LMK 382

Stainless Steel Probe

Ceramic Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO

Nominal pressure

from 0 ... 40 cmH_2O up to 0 ... 200 mH_2O

Output signals

2-wire: 4 ... 20 mA
3-wire: 0 … 10 V
others on request

Special characteristics

- diameter 39.5 mm
- especially for sewage, viscous and pasty media

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- temperature element Pt 100
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al_2O_3
- different kinds of cables and elastomers

The stainless steel probe LMK 382 has been designed for continuous level measurement in waste water, polluted and higher viscosity media.

Basic element is a robust and high overpressure capable capacitive ceramic sensor which is suitable e. g. for low levels.

Preferred areas of use are

Water
drinking water abstraction

Sewage
waste water treatment
water recycling

Fuel and oil
level monitoring in open tanks with low filling heights
fuel storage
tank farms / biogas plants

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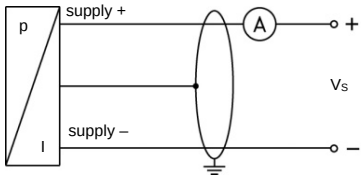
Input pressure range																
Nominal pressure gauge [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Max. ambient pressure (housing): 40 bar															

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Option temperature element Pt 100 [1]		
Temperature range	-25 … 125 °C	
Connectivity technology	3-wire	max. voltage 10 V_{DC}, in intrinsically safe circuit 30 V_{DC}
Resistance	100 Ω at 0 °C	max. current 2 mA, in intrinsically safe circuit 54 mA
Temperature coefficient	3850 ppm/K	max. power 10 mW, in intrinsically safe circuit 405 mW
Supply I_S	0.3 … 1.0 mA $_{DC}$	
[1] only in combination with 4 ... 20 mA / 2-wire (standard and IS-version)		
Performance		
Accuracy [2]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Turn-on time	700 msec	
Mean response time	< 200 msec	measuring rate 5/sec
Max. response time	380 msec	
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span)		
Tolerance band	≤ ± 1 % FSO	
in compensated range	-20 … 80 °C	
Permissible temperatures		
Permissible temperatures	medium / electronics / environment / storage: -25 ... 125 °C	
Electrical protection [3]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[3] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection		
Cable with sheath material [4]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-25 … 70 °C) black Ø 7.4 mm FEP [5] (-25 … 70 °C) black Ø 7.4 mm TPE-U (-25 … 125 °C) blue Ø 7.4 mm TPE-U [6] (-25 … 125 °C) red Ø 9.0 mm	
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter	
[4] shielded cable with integrated ventilation tube for atmospheric pressure reference *[5] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected* *[6] only in combination with IS version (explosion protection) and temperature element Pt 100*		
Materials (media wetted)		
Housing	stainless steel 1.4404 (316 L)	
Seals	FKM, FFKM, EPDM others on request	
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP, TPE-U	

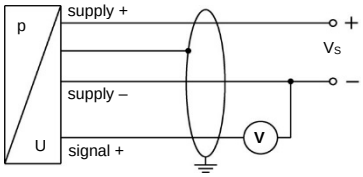
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval DX14-LMK 382	IBExU05ATEX1070 X zone 0 [7]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T110 °C Da
Safety technical maximum values (pressure)	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, L_i ≈ 0 µH, C_{gnd} = 27 nF
Safety technical maximum values (temperature)	U_i = 30 V, I_i = 54 mA, P_i = 405 mW, C_i = 0 nF, L_i = 0 µH (temperature element Pt 100)
Permissible media temperature	in zone 0: -10 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -10 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 220 pF/m cable inductance: signal line/shield also signal line/signal line: 1.5 µH/m
[7] for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)	
Miscellaneous	
Option cable protection for probes	prepared for mounting with stainless steel pipe
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagrams

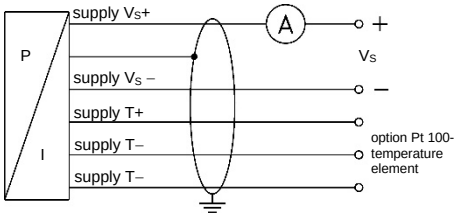
2-wire-system (current)



3-wire-system (voltage)



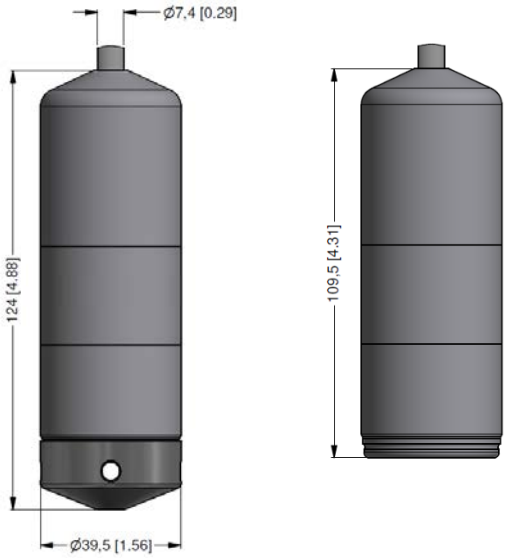
2-wire-system current (pressure) / 3-wire-system (temperature Pt 100)



Pin configuration		
Electrical connection		cable colours (IEC 60757)
	Supply V_S+	WH (white)
	Supply V_S–	BN (brown)
for Pt 100:	Supply T+	YE (yellow)
	Supply T–	GY (grey)
	Supply T–	PK (pink)
for 3-wire:	Signal +	GN (green)
	Shield	GNYE (green-yellow)

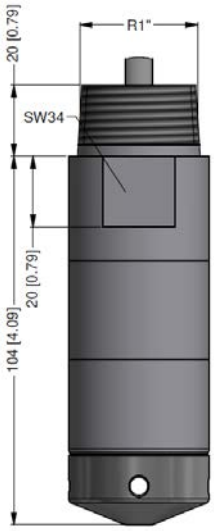
Dimensions (mm / in)

standard



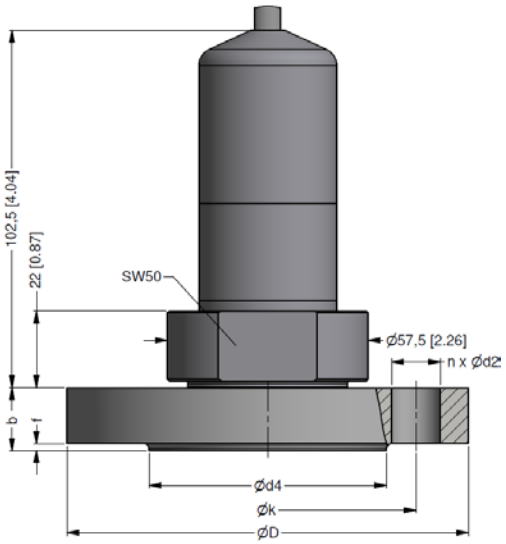
protection cap removable

option



prepared for mounting with stainless steel pipe

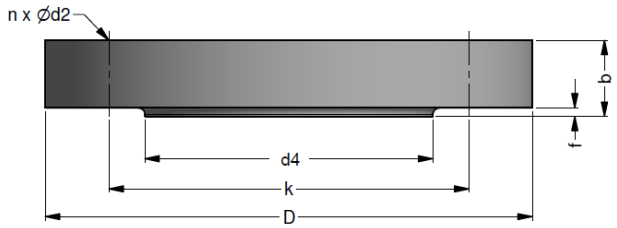
flange version



⇨ transmitter flange is not part of supply and has to be ordered separately

⇨ cable diameter Ø9 mm for TPE-U cable (red), drawings for option with Pt 100 on request

Transmitter flange for flange version

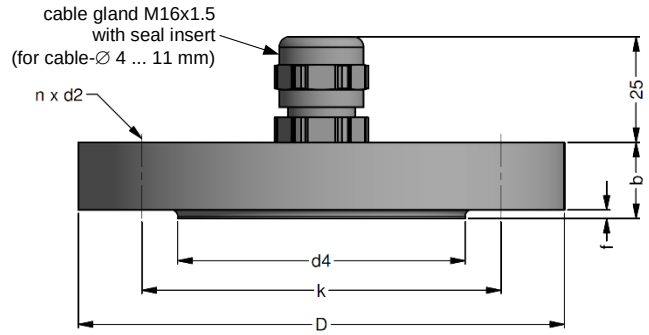


dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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

Ordering type	**Ordering code**	**Weight**
Transmitter flange DN25 / PN40	ZSF2540	1.2 kg
Transmitter flange DN50 / PN40	ZSF5040	2.6 kg
Transmitter flange DN80 / PN16	ZSF8016	4.1 kg

Mounting flange with cable gland



dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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 (303); plastic
Seal insert	material: TPE (ingress protection IP 68)	
Hole pattern	according to DIN 2507	

Ordering type	**Ordering code**	**Weight**
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016	4.8 kg

Terminal clamp

Technical data		
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)	
Dimensions (mm)	174 x 45 x 32	
Hook diameter	20 mm	

Ordering type	**Ordering code**	**Weight**
Terminal clamp, steel, zinc plated	Z100528	approx. 160 g
Terminal clamp, stainless steel 1.4301 (304)	Z100527	

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BD|SENSORS
pressure measurement

Ordering code LMK 382

LMK 382 □□□-□□□□-□-□-□-□-□□-□-□□□-□□□

Pressure													
		in bar	565										
		in mH_2O	566										
Input	**[mH_2O]**	**[bar]**											
	0.4	0.04		0400									
	0.6	0.06		0600									
	1.0	0.10		1000									
	1.6	0.16		1600									
	2.5	0.25		2500									
	4.0	0.40		4000									
	6.0	0.60		6000									
	10	1.0		1001									
	16	1.6		1601									
	25	2.5		2501									
	40	4.0		4001									
	60	6.0		6001									
	100	10		1002									
	160	16		1602									
	200	20		2002									
		customer		9999									consult
Housing													
		stainless steel 1.4404 (316L)			1								
Diaphragm													
		ceramics Al_2O_3 96 %				2							
		ceramics Al_2O_3 99.9 %				C							
Output													
		4 … 20 mA / 2-wire					1						
		0 … 10 V / 3-wire					3						
		intrinsic safety 4 … 20 mA / 2-wire					E						
Seal													
		FKM						1					
		EPDM						3					
		FFKM						7					
Electrical connection / cable length													
		PVC-cable (grey, Ø 7.4 mm) [1]											
		3 m							1		003		
		5 m							1		005		
		10 m							1		010		
		15 m							1		015		
		special length in m							1		999		
		PUR-cable (black, Ø 7.4 mm) [1]											
		3 m							2		003		
		5 m							2		005		
		10 m							2		010		
		15 m							2		015		
		special length in m							2		999		
		FEP-cable (black, Ø 7.4 mm) [1]											
		5 m							3		005		
		10 m							3		010		
		special length in m							3		999		
		TPE-U-cable (blue, Ø 7.4 mm) [1]											
		special length in m							4		999		
		TPE-U-cable (red, Ø 9.0 mm) [1,2]											
		special length in m							42		999		
Accuracy													
standard		0.35 % FSO								3			
option		0.25 % FSO								2			
Special version													
		standard										000	
		with temperature sensor Pt 100 [3]										013	
		prepared for mounting with stainless steel pipe [4]										502	
		flange version [5]										510	
		customer										999	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference
[2] only in combination with IS version (explosion protection) and temperature element Pt 100
[3] only in combination with 4 ... 20 mA / 2-wire (standard or IS-version)
[4] stainless steel pipe is not part of the supply
[5] mounting accessories are not part of supply and have to be ordered separately

01.04.2022

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_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- diameter 39.5 mm
- LR-certificate (Lloyd´s Register)
- DNV-approval (Det Norske Veritas)
- ABS-certificate (American Bureau of Shipping)
- CCS-certificate (China Classification Society)
- high overpressure resistance
- high long-term stability

Optional versions

- diaphragm Al_2O_3 99.9 %
- different housing materials (stainless steel, CuNiFe)
- IS-version Ex ia = intrinsically safe for gas
- 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 certificated for shipbuilding and offshore applications.

A permissible operating temperature 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

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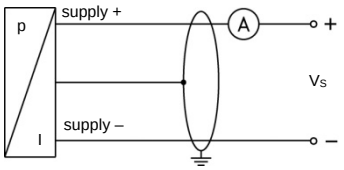
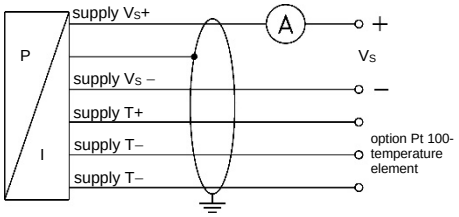
Pressure ranges																
Nominal pressure gauge [1] [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20	
Level [mH2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200	
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45	
Permissible vacuum [bar]	-0.2		-0.3		-0.5				-1							
Max. ambient pressure (housing): 40 bar																
[1] available in gauge and absolute; nominal pressure ranges absolute from 1 bar																
Output signal / Supply																
Standard	2-wire: 4 ... 20 mA / V_S = 10 ... 32 V_{DC}								$V_{S\ rated}$ = 24 V_{DC}							
Option IS-version	2-wire: 4 ... 20 mA / V_S = 12 ... 28 V_{DC}								$V_{S\ rated}$ = 24 V_{DC}							
Performance																
Accuracy [2]	standard: ≤ ± 0.25 % FSO								option: for p_N ≥ 0.6 bar [3]: ≤ ± 0.1 % FSO							
Permissible load	R_{max} = [(V_S – $V_{S\ min}$) / 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															
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)																
[3] under the influence of disturbance burst according to EN 61000-4-4 (2004) +2 kV accuracy decreased to ≤ ± 0.25 % FSO																
Thermal effects (offset and span) / Permissible temperatures																
Tolerance band	≤ ± 1 % FSO								in compensated range -20 … 80 °C							
Permissible temperatures	medium / electronics / environment: -25 ... 125 °C								storage: -40 ... 125 °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 (Det Norske Veritas)															
[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: class B, curve 2 / basis: DIN EN 60068-2-6)															
Electrical connection																
Cable with sheath material [5]	TPE-U blue Ø 7.4 mm															
Bending radius	static installation: 10-fold cable diameter								dynamic application: 20-fold cable diameter							
[5] shielded cable with integrated ventilation tube for atmospheric pressure reference (for nominal pressure ranges absolute, the ventilation tube is closed)																
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_2O_3 96 %								option: ceramics Al_2O_3 99.9 %							
Protection cap	POM-C															
Cable sheath	TPE-U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)															
Miscellaneous																
Option cable protection for probes in stainless steel	prepared for mounting with stainless steel pipe															
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															
Option Pt 100 temperature element [6]																
Temperature range	-25 ... 125°C															
Connection temperature element	3-wire															
Resistance	100 Ω at 0°C															
Temperature coefficient	3850 ppm/K															
Supply I_S	0.3 ... 1.0 mA $_{DC}$															
[6] not possible in combination with IS-version																
Category of the environment																
Lloyd´s Register (LR)	EMV1, EMV2, EMV3, EMV4								number of certificate: 13/20056							
Det Norske Veritas (DNV)	temperature: D vibration: B number of certificate: TAA00001GM humidity: B enclosure: D electromagnetic compatibility: B															
Explosion protection [7]																
Approval DX14A-LMK 458	IBExU 07 ATEX 1180 X								zone 0 [8]: II 1G Ex ia IIB T4 Ga							
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 105 nF; L_i = 0 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															
[7] not possible in combination with Pt 100 temperature element																
[8] 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 (pressure) / 3-wire-system (temperature)

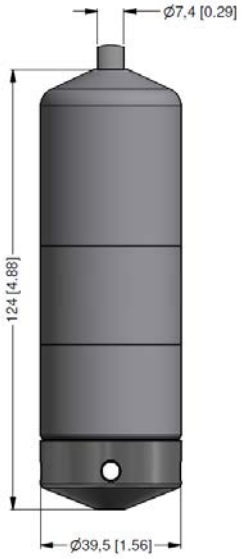


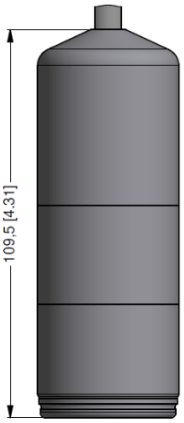
Pin configuration

Electrical connection	cable colours (IEC 60757)
Supply V_S + Supply V_S – Option Pt 100 temperature element: Supply T+ Supply T– Supply T–	WH (white) BN (brown) YE (yellow) GY (grey) PK (pink)
Shield	GNYE (green-yellow)

Dimensions for housing in stainless steel and CuNiFe (mm / in)

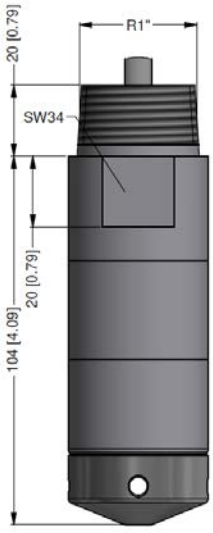
probe





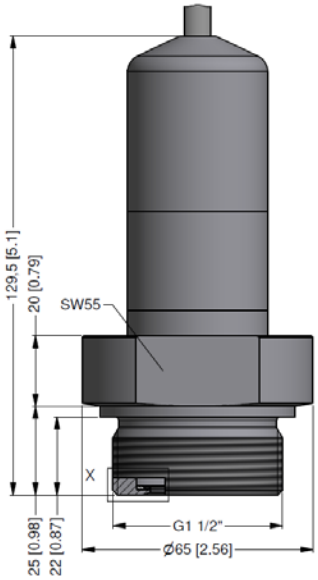
protection cap removable

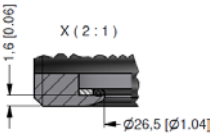
option



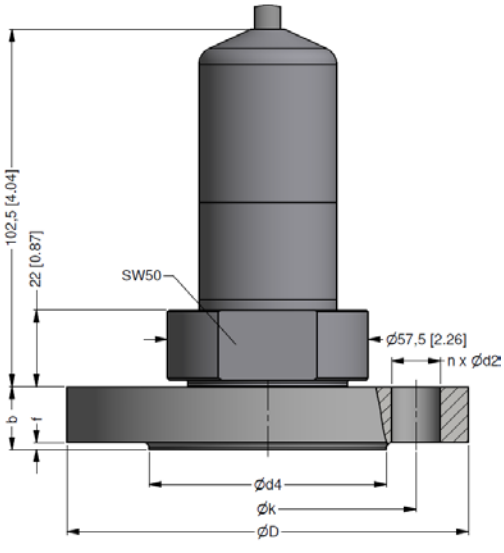
prepared for mounting with stainless steel pipe

screw-in version



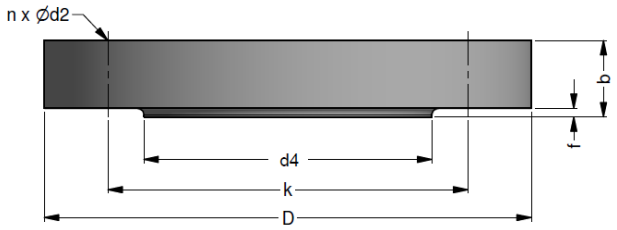


flange version



⇨ transmitter flange is not part of supply and has to be ordered separately

Transmitter flange for flange version

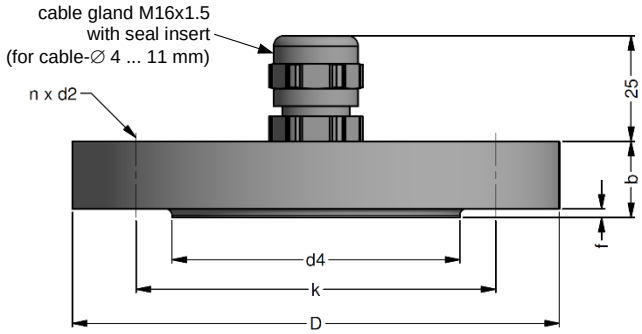


dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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

Ordering type	**Ordering code**	**Weight**
Transmitter flange DN25 / PN40	ZSF2540	1.2 kg
Transmitter flange DN50 / PN40	ZSF5040	2.6 kg
Transmitter flange DN80 / PN16	ZSF8016	4.1 kg

Mounting flange with cable gland



dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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 (303); plastic
Seal insert	material: TPE (ingress protection IP 68)
Hole pattern	according to DIN 2507

Ordering type	**Ordering code**	**Weight**
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016	4.8 kg

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BD|SENSORS pressure measurement

Ordering code LMK 458

LMK 458 □□□-□□□□-□-□-□-□-□-□-□-□□□-□□□

Option	Code	
Pressure		
in bar, gauge	7 6 5	
in bar, absolute [1]	7 6 8	
in mH_2O	7 6 6	
Input [mH_2O] / [bar]		
0.4 / 0.04	0 4 0 0	
0.6 / 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 9	consult
Housing		
stainless steel 1.4404 (316L)	1	
copper-nickel-alloy (CuNi10Fe1Mn)	K	
customer	9	consult
Design		
probe	1	
flange version [2]	3	
screw-in version	5	
Diaphragm		
ceramics Al_2O_3 96 %	2	
ceramics Al_2O_3 99.9 %	C	
customer	9	consult
Output		
4 … 20 mA / 2-wire	1	
intrinsic safety 4 … 20 mA / 2-wire	E	
customer	9	consult
Seals		
FKM	1	
EPDM	3	
FFKM [3]	7	
customer	9	consult
Electrical connection		
TPE-U-cable (blue, Ø 7.4 mm) [4]	4	
customer	9	consult
Accuracy		
standard: 0.25 % FSO	2	
option für P_N ≥0.6 bar: 0.1 % FSO	1	
customer	9	consult
Cable length		
in m	9 9 9	
Special version		
standard	0 0 0	
with temperature sensor Pt 100 [5]	0 1 3	
prepared for mounting [6] with stainless steel pipe	5 0 2	
customer	9 9 9	consult

[1] nominal pressure ranges absolute from 1 bar
[2] mounting accessories are not part of supply and have to be ordered separately
[3] min. permissible temperature from -15°C
[4] shielded cable with integrated ventilation tube for atmospheric reference
[5] not possible in combination with IS-version
[6] possible for probes in stainless steel; stainless steel pipe is not part of the supply

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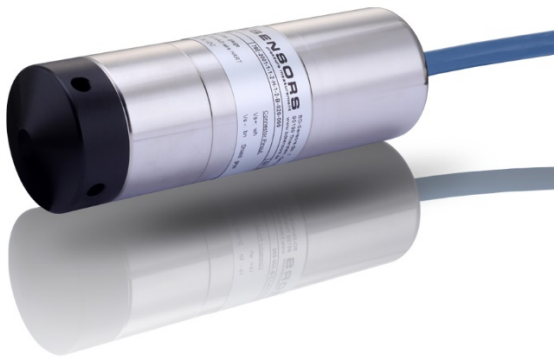
LMK 458H

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 (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
  Ex ia = intrinsically safe for gas and dust
- 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 certificated for shipbuilding and offshore applications.

A permissible operating temperature 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 self-developed 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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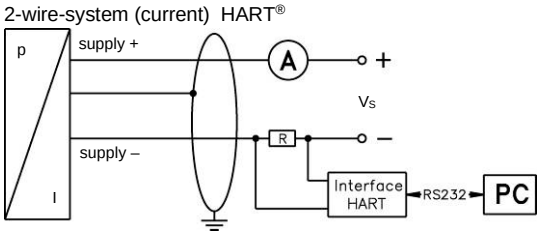
Pressure ranges								
Nominal pressure gauge [1] [bar]	0.06	0.16	0.4	1	2	5	10	20
Level [mH_2O]	0.6	1.6	4	10	20	50	100	200
Overpressure [bar]	2	4	6	8	15	25	35	45
Max. ambient pressure (housing): 40 bar								
[1] on customer request we adjust the devices by software on the required pressure ranges, 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] 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	≤ ± 1 % FSO			
in compensated range	-20 … 80 °C			
Permissible temperatures	medium / electronics / environment / 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 (Det Norske Veritas)			
[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: class B, curve 2 / basis: DIN EN 60068-2-6)			
Electrical connection				
Cable with sheath material [5]	TPE-U blue Ø 7.4 mm			
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter			
[5] shielded cable with integrated ventilation tube for atmospheric pressure reference (for nominal pressure ranges absolute the ventilation tube is closed)				
Materials (media wetted)				
Housing	standard: stainless steel 1.4404 (316L) option: CuNi10Fe1Mn (resistant against sea water)			
Seals	standard: FKM options: EPDM, FFKM (min. permissible temperature from -15 °C) others on request			
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %			
Protection cap	POM-C			
Cable sheath	TPE-U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)			
Miscellaneous				
Option cable protection for probes in stainless steel	prepared for mounting with stainless steel pipe			
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 (DNV)	temperature: D vibration: B humidity: B enclosure: D electromagnetic compatibility: B			number of certificate: TAA00001GM
Explosion protection				
Approval DX15A-LMK 458H	IBExU 10 ATEX 1186 X zone 0 [6]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T135 °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			
[6] for optional stainless steel pipe the following designation is valid: "II 1G Ex ia IIC T4" (zone 0)				

Wiring diagram

2-wire-system (current) HART®

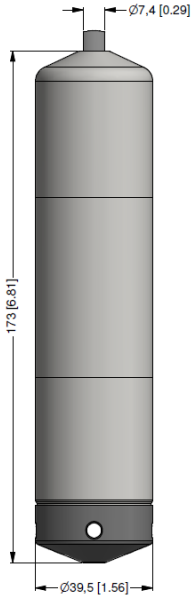


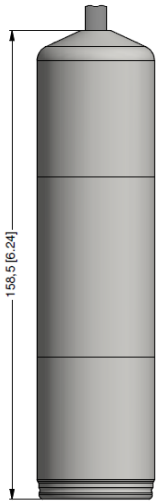
Pin configuration

Electrical connection	cable colours (IEC 60757)
Supply V_S + Supply V_S –	WH (white) BN (brown)
Shield	GNYE (green-yellow)

Dimensions for housing in stainless steel and CuNiFe (mm / in)

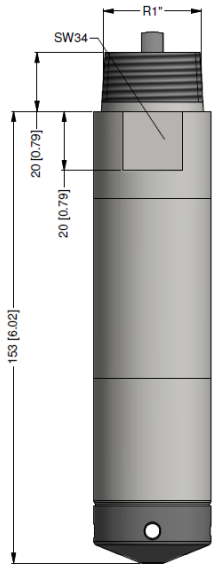
probe





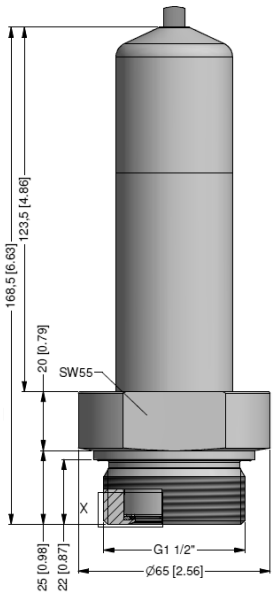
protection cap removable

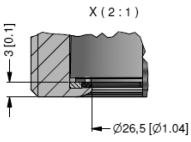
option



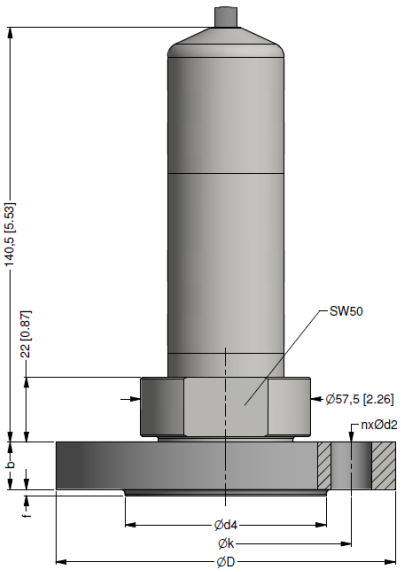
prepared for mounting with stainless steel pipe

screw-in version





flange version



⇨ transmitter flange is not part of supply and has to be ordered separately

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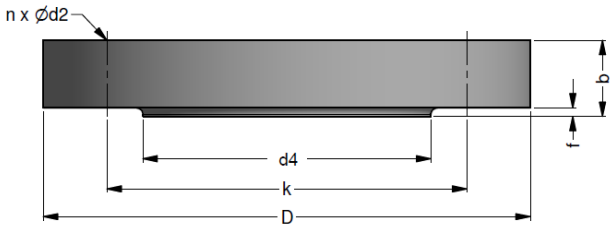
Transmitter flange for flange version

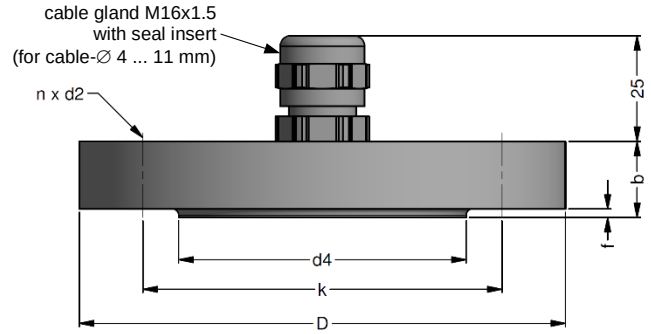


dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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

Ordering type	**Ordering code**	**Weight**
Transmitter flange DN25 / PN40	ZSF2540	1.2 kg
Transmitter flange DN50 / PN40	ZSF5040	2.6 kg
Transmitter flange DN80 / PN16	ZSF8016	4.1 kg

Mounting flange with cable gland



dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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 (303); plastic
Seal insert	material: TPE (ingress protection IP 68)
Hole pattern	according to DIN 2507

Ordering type	**Ordering code**	**Weight**
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016	4.8 kg

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pressure measurement

BD|SENSORS pressure measurement

Ordering code LMK 458H

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

Pressure			
in bar, gauge		7 6 E	
in bar, absolute [1]		7 6 H	
in mH_2O		7 6 F	
Input	**[mH_2O]**	**[bar]**	
	0.6	0.06	0 6 0 0
	1.6	0.16	1 6 0 0
	4.0	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			
probe		1	
flange version [2]		3	
screw-in version		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
Seal			
FKM		1	
EPDM		3	
FFKM [3]		7	
customer		9	consult
Electrical connection			
TPE-U-cable (blue, Ø 7.4 mm) [4]		4	
customer		9	
Accuracy			
$p_N \geq 1$ bar:	0.1 % FSO	1	
$p_N < 1$ bar:	0.2 % FSO	B	
customer		9	consult
Cable length			
in m		9 9 9	
Special version			
standard		0 0 0	
prepared for mounting with stainless steel pipe [5]		5 0 2	
customer		9 9 9	consult

[1] nominal pressure ranges and absolute from 1 bar
[2] mounting accessories are not part of supply and have to be ordered separately
[3] min. permissible temperature from -15°C
[4] shielded cable with integrated ventilation tube for atmospheric reference
[5] possible for probes in stainless steel; stainless steel pipe is not part of the supply

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LMK 806

Plastic Probe for Aggressive Media

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

from 0 ... 6 mH_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- diameter 21 mm
- suitable for hydrostatic level measurement e. g. in 3/4" pipes
- good linearity
- good long term stability

Optional versions

- different cable materials
- customer specific versions
  e. g. special pressure ranges

The LMK 806 with ceramic sensor and diameter of only 21 mm has been especially designed for the continuous level measurement at confined space conditions. Permissible media are highly polluted and aggressive fluids.

Basic element of the plastic submersible probe is a flush mounted ceramic sensor, which makes cleaning easier when solid parts of the medium deposit on it. Different cable and elastomer materials are available in order to achieve maximum media compatibility.

Preferred areas of use are

Sewage
waste water treatment
water recycling
dumpsites

Aggressive media
level measurement
in most of acids and lyes

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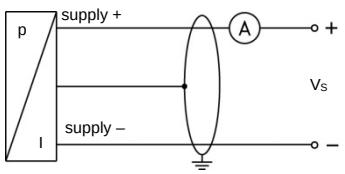
Input pressure range										
Nominal pressure gauge	[bar]	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH_2O]	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	10	10	20	40	40
Burst pressure ≥	[bar]	4	4	5	5	12	12	25	50	50
Max. ambient pressure (housing): 30 bar										

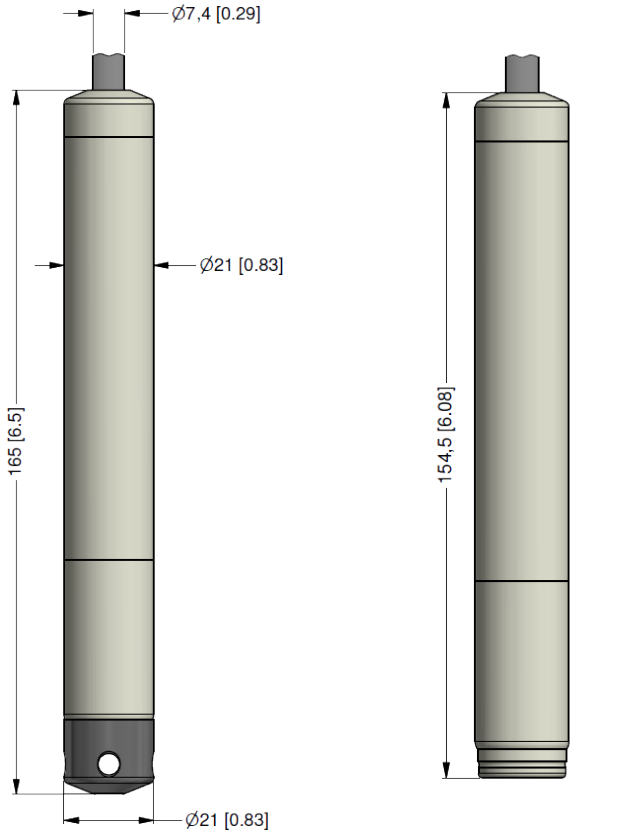
Output signal / Supply		
2-wire	4 ... 20 mA / V_S = 12 ... 32 V_{DC}	
Performance		
Accuracy [1]	≤ ± 0.5 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ
Response time	≤ 10 msec	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span) / Permissible temperatures		
Thermal error	≤ ± 0.4 % FSO / 10 K	in compensated range 0 ... 70 °C
Permissible temperatures	medium / electronics / environment / storage:	-25 ... 80 °C
Electrical protection [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic protection	emission and immunity according to EN 61326	
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection		
Cable with sheath material [3]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-25 … 70 °C) black Ø 7.4 mm FEP [4] (-25 … 70 °C) black Ø 7.4 mm others on request	
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m	
Cable inductance	signal line/shield also signal line/signal line: 1 µH/m	
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter	
[3] shielded cable with integrated ventilation tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*		
Materials (media wetted)		
Housing	PP-HT	others on request
Seals	FKM	
Diaphragm	ceramics Al_2O_3 96 %	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP	
Miscellaneous		
Current consumption	max. 25 mA	
Weight	approx. 100 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
Wiring diagram		

2-wire-system (current)



Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply –	WH (white) BN (brown)
Shield	GNYE (green-yellow)

Dimensions (mm / in)



protection cap removable

Accessories

Terminal clamp

Technical data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material of housing	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)
Dimensions (mm)	174 x 45 x 32
Hook diameter	20 mm

Ordering type	**Ordering code**	**Weight**
Terminal clamp, steel, zinc plated	Z100528	approx. 160 g
Terminal clamp, stainless steel 1.4301 (304)	Z100527	

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BD|SENSORS pressure measurement

Ordering code LMK 806

LMK 806 ☐☐☐ - ☐☐☐☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐☐☐ - ☐☐☐

	[mH2O]	[bar]	Pressure	Input	Housing	Diaphragm	Output	Seal	Accuracy	Electrical connection	Cable length	Special version	
Pressure													
in bar			3 7 5										
in mH_2O			3 7 6										
Input	**[mH_2O]**	**[bar]**											
	6	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 9									consult
Housing													
PP-HT					R								
customer					9								consult
Diaphragm													
ceramics Al_2O_3 96 %						2							
customer						9							consult
Output													
4 … 20 mA / 2-wire							1						
customer							9						consult
Seal													
FKM								1					
customer								9					consult
Accuracy													
0.5 % FSO									5				
customer									9				consult
Electrical connection													
PVC-cable (grey, Ø 7.4 mm) [1]										1			
PUR-cable (black, Ø 7.4 mm) [1]										2			
FEP-cable (black, Ø 7.4 mm) [1]										3			
customer										9			consult
Cable length													
in m											9 9 9		
Special version													
standard												0 0 0	
customer												9 9 9	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference

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LMK 807

Plastic Probe for Aggressive Media

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

from 0 ... 4 mH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 35 mm
- good long term stability
- easy handling

Optional versions

- SIL 2 (Safety Integrity Level)
  according to IEC 61508 / IEC 61511
- different kinds of cables
  and elastomers
- customer specific versions
  e. g. special pressure ranges

The plastic submersible probe LMK 807 is designed for continuous level measurement for highly polluted and aggressive media.

Basic element of the plastic submersible probe is the flush mounted ceramic sensor, which makes cleaning easier when solid parts of the medium deposit on it. Different cable and elastomer materials are available in order to achieve maximum media compatibility.

Preferred areas of use are

Sewage
waste water treatment
water recycling
dumpsite

Aggressive media
level measurement
in most of acids and lyes

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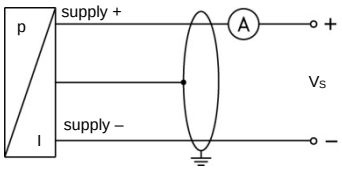
Input pressure range								
Nominal pressure gauge [bar]	0.4	0.6	1	1.6	2.5	4	6	10
Level [mH_2O]	4	6	10	16	25	40	60	100
Overpressure [bar]	1	2	2	4	4	10	10	20
Burst pressure ≥ [bar]	2	4	4	5	5	12	12	25
Max. ambient pressure (housing): 20 bar								

Output signal / Supply		
2-wire	4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Performance		
Accuracy [1]	≤ ± 0.5 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Response time	≤ 10 msec	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (Offset and Span)		
Thermal error	≤ ± 0.2 % FSO / 10 K	in compensated range 0 ... 70 °C
Permissible temperatures		
Permissible temperatures	medium / electronic / environment / storage:	-25 … 80 °C
Electrical protection [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection		
Cable with sheath material [3]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-25 … 70 °C) black Ø 7.4 mm FEP [4] (-25 … 70 °C) black Ø 7.4 mm others on request	
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m	
Cable inductance	signal line/shield also signal line/signal line: 1 µH/m	
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter	
[3] shielded cable with integrated ventilation tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*		
Materials (media wetted)		
Housing	PP-HT	
Seals	FKM, EPDM, FFKM	
Diaphragm	ceramics Al_2O_3 96 %	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP	
Miscellaneous		
Option SIL 2 version	according to IEC 61508 / IEC 61511	
Current consumption	max. 25 mA	
Weight	approx. 200 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	

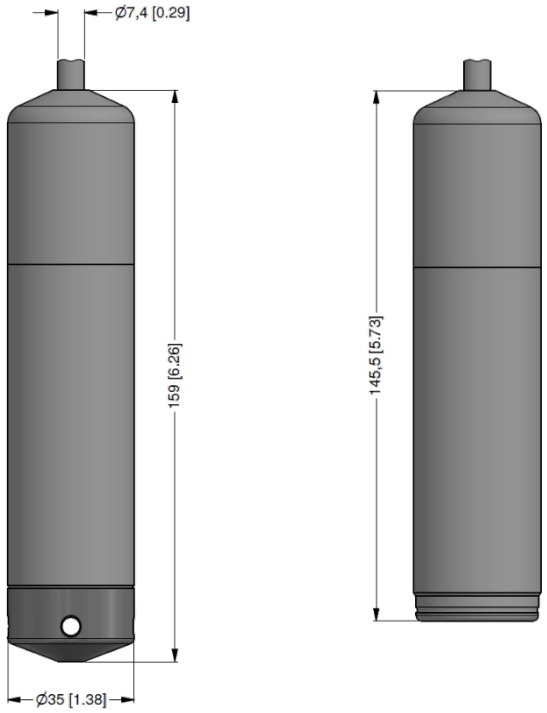
Wiring diagram

2-wire-system (current)



Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply –	WH (white) BN (brown)
Shield	GNYE (green-yellow)

Dimensions (mm / in)



protection cap removable

Accessories

Terminal clamp

Technical data		
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)	
Dimensions (mm)	174 x 45 x 32	
Hook diameter	20 mm	

Ordering type	**Ordering code**	**Weight**
Terminal clamp, steel, zinc plated	Z100528	approx. 160 g
Terminal clamp, stainless steel 1.4301 (304)	Z100527	

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pressure measurement

Ordering code LMK 807

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	[mH_2O]	[bar]	Code	
Pressure				
in bar			3 9 0	
in mH_2O			3 9 1	
Input	[mH_2O]	[bar]		
	4	0.4	4 0 0 0	
	6	0.6	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	
customer			9 9 9 9	consult
Housing				
PP-HT			R	
customer			9	consult
Diaphragm				
ceramics Al_2O_3 96 %			2	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
SIL2 4 … 20 mA / 2-wire			1S	
customer			9	consult
Seal				
FKM			1	
EPDM			3	
FFKM			7	
customer			9	consult
Accuracy				
0.5 % FSO			5	
customer			9	consult
Electrical connection				
PVC-cable (grey, Ø 7.4 mm) [1]			1	
PUR-cable (black, Ø 7.4 mm) [1]			2	
FEP-cable (black, Ø 7.4 mm) [1]			3	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
customer			9 9 9	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference

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LMP 307i

Stainless Steel Probe

Stainless Steel Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 4 mH_2O up to 0 ... 200 mH_2O

Output signals

2-wire: 4 ... 20 mA
3-wire: 0 ... 10 V
others on request

Special characteristics

- diameter 26.5 mm
- small thermal effect
- excellent accuracy
- excellent long term stability

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- drinking water certificate
  according to DVGW and KTW
- different kinds of cables
  and elastomers

The stainless steel probe LMP 307i is designed for continuous level measurement in water and clean or lightly polluted fluids.

Basic element is a high quality stainless steel sensor with high requirements for exact measurement with good long term stability.

Preferred areas of use are

Water / filtrated sewage
drinking water systems
ground water level measurement
rain spillway basins
pump and booster stations
level measurement in containers
water treatment plants
water recycling

Fuel and oil
fuel storage
tank farms

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Input pressure range [1]							
Nominal pressure gauge	[bar]	0.40	1	2	4	10	20
Level	[mH_2O]	4	10	20	40	100	200
Overpressure	[bar]	2	5	10	20	40	80
Burst pressure ≥	[bar]	3	7.5	15	25	50	120
Max. ambient pressure (housing): 40 bar							
[1] On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.							

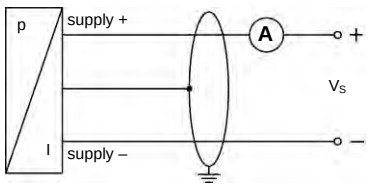
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}	
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Options 3-wire	3-wire: 0 ... 10 V / V_S = 14 ... 36 V_{DC}	
Performance		
Accuracy [2]	nominal pressure ≥ 0.1 bar: ≤ ± 0.1 % FSO nominal pressure < 0.1 bar: ≤ ± 0.2 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S – V_{S\ min}) / 0.02\ A]\ \Omega$ voltage 3-wire: R_{min} = 10 kΩ	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Response time	ca. 200 msec	
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span)		
Tolerance band	≤ ± 0.2 % FSO	in compensated range -20 … 80°C
TC	± 0.02 % FSO / 10K	in compensated range -20 … 80°C
Permissible temperatures		
Permissible temperatures	medium: -10 ... 70 °C	storage: -25 ... 70 °C
Electrical protection [3]		
Insulation resistance	> 100 MΩ	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[3] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection		
Cable with sheath material [4]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-10 … 70 °C) black Ø 7.4 mm FEP [5] (-10 … 70 °C) black Ø 7.4 mm TPE-U (-10 … 70 °C) blue Ø 7.4 mm	(without/with drinking water certificate)
Bending radius	static installation: 10-fold cable diameter	dynamic application: 20-fold cable diameter
[4] shielded cable with integrated ventilation tube for atmospheric pressure reference *[5] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*		
Materials (media wetted)		
Housing	stainless steel 1.4404 (316L)	
Seals	FKM EPDM (without/with drinking water certificate) others on request	
Diaphragm	stainless steel 1.4435 (316L)	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP, TPE-U	
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approvals DX19-LMP 307i	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing	
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 ... 65 °C	
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m	

Miscellaneous	
Drinking water certificate [6]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

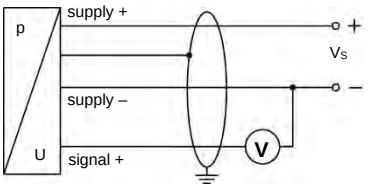
[6] only possible with EPDM seal in combination with TPE-U cable; not possible with IS-version (explosion protection)

Wiring diagrams

2-wire-system (current)

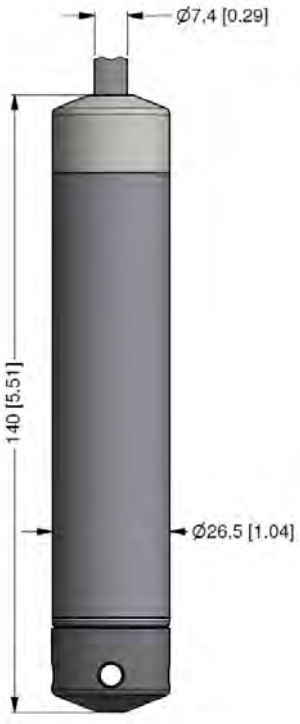


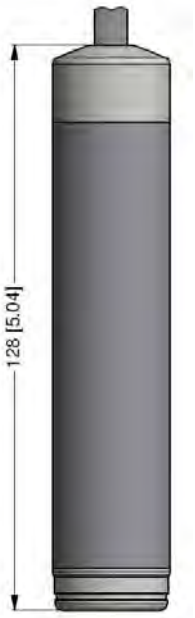
3-wire-system (current / voltage)



Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply – Signal + (only 3-wire)	WH (white) BN (brown) GN (green)
Shield	GNYE (green-yellow)

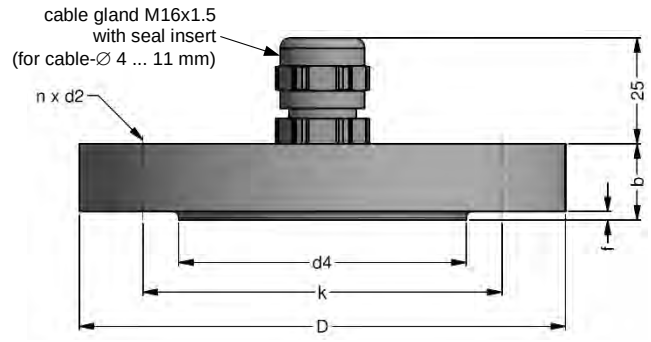
Dimensions (mm / in)





protection cap removable

Mounting flange with cable gland



dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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 (303); plastic
Seal insert	material: TPE (ingress protection IP 68)
Hole pattern	according to DIN 2507

Ordering type	**Ordering code**	**Weight**
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016	4.8 kg

Terminal clamp

Technical data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material of housing	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)
Dimensions (mm)	174 x 45 x 32
Hook diameter	20 mm

Ordering type	**Ordering code**	**Weight**
Terminal clamp, steel, zinc plated	Z100528	approx. 160 g
Terminal clamp, stainless steel 1.4301 (304)	Z100527	

Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

CIT 300 Process display with LED display, contacts and analogue output

CIT 350 Process display with LED display, bargraph, contacts and analogue output

CIT 400 Process display with LED display, contacts, analogue output and Ex-approval

CIT 600 Multichannel process display with graphics-capable LC display

CIT 650 Multichannel process display with graphics-capable LC display and datalogger

CIT 700 / CIT 750 Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts

PA 440 Field display with 4-digit LC display

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Ordering code LMP 307i

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			Code	
Pressure				
		in bar	4 5 0	
		in mH_2O	4 5 1	
Input	[mH_2O]	[bar]		
	4.0	0.4	4 0 0 0	
	10	1.0	1 0 0 1	
	20	2.0	2 0 0 1	
	40	4.0	4 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	
		customer	9	consult
Diaphragm				
		stainless steel 1.4435 (316L)	1	
		customer	9	consult
Output				
		4 … 20 mA / 2-wire	1	
		intrinsic safety 4 … 20 mA / 2 wire	E	
		0 … 10 V / 3-wire	3	
		customer	9	consult
Seal				
		FKM	1	
		EPDM	3	
DVGW/KTW:		EPDM [1]	3T	
		customer	9	consult
Accuracy				
standard for $p_N \geq 0.1$ bar		0.1 % FSO	1	
standard for $p_N < 0.1$ bar		0.2 % FSO	B	
		customer	9	consult
Electrical connection				
		PVC-cable (grey, Ø 7.4 mm) [2]	1	
		PUR-cable (black, Ø 7.4 mm) [2]	2	
		FEP-cable (black, Ø 7.4 mm) [2]	3	
		TPE-U-cable (blue, Ø 7.4 mm) [2]	4	
DVGW/KTW:		TPE-U-cable (blue, Ø 7.4 mm) [1,2]	F	
		customer	9	consult
Cable length				
		in m	9 9 9	
Special version				
		standard	1 1 1	
		customer	9 9 9	consult

[1] drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F); not possible with IS version (explosion protection)

[2] shielded cable with integrated ventilation tube for atmospheric pressure reference

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LMP 308i

Detachable Stainless Steel Probe Precision

Stainless Steel Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 4 mH_2O up to 0 ... 200 mH_2O

Output signals

2-wire: 4 ... 20 mA
3-wire: 0 ... 10 V
others on request

Special characteristics

- diameter 35 mm
- cable assembly and sensor head detachable
- excellent accuracy
- communication interface
- thermal error in compensated range
  -20 ... 70 °C: 0.2 % FSO
  TC 0.02 % FSO / 10K
- Turn-Down 1:10

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- mounting accessories
  e.g. mounting flange and terminal clamp in stainless steel
- different kinds of cables and elastomers

The detachable precision stainless steel probe LMP 308i is designed for continuous level measurement in water and low-viscosity fluids. The signal processing of sensor signal is done by digital electronics with 16-bit analogue digital converter. Consequently, it is possible to conduct an active compensation of sensor intrinsic deviations from normal conditions like nonlinearity and thermal error.

In order to facilitate stock-keeping and maintenance the sensor head is plugged to the cable assembly with a connector and can be changed easily.

Preferred areas of use are

Water / filtrated sewage
ground water level measurement
level measurement in wells and open waters
rain spillway basins
level measurement in containers
water treatment plants
water recycling

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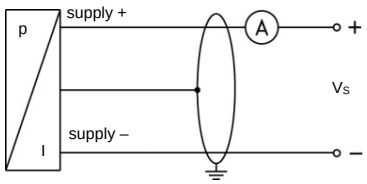
Input pressure range [1]							
Nominal pressure gauge	[bar]	0.40	1	2	4	10	20
Level	[mH_2O]	4	10	20	40	100	200
Overpressure	[bar]	2	5	10	20	40	80
Burst pressure	[bar]	3	7.5	15	25	50	120
Max. ambient pressure (housing): 40 bar							
[1] On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.							

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}
Options	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC} with communication interface 3-wire: 0 ... 10 V / V_S = 14 ... 36 V_{DC} 0 ... 10 V / V_S = 14 ... 36 V_{DC} with communication interface
Performance	
Accuracy	IEC 60770 [2]: ≤ ± 0.1 % FSO
Performance after turn-down (TD) - TD ≤ 1:5 - TD > 1:5	 no change of accuracy [3] formula for accuracy calculating (for nominal pressure gauge ≤ 0.40 bar see note 3): ≤ ± [0.1 + 0.015 x turn-down] % FSO with turn-down = nominal pressure range / adjusted range e.g. following accuracy can be calculated for turn-down 1:10: ≤ ± (0.1 + 0.015 x 10) % FSO i.e. the accuracy is ≤ ± 0.25 % FSO
Permissible load	current 2-wire: R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω voltage 3-wire: R_{min} = 10 kΩ
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions
Response time	ca. 200 msec
Adjustability (with option communication interface)	following parameters can be adjusted (interface / software needed [4]) electronic damping: 0 ... 100 sec offset: 0 ... 90 % FSO turn-down of span: max. 1:10
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[3] nominal pressure gauges ≤ 0,40 bar are excluded; for these the calculation of accuracy is as follows:* *≤ ± (0.1 + 0.02 x turn-down) % FSO e.g. torn-down 1:3: ≤ ± (0.1 + 0.02 x 3) % FSO i.e. the accuracy is ≤ ± 0.16 % FSO* *[4] software, interface and cable must separate be ordered (software is compatible with Windows® 95, 98, 2000, NT from version 4.0 or higher and XP)*	
Thermal effects (offset and span)	
Tolerance band [% FSO]	≤ ± (0.2 x turn-down) in compensated range -20 ... 70 °C
TC [% FSO / 10 K]	± (0.2 x turn-down) in compensated range -20 ... 70 °C
Permissible temperatures	medium: -20 ... 70 °C storage: -25 ... 70 °C electronics / environment: -25 ... 65 °C
Electrical protection [5]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Lightning protection	2-wire: integrated 3-wire: without
Electromagnetic compatibility	emission and immunity according to EN 61326
[5] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [6]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-20 … 70 °C) black Ø 7.4 mm FEP [7] (-20 … 70 °C) black Ø 7.4 mm
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter
[6] shielded cable with integrated ventilation tube for atmospheric pressure reference *[7] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM, EPDM, others on request
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM-C
Cable sheath	PVC, PUR, FEP, others on request
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-LMP 308 i	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 ... 65 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1µH/m

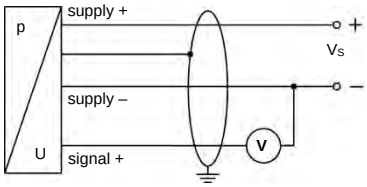
Miscellaneous		
Current consumption	max. 25 mA	
Weight	approx. 250 g (without cable)	
Ingress protection	IP 68	
CE-conformity / ATEX Directive	EMC Directive: 2014/30/EU	ATEX Directive: 2014/34/EU

Wiring diagram / connector

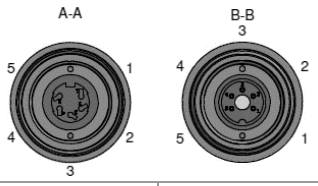
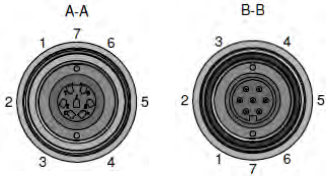
2-wire-system (current)



3-wire-system (voltage)

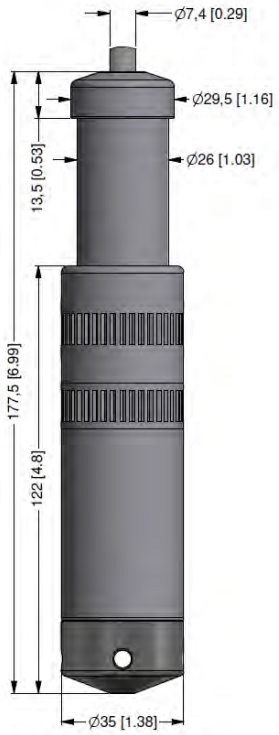


Pin configuration

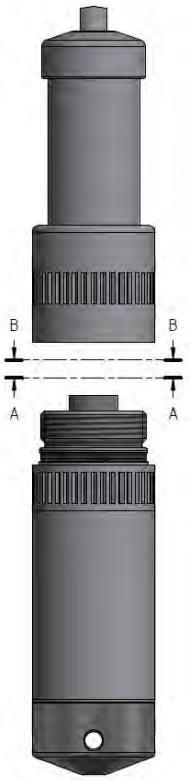
Electrical connection	Binder series 723 [8] (5-pin)		Binder series 723 [8] (7-pin)	cable colours (IEC 60757)
				
	2-wire	3-wire	with communication interface	
Supply +	3	3	3 / WH (white)	WH (white)
Supply –	1	4	1 / BN (brown)	BN (brown)
Signal + (for 3-wire)	-	1	6 / GN (green)	GN (green)
RxD	-	-	4 / YE (yellow)	-
TxD	-	-	5 / GY (grey)	-
GND	-	-	7 / GN (green)	-
Shield	5	5	2 / GNYE (green-yellow)	GNYE (green-yellow)

[8] if detached

Dimensions (mm / in)

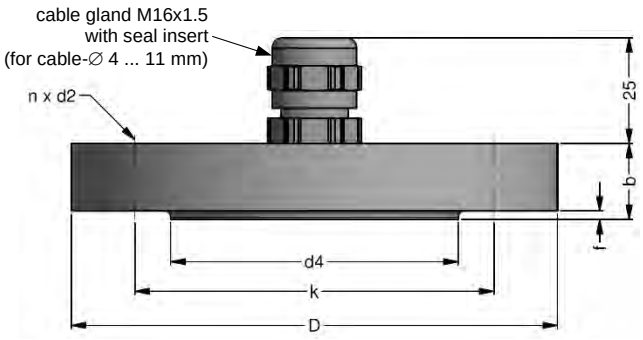


protection cap removable



sensor head and cable detached

Mounting flange with cable gland



dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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 (303); plastic
Seal insert	material: TPE (ingress protection IP 68)
Hole pattern	according to DIN 2507

Ordering type	**Ordering code**	**Weight**
DN25 / PN40 with cable gland brass, nickel plated	ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass, nickel plated	ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass, nickel plated	ZMF8016	4.8 kg

Terminal clamp

Technical data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material of housing	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)
Dimensions (mm)	174 x 45 x 32
Hook diameter	20 mm

Ordering type	**Ordering code**	**Weight**
Terminal clamp, steel, zinc plated	Z100528	approx. 160 g
Terminal clamp, stainless steel 1.4301 (304)	Z100527	

Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

CIT 300 Process display with LED display, contacts and analogue output

CIT 350 Process display with LED display, bargraph, contacts and analogue output

CIT 400 Process display with LED display, contacts, analogue output and Ex-approval

CIT 600 Multichannel process display with graphics-capable LC display

CIT 650 Multichannel process display with graphics-capable LC display and datalogger

CIT 700 / CIT 750 Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts

PA 440 Field display with 4-digit LC display

For further information please contact our sales department or visit our homepage: http://www.bdsensors.de

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info@bdsensors.de

BD|SENSORS pressure measurement

Ordering code LMP 308i

LMP 308i □□□-□□□□-□-□-□-□-□-□-□□□-□□□

Pressure			
in bar		4 4 0	
in mH_2O		4 4 1	
Input	**[mH_2O]**	**[bar]**	
4.0	0.4	4 0 0 0	
10	1.0	1 0 0 1	
20	2.0	2 0 0 1	
40	4.0	4 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	
customer		9	consult
Diaphragm			
stainless steel 1.4435 (316L)		1	
customer		9	consult
Output			
4 … 20 mA / 2-wire		1	
intrinsic safety 4 … 20 mA / 2-wire		E	
0 … 10 V / 3-wire		3	
customer		9	consult
Seal			
FKM		1	
EPDM		3	
customer		9	consult
Electrical connection			
PVC-cable (grey, Ø 7.4 mm) [1]		1	
PUR-cable (black, Ø 7.4 mm) [1]		2	
FEP-cable (black, Ø 7.4 mm) [1]		3	
customer		9	consult
Accuracy			
0.1 % FSO [2]		1	
customer		9	consult
Cable length			
in m		9 9 9	consult
Special version			
standard		1 1 1	
with communication interface [3]		1 2 1	
customer		9 9 9	consult

[1] cable with integrated ventilation tube for atmospheric pressure reference
[2] available on request: calibration of individual pressure range higher than 400 mbar with accuracy 0.1 %
[3] software, interface and cable have to be order separately (ordering code: CIS-G; software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or newer and XP)

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01.04.2022

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