

# Model 239

## High Accuracy Low Differential Pressure Transducer

Setra's Model 239 is the "standard" for measuring low differential pressure in the Test & Measurement industry. Decades worth of installations have helped the 239 build a reputation of reliability and remains the trusted choice for critical installations. The 239 delivers a high performance 0.073% FS accuracy over a wide temperature range which outperforms competitive transducers in the low pressure market. The 239 offers multiple options to meet both simple and demanding application requirements that are not provided on competitive transducers.

### Long-Term Reliability

The Model 239 differential pressure transducer uses a simple and reliable variable capacitance sensor design. The 239 provides repeatable and dependable readings in rugged applications through its efficient sensor design.

### Accuracy & Performance For Low Pressure Ranges

The Model 239 is a Test & Measurement grade transducer for extremely low pressure ranges. The 239 covers a large selection of pressure ranges with  $\pm 0.073\%$  FS accuracy over a wide temperature range. The Model 239 provides the fastest response time compared to its competitors.

### Customization is Standard

Unlike many competitors, the 239 offers many mechanical and electrical options that can be integrated into existing system designs. These options reduce engineering design time, allowing for earlier project completion and quicker time to market.



- Industry Standard For Accuracy
- Captures Dynamic Pressure Changes
- Small Footprint

### Model 239 Features:

- High Accuracy: 0.073% FS
- Fast Response Time: <10ms
- Fast Warm-Up: <0.1% over 5 min.
- Low Thermal Error
- Meets CE Conformance Standards

### Applications

- Exhaust Pressure
- Leak Detection Systems
- Filter Pressure
- Medical Instrumentation
- Part Integrity Testing
- Cleanrooms

# Model 239

## High Accuracy Low Differential Pressure Transducer



### ORDERING INFORMATION

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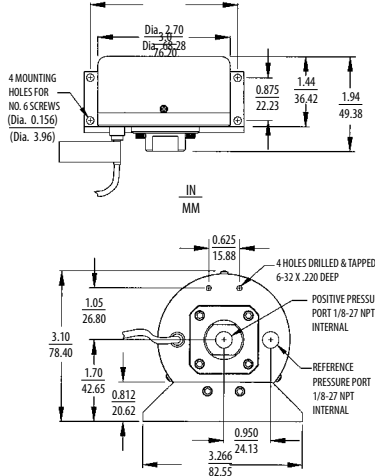
| Model    | Pressure Ranges         |                      | Pressure Fitting |                 | Output |                         | Termination |                                    | Accuracy |            | Options <sup>4</sup> |   |
|----------|-------------------------|----------------------|------------------|-----------------|--------|-------------------------|-------------|------------------------------------|----------|------------|----------------------|---|
|          | Unidirectional          | Bidirectional        | 1F               | 1/8" NPT Female | 11     | 4 to 20 mA              | 02          | 2' Cable 22 GA                     | W        | ±0.14% FS  | N                    | None  |
| 2391=239 |                         |                      |                  |                 |        |                         |             |                                    |          |            |                      |   |
|          | 0R5WD 0 to 0.5 in. W.C. | R25WB ±0.25 in. W.C. |                  |                 | 2S     | ±2.5 VDC <sup>1</sup>   | 10          | 10' Cable 22 GA                    | 9        | ±0.073% FS | 1                    | 3035S Housing Positive Port                         |
|          | 001WD 0 to 1 in. W.C.   | 0R5WB ±0.5 in. W.C.  |                  |                 | 2B     | 0 to 5 VDC <sup>2</sup> | 25          | 25' Cable 22 GA                    |          |            | 3                    | Compensated Temp. Range (-65 to 250°F) <sup>6</sup> |
|          | 2R5WD 0 to 2.5 in. W.C. | 001WB ±1 in. W.C.    |                  |                 | 27     | 1 to 5 VDC              | Y1          | 2' 30 GA 9-Conductor <sup>3</sup>  |          |            | 4                    | Viton O-Ring  |
|          | 005WD 0 to 5 in. W.C.   | 2R5WB ±2.5 in. W.C.  |                  |                 | 28     | 1 to 6 VDC              | Y3          | 5' 30 GA 9-Conductor <sup>3</sup>  |          |            | D                    | Mate with Datum                                     |
|          | 015WD 0 to 15 in. W.C.  | 005WB ±5 in. W.C.    |                  |                 | 2C     | 0 to 10 VDC             | Y4          | 10' 30 GA 9-Conductor <sup>3</sup> |          |            | E                    | Special Excitation Voltage ±24 VDC                  |
|          | 030WD 0 to 30 in. W.C.  | 7R5WB ±7.5 in. W.C.  |                  |                 | 2T     | 0 to 5 VDC <sup>1</sup> | Y6          | 25' 30 GA 9-Conductor <sup>3</sup> |          |            | G                    | Special Excitation Voltage ±15VDC                   |
|          | 005PD 0 to 5 PSID       | 015WB ±15 in. W.C.   |                  |                 |        |                         |             |                                    |          |            | L                    | Etched SS Tags                                      |
|          | 010PD 0 to 10 PSID      | 2R5PB ±2.5 PSID      |                  |                 |        |                         |             |                                    |          |            | M                    | Remote Full Scale Sensitivity <sup>5</sup>          |
|          | 250LD 0 to 250 Pa       | 005PB ±5 PSID        |                  |                 |        |                         |             |                                    |          |            | R                    | Remote Calibration (Adjustable) <sup>5</sup>        |
|          | 500LD 0 to 500 Pa       | 125LB ±125 Pa        |                  |                 |        |                         |             |                                    |          |            | S                    | Remote Calibration Adjustment (Fixed) <sup>5</sup>  |
|          | 10CLD 0 to 1000 Pa      | 250LB ±250 Pa        |                  |                 |        |                         |             |                                    |          |            | Y                    | Clean for Oxygen                                    |
|          | 20CLD 0 to 2000 Pa      | 500LB ±500 Pa        |                  |                 |        |                         |             |                                    |          |            |                      |   |
|          | 50CLD 0 to 5000 Pa      | 10CLB ±1000 Pa       |                  |                 |        |                         |             |                                    |          |            |                      |   |
|          | 010KD 0 to 10 kPa       | 25CLB ±2500 Pa       |                  |                 |        |                         |             |                                    |          |            |                      |   |
|          | 015KD 0 to 15 kPa       | 50CLB ±5000 Pa       |                  |                 |        |                         |             |                                    |          |            |                      |   |
|          | 035KD 0 to 35 kPa       | 75CLB ±7500 Pa       |                  |                 |        |                         |             |                                    |          |            |                      |   |
|          | 070KD 0 to 70 kPa       | 035KB ±35 kPa        |                  |                 |        |                         |             |                                    |          |            |                      |   |

<sup>1</sup>2S and 2T are for Bidirectional Pressure Ranges Only  
<sup>2</sup>2B is for Unidirectional Pressure Ranges Only  
<sup>3</sup>Y1-Y6 = Red Jacket Cable (Previously the standard for voltage outputs.)  
<sup>4</sup>Both boxes must filled in alphanumeric order:  
 • If No options: N + N  
 • If 1 option: Option Code + N  
 • If 2 options: Option Code + Option Code  
<sup>5</sup>Options M, R & S are for voltage units and Y1-Y6 Termination Codes  
<sup>6</sup>2x Thermal Effects Specification

Example: Part No. 2391001WD1F1102WLN = Model 239, 0 to 1 in. W.C. pressure range, 1/8" NPT female fitting, 4 to 20 mA Output, 2' Cable Length, ±0.14% FS Accuracy, Etched SS Tags Option

### GENERAL SPECIFICATIONS

### DIMENSIONS



### PROOF PRESSURE

| Pressure Range    |                   | Proof Pressure |               | Pressure Range |               | Proof Pressure |          |
|-------------------|-------------------|----------------|---------------|----------------|---------------|----------------|----------|
| Unidirectional    | Bidirectional     | Positive       | Negative      | Unidirectional | Bidirectional | Positive       | Negative |
| 0 to 0.5 in. W.C. | ±0.25 in. W.C.    | 5 PSI          | 2.5 in. W.C.  | 0 to 250 Pa    | ±125 Pa       | 0.5 BAR        | 1250 Pa  |
| 0 to 1 in. W.C.   | ±0.5 in. W.C.     | 7 PSI          | 5 in. W.C.    | 0 to 500 Pa    | ±250 Pa       | 0.7 BAR        | 3000 Pa  |
| 0 to 2.5 in. W.C. | ±1 in. W.C.       | 10 PSI         | 12.5 in. W.C. | 0 to 1000 Pa   | ±500 Pa       | 1.25 BAR       | 6250 Pa  |
| 0 to 5 in. W.C.   | ±2.5 in. W.C.     | 20 PSI         | 25 in. W.C.   | 0 to 2000 Pa   | ±1000 Pa      | 3.5 BAR        | 18500 Pa |
| 0 to 15 in. W.C.  | ±5 in. W.C.       | 50 PSI         | 75 in. W.C.   | 0 to 5000 Pa   | ±2500 Pa      | 3.5 BAR        | 37000 Pa |
| 0 to 30 in. W.C.  | 0 to ±15 in. W.C. | 50 PSI         | 150 in. W.C.  | 0 to 15 kPa    | ±7500 Pa      | 3.5 BAR        | 37000 Pa |
| 0 to 5 PSID       | 0 to ±2.5 PSID    | 75 PSI         | 25 PSI        | 0 to 35 kPa    |               | 5 BAR          | 1.75 BAR |
| 0 to 10 PSID      | 0 to ±5 PSID      | 100 PSI        | 50 PSI        | 0 to 70 kPa    | ±35 kPa       | 7 BAR          | 3.5 BAR  |

| Performance Data  |  | Physical Description      |  |
|---|--|---------------------------|--|
| Accuracy RSS <sup>1</sup> at constant temp  | ±0.14% FS                                | Pressure Fittings         | 1/8" -27NPT internal   |
| Non-Linearity (BFSL)  | ±0.10% FS                                | Electrical Connection     | 2' Multiconductor cable  |
| Hysteresis  | 0.10%FS                                  | Weight (approx)           | 8 oz   |
| Non-Repeatability   | 0.02% FS                                 | Vibration                 | 2g from 5 Hz to 500 Hz   |
| Warm-up Shift   | <±0.1% FS residual shift after 5 minutes | Internal Volumes          | Positive port 0.03 in <sup>3</sup> Negative port 0.1 in <sup>3</sup>                     |
| Setting Time  | <100ms                                   | Max Volume Change at FS   | 0.001 in <sup>3</sup>  |
| Acceleration Response   | <0.0002 psi/g                            | Acceleration              | 10g Max  |
| Natural Frequency   | 2000 Hz nominal                          | Shock                     | 50g Operating  |
| Operable Line Pressure  | Vacuum to Max 250 PSIG                   | Electrical Data (Current) |  |
| Line Pressure Effect  | 2%/100 PSI                               | Circuit                   | 2-Wire   |
| Thermal Effects <sup>2</sup>  |  | Output <sup>3</sup>       | 0 to 20 mA <sup>4</sup>  |
| Compensated Range °F(°C)  | +30 to +150 (-1 to -65)                  | External Load             | 0 to 1000 ohms   |
| Zero/Span Shift %FS/100°F(50°C)   | <+1 (<±0.9)/<+1 (<±0.9)                  | Min. Supply Voltage (VDC) | 17 + 0.02 x (resistance of receiver plus line)   |
|   |  | Max. Supply Voltage (VDC) | 42 + 0.004 x (resistance of receiver plus line)  |
| Environmental Data  |  | Electrical Data (Voltage) |  |
| Operating Temp. <sup>3</sup> °F (°C)  | 0 to +175 (0-18 to +80)                  | Effect of Power Supply    |  |
| Storage Temp. °F (°C)   | -65 to +250 (-55 to +120)                | Variations                | <0.003 mA/Volt   |
| Pressure Media  |  | Output Noise              | <10 microamperes RMS (0Hz to 10kHz)  |
| Positive Pressure Media: Gases compatible with stainless steel, hard anodized 6061 aluminum (Buna-N O-ring) |  | Electrical Data (Voltage) |  |
| Reference Pressure Media: Clean dry air or other gases (non-corrosive, non-condensable)                     |  | Circuit                   | 4-Wire (+Exc, -Exc, +Out, -Opt)  |
| Approvals   |  | Excitation <sup>5</sup>   | 22 to 30 VDC (reverse excitation protected)  |
| CE, RoHS  |  | Output Impedance          | <10 ohms   |
|   |  | Output Noise              | <200 microvolts RMS (in band, 0Hz to 10kHz)  |
|   |  | Output <sup>6</sup>       | See ordering information (for unidirectional ranges) ±2.5 VDC (for bidirectional ranges) |

<sup>1</sup>RSS of Non-Linearity, Hysteresis, and Non-Repeatability.  
<sup>2</sup>Units calibrated at nominal 70°F. Max thermal error computer from this datum. x2 for 0.5 and ±0.25 in W.C. changes.  
<sup>3</sup>Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.  
<sup>4</sup>Zero output factory set to within ±0.07 mA. Span (FS) output factory set to within ±0.07 mA.  
<sup>5</sup>Internal regulation minimizes effect of excitation variation, with <±0.005% FS output change. Will operate on 28VDC aircraft power per MIL-STD-704A & not be damaged by emergency power conditions.  
<sup>6</sup>Calibrated into 50K oh load. Operable into 5000 ohms or greater. Zero output factory set to within ±20mV.