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
  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 behavior 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

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 ≤ 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-protection	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 grade 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 grade 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} *≤ 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 grade oil, compliant with 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 1.4305 (303), cable gland brass, nickel plated	others on request
Seals (media wetted) Standard Optional	FKM (recommended for medium temperatures ≤ 200 °C) FFKM (recommended for medium temperatures > 200 °C) Clamp, dairy pipe, Varivent®: without	others on request
Diaphragm Standard Optional	stainless steel 1.4435 (316 L) 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 DX 19-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, $C_i \approx$ 0 nF, $L_i \approx$ 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

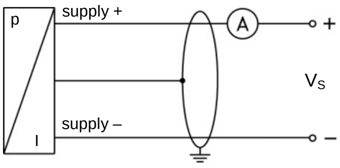
Miscellaneous

Option SIL[6] 2	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 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

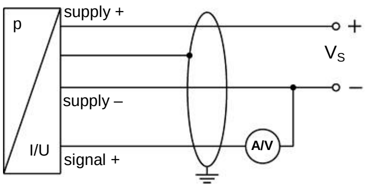
[6] *only for 4 … 20 mA / 2-wire*

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)



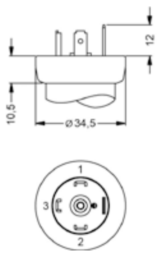
Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	field housing	cable colour (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)

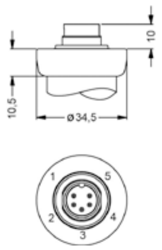
Electrical connections (dimensions in mm)

standard

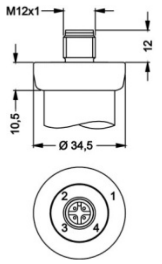
option



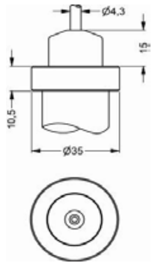
ISO 4400
(IP 65)



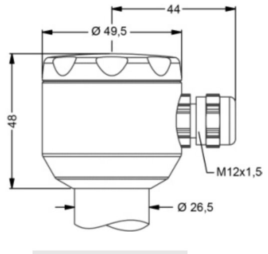
Binder Series 723
(IP 67)



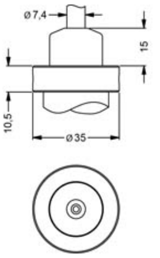
M12x1 4-pin
(IP 67)



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



compact field housing
(IP 67)



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

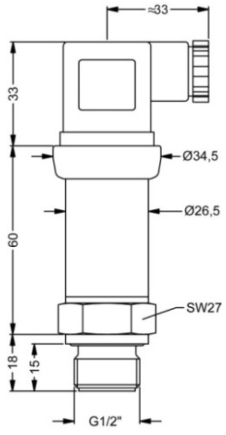
⇨ **universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880)
and other versions on request**

[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*

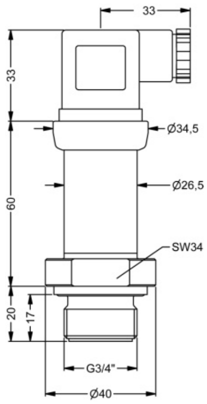
Mechanical connection (dimension in mm)

Standard

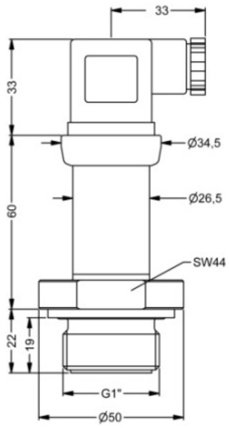


G1/2" flush DIN 3852[9]

Option

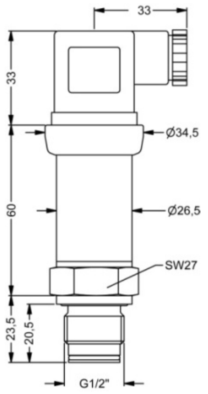


G 3/4" flush DIN 3852
with ISO 4400

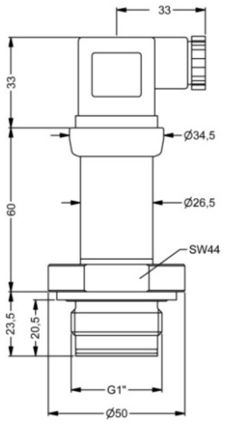


G1" flush DIN 3852
with ISO 4400

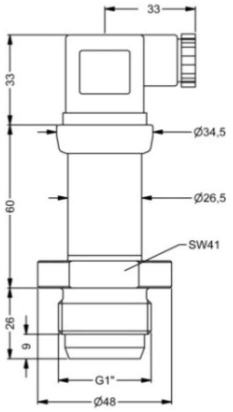
Option



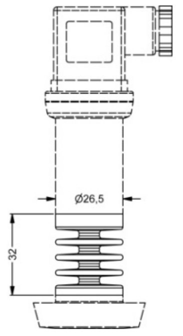
G1/2" flush
with radial o-ring [9]



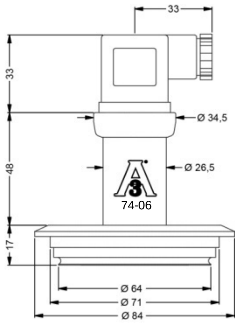
G1" flush
with radial o-ring (P_N ≤ 2 bar)



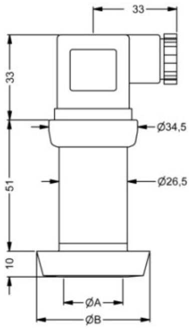
G1" cone
with ISO 4400



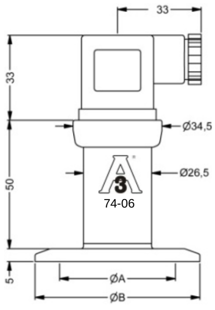
cooling element 300 °C



Varivent®
PN ≤ 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	¾“	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		500	
absolute		501	
Input	[bar]		
	0.10 [1]	1000	
	0.16 [1]	1600	
	0.25 [1]	2500	
	0.40	4000	
	0.60	6000	
	1.0	1001	
	1.6	1601	
	2.5	2501	
	4.0	4001	
	6.0	6001	
	10	1002	
	16	1602	
	25	2502	
	40	4002	
	-1 … 0	X102	
	customer	9999	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 $P_N \geq 0.4$ bar	0.35 %	3	
standard for $P_N < 0.4$ bar	0.5 %	5	
option for $P_N \geq 0.4$ bar	0.25 %	2	
customer		9	consult
Electrical connection			
Male and female plug ISO 4400		100	
Male plug Binder series 723 (5-pin)		200	
Cable outlet with PVC-cable [2]		TA0	
Cable outlet [3]		TR0	
Male plug M12x1 (4-pin) / metal		M10	
Compact field housing stainless steel stainless steel 1.4305 [4]		850	
customer		999	consult
Mechanical connection			
G1/2" with flush welded diaphragm (DIN 3852) [5]		Z00	
G3/4" with flush welded diaphragm (DIN 3852)		Z30	
G1" with flush welded diaphragm (DIN 3852)		Z31	
G1" DIN 3852 with rad. o-ring and flush diaphragm [6]		Z57	
G1/2" DIN 3852 with rad. o-ring and flush diaphragm [5]		Z61	
G 1" cone		K31	
Clamp DN 25 / 1" (DIN 32676) / 3A		C61	
Clamp DN 32 / 1 1/2" (DIN 32676) / 3A		C62	
Clamp DN 50 / 2" (DIN 32676) / 3A		C63	
Clamp 3/4" (DIN 32676) / 3A		C69	
Dairy pipe DN 25 (DIN 11851) [4]		M73	
Dairy pipe DN 40 (DIN 11851) [4]		M75	
Dairy pipe DN 50 (DIN 11851) [4]		M76	
Varivent® DN 40/50 / 3A		P41	
customer		999	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 grade oil (FDA) / 3A		2	
customer		9	consult
Special version			
standard		000	
with cooling element up to 300°C / 3A		200	
customer		999	consult

absolute pressure possible from 0.4 bar

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

cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable

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.

possible only for $P_N \geq 1$ bar

possible only for $P_N \leq 2$ bar

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

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