

# LMK 358H

## Separable Stainless Steel Probe with HART<sup>®</sup>-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
- ▶ cable and sensor section separable
- ▶ HART<sup>®</sup> communication (setting of offset, span and damping)
- ▶ permissible temperatures up to 85 °C
- ▶ high long-term stability


### Optional versions


- ▶ IS-version zone 0
- ▶ cable protection via corrugated pipe
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>


The separable 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 transmitter 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 / Oil  
level monitoring in open tanks  
with low filling heights  
fuel storage  
tank farms  
biogas plants



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

<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 <sup>□</sup> communication	V <sub>S rated</sub> = 24 V <sub>DC</sub>
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 28 V <sub>DC</sub> with HART <sup>□</sup> 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> ≥ 0.6 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 <sup>®</sup> -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 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> ) - electronic damping 0 ... 100 sec - offset: 0 ... 80 % FSO - 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<sup>®</sup> 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span) / - permissible temperatures	
Tolerance band	≤ ± (0.2 x turn-down) % FSO
TC, average	± (0.02 x turn-down) % FSO / 10 K
in compensated range	-20 ... 80 °C
Permissible temperatures	medium: -25 ... 85 °C electronic / environment: -25 ... 85 °C storage: -25 ... 85 °C

Electrical protection <sup>4</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
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 PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 85 °C) blue

<sup>5</sup> shielded cable with integrated air tube for atmospheric pressure reference

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

Explosion protection	
Approval DX15A-LMK 358H	IBExU 10 ATEX 1186 X Zone 0 <sup>6</sup> : II 1G Ex ia IIB T4 zone 20: II 1D Ex iaD 20 T85°C
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> = 0 nF, L <sub>i</sub> = 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 <sub>atm</sub> 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

<sup>6</sup> for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)

# LMK 358H

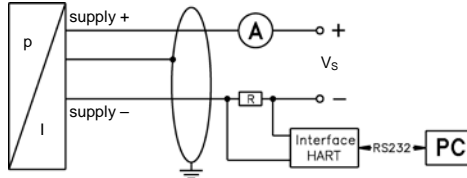
Stainless Steel Probe

Technical Data

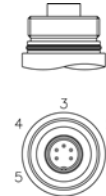
Miscellaneous	
Option cable protection	stainless steel pipe for probe in stainless steel: available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)
Current consumption	max. 21 mA
Weight	approx. 650 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

## Wiring diagram

2-wire-system (current) HART®



connector

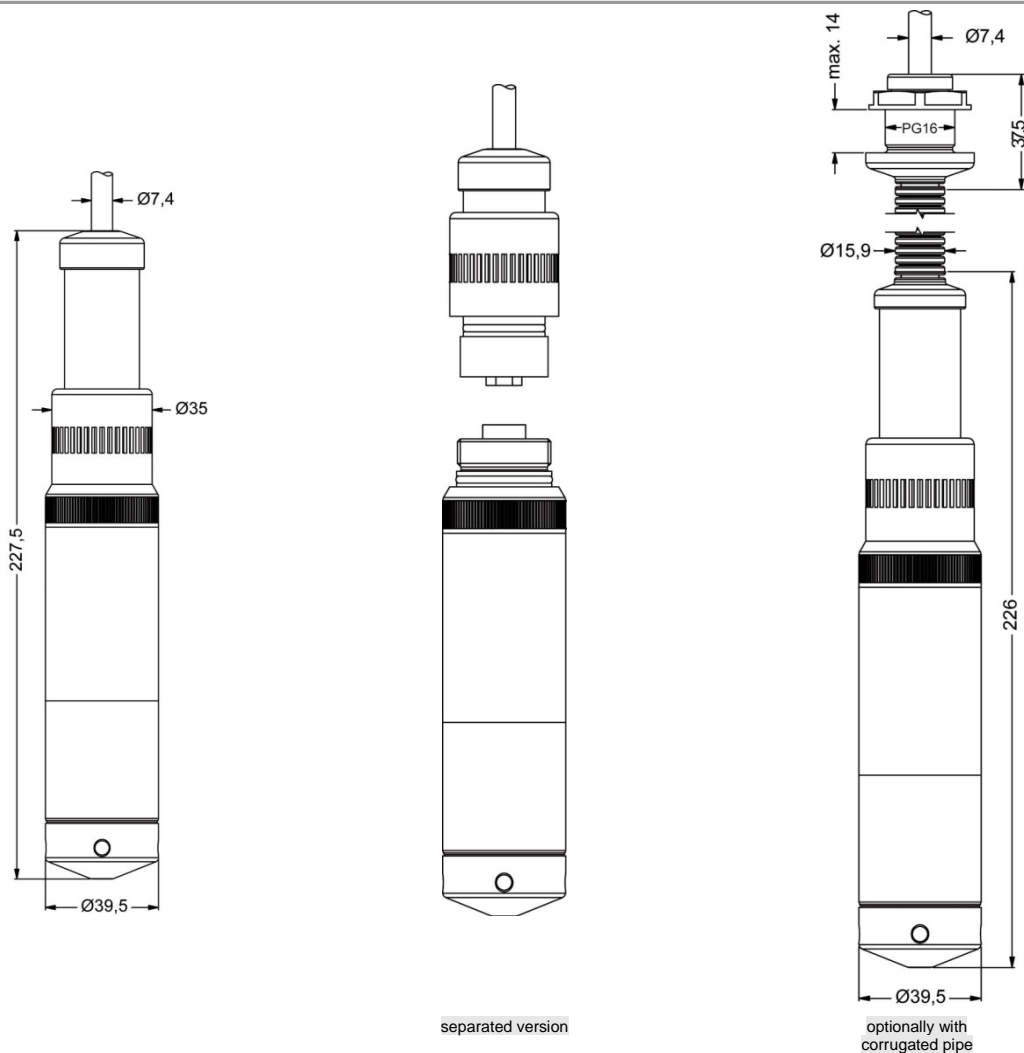


## Pin configuration

Electrical connection	Binder series 723 <sup>7</sup> (5-pin)	cable colours (DIN 47100)
Supply +	3	wh (white)
Supply -	1	gn (brown)
Shield	5	gn/ye (yellow / green)

<sup>7</sup> in separated version

## Dimensions (in mm)



HART® is a registered trade mark of HART Communication Foundation;  
Windows® is a registered trade mark of Microsoft Corporation

Mounting flange with cable gland	
<b>Technical data</b>	
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
<b>Version</b>	<b>Size (in mm)</b>
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d = 14
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d = 18
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d = 18
<b>Weight</b>	
DN25 / PN40	1.4 kg
DN50 / PN40	3.2 kg
DN80 / PN16	4.8 kg
<b>Ordering type</b>	<b>Ordering code</b>
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016
<b>Terminal clamp</b>	
<b>Technical Data</b>	
Suitable for	all probes with cable $\varnothing$ 5.5 ... 10.5 mm
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Weight	approx. 160 g
<b>Ordering type</b>	<b>Ordering code</b>
Terminal clamp, steel, zinc plated	Z100528
Terminal clamp, stainless steel 1.4301 (304)	Z100527
<b>Display program</b>	
<p><b>CIT 200</b> Process display with LED display</p> <p><b>CIT 250</b> Process display with LED display and contacts</p> <p><b>CIT 300</b> Process display with LED display, contacts and analogue output</p> <p><b>CIT 350</b> Process display with LED display, bargraph, contacts and analogue output</p> <p><b>CIT 400</b> Process display with LED display, contacts, analogue output and Ex-approval</p> <p><b>CIT 600</b> Multichannel process display with graphics-capable LC display</p> <p><b>CIT 650</b> Multichannel process display with graphics-capable LC display and datalogger</p> <p><b>CIT 700</b> Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts</p> <p><b>PA 440</b> Field display with 4-digit LC display</p>	
<p>For further information please contact our sales department or visit our homepage: <a href="http://www.bdsensors.com">http://www.bdsensors.com</a></p>	

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## Ordering code LMK 358H

LMK 358H

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Pressure	in bar	4	4	5																			
	in mH <sub>2</sub> O	4	4	6																			
<b>Input</b>	[mH <sub>2</sub> O] [bar]																						
	0.60 0.06				0	6	0	0															
	1.60 0.16				1	6	0	0															
	4.00 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	consult	
<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	consult
<b>Output</b>																							
	HART <sup>®</sup> -communication 4 ... 20 mA / 2-wire																					H	
	HART <sup>®</sup> -communication Intrinsic safety 4 ... 20 mA / 2-wire																					I	
	customer																					9	consult
<b>Seals</b>																							
	FKM																					1	
	EPDM																					3	
	customer																					9	consult
<b>Electrical connection</b>																							
	PVC-cable <sup>1</sup>																					1	
	PUR-cable <sup>1</sup>																					2	
	FEP-cable <sup>1</sup>																					3	
	TPE-cable																					4	
	customer																					9	consult
<b>Accuracy</b>																							
	0.1 % <sup>2</sup>																					1	
	customer																					9	consult
<b>Cable length</b>																							
	in m																					9	
																						9	
																						9	
<b>Special version</b>																							
	standard																					0	
	prepared for mounting <sup>3</sup>																					1	
	with stainless steel pipe																					0	
	cable protection with																					6	
	stainless steel corrugated pipe																					1	
	with pipe length in m																					0	
	customer																					3	
																						9	
																						9	
																						9	

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

<sup>2</sup> only possible for P<sub>N</sub> ≥ 0,60 bar

<sup>3</sup> stainless steel pipe is not part of the supply

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This price list contains product specification; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.

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BD|SENSORS GmbH  
BD-Sensors-Straße 1  
D - 95199 Thierstein

Tel. +49 (0) 9235 / 98 11 - 0  
Fax +49 (0) 9235 / 98 11 - 11

www.bdsensors.de  
www.bdsensors.com  
info@bdsensors.de