



# LMK 331

## Screw-in Transmitter with Ceramic Sensor

- ▶ flush diaphragm
- ▶ pressure ports in stainless steel, PVC, or PVDF
- ▶ accuracy:  
0.25 % FSO BFSL  
(0.5 % FSO IEC 60770)
- ▶ nominal pressure ranges  
from 0 ... 160 mbar  
up to 0 ... 60 bar

The screw-in transmitter LMK 331 has been specially designed for level and process measurement. Due to the semi-flush mounted pressure sensors the LMK 331 can also be used in viscous or contaminated media.

The ceramic sensors feature high compatibility against aggressive media. The sensor is sealed against the pressure port depending on the nominal pressure range with FKM or NBR seals as standard. Other elastomers are available.

Pressure port material is alternatively stainless steel 1.4571 (316Ti), or, for particularly aggressive media, PVDF or PVC. For process measurement applications different process connections are available on request. Additional it is possible to use the screw-in transmitter LMK 331 in explosive area (zone 0).

Preferred areas of use are:

- ▶ tank level measurement
- ▶ water and sewage treatment
- ▶ paper industry
- ▶ chemical industry

- ▶ ceramic sensor without oil-filling with high resistance against aggressive media, e.g. acids and lyes
- ▶ small thermal effects
- ▶ good long term stability
- ▶ option Ex-version:  
(only for 4 ... 20 mA / 2-wire)  
TÜV 03 ATEX 2006 X
- ▶ customer specific versions:  
- special pressure ranges

Characteristics



**LMK 331**  
Screw-in Transmitter

Input pressure range <sup>1</sup>														
Pressure port	G1 1/2"					G3/4"								
Nominal pressure gauge [bar]	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10	16	25	40 <sup>2</sup>	60 <sup>2</sup>
Level [mWC]	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400	600
Permissible overpressure [bar]	0.6	0.6	1.5	1.5	3	7	7	12	12	25	50	50	120	120

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / $V_S = 12 \dots 36 V_{DC}$ Ex-protection <sup>3</sup> : $V_S = 14 \dots 28 V_{DC}$
Options for G3/4"	3-wire: 0 ... 20 mA / $V_S = 14 \dots 36 V_{DC}$ 0 ... 10 V / $V_S = 14 \dots 36 V_{DC}$

Performance	
Accuracy	IEC 60770 <sup>4</sup> : $\leq \pm 0.5\%$ FSO      BFSL: $\leq \pm 0.25\%$ FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{Smin}) / 0.02] \Omega$ 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 / k $\Omega$
Response time	< 10 msec.

Thermal effect	
Thermal error for offset and span in compensated range	$\leq \pm 0.2\%$ FSO / 10 K -25 ... 85 °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
Option Ex-protection only with 4 ... 20 mA / 2-wire DX13-LMK 331	stainless steel pressure port: zone 0 <sup>5</sup> : II 1 G EEx ia IIC T4 zone 20: II 1 D T 85°C plastic pressure port G1 1/2": zone 1: II 2 G EEx ia IIC T4 zone 20: II 1 D T 85°C safety technical maximum values: $V_i = 28 V$ , $I_i = 93 mA$ , $P_i = 660 mW$ ; $C_i \leq 1 nF$ , $L_i \leq 10 \mu H$

Mechanical stability	
Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 ms

Permissible temperatures <sup>6</sup>	
Medium	-25 ... 135 °C
Electronics / environment	-25 ... 85 °C      Ex-protection: application in zone 0: -20 ... 60 °C application in zone 1 or higher: -25 ... 70 °C
Storage	-40 ... 100 °C

<sup>1</sup> G1 1/2" from 0.16 bar up to 0.4 bar; G3/4" from 0.6 bar up to 60 bar

<sup>2</sup> only possible for pressure port in stainless steel

<sup>3</sup> Ex-protection not possible with mech. connection G3/4" with plastic pressure port

<sup>4</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>5</sup> approved for atmospheric pressure from 0.8 bar up to 1.1 bar

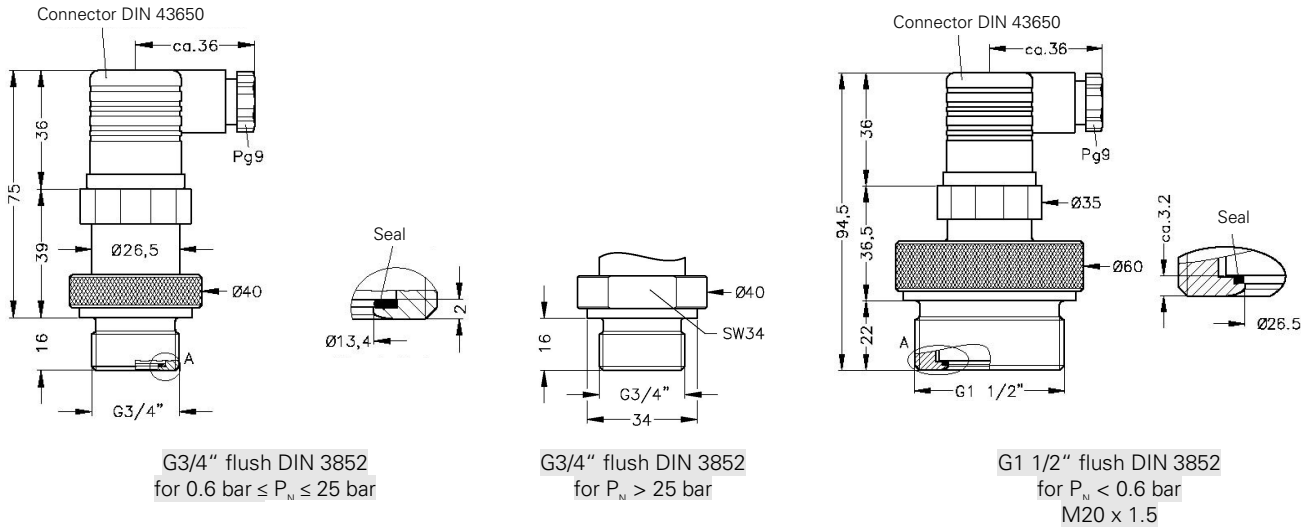
<sup>6</sup> for pressure port of PVC the maximum permissible temperature is 50 °C

# LMK 331

## Screw-in Transmitter

## Technical Data

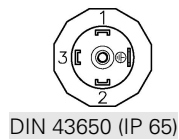
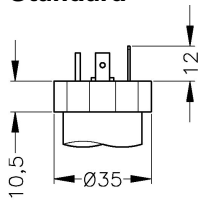
### Mechanical connection



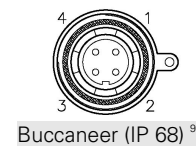
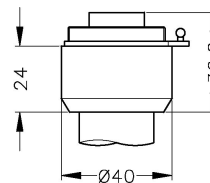
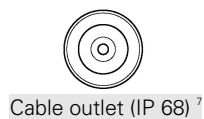
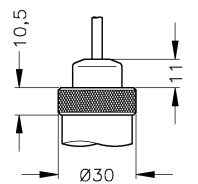
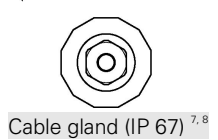
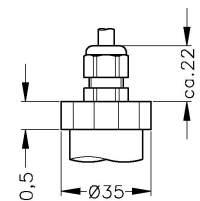
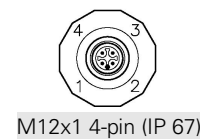
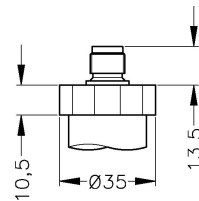
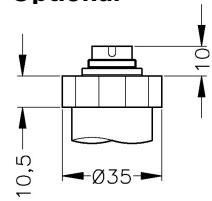
- ⇒ With PVC and PVDF versions total length increases by 3 mm (G3/4") or by 3.5 mm (G1 1/2") !
- ⇒ G3/4" with Ex-protection: total length increases by 17.5 mm!

### Electrical connection

#### Standard



#### Optional



<sup>7</sup> different cable types and lengths available

<sup>8</sup> standard: 2m PVC cable (without ventilation tube), optionally cable with ventilation tube

<sup>9</sup> for gauge pressure up to 40 bar cable with ventilation tube required

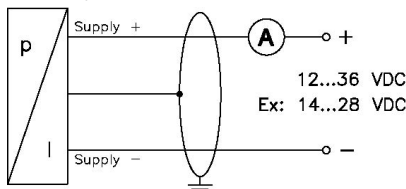
Materials		
Pressure port / housing	pressure port G 3/4"	pressure port G1 1/2"
	standard: stainless steel 1.4571 (316Ti)/ stainless steel 1.4301 (304) options <sup>10</sup> : PVC grey / PVC grey PVDF / PVDF	standard: stainless steel 1.4571 (316Ti)/ stainless steel 1.4305 (303) options: PVC grey / stainless steel 1.4305 (303) PVDF / stainless steel 1.4305 (303)
Seals (media wetted)	P <sub>N</sub> ≤ 25 bar: FKM / EPDM P <sub>N</sub> > 25 bar: NBR others on request	
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 96 %	
Media wetted parts	pressure port, seals, diaphragm	

Miscellaneous			
Cable capacitance <sup>11</sup>	cable without air tube:	signal line/shield: 160 pF/m	signal line/signal line: 120 pF/m
	cable with air tube:	signal line/shield: 150 pF/m	signal line/signal line: 100 pF/m
Cable inductance <sup>11</sup>	cable without air tube:	signal line/shield: 0.65 µH/m	signal line/signal line: 0.65 µH/m
	cable with air tube:	signal line/shield: 1.0 µH/m	signal line/signal line: 1.0 µH/m
Current consumption	signal output current:	max. 25 mA	
	signal output voltage:	max. 7 mA	
Weight	approx. 150 g		
Installation position	any		

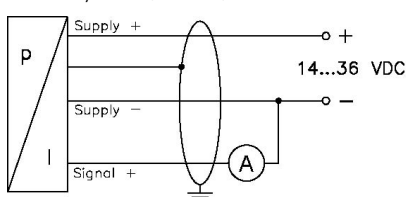
Pin configuration						
Electrical connection		DIN 43650	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	cable colours <sup>11</sup> (DIN 47100)
2-wire-system	Supply +	1	3	1	1	white
	Supply -	2	4	2	2	brown
	Ground	ground pin	5	4	4	yellow / green (shield)
3-wire-system	Supply +	1	3	1	1	white
	Supply -	2	4	2	2	brown
	Signal +	3	1	3	3	green
	Ground	ground pin	5	4	4	yellow / green (shield)

### Wiring diagrams

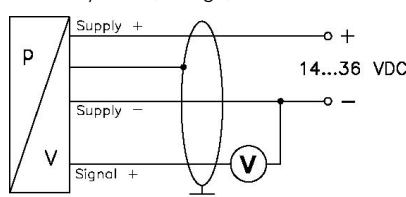
2-wire-system (current)



3-wire-system (current)



3-wire-system (voltage)



<sup>10</sup> possible for nominal pressure ranges P<sub>N</sub> ≤ 25 bar; not possible with Ex-protection

<sup>11</sup> if the electrical connection is a mounted cable by factory

**Ordering code LMK 331**

**LMK 331**

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<b>Pressure</b>			
gauge in bar		4	6 0
gauge in mWC		4	6 1
<b>Input</b>			
[mWC]	[bar]		
<b>For pressure port G1 1/2"</b>			
1,6	0,16	1	6 0 0
2,5	0,25	2	5 0 0
4,0	0,40	4	0 0 0
<b>For pressure port G3/4"</b>			
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 <sup>2</sup>		2	
0 ... 10 V / 3-wire <sup>2</sup>		3	
Intrinsic safety 4 ... 20 mA / 2-wire <sup>3</sup>		E	
	customer	9	
<b>Accuracy</b>			
for P <sub>N</sub> > 0,40 bar	0,5 %	5	
for P <sub>N</sub> ≤ 0,40 bar	0,5 %	F	
	customer	9	
<b>Electrical connection</b>			
Male and female plug DIN 43650		1	0 0
Binder series 723 (5-pin)		2	0 0
Cable gland incl. Cable <sup>4, 5</sup>		4	0 0
Cable outlet <sup>4</sup>		T	R 0
Male plug Buccaneer IP68 <sup>6</sup>		5	0 0
M12x1 (4-pin)		M	0 0
	customer	9	9 9
<b>Mechanical connection</b>			
G3/4" DIN 3852 with flush sensor		K	0 0
G1 1/2" DIN 3852 with flush sensor		M	0 0
	customer	9	9 9
<b>Seals</b>			
for P <sub>N</sub> ≤ 25 bar	FKM	1	
for P <sub>N</sub> > 25 bar	NBR	5	
for P <sub>N</sub> ≤ 25 bar	EPDM	3	
	customer	9	
<b>Pressure port</b>			
Stainless steel 1.4571 (316Ti)		1	
for P <sub>N</sub> ≤ 25 bar	PVC <sup>3</sup>	A	
for P <sub>N</sub> ≤ 25 bar	PVDF <sup>3</sup>	B	
	customer	9	
<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> 3-wire-version only possible for mech. connection G3/4"  
<sup>3</sup> Ex-protection not possible with mech. connection G3/4" with plastic pressure port  
<sup>4</sup> different cable types and lengths deliverable  
<sup>5</sup> standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube  
<sup>6</sup> cable with ventilation tube required

This ordering code contains product specification; properties are not guaranteed. Subject to change without notice.

