BD|SENSORS
pressure measurement

DMP 331i
DMP 333i

Precision
Pressure Transmitter

Stainless Steel Sensor

accuracy according to IEC 60770:
0.1 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 600 bar

Output signal

2-wire: 4 ... 20 mA
3-wire: 0 … 10 V
others on request

Product characteristics

► thermal error in compensated range
   -20 ... 80 °C: 0.2 % FSO
   TC 0.02 % FSO / 10K

► Turn-Down 1:10

► communication interface for adjusting
   of offset, span and damping

Optional versions

► IS-versions
   Ex ia = intrinsically safe
        for gases and dusts

► adjustment of nominal pressure
   ranges (factory-provided)

The precision pressure transmitter DMP 331i and DMP 333i demonstrate the further development of our industrial pressure transmitters.

The signal processing of sensor signal is done by digital electronics with 16-bit analogue digital converter. Consequently, it is possible to conduct an active compensation and the transmitters with excellent measurements and exceptionally attractive price to offer on the market.

Preferred areas of use are

Laboratory techniques

Energy production (gas consumption and thermal energy measurement)

BD SENSORS GmbH
BD-Sensors-Straße 1
D - 95199 Thierstein

Tel.: +49 (0) 92 35 / 98 11- 0
Fax: +49 (0) 92 35 / 98 11- 11

www.bdsensors.com
info@bdsensors.de

Pressure ranges DMP 331i [1]

Nominal pressure gauge / absolute	[bar]	0.4	1	2	4	10	20	40	60
Overpressure	[bar]	2	5	10	20	40	80	105	105
Burst pressure	[bar]	3	7.5	15	25	50	120	210	210

Vacuum ranges

Nominal pressure gauge	[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	

Pressure ranges DMP 333i [1]

Nominal pressure gauge / absolute	[bar]	100	200	400	600
Overpressure	[bar]	210	600	1000	1000
Burst pressure	[bar]	420	1000	1250	1250

[1] On customer request we adjust the device within the turn-down-possibility by software on the required pressure range.

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 analogue signal	2-wire:	4 ... 20 mA	with communication interface [2]	
	3-wire:	0 ... 10 V	/	V_S = 14 ... 36 V_{DC}
		0 ... 10 V	with communication interface [2]	

[2] only possible with el. connection Binder series 723 (7-pin)

Performance

Accuracy	IEC 60770 [3]: ≤ ± 0.1 % FSO
performance after turn-down	
- TD ≤ 1:5	no change of accuracy [4]
- TD > 1:5	for calculation use the following formula (for nominal pressure ranges ≤ 0.40 bar see note 4):
	≤ ± [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	approx. 5 msec
Adjustability (with option communication interface RS232)	configuration of following parameters possible (interface / software necessary [5]): electronic damping: 0 ... 100 sec offset: 0 ... 90 % FSO turn down of span: max. 1:10

[3] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)
[4] 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
[5] 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 (Offset and Span) / Permissible temperatures

Tolerance band	[% FSO]	≤ ± (0.2 x turn-down)	in compensated range -20 ... 80 °C
TC, average	[% FSO / 10 K]	± (0.02 x turn-down)	in compensated range -20 ... 80 °C
Permissible temperatures		medium:	-25 ... 125 °C
		electronics / environment:	-25 ... 85 °C
		storage:	-40 ... 100 °C

Electrical protection

Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326

Materials

Pressure port	stainless steel 1.4404 (316 L)
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	FKM
	NBR
	welded version [6] others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seal, diaphragm

[6] welded version only with pressure ports according to EN 837; welded version not available with pressure ranges > 60 bar

Mechanical stability

Vibration	10 g RMS (20 ... 2000 Hz)	according to DIN EN 60068-2-6
Shock	100 g / 11 msec.	according to DIN EN 60068-2-27

Explosion protection (only for 4 ... 20 mA / 2-wire)		
Approvals DX19-DMP 331i	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X	
DX19-DMP 333i	zone 0: II 1G Ex ia IIC T4 Ga	zone 20: II 1D Ex ia IIIC T 85°C Da
Safety technical max. values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \approx$ 0 nF, $L_i \approx$ 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: -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: 1μH/m	

Miscellaneous		
Current consumption	signal output current: max. 25 mA	signal output voltage: max. 7 mA
Weight	approx. 200 g	
Installation position	any [7]	
Operational life	100 million load cycles	
CE-conformity	EMC Directive: 2014/30/EU	Pressure Equipment Directive: 2014/68/EU (module A) [8]
ATEX Directive	2014/34/EU	

[7] 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.
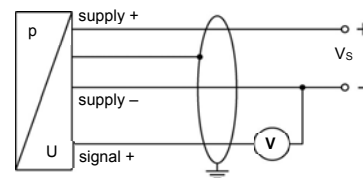[8] This directive is only valid for devices with maximum permissible overpressure > 200 bar.

## Wiring diagrams

2-wire-system (current)
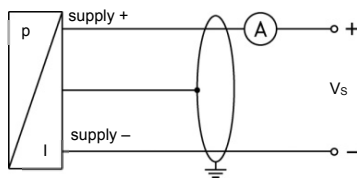
3-wire-system (voltage)

Pin configuration

Electrical connections		ISO 4400	Binder 723 (5-pin)	Binder 723 (7-pin)	M12x1/metal (4-pin)	Bayonet MIL-C-26482 (10-6) 2-wire	Bayonet MIL-C-26482 (10-6) 3-wire	compact field housing	cable colours (IEC 60757)
	supply +	1	3	3	1	A	A	IN +	WH (white)
	supply –	2	4	1	2	B	D	IN –	BN (brown)
	signal + (only for 3-wire)	3	1	6	3	-	B	OUT +	GN (green)
	shield	ground pin ⏚	5	2	4	pressure port	pressure port	⏚	GNYE (green-yellow)
Communication interface RS232 [9]	RxD	-	-	4	-	-	-	-	-
	TxD	-	-	5	-	-	-	-	-
	GND	-	-	7	-	-	-	-	-

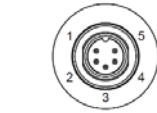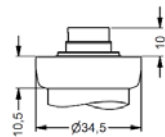[9] may not be transmitted directly with the PC (the suitable adapter is available as accessory)

Electrical connections (dimensions in mm)

standard   **options**
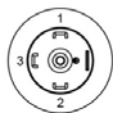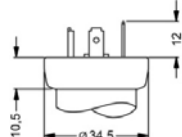
ISO 4400 (IP 65)

Binder series 723 5-pin (IP 67)
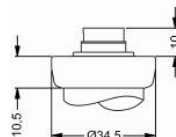
Binder series 723 7-pin (IP 67)
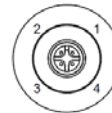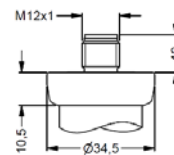
M12x1 4-pin (IP 67)
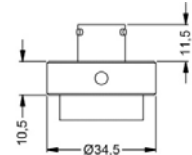
Bayonet MIL-C-26482 (10-6) (IP 67)
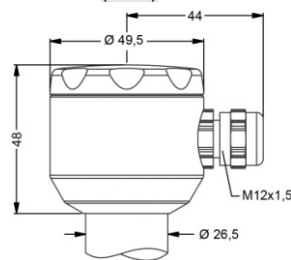
compact field housing (IP 67)
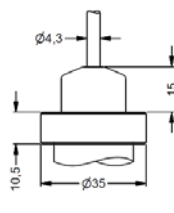
cable outlet with PVC cable (IP 67) [10]
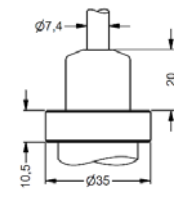
cable outlet, cable with ventilation tube (IP 68) [11]

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

[10] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C)
[11] different cable types and lengths available, permissible temperature depends on kind of cable

Mechanical connections (dimensions in mm)
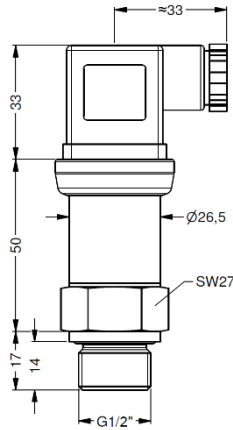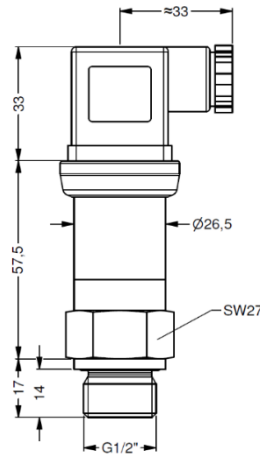
DMP331i [12]	DMP 333i [12, 13]	DMP 331i with communication interface RS232
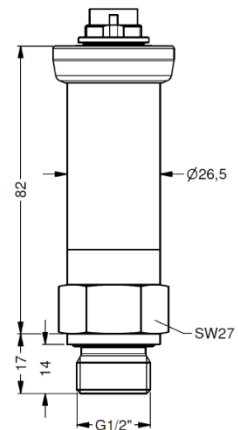
G1/2" DIN 3852   G1/2" DIN 3852   G1/2" DIN 3852

Optional
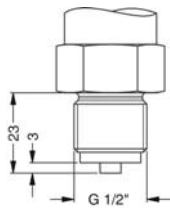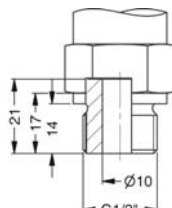
G1/2" EN 837   G1/2" DIN 3852 open port, $P_N \leq 40$ bar   1/2" NPT
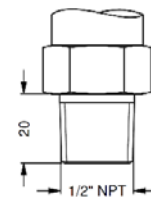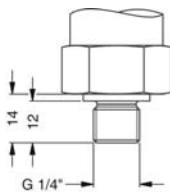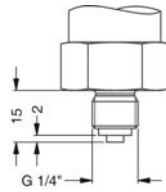
G1/4" DIN 3852   G1/4" EN 837   1/4" NPT

⇨ **metric threads and others on request**

[12] with electrical connection Bayonet MIL-C-26482 (10-6) increases the length of devices by 5 mm
[13] for nominal pressure PN > 400 bar increases the length without IS-version by 19 mm and with IS-version by 39 mm
Windows® is a registered trade mark of Microsoft Corporation

BD|SENSORS
pressure measurement

Ordering code DMP 331i / DMP 333i

DMP 331i / DMP 333i   □□□ - □□□□ - □ - □ - □□□ - □□□ - □ - □□□

Pressure

For DMP 331i				
gauge	1	1	0	
absolute	1	1	1	
For DMP 333i				
gauge [1]	1	3	0	
absolute	1	3	1	

Input

	[mH₂O]	[bar]					
For DMP 331i [2]							
	4	0.40	4	0	0	0	
	10	1.0	1	0	0	1	
	20	2.0	2	0	0	1	
	40	4.0	4	0	0	1	
	100	10	1	0	0	2	
	200	20	2	0	0	2	
	400	40	4	0	0	2	
	600	60	6	0	0	2	
For DMP 333i [2]							
		100	1	0	0	3	
		200	2	0	0	3	
		400	4	0	0	3	
		600	6	0	0	3	
For DMP 331i							
		-0.40 … 0.40	S	4	0	0	
		-1 … 1	S	1	0	2	
		-1 … 2	V	2	0	2	
		-1 … 4	V	4	0	2	
		-1 … 10	V	1	0	3	
		customer	9	9	9	9	consult

Output

4 … 20 mA / 2-wire	1	
intrinsic safety 4 … 20 mA / 2-wire	E	
0 … 10 V / 3-wire	3	
customer	9	consult

Accuracy (at nominal pressure)

0.1 % FSO	1	
customer	9	consult

Electrical connection

male and female plug ISO 4400	1	0	0	
male plug Binder series 723 (5-pin)	2	0	0	
male and female plug Binder series 723 (7-pin)	A	0	0	
male plug M12x1 (4-pin) / metal for analog output	M	1	0	
male plug M12x1 (4-pin) / metal for digital output	M	1	3	
Bayonet MIL-C-26482 (10-6); 2 wire	B	G	0	
Bayonet MIL-C-26482 (10-6); 3 wire	B	G	4	
cable outlet with PVC cable (IP67) [3]	T	A	0	
cable outlet, cable with ventilation tube (IP68) [4]	T	R	0	
compact field housing stainless steel 1.4301 (304)	8	5	0	
customer	9	9	9	consult

Mechanical connection

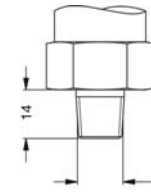|				
G1/2" DIN 3852	1	0	0	
G1/2" EN 837	2	0	0	
G1/4" DIN 3852	3	0	0	
G1/4" EN 837	4	0	0	
G1/2" DIN 3852 with flush sensor [5]	F	0	0	
G1/2" DIN 3852 open pressure port [5]	H	0	0	
1/2" NPT	N	0	0	
1/4" NPT	N	4	0	
customer	9	9	9	consult

Seals

For DMP 331i		
FKM	1	
without (welded version) [5, 6]	2	
For DMP 333i		
FKM	1	
NBR	5	
customer	9	consult

Special version

standard	1	1	1	
communication interface RS232 [7]	1	2	1	
customer	9	9	9	consult

[1] measurement starts with ambient pressure

[2] pressure ranges ≤ 60 bar as DMP 331i; pressure ranges > 60 bar as DMP 333i

[3] standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request

[4] code TR0 = PVC cable, cable with ventilation tube available in different types and lengths

[5] only possible for DMP 331i and P_N ≤ 40 bar

[6] welded version only with pressure ports according to EN 837

[7] Communication interface RS232 only possible with el. connection Binder serie 723 (7pin)

Software, Interface and cable for DMP 331i and DMP 333i with option RS-232 have to be order separately

(Ordering code: CIS-G; Software appropriate for Windows® 95, 98, 2000, NT Version 4.0 or newer and XP)

Windows® is a registrated trademark of Microsoft Corporation

01.04.2020