SITRANS P MPS (submersible sensor)
Transmitter for hydrostatic level

Overview

SITRANS P MPS pressure transmitters are submersible sensors for hydrostatic level measurements.

The SITRANS P MPS pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A junction box and a cable hanger are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0,3 %)
- Degree of protection IP 68

Application

SITRANS P MPS pressure transmitters are used in the following branches for example:

- Oil and gas industries
- Shipbuilding
- Water supply

Design

SITRANS P MPS pressure transmitters have a front-flush piezo-resistive sensor with stainless steel diaphragm.

These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing. The cable also contains a strength cord and vent pipe.

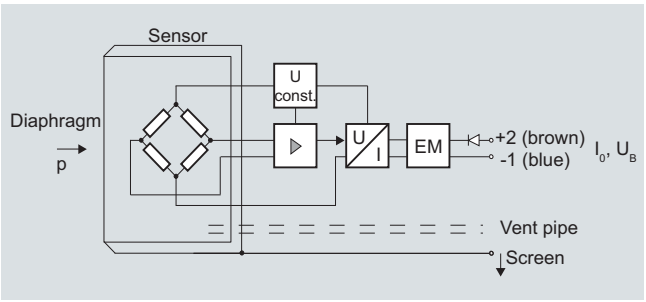
The diaphragm is protected against external influences by a protective cap.

The sensor, electronic circuit and cable are sealed in a common housing of small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function

SITRANS P MPS pressure transmitters are for measuring the liquid levels in wells, tanks, channels and dams.



SITRANS P MPS pressure transmitter, mode of operation and wiring diagram

On one side of the sensor, the diaphragm is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe in the connection cable.

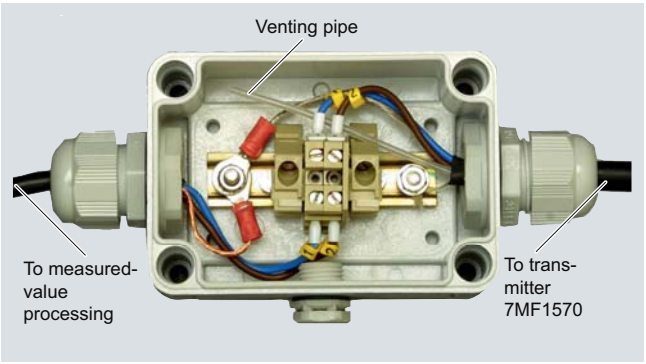
The hydrostatic pressure of the liquid column acts on the sensor diaphragm, and transmits the pressure to the piezo-resistive bridge in the sensor.

The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

The cable of the 7MF1570 transmitter must always be connected in the supplied junction box. The junction box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter.

Integration



Junction box 7MF1570-8AA, opened

Measuring point setup, in principle

Technical specifications

SITRANS P MPS pressure measurement transmitter (submersible sensor)	
Mode of operation	
Measuring principle	piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Maximum operating pressure
• 0 ... 2 mH_2O (0 ... 6 ftH_2O)	• 1,4 bar (20.3 psi) (corresponds to 14 mH_2O (42 ftH_2O))
• 0 ... 4 mH_2O (0 ... 12 ftH_2O)	• 1,4 bar (20.3 psi) (corresponds to 14 mH_2O (42 ftH_2O))
• 0 ... 5 mH_2O (0 ... 15 ftH_2O)	• 1,4 bar (20.3 psi) (corresponds to 14 mH_2O (42 ftH_2O))
• 0 ... 6 mH_2O (0 ... 18 ftH_2O)	• 3,0 bar (43.5 psi) (corresponds to 30 mH_2O (90 ftH_2O))
• 0 ... 10 mH_2O (0 ... 30 ftH_2O)	• 3,0 bar (43.5 psi) (corresponds to 30 mH_2O (90 ftH_2O))
• 0 ... 20 mH_2O (0 ... 60 ftH_2O)	• 6,0 bar (87.0 psi) (corresponds to 60 mH_2O (180 ftH_2O))
Output	
Output signal	4 ... 20 mA
Measuring accuracy	Acc. to EN 60770-1
Error in measurement (including non-linearity, hysteresis and repeatability, at 25 °C (77 °F))	0.3% of full-scale value (typical)
Influence of ambient temperature	
Zero and span	
• 1 ... 6 mH_2O (3 ... 18 ftH_2O)	0.45 %/10 K of full-scale value
• ≥ 6 mH_2O (≥ 18 ftH_2O)	0.3 %/10 K of full-scale value
Long-term stability	
Zero and span	
• 1 ... 6 mH_2O (3 ...18 ftH_2O)	0.25 % of full-scale value/year
• ≥ 6 mH_2O (≥ 18 ftH_2O)	0.2 % of full-scale value/year
Rated conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-40 ... +100 °C (-40 ... +212 °F)
Degree of protection to DIN EN 60529	IP68
Design	
Weight	
• Pressure transmitter	≈ 0.4 kg (≈ 0.88 lb)
• Cable	0.08 kg/m (≈ 0.054 lb/ft)
Electrical connection	Cable with 2 conductors with screen and vent pipe, strength cord (max. 300 N (67.44 lbf)
Material	
• Seal diaphragm	Stainless steel, mat. no. 316L/ 316 Ti
• Enclosure	Stainless steel, mat. no. 316L/ 316 Ti
• Gasket	Viton
• Connecting cable	Either PE/HFFR sheath (non-halogen) or FEP sheath
Power supply	
Terminal voltage on pressure transmitter U_B	10 ... 36 V DC
Certificates and approvals	
The transmitter is not subject to the pressure equipment directive (PED 97/23/EC)	
Explosion protection	
• Intrinsic safety "i"	TÜV 03 ATEX 2004X
- Marking	Ex II 1 G EEx ia IIC T4
Junction box	
Application	for connecting the transmitter cable
Design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x M20 x 1.5
Enclosure material	polycarbonate
Vent pipe for atmospheric pressure	
Screw for cable strength cord	
Rated conditions	
Degree of protection to DIN EN 60529	IP54
Cable hanger	
Application	for mounting the transmitter
Design	
Weight	0.16 kg (0.35 lb)
Material	Galvanized steel, polyamide

SITRANS P MPS (submersible sensor)
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Selection and Ordering data			Order No.	Order code
SITRANS P MPS pressure transmitter for gauge pressure (submersible sensor)		C)	**7MF1570-**	**A0**
2-wire system				
Note: Junction box and cable hanger included in delivery				
Connection cable material				
PE	►			**1**
FEP				**5**
Measuring range	**Cable length L**			
0 ... 2 mH_2O	10 m	►		**C**
0 ... 4 mH_2O	10 m	►		**D**
0 ... 5 mH_2O (with PE cable only)	25 m	►		**B**
0 ... 6 mH_2O	25 m	►		**E**
0 ... 10 mH_2O	25 m	►		**F**
0 ... 20 mH_2O	25 m	►		**G**
0 ... 6 ftH_2O	32 ft			**K**
0 ... 12 ftH_2O	32 ft			**L**
0 ... 18 ftH_2O	82 ft			**M**
0 ... 30 ftH_2O	82 ft			**N**
0 ... 60 ftH_2O	82 ft			**P**
Special measuring range/ special cable length) Specify measuring range and cable length in plain text[1]				**Z** **J1Y**
Explosion protection				
• None		►		**1**
• with type of protection "intrinsic safety" (Ex II 1 G EEx ia IIC T4)		►		**2**
Approvals				
• with drinking water approval to WRAS and ACS		►		**6**

Further designs	Order code
Supplied with quality inspection certificate (factory calibration) to IEC 60770-2, add Z to order no. and add order code.	**C11**

	Order No.
Quality inspection certificate (factory calibration) to IEC 60770-2 supplied later, in this case state manufacturing number of transmitter.	**7MF1564-8CC11**

Accessories (as spare part)	
Junction box for connecting the transmitter cable	**7MF1570-8AA**
Cable hanger For attachment of transmitter	**7MF1570-8AB**

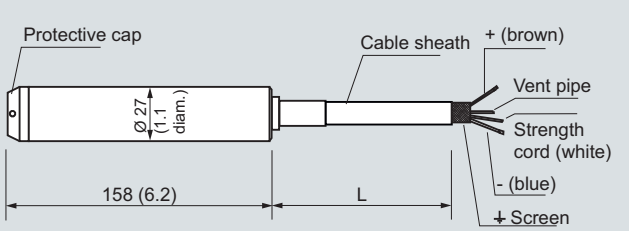
► Available ex stock

Power supply units see Chap. 8 "Supplementary Components".

1) Special measuring ranges of between 0 ... 1 mH_2O (0 ... 3 ftH_2O) and 0 ... 200 mH_2O (0 ... 656 ftH_2O) and special cable lengths of up to 1000 m (3281 ft) are possible. With Ex versions the max. custom cable length is 50 m (150 (ft). The length of free-hanging cable should not exceed 375 m (1230 ft).

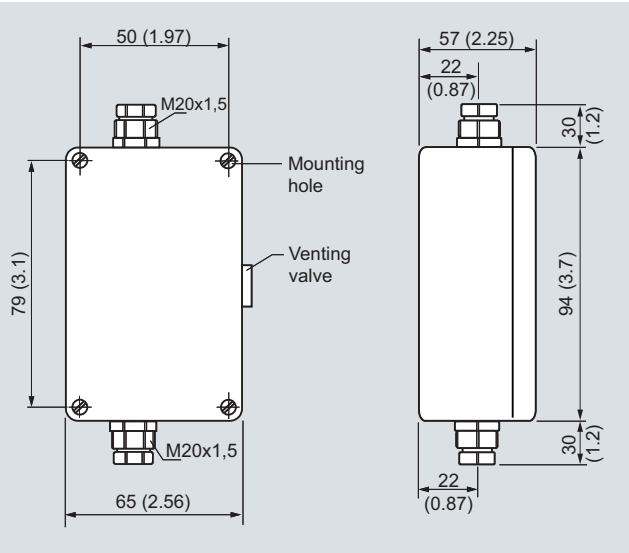
C) Subject to export regulations AL: N, ECCN: EAR99.

Dimensional drawings

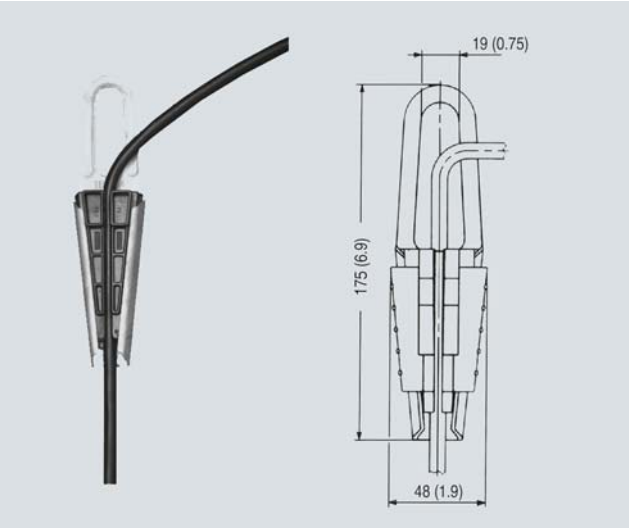


Cable sheath 8.3 (0.33) diam. (black or blue, PE/HFFR)
Flexible cable with 0.5 mm^2 (0.00078 $inch^2$) cross-section
Vent pipe 1 (0.04) diam. (inner diameter)
Protective cap with 4 x 3 diam. (4 x 0.12 diam.) holes (black, PA)

SITRANS P MPS pressure transmitters, dimensions in mm (inch)



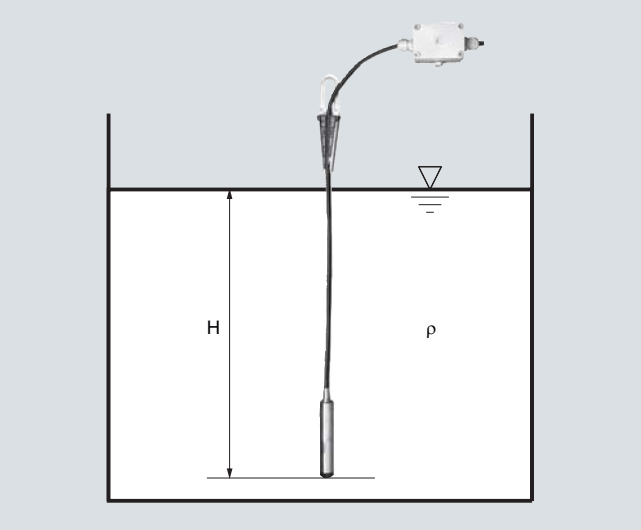
Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

More information

Determination of the measuring range in case of media with a density ≠ 1000 kg/m3 (medium ≠ water)



Calculation of the measuring range:

p = ρ x g x H

with:

ρ = density of medium

g = local acceleration due to gravity

H = maximum level

Example:

Medium: Diesel fuel, ρ = 850 kg/m^3

Acceleration due to gravity: 9.81 m/s^2

Start-of-scale: 0 m

Maximum level: 6.2 m

Calculation:

p = 850 kg/m^3 x 9.81 m/s^2 x 6.2 m

p = 51698.7 N/m^2

p = 517 mbar

Transmitter to be ordered:

7MF1570-5ZA02-Z

J1Y: 0 ... 517 mbar; cable length e.g. 8 m

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