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

## Description

The 101B(a19F) pressure sensor with a complete flush diaphragm is developed from the 101B(a19G) pressure sensor. This model is specially designed for the applications in which the medium is thick and requires cleaning process.

The 101B(a19F) is based on BCM's piezoresistive sensor die. The sensor die is packaged in a stainless steel housing. Oil filled in the housing is isolated from measured media by a stainless steel diaphragm.

The pressure types of the sensor include gauge (relative) and absolute. For gauge pressure type, vacuum pressure measurement is available as an option.

The output of 101B(a19F) can be configured to 10%~90%Vs ratiometric, 4~20mA, $I^2C$, or SPI by integrated the electronics.

The 101B(a19F) can be either temperature compensated or not. The compensated temperature range can be extended to -10~+80°C.

## Features

- complete flush diaphragm
- pressure types & ranges:
  gauge: -1, ..., 35 bar
  absolute: 0.35, ..., 100 bar
- rugged, isolated stainless steel package
- either with or without temperature compensation
- outstanding sensitivity and reliability
- excited by either current or voltage

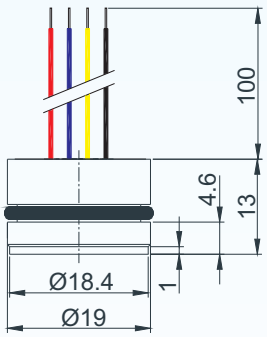
## Applications

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

## 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




Note: All dimensions are in mm.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## Technical Data

| Parameters | | Units | Specifications | Notes |
|---|---|---|---|---|
| pressure medium | | | compatible with pressure diaphragm | |
| pressure types & ranges | gauge | bar | 0~0.1, ~0.35, ~0.7, ~1, ~2, ~4, ~6, ~10, ~16, ~20, ~35 | 1 & 2 |
| | absolute | bar | 0~0.35, ~0.7, ~1, ~2, ~4, ~6, ~10, ~16, ~20, ~35, ~70, ~100 | 2 |
| overload pressure | | %fs | 250 (< 35bar), 150 (≥ 35bar) | 3 |
| output signal | | mV | ≥ 55, ≥ 35 in case of 0.1bar range,<br>option: 10%~90%Vs ratiometric, 4~20mA, I²C, SPI | 4 & 5 |
| excitation | voltage | Vdc | 3, ..., 10 (typically 5Vdc) | |
| | current | mA | 1, ..., 2 (typically 1.5mA) | |
| zero offset | | mV | ≤ ±1 | 5 |
| accuracy | | %fs | ±0.5 | 6 |
| long-term stability | | %fs/year | ≤ ±0.1 | |
| input resistance | | kΩ | 4±1 | |
| output resistance | | kΩ | 4±1 | |
| insulation resistance | | MΩ | ≥ 500 @500Vdc | |
| compensated temperature range | | °C | 0 ~ 50 (standard), -10 ~ +80 | |
| operating temperature range | | °C | -40 ~ +125 | |
| storage temperature range | | °C | -40 ~ +125 | |
| temperature drift of zero offset | | %fso | ≤ ±0.8 | 7 |
| temperature drift of span | | %fso | ≤ ±0.8 | 7 |
| life time | | cycles | $10^8$ | |
| response time | | ms | ≤ 1 | 8 |
| process sealing | | | O-ring (fluorine rubber) | |
| electrical interface | | | 4 colored flying wires, silicone rubber, 100mm (standard) | |
| | | | 5 gold-plated copper pins, Φ0.5mm, 12mm | |
| pressure diaphragm | | | 316L stainless steel | |
| wetted parts material | | | 316L stainless steel | |
| filling oil | | | silicone oil | |
| net weight | | gram | ~36 | |

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. Vacuum pressure measurement is available on request for all gauge pressure ranges, e.g., -1~0.1bar.
2. For customized pressure ranges, consult BCM.
3. “fs” refers to full scale pressure.
4. Measured at fs, i.e. full scale pressure.
5. Measured at 5Vdc excitation.
6. Accuracy = sqrt (non-linearity$^2$ + hysteresis$^2$ + repeatability$^2$).
7. Maximum output change over compensated temperature range, and normalized by the span at 25°C, for the sensor which is temperature compensated.
8. Response time for a 0 bar to fs step change, 10% to 90% rise time.

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


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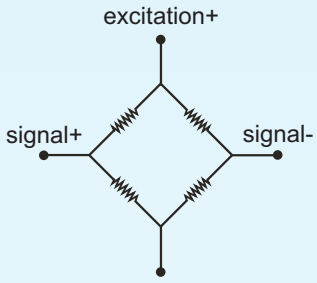
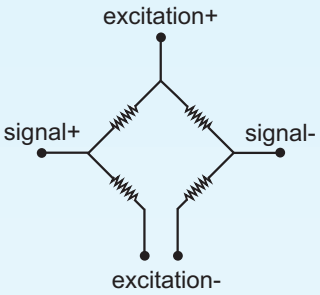
## Circuit Diagram



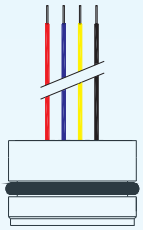

**closed-bridge circuit diagram**
for compensated sensors




**open-bridge circuit diagram**
for uncompensated sensors

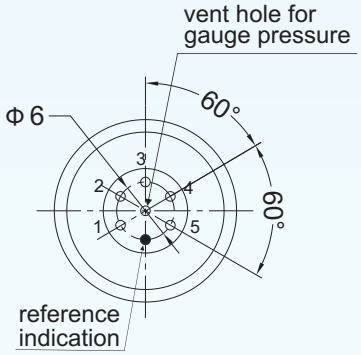
## Electrical interface

### 4-colored flying wires (4F)



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

### 5 pins (5P)




compensated sensors (closed-bridge)

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

uncompensated sensors (open-bridge)

| pin | connection |
|---|---|
| 1 | excitation + |
| 2 | signal + |
| 3 | excitation - |
| 4 | excitation - |
| 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**

| gauge* (G): | | | absolute (A): | |
|---|---|---|---|---|
| 0.1barG | 6barG | | 0.35barA | 10barA |
| 0.35barG | 10barG | | 0.7barA | 16barA |
| 0.7barG | 16barG | | 1barA | 20barA |
| 1barG | 20barG | | 2barA | 35barA |
| 2barG | 35barG | | 4barA | 70barA |
| 4barG | | | 6barA | 100barA |

*: If the vacuum pressure measurement is required, indicate the vacuum pressure in the ordering code, e.g., (-1/+1)barG.

**pos. 3: output signal**

standard: 35mV: for 0~0.1bar range; 55mV: for other ranges

options: 10%/90%Vs (ratiometric) 4/20mA $I^2C$ SPI

**pos. 4: accuracy**

0.5%fs

**pos. 5: compensation**

T1 = 0~50°C (standard) T2 = -10~+80°C (standard)

NT = no temperature compensation

**pos. 6: pressure diaphragm**

316L = 316L stainless steel

**pos. 7: wetted parts**

316L = 316L stainless steel

**pos. 8: electrical interface**

4F = 4 colored flying silicone rubber wires (standard)

5P = 5 gold-plated copper pins

If the required output signal is not mV, the electrical interface will be adjusted as the way confirmed on request.

**pos. 9: excitation**

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-55mV-0.5%fs-T1-316L-316L-4F-v**

- customized sensor:

  **101B(a19F)-70barA-10%/90%Vs-0.5%fs-T1-316L-316L-3F-v-(*)**

  (*): - Customized output signal = 10%~90%Vs ratiometric
  - Electrical interface = 3 colored flying wire with length of 100mm.

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