PRODUCT CATALOGUE
HYDROSTATIC PROBES
SCREW-IN TRANSMITTERS

BD|SENSORS
pressure measurement

BD|SENSORS
pressure measurement

PRESSURE AT THE HIGHEST LEVEL

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

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

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

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
- → electronic pressure switches
- → pressure measuring devices with display and switching outputs
- → hydrostatic level probes

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

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

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 307i

Stainless Steel Probe

Stainless Steel Sensor

accuracy according to IEC 60770:
standard: 0.1 % FSO

Nominal pressure

from 0 ... 0.4 mH$_2$O up to 0 ... 200 mH$_2$O

Output signals

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

Special characteristics

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

Optional versions

- IS-protection zone 0
- cable protection via corrugated pipe
- different kinds of cables
- different kinds of seal materials

The stainless steel probe LMP 307i 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

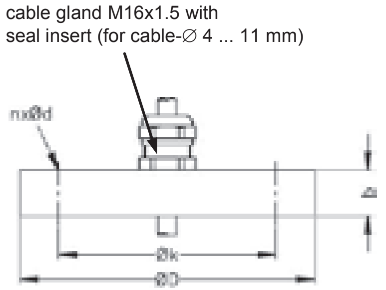
Fuel / Oil
fuel storage
tank farm

CE Ex IEC IECEx

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

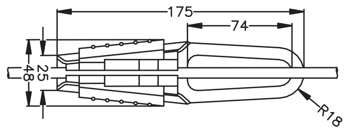
Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}
Option Ex-protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}
Options 3-wire	3-wire: 0 ... 10 V / V_S = 14 ... 36 V_{DC}
Performance	
Accuracy	nominal pressure ≥ 0.1 bar: ≤ ± 0.1 % FSO nominal pressure < 0.1 bar: ≤ ± 0.2 % FSO
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 / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (Offset and Span)	
Tolerance band [% FSO]	≤ ± 0.2 in compensated range -20 … 80°C
TC [% FSO / 10K]	≤ ± 0.02 in compensated range -20 … 80°C
Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection [2]	
Insulation resistance	> 100 MΩ
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-10 … 70 °C) black FEP[4] (-10 … 70 °C) black
[3] cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	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 307i	**IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X** zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 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	
Current consumption	max. 25 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC
ATEX Directive	94/9/EG

Mounting flange with cable gland


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

Technical data		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316L)	
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305 (303); plastic	
Seal insert	material: TPE (ingress protection IP 68)	
Hole pattern	according to DIN 2507	
Version	**Size (in mm)**	**Weight**
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
Ordering type		**Ordering code**
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

Terminal clamp



Technical data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)
Weight	approx. 160 g
Ordering type	**Ordering code**
Terminal clamp, steel, zinc plated	Z100528
Terminal clamp, stainless steel 1.4301 (304)	Z100527

Display program

CIT 200
Process display with LED display

CIT 250
Process display with LED display and contacts

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

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

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

CIT 600
Multichannel process display with graphics-capable LC display

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

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

PA 440
Field display with 4-digit LC display

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

LMP 307i ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐-☐☐☐

Pressure												
in bar		4 5 0										
in mH$_2$O		4 5 1										
Input [mH$_2$O]	[bar]											
4.0	0.40		4 0 0 0									
10	1.0		1 0 0 1									
25	2		2 0 0 1									
40	4.0		4 0 0 1									
100	10		1 0 0 2									
200	20		2 0 0 2									
customer			9 9 9 9									consult
Housing												
Stainless steel 1.4404 (316L)				1								
customer				9								consult
Diaphragm												
Stainless steel 1.4435 (316L)					1							
customer					9							consult
Output												
4 … 20 mA / 2-wire						1						
intrinsic safety 4 … 20 mA / 2 wire						E						
0 … 10 V / 3-wire						3						
customer						9						consult
Seals												
FKM							1					
customer							9					consult
Accuracy												
standard for $P_N \geq 0.1$ bar	0.1 %							1				
standard for $P_N < 0.1$ bar	0.2 %							B				
customer								9				consult
Electrical connection												
PVC-cable [1]									1			
PUR-cable [1]									2			
FEP-cable [1]									3			
customer									9			consult
Cable length												
in m										☐☐☐		
Special version												
standard										1 1 1		
cable protection with stainless steel corrugated pipe with pipe length in m										1 0 3	9 9 9	consult
customer										9 9 9		consult

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[1] cable with integrated air tube for atmospheric pressure reference

LMP 308i

Separable Stainless Steel Probe Precision

Stainless Steel Sensor

accuracy according to IEC 60770: 0.1 % FSO

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 condions 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

Nominal pressure

from 0 ... 4 mH$_2$O up to 0 ... 200 mH$_2$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
- Turn-Down 1:10

Optional versions

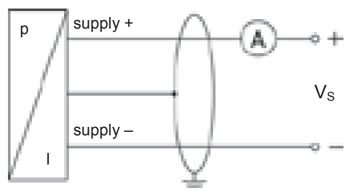
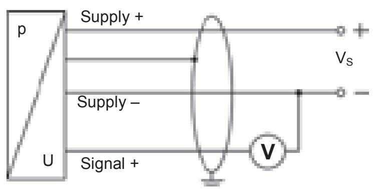
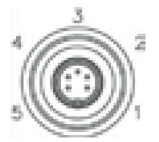
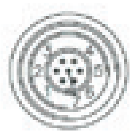
- IS-version zone 0
- cable protection via corrugated pipe
- mounting accessories as cable gland and terminal clamp in stainless steel
- different kinds of cables
- different kinds of seal materials

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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC} with RS-232 communication interface
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}
Options	3-wire: 0 ... 10 V / V_S = 14 ... 36 V_{DC}
Performance	
Accuracy Performance after turn-down (TD) - TD ≤ 1:5 - TD > 1:5	IEC 60770 [2]: ≤ ± 0.1 % FSO no change of accuracy [3] formula for accuracy calculating (for nominal pressure gauge ≤ 0.40 bar see note 3): ≤ ± [0.1 + 0.015 x turn-down] % FSO with turn-down = nominal pressure range / adjusted range e.g. follwing accuracy can be calculated for turn-down 1:10: ≤ ± (0.1 + 0.015 x 10) % FSO viz. the accuracy is ≤ ± 0.25 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ voltage 3-wire: $R_{min} = 10\ k\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions
Response time	ca. 200 msec
Adjustability	following parameters can be adjusted (interface / software needed [4]) electronic damping: 0 ... 100 sec offset: 0 ... 90 % FSO turn-down of span: max. 1:10
[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[3] nominal pressure gauges ≤ 0,40 bar are excluded; for these the calculation of accuracy is as follows:* *≤ ± (0.1 + 0.02 x turn-down) % FSO e.g. torn-down 1:3: ≤ ± (0.1 + 0.02 x 3) % FSO viz. the accuracy is ≤ ± 0.16 % FSO* *[4] software, interface and cable must separate be ordered (software is compatible with Windows® 95, 98, 2000, NT from version 4.0 or higher and XP)*	
Thermal effects (Offset and Span)	
Tolerance band [% FSO]	≤ ± (0.2 x turn-down) in compensated range -20 ... 70 °C
TC [% FSO / 10 K]	± (0.2 x turn-down) in compensated range -20 ... 70 °C
Permissible temperatures	medium: -20 ... 70 °C storage: -25 ... 70 °C electronics / enviroment: -25 ... 65 °C
Electrical protection [5]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[5] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [6]	PVC (-5 … 70 °C) grey PUR (-20 … 70 °C) black FEP[7] (-20 … 70 °C) black others on request
[6] cable with integrated air tube for atmospheric pressure reference *[7] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM, EPDM, others on request
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-LMP 308 i	**IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X** zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -20 ... 65 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance:signal line/shield also signal line/signal line: 1µH/m
Miscellaneous	
Current consumption	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	94/9/EG

Wiring diagram / connector

2-wire-system (current)	3-wire-system (voltage)	Binder series 723 [8] (5-pin)	Binder series 723 [8] (7-pin)
			

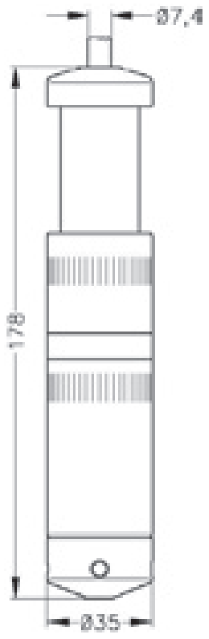
Pin configuration

Electrical connection	Binder series 723 [8] (5-pin) / 2-wire	Binder series 723 [8] (5-pin) / 3-wire	Binder series 723 [8] (7-pin) / 2-wire with communication interface	cable colours (DIN 47100)
Supply +	3	3	3 / wh (white)	wh (white)
Supply –	1	4	1 / bn (brown)	bn (brown)
Signal + (for 3-wire)	-	1	(6) / gn (green)	gn (green)
RxD	-	-	4 / ye (yellow)	-
TxD	-	-	5 / gr (gray)	-
GND	-	-	7 / gn (green)	-
Shield	5	5	2 / gn/ye (green / yellow)	gn/ye (green / yellow)

[8] in separated version

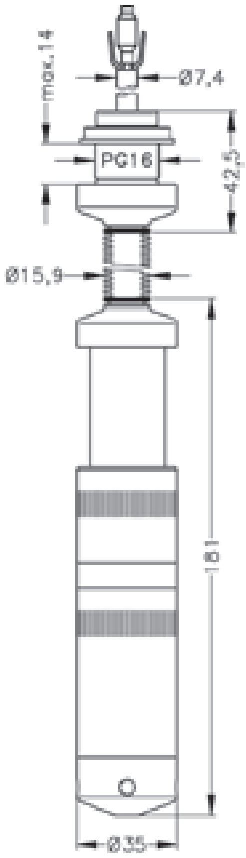
Dimensions (in mm)

standard



option

separated version



version with
corrugated pipe

LMP 308i		□□□	□□□□	□	□	□	□	□	□	□□□	□□□	□□□	
Pressure													
in bar		4 4 0											
in mH_2O		4 4 1											
Input $[mH_2O]$	**[bar]**												
4.0	0.40		4 0 0 0										
10	1.0		1 0 0 1										
20	2.0		2 0 0 1										
40	4.0		4 0 0 1										
100	10		1 0 0 2										
200	20		2 0 0 2										
customer			9 9 9 9										consult
Housing													
Stainless steel 1.4404 (316L)				1									
customer				9									consult
Diaphragm													
Stainless steel 1.4435 (316L)					1								
customer					9								consult
Output													
4 … 20 mA / 2-wire						1							
Intrinsic safety 4 … 20 mA / 2-wire						E							
0 … 10 V / 3-wire						3							
customer						9							consult
Seals													
FKM							1						
EPDM							3						
customer							9						consult
Electrical connection													
PVC-cable [1]								1					
PUR-cable [1]								2					
FEP-cable [1]								3					
customer								9					consult
Accuracy													
0.1 % [2]									1				
customer									9				consult
Cable length													
in m										9 9 9			consult
Version													
standard											1 1 1		
with communicaton interface [3]											1 2 1		
prepared for mounting [4] with stainless steel pipe											1 2 6		consult
cable protection with stainless steel corrugated pipe with pipe length in m											1 2 3	9 9 9	consult
customer											9 9 9		consult

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[1] cable with integrated air tube for atmospheric pressure reference

[2] available on request: calibration of individual pressure range higher than 400 mbar with accuracy 0.1 %

[3] Software, interface and cable have to be order separately (Ordering code: CIS-G; Software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or newer and XP)

[4] stainless steel pipe is not part of the supply

Windows® is a registrated trademark of Microsoft Corporation

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

LMK 382H

Stainless Steel Probe with HART®-communication

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

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

Optional versions

- IS-version zone 0
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al_2O_3
- accessories e.g. assembling and probe flange, mounting clamp

The stainless steel probe LMK 382H has been designed for continous 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 [1]								
Nominal pressure [bar]	0.06	0.16	0.4	1	2	5	10	20
Level [mH_2O]	0.6	1.6	4	10	20	50	100	200
Overpressure [bar]	2	4	6	8	15	25	35	45

[1] *On customer request we adjust the devices by software on the required pressure ranges, within the turn-down possibility (starting at 0.02 bar).*

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC} with HART® communication $V_{S\ rated}$ = 24 V_{DC}
Option IS- protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC} with HART® communication $V_{S\ rated}$ = 24 V_{DC}
Performance	
Accuracy [2]	P_N ≥ 160 mbar: TD ≤ 1:5 ≤ ± 0.2 % FSO TD > 1:5 ≤ ± [0.2 + 0.03 x TD] % FSO TD_{max} = 1:10 P_N < 160 mbar: ≤ ± [0.2 + 0.1 x TD] % FSO TD_{max} = 1:3 P_N ≥ 1 bar: TD ≤ 1:5 ≤ ± 0.1 % FSO TD > 1:5 ≤ ± [0.1 + 0.02 x TD] % FSO TD_{max} = 1:10
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$ load at HART®-communication: $R_{min} = 250\ \Omega$
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions
Influence effects	supply: 0.05 % FSO / 10 V permissible load: 0.05 % FSO / kΩ
Turn-on time	850 msec
Mean response time	140 msec without consideration of electronic damping mean measuring rate 7/sec
Max. response time	380 msec
Adjustability	configuration of following parameters possible (interface / software necessary [3]): - electronic damping: 0 ... 100 sec - offset: 0 ... 80 % FSO - turn down of span: max. 1:10

[2] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*
[3] *software, interface, and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)*

Thermal effects (Offset and Span)	
Tolerance band	≤ ± (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 [4]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

[4] *additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request*

Mechanical stability	
Vibration	4 g (according to: DIN EN 60068-2-6)
Electrical connection	
Cable outlet with sheat material[5]	PVC (-5 … 70 °C) grey PUR (-25 … 70 °C) black FEP[6] (-25 … 70 °C) black TPE (-25 … 85 °C) blue

[5] *shielded cable with integrated air tube for atmospheric pressure reference*
[6] *do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*

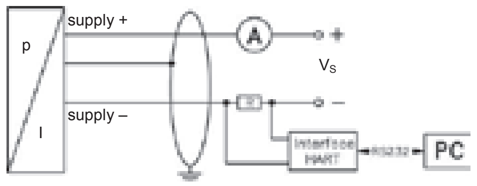
Materials	
Housing	stainless steel 1.4404
Seals	FKM FFKM EPDM others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %
Protection cap	POM
Miscellaneous	
Option cable protection	stainless steel pipe for probe in stainless steel: available as compact product (standard: 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

IS-protection	
Approval DX15A-LMK 382H	IBExU 10 ATEX 1186 X zone 0 [7]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 13,2 nF, L_i = 0 µH, the supply connections have an inner capacity of max. 27 nF opposite the enclosure
Permissible media temperature	in zone 0: -10 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: -25 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1µH/m

[7] *for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)*

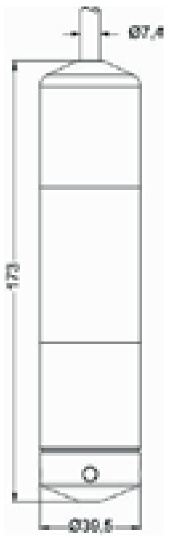
Wiring diagram

2-wire-system (current) HART®

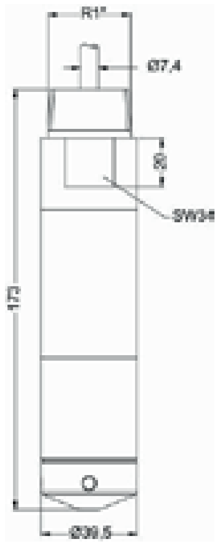


Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply +	wh (white)
Supply –	bn (brown)
Shield	gnye (green-yellow)

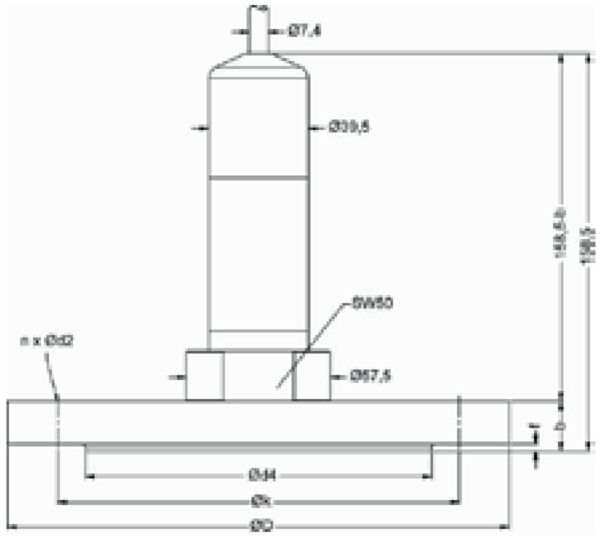
Dimensions (in mm)



standard



thread R1"
for stainless steel pipe



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

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Windows® is a registered trade mark of Microsoft Corporation

LMK 382 H

Ordering code

LMK 382H	[mH_2O]	[bar]	Code	
Pressure				
in bar			5 6 5	
in mH_2O			5 6 6	
Input				
	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
Housing				
Stainless steel 1.4404 (316L)			1	
customer			9	consult
Diaphragm				
Ceramics Al_2O_3 96%			2	
Ceramics Al_2O_3 99.9%			C	
customer			9	consult
Output				
HART®-communication 4 … 20 mA / 2-wire			H	
HART®-communication Intrinsic safety 4 … 20 mA / 2-wire			I	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
FFKM			7	
customer			9	consult
Electrical connection				
PVC-cable [1]			1	
PUR-cable [1]			2	
FEP-cable [1]			3	
TPE-cable [1]			4	
customer			9	consult
Accuracy				
$P_N \geq 1$ bar 0.1 %			1	
$P_N < 1$ bar 0,2 %			B	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
prepared for mounting [2] with stainless steel pipe			5 0 2	
flange version			5 1 0	
customer			9 9 9	consult

---

[1] cable with integrated air tube for atmospheric pressure reference

[2] stainless steel pipe is not part of the supply

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LMK 458H

Probe with HART®-communication for Marine and Offshore

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- shipping approvals acc. to: Lloyd´s Register (LR), Germanischer Lloyd (GL), Det Norske Veritas (DNV) China Classification Society (CCS), American Bureau of Shipping (ABS)
- diameter 39.5 mm
- HART® communication (setting of offset, span and damping)
- high overpressure resistance
- high long-term stability

Optional versions

- IS-version zone 0
- diaphragm Al_2O_3 99.9 %
- different housing materials (stainless steel, CuNiFe)
- screw-in and flange version
- accessories e. g. assembling and probe flange, mounting clamp

The hydrostatic probe LMK 458H has been developed for measuring level in service and storage tanks and is as a consequence certificated 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

Pressure ranges								
Nominal pressure [1] [bar]	0.06	0.16	0.4	1	2	5	10	20
Level [mH_2O]	0.6	1.6	4	10	20	50	100	200
Overpressure [bar]	2	4	6	8	15	25	35	45

[1] On customer request we adjust the devices by software on the required pressure ranges, within the turn-down possibility (starting at 0.02 bar).

Output signal / Supply			
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}	with HART® communication	$V_{S\ rated}$ = 24 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	with HART® communication	$V_{S\ rated}$ = 24 V_{DC}

Performance				
Accuracy [2]	P_N ≥ 160 mbar	TD ≤ 1:5 TD > 1:5	≤ ± 0.2 % FSO ≤ ± [0.2 + 0.03 x TD] % FSO	TD_{max} = 1:10
	P_N < 160 mbar		≤ ± [0.2 + 0.1 x TD] % FSO	TD_{max} = 1:3
	P_N ≥ 1 bar	TD ≤ 1:5 TD > 1:5	≤ ± 0.1 % FSO ≤ ± [0.1 + 0.02 x TD] % FSO	TD_{max} = 1: 10
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$	load at HART®-communication: $R_{min} = 250\ \Omega$		
Long term stability	≤ ± (0.1 x turn-down) FSO / year at reference conditions			
Influence effects	supply: 0.05 % FSO / 10 V	permissible load: 0.05 % FSO / kΩ		
Turn-on time	850 msec			
Mean response time	140 msec without consideration of electronic damping	mean measuring rate 7/sec		
Max. response time	380 msec			
Adjustability	configuration of following parameters possible (interface / software necessary [3]): - electronic damping: 0 ... 100 sec - offset: 0 ... 80 % FSO - turn down of span: max. 1:10			

[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[3] software, interface, and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span) / Permissible temperatures	
Tolerance band	≤ ± [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 [4]	
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)

[4] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available

Mechanical stability	
Vibration	4 g (according to GL: curve 2 / according to DNV: Class B / basis: DIN EN 60068-2-6)

Electrical connection	
Cable	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed)

Materials (media wetted)	
Housing	standard: stainless steel 1.4404 (316L) option: CuNi10Fe1Mn (resistant against sea water) others on request
Cable sheath	TPE -U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)
Seals	FKM; FFKM; EPDM others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %
Nose cone	POM

Miscellaneous	
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

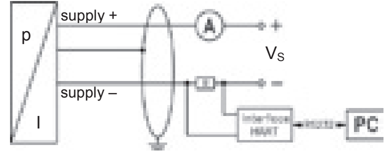
Category of the environment			
Lloyd´s Register (LR)	EMV1, EMV2, EMV3, EMV4		number of certificate: 13/20056
Germanischer Lloyd (GL)	D, EMC 1		number of certificate: 19 777 - 11 HH
Det Norske Veritas (DNV)	temperature: D electromagnetic compatibility: B	humidity: B	vibration: B number of certificate: A-12144

IS-protection	
Approval DX15A-LMK 458H	IBExU 10 ATEX 1186 X zone 0 [5]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 94,6 nF; L_i = 0 µH; the supply connections have an inner capacity of max. 110 nF opposite the enclosure
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 70 °C
Connecting cables (by factory)	cable capacity: signal line/shield as well as signal line/signal line: 160 pF/m cable inductance: signal line/shield as well as signal line/signal line: 1 µH/m

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

Wiring diagrams

2-wire-system (current) HART®

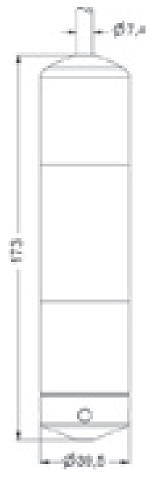


Pin configuration

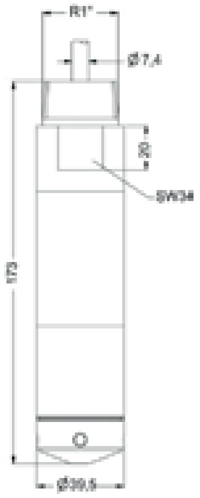
Electrical connection	cable colours (IEC 60575)
Supply V_S+ Supply V_S–	wh (white) bn (brown)
Shield	gnye (green-yellow)

Dimensions (in mm)

probe version



stainless steel / CuNiFe



prepared for mounting
with stainless steel pipe

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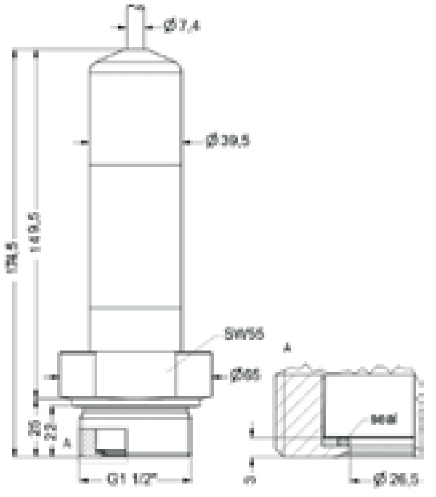
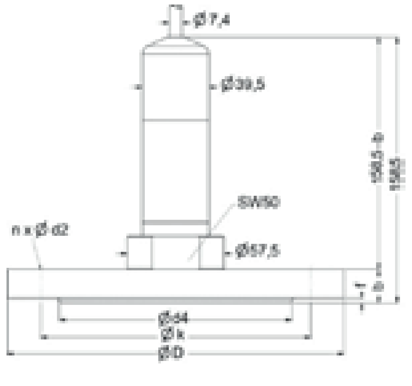
Dimensions (in mm)

screw-in version



stainless steel / CuNiFe

flange version



stainless steel / CuNiFe

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

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

Pressure			
in bar, gauge		7 6 E	
in bar, sealed gauge [1]		7 6 G	consult
in bar, absolute [1]		7 6 H	
in mH_2O		7 6 F	
Input [mH_2O]	**[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
Housing			
Stainless steel 1.4404 (316L)		1	
Copper-Nickel-alloy (CuNi10Fe1Mn)		K	
customer		9	consult
Design			
Submersible transmitter [2]		1	
Flange transmitter [2]		3	
Screw-in transmitter [2]		5	
Diaphragm			
Ceramics Al_2O_3 96%		2	
Ceramics Al_2O_3 99.9%		C	
customer		9	consult
Output			
HART®-communication 4 … 20 mA / 2-wire		H	
HART®-communication Intrinsic safety 4 … 20 mA / 2-wire		I	
customer		9	consult
Seals			
FKM		1	
EPDM		3	
FFKM		7	
customer		9	consult
Electrical connection			
TPE-U-cable [3]		4	
customer		9	
Accuracy			
$P_N \geq 1$ bar	0.1 %	1	
$P_N < 1$ bar	0,2 %	B	
customer		9	consult
Cable length			
in m		9 9 9	
Special version			
standard		0 0 0	
prepared for mounting with st. steel pipe [2, 4]		5 0 2	
customer		9 9 9	consult

---

[1] nominal pressure ranges sealed gauge and absolute from 1 bar
[2] mounting accessories are not part of supply and have to be ordered separately
[3] shielded cable with integrated air tube for atmospheric reference
[4] stainless steel pipe is not part of the supply

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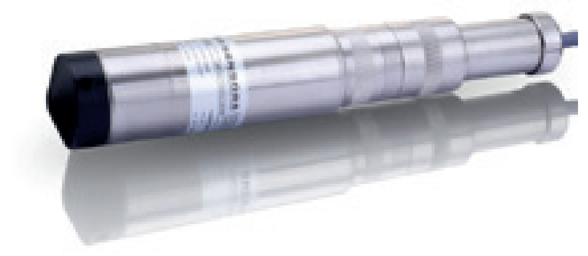
This document contains product specifications; properties are not guaranteed. Detailed information about options are defined in the datasheet. Subject to change without notice.

LMK 358H



Separable Stainless Steel Probe with HART®-communication

Ceramic Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 60 cmH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- diameter 39.5 mm
- cable and sensor section separable
- HART® 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_2O_3

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 [1]							
Nominal pressure gauge [bar]	0.06	0.16	0.4	1	2	5	10
Level [mH_2O]	0.6	1.6	4	10	20	50	100
Overpressure [bar]	2	4	6	8	15	25	35

[1] On customer request we adjust the devices by software on the required pressure ranges, within the turn-down-possibility (starting at 0.02 bar)

Output signal / Supply				
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC} with HART□ communication			$V_{S\ rated}$ = 24 V_{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 12 ... 28 V_{DC} with HART□ communication			$V_{S\ rated}$ = 24 V_{DC}
Performance				
Accuracy [2]	$P_N \geq$ 160 mbar	TD ≤ 1:5 TD > 1:5	≤ ± 0.2 % FSO ≤ ± [0.2 + 0.03 x TD] % FSO	TD_{max} = 1:10
	$P_N <$ 160 mbar		≤ ± [0.2 + 0.1 x TD] % FSO	TD_{max} = 1:3
	$P_N \geq$ 1 bar	TD ≤ 1:5 TD > 1:5	≤ ± 0.1 % FSO ≤ ± [0.1 + 0.02 x TD] % FSO	TD_{max} = 1:10
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$		load at HART®-communication: R_{min} = 250 Ω	
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions			
Influence effects	supply: 0.05 % FSO / 10 V		load: 0.05 % FSO / kΩ	
Turn-on time	850 msec			
Mean response time	140 msec – without consideration of electronic damping			measuring rate 7/sec
Max. response time	380 msec			
Adjustability	configuration of following parameters possible (interface / software necessary [3]) - electronic damping 0 ... 100 sec - offset: 0 ... 80 % FSO - turn-down of span: max. 1:10			

[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[3] software, interface, and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span) / - permissible temperatures		
Tolerance band	≤ ± (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: electronic / environment: storage:	-25 ... 85 °C -25 … 85 °C -25 ... 85 °C

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

[4] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Mechanical stability	
Vibration	4 g (according to: DIN EN 60068-2-6)
Electrical connection	
Cable with sheath material [5]	PVC (-5 … 70 °C) grey PUR (-25 … 70 °C) black FEP[6] (-25 … 70 °C) black TPE (-25 …85 °C) blue

[5] shielded cable with integrated air tube for atmospheric pressure reference
[6] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected

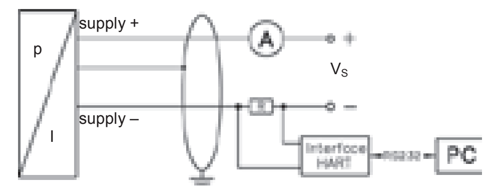
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %
Protection cap	POM
Explosion protection	
Approval DX15A-LMK 358H	IBExU 10 ATEX 1186 X zone 0 [7]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 13,2 nF , L_i = 0 μH, the supply connections have an inner capacity of max. 27 nF opposite the enclosure
Permissible media temperature	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 or higher: -25 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1μH/m

[7] for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4" (zone 0)

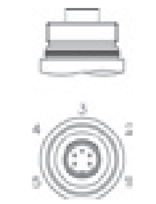
Miscellaneous	
Option cable protection	stainless steel pipe for probe in stainless steel: available as compact product (standard: stainless steel pipe with a total length up to 2 m possible; other lengths on request)
Current consumption	max. 21 mA
Weight	approx. 650 g (without cable)
Ingress protection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

Wiring diagram

2-wire-system (current) HART®



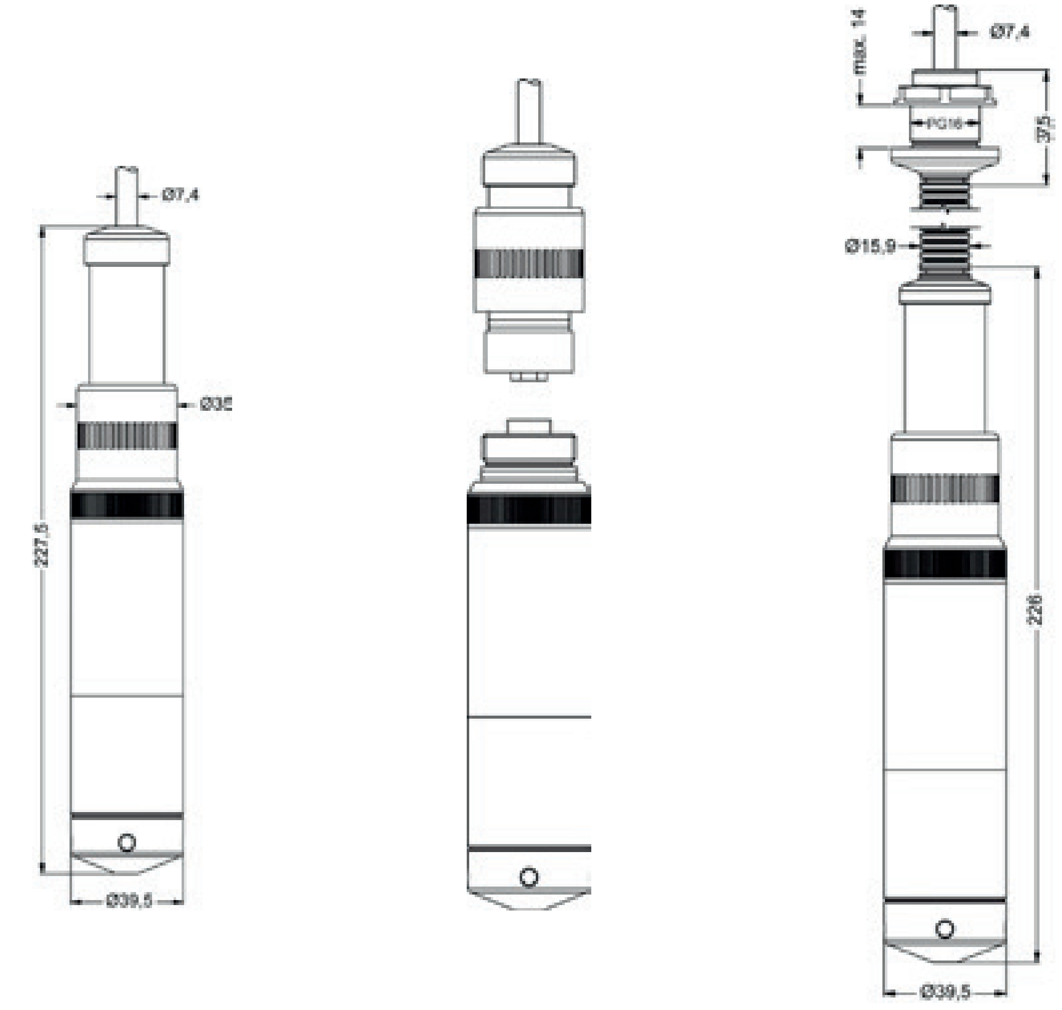
connector



Pin configuration		
Electrical connection	Binder series 723 [8] (5-pin)	cable colours (IEC 60575)
Supply + Supply –	3 1	wh (white) gn (brown)
Shield	5	gnye (green-yellow)

[8] in separated version

Dimensions (in mm)



separated version

optionally with corrugated pipe

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LMK 358H ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐-☐☐☐

Pressure														
in bar			445											
in mH_2O			446											
Input	**[mH_2O]**	**[bar]**												
	0.60	0.06		0600										
	1.60	0.16		1600										
	4.00	0.40		4000										
	10	1.0		1001										
	20	2.0		2001										
	50	5.0		5001										
	100	10		1002										
customer				9999										consult
Housing														
Stainless steel 1.4404 (316L)					1									
customer					9									consult
Diaphragm														
Ceramics Al_2O_3 96%						2								
Ceramics Al_2O_3 99.9%						C								
customer						9								consult
Output														
HART®-communication 4 … 20 mA / 2-wire							H							
HART®-communication Intrinsic safety 4 … 20 mA / 2-wire							I							
customer							9							consult
Seals														
FKM								1						
EPDM								3						
customer								9						consult
Electrical connection														
PVC-cable [1]									1					
PUR-cable [1]									2					
FEP-cable [1]									3					
TPE-cable									4					
customer									9					consult
Accuracy														
$P_N \geq 1$ bar 0.1 %										1				
$P_N < 1$ bar 0,2 %										B				
customer										9				consult
Cable length														
in m											999			
Special version														
standard												000		
prepared for mounting [2] with stainless steel pipe												106		
cable protection with stainless steel corrugated pipe with pipe length in m												103	999	consult
customer												999		consult

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[1] cable with integrated air tube for atmospheric pressure reference

[2] stainless steel pipe is not part of the supply

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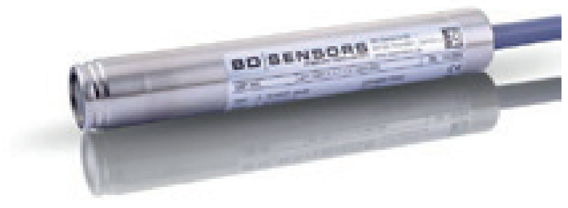


LMP 305

Slimline Probe

Stainless Steel Sensor

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

Nominal pressure

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

Output signals

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

Special characteristics

- diameter 19 mm for 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 continous level measurement in confined space conditions. Permissible media are clean or waste water and thin fluids.

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

Preferred areas of use are

Water
level measurement in confined space conditions
ground water monitoring
depth or level measurement in wells and open waters
drinking water system
level measurement in container

CE

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$_2$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_S = 12 ... 36 V_{DC}
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_{max} = [(V_S – $V_{S\,min}$) / 0,02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time	< 10 msec

[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)					
Nominal pressure P_N [bar]	≤ 0.1	≤ 0.25	≤ 0.4	≤ 1	> 1
Tolerance band [% FSO]	≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 1	≤ ± 0.75
TC, average [% FSO / 10 K]	± 0.3	± 0.2	± 0.14	± 0.1	± 0.07
in compensated range [°C]	0 ... 50			0 ... 70	

Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

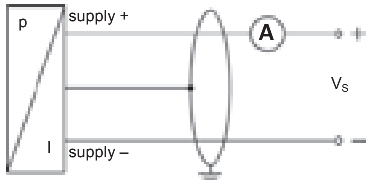
Electrical connection	
Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-10 … 70 °C) black FEP[4] (-10 … 70 °C) black others on request

[3] cable with integrated air tube for atmospheric pressure reference
[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected

Materials (media wetted)	
Housing	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

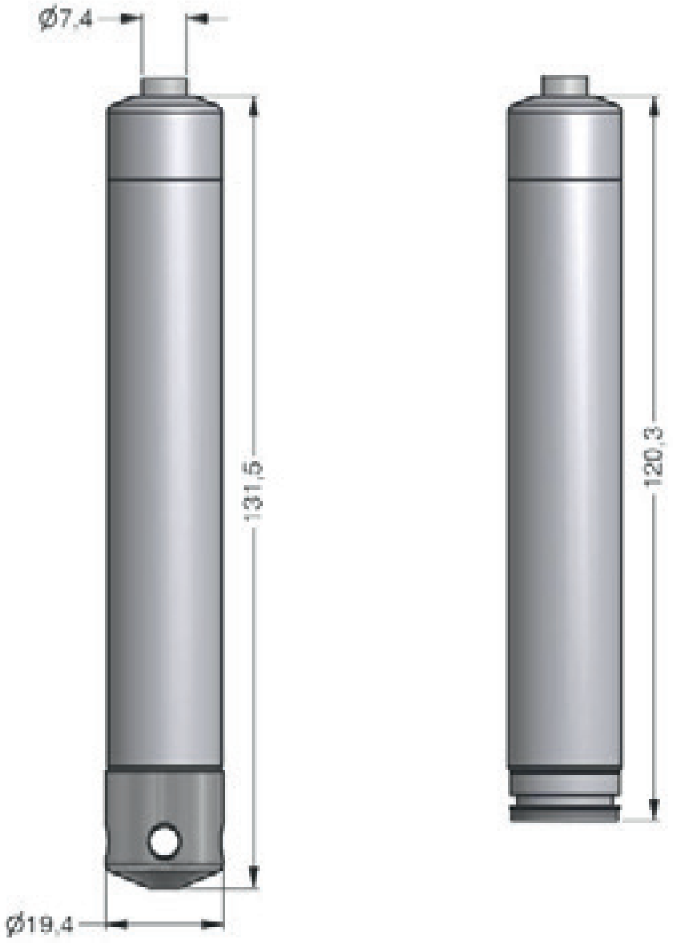
Wiring diagram

2-wire-system (current)



Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply + Supply –	wh (white) bn (brown)
Shield	gnye (green-yellow)

Dimensions (in mm)



Protection cap removable

LMP 305

Ordering code

LMP 305 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure				
in bar			4 0 0	
in mH_2O			4 0 1	
Input	**$[mH_2O]$**	**[bar]**		
	1.0	0.10	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	250	25	2 5 0 2	
customer			9 9 9 9	consult
Housing				
Stainless steel 1.4404 (316L)			1	
customer			9	consult
Diaphragm				
Stainless steel 1.4435 (316L)			1	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
customer			9	consult
Accuracy				
standard for $P_N > 0.4$ bar	0.35 %		3	
standard for $P_N \leq 0.4$ bar	0.5 %		5	
option for $P_N > 0.4$ bar	0.25 %		2	
customer			9	consult
Electrical connection				
PVC-cable [1]			1	
PUR-cable [1]			2	
FEP-cable [1]			3	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
customer			9 9 9	consult

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[1] cable with integrated air tube for atmospheric pressure reference

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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_2O up to 0 ... 250 mH_2O

Output signals

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

Special characteristics

- diameter 26,5 mm
- small thermal effect
- 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$_2$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_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option Ex-protection	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}	
Performance		
Accuracy	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO option 2: for all nominal pressures: ≤ ± 0.1 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S – V_S \text{ min}) / 0.02 \text{ A}]\ \Omega$ current 3-wire: $R_{max} = 500\ \Omega$ voltage 3-wire: $R_{min} = 10\ k\Omega$	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Response time	2-wire: ≤ 10 msec;	3-wire: ≤ 3 msec

[1] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

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

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

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

[2] *additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request*

Electrical connection			
Cable with sheath material [3]	PVC (-5 … 70 °C) grey	PUR (-10 … 70 °C) black	FEP[4] (-10 … 70 °C) black

[3] *cable with integrated air tube for atmospheric pressure reference*

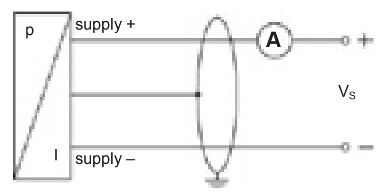
[4] *do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*

Materials (media wetted)	
Housing	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	**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_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 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[5] 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	94/9/EG

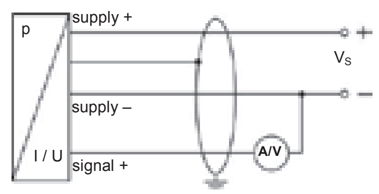
[5] *not in combination with the accuracy 0.1%, only for 4...20mA / 2-wire*

Wiring diagrams

2-wire-system (current)



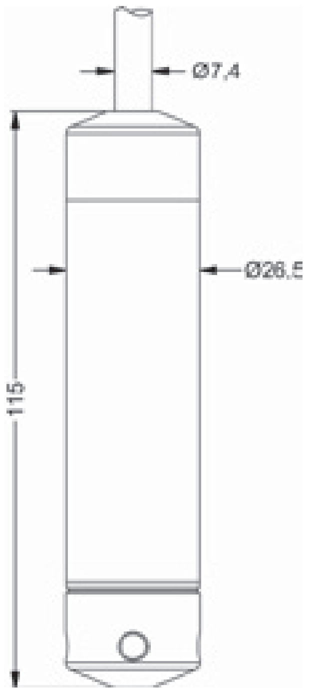
3-wire-system (current / voltage)



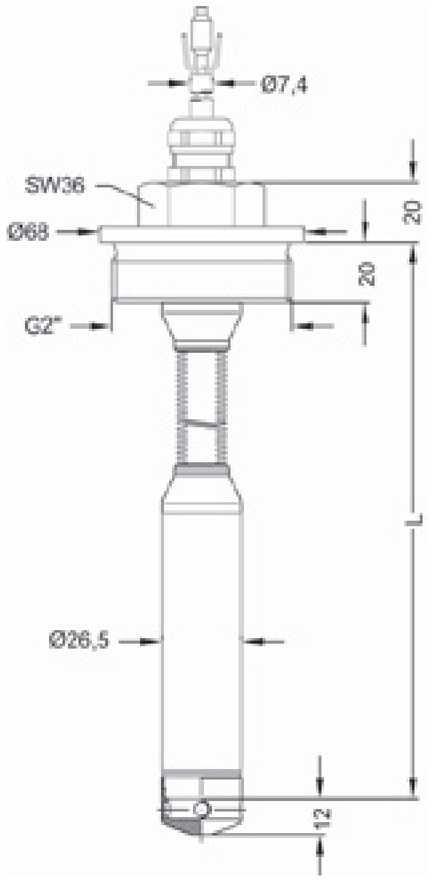
Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply + Supply – Signal + (only 3-wire)	wh (white) bn (brown) gn (green)
Shield	gnye (green-yellow)

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 307 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐-☐☐☐

			Code	
Pressure				
	in bar		4 5 0	
	in mH_2O		4 5 1	
Input	[mH_2O]	[bar]		
	1.0	0.10	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	250	25	2 5 0 2	
	customer		9 9 9 9	consult
Housing				
	Stainless steel 1.4404 (316L)		1	
	customer		9	consult
Diaphragm				
	Stainless steel 1.4435 (316L)		1	
	customer		9	consult
Output				
	4 … 20 mA / 2-wire		1	
	0 … 20 mA / 3-wire		2	
	0 … 10 V / 3-wire		3	
	Intrinsic safety 4 … 20 mA / 2-wire		E	
	SIL2 4 … 20 mA / 2-wire		1S	
	SIL2 with Intrinsic safety 4 … 20 mA / 2-wire		ES	
	customer		9	consult
Seals				
	FKM		1	
	customer		9	consult
Accuracy				
standard for $P_N \geq 0.4$ bar		0.35 %	3	
standard for $P_N < 0.4$ bar		0.5 %	5	
option 1 for $P_N \geq 0.4$ bar		0.25 %	2	
option 2		0.1 % [1]	1	
	customer		9	consult
Electrical connection				
	PVC-cable [2]		1	
	PUR-cable [2]		2	
	FEP-cable [2]		3	
	customer		9	consult
Cable length				
	in m			
	standard: 3 m	PVC	0 0 3	
	standard: 5 m	PVC	0 0 5	
	standard: 10 m	PVC	0 1 0	
	standard: 15 m	PVC	0 1 5	
	standard: 20 m	PVC	0 2 0	
	special length	**PVC**	**9 9 9**	
	standard: 3 m	PUR	0 0 3	
	standard: 5 m	PUR	0 0 5	
	standard: 10 m	PUR	0 1 0	
	standard: 15 m	PUR	0 1 5	
	standard: 20 m	PUR	0 2 0	
	special length	**PUR**	**9 9 9**	
	standard: 5 m	FEP	0 0 5	
	standard: 10 m	FEP	0 1 0	
	special length	**FEP**	**9 9 9**	
Special version				
	standard		0 0 0	
	cable protection with stainless steel corrugated pipe with pipe length in m		1 0 3 - 9 9 9	consult
	customer		9 9 9	consult

[1] not in combination with SIL

[2] cable with integrated air tube for atmospheric pressure reference

Standard lengths 3 / 5 / 10 / 15 / 20 m are available from stock, special lengths are manufactured order-related, price per meter (see above).

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Subject to change without notice.

LMP 307T

Level and Temperature Transmitter

Stainless Steel Sensor

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

Nominal pressure / nominal temperature

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

from 0 ... 30 °C up to 0 ... 70 °C

others on request

Output signals

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

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

Special characteristics

- diameter 26,5 mm
- separate output signals for pressure and temperature ranges
- easy handling
- low maintenance and wiring costs

Optional versions

- 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_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120

Input temperature range				
Temperature measuring range standard	0 … 30 °C	0 … 50 °C	0 … 70 °C	others on request[1]
[1] min. temperature range: 30°C; max. temperature range: 80°C *min. temperature: -10°C; max. temperature: 70 °C*				

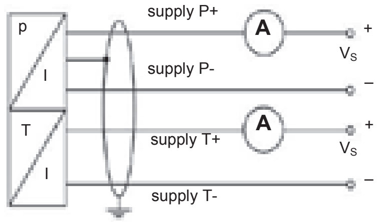
Output signal / Supply	
2-wire (pressure) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}
2-wire (temperature) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}
[2] the circuits are galvanically isolated from each other	
Performance	
Accuracy (pressure) [3]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0,4 bar: ≤ ± 0,25 % FSO
Accuracy (temperature) [4]	≤ ± 1 °C
Permissible load	R_{max} = [(V_S – V_S min) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time	< 10 ms (for output signal 2-wire (pressure))
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] Pt 100 class B; compensation time up to 1h depending on constant temperature and environmental respectively mass conditions*	

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

Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection [5]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[5] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [6]	PVC (-5 … 70 °C) grey PUR (-10 … 70 °C) black FEP[7] (-10 … 70 °C) black others on request
[6] cable with integrated air tube for atmospheric pressure reference *[7] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM 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: 1µH/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

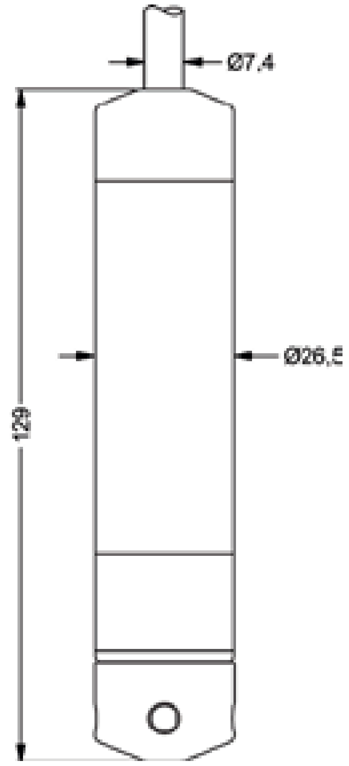
Wiring diagram

2x2-wire-system (current)



Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply P+ Supply P– Supply T+ Supply T–	wh (white) bn (brown) gy (gray) pk (pink)
Shield	gnye (green-yellow)

Dimensions (in mm)



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

			Code
Pressure			
		in bar	4 5 5
		in mH_2O	4 5 6
Input	**[mH_2O]**	**[bar]**	
	1.0	0.10	1 0 0 0
	1.6	0.16	1 6 0 0
	2.5	0.25	2 5 0 0
	4.0	0.40	4 0 0 0
	6.0	0.60	6 0 0 0
	10	1.0	1 0 0 1
	16	1.6	1 6 0 1
	25	2.5	2 5 0 1
	40	4.0	4 0 0 1
	60	6.0	6 0 0 1
	100	10	1 0 0 2
	160	16	1 6 0 2
	250	25	2 5 0 2
		customer	9 9 9 9
Input temperature		**°C**	
		0 … 30	0 0 0 x 3 0
		0 … 50	0 0 0 x 5 0
		0 … 70	0 0 0 x 7 0
		customer	9 9 9 9 9 9
Housing			
		Stainless steel 1.4404 (316L)	1
		customer	9
Diaphragm			
		Stainless steel 1.4435 (316L)	1
		customer	9
Output pressure			
		4 … 20 mA / 2-wire	1
Output temperature			
		4 … 20 mA / 2-wire	1
Seals			
		FKM	1
		customer	9
Accuracy			
	standard for $P_N \geq 0.4$ bar	0.35 %	3
	standard for $P_N < 0.4$ bar	0.5 %	5
	option 1 for $P_N \geq 0.4$ bar	0.25 %	2
		customer	9
Electrical connection			
		PVC-cable [1]	1
		PUR-cable [1]	2
		FEP-cable [1]	3
		customer	9
Cable length			
	in m		
	standard: 3 m	PVC	0 0 3
	standard: 5 m	PVC	0 0 5
	standard: 10 m	PVC	0 1 0
	standard: 15 m	PVC	0 1 5
	standard: 20 m	PVC	0 2 0
	special length	**PVC**	**9 9 9**
	standard: 3 m	PUR	0 0 3
	standard: 5 m	PUR	0 0 5
	standard: 10 m	PUR	0 1 0
	standard: 15 m	PUR	0 1 5
	standard: 20 m	PUR	0 2 0
	special length	**PUR**	**9 9 9**
	standard: 5 m	FEP	0 0 5
	standard: 10 m	FEP	0 1 0
	special length	**FEP**	**9 9 9**
Special version			
		standard	0 0 0
		customer	9 9 9

[1] cable with integrated air tube for atmospheric pressure reference

Standard lengths 3 / 5 / 10 / 15 / 20 m are available from stock, special lengths are manufactured order-related, price per meter (see above).

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_2O up to 0 ... 250 mH_2O

Output signals

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

Special characteristics

- diameter 35 mm
- cable and sensor 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$_2$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

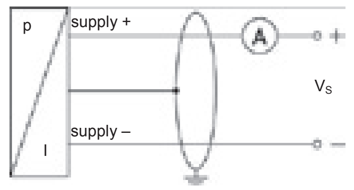
Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Performance	
Accuracy [1]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO option 2: for all nominal pressures: ≤ ± 0.1 % FSO
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\,A]\,\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time	< 10 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	

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

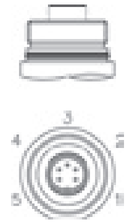
Permissible temperatures	
Permissible temperatures	medium: -20 ... 70 °C storage: -25 ... 70 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-20 … 70 °C) black FEP[4] (-20 … 70 °C) black others on request
[3] cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	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	**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_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0nF, L_i ≈ 0µH, the supply connections have an inner capacity of max. 27 nF to the housing
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 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[5] 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	94/9/EG
[5] not in combination with the accuracy 0.1%	

Wiring diagram

2-wire-system (current)



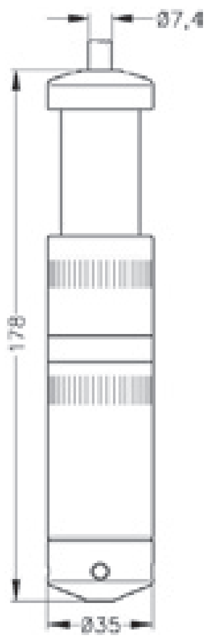
connector

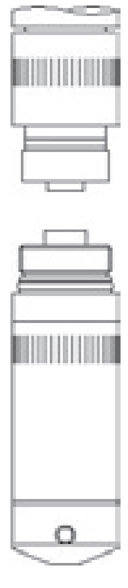


Pin configuration		
Electrical connection	Binder series 723 [6] (5-pin)	cable colours (IEC 60575)
Supply + Supply –	3 1	wh (white) bn (brown)
Shield	5	gnye (green-yellow)
[6] in separated version		

Dimensions (in mm)

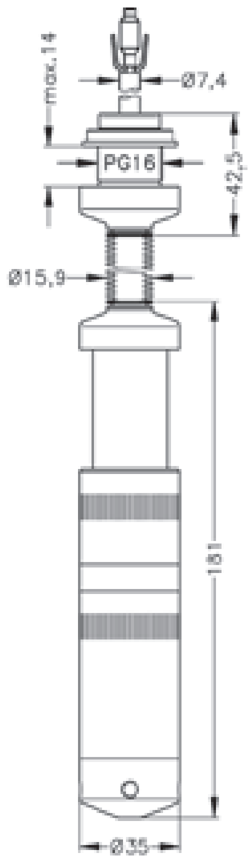
standard





separated version

option



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_2O			4 4 1	
Input	$[mH_2O]$	[bar]		
	1.0	0.10	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	250	25	2 5 0 2	
customer			9 9 9 9	consult
Housing				
Stainless steel 1.4404 (316L)			1	
customer			9	consult
Diaphragm				
Stainless steel 1.4435 (316L)			1	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
Intrinsic safety 4 … 20 mA / 2-wire			E	
SIL2 4 … 20 mA / 2-wire			1S	
SIL2 with Intrinsic safety 4 … 20 mA / 2-wire			ES	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
customer			9	consult
Electrical connection				
PVC-cable [1]			1	
PUR-cable [1]			2	
FEP-cable [1]			3	
customer			9	consult
Accuracy				
standard for $P_N \geq 0.4$ bar	0.35 %		3	
standard for $P_N < 0.4$ bar	0.5 %		5	
option 1 for $P_N \geq 0.4$ bar	0.25 %		2	
option 2	0.1 % [2]		1	
customer			9	consult
Cable length				
in m			9 9 9	
Version				
standard			0 0 0	
prepared for mounting with stainless steel pipe [3]			1 0 6	consult
cable protection with stainless steel corrugated pipe with pipe length in m			1 0 3 - 9 9 9	consult
customer			9 9 9	consult

---

[1] cable with integrated air tube for atmospheric pressure reference
[2] not in combination with SIL
[3] 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_2O up to 0 ... 200 mH_2O

Output signals

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

Special characteristics

- diameter 17 mm
- suitable for hydrostatic level measurement e.g. 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

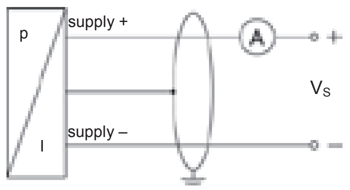
Water
level measurement at confined space conditions
ground water monitoring
depth or level measurement in wells
drinking water abstraction
level measurement in open tanks

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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}
Performance	
Accuracy	≤ ± 0.5 % FSO
Permissible load	$R_{max} = [(V_S – V_{S\,min}) / 0.02\,A]\,\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Response time	≤ 10 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (Offset and Span) / Permissible temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K in compensated range -25 ... 70 °C
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic protection	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-10 … 70 °C) black FEP[4] (-10 … 70 °C) black
[3] shielded cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM
Diaphragm	ceramics Al_2O_3 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

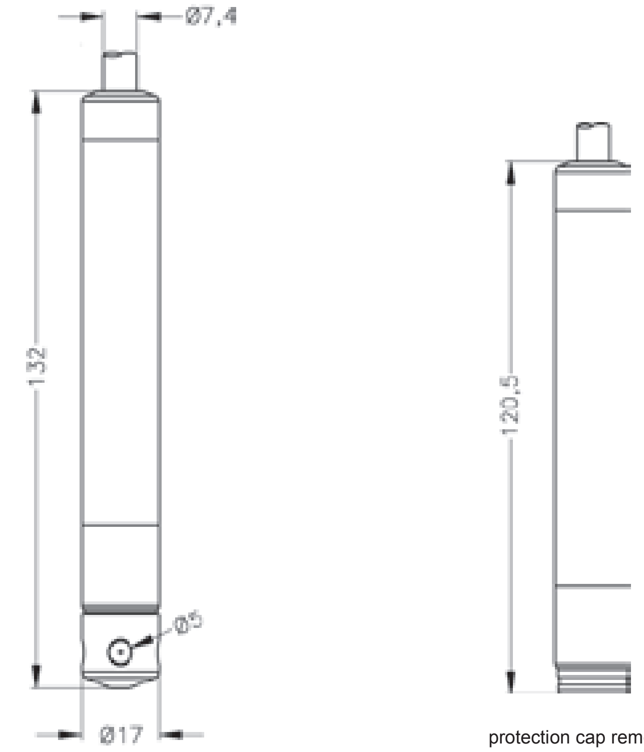
Wiring diagram

2-wire-system (current)

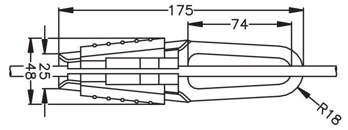


Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply + Supply –	wh (white) bn (brown)
Shield	gnye (green-yellow)

Dimensions (in mm)



Accessories

Terminal clamp		
Technical Data		
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm	
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)	
Weight	approx. 160 g	

Ordering type	**Ordering code**
Terminal clamp, steel, zinc plated	Z100528
Terminal clamp, stainless steel 1.4301 (304)	Z100527

LMK 306 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure				
	in bar		3 7 0	
	in mH$_2$O		3 7 1	
Input	**[mH$_2$O]**	**[bar]**		
	6	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	200	20	2 0 0 2	
	customer		9 9 9 9	consult
Housing				
	Stainless steel 1.4404 (316L)		1	
	customer		9	consult
Diaphragm				
	Ceramics Al$_2$O$_3$ 96%		2	
	customer		9	consult
Output				
	4 … 20 mA / 2-wire		1	
	customer		9	consult
Seals				
	FKM		1	
	customer		9	consult
Accuracy				
	0.5 %		5	
	customer		9	consult
Electrical connection				
	PVC-cable [1]		1	
	PUR-cable [1]		2	
	FEP-cable [1]		3	
	customer		9	consult
Cable length				
	in m		9 9 9	
Special version				
	standard		0 0 0	
	customer		9 9 9	consult

[1] cable with integrated air tube for atmospheric pressure reference

LMK 307

Stainless Steel Probe

Ceramic Sensor

accuracy according
to IEC 60770: 0.5 % FSO

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 matierals 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

Nominal pressure

from 0 ... 4 mH$_2$O up to 0 ... 250 mH$_2$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

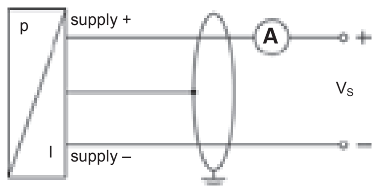
- IS-protection
- SIL 2 (Safety Integrity Level) according to IEC 61508 / IEC 61511
- different kinds of cables and elastomeres
- customer specific versions e. g. special pressure ranges

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

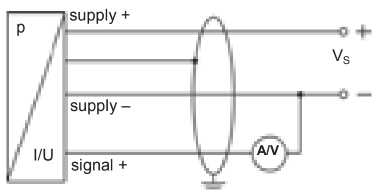
Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}
Performance	
Accuracy	≤ ± 0.5 % FSO
Permissible load	current 2-wire: R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω current 3-wire: R_{max} = 500 Ω voltage 3-wire: R_{min} = 10 k Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Response time	≤ 10 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.2 % FSO / 10 K in compensated range -25 … 70 °C
Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic protection	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material[3]	PVC (-5 … 70 °C) grey PUR (-10 … 70 °C) black FEP[4] (-10 … 70 °C) black
[3] shielded cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM
Diaphragm	ceramics Al_2O_3 96 %
Protection cap	POM
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approvals DX19-LMK 307	**IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X** zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0nF, L_i ≈ 0 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1: -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[5] 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	94/9/EG
[5] only for 4...20mA / 2-wire	

Wiring diagrams

2-wire-system (current)



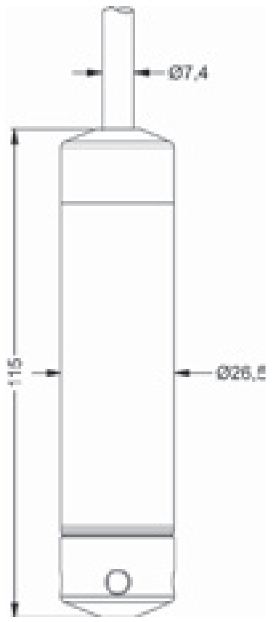
3-wire-system (current / voltage)

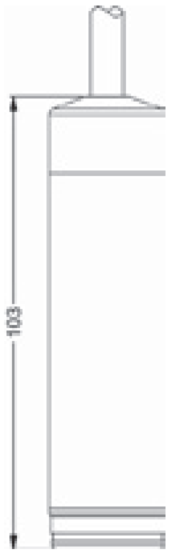


Pin configuration

Electrical connection	cable colours (IEC 60575)
Supply + Supply – Signal + (only 3-wire)	wh (white) bn (brown) gn (green)
Shield	gnye (green-yellow)

Dimensions (in mm)





protection cap removable

LMK 307

Ordering code

LMK 307 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure			
in bar		3 8 0	
in mH_2O		3 8 1	
Input [mH_2O]	**[bar]**		
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			
Ceramics Al_2O_3 96%		2	
customer		9	consult
Output			
4 … 20 mA / 2-wire		1	
0 … 20 mA / 3-wire		2	
0 … 10 V / 3-wire		3	
Intrinsic safety 4 … 20 mA / 2-wire		E	
SIL2 4 … 20 mA / 2-wire		1S	
SIL2 with Intrinsic safety 4 … 20 mA / 2-wire		ES	
customer		9	consult
Seals			
FKM		1	
EPDM		3	
customer		9	consult
Accuracy			
0.5 %		5	
customer		9	consult
Electrical connection			
PVC-cable [1]		1	
PUR-cable [1]		2	
FEP-cable [1]		3	
customer		9	consult
Cable length			
in m			
standard: 3 m	PVC	0 0 3	
standard: 5 m	PVC	0 0 5	
standard: 10 m	PVC	0 1 0	
standard: 15 m	PVC	0 1 5	
standard: 20 m	PVC	0 2 0	
special length	**PVC**	**9 9 9**	
standard: 3 m	PUR	0 0 3	
standard: 5 m	PUR	0 0 5	
standard: 10 m	PUR	0 1 0	
standard: 15 m	PUR	0 1 5	
standard: 20 m	PUR	0 2 0	
special length	**PUR**	**9 9 9**	
standard: 5 m	FEP	0 0 5	
standard: 10 m	FEP	0 1 0	
special length	**FEP**	**9 9 9**	
Special version			
standard		0 0 0	
customer		9 9 9	consult

---

[1] cable with integrated air tube for atmospheric pressure reference

Standard lengths 3 / 5 / 10 / 15 / 20 m are available from stock, special lengths are manufactured order-related, price per meter (see above).

LMK 307T

Level and Temperature Transmitter

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure / nominal temperature

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

from 0 ... 30 °C up to 0 ... 70 °C

others on request

Output signals

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

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

Special characteristics

- diameter 26,5 mm
- separate output signals
  for pressure and temperature ranges
- good lang term stability
- easy handling
- low maintenance and wiring costs

Optional versions

- different kinds of cables
- different kinds of seal materials
- customer specific versions

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

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

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

Preferred areas of use are

Water
e.g. drinking water system, RÜBs
ground water monitoring
storm water systems

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

Fuel / Oil
fuel storage
tank farm, biogas plants

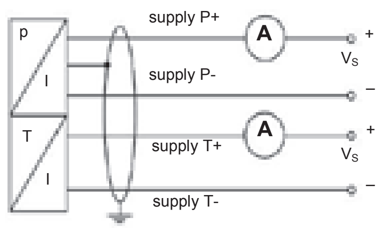
Input pressure range										
Nominal pressure gauge [bar]	0,4	0,6	1	1,6	2,5	4	6	10	16	25
Level [mH_2O]	4	6	10	16	25	40	60	100	160	250
Overpressure [bar]	1	2	2	4	4	10	10	20	40	40
Burst pressure ≥ [bar]	2	4	4	5	5	12	12	25	50	50

Input temperature range				
Temperature measuring range standard	0 … 30 °C	0 … 50 °C	0 … 70 °C	others on request[1]
[1] min. temperature range: 30°C; max. temperature range: 80°C *min. temperature: -10°C; max. temperature: 70 °C*				

Output signal / Supply	
2-wire (pressure) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}
2-wire (temperature) [2]	4 ... 20 mA / V_S = 10 ... 30 V_{DC}
[2] the circuits are galvanically isolated from each other	
Performance	
Accuracy (pressure) [3]	≤ ± 0.5 % FSO
Accuracy (temperature) [4]	≤ ± 1 °C
Permissible load	R_{max} = [(V_S – V_S min) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.3 % FSO / year at reference conditions
Response time	< 10 ms (for output signal 2-wire (pressure))
[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability) *[4] Pt 100 class B; compensation time up to 1h depending on constant temperature and environmental respectively mass conditions*	
Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.2 % FSO / 10 K in compensated range -25 … 70 °C
Permissible temperatures	
Permissible temperatures	medium: -10 ... 70 °C storage: -25 ... 70 °C
Electrical protection [5]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[5] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [6]	PVC (-5 … 70 °C) grey PUR (-10 … 70 °C) black FEP[7] (-10 … 70 °C) black others on request
[6] cable with integrated air tube for atmospheric pressure reference *[7] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM others on request
Diaphragm	ceramics Al_2O_3 96%
Protection cap	POM
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: 1μH/m
Current consumption	max. 25 mA
Weight	approx. 250 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

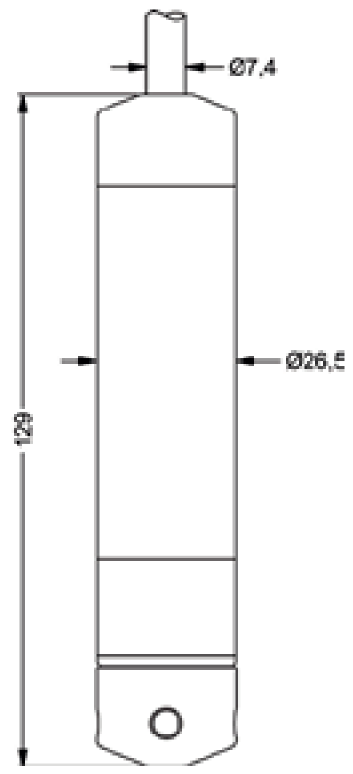
Wiring diagram

2x2-wire-system (current)



Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply P+ Supply P– Supply T+ Supply T–	wh (white) bn (brown) gy (gray) pk (pink)
Shield	gnye (green-yellow)

Dimensions (in mm)



LMK 307T		☐☐☐-☐☐☐☐-☐☐☐☐☐☐-☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐
Pressure		
in bar		3 8 A
in mH_2O		3 8 B
Input	**[mH_2O]**	**[bar]**
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
Input temperature	**°C**	
0 … 30		0 0 0 x 3 0
0 … 50		0 0 0 x 5 0
0 … 70		0 0 0 x 7 0
customer		9 9 9 9 9 9
Housing		
Stainless steel 1.4404 (316L)		1
customer		9
Diaphragm		
Ceramic Al_2O_3 96 %		2
customer		9
Output pressure		
4 … 20 mA / 2-wire		1
Output temperature		
4 … 20 mA / 2-wire		1
Seals		
FKM		1
EPDM		3
customer		9
Accuracy		
0.5 %		5
customer		9
Electrical connection		
PVC-cable [1]		1
PUR-cable [1]		2
FEP-cable [1]		3
customer		9
Cable length		
in m		
standard: 3 m	PVC	0 0 3
standard: 5 m	PVC	0 0 5
standard: 10 m	PVC	0 1 0
standard: 15 m	PVC	0 1 5
standard: 20 m	PVC	0 2 0
special length	**PVC**	**9 9 9**
standard: 3 m	PUR	0 0 3
standard: 5 m	PUR	0 0 5
standard: 10 m	PUR	0 1 0
standard: 15 m	PUR	0 1 5
standard: 20 m	PUR	0 2 0
special length	**PUR**	**9 9 9**
standard: 5 m	FEP	0 0 5
standard: 10 m	FEP	0 1 0
special length	**FEP**	**9 9 9**
Special version		
standard		0 0 0
customer		9 9 9

[1] cable with integrated air tube for atmospheric pressure reference

Standard lengths 3 / 5 / 10 / 15 / 20 m are available from stock, special lengths are manufactured order-related, price per meter (see above).

LMK 382

Stainless Steel Probe

Ceramic Sensor

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

Nominal pressure

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

Output signals

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

Special characteristics

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

Optional versions

- IS-protection zone 0
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al_2O_3
- different kinds of cables
- different kinds of elastomers

The stainless steel probe LMK 382 has been designed for continous 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

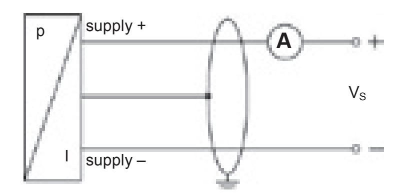
Fuel / Oil
level monitoring in open tanks with low filling heights
fuel storage
tank farms / biogas plants

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$_2$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

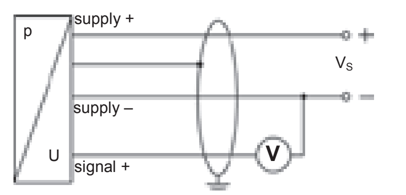
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	R_{max} = [(V_S – $V_{S\ min}$) / 0.02 A] Ω	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Turn-on time	700 msec	
Mean response time	< 200 msec	measuring rate 5/sec
Max. response time	380 msec	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (Offset and Span)		
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 [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection (only for 4 … 20 mA / 2-wire)		
Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-25 … 70 °C) black FEP[4] (-25 … 70°C) black TPE (-25 … 125 °C) blue	
[3] shielded cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*		
Materials (media wetted)		
Housing	stainless steel 1.4404 (316 L)	
Seals	FKM FFKM EPDM others on request	
Diaphragm	standard: ceramics Al_2O_3 96 % Option: ceramics Al_2O_3 99.9 %	
Nose cone	POM	
Explosion protection		
Approval DX14-LMK 382	**IBExU05ATEX1070 X** zone 0 [5]: II 1G Ex ia IIB T4 Ga zone 20: II 1D Ex ia IIIC T85 °C Da	
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 27 nF, L_i = 5 μH	
Permissible media temperature	in zone 0: -10 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -10 ... 70 °C	
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1μH/m	
[5] 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)

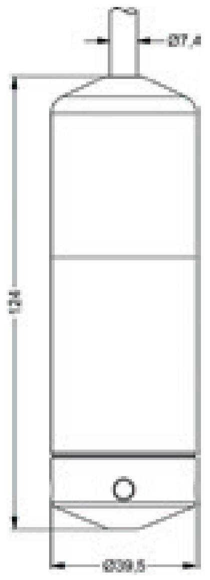


3-wire-system (voltage)

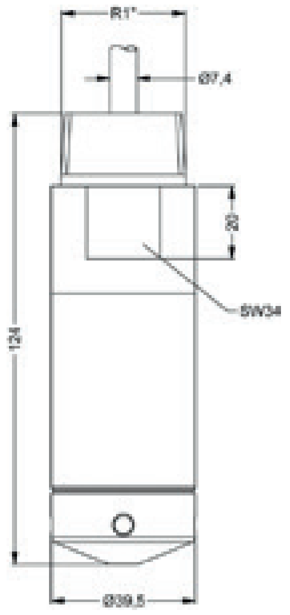


Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply +	wh (white)
Supply –	bn (brown)
Signal + (only for 3-wire)	gn (green)
Shield	gnye (green-yellow)

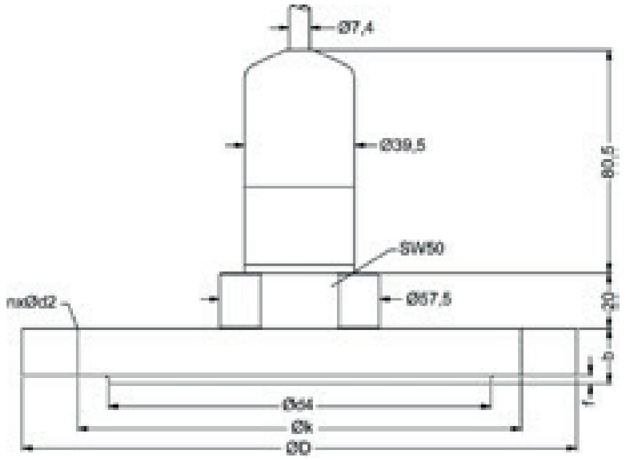
Dimensions (in mm)



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 382			□□□-□□□□-□-□-□-□-□-□-□□□-□□□	
Pressure				
in bar			565	
in mH_2O			566	
Input	**[mH_2O]**	**[bar]**		
	0.40	0.04	0400	
	0.60	0.06	0600	
	1.0	0.10	1000	
	1.6	0.16	1600	
	2.5	0.25	2500	
	4.0	0.40	4000	
	6.0	0.60	6000	
	10	1.0	1001	
	16	1.6	1601	
	25	2.5	2501	
	40	4.0	4001	
	60	6.0	6001	
	100	10	1002	
	160	16	1602	
	200	20	2002	
customer			9999	consult
Housing				
Stainless steel 1.4404 (316L)			1	
customer			9	consult
Diaphragm				
Ceramics Al_2O_3 96%			2	
Ceramics Al_2O_3 99.9%			C	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
0 … 10 V / 3-wire			3	
Intrinsic safety 4 … 20 mA / 2-wire			E	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
FFKM			7	
customer			9	consult
Electrical connection				
PVC-cable [1]			1	
PUR-cable [1]			2	
FEP-cable [1]			3	
TPE-cable			4	
customer			9	consult
Accuracy				
standard	0.35 %		3	
option	0.25 %		2	
customer			9	consult
Cable length				
in m				
standard: 3 m	PVC		003	
standard: 5 m	PVC		005	
standard: 10 m	PVC		010	
standard: 15 m	PVC		015	
standard: 20 m	PVC		020	
special length	**PVC**		**999**	
standard: 3 m	PUR		003	
standard: 5 m	PUR		005	
standard: 10 m	PUR		010	
standard: 15 m	PUR		015	
standard: 20 m	PUR		020	
special length	**PUR**		**999**	
standard: 5 m	FEP		005	
standard: 10 m	FEP		010	
special length	**FEP**		**999**	
special length	**TPE**		**999**	
Special version				
standard			000	
prepared for mounting [2] with stainless steel pipe			502	
flange version			510	
customer			999	consult

---

[1] cable with integrated air tube for atmospheric pressure reference

[2] stainless steel pipe is not part of the supply

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

LMK 387

Stainless Steel Probe

Ceramic Sensor

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

Nominal pressure

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

Output signals

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

Special characteristics

- diameter 22 mm
- diaphragm ceramics 96% Al_2O_3
- good long-term stability
- especially for waste water,

Optional versions

- diaphragm ceramics 99,9% Al_2O_3
- IS-version
  Ex ia = intrinsically safe for gases and dust
- mounting with stainless steel tube
- different kinds of cable
- different kinds of elastomer

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

Compared to the level probe LMK 382 the outside-diameter is only 22mm, which allows an easy installation and backfitting in 1“ tubes or in cramped fitting conditions. An IS-version is also available.

Preferred areas of use

Water
Groundwater and level monitoring

Sewage
waste water treatment
water recycling

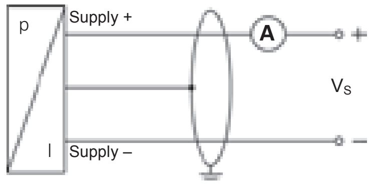
Fuel and oil
Tank battery
Biogas plants

Input pressure range											
Nominal pressure gauge [bar]	0,1	0,16	0,25	0,4	0,6	1	1,6	2,5	4	6	10
Level [mH$_2$O]	1	1,6	2,5	4	6	10	16	25	40	60	100
Overpressure [bar]	3	4	5	5	7	7	12	20	20	20	20
Berst pressure ≥ [bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum [bar]	-0.2	-0.3	-0.5				-1				

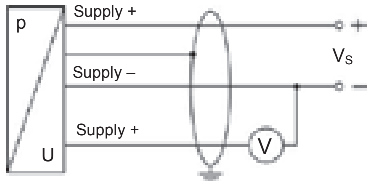
Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 12 ... 36 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}
Option	3-wire: 0 … 10 V / V_S = 14 ... 36 V_{DC}
Performance	
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO others on request
Permissible load	2-wire: R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year
Turn-on time	450 msec
Mean response time	≤ 70 msec
Measuring rate	80 Hz
[1] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*	
Thermal effects (Offset and Span)	
Tolerance band [% FSO]	≤ 1.0% FSO in compensated range -20 ... 80 °C
Permissible temperatures	
Permissible temperatures	medium: -40 ... 85 °C electronics / environment: -40 ... 85 °C storage: -40 ... 85 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[2] *additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request*	
Electrical connection	
Cable outlet	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges absolute, the air tube is closed)
Materials (media wetted)	
Housing	standard: stainless steel 1.4404 (316 L) others on request
Cable	PVC (-5 … 70 °C) gray PUR (-25 … 70 °C) black FEP[3] (-25 … 70 °C) black TPE (-25 …125 °C) blue others on request
Seals (O-rings)	standard: FKM option: EPDM; FFKM (min. permissible temperature from -15 °C) others on request
Diaphragm	standard: ceramics Al_2O_3 96% option: ceramics Al_2O_3 99,9%
Protection cap	POM
[3] *do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
IS-protection	
Approval DX14B-LMK 387	**IBExU 15 ATEX 1066 X** zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 49,2 nF; L_i = 0 μH; the supply connections have an inner capacity of max. 100 nF opposite the enclosure
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 65 °C
Connecting cables (by factory)	cable capacity: signal line/shield as well as signal line/signal line: 160 pF/m cable inductance: signal line/shield as well as signal line/signal line: 1 μH/m
Miscellaneous	
Current consumption	max. 22 mA
Weight	approx. 180 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC
Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply +	wh (white)
Supply –	bn (brown)
signal + (only 3-wire)	gn (green)
Shield	gnye (green-yellow)

Wiring diagrams

2-wire-system (current)

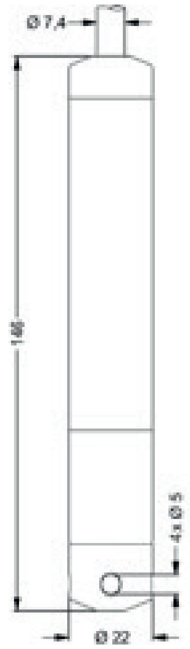


3-wire-system (voltage)



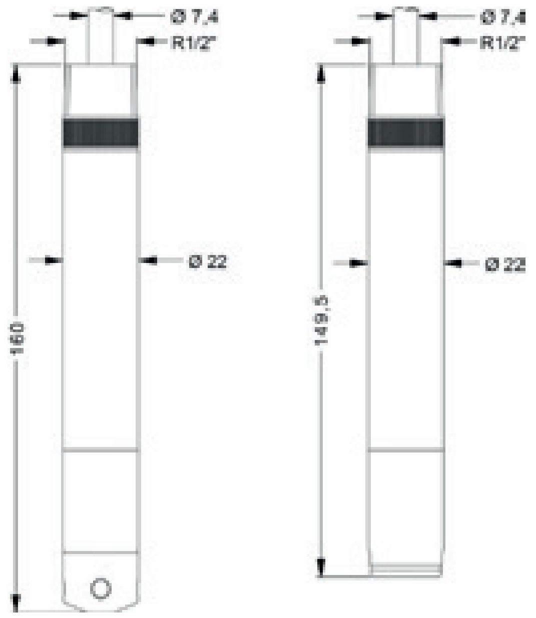
Dimensions (in mm)

standard



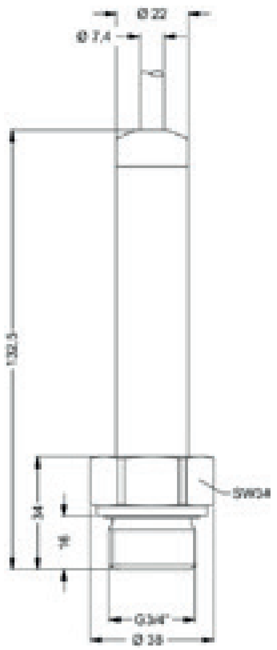
with protection cap

without protection cap



with thread R1/2“ for
mounting with stainless steel tube

option: screw-in version



G3/4“

G1/2“ open

LMK 387 □□□-□□□□-□-□-□-□-□-□-□-□□□-□□□

			Code	
Pressure				
	gauge in bar		3 6 0	
	absolute in bar		3 6 3	consult
	gauge in mH_2O		3 6 1	
Input	**[mH_2O]**	**[bar]**		
	1	0.1	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
		customer	9 9 9 9	consult
Housing				
	Stainless steel 1.4404 (316L)		1	
	customer		9	consult
Design				
	probe		1	
	screw-in version G1/2" open		A	
	screw-in version G3/4" flush		B	
Diaphragm				
	Ceramics Al_2O_3 96%		2	
	Ceramics Al_2O_3 99.9%		C	
	customer		9	consult
Output				
	4 … 20 mA / 2-wire		1	
	0 … 10 V / 3-wire		3	
	Intrinsic safety 4 … 20 mA / 2-wire		E	
	customer		9	consult
Seals				
	FKM		1	
	EPDM		3	
	FFKM [1]		7	consult
	customer		9	consult
Electrical connection				
	PVC-cable [2]		1	
	PUR-cable [2]		2	
	FEP-cable [2]		3	
	TPE-cable [2]		4	
	customer		9	consult
Accuracy				
standard	0.35 % FSO		3	
option	0.25 % FSO		2	
	customer		9	consult
Cable length				
	in m		9 9 9	
Special version				
	standard		0 0 0	
	prepared for mounting with st. steel pipe [3]		5 0 2	
	customer		9 9 9	consult

min. permissible temperature from -15 °C
cable with integrated air tube for atmospheric pressure reference
stainless steel pipe is not part of the supply

LMK 458

Probe For Marine And Offshore

Ceramic Sensor

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

Nominal pressure

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

Output signals

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

Special characteristics

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

Optional versions

- diaphragm Al_2O_3 99.9 %
- different housing materials (stainless steel, CuNiFe)
- IS-version 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 certificated 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

Pressure ranges

Nominal pressure [1] [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Permissible vacuum [bar]	-0.2		-0.3		-0.5				-1						

[1] available in gauge and absolute; nominal pressure ranges absolute from 1 bar

Output signal / Supply

Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC} $V_{S\ rated}$ = 24 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC} $V_{S\ rated}$ = 24 V_{DC}

Performance

Accuracy [2]	standard: ≤ ± 0.25 % FSO	option: for $P_N \geq 0.6$ bar [3]: ≤ ± 0.1 % FSO
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Influence effects	supply: 0.05 % FSO / 10 V	permissible load: 0.05 % FSO / kΩ
Turn-on time	700 msec	
Mean response time	< 200 msec	mean measuring rate 5/sec
Max. response time	380 msec	

[2] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[3] Under the influence of disturbance burst according to EN 61000-4-4 (2004) +2 kV accuracy decreased to ≤ ± 0.25 % FSO.

Thermal effects / Permissible temperatures

Thermal error	≤ ± 0.1 % FSO / 10 K in compensated range -20 … 80 °C
Permissible temperatures	medium / electronics / environment: -25 ... 125 °C storage: -40 ... 125 °C

Electrical protection [4]

Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to - EN 61326 - Germanischer Lloyd (GL) - Det Norske Veritas (DNV)

[4] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available

Mechanical stability

Vibration	4 g (according to GL: curve 2 / according to DNV: Class B / basis: DIN EN 60068-2-6)

Electrical connection

Cable outlet	shielded cable with integrated air tube for atmospheric reference (for nominal pressure ranges sealed gauge and absolute, the air tube is plugged)

Materials

Housing	standard: stainless steel 1.4404 (316L) option: CuNi10Fe1Mn (resistant against sea water) others on request
Seals (media wetted)	standard: FKM options: EPDM, FFKM (min. permissible temperature from -15 °C) others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %
Cable sheath	TPE -U (flame-resistant, halogen free, increased resistance against oil and gasoline, resistant against salt, sea water, heavy oil)

Miscellaneous

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

Option Pt 100 temperature element [5]

Temperature range	-25 ... 125°C
Connection temperature element	3-wire
Resistance	100 Ω at 0°C
Temperature coefficient	3850 ppm/K
Supply I_S	0.3 ... 1.0 mA $_{DC}$

Category of the environment

Lloyd´s Register (LR)	EMV1, EMV2, EMV3, EMV4	number of certificate: 13/20055
Germanischer Lloyd (GL)	D, EMC 1	number of certificate: 60 481 - 09 HH
Det Norske Veritas (DNV)	temperature: D humidity: B electromagnetic compatibility: B	vibration: B number of certificate: A-12144

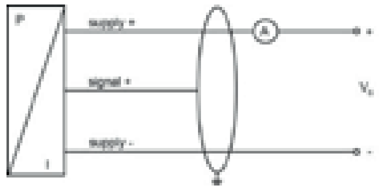
IS-protection

Approval DX14A-LMK 458	**IBExU 07 ATEX 1180 X** zone 0: II 1G Ex ia IIB T4 Ga
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 105 nF; L_i = 5 µH; the supply connections have an inner capacity of max. 140 nF opposite the enclosure
Permissible temp.for environment	in zone 0 [6]: -20 ... 60°C with p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 70°C
Connecting cables (by factory)	cable capacity: signal line/shield as well as signal line/signal line: 160 pF/m cable inductance: signal line/shield as well as signal line/signal line: 1 µH/m

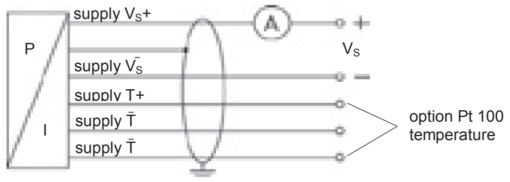
[5] only for 4...20mA, cable lenght max. 5m
[6] for optional stainless steel pipe the following designation is valid: "II 1 G Ex ia IIC T4" (zone 0)

Wiring diagrams

2-wire-system (current)



2-wire-system (current) with Pt 100



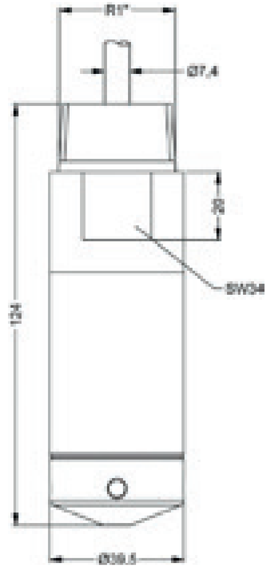
Pin configuration

Electrical connection	cable colours (IEC 60575)
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	gnye (green-yellow)

Dimensions (in mm)

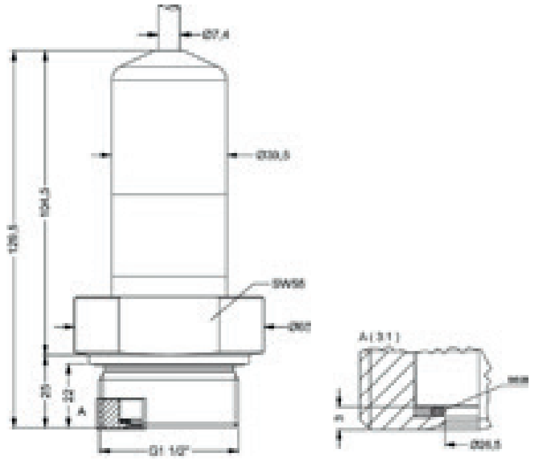
probe versions

stainless steel / CuNiFe



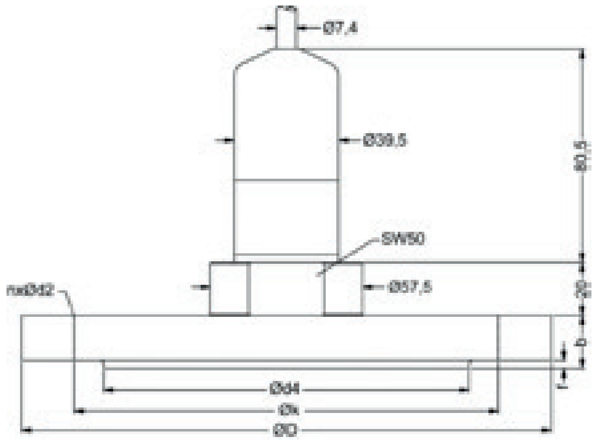
prepared for mounting
with stainless steel pipe
stainless steel / CuNiFe

screw-in version



stainless steel / CuNiFe

flange version



stainless steel / CuNiFe

LMK 458

□□□-□□□□-□-□-□-□-□-□-□-□□□-□□□

Pressure				
in bar, gauge			7 6 5	
in bar, absolute [1]			7 6 8	
in mH_2O			7 6 6	
Input	**[mH_2O]**	**[bar]**		
	0.40	0.04	0 4 0 0	
	0.60	0.06	0 6 0 0	
	1.0	0.10	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	200	20	2 0 0 2	
customer			9 9 9 9	consult
Housing				
Stainless steel 1.4404 (316L)			1	
Copper-Nickel-alloy (CuNi10Fe1Mn)			K	
customer			9	consult
Design				
Probe			1	
Flange version [2]			3	
Screw-in version			5	
Diaphragm				
Ceramics Al_2O_3 96%			2	
Ceramics Al_2O_3 99.9%			C	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
Intrinsic safety 4 … 20 mA / 2-wire			E	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
FFKM [3]			7	
customer			9	consult
Electrical connection				
TPE-U-cable [4]			4	
customer			9	consult
Accuracy				
standard	0.25 %		2	
option für P_N ≥0.6 bar:	0.1 %		1	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
with temperature sensor Pt 100			0 1 3	
prepared for mounting with st. steel pipe [5]			5 0 2	
customer			9 9 9	consult

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

LMK 358

Separable Stainless Steel Probe

Ceramic Sensor

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

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

Nominal pressure

from 0 ... 40 cmH_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

- cable 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_2O_3
- different kinds of cable
- different kinds of elastomers

Input pressure range

Nominal pressure gauge [bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level [mH_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35

Output signal / Supply

Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy [1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Turn-on time	700 msec	
Mean response time	< 200 msec	measuring rate 5/sec
Max. response time	380 msec	

[1] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Thermal effects (Offset and Span)

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 [2]

Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

[2] *additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request*

Electrical connection

Cable with sheath material [3]	PVC (-5 … 70 °C) grey PUR (-25 … 70 °C) black FEP[4] (-25 … 70 °C) black TPE (-25 … 125 °C) blue

[3] *shielded cable with integrated air tube for atmospheric pressure reference*

[4] *do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*

Materials (media wetted)

Housing	stainless steel 1.4404 (316L)
Seals	FKM EPDM others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %
Nose cone	POM

Explosion protection (only for 4 ... 20 mA / 2-wire)

Approval DX14-LMK 358	**IBExU05ATEX1070 X** Zone 0 [5]: II 1G Ex ia IIB T4 Ga Zone 20: II 1D Ex ia IIIC T85 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 27 nF, L_i = 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

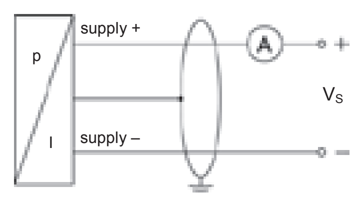
[5] *for optional stainless steel pipe following designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)*

Miscellaneous

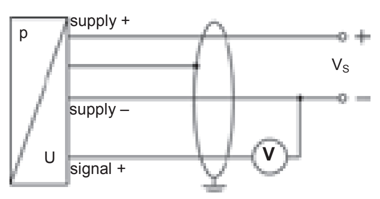
Current consumption	max. 21 mA
Weight	approx. 650 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

Wiring diagram

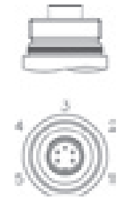
2-wire-system (current)



3-wire-system (voltage)



connector



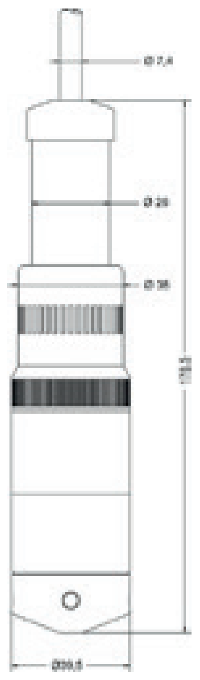
Pin configuration

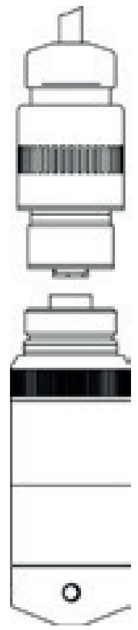
Electrical connection	Binder series 723 [6] (5-pin)		cable colours (IEC 60575)
	2 - wire	3 - wire	
Supply +	3	3	wh (white)
Supply –	1	4	bn (brown)
Signal + (only for 3-wire)	-	1	gn (green)
Shield	5	5	gnye (green-yellow)

[6] *in separated version*

Dimensions (in mm)

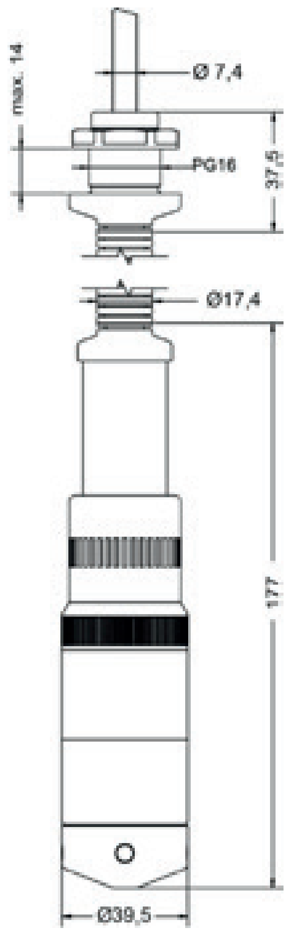
standard:





separated version

optional:



with
corrugated pipe

LMK 358

Ordering code

LMK 358 □□□-□□□□-□-□-□-□-□-□-□□□-□□□-□□□

Pressure				
in bar			4 4 5	
in mH$_2$O			4 4 6	
Input	**[mH$_2$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				
Stainless steel 1.4404 (316L)			1	
customer			9	consult
Diaphragm				
Ceramics Al$_2$O$_3$ 96%			2	
Ceramics Al$_2$O$_3$ 99.9%			C	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
0 … 10 V / 3-wire			3	
Intrinsic safety 4 … 20 mA / 2-wire			E	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
customer			9	consult
Electrical connection				
PVC-cable [1]			1	
PUR-cable [1]			2	
FEP-cable [1]			3	
TPE-cable [1]			4	
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 [2] with stainless steel pipe			1 0 6	consult
cable protection with stainless steel corrugated pipe with pipe length in m			1 0 3 - 9 9 9	consult
customer			9 9 9	consult

---

[1] cable with integrated air tube for atmospheric pressure reference

[2] stainless steel pipe is not part of the supply

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$_2$O up to 0 ... 100 mH$_2$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 assembl 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

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

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}
Performance	
Accuracy	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % 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: $R_{min} = 10\ k\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time	< 10 msec

[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)			
Nominal pressure P_N	[bar]	< 0.40	≥ 0.40
Tolerance band	[% FSO]	≤ ± 1	≤ ± 0.75
in compensated range	[°C]	0 ... 50	

Permissible temperatures	
Permissible temperatures	medium: 0 ... 50 °C storage: -10 ... 50 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection	
Cable with sheath material [3]	PVC (0 … 50 °C) grey PUR (0 … 50 °C) black FEP[4] (0 … 50 °C) black
Cable protection	standard: without cable protection optional: prepared for mounting of a PVC pipe with diameter 25 mm

[3] cable with integrated air tube for atmospheric pressure reference

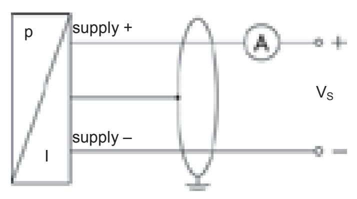
[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected

Materials (media wetted)	
Housing	PVC grey
Seals	FKM EPDM
Diaphragm	stainless steel 1.4435 (316L)
Protection cap	POM
Miscellaneous	
Option SIL[5] 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: 1µH/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

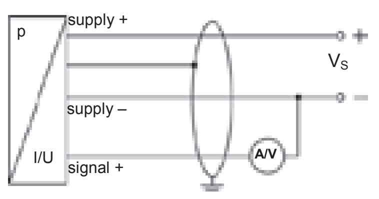
[5] only for 4...20mA / 2-wire

Wiring diagrams

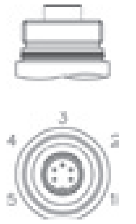
2-wire-system (current)



3-wire-system (current / voltage)



connector

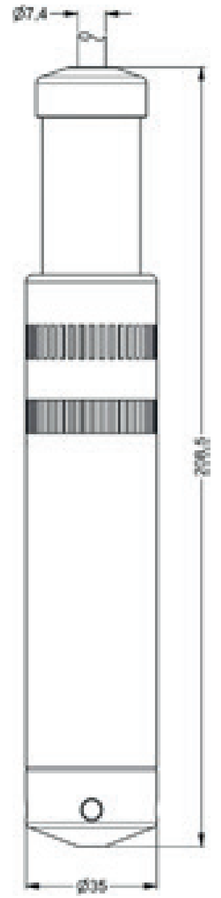


Pin configuration		
Electrical connection	Binder serie 723 [6] (5-pin)	cable colours (IEC 60575)
Supply +	3	wh (white)
Supply – (only 2-wire)	1	bn (brown)
Supply – (only 3-wire)	4	bn (brown)
Signal + (only 3-wire)	1	gn (green)
Shield	5	gnye (green-yellow)

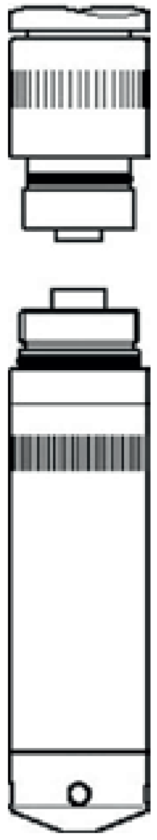
[6] in separated version

Dimensions (in mm)

standard

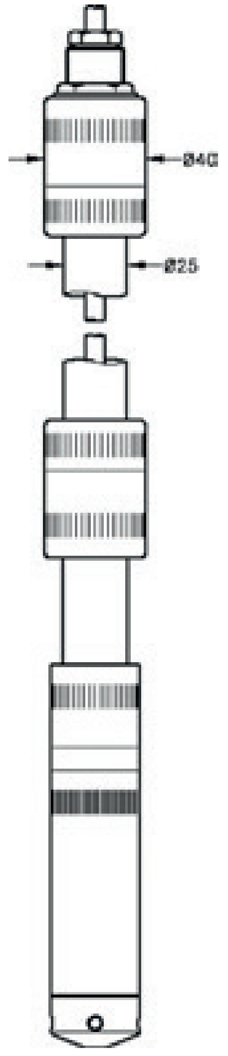


standard version
without cable protection



separate version

option



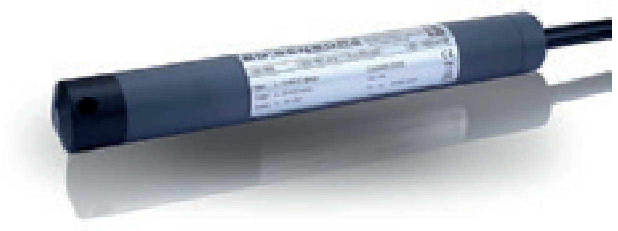
cable protection with PVC pipe

LMP 808 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

Pressure				
		in bar	4 1 0	
		in mH_2O	4 1 1	
Input	**[mH_2O]**	**[bar]**		
	1.0	0.10	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
		customer	9 9 9 9	consult
Housing				
		PVC	A	
		customer	9	consult
Diaphragm				
		Stainless steel 1.4435 (316L)	1	
		customer	9	consult
Output				
		4 … 20 mA / 2-wire	1	
		0 … 20 mA / 3-wire	2	
		0 … 10 V / 3-wire	3	
		SIL2 4 … 20 mA / 2-wire	1S	
		customer	9	consult
Seals				
		FKM	1	
		EPDM	3	
		customer	9	consult
Electrical connection				
		PVC-cable [1]	1	
		PUR-cable [1]	2	
		FEP-cable [1]	3	
		customer	9	consult
Accuracy				
standard for $P_N \geq 0.4$ bar		0.35 %	3	
standard for $P_N < 0.4$ bar		0.5 %	5	
option 1 for $P_N \geq 0.4$ bar		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 [2]	1 0 6	
		customer	9 9 9	consult

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

LMK 806



Plastic Probe for Aggressive Media

Ceramic Sensor

accuracy according to
IEC 60770: 0.5 % FSO

Nominal pressure

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

Output signals

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

Special characteristics

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

Optional versions

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

The LMK 806 with ceramic sensor and diameter from only 21 mm has been especially designed for the continuous level measurement at confined space conditions. Permissible media are waste water 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

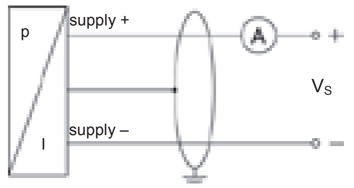
Aggressive media
level measurement in most of
acids and lyes

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

Output signal / Supply	
2-wire	4 ... 20 mA / V_S = 12 ... 32 V_{DC}
Performance	
Accuracy[1]	≤ ± 0.5 % FSO
Permissible load	R_{max} = [(V_S – $V_{S\ min}$) / 0.02 A] Ω
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Response time	≤ 10 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (Offset and Span) / Permissible temperatures	
Thermal error	≤ ± 0.4 % FSO / 10 K in compensated range -25 ... 70 °C
Permissible temperatures	medium: -10 ... 50 °C storage: -25 ... 50 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic protection	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [3]	PVC (-5 … 50 °C) grey PUR (-10 … 50 °C) black FEP[4] (-10 … 50 °C) black
[3] shielded cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	PVC
Seals	FKM
Diaphragm	ceramics Al_2O_3 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

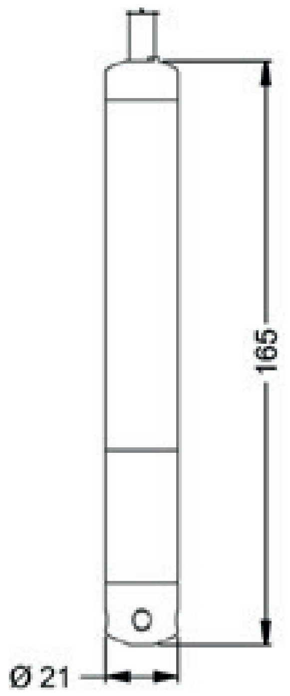
Wiring diagram

2-wire-system (current)



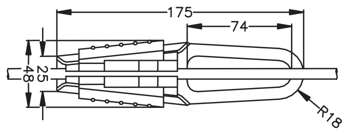
Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply +	wh (white)
Supply –	bn (brown)
Shield	gnye (green-yellow)

Dimensions (in mm)



Accessories

Terminal clamp		
Technical Data		
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm	
Material	standard: steel, zinc plated optionally: stainless steel 1.4301 (304)	
Weight	approx. 160 g	



Ordering type	Ordering code
Terminal clamp, steel, zinc plated	Z100528
Terminal clamp, stainless steel 1.4301 (304)	Z100527

LMK 806 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

Pressure				
		in bar	3 7 5	
		in mH_2O	3 7 6	
Input	[mH_2O]	[bar]		
	6	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	200	20	2 0 0 2	
		customer	9 9 9 9	consult
Housing				
		PVC	A	
		customer	9	consult
Diaphragm				
		Ceramics Al_2O_3 96%	2	
		customer	9	consult
Output				
		4 … 20 mA / 2-wire	1	
		customer	9	consult
Seals				
		FKM	1	
		customer	9	consult
Accuracy				
		0.5 %	5	
		customer	9	consult
Electrical connection				
		PVC-cable [1]	1	
		PUR-cable [1]	2	
		FEP-cable [1]	3	
		customer	9	consult
Cable length				
		in m	9 9 9	
Special version				
		standard	0 0 0	
		customer	9 9 9	consult

---

[1] cable with integrated air tube for atmospheric pressure reference

LMK 807

Plastic Probe for Aggressive Media

Ceramic Sensor

accuracy according to
IEC 60770: 0.5 % FSO

Nominal pressure

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

Output signals

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

Special characteristics

- diameter 35 mm
- 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 continous 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

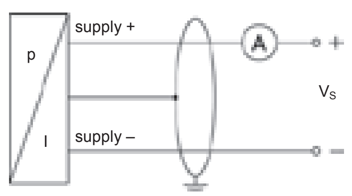
Aggressive media
level measurement in most of acids and lyes

Input pressure range									
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10
Level	$[mH_2O]$	4	6	10	16	25	40	60	100
Overpressure	[bar]	1	2	2	4	4	10	10	20
Burst pressure ≥	[bar]	2	4	4	5	5	12	12	25

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Performance	
Accuracy [1]	≤ ± 0.5 % FSO
Permissible load	$R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time	< 10 msec
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)	
Thermal effects (Offset and Span)	
Thermal error	≤ ± 0.2 % FSO / 10 K in compensated range -25 ... 70 °C
Permissible temperatures	
Permissible temperatures	medium: 0 ... 50 °C storage: -10 ... 50 °C
Electrical protection [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request	
Electrical connection	
Cable with sheath material [3]	PVC (0 … 50 °C) grey PUR (0 … 50 °C) black FEP[4] (0 … 50 °C) black
[3] cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*	
Materials (media wetted)	
Housing	PVC grey
Seals	FKM / EPDM / FFKM
Diaphragm	ceramics Al_2O_3 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: 1µH/m
Current consumption	max. 25 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2004/108/EC

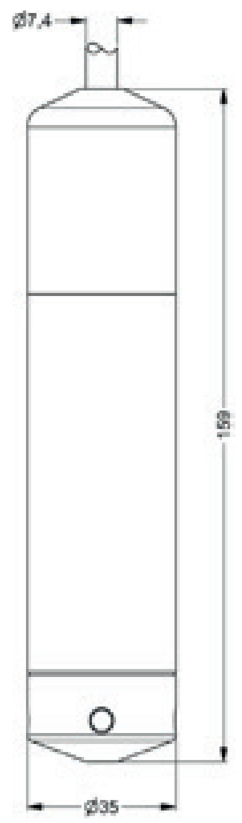
Wiring diagram

2-wire-system (current)



Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply + Supply –	wh (white) bn (brown)
Shield	gnye (green-yellow)

Dimensions (in mm)



LMK 807 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

	[mH$_2$O]	[bar]	Code	
Pressure				
in bar			3 9 0	
in mH$_2$O			3 9 1	
Input	**[mH$_2$O]**	**[bar]**		
	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$_2$O$_3$ 96%			2	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
SIL2 4 … 20 mA / 2-wire			1S	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
FFKM			7	
customer			9	consult
Accuracy				
0.5 %			5	
customer			9	consult
Electrical connection				
PVC-cable [1]			1	
PUR-cable [1]			2	
FEP-cable [1]			3	
customer			9	consult
Cable length				
in m			9 9 9	
Special version				
standard			0 0 0	
customer			9 9 9	consult

[1] cable with integrated air tube for atmospheric pressure reference

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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$_2$O up to 0 ... 100 mH$_2$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$_2$O$_3$
- 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 continous 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

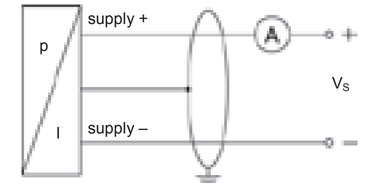
Aggressive media
level measurement in most of acids and lyes

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_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35

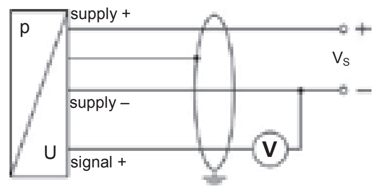
Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}	
Performance		
Accuracy[1]	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO	
Permissible load	R_{max} = [(V_S – $V_{S\ min}$) / 0.02 A] Ω	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Turn-on time	700 msec	
Mean response time	< 200 msec	measuring rate: 5/sec
Max. response time	380 msec	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (Offset and Span)		
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 [2]		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request		
Electrical connection		
Cable with sheath material [3]	PUR (-25 … 70 °C) black FEP[4] (-25 … 70 °C) black TPE (-25 … 100 °C) blue	
[3] cable with integrated air tube for atmospheric pressure reference *[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected*		
Materials (media wetted)		
Housing	standard: PP option: PVDF	
Seals	FKM / EPDM / FFKM	
Diaphragm	ceramics Al_2O_3 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: 1µH/m	
Current consumption	max. 21 mA	
Weight	approx. 320 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2004/108/EC	

Wiring diagram

2-wire-system (current)



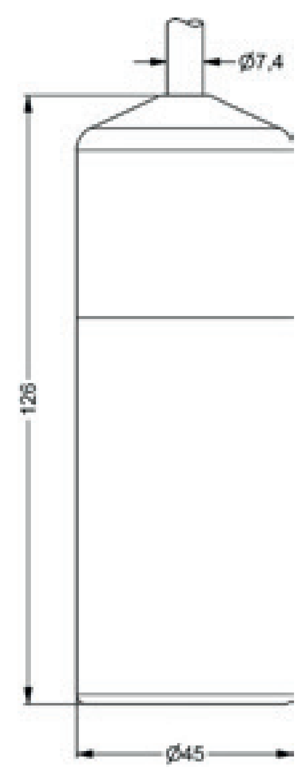
3-wire-system (voltage)



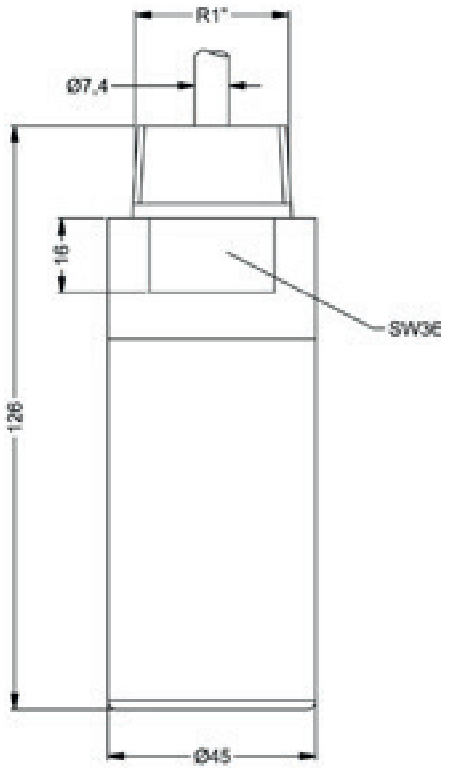
Pin configuration	
Electrical connection	cable colours (IEC 60575)
Supply + Supply – Signal + (only for 3-wire)	wh (white) bn (brown) gn (green)
Shield	gnye (green-yellow)

Dimensions (in mm)

standard



option



prepared for mounting with pipe R1"

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

LMK 809

Ordering code

LMK 809 □□□-□□□□-□-□-□-□-□-□-□□□-□□□

			Code	
Pressure				
		in bar	3 9 5	
		in mH_2O	3 9 6	
Input	**[mH_2O]**	**[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				
		PP	E	
		PVDF	B	
		customer	9	consult
Diaphragm				
		Ceramics Al_2O_3 99.9%	C	
		customer	9	consult
Output				
		4 … 20 mA / 2-wire	1	
		0 … 10 V / 3-wire	3	
		customer	9	consult
Seals				
		FKM	1	
		EPDM	3	
		FFKM	7	
		customer	9	consult
Accuracy				
standard		0.35 %	3	
option		0.25 %	2	
		customer	9	consult
Electrical connection				
		PUR-cable [1]	2	
		FEP-cable [1]	3	
		TPE-cable [1]	4	
		customer	9	consult
Cable length				
		in m	9 9 9	
Special version				
		standard	0 0 0	
		pipe R1"	6 1 0	
		customer	9 9 9	consult

[1] cable with integrated air tube for atmospheric pressure reference

---

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_2O up to 0 ... 100 mH_2O

Output signals

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

Special characteristics

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

Optional versions

- cable protection via PVC pipe
- diaphragm 99.9 % Al_2O_3
- 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_2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure [bar]	2	2	4	4	6	6	8	8	15	25	25	35	35

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}	option 3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}

Performance		
Accuracy		IEC 60770 [1]
	standard: option:	≤ ± 0.35 % FSO ≤ ± 0.25 % FSO
Permissible load	R_{max} = [(V_S – $V_{S\,min}$) / 0.02 A] Ω	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Turn-on time	700 msec	
Mean response time	< 200 msec	measuring rate 5/sec
Max. response time	380 msec	

[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span)	
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 [2]	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

[2] additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request

Electrical connection	
Cable with sheath material [3]	PVC (-5 … 50 °C) grey PUR (-10 … 50 °C) black FEP[4] (-10 … 50 °C) black
Cable protection	standard: without cable protection optional: prepared for mounting of a PVC pipe with diameter 25 mm

[3] cable with integrated air tube for atmospheric pressure reference

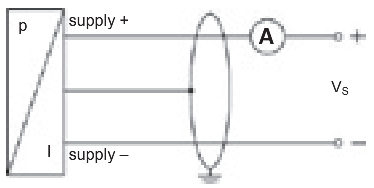
[4] do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected

Materials (media wetted)	
Housing	PVC grey
Seals	FKM / EPDM / others on request
Diaphragm	standard: ceramics Al_2O_3 96 % option: ceramics Al_2O_3 99.9 %

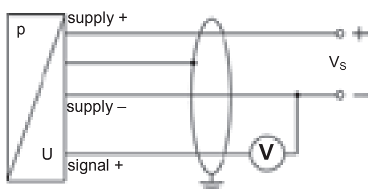
Miscellaneous	
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
Current consumption	max. 25 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity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

Wiring diagram

2-wire-system (current)



3-wire-system (voltage)

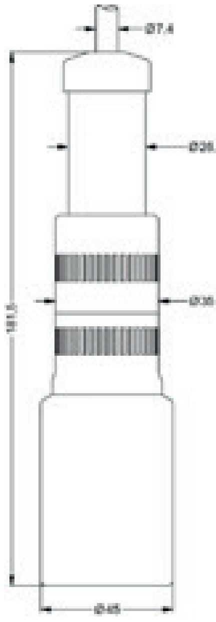


connector

Pin configuration			
Electrical connection	Binder series 723 [5] (5-pin)		cable colours (IEC 60575)
	2 - wire	3 - wire	
Supply + Supply – Signal + (only for 3-wire)	3 1 -	3 4 1	wh (white) bn (brown) gn (green)
Shield	5	5	gnye (green-yellow)

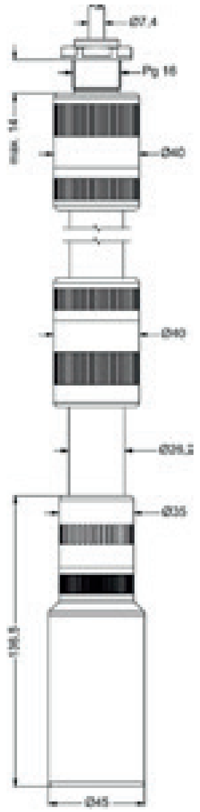
[5] in separated version

Dimensions (in mm)



standard

separated version



special version for cable protection with PVC pipe

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

LMK 858 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐-☐-☐☐☐-☐☐☐

			☐☐☐	☐☐☐☐	☐	☐	☐	☐	☐	☐	☐☐☐	☐☐☐	
Pressure													
	in bar		4 1 5										
	in mH$_2$O		4 1 6										
Input	**[mH$_2$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$_2$O$_3$ 96%					2							
	Ceramics Al$_2$O$_3$ 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 [1]								1				
	PUR-cable [1]								2				
	FEP-cable [1]								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 [2]											1 0 6	
	customer											9 9 9	consult

[1] cable with integrated air tube for atmospheric pressure reference

[2] 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_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400
Overpressure [bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
Burst pressure ≥ [bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
Vacuum resistance	$P_N \geq 1$ bar: unlimited vacuum resistance $P_N < 1$ bar: on request													

Output signal / Supply

Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}	

Performance

Accuracy1	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option 1: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO option 2: for all nominal pressures: ≤ ± 0.1 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ current 3-wire: $R_{max} = 500\ \Omega$ voltage 3-wire: $R_{min} = 10\ k\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Response time [2]	2-Leiter: ≤ 10 msec 3-Leiter: ≤ 3 msec

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

Thermal effects (Offset and Span)

Nominal pressure P_N [bar]	≤ 0.40	> 0.40
Tolerance band [% FSO]	≤ ± 1	≤ ± 0.75
in compensated range [°C]	0 ... 70	-20 … 85

Permissible temperatures

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

Electrical protection

Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Mechanical stability

Vibration	10 g RMS (25 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	500 g / 1 msec	according to DIN EN 60068-2-27

Explosion protection (only for 4 ... 20 mA / 2-wire)

Approvals DX19-LMP 331	**IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X** zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \approx$ 0nF, $L_i \approx$ 0 µH, the supply connections have an inner capacity of max. 27 nF opposite the housing
Permissible temperature for medium	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar bis 1.1 bar in zone 1 or higher: -20 ... 70 °C
Conneting 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 others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

Miscellaneous

Optionally SIL 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 [3]	
Operational life	> 100 x 10^6 cycles	
CE-conformity	EMC Directive: 2004/108/EC	
ATEX Directive	94/9/EG	

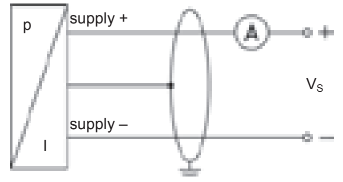
[3] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges $P_N \leq 1$ bar.

Pin configuration

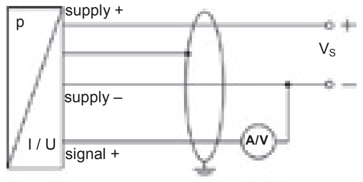
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	field housing	cable colours (IEC 60575)
Supply +	1	3	1	IN +	wh (white)
Supply –	2	4	2	IN –	bn (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	gn (green)
Shield	ground pin	5	4	⏚	gnye (green-yellow)

Wiring diagrams

2-wire-system (current)

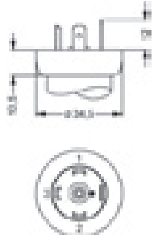


3-wire-system (current/voltage)

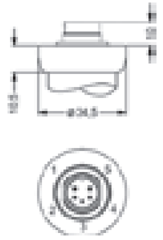


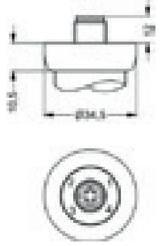
Electrical connections (dimensions in mm)

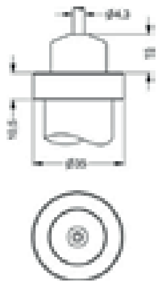
standard

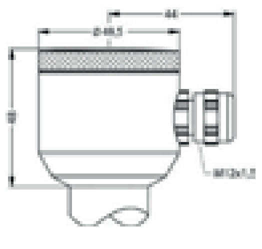

ISO 4400
(IP 65)

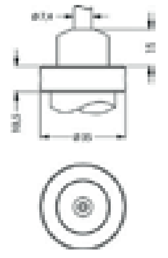
option


Binder Series 723 5-pin
(IP 67)


M12x1 4-pin
(IP 67)


cable outlet with PVC cable
(IP 67) [4]

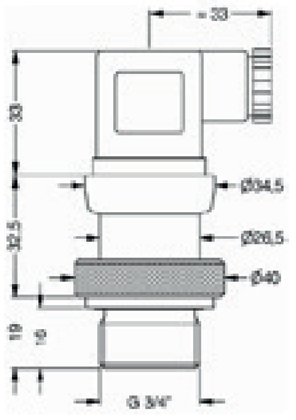

compact field housing
(IP 67)


cable outlet, cable with
ventilation tube (IP 68)[5]

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

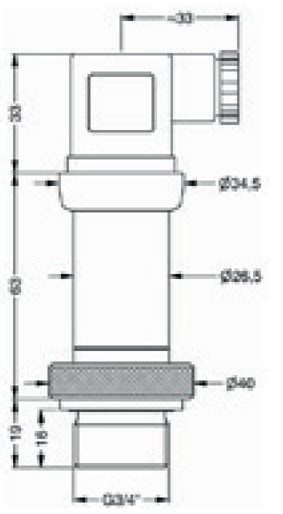
Mechanical connection (dimensions in mm)

standard



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

standard for SIL- and SIL-Ex-version [6]



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

[6] not in combination with the accuracy 0.1%

LMP 331 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐☐☐-☐-☐☐☐

			Code	
Pressure				
in bar			430	
in mH$_2$O			431	
Input	[mH$_2$O]	[bar]		
	1	0.10	1000	
	1.6	0.16	1600	
	2.5	0.25	2500	
	4	0.40	4000	
	6	0.60	6000	
	10	1.0	1001	
	16	1.6	1601	
	25	2.5	2501	
	40	4.0	4001	
	60	6.0	6001	
	100	10	1002	
	160	16	1602	
	250	25	2502	
	400	40	4002	
customer			9999	consult
Pressure port				
Stainless steel 1.4404 (316L)			1	
customer			9	consult
Diaphragm				
Stainless steel 1.4435 (316L)			1	
customer			9	consult
Output				
4 … 20 mA / 2-wire			1	
0 … 20 mA / 3-wire			2	
0 … 10 V / 3-wire			3	
Intrinsic safety 4 … 20 mA / 2-wire			E	
SIL2 4 … 20 mA / 2-wire			1S	
SIL2 with Intrinsic safety 4 … 20 mA / 2-wire			ES	
customer			9	consult
Seals				
FKM			1	
EPDM			3	
customer			9	consult
Electrical connection				
Male and female plug ISO 4400			100	
Male plug Binder series 723 (5-pin)			200	
Cable outlet with PVC cable [1]			TA0	
Cable outlet [2]			TR0	
Male plug M12x1 (4-pin) / metal			M10	
Compact field housing stainless steel 1.4305			850	
customer			999	consult
Accuracy				
standard for $P_N \geq 0.4$ bar	0.35 %		3	
standard for $P_N < 0.4$ bar	0.5 %		5	
option 1 for $P_N \geq 0.4$ bar	0.25 %		2	
option 2	0.1 % [3]		1	
customer			9	consult
Special version				
standard			000	
customer			999	consult

Prices EXW Thierstein, excluding package

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70 °C), others on request

[2] cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable

[3] not in combination with SIL

LMK 331

Screw-In Transmitter

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

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

Output signals

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

Special characteristics

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

Optional versions

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

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

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

Preferred areas of use are

- Plant and Machine Engineering
- Energy Industry
- Environmental Engineering
  (water – sewage – recycling)
- Medical Technology

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

[1] *only possible with stainless steel pressure port*

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Option IS-protection [2]	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Optionen 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}

[2] *IS-protection not possible with plastic pressure port*

Performance	
Accuracy [3]	≤ ± 0.5 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\ A]\ \Omega$ current 3-wire: $R_{max} = 500\ \Omega$ voltage 3-wire: $R_{min} = 10\ k\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Response time	2-wire: ≤ 10 msec 3-wire: ≤ 3 msec
Long term stability	≤ ± 0,3 % FSO / year at reference conditions

[3] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Thermal effects (Offset and Span) / Permissible Temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures	medium: -40 ... 125 °C electronics / environment: -25 ... 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

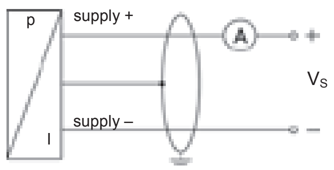
Materials			
Pressure port / housing		pressure port	housing
	standard:	stainless steel 1.4404 (316L)	stainless steel 1.4404 (316L)
	options for $P_N \leq 25$ bar:	PVDF	PVDF
Option compact field housing	stainless steel 1.4305 with cable gland brass nickel plated others on request		
Seals	standard: FKM options: EPDM others on request		
Diaphragm	ceramics Al_2O_3 96 %		
Media wetted parts	pressure port, seals, diaphragm		

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval DX19-LMK 331 only for stainless steel pressure port	**IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X** zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \approx 0$ nF, $L_i \approx 0$ µH, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible temperatures for environment	in Zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in Zone 1 or higher: -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

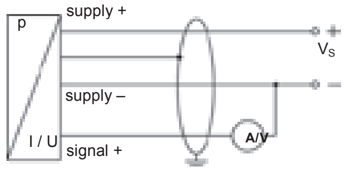
Miscellaneous	
Option SIL 2 application	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 150 g
Installation position	any
Operational life	> 100 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2004/108/EC
ATEX Directive	94/9/EG

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

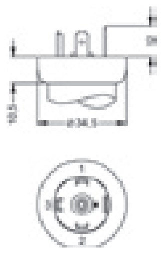


Pin configuration

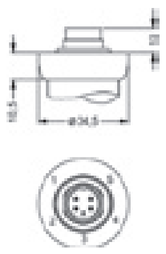
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	cable colours (IEC 60575)
Supply +	1	3	1	wh (white)
Supply –	2	4	2	bn (brown)
Signal + (only for 3-wire)	3	1	3	gn (green)
Shield	ground contact	5	4	gnye (green-yellow)

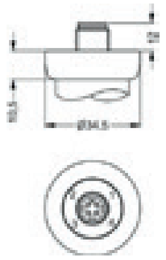
Electrical connections (dimensions in mm)

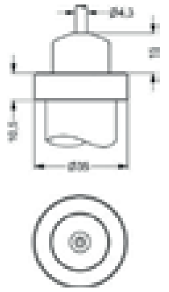
standard

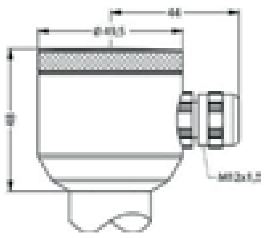

ISO 4400
(IP 65)

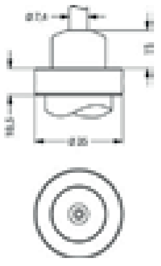
option


Binder Series 723 5-pin
(IP 67)


M12x1 4-pin
(IP 67)


cable outlet with PVC cable
(IP 67) [4]


compact field housing
(IP 67)

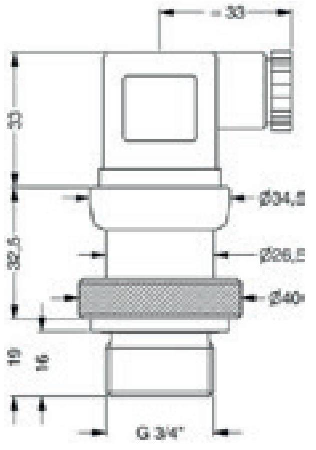

cable outlet, cable with
ventilation tube (IP 68)[5]

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

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

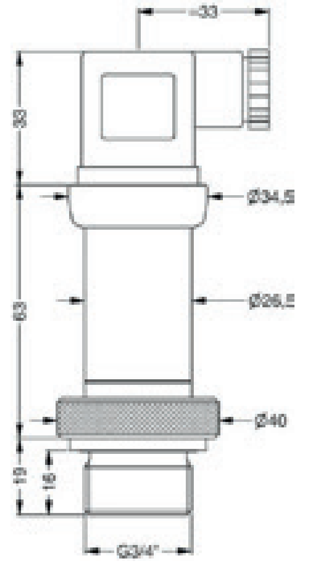
Mechanical connection (dimensions in mm)

standard



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

standard for SIL- and SIL-Ex-version



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

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

LMK 331 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

		Code	
Pressure			
gauge in bar		4 6 0	
gauge in mH_2O		4 6 1	
Input [mH_2O]	[bar]		
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	
400	40 [1]	4 0 0 2	
600	60 [1]	6 0 0 2	
customer		9 9 9 9	consult
Analogue output			
4 … 20 mA / 2-wire		1	
0 … 20 mA / 3-wire		2	
0 … 10 V / 3-wire		3	
Intrinsic safety 4 … 20 mA / 2-wire [2]		E	
SIL2 4 … 20 mA / 2-wire		1S	
SIL2 with Intrinsic safety [2] 4 … 20 mA / 2-wire		ES	
customer		9	consult
Accuracy			
0.5 %		5	
customer		9	consult
Electrical connection			
Male and female plug ISO 4400		1 0 0	
Male plug Binder series 723 (5-pin)		2 0 0	
Cable outlet with PVC cable [3]		T A 0	
Cable outlet [4]		T R 0	
Male plug M12x1 (4-pin) / metal		M 1 0	
compact field housing stainless steel 1.4305		8 5 0	
customer		9 9 9	consult
Mechanical connection			
G3/4" DIN 3852 with flush sensor		K 0 0	
customer		9 9 9	consult
Seals			
FKM		1	
EPDM		3	
customer		9	consult
Pressure port			
Stainless steel 1.4404 (316L)		1	
for $P_N \le 25$ bar PVDF [5]		B	
customer		9	consult
Diaphragm			
Ceramics Al_2O_3 96%		2	
customer		9	consult
Special version			
standard		0 0 0	
customer		9 9 9	consult

[1] only possible for pressure port of stainless steel
[2] Ex-protection not possible with plastic pressure port
[3] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70 °C)
[4] cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable
[5] min. permissible temperature -30 °C

LMK 351

Screw-in Transmitter

Ceramic Sensor

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

Nominal pressure

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

Output signal

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

Product characteristics

- pressure port PVDF-version for aggressive media
- pressure port G 1 ½" for pasty and polluted media

Optional versions

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

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

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

Preferred areas of use are

Plant and Machine Engineering
Environmental Engineering
(water – sewage – recycling)

Preferred used for

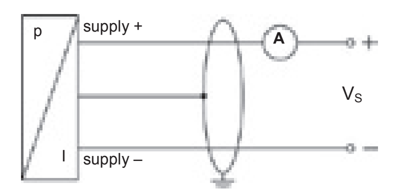
Fuel and Oil
Viscous and Pasty Media

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$_2$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							

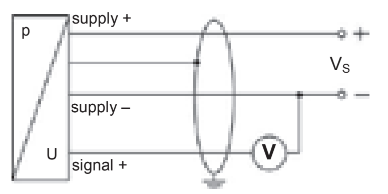
Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}
Option Ex-version	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}
Option 3-wire	3-wire: 0 ... 10 V / V_S = 12.5 ... 32 V_{DC}
Performance	
Accuracy[1]	standard: ≤ ± 0.35 % FSO option for $P_N \geq 0.6$ bar: ≤ ± 0.25 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02\text{ A}]\ \Omega$ voltage 3-wire: $R_{min} = 10\text{ k}\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Turn-on time	700 msec
Mean measuring time	5/sec
Response time	mean response time: ≤ 200 msec max. response time: 380 msec
[1] accuracy according to IEC 60770 - limit point adjustment (non-linearity, hysterisis, repeatability)	
Thermal effects (Offset and Span) / -Permissible temperatures	
Tolerance band	≤ ±0.1 % FSO / 10 K in compensated range - 20 ... 80 °C
Permissible temperatures [2]	medium: -40 ... 125 °C electronics / environment:-40 ... 85 °C storage: -40 ... 100 °C
[2] for pressure port of PVDF 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_2O_3 96 % options: ceramics Al_2O_3 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 1G Ex ia IIC T4 Ga Zone 20: II 1D Ex ia IIIC T85 °C Da plastic-pressure port with male (connector): Zone 0/1 [3]: II 1/2G Ex ia IIC T4 Ga/Gb Zone 20/21 [4]: II 1/2D Ex ia IIIC T85 °C Da/Db
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i = 27 nF , L_i = 5 µH
Max. permissible temperature for environment	in zone 0: -20 ... 60 °C for p_{atm} 0.8 bar up to 1.1 bar zone 1 and higher: -25 ... 70 °C
Connecting cables (by factory)	capacity: signal line / shield also signal line / signal line: 160 pF/m inductance: signal line / shield also signal line / signal line: 1 µH/m
[3] The designation depends on the used pressure range. With nominal pressure ranges ≤ 60 mbar the designation is „2G". *[4] 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 10^6 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)

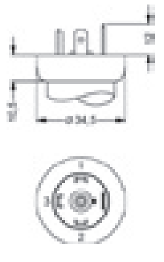


Pin configuration

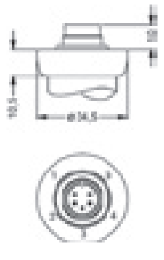
Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	field housing	cable colours (IEC 60575)
Supply +	1	3	1	IN +	wh (white)
Supply –	2	4	2	IN –	bn (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	gn (green)
Shield	ground pin	5	4	⏚	gnye (green-yellow)

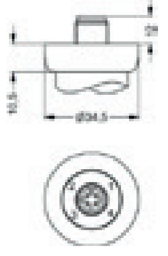
Electrical connections (dimensions in mm)

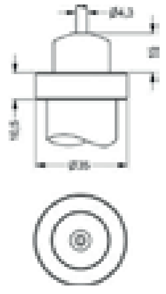
standard

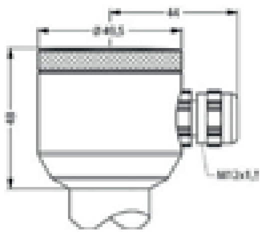

ISO 4400
(IP 65)

option

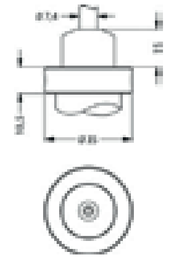

Binder Series 723 5-pin
(IP 67)


M12x1 4-pin
(IP 67)


cable outlet with PVC cable
(IP 67) [4]

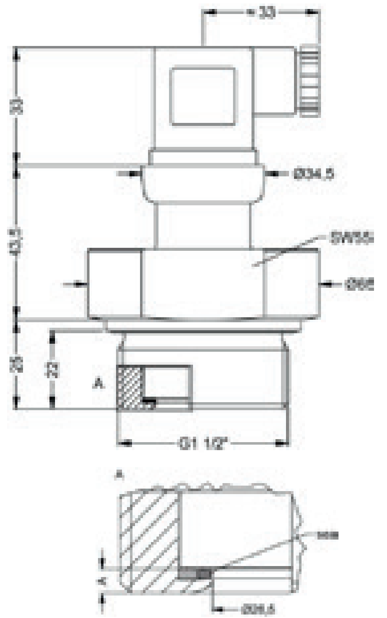


compact field housing
(IP 67)


cable outlet, cable with
ventilation tube (IP 68)[5]

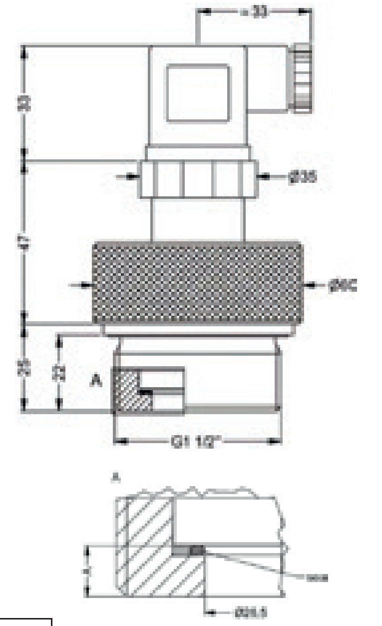
[4] *standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)*
[5] *different cable types and lengths available, permissible temperature depends on kind of cable*

Dimensions (in mm)



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

material	A
stainless steel	ca. 3
PVDF	ca. 6



G1 1/2" flush (DIN 3852)
PVDF [6]

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[6] *not possible in combination with compact field housing*

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

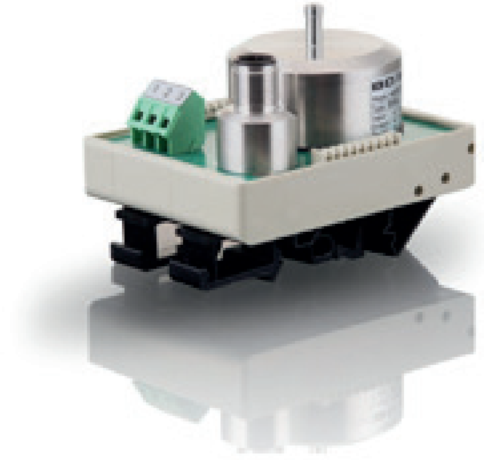
LMK 351 □□□-□□□□-□-□-□□□-□□□-□-□-□-□□□

			Code	
Pressure				
		in bar	4 7 0	
		in mH_2O	4 7 1	
Input	**[mH_2O]**	**[bar]**		
	0.4	0.04	0 4 0 0	
	0.6	0.06	0 6 0 0	
	1.0	0.10	1 0 0 0	
	1.6	0.16	1 6 0 0	
	2.5	0.25	2 5 0 0	
	4.0	0.40	4 0 0 0	
	6.0	0.60	6 0 0 0	
	10	1.0	1 0 0 1	
	16	1.6	1 6 0 1	
	25	2.5	2 5 0 1	
	40	4.0	4 0 0 1	
	60	6.0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	200	20	2 0 0 2	
		customer	9 9 9 9	consult
Output				
		4 … 20 mA / 2-wire	1	
		0 … 10 V / 3-wire	3	
		Intrinsic safety 4 … 20 mA / 2-wire	E	
		customer	9	consult
Accuracy				
standard		0.35 %	3	
option for $P_N \geq 0.6$ bar:		0.25 %	2	
		customer	9	consult
Electrical connection				
		Male and female plug ISO 4400	1 0 0	
		Male plug Binder series 723 (5-pin)	2 0 0	
		Cable outlet with PVC- cable [1]	T A 0	
		Cable outlet [2]	T R 0	
		Male plug M12x1 (4-pin) / metal	M 1 0	
		compact field housing	8 5 0	
		customer	9 9 9	consult
Mechanical connection				
		G1 1/2" DIN 3852 with flush sensor	M 0 0	
		customer	9 9 9	consult
Seals				
		FKM	1	
		EPDM	3	
		FFKM	7	
		customer	9	consult
Pressure port				
		Stainless steel 1.4404 (316L)	1	
		PVDF [3]	B	
		customer	9	consult
Diaphragm				
		Ceramics Al_2O_3 96%	2	
		Ceramics Al_2O_3 99.9%	C	
		customer	9	consult
Special version				
		standard	0 0 0	
		customer	9 9 9	consult

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70 °C)

[2] cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable

[3] not possible in combination witn compact field housing; min. permissible temperature -30 °C



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_N gauge [bar]	0.06	0.16	0.4	1	2	5	10	20
Nominal pressure P_N abs. [bar]	on request							
Permissible overpresure [bar]	2	4	6	8	15	25	35	40
Permissible vacuum for P_N gauge [bar]	-0.2	-0.3	-0.5		-1			

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 9 ... 32 V_{DC}; $V_{S\ Nom.}$ = 24 V_{DC}	
Current consumption	max. 21 mA	
Performance		
Accuracy [1]	IEC 60770 [2]: ≤ ± 0.2 % FSO	BFSL: ≤ ± 0.1 % FSO
Turn-on time	700 msec	
Permissible load	$R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$	
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Response time (10 ... 90 %)	120 msec – without consideration of electronic damping	
Measuring rate	8/sec	

[1] *for nominal pressure ranges ≤0.4 bar the accuracy is calculated as follows: ≤ ± [0.2 + 0.04 x(nominal pressure range / adjusted range)] % FSO*

[2] *accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)*

Thermal 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

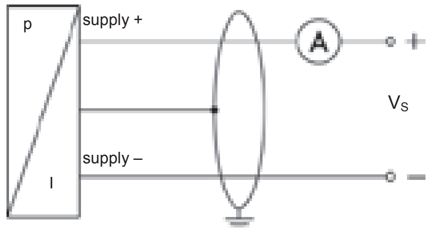
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electrical connection	
Input	terminal clamps (3-pin)
Communication connector	M12x1 (8-pin), metal
Materials	
Pressure port	standard: stainless steel 1.4301 on request: brass
Housing	version EP 500: PA6 (housing foot: PA66) varsion EP 500 - 500: ABS
Seals (media wetted)	FKM
Diaphragm	ceramic Al_2O_3 96 %
Media wetted parts	pressure port, seals of sensor, diaphragm
Category of the environment	
Lloyd´s Register (LR)	EMV1, EMV2, EMV3 number of certificate: 13/20056
Germanischer Lloyd (GL)	C, EMC1 number of certificate: 86 482 - 09 HH
Miscellaneous	
Ingress protection	IP 00
Function display	green SMD-LED - lights by information flow through the transmitter
Installation position	any
Operational life	> 100 x 10^6 pressure cycles
Weight	approx. 200 g
Adjustability	configuration via programming kit CIS 700 [3]; following configurations are possible: - electronic damping: 0 ... 100 sec - offset: 0 ... 67 % FSO - turn down of span: max. 1:20 - configuration of pressure unit - calibration via connected pressure reference

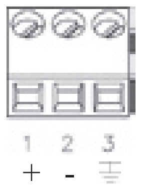
[3] *programming kit has to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)*

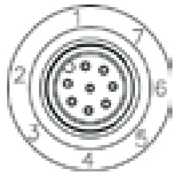
Pin configuration

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

Wiring diagram

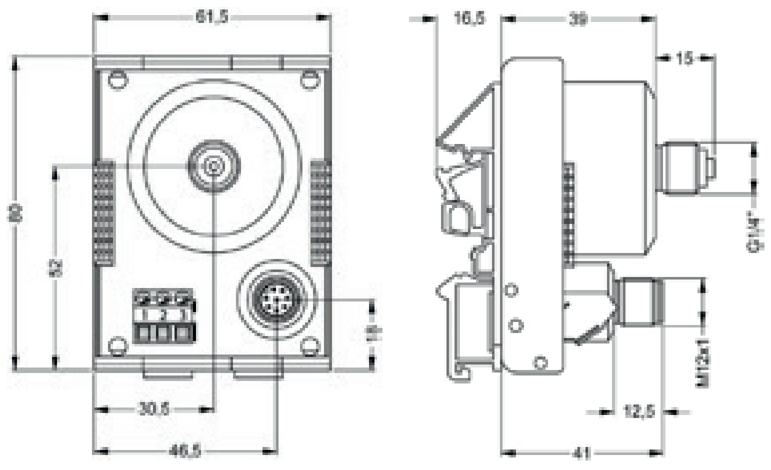






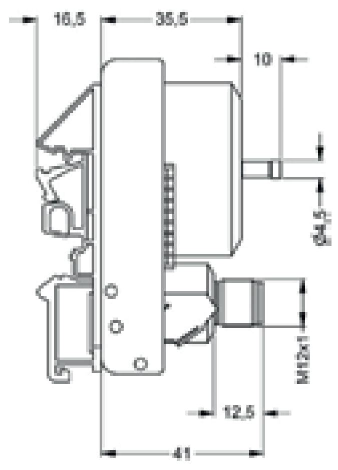
Dimensions (in mm)

standard EP 500:



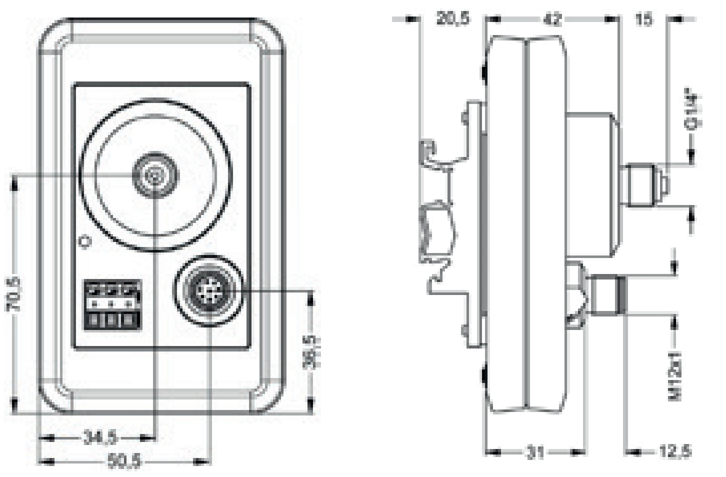
G1/4"

optionally for P_N ≤ 5 bar:



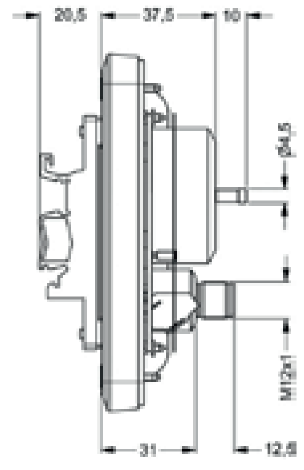
hose connection for flexible
hoses Ø 4 mm

option EP 500 - 500



G1/4"

optionally for PN ≤ 5 bar:



hose connection for flexible
hoses Ø 4 mm

EP 500	☐☐☐	☐☐☐☐	☐	☐	☐☐☐	☐	☐	☐	☐☐☐	
Pressure										
gauge	U P 5									
absolute	U P 6									consult
Input [bar]										
0.06		0 6 0 0								
0.16		1 6 0 0								
0.4		4 0 0 0								
1.0		1 0 0 1								
2.0		2 0 0 1								
5.0		5 0 0 1								
10		1 0 0 2								
20		2 0 0 2								
customer		9 9 9 9								consult
Output										
4 … 20 mA / 2-wire			1							
customer			9							consult
Accuracy										
0.2 %				B						
customer				9						consult
Mechanical connection										
hose connection Ø 4.5 mm [1]					Y 0 2					
G1/4" EN 837					4 0 0					
customer					9 9 9					consult
Seal										
FKM						1				
customer						9				consult
Pressure port										
stainless steel 1.4301 (304)							2			
brass							M			consult
customer							9			consult
Diaphragm										
ceramics Al_2O_3 96%								2		
customer								9		consult
Special version										
standard									0 0 0	
option									5 0 0	consult
customer									9 9 9	consult

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[1] hose connection only up to 5 bar

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

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 temperatur 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.

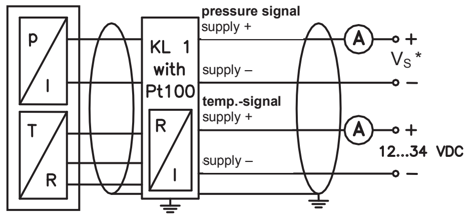
KL 1

Technical Data

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^2
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 [1]	
Temperature range	standard: 0 ... 70 °C option: T_{min} ... T_{max} 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_S = 12 … 34 V_{DC}
Accuracy	< 0.15 %
Linearity	< 0.1 %
Thermal effects	< 0.01 % / K

[1] only necessary if the transmitter is equipped with a Pt 100 temperature sensor

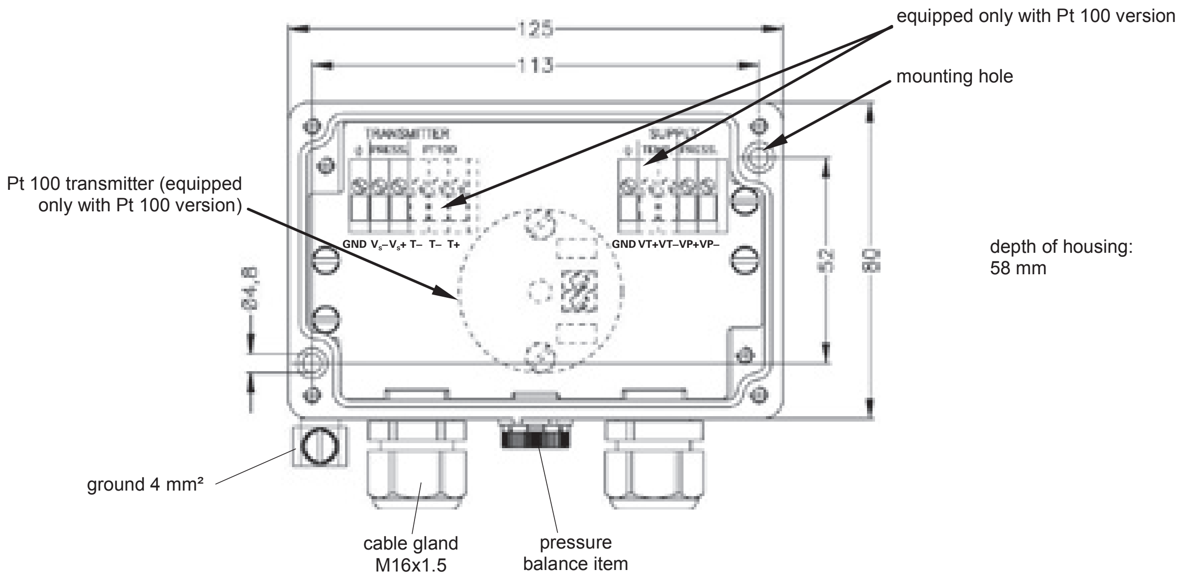
Wiring diagram



The ground wires of all components have to be connected!

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

Dimensions (in mm)



KL 1

Ordering code

KL 1 - ZB.601 -☐☐☐-☐☐☐

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 [1]	1	T	1				
Special version							
standard				0	0	0	
customer				9	9	9	consult

[1] 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

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

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

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

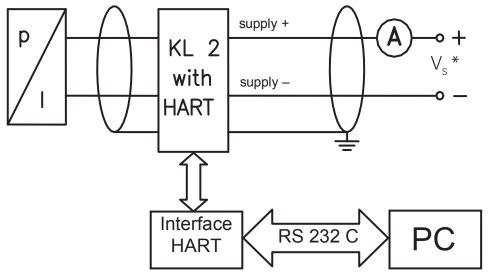
Vertical terminal clamps enable easy connection of cables inside the case.

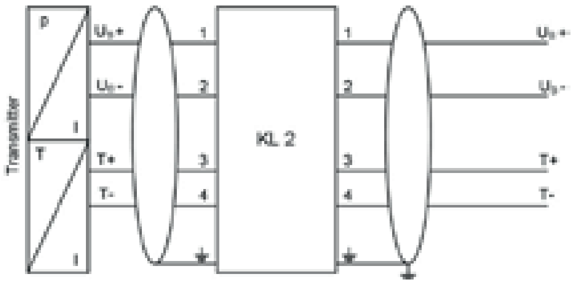
The KL 2 with optional overvoltage protection is additionally equipped with surge arresters with a nominal discharge current of 10 kA.

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

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

Wiring diagram



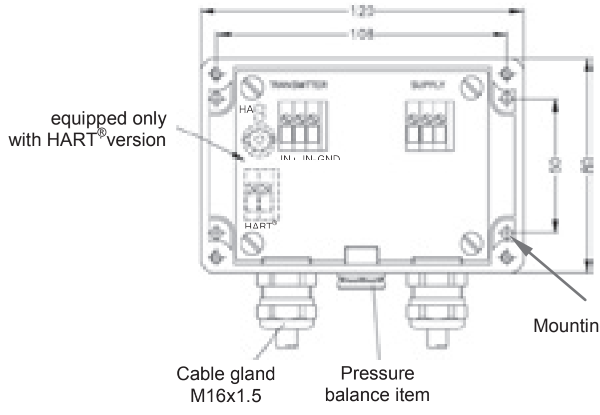


Version with 2 channels, eg. LMK 307T, LMP 307T

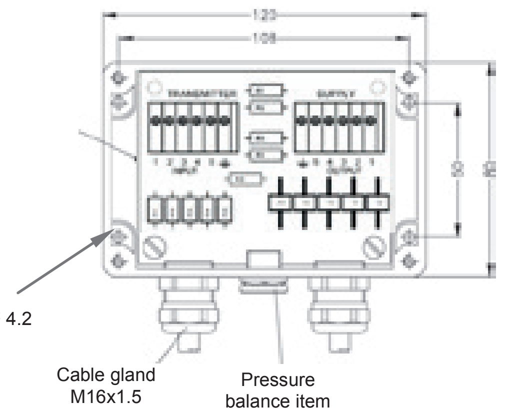
* The supply V_S has to be chosen according to needs of the used transmitter. The ground wires of all components have to be connected!

Dimensions (in mm)

standard



version with 2 channels



depth of housing: 55 mm

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

HART® is a registered trade mark of HART Communication Foundation

KL 2

Ordering code

KL 2 - ZB.601 - ☐☐☐ - ☐☐☐

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

[1] *Version for 2 independent 2 wire circuits*

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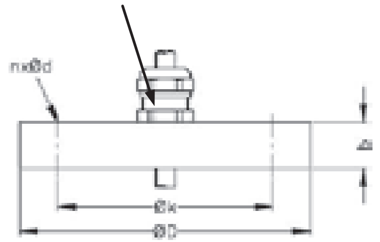
ACCESSORIES

Mounting flange with cable gland

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

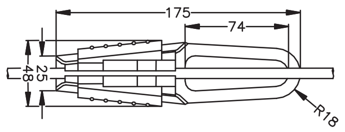


Technical data	
Suitable for	all probes
Flange material	stainless steel 1.4404 (316L)
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305; plastic
Seal insert	material: TPE (ingress protection IP 68)
Hole pattern	according to DIN 2507

Version	**Size (in mm)**	**Weight**
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

Ordering type	**Ordering code**
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

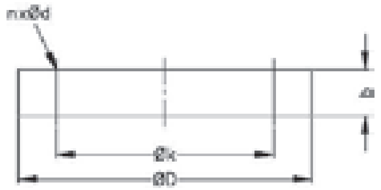
Terminal clamp



Technical Data	
Suitable for	all probes with cable ∅ 5.5 ... 10.5 mm
Material	standard: steel, zinc plated optionally: stainless steel 1.4301
Weight	approx. 160 g

Ordering type	**Ordering code**
Terminal clamp, steel, zinc plated	Z100528
Terminal clamp, stainless steel 1.4301	Z100527

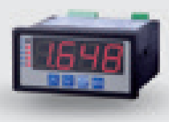
probe flange



Technical data	
Suitable for	LMK 382, LMK 382H, LMK 458, LMK 458H
Flange material	stainless steel 1.4404 (316L)
Hole pattern	according to DIN 2507

Version	**Size (in mm)**	**Weight**
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

Ordering type	**Ordering code**
Transmitter flange DN25 / PN40	ZSF2540
Transmitter flange DN50 / PN40	ZSF5040
Transmitter flange DN80 / PN16	ZSF8016

	Description	Display	Input	Output	Housing Dimensions (B x H x T) in mm	Interface	
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	0 / 1 / 2 PNP-outputs 4 ... 20 mA, 0 ... 10 V	plastic, rotatable 47 x 47 x 68	–	
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	0 / 1 / 2 PNP- outputs 4 ... 20 mA	plastic 120 x 80 x 57 aluminium 125 x 80 x 57	–	
PA 450	Field Display for Difference Formation	4-digit LED-display 4 x 10 mm	2 inputs: 4 ... 20 mA	0 / 1 / 2 PNP- outputs 4 ... 20 mA	plastic 120 x 80 x 57	–	
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		front panel 72 x 36 x77 (95)	RS 485 Modbus RTU	
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	0 / 1 / 2 relay- outputs	front panel 72 x 36 x 77	RS 485 Modbus RTU	
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	0 / 2 / 4 relay- outputs 0/4 ... 20 mA	front panel 96 x 48 x 98	RS 485 Modbus RTU	
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	0 / 2 / 4 relay- outputs 0/4 ... 20 mA	front panel 48 x 96 x 98	RS 485 Modbus RTU	
CIT 400	Process Display with Contacts, Analogue Output and Ex-approval	4-digit LED-display 4 x 10 mm	4 ... 20 mA	2 / 4 relay- outputs 0/4 ... 20 mA	front panel 72 x 72 x 110 hat rail 70 x 75 x 110	–	
CIT 600	Multichannel Process Display (LCD)	graphic LC-display 128 x 64 pixel	2 / 4 / 8 inputs: 0/4 ... 20 mA, PT100 / PT500 / PT1000	2 OC- outputs	front panel 96 x 96 x 100	RS 485 Modbus RTU	
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	2 OC- outputs	front panel 96 x 96 x 100	RS 485 Modbus RTU USB-Host Port	
CIT 700	Mulitchannel 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 (Ω) max. 24 inputs: thermocouple (mV)	max. 16 relay- outputs, max. 24 SSR-ouputs, 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	
CIT 750	Mulitchannel 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 (Ω) max. 36 inputs: thermocouple (mV)	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

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HEADQUARTERS OF BD|SENSORS GROUP

BD | SENSORS GmbH
BD-Sensors-Straße 1
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Tel.: +49 9235 9811-0
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DISTRIBUTION EASTERN EUROPE

BD | SENSORS s.r.o.
Hradišťská 817
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www.bdsensors.cz
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