

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
- ▶ 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 ¹	[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 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 _S = 12 ... 36 V _{DC}							
Option IS-version	2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC}							
Option	3-wire: 0 ... 10 V / V _S = 14 ... 36 V _{DC}							
Performance								
Accuracy ²	≤ ± 0.1 % 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 % FSO / year at reference conditions							
Response time	current 2-wire: approx. 5 msec voltage 3-wire: 25 msec							
² accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)								
Thermal effects ³ (offset and span)								
Tolerance band [% FSO]	≤ ± 0.35							
TC, average [% FSO / 10 K]	≤ ± 0.035							
In compensated range	0 ... 80 °C							
³ 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 ⁴	-40 ... 125 °C			-10 ... 125 °C				
Medium with cooling element ⁵	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C ⁶			overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C ⁶				
Electronics / environment	-25 ... 85 °C							
Storage	-40 ... 100 °C							
⁴ max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C								
⁵ max. temperature depends on the used sealing material, type of seal and installation								
⁶ 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	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	20 g RMS / 10 ... 2000 Hz according to DIN EN 60068-2-6 10 g RMS / 10 ... 2000 Hz according to DIN EN 60068-2-6 (with cooling element)							
Shock	500 g / 1 msec half sine according to DIN EN 60068-2-27							

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Precision Pressure Transmitter

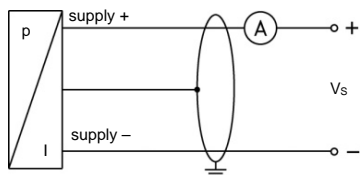
Technical Data

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 Clamp, dairy pipe, Varivent [®] : 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 (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: $-20 \dots 60\text{ }^{\circ}\text{C}$ with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: $-40/-20 \dots 65\text{ }^{\circ}\text{C}$
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 [®] (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 ⁷
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

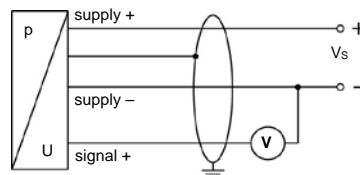
⁷ Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges $p_N \leq 1\text{ bar}$.

Wiring diagrams

2-wire-system (current)



3-wire-system (voltage)



Pin configuration

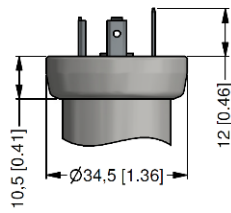
Electrical connections	ISO 4400	Binder 723 (5-pin)	M12x1/ metal (4-pin)	compact field housing	cable colours (IEC 60757)
Supply +	1	3	1	V_{S+}	WH (white)
Supply -	2	4	2	V_{S-}	BN (brown)
Signal + (only for 3-wire)	3	1	3	S-	GN (green)
shield	ground pin \oplus	5	4	GND	GNYE (green-yellow)

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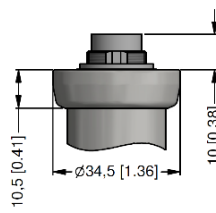
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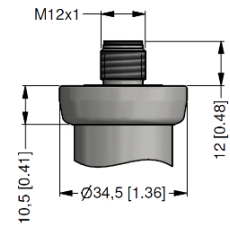
Electrical connections (dimensions mm / in)



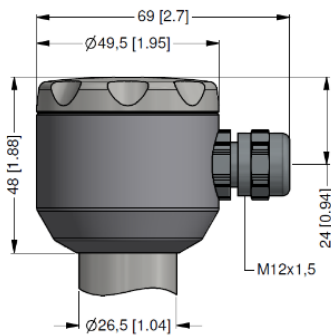
ISO 4400
(IP 65)



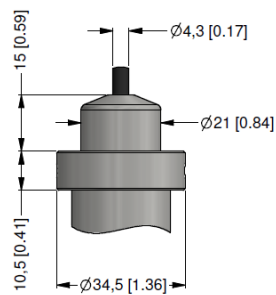
Binder series 723, 5-pin
(IP 67)



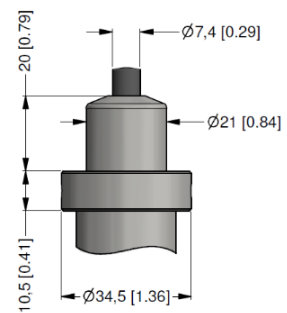
M12x1, 4-pin
(IP 67)



compact field housing
(IP 67)



cable outlet
with PVC cable
(IP 67)⁸



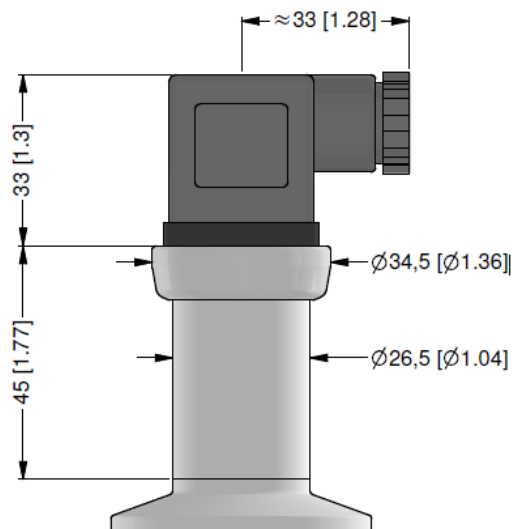
cable outlet,
cable with ventilation tube
(IP 68)⁹

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

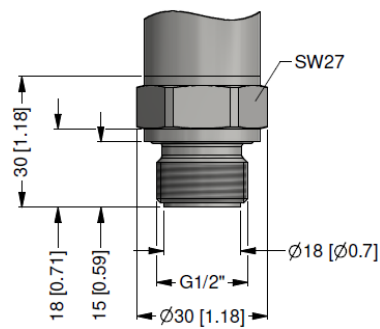
⁸ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

⁹ different cable types and lengths available, permissible temperature depends on kind of cable

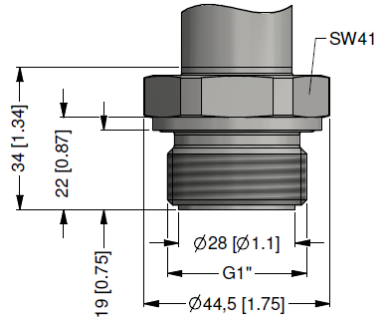
Dimensions (mm / in)



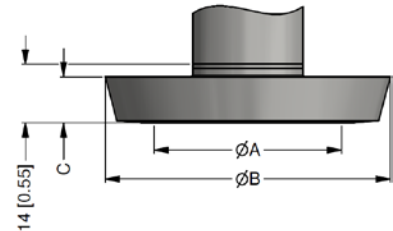
Mechanical connection (dimensions mm / in)



G1/2" flush DIN 3852
pN ≥ 1 bar

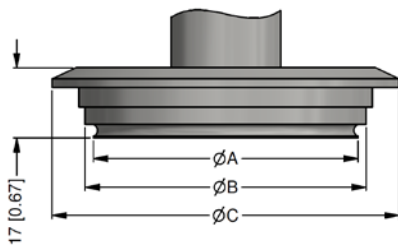


G1" flush DIN 3852



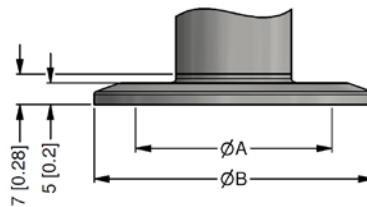
dairy pipe (DIN 11851)

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 [1.20]	68.5 [2.70]
C	10 [0.39]	10 [0.39]	11 [0.43]
pN [bar]	≤ 40	≤ 40	≤ 25



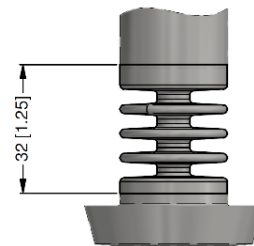
Varivent®
pN ≤ 25 bar

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]
pN [bar]	0.25 ... 16	≤ 16	≤ 16



Cooling element up to 300 °C⁷
(optionally)

⇒ metric threads and others on request

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

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