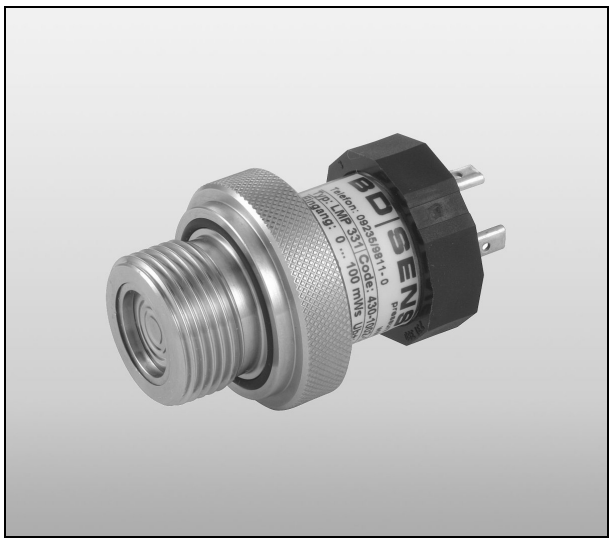

LMP 331

Screw-In Transmitter with piezoresistive Stainless Steel Sensor

- flush diaphragm
- hydrostatic level measurement
- nominal pressure ranges from 0 ... 100 mbar up to 0 ... 40 bar (0 ... 1 mH_2O up to 0 ... 400 mH_2O)

The screw-in transmitters LMP 331 are suited for continuous level measurement.

Due to the high-quality piezoresistive stainless steel sensor the submersible screw-in transmitter LMP 331 features an excellent linearity and good long term stability. The diaphragm in stainless steel 1.4435 is flush with a G3/4" pressure port. It is sealed with an O-ring in FKM as standard; other materials on request. Possible media are non-abrasive lubricants, oils, sewage, diesel etc. if compatible with the media wetted materials.

A variety of standard output signals as well as mechanical and electrical connections make the LMP 331 covering a wide field of applications. Additional it is possible to use the screw-in transmitter LMP 331 in explosive area (zone 0).

Preferred areas of use are:

- ground water level measurement
- level measurement in tanks

Characteristics

- small thermal effect
- excellent linearity
- good long term stability
- option Ex-version (only for 4 ... 20 mA / 2-wire) TÜV 03 ATEX 2006 X
- accuracy: 0.175 / 0.125 / 0.05% FSO BFSL (0.35 / 0.25 / 0.1% FSO IEC 60770)
- customer specific versions:
  - special pressure ranges

LMP 331
Stainless Steel Screw-In Transmitter

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LMP 331

Stainless Steel Screw-In Transmitter

Technical Data

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	40
Level [mH_2O]	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400
Permissible overpressure [bar]	1	1	1	1	3	3	6	6	20	20	60	60	60	100

Output signal / Supply

Standard	2-wire:	4 ... 20 mA / V_S = 12 ... 36 V_{DC}	Ex-protection:	V_S = 14 ... 28 V_{DC}
Optional	3-wire:	0 ... 20 mA / V_S = 14 ... 36 V_{DC} 0 ... 10 V / V_S = 14 ... 36 V_{DC}		

Performance

Accuracy		IEC 60770 [1]	BFSL
	standard: nominal pressure > 0.4 bar	≤ ± 0.35 % FSO	≤ ± 0.175 % FSO
	nominal pressure ≤ 0.4 bar	≤ ± 0.50 % FSO	≤ ± 0.250 % FSO
	option 1: nominal pressure > 0.4 bar	≤ ± 0.25 % FSO	≤ ± 0.125 % FSO
	option 2: nominal pressure ≥ 0.16 bar	≤ ± 0.10 % FSO	≤ ± 0.050 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\,min}) / 0.02]\ \Omega$ current 3-wire: R_{max} = 500 Ω voltage 3-wire: R_{min} = 10 kΩ		
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year		
Response time [2]	< 5 msec.		

Thermal errors (Offset and Span - standard)

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

Thermal errors (Offset and Span - optional for -20 ... 50 °C)

Nominal pressure gauge P_N [bar]	≤ 0.25	≤ 0.4	≤ 1.0	> 1.0
Tolerance band [% FSO]	≤ ± 2	≤ ± 1.5	≤ ± 1	≤ ± 0.75
TC, average [% FSO / 10 K]	± 0.3	± 0.2	± 0.1	± 0.07
in compensated range [°C]	-20 ... 50			

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-LMP 331	zone 0 [3]: II 1 G Ex ia IIC T4 zone 20: II 1 D Ex tD A20 IP 65 T 85°C safety technical maximum values: V_i = 28 V, I_i = 93 mA, P_i = 660 mW; C_i ≤ 1nF, L_i ≤ 10 µH

Permissible temperatures

Medium	-25 ... 125 °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		

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

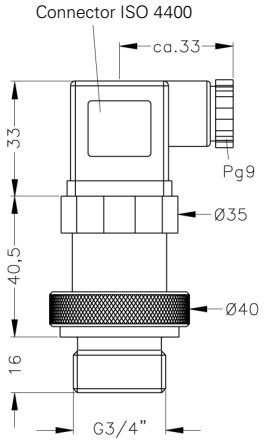
[2] with optional accuracy 0.1 % FSO the response time is 200 msec

[3] approved for atmospheric pressure from 0.8 bar up to 1.1 bar

Mechanical stability

Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 msec

Mechanical connection (dimensions in mm)

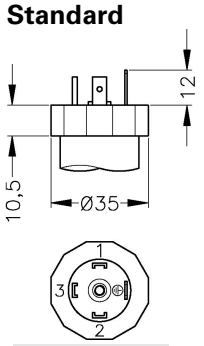


G3/4“ flush DIN 3852

⇨ Total length of devices with Ex-protection increases by 16 mm!
⇨ Total length of devices with accuracy 0.1 % FSO IEC 60770 increases by 42.5 mm! (standard and Ex-protection)

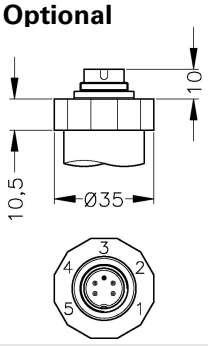
Electrical connection (dimensions in mm)

Standard

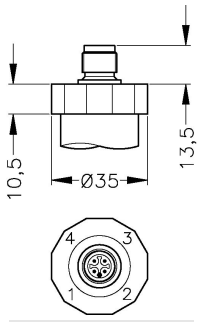


ISO 4400 (IP 65)

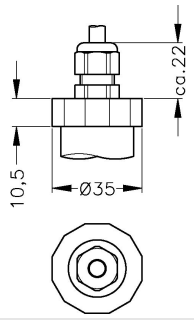
Optional



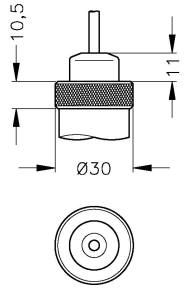
Binder Series 723 (IP 67)



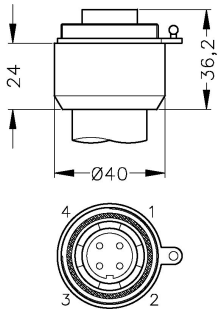
M12x1 4-pin (IP 67)



Cable gland (IP 67) [4, 5]



Cable outlet (IP 68) [4]



Buccaneer (IP 68) [6]

[4] different cable types and lengths available
[5] standard: 2 m PVC cable (without ventilation tube), optionally cable with ventilation tube
[6] cable with ventilation tube required

Materials

Pressure port	stainless steel 1.4571 (316Ti) / others on request
Housing	stainless steel 1.4301 (304)
Seals (media wetted)	FKM / EPDM / others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

Miscellaneous

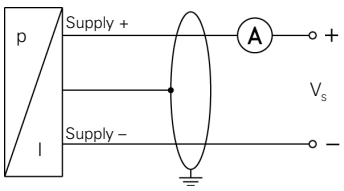
Optionally SIL 2 application	according to IEC 61508 / IEC 61511
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1 µH/m
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 200 g
Installation position	any [7]
Operational life	> 100 x 10^6 cycles

Pin configuration

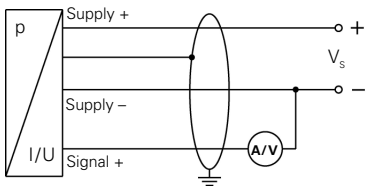
Electrical connection		ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	Cable colours (DIN 47100)
2-wire-system	Supply +	1	3	1	1	white
	Supply –	2	4	2	2	brown
	Ground	ground pin	5	4	4	yellow / green (shield)
3-wire-system	Supply +	1	3	1	1	white
	Supply –	2	4	2	2	brown
	Signal +	3	1	3	3	green
	Ground	ground pin	5	4	4	yellow / green (shield)

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)



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

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BD|SENSORS® pressure measurement

Ordering code LMP 331

LMP 331 ☐☐☐-☐☐☐☐-☐-☐-☐-☐-☐☐☐-☐-☐☐☐

Pressure			Code	
		in bar	4 3 0	
		in mH_2O	4 3 1	

Input	$[mH_2O]$	[bar]	Code	
	1	0,10	1 0 0 0	
	1,6	0,16	1 6 0 0	
	2,5	0,25	2 5 0 0	
	4	0,40	4 0 0 0	
	6	0,60	6 0 0 0	
	10	1,0	1 0 0 1	
	16	1,6	1 6 0 1	
	25	2,5	2 5 0 1	
	40	4,0	4 0 0 1	
	60	6,0	6 0 0 1	
	100	10	1 0 0 2	
	160	16	1 6 0 2	
	250	25	2 5 0 2	
	400	40	4 0 0 2	
		customer	9 9 9 9	on request

Pressure port	Code	
Stainless steel 1.4571 (316Ti)	1	
customer	9	on request

Diaphragm	Code	
Stainless steel 1.4435 (316L)	1	
customer	9	on request

Output	Code	
4 ... 20 mA / 2-wire	1	
0 ... 20 mA / 3-wire	2	
0 ... 10 V / 3-wire	3	
Intrinsic safety 4 ... 20 mA / 2-wire	E	
SIL2 4 ... 20 mA / 2-wire	1S	
SIL2 with Intrinsic safety 4 ... 20 mA / 2-wire	ES	
customer	9	on request

Seals	Code	
FKM	1	
EPDM	3	
customer	9	on request

Electrical connection	Code	
Male and female plug ISO 4400	1 0 0	
Binder series 723 (5-pin)	2 0 0	
Cable gland incl. cable [1, 2]	4 0 0	
Cable outlet [1]	T R 0	
Male plug Buccaneer IP68 [3]	5 0 0	
M12x1 (4-pin)	M 0 0	
customer	9 9 9	on request

Accuracy		Code	
standard for $P_N > 0,4$ bar	0,35 %	3	
standard for $P_N \leq 0,4$ bar	0,5 %	5	
option for $P_N > 0,4$ bar	0,25 %	2	
option for $P_N \geq 0,16$ bar	0,1 %	1	
customer		9	on request

Special version	Code	
standard	0 0 0	
special compensation -20 ... 50 °C	0 0 6	on request
customer	9 9 9	on request

[1] different cable types and lengths deliverable
[2] standard: 2 m PVC cable without ventilation tube
[3] for gauge pressure cable with ventilation tube required

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