

DMP 331P

Industrial Pressure Transmitter

Process Connections with
Flush Welded Stainless Steel
Diaphragm

accuracy according to IEC 61298-2:
standard: 0.35 % FSO
option: 0.25 % FSO



Nominal pressure

from 0 ... 100 mbar up to 0 ... 40 bar

Output signals

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

Special characteristics

- ▶ hygienic version
- ▶ diaphragm with low surface roughness
- ▶ CIP / SIP cleaning up to 150 °C
- ▶ vacuum resistant

Optional versions

- ▶ IS-version
Ex ia = intrinsically safe
for gases and dust
- ▶ SIL 2 version
according to IEC 61508 / IEC 61511
- ▶ diaphragm in
Hastelloy® or Tantalum
- ▶ cooling element for media
temperatures up to 300 °C

The pressure transmitter DMP 331P was designed for use in the food / beverage and pharmaceutical industry. The compact design with hygienic versions makes it possible to achieve an outstanding performance in terms of accuracy, temperature behaviour and long term stability.

The modular construction concept allows a combination of various process connections with different filling fluids and a cooling element. Several electrical connections complete the profile of DMP 331P.

Preferred areas of use are



Food and beverage



Pharmaceutical industry

Material and test certificates

- ▶ Inspection certificate 3.1
according to EN 10204
- ▶ Test report 2.2
according to EN 10204



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Technical Data

Input pressure range ¹									
Nominal pressure gauge	[bar]	-1...0	0.10	0.16	0.25	0.40	0.60	1	1.6
Nominal pressure absolute	[bar]	-	-	-	-	0.40	0.60	1	1.6
Overpressure	[bar]	5	0.5	1	1	2	5	5	10
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15

Nominal pressure gauge / absolute	[bar]	2.5	4	6	10	16	25	40
Overpressure	[bar]	10	20	40	40	80	80	105
Burst pressure ≥	[bar]	15	25	50	50	120	120	210
Vacuum resistance	$p_N > 1 \text{ bar}$: unlimited vacuum resistance $p_N \leq 1 \text{ bar}$: on request							

¹ consider the pressure resistance of fittings and clamps

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / $V_S = 8 \dots 32 \text{ V}_{DC}$ SIL-version: $V_S = 14 \dots 28 \text{ V}_{DC}$
Option IS-version	2-wire: 4 ... 20 mA / $V_S = 10 \dots 28 \text{ V}_{DC}$ SIL-version: $V_S = 14 \dots 28 \text{ V}_{DC}$
Options 3-wire	3-wire: 0 ... 20 mA / $V_S = 14 \dots 30 \text{ V}_{DC}$ 0 ... 10 V / $V_S = 14 \dots 30 \text{ V}_{DC}$

Performance	
Accuracy ²	standard: nominal pressure < 0.4 bar: $\leq \pm 0.5 \% \text{ FSO}$ nominal pressure ≥ 0.4 bar: $\leq \pm 0.35 \% \text{ FSO}$ option: nominal pressure ≥ 0.4 bar: $\leq \pm 0.25 \% \text{ FSO}$
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S \text{ min}}) / 0.02 \text{ A}] \Omega$ current 3-wire: $R_{max} = 500 \Omega$ voltage 3-wire: $R_{min} = 10 \text{ k}\Omega$
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ
Long term stability	$\leq \pm 0.1 \% \text{ FSO} / \text{year}$ at reference conditions
Response time	2-wire: < 10 msec 3-wire: ≤ 3 msec

² accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

Thermal effects (offset and span) ³			
Nominal pressure p_N	[bar]	-1 ... 0	< 0.40 ≥ 0.40
Tolerance band	[% FSO]	$\leq \pm 0.75$	$\leq \pm 1.5$ $\leq \pm 0.75$
In compensated range	[°C]	-20 ... 85	0 ... 50 -20 ... 85

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	-40 ... 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 $p_{abs} \leq 1 \text{ bar}$

Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

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

Filling fluids	
Standard	silicone oil
Option	food compatible oil according to 21CFR178.3570 (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

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Technical Data

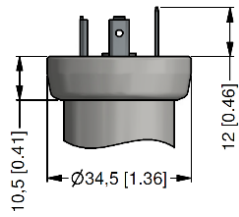
Materials					
Pressure port	stainless steel 1.4435 (316 L) others on request				
Housing	stainless steel 1.4404 (316 L)				
Option compact field housing	stainless steel 1.4301 (304); cable gland M12x1.5, brass, nickel plated (clamping range 2 ... 8 mm)				
Seals	standard: FKM (recommended for medium temperatures ≤ 200 °C) option: FFKM (recommended for medium temperatures < 260 °C) others on request Clamp, dairy pipe, Varivent®: without				
Diaphragm	standard: stainless steel 1.4435 (316 L) option: Hastelloy® C-276 (2.4819) Tantalum on request				
Media wetted parts	pressure port, seal, diaphragm				
Explosion protection (only for 4 ... 20 mA / 2-wire)					
Approvals DX19-DMP 331P	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 °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				
Permissible temperatures for environment	in zone 0: -20 ... 60 °C with p _{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -40/-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					
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				
Option SIL2 version ⁷	according to IEC 61508 / IEC 61511				
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA				
Surface roughness	pressure port R _a < 0.8 μm (media wetted parts) diaphragm R _a < 0.15 μm weld seam R _a < 0.8 μm				
Weight	min. 200 g (depending on process connection)				
Installation position	any (standard calibration in a vertical position with the pressure port connection down; differing installation position for p _N ≤ 2 bar have to be specified in the order)				
Operational life	100 million load cycles				
CE-conformity	EMC Directive: 2014/30/EU				
ATEX Directive	2014/34/EU				
⁷ only for 4 ... 20 mA / 2-wire					
Wiring diagrams					
2-wire-system (current)	3-wire-system (current / voltage)				
Pin configuration					
Electrical connection	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 3-wire)	3	1	3	S+	GN (green)
Shield	ground pin	5	4	GND	GNYE (green-yellow)

DMP 331P

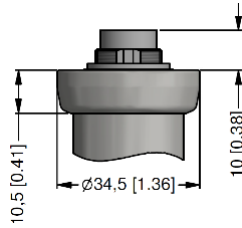
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Technical Data

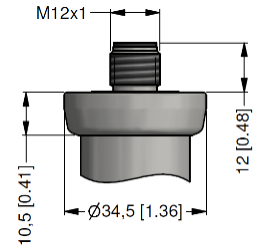
Electrical connections (dimensions mm / in)



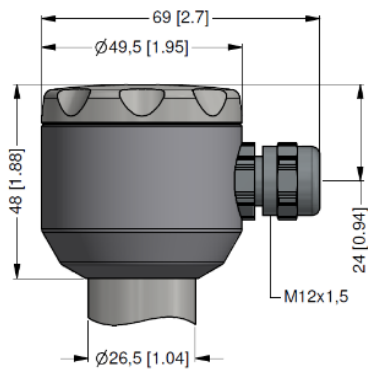
ISO 4400
(IP 65)



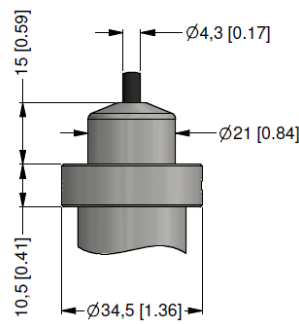
Binder series 723, 5-pin
(IP 67)



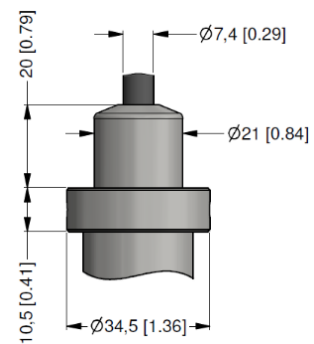
M12x1, 4-pin
(IP 67)



compact field housing
(IP 67)



cable outlet with PVC cable
(IP 67) ⁸



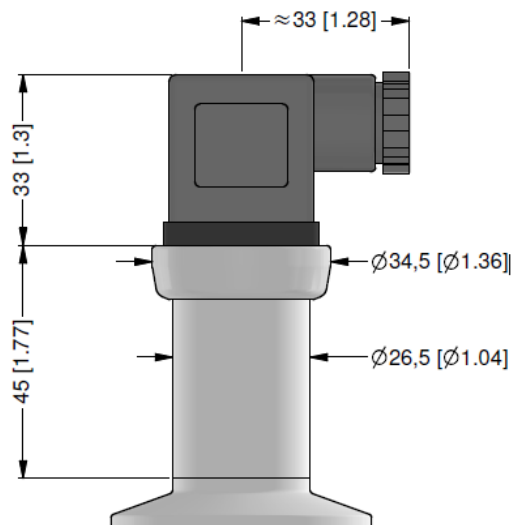
cable outlet,
cable with ventilation tube
(IP 68) ⁹

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

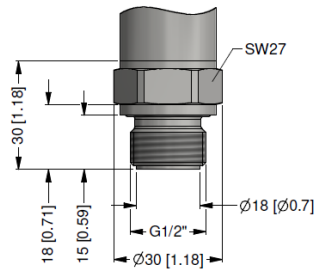
⁸ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

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

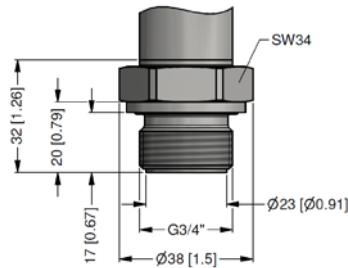
Dimensions (mm / in)



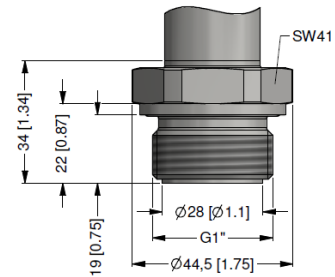
Mechanical connection (dimension mm / in)



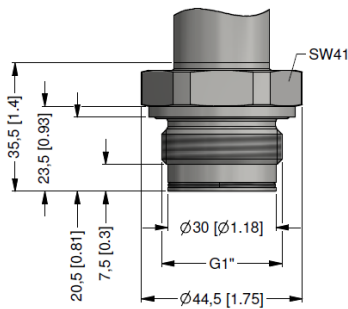
G1/2" flush DIN 3852
 $p_N \geq 1 \text{ bar}$



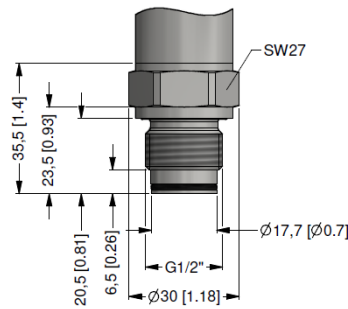
G3/4" flush DIN 3852



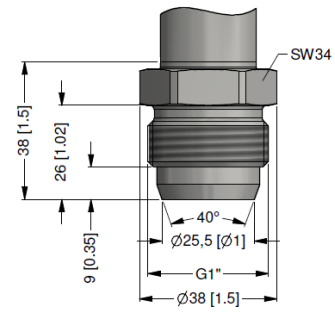
G1" flush DIN 3852



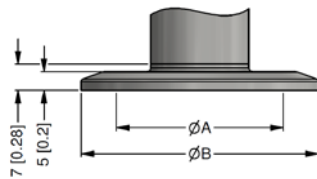
G1" flush with radial o-ring



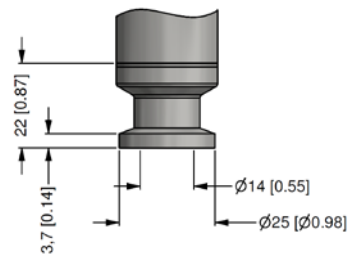
G1/2" flush with radial o-ring
 $p_N \geq 1 \text{ bar}$



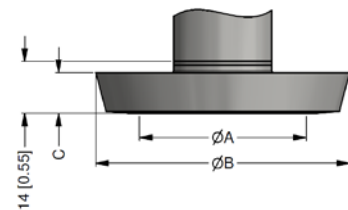
G1" cone
 $p_N \geq 0.6 \text{ bar}$



Clamp (DIN 32676)



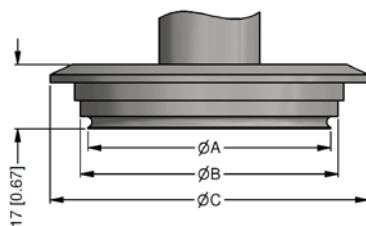
Clamp 3/4" (DIN 32676)
 $4 \text{ bar} \leq p_N \leq 8 \text{ bar}$



dairy pipe (DIN 11851)

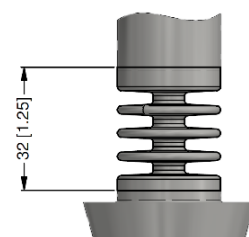
size	DN 25	DN 32	DN 50
A	23.0 [0.91]	23.0 [0.91]	45 [1.77]
B	50.5 [1.99]	50.5 [1.99]	64 [2.52]
p_N [bar]	0.25 ... 16	≤ 16	≤ 16

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]
p_N [bar]	0.25 ... 40	≤ 40	≤ 25



Varivent® DN 40/50
 $p_N \leq 25 \text{ bar}$

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



cooling element up to 300 °C¹⁰
(optionally)

- ⇨ **SIL- and SIL-Ex version: total length increases by 26.5 mm!**
- ⇨ **metric threads and other versions on request**

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

Ordering code DMP 331P

DMP 331P

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Pressure					
	gauge	5	0	0	
	absolute	5	0	1	
Input [bar]					
	0.10 ¹	1	0	0	0
	0.16 ¹	1	6	0	0
	0.25 ¹	2	5	0	0
	0.40	4	0	0	0
	0.60	6	0	0	0
	1.0	1	0	0	1
	1.6	1	6	0	1
	2.5	2	5	0	1
	4.0	4	0	0	1
	6.0	6	0	0	1
	10	1	0	0	2
	16	1	6	0	2
	25	2	5	0	2
	40	4	0	0	2
	-1 ... 0	X	1	0	2
	customer	9	9	9	9
Output					
	4 ... 20 mA / 2-wire				1
	0 ... 20 mA / 3-wire				2
	0 ... 10 V / 3-wire				3
	intrinsic safety 4 ... 20 mA / 2-wire				E
	SIL2 4 ... 20 mA / 2-wire				1S
	SIL2 with intrinsic safety 4 ... 20 mA / 2-wire				ES
	customer				9
Accuracy					
	standard for p _N ≥ 0.4 bar:	0.35 % FSO			3
	standard for p _N < 0.4 bar:	0.50 % FSO			5
	option for p _N ≥ 0.4 bar:	0.25 % FSO			2
	customer				9
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,				T R 0
	cable with ventilation tube (IP68) ³				
	male plug M12x1 (4-pin) / metal				M 1 0
	compact field housing				8 5 0
	stainless steel 1.4301 (304) ⁴				
	customer				9 9 9
Mechanical connection					
	G1/2" with flush welded diaphragm (DIN 3852) ⁵		Z	0	0
	G3/4" with flush welded diaphragm (DIN 3852)		Z	S	0
	G1" with flush welded diaphragm (DIN 3852)		Z	S	1
	G1" DIN 3852 with rad. o-ring and flush diaphragm		Z	S	7
	G1/2" DIN 3852 with rad. o-ring and flush diaphragm ⁵		Z	6	1
	G 1" cone		K	S	1
	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
	Clamp 3/4" (DIN 32676) / 3A		C	6	9
	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
Diaphragm					
	stainless steel 1.4435 (316L)				1
	tantalum				T
	Hastelloy® C-276 (2.4819)				H
	customer				9
Seal					
	for clamp, dairy pipe, Varivent®:				0
	for inch thread - standard:				1
	for inch thread - option:				7
	customer				9
Filling fluid					
	silicone oil				1
	food compatible oil (FDA) / 3A				2
	customer				9
Special version					
	standard				0 0 0
	with cooling element up to 300°C / 3A				2 0 0
	customer				9 9 9

¹ absolute pressure possible from 0.4 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.

⁵ possible only for $p_N \geq 1$ bar

Varivent® is a brand name of GEA Tuchenhausen GmbH, Hastelloy® is a brand name of Haynes International Inc.