DMK 331

Industrial Pressure Transmitter

Ceramic Sensor

accuracy according to IEC 60770:
0.5 % FSO

Nominal pressure

from 0 ... 400 mbar up to 0 ... 600 bar

Output signals

2-wire: 4 ... 20 mA
3-wire: 0 … 20 mA / 0 … 10 V
others on request

Special characteristics

- pressure port G 1/2" flush for pasty and polluted media
- pressure port G 1/2" open port PVDF for aggressive media
- oxygen application

Optional versions

- IS-version
  Ex ia = intrinsically safe for gases and dusts
- SIL 2
  according to IEC 61508 / IEC 61511
- customer specific versions

The industrial pressure transmitter DMK 331 with ceramic sensor has been especially designed for pasty, polluted or aggressive media and for oxygen applications at low pressure range.

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

Preferred areas of use are

- Plant and Machine Engineering
- Energy Industry
- Environmental Engineering (water - sewage - recycling)
- Medical Technology

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Input pressure range [1]																			
Nominal pressure gauge	[bar]	-1…0	0.4	0.6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	250	400	600[2]
Nominal pressure abs.	[bar]	-	-	0.6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	250	400	600[2]
Overpressure	[bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
Burst pressure ≥	[bar]	7	2	4	4	5	7,5	12	18	30	50	75	120	180	300	500	750	1000	1100
Vacuum resistance		P_N ≥ 1 bar: unlimited vacuum resistance												P_N < 1 bar: on request					

[1] PVDF pressure port possible for nominal pressure ranges up to 60 bar
[2] nominal pressure 600 bar without UL certification

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 [3]	≤ ± 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

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

Thermal effects (Offset and Span) / Permissible Temperatures	
Thermal error	≤ ± 0.2 % FSO / 10 K
in compensated range	-25 ... 85 °C
Permissible temperatures [4]	medium: -40 ... 125 °C electronics / environment: -40 ... 85 °C storage: -40 ... 100 °C

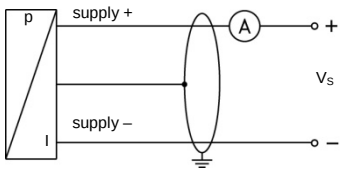
[4] for pressure port of PVDF the minimun temperature is -30 °C

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	10 g RMS (25 ... 2000 Hz) according to DIN EN 60068-2-6
Shock	500 g / 1 msec according to DIN EN 60068-2-27
Materials	
Pressure port	standard: stainless steel 1.4404 (316 L) optional for G1/2" open port with nominal pressure range up to 60 bar: PVDF others on request
Housing	stainless steel 1.4404 (316L)
Option compact field housing	stainless steel 1.4305 (303) with cable gland brass, nickel plated others on request
Seals (media wetted)	standard: FKM options: EPDM (for P_N ≤ 160 bar), others on request
Diaphragm	ceramic Al_2O_3 96 %
Media wetted parts	pressure port, seals, diaphragm
Explosion protection (only for 4 … 20 mA / 2-wire)	
Approval DX19-DMK 331	**IBExU 10 ATEX 1068 X / IECEx IBE 12.0027X** stainless steel pressure port: zone 0: II 1G Ex ia IIC T4 Ga zone 20: II 1D Ex ia IIIC T 85°C Da plastic pressure port: zone 1: II 2G Ex ia IIC T4 Gb zone 21: II 2D Ex ia IIIC T 85°C Db
Safety technical maximum values	U_i = 28 V_{DC}, 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: -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[5] 2	according to IEC 61508 / IEC 61511
Option oxygen application	for P_N ≤ 15 bar: O-ring in 70 EPDM 281 (with BAM-approval); permissible maximum values are 15 bar / 60° C and 10 bar / 90° C for P_N ≤ 25 bar: O-ring in FKM Vi 567 (with BAM-approval); permissible maximum values are 25 bar / 150° C
Current consumption	signal output current: max. 25 mA signal output voltage: max. 7 mA
Weight	approx. 140 g
Installation position	any
Operational life	> 100 x 10^6 pressure cycles
CE-conformity	EMC Directive: 2014/30/EU Pressure Equipment Directive: 2014/68/EU (module A) [6]
ATEX Directive	2014/34/EU

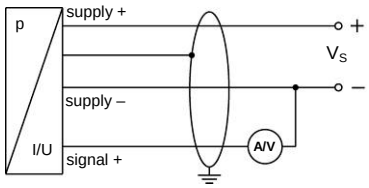
[5] only for 4 … 20 mA / 2-wire
[6] This directive is only valid for devices with maximum permissible overpressure > 200 bar

Wiring diagrams

2-wire-system (current)



3-wire-system (current / voltage)

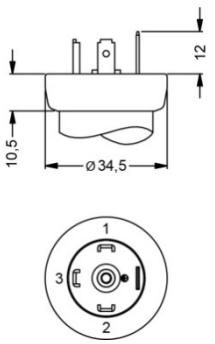


Pin configuration

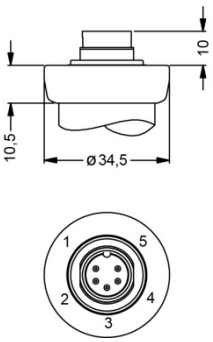
Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	field housing	cable colour (IEC 60757)
Supply +	1	3	1	IN +	wh (white)
Supply –	2	4	2	IN -	bn (brown)
Signal + (only for 3-wire)	3	1	3	OUT+	gn (green)
Shield	ground pin	5	4	⏚	gnye (green-yellow)

Electrical connections (dimensions in mm)

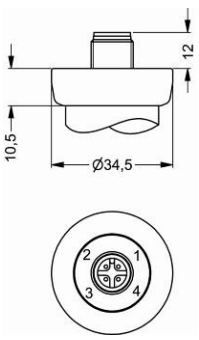
standard **option**



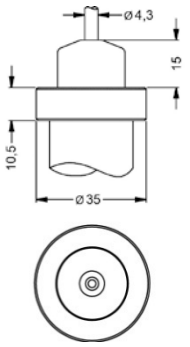
ISO 4400
(IP 65)



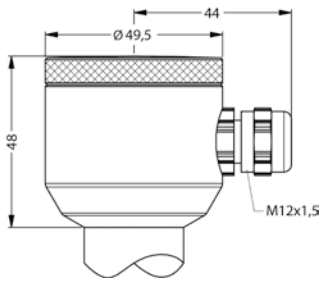
Binder Series 723 5-pin
(IP 67)



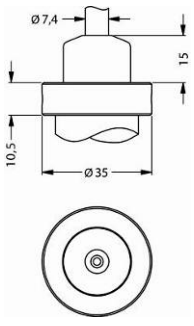
M12x1 4-pin
(IP 67)



cable outlet with PVC cable
(IP 67) [7]



compact field housing
(IP 67)



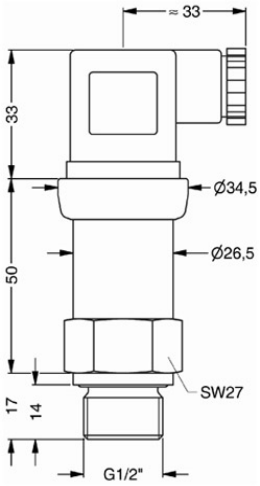
cable outlet,
cable with ventilation tube
(IP 68) [8]

⇨ **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)*
[8] *different cable types and lengths available, permissible temperature depends on kind of cable*

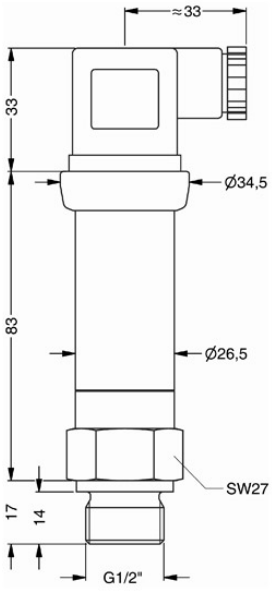
Mechanical connection (dimensions in mm)

standard



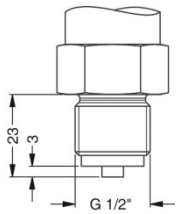
G1/2" DIN 3852
with ISO 4400

standard for SIL- and SIL-IS-version

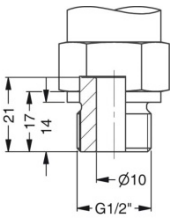


G1/2" DIN 3852
with ISO 4400

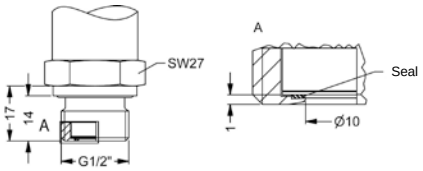
option



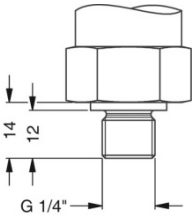
G1/2" EN 837



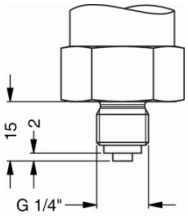
G1/2" open port



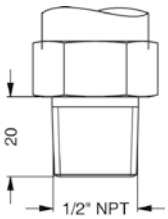
G1/2" semi-flush DIN 3852; M20x1.5 [9]



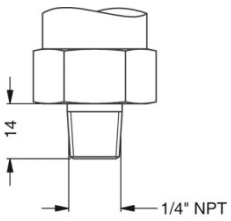
G1/4" DIN 3852



G1/4" EN 837



1/2" NPT



1/4" NPT

⇨ **metric threads and other versions on request**

[9] *possible for nominal pressure ranges $P_N \leq 25$ bar; absolute pressure ranges on request*

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BD|SENSORS pressure measurement

Ordering code DMK 331

DMK 331 ☐☐☐-☐☐☐☐-☐-☐-☐☐☐-☐☐☐-☐-☐-☐-☐☐☐

	Pressure	Input	Output	Accuracy	Electrical connection	Mechanical connection	Seals	Pressure port	Diaphragm	Special version	
Pressure											
gauge	250										
absolute	251										
Input [bar]											
0.40		4000									
0.60		6000									
1.0		1001									
1.6		1601									
2.5		2501									
4.0		4001									
6.0		6001									
10		1002									
16		1602									
25		2502									
40		4002									
60		6002									
100		1003									
160		1603									
250		2503									
400		4003									
600		6003									
-1 … 0		X102									
customer		9999									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 %				5							
customer				9							consult
Electrical connection											
Male and female plug ISO 4400					100						
Male plug Binder series 723 (5-pin)					200						
Cable outlet with PVC cable [1]					TA0						
Cable outlet with cable					TR0						
Male plug M12x1 (4-pin) / metal					M10						
compact field housing stainless steel 1.4305 (303)					850						
customer					999						consult
Mechanical connection [2]											
G1/2" DIN 3852						100					
G1/2" EN 837						200					
G1/4" DIN 3852						300					
G1/4" EN 837						400					
G1/2" DIN 3852 with [3] semi-flush sensor						F00					
G1/2" DIN 3852 open pressure port						H00					
1/2" NPT						N00					
1/4" NPT						N40					
customer						999					consult
Seals											
FKM							1				
EPDM [4]							3				
customer							9				consult
Pressure port											
Stainless steel 1.4404 (316L)								1			
PVDF [5]								B			
customer								9			consult
Diaphragm											
Ceramics Al_2O_3 96%									2		
customer									9		consult
Special version											
standard										000	
oxygen application [6]										007	
customer										999	consult

Prices EXW Thierstein, excluding package

1. standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)
2. metric threads and others on request
3. possible for nominal pressure ranges $P_N \leq 25$ bar; absolute pressure ranges on request
4. possible for nominal pressure range $P_N \leq 160$ bar
5. PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar), minimum permissible temperature is -30 °C
6. oxygen application with FKM-seal up to 25 bar and with EPDM-seal up to 15 bar possible

04.03.2015