



Wide range manometer with auxiliary outputs and relays shown on right with standard manometer at left. Transducer with NW-16 flange shown in the foreground.

- **Wide Range: 10<sup>-3</sup> to 1500 Torr**
- **Available in .001 to 2000 mbar & 0.1 to 200 kPa**
- **Linear With Any Gas from 2 to 1500 Torr**
- **Up to 4 Adjustable Set Points and 3 Amp Relays**
- **0 to 2 VDC, 0 to 10 VDC, and 4 to 20 mA Outputs**
- **Linear Analog Outputs for Computer Interface**
- **Large Easy to Read Green LED Display**
- **Stainless Steel or Silicon Diaphragms Available**
- **Bench or Panel Mount Enclosure**
- **400 mSec. Response Time From 2 to 1500 Torr**
- **1.25 Sec. Response Time From 1 to 2000 mTorr**
- **All Cables and Mounting Hardware Included**
- **Extension Cables up to 250 Feet, see page 42**

**Fast Response**

The Wide Range Manometer uses a fast response diaphragm sensor to provide high accuracy measurements that are unaffected by gas composition from 2 to 1500 Torr. At pressures from 2000 mTorr to one 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 the diaphragm sensor is easily replaceable in the field.

**Unaffected By Sensor Orientation**

This durable process control instrument uses a transducer body machined from a solid block of stainless steel and, unlike convection gauges, our wide range gauge accuracy is not affected by the transducer orientation or gas composition.

**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 0 to 2 VDC and 0 to 1.5 VDC outputs. In addition to these standard outputs, the optional version provides 2 programmable analog outputs of 0 to 10 VDC or 4 to 20 mA.

**Torr, milliBar, Pascals**

The Vacuum Research Wide Range Manometer reads directly in Torr and mTorr, but ranges of .001 to 2000 millibar and 0.100 Pascals to 200 kiloPascals are available at no extra charge.

**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 (1 to 2 Pascal) removes oxygen and water vapor. Then, the furnace is back filled with argon to approximately 200 Torr (2500 Pa). 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 (1 Pa) and then monitor pressures of back fill gas mixture of argon, neon, and krypton to 600 Torr (80,000 Pa).

**L.P.C.V.D.** Evacuate furnace to less than 20 mTorr (2 Pa), 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 (200 and 1200 Pascal).

**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 to 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: 912110 ..\$530.

Standard and Auxiliary Output Model Specifications	1 to 2000 milli Torr Pirani Sensor	2 to 1500 Torr Diaphragm Sensor
<b>Sensor Type:</b>	Platinum alloy Pirani	Silicon or 316 SS Diaphragm
<b>Resolution and Repeatability:</b>	± 1 mTorr	± 1 Torr
<b>Linearity:</b>	3% of Reading	0.15% of Full Scale
<b>Accuracy:</b>	3% of Reading or 3 mTorr	1% of reading or 2 Torr
<b>Response Time:</b>	Less than 1.25 seconds	Under 400 msec. for 100 % of step change
<b>Hysteresis:</b> (to prevent chatter, up to 5% available)	Less than 2 mTorr minimum	Less than 2 Torr minimum
<b>Analog Output (Standard Model):</b>	0 to 2.000 VDC	0 to 1.500 VDC
<b>Analog Output (Auxiliary Output Model):</b>	0 to 2.000 VDC plus a second output programmable as 0 to 10 VDC or 4-20 mA	0 to 1.500 VDC plus a second output programmable as 0 to 10 VDC or 4-20 mA
<b>Maximum Pressure without Calibration Change:</b>	60,000 Torr (1250 PSIG)	2,300 Torr (30 PSIG)
<b>Effect of Ambient Temp. Changes from 0 °C to 50 °C</b> Reading will change less than:	0.2 mT per °C at 50 mT; 4 mT per °C at 900 mT	± 0.02% per °C
<b>Maximum Transducer Bakeout Temperature:</b>	100 °C	
<b>Display:</b>	3 1/2 Digit, Green LED character height 0.47 in. (11 mm)	
<b>Set Points and Relays:</b>	2 or 4 independent set points with front panel LED indicators and 2 or 4 SPDT relays. 3 amp @ 220 VAC, non-inductive. Front panel adjustable over 100% of range.	
<b>Transducer Orientation:</b>	Calibration is not affected by orientation.	
<b>Line Voltage and Power:</b>	95 to 120V, 50/60 Hz standard; 220 V available. 5 watts with both relays energized.	
<b>Line Cord:</b>	65 inch (1.7 meter) attached, 3 conductor.	
<b>Bench or Panel Mounting:</b>	Panel cutout: 3.62 in. W X 4.68 in. H (92 X 119 mm). Panel mount jack screws included.	
<b>Dimensions:</b>	See page 45.	
<b>Transducer Cables</b> (see pg. 42 for extension cables):	10 ft. (3 m) with connectors on both ends. Cables up to 500 ft. (150 m) available.	
<b>Weight with Transducer</b> (Standard / Aux. Output):	Net 4 lb. (1.8 kg); Shipping 6.0 lb. (2.7 kg); add 1 lb. (.22 kg) for Auxiliary Output model.	

## Display Units Standard and Auxiliary Output Models

### Standard Wide Range Gauge Display Units

Digital display unit with 2 set points and 2 analog outputs; 0 - 1.5 & 0 - 2 VDC. 1/4 DIN cabinet suitable for bench or panel mounting. Built to CSA standards. Line cord and 3 meter (10 ft) transducer cable included. Transducer not included. One transducer required.

1 mTorr to 1500 Torr, P/N: 902074 (220VAC 50/60 Hz) . . . . .	\$792.
.001 to 2000 millibar, P/N: 902075-mbar (220VAC 50/60 Hz) . . . . .	\$792.
0.1 PA to 200 kPa, P/N: 902076-Pascal (220VAC 50/60 Hz) . . . . .	\$792.
1 mTorr to 1500 Torr, P/N: 902056 (115VAC 50/60 Hz) . . . . .	\$792.
.001 to 2000 millibar, P/N: 902072 (115VAC 50/60 Hz) . . . . .	\$792.
0.1 PA to 200 kPa, P/N: 902073 (115VAC 50/60 Hz) . . . . .	\$792.

### Wide Range Display Units with Auxiliary Outputs

Digital display unit with 4 set points and 4 analog outputs; 0-2 & 0-1.5 VDC plus separate 0-10 VDC and 4-20 mA for Diaphragm and Pirani Gauge signals. Built to CSA standards. Line cord and 10 ft. (3m.) transducer cable included. Transducer not included. One transducer required. For operation from 220VAC power add suffix "220" to P/N.

1 mTorr to 1500 Torr (115VAC 50/60 Hz) P/N: 902081 . . . . .	\$1,046.
0.1 Pa to 200 kPa (100VAC 50/60 Hz) P/N: 902127-Pascal . . . . .	\$1,046.
.001 to 2000 millibar (115VAC 50/60 Hz) P/N: 902126-mbar . . . . .	\$1,046.

### Replacement Sensors for Mini Transducers, 1999 & later

<b>Pirani Sensor; Mini Transducer, P/N: 902300 . . . . .</b>	<b>\$88.</b>
<b>Silicon Diaphragm Sensor; Mini Transducer, P/N: 902301 . . . . .</b>	<b>\$208.</b>
<b>Stainless Steel Diaphragm Sensor; Mini Transducer, P/N: 902079 . . . . .</b>	<b>\$361.</b>

### Replacement Sensors for Older Transducers, 1998 & earlier

Because some critical components used in the manufacture of Wide Range Transducers in 1998 and before are no longer available, it is not possible to provide replacement sensors for installation in the field. However, if a sensor failure occurs in one of these older transducers, it may be returned to the factory for exchange for a rebuilt transducer with new sensors and factory calibration. The exchange transducer will have the same flange or system connection as your original, but it may be the newer "Mini" style. Request an RGA (Return Goods Authorization) number before shipping your transducer.

Exchange Transducer with new Silicon Diaphragm and Pirani Sensors. Calibrated and ready to operate. P/N 902309 . . . . .	\$350. plus old transducer
Exchange Transducer with new Stainless Steel Diaphragm and Pirani Sensors. Calibrated and ready to operate. P/N 902308 . . . . .	\$504. plus old transducer

## Transducers (Use with Torr, mbar, or Pascal Display Units)

### Mini Transducers with Silicon Diaphragm

The new Mini Transducers operate with all models of VRL Wide Range Manometers regardless of date of manufacture. Transducer body is 304 stainless steel. Pirani gauge materials include 304 SS, platinum alloy and glass to metal seals. Diaphragm sensor is 304 stainless steel except for the diaphragm itself which is pure silicon metal.

1/8 in. NPT, P/N: 902058-mini . . . . .	\$543.
1/2 in. OD tube, P/N: 902055-mini . . . . .	\$543.
15 mm OD tube, P/N: 902122-mini . . . . .	\$543.
NW-16 flange, P/N: 902068-mini . . . . .	\$593.
NW-25 flange, P/N: 902147-mini . . . . .	\$593.
VCR-4, Male P/N: 902085-mini-MAL . . . . .	\$615.
VCR-4, Female P/N: 902085-mini-FEM . . . . .	\$615.
VCR-8, Male P/N: 902091-mini-MAL . . . . .	\$615.
VCR-8, Female P/N: 902091-mini-FEM . . . . .	\$615.
VCO-8, Male P/N: 902146-mini-MAL . . . . .	\$615.
VCO-8, Female P/N: 902146-mini-FEM . . . . .	\$615.
1.33 in. Conflat®, P/N: 902153-mini . . . . .	\$593.
2.75 in. Conflat®, P/N: 902210-mini . . . . .	\$593.

### Mini Transducers with 316 Stainless Steel 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 316 stainless steel including the diaphragm itself.

1/8 in. NPT, P/N: 902057-mini . . . . .	\$687.
1/2 in. OD tube, P/N: 902052-mini . . . . .	\$687.
15 mm OD Tube, P/N: 902121-mini . . . . .	\$687.
NW-16 flange, P/N: 902067-mini . . . . .	\$731.
NW-25 flange, P/N: 902151-mini . . . . .	\$731.
VCR-4, Male P/N: 902051-mini-MAL . . . . .	\$753.
VCR-4, Female P/N: 902051-mini-FEM . . . . .	\$753.
VCR-8, Male P/N: 902092-mini-MAL . . . . .	\$753.
VCR-8, Female P/N: 902092-mini-FEM . . . . .	\$753.
VCO-4, Male P/N: 902157-mini-MAL . . . . .	\$753.
VCO-4, Female P/N: 902157-mini-FEM . . . . .	\$753.
VCO-8, Male P/N: 902150-mini-MAL . . . . .	\$753.
VCO-8, Female P/N: 902150-mini-FEM . . . . .	\$753.
1.33 in. Conflat®, P/N: 902154-mini . . . . .	\$731.
2.75 in. Conflat®, P/N: 902211-mini . . . . .	\$731.