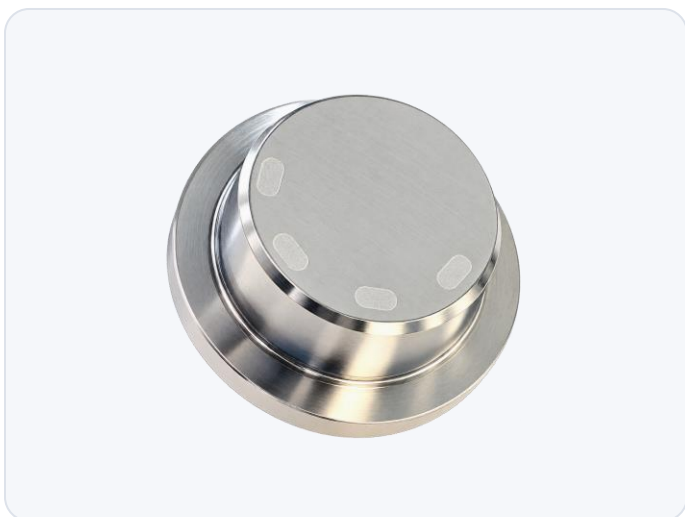


PPS13 High Temperature High Pressure Sensing Element

Thin-film strain gauge on 17-4PH stainless steel — mV output to 30,000 psi



KEY FEATURES

- -40 to 150 °C operating temperature (175 °C option)
- 500 to 30,000 psi pressure ranges
- MEMS thin-film strain resistors on 17-4PH stainless steel
- Full Wheatstone bridge, 1.5 mV/V typical sensitivity
- Response time ≤ 0.1 ms
- Long-term stability ± 0.1 %FS/year
- Strain surface $\varnothing 7$ mm · step $\varnothing 9.5$ mm · height 5 mm
- Media: liquid, air & gas

DESCRIPTION

The PPS13 is a metal-based pressure sensing element. Strain resistors are deposited directly onto a 17-4PH stainless steel substrate using MEMS thin-film technology. Applied pressure elastically deforms the diaphragm, and the bridge outputs a millivolt signal linearly proportional to pressure — fast, accurate, and stable.

Built for sensor OEMs and integrators with demanding performance, reliability, and stability requirements, the PPS13 delivers a raw mV signal you condition to your own spec. Custom designs are available — talk to an engineer.

APPLICATIONS

- Aerospace
- Oil & gas
- Rail transit
- Construction machinery
- Gasoline in-cylinder direct injection

MAXIMUM ENVIRONMENTAL RATINGS

Operating Temperature	-40 to 150 °C (175 °C opt.)	Proof Pressure	3× FS (35 kpsi max)
Storage Temperature	-55 to 150 °C	Burst Pressure	5× FS (35 kpsi max)
Vibration	20 g, 20–5,000 Hz	Pressure Range	500 to 30,000 psi

Operational characteristics

V+ = 5 V, V- = 0 V, T = 25 °C unless otherwise noted

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Excitation voltage	V _{EX}	3.0	5.0	10.0	V
Excitation current	I _{EX}	0.8	1.2	2.0	mA
Sensitivity	S	1.40	1.50	1.60	mV/V
Full-scale output (5 V excitation)	V _{FS0}	7.0	7.5	8.0	mV
Zero pressure offset (note 1)	V _{0S}	-0.5	—	+0.5	%FS
Non-linearity, BFL (note 2)	—	-0.10	—	+0.10	%FS
Hysteresis	—	—	0.05	0.08	%FS
Repeatability	—	—	—	±0.05	%FS
Zero temperature drift (note 3)	—	—	—	±0.03	%FS/°C
Span temperature drift (note 3)	—	—	—	±0.03	%FS/°C
Temperature error (span / offset @ 35 °C)	—	—	0.15	0.30	%FS
TCR (temperature coefficient of resistance)	TCR	2300	—	3300	ppm/°C
Output impedance	R _{OUT}	3.0	3.5	5.0	kΩ
Insulation resistance	—	1000	—	—	MΩ
Response time	t _R	—	—	0.1	ms
Long-term stability	—	—	—	±0.1	%FS/yr
Pressure range	—	500	—	30,000	psi
Operating temperature (note 4)	—	-40	—	150	°C

Notes: 1) Measured at zero pressure. 2) Best-fit straight line. 3) Uncompensated element. 4) 175 °C option available.

Electrical connections

PAD	CODE	FUNCTION
P1	V-	Negative excitation
P2	S+	Positive signal output
P3	V+	Positive excitation
P4	S-	Negative signal output

INTEGRATION NOTES

The PPS13 outputs a raw, uncompensated bridge signal. Offset, span, and temperature correction are applied by your signal-conditioning circuit. Output is ratiometric to excitation voltage.

Bridge circuit & pad layout

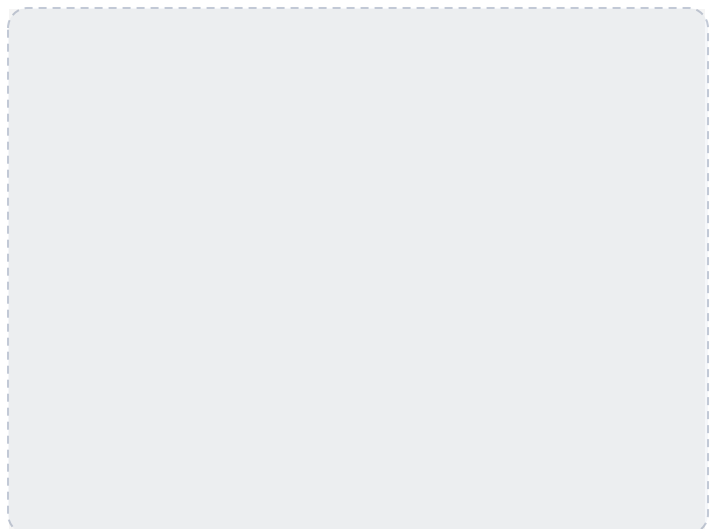


Fig. 1 – Full Wheatstone bridge; pads P1-P4 viewed from the circuit side.

Application information

Construction

Strain resistors are deposited directly onto a machined 17-4PH (Type 630) stainless steel diaphragm — no adhesive, oil fill, or glass bond between the sensing film and the pressure surface.

Stability

The thin-film bridge is molecularly bonded to the substrate, giving low drift, high shock resistance, and long-term stability of $\leq \pm 0.1$ %FS per year.

Mounting

Designed to be welded or sealed into your port fitting at the $\varnothing 9.5$ mm step. Keep mounting stress off the $\varnothing 7$ mm strain surface. Custom fittings available for OEM customers.

Media

Compatible with liquids, air, and gases — including oil, fuel, hydraulic fluid, and some corrosive media — that are compatible with the wetted material.

Wetted parts

17-4PH stainless steel standard. Hastelloy available for corrosive media.

Pressure ranges

Standard gauge ranges: 1,000, 2,500, 5,000, 7,500, 10,000, and 20,000 psi. Custom ranges from 500 to 30,000 psi for OEM customers.

Mechanical dimensions — inches [mm]

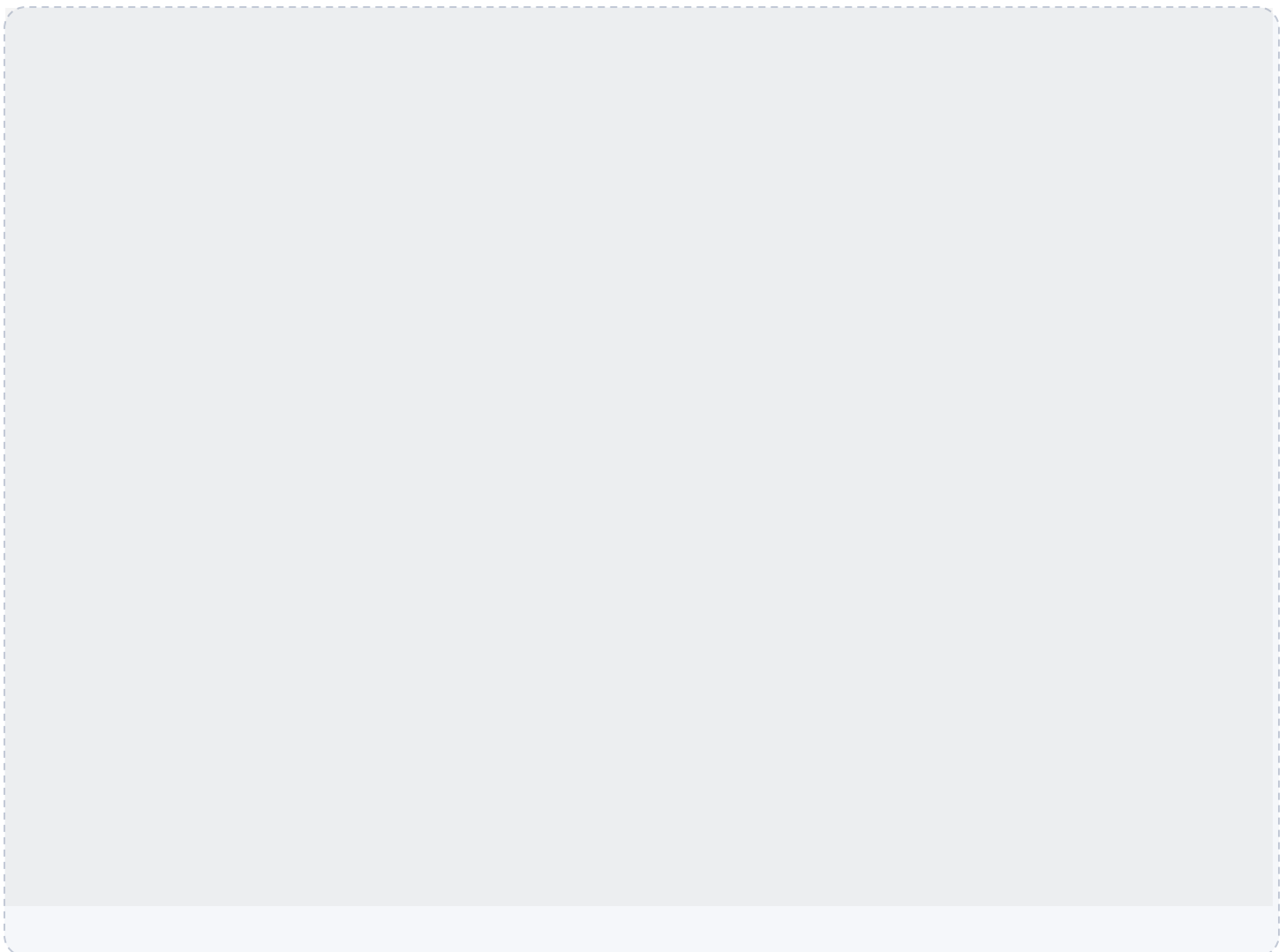


Fig. 2 — PPS13 outline, Section A-A.

Ordering information — part-number configuration



Model	Pressure range (psi)	Type	Compensation
PPS13	1K, 2.5K, 5K, 7.5K, 10K, 20K Custom: 500 - 30K	G = Sealed gauge A = Absolute	1 = Uncompensated 2 = Compensated 3 = Custom

Standard part numbers

PART NUMBER	RANGE (PSI)	TYPE	PROOF (PSI)	BURST (PSI)
PPS13-1K-G-1	1,000	Gauge	3,000	5,000
PPS13-2.5K-G-1	2,500	Gauge	7,500	12,500
PPS13-5K-G-1	5,000	Gauge	15,000	25,000
PPS13-7.5K-G-1	7,500	Gauge	22,500	35,000
PPS13-10K-G-1	10,000	Gauge	30,000	35,000
PPS13-20K-G-1	20,000	Gauge	35,000	35,000

Proof = 3× FS, burst = 5× FS, each limited to 35,000 psi maximum.

SPECIFY WITH YOUR ORDER

Custom pressure range · 175 °C high-temperature option · Hastelloy wetted material · Custom fitting or port integration.

Build your sensor around the PPS13

REQUEST A QUOTE

Custom ranges, materials, and integration support for OEM volumes. Talk to an engineer to spec your part. sales@phoenixsensors.com
(480) 462-1810

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