

## 590 Series

### Differential Pressure Sensor

CE



Sensor in Conduit Housing



Sensor without Conduit Housing

#### Description

The 590 Series Differential Pressure Sensors obtain differential or gauge (static) pressures and convert this pressure difference to a proportional electrical output. They are offered with a 0 to 10 Vdc and 4 to 20 mA output.

Static accuracy is  $\pm 1\%$  full scale in normal ambient temperature environments. The units are temperature compensated to less than  $\pm 0.033\%$  FS/ $^{\circ}$ F of thermal error over the temperature range of  $0^{\circ}$ F to  $150^{\circ}$ F ( $-19^{\circ}$ C to  $66^{\circ}$ C).

#### Features

- 10 PSI proof pressure on all ranges
- 24 Vac excitation
- 0 to 10 Vdc analog input is compatible with all energy management systems
- Fully protected against reverse wiring
- 1% accuracy improves variable air volume system performance
- Optional accuracies as high as 0.25% FS
- Meets **CE** conformance standards

#### Applications

- Heating, Ventilating and Air Conditioning (HVAC)
- Energy management systems
- Variable Air Volume (VAV) and fan control
- Environmental pollution control
- Static duct and clean room pressures
- Oven pressurization and furnace draft controls

**Product Numbers**

**Table 1.**

Product Number	Percent Accuracy	Pressure Range Inches WC (Water Column)	In Conduit Box
590-501	1% FS	5	No
590-502		2	
590-503		1	
590-505		± 0.25	
590-506	1% FS	5	Yes
590-507		2	
590-508		1	
590-510		± 0.25	
590-780	0.4% FS	1	
590-781		0.65	
590-782		0.5	

<b>Accessories</b>	590-500	Conduit Assembly Kit
<b>Specifications</b>	Case	Fire-retardant, glass-filled polyester
<b>Physical</b>	Electrical connection	Screw terminal strip
	Pressure fittings	1/4-inch fitting
	Weight	3 ounces (85 g)
<b>Ambient Temperature</b>	Operating	0°F to 150°F (-18°C to 65°C)
	Storage	-40°F to 185°F (-40°C to 85°C)

**NOTE:** Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher or lower.

<b>Electrical (Voltage)</b>	Circuit	3-wire (Com, Out, Exc)	
	Excitation/Output <sup>1</sup>	9 to 30 Vdc/0 to 5 Vdc <sup>2</sup> 9 to 30 Vac/0 to 5 Vdc 12 to 30 Vac/0 to 10 Vdc <sup>2</sup>	
	Bi-directional output at zero Pressure	2.5 Vdc (±50m)	
	Output Impedance	100 ohms	
	1 Calibrated into a 40K ohm load, operable into a 5000 ohm load or greater.		
	2 Zero output factory-set to within ±50 mV Span (full scale) output factory-set to within ±50 mV		
<b>Electrical (Current)</b>	Circuit	2-Wire	
	Output <sup>1</sup>	4 to 20 mA <sup>2</sup>	
	Bidirectional output at zero pressure:	12 mA	
	Electrical Load	0 to 800 ohms	
	Minimum loop supply voltage (Vdc) = 9 + 0.02 × (Resistance of receiver plus line).		
	Maximum loop supply voltage (Vdc) = 30 + 0.004 × (Resistance of receiver plus line).		
	1 Calibrated at factory with a 24 Vdc loop supply voltage and a 250 ohm load.		
	2 Zero output factory set to within ± 0.16mA (± 0.08 mA for optional accuracies). Span (full scale) output factory set to within ± 0.16mA (± 0.08 mA for optional accuracies).		
<b>Pressure Media</b>	Typically air or similar non-conducting gases.		
<b>Performance</b>		<b>Standard</b>	<b>Optional</b>
	Accuracy RSS <sup>1</sup> (at constant temp.)	± 1.0% FS	± 0.4% FS ± 0.25% FS
	Non-Linearity (BFSL)	± 0.98% FS	± 0.38% FS ± 0.22% FS
	Hysteresis	0.10% FS	0.10% FS 0.10% FS
	Non-Repeatability	0.05% FS	0.05% FS 0.05% FS
	Thermal effects <sup>2</sup>		
	Compensated range	0°F to 150°F (-18°C to 65°C)	
	Zero/Span shift %FS	±0.033 (±0.06)	
	Maximum line pressure	10 psi	
	Overpressure	10 psi in positive or negative direction	
	Warm-up shift	±1% FS total	
	Position effect <sup>3</sup>		
	<u>Range (in. WC)</u>	<u>Zero Offset (%FS/G)</u>	
	To 0.5	0.60	
	To 1.0	0.50	
	To 2.0	0.22	
	To 5.0	0.14	
	1 RSS of non-linearity, non repeatability and hysteresis		
	2 Units calibrated at nominal 70°F (21°C)		
	3 Unit is factory-calibrated at 0g effect in the vertical position.		

## Operation

This sensor uses an improved all stainless steel micro-tig welded sensor.

The tensioned stainless steel diaphragm and insulated stainless steel electrode, positioned close to the diaphragm, form a variable capacitor. Positive pressure moves the diaphragm toward the electrode, increasing the capacitance.

A decrease in pressure moves the diaphragm away from the electrode, decreasing the capacitance. The change in capacitance is detected and converted to a linear DC electrical signal by a unique electronic circuit.

The micro-tig welded tension sensor allows up to 10 psi overpressure (in either direction) without damaging the unit. In addition, the sensor parts have thermally matched coefficients, which promote improved temperature performance and excellent long-term stability.

## Dimensions

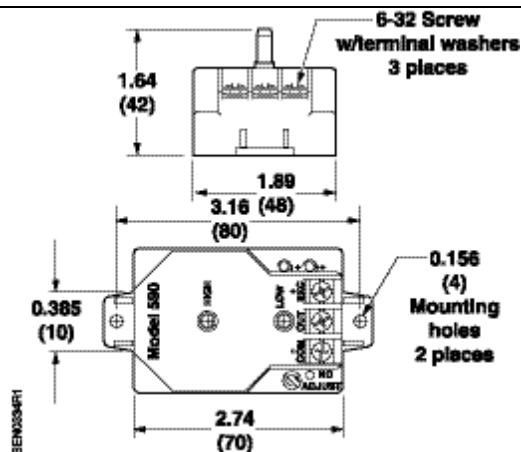


Figure 1. Sensor Dimensions in Inches (Millimeters).

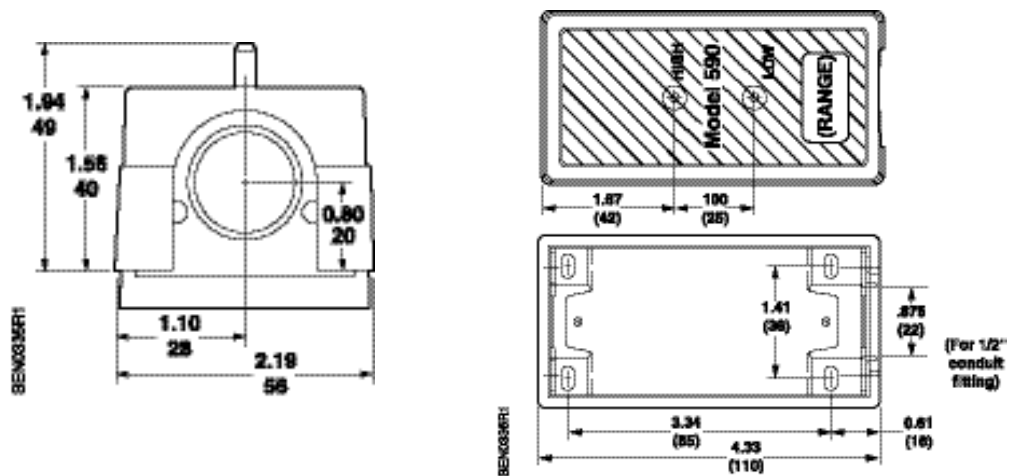


Figure 2. Conduit Enclosure Dimensions in Inches (Millimeters).

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