TEESING

WE MAKE YOUR TECHNOLOGY WORK

Industrial Sensing

Product Selection Guide

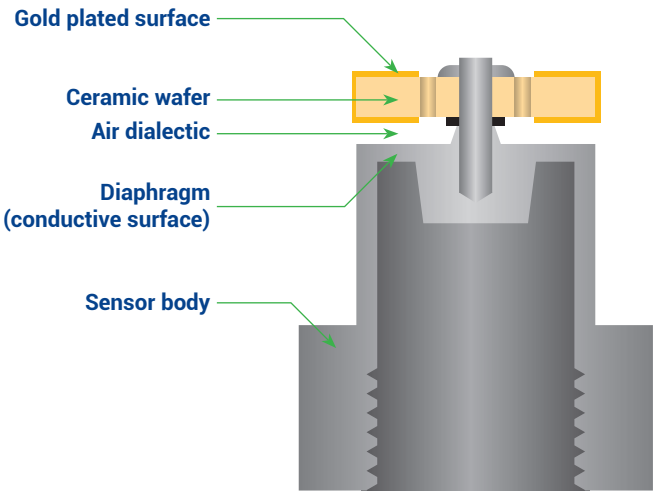
setra®

Setra Systems, Inc. was founded in 1967 by brothers Dr.Y.T. Li and Dr. S.Y. Lee, both professors of engineering at the Massachusetts Institute of Technology and co-developers of the variable capacitance transduction principle.

Building on this heritage of innovation, we continue to design and deliver premium sensing devices for many diverse applications and industries — innovating solutions for HVAC & building automation, industrial OEM, test & measurement, and critical environments.

Setra is part of the **Fortive** group of companies, a diversified industrial growth organization with 24,000 employees worldwide. The Fortive Business System (FBS) is the cornerstone of our culture and our ultimate competitive advantage. It drives every aspect of our work, our strategy and our performance. We use FBS to guide our decisions, measure how well we execute and develop innovative ways to do even better.

Setra's technology



Variable capacitance

In a typical Setra configuration, a compact housing contains two closely spaced, parallel, electrically isolated metallic surfaces, one of which is a diaphragm capable of slight flexing under pressure. The diaphragm is constructed of a low-hysteresis material such as 17-4 PH SS or a proprietary compound of fused glass and ceramic (Setraceram).

These firmly secured surfaces (or plates) are mounted so that a slight mechanical flexing of the assembly, caused by a minute change in applied pressure, alters the gap between them (creating, in effect, a variable capacitor).The resulting change in capacitance is detected by a sensitive linear comparator circuit (employing proprietary custom designed ASICs), which amplifies and outputs a proportional, high level signal.

Advantage of capacitive sensors

Better for applications that are susceptible to over-pressurization

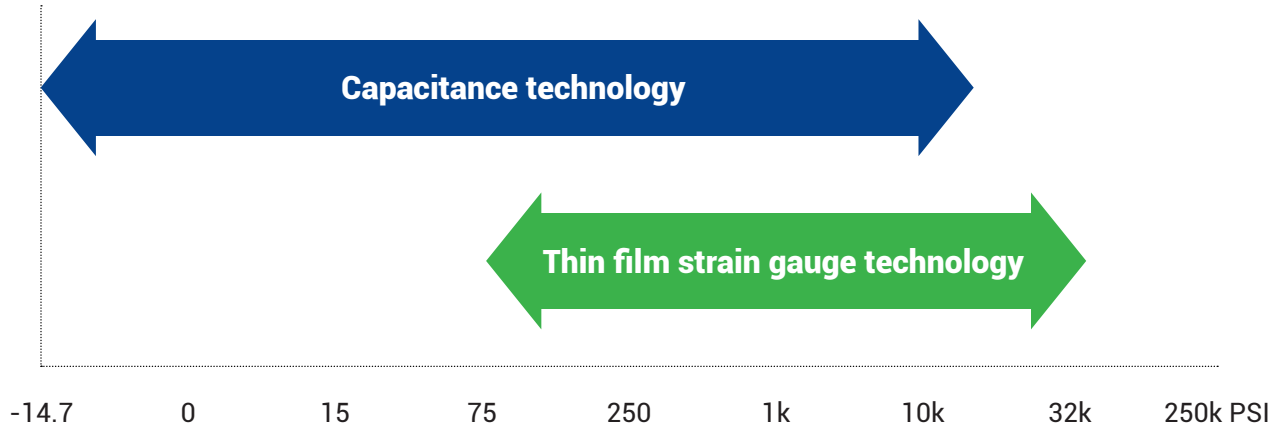
—

Very good hysteresis, linearity, stability, and repeatability, in addition to static pressure measurement capability

—

Excellent accuracy in low pressure ranges – as low as 1 PSI.

Providing you the right solution for any application

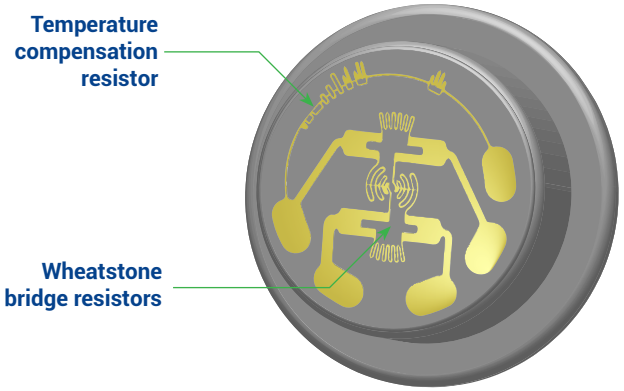


Sensor type	Measuring principle	Best avail. accuracy	Pressure ranges	Max. temperature ranges
Variable capacitance	Fixed electrode with moving diaphragm linearized over temperature through ASIC	±0.05% FS	1 to 15,000 PSI G, C, S, V, A	-40°C to 125°C
Thin film	Wheatstone bridge with integrated temperature compensation; resistors in compression or tension, then linearized through ASIC	±0.25% FS	75 to 32,000 PSI G, C, S, A	-40°C to 125°C

Thin film strain gauge

Thin film pressure transducers are made by vapor deposition or sputtering of insulation and strain gauge elements directly on a polished pressure sensing diaphragm or beam. The desired strain gauge pattern is deposited either by masking the non-conductive areas or by etching away unwanted conductive material.

Through a sputtering process, a small circuit is created that contains on it a Wheatstone-bridge resistance network. As pressure is applied to the diaphragm and unbalances (or strains) the bridge, its electrical resistance is changed and results in a voltage output.



Advantage of thin film strain gauge sensors

Excellent resistance to shock, vibration, and dynamic pressure changes

—

Measurement cell is hermetically sealed and does not require additional sealing materials

—

Like variable capacitance technology, does not exhibit position effect

General OEM pressure sensing






Model	AXD	206	209	209H	210	256
Description	Low & high range OEM pressure transducer	Field calibration-enabled OEM pressure transducer	General purpose OEM pressure transducer	OEM pressure transducer for harsh applications	Circuit board-mountable pressure transducer	NEMA4/IP65 rated pressure transducer
Sample Applications	Fuel cell OEM, Industrial OEM, CNG/LNG, Hydraulic systems, Compressor control, HVAC/R equipment	Hydraulic systems, Compressor control, HVAC/R equipment, Tank level	Hydraulic systems, Compressor control, HVAC/R equipment, Tank level	Fuel cell OEM, CNG & LNG, Hydrogen production, Water & wastewater, Natural gas distribution.	Analytical measurement & control, OEM Medical Systems	Process control, Chemical processing, Agricultural irrigation, Nat. gas pipeline monitoring, Grain processing
Sensing technology	Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance
Gauge (PSIG)	•	•	•	•	•	•
Sealed Gauge (PSIS)	•		•	•		
Compound (PSIC)	•	•	•	•		
Absolute (PSIA)		•				
Vacuum (PSIV)	•		•			
Ranges (PSI)	1 to 10,000 PSIG	25 to 10,000 PSIG	1 to 10,000 PSIG	15 to 1,000 PSIG	1 to 1,000 PSIG	1 to 10,000
	200 to 10,000 PSIS	-	200 to 10,000 PSIS	250 to 1,000 PSIS	-	-
	5 to 10,000 PSIC	25 to 10,000 PSIC	1 to 10,000 PSIC	15 to 1,000 PSIC	-	-
	25 to 5,000 PSIA	25 to 10,000 PSIA	-	-	-	-
	ATM to 14.7 PSIV	-	ATM to 14.7 PSIV	-	-	-
Accuracy FS (RSS) or % of reading	±0.25% FS	±0.13% FS	±0.25% FS	±0.25% FS	**Standard:** ±1.0% FS **Opt.:** ±0.5%, ±0.25%	**≥25 PSI:** ±0.13% FS **<25 PSI:** ±0.25% FS
Operating temperature	-40° to 257°F (-40° to 125°C)	-40° to 185°F (-40° to 85°C)	-40° to 185°F (-40° to 85°C)	-40° to 185°F (-40° to 85°C)	-4° to 176°F (-20 to 80°C)	-40° to 185°F (-40° to 85°C)
Compensated temperature range	-4° to 176°F (-20 to 80°C)	-4° to 176°F (-20 to 80°C)	-4° to 176°F (-20 to 80°C)	-4° to 176°F (-20 to 80°C)	NA	-4° to 176°F (-20 to 80°C)
Thermal effect % FS/100°F (% FS/50°C)	<1% (TEB avail.)	**Zero:** ±1 (0.9) **Span:** ±1.5 (1.4)	**Zero:** ±2.0 (1.8) **Span:** ±1.5 (1.3)	**Zero:** ±0.03 (0.05) **Span:** ±0.015 (0.03)	**Zero:** <±2.0 (1.8) **Span:** <±1.5 (1.4)	Please view data sheet
Media compatibility	Gases or liquid compatible with 17-4 or 316L stainless steel	Gases or liquid compatible with 17-4 stainless steel	Gases or liquid compatible with 17-4 or 17-7 stainless steel	Gases or liquid compatible with 316L stainless steel	Gases compatible with 304 or 17-7 stainless steel, nylon, polyester, or silicone	Gases or liquid compatible with 17-4 stainless steel
Output	4 to 20 mA 0.5 to 5.5 VDC 0.5 to 10.5 VDC (13.5 VDC Exc. Min) 0.5 to 4.5 VDC (5 VDC Exc.)	4 to 20 mA 0.1 to 5.1 VDC 1 to 5 VDC 1 to 6 VDC 0.1 to 10.1 VDC	4 to 20 mA 0.5 to 5.5 VDC 1 to 5 VDC 1 to 6 VDC 0.5 to 4.5 VDC (5 VDC Exc.)	4 to 20 mA 0.5 to 5.5 VDC 0.2 to 5.2 VDC	1 to 6 VDC 0.5 to 4.5 VDC 0.5 to 5.5 VDC	4 to 20 mA 0.1 to 5.1 VDC
Electrical terminations	Cable, 3-pin Packard, M12 4-pin, 1/2" conduit	Cable, Hirschmann, 1/2" conduit w/ cable, Terminal strip	Cable, 3-pin Packard, 4-pin Packard, "Mini" Hirschmann, Terminal strip	Cable, 3-pin Packard, 4-pin Packard, "Mini" Hirschmann, Terminal strip	PC board mountable pins	Two (2) 1/2" Int. conduit ports
Pressure fittings	1/4" NPT Ext., 1/4" NPT Int., 1/8" NPT Ext., 1/8" NPT Int., 7/16" SAE, 1/4" Int. SAE w/ Schraeder	1/4" NPT Ext., 1/8" NPT Ext., 7/16" SAE	1/4" NPT Ext. 7/16" SAE Ext. 1/8" NPT Ext., 1/4 Int. SAE internal 7/16"-20 w/ Schrader, 1/2" A Ext., 1/8" NPT Int. bulkhead	1/4"-18 NPT Ext., 7/16"-20 SAE Ext., 1/8"-27 NPT Ext.	Straight barbed, Right angled barbed	1/4" NPT Ext., 1/8" NPT Ext., 1/2" NPT Ext., 1.4" NPT Int.

For complete product specifications and ordering information, please visit **www.setra.com**.
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Industrial Sensing
Product Selection Guide






Product images are not shown to scale

526	550	3100	3200	31CS	32CS	Model
Submersible pressure transducer	Low range submersible pressure transducer	Rugged OEM pressure transducer	Heavy-duty OEM pressure transducer	Intrinsically safe CSA rated pressure transducer	Heavy-duty Intrinsically safe CSA rated pressure transducer	**Description**
General purpose, OHV, Nat. gas equipment, Power plants, HVAC compressors, Refrigeration, Robotics	Tank level, Reservoir level, River level, Hydro-power, Open channel flow, Flood warning, Waste water	Power generation, Hydraulic systems, Booster pump systems, Irrigation systems, OHV	Power generation, Hydraulic systems, Booster pump systems, Irrigation systems, OHV	Industrial processes, Chemical, HVAC/R equipment, Water management	Natural gas test equip-ment, Gas bottle filling, Petroleum processing, Oil & gas drilling	**Sample Applications**
Thin film strain gauge	Variable capacitance	Thin film strain gauge	Thin film strain gauge	Thin film strain gauge	Thin film strain gauge	**Sensing technology**
•	•	•	•	•	•	**Gauge (PSIG)**
		•	•	•	•	**Sealed Gauge (PSIS)**
•		•	•			**Compound (PSIC)**
•						**Absolute (PSIA)**
						Vacuum (PSIV)
15 to 6,000 PSIG	1 to 15 PSIG	75 to 32,000 PSIG	50 to 25,000 PSIG	75 to 32,000 PSIG	75 to 32,000 PSIG	**Ranges (PSI)**
-	-	2,300 to 32,000 PSIS	2,300 to 25,000 PSIS	1,500 to 32,000 PSIS	1,500 to 32,000 PSIS	
-14.7 to 300 PSIC	-	75 to 32,000 PSIC	50 to 25,000 PSIC	-	-	
15 to 300 PSIA	-	-	-	-	-	
-	-	-	-	-	-	
Standard: ±0.25% FS **Opt.:** ±0.15% FS	±0.25% FS	±0.25% FS	±0.5% FS	±0.25% FS	±0.5% FS	**Accuracy FS (RSS) or % of reading**
Please view data sheet	Please view data sheet	-40° to 257°F (-40° to 125°C)	-40° to 257°F (-40° to 125°C)	-40° to 176°F (-40 to 80°C)	-40° to 176°F (-40 to 80°C)	**Operating temperature**
-4° to 176°F (-20 to 80°C)	-5° to 140°F (-20 to 60°C)	-40° to 257°F (-40° to 125°C)	-40° to 257°F (-40° to 125°C)	-4° to 176°F (-20 to 80°C)	-4° to 176°F (-20 to 80°C)	**Compensated temperature range**
Standard: ±0.8 (1.5) **Opt.:** ±0.5 (1.0)	±1.0 (2.0)	±0.83 (1.5)	±0.94 (2.0)	±0.83 (1.5)	±0.94 (2.0)	**Thermal effect % FS/100°F (% FS/50°C)**
Gases or liquid compatible with 17-4 stainless steel	Water or viscous fluids compatible with 316 stainless steel, ceramic, or nitrile	Gases or liquid compatible with 17-4 stainless steel	Gases or liquid compatible with 17-4 stainless steel	Gases or liquid compatible with 17-4 stainless steel	Gases or liquid compatible with 17-4 stainless steel	**Media compatibility**
100 mV 4 to 20 mA 1 to 6 VDC 1 to 5 VDC 0.5 to 5.5 VDC 0 to 5 VDC 0 to 10 VDC (and more)	4 to 20 mA 1 to 6 VDC 0 to 5 VDC 0.5 to 5.5 VDC 1 to 5 VDC 0.1 to 5.1 VDC	4 to 20 mA 1 to 6 VDC 1 to 5 VDC 0.5 to 4.5 VDC 0 to 5 VDC 0 to 10 VDC 0.5 to 4.5 ratiometric	4 to 20 mA 1 to 6 VDC 1 to 5 VDC 0.5 to 4.5 VDC 0 to 5 VDC 0 to 10 VDC 0.5 to 4.5 ratiometric	4 to 20 mA 1 to 6 VDC 0.1 to 5.1 VDC 1 to 5 VDC 1 to 10 VDC 0 to 5 VDC 0 to 10 VDC (and more)	4 to 20 mA 1 to 6 VDC 0.1 to 5.1 VDC 1 to 5 VDC 1 to 10 VDC 0 to 5 VDC 0 to 10 VDC (and more)	**Output**
10-6 bayonet conn., Immersible cable, 8-4 bayonet conn., 1/2" conduit, Large DIN 43650	Large DIN 43650, Immersible cable	Industrial DIN, 3-pin Deutsch, M12xP 4-pin, AMP Superseal 1.5 Series, Deutsch DT04-4P, Packard Metri Pack	Industrial DIN, 3-pin Deutsch, M12xP 4-pin, AMP Superseal 1.5 Series, Deutsch DT04-4P, Packard Metri Pack	EN175301 (DIN43650 A), M12xP 4-pin, AMP Superseal 1.5 Series, Deutsch DT04-4P, Packard Metri Pack, Industry Standard Form C, Integrated cable	EN175301 (DIN43650 A), M12xP 4-pin, AMP Superseal 1.5 Series, Deutsch DT04-4P, Packard Metri Pack, Industry Standard Form C, Integrated cable	**Electrical terminations**
1/8"-27 NPT Ext., 1/8"-27 NPT Int., 1/4-18 NPT Ext., 7/16"-20 UNF Ext., G 1/4" Ext., G 1/4" Int., Plastic nose cone, SS nose cone	G 1/4" Int., 1/4"-18 NPT Ext., 1/2"-14 NPT Ext., G 1/4" Ext., KF25 flange	Please view data sheet	Please view data sheet	Please view data sheet	Please view data sheet	**Pressure fittings**

Test & measurement pressure sensing





Model	ASL	ASM	201	204	239
Description	Test stand-grade low differential pressure transducer	Test stand-grade pressure transducer	Very low differential/gauge pressure transducer	High accuracy pressure transducer	High accuracy low differential pressure transducer
Sample Applications	Filter pressure, Leak detection systems, Exhaust pressure, Medical instrumentation, Part integrity testing, Test stands, Wind tunnels	Engine test stands, Particle test & analysis, Manifold pressure, Refrigeration testing, High accuracy industrial	Vapor recovery systems, Exhaust gas control systems, Industrial scrubbers	Research & development, Vacuum systems, Dynamometers, Engine test cells, General purpose	Filter pressure, Leak detection systems, Exhaust pressure, Medical instrumentation, Part integrity testing, Cleanrooms
Sensing technology	Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance
Gauge (PSIG)		•	•	•	
Compound (PSIC)		•			
Absolute (PSIA)		•		•	
Vacuum (PSIV)		•		•	
Differential (PSID)	•		•		•
Ranges	-	15 to 1,000 PSIG	5" W.C. to 20 PSIG	25 to 10,000 PSIG	-
	-	15 to 1,000 PSIC	-	-	-
	-	15 to 1,000 PSIA	-	25 to 5,000 PSIA	-
	-	0 to 14.7 PSIV	-	0 to 14.7 PSIV	-
	2 to 40" W.C. Unidirectional, ±1 to ±15" W.C. Bidirectional	-	5 to 50" W.C. Unidirectional, ±2.5" to ±25" W.C. Bidirectional	-	0.5 to 30" W.C. Unidirectional, ±0.25 to ±15" W.C. Bidirectional
Accuracy FS (RSS) or % of reading	<±0.07% FS	±0.05% FS	**Standard:** ±0.5% FS **Opt.:** ±0.25% FS	±0.11% FS, ±0.073% FS	**Standard:** ±1.0% FS **Opt.:** ±0.5%, ±0.25%
Operating temperature	-40° to 185°F (-40° to 85°C)	-40° to 185°F (-40° to 85°C)	-40° to 176°F (-40 to 80°C)	0 to 176°F (-18° to 80°C)	0 to 176°F (-18° to 80°C)
Compensated temperature range	-5° to 140°F (-20 to 60°C)	-5° to 140°F (-20 to 60°C)	-20° to 175°F (-29° to 80°C)	NA	30° to 150° (-1 to 65° C)
Thermal effect % FS/100°F (% FS/50°C)	<0.25% (total error band)	<0.25% (total error band)	**Zero:** ±2.0 (1.8) **Span:** ±1.5 (1.4)	**Zero:** <±0.4 (0.36) **Span:** <±0.3 (0.27)	<±1.0 (0.9)
Media compatibility	Clean, dry gases compatible with 300 series and 17-4 PH stainless steel	Gases or liquid compatible with 17-4 stainless steel	Gases or liquid compatible with stainless steel and Inconel	Gases or liquid compatible with 17-4 stainless steel	Gases compatible with stainless steel, hard adonized 6061 aluminum (Buna-N O-ring)
Output	0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA	0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA	4 to 20 mA	4 to 20 mA, 0 to 5 VDC, 0 to 2.5 VDC, 1 to 5 VDC, 1 to 6 VDC, 0 to 10 VDC, 1 to 10 VDC	4 to 20 mA, ±2.5 VDC, 0 to 5 VDC, 1 to 5 VDC, 1 to 6 VDC, 0 to 10 VDC
Electrical terminations	3 ft (1 m) standard cable, Standard 6-pin ext. bayonet connection	3 ft (1 m) standard cable, Standard 6-pin ext. bayonet connection	Cable, 1/2" NPT Ext. conduit, 4-pin bayonet connector, Hirschmann w/ large ext. fitting, Terminal strip	Cable, 30 AWG 9-conductor cable	Cable, 30 AWG 9-conductor cable
Pressure fittings	1/8" NPT Int., Barb; 1/8" NPT Int., 1/8" NPT Int.; 1/8" NPT Ext., Barb; 7/16"-20 SAE Ext., Barb	1/8" NPT Ext., 1/8" NPT Int., 1/4" NPT Ext., 1/4" NPT Int., 7/16"-20 SAE Ext.	1/4"-18 NPT Ext., 1/4" Tube stub, 1/4"-18 NPT Int., 7/16" SAE 37° flare	1/4" NPT Int.	1/8" NPT Int.

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Barometric pressure sensing





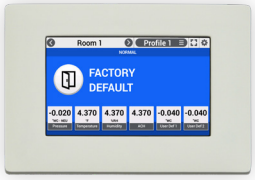
Product images are not shown to scale

270	276	278	370	470	Model
Premium barometric pressure sensor	Low-cost barometric pressure transducer	Low power barometric pressure transducer	Digital barometric pressure standard	OEM digital barometric transducer	**Description**
High accuracy barometric pressure measurement, Data buoys, Remote weather stations, Engine test cells	Environmental monitoring systems, Wind measurement systems, Weather & environmental data logging,	AWS, Data buoys and ships, Agriculture metrology, AWOS/ASOS systems	Automatic weather reporting systems, Pressure transfer standard, Altimeter calibration, lab process monitoring, altitude chambers	Automatic weather reporting systems, Pressure transfer standard, Altimeter calibration, lab process monitoring, altitude chambers	**Sample Applications**
Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance	Variable capacitance	**Sensing technology**
•					**Gauge (PSIG)**
					Compound (PSIC)
•	•	•	•	•	**Absolute (PSIA)**
					Vacuum (PSIV)
					Differential (PSID)
5 to 100 PSIG	-	-	-	-	**Ranges (PSI)**
-	-	-	-	-	
600/800 to 1,100 mb/hPa, 5 to 100 PSIA	600/800 to 1,100 mb/hPa, 20 PSIA	500/600/800 to 1,100 mb/hPa	600/800 to 1,100 mb/hPa, 10 to 100 PSIA	600/800 to 1,100 mb/hPa, 10 to 100 PSIA	
-	-	-	-	-	
-	-	-	-	-	
±0.03% FS, ±0.05% FS	±0.25% FS	Between ±0.3 and ±2.5 mb/hPa (range dependent)	±0.02% FS at 70°F (21°C)	±0.02% FS at 70°F (21°C)	**Accuracy FS (RSS) or % of reading**
0 to 176°F (-18° to 80°C)	0 to 176°F (-18° to 80°C)	-40 to 140°F (-40 to 60°C)	32° to 110°F (0 to 45°C)	32° to 110°F (0 to 45°C)	**Operating temperature**
30° to 120° (-1 to 49° C)	30° to 130° (-1 to 55° C)	NA	32° to 110°F (0 to 45°C)	32° to 110°F (0 to 45°C)	**Compensated temperature range**
Barometric: ±0.2 (0.18) **Other:** ±0.1 (0.09)	±1% FS	Please view data sheet	**Zero:** ±0.002 (0.004) **Span:** ±0.001 (0.002)	**Zero:** ±0.002 (0.004) **Span:** ±0.001 (0.002)	**Thermal effect % FS/100°F (% FS/50°C)**
Non-condensing air or gas compatible with hard adonized aluminum, alumina ceramics, gold, flourocarbon elastomer sealant & Buna-N O-ring	Non-condensing air or gas compatible with stainless steel, alumina ceramics, gold, and elastomer	Non-condensing air or gas	Non-condensing air or gas	Non-condensing air or gas	**Media compatibility**
0 to 5 VDC (24 VDC Exc.), 0 to 5 VDC (12 VDC Exc.)	0.1 to 5.1 VDC (24 VDC Exc.), 0.1 to 5.1 VDC (12 VDC Exc.), 0.5 to 4.5 VDC (5 VDC Exc.)	0 to 2.5 VDC (9.5 to 28 VDC Exc.), 0 to 5 VDC (9.5 to 28 VDC Exc.)	Bidirectional RS-232 6 digit LCD display	Bidirectional RS-232	**Output**
Cable	Cable	5-pin terminal block	25-pin D-Sub	EIA-232 connector DB-9P	**Electrical terminations**
1/8" NPT Int.	1/8" push tube fitting, 1/8" NPT Ext.	1/8" barbed fitting	1/8" NPT Int.	1/8" barbed fitting	**Pressure fittings**

More solutions from Setra

Environmental monitoring

- Hospitals — ASHRAE Standard 170
- Pharmacies — USP 797 & USP 800
- Bio-safety laboratories & vivariums
- Pharmaceutical manufacturing



Particle counting & indoor air quality

- Compounding pharmacy cleanrooms
- Hospital operating and patient isolation rooms
- Construction sites near critical environments
- Industrial manufacturing cleanrooms

Power monitoring & energy management

- Tenant submetering
- Energy cost allocation
- Demand response
- Equipment efficiency tracking

Low differential pressure sensing

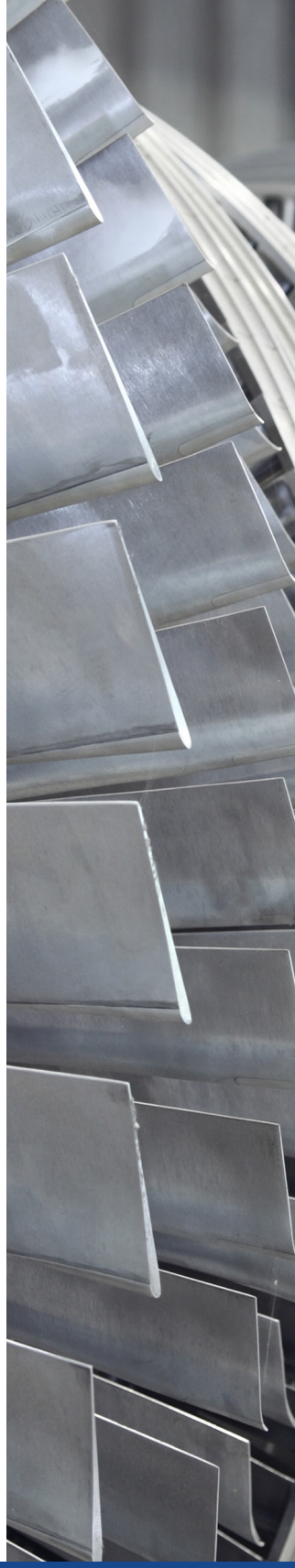
- Building automation systems
- HVAC/R & energy management
- Cleanrooms & other critical environments
- Variable air volume (VAV) and fan control

Humidity & temperature sensing

- Hospital operating and patient isolation rooms
- Compounding pharmacy cleanrooms
- Bio-safety laboratories & vivariums
- Pharmaceutical manufacturing

Sanitary pressure sensing

- Food processing
- Dairy & beverage processing
- Sanitary pipelines
- Liquid level control



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Setra Systems, Inc.
159 Swanson Road
Boxborough, MA 01719

800.257.3872
www.setra.com

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