10^{-5} to 1000 Torr
Wide Range Manometer

• No High Voltage & No Magnets
• 0-10 VDC and 4-20 mA Outputs
• 2 or 4 Set Points With Relays
• Wide Range: 1 X 10^{-5} to 1000 Torr
• Available in .01 X 10^{-3} to 1300 mbar
• Linear With Any Gas from .05 to 1000 Torr
• Up to 4 Adjustable Set Points and 3 Amp Relays
• 0 to 10 VDC and 4 to 20 mA Outputs Standard
• Linear Analog Outputs for Computer Interface
• Large Easy to Read Green LED Display
• 316L Stainless Steel Diaphragms Standard
• Bench or 1/4 DIN Panel Mount Enclosure
• 400 mSec. Response Time From .05 to 1000 Torr
• 2 Sec. Response Time From .01 to 50 mTorr
• All Cables and Mounting Hardware Included
• Extension Cables up to 500 Feet, 150 meters.

Fast Response
The Wide Range Manometer uses a fast response diaphragm sensor to provide high accuracy measurements that are unaffected by gas composition from .05 to 1000 Torr. At pressures below 50 mTorr the easy to read green LED display is driven by a rugged Pirani sensor that is mounted in the transducer next to the Diaphragm sensor. The Diaphragm and Pirani sensors are both mounted in the same transducer body, and both are easily replaceable in the field.

Two or Four Set Points for Process Control
The standard Wide Range Manometer includes 2 adjustable set points, while the optional version provides 4 adjustable set points for process control. These process control set points have front panel LED indicators and can be set anywhere in the range of the instrument. Each set point drives its own SPDT relay. Contacts are rated 3 amps @ 220V, non-inductive.

0 to 10 VDC and 4 to 20 mA Outputs
The standard instrument provides both 0 to 10 VDC and 4-20 mA outputs. The 4-20 output can be changed in the field to have ranges of 0 to 1, 5, 10, 50 or 1000 Torr.

Torr, or millibar
The Vacuum Research Wide Range Manometer reads directly in Torr and mTorr, instruments with calibration of 0.01 X 10^{-3} to 1300 mbar are available without extra cost.

No Magnets and No High Voltage
The sensors used in this gauge use less than 1 watt of power at less than 12 volts. There is no risk to technicians due to high voltage as in Penning and other magnetron style gauges. There are no magnetic fields to interfere with your sensitive circuits and beams.

Diaphragm Manometer Applications
Crystal Growing Like many vacuum processes, crystal growing is a two step operation that has traditionally required more than one gauge for control. First, evacuation with a two stage pump to 10 to 15 mTorr removes oxygen and water vapor. Then, the furnace is back filled with argon to approximately 200 Torr. The wide range diaphragm manometer was designed for processes such as this that require accurate and repeatable measurements at pressures many decades apart.

Lamp Manufacture Measure pump down of mechanical booster pump from atmosphere to less than 5 mTorr and then monitor pressures of back fill gas mixture of argon, neon, and krypton to 600 Torr.

L.P.C.V.D. Evacuate furnace to less than 20 mTorr, close valve in roughing pump line and monitor rate of pressure rise to check for leaks. If rate of rise is satisfactory, then back fill with process gas mixture to between 2 and 10 Torr.

Wide Range Gauge Calibrator
Making sure that your vacuum gauge is working properly has never been easier. Our compact electronic calibrators allow you to adjust your Wide Range Diaphragm Manometer display to be exactly like new factory specification. No electronics training is required to operate these calibrators which allow you to adjust zero and full scale of the Wide Range Display Unit without using a vacuum system. Just follow the step-by-step procedure on the calibrator front panel to ensure optimum performance of your Wide Range Gauge. P/N: V912046.
### Standard and Auxiliary Output Model Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>.01 to 50 mTorr Pirani Sensor</th>
<th>50 mTorr to 1000 Torr Diaphragm Sensor</th>
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</thead>
<tbody>
<tr>
<td>Sensor Type:</td>
<td>Platinum alloy Pirani</td>
<td>316L Stainless Steel Diaphragm</td>
</tr>
<tr>
<td>Resolution and Sensitivity:</td>
<td>±.01 mTorr</td>
<td>50 mTorr to 30 Torr ± 10 mTorr</td>
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<tr>
<td></td>
<td></td>
<td>30 Torr to 1000 Torr ± 0.1 Torr</td>
</tr>
<tr>
<td>Accuracy</td>
<td>3% of Reading or 3 mTorr</td>
<td>50 mTorr to 30 Torr ± 20 mTorr</td>
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<tr>
<td></td>
<td></td>
<td>30 Torr to 1000 Torr ± 1 Torr</td>
</tr>
<tr>
<td>Hysteresis:</td>
<td>Less than 2 mTorr minimum</td>
<td>50 mTorr to 30 Torr ± 20 mTorr</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 Torr to 1000 Torr ± 1 Torr</td>
</tr>
<tr>
<td>Response Time:</td>
<td>Less than 2 seconds</td>
<td>Under 400 msec. for 100% of step change</td>
</tr>
<tr>
<td>Analog Output (Standard Model):</td>
<td>0 to 1.000 VDC</td>
<td>0 to 10 VDC plus scalable 4-20 mA</td>
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<tr>
<td>Analog Output (Auxiliary Output Model):</td>
<td>0 to 1.000 VDC plus a second output programmable as 0 to 10 VDC or 4-20 mA</td>
<td>0 to 10 VDC or 4-20 mA. 4-20 can have F.S. of 1, 5, 10, 50 or 1000 Torr</td>
</tr>
<tr>
<td>Effect of Ambient Temp. Changes from 0 ºC to 50 ºC</td>
<td>0.2 mT per C° at 50 mT; 4 mT per C° at 900 mT</td>
<td>± 0.02% per C°</td>
</tr>
<tr>
<td>Maximum Transducer Bakeout Temperature:</td>
<td>100 ºC</td>
<td></td>
</tr>
<tr>
<td>Digital Display:</td>
<td>4 1/2 Digit</td>
<td></td>
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<tr>
<td></td>
<td>Green LED character height 0.47 in. (11 mm)</td>
<td></td>
</tr>
<tr>
<td>Maximum Pressure without Calibration Change:</td>
<td>1.000 Torr; 18 PSIG, 1300 mbar</td>
<td></td>
</tr>
<tr>
<td>Set Points and Relays:</td>
<td>2 or 4 independent set points with front panel LED indicators and 2 or 4 SPDT relays.</td>
<td>3 amp @ 220 VAC, non-inductive. Front panel adjustable over 100% of range.</td>
</tr>
<tr>
<td>Transducer Orientation:</td>
<td>All instruments are calibrated with the transducer stem horizontal. Operating with other orientation may require a zero adjustment.</td>
<td></td>
</tr>
<tr>
<td>Line Voltage and Power:</td>
<td>95 to 120V, 50/60 Hz standard, 220 V available.</td>
<td>5 watts with both relays energized.</td>
</tr>
<tr>
<td>Line Cord:</td>
<td>65 inch (1.7 meter) attached, 3 conductor.</td>
<td></td>
</tr>
<tr>
<td>Dimensions: 1/4 Din. Front Panel 96 X 96 mm</td>
<td>Cabinet cutout: 89 X 89 mm X 174mm F to B</td>
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<tr>
<td>Transducer Cables (see pg. 42 for extension cables):</td>
<td>10 ft. (3 m) with connectors on both ends. Cables up to 500 ft. (150 m) available.</td>
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<tr>
<td>Weight with Transducer (Standard / Aux. Output):</td>
<td>Net 4 lb. (1.8 kg); Shipping 6.0 lb. (2.7 kg); add 1 lb. (.2.2 kg) for Auxiliary Output model.</td>
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</tbody>
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### Display Units

**Standard Wide Range Gauge Display Units**
Digital display unit with 2 set points and 2 analog outputs; 0 to 10 VDC & 4-20 mA for the 50 mTorr to 1000 Torr diaphragm range and 0 to 1 VDC for the .01 to 50 mTorr Pirani range. 1/4 DIN cabinet suitable for bench or panel mounting. Built to CSA standards. Line cord and 3 meter (10 ft) transducer cable included. A transducer is required and must be ordered separately.

**For operation with 90-120 V, 50/60 Hz Power**
- Calibrated in Torr/mTorr P/N 902310: $850.00
- Calibrated in mbar/10⁻³ mbar P/N 902311: $850.00

**For operation with 200-240 V, 50/60 Hz Power**
- Calibrated in Torr/mTorr P/N 902312: $850.00
- Calibrated in mbar/10⁻³ mbar P/N 902313: $850.00

**Wide Range Display Units with Auxiliary Outputs**
Similar to the standard display except the cabinet is taller, 4 set points and relays instead of two and the analog output for the Pirani Range is both 0 to 10 VDC and 4-20 mA. Built to CSA standards. Line cord and 10 ft. (3m) transducer cable included. Transducer not included. A transducer is required and must be ordered separately.

**For operation with 90-120 V, 50/60 Hz Power**
- Calibrated in Torr/mTorr P/N 902282: $1,125.00
- Calibrated in mbar/10⁻³ mbar P/N 902283: $1,125.00

**For operation with 200-240 V, 50/60 Hz Power**
- Calibrated in Torr/mTorr P/N 902284: $1,125.00
- Calibrated in mbar/10⁻³ mbar P/N 902285: $1,125.00

**Transducers**
10⁻⁵ to 1000 Torr Diaphragm with 316 L SS Diaphragm

Transducer body is 304 stainless steel. Pirani gauge materials include 304 stainless steel, platinum alloy and glass to metal seals. Diaphragm sensor is all 316L stainless steel including the diaphragm itself.

- 25 mm O.D. Smooth (.98 in.). P/N: 902046. $779.00
- 3/4 in. Smooth. P/N: 902041. $735.00
- NW-16 Flange. P/N: 902037. $779.00
- NW-25 Flange. P/N: 902038. $779.00
- 1.33 in. Conflat®, P/N: 902039. $779.00
- 2.75 in. Conflat®, P/N: 902040. $779.00
- VCR-12 Male. P/N: 902042. $795.00
- VCR-12 Female. P/N: 902043. $795.00
- VCO-12 Male. P/N: 902044. $795.00
- VCO-12 Female. P/N: 902045. $795.00

**Replacement Sensors**
In the event that either of the sensors in your wide range transducer should fail you have two choices for repair. You can purchase a replacement sensor and install and recalibrate the transducer yourself. The recommended procedure is to return the transducer to your supplier for repair.

- Replacement Pirani Sensor for replacement in the field. P/N 902298. $125.00
- Replacement Stainless Diaphragm Sensor for replacement in the field. P/N 902303. $208.00
- Replacement Pirani Sensor replaced at the factory and including recalibration with our certified calibration instruments. P/N 902314. $190.00
- Replacement Stainless Steel Diaphragm Sensor replaced and including recalibration with our certified calibration instruments. P/N 902315. $273.00

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Dimensions of 10⁻⁵ Torr Wide Range Manometer

**Transducers For 10⁻⁵ Torr Wide Range Manometer**

- **3/4" O.D. Smooth**
  - Part No. 902041
- **25 mm (.98") O.D. Smooth**
  - Part No. 902046
- **NW-16**
  - Part No. 902037
- **NW-25**
  - Part No. 902038
- **VCO-12 Female**
  - Part No. 902045
- **VCO-12 Male**
  - Part No. 902044
- **VCR-12 Female**
  - Part No. 902043
- **VCR-12 Male**
  - Part No. 902042
- **1.33 In. Conflat®**
  - Part No. 902039
- **2.75 In. Conflat®**
  - Part No. 902040

Panel Cutout for auxiliary output
89 m X 123 m H (3.62 X 4.84")

**Panel Mount Jack Screw**

**Front Panel:** 96 mm x 96 mm (3.78 in x 3.78 in)
**1/4 DIN Panel Cutout:** 92 mm x 92 mm (3.62 in x 3.62 in)
**Case Dimension:** 89 mm x 89 mm x 174 mm long
3.5 in. x 3.5 in. x 6.84 in. long