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 10⁻⁶ 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

<table>
<thead>
<tr>
<th>Pressure Ranges (mmHg F.S.)</th>
<th>Resolution of F.S.</th>
<th>Accuracy % of Rdg. (± temp. coeff.)</th>
<th>Useable Measurement Range (F.S. to)</th>
<th>Temp. Coefficients</th>
<th>Volume (cc)</th>
<th>Maximum Over-pressure</th>
<th>Maximum Line Pressure</th>
<th>Operating Temperature (°C)</th>
<th>Materials Exposed to Gases</th>
<th>Fittings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>1 x 10^-4</td>
<td>S: 0.12%</td>
<td>2 x 10^{-5}</td>
<td>30 ppm</td>
<td>100 ppm</td>
<td>2.5</td>
<td>N/A</td>
<td>40 psia</td>
<td>Inconel, Stainless Steel</td>
<td>Swagelok® 4 VCR²</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O: 0.08%</td>
<td>1 x 10^-4</td>
<td>30 ppm</td>
<td>100 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)
- 1 mmHg
- 10 mmHg
- 100 mmHg
- 1000 mmHg
- 5000 mmHg
- 10,000 mmHg
- 15,000 mmHg
- 20,000 mmHg
- 25,000 mmHg

**Fittings:**
- Swagelok 4 VCR female

**Accuracy:**
- ±0.12% of Reading
- ±0.08% of Reading (1-1000 mmHg ranges)
- ±0.05% of Reading (1-1000 mmHg ranges)

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## 698A Differential

<table>
<thead>
<tr>
<th>Pressure Ranges (mmHg)</th>
<th>Resolution of F.S.</th>
<th>Accuracy % of Rdg. (± temp. coeff.)</th>
<th>Useable Measurement Range (F.S. to)</th>
<th>Temp. Coefficients</th>
<th>Volume (cc)</th>
<th>Maximum Over-pressure</th>
<th>Maximum Line Pressure</th>
<th>Operating Temperature (°C)</th>
<th>Materials Exposed to Gases</th>
<th>Fittings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>1 x 10^-4</td>
<td>S: 0.12%</td>
<td>2 x 10^{-5}</td>
<td>30 ppm</td>
<td>100 ppm</td>
<td>3.5</td>
<td>25</td>
<td>40 psid²</td>
<td>Inconel, Stainless Steel</td>
<td>Swagelok 4 VCR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O: 0.08%</td>
<td>1 x 10^-4</td>
<td>30 ppm</td>
<td>100 ppm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

**698A Ordering Code Example:** 698A11TRC | Code | Configuration
---|---|---
698 Differential Pressure Sensor | 698A | 698A

**Pressure Range (mmHg):**
- 0.1 mmHg (690 only)
- 1 mmHg
- 10 mmHg
- 100 mmHg
- 1000 mmHg
- 5000 mmHg
- 10,000 mmHg
- 15,000 mmHg
- 20,000 mmHg
- 25,000 mmHg

**Fittings:**
- Swagelok 4 VCR female

**Accuracy:**
- ±0.12% of Reading
- ±0.08% of Reading (1-1000 mmHg ranges)
- ±0.05% of Reading (1-1000 mmHg ranges)

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

### 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 Ordering Information

<table>
<thead>
<tr>
<th>Ordering Code Example: 670Bxyz</th>
<th>Code</th>
<th>Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>670B Electronics/Display Unit 670B</td>
<td></td>
<td>670B</td>
</tr>
<tr>
<td>Interface (xyz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS-232</td>
<td>D21</td>
<td>D21</td>
</tr>
<tr>
<td>IEEE-488</td>
<td>D81</td>
<td></td>
</tr>
</tbody>
</table>
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.