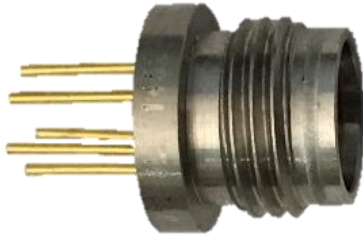


PPS03 Miniature High Pressure Sensor Element

Ø9 mm media-isolated SS316L mV bridge for 500 to 10,000 PSI — up to 150 °C option



ABSOLUTE / SEALED GAUGE

SS316L

MV OUTPUT

DESCRIPTION

The PPS03 is a miniature high-pressure sensing element for medical, industrial and commercial OEM designs. A MEMS piezoresistive die is sealed in a media-isolated SS316L housing, so liquids, air and gases reach the die only through a stainless diaphragm and the oil fill behind it.

Stainless construction and high-temperature component selection allow use up to 125 °C, with a 150 °C option on request. The unamplified millivolt bridge output is designed to be conditioned by the host electronics. The design is simple, cost-effective and proven reliable in OEM production.

FEATURES

- Pressure ranges from 500 PSI to 10,000 PSI
- Absolute or sealed gauge reference
- Compact Ø0.355 in [9 mm] sensing body
- Accuracy $\pm 0.15\%$ FS
- Full-scale output ≥ 70 mV at 2.0 mA excitation
- Operating temperature -40 to 125 °C (150 °C option)
- Uncompensated or temperature-compensated versions
- Oil-filled, media-isolated SS316L construction
- Optional threaded process fittings: NPT, UNF, UNEF

APPLICATIONS

- Medical devices
- Industrial automation
- Agricultural equipment
- Chemical process
- Natural gas
- Hydraulic systems
- High-pressure transducer cores

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	-40 to 125 °C (150 °C opt.)
Storage Temperature	-55 to 150 °C • -67-302 °F
Compensated Temperature	-10 to 80 °C (option 2)

Pressure Range	500 to 10,000 PSI
Proof Pressure	3× FS • 15,955 PSI max
Burst Pressure	5× FS • 17,400 PSI max

Electrical & performance specifications

Constant-current excitation, 25 °C unless otherwise noted.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Excitation current	I_{EX}	—	1.5	2.0	mA
Excitation voltage (alternative)	V_{EX}	—	5.0	10	V
Input impedance	R_{IN}	3	5	8	k Ω
Output impedance	R_{OUT}	3.5	5	6	k Ω
Full-scale output (at 2.0 mA)	V_{FS}	70	—	—	mV
Zero pressure offset (Note 1)	V_{OS}	−10	—	10	mV
Accuracy (Note 2)	—	−0.15	—	0.15	%FS
Hysteresis	—	—	0.05	0.08	%FS
Temperature coefficient of resistance	TCR	2,300	—	3,300	ppm/°C
Temperature error, compensated (Note 3)	—	—	0.15	0.30	%FS
Compensated temperature (option 2)	—	−10	—	80	°C
Operating temperature (Note 4)	T_{OP}	−40	—	125	°C
Storage temperature	T_{ST}	−55	—	150	°C

1) Measured at zero pressure. 2) Includes non-linearity (BFSL), hysteresis and repeatability at 25 °C. 3) Span and offset over the compensated range, option 2 only. 4) 150 °C option on request.

Electrical connections

PIN	FUNCTION
P1	N/C
P2	−OUT · output −
P3	−IN · excitation −
P4	−IN · excitation −
P5	+OUT · output +
P6	+IN · excitation +

6 × Ø0.5 mm Kovar pins. A solder ball marks pin orientation (P1 / P3 side).

Bridge circuit

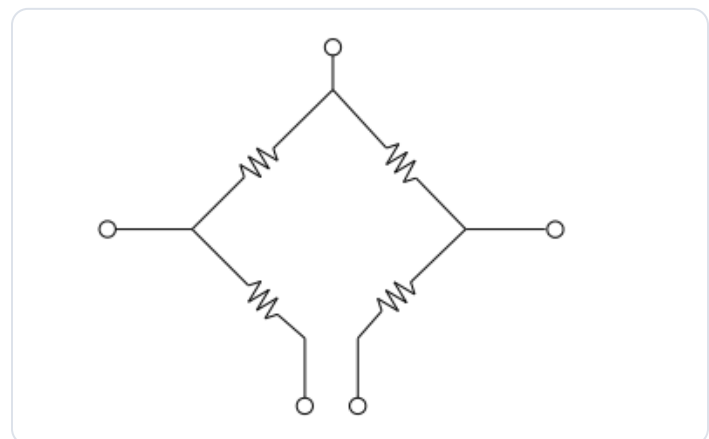


Fig. 1 – Four-arm piezoresistive Wheatstone bridge. Excite across ±IN; read ±OUT differentially.

Package, media & installation

Package

A compact SS316L body, 0.355 in [9 mm] in diameter, with six Kovar feed-through pins. The vibration-resistant, automotive-grade design suits engine-mounted and other high-vibration use. The element seals into the host with a Viton O-ring.

Process fittings

Supplied as a bare element (S) for welding or O-ring installation, or pre-assembled in a 5/16-32 UNEF-3A, 1/4" NPT, 1/8" NPT or 7/16-20 UNF fitting. Custom fittings are available for OEM customers.

Wetted parts

SS316L diaphragm and housing (Hastelloy option). Viton O-ring.

Over-pressure

Proof pressure is 3× full scale and burst pressure is 5× full scale, up to the housing limits of 15,955 PSI proof and 17,400 PSI burst.

Stability

The silicon MEMS die is mounted to a ceramic base and sealed into the SS housing behind an oil-filled stainless diaphragm. Proprietary factory calibration and screening give the most stable product possible with this technology.

Media

Compatible with oil, air, gas, water, salt water and other media compatible with SS316L and the Viton seal. Hastelloy wetted parts are available for more corrosive media.

Pressure ranges

Standard ranges are 500, 1,000, 2,500, 3,000, 5,000, 7,500 and 10,000 PSI, in absolute or sealed gauge. Custom ranges are available for OEM customers.

High temperature

Standard parts operate to 125 °C. A 150 °C version is available on request. Confirm the seal material for sustained high-temperature service.

10,000

Max range PSI

±0.15%

Accuracy FS

Ø9 mm

Body diameter

150 °C

High-temp option

mV bridge output

The PPS03 is an unamplified sensing element. Its output is a millivolt-level differential signal across +OUT and -OUT. The host must condition it — amplify it, correct the offset and, for uncompensated parts, correct for temperature — before use as a process signal.

Excitation

Drive the bridge from a **constant-current source** across +IN and -IN: 1.5 mA typical, 2.0 mA maximum. Constant-current drive partly self-compensates span over temperature. Constant-voltage drive at 5 V (10 V maximum) is also possible.

ITEM	VALUE
Rated excitation	1.5 mA typ · 2.0 mA max
Voltage alternative	5 V typ · 10 V max
Input impedance	3–8 kΩ
Bridge voltage at 2.0 mA	6–16 V ($I \times R_{in}$)

Size the current source for the full compliance voltage across the bridge.

Compensated vs. uncompensated

OPTION	CODE	TEMPERATURE BEHAVIOR
Uncompensated	1	Raw bridge. TCR 2,300–3,300 ppm/°C. Characterize and correct zero and span over temperature in the host electronics.
Compensated	2	Passive compensation over -10 to 80 °C. Temperature error 0.15% FS typical, 0.30% FS max.
Custom	3	Custom compensation range or calibration — contact the factory.

SIGNAL CONDITIONING NOTES

Read ±OUT differentially with a high-impedance instrumentation amplifier or a differential-input ADC. Keep output leads short and twisted, away from switching noise. With a full-scale signal of only ~70 mV, front-end offset and gain drift add directly to the error budget.

Zero & span

At zero pressure (vacuum for absolute, ambient for sealed gauge), the output is the **zero** offset. At full-scale pressure it rises by the **span**.

$$V_{out} \approx V_{OS} + V_{FS} \times (P / P_{FS})$$

PARAMETER	VALUE
Zero offset	-10 to +10 mV
Full-scale span (2.0 mA)	≥ 70 mV

Span varies from part to part. Calibrate each unit in the host.

Mechanical dimensions – inches

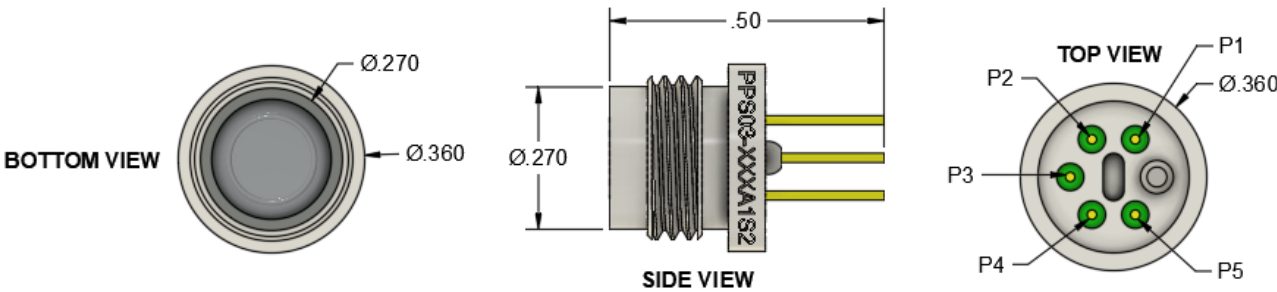


Fig. 2 – PPS03 element: bottom, side and top (pin) views. Body $\varnothing 0.355$ [9.0].

Pinout

Electrical Connections	
P#	Function
1	+VIN
2	+OUT
3	-VIN
4	-VIN
5	-OUT

FEATURE	DETAIL
Housing & diaphragm	SS316L (Hastelloy option)
Body diameter	$\varnothing 0.355$ in [9 mm]
Pins	6 × $\varnothing 0.5$ mm Kovar
Seal	Viton O-ring
Fittings (option)	5/16-32 UNEF · 1/4 NPT · 1/8 NPT · 7/16-20 UNF

TOLERANCES (INCHES)

X ± 0.25 · X.X ± 0.15
X.XX ± 0.010 · X.XXX ± 0.005

Seal on the O-ring only. Do not load the diaphragm face.

Ordering information — part-number configuration

PPS03

—

1K

G

2

1

MODEL

RANGE

TYPE

COMP. PORT

Model	Pressure range (XXX)	Type (Y)	Compensation (C)	Port (P)
PPS03	500 = 500 PSI 1K = 1,000 PSI 5K = 5,000 PSI 10K = 10,000 PSI	A = Absolute S = Sealed gauge	1 = Uncompensated 2 = Compensated 3 = Custom	S = Standard (no fitting) 0 = 5/16-32 UNEF-3A 1 = 1/4" NPT male 2 = 1/8" NPT male 3 = 7/16-20 UNF

Standard part numbers

PART NUMBER	RANGE (PSI)	TYPE	PROOF (PSI)	BURST (PSI)
PPS03-500SIS	500	Sealed gauge	1,500	2,500
PPS03-1KSIS	1,000	Sealed gauge	3,000	5,000
PPS03-3KSIS	3,000	Sealed gauge	9,000	15,000
PPS03-10KAIS	10,000	Absolute	15,955	17,400

SPECIFY WITH YOUR ORDER

Custom pressure range · 150 °C operation · Hastelloy wetted parts · Custom fitting or welded adapter · Flying leads or cable in place of pins.

Configure your PPS03

Custom ranges, fittings and compensation for OEM volumes. Talk to an engineer to spec your part.

REQUEST A QUOTE

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