

DMP 331Pi

Precision Pressure Transmitter

Pressure Ports and Process Connections with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 61298-2:
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 61298-2 – 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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Technical Data

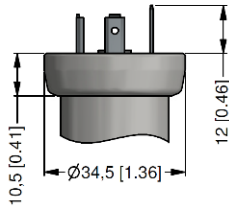
Materials					
Pressure port	stainless steel 1.4435 (316 L)		others on request		
Housing	stainless steel 1.4404 (316 L)				
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 ... 8 mm)				
Seals (O-ring)	standard: FKM (recommended for 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 [®] 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_{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 [®] (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)

DMP 331Pi

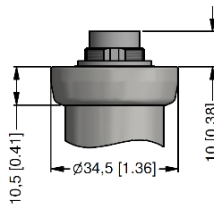
Precision Pressure Transmitter

Technical Data

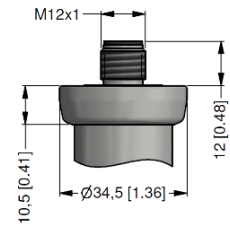
Electrical connections (dimensions mm / in)



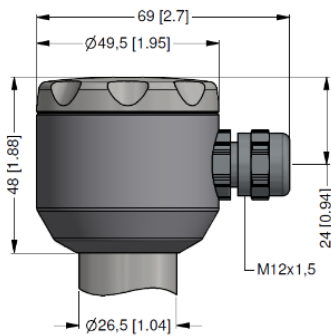
ISO 4400
(IP 65)



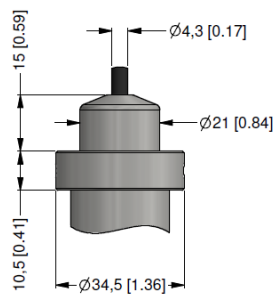
Binder series 723, 5-pin
(IP 67)



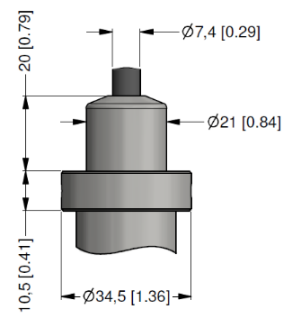
M12x1, 4-pin
(IP 67)



compact field housing
(IP 67)



cable outlet
with PVC cable
(IP 67)⁸



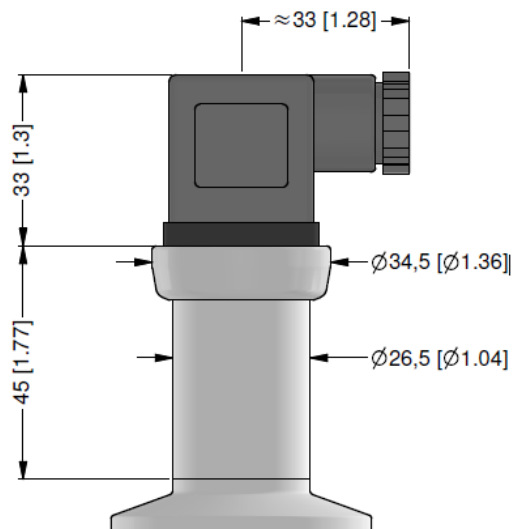
cable outlet,
cable with ventilation tube
(IP 68)⁹

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

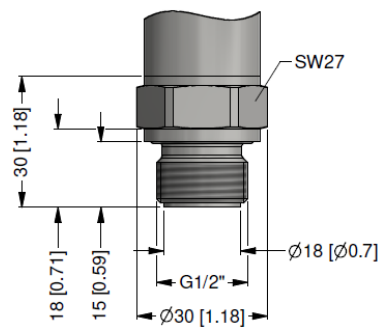
⁸ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

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

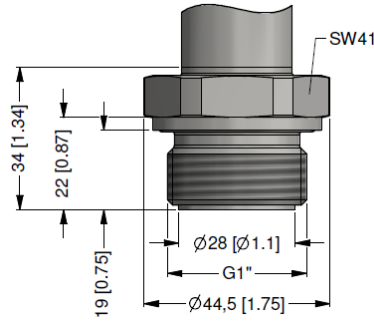
Dimensions (mm / in)



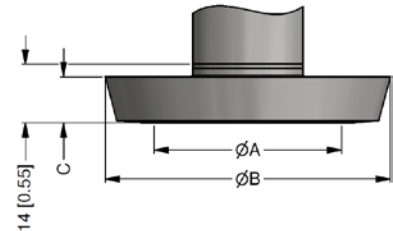
Mechanical connection (dimensions mm / in)



G1/2" flush DIN 3852
pN ≥ 1 bar

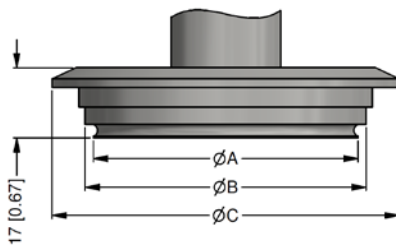


G1" flush DIN 3852



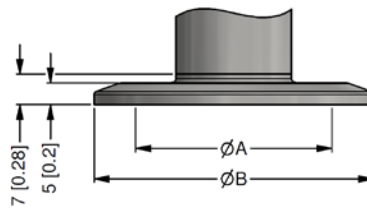
dairy pipe (DIN 11851)

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



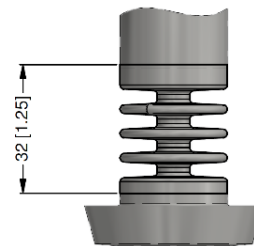
Varivent®
pN ≤ 25 bar

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

Ordering code DMP 331Pi

DMP 331Pi

□	□	□	□	□	□	□	□	□	□	□	□
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Pressure															
	gauge	5	0	0											
	absolute ¹	5	0	1											
Input															
	[bar]														
	0.4	1			4	0	0	0							
	1.0				1	0	0	1							
	2.0				2	0	0	1							
	4.0				4	0	0	1							
	10				1	0	0	2							
	20				2	0	0	2							
	40				4	0	0	2							
	-0.40 ... 0.40				S	4	0	0							
	-1 ... 1				S	1	0	2							
	-1 ... 2				V	2	0	2							
	-1 ... 4				V	4	0	2							
	-1 ... 10				V	1	0	3							
	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															
	0.1 % FSO							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					
	cable outlet with PVC cable (IP67) ²							T	A	0					
	cable outlet,														
	cable with ventilation tube (IP68) ³							T	R	0					
	male plug M12x1 (4-pin) / metal							M	1	0					
	compact field housing														
	stainless steel 1.4301 (304) ⁴							8	5	0					
	customer							9	9	9					consult
Mechanical connection															
	G1/2" with flush								Z	0	0				
	welded diaphragm (DIN 3852) ⁵								Z	S	1				
	G1" with flush														
	welded diaphragm (DIN 3852)														
	Clamp DN 25 / 1" (DIN 32676) / 3A								C	6	1				
	Clamp DN 32 / 1 1/2" (DIN 32676) / 3A								C	6	2				
	Clamp DN 50 / 2" (DIN 32676) / 3A								C	6	3				
	dairy pipe DN 25 (DIN 11851) ⁴								M	7	3				
	dairy pipe DN 40 (DIN 11851) ⁴								M	7	5				
	dairy pipe DN 50 (DIN 11851) ⁴								M	7	6				
	Varivent [®] DN 40/50 / 3A								P	4	1				
	customer								9	9	9				consult
Diaphragm															
	stainless steel 1.4435 (316L)									1					
	Hastelloy [®] C-276 (2.4819)									H					consult
	tantalum									T					consult
	customer									9					consult
Seal															
	for clamp or dairy pipe: without									0					
	for inch thread - standard: FKM									1					
	for inch thread - option: FFKM									7					
	customer									9					consult
Filling fluid															
	silicone oil									1					
	food compatible oil (FDA) / 3A									2					
	customer									9					consult
Special version															
	standard									1	1	1			
	with cooling element up to 300 °C									2	1	1			
	customer									9	9	9			consult

¹ absolute pressure possible from 1 bar

² standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request

³ code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

⁴ The cup nut has to be mounted by production of pressure transmitter with electrical connection field housing and mechanical connection dairy pipe.

The cup nut has to be ordered as separate position.

⁵ possible only for p_N ≥ 1 bar

Hastelloy[®] is a brand name of Haynes International Inc.; Varivent[®] is a brand name of GEA Tuuchen GmbH