

# DMP 331Pi

## Precision Pressure Transmitter

Pressure Ports and  
Process Connections with  
Flush Welded Stainless Steel Dia-  
phragm

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
- ▶ processing of the sensor signal  
using digital electronics
- ▶ process connections suitable for  
hygienic application
- ▶ vacuum resistant

### Optional versions




- ▶ IS-version
- ▶ cooling element for media  
temperatures up to 300 °C

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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Technical Data

Pressure ranges								
Nominal pressure gauge / absolute <sup>1</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> absolute pressure permissible 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-version	2-wire: 4 ... 20 mA / V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>							
Option	3-wire: 0 ... 10 V / V <sub>S</sub> = 14 ... 36 V <sub>DC</sub>							
Performance								
Accuracy <sup>2</sup>	≤ ± 0.1 % FSO							
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 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 % FSO / year at reference conditions							
Response time	current 2-wire: approx. 5 msec voltage 3-wire: 25 msec							
<sup>2</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)								
Thermal effects <sup>3</sup> (offset and span)								
Tolerance band [% FSO]	≤ ± 0.35							
TC, average [% FSO / 10 K]	≤ ± 0.035							
In compensated range	0 ... 80 °C							
<sup>3</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions								
Permissible temperatures								
Filling fluid	silicone oil			food compatible oil				
Medium <sup>4</sup>	-40 ... 125 °C			-10 ... 125 °C				
Medium with cooling element <sup>5</sup>	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C <sup>6</sup>			overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C <sup>6</sup>				
Electronics / environment	-25 ... 85 °C							
Storage	-40 ... 100 °C							
<sup>4</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>5</sup> max. temperature depends on the used sealing material, type of seal and installation								
<sup>6</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	silicone oil							
Options	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request							
Mechanical stability								
Vibration according to DIN EN 60068-2-6	G 1/2": 20 g RMS (25 ... 2000 Hz)			others: 10 g RMS (25 ... 2000 Hz)				
Shock according to DIN EN 60068-2-27	G 1/2": 500 g / 1 msec			others: 100 g / 1 msec				

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Technical Data

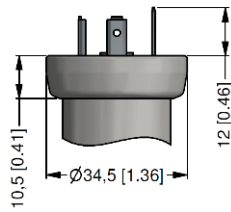
Materials					
Pressure port	stainless steel 1.4435 (316 L)		others on request		
Housing	stainless steel 1.4404 (316 L)				
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 ... 8 mm)				
Seals (O-ring)	standard: FKM (recommended for medium temperatures $\leq 200\text{ }^{\circ}\text{C}$ ) option: FFKM (recommended for medium temperatures $< 260\text{ }^{\circ}\text{C}$ )		others on request		
Diaphragm	standard: stainless steel 1.4435 (316L) option: Hastelloy <sup>®</sup> C-276 (2.4819) and Tantalum on request				
Media wetted parts	pressure port, diaphragm				
Explosion protection (for 4 ... 20 mA / 2-wire)					
Approvals DX19-DMP 331Pi	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 $^{\circ}\text{C}$ Da				
Safety technical maximum values	$U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ , $P_i = 660\text{ mW}$ , $C_i \approx 0\text{ nF}$ , $L_i \approx 0\text{ }\mu\text{H}$ , the supply connections have an inner capacity of max. 27 nF to the housing				
Permissible temperatures for environment	in zone 0: -20 ... 60 $^{\circ}\text{C}$ with $p_{\text{atm}}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-20 ... 65 $^{\circ}\text{C}$				
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 $\mu\text{H}/\text{m}$				
Miscellaneous					
EHEDG certificate Type EL Class I	EHEDG conformity is only ensured in combination with an approved seal. This is e.g. for - Clamp (C61, C62, C63): T-ring-seal from Combifit International B.V. - Varivent <sup>®</sup> (P41): EPDM-O-ring which is FDA-listed - dairy pipe (M73, M75, M76): ASEPTO-STAR k-flex upgrade seal by Kieselmann GmbH				
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA				
Surface roughness	pressure port $R_a < 0.8\text{ }\mu\text{m}$ (media wetted parts) diaphragm $R_a < 0.15\text{ }\mu\text{m}$ weld seam $R_a < 0.8\text{ }\mu\text{m}$				
Weight	approx. 200 g				
Installation position	any <sup>7</sup>				
Operational life	100 million load cycles				
CE-conformity	EMC Directive: 2014/30/EU				
ATEX Directive	2014/34/EU				
<sup>7</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 $p_N \leq 1\text{ bar}$ .					
Wiring diagrams					
2-wire-system (current)			3-wire-system (voltage)		
Pin configuration					
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1/ metal (4-pin)	compact field housing	cable colours (IEC 60757)
				$V_{S+}$ $V_{S-}$ S+ GND	
Supply +	1	3	1	$V_{S+}$	WH (white)
Supply -	2	4	2	$V_{S-}$	BN (brown)
Signal + (only for 3-wire)	3	1	3	S-	GN (green)
shield	ground pin $\oplus$	5	4	GND	GNYE (green-yellow)

# DMP 331Pi

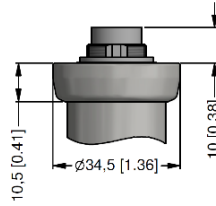
Precision Pressure Transmitter

Technical Data

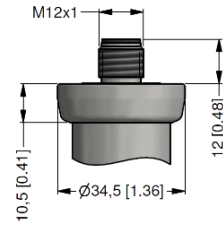
## Electrical connections (dimensions mm / in)



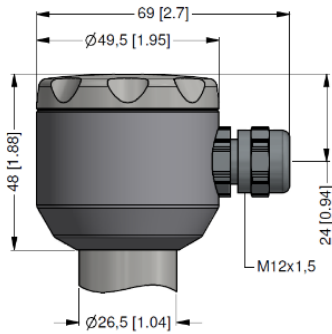
ISO 4400  
(IP 65)



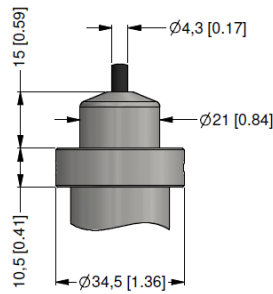
Binder series 723, 5-pin  
(IP 67)



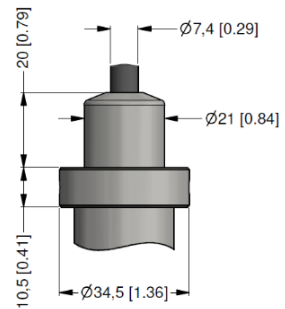
M12x1, 4-pin  
(IP 67)



compact field housing  
(IP 67)



cable outlet  
with PVC cable  
(IP 67)<sup>8</sup>



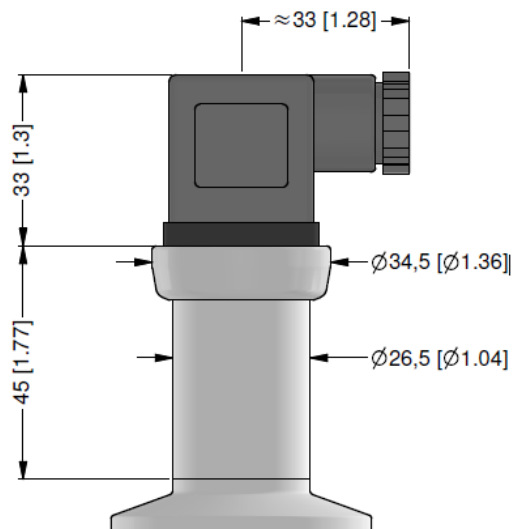
cable outlet,  
cable with ventilation tube  
(IP 68)<sup>9</sup>

⇒ universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880) and other versions on request

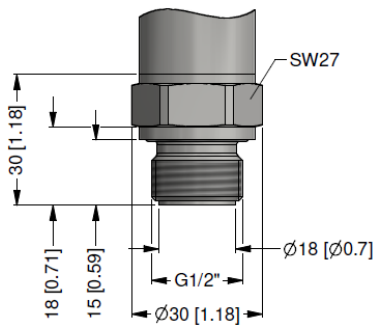
<sup>8</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

<sup>9</sup> different cable types and lengths available, permissible temperature depends on kind of cable

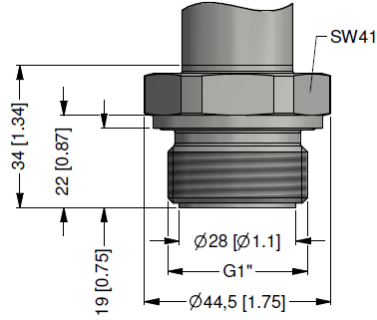
## Dimensions (mm / in)



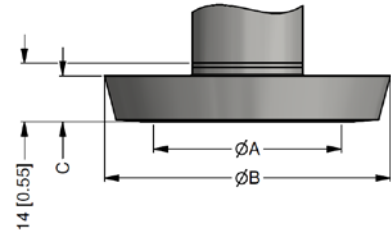
### Mechanical connection (dimensions mm / in)



G1/2" flush DIN 3852  
p<sub>N</sub> ≥ 1 bar

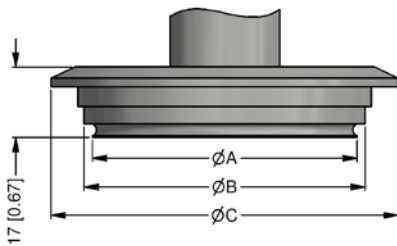


G1" flush DIN 3852



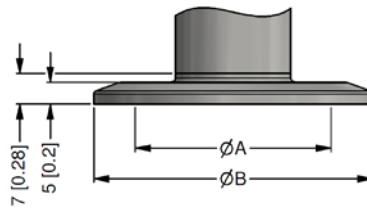
dairy pipe (DIN 11851)

dimensions in mm [in]			
size	DN 25	DN 40	DN 50
A	23 [0.91]	32 [1.26]	45 [1.77]
B	44 [1.73]	56 [2.20]	68.5 [2.70]
C	10 [0.39]	10 [0.39]	11 [0.43]
p <sub>N</sub> [bar]	≤ 40	≤ 40	≤ 25



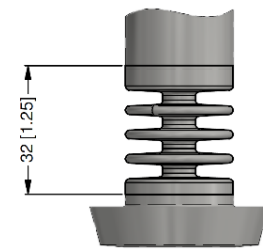
Varivent®  
p<sub>N</sub> ≤ 25 bar

dimensions in mm [in]	
size	DN 40/50
A	64 [2.52]
B	68 [2.68]
C	84 [3.31]



Clamp (DIN 32676)

dimensions in mm [in]			
size	DN 25	DN 32	DN 50
A	23.0 [0.91]	23.0 [0.91]	45 [1.77]
B	50.5 [1.99]	50.5 [1.99]	64 [2.52]
p <sub>N</sub> [bar]	0.25 ... 16	≤ 16	≤ 16



Cooling element up to 300 °C<sup>7</sup>  
(optionally)

↪ metric threads and others on request

<sup>10</sup> max. temperature depends on the used sealing material, type of seal and installation

