SITRANS LH300 Transmitter for hydrostatic level

Overview

The pressure transmitter SITRANS LH300 is a submersible sensor for hydrostatic level measurement with cap made of PPE (left), stainless steel (mid) and ETFE (right).

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH300 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 (0.15 % typical)
- Degree of protection IP68

Application

SITRANS LH300 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- Drinking water facilities
- For use in unpressurized/open vessels and wells
- Desalination plants

Design

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

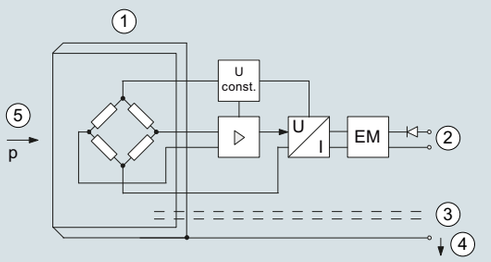
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel enclosure. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

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



1 Sensor
2 Connection for auxiliary power supply
3 Vent pipe with humidity filter
4 Protective conductor connection/ Equipotential bonding
5 Diaphragm

SITRANS LH300 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.

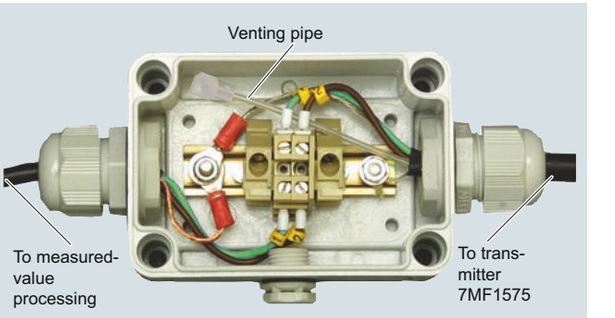
The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

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

Integration

It is generally recommended that the connecting cable of the SITRANS LH300 transmitter is connected to the cable box, which can be ordered separately, and secured with an anchoring clamp, also available separately. The cable plug is to be installed near the measuring point, but outside the medium.

Likewise, in the case of media other than water the compatibility with the specified materials of the transmitter, cable and seal must be checked.



Junction box 7MF1575-8AA, open, schematic diagram

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Measuring point setup, generally with junction box 7MF1575-8AA and 7MF1575-8AB cable hanger

Technical specifications

Pressure transmitter SITRANS LH300 (submersible sensor)	
Mode of operation	
Measuring principle	Piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 ... 1 mH_2O (0 ... 3 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 2 mH_2O (0 ... 6 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 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)	• 2 bar (29 psi) (corresponds to 20 mH_2O (60 ftH_2O))
• 0 ... 5 mH_2O (0 ... 15 ftH_2O)	• 2 bar (29 psi) (corresponds to 20 mH_2O (60 ftH_2O))
• 0 ... 6 mH_2O (0 ... 18 ftH_2O)	• 2 bar (29 psi) (corresponds to 20 mH_2O (60 ftH_2O))
• 0 ... 10 mH_2O (0 ... 30 ftH_2O)	• 5 bar (72.5 psi) (corresponds to 50 mH2O (150 ftH_2O))
• 0 ... 20 mH_2O (0 ... 60 ftH_2O)	• 10 bar (145 psi) (corresponds to 100 mH_2O (300 ftH_2O))
• 0 ... 40 mH_2O (0 ... 120 ftH_2O)	• 20 bar (290 psi) (corresponds to 200 mH_2O (600 ftH_2O))
Special measuring ranges	
• Up to 100 mH_2O (300 ftH_2O)	• 20 bar (290 psi) (corresponds to 200 mH_2O (600 ftH_2O))
• Up to 160 mH_2O (480 ftH_2O)	• 24 bar (348 psi) (corresponds to 240 mH_2O (720 ftH_2O))
Measuring range	
• 0 ... 0.1 bar	• 1.5 bar
• 0 ... 0.2 bar	• 1.5 bar
• 0 ... 0.3 bar	• 1.5 bar
• 0 ... 0.4 bar	• 2 bar
• 0 ... 0.5 bar	• 2 bar
• 0 ... 0.6 bar	• 2 bar
• 0 ... 1 bar	• 5 bar
• 0 ... 2 bar	• 10 bar
• 0 ... 4 bar	• 20 bar
Special measuring range	
• Up to 10 bar	• 20 bar
• Up to 16 bar	• 24 bar
Output	
Output signal	4 ... 20 mA
Measuring accuracy	According to IEC 60770-1
Error in measurement at limit setting including hysteresis and reproducibility	≤ 0.15 % of upper range value (typical)
	≤ 0.3 % of upper range value (maximum)
Influence of ambient temperature	≤ 0.05 %/10 K of upper range value (zero and span)
Long-term stability	≤ 0.15 % of upper range value/year (zero and span)
Operating conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-20 ... +80 °C (-4 ... +176 °F)
Degree of protection according to IEC 60529	IP68

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SITRANS LH300 Transmitter for hydrostatic level

Design	
Weight	
• Pressure transmitter	≈ 0.4 kg (≈ 0.88 lb)
• Cable	0.08 kg/m (≈ 0.059 lb/ft)
Maximal freely suspended length	300 m (990 ft)
Electrical connection	Cable with 2 conductors, vent pipe and integrated humidity filters
Material	
• Seal diaphragm	Al_2O_3 ceramic, 99.6 %
• Enclosure	Stainless steel, mat. no. 1.4404/316L and 1.4539/904L (sea water applications) respectively
• Gasket	FPM (standard)
	EPDM (optional)
• Connecting cable	PE (standard/drinking water applications)
	FEP (for aggressive media)
• Cap	Stainless steel, PPE or ETFE
Auxiliary power	
Terminal voltage on pressure transmitter U_B	10 ... 33 V DC for transmitter without explosion protection
	10 ... 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Drinking water approval (ACS)	17 ACC NY 055
EAC	TC N RU Д-DE.ГА02.B.05092
Underwriters Laboratories (UL)	ML File No. E344532, issued 2017-08-17
Shipbuilding approval (LR)	LR_18/20074
Shipbuilding approval (DNV/GL)	TAA00000CE
Shipbuilding approval (BV)	56926/A0 BV
Shipbuilding approval (ABS)	HG1881314_P
Shipbuilding approval (RINA)	ELE067319XG
Pressure equipment directive	The transmitter is not subject to the pressure equipment directive (PED 2014/68/EU)
Explosion protection	
• ATEX	SEV 16 ATEX 0121
• IEC Ex	IEC Ex SEV 16.0003
• EAC Ex	TC RU C-DE.AA87.B.00324
• Intrinsic safety "i"	
- Marking	II 1 G Ex ia IIC T4 Ga

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 PG 13.5
Enclosure material	Polycarbonate
Vent valve for atmospheric pressure	
Operating conditions	
Degree of protection according to IEC 60529	IP65

Cable hanger	
Application	For mounting the transmitter
Design	
Weight	0.16 kg (0.35 lb)
Material	Galvanized steel, polyamide
Terminal area	For cable with a diameter of 5.5 ... 9.5 mm

Selection and ordering data		Article No.	Order code
Pressure transmitter SITRANS LH300 (submersible sensor) ↗		**7MF1575-**	
For hydrostatic level measurement, submersible transmitter, two-wire connection, 4 … 20 mA, enclosure material see Order option, measuring cell Al_2O_3 ceramics (99.6 % purity), with fixed mounted cable, material of protective cap at PE cable: PPE (colour black) material of protective cap at FEP cable: PPE (colour white)			
Note: junction box and cable hanger have to be ordered separately.			
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring range	**Cable length (PE cable)**		
0 ... 1 mH_2O	5 m	**1A**	
0 ... 2 mH_2O	5 m	**1B**	
0 ... 3 mH_2O	10 m	**1C**	
0 ... 4 mH_2O	10 m	**1D**	
0 ... 5 mH_2O	10 m	**1E**	
0 ... 6 mH_2O	10 m	**1F**	
0 ... 10 mH_2O	20 m	**1H**	
0 ... 20 mH_2O	30 m	**1K**	
0 ... 40 mH_2O	50 m	**1L**	
0 ... 3 ftH_2O	5 m (≈ 15 ft)	**2A**	
0 ... 6 ftH_2O	5 m (≈ 15 ft)	**2B**	
0 ... 9 ftH_2O	10 m (≈ 30 ft)	**2C**	
0 ... 12 ftH_2O	10 m (≈ 30 ft)	**2D**	
0 ... 15 ftH_2O	10 m (≈ 30 ft)	**2E**	
0 ... 18 ftH_2O	10 m (≈ 30 ft)	**2F**	
0 ... 30 ftH_2O	20 m (≈ 60 ft)	**2H**	
0 ... 60 ftH_2O	30 m (≈ 90 ft)	**2K**	
0 ... 120 ftH_2O	50 m (≈ 150 ft)	**2L**	
0 ... 0.1 bar	5 m	**3A**	
0 ... 0.2 bar	5 m	**3B**	
0 ... 0.3 bar	10 m	**3C**	
0 ... 0.4 bar	10 m	**3D**	
0 ... 0.5 bar	10 m	**3E**	
0 ... 0.6 bar	10 m	**3F**	
0 ... 1 bar	20 m	**3H**	
0 ... 2 bar	30 m	**3K**	
0 ... 4 bar	50 m	**3L**	
Special versions:			
Measuring ranges for special versions between			
0 ... 1 mH_2O and 0 ... 160 mH_2O or			
0 ... 3 ftH_2O and 0 ... 530 ftH_2O or			
0 ... 0.1 bar and 0 ... 16 bar possible.			

Selection and ordering data	Article No.	Order code
Pressure transmitter SITRANS LH300 (submersible sensor)	**7MF1575-**	
PE cable for general purpose and drinking water applications		
Special cable length Please add „-Z" to Article No. and specify Order code and plain text: Y01: Cable length	**9X**	**H..** **+** **Y01**
3 m (≈ 10 ft)		**H1A**
5 m (≈ 16 ft)		**H1B**
7 m (≈ 23 ft)		**H1C**
10 m (≈ 33 ft)		**H1D**
15 m (≈ 50ft)		**H1E**
20 m (≈ 65 ft)		**H1F**
25 m (≈ 80 ft)		**H1G**
30 m (≈ 100 ft)		**H1H**
40 m (≈ 130 ft)		**H1J**
50 m (≈ 160 ft)		**H1K**
60 m (≈ 200 ft)		**H1L**
70 m (≈ 230 ft)		**H1M**
80 m (≈ 265 ft)		**H1N**
90 m (≈ 295 ft)		**H1P**
100 m (≈ 330 ft)		**H1Q**
125 m (≈ 410 ft)		**H1R**
150 m (≈ 495 ft)		**H1S**
175 m (≈ 575 ft)		**H1T**
200 m (≈ 650 ft)		**H1U**
225 m (≈ 740 ft)		**H1V**
250 m (≈ 820 ft)		**H1W**
275 m (≈ 900 ft)		**H1X**
300 m (≈ 990 ft)		**H2A**
350 m (≈ 1150 ft)		**H2B**
400 m (≈ 1320 ft)		**H2C**
450 m (≈ 1480 ft)		**H2D**
500 m (≈ 1650 ft)		**H2E**
550 m (≈ 1815 ft)		**H2F**
600 m (≈ 1980 ft)		**H2G**
650 m (≈ 2145 ft)		**H2H**
700 m (≈ 2310 ft)		**H2J**
750 m (≈ 2475 ft)		**H2K**
800 m (≈ 2640 ft)		**H2L**
850 m (≈ 2800 ft)		**H2M**
900 m (≈ 2970 ft)		**H2N**
950 m (≈ 3135 ft)		**H2P**
1000 m (≈ 3300 ft)		**H2Q**
Other special cable length Please add „-Z" to Article No. and specify Order codes and plain text: H1Y: Cable length ..... Y01: Measuring range	**9X**	**H1Y** **+** **Y01**

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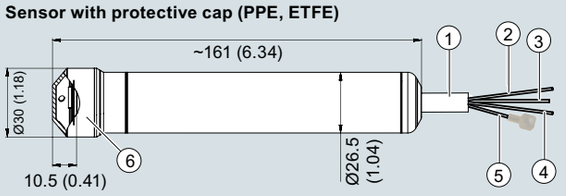
SITRANS LH300 Transmitter for hydrostatic level

Selection and ordering data	Article No.	Order code
Pressure transmitter SITRANS LH300 (submersible sensor)	**7MF1575-**	
FEP cable for aggressive media		
Special cable length Please add „-Z" to Article No. and specify Order code and plain text: Y01: Cable length	**9X**	**H..** **+** **Y01**
3 m (≈ 10 ft)		**H5A**
5 m (≈ 16 ft)		**H5B**
7 m (≈ 23 ft)		**H5C**
10 m (≈ 33 ft)		**H5D**
15 m (≈ 50ft)		**H5E**
20 m (≈ 65 ft)		**H5F**
25 m (≈ 80 ft)		**H5G**
30 m (≈ 100 ft)		**H5H**
40 m (≈ 130 ft)		**H5J**
50 m (≈ 160 ft)		**H5K**
60 m (≈ 200 ft)		**H5L**
70 m (≈ 230 ft)		**H5M**
80 m (≈ 265 ft)		**H5N**
90 m (≈ 295 ft)		**H5P**
100 m (≈ 330 ft)		**H5Q**
125 m (≈ 410 ft)		**H5R**
150 m (≈ 495 ft)		**H5S**
175 m (≈ 575 ft)		**H5T**
200 m (≈ 650 ft)		**H5U**
225 m (≈ 740 ft)		**H5V**
250 m (≈ 820 ft)		**H5W**
275 m (≈ 900 ft)		**H5X**
300 m (≈ 990 ft)		**H6A**
350 m (≈ 1150 ft)		**H6B**
400 m (≈ 1320 ft)		**H6C**
450 m (≈ 1480 ft)		**H6D**
500 m (≈ 1650 ft)		**H6E**
550 m (≈ 1815 ft)		**H6F**
600 m (≈ 1980 ft)		**H6G**
650 m (≈ 2145 ft)		**H6H**
700 m (≈ 2310 ft)		**H6J**
750 m (≈ 2475 ft)		**H6K**
800 m (≈ 2640 ft)		**H6L**
850 m (≈ 2800 ft)		**H6M**
900 m (≈ 2970 ft)		**H6N**
950 m (≈ 3135 ft)		**H6P**
1000 m (≈ 3300 ft)		**H6Q**
Other special cable length Please add „-Z" to Article No. and specify Order codes and plain text: H1Y: Cable length ..... Y01: Measuring range	**9X**	**H5Y** **+** **Y01**

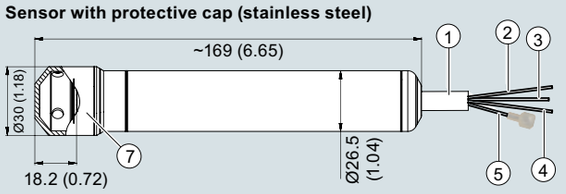
Selection and ordering data		Article No.	Order code
Pressure transmitter SITRANS LH300 (submersible sensor)		**7MF1575-**	
Enclosure material	**Material of protective cap**		
Stainless steel 316L (1.4404)	Protective capability made of PPE (recommended for PE cable)	**A**	
Stainless steel 316L (1.4404)	Protective cap made of ETFE (standard with FEP cable)	**B**	
Stainless steel 316L (1.4404)	Stainless steel 316L (1.4404)	**C**	
Stainless steel 904L (1.4539) for sea water applications	Protective cap PPE	**D**	
Stainless steel 904L (1.4539) for sea water applications	Protective cap ETFE	**E**	
Stainless steel 904L (1.4539) for seawater applications	Stainless steel 904L (1.4539) for seawater applications	**F**	
Sealing material between sensor and enclosure			
FPM (Standard)		**1**	
EPDM (for drinking water)		**2**	
Explosion protection			
without		**0**	
With ATEX II1 G Ex ia IIC T4 Ga, IECEx Ex ia IIC T4 Ga and EAC Ex (only possible for cable length ≤ 300 m (990 ft)		**1**	
Additional versions			Order code
Quality test certificate, 5-point factory calibration (IEC 60770-2)			**C11**
Accessories/spare parts			Article No.
Junction box			**7MF1575-8AA**
Cable hanger			**7MF1575-8AB**
Protective caps, PPE, as spare part (10-pack)			**7MF1575-8AD**
Protective caps, ETFE, as spare part (10-pack)			**7MF1575-8AE**
Humidity filters as spare part (10-pack)			**7MF1575-8AF**
Protective cap, stainless steel 316L (1.4404) for waste water applications			**7MF1575-8AG**
Protective cap, stainless steel 904L (1.4539) for sea water applications			**7MF1575-8AH**

Dimensional drawings

Sensor with protective cap (PPE, ETFE)

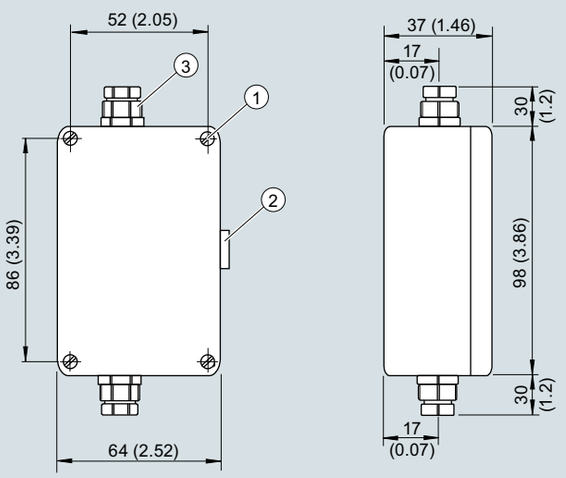


Sensor with protective cap (stainless steel)



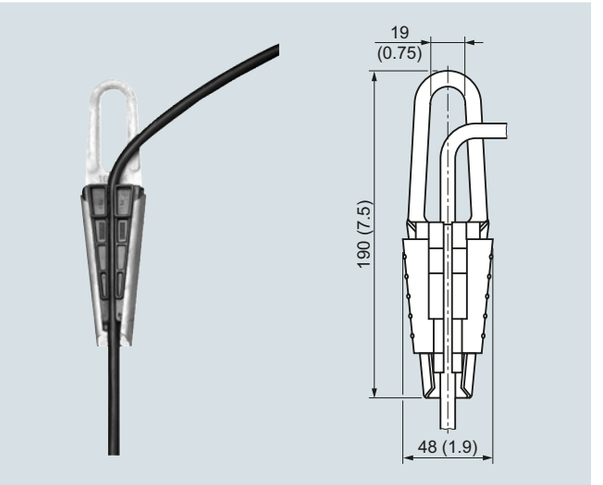
1. Cable, sheat Ø 8.3 (0.33)
2. - (blue)
3. + (brown)
4. Protective conductor connection/Equipotential bonding (black)
5. Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
6. Protective cap (PPE or PTFE) with 4 x Ø 2.5 (0.10) holes
7. Protective cap (stainless steel) with 4 x Ø 5 (0.20) holes

SITRANS LH300 pressure transmitter, dimensions in mm (inch)



1. Fastening hole
2. Vent valve
3. Cable gland Pg 13.5, cable diameter 6 ... 12 (0.23 ... 0.47)

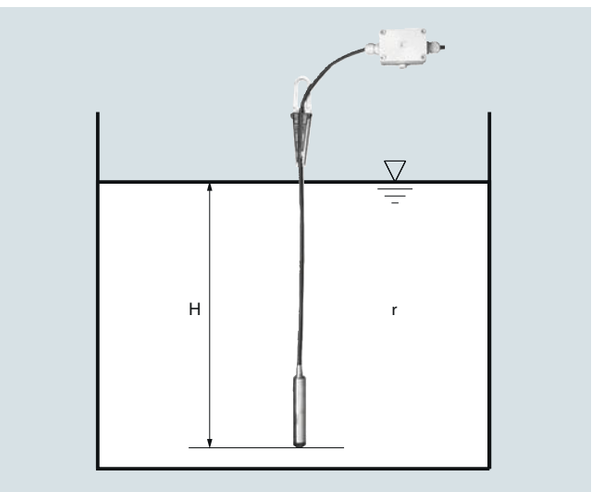
Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

More information

Determination of the measuring range for 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: Water, ρ = 1 000 kg/m^3
Acceleration due to gravity: 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:
7MF1575-1FA10
Plus, if required, junction box 7MF1575-8AA and cable hanger 7MF1575-8AB