

# AHD-S 201

## Hydrostatic Level Transmitter for Shipbuilding and Offshore

# AHD-S 201



### Hydrostatic Probe For Marine And Offshore

### Ceramic Diaphragm

Accuracy according to IEC 60770:  
standard: 0.25% FSO  
option: 0.1% FSO

Hydrostatic Level Transmitter

#### Nominal pressure

from 0 ... 40 cmH<sub>2</sub>O  
up to 0 ... 200 mH<sub>2</sub>O

#### Special characteristics

- ▶ diameter 39.5 mm
- ▶ permissible temperatures up to 125 °C
- ▶ high overpressure resistance
- ▶ chemical 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 AHD-S 201 is a self-developed capacitive ceramic sensor element, which offers a high overload resistance and medium compatibility.

#### Preferred areas of use are

##### Shipbuilding / Offshore



- ▶ ballast tanks
- ▶ monitoring of a ship's position and draught
- ▶ level measurement in ballast and storage tanks

##### Water



- ▶ drinking water abstraction
- ▶ desalination plant

AHD-S 201



<b>Pressure ranges</b>																
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	40	40
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																
<b>Output signal / Supply</b>																
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>							V <sub>S</sub> rated: 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</sub> rated: 24 V <sub>DC</sub>								
<b>Performance</b>																
Accuracy <sup>2</sup>	standard: $\leq \pm 0.25$ % FSO							option for P <sub>N</sub> $\geq 0.6$ bar <sup>3</sup> : $\leq \pm 0.1$ % FSO								
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02] Ω															
Long term stability	$\leq \pm 0.1$ % FSO / year															
Influence effects	supply: 0.05 % FSO / 10V							permissible load: 0.05 % FSO / kΩ								
Mean response time	< 200 ms							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 $\leq \pm 0.25$ % FSO.																
<b>Thermal errors / Permissible temperatures</b>																
Thermal error	$\leq \pm 0.1$ % 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															
<b>Electrical protection <sup>4</sup></b>																
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																
<b>Mechanical stability</b>																
Vibration	4 g (according to GL: curve 2 / according to DNV: Class B / basis: IEC 60068-2-6)															
<b>Electrical connection</b>																
Cable outlet	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges sealed gauge and absolute, the air tube is plugged)															
<b>Materials</b>																
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															
<b>Miscellaneous</b>																
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															
<b>Option Pt 100 temperature element (only with standard version)</b>																
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 DC															

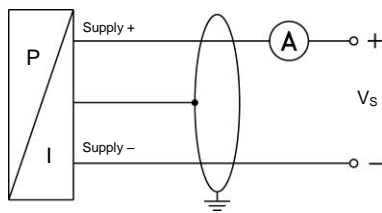
### Wiring diagrams

Approval DX14A-LMK 458	zone 0: II 1 G Ex ia IIB T4 zone 20: II 1 D IP6X T=85°C
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, 140 nF opposite GND
Permissible temperatures for environment	in zone 0 <sup>5</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

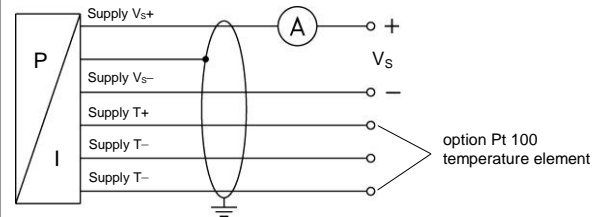
<sup>5</sup> for optional stainless steel pipe the following designation is valid: "II 1 G Ex ia IIC T4" (zone 0)

### Wiring diagrams

#### 2-wire-system (current)



#### 2-wire-system (current) with Pt 100

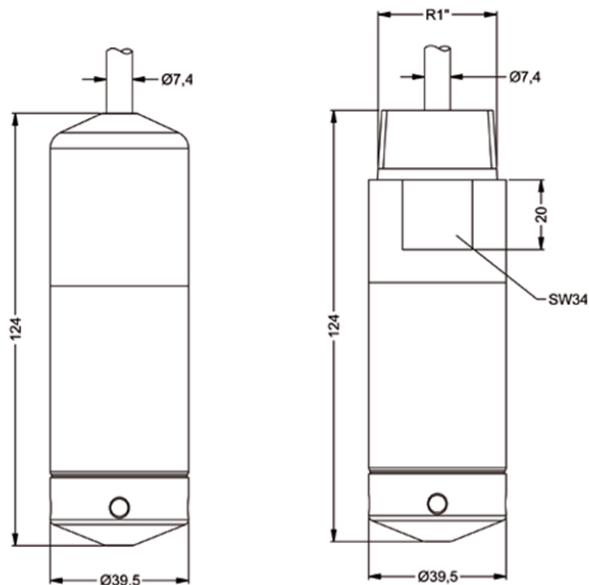


### Pin configuration

Electrical connection	cable colours (DIN 47100)
Supply V <sub>S</sub> +	wh (white)
Supply V <sub>S</sub> -	bn (brown)
option Pt 100 temperature element:	
Supply T+ (with Pt 100)	ye (yellow)
Supply T- (with Pt 100)	gr (grey)
Supply T- (with Pt 100)	pn (pink)
Shield	gn/ye (green / yellow)

### Dimensions (in mm)

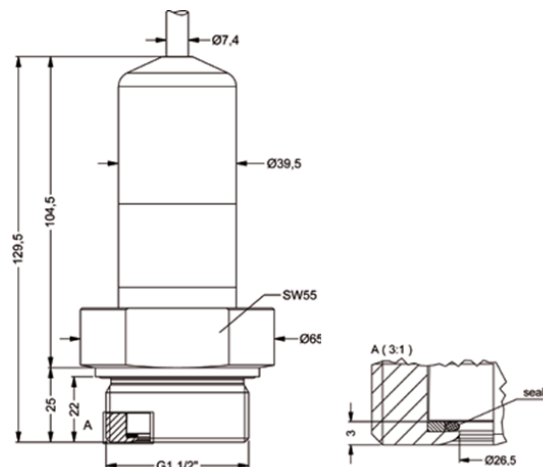
#### probe versions



stainless steel / CuNiFe

prepared for mounting with stainless steel pipe  
stainless steel / CuNiFe

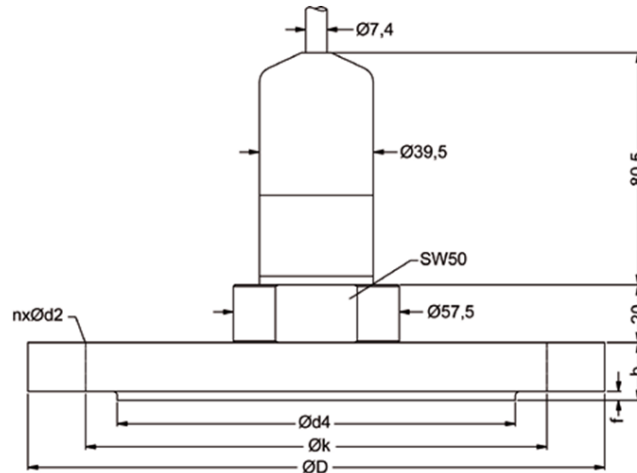
#### screw-in version



stainless steel / CuNiFe

**Dimensions (in mm)**

**flange version**



stainless steel / CuNiFe

Accessories

Probe flange for flange version	
<b>Technical Data</b>	
Suitable for	LMK 382, LMK 382H, LMK 458
Flange material	stainless steel 1.4404 (316Ti)
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)

