LMK 458

Probe for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 60770:
standard: 0.25 % FSO
option: 0.1 % FSO

Nominal pressure

from 0 ... 40 cmH_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- diameter 39.5 mm
- LR-certificate (Lloyd´s Register)
- DNV▪GL Approval (Det Norske Veritas ▪ Germanischer Lloyd)
- ABS-certificate (American Bureau of Shipping)
- CCS-certificate (China Classification Society)
- high overpressure resistance
- high long-term stability

Optional versions

- diaphragm Al_2O_3 99.9 %
- different housing materials (stainless steel, CuNiFe)
- IS-version zone 0
- 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 as a consequence certificated for shipbuilding and offshore applications.

A permissible operating temperature of 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

BD SENSORS GmbH
BD-Sensors-Straße 1
D - 95199 Thierstein

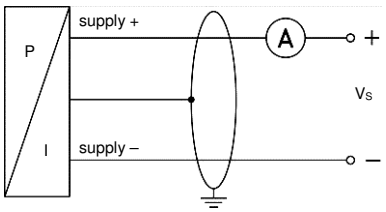
Tel: +49 (0) 92 35 / 98 11- 0
Fax: +49 (0) 92 35 / 98 11- 11

www.bdsensors.com
info@bdsensors.de

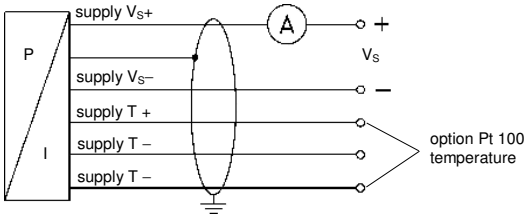
Pressure ranges																
Nominal pressure [1]	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Permissible vacuum	[bar]	-0.2		-0.3		-0.5				-1						
[1] available 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		$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$														
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 60770 – 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 / Permissible temperatures																
Thermal error		≤ ± 0.1 % FSO / 10 K								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▪GL (Det Norske Veritas ▪ Germanischer Lloyd)														
[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▪GL: class B, curve 2 / basis: DIN EN 60068-2-6)														
Electrical connection																
Cable outlet		shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges sealed gauge and absolute, the air tube is plugged)														
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		standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %														
Cable sheath		TPE -U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)														
Miscellaneous																
Optionally cable protection		stainless steel pipe for probe in stainless steel: available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)														
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 [5]																
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 $_{DC}$														
[5] only for 4...20 mA, cable length max. 5 m																
Category of the environment																
Lloyd´s Register (LR)		EMV1, EMV2, EMV3, EMV4 number of certificate: 13/20055														
Det Norske Veritas ▪ Germanischer Lloyd (DNV▪GL)		temperature: D vibration: B number of certificate: TAA00001GM humidity: B enclosure: D electromagnetic compatibility: B														
Explosion protection																
Approval DX14A-LMK 458		**IBExU 07 ATEX 1180 X** zone 0 [6]: 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 = 5 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														
[6] for optional stainless steel pipe the following designation is valid: "II 1 G Ex ia IIC T4" (zone 0)																

Wiring diagrams

2-wire-system (current)



2-wire-system (current) with Pt 100

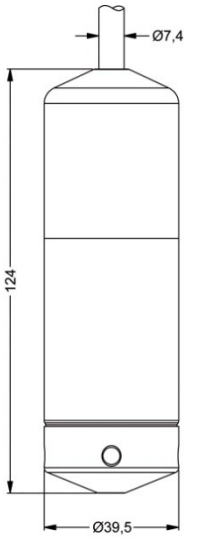


Pin configuration

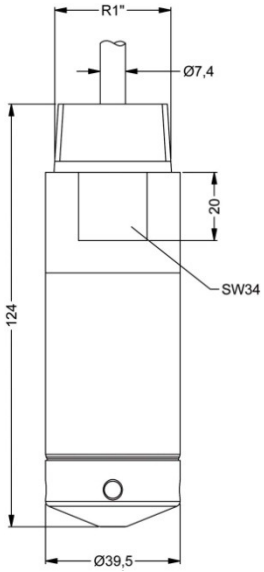
Electrical connection	cable colours (IEC 60757)
Supply V_S +	wh (white)
Supply V_S –	bn (brown)
Option Pt 100 temperature element:	
Supply T+ (with Pt 100)	ye (yellow)
Supply T– (with Pt 100)	gy (grey)
Supply T– (with Pt 100)	pk (pink)
Shield	gnye (green-yellow)

Dimensions (in mm)

probe versions

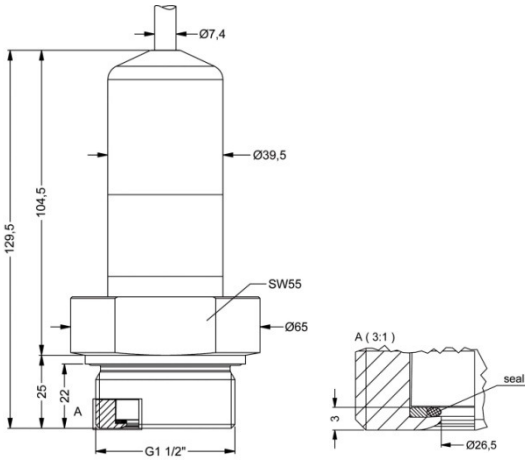


stainless steel / CuNiFe



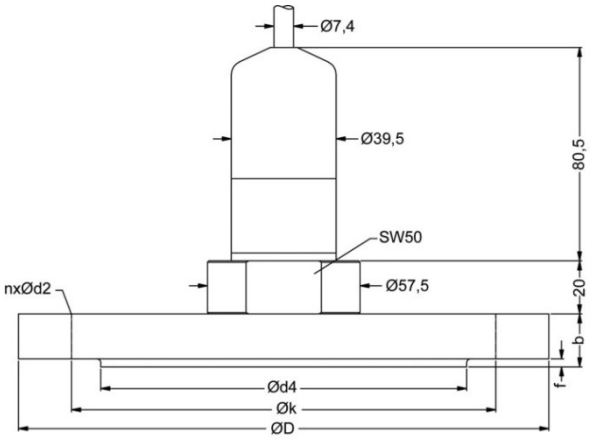
prepared for mounting
with stainless steel pipe
stainless steel / CuNiFe

screw-in version



stainless steel / CuNiFe

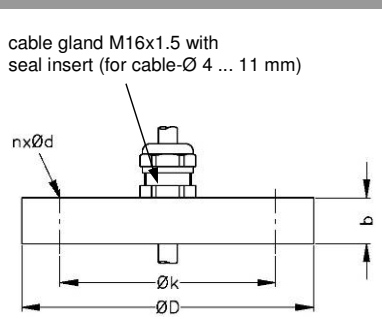
flange version



stainless steel / CuNiFe

Probe flange for flange version	
Technical Data	
Suitable for	LMK 382, LMK 382H, LMK 458
Flange material	stainless steel 1.4404 (316L)
Hole pattern	according to DIN 2507
Version	**Size (in mm)**
DN25 / PN40	D = 115, k = 85, d4 = 68, b = 18, f = 2, n = 4, d2 = 14
DN50 / PN40	D = 165, k = 125, d4 = 102, b = 20, f = 3, n = 4, d2 = 18
DN80 / PN16	D = 200, k = 160, d4 = 138, b = 20, f = 3, n = 8, d2 = 18
Ordering type	
Probe flange DN25 / PN40	ZSF2540
Probe flange DN50 / PN40	ZSF5040
Probe flange DN80 / PN16	ZSF8016

Assembling flange with cable gland	
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
Version	**Size (in mm)**
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d = 14
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d = 18
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d = 18
Ordering type	
Assembling Flange DN25 / PN40	ZMF2540
Assembling Flange DN50 / PN40	ZMF5040
Assembling Flange DN80 / PN16	ZMF8016



Tel: +49 (0) 92 35 / 98 11- 0
Fax: +49 (0) 92 35 / 98 11- 11
www.bdsensors.com
info@bdsensors.de
BD|SENSORS pressure measurement

Ordering code LMK 458

LMK 458			☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐	
Pressure				
in bar, gauge			765	
in bar, absolute [1]			768	
in mH_2O			766	
Input	**[mH_2O]**	**[bar]**		
	0.40	0.04	0400	
	0.60	0.06	0600	
	1.0	0.10	1000	
	1.6	0.16	1600	
	2.5	0.25	2500	
	4.0	0.40	4000	
	6.0	0.60	6000	
	10	1.0	1001	
	16	1.6	1601	
	25	2.5	2501	
	40	4.0	4001	
	60	6.0	6001	
	100	10	1002	
	160	16	1602	
	200	20	2002	
customer			9999	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_2O_3 96%			2	
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	
FFKM [3]			7	
customer			9	consult
Electrical connection				
TPE-U-cable [4]			4	
customer			9	consult
Accuracy				
standard		0.25 %	2	
option für $P_N \geq 0.6$ bar:		0.1 %	1	
customer			9	consult
Cable length				
in m			999	
Special version				
standard			000	
with temperature sensor Pt 100			013	
prepared for mounting with st. steel pipe [5]			502	
customer			999	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 air tube for atmospheric reference

[5] stainless steel pipe is not part of the supply

23.10.2017