



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} , max. current 2 mA, max. power 10 mW,	
in intrinsically safe circuit 30 V _{DC} in intrinsically safe circuit 54 mA 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 _{S min}) / 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 - 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

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Technical Data

Miscellaneous

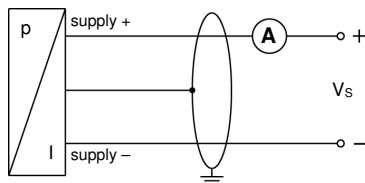
Current consumption	max. 22 mA
Weight	approx. 180 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Pin configuration

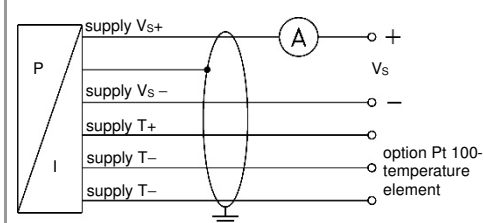
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply -	BN (brown)
Option Pt 100 temperature element:	
Supply T+	YE (yellow)
Supply T-	GY (grey)
Supply T-	PK (pink)
Shield	GYNE (green-yellow)

Wiring diagrams

2-wire-system (current)

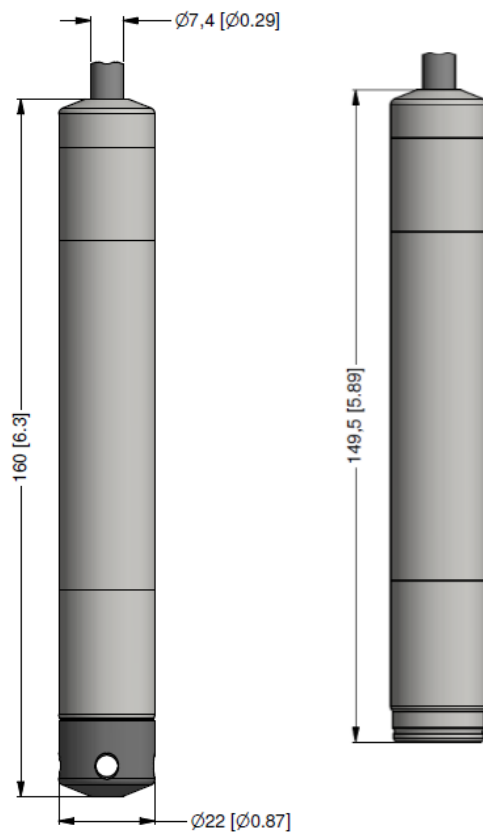


2-wire-system (pressure) / 3-wire-system (temperature)



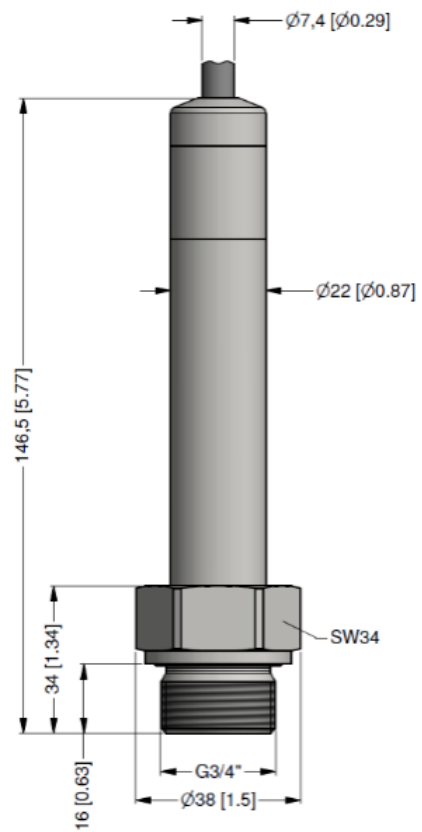
Dimensions (mm / in)

standard



protection cap removable

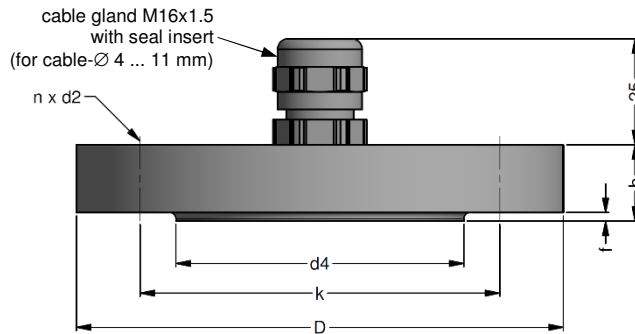
option: screw-in version



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

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



Ordering code LMK 487

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[illegible]¹ min. permissible temperature from -15 °C² shielded cable with integrated ventilation tube for atmospheric pressure reference

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