



# 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 x 10 <sup>-6</sup>	S: 0.12%	2 <sup>-3</sup> x 10 <sup>-5</sup>	30 ppm	100 ppm	2.5	N/A	40 psia	N/A	15° - 40°C			
		O: 0.08%	1 x 10 <sup>-5</sup>	30 ppm	100 ppm								
1 10 100 1000	1 x 10 <sup>-6</sup>	S: 0.12%	2 <sup>-3</sup> x 10 <sup>-5</sup>	15 ppm	20 ppm	2.5	N/A	45 psia	N/A	temperature regulated at 45°C	Inconel, Stainless Steel	N/A	Swagelok® 4 VCR®
		O: 0.08%	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								
		O: 0.05%	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								
5000 10000 15000 20000 25000	1 x 10 <sup>-6</sup>	S: 0.12%	2 <sup>-3</sup> x 10 <sup>-5</sup>	15 ppm	20 ppm	14	N/A	125% F.S.	N/A				
		O: 0.08%	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								

# 698A Differential

0.1	1 x 10 <sup>-6</sup>	S: 0.12%	2 <sup>-3</sup> x 10 <sup>-5</sup>	30 ppm	100 ppm	3.5	25	40 psid <sup>(2)</sup>	150 psig	15° - 40°C			
		O: 0.08%	1 x 10 <sup>-5</sup>	30 ppm	100 ppm								
1 10 100 1000	1 x 10 <sup>-6</sup>	S: 0.12%	2 <sup>-3</sup> x 10 <sup>-5</sup>	15 ppm	20 ppm	3.5	25	45 psid <sup>(2)</sup>	150 psig	temperature regulated at 45°C	Inconel, Stainless Steel	Inconel, Stainless Steel, Alumina, Palladium Glass	Swagelok 4 VCR
		O: 0.15% <sup>(1)</sup>	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								
		S: 0.25%	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								
		O: 0.08%	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								
		O: 0.05%	1 x 10 <sup>-5</sup>	4 ppm	20 ppm								

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

Notes:

<sup>(1)</sup> 0.15% of Reading and 0.25% of Reading accuracies on 698 sensors are for bidirectional calibrations.

<sup>(2)</sup> 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)

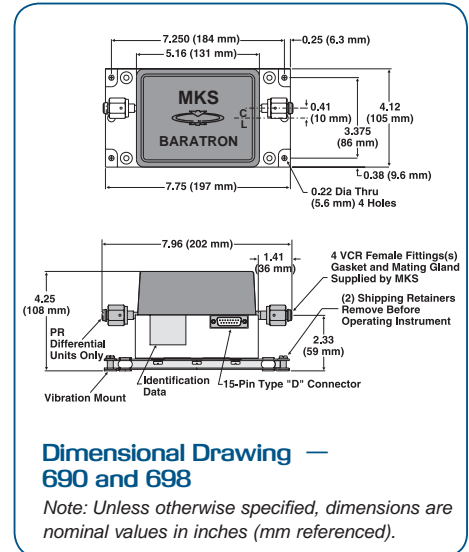
0.1 mmHg	.1T	11T
1 mmHg	01T	
10 mmHg	11T	
100 mmHg	12T	
1000 mmHg	13T	

### 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

#### Display

Resolution

Engineering Units

#### Ranges

#### Response Time

#### Data Averaging

#### Outputs

##### Analog

Impedance  
Connectors

##### Digital

RS-232 Connector  
IEEE-488 Connector

### Process Trip Point Relays

### Operating Temperature Range

### Power Required

### Size

690 and 698 from 0.1 to 25,000 mmHg (Torr) F.S.

2-line LCD, readings updated twice/second

3½, 4½, or 5½ digits, user-selectable (Note: Useable system resolution depends upon sensor choice and application.)

Torr, mTorr, mmHg, mbar, Pa, kPa, inHg, inH<sub>2</sub>O, cmH<sub>2</sub>O, psi, % of F.S., ppm of F.S. (All user-selectable)

x1, x0.1, x0.01 of sensor F.S., manual or auto-ranging

1, 40, or 400 msec, user-selectable

0.1 to 10 sec, user-selectable

0 to ±10 VDC on each range into >10K Ω load

<1

I/O: 37-pin female Type "D", Remote signal: 9-pin male Type "D"

9-pin male Type "D"

24-pin female IEEE-488. 1 standard pin assignment.

Two, 24 VAC/DC @ 1 Amp resistive (contact ratings)

Two LEDs on front panel indicate status of each relay

15° to 40° C

90-132 or 180-264 VAC, 50-60 Hz, 75 VA (max.) IEC-AC power line connector

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

IEEE-488

D81

D21



## 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.*



#### MKS Instruments, Inc. Global Headquarters

2 Tech Drive, Suite 201  
Andover, MA 01810  
Tel: 978.645.5500  
Tel: 800.227.8766 (in U.S.A.)  
Web: www.mksinst.com

#### MKS Instruments, Inc. Pressure & Vacuum Measurement Solutions

Six Shattuck Road  
Andover, MA 01810  
Tel: 978.975.2350