



DMP 331Pi

Precision Pressure Transmitter

Pressure Ports and
Process Connections with
Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 40 bar

Output signals

2-wire: 4 ... 20 mA

3-wire: 0 ... 10 V

others on request

Product characteristics

- ▶ excellent temperature response
0.04 % FSO / 10K
- ▶ Turn-Down 1:10
- ▶ processing of the sensor signal
using digital electronics
- ▶ process connections suitable for
hygienic application
- ▶ vacuum resistant

Optional versions

- ▶ communication interface for adjustment
of offset, span and damping
- ▶ IS-version (on request)
- ▶ cooling element for media
temperatures up to 300 °C

The precision pressure transmitter DMP 331Pi demonstrates the further development of well-tried industrial pressure transmitter DMP 331P.

The signal from the specially designed piezoresistive stainless steel sensor is processed by the newly developed digital electronic system, performing thus an active compensation of sensor-specific deviations such as hysteresis, thermal errors and non-linearity.

The temperature range of -40 ... 125 °C can be extended by the integration of a cooling element up to 300 °C.

Preferred areas of use are



Laboratory techniques



Food and beverage



Pharmaceutical industry



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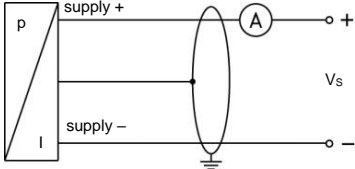
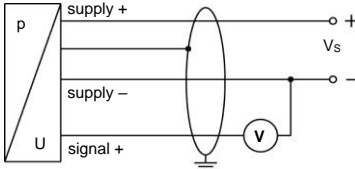


Technical Data

Pressure ranges ¹								
Nominal pressure gauge / absolute ²	[bar]	0.4	1	2	4	10	20	40
Overpressure	[bar]	2	5	10	20	40	80	105
Burst pressure ≥	[bar]	3	7.5	15	25	50	120	210
Vacuum resistance		p _N ≥ 1 bar: unlimited vacuum resistance p _N < 1 bar: on request						
¹ on customer request we adjust the device within the turn-down-possibility by software on the required pressure range								
² absolute pressure permissible from 1 bar								
Vacuum ranges								
Nominal pressure	[bar]	-0.4 ... 0.4	-1 ... 1	-1 ... 2	-1 ... 4	-1 ... 10		
Overpressure	[bar]	2	5	10	20	40		
Burst pressure ≥	[bar]	3	7.5	15	25	50		
Output signal / Supply								
Standard	2-wire: 4 ... 20 mA / V _S = 12 ... 36 V _{DC}							
Option IS-version	2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC}							
Options	2-wire: 4 ... 20 mA with communication interface ³							
	3-wire: 0 ... 10 V / V _S = 14 ... 36 V _{DC}							
	0 ... 10 V with communication interface ³							
³ only possible with electrical connection Binder series 723 (7-pin)								
Performance								
Accuracy ⁴ performance after turn-down - TD ≤ 1:5 - TD > 1:5	IEC 60770: ≤ ± 0.1 % FSO no change of accuracy ⁵ for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 5): ≤ ± [0.1 + 0.015 x turn-down] % FSO with turn-down = nominal pressure range / adjusted range e.g. with a turn-down of 1:10 following accuracy is calculated: ≤ ± (0.1 + 0.015 x 10) % FSO i.e. accuracy is ≤ ± 0.25 % FSO							
Permissible load	current 2-wire: R _{max} = [(V _S – V _{S min}) / 0.02 A] Ω voltage 3-wire: R _{min} = 10 kΩ							
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ							
Long term stability	≤ ± (0.1 x turn-down) % FSO / year at reference conditions							
Response time	current 2-wire: approx. 5 msec voltage 3-wire: 25 msec							
Adjustability (option) ⁶	configuration of following parameters possible (interface / software necessary): electronic damping: 0 ... 100 sec offset: 0 ... 90 % FSO turn down of span: max. 1:10							
⁴ accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)								
⁵ except nominal pressure ranges ≤ 0.40 bar; for these calculation of accuracy is as follows: ≤ ± (0.1 + 0.02 x turn-down) % FSO e.g. turn-down of 1:3: ≤ ± (0.1 + 0.02 x 3) % FSO i.e. accuracy is ≤ ± 0.16 % FSO								
⁶ adjustable version is only possible in combination with Binder Series 723, 7-pin; software, interface and cable have to be ordered separately (software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or higher, and XP)								
Thermal effects ⁷ (offset and span)								
Tolerance band [% FSO]	≤ ± (0.35 x turn-down)							
TC, average [% FSO / 10 K]	≤ ± (0.035 x turn-down)							
in compensated range	0 ... 80 °C							
⁷ 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 ⁸	-40 ... 125 °C				-10 ... 125 °C			
Medium with cooling element ⁹	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C ¹⁰				overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C ¹⁰			
Electronics / environment	-25 ... 85 °C							
Storage	-40 ... 100 °C							
⁸ max. temperature of the medium for nominal pressure gauge > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C								
⁹ max. temperature depends on the used sealing material, type of seal and installation								
¹⁰ 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							
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							
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			

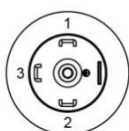
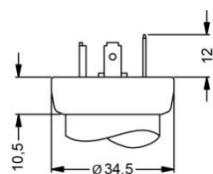
DMP 331Pi

Precision Pressure Transmitter

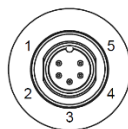
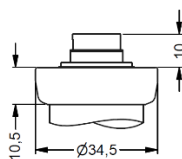
Technical Data

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 (O-ring)	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 (316L) option: Hastelloy® C-276 (2.4819) and Tantalum on request					
Media wetted parts	pressure port, diaphragm					
Explosion protection (on request for 4 ... 20 mA / 2-wire)						
Approvals DX19-DMP 331Pi	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 ... 65 °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					
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	approx. 200 g					
Installation position	any ¹¹					
Operational life	100 million load cycles					
CE-conformity	EMC Directive: 2014/30/EU					
ATEX Directive	2014/34/EU					
¹¹ 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 ≤ 1 bar.						
Wiring diagrams						
<div>2-wire-system (current)</div> 	<div>3-wire-system (voltage)</div> 					
Pin configuration						
Electrical connections	ISO 4400	Binder 723 (5-pin)	Binder 723/423 (7-pin)	M12x1/ metal (4-pin)	compact field housing	cable colours (IEC 60757)
Supply +	1	3	3	1	IN +	WH (white)
Supply –	2	4	1	2	IN –	BN (brown)
Signal + (only for 3-wire)	3	1	6	3	OUT +	GN (green)
shield	ground pin 	5	2	4		GNYE (green-yellow)
Communication interface ¹²						
RxD	-	-	4	-	-	-
TxD	-	-	5	-	-	-
GND	-	-	7	-	-	-
¹² may not be connected directly with the PC (the suitable adapter is available as accessory)						

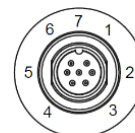
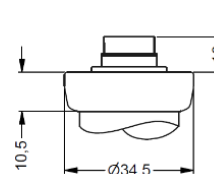
Electrical connections (dimensions in mm)



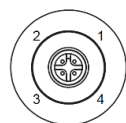
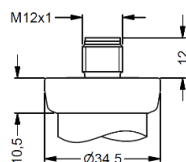
ISO 4400
(IP 65)



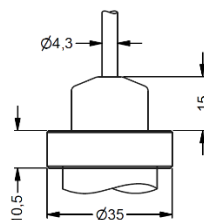
Binder series 723, 5-pin
(IP 67)



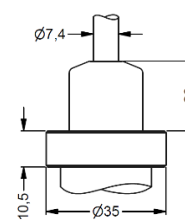
Binder series 723, 7-pin
(IP 67)



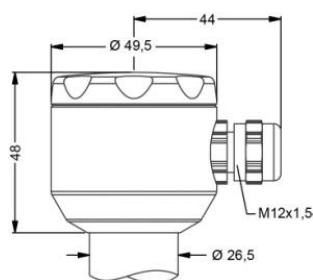
M12x1, 4-pin
(IP 67)



cable outlet with PVC cable
(IP 67) ¹³



cable outlet, cable with
ventilation tube (IP 68) ¹⁴



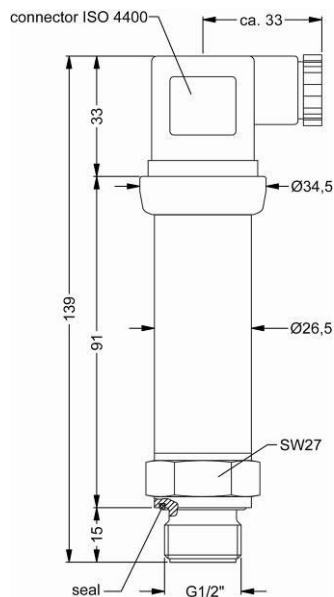
compact field housing
(IP 67)

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

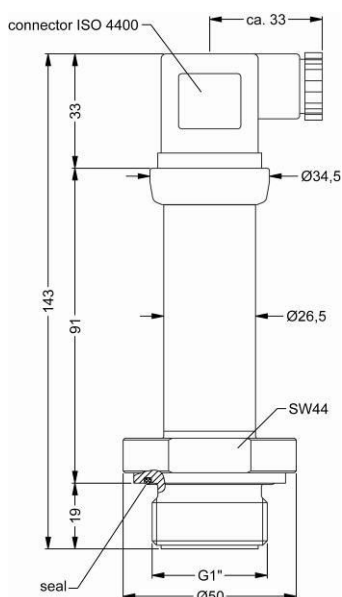
¹³ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

¹⁴ different cable types and lengths available, permissible temperature depends on kind of cable

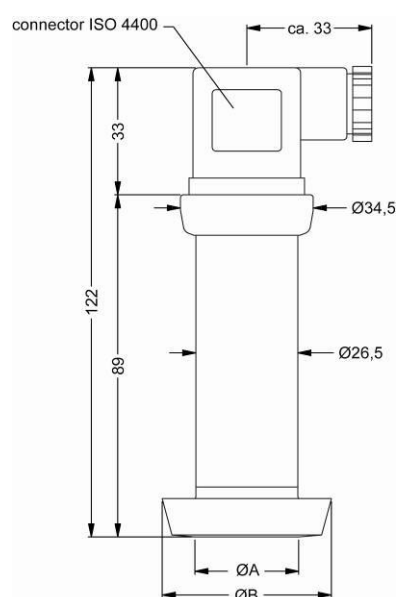
Mechanical connection (dimensions in mm)



G1/2" flush DIN 3852

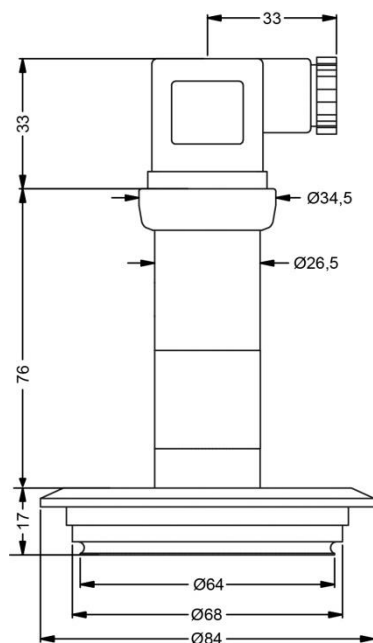


G1" flush DIN 3852

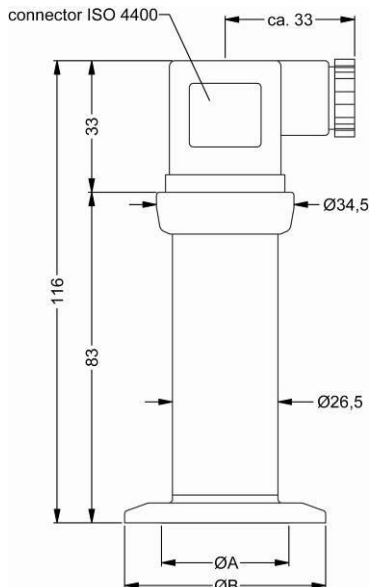


dairy pipe (DIN 11851)

dimensions in mm			
size	DN 25	DN 40	DN 50
A	23	32	45
B	44	56	68.5
pN [bar]	≤ 40	≤ 40	≤ 25

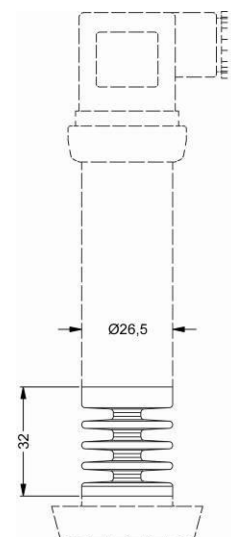


Varivent®
pN ≤ 25 bar



Clamp (DIN 32676)

dimensions in mm			
size	DN 25	DN 32	DN 50
A	23	32	45
B	50.5	50.5	64
pN [bar]	≤ 16	≤ 16	≤ 16



cooling element up to 300 °C⁹

⇒ metric threads and others on request

⁹ max. temperature depends on the used sealing material, type of seal and installation
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