

# LMK 487

## Probe for Marine and Offshore 22 mm

Ceramic Sensor

accuracy according to IEC 60770:  
standard: 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
- ▶ LR-certificate (Lloyd's Register)
- ▶ DNV•GL Approval (Det Norske Veritas • Germanischer Lloyd)
- ▶ diaphragm  
ceramics 99.9% Al<sub>2</sub>O<sub>3</sub>
- ▶ high long-term stability

### Optional versions

- ▶ housing material titanium
- ▶ IS-version  
Ex ia = intrinsically safe  
for gases 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, elastomer materials are available by which an optimum adaptation to the application can be produced.

### Preferred areas of use

#### Water



drinking water abstraction  
desalinization plant

#### Shipbuilding / Offshore



ballast tanks  
draught monitoring  
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 <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				
Output signal / Supply												
Standard	4 ... 20 mA / V <sub>S</sub> = 12 ... 36 V <sub>DC</sub>											
Option IS-version	4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>											
Option Pt 100-temperature element												
Temperature range	-25 ... 125 °C					max. voltage 10 V <sub>DC</sub> , in intrinsically safe circuit 30 V <sub>DC</sub> max. current 2 mA, intrinsically safe circuit 54 mA max. power 10 mW, intrinsically safe circuit 405 mW						
Connectivity technology	3-wire											
Resistance	100 Ω at 0 °C											
Temperature coefficient	3850 ppm/K											
Supply IS	0.3 ... 1.0 mA DC											
Performance												
Accuracy <sup>1</sup>	nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO nominal pressure < 0.4 bar: ≤ ± 0.35 % FSO others on request											
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 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											
<sup>1</sup> 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: -25 ... 85 °C storage: -25 ... 70 °C											
Electrical protection <sup>2</sup>												
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)											
<sup>2</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 DNV+GL: Class B, curve 2 / basis: IEC 60068-2-6)											
Electrical connection												
Cable	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed)											
Materials (media wetted)												
Housing	standard: stainless steel 1.4404 (316 L) option: titanium (resistant against sea water) others on request											
Cable sheath	TPE -U (-25 ... 125 °C) blue Ø7.4 mm TPE -U <sup>3</sup> (-25 ... 125 °C) red Ø9.0 mm flame-resistant, halogen free, increased resistance against oil, gasoline, salt, sea water, heavy oil											
Seals (O-rings)	standard: FKM option: EPDM 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											
<sup>3</sup> only in combination with Ex version (explosion protection) and temperature element Pt100												
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 <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 49.2 nF, L <sub>i</sub> = 0 μH; the supply connections have an inner capacity of max. 100 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 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											

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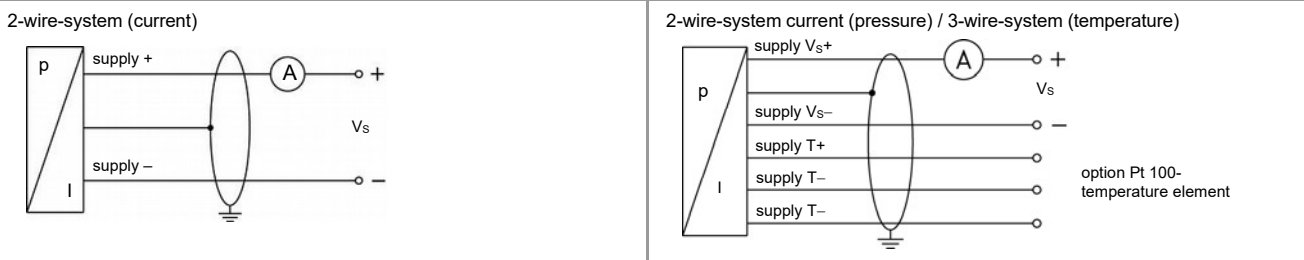
Hydrostatic Probe

Technical Data

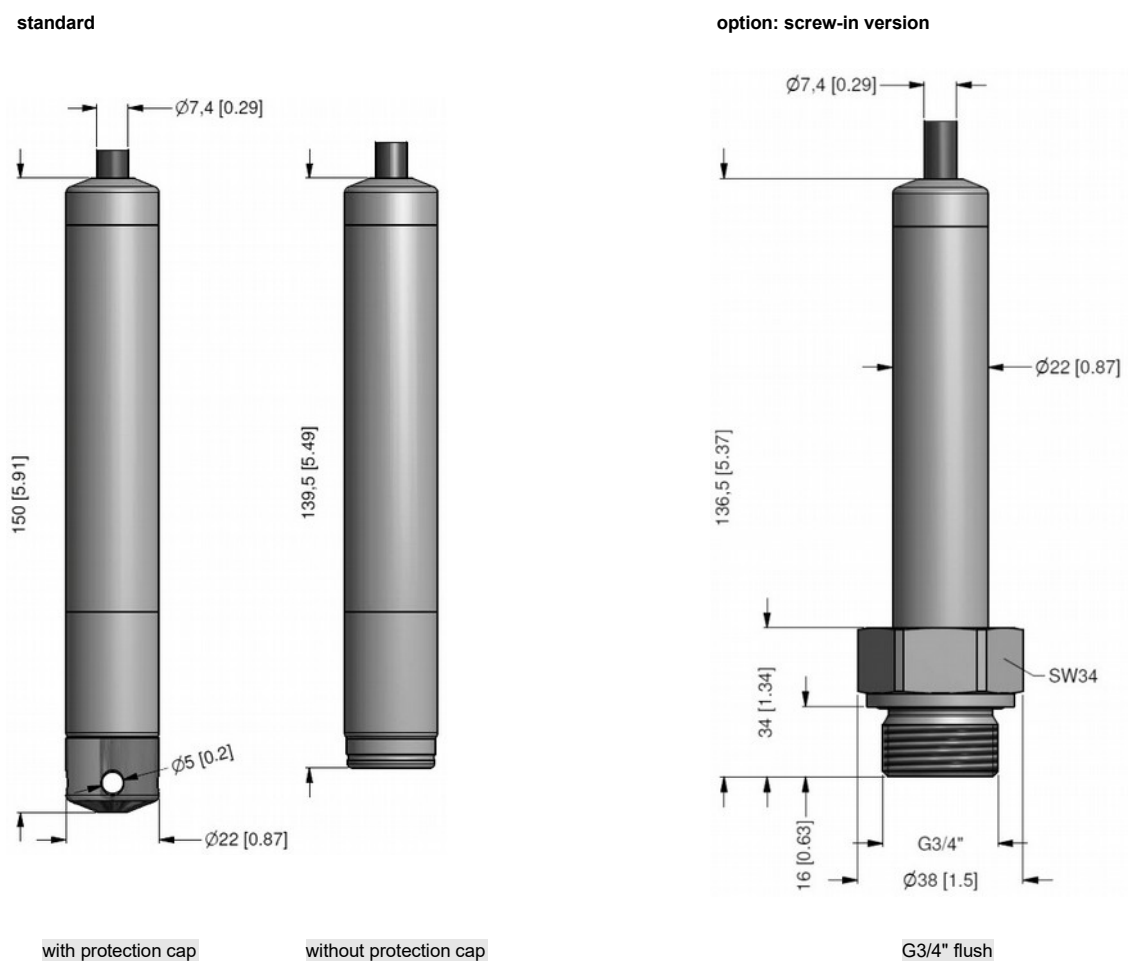
Miscellaneous	
Current consumption	max. 22 mA
Weight	approx. 180 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply -	wh (white) bn (brown)
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



### Dimensions (mm/in)



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

Mounting flange with cable gland		
<b>Technical data</b>		
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	
<b>Version</b>	<b>Size (in mm)</b>	<b>Weight</b>
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
<b>Ordering type</b>		<b>Ordering code</b>
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
<b>Terminal clamp</b>		
<b>Technical data</b>		
Suitable for	all probes with cable Ø 5.5 ... 10.5 mm	
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)	
Weight	approx. 160 g	
<b>Ordering type</b>		<b>Ordering code</b>
Terminal clamp, steel, zinc plated		Z100528
Terminal clamp, stainless steel 1.4301 (304)		Z100527
<b>Display program</b>		
<p><b>CIT 200</b> Process display with LED display</p> <p><b>CIT 250</b> Process display with LED display and contacts</p> <p><b>CIT 300</b> Process display with LED display, contacts and analogue output</p> <p><b>CIT 350</b> Process display with LED display, bargraph, contacts and analogue output</p> <p><b>CIT 400</b> Process display with LED display, contacts, analogue output and Ex-approval</p> <p><b>CIT 600</b> Multichannel process display with graphics-capable LC display</p> <p><b>CIT 650</b> Multichannel process display with graphics-capable LC display and datalogger</p> <p><b>CIT 700 / CIT 750</b> Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts</p> <p><b>PA 440</b> Field display with 4-digit LC display</p>		

## Ordering code LMK 487

**LMK 487**



Pressure										
	gauge in bar	3	6	5						
	absolute in bar	3	6	8						
	gauge in mH <sub>2</sub> O	3	6	6						
Input										
	[mH <sub>2</sub> O]	[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			
	titanium						T			
	customer						9			consult
Design										
	probe						1			
	screw-in version G3/4" flush						B			
Diaphragm										
	ceramics Al <sub>2</sub> O <sub>3</sub> 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 <sup>1</sup>						7			
	customer						9			consult
Electrical connection										
	TPE-U-cable <sup>2</sup>						4			
Accuracy										
	standard for P <sub>N</sub> < 400 mbar	0.35 % FSO							3	
	standard for P <sub>N</sub> ≥ 400 mbar	0.25 % FSO							2	
	customer								9	consult
Cable length										
	in m								9	9
Special version										
	standard								0	0
	permissible temperatures -40 ... 125 °C									
	customer								9	9

<sup>1</sup> min. permissible temperature from -15 °C

<sup>2</sup> cable with integrated air tube for atmospheric pressure reference