



LMK 458

Probe for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 61298-2:
standard: 0.25 % FSO
option: 0.1 % FSO

Nominal pressure

from 0 ... 40 cmH₂O up to 0 ... 200 mH₂O

Output signals

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

Special characteristics

- ▶ diameter 39.5 mm
- ▶ diaphragm ceramics Al₂O₃ 99.9 %
- ▶ LR-certificate (Lloyd's Register)
- ▶ DNV-approval
- ▶ ABS-certificate (American Bureau of Shipping)
- ▶ CCS-certificate (China Classification Society)
- ▶ high overpressure resistance
- ▶ high long-term stability

Optional versions

- ▶ different housing materials (stainless steel, CuNiFe)
- ▶ IS-version
Ex ia = intrinsically safe for gas
- ▶ screw-in and flange version
- ▶ accessories e.g. assembling and probe flange, mounting clamp

The hydrostatic probe LMK 458 has been developed for measuring level in service and storage tanks and is certificated for shipbuilding and offshore applications.

A permissible operating temperature up to 125 °C and the possibility to use the device in intrinsic safe areas enable to measure the pressure of various fluids under extreme conditions. The basis for the LMK 458 is a capacitive ceramic sensor element designed by BD|SENSORS, which offers a high overload resistance and medium compatibility.

Preferred areas of use are



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

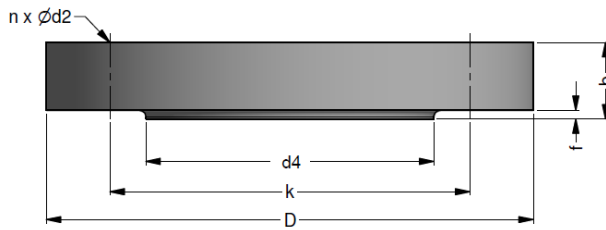


Pressure ranges																			
Nominal pressure gauge ¹	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20			
Level	[mH2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200			
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45			
Permissible vacuum	[bar]	-0.2		-0.3		-0.5				-1									
Max. ambient pressure (housing): 40 bar																			
¹ available in gauge and absolute; nominal pressure ranges absolute from 1 bar																			
Output signal / Supply																			
Standard		2-wire: 4 ... 20 mA / V _S = 10 ... 32 V _{DC}								V _S rated = 24 V _{DC}									
Option IS-version		2-wire: 4 ... 20 mA / V _S = 12 ... 28 V _{DC}								V _S rated = 24 V _{DC}									
Performance																			
Accuracy ²		standard: ≤ ± 0.25 % FSO								option: for p _N ≥ 0.6 bar ³ : ≤ ± 0.1 % FSO									
Permissible load		R _{max} = [(V _S – V _S min) / 0.02 A] Ω																	
Long term stability		≤ ± 0.1 % FSO / year at reference conditions																	
Influence effects		supply: 0.05 % FSO / 10 V								permissible load: 0.05 % FSO / kΩ									
Turn-on time		700 msec																	
Mean response time		< 200 msec								mean measuring rate 5/sec									
Max. response time		380 msec																	
² accuracy according to IEC 61298-2 – limit point adjustment (non-linearity, hysteresis, repeatability)																			
³ under the influence of disturbance burst according to EN 61000-4-4 (2004) +2 kV accuracy decreased to ≤ ± 0.25 % FSO																			
Thermal effects (offset and span) / Permissible temperatures																			
Tolerance band		≤ ± 1 % FSO								in compensated range -20 ... 80 °C									
Permissible temperatures		medium / electronics / environment: -25 ... 125 °C								storage: -40 ... 125 °C									
Electrical protection ⁴																			
Short-circuit protection		permanent																	
Reverse polarity protection		no damage, but also no function																	
Electromagnetic compatibility		emission and immunity according to								- EN 61326		- DNV							
⁴ additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available																			
Mechanical stability																			
Vibration		4 g (according to DNV: class B, curve 2 / basis: DIN EN 60068-2-6)																	
Electrical connection																			
Cable with sheath material ⁵		TPE-U blue Ø 7.4 mm																	
Bending radius		static installation: 10-fold cable diameter								dynamic application: 20-fold cable diameter									
⁵ shielded cable with integrated ventilation tube for atmospheric pressure reference (for nominal pressure ranges absolute, the ventilation tube is closed)																			
Materials																			
Housing		standard: stainless steel 1.4404 (316L) option: CuNi10Fe1Mn (resistant against sea water)								others on request									
Seals (media wetted)		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)																	
Miscellaneous																			
Option cable protection for probes in stainless steel		prepared for mounting with stainless steel pipe																	
Ingress protection		IP 68																	
Current consumption		max. 21 mA																	
Weight		min. 650 g (without cable)																	
CE-conformity		EMC Directive: 2014/30/EU																	
ATEX Directive		2014/34/EU																	
Option Pt 100 temperature element ⁶																			
Temperature range		-25 ... 125°C																	
Connection temperature element		3-wire																	
Resistance		100 Ω at 0°C																	
Temperature coefficient		3850 ppm/K																	
Supply I _S		0.3 ... 1.0 mA _{DC}																	
⁶ not possible in combination with IS-version																			
Category of the environment																			
Lloyd´s Register (LR)		EMV1, EMV2, EMV3, EMV4								number of certificate: 13/20056									
Det Norske Veritas (DNV)		temperature: D		vibration: B		humidity: B		enclosure: D		number of certificate: TAA00001GM electromagnetic compatibility: B									
Explosion protection ⁷																			
Approval DX14A-LMK 458		IBExU 07 ATEX 1180 X								zone 0 ⁸ : II 1G Ex ia IIB T4 Ga									
Safety technical maximum values		U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i = 105 nF; L _i = 0 µH; the supply connections have an inner capacity of max. 140 nF opposite the enclosure																	
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 ... 70°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																	
⁷ not possible in combination with Pt 100 temperature element																			
⁸ for optional stainless steel pipe the following designation is valid: "II 1 G Ex ia IIC T4" (zone 0)																			

Probe for Marine and Offshore

Wiring diagrams	
2-wire-system (current)	2-wire-system current (pressure) / 3-wire-system (temperature)
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply V_S+ Supply V_S-	WH (white) BN (brown)
Option Pt 100 temperature element: Supply T_+ Supply T_- Supply T_-	YE (yellow) GY (grey) PK (pink)
Shield	GNYE (green-yellow)
Dimensions for housing in stainless steel and CuNiFe (mm / in)	
probe protection cap removable	option prepared for mounting with stainless steel pipe
screw-in version	flange version $\Rightarrow$ transmitter flange is not part of supply and has to be ordered separately

Transmitter flange for flange version



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	LMK 382, LMK 382H, LMK 458, LMK 458H
Flange material	stainless steel 1.4404 (316L)
Hole pattern	according to DIN 2507

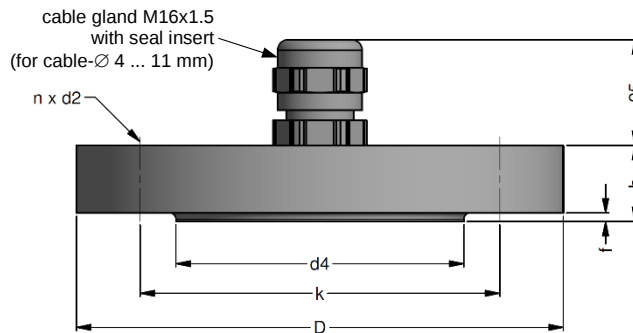
Ordering type

Ordering code

Weight

Transmitter flange DN25 / PN40	ZSF2540	1.2 kg
Transmitter flange DN50 / PN40	ZSF5040	2.6 kg
Transmitter flange DN80 / PN16	ZSF8016	4.1 kg

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

Ordering code LMK 458

LMK 458

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Pressure												
in bar, gauge			7	6	5							
in bar, absolute ¹			7	6	8							
in mH ₂ O			7	6	6							
Input												
	[mH ₂ O]	[bar]										
	0.4	0.04		0	4	0	0					
	0.6	0.06		0	6	0	0					
	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					
	160	16		1	6	0	2					
	200	20		2	0	0	2					
	customer			9	9	9	9					consult
Housing												
stainless steel 1.4404 (316L)							1					
copper-nickel-alloy (CuNi10Fe1Mn)							K					
customer							9					consult
Design												
probe								1				
flange version ²								3				
screw-in version								5				
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
Seal												
FKM								1				
EPDM								3				
FFKM ³								7				
customer								9				consult
Electrical connection												
TPE-U-cable (blue, Ø 7.4 mm) ⁴								4				
customer								9				consult
Accuracy												
standard			0.25 % FSO					2				
option für P _N ≥ 0.6 bar:			0.1 % FSO					1				
customer								9				consult
Cable length												
in m									9	9	9	
Special version												
standard									0	0	0	
with temperature sensor Pt 100 ⁵									0	1	3	
prepared for mounting ⁶									5	0	2	
with stainless steel pipe												
customer									9	9	9	consult

¹ nominal pressure ranges absolute from 1 bar

² mounting accessories are not part of supply and have to be ordered separately

³ min. permissible temperature from -15°C

⁴ shielded cable with integrated ventilation tube for atmospheric reference

⁵ not possible in combination with IS-version

⁶ possible for probes in stainless steel; stainless steel pipe is not part of the supply