

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 ¹	$\leq \pm 0.5 \% \text{ FSO}$
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: $\leq 3 \text{ msec}$

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

Thermal effects (Offset and Span) ² / Permissible temperatures	
Thermal error	$\leq \pm 0.2 \% \text{ FSO} / 10 \text{ K}$
In compensated range	-20 ... 85°C
Permissible temperatures ³	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

² an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions.
³ 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 ⁴ (recommended for medium temperatures > 200 °C) others on request
Diaphragm	stainless steel 1.4435 (316 L)
Media wetted parts	pressure port, seals, diaphragm

⁴ 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_{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 $\mu\text{H}/\text{m}$

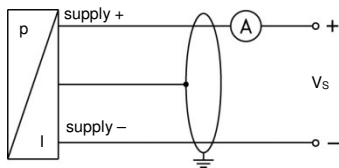
Miscellaneous	
Option SIL 2 version ⁵	according to IEC 61508 / IEC 61511
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	min. 200 g (depending on process connection)
Installation position	any (standard calibration in a vertical position with the pressure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

⁵ only for 4 ... 20 mA / 2-wire

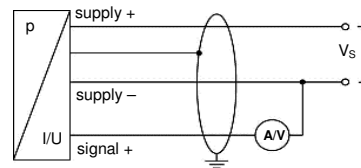
⁶ this directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

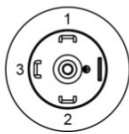
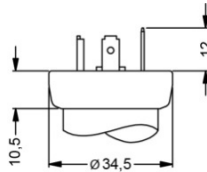


Pin configuration

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	GNYE (green-yellow)

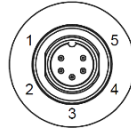
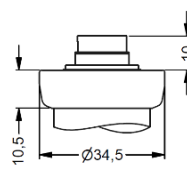
Electrical connection (dimensions in mm)

standard

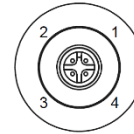
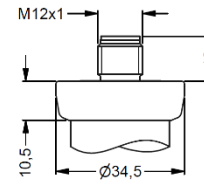


ISO 4400 (IP 65)

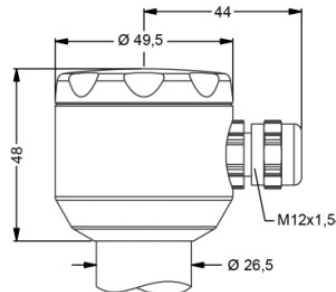
options



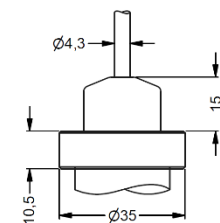
Binder Series 723 5-pin (IP 67)



M12x1 4-pin (IP 67)



compact field housing (IP 67)



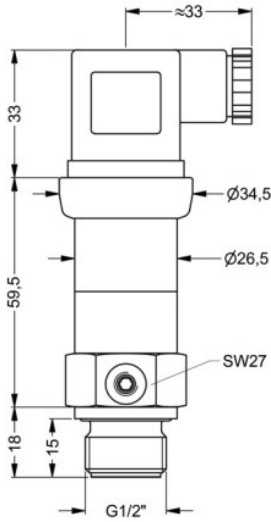
cable outlet with PVC cable (IP 67) ⁷

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

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

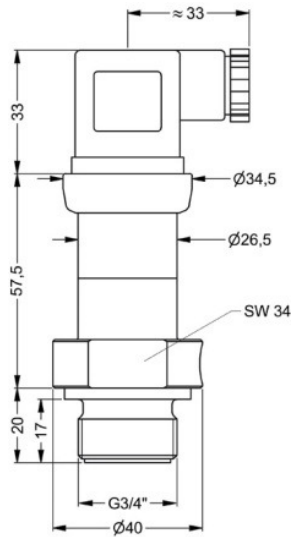
Mechanical connection (dimensions in mm)

standard

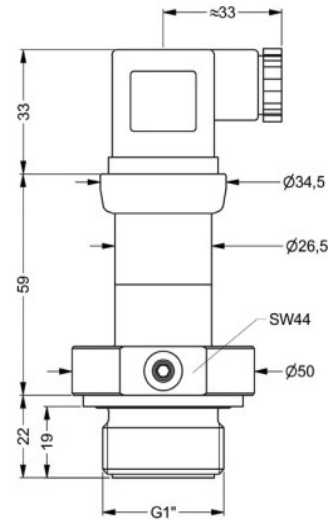


G1/2" flush DIN 3852

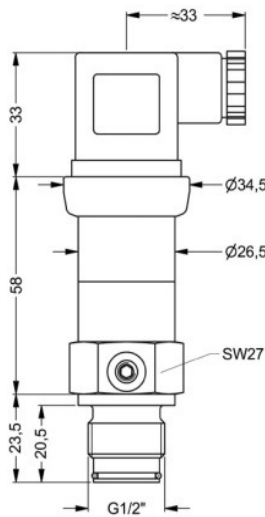
options



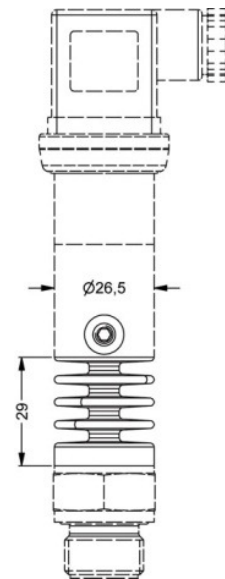
G3/4" flush DIN 3852



G1" flush DIN 3852



G1/2" flush
with radial o-ring



cooling element
300 °C⁸

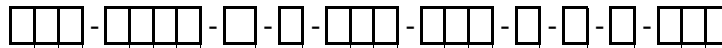
- ⇒ SIL- and SIL-Ex version: total length increases by 26.5 mm!
- ⇒ metric threads and other versions on request

⁸ possible for nominal pressure ranges $P_N \leq 160$ bar

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Ordering code DMK 331P

DMK 331P



Pressure										
gauge	5	0	5							
absolute	5	0	6							
Input [bar]										
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
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				
SIL2 4 ... 20 mA / 2-wire						1S				
SIL2 with Intrinsic safety 4 ... 20 mA / 2-wire						ES				
customer						9				consult
Accuracy										
0.5 % FSO						5				
customer						9				consult
Electrical connection										
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) ¹						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
Mechanical connection										
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		consult
Diaphragm										
stainless steel 1.4435 (316L)								1		
customer								9		consult
Seals										
FKM								1		
FFKM ²								7		
customer								9		consult
Filling Fluids										
Silicone oil								1		
food compatible oil								2		
customer								9		consult
Special version										
standard								0	0	0
with cooling element up to 300°C ³								2	0	0
customer								9	9	9
										consult

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

² only for $P_N \leq 100$ bar possible

³ only for $P_N \leq 160$ bar possible