



## 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<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

#### Output signals

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

#### Special characteristics

- ▶ diameter 39.5 mm
- ▶ permissible temperatures up to 125 °C
- ▶ high overpressure resistance
- ▶ high long-term stability

#### Optional versions

- ▶ diaphragm Al<sub>2</sub>O<sub>3</sub> 99.9 %
- ▶ different housing materials (stainless steel, CuNiFe)
- ▶ IS-version zone 0
- ▶ 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 of the certification by Germanischer Lloyd predestined 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



# LMK 458

Hydrostatic Probe

Technical Data

Pressure ranges																
Nominal pressure <sup>1</sup>	[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 <sub>2</sub> O]	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							
<sup>1</sup> 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 <sub>S</sub> = 9 ... 32 V <sub>DC</sub>								V <sub>S rated</sub> = 24 V <sub>DC</sub>							
Option IS-version	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>								V <sub>S rated</sub> = 24 V <sub>DC</sub>							
Performance																
Accuracy <sup>2</sup>	standard: ≤ ± 0.25 % FSO								option: for P <sub>N</sub> ≥ 0.6 bar <sup>3</sup> : ≤ ± 0.1 % FSO							
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω															
Long term stability	≤ ± 0.1 % FSO / year at reference conditions															
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															
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)																
<sup>3</sup> 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: -25 ... 125 °C (depending on cable sheath / seal) storage: -40 ... 125 °C															
Electrical protection <sup>4</sup>																
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)															
<sup>4</sup> 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	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 <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %															
Cable sheath	standard: TPE (-25 ... 125 °C) dark blue (resistant against sea water, halogen free) option: FEP (-25 ... 70 °C) black (resistant against sea water) PUR (-25 ... 70 °C) black others on request															
Miscellaneous																
Optionally 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															
Option Pt 100 temperature element <sup>5</sup>																
Temperature range	-25 ... 125 °C															
Connection temperature element	3-wire															
Resistance	100 Ω at 0 °C															
Temperature coefficient	3850 ppm/K															
Supply I <sub>S</sub>	0.3 ... 1.0 mA <sub>DC</sub>															
IS-protection																
Approval DX14A-LMK 458	zone 0: II 1G Ex ia IIB T4															
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 105 nF; L <sub>i</sub> = 5 μH; the supply connections have an inner capacity of max. 140 nF opposite the enclosure															
Permissible temperatures for environment	in zone 0 <sup>6</sup> : -20 ... 60 °C with p <sub>atm</sub> 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															
<sup>5</sup> only for 4...20mA, cable length max. 5m																
<sup>6</sup> for optional stainless steel pipe the following designation is valid: "II 1 G Ex ia IIC T4" (zone 0)																

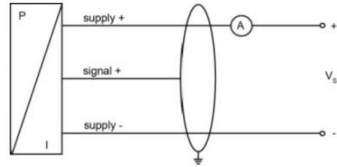
# LMK 458

Hydrostatic Probe

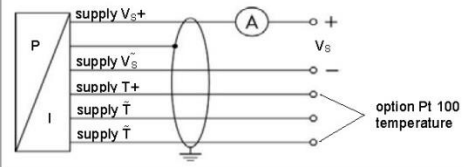
Technical Data

## Wiring diagrams

2-wire-system (current)



2-wire-system (current) with Pt 100



## Pin configuration

Electrical connection

cable colours (DIN 47100)

Supply  $V_S+$   
Supply  $V_S-$   
Option Pt 100 temperature element:  
Supply T+ (with Pt 100)  
Supply T- (with Pt 100)  
Supply T- (with Pt 100)

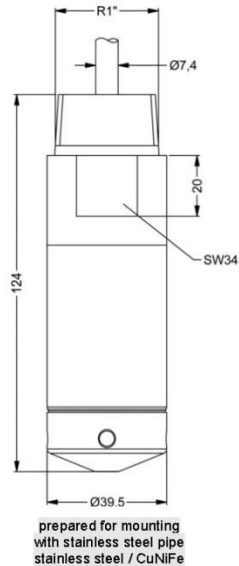
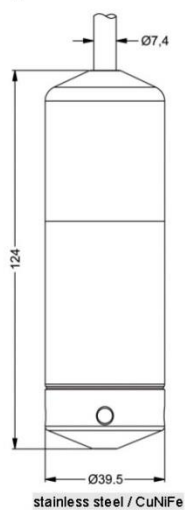
wh (white)  
bn (brown)  
  
ye (yellow)  
gy (grey)  
pk (pink)

Shield

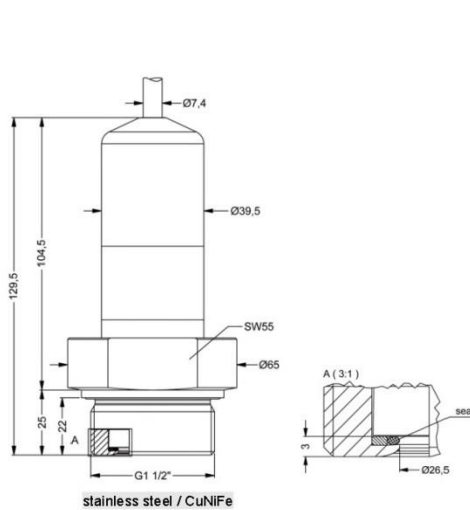
gn/ye (green / yellow)

## Dimensions (in mm)

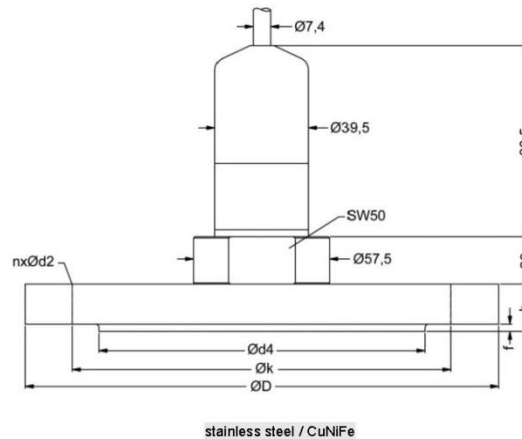
probe versions



screw-in version



flange version



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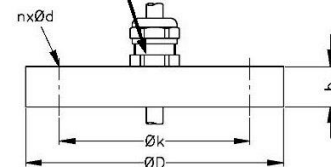
Hydrostatic Probe

Accessories

Probe flange for flange version	
<b>Technical Data</b>	
Suitable for	LMK 382, LMK 382H, LMK 458
Flange material	stainless steel 1.4404 (316L)
Hole pattern	according to DIN 2507
<b>Version</b>	<b>Size (in mm)</b>
DN25 / PN40	D = 115, k = 85, d4 = 68, b = 18, f = 2, n = 4, d2 = 14
DN50 / PN40	D = 165, k = 125, d4 = 102, b = 20, f = 3, n = 4, d2 = 18
DN80 / PN16	D = 200, k = 160, d4 = 138, b = 20, f = 3, n = 8, d2 = 18
<b>Ordering type</b>	
Probe flange DN25 / PN40	ZSF2540
Probe flange DN50 / PN40	ZSF5040
Probe flange DN80 / PN16	ZSF8016

Assembling flange with cable gland	
<b>Technical Data</b>	
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
<b>Version</b>	<b>Size (in mm)</b>
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
<b>Ordering type</b>	
Assembling Flange DN25 / PN40	ZMF2540
Assembling Flange DN50 / PN40	ZMF5040
Assembling Flange DN80 / PN16	ZMF8016

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



## Ordering code LMK 458

**LMK 458**

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<b>Pressure</b>																	
	in bar, gauge	7	6	5													
	in bar, absolute <sup>1</sup>	7	6	8													
	in bar, sealed gauge	7	6	7										consult			
	in mH <sub>2</sub> O	7	6	6													
<b>Input</b>		[mH <sub>2</sub> O]	[bar]														
	0.40	0.04		0	4	0	0										
	0.60	0.06		0	6	0	0										
	1.0	0.10		1	0	0	0										
	1.6	0.16		1	6	0	0										
	2.5	0.25		2	5	0	0										
	4.0	0.40		4	0	0	0										
	6.0	0.60		6	0	0	0										
	10	1.0		1	0	0	1										
	16	1.6		1	6	0	1										
	25	2.5		2	5	0	1										
	40	4.0		4	0	0	1										
	60	6.0		6	0	0	1										
	100	10		1	0	0	2										
	160	16		1	6	0	2										
	200	20		2	0	0	2										
	customer			9	9	9								consult			
<b>Housing</b>																	
	Stainless steel 1.4404 (316L)						1										
	Copper-Nickel-alloy (CuNi10Fe1Mn)						K										
	customer						9							consult			
<b>Design</b>																	
	Probe						1										
	Flange version <sup>2</sup>						3										
	Screw-in version						5										
<b>Diaphragm</b>																	
	Ceramics Al <sub>2</sub> O <sub>3</sub> 96%								2								
	Ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%								C								
	customer								9					consult			
<b>Output</b>																	
	4 ... 20 mA / 2-wire								1								
	Intrinsic safety 4 ... 20 mA / 2-wire								E								
	customer								9					consult			
<b>Seals</b>																	
	FKM								1								
	EPDM								3								
	FFKM <sup>3</sup>								7								
	customer								9					consult			
<b>Electrical connection</b>																	
	PUR-cable										2						
	FEP-cable										3						
	TPE-cable										4						
	customer										9			consult			
<b>Accuracy</b>																	
	standard		0.25 %									2					
	option für P <sub>N</sub> ≥ 0.6 bar:		0.1 %									1					
	customer											9		consult			
<b>Cable length</b>																	
	in m											9	9	9			
<b>Special version</b>																	
	standard												0	0	0		
	with temperature sensor Pt 100													0	1	3	
	prepared for mounting with st. steel pipe <sup>4</sup>														5	0	2
	customer														9	9	9

<sup>1</sup> nominal pressure ranges sealed gauge and absolute from 1 bar

<sup>2</sup> mounting accessories are not part of supply and have to be ordered separately

<sup>3</sup> min. permissible temperature from -15°C

<sup>4</sup> stainless steel pipe is not part of the supply