SensorsONE
Measurement Instrumentation Products

LMK 458H

Probe with HART®-communication for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % FSO

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 zone 0
- 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 certificated 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

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 ≥ 160 mbar	TD ≤ 1:5 TD > 1:5	≤ ± 0.2 % FSO ≤ ± [0.2 + 0.03 x TD] % FSO	TD_{max} = 1:10
	P_N < 160 mbar		≤ ± [0.2 + 0.1 x TD] % FSO	TD_{max} = 1:3
	P_N ≥ 1 bar	TD ≤ 1:5 TD > 1:5	≤ ± 0.1 % FSO ≤ ± [0.1 + 0.02 x TD] % FSO	TD_{max} = 1: 10
Permissible load	R_{max} = [(V_S - $V_{S\ min}$) / 0.02 A] Ω	load at HART®-communication: R_{min} = 250 Ω		
Long term stability	≤ ± (0.1 x turn-down) FSO / year at reference conditions			
Influence effects	supply: 0.05 % FSO / 10 V	permissible load: 0.05 % FSO / 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 % FSO - turn down of span: max. 1:10			
[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] % FSO		
TC, average	≤ ± [0.02 x turn-down] % FSO / 10 K		
in compensated range	-20 … 80 °C		
Permissible temperatures	medium: -25 … 85 °C	electronics / environment: -25 … 85 °C	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			

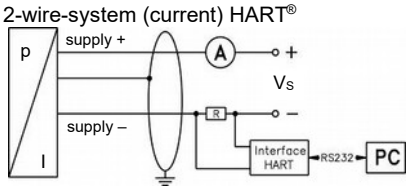
Mechanical stability	
Vibration	4 g (according to DNV▪GL: class B, curve 2 / basis: DIN EN 60068-2-6)
Electrical connection	
Cable	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed)
Materials (media wetted)	
Housing	standard: stainless steel 1.4404 (316L) option: CuNi10Fe1Mn (resistant against sea water) others on request
Cable sheath	TPE -U (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
Miscellaneous	
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
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 number of certificate: TAA00001GM humidity: B enclosure: D electromagnetic compatibility: B

Explosion protection	
Approval DX15A-LMK 458H	IBExU 10 ATEX 1186 X zone 0 [5]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC 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®

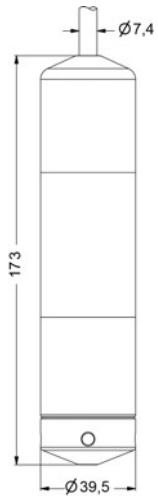


Pin configuration

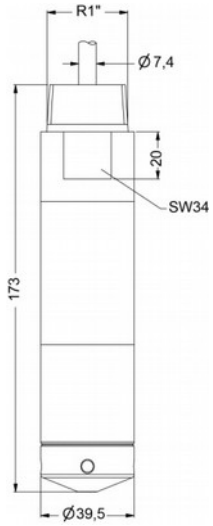
Electrical connection	cable colours (IEC 60757)
Supply V_S + Supply V_S –	wh (white) bn (brown)
Shield	gnye (green-yellow)

Dimensions (in mm)

probe version



stainless steel / CuNiFe



prepared for mounting
with stainless steel pipe

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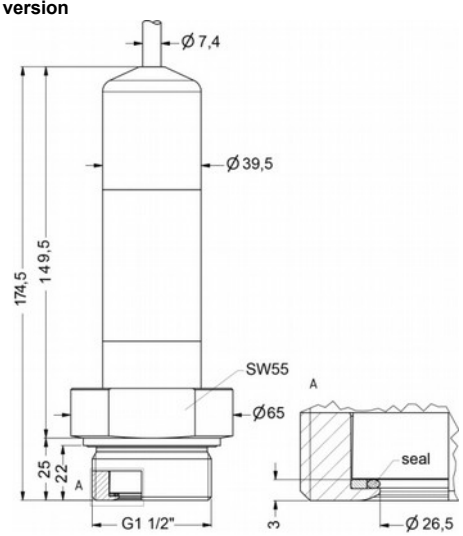
Windows® is a registered trade mark of Microsoft Corporation

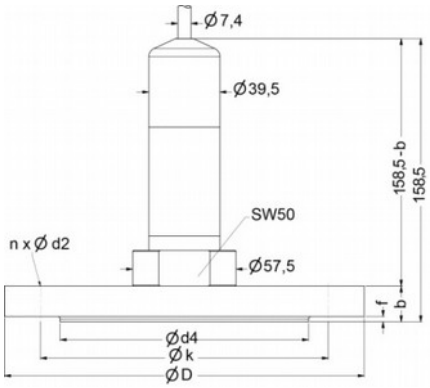
Dimensions (in mm)

screw-in version



stainless steel / CuNiFe

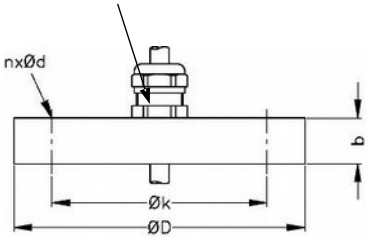
flange version



stainless steel / CuNiFe

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	

cable gland M16x1.5 with
seal insert (for cable-∅ 4 ... 11 mm)



Ordering code LMK 458H

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

Pressure				
in bar, gauge			7 6 E	
in bar, sealed gauge [1]			7 6 G	consult
in bar, absolute [1]			7 6 H	
in mH_2O			7 6 F	
Input	[mH_2O]	[bar]		
	0.60	0.06	0 6 0 0	
	1.60	0.16	1 6 0 0	
	4.00	0.40	4 0 0 0	
	10	1.0	1 0 0 1	
	20	2.0	2 0 0 1	
	50	5.0	5 0 0 1	
	100	10	1 0 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				
Submersible transmitter [2]			1	
Flange transmitter [2]			3	
Screw-in transmitter [2]			5	
Diaphragm				
Ceramics Al_2O_3 96%			2	
Ceramics Al_2O_3 99.9%			C	
customer			9	consult
Output				
HART®-communication 4 … 20 mA / 2-wire			H	
HART®-communication Intrinsic safety 4 … 20 mA / 2-wire			I	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
FFKM			7	
customer			9	consult
Electrical connection				
TPE-U-cable [3]			4	
customer			9	
Accuracy				
$P_N \geq 1$ bar	0.1 %		1	
$P_N < 1$ bar	0,2 %		B	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
prepared for mounting with st. steel pipe [2, 4]			5 0 2	
customer			9 9 9	consult

[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] shielded cable with integrated air tube for atmospheric reference
[4] stainless steel pipe is not part of the supply

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