



# DMK 331 P

## Pressure Transmitter with Flush Stainless Steel Diaphragm

- ▶ ceramic sensor
- ▶ for viscous and pasteous media
- ▶ accuracy:  
0.25 % FSO BFSL  
(0.5 % FSO IEC 60770)
- ▶ nominal pressure ranges from  
0 ... 1 bar up to 0 ... 400 bar

The DMK 331 P is a pressure transmitter for process measurement. Because of its flush diaphragm the DMK 331 P is suited for viscous media and gases, which are compatible stainless steel 1.4435 (316L) and sealing material.

Basic element of the DMK 331 P is a ceramic sensor, which features small thermal effect, good linearity and long term stability. Different filling fluids are available: besides silicon oil, food compatible oil, and Halocarbon; others are available on request.

For usage at higher temperatures a cooling element can be delivered optionally. Different output signals and electrical connections make the DMK 331 P covering a wide field of applications. Additional the pressure transmitter can be used in explosive area.

Preferred areas of use are:

- ▶ process engineering
- ▶ chemical industry
- ▶ food industry
- ▶ paper industry

- ▶ small thermal effect
- ▶ good linearity
- ▶ good long term stability
- ▶ option Ex version:  
(only for 4 ... 20 mA / 2-wire)  
TÜV 03 ATEX 2006 X
- ▶ customer specific versions:
  - variety of electrical and mechanical connections
  - other versions on request

Characteristics



**DMK 331 P**  
Flush Pressure Transmitter

Input pressure range <sup>1</sup>																	
Nominal pressure gauge [bar]	-1...0 <sup>2</sup>	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400		
Nominal pressure abs. <sup>2</sup> [bar]	-	1	1.6	2.5	4	6	10	16	25	40	60	100	160	250	400		
Permissible overpressure [bar]	3	3	7	7	12	12	25	50	50	120	120	250	500	500	600		

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	IEC 60770 <sup>3</sup> : $\leq \pm 0.5 \% \text{ FSO}$		BFSL: $\leq \pm 0.25 \% \text{ FSO}$
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S,min}) / 0.02] \Omega$ current 3-wire: $R_{max} = 500 \Omega$ voltage 3-wire: $R_{min} = 10 \text{ k}\Omega$		
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / k $\Omega$		
Response time	< 10 msec		

Thermal effects (Offset and Span) <sup>4</sup>		
Thermal error for offset and span in compensated range	$\leq \pm 0.2 \% \text{ FSO} / 10 \text{ K}$	-25 ... 85 °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	
Option Ex-protection only with 4 ... 20 mA / 2-wire DX13-DMK 331 P	zone 0 <sup>5</sup> : II 1 G EEx ia IIC T4 zone 20: II 1 D T 85°C safety technical maximum values: $V_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C_i \leq 1 \text{ nF}$ , $L_i \leq 10 \mu\text{H}$	

Mechanical stability		
Vibration	10 g RMS (20 ... 2000 Hz)	
Shock	100 g / 11 ms	

Permissible temperatures		
Medium	-25 ... 135 °C <sup>2,6</sup>	
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> pressure ranges  $P_N < 1.6 \text{ bar}$  not possible with mechanical connection G1/2" flush

<sup>2</sup> for vacuum and nominal pressure abs the max. medium temperature is 70 °C

<sup>3</sup> accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)

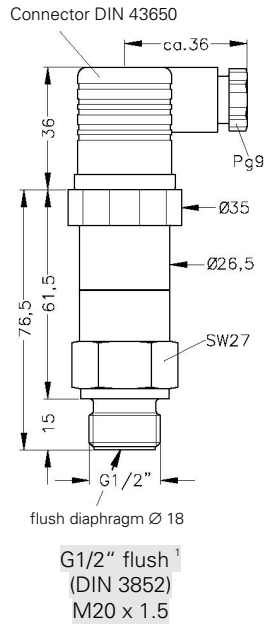
<sup>4</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions

<sup>5</sup> approved for atmospheric pressure from 0.8 bar up to 1.1 bar

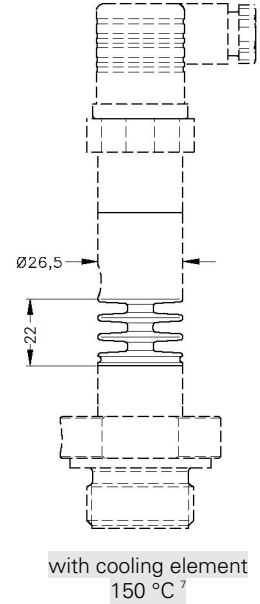
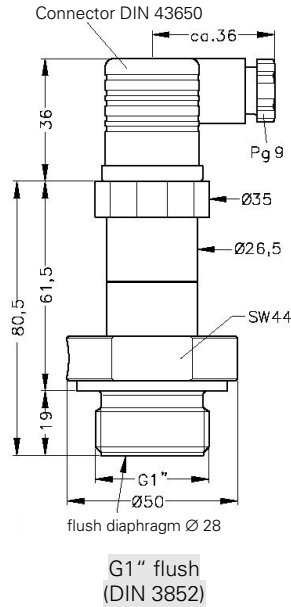
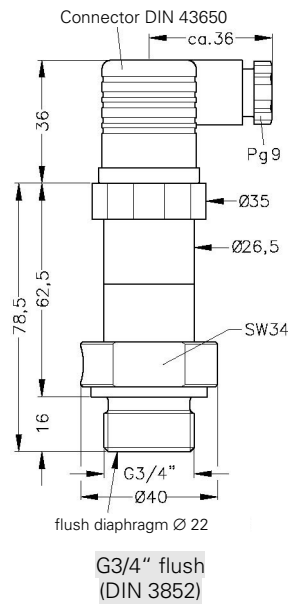
<sup>6</sup> with optional cooling element its maximum permissible temperature is valid

### Mechanical connection

#### Standard



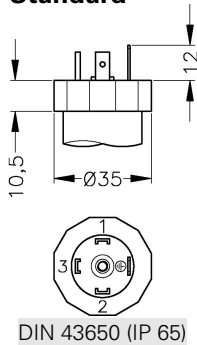
#### Optional



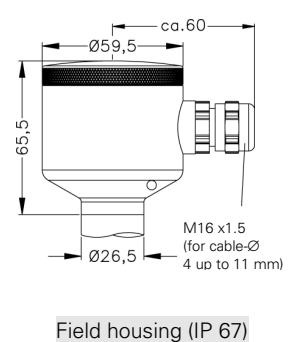
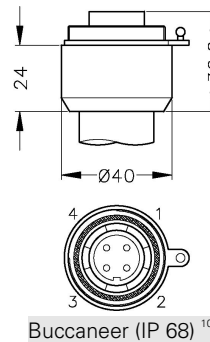
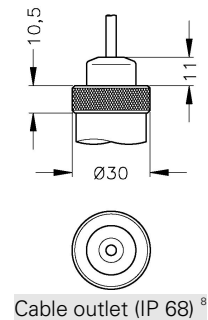
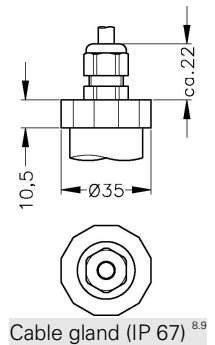
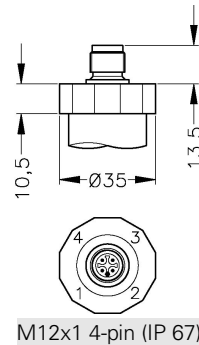
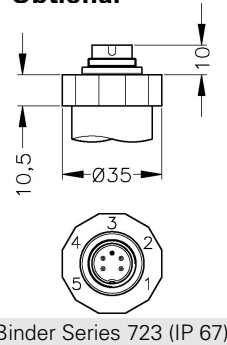
⇒ Ex-protection: total length increases by 26.5mm!

### Electrical connection

#### Standard



#### Optional



<sup>7</sup> for max. 100 bar

<sup>8</sup> different cable types and lengths available

<sup>9</sup> standard: 2m PVC cable without ventilation tube, optionally cable with ventilation tube

<sup>10</sup> for gauge pressure up to 40 bar cable with ventilation tube required

### Filling Fluids

Standard	Silicon oil
Optional	food compatible oil (with FDA-approval) / Halocarbon / others on request

### Materials

Pressure port	stainless steel 1.4571 (316Ti)
Housing	stainless steel 1.4301 (304) / field housing: 1.4305 (303), cable gland: brass, nickel plated
Seals (media wetted)	$P_N < 100$ bar: FKM / $P_N \geq 100$ bar: NBR / others on request
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seals, diaphragm

### Miscellaneous

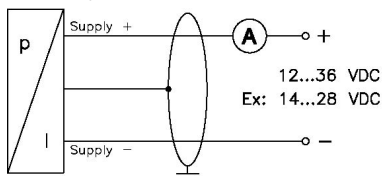
Cable capacitance <sup>11</sup>	cable without air tube:	signal line/shield: 160 pF/m	signal line/signal line: 120 pF/m
	cable with air tube:	signal line/shield: 150 pF/m	signal line/signal line: 100 pF/m
Cable inductance <sup>11</sup>	cable without air tube:	signal line/shield: 0.65 $\mu$ H/m	signal line/signal line: 0.65 $\mu$ H/m
	cable with air tube:	signal line/shield: 1.0 $\mu$ H/m	signal line/signal line: 1.0 $\mu$ H/m
Current consumption	signal output current:	max. 25 mA	
	signal output voltage:	max. 7 mA	
Weight	min. 200 g (depending on process connection)		
Installation position	any <sup>12</sup>		
Operational life	> 100 x 10 <sup>6</sup> cycles		

### Pin configuration

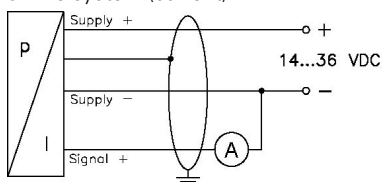
Electrical connection		DIN 43650	Binder 723 (5-pin)	M12x1 (4-pin)	Buccaneer (4-pin)	Cable colours <sup>11</sup> (DIN 47100)
2-wire-system	Supply +	1	3	1	1	white
	Supply -	2	4	2	2	brown
	Ground	ground pin	5	4	4	yellow / green (shield)
3-wire-system	Supply +	1	3	1	1	white
	Supply -	2	4	2	2	brown
	Signal +	3	1	3	3	green
	Ground	ground pin	5	4	4	yellow / green (shield)

### Wiring diagrams

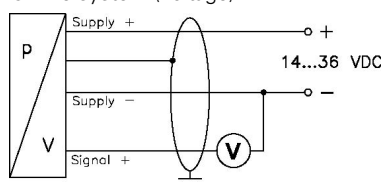
2-wire-system (current)



3-wire-system (current)



3-wire-system (voltage)



<sup>11</sup> if the electrical connection is a mounted cable by factory

<sup>12</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 DMK 331P**

**DMK 331P**

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Pressure				
	gauge	5	0	5
	absolute	5	0	6
Input [bar]				
	1,0 <sup>1</sup>	1	0	0
	1,6	1	6	0
	2,5	2	5	0
	4,0	4	0	0
	6,0	6	0	0
	10	1	0	0
	16	1	6	0
	25	2	5	0
	40	4	0	0
	60	6	0	0
	100	1	0	0
	160	1	6	0
	250	2	5	0
	400	4	0	0
	-1 ... 0 <sup>1</sup>	X	1	0
	customer	9	9	9
Output				
	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
Accuracy				
	0,5 %			5
	customer			9
Electrical connection				
	Male and female plug DIN 43650		1	0
	Binder series 723 (5-pin)		2	0
	Cable gland incl. Cable <sup>2,3</sup>		4	0
	Cable outlet <sup>2</sup>		T	R
	Male plug Buccaneer IP68 <sup>4</sup>		5	0
	M12x1 (4-pin)		M	0
	Field housing stainless steel		8	0
	customer		9	9
Mechanical connection				
	G1/2" DIN 3852 with <sup>1</sup>			
	flush diaphragm		Z	0
	G3/4" DIN 3852 with			
	flush diaphragm		Z	3
	G1" DIN 3852 with			
	flush diaphragm		Z	3
	customer		9	9
Diaphragm				
	Stainless steel 1.4435 (316L)			1
	customer			9
Seals				
	for P <sub>N</sub> < 100 bar		FKM	1
	for P <sub>N</sub> ≥ 100 bar		NBR	5
	customer			9
Filling Fluids				
	Silicon oil			1
	food compatible oil <sup>5</sup>			2
	Halocarbon			C
	customer			9
Special version				
	standard			0
	with cooling element up to 150°C <sup>6</sup>			1
	customer			9

<sup>1</sup> pressure ranges P<sub>N</sub> < 1.6 bar not possible with mechanical connection G1/2" flush; for vacuum and nominal pressure abs. the max. medium temperature is 70 °C  
<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 up to 40 bar cable with ventilation tube required  
<sup>5</sup> Name of oil: Mobil DTE FM 32; Category Code: H1; NSF Registration No.: 130662  
<sup>6</sup> cooling element up to 150°C not with pressure range P<sub>N</sub> > 100 bar

This ordering code contains product specification; properties are not guaranteed. Subject to change without notice.