

Very Low Differential Pressure Transducer



Figure 1. Very Low Differential Pressure Transducer

Description

The Very Low Differential Pressure Transducers sense differential or gauge (static) pressures and convert pressure difference to a proportional electrical output. The 590 Series is offered with a 0 to 10 Vdc or 4 to 20 mA output.

Used in Building Energy Management Systems, these transducers are capable of measuring pressures with the accuracy necessary for proper building pressurization and airflow control.

The 590 Series Transducers are available in five (5) different air pressure ranges. 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 $+150^{\circ}$ F.

The 590 Series 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 the unique electronic circuit of the 590 Series.

The micro-tig-welded tension sensor allows up to 10 PSI overpressure (in either direction) with no damage to the unit. In addition, the sensor parts have thermally matched coefficients, which promotes improved temperature performance and excellent long-term stability.

Applications

- Heating, Ventilation and Air Conditioning (HVAC)
- Energy Management Systems
- Variable Air Volume (VAV) and Fan Control
- Environmental pollution control
- Static duct and clean room pressures

Benefits

- 10 psi proof pressure on all ranges.
- 24 Vac excitation.
- 0 to 10 Vdc and 4 to 20 mA analog output is compatible with all energy management systems.
- Fully protected against reverse wiring.
- Internal regulation permits use with unregulated DC power supplies.
- 1% accuracy improves variable air volume system performance.
- Meets CE conformance standards.
- No field calibration or adjustment necessary.

Pressure Ranges

Unidirectional Pressure	Bi-directional Pressure
0 to 0.5 in. WC	± 0.25 in. WC
0 to 1 in. WC	± 0.1 in. WC
0 to 2 in. WC	
0 to 5 in. WC	

Ordering Information

Description	Product Part Number
Conduit Assembly Kit For Differential Pressure Sensors	590-500
Differential Pressure Sensor, 1% FS, 5" WC, 0 to 10 Vdc	590-501
Differential Pressure Sensor, 1% FS, 2" WC, 0 to 10 Vdc	590-502
Differential Pressure Sensor, 1% FS, 1" WC, 0 to 10 Vdc	590-503
Differential Pressure Sensor, 1% FS, ± 0.25 " WC, 0 to 10 Vdc	590-505
Differential Pressure Sensor in Conduit Box, 1% FS, 5" WC, 0 to 10 Vdc	590-506
Differential Pressure Sensor in Conduit Box, 1% FS, 2" WC, 0 to 10 Vdc	590-507
Differential Pressure Sensor in Conduit Box, 1% FS, 1" WC, 0 to 10 Vdc	590-508
Differential Pressure Sensor in Conduit Box, 1% FS, ± 0.25 " WC, 0 to 10 Vdc	590-510
Differential Pressure Sensor in Conduit Box, 0.4% FS, 1" WC, 4 to 20 mA	590-780
Differential Pressure Sensor in Conduit Box, 0.4% FS, 0.65" WC, 4 to 20 mA	590-781
Differential Pressure Sensor in Conduit Box, 0.4% FS, 0.5" WC, 4 to 20 mA	590-782

Specifications (Application of some available options may impact standard specifications)

Environmental Data

Temperature

Operating °F (°C)*	0 to 150 (–18 to 65)
Storage °F (°C)	–40 to 185 (–40 to 85)

*Operating temperature limits of the electronics only.

Pressure media temperatures may be considerably higher or lower.

Physical Description

Case	Fire retardant glass filled polyester
Electrical connection	Screw terminal strip
Pressure fitting	1/4" fitting
Weight	3 ounces

Electrical Data (Voltage)

Circuit	3-wire (Com, Out, Exc)
Excitation/Output*	12 to 30 Vac/0 to 10 Vdc**
Bi-directional output at zero pressure:	5.0 Vdc**
Output Impedance	100 ohms

* Calibrated into a 50K ohm load, operable into a 5000-ohm load or greater.

** Zero and span outputs factory-set to within $\pm 50\text{mV}$ ($\pm 25\text{ mV}$ for optional accuracies).

Electrical Data (Current)

Circuit	2-Wire
Excitation/Output*	24 Vdc*** / 4 to 20 mA**
Bi-directional output at zero pressure:	12 mA**
Controller Load	0 to 800 ohms

* Calibrated at factory with a 24 Vdc loop supply voltage and a 250 ohm load.

** Zero and Span outputs factory set to within $\pm 0.16\text{ mA}$ ($\pm 0.08\text{ mA}$ for optional accuracies).

*** Minimum loop supply voltage (Vdc) = $9 + 0.02 \times (\text{Resistance of controller input plus field wiring})$.
Maximum loop supply voltage (Vdc) = $30 + 0.004 \times (\text{Resistance of controller input plus field wiring})$.

Pressure Media

Typically air or similar non-conducting gases

Position Effect *

Range	Zero Offset (%FS/G)
To 0.5 in. WC	0.60
To 1.0 in. WC	0.50
To 2.5 in. WC	0.22
To 5.0 in. WC	0.14

* Unit is factory calibrated at 0g effect in the vertical position.

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