

LMK 358H



Detachable Stainless Steel Probe with HART®-Communication

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH₂O up to 0 ... 100 mH₂O

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 % Al₂O₃
- ▶ 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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Technical Data

Input pressure range ¹								
Nominal pressure gauge	[bar]	0.06	0.16	0.4	1	2	5	10
Level	[mH ₂ O]	0.6	1.6	4	10	20	50	100
Overpressure	[bar]	2	4	6	8	15	25	35

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 ≥ 160 mbar	TD ≤ 1:5 ≤ ± 0.2 % FSO TD > 1:5 ≤ ± [0.2 + 0.03 x TD] % FSO	TD _{max} = 1:10
	p _N < 160 mbar		TD _{max} = 1:3
	p _N ≥ 1 bar	TD ≤ 1:5 ≤ ± 0.1 % FSO TD > 1:5 ≤ ± [0.1 + 0.02 x TD] % FSO	TD _{max} = 1:10
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 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 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)

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	standard: ceramics Al ₂ O ₃ 96 % option: ceramics Al ₂ O 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 ⁷ : II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °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: 1 μH/m

⁷ for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)

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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 ⁸ (5-pin)	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply -	1	BN (brown)
Shield	5	GNYE (green-yellow)
⁸ if detached		
Dimensions (mm / in)		
protection cap removable		sensor head and cable detached
corrugated pipe		
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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

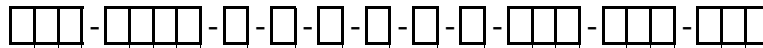
- CIT 200** Process display with LED display
- CIT 250** Process display with LED display and contacts
- CIT 300** Process display with LED display, contacts and analogue output
- CIT 350** Process display with LED display, bargraph, contacts and analogue output
- CIT 400** Process display with LED display, 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

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Ordering code LMK 358H

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Pressure										
	in bar	4	4	5						
	in mH ₂ O	4	4	6						
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		
	customer				9	9	9	9		consult
Housing										
	stainless steel 1.4404 (316L)				1					
	customer				9					consult
Diaphragm										
	ceramics Al ₂ O ₃ 96 %				2					
	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
Seals										
	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 ≥ 1 bar	0.1 % FSO							1	
	p _N < 1 bar	0.2 % FSO							B	
	customer								9	consult
Cable length										
	in m								9	9
Special version										
	standard								0	0
	cable protection with									
	stainless steel corrugated pipe								1	0
	with pipe length in m								9	9
	customer								9	9

¹ shielded cable with integrated ventilation tube for atmospheric pressure reference

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