

# DMK 331P

## Industrial Pressure Transmitter

Pressure Ports with Flush Welded Stainless Steel Diaphragm

accuracy according to IEC 60770:  
0.5 % FSO



### Nominal pressure

from 0 ... 60 bar up to 0 ... 400 bar

### Output signals

2-wire: 4 ... 20 mA

3-wire: 0 ... 20 mA / 0 ... 10 V

others on request

### Special characteristics

- ▶ suited for viscous and pasty media



### Optional versions

- ▶ IS-version  
Ex ia = intrinsically safe for gases and dusts
- ▶ SIL 2  
according to IEC 61508 / IEC 61511
- ▶ food compatible filling fluid with FDA approval
- ▶ cooling element for media temperatures up to 300 °C
- ▶ customer specific versions


The pressure transmitter DMK 331P is suitable for measuring the pressure of viscous and pasty media, where a totally flush pressure port is required.

As on all industrial pressure transmitters made by BD|SENSORS, you may choose between various electrical and mechanical connections also on DMK 331P.

### Preferred areas of use are

-  Plant and machine engineering
-  Food industry

### Preferred used for

-  Viscous and pasty media



Input pressure range					
Nominal pressure gauge/abs. [bar]	60	100	160	250	400
Overpressure [bar]	100	200	400	400	600
Burst pressure $\geq$ [bar]	180	300	500	750	1000

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / $V_S = 8 \dots 32 V_{DC}$	SIL-version: $V_S = 14 \dots 28 V_{DC}$
Option IS-protection	2-wire: 4 ... 20 mA / $V_S = 10 \dots 28 V_{DC}$	SIL-version: $V_S = 14 \dots 28 V_{DC}$
Options 3-wire	3-wire: 0 ... 20 mA / $V_S = 14 \dots 30 V_{DC}$ 0 ... 10 V / $V_S = 14 \dots 30 V_{DC}$	

Performance	
Accuracy <sup>1</sup>	$\leq \pm 0.5 \% \text{ FSO}$
Permissible load	current 2-wire: $R_{\max} = [(V_S - V_{S \min}) / 0.02 \text{ A}] \Omega$ 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 / $\text{k}\Omega$
Long term stability	$\leq \pm 0.3 \% \text{ FSO} / \text{year}$ at reference conditions
Response time	2-wire: $\leq 10 \text{ msec}$ 3-wire: $\leq 3 \text{ msec}$

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

Thermal effects (Offset and Span) <sup>2</sup> / Permissible temperatures	
Thermal error	$\leq \pm 0.2 \% \text{ FSO} / 10 \text{ K}$
In compensated range	-20 ... 85°C
Permissible temperatures <sup>3</sup>	medium: -40 ... 125 °C for filling fluid silicone oil -10 ... 125 °C for filling fluid food compatible oil electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C
Permissible temperature medium for cooling element 300°C	filling fluid silicone oil overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C filling fluid food compatible oil overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C

<sup>2</sup> an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.

<sup>3</sup> max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °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

Mechanical stability	
Vibration	20 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27

Filling fluids	
Standard	silicone oil
Options	food compatible oil (with FDA approval) (Mobil SHC Cibus 32; Category Code: H1; NSF Registration No.: 141500) others on request

Materials	
Pressure port	stainless steel 1.4435 (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	standard: FKM (recommended for medium temperatures $\leq 200 \text{ }^\circ\text{C}$ ) option: FFKM <sup>4</sup> (recommended for medium temperatures > 200 °C) others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

<sup>4</sup> for pressure ranges  $P_N \leq 100 \text{ bar}$

Explosion protection (only for 4 ... 20 mA / 2-wire)	
Approvals DX19-DMK 331P	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 maximum values	$U_i = 28 \text{ V}$ , $I_i = 93 \text{ mA}$ , $P_i = 660 \text{ mW}$ , $C_i \approx 0 \text{ nF}$ , $L_i \approx 0 \text{ }\mu\text{H}$ , 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 $p_{\text{atm}}$ 0.8 bar up to 1.1 bar in zone 1 or higher: -20 ... 70 °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 $\mu\text{H}/\text{m}$

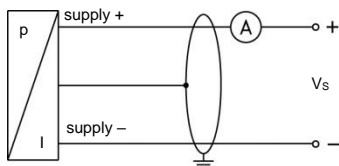
Miscellaneous	
Option SIL 2 version <sup>5</sup>	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	min. 200 g (depending on process connection)
Installation position	any (standard calibration in a vertical position with the pressure port connection down)
Operational life	100 million load cycles
CE-conformity	EMC Directive: 2014/30/EU      Pressure Equipment Directive: 2014/68/EU (module A) <sup>6</sup>
ATEX Directive	2014/34/EU

<sup>5</sup> only for 4 ... 20 mA / 2-wire

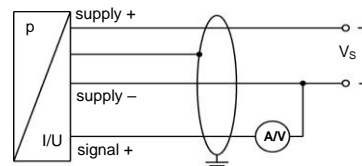
<sup>6</sup> this directive is only valid for devices with maximum permissible overpressure > 200 bar

### Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

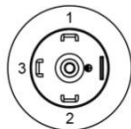
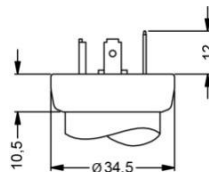


### Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	field housing	cable colour (IEC 60757)
Supply +	1	3	1	IN +	WH (white)
Supply -	2	4	2	IN -	BN (brown)
Signal + (only for 3-wire)	3	1	3	OUT +	GN (green)
Shield	ground pin $\oplus$	5	4	$\oplus$	GYNE (green-yellow)

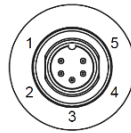
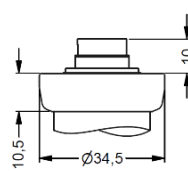
### Electrical connection (dimensions in mm)

standard

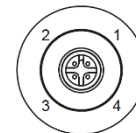
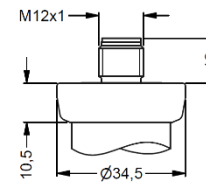


ISO 4400 (IP 65)

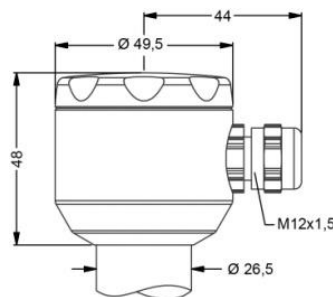
options



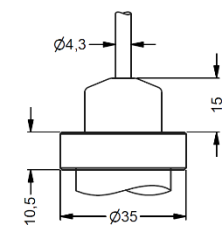
Binder Series 723 5-pin (IP 67)



M12x1 4-pin (IP 67)



compact field housing (IP 67)



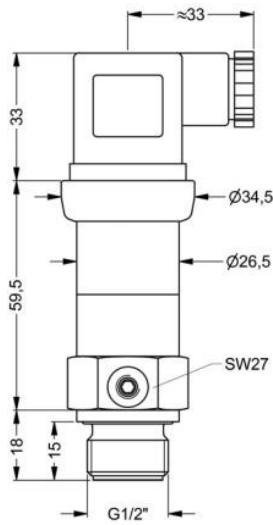
cable outlet with PVC cable (IP 67) <sup>7</sup>

⇒ universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880) and other versions on request

<sup>7</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

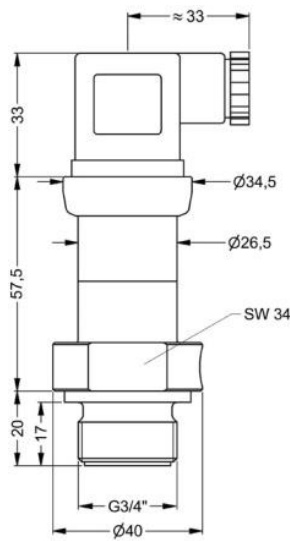
**Mechanical connection (dimensions in mm)**

**standard**

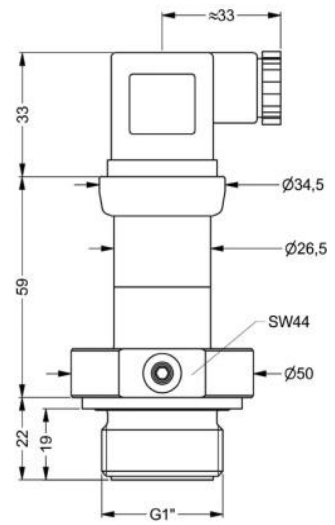


G1/2" flush DIN 3852

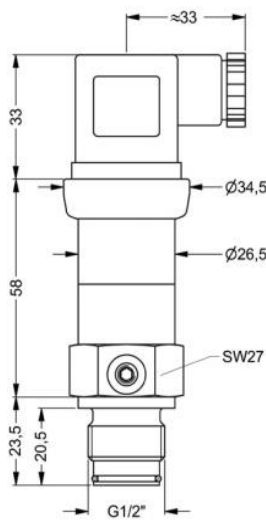
**options**



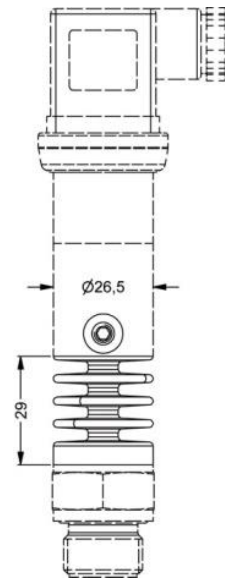
G3/4" flush DIN 3852



G1" flush DIN 3852



G1/2" flush  
with radial o-ring



cooling element  
300 °C<sup>8</sup>

- ⇒ SIL- and SIL-Ex version: total length increases by 26.5 mm!
- ⇒ metric threads and other versions on request

<sup>8</sup> possible for nominal pressure ranges  $P_N \leq 160$  bar

## Ordering code DMK 331P

DMK 331P



<b>Pressure</b>												
gauge	5	0	5									
absolute	5	0	6									
<b>Input [bar]</b>												
60				6	0	0	2					
100				1	0	0	3					
160				1	6	0	3					
250				2	5	0	3					
400				4	0	0	3					
customer				9	9	9	9				consult	
<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		
SIL2 4 ... 20 mA / 2-wire										1S		
SIL2 with Intrinsic safety 4 ... 20 mA / 2-wire										ES		
customer										9	consult	
<b>Accuracy</b>												
0.5 % FSO										5		
customer										9	consult	
<b>Electrical connection</b>												
male and female plug ISO 4400										1	0	0
male plug Binder series 723 (5-pin)										2	0	0
cable outlet with PVC-cable (IP67) <sup>1</sup>										T	A	0
male plug M12x1 (4-pin) / metal										M	1	0
compact field housing										8	5	0
stainless steel 1.4301 (304)										9	9	9
customer												consult
<b>Mechanical connection</b>												
G1/2" DIN 3852 with flush diaphragm										Z	0	0
G3/4" DIN 3852 with flush diaphragm										Z	3	0
G1" DIN 3852 with flush diaphragm										Z	3	1
G 1/2" DIN 3852 with rad. o-ring and flush diaphragm										Z	6	1
customer										9	9	9
<b>Diaphragm</b>												
stainless steel 1.4435 (316L)										1		
customer										9		consult
<b>Seals</b>												
FKM										1		
FFKM <sup>2</sup>										7		
customer										9		consult
<b>Filling Fluids</b>												
Silicone oil										1		
food compatible oil										2		
customer										9		consult
<b>Special version</b>												
standard										0	0	0
with cooling element up to 300°C <sup>3</sup>										2	0	0
customer										9	9	9
												consult

<sup>1</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

<sup>2</sup> only for P<sub>N</sub> ≤ 100 bar possible

<sup>3</sup> only for P<sub>N</sub> ≤ 160 bar possible