Submersible pressure sensor
For general applications
Model LS-1000

Applications

- Sewage lifting stations
- AdBlue tanks
- Pumping stations
- Fuel and oil tanks

Special features

- Hydrostatic measurement of levels from 1 to 10 m [3.28 ... 32.81 ft]
- Permanently leak-tight
- Low total cost of ownership
- Certified for use in hazardous areas
- Low current consumption

Submersible pressure sensor, model LS-1000

Configurator

Standard articles

Description

The model LS-1000 submersible pressure sensor continuously measures the level of liquid media in industrial environments. It records the level hydrostatically from 1 ... 10 m [3.28 ... 32.81 ft]. Optimum long-term stability ensures precise measured data and minimal signal drift. Hermetic leak tightness is ensured by the robust design and a specially developed cable with integrated strain relief. Due to its attractive pricing, the LS-1000 submersible pressure sensor is the ideal choice for OEM customers.

Permanently leak-tight
The fully welded probe, made of stainless steel, works reliably thanks to IP68 ingress protection. A special cable design ensures effective strain relief. The potting of the cable inlet provides additional safety. In addition, a helium leak test is carried out on each individual instrument in our final inspection so that even the smallest leaks and hairline cracks can be detected.

Low total cost of ownership
The submersible pressure sensor is maintenance-free and offers a long-term stability of 0.2 %. This minimises failures, downtimes and the total cost of ownership.

Certified for hazardous areas
The version for hazardous areas has extensive international Ex approvals. Regular audits ensure global traceability and transparency.

Low current consumption
The probe can be operated with a 5 V battery. The energy-saving 0.5 ... 4.5 V ratiometric output signal only consumes < 5 mA and puts so little strain on the battery that it doesn't need to be replaced for years.

Data sheets showing similar products:
Submersible pressure sensor for demanding applications; model LF-1;
see data sheet FM 40.04

Specifications

Accuracy specifications per IEC 62828-1	Max. measured error ≤ ±0.5 % of span	Max. measured error ≤ ±1.0 % of span
Non-linearity per BFSL	≤ ±0.25 % of span	≤ ±0.5 % of span
Long-term stability	≤ ±0.2 % of span/year	≤ ±0.2 % of span/year

Further details on: accuracy specifications	
Accuracy	→ See max. measured error per IEC 62828-1, above
Total probable error per IEC 62828-2	→ See table "Total probable error per IEC 62828-2" below
Non-repeatability per IEC 62828-1	≤ 0.1 % of span (0.2 % of span with measuring range 0 ... 100 mbar)
Reference conditions	Per IEC 62828-1

Total probable error per IEC 62828-2	Max. measured error ≤ ±0.5 % of span	Max. measured error ≤ ±1.0 % of span
Temperature range -10 ... +5 °C [+14 ... +41 °F]		
Measuring range ≤ 0.1 bar	2.0 %	2.2 %
Measuring range < 0.4 bar [5.8 psi]	1.3 %	1.6 %
Measuring range ≥ 0.4 bar [5.8 psi]	1.0 %	1.3 %
Temperature range +5 … +35 °C [+41 ... +95 °F]		
Measuring range ≤ 0.1 bar	1.1 %	1.4 %
Measuring range < 0.4 bar [5.8 psi]	0.7 %	1.1 %
Measuring range ≥ 0.4 bar [5.8 psi]	0.6 %	1.1 %
Temperature range +35 … +50 °C [+95 ... +122 °F]		
Measuring range ≤ 0.1 bar	2.0 %	2.2 %
Measuring range < 0.4 bar [5.8 psi]	1.3 %	1.6 %
Measuring range ≥ 0.4 bar [5.8 psi]	1.0 %	1.3 %

Measuring ranges, gauge pressure

bar	
0 ... 0.1	0 ... 0.4
0 ... 0.16	0 ... 0.6
0 ... 0.25	0 ... 1

psi	
0 ... 5	0 ... 15
0 ... 10	-

inWC	
0 ... 50	0 ... 250
0 ... 100	0 ... 400
0 ... 150	-

→ Other measuring ranges on request.

Measuring ranges, absolute pressure

bar	
0 ... 1.25	0 ... 1.6
0 ... 1.4	0 ... 2

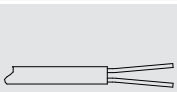
Further details on: measuring range	
Units	■ bar ■ psi ■ inWC ■ mH_2O ■ mbar ■ kPa
Max. working pressure	→ Corresponds to the upper measuring range value / measuring range full scale value → Any permanent operation above the maximum working pressure is not permissible
Overpressure limit per IEC 62828-2	1.5 times
	The overpressure limit is based on the measuring range.

Output signal	Current (2-wire)	Ratiometric
Signal type	4 ... 20 mA	0.5 ... 4.5 V
Load		
Non-Ex version	≤ (auxiliary power - 8 V) / 0.023 A - (cable length in m x 0.0942 Ω/m)	≥ 4.5 kΩ
Ex version	≤ (auxiliary power - 14 V) / 0.023 A - (cable length in m x 0.0942 Ω/m)	≥ 4.5 kΩ
Signal clamping		
Min.	3.8 mA	0.45 V
Max.	20.5 mA	4.85 V
Voltage supply		
Auxiliary power	DC 8 ... 35 V (with Ex approval: DC 14 ... 30 V)	DC 5 V ± 10 %
Current supply	Max. 25 mA	Max. 5 mA
Overvoltage resistance	DC 40 V	DC 30 V
Diagnostic function		
Max. permissible vacuum/overpressure	21.5 mA	5 % of auxiliary power
Max. permissible undertemperature/ overtemperature	21.5 mA	5 % of auxiliary power
Sensor defect	3.6 mA	3 % of auxiliary power
Sensor short-circuit	3.6 mA	3 % of auxiliary power
EEPROM error	3.6 mA	3 % of auxiliary power
Auxiliary power outside specification	< 3.0 mA	< 2 % of auxiliary power
Dynamic behaviour		
Switch-on time	≤ 50 ms	≤ 50 ms

Electrical connection		
Connection type	Cable, shielded	
Wire cross-section	0.24 mm^2 [0.47 MCM]	
Cable diameter	7.5 mm [0.3 in]	
Pin assignment	See "Pin assignment" auf Seite 4.	
Tension force of cable	400 N	
Cable length	■ 3 m ■ 5 m ■ 10 m ■ 15 m ■ 20 m ■ 25 m ■ 30 m	■ 10 ft ■ 20 ft ■ 30 ft ■ 40 ft ■ 50 ft ■ 75 ft ■ 100 ft
	→ Other cable lengths on request.	

Electrical connection	
Lead resistance	0.0942 Ω/m
Short-circuit resistance	S+ vs. U-
Reverse polarity protection	U+ vs. U-
Insulation voltage	DC 750 V

Pin assignment

Cable outlet, shielded			
		2-wire	**3-wire**
	U+	Brown	Brown
	U-	Blue	Blue
	S+	-	Black
	Shield	Grey	Grey

Legend

U+ Positive power supply terminal
U- Negative power supply terminal
S+ Analogue output

Material	
Material (wetted)	
Instrument	Stainless steel 316L, epoxy resin
Cable	■ PVC ■ FEP
Protective cap	PVDF
Material (in contact with the environment)	
Measuring location marking	PE (polyethylene)

Operating conditions	
Medium temperature limit	-10 ... +50 °C [+14 ... +122 °F]
Ambient temperature limit	-30 ... +80 °C [-22 ... +176 °F]
Storage temperature limit	-40 ... +80 °C [-40 ... +176 °F]
Operating altitude	≤ 2,000 m [6,562 ft]
Pollution degree	2
Overvoltage category	I
Vibration resistance per IEC 60068-2-6	4g (25 - 100 Hz)
Shock resistance per IEC 60068-2-6	10g (6 ms)
Free fall per IEC 60068-2-31	
Without packaging	1 m [3.28 ft]
With individual packaging	0.5 m [1.64 ft]
Mounting position	Calibrated in vertical mounting position with process connection facing downwards.
Ingress protection (IP code) per IEC 60529	IP68 (permanently, max. 15 m [49.2 ft])
Service life	10 million load cycles
Weight	
Submersible pressure sensor	Max. 200 g [0.441 lb]
Cable	■ PVC approx. 75 g/m [2.64 lb/ft] ■ FEP approx. 90 g/m [3.17 lb/ft]

Packaging and instrument labelling	
Packaging	Individual packaging
Instrument labelling	■ WIKA product label, lasered (incl. marking of measuring locations with product label) ■ Customer-specific product label on request

Approvals

Logo	Description	Region
CE	**EU declaration of conformity**	European Union
	EMC Directive EN 61326 emission (group 1, class B) and immunity (industrial environments)	
	Pressure Equipment Directive	
	RoHS directive	

Optional approvals

Logo	Description	Region
Ex	**EU declaration of conformity**	European Union
	ATEX directive Hazardous areas 4 ... 20 mA - Ex i Zone 0 gas — II 1G Ex ia IIC T6 ... T4 Ga Zone 1 gas — II 2G Ex ia IIC T6 ... T4 Gb 0.5 ... 4.5 V ratiometric - Ex i Zone 0 gas — II 1G Ex ia IIC T4 Ga Zone 1 gas — II 2G Ex ia IIC T4 Gb	
IEC IECEx	**IECEx** Hazardous areas 4 ... 20 mA - Ex i Zone 0 gas — Ex ia IIC T6 ... T4 Ga Zone 1 gas — Ex ia IIC T6 ... T4 Gb Zone 2 gas — Ex ia IIC T6 ... T4 Gc 0.5 ... 4.5 V ratiometric - Ex i Zone 0 gas — Ex ia IIC T4 Ga Zone 1 gas — Ex ia IIC T4 Gb Zone 2 gas — Ex ia IIC T4 Gc	International

Manufacturer's declaration

Logo	Description
-	**China RoHS directive**

Certificates (option)

Certificates	
Certificates	■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy)

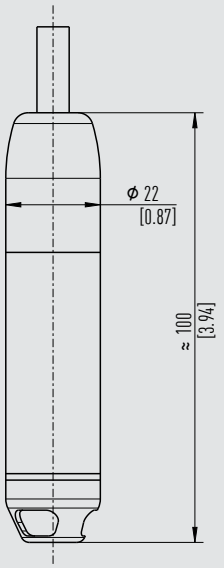
→ For approvals and certificates, see website

Safety-related characteristic values (Ex)

Safety-related characteristic values (Ex)		
Output signal	**4 ... 20 mA**	**0.5 ... 4.5 V ratiometric**
Max. medium temperature range	-10 °C ≤ T_m ≤ +50 °C	-10 °C ≤ T_m ≤ +50 °C
Connection values		
Max. voltage U_i	DC 30 V	DC 12 V
Max. current I_i	130 mA	400 mA
Max. power P_i (at the sensor)	1,000 mW	550 mW
Effective internal capacitance C_i	4.1 nF + 0.32 nF/m cable	800 nF + 0.78 nF/m cable
Effective internal inductance L_i	0 µH + 1,77 µH/m cable	0 µH + 1,77 µH/m cable

Further specifications on safety-related characteristic values (Ex)		
Output signal	**Temperature class**	**Ambient temperature range**
4 ... 20 mA	T4 ... T1	-30 °C … +80 °C
	T6	-30 °C … +60 °C
0.5 ... 4.5 V ratiometric	T4 ... T1	-30 °C … +80 °C

Dimensions in mm [in]



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Submersible pressure sensor, max. 200 g [0.441 lb]
Cable: PVC, approx. 75 g [0.165 lb] per metre
FEP, approx. 90 g [0.198 lb] per metre

Accessories and spare parts

Model	Description	Order number
	**Additional weight** The additional weight increases the dead weight of the submersible pressure sensor. It simplifies the lowering in monitoring wells, narrow shafts and deep wells. It effectively reduces negative environmental influences of the medium (e.g. turbulent flows) on the measuring result. Stainless steel 316L, approx. 300 g [0.661 lb], length 115 mm [4.53 in]	14131008
	**Cable strain relief clamp** The cable strain relief clamp ensures easy and secure mechanical fastening of the submersible pressure sensor's cable. It serves to guide the cable to prevent mechanical damage and to reduce the action of tensile stresses.	14052336
	**Cable socket** The cable socket, with IP67 ingress protection and waterproof ventilation element, provides a moisture-free electrical termination for the submersible pressure sensor. It should be mounted in a dry environment, outside any shafts or vessels, or directly in the control cabinet. Not suitable for hazardous areas!	14052339
	**Filter element** The filter element prevents dirt and moisture from entering the capillary tube. The waterproof diaphragm also offers a reliable protection for the submersible pressure sensor in the harshest environments.	14052344

Standard articles

Configurator

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