

# Model 230

## Wet-to-Wet Pressure Transducer



NOTE: Setra quality standards are based on ANSI-Z540-1. The calibration of this product is NIST traceable.

### DESCRIPTION

The Mode 230 is a high output low differential pressure transducer designed for wet-to-wet differential pressure measurements of liquids or gases. A fast-response capacitance sensor and signal conditioned electronic circuitry provide a highly accurate, linear analog output proportional to pressure. Both unidirectional and bidirectional ranges are available for applications with line pressure up to 250 psig.

Optional 3-valve or 5-valve manifold assemblies are available for ease of installation and maintenance. The manifolds are machined brass bodies requiring no internal pipe connections, thereby eliminating the risk of internal leaks. If the 230 is ordered with manifold, the system is shipped completely assembled.

### FEATURES

- Ideal for Applications with Line Pressure up to 250 psig
- NEMA 4/IP65 Rating
- No Liquid Fill Diaphragm
- Available with 3-Valve or 5-Valve Manifold Assembly Option
- Low Line Pressure Effect
- Fast Response
- Gas and Liquid Compatible
- Low Differential Ranges
- Meets CE Conformance Standards

### APPLICATIONS

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

### PRESSURE RANGES

UNIDIRECTIONAL		
Pressure Range PSID	Proof Pressure High Side* PSI	Proof Pressure Low Side* PSI
0 to 1.0	20	2.5
0 to 2.0	40	5
0 to 5.0	100	12.5
0 to 10.0	100	25
0 to 25.0	250	62.5
0 to 30.0	250	75
0 to 50.0	250	125
0 to 100.0	250	250

BIDIRECTIONAL		
Pressure Range PSID	Proof Pressure High Side* PSI	Proof Pressure Low Side* PSI
0 to $\pm 0.5$	20	1.25
0 to $\pm 1.0$	40	2.5
0 to $\pm 2.5$	100	6.35
0 to $\pm 5.0$	100	12.5
0 to $\pm 10.0$	200	25
0 to $\pm 25.0$	250	62.5
0 to $\pm 50.0$	250	125

\*The zero will shift slightly when high differential overpressure is applied. The shift may be as much as  $\pm 10\%$  FS with overpressure applied to the low pressure port. Other parameters (sensitivity, linearity, etc) will not shift. If the overpressure is normally only in one direction, the user may apply this overpressure to preset the sensor. Subsequent overload of less magnitude will not cause additional shift. The unit is pre-zeroed at the factory after application of maximum overload pressure to the high pressure port.

### SPECIFICATIONS

#### Performance Data

Accuracy RSS <sup>1</sup> (at constant temp)	±0.25% FS
Non-Linearity, BFSL	±0.20% FS
Hysteresis	0.10% FS
Non-Repeatability	0.05% FS

#### Thermal Effects<sup>2</sup>

Compensated Range °F(°C)	+30 to +150 (-1 to +65)
Zero shift %FS/100°F(%FS/50°C)	2.0 (1.8)
Span Shift %FS/100°F(%FS/50°C)	2.0 (1.8)
Line Pressure Effect	Zero shift ±0.004% FS/psig line pressure

#### Resolution

Infinite, limited only by output noise level (0.02%FS)

#### Static Acceleration Effect

2%FS/g (most sensitive axis)

#### Natural Frequency

500 Hz (gaseous media)

#### Warm-up Shift

±0.1% FS total

#### Response Time

30 to 50 milliseconds

#### Long Term Stability

0.5%FS/1 YR

**Maximum Working Pressure 250 psig**

#### Environmental Data

##### Temperature

Operating <sup>3</sup> °F (°C)	0 to +175 (-18 to +79)
Storage °F (°C)	-65 to +250 (-54 to +121)

##### Vibration

5 g from 5 Hz to 500 Hz

##### Acceleration

10 g

##### Shock

50 g

#### Physical Description (Model 230)

Case	Stainless Steel/Aluminum
Electrical Connection	Barrier strip terminal block with conduit enclosure & 0.875 DIA conduit opening.

Pressure Fittings 1/4"-18 NPT internal

Weight (approx.) 14.4 oz

Sensor Cavity Volume 0.27 in<sup>3</sup> Positive Port, 0.08 in<sup>3</sup> Negative Port

(With 1/4"NPT external fittings installed - does not include cavity volume of 1/4"NPT external fittings.)

#### Physical Description (3-Valve Manifold Assembly)<sup>4</sup>

Manifold Block	Brass
Valves (3) <sup>5</sup>	V1 for connection to + port V2 for connection to - port V3 for equalizing pressure
Valve Type	90° On/Off

Process Connections 1/4"-18 NPT Internal Thread

Dimensions 7.05"W x 6.25"H x 2.16"D

Weight <2.5 lbs.

#### Physical Description (5-Valve Manifold Assembly)<sup>6</sup>

Valve (5)	V1 for Connection to 1 Port V2 for Connection to -Port V3 for Equalizing Pressure V4 & V5 purging and remote sensor / pressure gauge
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#### Electrical Data (Voltage)

Circuit	3-Wire (Com, Exc, Out)
Excitation	9 to 30 VDC for 0-5 VDC Output 13 to 30 VDC for 0-10 VDC Output

Output<sup>7</sup> 0 to 5 VDC<sup>8</sup>

0 to 10 VDC<sup>8</sup>

Output Impedance 100 ohms

#### Electrical Data (Current)

Circuit	2-Wire
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).	

#### Pressure Media

##### For the Model 230

Gases or liquids compatible with 17-4 PH Stainless Steel, 300 Series Stainless Steel, Viton and Silicone O-Rings.

Note: Hydrogen not recommended for use with 17-4 PH stainless steel.

Optional Buna-N O-rings are recommended for hydrocarbon applications.

##### For the 3 Valve Manifold

Gases or liquids compatible with 360 brass, Copper 122, Acetal plug valves and Nitrile O-rings.

<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 drawing on back page.

<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.

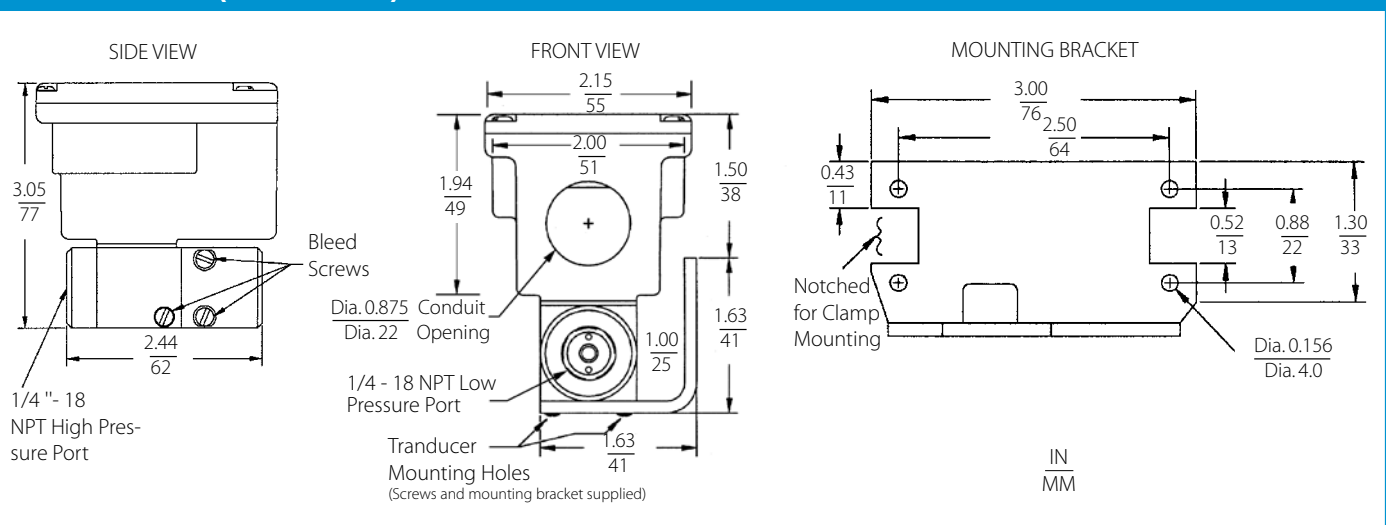
<sup>8</sup> Zero output factory set to within ±50mV (±25 mV for optional accuracies).

<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 (±0.08 mA for optional accuracies).

**Specifications subject to change without notice.**

### DIMENSIONS (Model 230)



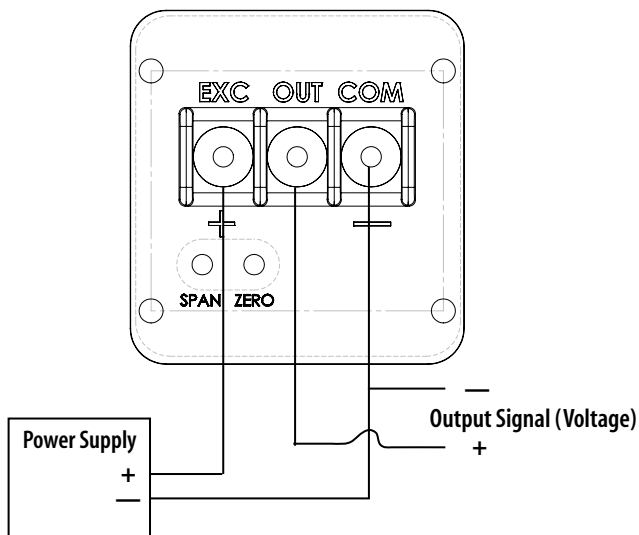
# Model 230

## Wet-to-Wet Pressure Transducer

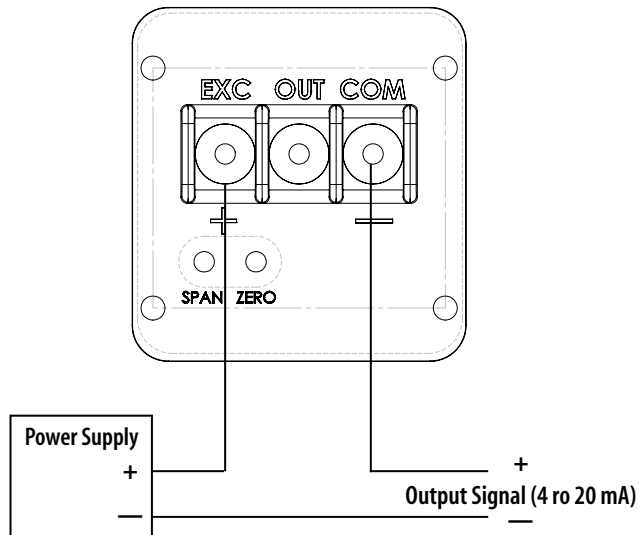


### WIRING

#### Voltage Transducer



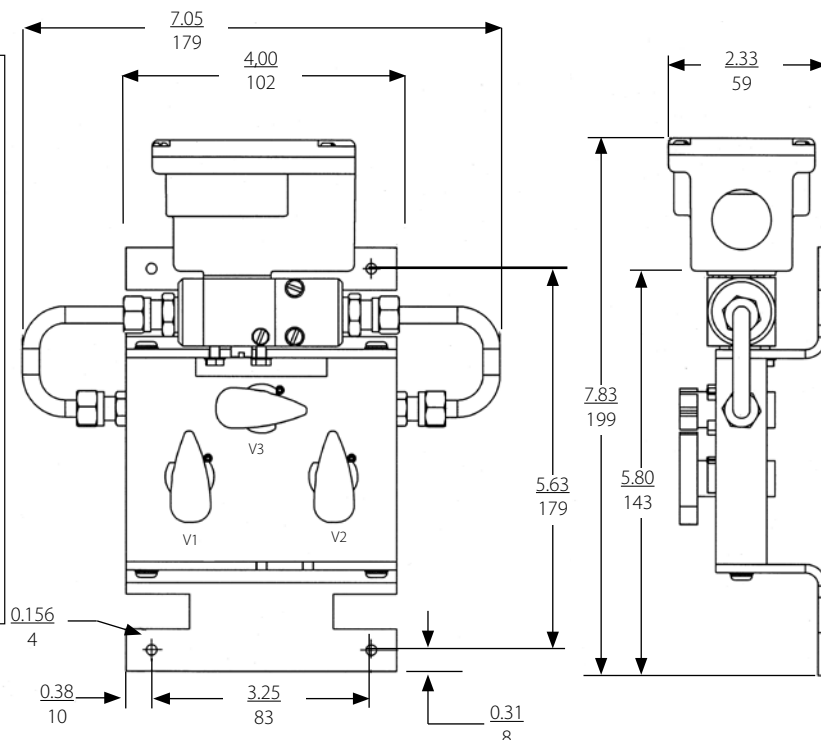
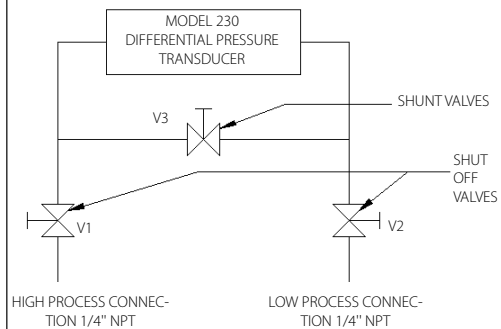
#### Current Transmitter



### DIMENSIONS (3-Valve Manifold Assembly)



**3-Valve Manifold Assembly Description**  
 (Order as Pressure Code Fitting "3V". See Table below.)  
 Manifold Block Brass  
 Valves (3) V1 for connection to +port  
 V2 for connection to -port  
 V3 for equalizing pressure  
 Valve type 90 Degree On/Off  
 Process Connections 1/4"-18 NPT Internal Thread

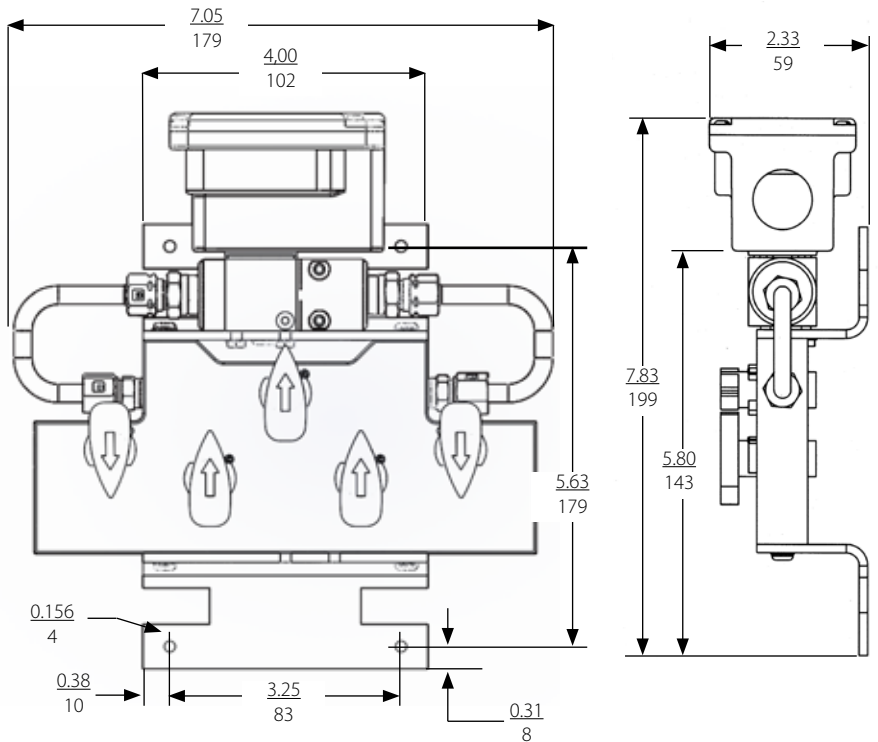
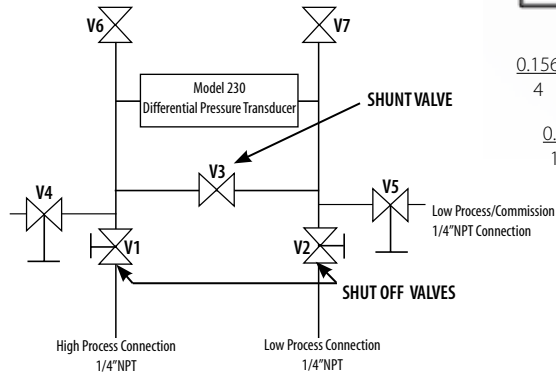


## DIMENSIONS (5-Valve Manifold Assembly)



### 5-Valve Manifold Assembly-Description

- Manifold Block  
Valves (5)      Brass
- V1 for connection to  $\pm$ port
- V2 for connection to -port
- V3 for equalizing pressure
- V4 for connection to external gauge or alternate plumbing configuration
- V5 for connection to external gauge or alternate plumbing configuration
- Valve Type      90 Degree On/Off
- Process Connection      1/4" -18 NPT Internal Thread



For differential pressure measurements at high line pressure (250 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.

## ORDERING INFORMATION

2 3 0 1 - [ ] [ ] [ ] [ ] [ ] - [ ] [ ] - [ ] - [ ]

Model	Range Code	Pressure Fitting	Output	Bleed Screw Seals	Optional
230 = 2301	See Table 1 Below	2F 1/4" NPT (F)	11 4-20 mA	Std. B Viton/Silicone	C Calibration Certificate
		3V 3-Valve Manifold*	2D 0-5 VDC	Opt. A Buna-N	
		5V 5-Valve Manifold*	2E 0-10VDC		

\*Order assembled with the Model 230 (Code 3V or 5V) or separately as Option 891. (Manifold can only be mated with Setra's Model 230.)

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

RANGE CODE	UNIDIRECTIONAL	RANGE CODE	BIDIRECTIONAL
	PSID		PSID
001PD	0 to 1.0	0R5PB	±0.5
002PD	0 to 2.0	001PB	±1.0
005PD	0 to 5.0	2R5PB	±2.5
010PD	0 to 10.0	005PB	±5.0
025PD	0 to 25.0	010PB	±10.0
030PD	0 to 30.0	025PB	±25.0
050PD	0 to 50.0	050PB	±50.0
100PD	0 to 100.0		

Please contact factory for versions not shown.