DMP 331P

Industrial Pressure Transmitter

Process Connections with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770:
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

74-06

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 abs. [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 / abs. [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	$P_N > 1$ bar: unlimited vacuum resistance $P_N \leq 1$ bar: on request						

[1] *consider the pressure resistance of fitting and clamps*

Output signal / Supply	
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Option IS-version	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC} SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}
Performance	
Accuracy [2]	standard: nominal pressure < 0.4 bar: ≤ ± 0.5 % FSO nominal pressure ≥ 0.4 bar: ≤ ± 0.35 % FSO option: nominal pressure ≥ 0.4 bar: ≤ ± 0.25 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$ current 3-wire: $R_{max} = 500\ \Omega$ voltage 3-wire: $R_{min} = 10\ k\Omega$
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	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] **/ Permissible temperatures**			
Nominal pressure P_N [bar]	-1 … 0	< 0.40	≥ 0.40
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 1.5	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 50	-20 ... 85
Permissible temperatures [4]	medium: -40 ... 125 °C for filling fluid silicone oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C		
Permissible temperature medium for cooling element 300°C	filling fluid silicone oil	overpressure: -40 … 300 °C	vacuum: -40 ... 150 °C [5]
	filling fluid food compatible oil	overpressure: -10 ... 250 °C	vacuum: -10 ... 150 °C [5]

[3] *an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.*
[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] *also for $P_{abs} \leq 1$ 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
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
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
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 > 200 °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 T 85°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
Ambient temperature range	in zone 0: -20 ... 60 °C with p_{atm} 0.8 bar up to 1.1 bar in zone 1 or higher: -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: 1μH/m

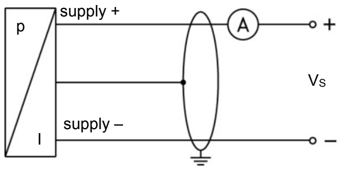
Miscellaneous

Option SIL2 version [6]	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
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 $P_N \leq 2$ 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

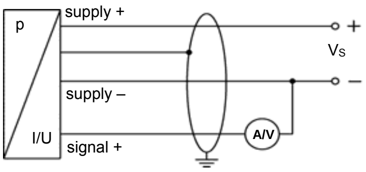
[6] *only for 4 … 20 mA / 2-wire*

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

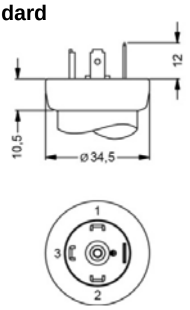


Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	compact field housing	cable colours (IEC 60757)
Supply +	1	3	1	IN +	WH (white)
Supply –	2	4	2	IN -	BN (brown)
Signal + (only 3-wire)	3	1	3	OUT+	GN (green)
Shield	ground pin ⏚	5	4	⏚	GNYE (green-yellow)

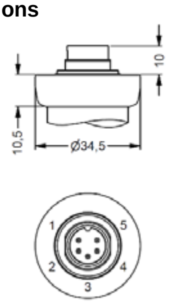
Electrical connections (dimensions in mm)

standard

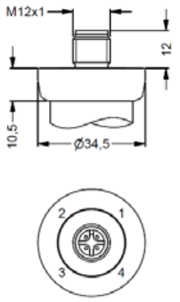


ISO 4400
(IP 65)

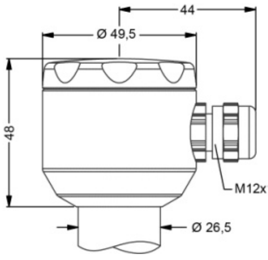
options



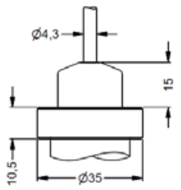
Binder series 723 5-pin
(IP 67)



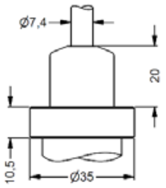
M12x1 4-pin
(IP 67)



compact field housing
(IP 67)



cable outlet with PVC cable
(IP 67) [7]



cable outlet, cable with
ventilation tube (IP 68) [8]

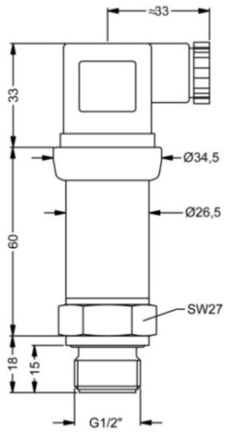
⇨ **universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880) and other versions on request**

[7] *standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 … 70°C)*

[8] *different cable types and lengths available, permissible temperature depends on kind of cable*

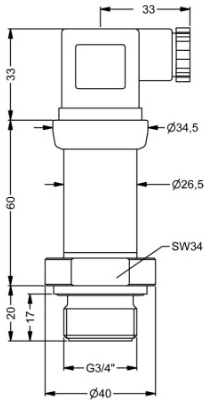
Mechanical connection (dimension in mm)

standard

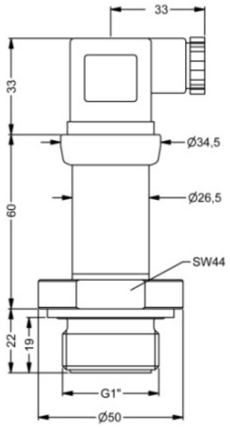


G1/2" flush DIN 3852 [9]

options

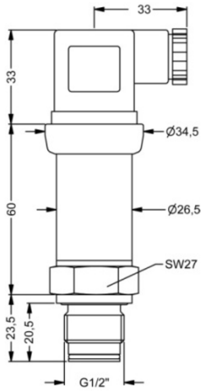


G 3/4" flush DIN 3852
with ISO 4400

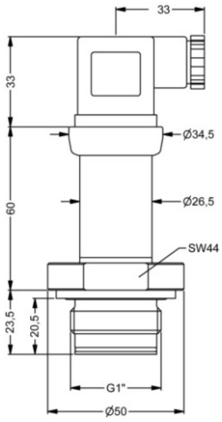


G1" flush DIN 3852
with ISO 4400

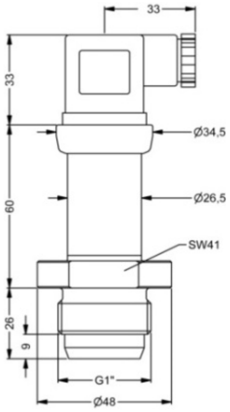
options



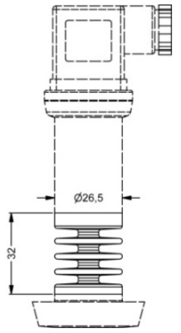
G1/2" flush
with radial o-ring [9]



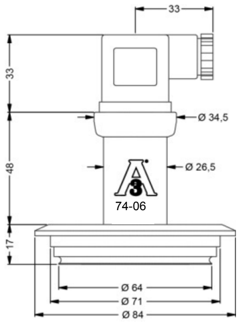
G1" flush
with radial o-ring (P_N ≤ 2 bar)



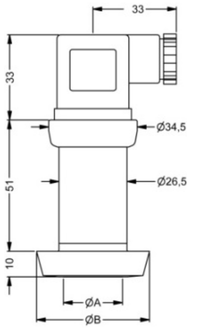
G1" cone
with ISO 4400



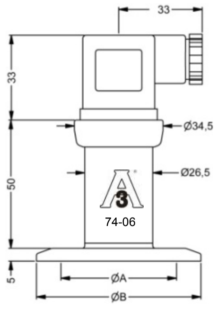
cooling element 300 °C



Varivent®
P_N ≤ 25 bar



dairy pipe (DIN 11851)
with ISO 4400



Clamp (DIN 32676)
with ISO 4400

	dimension in mm		
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
P_N [bar]	≥ 0.25 ≤ 40	≥ 0.25 ≤ 40	≥ 0.25 ≤ 25

	dimension in mm			
size	3/4″	DN 25	DN 32	DN 50
A	14	23	32	45
B	25	50.5	50.5	64
P_N [bar]	≥ 4 ≤ 8	≥ 0.25 ≤ 16	≤ 16	≤ 16

** higher pressure ranges on request*

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

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[9] *possible only for P_N ≥ 1 bar*

Ordering code DMP 331P

DMP 331P	☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐	
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	consult
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	consult
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	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 welded diaphragm (DIN 3852) [5]	Z 0 0	
G3/4" with flush welded diaphragm (DIN 3852)	Z 3 0	
G1" with flush welded diaphragm (DIN 3852)	Z 3 1	
G1" DIN 3852 with rad. o-ring and flush diaphragm [6]	Z 5 7	
G1/2" DIN 3852 with rad. o-ring and flush diaphragm [5]	Z 6 1	
G 1" cone	K 3 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	consult
Diaphragm		
stainless steel 1.4435 (316L)	1	
tantalum	T	consult
Hastelloy ® C-276 (2.4819)	H	
customer	9	consult
Seals		
for clamp, dairy pipe, Varivent®: without	0	
for inch thread - standard: FKM	1	
for inch thread - option: FFKM	7	
customer	9	consult
Filling fluids		
silicone oil	1	
food compatible oil (FDA) / 3A	2	
customer	9	consult
Special version		
standard	0 0 0	
with cooling element up to 300°C / 3A	2 0 0	
customer	9 9 9	consult

[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. The cup nut has to be ordered as separate position.

[5] possible only for p_N ≥ 1 bar

[6] possible only for P_N ≤ 2 bar

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

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