



Pressure &

Vacuum Measurement Solutions

WWW.MKSINST.COM

Series 345 & 945

PIRANI VACUUM SENSOR AND CONTROLLER

The Series 945 Pirani is a single-channel controller, designed to be economical and user-friendly and provide fast reliable pressure measurement. The Series 945 displays pressure from 10^{-4} to 100 Torr on a highly-visible red LED readout. All of the operating controls are conveniently accessible from the front panel of the controller, including the power on-off switch.

Two standard independent relay set points allow you to control your process. The relays can be set to trip anywhere within the controller's set point range. Red LEDs indicate set point activation status. You can check the set point value at any time with no break in process control. A buffered analog signal is available through the 9 pin accessory connector at the rear of the controller.

Features & Benefits

- Rugged filament design for high reliability
- Designed for use in harsh process environments
- Rapid response to pump down
- Repeatable measurements and independent relay set points for improved process control
- 10^{-4} to 100 Torr measurement range for rough to medium vacuum applications
- Sensor may be mounted in any position, increasing flexibility during installation
- Digital LED display
- CE compliant with EMC directive 89/336/EEC and Low Voltage Directive 72/23/EEC

Applications

The Pirani controller and sensor are ideal for applications in the rough to medium vacuum range, including measurement of base pressures of mechanical vacuum pumps or start-up of system processes.

The Series 945 controller and 345 sensor can be used in many industrial applications such as semiconductor manufacturing, load locks, leak detection, vacuum coating, and freeze dryers. The UHV compatible materials used in the sensor and the ability to bakeout the sensors make them useful in high energy physics applications such as accelerators and laser fusion projects.



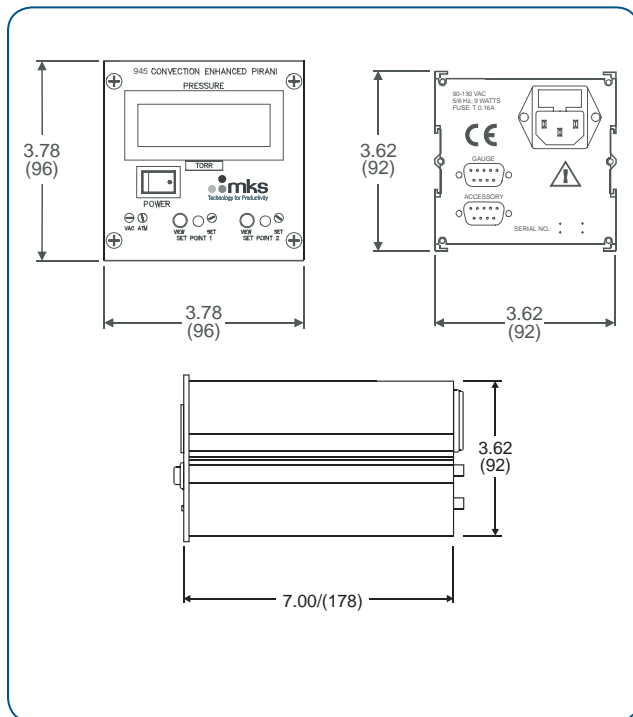
Description (cont'd)

Choose a Series 945 Pirani controller in one of four models that measures either in Torr, millibar, Pascal, or microns. The controller can be easily installed in a standard ¼ DIN panel cutout with the optional mounting kit.

For quick controller calibration, atmosphere and zero adjustment potentiometers are located on the front panel.

The 945, when used in conjunction with the 345 sensor, has passed the requirements of the European Directives and is CE marked.

Included with the Pirani controller is a power cord, an accessory connector kit, and an instruction manual. The Pirani sensor and its cable are ordered separately.



Dimensional Drawing — Series 945 Controller

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

Series 345 Pirani Sensor

The Series 345 Pirani sensor is a robust, dependable sensor with fast and stable pressure measurement. A thermal conductivity sensor, the 345 sensor measures absolute pressure by determining heat loss from a fine heated wire. Special temperature compensation circuitry provides for greater sensor stability over the operating range.

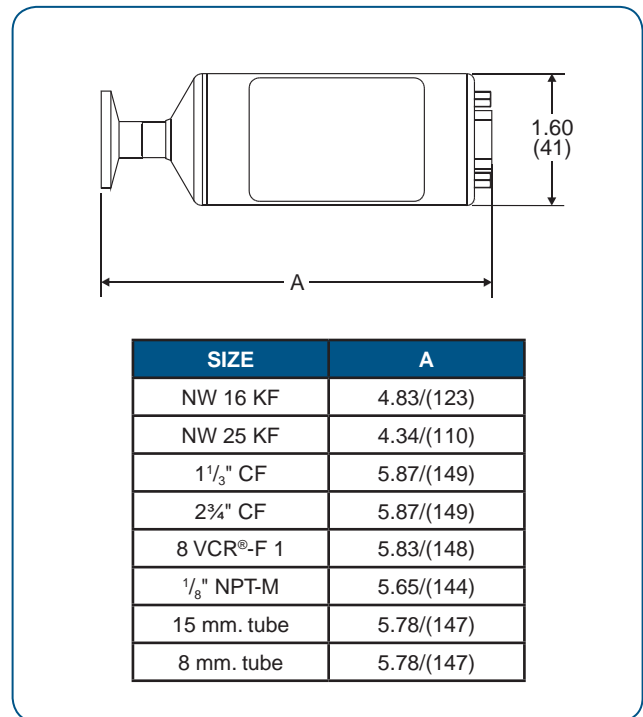
The sensor is factory calibrated so that controller calibration is typically unnecessary when interchanging or replacing a sensor.

A platinum filament ensures compatibility with a wide array of process gases. Only UHV compatible materials are exposed to vacuum.

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

Like all thermal conductivity sensors, the 345 Pirani sensor is 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 345 sensor is shielded for use where CE marking is a requirement and has a standard 9-pin D-sub connector.



Dimensional Drawing — Series 345 Sensor

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



Specifications

Series 945 Controller

Measurement Range	1.0 x 10 ⁻⁴ to 100 Torr 1.0 x 10 ⁻⁴ to 130 mbar 1.0 x 10 ⁻² to 1.3 x 10 ⁺⁴ Pascal 1.0 x 10 ⁻¹ to 1.0 x 10 ⁺⁵ microns
Set Point Range	2.0 x 10 ⁻³ to 99 Torr 2.7 x 10 ⁻³ to 130 mbar 2.7 x 10 ⁻¹ to 1.3 x 10 ⁺⁴ Pascal 2.0 to 9.9 x 10 ⁺⁴ microns
Resolution	1% of indicated decade, 10% of decade for pressures less than 10 ⁻³ Torr
Operating Temperature Range	5° to 40°C (41° to 104°F)
Relative Humidity	80% maximum for temperatures less than 31°C, decreasing linearly to 50% maximum at 40°C
Altitude	2000 m maximum
Insulation Coordination	Overvoltage Category II Pollution Degree 2
Output Voltage	0.20 to 3.25 VDC, buffered analog, 1kW maximum output impedance
Set Point Relays	2 independently set, SPDT contacts, resistive load; 1 A @ 24 VAC/DC
Set Point Response	150 msec maximum
Power Requirements	90 to 130 VAC, 50/60 Hz, 9 W 210 to 250 VAC, 50/60 Hz, 9 W
Weight	2.2 lb (1.0 kg)
CE Certification	89/336/EEC EMC Directive 73/23/EEC Low Voltage Directive

Series 345 Sensor

Measurement Range	1.0 x 10 ⁻⁴ Torr to atmosphere 1.0 x 10 ⁻⁴ mbar to atmosphere 1.0 x 10 ⁻² Pascal to atmosphere 1.0 x 10 ⁻¹ microns to atmosphere
Reproducibility	5% of reading at constant temperature
Operating Temperature Range	0° to 50°C (32° to 122°F)
Bakeout Temperature	50°C (122°F)
Calibration Gas	Air/nitrogen
Materials Exposed to Vacuum	Stainless steel, nickel, glass, platinum, silver brazing alloy
Installation Orientation	Any
Internal Volume	0.5 in.3 (8.0 cm3) maximum
Weight	0.5 lb (0.2 kg)



Ordering Information

Series 945 Digital Pirani Controllers

Part Number	Description
945-A-120-TR	Series 945 Digital Pirani Controller, 120 Volts, Torr readout
945-A-220-TR	Series 945 Digital Pirani Controller, 220 Volts, Torr readout
945-A-120-MC	Series 945 Digital Pirani Controller, 120 Volts, micron readout
945-A-220-MC	Series 945 Digital Pirani Controller, 220 Volts, micron readout
945-A-120-PA	Series 945 Digital Pirani Controller, 120 Volts, Pascal readout
945-A-220-PA	Series 945 Digital Pirani Controller, 220 Volts, Pascal readout
945-A-120-MB	Series 945 Digital Pirani Controller, 120 Volts, mbar readout
945-A-220-MB	Series 945 Digital Pirani Controller, 220 Volts, mbar readout

Series 345 Shielded Pirani Sensors

Part Number	Description
103450210	Series 345 Pirani Sensor, Shielded, NW 16 KF
103450211	Series 345 Pirani Sensor, Shielded, 1/8" NPT-M
103450212	Series 345 Pirani Sensor, Shielded, 8 VCR-F 1
103450213	Series 345 Pirani Sensor, Shielded, Mini 1 1/3" CF
103450214	Series 345 Pirani Sensor, Shielded, 2 3/4" CF
103450215	Series 345 Pirani Sensor, Shielded, NW 25 KF
103450216	Series 345 Pirani Sensor, Shielded, 15mm Tube
103450218	Series 345 Pirani Sensor, Shielded, 18mm Tube

Cables, Series 345 Sensor to Series 945 Controller

Part Number	Description
103170006SH	10 ft. (3.0 m)
103170007SH	25 ft. (7.6 m)
103170008SH	50 ft. (15.2 m)
103170009SH	Custom (max length 500 ft.)

Accessories

Part Number	Description
103150001	Power cord, 115 VAC
100008103	Series 945 output connector kit
100005021	Mounting hardware kit
100009993	Octal to 9 pin adapter
100005456	Rack panel, 19", 3U 1/4 DIN, blank
100005457	Rack panel, 19", 3U 1/4 DIN, 1 cutout
100005458	Rack panel, 19", 3U 1/4 DIN, 2 cutouts
100005459	Rack panel, 19", 3U 1/4 DIN, 3 cutouts
100005460	Rack panel, 19", 3U 1/4 DIN, 4 cutouts



MKS Instruments, Inc. Global Headquarters

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

MKS Instruments, Inc. Pressure & Vacuum Measurement Solutions

6450 Dry Creek Parkway
Longmont, CO 80503
Tel: 303.652.4400