Model 101B(f)
Flush-Diaphragm Pressure Sensors

Description

The model 101B(f) pressure sensor features a flush diaphragm made from 316L stainless steel, which contacts directly to pressure medium when the sensor is in operation. Compared to 101B(a19F, a19G, a19L)-series pressure sensors, the 101B(f) pressure sensors possess G1/2 threads for pressure connection by SW27 hexagon for mechanical installation. As a result, the 101B(f) pressure sensor can be easily turned into a pressure transmitter by adding both an SSC (sensor signal conditioner) at its backside and a housing via its M25x1 threads.

Like 101B(a19F, a19G, a19L)-series pressure sensors, inside the 101B(f) pressure sensors a piezoresistive pressure sensor die is bonded on a sensor header and is completely surrounded and covered by un-compressive oil. The oil is fully filled in a cavity which is formed by the flush diaphragm and the sensor header. Therefore, when pressure is applied to the flush diaphragm the oil transfers the pressure to the sensor die, and the sensor die measures the pressure.

Thanks to the feature of the stainless steel flush diaphragm, the 101B(f) sensors are able to measure pressure of either viscous paste or fluids containing solid particles. The pressure medium can be corrosive or conductive as long as it is compatible to 316L stainless steel.

Features

- pressure types & ranges:
  gauge: -1, ..., 35 bar
  absolute: 1, ..., 400 bar
  sealed gauge: 600, ..., 1000 bar
- full-welded construction
- no O-ring inside the housing
- either with or without temperature compensation
- outstanding reliability
- excited by either current or voltage

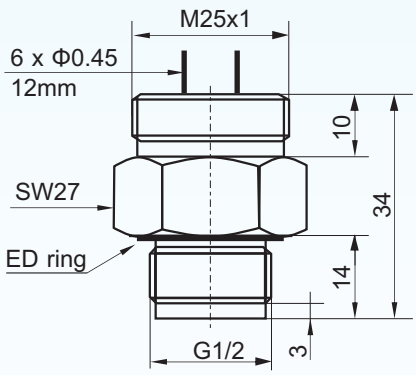
Applications

- process control systems
- liquid level control
- pneumatic and hydraulic controls
- biomedical instruments
- ship and marine systems
- aircraft and avionic systems

Environmental Specifications

- position effect: < 0.1% of zero offset shift in any direction
- vibration effect: no change at 10 g (RMS), 20~2000 Hz
- shock: 100 g, for 10 millisecond

Dimensions



Notes:

1. All dimensions are in mm.
2. Standard mechanical interface is G1/2 and M20x1.5 threads. Other thread types are available on request. In such a case, there might be some modifications in the other dimensions of the sensor. Contact BCM SENSOR to have more information.

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Technical Data

Parameters		Units	Specifications	Notes
pressure medium			compatible with pressure diaphragm	
pressure types & ranges	gauge	bar	-1~0, 0~0.1, ~0.2, ~0.35, ~0.7, ~1, ~2, ~4, ~6, ~10, ~16, ~20, ~35	1
	absolute	bar	0~0.7, ~1, ~2, ~4, ~6, ~10, ~16, ~20, ~35, ~70, ~100, ~250, ~400	
	sealed gauge	bar	0~600, ~1000	
proof pressure		%fs	200, 150 in case of ranges ⩾ 100bar	2
burst pressure		%fs	300, 200 in case of ranges ⩾ 100bar	
output signal	standard	mV	⩾ 60, ⩾ 40 in case of 0.1bar range	3 & 4
	option		10%~90%Vs ratiometric, I²C, SPI	5
excitation	voltage	Vdc	5 (max. 10)	
	current	mA	1.5 (max. 2)	
power supply (Vs) for option outputs		Vdc	3, ..., 5	
load resistance for ratiometric output		kΩ	> 5	
zero offset		mV	⩽ ±2	4
accuracy		%fs	±0.25, ±0.5 (standard)	6
long-term stability		%fs/year	⩽ ±0.1, ⩽ ±0.2 in case of ranges < 2bar, or > 250bar	
input resistance		kΩ	5±3	
output resistance		kΩ	4.5±1.5	
insulation resistance		MΩ	⩾ 100 @250Vdc	
compensated temperature range		°C	0~50 (⩽ 2bar), -10~+70 (> 2bar)	
operating temperature range		°C	-40 ~ +125, -40 ~ +85 in case of option outputs	
storage temperature range		°C	-40 ~ +125, -40 ~ +85 in case of option outputs	
temperature drift of zero offset		%fso	⩽ ±0.75 (> 2bar), ⩽ ±0.8 (0.35bar, ..., 2bar), ⩽ ±1.2 (< 0.35bar)	4 & 7
temperature drift of span		%fso	⩽ ±0.75 (> 2bar), ⩽ ±0.8 (0.35bar, ..., 2bar), ⩽ ±1.2 (< 0.35bar)	4 & 7
life time		cycles	10^8	
response time		ms	⩽ 1	8
process connection			G1/2 male, other threads on request	
connection for electronics housing			M24x1 male, other threads on request	
electrical interface			colored flying wires, silicone rubber, 100mm (standard)	9
			pins	9 & 10
			flexible flat cable, 15mm (available for ratiometric output)	9
pressure diaphragm			316L SS	
thread and housing material			316L SS	
filling oil			silicone oil	
net weight		gram	~131	

General conditions for measurements: media temp. = 25°C ±1°C, ambient temp. = 25°C ±1°C, humidity = 50%RH ±5%RH, barometric pressure: 860~1060 mbar, max. vibration = 0.1 g (i.e. 0.98m/s/s).

Notes:
1. For customized pressure ranges, consult BCM.
2. “fs” refers to full scale pressure.
3. Measured at fs, i.e. full scale pressure.
4. Measured at 5Vdc excitation.
5. A PCB board will be attached to the sensor.
6. Accuracy = sqrt (non-linearity² + hysteresis² + repeatability²).

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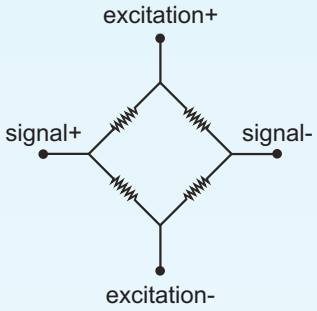
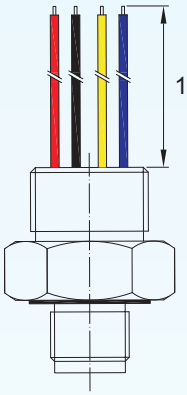
Notes: 7. Calculated as the maximum change of output signal over the compensated temperature range.
8. Response time for a 0 bar to fs step change, 10% to 90% rise time.
9. 4 contacts for millivolt output and for I^2C and SPI output; 3 contacts for ratiometric and ZACwire output.
10. Incase of millivolt output, the pins are 5 gold-plated copper pins of Φ0.5mm and 13mm length. The configuration and electrical definition of these 5 pins are specified in Electrical Interface.

Wheatstone Bridge Circuit



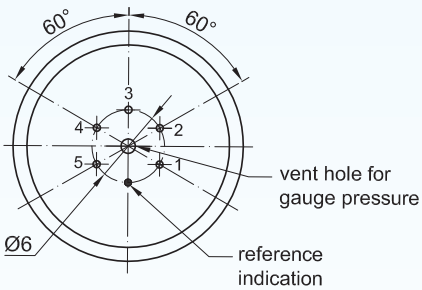
Electrical interface

4-colored flying wires (FW)



wire color	connection
red	excitation +
black	excitation -
yellow	signal +
blue	signal -

5 pins (PI)



pin	connection
1	excitation +
2	signal +
3	excitation -
4	N.C.(1)
5	signal -

Notes: (1) N.C.: Not connected.
(2) All dimensions are in mm.
(3) In case of alterations, refer to the label on the package.

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Ordering Information

position (pos.) 1: model

101B(f)

pos. 2: pressure ranges and references

(-1/0)bar	G	1bar	G, A	16bar	G, A	250bar	A	G: gauge pressure
0.1bar	G	2bar	G, A	20bar	G, A	400bar	A	A: absolute pressure
0.2bar	G	4bar	G, A	35bar	G, A	600bar	S	S: sealed gauge
0.35bar	G	6bar	G, A	70bar	A	1000bar	S	
0.7bar	G, A	10bar	G, A	100bar	A			

Note: In case of the conditioned output signal, indicate both min. and max. measuring pressure, e.g., 0/10bar.

pos. 3: output signal

standard: 40mV for range of 0.1bar; 60mV for other ranges
options: 10%/90%Vs(ratiometric) I^2C SPI

pos. 4: accuracy

0.25%fs 0.5%fs (standard)

pos. 5: compensation

T1 = 0~50 (≤ 2bar), -10~+70 (> 2bar)

pos. 6: mechanical interface

G1/2 = G1/2 male thread (standard)
other thread types available on request

pos. 7: electrical interface

FW (standard): 3 or 4 (#) colored PVC flying wires, length = 100mm (##)
PI: 3, 4, or 5 (#) pins
FC (available for ratiometric output): 3-conductor flat cable, length = 15mm (##)
#: The specific number of conductor refers to note-9 and -10 of Technical Data.
##: Length can be customized on request.

pos. 8: excitation (needed only for mV output)

v = 5Vdc (standard) c = 1.5mA

pos. 9: customized specifications

"(*)" is necessary only if any customized parameter is required, otherwise it is neglectable.

pos.1	pos. 2	pos. 3	pos. 4	pos. 5	pos. 6	pos. 7	pos. 8	pos. 9

Examples of Ordering Code

- standard sensor:

  101B(f)-10barG-60mV-0.5%fs-T1-G1/2-4F-v

- customized sensor:

  101B(f)-0/15barG-10%/90%Vs-0.5%fs-T1-M20x1-3F(50mm)-(*)

  (*): - Customized pressure range = 0~15barG;
  - Customized mechanical interface = M20x1 male thread.

The listed dimensions, specifications and ordering information are subject to change without prior notice.

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