LMK 358H

Detachable Stainless Steel Probe with HART®-Communication

Ceramic Sensor

accuracy according to IEC 61298-2:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 39.5 mm
- diaphragm ceramics Al_2O_3 99.9 %
- 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
- accessories e.g. mounting flange with cable gland and terminal clamp

The detachable stainless steel probe LMK 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

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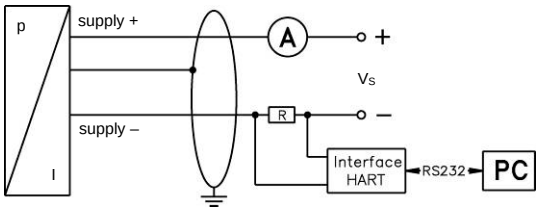
Input pressure range [1]							
Nominal pressure gauge [bar]	0.06	0.16	0.4	1	2	5	10
Level [mH_2O]	0.6	1.6	4	10	20	50	100
Overpressure [bar]	2	4	6	8	15	25	35
Max. ambient pressure (housing): 40 bar							
[1] on customer request we adjust the devices by software on the required pressure ranges, within 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 = 12 ... 28 V_{DC} with HART® communication			$V_{S\ rated}$ = 24 V_{DC}
Performance				
Accuracy [2]	$p_N \geq$ 160 mbar	TD ≤ 1:5	≤ ± 0.2 % FSO	TD_{max} = 1:10
		TD > 1:5	≤ ± [0.2 + 0.03 x TD] % FSO	
	$p_N <$ 160 mbar		≤ ± [0.2 + 0.1 x TD] % FSO	TD_{max} = 1:3
	$p_N \geq$ 1 bar	TD ≤ 1:5	≤ ± 0.1 % FSO	TD_{max} = 1:10
		TD > 1:5	≤ ± [0.1 + 0.02 x TD] % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$		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 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 [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 / electronic / environment / storage: -25 ... 85 °C			
Electrical protection [4]				
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			
[4] 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 [5]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-25 … 70 °C) black Ø 7.4 mm FEP [6] (-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			
[5] shielded cable with integrated ventilation tube for atmospheric pressure reference *[6] 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	ceramics Al_2O_3 99.9 %			
Protection cap	POM-C			
Cable sheath	PVC, PUR, FEP, TPE-U			
Explosion protection				
Approval DX15A-LMK 358H	IBExU 10 ATEX 1186 X zone 0: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da			
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 13,2 nF, L_i = 0 µH, 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_{atm} 0.8 bar up to 1.1 bar 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: 1µH/m			

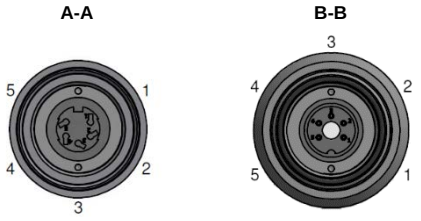
Miscellaneous	
Current consumption	max. 21 mA
Weight	approx. 650 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagram

2-wire-system (current) HART®



connector

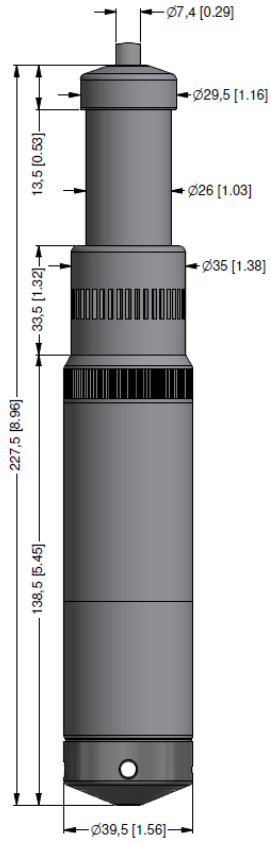


Pin configuration

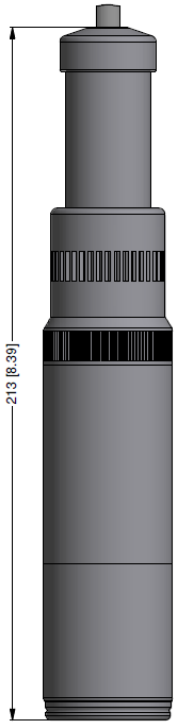
Electrical connection	Binder series 723 [7] (5-pin)	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply –	1	BN (brown)
Shield	5	GNYE (green-yellow)

[7] *if detached*

Dimensions (mm / in)



protection cap removable



sensor head and cable detached

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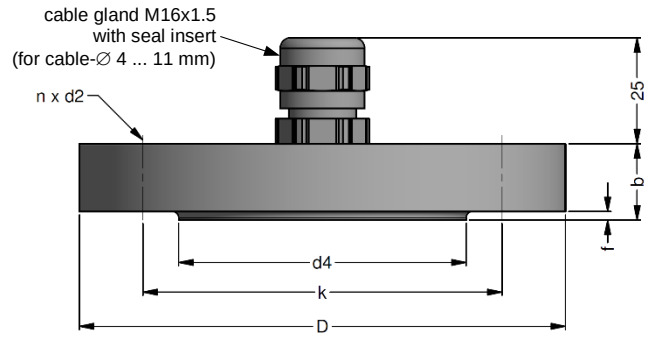
Mounting flange with cable gland



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 ∅ 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: http://www.bdsensors.de

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pressure measurement

Ordering code LMK 358H

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Pressure			
	in bar	4 4 5	
	in mH_2O	4 4 6	
Input	**[mH_2O]**	**[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
Housing			
	stainless steel 1.4404 (316L)	1	
	customer	9	consult
Diaphragm			
	ceramics Al_2O_3 99.9 %	C	
	customer	9	consult
Output			
	HART®-communication 4 … 20 mA / 2-wire	H	
	HART®-communication intrinsic safety 4 … 20 mA / 2-wire	I	
	customer	9	consult
Seal			
	FKM	1	
	EPDM	3	
	customer	9	consult
Electrical connection			
	PVC-cable (grey, Ø 7.4 mm) [1]	1	
	PUR-cable (black, Ø 7.4 mm) [1]	2	
	FEP-cable (black, Ø 7.4 mm) [1]	3	
	TPE-U-cable (blue, Ø 7.4 mm) [1]	4	
	customer	9	consult
Accuracy			
$p_N \geq 1$ 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	
	customer	9 9 9	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference

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