BD SENSORS®
pressure measurement

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)
- DVN▪ 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 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 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

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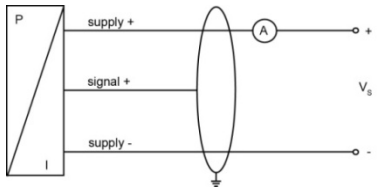
Pressure ranges																
Nominal pressure [1]	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Permissible vacuum	[bar]	-0.2		-0.3		-0.5				-1						
max. ambient pressure (housing)		40 bar														
[1] available in gauge, sealed gauge and absolute; nominal pressure ranges sealed gauge and absolute from 1 bar																
Output signal / Supply																
Standard		2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC} $V_{S\ rated}$ = 24 V_{DC}														
Option IS-version		2-wire: 4 ... 20 mA / V_S = 14 ... 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														
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 / storage: -25 ... 125 °C (depends on cable sheath / seals)														
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)														
Cable with sheath material		TPE-U blue Ø 7.4 mm														
Bending radius		static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter														
(*shielded cable with integrated ventilation tube for atmospheric pressure reference (for nominal pressure ranges absolute, the ventilation tube is closed)*																
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 %														
Protection cap		POM-C														
Cable sheath		TPE -U (-25 … 125 °C) (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; 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] *(not possible with IS-version)*																
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 $_{DC}$														

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 humidity: B electromagnetic compatibility: B	vibration: B number of certificate: TA00001GM
IS-protection *(not possible with Pt1000 temperature element)*		
Approval DX4A-LMK 458	**IBExU 07 ATEX 1180 X**	zone 0[6]: II 1G Ex ia IIB T4
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 temp. for environment	in zone 0 [6]: -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	
[5] only for 4...20mA, cable lenght max. 5m		

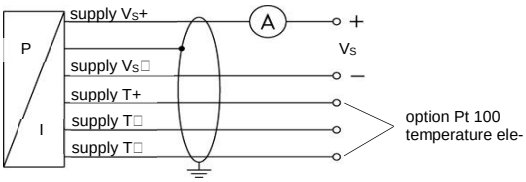
[6] for optional stainless steel pipe the following designation is valid: "II 1 G Ex ia IIC T4" (zone 0)

Wiring diagrams

2-wire-system (current)



2-wire-system (current) with Pt 100

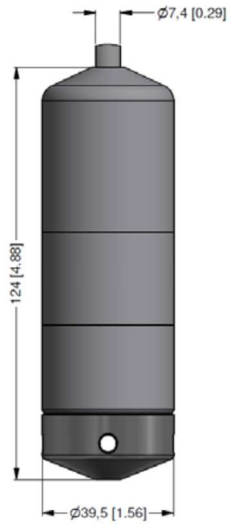


Pin configuration

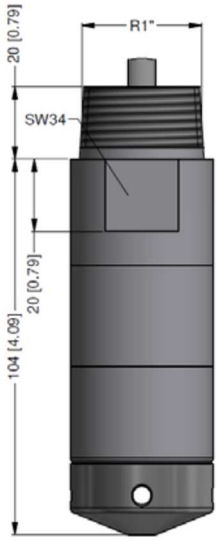
Electrical connection	cable colours (DIN 47100)
Supply V_S+	wh (white)
Supply V_S–	bn (brown)
Option Pt 100 temperature element:	
Supply T+ (with Pt 100)	ye (yellow)
Supply T– (with Pt 100)	gy (grey)
Supply T– (with Pt 100)	pk (pink)
Shield	gn/ye (green / yellow)

Dimensions for housing in stainless steel and CuNiFe (mm / in)

probe versions

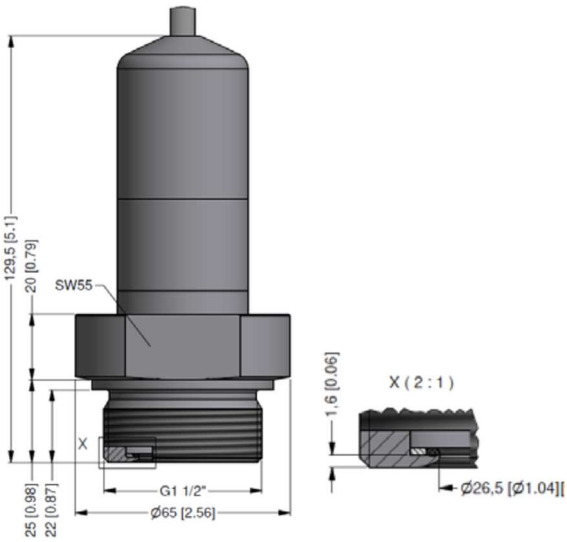


Screw-in version



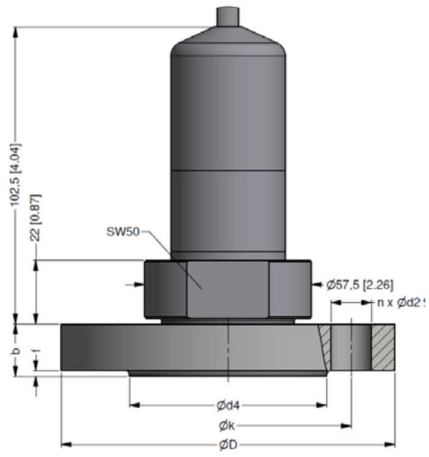
prepared for mounting
with stainless steel pipe
stainless steel / CuNiFe

screw-in version

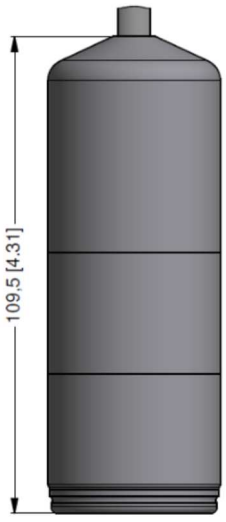


stainless steel / CuNiFe

flange version



stainless steel / CuNiFe

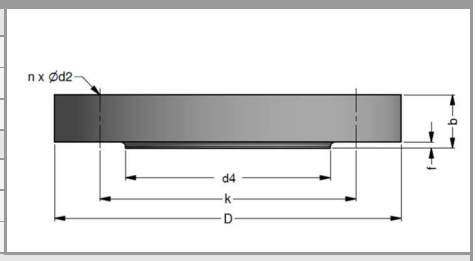


Protection cap removable

This data sheet contains product specification. properties are not guaranteed. Subject to change without notice.

Probe flange for flange version

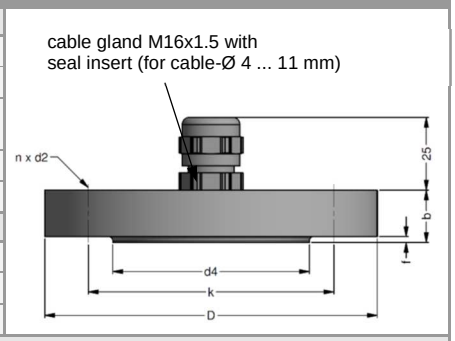
Technical data		
Suitable for	LMK 382, LMK 382H, LMK 458, LMK 458H	
Flange materiál	stainless steel 1.4404 (316L)	
Hole pattern	according to DIN 2507	
Version	**Size (in mm**	**Weight**
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d= 14	1.2 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d= 18	2.6 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d= 18	4.1 kg



Ordering type	Ordering code
Probe flange DN25 / PN40	5000389
Probe flange DN50 / PN40	5000390
Probe flange DN80 / PN16	5000392

Assembling flange with cable gland

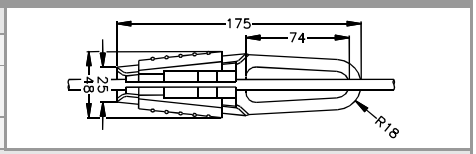
Technical Data	
Suitable for	all probes
Flange material	stainless steel 1.4404 (316L)
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection IP 68)
Hole pattern	according to DIN 2507
Version	**Size (in mm)**
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	Ordering code
Assembling Flange DN25 / PN40	5000275
Assembling Flange DN50 / PN40	5000278
Assembling Flange DN80 / PN16	5000279

Terminal clamp

Technical data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Weight	approx. 160 g



Ordering type	Ordering code
Terminal clamp, steel, zinc plated	1003440
Terminal clamp, stainless steel 1.4301 (304)	1000278

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BD SENSORS® pressure measurement

Ordering code LMK 458

1.3.2021

LMK 458 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure			
in bar (gauge)			7 6 5
in m H_2O (gauge)			7 6 6
in bar (absolute)[1]			7 6 8
Input	**[mH_2O]**	**[bar]**	
	0 … 0.4	0 … 0,04	0 4 0 0
	0 … 0.6	0 … 0,06	0 6 0 0
	0 … 1	0 … 0,1	1 0 0 0
	0 … 1.6	0 … 0,16	1 6 0 0
	0 … 2.5	0 … 0,25	2 5 0 0
	0 … 4	0 … 0,4	4 0 0 0
	0 … 6	0 … 0,6	6 0 0 0
	0 … 10	0 … 1	1 0 0 1
	0 … 16	0 … 1,6	1 6 0 1
	0 … 25	0 … 2,5	2 5 0 1
	0 … 40	0 … 4	4 0 0 1
	0 … 60	0 … 6	6 0 0 1
	0 … 100	0 … 10	1 0 0 2
	0 … 160	0 ... 16	1 6 0 2
	0 … 200	0 … 20	2 0 0 2
Customer			9 9 9 9
Housing material			
Stainless steel 1.4404 (316 L)			1
Copper-nickel-alloy ($CuNi_{10}Fe_1Mn$) - resistant against sea water			K
Customer			9
Design			
Submersible probe			1
Flange mounting version[2]			3
Screw-in transmitter (with G 1 1/2" thread)			5
Customer			9
Diaphragm material			
Ceramic Al_2O_3 96 %			2
Ceramic Al_2O_3 99,9 %			C
Customer			9
Output			
4 … 20 mA / 2-wire			1
Intrinsic safety Ex ia 4 … 20 mA / 2-wire			E
Customer			9
Seals			
Viton (FKM)			1
EPDM			3
FFKM[3]			7
Customer			9
Electrical connection			
TPE-U - cable, up to 125°C (blue, Ø 7.4 mm, price for 1 m)[4]			4
Customer			9
Accuracy			
0,35 %			3
0,25 %			2
0,25 % including Calibration Certificate			R
0,1 % (P_N ≥ 0,6 bar)			1
Customer			9
Cable length			
in m			9 9 9
Special version			
Standard			0 0 0
Temperature sensor PT100[5]			0 1 3
R 1" thread - Prepared for mounting v with stainless steel pipe[6]			5 0 2
Customer			9 9 9
Accessories for submersible transmitter			

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Terminal clamp - zinc plated	1003440
Terminal clamp - Stainless Steel 1.4301	1000278
Mounting screw PG16 - plastic	5002200
Flange with thread for flange version DN 25/PN 40	5000389
Flange with thread for flange version DN 50/PN 40	5000390
Flange with thread for flange version DN 80/PN 16	5000392
Mounting flange with cable gland (M 16 x 1,5) DN 25/PN 40	5000275
Mounting flange with cable gland (M 16 x 1,5) DN 50/PN 40	5000278
Mounting flange with cable gland (M 16 x 1,5) DN 80/PN 16	5000279

0,-…without additional charge
On request...in accordance with the producer
Version 502 is not possible for CuNiFe !!!
St. steel flange, clamp and pipe are not parts of the supply !!!
Surcharges for calibration are not subject to any discounts. Subject to change.
This document contains the specification for ordering the product; detailed technical parameters of the product and its possible variants are given in the data sheet.
BD SENSORS reserves the right to change sensor specifications without further notice.

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