

DMP 331Pi

Precision Pressure Transmitter

pressure ports and
process connections with
flush welded stainless steel diaphragm

accuracy according to IEC 60770:
0.1 % FSO



Nominal pressure

from 0 ... 400 mbar up to 0 ... 40 bar

Output signals

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

Product characteristics

- ▶ excellent temperature response
0.04 % FSO / 10K
- ▶ turn-down 1:10
- ▶ processing of the sensor signal using
digital electronics
- ▶ process connections suitable for hy-
gienic application
- ▶ vacuum resistant

Optional versions

- ▶ IS-version
Ex ia = intrinsically safe for gases and
dusts
- ▶ communication interface for adjustment
of offset, span and damping

The precision pressure transmitter DMP 331Pi demonstrates the further development of well-tried industrial pressure transmitter DMP 331P.

The signal from the specially designed piezoresistive stainless steel sensor is processed by the newly developed digital electronic system, performing thus an active compensation of sensor-specific deviations such as hysteresis, thermal errors and non-linearity.

The temperature range of -40 ... 125 °C can be extended by the integration of a cooling element up to 300 °C.

Preferred areas of use are



Laboratory techniques



Food and beverage



Pharmaceutical industry



74-06

Pressure ranges ¹								
Nominal pressure gauge / absolute ²	[bar]	0.4	1	2	4	10	20	40
Overpressure	[bar]	2	5	10	20	40	80	105
Burst pressure ≥	[bar]	3	7,5	15	25	50	120	210
Vacuum resistance		P _N ≥ 1 bar: unlimited vacuum resistance P _N < 1 bar: on request						
¹ On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.								
² absolut pressure permissible from 1 bar								
Vacuum ranges								
Nominal pressure	[bar]	-0.4 ... 0.4	-1 ... 1	-1 ... 2	-1 ... 4	-1 ... 10		
Overpressure	[bar]	2	5	10	20	40		
Burst pressure ≥	[bar]	3	7.5	15	25	50		
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		2-wire: 4 ... 20 mA with communication interface ³ 3-wire: 0 ... 10 V / V _S = 14 ... 36 V _{DC} 0 ... 10 V with communication interface ³						
³ only possible with el. connection Binder series 723 (7-pin)								
Performance								
Accuracy ⁴		IEC 60770: ≤ ± 0.1 % FSO						
performance after turn-down		no change of accuracy ⁵ for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 5): ≤ ± [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] 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 x turn-down) % FSO / year						
Response time		< 5 msec						
Adjustability		configuration of following parameters possible (interface / software necessary ⁶): - electronic damping: 0 ... 100 sec - offset: 0 ... 90 % FSO - turn down of span: max. 1:10						
⁴ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)								
⁵ 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								
⁶ 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 ⁷ (Offset and Span) / Permissible temperatures								
Tolerance band [% FSO]		≤ ± (0.35 x turn-down)		in compensated range 0 ... 80 °C				
TC, average [% FSO / 10 K]		≤ ± (0.035 x turn-down)		in compensated range 0 ... 80 °C				
Permissible temperatures ⁸		medium: -40 ... 125 °C for filling fluid silicon oil -40 ... 125 °C for filling fluid food compatible oil electronics / environment: -25 ... 85 °C storage: -40 ... 100 °C						
Permissible temperature medium for cooling element 300°C		filling fluid silicon oil		overpressure: -40 ... 300 °C		vacuum: -40 ... 150 °C ⁹		
		filling fluid food compatible oil		overpressure: -10 ... 250 °C		vacuum: -10 ... 150 °C ⁹		
⁷ an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.								
⁸ max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C								
⁹ also for P _{abs} ≤ 1 bar								
Electrical protection								
Short-circuit protection		permanent						
Reverse polarity protection		no damage, but also no function						
Electromagnetic compatibility		emission and immunity according to EN 61326						
Filling fluids								
Standard		silicon oil						
Options		food compatible oil with FDA approval (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request						
Mechanical stability								
Vibration (DIN EN 60068-2-6)		G 1/2": 20 g RMS (25 ... 2000 Hz);			others except G 1/2": 10 g RMS (25 ... 2000 Hz)			
Shock (DIN EN 60068-2-27)		G 1/2": 500 g / 1 msec;			others except G 1/2": 100 g / 1 msec			

Materials		
Pressure port	stainless steel 1.4404 (316 L)	others on request
Housing	stainless steel 1.4404 (316 L)	
Option compact field housing	stainless steel 1.4305 (303), cable gland brass, nickel plated	others on request
Seals (O-ring)	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures > 200 °C) others on request clamp and dairy pipe: without	
Diaphragm	standard: stainless steel 1.4435 (316L) option: Hastelloy® C-276 (2.4819) and Tantalum on request	
Media wetted parts	pressure port, diaphragm	

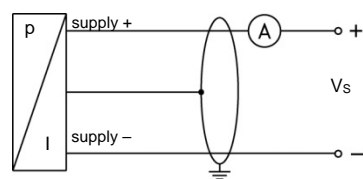
Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approvals DX9-DMP 331Pi	IBExU10ATEX1122 X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da	
Safety technical maximum values	U _i = 28 V, I _i = 93 mA, P _i = 660 mW, C _i ≈ 0 nF, L _i ≈ 0 μH, the supply connections have an inner 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 ... 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		
Current consumption	signal output current: max. 25 mA	signal output voltage: max. 7 mA
Weight	approx. 200 g	
Installation position	any ¹⁰	
Operational life	> 100 x 10 ⁶ pressure cycles	
CE-conformity	EMC Directive: 2014/30/EU	
ATEX Directvie	2014/34/EU	

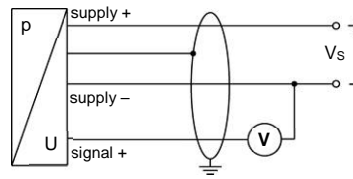
¹⁰ Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges P_N ≤ 1 bar.

Wiring diagrams

2-wire-system (current)



3-wire-system (voltage)



Pin configuration

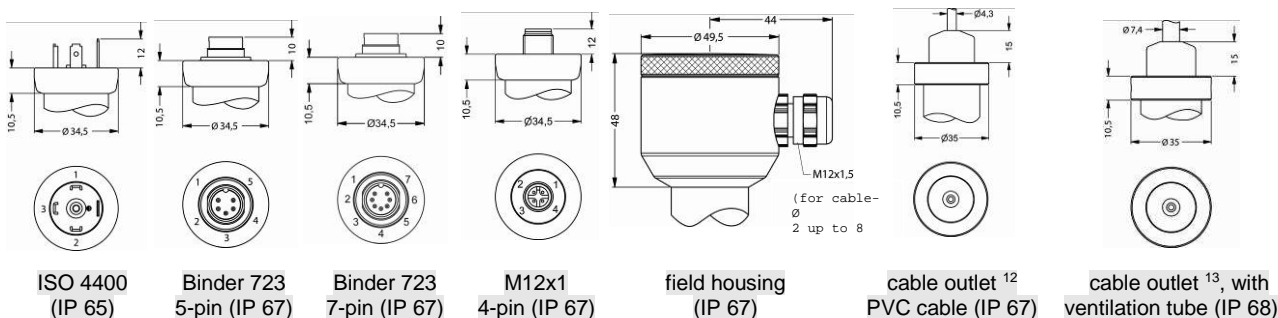
Electrical connections	ISO 4400	Binder 723 (5-pin)	Binder 723 (7-pin)	M12x1/ metal (4-pin)	field housing	cable colours (IEC 60757)
Supply +	1	3	3	3	IN +	wh (white)
Supply -	2	4	1	1	IN -	bn (brown)
Signal + (only for 3-wire)	3	1	6	-	OUT +	gr (green)
shield	ground pin	5	2	4	⏏	ye/gn yellow / green
Communication interface ¹¹						
RxD	-	-	4	-	-	-
TxD	-	-	5	-	-	-
GND	-	-	7	-	-	-

¹¹ may not be connected directly with the PC (the suitable adapter is available as accessory)

Electrical connections (dimensions in mm)

standard

option

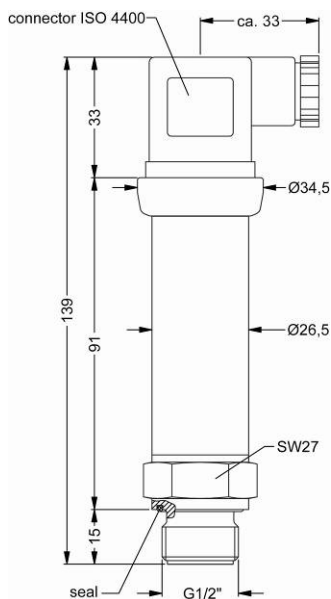


¹² standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)

¹³ different cable types and lengths available, permissible temperature depends on kind of cable

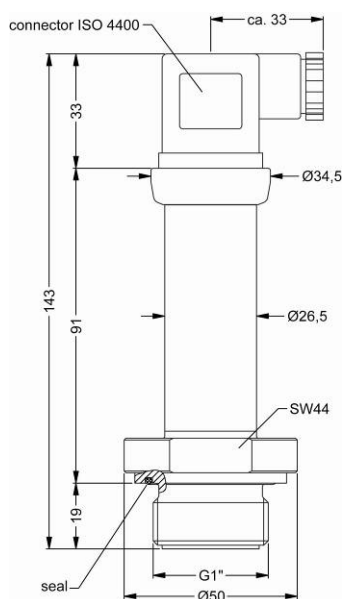
Mechanical connection (dimensions in mm)

standard

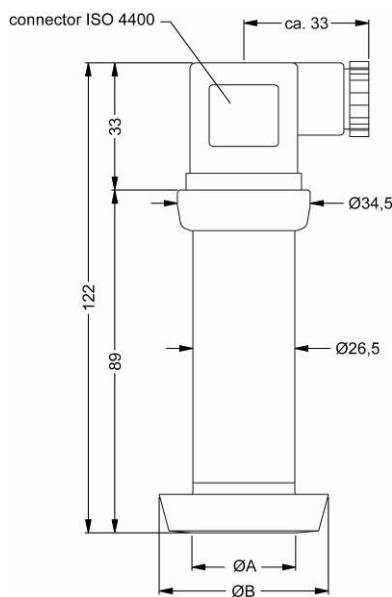


G1/2" flush DIN 3852

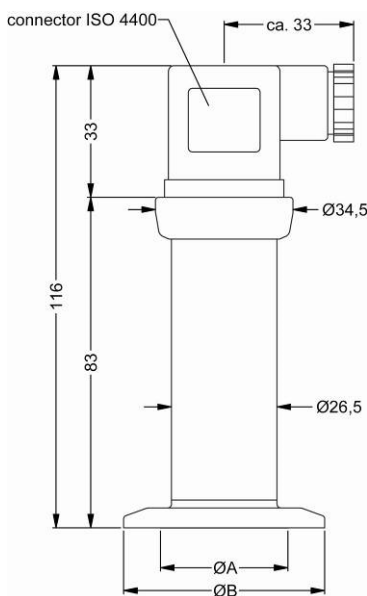
option



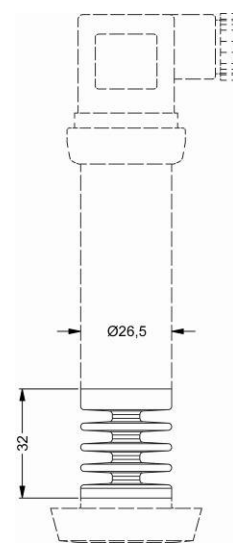
G1" flush DIN 3852



dairy pipe (DIN 11851)



Clamp (DIN 32676)



cooling element up to 300 °C

dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
P_N [bar]	≤ 40	≤ 40	≤ 25

dimensions in mm			
size	DN 25	DN 32	DN 50
A	23	32	45
B	50.5	50.5	64
P_N [bar]	≤ 16	≤ 16	≤ 16

⇒ metric threads and others on request

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