



# ILMK 358H

## Detachable Stainless Steel Probe with HART®-Communication

Ceramic Sensor

accuracy according to IEC 60770:  
0.1 % FSO

### Nominal pressure

from 0 ... 60 cmH<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 39.5 mm
- ▶ HART® communication (setting of offset, span and damping)
- ▶ permissible temperatures up to 85 °C
- ▶ high overpressure resistance
- ▶ high long-term stability


### Optional versions


- ▶ IS-version  
Ex ia = intrinsically safe for gas and dust
- ▶ cable protection on request
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- ▶ accessories e.g. mounting flange with cable gland and terminal clamp


The detachable stainless steel probe ILMK 358H has been designed for level measurement in waste water, waste and higher viscosity media. Basic element is a capacitive ceramic sensor.

In order to facilitate stock-keeping and maintenance the sensor head is plugged to the cable assembly with a connector and can be changed easily.

### Preferred areas of use are

 Water  
ground water level measurement  
rain spillway basin

 Sewage  
waste water treatment  
water recycling

 Fuel and oil  
level monitoring in open tanks  
with low filling heights  
fuel storage  
tank farms  
biogas plants



# ILMK 358H

Detachable Stainless Steel Probe

Technical Data

| Input pressure range <sup>1</sup>                                                                                                                            |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------|-----|----|--------------------------------------------------------|--------------------------|-----|
| Nominal pressure gauge                                                                                                                                       | [bar]                                                                                                                                                                                                          | 0.06     | 0.16                                                      | 0.4 | 1  | 2                                                      | 5                        | 10  |
| Level                                                                                                                                                        | [mH <sub>2</sub> O]                                                                                                                                                                                            | 0.6      | 1.6                                                       | 4   | 10 | 20                                                     | 50                       | 100 |
| Overpressure                                                                                                                                                 | [bar]                                                                                                                                                                                                          | 2        | 4                                                         | 6   | 8  | 15                                                     | 25                       | 35  |
| Max. ambient pressure (housing): 40 bar                                                                                                                      |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| <sup>1</sup> 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 <sub>S</sub> = 12 ... 36 V <sub>DC</sub> with HART® communication                                                                                                                      |          |                                                           |     |    | V <sub>S rated</sub> = 24 V <sub>DC</sub>              |                          |     |
| Option IS-version                                                                                                                                            | 2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 28 V <sub>DC</sub> with HART® communication                                                                                                                      |          |                                                           |     |    | V <sub>S rated</sub> = 24 V <sub>DC</sub>              |                          |     |
| Performance                                                                                                                                                  |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Accuracy <sup>2</sup>                                                                                                                                        | p <sub>N</sub> ≥ 160 mbar                                                                                                                                                                                      | TD ≤ 1:5 | ≤ ± 0.2 % FSO                                             |     |    |                                                        | TD <sub>max</sub> = 1:10 |     |
|                                                                                                                                                              |                                                                                                                                                                                                                | TD > 1:5 | ≤ ± [0.2 + 0.03 x TD] % FSO                               |     |    |                                                        |                          |     |
|                                                                                                                                                              | p <sub>N</sub> < 160 mbar                                                                                                                                                                                      |          | ≤ ± [0.2 + 0.1 x TD] % FSO                                |     |    |                                                        | TD <sub>max</sub> = 1:3  |     |
|                                                                                                                                                              | p <sub>N</sub> ≥ 1 bar                                                                                                                                                                                         | TD ≤ 1:5 | ≤ ± 0.1 % FSO                                             |     |    |                                                        | TD <sub>max</sub> = 1:10 |     |
|                                                                                                                                                              |                                                                                                                                                                                                                | TD > 1:5 | ≤ ± [0.1 + 0.02 x TD] % FSO                               |     |    |                                                        |                          |     |
| Permissible load                                                                                                                                             | R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω load at HART®-communication: R <sub>min</sub> = 250 Ω                                                                                   |          |                                                           |     |    |                                                        |                          |     |
| Long term stability                                                                                                                                          | ≤ ± (0.1 x turn-down) % FSO / year at reference conditions                                                                                                                                                     |          |                                                           |     |    |                                                        |                          |     |
| Influence effects                                                                                                                                            | supply: 0.05 % FSO / 10 V<br>load: 0.05 % FSO / kΩ                                                                                                                                                             |          |                                                           |     |    |                                                        |                          |     |
| Turn-on time                                                                                                                                                 | 850 msec                                                                                                                                                                                                       |          |                                                           |     |    |                                                        |                          |     |
| Mean response time                                                                                                                                           | 140 msec – without consideration of electronic damping                                                                                                                                                         |          |                                                           |     |    | measuring rate 7/sec                                   |                          |     |
| Max. response time                                                                                                                                           | 380 msec                                                                                                                                                                                                       |          |                                                           |     |    |                                                        |                          |     |
| Adjustability                                                                                                                                                | configuration of following parameters possible (interface / software necessary <sup>3</sup> )<br>- electronic damping 0 ... 100 sec<br>- offset: 0 ... 80 % FSO<br>- turn-down of span: max. 1:10              |          |                                                           |     |    |                                                        |                          |     |
| <sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)                                             |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| <sup>3</sup> 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 / electronic / environment / storage: -25 ... 85 °C                                                                                                                                                     |          |                                                           |     |    |                                                        |                          |     |
| Electrical protection <sup>4</sup>                                                                                                                           |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Short-circuit protection                                                                                                                                     | permanent                                                                                                                                                                                                      |          |                                                           |     |    |                                                        |                          |     |
| Reverse polarity protection                                                                                                                                  | no damage, but also no function                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Lightning protection                                                                                                                                         | integrated                                                                                                                                                                                                     |          |                                                           |     |    |                                                        |                          |     |
| Electromagnetic compatibility                                                                                                                                | emission and immunity according to EN 61326                                                                                                                                                                    |          |                                                           |     |    |                                                        |                          |     |
| <sup>4</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request           |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Mechanical stability                                                                                                                                         |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Vibration                                                                                                                                                    | 4 g (according to: DIN EN 60068-2-6)                                                                                                                                                                           |          |                                                           |     |    |                                                        |                          |     |
| Electrical connection                                                                                                                                        |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Cable with sheath material <sup>5</sup>                                                                                                                      | PVC (-5 ... 70 °C)                                                                                                                                                                                             | grey     | Ø 7.4 mm                                                  |     |    |                                                        |                          |     |
|                                                                                                                                                              | PUR (-25 ... 70 °C)                                                                                                                                                                                            | black    | Ø 7.4 mm                                                  |     |    |                                                        |                          |     |
|                                                                                                                                                              | FEP <sup>6</sup> (-25 ... 70 °C)                                                                                                                                                                               | black    | Ø 7.4 mm                                                  |     |    |                                                        |                          |     |
|                                                                                                                                                              | TPE-U (-25 ... 85 °C)                                                                                                                                                                                          | blue     | Ø 7.4 mm                                                  |     |    |                                                        |                          |     |
| Bending radius                                                                                                                                               | static installation:                                                                                                                                                                                           |          | 10-fold cable diameter                                    |     |    |                                                        |                          |     |
|                                                                                                                                                              | dynamic application:                                                                                                                                                                                           |          | 20-fold cable diameter                                    |     |    |                                                        |                          |     |
| <sup>5</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference                                                              |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| <sup>6</sup> do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected                                   |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Materials (media wetted)                                                                                                                                     |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Housing                                                                                                                                                      | stainless steel 1.4404 (316L)                                                                                                                                                                                  |          |                                                           |     |    |                                                        |                          |     |
| Seals                                                                                                                                                        | FKM, EPDM, others on request                                                                                                                                                                                   |          |                                                           |     |    |                                                        |                          |     |
| Diaphragm                                                                                                                                                    | standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 %                                                                                                                                                         |          |                                                           |     |    | option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 % |                          |     |
| Protection cap                                                                                                                                               | POM-C                                                                                                                                                                                                          |          |                                                           |     |    |                                                        |                          |     |
| Cable sheath                                                                                                                                                 | PVC, PUR, FEP, TPE-U                                                                                                                                                                                           |          |                                                           |     |    |                                                        |                          |     |
| Explosion protection                                                                                                                                         |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |
| Approval DX15A-ILMK 358H                                                                                                                                     | IBExU 10 ATEX 1186 X<br>zone 0 <sup>7</sup> : II 1G Ex ia IIB T4 Ga<br>zone 20: II 1D Ex ia IIIC T85 °C Da                                                                                                     |          |                                                           |     |    |                                                        |                          |     |
| Safety technical maximum values                                                                                                                              | U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 13,2 nF, L <sub>i</sub> = 0 μH,<br>the supply connections have an inner capacity of max. 27 nF opposite the enclosure |          |                                                           |     |    |                                                        |                          |     |
| Permissible media temperature                                                                                                                                | in zone 0: -20 ... 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar<br>zone 1 or higher: -25 ... 70 °C                                                                                                        |          |                                                           |     |    |                                                        |                          |     |
| Connecting cables (by factory)                                                                                                                               | cable capacitance:                                                                                                                                                                                             |          | signal line/shield also signal line/signal line: 160 pF/m |     |    |                                                        |                          |     |
|                                                                                                                                                              | cable inductance:                                                                                                                                                                                              |          | signal line/shield also signal line/signal line: 1 μH/m   |     |    |                                                        |                          |     |
| <sup>7</sup> for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)                                                 |                                                                                                                                                                                                                |          |                                                           |     |    |                                                        |                          |     |

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Detachable Stainless Steel Probe

Technical Data

| Miscellaneous                        |                                        |                                       |
|--------------------------------------|----------------------------------------|---------------------------------------|
| Current consumption                  | max. 21 mA                             |                                       |
| Weight                               | approx. 650 g (without cable)          |                                       |
| Ingress protection                   | IP 68                                  |                                       |
| CE-conformity                        | EMC Directive: 2014/30/EU              |                                       |
| ATEX Directive                       | 2014/34/EU                             |                                       |
| Wiring diagram                       |                                        |                                       |
| <p>2-wire-system (current) HART®</p> |                                        | <p>connector</p>                      |
| Pin configuration                    |                                        |                                       |
| Electrical connection                | Binder series 723 <sup>8</sup> (5-pin) | cable colours (IEC 60757)             |
| Supply +                             | 3                                      | WH (white)                            |
| Supply -                             | 1                                      | BN (brown)                            |
| Shield                               | 5                                      | GNYE (green-yellow)                   |
| <sup>8</sup> if detached             |                                        |                                       |
| Dimensions (mm / in)                 |                                        |                                       |
| <p><b>standard</b></p>               |                                        | <p><b>option</b></p>                  |
| <p>protection cap removable</p>      |                                        | <p>sensor head and cable detached</p> |
|                                      |                                        | <p>corrugated pipe</p>                |

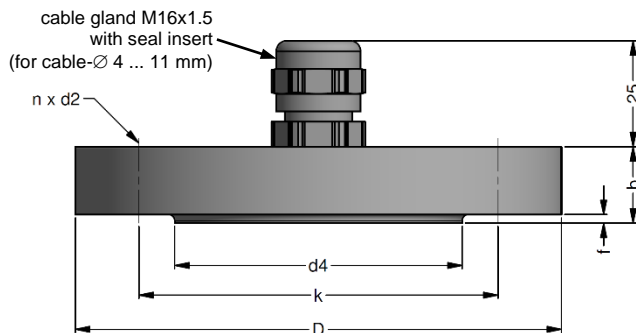
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# ILMK 358H

Detachable Stainless Steel Probe

Accessories

## 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



## Ordering code ILMK 358H

ILMK 358H



|                              |                                                |           |   |   |   |   |   |   |  |  |         |
|------------------------------|------------------------------------------------|-----------|---|---|---|---|---|---|--|--|---------|
| <b>Pressure</b>              |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | in bar                                         | 4         | 4 | 5 |   |   |   |   |  |  |         |
|                              | in mH <sub>2</sub> O                           | 4         | 4 | 6 |   |   |   |   |  |  |         |
| <b>Input</b>                 |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | [mH <sub>2</sub> 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 |  |  |         |
|                              | customer                                       |           |   |   | 9 | 9 | 9 | 9 |  |  | consult |
| <b>Housing</b>               |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | stainless steel 1.4404 (316L)                  |           |   |   |   |   |   |   |  |  | 1       |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  |         |
| <b>Diaphragm</b>             |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | ceramics Al <sub>2</sub> O <sub>3</sub> 96 %   |           |   |   |   |   |   |   |  |  | 2       |
|                              | ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 % |           |   |   |   |   |   |   |  |  | C       |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  |         |
| <b>Output</b>                |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | HART®-communication                            |           |   |   |   |   |   |   |  |  | H       |
|                              | 4 ... 20 mA / 2-wire                           |           |   |   |   |   |   |   |  |  |         |
|                              | HART®-communication                            |           |   |   |   |   |   |   |  |  | I       |
|                              | intrinsic safety 4 ... 20 mA / 2-wire          |           |   |   |   |   |   |   |  |  |         |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  |         |
| <b>Seals</b>                 |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | FKM                                            |           |   |   |   |   |   |   |  |  | 1       |
|                              | EPDM                                           |           |   |   |   |   |   |   |  |  | 3       |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  |         |
| <b>Electrical connection</b> |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | PVC-cable (grey, Ø 7.4 mm) <sup>1</sup>        |           |   |   |   |   |   |   |  |  | 1       |
|                              | PUR-cable (black, Ø 7.4 mm) <sup>1</sup>       |           |   |   |   |   |   |   |  |  | 2       |
|                              | FEP-cable (black, Ø 7.4 mm) <sup>1</sup>       |           |   |   |   |   |   |   |  |  | 3       |
|                              | TPE-U-cable (blue, Ø 7.4 mm) <sup>1</sup>      |           |   |   |   |   |   |   |  |  | 4       |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  |         |
| <b>Accuracy</b>              |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | p <sub>N</sub> ≥ 1 bar                         | 0.1 % FSO |   |   |   |   |   |   |  |  | 1       |
|                              | p <sub>N</sub> < 1 bar                         | 0.2 % FSO |   |   |   |   |   |   |  |  | B       |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  |         |
| <b>Cable length</b>          |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | in m                                           |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  | 9       |
| <b>Special version</b>       |                                                |           |   |   |   |   |   |   |  |  |         |
|                              | standard                                       |           |   |   |   |   |   |   |  |  | 0       |
|                              | cable protection with                          |           |   |   |   |   |   |   |  |  | 0       |
|                              | stainless steel corrugated pipe                |           |   |   |   |   |   |   |  |  | 1       |
|                              | with pipe length in m                          |           |   |   |   |   |   |   |  |  | 0       |
|                              | customer                                       |           |   |   |   |   |   |   |  |  | 3       |
|                              |                                                |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  | 9       |
|                              |                                                |           |   |   |   |   |   |   |  |  | 9       |

<sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

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