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Pressure & Vacuum Measurement Solutions

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High Accuracy Systems

690A AND 698A SENSORS
670B SIGNAL CONDITIONER

The High Accuracy Baratron® Pressure Measurement Systems combine advanced capacitance diaphragm sensor technology and solid state electronics with the features demanded by today's process and metrology engineers to make precision pressure measurement easy – whether on the production line or in the research or metrology laboratory. If your principal concern is accurate pressure measurement, or you need to measure pressure over a very wide range, the High Accuracy Systems are ideal solutions. Long considered standards of pressure measurement in both industry and research, high accuracy Baratron systems are completely modular with a full selection of pressure ranges, levels of accuracy, options, and accessories that ensure there is a system exactly right for your application.

690A Absolute 698A Differential

All high-accuracy sensors are single-ended dual-electrode/AC bridge devices that are extremely stable and designed to minimize the effect of temperature changes. They measure pressure from 25,000 mmHg (500 psi) to 10^{-5} mmHg, with accuracies ranging from 0.25% to 0.05% of Reading. Models are available in absolute and differential configurations, and bakeable versions are offered for use in ultrahigh vacuum or high temperature applications. They are constructed of Inconel® and stainless steel, allowing use with many wet, dirty, or corrosive gases. The 690 and 698 are designed for high accuracy pressure measurements in process or metrology environments. By incorporating temperature control into the head, the accuracy is improved to as high as 0.05% of Rdg. The 690 absolute and 698 differential operate at 45°C.

690A/698A Features & Benefits

- Excellent thermal stability due to extremely low temperature coefficients
- Highest accuracy pressure measurement instruments available
- Designed for use with 670B Signal Conditioner
- Ideal for calibration Transfer Standards
- Six decades of measurement often eliminates several transducers with limited resolution

690A Absolute

Pressure Ranges (mmHg F.S.)	Resolution (of F.S.)	Accuracy % of Rdg. (± temp. coeff.)	Useable Measurement Range (F.S. to)	Temp. Coefficients		Volume (cc)		Maximum Over-pressure	Maximum Line Pressure	Operating Temperature Range (°C)	Materials Exposed to Gases		Fittings
				Zero (F.S.°C)	Span (Rdg. °C)	Px	Pr				Px	Pr	
0.1	1×10^{-6}	S: 0.12%	$2^{-3} \times 10^{-5}$	30 ppm	100 ppm	2.5	N/A	40 psia	N/A	15° - 40°C	Inconel, Stainless Steel	N/A	Swagelok® 4 VCR®
		O: 0.08%	1×10^{-5}	30 ppm	100 ppm								
1 10 100 1000	1×10^{-6}	S: 0.12%	$2^{-3} \times 10^{-5}$	15 ppm	20 ppm	2.5	N/A	45 psia	N/A	temperature regulated at 45°C			
		O: 0.08%	1×10^{-5}	4 ppm	20 ppm								
		O: 0.05%	1×10^{-5}	4 ppm	20 ppm								
5000 10000 15000 20000 25000	1×10^{-6}	S: 0.12% O: 0.08%	$2^{-3} \times 10^{-5}$ 1×10^{-5}	15 ppm 4 ppm	20 ppm 20 ppm	14	N/A	125% F.S.	N/A				

698A Differential

0.1	1×10^{-6}	S:0.12%	$2^{-3} \times 10^{-5}$	30 ppm	100 ppm	3.5	25	40 psid[2]	150 psig	15° - 40°C	Inconel, Stainless Steel	Inconel, Stainless Steel, Alumina, Palladium Glass	Swagelok 4 VCR
		O: 0.08%	1×10^{-5}	30 ppm	100 ppm								
1 10 100 1000	1×10^{-6}	S: 0.12%	$2^{-3} \times 10^{-5}$	15 ppm	20 ppm	3.5	25	45 psid[2]	150 psig	temperature regulated at 45°C			
		O: 0.15%[1]	1×10^{-5}	4 ppm	20 ppm								
		S: 0.25%	1×10^{-5}	4 ppm	20 ppm								
		O: 0.08%	1×10^{-5}	4 ppm	20 ppm								
		O: 0.05%	1×10^{-5}	4 ppm	20 ppm								

S = Standard accuracy for particular range/calibration. O = Optional accuracy for particular range/calibration.

Notes:

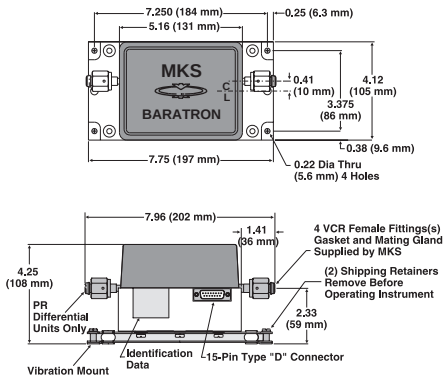
[1] 0.15% of Reading and 0.25% of Reading accuracies on 698 sensors are for bidirectional calibrations.

[2] For differential sensors: overpressure limits specified in above table are only for Px > Pr. For reverse overpressure (Pr > Px) on differential sensors, overpressure limit is 125% of F.S.

Ordering Information

690A Ordering Code Example: 690A11TRC	Code	Configuration
690 Absolute Pressure Sensor	**690A**	690A
Pressure Range (mmHg)		
0.1 mmHg (690 only)	.1T	11T
1 mmHg	01T	
10 mmHg	11T	
100 mmHg	12T	
1000 mmHg	13T	
5000 mmHg	53T	
10,000 mmHg	14T	
15,000 mmHg	RBT	
20,000 mmHg	24T	
25,000 mmHg	RCT	
Fittings		
Swagelok 4 VCR female	R	R
Accuracy		
±0.12% of Reading	C	C
±0.08% of Reading	B	
±0.05% of Reading (1-1000 mmHg ranges)	A	

698A Ordering Code Example: 698A11TRC	Code	Configuration
698 Differential Pressure Sensor	**698A**	698A
Pressure Range (mmHg)		
0.1 mmHg	.1T	11T
1 mmHg	01T	
10 mmHg	11T	
100 mmHg	12T	
1000 mmHg	13T	
Fittings		
Swagelok 4 VCR female	R	R
Accuracy		
Unidirectional Calibration		C
±0.12% of Reading	C	
±0.08% of Reading	B	
±0.05% of Reading (1-1000 mmHg ranges only)	A	
Bidirectional Calibration		
±0.25% of Reading (1-1000 mmHg ranges only)	E	
±0.15% of Reading (1-1000 mmHg ranges only)	D	



Dimensional Drawing — 690 and 698

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

670B Electronics/Display Unit



The 670B Display Unit has a front panel that allows for full control of all the instrument's features. All functions can be monitored and controlled via the RS-232 or IEEE-488 interface. Range switching may be done manually or automatically with the 670B, selecting the lowest possible on-scale range. A key-lock switch on the front panel determines Local or Remote control. The 670B may be used with any sensor Full Scale and will display pressure in any one of 12 engineering units. Sensor response time may be set for 1, 40, or 400 msec, and a data averaging feature allows the user to average signals from 0.1 to 10 seconds, to optimize the pressure readings for transients or noisy pressures.

670B Features & Benefits

- Microprocessor-based electronics unit provides power, signal conditioning, and display for operating all High Accuracy Baratron pressure sensors
- Analog and digital input/output signals facilitate interfacing to computers and process control systems
- Two built-in alarm relays provide process pressure trip points

670B Specifications

Compatible Sensors & Ranges	690 and 698 from 0.1 to 25,000 mmHg (Torr) F.S.
Display	2-line LCD, readings updated twice/second
Resolution	3½, 4½, or 5½ digits, user-selectable (Note: Useable system resolution depends upon sensor choice and application.)
Engineering Units	Torr, mTorr, mmHg, mbar, Pa, kPa, inHg, inH_20, cmH_20, psi, % of F.S., ppm of F.S. (All user-selectable)
Ranges	x1, x0.1, x0.01 of sensor F.S., manual or auto-ranging
Response Time	1, 40, or 400 msec, user-selectable
Data Averaging	0.1 to 10 sec, user-selectable
Outputs	
Analog	0 to ±10 VDC on each range into >10K Ω load
Impedance	<1
Connectors	I/O: 37-pin female Type "D", Remote signal: 9-pin male Type "D"
Digital	
RS-232 Connector	9-pin male Type "D"
IEEE-488 Connector	24-pin female IEEE-488. 1 standard pin assignment.
Process Trip Point Relays	Two, 24 VAC/DC @ 1 Amp resistive (contact ratings) Two LEDs on front panel indicate status of each relay
Operating Temperature Range	15° to 40° C
Power Required	90-132 or 180-264 VAC, 50-60 Hz, 75 VA (max.) IEC-AC power line connector
Size	88 mm H x 240 mm W x 234 mm D (3.5" H x 9.5" W x 9.25" D)

670B Ordering Information

Ordering Code Example: 670Bxyz	Code	Configuration
670B Electronics/Display Unit 670B		670B
Interface (xyz)		
RS-232	D21	D21
IEEE-488	D81	

Accessories

Rack Mounts

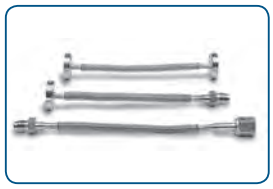
The RM-6 Rack Mount Kit is used to adapt any half-rack instrument (3 1/2” x 9 1/2”) to full-rack size (3 1/2” x 19”).

Isolation Valves



To decrease the frequency of zero adjustment, it is recommended that a simple manual or air-actuated bellows-type isolation valve, such as MKS Part No. 108818 (NC11 Cleaned), be installed between a low range absolute sensor head and the processing system.

Bellows Adapters



Frequently it is desirable, because of mechanical configuration or system vibration, to attach the Baratron sensor to the processing system using flexible bellows couplings. All flexible tubing is 321 stainless steel, 1/4” diameter, and available in 6” and 12” active bellows lengths. The use of flexible bellows minimizes thermal expansion effects on sensor zero induced by hard plumbing to the system.

274B Three-channel Sensor Multiplexer



The 274B provides operation of one, two, or three high accuracy sensors with a single 670 Electronics Unit. The 274B provides heater power for temperature-controlled sensors (690, 698). All sensors are kept warmed up and ready for reading by the 670. The 670 can sequentially read any one of the sensors, as selected by a switch on the 670’s front panel, or by a remote ground closure.

274B Ordering Information

Ordering Code Example: 274B	Code	Configuration
274B **Three-Channel Sensor Multiplexer**	**274B**	274B

Cable Information

670B or 274B Sensor to 690A or 698A Sensors	RCB270S-2-10 (10ft, shielded)
(also works for older 390, 398, 590, 690 and 698)	RCB270S-2-20 (20ft, shielded)

For cables longer than 20 ft, Consult Factory.

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High Accuracy - 1/18
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