

LMK 387

Stainless Steel Probe

Ceramic Sensor

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



Nominal pressure

from 0 ... 1 mH₂O up to 0 ... 100 mH₂O

Output signal

2-wire: 4 ... 20 mA
others on request

Special characteristics

- ▶ diameter 22 mm
- ▶ diaphragm ceramics 99.9% Al₂O₃
- ▶ 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
- ▶ mounting with stainless steel tube
- ▶ different kinds of cables and elastomers

The stainless steel probe LMK 387 was developed for level and gauge measurement in waste water, 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.

Compared to the level probe LMK 382 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. An IS-version (zone 0) is also 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 ₂ 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 _S = 12 ... 36 V _{DC}										
Option IS-version		2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC}										
Option temperature element Pt 100												
Temperature range		-25 ... 125 °C										
Connectivity technology		3-wire										
Resistance		100 Ω at 0 °C										
Temperature coefficient		3850 ppm/K										
Supply I _S		0.3 ... 1.0 mA _{DC}										
		max. voltage 10 V _{DC} , in intrinsically safe circuit 30 V _{DC} max. current 2 mA, in intrinsically safe circuit 54 mA max. power 10 mW, in intrinsically safe circuit 405 mW										
Performance												
Accuracy ¹		standard: ≤ ± 0.35 % FSO					option: ≤ ± 0.25 % FSO					
Permissible load		R _{max} = [(V _S - V _{Smin}) / 0.02 A] Ω										
Influence effects		supply: 0.05 % FSO / 10 V					load: 0.05 % FSO / kΩ					
Long term stability		≤ ± 0.1 % FSO / year										
Turn-on time		450 msec										
Mean response time		≤ 70 msec										
Measuring rate		80 Hz										
¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)												
Thermal effects (offset and span)												
Tolerance band		≤ ± 1 % FSO										
in compensated range		-20 ... 80 °C										
Permissible temperatures												
Permissible temperatures		medium / storage: -25 ... 85 °C										
Electrical protection ²												
Short-circuit protection		permanent										
Reverse polarity protection		no damage, but also no function										
Electromagnetic compatibility		emission and immunity according to EN 61326										
² 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 ³		PUR	(-25 ... 70 °C)	black	Ø 7.4 mm							
		FEP ⁴	(-25 ... 70 °C)	black	Ø 7.4 mm							
		TPE-U	(-25 ... 125 °C)	blue	Ø 7.4 mm						(without / with drinking water certificate)	
		TPE-U ⁵	(-25 ... 125 °C)	red	Ø 9.0 mm							others on request
Bending radius		static installation: 10-fold cable diameter					dynamic application: 20-fold cable diameter					
³ shielded cable with integrated ventilation tube for atmospheric pressure reference (for nominal pressure ranges absolute, the ventilation tube is closed)												
⁴ do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected												
⁵ only in combination with IS-version (explosion protection) and temperature element Pt 100												
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 ₂ O ₃ 99.9%										
Protection cap		POM-C										
Cable sheath		PUR, FEP, TPE-U										
Explosion protection												
Approval DX14B-LMK 387		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 _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 49.2 nF, L _i = 0 μH; the supply connections have an inner capacity of max. 100 nF opposite the enclosure										
Safety technical maximum values (temperature)		U _i = 30 V, I _i = 54 mA, P _i = 405 mW, C _i = 0 nF, L _i = 0 μH (temperature element Pt 100)										
Permissible temp. for environment		in zone 0: -20 ... 60 °C with p _{atm} 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										
Miscellaneous												
Drinking water certificate ⁶		according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)										
Option cable protection		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)										
Current consumption		max. 22 mA										
Weight		approx. 180 g (without cable)										
Ingress protection		IP 68										
CE-conformity		EMC Directive: 2014/30/EU										
ATEX Directive		2014/34/EU										
⁶ only possible with EPDM seal in combination with TPE-U cable; not possible with IS-version (explosion protection)												

LMK 387

Stainless Steel Probe

Technical Data

Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply -	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)</p>	<p>2-wire-system current (pressure) / 3-wire-system (temperature Pt 100)</p>
Dimensions (mm/in)	
<p>standard</p>	
<p>protection cap removable</p>	<p>with thread R1/2" for mounting with stainless steel tube</p>
<p>option: screw-in version</p>	
<p>G3/4"</p>	<p>G1/2" open</p>
<p>⇒ cable diameter Ø9 mm for TPE-U cable (red), drawings for option with Pt 100 on request</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>

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BDSENSORS
pressure measurement

LMK387_E_080221

Ordering code LMK 387

LMK 387

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Pressure														
gauge in bar	3	6 0											consult	
absolute in bar	3	6 3											consult	
gauge in mH ₂ O	3	6 1												
Input														
	[mH ₂ 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
Housing														
	stainless steel 1.4404 (316L)		1											
	titanium		T											
	customer		9											consult
Design														
	probe		1											
	screw-in version G1/2" open		A											
	screw-in version G3/4" flush		B											
Diaphragm														
	ceramics Al ₂ O ₃ 99.9 %		C											
	customer		9											consult
Output														
	4 ... 20 mA / 2-wire		1											
	intrinsic safety 4 ... 20 mA / 2-wire		E											
	customer		9											consult
Seals														
	FKM		1											
	EPDM		3											
DVGW / KTW:	EPDM ¹		3T											
	FFKM ²		7											consult
	customer		9											consult
Electrical connection														
	PUR-cable (black, Ø 7.4 mm) ³		2											
	FEP-cable (black, Ø 7.4 mm) ³		3											
	TPE-U-cable (blue, Ø 7.4 mm) ³		4											
	TPE-U-cable (red, Ø 9.0 mm) ⁴		42											
DVGW / KTW:	TPE-U-cable (blue, Ø 7.4 mm) ^{1,3}		F											
	customer		9											consult
Accuracy														
standard	0.35 % FSO		3											
option	0.25 % FSO		2											
	customer		9											consult
Cable length														
	in m		9	9	9									
Special version														
	standard									0	0	0		
	with temperature sensor Pt 100									0	1	3		
	prepared for mounting with stainless steel pipe ⁵									5	0	2		
	customer									9	9	9	consult	

¹ 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)

² min. permissible temperature from -15 °C

³ shielded cable with integrated air tube for atmospheric pressure reference

⁴ only in combination with IS version (explosion protection) and temperature element Pt 100

⁵ stainless steel pipe is not part of the supply