

228A

Differential Baratron® Capacitance Manometer with Trip Points



The 228A is a differential version of the industry-standard Baratron® Capacitance Manometer. It is designed to accurately measure differential pressures and vacuum from 1000 to 0.2 Torr (133 to 0.027 kPa) and provides two (2) independently-adjustable trip relays for control of external equipment and components. The patented capacitance sensor is built entirely from Inconel® nickel alloys on its measurement side, which offers superior corrosion resistance over long periods of time. Because the sensor operates by measuring the capacitance shift between a diaphragm exposed to the process and an electrode disk (rather than measuring the property of the gas), it is not sensitive to gas composition, and thus eliminates the need for gas-specific correction factors. The product can be used to measure either the true differential pressure or vacuum between two locations, or the reference side of the product can be left open to provide a true reference to local atmospheric pressure. Applications

include air and gas flow measurements for filters and analytical systems, downstream pressure control in thin film processing systems, and automated leak testing systems.

The 228A provides both a high-level analog output signal that is linear with pressure and two (2) trip relays. It can operate on either $\pm 15\text{VDC}$ or $+24\text{VDC}$ input voltage, and it offers three (3) different analog output signals for use in nearly any control or data acquisition system. The product can be equipped with any of twelve (12) industrial fittings on either the measurement or reference sides, including common industrial and semiconductor-industry standards like VCR®, NW-KF, VCO®, and NPT. The sensor and electronics are mounted in a rugged industrial-grade housing that has high immunity and isolation from RF and EM interference.

Product Features

- Fully-welded Inconel diaphragm sensor offers high resistance to corrosion for use in many difficult applications – no mercury, silicone, or hydrocarbon-based fluids are used
- Differential measurement ranges from 1000 to 0.2 Torr (133 to 0.027 kPa) allows accurate, repeatable characterization of very small pressure drops and flow rates
- Two (2) UL-approved trip relays independently adjustable from -100% to +100% of Full Scale measurement range
- Three different analog output signals (0-1V, 0-5V, and 0-10V) in either unidirectional or bidirectional calibrations



Key Benefits

- Direct pressure measurement is not affected by gas composition
- Input voltage of either $\pm 15\text{VDC}$ or $+24\text{VDC}$ for use in a wide variety of processing systems
- Rugged, industrial-grade design suitable for use in applications with high levels of RF/EM interference

Specifications

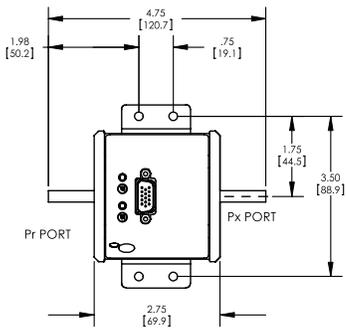
Full Scale Ranges		0.2, 1, 2, 5, 10, 20, 50, 100, 200, and 1000 Torr and equivalents in kPa, mbar, inches H ₂ O, and cm H ₂ O
Resolution		0.01% of Full Scale
Accuracy¹		<ul style="list-style-type: none"> • 0.50% of Full Scale unidirectional or bidirectional standard • 0.30% of Full Scale unidirectional or bidirectional • 0.30% of Reading (unidirectional only) optional
Temperature Coefficient	Zero Span	<ul style="list-style-type: none"> • 0.1% Full Scale/°C for standard accuracy specification • 0.04% of Reading/°C
Ambient Operating Temperature		0° to 50°C
Maximum Overpressure	Measurement Side Reference Side	<ul style="list-style-type: none"> • 120% of Full Scale or 20 psi (140 kPa), whichever is higher • 120% of Full Scale
Maximum Line Pressure		40 psig (275 kPa)
Materials Exposed to Process Gases	Measurement Side Reference Side	<ul style="list-style-type: none"> • Inconel • Inconel, ceramic, palladium, stainless steel, glass
Sensor Internal Volume	Measurement Side Reference Side	<ul style="list-style-type: none"> • 1.4 cm³ • 9.0 cm³
Warmup Time		30 minutes
Input Power		±15VDC (±5%) or +16 to +30VDC @ 75 mA, ripple less than 20 mV
Output Signal		0 - 1VDC, 0 - 5VDC, or 0 - 10VDC ¹ > 10 k Ω load
Trip Relays		Two (2) process pressure trip relays, independently adjustable from -100% to +100% of Full Scale. DPDT contacts rated at 1.0 amps at 30VDC or 0.3 amps at 120VAC. Relays conform to UL-1950 Basic Insulation at 125V. Internally mounted, externally adjustable by customer.
Electrical Connector		15-pin high-density D-subminiature
Fittings²	Standard Optional	<ul style="list-style-type: none"> • ¼" OD (6.4 mm) tubes • 3/16" OD (4.8 mm) tubes, 4 male VCR®, 4 female VCR, 4 male VCO®, 4 female VCO, NW16-KF, 1.33" OD (33.8 mm) Conflat®, 1/8" male and female NPT, 1/4" male and female NPT
Compliance³		CE, SEMI S2-0706

Notes:

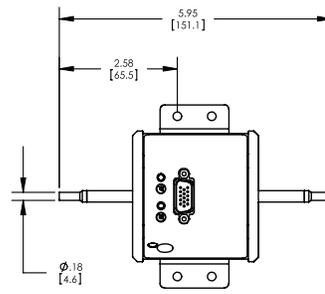
¹ 0-10 VDC bidirectional output signal not available with +24VDC input voltage.

² When used with an overall metal braided shielded cable, properly grounded at both ends.

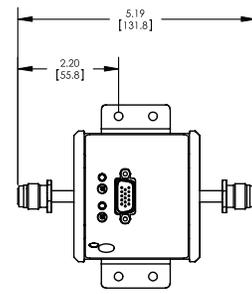
³ When equipped with standard 1/4-inch (6.4 mm) O.D. inlet and reference tubes



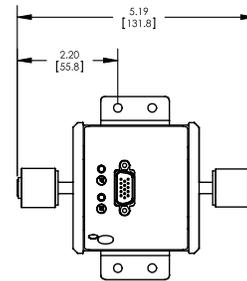
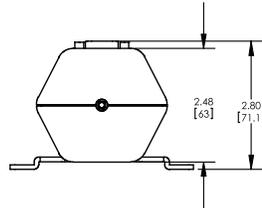
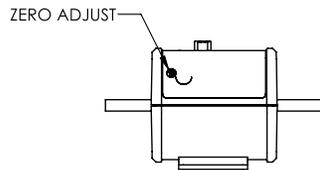
1/4" TUBE STUB
FITTING CODE "BB"



3/16" TUBE STUB
FITTING CODE "BG"



MALE VCR
FITTING CODE "CB"



FEMALE VCR
FITTING CODE "CD"

Dimensional Drawings

Note: Unless otherwise specified, dimensions are nominal values in inches (mm referenced).

Ordering Code Example: 228AXXXYYZZQSSTVRR						Code	Configuration
Model							
228A Baratron Differential Capacitance Manometer						228A	228A
Pressure Ranges (XXX)							
	Torr	mbar	kPA	inH ₂ O	cmH ₂ O		
0.02	-	-	U2K	-	-		
0.1	-	-	.1K	.1W	-		
0.2	.2T	.2M	.2K	-	.2R		
0.5	-	-	.5K	.5W	-		
1	01T	01M	01K	01W	01R		
2	02T	02M	02K	02W	02R		
5	05T	05M	05K	05W	05R		
10	11T	11M	11K	11W	11R	11T	11T
20	21T	21M	21K	21W	21R		
50	51T	51M	-	51W	51R		
100	12T	12M	12K	12W	12R		
200	22T	22M	-	-	22R		
500	-	-	-	52W	-		
1000	13T	13M	-	-	13R		
Reference Side Fitting (YY)							
1/4" OD tube						BB	
3/16" OD tube						BG	
4 male VCR						CB	
4 female VCR						CD	
4 male VCO						DC	
4 female VCO						DD	
1/4" female NPT						FA	
1/4" male NPT						FB	
1/8" male NPT						FE	
1/8" female NPT						FF	
NW16-KF						GA	
1.33" OD Conflat						HA	CD
Measurement Side Fitting (ZZ)							
1/4" OD tube						BB	
3/16" OD tube						BG	
4 male VCR						CB	
4 female VCR						CD	
4 male VCO						DC	
4 female VCO						DD	
1/4" female NPT						FA	
1/4" male NPT						FB	
1/8" male NPT						FE	
1/8" female NPT						FF	
NW16-KF						GA	
1.33" OD Conflat						HA	CD
Accuracy (Q)							
0.50% Full Scale (standard)						F	
0.30% Full Scale						K	F
0.30% Reading (unidirectional calibrations only)						S	
Input/Output and Calibration (SS)							
±15 VDC input/0-1 VDC bidirectional output						B1	
±15 VDC input/0-10 VDC bidirectional output						B2	
±15 VDC input/0-5 VDC bidirectional output						B3	
+24 VDC input/0-1 VDC bidirectional output						B5	
+24 VDC input/0-5 VDC bidirectional output						B7	
±15 VDC input/0-1 VDC unidirectional output						U1	B2
±15 VDC input/0-10 VDC unidirectional output						U2	
±15 VDC input/0-5 VDC unidirectional output						U3	
+24 VDC input/0-1 VDC unidirectional output						U5	
+24 VDC input/0-5 VDC unidirectional output						U7	
Electrical Connector (T)							
15-pin high-density D-subminiature						C	C
Mounting (V)							
No bracket						0	
Mounting bracket, standard						1	1
Mounting bracket, slotted						2	
Trip Relay Settings (RR)							
Trip A above 50% Full Scale, Trip B above 50% Full Scale* (default setting)						AA	
Trip A above 50% Full Scale, Trip B below 50% Full Scale*						AB	
Trip A below 50% Full Scale, Trip B below 50% Full Scale*						BB	BB
Trip A below 50% Full Scale, Trip B above 50% Full Scale*						BA	
*Contact factory for alternate trip relay settings							