

LMK 387

Stainless Steel Probe

Ceramic Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO



Nominal pressure

from 0 ... 1 mH₂O up to 0 ... 100 mH₂O

Output signal

2-wire: 4 ... 20 mA
others on request

Special characteristics

- ▶ diameter 22 mm
- ▶ diaphragm ceramics 99.9% Al₂O₃
- ▶ good long-term stability
- ▶ especially for waste water

Optional versions

- ▶ IS-version
Ex ia = intrinsically safe for gas and dust
- ▶ drinking water certificate according to DVGW and KTW
- ▶ temperature element Pt 100
- ▶ mounting with stainless steel tube
- ▶ different kinds of cables and elastomers

The stainless steel probe LMK 387 was developed for level and gauge measurement in waste water, sludge or water courses. The mechanical robustness of the flush ceramic diaphragm facilitates an easy disassembly and cleaning of the probe in case of service.

Compared to the level probe LMK 382 the outer diameter is only 22 mm, whereby the installation or retrofitting can be easily carried out in 1" pipes or in confined installation conditions. An IS-version (zone 0) is also available.

Preferred areas of use



Water

groundwater and level monitoring



Sewage

waste water treatment
water recycling



Fuel and oil

tank battery
biogas plants



| Input pressure range | | | | | | | | | | | | |
|--|---------------------|---|-------|---|---|------|------------------------------------|-----|-----|----|----|-------------------|
| Nominal pressure gauge | [bar] | 0.1 | 0.16 | 0.25 | 0.4 | 0.6 | 1 | 1.6 | 2.5 | 4 | 6 | 10 |
| Level | [mH ₂ O] | 1 | 1.6 | 2.5 | 4 | 6 | 10 | 16 | 25 | 40 | 60 | 100 |
| Overpressure | [bar] | 3 | 4 | 5 | 5 | 7 | 7 | 12 | 20 | 20 | 20 | 20 |
| Burst pressure ≥ | [bar] | 4 | 6 | 8 | 8 | 9 | 9 | 18 | 25 | 25 | 30 | 30 |
| Permissible vacuum | [bar] | -0.2 | -0.3 | | | -0.5 | | | | | -1 | |
| Output signal / Supply | | | | | | | | | | | | |
| Standard | | 2-wire: 4 ... 20 mA / V _S = 12 ... 36 V _{DC} | | | | | | | | | | |
| Option IS-version | | 2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC} | | | | | | | | | | |
| Option temperature element Pt 100 | | | | | | | | | | | | |
| Temperature range | | -25 ... 125 °C | | | | | | | | | | |
| Connectivity technology | | 3-wire | | | | | | | | | | |
| Resistance | | 100 Ω at 0 °C | | | | | | | | | | |
| Temperature coefficient | | 3850 ppm/K | | | | | | | | | | |
| Supply I _S | | 0.3 ... 1.0 mA _{DC} | | | | | | | | | | |
| | | max. voltage 10 V _{DC} , in intrinsically safe circuit 30 V _{DC} max. current 2 mA, in intrinsically safe circuit 54 mA max. power 10 mW, in intrinsically safe circuit 405 mW | | | | | | | | | | |
| Performance | | | | | | | | | | | | |
| Accuracy ¹ | | standard: ≤ ± 0.35 % FSO | | | | | option: ≤ ± 0.25 % FSO | | | | | |
| Permissible load | | R _{max} = [(V _S - V _{S min}) / 0.02 A] Ω | | | | | | | | | | |
| Influence effects | | supply: 0.05 % FSO / 10 V | | | | | load: 0.05 % FSO / kΩ | | | | | |
| Long term stability | | ≤ ± 0.1 % FSO / year | | | | | | | | | | |
| Turn-on time | | 450 msec | | | | | | | | | | |
| Mean response time | | ≤ 70 msec | | | | | | | | | | |
| Measuring rate | | 80 Hz | | | | | | | | | | |
| ¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) | | | | | | | | | | | | |
| Thermal effects (Offset and Span) | | | | | | | | | | | | |
| Tolerance band | | ≤ 1.0 % FSO | | | | | in compensated range -20 ... 80 °C | | | | | |
| Permissible temperatures | | | | | | | | | | | | |
| Permissible temperatures | | medium / storage: -25 ... 85 °C | | | | | | | | | | |
| Electrical protection ² | | | | | | | | | | | | |
| Short-circuit protection | | permanent | | | | | | | | | | |
| Reverse polarity protection | | no damage, but also no function | | | | | | | | | | |
| Electromagnetic compatibility | | emission and immunity according to EN 61326 | | | | | | | | | | |
| ² additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request | | | | | | | | | | | | |
| Electrical connection | | | | | | | | | | | | |
| Cable with sheath material ³ | | PUR (-25 ... 70 °C) | black | Ø 7.4 mm | | | | | | | | |
| | | FEP ⁴ (-25 ... 70 °C) | black | Ø 7.4 mm | | | | | | | | |
| | | TPE-U (-25 ... 125 °C) | blue | Ø 7.4 mm | (without / with drinking water certificate) | | | | | | | |
| | | TPE-U ⁵ (-25 ... 125 °C) | red | Ø 9.0 mm | | | | | | | | others on request |
| Bending radius | | static installation: | | 10-fold cable diameter | | | | | | | | |
| | | dynamic application: | | 20-fold cable diameter | | | | | | | | |
| ³ shielded cable with integrated air tube for atmospheric pressure reference (for nominal pressure ranges absolute, the air tube is closed) | | | | | | | | | | | | |
| ⁴ do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected | | | | | | | | | | | | |
| ⁵ only in combination with IS-version (explosion protection) and temperature element Pt 100 | | | | | | | | | | | | |
| Materials (media wetted) | | | | | | | | | | | | |
| Housing | | stainless steel 1.4404 (316 L) | | | | | | | | | | others on request |
| Seals (O-rings) | | standard: FKM option: EPDM (without / with drinking water certificate) FFKM (min. permissible temperature from -15 °C) | | | | | | | | | | others on request |
| Diaphragm | | ceramics Al ₂ O ₃ 99.9% | | | | | | | | | | |
| Protection cap | | POM-C | | | | | | | | | | |
| Cable sheath | | PUR, FEP, TPE-U | | | | | | | | | | |
| Explosion protection | | | | | | | | | | | | |
| Approval DX14B-LMK 387 | | IBExU 15 ATEX 1066 X / IECEx IBE 18.0019X zone 0: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da | | | | | | | | | | |
| Safety technical maximum values (pressure) | | U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 49.2 nF, L _i = 0 μH; the supply connections have an inner capacity of max. 100 nF opposite the enclosure | | | | | | | | | | |
| Safety technical maximum values (temperature) | | U _i = 30 V, I _i = 54 mA, P _i = 405 mW, C _i = 0 nF, L _i = 0 μH (temperature element Pt 100) | | | | | | | | | | |
| Permissible temp. for environment | | in zone 0: -20 ... 60 °C with p _{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 65 °C | | | | | | | | | | |
| Connecting cables (by factory) | | cable capacity: | | signal line/shield also signal line/signal line: 160 pF/m | | | | | | | | |
| | | cable inductance: | | signal line/shield also signal line/signal line: 1 μH/m | | | | | | | | |
| Miscellaneous | | | | | | | | | | | | |
| Drinking water certificate ⁶ | | according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary) | | | | | | | | | | |
| Option cable protection | | prepared for mounting with stainless steel pipe; available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request) | | | | | | | | | | |
| Current consumption | | max. 22 mA | | | | | | | | | | |
| Weight | | approx. 180 g (without cable) | | | | | | | | | | |
| Ingress protection | | IP 68 | | | | | | | | | | |
| CE-conformity | | EMC Directive: 2014/30/EU | | | | | | | | | | |
| ATEX Directive | | 2014/34/EU | | | | | | | | | | |
| ⁶ only possible with EPDM seal in combination with TPE-U cable; not possible with IS-version (explosion protection) | | | | | | | | | | | | |

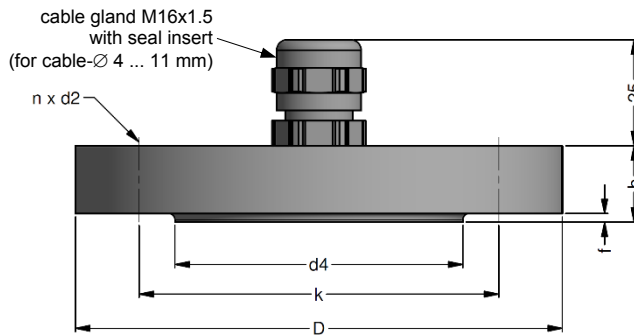
LMK 387

Stainless Steel Probe

Technical Data

| Pin configuration | |
|---|--|
| Electrical connection | cable colours (IEC 60757) |
| Supply + | WH (white) |
| Supply - | BN (brown) |
| Supply T+ (with Pt 100) | YE (yellow) |
| Supply T- (with Pt 100) | GY (grey) |
| Supply T- (with Pt 100) | PK (pink) |
| Shield | GNYE (green-yellow) |
| Wiring diagrams | |
| <p>2-wire-system (current)</p> | <p>2-wire-system current (pressure) / 3-wire-system (temperature Pt 100)</p> |
| Dimensions (mm/in) | |
| <p>standard</p> | |
| <p>protection cap removable</p> | <p>with thread R1/2" for mounting with stainless steel tube</p> |
| <p>option: screw-in version</p> | |
| <p>G3/4"</p> | <p>G1/2" open</p> |
| <p>⇒ cable diameter Ø9 mm for TPE-U cable (red), drawings for option with Pt 100 on request</p> | |

Mounting flange with cable gland



| dimensions in mm | | | |
|------------------|-------------|-------------|-------------|
| size | DN25 / PN40 | DN50 / PN40 | DN80 / PN16 |
| b | 18 | 20 | 20 |
| D | 115 | 165 | 200 |
| d2 | 14 | 18 | 18 |
| d4 | 68 | 102 | 138 |
| f | 2 | 3 | 3 |
| k | 85 | 125 | 160 |
| n | 4 | 4 | 8 |

Technical data

| Suitable for | all probes | | |
|---|--|---|--|
| Flange material | stainless steel 1.4404 (316L) | | |
| Material of cable gland | standard: brass, nickel plated | on request: stainless steel 1.4305 (303); plastic | |
| Seal insert | material: TPE (ingress protection IP 68) | | |
| Hole pattern | according to DIN 2507 | | |
| Ordering type | Ordering code | Weight | |
| DN25 / PN40 with cable gland brass, nickel plated | ZMF2540 | 1.4 kg | |
| DN50 / PN40 with cable gland brass, nickel plated | ZMF5040 | 3.2 kg | |
| DN80 / PN16 with cable gland brass, nickel plated | ZMF8016 | 4.8 kg | |

Terminal clamp



Technical data

| Suitable for | all probes with cable Ø 5.5 ... 10.5 mm | | |
|---|---|--|--|
| Material of housing | standard: steel, zinc plated | optionally: stainless steel 1.4301 (304) | |
| Material of clamping jaws and positioning clips | PA (fibre-glass reinforced) | | |
| Dimensions (mm) | 174 x 45 x 32 | | |
| Hook diameter | 20 mm | | |
| Ordering type | Ordering code | Weight | |
| Terminal clamp, steel, zinc plated | Z100528 | approx. 160 g | |
| Terminal clamp, stainless steel 1.4301 (304) | Z100527 | | |

Display program

- CIT 200** Process display with LED display
- CIT 250** Process display with LED display and contacts
- CIT 300** Process display with LED display, contacts and analogue output
- CIT 350** Process display with LED display, bargraph, contacts and analogue output
- CIT 400** Process display with LED display, contacts, analogue output and Ex-approval
- CIT 600** Multichannel process display with graphics-capable LC display
- CIT 650** Multichannel process display with graphics-capable LC display and datalogger
- CIT 700 / CIT 750** Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts
- PA 440** Field display with 4-digit LC display

For further information please contact our sales department or visit our homepage:
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