



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

- IS-version
 Ex ia = intrinsically safe for gases and dusts
- communication interface for adjustment of offset, span and damping

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

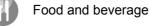
The signal from the specially designed piezoresistive stainless steel sensor is processed by the newly developed digital electronic system, performing thus an active compensation of sensor-specific deviations such as hysteresis, thermal errors and non-linearity.

The temperature range of -40 ... 125 $^\circ\text{C}$ can be extended by the integration of a cooling element up to 300 $^\circ\text{C}.$

Preferred areas of use are



Laboratory techniques





Pharmaceutical industry



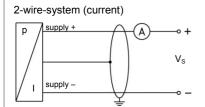


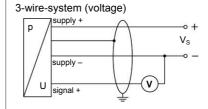
Pressure ranges ¹													
Nominal pressure		<u></u>	4	2		10	00	40					
gauge / absolute 2	[bar]	0.4	1	2	4	10	20	40					
Overpressure	[bar]	2	5	10	20	40	80	105					
Burst pressure ≥	[bar]	3	7,5	15	25	50	120	210					
Vacuum resistance				uum resistanc	e			·					
¹ On customer request we ac ² absolut pressure permissib				ssibility by softwa	are on the require	d pressure range.							
Vacuum ranges													
Nominal pressure	[bar]	-0.4 .0.4 -1 .1 -1 .2 -1 .4 -1 .10 2 5 10 20 40											
Overpressure	[bar]							40					
Burst pressure ≥	[bar]	3	7.5		15	25	50						
Output signal / Supply	,			· · · ·									
Standard		2-wire: 4	20 mA / \	$l_{0} = 12 - 36$	/==								
		2-wire: 4 20 mA / V _S = 12 36 V _{DC}											
Option IS-protection				/ _s = 14 28 \									
Options		3-wire: 0	10 V / \	ommunication $I_{\rm S}$ = 14 36 N mmunication ir	/ _{DC}								
³ only possible with el. conne	ection Bil												
Performance													
Accuracy ⁴		IEC 60770: ≤	± 0.1 % FSO										
performance after turn-de	own												
- TD ≤ 1:5		no change of	accuracv ⁵										
- TD > 1:5		-	•	wing formula (for nominal pre-	ssure rannes <	0 40 har se	e note 5) [.]					
		for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 5): $\leq \pm 10.1 + 0.015 \text{ x turn-down} \% \text{ FSO}$											
		$\leq \pm [0.1 + 0.015 \times turn-down] \% FSOwith turn-down = nominal pressure range / adjusted range$											
		e.g. with a turn-down of 1:10 following accuracy is calculated:											
		$\leq \pm (0.1 \pm 0.015 \times 10)$ % FSO i.e. accuracy is $\leq \pm 0.25$ % FSO											
Permissible load													
Influence effects		supply: 0.					10 K12						
			05 % FSO / 1	0 V		5 % FSO / kΩ	10 K12						
Long term stability			05 % FSO / 1	0 V	load: 0.0	5 % FSO / kΩ	10 K12						
Long term stability Response time		$\leq \pm (0.1 \text{ x turn})$ < 5 msec configuration of	05 % FSO / 1 -down) % FS of following pa	0 V O / year at refe arameters pos	load: 0.0	5 % FSO / kΩ ns							
Long term stability Response time		$\leq \pm (0.1 \text{ x turn})$ < 5 msec configuration of the electronic data	05 % FSO / 1 -down) % FS of following pa amping: 0 ?	0 V O / year at refe arameters pos	load: 0.0	5 % FSO / kΩ ns							
Response time		$\leq \pm (0.1 \text{ x turn})$ < 5 msec configuration of - electronic data - offset: 0 9	05 % FSO / 1 -down) % FS of following pa amping: 0 00 % FSO	0 V O / year at refe arameters pos 100 sec	load: 0.0	5 % FSO / kΩ ns							
Long term stability Response time Adjustability		≤ ± (0.1 x turn < 5 msec configuration of - electronic da - offset: 0 § - turn down o	05 % FSO / 1 -down) % FS of following pa amping: 0 00 % FSO f span: max.	0 V O / year at refe arameters pos 100 sec 1:10	load: 0.0 erence conditio sible (interface	5 % FSO / kΩ ns							
Long term stability Response time Adjustability		≤ ± (0.1 x turn < 5 msec configuration o - electronic da - offset: 0 § - turn down o <i>limit point adjust</i>	05 % FSO / 1 -down) % FSO of following pa amping: 0 7 00 % FSO f span: max. 7 ment (non-linea	0 V O / year at refe arameters pos 100 sec 1:10 arity, hysteresis,	load: 0.0 erence condition sible (interface repeatability)	5 % FSO / kΩ ns							
Long term stability Response time Adjustability $\frac{4}{3}$ accuracy according to IEC $\frac{5}{5}$ except nominal pressure ra $\leq \pm (0.1 + 0.02 \times turn-down$	ange <u>s</u> ≤ (1) % FSC	≤ ± (0.1 x turn < 5 msec configuration (- electronic da - offset: 0 § - turn down o limit point adjust 0.40 bar; for thes e.g. turn-down (05 % FSO / 1 -down) % FSO of following pa amping: 0 7 00 % FSO f span: max. 7 ment (non-lineæ se calculation of f 1.3: \$\u00e4 (0.1)	0 V O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as + 0.02 x 3) % F3	load: 0.0 erence condition sible (interface repeatability) follows: SO i.e. accuracy i	5 % FSO / kΩ ns / software nece s ≤ ± 0.16 % FSO	ssary ⁶):						
Long term stability Response time Adjustability ⁴ accuracy according to IEC ⁵ except nominal pressure ra ⁵ ± (0.1 + 0.02 x turn-down ⁶ software, interface, and cal	ange <u>s</u> ≤ (ı) % FSC ble have	≤ ± (0.1 x turm < 5 msec configuration d - electronic da - offset: 0 § - turn down o limit point adjust 0.40 bar; for thes 0 e.g. turn-down o to be ordered se	05 % FSO / 1 -down) % FSO of following pa amping: 0 2^{-1} 00 % FSO f span: max. <i>ment (non-lineæ ce calculation of</i> of 1:3: $\leq \pm (0.1 - 2^{-1})$ parately (softwo	0 V O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as + 0.02 x 3) % F are appropriate i	load: 0.0 erence condition sible (interface repeatability) follows: SO i.e. accuracy i	5 % FSO / kΩ ns / software nece s ≤ ± 0.16 % FSO	ssary ⁶):	gher, and XP)					
Long term stability Response time Adjustability ⁴ accuracy according to IEC ⁵ except nominal pressure ra ⁵ ± (0.1 + 0.02 x turn-down ⁶ software, interface, and cal	ange <u>s</u> ≤ (ı) % FSC ble have	≤ ± (0.1 x turm < 5 msec configuration d - electronic da - offset: 0 § - turn down o limit point adjust 0.40 bar; for thes 0 e.g. turn-down o to be ordered se	05 % FSO / 1 -down) % FSO of following pa amping: 0 2^{-1} 00 % FSO f span: max. <i>ment (non-lineæ ce calculation of</i> of 1:3: $\leq \pm (0.1 - 2^{-1})$ parately (softwo	0 V O / year at refe arameters pos 100 sec 1:10 arity, hysteresis, f accuracy is as + 0.02 x 3) % F are appropriate i	load: 0.0 erence condition sible (interface repeatability) follows: SO i.e. accuracy i	5 % FSO / kΩ ns / software nece s ≤ ± 0.16 % FSO	ssary ⁶):	gher, and XP)					
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Meteriala	
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 (O-ring)	standard: FKM (recommended for medium temperatures \leq 200 °C)
	option: FFKM (recommended for medium temperatures > 200 °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 (only for	4 20 mA / 2-wire)
Approvals	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X
DX 19-DMP 331Pi	zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical maximum val-	$U_i = 28 \text{ V}, I_i = 93 \text{ mA}, P_i = 660 \text{ mW}, C_i \approx 0 \text{ nF}, L_i \approx 0 \mu\text{H},$
ues	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	cable capacitance: signal line/shield also signal line/signal line: 160 pF/m
(by factory)	cable inductance:signal line/shield also signal line/signal line: 1 µH/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 x 10 ⁶ pressure cycles
CE-conformity	EMC Directive: 2014/30/EU
ATEX Directive	2014/34/EU
10 Dragouro tranomittaro ara galibrata	d in a vartical position with the pressure connection down. If this position is abapted on installation there can be clicht

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 $P_N \leq 1$ bar.

Wiring diagrams





Pin configuration

· · · · · · · · · · · · · · · · · · ·							
Electrical connections		ISO 4400	Binder 723 (5-pin)	Binder 723 (7-pin)	M12x1/ metal (4-pin)	field housing	cable colour (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	Ŧ	gnye (green- yellow)
Communication	RxD	-	-	4	-	-	-
interface 11	TxD	-	-	5	-	-	-
	GND	-	-	7	-	-	-
44							

¹¹ may not be connected directly with the PC (the suitable adapter is available as accessory)





ISO 4400

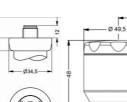
(IP 65)





Binder 723

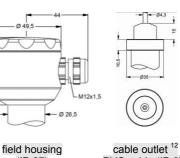
5-pin (IP 67)



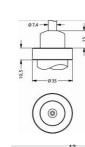
(IP 67)

M12x1

4-pin (IP 67)



PVC cable (IP 67)

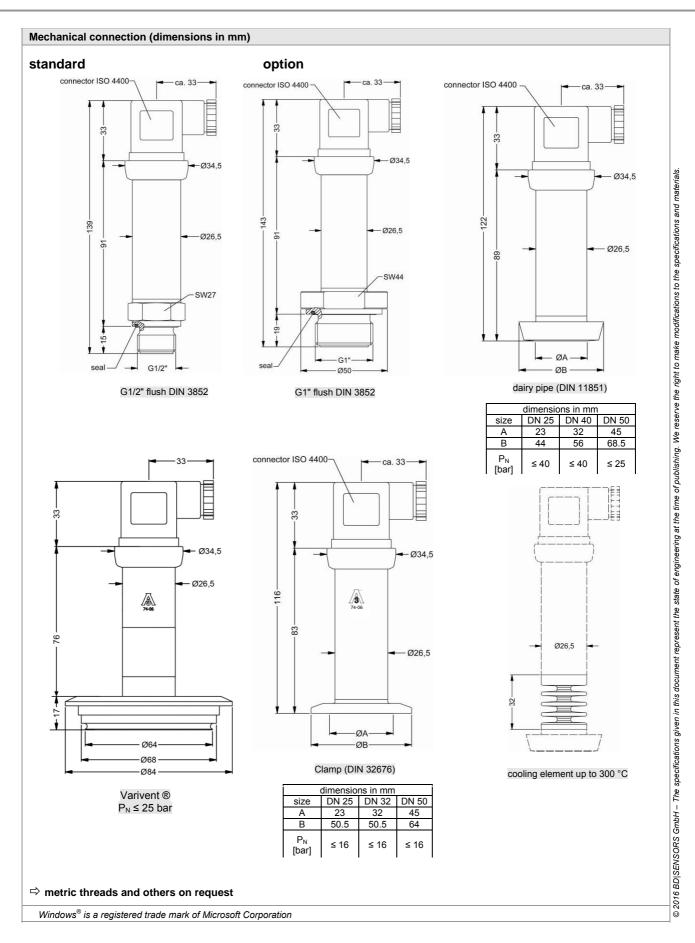


cable outlet ¹³, with ventilation tube (IP 68)

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

Binder 723

7-pin (IP 67)



JRS

pressure measurement

IS

BD SEI

	Orc	dering	coc	de D	DMI	> 33	1Pi					
DMP 331Pi			-[]	-□	П	- 🗆	□-	- []-[]-[]]
Pressure												
gauge absolute ¹	5 0 0 5 0 1											
Input [bar]												
1.0	1 0											
2.0 4.0	2 0 4 0	0 1 0 1										
10	1 0	0 2										
20 40	2 0 4 0	0 2 0 2 0 2										
-0.40 0.40 -1 1	S 4	0 0										
-1 2	V 2	0 2										
-1 4 -1 10	4 0 S 4 S 1 V 2 V 4 V 1 9 9	0 2 0 3										
Customer	99	99										consult
4 20 mA / 2-wire		1										
Intrinsic safety 4 20 mA / 2-wire 0 10 V / 3-wire customer		E 3 9										consult
Accuracy			1									
0.1% customer			9									consult
Electrical connection Male and female plug ISO 4400				1	0 0							
Male plug Binder series 723 (5-pin) Male plug Binder series 723 (7-pin) ²				2	0 0 0 0							
Cable outlet with PVC-cable ³				Т	A 0							
Cable outlet ⁴ Male plug M12x1 (4-pin) / metal				TI	R 0 1 0							
Compact field housing stainless steel 1.4305 ⁵					5 0							
customer				9	9 9							consult
Mechanical connection G1/2" with flush	_			-		7.0	0					
welded diaphragm (DIN 3852) ⁶ G1" with flush						Z 0						
welded diaphragm (DIN 3852)						Z 3						
Clamp DN 25 / 1" (DIN 32676) / 3A Clamp DN 32 / 1 1/2" (DIN 32676) / 3A						C 6 C 6	1					
Clamp DN 50 / 2" (DIN 32676) / 3A Clamp 3/4" (DIN 32676) / 3A						C 6	3					
Dairy pipe DN 25 (DIN 11851) 5						M 7	3					
Dairy pipe DN 40 (DIN 11851) ⁵ Dairy pipe DN 50 (DIN 11851) ⁵						M 7	6					
Varivent [®] DN 40/50 / 3A customer						C 6 C 6 C 6 M 7 M 7 P 4 9 9	1					consult
Diaphragm						010						Consult
Stainless steel 1.4435 (316L) Hastelloy [®] C-276 (2.4819)								1 H				
Tantalum customer								Т 9				consult consult
Seals												Consult
for clamp or dairy pipe: without for inch thread - standard: FKM									0			
for inch thread - option: FFKM									7			a successive states and stat
Filling Fluids									9			consult
silicone oil food compatible oil									1			
customer				_	_	_			ę	9		consult
Special version standard											1 1	
RS-232 interface ⁷ with cooling element up to 300 °C										1 2	2 1 1 1	
RS-232 interface and cooling element up to 300 °C 7										2	2 1	
customer										9	99	consult
absolut pressure possible from 1 bar cable socket is included in delivery standard: 2 m PVC cable without ventilation tube (permis cable with ventilation tube (code TR0 = PVC cable), differ The cup nut has to be mounted by production of pressure The cup nut has to be ordered as separate position. possible only for $P_N \ge 1$ bar RS-232 interface only possible with el. connection Binder Software, Interface and cable for DMP 331 Pi with option (Ordering code: CIS-G; Software appropriate for Windows [®] is a registrated trademark of Microsoft Corpore	rent cable types and leng transmitter with electrica series 723 (7-pin) RS-232 have to be order s [®] 95, 98, 2000, NT Versi	ths available, al connection f	price wi ield hou	ithout ca using and		nanical co	onnectio	n dairy	pipe.			
												12.03.2015