

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 cmH₂O up to 0 ... 200 mH₂O

Output signals

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

Special characteristics

- ▶ shipping approvals acc. to:
Lloyd's Register (LR), Germanischer Lloyd (GL), Det Norske Veritas (DNV)
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 Al₂O₃ 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 ₂ O]	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	≤ ± 0.2 % FSO					TD _{max} = 1:10	
		TD > 1:5	≤ ± [0.2 + 0.03 x TD] % FSO						
	P _N < 160 mbar						≤ ± [0.2 + 0.1 x TD] % FSO		
	P _N ≥ 1 bar	TD ≤ 1:5	≤ ± 0.1 % FSO					TD _{max} = 1:10	
		TD > 1:5	≤ ± [0.1 + 0.02 x TD] % FSO						
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			- Germanischer Lloyd (GL)			- Det Norske Veritas (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 GL: curve 2 / according to DNV: Class B / 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 ₂ O ₃ 96 %		option: ceramics Al ₂ O 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			
Germanischer Lloyd (GL)	D, EMC 1					number of certificate: 19 777 - 11 HH			
Det Norske Veritas (DNV)	temperature: D		humidity: B			vibration: B			number of certificate: A-12144
	electromagnetic compatibility: B								

LMK 458H

Hydrostatic Probe

Technical Data

IS-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	$U_i = 28\text{ V}$, $I_i = 93\text{ mA}$, $P_i = 660\text{ mW}$, $C_i = 94,6\text{ nF}$; $L_i = 0\text{ }\mu\text{H}$; the supply connections have an inner capacity of max. 110 nF opposite the enclosure
Permissible temperatures for environment	in zone 0: $-20 \dots 60\text{ }^\circ\text{C}$ with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: $-25 \dots 70\text{ }^\circ\text{C}$
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 $\mu\text{H}/\text{m}$

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

Wiring diagrams	Pin configuration	
<p>2-wire-system (current) HART[®]</p>	Electrical connection	cable colours (IEC 60757)
	Supply V_S+ Supply V_S-	wh (white) bn (brown)
	Shield	gnye (green-yellow)

Dimensions (in mm)	
<p>probe version</p> <p>stainless steel / CuNiFe</p>	<p>prepared for mounting with stainless steel pipe</p>

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Windows[®] is a registered trade mark of Microsoft Corporation

Dimensions (in mm)	
<p>screw-in version</p> <p>stainless steel / CuNiFe</p>	<p>flange version</p> <p>stainless steel / CuNiFe</p>

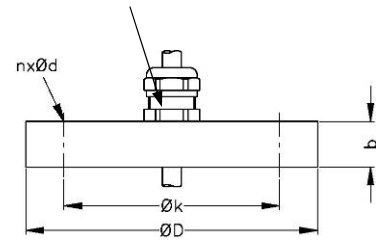
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Hydrostatic Probe

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

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



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Ordering code LMK 458H

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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 ₂ O		7	6	F																	
Input		[mH ₂ O]	[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															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 ₂ O ₃ 96%																					2
Ceramics Al ₂ O ₃ 99.9%																					C
customer																					9
Output																					
HART®-communication																					H
4 ... 20 mA / 2-wire																					
HART®-communication																					I
Intrinsic safety 4 ... 20 mA / 2-wire																					
customer																					9
Seals																					
FKM																					1
EPDM																					3
FFKM																					7
customer																					9
Electrical connection																					
TPE-U-cable ³																					4
customer																					9
Accuracy																					
P _N ≥ 1 bar																					1
P _N < 1 bar																					B
customer																					9
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

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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