

# LMK 382H

## Stainless Steel Probe with HART®-communication

Ceramic Sensor

accuracy according to IEC 60770:  
0.1 % FSO



### Nominal pressure

from 0 ... 60 cmH<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

### 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 % Al<sub>2</sub>O<sub>3</sub>
- ▶ 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 <sup>1</sup>									
Nominal pressure	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45

<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® communication V <sub>S rated</sub> = 24 V <sub>DC</sub>
Option IS-version	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub> with HART® 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 > 1:5 ≤ ± [0.2 + 0.03 x TD] % FSO TD <sub>max</sub> = 1:10
	P <sub>N</sub> < 160 mbar ≤ ± [0.2 + 0.1 x TD] % FSO TD <sub>max</sub> = 1:3
	P <sub>N</sub> ≥ 1 bar TD ≤ 1:5 ≤ ± 0.1 % FSO TD > 1:5 ≤ ± [0.1 + 0.02 x TD] % FSO TD <sub>max</sub> = 1:10
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω load at HART®-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 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 <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® 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 <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 outlet with sheath material <sup>5</sup>	PVC (-5 ... 70 °C) grey Ø 7.4 mm PUR (-25 ... 70 °C) black Ø 7.4 mm FEP <sup>6</sup> (-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

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

<sup>6</sup> 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 <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 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 <sup>7</sup> : II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da
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> = 13.2 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: -10 ... 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>7</sup> for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)

# LMK 382H

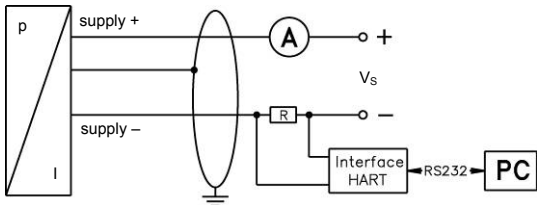
Stainless Steel Probe

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

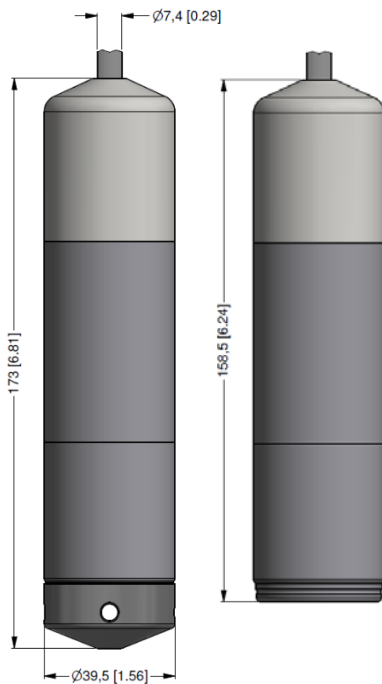
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply -	BN (brown)
Shield	GYNE (green-yellow)

## Dimensions (mm / in)

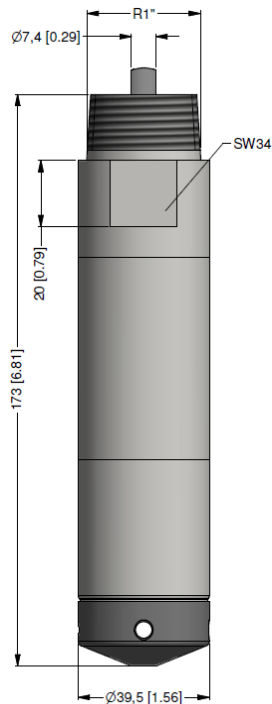
standard

option

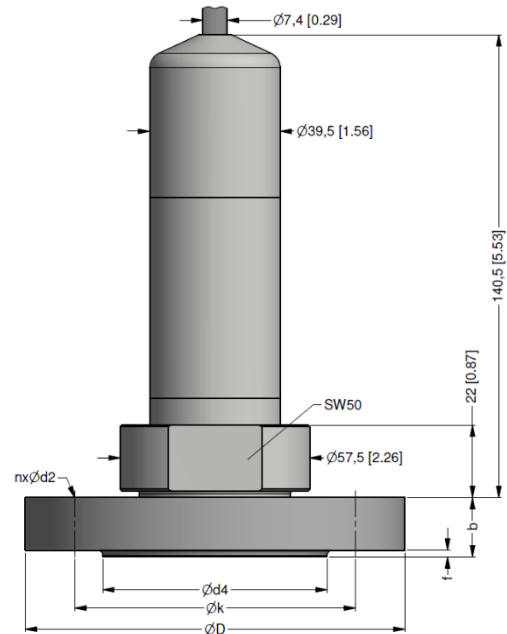
flange version



protection cap removable



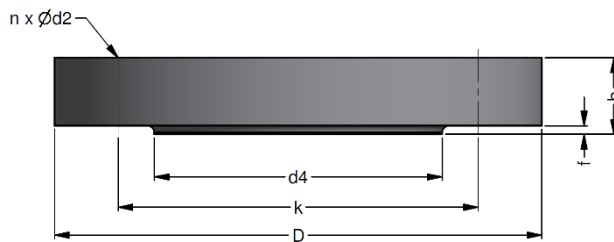
prepared for mounting with stainless steel pipe



dimensions	dimensions in mm		
	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

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### Transmitter flange for flange version



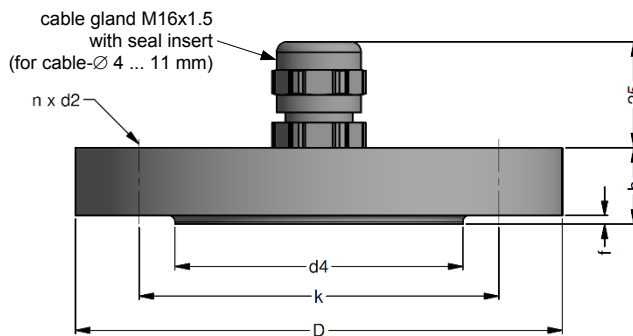
dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

#### 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



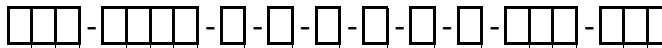
#### Technical data

Suitable for	all probes with cable 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	

## Ordering code LMK 382H

LMK 382H



<b>Pressure</b>										
	in bar	5	6	5						
	in mH <sub>2</sub> O	5	6	6						
<b>Input</b>										
	[mH <sub>2</sub> 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	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							H		
	4 ... 20 mA / 2-wire									
	HART <sup>®</sup> -communication							I		
	intrinsic safety 4 ... 20 mA / 2-wire									
	customer							9		consult
<b>Seals</b>										
	FKM							1		
	EPDM							3		
	FFKM							7		
	customer							9		consult
<b>Electrical connection</b>										
	PVC-cable (grey, Ø 7.4 mm) <sup>1</sup>							1		
	PUR-cable (black, Ø 7.4 mm) <sup>1</sup>							2		
	FEP-cable (black, Ø 7.4 mm) <sup>1</sup>							3		
	TPE-U-cable (blue, Ø 7.4 mm) <sup>1</sup>							4		
	customer							9		consult
<b>Accuracy</b>										
	P <sub>N</sub> ≥ 1 bar:	0.1 % FSO						1		
	P <sub>N</sub> < 1 bar:	0.2 % FSO						B		
	customer							9		consult
<b>Cable length</b>										
	in m							9	9	9
<b>Special version</b>										
	standard							0	0	0
	prepared for mounting							5	0	2
	with stainless steel pipe <sup>2</sup>							5	1	0
	flange version							9	9	9
	customer							9	9	9

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

<sup>2</sup> stainless steel pipe is not part of the supply

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