Model 101B(a19G)
Pressure Sensors for General Purpose

Description

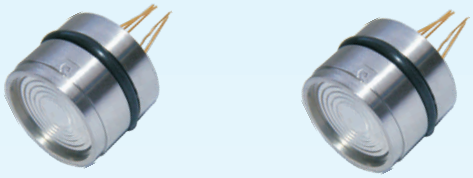
Model 101B(a19G) pressure sensor (PS) is developed for general purpose of pressure measurement. This PS covers a wide measuring range of pressures from 0.1bar to 1000bar, with pressure reference of gauge (relative), absolute, or sealed gauge.

As a PS for general purpose, the model 101B(a19G) PS has been temperature compensated for temperature range of -10~+70°C. And the PS can be supplied with a variety of output signals, e.g., mV/V signal directly from its Wheatstone bridge circuit, ratiometric signal of 10%~90%Vs, or digital signal of I2C or SPI protocols by means of an SSC (sensor signal conditioner) which is fixed at its backside.

Like all the other 101B-series PS's, the 101B(a19G) PS measures pressure by a piezoresistive pressure sensor die. The sensor die is integrated inside a capsule of the PS. The capsule is formed by the sensor housing and its diaphragm, and is fully filled with un-compressive oil. Therefore, the diaphragm of the PS isolates the sensor die from pressure medium. When the pressure of pressure medium is applied to the isolation diaphragm, the oil transfers the pressure onto the sensor die.

Thanks to the isolation diaphragm and sensor housing, both of which are made from 316L stainless steel, the 101B(a19G) PS can measure corrosive or/and conductive medium as long as the pressure medium is compatible to 316L stainless steel.

One of the most common application with the 101B(a19G) PS is to integrate it into a customized housing to form a customized PS, like 101B(c) PS, so as to facilitate pressure measurement with 101B(a19G).



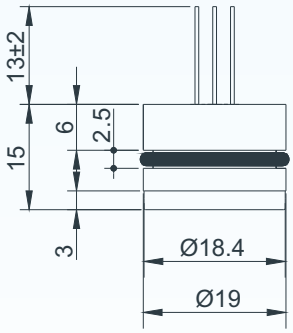
Features

- pressure types & ranges:
  gauge: -1, ..., 35 bar
  absolute: 0.7, ..., 400 bar
  sealed gauge: 600, 1000 bar
- accuracy up to 0.25%fs
- 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	0~0.7, ~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, I^2C, 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 (standard), ±0.5	6
long-term stability		%fs/year	⩽ ±0.1, ⩽ ±0.2 (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 sealing			O-ring (fluorine rubber), O-ring with PVDF washer (⩾ 250bar)	
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 (standard), Hastelloy-C, Tantalum	
housing material			316L SS (standard), Hastelloy-C, Tantalum	
filling oil			silicone oil	
net weight		gram	~16.5 (⩽ 100bar), ~25 (⩾ 200bar)	

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-linearity^2 + hysteresis^2 + repeatability^2).

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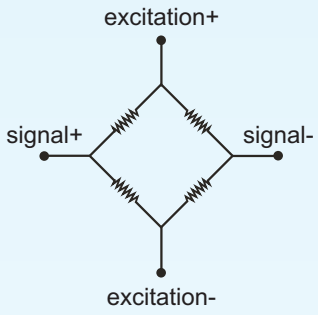
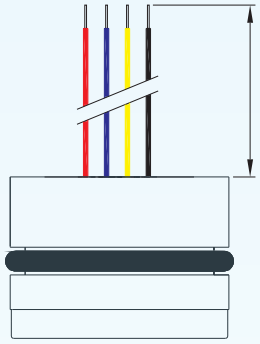
Notes: 7. Calculated as the maximum change of output signal over the compensated temperature range.
8. Response time for a 0 bar to fs step change, 10% to 90% rise time.
9. 4 contacts for millivolt output and for I^2C and SPI output; 3 contacts for ratiometric and ZACwire output.
10. Incase of millivolt 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.

Circuit Diagram



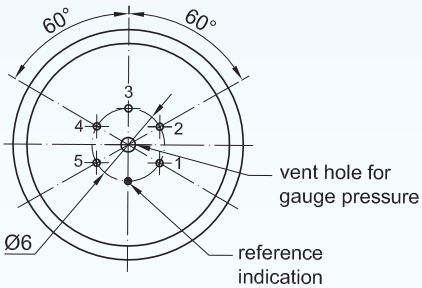
Electrical interface

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(a19G)

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 (standard) 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(a19G)-6barG-60mV-0.25%fs-T1-316L-316L-FW-v
- customized sensor:
  101B(a19G)-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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