

# DMP 331

## Industrial Pressure Transmitter for Low Pressure

- ▶ piezoresistive stainless steel sensor
- ▶ accuracy:
  - 0.175 %, 0.125 %, 0.10 %, 0.05 % FSO BFSL
  - (0.35 %, 0.25 %, 0.2 %, 0.1 % FSO IEC 60770)
- ▶ nominal pressure ranges from 0 ... 40 mbar up to 0 ... 40 bar

The DMP 331 is a pressure transmitter for universal use in all branches of industry. Permissible media are compressed air, non-aggressive gases, steam, water, heating and diesel oil as well as all with stainless steel 1.4571 resp. 1.4435 compatible media.

A piezoresistive stainless steel sensor, which features small thermal effect and excellent linearity generate the basis of the DMP 331. So it is possible to meet accuracy demands up to 0,1 % FSO (IEC 60770).

A variety of standard output signals as well as mechanical and electrical connections make the DMP 331 covering a wide field of applications. Additional it is possible to use the DMP 331 in explosive area (zone 0 / 20).

Typical areas of use are:

- ▶ pneumatics / hydraulics
- ▶ process control and chemical industry
- ▶ environmental engineering
- ▶ measurement technology

- ▶ small thermal effect
- ▶ excellent linearity
- ▶ option Ex-version (only for 4 ... 20 mA / 2-wire) TÜV 03 ATEX 2006 X
- ▶ option: flush pressure port
- ▶ customer specific versions:
  - special pressure ranges
  - variety of electrical and mechanical connections
  - other versions on request

Characteristics

**DMP 331**  
Industrial Pressure Transmitter



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Technical Data

## Input pressure range

Nominal pressure gauge [bar]	-1...0	0.04	0.06	0.10	0.16	0.25	0.4	0.6	1.0	1.6	2.5	4.0	6.0	10	16	25	40
Nominal pressure abs. [bar]	-	-	-	0.10	0.16	0.25	0.4	0.6	1.0	1.6	2.5	4.0	6.0	10	16	25	40
Permissible overpressure [bar]	3	0.2	0.2	0.5	0.5	1	1	3	3	6	6	20	20	20	60	100	100

## Output signal / Supply

Standard	2-wire:	4 ... 20 mA / $V_s = 12 \dots 36 V_{DC}$	Ex-protection:	$V_s = 14 \dots 28 V_{DC}$
Optional	3-wire:	0 ... 20 mA / $V_s = 14 \dots 36 V_{DC}$ 0 ... 10 V / $V_s = 14 \dots 36 V_{DC}$		

## Performance

Accuracy	standard: nominal pressure > 0.4 bar nominal pressure ≤ 0.4 bar option 1: nominal pressure > 0.4 bar option 2: nominal pressure ≥ 1 bar option 3: nominal pressure ≥ 0.16 bar	IEC 60770 <sup>1</sup> ≤ ± 0.35 % FSO ≤ ± 0.50 % FSO ≤ ± 0.25 % FSO ≤ ± 0.20 % FSO ≤ ± 0.10 % FSO	BFSL ≤ ± 0.175 % FSO ≤ ± 0.250 % FSO ≤ ± 0.125 % FSO ≤ ± 0.100 % FSO ≤ ± 0.050 % FSO
Permissible load	current 2-wire: $R_{max} = [(V_s - V_{smin}) / 0.02] \Omega$ current 3-wire: $R_{max} = 500 \Omega$ voltage 3-wire: $R_{min} = 10 k\Omega$		
Influence effects	supply: 0.05 % FSO / 10 V	load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.1 % FSO / year		
Response time <sup>2</sup>	< 5 msec		

## Thermal errors (Offset and Span - standard)

Nominal pressure $P_N$ [bar]	-1 ... 0	≤ 0.1	≤ 0.25	≤ 0.4	≤ 1.0	> 1.0
Tolerance band [% FSO]	≤ ± 0.75	≤ ± 2.0	≤ ± 1.5	≤ ± 1.0	≤ ± 1.0	≤ ± 0.75
TC, average [% FSO / 10 K]	± 0.07	± 0.3	± 0.2	± 0.14	± 0.1	± 0.07
in compensated range [°C]	0 ... 70		0 ... 50			0 ... 70

## Thermal errors (Offset and Span - optional for -20 ... 50 °C)

Nominal pressure $P_N$ [bar]	-1 ... 0	≤ 0.25	≤ 0.4	≤ 1.0	> 1.0
Tolerance band [% FSO]	≤ ± 1.5	≤ ± 2.0	≤ ± 1.5	≤ ± 1.0	≤ ± 0.75
TC, average [% FSO / 10 K]	± 0.2	± 0.3	± 0.2	± 0.1	± 0.07
in compensated range [°C]			-20 ... 50		

## Electrical protection

Short-circuit protection	permanent
Reverse polarity protection	no damage, but also no function
Electromagnetic compatibility	emission and immunity according to EN 61326
Option Ex-protection only with 4 ... 20 mA / 2-wire DX13-DMP 331	zone 0 <sup>3</sup> : II 1 G EEx ia IIC T4 zone 20: II 1 D T 85°C safety technical maximum values: $V_i = 28 V$ , $I_i = 93 mA$ , $P_i = 660 mW$ , $C_i \leq 1 nF$ , $L_i \leq 10 \mu H$

## Permissible temperatures

Medium	-25 ... 125 °C	
Electronics / environment	-25 ... 85 °C	Ex-protection: application in zone 0: -20 ... 60 °C application in zone 1 or higher: -25 ... 70 °C
Storage	-40 ... 100 °C	

<sup>1</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

<sup>2</sup> with optional accuracy 0.1 % FSO the response time is 200 msec

<sup>3</sup> approved for atmospheric pressure from 0.8 bar up to 1.1 bar

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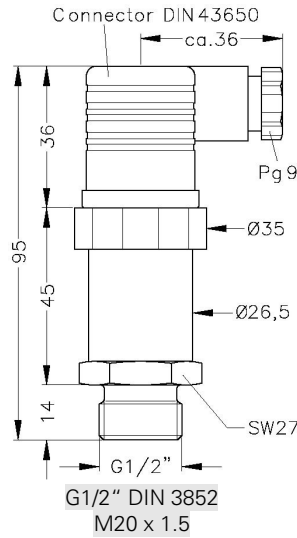
Technical Data

## Mechanical stability

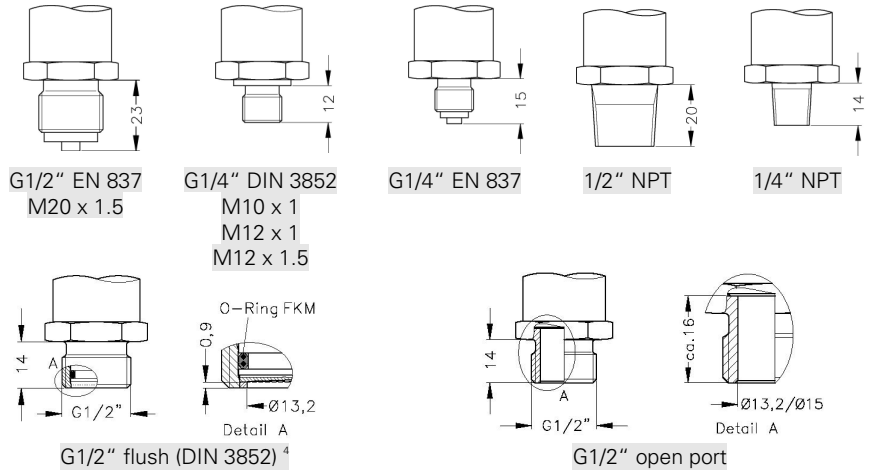
Vibration	10 g RMS (20 ... 2000 Hz)
Shock	100 g / 11 msec

## Mechanical connection

### Standard



### Optional

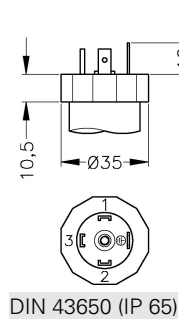


⇒ Total length of devices with Ex-protection increases by 20 mm!

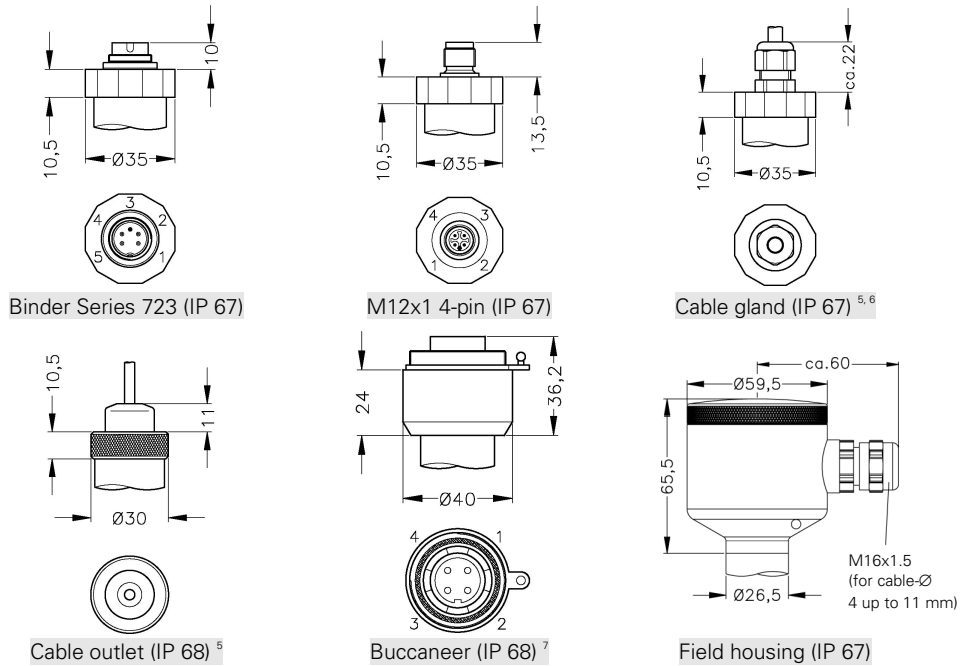
⇒ Total length of devices with accuracy 0.1 % FSO IEC 60770 increases by 37 mm! (standard and Ex-protection)

## Electrical connection

### Standard



### Optional



<sup>4</sup> impossible for nominal pressure  $P_N < 0.1$  bar and for vacuum ranges

<sup>5</sup> different cable types and lengths available

<sup>6</sup> standard: 2m PVC cable without ventilation tube, optionally cable with ventilation tube

<sup>7</sup> for gauge pressure cable with ventilation tube required

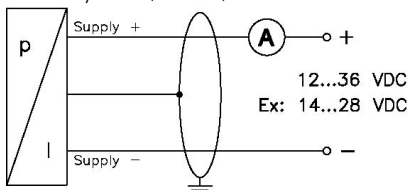
Materials	
Pressure port	stainless steel 1.4571 (316Ti)
Housing	standard: stainless steel 1.4301 (304) field housing: stainless steel 1.4305 (303), cable gland: brass, nickel plated
Seals (media wetted)	standard: FKM optional: EPDM; welded version <sup>8</sup> ; others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

Miscellaneous			
Cable capacitance <sup>9</sup>	cable without air tube:	signal line/shield: 160 pF/m	signal line/signal line: 120 pF/m
	cable with air tube:	signal line/shield: 150 pF/m	signal line/signal line: 100 pF/m
Cable inductance <sup>9</sup>	cable without air tube:	signal line/shield: 0.65 µH/m	signal line/signal line: 0.65 µH/m
	cable with air tube:	signal line/shield: 1.0 µH/m	signal line/signal line: 1.0 µH/m
Current consumption	signal output current:	max. 25 mA	
	signal output voltage:	max. 7 mA	
Weight	approx. 140 g		
Installation position	any <sup>10</sup>		
Operational life	> 100 x 10 <sup>6</sup> cycles		

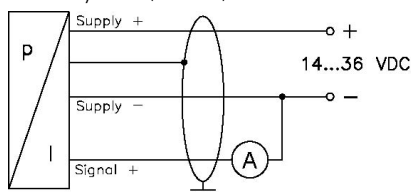
Pin configuration						
Electrical connection		DIN 43650	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	cable colours <sup>9</sup> (DIN 47100)
2-wire-system	Supply +	1	3	1	1	white
	Supply -	2	4	2	2	brown
	Ground	ground pin	5	4	4	yellow / green (shield)
3-wire-system	Supply +	1	3	1	1	white
	Supply -	2	4	2	2	brown
	Signal +	3	1	3	3	green
	Ground	ground pin	5	4	4	yellow / green (shield)

### Wiring diagrams

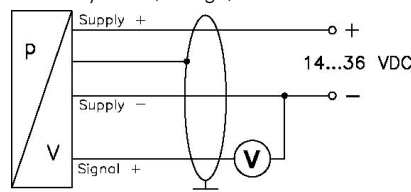
2-wire-system (current)



3-wire-system (current)



3-wire-system (voltage)



<sup>8</sup> welded version only with pressure ports according to EN 837; welded version not available with pressure ranges  $\leq 0.16$  bar

<sup>9</sup> if the electrical connection is a mounted cable by factory

<sup>10</sup> 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.

**Ordering code DMP 331**

**DMP 331**

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<b>Pressure</b>			
gauge	1	1	0
absolute <sup>1</sup>	1	1	1
<b>Input [bar]</b>			
0,04	0	4	0 0
0,06	0	6	0 0
0,10	1	0	0 0
0,16	1	6	0 0
0,25	2	5	0 0
0,40	4	0	0 0
0,60	6	0	0 0
1,0	1	0	0 1
1,6	1	6	0 1
2,5	2	5	0 1
4,0	4	0	0 1
6,0	6	0	0 1
10	1	0	0 2
16	1	6	0 2
25	2	5	0 2
40	4	0	0 2
-1 ... 0	X	1	0 2
customer	9	9	9 9
<b>Output</b>			
4 ... 20 mA / 2-wire			1
0 ... 20 mA / 3-wire			2
0 ... 10 V / 3-wire			3
Intrinsic safety 4 ... 20 mA / 2-wire			E
customer			9
<b>Accuracy</b>			
standard for P <sub>N</sub> > 0,4 bar	0,35 %		3
standard for P <sub>N</sub> ≤ 0,4 bar	0,5 %		5
option 1 for P <sub>N</sub> > 0,4 bar	0,25 %		2
option 2 for P <sub>N</sub> ≥ 1 bar	0,2 %		B
option 3 for P <sub>N</sub> ≥ 0,16 bar	0,1 %		1
customer			9
<b>Electrical connection</b>			
Male and female plug DIN 43650		1	0 0
Binder series 723 (5-pin)		2	0 0
Cable gland incl. Cable <sup>2, 3</sup>		4	0 0
Cable outlet <sup>2</sup>		T	R 0
Male plug Buccaneer IP68 <sup>4</sup>		5	0 0
M12x1 (4-pin)		M	0 0
Field housing stainless steel		8	0 0
customer		9	9 9
<b>Mechanical connection</b>			
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 <sup>5</sup>		F	0 0
flush sensor			
G1/2" DIN 3852 open pressure port		H	0 0
1/2" NPT		N	0 0
1/4" NPT		N	4 0
customer		9	9 9
<b>Seals</b>			
FKM			1
EPDM			3
without (welded version) <sup>6</sup>			2
customer			9
<b>Special version</b>			
standard		0	0 0
special compensation -20 ... 50 °C		0	0 6
customer		9	9 9

<sup>1</sup> absolute pressure possible from 0,1 bar

<sup>2</sup> different cable types and lengths deliverable

<sup>3</sup> standard: 2 m PVC cable without ventilation tube, optionally cable with ventilation tube

<sup>4</sup> for gauge pressure cable with ventilation tube required

<sup>5</sup> Mechanical connection G1/2" DIN 3852 flush impossible for nominal pressure P<sub>N</sub> < 0.1 bar and for vacuum ranges

<sup>6</sup> welded version only with pressure ports according to EN 837; not possible with pressure ranges ≤ 0.16 bar

