

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)

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

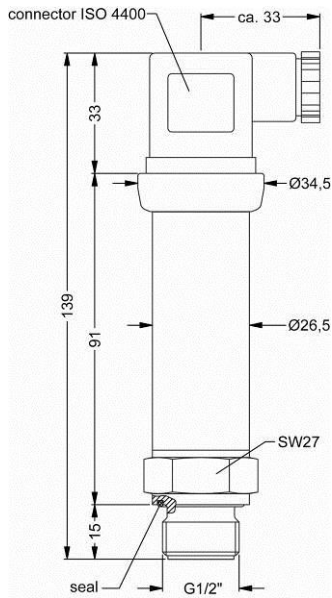
-  Laboratory techniques
-  Food and beverage
-  Pharmaceutical industry



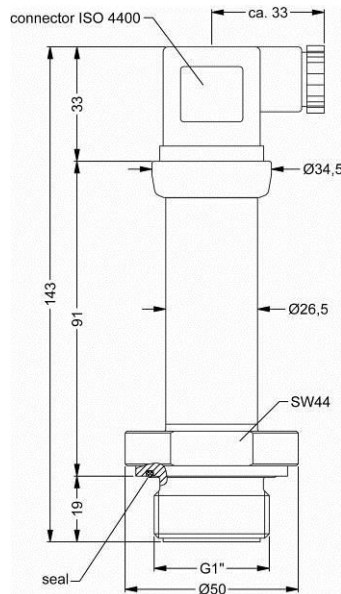
| Pressure ranges ¹ | | | | | | | | |
|--|----------------|--|----------|------------------------------|---|-------------------------------------|-------------------|-------------------|
| Nominal pressure gauge / absolute ² | [bar] | 0.4 | 1 | 2 | 4 | 10 | 20 | 40 |
| Overpressure | [bar] | 2 | 5 | 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 el. 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 | | < 5 msec | | | | | | |
| Adjustability | | configuration of following parameters possible (interface / software necessary ⁶): 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 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) / Permissible temperatures | | | | | | | | |
| Tolerance band | [% FSO] | ≤ ± (0.35 x turn-down) | | | in compensated range 0 ... 80 °C | | | |
| TC, average | [% FSO / 10 K] | ≤ ± (0.035 x turn-down) | | | in compensated range 0 ... 80 °C | | | |
| Permissible temperatures ⁸ | | medium: -40 ... 125 °C for filling fluid silicone oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -25 ... 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 ⁹ | | |
| | | filling fluid food compatible oil | | overpressure: -10 ... 250 °C | | vacuum: -10 ... 150 °C ⁹ | | |
| ⁷ an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions. | | | | | | | | |
| 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 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 (DIN EN 60068-2-6) | | G 1/2": 20 g RMS (25 ... 2000 Hz); | | | others except G 1/2": 10 g RMS (25 ... 2000 Hz) | | | |
| Shock (DIN EN 60068-2-27) | | G 1/2": 500 g / 1 msec; | | | others except G 1/2": 100 g / 1 msec | | | |
| 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 > 200 °C) Clamp, dairy pipe, Varivent®: without | | | | | | others on request |
| 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 IIC T135 °C Da | | | | | |
| Safety technical maximum values | $U_i = 28\text{ V}$, $I_i = 93\text{ mA}$, $P_i = 660\text{ mW}$, $C_i \approx 0\text{ nF}$, $L_i \approx 0\text{ }\mu\text{H}$, 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 $\mu\text{H}/\text{m}$ | | | | | |
| Miscellaneous | | | | | | |
| Current consumption | signal output current: max. 25 mA | | | signal output voltage: max. 7 mA | | |
| Weight | approx. 200 g | | | | | |
| Installation position | any ¹⁰ | | | | | |
| Operational life | 100 million load cycles | | | | | |
| CE-conformity | EMC Directive: 2014/30/EU | | | | | |
| ATEX Directive | 2014/34/EU | | | | | |
| ¹⁰ 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 $p_N \leq 1\text{ bar}$. | | | | | | |
| Wiring diagrams | | | | | | |
| <p>2-wire-system (current)</p> | | | <p>3-wire-system (voltage)</p> | | | |
| Pin configuration | | | | | | |
| Electrical connections | ISO 4400 | Binder 723 (5-pin) | Binder 723 (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 \oplus | 5 | 2 | 4 | \oplus | GNYE (green-yellow) |
| Communication interface ¹¹ | RxD | - | 4 | - | - | - |
| | TxD | - | 5 | - | - | - |
| | GND | - | 7 | - | - | - |
| ¹¹ may not be connected directly with the PC (the suitable adapter is available as accessory) | | | | | | |
| Electrical connections (dimensions in mm) | | | | | | |
| | | | | | | |
| ¹² standard: 2 m PVC cable (without ventilation tube, permissible temperature: -5 ... 70 °C) | | | | | | |
| ¹³ different cable types and lengths available, permissible temperature depends on kind of cable | | | | | | |

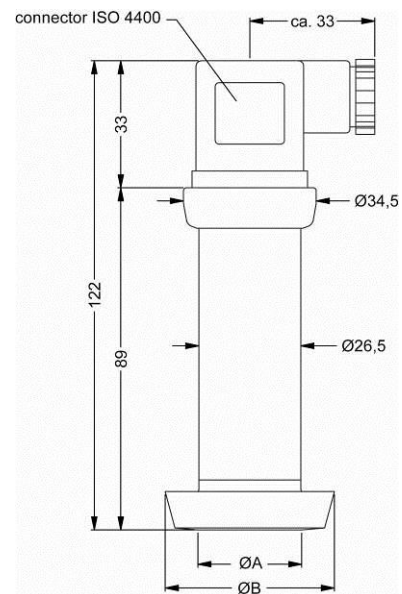
Mechanical connection (dimensions in mm)



G1/2" flush DIN 3852

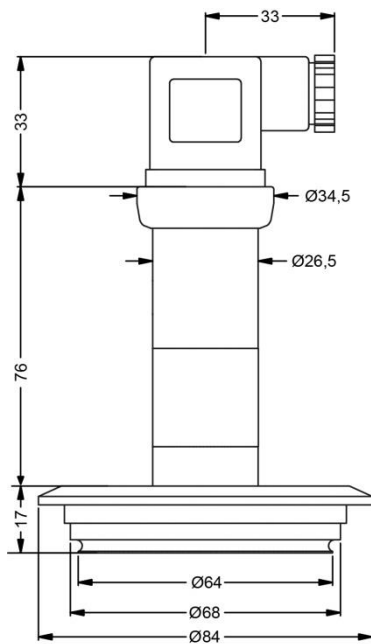


G1" flush DIN 3852

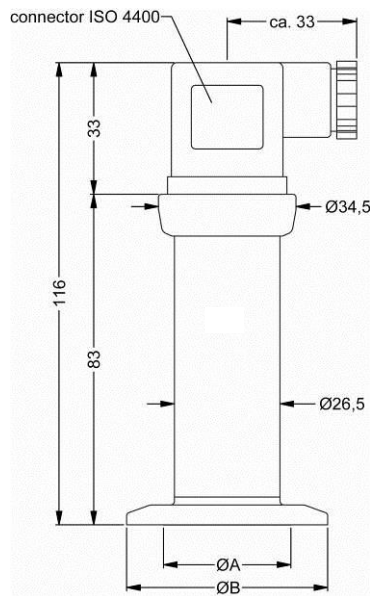


dairy pipe (DIN 11851)

| 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 |

⇨ metric threads and others on request

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