



Model 231

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

Features

- Dual sensors
- Suitable for harsh environments
- 3 & 5 valve manifold assembly options
- 4 Field Selectable Outputs
- 8 Field Selectable Pressure Ranges
- Field Accessible Push-Button Zero & Remote Zero
- Hinged Cover
- Optional LCD Display
- NEMA 4 Rated Housing, All Cast Aluminum
- 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

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 a hinged, captive cover allowing for easy access to switches for adjusting the range and output. An optional display is available that allows users to view high, low, and differential pressure readings on a simple rotating cycle.

Field selectable pressure ranges

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

Quick and 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.

Specifications

Electrical data (voltage)

| | |
|----------------------------|---|
| Circuit | 3-Wire |
| Excitation | 15 to 30 VDC/18 to 30 VAC (Reverse Excitation Protected) |
| Output¹ | 0 to 5 VDC, 0 to 10 VDC, 1 to 5 VDC |
| Output impedance | 30 Ω |
| Circuit consumption | 8 mA (typ.) at 5 VDC, 8 mA (typ) at 10 VDC, 40 mA (typ.) at 18-30 VAC |

Electrical data (current)

| | |
|----------------------------|---|
| Circuit | 2-wire (reverse excitation protected) |
| Output² | 4 to 20 mA |
| External load | 0 to 250 Ω |
| Min. supply voltage | 15 VDC + 0.02 x (resistance of receiver plus line) |
| Max. supply voltage | 30 VDC + 0.004 x (resistance of receiver plus line) |

Physical description

| | |
|------------------------------|-------------------------------------|
| Case | Die cast aluminum, powder coated |
| Pressure fittings | 1/8-18 NPT internal |
| Electrical connection | 1/2 in. conduit |
| Size | 4.0 x 6 x 2 in. (102 x 152 x 51 mm) |
| Weight | 1.5 lb |
| Sensor vacuity volume | 0.2 cc |

Environmental data

| | |
|--|--------------------------|
| Operating³ temperature °F (°C) | -4 to +185 (-20 to -85) |
| Storage temperature °F (°C) | -4 to +185 (-20 to +85) |
| Vibration | 10g from 50Hz to 2000 Hz |
| Shock | 200g |

¹ Calibrated into a 50K ohm load, operable into a 5000 ohm load or greater.

² Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.

³ Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher or lower.

⁴ RSS of Non-Linearity, Hysteresis, and Non-Repeatability.

⁵ Units calibrated at nominal 70 °F. Maximum thermal error computed from this datum.

Specifications subject to change without notice.

Performance data

Accuracy RSS⁴ (at constant temp.)

| | |
|---------------------------------|----------|
| Pressure ranges A, B, C: | ±1.0% FS |
| Pressure ranges D: | ±2.0% FS |

Pressure ranges (PSID)

| 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 |

Pressure media

Liquids or Gases Compatible with 17-4 PH Stainless Steel
Note: Hydrogen not recommended for use with 17-4 PH stainless steel

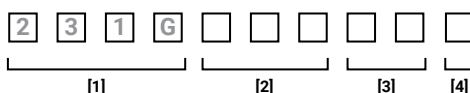
Thermal effects⁵

| | |
|---|--|
| Compensated range °F (°C) | +32 to +130 (0 to +54) |
| Zero/Span Shift %FS/100°F (50°C) | 2.0 (1.8) |
| Warm-up shift | <0.12% FS |
| Surge damping | 1 to 5 sec. (selectable) |
| Proof pressure | 2 x Full Scale |
| Burst pressure | 15 x Full Scale (50 PSI), 10 x Full Scale (75 x 150 PSI), 8 x Full Scale (250 PSI) |

Ordering information

Example part number: 231GMS12FD;

Model 231, 5 PSID up to 50 PSID, 1/8" NPT Int. fitting, and LCD display:



| [1] |
|-----------------------|
| Model |
| 231G Model 231 |

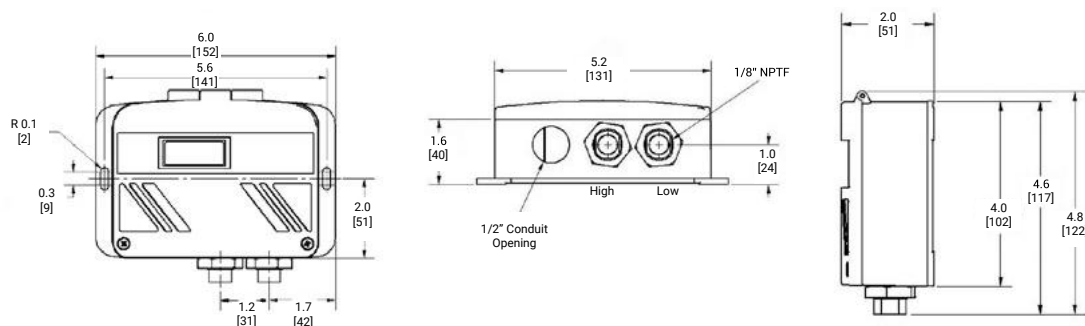
| [2] | | |
|-----------------------------------|-----------------------|---------------------------|
| Range specifications ¹ | | |
| | Unidirectional | Bidirectional |
| MS1 | 5, 10, 25, 50 PSID | ±5, ±10, ±25, ±50 PSID |
| MS2 | 10, 20, 50, 100 PSID | ±10, ±20, ±50, ±100 PSID |
| MS3 | 25, 50, 125, 250 PSID | ±25, ±50, ±125, ±250 PSID |

| [3] | |
|---------------------|---|
| Pressure connection | |
| 2F | 1/8-18 NPT female (standard) sensor (conduit version) |
| 3V | 3-V manifold assembled w/ Model 231 |
| 5V | 5-V manifold assembled w/ Model 231 |

| [4] | |
|----------|-------------|
| Display | |
| N | No display |
| D | LCD display |

¹ Maximum line pressure is maximum range of pressure ordered.

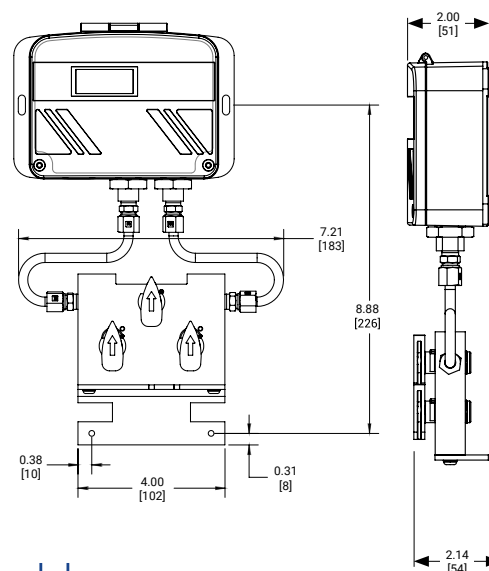
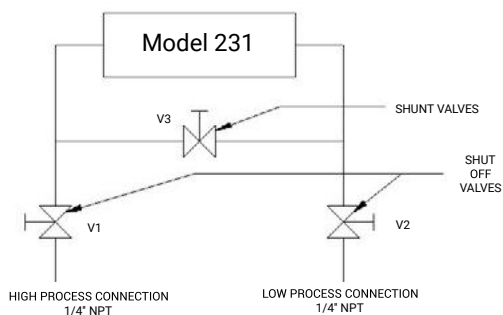
Dimensions



Dimensions - 3 valve manifold assembly

Manifold Block
Valves (3)
Valve type
Process Connections

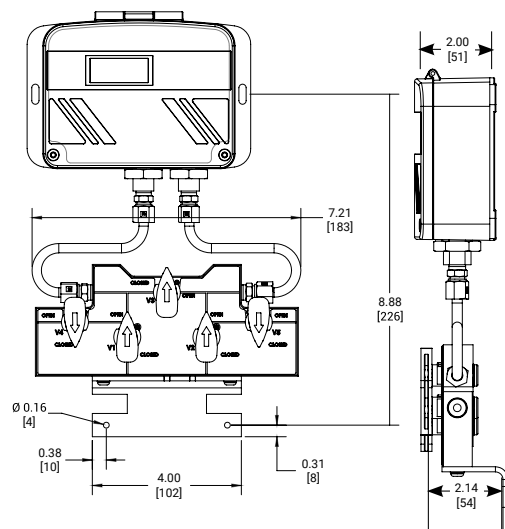
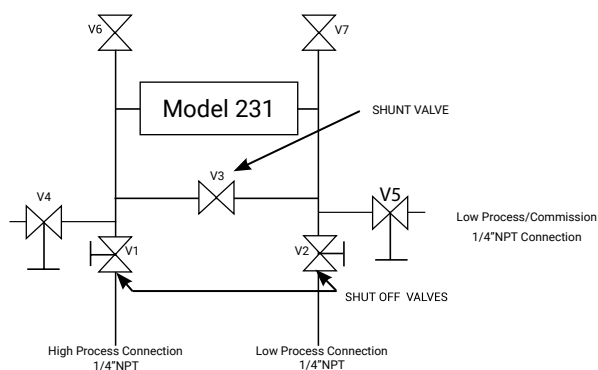
Brass
V1 for connection to +port
V2 for connection to -port
V3 for equalizing pressure
90 Degree On/Off
1/4" -18 NPT Internal Thread



Dimensions - 5 valve manifold assembly

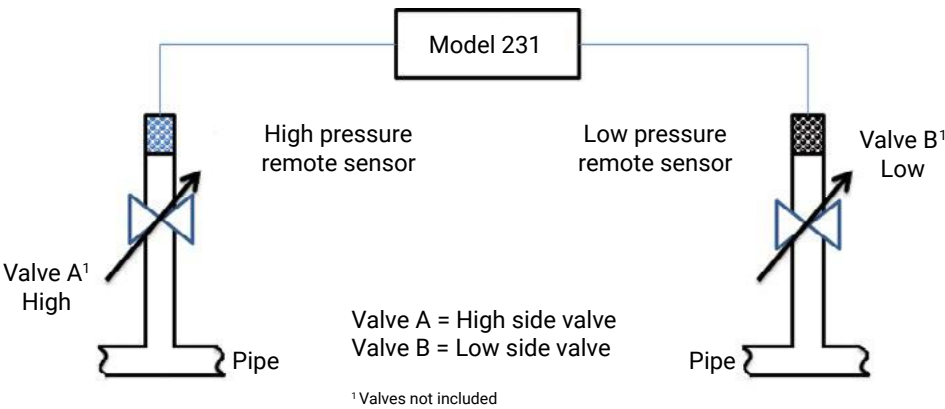
Manifold Block
Valves (5)
Valve Type
Process Connection 1/4

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
90 Degree On/Off
"-18 NPT Internal Thread



inches (mm)

Installation



Pressure range code selector

- NOTE: Please read before ordering.**
- 1. Examine the pressure application and determine what is the Highest System Line Pressure.
 - 2. Determine what is the Differential Pressure being measured.
 - 3. Find the MAX. Line Pressure in the table on the right that is \geq to your Highest System Line Pressure.
 - 4. Verify that your DP falls within the selectable ranges in that row.
 - 5. 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