

DMP 331i / DMP 333i LMP 331 i



Precision Pressure Transmitter / Screw-in 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
- ▶ 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
gauges (factory-provided)
- ▶ digital signal RS485 ModBus RTU



The precision pressure transmitter DMP 331i and DMP 333i also the precision screw-in transmitter LMP 331i demonstrate the further development of our industrial pressure transmitters.

The signal processing of sensor signal is done by digital electronics with 16-bit analog 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 DMP 331i / DMP 333i

-  Laboratory Techniques
-  Energy production (gas consumption and thermal energy measurement)

Preferred areas of use are LMP 331i

-  Chemical / petrochemical industry
-  Environmental Engineering
(water / sewage / recycling)



Pressure ranges DMP 331 i ¹								
Nominal pressure gauge / absolute	[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

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

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

Pressure ranges DMP 333 i ¹						
Nominal pressure gauge / absolute	[bar]	60	100	200	400	600
Overpressure	[bar]	210	210	600	1000	1000
Burst pressure	[bar]	420	420	1000	1250	1250

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

Pressure ranges LMP 331 i ¹								
Nominal pressure gauge / absolute	[bar]	0.4	1	2	4	10	20	40
Level gauge	[mH ₂ O]	4	10	20	40	100	200	400
Overpressure	[bar]	2	5	10	20	40	80	105
Burst pressure	[bar]	3	7.5	15	25	80	120	210

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-protection	2-wire: 4 ... 20 mA / V _S = 14 ... 28 V _{DC}
Options analog 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
Option digital signal ³	RS485 ModBus RTU / V _S = 14 ... 36 V _{DC} (no analog signal and TD available)

² only possible with el. connection Binder series 723 (7-pin)
³ only possible with el. connection Binder series 723 (5-pin), M12x1 (4-pin), cable outlet

Performance	
Accuracy performance after turn-down - TD ≤ 1:5 - TD > 1:5	IEC 60770 ⁴ : ≤ ± 0.1 % FSO no change of accuracy ⁴ 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	approx. 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)

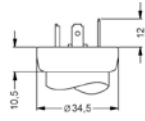
Thermal effects (Offset and Span) / Permissible temperatures			
Tolerance band	[% FSO]	≤ ± (0.2 x turn-down) in compensated range	-20 ... 80 °C
TC, average	[% FSO / 10 K]	± (0.02 x turn-down) in compensated range	-20 ... 80 °C
Permissible temperatures		medium: -25 ... 125 °C electronics / environment: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

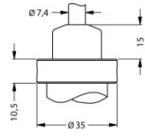
Materials						
Pressure port	stainless steel 1.4404 (316 L)					
Housing	stainless steel 1.4404 (316 L)					
Seals	DMP 331i / LMP 331i: FKM DMP 333i: NBR optional: welded version ⁷ others on request					
Diaphragm	stainless steel 1.4435 (316L)					
Media wetted parts	pressure port, seals, diaphragm					
⁷ welded version only with pressure ports according to EN 837; welded version not available with pressure ranges ≤ 0.16 bar and > 40 bar						
Mechanical stability						
Vibration	10 g RMS (20 ... 2000 Hz)					
Shock	100 g / 11 msec.					
Explosion protection (only for 4 ... 20 mA / 2-wire)						
Approvals	DX19-DMP 331i DX19-DMP 333i DX19-LMP 331i					
	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 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, $L_i \approx 0$ μ H, 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 ... 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 μ H/m					
Miscellaneous						
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA					
Weight	approx. 200 g					
Installation position	any ⁸					
Operational life	$> 100 \times 10^6$ pressure cycles					
CE-conformity	EMC Directive: 2004/108/EC Pressure Equipment Directive: 97/23/EC (module A) ⁹					
ATEX Directive	94/9/EG					
⁸ 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.						
⁹ This directive is only valid for devices with maximum permissible overpressure > 200 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)	field housing	cable colours (DIN 47100)
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	\perp	ye/gn (yellow / green)
Communication interface ¹⁰	RxD	-	4	-	-	-
	TxD	-	5	-	-	-
	GND	-	7	-	-	-
Digital signal RS485	supply +	-	3	-	-	wh (white)
	GND	-	4	-	-	bn (brown)
	pin A	-	1	-	-	ye (yellow)
	pin B	-	2	-	-	pk (pink)
	shield	-	5	-	pressure port	ye/gn (yellow / green)
¹⁰ may not be transmitted directly with the PC (the suitable adapter is available as accessory)						

Electrical connections (dimensions in mm)

standard

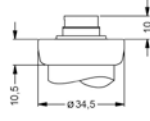


ISO 4400
(IP 65)

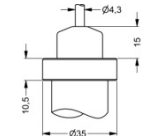


cable outlet with ventilation tube
(IP 68)¹⁰

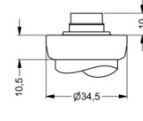
option



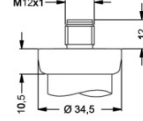
Binder Series 723 5-pin
(IP 67)



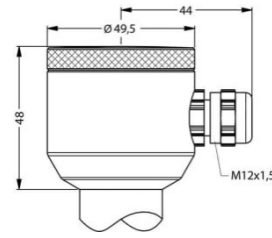
cable outlet with PVC cable
(IP 67)¹¹



Binder Series 723 7-pin
(IP 67)



M12x1 4-pin
(IP 67)



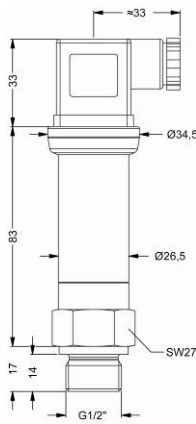
compact field housing
(IP 67)

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

Mechanical connection (dimensions in mm)

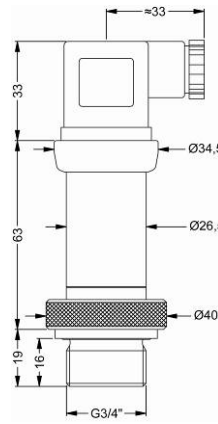
standard

DMP 331 i / DMP 333 i *



G1/2" DIN 3852

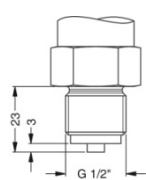
LMP 331 i



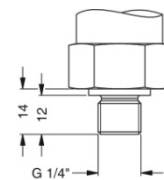
G3/4" DIN 3852

* for nominal pressure $P_N > 400$ bar increases the length of DMP 333i without IS-version by 19 mm and of DMP 333i with IS-version by 39 mm

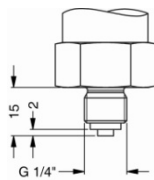
option for DMP 331 i and DMP 333 i



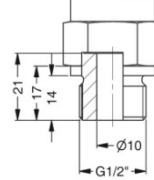
G1/2" EN 837



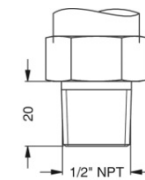
G1/4" DIN 3852



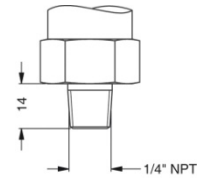
G1/4" EN 837



G1/2" open port



1/2" NPT



1/4" NPT

⇨ metric threads and others on request

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Ordering code DMP 331i/ DMP 333i/ LMP 331i

DMP 331i/ DMP 333i/ LMP 331i

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Pressure										
For DMP 331i										
	gauge	1	1	0						
	absolute	1	1	1						
For DMP 333i										
	gauge ¹	1	3	0						
	absolute	1	3	1						
For LMP 331i										
	in bar	4	3	0						
	in mH ₂ O	4	3	1						
Input										
	[mH ₂ O]		[bar]							
For DMP 331i² or LMP 331i										
	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			
For DMP 333i²										
	60			6	0	0	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		
	digital output (ModBus)							2D		
	customer							9		consult
Accuracy (at nominal pressure)										
	0.1 %							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			
	Compact field housing stainless steel 1.4404 (316L)				8	5	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			
	Cable outlet with PVC cable ³				T	A	0			
	Cable outlet ⁴				T	R	0			
	customer				9	9	9			consult
Mechanical connection										
For DMP 331i or DMP 333i										
	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 ^{5,6} flush sensor				F	0	0			
	G1/2" DIN 3852 open pressure port ⁶				H	0	0			
	1/2" NPT				N	0	0			
	1/4" NPT				N	4	0			
For LMP 331i										
	G3/4" DIN 3852 with flush sensor				K	0	0			
	customer				9	9	9			consult
Seals										
For DMP 331i or LMP 331i										
	FKM							1		
	without (welded version) ⁷							2		
For DMP 333i										
	NBR							5		
	customer							9		consult
Special version										
	standard							1	1	1
	RS-232 interface ⁸							1	2	1
	RS485 Modbus RTU ⁹							1	4	1
	customer							9	9	9

¹ measurement starts with ambient pressure
² pressure ranges ≤ 40 bar as DMP 331i; pressure ranges > 40 bar as DMP 333i
³ standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C), optionally cable with ventilation tube
⁴ cable with ventilation tube (code TR0 = PVC cable), different cable types and lengths available, price without cable
⁵ Mechanical connection G1/2" DIN 3852 flush impossible for vacuum ranges
⁶ only possible for DMP 331i
⁷ welded version only with pressure ports according to EN 837; not possible with pressure ranges ≤ 0.16 bar and > 40 bar
⁸ RS-232 interface only possible with el. connection Binder serie 723 (7pin)
 Software, Interface and cable for DMP 331i, DMP 333i and LMP 331i 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)
⁹ RS485 Modbus RTU only possible with el. connection Binder serie 723 (5pin), Male plug M12x1 (4-pin) and cable outlet
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