

Model 101B(a19F) Pressure Sensors with Flush-Diaphragm

Description

Model 101B(a19F) pressure sensor (PS) is designed with a completely flush diaphragm in its front. Compared to the diaphragm of 101B(a19G) PS, 101B(a19F) features no any raised edge at its diaphragm. This feature is especially useful when the PS measures the pressure either of sticky pressure medium, like viscous paste, or of pressure medium containing solid particles, like wasted water. The completely flush diaphragm brings the 101B(a19F) PS with advantages when the PS is used to constitute 2-D or 3-D sensor arrays, which are commonly used to measure pressure distribution in relevant space of liquids.

Both its diaphragm and its housing are made from 316L stainless steel. Therefore, the 101B(a19F) PS can measure pressures of corrosive or/and conductive pressure medium as long as the medium is compatible to 316L stainless steel.

The same as 101B(a19G), the 101B(a19F) PS has a piezoresistive pressure sensor die integrated inside the PS and its capsule is filled with un-compressive oil.

A variety of output signals are available, e.g., mV/V signal directly from the Wheatstone bridge circuit, ratiometric signal of 10%~90%Vs, or digital signal of I2C or SPI protocols via an SSC which is fixed at the PS backside.



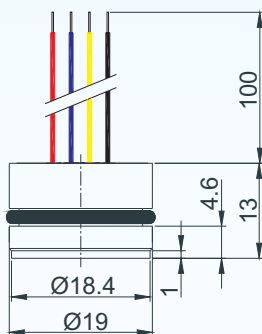
Features

- complete flush diaphragm
- pressure types & ranges:
 - gauge: -1, 0.1, ..., 35 bar
 - absolute: 1, ..., 100 bar
 - sealed gauge: 35, 70, 100 bar
- rugged, isolated stainless steel package
- either with or without temperature compensation
- outstanding sensitivity and reliability
- excited by either current or voltage

Applications

- process control systems
- industrial controls
- pneumatic and hydraulic controls
- pressure transducers and transmitters
- pressure calibrators

Dimensions



Note: All dimensions are in mm.

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

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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	0~1, ~2, ~4, ~6, ~10, ~16, ~20, ~35, ~70, ~100	
	sealed gauge	bar	0~35, ~70, ~100	
proof pressure		%fs	200, 150 in case of ranges ≥ 10 bar	2
burst pressure		%fs	300, 200 in case of ranges ≥ 10 bar	
output signal	standard	mV	≥ 60 , ≥ 30 in case of 0.1bar gauge	3 & 4
	option		10%~90%Vs ratiometric, I ² C, 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		k Ω	> 5	
zero offset		mV	$\leq \pm 2$	4
accuracy		%fs	± 0.5	6
long-term stability		%fs/year	$\leq \pm 0.1$, $\leq \pm 0.2$ (ranges < 2bar, or > 250bar)	
input resistance		k Ω	5 \pm 3	
output resistance		k Ω	4.5 \pm 1.5	
insulation resistance		M Ω	≥ 100 @250Vdc	
compensated temperature range		$^{\circ}$ C	0~50 (≤ 2 bar), -10~+70 (> 2bar)	
operating temperature range		$^{\circ}$ C	-40 ~ +125, -40 ~ +85 in case of option outputs	
storage temperature range		$^{\circ}$ C	-40 ~ +125, -40 ~ +85 in case of option outputs	
temperature drift of zero offset		%fso	$\leq \pm 0.75$ (> 2bar), $\leq \pm 0.8$ (0.35bar, ..., 2bar), $\leq \pm 1.2$ (< 0.35bar)	4 & 7
temperature drift of span		%fso	$\leq \pm 0.75$ (> 2bar), $\leq \pm 0.8$ (0.35bar, ..., 2bar), $\leq \pm 1.2$ (< 0.35bar)	4 & 7
life time		cycles	10 ⁸	
response time		ms	≤ 1	8
process sealing			O-ring (fluorine rubber), O-ring with PVDF washer (≥ 250 bar)	
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	
housing material			316L SS	
filling oil			silicone oil	
net weight		gram	~36	

General conditions for measurements: media temp. = 25 $^{\circ}$ C \pm 1 $^{\circ}$ C, ambient temp. = 25 $^{\circ}$ C \pm 1 $^{\circ}$ C, humidity = 50%RH \pm 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.

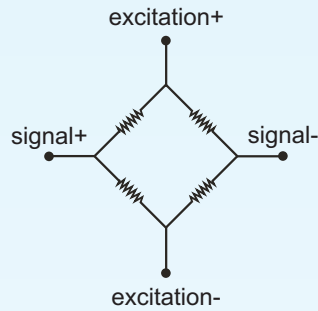
2. "fs" refers to full scale pressure.
3. Measured at fs, i.e. full scale pressure.
4. Measured at 5Vdc excitation.
5. A PCB board will be attached to the sensor.
6. Accuracy = sqrt (non-linearity² + hysteresis² + repeatability²).

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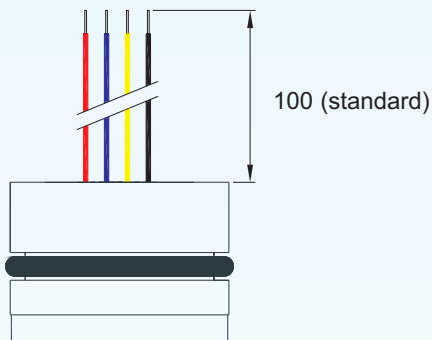
- Notes:
7. Calculated as the maximum change of output signal over the compensated temperature range.
 8. Response time for a 0 bar to fs step change, 10% to 90% rise time.
 9. 4 contacts for millivolt output and for I²C and SPI output; 3 contacts for ratiometric and ZACwire output.
 10. In case of millivolt output, the pins are 5 gold-plated copper pins of $\Phi 0.5\text{mm}$ and 13mm length. The configuration and electrical definition of these 5 pins are specified in Electrical Interface.

Circuit Diagram



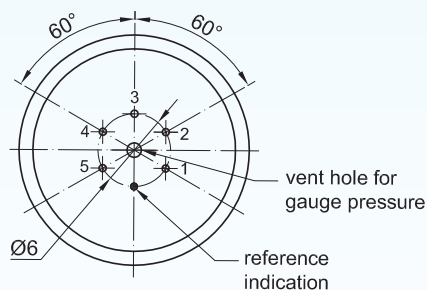
Electrical interface

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(a19F)									
pos. 2: pressure ranges and references									
(-1/0)bar G		1bar G, A		16bar G, A		G: gauge pressure			
0.1bar G		2bar G, A		20bar G, A		A: absolute pressure			
0.2bar G		4bar G, A		35bar G, A, S		S: sealed gauge			
0.35bar G		6bar G, A		70bar A, S					
0.7bar G		10bar G, A		100bar A, S					
Note: In case of the conditioned output signal, indicate both min. and max. measuring pressure, e.g., 0/10bar.									
pos. 3: output signal									
standard: 30mV for range of 0.1barG; 60mV for other ranges									
options: 10%/90%Vs(ratiometric) I ² C SPI									
pos. 4: accuracy									
0.5%fs									
pos. 5: compensation									
T1 = 0~50°C (≤ 2bar), -10~+70°C (> 2bar)									
pos. 6: pressure diaphragm									
316L = 316L stainless steel (standard) Ha = Hastelloy-C Ta = Tantalum									
pos. 7: housing									
316L = 316L stainless steel (standard)									
Ha = Hastelloy-C									
Ta = Tantalum									
pos. 8: 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. 9: excitation (needed only for mV output)									
v = 5Vdc (standard) c = 1.5mA									
pos. 10: 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	pos. 10

Examples of Ordering Code

- standard sensor:
101B(a19F)-6barG-60mV-0.25%fs-T1-316L-316L-FW-v
- customized sensor:
101B(a19F)-0/60barA-10%/90%Vs-0.25%fs-T1-316L-316L-FW(200)-(*)
(*): Customized pressure range = 0~60barA.

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

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