PPS01 Media-Isolated Pressure Sensor

Stainless steel sensing element — 1 to 10,000 PSI with mV, voltage, or I²C / SPI output



FEATURES

- Media-isolated SS316L sensing element — Ø0.75" (19 mm)
- Pressure ranges from 1 PSI to 10,000 PSI
- Gauge, Absolute, Sealed Gauge & Vacuum references
- ±0.25% FS total error band
- Outputs: mV (uncompensated / compensated), I²C, SPI, 0–5 V, 0.5–4.5 V
- -40 to 125 °C operating · -10 to 80 °C compensated
- Unported for welding, or ported: NPT, UNF, UNF AN, BSP
- Compatible analog and digital signal-conditioning boards
- 6 Kovar pins or 4 / 5 wire leads · 1.5 mA or 10 V excitation

DESCRIPTION

The PPS01 is a media-isolated pressure sensor built for a wide range of pressure applications, and has been designed into medical, industrial, military, and commercial products. Its stainless steel construction and high-temperature component selection suit demanding thermal environments.

MEMS piezoresistive sensors inside a media-isolated stainless housing provide superior long-term stability and accuracy. Use the element on its own with a mV bridge output, or pair it with a Phoenix Sensors board for voltage or I²C / SPI output. Contact us for custom designs.

APPLICATIONS

- Medical devices
- Industrial automation
- Agricultural equipment
- Chemical process
- Natural gas
- Military & commercial OEM
- Custom transducer assemblies

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	**-40 to 125 °C · -40–257 °F**	Overpressure	**2× rated pressure**
Storage Temperature	**-55 to 125 °C · -67–257 °F**	Burst Pressure	**3× rated pressure**
Compensated Range	**-10 to 80 °C**	Pressure Range	**1 to 10,000 PSI**

Electrical & performance specifications

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Operating temperature	—	-40	—	125	°C
Compensated temperature	—	-10	—	80	°C
Supply — digital PCBA (I²C / SPI)	Vdd	2.7	5.0	5.5	VDC
Supply — analog PCBA (0–5 V / 0.5–4.5 V)	Vdd	8	—	32	VDC
Total error band	±%FS	-0.25	—	+0.25	%FS
Pressure range	—	1	—	10,000	PSI
Overpressure / burst	—	—	2× / 3×	—	FS

Sensing element — mV bridge (compensation 1, 2)

V+ = 5 V, V– = 0 V, temperature = 30 °C.

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Excitation voltage	VEX	4.75	5.0	9.25	V
Excitation current	IEX	—	1	1.9	mA
Input impedance	—	3	5	8	kΩ
Output impedance	—	3.5	4	6	kΩ
Zero pressure output (note 1)	VOS	—	—	±4	mV/V
Full scale output (5 V source)	—	60	70	—	mV
Linearity (note 2)	—	-0.25	±0.15	0.25	%FS
Hysteresis	—	—	0.05	0.08	%FS
Repeatability	—	—	±0.05	±0.07	%FS
Temperature error, span / offset @ 35 °C	—	—	0.75	1	%FS

Notes: 1) Measured at zero pressure with 5.00 V source. 2) Defined as best straight line.

Electrical connections

ELEMENT PIN	FUNCTION
J3	–IN
J4	–OUT
J5	N/C
J8	+IN
J9	+OUT
J10	–IN

WIRE	DIGITAL PCBA
Red	VDD
Green	INT
White	SDA
Yellow	SCL
Black	GND

WIRE	ANALOG PCBA
Red	VDD
White	OUT
Black	GND

Package, media & installation

Package

The sensing element is housed in stainless steel (SS316L) for easy manufacturability and long-term stability. It can be O-ring mounted or welded into the customer's assembly — the element protrudes 0.02" from the housing for welding — or supplied in a ported hex housing.

Stability

The silicon MEMS media-isolated pressure sensor is mounted to a ceramic base and sealed into the stainless housing. Proprietary factory calibration and analysis give the most stable product possible with this technology.

Pressure port

Port S: standard, no port. Ported versions use an M22 × 1.0 hex housing with 1/4"-18 NPT, 1/8"-27 NPT, 7/16-20 UNF, 9/16-18 UNF AN, or 1/4"-19 BSP process connections.

Media

Tolerant of most media, including oil, air, gas, some corrosive media, and salt water. Media must be compatible with SS316L.

Wetted parts

Stainless steel SS316L. Evaluate material compatibility for corrosive environments; consult the factory for alternative wetted materials.

Pressure ranges

1 PSI to 10,000 PSI in gauge, absolute, sealed gauge, and vacuum references. Custom pressure ranges are available for OEM customers.

Signal conditioning

Analog boards: PPS01-PCBA-AN2, PPS06-PCBA-AN-HV, PPS06-PCBA-AN-LV. Digital boards: PPS06-PCBA-DG, PPS06-PCBA-DG-R, PPS06-PCBA-MLX-MPM285, PPS06-PCBA-MPM285-MPM281-BLE.

Installation

Mount the signal-conditioning PCBA at least 0.25" from the sensor housing. Do not seal on the sensing face.

±0.25%	10,000	Ø19 mm	6
Total error band FS	Max range PSI	Element diameter	Output options

Output options & signal conditioning

OUTPUT	SIGNAL	CONDITIONING	SUPPLY
1 · Uncompensated	mV bridge, ratiometric	Bare element	4.75–9.25 V excitation
2 · Compensated	mV bridge, temperature compensated	Compensated element	5 V excitation typ.
I²C	Digital, I²C	Digital PCBA	2.7–5.5 VDC
SPI	Digital, SPI	Digital PCBA	2.7–5.5 VDC
0–5 V	Analog voltage	Analog PCBA	8–32 VDC
0.5–4.5 V	Analog voltage	Analog PCBA	8–32 VDC

mV bridge output

Compensation codes 1 and 2 give direct access to the piezoresistive Wheatstone bridge. Excite across +IN / -IN and read the differential signal across +OUT / -OUT. The output is **ratiometric**: full scale output is 60–70 mV at 5 V excitation and scales with the excitation voltage, so drive the bridge and the measuring ADC from the same reference.

Conditioned outputs

Conditioned outputs add a Phoenix Sensors board soldered directly to the element pins, delivering a calibrated digital (I²C / SPI) or analog voltage signal. The ±0.25% FS total error band applies across the -10 to 80 °C compensated range.

COMPATIBLE BOARDS

Analog: PPS01-PCBA-AN2 · PPS06-PCBA-AN-HV · PPS06-PCBA-AN-LV

Digital: PPS06-PCBA-DG · PPS06-PCBA-DG-R · PPS06-PCBA-MLX-MPM285 · PPS06-PCBA-MPM285-MPM281-BLE (same as PPS01-PCBA-MPM285-MPM281-BLE)

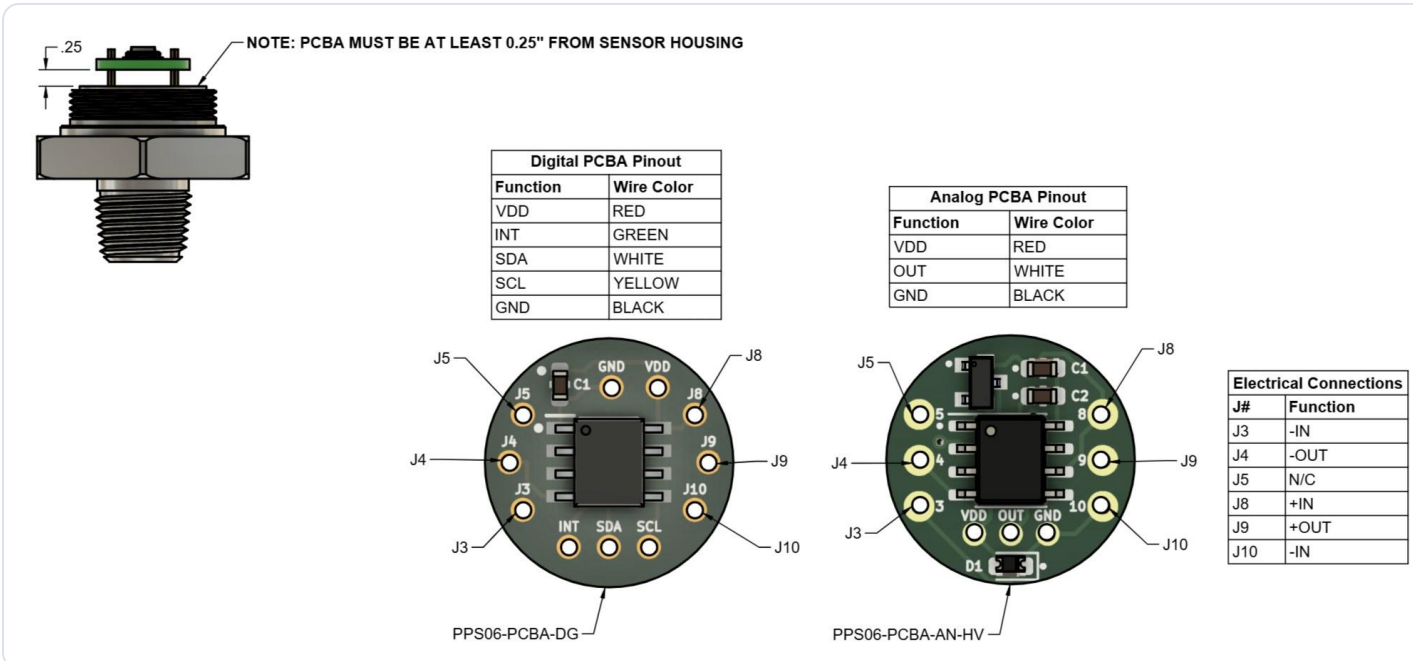


Fig. 1 — PCBA mounting (at least 0.25" from housing) and pinouts: PPS06-PCBA-DG (digital) and PPS06-PCBA-AN-HV (analog).

Mechanical dimensions — inches

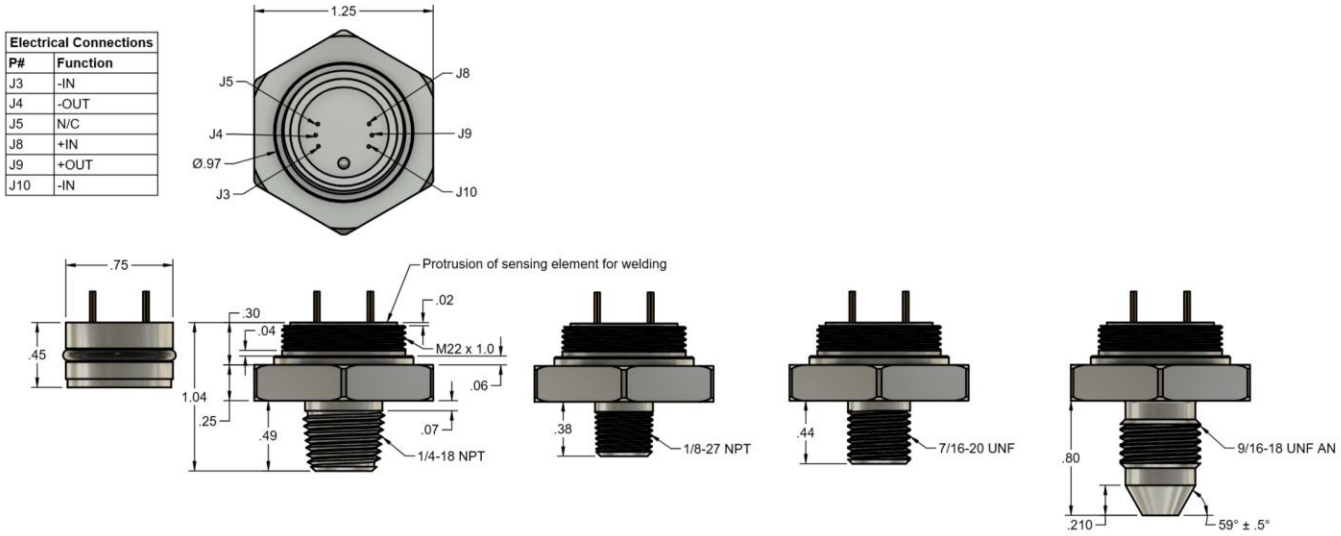


Fig. 2 — Unported element (Ø0.75 × 0.45) and M22 × 1.0 hex housing (1.25" hex) with 1/4-18 NPT, 1/8-27 NPT, 7/16-20 UNF, and 9/16-18 UNF AN ports.

Port length

PORT (P)	THREAD	LENGTH (IN)
S	No port — weld / O-ring	—
1	1/4"-18 NPT	.49
2	1/8"-27 NPT	.38
3	7/16-20 UNF	.44
4	9/16-18 UNF AN	.80

FEATURE	DETAIL
Element	Ø0.75" × 0.45", SS316L
Housing (ported)	1.25" hex, M22 × 1.0
Overall height, 1/4 NPT	1.04"
Electrical	Pins J3–J10 (see page 2)

NOTES

1) Tolerances: X.XX ±0.010 · X.XXX ±0.005 in.
2) Element protrudes 0.02" for welding.
3) 9/16-18 UNF AN port: 59° ±0.5° cone seat.

Ordering information — part-number configuration

PPS01	–	50	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)
PPS01	1 = 1 PSI 10K = 10,000 PSI	G = Gauge A = Absolute S = Sealed Gauge C = Vacuum	1 = Uncompensated 2 = Compensated	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

Signal-conditioning board (I²C, SPI, 0–5 V or 0.5–4.5 V output) · Custom pressure range · Cable or connector for conditioned outputs · Special calibration points · Alternate wetted materials for aggressive media.

EXAMPLE PART NUMBERS

PPS01-100G1S-W4-V → 100 PSI · gauge · uncompensated · no port · 4 wire leads · 10 V

PPS01-50S21-K6-I → 50 PSI · sealed gauge · compensated · 1/4" NPT · 6 Kovar pins · 1.5 mA

Configure your PPS01

Custom ranges, ports, leads, and signal-conditioning boards available for OEM volumes. Talk to an engineer to spec your part.

REQUEST A QUOTE
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(480) 462-1810

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