

# Multi-Sense® Model 231

## Multi-Configurable, Wet-to-Wet Differential Pressure Transducer

Setra's 231 is a multi-configurable, wet-to-wet differential pressure transducer offering the user an all-in-one device with field selectable pressure ranges and analog outputs. The device is offered with an optional 3 or 5 valve machined brass manifold for ease of installation and maintenance. The 231 has a robust, NEMA 4 enclosure with an LCD display and a hinged, captive cover allowing for easy access to switches for adjusting the range and output.

### Field Selectable Pressure Ranges

The 231 offers 8 field selectable pressure ranges which can be changed using a slide switch, eliminating the risk of ordering the wrong range or improperly installing the unit. The multi-range functionality allows the user to hold less inventory and add additional flexibility in the field.

### Quick & Simple Installation

The 231 provides the user with an optional 3 or 5 valve machined brass manifold which can save money on installation and maintenance. The single piece construction of the brass body has no internal process connections, eliminating the risk of internal leaks.

### Robust Enclosure for Difficult Applications

The 231 NEMA 4 housing offers an optional LCD display for instant indication of the high, low and differential pressure readings. A hinged enclosure makes it suitable for harsh environments and saves the hassle of misplacing it when completing a difficult installation.



- Dual Sensors
- Suitable for Harsh Environments
- 3 & 5 Valve Manifold Assembly Options

### Model 231 Features:

- 4 Field Selectable Outputs
- 8 Field Selectable Pressure Ranges
- Field Accessible Push-Button Zero & Remote Zero
- Hinged Cover
- Optional LCD Display
- All Cast Aluminum, NEMA 4 Rated Housing
- CE & RoHS Compliant

### Applications:

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

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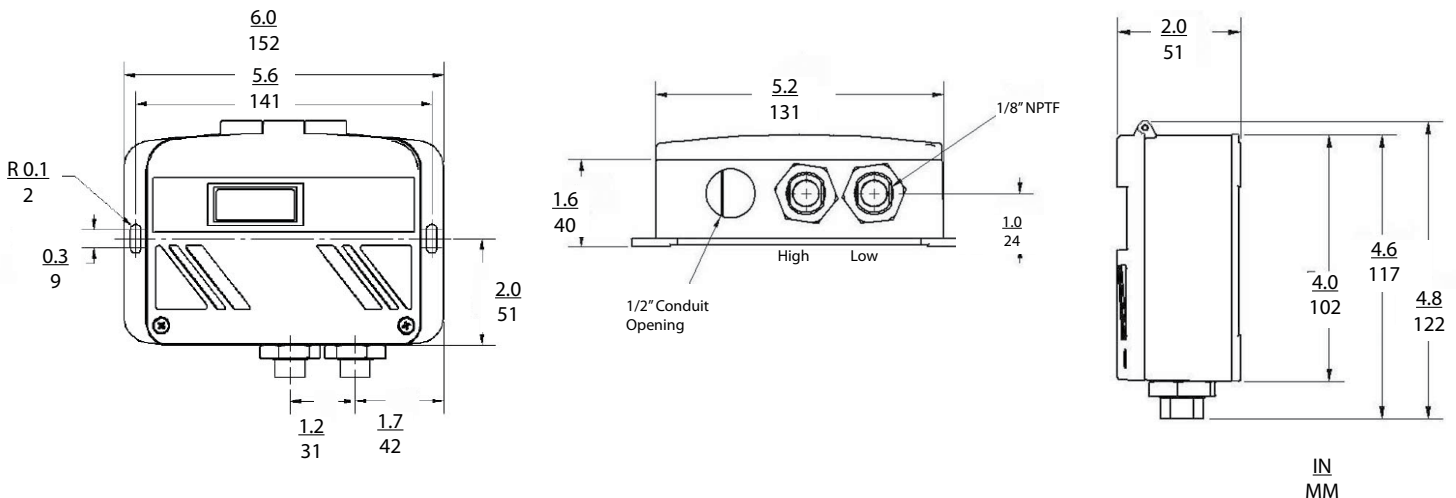
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## GENERAL SPECIFICATIONS

Electrical Data (Voltage)		Performance Data	
Circuit	3-Wire	Accuracy RSS <sup>4</sup> (at constant temp.)	
Excitation	15 to 30 VDC/18 to 30 VAC (Reverse Excitation Protected)	Pressure Ranges A, B, C	±1.0% FS
Output <sup>1</sup>	0 to 5 VDC, 0 to 10 VDC, 1 to 5 VDC	Pressure Ranges D	±2.0% FS
Output Impedance	30 Ohms	Pressure Ranges	
Circuit Consumption	8 mA (typ.) at 5 VDC, 8 mA (typ.) at 10 VDC, 40 mA (typ.) at 18-30 VAC	Range Code	A B C D Max. Line Pressure
		MS1	50 25 10 5 50
<b>Electrical Data (Current)</b>		MS2	100 50 20 10 100
Circuit	2-wire (Reverse Excitation Protected)	MS3	250 125 50 25 250
Output <sup>2</sup>	4 to 20 mA	Pressure Media	
External Load	0 to 250 Ohms	Liquids or Gases Compatible with 17-4 PH Stainless Steel Note: Hydrogen not recommended for use with 17-4 PH stainless steel	
Min. Supply Voltage (VDC)	15 + 0.02 x (Resistance of receiver plus line)	Thermal Effects <sup>5</sup>	
Max. Supply Voltage (VDC)	30 + 0.004 x (Resistance of receiver plus line)	Compensated Range °F (°C)	+32 to +130 (0 to +54)
<b>Physical Description</b>		Zero/Span Shift %FS/100°F (50°C)	2.0 (1.8)
Case	Die Cast Aluminum, Powder Coated	Warm-up Shift	<0.12% FS
Pressure Fittings	1/8-18 NPT Internal	Response Time	1 to 5 sec. (selectable)
Electrical Connection	1/2 in. Conduit	Proof Pressure	2 x Full Scale
Size	4.0 x 6 x 2 in. (102 x 152 x 51 mm)	Burst Pressure	15 x Full Scale (50 PSI), 10 x Full Scale (75 x 150 PSI), 8 x Full Scale (250 PSI)
Weight	1.5 lb	<sup>1</sup> Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.	
Sensor Vacuity Volume	0.2 cc	<sup>2</sup> Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.	
<b>Environmental Data</b>		<sup>3</sup> Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher or lower.	
Operating <sup>3</sup> Temperature °F (°C)	-4 to +185 (-20 to +85)	<sup>4</sup> RSS of Non-Linearity, Hysteresis, and Non-Repeatability.	
Storage Temperature °F (°C)	-4 to +185 (-20 to +85)	<sup>5</sup> Units calibrated at nominal 70°F. Maximum thermal error computed from this datum. Specifications subject to change without notice.	
Vibration	10g from 50Hz to 2000 Hz		
Shock	200g		

## MODEL 231 DIMENSIONS



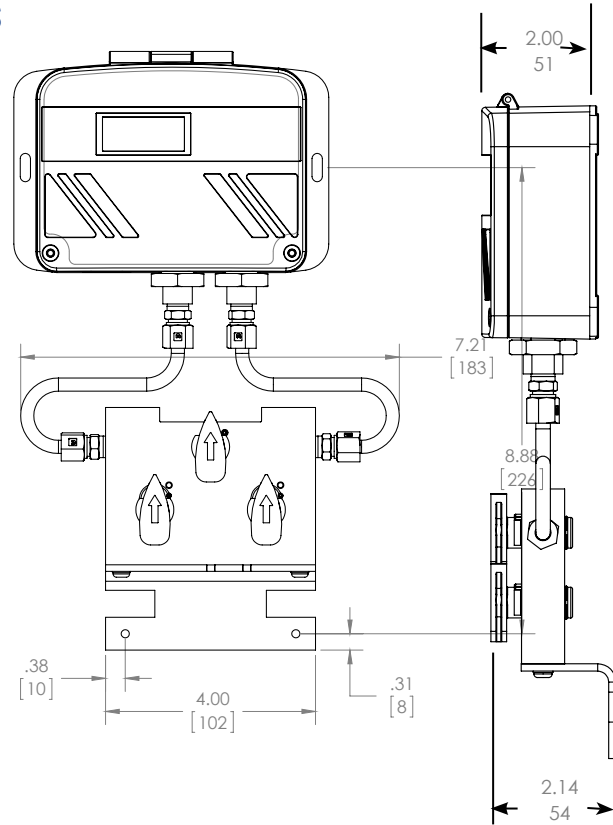
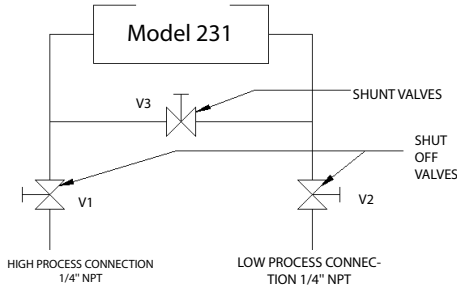
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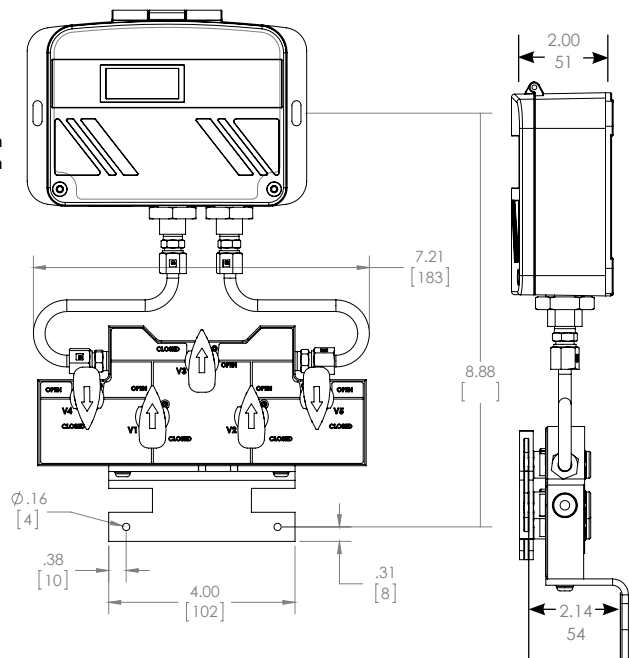
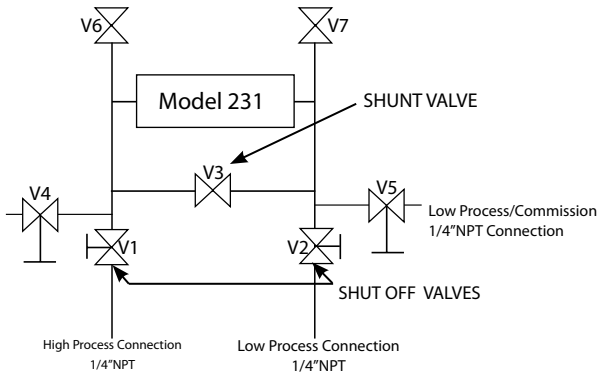
## 3-VALVE MANIFOLD ASSEMBLY DIMENSIONS

Manifold Block Valves (3) Brass  
 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



## 5-VALVE MANIFOLD ASSEMBLY DIMENSIONS

Manifold Block Valves (5) Brass  
 V1 for connection to ±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



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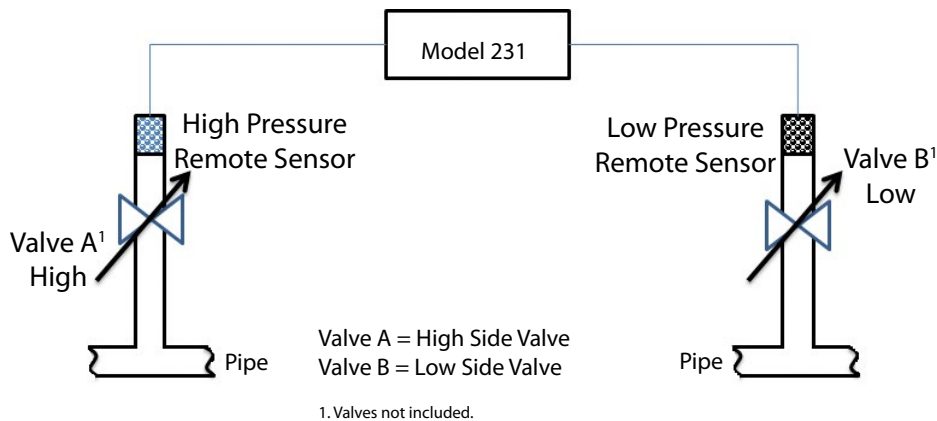
## ORDERING INFORMATION

2	3	1	G	-		-		-	
Model	Range Specifications <sup>1</sup>		Pressure Connection		Display				
231G = 231	Unidirectional	Bidirectional	2F	1/8-18 NPT female (Standard) Sensor (Conduit Version)	N	No Display			
MS1	5, 10, 25, 50 PSID	±5, ±10, ±25, ±50 PSID	3V	3-V Manifold assembled w/ Model 231	D	LCD Display			
MS2	10, 20, 50, 100 PSID	±10, ±20, ±50, ±100 PSID	5V	5-V Manifold assembled w/ Model 231					
MS3	25, 50, 125, 250 PSID	±25, ±50, ±125, ±250 PSID							

<sup>1</sup> Maximum line pressure is maximum range of pressure ordered.

Ordering Example: 231GMS12FD = Model 231, 5 PSID up to 50 PSID, 1/8" NPT Female Fitting, and LCD Display 31GMS13VN = Model 231, 0 to 5 PSID up to 50 PSI, 3-Valve Manifold, and No LCD Display

## INSTALLATION



## PRESSURE RANGE CODE SELECTOR (IMPORTANT: READ BEFORE ORDERING)

Examine the pressure application and determine what is the Highest System Line Pressure. Determine what is the Differential Pressure being measured. Find the MAX. Line Pressure in the table on the right that is  $\geq$  to your Highest System Line Pressure. Verify that your DP falls within the selectable ranges in that row. Follow that row to the left and select that range code.

Range Code	A	B	C	D	Max. Line Pressure
MS1	50	25	10	5	50
MS2	100	50	20	10	100
MS3	250	125	50	25	250

### Example:

Highest System Line Pressure: 125 PSIG  
 Differential Pressure Measured: 50 PSID  
 "Max Line Pressure"  $\geq$  to System Line Pressure: 250 PSID (50 PSID DP falls within ranges in this row)  
 Select Range Code: MS3