

# PRODUCT CATALOGUE

## HYDROSTATIC PROBES

## SCREW-IN TRANSMITTER





# 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 BDESENSORS has concentrated on electronic pressure measurement technology from the beginning.

With our unremitting product 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.

With 260 employees at 4 locations in Germany, the Czech Republic, Russia and China BD|SENSORS has solutions from 0.1 mbar to 6000 bar:

- pressure sensors, pressure transducers  
pressure transmitters

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- electronic pressure switches

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- pressure measuring devices with display and  
switching outputs

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- hydrostatic level probes

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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.

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.**

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# LMP 308i

## Separable Stainless Steel Probe Precision

Stainless Steel Sensor

accuracy according to IEC 60770: 0.1 % FSO

### Nominal pressure

from 0 ... 4 mH<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

### Output signals

2-wire: 4 ... 20 mA

3-wire: 0 ... 10 V

others on request

### Special characteristics

- ▶ diameter 35 mm
- ▶ cable and sensor section separable
- ▶ excellent accuracy
- ▶ communication connection
- ▶ thermal error in compensated range  
-20 ... 70 °C: 0.2 % FSO  
TC 0.02 % FSO / 10K

### Optional versions

- ▶ IS-version zone 0
- ▶ cable protection via corrugated pipe
- ▶ mounting accessories as cable gland and terminal clamp in stainless steel
- ▶ different kinds of cables
- ▶ different kinds of seal materials

The separable precision stainless steel probe LMP 308i is designed for continuous fill level and level measurement of water and liquid mediums. The signal processing of sensor signal is done by digital electronics with 16-bit analog 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 transmitter body 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

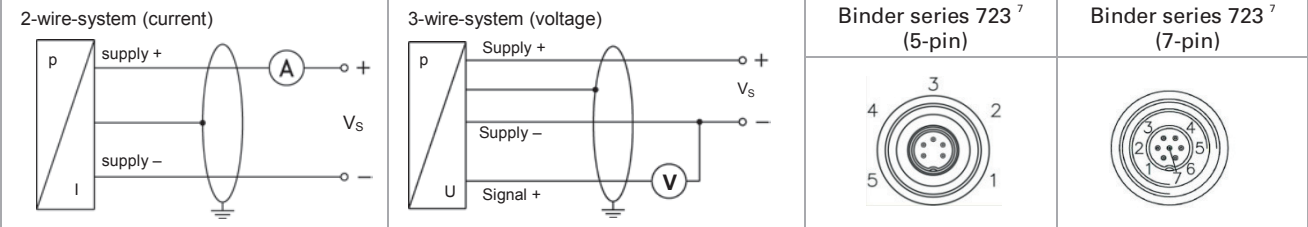
water treatment plants

water recycling



Input pressure range <sup>1</sup>							
Nominal pressure gauge	[bar]	0.40	1	2	4	10	20
Level	[mH <sub>2</sub> O]	4	10	20	40	100	200
Overpressure	[bar]	2	5	10	20	40	80
Burst pressure	[bar]	3	7.5	15	25	50	120
<sup>1</sup> 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 <sub>S</sub> = 12 ... 36 V <sub>DC</sub> with RS-232 communication interface						
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>						
Options	3-wire: 0 ... 10 V / V <sub>S</sub> = 14 ... 36 V <sub>DC</sub>						
Performance							
Accuracy	IEC 60770 <sup>2</sup> : ≤ ± 0.1 % FSO						
Performance after turn-down (TD)	no change of accuracy <sup>3</sup> 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 viz. the accuracy is ≤ ± 0.25 % FSO						
- TD ≤ 1:5							
- TD > 1:5							
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω voltage 3-wire: R <sub>min</sub> = 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						
Response time	ca. 200 msec						
Adjustability	following parameters can be adjusted (interface / software needed <sup>4</sup> ) electronic damping: 0 ... 100 sec offset: 0 ... 90 % FSO turn-down of span: max. 1:10						
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)							
<sup>3</sup> 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. turn-down 1:3: ≤ ± (0.1 + 0.02 x 3) % FSO viz. the accuracy is ≤ ± 0.16 % FSO							
<sup>4</sup> software, interface and cable must separate be ordered (software is compatible with Windows <sup>®</sup> 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 <sup>5</sup>							
Short-circuit protection	permanent						
Reverse polarity protection	no damage, but also no function						
Electromagnetic compatibility	emission and immunity according to EN 61326						
<sup>5</sup> 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 <sup>6</sup>	PVC (-5 ... 70 °C) grey PUR (-20 ... 70 °C) black FEP (-20 ... 70 °C) black others on request						
<sup>6</sup> cable with integrated air tube for atmospheric pressure reference							
Materials (media wetted)							
Housing	stainless steel 1.4404 (316L)						
Seals	FKM, EPDM, others on request						
Diaphragm	stainless steel 1.4435 (316L)						
Protection cap	POM						
Explosion protection (only for 4 ... 20 mA / 2-wire)							
Approvals	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X						
DX19-LMP 308 i	zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da						
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing						
Permissible media temperature	in zone 0: -20 ... 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in zone 1 or higher: -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							
Current consumption	signal output current: max. 25 mA						
Weight	approx. 250 g (without cable)						
Ingress protection	IP 68						
CE-conformity	EMC Directive: 2004/108/EC						
ATEX Directive	94/4/EG						

### Wiring diagram / connector



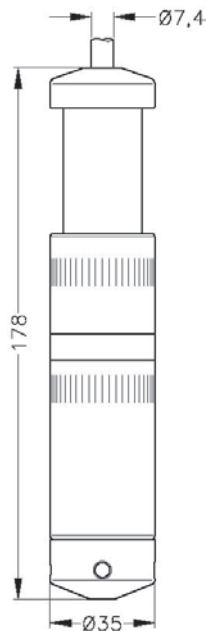
### Pin configuration

Electrical connection	Binder series 723 <sup>7</sup> (5-pin) / 2-wire	Binder series 723 <sup>7</sup> (5-pin) / 3-wire	Binder series 723 <sup>7</sup> (7-pin) / 2-wire with communication interface	cable colours (DIN 47100)
Supply +	3	3	3	wh (white)
Supply -	1	4	1	bn (brown)
Signal + (for 3-wire)	-	1	(6)	gn (green)
RxD	-	-	4	-
TxD	-	-	5	-
GND	-	-	7	-
Shield	5	5	2	gn/ye (green / yellow)

<sup>7</sup> in separated version

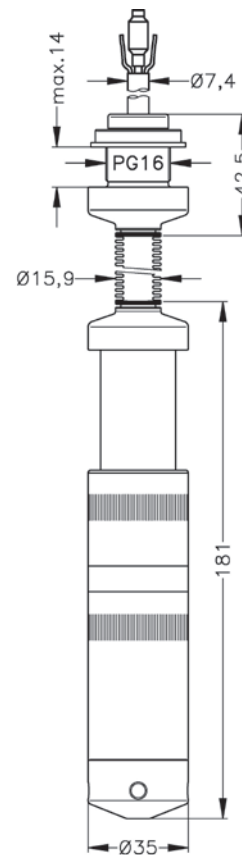
### Dimensions (in mm)

#### standard



separated version

#### option



version with  
corrugated pipe







# LMK 382H

## Stainless Steel Probe with HART<sup>®</sup>-communication

Ceramic Sensor

accuracy according to IEC 60770:  
0.1 % FSO

### Nominal pressure

from 0 ... 60 cmH<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 39.5 mm
- ▶ HART<sup>®</sup> communication (setting of offset, span and damping)
- ▶ permissible temperatures up to 85 °C
- ▶ high overpressure resistance
- ▶ high long-term stability


### Optional versions


- ▶ IS-version zone 0
- ▶ mounting with stainless steel pipe
- ▶ flange version
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- ▶ accessories e.g. assembling and probe flange, mounting clamp


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

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 basin

 Sewage  
waste water treatment  
water recycling

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



Pressure ranges <sup>1</sup>									
Nominal pressure	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45

<sup>1</sup> 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 <sub>S</sub> = 12 ... 36 V <sub>DC</sub> with HART <sup>®</sup> communication V <sub>S rated</sub> = 24 V <sub>DC</sub>
Option IS- protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub> with HART <sup>®</sup> communication V <sub>S rated</sub> = 24 V <sub>DC</sub>
Performance	
Accuracy <sup>2</sup>	P <sub>N</sub> ≥ 160 mbar TD ≤ 1:5 ≤ ± 0.2 % FSO TD > 1:5 ≤ ± [0.2 + 0.03 x TD] % FSO TD <sub>max</sub> = 1:10
	P <sub>N</sub> < 160 mbar ≤ ± [0.2 + 0.1 x TD] % FSO TD <sub>max</sub> = 1:3
	P <sub>N</sub> ≥ 1 bar TD ≤ 1:5 ≤ ± 0.1 % FSO TD > 1:5 ≤ ± [0.1 + 0.02 x TD] % FSO TD <sub>max</sub> = 1:10
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω load at HART <sup>®</sup> -communication: R <sub>min</sub> = 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 <sup>3</sup> ): - electronic damping: 0 ... 100 sec - offset: 0 ... 80 % FSO - turn down of span: max. 1:10

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> software, interface, and cable have to be ordered separately (software appropriate for Windows<sup>®</sup> 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span)	
Tolerance band	≤ ± (0.2 x turn-down) % FSO
TC, average	± (0.02 x turn-down) % FSO / 10 K
in compensated range	-20 ... 80 °C
Permissible temperatures	medium: -25 ... 85 °C electronics / environment: -25 ... 85 °C storage: -25 ... 85 °C

Electrical protection <sup>4</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<sup>4</sup> 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 sheat material <sup>5</sup>	PVC (-5 ... 70 °C) grey PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 85 °C) blue

<sup>5</sup> shielded cable with integrated air tube for atmospheric pressure reference

Materials	
Housing	stainless steel 1.4404
Seals	FKM FFKM EPDM others on request
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Protection cap	POM

Miscellaneous	
Option cable protection	stainless steel pipe for probe in stainless steel: available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)
Ingress protection	IP 68
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
CE-conformity	EMC Directive: 2004/108/EC



## LMK 382H



<b>Pressure</b>																			
	in bar	5	6	5															
	in mH <sub>2</sub> O	5	6	6															
<b>Input</b>	[mH <sub>2</sub> O]																		
	[bar]																		
	0.60	0.06			0	6	0	0											
	1.60	0.16			1	6	0	0											
	4.00	0.40			4	0	0	0											
	10	1.0			1	0	0	1											
	20	2.0			2	0	0	1											
	50	5.0			5	0	0	1											
	100	10			1	0	0	2											
	200	20			2	0	0	2											
	customer				9	9	9	9											consult
<b>Housing</b>																			
	Stainless steel 1.4404 (316L)							1											
	customer							9											consult
<b>Diaphragm</b>																			
	Ceramics Al <sub>2</sub> O <sub>3</sub> 96%								2										
	Ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%								C										
	customer								9										consult
<b>Output</b>																			
	HART <sup>®</sup> -communication									H									
	4 ... 20 mA / 2-wire																		
	HART <sup>®</sup> -communication									I									
	Intrinsic safety 4 ... 20 mA / 2-wire																		
	customer									9									consult
<b>Seals</b>																			
	FKM									1									
	EPDM									3									
	FFKM									7									
	customer									9									consult
<b>Electrical connection</b>																			
	PVC-cable <sup>1</sup>										1								
	PUR-cable <sup>1</sup>										2								
	FEP-cable <sup>1</sup>										3								
	TPE-cable <sup>1</sup>										4								
	customer										9								consult
<b>Accuracy</b>																			
	0.1 % <sup>2</sup>											1							
	customer											9							consult
<b>Cable length</b>																			
	in m											9	9	9					
<b>Special version</b>																			
	standard														0	0	0		
	prepared for mounting <sup>3</sup>														5	0	2		
	with stainless steel pipe														5	1	0		
	flange version														5	1	0		
	customer														9	9	9		consult

<sup>1</sup> cable with integrated air tube for atmospheric pressure reference

<sup>2</sup> only possible for P<sub>N</sub> ≥ 1 bar

<sup>3</sup> stainless steel pipe is not part of the supply

HART<sup>®</sup> is a registered trade mark of HART Communication Foundation



# LMK 458H

Probe  
with HART<sup>®</sup>-communication  
for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 60770:  
0.1 % FSO

### Nominal pressure

from 0 ... 60 cmH<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 39.5 mm
- ▶ HART<sup>®</sup> communication (setting of offset, span and damping)
- ▶ high overpressure resistance
- ▶ high long-term stability

### Optional versions

- ▶ IS-version Ex ia = intrinsically safe for gases and dusts
- ▶ diaphragm Al<sub>2</sub>O<sub>3</sub> 99.9 %
- ▶ different housing materials (stainless steel, CuNiFe)
- ▶ screw-in and flange version
- ▶ accessories e. g. assembling and probe flange, mounting clamp

The hydrostatic probe LMK 458H has been developed for measuring level in service and storage tanks and is as a consequence of the certification by Germanischer Lloyd predestined for shipbuilding and offshore applications.

A permissible operating temperature of up to 85 °C and the possibility to use the device in intrinsic safe areas enable to measure the pressure of various fluids under extreme conditions. The basis for the LMK 458H is a capacitive ceramic sensor element, which offers a high overload resistance and medium compatibility.

### Preferred areas of use are



#### Water

Drinking water abstraction  
Desalinization plant

#### Shipbuilding / Offshore



Ballast tanks  
Draught monitoring  
Level measurement in ballast and storage tanks



<b>Pressure ranges</b>									
Nominal pressure <sup>1</sup>	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45
<sup>1</sup> On customer request we adjust the devices by software on the required pressure ranges, within the turn-down possibility (starting at 0.02 bar).									
<b>Output signal / Supply</b>									
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 36 V <sub>DC</sub> with HART <sup>®</sup> communication V <sub>S rated</sub> = 24 V <sub>DC</sub>								
Option IS-version	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub> with HART <sup>®</sup> communication V <sub>S rated</sub> = 24 V <sub>DC</sub>								
<b>Performance</b>									
Accuracy <sup>2</sup>	P <sub>N</sub> ≥ 160 mbar	TD ≤ 1:5		≤ ± 0.2 % FSO				TD <sub>max</sub> = 1:10	
	P <sub>N</sub> < 160 mbar	TD > 1:5		≤ ± [0.2 + 0.03 x TD] % FSO				TD <sub>max</sub> = 1:3	
		TD ≤ 1:5		≤ ± [0.2 + 0.1 x TD] % FSO				TD <sub>max</sub> = 1:3	
P <sub>N</sub> ≥ 1 bar	TD ≤ 1:5		≤ ± 0.1 % FSO				TD <sub>max</sub> = 1:10		
	TD > 1:5		≤ ± [0.1 + 0.02 x TD] % FSO				TD <sub>max</sub> = 1:10		
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω load at HART <sup>®</sup> -communication: R <sub>min</sub> = 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 <sup>3</sup> ): - electronic damping: 0 ... 100 sec - offset: 0 ... 80 % FSO - turn down of span: max. 1:10								
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)									
<sup>3</sup> software, interface, and cable have to be ordered separately (software appropriate for Windows <sup>®</sup> 95, 98, 2000, NT Version 4.0 or higher, and XP)									
<b>Thermal effects (Offset and Span) / Permissible temperatures</b>									
Tolerance band	≤ ± [0.2 x turn-down] % FSO								
TC, average	≤ ± [0.02 x turn-down] % FSO / 10 K								
in compensated range	-20 ... 80 °C								
Permissible temperatures	medium: -25 ... 85 °C			electronics / environment: -25 ... 85 °C			storage: -25 ... 85 °C		
<b>Electrical protection <sup>4</sup></b>									
Short-circuit protection	permanent								
Reverse polarity protection	no damage, but also no function								
Electromagnetic compatibility	emission and immunity according to - EN 61326 - Germanischer Lloyd (GL) - Det Norske Veritas (DNV)								
<sup>4</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available									
<b>Mechanical stability</b>									
Vibration	4 g (according to GL: curve 2 / according to DNV: Class B / basis: DIN EN 60068-2-6)								
<b>Electrical connection</b>									
Cable outlet with sheath material <sup>5</sup>	PUR	(-25 ... 70 °C)		black					
	FEP	(-25 ... 70 °C)		black					
	TPE	(-25 ... 85 °C)		blue					
	others on request								
<sup>5</sup> shielded cable with integrated air tube for atmospheric pressure reference									
<b>Materials (media wetted)</b>									
Housing	standard: stainless steel 1.4404 (316L)			option: CuNi10Fe1Mn (resistant against sea water)					
Seals	FKM; FFKM; EPDM others on request								
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 %			option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %					
Nose cone	POM								
<b>Category of the environment</b>									
Germanischer Lloyd (GL)	D, EMC 1			number of certificate: 19 777 - 11 HH					
Det Norske Veritas (DNV)	temperature: D humidity: B			vibration: B					
	electromagnetic compatibility: B			number of certificate: A-12144					
<b>Miscellaneous</b>									
Cable protection	stainless steel pipe for probe in stainless steel: available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)								
Ingress protection	IP 68								
Current consumption	max. 21 mA								
Weight	min. 650 g (without cable)								
CE-conformity	EMC Directive: 2004/108/EC								









# LMK 358H

## Separable Stainless Steel Probe with HART<sup>®</sup>-communication

Ceramic Sensor

accuracy according to IEC 60770:  
0.1 % FSO

### Nominal pressure

from 0 ... 60 cmH<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 39.5 mm
- ▶ cable and sensor section separable
- ▶ HART<sup>®</sup> communication (setting of offset, span and damping)
- ▶ permissible temperatures up to 85 °C
- ▶ high long-term stability


### Optional versions


- ▶ IS-version zone 0
- ▶ cable protection via corrugated pipe
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>


The separable 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 transmitter 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 / Oil  
 level monitoring in open tanks  
 with low filling heights  
 fuel storage  
 tank farms  
 biogas plants



Input pressure range <sup>1</sup>								
Nominal pressure gauge	[bar]	0.06	0.16	0.4	1	2	5	10
Level	[mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100
Overpressure	[bar]	2	4	6	8	15	25	35

<sup>1</sup> 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 <sub>S</sub> = 12 ... 36 V <sub>DC</sub> with HART <sup>□</sup> communication V <sub>S rated</sub> = 24 V <sub>DC</sub>		
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 28 V <sub>DC</sub> with HART <sup>□</sup> communication V <sub>S rated</sub> = 24 V <sub>DC</sub>		
Performance			
Accuracy <sup>2</sup>	P <sub>N</sub> ≥ 160 mbar	TD ≤ 1:5 ≤ ± 0.2 % FSO TD > 1:5 ≤ ± [0.2 + 0.03 x TD] % FSO	TD <sub>max</sub> = 1:10
	P <sub>N</sub> < 160 mbar		TD <sub>max</sub> = 1:3
	P <sub>N</sub> ≥ 1 bar	TD ≤ 1:5 ≤ ± 0.1 % FSO TD > 1:5 ≤ ± [0.1 + 0.02 x TD] % FSO	TD <sub>max</sub> = 1:10
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω load at HART <sup>□</sup> -communication: R <sub>min</sub> = 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 <sup>3</sup> ) - electronic damping 0 ... 100 sec - offset: 0 ... 80 % FSO - turn-down of span: max. 1:10		

<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>3</sup> software, interface, and cable have to be ordered separately (software appropriate for Windows<sup>®</sup> 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span) / - permissible temperatures	
Tolerance band	≤ ± (0.2 x turn-down) % FSO
TC, average	± (0.02 x turn-down) % FSO / 10 K
in compensated range	-20 ... 80 °C
Permissible temperatures	medium: -25 ... 85 °C electronic / environment: -25 ... 85 °C storage: -25 ... 85 °C

Electrical protection <sup>4</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<sup>4</sup> 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 <sup>5</sup>	PVC (-5 ... 70 °C) grey PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 85 °C) blue

<sup>5</sup> shielded cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM others on request
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Protection cap	POM

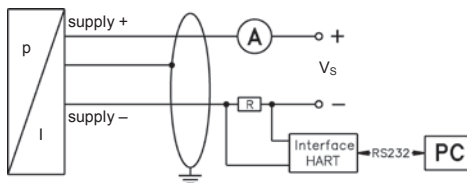
Explosion protection	
Approval DX15A-LMK 358H	IBExU 10 ATEX 1186 X Zone 0 <sup>6</sup> : II 1G Ex ia IIB T4 zone 20: II 1D Ex iaD 20 T85°C
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 0 nF, L <sub>i</sub> = 0 μH, the supply connections have an inner capacity of max. 27 nF opposite the enclosure
Permissible media temperature	in zone 0: -20 ... 60 °C with p <sub>atm</sub> 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: 1 μH/m

<sup>6</sup> for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)

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

### Wiring diagram

2-wire-system (current) HART<sup>®</sup>



connector

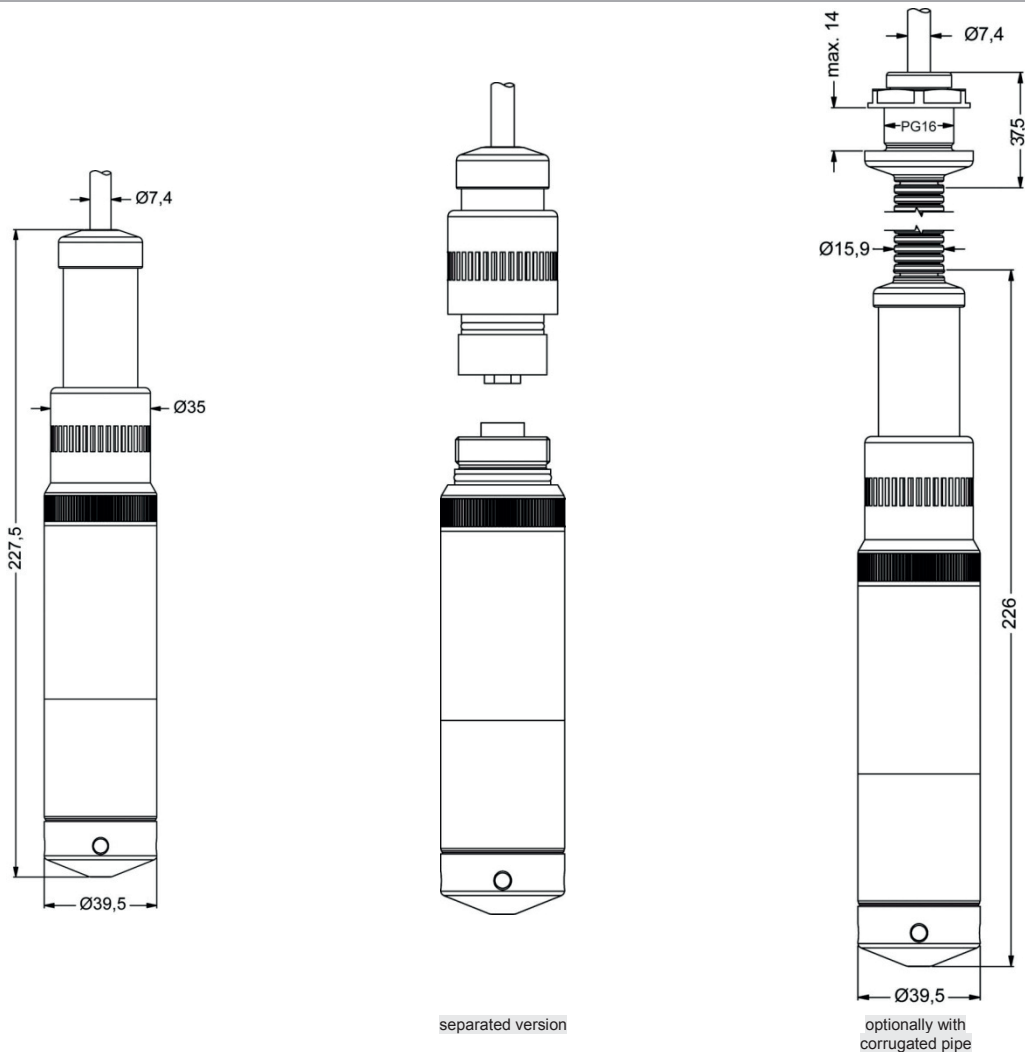


### Pin configuration

Electrical connection	Binder series 723 <sup>7</sup> (5-pin)	cable colours (DIN 47100)
Supply +	3	wh (white)
Supply -	1	gn (brown)
Shield	5	gn/ye (yellow / green)

<sup>7</sup> in separated version

### Dimensions (in mm)







# 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<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O

#### Output signals

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

#### Special characteristics

- ▶ diameter 19 mm for cramped areas
- ▶ small thermal effect
- ▶ excellent 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 continuous level measurement in confined space conditions. Permissible media are clean or waste water and thin fluids.

A piezoresistive 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 <sub>2</sub> O]	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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 36 V <sub>DC</sub>
Performance	
Accuracy	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 <sub>max</sub> = [(V <sub>S</sub> - V <sub>S,min</sub> ) / 0,02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year
Response time	< 10 msec

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)						
Nominal pressure P <sub>N</sub>	[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 <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

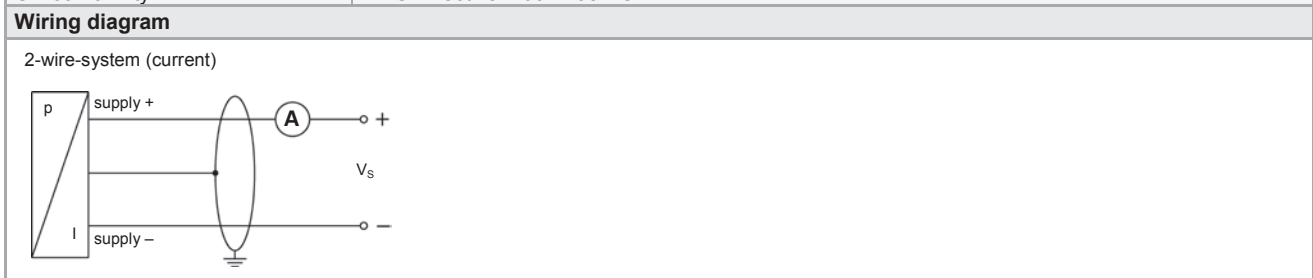
<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection	
Cable with sheath material <sup>3</sup>	PVC (-5 ... 70 °C) grey PUR (-10 ... 70 °C) black FEP (-10 ... 70 °C) black others on request

<sup>3</sup> cable with integrated air tube for atmospheric pressure reference

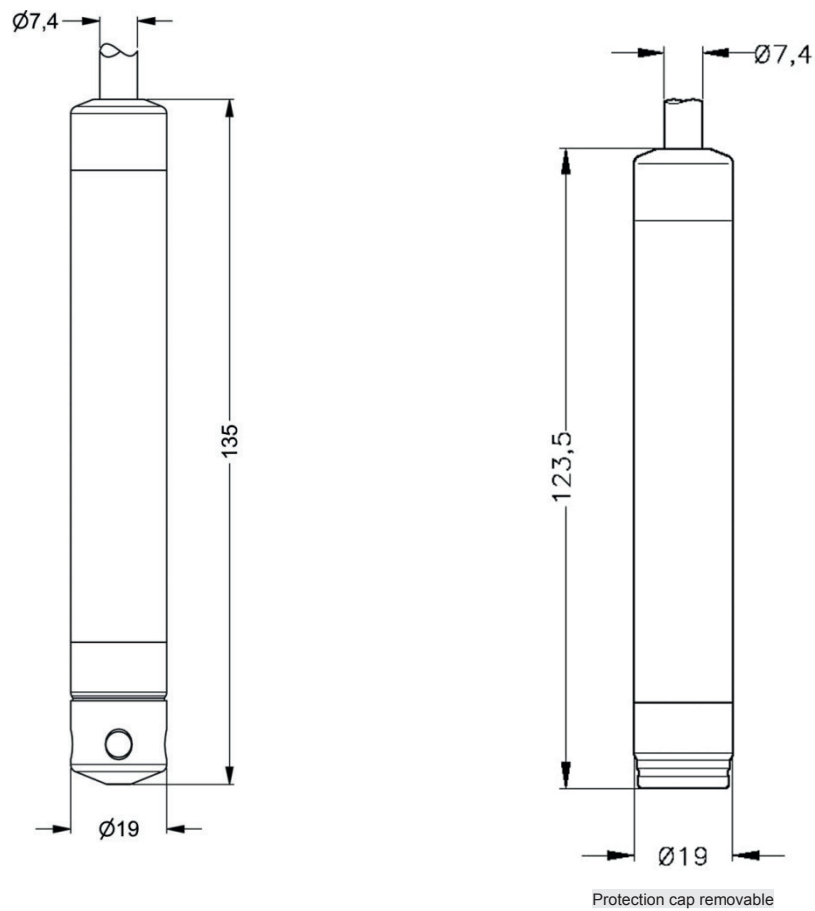
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM / EPDM
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM
Cable sheath	PVC / PUR / FEP

Miscellaneous	
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
Current consumption	signal output current: max. 25 mA
Weight	approx. 100 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC



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

**Dimensions (in mm)**









# LMP 307

## Stainless Steel Probe

### Stainless Steel Sensor

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

#### Nominal pressure

from 0 ... 1 mH<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O

#### Output signals

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

#### Special characteristics

- ▶ diameter 27 mm
- ▶ small thermal effect
- ▶ excellent accuracy
- ▶ excellent long term stability

#### Optional versions


- ▶ IS-protection zone 0
- ▶ SIL 2 (Safety Integrity Level)
- ▶ cable protection via corrugated pipe
- ▶ different kinds of cables
- ▶ different kinds of seal materials

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


Basic element is a high quality stainless steel sensor with high requirements for exact measurement with excellent 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 / 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 <sub>2</sub> O]	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 $\geq$	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / $V_S = 8 \dots 32 V_{DC}$
Option Ex-protection	2-wire: 4 ... 20 mA / $V_S = 10 \dots 28 V_{DC}$
Options 3-wire	3-wire: 0 ... 20 mA / $V_S = 14 \dots 30 V_{DC}$ 0 ... 10 V / $V_S = 14 \dots 30 V_{DC}$

Performance	
Accuracy	standard: nominal pressure < 0.4 bar: $\leq \pm 0.5\%$ FSO nominal pressure $\geq 0.4$ bar: $\leq \pm 0.35\%$ FSO option 1: nominal pressure $\geq 0.4$ bar: $\leq \pm 0.25\%$ FSO option 2: for all nominal pressures: $\leq \pm 0.1\%$ FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_S \text{ min}) / 0.02 \text{ A}] \Omega$ current 3-wire: $R_{max} = 500 \Omega$ voltage 3-wire: $R_{min} = 10 \text{ k}\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k $\Omega$
Long term stability	$\leq \pm 0.1\%$ FSO / year
Response time	2-wire: $\leq 10$ msec; 3-wire: $\leq 3$ msec

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
Nominal pressure $P_N$	[bar] < 0.40 $\geq 0.40$
Tolerance band	[% FSO] $\leq \pm 1$ $\leq \pm 0.75$
in compensated range	[°C] 0 ... 70

Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<sup>2</sup> 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 <sup>3</sup>	PVC (-5 ... 70 °C) grey PUR (-10 ... 70 °C) black FEP (-10 ... 70 °C) black

<sup>3</sup> cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM others on request
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM

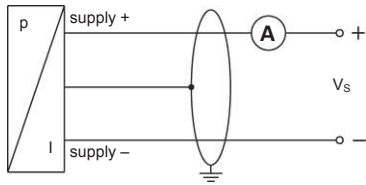
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-LMP 307	<b>IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X</b> zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C_i \approx 0 \text{ nF}$ , $L_i \approx 0 \mu\text{H}$ , the supply connections have an inner capacity of max. 27 nF to the housing
Permissible media temperature	in zone 0: -10 ... 60 °C with $p_{atm}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -10 ... 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 $\mu\text{H}/\text{m}$

Miscellaneous	
Option SIL <sup>4</sup> 2 application	according to IEC 61508 / IEC 61511
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: 2004/108/EC
ATEX Directive	94/4/EG

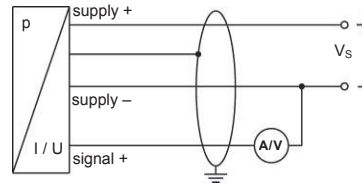
<sup>4</sup> not in combination with the accuracy 0.1%, only for 4...20mA / 2-wire

### Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

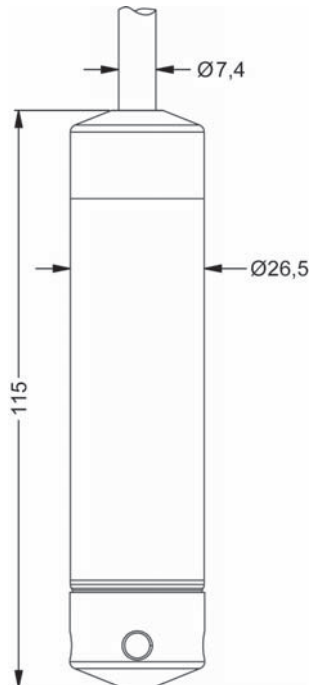


### Pin configuration

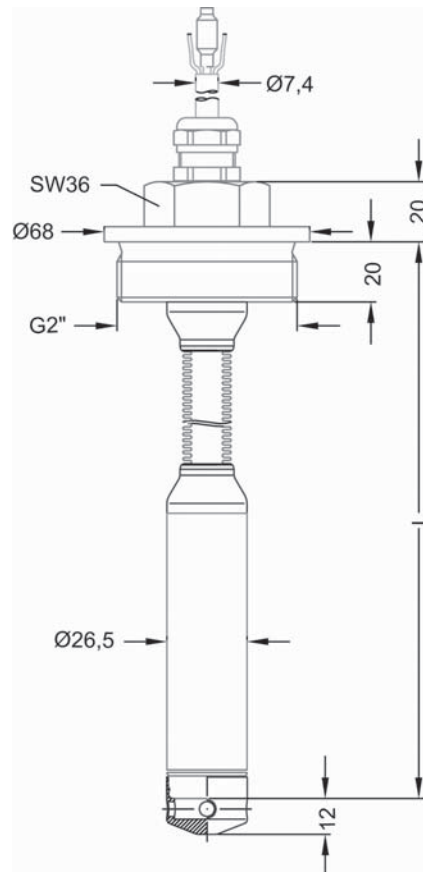
Electrical connection	cable colours (DIN 47100)
Supply +	wh (white)
Supply -	bn (brown)
Signal + (only 3-wire)	gn (green)
Shield	ye/gn (yellow / green)

### Dimensions (in mm)

standard



option



cable protection  
with corrugated pipe

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





# LMP 307T

## Stainless Steel Probe

Stainless Steel Sensor and Temperature Sensor

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

### Nominal pressure

from 0 ... 1 mH<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 27 mm
- ▶ separate output signals for pressure and temperature ranges
- ▶ integrated Pt 100 thermal element
- ▶ small thermal effect
- ▶ high accuracy
- ▶ easy handling

### Optional versions

- ▶ different kinds of cables
- ▶ different kinds of seal materials
- ▶ 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 to lightly-soiled liquids.

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 rainwater overflow basins and river courses, in addition to level measurement in containers or tank batteries.

### Preferred areas of use are



Water / filtrated sewage  
e.g. drinking water system

water recycling



Fuel / Oil  
e.g. 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 <sub>2</sub> O]	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 $\geq$	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120

Input temperature range					
Temperature measuring range	standard		0 ... 30 °C	0 ... 50 °C	-10 ... 50 °C
	others on request <sup>1</sup>				
<sup>1</sup> max. temperature range + 70 °C					

Output signal / Supply	
2-wire (pressure) <sup>2</sup>	4 ... 20 mA / V <sub>S</sub> = 10 ... 30 V <sub>DC</sub>
2-Leiter (temperature) <sup>2</sup>	4 ... 20 mA / V <sub>S</sub> = 10 ... 30 V <sub>DC</sub>
<sup>2</sup> the circuits are galvanically isolated from each other	

Performance			
Accuracy (pressure) <sup>3</sup>	standard:	nominal pressure < 0.4 bar:	$\leq \pm 0.5$ % FSO
		nominal pressure $\geq 0.4$ bar:	$\leq \pm 0.35$ % FSO
	option 1:	nominal pressure $\geq 0.4$ bar:	$\leq \pm 0.25$ % FSO
Accuracy (temperature)	$\leq \pm 1$ °C		
Permissible load	$R_{\max} = [(V_S - V_S \text{ min}) / 0.02 \text{ A}] \Omega$		
Influence effects	supply:	0.05 % FSO / 10 V	
	load:	0.05 % FSO / k $\Omega$	
Long term stability	$\leq \pm 0.1$ % FSO / year		
Response time	< 10 ms (for output signal 2-wire (pressure))		
<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)			

Thermal effects (Offset and Span)			
Nominal pressure P <sub>N</sub>	[bar]	< 0.40	$\geq 0.40$
Tolerance band	[% FSO]	$\leq \pm 1$	$\leq \pm 0.75$
in compensated range	[°C]	0 ... 70	

Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C

Electrical protection <sup>4</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
<sup>4</sup> 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 <sup>5</sup>	PVC (-5 ... 70 °C)	grey
	PUR (-10 ... 70 °C)	black
	FEP (-10 ... 70 °C)	black
	others on request	
<sup>5</sup> cable with integrated air tube for atmospheric pressure reference		

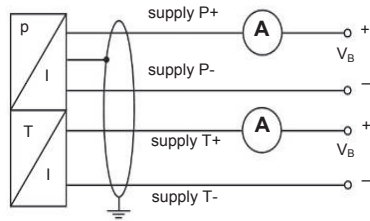
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM others on request
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM
Cable sheath	PVC, PUR, FEP

Miscellaneous	
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 $\mu$ H/m
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: 2004/108/EC

### Wiring diagram

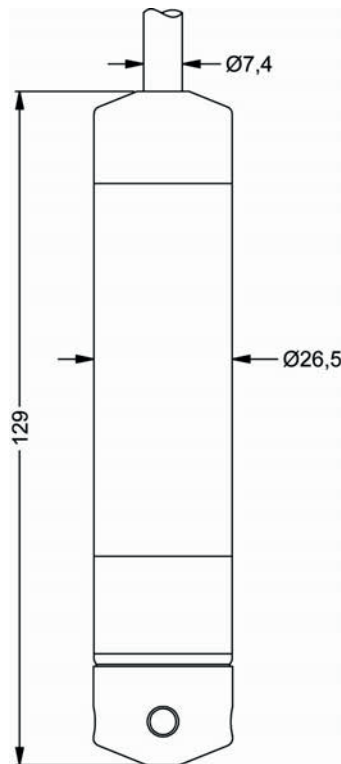
2x2-wire-system (current)



### Pin configuration

Electrical connection	cable colours (DIN 47100)
Supply P+	wh (white)
Supply P-	bn (brown)
Supply P+	gy (gray)
Supply P-	pk (pink)
Shield	ye/gn (yellow / green)

### Dimensions (in mm)









# LMP 308

## Separable 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<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 35 mm
- ▶ cable and sensor section separable
- ▶ excellent accuracy
- ▶ excellent long term stability

### Optional versions

- ▶ IS-version zone 0
- ▶ SIL 2 (Safety Integrity Level)
- ▶ cable protection via corrugated pipe
- ▶ mounting accessories as cable gland and terminal clamp of stainless steel
- ▶ different kinds of cables
- ▶ different kinds of seal materials

The separable stainless steel probe LMP 308 is designed for the continually level measurement of water and thin fluids.

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

### Preferred areas of use are

#### Water / filtrated sewage



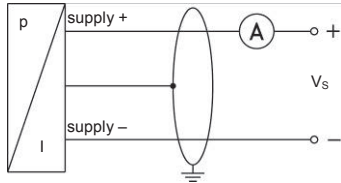
- ground water level measurement
- level measurement in wells and open waters
- rain spillway basin
- level measurement in container
- water treatment plants
- water recycling



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 <sub>2</sub> O]	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
Output signal / Supply														
Standard		2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>												
Option IS-protection		2-wire: 4 ... 20 mA / V <sub>S</sub> = 10 ... 28 V <sub>DC</sub>												
Performance														
Accuracy <sup>1</sup>		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 <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω												
Influence effects		supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ												
Long term stability		≤ ± 0.1 % FSO / year												
Response time		< 10 msec												
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)														
Thermal effects (Offset and Span)														
Nominal pressure P <sub>N</sub>	[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 <sup>2</sup>														
Short-circuit protection		permanent												
Reverse polarity protection		no damage, but also no function												
Electromagnetic compatibility		emission and immunity according to EN 61326												
<sup>2</sup> 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 <sup>3</sup>		PVC (-5 ... 70 °C) grey PUR (-20 ... 70 °C) black FEP (-20 ... 70 °C) black others on request												
<sup>3</sup> cable with integrated air tube for atmospheric pressure reference														
Materials (media wetted)														
Housing		stainless steel 1.4404 (316L)												
Seals		FKM EPDM others on request												
Diaphragm		stainless steel 1.4435 (316L)												
Protection cap		POM												
Explosion protection														
Approvals DX19-LMP 308		<b>IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X</b> zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da												
Safety technical maximum values		U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0nF, L <sub>i</sub> ≈ 0μH, the supply connections have an inner capacity of max. 27 nF to the housing												
Permissible media temperature		in zone 0: -20 ... 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in zone 1 or higher: -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: 1μH/m												
Miscellaneous														
Option SIL <sup>4</sup> 2 application		according to IEC 61508 / IEC 61511												
Current consumption		signal output current: max. 25 mA												
Weight		approx. 250 g (without cable)												
Ingress protection		IP 68												
CE-conformity		EMC Directive: 2004/108/EC												
ATEX Directive		94/4/EG												
<sup>4</sup> not in combination with the accuracy 0.1%														

### Wiring diagram

2-wire-system (current)



connector



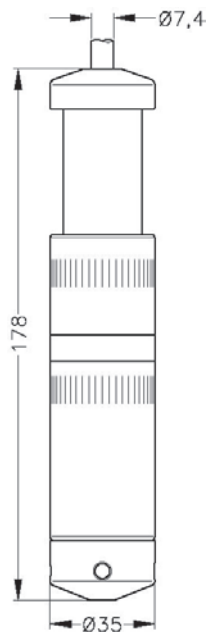
### Pin configuration

Electrical connection	Binder series 723 <sup>5</sup> (5-pin)	cable colours (DIN 47100)
Supply +	3	wh (white)
Supply -	1	bn (brown)
Shield	5	gn/ye (green / yellow)

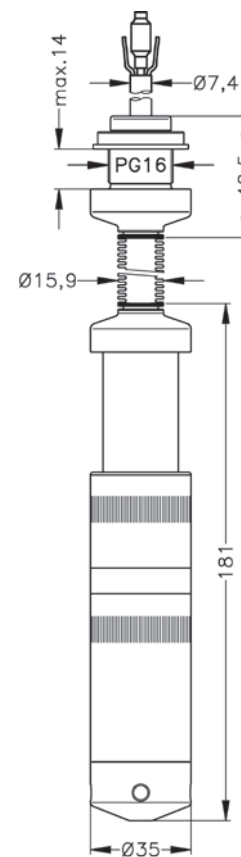
<sup>5</sup> in separated version

### Dimensions (in mm)

standard



option



separated version

version with  
corrugated pipe

⇒ Total length of devices with accuracy 0.1 % FSO IEC 60770 increases by 16 mm!  
(standard, Ex-protection and SIL-version)

## LMP 308



Pressure																				
	in bar	4	4	0																
	in mH <sub>2</sub> O	4	4	1																
Input		[mH <sub>2</sub> O]	[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
Seals																				
	FKM			1																
	EPDM			3																
	customer			9																consult
Electrical connection																				
	PVC-cable <sup>1</sup>			1																
	PUR-cable <sup>1</sup>			2																
	FEP-cable <sup>1</sup>			3																
	customer			9																consult
Accuracy																				
	standard for P <sub>N</sub> ≥ 0.4 bar	0.35 %		3																
	standard for P <sub>N</sub> < 0.4 bar	0.5 %		5																
	option 1 for P <sub>N</sub> ≥ 0.4 bar	0.25 %		2																
	option 2	0.1 % <sup>2</sup>		1																
	customer			9																consult
Cable length																				
	in m			9	9	9														
Version																				
	standard			0	0	0														
	prepared for mounting <sup>3</sup>			1	0	6														
	with stainless steel pipe																			
	cable protection with stainless steel corrugated pipe			1	0	3														consult
	with pipe length in m																			
	customer			9	9	9														consult

<sup>1</sup> cable with integrated air tube for atmospheric pressure reference

<sup>2</sup> not in combination with SIL

<sup>3</sup> stainless steel 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<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 17 mm
- ▶ suitable for hydrostatic level measurement e.g. 3/4" pipes
- ▶ excellent linearity
- ▶ excellent 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 tanks



Input pressure range										
Nominal pressure gauge	[bar]	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH <sub>2</sub> O]	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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 36 V <sub>DC</sub>
Performance	
Accuracy	≤ ± 0.5 % FSO
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Response time	≤ 10 msec
<sup>1</sup> 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 -25 ... 70 °C
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic protection	emission and immunity according to EN 61326
<sup>2</sup> 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 <sup>3</sup>	PVC (-5 ... 70 °C) grey PUR (-10 ... 70 °C) black FEP (-10 ... 70 °C) black
<sup>3</sup> shielded cable with integrated air tube for atmospheric pressure reference	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %
Protection cap	POM
Miscellaneous	
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
Current consumption	max. 25 mA
Weight	approx. 100 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC
Wiring diagram	
2-wire-system (current)	

Pin configuration	
Electrical connection	cable colours (DIN 47100)
Supply +	wh (white)
Supply -	bn (brown)
Shield	gn/ye (green / yellow)
Dimensions (in mm)	







# LMK 307

## Stainless Steel Probe

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

### Nominal pressure

from 0 ... 4 mH<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O

### 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
- ▶ good long term stability
- ▶ easy handling

### Optional versions

- ▶ IS-protection
- ▶ 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 system
- ground water monitoring
- storm water systems

#### Sewage



- waste water treatment
- water recycling
- dumpsite

#### Fuel / 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 <sub>2</sub> O]	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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / $V_S = 8 \dots 32 V_{DC}$
Option IS-protection	2-wire: 4 ... 20 mA / $V_S = 10 \dots 28 V_{DC}$
Options 3-wire	3-wire: 0 ... 20 mA / $V_S = 14 \dots 30 V_{DC}$ 0 ... 10 V / $V_S = 14 \dots 30 V_{DC}$

Performance	
Accuracy	$\leq \pm 0.5 \% \text{ FSO}$
Permissible load	current 2-wire: $R_{\max} = [(V_S - V_{S \min}) / 0.02 \text{ A}] \Omega$ current 3-wire: $R_{\max} = 500 \Omega$ voltage 3-wire: $R_{\min} = 10 \text{ k} \Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k $\Omega$
Response time	$\leq 10 \text{ msec}$

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
Thermal error	$\leq \pm 0.2 \% \text{ FSO} / 10 \text{ K}$ in compensated range -25 ... 70 °C

Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic protection	emission and immunity according to EN 61326

<sup>2</sup> 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 <sup>3</sup>	PVC (-5 ... 70 °C) grey PUR (-10 ... 70 °C) black FEP (-10 ... 70 °C) black

<sup>3</sup> shielded cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %
Protection cap	POM

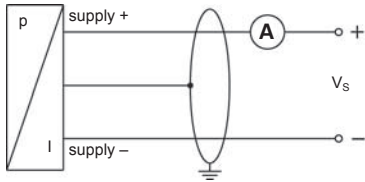
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-LMK 307	<b>IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X</b> zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C_i \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ } \mu\text{H}$ , the supply connections have an inner capacity of max. 27 nF to the housing
Permissible media temperature	in zone 0: -10 ... 60 °C with $p_{\text{atm}}$ 0.8 bar up to 1.1 bar in zone 1: -10 ... 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 $\mu\text{H}/\text{m}$

Miscellaneous	
Option SIL <sup>4</sup> 2 application	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: 2004/108/EC
ATEX Directive	94/4/EG

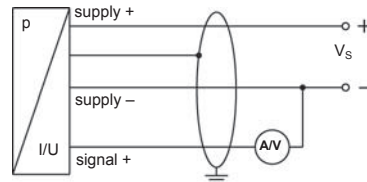
<sup>4</sup> only for 4...20mA / 2-wire

### Wiring diagrams

2-wire-system (current)



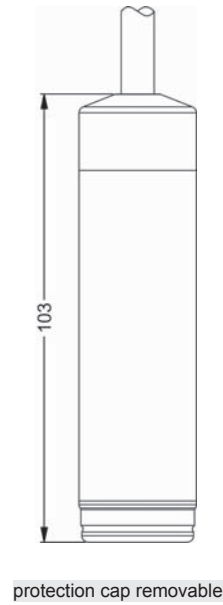
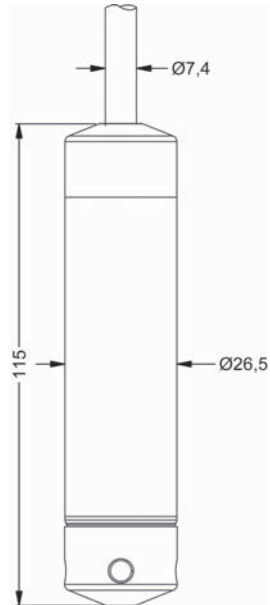
3-wire-system (current / voltage)



### Pin configuration

Electrical connection	cable colours (DIN 47100)
Supply +	wh (white)
Supply -	bn (brown)
Signal + (only 3-wire)	gn (green)
Shield	ye/gn (yellow / green)

### Dimensions (in mm)







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

### 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-protection zone 0
- ▶ mounting with stainless steel pipe
- ▶ flange version
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- ▶ different kinds of cables
- ▶ different kinds of elastomers

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

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

### Preferred areas of use are



#### Water

drinking water abstraction



#### Sewage

waste water treatment  
water recycling



#### Fuel / 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 <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>
Option 3-wire	3-wire: 0 ... 10 V / V <sub>S</sub> = 12.5 ... 32 V <sub>DC</sub>

Performance	
Accuracy <sup>1</sup>	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 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	700 msec
Mean response time	< 200 msec
Max. response time	380 msec

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range 0 ... 70 °C

Permissible temperatures	
Permissible temperatures	medium: -25 ... 125 °C electronics / environment: -25 ... 125 °C storage: -25 ... 125 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection (only for 4 ... 20 mA / 2-wire)	
Cable with sheath material <sup>3</sup>	PVC (-5 ... 70 °C) grey PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 125 °C) blue

<sup>3</sup> shielded cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	stainless steel 1.4404 (316 L)
Seals	FKM FFKM EPDM others on request
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % Option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Nose cone	POM

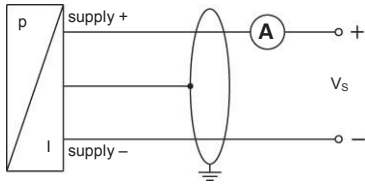
Explosion protection	
Approval DX14-LMK 382	zone 0 <sup>4</sup> : II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex iaD 20 T 85°C
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 27 nF, L <sub>i</sub> = 5 μH
Permissible media temperature	in zone 0: -10 ... 60 °C with p <sub>atm</sub> 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: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μH/m

<sup>4</sup> for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)

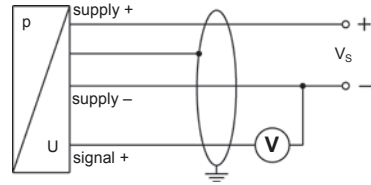
Miscellaneous	
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

**Wiring diagram**

2-wire-system (current)



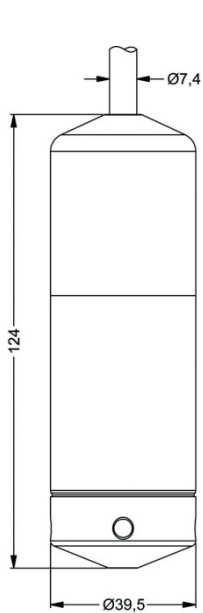
3-wire-system (voltage)



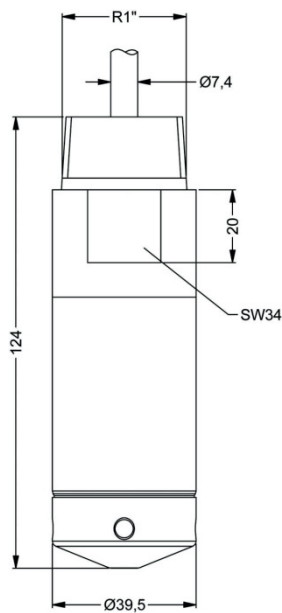
**Pin configuration**

Electrical connection	cable colours (DIN 47100)
Supply +	wh (white)
Supply -	bn (brown)
Signal + (only for 3-wire)	gn (green)
Shield	gn/ye (green / yellow)

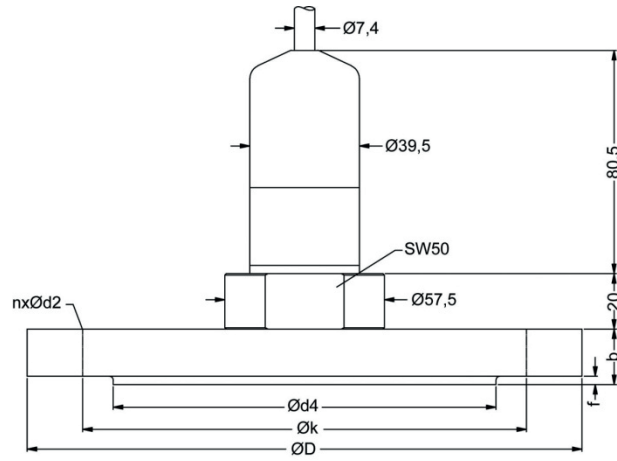
**Dimensions (in mm)**



LMK 382 standard



LMK 382 with thread R1"  
 for stainless steel pipe



LMK 382  
 flange version

dimensions in mm				
dimen- sions	DN25 / PN40	DN40/ PN40	DN50 / PN40	DN80 / PN16
D	115	150	165	200
k	85	110	125	160
d4	68	88	102	138
b	18	18	20	20
f	2	3	3	3
n	4	4	4	8
d2	14	18	18	18







# LMK 458

## Probe For Marine And Offshore

Ceramic Sensor

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

### Nominal pressure

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

### Output signals

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

### Special characteristics

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

### Optional versions

- ▶ diaphragm Al<sub>2</sub>O<sub>3</sub> 99.9 %
- ▶ different housing materials (stainless steel, CuNiFe)
- ▶ IS-version zone 0
- ▶ screw-in and flange version
- ▶ accessories e.g. assembling and probe flange, mounting clamp

The hydrostatic probe LMK 458 has been developed for measuring level in service and storage tanks and is as a consequence of the certification by Germanischer Lloyd predestined for shipbuilding and offshore applications.

A permissible operating temperature of up to 125 °C and the possibility to use the device in intrinsic safe areas enable to measure the pressure of various fluids under extreme conditions. The basis for the LMK 458 is a capacitive ceramic sensor element designed by BD|SENSORS, which offers a high overload resistance and medium compatibility.

### Preferred areas of use are



#### Water

drinking water abstraction  
desalinization plant

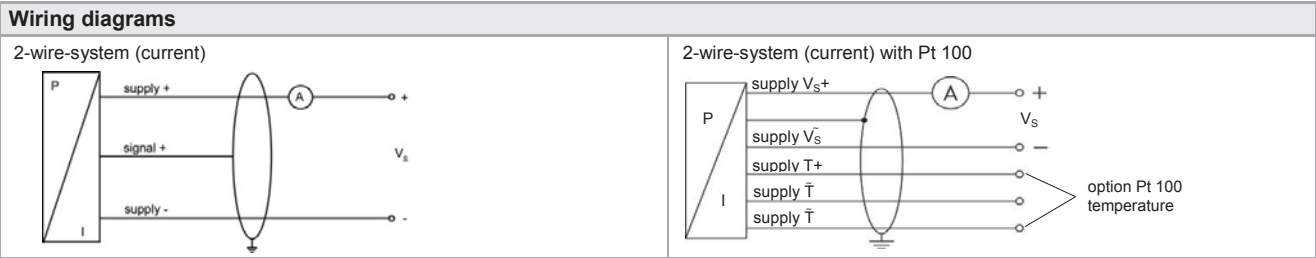


#### Shipbuilding / Offshore

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

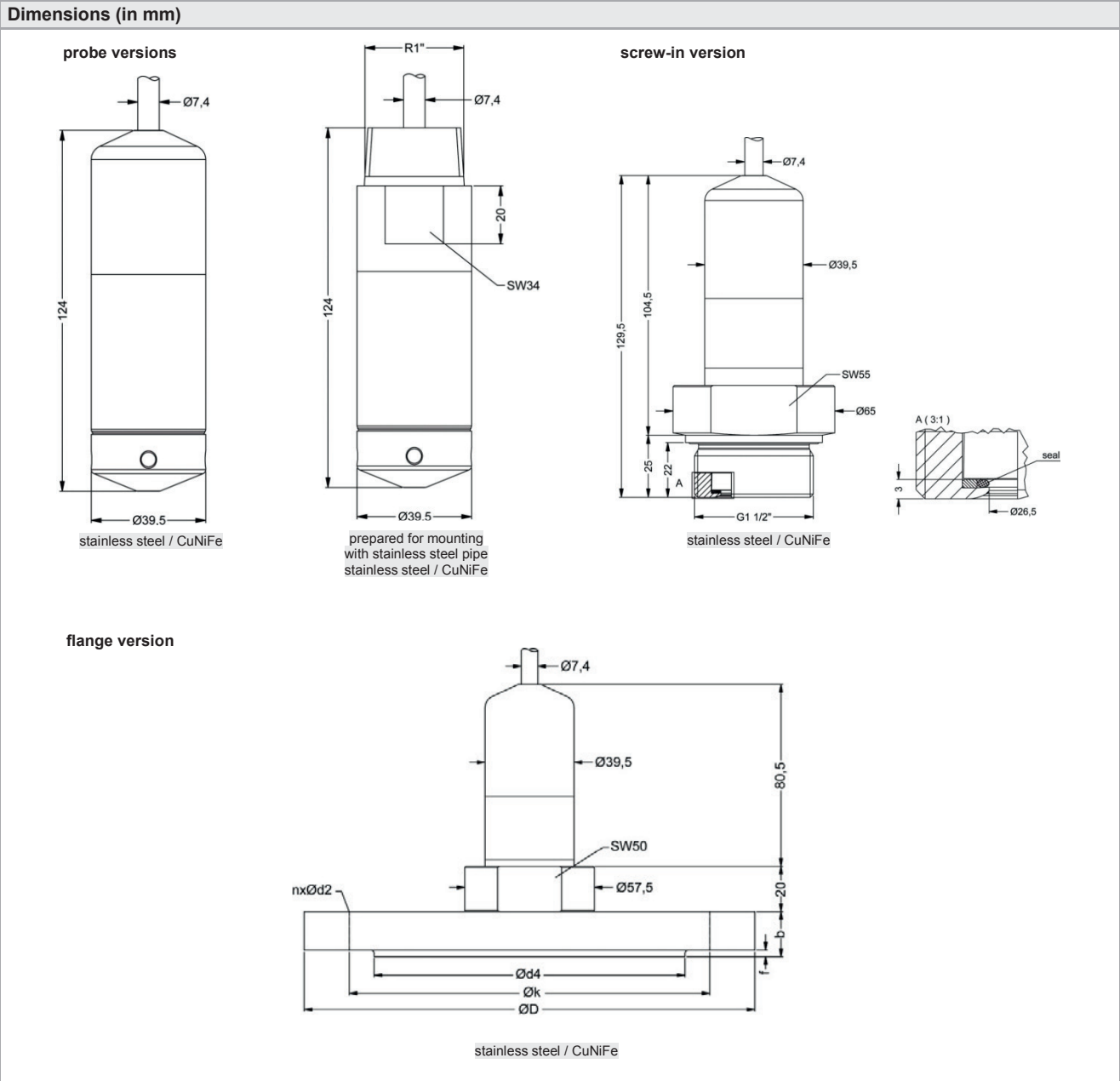






**Pin configuration**

Electrical connection	cable colours (DIN 47100)
Supply $V_{S+}$	wh (white)
Supply $V_{S-}$	bn (brown)
Option Pt 100 temperature element:	
Supply T+ (with Pt 100)	ye (yellow)
Supply T- (with Pt 100)	gy (grey)
Supply T- (with Pt 100)	pk (pink)
Shield	gn/ye (green / yellow)







# LMK 358

## Separable Stainless Steel Probe

Ceramic Sensor

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

### Nominal pressure

from 0 ... 40 cmH<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ cable and probe separable
- ▶ diameter 39.5 mm
- ▶ especially for sewage, viscous and pasty media

### Optional versions

- ▶ IS-protection zone 0
- ▶ cable protection via corrugated pipe
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- ▶ different kinds of cable
- ▶ different kinds of elastomers

The separable 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 transmitter 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 / 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 <sub>2</sub> O]	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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>
Option 3-wire	3-wire: 0 ... 10 V / V <sub>S</sub> = 12.5 ... 32 V <sub>DC</sub>

Performance	
Accuracy <sup>1</sup>	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 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	700 msec
Mean response time	< 200 msec
Max. response time	380 msec

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range 0 ... 70 °C

Permissible temperatures	
Permissible temperatures	medium: -25 ... 125 °C electronic / environment: -25 ... 125 °C storage: -40 ... 125 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<sup>2</sup> 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 <sup>3</sup>	PVC (-5 ... 70 °C) grey PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 125 °C) blue

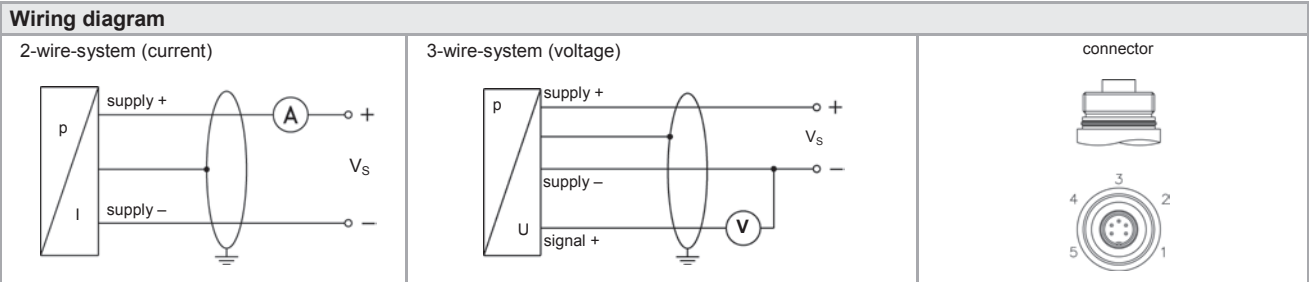
<sup>3</sup> shielded cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM others on request
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Nose cone	POM

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval DX14-LMK 358	IBExU05ATEX1070 X Zone 0 <sup>4</sup> : II 1G Ex ia IIB T4 Ga Zone 20: II 1D Ex iaD 20 T 85°C
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 27 nF, L <sub>i</sub> = 5 μH
Permissible temperature	-25 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 100 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μH/m

<sup>4</sup> for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)

Miscellaneous	
Current consumption	max. 21 mA
Weight	approx. 650 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC



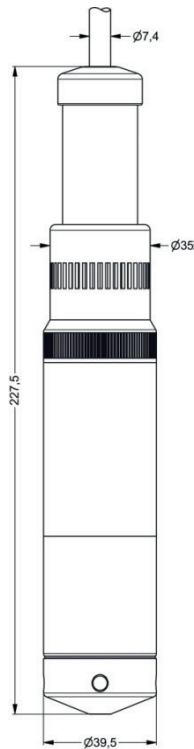
**Pin configuration**

Electrical connection	Binder series 723 <sup>5</sup> (5-pin)		cable colours (DIN 47100)
	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	gn/ ye (green / yellow)

<sup>5</sup> in separated version

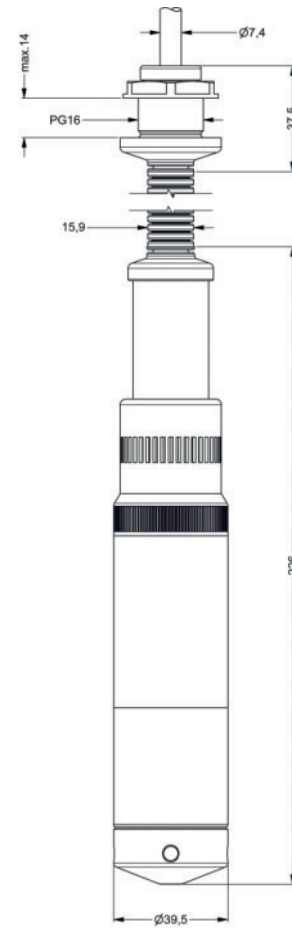
**Dimensions (in mm)**

**standard:**



separated version

**optional:**



with corrugated pipe







# LMP 808

## Separable Plastic Probe

Stainless Steel Sensor

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

### Nominal pressure

from 0 ... 1 mH<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 35 mm
- ▶ cable and sensor section separable
- ▶ excellent linearity
- ▶ small thermal effect

### Optional versions

- ▶ SIL 2 (Safety Integrity Level) according to IEC 61508 / 61511
- ▶ mounting accessories as screw fitting and terminal clamp of stainless steel
- ▶ different kinds of cables and elastomers
- ▶ customer specific versions e. g. special pressure ranges

The separable plastic probe is designed for level measurement of water, waste water as well as fuels and oils. Basic element is a piezoresistive stainless steel sensor.

In order to facilitate stock-keeping and maintenance the transmitter 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
- storm water systems
- drinking water system
- water treatment plants

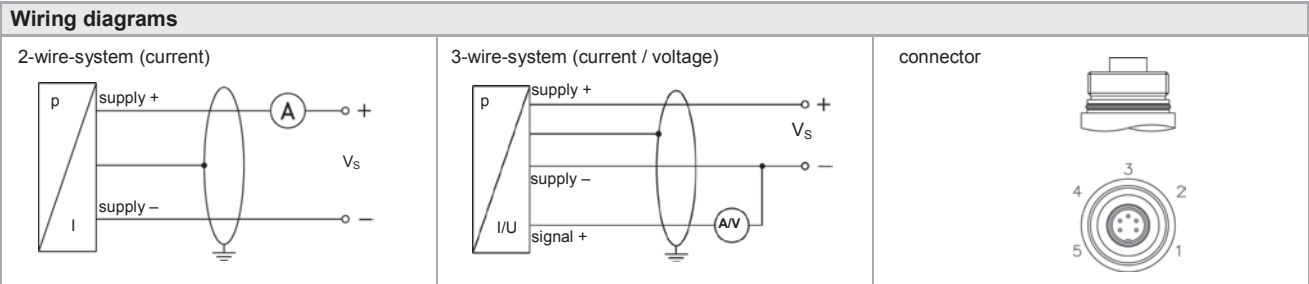


#### Fuel / Oil

- fuel storage
- tank farm
- biogas plants
- process water recycling



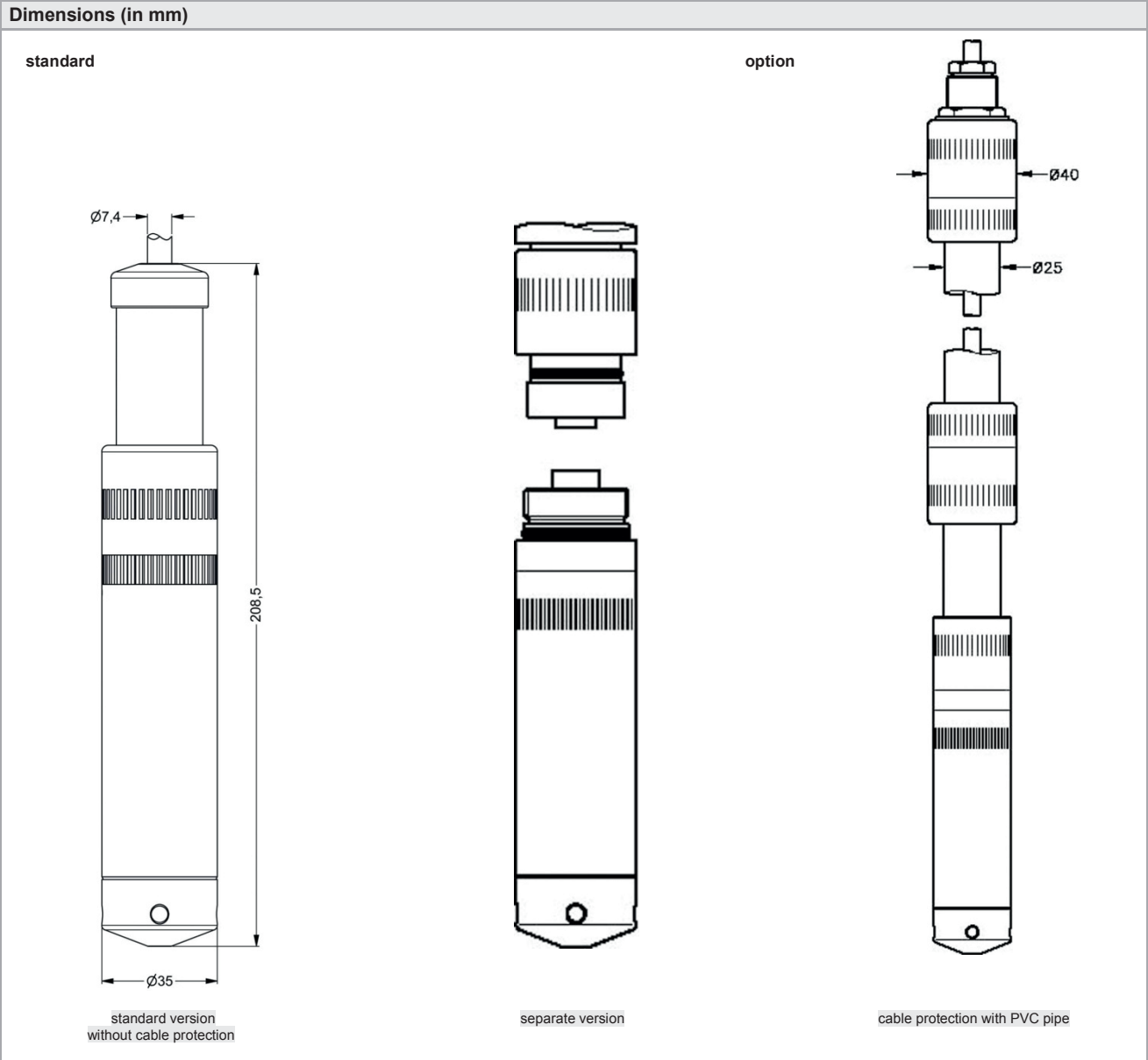
<b>Input pressure range</b>												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50
<b>Output signal / Supply</b>												
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>											
Options 3-wire	3-wire: 0 ... 20 mA / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub> 0 ... 10 V / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub>											
<b>Performance</b>												
Accuracy	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											
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S</sub> min) / 0.02 A] Ω current 3-wire: R <sub>max</sub> = 500 Ω voltage 3-wire: R <sub>min</sub> = 10 kΩ											
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ											
Long term stability	≤ ± 0.1 % FSO / year											
Response time	< 10 msec											
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)												
<b>Thermal effects (Offset and Span)</b>												
Nominal pressure P <sub>N</sub>	[bar]	< 0.40						≥ 0.40				
Tolerance band	[% FSO]	≤ ± 1						≤ ± 0.75				
in compensated range	[°C]	0 ... 50										
<b>Permissible temperatures</b>												
Permissible temperatures	medium: 0 ... 50 °C storage: -10 ... 50 °C											
<b>Electrical protection <sup>2</sup></b>												
Short-circuit protection	permanent											
Reverse polarity protection	no damage, but also no function											
Electromagnetic compatibility	emission and immunity according to EN 61326											
<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request												
<b>Electrical connection</b>												
Cable with sheath material <sup>3</sup>	PVC (0 ... 50 °C) grey PUR (0 ... 50 °C) black FEP (0 ... 50 °C) black											
Cable protection	standard: without cable protection optional: prepared for mounting of a PVC pipe with diameter 25 mm											
<sup>3</sup> cable with integrated air tube for atmospheric pressure reference												
<b>Materials (media wetted)</b>												
Housing	PVC grey											
Seals	FKM EPDM											
Diaphragm	stainless steel 1.4435 (316L)											
Protection cap	POM											
<b>Miscellaneous</b>												
Option SIL <sup>4</sup> 2 application	according to IEC 61508 / IEC 61511											
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											
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: 2004/108/EC											
<sup>4</sup> only for 4...20mA / 2-wire												



**Pin configuration**

Electrical connection	Binder serie 723 <sup>5</sup> (5-pin)	cable colours (DIN 47100)
Supply +	3	wh (white)
Supply - (only 2-wire)	1	bn (brown)
Supply - (only 3-wire)	4	bn (brown)
Signal + (only 3-wire)	1	gn (green)
Shield	5	gn/ye (green / yellow)

<sup>5</sup> in separated version



This document contains product specifications; properties are not guaranteed. Subject to change without notice.

## LMP 808



<b>Pressure</b>																				
	in bar	4	1	0																
	in mH <sub>2</sub> O	4	1	1																
<b>Input</b>	[mH <sub>2</sub> O]	[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
<b>Housing</b>																				
	PVC							A												
	customer							9												consult
<b>Diaphragm</b>																				
	Stainless steel 1.4435 (316L)							1												
	customer							9												consult
<b>Output</b>																				
	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
<b>Seals</b>																				
	FKM								1											
	EPDM								3											
	customer								9											consult
<b>Electrical connection</b>																				
	PVC-cable <sup>1</sup>								1											
	PUR-cable <sup>1</sup>								2											
	FEP-cable <sup>1</sup>								3											
	customer								9											consult
<b>Accuracy</b>																				
	standard for P <sub>N</sub> ≥ 0.4 bar	0.35 %							3											
	standard for P <sub>N</sub> < 0.4 bar	0.5 %							5											
	option 1 for P <sub>N</sub> ≥ 0.4 bar	0.25 %							2											
	customer								9											consult
<b>Cable length</b>																				
	in m									9	9	9								
<b>Special version</b>																				
	standard									0	0	0								
	prepared for mounting with PVC pipe <sup>2</sup>									1	0	6								
	customer									9	9	9								consult

<sup>1</sup> cable with integrated air tube for atmospheric pressure reference

<sup>2</sup> PVC pipe is not part of the supply



# LMK 807

## Plastic Probe for Aggressive Media

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

### Nominal pressure

from 0 ... 4 mH<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 35 mm
- ▶ excellent 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 version e. g. special pressure ranges

The plastic submersible probe LMK 807 is designed for continuous level measurement for waste water or and different 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 <sub>2</sub> O]	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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>

Performance	
Accuracy <sup>1</sup>	≤ ± 0.5 % FSO
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year
Response time	< 10 msec

<sup>1</sup> 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 -25 ... 70 °C

Permissible temperatures	
Permissible temperatures	medium: 0 ... 50 °C storage: -10 ... 50 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

<sup>2</sup> 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 <sup>3</sup>	PVC (0 ... 50 °C) grey PUR (0 ... 50 °C) black FEP (0 ... 50 °C) black

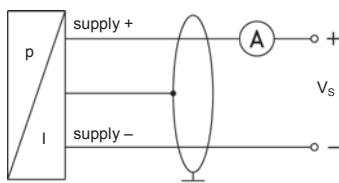
<sup>3</sup> cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	PVC grey
Seals	FKM / EPDM / FFKM
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %

Miscellaneous	
Option SIL 2 application	according to IEC 61508 / IEC 61511
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
Current consumption	max. 25 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

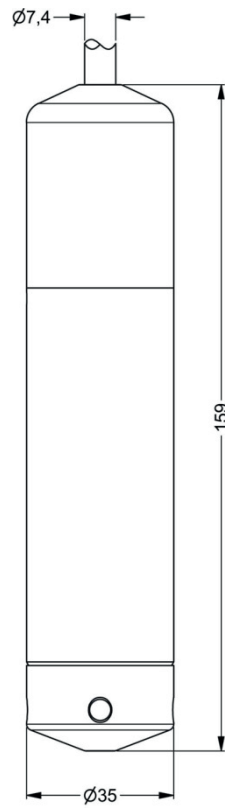
#### Wiring diagram

2-wire-system (current)



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

### Dimensions (in mm)









# 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<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### 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<sub>2</sub>O<sub>3</sub>
- ▶ housing material PP or PVDF

### Optional versions

- ▶ different kinds of cable and seal materials
- ▶ prepared for mounting with pipe

The plastic submersible probe LMK 809 is designed for continuous level measurement in waste water or in most of aggressive media. Basic element is a capacitiv 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 <sub>2</sub> O]	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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>
Option 3-wire	3-wire: 0 ... 10 V / V <sub>S</sub> = 12.5 ... 32 V <sub>DC</sub>

Performance	
Accuracy <sup>1</sup>	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 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	700 msec
Mean response time	< 200 msec
Max. response time	380 msec
	measuring rate: 5/sec

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range 0 ... 70 °C

Permissible temperatures	
Permissible temperatures	medium: -25 ... 100 °C electronic / environment: -25 ... 100 °C storage: -25 ... 100 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

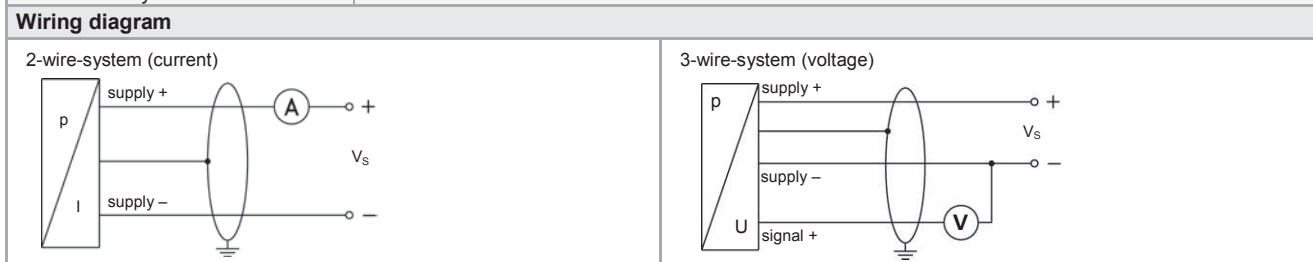
<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection	
Cable with sheath material <sup>3</sup>	PUR (-25 ... 70 °C) black FEP (-25 ... 70 °C) black TPE (-25 ... 100 °C) blue

<sup>3</sup> cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	standard: PP option: PVDF
Seals	FKM / EPDM / FFKM
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %

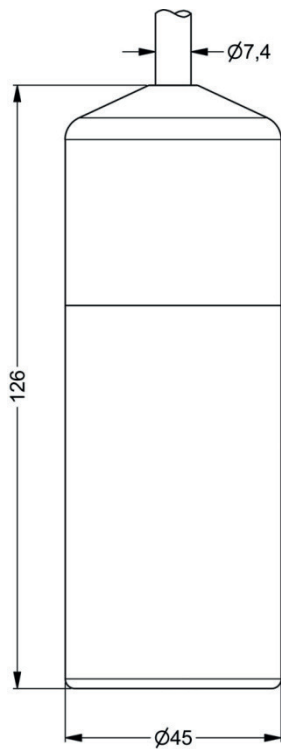
Miscellaneous	
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μH/m
Current consumption	max. 21 mA
Weight	approx. 320 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC



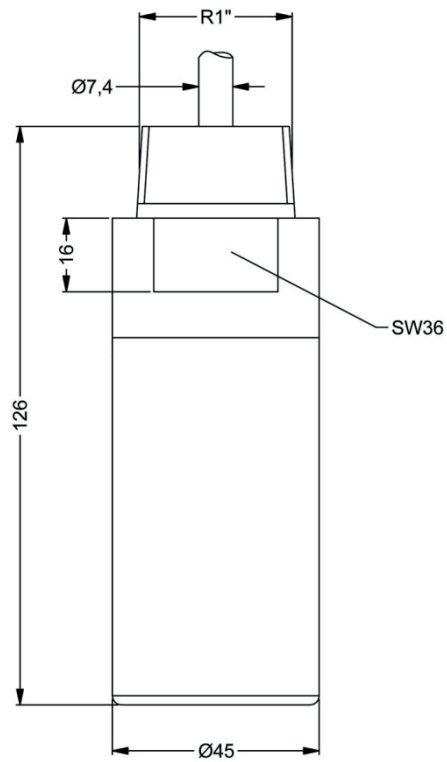
Pin configuration	
Electrical connection	cable colours (DIN 47100)
Supply +	wh (white)
Supply -	bn (brown)
Signal + (only for 3-wire)	gn (green)
Shield	gn/ye (green / yellow)

### Dimensions (in mm)

standard



option



prepared for mounting with pipe R1"





# LMK 858

## Separable Plastic Submersible Probe

Ceramic Sensor

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

### Nominal pressure

from 0 ... 40 cmH<sub>2</sub>O up to 0 ... 100 mH<sub>2</sub>O

### Output signals

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

### Special characteristics

- ▶ diameter 45 mm
- ▶ cable and probe separable
- ▶ chemical resistance
- ▶ housing PVC

### Optional versions

- ▶ cable protection via PVC pipe
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- ▶ different kinds of cable
- ▶ different kinds of seal materials

The separable plastic submersible probe LMK 858 is designed for level measurement in most aggressive media. Usage in more viscous media as for example sludge is possible because of the semi-flush diaphragm.

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

### 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 <sub>2</sub> O]	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

Output signal / Supply			
Standard	2-wire:	4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>	option 3-wire: 0 ... 10 V / V <sub>S</sub> = 12.5 ... 32 V <sub>DC</sub>

Performance		
Accuracy	standard: option:	IEC 60770 <sup>1</sup> ≤ ± 0.35 % FSO ≤ ± 0.25 % FSO
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 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	700 msec	
Mean response time	< 200 msec	measuring rate 5/sec
Max. response time	380 msec	

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range 0 ... 50 °C

Permissible temperatures	
Permissible temperatures	medium: -10 ... 50 °C electronic / environment: -10 ... 50 °C storage: -10 ... 50 °C

Electrical protection <sup>2</sup>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

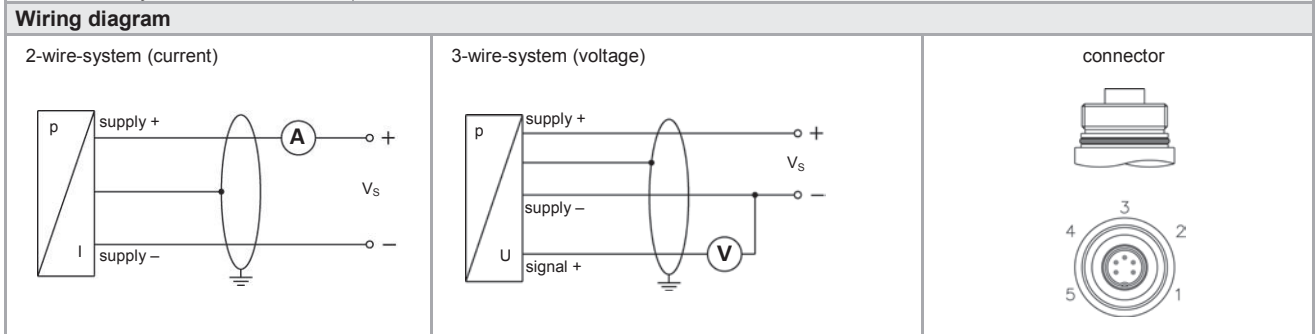
<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection	
Cable with sheath material <sup>3</sup>	PVC (-5 ... 50 °C) grey PUR (-10 ... 50 °C) black FEP (-10 ... 50 °C) black
Cable protection	standard: without cable protection optional: prepared for mounting of a PVC pipe with diameter 25 mm

<sup>3</sup> cable with integrated air tube for atmospheric pressure reference

Materials (media wetted)	
Housing	PVC grey
Seals	FKM / EPDM / others on request
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %

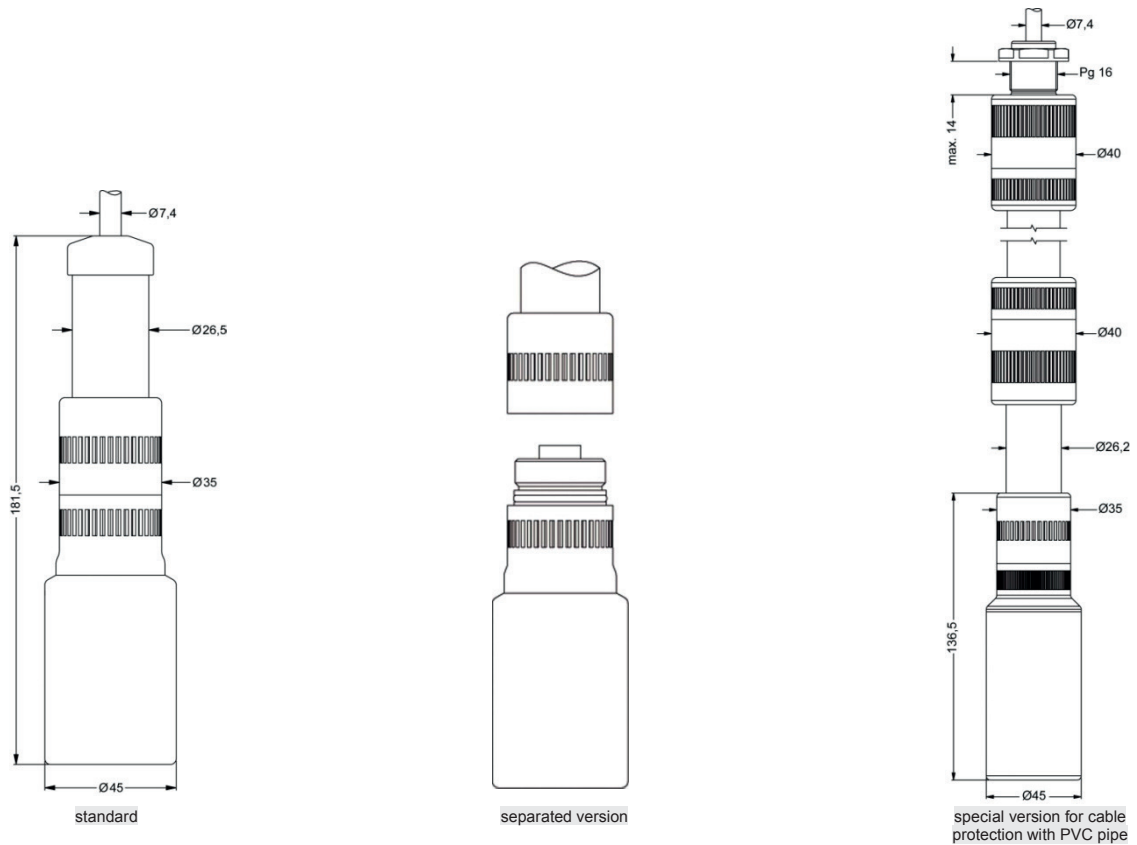
Miscellaneous	
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 μH/m
Current consumption	max. 25 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC



Pin configuration			
Electrical connection	Binder series 723 <sup>4</sup> (5-pin)		cable colours (DIN 47100)
	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	gn/ye (green / yellow)

<sup>4</sup> in separated version

### Dimensions (in mm)



## LMK 858



Pressure																		
	in bar	4	1	5														
	in mH <sub>2</sub> O	4	1	6														
Input		[mH <sub>2</sub> O]	[bar]															
	0.40	0.04		0	4	0	0											
	0.60	0.06		0	6	0	0											
	1.0	0.10		1	0	0	0											
	1.6	0.16		1	6	0	0											
	2.5	0.25		2	5	0	0											
	4.0	0.40		4	0	0	0											
	6.0	0.60		6	0	0	0											
	10	1.0		1	0	0	1											
	16	1.6		1	6	0	1											
	25	2.5		2	5	0	1											
	40	4.0		4	0	0	1											
	60	6.0		6	0	0	1											
	100	10		1	0	0	2											
	customer			9	9	9	9											consult
Housing																		
	PVC						A											
	customer						9											consult
Diaphragm																		
	Ceramics Al <sub>2</sub> O <sub>3</sub> 96%						2											
	Ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%						C											
	customer						9											consult
Output																		
	4 ... 20 mA / 2-wire						1											
	0 ... 10 V / 3-wire						3											
	customer						9											consult
Seals																		
	FKM						1											
	EPDM						3											
	customer						9											consult
Electrical connection																		
	PVC-cable <sup>1</sup>						1											
	PUR-cable <sup>1</sup>						2											
	FEP-cable <sup>1</sup>						3											
	customer						9											consult
Accuracy																		
standard	0.35 %						3											
option	0.25 %						2											
	customer						9											consult
Cable length																		
	in m						9	9	9									
Special version																		
	standard						0	0	0									
	prepared for mounting with PVC pipe <sup>2</sup>						1	0	6									
	customer						9	9	9									consult

<sup>1</sup> cable with integrated air tube for atmospheric pressure reference

<sup>2</sup> PVC pipe is not part of the supply





# 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

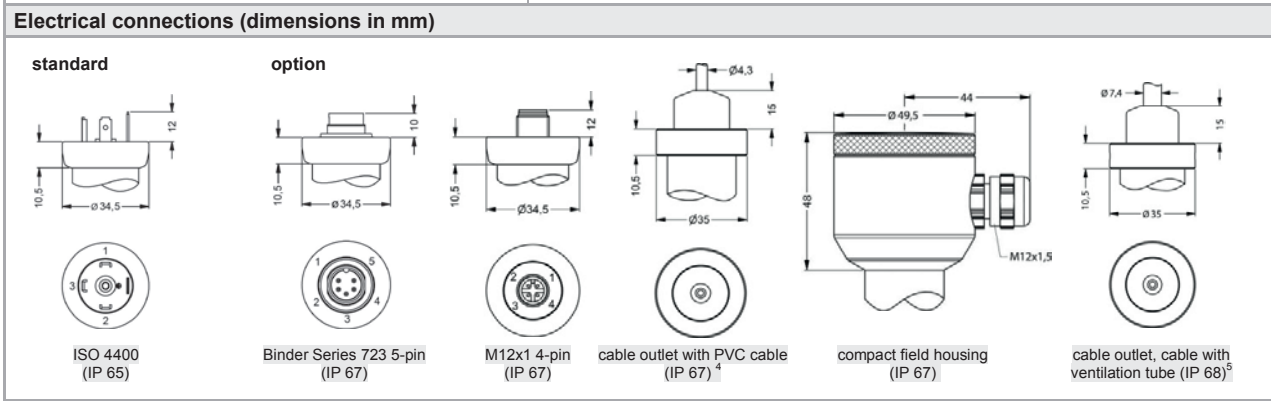
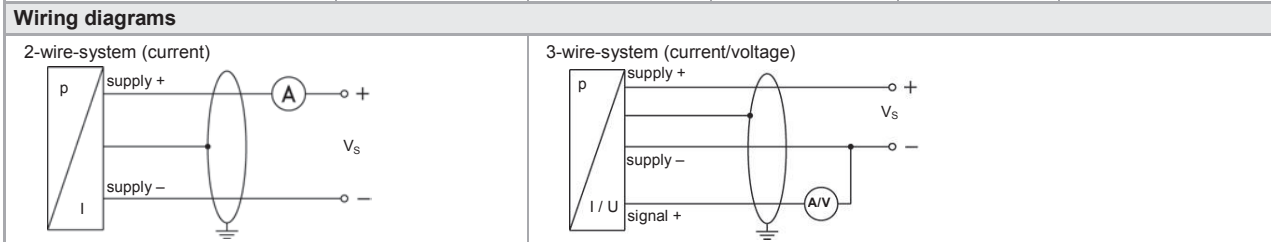


Environmental Engineering  
(water – sewage – recycling)

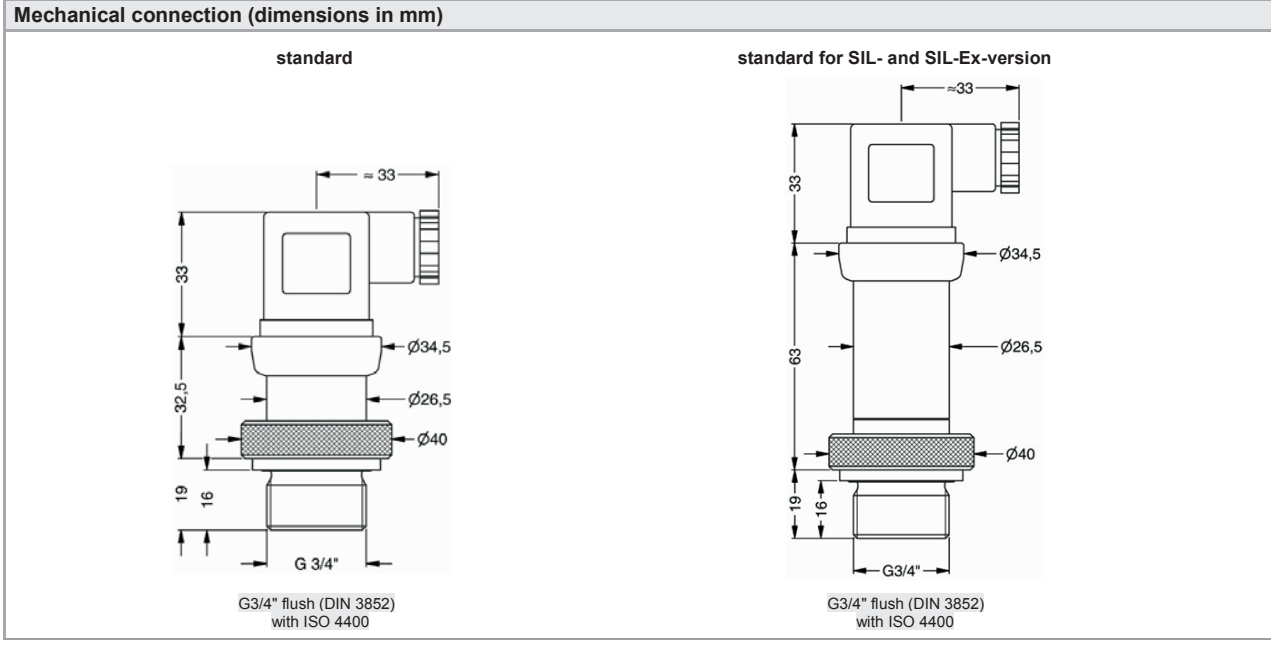


Input pressure range															
Nominal pressure gauge	[bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance		P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance P <sub>N</sub> < 1 bar: on request													
Output signal / Supply															
Standard		2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>													
Option IS-version		2-wire: 4 ... 20 mA / V <sub>S</sub> = 10 ... 28 V <sub>DC</sub>													
Options 3-wire		3-wire: 0 ... 20 mA / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub> 0 ... 10 V / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub>													
Performance															
Accuracy <sup>1</sup>		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 <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω current 3-wire: R <sub>max</sub> = 500 Ω voltage 3-wire: R <sub>min</sub> = 10 kΩ													
Influence effects		supply: 0.05 % FSO / 10 V      load: 0.05 % FSO / kΩ													
Long term stability		≤ ± 0.1 % FSO / year													
Response time		2-Leiter: ≤ 10 msec 3-Leiter: ≤ 3 msec													
<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)															
Thermal effects (Offset and Span)															
Nominal pressure P <sub>N</sub>	[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 T 85°C Da													
Safety technical maximum values		U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 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 <sub>atm</sub> 0.8 bar bis 1.1 bar in zone 1 or higher: -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)													
Seals		standard: FKM option: EPDM, NBR										others on request			
Diaphragm		stainless steel 1.4435 (316L)													
Media wetted parts		pressure port, seals, diaphragm													
Miscellaneous															
Optionally SIL <sup>2</sup> 2 application		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 <sup>3</sup>													
Operational life		> 100 x 10 <sup>6</sup> cycles													
CE-conformity		EMC Directive: 2004/108/EC													
ATEX Directive		94/4/EG													
<sup>2</sup> only for 4...20mA / 2-wire, not in combination with the accuracy 0.1%															
<sup>3</sup> 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 <sub>N</sub> ≤ 1 bar.															

Pin configuration					
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	field housing	cable colours (DIN 47100)
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		ye/gn (yellow/green)



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







# 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 impurified 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 recommend 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 <sup>1</sup>	60 <sup>1</sup>	
Level [mH <sub>2</sub> O]	4	6	10	16	25	40	60	100	160	250	400	600	
Overpressure [bar]	1	2	2	4	4	10	20	20	40	100	100	200	
Burst pressure [bar]	2	4	4	5	5	12	25	25	50	120	120	250	
Vacuum resistance [bar]	P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance P <sub>N</sub> < 1 bar: on request												

<sup>1</sup> only possible with stainless steel pressure port

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>
Option IS-protection <sup>2</sup>	2-wire: 4 ... 20 mA / V <sub>S</sub> = 10 ... 28 V <sub>DC</sub>
Optionen 3-wire	3-wire: 0 ... 20 mA / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub> 0 ... 10 V / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub>

<sup>2</sup> IS-protection not possible with plastic pressure port

Performance	
Accuracy <sup>3</sup>	≤ ± 0.5 % FSO
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>Smin</sub> ) / 0.02 A] Ω current 3-wire: R <sub>max</sub> = 500 Ω voltage 3-wire: R <sub>min</sub> = 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

<sup>3</sup> 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	-25 ... 85 °C
Permissible temperatures <sup>4</sup>	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C

<sup>4</sup> for pressure port of PVC the minimum permissible temperature is -30 °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	standard:	pressure port	housing
	options for P <sub>N</sub> ≤ 25 bar:	stainless steel 1.4404 (316L) PVDF	stainless steel 1.4404 (316L) PVDF
Option compact field housing	stainless steel 1.4305 with cable gland brass nickel plated others on request		
Seals	standard: FKM options: EPDM, NBR, others on request		
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 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	<b>IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X</b> zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 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 <sub>atm</sub> 0.8 bar up to 1.1 bar in 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: 1 μH/m

Miscellaneous	
Option SIL <sup>5</sup> 2 application	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 x 10 <sup>6</sup> pressure cycles
CE-conformity	EMC Directive: 2004/108/EC
ATEX Directive	94/4/EG

<sup>5</sup> only for 4...20mA / 2-wire

Wiring diagrams					
2-wire-system (current)		3-wire-system (current / voltage)			
Pin configuration					
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	cable colours (DIN 47100)	
Supply +	1	3	1	wh (white)	
Supply -	2	4	2	bn (brown)	
Signal + (only for 3-wire)	3	1	3	gn (green)	
Shield	ground contact	5	4	gn/ye (green / yellow)	
Electrical connections (dimensions in mm)					
<b>standard</b>  ISO 4400 (IP 65)	<b>option</b>  Binder Series 723 5-pin (IP 67)	 M12x1 4-pin (IP 67)	 cable outlet with PVC cable (IP 67) <sup>6</sup>	 compact field housing (IP 67)	 cable outlet, cable with ventilation tube (IP 68) <sup>7</sup>
⇒ universal stainless steel housing 1.4404 with cable gland M20x1.5 (ordering code 880) and other versions on request					
<sup>6</sup> standard: 2 m PVC-cable without ventilation tube ( permissible temperature: -5 ... 70°C) <sup>7</sup> different cable types and length available, permissible temperature depends on kind of cable					
Mechanical connection (dimensions in mm)					
<b>standard</b>  G3/4" flush (DIN 3852) with ISO 4400		<b>standard for SIL- and SIL-Ex-version</b>  G3/4" flush (DIN 3852) with ISO 4400			

This document contains product specifications; properties are not guaranteed. Subject to change without notice.







# 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 ½" for pasty and polluted media



### Optional versions

- ▶ IS-version  
Ex ia = intrinsically safe for gases and dusts
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- ▶ 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<sub>2</sub>O<sub>3</sub> 99.9 % is available. An intrinsically safe version complete 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 <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Low pressure	[bar]	-0.2		-0.3		-0.5			-1							

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub>
Option Ex-version	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>
Option 3-wire	3-wire: 0 ... 10 V / V <sub>S</sub> = 12.5 ... 32 V <sub>DC</sub>

Performance	
Accuracy <sup>1</sup>	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω voltage 3-wire: R <sub>min</sub> = 10 kΩ
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year
Turn-on time	700 msec
Mean measuring time	5/sec
Response time	mean response time: ≤ 200 msec      max. response time: 380 msec

<sup>1</sup> accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span) / -Permissible temperatures	
Tolerance band	≤ ± 0.1 % FSO / 10 K      in compensated range - 20 ... 80 °C
Permissible temperatures <sup>2</sup>	medium: -40 ... 125 °C      electronics / environment: -40 ... 85 °C      storage: -40 ... 100 °C

<sup>2</sup> for pressure port of PVC the minimum permissible temperature is -30 °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
Seals	FKM -40 ... 125 °C FFKM -15 ... 125 °C EPDM -40 ... 125 °C
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % options: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Media wetted parts	pressure port, seals, diaphragm

IS-protection (only for 4 ... 20 mA / 2-wire)	
Approval DX14-LMK 351	IBExU05ATEX1070 X stainless steel-pressure port with male (connector): zone 0: II 1 G Ex ia IIC T4 Ga      zone 20: II 1 D Ex iaD T 85 °C stainless steel-pressure port with cable: zone 0: II 1 G Ex ia IIB T4 Ga      zone 20: II 1 D Ex iaD T 85 °C plastic-pressure port with male (connector): zone 0/1 <sup>3</sup> : II 1/2 G Ex ia IIC T4 Ga/Gb      zone 20/21 <sup>4</sup> : II 1 D Ex iaD T 85 °C plastic-pressure port with cable: zone 0/1 <sup>3</sup> : II 1/2 G Ex ia IIB T4 Ga/Gb      zone 20/21 <sup>4</sup> : II 1 D Ex iaD T 85 °C
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> = 27 nF, L <sub>i</sub> = 5 μH
Max. permissible temperature for environment	in zone 0: -20 ... 60 °C for p <sub>atm</sub> 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 70 °C
Connecting cables (by factory)	capacity: signal line / shield also signal line / signal line: 160 pF/m inductance: signal line / shield also signal line / signal line: 1 μH/m

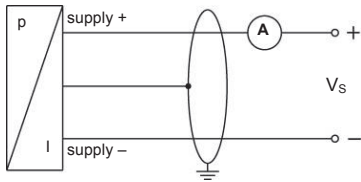
<sup>3</sup> The designation depends on the used pressure range. With nominal pressure ranges ≤ 60 mbar the designation is „2G“.

With nominal pressure ranges > 60 mbar and < 10 bar (see item 17 of the type-examination certificate) must be attended!

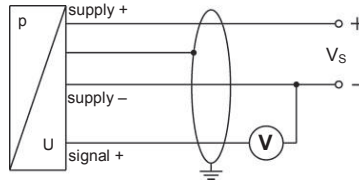
Miscellaneous	
Current consumption	signal output current: max. 21 mA      signal output voltage: max. 5 mA
Weight	approx. 200 g
Installation position	any
Operational life	> 100 x 10 <sup>6</sup> loading cycles
CE-conformity	EMV-directive: 2004/108/EC
ATEX Directive	94/9/EC

**Wiring diagram**

2-wire-system (current)



3-wire-system (current/voltage)



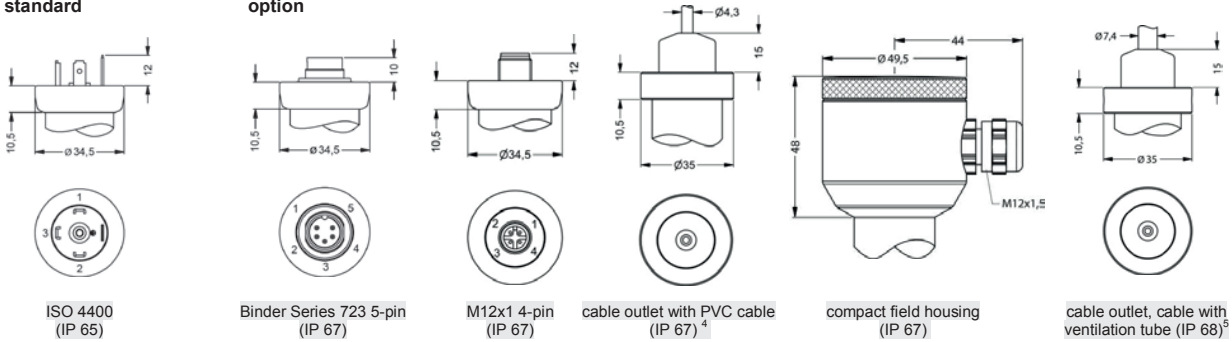
**Pin configuration**

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	field housing	cable colours (DIN 47100)
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	⊥	gn/ye (green/yellow)

**Electrical connections (dimensions in mm)**

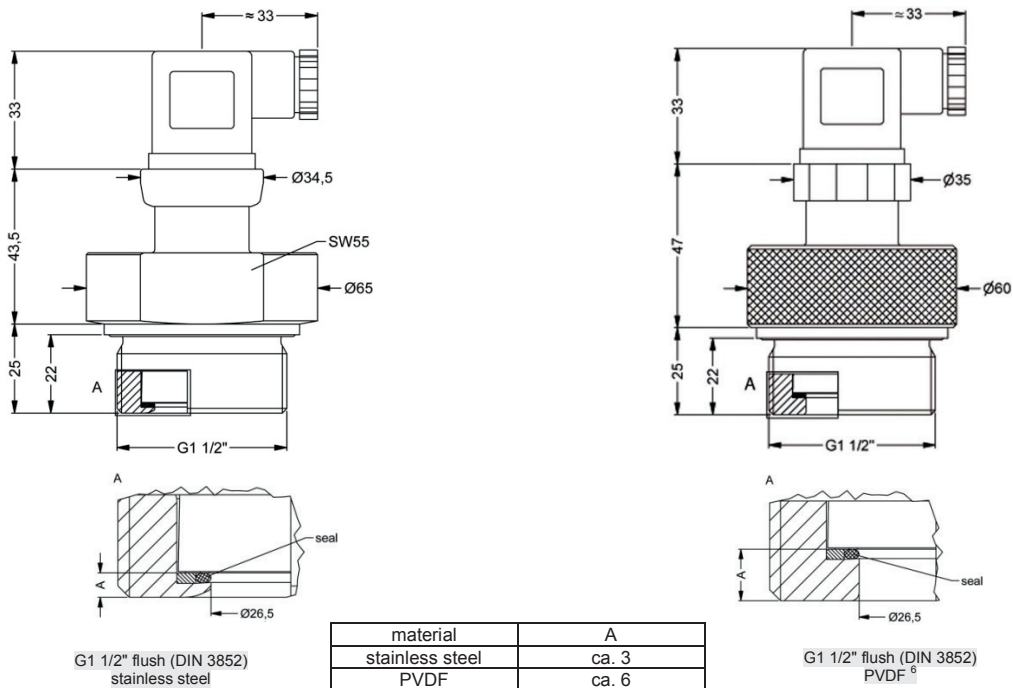
standard

option



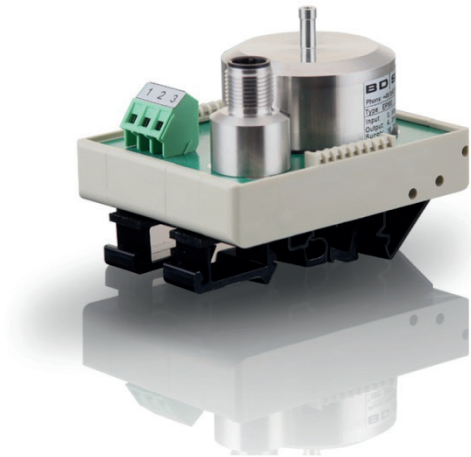
<sup>4</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)  
<sup>5</sup> different cable types and lengths available, permissible temperature depends on kind of cable

**Dimensions (in mm)**



<sup>6</sup> not possible in combination with compact field housing





# EP 500

## Pressure Transmitter

Special application:  
level measurement via air bubbling

### Characteristics:

- ▶ capacitive ceramic sensor
- ▶ nominal pressure range 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 <sub>N</sub> gauge [bar]	0.06	0.16	0.4	1	2	5	10	20
Nominal pressure P <sub>N</sub> abs. [bar]	on request							
Permissible overpressure [bar]	2	4	6	8	15	25	35	40
Permissible vacuum for P <sub>N</sub> gauge [bar]	-0.2	-0.3	-0.5		-1			

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 9 ... 32 V <sub>DC</sub> ; V <sub>S Nom.</sub> = 24 V <sub>DC</sub>
Current consumption	max. 21 mA
Performance	
Accuracy <sup>1</sup>	IEC 60770 <sup>2</sup> : ≤ ± 0.2 % FSO      BFSL: ≤ ± 0.1 % FSO
Turn-on time	700 msec
Permissible load	R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω
Long term stability	≤ ± 0.1 % FSO / year
Response time (10 ... 90 %)	120 msec – without consideration of electronic damping
Measuring rate	8/sec
<sup>1</sup> for nominal pressure ranges ≤ 0.4 bar the accuracy is calculated as follows: ≤ ± [0.2 + 0.04 x (nominal pressure range / adjusted range)] % FSO	
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal errors (Offset and Span)/ Permissible temperatures	
Thermal error	≤ ± (0.02 x nominal range / adjusted range) % FSO / 10 K in compensated range 0 ... 80 °C
Permissible temperatures	medium: -40 ... 125 °C    electronics / environment / storage: -40 ... 85 °C

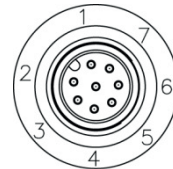
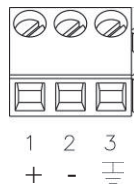
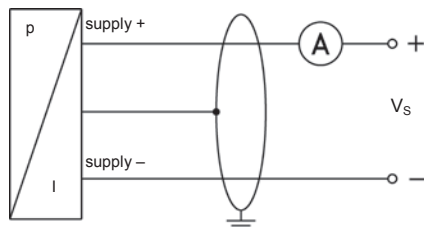
<b>Electrical protection</b>	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
<b>Electrical connection</b>	
Input	terminal clamps (3-pin)
Communication connector	M12x1 (8-pin), metal
<b>Materials</b>	
Pressure port	standard: stainless steel 1.4301 on request: brass
Housing	version EP 500: PA6 (housing foot: PA66) version EP 500 - 500: ABS
Seals (media wetted)	FKM
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 96 %
Media wetted parts	pressure port, seals of sensor, diaphragm
<b>Category of the environment</b>	
Germanischer Lloyd (GL)	C, EMC1 <span style="float: right;">number of certificate: 86 482 - 09 HH</span>
<b>Miscellaneous</b>	
Ingress protection	IP 00
Function display	green SMD-LED - lights by information flow through the transmitter
Installation position	any
Operational life	> 100 x 10 <sup>6</sup> pressure cycles
Weight	approx. 200 g
Adjustability	configuration via programming kit CIS 700 <sup>3</sup> ; 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

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

#### Pin configuration

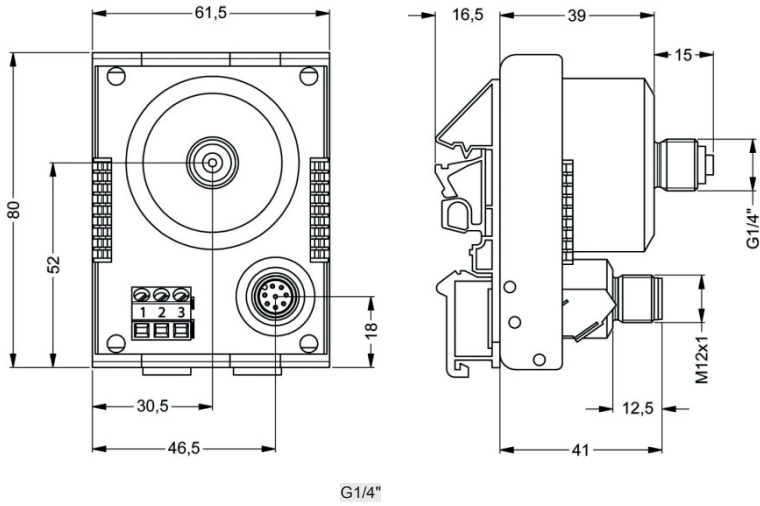
Electrical connections	terminal clamps	M12x1 (8-polig), metal
Supply +1	1	-
Supply +2	-	4
Supply -	2	2
Tx	-	5
Rx	-	6
GND	-	7
NC	-	1
Shield	3	3

#### Wiring diagram

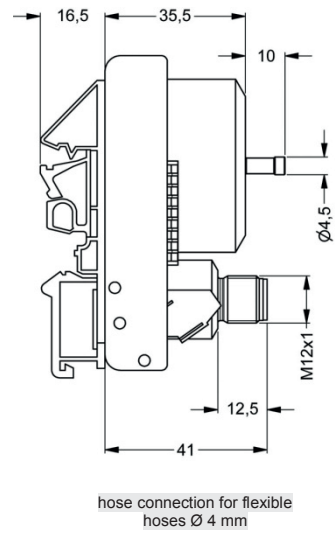


### Dimensions (in mm)

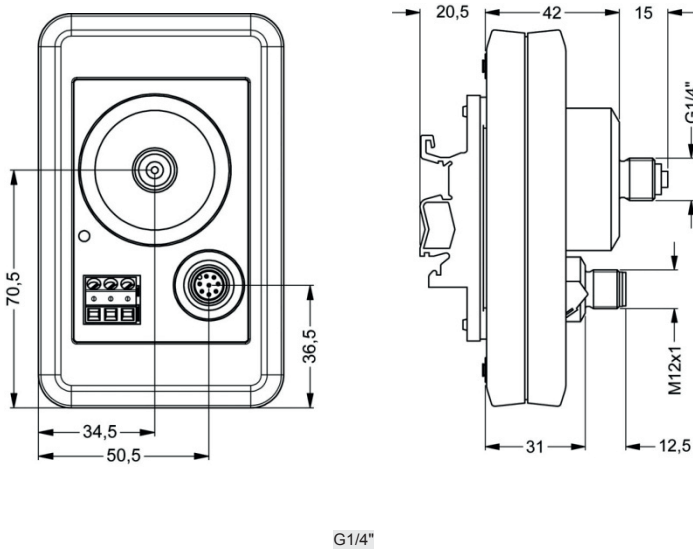
#### standard EP 500:



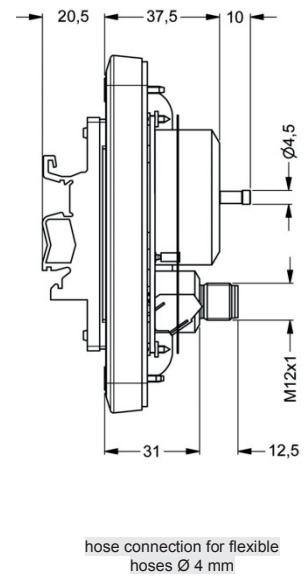
#### optionally for $P_N \leq 5$ bar:



#### option EP 500 - 500



#### optionally for $P_N \leq 5$ bar:



## EP 500



<b>Pressure</b>											
	gauge	U	P	5							
	absolute	U	P	6						consult	
<b>Input</b>											
	[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	
<b>Output</b>											
	4 ... 20 mA / 2-wire							1			
	customer							9		consult	
<b>Accuracy</b>											
	0.2 %							B			
	customer							9		consult	
<b>Mechanical connection</b>											
	hose connection Ø 4.5 mm <sup>1</sup>							Y	0	2	
	G1/4" EN 837							4	0	0	
	customer							9	9	9	
<b>Seal</b>											
	FKM								1		
	customer								9	consult	
<b>Pressure port</b>											
	stainless steel 1.4301 (304)								2		
	brass								M	consult	
	customer								9	consult	
<b>Diaphragm</b>											
	ceramics Al <sub>2</sub> O <sub>3</sub> 96%								2		
	customer								9	consult	
<b>Special version</b>											
	standard								0	0	0
	option								5	0	0
	customer								9	9	9

<sup>1</sup> hose connection only up to 5 bar





# KL 1

## Terminal Box

Aluminium

### Product characteristics

- ▶ aluminium die cast case
- ▶ for connecting 2-wire submersible transmitters
- ▶ integrated pressure balance item
- ▶ 2 signal lines

### Optional versions

- ▶ overvoltage protection with nominal discharge current of 10 kA
- ▶ Pt 100 temperature sensor for submersible pressure transmitters with built in Pt 100 sensor

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

It offers integrated atmospheric pressure compensation. Optionally with overvoltage protection and Pt 100 temperature sensor for BD|SENSORS devices.

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.

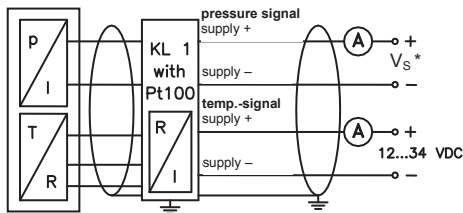
Vertical terminal clamps enable easy connection of cables inside. The terminal box has to be mounted with two fastening screws.



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, 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 mm <sup>2</sup>
Weight	approx. 550 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 Pt 100 temperature sensor <sup>1</sup>	
Temperature range	standard: 0 ... 70 °C option: T <sub>min</sub> ... T <sub>max</sub> can be in range from -40 °C up to 400 °C
Connection temperature sensor	3-wire
Output signal / Supply	2-wire: 4 ... 20 mA / V <sub>S</sub> = 12 ... 34 V <sub>DC</sub>
Accuracy	< 0.15 %
Linearity	< 0.1 %
Thermal effects	< 0.01 % / K

<sup>1</sup> only necessary if the transmitter is equipped with a Pt 100 temperature sensor

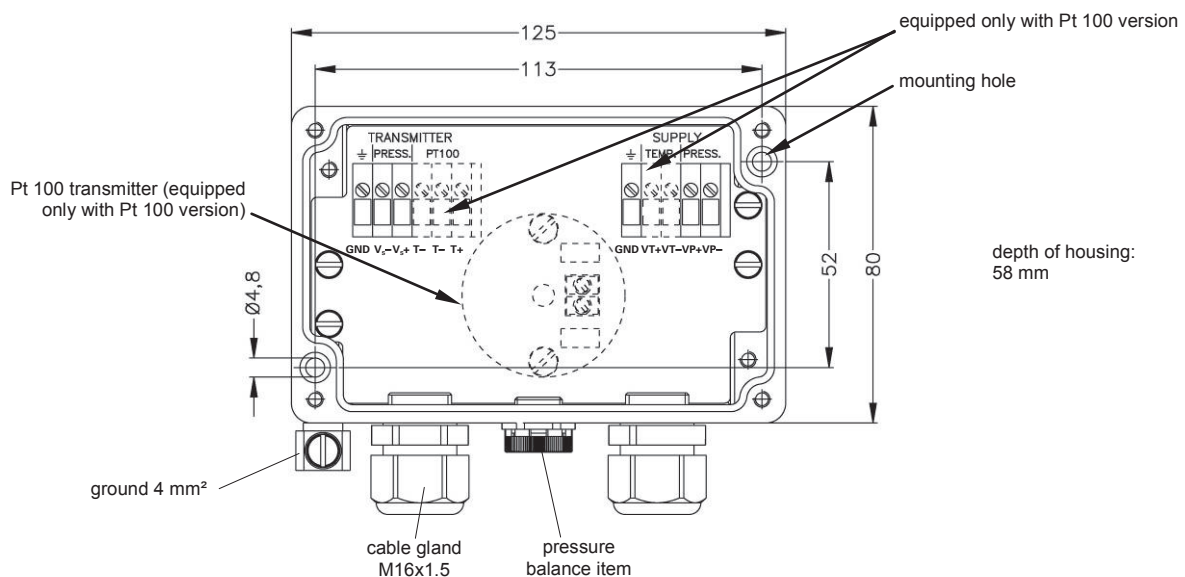
#### Wiring diagram



The ground wires of all components have to be connected!

\* The supply V<sub>S</sub> has to be chosen according to needs of the used transmitter.

#### Dimensions (in mm)



# KL 1

Ordering code

KL 1 - ZB.601 - 

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 - 

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Version					
	standard	1	0	0	
	over voltage protection	1	0	1	
	thermo element Pt 100	1	T	0	
	thermo element Pt 100 and over voltage protection <sup>1</sup>	1	T	1	
Special version					
	standard			0	0
	customer			9	9

consult

<sup>1</sup> only necessary if the submersible transmitter is equipped with a Pt 100 temperature sensor



# 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

- ▶ 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.

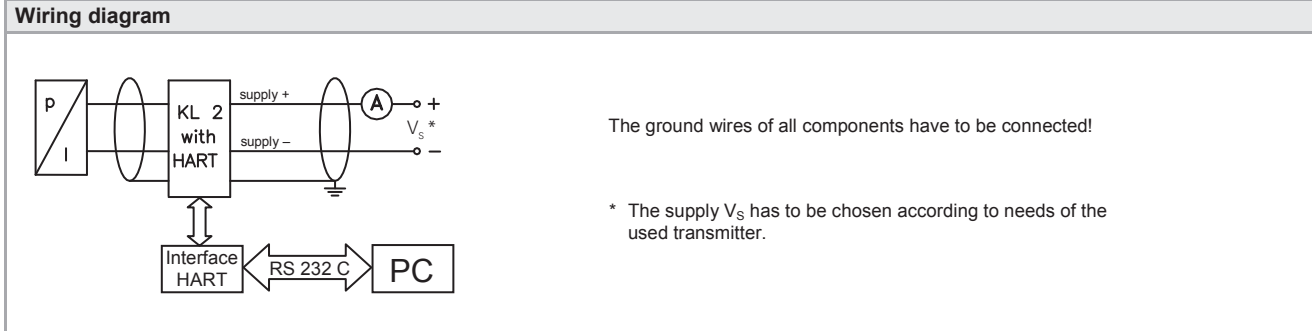
The KL 2 with optional overvoltage protection is additionally equipped with surge arresters with a nominal discharge current of 10 kA.

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

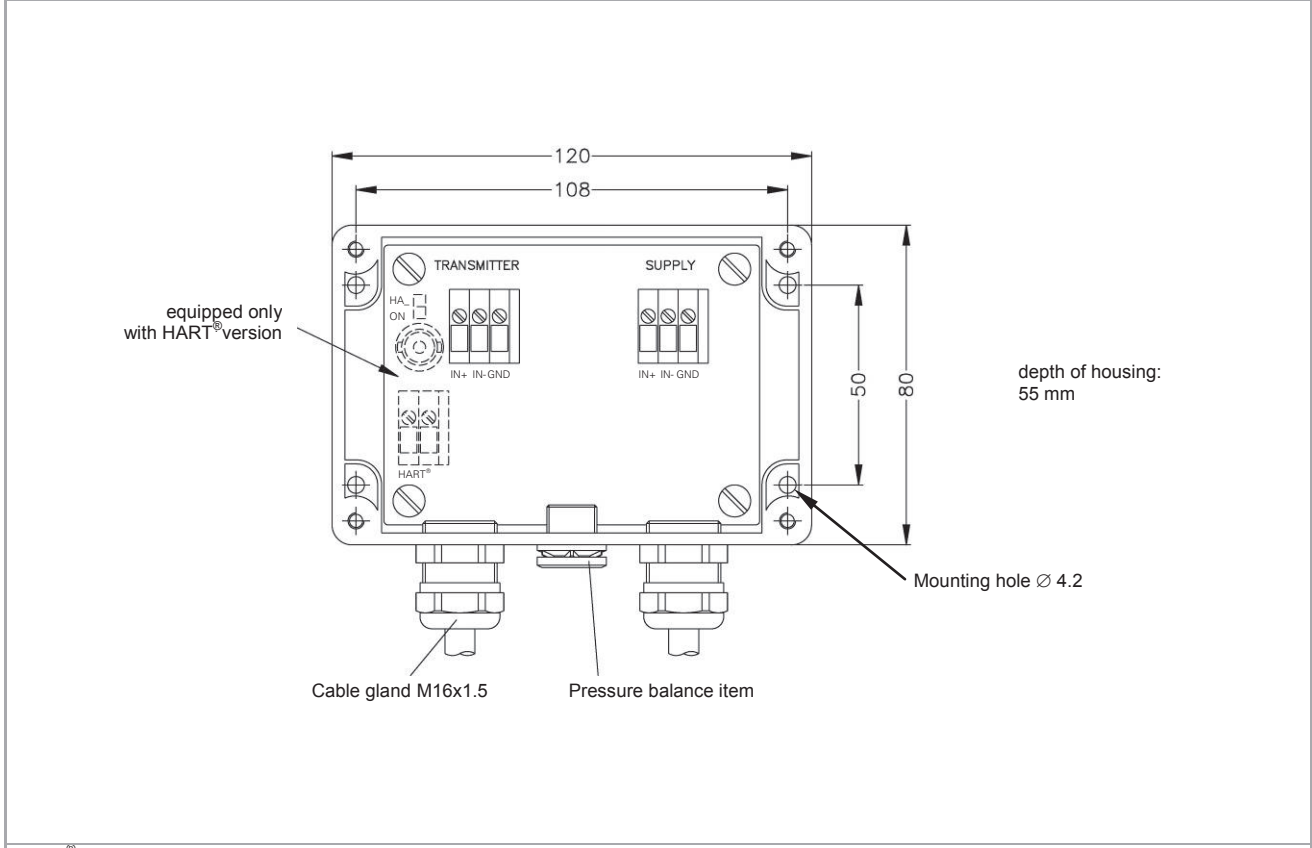


General specifications	
Number of signal lines	2-wire (4 ... 20 mA)
Housing material	plastic ABS, grey
Ingress protection	IP 66
Cable entries	cable gland M16x1.5 Polyamide, seals NBR, IP 68, diameter range: standard 5 ... 10 mm others on request
Atmospheric pressure compensation	pressure balance item with PTFE filter
Terminal clamps	vertical clamps for stranded and solid wires up to 2.5 mm <sup>2</sup>
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



**Dimensions (in mm)**



HART® is a registered trade mark of HART Communication Foundation

This document contains product specifications; properties are not guaranteed. Subject to change without notice.

# KL 2

Ordering code

KL 2 - ZB.601 - 

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Version							
	standard	2	0	0			
	over voltage protection	2	0	1			
	version with 2 channels	2	2	0			
	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

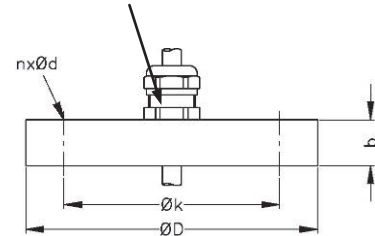
consult

HART® is a registered trade mark of HART Communication Foundation

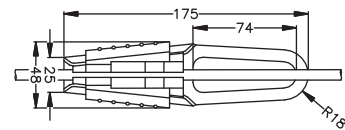
*This document contains product specifications; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.*

Mounting flange with cable gland		
<b>Technical data</b>		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316L)	
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305; plastic	
Seal insert	material: TPE (ingress protection IP 68)	
Hole pattern	according to DIN 2507	
<b>Version</b>	<b>Size (in mm)</b>	<b>Weight</b>
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d = 14	1.4 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d = 18	3.2 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d = 18	4.8 kg
<b>Ordering type</b>		<b>Ordering code</b>
DN25 / PN40 with cable gland brass, nickel plated		ZMF2540
DN50 / PN40 with cable gland brass, nickel plated		ZMF5040
DN80 / PN16 with cable gland brass, nickel plated		ZMF8016

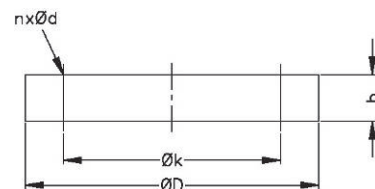
cable gland M16x1.5 with seal insert (for cable- $\varnothing$  4 ... 11 mm)



Terminal clamp		
<b>Technical Data</b>		
Suitable for	all probes with cable $\varnothing$ 5.5 ... 10.5 mm	
Material	standard: steel, zinc plated optionally: stainless steel 1.4301	
Weight	approx. 160 g	
<b>Ordering type</b>		<b>Ordering code</b>
Terminal clamp, steel, zinc plated		Z100528
Terminal clamp, stainless steel 1.4301		Z100527



probe flange		
<b>Technical data</b>		
Suitable for	LMK 382, LMK 382H, LMK 458, LMK 458H	
Flange material	stainless steel 1.4404 (316L)	
Hole pattern	according to DIN 2507	
<b>Version</b>	<b>Size (in mm)</b>	<b>Weight</b>
DN25 / PN40	D = 115, k = 85, b = 18, n = 4, d = 14	1.2 kg
DN50 / PN40	D = 165, k = 125, b = 20, n = 4, d = 18	2.6 kg
DN80 / PN16	D = 200, k = 160, b = 20, n = 8, d = 18	4.1 kg
<b>Ordering type</b>		<b>Ordering code</b>
Transmitter flange DN25 / PN40		ZSF2540
Transmitter flange DN50 / PN40		ZSF5040
Transmitter flange DN80 / PN16		ZSF8016



	Description	Display	Input
PA 430	Plug-on Display self powered with Contacts and Ex-approval	4-digit LED-display 4 x 7 mm, rotatable	4 ... 20 mA, 0 ... 10 V
PA 440	Field Display with Contacts and Ex-approval	4-digit LED-display 4 x 10 mm 4-digit LCD-display 4 x 18 mm	4 ... 20 mA
PA 450	Field Display for Difference Formation	4-digit LED-display 4 x 10 mm	2 inputs: 4 ... 20 mA
CIT 200	Process Display	4-digit LED-display 4 x 13 mm	0/4 ... 20 mA, 0/1 ... 5 V, 0/2 ... 10 V, PT100 / PT500 / PT1000
CIT 250	Process Display with Contacts	4-digit LED-display 4 x 13 mm	0/4 ... 20 mA, 0/1 ... 5 V, 0/2 ... 10 V, PT100 / PT500 / PT1000
CIT 300	Process Display with Contacts and Analogue Output	4-digit LED-display 4 x 20 mm	0/4 ... 20 mA, 0/1 ... 5 V, 0/2 ... 10 V, PT100 / PT500 / PT1000
CIT 350	Process Display with Bargraph, Contacts and Analogue Output	4-digit LED-display 4 x 9 mm + 20-segment-Bargraph	0/4 ... 20 mA, 0/1 ... 5 V, 0/2 ... 10 V
CIT 400	Process Display with Contacts, Analogue Output and Ex-approval	4-digit LED-display 4 x 10 mm	4 ... 20 mA
CIT 600	Multichannel Process Display (LCD)	graphic LC-display 128 x 64 pixel	2 / 4 / 8 inputs: 0/4 ... 20 mA, PT100 / PT500 / PT1000
CIT 650	Multichannel Process Display (LCD) with Datalogger	graphic LC-display 128 x 64 pixel	1 / 4 / 8 inputs: 0/4 ... 20 mA, PT100 / PT500 / PT1000
CIT 700	Multichannel Process Display (TFT) with Contacts, Analogue Outputs and Datalogger	graphic 3,5" TFT- monitor, touchscreen	max. 48 inputs: 0 ... 20 mA, 0 ... 10 V max. 12 inputs: PT 100 / PT 500 / PT 1000 ( $\Omega$ ) max. 24 inputs: thermocouple (mV)
CIT 750	Multichannel Process Display (TFT) with Contacts, Analogue Outputs and Datalogger	graphic 5,7" TFT- monitor, touchscreen	max. 72 inputs: 0 ... 20 mA, 0 ... 10 V max. 18 inputs: PT 100 / PT 500 / PT 1000 ( $\Omega$ ) max. 36 inputs: thermocouple (mV)



Output	Housing Dimensions (B x H x T) in mm	Interface	
0 / 1 / 2 PNP-outputs 4 ... 20 mA, 0 ... 10 V	plastic, rotatable 47 x 47 x 68	–	
0 / 1 / 2 PNP- outputs 4 ... 20 mA	plastic 120 x 80 x 57 aluminium 125 x 80 x 57	–	
0 / 1 / 2 PNP- outputs 4 ... 20 mA	plastic 120 x 80 x 57	–	
	front panel 72 x 36 x 77 (95)	RS 485 Modbus RTU	
0 / 1 / 2 relay- outputs	front panel 72 x 36 x 77	RS 485 Modbus RTU	
0 / 2 / 4 relay- outputs 0/4 ... 20 mA	front panel 96 x 48 x 98	RS 485 Modbus RTU	
0 / 2 / 4 relay- outputs 0/4 ... 20 mA	front panel 48 x 96 x 98	RS 485 Modbus RTU	
2 / 4 relay- outputs 0/4 ... 20 mA	front panel 72 x 72 x 110 hat rail 70 x 75 x 110	–	
2 OC- outputs	front panel 96 x 96 x 100	RS 485 Modbus RTU	
2 OC- outputs	front panel 96 x 96 x 100	RS 485 Modbus RTU USB-Host Port	
max. 16 relay- outputs, max. 24 SSR-outputs, max. 8 outputs 4 ... 20 mA	front panel 96 x 96 x 100	RS 485 Modbus RTU, RS 232, Ethernet (Modbus TCP, Java Applets) USB Host Port	
max. 36 relay- outputs, max. 72 SSR-outputs, max. 24 outputs 4 ... 20 mA	front panel 144 x 144 x 100	RS 485 Modbus RTU, RS 232, Ethernet (Modbus TCP, Java Applets) USB Host Port	

## 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.

## PRICE / PERFORMANCE

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.

## INDUSTRIES



plant and machine engineering



chemical and biochemical industry



energy industry



renewable energy



semiconductor industry /  
cleanroom technology



HVAC



hydraulics



refrigeration



calibration techniques



laboratory techniques



medical technology



food and beverage



vehicles and mobile hydraulics



oil and gas industry



pharmaceutical industry



marine / shipbuilding / offshore



heavy industry



environmental industry



packaging and paper industry

## MEDIA



sewage



aggressive media



colours



gases



fuels and oils



pasty and viscous media



oxygen



water



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