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 mH_2O up to 0 ... 100 mH_2O

Output signal

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

Special characteristics

- diameter 22 mm
- diaphragm ceramics 99.9% Al_2O_3
- good long-term stability
- especially for waste water

Optional versions

- IS-version
  Ex ia = intrinsically safe for
  gases and dust
- drinking water certificate according to DVGW and KTW
- temperature element Pt 100
- mounting with stainless steel tube
- different kinds of cable
- different kinds of elastomer

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

Compared to the level probe LMK 382 the outside-diameter is only 22 mm, which allows an easy installation and backfitting in 1" tubes or in cramped fitting conditions. An IS-version 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

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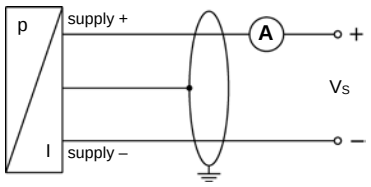
Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3	-0.5				-1				

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	max. voltage 10 V_{DC}, in intrinsically safe circuit 30 V_{DC}
Connectivity technology	3-wire	max. current 2 mA, intrinsically safe circuit 54 mA
Resistance	100 Ω at 0 °C	max. power 10 mW, intrinsically safe circuit 405 mW
Temperature coefficient	3850 ppm/K	
Supply IS	0.3 … 1.0 mA DC	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO	option: ≤ ± 0.25 % FSO
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
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	[% FSO]	≤ 1.0% FSO in compensated range -20 ... 80 °C
Permissible temperatures		
Permissible temperatures	medium: -25 ... 85 °C	storage: -25 … 70 °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 outlet	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed)	
Materials (media wetted)		
Housing	stainless steel 1.4404 (316 L)	others on request
Cable	PUR (-25 … 70 °C) black Ø7.4mm FEP [3] (-25 … 70 °C) black Ø7.4mm TPE-U (-25 …125 °C) blue Ø7.4mm (without/with drinking water certificate) TPE-U [4] (-25 …125 °C) red Ø9.0mm	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_2O_3 99.9%	
Protection cap	POM-C	
[3] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected *[4] only in combination with Ex version (explosion protection) and temperature element Pt100*		
Explosion protection		
Approval DX14B-LMK 387	IBExU 15 ATEX 1066 X / IECEx IBE 12.xxxxX 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)	Ui = 30 V, Ii = 54 mA, Pi = 405 mW, Ci = 0 nF, Li = 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 as well as signal line/signal line: 160 pF/m cable inductance: signal line/shield as well as signal line/signal line: 1 µH/m	
Miscellaneous		
Drinking water certificate [5]	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. 180 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
[5] only possible with EPDM seal in combination with TPE-U cable; not possible with IS-protection (explosion protection)		

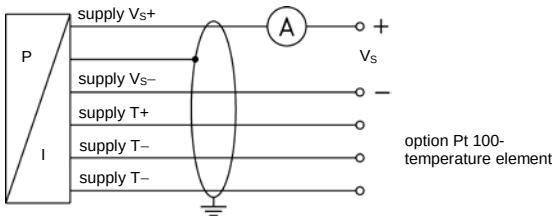
Pin configuration			
Electrical connection	cable colors (IEC 60757)	electrical connection	cable colors (IEC 60757)
Supply + Supply –	wh (white) bn (brown)	Supply T+ (with Pt 100) Supply T– (with Pt 100) Supply T– (with Pt 100)	ye (yellow) gy (grey) pk (pink)
Shield	gnye (green-yellow)		

Wiring diagrams

2-wire-system (current)

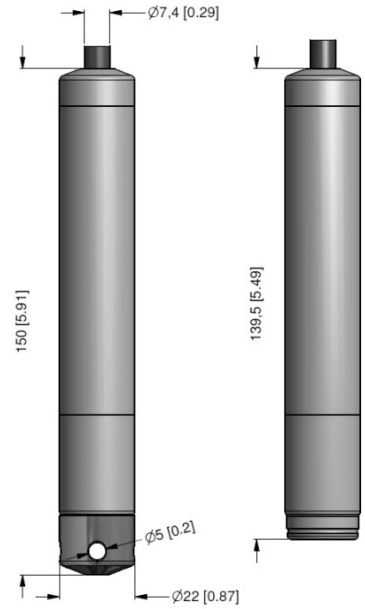


2-wire-system current (pressure) / 3-wire-system (temperature Pt 100)



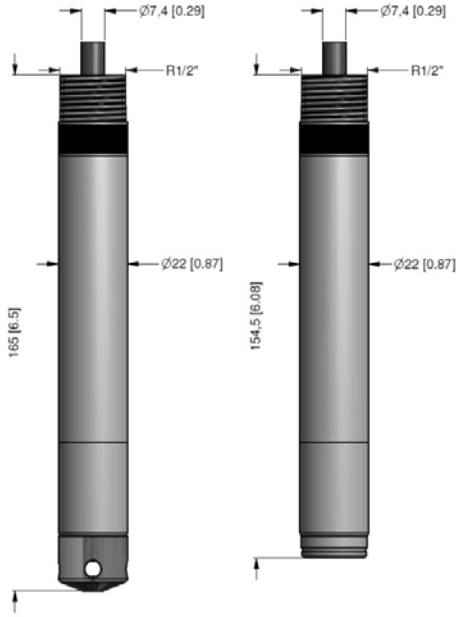
Dimensions (mm/in)

standard



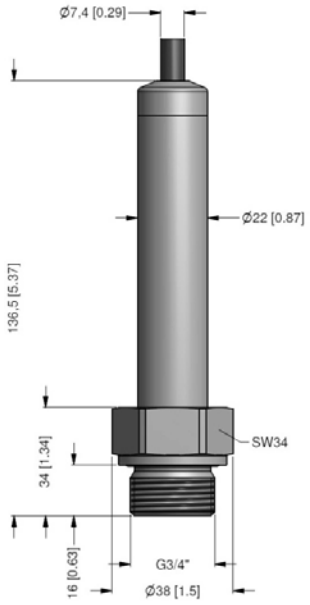
with protection cap

without protection cap

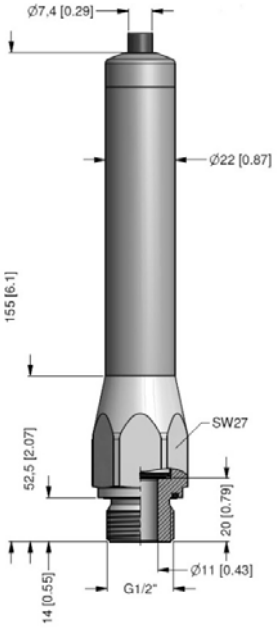


with thread R1/2" for
mounting with stainless steel tube

option: screw-in version



G3/4"



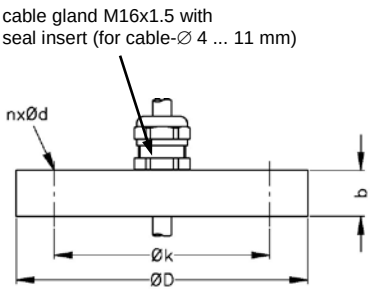
G1/2" open

⇨ **cable diameter Ø9.0mm for TPE-U cable (red), drawings for option with Pt100 on request**

Mounting flange with cable gland

Technical data		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316 L)	
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	
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

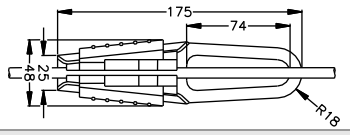
Ordering type	Ordering code
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016



Terminal clamp

Technical data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Weight	approx. 160 g

Ordering type	Ordering code
Terminal clamp, steel, zinc plated	Z100528
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

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BD|SENSORS pressure measurement

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pressure measurement

Ordering code LMK 387

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		Code	
Pressure			
gauge in bar		3 6 0	
absolute in bar		3 6 3	consult
gauge in mH_2O		3 6 1	
Input [mH_2O]	[bar]		
1	0.1	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	
customer		9	consult
Design			
probe		1	
screw-in version G1/2" open		A	
screw-in version G3/4" flush		B	
Diaphragm			
ceramics Al_2O_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, Ø7.4mm) [3]		2	
FEP-cable (black, Ø7.4mm) [3]		3	
TPE-U-cable (blue, Ø7.4mm) [3]		4	
TPE-U-cable (red, Ø9.0mm) [4]		42	
DVGW / KTW:	TPE-U-cable (blue, Ø7.4mm) [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 st. 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] cable with integrated air tube for atmospheric pressure reference
[4] only in combination with Ex version (explosion protection) and temperature element Pt100
[5] stainless steel pipe is not part of the supply

20.08.2018