

# 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 hygienic application
- ▶ vacuum resistant

### Optional versions

- ▶ IS-version (on request)  
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

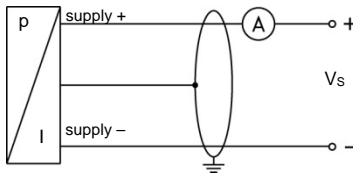
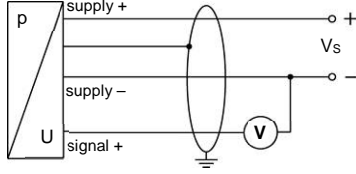
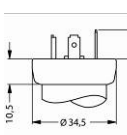
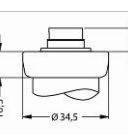
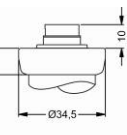
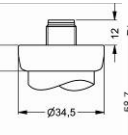
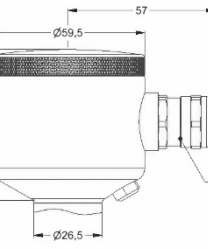
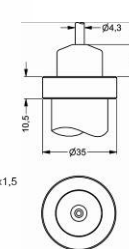
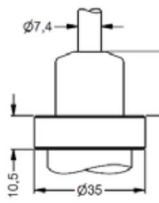


Pharmaceutical industry



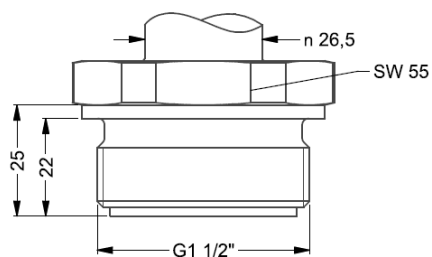
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Pressure ranges <sup>1</sup>								
Nominal pressure gauge / absolute <sup>2</sup>	[bar]	0.4	1	2	4	10	20	40
Overpressure	[bar]	2	5	10	20	40	80	105
Burst pressure ≥	[bar]	3	7,5	15	25	50	120	210
Vacuum resistance		P <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance P <sub>N</sub> < 1 bar: on request						
<sup>1</sup> On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.								
<sup>2</sup> 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 <sub>S</sub> = 12 ... 36 V <sub>DC</sub>							
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>							
Options	2-wire: 4 ... 20 mA with communication interface <sup>3</sup>							
	3-wire: 0 ... 10 V / V <sub>S</sub> = 14 ... 36 V <sub>DC</sub>							
	0 ... 10 V with communication interface <sup>3</sup>							
<sup>3</sup> only possible with el. connection Binder series 723 (7-pin)								
Performance								
Accuracy <sup>4</sup>	IEC 60770: ≤ ± 0.1 % FSO							
performance after turn-down	no change of accuracy <sup>5</sup>							
- TD ≤ 1:5	for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 5):							
- TD > 1:5	≤ ± [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 <sub>max</sub> = [(V <sub>S</sub> – V <sub>S</sub> min) / 0.02 A] Ω voltage 3-wire: R <sub>min</sub> = 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 <sup>6</sup> ):							
	- electronic damping: 0 ... 100 sec							
	- offset: 0 ... 90 % FSO							
	- turn down of span: max. 1:10							
<sup>4</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)								
<sup>5</sup> 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								
<sup>6</sup> 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 <sup>7</sup> (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 <sup>8</sup>	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 <sup>9</sup>			
	filling fluid food compatible oil		overpressure: -10 ... 250 °C		vacuum: -10 ... 150 °C <sup>9</sup>			
<sup>7</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.								
<sup>8</sup> max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C								
<sup>9</sup> also for P <sub>abs</sub> ≤ 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							

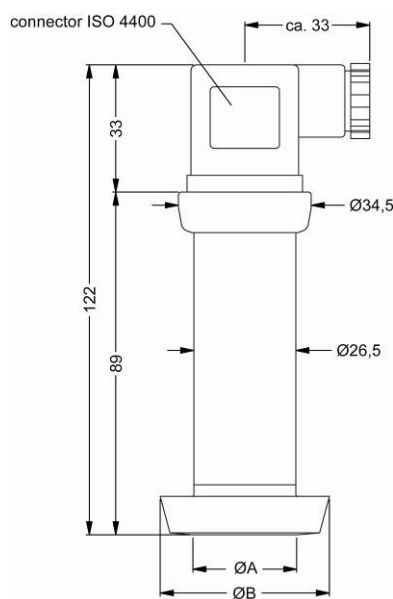
Materials							
Pressure port	stainless steel 1.4404 (316 L) others on request						
Housing	stainless steel 1.4404 (316 L)						
Option field housing	stainless steel 1.4301 (304), cable gland M16x 1.5 brass, nickel plated (clamping range 2....8 mm)						
Seals (O-ring)	standard: FKM (recommended for 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	IBExU10ATEX1122 X						
DX9-DMP 331Pi	zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 135°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						
Ambient temperature range	in zone 0: -20 ... 60 °C with p <sub>atm</sub> 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: 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 <sup>10</sup>						
Operational life	100 million load cycles						
CE-conformity	EMC Directive: 2014/30/EU						
ATEX Directive	2014/34/EU						
<sup>10</sup> 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 <sub>N</sub> ≤ 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 in- terface <sup>11</sup>	RxD	-	4	-	-	-	
	TxD	-	5	-	-	-	
	GND	-	7	-	-	-	
<sup>11</sup> may not be connected directly with the PC (the suitable adapter is available as accessory)							
Electrical connections (dimensions in mm)							
standard		option					
							
ISO 4400 (IP 65)	Binder 723 5-pin (IP 67)	Binder 723 7-pin (IP 67)	M12x1 4-pin (IP 67)	field housing (IP 67)	cable outlet <sup>12</sup> PVC cable (IP 67)	cable outlet <sup>13</sup> , with ventilation tube (IP 68)	
<sup>12</sup> standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C)							
<sup>13</sup> different cable types and lengths available, permissible temperature depends on kind of cable							

**Mechanical connection (dimensions in mm)**

**standard**



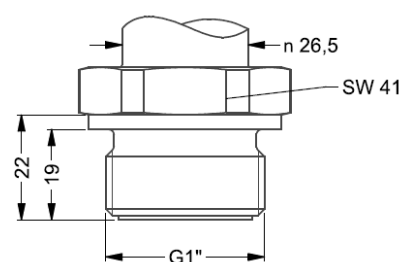
G1/2" flush DIN 3852



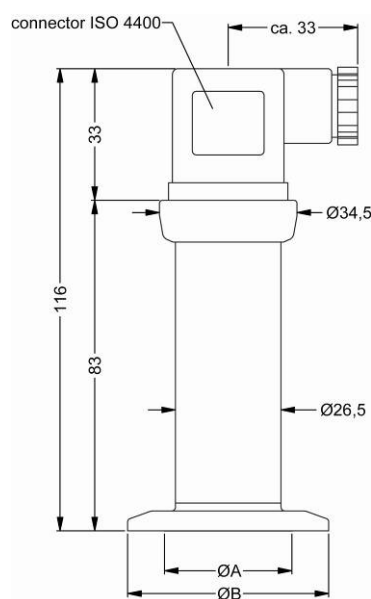
dairy pipe (DIN 11851)

dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
P <sub>N</sub> [bar]	≤ 40	≤ 40	≤ 25

**option**

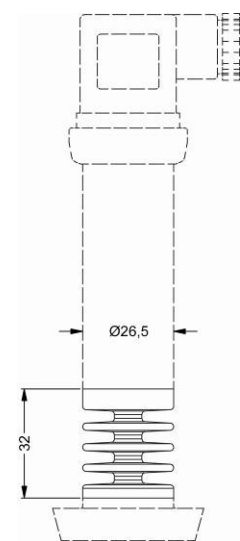


G1" flush DIN 3852



Clamp (DIN 32676)

dimensions in mm			
size	DN 25	DN 32	DN 50
A	23	32	45
B	50.5	50.5	64
P <sub>N</sub> [bar]	≤ 16	≤ 16	≤ 16



cooling element up to 300 °C

⇒ metric threads and others on request

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Ordering code DMP 331Pi

3.4.2020

DMP 331 Pi


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Pressure														
Gauge	5	0	0											
Absolute	5	0	1											
Input [bar]														
0 ... 0,4				4	0	0	0							
0 ... 1				1	0	0	1							
0 ... 2				2	0	0	1							
0 ... 4				4	0	0	1							
0 ... 10				1	0	0	2							
0 ... 20				2	0	0	2							
0 ... 40				4	0	0	2							
-0,4... 0,4				S	4	0	0							
-1 ... 0 (temperature max. 70°C)				X	1	0	2							
-1 ... 1 (temperature max. 70°C)				S	1	0	2							
-1 ... 2 (temperature max. 70°C)				V	2	0	2							
-1 ... 4 (temperature max. 70°C)				V	4	0	2							
-1 ... 10 (temperature max. 70°C)				V	1	0	3							
Customer				9	9	9	9							
Customer - underpressure (temperature max. 70°C)				X	X	X	X							
Output														
4...20 mA / 2-wire								1						
0 ... 10 V / 3-wire								3						
Intrinsic safety Ex ia 4 ... 20 mA / 2-wire								E						
Customer								9						
Accuracy														
0,1 % - standard range									1					
0,1 % - standard range including Calibration Certificate									P					
0,1 % - customer range									I					
0,1 % - customer range including Calibration Certificate									H					
0,2 % (P <sub>N</sub> < 0,1 bar)									B					
Customer									9					
Electrical connection														
Connector DIN 43650 (ISO 4400) (IP 65)									1	0	0			
Connector Binder 723 5-pin (IP 67)									2	0	0			
Cable gland PG7 / cable length specify (IP 67)									4	0	0			
+ PVC cable / 1 m														
Connector Buccaneer (IP 68)									5	0	0			
Field housing stainless steel, cable gland M 16 x 1,5 (IP 67)									8	0	0			
Field housing stainless steel, cable gland M 20 x 1,5 (IP 67)									8	8	0			
Connector Binder 723 7-pin (IP 67) (for RS 232)									A	0	0			
Connector DIN 43650 (ISO 4400) - Potting compound inside (IP 67)									E	0	0			
Connector M12 x 1, 4-pin (IP 67)									M	0	0			
Connector M12 x 1, 4-pin (IP 67) - metal									M	1	0			
Cable outlet, cable with ventilation tube (IP68)									T	R	0			
+ PVC cable / 1 m														
Customer									9	9	9			
Mechanical connection														
G 1/2" DIN 3852 (P <sub>N</sub> > 2,5 bar) (only with seals)										Z	0	0		
M 20 x 1,5 DIN 3852 (P <sub>N</sub> > 2,5 bar) (only with seals)										D	0	4		
G 3/4" DIN 3852 (P <sub>N</sub> > 0,6 bar) (only with seals)										Z	3	0		
G 1" DIN 3852 (P <sub>N</sub> > 0,25 bar) (only with seals)										Z	3	1		
G 1 1/2" DIN 3852 (only with seals)										Z	3	3		
G 2" DIN 3852										Z	3	4		
G 1" DIN 3852 flush 2x O ring (P <sub>N</sub> > 0,25 bar)										Z	5	7		
G 1/2" DIN 3852 flush 2x O ring (P <sub>N</sub> > 1 bar)										Z	6	1		
1/8" - 27 NPT (without seals, monel pressure port, tantal membrane)										Z	9	2		
G1" cone seal (without seals)										K	3	1		
Clamp DN 1" (DN 25) (P <sub>N</sub> > 0,6 bar) (without seals)										C	6	1		
Clamp DN 1 1/2" (DN 32) (P <sub>N</sub> > 0,4 bar) (without seals)										C	6	2		
Clamp DN 2" (DN 50) (P <sub>N</sub> > 0,25 bar) (without seals)										C	6	3		



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The company BD SENSORS s.r.o. is certified by TÜV SÜD Czech according to the standard ISO 9001.

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DIN 11851 DN 25 (P <sub>N</sub> > 0,6 bar) (without seals)	M	7	3						
DIN 11851 DN 40 (P <sub>N</sub> > 0,4 bar) (without seals)	M	7	5						
DIN 11851 DN 50 (P <sub>N</sub> > 0,25 bar) (without seals)	M	7	6						
"sandwich" DN 25 (without seals)	S	6	1						
"sandwich" DN 50 (without seals)	S	7	6						
"sandwich" DIN 2501 DN 80 (without seals)	S	8	0						
M 22 x 1,5 DIN 3852 (P <sub>N</sub> > 2,5 bar) (only with seals)	D	1	5						
Flange DN 25/PN40 DIN 2501 (without seals)	F	2	0						
Flange DN 40/PN40 DIN 2501 (without seals)	F	2	2						
Flange DN 50/PN40 DIN 2501 (without seals)	F	2	3						
Flange DN 80/PN16 DIN 2501 (without seals)	F	1	4						
Flange DN 100/PN16 DIN 2501 (without seals)	F	2	5						
Varivent® DN 40/50 (without seals)	P	4	1						
Customer	9	9	9						
<b>Diaphragm</b>									
Stainless steel 1.4435 (316 L)				1					
Hastelloy® C-276				H					
Tantalum				T					
Customer				9					
<b>Seals</b>									
Without seals (Clamp, dairy pipe DIN, sandwich, flange, varivent)				0					
Viton (FKM)				1					
FFKM				7					
EPDM				3					
Customer				9					
<b>Filling Fluids</b>									
Silicone oil					1				
Edible oil for foodstuff industry (temperature max. 150°C)					2				
Halocarbon					C				
Customer					9				
<b>Special version</b>									
Standard							1	1	1
Communication RS 232							1	2	1
With cooling element for temp. up to 150°C							1	6	1
With cooling element for temp. up to 300°C (P <sub>N</sub> ≤ 70 bar max. 200°C permanent)							2	1	1
Communication RS 232 with cooling element (up to 300°C P <sub>N</sub> ≤ 70 bar max. 200°C)							2	2	1
Customer							9	9	9
3.1 Material Certificate for Membrane and Mechanical Connection							3.1 prot.		
Settings in temperature different from basic 20°C (+/-10°C, max. 70 bar and 200°C)									

0,...without additional charge

On request...in accordance with the producer

!!! When you make an order it is necessary to fill the questionnaire for transmitter with separators!!!

Surcharges for calibration are not subject to any discounts. Subject to change.

This document contains the specification for ordering the product; detailed technical parameters of the product and its possible variants are given in the data sheet.

BD SENSORS reserves the right to change sensor specifications without further notice.