



# LMK 331

## Screw-In Transmitter

Ceramic Sensor

accuracy according to IEC 60770:  
0.5 % FSO

### Nominal pressure

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

### Output signals

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

### Special characteristics

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





### Optional versions

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

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

For the usage in aggressive media we 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



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Technical Data

Input pressure range													
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40 <sup>1</sup>	60 <sup>1</sup>
Level	[mH <sub>2</sub> O]	4	6	10	16	25	40	60	100	160	250	400	600
Overpressure	[bar]	1	2	2	4	4	10	20	20	40	100	100	200
Burst pressure	[bar]	2	4	4	5	7.5	12	25	30	50	120	120	250
Vacuum resistance	[bar]	P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance P <sub>N</sub> < 1 bar: on request											

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

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

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

Performance	
Accuracy <sup>3</sup>	≤ ± 0.5 % FSO
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω current 3-wire: R <sub>max</sub> = 500 Ω voltage 3-wire: R <sub>min</sub> = 10 kΩ
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Response time	2-wire: ≤ 10 msec 3-wire: ≤ 3 msec
Long term stability	≤ ± 0.3 % FSO / year at reference conditions

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (Offset and Span) / Permissible Temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures	medium: -40 ... 125 °C electronics / environment: -25 ... 85 °C storage: -40 ... 100 °C

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

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

Materials		
Pressure port / housing	standard:	pressure port housing
	options for P <sub>N</sub> ≤ 25 bar:	stainless steel 1.4404 (316L) stainless steel 1.4404 (316L) PVDF PVDF
Option compact field housing	stainless steel 1.4305 with cable gland brass nickel plated others on request	
Seals	standard: FKM options: EPDM, NBR, others on request	
Diaphragm	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %	
Media wetted parts	pressure port, seals, diaphragm	

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approval DX19-LMK 331 only for stainless steel pressure port	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum values	U <sub>i</sub> = 28 V, I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 0 μH, the supply connections have an inner capacity of max. 27 nF to the housing
Permissible temperatures for environment	in Zone 0: -20 ... 60 °C with p <sub>atm</sub> 0.8 bar up to 1.1 bar in Zone 1 or higher: -25 ... 70 °C
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line / signal line: 160 pF/m cable inductance: signal line /shield also signal line / signal line: 1 μH/m

Miscellaneous	
Option SIL 2 application	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 150 g
Installation position	any
Operational life	> 100 x 10 <sup>5</sup> pressure cycles
CE-conformity	EMC Directive: 2004/108/EC
ATEX Directive	94/4/EG

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**Wiring diagrams**

**2-wire-system (current)**

**3-wire-system (current / voltage)**

**Pin configuration**

Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	cable colours (DIN 47100)
Supply +	1	3	1	wh (white)
Supply -	2	4	2	bn (brown)
Signal + (only for 3-wire)	3	1	3	gn (green)
Shield	ground contact	5	4	gn/ye (green / yellow)

**Electrical connections (dimensions in mm)**

**standard**

ISO 4400 (IP 65)

**option**

Binder Series 723 5-pin (IP 67)

M12x1 4-pin (IP 67)

cable outlet with PVC cable (IP 67)<sup>4</sup>

compact field housing (IP 67)

cable outlet, cable with ventilation tube (IP 68)<sup>5</sup>

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

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

**Mechanical connection (dimensions in mm)**

**standard**

G 3/4" flush (DIN 3852) with ISO 4400

**standard for SIL- and SIL-Ex-version**

G 3/4" flush (DIN 3852) with ISO 4400

## Ordering code LMK 331

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<b>Pressure</b>		
gauge in bar	4 6 0	
gauge in mH <sub>2</sub> O	4 6 1	
<b>Input</b>		
[mH <sub>2</sub> O]	[bar]	
4.0	0.40	4 0 0 0
6.0	0.60	6 0 0 0
10	1.0	1 0 0 1
16	1.6	1 6 0 1
25	2.5	2 5 0 1
40	4.0	4 0 0 1
60	6.0	6 0 0 1
100	10	1 0 0 2
160	16	1 6 0 2
250	25	2 5 0 2
400	40 <sup>1</sup>	4 0 0 2
600	60 <sup>1</sup>	6 0 0 2
customer		9 9 9 9
<b>Analogue output</b>		
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 <sup>2</sup>		E
SIL2 4 ... 20 mA / 2-wire		1S
SIL2 with Intrinsic safety <sup>2</sup>		ES
4 ... 20 mA / 2-wire		9
customer		
<b>Accuracy</b>		
0.5 %		5
customer		9
<b>Electrical connection</b>		
Male and female plug ISO 4400		1 0 0
Male plug Binder series 723 (5-pin)		2 0 0
Cable outlet with PVC cable <sup>3</sup>		T A 0
Cable outlet with cable		T R 0
Male plug M12x1 (4-pin) / metal		M 1 0
compact field housing		8 5 0
stainless steel 1.4305		9 9 9
customer		
<b>Mechanical connection</b>		
G3/4" DIN 3852 with flush sensor		K 0 0
customer		9 9 9
<b>Seals</b>		
FKM		1
NBR		5
EPDM		3
customer		9
<b>Pressure port</b>		
Stainless steel 1.4404 (316L)		1
for P <sub>N</sub> ≤ 25 bar		B
PVDF <sup>4</sup>		9
customer		
<b>Diaphragm</b>		
Ceramics Al <sub>2</sub> O <sub>3</sub> 96%		2
customer		9
<b>Special version</b>		
standard		0 0 0
customer		9 9 9

<sup>1</sup> only possible for pressure port of stainless steel

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

<sup>3</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)

<sup>4</sup> min. permissible temperature -30 °C