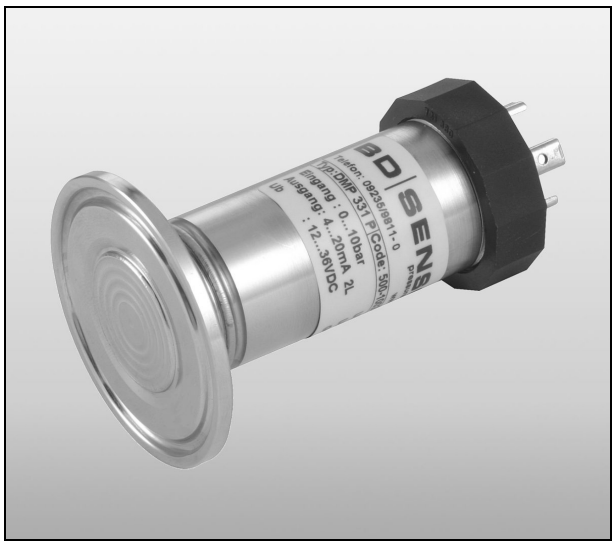
BD SENSORS®
pressure measurement



DMP 331 P

Pressure Transmitter with Flush Pressure Port

- foodstuff industry, pharmaceutical and chemical industries, etc.
- medium temperature up to 300 °C
- accuracy:
  0.175% / 0.125% FSO BFSL
  (0.35 % / 0.25% FSO IEC 60770)
- nominal pressure ranges from
  0 ... 100 mbar up to 0 ... 40 bar

The DMP 331 P is a pressure transmitter for process measurement. Usage is possible with all media that are compatible with stainless steel 1.4435 (316L) and sealing material.

A piezoresistive stainless steel sensor, which features small thermal effect and excellent linearity, generate the base of the DMP 331 P. So it is possible to meet accuracy demands up to 0.25 % FSO (IEC 60770). Besides silicon oil and food compatible oil also Halocarbon or other filling oils can be delivered on request.

For usage with higher media temperature a cooling element can be added optionally. Thus media temperatures up to 300 C can be achieved. The flush pressure ports are made with inch, clamp, or dairy pipe connection. Further pressure ports or chemical seals are available on request. Additional the DMP 331 P is suited for explosive area (zone 0).

Preferred areas of use are:

- process engineering
- chemical industry
- foodstuff industry
- paper industry

Characteristics

- small thermal effect
- good linearity
- good long term stability
- option Ex version:
  (only with 4 ... 20 mA / 2-wire)
  TÜV 03 ATEX 2006 X
- customer specific versions:
  - special pressure ranges
  - variety of electrical and mechanical connections
  - other versions on request

DMP 331 P
Process Pressure Transmitter

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DMP 331 P

Process Pressure Transmitter

Technical Data

Input pressure range

Nominal pressure gauge	[bar]	-1...0 [1]	0.10	0.16	0.25	0.4	0.6	1.0	1.6	2.5	4.0	6.0	10	16	25	40
Nominal pressure abs. [1]	[bar]	-	-	-	-	-	0.6	1.0	1.6	2.5	4.0	6.0	10	16	25	40
Permissible overpressure	[bar]	3	1	1	1	1	3	3	6	6	20	20	60	60	60	100

Output signal / Supply

Standard	2-wire:	4 ... 20 mA / V_S = 12 ... 36 V_{DC}	Ex-protection:	V_S = 14 ... 28 V_{DC}
Optional	3-wire:	0 ... 20 mA / V_S = 14 ... 36 V_{DC} 0 ... 10 V / V_S = 14 ... 36 V_{DC}		

Performance

Accuracy			IEC 60770 [2]	BFSL
	standard:	nominal pressure > 0.4 bar:	≤ ± 0.35 % FSO	≤ ± 0.175 % FSO
		nominal pressure ≤ 0.4 bar:	≤ ± 0.50 % FSO	≤ ± 0.250 % FSO
	option:	nominal pressure > 0.4 bar:	≤ ± 0.25 % FSO	≤ ± 0.125 % FSO
Permissible load	current 2-wire:	$R_{max} = [(V_S - V_{S\,min}) / 0.02]\ \Omega$		
	current 3-wire:	R_{max} = 500 Ω		
	voltage 3-wire:	R_{min} = 10 kΩ		
Influence effects	supply:	0.05 % FSO / 10 V		
	load:	0.05 % FSO / kΩ		
Response time	< 10 msec			

Thermal effects (Offset and Span) [3]

Nominal pressure P_N	[bar]	-1 ... 0	≤ 0.1	≤ 0.25	≤ 0.4	≤ 1.0	> 1.0
Tolerance band	[% FSO]	≤ ± 0.75	≤ ± 2.0	≤ ± 1.5	≤ ± 1.0	≤ ± 1.0	≤ ± 0.75
TC, average	[% FSO / 10 K]	± 0.12	± 0.4	± 0.3	± 0.2	± 0.15	± 0.12
in compensated range	[°C]	0 ... 70	0 ... 50			0 ... 70	

Electrical protection

Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Option Ex-protection only with 4 ... 20 mA / 2-wire DX13-DMP 331 P	zone 0 [4]: II 1 G Ex ia IIC T4 zone 20: II 1 D Ex tD A20 IP65 T 85°C safety technical maximum values: V_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \leq$ 1nF, $L_i \leq$ 10 µH

Mechanical stability

Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 ms

Permissible temperatures

Medium	-25 ... 125 °C [1, 5, 6]		
Electronics / environment	-25 ... 85 °C	Ex-protection:	application in zone 0: -20 ... 60 °C application in zone 1 or higher: -25 ... 70 °C
Storage	-40 ... 100 °C		

[1] for vacuum and nominal pressure abs. the max. medium temperature is 70 °C

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

[3] an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

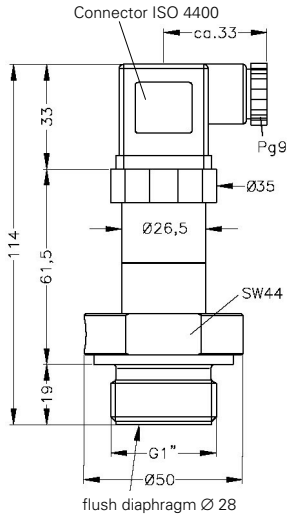
[4] approved for atmospheric pressure from 0.8 bar up to 1.1 bar

[5] with optional cooling element its maximum permissible temperature is valid

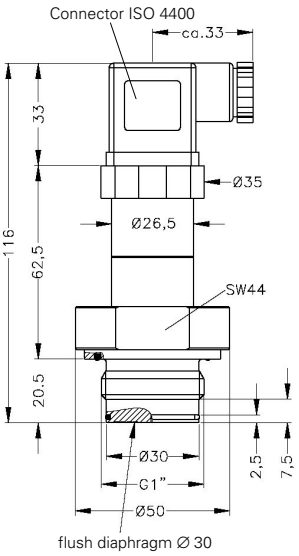
[6] max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 30 minutes with a max. environmental temperature of 50 °C

Mechanical connection (dimensions in mm)

Inch Thread (DIN 3852)

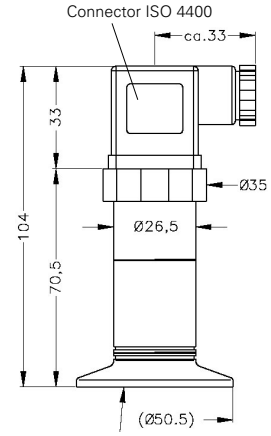


G1“ flush

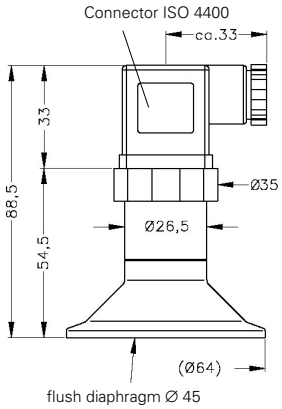


G1“ flush
with radial o-ring

Clamp (ISO 2852)

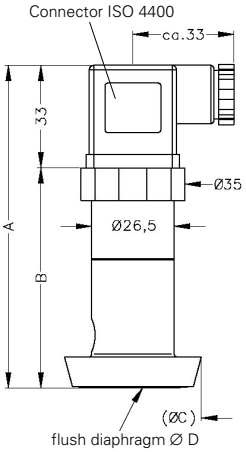


DN1“ or DN 1 1/2“



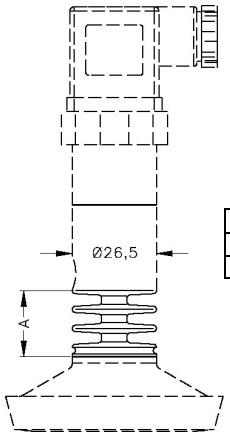
DN2“

Dairy pipe (DIN 11851)



Dimensions in mm			
Size	DN 25	DN 40	DN 50
A	104	86	86
B	71	53	53
C	44	56	68.5
D	24	32	45

Cooling element

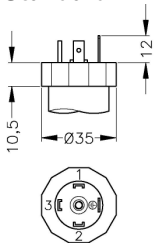


temperature range	150° C	300° C
size A	22	34
number of cooling fins	2	3

⇨ Ex-protection: total length increases by 20 mm!

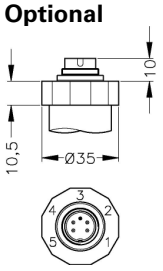
Electrical connection (dimensions in mm)

Standard

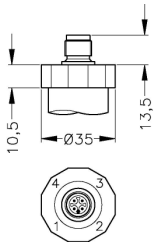


ISO 4400
(IP 65)

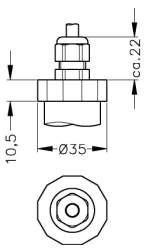
Optional



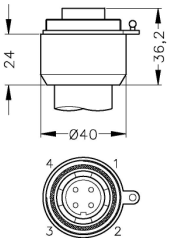
Binder Series 723
(IP 67)



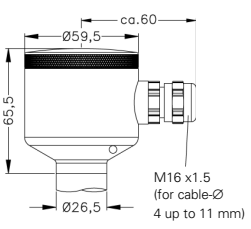
M12x1 4-pin
(IP 67)



Cable gland [7]
(IP 67)



Buccaneer [8]
(IP 68)



Field housing
(IP 67)

[7] different cable types and lengths available; standard: 2 m PVC cable (without ventilation tube), optionally cable with ventilation tube

[8] for gauge pressure cable with ventilation tube required

Filling Fluids

Standard	silicon oil
Optional	food compatible oil (with FDA-approval) / Halocarbon and others on request

Materials

Pressure port	stainless steel 1.4435 (316L) / Monel on request
Housing	stainless steel 1.4301 (304) / field housing 1.4305 (303) with cable gland of brass, nickel plated
Seals (media wetted)	inch thread: standard: FKM (recommended for medium temperatures ≤ 200 °C) optionally: FFKM (recommended for medium temperatures > 200 °C) others on request clamp and dairy pipe: without
Diaphragm	stainless steel 1.4435 (316L) / Tantalum and Hastelloy on request
Media wetted parts	pressure port, seals, diaphragm

Miscellaneous

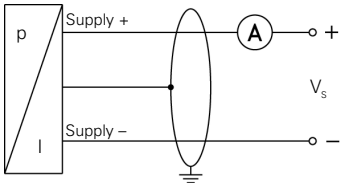
Optionally SIL 2 application	according to IEC 61508 / IEC 61511
Connecting cables (by factory)	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m cable inductance: signal line/shield also signal line/signal line: 1.0 µH/m
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	min. 200 g (depending on process connection)
Installation position	any [9]
Operational life	> 100 x 10^6 cycles

Pin configuration

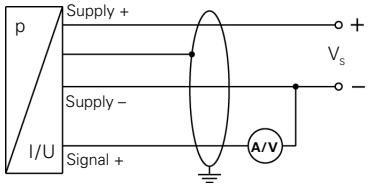
Electrical connection		ISO 4400	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	Field housing	cable colours (DIN 47100)
2-wire-system	Supply +	1	3	1	1	IN +	white
	Supply –	2	4	2	2	IN -	brown
	Ground	ground pin	5	4	4	⏚	yellow / green (shield)
3-wire-system	Supply +	1	3	1	1	IN +	white
	Supply –	2	4	2	2	IN –	brown
	Signal +	3	1	3	3	OUT +	green
	Ground	ground pin	5	4	4	⏚	yellow / green (shield)

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)



[9] 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 $P_N \leq 1$ bar.

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BD SENSORS pressure measurement

Ordering code DMP 331P

DMP 331P ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

Option		Code	Remark
Pressure			
gauge		5 0 0	
absolute [1, 2]		5 0 1	on request
Input	[bar]		
	0,10	1 0 0 0	
	0,16	1 6 0 0	
	0,25	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 [1]	X 1 0 2	
	customer	9 9 9 9	on request
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	on request
Accuracy			
standard for $P_N > 0,4$ bar	0,35 %	3	
standard for $P_N \leq 0,4$ bar	0,5 %	5	
option for $P_N > 0,4$ bar	0,25 %	2	
customer		9	on request
Electrical connection			
Male and female plug ISO 4400		1 0 0	
Binder series 723 (5-pin)		2 0 0	
Cable gland incl. cable [3]		4 0 0	
Male plug Buccaneer IP68 [4]		5 0 0	
M12x1 (4-pin)		M 0 0	
Field housing stainless steel [5]		8 0 0	
customer		9 9 9	on request
Mechanical connection			
G1" with flush welded diaphragm (DIN 3852)		Z 3 1	
G1" with radial O-ring and flush welded diaphragm (DIN 3852)		Z 5 7	on request
Clamp 1" (ISO 2852)		C 6 1	
Clamp 1 1/2" (ISO 2852)		C 6 2	
Clamp 2" (ISO 2852)		C 6 3	
Dairy pipe DN 25 (DIN 11851) [5]		M 7 3	
Dairy pipe DN 40 (DIN 11851) [5]		M 7 5	
Dairy pipe DN 50 (DIN 11851) [5]		M 7 6	
customer		9 9 9	on request
Diaphragm			
Stainless steel 1.4435 (316L)		1	
customer		9	on request
Seals			
for clamp or dairy pipe:	without	0	
for inch thread:	FKM	1	
	FFKM	7	on request
	customer	9	on request
Filling Fluids			
Silicon oil		1	
food compatible oil [6]		2	
Halocarbon		C	on request
customer		9	on request
Special version			
standard		0 0 0	
with cooling element up to 150°C		1 5 0	
with cooling element up to 300°C		2 0 0	
customer		9 9 9	on request

[1] for vacuum and nominal pressure abs. the max. medium temperature is 70 °C
[2] absolute pressure possible from 0,60 bar
[3] different cable types and lengths deliverable, standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube
[4] for gauge pressure cable with ventilation tube required
[5] The cup nut for dairy pipe has to be mounted by production of pressure transmitter with electrical connection field housing and mechanical connection dairy pipe. The cup nut for dairy pipe has to be ordered as separate position.
[6] Name of oil: Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662

010108

TÜV CERT DIN EN ISO 9001

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