

LMK 487



Probe for Marine and Offshore 22 mm

Ceramic Sensor

accuracy according to IEC 60770:
0.25 % FSO

Nominal pressure

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

Output signals

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

Special characteristics

- ▶ diameter 22 mm
- ▶ LR-certificate (Lloyd's Register)
- ▶ DNV-GL Approval (Det Norske Veritas • Germanischer Lloyd)
- ▶ diaphragm 99.9 % Al₂O₃
- ▶ high long-term stability

Optional versions

- ▶ housing material titanium
- ▶ IS-version
Ex ia = intrinsically safe for gas and dust
- ▶ temperature element Pt 100
- ▶ different kinds of elastomer

The hydrostatic probe LMK 487 has been developed for measuring levels in various tank applications for shipbuilding and offshore. In comparison to the hydrostatic probe LMK 458 the external diameter amounts to only 22 mm by which the installation in 1" pipes can be carried out easily.

Beside the housing materials stainless steel and titanium, different elastomer materials are available by which an optimum adaptation to the application can be ensured.

Preferred areas of use



Water

drinking water abstraction
desalinization plant

Shipbuilding / Offshore

ballast tanks



monitoring of a ship's
position and draught
level measurement in ballast
and storage tanks



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		
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 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 _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		nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO					nominal pressure < 0.4 bar ≤ ± 0.35 % 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		≤ 1.0% 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 - DNV•GL (Det Norske Veritas • Germanischer Lloyd)											
² 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 DNV•GL: Class B, curve 2 / basis: IEC 60068-2-6)											
Electrical connection													
Cable with sheath material ³		TPE-U (-25 ... 125 °C) blue Ø 7.4 mm TPE-U ⁴ (-25 ... 125 °C) red Ø 9.0 mm											
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 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 (resistant against sea water)					others on request						
Seals (O-rings)		standard: FKM options: EPDM; FFKM (min. permissible temperature from -15 °C)					others on request						
Diaphragm		ceramics Al ₂ O ₃ 99.9%											
Protection cap		POM-C											
Cable sheath		TPE-U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)											
Category of the environment													
Lloyd's Register (LR)		number of certificate: 18/20068					ENV1, ENV2, ENV3, ENV4						
Det Norske Veritas/ Germanischer Lloyd (DNV GL)		number of certificate: TAA00000RM temperature: D humidity: B					vibration: B		EMC: B		enclosure: D		
Explosion protection													
Approval DX14B-LMK 487		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 temperatures 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											

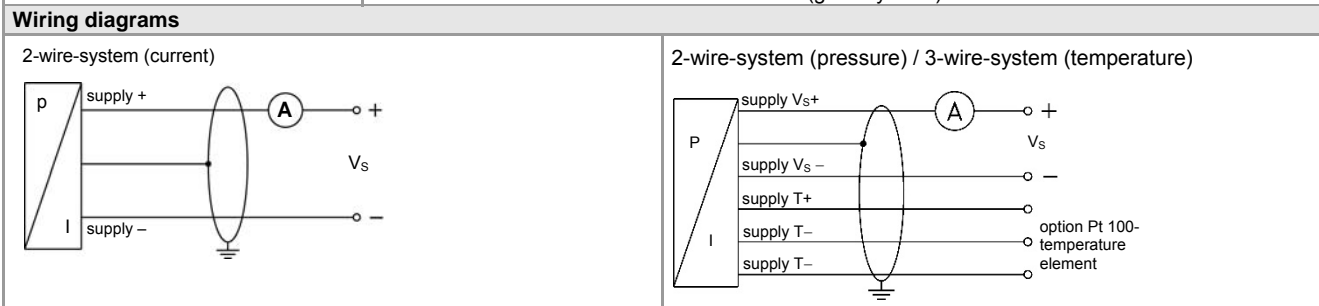
LMK 487

Probe for Marine and Offshore

Technical Data

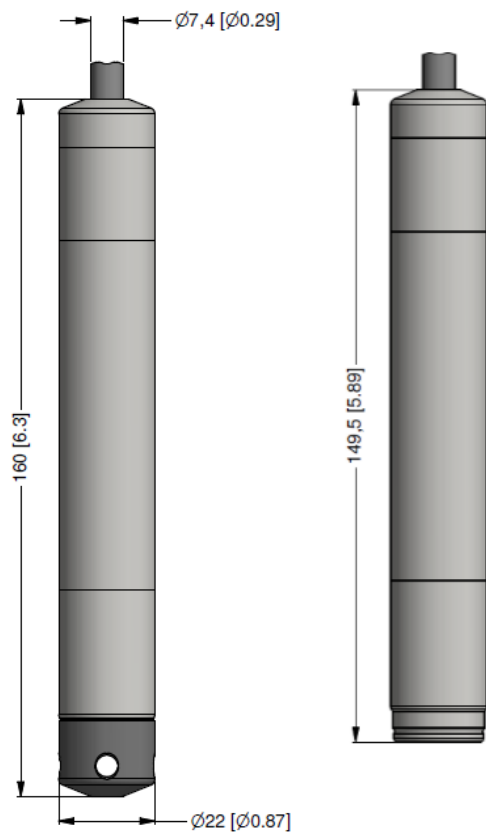
Miscellaneous	
Current consumption	max. 22 mA
Weight	approx. 180 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply -	WH (white) BN (brown)
Option Pt 100 temperature element: Supply T+ Supply T- Supply T-	YE (yellow) GY (grey) PK (pink)
Shield	GYNE (green-yellow)



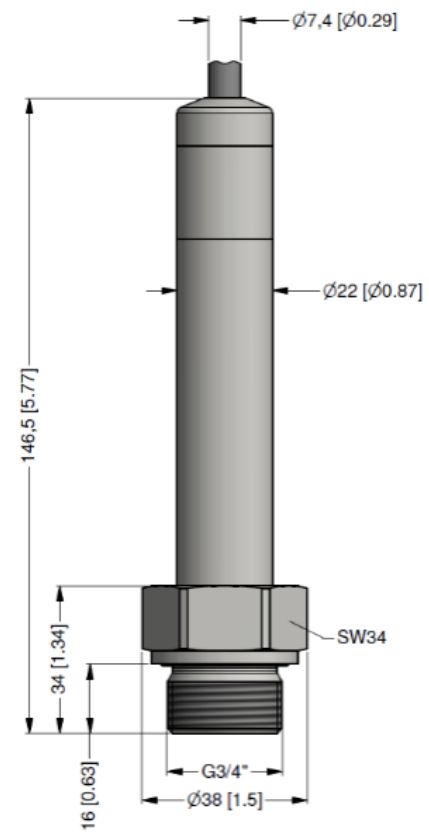
Dimensions (mm / in)

standard



protection cap removable

option: screw-in version



G3/4" flush

⇒ cable diameter Ø9 mm for TPE-U cable (red), drawings for option with Pt 100 on request

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

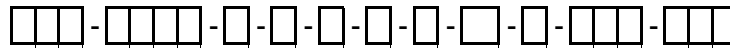
- CIT 200** Process display with LED display
- CIT 250** Process display with LED display and contacts
- CIT 300** Process display with LED display, contacts and analogue output
- CIT 350** Process display with LED display, bargraph, contacts and analogue output
- CIT 400** Process display with LED display, 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

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Ordering code LMK 487

LMK 487



Pressure														
	gauge in bar	3	6	5										
	gauge in mH ₂ O	3	6	6										
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 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							
	FFKM ¹						7							
	customer						9							consult
Electrical connection														
	TPE-U-cable (blue, Ø 7.4 mm) ²						4							
	TPE-U-cable (red, Ø 9.0 mm) ^{2,3}						42							
Accuracy														
	standard for p _N < 0,4 bar	0.35 % FSO					3							
	standard for p _N ≥ 0,4 bar	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		
	permissible temperatures -40 ... 125 °C													consult
	customer									9	9	9		consult

¹ min. permissible temperature from -15 °C

² shielded cable with integrated ventilation tube for atmospheric pressure reference

³ only in combination with IS version (explosion protection) and temperature element Pt 100