

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° F to 150° F (-19° C to 66° 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 | |
| 590-504 | | 0.5 | |
| 590-505 | | ± 0.25 | |
| 590-511 | | 0.25 | |
| 590-506 | 1% FS | 5 | Yes |
| 590-507 | | 2 | |
| 590-508 | | 1 | |
| 590-509 | | 0.5 | |
| 590-510 | | ± 0.25 | |
| 590-512 | | 0.25 | |
| 590-780 | 0.4% FS | 1 | |
| 590-781 | | 0.65 | |
| 590-782 | | 0.5 | |
| 590-783 | | 0.25 | |
| 590-784 | 0.25% FS | 0.1 | |
| 590-785 | | 0.25 | |
| 590-786 | | 0.5 | |
| 590-787 | | 1 | |
| 590-788 | | 2.5 | |
| 590-789 | | 5 | |
| 590-790 | | ± 0.1 | |
| 590-791 | | ± 0.25 | |

| | | |
|----------------------------|---|--|
| Accessories | 590-500 | Conduit Assembly Kit |
| Specifications | Case | Fire-retardant, glass-filled polyester |
| Physical | Electrical connection | Screw terminal strip |
| | Pressure fittings | 1/4-inch fitting |
| | Weight | 3 ounces (85 g) |
| Ambient Temperature | 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. | |

| | | | | |
|-----------------------------|---|--|-----------------|------------|
| Electrical (Voltage) | Circuit | 3-wire (Com, Out, Exc) | | |
| | Excitation/Output ¹ | 9 to 30 Vdc/0 to 5 Vdc ² 9 to 30 Vac/0 to 5 Vdc 12 to 30 Vac/0 to 10 Vdc ² | | |
| | 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 | | | |
| Electrical (Current) | Circuit | 2-Wire | | |
| | Output ¹ | 4 to 20 mA ² | | |
| | 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). | | | |
| Pressure Media | Typically air or similar non-conducting gases. | | | |
| Performance | | Standard | Optional | |
| | Accuracy RSS ¹ (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 ² | | | |
| | 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 ³ | | | |
| | <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

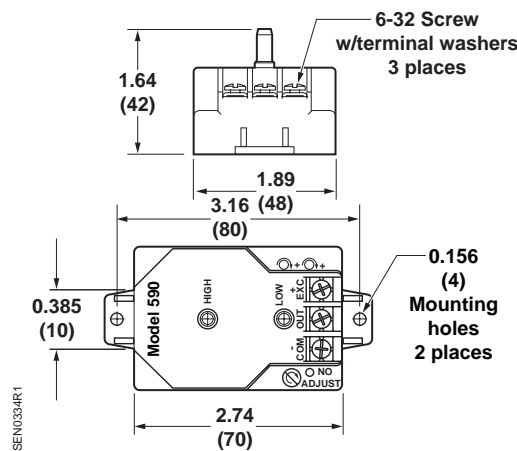


Figure 1. Sensor Dimensions in Inches (Millimeters).

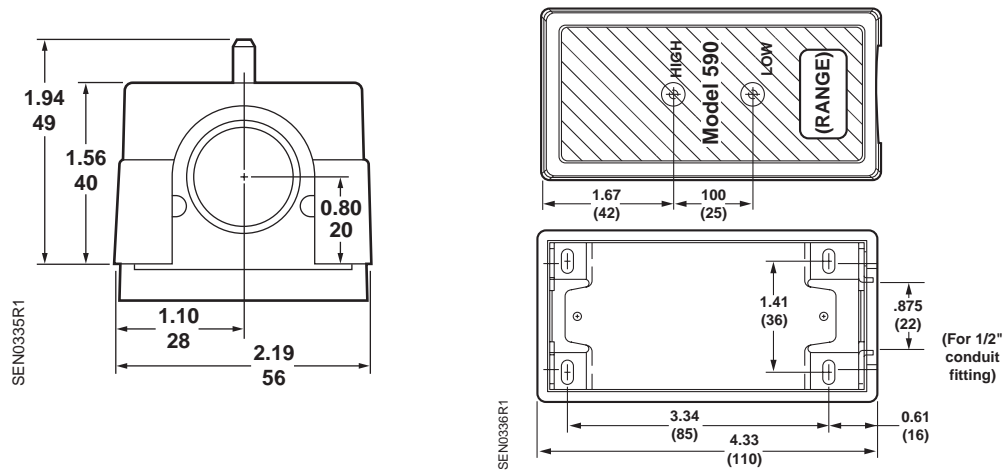


Figure 2. Conduit Enclosure Dimensions in Inches (Millimeters).

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