

High-performance submersible pressure transmitter

For level measurement in hazardous areas

Model LH-20

WIKA data sheet PE 81.56



Applications

- Deep well and borehole measurements
- Groundwater monitoring
- Level measurement in open bodies of water
- Sewage lift and pumping stations
- Settling ponds and rainwater basins

Special features

- Suitable for all level measurements in hazardous areas
- Explosion protection in accordance with ATEX, FM and CSA
- Slender design
- Adjustable turndown (option)
- Resistant against the harshest environmental conditions
- Reliable and secure by double-sealed design
- Titanium case for especially high resistance (option)

Description

For the most demanding measurement tasks

For operation in hazardous environments, the model LH-20 submersible pressure transmitter is also available in an intrinsically safe version. For potable and fresh water applications, a potable water conformant product variant is possible in accordance with KTW and ACS.

The model LH-20 submersible pressure transmitter has been designed for the most demanding of level measurement tasks. A slender design, highest accuracies, low temperature errors and an adjustable measuring range ensure the suitability of the LH-20 for all submerged level measurements.

The model LH-20 submersible pressure transmitter can adapt to countless applications and measuring media through a large number of features and options. Depending on the requirements, this level probe is available with, amongst other things, a titanium case, PUR/PE/FEP cable,



Submersible pressure transmitter model LH-20
Fig. left: from stainless steel
Fig. right: from titanium

0.1 % accuracy, HART®, scalability or parallel temperature output signal.

Hermetically sealed, robust and durable

The model LH-20 submersible pressure transmitter has been engineered for use in the harshest environments. Through a double, redundant sealing concept, it is permanently hermetically sealed. A robust design from stainless steel or titanium, with a spring-reinforced cable seal, ensures a long service life, even under the big mechanical loads of installation and continuous use.

Designs with the highest media resistance using FEP cable and titanium cases, along with the integrated lightning protection, guarantee the longevity of the submersible pressure transmitter even under the most adverse environmental influences in aggressive media, in both indoor and outdoor use.

Measuring ranges

| Relative pressure | | | | | | |
|-------------------|------------------------|------------------|-------------------|-------------------|------------------|------------------|
| bar | Measuring range | 0 ... 0.1 | 0 ... 0.16 | 0 ... 0.25 | 0 ... 0.4 | 0 ... 0.6 |
| | Overpressure limit | 15 | 20 | 30 | 30 | 35 |
| | Measuring range | 0 ... 1 | 0 ... 1.6 | 0 ... 2.5 | 0 ... 4 | 0 ... 6 |
| | Overpressure limit | 35 | 50 | 50 | 65 | 90 |
| | Measuring range | 0 ... 10 | 0 ... 16 | 0 ... 25 | | |
| | Overpressure limit | 90 | 130 | 130 | | |
| inWC | Measuring range | 0 ... 50 | 0 ... 100 | 0 ... 150 | 0 ... 250 | |
| | Overpressure limit | 8,000 | 12,000 | 12,000 | 14,000 | |
| psi | Measuring range | 0 ... 5 | 0 ... 10 | 0 ... 15 | 0 ... 25 | 0 ... 50 |
| | Overpressure limit | 400 | 500 | 700 | 700 | 900 |
| | Measuring range | 0 ... 100 | 0 ... 160 | 0 ... 200 | 0 ... 300 | |
| | Overpressure limit | 1,300 | 1,900 | 1,900 | 1,900 | |
| | Measuring range | 0 ... 1 | 0 ... 1.6 | 0 ... 2.5 | 0 ... 4 | 0 ... 6 |
| | Overpressure limit | 150 | 200 | 300 | 300 | 350 |
| mH ₂ O | Measuring range | 0 ... 10 | 0 ... 16 | 0 ... 25 | 0 ... 40 | 0 ... 60 |
| | Overpressure limit | 350 | 500 | 500 | 650 | 900 |
| | Measuring range | 0 ... 100 | 0 ... 160 | 0 ... 250 | | |
| | Overpressure limit | 900 | 1,300 | 1,300 | | |

| Absolute pressure | | | | | | |
|-------------------|------------------------|------------------|------------------|----------------|----------------|-----------------|
| bar | Measuring range | 0 ... 1.6 | 0 ... 2.5 | 0 ... 4 | 0 ... 6 | 0 ... 10 |
| | Overpressure limit | 50 | 50 | 60 | 90 | 90 |
| | Measuring range | 0 ... 16 | 0 ... 25 | | | |
| | Overpressure limit | 130 | 130 | | | |

The given measuring ranges are also available in mbar, kPa and MPa.

Output signals

| Output signal | |
|-----------------|--|
| Standard | 4 ... 20 mA |
| Option | 4 ... 20 mA and HART® signal, additional Pt100 measurement signal |

Load in Ω

- 4 ... 20 mA:
≤ (power supply - 8 V) / 0.022 A
- 4 ... 20 mA and HART® signal:
≤ (power supply - 9.6 V) / 0.022 A

Voltage supply

Power supply

The power supply depends on the selected output signal.

- 4 ... 20 mA: DC 8 ... 36 V
- 4 ... 20 mA and HART® signal: DC 9.6 ... 36 V

When being operated in Ex areas, the submersible pressure transmitter must be powered via an Ex isolated barrier. For Ex isolated barrier see "Accessories"

Additional Pt100 measuring element

The HART® version has an additional Pt100 measuring element for measuring the temperature of the medium.

Specifications:

- Pt100 per DIN EN 60751
- Measuring range -50 ... +100 °C
- Resolution of 1 °K

Reference conditions

Temperature

15 ... 25 °C

Atmospheric pressure

860 ... 1,060 mbar

Humidity

45 ... 75 % relative

Mounting position

Calibrated in vertical mounting position with pressure connection facing downwards.

Accuracy data

Non-linearity at reference conditions

| Non-linearity | |
|---------------|--------------------------|
| Standard | $\leq \pm 0.2$ % of span |
| Option | $\leq \pm 0.1$ % of span |

By setting a turndown of greater than 5:1, the non-linearity is decreased.

Determined using the limit point method in accordance to IEC 60770

Temperature error of the zero point in the temperature range 0 ... 80 °C

- at non-linearity ≤ 0.2 % of span
 - Standard, without turndown ≤ 0.15 % of span/10 K
 - Turndown $\leq 5:1$ ≤ 0.20 % of span/10 K
 - Turndown $> 5:1$ ≤ 0.25 % of span/10 K
- at non-linearity $\leq \pm 0.1$ % of span
 - Standard, without turndown ≤ 0.05 % of span/10 K
 - Turndown $\leq 5:1$ ≤ 0.10 % of span/10 K
 - Turndown $> 5:1$ ≤ 0.15 % of span/10 K

Long-term drift

≤ 0.1 % of span/year

Settling time (0 ... 63 %)

Depending on the output signal the following settling times apply:

- 4 ... 20 mA: 100 ms
- 4 ... 20 mA, HART® signal: 200 ms

Scalability (turndown)

The HART® version enables turndown to be set.

It is recommended that turndown is not set to over 5:1, since the accuracy can decrease dependant on the scaling.

Operating conditions

Ingress protection (per IEC 60529)

IP 68

Vibration resistance (per IEC 60068-2-6)

4 g (at 5 ... 100 Hz)

Lightning protection

Nominal discharge current ≥ 5 kA, response time < 25 ns

Explosion protection (optional)

The model LH-20 submersible pressure transmitter is available with the following Ex approvals, which can be ordered separately.

Temperatures

- for use without explosion protection

The permissible temperature ranges are dependent on the cable material used:

- Medium

- PE cable: - 40 ... +60 °C
- PUR cable: - 40 ... +80 °C
- FEP cable: - 40 ... +80 °C

- Ambient

- PE cable: - 40 ... +60 °C
- PUR cable: - 40 ... +85 °C
- FEP cable: - 40 ... +85 °C

- Storage

- PE cable: - 40 ... +80 °C
- PUR cable: - 40 ... +80 °C
- FEP cable: - 40 ... +80 °C

- for use as Category 1G equipment

- Ambient

- Temperature class T6: - 20 ... +50 °C
- Temperature class T1 ... T5: - 20 ... +60 °C

- for use as Category 2G equipment

- Ambient

- Temperature class T6: -40 ... +66 °C
- Temperature class T1 ... T5: -40 ... +80 °C

Maximum tensile force on the cable

1,200 N

Weight

- Submersible pressure transmitter: approx. 370 g
- Cable: approx. 100 g/m
- Additional weight (accessories): approx. 350 g

Process connections

The model LH-20 is available in two process connection variants:

| Process connection | |
|--------------------|-----------------------------|
| Standard | M14 x 1 with protective cap |
| Option | Flush measuring cell |

Electrical connections

Reverse polarity protection

U₊ vs. U₋

Overvoltage protection

see lightning protection under "Operating conditions"

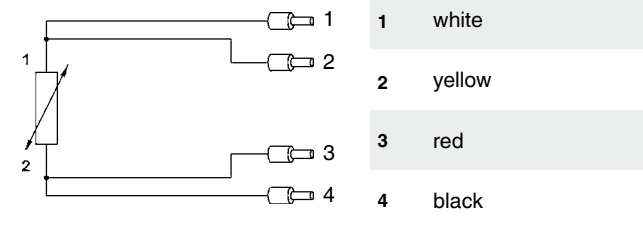
Cable lengths

Cable length to customer requirements, freely selectable

Connection diagrams

| Cable outlet | |
|---|------------------------------------|
|  | U₊ brown |
| | U₋ blue |
| | Shield black sheathed cable |

Pt100 measuring element (4-wire connection)



Approvals, directives and certificates

Approvals and certificates

On request, the submersible pressure transmitter can be supplied with the following approvals and certificates:

| Available approvals |
|---|
| ATEX (explosion protection in accordance with ATEX) |
| FM (ignition protection type "i" - intrinsic safety, USA) |
| CSA (ignition protection type "i" - intrinsic safety, Canada) |
| IECEX (explosion protection in accordance with IECEX) |
| GL (Germanischer Lloyd) |

| Available certificates |
|---|
| Drinking water declaration of conformity in accordance with KTW and ACS |
| Test certificate ¹⁾ |

1) The test certificate documents the product-specific instrument specifications and include a detailed listing of the individual measured values of the acceptance test.

CE conformity

- Outputsignal 4 ... 20 mA:
EMC directive 2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)
- Outputsignal 4 ... 20 mA and HART® signal:
EMC directive 2004/108/EC, EN 61326 emission (group 1, class A) and interference immunity (industrial application)
- ATEX 94/9/EG (option)

Materials (wetted)

| Case | |
|----------|----------------------|
| Standard | Stainless steel 316L |
| Option | Titan |

| Cable material | |
|----------------|-----|
| Standard | PUR |
| Option 1 | PE |
| Option 2 | FEP |

| Sealing material ¹⁾ | |
|--------------------------------|------|
| Standard | FKM |
| Option | EPDM |

1) The model LH-20 is double sealed behind the sensor.

| Additional weight | |
|-------------------|----------------------|
| Standard | Stainless steel 316L |
| Option | Titan |

Sensor

Ceramic Al₂O₃ 96 %

Titanium for especially high resistance (option)

For a particularly high resistance against aggressive media, the model LH-20 submersible pressure transmitter is available with a titanium case.

This exceptionally high-quality material enables the submersible pressure transmitter to be used under the most adverse conditions.

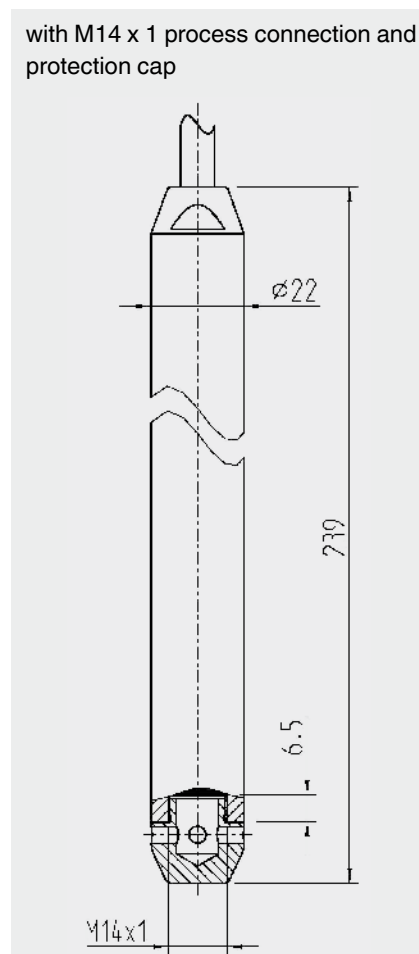
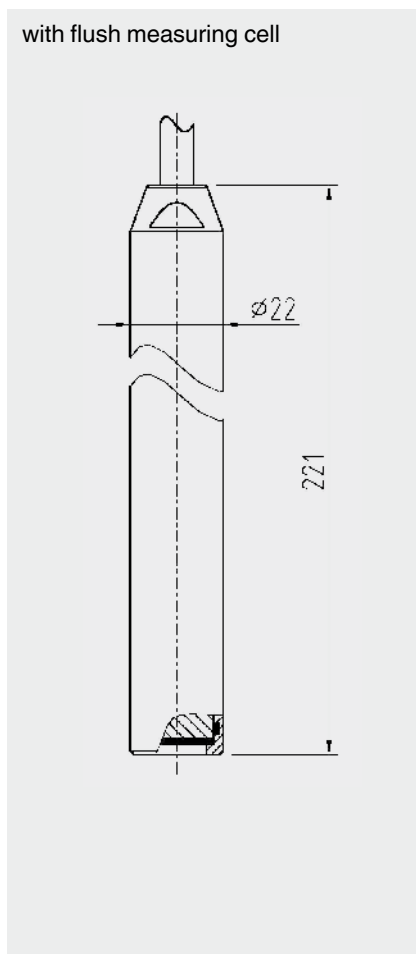
The highly chemically-resistant titanium design ensures a long service life, even in aggressive media and the most demanding applications.

The additional weight, available as an accessory, is also obtainable in titanium.



Dimensions in mm

Submersible pressure transmitter model LH-20



Accessories

| | Description | Order number |
|---|---|---|
|  | Cable strain relief clamp The cable strain relief clamp enables easy and secure mechanical fastening of the submersible pressure transmitter's cable at the measuring point. It acts as a guide for the cable, in order to avoid mechanical damage and to reduce the tensile stress. | 14052336 |
|  | Additional weight The additional weight increases the dead weight of the submersible pressure transmitter. It simplifies the lowering into monitoring wells, narrow shafts and deep wells. It effectively reduces negative environmental influences on the measuring result from the measured medium (e.g. turbulent flow). The additional weight is available in two variants: <ul style="list-style-type: none"> ■ Stainless steel 316L, approx. 350 g, length 120 mm ■ Titanium, approx. 350 g, length 214.5 mm | 14052322 (316L) 14052330 (Titanium) |
|  | Terminal box The terminal box, with IP 67 ingress protection and watertight ventilation element, provides a moisture-free electrical termination for the submersible pressure transmitter. It should be mounted in a dry environment, outside any shafts or vessels, or directly in the switch cabinet. | 14052339 |
|  | Ex isolated barrier Ex isolated barrier, power supply DC 20 ... 32 V, output: max. DC 25.4 V, max. 88.2 mA | 2341268 |
|  | Display module DIH52 and DIH62 5-digit display, 20-segment bargraph, without separate power supply, with additional HART® functionality. Automatic adjustment of measuring range and span. Secondary-master functionality: Setting the measuring range and unit of the connected transmitter using HART® standard commands possible. Optionally explosion protection per ATEX. | on request |
|  | HART® modem with USB, RS-232 or Bluetooth® interface For scaling the measuring range using a PC via the HART® protocol, a HART® modem with USB, RS-232 or Bluetooth interface is available. The modem communicates with all registered HART® field devices and can be used with the most popular HART® compatible software programs. | 7957522 (RS-232 interface) 11025166 (USB interface) 11364254 (Bluetooth® interface) |

Ordering information

Model / Measuring range / Output signal / Accuracy / Cable material / Cable length / Case / Process connection / Sealing / Approval / Certificate / Accessories

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