

LMK 458H



Probe with HART®-communication for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 61298-2:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH₂O up to 0 ... 200 mH₂O

Output signals

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

Special characteristics

- ▶ shipping approvals acc. to:
Lloyd's Register (LR),
Det Norske Veritas (DNV),
China Classification Society (CCS),
American Bureau of Shipping (ABS)
- ▶ diameter 39.5 mm
- ▶ diaphragm ceramics Al₂O₃ 99.9 %
- ▶ HART® communication
(setting of offset, span and damping)
- ▶ high overpressure resistance
- ▶ high long-term stability

Optional versions

- ▶ IS-version
Ex ia = intrinsically safe for gas and dust
- ▶ different housing materials
(stainless steel, CuNiFe)
- ▶ screw-in and flange version
- ▶ accessories e. g. assembling and
probe flange, mounting clamp

The hydrostatic probe LMK 458H has been developed for measuring level in service and storage tanks and is certificated for shipbuilding and offshore applications.

A permissible operating temperature up to 85°C and the possibility to use the device in intrinsic safe areas enable to measure the pressure of various fluids under extreme conditions. The basis for the LMK 458H is a self-developed capacitive ceramic sensor element, which offers a high overload resistance and medium compatibility.

Preferred areas of use are

 Water
drinking water abstraction
desalinization plant

 Shipbuilding / Offshore
ballast tanks
draught monitoring
level measurement in ballast and
storage tanks



LMK 458H

Probe for Marine and Offshore

Technical Data

| Pressure ranges | | | | | | | | | |
|--|---|--------------------------------------|-------------|--------------|--|----|---------------------------|---|--|
| Nominal pressure gauge ¹ [bar] | 0.06 | 0.16 | 0.4 | 1 | 2 | 5 | 10 | 20 | |
| Level [mH ₂ O] | 0.6 | 1.6 | 4 | 10 | 20 | 50 | 100 | 200 | |
| Overpressure [bar] | 2 | 4 | 6 | 8 | 15 | 25 | 35 | 45 | |
| Max. ambient pressure (housing): 40 bar | | | | | | | | | |
| ¹ on customer request we adjust the devices by software on the required pressure ranges, within the turn-down possibility (starting at 0.02 bar) | | | | | | | | | |
| Output signal / Supply | | | | | | | | | |
| Standard | 2-wire: 4 ... 20 mA / V _S = 12 ... 36 V _{DC} | | | | with HART [®] communication | | | V _{S rated} = 24 V _{DC} | |
| Option IS-version | 2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC} | | | | with HART [®] communication | | | V _{S rated} = 24 V _{DC} | |
| Performance | | | | | | | | | |
| Accuracy ² | p _N ≥ 160 mbar | TD ≤ 1:5 ≤ ± 0.2 % FSO | | | | | TD _{max} = 1:10 | | |
| | p _N < 160 mbar | TD > 1:5 ≤ ± [0.2 + 0.03 x TD] % FSO | | | | | TD _{max} = 1:3 | | |
| | p _N ≥ 1 bar | TD ≤ 1:5 ≤ ± 0.1 % FSO | | | | | TD _{max} = 1:10 | | |
| | | TD > 1:5 ≤ ± [0.1 + 0.02 x TD] % FSO | | | | | | | |
| Permissible load | R _{max} = [(V _S - V _{S min}) / 0.02 A] Ω | | | | load at HART [®] -communication: R _{min} = 250 Ω | | | | |
| Long term stability | ≤ ± (0.1 x turn-down) FSO / year at reference conditions | | | | | | | | |
| Influence effects | supply: 0.05 % FSO / 10 V | | | | permissible load: 0.05 % FSO / kΩ | | | | |
| Turn-on time | 850 msec | | | | | | | | |
| Mean response time | 140 msec without consideration of electronic damping | | | | | | mean measuring rate 7/sec | | |
| Max. response time | 380 msec | | | | | | | | |
| Adjustability | configuration of following parameters possible (interface / software necessary ³): electronic damping: 0 ... 100 sec offset: 0 ... 80 % FSO turn down of span: max. 1:10 | | | | | | | | |
| ² accuracy according to IEC 61298-2 – limit point adjustment (non-linearity, hysteresis, repeatability) | | | | | | | | | |
| ³ software, interface, and cable have to be ordered separately (software appropriate for Windows [®] 95, 98, 2000, NT Version 4.0 or higher, and XP) | | | | | | | | | |
| Thermal effects (offset and span) / Permissible temperatures | | | | | | | | | |
| Tolerance band | ≤ ± 1 % FSO | | | | | | | | |
| In compensated range | -20 ... 80 °C | | | | | | | | |
| Permissible temperatures | medium / electronics / environment / storage: -25 ... 85 °C | | | | | | | | |
| Electrical protection ⁴ | | | | | | | | | |
| Short-circuit protection | permanent | | | | | | | | |
| Reverse polarity protection | no damage, but also no function | | | | | | | | |
| Electromagnetic compatibility | emission and immunity according to - EN 61326 - DNV (Det Norske Veritas) | | | | | | | | |
| ⁴ additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available | | | | | | | | | |
| Mechanical stability | | | | | | | | | |
| Vibration | 4 g (according to DNV: class B, curve 2 / basis: DIN EN 60068-2-6) | | | | | | | | |
| Electrical connection | | | | | | | | | |
| Cable with sheath material ⁵ | TPE-U blue Ø 7.4 mm | | | | | | | | |
| Bending radius | static installation: 10-fold cable diameter | | | | dynamic application: 20-fold cable diameter | | | | |
| ⁵ shielded cable with integrated ventilation tube for atmospheric pressure reference (for nominal pressure ranges absolute the ventilation tube is closed) | | | | | | | | | |
| Materials (media wetted) | | | | | | | | | |
| Housing | standard: stainless steel 1.4404 (316L) | | | | option: CuNi10Fe1Mn (resistant against sea water) | | | | |
| Seals | standard: FKM options: EPDM, FFKM (min. permissible temperature from -15 °C) others on request | | | | | | | | |
| Diaphragm | ceramics Al ₂ O ₃ 99.9 % | | | | | | | | |
| Protection cap | POM-C | | | | | | | | |
| Cable sheath | TPE-U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil) | | | | | | | | |
| Miscellaneous | | | | | | | | | |
| Option cable protection for probes in stainless steel | prepared for mounting with stainless steel pipe | | | | | | | | |
| Ingress protection | IP 68 | | | | | | | | |
| Current consumption | max. 21 mA | | | | | | | | |
| Weight | min. 650 g (without cable) | | | | | | | | |
| CE-conformity | EMC Directive: 2014/30/EU | | | | | | | | |
| ATEX Directive | 2014/34/EU | | | | | | | | |
| Category of the environment | | | | | | | | | |
| Lloyd's Register (LR) | EMV1, EMV2, EMV3, EMV4 | | | | number of certificate: 13/20056 | | | | |
| Det Norske Veritas (DNV) | temperature: D | vibration: B | humidity: B | enclosure: D | number of certificate: TAA00001GM | | | | |
| | electromagnetic compatibility: B | | | | | | | | |
| Explosion protection | | | | | | | | | |
| Approval DX15A-LMK 458H | IBExU 10 ATEX 1186 X zone 0 ⁶ : II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIC T135 °C Da | | | | | | | | |
| Safety technical maximum values | U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 94,6 nF; L _i = 0 μH; the supply connections have an inner capacity of max. 110 nF opposite the enclosure | | | | | | | | |
| Permissible temperatures for environment | in zone 0: -20 ... 60 °C with p _{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 70 °C | | | | | | | | |
| Connecting cables (by factory) | cable capacity: signal line/shield as well as signal line/signal line: 160 pF/m cable inductance: signal line/shield as well as signal line/signal line: 1 μH/m | | | | | | | | |
| ⁶ for optional stainless steel pipe the following designation is valid: "II 1G Ex ia IIC T4" (zone 0) | | | | | | | | | |

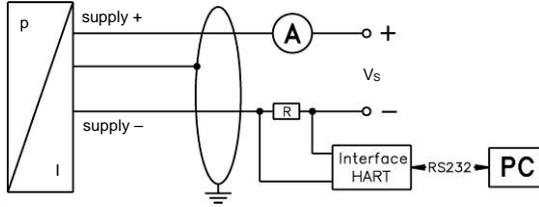
LMK 458H

Probe for Marine and Offshore

Technical Data

Wiring diagram

2-wire-system (current) HART®

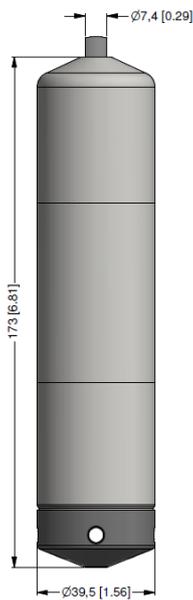


Pin configuration

| Electrical connection | cable colours (IEC 60757) |
|-----------------------|---------------------------|
| Supply V_S+ | WH (white) |
| Supply V_S- | BN (brown) |
| Shield | GNYE (green-yellow) |

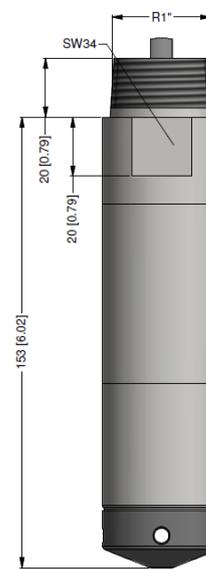
Dimensions for housing in stainless steel and CuNiFe (mm / in)

probe



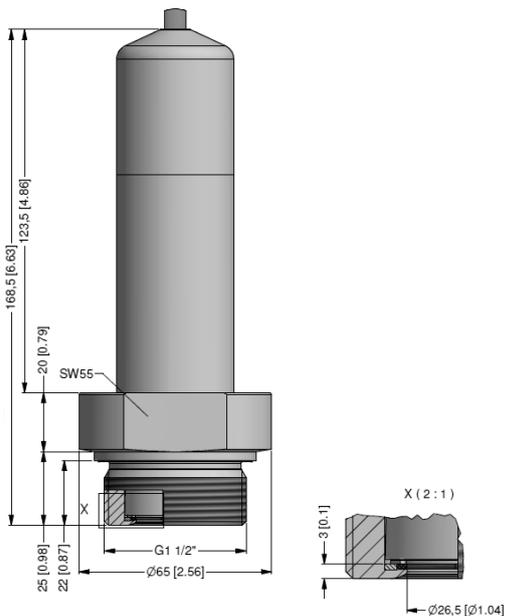
protection cap removable

option

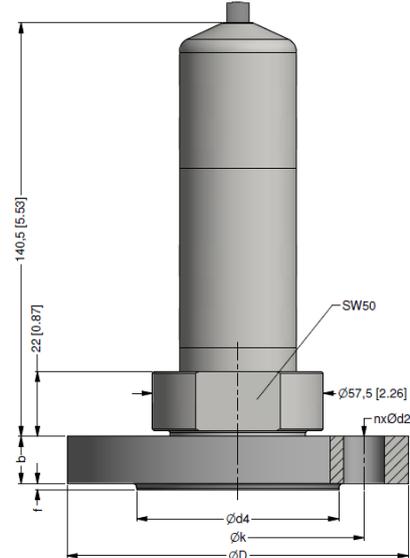


prepared for mounting with stainless steel pipe

screw-in version



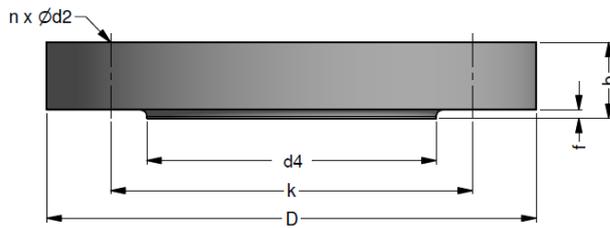
flange version



⇒ transmitter flange is not part of supply and has to be ordered separately

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Transmitter flange for flange version



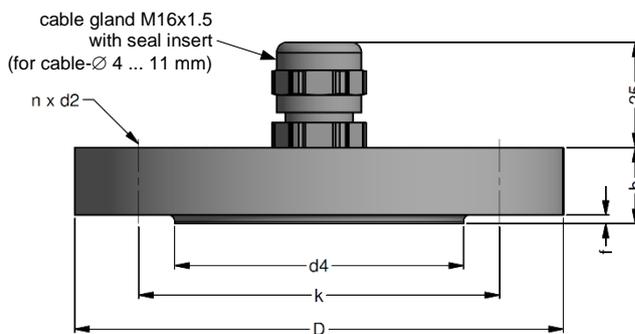
| dimensions in mm | | | |
|------------------|-------------|-------------|-------------|
| size | DN25 / PN40 | DN50 / PN40 | DN80 / PN16 |
| b | 18 | 20 | 20 |
| D | 115 | 165 | 200 |
| d2 | 14 | 18 | 18 |
| d4 | 68 | 102 | 138 |
| f | 2 | 3 | 3 |
| k | 85 | 125 | 160 |
| n | 4 | 4 | 8 |

Technical data

| | |
|-----------------|--------------------------------------|
| Suitable for | LMK 382, LMK 382H, LMK 458, LMK 458H |
| Flange material | stainless steel 1.4404 (316L) |
| Hole pattern | according to DIN 2507 |

| Ordering type | Ordering code | Weight |
|--------------------------------|---------------|--------|
| Transmitter flange DN25 / PN40 | ZSF2540 | 1.2 kg |
| Transmitter flange DN50 / PN40 | ZSF5040 | 2.6 kg |
| Transmitter flange DN80 / PN16 | ZSF8016 | 4.1 kg |

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 |

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Ordering code LMK 458H

LMK 458H

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| | | | | | | | | | |
|------------------------------|--|-----------|---|---|---|---|---|---|---------|
| Pressure | | | | | | | | | |
| | in bar, gauge | 7 | 6 | E | | | | | |
| | in bar, absolute ¹ | 7 | 6 | H | | | | | |
| | in mH ₂ O | 7 | 6 | F | | | | | |
| Input | | | | | | | | | |
| | [mH ₂ O] | [bar] | | | | | | | |
| | 0.6 | 0.06 | 0 | 6 | 0 | 0 | | | |
| | 1.6 | 0.16 | 1 | 6 | 0 | 0 | | | |
| | 4.0 | 0.40 | 4 | 0 | 0 | 0 | | | |
| | 10 | 1.0 | 1 | 0 | 0 | 1 | | | |
| | 20 | 2.0 | 2 | 0 | 0 | 1 | | | |
| | 50 | 5.0 | 5 | 0 | 0 | 1 | | | |
| | 100 | 10 | 1 | 0 | 0 | 2 | | | |
| | 200 | 20 | 2 | 0 | 0 | 2 | | | |
| | customer | | 9 | 9 | 9 | | | | consult |
| Housing | | | | | | | | | |
| | stainless steel 1.4404 (316L) | | | | | 1 | | | |
| | copper-nickel-alloy (CuNi10Fe1Mn) | | | | | K | | | |
| | customer | | | | | 9 | | | consult |
| Design | | | | | | | | | |
| | probe | | | | | 1 | | | |
| | flange version ² | | | | | 3 | | | |
| | screw-in version | | | | | 5 | | | |
| Diaphragm | | | | | | | | | |
| | ceramics Al ₂ O ₃ 99.9 % | | | | | C | | | |
| | customer | | | | | 9 | | | consult |
| Output | | | | | | | | | |
| | HART [®] -communication | | | | | H | | | |
| | 4 ... 20 mA / 2-wire | | | | | | | | |
| | HART [®] -communication | | | | | I | | | |
| | intrinsic safety 4 ... 20 mA / 2-wire | | | | | | | | |
| | customer | | | | | 9 | | | consult |
| Seal | | | | | | | | | |
| | FKM | | | | | 1 | | | |
| | EPDM | | | | | 3 | | | |
| | FFKM ³ | | | | | 7 | | | |
| | customer | | | | | 9 | | | consult |
| Electrical connection | | | | | | | | | |
| | TPE-U-cable (blue, Ø 7.4 mm) ⁴ | | | | | 4 | | | |
| | customer | | | | | 9 | | | |
| Accuracy | | | | | | | | | |
| | p _N ≥ 1 bar: | 0.1 % FSO | | | | 1 | | | |
| | p _N < 1 bar: | 0.2 % FSO | | | | B | | | |
| | customer | | | | | 9 | | | consult |
| Cable length | | | | | | | | | |
| | in m | | | | | | 9 | 9 | 9 |
| Special version | | | | | | | | | |
| | standard | | | | | | 0 | 0 | 0 |
| | prepared for mounting | | | | | | 5 | 0 | 2 |
| | with stainless steel pipe ⁵ | | | | | | | | |
| | customer | | | | | | 9 | 9 | 9 |
| | | | | | | | | | consult |

¹ nominal pressure ranges absolute from 1 bar

² mounting accessories are not part of supply and have to be ordered separately

³ min. permissible temperature from -15°C

⁴ shielded cable with integrated ventilation tube for atmospheric reference

⁵ possible for probes in stainless steel; stainless steel pipe is not part of the supply

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