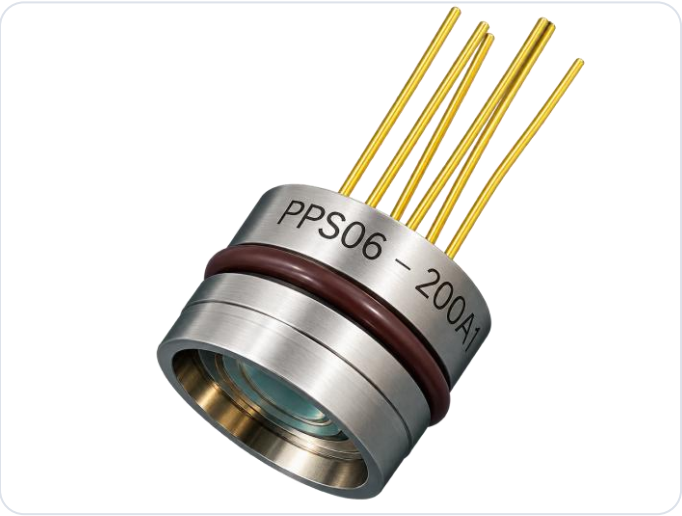
PPS06 Piezoresistive Silicon Pressure Sensor Element

Oil-filled, media-isolated Ø15 mm OEM element · 250 psi to 9,000 psi



316L STAINLESS MEDIA ISOLATED

FEATURES

- Standard Ø15 mm (Ø0.59 in) OEM pressure element
- Pressure ranges from 250 psi to 9,000 psi
- Sealed gauge and absolute references
- 1.5 mA constant-current or 10 V constant-voltage excitation
- Media isolated — 316L diaphragm with silicone oil fill
- All-316L stainless steel housing and diaphragm
- Compensated -10 to 70 °C; operates -40 to 125 °C
- 6 gold-plated Kovar pins, or 4 / 5 silicone wire leads
- Optional threaded ports and signal-conditioned front ends

DESCRIPTION

The PPS06 is a piezoresistive silicon pressure sensor element built as the core of OEM pressure sensors and transmitters. A diffused-silicon MEMS die is sealed in a 316L stainless steel housing; pressure reaches the die through a stainless diaphragm and an internal silicone-oil fill, so the die never contacts the measured media.

The all-solid construction handles liquids, gases, and corrosive media compatible with 316L. The element seals with an O-ring for simple installation, and its millivolt output is easy to amplify into a standard analog or digital signal.

APPLICATIONS

- Medical devices & biomedical instruments
- Industrial automation & process control
- Hydraulic systems, valves & switches
- HVAC & refrigeration equipment
- Agricultural equipment
- Chemical process & natural gas
- Level measurement
- Pressure gauges & calibration instruments

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	**-40 to 125 °C · -40 to 257 °F**	Overpressure	**1.5× – 2× FS (by range)**
Storage Temperature	**-40 to 125 °C · -40 to 257 °F**	Burst Pressure	**2× – 4× FS (by range)**
Compensated Temperature	**-10 to 70 °C · 14 to 158 °F**	Pressure Range	**250 to 9,000 psi**

Electrical & performance specifications

Performance is specified separately for the low-pressure (250–300 psi) and high-pressure (500–9,000 psi) builds. All values are for the compensated element (compensation option 2).

PARAMETER	LOW RANGE · 250-300 PSI			HIGH RANGE · 500-9K PSI			UNITS
	MIN	TYP	MAX	MIN	TYP	MAX	
Test conditions	5 V excitation · 30 °C			1.5 mA or 10 V · 30 °C			—
Excitation voltage	4.75	5.0	9.25	—	10	—	V
Excitation current	—	1.0	1.9	—	1.5	—	mA
Input impedance — const. voltage	2.5	—	5	3	—	18	kΩ
Input impedance — const. current	—	—	—	2	—	5	kΩ
Output impedance	3.5	—	6	—	—	—	kΩ
Zero pressure output [1]	-2.0	—	+2.0	-2.0	±1.0	+2.0	mV
Full-scale output — 5 V	—	50	—	—	—	—	mV
Full-scale output — 1.5 mA	—	—	—	60	90	150	mV
Full-scale output — 10 V	—	—	—	98	100	102	mV
Non-linearity (BFSL) [2]	—	±0.15	±0.25	-0.3	±0.2	+0.3	%FS
Hysteresis	—	±0.05	±0.075	-0.05	±0.03	+0.05	%FS
Repeatability	—	±0.05	±0.075	-0.05	±0.03	+0.05	%FS
Zero thermal error [3]	—	±0.75	±1.0	-1.5	±0.75	+1.5	%FS
Span thermal error [3]	—	±0.75	±1.0	-1.5	±0.75	+1.5	%FS
Thermal hysteresis [4]	—	—	—	-0.075	±0.05	+0.075	%FS
Long-term stability	—	—	—	-0.3	±0.2	+0.3	%FS/yr

NOTES

1) Measured at zero pressure.
2) Best-fit straight line (BFSL) method.
3) Over the compensated range, −10 to 70 °C, referenced to 30 °C.
4) Return to reference temperature after a high/low temperature excursion.

EXCITATION

Constant current (1.5 mA) is the recommended and most common compensation for high-range elements. Constant voltage (5 V low range / 10 V high range) is available. Select the excitation code at order (I = 1.5 mA, V = 10 V) — the element is compensated for the mode selected.

General specifications

PARAMETER	VALUE
Operating temperature	−40 to 125 °C (to 150 °C on request)
Storage temperature	−40 to 125 °C
Compensated temperature	−10 to 70 °C
Insulation resistance	≥ 200 MΩ @ 250 VDC
Response time	≤ 1 ms (to 90% FS)
Vibration	20 g, 20–5,000 Hz
Shock	100 g, 10 ms
Service life	10^6 pressure cycles
Measured media	Liquids and gases compatible with 316L stainless steel
Electrical connection	6 gold-plated Kovar pins, or 4 / 5 silicone wire leads (K6 / W4 / W5)

Pressure ranges, overpressure & burst

RANGE	MPA	BAR	REFERENCES	OVERPRESSURE	BURST
0–250 psi	1.72	17.2	S · A	2× FS	3× FS
0–300 psi	2.07	20.7	S · A	2× FS	3× FS
0–500 psi	3.45	34.5	S · A	2× FS	4× FS
0–1,000 psi	6.89	68.9	S	2× FS	4× FS
0–2,000 psi	13.8	138	S	2× FS	3× FS
0–3,000 psi	20.7	207	S	1.5× FS	3× FS
0–5,000 psi	34.5	345	S	1.5× FS	2× FS
0–8,000 psi	55.2	552	S	1.5× FS	2× FS
0–9,000 psi	62.1	621	S	Consult factory	—

S = Sealed gauge · A = Absolute (to 500 psi). Custom ranges available for OEM customers. Keep maximum system pressure below the overpressure rating.

Package, media & application information

Package

The body is machined from 316L stainless steel for easy manufacturability and long-term stability. The Ø15 mm element seals with an O-ring, so it drops into a standard OEM bore or one of the threaded port housings.

Stability

The silicon MEMS die is mounted to a ceramic base and sealed into the stainless housing behind an oil-filled diaphragm. Proprietary factory calibration and analysis deliver consistent, stable output over the life of the element.

Media

Compatible with liquids and gases that are compatible with 316L, including oil, air, gas, water, salt water, and some corrosive media. The die never contacts the media.

Wetted parts

316L stainless steel diaphragm and housing; Viton (FKM) O-ring, NSF approved. Internal fill is silicone oil.

Pressure port

Supplied as a sensor-only element or in a threaded housing: 1/4-18 NPT, 1/8-27 NPT, 7/16-20 UNF-3A, 9/16-18 UNF-3A (JIC), or 1/4 BSPP. Custom fittings are available.

Signal conditioning

Integrated front-end boards are available to convert the mV output to analog voltage (5 V or 9–32 V supply), 4–20 mA, or digital I²C. Contact us for signal-conditioned versions.

HANDLING

Do not touch the diaphragm with hard objects. Follow the pin-out for your version (page 5) exactly — incorrect wiring can damage the element. Confirm maximum system pressure is below the overpressure rating before installation.

10,000	≤ 1 ms	Ø15 mm	10^6
Max range psi	Response time	Standard OEM element	Pressure cycles

Electrical connections — sensor-only element

Sensor-only PPS06 elements are available compensated (compensation option 2) or uncompensated (option 1). Pin assignments differ between the two versions — wire to the pin-out for the version ordered.

Compensated

OPTION 2

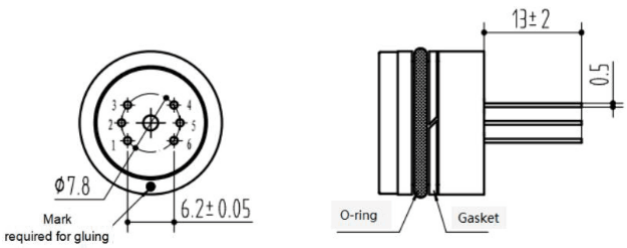


Fig. 1 — Compensated element, pin side view and profile (mm). 4-wire bridge.

PIN	FUNCTION	WIRE LEAD
3	+ Excitation (+IN)	Red
5	– Excitation (–IN)	Blue
2	+ Output (+OUT)	Yellow
4	– Output (–OUT)	White
1	Die –	–
6	Die –	–

Uncompensated

OPTION 1

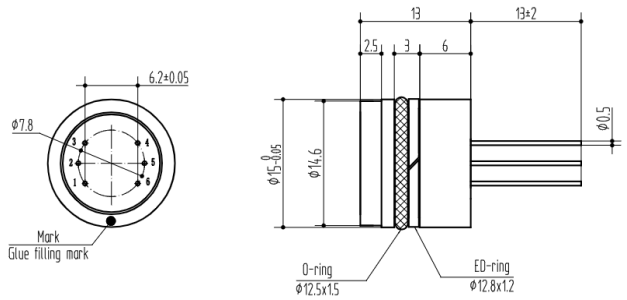


Fig. 2 — Uncompensated element, pin side view and profile (mm). 5-wire open bridge.

PIN	FUNCTION	WIRE LEAD
3	+ Excitation (+IN)	–
1	– Excitation (–IN)	–
6	– Excitation (–IN)	–
2	+ Output (+OUT)	–
4	– Output (–OUT)	–
5	Not used	–

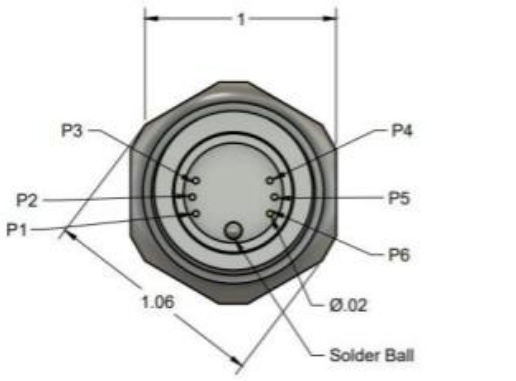


Fig. 3 — Pin positions P1–P6, viewed from pin side. The glue-fill mark (solder ball) sits below pins 1 and 6.

COMPENSATED VS. UNCOMPENSATED

Compensated: –IN on pin 5; pins 1 and 6 are die – connections.

Uncompensated: the bridge's two –IN legs come out separately on pins 1 and 6 (5-wire open bridge).

+IN (pin 3), +OUT (pin 2) and –OUT (pin 4) are the same on both.

WIRE LEADS

Silicone wire lead colors (Red / Blue / Yellow / White) apply to compensated 4-wire elements (W4); uncompensated elements use 5 wire leads (W5). Kovar pin version (K6): pin length 13 ± 2 mm; specify wire length at order.

Mechanical dimensions — inches [mm]

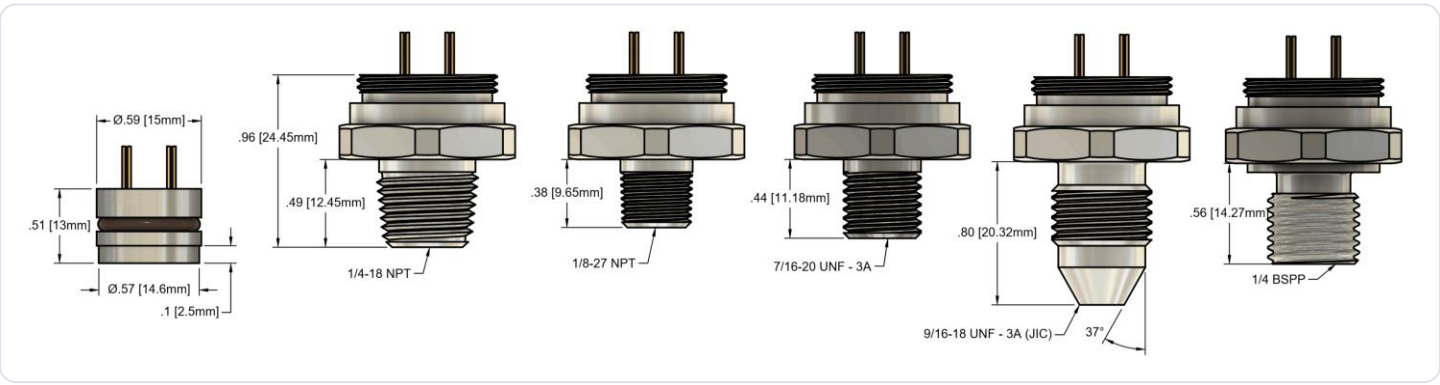


Fig. 4 — Sensor-only element (left) and threaded port housings: 1/4-18 NPT, 1/8-27 NPT, 7/16-20 UNF-3A, 9/16-18 UNF-3A (JIC), 1/4 BSPP.

FEATURE	DIMENSION
Element diameter	Ø0.59 [15]
Body diameter at O-ring	Ø0.57 [14.6]
Element height	0.51 [13]
O-ring	Ø0.5 [12.7] × Ø0.07 [1.78]
Housing overall height	0.96 [24.45]
1/4-18 NPT thread length	0.49 [12.45]
1/8-27 NPT thread length	0.38 [9.65]
7/16-20 UNF-3A length	0.44 [11.18]
9/16-18 UNF-3A (JIC) length	0.80 [20.32] · 37° flare
1/4 BSPP thread length	0.56 [14.27]

MATERIAL	DETAIL
Diaphragm	316L SS
Housing	316L SS
Fill fluid	Silicone oil
O-ring	Viton (FKM), NSF
Terminals	Au-plated Kovar pins or silicone wires

TOLERANCES

Dimensions in inches [mm].
X ±0.5 · X.X ±0.15
X.XX ±0.010 · X.XXX ±0.005

Ordering information — part-number configuration

PPS06	_	500	S	2	1	_	K6	_	I
MODEL		RANGE	TYPE	COMP	PORT		ELECTRICAL		EXCITATION

Model	Range (XX)	Type (Y)	Compensation (C)	Port (P)	Electrical (E)	Excitation (X)
PPS06	250 = 250 PSI 9K = 9,000 PSI	A = Absolute S = Sealed Gauge	1 = Uncompensated 2 = Compensated Pin-outs differ — see page 5	S = Sensor Only (No Port) 1 = 1/4"-18 NPT 2 = 1/8"-27 NPT 3 = 7/16"-20 UNF 4 = 9/16"-18 UNF AN 5 = 1/4"-19 BSP	K6 = 6 Kovar Pins W4 = 4 Wire Leads W5 = 5 Wire Leads	I = 1.5 mA Constant Current V = 10 V Constant Voltage

SPECIFY WITH YOUR ORDER

Wire lead length · Custom pressure range or units · Signal-conditioned front end: analog 5 V, analog 9–32 V, 4–20 mA, or digital I²C — contact us for configuration.

EXAMPLE PART NUMBERS

PPS06-500S2S-K6-I → 0–500 psi sealed gauge · compensated · sensor-only element · 6 Kovar pins · 1.5 mA

PPS06-300A21-W4-I → 0–300 psi absolute · compensated · 1/4"-18 NPT housing · 4 wire leads · 1.5 mA

PPS06-5KS13-W5-V → 0–5,000 psi sealed gauge · uncompensated · 7/16"-20 UNF housing · 5 wire leads · 10 V

ORDERING TIPS

Select a range within ±30% FS of the actual operating pressure. Confirm the maximum system overload is below the element's overpressure rating. Sealed gauge elements are referenced to atmospheric pressure at the time of manufacture.

Configure your PPS06 element

Custom ranges, ports, compensation, and front ends available for OEM volumes. Talk to an engineer to spec your part.

REQUEST A QUOTE
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