

Model 239

High Accuracy, Low-Differential Pressure Transducer

setra

TEST & MEASUREMENT



DESCRIPTION

The Model 239 Series pressure transducers are designed for very low pressure applications that require high accuracy.

The variable capacitance sensor is design to be simple and reliable. The stainless steel diaphragm and insulated electrode form a variable capacitor. As pressure increases or decreases, the capacitance changes. This change is detected and converted to a linear DC electric signal by Setra's unique electronic circuit.

The Model 239 series is available in a voltage or current output. High positive overpressure protection is achieved by the sensor electrode acting as a stop for the diaphragm. The high level output signals, excellent long term stability, and fast dynamic response make these transducers ideal for a wide range of industrial, laboratory and aerospace applications.

FEATURES

- $\pm 0.14\%$ FS Accuracy
- Fast Warm-Up
- Low Thermal Effects
- Fast Response Time ($<10\text{ms}$)
- Withstands High Overpressure
- RoHS Compliant
- Meets CE Conformance Standards

APPLICATIONS

- HVAC Control
- Leak Detection
- Environmental Testing
- Medical Instrumentation
- Energy Management
- Clean Rooms

SPECIFICATIONS

Performance Data		Physical Description		Electrical Data (Voltage)	
Accuracy RSS at constant temp*	±0.14% FS	Pressure Fittings	1/8" - 27NPT internal	Circuit	4-Wire (+Exc, -Exc, +Out, -Out)
Non-Linearity, BFSI	±0.10% FS	Electrical Connection	2' Multiconductor Cable	Excitation*	22 to 30 VDC (reverse excitation protected)
Hysteresis	0.10% FS	Weight (approx)	8 oz	Output Impedance	<10 ohms
Non-Repeatability	0.02% FS	Vibration	2g from 5 Hz to 500 Hz	Output Noise	<200 microvolts RMS (in band, 0Hz to 10kHz)
Warm-Up Shift	<±0.1% FS residual shift after 5 minutes	Internal Volumes	Positive port 0.03 in ³ Reference port 0.1 in ³	Output**	See Ordering Information (for unidirectional ranges) ±2.5 VDC (for bidirectional ranges)
Settling Time	<100 ms	Max Volume Change at FS	0.001 in ³	*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. **Calibrated into 50K ohm load. Operable into 5000 ohms or greater. ***Zero output factory set to within ±20mV	
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	Environmental Data		Electrical Data (Current)	
Line Pressure Effect	2%/100 PSI	Temperature		Circuit	2-Wire
Thermal Effects**		Operating °F (°C)	0 to +175 (-18 to +80)	Output*	4 to 20 mA**
Compensated Range °F (°C)	+30 to +150 (-1 to +65)	Storage °F (°C)	-65 to +250 (-55 to +120)	External Load	0 to 1000 ohms
Zero Shift %FS/100°F(50°C)	<+1 (<±0.9)	Pressure Media		Min. Supply Voltage (VDC)	17 + 0.02 x (resistance of receiver plus line)
Span Shift %FS/100°F(50°C)	<+1 (<±0.9)	Positive Pressure Media: Gases compatible with stainless steel, hard anodized 6061 aluminum (Buna-N® O'ring)		Max. Supply Voltage (VDC)	42 + 0.004 x (resistance of receiver plus line)
*RSS of Non-Linearity, Non-Repeatability and Hysteresis **Units calibrated at nominal 70°F. Maximum thermal error computed from this datum. x 2 for 0.5 and ±0.25 in. W.C. ranges.				Reference Pressure Media: Clean dry air or other gases (non-corrosive, non-condensable)	Effect of Power Supply
		Variations	<0.003 mA/Volt		
					Output Noise

Specifications subject to change without notice

U.S. Patent No. 4093915

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

**Zero output factory set to within ± 0.07 mA. Span (FS) output factory set to within ± 0.07 mA.

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ORDERING INFORMATION

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Model		Pressure Ranges				Pressure Fitting		Output		Termination		Accuracy		Options ⁴	
2391	239	Unidirectional		Bidirectional		1F	1/8" NPT Female	11	4 to 20 mA	XX	Std Cable Length (02-25')	W	±0.14% FS	NN	None
		0R5WD	0 to 0.5 in. W.C.	R25WB	±0.25 in. W.C.			25	±2.5 VDC ¹			9	±0.073% FS	1	303SS Housing Positive Port
		001WD	0 to 1 in. W.C.	0R5WB	±0.5 in. W.C.			2B	0 to 5 VDC ²	Y1	2' Tensolite (Red) ³			3	Compensated Temp. Range (-65 to 250°F)
		2R5WD	0 to 2.5 in. W.C.	001WB	±1 in. W.C.			27	1 to 5 VDC	Y3	5' Tensolite (Red) ³			4	Viton O-Ring
		005WD	0 to 5 in. W.C.	2R5WB	±2.5 in. W.C.			28	1 to 6 VDC	Y4	10' Tensolite (Red) ³			D	Mate with Datum
		015WD	0 to 15 in. W.C.	005WB	±5 in. W.C.			2C	0 to 10 VDC	Y6	25' Tensolite (Red) ³			E	Special Excitation Voltage ±24 VDC
		030WD	0 to 30 in. W.C.	7R5WB	±7.5 in. W.C.			2Y	0 to 2.5 VDC	³ Y1-Y6 = Red Conductor Cable (previously the standard for voltage outputs.)				G	Special Excitation Voltage ±15VDC
		005PD	0 to 5 PSID	015WB	±15 in. W.C.			2T	0 to 5 VDC ¹					L	Etched SS Tags
		010PD	0 to 10 PSID	2R5PB	±2.5 PSID									M	Remote Full Scale Sensitivity ⁵
		250LD	0 to 250 Pa	005PB	±5 PSID									R	Remote Calibration (Adjustable) ⁵
		500LD	0 to 500 Pa	125LB	±125 Pa									S	Remote Calibration Adjustment (Fixed) ⁵
		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										
		10KLD	0 to 10 kPa	25CLB	±2500 Pa										
		15KLD	0 to 15 KPa	50CLB	±5000 Pa										
		35KLD	0 to 35 KPa	75CLB	±7500 Pa										
		70KLD	0 to 70 KPa	35KLB	±35 KPa										

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

⁴ Both boxes must be filled in alphanumeric order:

- If No options: N + N
- If 1 option: Option Code + N
- If 2 options: Option Code + Option Code

⁵ Options M, R & S are for voltage units and Y1-Y6 Termination Codes

¹ 25 and 2T are for Bi-Directional Pressure Ranges Only

² 2B is for Uni-Directional Pressure Ranges Only

⁴ Both boxes must be filled in alphanumeric order:

- If No options: N + N
- If 1 option: Option Code + N
- If 2 options: Option Code + Option Code

⁵ Options M, R & S are for voltage units and Y1-Y6 Termination Codes

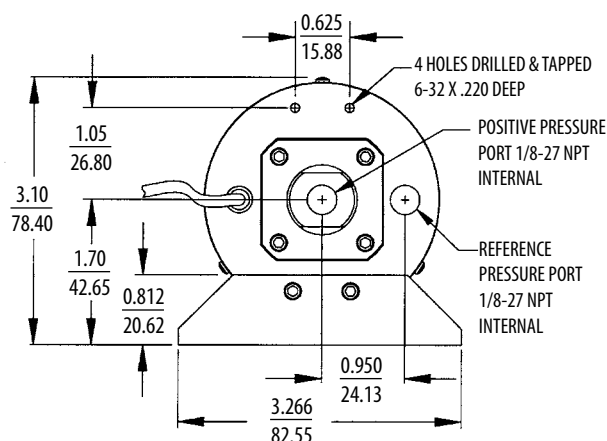
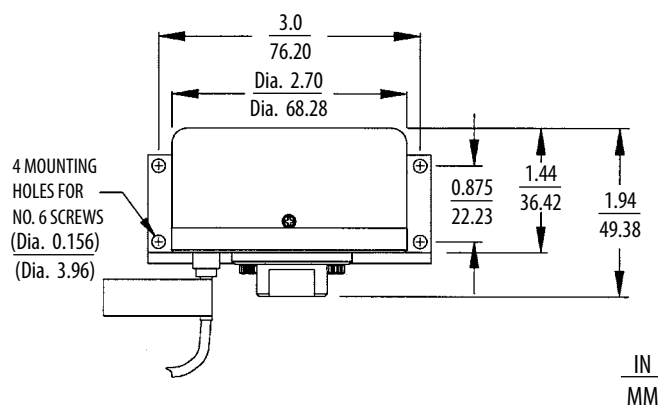
Example: Part No. 2391001WD1F1102WLN = Model 239, 0 to 1 in. W.C. pressure range, 1/8" NPT female fitting, 4 to 20 mA Output, 2' Cable Length, ±0.14% FS Accuracy, Etched SS Tags Option

PRESSURE RANGE		PROOF PRESSURE	
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 1 in. W.C.	±0.5 in. W.C.	7 PSI	5 in. W.C.
0 to 2.5 in. W.C.	±1 in. W.C.	10 PSI	12.5 in. W.C.
0 to 5 in. W.C.	±2.5 in. W.C.	20 PSI	25 in. W.C.
0 to 15 in. W.C.	±5 in. W.C.	50 PSI	75 in. W.C.
0 to 30 in. W.C.	0 to ±15 in. W.C.	50 PSI	150 in. W.C.
0 to 5 PSID	0 to ±2.5 PSID	75 PSI	25 PSI
0 to 10 PSID	0 to ±5 PSID	100 PSI	50 PSI

PRESSURE RANGE		PROOF PRESSURE	
Unidirectional	Bidirectional	Positive	Negative
0 to 250 Pa	±125 Pa	0.5 BAR	1250 Pa
0 to 500 Pa	±250 Pa	0.7 BAR	3000 Pa
0 to 1000 Pa	±500 Pa	1.25 BAR	6250 Pa
0 to 2000 Pa	±1000 Pa	3.5 BAR	18500 Pa
0 to 5000 Pa	±2500 Pa	3.5 BAR	37000 Pa
0 to 15 kPa	±7500 Pa	3.5 BAR	37000 Pa
0 to 35 kPa		5 BAR	1.75 BAR
0 to 70 kPa	±35 Pa	7 BAR	3.5 BAR

Proof Pressure: The maximum recoverable pressure that may be applied without changing performance beyond specifications ±0.5% Zero/Span shift.

DIMENSIONS



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