LIM DMP 331P

Industrial Pressure Transmitter

Process Connections With
Flush Welded Stainless Steel
Diaphragm

accuracy according to EN IEC 62828-2:
standard: 0.35 % span
option: 0.25 % span

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
- 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 DIN 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

** for 0 … 1 bar abs. or -1 … 0 bar gauge max.temperature 70°C*

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

[2] accuracy according to EN IEC 62828-2– 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 [% span]	≤ ± 0.75	≤ ± 1,5	≤ ± 0.75
in compensated range [°C]	-20 ... 85	0 ... 50	-20 ... 85
Permissible temperatures [4]	medium [4]: -40 ... 125 °C for filling fluid silicon 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 [5]	filling fluid silicon oil	overpressure: -40 … 300 °C	vacuum: -40 ... 150 °C[6]
	filling fluid food grade oil	overpressure: -10 ... 250 °C	vacuum: -10 ... 150 °C[6]

[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] max. temperature depends on the used sealing material, type of seal and installation
[6] also for P_{abs} ≤ 1 bar

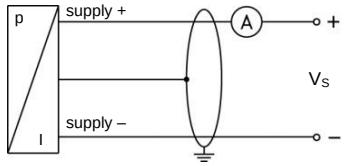
Electrical protection	
Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Mechanical stability	
Vibration according to DIN EN 60068-2-6	G 1/2": 20 g RMS (25 ... 2000 Hz) others: 10 g 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	silicon 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 1.4404 (316 L) others on request
Housing	stainless steel 1.4404 (316 L)
Option field housing	stainless steel 1.4301 (304), cable gland M16x1.5 brass, nickel plated (clamping range 2….8 mm)
Seals (media wetted) Standard Optional	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 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 DX9-DMP 331P	**IBExU10ATEX1122 X** 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
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: -40/-20 ... 70 °C (lower temperature limit depends on the type of cable used)
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[7] 2	according to IEC 61508 / IEC 61511
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 Ra < 0.8 µm (media wetted parts) diaphragm Ra < 0.15 µm weld seam Ra < 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 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU

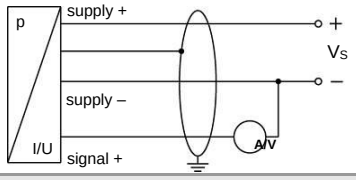
[7] *only for 4 … 20 mA / 2-wire*

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

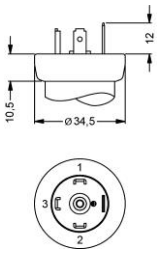


Pin configuration

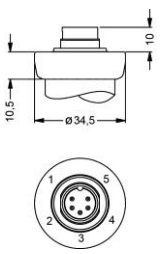
Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	field housing	cable colours (DIN 47100)
Supply +	1	3	1	IN +	wh (white)
Supply –	2	4	2	IN -	bn (brown)
Signal □ (only 3-wire)	3	1	3	OUT+	gn (green)
Shield	ground pin ⏚	5	4	⏚	ye/gn (yellow / green)

Electrical connections (dimensions in mm)

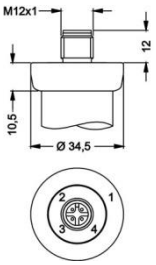
standard **option**



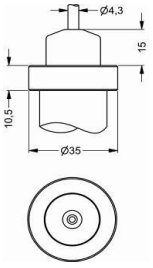
ISO 4400
(IP 65)



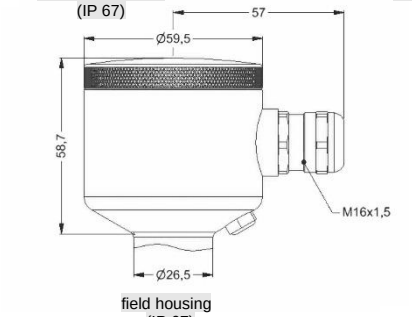
Binder Series 723
(IP 67)



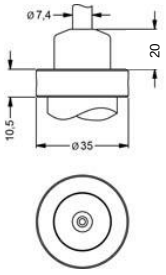
M12x1 4-pin
(IP 67)



cable outlet with PVC cable
(IP 67) [8]



field housing
(IP 67)



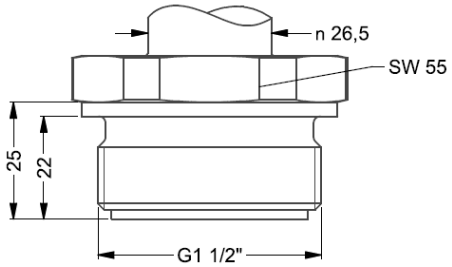
cable outlet, cable with ventilation tube
(IP 68) [9]

➪ **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*

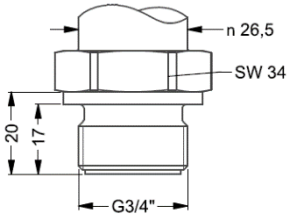
Mechanical connection (dimension in mm)

Standard

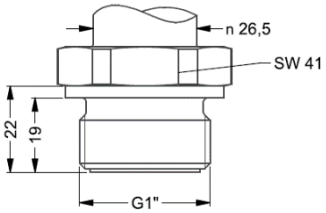


G1/2" flush DIN 3852[10]

Option

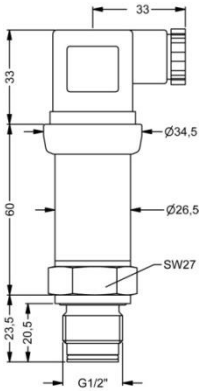


G 3/4" flush DIN 3852
with ISO 4400

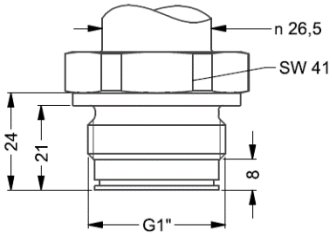


G1" flush DIN 3852
with ISO 4400

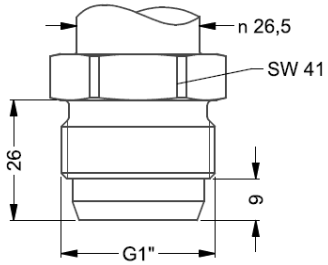
Option



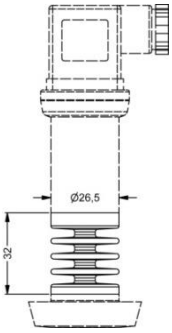
G1/2" flush
with radial o-ring [10]



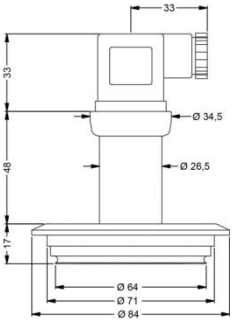
G1" flush
with 2 radial o-ring (P_N > 0,25 bar)



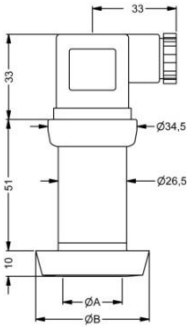
G1" cone
with ISO 4400



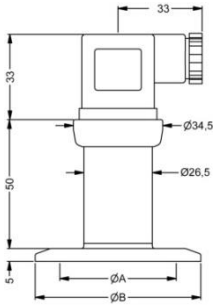
cooling element 300 °C



Varivent[10]
P_N ≤ 10 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**

[10] possible only for P_N ≥ 1 bar; max.temperature depends on the used sealing material, type of seal and installation