



LMK 358 LMK 358 H

Separable Stainless Steel Submersible Transmitter with Ceramic Sensor

- ▶ Diameter: 39.5 mm
- ▶ H-version: HART® communication
- ▶ nominal pressure ranges from
0 ... 40 cmWC up to 0 ... 100 mWC
(0 ... 40 mbar up to 0 ... 10 bar)

The submersible transmitters LMK 358 and LMK 358 H have been designed for continuous level measurement. Basic element is a capacitive ceramic sensor. Use in more viscous media such as slurries is possible - removing the protective cap makes the transmitter flush.

On basis on a mechanically robust and highly overloadable capacitive ceramic sensor the transmitters are among others suited for the measurement of low filling heights with good long term stability. In order to facilitate stock-keeping and maintenance the transmitter head is plugged to the cable assembly with a connector and can be changed easily. On type LMK 358 H thermal errors and non-linearity of the sensor are actively compensated by the microprocessor electronics. Then a D/A converter creates the standard output signal 4 ... 20 mA which is overlaid with a signal according to HART® protocol. Thus measurement specific parameters (offset, span, and damping) can be adjusted individually. The submersible transmitters LMK 358 and LMK 358 H are suited for explosive area (zone 0).

Preferred areas of use are:

- ▶ level monitoring in open tanks with low filling heights
- ▶ depth or level measurement in wells and open waters
- ▶ ground water level measurement
- ▶ sewage and water treatment plants
- ▶ chemical and pharmaceutical industries

- ▶ good long term stability
- ▶ **accuracy LMK 358:**
0.175% / 0.125% FSO BFSL
(0.35% / 0.25% FSO IEC 60770)
- ▶ **accuracy LMK 358 H:**
0.1% FSO BFSL
(0.2% FSO IEC 60770)
- ▶ **LMK 358 H:**
HART® communication
(adjustment of offset, span, and damping)
- ▶ **option Ex version**
(only for 4 ... 20 mA / 2-wire)
LMK 358: IBExU 05 ATEX 1070 X
LMK 358 H: FTZÜ 06 ATEX 0018 X
- ▶ optional:
 - cable protection with corrugated pipe
 - diaphragm in Al₂O₃ 99.9 %
 - customer versions on request

Characteristics

LMK 358 / 358 H
Stainless Steel Level Transmitter



LMK 358 / 358 H

Stainless Steel Level Transmitter

Technical Data

| Input pressure range ¹ | | | | | | | | | | | | | |
|---|------|------|------|------|------|-----|-----|----|-----|-----|----|----|-----|
| LMK 358 | | | | | | | | | | | | | |
| Nominal pressure gauge [bar] | 0.04 | 0.06 | 0.1 | 0.16 | 0.25 | 0.4 | 0.6 | 1 | 1.6 | 2.5 | 4 | 6 | 10 |
| Level [mWC] | 0.4 | 0.6 | 1 | 1.6 | 2.5 | 4 | 6 | 10 | 16 | 25 | 40 | 60 | 100 |
| Permissible overpressure [bar] | 2 | 2 | 4 | 4 | 6 | 6 | 8 | 8 | 15 | 25 | 25 | 35 | 35 |
| LMK 358 H | | | | | | | | | | | | | |
| Nominal pressure gauge [bar] | 0.06 | | 0.16 | | 0.4 | | 1 | | 2 | | 5 | | 10 |
| Level [mWC] | 0.6 | | 1.6 | | 4 | | 10 | | 20 | | 50 | | 100 |
| Permissible overpressure [bar] | 2 | | 4 | | 6 | | 8 | | 15 | | 25 | | 35 |
| 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 | | |
|------------------------|---|--|
| LMK 358 | | |
| 2-wire | 4 ... 20 mA / $V_s = 9 \dots 36 V_{DC}$ | Ex-protection: $V_s = 12 \dots 28 V_{DC}$ |
| LMK 358 H | | |
| 2-wire | 4 ... 20 mA / $V_s = 12 \dots 36 V_{DC}$ with modulated HART [®] signal | Ex-protection: $V_s = 12 \dots 28 V_{DC}$ with modulated HART [®] signal |

| Performance | | |
|---------------------|--|--|
| LMK 358 | | |
| Accuracy | IEC 60770 ² standard: $\leq \pm 0.35 \% \text{ FSO}$ option: $\leq \pm 0.25 \% \text{ FSO}$ | BFSL standard: $\leq \pm 0.175 \% \text{ FSO}$ option: $\leq \pm 0.125 \% \text{ FSO}$ |
| Permissible load | $R_{max} = [(V_s - V_{smin}) / 0.02] \Omega$ | |
| Influence effects | supply: 0.05 % FSO / 10 V | load: 0.05 % FSO / k Ω |
| Long term stability | $\leq \pm 0.1 \% \text{ FSO} / \text{year}$ | |
| Response time | 200 ms | measuring rate 5/s |
| LMK 358 H | | |
| Accuracy | IEC 60770 ² : $\leq \pm 0.2 \% \text{ FSO}$ relating to nominal range BFSL: $\leq \pm 0.1 \% \text{ FSO}$ relating to nominal range | |
| Permissible load | $R_{max} = [(V_s - V_{smin}) / 0.02] \Omega$ | load during HART [®] communication: $R_{min} = 250 \Omega$ |
| Influence effects | supply: 0.05 % FSO / 10 V | load: 0.05 % FSO / k Ω |
| Long term stability | $\leq \pm (0.1 \times \text{nominal range} / \text{adjusted range}) \% \text{ FSO} / \text{year}$ | |
| Response time | 200 ms – without consideration of electronic damping | measuring rate 5/s |
| Adjustability | configuration of following parameters possible (interface / software necessary ³): - electronic damping: 0 ... 100 s - offset: 0 ... 67 % FSO - turn down of span: max. 1:3 | |

| Thermal effects | |
|--|---|
| LMK 358 | |
| Thermal error for offset and span in compensated range | $\leq \pm 0.1 \% \text{ FSO} / 10 \text{ K}$ 0 ... 70 °C |
| LMK 358 H | |
| Tolerance band | $\leq \pm (0.2 \times \text{nominal range} / \text{adjusted range}) \% \text{ FSO}$ |
| TC, average in compensated range | $\pm (0.02 \times \text{nominal range} / \text{adjusted range}) \% \text{ FSO} / 10 \text{ K}$ 0 ... 70 °C |

¹ version with Al₂O₃ 99.9% possible for pressure ranges from 0.1 bar up to 1 bar

² accuracy according to IEC 60770 – 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)

LMK 358 / 358 H

Stainless Steel Level Transmitter

Technical Data

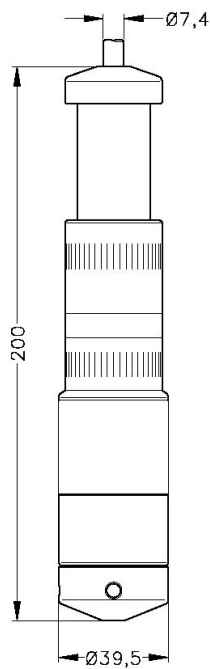
Electrical protection ⁴

| | |
|---|--|
| Reverse polarity protection | no damage, but also no function |
| Electromagnetic compatibility | emission and immunity according to EN 61326 |
| Option Ex-protection only with 4 ... 20 mA / 2-wire DX14-LMK 358 DX15-LMK 358 H | LMK 358 (IBExU05 ATEX 1070 X) LMK 358 H (FTZÜ 06 ATEX 0018 X) Zone 0 ^{5,6} : II 1 G EEx ia IIB T4 safety technical maximum values: $U_i = 28 \text{ V}$, $I_i = 93 \text{ mA}$, $P_i = 660 \text{ mW}$, $C_i = 27 \text{ nF}$, $L_i = 5 \mu\text{H}$ |

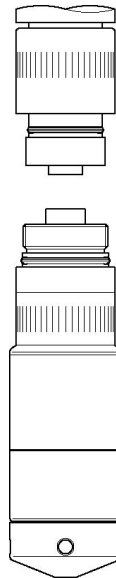
Permissible temperatures

| | | |
|---------|---------------|---|
| Medium | -10 ... 70 °C | Ex-protection: application in zone 0: -10 ... 60 °C application in zone 1 or higher: -10 ... 70 °C |
| Storage | -25 ... 70 °C | |

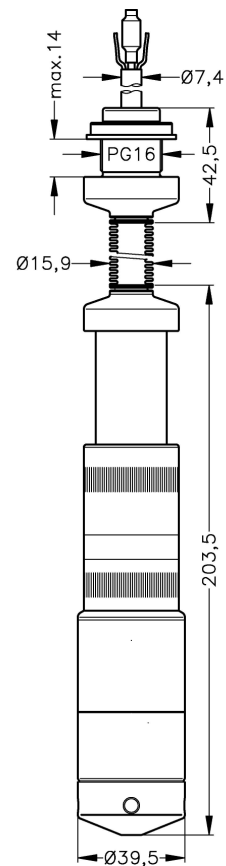
Dimensions



LMK 358



Transmitter head and cable assembly separable



optionally with corrugated pipe

⇒ Total length of LMK 358 H increases by 71 mm.

⁴ additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available as accessory

⁵ approved for atmospheric pressure from 0.8 bar up to 1.1 bar

⁶ for option corrugated pipe following designation is valid: "II 1 G EEx ia IIC T4" (zone 0)

LMK 358 / 358 H

Stainless Steel Level Transmitter

Technical Data

Electrical connection

| | |
|---|------------------------------------|
| Cable with sheath material ⁷ | PVC grey PUR black FEP black |
|---|------------------------------------|

Materials

| | |
|--------------|--|
| Housing | stainless steel 1.4571 (316Ti) |
| Seals | FKM, EPDM; others on request |
| Diaphragm | Standard: ceramics Al ₂ O ₃ 96 % Option: ceramics Al ₂ O ₃ 99.9 % (possible for pressure ranges from 0.1 bar up to 1 bar) |
| Cable sheath | PVC / PUR / FEP |

Miscellaneous

| | | |
|---------------------|-------------------------------|-----------------------------------|
| Cable capacitance | signal line/shield: 150 pF/m | signal line/signal line: 100 pF/m |
| Cable inductance | signal line/shield: 1.0 µH/m | signal line/signal line: 1.0 µH/m |
| Current consumption | max. 21 mA | |
| Weight | approx. 650 g (without cable) | |
| Ingress protection | IP 68 | |

Mounting accessories (not part of delivery)

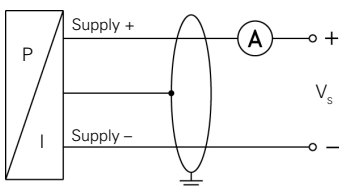
Screw fitting made of stainless steel 1.4571 (316Ti)
 Mounting flange for transmitter fixing made of stainless steel 1.4571 (316Ti):
 DN25 / PN40 (Ø115, 18 thick, 4 drill holes Ø14 at Ø85)
 DN50 / PN16 (Ø165, 18 thick, 4 drill holes Ø18 at Ø125)
 DN80 / PN16 (Ø200, 20 thick, 8 drill holes Ø18 at Ø160)
 Terminal clamp made of stainless steel 1.4301 (304) or steel, zinc plated

Pin configuration

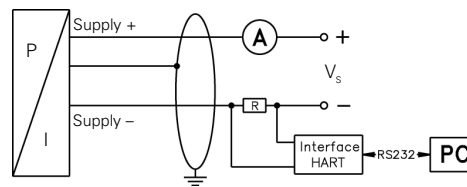
| Electrical connection | | Binder Series 723 ⁸ (5-pin) | cable colours (DIN 47100) |
|-----------------------|----------|---|------------------------------|
| 2-wire- system | Supply + | 3 | white |
| | Supply - | 1 | brown |
| | Ground | 5 | yellow / green (shield) |

Wiring diagrams

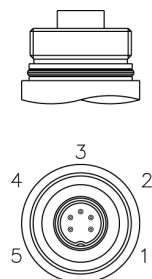
2-wire-system (current)



2-wire-system (current) HART[®]



connector ⁸



⁷ cable with integrated air tube for atmospheric pressure reference

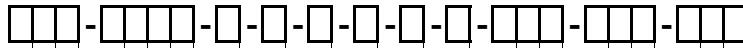
⁸ in separated version

HART[®] is a registered trade mark of HART Communication Foundation

Windows[®] is a registered trade mark of Microsoft Corporation

Ordering Code LMK 358

LMK 358



| | | | | | | | | | | | | | | | | | | | |
|------------------------------|--|--------|---|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|--|
| Pressure | | in bar | 4 | 4 | 5 | | | | | | | | | | | | | | |
| | | in mWC | 4 | 4 | 6 | | | | | | | | | | | | | | |
| Input | [mWC] | [bar] | | | | | | | | | | | | | | | | | |
| | 0,40 | 0,04 | 0 | 4 | 0 | 0 | | | | | | | | | | | | | |
| | 0,60 | 0,06 | 0 | 6 | 0 | 0 | | | | | | | | | | | | | |
| | 1,0 | 0,10 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | |
| | 1,6 | 0,16 | 1 | 6 | 0 | 0 | | | | | | | | | | | | | |
| | 2,5 | 0,25 | 2 | 5 | 0 | 0 | | | | | | | | | | | | | |
| | 4,0 | 0,40 | 4 | 0 | 0 | 0 | | | | | | | | | | | | | |
| | 6,0 | 0,60 | 6 | 0 | 0 | 0 | | | | | | | | | | | | | |
| | 10 | 1,0 | 1 | 0 | 0 | 1 | | | | | | | | | | | | | |
| | 16 | 1,6 | 1 | 6 | 0 | 1 | | | | | | | | | | | | | |
| | 25 | 2,5 | 2 | 5 | 0 | 1 | | | | | | | | | | | | | |
| | 40 | 4,0 | 4 | 0 | 0 | 1 | | | | | | | | | | | | | |
| | 60 | 6,0 | 6 | 0 | 0 | 1 | | | | | | | | | | | | | |
| | 100 | 10 | 1 | 0 | 0 | 2 | | | | | | | | | | | | | |
| | customer | | 9 | 9 | 9 | | | | | | | | | | | | | | |
| Housing | | | | | | | | | | | | | | | | | | | |
| | Stainless steel 1.4571 (316Ti) | | | | | 1 | | | | | | | | | | | | | |
| | customer | | | | | 9 | | | | | | | | | | | | | |
| Diaphragm | | | | | | | | | | | | | | | | | | | |
| | Ceramics Al ₂ O ₃ 96% | | | | | 2 | | | | | | | | | | | | | |
| | Ceramics Al ₂ O ₃ 99,9% ¹ | | | | | 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 | | | | | | | | | | | | | | | | | | | |
| | PVC-cable ² | | | | | 1 | | | | | | | | | | | | | |
| | PUR-cable ² | | | | | 2 | | | | | | | | | | | | | |
| | FEP-cable ² | | | | | 3 | | | | | | | | | | | | | |
| | customer | | | | | 9 | | | | | | | | | | | | | |
| Accuracy | | | | | | | | | | | | | | | | | | | |
| | standard | 0,35 % | | | | 3 | | | | | | | | | | | | | |
| | option | 0,25 % | | | | 2 | | | | | | | | | | | | | |
| | customer | | | | | 9 | | | | | | | | | | | | | |
| Cable length | | | | | | | | | | | | | | | | | | | |
| | in m | | | | | 9 | 9 | 9 | | | | | | | | | | | |
| Special version | | | | | | | | | | | | | | | | | | | |
| | standard | | | | | | | | | | | | | | | | | | |
| | prepared for mounting ³ | | | | | | | | | | | | | | | | | | |
| | with stainless steel pipe | | | | | | | | | | | | | | | | | | |
| | cable protection with | | | | | | | | | | | | | | | | | | |
| | stainless steel corrugated pipe | | | | | | | | | | | | | | | | | | |
| | with pipe length in m | | | | | | | | | | | | | | | | | | |
| | customer | | | | | | | | | | | | | | | | | | |

¹ ceramics Al₂O₃ 99.9% only possible with pressure ranges
² cable with integrated air tube for atmospheric pressure reference
³ stainless steel pipe is not part of the supply

HART® is a registered trade mark of HART Communication Foundation

This ordering code contains product specification; properties are not guaranteed. Subject to change without notice.

