

# Model 230

## True Wet-to-Wet Differential Pressure Transducer

The Model 230 is Setra's highest accuracy solution for monitoring differential pressure in wet-to-wet applications. Its single diaphragm design enables a true wet-to-wet differential pressure measurement with superior  $\pm 0.25\%$  FS accuracy compared to competitive units which calculate differential pressure using two single point pressure sensors. The stainless steel capacitive sensor provides a highly accurate, linear analog output proportional to the pressure over a wide temperature range. The 230 is offered with an optional 3 or 5 valve machined brass manifold for ease of installation and maintenance.

### Avoid Line Pressure w/ Single Diaphragm Sensor

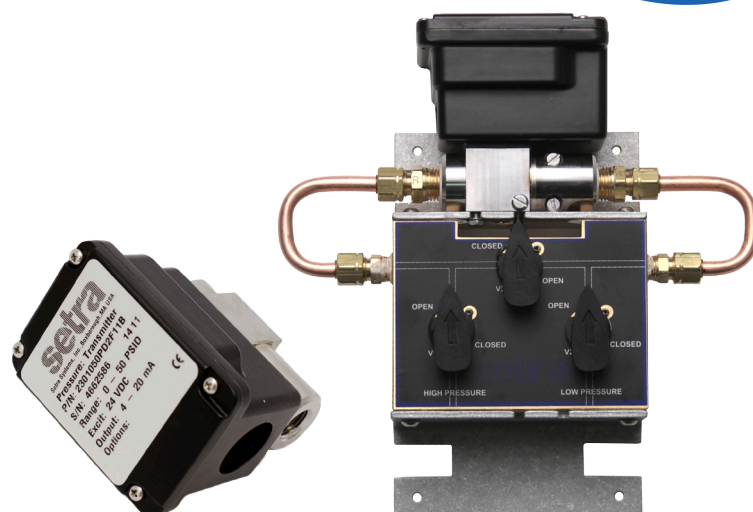
Unlike the competition, the 230 is a true wet-to-wet sensor with a single diaphragm construction. The differential pressure range of a single diaphragm is not impacted by line pressure whereas dual differential pressure sensors require the individual sensors to measure gauge pressure, comparing the outputs to determine the differential pressure.

### Increase the Sensors Response Time

The 230 utilizes an all stainless steel capacitive sensor which responds 20x faster than oil filled sensors and provides conditioned electronic circuitry with a highly accurate, linear analog output proportional to the pressure over a wide temperature range.

### Save Time on Money & Installation

When time and project costs are a priority, the 230 is offered with an optional 3 or 5 valve machined brass manifold for ease of installation and maintenance. The brass body has no internal process connections, therefore eliminating the risk of internal leaks.



- Single Diaphragm Design
- All Stainless Steel Capacitive Sensor
- 3 or 5 Valve Manifold Assembly Options

### Model 230 Features:

- Only true wet-to-wet differential pressure transducer on the market
- $\pm 0.25\%$  FS Accuracy
- Available to 1 PSID with 350 PSI Line Pressure
- No Liquid Fill Diaphragm
- NEMA 4 Rated Housing
- Low Line Pressure Effect
- Fast Response Time
- Gas & Liquid Compatible
- CE & RoHS Compliant

### Applications:

- Energy Management Systems
- Process Control Systems
- Flow Measurement of Various Gases or Liquids
- Liquid Level Measurement or Pressurized Vessels
- Pressure Drop Across Filters

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### PROOF PRESSURE

Unidirectional		
Pressure Range PSID	Proof Pressure High Side PSI	Proof Pressure Low Side PSI
0 to 1.0	50	2.5
0 to 2.0	50	5
0 to 5.0	100	12.5
0 to 10.0	100	25
0 to 25.0	350	62.5
0 to 30.0	350	75
0 to 50.0	350	125
0 to 100.0	350	250

Bidirectional		
Pressure Range PSID	Proof Pressure High Side PSI	Proof Pressure Low Side PSI
0 to ±0.5	50	1.25
0 to ±1.0	50	2.5
0 to ±2.5	100	6.35
0 to ±5.0	100	12.5
0 to ±10.0	200	25
0 to ±25.0	350	62.5
0 to ±50.0	350	125

### GENERAL SPECIFICATIONS

Performance Data		Physical Description (Model 230)	
Accuracy RSS <sup>1</sup> (at constant temp)	±0.25% FS	Case	Stainless Steel/Aluminum
Non-Linearity, BFSL	±0.20% FS	Electrical Connection	Barrier strip terminal block with conduit enclosure & 0.875 DIA conduit opening.
Hysteresis	0.10% FS	Pressure Fittings	1/4"-18 NPT internal
Non-Repeatability	0.05% FS	Weight (approx.)	14.4 oz
Thermal Effects <sup>2</sup>		Sensor Cavity Volume	0.27 in <sup>3</sup> Positive Port, 0.08 in <sup>3</sup> Negative Port
Compensated Range °F(°C)	+30 to +150 (-1 to +65)	(With 1/4"NPT external fittings installed-does not include cavity volume of 1/4"NPT external fittings.)	
Zero Shift %FS/100°F(%FS/50°C)	2.0 (1.8)	Physical Description (3-Valve Manifold Assembly) <sup>4</sup>	
Span Shift %FS/100°F(%FS/50°C)	2.0 (1.8)	Manifold Block	Brass
Line Pressure Effect	Zero shift ±0.004% FS/PSIG line pressure	Valves (3) <sup>5</sup>	V1 for Connection to + port V2 for Connection to - port V3 for Equalizing Pressure
Resolution	Infinite, limited only by output noise level (0.02%FS)	Valve Type	90° On/Off
Static Acceleration Effect	2%FS/g (most sensitive axis)	Process Connections	1/4"-18 NPT Internal Thread
Natural Frequency	500 Hz (gaseous media)	Dimensions	7.05"W x 6.25"H x 2.16"D
Warm-up Shift	±0.1% FS total	Weight	<2.5 lbs.
Response Time	30 to 50 milliseconds	Physical Description (5-Valve Manifold Assembly) <sup>6</sup>	
Long Term Stability	0.5%FS/1 YR	Manifold Block	Brass
Maximum Line Pressure	350 PSIG	Valve (5) <sup>5</sup>	V1 for Connection to ± Port V2 for Connection to - Port V3 for Equalizing Pressure V4 & V5 for Connection to External Gauge or Alternate Plumbing Configuration
Environmental Data		Process Connection	1/4"-18 NPT Internal Thread
Operating <sup>3</sup> Temperature °F (°C)	0 to +175 (-18 to +80)	Dimensions	7.05"W x 6.25"H x 2.16"D
Storage Temperature °F (°C)	-65 to +250 (-54 to +121)	Weight	<3.8 lbs.
Vibration	5 g from 5 Hz to 500 Hz	Electrical Data (Voltage)	
Acceleration	10g	Circuit	3-Wire (Exc, Out, Com)
Shock	50g	Excitation	9 to 30 VDC for 0-5 VDC Output, 13 to 30 VDC for 0-10 VDC Output
Pressure Media		Output <sup>7</sup>	0 to 5 VDC <sup>8</sup> , 0 to 10 VDC <sup>8</sup>
Model 230		Output Impedance	100 ohms
Gases or liquids compatible with 17-4 PH Stainless Steel, 300 Series Viton O-Rings. Note: Hydrogen not recommended for use with 17-4 PH stainless steel. Optional Buna-N O'rings are recommended for hydrocarbon applications.		Electrical Data (Current)	
3 & 5 Valve Manifold		Circuit	2-Wire
Gases or liquids compatible with 360 brass, Copper 122, Acetal plug valves and Nitrile O-rings.		Output <sup>9</sup>	4 to 20mA <sup>10</sup>
		External Load	0 to 1000 ohms
		Minimum supply voltage (VDC)	9+ 0.02 x (Resistance of receiver plus line).
		Maximum supply voltage (VDC)	30+ 0.004 x (Resistance of receiver plus line).

<sup>1</sup> RSS of Non-Linearity, Hysteresis, and Non-Repeatability.

<sup>2</sup> Units calibrated at nominal 70°F. Maximum thermal error computed from this datum.

<sup>3</sup> Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher.

<sup>4</sup> Order assembled with the Model 230 (Code 3V) or separately as Option 891.

<sup>5</sup> Refer to drawings

<sup>6</sup> Order assembled with the Model 230 (Code 5V)

<sup>7</sup> Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.

<sup>8</sup> Zero output factory set to within ±25mV (for 5 VDC output) or ±50mV (for 10 VDC output)

Span (Full Scale) output factory set to ±25 mV (for 5 VDC output) or ±50 mV (for 10 VDC output)

<sup>9</sup> Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.

<sup>10</sup> Zero output factory set to within ±0.16mA. Span factory set to within ±0.16 mA

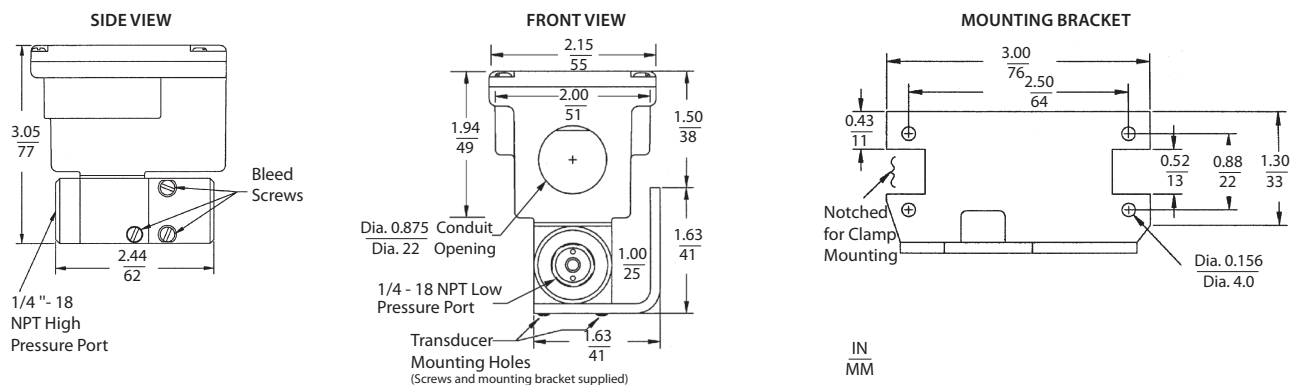
Specifications subject to change without notice.

# Model 230

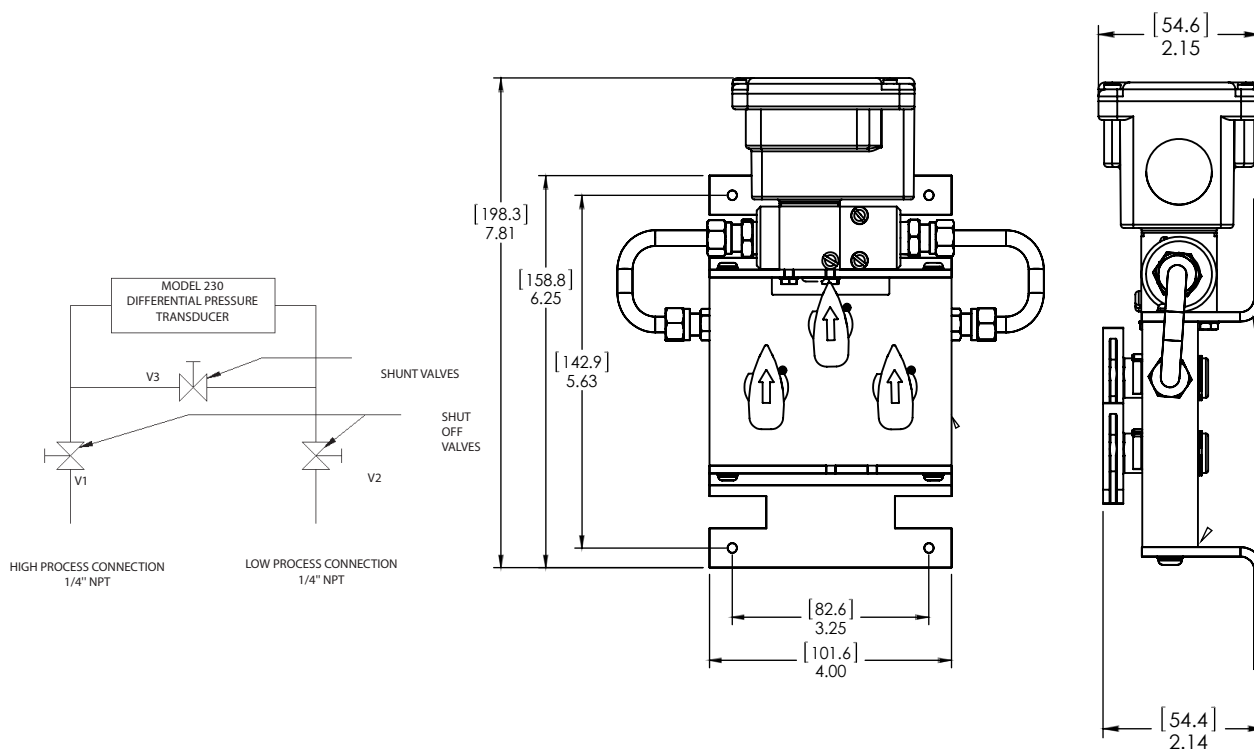
## True Wet-to-Wet Differential Pressure Transducer



### MODEL 230 DIMENSIONS



### DIMENSIONS W/ 3-VALVE MANIFOLD ASSEMBLY



For differential pressure measurements at high line pressure (350 PSIG max), it is recommended that the pressure sensor be installed with a valve in each line, plus a shunt valve across the high and low (reference) pressure ports as shown.

# Model 230

## True Wet-to-Wet Differential Pressure Transducer



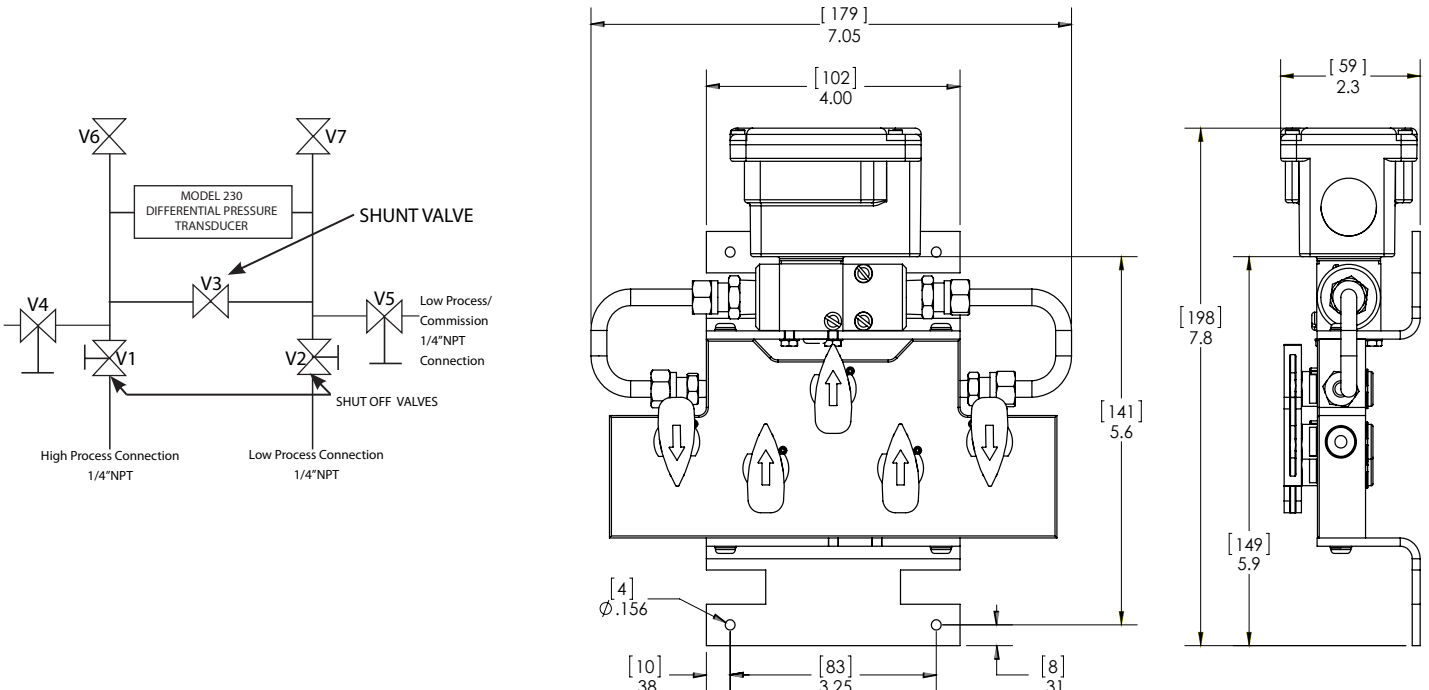
### ORDERING INFORMATION

2	3	0	1	-					-			-			-		
Model				Range				Pressure Fitting		Output		Bleed Screw Seals			Optional		
2301 = 230				Unidirectional		Bidirectional		2F	1/4" NPT (F)	11	4-20 mA	Std.	B	Viton	C	Calibration Certificate	
				001PD	0 to 1 PSID	0R5PB	±0.5 PSID	3V	3-Valve Manifold	2D	0.05-5.05 VDC	Opt.	A	Buna-N			
				002PD	0 to 2 PSID	001PB	±1 PSID	5V	5-Valve Manifold	2E	0.05-10.05 VDC						
				005PD	0 to 5 PSID	2R5PB	±2.5 PSID										
				010PD	0 to 10 PSID	005PB	±5 PSID										
				025PD	0 to 25 PSID	010PB	±10 PSID										
				030PD	0 to 30 PSID	025PB	±25 PSID										
				050PD	0 to 50 PSID	050PB	±50 PSID										
				100PD	0 to 100 PSID												
Please contact factory for versions not shown.																	

Please contact factory for versions not shown.

Ordering Example: 2301005PD2F11B = Model 230 0 to 5 PSID unidirectional, 1/4-18 NPT Ext. fitting, 4 to 20 mA Output, and Viton/Silicone Seals.  
 2301005PD3V11B = Model 230, 0 to 5 PSID unidirectional, 3-Valve Manifold, 4 to 20 mA, Output, and Viton/Silicone Seals (Assembled w/3- Valve Manifold).

### DIMENSIONS W/ 5-VALVE MANIFOLD ASSEMBLY



For differential pressure measurements at high line pressure (350 PSIG max), it is recommended that the pressure sensor be installed with a valve in each line, plus a shunt valve across the high and low (reference) pressure ports as shown.

Note: V6 and V7 bleed valves are not required when used with a Setra Model 230. Use the bleed screws on Model 230 to bleed the lines of air.