

# 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

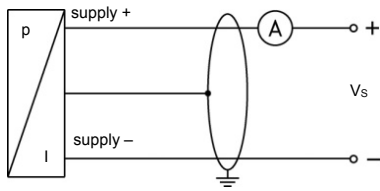
-  Plant and machine engineering
-  Energy industry
-  Environmental engineering  
(water - sewage - recycling)
-  Medical technology



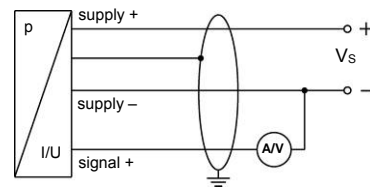
Input pressure range <sup>1</sup>																		
Nominal pressure gauge [bar]	-1...0	0.4	0.6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	250	400	600
Nominal pressure abs. [bar]	-	-	0.6	1	1,6	2,5	4	6	10	16	25	40	60	100	160	250	400	600
Overpressure [bar]	4	1	2	2	4	4	10	10	20	40	40	100	100	200	400	400	600	800
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 <sub>N</sub> ≥ 1 bar: unlimited vacuum resistance										P <sub>N</sub> < 1 bar: on request							
<sup>1</sup> PVDF pressure port possible for nominal pressure ranges up to 60 bar																		
Output signal / Supply																		
Standard	2-wire: 4 ... 20 mA / V <sub>S</sub> = 8 ... 32 V <sub>DC</sub>										SIL-version: V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>							
Option IS-protection	2-wire: 4 ... 20 mA / V <sub>S</sub> = 10 ... 28 V <sub>DC</sub>										SIL-version: V <sub>S</sub> = 14 ... 28 V <sub>DC</sub>							
Options 3-wire	3-wire: 0 ... 20 mA / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub> 0 ... 10 V / V <sub>S</sub> = 14 ... 30 V <sub>DC</sub>																	
Performance																		
Accuracy <sup>2</sup>	± 0.5 % FSO																	
Permissible load	current 2-wire: R <sub>max</sub> = [(V <sub>S</sub> - V <sub>S min</sub> ) / 0.02 A] Ω										current 3-wire: R <sub>max</sub> = 240 Ω							
	voltage 3-wire: R <sub>min</sub> = 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							
<sup>2</sup> 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 <sup>3</sup>	medium: -40 ... 125 °C						electronics / environment: -40 ... 85 °C						storage: -40 ... 100 °C					
<sup>3</sup> for pressure port of PVDF the minimum 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 (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 option: EPDM (for P <sub>N</sub> ≤ 160 bar) others on request																	
Diaphragm	ceramic Al <sub>2</sub> O <sub>3</sub> 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 <sub>i</sub> = 28 V <sub>DC</sub> , I <sub>i</sub> = 93 mA, P <sub>i</sub> = 660 mW, C <sub>i</sub> ≈ 0 nF, L <sub>i</sub> ≈ 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 <sub>atm</sub> 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 μH/m																	
Miscellaneous																		
Option SIL2 version <sup>4</sup>	according to IEC 61508 / IEC 61511																	
Option oxygen application	for P <sub>N</sub> ≤ 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 million load cycles																	
CE-conformity	EMC Directive: 2014/30/EU										Pressure Equipment Directive: 2014/68/EU (module A) <sup>5</sup>							
ATEX Directive	2014/34/EU																	
<sup>4</sup> only for 4 ... 20 mA / 2-wire																		
<sup>5</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)

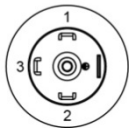
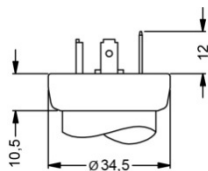


## Pin configuration

Electrical connection	ISO 4400	Binder 723 (5-pin)	M12x1 / metal (4-pin)	compact 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)

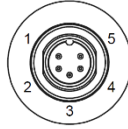
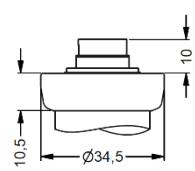
## Electrical connections (dimensions in mm)

### standard

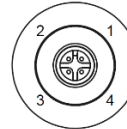
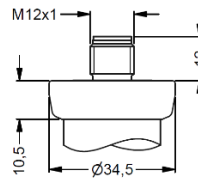


ISO 4400 (IP 65)

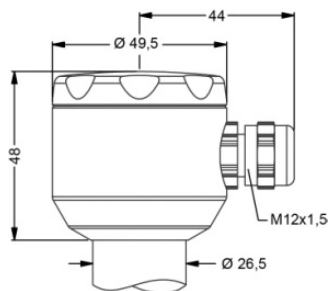
### options



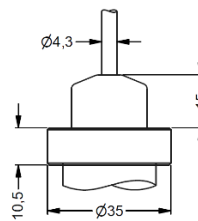
Binder Series 723 5-pin (IP 67)



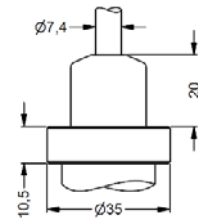
M12x1 4-pin (IP 67)



compact field housing (IP 67)



cable outlet with PVC cable (IP 67)<sup>6</sup>



cable outlet, cable with ventilation tube (IP 68)<sup>7</sup>

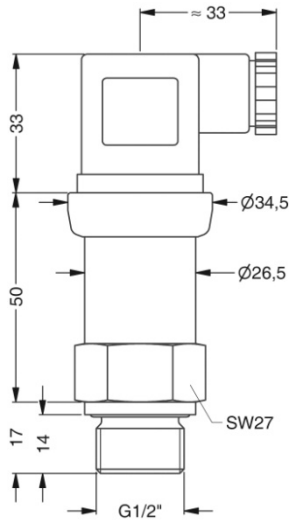
⇒ universal field housing stainless steel 1.4404 (316 L) with cable gland M20x1.5 (ordering code 880) and other versions on request

<sup>6</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70°C)

<sup>7</sup> different cable types and lengths available, permissible temperature depends on kind of cable

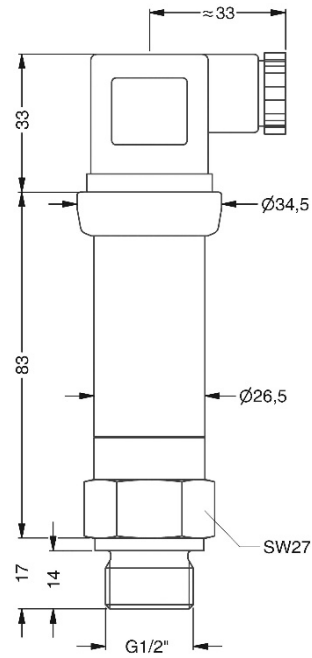
**Mechanical connection (dimensions in mm)**

**standard**



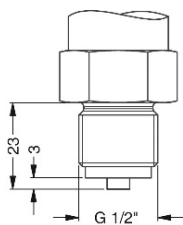
G1/2" DIN 3852  
with ISO 4400

**standard for SIL- and SIL-IS-version**

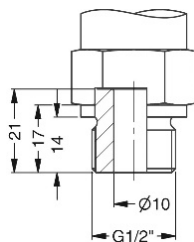


G1/2" DIN 3852  
with ISO 4400

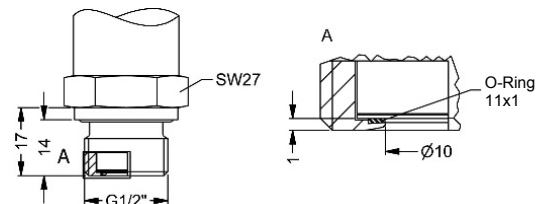
**options**



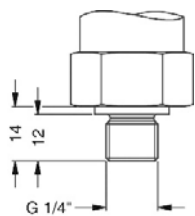
G1/2" EN 837



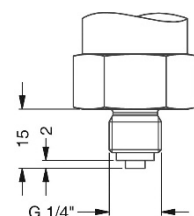
G1/2" open port



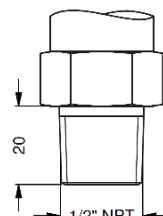
G1/2" semi-flush DIN 3852; M20x1.5<sup>8</sup>



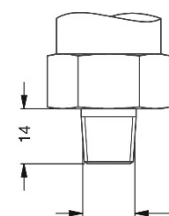
G1/4" DIN 3852



G1/4" EN 837



1/2" NPT



1/4" NPT

⇒ metric threads and other versions on request

<sup>8</sup> possible for nominal pressure ranges  $P_N \leq 25$  bar; absolute pressure ranges on request

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## Ordering code DMK 331

**DMK 331**

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Pressure												
	gauge	2	5	0								
	absolute	2	5	1								
Input [bar]												
	0.4		4	0	0	0						
	0.6		6	0	0	0						
	1.0		1	0	0	1						
	1.6		1	6	0	1						
	2.5		2	5	0	1						
	4.0		4	0	0	1						
	6.0		6	0	0	1						
	10		1	0	0	2						
	16		1	6	0	2						
	25		2	5	0	2						
	40		4	0	0	2						
	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						
	600		6	0	0	3						
	-1 ... 0		X	1	0	2						
	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) <sup>1</sup>						T	A	0			
	cable outlet,						T	R	0			
	cable with ventilation tube (IP68) <sup>2</sup>											
	male plug M12x1 (4-pin) / metal						M	1	0			
	compact field housing						8	5	0			
	stainless steel 1.4301 (304)											
	customer						9	9	9	consult		
Mechanical connection <sup>3</sup>												
	G1/2" DIN 3852						1	0	0			
	G1/2" EN 837						2	0	0			
	G1/4" DIN 3852						3	0	0			
	G1/4" EN 837						4	0	0			
	G1/2" DIN 3852 with						F	0	0			
	semi-flush sensor <sup>4</sup>											
	G1/2" DIN 3852 open pressure port						H	0	0			
	1/2" NPT						N	0	0			
	1/4" NPT						N	4	0			
	customer						9	9	9	consult		
Seals												
	FKM								1			
	EPDM <sup>5</sup>								3			
	customer								9	consult		
Pressure port												
	stainless steel 1.4404 (316L)								1			
	PVDF <sup>6</sup>								B			
	customer								9	consult		
Diaphragm												
	ceramics Al <sub>2</sub> O <sub>3</sub> 96 %								2			
	customer								9	consult		
Special version												
	standard								0	0	0	
	oxygen application <sup>7</sup>								0	0	7	
	customer								9	9	9	consult

<sup>1</sup> standard: 2 m PVC cable without ventilation tube (permissible temperature: -5 ... 70 °C); others on request  
<sup>2</sup> code TR0 = PVC cable, cable with ventilation tube available in different types and lengths  
<sup>3</sup> metric threads and others on request  
<sup>4</sup> possible for nominal pressure ranges P<sub>N</sub> ≤ 25 bar; absolute pressure ranges on request  
<sup>5</sup> possible for nominal pressure range P<sub>N</sub> ≤ 160 bar  
<sup>6</sup> PVDF only with G1/2" DIN 3852 open pressure port (up to 60 bar), minimum permissible temperature is -30 °C  
<sup>7</sup> oxygen application with FKM-seal up to 25 bar possible