

LMK 382H

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 ... 200 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 zone 0
- ▶ mounting with stainless steel pipe
- ▶ flange version
- ▶ diaphragm 99.9 % Al₂O₃
- ▶ accessories e.g. assembling and probe flange, mounting clamp


The stainless steel probe LMK 382H has been designed for continuous level measurement in waste water, waste and higher viscosity mediums.

Basic element is a robust and high overpressure capable capacitive ceramic sensor e.g. for low levels.

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



HART

Pressure ranges ¹									
Nominal pressure	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH ₂ O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45

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- protection	2-wire: 4 ... 20 mA / V _S =	14 ... 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 permissible load: 0.05 % FSO / kΩ		
Turn-on time	850 msec		
Mean response time	140 msec without consideration of electronic damping		mean 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)	
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 electronics / environment: -25 ... 85 °C storage: -25 ... 85 °C

Electrical protection ⁴	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
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 outlet with sheat material ⁵	PVC (-5 ... 70 °C) grey PUR (-25 ... 70 °C) black FEP ⁶ (-25 ... 70 °C) black TPE (-25 ... 85 °C) blue

⁵ shielded cable with integrated air 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	
Housing	stainless steel 1.4404
Seals	FKM FFKM EPDM others on request
Diaphragm	standard: ceramics Al ₂ O ₃ 96 % option: ceramics Al ₂ O ₃ 99.9 %
Protection cap	POM

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)
Ingress protection	IP 68
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
CE-conformity	EMC Directive: 2004/108/EC

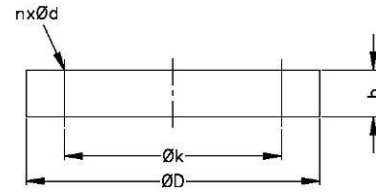
IS-protection																																														
Approval DX15A-LMK 382H	IBExU 10 ATEX 1186 X zone 0 ⁷ : II 1G Ex ia IIB T4 zone 20: II 1D Ex iaD 20 T85°C																																													
Safety technical maximum values	$U_i = 28\text{ V}$, $I_i = 93\text{ mA}$, $P_i = 660\text{ mW}$, $C_i = 0\text{ nF}$, $L_i = 0\text{ }\mu\text{H}$, the supply connections have an inner capacity of max. 27 nF opposite the enclosure																																													
Permissible media temperature	in zone 0: $-10 \dots 60\text{ }^\circ\text{C}$ with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: $-25 \dots 70\text{ }^\circ\text{C}$																																													
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 $\mu\text{H}/\text{m}$																																													
⁷ for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)																																														
Wiring diagram																																														
2-wire-system (current) HART®																																														
Pin configuration																																														
Electrical connection	cable colours (DIN 47100)																																													
Supply +	wh (white)																																													
Supply -	bn (brown)																																													
Shield	gn/ye (green / yellow)																																													
Dimensions (in mm)																																														
<table border="1"> <thead> <tr> <th colspan="5">dimensions in mm</th> </tr> <tr> <th>dimen- sions</th> <th>DN25 / PN40</th> <th>DN40/ PN40</th> <th>DN50 / PN40</th> <th>DN80 / PN16</th> </tr> </thead> <tbody> <tr> <td>D</td> <td>115</td> <td>150</td> <td>165</td> <td>200</td> </tr> <tr> <td>K</td> <td>85</td> <td>110</td> <td>125</td> <td>160</td> </tr> <tr> <td>d4</td> <td>68</td> <td>88</td> <td>102</td> <td>138</td> </tr> <tr> <td>b</td> <td>18</td> <td>18</td> <td>20</td> <td>20</td> </tr> <tr> <td>f</td> <td>2</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td>n</td> <td>4</td> <td>4</td> <td>4</td> <td>8</td> </tr> <tr> <td>d2</td> <td>14</td> <td>18</td> <td>18</td> <td>18</td> </tr> </tbody> </table>		dimensions in mm					dimen- sions	DN25 / PN40	DN40/ PN40	DN50 / PN40	DN80 / PN16	D	115	150	165	200	K	85	110	125	160	d4	68	88	102	138	b	18	18	20	20	f	2	3	3	3	n	4	4	4	8	d2	14	18	18	18
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<p>HART® is a registered trade mark of HART Communication Foundation; Windows® is a registered trade mark of Microsoft Corporation</p>																																														

LMK 382H

Stainless Steel Probe

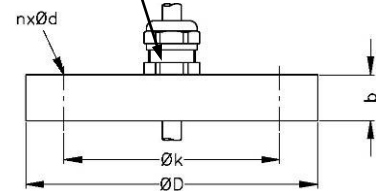
Accessories

Transmitter flange for flange version		
Technical data		
Suitable for	LMK 382, LMK 382H, LMK 458, LMK 458H	
Flange material	stainless steel 1.4404 (316L)	
Hole pattern	according to DIN 2507	
Version	Size (in mm)	Weight
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d = 14	1.2 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d = 18	2.6 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d = 18	4.1 kg
Ordering type		Ordering code
Transmitter flange DN25 / PN40		ZSF2540
Transmitter flange DN50 / PN40		ZSF5040
Transmitter flange DN80 / PN16		ZSF8016

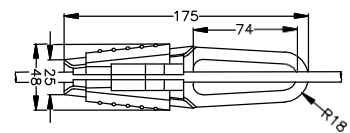


Mounting flange with cable gland		
Technical data		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316L)	
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305; plastic	
Seal insert	material: TPE (ingress protection IP 68)	
Hole pattern	according to DIN 2507	
Version	Size (in mm)	Weight
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d = 14	1.4 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d = 18	3.2 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d = 18	4.8 kg
Ordering type		Ordering code
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

cable gland M16x1.5 with seal insert (for cable- Ø 4 ... 11 mm)



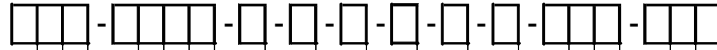
Terminal clamp		
Technical Data		
Suitable for	all probes with cable Ø 5.5 ... 10.5 mm	
Material	standard: steel, zinc plated optionally: stainless steel 1.4301	
Weight	approx. 160 g	
Ordering type		Ordering code
Terminal clamp, steel, zinc plated		Z100528
Terminal clamp, stainless steel 1.4301		Z100527



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Ordering code LMK 382H

LMK 382H



Pressure		5	6	5												
	in bar	5	6	5												
	in mH ₂ O	5	6	6												
Input		[mH ₂ O]	[bar]													
	0.60	0.06		0	6	0										
	1.60	0.16		1	6	0										
	4.00	0.40		4	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									
	200	20		2	0	0	2									
	customer			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						
	FFKM									7						
	customer									9						consult
Electrical connection																
	PVC-cable ¹										1					
	PUR-cable ¹										2					
	FEP-cable ¹										3					
	TPE-cable ¹										4					
	customer										9					consult
Accuracy																
	0.1 % ²											1				
	customer											9				consult
Cable length																
	in m												9	9		
Special version																
	standard													0	0	0
	prepared for mounting ³															
	with stainless steel pipe														5	0
	flange version															5
	customer															9

¹ cable with integrated air tube for atmospheric pressure reference

² only possible for P_N ≥ bar

³ stainless steel pipe is not part of the supply

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