

Model 500G

Mono-Block Stainless Steel Pressure Sensors



Description

The 500G pressure sensor employs a 316L stainless steel mono-block structure (17-4ph SS available as an option), and is designed for high pressure applications. Thanks to the mono-block structure, the sensor has excellent resistance to overload pressure - proof pressure up to 300%fs and burst pressure up to 500%fs. And this structure prevents pressure medium from leakage to the backside of the sensor. In addition, there is no any O-ring needed inside the sensor structure for sealing purpose.

On the pressure diaphragm of the 500G-series pressure sensors, the Wheatstone bridge circuit is built with BCM silicon (Si) strain gauges via glass-frit bonding process, resulting in a creep free behavior of the sensors. Compared to the 664F-series pressure sensors which are based on metal foil strain gauge technology, the 500G-series sensors offer higher output sensitivity (up to 15mV/V).

The 500G is mostly used for pressure transmitter applications for high pressure measurement.

Features

- rugged and mono-block structure
- sensor body made from 316LSS (or 17-4ph SS)
- glass-frit bonded Si strain gauges
- accuracy up to 0.35%fs
- measuring ranges: 5bar, ..., 5000bar
- proof pressure: up to 300%fs
- burst pressure: up to 500%fs
- compensated temperature range: -20~+85 °C

Applications

- industrial controls
- hydraulic systems
- compressors
- process control 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

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Technical Data

Parameters		Units	Specifications	Notes
pressure medium			gases or dilute fluids	1
measuring ranges	316L (standard)	bar	0~5, ~10, ~16, ~25, ~40, ~60, ~100, ~160, ~250, ~400, ~600, ~1000	2
		psi	0~60, ~150, ~200, ~300, ~400, ~500, ~600, ~1000, ~1500, ~2000, ~3000, ~4000, ~5000, ~6000, ~7500, ~10000, ~15000	
	17-4ph (option)	bar	0~25, ~40, ~60, ~100, ~160, ~250, ~400, ~600, ~1000, ~1600, ~2500, ~4000, ~5000	
		psi	0~300, ~400, ~500, ~600, ~1000, ~1500, ~2000, ~3000, ~4000, ~5000, ~6000, ~7500, ~10000, ~15000, ~20000, ~30000, ~50000, ~75000	
pressure reference			gauge	
proof pressure	316L	%fs	150	3
	17-4ph	%fs	300; for ranges \geq 1000bar or 15000psi refers to note 4	4
burst pressure	316L	%fs	500	5
	17-4ph	%fs	500; for ranges \geq 1000bar or 15000psi refers to note 5	
output sensitivity		mV/V	\geq 15; for ranges \geq 1000bar or 15000psi refers to note 6	6 & 7
excitation		Vdc	3, ..., 10	
zero offset		mV	$\leq \pm 1$	
accuracy		%fs	± 0.35 only available for ranges \leq 1000bar (or 20000psi), ± 0.5 (standard)	8
long-term stability		%fs/year	$\leq \pm 0.2$	
input resistance		k Ω	5 \pm 2	
output resistance		k Ω	4 \pm 1	
insulation resistance		M Ω	100 @250Vdc	
compensated temperature range		$^{\circ}$ C	-20 ~ +85	
operating temperature range		$^{\circ}$ C	-40 ~ +125	
storage temperature range		$^{\circ}$ C	-40 ~ +125	
temperature coefficient of zero offset		%fso/ $^{\circ}$ C	$\leq \pm 0.03$	9
temperature coefficient of span		%fso/ $^{\circ}$ C	$\leq \pm 0.03$	9
life time		cycles	10 ⁸	
response time		ms	≤ 1	10
process sealing			O-ring (fluorine rubber)	
mechanical interface			G1/4 male, G1/2 male, M20x1.5, M22x1.5	11
electrical interface			solder pads (standard for output of mV/V)	
			4 colored silicone flexible wires, 100mm	
			4 pins (standard for amplified output, e.g., 4~20mA, 0.5~4.5V)	
pressure diaphragm			316L SS (standard), 17-4ph SS	
wetted parts material			316L SS (standard), 17-4ph SS	
net weight		gram	~60	

General conditions for measurements: media temp. = 25°C \pm 1°C, ambient temp. = 25°C \pm 1°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. The pressure medium should be compatible with wetted parts material and pressure diaphragm.

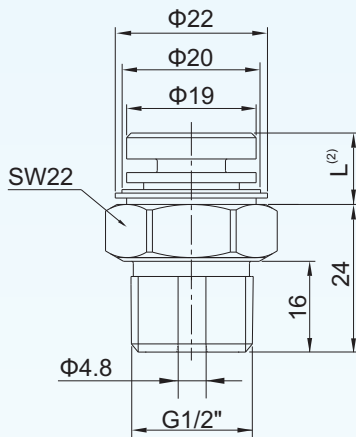
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Model 500G Mono-Block Stainless Steel Pressure Sensors

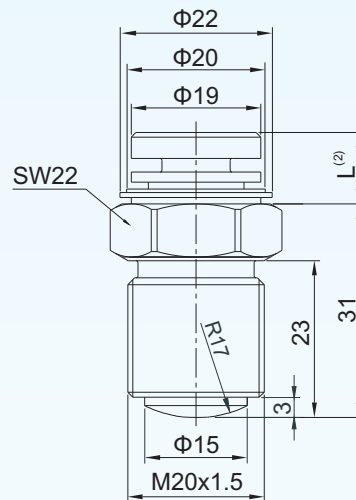


- Notes:
- For customized pressure ranges, consult BCM.
 - "fs" refers to full scale pressure or rated pressure.
 - Proof pressure of 150%fs is for ranges $\geq 1000\text{bar}$ or 15000psi.
 - Burst pressure of 300%fs for $[1000\text{bar} \leq \text{ranges} \leq 2500\text{bar}]$ or $[15000\text{psi} \leq \text{ranges} \leq 30000\text{psi}]$, 250%fs for ranges of 4000bar or 50000psi, 200%fs for range of 5000bar, 190%fs for ranges of 75000psi.
 - Output sensitivity of $\geq 10\text{mV/V}$ for $[1000\text{bar} \leq \text{ranges} \leq 1600\text{bar}]$ or $[15000\text{psi} \leq \text{ranges} \leq 30000\text{psi}]$, $\geq 5\text{mV/V}$ for ranges $\geq 2500\text{bar}$ or 50000psi.
 - Options for the output signal: 0.5~4.5 Vdc ratiometric, 4~20 mA, I²C, SPI.
 - Accuracy = $\sqrt{(\text{non-linearity}^2 + \text{hysteresis}^2 + \text{repeatability}^2)}$.
 - Calculated as a rate of output change between -20°C and +85°C, and normalized by the output at 25°C, for the sensor which is temperature compensated.
 - Response time for a 0 bar to fs step change, 10% to 90% rise time.
 - G1/4 male threads is standard for ranges $\leq 1600\text{bar}$; G1/2 male threads is standard for ranges $> 1600\text{bar}$.
Semi-sphere surface as surface contact seal at process connection is available on request.

Dimensions



Dimensions of 500G with G1/2" threads



Dimensions of 500G $\geq 600\text{bar}$
with M20x1.5 threads and semi-sphere surface

- Notes:
- All dimensions in mm.
 - $L = 12.3\text{mm}$ in case the ranges $< 250\text{bar}$; $L = 10.5\text{mm}$ in case the ranges $\geq 250\text{bar}$.
 - When ranges $\geq 600\text{bar}$, the semi-sphere surface will be applied as standard. And it is suggested to choose either M20x1.5 or G1/2 threads. For any customized mechanical interface, consult BCM SENSOR.
 - The dimensions of the PCB or SSC circuit are not included in the drawings above. The diameter of the PCB is $\Phi 19\text{mm}$, and the height of the PCB will depend on its functionality.

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Ordering Information

position (pos.) 1: model											
500G											
pos. 2: pressure ranges and references											
316L:	5bar	G	100bar	G	60psi	G	600psi	G	5000psi	G	G: gauge pressure
	10bar	G	160bar	G	150psi	G	1000psi	G	6000psi	G	
	16bar	G	250bar	G	200psi	G	1500psi	G	7500psi	G	
	25bar	G	400bar	G	300psi	G	2000psi	G	10000psi	G	
	40bar	G	600bar	G	400psi	G	3000psi	G	15000psi	G	
	60bar	G	1000bar	G	500psi	G	4000psi	G			
17-4ph:	25bar	G	600bar	G	300psi	G	3000psi	G	20000psi	G	
	40bar	G	1000bar	G	400psi	G	4000psi	G	30000psi	G	
	60bar	G	1600bar	G	500psi	G	5000psi	G	50000psi	G	
	100bar	G	2500bar	G	600psi	G	6000psi	G	75000psi	G	
	160bar	G	4000bar	G	1000psi	G	7500psi	G			
	250bar	G	5000bar	G	1500psi	G	10000psi	G			
	400bar	G			2000psi	G	15000psi	G			
pos. 3: output signal											
15mV/V, 10mV/V, or 5mV/V according to the range(*) (standard) 0.5/4.5V = 0.5~4.5 V (ratiometric) I ² C SPI (*): 15mV/V for ranges < 1000bar or 15000psi; 10mV/V for 1000bar ≤ ranges ≤ 1600bar or 15000psi ≤ ranges ≤ 30000psi; 5mV/V for ranges ≥ 2500bar or 50000psi.											
pos. 4: accuracy											
0.5%fs (standard) 0.35%fs (available on request, but only for [ranges ≤ 1000bar] or [ranges ≤ 20000psi])											
pos. 5: temperature compensation											
T2 = -20~85 °C (standard) NT = no temperature compensation											
pos. 6: wetted parts material (including pressure diaphragm)											
316L (standard) 17/4ph											
pos. 7: mechanical interface											
G1/4: G1/4 male M20x1.5: M20x1.5 male G1/2: G1/2 male M22x1.5: M22x1.5 male											
pos. 8: electrical interface											
SP: solder pads (standard) FW: flying wires, silicone, 100mm 4P: 4 pins (for amplified output)											
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:

500G-100barG-15mV/V-0.5%fs-T2-316L-G1/2-SP

- customized sensor:

500G-2500psiG-10%/90%Vs-0.5%fs-T2-17/4ph-G1/4-FW-(*)

(*): Customized range = 2500psiG;
Customized output = 10%/90%Vs ratiometric.

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

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