BD|SENSORS pressure measurement

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

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

Output signal / Supply		
Standard	2-wire: 4 ... 20 mA / V_S = 8 ... 32 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Option IS-protection	2-wire: 4 ... 20 mA / V_S = 10 ... 28 V_{DC}	SIL-version: V_S = 14 … 28 V_{DC}
Options 3-wire	3-wire: 0 ... 20 mA / V_S = 14 ... 30 V_{DC} 0 ... 10 V / V_S = 14 ... 30 V_{DC}	
Performance		
Accuracy [1]	≤ ± 0.5 % FSO	
Permissible load	current 2-wire: $R_{max} = [(V_S - V_{S\ min}) / 0.02\ A]\ \Omega$ current 3-wire: R_{max} = 500 Ω voltage 3-wire: R_{min} = 10 kΩ	
Influence effects	supply: 0.05 % FSO / 10 V load: 0.05 % FSO / kΩ	
Long term stability	≤ ± 0.3 % FSO / year at reference conditions	
Response time	2-wire: ≤ 10 msec 3-wire: ≤ 3 msec	
[1] accuracy according to IEC 60770 – limit point adjustment (non-linearity, hysteresis, repeatability)		
Thermal effects (offset and span) [2]		
Thermal error	≤ ± 0.2 % FSO / 10 K	
In compensated range	0 ... 85°C	
[2] an optional cooling element can influence thermal effects for offset and span depending on installation position and filling conditions		

Permissible temperatures		
Filling fluid	silicone oil	food compatible oil
Medium [3]	-40 ... 125 °C	-10 ... 125 °C
Medium with cooling element [4]	overpressure: -40 ... 300 °C vacuum: -40 ... 150 °C	overpressure: -10 ... 250 °C vacuum: -10 ... 150 °C
Electronics / environment	-40 ... 85 °C	
Storage	-40 ... 100 °C	
[3] max. temperature of the medium for overpressure > 0 bar: 150 °C for 60 minutes with a max. environmental temperature of 50 °C *[4] max. temperature depends on the used sealing material, type of seal and installation*		

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 / 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 ≤ 200 °C) option: FFKM [5] (recommended for medium temperatures < 260 °C)	others on request
Diaphragm	stainless steel 1.4435 (316 L)	
Media wetted parts	pressure port, seals, diaphragm	
[5] for pressure ranges p_N ≤ 100 bar		

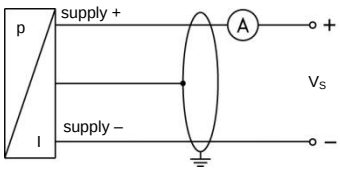
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approvals DX19-DMK 331P	IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T135 °C Da
Safety technical maximum values	U_i = 28 V, I_i = 93 mA, P_i = 660 mW, C_i ≈ 0 nF, L_i ≈ 0 µH, the supply connections 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: -40/-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: 1µH/m

Miscellaneous	
Option SIL 2 version [6]	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) [7]
ATEX Directive	2014/34/EU

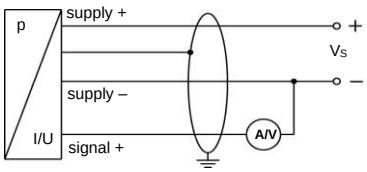
[6] only for 4 … 20 mA / 2-wire
[7] this directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagrams

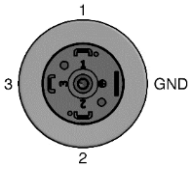
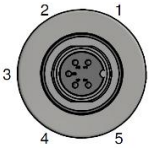
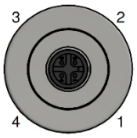
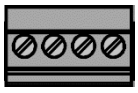
2-wire-system (current)



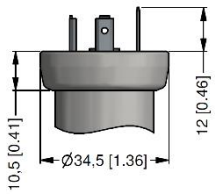
3-wire-system (current / voltage)



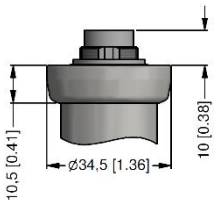
Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	compact field housing	cable colours (IEC 60757)
					
supply +	1	3	1	V_S+	WH (white)
supply –	2	4	2	V_S-	BN (brown)
signal + (only 3-wire)	3	1	3	S+	GN (green)
Shield	ground pin ⏚	5	4	GND	GNYE (green-yellow)

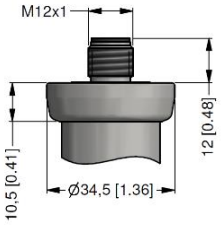
Electrical connections (dimensions mm / in)



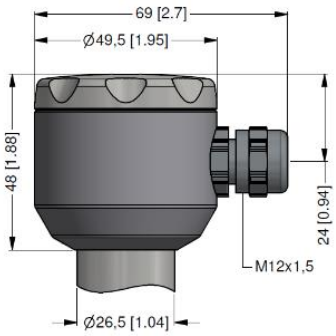
ISO 4400
(IP 65)



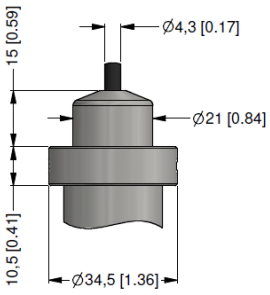
Binder series 723, 5-pin
(IP 67)



M12x1, 4-pin
(IP 67)



compact field housing
(IP 67)

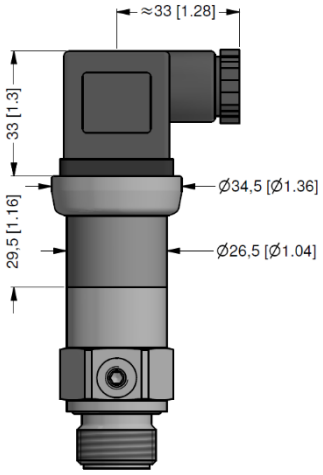


cable outlet
with PVC-cable (IP 67) [8]

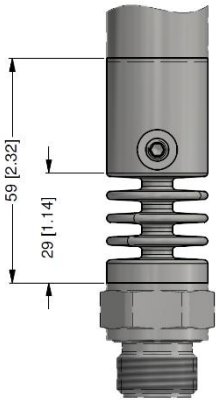
⇨ **universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880) and other versions on request**

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

Dimensions (mm / in)



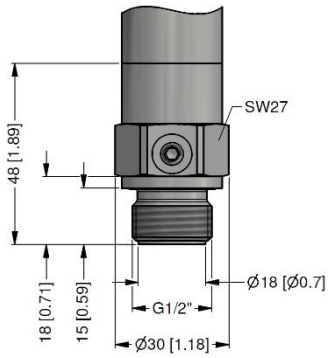
cooling element up to 300 °C [4] (optionally)



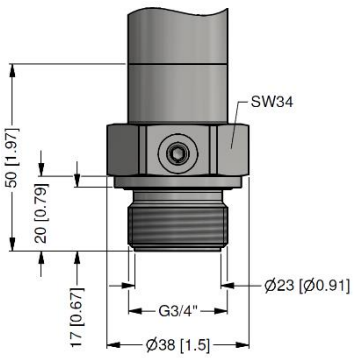
possible for $p_N \leq 160$ bar

[4] max. temperature depends on the used sealing material, type of seal and installation

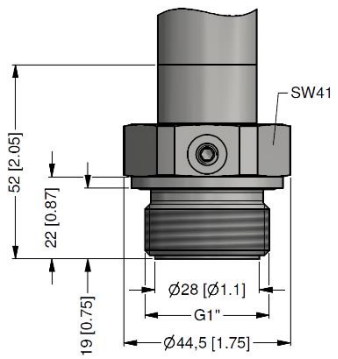
Mechanical connections (dimensions mm / in)



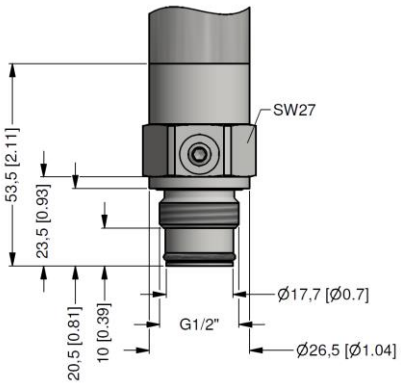
G1/2" flush DIN 3852



G3/4" flush DIN 3852



G1" flush DIN 3852



G1/2" flush
with radial o-ring

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

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BD|SENSORS
pressure measurement

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 stainless steel1.4301 (304)											8	5	0												
customer											9	9	9												consult
Mechanical connection																									
G1/2" DIN 3852 with flush diaphragm														Z	0	0									
G3/4" DIN 3852 with flush diaphragm														Z	S	0									
G1" DIN 3852 with flush diaphragm														Z	S	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); others on request

[2] only for $p_N \leq 100$ bar possible

[3] only for $p_N \leq 160$ bar possible

01.04.2022

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