Series 947
DIGITAL CONVECTION-ENHANCED PIRANI VACUUM SENSOR SYSTEM

Features and Benefits
- 1.0 x 10⁻³ to 1.0 x 10⁺³ Torr measurement range for rough to medium vacuum applications
- Fewer controls for simplified operation and lower cost
- LED digital display for wider angle viewing and visibly clearer, unmistakable readings
- Rapid responsiveness for applications in which speed is important
- Two independent relay set points are standard for process control
- LED set point status indicators
- Available in models that measure in Torr, millibar, Pascal, or microns
- Sensor gives highly reliable and repeatable pressure measurements
- Gas-type sensitivity useful for leak detection

Applications
With a wide measurement range of 10⁻³ to 10⁻³ Torr, the HPS® Series 947 Convection-Enhanced Pirani Controller is ideal for rough to medium vacuum applications. This includes measurement of roughing and foreline pressures, activation of high vacuum sensors, or start-up of a system process with the standard relay set points.

The Series 947 Controller is not only suitable for all vacuum industrial applications such as semiconductor or food processing, but also analytical applications and research. It is useful as either a small system controller or as a module in more sophisticated pressure control environments.

Description
Series 947 Convection-Enhanced Pirani Controller
The Series 947 Convection-Enhanced Pirani Controller offers many standard features at a low price, and is easy to use. An analog output signal proportional to pressure is standard and is accessible from the rear of the controller.
Processes are controlled with two independent relay set points that are standard on this single-channel controller. The relays can be set to trip anywhere within the controller's set point range.

All of the operating controls are conveniently accessible from the front panel of the controller, including the power on-off switch.

Adjust set points from the front panel while viewing the large, easy-to-read display. Set point activation is shown with red LED indicators. Set points can be checked at any time with no break in process control.

Atmosphere and zero adjustment potentiometers are also located on the front panel for quick controller calibration when interchanging sensors.

Choose a Series 947 Controller in one of four models that measures either in Torr, millibar, Pascal, or microns. The 947 is ready for benchtop use or can easily be mounted in a standard ¼ DIN panel cutout. Installation is quick and easy with the optional mounting kit.

Included with the Series 947 Controller is a power cord, an accessory connector kit, and an instruction manual. The Convection-Enhanced Pirani Sensor and its cable are ordered separately.

**317 Convection-Enhanced Pirani Sensor**

The 317 Convection-Enhanced Pirani Sensor provides dependable and stable pressure measurement at a very low cost.

Since the only materials exposed to vacuum are stainless steel, nickel, glass, and platinum, the sensor is compatible with a wide array of process gases and is especially suitable for UHV applications. The platinum filament effectively eliminates any reading variance throughout a convection sensor's higher measuring range.

More accurate than a thermocouple sensor, the 317 Sensor measures over a wider pressure range and responds more rapidly to process pressure changes.

The upper measuring limit of a convection-enhanced Pirani sensor is increased over that of a traditional Pirani sensor from 100 Torr to 1,000 Torr. This higher limit is useful when monitoring the pumpdown of a vacuum system from atmosphere to a base pressure. The sensor compensates for any changes in room temperature ranging from 10° to 50°C.

Like all thermal conductivity sensors, the 317 sensor is innately gas-type sensitive. This feature makes it a simple solution for locating medium to fine leaks in vacuum systems. It complements a mass spectrometer leak detector, which is more efficient in finding smaller leaks.

The sensor, which is shielded against RF noise, meets CE mark requirements and can be baked to 100°C. A version of the sensor that can be baked to 250°C is also available.

Eight mounting options for the 317 Sensor include standard vacuum connections such as KF 16 and 2¾" CF flanges. Other flange types are available if requested.

With cables available in standard lengths up to 50 feet, the 317 Sensor can be installed remotely from the Series 947 Controller. Custom lengths up to 500 feet are also available.
### Specifications & Dimensions

#### Series 947 Controller

- **Measuring Range**
  - 1.0 x 10⁻³ to 1.0 x 10⁻¹ Torr
  - 1.3 x 10⁻³ to 1.3 x 10⁻² mbar
  - 1.3 x 10⁻¹ to 1.3 x 10² Pascal
  - 1.0 to 1.0 x 10⁴ microns

- **Set Point Range**
  - 2.0 x 10⁻³ to 9.9 x 10⁻¹ Torr
  - 2.7 x 10⁻³ to 1.3 x 10⁻¹ mbar
  - 2.7 x 10⁻¹ to 1.3 x 10⁵ Pascal
  - 2.0 to 9.9 x 10⁴ microns

- **Operating Temperature**
  - 5° to 40°C (41° to 104°F)

- **Power Requirements**
  - 90 to 130 VAC, 50/60 Hz or
  - 210 to 250 VAC, 50/60 Hz, 9 watts

- **Resolution**
  - 1% of indicated decade

- **Relays**
  - 2 relays, SPDT

- **Analog Output**
  - 0.33 to 5.63 VDC, buffered analog, 1kΩ maximum output impedance

- **Front Panel Controls**
  - Two set points with LEDs, pushbuttons, and potentiometers; power switch; zero adjustment; atmospheric adjustment

- **Display**
  - Red LED display; 0.6” high readout of 2 digits and 1 exponent; units shown in either Torr, mbar, Pascal or microns

- **Weight (with KF25 Flange)**
  - 2.2 lb (1.0 kg)

- **CE Certification**
  - 89/336/EEC EMC Directive

#### Series 317 Convection Pirani Sensor (Shielded)

- **Sensor Construction**
  - Stainless steel, nickel, glass, platinum (materials exposed to vacuum)

- **Reproducibility**
  - 5% of indicated pressure

- **Cables & Connectors**
  - Maximum length is 500 ft
  - 9 pin D-sub connectors, multi-conductor shielded cable

- **Operating Temperature**
  - 0° to 50°C (32° to 122°F)

- **Bakeout Temperature**
  - 100°C (212°F) shielded version

- **Gas Calibration**
  - Air/nitrogen

- **Installation**
  - Horizontal

- **Weight**
  - 0.5 lb (0.2 kg)

#### 317 Convection Pirani

**Size**

- NW 16 KF: 2.76 (70)
- NW 25 KF: 2.76 (70)
- 1 1/2” CF: 3.06 (78)
- 2 1/2” CF: 2.73 (69)
- 8 VCR®-F: 2.83 (72)
- 4 VCR®-F: 2.51 (64)
- ¼” NPT-F: 2.93 (74)
- 15 & 18 mm: 3.19 (81)

**Weight**

- 0.5 lb (0.2 kg)
### Ordering Information

#### Series 947 Convection-Enhanced Pirani Controller

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>947-A-120-TR</td>
<td>Series 947 Controller, 120 volts, Torr readout</td>
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<tr>
<td>947-A-220-TR</td>
<td>Series 947 Controller, 220 volts, Torr readout</td>
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<tr>
<td>947-A-120-MC</td>
<td>Series 947 Controller, 120 volts, micron readout</td>
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<td>947-A-220-MC</td>
<td>Series 947 Controller, 220 volts, micron readout</td>
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<tr>
<td>947-A-120-PA</td>
<td>Series 947 Controller, 120 volts, Pascal readout</td>
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<tr>
<td>947-A-220-PA</td>
<td>Series 947 Controller, 220 volts, Pascal readout</td>
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<tr>
<td>947-A-120-MB</td>
<td>Series 947 Controller, 120 volts, mbar readout</td>
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<td>947-A-220-MB</td>
<td>Series 947 Controller, 220 volts, mbar readout</td>
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#### Series 317 Shielded Convection-Enhanced Pirani Sensor

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<th>Description</th>
<th>Price</th>
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<tbody>
<tr>
<td>103170010SH</td>
<td>Series 317 Sensor, Shielded, NW 16 KF</td>
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<td>103170011SH</td>
<td>Series 317 Sensor, Shielded, ¼&quot; NPT-M</td>
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<td>103170012SH</td>
<td>Series 317 Sensor, Shielded, 8 VCR®-F</td>
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<td>103170013SH</td>
<td>Series 317 Sensor, Shielded, Mini 1½&quot; CF</td>
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<td>103170014SH</td>
<td>Series 317 Sensor, Shielded, 2¼&quot; CF</td>
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<td>103170016SH</td>
<td>Series 317 Sensor, Shielded, 15 mm. tube</td>
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<td>103170018SH</td>
<td>Series 317 Sensor, Shielded, 18 mm. tube</td>
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<td>Series 317 Sensor, Shielded, NW 25 KF</td>
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<td>Series 317 Sensor, Shielded, 4 VCR®-F</td>
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#### Cables

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<th>Description</th>
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<tr>
<td>103170006SH</td>
<td>10 ft (3.0 m)</td>
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<td>103170007SH</td>
<td>25 ft (7.6 m)</td>
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<td>50 ft (15.2 m)</td>
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<td>103170009SH</td>
<td>Custom Cable (maximum length 500 ft.)</td>
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#### Accessories

<table>
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<th>Part Number</th>
<th>Description</th>
<th>Price</th>
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<tr>
<td>103150001</td>
<td>Power cord, 115 VAC</td>
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<tr>
<td>100005021</td>
<td>Mounting hardware</td>
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<td>109470020</td>
<td>Series 947 User’s Manual</td>
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<td>100005456</td>
<td>Rack panel, 19&quot;, 3U, ⅛ DIN, blank</td>
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<td>100005457</td>
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<td>100005458</td>
<td>Rack panel, 19&quot;, 3U, ⅛ DIN, 2 cutouts</td>
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<td>100005459</td>
<td>Rack panel, 19&quot;, 3U, ⅛ DIN, 3 cutouts</td>
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<tr>
<td>100005460</td>
<td>Rack panel, 19&quot;, 3U, ⅛ DIN, 4 cutouts</td>
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* Includes controller, power cord, manual and output connector.

* VCR®-compatible parts may be used.