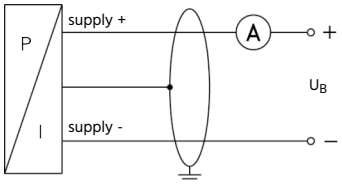
Measuring Ranges:

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						

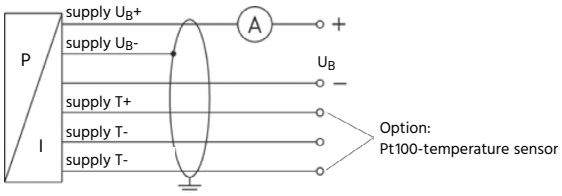
Electrical Connection:

Wiring diagram: 2-wire-system (current)



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)

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



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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:

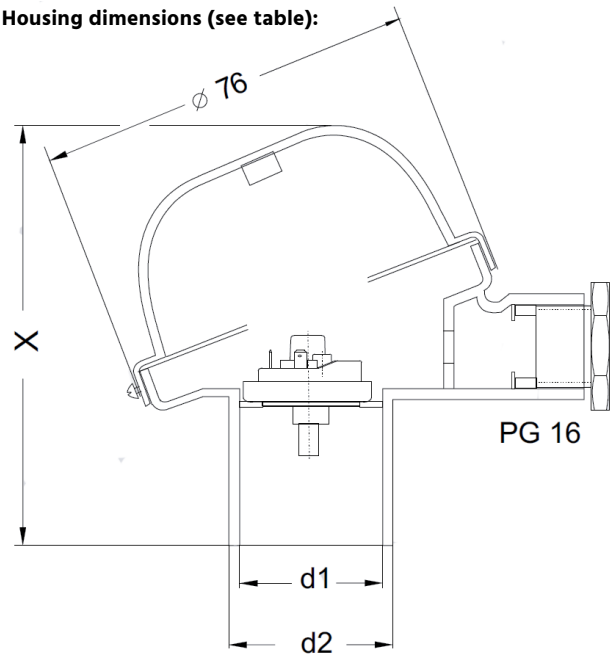
Pressure range /	0.05 to 1 m water column
Least switching pressure /	50 mm water column
Least switch back pressure /	20 mm water column
max. Temperature /	-10. . .+85°C
Materials /	
Housing:	polyamide
Membrane:	nitrile rubber
Pressure chamber:	polyamide, fiberglass reinforced
Hysteresis /	15%, min. 30 mm water column
Indexing tolerance /	± 10%, min. +7.5 mm water column

Electrical Specifications:

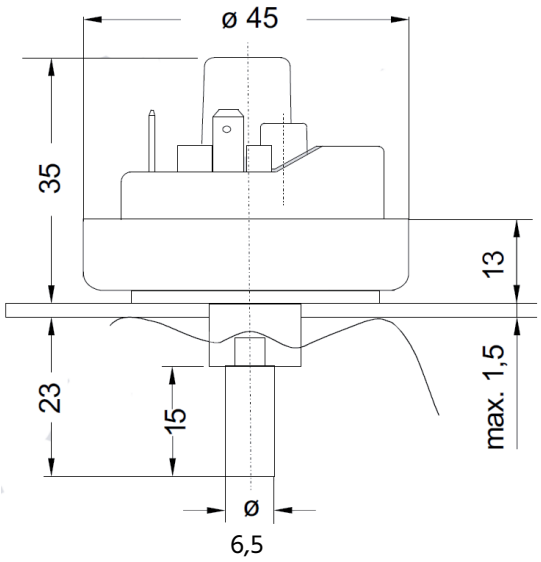
Switching load /	change-over 6 A, 250 V, 50 Hz, ohmic; tested as per VDE 0630
Electrical connection /	flat plug, 6.3 DIN 46248

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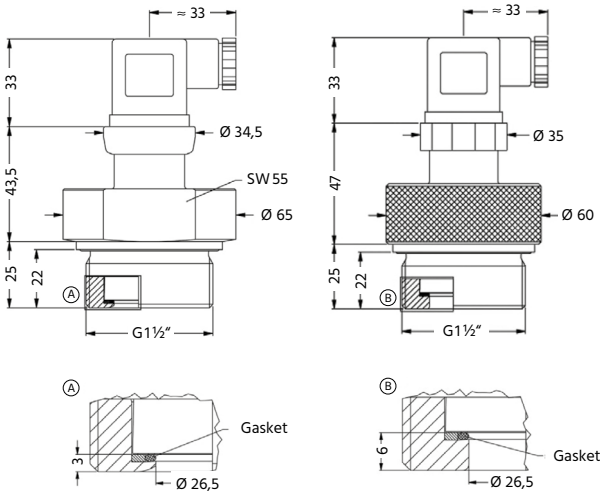
Operating ranges and Overload															
Nom. pressure [bar rel.]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Height of fluid [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
max. pressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
perm. vacuum [bar]	-0.2		-0.3		-0.5				-1.0						

Dimensions in mm:

Versions:

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

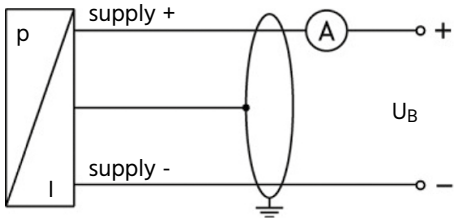
Process connection PVDF [1)]
G 1½" flush (DIN 3852)



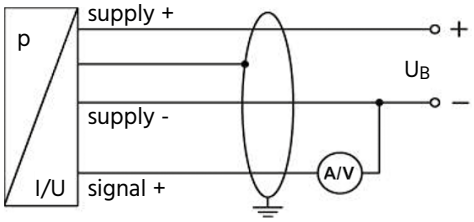
[1)] not possible in combination with field housing

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)

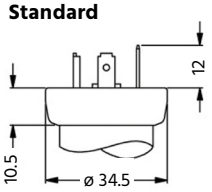
Material of process connection /
1 = stainless steel 1.4404
2 = PVC (on request)
3 = PVDF

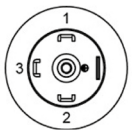
Wiring table:

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):

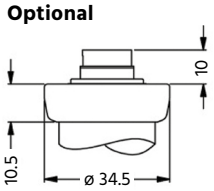
Standard

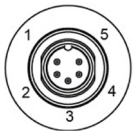




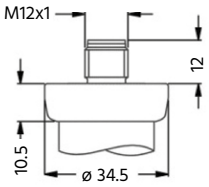
ISO 4400
(IP65)

Optional

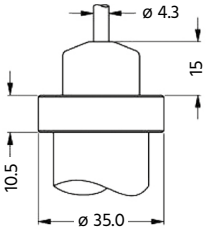


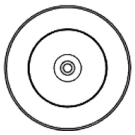


Binder Series 723 5-pin
(IP67)

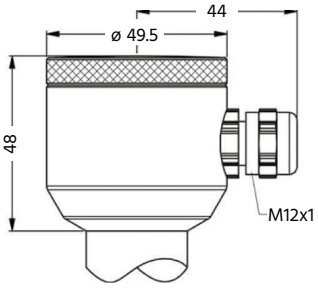


M12 x 1 4-pin
(IP67)

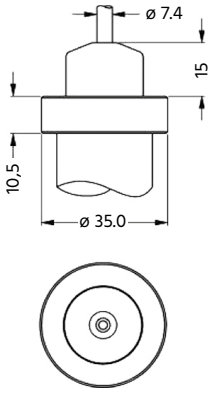




cable outlet with PVC-cable [4]
(IP67)



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

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

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.

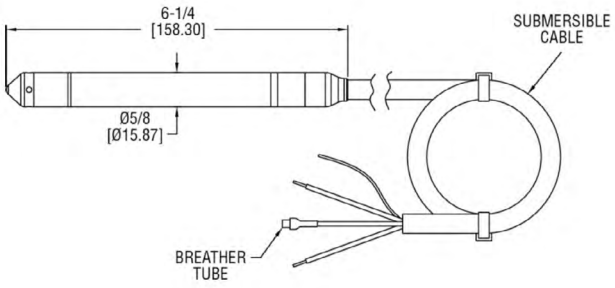
Technical Specifications:

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

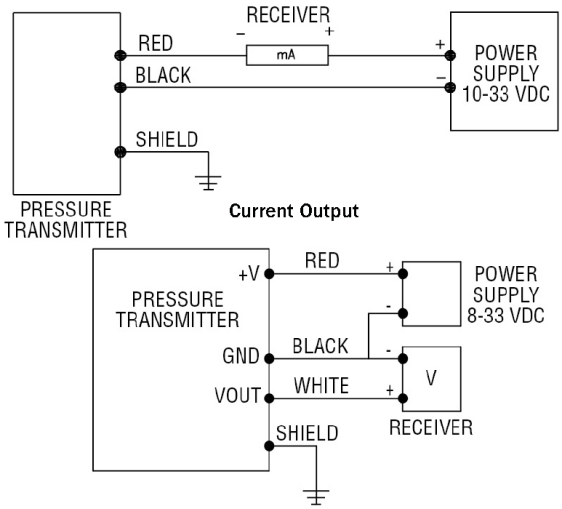
Output /
1 = 4. . .20 mA
2 = 0. . .2 V
3 = 0. . .2.5 V
4 = 0. . .3 V
5 = 0. . .4 V
6 = 0. . .5 V
7 = 1. . .5 V

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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