

# LMK 387H

## Stainless Steel Probe with HART®-communication

Ceramic Sensor

accuracy according to IEC 60770:  
standard: 0.35 % FSO  
option: 0.25 % FSO



### Nominal pressure

from 0 ... 1 mH<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 22 mm
- ▶ HART® communication (revision 7)
- ▶ setting of offset, span and damping
- ▶ diaphragm ceramics 99.9% Al<sub>2</sub>O<sub>3</sub>
- ▶ good long-term stability
- ▶ especially for waste water

### Optional versions

- ▶ housing material titanium
- ▶ IS-version  
Ex ia = intrinsically safe for gas and dust
- ▶ drinking water certificate  
according to DVGW and KTW
- ▶ temperature element Pt 100
- ▶ different kinds of elastomer

The stainless steel probe LMK 387H was developed for level and gauge measurement in wastewater, sludge or water courses. The mechanical robustness of the flush ceramic diaphragm facilitates an easy disassembly and cleaning of the probe in case of service.

The outer diameter is only 22 mm, whereby the installation or retrofitting can be easily carried out in 1" pipes or in confined installation conditions. In addition to an intrinsically safe version (zone 0), a version with temperature signal is available.

### Preferred areas of use



#### Water

groundwater and level monitoring



#### Sewage

waste water treatment  
water recycling



#### Fuel and oil

tank battery  
biogas plants



Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3			-0.5					-1	
Max. ambient pressure (housing): 40 bar												
Output signal / Supply												
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 36 V <sub>DC</sub> with HART® communication (revision 7) / 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 (revision 7) / V <sub>S rated</sub> = 24 V <sub>DC</sub>											
Option Pt 100-temperature element												
Temperature range	-25 ... 125 °C											
Connectivity technology	3-wire											
Resistance	100 Ω at 0 °C											
Temperature coefficient	3850 ppm/K											
Supply I <sub>s</sub>	0.3 ... 1.0 mA DC											
max. voltage 10 V <sub>DC</sub> , in intrinsically safe circuit 30 V <sub>DC</sub> max. current 2 mA, in intrinsically safe circuit 54 mA max. power 10 mW, in intrinsically safe circuit 405 mW												
Performance												
Accuracy <sup>1</sup>	standard	p <sub>N</sub> ≥ 160 mbar	T <sub>D</sub> ≤ 1:5	≤ ± 0.35 % FSO								T <sub>D max</sub> = 1:10
		p <sub>N</sub> < 160 mbar	T <sub>D</sub> > 1:5	≤ ± [0.35 + 0.05 x TD] % FSO								T <sub>D max</sub> = 1:3
	option	p <sub>N</sub> ≥ 160 mbar	T <sub>D</sub> ≤ 1:5	≤ ± 0.25 % FSO								T <sub>D max</sub> = 1:10
		p <sub>N</sub> < 160 mbar	T <sub>D</sub> > 1:5	≤ ± [0.25 + 0.05 x TD] % FSO								T <sub>D max</sub> = 1:3
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											
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ											
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions											
Turn-on time	≤ 3 sec											
Mean response time	≤ 50 msec without electronic damping											
Measuring rate	≤ 20 Hz											
Adjustability	configuration of following parameters possible (interface / software necessary <sup>2</sup> ): electronic damping: 0 ... 100 sec offset: 0 ... 80 % FSO turn down of span: max. 1:10											
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)												
<sup>2</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	≤ ± 1 % FSO in compensated range -20 ... 80 °C											
Permissible temperatures												
Permissible temperatures	medium / electronics / environment / storage: -40 ... 85 °C											
Electrical protection <sup>3</sup>												
Short-circuit protection	permanent											
Reverse polarity protection	no damage, but also no function											
Electromagnetic compatibility	emission and immunity according to EN 61326											
<sup>3</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request												
Electrical connection												
Cable with sheath material <sup>4</sup>	TPE-U blue Ø 7.4 mm (without / with drinking water certificate) TPE-U <sup>5</sup> red Ø 9.0 mm others on request											
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter											
<sup>4</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference												
<sup>5</sup> only in combination with IS-version (explosion protection) and temperature element Pt100												
Materials (media wetted)												
Housing	standard: stainless steel 1.4404 (316 L); option: titanium										others on request	
Seals (O-rings)	standard: FKM option: EPDM (without / with drinking water certificate) FFKM (min. permissible temperature from -15 °C)										others on request	
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%											
Protection cap	POM-C											
Cable sheath	TPE-U											
Explosion protection												
Approval DX14B-LMK 387H	IBExU 15 ATEX 1066 X / IECEx IBE 18.0019X zone 0: II 1G Ex ia IIB T4 Ga; zone 20: II 1D Ex ia IIIC T135 °C Da											
Safety technical maximum values (pressure)	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 14 nF, L <sub>i</sub> = 0 µH; the supply connections have an inner capacity of max. 27 nF opposite the enclosure											
Safety technical maximum values (temperature)	U <sub>i</sub> = 30 V, I <sub>i</sub> = 54 mA, P <sub>i</sub> = 405 mW, C <sub>i</sub> = 0 nF, L <sub>i</sub> = 0 µH (temperature element Pt 100)											
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 65 °C											
Connecting cables (by factory)	cable capacity: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m											

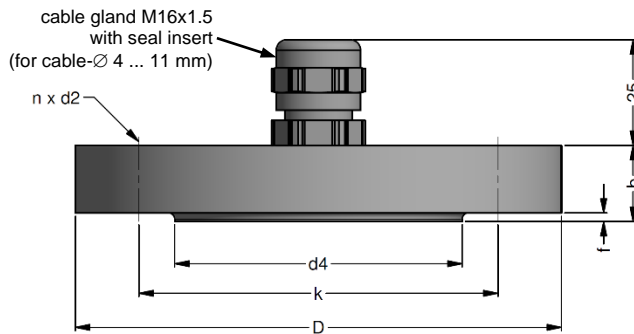
# LMK 387H

Stainless Steel Probe

Technical Data

Miscellaneous	
Drinking water certificate <sup>6</sup>	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Current consumption	max. 22 mA
Weight	approx. 280 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU
<sup>6</sup> only possible with EPDM seal in combination with TPE-U cable; not possible with IS-version (explosion protection) or housing material titanium	
Pin configuration	
Electrical connection	cable colours (IEC 60757)
	4 ... 20 mA / HART <sup>®</sup>
Supply V <sub>S</sub> +	WH (white)
Supply V <sub>S</sub> -	BN (brown)
Supply T+ (with Pt 100)	-
Supply T- (with Pt 100)	-
Supply T- (with Pt 100)	-
Shield	GNYE (green-yellow)
	4 ... 20 mA / HART <sup>®</sup> (pressure) <b>with Pt 100</b> (temperature)
Supply V <sub>S</sub> +	WH (white)
Supply V <sub>S</sub> -	BN (brown)
Supply T+ (with Pt 100)	YE (yellow)
Supply T- (with Pt 100)	GY (grey)
Supply T- (with Pt 100)	PK (pink)
Shield	GNYE (green-yellow)
Wiring diagrams	
<p>2-wire-system current HART<sup>®</sup></p>	<p>2-wire-system HART<sup>®</sup> (pressure) / 3-wire-system (temperature)</p>
Dimensions (mm / in)	
<p><b>standard</b></p>	<p><b>IS-version with Pt100 (temperature element)</b></p>
<p>HART<sup>®</sup> is a registered trademark of HART Communication Foundation; Windows<sup>®</sup> is a registered trademark of Microsoft Corporation</p>	

## 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

For further information please contact our sales department or visit our homepage: <http://www.bdsensors.de>



## Ordering code LMK 387H

LMK 387H

□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
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<b>Pressure</b>																		
	gauge in bar	3	6	0														
	gauge in mH <sub>2</sub> O	3	6	1														
<b>Input</b>	[mH <sub>2</sub> O]	[bar]																
	1.0	0.10	1	0	0	0												
	1.6	0.16	1	6	0	0												
	2.5	0.25	2	5	0	0												
	4.0	0.40	4	0	0	0												
	6.0	0.60	6	0	0	0												
	10	1.0	1	0	0	1												
	16	1.6	1	6	0	1												
	25	2.5	2	5	0	1												
	40	4.0	4	0	0	1												
	60	6.0	6	0	0	1												
	100	10	1	0	0	2												
	customer		9	9	9	9												consult
<b>Housing</b>																		
	stainless steel 1.4404 (316L)					1												
	titanium					T												
	customer					9												consult
<b>Diaphragm</b>																		
	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %					C												
	customer					9												consult
<b>Output</b>																		
	HART®-communication (revision 7)										H							
	4 ... 20 mA / 2-wire										I							
	HART®-communication (revision 7)										I							
	intrinsic safety 4 ... 20 mA / 2-wire										I							
	customer					9												consult
<b>Seals</b>																		
	FKM					1												
	EPDM					3												
<b>DVGW / KTW:</b>	EPDM <sup>1</sup>					3T												
	FFKM <sup>2</sup>					7												
	customer					9												consult
<b>Electrical connection</b>																		
	TPE-U-cable (blue, Ø 7.4 mm) <sup>3</sup>					4												
<b>DVGW / KTW:</b>	TPE-U-cable (blue, Ø 7.4 mm) <sup>1,3</sup>					F												
	TPE-U-cable (red, Ø 9.0 mm) <sup>3,4</sup>					42												
	customer					9												consult
<b>Accuracy</b>																		
<b>standard:</b>	0.35 % FSO					3												
<b>option for p<sub>N</sub> ≥ 160 mbar:</b>	0.25 % FSO					2												
	customer					9												consult
<b>Cable length</b>																		
	in m										9	9	9					
<b>Special version</b>																		
	standard										0	0	0					
	with temperature element Pt 100										0	1	3					
	customer										9	9	9					consult

<sup>1</sup> drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F); not possible with IS-protection (explosion protection) or housing material titanium

<sup>2</sup> min. permissible temperature from -15 °C

<sup>3</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

<sup>4</sup> only in combination with Ex version (explosion protection) and temperature element Pt 100

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