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Overview

The pressure transmitter SITRANS LH100 is a submersible sensor for hydrostatic level measurement.

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH100 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A cable box and an anchoring clamp are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

Application

SITRANS LH100 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- For use in unpressurized/open vessels and wells

Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

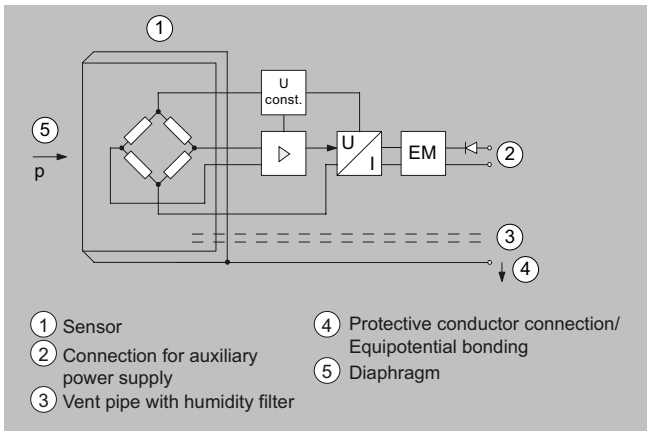
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel enclosure. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

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

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

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

Function



SITRANS LH100 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) 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 (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condensation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

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

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

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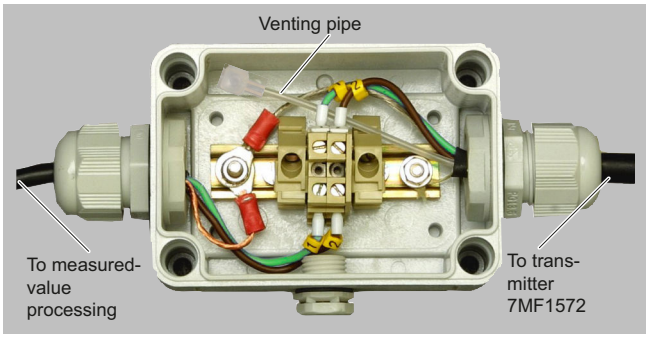
Integration

It is generally recommended that the connecting cable of the SITRANS LH100 transmitter is connected to the cable box, which can be ordered separately, and secured with the anchoring clamp, also available separately. The cable 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.



Cable box 7MF1572-8AA, open, schematic diagram

Measuring point setup, generally with cable box 7MF1572-8AA and 7MF1572-8AB cable hanger

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Selection and ordering data

SITRANS LH100 pressure transmitter		Article No. 7MF1572-					Order code		
		●	●	A	●	●	●	●	●
For the measurement of the hydrostatic fill level through submersion 2-wire system, 4 ... 20 mA, enclosure material mat. no. 1.4404 (316 L) Measuring cell Al2O3 ceramic, with permanently mounted PE cable									
Click the article number for online configuration in the PIA Life Cycle Portal.									
Measuring range	**Cable length**								
0 ... 3 mH_2O	10 m (≈ 30 ft)	1	C						
0 ... 4 mH_2O	10 m (≈ 30 ft)	1	D						
0 ... 5 mH_2O	10 m (≈ 30 ft)	1	E						
0 ... 6 mH_2O	10 m (≈ 30 ft)	1	F						
0 ... 10 mH_2O	20 m (≈ 60 ft)	1	H						
0 ... 20 mH_2O	30 m (≈ 90 ft)	1	K						
0 ... 9 ftH_2O[1)]	33 ft	2	C						
0 ... 12 ftH_2O	33 ft	2	D						
0 ... 15 ftH_2O	33 ft	2	E						
0 ... 18 ftH_2O	33 ft	2	F						
0 ... 30 ftH_2O	66 ft	2	H						
0 ... 60 ftH_2O	98 ft	2	K						
0 ... 0.3 bar[1)]	10 m (≈ 30 ft)	3	C						
0 ... 0.4 bar	10 m (≈ 30 ft)	3	D						
0 ... 0.5 bar	10 m (≈ 30 ft)	3	E						
0 ... 0.6 bar	10 m (≈ 30 ft)	3	F						
0 ... 1 bar	20 m (≈ 60 ft)	3	H						
0 ... 2 bar	30 m (≈ 90 ft)	3	K						
Special designs									
Measuring ranges for special designs between: • 0 ... 3 mH_2O and 0 ... 30 mH_2O • 0 ... 9 ftH_2O and 0 ... 100 ftH_2O • 0 ... 0.3 bar and 0 ... 3 bar									
Special cable length/special measuring range		9	A				H	.	.
Add **"-Z"** to article number, specify order code and plain text. Note: Specification of the measuring range Y01 is mandatory!							+ Y	 0	 1
The following applies to determining the maximum cable length for Ex versions: Transmitters: • C_i = 0 µF, L_i = 0 µH Cables: • C_k = 0.19 nF per meter cable • L_k = 1.5 µH per meter cable The max. permissible data of the transmitter infeed device must be taken into account!									
3 m (10 ft)							H	1	A
5 m (16 ft)							H	1	B
7 m (23 ft)							H	1	C
10 m (33 ft)							H	1	D
15 m (49 ft)							H	1	E
20 m (66 ft)							H	1	F
25 m (82 ft)							H	1	G
30 m (98 ft)							H	1	H
40 m (131 ft)							H	1	J
50 m (164 ft)							H	1	K
60 m (198 ft)							H	1	L
70 m (231 ft)							H	1	M
80 m (264 ft)							H	1	N
90 m (297 ft)							H	1	P
100 m (330 ft)							H	1	Q
Gasket material between sensor and enclosure									
FPM (standard)					1				
EPDM (for drinking water applications)					2				
Explosion protection									
None						0			
With explosion protection ATEX II1 G Ex ia IIC T4 Ga and IECEx Ex ia IIC T4 Ga						1			

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Selection and ordering data (continued)

Options Add "-Z" to article number and specify order code.	Order code
Quality inspection certificate (5-point characteristic curve test) according to IEC 62828-2	**C11**
Specification of measuring range (only with special cable lengths) in: "... to ... mH_2O" or "... to ... ftH_2O" or "... to ... bar"	**Y01**

Accessories/spare parts

	Article No.
Cable plug for connecting the transmitter cable	**7MF1572-8AA**
Anchoring clamp For mounting the pressure transmitter	**7MF1572-8AB**
Protective caps As a replacement (pack of 10)	**7MF1572-8AD**
Humidity filter As a replacement (pack of 10)	**7MF1572-8AE**

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Technical specifications

Pressure transmitter SITRANS LH100 (submersible sensor)	
Mode of operation	
Measuring principle	Piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 ... 3 mH_2O (0 ... 9 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 4 mH_2O (0 ... 12 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 5 mH_2O (0 ... 15 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 6 mH_2O (0 ... 18 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 10 mH_2O (0 ... 30 ftH_2O)	• 3.0 bar (43.5 psi) (corresponds to 30 mH2O (90 ftH2O))
• 0 ... 20 mH_2O (0 ... 60 ftH_2O)	• 5.0 bar (72.5 psi) (corresponds to 50 mH_2O (150 ftH_2O))
• 0 ... 0.3 bar	• 1.5 bar
• 0 ... 0.4 bar	• 1.5 bar
• 0 ... 0.5 bar	• 1.5 bar
• 0 ... 0.6 bar	• 1.5 bar
• 0 ... 1 bar	• 3.0 bar
• 0 ... 2 bar	• 5.0 bar
Output	
Output signal	4 ... 20 mA
Measuring accuracy	According to IEC 62828-1
Measurement deviation at limit setting including hysteresis and reproducibility	
Measuring range	
• 0 ... 3 mH_2O (0 ... 9 ftH_2O or 0 ... 0.3 bar)	• 0.5% measuring range end value (typical) • 1.0% of measuring range end value (maximum)
• For all other measuring ranges	• 0.3% of measuring range end value (typical) • 0.6% of measuring range end value (maximum)
Effect of ambient temperature	
Measuring range	Zero and span
• 3 mH_2O (9 ftH_2O or 0.3 bar)	0.45%/10 K of measuring range end value
• 4 ... 6 mH_2O (12 ... 18 ftH_2O or 0.4...0.6 bar)	0.45%/10 K of measuring range end value
• > 6 mH_2O (> 18 ftH_2O or > 0.6 bar)	0.3%/10 K of measuring range end value
Long-term stability	
Measuring range	Zero and span
• 3 mH_2O (9 ftH_2O or 0.3 bar)	0.4% of measuring range end value/year
• 4 ... 6 mH_2O (12 ... 18 ftH_2O or 0.4...0.6 bar)	0.25% of measuring range end value/year
• > 6 mH_2O (> 18 ftH_2O or > 0.6 bar)	0.2% of measuring range end value/year
Operating conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Degree of protection according to IEC 60529	IP68
Structural design	
Weight	
• Pressure transmitter	≈ 0.2 kg (≈ 0.44 lb)

Technical specifications (continued)

Pressure transmitter SITRANS LH100 (submersible sensor)	
• Cable; maximum cable length 100 m (330 ft)	0.025 kg/m (≈ 0.015 lb/ft)
Electrical connection	Cable with 3 conductors, vent pipe and integrated humidity filter
Material	
• Seal diaphragm	Al_2O_3 ceramic, 96%
• Enclosure	Stainless steel, mat. no. 1.4404/316L
• Gasket	• FPM (standard) • EPDM (optional)
• Connecting cable	• PE-HD (standard) • PE-LD (in the case of versions with EPDM seal, suitable for drinking water applications)
Auxiliary power	
Terminal voltage on pressure transmitter U_B	• 10 ... 33 V DC • 10 ... 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Drinking water approval (ACS)	15 ACC NY 360
EAC	№ ТС RU C-DE.ГБ05.В.00732 ОС НАНИО «ЦСВЭ»
Underwriters Laboratories (UL)	2014-11-17 - E344532
The device is not subject to the pressure equipment directive (PED 2014/68/EU)	
Explosion protection	
• Intrinsic safety "i"	IECEx SEV 14.0003 SEV 14 ATEX 0109
- Marking	II 1 G Ex ia IIC T4 Ga
• EAC Ex	TC RU C-DE.AA87.B.00324

Cable box	
Area of application	For connecting the transmitter cable
Structural design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 × Pg 9
Enclosure material	Polycarbonate
Vent valve for atmospheric pressure	
Operating conditions	
Degree of protection according to IEC 60529	IP65

Anchoring clamp	
Area of application	For mounting the transmitter
Structural design	
Weight	0.16 kg (0.35 lb)
Material	Zinc-plated steel, polyamide

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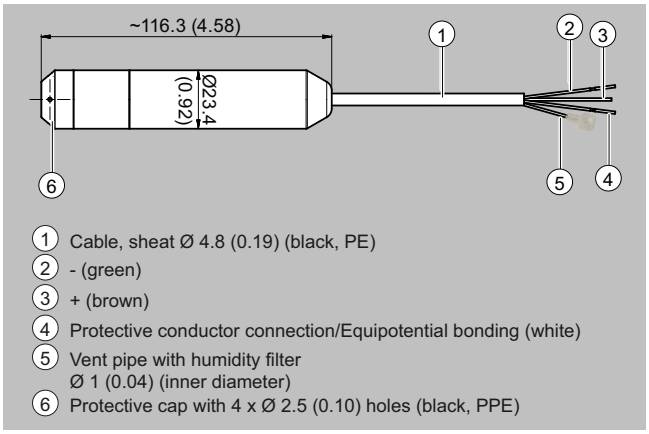
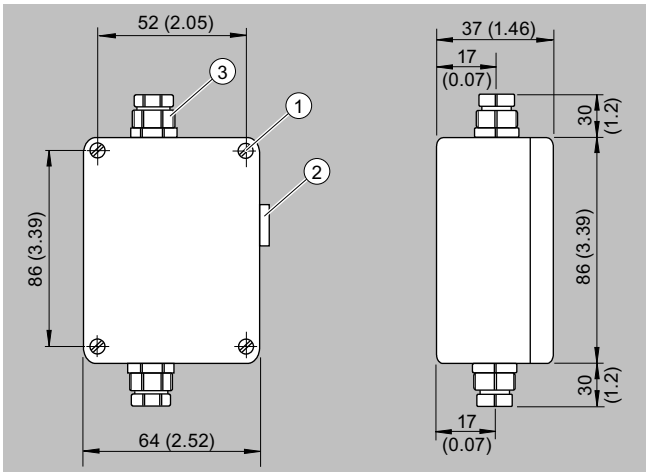
Dimensional drawings



1. Cable, sheat Ø 4.8 (0.19) (black, PE)
2. - (green)
3. + (brown)
4. Protective conductor connection/Equipotential bonding (white)
5. Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
6. Protective cap with 4 x Ø 2.5 (0.10) holes (black, PPE)

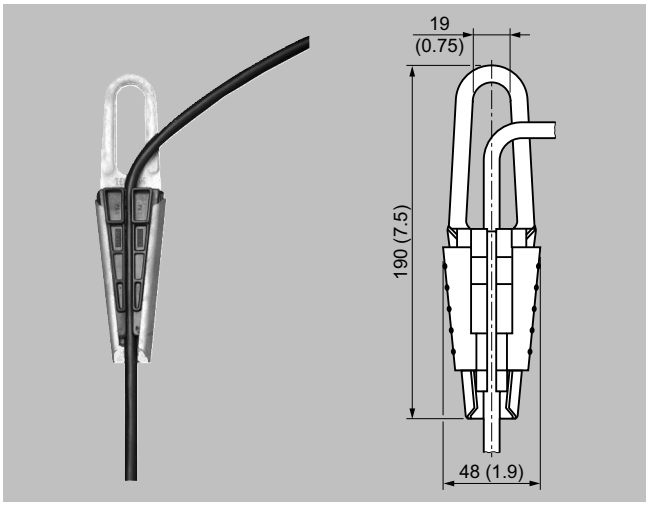
SITRANS LH100 pressure transmitter, dimensions in mm (inch)



1. Fastening hole
2. Vent valve
3. Cable gland Pg 9, cable diameter 4 ... 8 mm (0.16 ... 0.31)

Junction box, dimensions in mm (inch)

Dimensional drawings (continued)



Anchoring clamp, dimensions in mm (inch)

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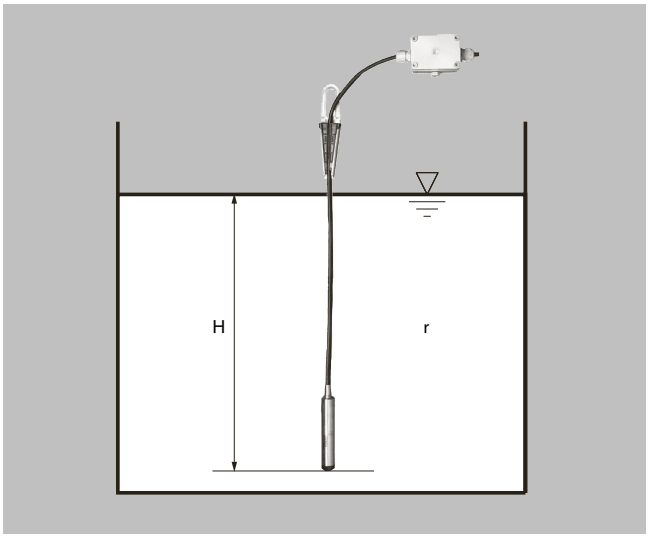
More information

Establishing the measuring range with water as process medium



Calculation of the measuring range

p = ρ x g x H

with:

ρ = density of medium
g = local gravitational acceleration
H = maximum level

Example:

Medium: Water, ρ = 1 000 kg/m^3
Gravitational acceleration: 9.81 m/s^2
Lower range value: 0 m
Maximum level: 6.0 m
Cable length: 10 m

Calculation:

p = 1 000 kg/m^3 x 9.81 m/s^2 x 6.0 m
p = 58 860 N/m^2
p = 589 mbar

Transmitter to be ordered:

7MF1572-1FA10

Plus, if required, cable box 7MF1572-8AA and anchoring clamp 7MF1572-8AB