BD SENSORS®
pressure measurement

LMK 458H

Probe with HART®-communication for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % span

Nominal pressure

from 0 ... 60 cmH_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- shipping approvals acc. to: Lloyd´s Register (LR), Det Norske Veritas ▪ Germanischer Lloyd (DNV▪GL) China Classification Society (CCS), American Bureau of Shipping (ABS)
- diameter 39.5 mm
- HART® communication (setting of offset, span and damping)
- high overpressure resistance
- high long-term stability

Optional versions

- IS-version Ex ia = intrinsically safe for gas and dust
- diaphragm Al_2O_3 99.9 %
- different housing materials (stainless steel, CuNiFe)
- screw-in and flange version
- accessories e. g. assembling and probe flange, mounting clamp

The hydrostatic probe LMK 458H has been developed for measuring level in service and storage tanks and is as a consequence of the certification by Germanischer Lloyd predestined for shipbuilding and offshore applications.

A permissible operating temperature of up to 85 °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 458H is a capacitive ceramic sensor element, which offers a high overload resistance and medium compatibility.

Preferred areas of use are

Water
Drinking water abstraction
Desalinization plant

Shipbuilding / Offshore
Ballast tanks
Draught monitoring
Level measurement in ballast and storage tanks

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Pressure ranges									
Nominal pressure [1]	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH_2O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45

[1] On customer request we adjust the devices by software on the required pressure ranges, within the turn-down possibility (starting at 0.02 bar).

Output signal / Supply				
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}	with HART® communication	$V_{S\ rated}$ = 24 V_{DC}	
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	with HART® communication	$V_{S\ rated}$ = 24 V_{DC}	

Performance				
Accuracy [2]	$P_N \geq$ 160 mbar	TD ≤ 5:1 TD > 5:1	≤ ± 0.2 % span ≤ ± [0.2 + 0.03 x TD] % span	TD_{max} = 10::1
	$P_N <$ 160 mbar		≤ ± [0.2 + 0.1 x TD] % span	TD_{max} = 3:1
	$P_N \geq$ 0.6 bar	TD ≤ 5:1 TD > 5:1	≤ ± 0.1 % span ≤ ± [0.1 + 0.02 x TD] % span	TD_{max} = 10:1
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$	load at HART®-communication: R_{min} = 250 Ω		
Long term stability	≤ ± (0.1 x turn-down) span / year at reference conditions			
Influence effects	supply: 0.05 % span / 10 V	permissible load: 0.05 % span / kΩ		
Turn-on time	850 msec			
Mean response time	140 msec without consideration of electronic damping	mean measuring rate 7/sec		
Max. response time	380 msec			
Adjustability	configuration of following parameters possible (interface / software necessary [3]): - electronic damping: 0 ... 100 sec - offset: 0 ... 80 % span - turn down of span: max. 10:1			

[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[3] software, interface, and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span) / Permissible temperatures	
Tolerance band	≤ ± [0.2 x turn-down] % span
TC, average	≤ ± [0.02 x turn-down] % span / 10 K
in compensated range	-20 … 80 °C
Permissible temperatures	medium / electronics / environment / storage: -25 … 85 °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 with sheat material[5]	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 (316L) others on request	option: CuNi10Fe1Mn (resistant against sea water)
Cable sheath	TPE -U (-25 … 125 °C) (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)	
Seals	FKM; FFKM; EPDM others on request	
Diaphragm	standard: ceramics Al_2O_3 96 %	option: ceramics Al_2O_3 99.9 %
Nose cone	POM	

Category of the environment			
Lloyd´s Register (LR)	EMV1, EMV2, EMV3, EMV4		number of certificate: 13/20056
Det Norske Veritas ▪ Germanischer Lloyd (DNV▪GL)	temperature: D vibration: B electromagnetic compatibility: B	humidity: B enclosure: D	number of certificate: TAA00001GM

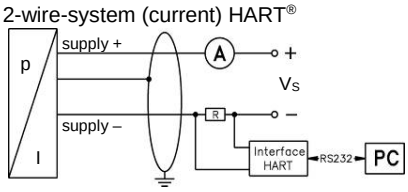
Miscellaneous	
Option cable protection for probes in stainless steel	prepared for mounting with stainless steel pipe; available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)
Ingress protection	IP 68
Current consumption	max. 21 mA
Weight	min. 650 g (without cable)
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

IS-protection	
Approval DX5A-LMK 458H	IBExU10ATEX1185 X zone 0 [5]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex iaD 20 T85°C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 94,6 nF; L_i = 0 µH; the supply connections have an inner capacity of max. 110 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

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

Wiring diagrams

2-wire-system (current) HART®

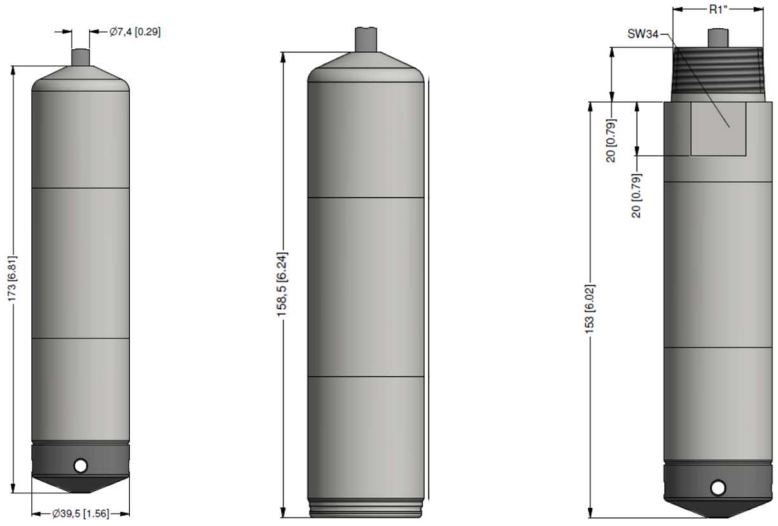


Pin configuration

Electrical connection	cable colours (DIN 47100)
Supply V_S+	wh (white)
Supply V_S–	bn (brown)
Shield	ye/gn (yellow / green)

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

probe version



stainless steel / CuNiFe | protection cap removable | prepared for mounting with stainless steel pipe

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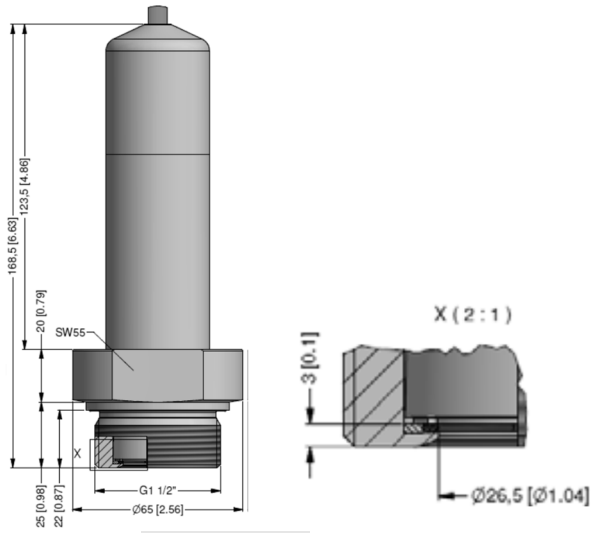
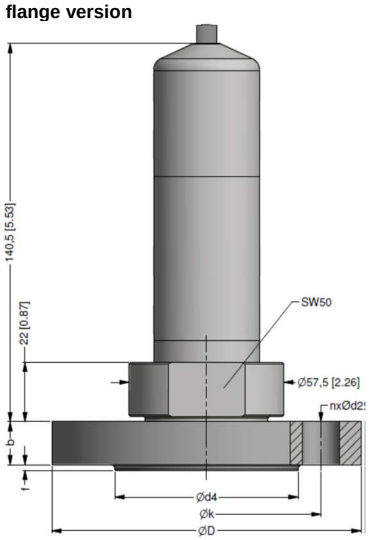
Dimensions for housing in stainless steel and CuNiFe (mm / in)

screw-in version



stainless steel / CuNiFe

flange version

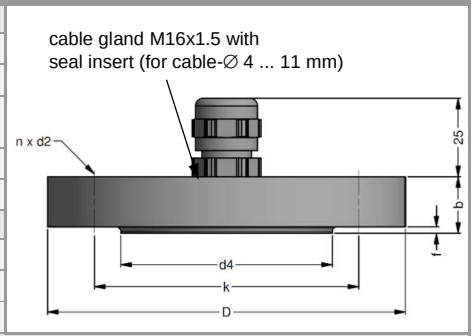


stainless steel / CuNiFe

Accessories

Transmitter flange for flange version		
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	
Version	**Size (in mm)**	**Weight**
DN25 / PN40	D = 115, k = 85, d4 = 68, b = 18, f = 2, n = 4, d2 = 14	1.2 kg
DN50 / PN40	D = 165, k = 125, d4 = 102, b = 20, f = 3, n = 4, d2 = 18	2.6 kg
DN80 / PN16	D = 200, k = 160, d4 = 138, b = 20, f = 3, n = 8, d2 = 18	4.1 kg
Ordering type		**Ordering code**
Transmitter flange DN25 / PN40		ZSF2540
Transmitter flange DN50 / PN40		ZSF5040
Transmitter flange DN80 / PN16		ZSF8016

Mounting 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; plastic	
Seal insert	material: TPE (ingress protection IP 68)	
Hole pattern	according to DIN 2507	
Version	**Size (in mm)**	**Weight**
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
Ordering type		**Ordering code**
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



Ordering code LMK 458H

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			Code
Pressure			
in bar (gauge)			7 6 E
in bar (absolue)[1]			7 6 H
in m H_2O			7 6 F
Input	**[mH_2O]**	**[bar]**	
	0 … 0,6	0 … 0,06	0 6 0 0
	0 … 1,6	0 … 0,16	1 6 0 0
	0 … 4	0 … 0,4	4 0 0 0
	0 … 10	0 … 1	1 0 0 1
	0 … 20	0 … 2	2 0 0 1
	0 … 50	0 … 5	5 0 0 1
	0 … 100	0 … 10	1 0 0 2
	0 … 200	0 … 20	2 0 0 2
Customer			9 9 9 9
Housing material			
Stainless steel 1.4404 (316L)			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
Diaphragm material			
Ceramic Al_2O_3 96 %			2
Ceramic Al_2O_3 99,9 %			C
Customer			9
Output			
HART® communication 4 … 20 mA / 2-wire			H
HART® communication Intrinsic safety 4 … 20 mA / 2-wire			I
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			
0,1 % (P_N ≥ 1 bar)			1
0,2 % (P_N < 1 bar)			B
Customer			9
Cable length			
in m			9 9 9
Special version			
Standard			0 0 0
R 1" thread - Prepared for mounting v with stainless steel pipe[5]			5 0 2
Customer			9 9 9

Accessories for submersible transmitter	
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
Software for the intelligent pressure transmitters	
Communication device ADAPT-5 (RS 232 / HART incl. USB)	
(ADAPT - 5 , INT-702, software included)	

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.
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1 nominal pressure ranges sealed gauge and 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 possible for probes in stainless steel; stainless steel pipe is not part of the supply