

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
Ex ia = intrinsically safe for gas and dust
- ▶ mounting with stainless steel pipe
- ▶ flange version
- ▶ diaphragm 99.9 % Al₂O₃
- ▶ accessories e.g. transmitter and mounting
flanges and terminal clamp

The stainless steel probe LMK 382H has been designed for continuous level measurement in sewage, polluted and higher viscosity fluids.

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 basins



Sewage

waste water treatment
water recycling



Fuel and oil

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



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-version	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 ≤ ± [0.2 + 0.1 x TD] % FSO 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 / electronics / environment / 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 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	
Housing	stainless steel 1.4404 (316 L)
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-C
Cable sheath	PVC, PUR, FEP, TPE-U, others on request

Explosion protection	
Approval DX15A-LMK 382H	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: -10 ... 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)

LMK 382H

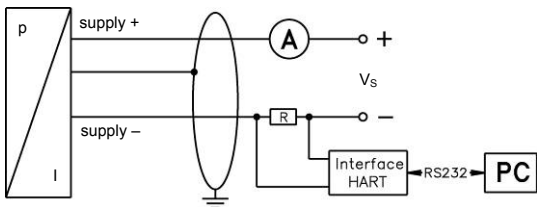
Stainless Steel Probe

Technical Data

Miscellaneous	
Option cable protection for probes	prepared for mounting with stainless steel pipe; 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: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagram

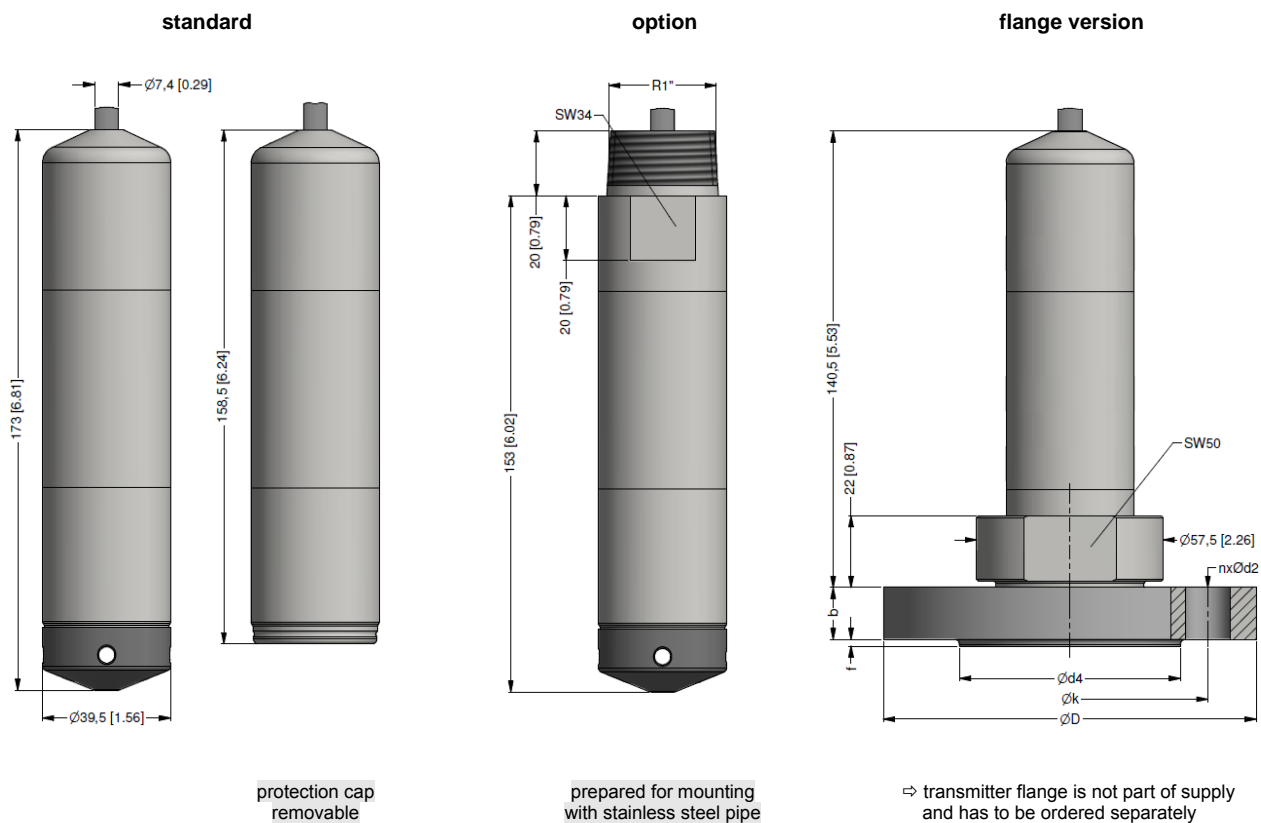
2-wire-system (current) HART®



Pin configuration

Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply -	BN (brown)
Shield	GYE (green-yellow)

Dimensions (mm / in)



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Transmitter flange for flange version			
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	LMK 382, LMK 382H, LMK 458, LMK 458H		
Flange material	stainless steel 1.4404 (316L)		
Hole pattern	according to DIN 2507		
Ordering type	Ordering code	Weight	
Transmitter flange DN25 / PN40	ZSF2540	1.2 kg	
Transmitter flange DN50 / PN40	ZSF5040	2.6 kg	
Transmitter flange DN80 / PN16	ZSF8016	4.1 kg	

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 \varnothing 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		

Ordering code LMK 382H

LMK 382H



Pressure						
	in bar	5	6	5		
	in mH ₂ O	5	6	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
	200	20	2	0	0	2
	customer		9	9	9	
Housing						
	stainless steel 1.4404 (316L)					1
	customer					9
Diaphragm						
	ceramics Al ₂ O ₃ 96 %					2
	ceramics Al ₂ O ₃ 99.9 %					C
	customer					9
Output						
	HART [®] -communication					H
	4 ... 20 mA / 2-wire					
	HART [®] -communication					I
	intrinsic safety 4 ... 20 mA / 2-wire					
	customer					9
Seals						
	FKM					1
	EPDM					3
	FFKM					7
	customer					9
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
Accuracy						
	p _N ≥ 1 bar:	0.1 % FSO				1
	p _N < 1 bar:	0.2 % FSO				B
	customer					9
Cable length						
	in m					9 9 9
Special version						
	standard					0 0 0
	prepared for mounting					
	with stainless steel pipe ²					5 0 2
	flange version ³					5 1 0
	customer					9 9 9

¹ shielded cable with integrated ventilation tube for atmospheric pressure reference

² stainless steel pipe is not part of the supply

³ mounting accessories are not part of supply and have to be ordered separately

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01.04.2020