BD|SENSORS
pressure measurement

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
  of offset, span and damping

Optional versions

► IS-versions
  Ex ia = intrinsically safe for gases and
  dusts

► adjustment of nominal pressure
  gauges (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 analog digital converter. Consequently it is possible to conduct an active compensation and the transmitters with excellent maesurements and exeptionally attractive price to offer on the market.
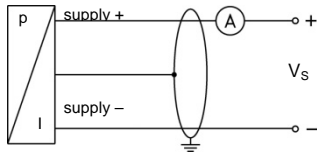
Preferred areas of use are

Chemical / petrochemical industry
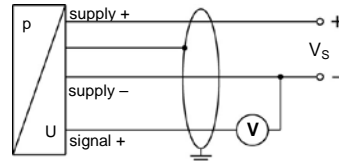
Environmental Engineering
(water / sewage / recycling)

CE   Ex   IEC   IECEx   RoHS   REACH

Pressure ranges LMP 331 i [1]

Nominal pressure gauge / absolute	[bar]	0.4	1	2	4	10	20	40
Level gauge	[mH$_2$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	80	120	210

[1] 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_S = 12 ... 36 V_{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 14 ... 28 V_{DC}
Options analog signal	2-wire: 4 ... 20 mA with communication interface [2]
	3-wire: 0 ... 10 V / V_S = 14 ... 36 V_{DC}
	0 ... 10 V with communication interface [2]

[2] only possible with el. connection Binder series 723 (7-pin)

Performance

Accuracy	IEC 60770 [3]: ≤ ± 0.1 % FSO

performance after turn-down
  - TD ≤ 1:5
  - TD > 1:5
	no change of accuracy [4]
	
	for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 4):
	≤ ± [0.1 + 0.015 x turn-down] % FSO
	with turn-down = nominal pressure range / adjusted range
	e.g. with a turn-down of 1:10 following accuracy is calculated:
	≤ ± (0.1 + 0.015 x 10) % FSO i.e. accuracy is ≤ ± 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 kΩ
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions
Response time	approx. 5 msec
Adjustability	configuration of following parameters possible (interface / software necessary [5]): - electronic damping: 0 ... 100 sec - offset: 0 ... 90 % FSO - turn down of span: max. 1:10

[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[4] except nominal pressure ranges ≤ 0 .40 bar; for these calculation of accuracy is as follows:
 ≤ ± (0.1 + 0.02 x turn-down) % FSO e.g. turn-down of 1:3: ≤ ± (0.1 + 0.02 x 3) % FSO i.e. accuracy is ≤ ± 0.16 % FSO
[5] software, interface, and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)

Thermal effects (Offset and Span) / Permissible temperatures

Tolerance band [% FSO]	≤ ± (0.2 x turn-down)	in compensated range	-20 ... 80 °C
TC, average [% FSO / 10 K]	± (0.02 x turn-down)	in compensated range	-20 ... 80 °C
Permissible temperatures	medium: -25 ... 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

Materials

Pressure port	stainless steel 1.4404 (316 L)
Housing	stainless steel 1.4404 (316 L)
Seals	FKM others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

Mechanical stability

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

Explosion protection (only for 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 Gazone 20: II 1D Ex ia IIIC T 85°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 µH, the supply connections have an inner capacity of max. 27 nF to the housing
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -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: 1µH/m

Miscellaneous

Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 200 g
Installation position	any [6]
Operational life	> 100 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

[6] 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_N ≤ 1 bar.

Wiring diagrams
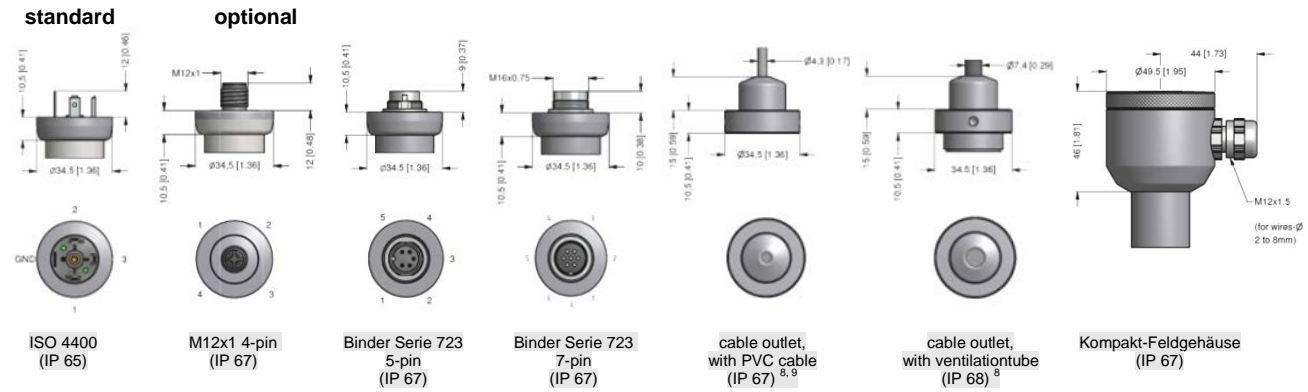
2-wire-system (current)

3-wire-system (voltage)

Pin configuration

Electrical connections		ISO 4400	Binder 723 (5-pin)	Binder 723 (7-pin)	M12x1/ metal (4-pin)	field housing	cable colours (IEC 60757)
	supply +	1	3	3	1	IN +	wh (white)
	supply –	2	4	1	2	IN –	bn (brown)
	signal + (only for 3-wire)	3	1	6	3	OUT +	gn (green)
	shield	ground pin	5	2	4	⏚	gnye (green-yellow)
Communication interface [7]	RxD	-	-	4	-	-	-
	TxD	-	-	5	-	-	-
	GND	-	-	7	-	-	-

[7] may not be transmitted directly with the PC (the suitable adapter is available as accessory)

Electrical connections (dimensions in mm / inch)

standard   **optional**

ISO 4400 (IP 65)	M12x1 4-pin (IP 67)	Binder Serie 723 5-pin (IP 67)	Binder Serie 723 7-pin (IP 67)	cable outlet, with PVC cable (IP 67) [8, 9]	cable outlet, with ventilationtube (IP 68) [8]	Kompakt-Feldgehäuse (IP 67)

⇨   **universal-Fieldhousing stainless steel 316L with cable gland M20x1,5 (ordering code 880) and other versions on request**

[8] different cable types and lengths available, permissible temperature depends on kind of cable
[9] standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

Mechanical connection (dimensions in mm / inch)

standard   **with RS232**   **pressureport**

G3/4" DIN 3852 with flush sensor

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Ordering code LMP 331i

LMP 331i □□□ - □□□□ - □ - □ - □□□ - □□□ - □ - □□□

Pressure															
in bar	4	3	0												
in mH₂O	4	3	1												

Input	[mH₂O]	[bar]													
	4	0.40	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	4	0	0	2									
	customer		9	9	9	9									consult

Output		
4 … 20 mA / 2-wire	1	
Intrinsic safety 4 … 20 mA / 2-wire	E	
0 … 10 V / 3-wire	3	
customer	9	consult

Accuracy (at nominal pressure)		
0.1 %	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	
Compact field housing stainless steel 1.4404 (316L)	8	5	0	
Male and female plug Binder series 723 (7-pin)	A	0	0	
Male plug M12x1 (4-pin) / metal for analog output	M	1	0	
Male plug M12x1 (4-pin) / metal for digital output	M	1	3	
Cable outlet with PVC cable [1]	T	A	0	
Cable outlet [2]	T	R	0	
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	
customer	9	consult

Special version				
standard	1	1	1	
RS-232 interface [8]	1	2	1	
customer	9	9	9	consult

[1] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70 °C), optionally cable with ventilation tube

[2] cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable

[3] RS-232 interface only possible with el. connection Binder serie 723 (7pin)

Software, Interface and cable for LMP 331i with option RS-232 have to be order separately

(Ordering code: CIS-G; Software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or newer and XP)

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