LR-Cal

DRUCK & TEMPERATUR LEITENBERGER

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 ana-logue
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)

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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 - TD > 1:5	 no change of accuracy [4] 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

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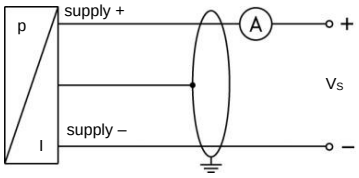
Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-DMP 331i DX19-DMP 333i	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical max. values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, $C_i \approx 0$ nF, $L_i \approx 0$ 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: -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: 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	

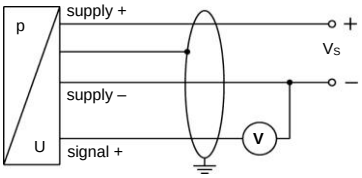
[7] *Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges $p_N \leq 1$ bar.*
[8] *This directive is only valid for devices with maximum permissible overpressure > 200 bar.*

Wiring diagrams

2-wire-system (current)



3-wire-system (voltage)

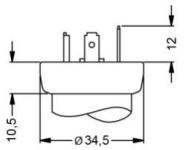


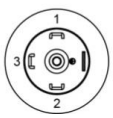
Pin configuration

Electrical connections		ISO 4400	Binder 723 (5-pin)	Binder 723/423 (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		⏚	GNYE (green-yellow)
Communication interface RS232 [9]	RxD	-	-	4	-	-		-	-
	TxD	-	-	5	-	-		-	-
	GND	-	-	7	-	-		-	-

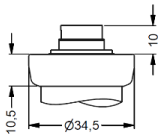
[9] *may not be transmitted directly with the PC (the suitable adapter is available as accessory)*

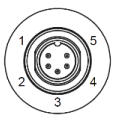
Electrical connections (dimensions in mm)



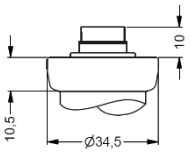


ISO 4400
(IP 65)

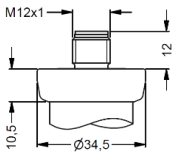


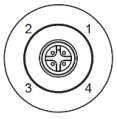


Binder series 723, 5-pin
(IP 67)

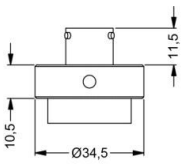


Binder series 723, 7-pin
(IP 67)

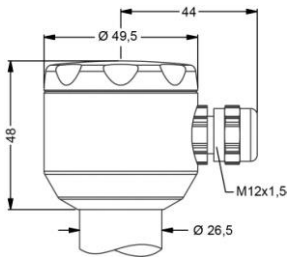




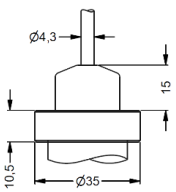
M12x1, 4-pin
(IP 67)



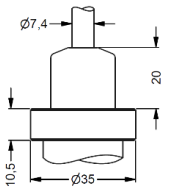
Bayonet MIL-C-26482 (10-6)
(IP 67)



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*

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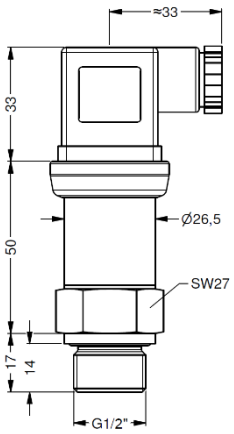
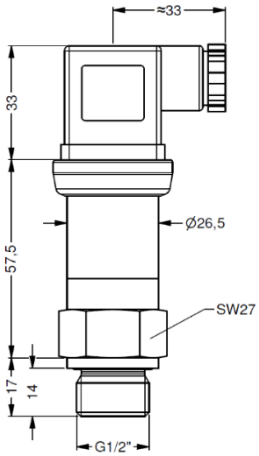
Mechanical connections (dimensions in mm)

DMP331i [12]



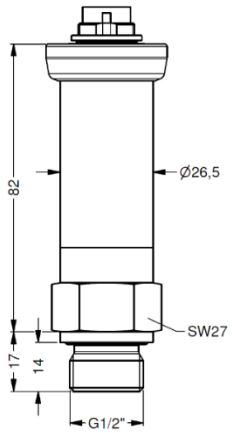
G1/2" DIN 3852

DMP 333i [12, 13]



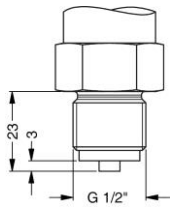
G1/2" DIN 3852

DMP 331i with communication interface RS232

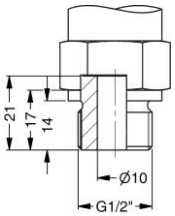


G1/2" DIN 3852

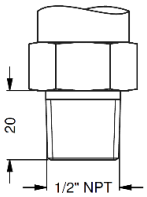
Optional



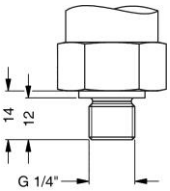
G1/2" EN 837



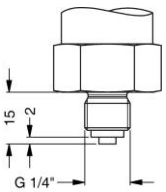
G1/2" DIN 3852
open port, $p_N \leq 40$ bar



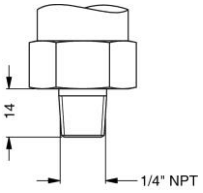
1/2" NPT



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 p_N > 400 bar increases the length without IS-version by 19 mm and with IS-version by 39 mm
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Ordering code **DMP 331i / DMP 333i**

DMP 331i / DMP 333i ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐☐☐

Option	[mH₂O]	[bar]	Code	
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	[mH$_2$O]	[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 plug Binder series 723 (7-pin) and female plug Binder series 423 (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] [redacted]ion 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 723/423 (7pin). Software, Interface and cable for DMP 331i and DMP 333i with option RS232 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

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