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

- 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 gases and dusts
- 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 ≤ 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
	$P_N \geq$ 1 bar	TD ≤ 1:5 TD > 1:5	≤ ± 0.1 % FSO ≤ ± [0.1 + 0.02 x TD] % FSO	TD_{max} = 1: 10
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$	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 outlet with sheat material[5]	PUR (-25 … 70 °C) black FEP (-25 … 70 °C) black TPE (-25 … 85 °C) blue others on request

[5] shielded cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)		
Housing	standard: stainless steel 1.4404 (316L) others on request	option: CuNi10Fe1Mn (resistant against sea water)
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		
Germanischer Lloyd (GL)	D, EMC 1	number of certificate: 19 777 - 11 HH
Det Norske Veritas (DNV)	temperature: D humidity: B electromagnetic compatibility: B	vibration: B number of certificate: A-12144

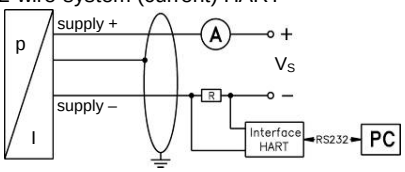
Miscellaneous	
Cable protection	stainless steel pipe for probe in stainless steel: available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)
Ingress protection	IP 68
Current consumption	max. 21 mA
Weight	min. 650 g (without cable)
CE-conformity	EMC Directive: 2004/108/EC

IS-protection	
Approval DX15A-LMK 458H	IBExU 10 ATEX 1186 X zone 0 [6]: II 1G Ex ia IIB T4 zone 20: II 1D Ex iaD 20 T85°C
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 1G Ex ia IIC T4" (zone 0)

Wiring diagrams

2-wire-system (current) HART®

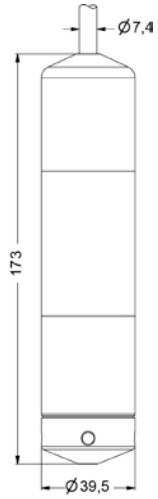


Pin configuration

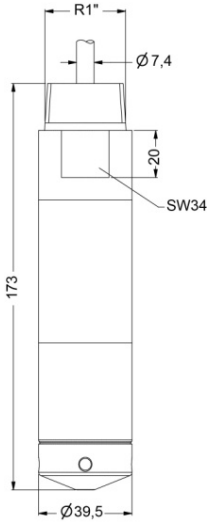
Electrical connection	cable colours (DIN 47100)
Supply V_S+	wh (white)
Supply V_S–	bn (brown)
Shield	ye/gn (yellow / green)

Dimensions (in mm)

probe version



stainless steel / CuNiFe



prepared for mounting
with stainless steel pipe

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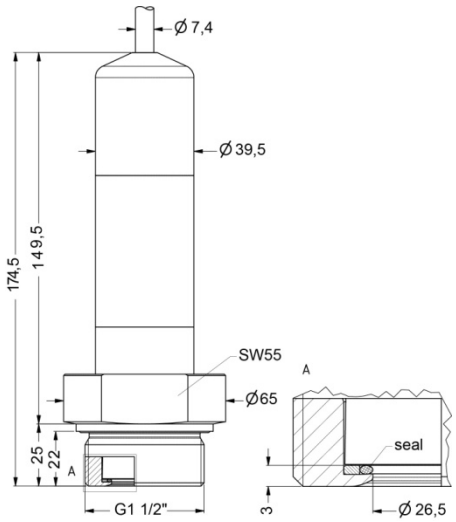
Windows® is a registered trade mark of Microsoft Corporation

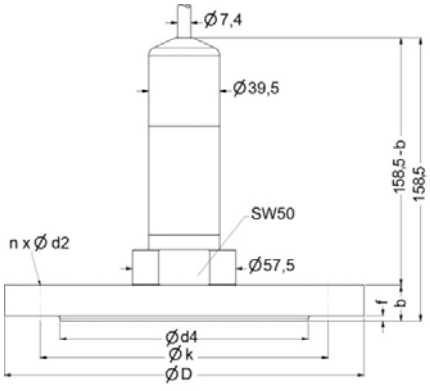
Dimensions (in mm)

screw-in version



stainless steel / CuNiFe

flange version

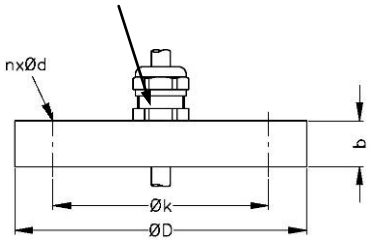


stainless steel / CuNiFe

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-∅ 4 ... 11 mm)



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BD|SENSORS
pressure measurement

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			
PUR-cable [3]		2	
FEP-cable [3]		3	
TPE-cable [3]		4	
customer		9	
Accuracy			
0.1 % [5]		1	
customer		9	consult
Cable length			
in m		9 9 9	
Special version			
standard		0 0 0	
prepared for mounting with st. steel pipe [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
[5] only possible for $P_N \geq 1$ bar

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14.02.2013

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