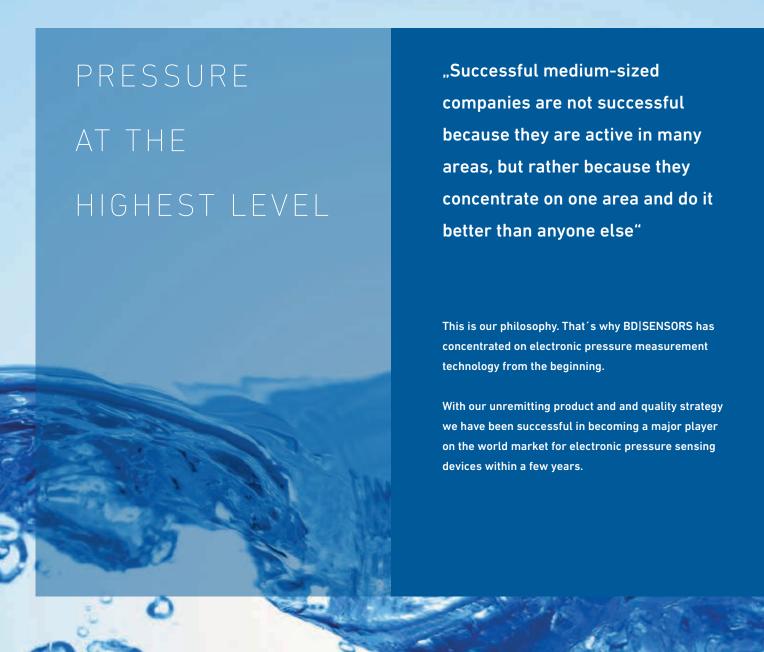
# HYDROSTATIC PROBES SCREW-IN TRANSMITTERS

PRODUCT CATALOGUE



PRESSURE at the highest LEVEL.





This document commons product specifications, properties are not guaranteed. Detailed information about options are defined in the datasheets. Subject to change without notice.



With 300 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	transmit	ters	

- > 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 BDISENSORS. 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

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

flexibly, quickly and cost-efficiently.

PRODUCT	ا	PREFE	RRED .	APPLIC	CATION		Ø	TYPE HOUSING		LOWEST RANGE	OUT	PUT			
	water / drinking water	waste water / viscous	sea water / salty water	fuel / oil	petrol / solvents	acid / lye	mm / inch	cable assembly / sensor head	metal	plastic	stainless steel	ceramic	meter H <sub>2</sub> 0	analog	digital
SUBMERSIB	LE PR	OBE													
DCL 551	•	•					40		•			•	0.4		•
DCL 571	•	•					22		•			•	1		•
LMK 307	•	•					27		•			•	4	•	
LMK 307T	•	•					27		•			•	4	•	
LMK 358	•	•					40	detachable	•			•	0.4	•	
LMK 358H	•	•					40	detachable	•			•	0.2	•	•
LMK 382	•	•					40		•			•	0.4	•	
LMK 382H	•	•					40		•			•	0.2	•	•
LMK 387	•	•					22		•			•	1	•	
LMK 387H	•	•					22		•			•	0.3	•	•
DCL 531	•			•			27		•		•		1		•
LMK 306	•			•			17		•		•		6	•	
LMP 305	•			•			19		•		•		1	•	
LMP 307	•			•	•		22		•		•		1	•	
LMP 307i	•			•			27		•		•		0.4	•	
LMP 307T	•			•			27		•		•		1	•	
LMP 308	•			•			35	detachable	•		•		1	•	
LMP 308i	•			•			35	detachable	•		•		4	•	
LMP 808	•			•			35	detachable		•	•		1	•	
LMK 806		•				•	21			•		•	6	•	
LMK 807		•				•	35			•		•	4	•	
LMK 808		•				•	35	detachable		•		•	1	•	
LMK 809		•				•	45			•		•	0.4	•	
LMK 858		•				•	45	detachable		•		•	0.4	•	
LMK 458				•			40		•			•	0.4	•	
LMK 458H			•				40						0.2		•
LMK 43811							22					•	1	•	
SCREW-IN TI	RANS	MITTE	R												
LMP 331				•			3/4"		•		•		1	•	
LMP 331i							3/4						0.4		
LMF 3311												•			
		•					3/4"						0.4		
LMK 351	•	•				•	1 1/2"		•	•		•	0.4	•	

PRODUCT		APPR	OVAL		PAGE
	ater				
	drinking water	ij	<u>s</u>		
	drin	nautic	EX / IS	SIL	
SUBMERSIB	LE PR	OBE			
DCL 551					6-10
DCL 571	•				11-16
LMK 307			•	•	17-20
LMK 307T					21-25
LMK 358			•		26-30
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LMK 807				•	105-108
LMK 808					109-112
LMK 809					113-116
LMK 858					117-120
LMK 458		•	•		121-125
LMK 458H		•	•		126-130
LMK 487		•	•		131-135
SCREW-IN T	RANS	MITTE	R		
LMP 331			•	•	136-139
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LMK 331			•	•	145-148
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## **DCL 551**

## **Stainless Steel Probe** with RS485 Modbus RTU

Ceramic Sensor

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

#### **Nominal pressure**

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

#### **Output signal**

RS485 with Modbus RTU protocol

#### Special characteristics

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

#### **Optional version**

diaphragm ceramics Al<sub>2</sub>O<sub>3</sub> 99,9%

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

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

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

#### Preferred areas of use are



#### Sewage

waste water treatment water recycling

#### Fuel and oil



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

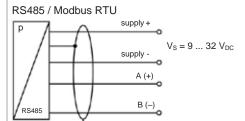




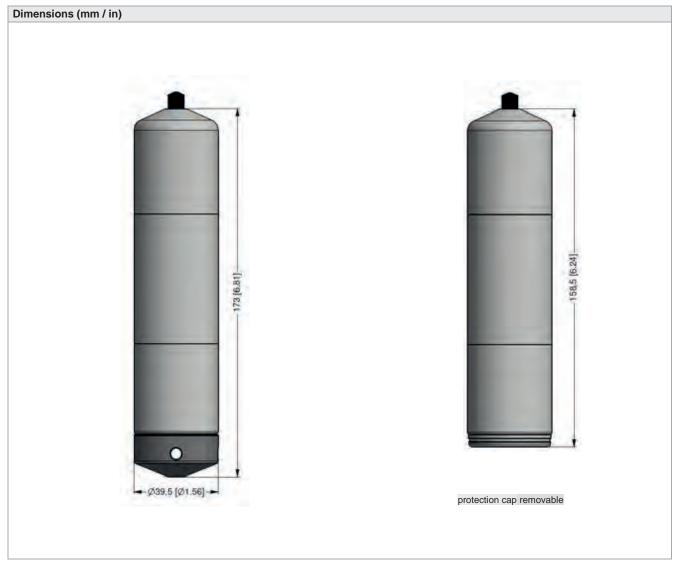


Input pressure range																
Nominal pressure gauge	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Max. ambient pressure (he	ousing): 4	0 bar														

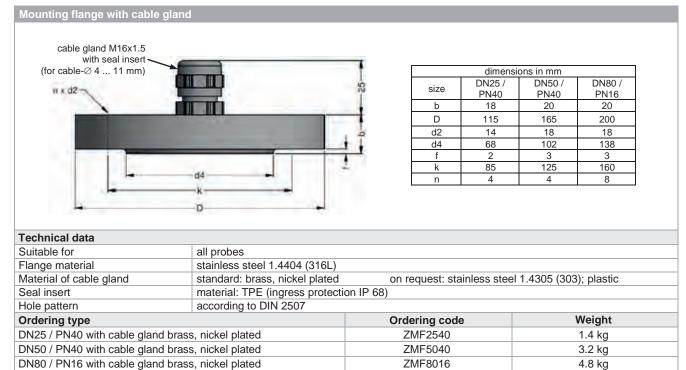
wax. ambient pressure (neasing).		
Output signal		
Digital (pressure and temperature)	RS485 with Modbus RTU protocol	
Supply		
Direct current	$V_{S} = 9 32 V_{DC}$	
Performance		
Accuracy 1	standard: ≤ ± 0.35 % FSO	option: ≤ ± 0.25 % FSO
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	
Measuring rate	500 Hz	
Delay time	500 msec	
	nit point adjustment (non-linearity, hysteresis, repeatability	y)
Thermal effects (offset and span		
Tolerance band	≤±1%FSO	
in compensated range	-20 80 °C	
Permissible temperatures		
Permissible temperatures	medium / storage: -25 125 °C	
Electrical protection <sup>2</sup>		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic compatibility	emission and immunity according to EN 61326	
<sup>2</sup> additional external overvoltage protect	ion unit in terminal box KL 1 or KL 2 with atmospheric pre	essure reference available on request
Electrical connection		
Cable with sheath material <sup>3</sup>	PUR (-25 70 °C) black Ø 7.4 mm	
Cable capacitance	signal line/shield also signal line/signal line: 16	0 pF/m
Cable inductance	signal line/shield also signal line/signal line: 1 μ	ıH/m
Bending radius	static installation: 10-fold cable diameter	dynamic application: 20-fold cable diameter
<sup>3</sup> shielded cable with integrated ventilati	on tube for atmospheric pressure reference	
Materials (media wetted)		
Housing	stainless steel 1.4404 (316 L)	
Seals	FKM	others on request
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	
	option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %	
Protection cap	POM-C	
Cable sheath	PUR	
Miscellaneous		
Adjustable units	pressure: mmH <sub>2</sub> O, mmHg, PSI, bar, mbar, g/cm	
Read out	serial number; date of calibration, min- and max	-value for pressure
Current consumption	max. 10 mA	
Weight	approx. 400 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
Wiring diagram		

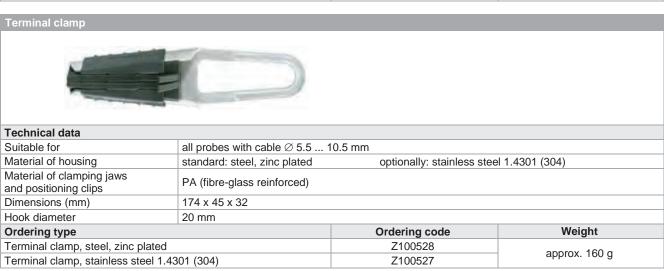


Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
A +	GN (green)
B –	YE (yellow)
Shield	GNYE (green yellow)



Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
Address	001				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2
Configuration code					
(to specify with order)		-		-	





Ordering code

			(	Orde	rir	าดู	C	ode	DC	CL	551							
	DCL 551		Ш	-Щ		]	-	-	-[	]- <u></u>	[-[	- <u> </u>	]-[		]-[			
Pressure																		
		in bar	5 6 5 5 6 6															
		in mH <sub>2</sub> O	5 6 6															
Input	[mH <sub>2</sub> O]	[bar]																
	0.4	0.04		0 4	0	0												
	0.6	0.06		0 6	0	0												
	1.0	0.10 0.16		1 0	0	0												
	1.6 2.5	0.16		2 5	0	0												
	4.0	0.40		2 5 4 0	0	0												
	6.0	0.40		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	Λ	1												
	100	10		1 0	0	2												
	160	16		1 6	0	2												
	200	20		2 0 9	0 0 0 9	2												
		customer		9 9	9	9												consult
Housing	-1-1-111-4-444	24 (0401)																
	stainless steel 1.44						1											
Diaphragm		customer					9											consult
Diapiliagiii	ceramics A	LO. 96%			-	-	_	2										
	ceramics Al <sub>2</sub>	O <sub>2</sub> 99.9%						ć										
		customer						9										consult
Digital out		0401011101	_															Conduc
	RS485 Mod	lbus RTU					_	_	L5							П		
Seals																		
		FKM								1						П		
		customer								9								consult
Electrical of	connection																	
	PUR-cable (black, Ø										2							
		customer									9							consult
Accuracy																		
standard:		5 % FSO										3						
option:		5 % FSO										2						
Cable leng		customer										9						consult
- Cable leng	ui	in m											0	9 9				
Special ver	rsion	in m											9	9 9				
Opecial vel	ISION	standard													0	0	0	
		customer													9	0 9	9	consult
																1 - 1	-	

<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



## **DCL 571**

## **Stainless Steel Probe** with RS485 Modbus RTU

Ceramic Sensor

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

#### **Nominal pressure**

from  $0 ... 1 \text{ mH}_2\text{O}$  up to  $0 ... 100 \text{ mH}_2\text{O}$ 

#### **Output signal**

RS485 with Modbus RTU protocol

#### Special characteristics

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

#### **Optional versions**

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

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

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

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

#### Preferred areas of use



Water

groundwater and level monitoring



Sewage

waste water treatment, water recycling



Fuel and oil

tank battery, biogas plants









Input pressure range

Input pressure range													
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4			1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6		10	16	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	7	12	20	20	20	20
Max. ambient pressure (hous	sing): 40 b	oar											
Nominal pressure absolute	[bar]	1.2	1.4	4	1.6	1.8		2	2.5	3	4	6	10
Overpressure	[bar]	7	7		12	12		12	12	20	20	20	20
Burst pressure ≥	[bar]	9	9		18	18		18	18	25	25	30	30
Max. ambient pressure (hous	sing): 40 b	oar	·						·	·			
Output signal													
Digital (pressure and temper	ature) R	S485 v	with Mod	bus RTI	Lprotoc	იl							
Supply	ataro, 11	0 100	William William	000 1111	o protoc	<u>.                                    </u>							
Direct current	V	s = 9	32 V <sub>DC</sub>										
Performance		3 0.	0_ 100										
Accuracy <sup>1</sup>	St	tandar	d: ≤±0	) 35 % F	-SO								
7.1004.40)		ption:		).25 % F							othe	rs on requ	est
Long term stability			% FSO /		-						23.70		
Measuring rate		00 Hz	/	•									
Delay time	5	00 ms	ec										
<sup>1</sup> accuracy according to IEC 607	70 – limit po	oint adju	ustment (n	on-linear	ity, hyster	resis, rep	eatak	oility)					
Thermal effects (offset and s													
Tolerance band	≤	± 1 %	FSO										
In compensated range	-2	20 8	30 °C										
Permissible temperatures	,												
Medium / storage	-2	25 8	5 °C										
Electrical protection <sup>2</sup>													
Short-circuit protection	pe	erman	ent										
Reverse polarity protection			age, but a	also no i	function								
Electromagnetic compatibility			n and imr			g to EN	6132	26					
<sup>2</sup> additional external overvoltage									e reference	available o	n request		
Electrical connection													
Cable with sheath material <sup>3</sup>	Т	PE-U	(-10	70 °C	C) blu	ue Ø	7.4 ו	mm	(with dri	nking wat	er approv	/al)	
	Р	UR	•	70 °C	,	ack Ø	7.4 ı	mm	`	Ü	• • •	,	
Cable capacitance	si	ignal lii	ne/shield	also sig	nal line/	signal lii	ne: 1	160 pF/r	n				
Cable inductance			ne/shield										
Bending radius	st	tatic in	stallation	: 1	0-fold ca	able diar	nete	r					
			c applicat		:0-fold ca		nete	r					
<sup>3</sup> shielded cable with integrated v	entilation to	ube for	atmospher	ric pressu	ıre refere	nce							
Materials (media wetted)													
Housing			s steel 1.									ers on req	
Cable			blue (with									ers on req	
Seals (O-rings)		,	with drink		er appro	oval), FK	M				oth	ers on req	uest
Diaphragm			s Al <sub>2</sub> O <sub>3</sub> 9	9,9 %									
Protection cap		OM-C											
Cable sheath	T	PE-U,	PUR										
Miscellaneous			(- D) (	214/14/2	70 - 11	LID A LCT	14/						
Drinking water certificate 4			ng to DVO					oortifio	ate" is ned	occon/\			
Adjustable units									cm², Pa, k		atm mH (	) MPa	
Read out									ue for pres		au11, 111□1 <sub>2</sub> 0	J, IVII <sup>r</sup> a	
Current consumption		enai ni nax. 10		al <del>o</del> UI Ca	anoration	i, iiiiii- al	iiu II	iax-vall	ie ioi bies	oui <del>c</del>			
Weight			180 g (w	ithout o	ahla)								
V V CIUI IL	∣ a	ρρισχ.	100 g (W	iti lout C	avic)								
	I F	2 62											
Ingress protection CE-conformity		P 68	rective: 2	N14/30/	/FII								



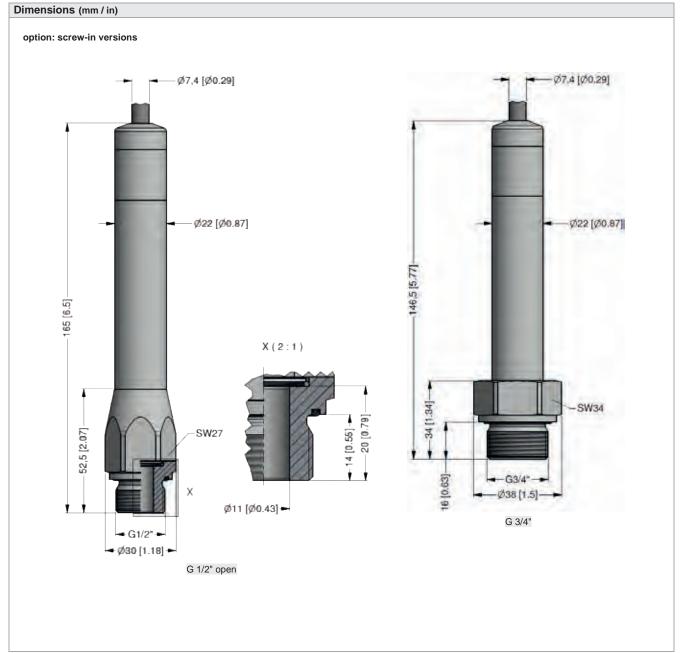
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
A +	GN (green)
B –	YE (yellow)
Reset	PK (pink)
Shield	GNYE (green-yellow)

#### Dimensions (mm / in)

#### standard



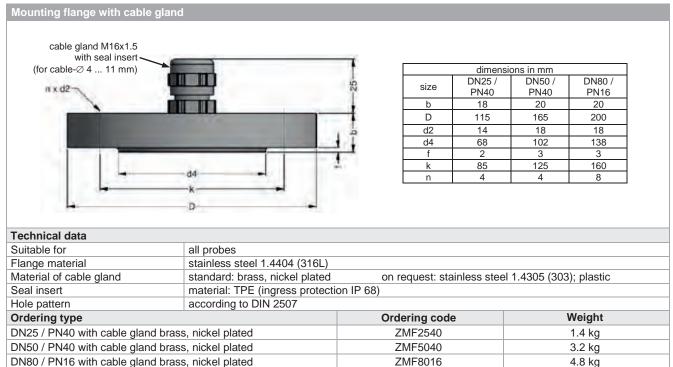




Configuration Modbus RTU					
Standard configuration	001	-	1	-	1
Address					
Address	001				
	247				
Baud Rate					
4800 Bd			0		
9600 Bd			1		
19200 Bd			2		
38400 Bd			3		
Parity					
None					0
Odd					1
Even					2

PREFIGER	www.hdeaneare.da	

(to specify with order)



DINOU / I INTO WILLI Cable gland i	rass, moker plated	ZIVII 00 TO	4.0 kg						
Terminal clamp									
Technical data									
Suitable for	all probes with cable Ø 5.5 1	10.5 mm							
Material of housing	standard: steel, zinc plated	optionally: stainless stee	el 1.4301 (304)						
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)								
Dimensions (mm)	174 x 45 x 32								
Hook diameter	20 mm								
Ordering type		Ordering code	Weight						
Terminal clamp, steel, zinc plate	ed	Z100528	approx 160 a						
Terminal clamp, stainless steel	4301 (304) Z100527 approx. 160 g								

Ordering code

				Or	der	in	g	C	ode	e D	CL	57	1									
	DCL 571			П	]-[					- [	- [	]-□	]-[	]-[	-□	]-[			- <u> </u>			
Pressure																						
	gaug	auge in bar ge in mH <sub>2</sub> O olute in bar	3	6 0 6 1 6 3																		
Input	[mH <sub>2</sub> O]	[bar]	Ŭ	1010																		
	1.0	0.10			1	0	0	0									П					
	1.6	0.16			1	6	0	0														
	2.5	0.25			2	5	0	0														
	4.0	0.40			4	0	0															
	6.0	0.60			6		0	0														
	10	1.0			1	0	0	1														
	12	1.2			1	2	0	1														
	14	1.4			1	2	0	1														
	16	1.6			1	6 8		1														
	18	1.8			1	8	0	1														
	20	2.0			2	0		1														
	25	2.5			2	5	0	1														
	30	3.0			3	0	0	1														
	40	4.0			4	0		1														
	60	6.0			6	0	0	1														
	100	10 customer			1	0	0	2														
Housing		customer	-	-	9	9	9	9	-								-				-	consult
Housing	stainless steel 1.4	404 (3161.)	-	-	-	-	-	-	1								-				-	
	3tail11033 3t001 1.4	customer							9													consult
Design		oustorner							3													Consuit
Design		probe								1												
	screw-in version (									A												
	screw-in version									В												
Diaphragm																						
	ceramics Al	<sub>2</sub> O <sub>3</sub> 99.9 %									С											
		customer									9											consult
Output																						
	RS485 M	odbus RTU										L5										
		customer										9										consult
Seals																						
		FKM											1									
DVGW / KTW:		EPDM 1	'										3T									.,
Electrical		customer											9									consult
Electrical conn		Ø 7 4 \	2											0								
DVCW/KTW	PUR-cable (black, TPE-U-cable (blue,	Ø 7.4 mm)	1, 2											2 F								
DVGW/KIW:	IFE-U-Cable (blue,													9								concult
Accuracy		customer												9								consult
standard	0	.35 % FSO													3							
option		.25 % FSO													2							
орион	0	customer													9							consult
Cable length																						
		in m														9	9	9				
Special version	1																					
		standard																	0	0	0	
		customer																	9	9	9	consult

 $<sup>^{1}</sup>$  drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)  $^{2}$  shielded cable with integrated ventilation tube for atmospheric pressure reference



## **LMK 307**

#### **Stainless Steel Probe**

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

#### **Nominal pressure**

from  $0 \dots 4 \text{ mH}_2\text{O}$  up to  $0 \dots 250 \text{ mH}_2\text{O}$ 

#### **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
- excellent long term stability
- easy handling

#### **Optional versions**

- IS-version Ex ia = intrinsically safe for gas and dust
- SIL 2 (Safety Integrity Level) according to IEC 61508 / IEC 61511
- different kinds of cables and elastomers
- customer specific versions e. g. special pressure ranges

The level transmitter LMK 307 is designed for continuous level measurement in water or waste water applications. Basic element is a flush mounted ceramic sensor.

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

#### Preferred areas of use are



#### Water

drinking water systems ground water monitoring storm water systems



## Sewage

waste water treatment water recycling dumpsite



#### Fuel and oil

fuel storage tank farm biogas plants









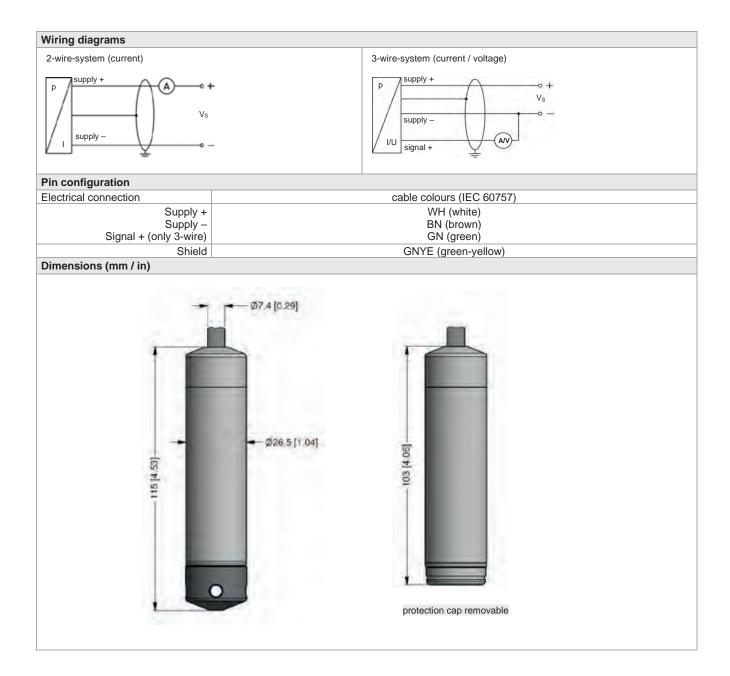






Input pressure range											
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	2	2	2	4	4	10	10	20	40	40
Burst pressure ≥	[bar]	4	4	4	5	5	12	12	25	50	50
Max. ambient pressure (housing): 40 bar											

Output signal / Supply		
Standard	2 wire: 4 20 mA / \/ 9 22\	/ CII version: \/ 44 20 \/
Option IS-version	2-wire: $4 \dots 20 \text{ mA} / V_S = 8 \dots 32 \text{ N}$	
Options 3-wire	2-wire: 4 20 mA / V <sub>S</sub> = 10 28 \ 3-wire: 0 20 mA / V <sub>S</sub> = 14 30 \	
·	0 20 MA / $V_S = 14 30 V_S$ 0 10 V / $V_S = 14 30 V_S$	
Performance		
Accuracy 1	≤ ± 0.5 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S min}) / 0.02]$	Α] Ω
	current 3-wire: $R_{max} = 500 \Omega$	
	voltage 3-wire: $R_{min} = 10 \text{ k }\Omega$	
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ
Response time	≤ 10 msec	
	it point adjustment (non-linearity, hysteresis, repea	tability)
Thermal effects (Offset and Span	-	
Thermal error	≤ ± 0.2 % FSO / 10 K	in compensated range 0 70 °C
Permissible temperatures		
Permissible temperatures	medium: -10 70 °C	storage: -25 70 °C
Electrical protection <sup>2</sup>		
Short-circuit protection	permanent	
Reverse polarity protection	no damage, but also no function	
Electromagnetic protection	emission and immunity according to EN 61	326
<sup>2</sup> additional external overvoltage protecti	on unit in terminal box KL 1 or KL 2 with atmosphe	ric pressure reference available on request
Electrical connection		
Cable with sheath material <sup>3</sup>	PVC ( -5 70 °C) grey Ø 7.4 mm	
	PUR (-10 70 °C) black Ø 7.4 mm	
	FEP 4 (-10 70 °C) black Ø 7.4 mm	
	others on request	
Bending radius	static installation: 10-fold cable diame	
2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	dynamic application: 20-fold cable diame	eter
	on tube for atmospheric pressure reference th an FEP cable if effects due to highly charging pr	ncesses are expected
Materials (media wetted)	aran i Er casic ii circote dae te riiginy chaiging pr	occours experies
Housing	stainless steel 1.4404 (316L)	
Seals	FKM	
	EPDM	
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP	
Explosion protection (only for 4.	20 mA / 2-wire)	
Approvals	IBEXU 10 ATEX 1068 X / IECEx IBE 12.0	0027X
DX19-LMK 307	zone 0: II 1G Ex ia IIC T4 Ga	· <del>-</del>
	zone 20: II 1D Ex ia IIIC T135 °C Da	
Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ m}$	nF, L <sub>i</sub> ≈ 0 μH,
	the supply connections have an inner capa	acity of max. 27 nF to the housing
Permissible temperatures for	in zone 0: -20 60 °C with patm 0.8 bar up	
environment	in zone 1: -40/-20 70 °C	
Connecting cables	cable capacitance: signal line/shield also	
(by factory)	cable inductance: signal line/shield also	signal line/signal line: 1 µH/m
Miscellaneous		
Option SIL 2 version <sup>5</sup>	according to IEC 61508 / IEC 61511	
Current consumption	signal output current: max. 25 mA	
	signal output voltage: max. 7 mA	
Weight	approx. 250 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
<sup>5</sup> only for 4 20mA / 2-wire		



#### Accessories



	Ordering	code LN	1K 307	7				
LMK 307	<u> </u>	- 🗆 - 🗆	-  -	-□-	Ш	]-[		
Pressure								
in bar	3 8 0							
in mH <sub>2</sub> O	3 8 0 3 8 1							
Input [mH <sub>2</sub> O] [bar]								
4 0.4	4 0 0 0							
6 0.6	6 0 0 0							
10 1.0	1 0 0 1							
16 1.6 25 2.5	1 6 0 1 2 5 0 1							
40 4.0	4 0 0 1							
60 6.0	6 0 0 1 1 0 0 2 1 6 0 2 2 5 0 2 9 9 9 9							
100 10	1 0 0 2							
160 16	1 6 0 2							
250 25	2 5 0 2							2272114
Housing	9 9 9 9					_		consult
stainless steel 1.4404 (316L)		1				_		
customer		9						consult
Diaphragm								
ceramics Al <sub>2</sub> O <sub>3</sub> 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		ES						
4 20 mA / 2-wire customer		9						consult
Seals		<u> </u>						Consuit
FKM			1					
EPDM			3					
customer			9					consult
Accuracy								
0.5 % FSO customer			5 9					consult
Electrical connection / cable length			3					Consuit
PVC-cable (grey, Ø 7.4 mm) <sup>1</sup>								
3 m				1	0 0	3		
5 m				1	0 0	5		
10 m				1		0		
15 m special length in m				1	0 1 9 9	5 a		
Special length in in				'	3 3	3		
PUR-cable (black, Ø 7.4 mm) <sup>1</sup>								
3 m				2	0 0	3		
5 m				2	0 0	5		
10 m				2	0 1 0 1	0		
15 m special length in m				2 2 2 2 2	0 1 9 9	9		
special ietigii III III				-	3 3			
FEP-cable (black, Ø 7.4 mm) <sup>1</sup>								
5 m				3	0 0	5		
10 m				3	0 1	0		
special length in m				3	9 9	9		
Special version standard						(	2 0 0	
customer						(	0 0 0	consult
33331101						`	- 1 - 1 -	Concart

 $<sup>^{\</sup>rm 1}$  shielded cable with integrated ventilation tube for atmospheric pressure reference



## **LMK 307T**

## Level and Temperature Transmitter

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

#### Nominal pressure / nominal temperature

from 0 ... 4 mH<sub>2</sub>O up to 0 ... 250 mH<sub>2</sub>O from 0 ... 30 °C up to 0 ... 70 °C others on request

#### **Output signals**

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

#### Special characteristics

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

#### **Optional versions**

- different kinds of cables and elastomers
- ▶ customer specific versions

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

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

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

#### Preferred areas of use are

#### <u>Water</u>



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



#### Sewage

waste water treatment, water recycling dumpsite, waste water tanks



#### Fuel and oil

fuel storage, tank farm, biogas plants

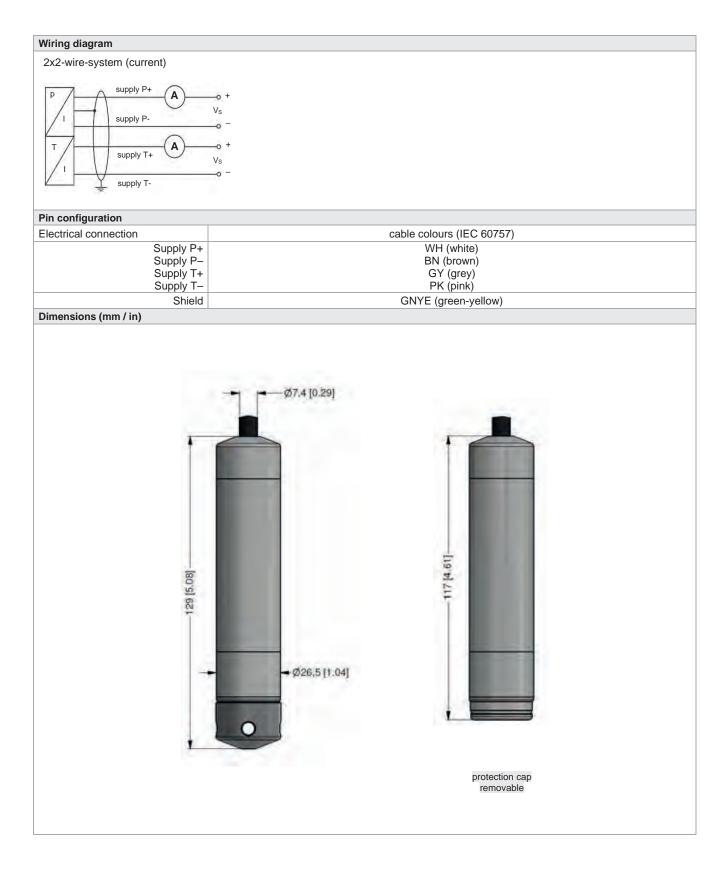


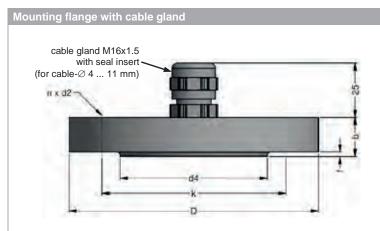




Input pressure range											
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	1	2	2	4	4	10	10	20	40	40
Burst pressure ≥	[bar]	2	4	4	5	5	12	12	25	50	50
Max. ambient pressure (housing): 40 bar											

Input temperature range									
Temperature measuring range	0 30 °C	0 50 °C	0 70 °C	others on request 1					
standard:		0 50 C	0 70 0	Others on request					
<sup>1</sup> min. temperature range: 30°C; max. temperature range: 80°C min. temperature: -10°C; max. temperature: 70 °C									
Output signal / Supply									
2-wire (pressure) <sup>2</sup>	$4 20 \text{ mA} / V_S = 10 30 V_{DC}$								
2-wire (temperature) <sup>2</sup>									
<sup>2</sup> 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 r	reference conditions							
Response time	< 10 msec (for output sig	nal 2-wire (pressure))							
<sup>3</sup> accuracy according to IEC 60770 – lim									
<sup>4</sup> Pt 100 class B; compensation time up	to 1 h depending on constant t	temperature and environmen	tal respectively mass condition	ns					
Thermal effects (Offset and Span)									
Thermal error	≤ ± 0.2 % FSO / 10 K		in compensated ran	ge 0 70 °C					
Permissible temperatures									
Permissible temperatures	medium: -10 70 °C		storage: -25 70 °0	<u> </u>					
Electrical protection 5									
Short-circuit protection	permanent								
Reverse polarity protection	no damage, but also no f	unction							
Electromagnetic compatibility	emission and immunity a	ccording to EN 61326							
<sup>5</sup> additional external overvoltage protecti	ion unit in terminal box KL 1 or	KL 2 with atmospheric press	ure reference available on re	quest					
Electrical connection									
Cable with sheath material <sup>6</sup>	PUR (-10 70 °C) bl	rey Ø 7.4 mm lack Ø 7.4 mm lack Ø 7.4 mm							
Cable capacitance	signal line/shield also si	ignal line/signal line: 160	pF/m						
Cable inductance	signal line/shield also si	ignal line/signal line: 1 μΗ	l/m						
Bending radius		0-fold cable diameter 0-fold cable diameter							
<ul> <li><sup>6</sup> shielded cable with integrated ventilati</li> <li><sup>7</sup> do not use freely suspended probes w</li> </ul>	on tube for atmospheric pressu		are expected						
Materials (media wetted)									
Housing	stainless steel 1.4404 (3°	16L)							
Seals	FKM EPDM others on request								
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96%								
Protection cap	POM-C								
Cable sheath	PVC, PUR, FEP								
Miscellaneous									
Current consumption	max. 25 mA								
Weight	approx. 250 g (without ca	ahle)							
Ingress protection	IP 68	abioj							
CE-conformity	EMC Directive: 2014/30/	FU							





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

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

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 1	0.5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless stee	el 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		
Ordering tune		Ordering code	Woight

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

#### Display program

CIT 200 Proces	s display	with LED	display
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CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

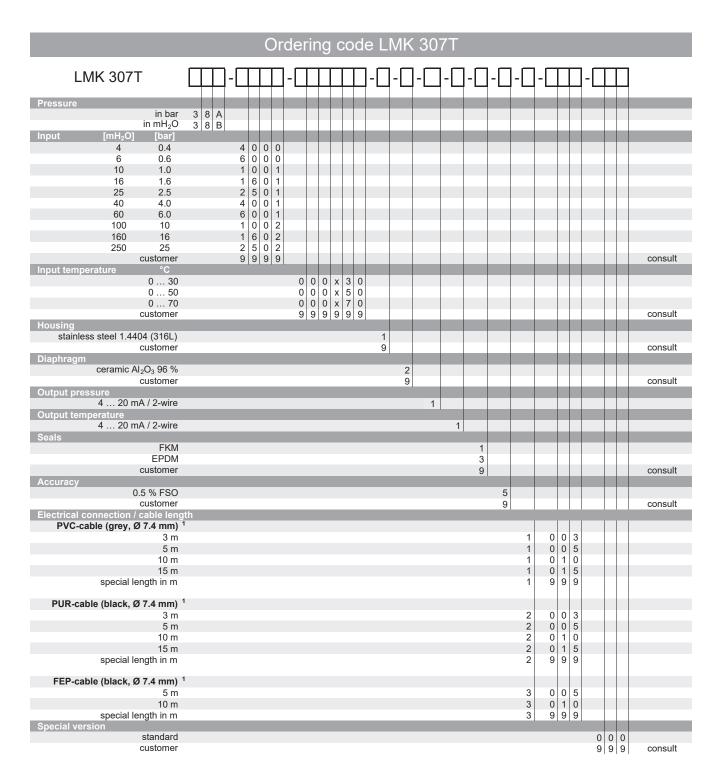
touchscreen and contacts

PA 440 Field display with 4-digit LC display

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



## LMK 307T



<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



## **LMK 358**

## **Detachable Stainless Steel Probe**

Ceramic Sensor

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

#### **Nominal pressure**

from 0 ... 40 cm $H_2O$  up to 0 ... 100 m $H_2O$ 

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

- IS-version Ex ia = intrinsically safe for gas and dust
- diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- different kinds of cables and elastomers

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

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

#### Preferred areas of use are



#### Water

ground water level measurement rain spillway basin



#### Sewage

waste water treatment water recycling

#### Fuel and oil



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





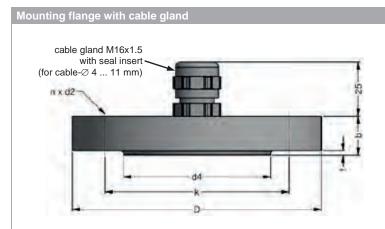




Input pressure range														
Nominal pressure gauge	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35
Max. ambient pressure (he	ousing): 4	0 bar												
0 / / : 1/0 1														

Output signal / Supply										
Standard	2-wire: $4 \dots 20 \text{ mA} / V_S = 9 \dots 32 V_{DC}$									
Option IS-version	2-wire: 4 20 mA / V <sub>S</sub> = 14 28 V <sub>DC</sub>									
Option 3-wire	-wire: 0 10 V / V <sub>S</sub> = 12.5 32 V <sub>DC</sub>									
Performance	V 50									
Accuracy <sup>1</sup>	ccuracy $^1$ standard: $\leq \pm 0.35$ % FSO option: $\leq \pm 0.25$ % FSO									
Permissible load	$R_{\text{max}} = [(V_S - V_{S  \text{min}}) / 0.02  \text{A}]  \Omega$									
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ									
Long term stability	≤ ± 0.1 % FSO / year at reference conditions									
Turn-on time	700 msec									
Mean response time	≤ 200 msec measuring rate 5/sec									
Max. response time	380 msec									
·	t point adjustment (non-linearity, hysteresis, repeatability)									
Thermal effects (offset and span)										
Tolerance band	≤±1% FSO									
in compensated range	-20 80 °C									
Permissible temperatures	-20 00									
Permissible temperatures	medium /electronic / environment: -25 125 °C									
remissible temperatures	storage: -40 125 °C									
Electrical protection <sup>2</sup>	10 120 0									
Short-circuit protection	permanent									
Reverse polarity protection	no damage, but also no function									
Lightning protection	2-wire: integrated 3-wire: without									
Electromagnetic compatibility	emission and immunity according to EN 61326									
	on unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request									
Electrical connection	The state of the s									
Cable with sheath material <sup>3</sup>	PVC ( -5 70 °C) grey Ø 7.4 mm									
Cable with sheath material	PUR (-25 70 °C) black Ø 7.4 mm FEP ⁴ (-25 70 °C) black Ø 7.4 mm									
Bending radius	TPE-U (-25 125 °C) blue Ø 7.4 mm static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter									
	th an FEP cable if effects due to highly charging processes are expected									
Materials (media wetted)	Truit Li Saule ii Shoote das to highly sharging processes are expected									
Housing	stainless steel 1.4404 (316L)									
Seals	FKM									
	EPDM others on request									
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 % option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %									
Protection cap	POM-C									
Cable sheath	PVC, PUR, FEP, TPE-U									
Explosion protection (only for 4.	20 mA / 2-wire)									
Approval DX14-LMK 358	IBEXU05ATEX1070 X									
	Zone 0: II 1G Ex ia IIB T4 Ga Zone 20: II 1D Ex ia IIIC T110 °C Da									
Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i = 14 \text{ nF}, L_i \approx 0  \mu\text{H}, C_{gnd} = 27 \text{ nF}$									
Permissible temperature	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar zone 1 or higher: -25 70 °C									
Connecting cables	cable capacity: signal line / shield also signal line / signal line: 220 pF/m									
(by factory)	cable inductance: signal line / shield also signal line / signal line: 1.5 µH/m									
Miscellaneous										
Current consumption	max. 21 mA									
Weight	approx. 650 g (without cable)									
Ingress protection	IP 68									
CE-conformity	EMC Directive: 2014/30/EU									
ATEX Directive	2014/34/EU									





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

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

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 10.	5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel 1.4301 (304)	
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		

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

#### Display program

CIT 200	Process	display	with	LED	display
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CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

PA 440 Field display with 4-digit LC display

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



## LMK 358

Ordering code

Pressure					Orc	ler	ing	CC	ode	LN	ΛK	358	3						
Input   ImH <sub>2</sub> O   Ibar	L	MK 358			<b>]</b> -[	П	T	-[	<b>]</b> -[	]-[	]-[	<b>∐</b> -□	]-[	-[		]-[		П	
Input	Pressure																		
Input				4 4	5												Т		
Input				4 4	6														
1.6 0.16 1 6 0 0 0 2.25 2 5 0 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Input																		
1.6 0.16 1 6 0 0 0 2.25 2 5 0 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						4	0 0												
1.6 0.16 1 6 0 0 0 2.25 2 5 0 0 0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0						6	0 0												
2.5 0.26						0	0 0												
4.0						6	0 0												
6.0 0.60					2	5	0 0												
10						0	0 0												
40						0	0 0												
40						0	0 1												
40						6	0 1												
Consult					2	5	0 1												
Customer						0	0 1												
Customer					6	0	0 1												
Stainless steel 1.4404 (316L)		100			1	0	0 2												
Stainless steel 1.4404 (316L)	11		customer		9	9	9   9										_		consult
Diaphragm		-:	104 (0401)																
Diaphragm   Ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	Sta	ainiess steel 1.44	. ,																
Ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %	Diankraam		customer			_	_	9									-		consult
Ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %	Diaphragm	coromics /	VI O 06 %						0										
Output         4 20 mA / 2-wire         1         0 10 V / 3-wire         3         0 10 V / 3-wire         3         0 10 V / 3-wire         1         0 10 V / 3-wire         3         0 10 V / 3-wire         1         0 10 V / 3-wire         1         0 10 V / 3-wire         1         0 10 V / 3-wire         2         0 10 V / 3-wire         2         0 10 V / 3-wire         2         0 10 V / 3-wire         0 10 V / 3-wire         2         0 10 V / 3-wire									2										
Output       4 20 mA / 2-wire       1         0 10 V / 3-wire       3         intrinsic safety 4 20 mA / 2-wire       E         customer       9         FKM       1         EPDM       3         Customer       9         Electrical connection         PVC-cable (grey, Ø 7.4 mm) <sup>1</sup> 1         PUR-cable (black, Ø 7.4 mm) <sup>1</sup> 2         FEP-cable (black, Ø 7.4 mm) <sup>1</sup> 3         TPE-U-cable (blue, Ø 7.4 mm) <sup>1</sup> 4         Customer       9         standard       0.35 % FSO         option       0.25 % FSO         customer       9         Cable length         in m       9 9 9         Special version		Ceramics Ai <sub>2</sub>	-						0										concult
4 20 mA / 2-wire	Output		customer						9										Consuit
O 10 V / 3-wire   3	Output	4 20 m	οΛ / 2-wiro							1							-		
Customer   9										3									
Customer   9	intrincio									5 F									
Seals         FKM         1         1         1         1         1         1         1         1         1         1         1         1         1         1         2         2         1         1         1         1         1         1         1         1         2         1         1         2         1         1         2         1         1         2         1         2         1         2         2         1         2 </td <td>1111111310</td> <td>Salety 4 20 11</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>a</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>consult</td>	1111111310	Salety 4 20 11								a									consult
FKM EPDM 3 Customer 9 Consult  Electrical connection  PVC-cable (grey, Ø 7.4 mm) 1	Spale		Customer							3									Consuit
EPDM customer 9 consult  Electrical connection  PVC-cable (grey, Ø 7.4 mm) 1 1	Jears		FKM								1						_		
customer         9         Consult           Electrical connection         PVC-cable (grey, Ø 7.4 mm) <sup>1</sup> 1           PUR-cable (black, Ø 7.4 mm) <sup>1</sup> 2         1           FEP-cable (black, Ø 7.4 mm) <sup>1</sup> 3         1           TPE-U-cable (blue, Ø 7.4 mm) <sup>1</sup> 4         1           customer         9         Consult           Accuracy         Standard         0.35 % FSO         3         0           option         0.25 % FSO         2         0         0           customer         9         Consult           Cable length         in m         9 9 9         Consult           Special version         5 9 9 9         0         0 0 0																			
PVC-cable (grey, Ø 7.4 mm)   1																			consult
PVC-cable (grey, Ø 7.4 mm) 1 1 2	Electrical conn	nection																	33341
PUR-cable (black, Ø 7.4 mm) 1 2 3 3 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5			Ø 7.4 mm) <sup>1</sup>									1							
FEP-cable (black, Ø 7.4 mm) 1																			
TPE-U-cable (blue, Ø 7.4 mm) 1	FE	P-cable (black,	Ø 7.4 mm) <sup>1</sup>									3							
customer         9         Consult           Accuracy         Standard         0.35 % FSO         3         0           option         0.25 % FSO         2         0           customer         9         0         consult           Cable length         in m         9 9 9         0         consult           Special version																			
Accuracy standard		, , ,																	consult
option 0.25 % FSO 2 2 Customer 9 Consult  Cable length 9 9 9 Consult  Special version 5 standard 0 0 0 0	Accuracy																		
option 0.25 % FSO 2 2 Customer 9 Consult  Cable length 9 9 9 Consult  Special version 5 standard 0 0 0 0	standard	0.	35 % FSO										3						
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in m 9 9 9 9 Special version Standard 0 0 0 0			customer										9						consult
Special version standard 0 0 0 0	Cable length																		
standard 0 0 0 0			in m											9	9 9	)			
standard         0 0 0           customer         9 9 9           consult	Special version	n																	
customer 9 9 9  consult																	0 0	0 0	
			customer														9   9	9   9	consult

<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



## **LMK 358H**

**Detachable Stainless** Steel Probe with HART®-Communication

Ceramic Sensor

accuracy according to IEC 60770: 0.1 % FSO

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

- **IS-version** Ex ia = intrinsically safe for gas and dust
- diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- accessories e.g. mounting flange with cable gland and terminal clamp

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

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

#### Preferred areas of use are



#### Water

ground water level measurement rain spillway basin



#### Sewage

waste water treatment water recycling

#### Fuel and oil



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









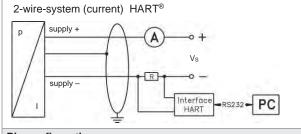


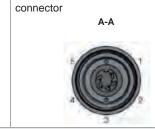
Input pressure range 1										
Nominal pressure gauge	[bar]	0.06	0.16	0.4	1	2	5	10		
Level	[mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100		
Overpressure	[bar]	2	4	6	8	15	25	35		
Max. ambient pressure (ho	Max. ambient pressure (housing): 40 bar									
¹ on customer request we adju	ıst the devic	es by software	on the required p	ressure ranges, i	within the turn-do	own-possibility (s	tarting at 0.02 ba	r)		

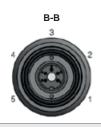
Output signal / Supply Standard	2-wire: 4 20 mA	/ V <sub>s</sub> = 12	36 V <sub>DC</sub> with HART® comm	unication	$V_{S rated} = 24 V_{DO}$
Option IS-version	2-wire: 4 20 mA		28 V <sub>DC</sub> with HART® comm		$V_{S \text{ rated}} = 24 V_{DO}$
Performance	2-WIIE. 4 20 IIIA	/ VS = 12	20 VDC WITH TIART COMM	idilication	V S rated — Z4 V DC
Accuracy <sup>2</sup>	p <sub>N</sub> ≥ 160 mbar	TD ≤ 1:5	< 10.2 % FSO		TD <sub>max</sub> = 1:10
Accuracy -	p <sub>N</sub> ≥ 160 mbar	TD ≤ 1:5 TD > 1:5	$\leq$ ± 0.2 % FSO $\leq$ ± [0.2 + 0.03 x TD] %	ESO	1D <sub>max</sub> = 1.10
	p <sub>N</sub> < 160 mbar	10 > 1.5	≤ ± [0.2 + 0.03 x 1D] % ≤ ± [0.2 + 0.1 x TD] % F		TD <sub>max</sub> = 1:3
	$p_N \ge 1$ bar	TD ≤ 1:5	≤±[0.2+0.1 x 1D] % F ≤±0.1 % FSO	30	$TD_{max} = 1.3$ $TD_{max} = 1:10$
	PN = 1 bai	TD ≥ 1.5	$\leq \pm 0.1 \% 130$ $\leq \pm [0.1 + 0.02 \times TD] \%$	FSO	1D <sub>max</sub> = 1.10
Permissible load	$R_{\text{max}} = [(V_{S} - V_{S \text{ min}}) /$		load at HART®-commur		250.0
Long term stability			r at reference conditions	iloation. It <sub>min</sub> –	200 32
Influence effects		SO / 10 V	at reference conditions		
illiaeriee erieete	load: 0.05 % F				
Turn-on time	850 msec	007102			
Mean response time		consideration of	of electronic damping	measur	ing rate 7/sec
Max. response time	380 msec	oonolaaration c	n crockerine damping	mododi	ing rate 17000
Adjustability	1	wing paramete	rs possible (interface / softwa	re necessary	3)
rajuotabiity	- electronic dampir	ng 0 100 sec	io possible (interface) serime	il o Tiococcai y	,
	- offset: 0 80 %				
	- turn-down of spa				
<sup>2</sup> accuracy according to IEC 60770 – li <sup>3</sup> software, interface, and cable have to	o be ordered separately (so	oftware appropria		Version 4.0 or I	nigher, and XP)
Thermal effects (offset and spa	<u> </u>	eratures			
Tolerance band	≤ ± 1 % FSO				
in compensated range	-20 80 °C				
Permissible temperatures	medium / electronic	/ environment /	storage: -25 85 °C		
Electrical protection <sup>4</sup>					
Short-circuit protection	permanent				
Reverse polarity protection	no damage, but also	no function			
Lightning protection	integrated				
Electromagnetic compatibility	emission and immur	nity according to	o EN 61326		
<sup>4</sup> additional external overvoltage protection	ction unit in terminal box Kl	1 or KL 2 with a	tmospheric pressure reference a	vailable on reque	est
Mechanical stability					
Vibration	4 g (according to: D	IN EN 60068-2	-6)		
Electrical connection					
Cable with sheath material <sup>5</sup>	PVC (-5 70 °	C) grey Ø	7.4 mm		
	PUR (-25 70 °		7.4 mm		
	FEP 6 (-25 70 °				
	TPE-U (-2585 °C		7.4 mm		
Bending radius	static installation:		ole diameter		
5 abiolded cable with intermeted !!!-	dynamic application		ole diameter		
<ul> <li><sup>5</sup> shielded cable with integrated ventila</li> <li><sup>6</sup> do not use freely suspended probes</li> </ul>					
Materials (media wetted)			5 5 p		
Housing	stainless steel 1.440	04 (316L)			
Seals	FKM, EPDM, others	, ,			
Diaphragm	standard: ceramics		option: ceramics	Al <sub>2</sub> Ω <sub>2</sub> 99 9 %	
Protection cap	POM-C	11203 00 70	option. Geranics	11203 00.0 70	
Cable sheath	PVC, PUR, FEP, TF	PF-11			
Explosion protection	I VO, I ON, I LF, IF	_ 0			
<u> </u>	IDEVITAD ATEV 440	DE V			
Approval DX15A-LMK 358H	IBExU 10 ATEX 118 zone 0: II 1G Ex	ia IIB T4 Ga			
	zone 20: II 1D Ex		Da		
Safety technical maximum values			$C_i = 13.2 \text{ nF}, L_i = 0 \mu H,$		
ca.c., toomica maximum values			ner capacity of max. 27 nF op	posite the enc	losure
Permissible media temperature	in zone 0:	-20 60 °C w	ith p <sub>atm</sub> 0.8 bar up to 1.1 bar	,	
	zone 1 or higher:	-25 70 °C	, 2011		
	Zone i oi nignei.	-23 10 0			
Connecting cables			eld also signal line/signal line:	160 pF/m	

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

#### Wiring diagram



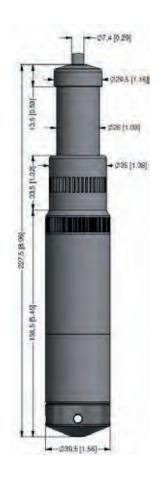




Pin	con	rigur	ratio	n

i iii ooiiiigaraaloii		
Electrical connection	Binder series 723 7 (5-pin)	cable colours (IEC 60757)
Supply +	3	WH (white)
Supply –	1	BN (brown)
Shield	5	GNYE (green-yellow)
<sup>7</sup> if detached		

#### Dimensions (mm / in)



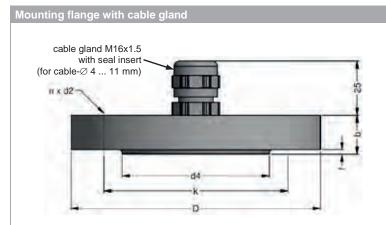




protection cap removable

sensor head and cable detached

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

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

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 1	0.5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless stee	el 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		
Ordering type		Ordering code	Weight

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

#### Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

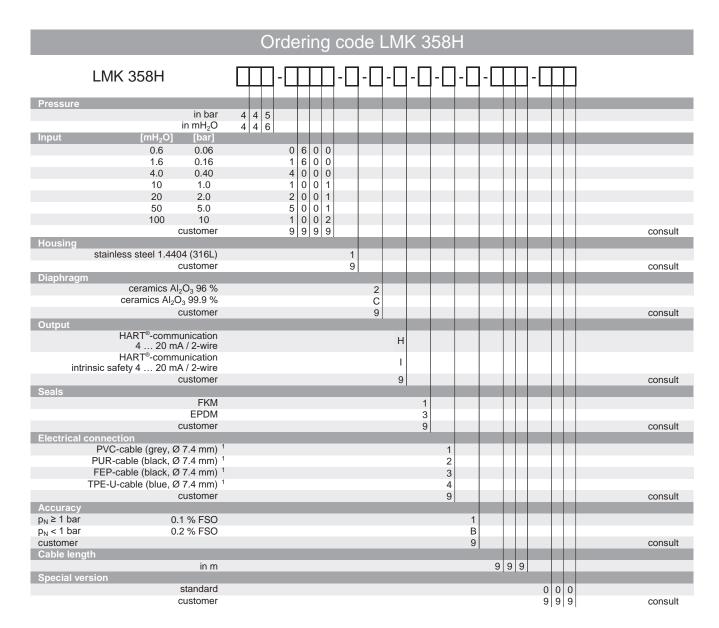
CIT 700 / CIT 750 Multichannel process display with graphics-capable TFT monitor,

touchscreen and contacts

PA 440 Field display with 4-digit LC display

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





<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

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## **LMK 382**

### **Stainless Steel Probe**

Ceramic Sensor

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

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

- IS-version Ex ia = intrinsically safe for gas and dust
- temperature element Pt 100
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- different kinds of cables and elastomers

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

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

#### Preferred areas of use are



Water

drinking water abstraction



Sewage

waste water treatment water recycling





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









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

Output signal / Supply							
Standard	2-wire: 4 20 mA / $V_S = 9$ 32 $V_{DC}$						
Option IS-version	2-wire: 4 20 mA / V <sub>S</sub> = 14 28 V						
Option 3-wire	3-wire: 0 10 V / V <sub>S</sub> = 12.5 32	$V_{DC}$					
Option temperature element Pt 10	00 <sup>1</sup>						
Temperature range	-25 125 °C						
Connectivity technology	3-wire	max. voltage	$10 \text{ V}_{DC}$ , in intrinsically safe circuit $30 \text{ V}_{DC}$				
Resistance	100 Ω at 0 °C	max. current					
Temperature coefficient	3850 ppm/K	max. power 1					
Supply I <sub>S</sub>	0.3 1.0 mA <sub>DC</sub>						
only in combination with 4 20 mA / 2	-wire (standard and IS-version)	ı					
Performance							
Accuracy <sup>2</sup>	standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO						
Permissible load	$R_{\text{max}} = [(V_S - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$						
Influence effects	supply: 0.05 % FSO / 10 V						
	load: 0.05 % FSO / kΩ						
Long term stability	≤ ± 0.1 % FSO / year at reference c	onditions					
Turn-on time	700 msec						
Mean response time	< 200 msec		measuring rate 5/sec				
Max. response time	380 msec						
<sup>2</sup> accuracy according to IEC 60770 – lim	it point adjustment (non-linearity, hysteresi	s, repeatability)					
Thermal effects (offset and span)							
Tolerance band	≤ ± 1 % FSO						
in compensated range	-20 80 °C						
Permissible temperatures							
Permissible temperatures	medium / electronics / environment	/ storage:	-25 125 °C				
Electrical protection <sup>3</sup>		-					
Short-circuit protection	permanent						
Reverse polarity protection	no damage, but also no function						
Electromagnetic compatibility	emission and immunity according to	EN 61326					
	on unit in terminal box KL 1 or KL 2 with at		sure reference available on request				
Electrical connection							
Cable with sheath material <sup>4</sup>	PUR (-25 70 °C) black (FEP 5 (-25 70 °C) black (FEP-U (-25 125 °C) blue (FEP-U (-25 125 °C) blue	Ø 7.4 mm Ø 7.4 mm Ø 7.4 mm Ø 7.4 mm Ø 9.0 mm					
Bending radius	static installation: 10-fold of	cable diameter					
<sup>5</sup> do not use freely suspended probes wit	nn tube for atmospheric pressure reference th an FEP cable if effects due to highly cha plosion protection) and temperature elemer	rging processes	are expected				
Materials (media wetted)							
Housing	stainless steel 1.4404 (316 L)						
Seals	FKM, FFKM, EPDM others on request						
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 %						
Diapiliagili	option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %						
Protection cap	POM-C						
Cable sheath	PVC, PUR, FEP, TPE-U						

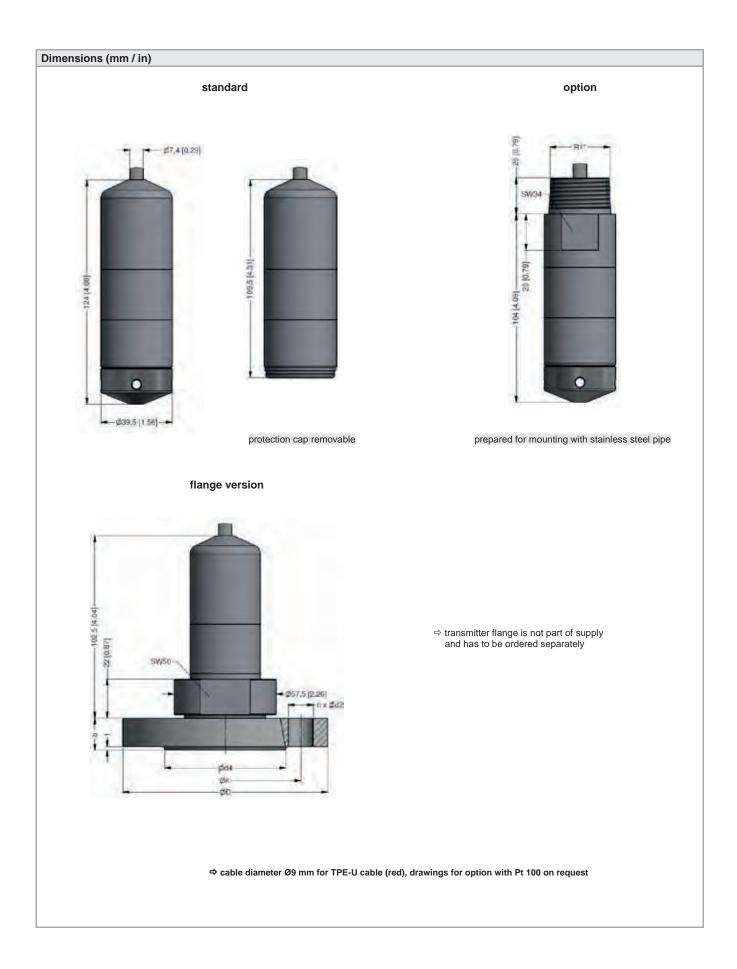
Explosion protection (only for	4 20 mA / 2-wire)
Approval DX14-LMK 382	IBExU05ATEX1070 X
	zone 0 7: II 1G Ex ia IIB T4 Ga
Cofety to abaical manyimy was value	zone 20: II 1D Ex ia IIIC T110 °C Da
Safety technical maximum values (pressure)	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i = 14 \text{ nF}, L_i \approx 0  \mu\text{H}, C_{god} = 27 \text{ nF}$
Safety technical maximum values (temperature)	$U_i = 30 \text{ V}, I_i = 54 \text{ mA}, P_i = 405 \text{ mW}, C_i = 0 \text{ nF}, L_i = 0  \mu\text{H} \text{ (temperature element Pt 100)}$
Permissible media temperature	in zone 0: -10 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar zone 1 and higher: -10 70 °C
Connecting cables	cable capacitance: signal line/shield also signal line/signal line: 220 pF/m
(by factory)	cable inductance: signal line/shield also signal line/signal line: 1.5 μH/m
<sup>7</sup> for optional stainless steel pipe follow	ring designation is valid: "II 1G Ex ia IIC T4 Ga" (zone 0)
Miscellaneous	
Option cable protection for probes	prepared for mounting with stainless steel pipe
Current consumption	max. 21 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU
Wiring diagrams	
2-wire-system current (pressure) / 3-1  supply V <sub>S</sub> +  A  supply V <sub>S</sub> - supply T- supply T- supply T-	vire-system (temperature Pt 100)
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply V <sub>S</sub> Supply V <sub>S</sub>	+ WH (white)
for Pt 100: Supply T Supply T Supply T	GY (grey) PK (pink)
for 2 wire: Signal	CN (groop)

GN (green)
GNYE (green-yellow)

for 3-wire:

Signal +

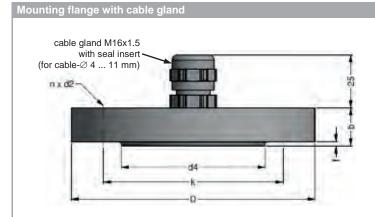
Shield





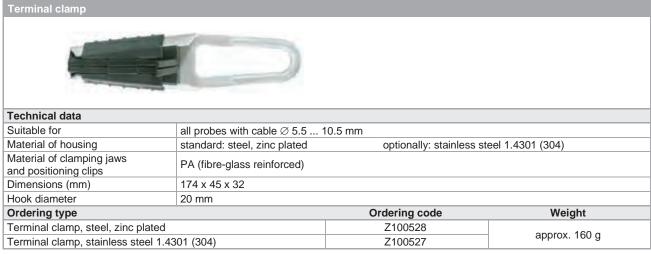
dimensions in mm					
size	DN25 / PN40	DN50 / PN40	DN80 / PN16		
b	18	20	20		
D	115	165	200		
d2	14	18	18		
d4	68	102	138		
f	2	3	3		
k	85	125	160		
n	4	4	8		

Technical data					
Suitable for	LMK 382, LMK 382H, LMK 458	LMK 382, LMK 382H, LMK 458, LMK 458H			
Flange material	stainless steel 1.4404 (316L)				
Hole pattern	according to DIN 2507				
Ordering type		Ordering code	Weight		
Transmitter flange DN25 / PN40		ZSF2540	1.2 kg		
Transmitter flange DN50 / PN40		ZSF5040	2.6 kg		
Transmitter flange DN80 / PN16		ZSF8016	4.1 kg		



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

Technical data					
Suitable for	all probes				
Flange material	stainless steel 1.4404 (316L)				
Material of cable gland	standard: brass, nickel plated on request: stainless steel 1.4305 (303); plastic				
Seal insert	material: TPE (ingress protection IP 68)				
Hole pattern	according to DIN 2507				
Ordering type		Ordering code	Weight		
DN25 / PN40 with cable gland brass	s, nickel plated	ZMF2540	1.4 kg		
DN50 / PN40 with cable gland brass	s, nickel plated	ZMF5040	3.2 kg		
DN80 / PN16 with cable gland brass	s, nickel plated	ZMF8016	4.8 kg		



	Ordering code LMK 382	
LMK 382	□ - □ - □ - □ - □ - □ - □ - □ - □ - □	-
Pressure in bar in mH <sub>2</sub> O	5 6 5 5 6 6	
Input [mH <sub>2</sub> O] [bar] 0.4 0.04 0.6 0.06 1.0 0.10 1.6 0.16 2.5 0.25 4.0 0.40 6.0 0.60	0 4 0 0 0 6 0 0 1 0 0 0 1 6 0 0 2 5 0 0 4 0 0 0 6 0 0 0	
10 1.0 16 1.6 25 2.5 40 4.0 60 6.0 100 10 160 16 200 20 customer	1 0 0 1 1 6 0 1 2 5 0 1 4 0 0 1 6 0 0 1 1 1 0 0 2 1 6 0 2 2 0 0 2 9 9 9 9	consult
Housing stainless steel 1.4404 (316L)	1	
Diaphragm  ceramics Al <sub>2</sub> O <sub>3</sub> 96 %  ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %	2 C	
Output  4 20 mA / 2-wire 0 10 V / 3-wire intrinsic safety 4 20 mA / 2-wire	1 3 E	
Seals FKM EPDM FFKM	1 3 7	
Electrical connection / cable length  PVC-cable (grey, Ø 7.4 mm) <sup>1</sup>		
3 m 5 m 10 m 15 m 20 m special length in m	1 0 0 3 1 0 0 5 1 0 1 0 1 0 2 0 1 9 9 9	
PUR-cable (black, Ø 7.4 mm) <sup>1</sup>	1 999	
3 m 5 m 10 m 15 m 20 m special length in m	2 0 0 3 2 0 0 5 2 0 1 0 2 0 1 5 2 0 2 0 2 9 9 9	
FEP-cable (black, Ø 7.4 mm) <sup>1</sup>		
5 m 10 m special length in m	3 0 0 5 3 0 1 0 3 9 9 9	
TPE-U-cable (blue, Ø 7.4 mm) <sup>1</sup> special length in m	4 999	
TPE-U-cable (red, Ø 9.0 mm) special length in m	42 9999	
Accuracy standard 0.35 % FSO option 0.25 % FSO Special version	3 2	
standard with temperature sensor Pt 100 <sup>3</sup> prepared for mounting with stainless steel pipe <sup>4</sup>		0 0 0 0 1 3 5 0 2
flange version <sup>5</sup> customer		5 1 0 9 9 9 consult

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



# **LMK 382H**

# **Stainless Steel Probe** with HART®-communication

Ceramic Sensor

accuracy according to IEC 60770: 0.1 % FSO

#### **Nominal pressure**

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

#### **Output signals**

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

#### Special characteristics

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

#### **Optional versions**

- IS-version Ex ia = intrinsically safe for gas and dust
- mounting with stainless steel pipe
- flange version
- diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- accessories e.g. transmitter and mounting flanges and terminal clamp

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

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

#### Preferred areas of use are



#### Water

ground water level measurement rain spillway basins



### Sewage

waste water treatment water recycling





level monitoring in open tanks with low filling heights

fuel storage

tank farms

biogas plants









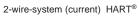


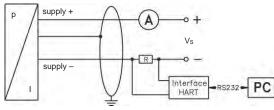
Pressure ranges 1									
Nominal pressure	[bar]	0.06	0.16	0.4	1	2	5	10	20
Level	[mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100	200
Overpressure	[bar]	2	4	6	8	15	25	35	45
Max. ambient pressure (housing): 40 bar									
on customer request we adjust the devices by software on the required pressure ranges, within the turn-down possibility (starting at 0.02 bar).									

Output signal / Supply					
Standard	2-wire: 4 20 mA / V <sub>s</sub>	= 12 36	V <sub>DC</sub> with HART® commu	nication	$V_{S rated} = 24 V_{DC}$
Option IS-version			V <sub>DC</sub> with HART® commu		$V_{S rated} = 24 V_{DC}$
Performance					o raiou Do
Accuracy <sup>2</sup>	p <sub>N</sub> ≥ 160 mbar	TD ≤ 1:5	≤ ± 0.2 % FSO		TD <sub>max</sub> = 1:10
,	"	TD > 1:5	$\leq$ ± [0.2 + 0.03 x TD]	% FSO	Thus.
	p <sub>N</sub> < 160 mbar		≤ ± [0.2 + 0.1 x TD] %	FSO	TD <sub>max</sub> = 1:3
	p <sub>N</sub> ≥ 1 bar	TD ≤ 1:5	≤ ± 0.1 % FSO		TD <sub>max</sub> = 1:10
		TD > 1:5	$\leq$ ± [0.1 + 0.02 x TD]		
Permissible load	$R_{\text{max}} = [(V_{S} - V_{S \text{ min}}) / 0.$	02 A] Ω	load at HAR	<sup>™</sup> -communication	$R_{min} = 250 \Omega$
Long term stability	≤ ± (0.1 x turn-down) %	6 FSO / year	at reference conditions		
Influence effects	supply: 0.05 % FSO / 1	10 V	permissible l	oad: 0.05 % FSO	′kΩ
Turn-on time	850 msec				
Mean response time	140 msec without cons	ideration of e	lectronic damping	mean me	asuring rate 7/sec
Max. response time	380 msec				
Adjustability	<ul><li>electronic damping</li><li>offset:</li><li>turn down of span:</li></ul>	0 100 0 80 % max. 1:1	6 FSO 0	tware necessary <sup>3</sup>	):
<sup>2</sup> accuracy according to IEC 60770 – limi: <sup>3</sup> software, interface, and cable have to b				NT Version 4.0 or hig	gher, and XP)
Thermal effects (offset and span)	< 1.4 % FOO				
Tolerance band	≤±1%FSO				
in compensated range	-20 80 °C				
Permissible temperatures	1				
Permissible temperatures	medium / electronics /	environment	/ storage: -25 85	<u>°C</u>	
Electrical protection <sup>4</sup>					
Short-circuit protection	permanent				
Reverse polarity protection	no damage, but also no function				
Electromagnetic compatibility	emission and immunity				
<sup>4</sup> additional external overvoltage protection	on unit in terminal box KL 1	or KL 2 with atn	nospheric pressure reference	available on reques	t
Mechanical stability					
Vibration	4 g (according to: DIN	EN 60068-2-0	6)		
Electrical connection					
Cable outlet with sheath material <sup>5</sup>	PVC (-5 70 °C) PUR (-25 70 °C) FEP <sup>6</sup> (-25 70 °C) TPE-U (-25 85 °C)	black Ø black Ø	7.4 mm 7.4 mm 7.4 mm 7.4 mm		
Bending radius	static installation: dynamic application:		ole diameter ole diameter		
<sup>5</sup> shielded cable with integrated ventilation					
<sup>6</sup> do not use freely suspended probes with	n an FEP cable if effects du	e to highly char	ging processes are expected		
Materials		(0.4.0.1.)			
Housing	stainless steel 1.4404	· ,			
Seals	FKM, FFKM, EPDM, o		est		
Diaphragm	<del>                                     </del>	I <sub>2</sub> O <sub>3</sub> 96 % I <sub>2</sub> O <sub>3</sub> 99.9 %			
Protection cap	POM-C				
Cable sheath	PVC, PUR, FEP, TPE-	U, others on	request		
Explosion protection					
Approval DX15A-LMK 382H		IIB T4 Ga	Da .		
	zone 20: II 1D Ex ia				
Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, F$	$P_i = 660 \text{ mW},$	$C_i = 13.2 \text{ nF}, L_i = 0 \mu\text{H},$ er capacity of max, 27 nF	opposite the enclo	osure
Safety technical maximum values Permissible media temperature	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, F the supply connections in zone 0: -1	P <sub>i</sub> = 660 mW, s have an inne 0 60 °C wit	$C_i$ = 13.2 nF, $L_i$ = 0 $\mu$ H, er capacity of max. 27 nF h $p_{atm}$ 0.8 bar up to 1.1 ba		osure
	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, F the supply connections in zone 0: -1 zone 1 or higher: -2 cable capacitance: sig	P <sub>i</sub> = 660 mW, s have an inne 0 60 °C wit 5 70 °C gnal line/shiel	er capacity of max. 27 nF	ne: 160 pF/m	osure

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

#### Wiring diagram

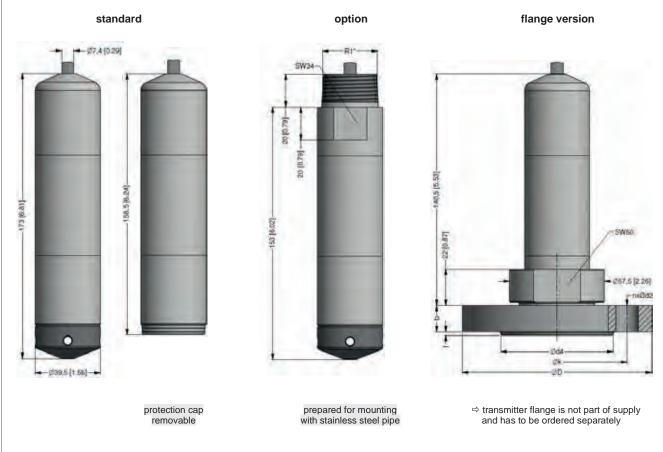




#### Pin configuration

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

#### Dimensions (mm / in)



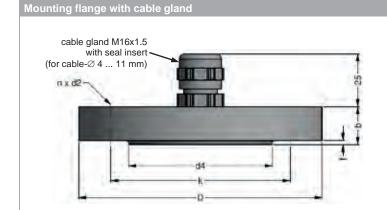
HART® is a registered trade mark of HART Communication Foundation; Windows® is a registered trade mark of Microsoft Corporation



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

Technical data			
Suitable for	LMK 382, LMK 382H, LMK 458	3, LMK 458H	
Flange material	stainless steel 1.4404 (316L)		
Hole pattern	according to DIN 2507		
Oudening true		Oudouina a a da	Majaht

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



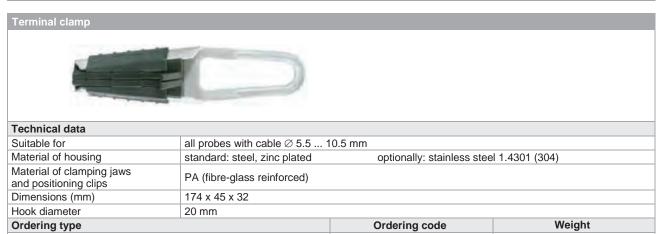
Terminal clamp, steel, zinc plated

Terminal clamp, stainless steel 1.4301 (304)

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

Technical data			
Suitable for	all probes		
Flange material	stainless steel 1.4404 (316L)		
Material of cable gland	standard: brass, nickel plated	on request: stainless stee	el 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection	on IP 68)	
Hole pattern	according to DIN 2507		
0 1 1 4		Ondering a sele	Mainlet

Hole pattern	according to Dirt 2007		
Ordering type		Ordering code	Weight
DN25 / PN40 with cable gland brass	s, nickel plated	ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass	s, nickel plated	ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass	s, nickel plated	ZMF8016	4.8 kg



Z100528

Z100527

approx. 160 g

Ordering code

	Ordering code LMK	( 382H
LMK 382H		-0-0-0
Pressure		
in bar	5 6 5	
in mH <sub>2</sub> O	5 6 6	
Input [mH <sub>2</sub> O] [bar]		
0.6 0.06	0 6 0 0	
1.6 0.16	1 6 0 0	
4.0 0.40	4 0 0 0	
10 1.0	1 0 0 1	
20 2.0	2 0 0 1	
50 5.0 100 10	5 0 0 1 1 1 0 0 2	
200 20	2 0 0 2	
customer	2 0 0 2 9 9 9	consult
Housing		Consuit
stainless steel 1.4404 (316L)	1	
customer	9	consult
Diaphragm		
ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	2	
ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %	С	
customer	9	consult
Output		
HART®-communication	н	
4 20 mA / 2-wire		
HART <sup>®</sup> -communication intrinsic safety 4 20 mA / 2-wire	I	
customer	9	consult
Seals		Consuit
FKM		1
EPDM		3
FFKM		7
customer		9 consult
Electrical connection		
PVC-cable (grey, Ø 7.4 mm) <sup>1</sup>		1
PUR-cable (black, Ø 7.4 mm) <sup>1</sup>		2
FEP-cable (black, Ø 7.4 mm) <sup>1</sup>		3
TPE-U-cable (blue, Ø 7.4 mm) <sup>1</sup>		4
customer		9 consult
Accuracy $p_N \ge 1$ bar: 0.1 % FSO		1
$p_N \ge 1 \text{ bar}$ . 0.1 % FSO $p_N < 1 \text{ bar}$ : 0.2 % FSO		B
customer		9 consult
Cable length		Consuit
in m		9 9 9
Special version		
standard		0 0 0
prepared for mounting		5 0 2
with stainless steel pipe 2		
flange version <sup>3</sup>		5 1 0
customer		9   9   9   consult

<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

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<sup>&</sup>lt;sup>2</sup> stainless steel pipe is not part of the supply

<sup>&</sup>lt;sup>3</sup> mounting accessories are not part of supply and have to be ordered separately



# **LMK 387**

#### Stainless Steel Probe

Ceramic Sensor

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

#### **Nominal pressure**

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

#### **Output signal**

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

#### **Special characteristics**

- diameter 22 mm
- diaphragm ceramics 99.9% Al<sub>2</sub>O<sub>3</sub>
- good long-term stability
- especially for waste water

#### **Optional versions**

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

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

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

#### Preferred areas of use



groundwater and level monitoring



Sewage

waste water treatment water recycling



Fuel and oil

tank battery biogas plants





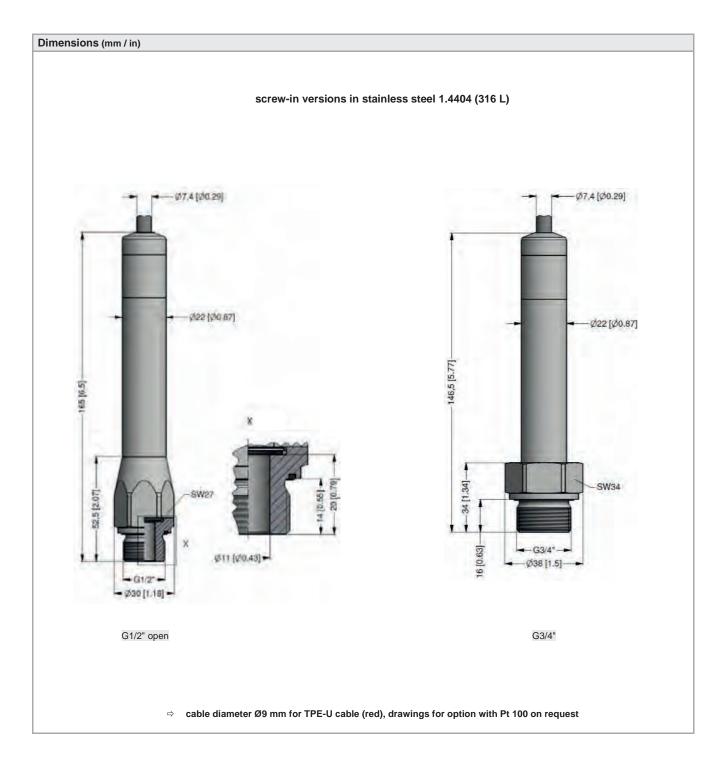




Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	1.6	25	40	60	100
Overpressure	[bar]	3	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3	-	_	0.5		10		-1	00	00
Max. ambient pressure (ho			0.5			J.J						
· · · · ·	Judinig). I	<i>- - - - - - - - - -</i>										
Output signal / Supply												
Standard				$1 / V_{S} = 12$								
Option IS-version			20 m/	$1 / V_{S} = 14$	4 28 V	DC						
Option temperature elem	nent Pt 10	0										
Temperature range		-25 12	25 °C									
Connectivity technology		3-wire				max. vo	ltage 10 V	$I_{DC}$ , in	intrinsica	lly safe ci	rcuit 30 V	DC
Resistance		100 Ω at	0 °C				rrent 2 m/				rcuit 54 m	
Temperature coefficient		3850 ppr	n/K			max. po	wer 10 m	W, in	intrinsica	lly safe ci	rcuit 405	mW
Supply I <sub>S</sub>		0.3 1.	0 mA <sub>DC</sub>									
Performance												
Accuracy 1		standard	: ≤ ± 0.35	5 % FSO				OD	tion: ≤ ±	0.25 % F	SO	
Permissible load				<sub>in</sub> ) / 0.02 A	λ] Ω							
Influence effects				SO / 10 V				loa	ad: 0.05 %	% FSO / k	Ω	
Long term stability		$\leq \pm 0.1\%$								1		
Turn-on time		450 mse										
Mean response time		≤ 70 mse										
Measuring rate		80 Hz										
<sup>1</sup> accuracy according to IEC 6	0770 – limit		stment (no	n-linearity	hvsteresi	s. repeatal	oility)					
Thermal effects (offset a				,,	.,	-,	····• <b>3</b> 7					
Tolerance band	na spanj	≤±1%F	-e0									
		-20 80										
in compensated range		-20 00	, с									
Permissible temperature	)											
Medium / storage		-25 85	· °C									
Electrical protection <sup>2</sup>												
Short-circuit protection		permane										
Reverse polarity protection		no dama	<u> </u>									
Electromagnetic compatib		emission										
<sup>2</sup> additional external overvolta	ge protectio	on unit in te	rminal box	KL 1 or K	2 with at	mospheric	pressure r	eference a	vailable on	request		
Electrical connection												
Cable with sheath materia	J <sup>3</sup>	PUR FEP <sup>4</sup> TPE-U TPE-U <sup>5</sup>	(-25 (-25	70 °C) 70 °C) 125 °C) 125 °C)	blac blac blue red	k Ø7	.4 mm .4 mm .4 mm .0 mm	(witho	ut / with c	Irinking w	rater certif	ficate)
Bending radius		static ins	tallation:	10-fold o		meter	dynamic				diameter	
<sup>3</sup> shielded cable with integrate <sup>4</sup> do not use freely suspended <sup>5</sup> only in combination with IS-v	probes with ersion (exp	h an FEP c	able if effe	ects due to	highly cha	arging proc	al pressure esses are e	e ranges al expected	bsolute, the	e ventilatio	n tube is cl	losed)
Materials (media wetted)		-1		4 - 1 - 1	4404 (2)	01,						
Housing				ss steel 1.	4404 (31	6 L)	op	otion: titar	nium	othe	ers on req	uest
Seals (O-rings)		standard option:	<b>EPDM</b>				r certifica re from -1			othe	ers on req	uest
Diaphragm		ceramics		•							- 7	
Protection cap		POM-C										
Cable sheath		PUR, FE	P, TPE-l	J								
Explosion protection												
Approval DX14B-LMK 387	,	IBFxI I 1	5 ATFX 1	066 X / II	CEx IRI	E 18.0019	X					
Approval BXT IB ENIT OF		zone 0: zone 20:	II 1G E	x ia IIB T <sup>z</sup> x ia IIIC T	I Ga 135 °C ⊑	Оа						
Safety technical maximum (pressure)							nF, $L_i = 0$ y of max.		pposite th	ne enclos	ure	
Safety technical maximum (temperature)							, L <sub>i</sub> = 0 μF		ature eler	ment Pt 1	00)	
Permissible temperatures environment	IOF		nd highe	r: -25 6	5 °C		bar up to		160 55/5-			
Connecting cables		cable cap					nal line/sig	inal line: ' inal line: '				

Miscellaneous		
Drinking water certificate <sup>6</sup>	according to DVGW W 270 an is necessary)	d UBA KTW (with order the indication "with drinking water certificate
Option cable protection	prepared for mounting with sta	inless steel pipe
Current consumption	max. 22 mA	
Veight	approx. 180 g (without cable)	
ngress protection	IP 68	
DE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	
• • • • • • • • • • • • • • • • • • • •	nation with TPE-U cable; not possibl	e with IS-version (explosion protection) or housing material titanium
Pin configuration		
Electrical connection		cable colours (IEC 60757)
Supply V <sub>S</sub> +		WH (white)
Supply V <sub>S</sub> −		BN (brown)
Supply T+ (with Pt 100)		YE (yellow)
Supply T- (with Pt 100)		GY (grey)
Supply T– (with Pt 100)		PK (pink)
Shield		GNYE (green-yellow)
Viring diagrams		
2-wire-system (current)		2-wire-system current (pressure) / 3-wire-system (temperature Pt 100)
Asymptotic Company		supply V <sub>S</sub> + A - o +
p supply + A	<b>→</b> +	
		P Vs
	Vs	0 -
		supply T+
	·	supply T— option Pt 100-
I supply –		supply T-
		о острои
		7-
Dimensions (mm / in)		
probes		optionally with thread R1/2"
probes		optionally with thread R1/2" for mounting with stainless steel tube
probes		optionally with thread R1/2" for mounting with stainless steel tube
probes		optionally with thread R1/2" for mounting with stainless steel tube
probes	al.	for mounting with stainless steel tube
90 100	a)	optionally with thread R1/2" for mounting with stainless steel tube
90 100	i)	for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
90 100		for mounting with stainless steel tube
95 41 85		for mounting with stainless steel tube
95 41 85		for mounting with stainless steel tube
95 41 85		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
90 100	149.5 [5.89]	for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
07,4   00.24		for mounting with stainless steel tube
67,4   Ø0.24	149.5 15.89	for mounting with stainless steel tube
07,4   00.24	149.5 15.89	for mounting with stainless steel tube

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



			Or	de	rir	ng	CC	de	LN	ΛK	387	7									
	LMK 387		Щ	]-				-[	- <u> </u>	]-[	]-[	]- <u></u>	]-[	]-[	]- <u></u>			-[			
Pressure	gau	ıge in bar	3 6	0																	
	absol	ute in bar in mH <sub>2</sub> O	3 6	3																	consult
Input	[mH <sub>2</sub> O]	[bar]																			
	1.0 1.6	0.10 0.16			1	0 0	0 0														
	2.5	0.10			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 40	2.5 4.0			2	5 (	0 1 0 1														
	60	6.0			6	0 (	1														
	100	10			1	0 0	0 2 9														
		customer			9	9 9	9 9														consult
Housing																					
	stainless steel 1.440	04 (316L)						1													
		titanium						Т													
Decima		customer	_	-	-	-	-	9					_					-			consult
Design		probe			-	-			1												
	screw-in version G1	1/2" open 1							A												
	screw-in version G								В												
Diaphragm																					
	ceramics Al <sub>2</sub> C									С											
Output		customer								9											consult
Output	4 20 m	A / 2-wire									1										
intr	insic safety 4 20 m										Ē										
	•	customer									9										consult
Seals																					
		FKM										1									
		EPDM										3									
DVGW / KTW:		EPDM <sup>2</sup>										31									
		FFKM <sup>3</sup> customer										7 9									consult
Electrical conn		ousion it										Э									CONSUIT
10011001 00111	PUR-cable (black, Ø	7.4 mm) <sup>4</sup>											2								
	FEP-cable (black, Ø	7.4 mm) <sup>4</sup>											3								
	TPE-U-cable (blue, Ø	7.4 mm) <sup>4</sup>											4								
	TPE-U-cable (red, Ø	9.0 mm) <sup>4,5</sup>											42								
DVGW / KTW:	TPE-U-cable (blue, Ø												F								
Accuracy		customer											9								consult
standard	0.2	5 % FSO												2							
option		5 % FSO												3 2							
орион		customer												9							consult
Cable length																					oo.louit
		in m													9	9	9				
Special versior																					
		standard																0	0	0	
	with temperature sens																	0	1	3	
prepared for mo	ounting with stainless s	customer																5	9	2	consult
	,	0431011101																9	9	9	CONSUIT

<sup>&</sup>lt;sup>1</sup> only in combination with housing in stainless steel 1.4404 (316L)

<sup>&</sup>lt;sup>2</sup> drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F); not possible with IS-protection (explosion protection) or housing material titanium

 $<sup>^{3}</sup>$  min. permissible temperature from -15  $^{\circ}\text{C}$ 

<sup>&</sup>lt;sup>4</sup> shielded cable with integrated air tube for atmospheric pressure reference

 $<sup>^{\</sup>rm 5}$  only in combination with IS version (explosion protection) and temperature element Pt 100

<sup>&</sup>lt;sup>6</sup> stainless steel pipe is not part of the supply



# **LMK 387H**

# **Stainless Steel Probe** with HART®-communication

Ceramic Sensor

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

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

- diameter 22 mm
- HART® communication (revision 7)
- setting of offset, span and damping
- diaphragm ceramics 99.9% Al<sub>2</sub>O<sub>3</sub>
- good long-term stability
- especially for waste water

#### **Optional versions**

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

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

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

#### Preferred areas of use



Water

groundwater and level monitoring



Sewage

waste water treatment water recycling



tank battery biogas plants

Fuel and oil











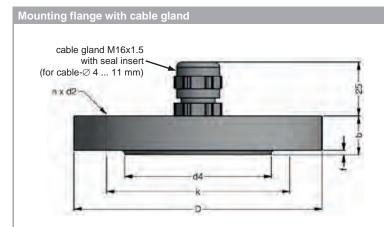




Connecting cables (by factory)

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 <sub>2</sub> O	1 1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure [bar	-	4	5	5	7	7	12	20	20	20	20
Burst pressure ≥ [bar		6	8	8	9	9	18	25	25	30	30
Permissible vacuum [bar		-0.3	-		0.5		10	20	-1	00	00
		-0.5		-(	J.J				-1		
Max. ambient pressure (housing):	40 bar										
Output signal / Supply											
Standard	2 wiro:	4 20 m	Λ / \/ _	12 26 \	/ with H	ΛPT® co	mmunicat	ion (revision	n 7\ /\/	- 24	\/
Option IS-version		4 20 m	IA / V <sub>S</sub> =	14 28 \	DC WITH H	AR I © CO	mmunica	ion (revision	on /) / vs	S rated = 24	V <sub>DC</sub>
Option Pt 100-temperature elem	ent										
Temperature range	-25	125 °C									
Connectivity technology	3-wire				max. v	oltage 1	$V_{DC}$ , in	intrinsicall	y safe ci	rcuit 30 V	DC
Resistance	100 Ω a	at 0 °C				urrent 2		intrinsicall	y safe ci	rcuit 54 m	nΑ
Temperature coefficient	3850 p	pm/K			max. p	ower 10	mW, in	intrinsicall	y safe ci	rcuit 405	mW
Supply I <sub>S</sub>		1.0 mA <sub>DC</sub>									
Performance	1 0.0		<u> </u>								
•	n > 16	n mhar	TD	< 4.5	- · · ·	25.0/.50	-		TD	= 1:10	
Accuracy <sup>1</sup> standard	$p_N \ge 10$	30 mbar		≤ 1:5		.35 % FS		/ F00	I D <sub>max</sub>	= 1.10	
			וטו	> 1:5			05 x TD] 9				
	<del></del>	30 mbar					5 x TD] %	6 FSO	TD <sub>max</sub>		
option	$p_N \ge 16$	30 mbar		≤ 1:5		.25 % FS			TD <sub>max</sub>	= 1:10	
			TD	> 1:5			)5 x TD] %				
	$p_N < 16$	30 mbar			$\leq \pm [0]$	0.25 + 0.1	5 x TD] 9	6 FSO	TD <sub>max</sub>	= 1:3	
Permissible load	R <sub>max</sub> =	[(V <sub>S</sub> - V <sub>S n</sub>	<sub>nin</sub> ) / 0.02	Α] Ω		loa	d at HAR	Γ®-commui	nication:	$R_{min} = 25$	0 Ω
Influence effects		0.05 %						FSO / kΩ			
Long term stability					at refere						
Turn-on time	≤ 3 sec		OWII) 70 I	OO / ycai	at reiere	nice conc	1110113				
			ut alaatra	nia dama	ina						
Mean response time			ut electro	nic damp	ing						
Measuring rate	≤ 20 H								2)		
Adjustability		iration of t nic dampi				le (interfa 0 80 9		are neces		span: max	
Thermal effects (offset and spar Tolerance band	1)  ≤±1%	FSO			in com	pensate	d range -2	20 80 °C	;		
Permissible temperatures		-					<u>J</u> .				
Permissible temperatures	mediun	n / electro	nics / en	vironment	/ storage	-40	85 °C				
Electrical protection <sup>3</sup>	1110 01011	., 0.00.0			, otolage		00 0				
Short-circuit protection	permar	ent									
Reverse polarity protection		age, but	alco no fi	ınction							
Electromagnetic compatibility		<u> </u>			o EN 613	26					
<sup>3</sup> additional external overvoltage protection							nce available	on request			
Electrical connection	T GITHE HIT COTT	minar box it	LIOINEZ	with attrios	oriene press	uic referei	icc available	on request			
	TDE II	blue	071~	(i+	haut / with	م طعنمادنم	otor oc	rtificata)			
Cable with sheath material 4	TPE-U		Ø 7.4 m		hout / with		y water ce	nuncate)			
Danding radius			Ø 9.0 m		ers on rec			lication, 20	) fold ool	blo diomo	tor
Bending radius  4 shielded cable with integrated ventilation				cable diar	петег	ayr	іаппс арр	lication: 20	y-iola cal	ole diame	ıeı
5 only in combination with IS-version (expl					100						
Materials (media wetted)	p. 510	, a	.,								
Housing	standa	rd: etainla	ee etaal 1	1 4404 (2	16 L ): opti	on: titoni	ıım		oth	are on roo	nuet
			ss sieei	1.4404 (3	16 L); opti	on. utani	ulli		otne	ers on rec	<sub>l</sub> uesi
Seals (O-rings)		rd: FKM	L 6 - 20	1 20	. 1.2		-1-\				
	option:		`		nking wate		,		- 0	o ro	
Diambrasia				ITHISSIBLE	temperatu	ire from	15 °C)		oth	ers on rec	uest
Diaphragm		cs Al <sub>2</sub> O <sub>3</sub> S	19.9%								
Protection cap	POM-C										
Cable sheath	TPE-U										
Explosion protection											
Approval	IBExU	15 ATEX	1066 X /	IECEx IB	E 18.0019	9X					
DX14B-LMK 387H	zone 0:	II 1G Ex	ia IIB T4	Ga; zone	20: II 1D	Ex ia III0	C T135 °C	Da			
Safety technical maximum values	$U_i = 28$	$V, I_i = 93$	$mA, P_i =$	660 mW,	C <sub>i</sub> = 14 n	$F, L_i = 0$	μH;				
(pressure)	the sup	ply conne	ections ha	ave an inn	er capaci	ty of max	c. 27 nF o	pposite the	enclosu	ıre	
Safety technical maximum values	11 20	V 1. – 54	mΔ D.	105 m\//	C 0 pE	: I O.	H (tempo	rature elen	nent Dt 1	100)	
(temperature)	$O_i = 30$	v, i <sub>i</sub> = 54							ווכוונרנו	100)	
Permissible temperatures for	in zone				ith p <sub>atm</sub> 0.8	3 bar up	to 1.1 bar				
environment		and highe									
Connecting cables	L cable c	apacity:	signa	al line/shie	ld also sid	anal line/	signal line	e: 160 pF/m	า		

Miscellaneous			
Drinking water certificate <sup>6</sup>	according to DVGW W 270 and (with order the indication "with	d UBA KTW drinking water certifi	icate" is necessary)
Current consumption	max. 22 mA		
Veight	approx. 280 g (without cable)		
ngress protection	IP 68		
CE-conformity	EMC Directive: 2014/30/EU		
ATEX Directive	2014/34/EU	10	and a Construction of the
only possible with EPDM seal in combina Pin configuration	nion with TPE-U cable; not possible with	1 io-version (explosion p	rotection) or nousing material titanium
Joinigaration		cable colours	(IEC 60757)
Electrical connection	4 20 mA / HA		4 20 mA / HART® (pressure)
		IV1	with Pt 100 (temperature)
Supply V <sub>S</sub> +	WH (white)		WH (white)
Supply T <sub>s</sub> (with Dt 100)	BN (brown)		BN (brown)
Supply T+ (with Pt 100) Supply T– (with Pt 100)	-		YE (yellow) GY (grey)
Supply T- (with Pt 100)	-		PK (pink)
Shield	GNYE (green-ye	llow)	GNYE (green-yellow)
Wiring diagrams			
2-wire-system current HART®			ART® (pressure) /
-		3-wire-system (te	
p supply +		supply V <sub>S</sub> +	A - +
/ \ A	<del></del>	P /	Vs
	Vs	supply V <sub>S</sub> –	0 -
	o _	supply T+	0
supply –	15.0	supply T-	option Pt 100-
	Interface -RS232- PC	supply T-	element
Ž,	V-0034	V	¥
Dimensions (mm / in)			
standard		IS-version	on with Pt100 (temperature element)
<del></del>   <del></del> Ø7,4 [0	.29]	-	→ Ø9 [0.35]
iii			
			<u> </u>
- Jej	<u>.</u>		
19.06]	[8.64]		9.04
-230 [9.06]	9,5 [8.64] —	[9.45]	9,5 [9.04]
230 [9.06] —	-219,5 [8.64]	240 [9.45]	-229,5 [9.04]
230 [9.06]	219,5 [8.64]		229,5 [9.04]
230 [9.06]	219,5 [8.64]	240 [9.45]	229,5 [9.04]
230 [9.06]	219,5 [8.64]	240 [9.45]	229,5 [9,04]
-230 [9.06] -	219,5 [8.64]	240 [9.45]	229,5 [9.04]
-230 [9.06] -	219,5 [8.64]	-240 [9.45]	-229,5 [9.04]
	219,5 [8.64]	240 (9.45)	229,5 [9.04]
	219,5 [8.64] —	240 [9.45]	
- 230 [9.06] - 4xø5 [0.2]	219,5 [8.64]—	240 [9.45]	
	219,5 [8.64]	-240 [9:45]	
	219,5 [8.64]	240 [9:45]	
4xØ5[0.2]		240 [9.45]	
4xØ5[0.2]	2 [0.87]	240 [9.45]	
4xØ5[0.2]		240 [9.45]	



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

Technical data			
Suitable for	all probes		
Flange material	stainless steel 1.4404 (316L)		
Material of cable gland	standard: brass, nickel plated	on request: stainless stee	el 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection	on IP 68)	
Hole pattern	according to DIN 2507		
Ondonina tuna		Oudening seds	Mainlet

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 10	.5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel 1.4301 (304)	
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		

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

#### Display program

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

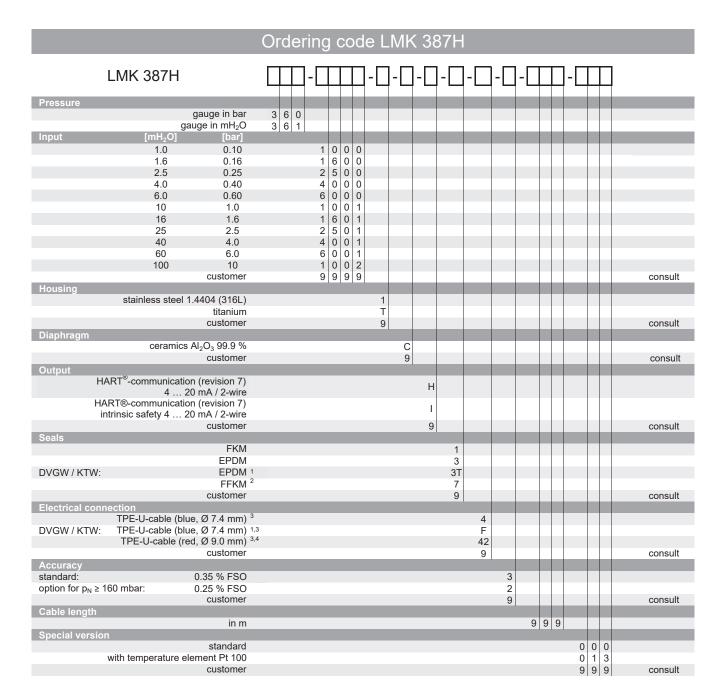
CIT 700 / CIT 750 Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts

PA 440 Field display with 4-digit LC display

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



Ordering code



<sup>&</sup>lt;sup>1</sup> drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F); not possible with IS-protection (explosion protection) or housing material titanium

HART® is a registered trade mark of HART Communication Foundation

 $<sup>^2\,</sup>$  min. permissible temperature from -15  $^\circ\text{C}$ 

<sup>&</sup>lt;sup>3</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

<sup>4</sup> only in combination with Ex version (explosion protection) and temperature element Pt 100



# **DCL 531**

# Stainless Steel Probe with RS485 Modbus RTU

Stainless Steel Sensor

accuracy according to IEC 60770: 0.25 % FSO

#### **Nominal pressure**

from  $0 ... 1 \text{ mH}_2\text{O}$  up to  $0 ... 250 \text{ mH}_2\text{O}$ 

#### **Output signal**

RS485 with Modbus RTU protocol

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are

#### Water / filtrated sewage



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



Fuel and oil fuel storage tank farm



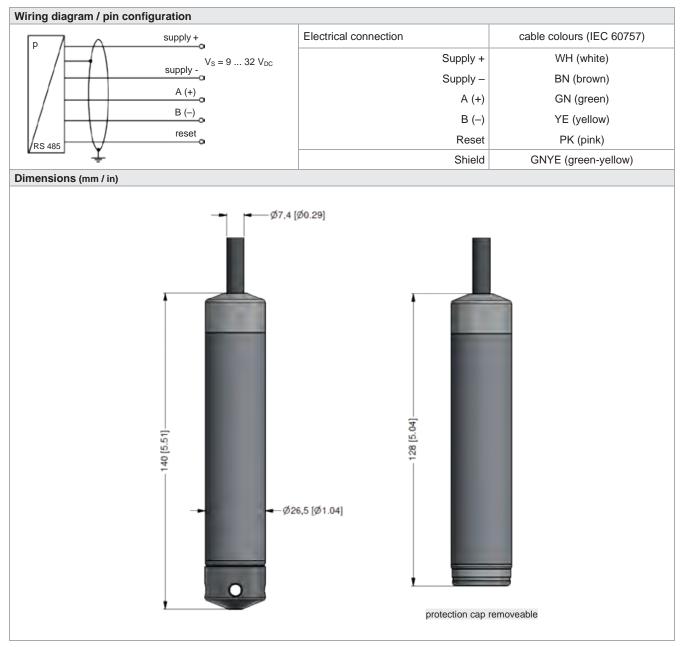




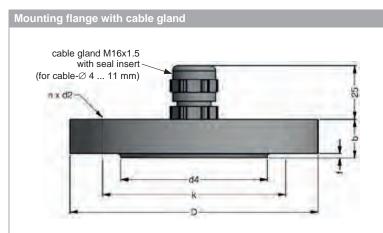


Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Max. ambient pressure (housing): 40 bar														

Output signal							
Output signal	DOVOS with Madhus DTH Drates al						
Digital (pressure)	RS485 with Modbus RTU Protocol						
Supply							
Direct current	$V_{S} = 9 \dots 32 V_{DC}$						
Performance							
Accuracy <sup>1</sup>	≤±0.25 % FSO						
Long term stability	≤ ± 0.1 % FSO / year at reference conditions						
Measuring rate	500 Hz						
Delay time	500 msec						
<sup>1</sup> accuracy according to IEC 60770 – limi	it point adjustment (non-linearity, hysteresis, repeatability)						
Thermal effects (offset and span)							
Tolerance band	≤±0.75 % FSO						
in compensated range	-20 85 °C						
Permissible temperatures							
Medium	-10 70 °C						
Storage	-25 70 °C						
Electrical protection <sup>2</sup>							
Short-circuit protection	permanent						
Reverse polarity protection	no damage, but also no function						
Electromagnetic compatibility	emission and immunity according to EN 61326						
	on unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request						
Electrical connection							
Cable with sheath material <sup>3</sup>	PUR (-10 70 °C) black Ø 7.4 mm						
Cable Will Glocul Material	FEP (-10 70 °C) black Ø 7.4 mm						
	TPE-U (-10 70 °C) blue Ø 7.4 mm (with drinking water approval)						
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m						
Cable inductance	signal line/shield also signal line/signal line: 1 μH/m						
Bending radius	static installation: 10-fold cable diameter						
bending radius	dynamic application: 20-fold cable diameter 20-fold cable diameter						
<sup>3</sup> shielded cable with integrated ventilation	on tube for atmospheric pressure reference						
Materials (media wetted)	Trade to different procedure total and						
Housing	stainless steel 1.4404 (316L)						
Seals	FKM; EPDM (without / with drinking water approval) others on request						
Diaphragm	stainless steel 1.4435 (316L)						
Protection cap	POM-C						
Cable sheath	PUR, FEP, TPE-U						
Miscellaneous							
Drinking water certificate <sup>4</sup>	according to DVGW W 270 and LIBA KTW						
Dilliking water certificate	according to DVGW W 270 and UBA KTW						
A divistable units	(with order the indication "with drinking water certificate" is necessary)						
Adjustable units	pressure: mmH <sub>2</sub> O, mmHg, psi, bar, mbar, g/cm <sup>2</sup> , kg/cm <sup>2</sup> , Pa, kPa, torr, atm, mH <sub>2</sub> O, MPa						
Read out	serial number; date of calibration, min- and max-value for pressure						
Current consumption	max. 10 mA						
Weight	approx. 200 g (without cable)						
Ingress protection	IP 68						
CE-conformity	EMC Directive: 2014/30/EU						
<sup>4</sup> only possible with EPDM seal in combin	nation with TPE-U cable						



Configuration Modbus RTU						
Standard configuration	001	-	1	-	1	
Address						
address	001					
	247					
Baud Rate						
4800 Bd			0			
9600 Bd			1			
19200 Bd			2			
38400 Bd			3			
Parity						
None					0	
Odd					1	
Even					2	
Configuration code (to specify with order)		-		-		



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

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

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

## Terminal clamp



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

Ordering type	Ordering code	Weight
Terminal clamp, steel, zinc plated	Z100528	460 5
Terminal clamp, stainless steel 1.4301 (304)	Z100527	approx. 160 g

			Orde	erin	go	CO	de	DC	L 5	31								
	DCL 531		Ш	-Ц	I	П	-	-	- 🗆	-	]-[	]-[	- 🗌		-			
Pressure		in bar	150															
		in mH <sub>2</sub> O	4 5 0 4 5 1															
Input	[mH <sub>2</sub> O]	[bar]	.,,,,,															
	1.0	0.10		1	0 0	0												
	1.6	0.16		1	6 0	0												
	2.5	0.25			5 0	0 0												
	4.0	0.40		4	0 0	0												
	6.0	0.60		6	0 0	0 0												
	10	1.0			0 0	1												
	16 25	1.6 2.5			6 C													
	40	4.0			5 C	) 1												
	60	6.0			0 0	) 1												
	100	10			0 0	) 2												
	160	16		1	6 0	) 2												
	250	25		2	5 0	2												
		customer		9	9 9	2 9												consult
Housing																		
	stainless steel 1.4						1											
		customer					9											consult
Diaphragm		405 (0401)																
	stainless steel 1.4	customer						1										
Output		customer						9										consult
Output	RS485 Mc	odbus RTU			-				L5									
Seals	TO-OO WIC	Japas IVI O	_	-			-	-	LJ					-			_	
Jours		FKM		_		_	_	_	_	1				_				
		EPDM								3								
DVGW/KTW:		EPDM <sup>1</sup>								3T								
		customer								9								consult
Accuracy																		
	0	.25 % FSO									2							
	45	customer									9							consult
Electrical conn	ection	<b>~ 7 4</b> ······· 2																
	PUR-cable (black, FEP-cable (black,	7.4 mm) <sup>2</sup>										2						
DVGW/KTW:	TPE-U cable (blue,	Ø 7.4 mm) = Ø 7.4 mm) 1.3	2									3 F						
DVGVV/KTVV:	TI L-O Cable (blue,	customer										9						consult
Cable length		3401011101										3						Jonath
o disto lolligiti		in m																
Special version	n																	
		standard													0	0 0		
		customer													9	9 9		consult

 $<sup>^{\</sup>rm 1}$  drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)  $^{\rm 2}$  shielded cable with integrated ventilation tube for atmospheric pressure reference



# **LMK 306**

### **Stainless Steel Probe**

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

#### **Nominal pressure**

from 0 ... 6 mH<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

#### **Output signals**

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

#### **Special characteristics**

- diameter 17 mm
- suitable for hydrostatic level measurement e.g. in 3/4" pipes
- good linearity
- good long term stability

#### **Optional versions**

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

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

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

#### Preferred areas of use are

#### **Water**

level measurement at confined space conditions



ground water monitoring depth or level measurement in wells drinking water abstraction level measurement in open and

closed tanks



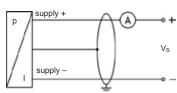




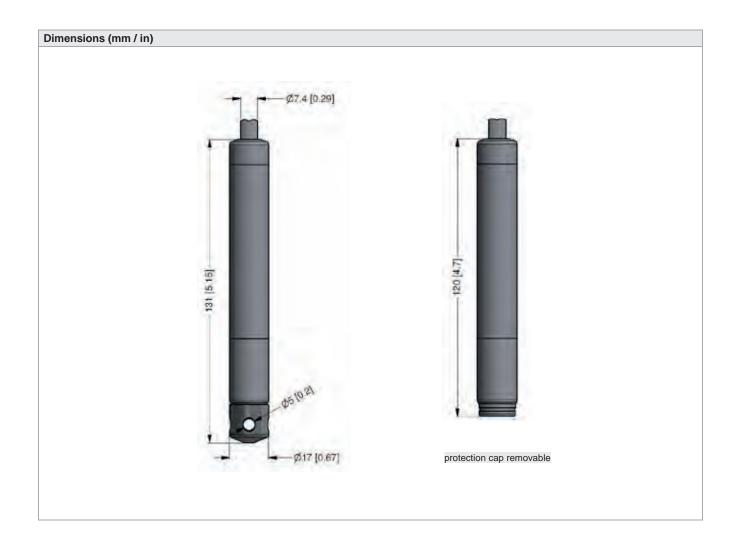
Input pressure range										
Nominal pressure gauge	[bar]	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH <sub>2</sub> O]	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	10	10	20	40	40
Burst pressure ≥	[bar]	4	4	5	5	12	12	25	50	50
Max. ambient pressure (housing): 40 bar										

Output signal / Supply						
2-wire	$4 20 \text{ mA} / V_S = 12 36 V_{DC}$					
Performance						
Accuracy	≤± 0.5 % FSO					
Permissible load	$R_{\text{max}} = [(V_{\text{S}} - V_{\text{S min}}) / 0.02 \text{ A}] \Omega$					
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ					
Response time	≤10 msec					
<sup>1</sup> accuracy according to IEC 60770 –	- limit point adjustment (non-linearity, hysteresis, repeatability)					
Thermal effects (Offset and S	pan) / Permissible temperatures					
Thermal error	≤ ± 0.2 % FSO / 10 K in compensated range 0 70 °C					
Permissible temperatures	medium: -10 70 °C storage: -25 70 °C					
Electrical protection <sup>2</sup>	· · · · · · · · · · · · · · · · · · ·					
Short-circuit protection	permanent					
Reverse polarity protection	no damage, but also no function					
Electromagnetic protection	emission and immunity according to EN 61326					
<sup>2</sup> additional external overvoltage pro	tection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request					
Electrical connection						
Cable with sheath material <sup>3</sup>	PVC (-5 70 °C) grey Ø 7.4 mm					
	PUR (-10 70 °C) black Ø 7.4 mm					
	FEP <sup>4</sup> (-10 70 °C) black Ø 7.4 mm					
Cable associtores	others on request					
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m					
Cable inductance	signal line/shield also signal line/signal line: 1 μH/m					
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter					
<sup>3</sup> shielded cable with integrated vent	ilation tube for atmospheric pressure reference					
	s 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 <sub>2</sub> O <sub>3</sub> 96 %					
Protection cap	POM-C					
Cable sheath	PVC, PUR, FEP					
Miscellaneous						
Current consumption	max. 25 mA					
Weight	approx. 100 g (without cable)					
Ingress protection	IP 68					
CE-conformity	EMC Directive: 2014/30/EU					
Wiring diagram						
2-wire-system (current)						

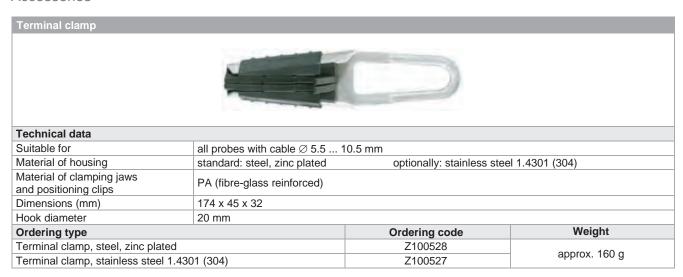
2-wire-system (current)

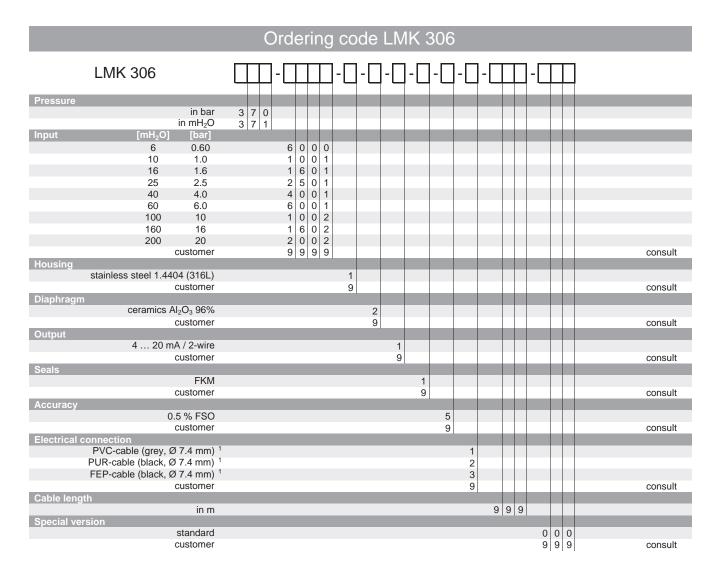


Pin configuration							
Electrical connection	cable colours (IEC 60757)						
Supply +	WH (white)						
Supply –	BN (brown)						
Shield	GNYE (green-yellow)						



#### Accessories





<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



# **LMP 305**

### **Slimline Probe**

Stainless Steel Sensor

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

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are

#### Water

level measurement in confined space conditions



ground water monitoring depth or level measurement in wells and open waters

drinking water system

level measurement in container



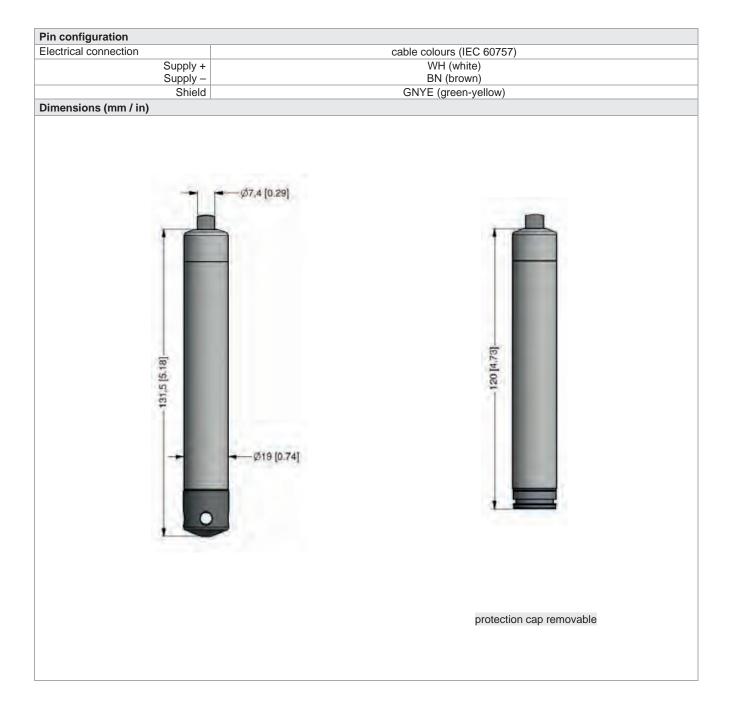


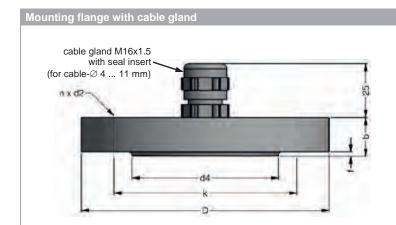


# LMP 305

Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	1	1	1	1	3	3	6	6	20	20	60	60	100
Max. ambient pressure (housing): 40 bar														

Output signal / Supply							
2-wire	4 20 mA / V <sub>S</sub> = 1	2 36 V <sub>DC</sub>					
Performance							
Accuracy <sup>1</sup>		al pressure > 0.4 bar al pressure ≤ 0.4 bar					
		al pressure > 0.4 bar					
Permissible load	$R_{\text{max}} = [(V_S - V_{S \text{ min}})]$		. = = 0.20 /0 : 00				
Influence effects	supply: 0.05 % FS0			load: 0.05 % F	SO / kΩ		
Long term stability		ar at reference condi	tions				
Response time	≤ 10 msec						
<sup>1</sup> accuracy according to IEC 60770 – i	imit point adjustment (non-	-linearity, hysteresis, rep	eatability)				
Thermal effects (Offset and Sp	an)						
Nominal pressure P <sub>N</sub> [ba	r] ≤ 0.1	≤ 0.25	≤ 0.4	≤ 1	> 1		
Tolerance band [% FS0	)] ≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 1	≤ ± 0.75		
TC, average [% FSO / 10 I	() ± 0.3	± 0.2	± 0.14	± 0.1	± 0.07		
In compensated range [°C	C]	0 50		0	70		
Permissible temperatures							
Permissible temperatures	medium: -10 70	°C		storage: -25	70 °C		
Electrical protection <sup>2</sup>	·						
Short-circuit protection	permanent						
Reverse polarity protection	no damage, but als	o no function					
Electromagnetic compatibility	emission and immu	inity according to EN	61326				
<sup>2</sup> additional external overvoltage prote	ection unit in terminal box h	KL 1 or KL 2 with atmosp	heric pressure referen	ce available on request			
Electrical connection							
Cable with sheath material <sup>3</sup>	PUR (-10 70 °	C) grey Ø 7.4 mm C) black Ø 7.4 mm C) black Ø 7.4 mm					
Cable capacitance	· ·	lso signal line/signal	line: 160 pF/m				
Cable inductance		lso signal line/signal					
Bending radius	static installation: dynamic application	10-fold cable dia n: 20-fold cable dia	meter				
<ul> <li><sup>3</sup> shielded cable with integrated ventil.</li> <li><sup>4</sup> do not use freely suspended probes</li> </ul>			processes are expect	ed			
Materials (media wetted)							
Housing	stainless steel 1.44	04 (316L)					
Seals	FKM, EPDM						
Diaphragm	stainless steel 1.44	35 (316L)					
Protection cap	POM-C						
Cable sheath	PVC, PUR, FEP, of	thers on request					
Miscellaneous							
Current consumption	max. 25 mA						
Weight	approx. 100 g (with	out cable)					
Ingress protection		IP 68					
CE-conformity	EMC Directive: 2014/30/EU						
Wiring diagram							
2-wire-system (current)	• <b>+</b> V <sub>s</sub>						
supply –	• -						





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

Technical data			
Suitable for	all probes		
Flange material	stainless steel 1.4404 (316L)		
Material of cable gland	standard: brass, nickel plated	on request: stainless stee	el 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection I	IP 68)	
Hole pattern	according to DIN 2507		

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 1	0.5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless stee	I 1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		

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

#### Display program

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

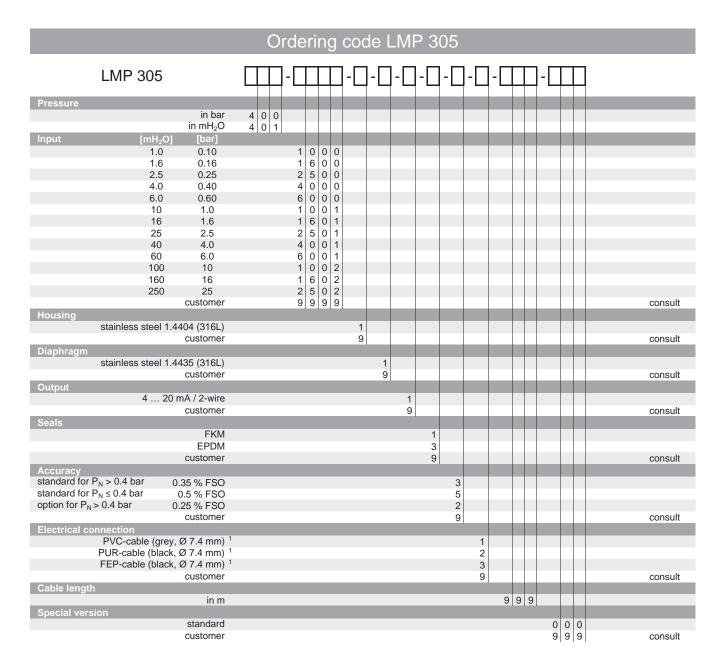
CIT 650 Multichannel process display with graphics-capable LC display and datalogger

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

PA 440 Field display with 4-digit LC display

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





<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



# **LMP 307**

### **Stainless Steel Probe**

Stainless Steel Sensor

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

#### **Nominal pressure**

from  $0 \dots 1 \text{ mH}_2\text{O}$  up to  $0 \dots 250 \text{ mH}_2\text{O}$ 

#### **Output signals**

2-wire: 4 ... 20 mA

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are

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



Fuel and oil fuel storage tank farms













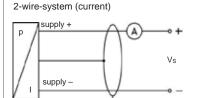


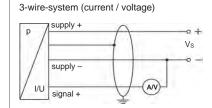
Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120
Max.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

Output signal / Supply						
Standard	2-wire: $4 \dots 20 \text{ mA} / V_S = 8 \dots 32 V_{DC}$ SIL-version: $V_S = 14 \dots 28 V_{DC}$					
Option IS-version	2-wire: $4 \dots 20 \text{ mA} / V_S = 10 \dots 28 V_{DC}$ SIL-version: $V_S = 14 \dots 28 V_{DC}$					
Options 3-wire	3-wire: $0 \dots 20 \text{ mA} / V_S = 14 \dots 30 V_{DC}$ $0 \dots 10 \text{ V} / V_S = 14 \dots 30 V_{DC}$					
Performance						
Accuracy 1	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO					
7.000.009	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-wire: ≤ 10 msec 3-wire: ≤ 3 msec					
<sup>1</sup> accuracy according to IEC 60770 – lin	nit point adjustment (non-linearity, hysteresis, repeatability)					
Thermal effects (offset and span						
Nominal pressure p <sub>N</sub> [bar]	_					
Tolerance band [% FSO]						
in compensated range [°C]	0 70					
Permissible temperatures						
Permissible temperatures	medium: -10 70 °C storage: -25 70 °C					
Electrical protection <sup>2</sup>						
Short-circuit protection	permanent					
Reverse polarity protection	no damage, but also no function					
Electromagnetic compatibility	emission and immunity according to EN 61326					
<sup>2</sup> additional external overvoltage protect	tion unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request					
Electrical connection						
Cable with sheath material <sup>3</sup>	PVC (-5 70 °C) grey Ø 7.4 mm					
	PUR (-10 70 °C) black Ø 7.4 mm					
	FEP <sup>4</sup> (-10 70 °C) black Ø 7.4 mm					
	TPE-U (-10 70 °C) blue Ø 7.4 mm (without / with drinking water certificate)					
Bending radius	static installation: 10-fold cable diameter					
<sup>3</sup> shielded cable with integrated ventilati	dynamic application: 20-fold cable diameter ion tube for atmospheric pressure reference					
4 do not use freely suspended probes w	vith an FEP cable if effects due to highly charging processes are expected					
Materials (media wetted)	<b>3</b>					
Housing	stainless steel 1.4404 (316L)					
Seals	FKM; EPDM (without / with drinking water certificate)					
•	welded version <sup>5</sup> others on request					
Diaphragm	stainless steel 1.4435 (316L)					
Protection cap	POM-C					
Cable sheath	PVC, PUR, FEP, TPE-U					
<sup>5</sup> not in combination with SIL version an	nd only in combination with FEP cable possible					
Explosion protection (only for 4	20 mA / 2-wire)					
Approvals DX19-LMP 307	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X					
	zone 0: II 1G Ex ia IIC T4 Ga					
	zone 20: II 1D Ex ia IIIC T135 °C Da					
Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0  \mu\text{H},$					
	the supply connections have an inner capacity of max. 27 nF to the housing					
Permissible temperatures for	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar					
environment	in zone 1 or higher: -40/-20 70 °C					
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m					
(by factory)	cable inductance.   signal interstiteta also signal litte/stignal litte. 1 pt 1/11					

Miscellaneous		
Option SIL 2 version <sup>6</sup>	according to IEC 61508 / IEC 61511	
Drinking water certificate <sup>7</sup>	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water	r certificate" is necessary)
Current consumption	signal output current: max. 25 mA	signal output voltage: max. 7 mA
Weight	approx. 200 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directive	2014/34/EU	

#### Wiring diagrams

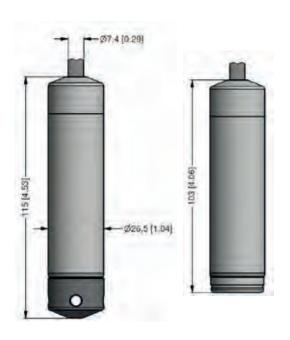




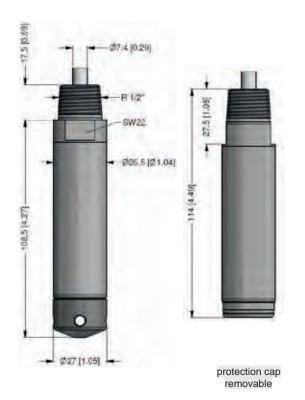
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
Signal + (only 3-wire)	GN (green)
Shield	GNYE (green-yellow)

#### Dimensions (mm / in)

#### Standard



#### Option

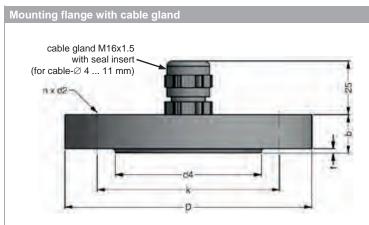


prepared for mounting with stainless steel pipe

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

protection cap removable

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



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

Technical data				
Suitable for	all probes			
Flange material	stainless steel 1.4404 (316L)			
Material of cable gland	standard: brass, nickel plated	on request: stainless stee	el 1.4305 (303); plastic	
Seal insert	material: TPE (ingress protection	n IP 68)		
Hole pattern	according to DIN 2507			

riolo pattorri	according to Dirt 2007		
Ordering type		Ordering code	Weight
DN25 / PN40 with cable gland brass, nickel plated		ZMF2540	1.4 kg
DN50 / PN40 with cable gland brass, nickel plated		ZMF5040	3.2 kg
DN80 / PN16 with cable gland brass	, nickel plated	ZMF8016	4.8 kg

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 10	5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel 1.4301 (304)	
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		

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

#### Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

PA 440 Field display with 4-digit LC display

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



	Ordering code LMP	307
LMP 307		
Pressure in bar	4 5 0 4 5 1	
in mH <sub>2</sub> O Input [mH <sub>2</sub> O] [bar]		
1.0 0.10 1.6 0.16 2.5 0.25	1 0 0 0 1 6 0 0 2 5 0 0 4 0 0 0	
4.0 0.40 6.0 0.60	6 0 0 0	
10 1.0 16 1.6	1 0 0 1	
25 2.5 40 4.0 60 6.0	2 5 0 1 4 0 0 1 6 0 0 1	
100 10 160 16	1 0 0 2 1 6 0 2	
250 25 customer	1 0 0 2 1 6 0 2 2 5 0 2 9 9 9 9	consult
Housing stainless steel 1.4404 (316L) customer	1 9	consult
Diaphragm stainless steel 1.4435 (316L)	1	Consult
Output	9	consult
4 20 mA / 2-wire 0 20 mA / 3-wire	1 2	
0 10 V / 3-wire intrinsic safety 4 20 mA / 2-wire SIL2 4 20 mA / 2-wire	3 E 1S	
SIL 2 with Intrinsic safety 4 20 mA / 2-wire	ES	
Seals	9	consult
FKM EPDM DVGW/KTW: EPDM <sup>1</sup>		1 3 3T
petrol-version: without (welded version) <sup>2,4</sup> customer		21 9 consult
Accuracy standard for $p_N \ge 0.4$ bar $0.35 \%$ FSO		3
standard for $p_N < 0.4$ bar 0.5 % FSO option 1 for $p_N \ge 0.4$ bar 0.25 % FSO option 2 0.1 % FSO $^2$		5 2 1
option 2 0.1 % FSO <sup>2</sup> customer  Electrical connection / cable length		9 consult
PVC-cable (grey, Ø 7.4 mm) <sup>3</sup> 3 m		1 0 0 3
5 m 10 m		1 0 0 5 1 0
15 m special length in m		1 0 1 0 1 0 1 5 1 9 9 9
PUR-cable (black, Ø 7.4 mm) <sup>3</sup> 3 m		2 0 0 3
5 m 10 m		2 0 0 5 2 0 1 0
15 m special length in m		2 0 1 5 2 9 9 9
FEP-cable (black, Ø 7.4 mm) <sup>3</sup> 5 m		3 0 0 5
10 m special length in m		3 0 0 5 3 0 1 0 3 9 9 9
TPE-U-cable (blue, Ø 7.4 mm) <sup>3</sup>		
special length in m  DVGW/KTW:  special length in m		4 9 9 9 F 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
Special version standard		
prepared for mounting with stainless steel customer		0 0 0 5 0 3 9 9 9 consult

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

<sup>&</sup>lt;sup>2</sup> not in combination with SIL

 $<sup>^{3}</sup>$  shielded cable with integrated ventilation tube for atmospheric pressure reference

<sup>&</sup>lt;sup>4</sup> petrol-version only in combination with FEP cable



# **LMP 307i**

## Stainless Steel Probe

Stainless Steel Sensor

accuracy according to IEC 60770: 0.1 % FSO

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are

Water / filtrated sewage

drinking water systems ground water level measurement rain spillway basins pump and booster stations

level measurement in containers water treatment plants water recycling



Fuel and oil fuel storage

















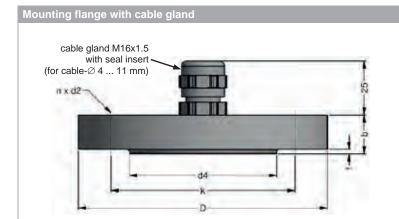
Input pressure range 1							
Nominal pressure gauge	[bar]	0.40	1	2	4	10	20
Level	[mH <sub>2</sub> O]	4	10	20	40	100	200
Overpressure	[bar]	2	5	10	20	40	80
Burst pressure ≥ [bar] 3 7.5 15 25 50 120							
Max. ambient pressure (housing): 40 bar							
1 On customer request we adi	ust the device	e within the turn-o	down-possibility by	software on the reg	uired pressure range	2	

Standard   2-wire:   420 mA   / V <sub>S</sub> = 1438 V <sub>DC</sub>	Output signal / Supply			
Option IS-version         2 -wire:         4 20 mA         / V <sub>S</sub> = 14 28 V <sub>SC</sub> Options 3-wire         3 -wire:         0 10 V         / V <sub>S</sub> = 14 28 V <sub>SC</sub> Performance           Accuracy 2         nominal pressure ≥ 0.1 bar: ≤ ± 0.2 % FSO           Permissible load         current 2-wire:         R <sub>min</sub> = (V <sub>S</sub> − V <sub>S</sub> min) / 0.02 Å] Ω           Influence effects         supply:         0.05 % FSO / KΩ           Influence effects         supply:         0.05 % FSO / KΩ           Long term stability         ≤ ± 0.1 % FSO / year at reference conditions           Response time         ca. 200 msec           2 accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)           Thermal effects (offset and span)           Tolerance band         ≤ ± 0.2 % FSO / IOK         in compensated range -20 80°C           Permissible temperatures         medium: -10 70 °C         storage: -25 70 °C           Electrical protection 3         medium: -10 70 °C         storage: -25 70 °C           Electrical protection 5         medium: -10 70 °C         gray (-10 70 °C) black (-10 70 °C) bl		2-wire: 4 20 mA / V <sub>S</sub> = 12 36 V <sub>DC</sub>		
Qptions 3-wire   3-wire   0 10 V				
Performance           Accuracy 2         nominal pressure ≥ 0.1 bar: ≤ ± 0.1 % FSO           Permissible load         current 2-wire: R <sub>max</sub> = 1(V <sub>R</sub> V <sub>S mm</sub> ) / 0.02 Å] Ω           Influence effects         supply: 0.05 % FSO / 10 V           Influence effects         supply: 0.05 % FSO / 10 V           Long term stability         ≤ ± 0.1 % FSO / year at reference conditions           Response time         ca. 200 msec           3 eccuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)           Thermal effects (offset and span)           Tolerance band         ≤ ± 0.2 % FSO         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10 K         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10 K         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10 K         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10 K         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10 K         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10 K         in compensated range -20 80°C           Tolerance band         ≤ ± 0.2 % FSO / 10	·			
Accuracy 2         nominal pressure ≥ 0.1 bar. ≤ ± 0.1 % FSO           Permissible load         current 2-wire: voltage 3-wire: R <sub>max</sub> = [(V <sub>S</sub> − V <sub>S</sub> m <sub>m</sub> ) / 0.02 A] Ω           Influence effects         supply: 0.5 % FSO / 10 V           Influence effects         supply: 0.05 % FSO / 10 V           Long term stability         ≤ ± 0.1 % FSO / year at reference conditions           Response time         ca. 200 msec           ² accuracy according to IEC 60770 – Imit point adjustment (non-linearity, hysteresis, repeatability)           Thermal effects (offset and span)           Tolerance band         ≤ ± 0.2 % FSO         in compensated range -20 80°C           TC         ± 0.02 % FSO / 10 K         in compensated range -20 80°C           Permissible temperatures         medium: -10 70 °C         storage: -25 70 °C           Electrical protection ³         medium: -10 70 °C         storage: -25 70 °C           Reverse polarity protection         no damage, but also no function           Electrical connection         emission and immunity according to EN 61326           Electrical connection         PVC (-5 70 °C) grey Ø 7.4 mm         Ø 7.4 mm           EPP (-10 70 °C) black Ø 7.4 mm         Q 7.4 mm         (without/with drinking water certificate)           Bending radius         stalic installation: 10-fold cable diameter         dynamic application:	<u>'</u>	V MIG. V M V V V V V V V V V V V V V V V V V		
nominal pressure < 0.1 bar; \$ ± 0.2 % FSO		nominal pressure > 0.1 bar: < + 0.1 % FSO		
Voltage 3-wire:   R <sub>min</sub> = 10 kΩ   Supply: 0.05 % FSO / 10 V   load: 0.05 % FSO / kΩ		nominal pressure < 0.1 bar: ≤ ± 0.2 % FSO		
Long term stability	Permissible load	max t( o o min)		
Response time  a ca. 200 msec  a carray according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)  Thermal effects (offset and span)  Tolerance band  5 ± 0.2 % FSO  1 in compensated range -20 80°C  TC  ± 0.02 % FSO / 10K  1 in compensated range -20 80°C  Permissible temperatures  Permissible temperatures  Redium: -10 70 °C  1 storage: -25 70 °C  Storage: -25 70 °C  Electrical protection 3  Insulation resistance  1 > 100 MΩ  Reverse polarity protection  Reverse polarity protection  Electromagnetic compatibility  emission and immunity according to EN 61326  additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request  Electrical connection  Cable with sheath material 4  PVC (-5 70 °C) grey Ø 7.4 mm PEP (-10 70 °C) black Ø 7.4 mm PEP (-10 70 °C)	Influence effects	1 - 11 /		
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)  Thermal effects (offset and span)  Tolerance band ≤ ± 0.2 % FSO in compensated range -20 80°C  TC ± 0.02 % FSO / 10K in compensated range -20 80°C  Permissible temperatures  Permissible temperatures  Permissible temperatures    medium: -10 70 °C   storage: -25 70 °C	Long term stability	≤ ± 0.1 % FSO / year at reference conditions		
Thermal effects (offset and span)  Tolerance band ≤ ± 0.2 % FSO in compensated range -20 80 °C  TC ± 0.02 % FSO / 10K in compensated range -20 80 °C  Permissible temperatures  Permissible temperatures medium: -10 70 °C storage: -25 70 °C  Electrical protection ³  Insulation resistance > 100 MΩ  Reverse polarity protection no damage, but also no function  Electromagnetic compatibility emission and immunity according to EN 61326  ³ additional external overvoitage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request  Electrical connection  Cable with sheath material ⁴ PVC (-5 70 °C) grey Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter ⁴ shielded cable with integrated ventilation tube for atmospheric pressure reference ⁴ do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4404 (316L)  Fexplosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i BEXU 10 ATEX 1068 X / IECEX IBE 12.0027X zone 0: II 10 Ex ia IIC T4 Ga zone 20: II 10 Ex ia IIC T4 Ga zone 20: II 10 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga zone 20: II 110 Ex ia IIC T4 Ga	Response time	ca. 200 msec		
Tolerance band	<sup>2</sup> accuracy according to IEC 60770 – lin	nit point adjustment (non-linearity, hysteresis, repeatability)		
Tolerance band	Thermal effects (offset and span			
TC ± 0.02 % FSO / 10K in compensated range -20 80°C  Permissible temperatures  Permissible temperatures  medium: -10 70 °C storage: -25 70 °C  Electrical protection 3  Insulation resistance > 100 MΩ  Reverse polarity protection no damage, but also no function  Electromagnetic compatibility emission and immunity according to EN 61326  ³ additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request  Electrical connection  Cable with sheath material 4  PVC (-5 70 °C) grey Ø 7.4 mm  FEP ° (-10 70 °C) black Ø 7.4 mm  FEP ° (-10 70 °C) black Ø 7.4 mm  FEP ° (-10 70 °C) black Ø 7.4 mm  FEP ° (-10 70 °C) black Ø 7.4 mm  (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter  ¹ shielded cable with integrated ventilation tube for atmospheric pressure reference  ¹ do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected  Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM  EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA /2-wire)  Approvals DX19-LMP 307i IBEXU 10 ATEX 1068 X / IECEX IBE 12.0027X  zone 0: II 10 Ex ia IIC T4 Ga  zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20: II 10 Ex ia IIC T4 Ga  Zone 20	` .	,		
Permissible temperatures         medium: -10 70 °C         storage: -25 70 °C           Electrical protection s           Insulation resistance         > 100 MΩ         Reverse polarity protection           Reverse polarity protection         no damage, but also no function         Electromagnetic compatibility           ∃ additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request           Electrical connection           Cable with sheath material 4         PVC (-5 70 °C) grey Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PEP (-10 70 °C)		1 0		
Permissible temperatures         medium: -10 70 °C         storage: -25 70 °C           Electrical protection ³         Insulation resistance         > 100 MΩ           Reverse polarity protection         no damage, but also no function           Electromagnetic compatibility         emission and immunity according to EN 61326           ³ additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request           Electrical connection           Cable with sheath material ⁴         PVC (-5 70 °C) grey pVR (-10 70 °C) black pVR (-10	Permissible temperatures			
Insulation resistance   > 100 MΩ   Note	•	medium: -10 70 °C storage: -25 70 °C		
Reverse polarity protection   no damage, but also no function	Electrical protection <sup>3</sup>			
Reverse polarity protection       no damage, but also no function         Electromagnetic compatibility       emission and immunity according to EN 61326         ³ additional external overvoltage protection unit in terminal box KL. 1 or KL.2 with atmospheric pressure reference available on request         Electrical connection       PVC (-5 70 °C) grey PUR (-10 70 °C) black Ø 7.4 mm PUR (-10	· · · · · · · · · · · · · · · · · · ·	> 100 MO		
Electromagnetic compatibility emission and immunity according to EN 61326  3 additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request  Electrical connection  Cable with sheath material PVC (-5 70 °C) grey Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PEF-U (-10 70 °C) black Ø 7.4 mm PEF-U (-10 70 °C) blue Ø 7.4 mm (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter  4 shielded cable with integrated ventilation tube for atmospheric pressure reference  5 do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected  Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1 IG Ex ia IIC T4 Ga zone 20: II 1 IG Ex ia IIC T4 Ga zone 20: II 1 IG Ex ia IIC T4 Ga zone 20: II 1 IG Ex ia IIC T4 Ga zone 20: II 1 ID Ex ia I				
3 additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request  Electrical connection  Cable with sheath material 4 PVC (-5 70 °C) grey Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm PUR (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter 4 shielded cable with integrated ventilation tube for atmospheric pressure reference 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 (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i IBEXU 10 A TEX 1068 X / IECEX IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing environment in zone 0: −20 60 °C with patm 0.8 bar up to 1.1 bar environment in zone 0: in zone 1 or higher: −40/-20 65 °C				
Electrical connection  Cable with sheath material <sup>4</sup> PVC (-5 70 °C) grey Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm FEP <sup>5</sup> (-10 70 °C) black Ø 7.4 mm (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter <sup>4</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference <sup>5</sup> do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected  Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i   IBEXU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values   U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing environment in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p₂tm 0.8 bar up to 1.1 bar in zone 1 in zone 1 or higher: -40/-20 65 °C with p		, ,		
Cable with sheath material <sup>4</sup> PVC (-5 70 °C) grey Ø 7.4 mm PUR (-10 70 °C) black Ø 7.4 mm FEP <sup>5</sup> (-10 70 °C) black Ø 7.4 mm (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold application: 20-fold cable diameter dynamic application: 20-fold application: 20-fold cable diameter dynamic application: 20-fold dynamic application:		, , , , , , , , , , , , , , , , , , ,		
TPE-U (-10 70 °C) blue Ø 7.4 mm (without/with drinking water certificate)  Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter <sup>4</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference <sup>5</sup> do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected  Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i   IBEXU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0:   II 1G Ex ia IIC T4 Ga zone 20:   II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values   U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing  Permissible temperatures for environment in zone 1 or higher: -40/-20 65 °C		PUR (-10 70 °C) black Ø 7.4 mm		
Bending radius static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter <sup>4</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference <sup>5</sup> do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected  Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i IBEXU 10 ATEX 1068 X / IECEX IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing  Permissible temperatures for in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C				
<sup>4</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference <sup>5</sup> do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected  Materials (media wetted)  Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing  Permissible temperatures for environment in zone 1 or higher: -40/-20 65 °C	Bending radius			
Materials (media wetted)         Housing       stainless steel 1.4404 (316L)         Seals       FKM EPDM (without/with drinking water certificate) others on request         Diaphragm       stainless steel 1.4435 (316L)         Protection cap       POM-C         Cable sheath       PVC, PUR, FEP, TPE-U         Explosion protection (only for 4 20 mA / 2-wire)         Approvals DX19-LMP 307i       IBEXU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da         Safety technical maximum values       U₁ = 28 V, I₁ = 93 mA, P₁ = 660 mW, C₁ ≈ 0 nF, L₁ ≈ 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 patm 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C	<sup>4</sup> shielded cable with integrated ventilat	ion tube for atmospheric pressure reference		
Housing stainless steel 1.4404 (316L)  Seals FKM EPDM (without/with drinking water certificate) others on request  Diaphragm stainless steel 1.4435 (316L)  Protection cap POM-C  Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \text{ µH},$ the supply connections have an inner capacity of max. 27 nF to the housing  Permissible temperatures for environment in zone 1 or higher: -40/-20 65 °C		, , , , , , , , , , , , , , , , , , ,		
Seals       FKM         EPDM (without/with drinking water certificate)         others on request         Diaphragm       stainless steel 1.4435 (316L)         Protection cap       POM-C         Cable sheath       PVC, PUR, FEP, TPE-U         Explosion protection (only for 4 20 mA / 2-wire)         Approvals DX19-LMP 307i       IBEXU 10 ATEX 1068 X / IECEx IBE 12.0027X         zone 0:       II 1G Ex ia IIC T4 Ga         zone 20:       II 1D Ex ia IIIC T135 °C Da         Safety technical maximum values       Ui = 28 V, Ii = 93 mA, Pi = 660 mW, Ci ≈ 0 nF, Li ≈ 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 patm 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C	, ,	stainless steel 1,4404 (316L)		
Protection cap POM-C Cable sheath PVC, PUR, FEP, TPE-U  Explosion protection (only for 4 20 mA / 2-wire)  Approvals DX19-LMP 307i IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \text{ µH}, the supply connections have an inner capacity of max. 27 nF to the housing}$ Permissible temperatures for in zone 0: -20 60 °C with $p_{atm}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C		FKM EPDM (without/with drinking water certificate)		
Cable sheath PVC, PUR, FEP, TPE-U <b>Explosion protection (only for 4 20 mA / 2-wire)</b> Approvals DX19-LMP 307i IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \text{ µH}, the supply connections have an inner capacity of max. 27 nF to the housing}$ Permissible temperatures for environment in zone 1 or higher: -40/-20 65 °C	Diaphragm	stainless steel 1.4435 (316L)		
	Protection cap	POM-C		
Approvals DX19-LMP 307i   IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X   zone 0: II 1G Ex ia IIC T4 Ga   zone 20: II 1D Ex ia IIIC T135 °C Da   Safety technical maximum values   $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H}, \text{ the supply connections have an inner capacity of max. 27 nF to the housing}   Permissible temperatures for environment   in zone 0: -20 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C$	Cable sheath	PVC, PUR, FEP, TPE-U		
zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da  Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i ≈ 0 \text{ nF}, L_i ≈ 0 \text{ μH}, the supply connections have an inner capacity of max. 27 nF to the housing}$ Permissible temperatures for environment in zone 0: -20 60 °C with $p_{atm}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C				
Safety technical maximum values $U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \text{ µH},$ the supply connections have an inner capacity of max. 27 nF to the housing Permissible temperatures for environment in zone 0: $-20 \dots 60 \text{ °C}$ with $p_{atm} 0.8$ bar up to 1.1 bar in zone 1 or higher: $-40/-20 \dots 65 \text{ °C}$	Approvals DX19-LMP 307i	zone 0: II 1G Ex ia IIC T4 Ga		
Permissible temperatures for environment in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C	Safety technical maximum values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0  \mu\text{H},$		
	•	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar		
(by factory) cable inductance: signal line/shield also signal line/signal line: 1 µH/m	Connecting cables	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m		

Miscellaneous

Drinking water certificate <sup>6</sup>	
	according to DVGW W 270 and UBA KTW (with order the indication "with drinking water certificate" is necessary)
Current consumption	signal output current: max. 25 mA
Surrent consumption	signal output voltage: max. 7 mA
Weight	approx. 200 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU
	ination with TPE-U cable; not possible with IS-version (explosion protection)
Wiring diagrams	(0,4,000,000)
2-wire-system (current)	3-wire-system (current / voltage)
p supply + A Supply -	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
Pin configuration	
Electrical connection	cable colours (IEC 60757)
Supply +	WH (white)
Supply –	BN (brown)
Signal + (only 3-wire) Shield	
Dimensions (mm / in)	GIVE (grown)
	Ø7,4 [0.29]
	128 [5:04]

protection cap removable



		•	
	aimensi	ons in mm	
size	DN25 /	DN50 /	DN80 /
5126	PN40	PN40	PN16
b	18	20	20
D	115	165	200
d2	14	18	18
d4	68	102	138
f	2	3	3
k	85	125	160
n	4	4	8

Technical data		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316L)	
Material of cable gland	standard: brass, nickel plated	on request: stainless steel 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection I	P 68)
Hole pattern	according to DIN 2507	

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

#### Terminal clamp



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

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

#### Display program

CIT 250 Process display with LED display and contacts

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

 $\textbf{CIT 350} \quad \text{Process display with LED display, bargraph, contacts and analogue output} \\$ 

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

CIT 600 Multichannel process display with graphics-capable LC display

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

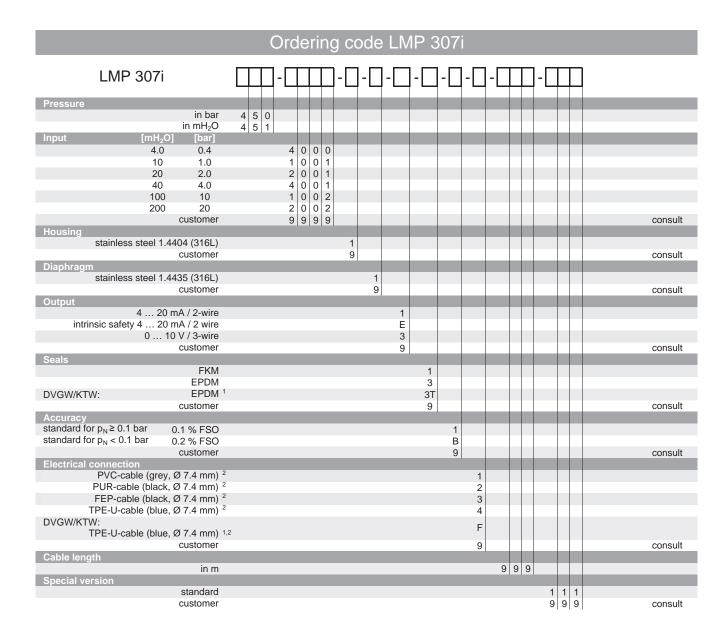
CIT 700 / CIT 750 Multichannel process display with graphics-capable TFT monitor, touchscreen and contacts

PA 440 Field display with 4-digit LC display

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



Ordering code



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

<sup>&</sup>lt;sup>2</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



## **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 $_2$ O up to 0 ... 250 mH $_2$ O from 0 ... 30 °C up to 0 ... 70 °C others on request

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

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

#### Preferred areas of use are



Water / filtrated sewage drinking water system

rain spillway basins water recycling



Fuel and oil tank farm









Input pressure range														
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure >	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120
Max. ambient pressure (he	ousing): 40	) bar												
Input temperature range														
Temperature measuring range 0 30 °C 0 50 °C 0 70 °C others on request 1							est 1							
<sup>1</sup> min. temperature range: 30°C; max. temperature range: 80°C; min. temperature: -10°C; max. temperature: 70 °C														
Output signal / Supply														
2-wire (pressure) <sup>2</sup>		$4 20 \text{ mA} / V_S = 10 30 V_{DC}$												
2-wire (temperature) <sup>2</sup>		$4 20 \text{ mA} / V_S = 10 30 V_{DC}$												

<sup>2</sup> the circuits are galvanically isolated fro	m 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			
Damesia sible la sel	D [/\/	\/ \/0.02.41.0		

 $R_{max} = [(V_S - V_{S min}) / 0.02 A] \Omega$ supply: 0.05 % FSO / 10 V Permissible load load: 0.05 % FSO / kΩ Influence effects ≤ ± 0.1 % FSO / year at reference conditions Long term stability < 10 msec (for output signal 2-wire (pressure)) Response time

<sup>&</sup>lt;sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
<sup>4</sup> Pt100 class B; compensation time up to 1 h depending on constant temperature and environmental respectively mass conditions

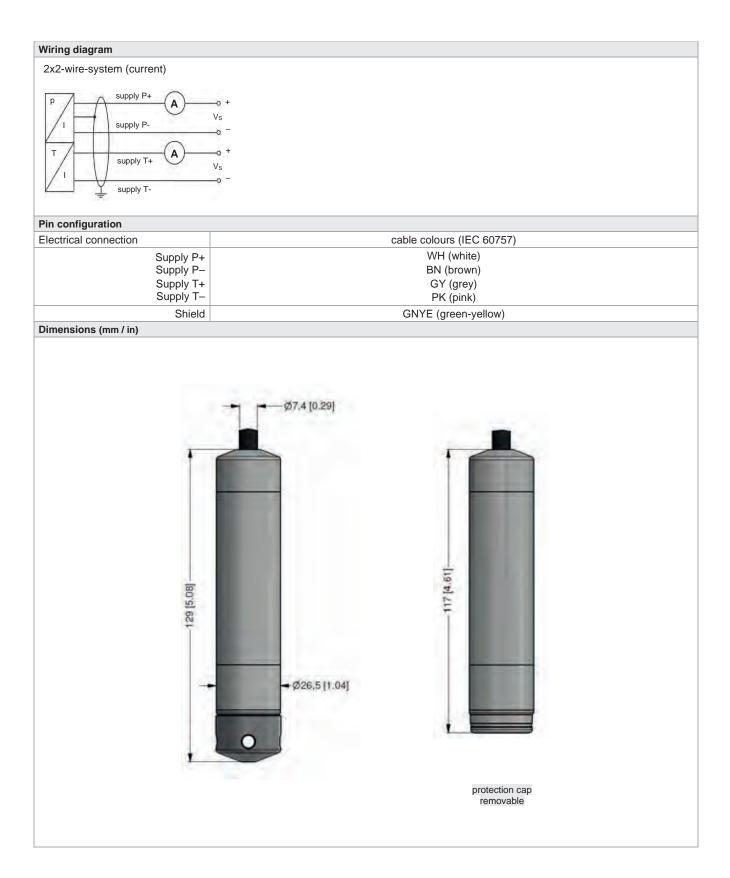
Thermal effects (offset a	and span)							
Nominal pressure P <sub>N</sub>	[bar]	< 0.40	≥ 0.40					
Tolerance band	[% FSO]	≤ ± 1	≤ ± 0.75					
in compensated range	[°C]	0.	70					
Permissible temperature	es							
Permissible temperature	Permissible temperatures medium: -10 70 °C storage: -25 70 °C							
Electrical protection <sup>5</sup>								
Short-circuit protection		permanent						
Reverse polarity protection no damage, but also no function								
Electromagnetic compatibility emission and immunity according to EN 61326								

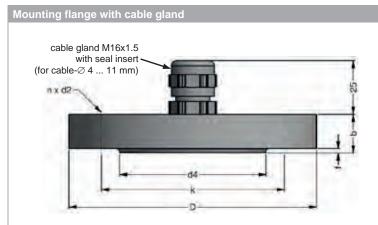
<sup>5</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressur	e reference available on request
--	----------------------------------

3.1						
Electrical connection						
Cable with sheath material <sup>6</sup>	PVC (-5 70 °C) grey Ø 7.4 mm					
	PUR (-10 70 °C) black Ø 7.4 mm					
	FEP <sup>7</sup> (-10 70 °C) black Ø 7.4 mm					
	TPE-U (-10 70 °C) blue Ø 7.4 mm (without/with drinking water certificate)					
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m					
Cable inductance	signal line/shield also signal line/signal line: 1 µH/m					
Bending radius	static installation: 10-fold cable diameter					
_	dynamic application: 20-fold cable diameter					
<sup>6</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference						

do not doo nooly daoponada probod with ann Er dab	e if effects due to highly charging processes are expected

<sup>7</sup> do not use freely suspended probes t	with an FEP cable if effects due to highly charging processes are expected	
Materials (media wetted)		
Housing	stainless steel 1.4404 (316L)	
Seals	FKM	
	EPDM (without/with drinking water certificate) other	ers on request
Diaphragm	stainless steel 1.4435 (316L)	
Protection cap	POM-C	
Cable sheath	PVC, PUR, FEP, TPE-U, others on request	
Miscellaneous		
Drinking water certificate 8	according to DVGW W 270 and UBA KTW	
	(with order the indication "with drinking water certificate" is necessary)	
Current consumption	max. 25 mA	
Weight	approx. 200 g (without cable)	
Ingress protection	IP 68	
CE-conformity	EMC Directive: 2014/30/EU	
<sup>8</sup> only possible with EPDM seal in com	bination with TPE-U cable	





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

Technical data			
Suitable for	all probes		
Flange material	stainless steel 1.4404 (316L)		
Material of cable gland	standard: brass, nickel plated	on request: stainless stee	el 1.4305 (303); plastic
Seal insert	material: TPE (ingress protecti	on IP 68)	
Hole pattern	according to DIN 2507		
Ordering type	·	Ordering code	Woight

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 10.	5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel	1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		
			*** * * .

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

#### Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

touchscreen and contacts

PA 440 Field display with 4-digit LC display

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



## LMP 307T

	Ordering code LMP 307T	
LMP 307T		
Pressure		
in bar in mH₂O	4 5 5 4 5 6	
Input [mH <sub>2</sub> O] [bar]		
1.0 0.10 1.6 0.16	1 0 0 0 0 1 6 0 0	
2.5 0.25 4.0 0.40	2 5 0 0 4 0 0 0	
6.0 0.60	6 0 0 0	
10 1.0 16 1.6	1 0 0 1 1 1 6 0 1	
25 2.5 40 4.0	2 5 0 1 4 0 0 1	
60 6.0	6 0 0 1	
100 10 160 16	1 0 0 2 1 6 0 2 2 5 0 2	
250 25 customer	2 5 0 2 9 9 9 9	consult
Input temperature °C		Soriouit
0 30 0 50	0 0 0 x 3 0 0 0 0 x 5 0	
0 70 customer	0 0 0 x 7 0 9 9 9 9 9 9 9	consult
Housing		Consult
stainless steel 1.4404 (316L) customer	1 9	consult
Diaphragm stainless steel 1.4435 (316L) customer	1 9	consult
Output pressure		Consuit
4 20 mA / 2-wire Output temperature	1	
4 20 mA / 2-wire Seals	1	
FKM EPDM	1	
DVGW/KTW: EPDM <sup>1</sup> customer	3 3T 9	consult
Accuracy standard for p <sub>N</sub> ≥ 0.4 bar 0.35 % FSO	3	
standard for p <sub>N</sub> < 0.4 bar 0.5 % FSO	5	
option 1 for p <sub>N</sub> ≥ 0.4 bar 0.25 % FSO customer	2 9	consult
Electrical connection / cable length  PVC-cable (grey, Ø 7.4 mm) <sup>2</sup>		
3 m	1 0 0 3	
5 m 10 m	1 0 0 5 1 0 1 0	
15 m special length in m	1 0 1 5 1 9 9 9	
· · · · · ·	1 9 9 9	
PUR-cable (black, Ø 7.4 mm) <sup>2</sup> 3 m	2 0 0 3	
5 m	2 0 0 5	
10 m 15 m	2 0 1 0 2 0 1 5	
special length in m	2 9 9 9	
FEP-cable (black, Ø 7.4 mm) <sup>2</sup>	3 0 0 5	
5 m 10 m	3 0 1 0	
special length in m	3 9 9 9	
TPE-U-cable (blue, Ø 7.4 mm) <sup>2</sup> special length in m	4 9 9 9	
DVGW/KTW:		
special length in m Special version	F 9 9 9	
standard customer		0 0 0 9 9 9 consult
343.31101		J J J J J J J J J J J J J J J J J J J

 $<sup>^{\</sup>rm 1}$  drinking water certification only possible with EPDM seal (code 3T) in combination with TPE-U cable (code F)  $^{\rm 2}$  shielded cable with integrated ventilation tube for atmospheric pressure reference



## **LMP 308**

### Detachable **Stainless Steel Probe**

Stainless Steel Sensor

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

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are

#### Water / filtrated sewage

ground water level measurement



level measurement in wells and open waters

rain spillway basin

level measurement in container water treatment plants water recycling













CE-conformity

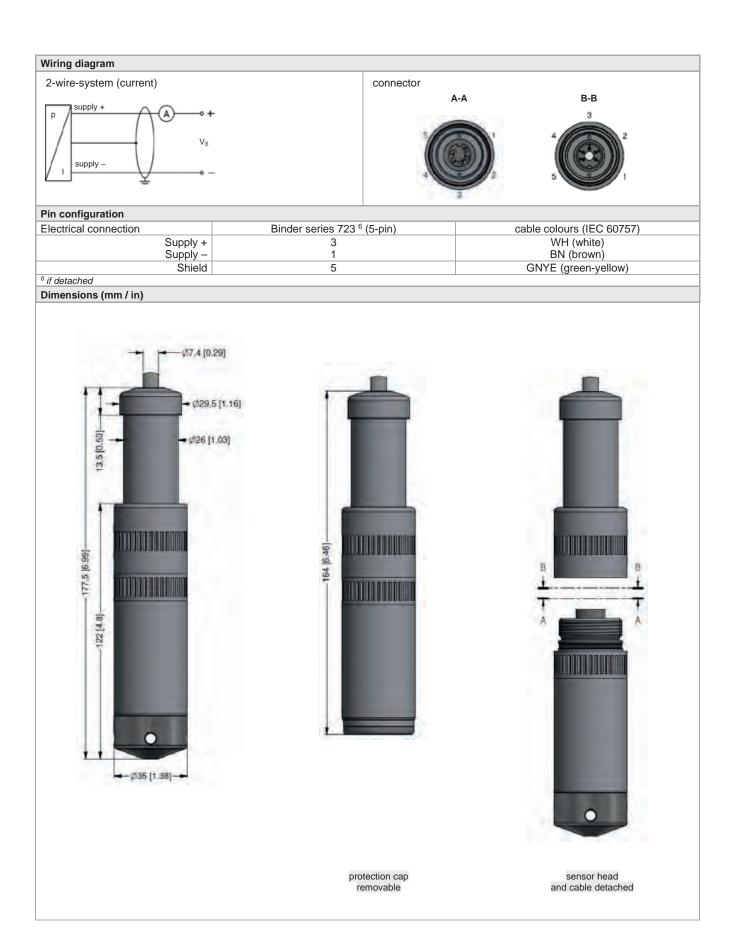
ATEX Directive

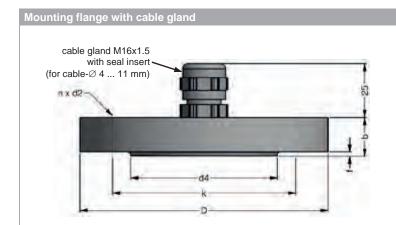
<sup>5</sup> not in combination with the accuracy 0.1 % FSO

Input pressure range	[hor]	0.10	0.16	0.25	0.40	0.60	1	1.0	2.5	1	6	10	16	) P
Nominal pressure gauge	[bar]		0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	100	16	25
Level	[mH <sub>2</sub> O]		1.6	2.5	4	6	10	16	25	40	60	100	160	250
Overpressure	[bar]		1	1	2	5	5	10	10	20	40	40	80	80
Burst pressure	[bar]		1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120
Max. ambient pressure (h	ousing): 4	0 bar												
Output signal / Supply														
Standard		2-wire:	4	20 m	A / Vs =	· 8 32	2 V <sub>DC</sub>	SI	L-version	ı: Vs = 1	4 28	Vnc		
Option IS-protection		2-wire:				: 10 28			L-version					
Performance			•		,,,,,,		, , DC				20	- 50		
Accuracy 1		standa	ırd· no	ominal r	oressure	e < 0.4 ba	ar.	<	± 0.5 % F	SO				
riodurady		Stariac				$e \ge 0.4 \text{ bis}$			± 0.35 %					
		option				e ≥ 0.4 ba			± 0.25 %					
		option				essures:			± 0.1 % F					
Permissible load		R <sub>max</sub> =	[(V <sub>S</sub> - V	/ <sub>S min</sub> ) / C	0.02 A] <u>(</u>	2								
Influence effects			: 0.05 %					loa	ad:0.05 %	6 FSO /	kΩ			
Long term stability						ence con	ditions							
Response time		≤ 10 m		,										
<sup>1</sup> accuracy according to IEC 6	60770 – limi			(non-line	earity. hv	steresis, ı	epeatah	ility)						
Thermal effects (Offset ar		,	,	,			,	.,,						
Nominal pressure p <sub>N</sub>	[bar]			<	0.40						≥ 0.4	0		
Tolerance band	[% FSO]				≤ ± 1						≤ ± 0.			
in compensated range	[°C]							0 7	0					
Permissible temperatures								0 7						
Permissible temperatures		modiu	m: -20 .	70 °C				storac	je: -25	70 °C				
Electrical protection <sup>2</sup>	1	mediai	1120 .	10 0	<u> </u>			Storag	je20	. 10 0				
•		norma	nont											
Short-circuit protection		-	permanent no damage, but also no function											
Reverse polarity protectio	n													
Lightning protection	.1116		integrated emission and immunity according to EN 61326											
Electromagnetic compatib														
<sup>2</sup> additional external overvolta	ige protection	on unit in	terminai	DOX KL 1	or KL 2	with atmo	spneric	pressur	e reterence	e availabi	e on requ	Jest		
Electrical connection	1.3	D) (O	<i>(</i>	70.00)		~ - 4								
Cable with sheath materia	ai °		(-20 î	70 °C) Ì	black !	Ø 7.4 mı Ø 7.4 mı Ø 7.4 mı	n							
Bending radius			nstallation			cable dia cable dia								
<sup>3</sup> shielded cable with integrate														
<sup>4</sup> do not use freely suspended	l probes wit	h an FEF	cable if	effects d	ue to higi	hly chargi	ng proce	esses ar	e expected	1				
Materials (media wetted)														
Housing			ss steel		( /									
Seals					n reque	st								
Diaphragm			stainless steel 1.4435 (316L)											
Protection cap		POM-0												
Cable sheath		PVC, I	<sup>2</sup> UR, FE	P, othe	rs on re	quest								
Explosion protection														
Approvals DX19-LMP 308	3	zone (	): II 10	Ex ia I	X / II IC T4 G IIC T13!		E 12.00	)27X						
Safety technical maximun	n values	U <sub>i</sub> = 28	3 V, I <sub>i</sub> = 9	93 mA,	P <sub>i</sub> = 660	mW, C <sub>i</sub>			H, ax. 27 nF	to the h	ousing			
Permissible temperatures environment	for	in zon	e 0:	- gher: -	20 60 40/-20 .	°C with 70 °C	p <sub>atm</sub> 0.8	3 bar u	p to 1.1 b	ar				
Connecting cables (by factory)		cable	capacita nductan	ince: s	signal lir	ne/shield			e/signal l e/signal l					
Miscellaneous														
Option SIL2 version <sup>5</sup>		accord	ling to IE	C 6150	08 / IEC	61511								
Current consumption		max. 2												
Weight			. 250 g	(without	t cable)									
Ingress protection		IP 68												
CE-conformity		EMC	)irective	. 2014/2	3∩/EII									

EMC Directive: 2014/30/EU

2014/34/EU





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

Technical data			
Suitable for	all probes		
Flange material	stainless steel 1.4404 (316L)		
Material of cable gland	standard: brass, nickel plated	on request: stainless stee	el 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection I	IP 68)	
Hole pattern	according to DIN 2507		
			144 1 1 4

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

#### Terminal clamp



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

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

#### Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

PA 440 Field display with 4-digit LC display

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



				Or	de	rir	ng	CC	ode	e LN	ИP	30	8								
	LMP 308	3	П	7-Г		T	٦-	П	<u>-</u> Г	1-F	 1-Г	]-[	7-[		- 🗆	Т	1-Г	T	П		
Виссения							_		_												
Pressure		in bar	4 4	0		_										_		Т	П		
		in mH₂O	4 4	1																	
Input	[mH <sub>2</sub> O]	[bar]				0 (	2														
	1.0 1.6	0.10 0.16		1	6	0 0															
	2.5	0.25		2	5	0 0															
	4.0	0.40		4	0	0 (															
	6.0	0.60		6		0 (															
	10	1.0		1		0 '															
	16	1.6		1		0 '															
	25 40	2.5 4.0		2		0 '															
	60	6.0		6	0	0 .															
	100	10		1	0	0 2	2														
	160	16		1	6	0 2															
	250	25		2	5	0 2	2														
Housing		customer		9	1 9	9 9	9		-							-				consult	į
Housing	stainless steel	1.4404 (316L)			-	-	-	1								_		_			
	0.00000	customer						9												consult	t
Diaphragm																					
	stainless steel								1												
Outrout		customer							9											consult	t
Output	4	20 mA / 2-wire			-	-	-	-	_	1				_		_		-			
intri	insic safety 4									Ė											
		20 mA / 2-wire								15											
		intrinsic safety								ES	3										
	4	20 mA / 2-wire																			
Seals		customer	_	_					-	9						-				consult	1
ocais -		FKM									1										
		EPDM									3										
		customer									9									consult	t
Electrical of		(A 7 4 ) 1											1								
		rey, Ø 7.4 mm) <sup>1</sup> ack, Ø 7.4 mm) <sup>1</sup>											1 2								
		ack, Ø 7.4 mm) <sup>1</sup>											3								
		customer											9							consult	t
Accuracy																					
	r p <sub>N</sub> ≥ 0.4 bar	0.35 % FSO												3							
	r p <sub>N</sub> < 0.4 bar r p <sub>N</sub> ≥ 0.4 bar	0.5 % FSO												5							
option 2	ν <sub>N</sub> = 0.4 μαι	0.25 % FSO 0.1 % FSO <sup>2</sup>												2							
οριίστι Ζ		customer												9						consult	t
Cable leng	th																			30110411	
		in m													9	9 9					
Version		ote - de - d																			
		standard customer																0 9	0	consult	+
		Custoniel															٤	9	9	CONSUIT	L

 $<sup>^{\</sup>rm 1}$  cable with integrated ventilation tube for atmospheric pressure reference  $^{\rm 2}$  not in combination with SIL



# **LMP 308i**

### Detachable **Stainless Steel Probe** Precision

Stainless Steel Sensor

accuracy according to IEC 60770: 0.1 % FSO

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

### **Optional versions**

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

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

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

#### Preferred areas of use are

Water / filtrated sewage

ground water level measurement level measurement in wells and open waters



rain spillway basins level measurement in containers water treatment plants water recycling













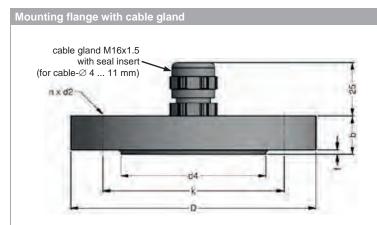
Input pressure range 1

Nominal pressure gauge	[bar]	0.40	1	2	4	10	20			
Level	[mH <sub>2</sub> O]	4	10	20	40	100	200			
Overpressure	[bar]	2	5	10	20	40	80			
Burst pressure	[bar]	3	7.5	15	25	50	120			
Max. ambient pressure (ho			7.0	10	20	00	120			
<sup>1</sup> On customer request we adju			n-possibility by soft	ware on the requir	ed pressure range					
Output signal / Supply										
Standard		2 wire: 4 2	0 m \ / \/ - 13	26 \/						
Option IS-version			$\frac{0 \text{ mA}}{0 \text{ mA}} / V_S = 12$ $\frac{0 \text{ mA}}{0 \text{ mA}} / V_S = 14$							
Options			$0 \text{ mA} / V_S = 14$ $0 \text{ mA} / V_S = 12$		vith communicati	on interface				
Орнопо			3-wire: $0 \dots 10 \text{ V} / \text{V}_S = 14 \dots 36 \text{ V}_{DC}$							
			$0 \text{ V} / \text{V}_{\text{S}} = 14$		ith communicati	on interface				
Performance										
Accuracy		IEC 60770 <sup>2</sup> : ≤ ±	: 0.1 % FSO							
Performance after turn-dov	wn (TD)									
- TD ≤ 1:5		no change of ac								
- TD > 1:5			racy calculating (		ssure gauge ≤ 0.	40 bar see note	3):			
			x turn-down] % F nominal pressu		od rango					
			curacy can be ca							
			x 10) % FSO i.e.			)				
Permissible load			$R_{\text{max}} = [(V_S - V_{S \text{ mi}})]$			3-wire: R <sub>min</sub> = 10	kΩ			
Influence effects		supply: 0.05 %		•		05 % FSO / kΩ				
Long term stability			own) % FSO / ye	ar at reference						
Response time		ca. 200 msec								
Adjustability (with option		following parameters can be adjusted (interface / software needed <sup>4</sup> )								
communication interface)			ing: 0 100 sec		. 90 % FSO	turn-down of s	pan: max. 1:10			
<sup>2</sup> accuracy according to IEC 60										
<sup>3</sup> nominal pressure gauges ≤ 0 ≤ ± (0.1 + 0.02 x turn-down) 9						80				
<sup>4</sup> software, interface and cable							er and XP)			
Thermal effects (offset ar	nd span)									
Tolerance band	[% FSO]	≤ ± (0.2 x turn-d	own) in co	ompensated ran	ge -20 70 °C					
TC [% FS0	O / 10 K]	± (0.2 x turn-dov	vn) in co	ompensated ran	ge -20 70 °C					
Permissible temperatures		medium: -20 7	70 °C stor	age: -25 70 °0	C electron	ics / environmen	t: -25 65 °C			
Electrical protection 5										
Short-circuit protection		permanent								
Reverse polarity protection	1	no damage, but	also no function							
Lightning protection		2-wire: integrate	d 3-w	re: without						
Electromagnetic compatibil	lity	emission and im	munity according	to EN 61326						
<sup>5</sup> additional external overvoltag	ge protection	unit in terminal box i	KL 1 or KL 2 with at	mospheric pressu	re reference availa	ble on request				
Electrical connection		<sup>5</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request								
0 - 1-1 - 1-20 - 1-1 11-1-1-1										
Cable with sheath material	l <sub>6</sub>	PVC (-5 70	)°C) grey Ø7	.4 mm						
Cable with sheath material	<sup>6</sup>	PUR (-20 70	°C) black Ø7	.4 mm						
	l 6	PUR (-20 70 FEP 7 (-20 70	) °C) black Ø 7 ) °C) black Ø 7	.4 mm .4 mm						
Bending radius	6	PUR (-20 70 FEP <sup>7</sup> (-20 70 static installation	) °C) black Ø 7 ) °C) black Ø 7 :: 10-fold cab	.4 mm .4 mm le diameter						
Bending radius		PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica	0°C) black Ø 7 0°C) black Ø 7 1: 10-fold cab tion: 20-fold cab	.4 mm .4 mm le diameter le diameter						
	d ventilation t	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica	0 °C) black Ø 7 0 °C) black Ø 7 10-fold cab tion: 20-fold cab pressure reference	.4 mm .4 mm le diameter le diameter	re expected					
Bending radius  6 shielded cable with integrated	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica	0 °C) black Ø 7 0 °C) black Ø 7 10-fold cab tion: 20-fold cab pressure reference	.4 mm .4 mm le diameter le diameter	re expected					
Bending radius <sup>6</sup> shielded cable with integrated <sup>7</sup> do not use freely suspended j	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica	0 °C) black Ø 7 0 °C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che	.4 mm .4 mm le diameter le diameter	re expected					
Bending radius <sup>6</sup> shielded cable with integrated or to the suspended of	d ventilation t probes with a	PUR (-20 70 FEP <sup>7</sup> (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect	0°C) black Ø 7 0°C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che	.4 mm .4 mm le diameter le diameter	re expected					
Bending radius <sup>6</sup> shielded cable with integrated or a superior of the shift of th	d ventilation t probes with a	PUR (-20 70 FEP <sup>7</sup> (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect	0 °C) black Ø 7 0 °C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 1: 4404 (316L) hers on request	.4 mm .4 mm le diameter le diameter	re expected					
Bending radius <sup>6</sup> shielded cable with integrated of the control	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect  stainless steel 1 FKM, EPDM, oth	0 °C) black Ø 7 0 °C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 1: 4404 (316L) hers on request	.4 mm .4 mm le diameter le diameter	re expected					
Bending radius <sup>6</sup> shielded cable with integrated of the control	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applicatube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C	0°C) black Ø 7 0°C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 1: 4404 (316L) hers on request 1: 4435 (316L)	.4 mm .4 mm le diameter le diameter arging processes a	re expected					
Bending radius <sup>6</sup> shielded cable with integrated <sup>7</sup> do not use freely suspended p  Materials (media wetted)  Housing  Seals  Diaphragm  Protection cap	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C PVC, PUR, FEP	0 °C) black Ø 7 0 °C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 1: 4404 (316L) hers on request	.4 mm .4 mm le diameter le diameter arging processes a	re expected					
Bending radius <sup>6</sup> shielded cable with integrated of the document of the shielded cable with integrated of the shielded of th	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic application for atmospheric an FEP cable if effects stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)	0°C) black Ø 7 0°C) black Ø 7 1: 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 1: 4404 (316L) hers on request 1: 4435 (316L)	.4 mm .4 mm le diameter le diameter le gring processes a						
Bending radius <sup>6</sup> shielded cable with integrated of the document of the document of the shielded cable with integrated of the document of the document of the shield of	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)  IBEXU 10 ATEX	0 °C) black Ø 7 0 °C) black Ø 7 10 °C) black Ø 7 11 10-fold cab tion: 20-fold cab pressure reference ts due to highly cha 14404 (316L) hers on request 14435 (316L)	.4 mm .4 mm le diameter le diameter le diameter le ging processes a						
Bending radius  6 shielded cable with integrated 7 do not use freely suspended p Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Explosion protection (onli	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)  IBEXU 10 ATEX zone 0: II 10	0 °C) black Ø 7 0 °C) black Ø 7 10 °C) black Ø 7 11 10-fold cab tion: 20-fold cab pressure reference ts due to highly cha 14404 (316L) 14405 (316L) 14435 (316L) 1668 X / IECE	.4 mm .4 mm le diameter le diameter le diameter le ging processes a						
Bending radius  6 shielded cable with integrated 7 do not use freely suspended p Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Explosion protection (onli	d ventilation t probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)  IBEXU 10 ATEX zone 0: II 10 zone 20: II 11 U <sub>i</sub> = 28 V, I <sub>i</sub> = 93	0 °C) black Ø 7 0 °C) black Ø 7 10 °C) black Ø 7 11 10-fold cab pressure reference ts due to highly che 14404 (316L) 14405 (316L) 15406 A / IECE 1668 X / IECE 1668 X / IECE 1668 X / IECE 1668 X / IECE 1669 Ex ia IIC T4 Ga 1660 Ex ia IIIC T135 1660 M	.4 mm .4 mm le diameter le	, ( ≈ 0 μH,					
Bending radius  6 shielded cable with integrated 7 do not use freely suspended 9 Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Explosion protection (onlapprovals DX19-LMP 308 i Safety technical maximum	d ventilation to probes with a	PUR (-20 70 FEP 7 (-20 70 static installation dynamic applica tube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, oth stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)  IBEXU 10 ATEX zone 0: II 10 zone 20: II 11 U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 the supply connection of the stainless steel 1 II I	0 °C) black Ø 7 0 °C) black Ø 7 10 °C) black Ø 7 11 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 14404 (316L) hers on request 14435 (316L) 1668 X / IECE 1668 X	.4 mm .4 mm le diameter le di	, ( ≈ 0 μH, max. 27 nF to tl	ne housing				
Bending radius  6 shielded cable with integrated 7 do not use freely suspended 9 Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Explosion protection (onl Approvals DX19-LMP 308 i Safety technical maximum Permissible temperatures f	d ventilation to probes with a	PUR (-20 70 FEP 7 (-20 70 Static installation dynamic applicatube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, other stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)  IBEXU 10 ATEX zone 0: II 10 zone 20: II 11 U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 the supply connert in zone 0:	0°C) black Ø 7 0°C) black Ø 7 10°C) black Ø 7 11 10-fold cab pressure reference 12 to the black of the b	.4 mm .4 mm le diameter le di	, ( ≈ 0 μH, max. 27 nF to tl	ne housing				
Bending radius  6 shielded cable with integrated 7 do not use freely suspended 9 Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Explosion protection (onlapprovals DX19-LMP 308 i Safety technical maximum	d ventilation to probes with a	PUR (-20 70 FEP 7 (-20 70 Static installation dynamic applicatube for atmospheric an FEP cable if effect stainless steel 1 FKM, EPDM, other stainless steel 1 POM-C PVC, PUR, FEP 20 mA / 2-wire)  IBEXU 10 ATEX zone 0: II 10 zone 20: II 11 U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 the supply conner in zone 0: in zone 1 or high	0 °C) black Ø 7 0 °C) black Ø 7 10 °C) black Ø 7 11 10-fold cab tion: 20-fold cab pressure reference ts due to highly che 14404 (316L) 15 16 16 16 16 16 16 16 16 16 16 16 16 16	.4 mm .4 mm le diameter le di	0 μH, max. 27 nF to the strength of 1.1 bar					

Miscellaneous								
	max. 25 mA							
Weight	approx. 250 g (without cable)							
<u> </u>	IP 68							
,	EMC Directive: 20	014/30/EU	ATEX Directive: 2014/	34/EU				
Wiring diagram / connector								
2-wire-system (current)  p		3-wir	e-system (voltage)  supply +					
Pin configuration		<u> </u>						
Electrical connection	Binder series	5 723 8 (5-pin)	Binder series 723 8 (7-pin)	cable colours (IEC 60757)				
	2-wire	3-wire	with communication interface					
Supply + Supply - Signal + (for 3-wire) RxD TxD GND	3 1 - - -	3 4 1 - -	3 / WH (white) 1 / BN (brown) 6 / GN (green) 4 / YE (yellow) 5 / GY (grey) 7 / GN (green)	WH (white) BN (brown) GN (green)				
Shield	5	5	2/GNYE (green-yellow)	GNYE (green-yellow				
8 if detached								
229 P [1.10]		164 Fs.46]	B.	# T A				
		,						

### LMP 308i

#### Technical Data



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

Technical data								
Suitable for	all probes	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 protecti	on IP 68)						
Hole pattern	according to DIN 2507							
Ordering type		Ordering code	Weight					

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

#### Terminal clamp



Technical data			
Suitable for	all probes with cable Ø 5.5 10.	5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless steel 1	.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		
			144

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

#### Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

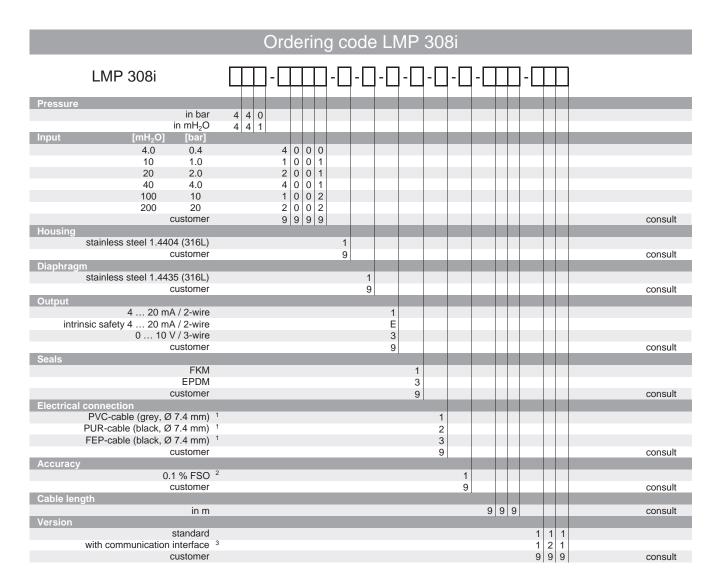
CIT 650 Multichannel process display with graphics-capable LC display and datalogger

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

PA 440 Field display with 4-digit LC display

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





<sup>&</sup>lt;sup>1</sup> cable with integrated ventilation tube for atmospheric pressure reference

Windows® is a registrated trademark of Microsoft Corporation

 $<sup>^{\</sup>rm 2}$  available on request: calibration of individual pressure range higher than 400 mbar with accuracy 0.1 %

<sup>&</sup>lt;sup>3</sup> 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)



## **LMP 808**

# Detachable Plastic Probe

Stainless Steel Sensor

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

#### **Nominal pressure**

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

#### **Output signals**

2-wire: 4 ... 20 mA

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

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

Preferred areas of use are



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

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



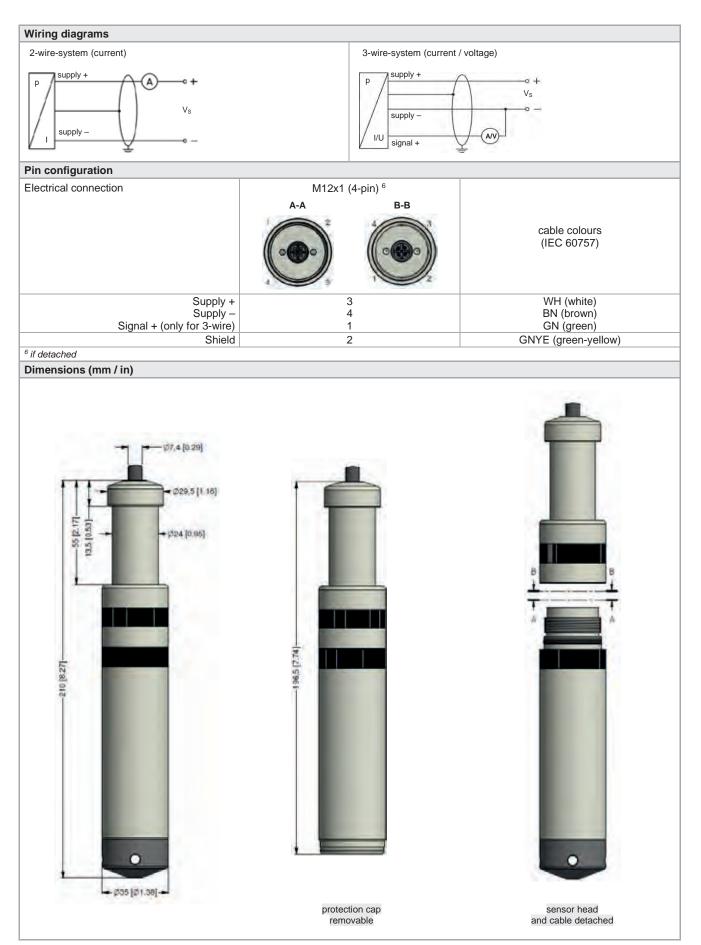


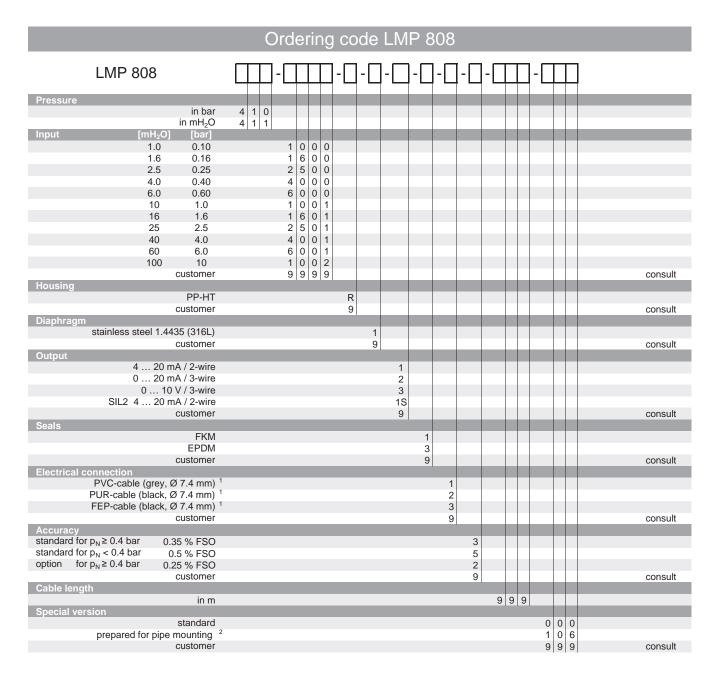




Input pressure range												
Nominal pressure gauge	[bar]	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	0.5	1	1	2	5	5	10	10	20	40	40
Burst pressure ≥	[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50
Max. ambient pressure (he	Max. ambient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

Output signal / Supply								
Standard	2-wire	$4 \dots 20 \text{ mA} / V_S = 8 \dots 32 V_{DC}$		SIL-version: V <sub>S</sub> = 14 28 V <sub>DC</sub>				
Options 3-wire	3-wire	$0 \dots 20 \text{ mA} / V_S = 14 \dots 30 V_{DC}$						
		$0 \dots 10 \text{ V}  / \text{ V}_{\text{S}} = 14 \dots 30 \text{ V}_{\text{DC}}$						
Performance								
Accuracy	standa			≤ ± 0.5 % FSO				
		nominal pressure ≥ 0.4 bar		≤ ± 0.35 % FSO				
	option	nominal pressure ≥ 0.4 bar	:	≤ ± 0.25 % FSO				
Permissible load		t 2-wire: $R_{max} = [(V_S - V_{S min}) / 0.02 A$	Α] Ω					
		t 3-wire: $R_{\text{max}} = 500 \Omega$						
		e 3-wire: $R_{min} = 10 \text{ k}\Omega$						
Influence effects	,	: 0.05 % FSO / 10 V		load:0.05 % FSO / kΩ				
Long term stability	≤ ± 0.′	% FSO / year at reference conditions	5					
Response time	< 10 n							
<sup>1</sup> accuracy according to IEC 60	770 – limit point a	ljustment (non-linearity, hysteresis, repeata	bility)					
Thermal effects (Offset a	nd Span)							
Nominal pressure P <sub>N</sub>	[bar]	< 0.40		≥ 0.40				
Tolerance band	% FSO]	≤ ± 1		≤ ± 0.75				
In compensated range	[°C]		0	. 50				
Permissible temperatures	3							
Permissible temperatures		m / electronics / environment / storage	: -25	80 °C				
Electrical protection <sup>2</sup>	1110	,						
Short-circuit protection	porma	nont						
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								
			press	sure reference available on request				
		4 20 mA/2-wire without SIL2)						
Series resistance		9.4 $\Omega$ for each positive and negative wire						
Max. leakage current	8 kA (	8 kA (8/20 µsec)						
Overload	4 kV (	4 kV (line-line and line-earth) according to EN 61000-4-5						
Max. rated current	30 mA							
Electrical connection	'							
Cable with sheath material	3 PVC	(-5 70 °C) grey Ø 7.4 mm						
		(-25 70 °C) black Ø 7.4 mm						
	FEP <sup>4</sup>	(-25 70 °C) black Ø 7.4 mm						
Cable capacitance	signal	line/shield also signal line/signal line:	160	pF/m				
Cable inductance	signal	line/shield also signal line/signal line:	: 1 µŀ	<del>I</del> /m				
Bending radius	static	nstallation: 10-fold cable diamete	er					
		ic application: 20-fold cable diamete	er					
<sup>3</sup> shielded cable with integrated		pheric pressure reference P cable if effects due to highly charging proc	20000	s are expected				
	DI ODES WILLI ALI FEL	cable if effects due to flighly charging prod	esses	are expected				
Materials (media wetted)	DD 117	•						
Materials (media wetted) Housing	PP-H1							
Materials (media wetted) Housing Seals	FKM,	EPDM						
Materials (media wetted) Housing Seals Diaphragm	FKM,	EPDM ss steel 1.4435 (316L)						
Materials (media wetted) Housing Seals Diaphragm Protection cap	FKM, stainle POM-	EPDM ss steel 1.4435 (316L)						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath	FKM, stainle POM-	EPDM ss steel 1.4435 (316L)						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous	FKM, stainle POM-I PVC,	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection	FKM, stainle POM-I PVC,	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection (on request)	FKM, stainle POM-I PVC,	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25 ard: pipe with a total length up to 2 m j						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection (on request) Option SIL 2 application 5	FKM, stainle POM-I PVC, prepar (stand	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25 ard: pipe with a total length up to 2 m ping to IEC 61508 / IEC 61511						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection (on request)	FKM, stainle POM-I PVC, prepar (stand accord signal	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25 ard: pipe with a total length up to 2 m g ing to IEC 61508 / IEC 61511 output current: max. 25 mA						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection (on request) Option SIL 2 application <sup>5</sup> Current consumption	FKM, stainle POM-I PVC, prepar (stand accord signal signal	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25 ard: pipe with a total length up to 2 m g ing to IEC 61508 / IEC 61511 output current: max. 25 mA output voltage: max. 7 mA						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection (on request) Option SIL 2 application <sup>5</sup> Current consumption Weight	PKM, stainle POM-I PVC, prepai (stand accord signal signal approx	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25 ard: pipe with a total length up to 2 m g ing to IEC 61508 / IEC 61511 output current: max. 25 mA						
Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath Miscellaneous Option cable protection (on request) Option SIL 2 application <sup>5</sup> Current consumption	PKM, stainle POM-I PVC, prepai (stand accord signal signal approx IP 68	EPDM ss steel 1.4435 (316L) C PUR, FEP, others on request ed for mounting with PP-HT pipe Ø 25 ard: pipe with a total length up to 2 m g ing to IEC 61508 / IEC 61511 output current: max. 25 mA output voltage: max. 7 mA						





<sup>&</sup>lt;sup>1</sup> cable with integrated ventilation tube for atmospheric pressure reference

<sup>&</sup>lt;sup>2</sup> 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<sub>2</sub>O up to 0 ... 200 mH<sub>2</sub>O

#### **Output signals**

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

#### Special characteristics

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are



#### Sewage

waste water treatment water recycling dumpsites



#### Aggressive media

level measurement in most of acids and lyes



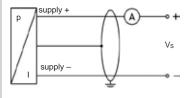




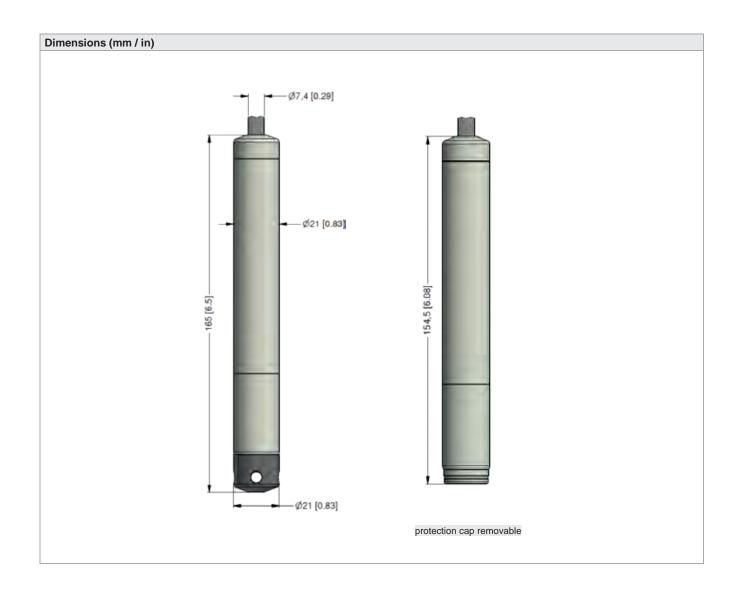
Input pressure range										
Nominal pressure gauge	[bar]	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH <sub>2</sub> O]	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	10	10	20	40	40
Burst pressure ≥	[bar]	4	4	5	5	12	12	25	50	50
Max. ambient pressure (he	Max. ambient pressure (housing): 30 bar									

Output signal / Supply								
2-wire	$4 20 \text{ mA} / V_S = 12 32 V_{DC}$							
Performance								
Accuracy 1	≤±0.5 % FSO							
Permissible load	$R_{\text{max}} = [(V_{S} - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$							
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ							
Response time	≤ 10 msec							
¹ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)								
Thermal effects (Offset and Span	) / Permissible temperatures							
Thermal error	≤ ± 0.4 % FSO / 10 K in compensated range 0 70 °C							
Permissible temperatures	medium / electronics / environment / storage: -25 80 °C							
Electrical protection <sup>2</sup>								
Short-circuit protection	permanent							
Reverse polarity protection	no damage, but also no function							
Electromagnetic protection	emission and immunity according to EN 61326							
<sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request								
Electrical connection								
Cable with sheath material <sup>3</sup>	PVC (-5 70 °C) grey Ø 7.4 mm PUR (-25 70 °C) black Ø 7.4 mm FEP <sup>4</sup> (-25 70 °C) black Ø 7.4 mm others on request							
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m							
Cable inductance	signal line/shield also signal line/signal line: 1 µH/m							
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter							
<sup>4</sup> do not use freely suspended probes with	on tube for atmospheric pressure reference th an FEP cable if effects due to highly charging processes are expected							
Materials (media wetted)								
Housing	PP-HT others on request							
Seals	FKM							
Diaphragm	ceramics Al₂O₃ 96 %							
Protection cap	POM-C							
Cable sheath	PVC, PUR, FEP							
Miscellaneous								
Current consumption	max. 25 mA							
Weight	approx. 100 g (without cable)							
Ingress protection	IP 68							
CE-conformity	EMC Directive: 2014/30/EU							
Wiring diagram								

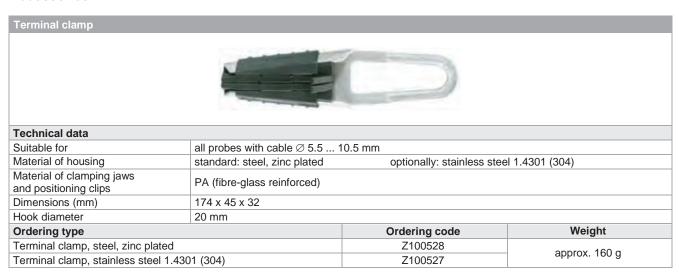
2-wire-system (current)

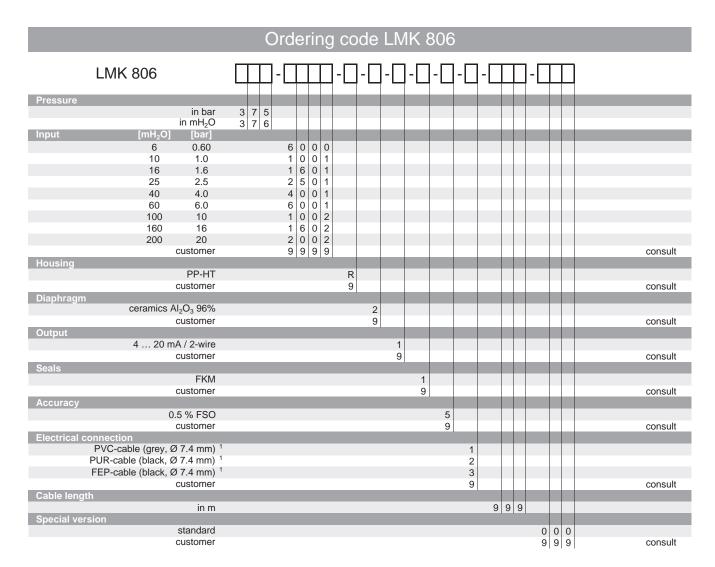


Pin configuration					
Electrical connection	cable colours (IEC 60757)				
Supply +	WH (white)				
Supply –	BN (brown)				
Shield	GNYE (green-yellow)				



#### Accessories





<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



# **LMK 807**

## Plastic Probe for Aggressive Media

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

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

#### **Optional versions**

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

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

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

#### Preferred areas of use are



#### Sewage

waste water treatment water recycling dumpsite



#### Aggressive media

level measurement in most of acids and lyes



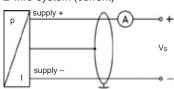




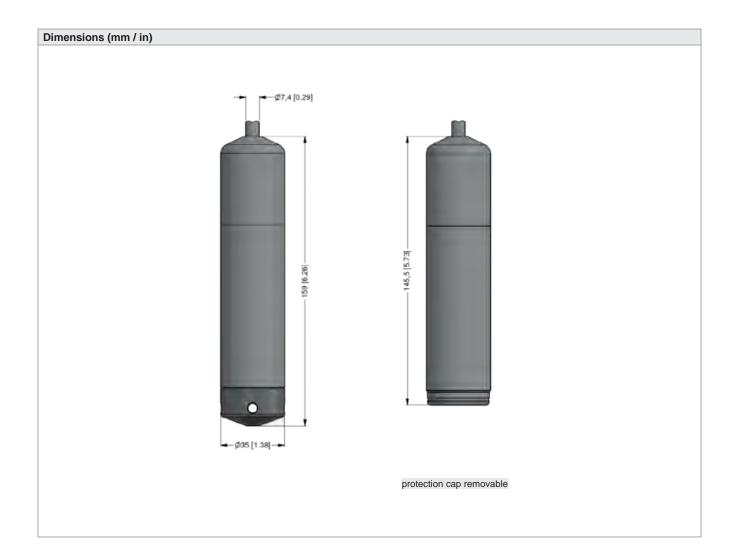


Input pressure range									
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	4	6	10	16	25	40	60	100
Overpressure	[bar]	1	2	2	4	4	10	10	20
Burst pressure ≥	[bar]	2	4	4	5	5	12	12	25
Max. ambient pressure (housing): 20 bar									

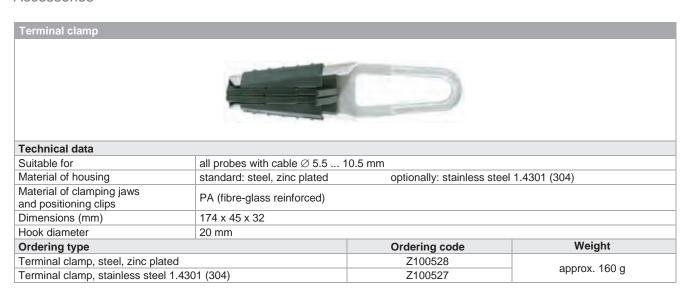
Output signal / Supply	4 00 4/1/ 0 001/	011					
2-wire	4 20 mA / V <sub>S</sub> = 8 32 V <sub>DC</sub>	$4 20 \text{ mA} / V_S = 8 32 V_{DC}$ SIL-version: $V_S = 14 28 V_{DC}$					
Performance							
Accuracy 1	≤ ± 0.5 % FSO						
Permissible load		$R_{\text{max}} = [(V_{S} - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$					
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ						
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	≤ ± 0.1 % FSO / year at reference conditions					
Response time	≤ 10 msec						
<sup>1</sup> accuracy according to IEC 60770 –	limit point adjustment (non-linearity, hysteresis, repeatability)						
Thermal effects (Offset and Sp	an)						
Thermal error	≤ ± 0.2 % FSO / 10 K	in compensated range 0 70 °C					
Permissible temperatures							
Permissible temperatures	medium / electronic / environment / storage:	-25 80 °C					
Electrical protection <sup>2</sup>							
Short-circuit protection	permanent						
Reverse polarity protection	no damage, but also no function						
Electromagnetic compatibility	emission and immunity according to EN 61326						
<sup>2</sup> additional external overvoltage prote	ection unit in terminal box KL 1 or KL 2 with atmospheric press	ure reference available on request					
Electrical connection							
Cable with sheath material <sup>3</sup>	PVC ( -5 70 °C) grey Ø 7.4 mm PUR (-25 70 °C) black Ø 7.4 mm FEP <sup>4</sup> (-25 70 °C) black Ø 7.4 mm others on request						
Cable capacitance	signal line/shield also signal line/signal line: 160 p	pF/m					
Cable inductance	signal line/shield also signal line/signal line: 1 μH/						
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter						
<sup>4</sup> do not use freely suspended probes	ation tube for atmospheric pressure reference with an FEP cable if effects due to highly charging processes	are expected					
Materials (media wetted)							
Housing	PP-HT						
Seals	FKM, EPDM, FFKM	FKM, EPDM, FFKM					
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %					
Protection cap	POM-C	POM-C					
Cable sheath	PVC, PUR, FEP						
Miscellaneous							
Option SIL 2 version	according to IEC 61508 / IEC 61511						
Current consumption	max. 25 mA						
Weight	approx. 200 g (without cable)						
	IP 68						
Ingress protection	EMC Directive: 2014/30/EU						
Ingress protection CE-conformity	EMC Directive: 2014/30/EU						

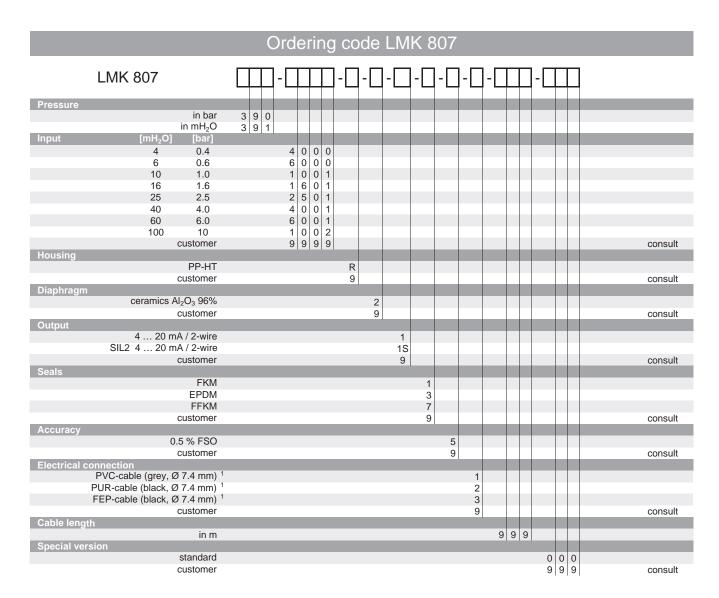


Pin configuration					
Electrical connection	cable colours (IEC 60757)				
Supply +	WH (white)				
Supply –	BN (brown)				
Shield	GNYE (green-yellow)				



#### Accessories





<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference



# **LMK 808**

### **Detachable Plastic Probe**

Ceramic Sensor

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

#### **Nominal pressure**

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

#### **Output signals**

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

#### **Special characteristics**

- diameter 35 mm
- diaphragm ceramics 99.9% Al<sub>2</sub>O<sub>3</sub>
- cable assembly and sensor head detachable
- good long-term stability
- integrated lightning protection 8 kA gas discharge tube (8/20µsec); 4 kV surge I-I/I-e according to EN61000-4-5

#### **Optional versions**

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

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

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

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

#### Preferred areas of use



### Water

groundwater and level monitoring sea water



#### Sewage

waste water treatment water recycling

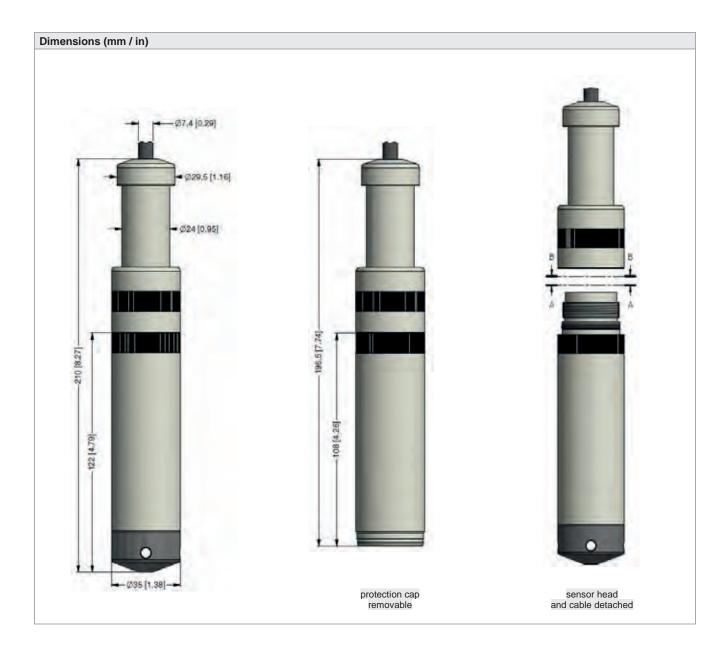




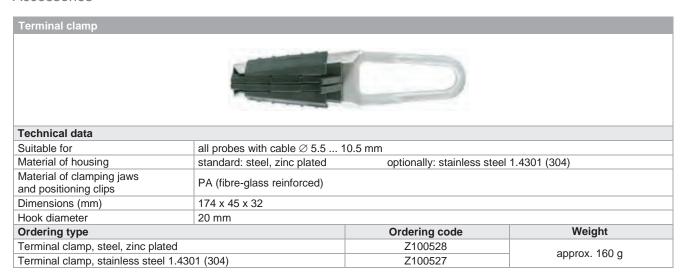


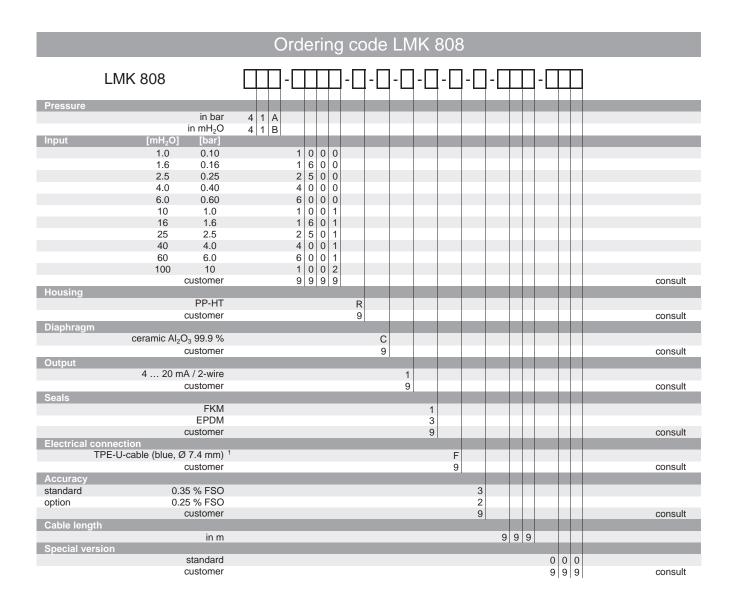
Input pressure range

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 <sub>2</sub> 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
Burst pressure ≥	[bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum	[bar]	-0.2	-0.3		-0	.5				-1		
Max. ambient pressure (ho	using): 2	0 bar										
Output signal / Supply												
2-wire		4 20	$mA / V_S =$	13 30	V <sub>DC</sub>							
Performance												
Accuracy 1		standar	d: ≤ ± 0.	35 % FS	0							
-		option:	$\leq \pm 0$ .	25 % FS	0			others of	n request	t		
Permissible load		$R_{max} = [$	$R_{\text{max}} = [(V_{\text{S}} - V_{\text{S min}}) / 0.02 \text{ A}] \Omega$									
Influence effects			0.05 % F					load: 0.0	05 % FSC	) / kΩ		
Long term stability					eference c	onditions						
Turn-on time		up to 1.		,								
Mean response time		≤ 20 ms										
Measuring rate		200 Hz										
<sup>1</sup> accuracy according to IEC 60	770 – limi			n-linearit	, hvsteresis	reneatah	ility)					
Thermal effects (offset ar			usunent (n	ori-iiricarity	r, rrysteresis	, тереатар	mity)					
•	iu spaii)	_	F00								00.00	
Tolerance band		≤ ± 1 %	FSO					in comp	ensated r	ange -20	0 80 °C	
Permissible temperatures	S											
Permissible temperatures		medium	ı / electroi	nics / env	rironment ,	storage:		-25 8	O°C			
Electrical protection <sup>2</sup>												
Short-circuit protection		perman	ent									
Reverse polarity protection			age, but a	ilso no fu	ınction							
Lightning protection		integrat		1130 110 10	inction							
Electromagnetic compatibil	lity			ounity oo	oording to	ENI 6122	06					
	Electromagnetic compatibility   emission and immunity according to EN 61326 <sup>2</sup> additional external overvoltage protection unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request											
			emma box	CAL I OI F	NL 2 WILITAL	nosprienc	pressure r	ененение а	valiable of	request		
Overvoltage / lightning p	rotection											
Series resistance				sitive an	d negative	wire						
Max. leakage current		<del></del>	'20 µsec)									
Overload	d 4 kV (line-line and line-earth) according to EN 61000-4-5											
Max. rated current		30 mA										
Electrical connection												
Cable with sheath material	3	TPE-U	blue Ø	7.4 mm (	suitable fo	or drinking	water)	others o	n request	t		
Cable capacitance					al line/sigi				<u> </u>			
Cable inductance					al line/sigi							
Bending radius					cable diar		рили	dynamic	annlicati	on: 20-f	fold cable of	diameter
<sup>3</sup> shielded cable with integrated	d air tuhe f					ilotoi		dynamic	аррпсан	011. 201	ioia cabic (	alamotor
Materials (media wetted)		or aurroop										
Housing		PP-HT						others o	n roquoof			
			DDM						n request			
Seals (O-rings)		FKM; E		0.00/				otners o	n request			
Diaphragm			s Al <sub>2</sub> O <sub>3</sub> 9	9.9%								
Protection cap		POM-C										
Cable sheath		TPE-U										
Miscellaneous												
Current consumption		max. 22	2 mA									
Weight		approx.	300 g (wi	thout cal	ole)							
Ingress protection		IP 68										
CE-conformity			rective: 2	014/30/F	U							
Wiring diagram		LIVIO DI	1001110. 2		in configu	ıration						
				F	iii comige	ii alion	ı					
2-wire-system (current)					lectrical onnection		Α.	M12x1 (4 - <b>A</b>	-pin) <sup>6</sup> <b>B-B</b>			
p supply +	(A)—	vs -					0				cable co	
Y												
						Supply +		2			WH (w	hite)
						Supply + Supply - Shield		3 4 2			WH (w BN (bro	own)



### Accessories





<sup>&</sup>lt;sup>1</sup> shielded cable, drinking water suitable, with integrated ventilation tube for atmospheric pressure reference



# **LMK 809**

## **Plastic Probe** for Aggressive Media

High Purity Ceramic Sensor

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

### **Nominal pressure**

from  $0 ... 0.4 \text{ mH}_2\text{O}$  up to  $0 ... 100 \text{ mH}_2\text{O}$ 

### **Output signals**

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

### **Special characteristics**

- diameter 45 mm
- chemical resistance
- high overpressure resistance
- especially for tank level measurement of viscous and aggressive media
- diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- housing material PP-HT or PVDF

### **Optional versions**

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

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

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

### Preferred areas of use are



### Sewage

waste water treatment water recycling dumpsite



### Aggressive media

level measurement in most of acids and lyes

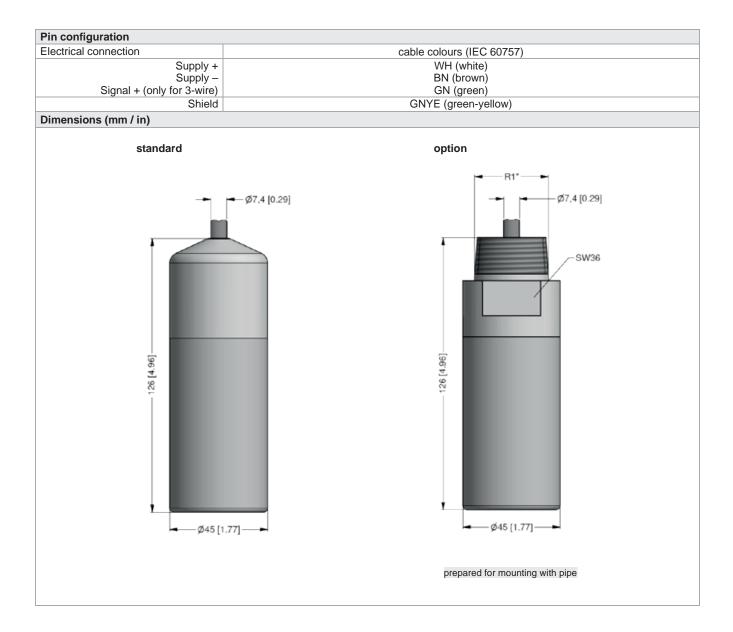






Input pressure range														
Nominal pressure gauge	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35
Max. ambient pressure (ho	using): 10 l	oar												

Output signal / Supply						
Standard	2-wire: 4 20 mA / V <sub>S</sub> = 9 32 V <sub>DC</sub>					
Option	3-wire: 0 10 V / V <sub>S</sub> = 12.5 32 V <sub>DC</sub>					
Performance						
Accuracy <sup>1</sup>	standard: $\leq \pm 0.35 \%$ FSO option: $\leq \pm 0.25 \%$ FSO					
Permissible load	$R_{\text{max}} = [(V_{\text{S}} - V_{\text{S min}}) / 0.02 \text{ A}] \Omega$					
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ					
Long term stability	≤ ± 0.1 % FSO / year at reference conditions					
Turn-on time	700 msec					
Mean response time	< 200 msec measuring rate: 5/sec					
Max. response time	380 msec					
<sup>1</sup> accuracy according to IEC 60770 – lim	it point adjustment (non-linearity, hysteresis, repeatability)					
Thermal effects (offset and span						
Tolerance band	≤±1% FSO					
in compensated range	-20 80 °C					
Permissible temperatures						
Permissible temperatures	medium / electronic / environment / storage: -25 80 °C					
Electrical protection <sup>2</sup>						
Short-circuit protection	permanent					
Reverse polarity protection	no damage, but also no function					
Electromagnetic compatibility emission and immunity according to EN 61326						
<sup>2</sup> additional external overvoltage protect	ion unit in terminal box KL 1 or KL 2 with atmospheric pressure reference available on request					
Electrical connection						
Cable with sheath material <sup>3</sup>	PUR (-25 70 °C) black Ø 7.4 mm FEP <sup>4</sup> (-25 70 °C) black Ø 7.4 mm TPE-U (-25 100 °C) blue Ø 7.4 mm others on request					
Cable capacitance	signal line/shield also signal line/signal line: 160 pF/m					
Cable inductance	signal line/shield also signal line/signal line: 1 µH/m					
Bending radius	static installation: 10-fold cable diameter dynamic application: 20-fold cable diameter					
	on tube for atmospheric pressure reference					
Materials (media wetted)	ith an FEP cable if effects due to highly charging processes are expected					
Housing	standard: PP-HT					
Housing	option: PVDF					
Seals	FKM, EPDM, FFKM					
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %					
Cable sheath	PUR, FEP, TPE-U					
Miscellaneous						
Option cable protection	prepared for mounting with plastic pipe					
Current consumption	max. 21 mA					
Weight	approx. 320 g (without cable)					
Ingress protection	IP 68					
CE-conformity	EMC Directive: 2014/30/EU					
Wiring diagrams						
2-wire-system (current)	3-wire-system (voltage)					
p supply + A Vs	p supply + o + Vs supply - o - Vs signal +					



### Accessories



			rderin	ig co	de	LM	K 8	09						ı	
	LMK 809	Ш	- 🔲	□-[	]-[	-	-	- 🔲	- 🗌	- 🔲	П.	- 🗌			
Pressure															
	in bar	3 9 5 3 9 6											П	Т	
	in mH <sub>2</sub> O	3 9 6													
Input	[mH₂O] [bar]														
	0.4 0.04		0 4 0 0 6 0	0											
	0.6 0.06 1.0 0.10		0 6 0	0											
	1.6 0.16		1 0 0 1 6 0 2 5 0 4 0 0 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		1 6 0 2 5 0 4 0 0 6 0 0	1											
	40 4.0		4 0 0	1											
	60 6.0 100 10		6 0 0	1											
	customer		1 0 0 9 9	2											consult
Housing	customer		3 3 3	3											CONSUIT
Housing	PP-HT			R									П		
	PVDF			В											
	customer			9											consult
Diaphragm															
	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%				С										
	customer				9										consult
Output	4 20 mA / 2 wire					4									
	4 20 mA / 2-wire 0 10 V / 3-wire					1									
	customer					9									consult
Seals	customer			_		9									CONSUM
ocaic	FKM						1						П	Т	
	EPDM						3								
	FFKM						7								
	customer						9								consult
Accuracy															
standard:	0.35 % FSO							3							
option:	0.25 % FSO							2 9							
Electrical c	customer							9							consult
Liectrical	PUR-cable (black, Ø 7.4 mm) <sup>1</sup>								2						
	FEP-cable (black, Ø 7.4 mm)								3						
	TPE-U-cable (blue, Ø 7.4 mm)								4						
	customer								9						consult
Cable leng	th														
	in m									9	9 9				
Special ver															
	standard pipe R1" <sup>2</sup>											0	0		
												6	9	0	concult
	customer											9	9	9	consult

 $<sup>^{\</sup>rm 1}$  shielded cable with integrated ventilation tube for atmospheric pressure reference

<sup>&</sup>lt;sup>2</sup> pipe is not part of the supply



# **LMK 858**

# Detachable Plastic Probe

Ceramic Sensor

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

### **Nominal pressure**

from 0 ... 40 cm $H_2O$  up to 0 ... 100 m $H_2O$ 

### **Output signals**

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

### **Special characteristics**

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

### **Optional versions**

- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- different kinds of cables and elastomers
- cable protection (on request)

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

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

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

### Preferred areas of use are



Sewage

waste water treatment, dumpsite, water recycling



Aggressive media level measurement in most of acids and lyes







Input pressure range														
Nominal pressure gauge	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Level	[mH <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35
Max. ambient pressure (housing): 10 bar														
Output signal / Supply														
2-wire $4 \dots 20 \text{ mA} / V_S = 9 \dots 32 V_{DC}$ others on request						st								
Performance														
Accuracy <sup>1</sup> standard: ≤ ± 0.35 % FSO option: ≤ ± 0.25 % FSO														

2-wire	$4 20 \text{ mA} / V_S = 9 32 V_{DC}$		others on request				
Performance							
Accuracy <sup>1</sup>	standard: ≤ ± 0.35 % FSO	option: ≤ ± 0.25 % FSO					
Permissible load	$R_{\text{max}} = [(V_{S} - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$						
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ					
Long term stability	≤±0.1 % FSO / year at reference conditions						
Turn-on time	700 msec						
Mean response time	< 200 msec	measuring rate 5/sec					
Max. response time	380 msec						
<sup>1</sup> accuracy according to IEC 60770 – lin	<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)						

### Thermal effects (offset and span)

Tolerance band  $\leq \pm 1 \%$  FSO
In compensated range -20 ... 80°C

### Permissible temperatures

Permissible temperatures | medium / electronic / environment / storage: -25 ... 80 °C

### Electrical protection <sup>2</sup>

 Short-circuit protection
 permanent

 Reverse polarity protection
 no damage, but also no function

 Electromagnetic compatibility
 emission and immunity according to EN 61326

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

### Overvoltage / lightning protection

Series resistance	9.4 $\Omega$ for each positive and negative wire					
Max. leakage current	8 kA (8/20 µsec)					
Overload	4 kV (line-line and line-earth) according to EN 61000-4-5					
Max. rated current	30 mA					
Electrical connection						
Cable with sheath material 3	PVC (-5 70 °C) grey Ø 7.4 mm					

Cable with sheath material <sup>3</sup>

PVC (-5 ... 70 °C) grey Ø 7.4 mm

PUR (-25 ... 70 °C) black Ø 7.4 mm

FEP <sup>4</sup> (-25 ... 70 °C) black Ø 7.4 mm

Cable capacitance signal line/shield also signal line: 160 pF/m

Cable inductance signal line/shield also signal line/signal line: 1 μH/m

Bending radius static installation: 10-fold cable diameter, dynamic application: 20-fold cable diameter

<sup>3</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference
 <sup>4</sup> do not use freely suspended probes with an FEP cable if effects due to highly charging processes are expected

### Materials (media wetted)

Housing	PP-HT	
Seals	FKM, EPDM, others on request	
Diaphragm	standard: ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	option: ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %
Cable sheath	PVC, PUR, FEP, others on request	

### Miscellaneous

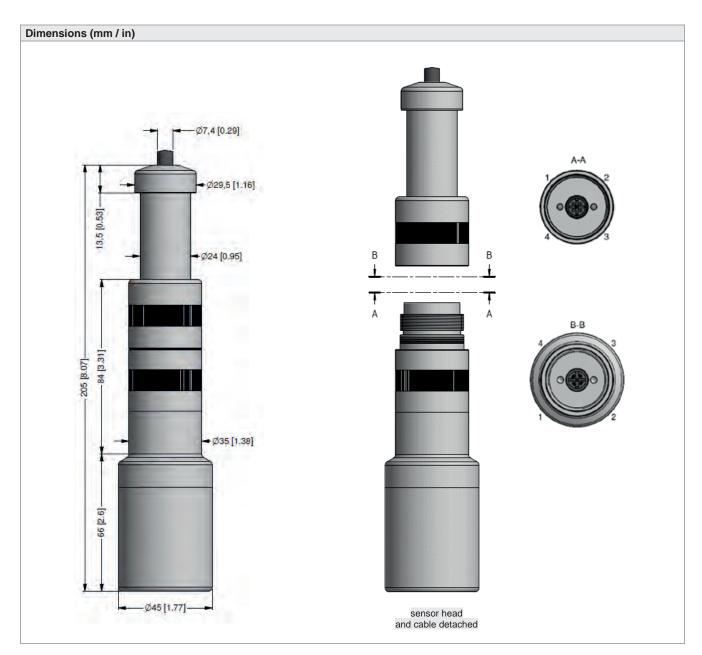
<sup>5</sup> if detached

Option cable protection (on request)	prepared for mounting with PP-HT pipe Ø 25 mm; available as compact product (standard: pipe with a total length up to 2 m possible)
Current consumption	max. 25 mA
Weight	approx. 400 g (without cable)
Ingress protection	IP 68
CE-conformity	EMC Directive: 2014/30/EU

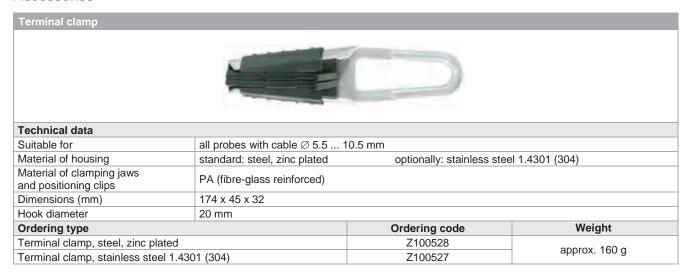
### Wiring diagram / pin configuration

р	supply +	—(A)—	<del>-</del> 0+
			Vs
/ 1	supply –		-0 -

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



### Accessories



		Ordering code LMK 858	
	LMK 858		]-[]
Pressure			
	in bar	4 1 5 4 1 6	
	in mH₂O	4 1 6	
Input	[mH <sub>2</sub> O] [bar]		
	0.4 0.04	0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	0.6 0.06 1.0 0.10	0 6 0 0 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 60 6.0	4 0 0 1 6 0 0 1	
	60 6.0 100 10	6 0 0 1 1 1 0 0 2	
	customer	1 0 0 2 9 9 9	consult
Housing	555	0,0,0,0	Seriodit
	PP-HT	R	
	customer	9	consult
Diaphragm			
	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	2	
	ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 %	C	
Output	customer	9	consult
Output	4 20 mA / 2-wire	1	
	customer	9	consult
Seal			geneau.
	FKM	1	
	EPDM	3	
	customer	9	consult
Electrical co	onnection		
	PVC-cable (grey, Ø 7.4 mm) <sup>1</sup> PUR-cable (black, Ø 7.4 mm) <sup>1</sup>	1	
	FEP-cable (black, Ø 7.4 mm) <sup>1</sup>	2 3	
	customer	9	consult
Accuracy			SCHOOL
standard	0.35 % FSO		3
option	0.25 % FSO		2
	customer		9 consult
Cable lengtl			
Special vers	in m		9 9 9
Special vers	standard		0 0 0
	prepared for pipe mounting <sup>2</sup>		1 0 6 consult
	customer		9 9 9 consult

<sup>&</sup>lt;sup>1</sup> shielded cable with integrated ventilation tube for atmospheric pressure reference

<sup>&</sup>lt;sup>2</sup> 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 cm $H_2O$  up to 0 ... 200 m $H_2O$ 

### **Output signals**

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

### **Special characteristics**

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

### **Optional versions**

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

The hydrostatic probe LMK 458 has been developed for measuring level in service and storage tanks and is certificated for shipbuilding and offshore applications.

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

### Preferred areas of use are



### Water

drinking water abstraction desalinization plant

Shipbuilding / Offshore



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





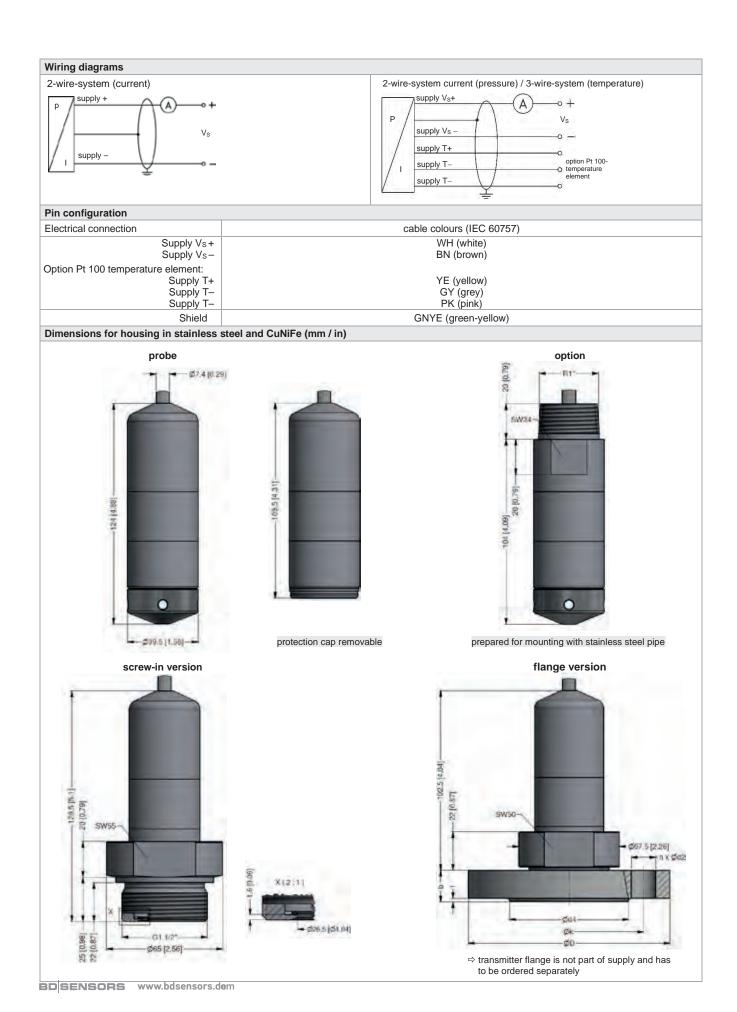


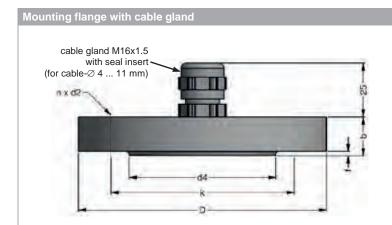






Pressure ranges  Nominal pressure gauge <sup>1</sup>	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level	[mH2O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]		2	4	4	6	6	8	8	15	25	25	35	35	45	45
Permissible vacuum	[bar]	-0.	2	-(	0.3		-0.	5					-1			
Max. ambient pressure (hou																
<sup>1</sup> available in gauge and absolut	te; nominal p	pressure r	anges al	bsolute t	rom 1 ba	r										
Output signal / Supply																
Standard		2-wire: 4	1 20	mA / V	s = 10	. 32 Vnc.			Vs.r	$_{\text{ated}} = 24$	1 Vpc					
Option IS-version		2-wire: 4								$_{\text{ated}} = 24$						
Performance		Z WIIC.	20	1117 ( ) V	3 – 12	. 20 VDC			V 3 16	ateu — Z	r V DC					
Accuracy <sup>2</sup>		standar	d. / 1 0	25.0/	FCO						- > 0 /	2 hau 3.	- 10	1 % FS		
									ори	on: for	p <sub>N</sub> ≥ υ.ι	o bar °.	$\leq \pm 0.$	1% F5	0	
Permissible load		R <sub>max</sub> = [					11.1									
Long term stability						ence con	ditions									
Influence effects		supply:		FSO /	10 V				perr	nissible	load: (	0.05 %	FSO /	kΩ		
Turn-on time		700 ms														
Mean response time		< 200 m							mea	an mea	suring r	ate 5/s	ec			
Max. response time		380 ms														
<sup>2</sup> accuracy according to IEC 607											_					
<sup>3</sup> under the influence of disturba						kV accur	acy deci	eased to	$0 \le \pm 0.2$	25 % FS	0					
Thermal effects (offset and	d span) / F	Permissi	ble ten	nperat	ures											
Tolerance band		≤±1%									sated ra		20 8	0 °C		
Permissible temperatures		medium	/ elect	ronics	enviror	ment: -2	25 12	5 °C	stor	age: -4	0 12	5°C				
Electrical protection 4																
Short-circuit protection		perman	ent													
Reverse polarity protection		no dam		ıt also ı	no functi	on										
Electromagnetic compatibili	tv					ding to	- FN 6	1326	- DNI	V•GI (Г	Oet Nor	ske \/e	ritas •	Germai	nischer	Llov
<sup>4</sup> additional external overvoltage	,											JNG VE	iiiao "	Jermai	113CHE	LiUyi
Mechanical stability	PIONOCHIOIT	III (CIII	iui DUX		, L Z VVIU	, απτυδρί	iono pre	Soure re	SIGILLE	avanabl	<u> </u>					
		1 0 /0-	ordin -	to DAIN	/-Cl · «!	200 P. 51	In 10 0 1	hogie: '	DINIE	1 60000	2.00					
Vibration		4 g (acc	ording	ווח או	/ =GL: Cla	ass B, cu	iive Z /	มสรเร:	חווא דו	00000	o- <b>∠</b> -6)					
Electrical connection																
Cable with sheath material 5	)	TPE-U	blue		.4 mm											
Bending radius						e diame								ble diar	meter	
<sup>5</sup> shielded cable with integrated	ventilation tu	ube for atn	nospheri	ic pressi	ıre refere	nce (for n	ominal p	ressure	ranges	absolute	e, the ve	ntilation	tube is	closed)		
Materials																
Housing		standar	d: staii	nless s	teel 1.44	104 (316	L)									
3		option:				sistant ag		ea wate	er)				c	thers o	n reque	est
Seals (media wetted)		standar				,			,							
,		options:	EPD	DM, FF	KM (min	. permis	sible te	mperat	ure fro	m -15 °	C)		C	thers o	n reque	est
Diaphragm		standar	d: cera	amics A	l <sub>2</sub> O <sub>3</sub> 96	%			opt	ion: ce	ramics	Al <sub>2</sub> O <sub>3</sub>	99.9 %	)		
Protection cap		POM-C														
Cable sheath		TPE-U	(flar	ne-resi	stant. ha	alogen fr	ee. incr	eased	resista	nce aga	ainst oil	and g	asoline	) <u>.</u>		
						alt, sea v				3				,		
Miscellaneous																
Option cable protection																
for probes in stainless steel		prepare	d for m	ounting	g with sta	ainless s	teel pip	е								
Ingress protection		IP 68														
Current consumption			mΛ													
Content Consumbtion		max. 21		haut i	املما											
<u> </u>		min. 65	ງa (wit	nout ca												
Weight																
Weight CE-conformity		EMC Di	rective													
Weight CE-conformity ATEX Directive		EMC Di 2014/34	rective													
Weight CE-conformity ATEX Directive	element	EMC Di 2014/34	rective													
Weight CE-conformity ATEX Directive Option Pt 100 temperature	element	EMC Di 2014/34	rective: /EU													
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range		EMC Di 2014/34	rective: /EU													
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele		EMC Di 2014/34 6 -25 1 3-wire	rective: /EU 25°C													
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance		EMC Di 2014/34 6 -25 1 3-wire 100 Ω a	rective: //EU 25°C t 0°C													
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient		EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp	rective: //EU 25°C at 0°C	: 2014/												
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is	ment	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1	rective: //EU 25°C at 0°C	: 2014/												
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination	ment n with IS-v	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1	rective: //EU 25°C at 0°C	: 2014/												
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environment	ment n with IS-v	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion	rective: //EU  25°C  t 0°C  m/K  0 mA	: 2014/:	30/EU											
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR)	ment n with IS-v	EMC Di 2014/3 <sup>2</sup> 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion	rective: //EU  25°C  t 0°C om/K 0 mA c	: 2014/3	30/EU EMV4						r of cer					
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas •	ment n with IS-vent	EMC Di 2014/3 <sup>2</sup> 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion	rective: //EU  25°C  at 0°C  am/K  and mA c  EMV2,  atture:	: 2014/:	EMV4 vib	pration:	В			numbe	r of cer	tificate	: TAAC	0001G	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV-0)	ment n with IS-vent	EMC Di 2014/3 <sup>2</sup> 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion	rective: //EU  25°C  at 0°C  am/K  and mA c  EMV2,  atture:	: 2014/3	EMV4 vib	oration: closure:	B			numbe		tificate	: TAAC	0001G	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV-C	ment n with IS-vent	EMC Di 2014/3 <sup>2</sup> 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion	rective: //EU  25°C  at 0°C  am/K  and mA c  EMV2,  atture:	: 2014/:	EMV4 vib					numbe	r of cer	tificate	: TAAC	0001G	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•C	ment n with IS-vent	EMC Di 2014/34 6 -25 1 3-wire 100 Ω ε 3850 pp 0.3 1 ersion EMV1, tempera humidity	rective: //EU 25°C at 0°C om/K .0 mA r	EMV3, D B	EMV4 vib en					numbe electro	r of cer magne	tificate tic com	: TAA0 patibili	0001G ty: B	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV-C Explosion protection 7 Approval DX14A-LMK 458	ment n with IS-vent GL)	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion EMV1, tempera humidity	rective: //EU 25°C at 0°C om/K .0 mA r sture: //:	EMV3, D B	EMV4 vib en	closure:	D	nF: I :=		numbe electro	r of cer	tificate tic com	: TAA0 patibili	0001G ty: B	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•C Explosion protection 7 Approval DX14A-LMK 458	ment n with IS-vent GL)	EMC Di 2014/3 $^{\prime}$ 6 -25 1 3-wire 100 $\Omega$ $\epsilon$ 3850 pp 0.3 1 ersion EMV1, tempera humidit	rective: //EU 25°C  at 0°C am/K 0 mA p  EMV2, ature: //: // ATE. V, I <sub>i</sub> = 9	EMV3, D B	EMV4 vib en X P <sub>i</sub> = 660	closure:	D = 105 i		0 μH;	numbe electro zone 0	r of cer magne	tificate tic com	: TAA0 patibili	0001G ty: B	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•C Explosion protection 7 Approval DX14A-LMK 458 Safety technical maximum v	ment n with IS-vent GL) values	EMC Di 2014/34 6 -25 1 3-wire 100 $\Omega$ a 3850 pp 0.3 1 ersion EMV1, tempera humidity IBEXU ( $U_i = 28$ the sup	rective: //EU 25°C  t 0°C om/K 0 mA r EMV2, ature: //: 07 ATE. V, I <sub>i</sub> = 9 bly con	EMV3, D B X 1180	EMV4 vib en X P <sub>i</sub> = 660 s have a	mW, C <sub>i</sub>	D = 105 i capacit	y of ma	0 μH; ιx. 140	numbe electro zone 0 nF opp	r of cer magne	tificate tic com	: TAA0 patibili	0001G ty: B	M	
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Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•C Explosion protection 7 Approval DX14A-LMK 458 Safety technical maximum v Permissible temperatures foenvironment	ment n with IS-vent GL) values	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion EMV1, tempera humidity IBEXU 0 U <sub>i</sub> = 28 the sup in zone zone 1	rective: //EU  25°C  at 0°C  m/K  0 mA r  ature: //:  07 ATE V, I <sub>i</sub> = 9  bly con 0: and hig	EMV3, D B X 1180 33 mA, nection her:	EMV4 vib en X P <sub>i</sub> = 660 s have a -20 6	mW, C <sub>i</sub> an inner 0°C with	= 105 i capacit p <sub>atm</sub> 0.	y of ma 3 bar up	0 μH; ix. 140 o to 1.1	zone 0	er of cer magne 8: II 10 posite th	tificate tic com G Ex ia ne encl	: TAA0 npatibili n IIB T4 osure	0001G ty: B	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•C Explosion protection 7 Approval DX14A-LMK 458 Safety technical maximum v Permissible temperatures for environment Connecting cables	ment n with IS-vent GL) values	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion EMV1, tempera humidity U <sub>i</sub> = 28 the sup in zone 1 cable ca	zective: //EU  25°C  at 0°C  m/K  0 mA c  EMV2,  ature: //:  27 ATE  V, I <sub>i</sub> = 9  boly con  0:  and high  apacity:	EMV3, D B X 1180 33 mA, nection	EMV4 vib en X P <sub>i</sub> = 660 s have a -20 6 -25 7 signal lii	mW, C <sub>i</sub> an inner 0°C with 0°C	D = 105 i capacit patm 0.	y of ma 3 bar up Il as sig	0 μH; ix. 140 o to 1.1	zone 0  nF opp bar  e/signal	r of cer magne  8: II 10  oosite th	tificate tic com G Ex ia ne encl	: TAA0 npatibili n IIB T4 osure	0001G ty: B	M	
Weight CE-conformity ATEX Directive Option Pt 100 temperature Temperature range Connection temperature ele Resistance Temperature coefficient Supply Is 6 not possible in combination Category of the environme Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•0 Explosion protection 7 Approval DX14A-LMK 458 Safety technical maximum v Permissible temperatures foenvironment	ment  n with IS-vent  GL)  values	EMC Di 2014/34 6 -25 1 3-wire 100 Ω a 3850 pp 0.3 1 ersion EMV1, tempera humidity U <sub>i</sub> = 28 the sup in zone zone 1 cable ca cable in	zective: //EU  25°C  at 0°C  a	EMV3, D B X 1180 93 mA, nection her:	EMV4 vib en X P <sub>i</sub> = 660 s have a -20 6 -25 7 signal lii	mW, C <sub>i</sub> an inner 0°C with	D = 105 i capacit patm 0.	y of ma 3 bar up Il as sig	0 μH; ix. 140 o to 1.1	zone 0  nF opp bar  e/signal	r of cer magne  8: II 10  oosite th	tificate tic com G Ex ia ne encl	: TAA0 npatibili n IIB T4 osure	0001G ty: B	M	





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

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

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

### Terminal clamp



all probes with cable Ø 5.5 1	0.5 mm	
standard: steel, zinc plated	optionally: stainless stee	el 1.4301 (304)
PA (fibre-glass reinforced)		
174 x 45 x 32		
20 mm		
	standard: steel, zinc plated PA (fibre-glass reinforced) 174 x 45 x 32	PA (fibre-glass reinforced)  174 x 45 x 32

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

### Display program

CIT 200 Process display with LED dis	play
--------------------------------------	------

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

PA 440 Field display with 4-digit LC display

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



Ordering code

	Oı	rdering	cod	le L	Mk	( 4	58								
LMK 458	Ш	-	-	-	-	- 🔲	- 🗌	-	-	]-[		]-[			
Pressure in bar, gauge in bar, absolute <sup>1</sup> in mH <sub>2</sub> O	7 6 5 7 6 8 7 6 6														
Input [mH <sub>2</sub> O] [bar] 0.4 0.04 0.6 0.06 1.0 0.10	7   0   0	0 4 0 0 0 6 0 0 1 0 0 0									T				
1.6 0.16 2.5 0.25 4.0 0.40 6.0 0.60 10 1.0		1 6 0 0 2 5 0 0 4 0 0 0 6 0 0 0 1 0 0 1													
10 1.0 16 1.6 25 2.5 40 4.0 60 6.0		1 0 0 1 1 6 0 1 2 5 0 1 4 0 0 1 6 0 0 1													
100 10 160 16 200 20 customer		1 0 0 2 1 6 0 2 2 0 0 2 9 9 9 9													consult
Housing stainless steel 1.4404 (316L) copper-nickel-alloy (CuNi10Fe1Mn) customer			1 K 9												consult
Design probe flange version <sup>2</sup> screw-in version				1 3 5											
Diaphragm  ceramics Al <sub>2</sub> O <sub>3</sub> 96%  ceramics Al <sub>2</sub> O <sub>3</sub> 99.9%  customer					2 C 9										consult
Output  4 20 mA / 2-wire intrinsic safety 4 20 mA / 2-wire customer			Ξ			1 E 9					Ι			I	consult
Seals FKM EPDM FFKM ** customer			Π				1 3 7 9								consult
Electrical connection  TPE-U-cable (blue, Ø 7.4 mm) <sup>4</sup> customer  Accuracy							9	4							consult
standard 0.25 % FSO option für P <sub>N</sub> ≥0.6 bar: 0.1 % FSO customer  Cable length									2 1 9						consult
in m  Special version  standard  with temperature sensor Pt 100 <sup>5</sup>			=							9	9 9	0	0	0 3	
prepared for mounting <sup>6</sup> with stainless steel pipe customer												5	0	2	consult

<sup>&</sup>lt;sup>1</sup> nominal pressure ranges absolute from 1 bar

<sup>&</sup>lt;sup>2</sup> mounting accessories are not part of supply and have to be ordered separately

<sup>&</sup>lt;sup>3</sup> min. permissible temperature from -15°C

<sup>&</sup>lt;sup>4</sup> shielded cable with integrated ventilation tube for atmospheric reference

 $<sup>^{\</sup>rm 5}$  not possible in combination with IS-version

<sup>&</sup>lt;sup>6</sup> possible for probes in stainless steel; stainless steel pipe is not part of the supply



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

### **Output signals**

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

### **Special characteristics**

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

### **Optional versions**

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

The hydrostatic probe LMK 458H has been developed for measuring level in service and storage tanks and is certificated for shipbuilding and offshore applications.

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

### Preferred areas of use are



### Water

drinking water abstraction desalinization plant

Shipbuilding / Offshore



ballast tanks draught monitoring level measurement in ballast and storage tanks





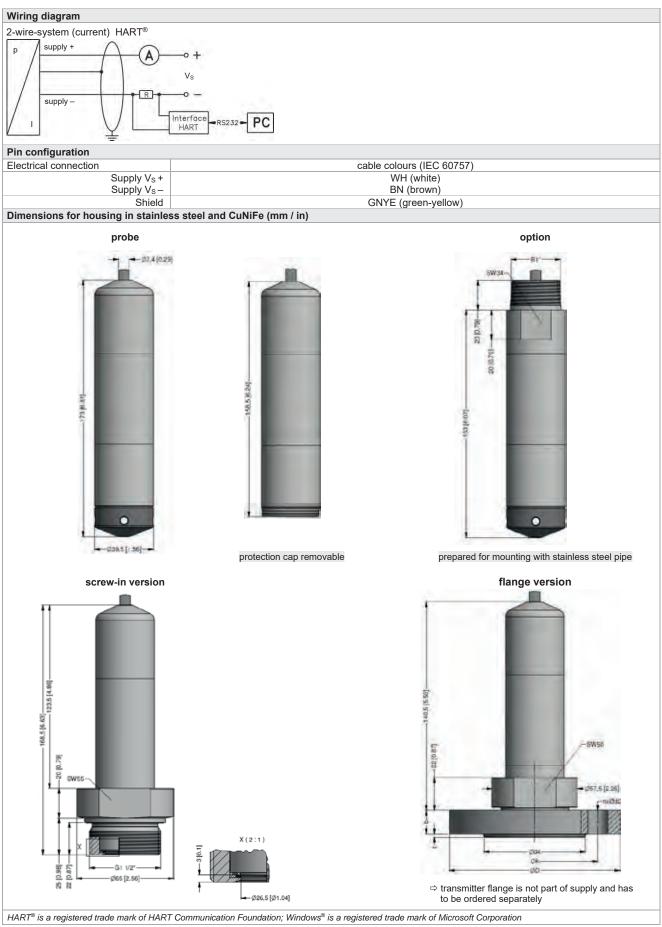








Pressure ranges								
Nominal pressure gauge <sup>1</sup> [bar]	0.06	0.16	0.4	1	2	5	10	20
Level [mH <sub>2</sub> O]	0.6	1.6	4	10	20	50	100	200
Overpressure [bar]		4	6	8	15	25	35	45
Max. ambient pressure (housing):								
on customer request we adjust the device	ces by software o	n the required p	pressure ranges,	within the turn-dov	vn possibility (	starting at 0.02	bar)	
Output signal / Supply								
Standard	2-wire: 4 2	0 mA / Vs = 1	12 36 V <sub>DC</sub>	with HART® o	communicati	on	V <sub>S rated</sub> = 2	24 V <sub>DC</sub>
Option IS-version	2-wire: 4 2	0 mA / Vs =	14 28 V <sub>DC</sub>	with HART® o	communicati	on	V <sub>S rated</sub> = 2	24 V <sub>DC</sub>
Performance								
Accuracy <sup>2</sup>	p <sub>N</sub> ≥ 160 mba	r	TD ≤ 1:5	≤ ± 0.2 % FS	0		TD <sub>max</sub> = 1	.10
			TD > 1:5	≤ ± [0.2 + 0.0	3 x TD] % F	SO	I Dmax - I	. 10
	p <sub>N</sub> < 160 mba	r		$\leq$ ± [0.2 + 0.1		0	TD <sub>max</sub> = 1	:3
	p <sub>N</sub> ≥ 1 bar		TD ≤ 1:5	≤ ± 0.1 % FS	-		TD <sub>max</sub> = 1	: 10
			TD > 1:5	≤ ± [0.1 + 0.0				
Permissible load	$R_{\text{max}} = [(V_S - V_S)^T]$			load at HART	®-communic	cation: R <sub>min</sub> =	250 Ω	
Long term stability	≤ ± (0.1 x turn supply: 0.05			ence conditions	- d. O OE 0/	F80 / I/O		
Influence effects Turn-on time	850 msec	% FSO / 10 V	/	permissible lo	au: 0.05 %	F30 / KΩ		
Mean response time	1	hout conside	ration of electro	onic damning		mean r	measuring ra	te 7/sec
Max. response time	380 msec	nout conside	ration of cicotic	onic damping		Incarri	neasuring ra	1/300
Adjustability		of following	parameters pos	ssible (interface	/ software n	ecessary 3):		
	electronic da	mping: 0 1	00 sec	offset: 0 80			own of span:	max. 1:10
<sup>2</sup> accuracy according to IEC 60770 – limit						40	1 \/P.	
<sup>3</sup> software, interface, and cable have to be				naows" 95, 98, 200	JU, INT Versior	1 4.0 or higher,	and XP)	
Thermal effects (offset and span) and Tolerance band	/ Permissible t ≤±1% FSO	emperatures	•					
in compensated range	-20 80 °C							
Permissible temperatures		ctronics / env	ironment / stora	age: -25 85 °	С			
Electrical protection <sup>4</sup>	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			.goc cc				
Short-circuit protection	permanent							
Reverse polarity protection	no damage, l	out also no fu	nction					
Electromagnetic compatibility	emission and		cording to					
	- EN 6132			L (Det Norske V		manischer Llo	oyd)	
<sup>4</sup> additional external overvoltage protection	n unit in terminal i	oox KL 1 or KL	2 with atmospher	ric pressure refere	nce available			
Mechanical stability								
Vibration	4 g (accordin	g to DNV•GL	· class R curve					
			olass b, oal ve	e Z / basis: DIN	EN 60068-2	-6)		
Electrical connection	TDE II	~ 7.4	·	e 2 / basis: DIN	EN 60068-2	-0)		
Cable with sheath material <sup>5</sup>	TPE-U blu		m			•	n diameter	
Cable with sheath material <sup>5</sup> Bending radius	static installa	tion: 10-fold o	m cable diameter	dynamic	application	: 20-fold cable		
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation	static installa	tion: 10-fold o	m cable diameter	dynamic	application	: 20-fold cable		
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation  Materials (media wetted)	static installa	tion: 10-fold of peric pressure r	m cable diameter reference (for non	dynamic ninal pressure ran	application	: 20-fold cable	ıbe is closed)	vater)
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation	static installa	tion: 10-fold of peric pressure in inless steel 1	m cable diameter reference (for non	dynamic ninal pressure ran	application	: 20-fold cable	ıbe is closed)	vater)
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation  Materials (media wetted)  Housing	static installa tube for atmosph standard: sta standard: FK options: EP	tion: 10-fold of peric pressure r inless steel 1 M DM, FFKM (r	m cable diameter reference (for non .4404 (316L) min. permissible	dynamic ninal pressure ran option: ( e temperature fr	c application ges absolute t CuNi10Fe1M om -15 °C)	: 20-fold cable he ventilation to In (resistant a	ube is closed) against sea w	vater)
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals Diaphragm	static installa a tube for atmosph standard: sta standard: FK options: EP standard: cer	tion: 10-fold of peric pressure r inless steel 1 M DM, FFKM (r	m cable diameter reference (for non .4404 (316L) min. permissible	dynamic ninal pressure ran option: ( e temperature fr	application ges absolute t	: 20-fold cable he ventilation to In (resistant a	ube is closed) against sea w	•
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals Diaphragm Protection cap	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C	tion: 10-fold of the pressure of tinless steel 1 M DM, FFKM (r amics Al <sub>2</sub> O <sub>3</sub> s	m cable diameter reference (for non .4404 (316L) min. permissible 96 %	dynamic ninal pressure rang option: ( e temperature fr option: (	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	•
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals Diaphragm	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla	tion: 10-fold of the pressure	m cable diameter reference (for non .4404 (316L) min. permissible 96 % halogen free,	dynamic ninal pressure ran option: ( e temperature fr option: c increased resist	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	•
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation  Materials (media wetted)  Housing Seals  Diaphragm  Protection cap Cable sheath	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla	tion: 10-fold of the pressure	m cable diameter reference (for non .4404 (316L) min. permissible 96 %	dynamic ninal pressure ran option: ( e temperature fr option: c increased resist	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation  Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath  Miscellaneous	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla res	tion: 10-fold of the pressure	m cable diameter reference (for non	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation  Materials (media wetted)  Housing Seals  Diaphragm  Protection cap Cable sheath	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla res	tion: 10-fold of the pressure	m cable diameter reference (for non .4404 (316L) min. permissible 96 % halogen free,	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation  Materials (media wetted) Housing Seals Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla res	tion: 10-fold of the pressure	m cable diameter reference (for non	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla res  prepared for IP 68 max. 21 mA	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla res prepared for IP 68 max. 21 mA min. 650 g (w	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity	static installa tube for atmosph standard: sta standard: FK options: EP standard: cer POM-C TPE-U (fla res  prepared for IP 68 max. 21 mA min. 650 g (w EMC Directiv	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub>	: 20-fold cable he ventilation to the ventilation t	against sea v	,
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Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment	static installa tube for atmospherical standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU	tion: 10-fold of the pressure	m cable diameter reference (for non	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation t	against sea wothers or	n request
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Cable with sheath material 5 Bending radius 5 shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas •	static installa tube for atmospherical standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature:	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation t	against sea wothers or others or others.	n request
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR)	static installa tube for atmospherical standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature: humidity:	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic option: ( e temperature fr option: ( increased resist r, heavy oil)  Bl pipe  B D	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation t	against sea wothers or others or others.	n request
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)	static installa tube for atmospherical standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature:	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic ninal pressure ran option: ( e temperature fr option: ( increased resist r, heavy oil)	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation t	against sea wothers or others or others.	n request
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)  Explosion protection	static installa tube for atmospherical standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature: humidity: electromagne	tion: 10-fold of the pressure	m cable diameter reference (for non .4404 (316L) min. permissible 96 % halogen free, t salt, sea wate n stainless stee  U  V4 vibration: enclosure:	dynamic option: ( e temperature fr option: ( increased resist r, heavy oil)  el pipe  B D B	c application ges absolute to CuNi10Fe1M com -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation t	against sea wothers or others or others or others or others against sea workers or others or other or ot	n request  56 001GM
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)  Explosion protection Approval DX15A-LMK 458H	static installa tube for atmosphane standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature: humidity: electromagne	tion: 10-fold of the pressure	m cable diameter reference (for non	dynamic option: ( e temperature fr option: ( increased resist r, heavy oil)  B pipe  B D B  G Ex ia IIB T4 G	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation t	against sea wothers or others or others or others or others against sea workers or others or other or ot	n request  56 001GM
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)  Explosion protection	static installa tube for atmospherical standard: standard: standard: FK options: EP standard: cer POM-C TPE-U (flares POM-C) IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature: humidity: electromagne	tion: 10-fold of the pressure in the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic option: ( e temperature fr option: ( increased resist r, heavy oil)  B pipe  B D B  G Ex ia IIB T4 G 04,6 nF; Li = 0 µ	c application ges absolute t  CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains	: 20-fold cable he ventilation to the ventilation of the ventilation to the ventilation of the ventilation to the ventilation t	against sea woothers or others or other or o	n request  56 001GM
Cable with sheath material <sup>5</sup> Bending radius <sup>5</sup> shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)  Explosion protection Approval DX15A-LMK 458H	static installa tube for atmospherical standard: standard: standard: FK options: EP standard: cer POM-C TPE-U (flares POM-C) IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature: humidity: electromagne	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic option: ( e temperature fr option: ( increased resist r, heavy oil)  B pipe  B D B  G Ex ia IIB T4 G	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains nui nui a   zone 2t H; 10 nF oppos	: 20-fold cable he ventilation to the ventilation of the ventilation to the ventilation of the ventilation to the ventilation t	against sea woothers or others or other or o	n request  56 001GM
Cable with sheath material 5 Bending radius 5 shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)  Explosion protection Approval DX15A-LMK 458H Safety technical maximum values	static installa tube for atmospherical standard: standard: standard: FK options: EP standard: cer POM-C TPE-U (flares prepared for IP 68 max. 21 mA min. 650 g (v EMC Directiv 2014/34/EU  EMV1, EMV2 temperature: humidity: electromagnerical standard: standar	tion: 10-fold of the pressure	m cable diameter reference (for non non non non non non non non non n	dynamic  option: ( e temperature fr  option: ( increased resist er, heavy oil)  el pipe  B D B D B O A,6 nF; Li = 0 µ D D D D D D D D D D D D D D D D D D D	c application ges absolute t CuNi10Fe1M om -15 °C) ceramics Al <sub>2</sub> ance agains nui nui a zone 20 H; 10 nF oppos 1.1 bar	: 20-fold cable he ventilation to the ventilation t	against sea woothers or others or other or o	n request  56 001GM
Cable with sheath material 5 Bending radius 5 shielded cable with integrated ventilation Materials (media wetted) Housing Seals  Diaphragm Protection cap Cable sheath  Miscellaneous Option cable protection for probes in stainless steel Ingress protection Current consumption Weight CE-conformity ATEX Directive Category of the environment Lloyd's Register (LR) Det Norske Veritas • Germanischer Lloyd (DNV•GL)  Explosion protection Approval DX15A-LMK 458H Safety technical maximum values Permissible temperatures for	static installa tube for atmosphila standard: EPOM-C TPE-U (flares  prepared for IP 68 max. 21 mA min. 650 g (w EMC Directive 2014/34/EU  EMV1, EMV2 temperature: humidity: electromagne IBExU 10 AT Ui = 28 V, Ii = the supply codin zone 0:	tion: 10-fold of the pressure	m cable diameter reference (for non more ference (for non more ference) and (316L) min. permissible 96 % halogen free, it salt, sea water that stainless stee for sta	dynamic  option: ( e temperature fr  option: c  increased resist er, heavy oil)  B  D  B  D  B  G  Ex ia IIB T4 G  Option: ( C)  Dacity of max. 1	c application ges absolute t  CuNi10Fe1M  com -15 °C) ceramics Al <sub>2</sub> ance agains  nui  nui  a zone 2i  H; 10 nF oppos 1.1 bar  ne/signal line	: 20-fold cable he ventilation to the ventilation t	against sea woothers or others or other or o	n request  56 001GM

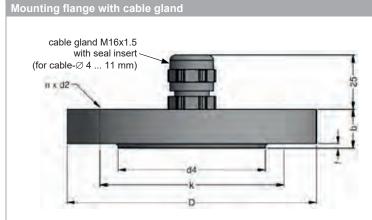


# Transmitter flange for flange version

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

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

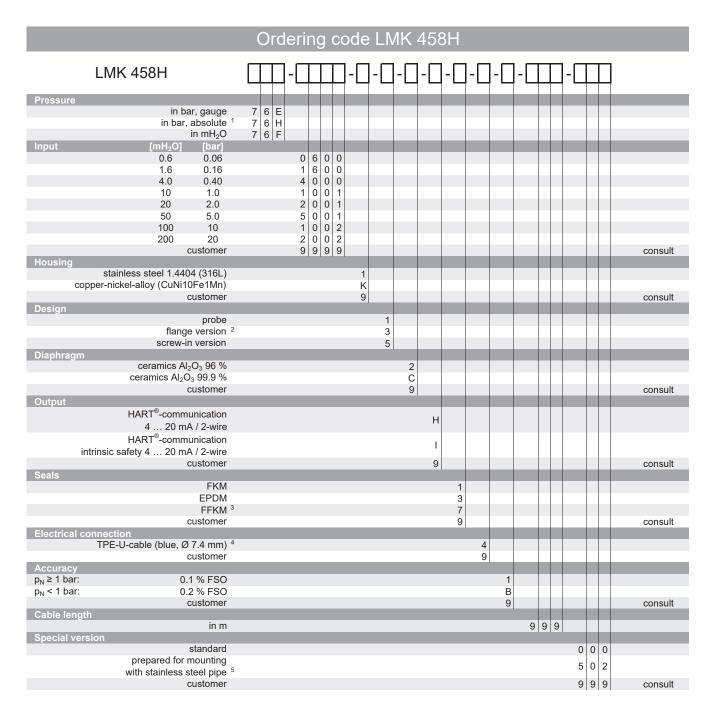
Ordering type	Ordering code	Weight
Transmitter flange DN25 / PN40	ZSF2540	1.2 kg
Transmitter flange DN50 / PN40	ZSF5040	2.6 kg
Transmitter flange DN80 / PN16	ZSF8016	4.1 kg



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

Technical data		
Suitable for	all probes	
Flange material	stainless steel 1.4404 (316L)	
Material of cable gland	standard: brass, nickel plated	on request: stainless steel 1.4305 (303); plastic
Seal insert	material: TPE (ingress protection I	P 68)
Hole pattern	according to DIN 2507	

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



<sup>&</sup>lt;sup>1</sup> nominal pressure ranges absolute from 1 bar

HART® is a registered trade mark of HART Communication Foundation

 $<sup>^{\</sup>rm 2}$  mounting accessories are not part of supply and have to be ordered separately

 $<sup>^3\,</sup>$  min. permissible temperature from -15°C

<sup>&</sup>lt;sup>4</sup> shielded cable with integrated ventilation tube for atmospheric reference

 $<sup>^{\</sup>rm 5}$  possible for probes in stainless steel; stainless steel pipe is not part of the supply



# **LMK 487**

## Probe for Marine and Offshore 22 mm

Ceramic Sensor

accuracy according to IEC 60770: 0.25 % FSO

### **Nominal pressure**

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

### **Output signals**

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

### **Special characteristics**

- ▶ diameter 22 mm
- ► LR-certificate (Lloyd's Register)
- DNV•GL Approval (Det Norske Veritas • Germanischer Lloyd)
- ▶ diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- high long-term stability

### **Optional versions**

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

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

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

### Preferred areas of use



### <u>Water</u>

drinking water abstraction desalinization plant

Shipbuilding / Offshore

ballast tanks monitoring of a ship's position and draught

level measurement in ballast and storage tanks





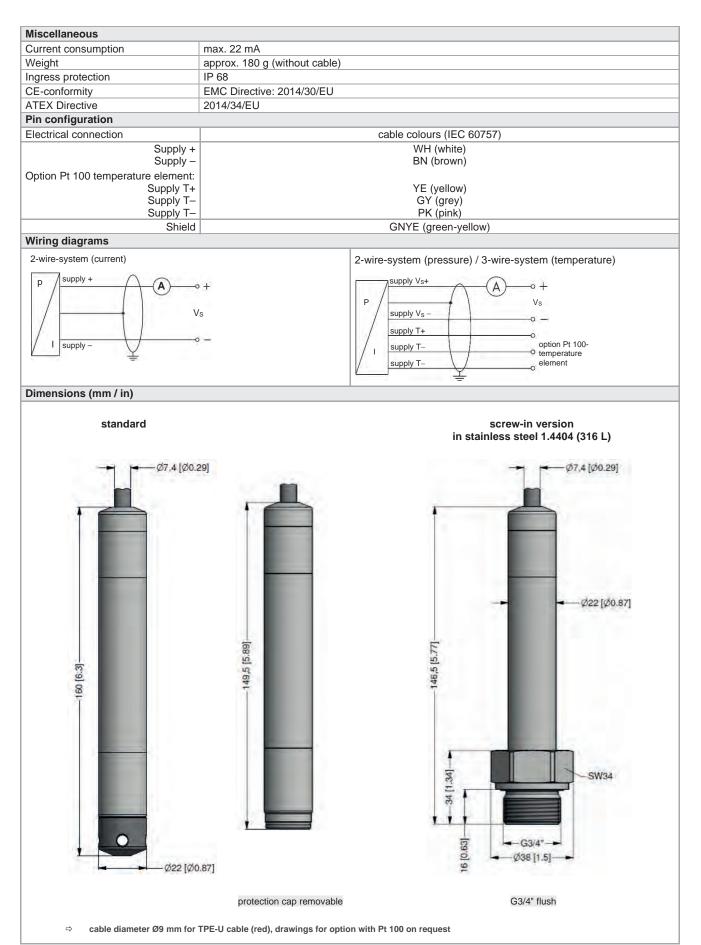


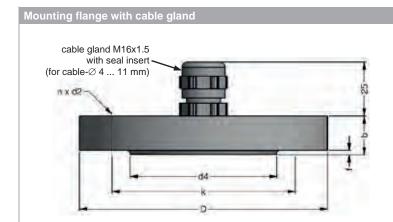




Input pressure range

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 <sub>2</sub> 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
Burst pressure ≥ [bar]	4	6	8	8	9	9	18	25	25	30	30
Permissible vacuum [bar]	-0.2	-0.3			0.5				-1		
Max. ambient pressure (housing): 40 bar											
max. ambient pressure (neusing). To bar											
Output signal / Supply											
· · · · · · · · · · · · · · · · · · ·											
0 00											
Option IS-version		20 111/	$A / V_S = I$	4 20	V <sub>DC</sub>						
Option Pt 100-temperature eleme											
Temperature range	-25 12	25 °C									
Connectivity technology	3-wire				max. vol	tage 10 V	DC,	in intrinsic	cally safe	circuit 30	$V_{DC}$
Resistance	100 Ω at	t 0 °C			max. cur	rent 2 mA	۸,	in intrinsic	cally safe	circuit 54	mA
Temperature coefficient	3850 ppi	m/K			max. pov	wer 10 m\	Ν,	in intrinsic	cally safe	circuit 40	5 mW
Supply Is	0.3 1.	0 mA nc			1						
Performance	0.3 1.0 mA <sub>DC</sub>										
	nominal	proceliro	> 0.4 has		E 0/ ECO		ominal r		0.4 hore	. L O 2E 0/	ECO
Accuracy <sup>1</sup>					25 % FSO	П	iominai p	ressure <	0.4 bar s	± ± 0.35 %	) FSU
Permissible load			<sub>nin</sub> ) / 0.02 /								
Influence effects			SO / 10 V	<u> </u>		lo	oad: 0.0	5 % FSO /	kΩ		
Long term stability	≤ ± 0.1 °	% FSO / <u>'</u>	year								
Turn-on time	450 mse										
Mean response time	≤ 70 ms										
Measuring rate	80 Hz										
<sup>1</sup> accuracy according to IEC 60770 – lim		stment (no	n-linearity	hysteresi	s reneatahi	lity)					
Thermal effects (offset and span)		anon (110)	mreanty,	yololosi	o, ropeatabl	<b>y</b> /					
		F00								00.00	
Tolerance band	≤±1%	FSO				i	n compe	nsated rar	nge -20	80 °C	
Permissible temperatures											
Permissible temperatures	medium	/ storage	: -25 8	5 °C							
Electrical protection <sup>2</sup>											
Short-circuit protection	permane	nt									
Reverse polarity protection			also no fui	oction							
Electromagnetic compatibility			nunity acc								
Electromagnetic compatibility			nunity acc		o GL (Det No	l \ /i	0-		المديما المد		
2 . 110	- EN 61		1/1 4 1/1								
<sup>2</sup> additional external overvoltage protecti	on unit in ten	minai box	KL T OF KL	2 with at	mospneric p	ressure re	ierence a	valiable on	request		
Mechanical stability											
Vibration	4 g (acco	ording to	DNV•GL:	Class E	3, curve 2 /	basis: IE	C 60068	-2-6)			
Electrical connection											
Cable with sheath material <sup>3</sup>	TPE-U	(-25	125 °C)	blue	Ø 7.4 mr	n					
	TPE-U 4		125 °C)	red	Ø 9.0 mr	n					
Bending radius	static ins	stallation:	10-fold c	able dia			lvnamic	application	n: 20-fold	cable dia	meter
<sup>3</sup> shielded cable with integrated ventilation											
<sup>4</sup> only in combination with IS version (exp	olosion prote	ction) and	temperatu	re elemei	nt Pt100						/
Materials (media wetted)											
Housing	etandaro	t etainle	ss steel 1	4404 (3	16   )						
1 loading	option:				st sea wate	2r)			otho	rs on requ	IDS†
Soals (O rings)	standard		וו נוכטוטנט	in ayairi	or oca Wall	J1 J			ouie	is on requ	1001
Seals (O-rings)			. EEIZNA /-	oin na	nionible te	mnorot	from 4	E °C\	- ملئم	ro on re-	100t
D: 1	options:			ıııı. perr	nissible ter	nperature	1-1110111	J ()	otne	rs on requ	162[
Diaphragm		s Al <sub>2</sub> O <sub>3</sub> 99	9.9%								
Protection cap	POM-C										
Cable sheath	TPE-U	(flame-	resistant,	haloger	free, incre	eased res	istance	against oil	and gase	oline,	
					a water, he			-	5	•	
Category of the environment			<u> </u>								
Lloyd's Register (LR)	numbor	of cartific	ate: 18/20	1068		NV1, ENV	/2 ENIV	R ENIVA			
2 0 1 7						vvi, ⊑INV	Z, LINV	, ∟INV4			
Det Norske Veritas/			ate: TAA			nentine P		EMO: D			
Germanischer Lloyd (DNV GL)	tempera	iure: D	numi	dity: B	VII	oration: B		EMC: B	encl	osure: D	
Explosion protection											
Approval DX14B-LMK 487	IBExU 1	5 ATEX 1	1066 X / I	ECEx IB	E 18.0019	X					
	zone 0:		G Ex ia IIE								
	zone 20:	II 1[	D Ex ia III	C T135	°C Da						
Safety technical maximum values	U <sub>i</sub> = 28 \	$I_{i} = 93 \text{ r}$	$mA, P_i = 6$	60 mW	$C_i = 49.2$	$nF, L_i = 0$	μH;				
(pressure)					ner capacit			opposite tl	he enclos	sure	
Safety technical maximum values					•	•		• • • • • • • • • • • • • • • • • • • •			
(temperature)	$U_i = 30 \$	$I_{\rm i} = 54$	$mA, P_i = 4$	105 mW	$C_i = 0 \text{ nF}$	, L <sub>i</sub> = 0 μΗ	I (tempe	rature eler	ment Pt 1	00)	
Permissible temperatures for	in zone (	٦٠	-20	60 °C W	ith p <sub>atm</sub> 0.8	har un to	1 1 har				
					ıııı P <sub>atm</sub> U.0	vai up 10	i.i bal				
environment			r: -25		lal a si e e		line of the	-1 Be - 10	0		
Connecting cables	cable ca				ld as well						
(by factory)	_ cable inc	ductance	: sıgnal	iine/shie	ld as well	as signal	ııne/sign	ai line: 1 µ	IH/M		
							_				





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

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

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

### Terminal clamp



Technical data			
Suitable for	all probes with cable $\varnothing$ 5.5 10.	5 mm	
Material of housing	standard: steel, zinc plated	optionally: stainless stee	1.4301 (304)
Material of clamping jaws and positioning clips	PA (fibre-glass reinforced)		
Dimensions (mm)	174 x 45 x 32		
Hook diameter	20 mm		

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

### Display program

CIT 200 Process display with LED display

CIT 250 Process display with LED display and contacts

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

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

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

CIT 600 Multichannel process display with graphics-capable LC display

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

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

PA 440 Field display with 4-digit LC display

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



		Ord	eri	ng	J C	ode	e LI	ΜK	48	7									
LMK 487	,	Ш	- 🗌	Ţ	I	]-[	]-[	]-[	- <u> </u>	]-□	-	- <u> </u>	]- <u>[</u>	П		-	П	]	
Pressure																			
	gauge in bar gauge in mH <sub>2</sub> O	3 6 5 3 6 6													T				
Input [m	iH <sub>2</sub> O] [bar]																		
	1.0 0.10		1	0 (	0 0									П				Т	
	1.6 0.16		1	6 ( 5 ( 0 (	0 0														
	2.5 0.25		2	5 (	0 0														
	4.0 0.40 6.0 0.60		4 6	0 (	0 0														
	10 1.0		1		0 1														
	16 1.6		1	6 (	0 1														
	25 2.5		2	6 0 5 0 0 0	0 1														
	40 4.0		4	0 (	1														
	60 6.0		6	0 (	) 1														
	100 10		1	0 0	2 9 9														
Housing	customer		9	9	9   9														consult
	el 1.4404 (316L)					1												-	
Stanness stor	titanium					Ť													
	customer					9													consult
Design																			
	probe						1												
	sion G3/4" flush 1			_	_		В											_	
Diaphragm	oo Al O 00 0 %							0											
cerami	cs Al <sub>2</sub> O <sub>3</sub> 99,9 % customer							C 9											aanault
Output	customer					-		9											consult
	. 20 mA / 2-wire		_	-	-	_	_	_	1		_					_		_	
intrinsic safety 4									Ė										
,	customer								9										consult
Seals																			
	FKM									1									
	EPDM									3									
	FFKM <sup>2</sup> customer									7									oone de
Electrical connection	customer									9									consult
	blue, Ø 7.4 mm) <sup>3</sup>										4								
	(red, Ø 9.0 mm) <sup>3,4</sup>										42								
Accuracy	,																		
standard for p <sub>N</sub> < 0,4 bar	0.35 % FSO											3							
standard for $p_N \ge 0.4$ bar	0.25 % FSO											2							
	customer											9							consult
Cable length																			
0 1-1 1	in m												9	9	9				
Special version	standard															0	0 (		
with temperatur	e sensor Pt 100															0	1 3	3	
to.//poratar	customer															9	9 9	9	consult
																		- 1	

 $<sup>^1</sup>$  only in combination with housing in stainless steel 1.4404 (316L)  $^2$  min. permissible temperature from -15  $^{\circ}\text{C}$ 

 $<sup>^{\</sup>rm 3}$  shielded cable with integrated ventilation tube for atmospheric pressure reference

<sup>&</sup>lt;sup>4</sup> only in combination with IS version (explosion protection) and temperature element Pt 100



# **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)











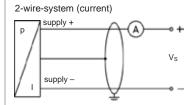


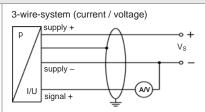
[bar]	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6	10	16	25	40
[mH <sub>2</sub> O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400
[bar]	0.5	1	1	2	5	5	10	10	20	40	40	80	80	105
[bar]	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50	50	120	120	210
	p <sub>N</sub> ≥ 1	p <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance						p <sub>N</sub> < 1 bar: on request						
	[mH <sub>2</sub> O] [bar]	[mH <sub>2</sub> O] 1 [bar] 0.5 [bar] 1.5		$ \begin{array}{c cccc} [mH_2O] & 1 & 1.6 & 2.5 \\ \hline [bar] & 0.5 & 1 & 1 \\ \hline [bar] & 1.5 & 1.5 & 1.5 \\ \end{array} $	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	[mH <sub>2</sub> O] 1 1.6 2.5 4 6 [bar] 0.5 1 1 2 5 [bar] 1.5 1.5 1.5 3 7.5	[mH <sub>2</sub> O] 1 1.6 2.5 4 6 10 [bar] 0.5 1 1 2 5 5	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$						

Output signal / Supply				
Standard		2-wire: 4 20 mA / V <sub>S</sub> = 8 33	2 Vpc	SIL-version: V <sub>S</sub> = 14 28 V <sub>DC</sub>
Option IS-version		2-wire: 4 20 mA / $V_S = 10$ 28		SIL-version: $V_S = 14 \dots 28 V_{DC}$
Options 3-wire		3-wire: 0 20 mA / $V_S = 14$ 30		0 10 V / V <sub>S</sub> = 14 30 V <sub>DC</sub>
Performance		0 20 mil 7 v3 = 11 0	0 100	0 10 v / v3 = 11 00 vbc
Accuracy1		standard: nominal pressure < 0.4 bar	r· < + 0	0.5 % FSO
Accuracy		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	0.1 % FSO
Permissible load		current 2-wire: $R_{max} = [(V_S - V_{S min}) / (V_{S min})]$	$0.02~\text{A}]~\Omega$	
		current 3-wire: $R_{max} = 240 \Omega$		
		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 cond	litions	
Response time <sup>2</sup>		2-wire: ≤ 10 msec		3-wire: ≤ 3 msec
<sup>1</sup> accuracy according to IEC	60770 – lim	it point adjustment (non-linearity, hysteresis, re	epeatability)	
<sup>2</sup> with optional accuracy 0,1				
Thermal effects (Offset	•	<i>)</i> ≤ 0.40		> 0.40
Nominal pressure p <sub>N</sub>	[bar]	****		
Tolerance band	[% FSO]	≤±1		≤ ± 0.75
in compensated range	[°C]	0 70		-20 85
Permissible temperatur				
Permissible temperatures	5	medium: -40 125 °C electronics	s / environme	ent: -40 85 °C storage: -40 100 °C
Electrical protection				
Short-circuit protection		permanent		
Reverse polarity protection		no damage, but also no function		
Electromagnetic compati	bility	emission and immunity according to EN	N 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 (o	nly for 4.	20 mA / 2-wire)		
Approvals		IBExU 10 ATEX 1068 X / IECEx IBE	E 12.0027X	
DX19-LMP 331		zone 0: II 1G Ex ia IIC T4 Ga		
		zone 20: II 1D Ex ia IIIC T135 °C Da		
Safety technical maximum	m values	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i = 660 \text{ mW}$		
Danasiasible temperature	f	the supply connections have an inner of		
Permissible temperature medium	TOF	in zone 0: -20 60 °C with p in zone 1 or higher: -40/-20 70 °C	D <sub>atm</sub> U.8 Dar U	up to 1.1 bar
Connecting cables		cable capacitance: signal line/shield a	also signal lir	ne / signal line: 160 pF/m
(by factory)				ine / signal line: 1 μH/m
Materials		,		, , , , , , , , , , , , , , , , , , ,
Pressure port		stainless steel 1.4404 (316L)		
Housing		stainless steel 1.4404 (316L)		
Option compact field hou	sina	, ,	nd M12x1.5.	, brass, nickel plated (clamping range 2 8 mm)
Seals		standard: FKM		,
		option: EPDM		others on request
Diaphragm		stainless steel 1.4435 (316L)		<u>.                                      </u>
Media wetted parts		pressure port, seals, diaphragm		
Miscellaneous				
Optionally SIL 2 version 3	3	according to IEC 61508 / IEC 61511		
Current consumption		signal output current: max. 25 mA		signal output voltage: max. 7 mA
Weight		approx. 200 g		
Installation position		any <sup>4</sup>		
Operational life		100 million load cycles		
CE-conformity		EMC Directive: 2014/30/EU		
ATEX Directive		2014/34/EU		
<sup>3</sup> only for 420mA / 2-wire: r	not in combii	nation with the accuracy 0.1%		

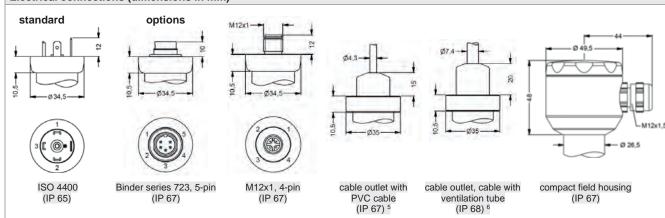
only for 4...20mA / 2-wire; not in combination with the accuracy 0.1%
 Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviation in the zero point for pressure ranges p<sub>N</sub> ≤ 1 bar.

Pin configuration					
Electrical connections	ISO 4400	Binder 723	M12x1 / metal	compact	cable colours
Electrical confilections	130 4400	(5-pin)	(4-pin)	field housing	(IEC 60757)
Supply +	1	3	1	IN +	WH (white)
Supply –	2	4	2	IN –	BN (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	GN (green)
Shield	around nin	_	4	<b>(1)</b>	GNYE
Snieid	ground pin 🛞	5	4	<b>⊕</b>	(green-yellow)
Wiring diagrams					

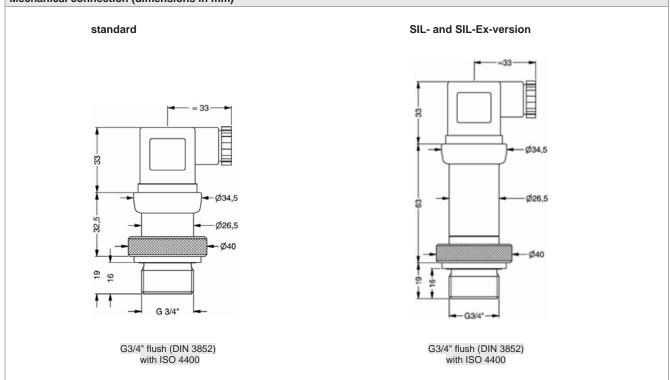




### Electrical connections (dimensions in mm)



### Mechanical connection (dimensions in mm)



<sup>&</sup>lt;sup>5</sup> standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)
<sup>6</sup> different cable types and lengths available, permissible temperature depends on kind of cable

Ordering code

		Or	der	in	g	C	ode	e L	MP	33	31							
LMP 331			]-[			].	- 🔲	-	-	]-[	]-[		I	]-[	]-[			]
Pressure																		
i	in bar n mH₂O	4 3 0 4 3 1																
	bar]	4 5 1																
	0.10		1		0													
	0.16		1		0													
	0.25		2		0													
	).40 ).60		6			0												
	1.0		1			1												
	1.6		1	6		1												
	2.5		2	5		1												
	4.0					1												
	6.0		6 1	0		1												
	10 16		1	6	0	2												
	25		2	5	0	2												
	40		4	0	0	2												
	stomer		9	9	9	9												consult
Pressure port	4 (0.4.01.)																	
stainless steel 1.4404	,						1											consult
Diaphragm	ustomer						9											Consult
stainless steel 1.4435	5 (316L)							1										
	ustomer							9										consult
Output																		
4 20 mA									1									
0 20 mA 0 10 V									2									
intrinsic safety 4 20 mA									E									
SIL2 4 20 mA									18									
SIL2 with intrinsic									ES									
4 20 mA																		10
Seals	ustomer	_	-	-	-	-	-	-	9			_	_				_	consult
Seals	FKM									1								
	EPDM									3								
C	ustomer									ç								consult
Electrical connection																		
male and female plug IS													0 0					
male plug Binder series 723 cable outlet with PVC cabl													0 0 A 0					
cabl	e outlet,																	
cable with ventilation tub	e (IP68) 2												R 0					
male plug M12x1 (4-pin)	) / metal											М	1 0					
compact field													5 0					
stainless steel 1.430	01 (304) ustomer												9 9					consult
Accuracy	astorrier											3	9 9					CONSUIT
standard for $p_N \ge 0.4$ bar: 0.35	% FSO													3				
standard for $p_N < 0.4$ bar: 0.50	% FSO													5				
	% FSO 3													2				
	% FSO 3 ustomer													1				consult
Special version	ustoniel													٤				Consult
	standard														(	0	0	
CI	ustomer														9	9	9	consult

 $<sup>^{\</sup>rm 1}$  standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), others on request

<sup>&</sup>lt;sup>2</sup> code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

<sup>&</sup>lt;sup>3</sup> not in combination with SIL



# **LMP 331i**

## **Precision Screw-in Transmitter**

Stainless Steel Sensor

accuracy according to IEC 60770: 0.1 % FSO

### **Nominal pressure**

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

### **Output signal**

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

### **Product characteristics**

- thermal error in compensated range -20 ... 80 °C: 0.2 % FSO TC 0.02 % FSO / 10K
- Turn-Down 1:10
- communication interface for adjusting offset, span and damping

### **Optional versions**

- **IS-versions** Ex ia = intrinsically safe for gases and dusts
- adjustment of nominal pressure ranges (factory-provided)

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

The signal processing of sensor signal is done by digital electronics with 16-bit analogue digital converter. Consequently, it is possible to conduct an active compensation and the transmitters with excellent measurements and exceptionally attractive price to offer on the market.

### Preferred areas of use are



Chemical / petrochemical industry



Environmental engineering (water / sewage / recycling)













Pressure ranges <sup>1</sup>											
Nominal pressure gauge	[bar]	0.4	1	2	4	10	20	40			
Level gauge	[mH <sub>2</sub> O]	4	10	20	40	100	200	400			
Overpressure	[bar]	2	5	10	20	40	80	105			
Burst pressure	[bar]	3	7.5	15	25	50	120	210			
<sup>1</sup> On customer request we adj	<sup>1</sup> On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.										

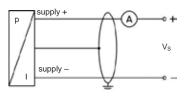
Output signal / Supply	
Standard	2-wire: 4 20 mA / V <sub>S</sub> = 12 36 V <sub>DC</sub>
Option IS-version	2-wire: 4 20 mA / V <sub>S</sub> = 14 28 V <sub>DC</sub>
Options analogue signal	2-wire: 4 20 mA with communication interface <sup>2</sup>
options analogus signal	3-wire: 0 10 V / V <sub>S</sub> = 14 36 V <sub>DC</sub>
	0 10 V with communication interface <sup>2</sup>
<sup>2</sup> only possible with electrical connection	Binder series 723 (7-pin)
Performance	
Accuracy	IEC 60770 <sup>3</sup> : ≤ ± 0.1 % FSO
performance after turn-down	
- TD ≤ 1:5	no change of accuracy <sup>4</sup>
- TD > 1:5	for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 4):
	$\leq \pm [0.1 + 0.015 \times \text{turn-down}] \% \text{ FSO}$
	with turn-down = nominal pressure range / adjusted range
	e.g. with a turn-down of 1:10 following accuracy is calculated:
Daweriasikla laad	$\leq \pm (0.1 + 0.015 \times 10) \%$ FSO i.e. accuracy is $\leq \pm 0.25 \%$ 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
milidence effects	load: $0.05 \% FSO / k\Omega$
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions
Response time	approx. 5 msec
Adjustability (with option	configuration of following parameters possible (interface / software necessary <sup>5</sup> ):
communication interface RS232)	- electronic damping: 0 100 sec
	- offset: 0 90 % FSO
2	- turn down of span: max. 1:10
	it point adjustment (non-linearity, hysteresis, repeatability) bar; for these calculation of accuracy is as follows:
$\leq \pm (0.1 + 0.02 \text{ x turn-down}) \% \text{ FSO e.g}$	g. turn-down of 1:3: $\leq \pm (0.1 + 0.02 \times 3)$ % FSO i.e. accuracy is $\leq \pm 0.16$ % FSO
	pe ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)
Thermal effects (Offset and Span	,
	≤ ± (0.2 x turn-down) in compensated range -20 80 °C
TC, average [% FSO / 10 K]	· · · · · · · · · · · · · · · · · · ·
Permissible temperatures	medium: -25 125 °C
	electronics / environment: -25 85 °C
Electrical protection	storage: -40 100 °C
Electrical protection	normanant
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Materials	
Pressure port	stainless steel 1.4404 (316 L)
Housing	stainless steel 1.4404 (316 L)
Option compact field housing	stainless steel 1.4301 (304)
Soals	cable gland M12x1.5, brass, nickel plated (clamping range 2 8 mm)  FKM others on request
Seals Diaphragm	'
Media wetted parts	stainless steel 1.4435 (316L) pressure port, seals, diaphragm
	pressure port, sears, diaprilagiti
Mechanical stability	40 = PMC (20 2000 LIP) - coording to PMI FM 20000 0 0
Vibration	10 g RMS (20 2000 Hz) according to DIN EN 60068-2-6
Shock	100 g / 11 msec. according to DIN EN 60068-2-27

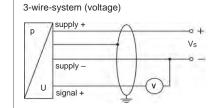
Explosion protection (only for 4	4 20 mA / 2-wire)
Approvals DX19-LMP 331i	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical max. values	$U_i$ = 28 V, $I_i$ = 93 mA, $P_i$ = 660 mW, $C_i$ ≈ 0 nF, $L_i$ ≈ 0 $\mu$ H, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible temperatures for environment	in zone 0: -20 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 65 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
Miscellaneous	
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 200 g
Installation position	any <sup>6</sup>
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

<sup>&</sup>lt;sup>6</sup> Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges p<sub>N</sub> ≤ 1 bar.

### Wiring diagrams







ISO 4400	Binder 723 (5-pin)	Binder 723/423 (7-pin)	M12x1/ metal (4-pin)	compact field housing	cable colours (IEC 60757)
+ 1	3	3	1	IN +	WH (white)
- 2	4	1	2	IN –	BN (brown)
3	1	6	3	OUT +	GN (green)
d ground pin 🚇	5	2	4	<b>⊕</b>	GNYE (green-yellow)
) -	-	4	-	-	-
) -	-	5	-	-	-
) -	-	7	-	-	-
C	+ 1 2 e) 3 ld ground pin (a) D - D - D - D - D - D - D - D - D - D	(5-pin)  + 1 3 - 2 4 e) 3 1  Id ground pin ( 5 5)  D D D D D	1	1	+     1     3     3     1     IN +       -     2     4     1     2     IN -       e)     3     1     2     IN -       e)     3     1     2     IN -       OUT +       Id     ground pin ⊕     5     2     4     ⊕       D     -     -     4     -     -       D     -     -     5     -     -       D     -     -     7     -     -

	Orderi	ng cod	e l	_MF	9	31	i						
LMP 331i	<u> </u>	<u> </u>	- 🗌	- 🔲		]-[		<u></u>	- 🔲	-			4
Pressure													
in bar	4 3 0 4 3 1												
in mH₂O	4 3 1				_								
Input [mH <sub>2</sub> O] [bar]	4 0												
4 0.4	4 0	0 0											
10 1.0	1 0	0 1											
20 2.0	2 0	0 1											
40 4.0	4 0	0 1											
100 10	1 0	0 2											
200 20	2 0	0 2											
400 40 customer	4 0 9 9	0 2 0 2 0 2 0 2 9 9											consult
Output	9 9	9 9											Consuit
4 20 mA / 2-wire		1			_								
intrinsic safety 4 20 mA / 2-wire		Ė											
0 10 V / 3-wire		3											
customer		9											consult
Accuracy (at nominal pressure)													Contact
0.1 % FSO			1										
customer			9										consult
Electrical connection													
male and female plug ISO 4400				1	0 0								
male plug Binder series 723 (5-pin)				2	0 0								
male plug Binder series 723 (7-pin)					0 0								
and female plug Binder series 423 (7-pin)				А	UU								
male plug M12x1 (4-pin) / metal				М	1 0								
for analog output				141	. 0								
male plug M12x1 (4-pin) / metal				М	1 3								
for digital output													
cable outlet with PVC cable (IP67) 1				Т	A 0								
cable outlet,				Т	R 0								
cable with ventilation tube (IP68) <sup>2</sup>													
compact field housing				8	5 0								
stainless steel 1.4301 (304)													
Customer			_	9	9 9		-	_		_			consult
Mechanical connection G3/4" DIN 3852													
with flush sensor						K	0	0					
customer						9	9	9					consult
Seals							, 5						Consult
FKM									1				
customer									9				consult
Special version													
standard										1	1	1	
communication interface RS232 3										1	2	1	
customer										9	9	9	consult

 $<sup>^{\</sup>rm 1}$  standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request

Windows® is a registrated trademark of Microsoft Corporation

 $<sup>^{2}</sup>$  code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

 $<sup>^{3}</sup>$  communication interface RS232 only possible with electrical connection Binder serie 723/423 (7-pin) software, interface and cable for LMP 331i with option RS232 have to be order separately (ordering code: CIS-G; software appropriate for Windows® 95, 98, 2000, NT version 4.0 or newer and XP)



# **LMK 331**

### Screw-In Transmitter

Ceramic Sensor

accuracy according to IEC 60770: 0.5 % FSO

### **Nominal pressure**

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

### **Output signals**

2-wire: 4 ... 20 mA

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

### **Special characteristics**

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

### **Optional versions**

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

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

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

### Preferred areas of use are



Plant and machine engineering



**Energy industry** 



Environmental engineering (water - sewage - recycling)



Medical technology











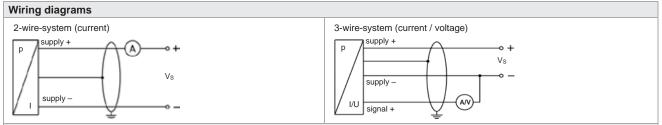






Input pressure range													
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40 <sup>1</sup>	60 <sup>1</sup>
Level	[mH <sub>2</sub> O]	4	6	10	16	25	40	60	100	160	250	400	600
Overpressure	[bar]	1	2	2	4	4	10	20	20	40	40	100	200
Burst pressure	[bar]	2	4	4	5	7,5	12	25	30	50	50	120	250
Vacuum resistance	[bar]	p <sub>N</sub> ≥ 1	bar: unli	mited vac	cuum res	istance							
		$p_{N} < 1$	bar: on r	equest									
<sup>1</sup> only possible with stainless steel pressure port													

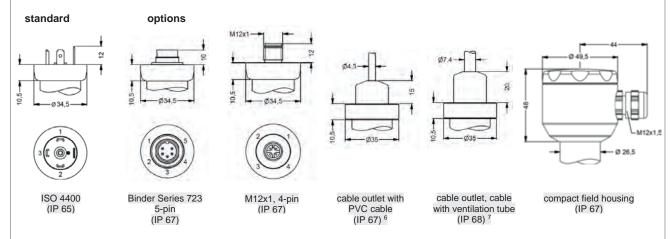
Output signal / Supply								
Standard	2-wire: 4 20 mA / V <sub>S</sub> =	- 8 32 V <sub>20</sub> SII -version: \	/ <sub>S</sub> = 14 28 V <sub>DC</sub>					
Option IS-version <sup>2</sup>	2-wire: 4 20 mA / V <sub>S</sub> =		$V_{\rm S} = 14 \dots 28  V_{\rm DC}$					
Options 3-wire	3-wire: 0 20 mA / V <sub>S</sub> =		7S - 14 20 VDC					
·	0 10 V / V <sub>S</sub> =							
<sup>2</sup> IS-version not possible with plastic pr	essure port							
Performance								
Accuracy <sup>3</sup>	≤ ± 0.5 % FSO							
Permissible load		$V_{\rm S} - V_{\rm S  min}$ / 0.02 A] $\Omega$						
	current 3-wire: $R_{max} = 500$							
	voltage 3-wire: $R_{min} = 10$							
Influence effects	supply: 0.05 % FSO / 10 V							
	load: $0.05 \% FSO / k\Omega$							
Response time	2-wire: ≤ 10 msec							
. respense ums	3-wire: ≤ 3 msec							
Long term stability	≤ ± 0,3 % FSO / year at refe	erence conditions						
<sup>3</sup> accuracy according to IEC 60770 – lii								
Thermal effects (Offset and Spa								
Thermal error	≤ ± 0.2 % FSO / 10 K							
in compensated range	0 85 °C							
Permissible temperatures <sup>4</sup>	medium: -40 125 °C	electronics / environment: -40 8	35 °C storage: -40 100 °C					
		electronics / environment40 8	55 C Storage40 100 °C					
<sup>4</sup> for pressure port in PVDF the medium	r temperature is -30 60 °C							
Electrical protection								
Short-circuit protection	permanent							
Reverse polarity protection	no damage, but also no fund							
Electromagnetic compatibility	emission and immunity acco	ording 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	Ü	Ü						
Pressure port / housing	1	pressure port	housing					
. resears porty measing	standard:	stainless steel 1.4404 (316L)	stainless steel 1.4404 (316L)					
	options for p <sub>N</sub> ≤ 25 bar:	PVDF	PVDF					
Option compact field housing		I.	I plated (clamping range 2 8 mm)					
Seals	standard: FKM	, cable glaria in 12x1.0, brace, more	r platea (clamping range 2 e min)					
Cears	options: EPDM		others on request					
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %		outere en requeet					
Media wetted parts	pressure port, seals, diaphra	agm						
Explosion protection (only for 4		~ <del>z···</del>						
Approval DX19-LMK 331 only for	-	IECEV IRE 12 0027V						
stainless steel pressure port	zone 0: II 1G Ex ia IIC T4							
stairliess steel pressure port	zone 20: II 1D Ex ia IIIC T1							
Safety technical maximum values								
Calcty teermoar maximum values		e an inner capacity of max. 27 nF to	the housing					
Permissible temperatures for		60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar	and moderning					
environment	in Zone 1 or higher: -40/-20	70 °C						
Connecting cables		ine/shield also signal line / signal lin	e: 160 pF/m					
(by factory)		ine /shield also signal line / signal lin						
Miscellaneous	2.3							
Option SIL 2 version <sup>5</sup>	according to IEC 61508 / IEC	C 61511						
Current consumption	signal output current: max. 2		signal output voltage: max. 7 mA					
Carrotti Corisumption	approx. 150 g	-V III/A	orginal output voltage. Max. / MA					
Weight	appius. 100 g							
Weight								
Installation position	any							
Installation position Operational life	any 100 million load cycles							
Installation position Operational life CE-conformity	any 100 million load cycles EMC Directive: 2014/30/EU							
Installation position Operational life	any 100 million load cycles							



#### Pin configuration

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

#### Electrical connections (dimensions in mm)



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

#### Mechanical connection (dimensions in mm)

# standard standard for SIL- and SIL-Ex-version 8 ≈ 33 Ø34,5 83 Ø26,5 Ø34,5 Ø26,5 Ø40 Ø40 G 3/4" -G3/4" G3/4" flush (DIN 3852) with ISO 4400 G3/4" flush (DIN 3852) with ISO 4400

<sup>&</sup>lt;sup>6</sup> standard: 2 m PVC-cable without ventilation tube ( permissible temperature: -5 ... 70°C)
<sup>7</sup> different cable types and length available, permissible temperature depends on kind of cable

		)rde	eri	ng	CC	de	e L	MI	K	3	31	ı					ı				
LMK 331	Ш	- 🗌			]-[	]-[	<u> </u>	· 🔲			-[			-[	]-[	]-		- <u> </u>			
Pressure																				Н	
gauge in bar	4 6 0 4 6 1		T	Т									П							П	
gauge in mH <sub>2</sub> O Input [mH <sub>2</sub> O] [bar]	4 6 1			_							_			_				_		Н	
Input [mH₂O] [bar] 4 0.4		4	0	0 0		-				-	-	-		-		•		-	-	-	
6 0.6				0 0																	
10 1.0		1	0	0 1																	
16 1.6		1	6	0 1																	
25 2.5		2		0 1																	
40 4.0 60 6.0				0 1 0 1																	
100 10			0	0 2																	
160 16		1	6	0 2 0 2																	
250 25		2	5	0 2																	
400 40 <sup>1</sup> 600 60 <sup>1</sup>		4	0	0 2																	
customer		g	9	0 2																	consult
Analogue output		9	J	J   J																	Consuit
4 20 mA / 2-wire					1				П				П			Т			Г	Г	
0 20 mA / 3-wire					2																
0 10 V / 3-wire intrinsic safety 4 20 mA / 2-wire <sup>2</sup>					3 E																
SIL2 4 20 mA / 2-wire					13																
SIL2 with intrinsic safety <sup>2</sup>					E																
4 20 mA / 2-wire																					
customer			_	_	ç						_			_				_	ш		consult
Accuracy 0.5 % FSO			-	-			5			-	-					۰			Н		
customer							9														consult
Electrical connection																					COLICUIT
male and female plug ISO 4400								1		0											
male plug Binder series 723 (5-pin)								2		0											
cable outlet with PVC cable (IP67) <sup>3</sup> cable outlet,										0											
cable with ventilation tube (IP68) <sup>4</sup>								Т	R	0											
male plug M12x1 (4-pin) / metal								М	1	0											
compact field housing										0											
stainless steel 1.4301 (304)																					
customer		_			_			9	9	9					_	÷		-			consult
Mechanical connection G3/4" DIN 3852 with																					
flush sensor											r	0	0								
customer											ç	9	9								consult
Seals																					
FKM														1							
EPDM customer														3							consult
Pressure port																					CONSUIT
stainless steel 1.4404 (316L)																1					
option for $p_N \le 25$ bar: PVDF <sup>5</sup>																3					
Customer															(	9					consult
Diaphragm ceramics Al <sub>2</sub> O <sub>3</sub> 96 %																	2				
customer																	9				consult
Special version																	_				
standard																		0	0	0	
customer																		9	9	9	consult

 $<sup>^{\</sup>mbox{\scriptsize 1}}$  only possible for pressure port of stainless steel

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



# **LMK 351**

# **Screw-in Transmitter**

Ceramic Sensor

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

## **Nominal pressure**

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

#### **Output signal**

2-wire: 4 ... 20 mA

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

#### **Product characteristics**

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

# **Optional versions**

- IS-version Ex ia = intrinsically safe for gases and dust
- diaphragm 99.9 % Al<sub>2</sub>O<sub>3</sub>
- customer specific versions

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

For the usage in aggressive media a pressure port in PVDF and the diaphragm in Al<sub>2</sub>O<sub>3</sub> 99.9 % is available. An intrinsically safe version completes the range of possibilities.

# Preferred areas of use are



Plant and machine engineering



Environmental engineering (water - sewage - recycling)

## Preferred used for



Fuel and oil



Viscous and pasty media







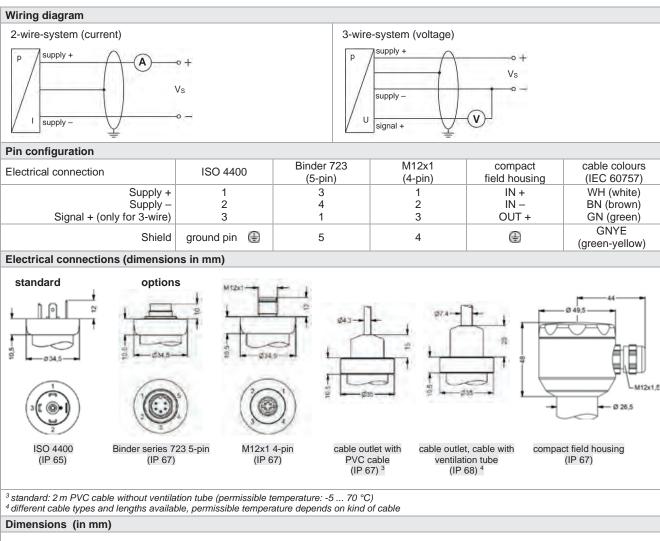


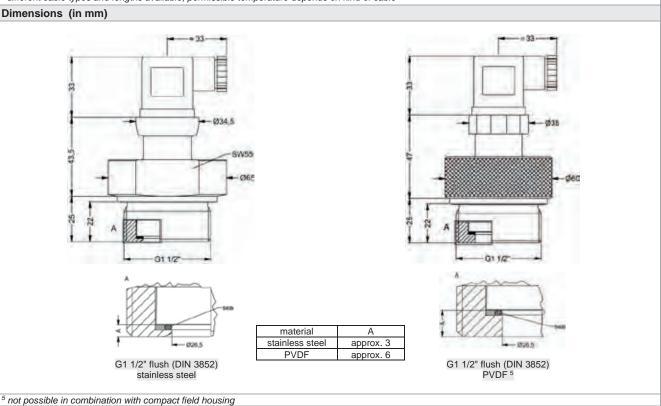


Pressure ranges																
Nominal pressure	[bar]	0.04	0.06	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	20
Level [r	nH <sub>2</sub> O]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40	60	100	160	200
Overpressure	[bar]	2	2	4	4	6	6	8	8	15	25	25	35	35	45	45
Permissible vacuum	[bar]	-0	.2	-(	0.3		-0	.5					-1			
Output signal / Supply																
Standard		2-wire			mA / \											
Option IS-version		2-wire														
Option 3-wire		3-wire	wire: 0 10 V / V <sub>S</sub> = 12.5 32 V <sub>DC</sub>													
Performance		,														
Accuracy <sup>1</sup>			and and ard: $\leq \pm 0.35 \%$ FSO option for $p_N \geq 0.6$ bar: $\leq \pm 0.25 \%$ FSO													
Permissible load					$_{\text{lax}} = [(V_{\text{lax}})]$		<sub>nin</sub> ) / 0.0	2 A] Ω			3-wire:					
Influence effects					SO / 10				lo	ad: 0.0	05 % F	SO / ks	2			
Long term stability				SO / ye	ear at re	eference	e cond	tions								
Turn-on time		700 n														
Mean measuring time		5/sec														
Response time					ne: ≤ 20					ax. res	ponse	time: 3	80 ms	ec		
<sup>1</sup> accuracy according to IEC 607			djustme	ent (nor	n-linearity	, hyster	esis, rej	peatabili	ity)							
Thermal effects (offset and	span)															
Tolerance band			% FSC													
in compensated range		-20	. 80 °C	;												
Permissible temperatures																
Permissible temperatures <sup>2</sup>		electr storaç	medium: -40 125 °C electronics / environment: -40 85 °C storage: -40 100 °C													
<sup>2</sup> for pressure port in PVDF the r	nedium	tempera	ture is	-30 6	60 °C											
Electrical protection		,														
Short-circuit protection		perma														
Reverse polarity protection					so no fu											
Electromagnetic compatibility	у	emiss	ion an	d imm	unity ac	cording	g to EN	61326	<u> </u>							
Mechanical stability																
Vibration		10 g l	RMS (2	20 2	000 Hz	)			a	ccordin	g to DI	N EN 6	0068-2	2-6		
Shock		100 g	/ 1 ms	sec					a	ccordin	g to DI	N EN 6	0068-2	2-27		
Materials (media wetted)																
Pressure port		stand	ard: s	stainles	ss steel	1.4404	(316L	)	o	otion:	PVDF					
Housing		stand	ard: s	stainles	ss steel	1.4404	(316L	)	O	otion:	PVDF					
Option compact field housing	]	stainle	ess ste	el 1.43	301 (30	4); cab	le glan	d M12	x1.5, b	rass, n	ickel pl	ated (c	lampin	g range	e 2 8	3 mm)
Seals		FKM FFKM EPDN	1 -	40 1 15 1 40 1												
Diaphragm		stand	ard: c	erami	cs Al <sub>2</sub> O	<sub>3</sub> 96 %			O	otions:	ceram	ics Al <sub>2</sub> 0	$O_3 99.9$	9 %		
Media wetted parts					ls, diapl	nragm										
Explosion protection (only	for 4	20 m	A / 2-v	vire)												
Approval DX14-LMK 351		IBEXU05ATEX1070 X stainless steel-pressure port with connector:     zone 0:														
Safety technical maximum va	alues				$A, P_i =$						<sub>nd</sub> = 27	nF				
Max. permissible temperatur		in zor	ne 0:		-20	. 60 °C	for p <sub>atn</sub>									
for environment Connecting cables		zone 1 and higher: -25 70 °C														
(by factory)		cable capacity: signal line / shield also signal line / signal line: 220 pF/m cable inductance: signal line / shield also signal line / signal line: 1.5 µH/m														
Miscellaneous		Cabic		ω. 100.	oigila		ornoid (	oo oig		, oigii	ωιιο.	μπ	, , , ,			
Current consumption				t curre		max.	21 mA 5 mA									
Weight			x. 200													
Installation position		any														
Operational life		-	nillion I	oad cy	cles											
CE-conformity					14/30/E	U										
A == 1/ D1																

2014/34/EU

ATEX Directive





	Ordering code LMK 351	
LMK 351		-
Pressure		
in bar in mH₂O	4 7 0 4 7 1	
Input [mH₂O] [bar]		
0.4 0.04 0.6 0.06	0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
1.0 0.10	1 0 0 0	
1.6 0.16	1 6 0 0	
2.5 0.25 4.0 0.40	2 5 0 0 4 0 0 0	
6.0 0.60	6 0 0 0	
10 1.0	1 0 0 1	
16 1.6 25 2.5	1 6 0 1 2 5 0 1	
40 4.0	4 0 0 1	
60 6.0	6 0 0 1	
100 10 160 16	1 0 0 2 1 6 0 2	
200 20	2 0 0 2 9 9 9 9	
Output	9 9 9 9	consult
4 20 mA / 2-wire	1	
0 10 V / 3-wire	3	
intrinsic safety 4 20 mA / 2-wire customer	E 9	consult
Accuracy		Concur
standard: $0.35 \% FSO$ option for $p_N \ge 0.6$ bar: $0.25 \% FSO$	3	
customer	2 9	consult
Electrical connection		
male and female plug ISO 4400 male plug Binder series 723 (5-pin)	1 0 0 2 0 0	
cable outlet with PVC cable (IP67) 1	T A 0	
cable outlet, cable with ventilation tube (IP68) <sup>2</sup>	T R 0	
male plug M12x1 (4-pin) / metal	M 1 0	
compact field housing	8 5 0	
stainless steel 1.4301 (304) 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		
FFKM	3 7	
Pressure port customer	9	consult
stainless steel 1.4404 (316L)	1	
PVDF <sup>3</sup>	В	
customer Diaphragm	9	consult
ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	2	
ceramics Al <sub>2</sub> O <sub>3</sub> 99.9 % customer	C 9	
Special version	9	
standard		0 0 0 9 9 9 consult
customer		9   9   9   consult

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

 $<sup>^3</sup>$  not possible in combination with compact field housing; permissible medium temperature: -30  $\dots$  60  $^{\circ}$ C



# **EP 500**

# **Pressure Transmitter**

Special Application:
Level Measurement via Air Bubbling

# Characteristics:

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











# Technical Data

Input pressure range									
Nominal pressure p <sub>N</sub> gauge	[bar]	0.06	0.16	0.4	1	2	5	10	20
Nominal pressure $p_N$ abs.	[bar]		on request						
Permissible overpressure	[bar]	2	4	6	8	15	25	35	40
Permissible vacuum for p <sub>N</sub> gauge	[bar]	-0.2	-0.3	-0	).5		-	1	

Output signal / Supply						
Standard	P-wire: 4 20 mA / V <sub>S</sub> = 12 32 V <sub>DC</sub> ; V <sub>S Nom.</sub> = 24 V <sub>DC</sub>					
Current consumption	max. 21 mA	nax. 21 mA				
Performance						
Accuracy 1	IEC 60770 <sup>2</sup> : ≤ ± 0.2 % FSO	BFSL: ≤ ± 0.1 % FSO				
Turn-on time	700 msec	700 msec				
Permissible load	$R_{\text{max}} = [(V_{\text{S}} - V_{\text{S min}}) / 0.02 \text{ A}] \Omega$	$R_{\text{max}} = \left[ \left( V_{\text{S}} - V_{\text{S min}} \right) / 0.02 \text{ A} \right] \Omega$				
Long term stability	≤ ± 0.1 % FSO / year at reference conditions	≤ ± 0.1 % FSO / year at reference conditions				
Response time (10 90 %)	120 msec – without consideration of electronic damping					
Measuring rate	8/sec					

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

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

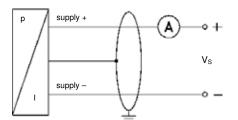
Thermal effects (offset and span)						
Tolerance band	≤ ± 1 % FSO					
in compensated range	-20 80 °C					
Permissible temperatures						
Permissible temperatures	medium:	-40 125°C				
	electronics / environment / storage:	-40 85°C				

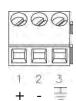
Electrical protection							
Short-circuit protection	permanent						
Reverse polarity protection	Reverse polarity protection no damage, but also no function						
Electrical connection							
Input	terminal clamps (3-pin)						
Communication connector	M12x1 (8-pin), metal						
Materials							
Pressure port	stainless steel 1.4301						
Housing	version EP 500: version EP 500-500:	PA6 (housing foot: PA66) ABS					
Seals (media wetted)	FKM						
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 96 %						
Media wetted parts	pressure port, seals of sense	or, diaphragm					
Category of the environment							
Lloyd's Register (LR)	EMV1, EMV2, EMV3		number of certificate: 13/20056				
Det Norske Veritas •	temperature:	В	number of certificate: TAA00001GM				
Germanischer Lloyd (DNV•GL)	humidity:	В					
	vibration:	Α					
	electromagnetic compatibility	y: B					
	enclosure:	-					
Miscellaneous							
Ingress protection	IP 00						
Function display	green SMD-LED - lights by in	nformation flow through the tran	smitter				
Installation position	any						
Operational life	100 million load cycles						
Weight	approx. 200 g						
Adjustability	<ul> <li>electronic damping: 0 100 sec</li> <li>offset: 0 67 % FSO</li> <li>turn down of span: max. 1:20</li> <li>configuration of pressure unit</li> <li>calibration via connected pressure reference</li> </ul>						
<sup>3</sup> programming kit has to be ordered separately (software appropriate for Windows®95, 98, 2000, NT Version 4.0 or higher, and XP)							
Pin configuration							

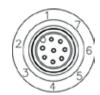
# Pin configuration

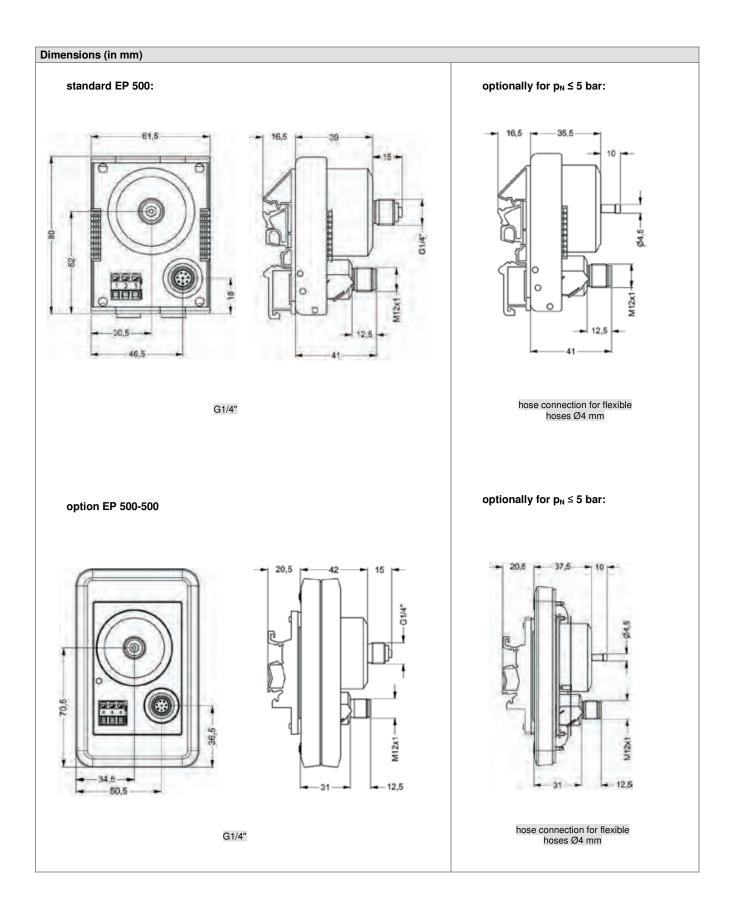
Electrical connections	terminal clamps	M12x1 (8-pin), metal
Supply +1	1	-
Supply +1 Supply +2 Supply –	-	4
Supply –	2	2
Tx	-	5
Rx	-	6
GND	-	7
NC	-	1
Shield	3	3

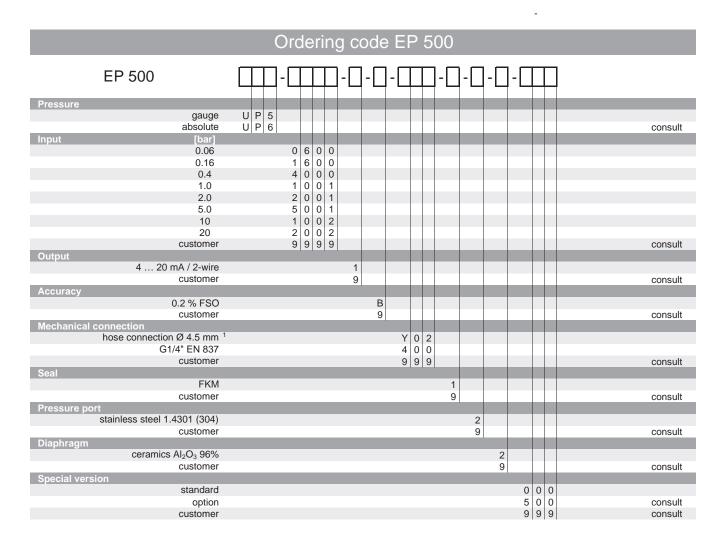
# Wiring diagram











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



# KL 1

# **Terminal Box**

# **Aluminium**

#### **Product characteristics**

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

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

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

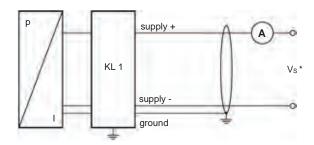
The terminal box KL 1 is equipped with a pressure balance item for equalization of atmospheric reference, therefore a cable without ventilation tube can be used on the supply side.

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



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

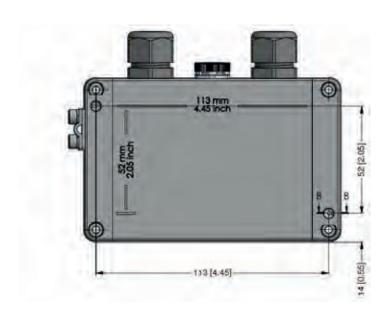
# Wiring diagram

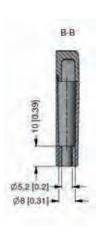


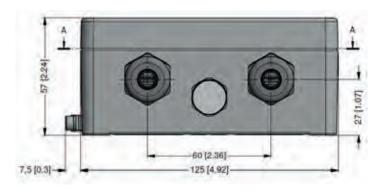
The ground wires of all components have to be connected!

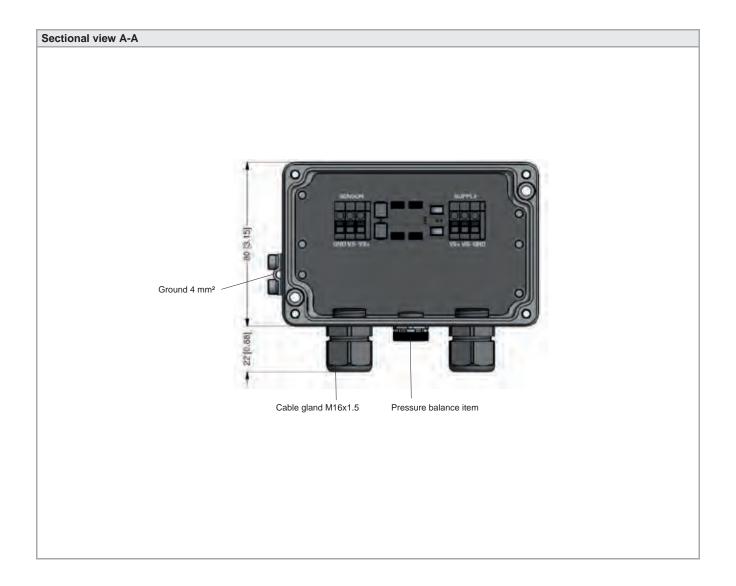
 $^{\star}$  The supply  $V_{\rm S}$  has to be chosen according to needs of the used transmitter.

# Dimensions (mm / in)









	Ordering code KL 1	
KL 1 - ZB.601		
Version		
standard	1 0 0	
custome	r 9 9 9	consult
Special version		
standard	000	
custome	d 0 0 0 r 9 9 9	consult



# KL<sub>2</sub>

# **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 of compensation 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.



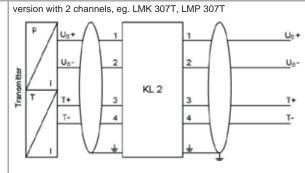




General specifications					
Number of signal lines	2-wire (4 20 mA)				
Housing material	astic ABS, grey				
Ingress protection	IP 66				
Cable entries	cable gland M16x1.5 Polyamide, seals NBR, IP 68, diameter range: standard 5 10 mm others on request				
Atmospheric pressure compensation	pressure balance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

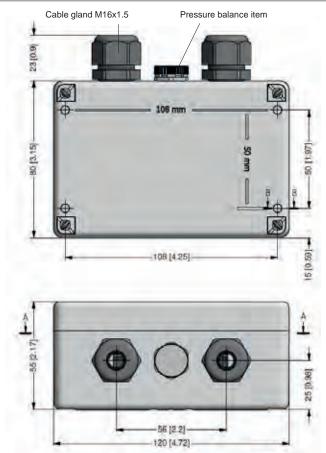
# KL 2 with HART Supply -

Interface HART



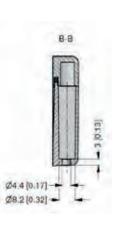
\* The supply V<sub>S</sub> has to be chosen according to needs of the used transmitter. The ground wires of all components have to be connected!

# Dimensions (mm / in)



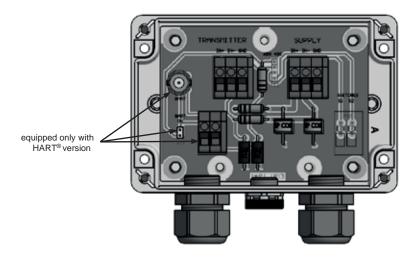
PC

RS 232 C



#### Sectional view A-A

# standard



# version with 2 channels



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

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## 

HART® is a registered trade mark of HART Communication Foundation

<sup>&</sup>lt;sup>1</sup> version for 2 independent 2 wire circuits

Product		Description	Display
PA 430	<b>€</b>	Plug-on Display with Contacts and Ex-approval	4-digit LED-display 4 x 7 mm, rotatable
PA 440	(Ex)	Field Display with Contacts and Ex-approval	4-digit LED-display 4 x 10 mm 4-digit LCD-display 4 x 18 mm
CIT 200	1648 Modbus	Process Display	4-digit LED-display 4 x 13 mm
CIT 250	Modbus*	Process Display with Contacts	4-digit LED-display 4 x 13 mm 4-digit LED-display 5 x 9 mm
CIT 300	Modbus*	Process Display with Contacts and Analogue Output	4-digit LED-display 4 x 20 mm
CIT 350	Modbus	Process Display / Field Display with Bargraph, Contacts and Analogue Output	4-digit LED-display 4 x 9 mm + 20-segment-Bargraph
CIT 400	(ξ <sub>X</sub> )	Process Display with Contacts, Analogue Output and Ex-approval	4-digit LED-display 4 x 10 mm
CIT 600	Modbus	Multichannel Process Display (LCD)	graphic LCD-display 128 x 64 pixel
CIT 650	483 1111011 Modbus	Multichannel Process Display (LCD) with Datalogger	graphic LCD-display 128 x 64 pixel
CIT 700/750	Modbus	Multichannel Process Display (TFT) with Contacts, Analogue Outputs and Datalogger	graphic 3,5 " TFT-monitor graphic 5,7 " TFT-monitor, touchscreen 320 x 240 pixel

Input	Output	Housing Dimensions (w x h x d) in mm	Interface
4 20 mA 0 10 V	0 / 1 / 2 PNP 4 20 mA, 0 10 V	plastic housing rotatable 47 x 47 x 68	-
4 20 mA	0 / 1 / 2 PNP 4 20 mA	wall panel 120 x 80 x 57	-
0/4 20 mA 0/1 5 V, 0/2 10 V PT100 / PT500 / PT1000		front panel 72 x 36 x 103 (86)	RS 485 Modbus RTU
0/4 20 mA 0/1 5 V, 0/2 10 V PT100 / PT500 / PT1000 thermocouple	0 / 1 / 2 relay 0 / 1 / 2 OC	front panel 72 x 36 x 107	RS 485 Modbus RTU
0/4 20 mA 0/1 5 V, 0/2 10 V PT100 / PT500 / PT1000 universal entry thermocouple	0 / 2 / 4 relay 0 / 2 / 4 OC 0/4 20 mA, 0 10 V	front panel 96 x 48 x 107 wall panel 110 x 80 x 67	RS 485 Modbus RTU
0/4 20 mA 0/1 5 V, 0/2 10 V	0 / 2 / 4 relay 0/4 20 mA	front panel 48 x 96 x 107	RS 485 Modbus RTU
4 20 mA	2 / 4 relay 0/4 20 mA	front panel 72 x 72 x 110 hat rail 70 x 75 x 110	-
2 / 4 / 8 inputs 0/4 20 mA 0/1 5V, 0/2 10 V PT100 / PT500 / PT1000 thermocouple	2 OC	front panel 96 x 96 x 110	RS 485 Modbus RTU USB Device
1 / 4 / 8 inputs 0/4 20 mA 0/1 5 V, 0/20 V PT100 / PT500 / PT1000 thermocouple	2 relay 2 OC	front panel 96 x 96 x 110 wall panel 166 x 161 x 103	RS 485 Modbus RTU USB-Host Port USB Device
max. 72 inputs 0 20 mA, 0 10 V binary max. 18 inputs PT 100 / PT 500 / PT 1000 max. 36 inputs thermocouple (mV) max. 12 inputs counter/ ratemeter/ flowmeter	max. 36 relay-outputs max. 72 SSR-outputs max. 24 outputs 4 20 mA	front panel 96 x 96 x 110 front panel 144 x 144 x 110 wall panel 166 x 161 x 103	RS 485 Modbus RTU, RS 232, Ethernet, Modbus TCP USB-Host Port

# COMPETENCE

# pressure transmitters, electronic pressure switches or hydrostatic level probes

- OEM or high-end products
- standard products or customized solutions

BDISENSORS has the right pressure measuring device at the right price.

# PRICE / PERFORMANCE

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

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

# **RELIABILITY**

# observance of deadlines

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

BDISENSORS reduces the level of your stock-keeping and increases your profitability.

# **FLEXIBILITY**

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

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

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plant and machine engineering



chemical and biochemical industry



energy industry



renewable energy



semiconducter industry / cleanroom technology



HVAC



hydraulics



refrigeration



calibration techniques



laboratory techniques



medical technology



food and beverage



vehicles and mobile hydraulics



oil and gas industry



pharmaceutical industry



marine / shipbuilding / offshore



heavy industry



environmental industry



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# MEDIA



sewage



aggressive media



colours



gases



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