The hydrostatic level transmitter LMK 457 has been designed especially for shipbuilding and offshore applications. The transmitter is suitable for level measurement in open tanks, containers or reservoirs.

Based on a rugged and reliable capacitive ceramic sensor this transmitter is qualified for measuring small filling heights with high accuracy. Due to the different housing materials such as stainless steel 1.4571 (316Ti) or the special copper-nickel-alloy CuNiFe in combination with several mounting types, the transmitter covers a lot of applications in shipbuilding and offshore business. Usage with many fluids or pasty media, compatible with the media wetted parts is possible.

The hydrostatic level transmitters as a standard comply with the requirements of Germanischer Lloyd (GL) and Det Norske Veritas (DNV). Additionally, the devices can optionally be delivered with ATEX certificate.

Typical areas of use are:
- ballast tanks
- fuel and oil tanks
- service and waste water tanks

**LMK 457**

Hydrostatic Level Transmitter for Shipbuilding and Offshore

- capacitive ceramic sensor
- materials: 1.4571 (316Ti); optional CuNiFe
- different types of construction
- nominal pressure ranges from 0 ... 40 cmH₂O up to 0 ... 200 mH₂O (0 ... 40 mbar up to 0 ... 20 bar)

**Characteristics**

- small thermal effect
- excellent linearity
- good long term stability
- 0.175 % / 0.125 % FSO BFSL (0.35 % / 0.25 % FSO IEC 60770)
- option Ex version (only for 4 ... 20 mA / 2-wire) IBExU05 ATEX 1070 X
- optional:
  - cable protection
  - diaphragm in Al₂O₃ 99.9 %
  - customer versions on request

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# Technical Data

## Input pressure range

<table>
<thead>
<tr>
<th>Nominal pressure [bar]</th>
<th>0.04</th>
<th>0.06</th>
<th>0.1</th>
<th>0.16</th>
<th>0.25</th>
<th>0.4</th>
<th>0.6</th>
<th>1</th>
<th>1.6</th>
<th>2.5</th>
<th>4</th>
<th>6</th>
<th>10</th>
<th>16</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level [mH₂O]</td>
<td>0.4</td>
<td>0.6</td>
<td>1</td>
<td>1.6</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>16</td>
<td>25</td>
<td>40</td>
<td>60</td>
<td>100</td>
<td>160</td>
<td>200</td>
</tr>
<tr>
<td>Permissible overpressure [bar]</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>15</td>
<td>25</td>
<td>35</td>
<td>35</td>
<td>60</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

## Output signal / Supply

2-wire 4 ... 20 mA / Vₙ = 9 ... 32 Vₙₒ (rated: 24 Vₒ)

Ex-protection: Vₛ = 12 ... 28 Vₛ

## Performance

### Accuracy

- **IEC 60770**: ≤ ±0.35 % FSO
- **BFSL**: standard: ≤ ±0.175 % FSO
- option: ≤ ±0.125 % FSO

### Permissible load

Rₚ₉₉ = [(Vₛ - Vₛₘᵋₙ) / 0.02] Ω

### Long term stability

≤ ±0.1 % FSO / year

### Influence effects

- supply: 0.05 % FSO / 10 V
- load: 0.05 % FSO / kΩ

### Response time

≤ 200 msec.

## Thermal effects

- **Thermal error**: ≤ ±0.1 % FSO / 10 K
- in compensated range: 0 ... 80 °C

## Mechanical stability

- **Vibration**: 4 g (according to GL: curve 2 / according to DNV: class B / basis: IEC 60068-2-6)

## Permissible temperatures

<table>
<thead>
<tr>
<th>Medium</th>
<th>-25 ... 80 °C</th>
<th>Ex-protection: application in zone 0: -20 ... 60 °C application in zone 1 or higher: -25 ... 70 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>-40 ... 80 °C</td>
<td></td>
</tr>
</tbody>
</table>

## Electrical protection

- **Reverse polarity protection**: no damage, but also no function
- **Electromagnetic compatibility**: emission and immunity according to
  - EN 61326
  - Germanischer Lloyd (GL)
  - Det Norske Veritas (DNV)
- Option Ex-protection DX14-LMK 457
  - zone 0: II 1 G EEx ia IIB T4
  - zone 20: II 1D EEx IP68 T=85 °C (valid for screw-in and flange transmitters)
  - safety technical maximum values: Uᵢ = 28 V, Iᵢ = 93 mA, Pᵢ = 860 mW, Cᵢ = 146.3 nF, Lᵢ = 5 µH

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1. available in gauge, sealed gauge and absolute; nominal pressure ranges sealed gauge and absolute from 1 bar
2. accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
3. additional external overvoltage-protection unit with atmospheric pressure compensation KL 1 or KL 2 available as accessory
4. approved for atmospheric pressure from 0.8 bar up to 1.1 bar

www.sensorsone.com
**LMK 457**

Hydrostatic Level Transmitter

**Technical Data**

### Dimensions (in mm)

**submersible transmitter**

- **stainless steel**
- **CuNiFe**

**screw-in transmitter**

**flange transmitter**

preparing for mounting with stainless steel pipe

### Accessories

**mounting flange**

- **transmitter flange**

- **mounting clamp**

### Flange (DIN 2501) Dimensions

<table>
<thead>
<tr>
<th>Flange (DIN 2501)</th>
<th>D</th>
<th>k</th>
<th>b</th>
<th>n</th>
<th>d</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN25/PN40</td>
<td>115</td>
<td>85</td>
<td>18</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>DN50/PN40</td>
<td>165</td>
<td>125</td>
<td>20</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>DN80/PN16</td>
<td>200</td>
<td>160</td>
<td>20</td>
<td>8</td>
<td>18</td>
</tr>
</tbody>
</table>

### Mounting clamp material Dimensions

<table>
<thead>
<tr>
<th>Mounting clamp material</th>
<th>a</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>CuNiFe</td>
<td>82</td>
<td>100</td>
</tr>
<tr>
<td>stainless steel</td>
<td>100</td>
<td>130</td>
</tr>
</tbody>
</table>

---

*DN80/PN16 possible for nominal pressure ranges up to 16 bar*

[www.sensorone.com](http://www.sensorone.com)
**Electrical connection**

<table>
<thead>
<tr>
<th>Cable with cable sheath</th>
<th>TPE dark blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable protection</td>
<td>standard: option stainless steel pipe</td>
</tr>
</tbody>
</table>

**Materials**

<table>
<thead>
<tr>
<th>Housing</th>
<th>standard: stainless steel 1.4571 (316Ti)</th>
<th>option: CuNi10Fe1Mn (resistant against sea water) - for submersible transmitter others on request</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seals</td>
<td>FKM, EPDM; others on request</td>
<td></td>
</tr>
<tr>
<td>Diaphragm</td>
<td>Standard: ceramics Al$_2$O$_3$ 96 %</td>
<td>Option: ceramics Al$_2$O$_3$ 99.9 % - for pressure ranges from 0.1 bar up to 1 bar</td>
</tr>
<tr>
<td>Cable sheath</td>
<td>TPE</td>
<td></td>
</tr>
</tbody>
</table>

**Miscellaneous**

<table>
<thead>
<tr>
<th>Cable capacitance</th>
<th>signal line/shield also signal line/signal line: 160 pF/m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable inductance</td>
<td>signal line/shield also signal line/signal line: 1.0 $\mu$H/m</td>
</tr>
<tr>
<td>Current consumption</td>
<td>max. 21 mA</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 400 g (without cable)</td>
</tr>
<tr>
<td>Ingress protection</td>
<td>IP 68</td>
</tr>
</tbody>
</table>

**Mounting accessories**

(Not part of the supply)

Transmitter flange for fixing screw-in transmitter, stainless steel 1.4571 (316Ti):
- DN25 / PN40 (Ø 115, 18 thick, 4 drill holes Ø 14 at Ø 85)
- DN50 / PN40 (Ø 165, 20 thick, 4 drill holes Ø 18 at Ø 125)
- DN80 / PN16 (Ø 200, 20 thick, 8 drill holes Ø 18 at Ø 160)

Mounting clamp, stainless steel 1.4571 (316Ti) or CuNiFe:
- DN25 / PN40 (Ø 115, 18 thick, 4 drill holes Ø 14 at Ø 85)
- DN50 / PN40 (Ø 165, 20 thick, 4 drill holes Ø 18 at Ø 125)
- DN80 / PN16 (Ø 200, 20 thick, 8 drill holes Ø 18 at Ø 160)

Terminal clamp, stainless steel 1.4301 (304) or steel, zinc plated

**Pin configuration**

<table>
<thead>
<tr>
<th>Electrical connection</th>
<th>cable colours (DIN 47100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-wire-system</td>
<td>Supply + white</td>
</tr>
<tr>
<td></td>
<td>Ground yellow / green (shield)</td>
</tr>
</tbody>
</table>

**Wiring diagram**

2-wire-system (current)

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* shielded cable with integrated air tube for atmospheric reference
* not for CuNiFe version
* resistant against sea water, halogen free, temperature resistant up to +125 °C

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### Ordering code LMK 457

#### Pressure
- in bar, gauge: 760
- in bar, sealed gauge: 762
- in bar, absolute: 763
- in mH₂O: 764

#### Input
<table>
<thead>
<tr>
<th>[mH₂O]</th>
<th>[bar]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.40</td>
<td>0.04</td>
</tr>
<tr>
<td>0.60</td>
<td>0.06</td>
</tr>
<tr>
<td>1.0</td>
<td>0.10</td>
</tr>
<tr>
<td>1.6</td>
<td>0.16</td>
</tr>
<tr>
<td>2.5</td>
<td>0.25</td>
</tr>
<tr>
<td>4.0</td>
<td>0.40</td>
</tr>
<tr>
<td>6.0</td>
<td>0.60</td>
</tr>
<tr>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>16</td>
<td>1.6</td>
</tr>
<tr>
<td>25</td>
<td>2.5</td>
</tr>
<tr>
<td>40</td>
<td>4.0</td>
</tr>
<tr>
<td>60</td>
<td>6.0</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>160</td>
<td>16</td>
</tr>
<tr>
<td>200</td>
<td>20</td>
</tr>
</tbody>
</table>

#### Housing
- Stainless steel 1.4571 (316Ti): 1
- Copper-Nickel-alloy (CuNi10Fe1Mn): K
- Customer: 9

#### Type of construction
- Submersible transmitter: 1
- Flange transmitter: 3
- Screw-in transmitter: 5

#### Diaphragm
- Ceramics Al₂O₃ 96%: 2
- Ceramics Al₂O₃ 99.9%: C
- Customer: 9

#### Output
- 4 … 20 mA / 2-wire: 1
- Intrinsic safety 4 … 20 mA / 2-wire: E
- Customer: 9

#### Seals
- FKM: 1
- EPDM: 3
- Customer: 9

#### Electrical connection
- TPE-cable: 4
- Customer: 9

#### Accuracy
- Standard: 0.35 %
- Option: 0.25 %
- Customer: 2

#### Cable length
- In m: 999

#### Special version
- Standard: 0 DC
- Prepared for mounting with st. steel pipe: 9 S
- Customer: 9 P

---

1. Nominal pressure ranges sealed gauge and absolute from 1 bar
2. Optionally for submersible transmitter (type of construction)
3. Mounting accessories are not part of supply and have to be ordered separately
4. Diaphragm Al₂O₃ 99.9% possible for pressure ranges from 0.1 bar up to 1 bar
5. Shielded cable with integrated air tube for atmospheric reference; Cable sheath: resistant against sea water, halogen free, temperature resistant up to +125 °C
6. Stainless steel pipe is not part of the supply