HYDROSTATIC PROBES
SCREW-IN TRANSMITTERS

PRODUCT CATALOGUE

PRESSURE at the highest **LEVEL.**

BD|SENSORS
pressure measurement

>> www.bdsensors.de

PRESSURE AT THE HIGHEST LEVEL

„Successful medium-sized companies are not successful because they are active in many areas, but rather because they concentrate on one area and do it better than anyone else“

This is our philosophy. That´s why BD|SENSORS has concentrated on electronic pressure measurement technology from the beginning.

With our unremitting product and and quality strategy we have been successful in becoming a major player on the world market for electronic pressure sensing devices within a few years.

BD|SENSORS
pressure measurement

With 300 employees at 3 locations in Germany, the Czech Republic and China BD|SENSORS has solutions from 0.1 mbar to 6.000 bar:

- pressure sensors, pressure transducers pressure transmitters
- electronic pressure switches
- pressure measuring devices with display and switching outputs
- hydrostatic level probes

Two pressure transmitters and a submersible probe, based on a stainless steel silicon sensor were the beginning. Today the range extends to more than 70 standard products, from economical OEM devices to high-end products with HART® communication or field bus interface.

In addition we have developed hundreds of customer-specific applications, underlining the competence and flexibility of BD|SENSORS. The excellent price/performance ratio of our products is proof of the fact that we are able to meet the toughest demand: Being a problem-solver for our customers.

INDEX

For large production batches as well as for small production numbers, no matter for what medium or external factors, with almost any mechanical or electrical connection - we solve your problem

flexibly, quickly and cost-efficiently.

	PRODUCT	PREFERRED APPLICATION						Ø	TYPE	MEDIA WETTED PARTS				NOMINAL PRESSURE		OUTPUT SIGNAL			APPROVAL				
										housing		Sensor diaphragm											
		water / drinking water	waste water / viscous	sea water / salty water	fuel / oil	petrol / solvents	acid / lye	mm / inch	detachable	metal	plastic	stainless steel	ceramic	meter H_2O min	meter H_2O max	analogue	digital	temperature	EX	UL	SIL	drinking water	nautic
submersible probes digital																							
INDUSTRY	DCL 531	•			•			27		•		•		1	250		•			•		•	
	DCL 532	•			•			27		•		•		1	40		•						
	DCL 551	•	•					40		•			•	0,4	200		•			•			
	DCL 571	•	•					22		•			•	1	100		•			•		•	
submersible probes analog																							
PRECISION	LMP 307 i	•			•			27		•		•		4	200	•			•	•		•	
	LMP 308 i	•						35	•	•		•		4	200	•			•	•			
	LMK 358 H	•	•					40	•	•			•	0,2	100	•	•		•	•			
	LMK 382 H	•	•					40		•			•	0,2	200	•	•		•	•			
	LMK 387 H	•	•					22		•			•	0,3	100	•	•	•	•				
	LMK 458 H			•	•			40		•			•	0,2	200	•	•		•	•			•
INDUSTRY	LMP 305	•						19		•		•		1	250	•				•			
	LMP 307	•			•	•		27		•		•		1	250	•			•	•	•	•	
	LMP 307 T	•			•			27		•		•		1	250	•		•		•		•	
	LMP 308	•						35	•	•		•		1	250	•			•	•	•		
	LMP 808	•			•			35	•		•	•		1	100	•				•	•		
	LMK 306	•						17		•		•		6	200	•				•			
	LMK 307	•	•					27		•			•	4	250	•			•	•	•		
	LMK 307 T	•	•					27		•			•	4	250	•		•		•			
	LMK 358	•	•					40	•	•			•	0,4	100	•			•	•			
	LMK 382	•	•					40		•			•	0,4	200	•		•	•	•			
	LMK 387	•	•					22		•			•	1	100	•		•	•	•		•	
	LMK 458			•	•			40		•			•	0,4	200	•		•	•	•			•
	LMK 487			•	•			22		•			•	1	100	•		•	•	•			•
	LMK 806		•				•	21			•		•	6	200	•				•			
	LMK 807		•				•	35			•		•	4	100	•				•	•		
	LMK 808	•	•	•			•	35	•		•		•	1	100	•				•			
	LMK 809		•	•			•	45			•		•	0,4	100	•				•			
	LMK 858		•	•			•	45	•		•		•	0,4	100	•				•			
OEM	18.605 G	•			•			24		•		•		1	10	•				•			
screw-in transmitter																							
PRECISION	LMP 331 i	•			•			3/4“		•		•		0,4	400	•			•	•			
INDUSTRY	LMP 331	•			•			3/4“		•		•		4	400	•			•	•	•		
	LMK 331	•	•				•	3/4“		•	•		•	4	600	•			•		•		
	LMK 351	•	•				•	1 1/2“		•	•		•	0,4	200	•			•				

DCL 531

Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 60770:
0.25 % FSO

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 250 mH_2O

Output signal

RS485 with Modbus RTU protocol

Special characteristics

- pressure value
- diameter 26.5 mm
- small thermal effect
- excellent accuracy
- good long term stability
- reset function

Optional versions

- drinking water certificate according to DVGW and KTW
- different kinds of cables and elastomers

The stainless steel probe DCL 531 with RS485 interface uses the communication protocol Modbus RTU which has found the way in industrial communication as an open protocol. The Modbus protocol is based on a master slave architecture with which up to 247 slaves can be questioned by a master – the data are transferred in binary form.

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

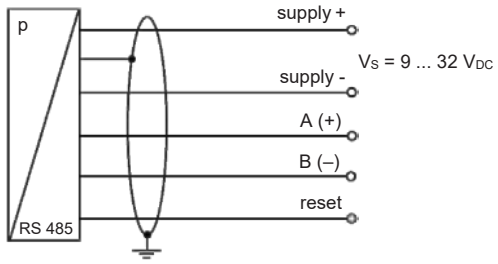
Water / filtrated sewage
drinking water system, ground water level measurement, rain spillway basin
pump and booster stations
level measurement in container
water treatment plants
water recycling

Fuel and oil
fuel storage
tank farm

Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Max. ambient pressure (housing): 40 bar														

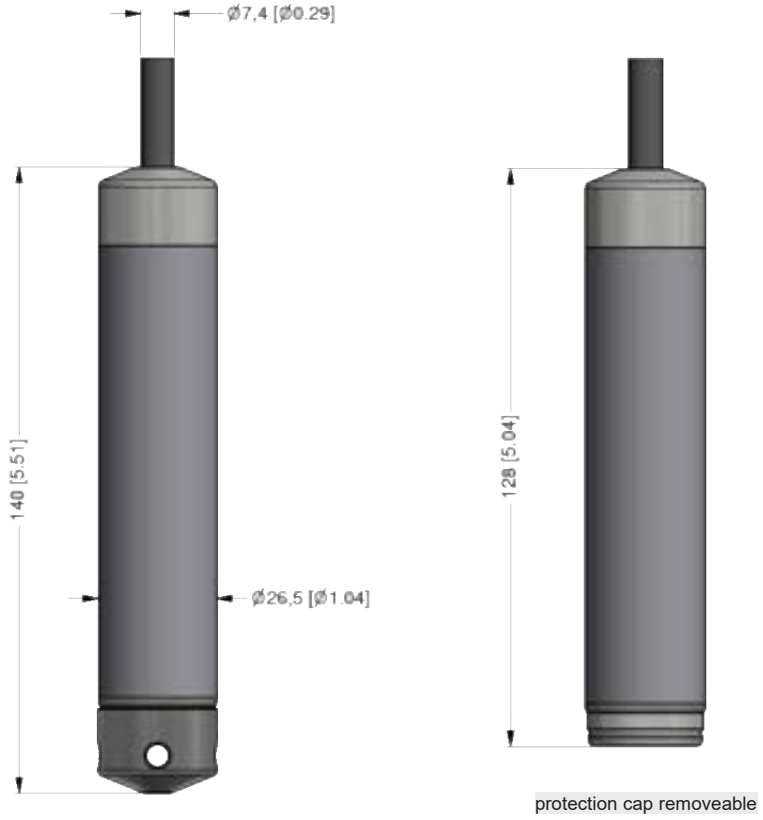
Output signal	
Digital (pressure)	RS485 with Modbus RTU Protocol
Supply	
Direct current	V_S = 9 … 32 V_{DC}
Performance	
Accuracy [1]	≤ ± 0.25 % FSO
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Measuring rate	500 Hz
Delay time	500 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (offset and span)	
Tolerance band	≤ ± 0.75 % FSO
in compensated range	-20 ... 85 °C
Permissible temperatures	
Medium	-10 ... 70 °C
Storage	-25 ... 70 °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]	PUR (-10 … 70 °C) black Ø 7.4 mm FEP (-10 … 70 °C) black Ø 7.4 mm TPE-U (-10 … 70 °C) blue Ø 7.4 mm (with drinking water approval)
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	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM; EPDM (without / with drinking water approval) others on request
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM-C
Cable sheath	PUR, FEP, TPE-U
Miscellaneous	
Drinking water certificate [4]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Adjustable units	pressure: mmH_2O, mmHg, psi, bar, mbar, g/cm^2, kg/cm^2, Pa, kPa, torr, atm, mH_2O, MPa
Read out	serial number; date of calibration, min- and max-value for pressure
Current consumption	max. 10 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
[4] only possible with EPDM seal in combination with TPE-U cable	

Wiring diagram / pin configuration



Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
A (+)	GN (green)
B (–)	YE (yellow)
Reset	PK (pink)
Shield	GNYE (green-yellow)

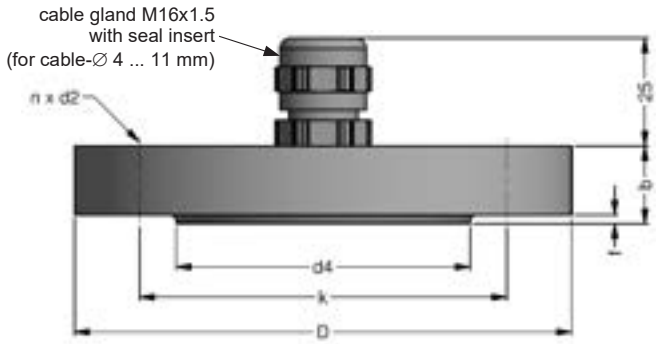
Dimensions (mm / in)



Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
address	001				
	…				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2

Configuration code (to specify with order)		-		-	

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	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	

Ordering code DCL 531

DCL 531 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

			Code	
Pressure				
		in bar	4 5 0	
		in mH_2O	4 5 1	
Input	**[mH_2O]**	**[bar]**		
	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	
	250	25	2 5 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				
		RS485 Modbus RTU	L5	
Seals				
		FKM	1	
		EPDM	3	
DVGW/KTW:		EPDM [1]	3T	
		customer	9	consult
Accuracy				
		0.25 % FSO	2	
		customer	9	consult
Electrical connection				
		PUR-cable (black, Ø 7.4 mm) [2]	2	
		FEP-cable (black, Ø 7.4 mm) [2]	3	
DVGW/KTW:		TPE-U cable (blue, Ø 7.4 mm) [1, 2]	F	
		customer	9	consult
Cable length				
		in m		
Special version				
		standard	0 0 0	
		customer	9 9 9	consult

[1] drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)
[2] shielded cable with integrated ventilation tube for atmospheric pressure reference

DCL 532

Stainless Steel Probe with i²C interface

Stainless Steel Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 40 mH_2O

Digital output signal

- i²C
- bus frequency max. 400 kHz

Special characteristics

- min. current consumption 0.15 mA @ 2.7 V
- diameter 26.5 mm
- small thermal effect
- excellent accuracy
- good long term stability

Optional versions

- accuracy 0.1 % FSO
- different kinds of cables and elastomers

The stainless-steel level probe DCL 532 is designed for continuous level measurement in water and clean or slightly polluted liquids. A piezoresistive pressure sensor with low thermal error, an excellent linearity and long-term stability, provides the basis of DCL 532.

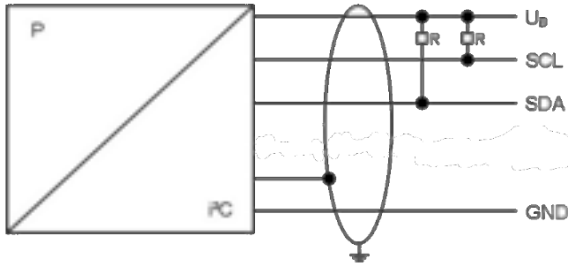
Contrary to level probes with analogue output signal, the DCL 532 offers a digital i²C-interface. Thanks to the very low current consumption and supply voltage, it is ideally combined with battery-powered data acquisition systems.

Preferred areas of use are

Water / filtrated sewage
drinking water system, ground water level measurement, rain spillway basin
pump and booster stations
level measurement in container
water treatment plants
water recycling

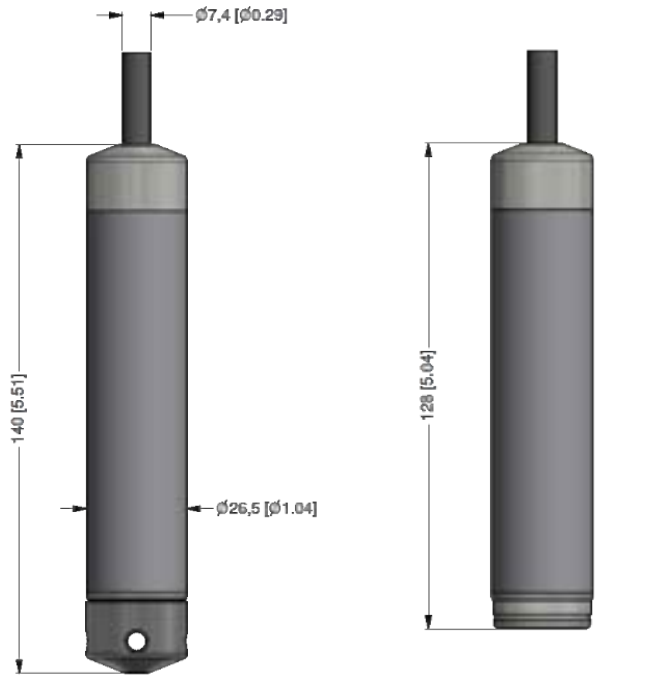
Fuel and oil
fuel storage
tank farm

Input pressure range									
Nominal pressure gauge [bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4
Level [mH_2O]	1	1.6	2.5	4	6	10	16	25	40
Overpressure [bar]	0.5	1	1	2	5	5	10	10	20
Max. ambient pressure (housing): 40 bar									
Output signal / supply									
Digital	i²C Power Save / V_S = 2.7 ... 5.5 V_{DC} sensor signal conditioner ZSC31014								
Performance									
Accuracy [1]	standard: ≤ ± 0.25 % FSO option: ≤ ± 0.1 % FSO								
Long term stability	≤ ± 0.1 % FSO / year at reference conditions								
Measuring rate	8 Hz (adjustable from 8 up to 660 Hz)								
Current consumption	min. 0.15 mA (V_S 2.7 V, measuring rate 8 Hz), max. 3.2 mA (V_S 5.5 V, measuring rate 660 Hz)								
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)									
Thermal effects (offset and span)									
Tolerance band	≤ ± 0.75 % FSO								
in compensated range	-20 ... 85 °C								
Permissible temperatures									
Medium	-10 ... 70 °C								
Storage	-25 ... 70 °C								
Electrical protection									
Short-circuit protection	none								
Reverse polarity protection	by exchanged supply connections no damage, but also no function by exchange of communication with supply lines, a damage is possible								
Electrical connection									
Cable with sheath material [2]	PUR (-10 … 70 °C) black Ø 7.4 mm max. cable length 50 m [3] FEP (-10 … 70 °C) black Ø 7.4 mm max. cable length 50 m [3]								
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								
[2] shielded cable with integrated ventilation tube for atmospheric pressure reference *[3] with max. cable length and standard settings, the bus frequency must be set to < 100 kHz*									
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	PUR, FEP, others on request								
Miscellaneous									
Weight	approx. 200 g (without cable)								
Ingress protection	IP 68								
Pull-up resistor	4.7 kΩ (recommended)								
Wiring diagram / pin configuration									



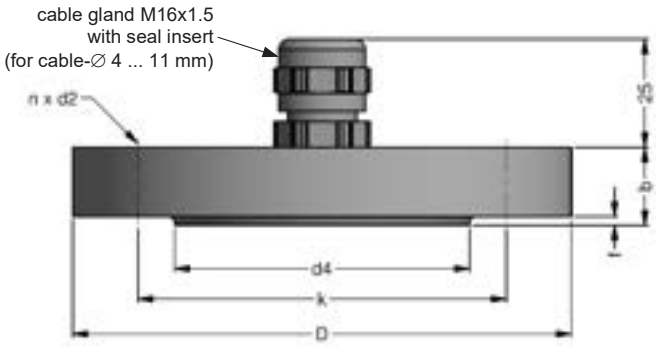
Electrical connection	Cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
SCL	GN (green)
SDA	YE (yellow)
Shield	GNYE (green-yellow)

Dimensions (mm / in)



protection cap removeable

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	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	

Ordering code DCL 532

DCL 532 □□□-□□□□-□-□-□-□-□-□-□-□□□-□□□

Pressure				
	in bar	450		
	in mH_2O	451		
Input	**[mH_2O]**	**[bar]**		
	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	
		customer	9999	consult
Housing				
	stainless steel 1.4404 (316L)		1	
	customer		9	consult
Diaphragm				
	stainless steel 1.4435 (316L)		1	
	customer		9	consult
Output				
	i²C Power Save		IP	
Seal				
	FKM		1	
	EPDM		3	
	customer		9	consult
Accuracy				
standard:	0.25 % FSO		2	
option:	0.1 % FSO		1	
Electrical connection				
	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			
Special version				
	standard		000	
	customer		999	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference, max. cable length 50 m

DCL 551

Stainless Steel Probe with RS485 Modbus RTU

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 signal

RS485 with Modbus RTU protocol

Special characteristics

- diameter 39.5 mm
- excellent long term stability
- especially for sewage, viscous and pasty media
- reset function

Optional version

- diaphragm ceramics Al_2O_3 99,9%

The stainless steel probe DCL 551 with RS485 interface uses the communication protocol Modbus RTU which has found the way in industrial communication as an open protocol. The Modbus protocol is based on a master slave architecture with which up to 247 slaves can be questioned by a master – the data are transferred in binary form.

DCL 551 has been designed for hydrostatic level measurement in sewage as well as for viscous and pasty media.

Basic element is a robust and high overpressure capable capacitive ceramic sensor.

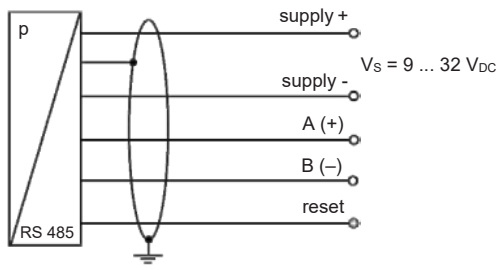
Preferred areas of use are

Sewage
waste water treatment
water recycling

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

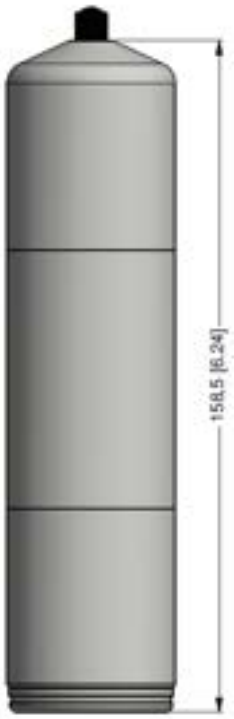
Input pressure range																
Nominal pressure gauge [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Max. ambient pressure (housing): 40 bar															

Output signal	
Digital (pressure and temperature)	RS485 with Modbus RTU protocol
Supply	
Direct current	V_S = 9 … 32 V_{DC}
Performance	
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Measuring rate	500 Hz
Delay time	500 msec
[1] 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 / storage: -25 ... 125 °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]	PUR (-25 … 70 °C) black Ø 7.4 mm
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	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316 L)
Seals	FKM others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %
Protection cap	POM-C
Cable sheath	PUR
Miscellaneous	
Adjustable units	pressure: mmH_2O, mmHg, PSI, bar, mbar, g/cm^2, kg/cm^2, Pa, kPa, torr, atm, mH_2O, MPa
Read out	serial number; date of calibration, min- and max-value for pressure
Current consumption	max. 10 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
Wiring diagram	



Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply – A + B – Reset	WH (white) BN (brown) GN (green) YE (yellow) PK (pink)
Shield	GNYE (green yellow)

Dimensions (mm / in)

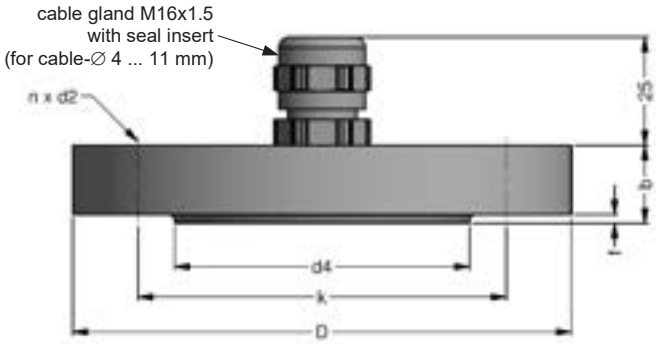


protection cap removable

Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
Address	001				
	…				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2

Configuration code (to specify with order)		-		-	

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	

Ordering code DCL 551

DCL 551 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

Option		Code	
Pressure			
in bar		5 6 5	
in mH_2O		5 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	
customer		9	consult
Diaphragm			
ceramics Al_2O_3 96%		2	
ceramics Al_2O_3 99.9%		C	
customer		9	consult
Digital output			
RS485 Modbus RTU		L5	
Seal			
FKM		1	
customer		9	consult
Electrical connection			
PUR-cable (black, Ø 7.4 mm) [1]		2	
customer		9	consult
Accuracy			
standard:	0.35 % FSO	3	
option:	0.25 % FSO	2	
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

DCL 571

Stainless Steel Probe with RS485 Modbus RTU

Ceramic Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 100 mH_2O

Output signal

RS485 with Modbus RTU protocol

Special characteristics

- diameter 22 mm
- good long term stability
- especially for waste water
- reset function

Optional versions

- accuracy: 0.25 % FSO
- different designs
- drinking water certificate according to DVGW and KTW
- different kinds of cables and elastomers

The stainless steel probe DCL 571 with RS485 interface uses the communication protocol Modbus RTU which has found the way in industrial communication as an open protocol. The Modbus protocol is based on a master slave architecture with which up to 247 slaves can be questioned by a master – the data will transfer in binary form.

The probe was developed for level measurement in waste water, sludge or water courses. The mechanical robustness of the flush ceramic diaphragm facilitates an easy disassembly and cleaning of the probe in case of service.

Compared to the level probe DCL 551 the outside-diameter is only 22 mm, which allows an easy installation and back fitting in 1″ tubes or in cramped fitting conditions.

Preferred areas of use

Water
groundwater and level monitoring

Sewage
waste water treatment, water recycling

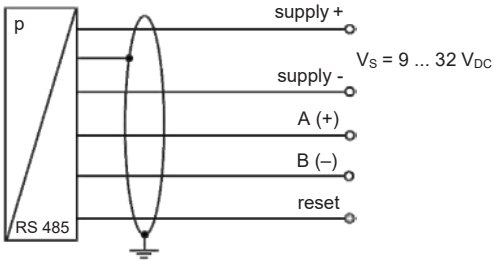
Fuel and oil
tank battery, biogas plants

Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Max. ambient pressure (housing): 40 bar												

Nominal pressure absolute	[bar]	1.2	1.4	1.6	1.8	2	2.5	3	4	6	10
Overpressure	[bar]	7	7	12	12	12	12	20	20	20	20
Burst pressure ≥	[bar]	9	9	18	18	18	18	25	25	30	30
Max. ambient pressure (housing): 40 bar											

Output signal	
Digital (pressure and temperature)	RS485 with Modbus RTU protocol
Supply	
Direct current	V_S = 9 … 32 V_{DC}
Performance	
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO others on request
Long term stability	≤ ± 0.1 % FSO / year
Measuring rate	500 Hz
Delay time	500 msec
[1] 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	
Medium / storage	-25 ... 85 °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]	TPE-U (-10 … 70 °C) blue Ø 7.4 mm (with drinking water approval) PUR (-10 … 70 °C) black Ø 7.4 mm
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	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316 L) others on request
Cable	TPE-U, blue (with drinking water approval) others on request
Seals (O-rings)	EPDM (with drinking water approval), FKM others on request
Diaphragm	ceramics Al_2O_3 99,9 %
Protection cap	POM-C
Cable sheath	TPE-U, PUR
Miscellaneous	
Drinking water certificate [4]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Adjustable units	pressure: mmH_2O, mmHg, psi, bar, mbar, g/cm^2, kg/cm^2, Pa, kPa, torr, atm, mH_2O, MPa
Read out	serial number, date of calibration, min- and max-value for pressure
Current consumption	max. 10 mA
Weight	approx. 180 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
[4] only possible with EPDM seal in combination with TPE-U cable	

Wiring diagram

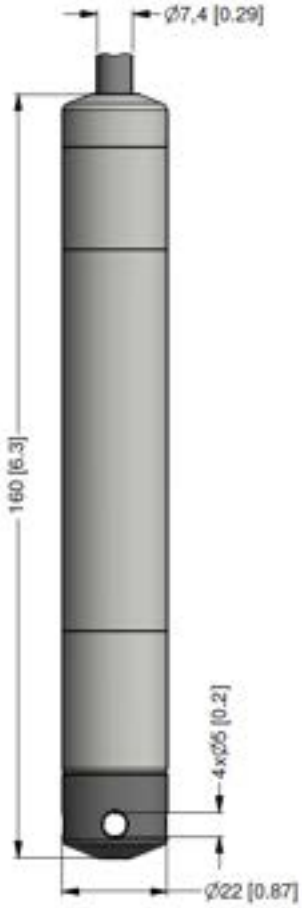


Pin configuration

Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
A +	GN (green)
B –	YE (yellow)
Reset	PK (pink)
Shield	GNYE (green-yellow)

Dimensions (mm / in)

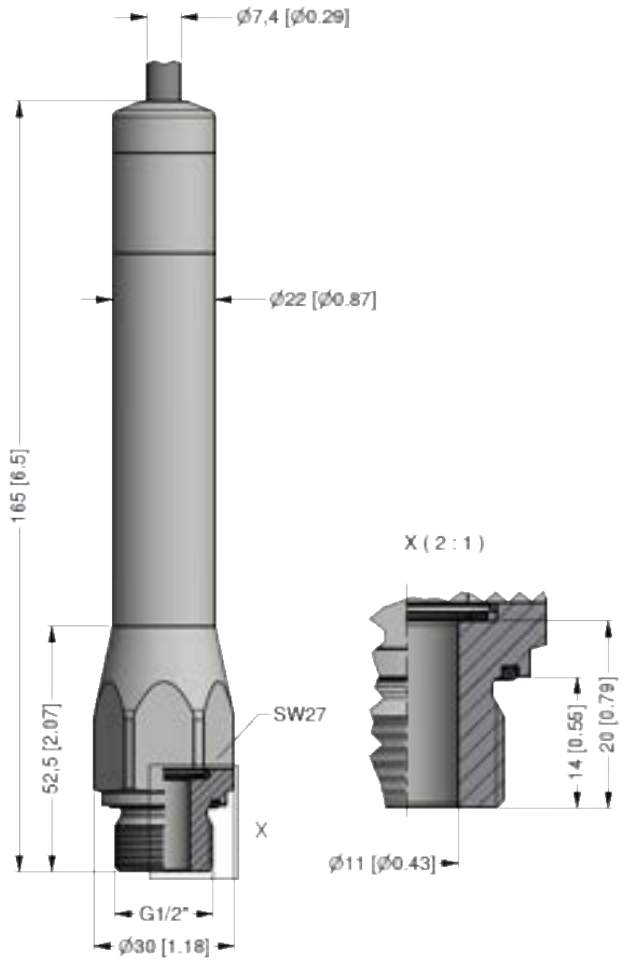
standard



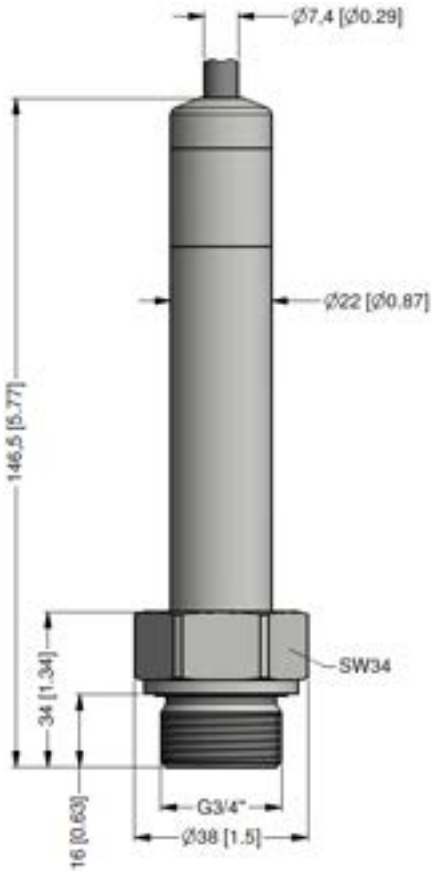
protection cap removable

Dimensions (mm / in)

option: screw-in versions



G 1/2" open

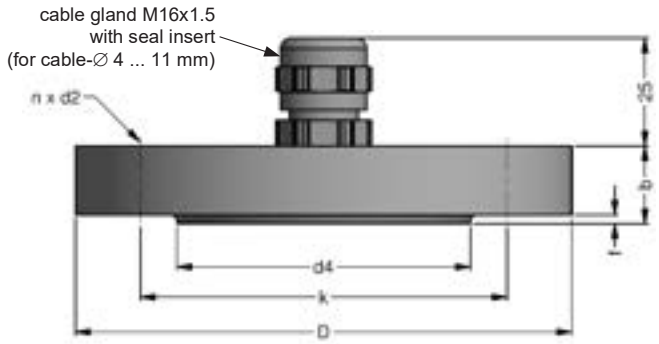


G 3/4"

Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
Address	001				
	…				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2

Configuration code (to specify with order)		-		-	

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	

Ordering code DCL 571

DCL 571 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

			Code	
Pressure				
	gauge in bar		3 6 0	
	gauge in mH_2O		3 6 1	
	absolute in bar		3 6 3	
Input	**[mH_2O]**	**[bar]**		
	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	
	12	1.2	1 2 0 1	
	14	1.4	1 4 0 1	
	16	1.6	1 6 0 1	
	18	1.8	1 8 0 1	
	20	2.0	2 0 0 1	
	25	2.5	2 5 0 1	
	30	3.0	3 0 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				
	stainless steel 1.4404 (316L)		1	
	customer		9	consult
Design				
	probe		1	
	screw-in version G1/2" open		A	
	screw-in version G3/4" flush		B	
Diaphragm				
	ceramics Al_2O_3 99.9 %		C	
	customer		9	consult
Output				
	RS485 Modbus RTU		L5	
	customer		9	consult
Seal				
	FKM		1	
DVGW / KTW:	EPDM [1]		3T	
	customer		9	consult
Electrical connection				
	PUR-cable (black, Ø 7.4 mm) [2]		2	
DVGW / KTW:	TPE-U-cable (blue, Ø 7.4 mm) [1, 2]		F	
	customer		9	consult
Accuracy				
standard	0.35 % FSO		3	
option	0.25 % FSO		2	
	customer		9	consult
Cable length				
	in m		9 9 9	
Special version				
	standard		0 0 0	
	customer		9 9 9	consult

[1] drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)

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

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

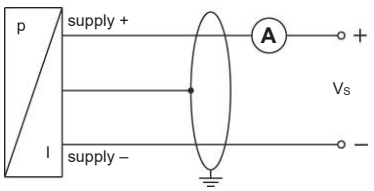
Input pressure range							
Nominal pressure gauge	[bar]	0.40	1	2	4	10	20
Level	[mH_2O]	4	10	20	40	100	200
Overpressure	[bar]	2	5	10	20	40	80
Burst pressure ≥	[bar]	3	7.5	15	25	50	120
Max. ambient pressure (housing): 40 bar							

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 [1]	≤ ± 0.1 % 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 % FSO / year at reference conditions	
Response time	approx. 5 msec	
[1] 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 [2]		
Insulation resistance	> 100 MΩ	
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 (-10 … 70 °C) black Ø 7.4 mm FEP [4] (-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	
[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	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	

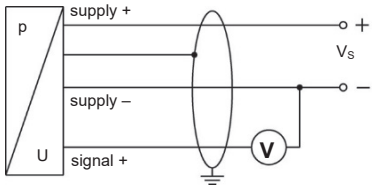
Miscellaneous	
Drinking water certificate [5]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU
[5] only possible with EPDM seal in combination with TPE-U cable; not possible with IS-version (explosion protection)	

Wiring diagrams

2-wire-system (current)

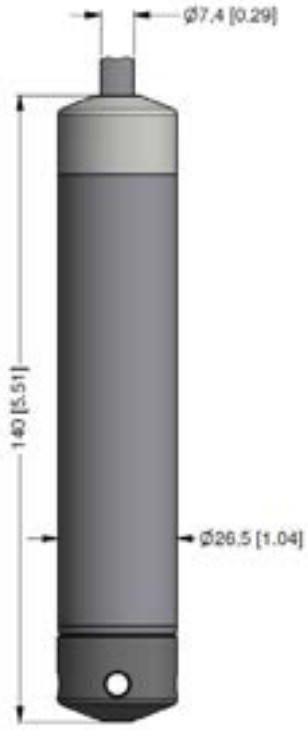


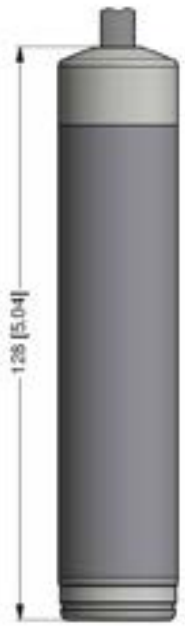
3-wire-system (current / voltage)



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

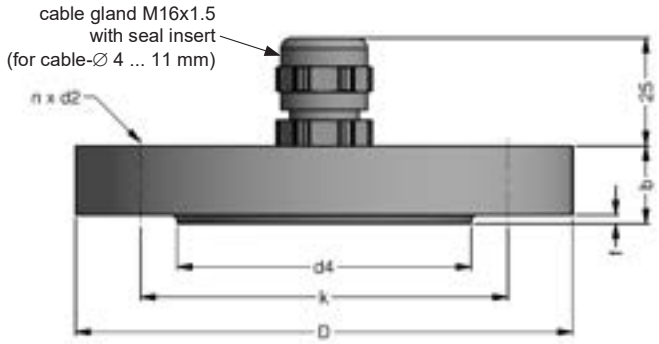
Dimensions (mm / in)





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

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

Ordering code LMP 307i

LMP 307i ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure			
in bar		450	
in mH_2O		451	
Input [mH_2O]	[bar]		
4.0	0.4	4000	
10	1.0	1001	
20	2.0	2001	
40	4.0	4001	
100	10	1002	
200	20	2002	
customer		9999	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			
0.1 % FSO		1	
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		999	
Special version			
standard		111	
customer		999	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

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

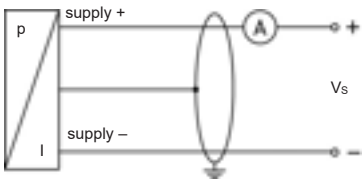
Input pressure range [1]							
Nominal pressure gauge	[bar]	0.40	1	2	4	10	20
Level	[mH_2O]	4	10	20	40	100	200
Overpressure	[bar]	2	5	10	20	40	80
Burst pressure	[bar]	3	7.5	15	25	50	120
Max. ambient pressure (housing): 40 bar							
[1] On customer request we adjust the device within the turn-down-possibility 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 Performance after turn-down (TD) - TD ≤ 1:5 - TD > 1:5	IEC 60770 [2]: ≤ ± 0.1 % FSO 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

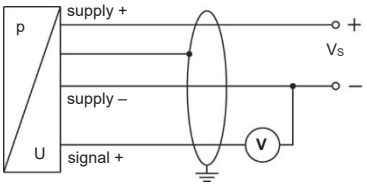
Miscellaneous		
Current consumption	max. 25 mA	
Weight	approx. 250 g (without cable)	
Ingress protection	IP 68	
CE-conformity / ATEX Directive	EMC Directive: 2014/30/EU	ATEX Directive: 2014/34/EU

Wiring diagram / connector

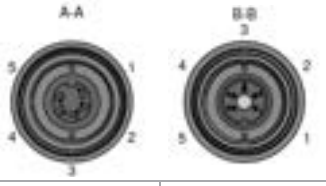
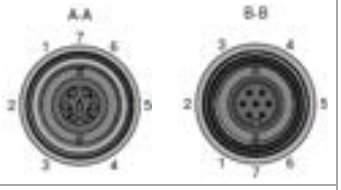
2-wire-system (current)



3-wire-system (voltage)

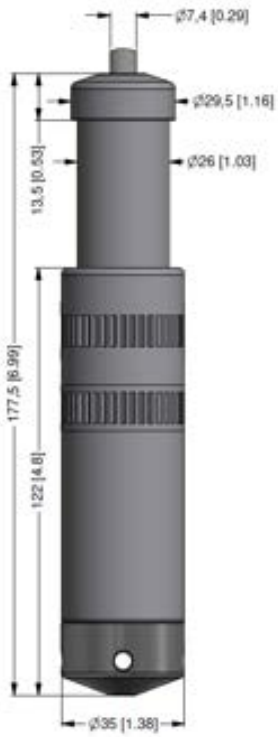


Pin configuration

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

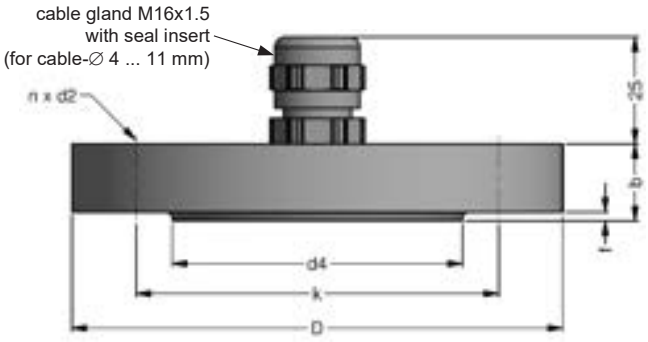
Dimensions (mm / in)



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

Ordering code LMP 308i

LMP 308i □□□-□□□□-□-□-□-□-□-□-□□□-□□□

Section / Option	[mH$_2$O]	[bar]	Code	
Pressure				
in bar			4 4 0	
in mH$_2$O			4 4 1	
Input				
	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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LMK 358H

Detachable Stainless Steel Probe with HART®-Communication

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH_2O up to 0 ... 100 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)
- permissible temperatures up to 85 °C
- high overpressure resistance
- high long-term stability

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- diaphragm 99.9 % Al_2O_3
- accessories e.g. mounting flange with cable gland and terminal clamp

The detachable stainless steel probe LMK 358H has been designed for level measurement in waste water, waste and higher viscosity media. Basic element is a capacitive ceramic sensor.

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
ground water level measurement
rain spillway basin

Sewage
waste water treatment
water recycling

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

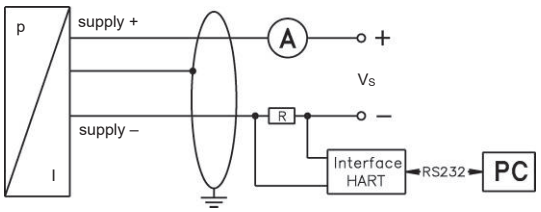
Input pressure range [1]							
Nominal pressure gauge [bar]	0.06	0.16	0.4	1	2	5	10
Level [mH_2O]	0.6	1.6	4	10	20	50	100
Overpressure [bar]	2	4	6	8	15	25	35
Max. ambient pressure (housing): 40 bar							
[1] on customer request we adjust the devices by software on the required pressure ranges, within 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 = 12 ... 28 V_{DC} with HART® communication			$V_{S\ rated}$ = 24 V_{DC}
Performance				
Accuracy [2]	$p_N \geq$ 160 mbar	TD ≤ 1:5	≤ ± 0.2 % FSO	TD_{max} = 1:10
		TD > 1:5	≤ ± [0.2 + 0.03 x TD] % FSO	
	$p_N <$ 160 mbar		≤ ± [0.2 + 0.1 x TD] % FSO	TD_{max} = 1:3
	$p_N \geq$ 1 bar	TD ≤ 1:5	≤ ± 0.1 % FSO	TD_{max} = 1:10
		TD > 1:5	≤ ± [0.1 + 0.02 x TD] % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$		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 load: 0.05 % FSO / kΩ			
Turn-on time	850 msec			
Mean response time	140 msec – without consideration of electronic damping			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 / electronic / environment / storage: -25 ... 85 °C			
Electrical protection [4]				
Short-circuit protection	permanent			
Reverse polarity protection	no damage, but also no function			
Lightning protection	integrated			
Electromagnetic compatibility	emission and immunity according to EN 61326			
[4] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request				
Mechanical stability				
Vibration	4 g (according to: DIN EN 60068-2-6)			
Electrical connection				
Cable with sheath material [5]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-25 … 70 °C) black Ø 7.4 mm FEP [6] (-25 … 70 °C) black Ø 7.4 mm TPE-U (-25 …85 °C) 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 *[6] 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	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				
Approval DX15A-LMK 358H	IBExU 10 ATEX 1186 X zone 0: 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 = 13,2 nF, L_i = 0 µH, the supply connections have an inner capacity of max. 27 nF opposite the enclosure			
Permissible media temperature	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: -25 ... 70 °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			

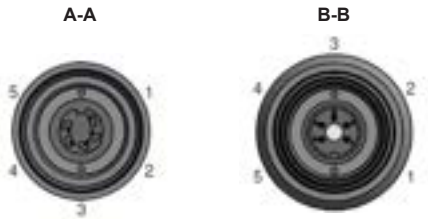
Miscellaneous	
Current consumption	max. 21 mA
Weight	approx. 650 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagram

2-wire-system (current) HART®



connector



Pin configuration		
Electrical connection	Binder series 723 [7] (5-pin)	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply –	1	BN (brown)
Shield	5	GNYE (green-yellow)

[7] *if detached*

Dimensions (mm / in)

protection cap removable

sensor head and cable detached

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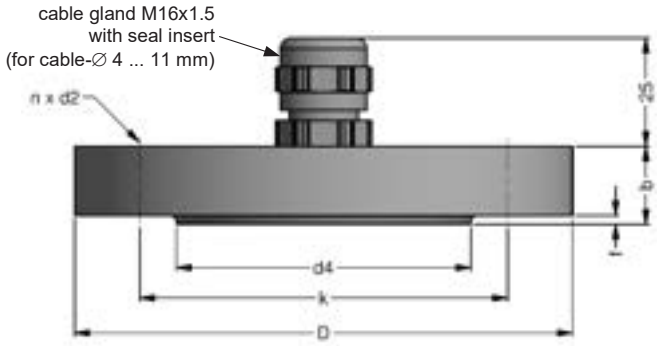
Mounting flange with cable gland



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

Ordering code LMK 358H

LMK 358H ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

		Pressure	Input	Housing	Diaphragm	Output	Seal	Electrical connection	Accuracy	Cable length	Special version	
Pressure												
	in bar	4 4 5										
	in mH_2O	4 4 6										
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									
	customer		9 9 9 9									consult
Housing												
	stainless steel 1.4404 (316L)			1								
	customer			9								consult
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					
	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				
	TPE-U-cable (blue, Ø 7.4 mm) [1]							4				
	customer							9				consult
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	
	customer										9 9 9	consult

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

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LMK 382H

Stainless Steel Probe with HART®-communication

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)
- permissible temperatures up to 85 °C
- high overpressure resistance
- high long-term stability

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al_2O_3
- accessories e.g. transmitter and mounting flanges and terminal clamp

The stainless steel probe LMK 382H has been designed for continuous level measurement in sewage, polluted and higher viscosity fluids.

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

Preferred areas of use are

Water
ground water level measurement
rain spillway basins

Sewage
waste water treatment
water recycling

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

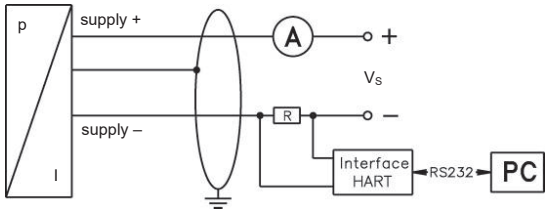
Pressure ranges [1]									
Nominal pressure	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH_2O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45
Max. ambient pressure (housing): 40 bar									
[1] on customer request we adjust the devices by software on the required pressure ranges, within 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	≤ ± 0.2 % FSO	TD_{max} = 1:10
		TD > 1:5	≤ ± [0.2 + 0.03 x TD] % FSO	
	$p_N <$ 160 mbar		≤ ± [0.2 + 0.1 x TD] % FSO	TD_{max} = 1:3
	$p_N \geq$ 1 bar	TD ≤ 1:5	≤ ± 0.1 % FSO	TD_{max} = 1:10
		TD > 1:5	≤ ± [0.1 + 0.02 x TD] % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$		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)				
Tolerance band	≤ ± 1 % FSO			
in compensated range	-20 … 80 °C			
Permissible temperatures				
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			
[4] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request				
Mechanical stability				
Vibration	4 g (according to: DIN EN 60068-2-6)			
Electrical connection				
Cable outlet with sheath material [5]	PVC (-5 … 70 °C) grey Ø 7.4 mm PUR (-25 … 70 °C) black Ø 7.4 mm FEP [6] (-25 … 70 °C) black Ø 7.4 mm TPE-U (-25 … 85 °C) 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 *[6] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*				
Materials				
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, others on request			
Explosion protection				
Approval DX15A-LMK 382H	IBExU 10 ATEX 1186 X zone 0 [7]: 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 = 13.2 nF, L_i = 0 µH, the supply connections have an inner capacity of max. 27 nF opposite the enclosure			
Permissible media temperature	in zone 0: -10 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: -25 ... 70 °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			
[7] for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)				

Miscellaneous	
Option cable protection for probes	prepared for mounting with stainless steel pipe
Ingress protection	IP 68
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

Wiring diagram

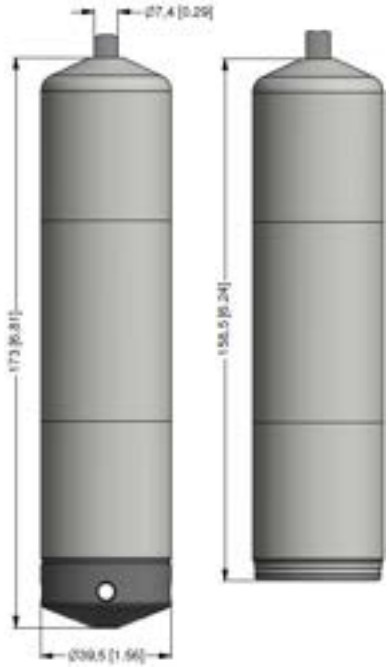
2-wire-system (current) HART®



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

Dimensions (mm / in)

standard

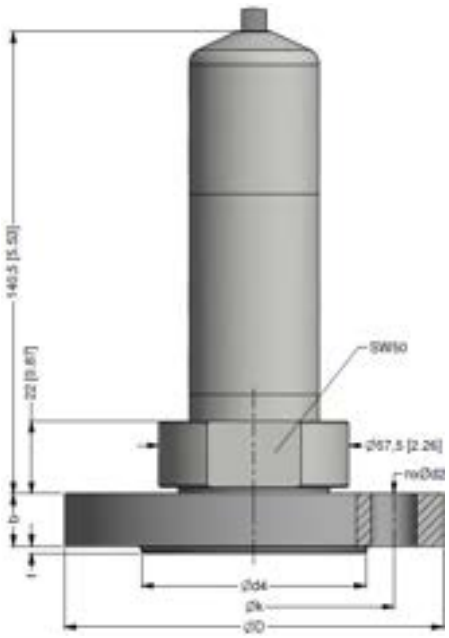


protection cap removable

option

prepared for mounting with stainless steel pipe

flange version



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

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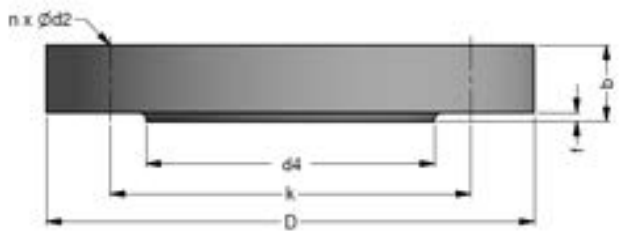
Transmitter flange for flange version

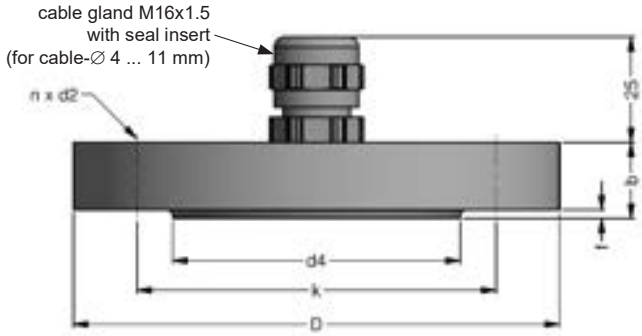


dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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

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	

Ordering code LMK 382H

LMK 382H ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Option		Code	Remark
Pressure			
in bar		5 6 5	
in mH_2O		5 6 6	
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	
customer		9	consult
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		7	
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	
TPE-U-cable (blue, Ø 7.4 mm) [1]		4	
customer		9	consult
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 [2]		5 0 2	
flange version [3]		5 1 0	
customer		9 9 9	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference
[2] stainless steel pipe is not part of the supply
[3] mounting accessories are not part of supply and have to be ordered separately

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LMK 387H

Stainless Steel Probe with HART®-communication

Ceramic Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 22 mm
- HART® communication (revision 7)
- setting of offset, span and damping
- diaphragm ceramics 99.9% Al_2O_3
- good long-term stability
- especially for waste water

Optional versions

- housing material titanium
- IS-version
  Ex ia = intrinsically safe for gas and dust
- drinking water certificate
  according to DVGW and KTW
- temperature element Pt 100
- different kinds of elastomer

The stainless steel probe LMK 387H was developed for level and gauge measurement in wastewater, sludge or water courses. The mechanical robustness of the flush ceramic diaphragm facilitates an easy disassembly and cleaning of the probe in case of service.

The outer diameter is only 22 mm, whereby the installation or retrofitting can be easily carried out in 1 "pipes or in confined installation conditions. In addition to an intrinsically safe version (zone 0), a version with temperature signal is available.

Preferred areas of use

Water
groundwater and level monitoring

Sewage
waste water treatment
water recycling

Fuel and oil
tank battery
biogas plants

Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3	-0.5				-1				
Max. ambient pressure (housing): 40 bar												

Output signal / Supply			
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC} with HART® communication (revision 7) / $V_{S\ rated}$ = 24 V_{DC}		
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC} with HART® communication (revision 7) / $V_{S\ rated}$ = 24 V_{DC}		
Option Pt 100-temperature element			
Temperature range	-25 … 125 °C	max. voltage 10 V_{DC},	in intrinsically safe circuit 30 V_{DC}
Connectivity technology	3-wire	max. current 2 mA,	in intrinsically safe circuit 54 mA
Resistance	100 Ω at 0 °C	max. power 10 mW,	in intrinsically safe circuit 405 mW
Temperature coefficient	3850 ppm/K		
Supply I_S	0.3 … 1.0 mA $_{DC}$		
Performance			
Accuracy [1] standard	p_N ≥ 160 mbar	TD ≤ 1:5 ≤ ± 0.35 % FSO TD > 1:5 ≤ ± [0.35 + 0.05 x TD] % FSO	TD_{max} = 1:10
	p_N < 160 mbar	≤ ± [0.35 + 0.15 x TD] % FSO	TD_{max} = 1:3
option	p_N ≥ 160 mbar	TD ≤ 1:5 ≤ ± 0.25 % FSO TD > 1:5 ≤ ± [0.25 + 0.05 x TD] % FSO	TD_{max} = 1:10
	p_N < 160 mbar	≤ ± [0.25 + 0.15 x TD] % FSO	TD_{max} = 1:3
Permissible load	R_{max} = [(V_S - $V_{S\ min}$) / 0.02 A] Ω	load at HART®-communication: R_{min} = 250 Ω	
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		
Turn-on time	≤ 3 sec		
Mean response time	≤ 50 msec without electronic damping		
Measuring rate	≤ 20 Hz		
Adjustability	configuration of following parameters possible (interface / software necessary [2]): electronic damping: 0 ... 100 sec offset: 0 ... 80 % FSO turn down of span: max. 1:10		
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[2] 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)			
Tolerance band	≤ ± 1 % FSO	in compensated range -20 … 80 °C	
Permissible temperatures			
Permissible temperatures	medium / electronics / environment / storage: -40 ... 85 °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]	TPE-U blue Ø 7.4 mm (without / with drinking water certificate) TPE-U [5] red Ø 9.0 mm others on request		
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] only in combination with IS-version (explosion protection) and temperature element Pt100*			
Materials (media wetted)			
Housing	standard: stainless steel 1.4404 (316 L); option: titanium others on request		
Seals (O-rings)	standard: FKM option: EPDM (without / with drinking water certificate) FFKM (min. permissible temperature from -15 °C) others on request		
Diaphragm	ceramics Al_2O_3 99.9%		
Protection cap	POM-C		
Cable sheath	TPE-U		
Explosion protection			
Approval DX14B-LMK 387H	IBExU 15 ATEX 1066 X / IECEx IBE 18.0019X zone 0: II 1G Ex ia IIB T4 Ga; zone 20: II 1D Ex ia IIIC T135 °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; the supply connections have an inner capacity of max. 27 nF opposite the enclosure		
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 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 ... 65 °C		
Connecting cables (by factory)	cable capacity: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m		

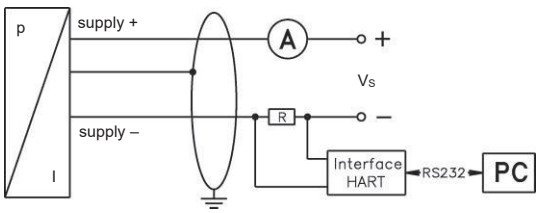
Miscellaneous	
Drinking water certificate [6]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Current consumption	max. 22 mA
Weight	approx. 280 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

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

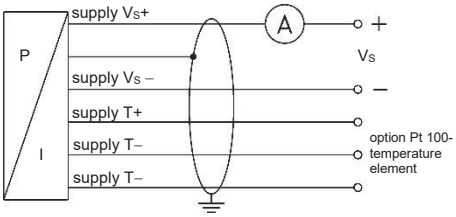
Pin configuration		
Electrical connection	cable colours (IEC 60757)	
	4 … 20 mA / HART®	4 … 20 mA / HART® (pressure) **with Pt 100** (temperature)
Supply V_S + Supply V_S – Supply T+ (with Pt 100) Supply T– (with Pt 100) Supply T– (with Pt 100)	WH (white) BN (brown) - - -	WH (white) BN (brown) YE (yellow) GY (grey) PK (pink)
Shield	GNYE (green-yellow)	GNYE (green-yellow)

Wiring diagrams

2-wire-system current HART®

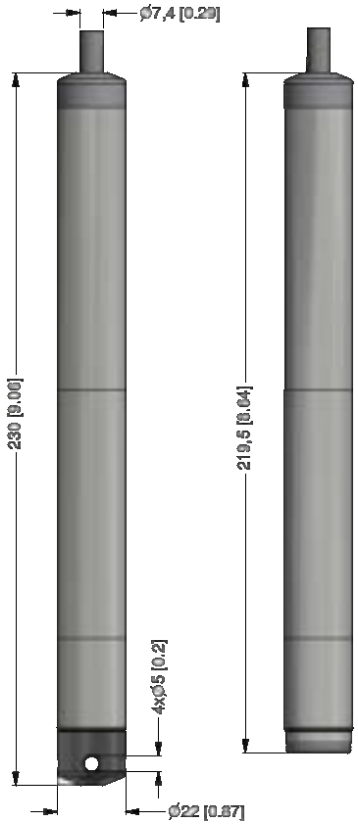


2-wire-system HART® (pressure) /
3-wire-system (temperature)

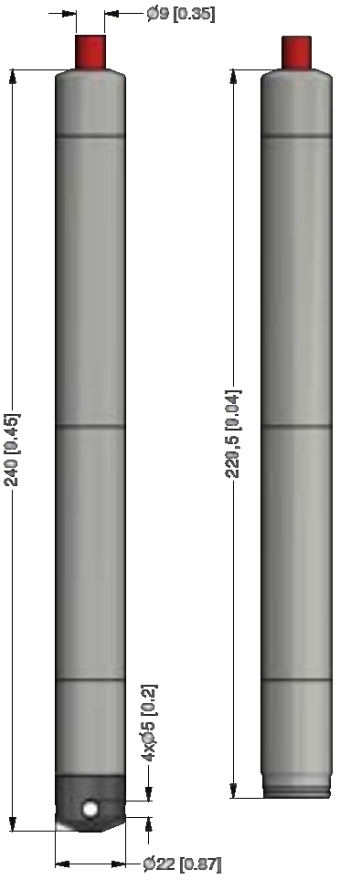


Dimensions (mm / in)

standard



IS-version with Pt100 (temperature element)



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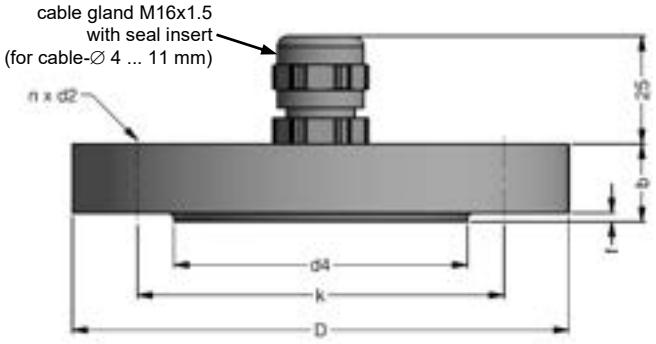
Mounting flange with cable gland



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

Ordering code LMK 387H

LMK 387H ☐☐☐ - ☐☐☐☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐☐☐ - ☐☐☐

		Pressure	Input	Housing	Diaphragm	Output	Seals	Electrical connection	Accuracy	Cable length	Special version	
Pressure												
	gauge in bar	3 6 0										
	gauge in mH_2O	3 6 1										
Input [mH_2O]	[bar]											
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									
	customer		9 9 9 9									consult
Housing												
	stainless steel 1.4404 (316L)			1								
	titanium			T								
	customer			9								consult
Diaphragm												
	ceramics Al_2O_3 99.9 %				C							
	customer				9							consult
Output												
	HART®-communication (revision 7) 4 … 20 mA / 2-wire					H						
	HART®-communication (revision 7) intrinsic safety 4 … 20 mA / 2-wire					I						
	customer					9						consult
Seals												
	FKM						1					
	EPDM						3					
DVGW / KTW:	EPDM [1]						3T					
	FFKM [2]						7					
	customer						9					consult
Electrical connection												
	TPE-U-cable (blue, Ø 7.4 mm) [3]							4				
DVGW / KTW:	TPE-U-cable (blue, Ø 7.4 mm) [1,3]							F				
	TPE-U-cable (red, Ø 9.0 mm) [3,4]							42				
	customer							9				consult
Accuracy												
standard:	0.35 % FSO								3			
option for $p_N \geq$ 160 mbar:	0.25 % FSO								2			
	customer								9			consult
Cable length												
	in m									9 9 9		
Special version												
	standard										0 0 0	
	with temperature element Pt 100										0 1 3	
	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-protection (explosion protection) or housing material titanium
[2] min. permissible temperature from -15 °C
[3] shielded cable with integrated ventilation tube for atmospheric pressure reference
[4] only in combination with Ex version (explosion protection) and temperature element Pt 100

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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

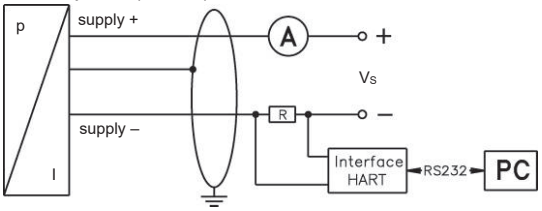
Shipbuilding / Offshore
ballast tanks
draught monitoring
level measurement in ballast and storage tanks

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 ≥ 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 ≥ 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 humidity: B electromagnetic compatibility:	vibration: B enclosure: D 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: zone 1 and higher:	-20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar -25 ... 70 °C		
Connecting cables (by factory)	cable capacity: cable inductance:	signal line/shield as well as signal line/signal line: 160 pF/m 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

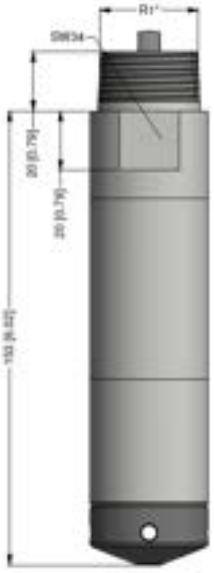
Electrical connection	cable colours (IEC 60757)
Supply V_S + Supply V_S –	WH (white) BN (brown)
Shield	GNYE (green-yellow)

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

probe

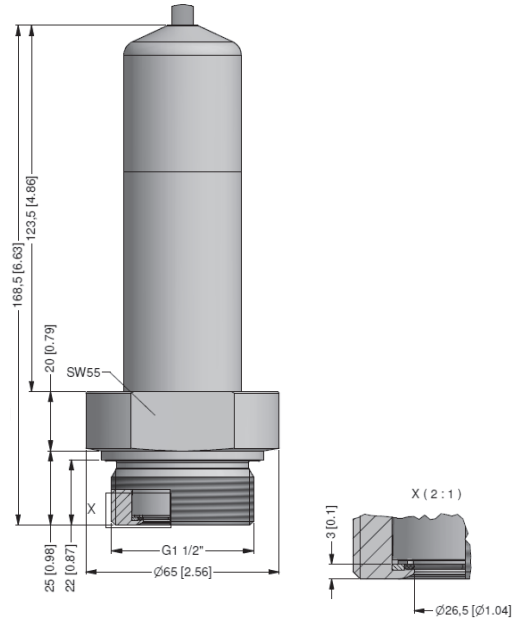
protection cap removable

option

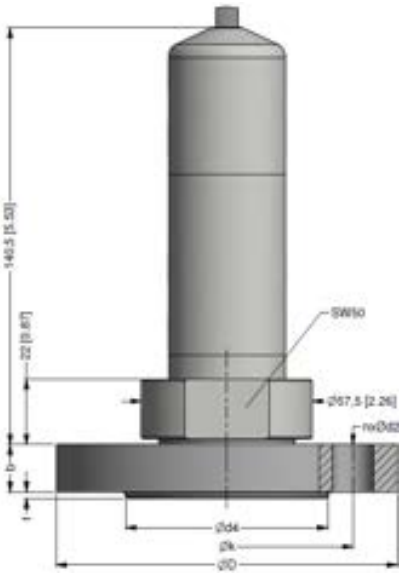


prepared for mounting with stainless steel pipe

screw-in version



flange version



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

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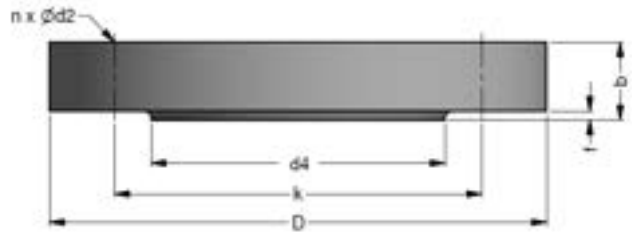
Transmitter flange for flange version

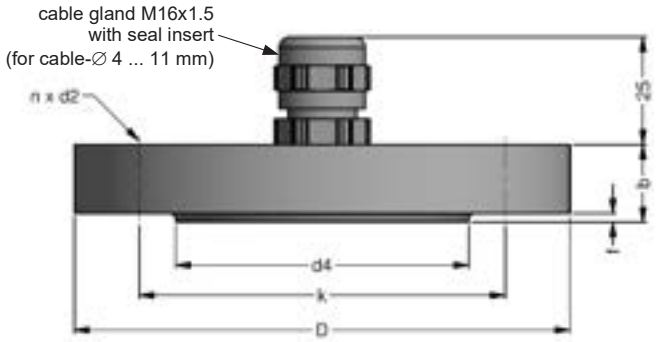


dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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

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 ≥ 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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LMP 305

Slimline Probe

Stainless Steel Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 250 mH_2O

Output signals

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

Special characteristics

- diameter 19 mm for confined space conditions e. g. in 1" pipes
- small thermal effect
- good long term stability
- excellent linearity

Optional versions

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

The slimline probe LMP 305 with silicon stainless steel sensor is designed for continous level measurement in confined space conditions e. g. 1" pipes. Permissible media are clean or lightly polluted water and thin fluids.

A piezoresistiv stainless steel sensor with low thermal error, an excellent linearity and a long term stability, is basis of LMP 305.

Preferred areas of use are

Water

level measurement in confined space conditions

ground water monitoring

depth or level measurement in wells and open waters

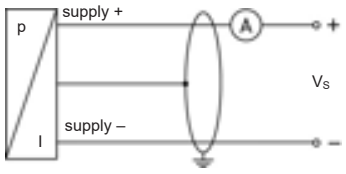
drinking water system

level measurement in container

Input pressure range													
Nominal pressure gauge [bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level [mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure [bar]	1	1	1	1	3	3	6	6	20	20	60	60	100
Max. ambient pressure (housing): 40 bar													

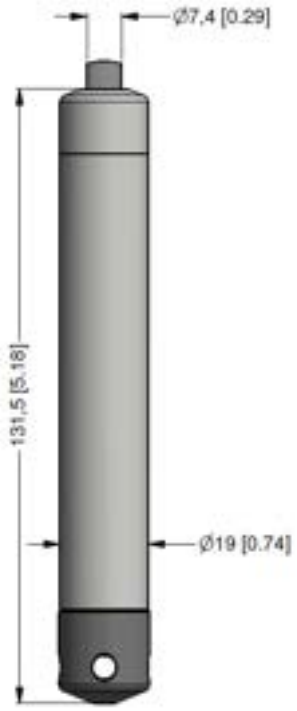
Output signal / Supply					
2-wire	4 ... 20 mA / V_S = 12 ... 36 V_{DC}				
Performance					
Accuracy [1]	standard: nominal pressure > 0.4 bar: ≤ ± 0.35 % FSO nominal pressure ≤ 0.4 bar: ≤ ± 0.50 % FSO option: nominal pressure > 0.4 bar: ≤ ± 0.25 % FSO				
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0{,}02\ A]\ \Omega$				
Influence effects	supply: 0.05 % FSO / 10 V			load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions				
Response time	≤ 10 msec				
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)					
Thermal effects (offset and span)					
Nominal pressure P_N [bar]	≤ 0.1	≤ 0.25	≤ 0.4	≤ 1	> 1
Tolerance band [% FSO]	≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 1	≤ ± 0.75
TC, average [% FSO / 10 K]	± 0.3	± 0.2	± 0.14	± 0.1	± 0.07
In compensated range [°C]	0 ... 50			0 ... 70	
Permissible temperatures					
Permissible temperatures	medium: -10 ... 70 °C			storage: -25 ... 70 °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 (-10 … 70 °C) black Ø 7.4 mm FEP [4] (-10 … 70 °C) black Ø 7.4 mm				
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	stainless steel 1.4404 (316L)				
Seals	FKM, EPDM				
Diaphragm	stainless steel 1.4435 (316L)				
Protection cap	POM-C				
Cable sheath	PVC, PUR, FEP, others on request				
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)



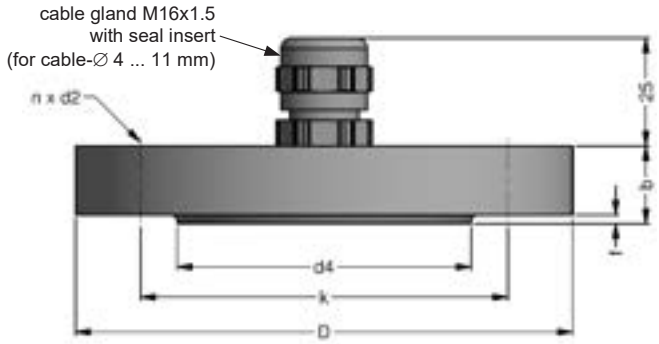
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply –	WH (white) BN (brown)
Shield	GNYE (green-yellow)

Dimensions (mm / in)



protection cap removable

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

Ordering code LMP 305

LMP 305 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

			Code	
Pressure				
		in bar	4 0 0	
		in mH_2O	4 0 1	
Input	**[mH_2O]**	**[bar]**		
	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	
	250	25	2 5 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	
		customer	9	consult
Seal				
		FKM	1	
		EPDM	3	
		customer	9	consult
Accuracy				
standard for p_N > 0.4 bar		0.35 % FSO	3	
standard for $p_N \leq$ 0.4 bar		0.50 % FSO	5	
option for p_N > 0.4 bar		0.25 % FSO	2	
		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

LMP 307

Stainless Steel Probe

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
options: 0.25 % / 0.1 % FSO

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 250 mH_2O

Output signals

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

Special characteristics

- diameter 26.5 mm
- small thermal effect
- high accuracy
- good long term stability

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- SIL 2 (Safety Integrity Level)
- drinking water certificate
  according to DVGW and KTW
- different kinds of cables
  and elastomers
- petrol-version
  welded pressure sensor and housing
- mounting with stainless steel pipe

The stainless steel probe LMP 307 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

Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120
Max. ambient pressure (housing): 40 bar														

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC}	0 ... 10 V / V_S = 14 ... 30 V_{DC}
Performance		
Accuracy [1]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO option 2: for all nominal pressures: ≤ ± 0.1 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$ current 3-wire: R_{max} = 500 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 % FSO / year at reference conditions	
Response time	2-wire: ≤ 10 msec	3-wire: ≤ 3 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		

Thermal effects (offset and span)		
Nominal pressure p_N [bar]	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 1	≤ ± 0.75
in compensated range [°C]	0 ... 70	

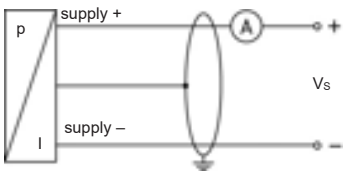
Permissible temperatures		
Permissible temperatures	medium: -10 ... 70 °C	storage: -25 ... 70 °C
Electrical protection [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[2] 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 (-10 … 70 °C) black Ø 7.4 mm FEP [4] (-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	
[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	stainless steel 1.4404 (316L)	
Seals	FKM; EPDM (without / with drinking water certificate) welded version [5]	others on request
Diaphragm	stainless steel 1.4435 (316L)	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP, TPE-U	
[5] not in combination with SIL version and only in combination with FEP cable possible		
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approvals DX19-LMP 307	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, $C_i \approx 0$ nF, $L_i \approx 0$ 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 ... 70 °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	
Option SIL 2 version [6]	according to IEC 61508 / IEC 61511
Drinking water certificate [7]	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

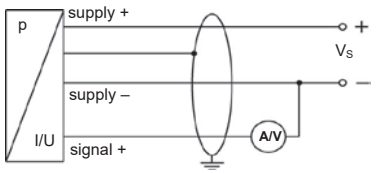
[6] not in combination with the accuracy 0.1 %, only for 4...20 mA / 2-wire
[7] only possible with EPDM seal in combination with TPE-U cable; not possible with IS-version (explosion protection)

Wiring diagrams

2-wire-system (current)



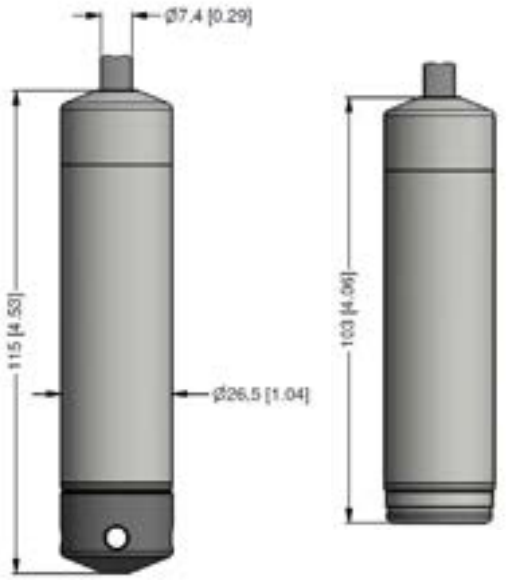
3-wire-system (current / voltage)



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

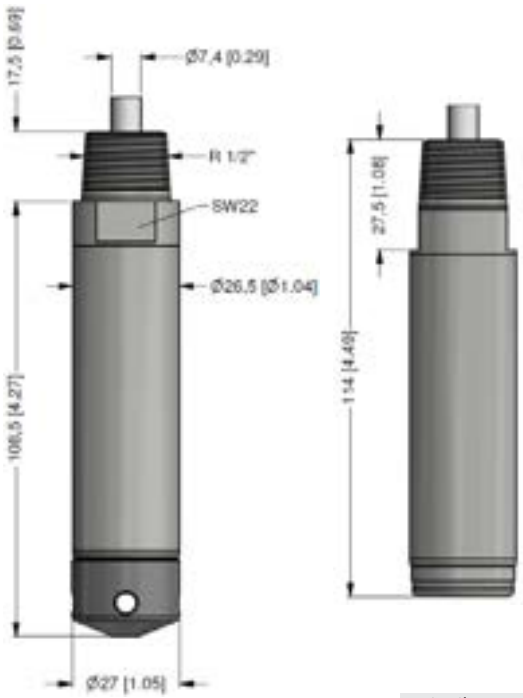
Dimensions (mm / in)

Standard



protection cap removable

Option

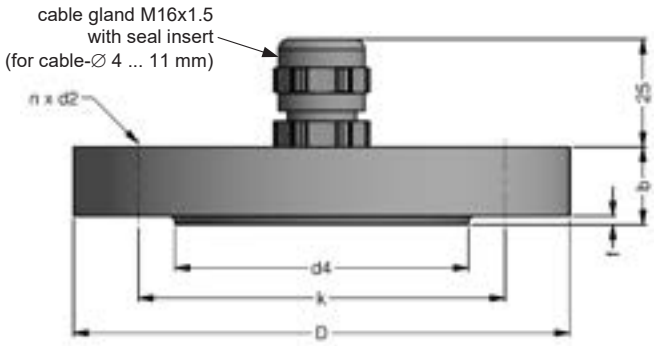


protection cap removable

prepared for mounting with stainless steel pipe

⇨ Total length of devices with accuracy 0.1 % FSO IEC 60770 increases by 35 mm!

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

Ordering code LMP 307

LMP 307 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

			Code	
Pressure				
		in bar	4 5 0	
		in mH_2O	4 5 1	
Input	[mH_2O]	[bar]		
	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	
	250	25	2 5 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	
		0 … 20 mA / 3-wire	2	
		0 … 10 V / 3-wire	3	
		intrinsic safety 4 … 20 mA / 2-wire	E	
		SIL2 4 … 20 mA / 2-wire	1S	
		SIL 2 with Intrinsic safety 4 … 20 mA / 2-wire	ES	
		customer	9	consult
Seal				
		FKM	1	
		EPDM	3	
DVGW/KTW:		EPDM [1]	3T	
petrol-version:		without (welded version) [2,4]	21	
		customer	9	consult
Accuracy				
standard for $p_N \geq 0.4$ bar		0.35 % FSO	3	
standard for $p_N < 0.4$ bar		0.5 % FSO	5	
option 1 for $p_N \geq 0.4$ bar		0.25 % FSO	2	
option 2		0.1 % FSO [2]	1	
		customer	9	consult
Electrical connection / cable length				
		PVC-cable (grey, Ø 7.4 mm) [3]		
		3 m	1 0 0 3	
		5 m	1 0 0 5	
		10 m	1 0 1 0	
		15 m	1 0 1 5	
		special length in m	1 9 9 9	
		PUR-cable (black, Ø 7.4 mm) [3]		
		3 m	2 0 0 3	
		5 m	2 0 0 5	
		10 m	2 0 1 0	
		15 m	2 0 1 5	
		special length in m	2 9 9 9	
		FEP-cable (black, Ø 7.4 mm) [3]		
		5 m	3 0 0 5	
		10 m	3 0 1 0	
		special length in m	3 9 9 9	
		TPE-U-cable (blue, Ø 7.4 mm) [3]		
		special length in m	4 9 9 9	
DVGW/KTW:		[1]		
		special length in m	F 9 9 9	
Special version				
		standard	0 0 0	
		prepared for mounting with stainless steel	5 0 3	
		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] not in combination with SIL
[3] shielded cable with integrated ventilation tube for atmospheric pressure reference
[4] petrol-version only in combination with FEP cable

LMP 307T

Level and Temperature Transmitter

Stainless Steel Sensor

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

Nominal pressure / nominal temperature

from 0 ... 1 mH_2O up to 0 ... 250 mH_2O

from 0 ... 30 °C up to 0 ... 70 °C

others on request

Output signals

2-wire: 4 ... 20 mA (pressure)

2-wire: 4 ... 20 mA (temperature)

Special characteristics

- diameter 26.5 mm
- separate output signals for pressure and temperature ranges
- easy handling
- low maintenance and wiring costs

Optional versions

- drinking water certificate according to DVGW and KTW
- different kinds of cables and elastomers
- customer specific versions

BD|SENSORS has developed the stainless steel submersible probe LMP 307T for continuous level and temperature measurement in water and in clean or lightly polluted fluids. The advantage: simultaneous recording of level and temperature with separate independent signal amplification. The maintenance and wiring costs are considerably reduced.

In addition to classical signal processing of the level, an additional signal circuit independent of the level which converts the temperature signal into a 4 … 20 mA analogue signal in 2-wire technology is provided.

Typical application areas are, for example, drinking water purification, monitoring of rain spillway basins or river courses and level measurement in containers or tank batteries.

Preferred areas of use are

Water / filtrated sewage
drinking water system
rain spillway basins
water recycling

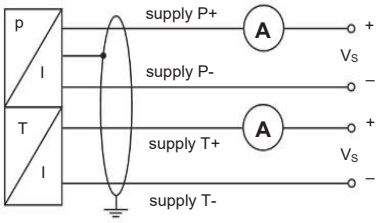
Fuel and oil
tank farm

Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120
Max. ambient pressure (housing): 40 bar														

Input temperature range				
Temperature measuring range standard:	0 … 30 °C	0 … 50 °C	0 … 70 °C	others on request [1]
[1] min. temperature range: 30°C; max. temperature range: 80°C; min. temperature: -10°C; max. temperature: 70 °C				
Output signal / Supply				
2-wire (pressure) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}			
2-wire (temperature) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}			
[2] the circuits are galvanically isolated from each other				
Performance				
Accuracy (pressure) [3]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO			
Accuracy (temperature) [4]	≤ ± 1 °C			
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 (for output signal 2-wire (pressure))			
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] Pt100 class B; compensation time up to 1 h depending on constant temperature and environmental respectively mass conditions*				
Thermal effects (offset and span)				
Nominal pressure P_N [bar]	< 0.40		≥ 0.40	
Tolerance band [% FSO]	≤ ± 1		≤ ± 0.75	
in compensated range [°C]	0 ... 70			
Permissible temperatures				
Permissible temperatures	medium: -10 ... 70 °C	storage: -25 ... 70 °C		
Electrical protection [5]				
Short-circuit protection	permanent			
Reverse polarity protection	no damage, but also no function			
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 (-10 … 70 °C) black Ø 7.4 mm FEP [7] (-10 … 70 °C) black Ø 7.4 mm TPE-U (-10 … 70 °C) blue Ø 7.4 mm (without/with drinking water certificate)			
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			
[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 (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, others on request			
Miscellaneous				
Drinking water certificate [8]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)			
Current consumption	max. 25 mA			
Weight	approx. 200 g (without cable)			
Ingress protection	IP 68			
CE-conformity	EMC Directive: 2014/30/EU			
[8] only possible with EPDM seal in combination with TPE-U cable				

Wiring diagram

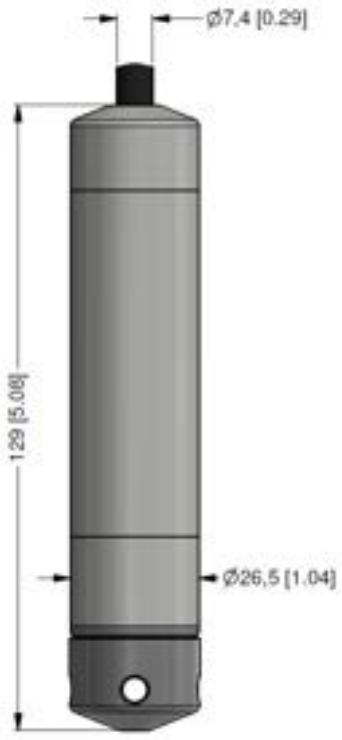
2x2-wire-system (current)

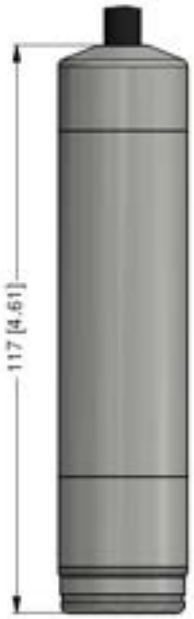


Pin configuration

Electrical connection	cable colours (IEC 60757)
Supply P+	WH (white)
Supply P–	BN (brown)
Supply T+	GY (grey)
Supply T–	PK (pink)
Shield	GNYE (green-yellow)

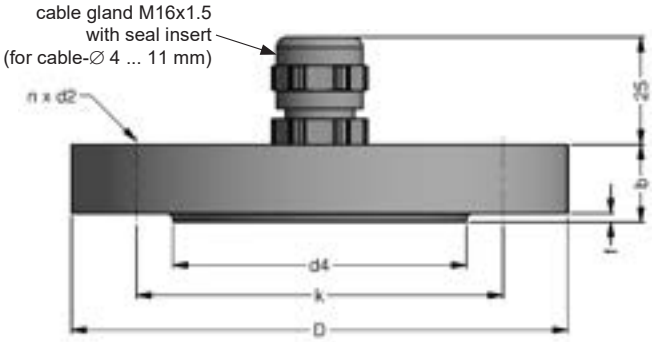
Dimensions (mm / in)





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

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

Ordering code LMP 307T

LMP 307T ☐☐☐-☐☐☐☐-☐☐☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐☐-☐☐☐

Option		Code	
Pressure			
	in bar	455	
	in mH_2O	456	
Input	**[mH_2O] / [bar]**		
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	
250	25	2502	
	customer	9999	consult
Input temperature	**°C**		
	0 … 30	000x30	
	0 … 50	000x50	
	0 … 70	000x70	
	customer	999999	consult
Housing			
	stainless steel 1.4404 (316L)	1	
	customer	9	consult
Diaphragm			
	stainless steel 1.4435 (316L)	1	
	customer	9	consult
Output pressure			
	4 … 20 mA / 2-wire	1	
Output temperature			
	4 … 20 mA / 2-wire	1	
Seal			
	FKM	1	
	EPDM	3	
DVGW/KTW:	EPDM [1]	3T	
	customer	9	consult
Accuracy			
standard for $p_N \geq 0.4$ bar	0.35 % FSO	3	
standard for $p_N < 0.4$ bar	0.5 % FSO	5	
option 1 for $p_N \geq 0.4$ bar	0.25 % FSO	2	
	customer	9	consult
Electrical connection / cable length			
	PVC-cable (grey, Ø 7.4 mm) [2]		
	3 m	1003	
	5 m	1005	
	10 m	1010	
	15 m	1015	
	special length in m	1999	
	PUR-cable (black, Ø 7.4 mm) [2]		
	3 m	2003	
	5 m	2005	
	10 m	2010	
	15 m	2015	
	special length in m	2999	
	FEP-cable (black, Ø 7.4 mm) [2]		
	5 m	3005	
	10 m	3010	
	special length in m	3999	
	TPE-U-cable (blue, Ø 7.4 mm) [2]		
	special length in m	4999	
DVGW/KTW:	[1] special length in m	F999	
Special version			
	standard	000	
	customer	999	consult

[1] drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)
[2] shielded cable with integrated ventilation tube for atmospheric pressure reference

LMP 308

Detachable Stainless Steel Probe

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % FSO / 0.1 % FSO

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 250 mH_2O

Output signals

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

Special characteristics

- diameter 35 mm
- cable and sensor head detachable
- high accuracy
- good long term stability

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- SIL 2 (Safety Integrity Level)
- customer specific versions
- mounting accessories e.g.
  mounting flange and terminal clamp
  in stainless steel
- different kinds of cables
  and elastomers

The detachable stainless steel probe LMP 308 is designed for the continuous level measurement of water and low-viscosity fluids.

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 basin

level measurement in container

water treatment plants

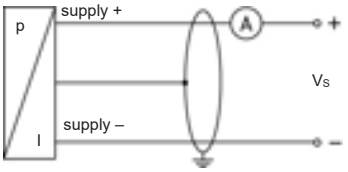
water recycling

Input pressure range														
Nominal pressure gauge	[bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120
Max. ambient pressure (housing): 40 bar														

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Performance		
Accuracy [1]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO option 2: for all nominal pressures: ≤ ± 0.1 % 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)		
Nominal pressure p_N [bar]	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 1	≤ ± 0.75
in compensated range [°C]	0 ... 70	
Permissible temperatures		
Permissible temperatures	medium: -20 ... 70 °C	storage: -25 ... 70 °C
Electrical protection [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Lightning protection	integrated	
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 (-20 … 70 °C) black Ø 7.4 mm FEP [4] (-20 … 70 °C) black Ø 7.4 mm	
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	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		
Approvals DX19-LMP 308	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, $C_i \approx$ 0nF, $L_i \approx 0\mu H$, 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 ... 70 °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		
Option SIL2 version [5]	according to IEC 61508 / IEC 61511	
Current consumption	max. 25 mA	
Weight	approx. 250 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
[5] not in combination with the accuracy 0.1 % FSO		

Wiring diagram

2-wire-system (current)



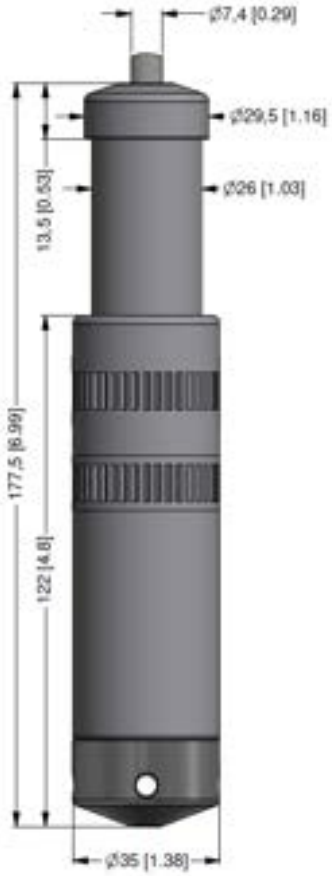
connector

Pin configuration

Electrical connection	Binder series 723 [6] (5-pin)	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply –	1	BN (brown)
Shield	5	GNYE (green-yellow)

[6] *if detached*

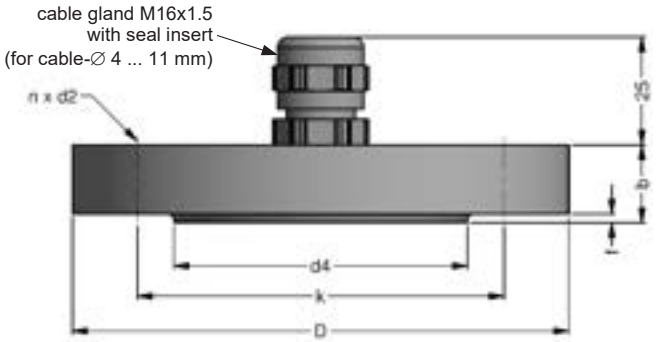
Dimensions (mm / in)



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

Ordering code LMP 308

LMP 308 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure												
	in bar	4 4 0										
	in mH_2O	4 4 1										
Input [mH_2O]	[bar]											
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									
250	25		2 5 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						
	SIL2 4 … 20 mA / 2-wire					1S						
	SIL2 with intrinsic safety 4 … 20 mA / 2-wire					ES						
	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												
standard for $p_N \geq 0.4$ bar	0.35 % FSO								3			
standard for $p_N < 0.4$ bar	0.5 % FSO								5			
option 1 for $p_N \geq 0.4$ bar	0.25 % FSO								2			
option 2	0.1 % FSO [2]								1			
	customer								9			consult
Cable length												
	in m									9 9 9		
Version												
	standard										0 0 0	
	customer										9 9 9	consult

[1] cable with integrated ventilation tube for atmospheric pressure reference
[2] not in combination with SIL

LMP 808

Detachable Plastic Probe

Stainless Steel Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 35 mm
- cable assembly and sensor head detachable
- excellent linearity
- small thermal effect
- integrated lightning protection and increased overvoltage protection 8 kA gas discharge tube (8/20 µsec); 4 kV surge l-l/l-e according to EN61000-4-5

Optional versions

- SIL 2 (Safety Integrity Level) according to IEC 61508 / 61511
- different kinds of cables and elastomers

The separable plastic immersion probe LMP 808 was developed for water applications, for level measurements in rivers and for level measurements by fuels and oils designed. The basic element is a precise stainless steel sensor.

Since the area of application is often outside a building, great emphasis was placed on overvoltage / lightning protection.

To simplify warehousing and Maintenance, the probe head can be separated from the cable part and, if necessary, can be done without time-consuming assembly work can be replaced.

Preferred areas of use are

Water / filtrated sewage
ground water level measurement
rain spillway basins
drinking water systems
water treatment plants

Fuel and oil
fuel storage
tank farms
biogas plants
process water recycling

Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50
Max. ambient pressure (housing): 20 bar												

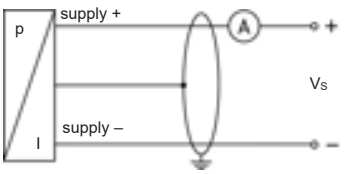
Output signal / Supply			
Standard	2-wire:	4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire:	0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}	
Performance			
Accuracy	standard:	nominal pressure < 0.4 bar:	≤ ± 0.5 % FSO
		nominal pressure ≥ 0.4 bar:	≤ ± 0.35 % FSO
	option:	nominal pressure ≥ 0.4 bar:	≤ ± 0.25 % FSO
Permissible load	current 2-wire:	R_{max} = [(V_S – $V_{S\ min}$) / 0.02 A] Ω	
	current 3-wire:	R_{max} = 500 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 % 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)			
Nominal pressure P_N	[bar]	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤ ± 1	≤ ± 0.75
In compensated range	[°C]	0 ... 50	

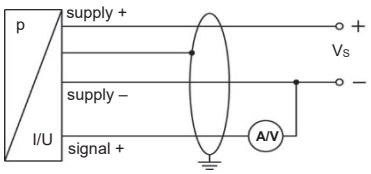
Permissible temperatures	
Permissible temperatures	medium / electronics / environment / storage: 0 ... 60 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Overvoltage / Lightning protection (only 4 … 20 mA / 2-wire without SIL2)	
Series resistance	9.4 Ω for each positive and negative wire
Max. leakage current	8 kA (8/20 µsec)
Overload	4 kV (line-line and line-earth) according to EN 61000-4-5
Max. rated current	30 mA
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
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 air 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
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM-C
Cable sheath	PVC, PUR, FEP, others on request
Miscellaneous	
Option cable protection (on request)	prepared for mounting with PP-HT pipe Ø 25 mm; available as compact product (standard: pipe with a total length up to 2 m possible)
Option SIL 2 application [5]	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
[5] only for 4...20 mA / 2-wire	

Wiring diagrams

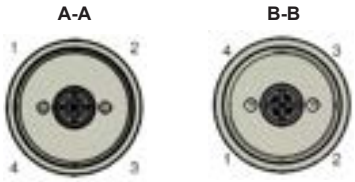
2-wire-system (current)



3-wire-system (current / voltage)

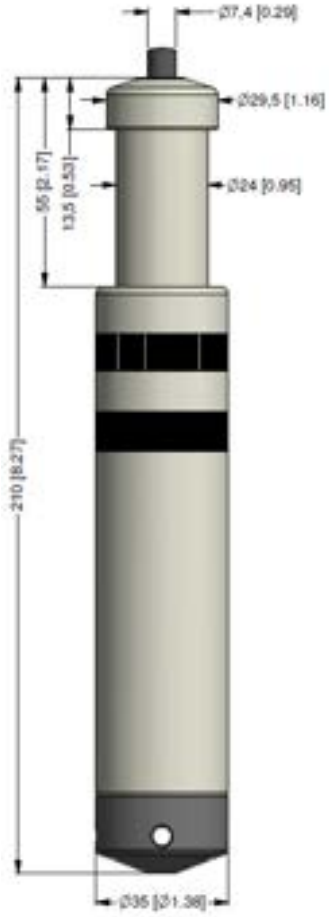


Pin configuration

Electrical connection	M12x1 (4-pin) [6] 	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply –	4	BN (brown)
Signal + (only for 3-wire)	1	GN (green)
Shield	2	GNYE (green-yellow)

[6] *if detached*

Dimensions (mm / in)



protection cap
removable

sensor head
and cable detached

Ordering code LMP 808

LMP 808 ☐☐☐ - ☐☐☐☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐☐☐ - ☐☐☐

Section	Description		Code	
Pressure				
	in bar		4 1 0	
	in mH_2O		4 1 1	
Input	[mH_2O]	[bar]		
	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	
	customer		9 9 9 9	consult
Housing				
	PP-HT		R	
	customer		9	consult
Diaphragm				
	stainless steel 1.4435 (316L)		1	
	customer		9	consult
Output				
	4 … 20 mA / 2-wire		1	
	0 … 20 mA / 3-wire		2	
	0 … 10 V / 3-wire		3	
	SIL2 4 … 20 mA / 2-wire		1S	
	customer		9	consult
Seals				
	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				
	standard for $p_N \geq 0.4$ bar	0.35 % FSO	3	
	standard for $p_N < 0.4$ bar	0.5 % FSO	5	
	option for $p_N \geq 0.4$ bar	0.25 % FSO	2	
	customer		9	consult
Cable length				
	in m		9 9 9	
Special version				
	standard		0 0 0	
	prepared for pipe mounting [2]		1 0 6	
	customer		9 9 9	consult

[1] cable with integrated ventilation tube for atmospheric pressure reference
[2] pipe is not part of the supply

LMK 306

Stainless Steel Probe

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 17 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 slimline probe LMK 306 with ceramic sensor has been especially designed for the continuous level measurement at confined space conditions. Permissible media are clean or slightly contaminated water and thin fluids.

Different cable sheath materials are available in order to achieve maximum media compatibility.

Preferred areas of use are

Water

level measurement at confined space conditions

ground water monitoring

depth or level measurement in wells

drinking water abstraction

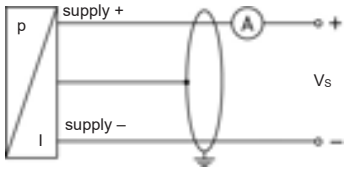
level measurement in open and closed tanks

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): 40 bar										

Output signal / Supply		
2-wire	4 ... 20 mA / V_S = 12 ... 36 V_{DC}	
Performance		
Accuracy	≤ ± 0.5 % FSO	
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω	
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	≤ ± 0.2 % FSO / 10 K	in compensated range 0 ... 70 °C
Permissible temperatures	medium: -10 ... 70 °C	storage: -25 ... 70 °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 (-10 … 70 °C) black Ø 7.4 mm FEP [4] (-10 … 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	stainless steel 1.4404 (316L)	
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	

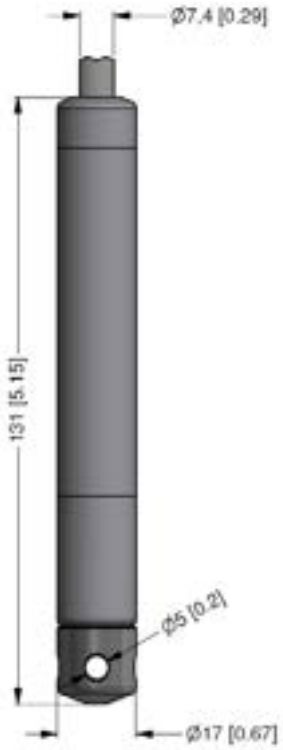
Wiring diagram

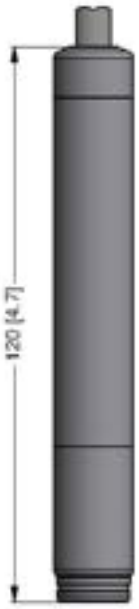
2-wire-system (current)



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	

Ordering code LMK 306

LMK 306 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure			
in bar		3 7 0	
in mH_2O		3 7 1	
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			
stainless steel 1.4404 (316L)		1	
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

LMK 307

Stainless Steel Probe

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

from 0 ... 4 mH_2O up to 0 ... 250 mH_2O

Output signals

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

Special characteristics

- diameter 27 mm
- good linearity
- excellent long term stability
- easy handling

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- 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 level transmitter LMK 307 is designed for continuous level measurement in water or waste water applications. Basic element is a flush mounted ceramic sensor.

Suitable for all fluids which are compatible with media wetted materials. Different cable and elastomer materials can be offered according to the customer-specific operating conditions.

Preferred areas of use are

Water
drinking water systems
ground water monitoring
storm water systems

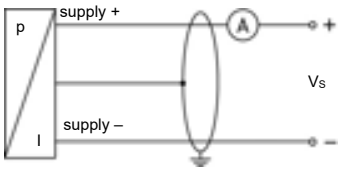
Sewage
waste water treatment
water recycling
dumpsite

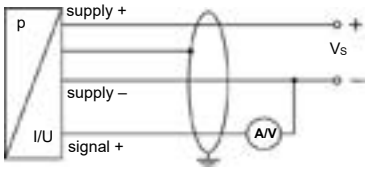
Fuel and oil
fuel storage
tank farm
biogas plants

Input pressure range											
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH_2O]	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	2	2	2	4	4	10	10	20	40	40
Burst pressure ≥	[bar]	4	4	4	5	5	12	12	25	50	50
Max. ambient pressure (housing): 40 bar											

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}	
Performance		
Accuracy [1]	≤ ± 0.5 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$ current 3-wire: R_{max} = 500 Ω voltage 3-wire: R_{min} = 10 k Ω	
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)		
Thermal error	≤ ± 0.2 % FSO / 10 K	in compensated range 0 … 70 °C
Permissible temperatures		
Permissible temperatures	medium: -10 ... 70 °C	storage: -25 ... 70 °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 (-10 … 70 °C) black Ø 7.4 mm FEP [4] (-10 … 70 °C) black Ø 7.4 mm others on request	
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	stainless steel 1.4404 (316L)	
Seals	FKM EPDM	
Diaphragm	ceramics Al_2O_3 96 %	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP	
Explosion protection (only for 4 … 20 mA / 2-wire)		
Approvals DX19-LMK 307	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 ≈ 0nF, 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: -40/-20 ... 70 °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		
Option SIL 2 version [5]	according to IEC 61508 / IEC 61511	
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA	
Weight	approx. 250 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
[5] only for 4 ... 20mA / 2-wire		

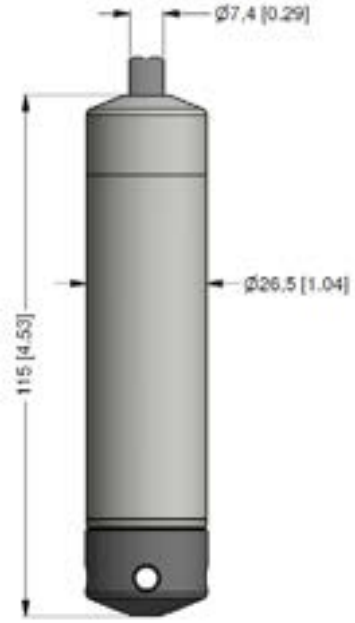
Wiring diagrams	
2-wire-system (current)	3-wire-system (current / voltage)

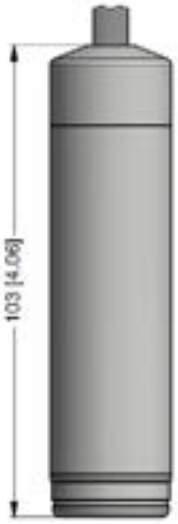




Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply – Signal + (only 3-wire)	WH (white) BN (brown) GN (green)
Shield	GNYE (green-yellow)

Dimensions (mm / in)





protection cap removable

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	

Ordering code LMK 307

LMK 307 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

		Code	
Pressure			
in bar		3 8 0	
in mH_2O		3 8 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	
160	16	1 6 0 2	
250	25	2 5 0 2	
customer		9 9 9 9	consult
Housing			
stainless steel 1.4404 (316L)		1	
customer		9	consult
Diaphragm			
ceramics Al_2O_3 96 %		2	
customer		9	consult
Output			
4 … 20 mA / 2-wire		1	
0 … 20 mA / 3-wire		2	
0 … 10 V / 3-wire		3	
intrinsic safety 4 … 20 mA / 2-wire		E	
SIL2 4 … 20 mA / 2-wire		1S	
SIL2 with intrinsic safety 4 … 20 mA / 2-wire		ES	
customer		9	consult
Seal			
FKM		1	
EPDM		3	
customer		9	consult
Accuracy			
0.5 % FSO		5	
customer		9	consult
Electrical connection / cable length			
PVC-cable (grey, Ø 7.4 mm) [1]			
3 m		1 - 0 0 3	
5 m		1 - 0 0 5	
10 m		1 - 0 1 0	
15 m		1 - 0 1 5	
special length in m		1 - 9 9 9	
PUR-cable (black, Ø 7.4 mm) [1]			
3 m		2 - 0 0 3	
5 m		2 - 0 0 5	
10 m		2 - 0 1 0	
15 m		2 - 0 1 5	
special length in m		2 - 9 9 9	
FEP-cable (black, Ø 7.4 mm) [1]			
5 m		3 - 0 0 5	
10 m		3 - 0 1 0	
special length in m		3 - 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

LMK 307T

Level and Temperature Transmitter

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure / nominal temperature

from 0 ... 4 mH_2O up to 0 ... 250 mH_2O
from 0 ... 30 °C up to 0 ... 70 °C
others on request

Output signals

2-wire: 4 ... 20 mA (pressure)
2-wire: 4 ... 20 mA (temperature)

Special characteristics

- diameter 26.5 mm
- separate output signals for pressure and temperature ranges
- good long term stability
- easy handling
- low maintenance and wiring costs

Optional versions

- different kinds of cables and elastomers
- customer specific versions

The stainless steel submersible probe LMK 307T with flush mounted ceramic sensor has developed for continuous level and temperature measurement in water or waste water applications.

The advantage: simultaneous recording of level and temperature with separate independent signal amplification. The maintenance and wiring costs are considerably reduced.

In addition to classical signal processing of the level, an additional signal circuit independent of the level which converts the temperature signal into a 4 … 20 mA analogue signal in 2-wire technology is provided.

Preferred areas of use are

Water
drinking water systems
ground water monitoring
domestic water tanks
rain spillway basin

Sewage
waste water treatment, water recycling
dumpsite, waste water tanks

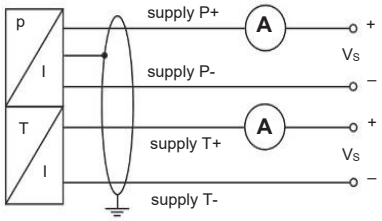
Fuel and oil
fuel storage, tank farm, biogas plants

Input pressure range										
Nominal pressure gauge [bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level [mH_2O]	4	6	10	16	25	40	60	100	160	250
Overpressure [bar]	1	2	2	4	4	10	10	20	40	40
Burst pressure ≥ [bar]	2	4	4	5	5	12	12	25	50	50
Max. ambient pressure (housing): 40 bar										

Input temperature range				
Temperature measuring range standard:	0 … 30 °C	0 … 50 °C	0 … 70 °C	others on request [1]
[1] min. temperature range: 30°C; max. temperature range: 80°C min. temperature: -10°C; max. temperature: 70 °C				
Output signal / Supply				
2-wire (pressure) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}			
2-wire (temperature) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}			
[2] the circuits are galvanically isolated from each other				
Performance				
Accuracy (pressure) [3]	≤ ± 0.5 % FSO			
Accuracy (temperature) [4]	≤ ± 1 °C			
Permissible load	R_{max} = [(V_S – V_S min) / 0.02 A] Ω			
Influence effects	supply: 0.05 % FSO / 10 V		load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.3 % FSO / year at reference conditions			
Response time	< 10 msec (for output signal 2-wire (pressure))			
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] Pt 100 class B; compensation time up to 1 h depending on constant temperature and environmental respectively mass conditions*				
Thermal effects (offset and span)				
Thermal error	≤ ± 0.2 % FSO / 10 K		in compensated range 0 … 70 °C	
Permissible temperatures				
Permissible temperatures	medium: -10 ... 70 °C		storage: -25 ... 70 °C	
Electrical protection [5]				
Short-circuit protection	permanent			
Reverse polarity protection	no damage, but also no function			
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 (-10 … 70 °C) black Ø 7.4 mm FEP [7] (-10 … 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			
[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	ceramics Al_2O_3 96%			
Protection cap	POM-C			
Cable sheath	PVC, PUR, FEP			
Miscellaneous				
Current consumption	max. 25 mA			
Weight	approx. 250 g (without cable)			
Ingress protection	IP 68			
CE-conformity	EMC Directive: 2014/30/EU			

Wiring diagram

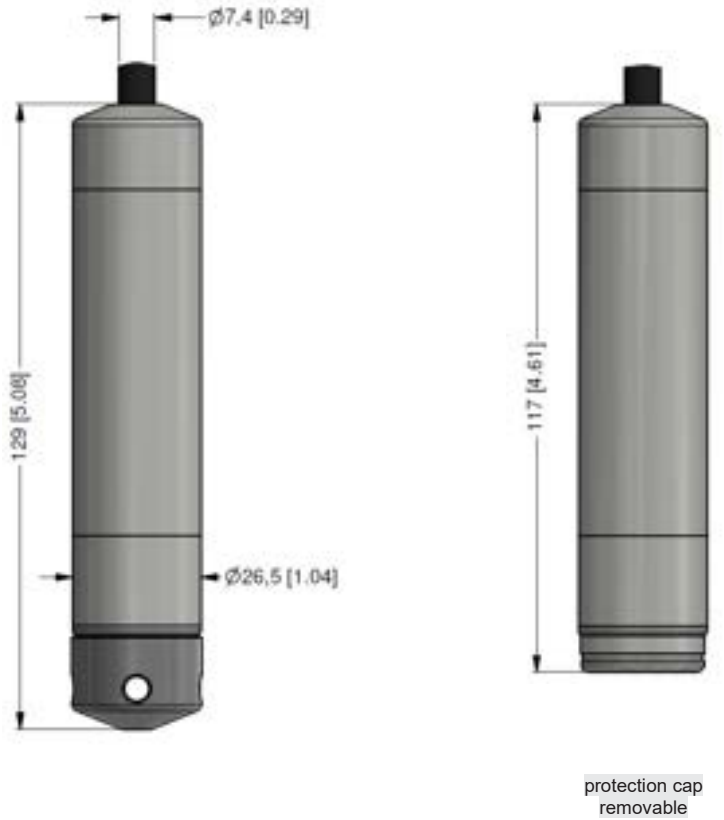
2x2-wire-system (current)



Pin configuration

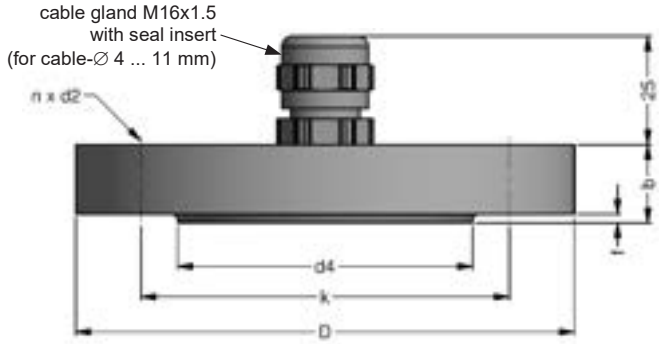
Electrical connection	cable colours (IEC 60757)
Supply P+	WH (white)
Supply P–	BN (brown)
Supply T+	GY (grey)
Supply T–	PK (pink)
Shield	GNYE (green-yellow)

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

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

Ordering code LMK 307T

LMK 307T □□□-□□□□-□□□□□□-□-□-□-□-□-□-□-□□□-□□□

Option	Pressure	Input	Input temperature	Housing	Diaphragm	Output pressure	Output temperature	Seal	Accuracy	Cable	Length	Special version	
Pressure													
in bar	3 8 A												
in mH_2O	3 8 B												
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											
160 / 16		1 6 0 2											
250 / 25		2 5 0 2											
customer		9 9 9 9											consult
Input temperature °C													
0 … 30			0 0 0 x 3 0										
0 … 50			0 0 0 x 5 0										
0 … 70			0 0 0 x 7 0										
customer			9 9 9 9 9 9										consult
Housing													
stainless steel 1.4404 (316L)				1									
customer				9									consult
Diaphragm													
ceramic Al_2O_3 96 %					2								
customer					9								consult
Output pressure													
4 … 20 mA / 2-wire						1							
Output temperature													
4 … 20 mA / 2-wire							1						
Seal													
FKM								1					
EPDM								3					
customer								9					consult
Accuracy													
0.5 % FSO									5				
customer									9				consult
Electrical connection / cable length													
PVC-cable (grey, Ø 7.4 mm) [1]													
3 m										1	0 0 3		
5 m										1	0 0 5		
10 m										1	0 1 0		
15 m										1	0 1 5		
special length in m										1	9 9 9		
PUR-cable (black, Ø 7.4 mm) [1]													
3 m										2	0 0 3		
5 m										2	0 0 5		
10 m										2	0 1 0		
15 m										2	0 1 5		
special length in m										2	9 9 9		
FEP-cable (black, Ø 7.4 mm) [1]													
5 m										3	0 0 5		
10 m										3	0 1 0		
special length in m										3	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

LMK 358

Detachable 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 ... 100 mH_2O

Output signals

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

Special characteristics

- cable assembly and sensor head detachable
- diameter 39.5 mm
- especially suitable for sewage, viscous and pasty media

Optional versions

- IS-version
  Ex ia = intrinsically safe for gas and dust
- diaphragm 99.9 % Al_2O_3
- different kinds of cables and elastomers

The detachable stainless steel probe LMK 358 has been designed for level measurement in waste water, waste and higher viscosity media. Basic element is a capacitive ceramic sensor.

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
ground water level measurement
rain spillway basin

Sewage
waste water treatment
water recycling

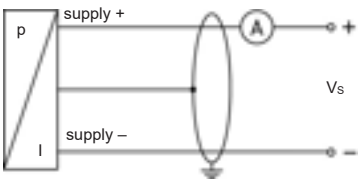
Fuel and oil
level monitoring in open tanks with low filling heights
fuel storage
tank farms
biogas plants

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
Level [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35
Max. ambient pressure (housing): 40 bar													

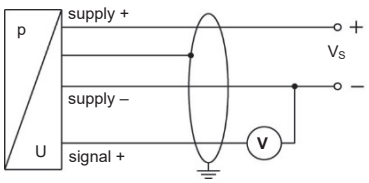
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
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	
[1] 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 /electronic / environment: -25 ... 125 °C storage: -40 ... 125 °C	
Electrical protection [2]		
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	
[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 TPE-U (-25 … 125 °C) blue Ø 7.4 mm	
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	stainless steel 1.4404 (316L)	
Seals	FKM 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 358	IBExU05ATEX1070 X Zone 0: II 1G Ex ia IIB T4 Ga Zone 20: II 1D Ex ia IIIC T110 °C Da	
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, L_i ≈ 0 µH, C_{gnd} = 27 nF	
Permissible temperature	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: -25 ... 70 °C	
Connecting cables (by factory)	cable capacity: 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	
Miscellaneous		
Current consumption	max. 21 mA	
Weight	approx. 650 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	

Wiring diagram

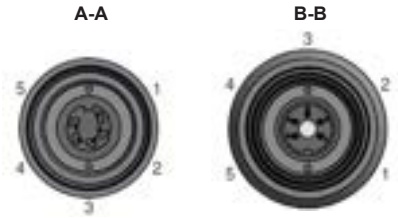
2-wire-system (current)



3-wire-system (voltage)



connector



Pin configuration

Electrical connection	Binder series 723 [5] (5-pin)		cable colours (IEC 60757)
	2-wire	3-wire	
Supply +	3	3	WH (white)
Supply –	1	4	BN (brown)
Signal + (only for 3-wire)	-	1	GN (green)
Shield	5	5	GNYE (green-yellow)

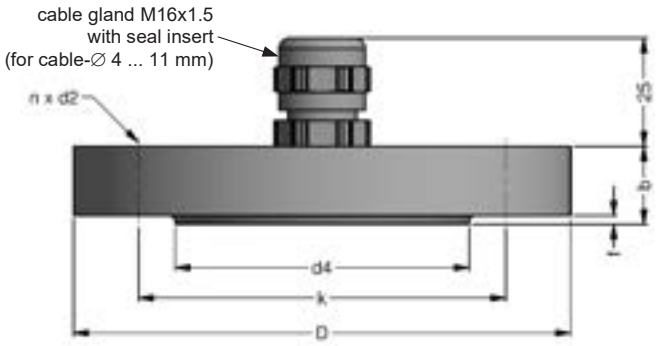
[5] *if detached*

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

Ordering code LMK 358

LMK 358 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

Option		Pressure	Input	Housing	Diaphragm	Output	Seal	Electrical connection	Accuracy	Cable length	Special version	
Pressure												
in bar		4 4 5										
in mH_2O		4 4 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									
customer			9 9 9 9									consult
Housing												
stainless steel 1.4404 (316L)				1								
customer				9								consult
Diaphragm												
ceramics Al_2O_3 96 %					2							
ceramics Al_2O_3 99.9 %					C							
customer					9							consult
Output												
4 … 20 mA / 2-wire						1						
0 … 10 V / 3-wire						3						
intrinsic safety 4 … 20 mA / 2-wire						E						
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				
TPE-U-cable (blue, Ø 7.4 mm) [1]								4				
customer								9				consult
Accuracy												
standard	0.35 % FSO								3			
option	0.25 % FSO								2			
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

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

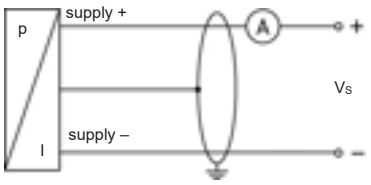
Input pressure range																
Nominal pressure gauge [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Max. ambient pressure (housing): 40 bar															

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	max. voltage 10 V_{DC}, in intrinsically safe circuit 30 V_{DC} max. current 2 mA, in intrinsically safe circuit 54 mA max. power 10 mW, in intrinsically safe circuit 405 mW
Connectivity technology	3-wire	
Resistance	100 Ω at 0 °C	
Temperature coefficient	3850 ppm/K	
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	

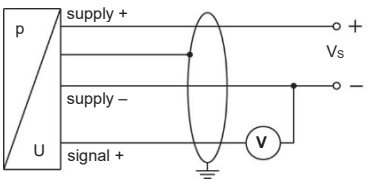
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval DX14-LMK 382	IBExU05ATEX1070 X zone 0 [7]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T110 °C Da
Safety technical maximum values (pressure)	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, $L_i \approx 0$ µH, C_{gnd} = 27 nF
Safety 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

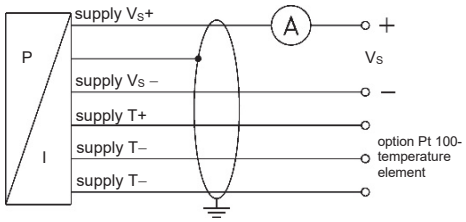
2-wire-system (current)



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)

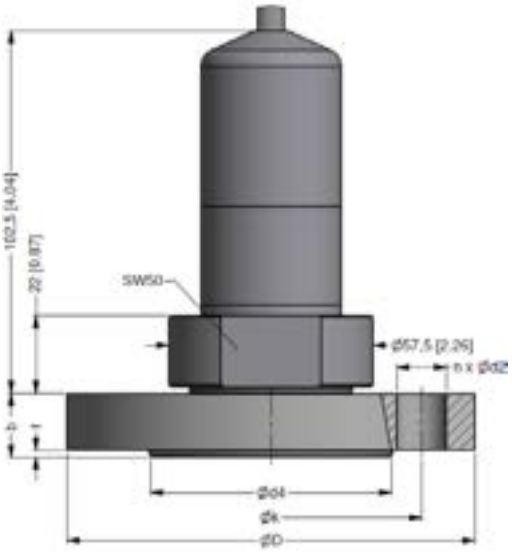
standard

protection cap removable

option

prepared for mounting with stainless steel pipe

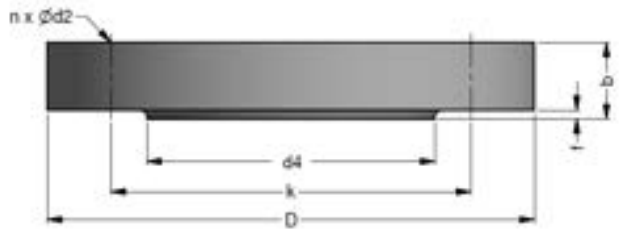
flange version



⇨ 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

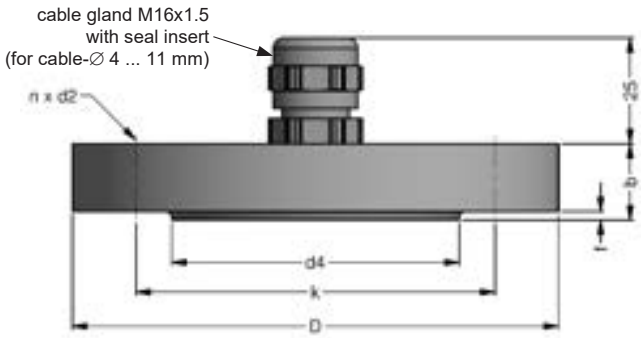
Transmitter flange for flange version



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	

Ordering code LMK 382

LMK 382 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐☐-☐-☐☐☐-☐☐☐

		Pressure	Input	Housing	Diaphragm	Output	Seal	Electrical connection	Accuracy	Cable length	Special version	
Pressure												
in bar		5 6 5										
in mH_2O		5 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								
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		0 0 3		
5 m								1		0 0 5		
10 m								1		0 1 0		
15 m								1		0 1 5		
special length in m								1		9 9 9		
PUR-cable (black, Ø 7.4 mm) [1]												
3 m								2		0 0 3		
5 m								2		0 0 5		
10 m								2		0 1 0		
15 m								2		0 1 5		
special length in m								2		9 9 9		
FEP-cable (black, Ø 7.4 mm) [1]												
5 m								3		0 0 5		
10 m								3		0 1 0		
special length in m								3		9 9 9		
TPE-U-cable (blue, Ø 7.4 mm) [1]												
special length in m								4		9 9 9		
TPE-U-cable (red, Ø 9.0 mm) [1,2]												
special length in m								42		9 9 9		
Accuracy												
standard	0.35 % FSO								3			
option	0.25 % FSO								2			
Special version												
standard											0 0 0	
with temperature sensor Pt 100 [3]											0 1 3	
prepared for mounting with stainless steel pipe [4]											5 0 2	
flange version [5]											5 1 0	
customer											9 9 9	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

LMK 387

Stainless Steel Probe

Ceramic Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 100 mH_2O

Output signal

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

Special characteristics

- diameter 22 mm
- diaphragm ceramics 99.9% Al_2O_3
- good long-term stability
- especially for waste water

Optional versions

- housing material titanium
- IS-version
  Ex ia = intrinsically safe for gas and dust
- drinking water certificate according to DVGW and KTW
- temperature element Pt 100
- mounting with stainless steel tube
- different kinds of cables
  and elastomers

The stainless steel probe LMK 387 was developed for level and gauge measurement in waste water, sludge or water courses. The mechanical robustness of the flush ceramic diaphragm facilitates an easy disassembly and cleaning of the probe in case of service.

Compared to the level probe LMK 382 the outer diameter is only 22 mm, whereby the installation or retrofitting can be easily carried out in 1 "pipes or in confined installation conditions. An IS-version (zone 0) is also available.

Preferred areas of use

Water
groundwater and level monitoring

Sewage
waste water treatment
water recycling

Fuel and oil
tank battery
biogas plants

Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3	-0.5				-1				
Max. ambient pressure (housing): 40 bar												

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}	
Option temperature element Pt 100		
Temperature range	-25 … 125 °C	max. voltage 10 V_{DC}, in intrinsically safe circuit 30 V_{DC} max. current 2 mA, in intrinsically safe circuit 54 mA max. power 10 mW, in intrinsically safe circuit 405 mW
Connectivity technology	3-wire	
Resistance	100 Ω at 0 °C	
Temperature coefficient	3850 ppm/K	
Supply I_S	0.3 … 1.0 mA $_{DC}$	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO	option: ≤ ± 0.25 % FSO
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω	
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year	
Turn-on time	450 msec	
Mean response time	≤ 70 msec	
Measuring rate	80 Hz	
[1] 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 temperature		
Medium / storage	-25 ... 85 °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]	PUR (-25 … 70 °C) black Ø 7.4 mm FEP [4] (-25 … 70 °C) black Ø 7.4 mm TPE-U (-25 … 125 °C) blue Ø 7.4 mm (without / with drinking water certificate) TPE-U [5] (-25 … 125 °C) red Ø 9.0 mm	
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 (for nominal pressure ranges absolute, the ventilation tube is closed) *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected* *[5] only in combination with IS-version (explosion protection) and temperature element Pt 100*		
Materials (media wetted)		
Housing	standard: stainless steel 1.4404 (316 L)	option: titanium others on request
Seals (O-rings)	standard: FKM option: EPDM (without / with drinking water certificate) FFKM (min. permissible temperature from -15 °C)	others on request
Diaphragm	ceramics Al_2O_3 99.9%	
Protection cap	POM-C	
Cable sheath	PUR, FEP, TPE-U	
Explosion protection		
Approval DX14B-LMK 387	IBExU 15 ATEX 1066 X / IECEx IBE 18.0019X zone 0: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety technical maximum values (pressure)	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 49.2 nF, L_i = 0 µH; the supply connections have an inner capacity of max. 100 nF opposite the enclosure	
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 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 ... 65 °C	
Connecting cables (by factory)	cable capacity: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m	

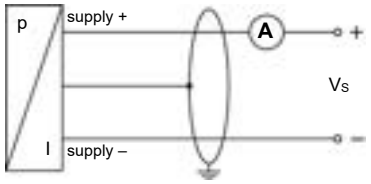
Miscellaneous	
Drinking water certificate [6]	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Option cable protection	prepared for mounting with stainless steel pipe
Current consumption	max. 22 mA
Weight	approx. 180 g (without cable)
Ingress 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) or housing material titanium

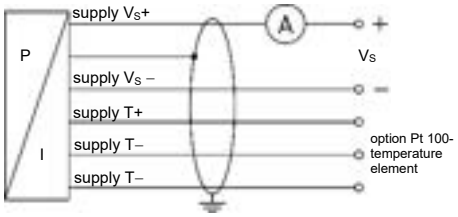
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply V_S +	WH (white)
Supply V_S –	BN (brown)
Supply T+ (with Pt 100)	YE (yellow)
Supply T– (with Pt 100)	GY (grey)
Supply T– (with Pt 100)	PK (pink)
Shield	GNYE (green-yellow)

Wiring diagrams

2-wire-system (current)

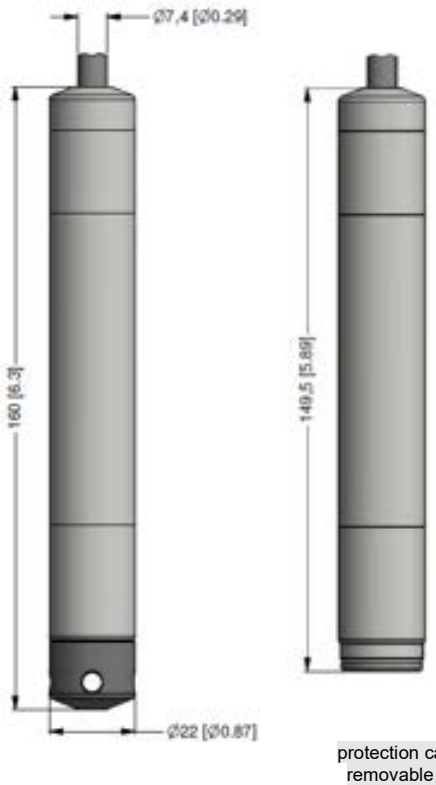


2-wire-system current (pressure) / 3-wire-system (temperature Pt 100)

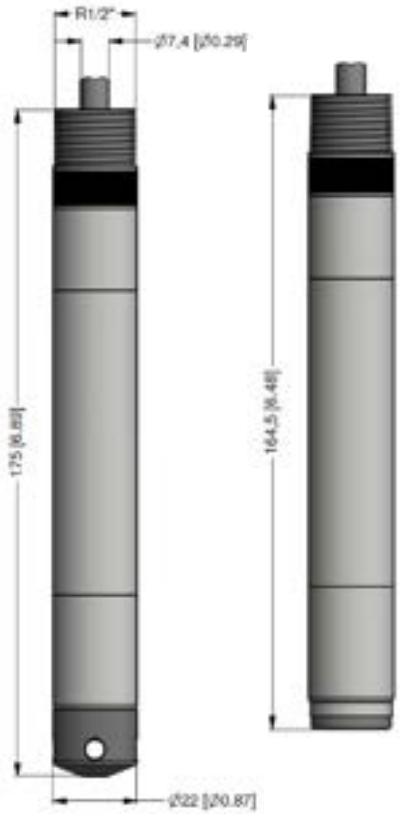


Dimensions (mm / in)

probes



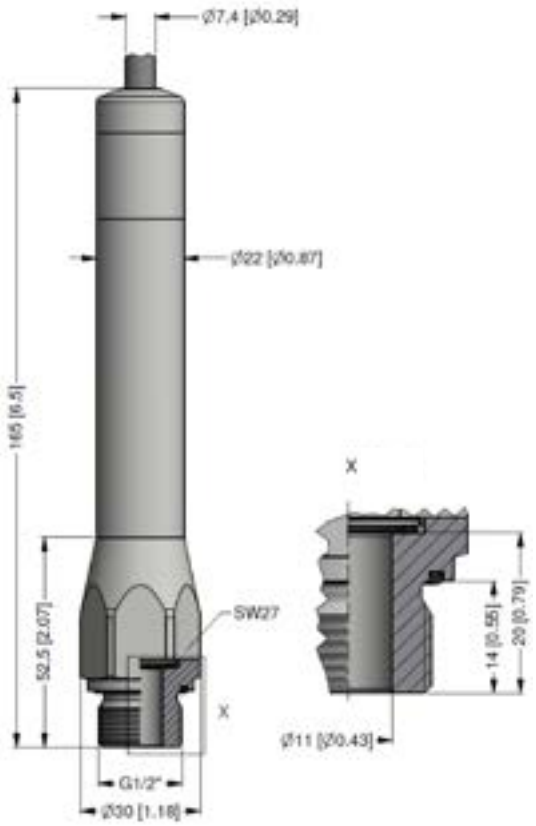
**optionally with thread R1/2"
for mounting with stainless steel tube**



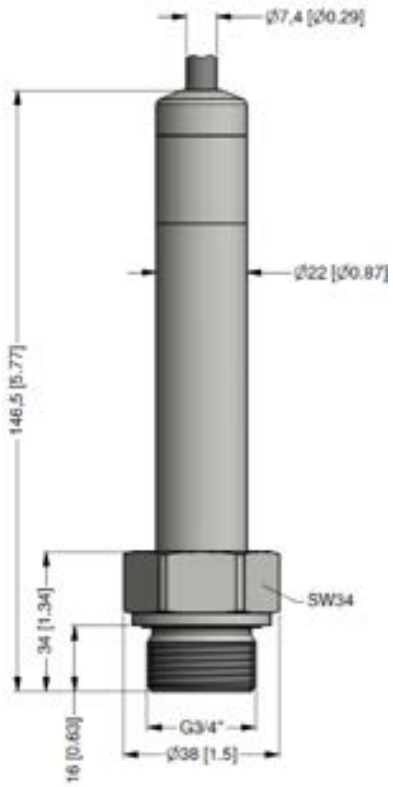
⇨ **cable diameter Ø9 mm for TPE-U cable (red), drawings for option with Pt 100 on request**

Dimensions (mm / in)

screw-in versions in stainless steel 1.4404 (316 L)



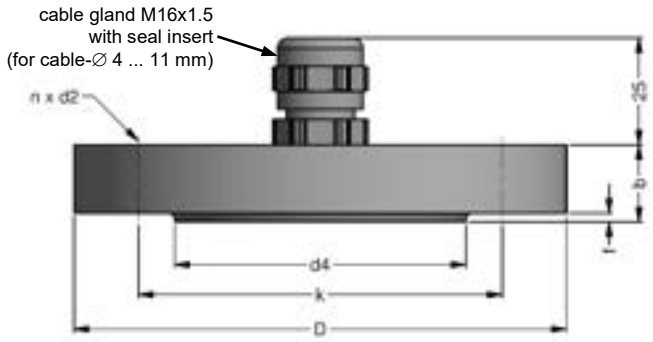
G1/2" open



G3/4"

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

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

Ordering code LMK 387

LMK 387 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure				
gauge in bar			3 6 0	
absolute in bar			3 6 3	consult
gauge in mH_2O			3 6 1	
Input	**[mH_2O]**	**[bar]**		
	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	
customer			9 9 9 9	consult
Housing				
stainless steel 1.4404 (316L)			1	
titanium			T	
customer			9	consult
Design				
probe			1	
screw-in version G1/2" open [1]			A	
screw-in version G3/4" flush [1]			B	
Diaphragm				
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	
DVGW / KTW: EPDM [2]			3T	
FFKM [3]			7	
customer			9	consult
Electrical connection				
PUR-cable (black, Ø 7.4 mm) [4]			2	
FEP-cable (black, Ø 7.4 mm) [4]			3	
TPE-U-cable (blue, Ø 7.4 mm) [4]			4	
TPE-U-cable (red, Ø 9.0 mm) [4,5]			42	
DVGW / KTW: TPE-U-cable (blue, Ø 7.4 mm) [2,4]			F	
customer			9	consult
Accuracy				
standard	0.35 % FSO		3	
option	0.25 % FSO		2	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
with temperature sensor Pt 100			0 1 3	
prepared for mounting with stainless steel pipe [6]			5 0 2	
customer			9 9 9	consult

[1] only in combination with housing in stainless steel 1.4404 (316L)
[2] drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F); not possible with IS-protection (explosion protection) or housing material titanium
[3] min. permissible temperature from -15 °C
[4] shielded cable with integrated air tube for atmospheric pressure reference
[5] only in combination with IS version (explosion protection) and temperature element Pt 100
[6] stainless steel pipe is not part of the supply

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

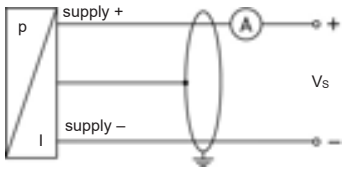
Water
drinking water abstraction
desalinization plant

Shipbuilding / Offshore
ballast tanks
monitoring of a ship´s position and draught
level measurement in ballast and storage tanks

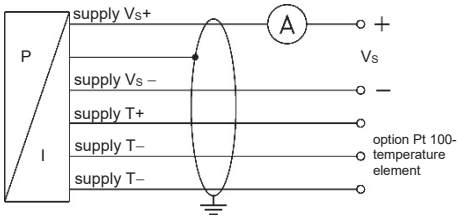
Pressure ranges																
Nominal pressure gauge [1] [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20	
Level [mH2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200	
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45	
Permissible vacuum [bar]	-0.2		-0.3		-0.5				-1							
Max. 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)

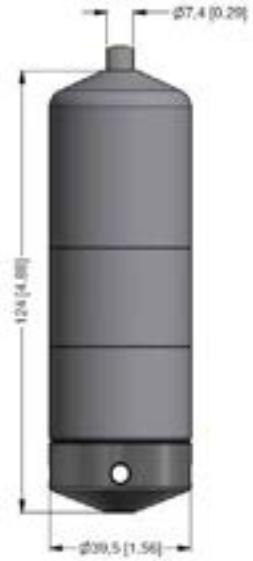


Pin configuration

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

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

probe



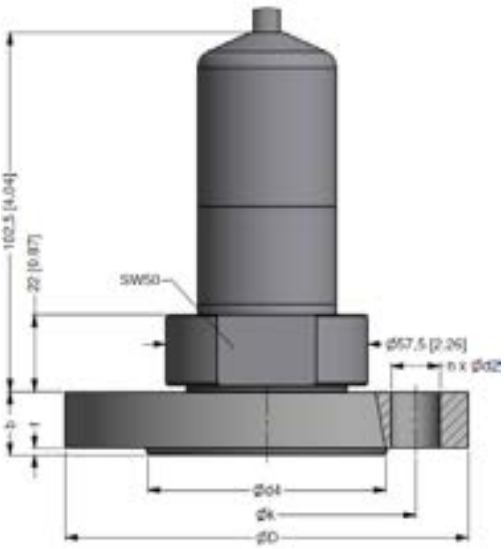
protection cap removable

option

prepared for mounting with stainless steel pipe

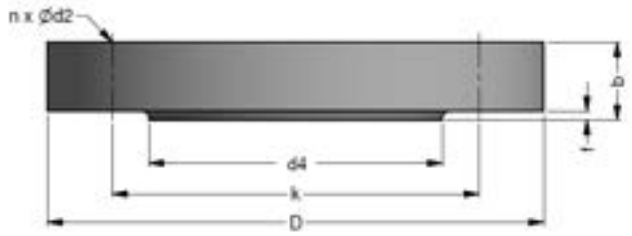
screw-in version

flange version



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

Transmitter flange for flange version

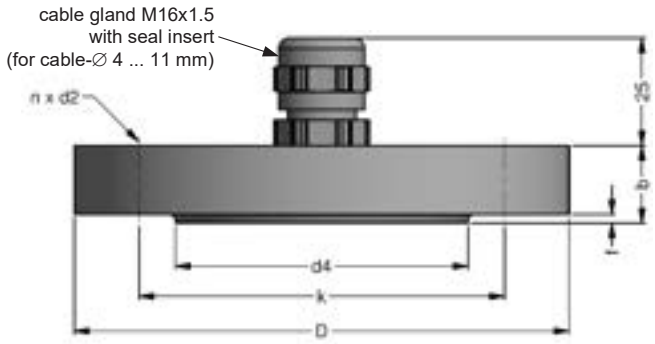


dimensions in mm			
size	DN25 / PN40	DN50 / PN40	DN80 / PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

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

Ordering code LMK 458

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

Pressure			
	in bar, gauge	765	
	in bar, absolute [1]	768	
	in mH_2O	766	
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
	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		999
Special version			
	standard		000
	with temperature sensor Pt 100 [5]		013
	prepared for mounting with stainless steel pipe [6]		502
	customer		999 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

LMK 487

Probe for Marine and Offshore 22 mm

Ceramic Sensor

accuracy according to IEC 60770:
0.25 % FSO

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 22 mm
- LR-certificate (Lloyd´s Register)
- DNV▪GL Approval (Det Norske Veritas ▪ Germanischer Lloyd)
- diaphragm 99.9 % Al_2O_3
- high long-term stability

Optional versions

- housing material titanium
- IS-version
  Ex ia = intrinsically safe for gas and dust
- temperature element Pt 100
- different kinds of elastomer

The hydrostatic probe LMK 487 has been developed for measuring levels in various tank applications for shipbuilding and offshore. In comparison to the hydrostatic probe LMK 458 the external diameter amounts to only 22 mm by which the installation in 1" pipes can be carried out easily.

Beside the housing materials stainless steel and titanium, different elastomer materials are available by which an optimum adaptation to the application can be ensured.

Preferred areas of use

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

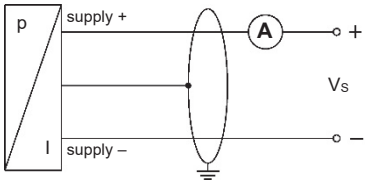
Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3	-0.5				-1				
Max. ambient pressure (housing): 40 bar												

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}	
Option Pt 100-temperature element		
Temperature range	-25 … 125 °C	max. voltage 10 V_{DC}, in intrinsically safe circuit 30 V_{DC} max. current 2 mA, in intrinsically safe circuit 54 mA max. power 10 mW, in intrinsically safe circuit 405 mW
Connectivity technology	3-wire	
Resistance	100 Ω at 0 °C	
Temperature coefficient	3850 ppm/K	
Supply I_S	0.3 … 1.0 mA $_{DC}$	
Performance		
Accuracy [1]	nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO	nominal pressure < 0.4 bar ≤ ± 0.35 % FSO
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω	
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year	
Turn-on time	450 msec	
Mean response time	≤ 70 msec	
Measuring rate	80 Hz	
[1] 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 / storage: -25 ... 85 °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 - DNV▪GL (Det Norske Veritas ▪ Germanischer Lloyd)	
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Mechanical stability		
Vibration	4 g (according to DNV▪GL: Class B, curve 2 / basis: IEC 60068-2-6)	
Electrical connection		
Cable with sheath material [3]	TPE-U (-25 …125 °C) blue Ø 7.4 mm TPE-U [4] (-25 …125 °C) red Ø 9.0 mm	
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 (for nominal pressure ranges absolute, the ventilation tube is closed) *[4] only in combination with IS version (explosion protection) and temperature element Pt100*		
Materials (media wetted)		
Housing	standard: stainless steel 1.4404 (316 L) option: titanium (resistant against sea water)	others on request
Seals (O-rings)	standard: FKM options: EPDM; FFKM (min. permissible temperature from -15 °C)	others on request
Diaphragm	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)	
Category of the environment		
Lloyd´s Register (LR)	number of certificate: 18/20068	ENV1, ENV2, ENV3, ENV4
Det Norske Veritas/ Germanischer Lloyd (DNV GL)	number of certificate: TAA00000RM temperature: D humidity: B vibration: B EMC: B enclosure: D	
Explosion protection		
Approval DX14B-LMK 487	IBExU 15 ATEX 1066 X / IECEx IBE 18.0019X zone 0: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety technical maximum values (pressure)	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 49.2 nF, L_i = 0 µH; the supply connections have an inner capacity of max. 100 nF opposite the enclosure	
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 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 ... 65 °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	

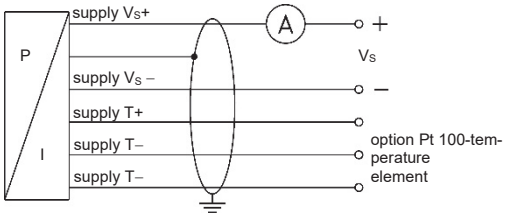
Miscellaneous	
Current consumption	max. 22 mA
Weight	approx. 180 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply – Option Pt 100 temperature element: Supply T+ Supply T– Supply T–	WH (white) BN (brown) YE (yellow) GY (grey) PK (pink)
Shield	GNYE (green-yellow)

Wiring diagrams

2-wire-system (current)

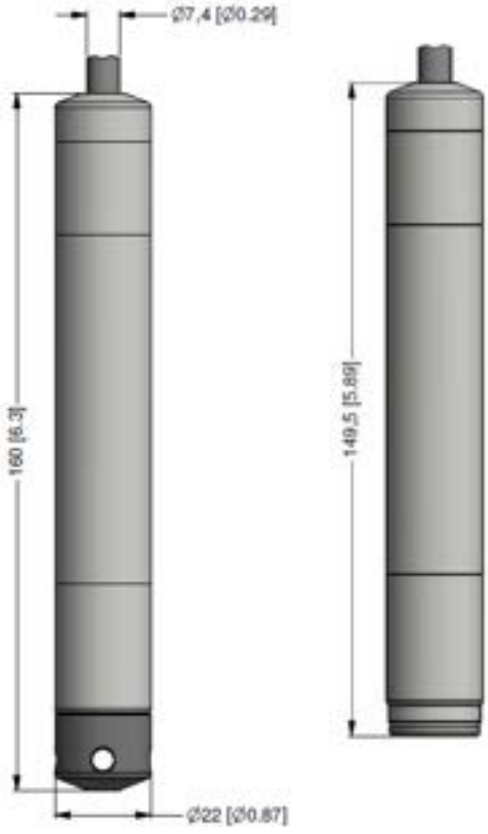


2-wire-system (pressure) / 3-wire-system (temperature)



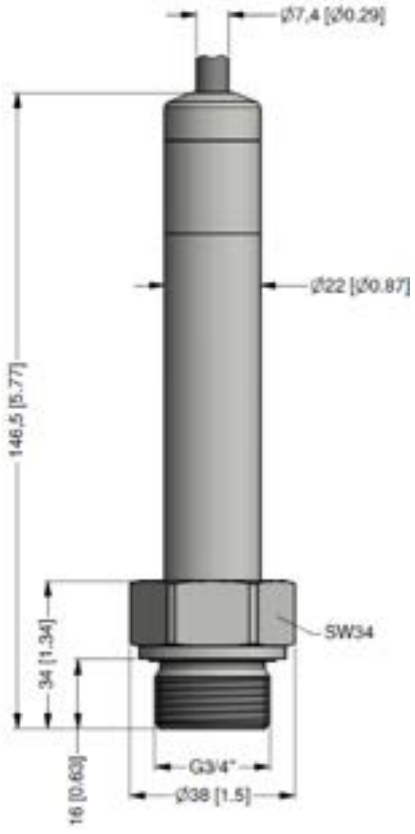
Dimensions (mm / in)

standard



protection cap removable

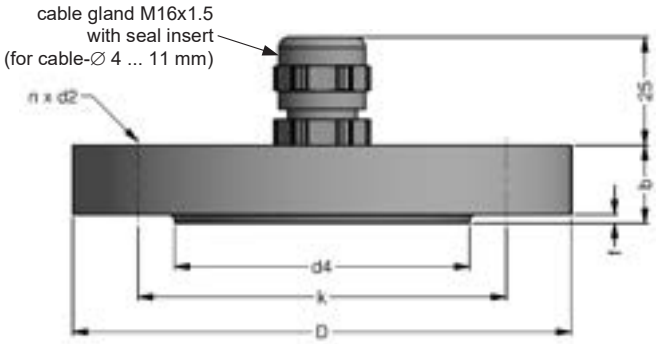
screw-in version
in stainless steel 1.4404 (316 L)



G3/4" flush

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

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

Ordering code LMK 487

LMK 487 ☐☐☐ - ☐☐☐☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐☐ - ☐ - ☐☐☐ - ☐☐☐

Field	Option	[mH_2O]	[bar]	Code	
Pressure	gauge in bar			365	
	gauge in mH_2O			366	
Input		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	
	customer			9999	consult
Housing	stainless steel 1.4404 (316L)			1	
	titanium			T	
	customer			9	consult
Design	probe			1	
	screw-in version G3/4" flush [1]			B	
Diaphragm	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 [2]			7	
	customer			9	consult
Electrical connection	TPE-U-cable (blue, Ø 7.4 mm) [3]			4	
	TPE-U-cable (red, Ø 9.0 mm) [3,4]			42	
Accuracy	standard for p_N < 0,4 bar — 0.35 % FSO			3	
	standard for p_N ≥ 0,4 bar — 0.25 % FSO			2	
	customer			9	consult
Cable length	in m			999	
Special version	standard			000	
	with temperature sensor Pt 100			013	
	customer			999	consult

[1] only in combination with housing in stainless steel 1.4404 (316L)
[2] min. permissible temperature from -15 °C
[3] shielded cable with integrated ventilation tube for atmospheric pressure reference
[4] only in combination with IS version (explosion protection) and temperature element Pt 100

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 ... 100 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

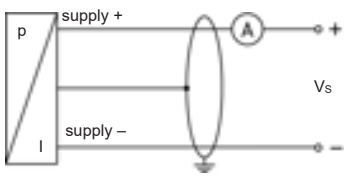
Aggressive media
level measurement
in most of acids and lyes

Input pressure range								
Nominal pressure gauge	[bar]	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	10	10	20
Burst pressure ≥	[bar]	4	4	5	5	12	12	25
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] Ω	
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:	0 ... 60 °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	

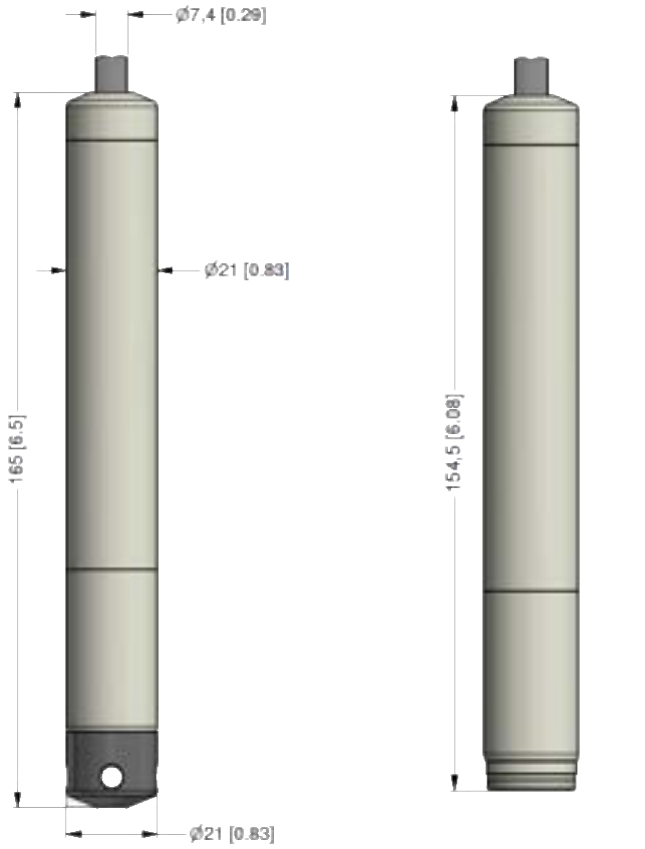
Wiring diagram

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	

Ordering code LMK 806

LMK 806 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

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	
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

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

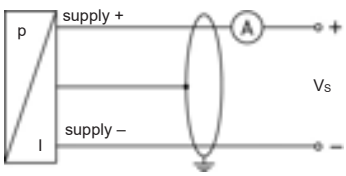
Aggressive media
level measurement
in most of acids and lyes

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] Ω	
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:	0 … 60 °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	

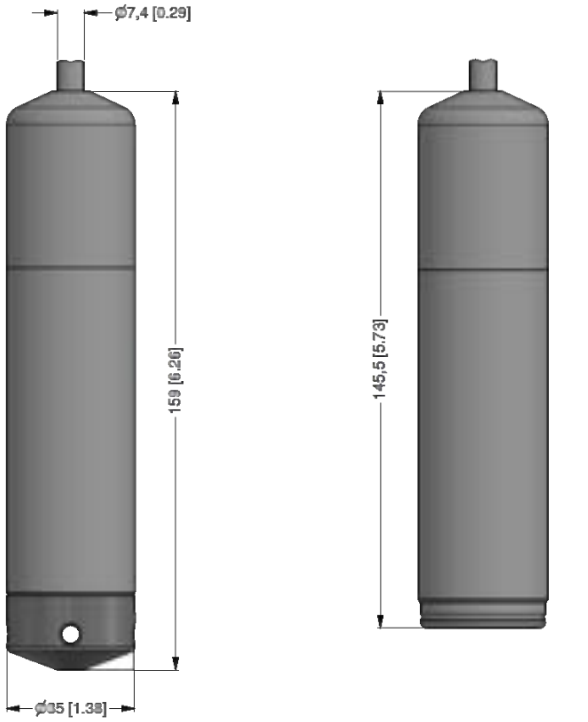
Wiring diagram

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	

Ordering code LMK 807

LMK 807 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Option		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
Seals			
	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

LMK 808

Detachable Plastic Probe

Ceramic Sensor

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

Nominal pressure

from 0 ... 1 mH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 35 mm
- diaphragm ceramics 99.9% Al_2O_3
- cable assembly and sensor head detachable
- good long-term stability
- integrated lightning protection
  8 kA gas discharge tube (8/20µsec);
  4 kV surge l-l/l-e according to EN61000-4-5

Optional versions

- different kinds of elastomer
- customer specific versions
  e. g. special pressure ranges
- mounting accessories

The detachable plastic submersible probe LMK 808 was developed for level measurement in water and wastewater. The basis of the probe is an extremely robust, almost maintenance-free capacitive ceramic sensor.

Since the level probe is used for level measurement i.a. in river courses, on weir systems or in locks, great emphasis was placed on high overvoltage / lightning protection. In addition, the cable can be protected against bites if necessary.

To simplify maintenance work or warehousing, the sensor head can be separated from the cable part and can therefore be replaced if necessary without time-consuming assembly work.

Preferred areas of use

Water
groundwater and level monitoring
sea water

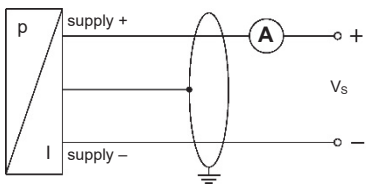
Sewage
waste water treatment
water recycling

Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3	-0.5				-1				
Max. ambient pressure (housing): 20 bar												

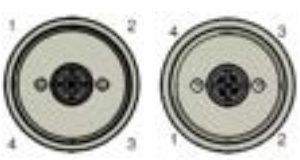
Output signal / Supply		
2-wire	4 ... 20 mA / V_S = 13 ... 30 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	others on request
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω	
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Turn-on time	up to 1.5 sec	
Mean response time	≤ 20 msec	
Measuring rate	200 Hz	
[1] 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:	0 ... 60 °C
Electrical protection [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Lightning protection	integrated	
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		
Overvoltage / lightning protection		
Series resistance	9.4 Ω for each positive and negative wire	
Max. leakage current	8 kA (8/20 µsec)	
Overload	4 kV (line-line and line-earth) according to EN 61000-4-5	
Max. rated current	30 mA	
Electrical connection		
Cable with sheath material [3]	TPE-U blue Ø 7.4 mm (suitable for drinking water)	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 air tube for atmospheric pressure reference		
Materials (media wetted)		
Housing	PP-HT	others on request
Seals (O-rings)	FKM; EPDM	others on request
Diaphragm	ceramics Al_2O_3 99.9%	
Protection cap	POM-C	
Cable sheath	TPE-U	
Miscellaneous		
Current consumption	max. 22 mA	
Weight	approx. 300 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	

Wiring diagram

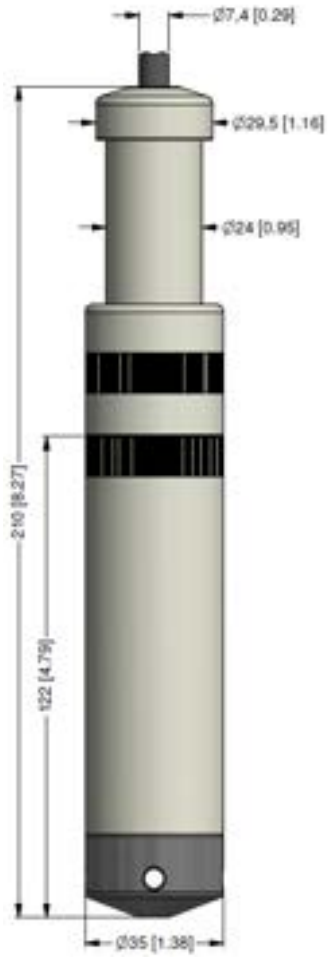
2-wire-system (current)

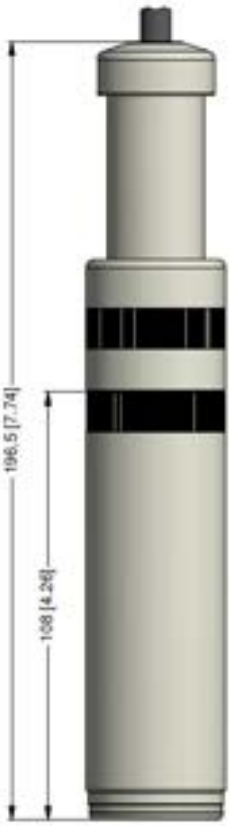


Pin configuration

Electrical connection	M12x1 (4-pin) [6]	cable colours (IEC 60757)
	A-A B-B 	
Supply + Supply –	3 4	WH (white) BN (brown)
Shield	2	GNYE (green-yellow)

Dimensions (mm / in)





protection cap
removable

sensor head
and cable detached

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	

Ordering code LMK 808

LMK 808 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

			Code	
Pressure				
		in bar	4 1 A	
		in mH_2O	4 1 B	
Input	**[mH_2O]**	**[bar]**		
	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	
		customer	9 9 9 9	consult
Housing				
		PP-HT	R	
		customer	9	consult
Diaphragm				
		ceramic Al_2O_3 99.9 %	C	
		customer	9	consult
Output				
		4 … 20 mA / 2-wire	1	
		customer	9	consult
Seals				
		FKM	1	
		EPDM	3	
		customer	9	consult
Electrical connection				
		TPE-U-cable (blue, Ø 7.4 mm) [1]	F	
		customer	9	consult
Accuracy				
standard		0.35 % FSO	3	
option		0.25 % FSO	2	
		customer	9	consult
Cable length				
		in m	9 9 9	
Special version				
		standard	0 0 0	
		customer	9 9 9	consult

[1] shielded cable, drinking water suitable, with integrated ventilation tube for atmospheric pressure reference

LMK 809

Plastic Probe for Aggressive Media

High Purity Ceramic Sensor

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

Nominal pressure

from 0 ... 0.4 mH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 45 mm
- chemical resistance
- high overpressure resistance
- especially for tank level measurement of viscous and aggressive media
- diaphragm 99.9 % Al_2O_3
- housing material PP-HT or PVDF

Optional versions

- different kinds of cables and elastomers
- prepared for mounting with pipe

The plastic submersible probe LMK 809 is designed for continuous level measurement in highly polluted and most of aggressive media. Basic element is a capacitive ceramic sensor.

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

Preferred areas of use are

Sewage
waste water treatment
water recycling
dumpsite

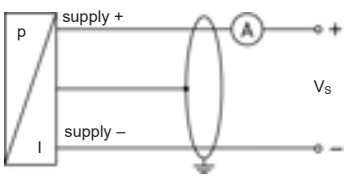
Aggressive media
level measurement in most of acids and lyes

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
Level	[mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35
Max. ambient pressure (housing): 10 bar														

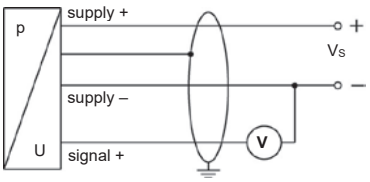
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$	
Influence effects	supply: 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	
[1] 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		
Housing in PVDF	medium / electronic / environment / storage: -30 … 60 °C	
Housing in PP-HT	medium / electronic / environment / storage: 0 … 60 °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]	PUR (-25 … 70 °C) black Ø 7.4 mm FEP [4] (-25 … 70 °C) black Ø 7.4 mm TPE-U (-25 … 100 °C) blue 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	standard: PP-HT option: PVDF	
Seals	FKM, EPDM, FFKM	
Diaphragm	ceramics Al_2O_3 99.9 %	
Cable sheath	PUR, FEP, TPE-U	
Miscellaneous		
Option cable protection	prepared for mounting with plastic pipe	
Current consumption	max. 21 mA	
Weight	approx. 320 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	

Wiring diagrams

2-wire-system (current)



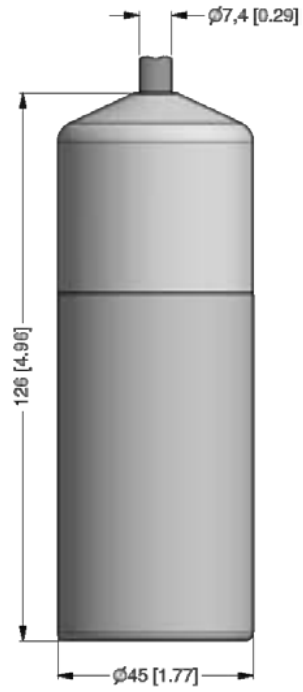
3-wire-system (voltage)



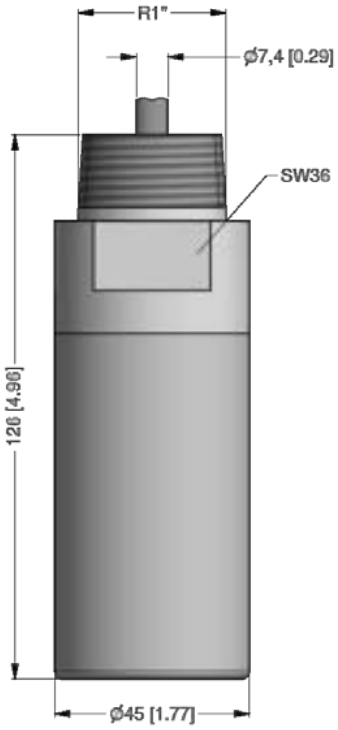
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply + Supply – Signal + (only for 3-wire)	WH (white) BN (brown) GN (green)
Shield	GNYE (green-yellow)

Dimensions (mm / in)

standard



option



prepared for mounting with pipe

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	

Ordering code LMK 809

LMK 809 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure			
	in bar	3 9 5	
	in mH_2O	3 9 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	
	customer	9 9 9 9	consult
Housing			
	PP-HT (0 … 60 °C)	R	
	PVDF (-30 … 60 °C)	B	
	customer	9	consult
Diaphragm			
	ceramics Al_2O_3 99.9 %	C	
	customer	9	consult
Output			
	4 … 20 mA / 2-wire	1	
	0 … 10 V / 3-wire	3	
	customer	9	consult
Seal			
	FKM	1	
	EPDM	3	
	FFKM	7	
	customer	9	consult
Accuracy			
standard:	0.35 % FSO	3	
option:	0.25 % FSO	2	
	customer	9	consult
Electrical connection			
	PUR-cable (black, Ø 7.4 mm) [1]	2	
	FEP-cable (black, Ø 7.4 mm) [1]	3	
	TPE-U-cable (blue, Ø 7.4 mm) [1]	4	
	customer	9	consult
Cable length			
	in m	9 9 9	
Special version			
	standard	0 0 0	
	prepared for pipe R1" [2]	6 1 0	
	customer	9 9 9	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference
[2] pipe is not part of the supply

LMK 858

Detachable Plastic 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 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 45 mm
- cable assembly and sensor head detachable
- chemical resistance
- housing PP-HT
- integrated lightning protection and increased overvoltage protection
  8 kA gas discharge tube (8/20 µsec);
  4 kV surge l-l/l-e according to EN61000-4-5

Optional versions

- diaphragm 99.9 % Al_2O_3
- different kinds of cables and elastomers
- cable protection (on request)

The separable plastic immersion probe LMK 858 was designed for level measurement in aggressive media (acids, alkalis), desalination plants and for use in more viscous media such as sludge. Since the area of application is often outside a building, great emphasis was placed on high surge / lightning protection.

The immersion probe is based on an extremely robust and precise pressure sensor, the membrane of which consists of a high-purity ceramic (99.9% purity), with which even the smallest fill levels can be reliably detected.

Another special feature of the LMK 858 is the separability of the probe head and cable part. This advantage reduces maintenance or service tasks and also simplifies storage.

Preferred areas of use are

Sewage
waste water treatment, dumpsite, water recycling

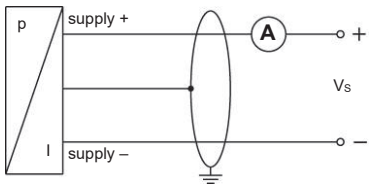
Aggressive media
level measurement in most of acids and lyes

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
Level	[mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35
Max. ambient pressure (housing): 10 bar														

Output signal / Supply		
2-wire	4 ... 20 mA / V_S = 9 ... 32 V_{DC}	others on request
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO	option: ≤ ± 0.25 % FSO
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω	
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	
[1] 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 / electronic / environment / storage: 0 ... 60 °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		
Overvoltage / lightning protection		
Series resistance	9.4 Ω for each positive and negative wire	
Max. leakage current	8 kA (8/20 µsec)	
Overload	4 kV (line-line and line-earth) according to EN 61000-4-5	
Max. rated current	30 mA	
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	
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, others on request	
Diaphragm	standard: ceramics Al_2O_3 96 %	option: ceramics Al_2O_3 99.9 %
Cable sheath	PVC, PUR, FEP, others on request	
Miscellaneous		
Option cable protection (on request)	prepared for mounting with PP-HT pipe Ø 25 mm; available as compact product (standard: pipe with a total length up to 2 m possible)	
Current consumption	max. 25 mA	
Weight	approx. 400 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	

Wiring diagram / pin configuration

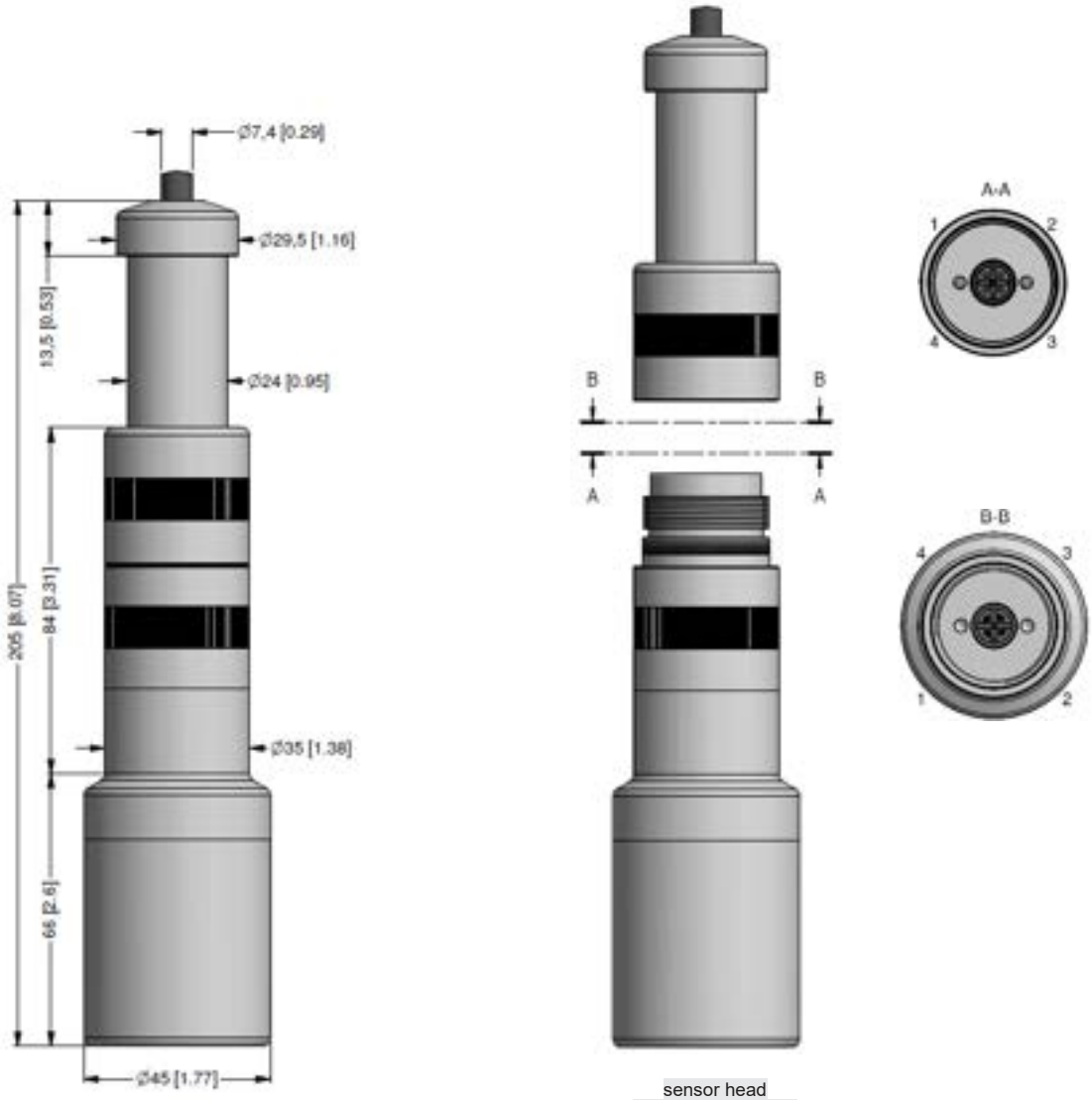
2-wire-system (current)



Electrical connection	M12x1 (4-pin) [5]	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply –	4	BN (brown)
Shield	2	GNYE (green-yellow)

[5] if detached

Dimensions (mm / in)



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	

Ordering code LMK 858

LMK 858 ☐☐☐ - ☐☐☐☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐☐☐ - ☐☐☐

Pressure			
	in bar	4 1 5	
	in mH_2O	4 1 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	
	customer	9 9 9 9	consult
Housing			
	PP-HT	R	
	customer	9	consult
Diaphragm			
	ceramics Al_2O_3 96 %	2	
	ceramics Al_2O_3 99.9 %	C	
	customer	9	consult
Output			
	4 … 20 mA / 2-wire	1	
	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			
standard	0.35 % FSO	3	
option	0.25 % FSO	2	
	customer	9	consult
Cable length			
	in m	9 9 9	
Special version			
	standard	0 0 0	
	prepared for pipe mounting [2]	1 0 6	
	customer	9 9 9	consult

[1] shielded cable with integrated ventilation tube for atmospheric pressure reference
[2] pipe is not part of the supply

18.605 G

Submersible OEM-Pressure Transmitter

Applications

- level measurement in water and fuel oil tanks

Characteristics

- piezoresistive stainless steel sensor
- accuracy 0.5 % FSO according to IEC 60770
- nominal pressure ranges from 0 … 1 mH_2O up to 0 … 10 mH_2O

Technical Data

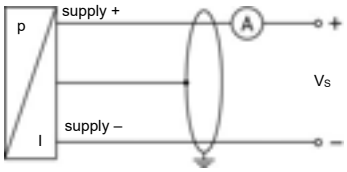
Input pressure range						
Nominal pressure gauge	[bar]	0.1	0.25	0.4	0.6	1
Level	[mH_2O]	1	2.5	4	6	10
Overpressure	[bar]	1	1	1	3	3
Burst pressure ≥	[bar]	1.5	1.5	1.5	5	5
Vacuum resistance		unlimited				

Output signal / Supply		
Standard	2-wire:	4 ... 20 mA / V_S = 8 ... 32 V_{DC}
Option 3-wire	3-wire:	0 ... 10 V / V_S = 14 ... 30 V_{DC}
	3-wire ratiometric:	10 … 90 % of V_S / V_S = 2.7 … 5 V_{DC}
Performance		
Accuracy [1]	p_N > 160 mbar: ≤ ± 0.5 % FSO	p_N ≤ 160 mbar: ≤ ± 1 % FSO
Permissible load	2-wire:	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$
	3-wire:	$R_{min} = 10\ k\Omega$
Influence effects	supply:	0.05 % FSO / 10 V
	load:	0.05 % FSO / kΩ
Response time	2-wire:	≤ 10 msec
	3-wire:	≤ 3 msec
Long term stability	≤ ± 0.2 % FSO / year at reference conditions	
Measuring range	1 kHz	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span) / Permissible temperatures		
Thermal error	≤ ± 0.3 % FSO / 10 K	in compensated range 0 ... 70 °C
Permissible temperatures	medium / electronics / environment / storage:	-10 ... 70 °C
Electrical protection		
Short circuit protection	permanent	3-wire ratiometric: none
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	

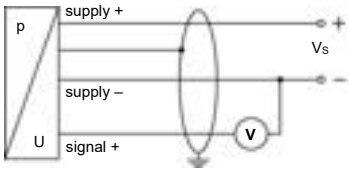
Mechanical stability		
Vibration	10 g, 25 Hz … 2 kHz	according to DIN EN 60068-2-6
Shock	100 g / 1 msec	according to DIN EN 60068-2-27
Materials (media wetted)		
Housing	stainless steel 1.4301 (304)	
Seals	FKM	
Diaphragm	stainless steel 1.4435 (316 L)	
Cable sheath	PVC (oil resistant)	
Miscellaneous		
Weight	approx. 120 g (without cable)	cable: 25 g / m
Cable length	3 m, 6 m, 9 m or 12 m; others on request	
Suitable for following media	water, fuel oil	
Current consumption	2-wire: max. 25 mA 3-wire voltage: typ. 5 mA (short circuit current: max. 20 mA)	3-wire ratiometric: typ. 1.5 mA
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	

Wiring diagrams

2-wire-system (current)



3-wire-system (voltage)



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

Dimensions (mm / in)

G1/4" DIN 3852
with PVC cable (with ventilation tube)

Ordering code 18.605 G

18.605 G - □□□□ - □ - □ - □ - □ - □□□ - □□□ - □ - □□□

Input	**[mH_2O]**	**[bar]**																				
	1.0	0.1	1	0	0	0																
	2.5	0.25	2	5	0	0																
	4	0.4	4	0	0	0																
	6	0.6	6	0	0	0																
	10	1.0	1	0	0	1																
		customer	9	9	9	9																consult
Pressure																						
		bar					B															
		mH_2O					M															
		customer					9															consult
Output																						
		4 … 20 mA / 2-wire						1														
		0 … 10 V / 3-wire						3														
		10 … 90% of V_S / 3-wire ratiometric						R														
		customer						9														consult
Accuracy																						
P_N > 160 mbar:		≤ ± 0.5 % FSO							5													
P_N ≤ 160 mbar:		≤ ± 1 % FSO							8													
		customer							9													consult
Electrical connection																						
		PVC-cable								1												
		customer								9												consult
Cable length																						
		3 m									0	0	3									
		6 m									0	0	6									
		9 m									0	0	9									
		12 m									0	1	2									
		customer									9	9	9									
Mechanical connection																						
		G1/4" DIN 3852												3	0	0						
		customer												9	9	9						consult
Seals																						
		FKM															1					
		customer															9					consult
Special version																						
		standard																0	0	0		
		customer																9	9	9		consult

LMP 331i

Precision Screw-in Transmitter

Stainless Steel Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 40 bar

Output signal

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

Product characteristics

- thermal error in compensated range
  -20 ... 80 °C: 0.2 % FSO
  TC 0.02 % FSO / 10K

Optional versions

- IS-versions
  Ex ia = intrinsically safe
  for gases and dusts

The precision screw-in transmitter LMP 331i demonstrate the further development of our industrial pressure transmitters.

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 and the transmitters with excellent measurements and exceptionally attractive price to offer on the market.

Preferred areas of use are

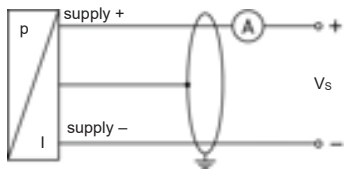
- Chemical / petrochemical industry
- Environmental engineering
  (water / sewage / recycling)

Pressure ranges								
Nominal pressure gauge	[bar]	0.4	1	2	4	10	20	40
Level gauge	[mH_2O]	4	10	20	40	100	200	400
Overpressure	[bar]	2	5	10	20	40	80	105
Burst pressure ≥	[bar]	3	7.5	15	25	50	120	210

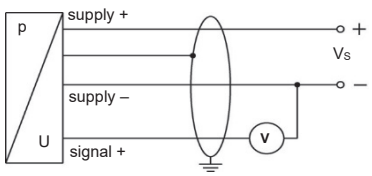
Output signal / Supply			
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}		
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}		
Options analogue signal	3-wire: 0 ... 10 V / VS = 14 ... 36 V_{DC}		
Performance			
Accuracy [1]	≤ ± 0.1 % FSO		
Permissible load	current 2-wire: R_{max} = [(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 % FSO / year at reference conditions		
Response time	approx. 5 msec		
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)			
Thermal effects (offset and span) / Permissible temperatures			
Tolerance band [% FSO]	≤ ± 0.2	in compensated range	-20 ... 80 °C
TC, average [% FSO / 10 K]	± 0.02	in compensated range	-20 ... 80 °C
Permissible temperatures	medium: electronics / environment: storage:	-25 ... 125 °C -25 ... 85 °C -40 ... 100 °C	
Electrical protection			
Short-circuit protection	permanent		
Reverse polarity protection	no damage, but also no function		
Electromagnetic compatibility	emission and immunity according to EN 61326		
Materials			
Pressure port	stainless steel 1.4404 (316 L)		
Housing	stainless steel 1.4404 (316 L)		
Option compact field housing	stainless steel 1.4301 (304) cable gland M12x1.5, brass, nickel plated (clamping range 2 … 8 mm)		
Seals	FKM	others on request	
Diaphragm	stainless steel 1.4435 (316L)		
Media wetted parts	pressure port, seals, diaphragm		
Mechanical stability			
Vibration	10 g RMS (20 ... 2000 Hz)	according to DIN EN 60068-2-6	
Shock	100 g / 11 msec.	according to DIN EN 60068-2-27	
Explosion protection (only for 4 ... 20 mA / 2-wire)			
Approvals DX19-LMP 331i	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 max. 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			
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA		
Weight	approx. 200 g		
Installation position	any [2]		
Operational life	100 million load cycles		
CE-conformity	EMC Directive: 2014/30/EU		
ATEX Directive	2014/34/EU		
[2] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges p_N ≤ 1 bar.			

Wiring diagrams

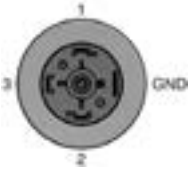
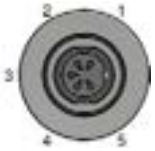
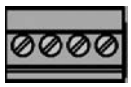
2-wire-system (current)



3-wire-system (voltage)



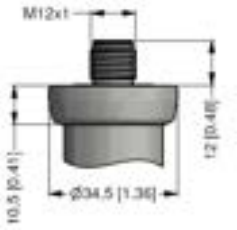
Pin configuration

Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1/ metal (4-pin)	compact field housing	cable colours (IEC 60757)
				 V_{S+} V_{S-} S+ GND	
supply + supply – signal + (only for 3-wire)	1 2 3	3 4 1	1 2 3	IN + IN – OUT +	WH (white) BN (brown) GN (green)
shield	ground pin ⊕	5	4	⊕	GNYE (green-yellow)

Electrical connections (dimensions mm / in)

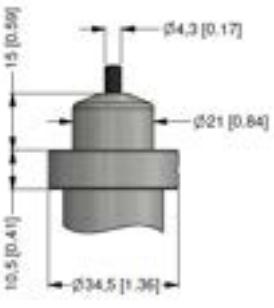
ISO 4400
(IP 65)

Binder series 723, 5-pin
(IP 67)

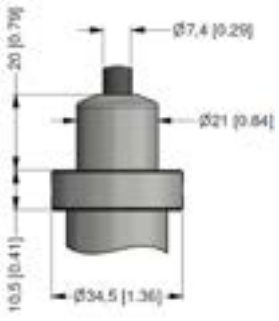


M12x1, 4-pin
(IP 67)

compact field housing
(IP 67)



cable outlet,
with PVC cable (IP 67) [3]

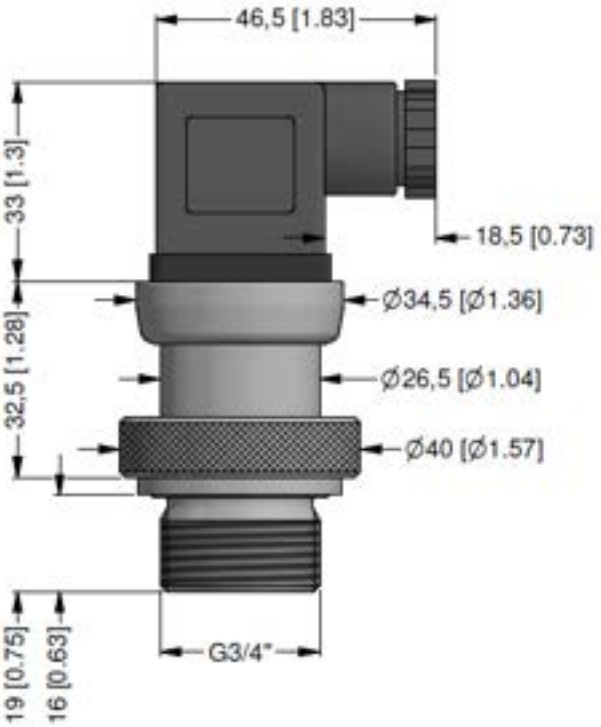


cable outlet,
cable withventilation tube (IP 68) [4]

⇨ **universal field housing stainless steel 316L with cable gland M20x1.5 (ordering code 880) and other versions on request**

[3] *standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)*
[4] *different cable types and lengths available, permissible temperature depends on kind of cable*

Mechanical connection (dimensions mm / in)



G3/4" DIN 3852 with flush sensor

⇨ **metric threads andother versions onrequest**

Ordering code LMP 331i

LMP 331i □□□-□□□□-□-□-□□□-□□□-□-□□□

Description	Code	Remark
Pressure		
in bar	430	
in mH_2O	431	
Input [mH_2O] / [bar]		
4 / 0.4	4000	
10 / 1.0	1001	
20 / 2.0	2001	
40 / 4.0	4001	
100 / 10	1002	
200 / 20	2002	
400 / 40	4002	
customer	9999	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
Accuracy (at nominal pressure)		
0.1 % FSO	1	
customer	9	consult
Electrical connection		
male and female plug ISO 4400	100	
male plug Binder series 723 (5-pin)	200	
male plug M12x1 (4-pin) / metal	M10	
cable outlet with PVC cable (IP67) [1]	TA0	
cable outlet, cable with ventilation tube (IP68) [2]	TR0	
compact field housing stainless steel 1.4301 (304)	850	
customer	999	consult
Mechanical connection		
G3/4" DIN 3852 with flush sensor	K00	
customer	999	consult
Seal		
FKM	1	
customer	9	consult
Special version		
standard	111	
customer	999	consult

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request
[2] code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

LMP 331

Screw-In Transmitter

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.35 % FSO
option: 0.25 % / 0.1 % FSO

Nominal pressure

from 0 ... 100 mbar up to 0 ... 40 bar

Output signals

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

Special characteristics

- pressure port G 3/4" flush
- excellent accuracy
- small thermal effect
- excellent long term stability

Optional versions

- accuracy 0.1% FSO IEC 60770
- IS-version:
  Ex ia = intrinsically safe
  for gases and dusts
- SIL 2 application according to
  IEC 61508 / IEC 61511
- different electrical connections
- customer specific versions
  e. g. special pressure ranges

The screw-in transmitter LMP 331 has been designed for continuous level measurement and is characterized by an excellent performance and a robust construction. The modular construction allows the user the highest possible flexibility in the adaption of LMP 331.

Optional features like e.g. an intrinsically safe version or a functionally safe version (SIL 2) increase the advantages when launching and realizing projects for plants and systems.

Preferred areas of use are

- Plant and machine engineering
- Energy industry
- Environmental engineering
  (water – sewage – recycling)

Input pressure range															
Nominal pressure gauge [bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Level [mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400
Overpressure [bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥ [bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance	p_N ≥ 1 bar: unlimited vacuum resistance								p_N < 1 bar: on request					

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC}	0 ... 10 V / V_S = 14 ... 30 V_{DC}
Performance		
Accuracy1	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO option 2: for all nominal pressures: ≤ ± 0.1 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ current 3-wire: R_{max} = 240 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 % FSO / year at reference conditions	
Response time [2]	2-wire: ≤ 10 msec	3-wire: ≤ 3 msec

[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[2] with optional accuracy 0,1 % FSO the response time is 200 msec

Thermal effects (offset and span)		
Nominal pressure p_N [bar]	≤ 0.40	> 0.40
Tolerance band [% FSO]	≤ ± 1	≤ ± 0.75
in compensated range [°C]	0 ... 70	-20 … 85

Permissible temperatures			
Permissible temperatures	medium: -40 ... 125 °C	electronics / environment: -40 ... 85 °C	storage: -40 ... 100 °C

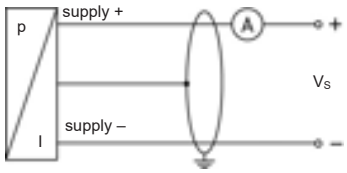
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-LMP 331	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 ≈ 0nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF opposite the housing
Permissible temperature for medium	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 ... 70 °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
Materials	
Pressure port	stainless steel 1.4404 (316L)
Housing	stainless steel 1.4404 (316L)
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 … 8 mm)
Seals	standard: FKM option: EPDM others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm
Miscellaneous	
Optionally SIL 2 version [3]	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 200 g
Installation position	any [4]
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

[3] only for 4...20mA / 2-wire; not in combination with the accuracy 0.1%
[4] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges p_N ≤ 1 bar.

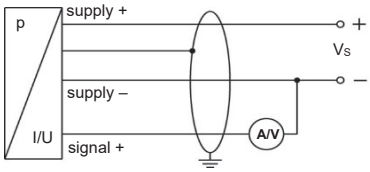
Pin configuration					
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	compact field housing	cable colours (IEC 60757)
Supply + Supply – Signal + (only for 3-wire)	1 2 3	3 4 1	1 2 3	IN + IN – OUT +	WH (white) BN (brown) GN (green)
Shield	ground pin ⊕	5	4	⊕	GNYE (green-yellow)

Wiring diagrams

2-wire-system (current)

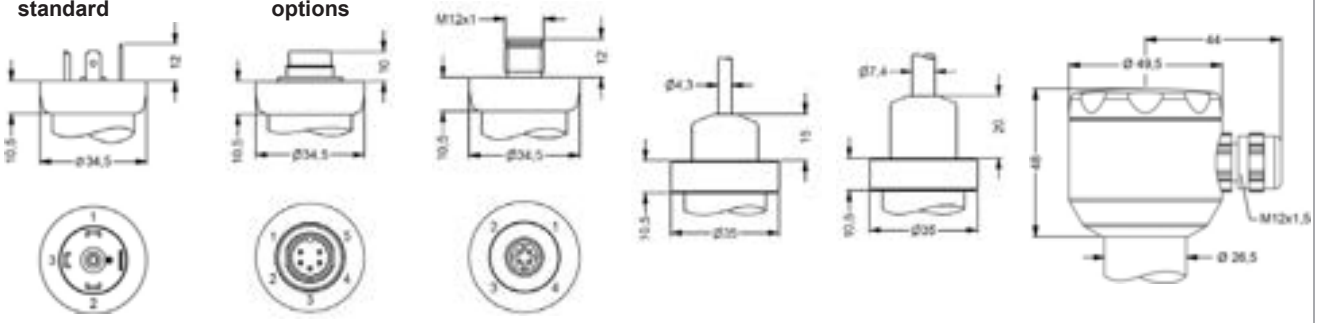


3-wire-system (current / voltage)



Electrical connections (dimensions in mm)

standard **options**

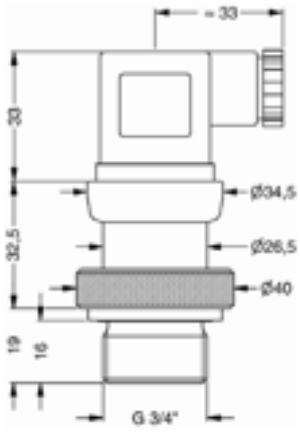


ISO 4400 (IP 65) | Binder series 723, 5-pin (IP 67) | M12x1, 4-pin (IP 67) | cable outlet with PVC cable (IP 67) [5] | cable outlet, cable with ventilation tube (IP 68) [6] | compact field housing (IP 67)

[5] *standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)*
[6] *different cable types and lengths available, permissible temperature depends on kind of cable*

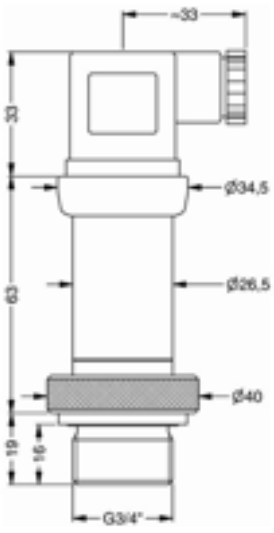
Mechanical connection (dimensions in mm)

standard



G3/4" flush (DIN 3852) with ISO 4400

SIL- and SIL-Ex-version



G3/4" flush (DIN 3852) with ISO 4400

Ordering code LMP 331

LMP 331 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐☐☐-☐-☐☐☐

Pressure	Code	
in bar	430	
in mH_2O	431	

Input [mH_2O]	[bar]	Code	
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	
250	25	2502	
400	40	4002	
	customer	9999	consult

Pressure port	Code	
stainless steel 1.4404 (316L)	1	
customer	9	consult

Diaphragm	Code	
stainless steel 1.4435 (316L)	1	
customer	9	consult

Output	Code	
4 … 20 mA / 2-wire	1	
0 … 20 mA / 3-wire	2	
0 … 10 V / 3-wire	3	
intrinsic safety 4 … 20 mA / 2-wire	E	
SIL2 4 … 20 mA / 2-wire	1S	
SIL2 with intrinsic safety 4 … 20 mA / 2-wire	ES	
customer	9	consult

Seal	Code	
FKM	1	
EPDM	3	
customer	9	consult

Electrical connection	Code	
male and female plug ISO 4400	100	
male plug Binder series 723 (5-pin)	200	
cable outlet with PVC cable (IP67) [1]	TA0	
cable outlet, cable with ventilation tube (IP68) [2]	TR0	
male plug M12x1 (4-pin) / metal	M10	
compact field housing stainless steel 1.4301 (304)	850	
customer	999	consult

Accuracy		Code	
standard for $p_N \geq 0.4$ bar:	0.35 % FSO	3	
standard for $p_N < 0.4$ bar:	0.50 % FSO	5	
option 1 for $p_N \geq 0.4$ bar:	0.25 % FSO	2	
option 2:	0.10 % FSO [3]	1	
	customer	9	consult

Special version	Code	
standard	000	
customer	999	consult

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70 °C), others on request
[2] code TR0 = PVC cable, cable with ventilation tube available in different types and lengths
[3] not in combination with SIL

LMK 331

Screw-In Transmitter

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 60 bar

Output signals

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

Special characteristics

- pressure port G 3/4" flush
  for pasty and impurity media
- pressure port PVDF
  for aggressive media

Optional versions

- IS-version
  (only for 4 … 20mA / 2-wire):
  Ex ia = intrinsically safe for
  gases and dusts
- SIL 2 application according to
  IEC 61508 / IEC 61511
- customer specific versions

The screw-in transmitter LMK 331 has been especially designed for level and process measurement and is suitable for pressure measurement of liquids, oils and gases. Usage in more viscous or polluted media is possible because of the semi-flush pressure sensor.

For the usage in aggressive media we recommended the version with PVDF pressure port. Additional features like e.g. an intrinsically safe version or a functionally safe version (SIL 2) complete the range of possibilities.

Preferred areas of use are

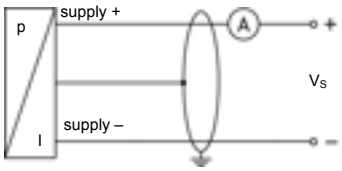
- Plant and machine engineering
- Energy industry
- Environmental engineering
  (water – sewage – recycling)
- Medical technology

Input pressure range													
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40 [1]	60 [1]
Level	[mH_2O]	4	6	10	16	25	40	60	100	160	250	400	600
Overpressure	[bar]	1	2	2	4	4	10	20	20	40	40	100	200
Burst pressure	[bar]	2	4	4	5	7,5	12	25	30	50	50	120	250
Vacuum resistance	[bar]	$p_N \geq 1$ bar: unlimited vacuum resistance $p_N < 1$ bar: on request											
[1] only possible with stainless steel pressure port													

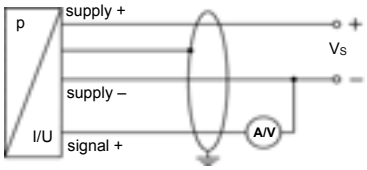
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-version [2]	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}	
[2] IS-version not possible with plastic pressure port		
Performance		
Accuracy [3]	≤ ± 0.5 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ current 3-wire: R_{max} = 500 Ω voltage 3-wire: R_{min} = 10 kΩ	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Response time	2-wire: ≤ 10 msec 3-wire: ≤ 3 msec	
Long term stability	≤ ± 0,3 % FSO / year at reference conditions	
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (Offset and Span) / Permissible Temperatures		
Thermal error	≤ ± 0.2 % FSO / 10 K	
in compensated range	0 ... 85 °C	
Permissible temperatures [4]	medium: -40 ... 125 °C	electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C
[4] for pressure port in PVDF the medium temperature is -30 … 60 °C		
Electrical protection		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
Mechanical stability		
Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27
Materials		
Pressure port / housing		pressure port / housing
	standard:	stainless steel 1.4404 (316L) / stainless steel 1.4404 (316L)
	options for p_N ≤ 25 bar:	PVDF / PVDF
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 … 8 mm)	
Seals	standard: FKM options: EPDM	others on request
Diaphragm	ceramics Al_2O_3 96 %	
Media wetted parts	pressure port, seals, diaphragm	
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval DX19-LMK 331 only for stainless steel pressure port	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, $C_i \approx 0$ nF, $L_i \approx 0$ 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 ... 70 °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		
Option SIL 2 version [5]	according to IEC 61508 / IEC 61511	
Current consumption	signal output current: max. 25 mA	signal output voltage: max. 7 mA
Weight	approx. 150 g	
Installation position	any	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
[5] only for 4...20mA / 2-wire		

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

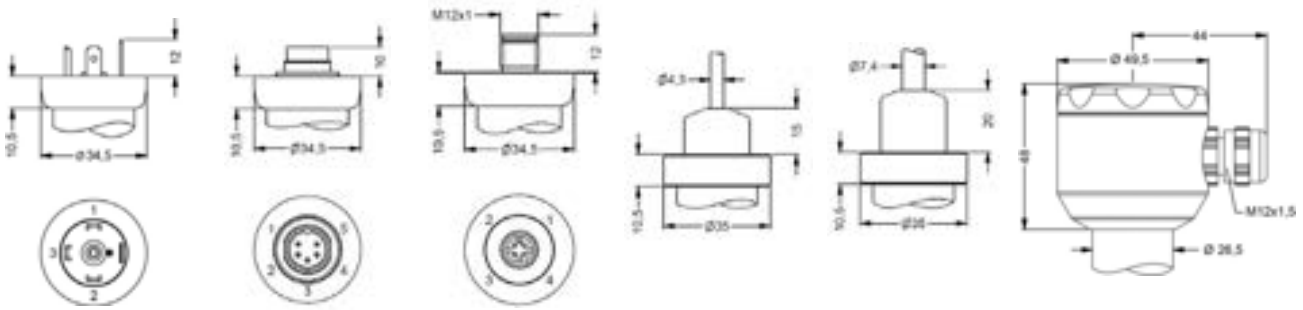


Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	compact field housing	cable colour (IEC 60757)
Supply +	1	3	1	IN +	WH (white)
Supply –	2	4	2	IN –	BN (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	GN (green)
Shield	ground pin ⊕	5	4	⊕	GNYE (green-yellow)

Electrical connections (dimensions in mm)

standard **options**



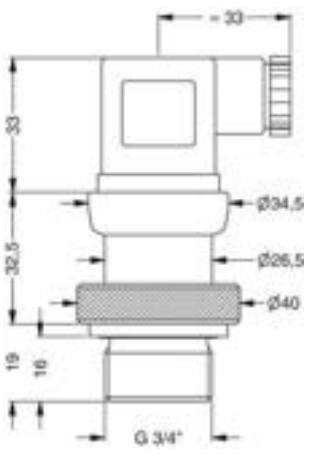
ISO 4400 (IP 65) | Binder Series 723 5-pin (IP 67) | M12x1, 4-pin (IP 67) | cable outlet with PVC cable (IP 67) [6] | cable outlet, cable with ventilation tube (IP 68) [7] | compact field housing (IP 67)

⇨ **universal field housing stainless steel 1.4404 with cable gland M20x1.5 (ordering code 880) and other versions on request**

[6] standard: 2 m PVC-cable without ventilation tube (permissible temperature: -5 ... 70°C)
[7] different cable types and length available, permissible temperature depends on kind of cable

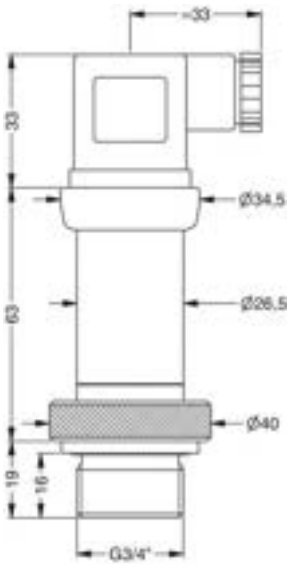
Mechanical connection (dimensions in mm)

standard



G3/4" flush (DIN 3852) with ISO 4400

standard for SIL- and SIL-Ex-version



G3/4" flush (DIN 3852) with ISO 4400

Ordering code LMK 331

LMK 331 [ ][ ][ ] - [ ][ ][ ][ ] - [ ] - [ ] - [ ][ ][ ] - [ ][ ][ ] - [ ] - [ ] - [ ] - [ ][ ][ ]

Option		Code	
Pressure			
gauge in bar		4 6 0	
gauge in mH_2O		4 6 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	
160	16	1 6 0 2	
250	25	2 5 0 2	
400	40 [1]	4 0 0 2	
600	60 [1]	6 0 0 2	
customer		9 9 9 9	consult
Analogue output			
4 … 20 mA / 2-wire		1	
0 … 20 mA / 3-wire		2	
0 … 10 V / 3-wire		3	
intrinsic safety 4 … 20 mA / 2-wire [2]		E	
SIL2 4 … 20 mA / 2-wire		1S	
SIL2 with intrinsic safety [2] 4 … 20 mA / 2-wire		ES	
customer		9	consult
Accuracy			
0.5 % FSO		5	
customer		9	consult
Electrical connection			
male and female plug ISO 4400		1 0 0	
male plug Binder series 723 (5-pin)		2 0 0	
cable outlet with PVC cable (IP67) [3]		T A 0	
cable outlet, cable with ventilation tube (IP68) [4]		T R 0	
male plug M12x1 (4-pin) / metal		M 1 0	
compact field housing stainless steel 1.4301 (304)		8 5 0	
customer		9 9 9	consult
Mechanical connection			
G3/4" DIN 3852 with flush sensor		K 0 0	
customer		9 9 9	consult
Seals			
FKM		1	
EPDM		3	
customer		9	consult
Pressure port			
stainless steel 1.4404 (316L)		1	
option for $p_N \leq 25$ bar: PVDF [5]		B	
customer		9	consult
Diaphragm			
ceramics Al_2O_3 96 %		2	
customer		9	consult
Special version			
standard		0 0 0	
customer		9 9 9	consult

[1] only possible for pressure port of stainless steel
[2] intrinsic safety not possible with plastic pressure port
[3] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request
[4] code TR0 = PVC cable, cable with ventilation tube available in different types and lengths
[5] permissible medium temperature: -30 … 60 °C

LMK 351

Screw-in Transmitter

Ceramic Sensor

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

Nominal pressure

from 0 ... 40 mbar up to 0 ... 20 bar

Output signal

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

Product characteristics

- pressure port PVDF-version for aggressive media
- pressure port G 1 1/2" for pasty and polluted media

Optional versions

- IS-version
  Ex ia = intrinsically safe for gases and dust
- diaphragm 99.9 % Al_2O_3
- customer specific versions

The screw-in transmitter LMK 351 has been designed for measuring small system pressure and level measurement in container. The LMK 351 is based on an own-developed capacitive ceramic sensor element. Usage in viscous and pasty media is possible because of the flush mounted sensor.

For the usage in aggressive media a pressure port in PVDF and the diaphragm in Al_2O_3 99.9 % is available. An intrinsically safe version completes the range of possibilities.

Preferred areas of use are

- Plant and machine engineering
- Environmental engineering (water – sewage – recycling)

Preferred used for

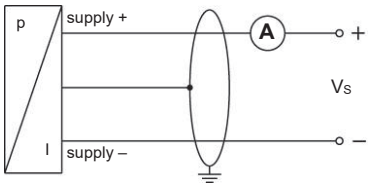
- Fuel and oil
- Viscous and pasty media

Pressure ranges																
Nominal pressure	[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
Permissible vacuum	[bar]	-0.2		-0.3		-0.5				-1						

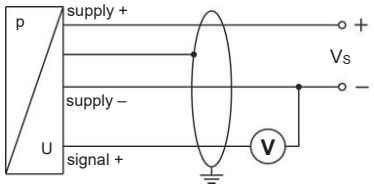
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO	option for p_N ≥ 0.6 bar: ≤ ± 0.25 % FSO
Permissible 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	
Turn-on time	700 msec	
Mean measuring time	5/sec	
Response time	mean response time: ≤ 200 msec	max. response time: 380 msec
[1] 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 [2]	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C	
[2] for pressure port in PVDF the medium temperature is -30 … 60 °C		
Electrical protection		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
Mechanical stability		
Vibration	10 g RMS (20 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 1 msec	according to DIN EN 60068-2-27
Materials (media wetted)		
Pressure port	standard: stainless steel 1.4404 (316L)	option: PVDF
Housing	standard: stainless steel 1.4404 (316L)	option: PVDF
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 … 8 mm)	
Seals	FKM -40 ... 125 °C FFKM -15 ... 125 °C EPDM -40 ... 125 °C	
Diaphragm	standard: ceramics Al_2O_3 96 %	options: ceramics Al_2O_3 99.9 %
Media wetted parts	pressure port, seals, diaphragm	
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approval DX14-LMK 351	IBExU05ATEX1070 X stainless steel-pressure port with connector/cable outlet: zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T110 °C Da plastic-pressure port with connector/cable outlet: zone 0/1: II 1/2G Ex ia IIC T4 Ga/Gb zone 20/21: II 1/2D Ex ia IIIC T110 °C Da/Db	
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 14 nF, L_i ≈ 0 µH, C_{gnd} = 27 nF	
Max. permissible temperature for environment	in zone 0: -20 ... 60 °C for 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 also signal line / signal line: 220 pF/m cable inductance: signal line / shield also signal line / signal line: 1.5 µH/m	
Miscellaneous		
Current consumption	signal output current: max. 21 mA signal output voltage: max. 5 mA	
Weight	approx. 200 g	
Installation position	any	
Operational life	100 million load cycles	
CE-conformity	EMV-directive: 2014/30/EU	
ATEX Directive	2014/34/EU	

Wiring diagram

2-wire-system (current)



3-wire-system (voltage)

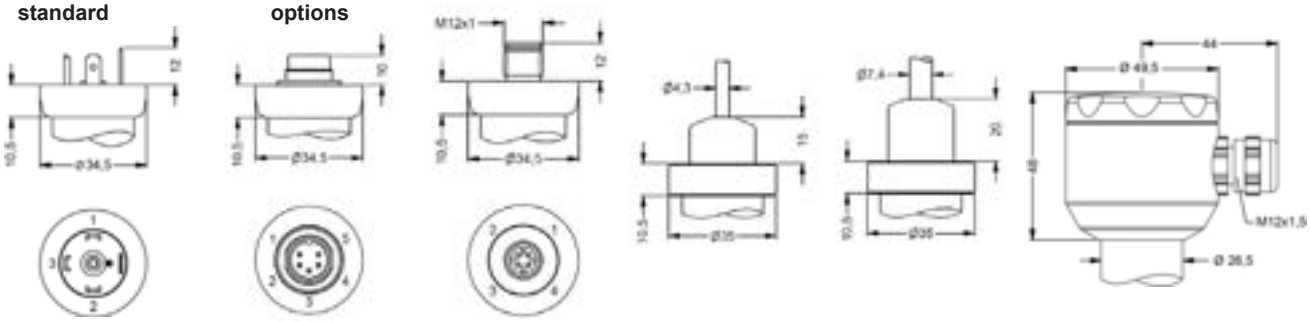


Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	compact field housing	cable colours (IEC 60757)
Supply +	1	3	1	IN +	WH (white)
Supply –	2	4	2	IN –	BN (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	GN (green)
Shield	ground pin ⊕	5	4	⊕	GNYE (green-yellow)

Electrical connections (dimensions in mm)

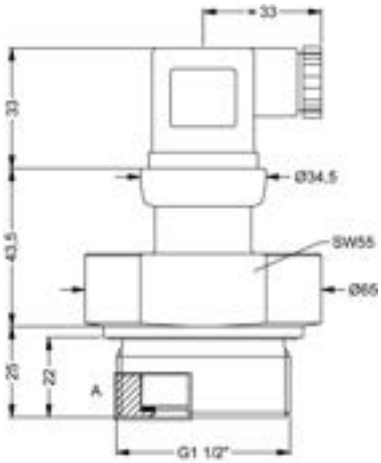
standard **options**



ISO 4400 (IP 65) | Binder series 723 5-pin (IP 67) | M12x1 4-pin (IP 67) | cable outlet with PVC cable (IP 67) [3] | cable outlet, cable with ventilation tube (IP 68) [4] | compact field housing (IP 67)

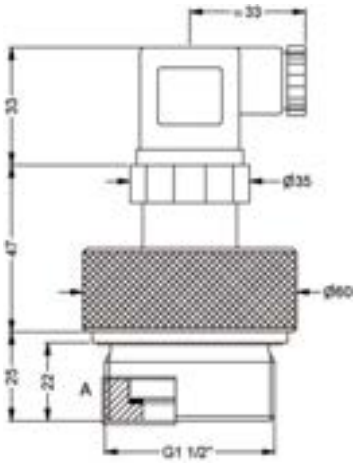
[3] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)
[4] different cable types and lengths available, permissible temperature depends on kind of cable

Dimensions (in mm)



G1 1/2" flush (DIN 3852) stainless steel

material	A
stainless steel	approx. 3
PVDF	approx. 6



G1 1/2" flush (DIN 3852) PVDF [5]

[5] not possible in combination with compact field housing

Ordering code LMK 351

LMK 351 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Section / option		Code	
Pressure			
in bar		4 7 0	
in mH_2O		4 7 1	
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
Output			
4 … 20 mA / 2-wire		1	
0 … 10 V / 3-wire		3	
intrinsic safety 4 … 20 mA / 2-wire		E	
customer		9	consult
Accuracy			
standard:	0.35 % FSO	3	
option for $p_N \geq 0.6$ bar:	0.25 % FSO	2	
customer		9	consult
Electrical connection			
male and female plug ISO 4400		1 0 0	
male plug Binder series 723 (5-pin)		2 0 0	
cable outlet with PVC cable (IP67) [1]		T A 0	
cable outlet, cable with ventilation tube (IP68) [2]		T R 0	
male plug M12x1 (4-pin) / metal		M 1 0	
compact field housing stainless steel 1.4301 (304)		8 5 0	
customer		9 9 9	consult
Mechanical connection			
G1 1/2" DIN 3852 with flush sensor		M 0 0	
customer		9 9 9	consult
Seals			
FKM		1	
EPDM		3	
FFKM		7	
customer		9	consult
Pressure port			
stainless steel 1.4404 (316L)		1	
PVDF [3]		B	
customer		9	consult
Diaphragm			
ceramics Al_2O_3 96 %		2	
ceramics Al_2O_3 99.9 %		C	
customer		9	consult
Special version			
standard		0 0 0	
customer		9 9 9	consult

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request
[2] code TR0 = PVC cable, cable with ventilation tube available in different types and lengths
[3] not possible in combination witn compact field housing; permissible medium temperature: -30 … 60 °C

EP 500

Pressure Transmitter

Special Application:
Level Measurement via Air Bubbling

Characteristics:

- capacitive ceramic sensor
- nominal pressure ranges from 0 ... 60 mbar up to 0 ... 20 bar
- output signal 4 ... 20 mA / 2-wire
- hat rail housing
- programming via integrated interface

Technical Data

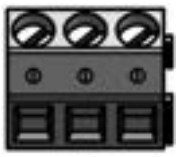
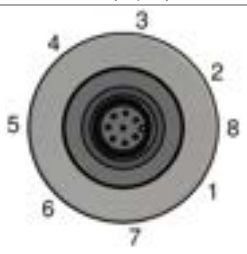
Input pressure range									
Nominal pressure p_N gauge	[bar]	0.06	0.16	0.4	1	2	5	10	20
Nominal pressure p_N absolute	[bar]	on request							
Permissible overpressure	[bar]	2	4	6	8	15	25	35	40
Permissible vacuum for p_N gauge	[bar]	-0.2	-0.3	-0.5		-1			

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 32 V_{DC}; $V_{S\ Nom.}$ = 24 V_{DC}
Current consumption	max. 21 mA
Performance	
Accuracy [1]	IEC 60770 [2]: ≤ ± 0.2 % FSO BFSL: ≤ ± 0.1 % FSO
Turn-on time	700 msec
Permissible load	R_{max} = [(V_S – $V_{S\ min}$) / 0.02 A] Ω
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time (10 ... 90 %)	120 msec – without consideration of electronic damping
Measuring rate	8/sec
[1] for nominal pressure ranges ≤0.4 bar the accuracy is calculated as follows: ≤ ± [0.2 + 0.04 x (nominal pressure range / adjusted range)] % FSO	
[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	
medium	-40 ... 125°C
electronics / environment / storage	-40 ... 85°C

Electrical protection			
Short-circuit protection	permanent		
Reverse polarity protection	no damage, but also no function		
Electrical connection			
Input	terminal clamps (3-pin)		
Communication connector	M12x1 (8-pin), metal		
Materials			
Pressure port	stainless steel 1.4301		
Housing	PA6 (housing foot: PA66)		
Seals (media wetted)	FKM		
Diaphragm	ceramic Al_2O_3 96 %		
Media wetted parts	pressure port, seals of sensor, diaphragm		
Category of the environment			
Lloyd´s Register (LR)	EMV1, EMV2, EMV3		number of certificate: 13/20056
Det Norske Veritas (DNV)	temperature:	B	number of certificate: TAA00001GM
	humidity:	B	
	vibration:	A	
	electromagnetic compatibility:	B	
	enclosure:	-	
Miscellaneous			
Ingress protection	IP00		
Function display	green SMD-LED - lights by information flow through the transmitter		
Installation position	any		
Operational life	100 million load cycles		
Weight	approx. 200 g		
Adjustability	configuration via programming kit CIS 700 [3]; following configurations are possible: - electronic damping: 0 ... 100 sec - offset: 0 ... 67 % FSO - turn down of span: max. 1:20 - configuration of pressure unit - calibration via connected pressure reference		

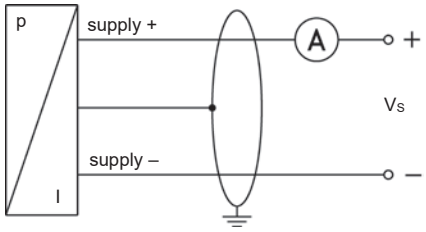
[3] programming kit has to be ordered separately (software appropriate for Windows®95, 98, 2000, NT Version 4.0 or higher, and XP)

Pin configuration

Electrical connections	terminal clamps	M12x1 (8-pin), metal
	 1 2 3	
Supply +1	1	-
Supply +2	-	4
Supply –	2	2
Tx	-	5
Rx	-	6
GND	-	7
NC	-	1
Shield	3	3

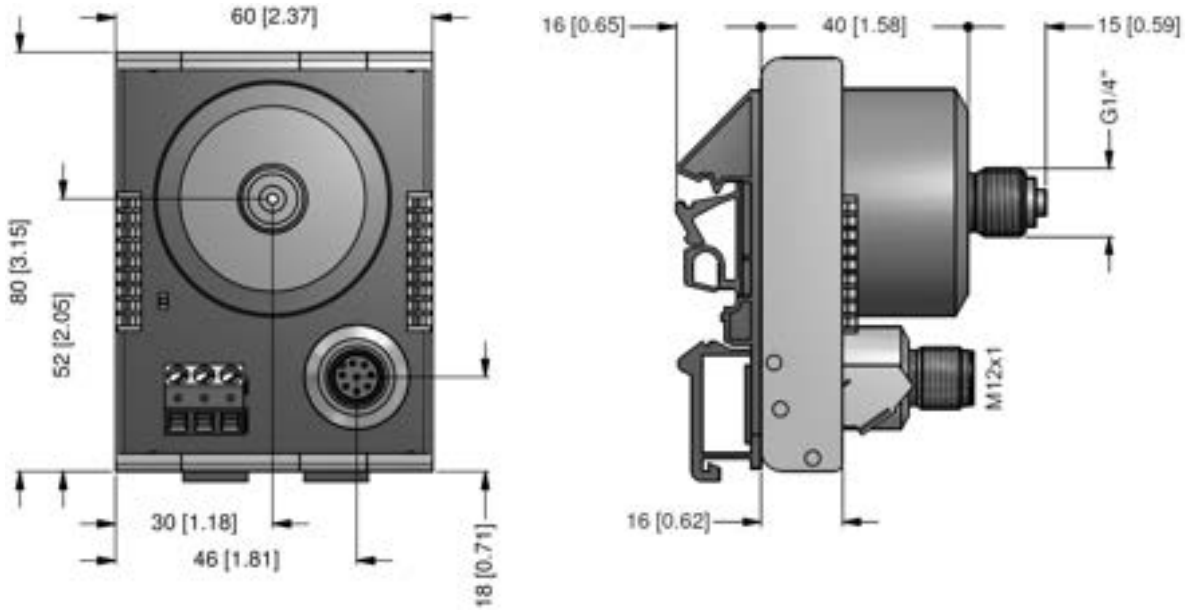
Wiring diagram

2-wire-system (current)



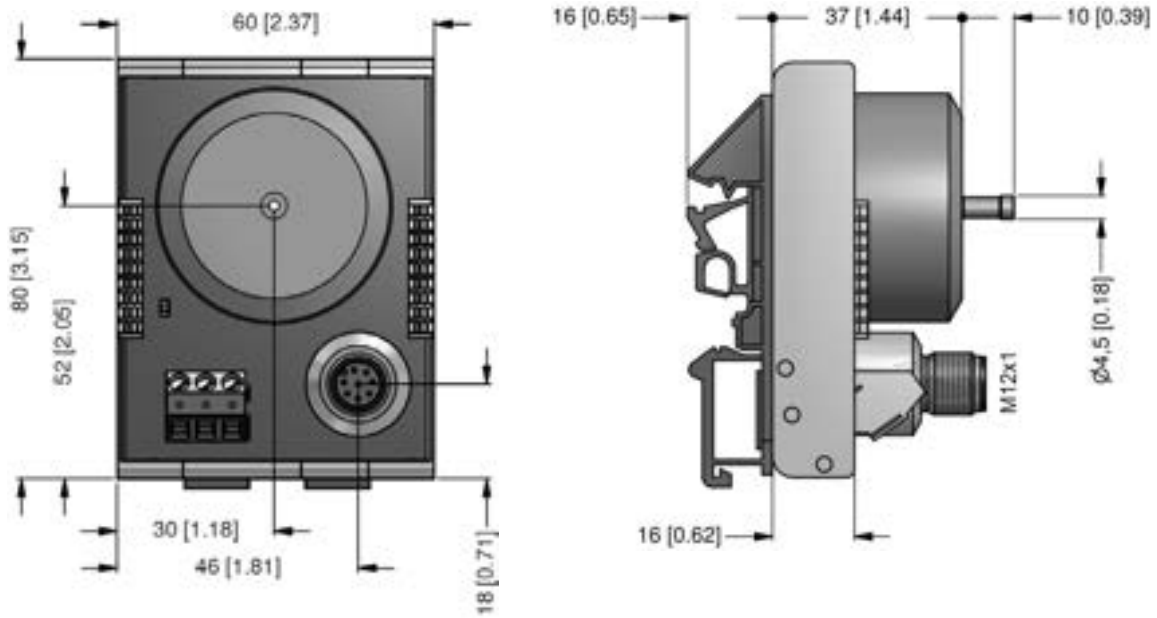
Dimensions (mm / in)

standard



G1/4"

option for $p_N \leq 3$ bar



hose connection for flexible hoses Ø4 mm

Ordering code EP 500

EP 500 □□□-□□□□-□-□-□□□-□-□-□-□□□

Pressure																		
gauge	U	P	5															
absolute	U	P	6															consult
Input	**[bar]**																	
0.06				0	6	0	0											
0.16				1	6	0	0											
0.4				4	0	0	0											
1.0				1	0	0	1											
2.0				2	0	0	1											
5.0				5	0	0	1											
10				1	0	0	2											
20				2	0	0	2											
customer				9	9	9	9											consult
Output																		
4 … 20 mA / 2-wire								1										
customer								9										consult
Accuracy																		
0.2 % FSO									B									
customer									9									consult
Mechanical connection																		
hose connection Ø 4.5 mm [1]										Y	0	2						
G1/4" EN 837										4	0	0						
customer										9	9	9						consult
Seal																		
FKM													1					
customer													9					consult
Pressure port																		
stainless steel 1.4301 (304)														2				
customer														9				consult
Diaphragm																		
ceramics Al_2O_3 96%															2			
customer															9			consult
Special version																		
standard																0	0	0
customer																9	9	9	consult

[1] hose connection only up to 3 bar

KL 1

Terminal Box

Aluminium

Product characteristics

- aluminium die cast case
- for connecting 2-wire submersible transmitters
- integrated pressure balance item
- overvoltage protection with nominal discharge current of 10 kA

The terminal box KL 1 is intended for the professional electrical connection of 2-wire transmitters.

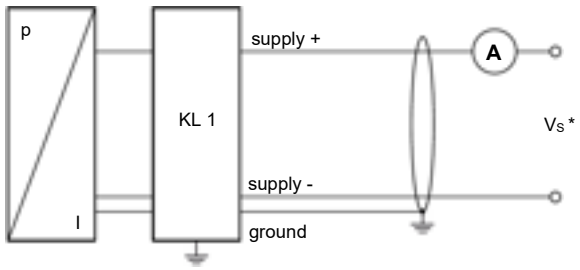
It offers integrated atmospheric pressure compensation also overvoltage protection and can be used for BD|SENSORS transmitters.

The terminal box KL 1 is equipped with a pressure balance item for equalization of atmospheric reference, therefore a cable without ventilation tube can be used on the supply side.

Vertical terminal clamps enable easy connection of cables inside. The terminal box has to be mounted with two fastening screws.

General specifications	
Number of signal lines	2-wire: 4 ... 20 mA
Housing	aluminium die cast case, grey powder-coating
Ingress protection	IP 66
Cable entries	cable gland: M16x1.5 Polyamide, seal NBR, IP 68, diameter range: standard Ø 5 ... 10 mm (others on request)
Atmospheric pressure compensation	pressure balance item with PTFE filter
Terminal clamps	vertical clamps for stranded and solid wires up to 2.5 mm²
Weight	approx. 550 g
Overvoltage protection	
Series resistance	10 Ω for each wire
Nominal discharge current	20 kA (8/20 µs)
Max. rated current	30 mA

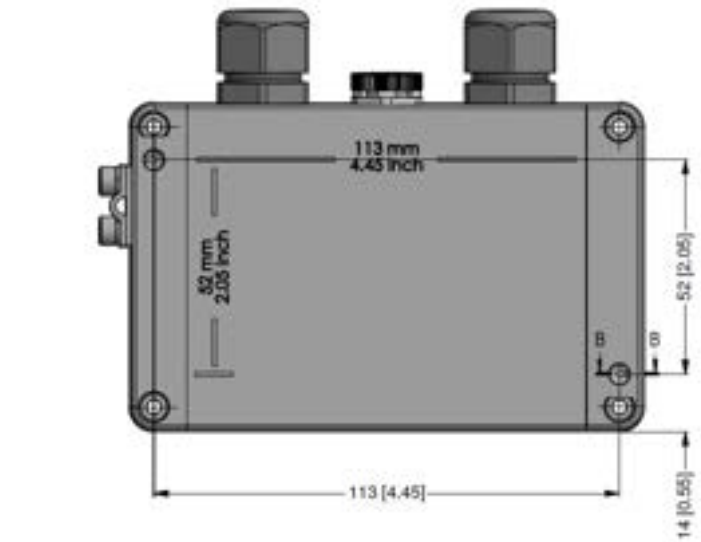
Wiring diagram

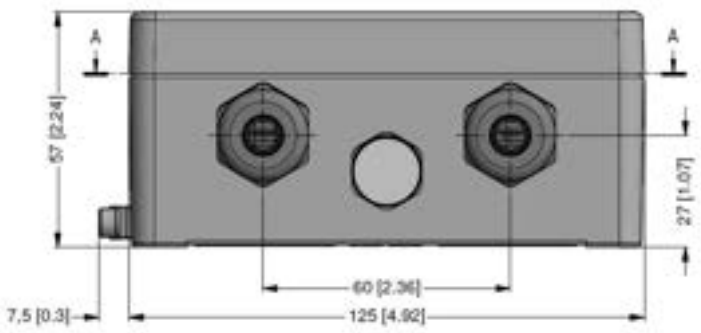


The ground wires of all components have to be connected!

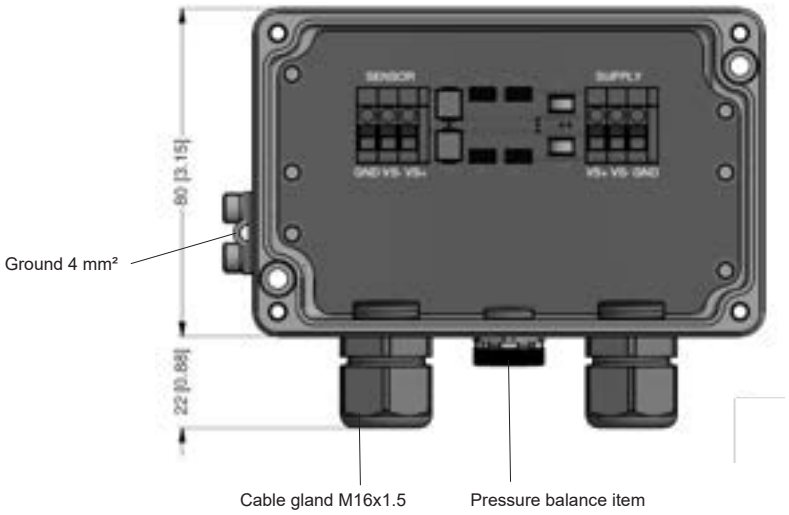
* The supply V_S has to be chosen according to needs of the used transmitter.

Dimensions (mm / in)





Sectional view A-A



Ordering code KL 1

KL 1 - ZB.601 - □□□ - □□□

Version								
	standard	1	0	0				
	customer	9	9	9				consult
Special version								
	standard				0	0	0	
	customer				9	9	9	consult

KL 2

Terminal Box

Plastics

Product characteristics

- cost-efficient ABS case
- for connecting 2-wire submersible transmitters
- integrated pressure balance item
- 2 signal lines

Optional versions

- Version for two independent 2 wire circuits
- overvoltage protection
- HART® connection

The terminal box KL 2 is intended for the professional electrical connection of submersible level transmitters. Thus, it is a cost-effective alternative to our well proven aluminium terminal box KL 1.

A pressure balance item is responsible for the compensation of atmospheric pressure variations. On the supply side a cable without ventilation tube can be used.

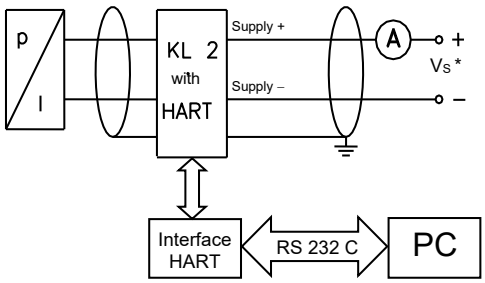
Vertical terminal clamps enable easy connection of cables inside the case.

The KL 2 with optional overvoltage protection is additionally equipped with surge arresters with a nominal discharge current of 10 kA.

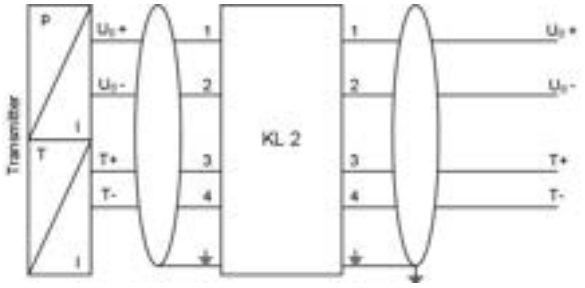
As a further option the KL 2 is available with a HART® connection.

General specifications	
Number of signal lines	2-wire (4 ... 20 mA)
Housing material	plastic ABS, grey
Ingress protection	IP 66
Cable entries	cable gland M16x1.5 Polyamide, seals NBR, IP 68, diameter range: standard 5 ... 10 mm others on request
Atmospheric pressure compensation	pressure balance item with PTFE filter
Terminal clamps	vertical clamps for stranded and solid wires up to 2.5 mm²
Weight	approx. 220 g
Optional overvoltage protection	
Series resistance	10 Ω for each wire
Nominal discharge current	10 kA (8/20 µs)
Max. rated current	30 mA
Optional HART® connection	
Connections	terminal clamp connection

Wiring diagrams

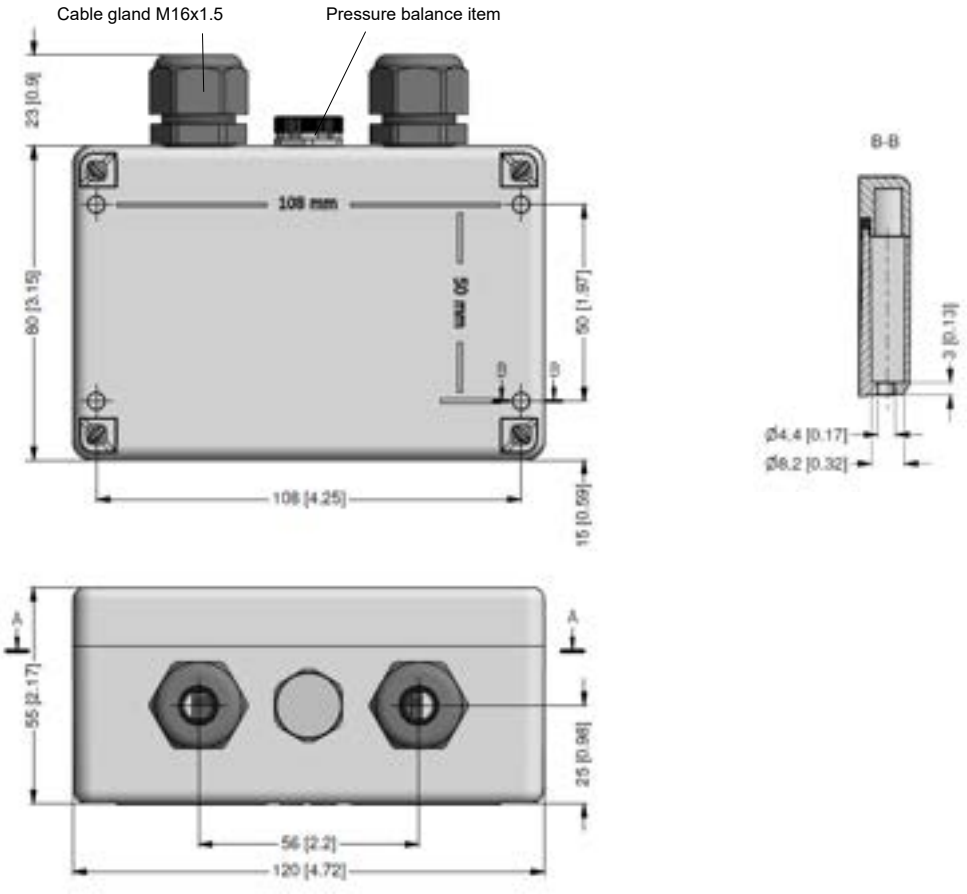


version with 2 channels, eg. LMK 307T, LMP 307T



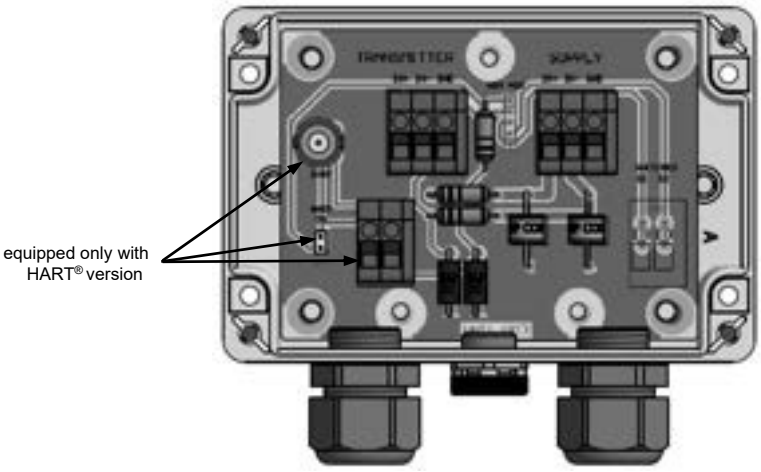
** The supply V_S has to be chosen according to needs of the used transmitter. The ground wires of all components have to be connected!*

Dimensions (mm / in)

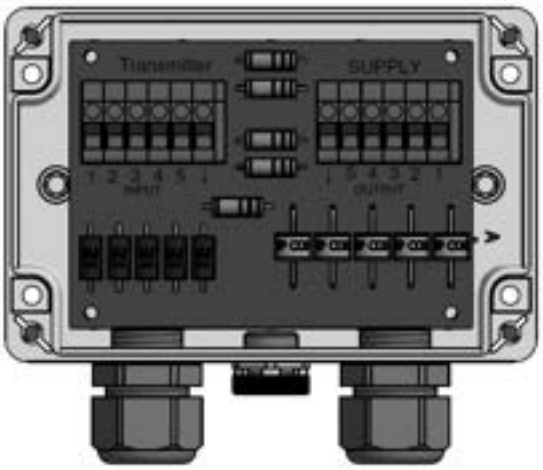


Sectional view A-A

standard



version with 2 channels



Version for two independent 2 wire circuits
and over voltage protection, e.g. for LMK 307T, LMP 307T

HART® is a registered trade mark of HART Communication Foundation

Ordering code KL 2

KL 2 - ZB.601 - [ ][ ][ ] - [ ][ ][ ]

Version							
standard	2	0	0				
over voltage protection	2	0	1				
version with 2 channels [1]	2	2	0				
version with 2 channels and over voltage protection [1]	2	2	1				
HART® communication interface	2	H	0				
HART® communication interface and over voltage protection	2	H	1				
Special version							
standard				0	0	0	
customer				9	9	9	consult

[1] version for 2 independent 2 wire circuits

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COMPETENCE

Industrial pressure measurement technology from 0.1 mbar up to 6000 bar

- pressure transmitters, electronic pressure switches or hydrostatic level probes
- OEM or high-end products
- standard products or customized solutions

BD|SENSORS has the right pressure measuring device at the right price.

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pressure measurement at the highest level

The concentration on electronic pressure transmitter has led to extraordinary efficiency and economical pricing.

BD|SENSORS is certain to be one of the most economical suppliers on the world market, given equal technical and commercial conditions.

RELIABILITY

projectable delivery times and strict observance of deadlines

Short delivery times and firm deadlines, even for special designs, make BD|SENSORS a reliable partner for our customers.

BD|SENSORS reduces the level of your stock-keeping and increases your profitability.

FLEXIBILITY

We have special solutions for your individual requirement.

We solve your problem in industrial pressure measurement quickly and economically, not only with large-scale production lines, but also for smaller requirements.

BD|SENSORS is especially flexible when technical support and quick assistance are required in service case as well as for rush orders.

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- pharmaceutical industry
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- heavy industry
- environmental industry
- packaging and paper industry

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- fuels and oils
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