

# 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

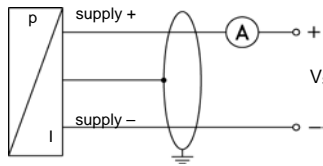
-  Plant and Machine Engineering
-  Energy Industry
-  Environmental Engineering (water – sewage – recycling)
-  Medical Technology



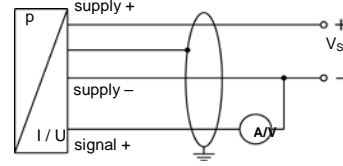
Input pressure range														
Nominal pressure gauge	[bar]	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40 <sup>1</sup>	60 <sup>1</sup>	
Level	[mH <sub>2</sub> O]	4	6	10	16	25	40	60	100	160	250	400	600	
Overpressure	[bar]	1	2	2	4	4	10	20	20	40	40	100	200	
Burst pressure	[bar]	2	4	4	5	7,5	12	25	30	50	50	120	250	
Vacuum resistance	[bar]	P <sub>N</sub> ≥ 1 bar: 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>			SIL-version: V <sub>S</sub> = 14 ... 28 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>			SIL-version: V <sub>S</sub> = 14 ... 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			stainless steel 1.4404 (316L)				housing			stainless steel 1.4404 (316L)			
	options for P <sub>N</sub> ≤ 25 bar: PVDF			PVDF							PVDF			
Option compact field housing	stainless steel 1.4305 with cable gland brass nickel plated others on request													
Seals	standard: FKM options: EPDM others on request													
Diaphragm	ceramics Al <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>6</sup> pressure cycles													
CE-conformity	EMC Directive: 2014/30/EU													
ATEX Directive	94/9/EG													

### Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)



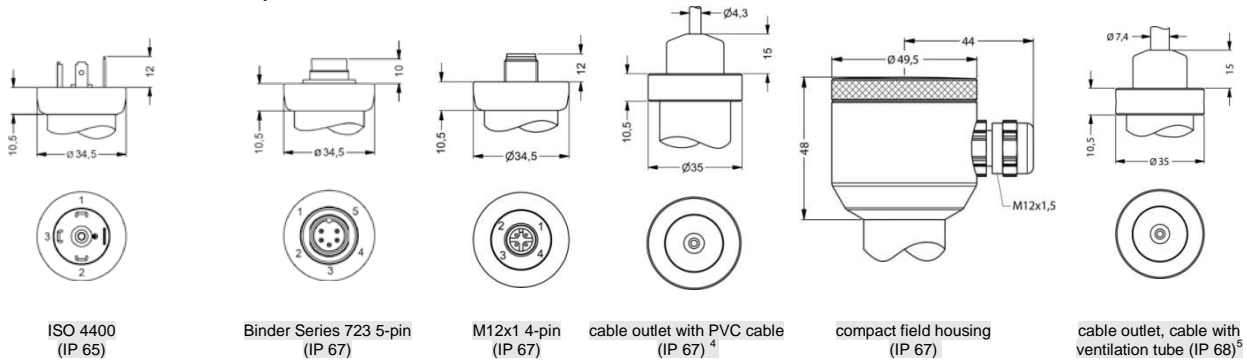
### Pin configuration

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

### Electrical connections (dimensions in mm)

standard

option



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

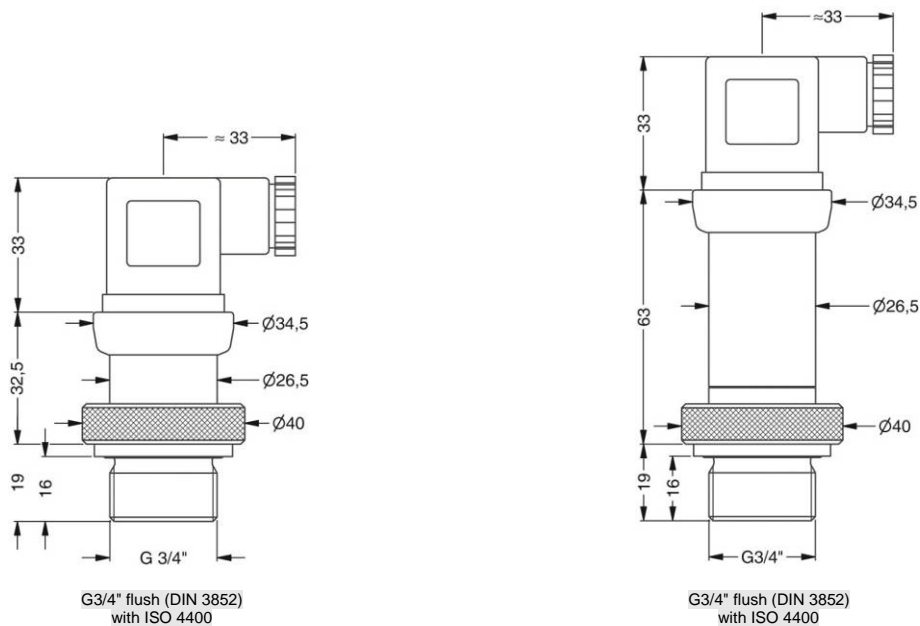
<sup>4</sup> standard: 2 m PVC-cable without ventilation tube (permissible temperature: -5 ... 70°C)

<sup>5</sup> different cable types and length available, permissible temperature depends on kind of cable

### Mechanical connection (dimensions in mm)

standard

standard for SIL- and SIL-Ex-version



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## Ordering code LMK 331

LMK 331

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Pressure		4	6	0																
	gauge in bar	4	6	0																
	gauge in mH <sub>2</sub> O	4	6	1																
Input		[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													consult
Analogue output																				
	4 ... 20 mA / 2-wire							1												
	0 ... 20 mA / 3-wire							2												
	0 ... 10 V / 3-wire							3												
	Intrinsic safety 4 ... 20 mA / 2-wire <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												consult
	customer							9												consult
Accuracy																				
	0.5 %							5												
	customer							9												consult
Electrical connection																				
	Male and female plug ISO 4400							1	0	0										
	Male plug Binder series 723 (5-pin)							2	0	0										
	Cable outlet with PVC cable <sup>3</sup>							T	A	0										
	Cable outlet <sup>4</sup>							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										consult
	customer							9	9	9										consult
Mechanical connection																				
	G3/4" DIN 3852 with flush sensor							K	0	0										
	customer							9	9	9										consult
Seals																				
	FKM							1												
	EPDM							3												
	customer							9												consult
Pressure port																				
	Stainless steel 1.4404 (316L)							1												
	for P <sub>N</sub> ≤ 25 bar							B												
	PVDF <sup>5</sup>							9												
	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>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> cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable  
<sup>5</sup> min. permissible temperature -30 °C

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