



## Level Probe LFH - Reliable Liquid Level Measurement

The level probe LFH is characterized by its high-quality and precise measurement technology. It is well suited for a wide application range.

The level probe LFH is designed for the hydrostatic level measurement of liquids. The LFH is a water-proof pressure transmitter that is immersed into the liquid together with its connection cable to the desired depth. The LFH provides an analog electrical output signal that is proportional to the applied hydrostatic pressure and hence, to the immersion depth. The level probe is available as standard with various cable lengths from 1.5 m up to 100 m. Other lengths are available upon request. The LFH is ideally suited for applications in water/ sewerage plants, in larger liquid vessels where other level measurement technologies fail and in cases where inserting a fitting into the tank wall is not permitted or is technically unviable.

The connection cable has a PUR sheathing and contains a ventilation tube for pressure compensation relative to the atmosphere. The maximum tensile strength of the cable is 1000 N. The sensor housing is made from stainless steel and has a plastic cap to protect the stainless steel sensor diaphragm. To meet diverse application require-

ments the level probe LFH is available in two accuracy grades: better than  $\pm 0.5\%$  and better than  $\pm 0.25\%$ .

The  $\pm 0.25\%$  variant is available with a number of options that extend the application range significantly. There is an integrated temperature measurement option using a Pt100 element, surge protection as well as a connection cable with FEP sheathing (tensile strength: 500 N). A special advantage of the variant with  $\pm 0.25\%$  accuracy is the so called longitudinal water resistance feature that prevents any liquid from entering the sensor in the event of cable damage. In addition, this variant also allows a maximum immersion depth of up to 250 m to be realised (standard: 100 m).

### Benefits

- Universal use
- High reliability
- Rugged design and high-quality materials
- High tensile strength of connection cable
- Optimized solutions through versatile options
- For cleaning purposes the probe can easily be taken out of the liquid

Technical Data

| Measurement ranges                   | LFH               |                    |      |     |     |   |     |     |                        |                      |                      |                  |                  |
|--------------------------------------|-------------------|--------------------|------|-----|-----|---|-----|-----|------------------------|----------------------|----------------------|------------------|------------------|
| Pressure ranges in bar <sup>1)</sup> | 0.1 <sup>2)</sup> | 0.16 <sup>2)</sup> | 0.25 | 0.4 | 0.6 | 1 | 1.6 | 2.5 | 4                      | 6                    | 10                   | 16 <sup>2)</sup> | 25 <sup>2)</sup> |
| Over pressure safety                 | 1                 | 1.5                | 2    | 2   | 4   | 5 | 10  | 10  | 10 <sup>3)</sup> /17   | 10 <sup>3)</sup> /35 | 10 <sup>3)</sup> /35 | 35               | 35               |
| Burst pressure                       | 2                 | 2                  | 2.4  | 2.4 | 4.8 | 6 | 12  | 12  | 12 <sup>3)</sup> /20.5 | 12 <sup>3)</sup> /42 | 12 <sup>3)</sup> /42 | 42               | 42               |

<sup>1)</sup> 1 bar = 10.2 mH<sub>2</sub>O (meter water column)

<sup>2)</sup> Only with accuracy 0.25 %.

<sup>3)</sup> With accuracy 0.5 % and with accuracy 0.25 % and FEP cable.

| Technical data   | LFH  |  |
|--|--|--|
| Materials  |  |  |
| ■ Wetted parts   | Stainless steel  |  |
| ■ Pressure connection/diaphragm                        | Stainless steel  |  |
| ■ Protection cap                                       | PA   |  |
| ■ Cable  | PUR (tensile strength 1000 N), FEP optional available (tensile strength 500 N) <sup>4)</sup> |  |
| Supply voltage   | 10 ... 30 V DC   |  |
|  | 14 ... 30 V DC with output signal 0 ... 10 V <sup>4)</sup>                                   |  |
| Output signal and maximum ohmic load R <sub>A</sub>    | 4 ... 20 mA, 2-wire  | R <sub>A</sub> ≤ (L+ - 10 V) / 0.02 A - (0.14 x cable length in m) [Ohm] |
|  | 0 ... 10 V, 3-wire <sup>4)</sup>   | R <sub>A</sub> > 100 kOhm optional                                       |
|  | 0 ... 5 V, 3-wire <sup>4)</sup>  | R <sub>A</sub> > 100 kOhm optional                                       |
|  | Pt 100, 4-wire <sup>4)</sup>   | I max. = 3 mA optional   |
|  |  | I meas. = 1 mA   |
| Dielectric strength                                    | 500 V DC <sup>5)</sup>   |  |
| Accuracy   | ≤ 0.5 % of span <sup>6)</sup>  |  |
|  | ≤ 0.25 % of span optional  |  |
| Non-linearity  | ≤ 0.2 % of span (BFSL) according to IEC 61298-2  |  |
| Non-repeatability                                      | ≤ 0.1 % of span  |  |
| 1-year stability                                       | ≤ 0.2 % of span (at reference conditions)  |  |
| Permissible temperature of                             |  |  |
| ■ Medium   | -10 ... +50 °C   | -10 ... +85 °C with option FEP-cable and accuracy 0.25 % <sup>4)</sup>   |
| ■ Storage  | -30 ... +80 °C   |  |
| Compensated temp range                                 | 0 ... +50 °C   |  |
| Temperature coefficients within compensated temp range |  |  |
| ■ Mean TC of zero                                      | ≤ 0.2 / 10 K % of span (< 0.4 for pressure ranges ≤ 250 mbar)                                |  |
| ■ Mean TC of range                                     | ≤ 0.2 / 10 K % of span   |  |
| CE- conformity   |  |  |
| ■ EMC directive  | 2004/108/EC, EN 61 326-2-3   |  |
| Wiring protection                                      |  |  |
| ■ Protection class                                     | III  |  |
| ■ Short-circuit proofness                              | Q <sub>A</sub> towards M   |  |
| ■ Reverse polarity protection                          | L <sup>+</sup> towards M   |  |
|  | Surge protection EN 61000-4-5 (1.5 J) optional <sup>4)</sup>                                 |  |
| Weight   |  |  |
| ■ Level probe  | Approx. 0.18 kg  | Approx. 0.20 kg <sup>4)</sup>  |
| ■ Cable  | Approx. 0.08 kg/m  | Approx. 0.08 kg/m <sup>4)</sup>  |

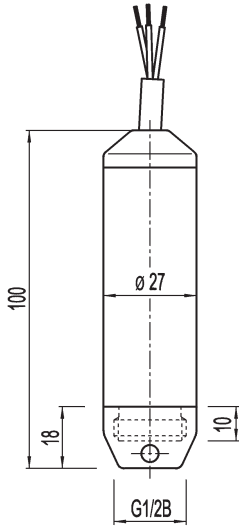
<sup>4)</sup> Only with accuracy 0.25 %.

<sup>5)</sup> Use NEC Class O2 power supply (low voltage and low current max. 100 VA even under fault conditions)

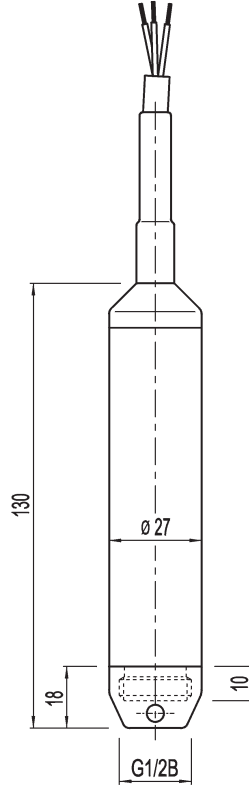
<sup>6)</sup> Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2). Adjusted in vertical mounting position with lower pressure connection.

**Dimensions in mm**

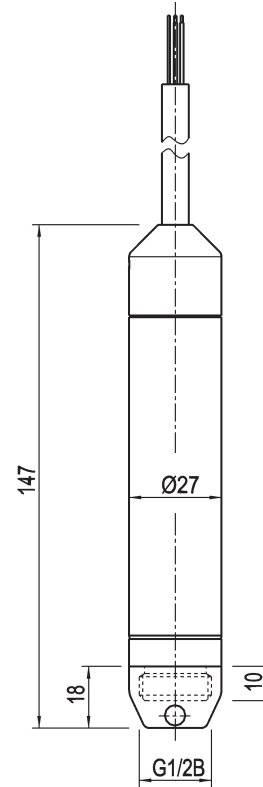
With standard accuracy  
(Immersion depth up to 100 m)



With accuracy  $\leq \pm 0.25\%$  (optional)  
with PUR cable  
(Immersion depth up to 250 m)



With accuracy  $\leq \pm 0.25\%$  (optional)  
with FEP cable  
(Immersion depth up to 100 m)

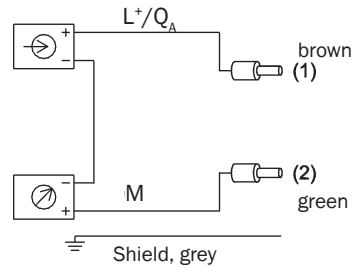


For mounting no additional strain relief required because the cable has a max. tensile strength of 1000 N (500 N with FEP cable).  
For installation and safety instructions see the operating instructions for this product.

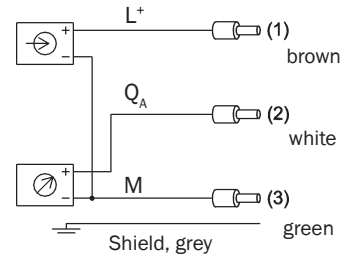
**Wiring details**

Vented PUR cable,  
tensile strength 1000 N  
(500 N with FEP cable)  
Enclosure rating IP 68 acc.  
to IEC 60529

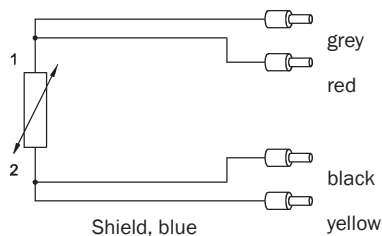
2-wire



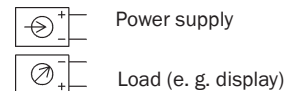
3-wire



4-wire, PT 100 - Element



**Legend:**



Errors excepted, subject to modifications

## Type code

### Accuracy

|   |                             |
|---|-----------------------------|
| S | Accuracy +/- 0.5 % of Span  |
| E | Accuracy +/- 0.25 % of Span |

### Pressure unit

|   |      |
|---|------|
| B | bar  |
| W | mH2O |

Standard measurement ranges see the following page

### Output signal

|   |                                  |
|---|----------------------------------|
| A | 4 ... 20 mA, 2-wire              |
| V | 0 ... 10 V, 3-wire <sup>1)</sup> |
| U | 0 ... 5 V, 3-wire <sup>1)</sup>  |

### Cable sheathing

|   |                         |
|---|-------------------------|
| S | Standard cable (PUR)    |
| F | FEP cable <sup>1)</sup> |

### Cable length

|    |       |
|----|-------|
| 01 | 1.5 m |
| 03 | 3 m   |
| 05 | 5 m   |
| 10 | 10 m  |
| 15 | 15 m  |
| 20 | 20 m  |
| 25 | 25 m  |
| 30 | 30 m  |
| 40 | 40 m  |
| 50 | 50 m  |
| 60 | 60 m  |
| 80 | 80 m  |
| 1H | 100 m |

Other cable lengths upon request

### Supply voltage

|   |   |
|---|---|
| S | Supply voltage 10 ... 30 V DC   |
| Z | Supply voltage 14 ... 30 V DC with output signal 0 ... 10 V <sup>1)</sup> |

### Electrical options

|   |   |
|---|---|
| Z | Non electrical options  |
| V | Overvoltage protection <sup>1)</sup>  |
| T | Temperature measurement with Pt100, 4-wire <sup>1)</sup>                          |
| C | Overvoltage protection + temperature measurement with Pt100, 4-wire <sup>1)</sup> |

|       |  |  |  |    |  |  |  |  |  |   |
|-------|--|--|--|----|--|--|--|--|--|---|
| LFH - |  |  |  | G1 |  |  |  |  |  | 0 |
|-------|--|--|--|----|--|--|--|--|--|---|

<sup>1)</sup> Only with accuracy 0.25 %.

## Type code

| Measurement ranges | bar / Gauge pressure         | mH <sub>2</sub> O / Gauge pressure            |
|--------------------|------------------------------|---|
| X10                | 0 ... 0.1 bar <sup>1)</sup>  | 1X0 0 ... 1 mH <sub>2</sub> O <sup>1)</sup>   |
| X16                | 0 ... 0.16 bar <sup>1)</sup> | 1X6 0 ... 1.6 mH <sub>2</sub> O <sup>1)</sup> |
| X25                | 0 ... 0.25 bar               | 2X5 0 ... 2.5 mH <sub>2</sub> O               |
| X40                | 0 ... 0.4 bar                | 4X0 0 ... 4 mH <sub>2</sub> O                 |
| X60                | 0 ... 0.6 bar                | 6X0 0 ... 6 mH <sub>2</sub> O                 |
| 1X0                | 0 ... 1 bar                  | 010 0 ... 10 mH <sub>2</sub> O                |
| 1X6                | 0 ... 1.6 bar                | 016 0 ... 16 mH <sub>2</sub> O                |
| 2X5                | 0 ... 2.5 bar                | 025 0 ... 25 mH <sub>2</sub> O                |
| 4X0                | 0 ... 4 bar                  | 040 0 ... 40 mH <sub>2</sub> O                |
| 6X0                | 0 ... 6 bar                  | 060 0 ... 60 mH <sub>2</sub> O                |
| 010                | 0 ... 10 bar                 | 100 0 ... 100 mH <sub>2</sub> O               |
| 016                | 0 ... 16 bar <sup>1)</sup>   | 160 0 ... 160 mH <sub>2</sub> O <sup>1)</sup> |
| 025                | 0 ... 25 bar <sup>1)</sup>   | 250 0 ... 250 mH <sub>2</sub> O <sup>1)</sup> |

<sup>1)</sup> Only with accuracy 0.25 %.

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