

LEVEL 2025



OVERVIEW



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 electromagnetic 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):
5 mm (0.2 inch)

Dielectric constant ϵ_r / > 1.6

Housing /

Material:	stainless steel 1.4404
Cable gland:	M20 x 1.5 or 1/2" 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 /

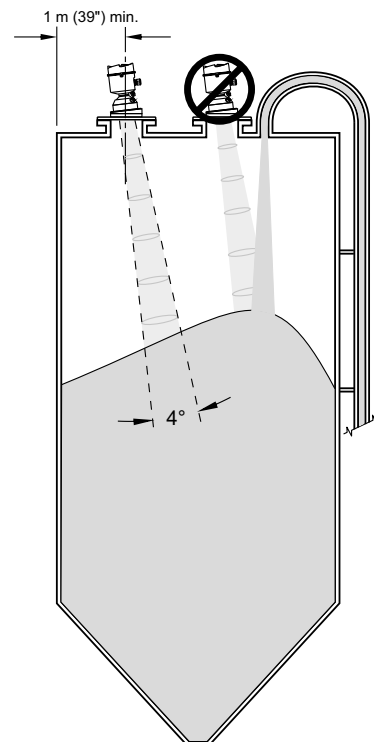
Approvals: intrinsically safe version
ATEX II 1GD Ex ia IIC T4 Ga
Ex iaD 20 T135 °C
T_a = -20...+50 °C

Field communicator: 375/475 field communicator for HART

PC: SIMATIC PDM, AMS, PACTware

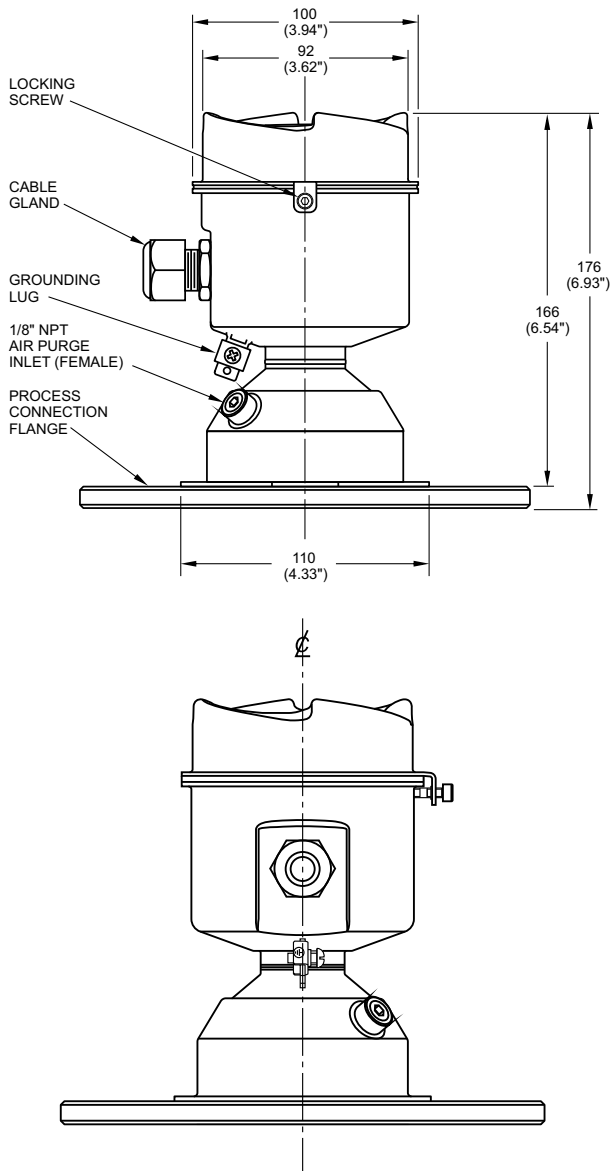
Display (local): Graphic local user interface including quick start wizard and echo profile displays

Installation Position:

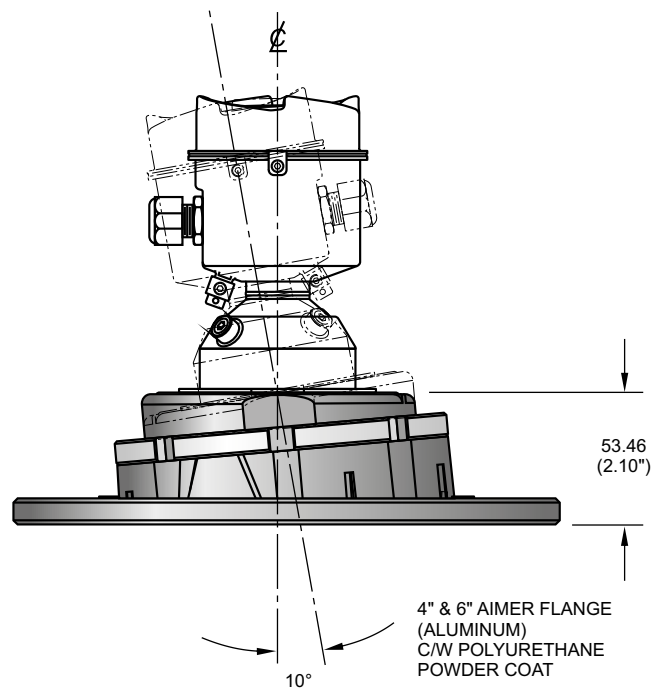
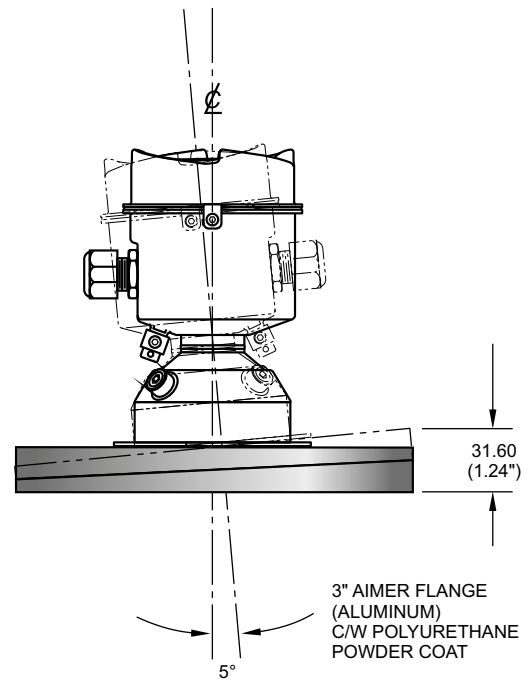




Dimensions in mm:



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



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 blank 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)								

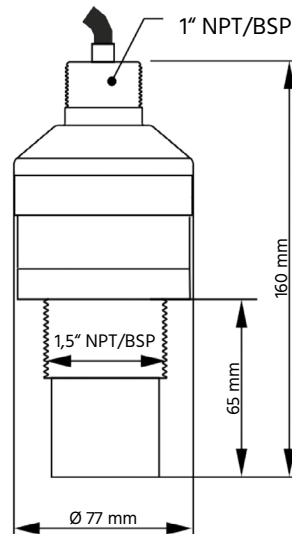


Electrical Specifications:

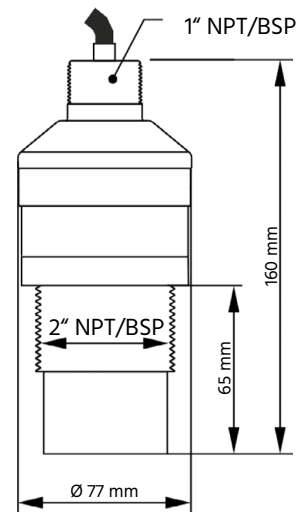
Supply voltage /	10...28 VDC
Output /	4...20 mA (3.8...22 mA) HART® - loop powered (2-wire)
Configuration /	PC software for parameter setting and linearisation via HART® communication (HART® - communicator not included).
Start up time /	4 sec. typical (9 sec. after 12 hours without activity)
Cable length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

Dim., Mounting Thread, front side:

Sensor Type A and Type B

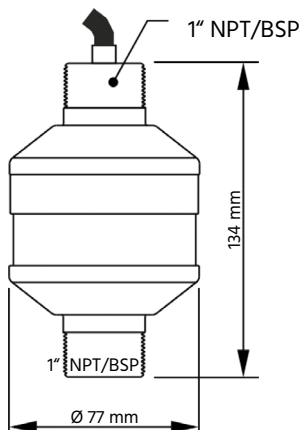


Sensor Type C

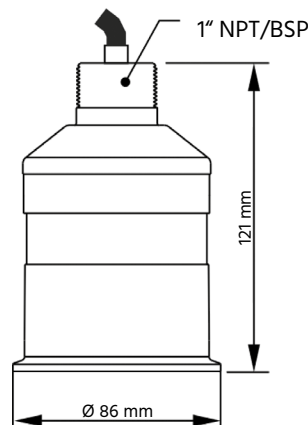


Dim., Mounting Thread, cable side:

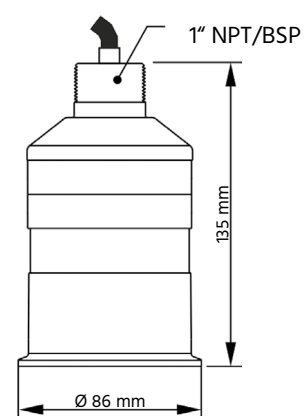
Sensor Type A



Sensor Type B and Type C



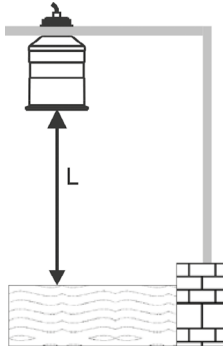
Sensor Type D





Outdoor and open Vessel installation:

Mounted via rear 1" NPT thread



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.

Mounted via optional front thread

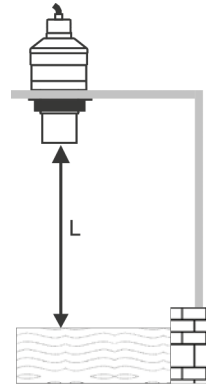
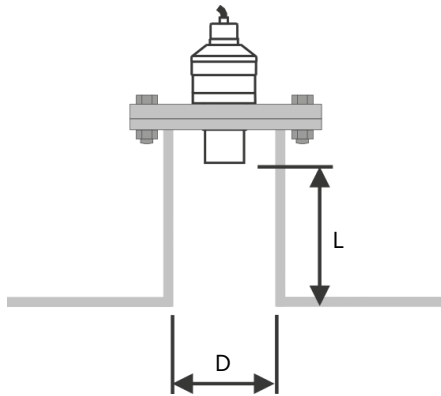


Table 1: Minimum sensor distance

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



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.

Optional flange mounted to a stand pipe

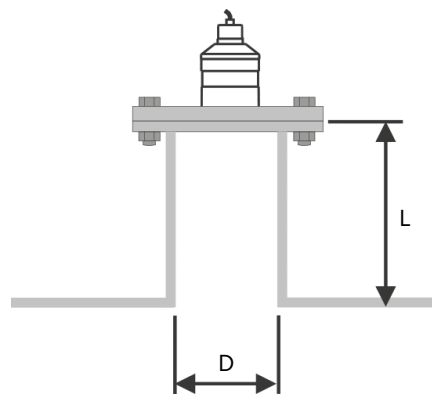


Table 2: Dimensions standing pipe

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



ECHO-N

Universal Ultrasonic Level-Sensor

Features

- / Contactless measurement
- / No mechanical parts
- / Maintenance and wear-free
- / Simple installation
- / Easy calibration
- / Temperature-compensated

Description:

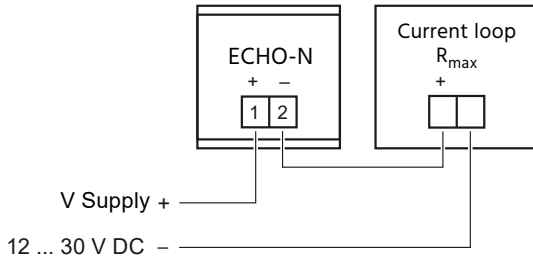
ECHO-N type ultrasonic level sensors are used when fluids and bulk goods need to be measured continually. The sensor works according to the principle of runtime method. It emits ultrasonic signals and subsequently measures the time elapsed until it receives again the echo reflected by the media surface. 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 agitators. 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:

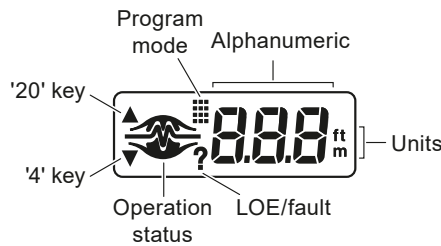
Ultrasonic level sensors are used wherever contamination and conditions of coldness, heat and humidity pose a problem to conventional measuring systems. By deploying ECHO-N, already occupied and soiled probes, hardened membranes, clogged floaters, leaking bubbling-through measuring systems and continual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



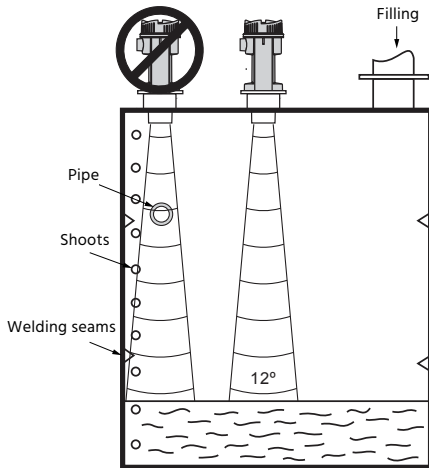
Electrical Connection:



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:

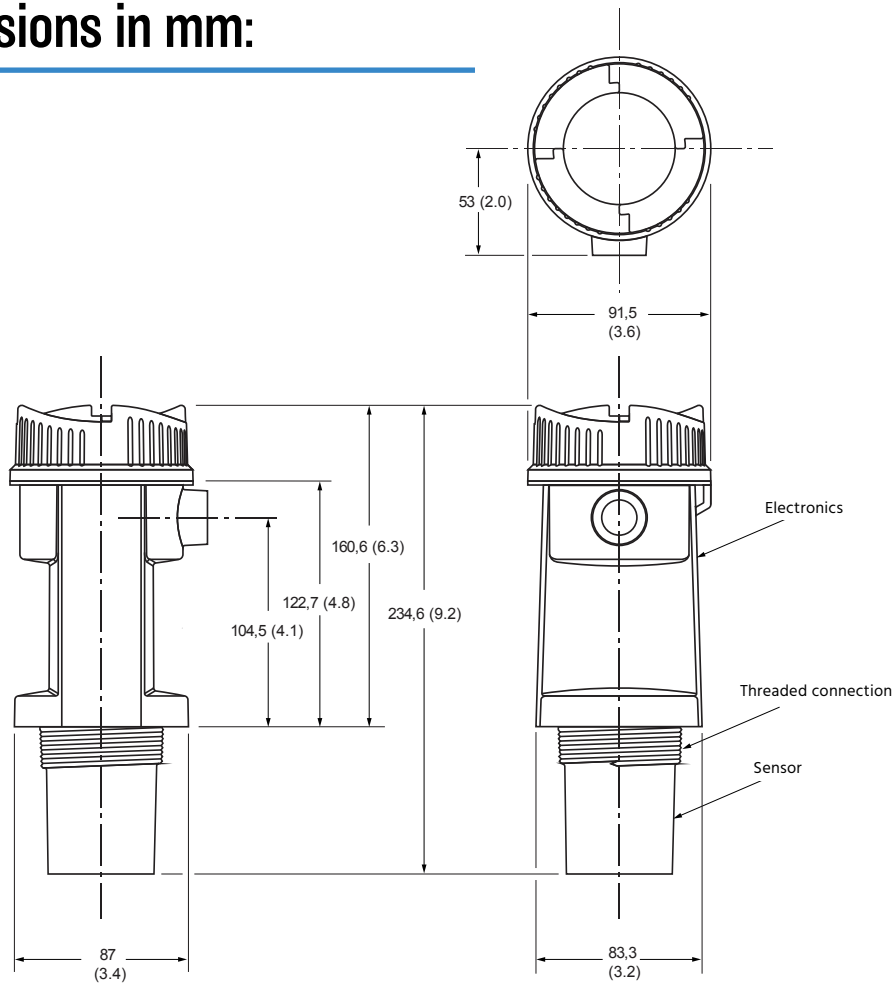
max. Pressure /	ambient pressure
max. Ambient-temp. /	standard: -30 .. +60°C installation with metal-thread: -20 .. +60°C
Measuring range /	0.25 .. 5 m at 54 kHz
Operating range /	proportional / inversibly proportional
Display /	3-digit LCD-display
Weight /	1.3 kg without flange adapter 1.5 kg with flange 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:

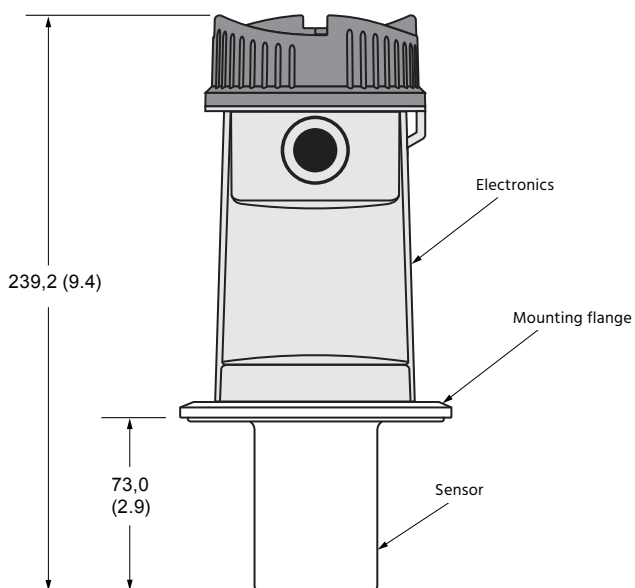
Order number	ECHO-N.	1
ECHO-N Universal Ultrasonic Level-Sensor		
Process connection /		
1 = 2" NPT		
2 = G2" (BSPP)		
3 = tri-clamp, sanitary flange 4"		
4 = R2" (BSPT)		



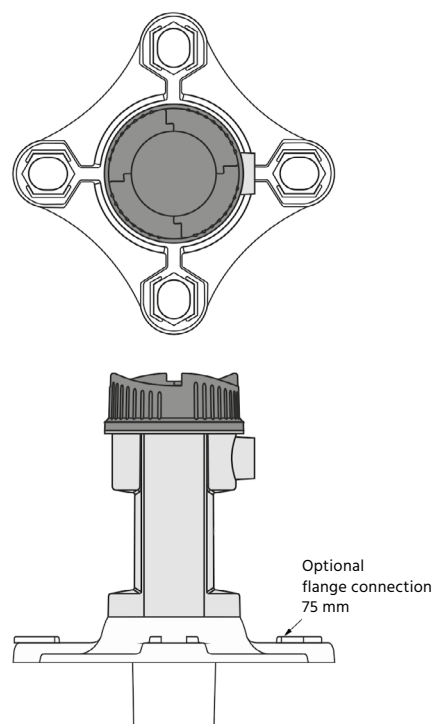
Dimensions in mm:



Sanitary connection in mm:



Flange connection:







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:

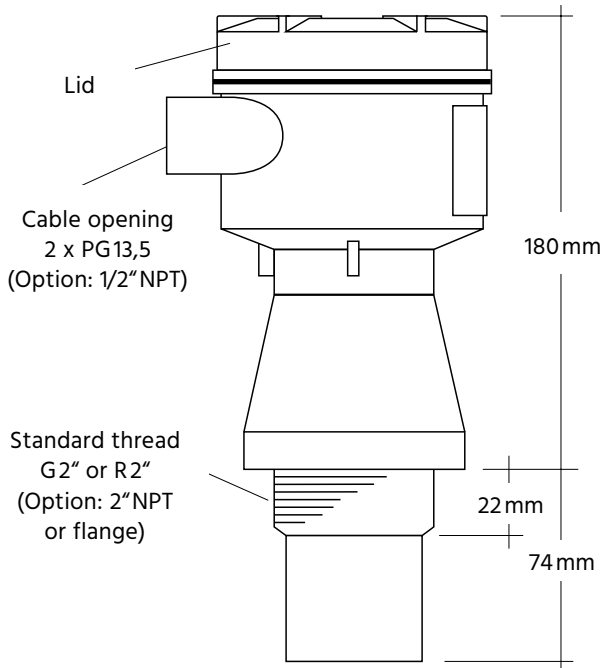
The FU-01 series of ultrasonic level switches is used wherever contactless measuring is advantageous. Typical applications are, for example, in water and effluent management, for bulk goods or in sewage treatment plants. As far as level monitoring is concerned, problems caused by soiling, blockages or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

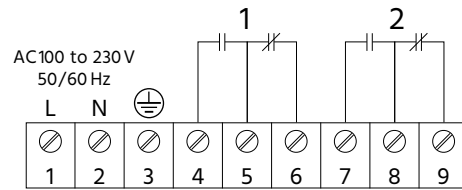


Electrical Specifications:

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

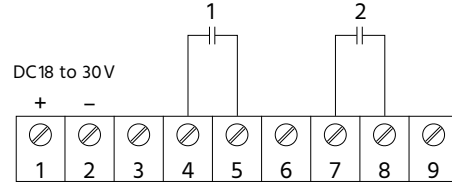
Outputs:

Relay output



AC100 to 230V
50/60 Hz
L N
+ -
DC18 to 30V
Two Form 'C' (SPDT) relays can switch external devices such as alarms, relays, contractors, PLCs, DSCs, etc.

Transistor Output: DC version only



DC18 to 30V
+ -
Two non-polarized transistor outputs are suitable for connection to PLCs, DSCs, or customer supplied relays.

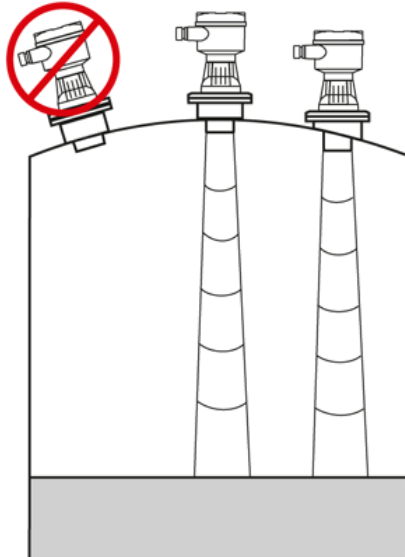
Ordering Codes:

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				

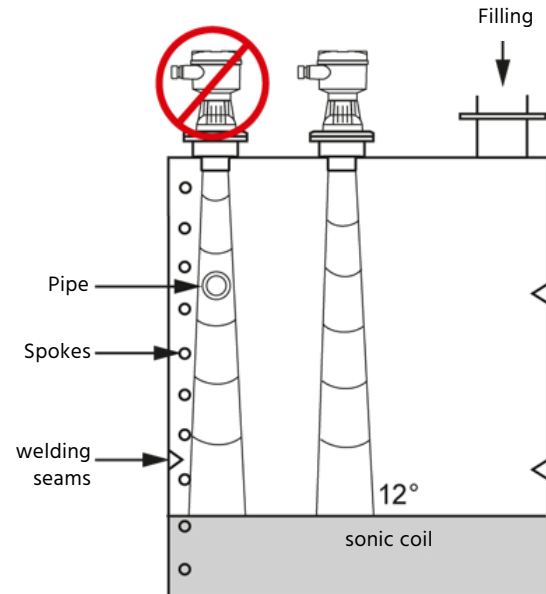


Mounting:

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.





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:

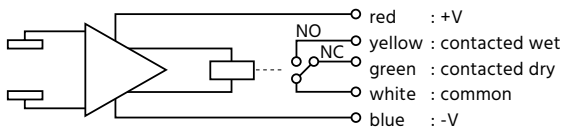
The Mobrey™ 003 is manufactured in Polyphenylene Sulphide (PPS). It is corrosion resistant in many liquids and can be used even in aggressive liquids such as acids and lyes. The sensor can be mounted in any position in a tank using the 1" or 3/4" BSPT or the 1" NPT threads available. A thread is provided 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.



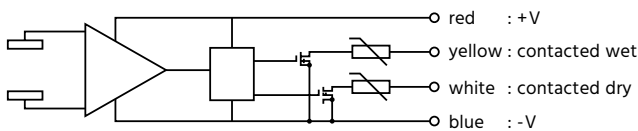
Technical Specifications:

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/cm ³
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

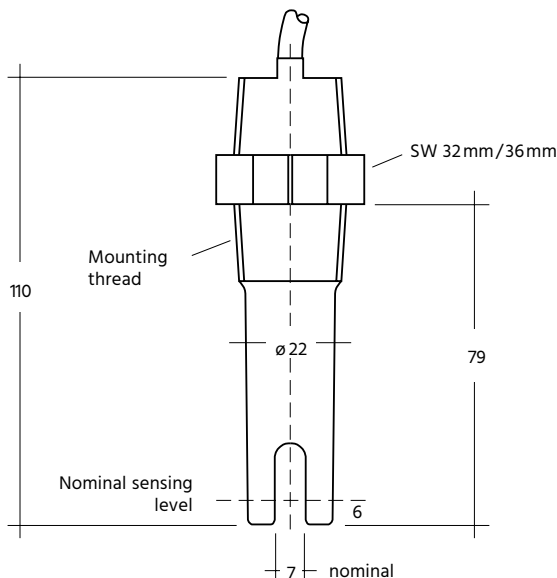
Schematic 003-S.x models



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			



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 magnetostrictive 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 to 13 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



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 (multiple 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.



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/cm ³

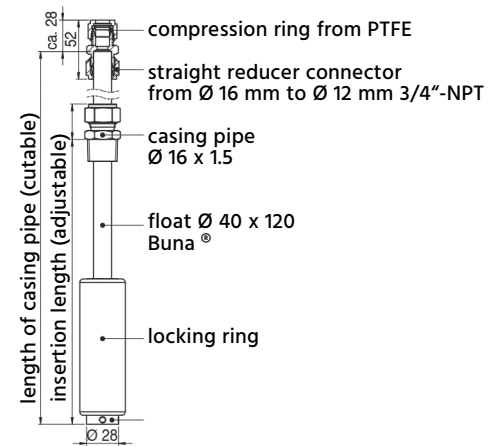
Heavy-Duty installation kit

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

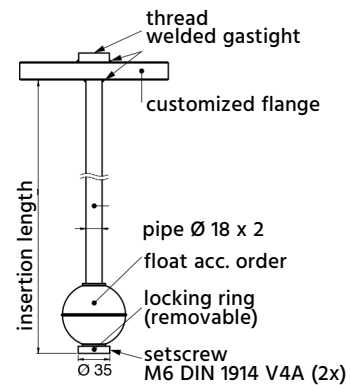
Plastic inst. kit from PVC, PP or PVDF

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/cm ³

LPG-installation kit



Heavy-Duty-installation kit



Plastic-installation kit

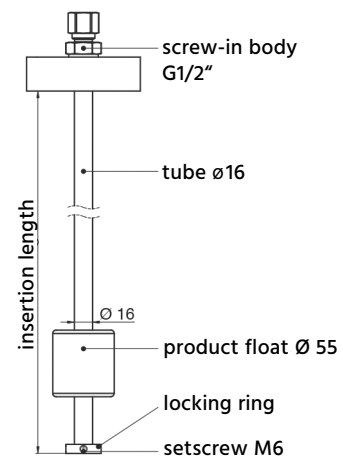
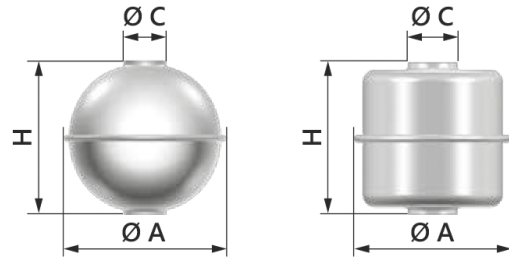




Table Floats:

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/cm ³	< 0.85 g/cm ³	-200...+250°C	50 bar	43.0	40.0	15.0	K	KE01
≥ 0.85 g/cm ³	< 0.75 g/cm ³	-200...+250°C	20 bar	43.0	40.0	15.5	K	KE02
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	40 bar	52.0	52.0	15.5	K	KE03
≥ 0.60 g/cm ³	< 0.50 g/cm ³	-200...+250°C	20 bar	52.0	49.0	15.5	K	KE04
≥ 0.45 g/cm ³	< 0.36 g/cm ³	-40...+250°C	25 bar	83.0	82.0	15.0	K	KE05
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	16 bar	43.0	43.0	15.5	Z	ZE01
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	5 bar	29.5	40.0	12.5	Z	ZE02
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	1 bar	29.5	40.0	12.5	Z	ZE03
≥ 0.78 g/cm ³	< 0.67 g/cm ³	-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/cm ³	< 0.60 g/cm ³	-200...+250°C	16 bar	43.0	43.0	15.5	Z	ZEF01
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	5 bar	29.5	40.0	12.5	Z	ZEF02
≥ 0.78 g/cm ³	< 0.67 g/cm ³	-20...+100°C	16 bar	27.0	31.0	10.0**	Z	ZEF03
Stainless steel 1.4571 precision float								
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	drucklos	54.0	31.0	13.0/23.4	Z	ZEP01
Titanium								
≥ 0.50 g/cm ³	< 0.40 g/cm ³	-200...+250°C	20 bar	50.0	48.0	15.4	K	KT01
≥ 0.40 g/cm ³	< 0.30 g/cm ³	-40...+125°C	25 bar	83.0	81.0	15.0	K	KT02
≥ 0.50 g/cm ³	< 0.42 g/cm ³	-40...+125°C	25 bar	98.0	96.0	23.0	K	KT03
≥ 0.69 g/cm ³	< 0.59 g/cm ³	-200...+450°C	200 bar	60.0	59.0	14.5	K	KT04
Hastelloy® C 276								
≥ 0.70 g/cm ³	< 0.60 g/cm ³	-200...+250°C	10 bar	46.0	48.0	15.2	Z	ZH01
BUNA®								
≥ 0.45 g/cm ³	< 0.38 g/cm ³	-40...+80°C	16 bar	40.0	120.0	18.0	Z	ZB01
≥ 0.45 g/cm ³	< 0.38 g/cm ³	-40...+80°C	16 bar	30.0	45.0	13.0	Z	ZB02
Plastic float (POM with graphite)								
≥ 0.65 g/cm ³	< 0.55 g/cm ³	-40...+80°C	1 bar	55.0	14.0	12.5	T	TP01

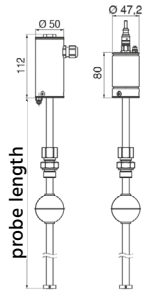
** only for versions FM-01F.06M and FM-01F.06S

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

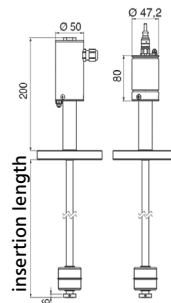


Dimensions in mm:

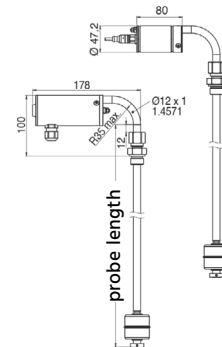
FM-01F.12M - thread version



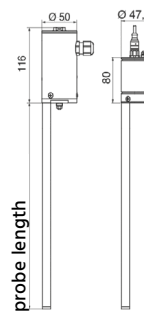
FM-01F.12M - flange version



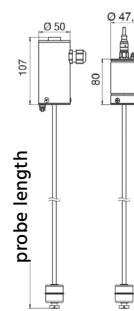
FM-01F.90G - angled version



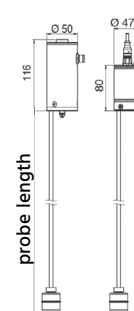
FM-01F.12S - bypass version



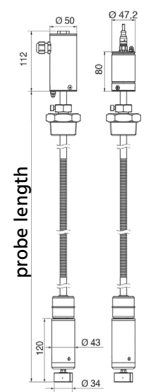
FM-01F.06M - 6 mm central



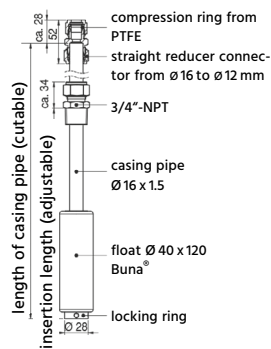
FM-01F.06S - 6 mm lateral



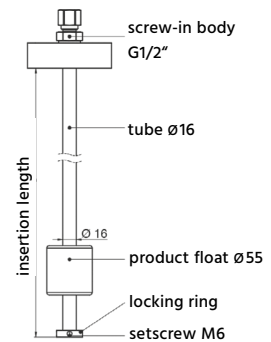
FM-01F.FLEX - flexible version



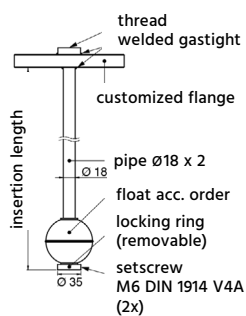
Installation kit for LPG-tanks



Installation kit from PP or PVDF



Heavy-Duty installation kit







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.

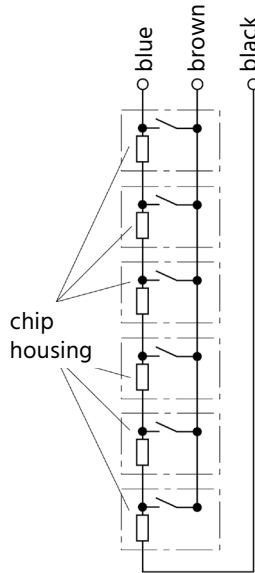
Application:

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 be 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 additionally be supplied as high-temperature- version HTF and HT (please check table below)

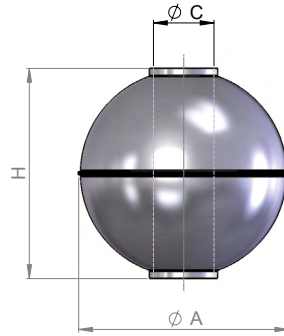
Grid	Resolution (mm)	Temp. range (mm)
5	5 mm	-30...+130°C
5HTF	5 mm	-30...+200°C
5HT	5 mm	-40...+250°C
10	10 mm	-30...+130°C
10HTF	10 mm	-30...+200°C
10HT	10 mm	-40...+250°C
12.7	12.7 mm	-30...+130°C
15	15 mm	-30...+130°C
15HTF	15 mm	-30...+200°C
5HT	5 mm	-40...+250°C
0.2	0,2 mm	-30...+125°C
0.2HT	0,2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



Table 1: Spherical Float - Dimensions

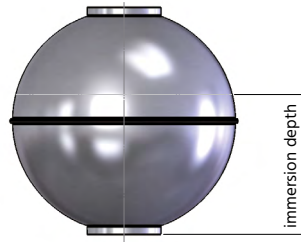


* = Design temperature 200°C, higher temperatures must be calculated
 ** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Weight
		(mm)	(mm)	(mm)	(kg/m ³)	(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



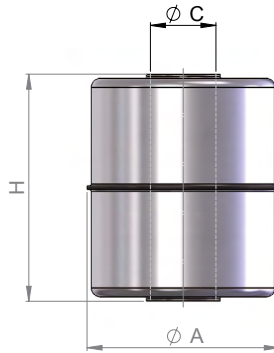
Spherical Float Immersion depth



Type	specific weight of the medium (kg/m ³)											
	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

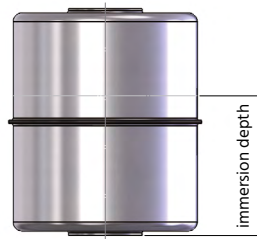


* = Design temperature 200°C, higher temperatures must be calculated
 ** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Weight
		(mm)	(mm)	(mm)	(kg/m ³)	(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



Cylindrical Float Immersion depth



Type	specific weight of the medium (kg/m ³)											
	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	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:

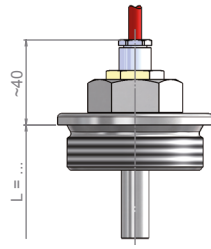
Function	Pt100	Pt1000
Operating temperature	-70...+400°C	-70...+400°C
Tolerance	Class B	Class B
Properties	acc. to IEC 751	acc. to IEC 751
Wiring	2-, 3-, or 4-wire	2-, 3-, or 4-wire

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.

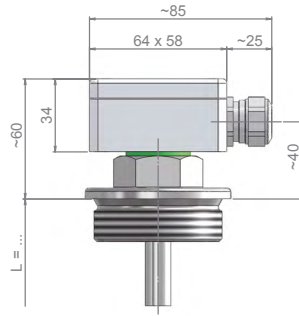


Conn. Type K
connecting cable



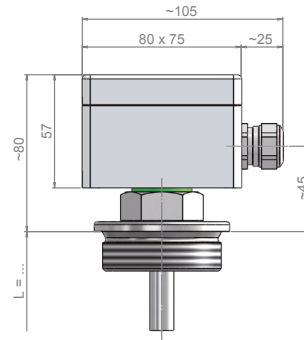
Material: acc. to cable definition
Cable gland: PG or M
Protect. cl.: IP55 (optional IP68)
Amb.temp.: -40...+200°C

Conn. Type E
Aluminium terminal box



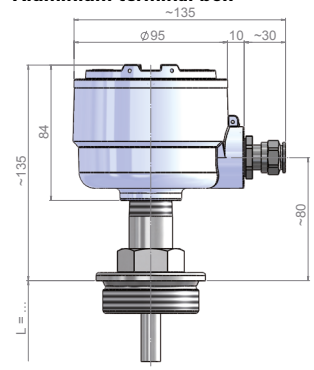
Material: Al coated RAL 7001
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40...+100°C

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

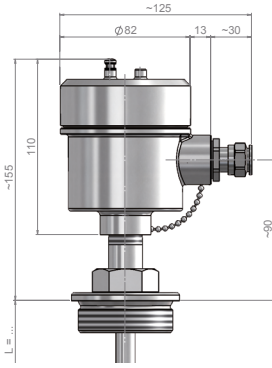


Material: Al coated RAL 9006
Cable gland: M20 x 1.5
Protection class: IP68
Amb.temp.: -40...+100°C

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	○	●	●	●	●

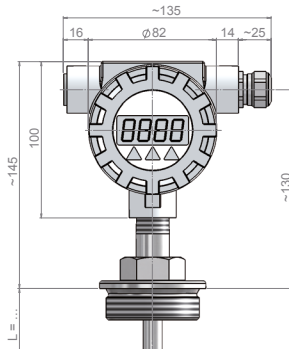


Conn. type VA (Exd)
st. steel terminal box



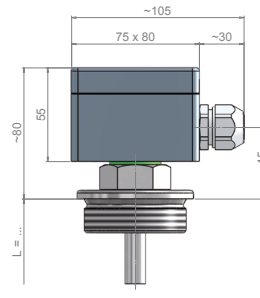
Material: st. steel A4 (SS316)
Cable gland: M20 x 1.5
Protect. class: IP67 (Exd / IP68)
Amb.temp.: -40...+85°C

Conn. type ADI
Aluminium terminal box



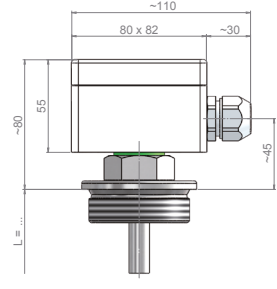
Material: aluminium
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -40...+60°C
Display: 7-Segment LED red

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



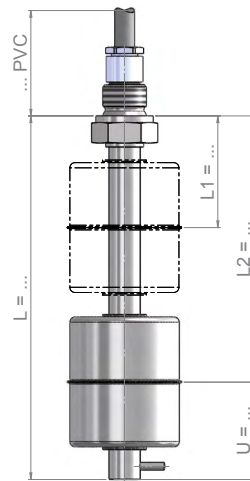
Material: ABS
Cable gland: M20 x 1.5
Protection class: IP65
Amb.temp.: -10...+80°C

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	●	●	●	○

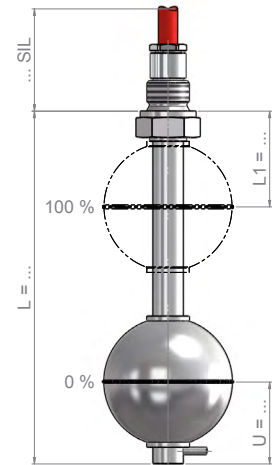


Level transmitter made of st. steel with thread facing upwards

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 /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m ³
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. / L1 ≥ 50 mm, U = 45 mm

poss.

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 /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	K52G15E
sp. Weight /	≥ 700 kg/m ³
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

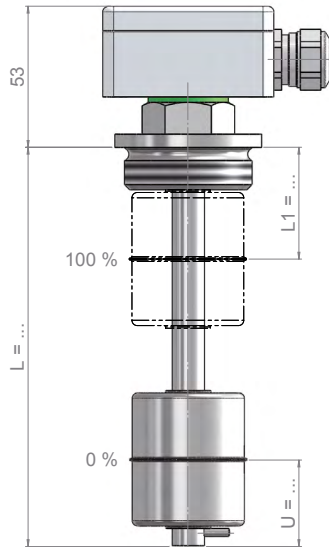
min. Dimens. / L1 ≥ 55 mm, U = 45 mm

poss.

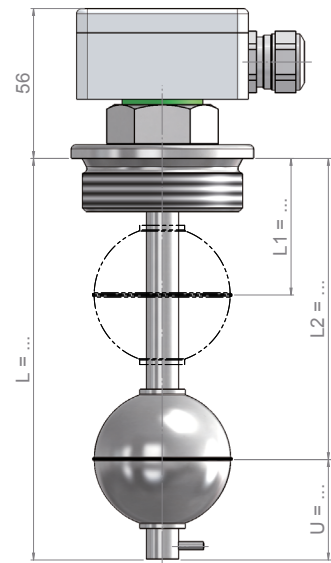
Approvals / ATEX, PED, GOST, GL, BV, ABS, WHG

**Level transmitter made of st. steel with downward facing thread**

Version: VAG112G



Version: VAG2G

**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 /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m ³
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. /	L1 ≥ 50 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

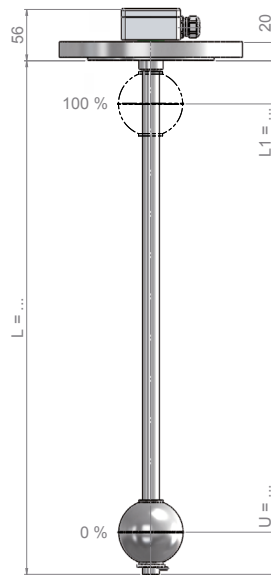
Technical Specifications:

Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti)
El. Connection /	Type E Aluminium terminal box
Process conn. /	G2"-male downwards
Sliding tube /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	K52G15E
sp. Weight /	≥ 700 kg/m ³
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. /	L1 ≥ 55 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

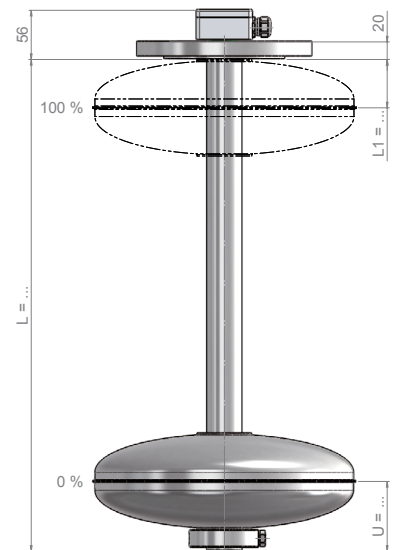


Level transmitter made of st. steel with flange connection

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 /	∅ 18 mm
insert. Length /	≤ 6000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m ³
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 ≥ 60 mm, U = 60 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

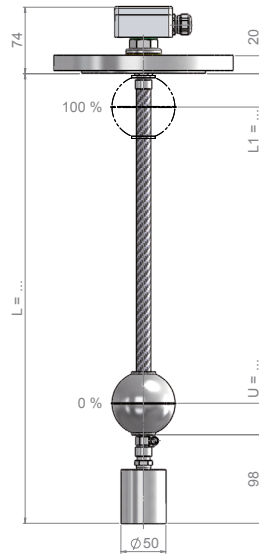
Technical Specifications:

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 /	∅ 40 mm
insert. Length /	≤ 10.000 mm
Float /	K300G56E
sp. Weight /	≥ 500 kg/m ³
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. /	L1 ≥ 70 mm, U = 90 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS, WHG

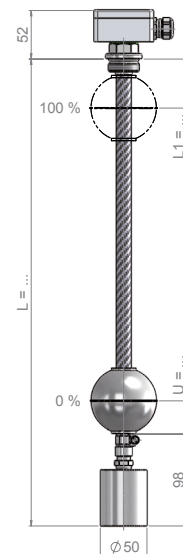


Level transmitter made of st. steel - flexible

Version: VAF80FLEX



Version: VAG25FLEX



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 /	∅ 16 mm
insert. Length /	≤ 10.000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m ³
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

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 /	∅ 16 mm
insert. Length /	≤ 10.000 mm
Float /	K72G24E
sp. Weight /	≥ 620 kg/m ³
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

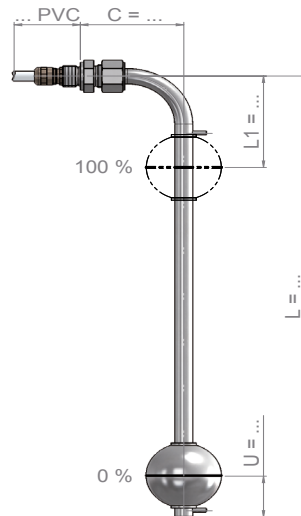
min. Dimens. / L1 ≥ 60 mm, U = 60 mm
poss.

Approvals/ ATEX, PED, GOST

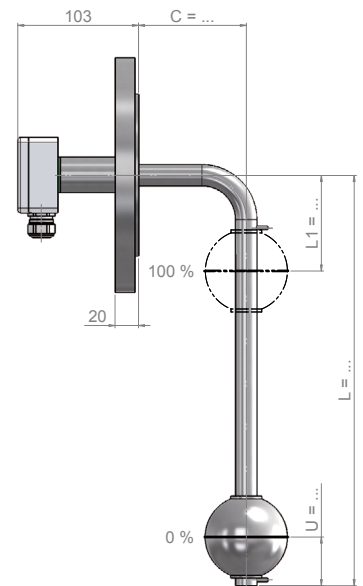


Level transmitter made of st. steel - angled

Version: VAWG38SIL



Version: VAWF80G



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/m ³
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 ≥ 55 mm, U = 45 mm, C ≥ 70 mm
poss.	
Approvals /	ATEX, PED, GOST, GL, BV, ABS

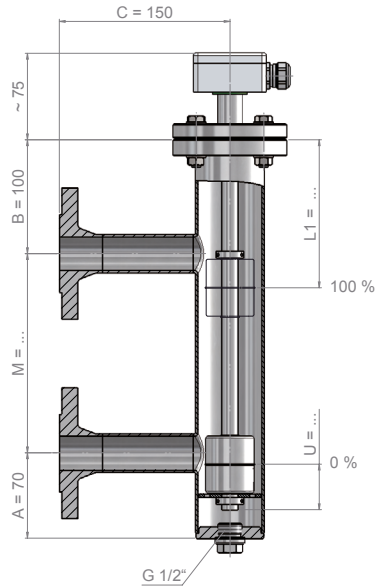
Technical Specifications:

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/m ³
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 ≥ 60 mm, U = 60 mm, C ≥ 70 mm
poss.	
Approvals /	ATEX, PED, GOST, GL, BV, ABS

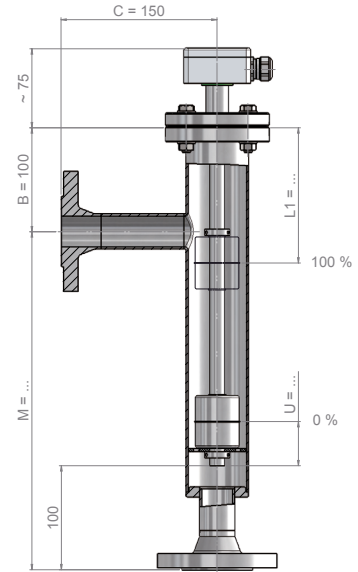


Level transmitter made of st. steel - with bypass housing

Version: VABHH



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/m ³
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 ≥ 130 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS

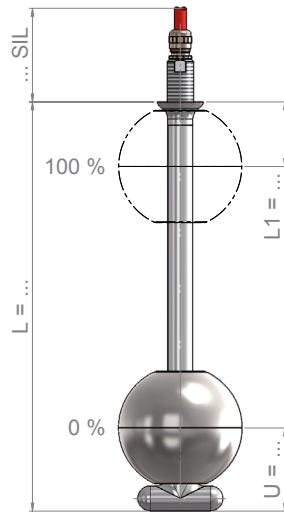
Technical Specifications:

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/m ³
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 ≥ 130 mm, U = 45 mm
poss.	
Approvals/	ATEX, PED, GOST, GL, BV, ABS

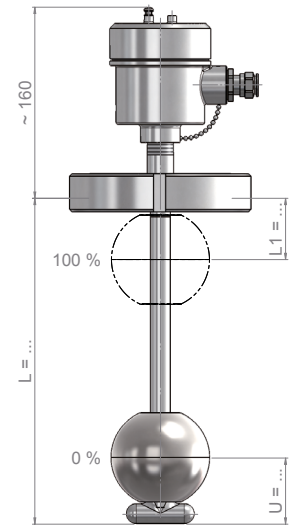


Level transmitter made of st. steel - 3A sanitary standard

Version: VASG38SIL



Version: VASMRG



Technical Specifications:

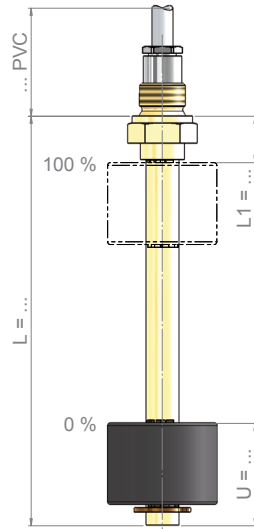
Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti) roughness depth wetted $\leq 0.4 \mu\text{m}$
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	$\varnothing 16 \text{ mm}$
insert. Length /	$\leq 5000 \text{ mm}$
Float /	K80G23E2
sp. Weight /	$\geq 750 \text{ kg/m}^3$
Design press. /	-1. . . +40 bar
Design temp. /	-40. . . +180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical $\pm 30^\circ$
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. /	$L1 \geq 50 \text{ mm}$, $U = 55 \text{ mm}$
poss.	
Approvals /	ATEX, PED, GOST, GL, BV, ABS, 3A

Technical Specifications:

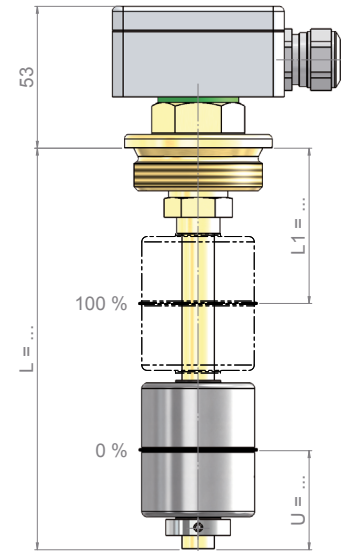
Material /	1.4404 / 1.4435 / 1.4571 (316L / 316Ti) roughness depth wetted $\leq 0.4 \mu\text{m}$
El. Connection /	Type VA st. steel terminal box
Process conn. /	cone acc. to 11851 with groove nut
Sliding tube /	$\varnothing 16 \text{ mm}$
insert. Length /	$\leq 5000 \text{ mm}$
Float /	K80G23E2
sp. Weight /	$\geq 750 \text{ kg/m}^3$
Design press. /	-1. . . +6 bar (depending on temp.)
Design temp. /	see table Grid
Protection class /	IP67
Mount. pos. /	vertical $\pm 30^\circ$
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. /	$L1 \geq 50 \text{ mm}$, $U = 55 \text{ mm}$
poss.	
Approvals /	ATEX, PED, GOST, GL, BV, ABS, 3A

**Level transmitter made of brass**

Version: MG38PVC



Version: MG112G

**Technical Specifications:**

Material /	brass, float made of BUNA
El. Connection /	PVC connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z40G15NB
sp. Weight /	≥ 700 kg/m ³
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. /** L1 ≥ 30 mm, U = 50 mm
poss.**Approvals/** PED, GOST, GL, BV, ABS**Technical Specifications:**

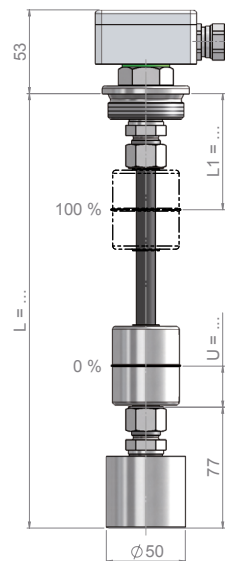
Material /	brass, float made of BUNA
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1 1/2"-male downwards
Sliding tube /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G15E
sp. Weight /	≥ 800 kg/m ³
Design press. /	-1...+25 bar
Design 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 ≥ 65 mm, U = 45 mm
poss.**Approvals/** PED, GOST, GL, BV, ABS

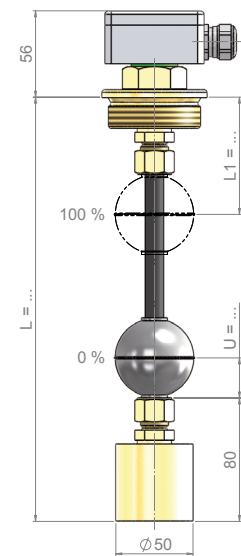


Level transmitter made of Polyamide - flexible

Version: PAFG112G



Version: PAFG2G



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/m ³
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

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/m ³
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

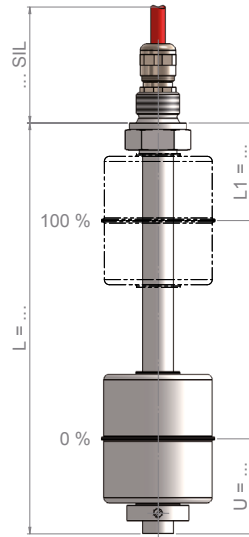
poss.

Approvals/ GOST

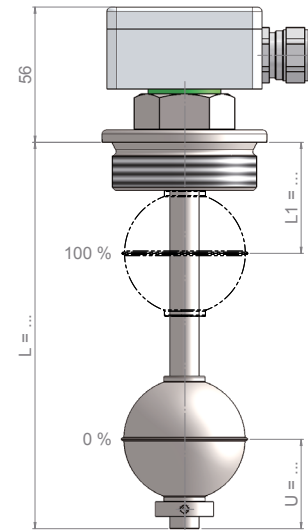


Level transmitter made of Titanium

Version: TG38SIL



Version: TG2G



Technical Specifications:

Material /	Titanium
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	Z44G14T
sp. Weight /	≥ 750 kg/m ³
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

Technical Specifications:

Material /	Titanium
El. Connection /	Type E Aluminium terminal box
Process conn. /	G2"-male downwards
Sliding tube /	∅ 12 mm for grid 10 mm, 12.7 mm & 15 mm, ∅ 14 mm for grid 5 mm
insert. Length /	≤ 5000 mm
Float /	K52G14T
sp. Weight /	≥ 600 kg/m ³
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

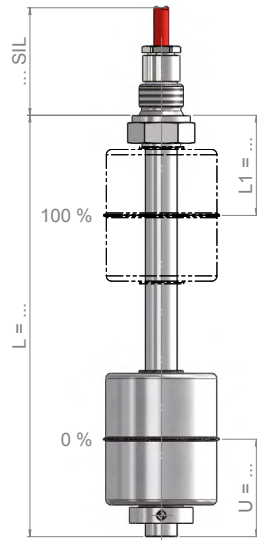
Temp. contacts / NO or NC

min. Dimens. / L1 ≥ 55 mm, U = 45 mm
poss.

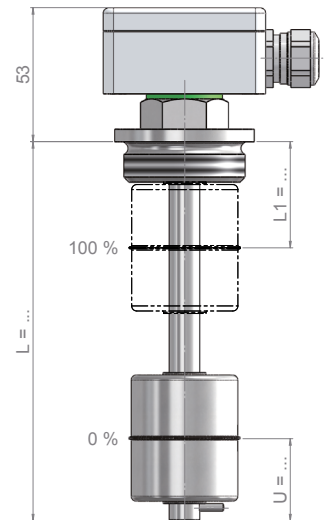
Approvals/ ATEX, PED, GOST, WHG

Level transmitter made of Alloy C

Version: ALCG38SIL



Version: ALCG112G



Technical Specifications:

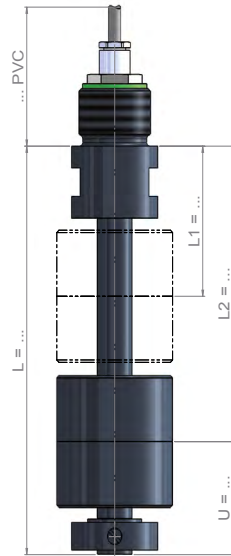
Material /	Alloy C
El. Connection /	silicone connecting cable
Process conn. /	G3/8"-male upwards
Sliding tube /	∅ 12 mm
insert. Length /	≤ 3000 mm
Float /	Z44G15A
sp. Weight /	≥ 1000 kg/m ³
Design press. /	-1. . . +45 bar
Design temp. /	-40. . . +180°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	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:

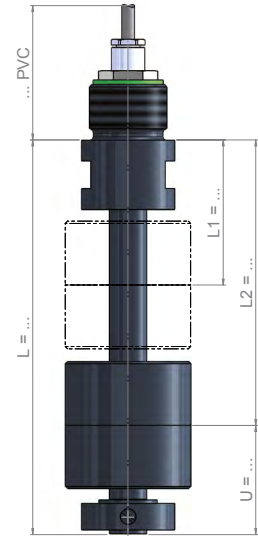
Material /	Alloy C
El. Connection /	Type E Aluminium terminal box
Process conn. /	G1 1/2"-male downwards
Sliding tube /	∅ 12 mm
insert. Length /	≤ 3000 mm
Float /	K52G15A
sp. Weight /	≥ 1000 kg/m ³
Design press. /	-1. . . +45 bar
Design temp. /	see table Grid
Protection class /	IP65
Mount. pos. /	vertical ±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



Version: PVCG1PVC20

**Technical Specifications:**

Material /	PVC
El. Connection /	PVC connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	∅ 16 mm
insert. Length /	≤ 3000 mm
Float /	Z54G22PC
sp. Weight /	≥ 750 kg/m ³
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

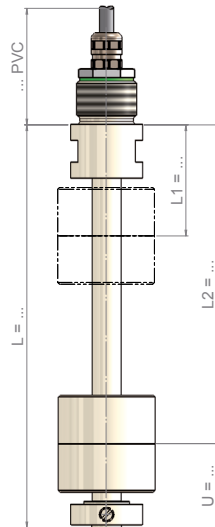
Technical Specifications:

Material /	PVC
El. Connection /	PVC connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	∅ 20 mm
insert. Length /	≤ 6000 mm
Float /	Z78G25A
sp. Weight /	≥ 600 kg/m ³
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

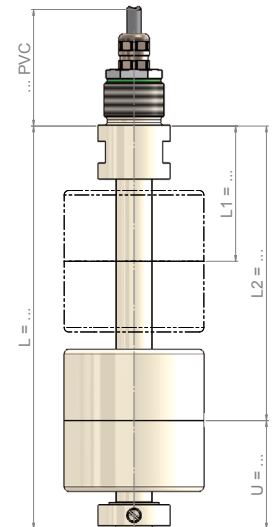


Level transmitter made of Polypropylene

Version: PPG1PVCD16



Version: PPG1PVCD20



Technical Specifications:

Material /	Polypropylene
El. Connection /	PVC connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	∅ 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PP
sp. Weight /	≥ 600 kg/m ³
Design press. /	-1. . .+1 bar
Design temp. /	-10. . .+80°C
Protection class /	IP55 (optional IP68)
Mount. pos. /	vertical ±30°
Grid /	5, 10, 12,7, 15
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 65 mm, U = 50 mm
poss.	
Approvals/	PED, WHG

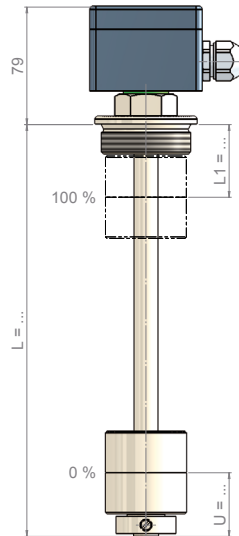
Technical Specifications:

Material /	Polypropylene
El. Connection /	PVC connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	∅ 20 mm
insert. Length /	≤ 6000 mm
Float /	Z80G24PP
sp. Weight /	≥ 500 kg/m ³
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

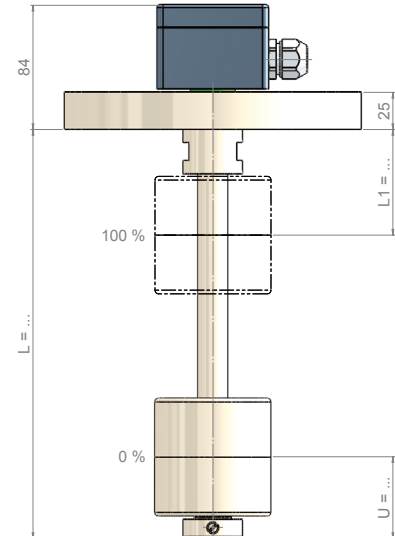


Level transmitter made of Polypropylene

Version: PPG2PVCD16



Version: PPF80GD20



Technical Specifications:

Material /	Polypropylene
El. Connection /	Type PA Polyester terminal box
Process conn. /	G2"-male upwards
Sliding tube /	∅ 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PP
sp. Weight /	≥ 600 kg/m ³
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

Technical Specifications:

Material /	Polypropylene
El. Connection /	Type PA Polyester terminal box
Process conn. /	Flange EN DN80 / PN10 / Form A
Sliding tube /	∅ 20 mm
insert. Length /	≤ 6000 mm
Float /	Z80G24PP
sp. Weight /	≥ 500 kg/m ³
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

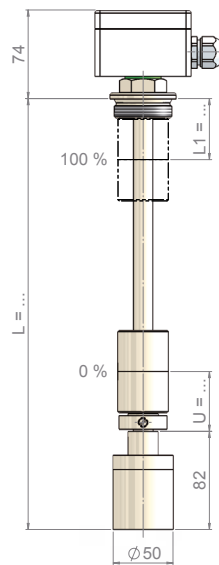
min. Dimens. / L1 ≥ 80 mm, U = 65 mm
poss.

Approvals/ PED, WHG

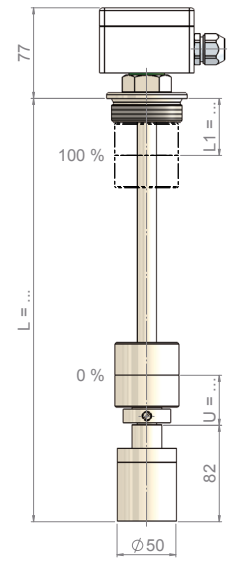


Level transmitter made of Polypropylene - flexible

Version: PPF112G



Version: PPF2G



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/m ³
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

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/m ³
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

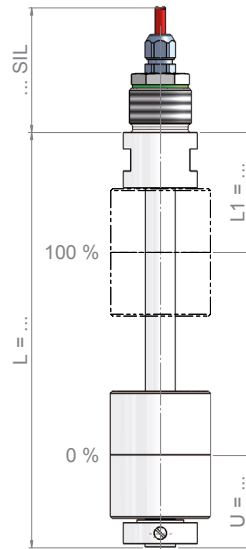
poss.

Approvals/ PED, WHG

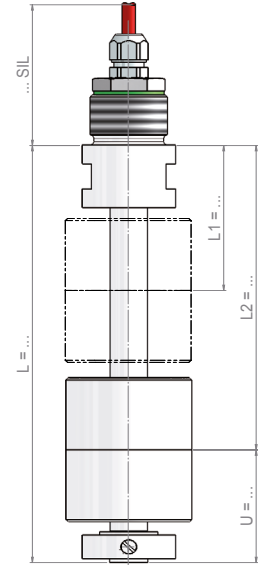


Level transmitter made of PVDF

Version: PVDFG1SILD16



Version: PVDFG1SILD20



Technical Specifications:

Material /	PVDF
El. Connection /	silicone connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	∅ 16 mm
insert. Length /	≤ 3000 mm
Float /	Z56G21PD
sp. Weight /	≥ 800 kg/m ³
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

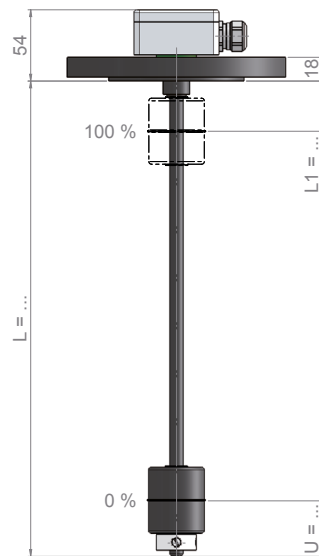
Technical Specifications:

Material /	PVDF
El. Connection /	silicone connecting cable
Process conn. /	G1"-male upwards
Sliding tube /	∅ 20 mm
insert. Length /	≤ 3000 mm
Float /	Z80G24PD
sp. Weight /	≥ 700 kg/m ³
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

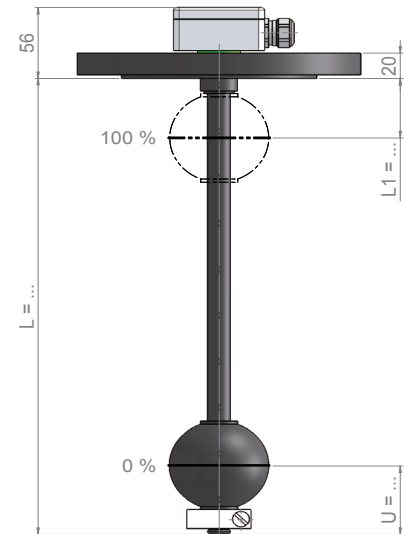


Level transmitter made of st. steel - ECTFE coated

Version: VAEBF50G



Version: VAEBF80G



Technical Specifications:

Material /	st. steel ECTFE-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	∅ 11 mm
insert. Length /	≤ 3000 mm
Float /	Z45G14EC1
sp. Weight /	≥ 950 kg/m ³
Design press. /	-1. .+.16 bar (depending on temp.)
Design temp. /	-40. .+.150°C
Protection class /	IP65
Mount. pos. /	vertical ±30°
Grid /	10, 10HTF
Option	
Temp. sensor /	Pt100 / Pt1000 IEC 751 Cl. B
Option	
Temp. contacts /	NO or NC
min. Dimens. /	L1 ≥ 70 mm, U = 70 mm
poss.	
Approvals/	ATEX, PED, GOST, WHG

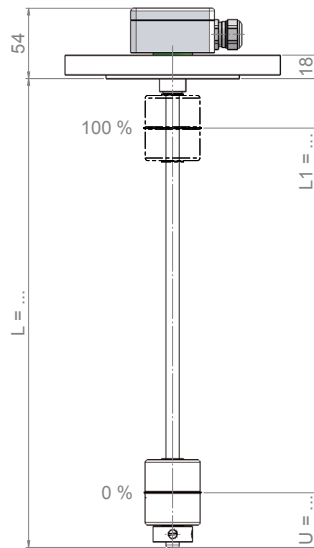
Technical Specifications:

Material /	st. steel ECTFE-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	∅ 17 mm
insert. Length /	≤ 3000 mm
Float /	K73G23EC1
sp. Weight /	≥ 750 kg/m ³
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

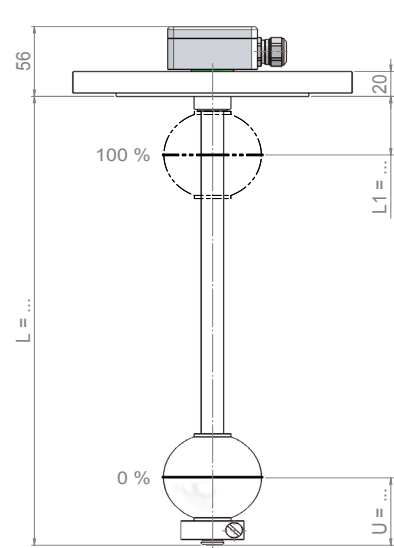


Level transmitter made of st. steel - PFA coated

Version: VAPBF50G



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 /	∅ 11 mm
insert. Length /	≤ 3000 mm
Float /	Z45G14PF1
sp. Weight /	≥ 1000 kg/m ³
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

Technical Specifications:

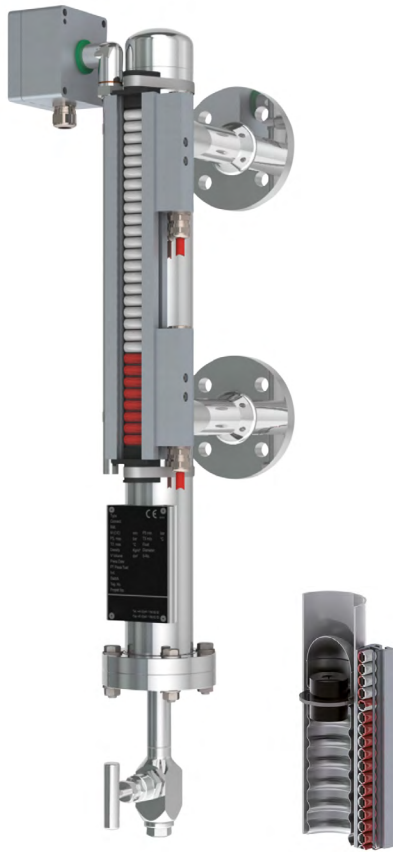
Material /	st. steel PFA-coated
El. Connection /	Type E Aluminium terminal box
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	∅ 17 mm
insert. Length /	≤ 3000 mm
Float /	K73G23PF1
sp. Weight /	≥ 800 kg/m ³
Design press. /	-1...+16 bar (depending on temp.)
Design temp. /	see table Grid
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



MA-400

Bypass-Magnetic Level Gauge

Description:

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

Features

/ Up to 25 meter measuring length

/ Up to +400 bar

/ Up to +400°C liquid temperature

/ Stainless steel, titanium,

Alloy C, PVC, PP, PVDF, ECTFE, PFA

/ Flange, thread and welded connections

/ Switching contacts

and measuring transmitter

/ Electrical trace heating

and insulation possible

/ Customized designs

Application:

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



Ordering Codes:

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

MA-400 Magnetic Level Gauge

Center distance of lateral connections (M) or length of instrument (instr. without side connections) in mm /

[][][][][] mm (150 mm to 25000 mm)

Bypass chamber material /

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

Bypass chamber outside diameter /

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

Process connection /

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

Nominal diameter, pressure level and sealing face /

[][][][] e.g. DN15 PN16 B1 or 1" 300 lbs RF (0000 for weld-on end and thread connection)

Weld-on end size elsewise thread size for screw neck or bushing /

[][][][] e.g. G3/4" or M18x1.5 (0000 for flange connection)

Float type and length acc. to appendix A „Cylindrical floats“ /

[][][][] e.g. ZVA52PN16-200 mm

Chamber end top acc. to appendix H „Chamber end top“ /

[][] = e.g. BA (welding cap)
99 = customized special, please specify in detailed text

Chamber end bottom acc. to appendix I „Chamber end bottom“ /

[][] = e.g. UB (flat top with drain plug G)
99 = customized special, please specify in detailed text

Indicator bar /

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

Approvals /

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

Options (multiple names like 7/8 possible) /

[][][][] z.B. 1 / 10 / 12 (3 x MRK-S01)

Indicator bar /

Aluminium housing - colorless mattfinished

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

Aluminium housing - stainless steel covered

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

Options /

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



Versions:

Measuring range (ME):

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

Measuring tube material:

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

Measuring tube diameter:

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

Process connection:

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

Nominal diameter and pressure level for flange:

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

Thread for screw neck or bushing:

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

Measuring tube connection top:

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

Measuring tube connection bottom:

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

Float type and length:

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

Indicator bar:

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

Approvals:

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

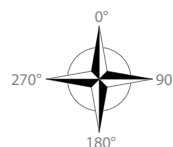
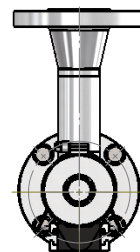
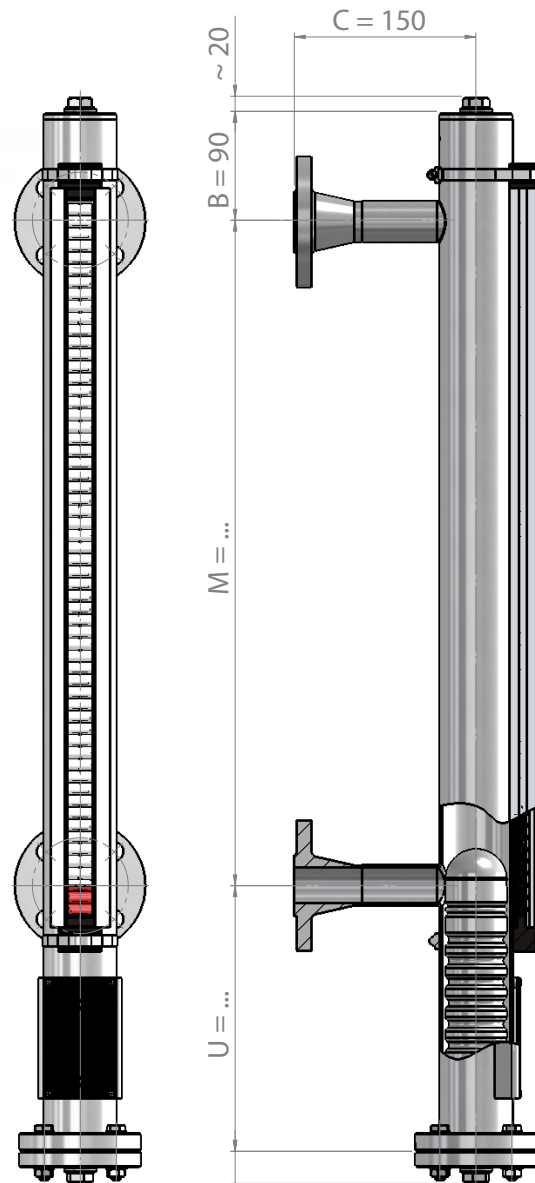
Options:

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

**Bypass-Magnetic Level Gauge made of st. steel PN16**

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	$\geq 400 \text{ kg/m}^3$
Design pressure /	-1. . .+16 bar
Design temp. /	-196. . .+400°C
Chambers /	$\varnothing 60,30 \times 2 \text{ mm}$ $\varnothing 60,33 \times 2,77 \text{ mm / NACE}$ $\varnothing 63,50 \times 2 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

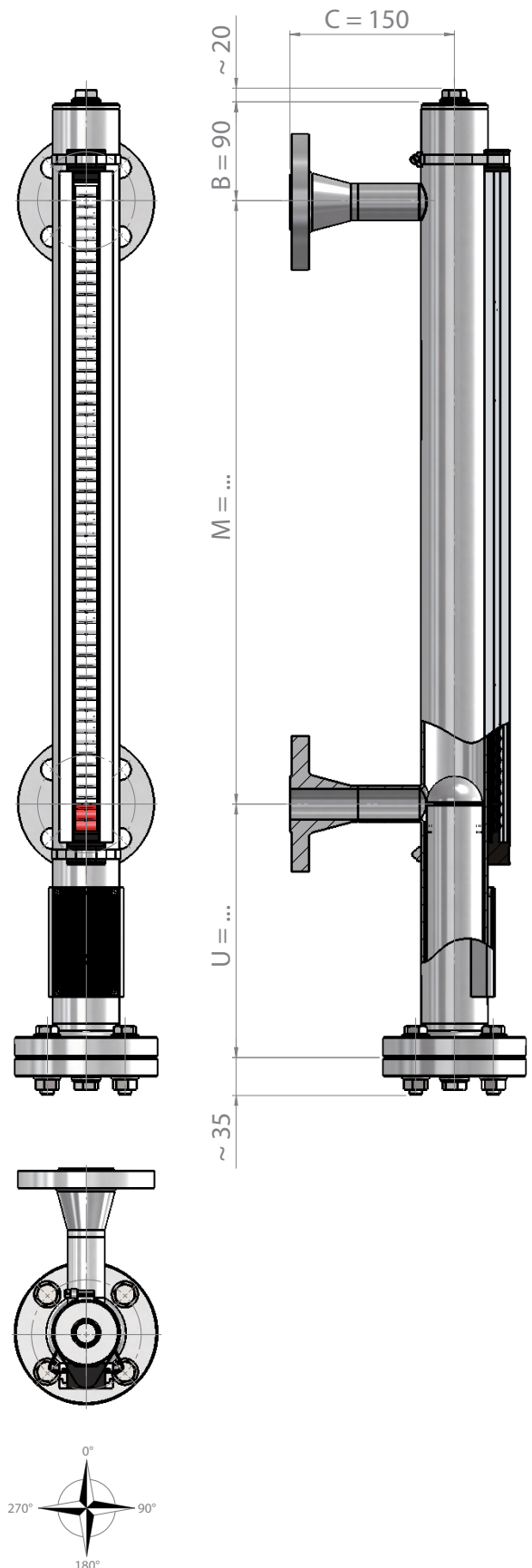




Bypass-Magnetic Level Gauge made of st. steel PN40

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	$\geq 480 \text{ kg/m}^3$
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	$\varnothing 60,30 \times 2 \text{ mm}$ $\varnothing 60,33 \times 2,77 \text{ mm / NACE}$ $\varnothing 63,50 \times 2 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

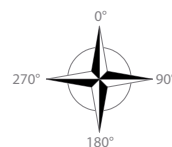
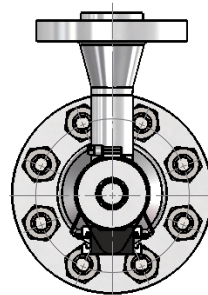
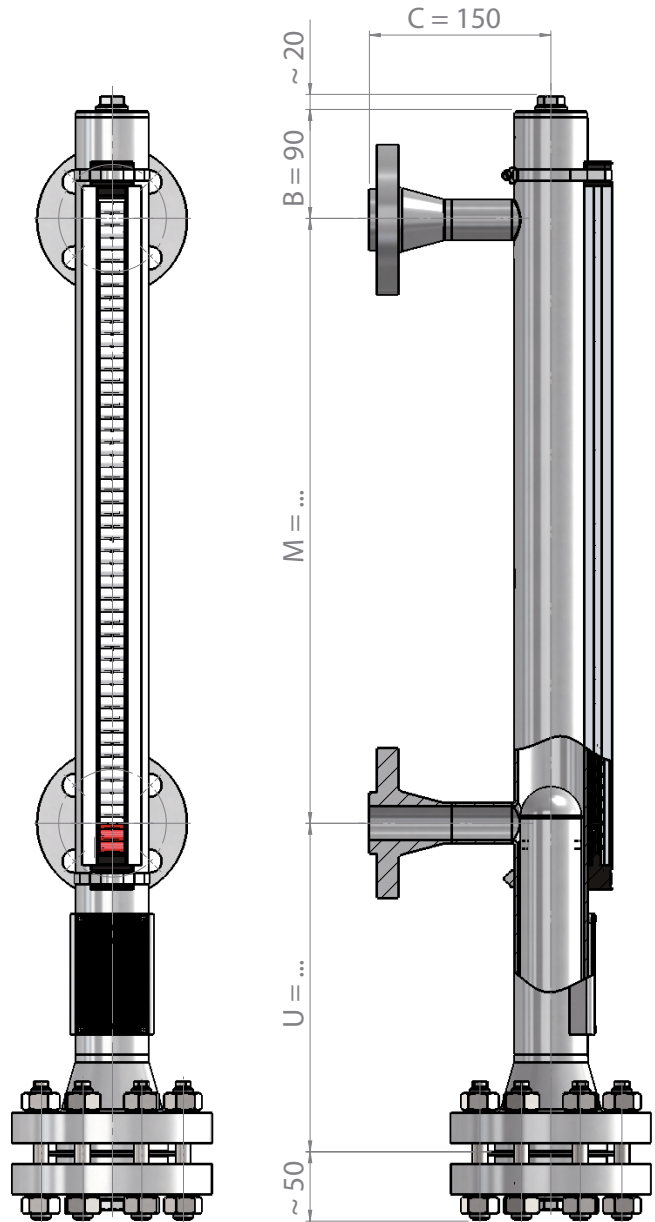




Bypass-Magnetic Level Gauge made of st. steel PN63

Technical Specifications:

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

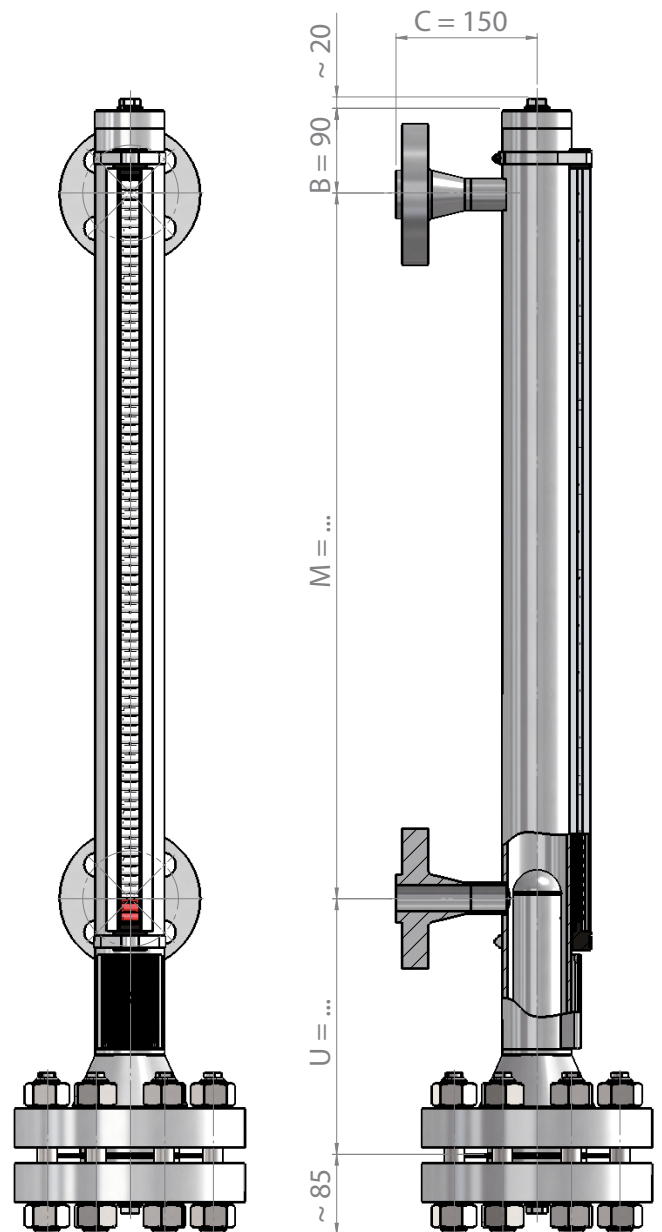




Bypass-Magnetic Level Gauge made of st. steel PN100

Technical Specifications:

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

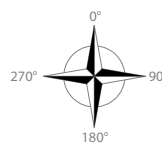
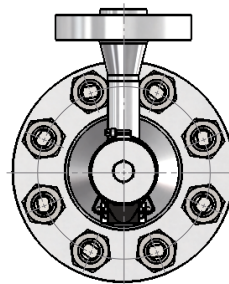
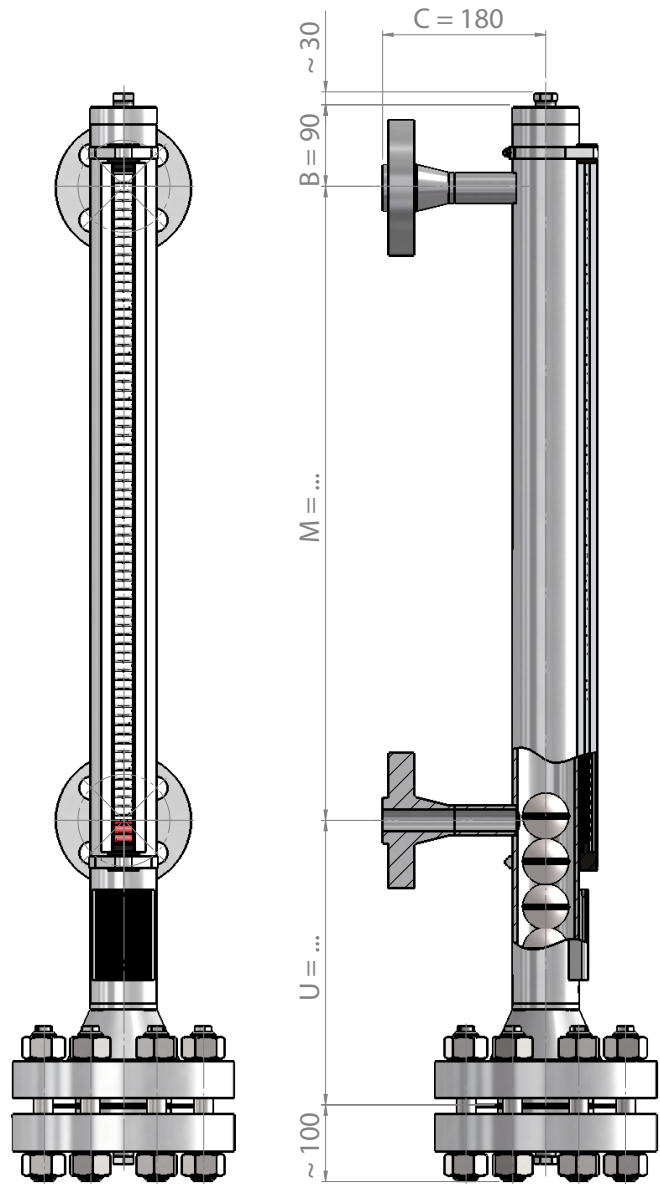




Bypass-Magnetic Level Gauge made of st. steel PN160

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 480 kg/m ³
Design pressure /	-1. . .+160 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST

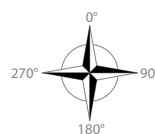
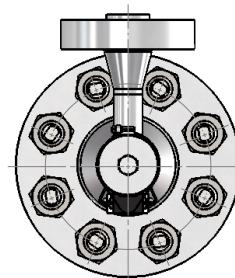
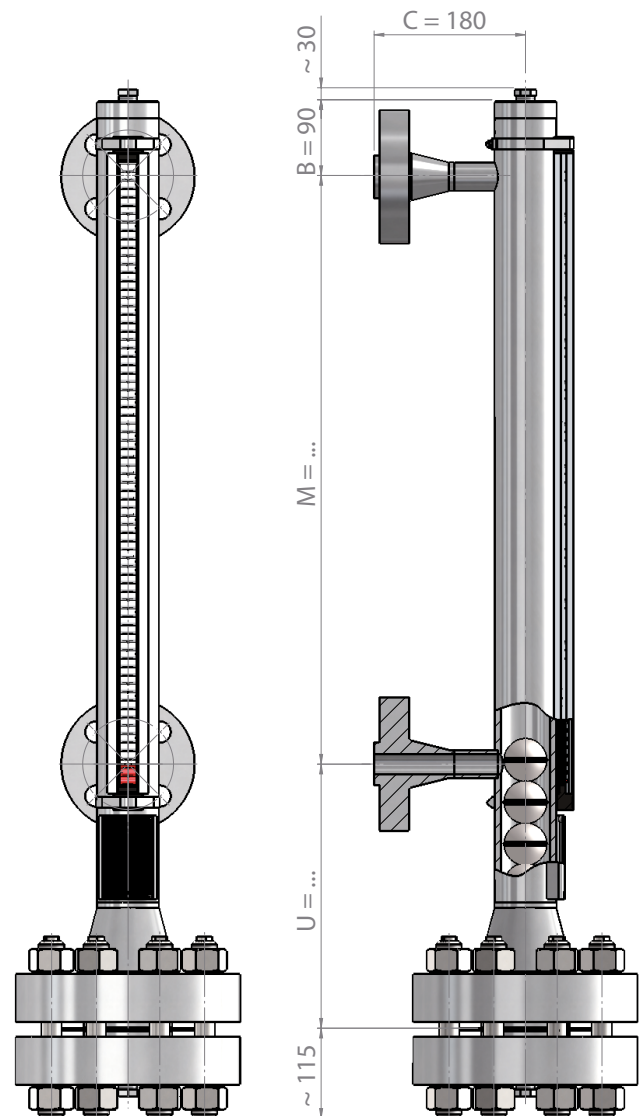




Bypass-Magnetic Level Gauge made of st. steel PN250. . .PN400

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	≥ 690 kg/m ³
Design pressure /	-1. . .+250 / +400 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST

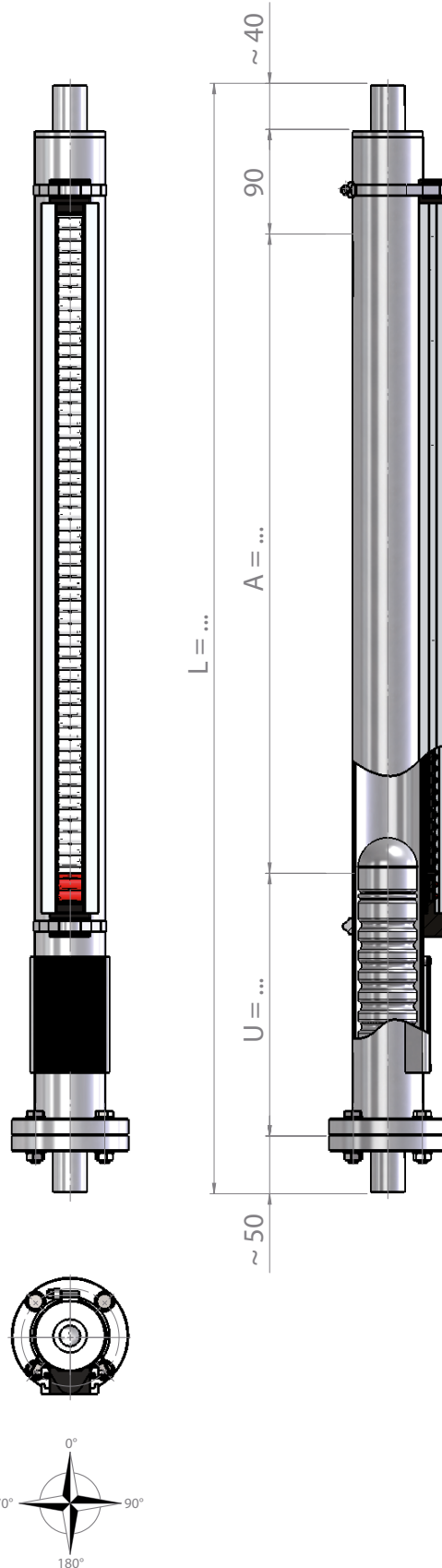




Bypass-Magnetic Level Gauge made of Stainless Steel without lateral Connections

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	$\geq 400 \text{ kg/m}^3$
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	$\varnothing 60,30 \times 2 \text{ mm}$ $\varnothing 60,33 \times 2,77 \text{ mm / NACE}$ $\varnothing 63,50 \times 2 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

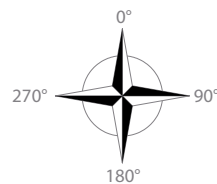
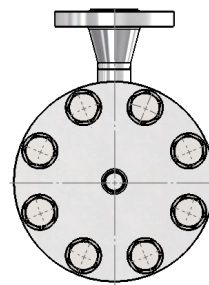
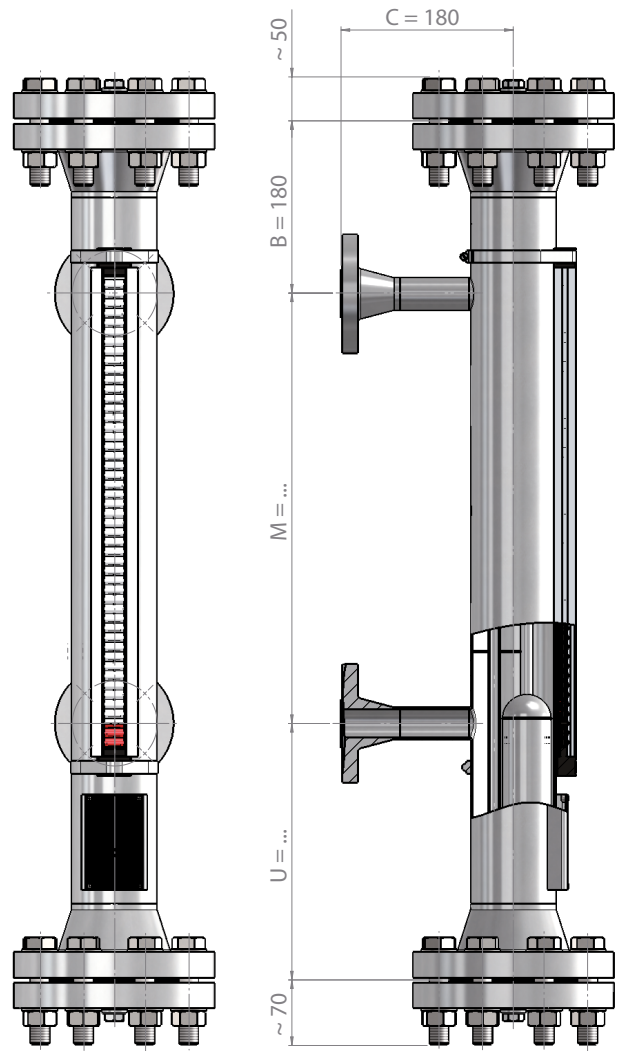




Bypass-Magnetic Level Gauge made of Stainless Steel in Liquid Gas Design

Technical Specifications:

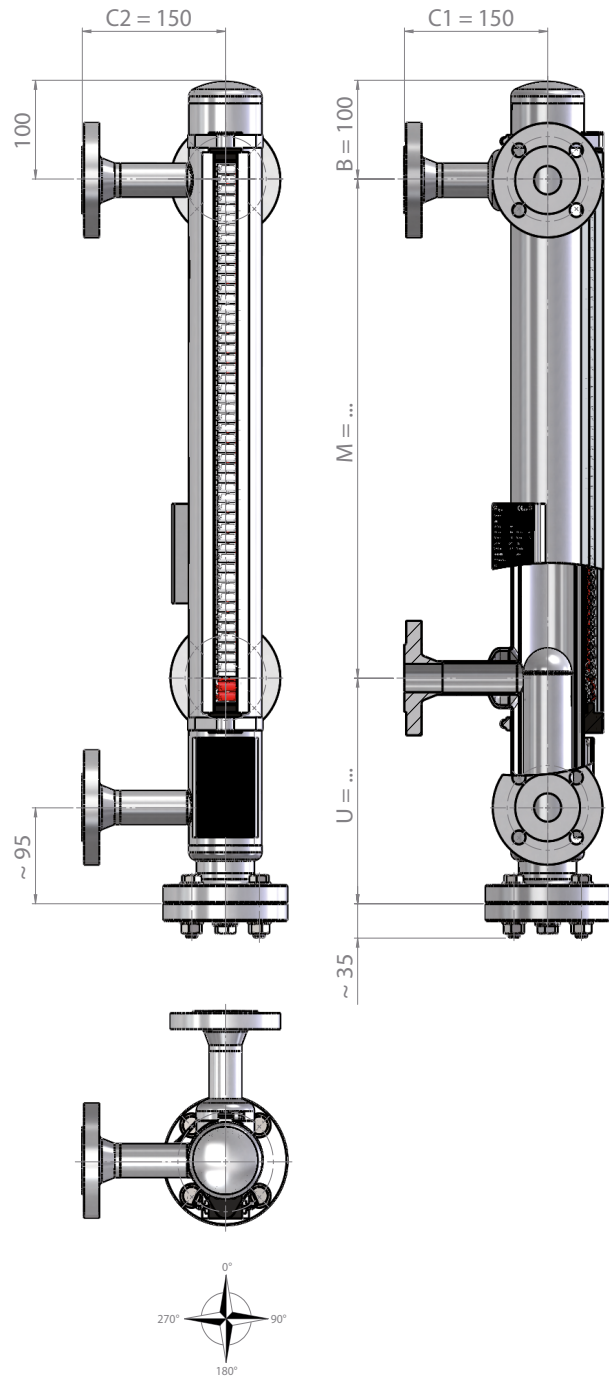
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 460 kg/m ³
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	Ø 88,90 x 2 mm Ø 88,90 x 3,05 mm / NACE Ø 88,90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



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

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	$\geq 460 \text{ kg/m}^3$
Design pressure /	-1. . .+ bar
Design temp. /	-196. . .+400°C
Chambers /	$\varnothing 60,30 \times 2 \text{ mm}$ $\varnothing 60,33 \times 2,77 \text{ mm / NACE}$ $\varnothing 63,50 \times 2 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Heating coat /	Heating coat pipe $\varnothing 76,10 \times 2 \text{ mm}$
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

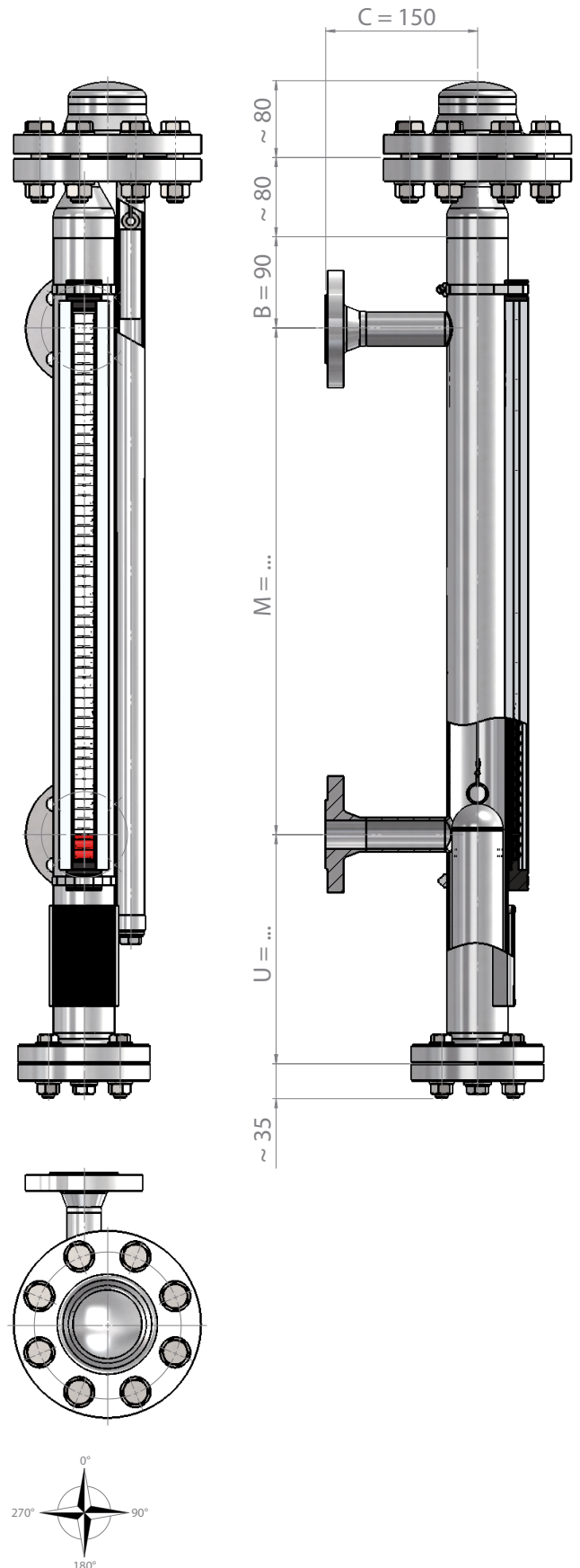




Bypass-Magnetic Level Gauge made of Stainless Steel, differential compensated

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	≥ 350 kg/m ³
Design pressure /	-1. . .+250 bar
Design temp. /	-10. . .+400°C
Chambers /	Ø 60,30 x 2 mm Ø 60,33 x 2,77 mm / NACE Ø 73,03 x . . . mm / NACE Ø 76,10 x . . . mm (. . . = calculated wall thickness)
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST

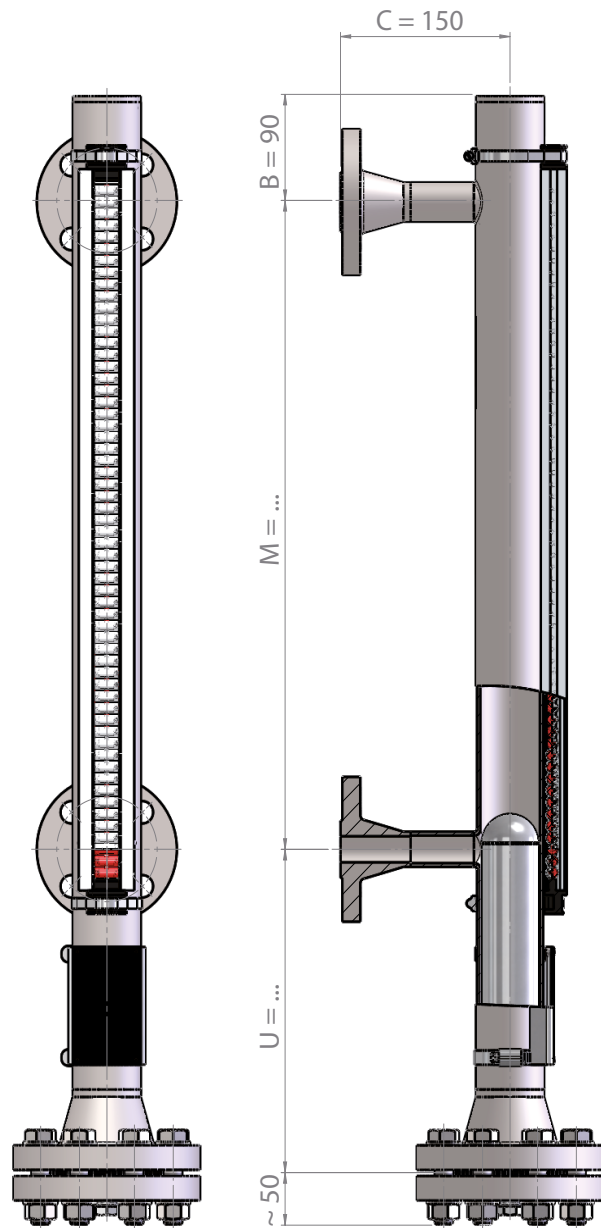




Bypass-Magnetic Level Gauge made of Titanium PN16. . .PN40

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm, for ATEX > 4000 mm choose diff. material for chamber and float
specific Weight /	$\geq 400 \text{ kg/m}^3$
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+400°C
Chambers /	$\varnothing 60,30 \times 2 \text{ mm}$ $\varnothing 60,33 \times 2,77 \text{ mm / NACE}$ $\varnothing 63,50 \times 2 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 300°C, PED, GOST, GL, DNV, BV, ABS

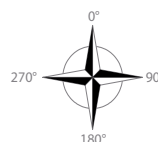
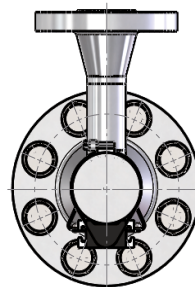
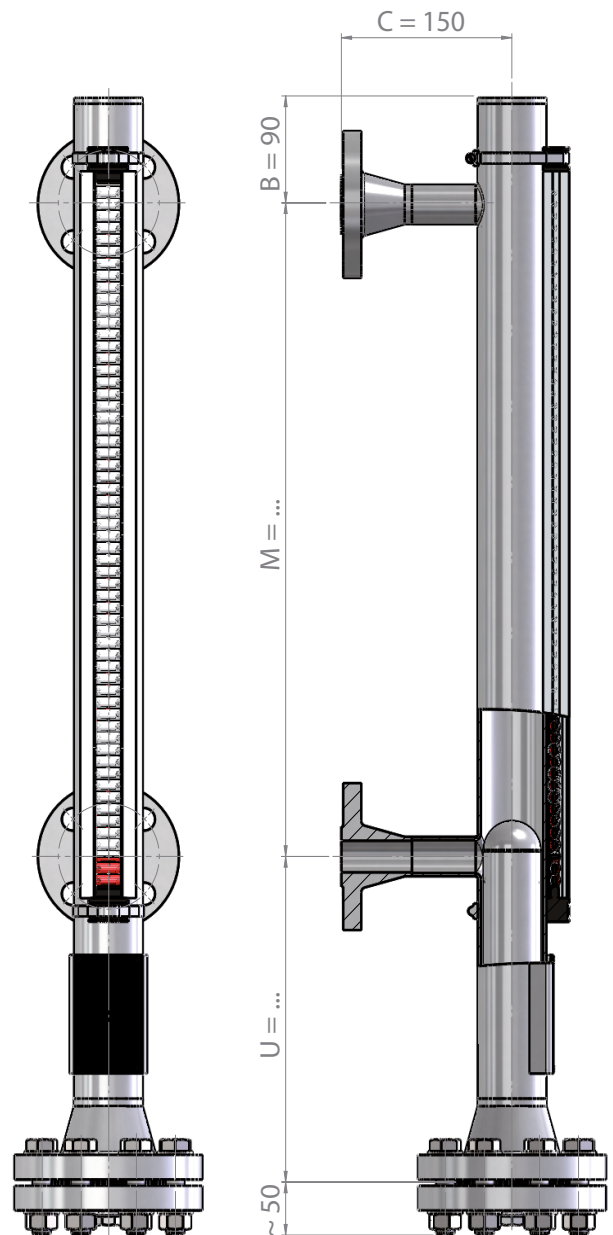




Bypass-Magnetic Level Gauge made of Alloy C PN16. . .PN40

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center dist. /	150. . .25000 mm
specific Weight /	$\geq 610 \text{ kg/m}^3$
Design pressure /	-1. . .+40 bar
Design temp. /	-196. . .+200°C
Chambers /	$\varnothing 60,30 \times 2,77 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bttm. /	see appendix I „Chamber end bottom“
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 200°C, PED, GOST



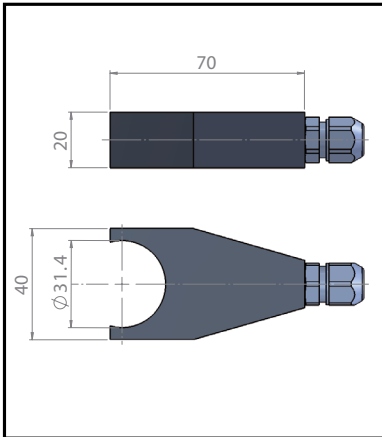


Bypass-Transparent Level Indicator made of PVC

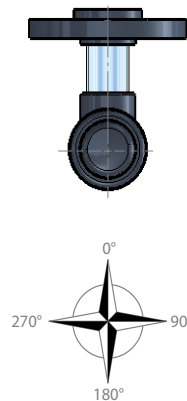
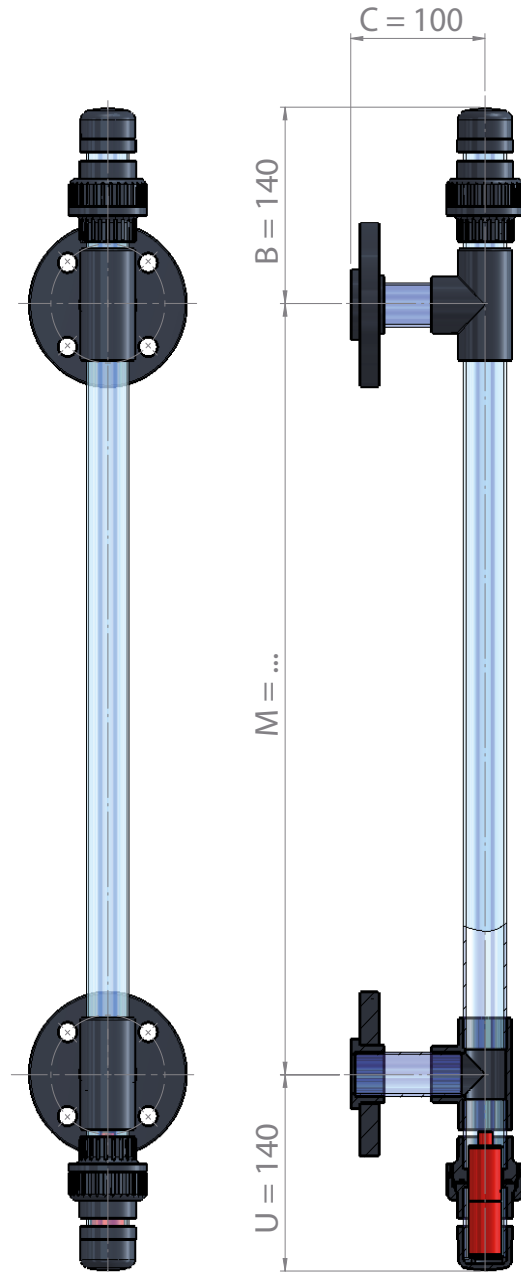
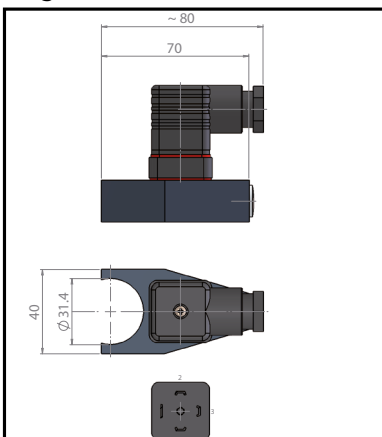
Technical Specifications:

Material /	PVC transparent
Flange center dist. /	200 .. 4000 mm
specific Weight /	$\geq 600 \text{ kg/m}^3$
Design pressure /	-1 .. +1 bar
Design temp. /	-15 .. +60°C
Chambers /	$\varnothing 32,0 \times 1,8 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	screw joint
Chamber end bttm. /	screw joint
opt. Insulation /	$\varnothing 24 \text{ mm}$ 80 mm long for spec. weight $\geq 900 \text{ kg/m}^3$ 120 mm long for spec. weight $\geq 600 \text{ kg/m}^3$
Switching contacts /	normally open, normally closed or co-contacts, 230 V, 0.5 A, 40 VA electrical connection: PVC cable or plug Hirschmann DIN 43650

Cable connection:



Plug connection:

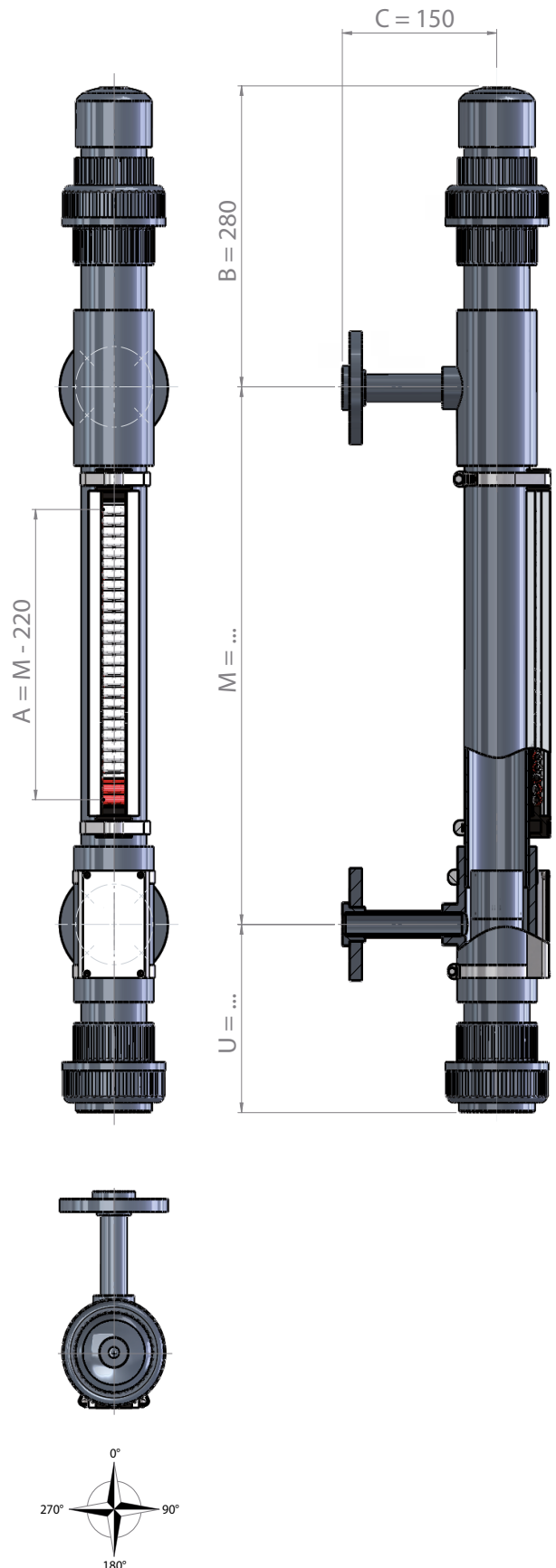




Bypass-Magnetic Level Gauge made of PVC

Technical Specifications:

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

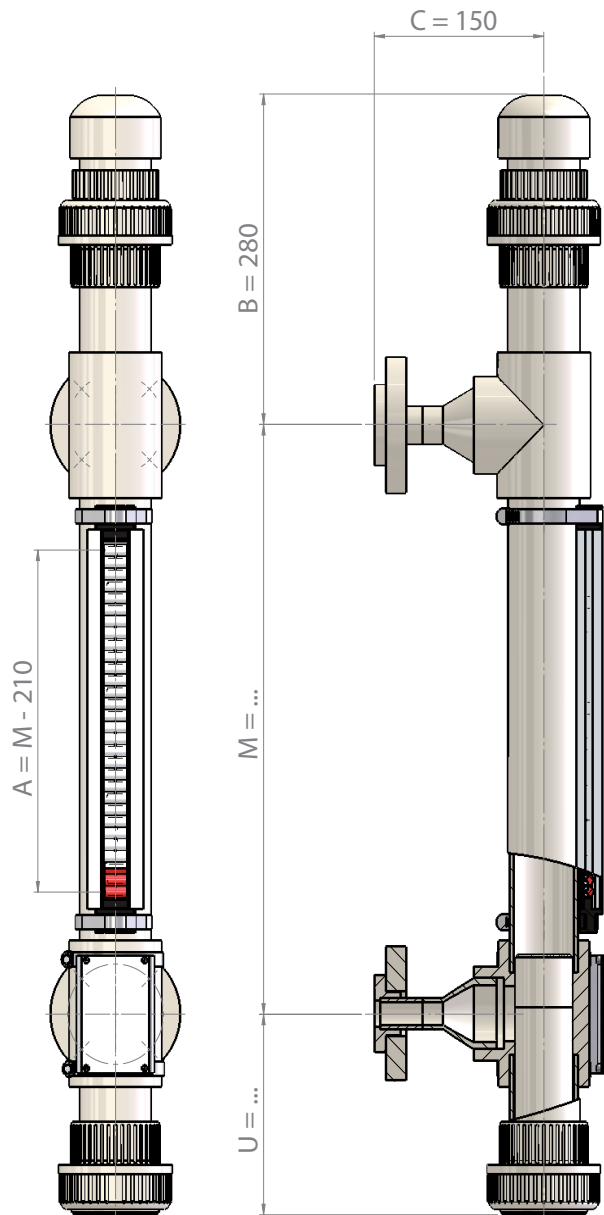




Bypass-Magnetic Level Gauge made of Polypropylene

Technical Specifications:

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

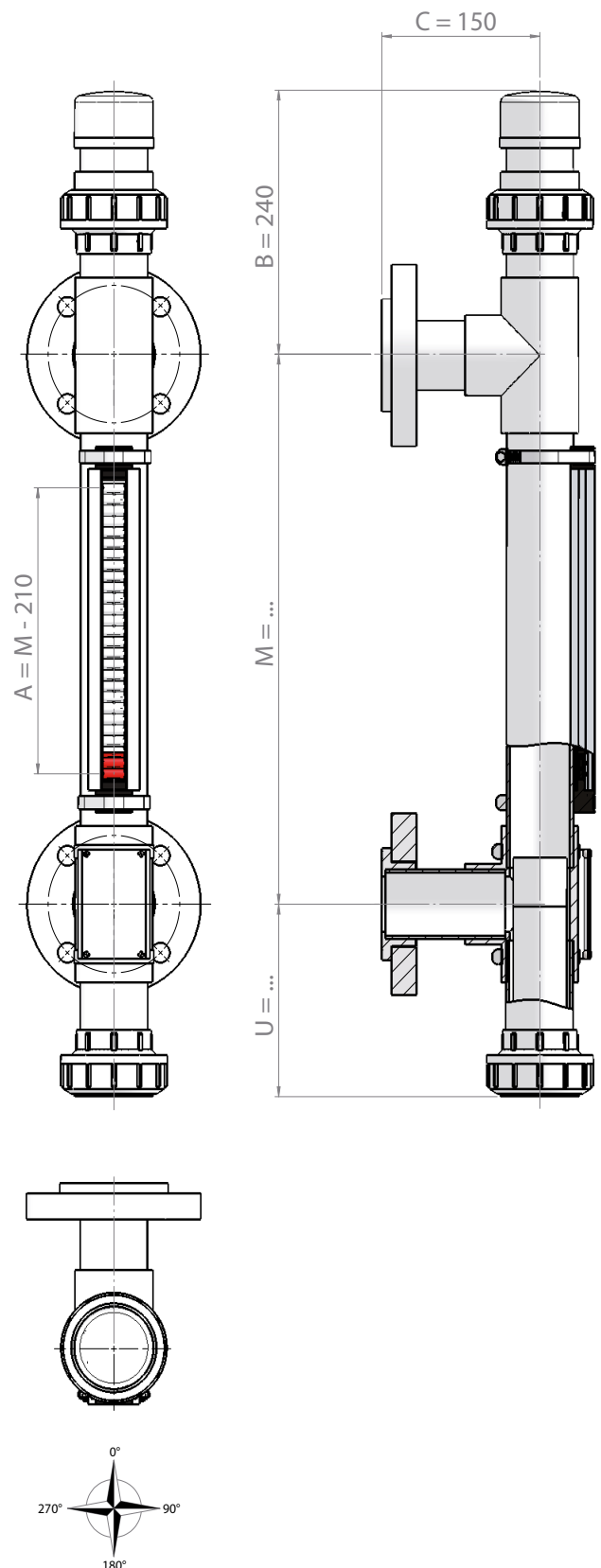




Bypass-Magnetic Level Gauge made of PVDF

Technical Specifications:

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

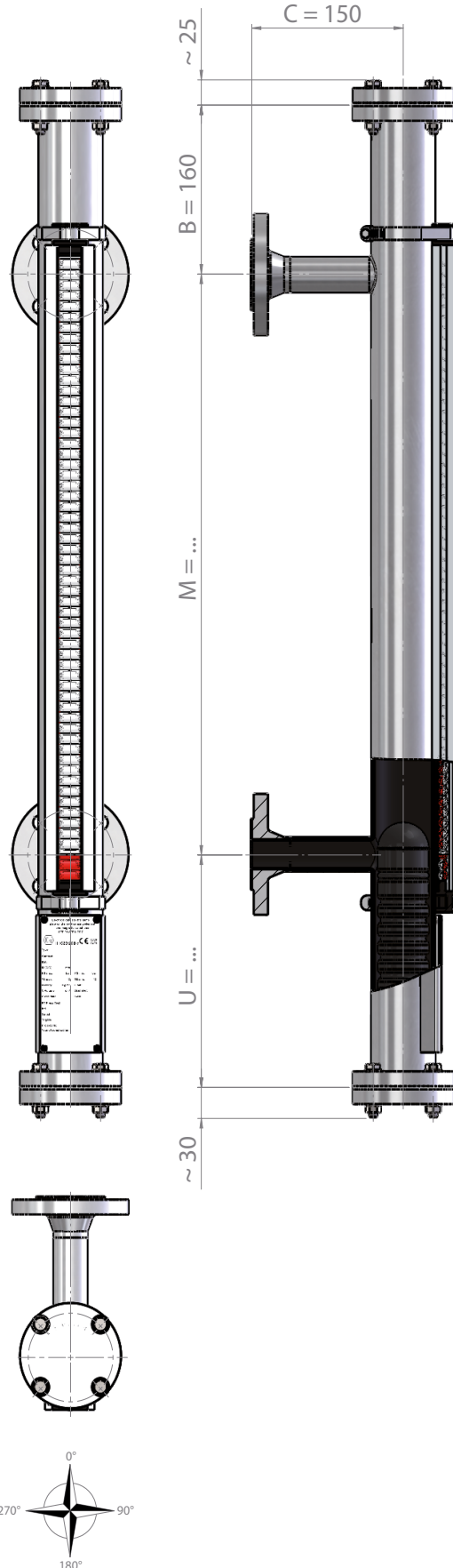




Bypass-Magnetic Level Gauge made of st. steel, ECTFE-coated

Technical Specifications:

Material /	st. steel, ECTFE-coated
Flange center dist. /	150. . .3000 mm
specific Weight /	≥ 690 kg/m ³
Design pressure /	-1. . .+16 bar
Design temp. /	-78. . .+150°C
Chambers /	Ø 63,50 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	flange connection
Chamber end bttm. /	flange connection
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 150°C, PED, GOST

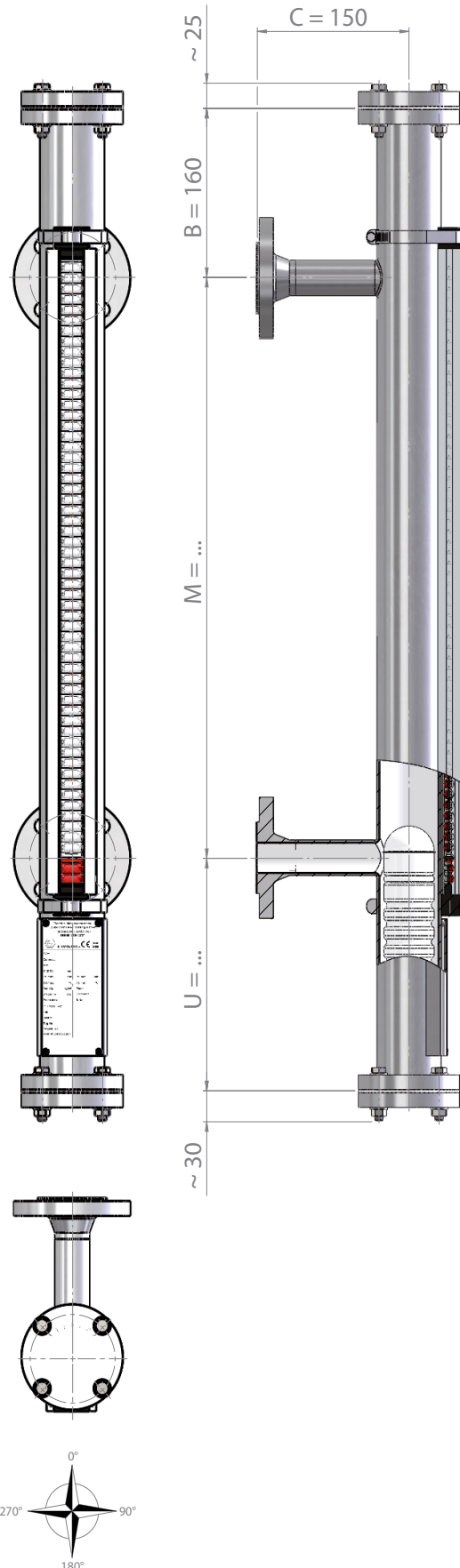




Bypass-Magnetic Level Gauge made of st. steel, PFA-coated


Technical Specifications:

Material /	st. steel PFA-coated
Flange center dist. /	150. . .3000 mm
specific Weight /	$\geq 715 \text{ kg/m}^3$
Design pressure /	-1. . .+16 bar
Design temp. /	-100. . .+250°C
Chambers /	$\varnothing 63,50 \times 2 \text{ mm}$
Process connection /	see appendix G „Process connections“
Chamber end top /	flange connection
Chamber end bttm. /	flange connection
Float /	see appendix A „Cylindrical floats“
Magnetic roller indicator /	Aluminium or st. steel / Pocan® Temp. -40. . .+200°C Aluminium or st. steel / ceramic Temp. -40. . .+400°C
Angular scale /	Aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	Aluminium / st. steel -60. . .+300°C
opt. Level transmitter /	FM-02N
opt. Trace heating /	holding temp. -10°C / frost protect.
opt. Insulation /	Armaflex® or rock-wool
available Approvals /	ATEX II 1G2D/2GD c or ATEX II 2GD c media temperature max. 250°C, PED, GOST



**Appendix A - Cylindrical float:****Cylindrical float made of PVC, PN4, Type ZPVC50PN4:**

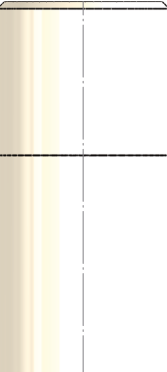
Float length (mm)	150	200	250	300	350	
Float weight (g)	275	316	356	397	437	
emerged float height (mm)		specific weight of media (kg/m ³)				
10	10	-	-	-	-	
20	20	-	-	-	-	
30	30	1170	950	820	750	
40	40	1270	1010	860	780	
50	50	1400	1070	910	810	
60	60	1560	1150	950	840	
70	70	1750	1240	1010	880	
80	80	2000	1340	1070	920	
90	90	2330	1460	1130	960	
100	100	2800	1610	1210	1010	



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

Cylindrical float made of PP, PN4, Type ZPP50PN4:

Float length (mm)	150	200	250	300	350	
Float weight (g)	246	279	311	344	376	
emerged float height (mm)		specific weight of media (kg/m ³)				
10	10	-	-	-	-	
20	20	-	-	-	-	
30	30	1040	840	720	650	
40	40	1140	890	750	670	
50	50	1250	950	790	700	
60	60	1390	1010	830	730	
70	70	1570	1090	880	760	
80	80	1790	1180	930	800	
90	90	2090	1290	990	830	
100	100	2510	1420	1060	880	




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



Cylindrical float made of PVDF, PN4, Type ZPVDF50PN4:

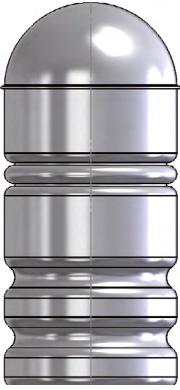
Float length (mm)	150	200	250	300	350
Float weight (g)	278	319	360	401	442
emerged float height (mm)		specific weight of media (kg/m ³)			
10	10	-	-	-	-
20	20	-	-	-	-
30	30	1180	960	830	760
40	40	1290	1020	870	790
50	50	1420	1080	920	820
60	60	1570	1160	960	850
70	70	1770	1250	1020	890
80	80	2020	1350	1080	930
90	90	2360	1480	1150	970
100	100	2830	1620	1220	1020



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

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

Float length (mm)	150	200	250	300	350	400	450
Float weight (g)	253	297	327	362	399	440	472
emerged float height (mm)		specific weight of media (kg/m ³)					
10	10	-	-	-	-	-	-
20	20	-	-	-	-	-	-
30	30	1170	950	800	720	680	600
40	40	1280	1010	840	740	700	610
50	50	1420	1080	880	780	720	630
60	60	1600	1160	930	810	750	650
70	70	1820	1260	980	850	780	660
80	80	2110	1370	1050	890	810	680
90	90	2520	1500	1110	930	840	700
100	100	-	1670	1190	980	870	720



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



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

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



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

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

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



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



Cylindrical float made of Titanium, PN16, Type ZT52PN16:

Float length (mm)	150	200	250	300	350	400	450
Float weight (g)	197	245	289	338	381	430	474
emerged float height (mm)		specific weight of media (kg/m ³)					
10	10	-	-	-	-	-	-
20	20	-	-	-	-	-	-
30	30	645	535	475	430	410	395
40	40	710	570	500	450	425	405
50	50	785	610	525	470	440	415
60	60	885	655	555	490	455	430
70	70	1005	710	585	510	470	440
80	80	1170	775	625	535	490	455
90	90	1400	850	665	560	510	470
100	100	1735	945	710	590	530	485



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

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

Float length (mm)	150	200	250	300	350	400	450
Float weight (g)	197	245	289	338	381	430	474
emerged float height (mm)		specific weight of media (kg/m ³)					
10	10	-	-	-	-	-	-
20	20	-	-	-	-	-	-
30	30	900	770	695	660	625	605
40	40	985	825	730	685	645	625
50	50	1095	880	770	710	665	640
60	60	1230	950	810	745	690	660
70	70	1400	1025	855	775	715	680
80	80	1625	1115	910	815	740	705
90	90	1940	1225	970	855	770	725
100	100	2410	1360	1040	900	805	750



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



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

Float length (mm)		150	200	250	300	350	400	450	500	550	600	650
Float weight (g)		197	258	300	342	389	431	472	519	561	603	645
emerged float height (mm)		specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	900	815	720	665	635	605	585	575	560	545	535
40	40	985	865	760	690	655	625	600	585	570	555	545
50	50	1095	930	795	720	680	640	615	600	580	565	555
60	60	1230	1000	840	750	705	660	630	610	595	580	565
70	70	1400	1080	890	785	730	680	645	625	605	590	575
80	80	1625	1175	945	825	755	705	665	640	620	600	585
90	90	1940	1290	1005	865	785	730	685	660	635	610	595
100	100	2410	1435	1080	910	820	755	705	675	645	625	605



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

Cylindrical float made of Titanium, PN40, Type ZT52PN40:

Float length (mm)		150	200	250	300	350	400	450	500	550	600	650
Float weight (g)		175	219	258	298	337	376	420	460	499	538	578
emerged float height (mm)		specific weight of media (kg/m³)										
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	775	670	600	560	535	515	505	490	480	475	465
40	40	850	715	630	585	550	530	515	505	490	480	475
50	50	945	765	665	610	570	545	530	515	500	490	480
60	60	1060	820	700	635	590	560	545	525	510	500	490
70	70	1205	890	740	665	610	575	560	540	520	510	500
80	80	1405	970	790	695	635	595	575	550	535	520	510
90	90	1675	1065	840	730	660	615	590	565	545	530	515
100	100	2080	1180	900	770	690	635	605	580	560	540	525



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



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

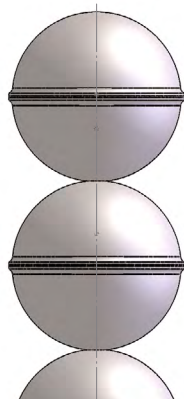
Float length (mm)	150	200	250	300	350	400	450	500	550	600	650	
Float weight (g)	216	264	313	361	414	463	511	565	613	661	710	
emerged float height (mm)			specific weight of media (kg/m ³)									
10	10	-	-	-	-	-	-	-	-	-	-	
20	20	-	-	-	-	-	-	-	-	-	-	
30	30	985	830	755	705	675	650	630	625	610	600	
40	40	1080	885	790	730	700	670	650	635	620	610	
50	50	1200	950	830	760	725	690	665	650	635	620	
60	60	1345	1020	875	795	750	710	680	665	650	635	
70	70	1535	1105	930	830	775	735	700	680	660	645	
80	80	1785	1205	985	870	805	755	720	700	675	660	
90	90	2130	1320	1050	910	840	780	740	715	690	670	
100	100	2640	1465	1125	960	870	810	760	735	705	685	



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

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

Number of balls	3	4	5	6	7	8	9	10	11	12	13	14
Float length (mm)	146	194	243	291	340	388	437	485	534	582	631	679
Float weight (g)	134	159	184	209	234	258	283	308	333	358	382	407
emerged float height (mm)			specific weight of media (kg/m ³)									
10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	870	725	645	595	565	535	520	505	490	480	475
40	40	975	785	685	625	585	555	535	515	505	493	480
50	50	1025	810	705	640	595	565	540	525	510	497	485
60	60	1080	840	720	650	605	570	550	530	515	502	490
70	70	1240	915	770	685	635	595	565	545	525	515	500
80	80	1515	1035	840	735	670	620	590	565	545	530	515
90	90	1855	1155	905	780	700	645	610	580	560	540	525
100	100	2045	1215	935	800	715	655	620	590	565	545	530



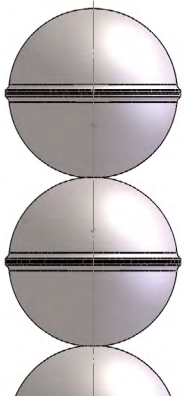
Design temperature:	-90...+400°C	-90...+350°C	-90...+300°C	-90...+250°C	-90...+200°C	-90...+150°C
Design pressure:	-1...+125 bar	-1...+135 bar	-1...+150 bar	-1...+155 bar	-1...+165 bar	-1...+175 bar
Float diameter:	52 mm					
Distance U:	see figure of magnetic level gauge					
Distance U with float stop:	float length minus 28 mm					
Distance U with dampening spring:	float length minus 13 mm					



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

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

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

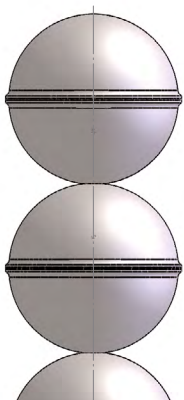


Design temperature:	-90...+400°C	-90...+350°C	-90...+300°C	-90...+250°C	-90...+200°C	-90...+150°C
Design pressure:	-1...+125 bar	-1...+135 bar	-1...+150 bar	-1...+155 bar	-1...+165 bar	-1...+175 bar
Float diameter:	52 mm					
Distance U:	see figure of magnetic level gauge					
Distance U with float stop:	float length minus 28 mm					
Distance U with dampening spring:	float length minus 13 mm					

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

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

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



Design temperature:	-90...+400°C	-90...+350°C	-90...+300°C	-90...+250°C	-90...+200°C	-90...+150°C
Design pressure:	-1...+212 bar	-1...+235 bar	-1...+258 bar	-1...+270 bar	-1...+282 bar	-1...+300 bar
Float diameter:	52 mm					
Distance U:	see figure of magnetic level gauge					
Distance U with float stop:	float length minus 28 mm					
Distance U with dampening spring:	float length minus 13 mm					



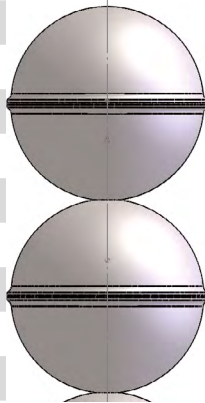
Cylindrical float made of Titanium, for chambers from 73.03 mm, PN63, Type ZT62PN63G:

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

emerged float height (mm)

specific weight of media (kg/m³)

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



Design temperature:	-90...+400°C	-90...+350°C	-90...+300°C	-90...+250°C	-90...+200°C	-90...+150°C
Design pressure:	-1...+50 bar	-1...+55 bar	-1...+60 bar	-1...+66 bar	-1...+66 bar	-1...+70 bar
Float diameter:	62 mm					
Distance U:	see figure of magnetic level gauge					
Distance U with float stop:	float length minus 36 mm					
Distance U with dampening spring:	float length minus 21 mm					

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

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

emerged float height (mm)

specific weight of media (kg/m³)

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



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

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

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650	
Float weight (g)	251	281	310	340	369	399	433	462	489	521	550	
emerged float height (mm)		specific weight of media (kg/m ³)										
10	10	-	-	-	-	-	-	-	-	-	-	
20	20	-	-	-	-	-	-	-	-	-	-	
30	30	1110	860	725	640	585	545	520	495	470	445	
40	40	1220	915	760	665	605	560	530	505	480	450	
50	50	1355	980	800	695	625	575	545	515	490	475	460
60	60	1520	1055	845	725	645	595	560	530	500	485	465
70	70	1730	1140	890	755	670	610	575	540	510	495	475
80	80	2015	1245	945	795	695	630	590	555	525	505	485
90	90	2405	1365	1010	830	725	655	610	570	535	515	490
100	100	2980	1515	1080	875	755	675	625	580	545	525	500



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

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

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650	
Float weight (g)	298	359	401	443	490	532	573	620	662	704	746	
emerged float height (mm)		specific weight of media (kg/m ³)										
10	10	-	-	-	-	-	-	-	-	-	-	
20	20	-	-	-	-	-	-	-	-	-	-	
30	30	1360	1130	965	860	800	750	710	685	660	640	
40	40	1495	1205	1015	895	825	770	725	700	670	630	
50	50	1655	1290	1065	935	855	795	745	715	685	660	640
60	60	1860	1390	1125	975	885	815	765	730	700	675	655
70	70	2120	1505	1190	1020	920	840	785	750	715	685	665
80	80	2460	1635	1265	1065	955	870	805	765	730	700	675
90	90	2935	1800	1345	1120	990	900	830	785	745	715	690
100	100	3640	1995	1440	1175	1035	930	855	805	765	730	700



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



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

Float length (mm)	150	200	250	300	350	400	450	500	550	600	650
Float weight (g)	276	320	359	399	438	477	521	561	600	639	679

emerged float height (mm)

specific weight of media (kg/m³)

10	10	-	-	-	-	-	-	-	-	-	-	-
20	20	-	-	-	-	-	-	-	-	-	-	-
30	30	1220	975	835	755	695	650	625	600	580	560	550
40	40	1340	1040	880	785	715	670	640	615	590	570	555
50	50	1490	1115	925	815	740	690	655	625	600	580	565
60	60	1670	1200	975	850	770	710	675	640	615	595	575
70	70	1905	1300	1035	890	795	730	690	655	630	605	585
80	80	2215	1415	1095	930	825	755	710	675	640	615	595
90	90	2640	1555	1170	975	860	780	730	690	655	630	605
100	100	3280	1725	1250	1030	895	805	755	705	670	640	620



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

**Appendix B - indicator bars:****Versions**

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

Technical Specifications

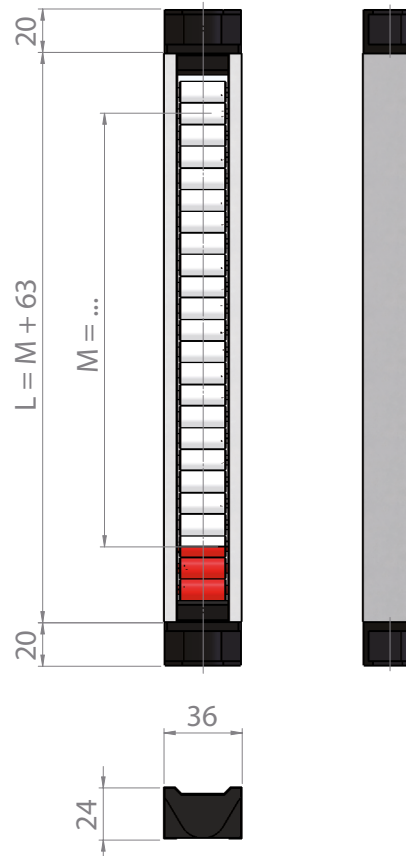
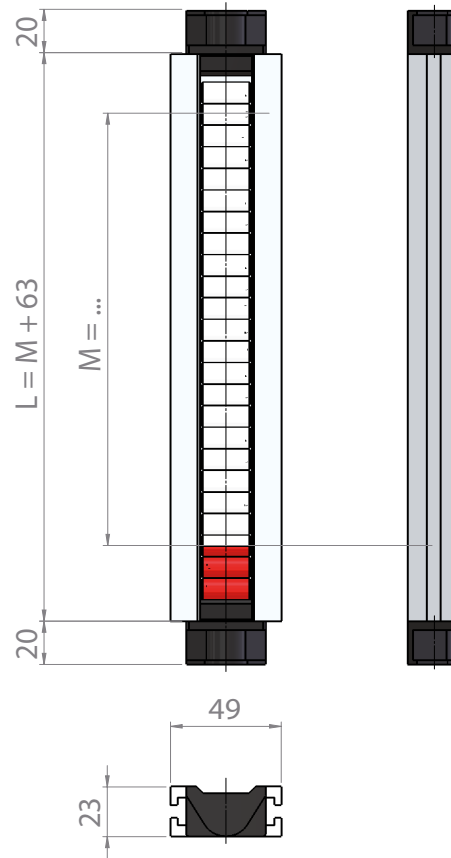
Housing /	Aluminium colorless matted
Prot. class /	IP67
Rollers /	Pocan® white / red, MA-01K and MA-01KN ceramic weiss / blue
End part /	Ryton®, black, MA-01K and MA-01KN Aluminium
Viewing glass /	MA-01 and MA-01N Makrolon, else glass
Ambient temp. /	-40...+200°C, MA-01K and MA-01KN -40...+400°C
Media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

Versions

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

Technical Specifications

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





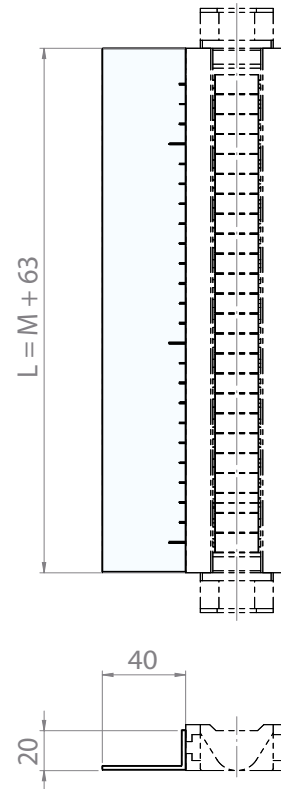
Appendix C - Angular scales and Sight extension:

Angular scale Versions

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

Technical Specifications

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

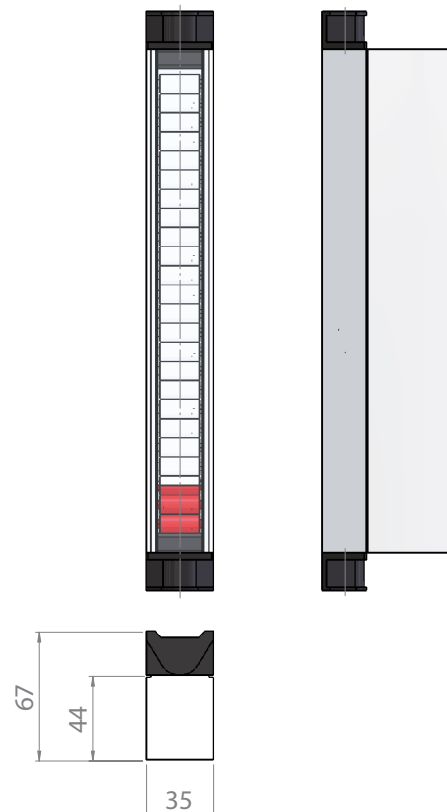


Sight extension Versions

PV	Extension for indicator bars
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Technical Specifications

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





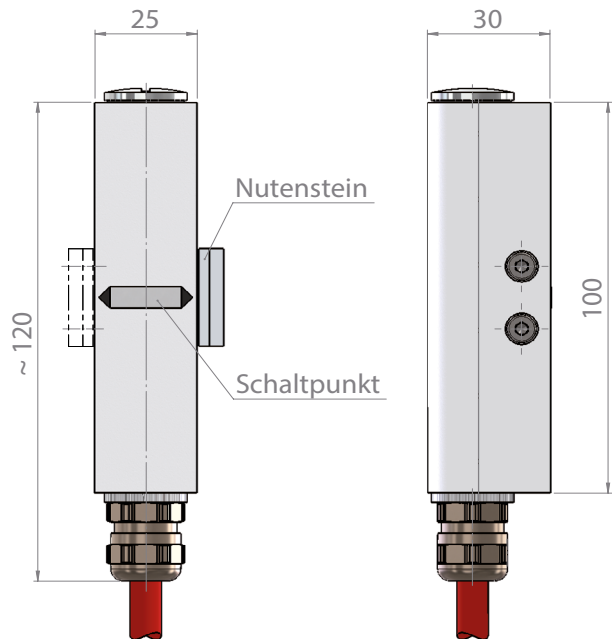
Appendix D - Switching contacts:

Versions fitted to the indicator bar

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

Technical Specifications

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

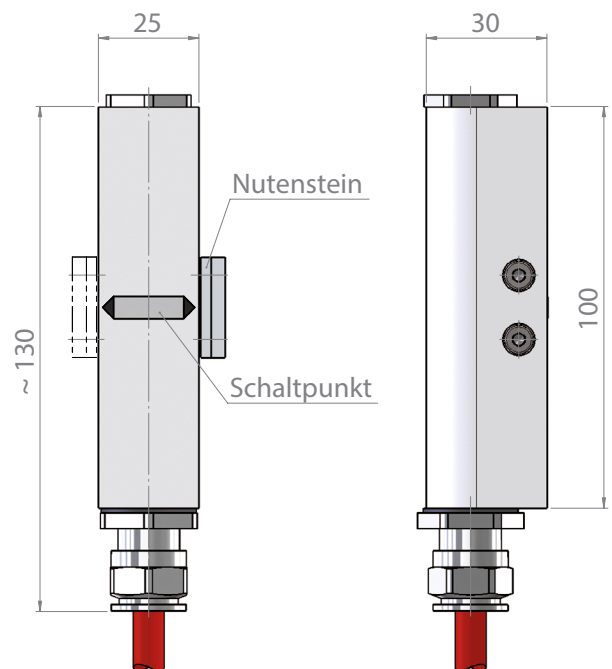


Versions fitted to the indicator bar

MRK-S01EXD press.-proof encapsulation from ATEX

Technical Specifications

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





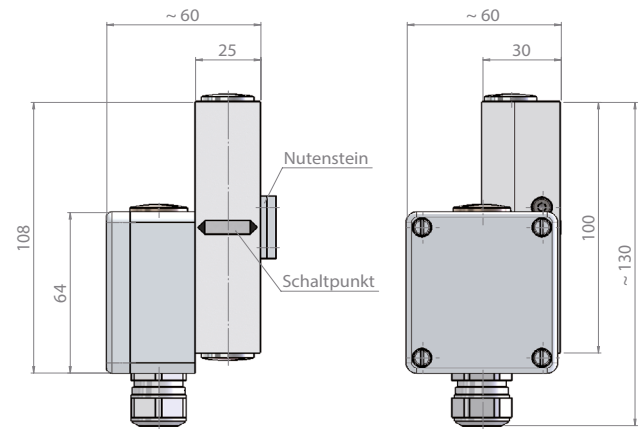
Switching contacts:

Versions fitted to the indicator bar

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

Technical Specifications

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

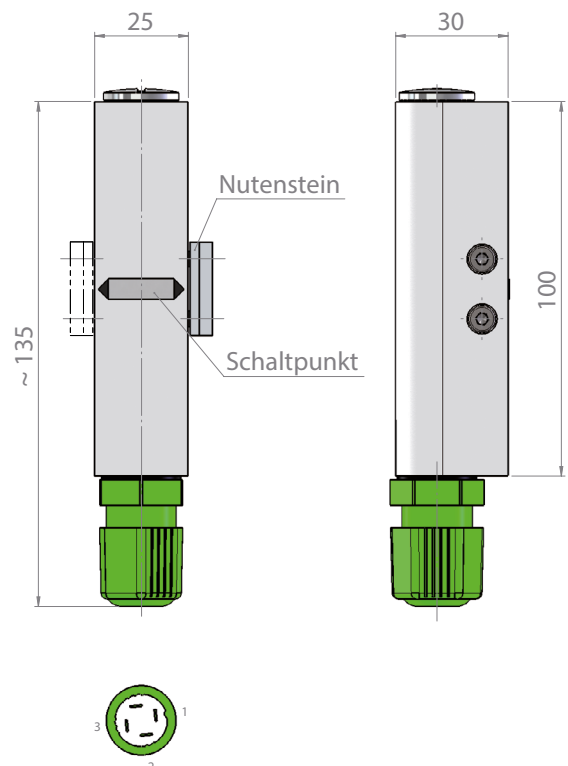


Versions fitted to the indicator bar

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

Technical Specifications

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

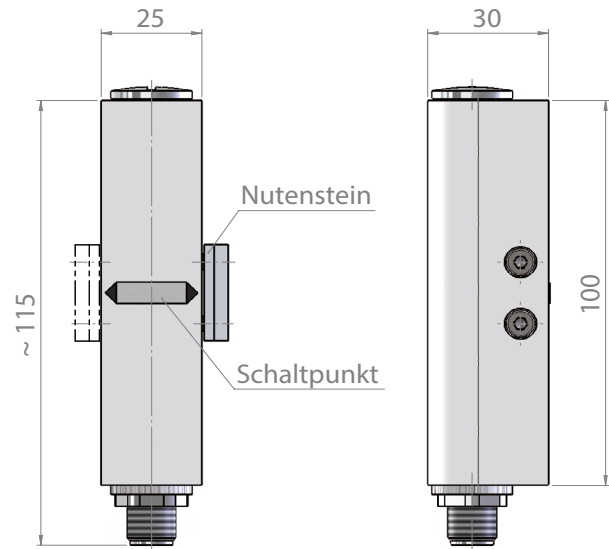
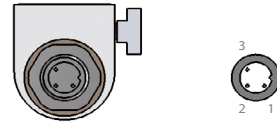


**Switching contacts:****Versions fitted to the indicator bar**

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

Technical Specifications

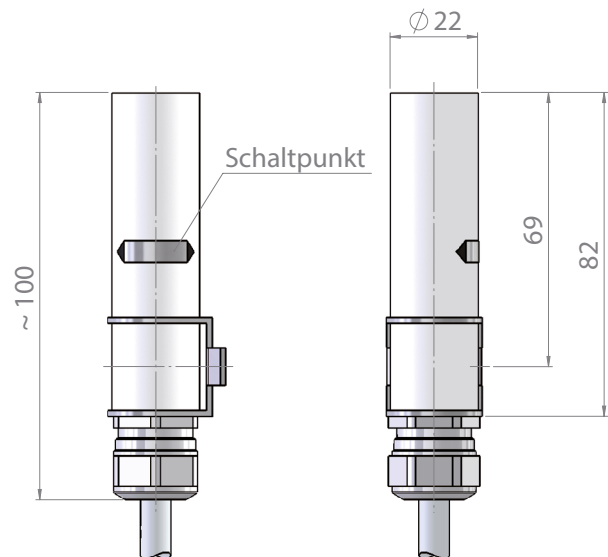
Housing /	Aluminium anodised
El. conn. /	plug M12
Mounting /	right or left side to the indicator bar
Prot. class /	IP65
Ambient temp. /	-25...+90°C
Function /	co-contact, increasing level, bistable
Switch rating /	230 V / 0.5 A / 40 VA
Switch rating (EX) /	Ex ia 100 mA / Ex ia NAMUR 60 mA
Hysteresis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

**Aluminium Versions fitted to the indicator bar**

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

Technical Specifications

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





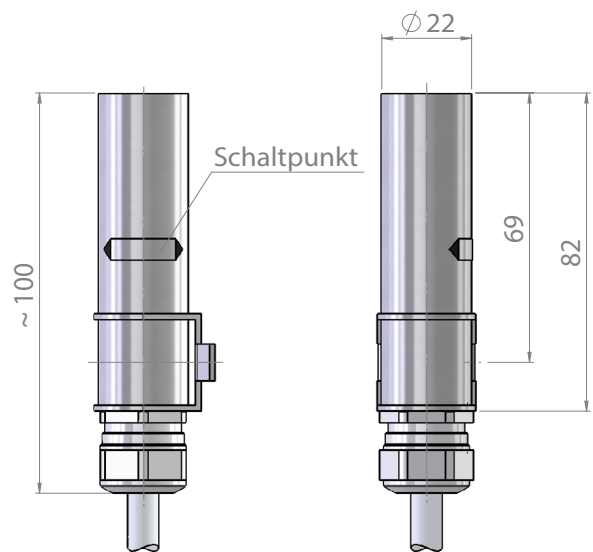
Switching contacts:

St. steel version fitted to the indicator bar

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

Technical Specifications

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

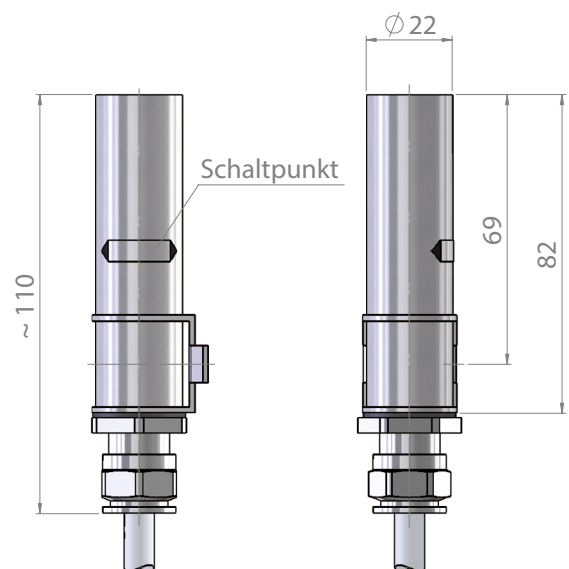


St. steel version fitted to the indicator bar

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

Technical Specifications

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





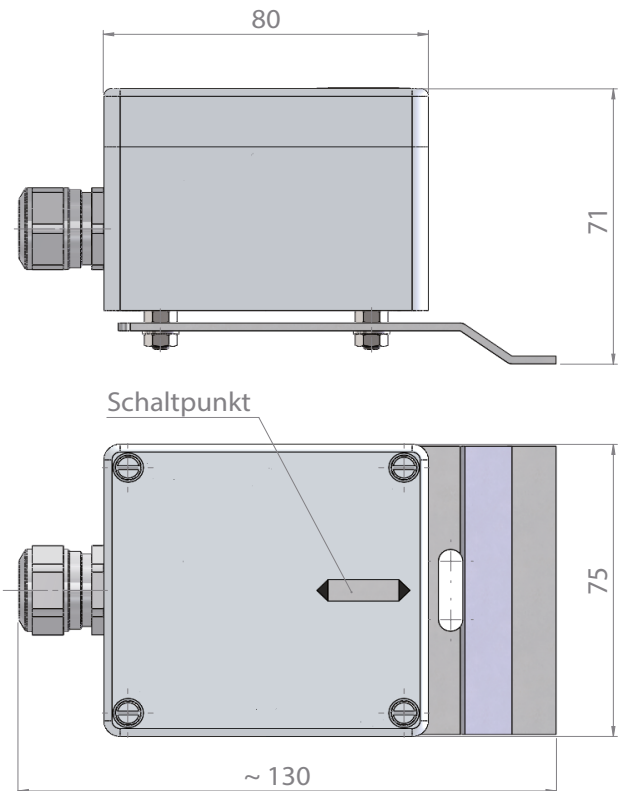
Switching contacts:

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

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

Technical Specifications

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

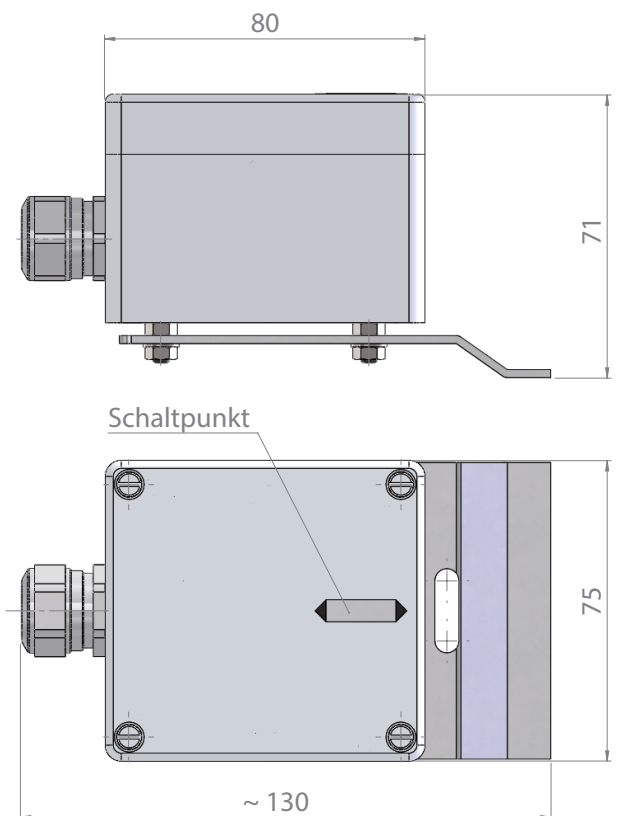


Proximity switch acc. to NAMUR fitted to the indicator bar

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

Technical Specifications

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





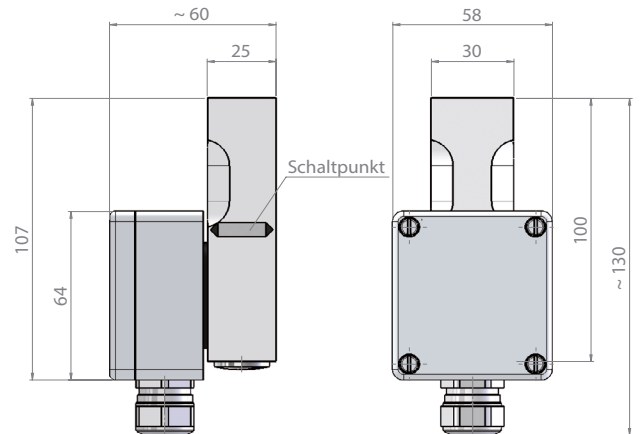
Switching contacts:

Standard co-contact fitted to the indicator bar

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

Technical Specifications

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

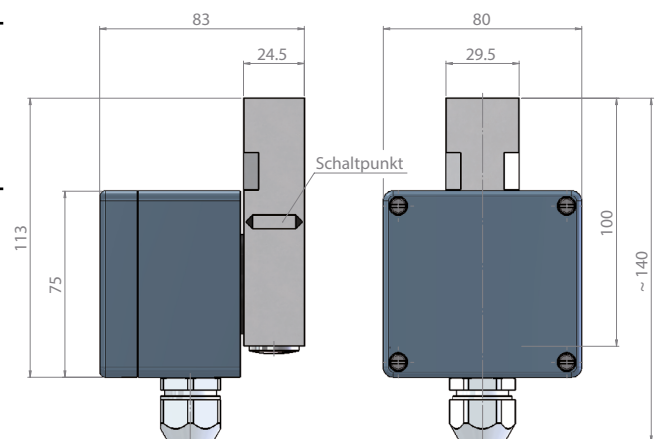


Co-contact in plastic housing fitted to the indicator bar

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

Technical Specifications:

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





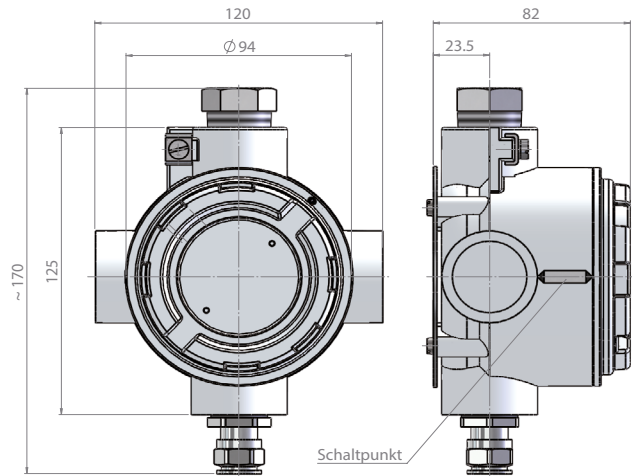
Switching contacts:

Co-contact in industrial housing fitted to the indicator bar

MGV-AUEXD press.-proof encapsulation from ATEX

Technical Specifications

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





Appendix E - Armaflex® insulation and electrical trace heating:

ART Armaflex® insulation Standard

Technical Specifications

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

ARH Armaflex® insulation High temperature

Technical Specifications

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

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

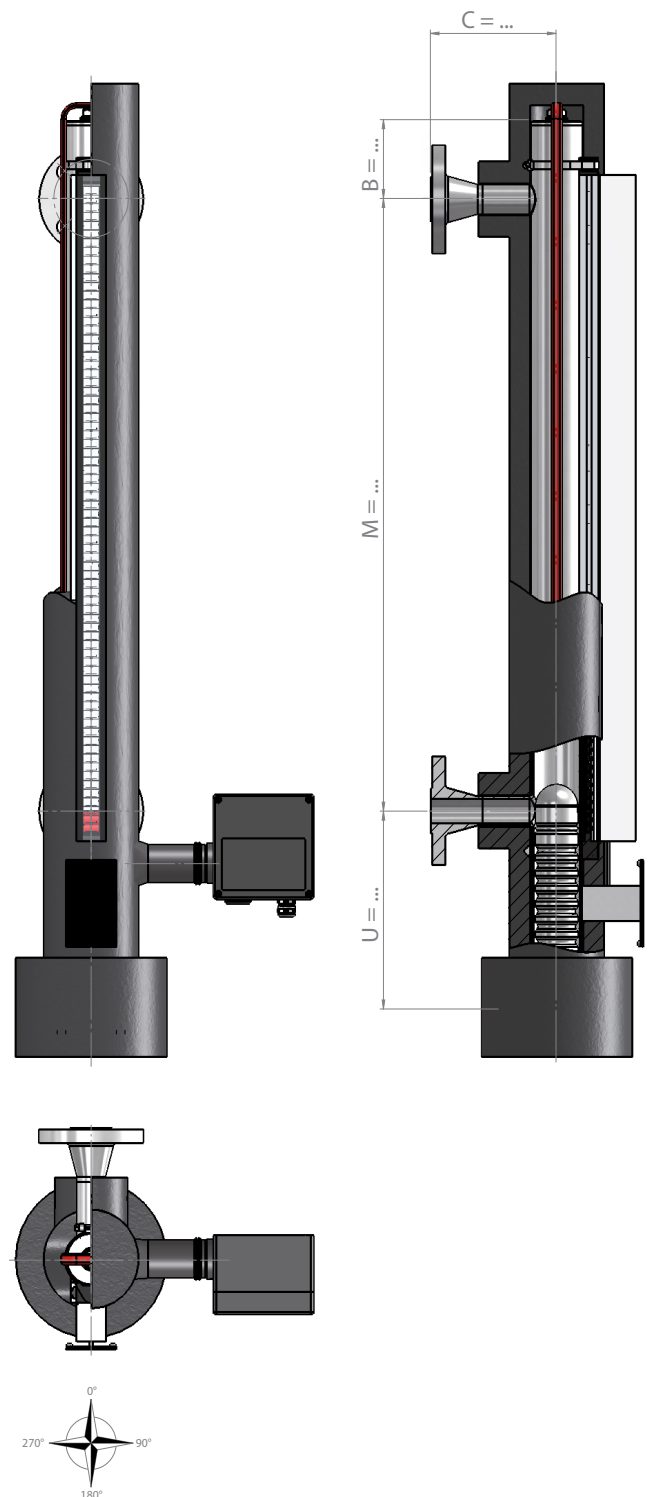
Technical Specifications

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

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

Technical Specifications

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



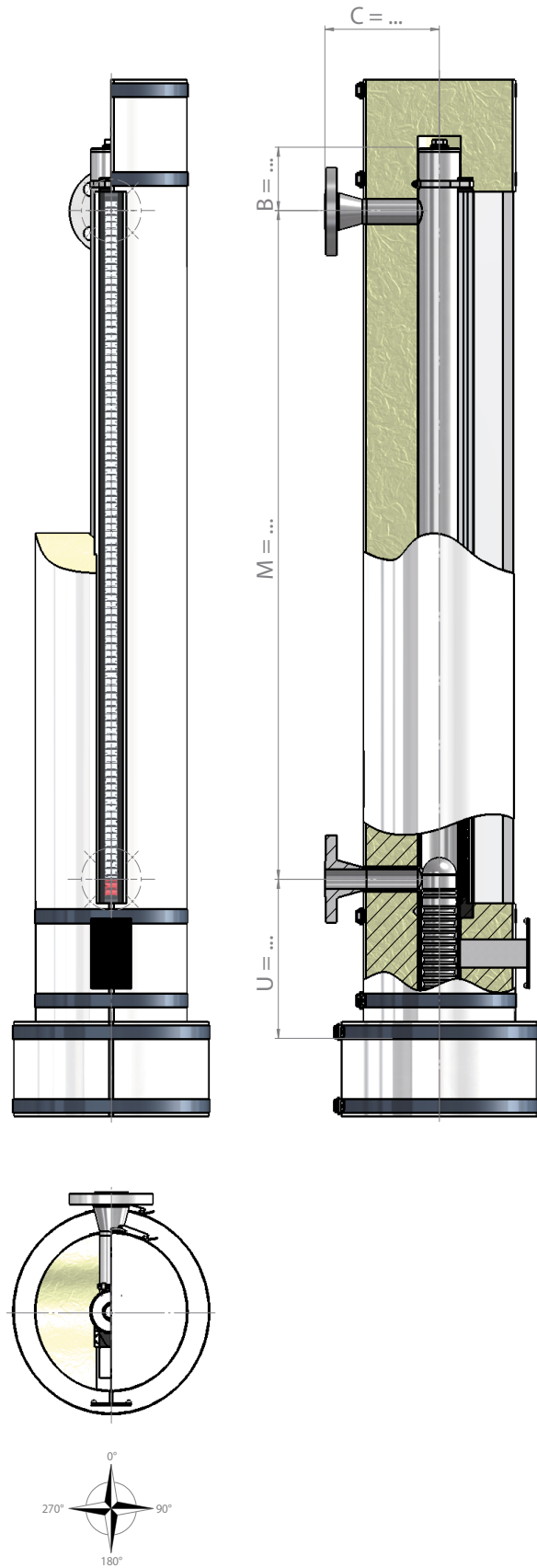


Appendix F - Rock-wool insulation:

SW Rock-wool insulation (removable)

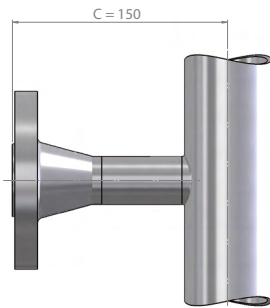
Technical Specifications

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

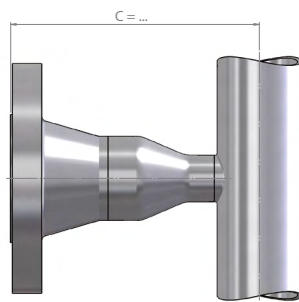




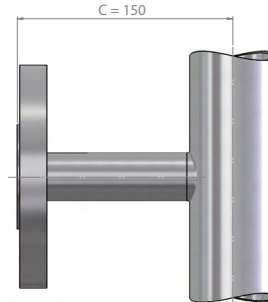
Appendix G - Prozessanschlüsse, Dämpfungsfedern und Haltelasche:



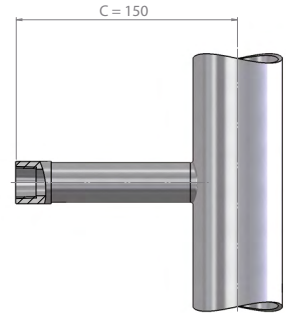
welding neck flange (standard)



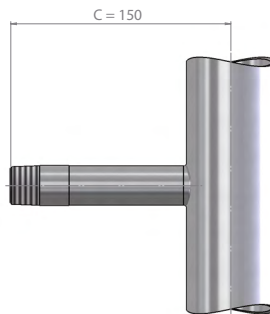
welding neck flange (reduced)



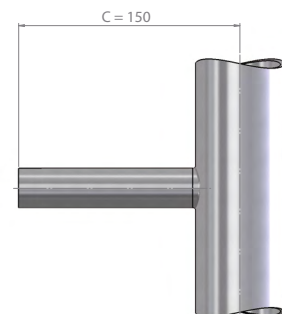
blind flange



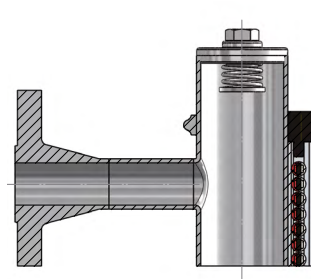
thread socket (female)



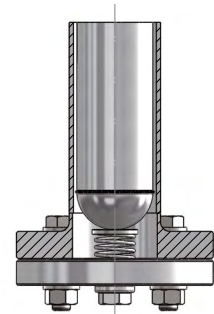
thread socket (male)



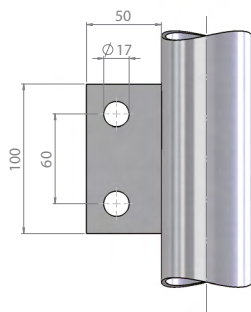
weld-on socket



upper dampening spring



lower dampening spring



mounting bracket

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

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

Material - Process connections

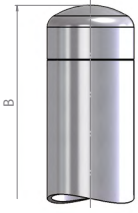
	Welding neck flange	Welding neck flange reduced	Blind flange	Female thread	Male thread	Weld-on socket
St. steel	x	x	x	x	x	x
Titanium	x	x	x	x	x	x
Alloy	x	x	x	x	x	x
PVC	o	o	x	o	o	o
PP	o	o	x	o	o	o
PVDF	o	o	x	o	o	o
ECTFE-coated	x	x	x	o	o	o
PFA-coated	x	x	x	o	o	o
redundant System	x	x	x	x	x	x
Reference vessel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

o = not combinable

x = combinable



Appendix H - Chamber end top:



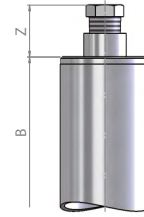
BA: welding cap



BB: flat top



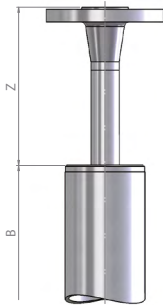
BC: flat top with vent plug G



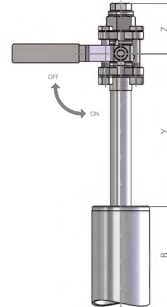
BD: flat top with vent plug NPT



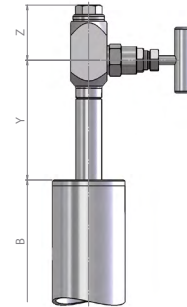
BE: flat top with vent nozzle



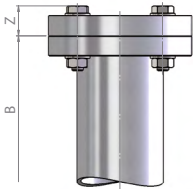
BF: flat top with vent flange



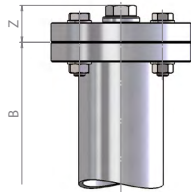
BG: flat top with vent ball valve



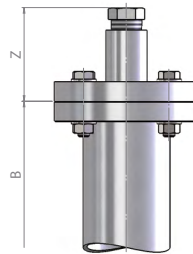
BH: flat top with needle valve



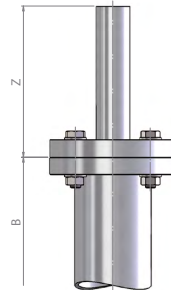
BI: flanged connection



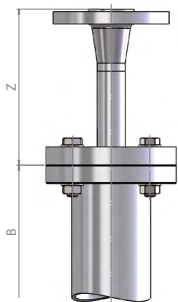
BJ: flanged connection with vent plug G



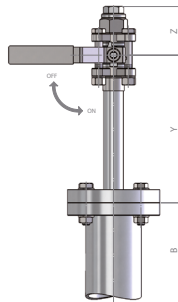
BK: flanged connection with vent plug NPT



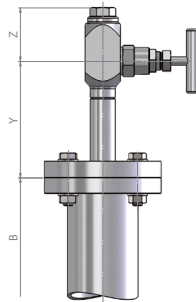
BL: flanged connection with vent nozzle



BM: flanged connection with vent flange



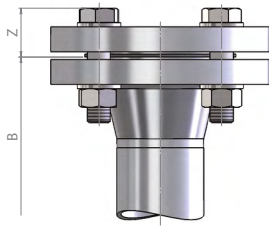
BN: flanged connection with vent ball valve



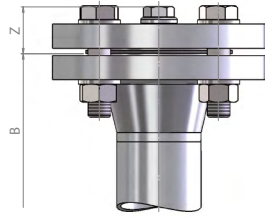
BO: flanged connection with vent needle valve



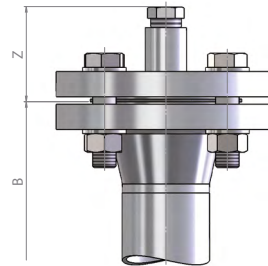
Chamber end top:



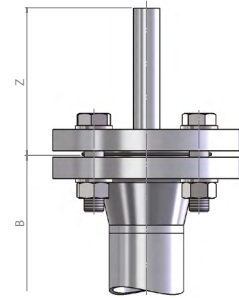
**BP: welding neck flange
EN / ANSI**



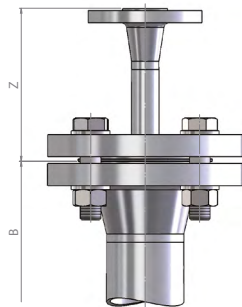
**BQ: welding neck flange
EN / ANSI
with vent plug G**



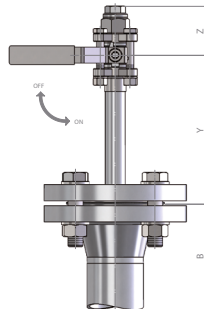
**BR: welding neck flange
EN / ANSI
with vent plug NPT**



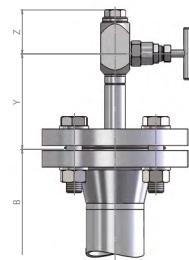
**BS: welding neck flange
EN / ANSI
with vent nozzle**



**BT: welding neck flange
EN / ANSI
with vent flange**



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

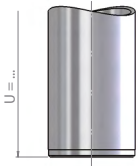


**BV: welding neck flange
EN / ANSI
with vent needle valve**

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



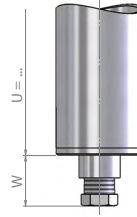
Appendix I - Chamber end bottom:



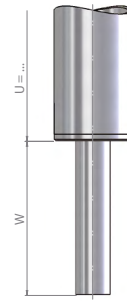
UA: flat top



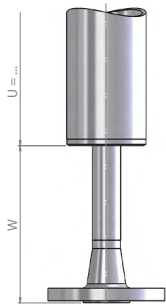
**UB: flat top
with drain plug G**



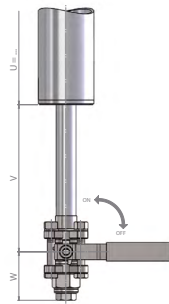
**UC: flat top
with drain plug NPT**



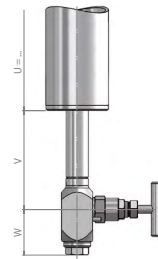
**UD: flat top
with drain nozzle**



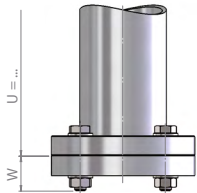
**UE: flat top
with drain flange**



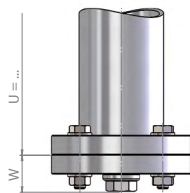
**UF: flat top
with drain ball valve**



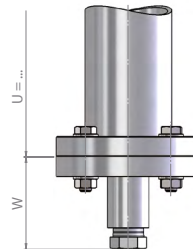
**UG: flat top
with drain needle valve**



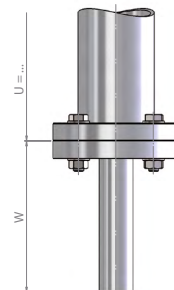
UH: flanged connection



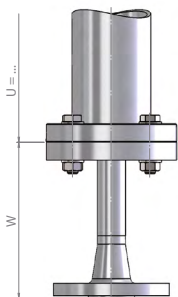
**UI: flanged connection
with drain plug G**



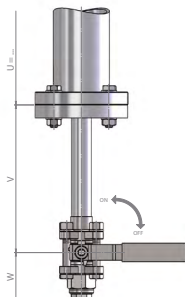
**UJ: flanged connection
with drain plug NPT**



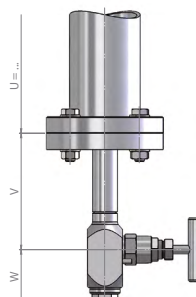
**UK: flanged connection
with drain nozzle**



**UL: flanged connection
with drain flange**



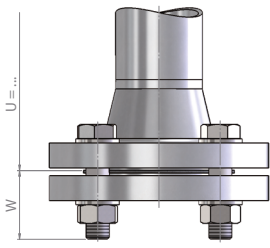
**UM: flanged connection
with drain ball valve**



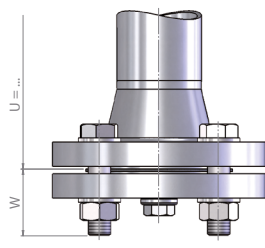
**UN: flanged connection
with drain needle valve**



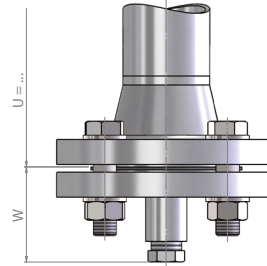
Chamber end bottom:



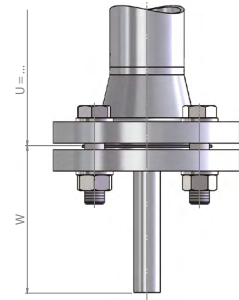
**UO: welding neck flange
EN / ANSI**



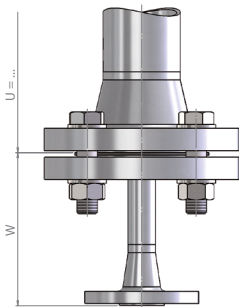
**UP: welding neck flange
EN / ANSI
with drain plug G**



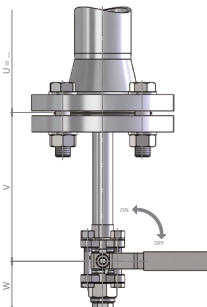
**UQ: welding neck flange
EN / ANSI
with drain plug NPT**



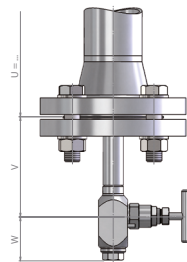
**UR: welding neck flange
EN / ANSI
with drain nozzle**



**US: welding neck flange
EN / ANSI
with drain flange**



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



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

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

-* depending on the float length





MA-400M

Mini-Bypass Magnetic Level Gauge

Description:

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

Features

- / Low-cost design
- / For simple applications
- / Up to 5 meter measuring length
- / Up to +6 bar
- / Up to +150°C liquid temperature
- / Flange, thread and welded connections
- / Switching contacts and measuring transmitter
- / Electrical trace heating and insulation possible
- / Customized designs

Application:

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



Ordering Codes:

Order no.	MA-400M.	1800.	E.	40.	1.	DN15PN6.	0000.	ZVA34PN6-200mm.	BA.	UB.	MMA-01.	0.	1/5
<p>MA-400M Mini-Bypass Magnetic Level Gauge</p> <p>Center distance of lateral connections (M) or length of instrument (instr. without side connections) in mm / [][][] mm (150 mm to 5000 mm)</p> <p>Bypass chamber material / E = stainless steel</p> <p>Bypass chamber outside diameter / 40 = Ø 40.00 mm</p> <p>Process connection / 0 = none 1 = flange acc. to EN 2 = flange acc. to ANSI 3 = female thread G 4 = female thread NPT 5 = male thread G 6 = male thread NPT 7 = weld-on end 99 = customized special, please specify in detailed text</p> <p>Nominal diameter, pressure level and sealing face / [][][] e.g. DN15 PN16 B1 (0000 for weld-on end and thread connection)</p> <p>Weld-on end size otherwise thread size for screw neck or bushing / [][][] e.g. G3/4" or M18x1.5 (0000 for flange connection)</p> <p>Float type and length acc. to appendix D „Cylindrical floats“ / [][][] e.g. ZVA34PN6-200 mm</p> <p>Chamber end top acc. to appendix H „Chamber end top“ / [][] = e.g. BA (welding cap) 99 = customized special, please specify in detailed text (00 for process connection located at the top of the chamber)</p> <p>Chamber end bottom acc. to appendix I „Chamber end bottom“ / [][] = e.g. UB (flat top with drain plug G) 99 = customized special, please specify in detailed text (00 for process connection located at the bottom of the chamber)</p> <p>Indicator bar / 0 = none [][][] e.g. MMA-01</p> <p>Approvals / 0 = none [][][] e.g. ATEX II 1G2D/2GD c</p> <p>Options (multiple names like 7/8 possible) / [][][] e.g. 1 / 10 / (3 x MGK-A70)</p>													
<p>Indicator bar / Aluminium housing - colorless mattfinished MMA-01 = standard MMA-01N = standard, over-roll-protected MMA-01EX = with ATEX approval MMA-01NEX = with ATEX approval, over-roll-protected</p> <p>Aluminium housing - stainless steel covered MMV-01 = standard MMV-01N = standard, over-roll-protected MMV-01EX = with ATEX approval MMV-01NEX = with ATEX approval, over-roll-protected</p>													
<p>Options / 1 = switching contacts, specify quantity and type in detailed text 2 = switch protective circuit with 22 Ω / 0.21 W 3 = switch protective circuit acc. to NAMUR EN 60947 4 = remote transmitter REED contact chain with resistance output acc. to data sheet FM-02N 5 = remote transmitter REED contact chain with power output 4 to 20 mA acc. to data sheet FM-02N 6 = remote transmitter magnetostrictive with linear power output 4 to 20 mA acc. to data sheet FM-01F 7 = mounting bracket for lengths above 2000 mm 8 = float damping spring top mounted 9 = float damping spring bottom mounted 10 = rock-wool insulation SW (removeable) 11 = Armaflex® insulation ART up to TU = +105°C 12 = Armaflex® insulation ARH up to TU = +150°C 13 = electrical trace heating HA up to TU = +75°C 14 = electrical trace heating HB up to TU = +150°C 15 = angle scale WK-AK, mounted on the indicator bar (please specify scale in detailed text) 16 = angle scale WK-AG, mounted on the indicator bar (please specify scale in detailed text) 17 = angle scale WK-EG, mounted on the indicator bar (please specify scale in detailed text) 18 = sight extension PV for indicator bar</p>													



Versions:

Measuring range (ME):

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

Measuring tube material and diameter:

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

Process connection:

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

Nominal diameter and pressure level for flange:

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

Thread for screw neck or bushing:

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

Measuring tube connection top:

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

Measuring tube connection bottom:

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

Indicator bars:

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

Float type and length:

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

Approvals:

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

Options:

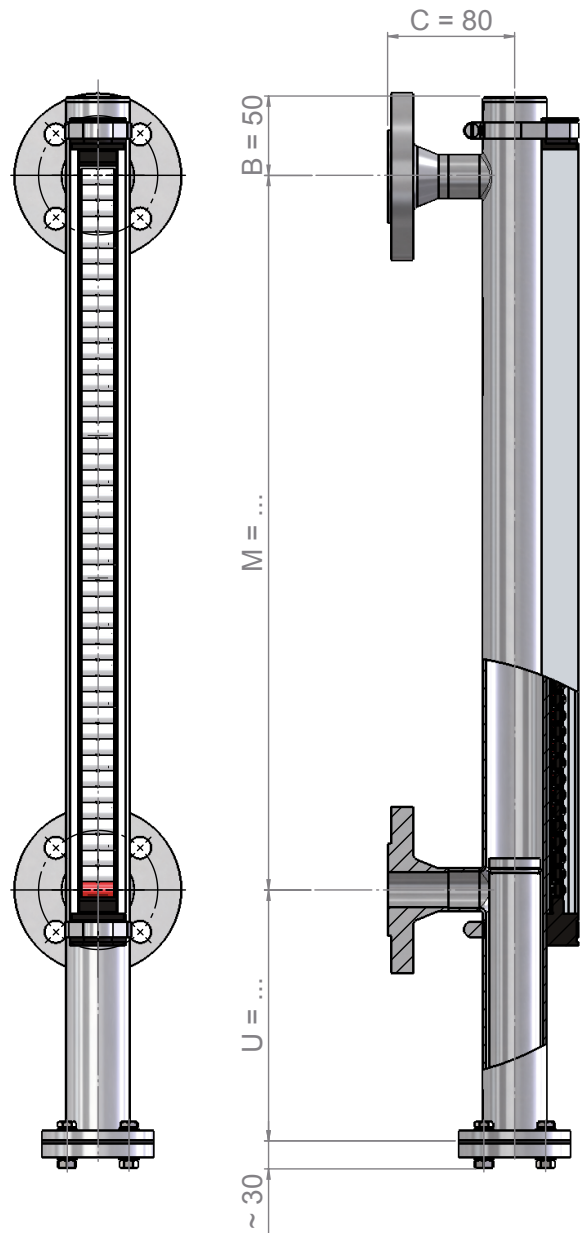
With regard to options, specify in detail whether the MA-400M should be provided with electrical limit contacts and as to how many (option /1). A circuit with a protective resistor or a combination of resistors, which offers a behavior according to NAMUR, is available for the contacts (option /2 and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



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

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center distance /	150..5000 mm
spec. Weight /	≅ 560 kg/m ³
Design pressure /	-1..+6 bar
Design temp. /	-40..+150°C
Chamber /	Ø 40 x 2 mm
Process connection /	see appendix G „Process connections“
Chamber end top /	see appendix H „Chamber end top“
Chamber end bottom /	see appendix I „Chamber end bottom“
Float /	see appendix D „Cylindrical floats“
Magnetic roller indicator /	aluminium or st. steel / Pocan [®] temp. -40..+200°C
Scale /	aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	aluminium / st. steel -40..+150°C
Option level transmitter /	FM-02N
Option El. heat tracing /	holding temperature -10°C / frost protect.
Option insulation /	Armaflex [®] or rock-wool
poss. Approvals*/	ATEX II 1G2D/2GD c or ATEX II 2GD c liquid temperature max. +150°C, PED, GOST, GL, BV, DNV, ABS

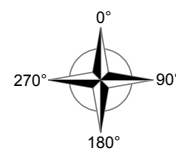
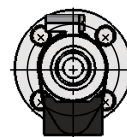
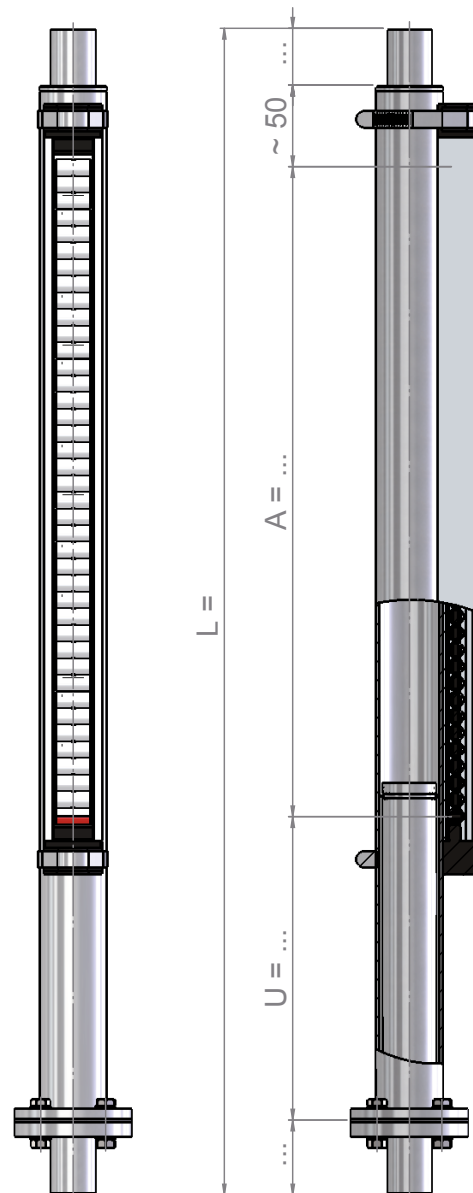




Mini-Bypass Magnetic Level Gauge made of Stainless Steel PN6 with top and bottom Process Connection

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
Flange center distance /	150...5000 mm
spec. Weight /	≥ 560 kg/m ³
Design pressure /	-1...+16 bar
Design temp. /	-40...+150°C
Chamber /	Ø 40 x 2 mm
Process connection /	see appendix G „Process connections“
Float /	see appendix D „Cylindrical floats“
Magnetic roller indicator /	aluminium or st. steel / Pocan [®] temp. -40...+200°C
Scale /	aluminium / st. steel with adhesive foil, engraving or blank
Switching contacts /	aluminium / st. steel -40...+150°C
Option level transmitter /	FM-02N
Option El. heat tracing /	holding temperature -10°C / frost protect.
Option insulation /	Armaflex [®] or rock-wool
poss. Approvals*/	ATEX II 1G2D/2GD c or ATEX II 2GD c liquid temperature max. +150°C, PED, GOST, GL, BV, DNV, ABS





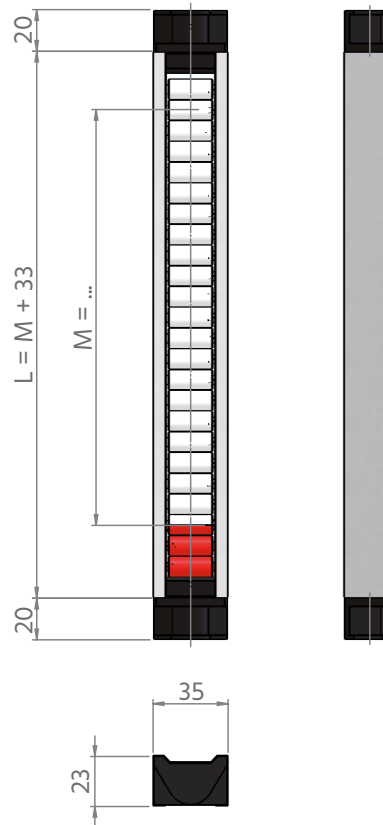
Appendix A - Indicator bars:

Versions

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

Technical specifications

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

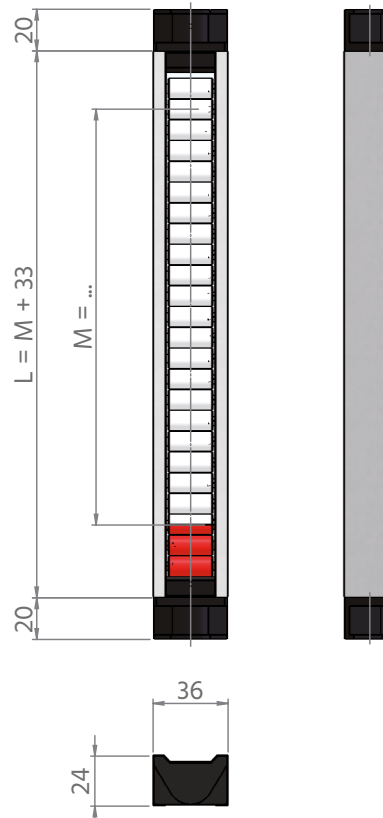


Versions

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

Technical Specifications

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





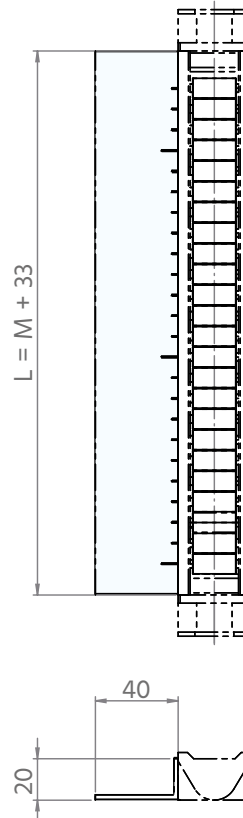
Appendix B - Angle scales and sight extension:

Angle scale versions

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

Technical specifications

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

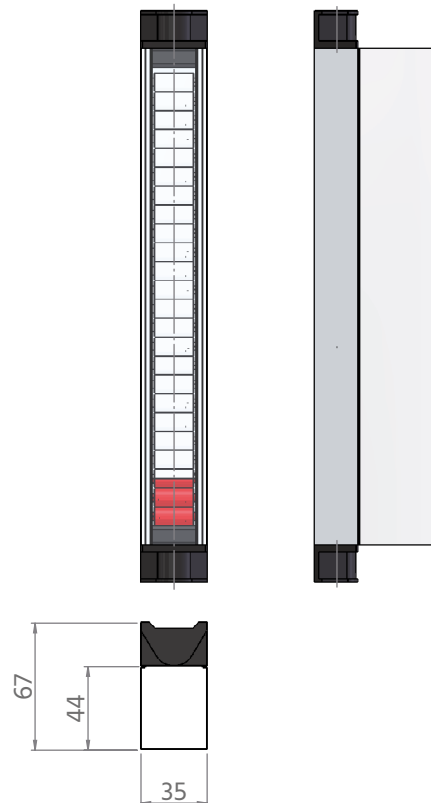


Sight extension version

PV	Sight extension for indicator bar
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Technical specifications

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





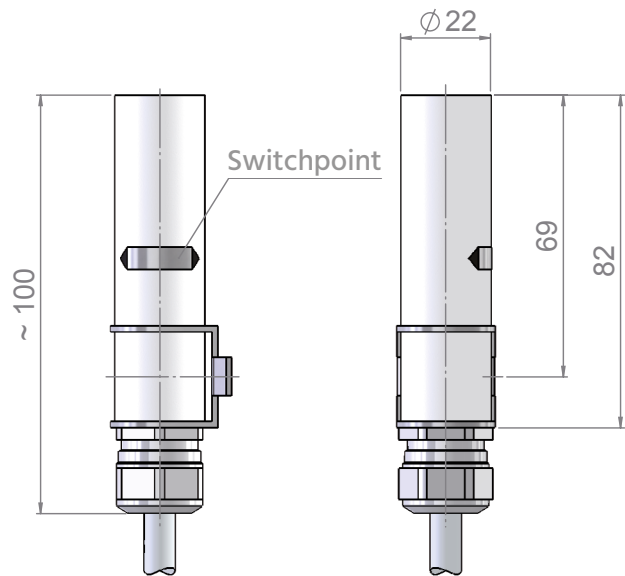
Appendix C - Switching Contacts:

Aluminium versions for chamber mounting

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

Technical specifications

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

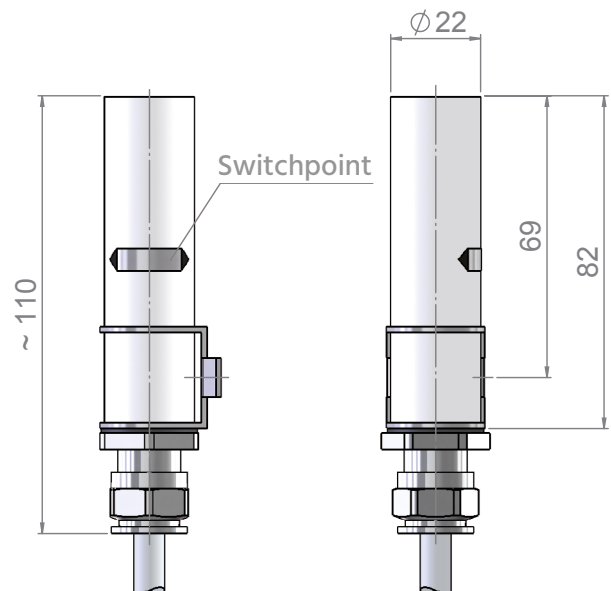


Aluminium versions for chamber mounting

MGK-A40EXD Explosion-proof enclosure acc. to ATEX

Technical specifications

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



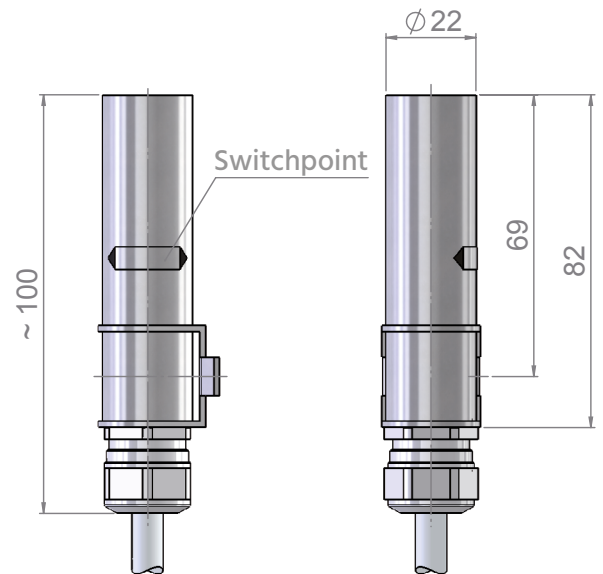


Stainless steel versions for chamber mounting:

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

Technical specifications

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

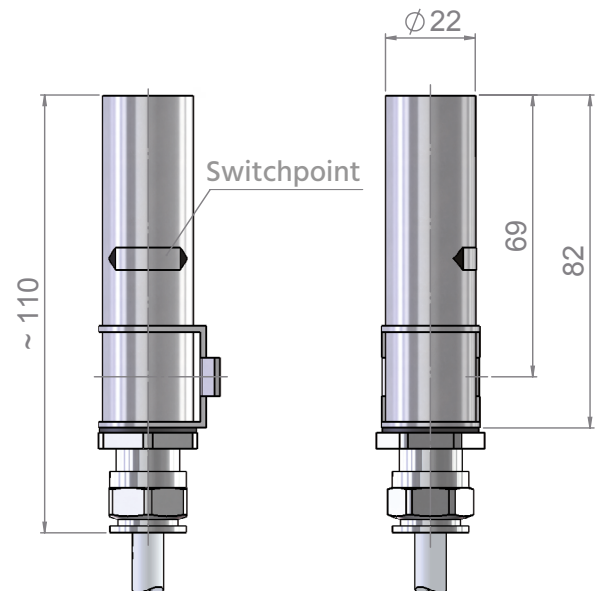


Stainless steel versions for chamber mounting:

MGK-E40EXD Explosion-proof enclosure acc. to ATEX

Technical specifications

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





Aluminium versions for chamber mounting

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

Technical specifications

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

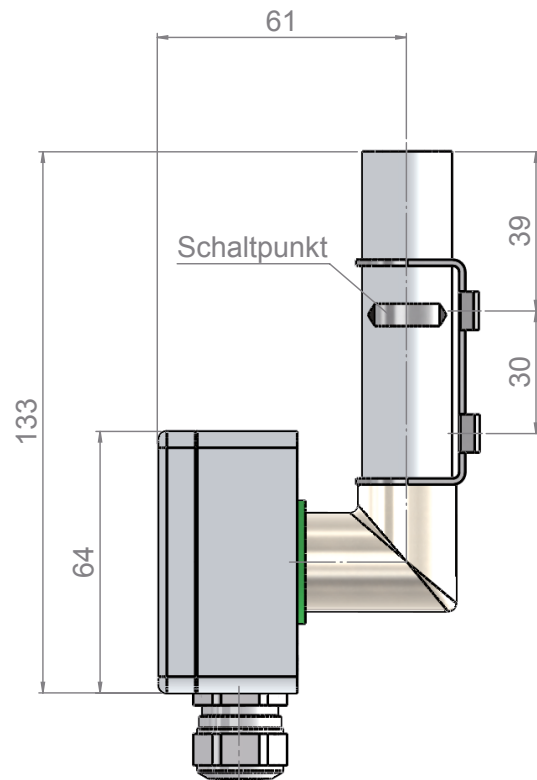


Fig. 1) with terminal box - flat

Aluminium versions for chamber mounting

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

Technical specifications

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

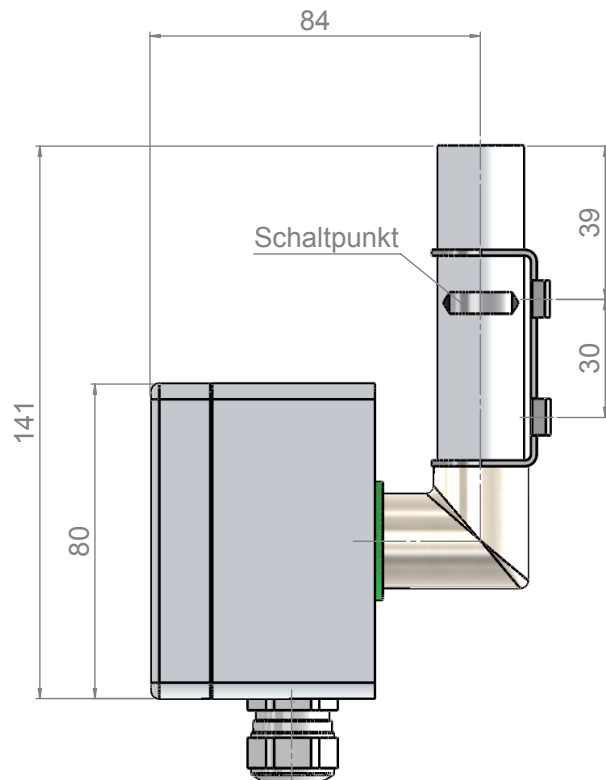


Fig. 2) with terminal box - high



Appendix D - Cylindrical floats:

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

Float length (mm)	180	200	230	250	280	300	340	420	480	580	
Float weight (g)	127	135	148	156	168	177	194	227	252	294	
emerged float height (mm)		spec. weight of the media (kg/m ³)									
0	0	-	-	-	-	-	-	-	-	-	
10	10	940	900	850	820	790	770	740	690	670	
20	20	1000	950	900	850	820	800	760	710	690	
30	30	1070	1000	940	890	850	830	790	730	710	
40	40	1140	1070	990	940	890	860	820	750	720	
50	50	1230	1140	1040	990	920	900	840	770	740	
60	60	1340	1220	1100	1030	960	930	870	790	760	
70	70	1460	1320	1170	1090	1010	970	900	820	770	
80	80	1600	1430	1250	1150	1060	1010	940	840	790	
90	90	1780	1550	1340	1230	1110	1060	980	860	810	
100	100	2000	1710	1440	1310	1180	1110	1020	890	830	



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

Cylindrical float made of Buna, PN6, Typ ZBU35PN6:

Float length (mm)	90	100	105	115	120	135	150	170	195	225	
Float weight (g)	73	76	77	80	81	85	89	96	103	110	
emerged float height (mm)		spez. Gewicht des Mediums (kg/m ³)									
0	0	-	-	-	-	-	-	-	-	-	
5	5	-	-	-	-	-	-	-	-	-	
10	10	950	850	840	790	770	710	660	620	580	
15	15	1000	950	900	850	800	750	700	650	600	
20	20	1080	990	940	870	840	770	710	670	610	
25	25	1170	1050	1000	920	890	800	740	690	630	
30	30	1260	1130	1070	980	940	840	770	710	650	
35	35	1380	1220	1140	1040	990	880	800	740	670	
40	40	1520	1320	1230	1160	1050	930	840	770	690	
45	45	1690	1440	1330	1190	1120	980	880	800	710	
50	50	1900	1580	1460	1280	1200	1040	930	830	740	



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



Appendix E - Armaflex® insulation and electrical trace heating

ART Armaflex® insulation - standard

Technical specifications

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

ARH Armaflex® insulation - high temp.

Technical specifications

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

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

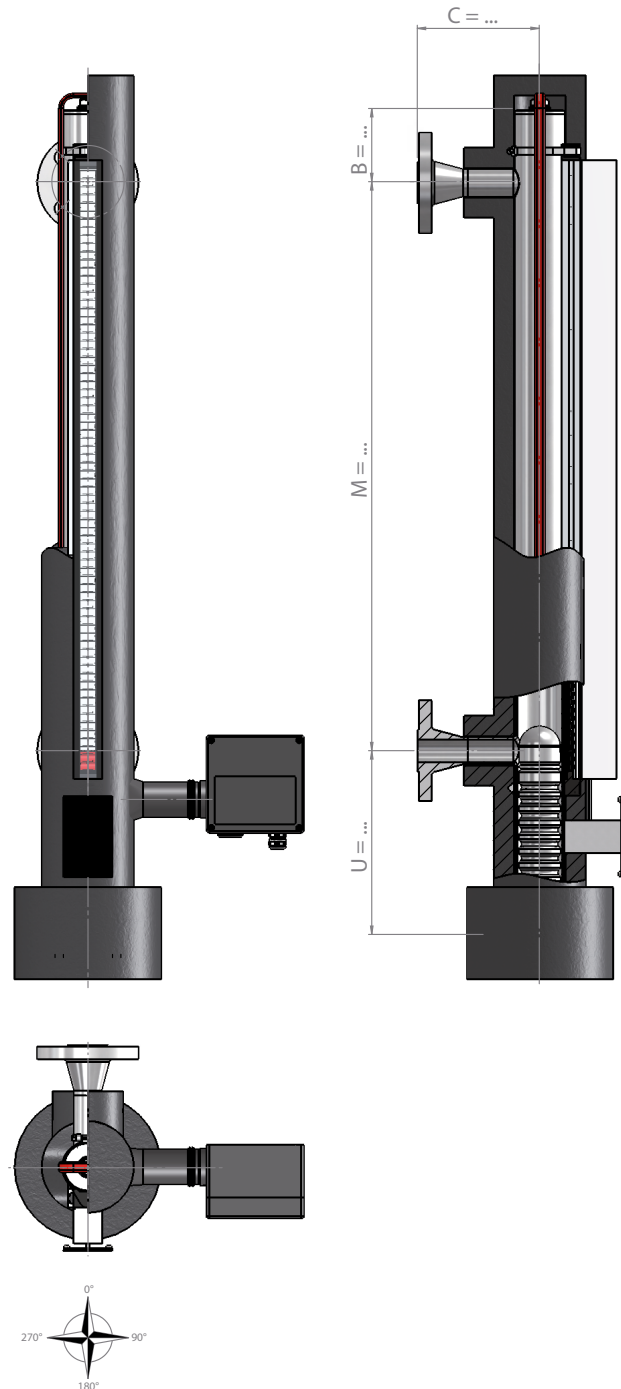
Technical specifications

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

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

Technical specifications

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





Appendix F - rock-wool insulation

SW Rock-wool insulation (removable)

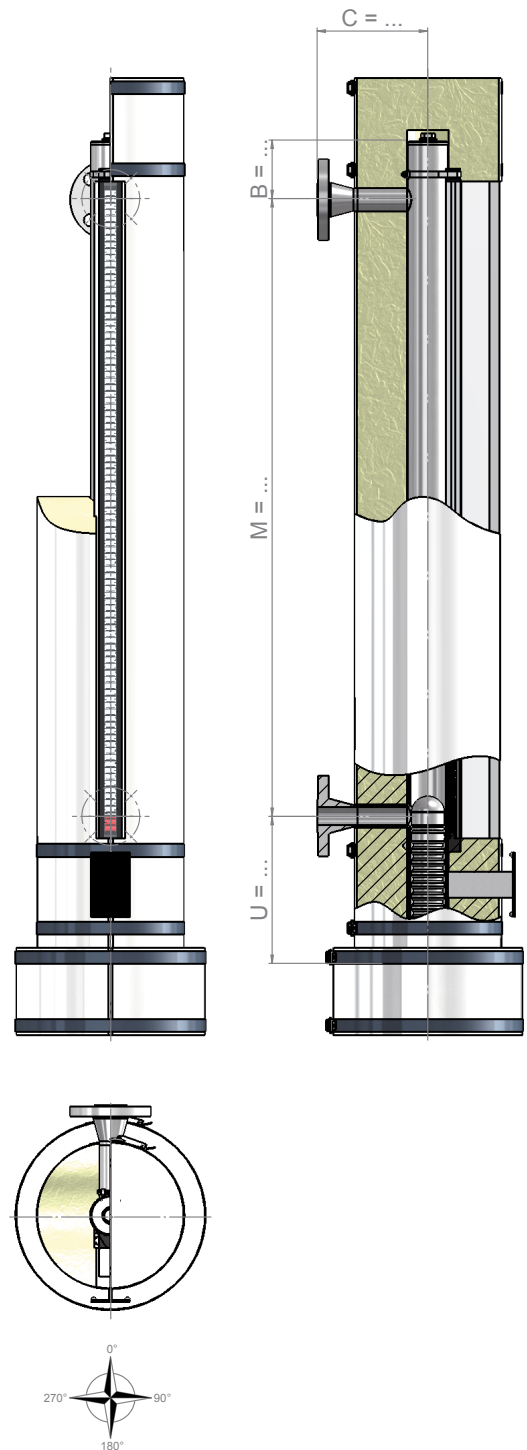
Technical specifications

Material / rock-wool with a chrome-nickel cover (removable)

Nom. thickness / -50 mm

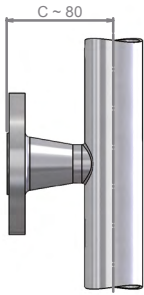
Ambient temperature / -50...+750°C

UV resistance / yes





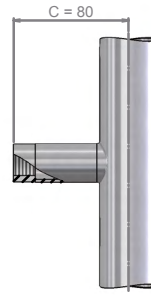
Appendix G - Process connections and the mounting bracket



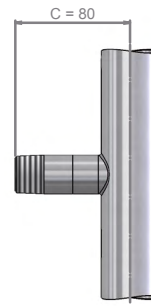
welding neck flange
(standard)



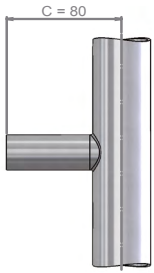
blind flange



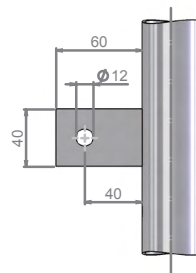
thread socket
(female)



thread socket
(male)

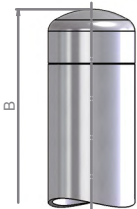


weld-on socket

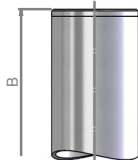


mounting bracket

Appendix H - Chamber end top



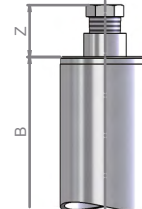
BA: welding cap



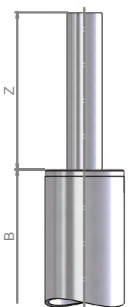
BB: flat top



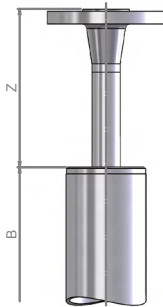
BC: flat top
with vent plug G



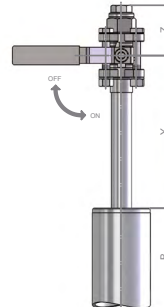
BD: flat top
with vent plug NPT



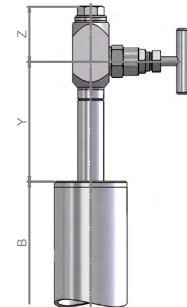
BE: flat top
with vent nozzle



BF: flat top
with vent flange



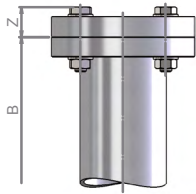
BG: flat top
with vent ball valve



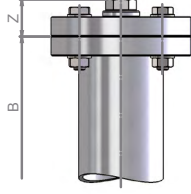
BH: flat top
with needle valve



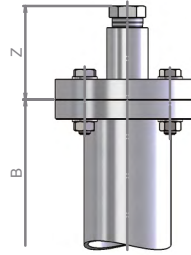
Appendix H - Chamber end top



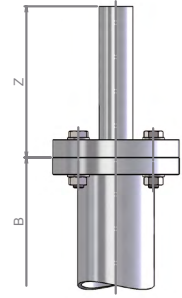
BI: flanged connection



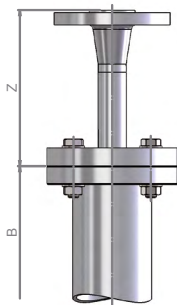
BJ: flanged connection with vent plug G



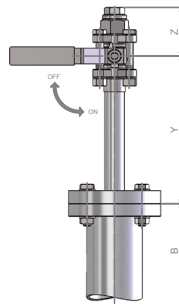
BK: flanged connection with vent plug NPT



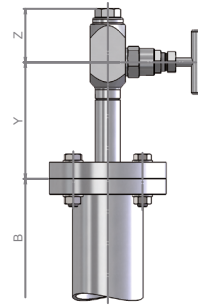
BL: flanged connection with vent nozzle



BM: flanged connection with vent flange



BN: flanged connection with vent ball valve



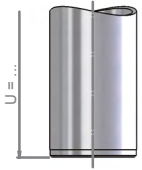
BO: flanged connection with vent needle valve

Chamber end top

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



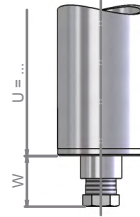
Appendix I - Chamber end bottom



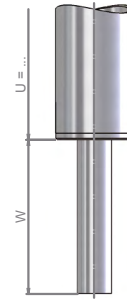
UA: flat top



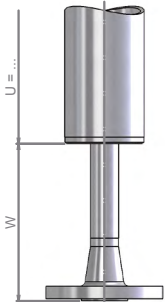
**UB: flat top
with drain plug G**



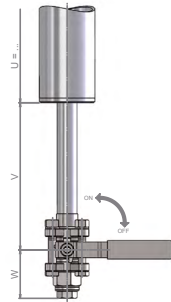
**UC: flat top
with drain plug NPT**



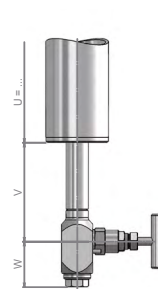
**UD: flat top
with drain nozzle**



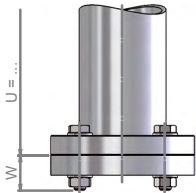
**UE: flat top
with drain flange**



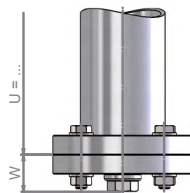
**UF: flat top
with drain ball valve**



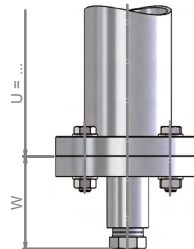
**UG: flat top
with drain needle valve**



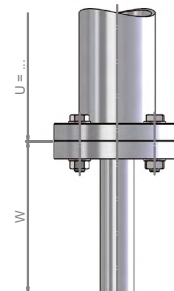
UH: flanged connection



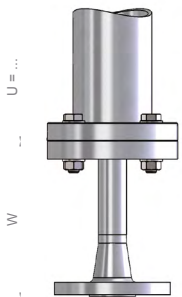
**UI: flanged connection
with drain plug G**



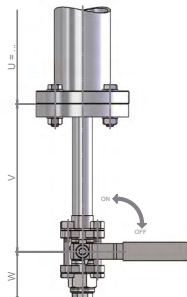
**UJ: flanged connection
with drain plug NPT**



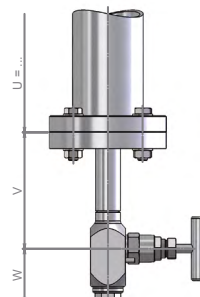
**UK: flanged connection
with drain nozzle**



**UL: flanged connection
with drain flange**



**UM: flanged connection
with drain ball valve**



**UN: flanged connection
with drain needle valve**



Chamber end bottom

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

-* depending on the float length





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 /	$\leq \pm 0.1$ % 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, $L_i = 0$ μ H $P_i = 660$ 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: $\leq \pm 0.35$ % FSO option: $\leq \pm 0.25$ % FSO acc. to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)
Thermal effects (offset and span) /	
Tolerance band in compensated range	$\leq \pm 0.1$ % 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



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 Al₂O₃ 96%
- 2 = ceramic Al₂O₃ 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 /

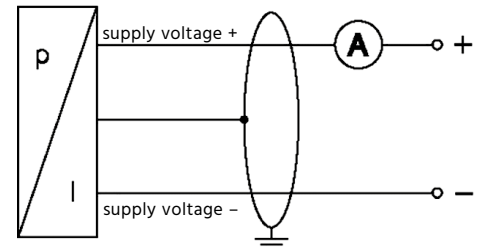
- A = none
- B = DN25 - PN40
- C = DN40 - PN40 (only probe)
- D = DN50 - PN40
- E = DN80 - PN16

Accuracy /

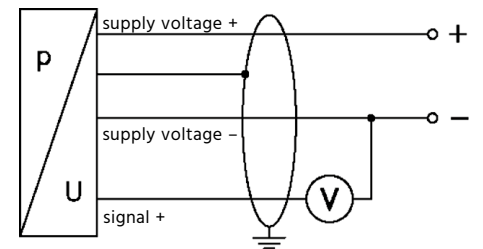
- 1 = $\pm 0.35\%$ FSO
- 2 = $\pm 0.25\%$ FSO

Wiring Diagrams:

2-wire system (power):



3-wire system (voltage):



EI. Connection table:

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

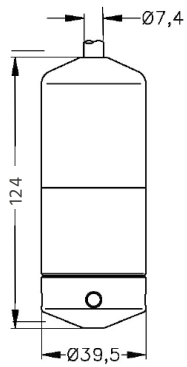


Ranges & Overpressure:

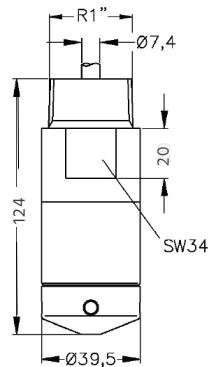
Value															
Nom. pressure [bar]	0,04	0,06	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10	16	20
Level [mH2O]	0,4	0,6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	200
Perm. overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45

Dimensions in mm:

standard:

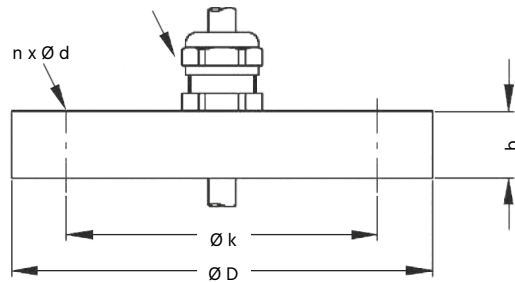


prepared for mounting inside a stainless steel pipe:



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

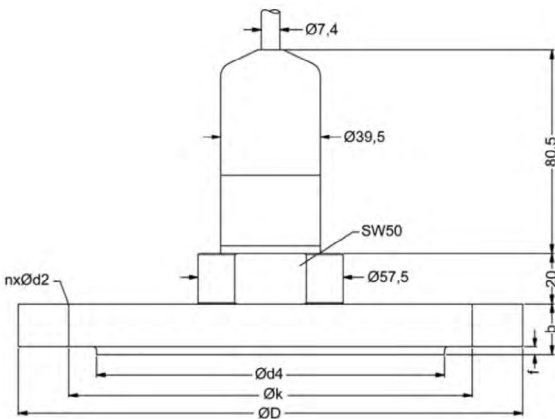
cable connection M16x1,5 with seals
(for cables-Ø 4...11 mm)



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	



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' Register, the Germanischer Lloyd (German Lloyd) and of DNV (Det Norske Veritas), ABS and CCS. The device can optionally 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, screw-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 /	$R_{max} = [(U_B - U_{Bmin}) / 0.02] \Omega$
Current consumption /	max. 21 mA
Influencing factors /	
Supply voltage:	0.05% FSO / 10 V
Load:	0.05% FSO / k Ω
Long time stability /	$\leq + 0.1\%$ 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	$\leq + 0.1\%$ 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, $L_i = 0$ μ H; 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: $\leq \pm 0.25\%$ FSO option: for $P_N \geq 0,6$ bar ¹ : $\leq \pm 0,1\%$ FSO ¹ Under the influence of disturbance burst according to EN 61000-4-4 (2004) +2 kV accuracy decreased to $\leq \pm 0.25\%$ 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 ₁ Mn (seawater resistant)
Seals (wetted):	FKM (Viton), EPDM or FFKM (from T > -15°C), (other materials on request)
Diaphragm:	standard: ceramic Al ₂ O ₃ 96% option: ceramic Al ₂ O 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

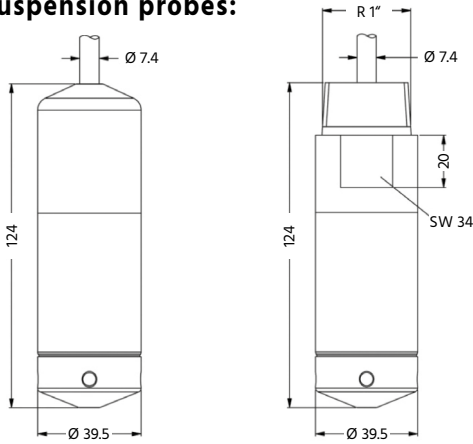


Order number	FD-GL.	1.	2.	1.	2.	4.	1.	2.	1.	1.	□□.	1.	A.	1.
FD-GL Hydrostatic Level Measurement														
Housing / 1 = stainless steel 1.4404 2 = copper nickel alloy (CuNi10Fe1Mn)														
Output / 1 = 4...20 mA, 2-wire 2 = 4...20 mA, 2-wire, Ex-Version 3 = 4...20 mA, 2-wire and PT100, 3-wire														
Measuring element / 1 = ceramic Al ₂ O ₃ 96% 2 = ceramic Al ₂ O 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 ₂ O, 0.04 bar 2 = 0.6 mH ₂ O, 0.06 bar 3 = 1.0 mH ₂ O, 0.10 bar 4 = 1.6 mH ₂ O, 0.16 bar 5 = 2.5 mH ₂ O, 0.25 bar 6 = 4.0 mH ₂ O, 0.40 bar 7 = 6.0 mH ₂ O, 0.60 bar 8 = 10 mH ₂ O, 1.0 bar 9 = 16 mH ₂ O, 1.6 bar 10 = 25 mH ₂ O, 2.5 bar 11 = 40 mH ₂ O, 4.0 bar 12 = 60 mH ₂ O, 6.0 bar 13 = 100 mH ₂ O, 10.0 bar 14 = 160 mH ₂ O, 16.0 bar 15 = 200 mH ₂ O, 20.0 bar XX = other (please specify in detailed text)														
Measuring unit / 1 = in bar, relative 2 = in bar, absolute 3 = in mH ₂ O														
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:

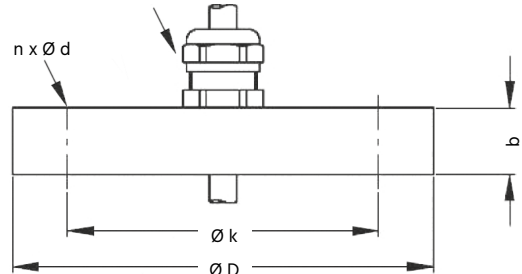


st. steel / CuNiFe

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

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

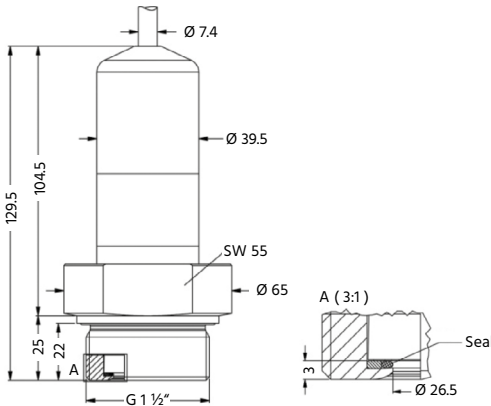
Cable gland M16x1,5 with seals
(for cables \varnothing 4...11 mm)



Flange	Dimensions				
	$\varnothing D$	$\varnothing k$	b	n	$\varnothing d$
DN25 / PN40	115	85	18	4	14
DN50 / PN40	165	125	20	4	18
DN80 / PN16	200	160	20	8	18

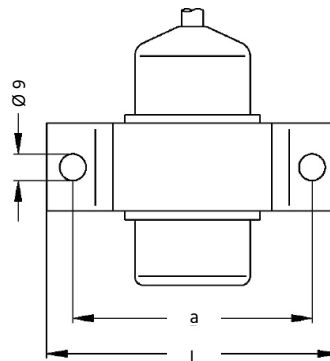
DN80/PN16 possible for NP ranges \leq 16 bar

Screw-in probe:



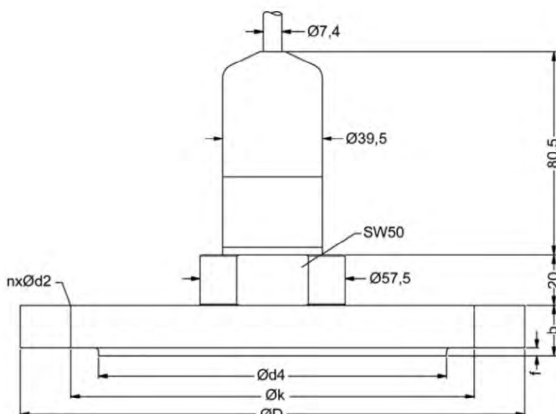
st. steel / CuNiFe

Mounting clamp:



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

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



Flange	Dimensions						
	$\varnothing D$	$\varnothing k$	$\varnothing d4$	b	f	n	$\varnothing d2$
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

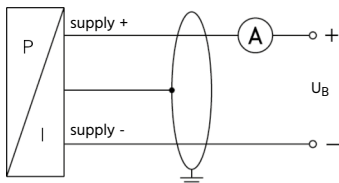


Measuring Ranges:

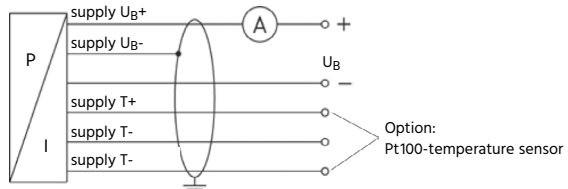
Ranges and Overload																
Nominal pressure [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20	
Height of fluid [mH ₂ O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200	
perm. Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45	
perm. Vacuum [bar]	-0.2		-0.3		-0.5			-1.0								

Electrical Connection:

Wiring diagram: 2-wire-system (current)



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



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





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 1/2"-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% AL₂O₃ or the even higher resistant 99% AL₂O₃.



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: $R_{max} = [(U_B - U_{Bmin}) / 0,02A] \Omega$ 0...10 VDC, 3-wire: $R_{min} = 10 \text{ k}\Omega$
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 / k Ω
Long term stability /	$\leq + 0,1\%$ 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	Zone 0: ATEX II 1G Ex ia IIC T4 Ga
SS process connection /	Zone 20: ATEX II 1D Ex ia IIIC T 85°C Da
Option Ex-protection	Zone 0/1: ATEX II 1/2G Ex ia IIC T4 Ga/Gb
PVDF connection /	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 /	$U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C_i = 14 \text{ nF}$, $L_i = 0 \mu\text{H}$, $C_{gnd} = 27 \text{ nF}$
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: $\leq \pm 0.35\%$ FSO option: $\leq \pm 0.25\%$ 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	$\leq \pm 0.1\%$ 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 \geq 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



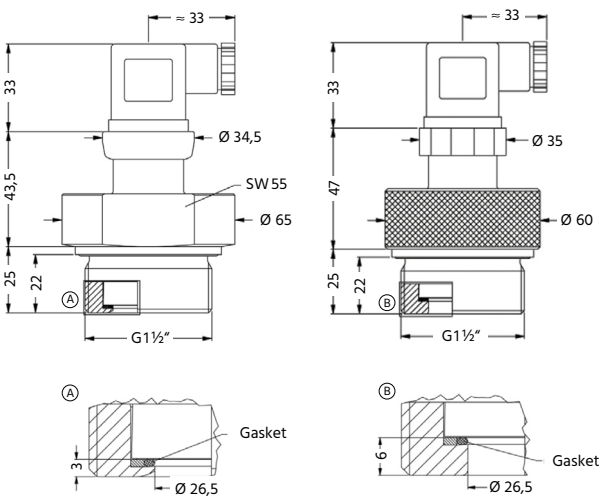
Operating ranges and Overload															
Nom. pressure [bar rel.]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Height of fluid [mH ₂ O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
max. pressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
perm. vacuum [bar]	-0.2		-0.3		-0.5				-1.0						

Dimensions in mm:

Versions:

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

Process connection PVDF¹⁾
G 1½" flush (DIN 3852)



¹⁾ not possible in combination with field housing

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 1½"-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)

EI. 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 Al₂O₃ 96%
- 2 = ceramics Al₂O₃ 99.9%

Accuracy /

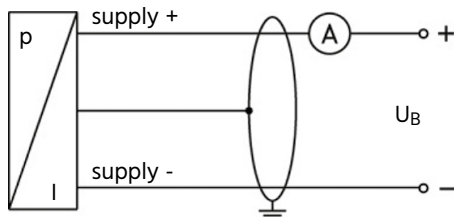
- 1 = ± 0.35 % FSO
- 2 = ± 0.25 % FSO (only for pressure ranges ≥ 0.6 bar)

Material of process connection /

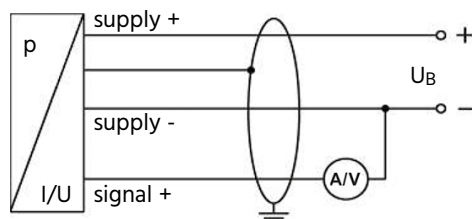
- 1 = stainless steel 1.4404
- 2 = PVC (on request)
- 3 = PVDF

Wiring Diagram:

2-wire system (current)



3-wire system (current / voltage)



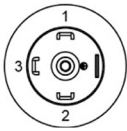
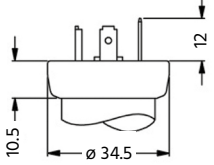


Wiring table:

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)

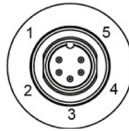
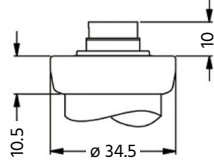
Electrical Connection (mm):

Standard

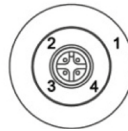
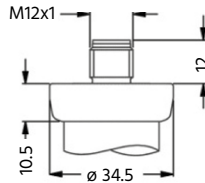


ISO 4400 (IP65)

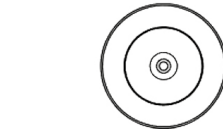
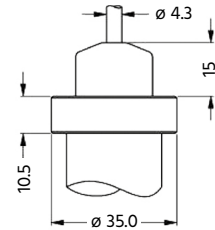
Optional



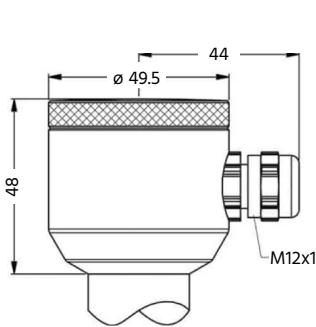
Binder Series 723 5-pin (IP67)



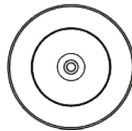
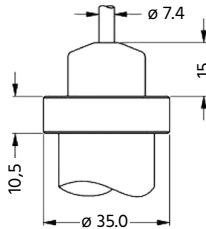
M12 x 1 4-pin (IP67)



cable outlet with PVC-cable⁴ (IP67)



compact field-housing (IP67)



cable outlet, cable with ventilation tube⁵ (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



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 carried 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 balast 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

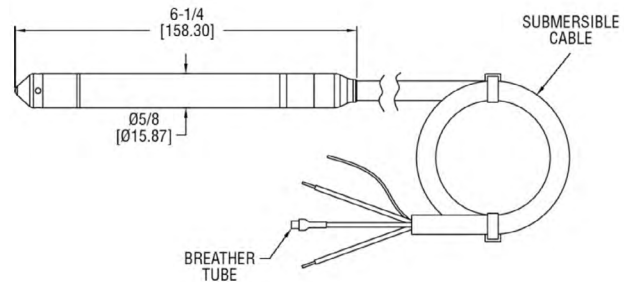
Ordering Codes:

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.						

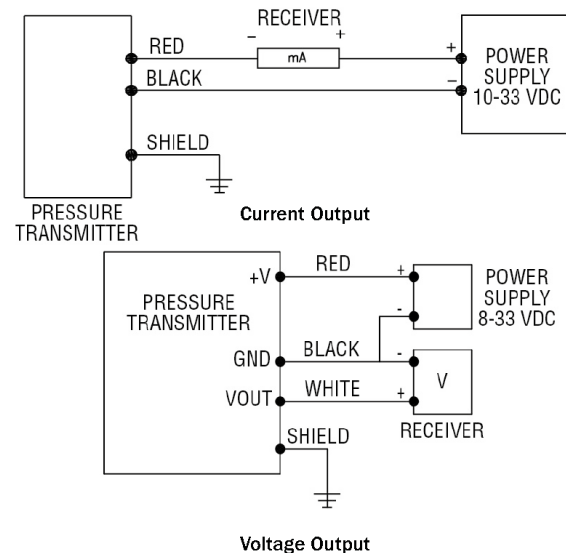
Electrical Specifications:

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:



Wiring Diagram:





KS-01/D

Conductive Level Switches



Features

/ Low-cost electrodes

/ sideways mounting

/ Easy to assemble

/ No mechanics

/ Low maintenance requirements

Description:

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

Application:

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



Technical Spec. KS-01:

Screw fit electrode / stainless steel V2A with Teflon socket

Technical Spec. KS-01D:

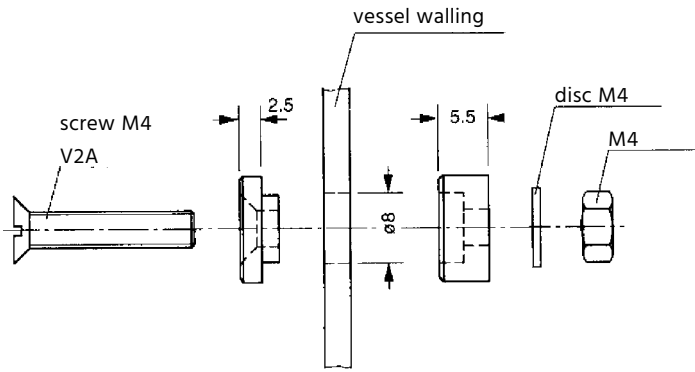
max. Pressure / 6 bar

max. Media temp. / -5...+60°C

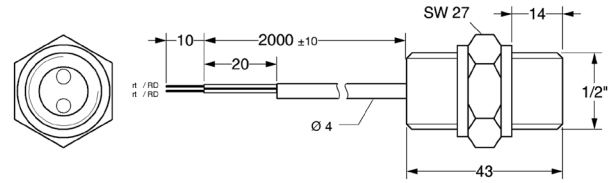
Process connection / G 1/2"-male

Electrical connection / 2 m infused cable PVC,
2 wire, 0,25 mm² each

Dimensions KS-01 in mm:



Dimensions KS-01D in mm:

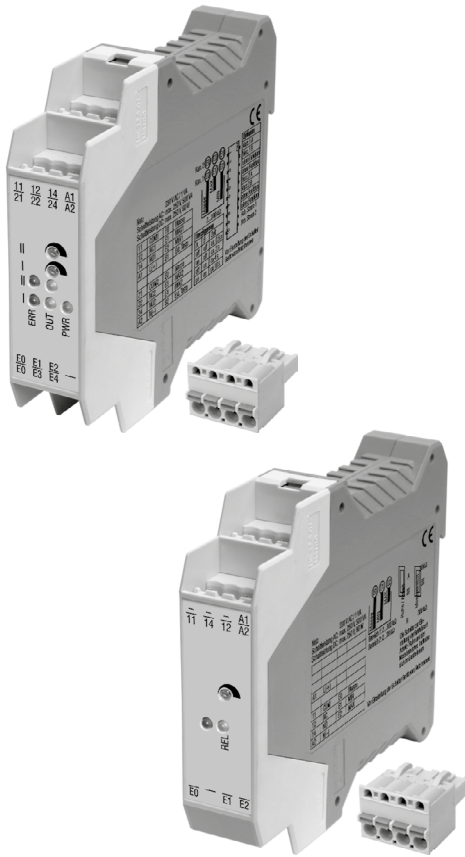


Ordering Codes:

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

Ordering Codes:

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



ER-01

Conductive Electrode Relay

Features

- / Single or dual channels
- / 24 V DC or 230 V AC
- / Secured galvanic isolation
- / MIN-MAX control
- / Limit value identification
in conductive fluids
- / Operating and
closed-circuit switchable

Description:

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

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

Application:

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



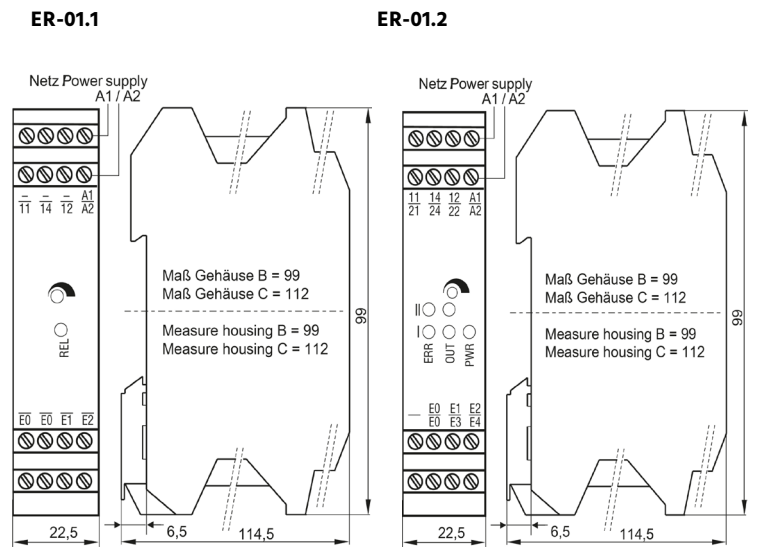
Electrical Specifications:

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

Technical Specifications:

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

Dimensions in mm:

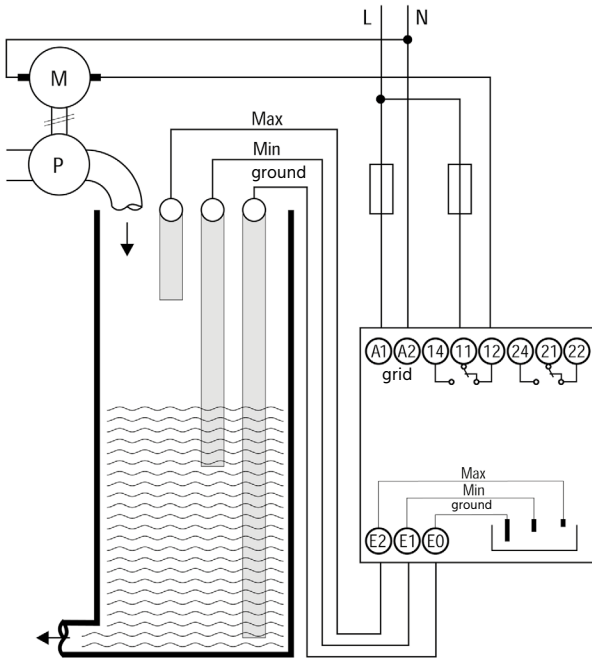


Ordering Codes:

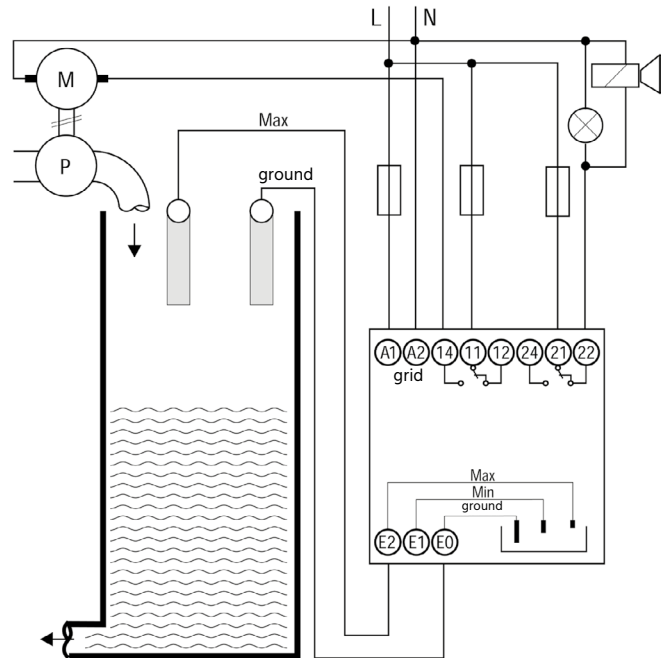
Order number	ER-01. 1. 24. 1
ER-01 Conductive Electrode Relay	
No. of Channels /	1 = 1 channel with one change-over-contact 2 = 2 channels with one change-over-contact per channel
Supply voltage /	□□□ = specify other voltage in detailed text 24 = 24 VDC 230 = 230 VAC
Options /	0 = no special features 1 = specify special features in detailed text

Connection examples 1 channel relay

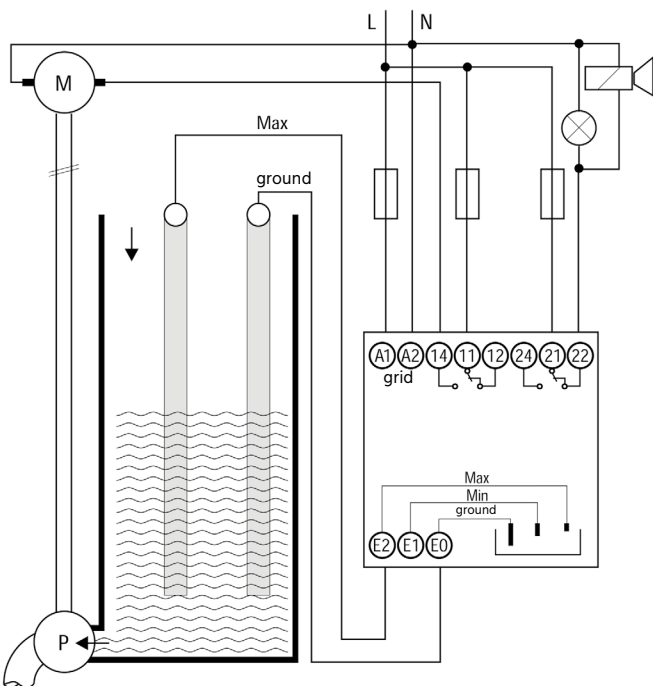
Connection example for filling
 Limit level detection in active current operation
 (min/max operation)



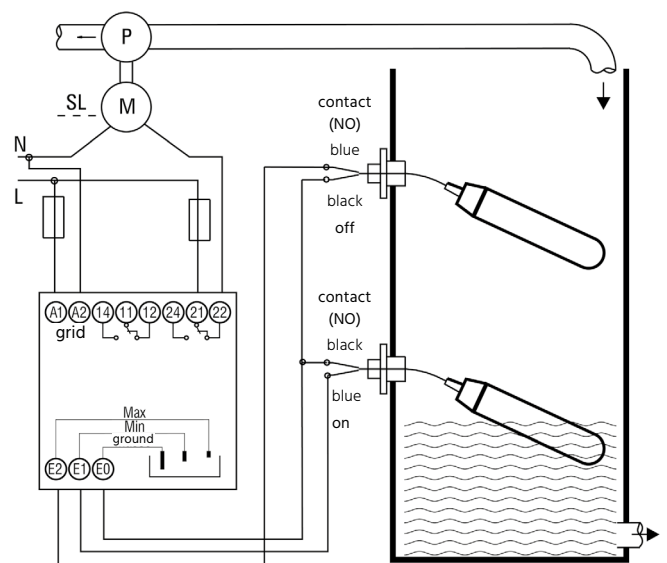
Connection example for overflow
 Limit level detection in standby current operation
 (Optional: 1 channel relay, 2 change-over contacts)



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



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

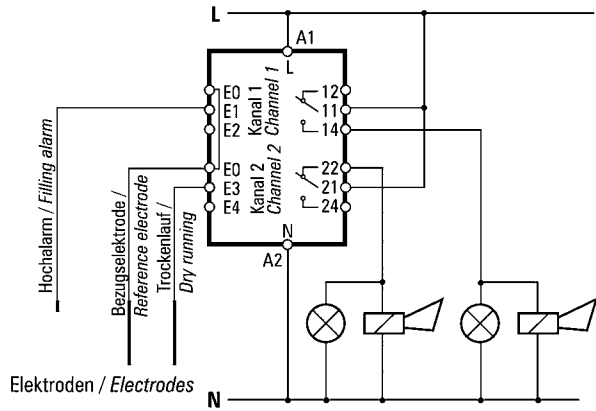
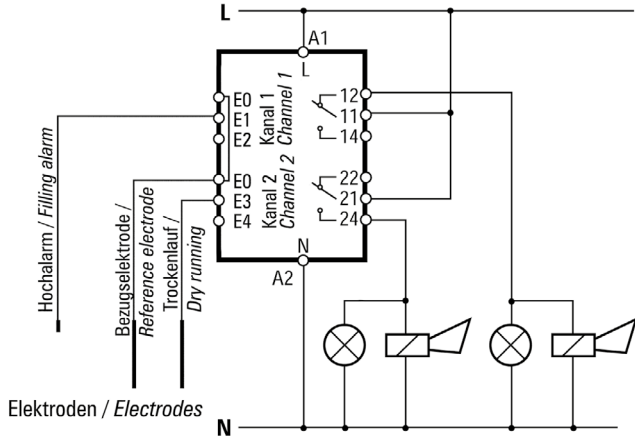




Connection examples 2 channel relay

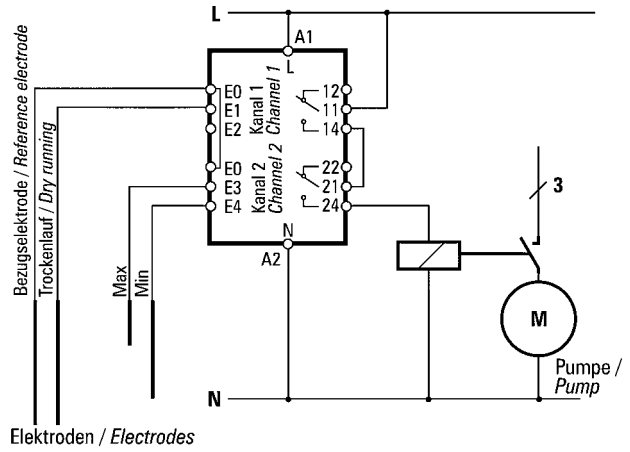
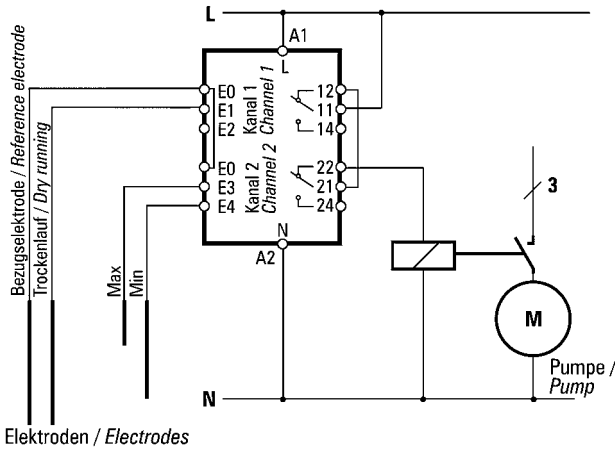
Channel 1: high alarm,
Channel 2: dry run standby current, high alarm, dry run

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



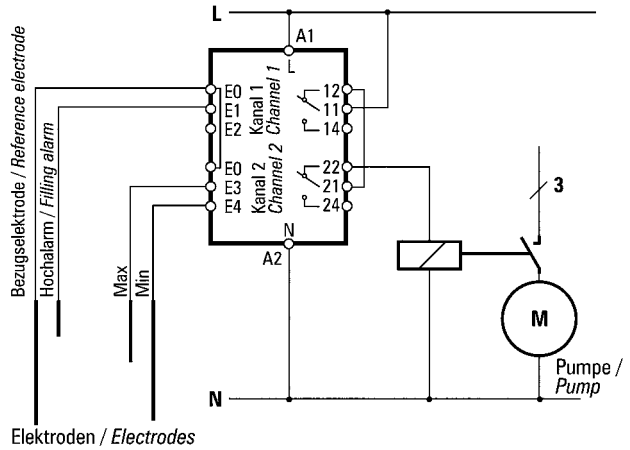
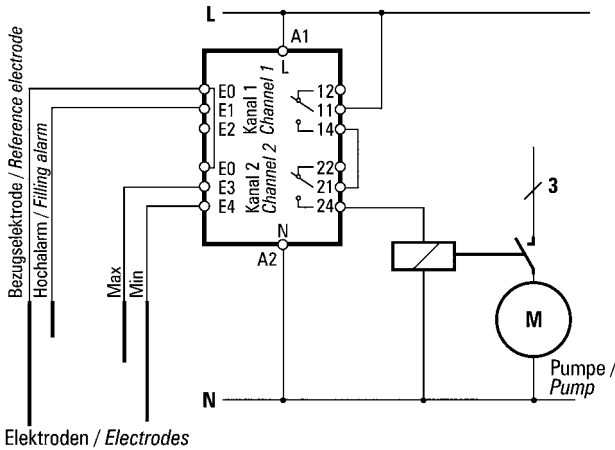
Channel 1: dry run,
Channel 2: min/max standby current, empty container

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



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

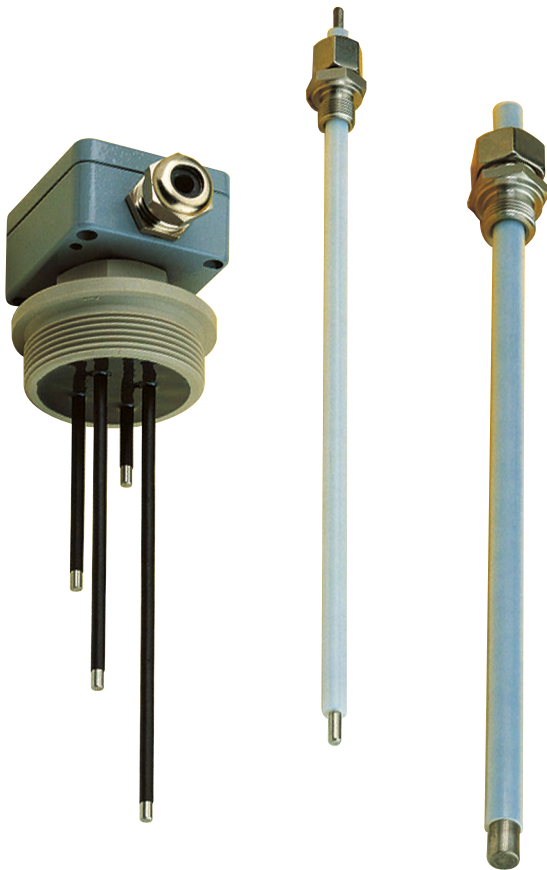
Channel 1: high alarm,
Channel 2: min/max active current, fill container





KS-02

Conductive Level Switch



Features

**/ Single or multiple electrodes
(up to 5 setpoints)**

/ Easy to assemble

/ Electrode rods made of st. steel

**/ Electrode relay for limit values,
pump control or pump control
with overflow and dry-run pro-
tection (see Data sheet ER-01)**

Description:

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

Application:

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

Benefits:

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



Versions:

- KS-02.01. . .05:** Single electrode with fixed screw on thread or with cutting ring joint for adjusting the electrode length
Electrical connection: PVC or silicon cable or polyester terminal housing
- KS-02.25. . .28:** Multiple electrodes
max. number of electrodes depends on size of joint
Electrical connection: polyester terminal housing

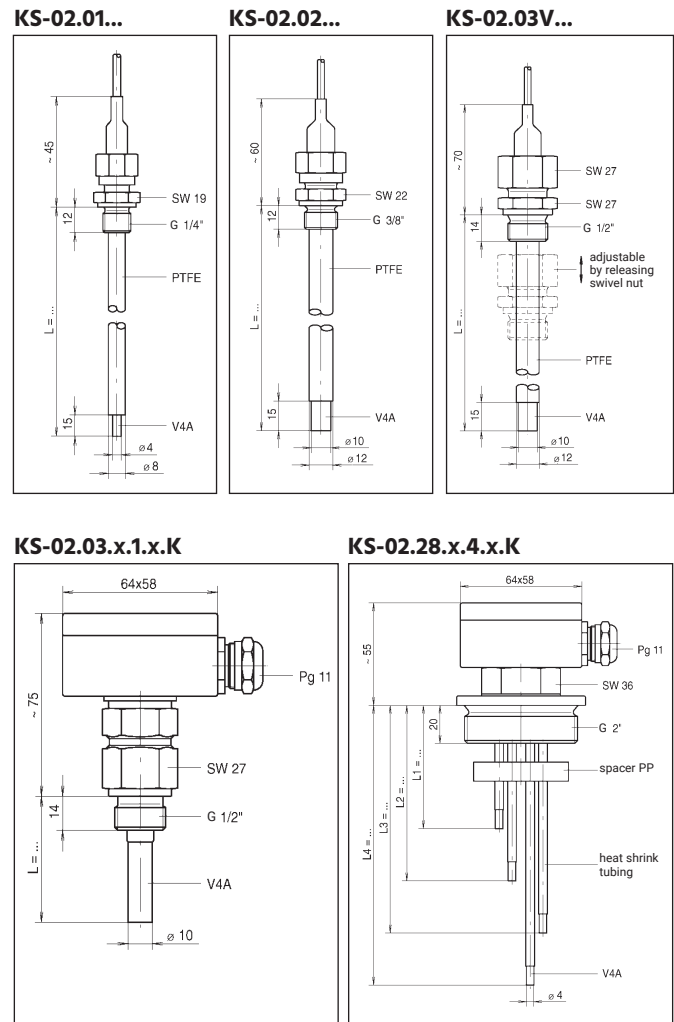
Technical Specifications:

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

Dimensions in mm:

Ordering Codes:

Order number	KS-02.	01.	2.	3.	1.	xP.	L1
KS-02 Conductive Level Switch							
Process connection /							
Single electrodes							
01 = G 1/4" male							
01V = G 1/4" male adjustable							
02 = G 3/8" male							
02V = G 3/8" male adjustable							
03 = G 1/2" male							
03V = G 1/2" male adjustable							
05 = G 1" male							
Multiple electrodes							
25 = G 1" male (max. 2 Electrodes)							
26 = G 1 1/4" male (max. 3 Electrodes)							
27 = G 1 1/2" male (max. 3 Electrodes)							
28 = G 2" male (max. 5 Electrodes)							
99 = special type connection							
Material for process connection /							
2 = stainless steel							
3 = PP (starting from G 1 1/2")							
Number of electrodes /							
1..5							
Electrode material /							
1 = stainless steel							
Electrical connection /							
Single electrodes only							
xP = PVC cable, x = length in m (standard = 3 m) T = -5...+80°C							
xS = Silicone cable, x = length in m (standard = 3 m) T = -5...+80°C							
Single or multiple electrodes							
K = polyester terminal connection housing (starting from G 3/8")							
9 = special type connection							
Other details /							
L1, L2, L3... = length of individual electrodes from sealing edge of screw joint							





KS-03

Compact Conductive Level Switch



Features

- / With integrated electronics
- / 24 V DC supply
- / One switching point or
MIN/MAX control
- / Adjustable sensitivity
- / Electrode material SS, Titanium,
Hastelloy or Tantalum
- / Plastic or stainless steel head

Description:

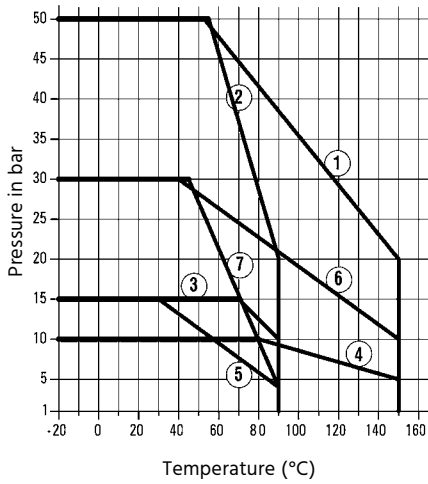
Inside the connector head of the KS-03 compact conductive switch is an electronic unit that is supplied with 24 V DC to provide a weak AC voltage to the switch's electrode rods. Whenever a conductive fluid establishes a connection between two of the electrodes, it results in an AC current which is recognized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

Application:

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



Pressure & Temp.-Curves:



- Curve 1:** stainless steel screw fitting with PTFE-coated electrodes
- Curve 2:** stainless steel screw fitting with PA-coated electrodes
- Curve 3:** PPH-screw fitting with PTFE-coated electrodes
- Curve 4:** PTFE-screw fitting with PTFE-coated electrodes
- Curve 5:** PA or PVDF-screw fitting (special design)
- Curve 6:** stainless steel screw fitting (special design) with PTFE-coated electrodes
- Curve 7:** stainless steel screw fitting (special design) with PA-coated electrodes

Technical Specifications:

- Operating temp. /** see Pressure-Temperature curves
- Connection thread /** G1"-male, G1 1/4"-male, G1 1/2"-male or G2 3/4"-swivel nut
- Screw con. material /** PPH, PTFE, PVDF, stainless steel 1.4571
- Electrode material /** stainless steel 1.4571, Titanium, Hastelloy B, Hastelloy C or Tantalum
- Coating material /** polyamide or PTFE
- Coating length /** full (entire rod, 10 mm at the end blank) or partial (up to approx. 250 mm from top)
- Rod diameter /** 4 mm or 6 mm
- Rod length /** max. 6000 mm
- Spacer /** one spacer every 1000 mm required

Electrical Specifications:

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

Ordering Codes:

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

KS-03 Compact Level Switch

Connector head /
PP = polypropylene
VA = stainless steel

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

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

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

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

Rod diameter /
4 = 4 mm
6 = 6 mm

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

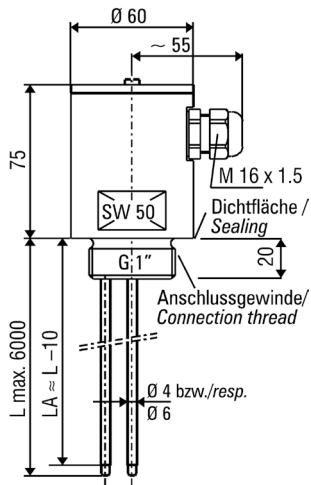
Sealing /
1 = Viton (standard)
2 = Kalrez

Electronic components /
0 = none
1 = 1 limit value (NC, opening when the level reaches the setpoint)
2 = MIN-MAX control (connecting thread ≥ G 1 1/4")

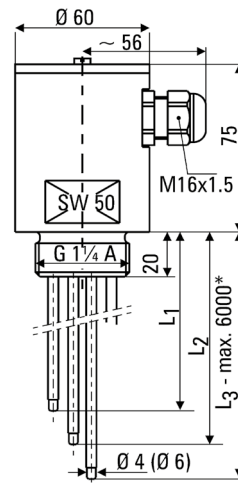


Dimensions in mm:

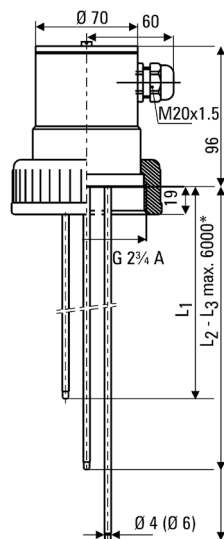
Dim. KS-03.PP.2.x.1



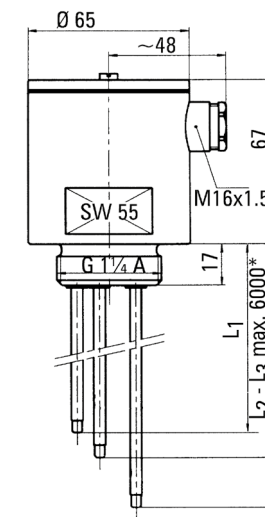
Dim. KS-03.PP.3.x.2



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



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



*greater lengths on request

Electrical Connection:

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





WD-03

Water Leak Detector

Description:

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

Features

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

Application:

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



Versions:

Supply voltage /

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

Alarms /

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

Relay outputs /

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

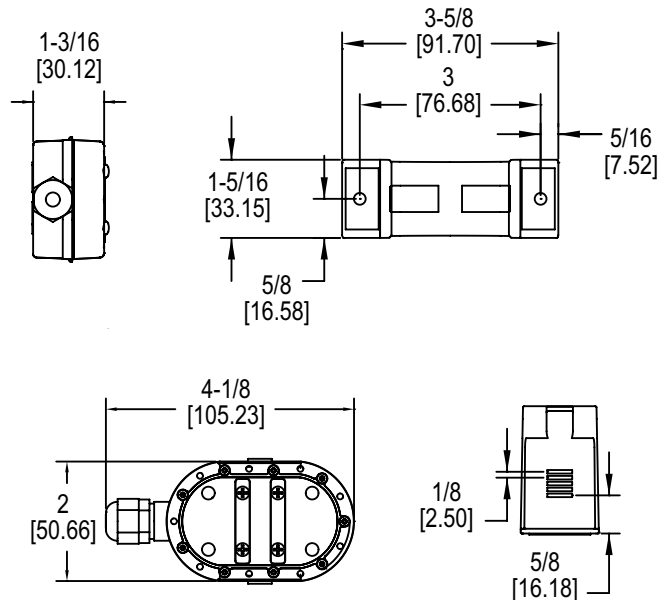
Electrical Specifications:

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

Technical Specifications:

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

Dimensions in inch [mm]:



Ordering Codes:

Order number	WD-03.	B.	MB
WD-03 Water Leak Detector			
Version /	B = battery powered with SPST relay DN = line powered with DPDT relay, 11. . .27 V AC/DC, no audible alarm DY = line powered with DPDT relay, 11. . .27 V AC/DC, with audible alarm		
Accessories /	0 = none MB= additional mounting bracket, one piece is included		



FC-01

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



Features

- / Easy to mount
- / Maintenance-free
- / No moving components
- / Adjustable sensitivity

Description:

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

Application:

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



Electrical Specifications:

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

Technical Specifications:

Measuring length /	100 mm
Ambient temperature /	-30...+85°C Fully synthetic: -10...+85°C
Storage temperature /	-40...+85°C Fully synthetic: -40...+85°C
Media temperature /	-30...+100°C Fully synthetic: -10...+100°C
Pressure /	-1...10bar
Media /	fluids, bulk goods, slurries, interfaces, foam
Process connection /	3/4" NPT [(conical), ANSI/ASME B1.20.1 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Connection material /	st. steel 1.4404 or PPS
Sensor material /	PPS (PVDF optional)
Housing material /	thermoplastic Polyester
Lid material /	thermoplastic polycarbonat (PC), transparent
Cable /	1 m, 4 x 0,5 mm ² shielded, polyester hood
Cable insertion /	1/2"-NPT (M20 x 1.5 on request)
Sealing /	FKM (optional FFKM)

Ordering Codes:

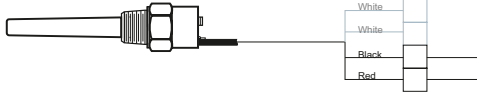
Order number	FC-01.	1.	1.	1.	0.	0.	0
FC-01 Limit Level Switch							
Process connection /							
1 = 3/4"-NPT thread							
2 = R 1"- thread (BSPT)							
3 = G 1"- thread (BSPP), not for fully synth. version							
Device version /							
1 = standard with cable cord (1 meter), process connection made of stainless steel							
2 = version with housing and clamp block, process connection made of stainless steel							
2 = fully synthetic version with housing and clamp block, process connection made of PPS							
Sensor material /							
1 = Ryton (PPS)							
2 = Kynar (PVDF), not for fully synthetic version							
Overfill protection /							
0 = none							
1 = with (as per German Federal Water act WHG)							
Approvals /							
0 = none							
1 = ATEX, II 1 GD 1/2GD EEx ia IIC T4...T6 T107°C, not for fully synthetic version							
Additional protection sleeve (FC-01.1 with 3/4"-NPT conn.) /							
0 = none							
1 = protection sleeve made of PPS with process connection 3/4"-NPT-male							
2 = protection sleeve made of PPS with process connection R1"-male							



Electrical Connection:

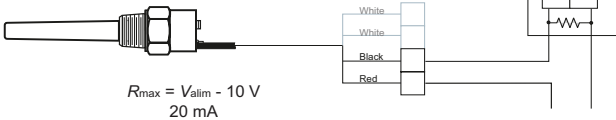
Cable Version (not intrinsically safe):

MIN / MAX alarm



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

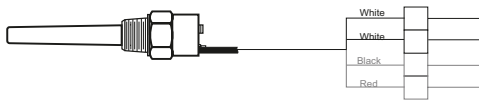
4/20 mA loop alarm



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

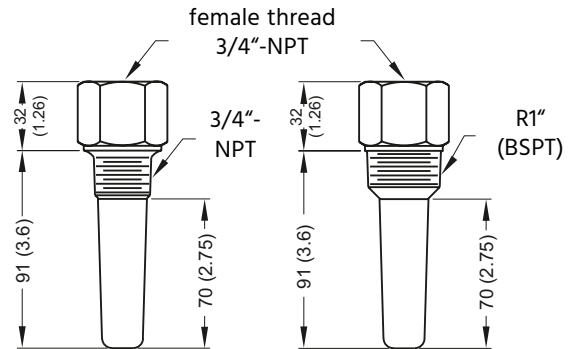
supply
DC 12...33 V

Solid state Switch

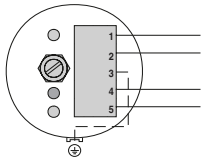


Transistor
DC 30 V / AC 30 V (peak)
82 mA max.
DC 12...33 VDC

Optionale separate prot. sleeve:



Housing and fully synthetic version



Terminal operations

- 1 mA current loop (+V or -V)
 - 2 mA current loop (+V or -V)
 - 3 ground
 - 4 solid state/relay
 - 5 solid state/relay
- solid state/relay normally open in unpowered state, relay just available for fully synthetic version

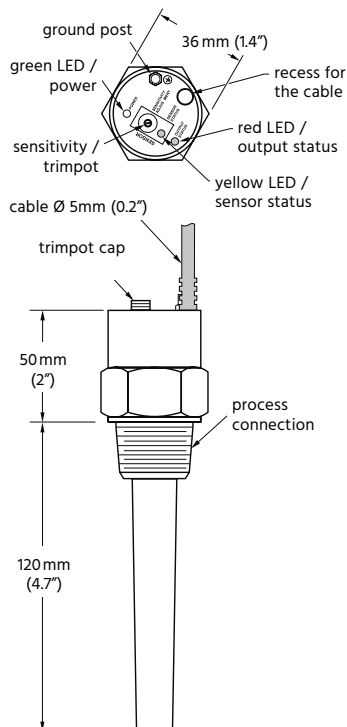
Cable equivalent

- red wire
- black wire
- cable shield
- white wire
- white wire

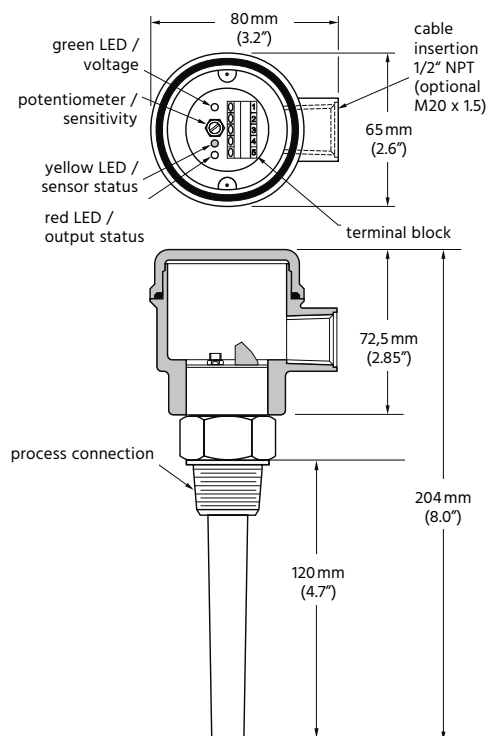
Note: use protection diode for inductive load!

Dimensions in mm:

Standard Version



Housing Version







FS-01

Float Switch

Features

- / Easy to assemble
- / Cost-effective
- / No response lag
- / Maintenance-free
- / Reliable
- / High switching load

Description:

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

Application:

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



Technical Specifications:

max. Pressure /	3.5 bar
max. Media temp. /	85°C
Float /	PP
Media density /	0.7..1.15 g/cm ³
Float weight /	200 g without cable
Adjustable weight /	250 g movable on cable
Switching angle /	± 25° to the horizontal line

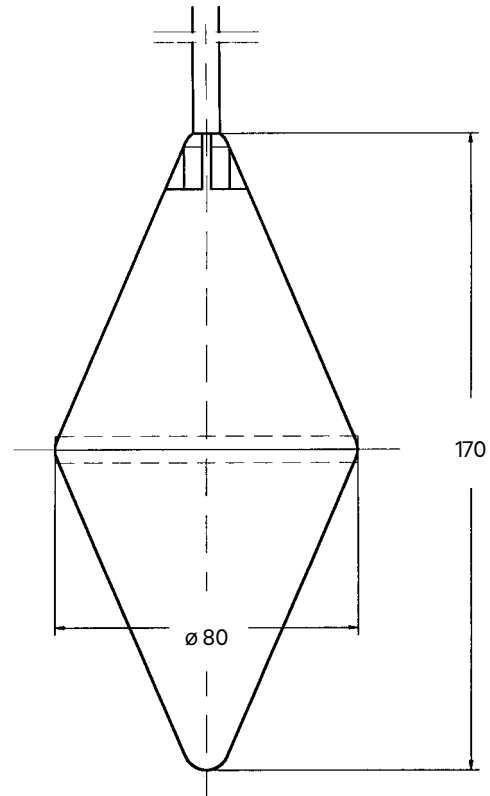
Electrical Specifications:

Contact /	micro-switch as change-over contact 12, 24, 48 VAC/VDC and 250 VAC - 50/60 Hz 16 A (resistive), 6 A (inductive)
Cable /	3 x 1 mm ² Neoprene or HR HY
Cable weight /	Neoprene 115 g/m, HR HY 110 g/m
Protection class /	IP 68

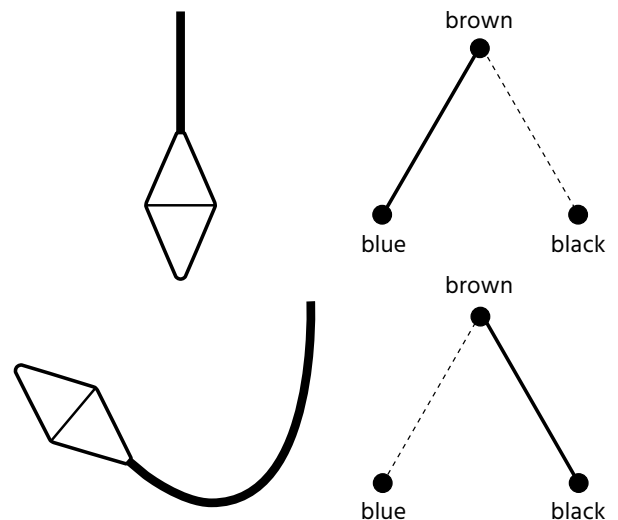
Ordering Codes:

Order number	FS-01.	1
FS-01 Float Switch		
Cable length /		
1 = 5 m cable		
2 = 10 m cable		
specific lengths on request		

Dimensions in mm:



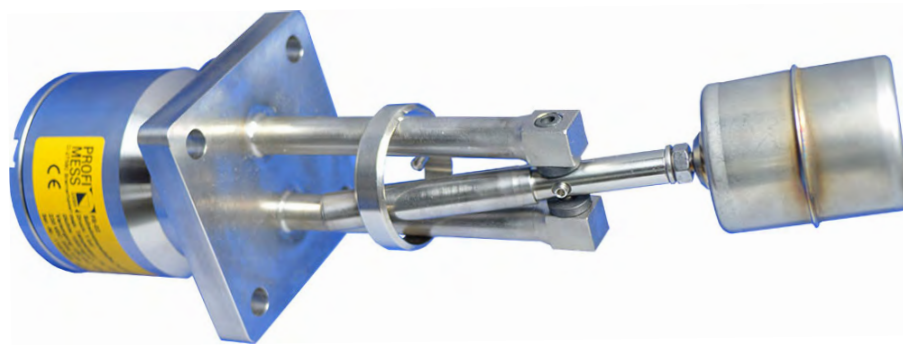
Electrical Connection:





FS-02

Float Switch for Horizontal Mounting



Features

- / Suitable in ship-building
- / Max. pressure to 232 bar
- / Robust
- / Stainless steel- and plastic version
- / DN50. . .DN100 flange
- / Pump and level control
- / Explosion proof version

Description:

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

Application:

The float switch FS-02 is used to monitor level limits and is designed for side installation on the tank. Various DIN- or ANSI- flange variants are available as process connections, as well as the square flange that is widely used on the market. The proven technology of this series has established itself in all areas of industry due to its extremely wide application limits with regard to pressure, temperature, media density and durability.

The switching technology via a magnetically controlled REED contact enables the device to be used in explosion-proof areas according to ATEX, insofar as the float switch is operated via an intrinsically safe isolating switching amplifier. The intended function of the FS-02 is not influenced by the conductivity of the medium, foaming, blistering or vibration.



Electrical Specifications:

Switching function /	Reed contact, alternatively normally open (NO), normally closed (NC) or change-over (SPDT) Ex version only change-over
Switching power /	FS-02.x: 230 VAC, 40 VA 1 A 230 VDC, 20 W 0,5 A
Switching power Ex /	FS-02.1: $U_{max} = 36V$, $I_{max} = 100$ mA Only for connection to a certified intrinsically safe circuit.
Electrical connection /	FS-02.1: connection housing, stainless st. 1.4571 FS-02.2: connection housing, Polypropylene
Protection class /	FS-02.1: IP 67 according to IEC/EN 60529 FS-02.2 IP 65 according to IEC/EN 60529

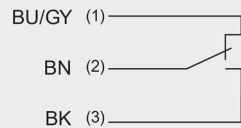
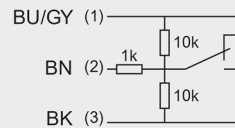
Technical Specifications:

Housing material /	FS-02.1: stainless steel 1.4571 (316Ti) FS-02.2: plastic PP (Polypropylen)
Max. Pressure /	FS-02.1: 232 bar FS-02.2: 6 bar
Temperature range /	FS-02.1: -50...+250 °C (standard version) Option: high-temperature version: +350 °C low-temperature version: -120 °C FS-02.1 Ex-version: -50...+180 °C depending on temperature range FS-02.2: -10...+80 °C
Min. density /	FS-02.1: 600 kg/m ³ FS-02.2: 750 kg/m ³
Mounting position /	horizontal
Certificate /	ATEX, DNV GL, ABS
Option /	FS-02.1 as an explosion-proof version - Ex i II 1/2G Ex ia IIC T6-T2 Ga/Gb II 2D Ex ia IIIC T80 °C Db

Electrical Connection:

Reed contact

1 switch point

1 switch point
Wiring for operation with a PLC1 switch point
NAMUR circuit per DIN EN 60947-5-6

Float Table:

Type	Cylinder	Ball	Oval	Floater for plastic version
Material	Stainless steele 1.4571	Titan 3.7035 Titan 3.7165	Stainless steele 1.4571	Polypropylen
Insertion length	190...990 mm	190...990 mm	240...990 mm	176 mm
Diameter	44 mm	52 mm	43 mm	44 mm
Length	52 mm	52 mm	100 mm	52 mm
Max. operating pressure	6 bar	Titan 3.7035: 100 bar Titan 3.7165: 232 bar	20 bar	4 bar
Min. density	600 kg/m ³	600 kg/m ³	500 kg/m ³	750 kg/m ³



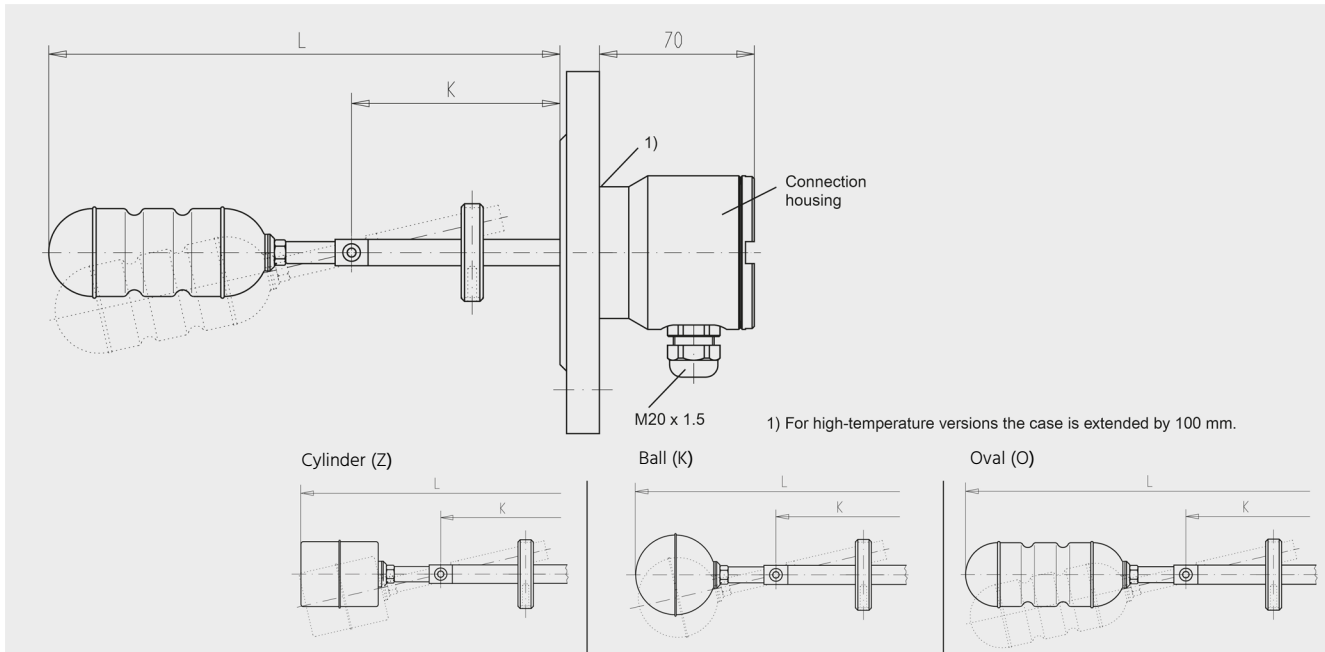
Ordering Codes:

Order number	FS-02.	1.	2.	1.	[50].	[6].	Z[300].	1.
FS-02 Float Switch								
Material /								
1 = stainless steel 1,4571								
2 = plastic PP								
Switching function /								
1 = normally open (NO), none Ex-version								
2 = normally closed (NC), none Ex-version								
3 = change over (SPDT)								
Process connection flange /								
1 = DIN								
2 = DIN EN								
3 = ANSI								
4 = square flange DN 80								
5 = square flange DN 92								
Nominal size [] /								
50 = DN 50								
65 = DN 65								
80 = DN 80								
100 = DN 100								
Pressure rating [] /								
6 = PN 6								
16 = PN 16								
40 = PN 40								
63 = PN 63								
100 = PN 100								
160 = PN 160								
Floater and insertion length [] /								
Z = cylinder (190..990 mm)*								
K = ball GL (190..990 mm)*								
O = oval (240..990 mm)*								
* Please specify in plain text e.g. K[600]								
Approvals (multiple choices possible) /								
0 = without								
1 = EAC (FS-02.1 or FS-02.2)								
2 = DNV GL (only FS-02.1)								
3 = ABS (only FS-02.1)								
4 = ATEX (only FS-02.1)								

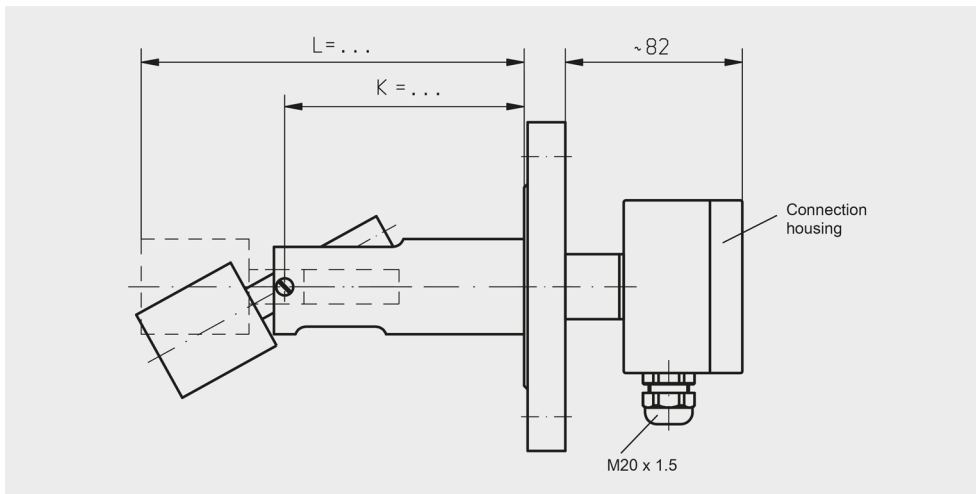


Dimensions:

Stainless steel version FS-02.1:



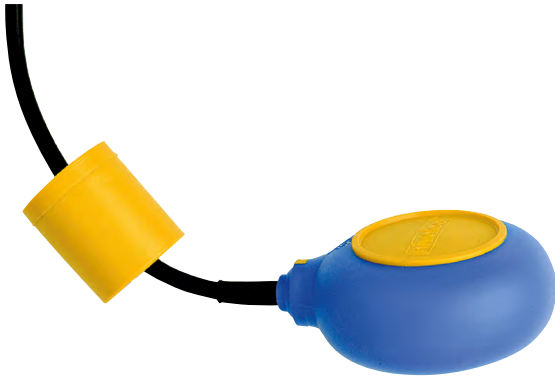
Plastic version FS-02.2:





FS-03

Float Switch



Features

/ Low-cost design

/ 2 chamber system

/ Compatible with drinking-water

/ Mercury-free

Description:

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

Application:

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



Versions:

FS-03 Float Switch

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

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

Electrical Specifications:

Contact /	change-over, 10A ohmic (4A inductive) for 250VAC
Life span /	min. 10 million switching operations
Protection class /	IP 68
Electrical connection /	cable diameter 9 mm, 3-wire with a cross-section of 1 mm ²

Technical Specifications:

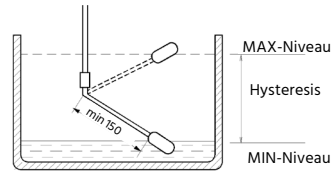
Float material /	polypropylene
Float volume /	430 cm ³
Float diameter /	106 mm
Float weight /	250 g without cable
Counterweight /	polystyrene
Media density /	at least 0,8 g/cm ³
Media temperature /	0 bis +50°C
Pressure /	max. 1 bar
Switching angle /	± 45° to the horizontal line

Ordering Codes:

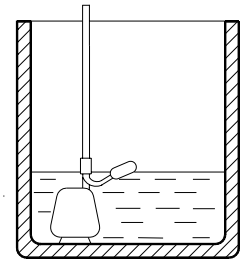
Order number	FS-03.	P.	10.	1
FS-03 Float Switch				
Cable material / P = PVC N = Neopren				
Cable length / 05 = 5 m 10 = 10 m 20 = 20 m				
Counterweight / 0 = without counterweight 1 = with counterweight				

Functionality:

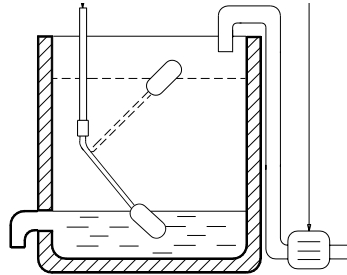
Pump control



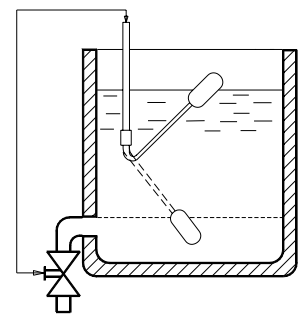
Dry-run protection



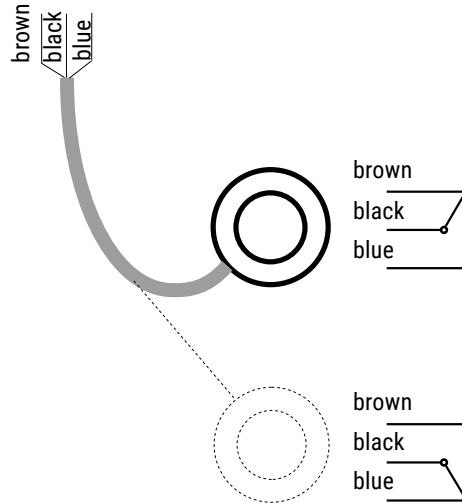
MIN-Alarm



Overfill protection



Electrical Specifications:





FS-05

Float Switch for Mounting through 1" Bushings

Description:

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

Application:

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

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

Features

/ High pressure resistance

/ Cost-effective

/ High switching load

/ Neoprene cable

/ Opt. available with counter weight



Electrical Specifications:

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

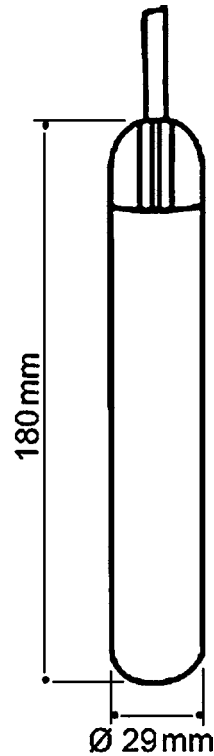
Technical Specifications:

Function /	omni-directional float switch
Measuring medium /	fluid media
Density range /	0.75. . 1.5 g/cm ³
max. Pressure /	5.5 bar
max. Media temperature /	85°C
Float material /	copolymer polypropylen
Cable material /	neoprene
Weight without cable /	60 g
Cable weight /	55 g per meter
Adjustable weight /	175g (optional)
Standard cable lengths /	5 m and 10 m (other lengths on request)
Switching angle /	± 20°

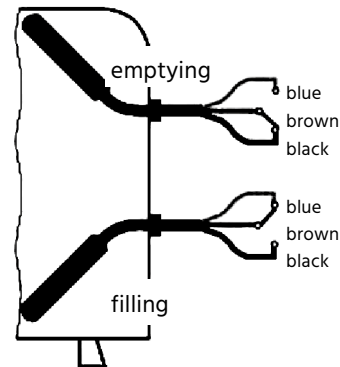
Ordering Codes:

Order number	FS-05.	05.	0
FS-05 Float Switch			
Cable length /			
05 = 5 m neoprene-cable			
10 = 10 m neoprene-cable			
Adjustable weight /			
0 = none			
1 = with adjustable weight			

Dimensions in mm:



Electrical Connections:





FS-08

Suspended Float Switch with Internal Weight



Features

- / Cost-effective
- / Easy to assemble
- / No response delay
- / Maintenance-free
- / Reliable
- / Media temperatures up to 70°C
- / Small switching hysteresis
- / High switching capacity

Description:

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

Application:

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



Electrical Specifications:

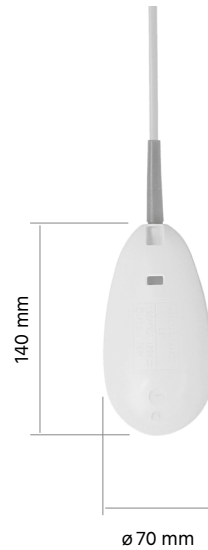
Switching element /	microswitch as changeover contact
Switching power /	
FS-08.1.x:	12, 24, 48 VAC / VDC and 250 VAC - 50/60 Hz 16 A (ohmic), 6 A (inductive)
FS-08.2.x:	250 VAC / VDC - 50/60 Hz 10 A (ohmic), 4 A (inductive)
Cable /	3 x 0.75 mm ² , PVC
Contacts /	silver / nickel
Protection class /	IP68

Technical Specifications:

Size /	
FS-08.1.x (small):	height 140 mm, Ø 70 mm
FS-08.2.x (large):	height 165 mm, Ø 100 mm
Function /	omni-directional float switch
Measuring medium /	fluid media
Media density /	0.95 to 1.05 g/cm ³
max. Pressure /	
FS-08.1.x:	3.5 bar
FS-08.2.x:	2.0 bar
max. Media temp. /	+70°C
Float material /	polypropylen
Cable material /	PVC
Weight without cable /	
FS-08.1.x:	400 g
FS-08.2.x:	775 g
Cable weight /	65 g per meter
Counterweight /	internal
Switching angle /	app. 10° from the vertical line

Dimensions in mm:

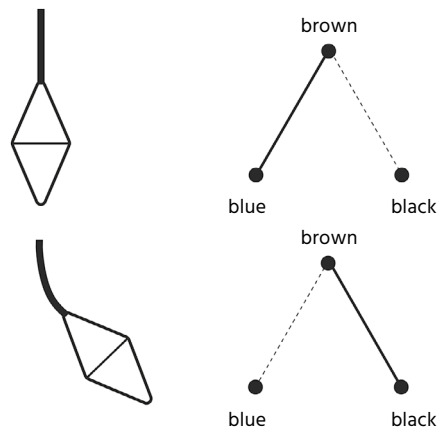
FS-08.1.x



FS-08.2.x



Electrical Connections:



Ordering Codes:

Order number	FS-08.	1.	06
FS-08 Float Switch			
Size /			
1 = small - 140 mm x 70 mm (height x diameter)			
2 = large - 165 mm x 100 mm (height x diameter)			
Cable length /			
06 = 6 m cable			
10 = 10 m cable			
□□ = other lengths			



FS-16

PTFE Float Switch for Side Mounting

Features

- / High chemical resistance
- / Media temperature up to 150°C
- / High switching load
- / Easy to assemble
- / Reliable
- / Mercury free
- / Rod versions

Description:

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

Application:

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

Contact protection relais:

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

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



Version:

FS-16 PTFE Float Switch for Side Mounting

FS-16.1.x.x - PTFE Float Switch - with bellows

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

Technical Specifications:

Process connection /

FS-16.1.x.x: G 1/2" - male thread

FS-16.2.x.x: cable outlet

Float size /

Ø 55 mm, height 130 mm

Function /

omni-directional float switch

Measuring medium /

fluid media

Media density /

 $\rho \geq 0.75 \text{ g/cm}^3$

max. Pressure /

1 bar

max. Operating temp. /

+ 150°C

Float material /

PTFE (Teflon®)

Cable material /

SIL (silicone), FEP (Teflon®)

Cable length /

2000 mm (basic length)

Switching angle /

± 20° from the horizontal line

Switching hysteresis /

approx. 100 mm

Electrical Specifications:

Switching element /

reed contact

Contact /

change-over

Switching voltage /

24 .. 250 V AC/DC

Switching current /

1 mA .. 1 A

Switching power /

max. 1 A, 60 VA / 60 W

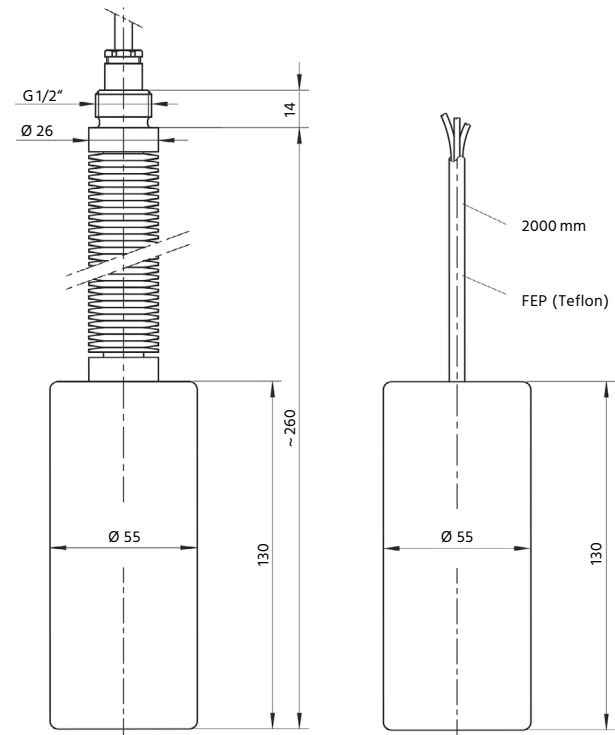
Protection class /

IP68

Option /

Namur-switching: 1 kΩ / 12 kΩ (for connection at „Namur“ relays only)

Dimensions in mm:



Ordering Codes:

Order number	FS-16.	1.	02.	1.	0
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FS-16 PTFE Float Switch for Side Mounting

Version /

1 = with bellows

2 = without bellows

Cable length /

02 = 2 m cable

[] [] = other lengths

Cable material /

1 = FEP

2 = SIL (for versions with bellows only)

Options (multiple selection such as /1/99 possible) /

0 = none

1 = NAMUR switching (1 kΩ / 12 kΩ)

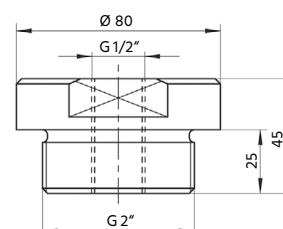
2 = PTFE cable gland, G 2", for version with bellows

3 = PTFE cable gland, G 2", for version without bellows

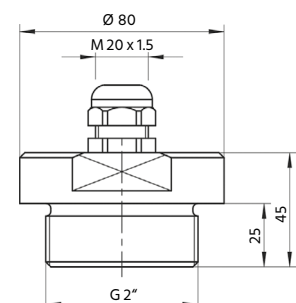
99 = Special (please specify in detailed text)

Accessories: 2" PTFE cable gland:

for FS-16.1



for FS-16.2





Version:

FS-16S PTFE Float Switch Rod Version

Technical Specifications:

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

Ordering Codes:

Order number	FS-16S.	1.	□.	□□□□.	0
FS-16S PTFE Float Switch Rod Ver.					
Float Type /					
1 = with bellows					
Number of floats /					
[] = 1..3					
Rod length L /					
[] [] [] [] = in mm (max. 3000 mm, meas. from the bttm. edge of the flange)					
Optionen (multiple selection such as /1/99 possible) /					
0 = none					
1 = NAMUR switch (1 kΩ / 12 kΩ)					
99 = Special (please specify in detailed text)					

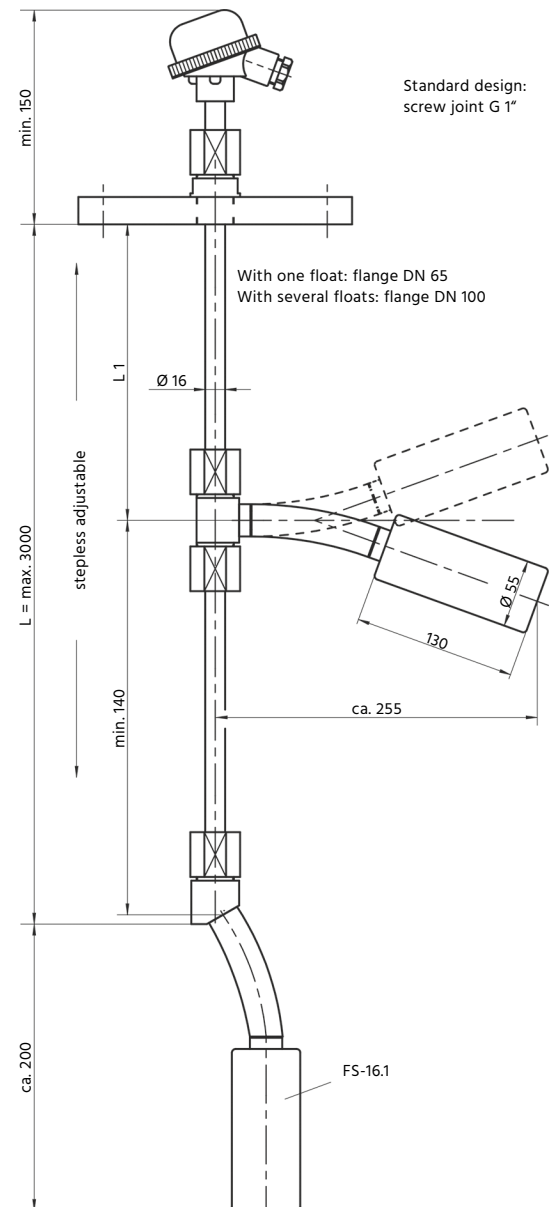
Other specifications:

- Position of the 1st float: L1 = xxxx mm
 - Position of the x. float: Lx = xxxx mm
- (All length specifications are measured from the bottom edge of the flange)

Electrical Specifications:

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

Dimensions in mm:







FS-17

Stainless Steel Float Switch for Side Mounting



Features

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

Description:

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

Application:

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

Contact protection relays:

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

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



Versions:

FS-17 Stainless Steel Float Switch for Side Mounting

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

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

Technical Specifications:

Process connection /	R 1/2"-male thread
Float size /	
FS-17.1.x.x:	Ø 132 mm
FS-17.2.x.x:	Ø 80 mm, height 180 mm
Function /	omni-directional float switch
Measuring medium /	fluid media
Media density /	$\rho \geq 0.8 \text{ g/cm}^3$
max. Pressure /	
FS-17.1.x.x:	15 bar
FS-17.2.x.x:	6 bar
max. Operating temp. /	+ 150°C
Float material /	stainless steel 1.4571
Hose material /	stainless steel corrugated hose (1.4404) with st. steel wire braid (1.4301)
Cable material /	silicone (non-wetted part)
Cable length /	2000mm (basic length), 270mm of which with a st. steel 1.4404 corrugated hose
Switching angle /	$\pm 20^\circ$ from the horizontal line
Switching hysteresis /	approx. 100 mm

Ordering Codes:

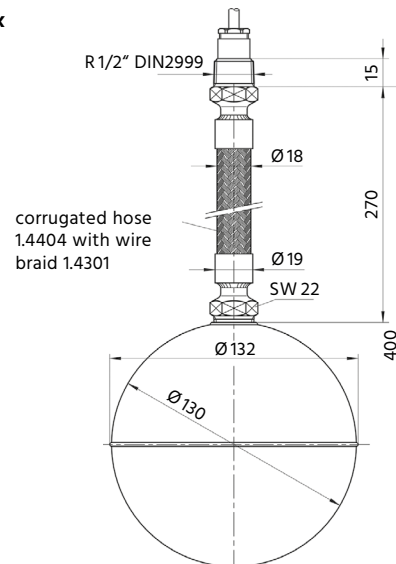
Order number	FS-17.	1.	02.	0
FS-17 Stainless Steel Float Switch for Side Mounting				
Float type /				
1 = spherical shape				
2 = cylindrical shape				
Cable length /				
02 = 2 m cable				
[] [] = other lengths				
Options (multiple selection such as /1/99 possible) /				
0 = none				
1 = NAMUR switching (1 k Ω / 12 k Ω)				
2 = PTFE-gland, G 2", for version with bellows				
3 = PTFE-gland, G 2", for version without bellows				
99 = special (please specify in detailed text)				

Electrical Specifications:

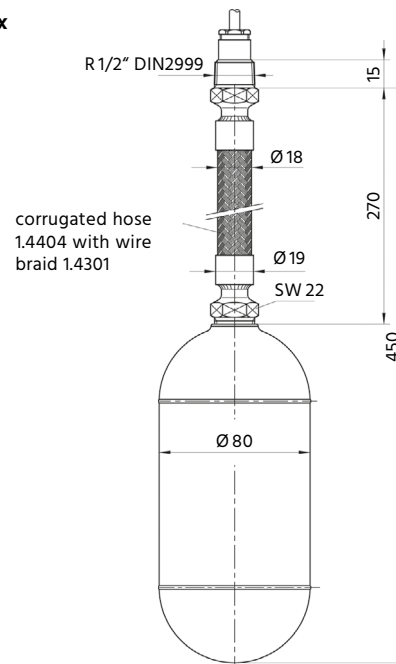
Switching element /	reed contact
Contact /	change-over
Switching voltage /	24 . . 250 V AC/DC
Switching current /	1 mA . . 1 A
Switching power /	max. 1 A, 60 VA / 60 W
Protection class /	IP68
Option /	
Namur switching:	1 k Ω / 12 k Ω (for connection at „Namur“ relays only)

Dimensions in mm:

FS-17.1.x.x



FS-17.2.x.x





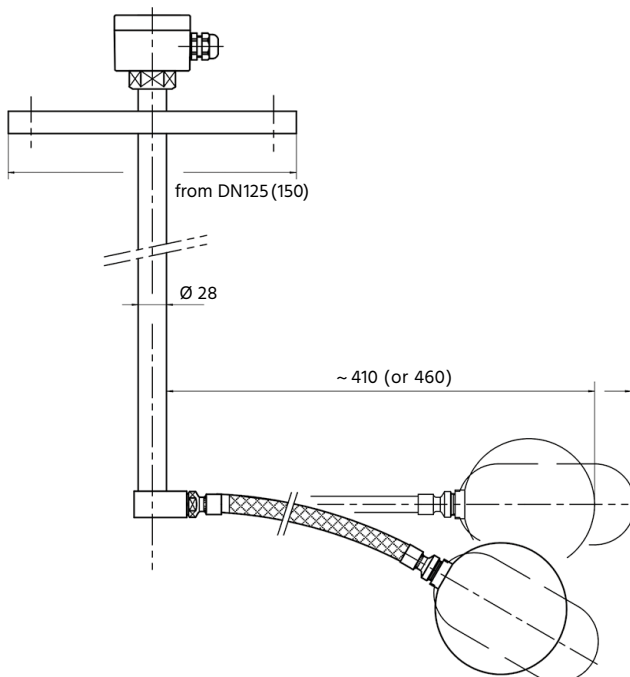
Versions:

FS-17S Float Switch - Rod Version

Electrical Specifications:

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

Dimensions in mm:



Technical Specifications:

Process connection /	flange from DN 150 (FS-17.1) flange from DN 125 (FS-17.2)
Float /	spherical- or cylindrical shape
Float size /	
sphere (FS-17.1):	Ø 132 mm
cylinder (FS-17.2):	Ø 80 mm, height 180 mm
max. Number of floats /	max. 5
Function /	omni-directional float switch
Rod length /	max. 5000 mm
Measuring medium /	fluid media
Media density /	$\rho \geq 0.8 \text{ g/cm}^3$
max. Operating temp. /	+ 150°C
max. Pressure /	
sphere (FS-17.1):	15 bar
cylinder (FS-17.2):	6 bar
Float material /	stainless steel 1.4571
Hose material /	stainless steel corrugated hose (1.4404) with st. steel wire braid (1.4301)
Rod material /	stainless steel
Switching angle /	$\pm 20^\circ$ from the horizontal line
Switching hysteresis /	ca. 100 mm

Ordering Codes:

Order number	FS-17S.	1.	[].	[] [] [] [].	0
FS-17S St. Steel Float Switch with Rod					
Float type /					
1 = spherical shape					
2 = cylindrical shape					
Number of floats /					
[] = 1..5					
Rod length L /					
[] [] [] [] = in mm (max. 5000 mm, from the bottom edge of the flange)					
Options (multiple selection such as / 1/ 99 possible) /					
0 = none					
1 = NAMUR switching (1 k Ω / 12 k Ω)					
99 = special (please specify in detailed text)					

Other specifications:

- position of the 1st float: L1 = xxxx mm
 - position of the x. float: Lx = xxxx mm
- (All length specifications are measured from the bottom edge of the flange)





FS-10

Float Switch for Bulk Solids

Description:

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

Features

/ ATEX approval for dust and gases in zones 0 and 20

/ Double-shell housing with HR HY (Hypalon) coating

/ High switching capacity due to microswitches

/ Neopren or HR HY (Hypalon) cables

/ Optionally available with counter weights

Application:

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



Electrical Specifications:

Switching element /	microswitch as changeover contact
Electrical conn. /	cable 3 x 1 mm ²
Protection class /	IP68
Switching power /	<p>non-Ex version FS-10.xx.0: 20 (8) A ohmic (inductive) at max. 250 V AC, 50/60 Hz</p> <p>dust EX version FS-10.xx.1: 1 A at max. 240 V AC, 50/60 Hz, must be operated with 1A/240 V fuse</p> <p>gas- & dust EX version FS-10xx.2: max. 24 V AC/DC with max. 10 mA or 12 V AC/DC with max. 100 mA, must be operated with intrinsically safe isolated switching amplifier, U_o ≤ 30 V, I_o ≤ 100 mA, P_o ≤ 0.75 W, L_i ≤ 2 μHenry, C_i ≤ 203 pF at 2 m cable (additionally 0.36 mH per kilometer cable)</p>
Contacts /	<p>non-Ex version FS-10.xx.0: Ag/ Cd oxide</p> <p>dust EX version FS-10.xx.1: Ag</p> <p>Gas- & dust EX version FS-10.xx.2: gold-plated</p>
Ignition protection class /	<p>dust EX version FS-10.xx.1: ATEXEx ta IIIC T70°C Da IP68</p> <p>gas- & dust EX version FS-10.xx.2: ATEX II 1 GD Ex ia IIC T6 Ga Ex ta IIIC T70°C Da IP68</p>

Technical Specifications:

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

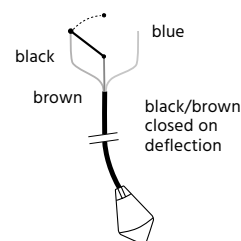
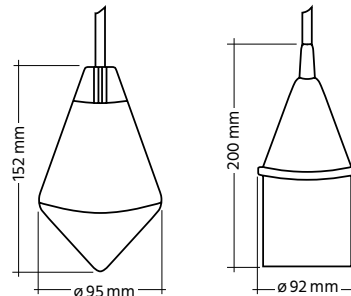
Ordering Codes:

Order number	FS-10.	10.	1.	1
FS-10 Floating Switch				
Cable length /	<p>05 = 5 m cable 10 = 10 m cable □□ = other lengths</p>			
Ignition protection class /	<p>0 = none 1 = dust EX Zone 20, 21 oder 22 2 = dust EX and gas EX Zone 20, 21, 22 and Zone 0, 1, 2</p>			
Load weight /	<p>0 = none 1 = with load weight</p>			

Dimensions in mm:

FS-10.xx.0

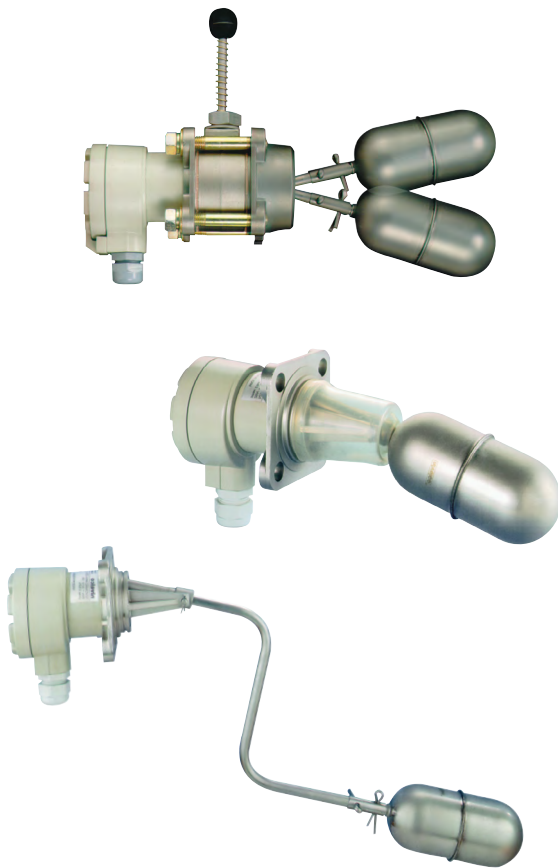
FS-10.xx.(1 & 2)





FS-04

Float Switch for Horizontal or Vertical Mounting



Features

/ Suitable in ship-building

/ Cost-effective

/ Robust

/ Square flange or thread connection

/ DN80 to DN150 flange

/ Fixed and adjustable hysteresis

/ Explosion proof version

/ SIL 1

Description:

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

Application:

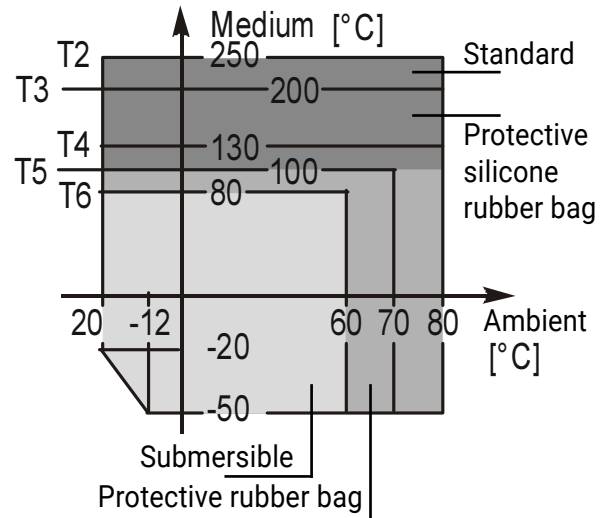
The FS-04 series of magnetic float switches is used for limit value switching in fluids. The switches are passive components and operate without any auxiliary power source. Thanks to the wide range of operating temperatures and pressure, including various mounting positions on top, on the side, under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



Technical Specifications:

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

Temperature diagramm:



Float Table:

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

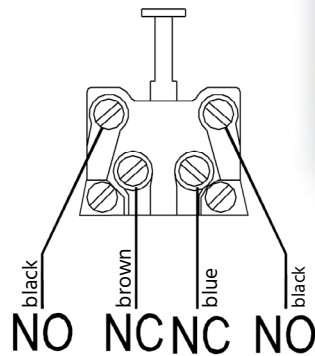


Electrical Specifications:

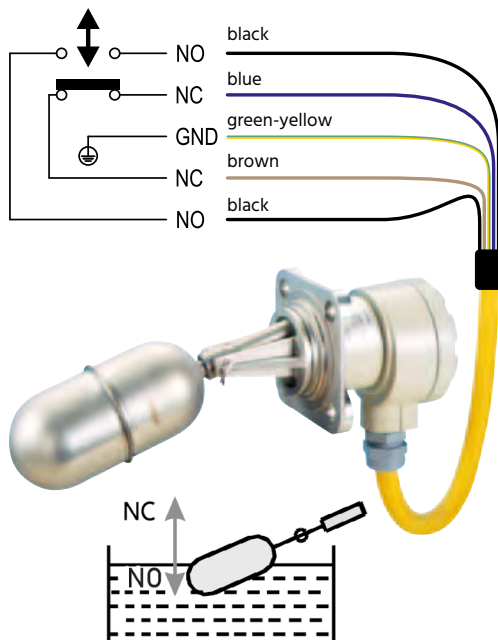
Switching element /	1 micro-switch with two switching contacts (NO and NC)
Switching load norm. /	250V AC12 10A, 220V DC13 0.6A
Switching load Ex /	250V AC12 2.5A, 220V DC13 0.3A
El. connection /	M20 x 1.5, in under water version molded cable with a cross-section of 5 x 1,5 mm ² (please specify cable length while ordering)
Protection class /	IP 65 except for the under water version IP 68 to 20 meter water column

Electrical Connection:

Standard-Version:



Submersible version:



Ordering Codes:

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

FS-04 Float Switch

Mounting position /

- 1 = horizontal
- 2 = vertical

Version /

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

Hysteresis /

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

Process connection /

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

Rod length in [mm] /

- 1 = 0 mm
- 2 = 100 mm
- 3 = 200 mm
- 4 = 300 mm
- 5 = Z-shaped (not for adjustable hysteresis)
- 6 = L-shaped (not for adjustable hysteresis)

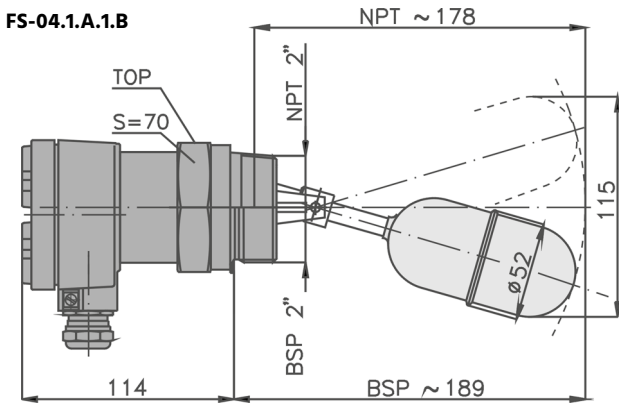
Counter flange /

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

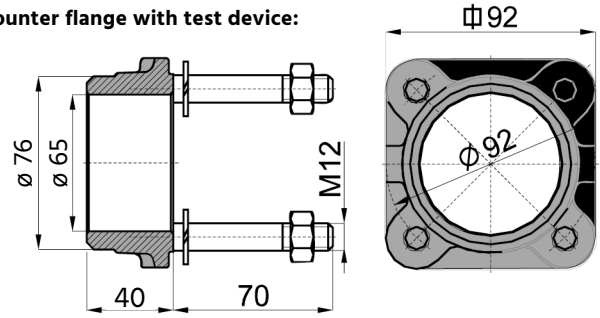
* please specify the desired cable length while ordering!



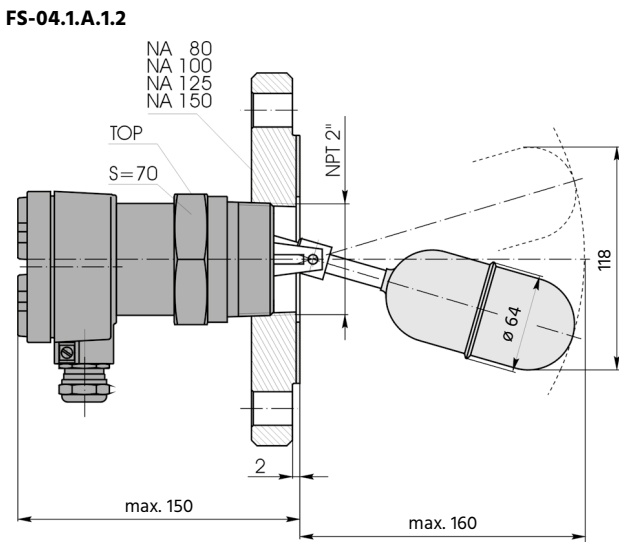
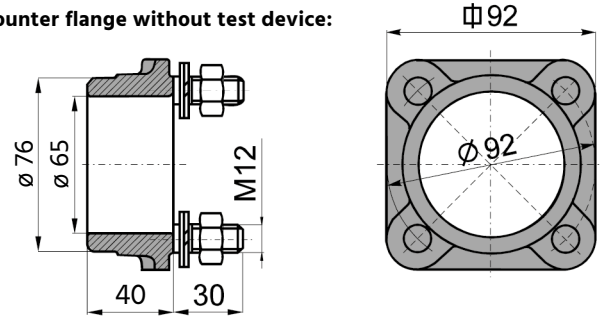
Dimensions in mm:



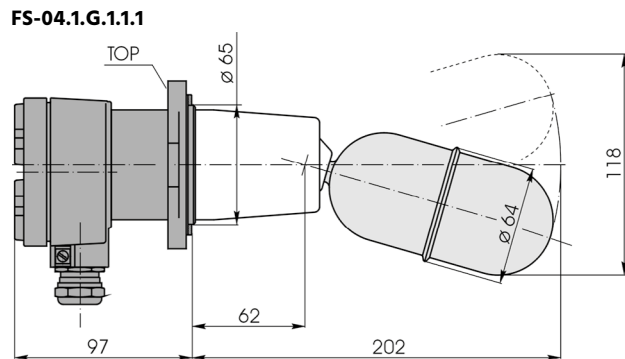
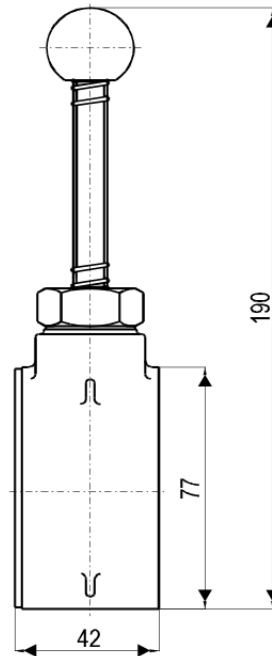
Counter flange with test device:



Counter flange without test device:

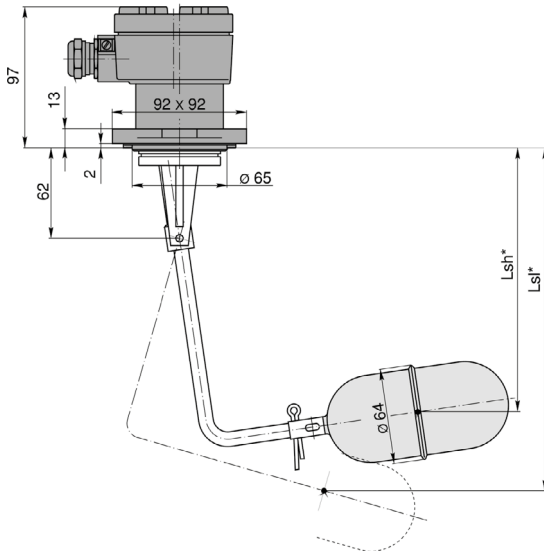


Test device:

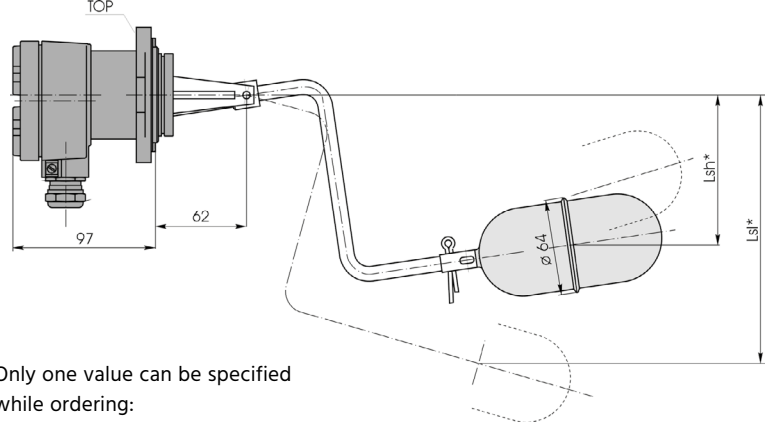




FS-04.2.A.1.1.6



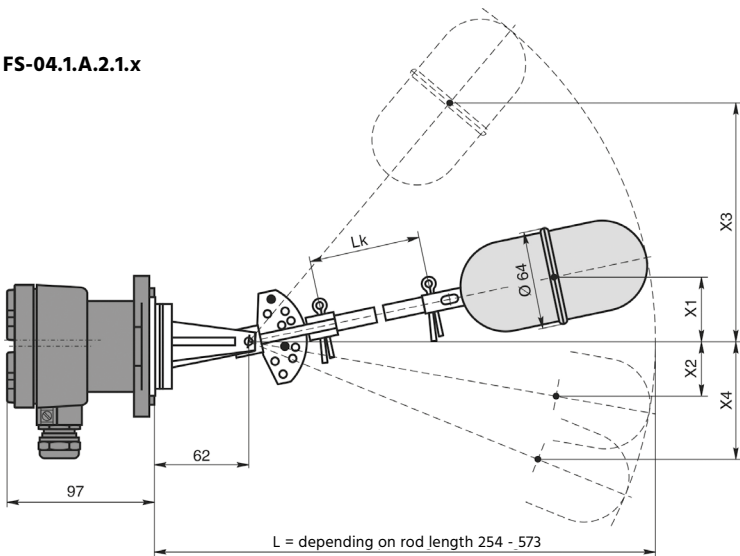
FS-04.1.A.1.1.5



Only one value can be specified while ordering:

L_{sh} = upper switching point
 L_{sl} = lower switching point

FS-04.1.A.2.1.x

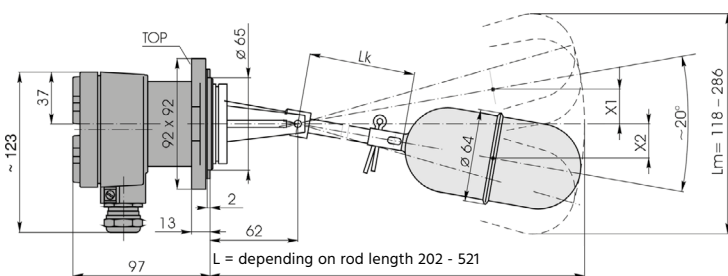


FS-04.x.x.2.x.x

Data refers to water 20°C; Tolerance: +/- 5mm

Lk = rod length [mm]	0	100	200	300
L = mounting length [mm]	254	373	473	573
x1 = min. upper switching dist. [mm]	28	55	78	100
x2 = min. lower switching dist. [mm]	28	55	78	100
x3 = max. upper switching dist. [mm]	100	193	270	350
x4 = max. lower switching dist. [mm]	100	193	270	350

FS-04.1.A.1.1.x



FS-04.x.x.1.x.x

Data refers to water 20°C; Tolerance: +/- 5mm

Lk = rod length [mm]	0	100	200	300
L = mounting length [mm]	202	321	421	521
Lm = total deflection [mm]	118	180	234	286
x1 = switching point top [mm]	12	30	46	62
x2 = switching point bottom [mm]	12	30	46	62





LS-10N

Float Switch for Level Detection

Description:

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

Application:

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

Features

/ Up to 15 m insertion length

/ Up to 150 bar and 250°C

/ Top, bottom or lateral mounting

/ Contacts available as NC-contact,

NO-contact or change-over contact

/ High repeatability of set points

/ Optionally with temperature sensor

/ Customized designs

/ Stainless steel (ECTFE or PFA coated),

Titanium, Alloy C, Brass,

PVC, PP, PA, PVDF



Ordering Codes:

Order number	LS-10N.	[] [] [] [] [] . [] [] [] [] [] .	S.	S.	LNO [] .LNO [] ...	0.	0.	S.	S.	S.	0.	0
LS-10N Float Switch												
Version / [] [] [] [] (e.g. VAG2G)												
Ins. length (L)* or center dist. for lateral connections (M) in mm / [] [] [] [] (*measured from the sealing edge of relevant connection joint)												
Electrical connection / S = acc. to variant standard K = connection cable; specify cable length and material in detailed text E = aluminium terminal box flat F = aluminium terminal box high DA = aluminium terminal box, flameproof enclosure for Ex d VA = stainless steel terminal box, flameproof enclosure for Ex d PA = polyester terminal box BA = ABS terminal box S1A (B) = connector M12, 3-pole (B = connector M12, 8-pole) S2A = plug Hirschmann DIN 43650 S3A (B) = plastic plug HTS straight (B = aluminium plug HTS straight) S4A (B) = plastic plug HTS angulate (B = aluminium plug HTS angulate)												
Float type / S = acc. to variant standard [] [] [] [] = special float type as per table spherical or cylindrical float (table 1 or 2)												
Level switching contact [position in mm from the sealing edge of relevant connection joint] / LNO [] = NO-contact [] increasing level LNC [] = NC-contact [] increasing level LUS [] = change-over-contact [] increasing level Example: LNO [100] LNC [580] = 2 contacts in engaging sequence from the sealing edge of relevant connection joint Contact No. 1 = NO-contact, position in 100 mm from the sealing edge of relevant connection joint Contact No. 2 = NC-contact, position in 580 mm from the sealing edge of relevant connection joint												
Temperature switching contact [temperature setpoint in °C] / 0 = none TNO [] = NO-contact [] increasing temperature TNC [] = NC-contact [] increasing temperature Example: TNO [90] = NO-contact, setpoint at +90°C												
Temperature sensor / 0 = none A = with built-in resistor Pt100, 3-wire B = with built-in resistor Pt1000, 3-wire 9 = special (please specify in detailed text)												
Material sliding tube and process connection / S = acc. to variant standard 9 = special (please specify in detailed text)												
Sliding tube diameter / S = acc. to variant standard 9 = special (please specify in detailed text)												
Process connection / S = acc. to variant standard 9 = special (please specify in detailed text)												
Approvals / 0 = none 1 = with approval (please specify in detailed text e.g. Ex i, Ex d, WHG, GOST, PED, GL, BV, ABS)												
Options (multiple selections possible e.g. B/D) / 0 = none A = counter plug M12x1 for electrical connection S1A or S1B B = contact function - protective circuit with 22 Ω / 0.21 W resistor C = contact function - protective circuit according to NAMUR EN 60947 D = contact function - high temperature 180°C to 250°C 9 = special (please specify in detailed text)												

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



Versions:

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

- sliding tube
- float
- process connection

Sliding tube:

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

For example:

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

Float:

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

Process connection:

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

Switching contacts level:

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

Reed contact values - Sliding tube < 12 mm

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

Reed contact values - Sliding tube ≥ 12 mm

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

Switching Contact Temp.:

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

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

Temperature Sensors:

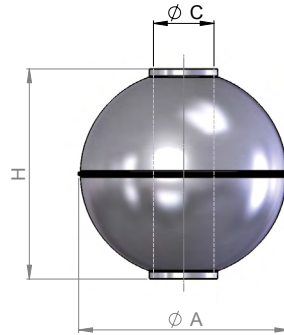
In the sliding tube of the LS-10N an additional temperature sensor can be installed as a Pt100 or Pt1000. The measuring resistors meet the following specifications:

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

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



Table 1: Spherical Float - Dimensions

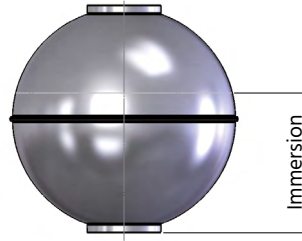


* = Design temperature 200°C, higher temperatures after calculating
 ** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Mass
		(mm)	(mm)	(mm)	(kg/m ³)	(bar)	(°C)	(mm)	(mm)	(mm)	(g)
K29S9.4E	St. Steel	29	28	9.4	900	-1...+35	-156...+200	35	30	45	7
K42S9.4E	St. Steel	42	42	9.4	650	-1...+15	-156...+200	45	40	60	19
K52S15E1	St. Steel	52	52	15	680	-1...+30*	-156...+250	55	45	70	35
K52S15E2	St. Steel	52	52	15	750	-1...+50*	-156...+250	55	45	70	40
K62S15E	St. Steel	62	62	15	630	-1...+25*	-156...+250	60	50	80	60
K72S15E	St. Steel	72	71.5	15	530	-1...+25*	-156...+250	65	50	90	83
K82S15E	St. Steel	82	81	15	400	-1...+25*	-156...+250	70	55	100	88
K72S24.4E	St. Steel	72	70	24.4	620	-1...+25*	-156...+250	60	60	90	86
K80S23E1	St. Steel	80	75	23	630	-1...+25*	-156...+250	70	60	95	114
K80S23E2	St. Steel	80	73	23	750	-1...+40*	-156...+250	50	55	100	145
K98S23E	St. Steel	98	96	23	570	-1...+25*	-156...+250	80	70	115	222
K29S9.4T	Titan	29	28	9.4	700	-1...+15	-10...+150	35	30	45	6
K44S12T	Titan	44	44	12	780	-1...+100*	-10...+250	50	40	60	25
K52S14T	Titan	52	52	14	650	-1...+24	-10...+150	55	45	70	35
K52S15T	Titan	52	52	15	780	-1...+150*	-10...+250	55	45	70	42
K62S14T	Titan	62	62	14	450	-1...+25	-10...+150	60	50	80	41
K82S14T	Titan	82	80	14	500	-1...+16	-10...+150	70	55	100	108
K80S24T	Titan	80	76	24	600	-1...+16	-10...+150	70	60	95	103
K52S15A	Alloy C	52	52	15	1260	-1...+55*	-196...+250	55	45	70	68
K62S15A	Alloy C	62	62	15	700	-1...+25*	-196...+250	60	50	80	65
K82S15A	Alloy C	82	81	15	500	-1...+16*	-196...+250	70	55	100	95
K72S24.4A	Alloy C	72	70	24.4	830	-1...+25*	-196...+250	60	60	90	116
K80S23A	Alloy C	80	75	23	730	-1...+18*	-196...+250	70	60	95	125
K98S23A	Alloy C	98	96	23	550	-1...+16*	-196...+250	80	70	115	208
K53S14EC1	ECTFE coat.	53	53	14	900	-1...+40	-78...+150	70	70	80	49
K53S14EC2**	ECTFE coat.	53	53	14	900	-1...+40	-78...+150	70	70	80	49
K73S23EC1	ECTFE coat.	73	71	23	750	-1...+25	-78...+150	70	70	105	105
K73S23EC2**	ECTFE coat.	73	71	23	750	-1...+25	-78...+150	70	70	105	105
K53S14PF1	PFA coat.	53	53	14	950	-1...+40*	-100...+250	70	70	80	52
K53S14PF2**	PFA coat.	53	53	14	950	-1...+40*	-100...+250	70	70	80	52
K73S23PF1	PFA coat.	73	71	23	800	-1...+25*	-100...+250	70	70	105	110
K73S23PF2**	PFA coat.	73	71	23	800	-1...+25*	-100...+250	70	70	105	110



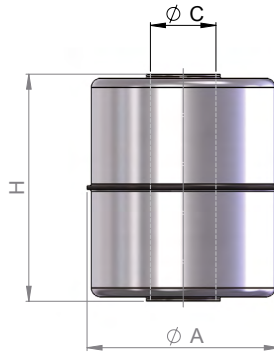
Spherical Float Immersion depth



Type	Specific weight of the medium (kg/m ³)											
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
	Immersion depth (mm)											
K29S9.4E						20.3	18.5	17.2	16.2	15.3	14.6	14.0
K42S9.4E				31.1	27.4	25.0	23.1	21.6	20.4	19.4	18.5	17.7
K52S15E1				38.6	34.1	31.1	28.8	27.0	25.5	24.2	23.1	22.2
K52S15E2					38.6	34.5	31.7	29.6	27.8	26.4	25.1	24.1
K62S15E				40.8	36.7	33.7	31.4	29.2	27.9	26.6	25.4	24.4
K72S15E			51.1	44.8	40.5	37.3	34.8	32.8	31.0	29.6	28.3	27.2
K82S15E	61.3	50.3	44.1	39.7	36.5	33.9	31.8	30.1	28.6	27.3	26.2	25.2
K72S24.4E				50.5	45.2	41.4	38.6	36.2	34.3	32.7	31.3	30.1
K80S23E1				56.2	49.9	45.6	42.3	39.7	37.5	35.7	34.1	32.8
K80S23E2					54.5	49.7	46.0	43.1	40.7	38.7	37.0	35.5
K98S23E			75.8	65.2	58.6	53.8	50.1	47.1	44.5	42.4	40.5	38.9
K29S9.4T				21.9	19.3	17.5	16.3	15.2	14.4	13.7	13.1	12.6
K44S12T					34.0	30.0	27.5	25.6	24.0	22.7	21.7	20.7
K52S14T				39.1	34.4	31.3	29.0	27.1	25.6	24.3	23.3	22.3
K52S15T					40.9	36.1	33.0	30.6	28.8	27.2	25.9	24.8
K62S14T		41.9	36.2	32.5	29.7	27.6	25.9	24.5	23.2	22.2	21.3	20.5
K82S14T		60.1	51.2	45.7	41.7	38.6	36.1	34.0	32.3	30.8	29.5	28.3
K80S24T			60.4	51.8	46.6	42.8	39.9	37.5	35.6	33.9	32.4	31.2
K52S15A										40.7	37.5	35.1
K62S15A				48.0	42.0	38.1	35.2	33.0	31.1	29.5	28.2	27.0
K82S15A		53.5	46.5	41.8	38.3	35.6	33.3	31.5	29.9	28.6	27.4	26.3
K72S24.4A						53.0	48.1	44.5	41.8	39.5	37.6	36.0
K80S23A				62.5	54.0	48.9	45.1	42.2	39.8	37.8	36.1	34.6
K98S23A			70.7	61.8	55.9	51.5	48.0	45.2	42.8	40.7	39.0	37.4
K53S14EC1						39.6	36.7	33.0	30.9	29.2	27.7	26.5
K53S14EC2**						39.6	36.7	33.0	30.9	29.2	27.7	26.5
K73S23EC1				59.8	51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0
K73S23EC2**				59.8	51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0
K53S14PF1							37.7	34.6	32.3	30.4	28.9	27.6
K53S14PF2**							37.7	34.6	32.3	30.4	28.9	27.6
K73S23PF1					54.4	48.7	44.8	41.8	39.3	37.3	35.6	34.1
K73S23PF2**					54.4	48.7	44.8	41.8	39.3	37.3	35.6	34.1



Table 2: Conical Float - Dimensions

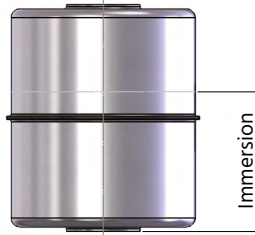


* = Design temperature 200°C, higher temperatures after calculating
 ** = acc. to Atex (conductive)

Type	Material	ØA	H	ØC	Density min.	Pressure range	Temperature range	L1 min.	U min.	Float distance min.	Mass
		(mm)	(mm)	(mm)	(kg/m ³)	(bar)	(°C)	(mm)	(mm)	(mm)	(g)
Z27S10E	St. Steel	27	31	10	800	-1...+6	-156...+200	30	30	45	7.8
Z44S15E	St. Steel	44	52	15	800	-1...+25*	-156...+250	50	45	70	43
Z44S14T	Titan	44	52	14	750	-1...+15	-10...+150	50	45	70	37
Z44S15A	Alloy C	44	52	15	1000	-1...+45*	-196...+250	50	45	70	52
Z18S11NB	NBR	18	25	11	800	-1...+6	-20...+80	15	40	40	2.5
Z19.5S8.4NB	NBR	19.5	20	8.4	850	-1...+6	-20...+80	15	35	35	3.3
Z23S8.4NB	NBR	23	25	8.4	800	-1...+6	-20...+80	15	40	40	5
Z25S09NB	NBR	25	14	9	800	-1...+6	-20...+80	15	30	30	3.5
Z30S13NB	NBR	30	45	13	700	-1...+6	-20...+80	20	65	60	14
Z40S15NB	NBR	40	30	15	700	-1...+6	-20...+80	25	50	45	17
Z50S20NB	NBR	50	45	20	700	-1...+6	-20...+80	30	70	60	41
Z42S14PC	PVC	42	44	14	800	-1...+1	-15...+60	50	40	65	32
Z54S22PC	PVC	54	55	22	750	-1...+1	-15...+60	65	50	75	64
Z78S25PC	PVC	78	80	25	600	-1...+1	-15...+60	80	65	100	164
Z28S08PP	PP	28	29	8	800	-1...+1	-10...+80	35	35	45	9
Z44S13PP	PP	44	43	13	700	-1...+1	-10...+80	50	40	65	25
Z44S21PP	PP	44	69	21	800	-1...+1	-10...+80	50	55	90	45
Z56S21PP	PP	56	54	21	600	-1...+1	-10...+80	65	50	75	50
Z80S24PP	PP	80	79	24	500	-1...+1	-10...+80	80	65	100	126
Z44S13PD	PVDF	44	55	13	850	-1...+1	-10...+100	50	55	70	46
Z56S21PD	PVDF	56	69	21	800	-1...+1	-10...+100	65	60	90	90
Z80S24PD	PVDF	80	79	24	700	-1...+1	-10...+100	80	65	100	192
Z45S14EC1	ECTFE coat.	45	53	14	950	-1...+25	-78...+150	70	70	80	54
Z45S14EC2**	ECTFE coat.	45	53	14	950	-1...+25	-78...+150	70	70	80	54
Z45S14PF1	PFA coat.	45	53	14	1000	-1...+25*	-100...+250	70	70	80	57
Z45S14PF2**	PFA coat.	45	53	14	1000	-1...+25*	-100...+250	70	70	80	57



Conical Float Immersion depths

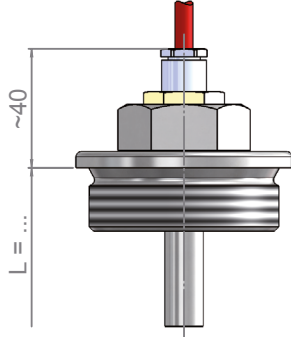


Type	Specific weight of the medium (kg/m ³)											
	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
	Immersion depth (mm)											
Z27S10E					23.6	21.0	18.9	17.2	15.8	14.6	13.5	12.6
Z44S15E					44.5	39.5	35.6	32.3	29.6	27.4	25.4	23.7
Z44S14T					37.6	33.4	30.0	27.3	25.0	23.1	21.5	20.0
Z44S15A							43.0	39.1	35.9	33.1	30.7	28.7
Z18S11NB					19.6	17.4	15.7	14.3	13.1	12.1	11.2	10.5
Z19.5S8.4NB						15.2	13.6	12.4	11.3	10.5	9.7	9.1
Z23S8.4NB					17.4	15.4	13.9	12.6	11.6	10.7	9.9	9.3
Z25S09NB					10.2	9.1	8.2	7.4	6.8	6.3	5.9	5.5
Z30S13NB				34.8	30.5	27.1	24.4	22.2	20.3	18.8	17.4	16.3
Z40S15NB				22.5	19.7	17.5	15.7	14.3	13.1	12.1	11.1	10.5
Z50S20NB				35.5	31.1	27.6	24.9	22.6	20.7	19.1	17.8	16.6
Z42S14PC					32.5	28.9	26.0	23.6	21.7	20.0	18.6	17.3
Z54S22PC					41.9	37.2	33.5	30.5	27.9	25.8	23.9	22.3
Z78S25PC			63.8	54.6	47.8	42.5	38.3	34.8	31.9	29.4	27.3	25.5
Z28S08PP					24.1	21.4	19.3	17.5	16.0	14.8	13.8	12.8
Z44S13PP				29.0	25.4	22.6	20.3	18.5	16.9	15.6	14.5	13.5
Z44S21PP					56.0	49.7	44.8	40.7	37.3	34.4	32.0	29.8
Z56S21PP			43.6	37.4	32.7	29.1	26.2	23.8	21.8	20.1	18.7	17.5
Z80S24PP		58.8	49.0	42.0	36.7	32.7	29.4	26.7	24.5	22.6	21.0	19.6
Z44S13PD						41.5	37.4	34.0	31.1	28.7	26.7	24.9
Z56S21PD					58.9	52.4	47.1	42.8	39.3	36.2	33.7	31.4
Z80S24PD				64.0	56.0	49.8	44.8	40.7	37.3	34.4	32.0	29.9
Z45S14EC1							41.6	37.8	34.7	32.0	29.7	27.7
Z45S14EC2**							41.6	37.8	34.7	32.0	29.7	27.7
Z45S14PF1							43.9	39.9	36.6	33.8	31.4	29.3
Z45S14PF2**							43.9	39.9	36.6	33.8	31.4	29.3
K73S23EC1				59.8	51.5	46.5	43.0	40.2	37.9	36.0	34.4	33.0



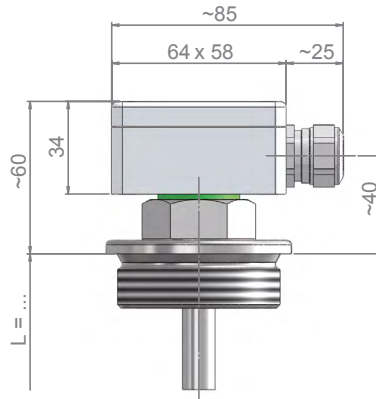
Table 3: Electrical Connection

Connection Type K
Connecting cable



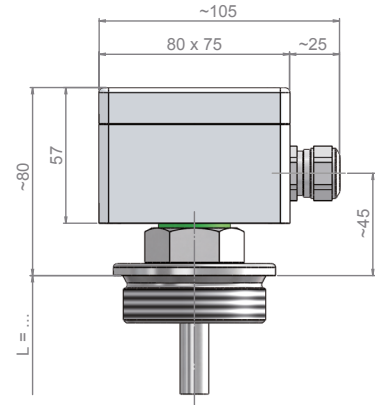
Material: as defined cable
Cable gland: PG or M
Prot. class: IP55 (optional IP68)
Ambient temp.: -40...+200°C
No. of contact clamps: max. -

Connection Type E
Aluminium socket



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

Connection Type F
Aluminium socket

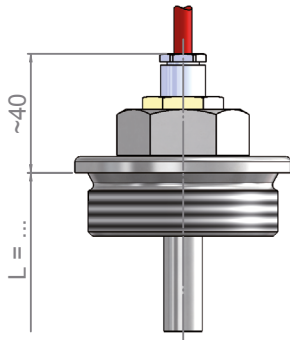


Material: Al coated RAL 7001
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -40...+100°C
No. of contact clamps: max. 12

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

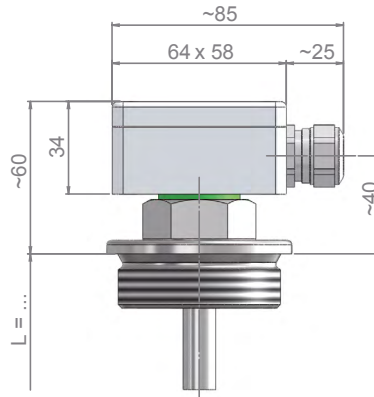


Connection Type K
Connecting cable



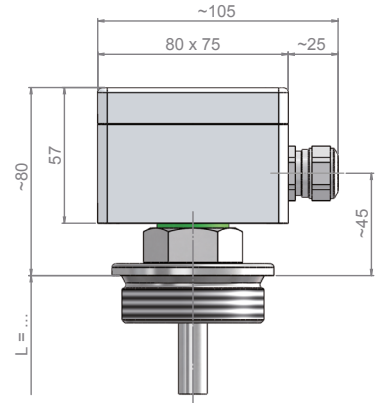
Material: as defined cable
Cable gland: PG or M
Prot. class: IP55 (optional IP68)
Ambient temp.: -40...+200°C
No. of contact clamps: max. -

Connection Type E
Aluminium socket



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

Connection Type F
Aluminium socket

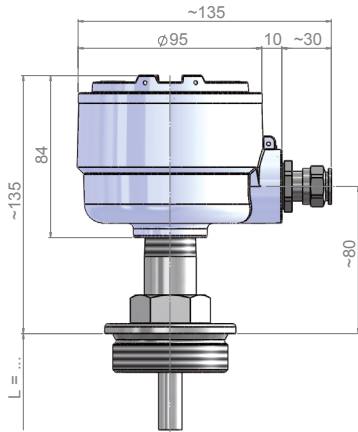


Material: Al coated RAL 7001
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -40...+100°C
No. of contact clamps: max. 12

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

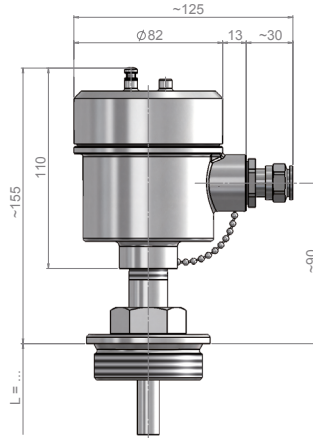


Connection Type DA (Exd)
Aluminium socket



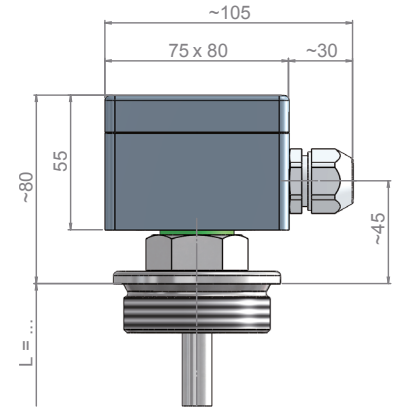
Material: Al coated RAL 9006
Cable gland: M20 x 1,5
Prot. class: IP68
Ambient temp.: -40...+100°C
No. of contact clamps: max. 8

Connection Type VA (Exd)
St. Steel socket



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

Connection Type PA
Polyester socket

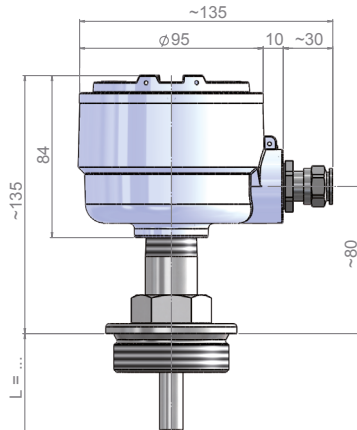


Material: Polyester
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10...+100°C
No. of contact clamps: max. 12

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

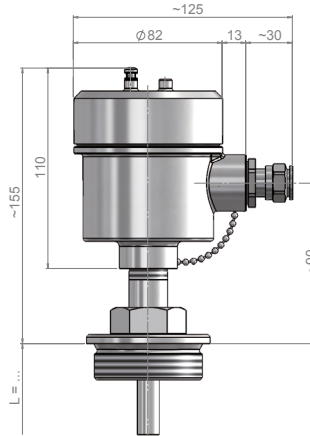


Connection Type DA (Exd)
Aluminium socket



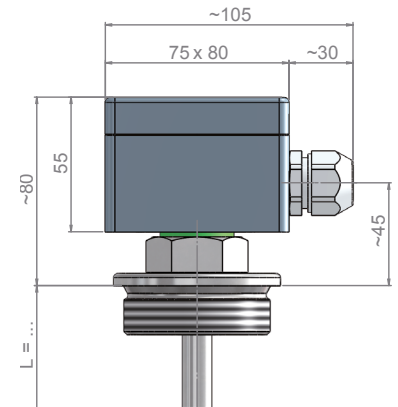
Material: Al coated RAL 9006
Cable gland: M20 x 1,5
Prot. class: IP68
Ambient temp.: -40...+100°C
No. of contact clamps: max. 8

Connection Type VA (Exd)
St. Steel socket



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

Connection Type PA
Polyester socket

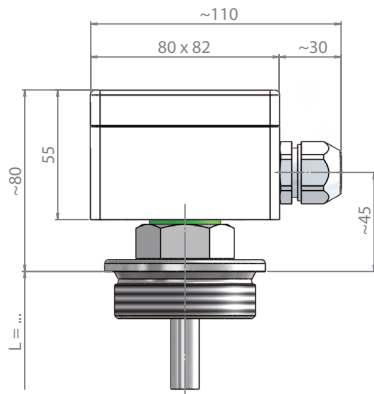


Material: Polyester
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10...+100°C
No. of contact clamps: max. 12

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

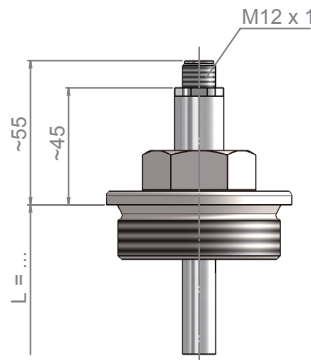


Connection Type BA
ABS socket



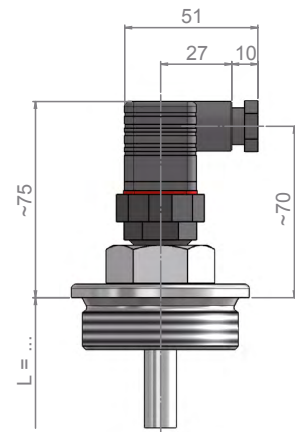
Material: ABS
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10...+80°C
No. of contact clamps: max. 12

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



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

Connection Type S2A
Connector Hirschmann DIN 43650

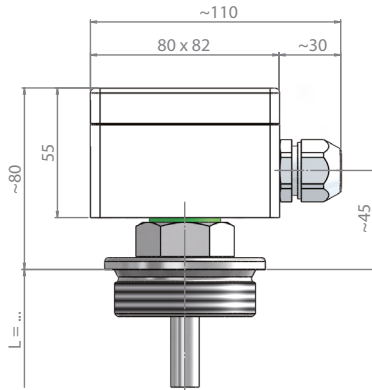


Material: PA
Cable gland: M16
Prot. class: IP65
Ambient temp.: -40...+125°C
No. of contact clamps: max. 3

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

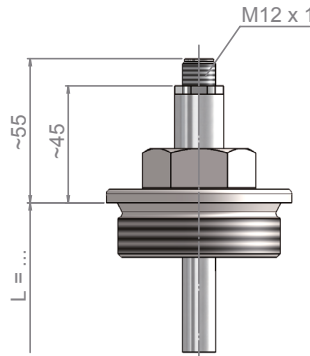


Connection Type BA
ABS socket



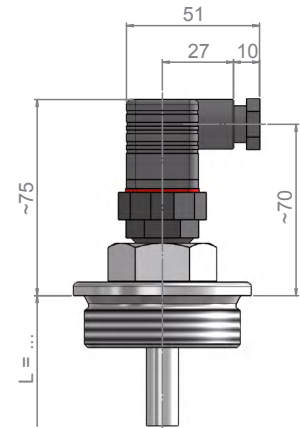
Material: ABS
Cable gland: M20 x 1,5
Prot. class: IP65
Ambient temp.: -10...+80°C
No. of contact clamps: max. 12

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



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

Connection Type S2A
Connector Hirschmann DIN 43650

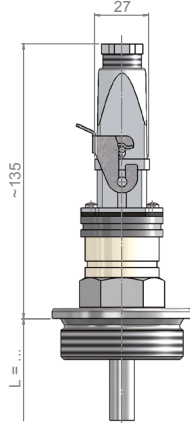


Material: PA
Cable gland: M16
Prot. class: IP65
Ambient temp.: -40...+125°C
No. of contact clamps: max. 3

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

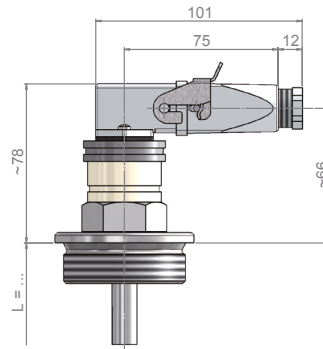


Connection Type S3A(B)
Connector HTS straight



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

Connection Type S4A(B)
Connector HTS angled

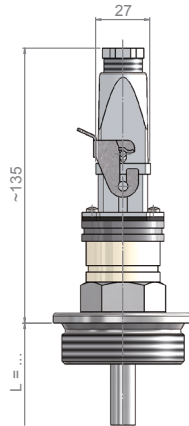


Material: S4A = Plastic / S4B = Aluminium
Cable gland: PG11
Prot. class: IP65
Ambient temp.: -10...+80°C
No. of contact clamps: max. 12

Version	● = compatible	/	○ = incompatible
VAG18PVC	○		○
VAG18SIL	○		○
VAG38PVC	○		○
VAG38SIL	○		○
VAG112G	○		○
VAG2G	○		○
VAF80G	○		○
VAF100G	○		○
VAF80FLEX	○		○
VAF1FLEX	○		○
VAVG12SIL	○		○
VAVG2G	○		○
VAWG38PVC	○		○
VAWG2G	○		○
VAFBHHG	○		○
VAFBHVH	○		○
VASBHHS	○		○
VASBHVG	○		○
VAFOPAS	○		○
VAFOVAS	○		○
VASG38SIL	○		○
VASMRG	○		○
VAG2HGG	○		○
VAG2HKG	○		○
VAG112PSG	○		○
VAG112PPG	○		○
MG18PVC	○		●
MG18SIL	○		●
MG38PVC	○		●

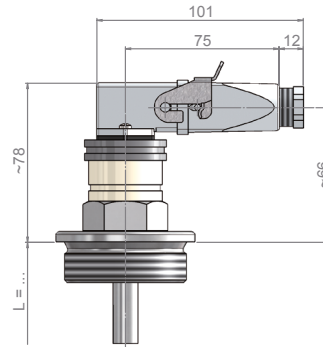


Connection Type S3A(B) Connector HTS straight



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

Connection Type S4A(B) Connector HTS angled

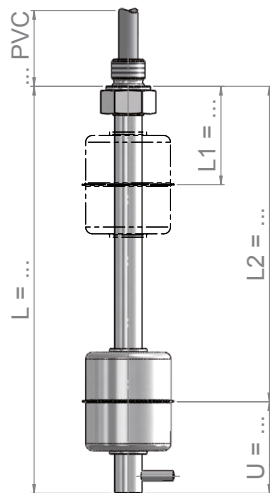


Material: S4A = Plastic / S4B = Aluminium
Cable gland: PG11
Prot. class: IP65
Ambient temp.: -10...+80°C
No. of contact clamps: max. 12

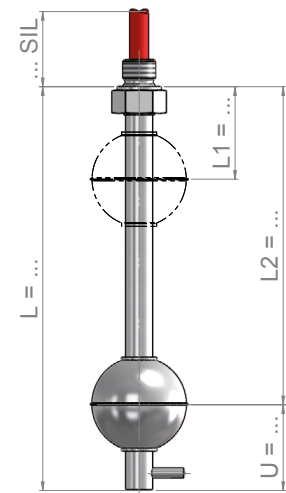
Version	● = compatible	/	○ = incompatible
MG38SIL	○		●
MG112G	○		●
MG2G	○		●
PAG112FLEX	○		●
PAG2FLEX	○		●
VAF80GT	○		○
MG112GT	○		○
TG38PVC	○		○
TG38SIL	○		○
TG112G	○		○
TG2G	○		○
TF65G	○		○
TF100G	○		○
ALCG38SIL	○		○
ALCF80G	○		○
PVCG38PVC	●		●
PVCG1PVC	●		●
PPG18PVC	●		●
PPG38PVC	●		●
PPG1PVC16	●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

**Float switch made of stainless steel with upward thread connection**

Version: VAG18PVC



Version: VAG18SIL

**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	Z27S10E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1...+6 bar
Design temp. /	-20...+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 30 mm, U = 30 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	K29S9.4E
spec. Weight /	≥ 900 kg/m ³
Design pressure /	-1...+35 bar
Design temp. /	-30...+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 35 mm, U = 30 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

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

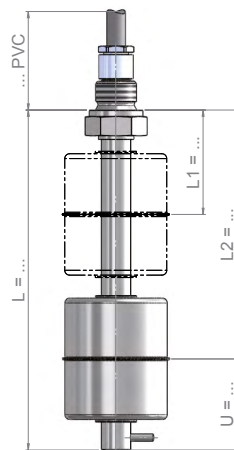
Electrical Specifications:

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

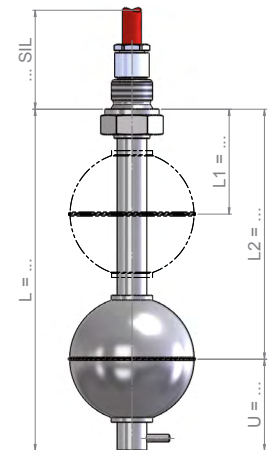


Float switch made of stainless steel with upward thread connection

Version: VAG38PVC



Version: VAG38SIL



Technical Specifications:

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

Electrical Specifications:

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

Technical Specifications:

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

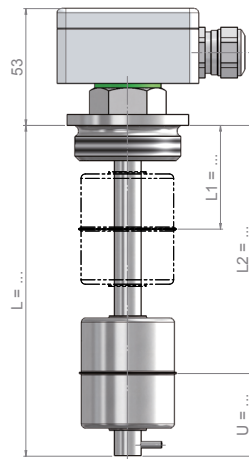
Electrical Specifications:

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

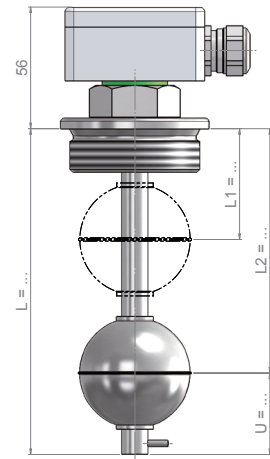
** ATEX = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

**Float switch made of stainless steel with downward thread connection**

Version: VAG112G



Version: VAG2G

**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 1/2"-male downwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . .+25 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm**
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m ³
Design pressure /	-1. . .+30 bar
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

Electrical Specifications:

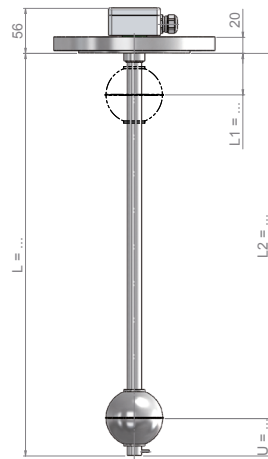
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

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

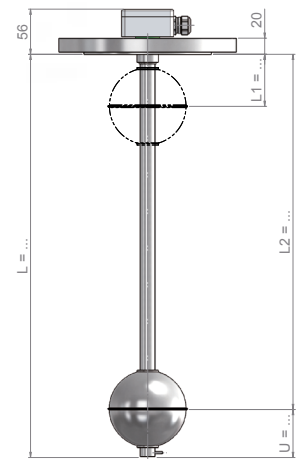


Float switch made of stainless steel with flange connection

Version: VAF80G



Version: VAF100G



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 18 mm
Insertion length /	≤ 6000 mm**
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m ³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

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

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 18 mm
Insertion length /	≤ 6000 mm**
Float /	K98S23E
spec. Weight /	≥ 570 kg/m ³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 80 mm, U = 70 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 115 mm

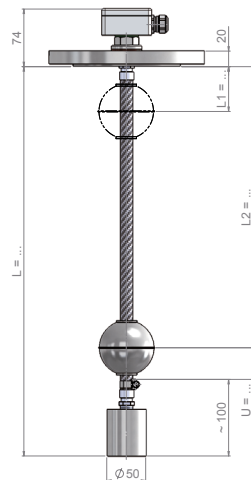
Electrical Specifications:

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

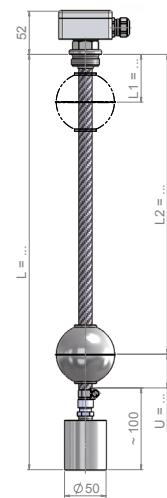
** ATEX = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

**Float switch made of stainless steel - flexible**

Version: VAF80FLEX



Version: VAGIFLEX

**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 16 mm
Insertion length /	≤ 15000 mm**
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m ³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1"-male downwards
Sliding tube /	∅ 16 mm
Insertion length /	≤ 15000 mm**
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m ³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

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

Electrical Specifications:

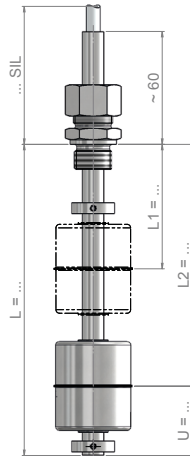
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

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



Float switch made of stainless steel - adjustable

Version: VAVG12SIL



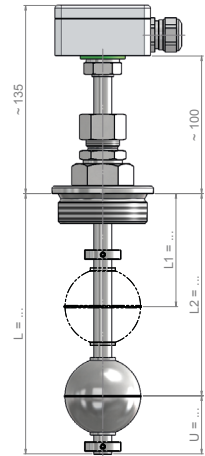
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Silicone connecting cable
Process conn. /	G ½"-male downwards
Sliding tube /	∅ 12 mm, adjustable
Insertion length /	≤ 3000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . .+3 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

Version: VAVG2G



Technical Specifications:

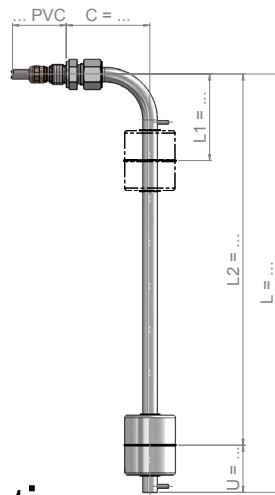
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	∅ 12 mm, adjustable
Insertion length /	≤ 3000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m ³
Design pressure /	-1. . .+3 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

**Float switch made of stainless steel - angled**

Version: VAWG38PVC

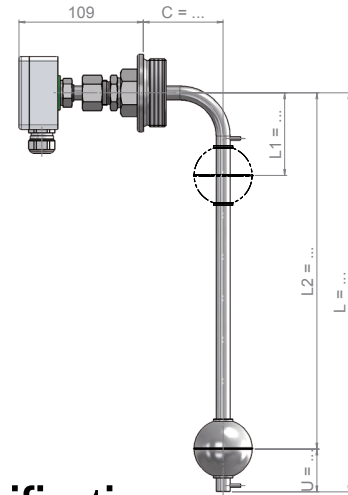
**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-AG
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 3000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . .+25 bar
Design temp. /	-20. . .+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 75 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

Version: VAWG2G

**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-AG
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 3000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m ³
Design pressure /	-1. . .+30 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 75 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

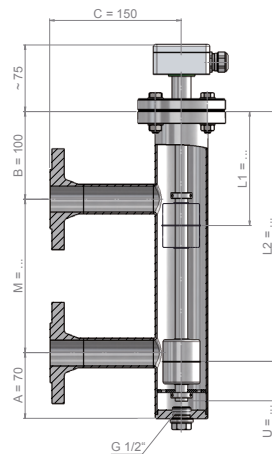
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3x (4x with Type F - Alu. socket)
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

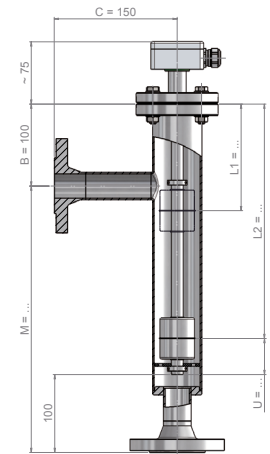


Float switch with bypass tube made of stainless steel

Version: VAFBHHG



Version: VAFBHVH



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN25 / PN16 / Form B1
Bypassgehäuse /	∅ 60.30 x 2.00 mm
Mittenabstand /	M ≤ 1000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-30. . . +180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 130 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

Technical Specifications:

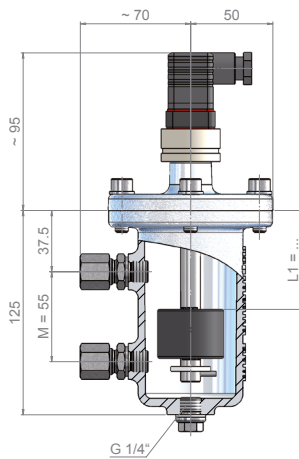
Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN25 / PN16 / Form B1
Bypassgehäuse /	∅ 60.30 x 2.00 mm
Mittenabstand /	M ≤ 1000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-30. . . +180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 130 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

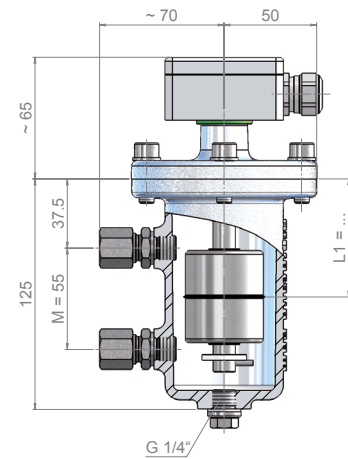
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

**Float switch with bypass tube made of aluminium**

Version: VASBHHS



Version: VASBHHG

**Technical Specifications:**

Materials /	St. Steel/ Aluminium/ Buna
El. connection /	Connector Hirschmann DIN 43650
Process conn. /	Comp. type fitting / \varnothing 10 mm
Bypassgehäuse /	\varnothing 64.00 x 3.50 mm, Aluminium
Mittenabstand /	M = 55 mm
Float /	Z40S15NB
spec. Weight /	$\geq 700 \text{ kg/m}^3$
Design pressure /	-1. . . +6 bar
Design temp. /	-30. . . +80°C
Mounting pos. /	vertical $\pm 30^\circ$
min. Dimensions /	L1 $\geq 25 \text{ mm}$, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

Technical Specifications:

Materials /	St. Steel/ Aluminium
El. connection /	Type E - Aluminium socket
Process conn. /	Comp. type fitting / \varnothing 10 mm
Bypassgehäuse /	\varnothing 64.00 x 3.50 mm, Aluminium
Mittenabstand /	M = 55 mm
Float /	Z44S15E
spec. Weight /	$\geq 800 \text{ kg/m}^3$
Design pressure /	-1. . . +6 bar
Design temp. /	-30. . . +150°C (optional 250°C)
Mounting pos. /	vertical $\pm 30^\circ$
min. Dimensions	L1 $\geq 45 \text{ mm}$, U = - Contact clearance: - Float clearance: -

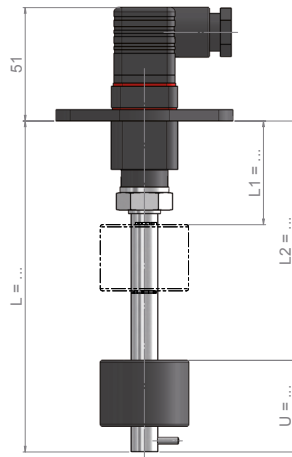
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

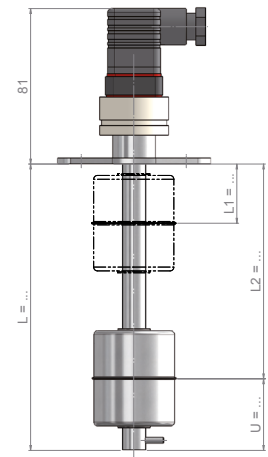


Float switch made of stainless steel - with oval flange

Version: VAFOPAS



Version: VAFOVAS



Technical Specifications:

Materials /	St. Steel/ Aluminium/ Buna
El. connection /	Connector Hirschmann DIN 43650
Process conn. /	Standard Oval flange 80 x 50 mm, PA
Sliding tube /	∅ 12 mm (optional 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z40S15NB
spec. Weight /	≥ 700 kg/m ³
Design pressure /	0...+0.5 bar
Design temp. /	-10...+80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 50 mm, Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	2
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	NO or NC
Approvals:	PED, BV, SIL1

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Connector Hirschmann DIN 43650
Process conn. /	Standard Oval flange 80 x 50 mm
Sliding tube /	∅ 12 mm (optional 14 mm)
Insertion length /	≤ 5000 mm**
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1...+1 bar
Design temp. /	-30...+150°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions	L1 ≥ 35 mm, U = 45 mm, Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

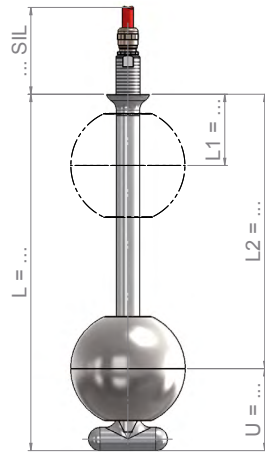
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	2
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, SIL1

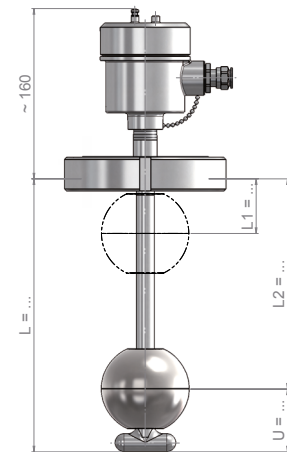
** ATEX = if length of instrument ≥ 4 m please choose diff. material quality for guide tube and float

**Float switch made of stainless steel - 3A sanitary standard**

Version: VASG38SIL



Version: VASMRG

**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti) roughness depth wetted $\leq 0,4 \mu\text{m}$
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	$\varnothing 16 \text{ mm}$
Insertion length /	$\leq 5000 \text{ mm}^{**}$
Float /	K80S23E2
spec. Weight /	$\geq 750 \text{ kg/m}^3$
Design pressure /	-1. . .+40 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical $\pm 30^\circ$
min. Dimensions /	L1 $\geq 50 \text{ mm}$, U = 55 mm Contact clearance: $\geq 20 \text{ mm}$ Float clearance: $\geq 100 \text{ mm}$

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti) roughness depth wetted $\leq 0,4 \mu\text{m}$
El. connection /	Type VA - St. Steel socket
Process conn. /	G 2"-AG
Sliding tube /	$\varnothing 16 \text{ mm}$
Insertion length /	$\leq 5000 \text{ mm}^{**}$
Float /	K80S23E2
spec. Weight /	$\geq 750 \text{ kg/m}^3$
Design pressure /	-1. . .+6 bar
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical $\pm 30^\circ$
min. Dimensions /	L1 $\geq 50 \text{ mm}$, U = 55 mm Contact clearance: $\geq 20 \text{ mm}$ Float clearance: $\geq 100 \text{ mm}$

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, 3A, SIL1

Electrical Specifications:

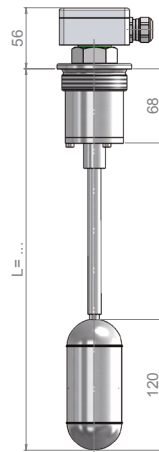
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, WHG, 3A, SIL1

** ATEX = if length of instrument $\geq 4 \text{ m}$ please choose diff. material quality for guide tube and float

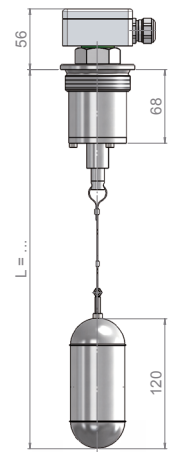


Float switch made of stainless steel - with hub float

Version: VAG2HGG



Version: VAG2HKG



Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-AG
Schw.-Gestänge /	∅ 12 mm
Insertion length /	≤ 500 mm
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-30. . . +180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1: -, U = - Contact clearance: - Float clearance: -

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-AG
Schw.-Gestänge /	-
Insertion length /	≤ 3000 mm
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-30. . . +180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions	L1: -, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

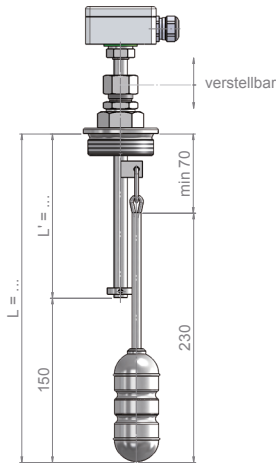
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	ATEX, PED, GOST, SIL1

Electrical Specifications:

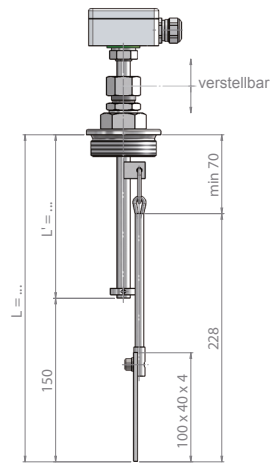
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	2
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	ATEX, PED, GOST, SIL 1

**Float switch made of stainless steel - with pendulum switch**

Version: VAG112PSG



Version: VAG112PPG

**Technical Specifications:**

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 1/2"-male downwards
Schw.-Gestänge /	ø 12 mm
Insertion length /	≤ 3000 mm
spec. Weight /	≥ 1000 kg/m ³
Design pressure /	-1...+3 bar
Design temp. /	-30...+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L': ≥ 150 mm, U = - Contact clearance: - Float clearance: -

Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 1/2"-male downwards
Sliding tube /	ø 12 mm
Insertion length /	≤ 3000 mm
Float /	Flat paddle 100 x 40 mm
spec. Weight /	-
Design pressure /	-1...+3 bar
Design temp. /	-30...+180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L': ≥ 150 mm, U = - Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	PED, SIL1

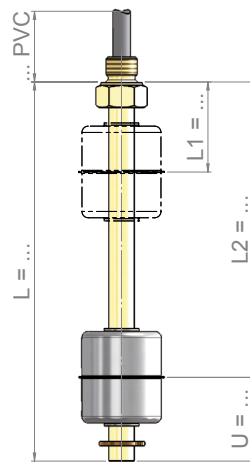
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP65
Optional /	
Temp.-sensor:	-
Temp.-contact:	-
Approvals:	PED, SIL1



Float switch made of brass with upward thread connection

Version: MG18PVC



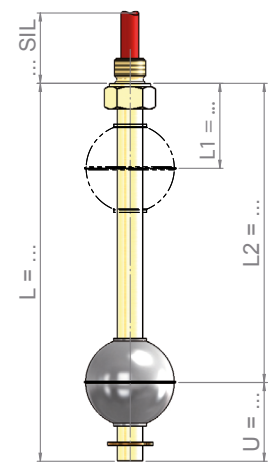
Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	PVC connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	Z27S10E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. .+.6 bar
Design temp. /	-10. .+.80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 30 mm, U = 30 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	-
Approvals:	PED, SIL1

Version: MG18SIL



Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	Silicone connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	ø 8 mm
Insertion length /	≤ 1000 mm
Float /	K29S9.4E
spec. Weight /	≥ 900 kg/m ³
Design pressure /	-1. .+.6 bar
Design temp. /	-10. .+.150°C
Mounting pos. /	vertical ±30°
min. Dimensions	L1 ≥ 35 mm, U = 30 mm, Contact clearance: ≥ 20 mm Float clearance: ≥ 45 mm

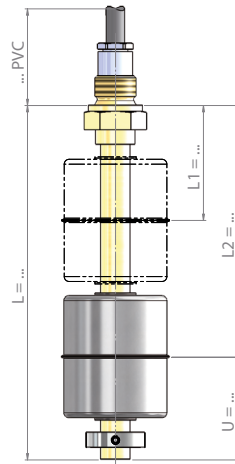
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 V
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	-
Approvals:	PED, SIL1

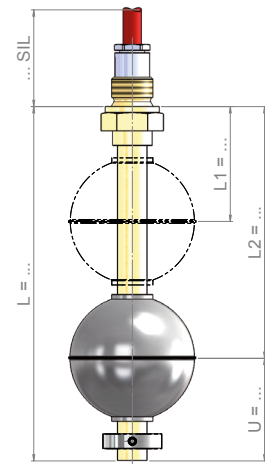


Float switch made of brass with upward thread connection

Version: MG38PVC



Version: MG38SIL



Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	ø 12 mm (optional ø 14 mm)
Insertion length /	≤ 5000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

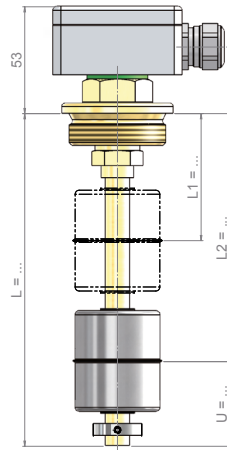
Electrical Specifications:

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

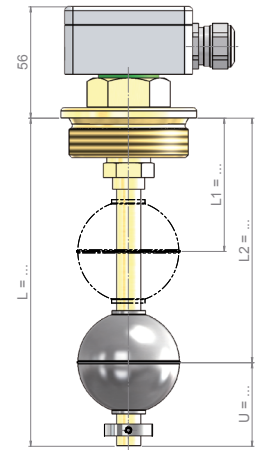


Float switch made of brass with downward thread connection

Version: MG112G



Version: MG2G



Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 1/2"-male downwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Brass (Float St. Steel)
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m ³
Design pressure /	-1. . . +16 bar
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

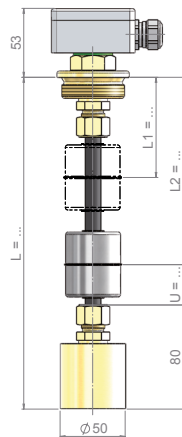
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

Electrical Specifications:

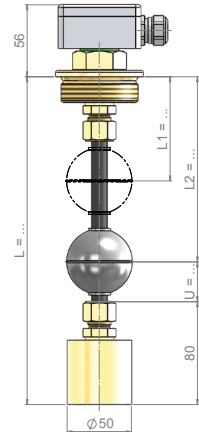
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

**Float switch made of Polyamide - flexible**

Version: PAG112FLEX



Version: PAG2FLEX

**Technical Specifications:**

Materials /	Polyamid, Brass, St. Steel
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 1/2"-male downwards
Sliding tube /	Ø 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Polyamid, Brass, St. Steel
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	Ø 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S15E1
spec. Weight /	≥ 680 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

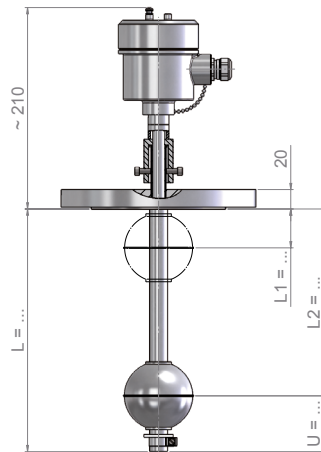
Electrical Specifications:

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



Float switch made of stainless steel / brass - with test function

Version: VAF80GT



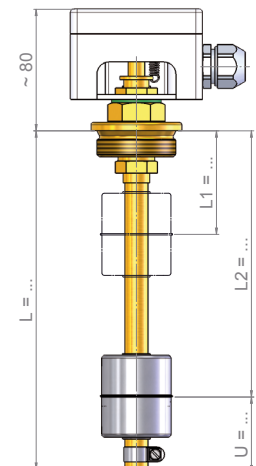
Technical Specifications:

Materials /	1.4404/ 1.4435/ 1.4571 (316L/ 316Ti)
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 18 mm
Insertion length /	≤ 6000 mm
Float /	K72S24.4E
spec. Weight /	≥ 620 kg/m ³
Design pressure /	-1. . .+16 bar (temperature-sensitive)
Design temp. /	-30. . .+180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 90 mm Float clearance: ≥ 90 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, GL, BV, ABS, WHG, SIL1

Version: MG112GT



Technical Specifications:

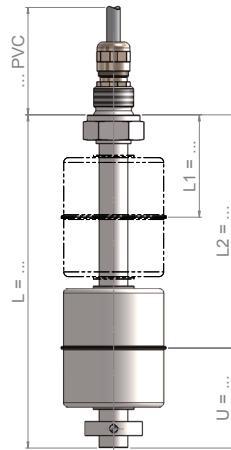
Materials /	Brass (Float St. Steel)
El. connection /	Type BA - ABS socket
Process conn. /	G 1 1/2"-male downwards
Sliding tube /	∅ 14 mm
Insertion length /	≤ 5000 mm
Float /	Z44S15E
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . .+16 bar
Design temp. /	-10. . .+100°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 45 mm Contact clearance: ≥ 70 mm Float clearance: ≥ 70 mm

Electrical Specifications:

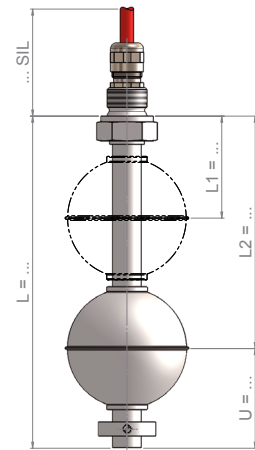
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, SIL1

**Float switch made of Titanium with upward thread connection**

Version: TG38PVC



Version: TG38SIL

**Technical Specifications:**

Materials /	Titan
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S14T
spec. Weight /	≥ 750 kg/m ³
Design pressure /	-1. . . +15 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Titan
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S14T
spec. Weight /	≥ 650 kg/m ³
Design pressure /	-1. . . +24 bar
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

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

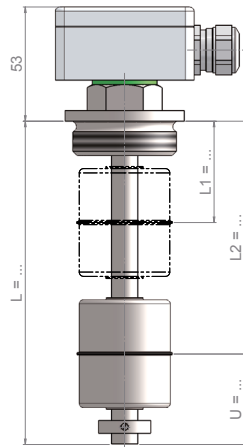
Electrical Specifications:

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

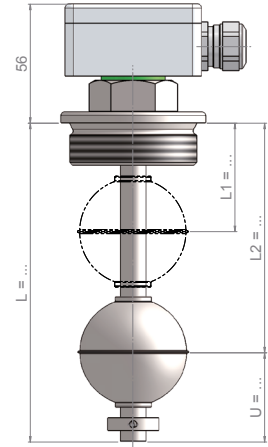


Float switch made of Titanium with downward thread connection

Version: TG112G



Version: TG2G



Technical Specifications:

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	G 1 1/2"-male downwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	Z44S14T
spec. Weight /	≥ 750 kg/m ³
Design pressure /	-1. . . +15 bar
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	G 2"-male downwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S14T
spec. Weight /	≥ 650 kg/m ³
Design pressure /	-1. . . +24 bar
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Electrical Specifications:

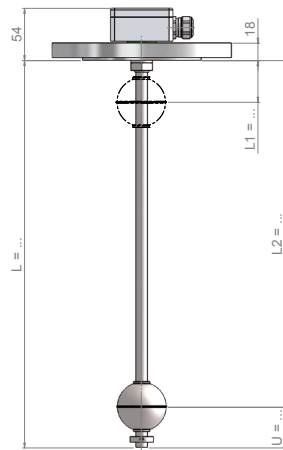
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

Electrical Specifications:

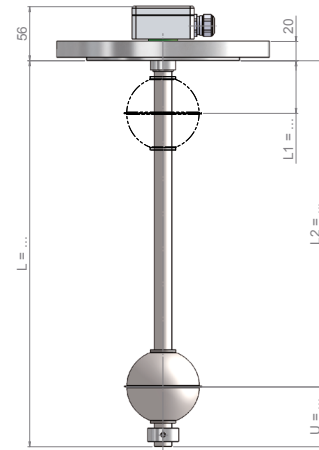
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4x (5x with Type F - Alu. socket)
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40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

**Float switch made of Titanium with flange connection**

Version: TF65G



Version: TF100G

**Technical Specifications:**

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN65 / PN16 / Form B1
Sliding tube /	∅ 12 mm
Insertion length /	≤ 5000 mm
Float /	K52S14T
spec. Weight /	≥ 660 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Titan
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN100 / PN16 / Form B1
Sliding tube /	∅ 18 mm
Insertion length /	≤ 6000 mm
Float /	K80S24T
spec. Weight /	≥ 600 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-10. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 95 mm

Electrical Specifications:

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

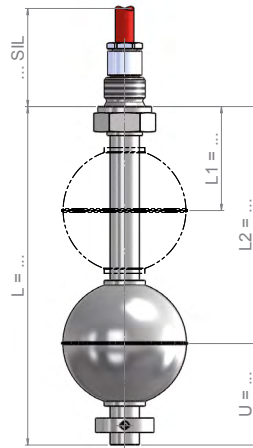
Electrical Specifications:

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

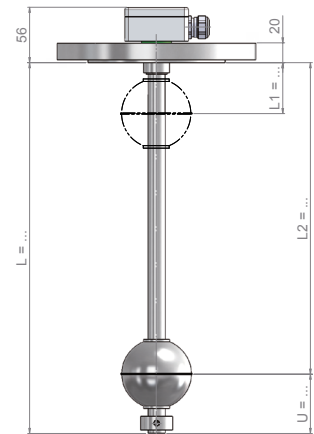


Float switch made of Alloy C

Version: ALCG38SIL



Version: ALCF80G



Technical Specifications:

Materials /	Alloy C
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 3000 mm
Float /	K52S15A
spec. Weight /	≥ 1260 kg/m ³
Design pressure /	-1. . . +55 bar
Design temp. /	-40. . . +180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 55 mm, U = 45 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	Alloy C
El. connection /	Type E - Aluminium socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 18 mm
Insertion length /	≤ 6000 mm
Float /	K72S24.4A
spec. Weight /	≥ 820 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-40. . . +200°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 60 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

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

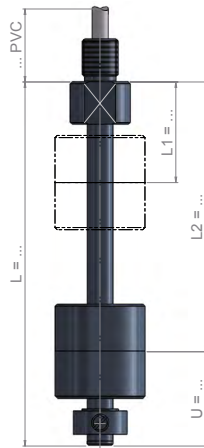
Electrical Specifications:

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

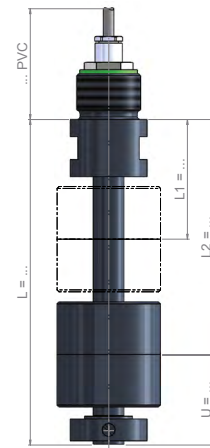


Float switch made of PVC with upward thread connection

Version: PVCG38PVC



Version: PVCG1PVC



Technical Specifications:

Materials /	PVC
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 3000 mm
Float /	Z42S14PC
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-15. . . +60°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 40 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 65 mm

Technical Specifications:

Materials /	PVC
El. connection /	PVC connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	∅ 16 mm
Insertion length /	≤ 3000 mm
Float /	Z54S22PC
spec. Weight /	≥ 750 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-15. . . +60°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Electrical Specifications:

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

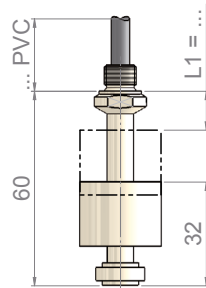
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP65 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1



Float switch made of Polypropylene with upward thread connection

Version: PPG18PVC



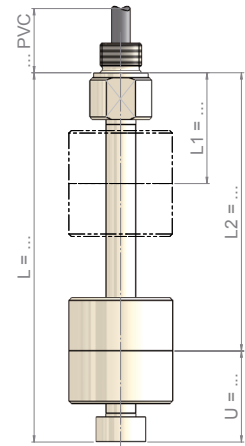
Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 1/8"-male upwards
Sliding tube /	∅ 8 mm
Insertion length /	60 mm
Float /	special
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 12 mm, U = 32 mm Contact clearance: - Float clearance: -

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	1
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	1
Prot. class /	IP55
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

Version: PPG38PVC



Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 3000 mm
Float /	Z44S13PP
spec. Weight /	≥ 700 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 40 mm, U = 40 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 65 mm

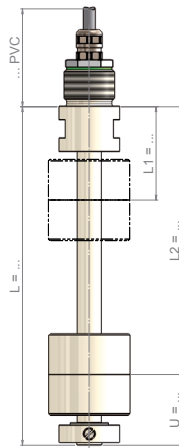
Electrical Specifications:

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

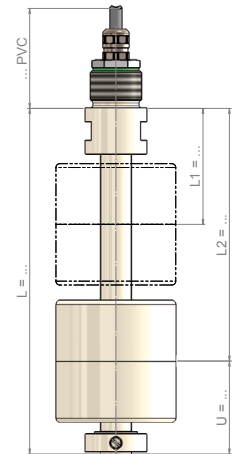


Float switch made of Polypropylene with upward thread connection

Version: PPG1PVC16



Version: PPG1PVC20



Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	∅ 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PP
spec. Weight /	≥ 600 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Technical Specifications:

Materials /	Polypropylene
El. connection /	PVC connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	∅ 20 mm
Insertion length /	≤ 6000 mm
Float /	Z80S24PP
spec. Weight /	≥ 500 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 80 mm, U = 65 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 100 mm

Electrical Specifications:

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

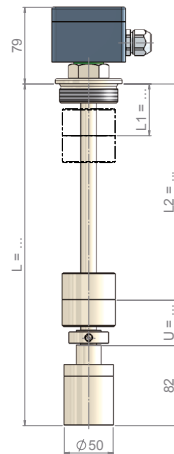
Electrical Specifications:

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

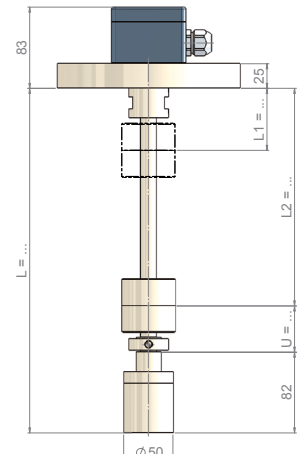


Float switch made of Polypropylene

Version: PPG2G



Version: PPF65G



Technical Specifications:

Materials /	Polypropylene
El. connection /	Type A - Polyester socket
Process conn. /	G 2"-male upwards
Sliding tube /	Ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PP
spec. Weight /	≥ 600 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Technical Specifications:

Materials /	Polypropylene
El. connection /	Type PA - Polyester socket
Process conn. /	Flange EN DN65 / PN10 / Form A
Sliding tube /	Ø 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PP
spec. Weight /	≥ 600 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +80°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 75 mm

Electrical Specifications:

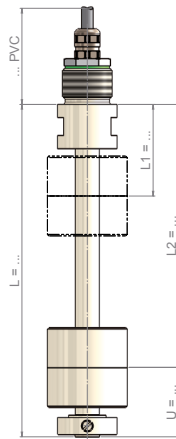
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	SIL

Electrical Specifications:

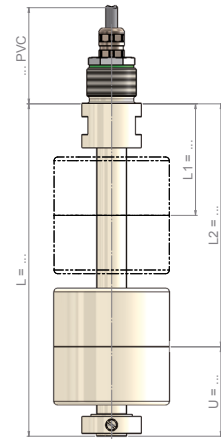
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP65
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	SIL

**Float switch made of PVDF with upward thread connection**

Version: PVDFG38SIL



Version: PVDFG1SIL

**Technical Specifications:**

Materials /	PVDF
El. connection /	Silicone connecting cable
Process conn. /	G 3/8"-male upwards
Sliding tube /	∅ 12 mm
Insertion length /	≤ 3000 mm
Float /	Z44S13PD
spec. Weight /	≥ 850 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +100°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 50 mm, U = 55 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 70 mm

Technical Specifications:

Materials /	PVDF
El. connection /	Silicone connecting cable
Process conn. /	G 1"-male upwards
Sliding tube /	∅ 16 mm
Insertion length /	≤ 3000 mm
Float /	Z56S21PD
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +1 bar
Design temp. /	-10. . . +100°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 60 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 90 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

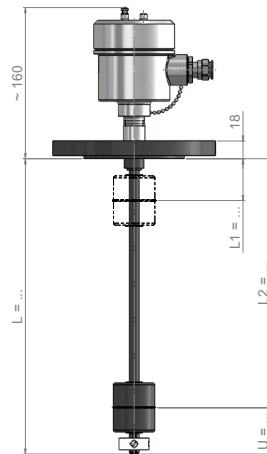
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	2
Prot. class /	IP55 (optional IP68)
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	PED, WHG, SIL1

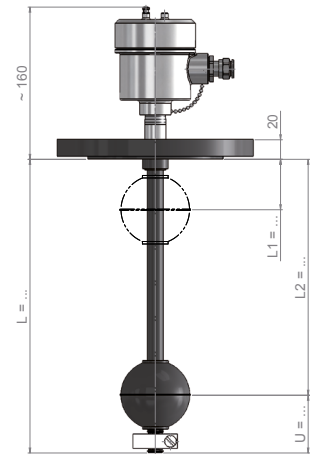


Float switch made of stainless steel - ECTFE coated

Version: VAEBF50G



Version: VAEBF80G



Technical Specifications:

Materials /	St. Steel ECTFE coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	∅ 11 mm
Insertion length /	≤ 3000 mm
Float /	KZ45S14EC1
spec. Weight /	≥ 950 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-30. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 80 mm

Technical Specifications:

Materials /	St. Steel ECTFE coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 17 mm
Insertion length /	≤ 3000 mm
Float /	K73S23EC1
spec. Weight /	≥ 750 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-30. . . +150°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 70 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 105 mm

Electrical Specifications:

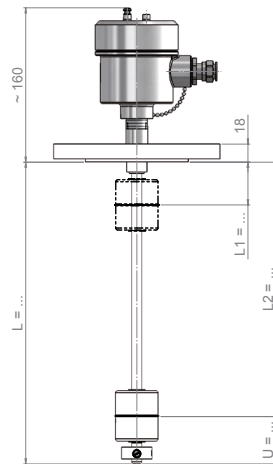
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, BV, WHG, SIL1

Electrical Specifications:

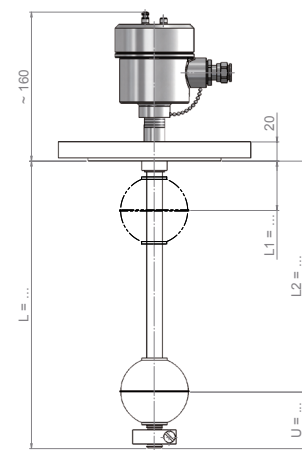
Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, BV, WHG, SIL1

**Float switch made of stainless steel - PFA coated**

Version: VAPBF50G



Version: VAPBF80G

**Technical Specifications:**

Materials /	St. Steel PFA coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN50 / PN16 / Form B1
Sliding tube /	∅ 11 mm
Insertion length /	≤ 3000 mm
Float /	Z45S14PF1
spec. Weight /	≥ 1000 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-30. . . +180°C (optional 250°C)
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 65 mm, U = 50 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 80 mm

Technical Specifications:

Materials /	St. Steel PFA coated
El. connection /	Type VA - St. Steel socket
Process conn. /	Flange EN DN80 / PN16 / Form B1
Sliding tube /	∅ 17 mm
Insertion length /	≤ 3000 mm
Float /	K73S23PF1
spec. Weight /	≥ 800 kg/m ³
Design pressure /	-1. . . +16 bar (temperature-sensitive)
Design temp. /	-30. . . +180°C
Mounting pos. /	vertical ±30°
min. Dimensions /	L1 ≥ 70 mm, U = 70 mm Contact clearance: ≥ 20 mm Float clearance: ≥ 105 mm

Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	3
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	3
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, SIL1

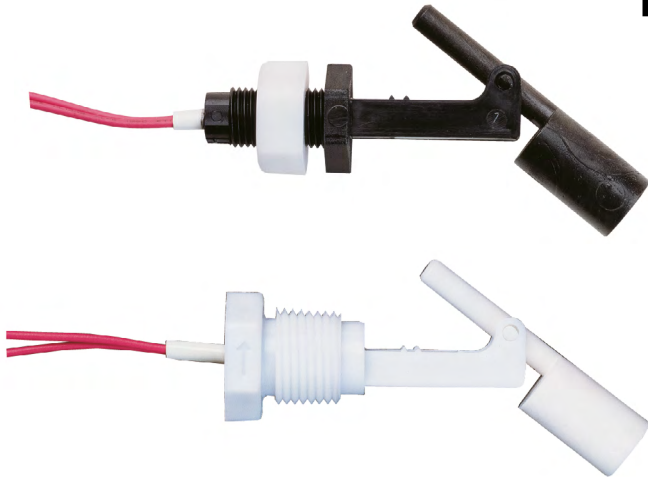
Electrical Specifications:

Switching funct. /	closer /NO
Switch rating:	230 V / 1.0 A / 100 VA
max. Contacts:	5
Switching funct. /	opener /NC
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	5
Switching funct. /	change over /U
Switch rating:	230 V / 0.5 A / 40 VA
max. Contacts:	4
Prot. class /	IP67
Optional /	
Temp.-sensor:	Pt100 / Pt1000 IEC 751 Cl. B
Temp.-contact:	NO or NC
Approvals:	ATEX, PED, GOST, SIL1



LS-14

Miniature Plastic Float Switch for Side Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Sideways mounting into vessel wall

/ PP or Nylon versions

Description:

The LS-14 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position of the float switch, the reed contact acts normally opened or normally closed.

Application:

The LS-14 float switches are suited for monitoring the level of nearly all types of fluid media that are non-hostile to the material used as an alarm for full or empty levels, for controlling valves and pumps or for alert signals.

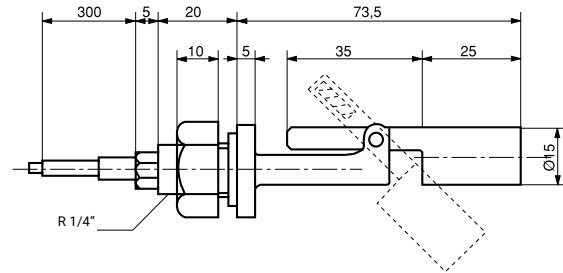


Technical Specifications:

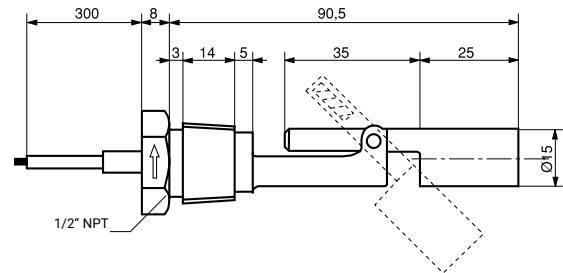
Connecting cable /	0,3 m PE stranded wire
Screw thread type /	LS-14.1: R 1/4" male with counter nut LS-14.2: 1/2" NPT male
Material /	LS-14.x.1: PP LS-14.x.2: Nylon (6-N)
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	2 bar rel.
max. Temperature /	LS-14.x.1: -10...+80°C LS-14.x.2: -10...+110°C
min. Media density /	0,8 kg/l (smaller on request)
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0,5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0,5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Dimensions in mm:

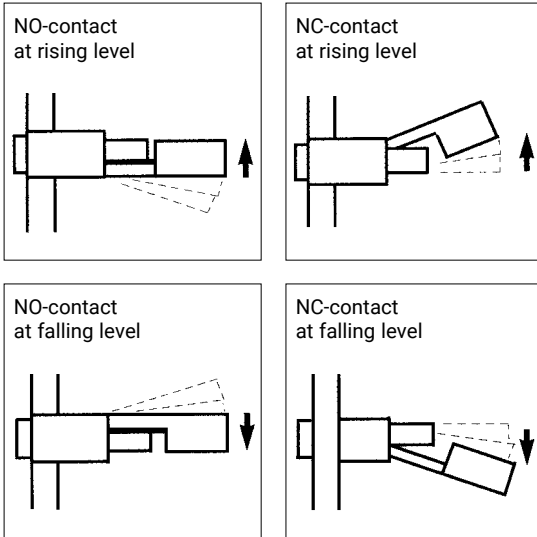
LS-14.1



LS-14.2



Installation variants:



Handling:

- / It must be ensured that the values given for voltage, current, and power are not exceeded.
- / When switched on, a load must be connected in series.
- / The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.
- / Not suitable for use in media with ferritic particles.

Ordering Codes:

Order number	LS-14.	1.	1.	2
LS-14 Miniature Plastic Float Switch				
Connection /				
1 = R 1/4" male				
2 = 1/2" NPT male				
Material /				
1 = Polypropylen				
2 = Nylon (6-N)				
Contact /				
2 = 50 V DC/AC, 0,5 A, 25 VA				



LS-15

Miniature Float Switch for Side Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Sideways mounting into vessel

/ Fully stainless steel version

Description:

The LS-15 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

The LS-15 float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.



Technical Specifications:

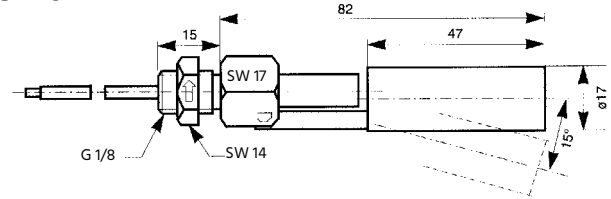
Connecting cable /	0.5 m FEP stranded wire
Screw thread type /	G 1/8"-male, G 1/2"-male, G 3/4"-male, 1/2" NPT-male or 3/4" NPT-male
Material /	float and float bracket are made of stainless steel 1.4301
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	5 bar
max. Temperature /	standard -40...+120°C high-temperature -40...+180°C
min. Media density /	0.8 kg/l (0.9 kg/l for special versions with extra short insertion length)
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0.5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0.5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Handling:

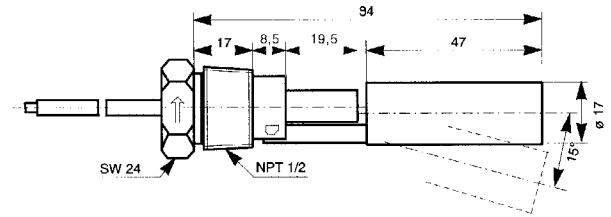
- / It must be ensured that the values given for voltage, current, and power are not exceeded.
- / When switched on, a load must be connected in series.
- / The electrical details apply to ohmic loads.
Capacitive, inductive and lamp loads must be operated using a protective circuit.
- / Not suitable for use in media with ferritic particles.

Dimensions in mm:

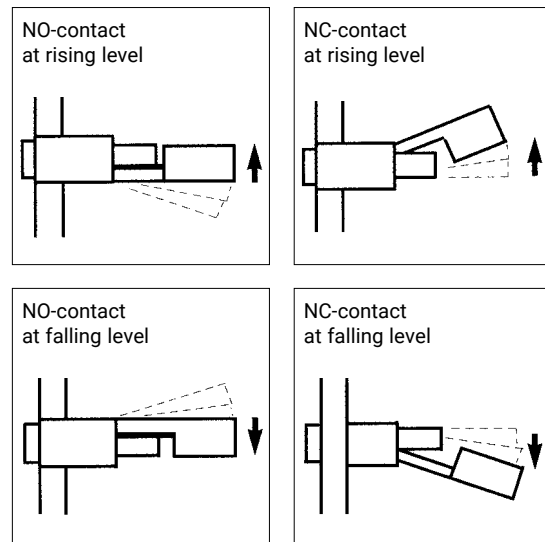
LS-15.1



LS-15.2



Installation variants:



Ordering Codes:

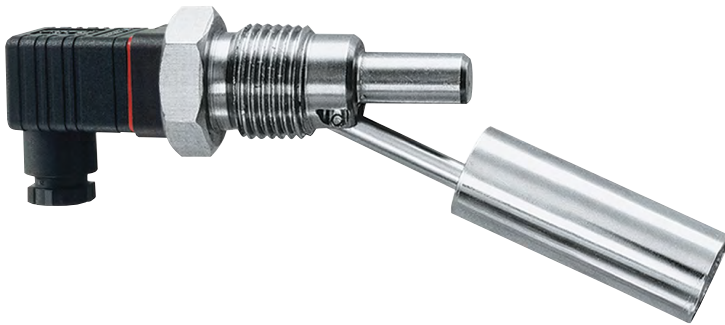
Order number	LS-15.	1.	1
LS-15 Miniature Float Switch for Side Mounting			
Connection /			
1 = G 1/8" male to be mounted from inside (82 mm)			
1a = G 1/8" male to be mounted from inside (54,5 mm)*			
2 = 1/2" NPT male to be mounted from outside (94 mm)			
3 = G 1/2" male to be mounted from outside (94 mm)			
4 = 3/4" NPT male to be mounted from outside (54 mm)			
5 = G 3/4" male to be mounted from outside (54 mm)*			
Temperature range /			
1 = standard -40...+120°C			
2 = high-temperature -40...+180°C			

*Only standard temperature-range



LS-15P

Miniature Float Switch for Side Mounting, Plug Version



Features

- / Compact design
- / Only one mechanically moving part
- / Sideways mounting into vessel wall
- / Fully stainless steel version
- / Electrical connection with DIN plug

Description:

The LS-15P series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

The LS-15P float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.



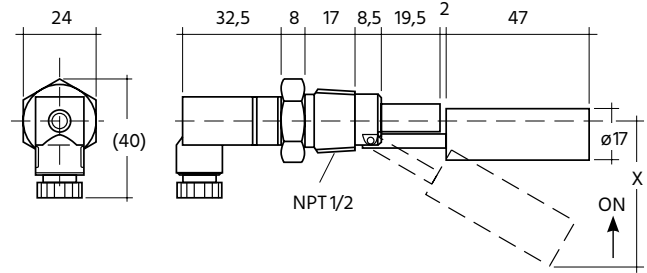
Technical Specifications:

Connecting cable /	plug EN175301-803 shape A
Screw thread type /	1/2" NPT male
Material /	float and float bracket are made of stainless steel
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	5 bar
max. Temperature /	Standard -40...+120°C
min. Media density /	0,8 kg/l
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0,5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0,5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

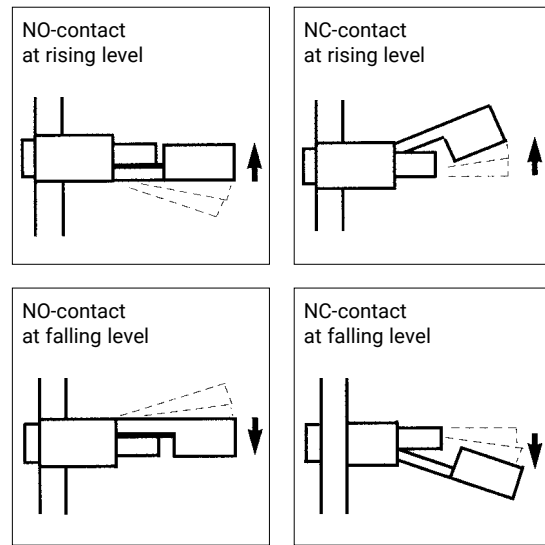
Handling:

- / It must be ensured that the values given for voltage, current, and power are not exceeded.
- / When switched on, a load must be connected in series.
- / The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.
- / Not suitable for use in media with ferritic particles.

Dimensions in mm:



Installation variants:



Ordering Codes:

Order number	LS-15P.	1
LS-15P Miniature Float Switch for Side Mounting, Plug Version		
Connection /		
1 = 1/2" NPT male		



LS-16

Miniature Plastic Float Switch for Vertical Mounting



Features

/ Compact design

/ Only one moving part

/ Mounting from top or bottom

/ PP version

Description:

The LS-16 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

The LS-16 float switches are suited for monitoring the level of nearly all types of fluid media that are non-hostile to the material used as an alarm for full or empty levels, for controlling valves and pumps or for alert signals.



Version:

LS-16 Miniature Plastic Float Switch for Vertical Mounting

Mechanical low-cost float switch made of PP, with contact-free triggering of a reed contact and a screw thread type G 1/8"

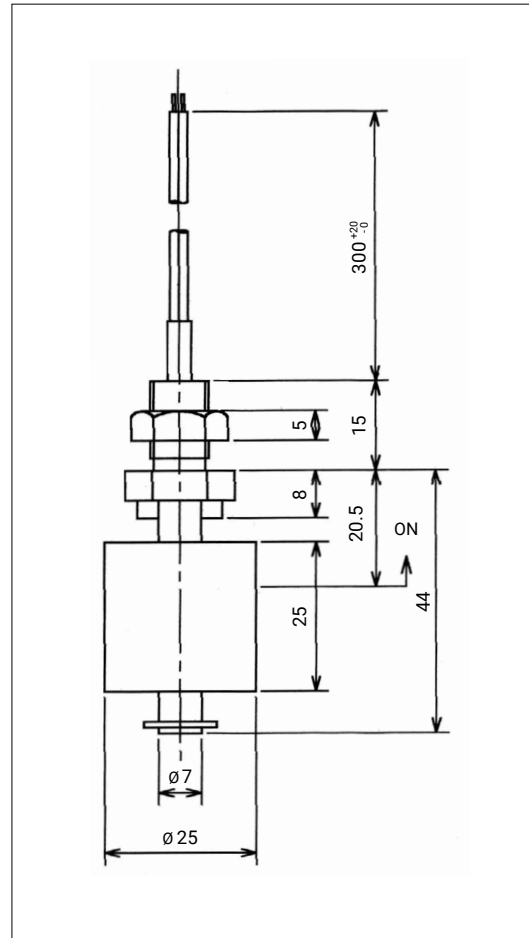
Technical Specifications:

Connecting cable /	0.3 m PVC stranded wire (AWG22)
Screw thread type /	G 1/8"-male with counter nut
Materials /	float, stem, counter nut and thread are made of PP, stainless steel 1.4301 stopper; tube made of vinyl (non wetted);
Function of contact /	NO-contact or NC-contact depending on installation of the float
max. Pressure /	2 bar
max. Temperature /	-10°C. . .+80°C
min. Media density /	0.8 kg/l
CE marking /	none, max. switching load is limited to 50 V AC/DC within area of application of low-voltage-directive
Switching load within CE area /	50 V AC/DC, 0.5 A, 25 VA
Switching load outside CE area /	300 V AC/DC, 0.5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Ordering Codes:

Order number**LS-16****LS-16 Miniature Plastic Float Switch for Vertical Mounting**

Dimensions in mm:



Handling:

- / It must be ensured that the values given for voltage, current, and power are not exceeded.
- / When switched on, a load must be connected in series.
- / The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.
- / Not suitable for use in media with ferritic particles.



LS-17

Miniature Stainless Steel Float Switch for Vertical Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Mounting from top
or into vessel bottom

/ Fully stainless steel version

Description:

The LS-17 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

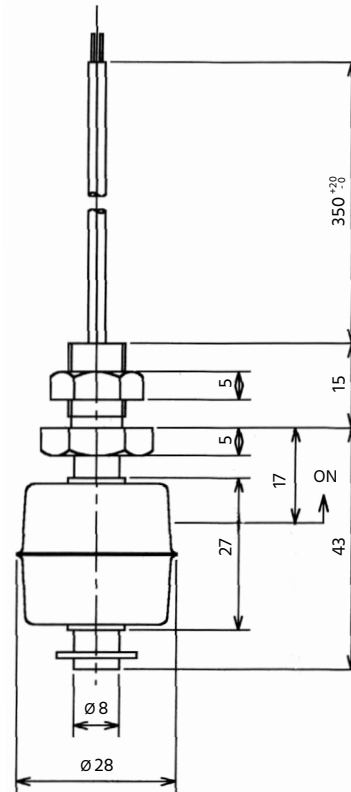
The LS-17 float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.



Technical Specifications:

Connecting cable /	0,35 m IRRAXTMB ₃₂ stranded wire (AWG22)
Screw thread type /	G 1/8" male with counter nut
Material /	float, stem, stopper, counter nut and thread are made of stainless steel 1.4301
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	10 bar
max. Temperature /	-40...+120°C
min. Media density /	0,8 kg/l
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0,5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0,5 A, 50 VA
Initial contact resistance /	150 mΩ (max.)
Insulation resistance /	10 MΩ (min.)

Dimensions in mm:



Handling:

- / It must be ensured that the values given for voltage, current, and power are not exceeded.
- / When switched on, a load must be connected in series.
- / The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.
- / Not suitable for use in media with ferritic particles.

Ordering Codes:

Order number	LS-17.	1
LS-17 Miniature Stainless Steel Float Switch for Vertical Mounting		
Connection /		
1 = G 1/8" male to be mounted from inside		



LS-18

Miniature Stainless Steel Float Switch for Side Mounting



Features

/ Compact design

/ Only one mechanically moving part

/ Mounted from the side

/ Fully stainless steel version

Description:

The LS-18 series of level switches operates according to the principle of a float with magnetic transmission. The float is lifted inside the vessel due to the rising fluid level; subsequently, it actuates a reed contact as a result of the magnetic field of the permanent magnet situated in the float. Depending on the mounting position, the reed contact acts normally opened or normally closed.

Application:

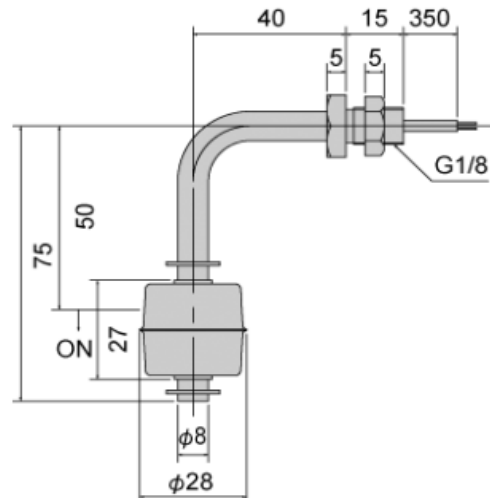
The LS-18 float switches are suited for monitoring the level of nearly all types of fluid media as an alarm for full or empty levels, for controlling valves and pumps or for alert signals. By deploying potential-free reed contacts, the float switches provide an ideal switching element in combination with PLC controls.



Technical Specifications:

Connecting cable /	0.35 m IRRAXTMB ₃₂ stranded wire (AWG22)
Screw thread type /	G 1/8" male with counter nut
Material /	float, stem, stopper, counter nut and thread are made of stainless steel 1.4301
Function of contacts /	NO-contact or NC-contact, depending on mounting variant
max. Pressure /	10 bar
max. Temperature /	-40. . . +120°C
min. Media density /	0.8 kg/l
CE marking /	RoHS
Switching load within EU area /	50 V AC/DC, 0.5 A, 25 VA
Switching load outside EU area /	300 V AC/DC, 0.5 A, 50 VA
Initial contact resistance /	150 MΩ (max.)
Insulation resistance /	10 MΩ (min.)

Dimensions in mm:



Handling:

- / It must be ensured that the values given for voltage, current, and power are not exceeded.
- / When switched on, a load must be connected in series.
- / The electrical details apply to ohmic loads. Capacitive, inductive and lamp loads must be operated using a protective circuit.
- / Not suitable for use in media with ferritic particles.

Ordering Codes:

Order number	LS-18.	1
LS-18 Miniature Stainless Steel Float Switch for Side Mounting		
Connection /		
1 = G 1/8" male to be mounted from inside		



F0-01

Optoelectronic Level Switch



Features

- / Small and compact
- / Easy to mount
- / No mechanical components
- / Easy to maintain

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a quartz glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the quartz glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a green LED.

Application:

The field of applications for the optoelectronic level switch is the detection of limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The extremely compact design guarantees minimum space; consequently, measurements in very small volumes becomes convenient. It can be mounted anywhere and the range of high pressure and temperature assure a broad spectrum of applications.



Technical Specifications:

max. Pressure /	0...50 bar
max. Media temp. /	-30...+135°C
max. Ambient temp. /	-25...+70°C
Electronic housing /	stainless steel
Sensor housing /	stainless steel
Lighting circuit /	quartz glass
Sealing /	graphite / PTFE
Weight /	approx. 75 g without cable
Accuracy /	± 0.5 mm
Light source /	IR light 930 nm
Ambient light /	max. 10.000 Lux
min. Clearance to opposite-side surface /	> 10 mm > 20 mm with electropolished surface
Assembling position /	any
Spanner width /	SW24 at M16 x 1.5 and 1/2"-NPT SW30 at G1/2"

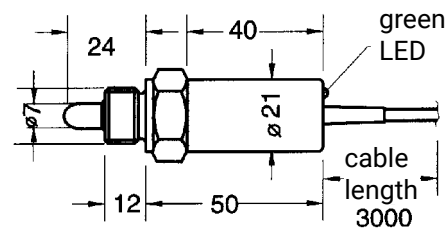
Ordering Codes:

Order number	FO-01.	1.	2.	1.	1.	0
FO-01 Optoelectronic Level Switch						
Process connection /						
1 = M16 x 1.5 male						
2 = 1/2" NPT male						
3 = G 1/2" A male						
Electrical connection /						
1 = 3m PVC cable						
2 = plug connection Binder 713 M12						
Output /						
1 = switching when immersing						
2 = switching when surfacing						
Sensor housing material /						
1 = stainless steel						
99 = special material on request						
Options /						
0 = no option						
1 = counter plug 4-pole Series 713						

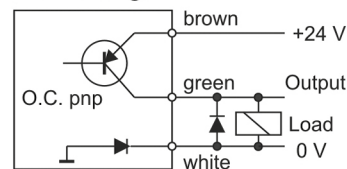
Electrical Specifications:

Supply voltage /	24 VDC -25...+30%
Consumption /	max. 40 mA
Output /	PNP open collector transistor, short-circuit protected, current, voltage and power limitation
Switching status /	green LED
Switching current /	For Tu = +70°C: 0.5 A
Electrical connection /	PVC cable 3 x 0.14 mm ² or plug 4-pole Series 713, M12
Protection class /	with cable IP 66 per EN 60 529 with plug IP 65 per EN 60 529

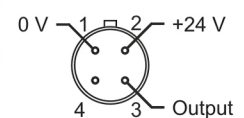
Dimensions in mm:



Connection diagram



pin assignment





FO-02N

Optoelectronic Compact Level Switch



Features

- / Compact design
- / Integrated electronic switch
- / Low-maintenance
- / Sensorlengths from 65-3000 mm
- / No moving parts
- / Any mounting position
- / Accuracy ± 2 mm

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If the sensor tip is not immersed in the fluid, the infrared light will be fully reflected by the inside of the quartz glass. However, as soon as it is immersed into the medium, a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's transistor output.

Application:

The field of application for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is, that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The extremely compact design guarantees minimum space requirement. In contrast to the FO-01, the FO-02N can be supplied with measuring lengths of up to 3000 mm, so that the user can select the setpoint freely. The direction of switching for the high-performance transistor output on the device is reversible.



Versions:

FO-02N Optoelectronic Compact Level Switch

Power supply: The power supply of the FO-02N should be 12 to 32 VDC.

Sensor length: The sensor is available in six standard-lengths: 150, 300, 500, 750, 1000 and 1500 mm. Other lengths, up to 3000 mm are available on request.

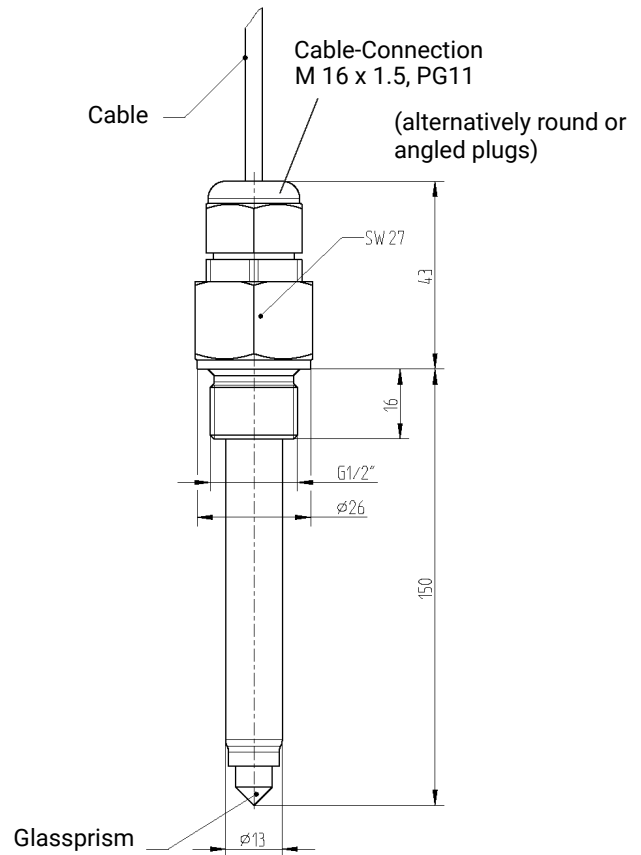
Technical Specifications:

Accuracy /	± 2 mm
Response sensitivity /	factory configured, please specify media, or alternatively with trimmer
Switching delay /	1 s (standard, 0. .7s to choose)
max. Pressure /	0. .25 bar
max. Mediatemp. /	-30°C to +100°C
max. Ambient-temp. /	-25°C to +70°C
Material /	
Light conductor:	Borosilicateglass
Body and process connection:	Stainless Steel 1.4571
Installation position /	any
min. Distance any opposing surface /	≥ 10 mm ≥ 20 mm with elektropolisch surface
Sensor length /	min. 65 mm - max. 3000 mm
Process connection /	G1/2"

Electrical Specifications:

Power supply /	DC 12. .32V
max. Current consumption /	40 mA
Output /	PNP-Transistor, polarity assured, 200 mA switching current
Electrical connection /	
Round plug:	M12 x 1 (4-pin)
PUR-Cable:	Standard length: 2 m or 5 m Diameter: 3 x 0.25 mm ² Cable-ends: open
Angled plug:	EN 175301-803 A
Switch /	NO (closed in the medium) or NC (open in the medium)
No. of switching points /	1
Protection class /	IP 65

Dimensions in mm:



Ordering Codes:

Order Number: FO-02N. 3. 4. 2. 0

FO-02N Optoelectronic Compact Level Switch

Electrical connection /

- 1 = 2 m cable PUR
- 2 = 5 m cable PUR
- 3 = round plug M 12 (without counterplug)
- 4 = angled plug EN 175301-803 A

Sensor length* /

- 1 = 150 mm
- 2 = 300 mm
- 3 = 500 mm
- 4 = 750 mm
- 5 = 1000 mm
- 6 = 1500 mm

Output /

- 1 = switch when immersing
- 2 = switch when surfacing

Option /

- 0 = factory configured (please specify media)
- 8 = switching delay 0. .7s (please specify)
- 9 = with Trimmer

*other lengths up to 3000 mm are available on request.



FO-03

Optoelectronic Level Switch



Features

- / Compact design
- / Under pressure removable
electronic part
- / Easy to mount
- / No moving parts
- / Easy to maintain
- / Cost-effective

Description:

The optoelectronic level switch is used for monitoring of liquid levels. An optical sensor is mounted in a glass fiber reinforced polyamide housing. It consists of a quartz glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If the sensor is not immersed in the fluid, the infrared light will be fully reflected by the inside of the quartz glass. However, as soon as it immerses into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the potential-free relay output, which is also indicated by a light emitting diode directly. The electronic part can be replaced without opening the process, due to the fact that the screw-in part including the glass prism remains installed.

Application:

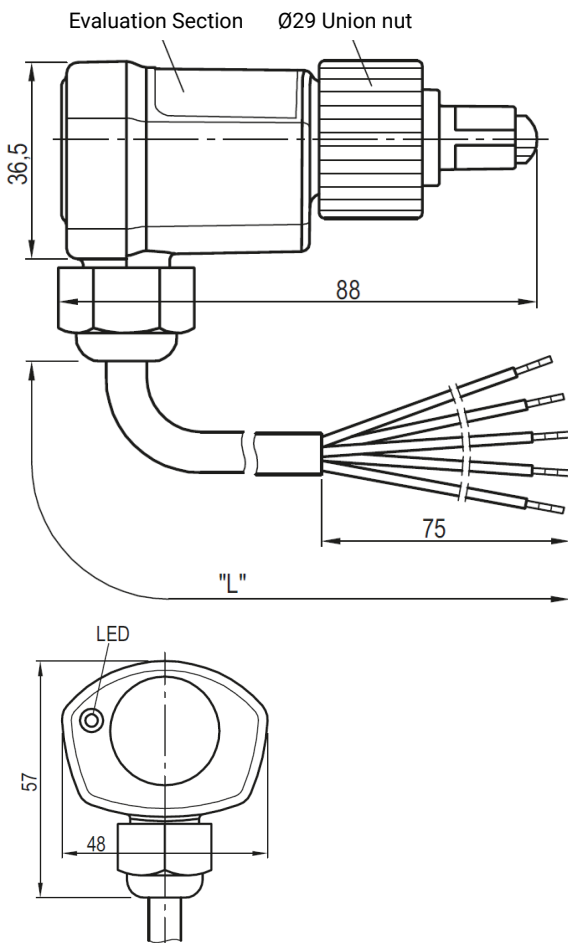
The area of applications for the optoelectronic level switch is the detection of number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The extremely compact design guarantees minimum space; consequently, measurements in very small volumes becomes convenient. The high pressure and temperature ranges assure a broad spectrum of applications.



Technical Specifications:

max. Pressure /	46 bar (-10...+120°C) 31.5 bar (-30...-10°C)
max. Media temp. /	+120°C (<16000h) +100°C
max. Ambient temp. /	-30...+60°C
Electronic housing /	PA66/PA6, fiber reinforced
Screw-in part /	steel nickel-plated
Prisma /	borosilicate glass
Mounting of case to process connection /	union nut
opt. Setpoint indication /	red LED
Minimum distance sensor tip to any opposite wall /	> 10 mm
Switch-on delay time /	3 sec, ± 1 sec

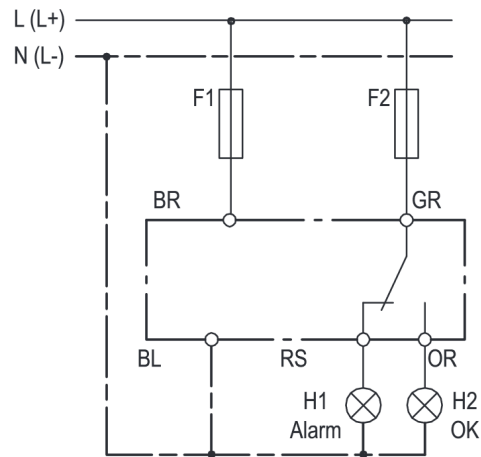
Dimensions in mm:



Electrical Specifications:

Supply voltage /	110...230 VAC ±10%, 3 VA or 24 DC/AC ±10%, 3 VA
allowed rel. Humidity /	10-95% r.H. without condensation
Output /	potential-free relay (change-over)
Switching voltage /	min. 24V, 20mA
Switching current /	max. 2.5 A C300
Mech. lifetime /	ca. 10 ⁶ switch cycles
connection /	1 m PVC cable 5 x 0.75 mm ²
Protection class /	IP 54

Electrical Connection:



Ordering Codes:

Order number	FO-03.	1.	1.	2.	[0][1].	0
FO-03 Optoelectronic Level Switch						
Process connection /						
1 = M20 x 1,5						
2 = 1/2" NPT						
3 = G 1/2" A						
Electrical connection /						
1 = 1 m PVC cable with free cable ends						
Supply voltage /						
1 = 230 VAC ± 10 %						
2 = 24 VDC ± 15 %						
Switch-on delay time /						
[0][5] = standard (approx. 5 s)						
[X][X] = up to approx. 12 s						
Options /						
0 = none						
9 = specify special features in detailed text						



FO-04

Optoelectronic Level Switch for General Applications



Features

- / Compact design
- / Accuracy ± 2 mm
- / Status LED
- / Easy to mount
- / No moving parts
- / Easy to maintain
- / Cost-effective

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the borosilicate glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a red LED.

Application:

The applications for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The compact design, the possibility of installation in any position as well as the attractive price level recommends the FO-04 especially for general industrial applications.

Typical applications:

- level detection of fluids, such as e.g. oil, water, aqueous media, etc.
- full or empty reporting
- overflow protection
- dry run protection



Technical Specifications:

Accuracy /	± 2 mm
Response sensitivity /	preset, for the detection of watery media and oils
max. Pressure /	0...25 bar
max. Media temp. /	-30...+100°C
max. Ambient temp. /	-25...+70°C
Materials /	
Light guide:	borosilicate glass
Housing and process connection	
G 3/8" and M 12 x 1:	stainless steel 1.4305
Housing and process connection G 1/2":	stainless steel 1.4571
Mounting position /	any
min. Clearance from the glass tip to an opposite surface /	≥ 10 mm, ≥ 20 mm (with electropolished surface)
Visual indication of the switching status /	1x yellow LED
Process connection /	G 3/8", G 1/2" or M12 x 1

Electrical Specifications:

Supply voltage /	12...32 VDC
max. Consumption /	40 mA
Output /	PNP-Transistor, protected against reverse polarity 200 mA switching circuit
Electr. connection /	
Circular connector:	M8 x 1, 3-pin
PUR cable:	standard lengths: 2 m or 5 m diameter: 3 x 0.25 mm ² cable end: open
Switching function /	NO (closed when immersed) or NC (open when immersed)
Switch points /	1
Protection class /	IP 65 (counter plug screwed on)
Options /	adjustable responsiveness (Trimmer) for other liquids and foaming media
Cable configuration/	BN: U ₊ WN: U ₋ GN: SP
M8 rounded plug configuration /	1: U ₊ 3: U ₋ 4: SP

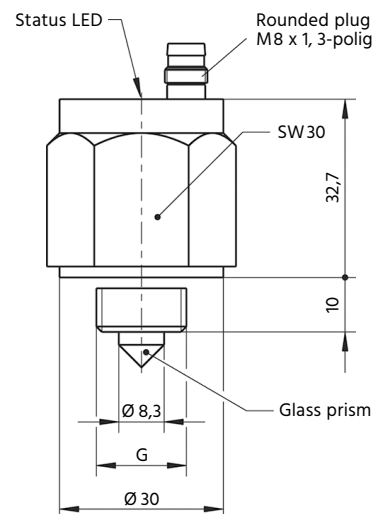


Ordering Codes:

Order number	FO-04.	1.	3.	1.	1.	1
FO-04 Optoelectronic Level Switch						
Process connection /						
1 = G 1/2" - male						
2 = G 3/8" - male						
3 = M 12 x 1 - male						
Electrical connection /						
1 = 2 m PUR cable						
2 = 5 m PUR cable						
3 = rounded plug M8 x 1, 3-pin (without counter plug)						
Output /						
1 = NC (closed when immersed)						
2 = NO (open when immersed)						
Media /						
1 = water						
9 = other (please specify in text)						
Options /						
0 = none						
1 = counter plug M8 x 1 with 2 m cable						
2 = Trimmer						
9 = other (please specify in text)						

Dimensions in mm:

Version: FO-04.1.3.x.x.0





F0-05

Optoelectronic Level Switch High-Temperature Version



Features

/ Up to +170°C media temperature

/ Accuracy ± 2 mm

/ Compact design

/ Easy to mount

/ No moving parts

/ Easy to maintain

Description:

An optical sensor is mounted in a robust stainless steel housing. It consists of a borosilicate glass tip which contains an infrared diode, as a transmitter, and a light-sensitive semi-conductor as the receiver. If no fluid moisture touches the sensor tip, the infrared light will be fully reflected by the inside of the borosilicate glass. However, as soon as it dips into the medium a large portion of the transmitted light can pass into the fluid. Registering this, the receiver initiates a switching operation at the device's PNP transistor output which is then directly displayed by a red LED. For variants with trimmer, the switching status can be read directly on the sensor (internal red LED).

Application:

The applications for the optoelectronic level switch include tapping limit values in a number of fluids. The main advantage is that the method of measurement is to a large extent independent of physical parameters like refractive index, colour, density, dielectric constant or conductivity. The compact construction guarantees minimum space; consequently, measurements in very small volumes becomes convenient. The possibility of mounting in any position as well as the property for use with fluids at high temperatures of up to +170°C assure a broad spectrum of applications.

Typical applications:

- level detection of fluids, such as e.g. oil, water, aqueous media, etc.
- full or empty reporting
- overflow protection
- dry run protection

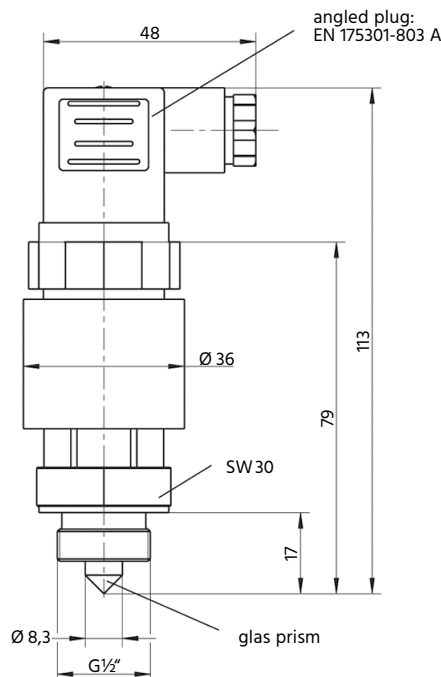


Technical Specifications:

Accuracy /	± 2 mm
Response sensitivity /	preset, for the detection of watery media and oils
max. Pressure /	0 .. 25 bar
max. Media temp. /	-40 .. +170°C
max. Ambient temp. /	-30 .. +80°C
Materials /	
Light guide:	borosilicate glass
Housing:	stainless steel 1.4305 (non wetted part)
Process connection:	stainless steel 1.4571
Mounting position /	any
min. Clearance from the glass tip to an opposite surface /	≥ 10 mm ≥ 20 mm (with electropolished surface)
Process connection /	G ½"-male

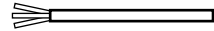
Dimensions in mm:

Pictured: FO-05.1.4.x.x.0



Electrical Specifications:

Supply voltage /	12 .. 32 VDC
max. Current /	40 mA
Output /	PNP transistor, protected against reverse polarity, 200 mA switching current
Electric. connection /	
circular connector:	M 12 x 1, 4-pin
angular connector:	as per EN 175301-803 A
PUR cable:	standard lengths: 2 m and 5 m diameter: 3 x 0.25 mm ² cable end: cut to length
Switching function /	NO (closed in medium) or NC (open in medium)
Switch points /	1
Protection class /	IP 65 (counter plug screwed on)
Cable configuration /	BN: U ₊ WN: U ₋ GN: SP
M12 x 1 rounded plug configuration /	1: U ₊ 3: U ₋ 4: SP
Angled plug configuration /	1: U ₊ 3: U ₋ 4: SP



Ordering Codes:

Order number	FO-05.	1.	3.	1.	1.	1
FO-05 Optoelectronic Level Switch High-Temperature Version						
Process connection /	1 = G ½" male thread					
Electrical connection /	1 = 2 m PUR cable 2 = 5 m PUR cable 3 = circular connector M 12 x 1, 4-pin (without counter plug) 4 = angular connector as per EN 175301-803 A (with counter pl.)					
Output /	1 = switching when immersing (closed in medium) 2 = switching when surfacing (open in medium)					
Medium /	1 = water 9 = special (please specify in detailed text)					
Option /	0 = none 1 = counter plug M 12 x 1, 4-pin 2 = counter plug M 12 x 1 with 2 m cable 9 = special (please specify in detailed text)					



2110 - Mini-SQUING

Mobrey™ Mini-Squing Compact Vibrating Fork Level Switch



Features

- / 3/4", 1" or 2" Tri-clamp
- / High operating frequency
- / 21...264V DC or AC voltage
- / Least depth for mounting
- / Diagnostic LED

Description:

The 2110 vibrates in the air according to the principle of a tuning fork at the frequency of resonance. When the switch is dipped into a fluid the frequency changes due to the higher inertia of the medium. The integrated electronic components capture this change and link to a load connected in series. For the first time, we succeeded in shortening the sensor element that is contacted by the media to 50 mm length and in keeping its size so narrow that a 3/4" thread is absolutely adequate. The same device can be operated with supply voltages of 21 to 264 V AC or DC, thereby reducing the storage of spare parts to a minimum. The device is provided with a microprocessor that is capable of self-monitoring and fail-safe functions. It triggers a user-defined alarm that indicates a dry-run or wet status through an LED which changes from continuous light to blinking and, in the event of malfunctioning, changes again its frequency.

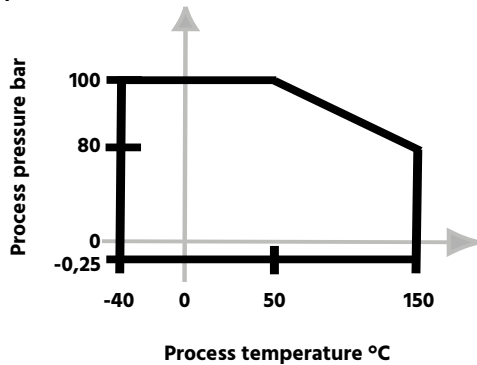
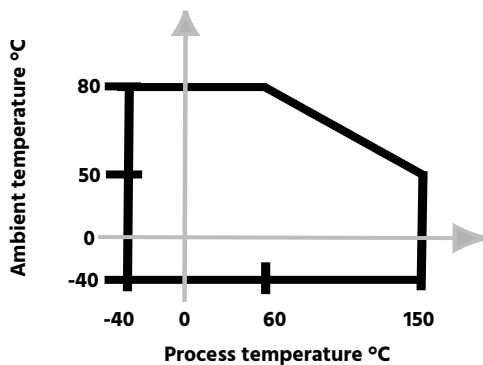
Application:

The 2110 series of limit switches is intended for recording limit levels in most of the fluids and slurries. The device can process also media with high viscosities or sticky properties without any problem since it is capable of „shaking away“ adhesions by virtue of its function. Irrespective of whether for overflow protection, pump protection, leakage monitoring or pump control, the 2110 is universally applicable and, due to its small dimensions, it can be mounted even in narrow spaces. The switch has a fully stainless steel facing to the media and can be connected with an R3/4" or R1" thread to the process. Optionally, a fitting is available for applications in food-processing industry which enables, together with the 1" variant and an O ring, a smooth joint to the fluid.



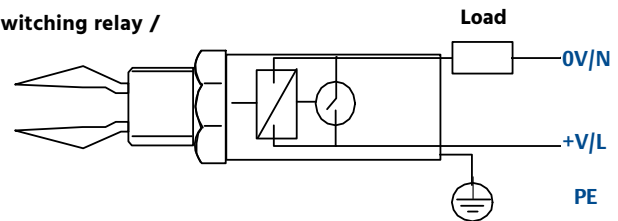
Technical Specifications:

Pressure range /	-0.25...+100 bar at 50°C
Temperature range /	-40...+150°C
Ambient temperature /	-40...+80°C (50°C at 150°C on the wet side)
CIP-cleaning /	withstands steam cleaning routines up to max. 150°C
Medium specific weight /	600 kg/m ³
Viscosity /	0.2...10000 cP
Switching point (water) /	approx. 13 mm immersion depth
Hysteresis (water) /	± 1 mm nom.
Switching delay /	1 sec.
Housing /	stainless steel 304
Fork /	stainless steel 316
LED-window /	anti-flammable polycarbonate
Plug /	polyamide, reinforced fiberglass
Plug sealing /	nitrile butadien rubber
Function test /	through magnetic test point during operation

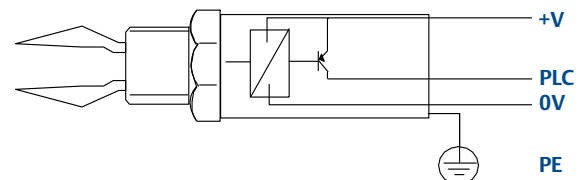
Process pressure curve /**Process temperature curve /**

Electrical Specifications:

Supply voltage /	2-wire: 21...264 V (± 10%) DC or AC 3-wire: 18...60 VDC
Leakage current (without load) /	< 3.0 mA continuous (2-wire)
max. Load /	500 mA
max. Peak load /	5 A for max. 40 ms electr. protected
min. Switching load /	20 mA continuous (2-wire)
Voltage drop 2-wire /	6.5 V for 24 VDC, 5.0 V for 240 VAC
Voltage drop 3-wire /	< 3.0 V
Electr. Protection /	protection against polarity reversal and short-circuiting, protection when load is absent
Electr. Connection /	square plug as per DIN 43650
Cable diameter /	4...9 mm (PG9)
Protection class /	IP66/IP67 EN60529

Switching relay /**Switching relay**

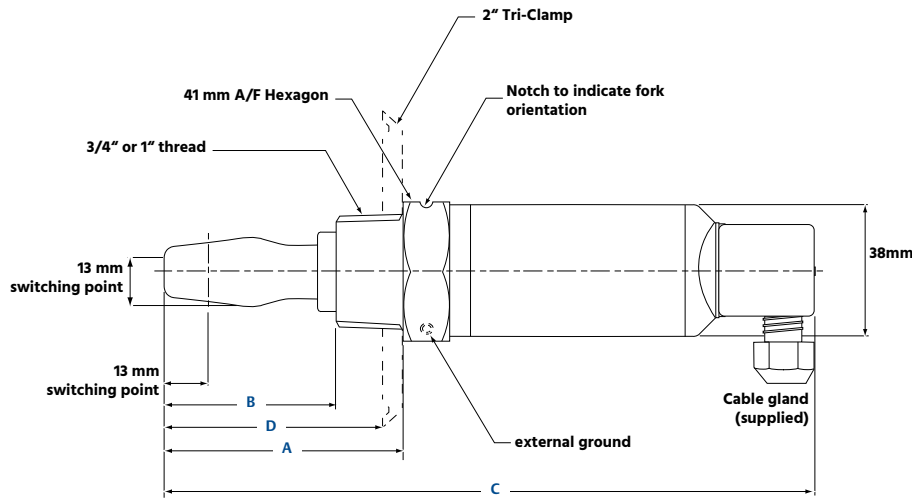
Power supply	21...264 Vac (50...60 Hz)/dc
max. switching voltage	500 mA
max. peak voltage	5 A for 40 ms
min. switching voltage	20 mA continuous
Current drop	6.5 V at 24 VDC
Current consumption	< 3.0 mA continuous

PNP Switch /**PNP Switch**

Power supply	18...60 VDC
max. switching voltage	500 mA
max. peak voltage	5 A for 40 ms
Current drop	< 3 V
Current supply	3 mA nominal
Current output	< 0.5 mA



Dimensions in (mm):



Connection	A	B	C	D
R 3/4"-male	69 mm	50 mm	188 mm	-
NPT 3/4"-male	69 mm	50 mm	188 mm	-
R 1"-male	69 mm	50 mm	188 mm	-
G 1"-male	78 mm	60 mm	201 mm	-
2" Tri-clamp	69 mm	50 mm	188 mm	64 mm
R 1"-male extended	116 mm	98 mm	239 mm	-

Ordering Codes:

Order number	2110.	1.	1A
2110 Miniature Vibrating Fork			
Electrical function /			
0 = 2-wire in series to load			
1 = PNP-3-wire for SPS-operation			
Process connection /			
0A = R 3/4"-male DIN2999			
1A = R 1"-male DIN2999			
0D = NPT 3/4"-male			
2R = 2" Tri-clamp, hygiene fitting			
1B = G 1"-male			
1L = G 1"-male extended			





FV-01

Compact Tuning Fork Level Switch



Features

- / Proven vibration principle
- / Short immersion depth of 40 mm
- / Error monitoring
- / Integrated testing function to ensure fault-free operation

Description:

The FV-01 is a compact tuning fork level switch for fluids and slurry. It can be used as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces. The vibrating fork is piezoelectric driven and vibrates on a mechanical resonance frequency of approximately 1.100 Hz. When the fork is covered by media, this frequency changes. This change will be registered by the build in oscillator, transforming it into a switching signal. Then, the integrated electronic will send this signal to connected devices. The FV-01 works practically without interferences from chemical or physical qualities of the fluid media. It can even be used under harsh conditions, such as turbulences, air bubbles, foam and external vibratons.

Application:

The 40 mm long vibrating fork makes the FV-01 ideal for deployment in small pipes and confined installations. The compact level switch was created to be used in all industrial fields with process engineering. The preferred field of application includes liquids and slurries, level monitoring and overflow and dry-running protection.



Technical Specifications:

Accuracy /

Switching point:	about 13 mm from the tip
Hysteresis:	2 mm for installation from above
Delay:	about 500 ms (on/off)
Frequency:	about 1100 Hz

Pressure /

-1 .. .64 bar g

Ambient-temp. /

-40 .. +70 °C

Media-temp. /

-40 .. +100 °C (standard)
-40 .. +150 °C (raised)

Media density /

0,7 .. 2,5 g/cm³

Materials /

Housing:	1.4404/316L and plastic PEI
Vibrating fork:	316L (1.4404 or 1.4435)
Process connection:	316L (1.4404 or 1.4435)
Seal:	klingsil C-4400

Process connection /

Thread (ISO 228 T1):	G ¾" A or G 1" A, others on request
Thread, conical:	¾" NPT or 1" NPT, others on request
Hygienic:	Pipe fitting DN 40, PN 40 Tri-clamp 1", 1½", 2" PN 10

Weight /

250 g (housing)

Ordering Codes:

Order number	FV-01.	1.	A.	2.	0.	1
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FV-01 Compact Vibrating Switch

Process connection /

- 1 = thread G¾" A PN 64/316L
- 2 = thread ¾" NPT A PN 64/316L
- 3 = thread G1" A PN 64/316L
- 4 = thread 1" NPT A PN 64/316L
- 9 = other (please specify separately)

Temperature /

- A = -40 .. +100°C (standard)
- B = -40 .. +150°C (raised)

Elektronik /

- 1 = 2-wire on load in series
- 2 = transistor output PNP DC 10 .. 35 V

Approvals /

- 0 = none
- 1 = ship-building approval (DNV, GL) - only possible for 150°C version
- 2 = flooding protection from WHG (only with transistor output)

Electrical connection /

- 1 = M12 x 1/IP67 (only PNP-output)
- 2 = DIN 43650 incl. plug/IP65

Electrical Specifications:

Power supply /

AC 20 .. 253 V, 50/60 Hz
DC 20 .. 253 V

Power consumption /

max. 0,5 W

Cable glands /

1 x M12 [IP66/IP67 or IP68 (0,2 bar)]

Electrical connection

Protection class /

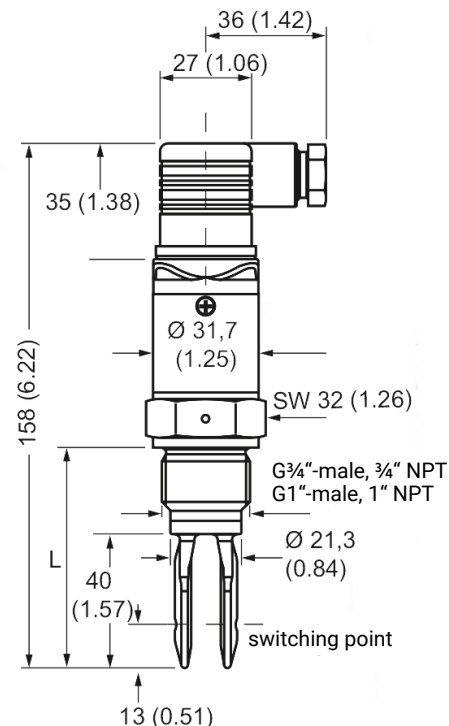
M12 x 1/IP67
according to ISO 4400 incl. plug/IP65
according to DIN 43650 incl. plug with
QUICKON-connection/IP65
M12 x 1 incl. 5 m cable/IP68 (0,2 bar)

Approvals /

overflow protection acc. to WHG
Ship-building approvals

Dimensions in mm:

Thread G¾"-male, G1"-male
(DIN ISO 228/1),
¾" NPT, 1" NPT
(valve plug ISO 4400)



L =

Length with G¾"-male, ¾" NPT:66 (2.6)

Length with G1"-male, 1" NPT:69 (2.7)



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 1/2"-female

FD-02.3 - with housing, R 1/2"-female, R1 1/4"-male

FD-02.4 - with housing, hose joint 40 mm

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

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

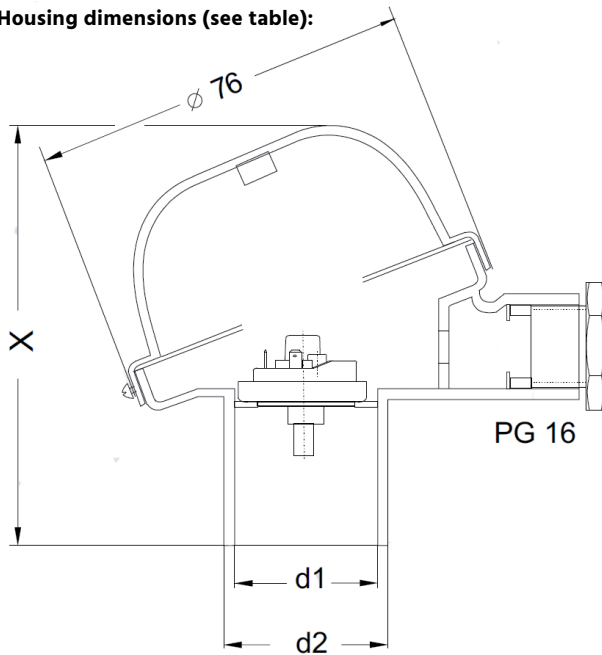
Pressure chamber: polyamide, fiberglass reinforced

Hysteresis / 15%, min. 30 mm water column

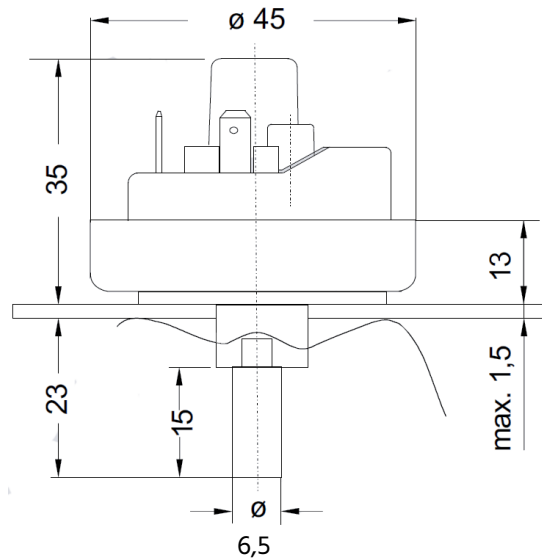
Indexing tolerance / ± 10%, min. +7.5 mm water column

Dimensions in mm:

Housing dimensions (see table):



Switch Dimensions FD-02.1 (without housing)



Housing Dimensions:

Version	d1	x	d2
FD-02.2	R 1/2" female	78 mm	-
FD-02.3	R 1/2" female	85 mm	R1 1/4" 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 1/2"-female
- 3 = with housing, R 1/2"-female, R1 1/4"-male
- 4 = with housing, hose joint 40 mm



DF-02

Rotating Vane Level Switch for Industrial Applications

Features

**/ Robust aluminium pressure cast
or stainless steel housing**

/ Easy to assemble

**/ Can be used as full
and empty alerter**

**/ Available optionally
with shaft extension**

**/ Capacity of the contact:
1mA/4VDC up to 2A/250VAC**

Description:

A gear motor situated at a certain rotatable angle in the extension of a shaft is held by means of a spring on a stopper. Over the shaft, the motor drives the vane projecting into a vessel. As soon as the filling material reaches the vane, it is prevented from its further rotation. The reverse torque twists the motor from its end position and actuates a switch. Subsequently, a second switch turns off the motor. If the level goes down, the vane is released and the motor is drawn back by the spring into its end position. In this, the motor is switched on again and the output signal is switched back. The gear motor and both the switches are mounted in an aluminium pressure housing. Precise running of the vane shaft is ensured by 2 encapsulated ball-bearings. In the event of a blockage, a retention coupling prevents damage to the motor. A special type sealing on the shaft prevents dust and humidity from infiltrating into the housing and the ball-bearing.

Application:

The device is suitable for all freely trickling or hardly flowing bulk goods and for goods that tend to bridge, felting or crusting.



Tehnical Specifications:

Materials /

Housing:	Alu pressure casting (Standard), stainless steel (Option)
Sealing ring:	NBR (optionally Viton or PTFE)
Shaft and Vane:	stainless steel 1.4301 (optionally 1.4571)
Nuts:	steel, Zn plated

Temperature range /

Ambient temp.:	-20...+70°C
Bulk goods temp.:	-25...+80°C (Standard) (up to +1000°C with high temp.-option)

Pressure range /

-0.5...+ 5 bar (Standard),
(optional -0.9...+10 bar)

Consumption /

4 VA (AC), 4 W (DC)

Switching load /

potential-free change-over
1mA/4VDC to 2A/250VAC

Cable insertion /

1 x M20 x 1,5

RPM /

1rpm, 5 or 8 rpm on request

Protection class /

IP 66, IP65 with control lamp

Seelection guide for measuring vanes:

Lowest bulk weight ρ_b for which the
measuring blade can be set.

bulk weight ρ_b in:

Filling level up to 100 mm above measuring blade	kg/l	t/m ³
Filling level until blade is completely covered	t/m ³	kg/l

Measuring blade	Blade size	Spring force setting		Measuring vane for opening
		light	medium	
S2 Socket blade	130 x 30	$\frac{0.2}{0.35}$	$\frac{0.3}{0.5}$	G1 ¼", G1 ½" and all flanges
M1 Socket blade	90 x 28	$\frac{0.15}{0.3}$	$\frac{0.2}{0.5}$	G1", G1 ¼", G1 ½" and all flanges
M2 Socket blade	90 x 40	$\frac{0.1}{0.2}$	$\frac{0.15}{0.3}$	G1 ½" and all flanges
T0 Blade T200	68 x 220	$\frac{0.15}{0.3}$	$\frac{0.25}{0.5}$	F70, F100, DN32 PN16, DN100 PN6
T1 Blade T50	98 x 50	$\frac{0.15}{0.3}$	$\frac{0.25}{0.5}$	F100 and DN100 PN6
T2 Blade T100	98 x 100	$\frac{0.1}{0.2}$	$\frac{0.2}{0.45}$	F100 and DN100 PN6
X1 Blade X50	98 x 50	$\frac{0.15}{0.3}$	$\frac{0.25}{0.5}$	F100 and DN100 PN6
X2 Blade X100	98 x 100	$\frac{0.1}{0.2}$	$\frac{0.2}{0.45}$	F100 and DN100 PN6
X3 Blade X200	180 x 100	$\frac{0.025}{0.05}$	$\frac{0.075}{0.15}$	Must be fitted from inside after mounting the housing
K1 Hinged Blade T230	200 x 30	$\frac{0.05}{0.08}$	$\frac{0.07}{0.12}$	G1 ¼", G1 ½" and all flanges
SG Blade	126 x 8	$\frac{0.45}{0.55}$	$\frac{0.65}{0.75}$	G1 ¼", G1 ½" and all flanges
TG Blade	98 x 8	$\frac{0.5}{0.6}$	$\frac{0.7}{0.8}$	F100 and DN100 PN6

All values given are approximate values and depend on the characteristics of the bulk goods such as consistency and flow behaviour, for example.



Ordering Codes:

Order number

DF-02. 1. 0. 1. 0. 1. 1. 1. 3. 1. 1. 0. 0

DF-02 Rotating Vane Level Switch

Housing /

- 1 = aluminium compact housing
- 2 = stainless steel round housing

Ex approval /

- 0 = none
- 1 = dust Ex ATEX II 1D T70°C IP66 (always with function or voltage monitoring)

Operating voltage /

- 1 = 220-240 VAC, 50-60 Hz
- 2 = 110-120 VAC, 50-60 Hz
- 3 = 48 VAC, 50-60 Hz
- 4 = 24 VAC, 50-60 Hz
- 5 = 24 VDC +10%/-15%

Self-monitoring /

- 0 = none
- 1 = function monitoring
- 2 = voltage monitoring

Signal lamps /

- 1 = standard with function LEDs on board
- 2 = calotte for function LEDs (not for Ex-version)
- 3 = signal lamps LED green (not for Ex-version)
- 4 = large signal lamps LED, green (not for Ex-version)

Bulk material temperature (max. -25°C to 45°C for dust Ex version) /

- 1 = standard -25...+80°C
- 2 = -40...+150°C
- 3 = -25...+200°C
- 4 = -25...+260°C
- 5 = -25...+500°C
- 6 = up to +1000°C on request

Vessel pressure /

- 1 = standard -0.5...+5 bar (-80...+80mbar for dust Ex version)
- 2 = -0.5...+10 bar
- 3 = -0.9...+10 bar

Process connection /

- 1 = G 1"-male
- 2 = G1 ¼"-male
- 3 = G1 ½"-male
- 4 = M30x1.5-male
- 5 = M32x1.5-male
- 6 = flange F70, diameter 110 mm, 4 holes with diameter of 9 mm, hole circle 90 mm
- 7 = flange F100, 150x150 mm, 4 holes with diameter of 18 mm, hole circle 170 mm
- 8 = flange DN32 PN10 (stainless steel only)
- 9 = flange DN100 PN6 (stainless steel only)

Material for process connection /

- 1 = aluminium
- 2 = stainless steel 1.4301

Measuring vane /

- 0 = no measuring vane
- 1 = S2 bushing vane 130x30 mm inclined, fits through G1 ¼" and G1 ½" and all flange variants
- 2 = M1 bushing vane 90x28 mm, fits through G1", G1 ¼" and G1 ½" and all flange variants
- 3 = M2 bushing vane 90x40 mm, fits through G1 ½" and all flange variants
- 4 = T50 vane 98x50 mm, fits through flanges F100 and DN100
- 5 = T100 vane 98x100 mm, fits through flanges F100 and DN100
- 6 = X50 vane 98x50 mm, fits through flanges F100 and DN100
- 7 = X100 vane 98x100 mm, fits through flanges F100 and DN100
- 8 = X200 vane 180x100 mm, must be fitted from inside after mounting the housing
- 9 = T0 flat paddle 68x220 mm, fits through flanges F70, F100 and DN100
- 10 = SG L rod vane for very rough bulk material mm, fits through G1 ¼" and G1 ½" and all flange variants
- 11 = T6 T rod vane for very rough bulk material mm, fits through flanges F100 and DN100
- 12 = T230 flap vane 200x30 mm, fits through G1 ¼", G1 ½" and all flange variants

Measuring vane reinforcement (for bushings and T vanes only) /

- 0 = no reinforcement
- 1 = with reinforcement

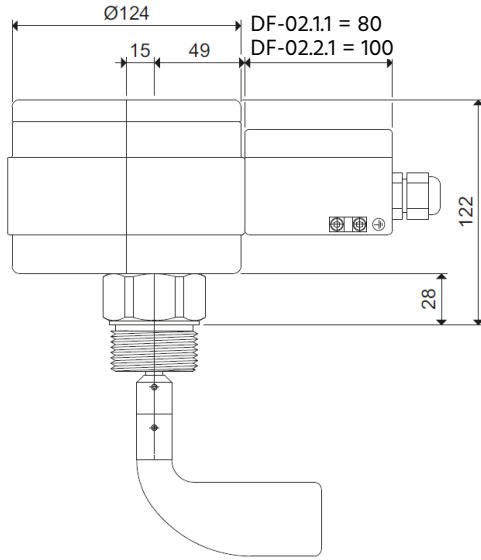
Options /

- 0 = no options
- 1 = sideways mounting with reinforced bearing
- 2 = with flexible wire rope extension (specify length in detailed text)
- 3 = with rigid shaft extension (specify length in detailed text)

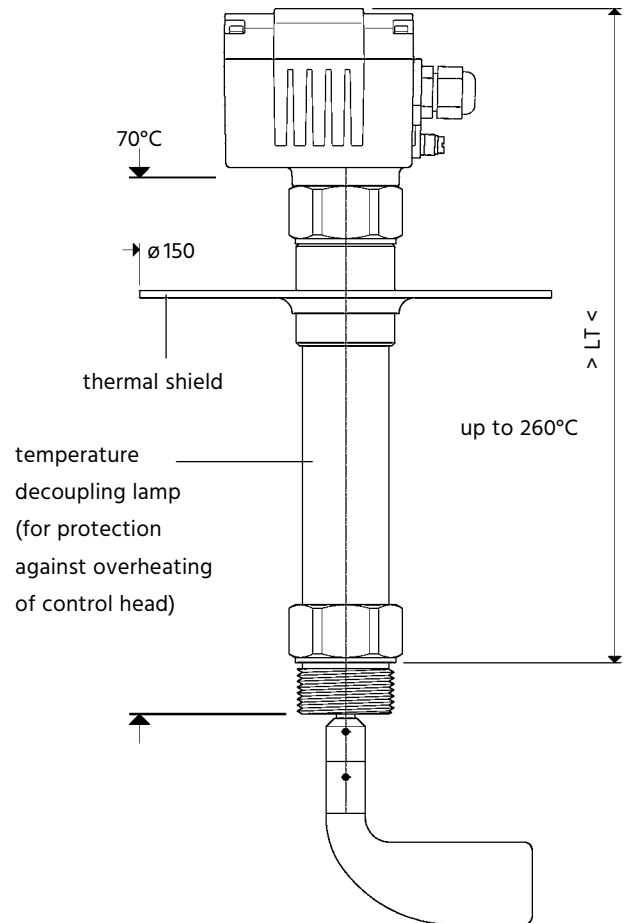
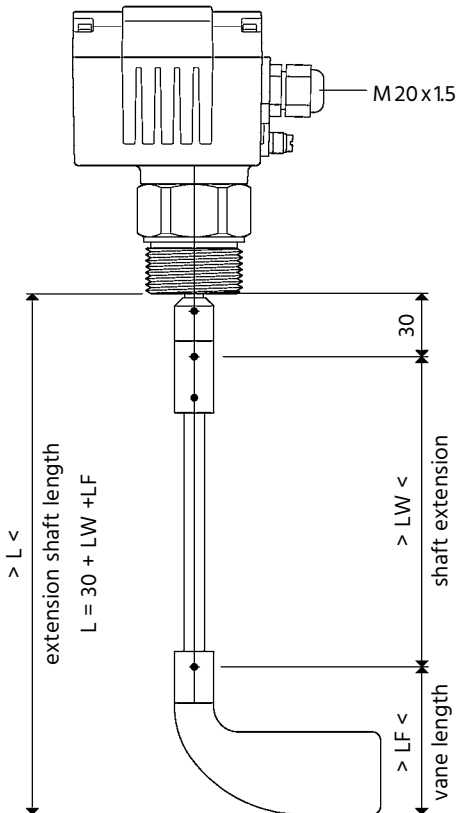
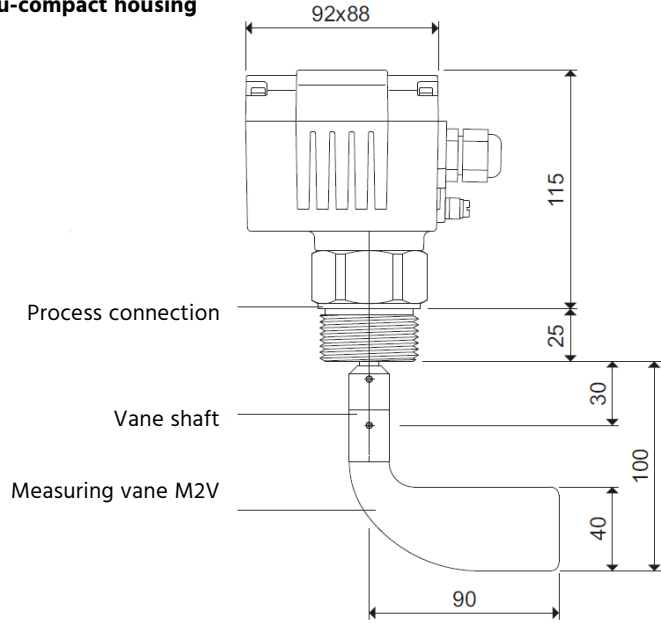


Dimensions and versions in mm:


St. steel rounded housing



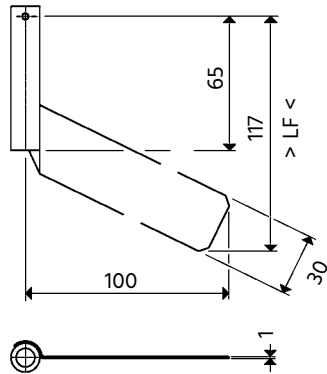
Alu-compact housing



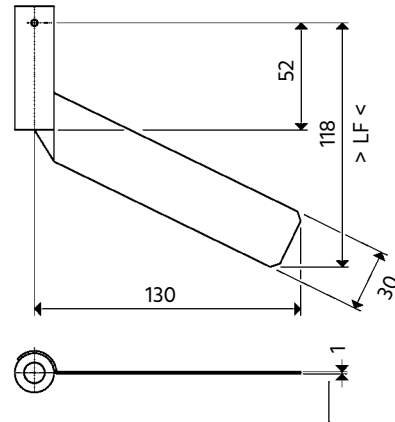


Flame protection for all measuring vanes shown:  II 1GD c IIC TX

S1 bushing blade

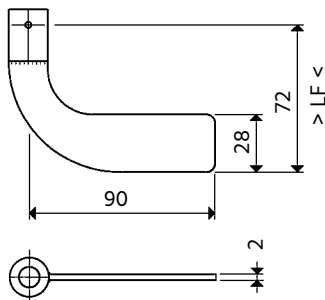


S2 bushing blade

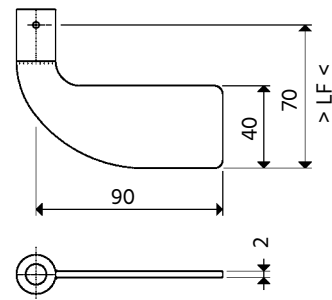


2mm for S2V bushing vane, reinforced

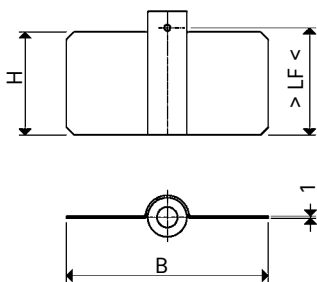
M1V bushing blade, reinforced



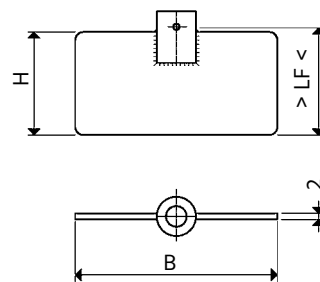
M2V bushing blade, reinforced



T - blade



T - blade, reinforced



	B	H	LF
T1	98	50	52
T2	98	100	102
T3	200	100	102
T5	250	100	102
T8*	250	100	102

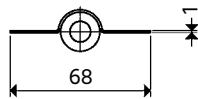
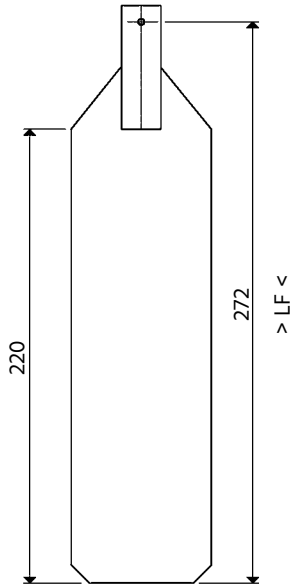
	B	H	LF
T1V	98	50	52
T2V	98	100	102

* vanes 10 mm thick
made of rubber NBR, black

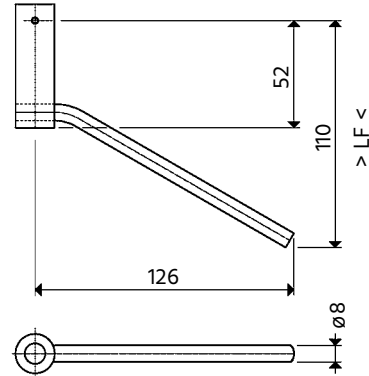


Flame protection for all measuring vanes shown: II 1GD c IIC TX

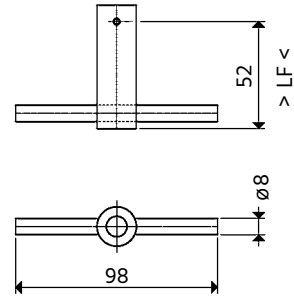
TO blade



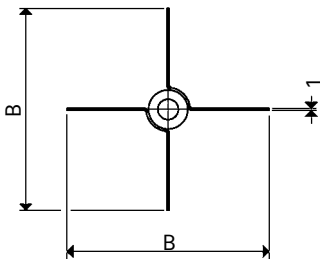
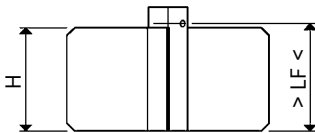
SG bushing blade, reinforced



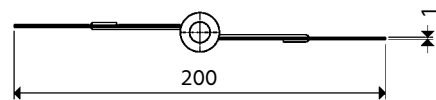
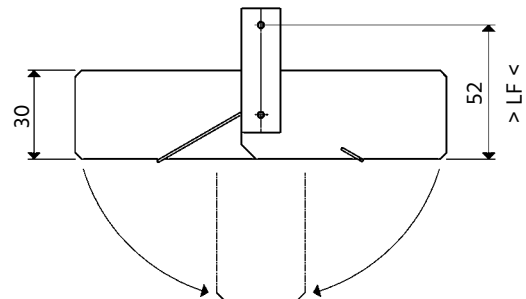
TG blade, reinforced



X blade



K1 flap-blade



	B	H	LF
X1	98	50	52
X2	98	100	102
X3	180	100	102



MS-04

Membrane Level Switch for Bulk Goods



Features

- / Can be used as full & empty detector
- / Easy to assemble
- / Does not require space in the vessel
- / Neopren, Viton or stainless steel membranes
- / High temp. version up to 200°C
- / Output signal: change-over contact with high switching cap. (4 A / 250 V)

Description:

The MS-04 series of membrane level switches consists of a plastic or aluminium housing with a membrane held in place by a fastening ring. They are mounted aligned into the vessel wall and, therefore, do not project into the vessel. The bulk material applies pressure against the membrane which is prestressed by a spring and thereby actuates a micro-switch. Depending on the type of bulk material and its weight, the devices can be supplied with different membrane diameters and membrane material.

Application:

The device is suitable for all freely trickling or hardly flowing bulk materials in non-pressurized vessels.



Technical Specifications:

Material /

- Housing: plastic, fiber glass reinforced or aluminium
- Membrane: NBR, Viton or stainless steel
- Mounting ring: aluminium, Zn plated steel or st. steel

Mounting position /

any

Pressure range /

for non-pressurized vessels

Overpressure security /

1 bar

Switching load /

potential-free change-over contact
4 A / 250 VAC

Switching voltage /

24 V...250 VAC or 12 V...125 VDC

Cable insert /

screw joint M20 x 1.5

Protection class /

- IP 40
- IP 53 if compensating filter is downwards
- IP 65 with stainless steel membrane
- IP 66 with aluminium housing and stainless steel membrane (MS-04.B max. IP 65)

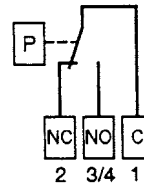
Temperature range /

Type	Membrane	Bulk temperature
MS-04.E	NBR / Viton	-20...+60 °C
	stainless steel 1.4301	(housing aluminium +80°C)
MS-04.F	NBR / Viton	-20...+60 °C
		(housing aluminium +80°C)
MS-04.B	NBR	-20...+80 °C
	Viton	-20...+150 °C
	stainless steel 1.4301	-20...+200 °C
MS-04.D	NBR / Viton	-20...+70 °C

Possible Combinations:

Type	Membrane	Mounting ring	Housing
MS-04.E	NBR / Viton / SS	Zn-plated steel / SS	plastic
MS-04.E	SS	SS	aluminium
MS-04.F	NBR / Viton	Zn-plated steel / SS	plastic
MS-04.F	SS	SS	aluminium
MS-04.B	NBR / Viton / SS	aluminium / SS	aluminium
MS-04.D	NBR / Viton	Zn-plated steel / SS	plastic

Electrical Connection:

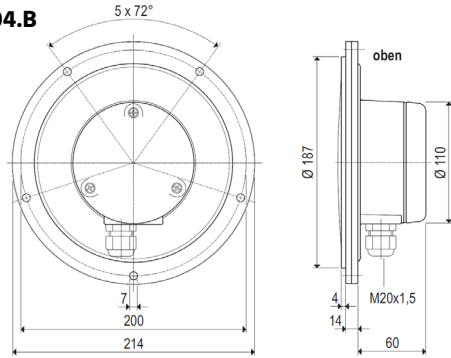


Ordering Codes:

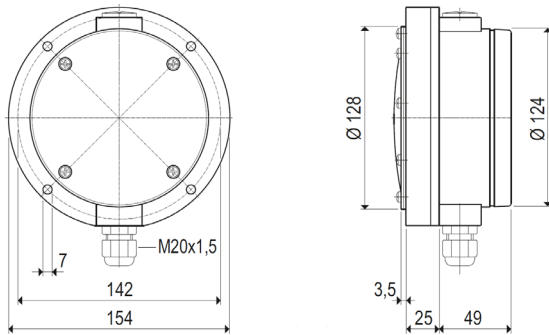
Order number	MS-04.	E.	N.	N.	K
MS-04 Membrane Level Switch					
Housing design /					
E = Ø 128 mm, standard version					
F = Ø 128 mm, construction for larger vessel wall thickness					
B = Ø 187 mm, construction for high temperature					
D = Ø 128 mm, construction with double-membrane					
Membrane material /					
N = NBR					
V = Viton					
E = stainless steel 1.4301 (with mounting ring in stainless steel only)					
Mounting ring /					
A = aluminium					
N = Zn-plated steel					
E = stainless steel 1.4301					
Housing /					
A = aluminium					
K = plastic (fiberglass reinforced)					

Dimensions in mm:

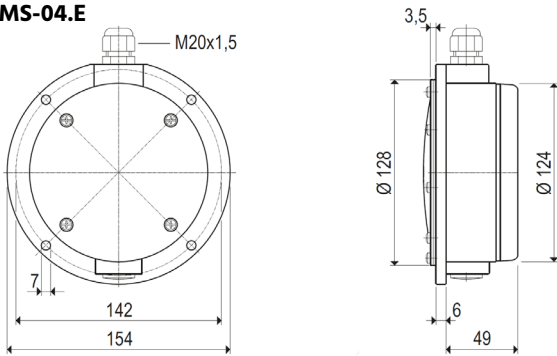
MS-04.B



MS-04.D top



MS-04.E



MS-04.F

