

Explosion Proof Gauges, Class 1, Div. 1, ATEX Certificate



Active Pirani Gauges & Transmitters 1 to 2000 milli Torr, 24 VDC Power



Pirani, Thermocouple, Diaphragm, and Convection Gauges



Wide Range Diaphragm Manometer 10^{-5} to 1500 Torr



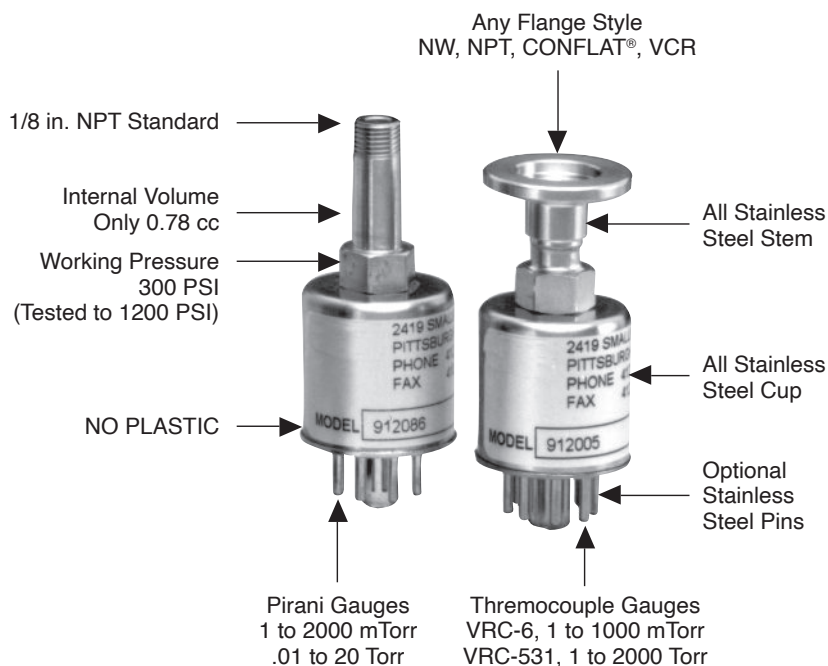
Vacuum Switch
with Adjustable
Set Point



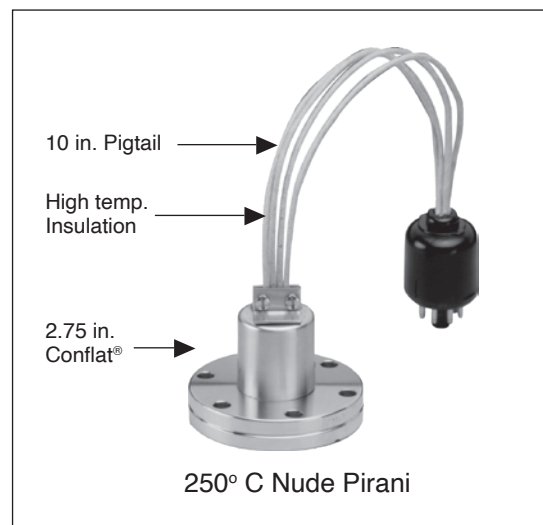
Display and Power Up To 7 Gauges, Linear Outputs for PLC or Data Systems



Possibly The World's Best Gauge Tubes!



For over 30 years Vacuum Research has been working on Pirani and Thermocouple gauge tube improvements. Our tubes aren't perfect yet but they are good enough that we thought you might like to know what we have accomplished so far.



2 Year Warranty Parts and Labor! On All Vacuum Instruments

The Vacuum Research vacuum instruments include a 2 year warranty that covers all parts and labor FOB Pittsburgh, PA USA. Vacuum Research gauge tubes and sensors come with a lifetime warranty against leaks. These warranties do not apply to instruments, sensors, or gauge tubes that have been subjected to misuse or abuse. Filament or diaphragm failure is not covered by this warranty.



Prices are FOB factory • Terms net 30 days

PayPal™





Gauges Calibrated in mbar

Page 4



Gauges Calibrated in Pascal

Page 5



Wide Range Diaphragm Manometer 1 mTorr to 1500 Torr

Page 6



Diaphragm Manometers 0.5 to 1200.0 Torr; ± 0.1 Torr

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1 to 1500 Torr; ± 1 Torr
Page 9



Vacuum & Pressure 30 in. Hg to 150.0 PSIG Pressure Gauges

.01 to 20 PSIG
.1 to 200 PSIG
1 to 1000 PSIG
Pages 10, 11



Convection Gauges 1×10^{-3} Torr to atm.

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Pirani Gauge 10^{-5} to 10^{-1} Tor

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Pirani Gauge 1 to 2000 mTorr

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250°C Pirani Tube
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Pirani Gauge .01 to 20 Torr

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Giant Display Vacuum Gauges

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Panel Mount or Transportable Gauges 1 to 20,000 Microns 1mT to 20 Torr

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Thermocouple Gauges 1 to 1000 mT, DV-6 Tube

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1 to 2000 mT, 531 Tube
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Low Cost Gauges
10⁻³ to 1500 Torr
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3 & 5 Position Gauges
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Integral Sensor Gauges
Pirani & Diaphragm
AC Power

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Gauges for 24 VDC Power
Pirani & Diaphragm
Absolute Pressure
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Gauge Pressure
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Active Pirani Gauge
1 to 2000 mTorr, 2000
Microns, 2.000 mbar,
200.0 Pa

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**Active Vacuum Switch
& Transmitter**
10⁻⁵ to 1500 Torr

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**Portable Battery
Powered & Self
Contained Pirani &
T/C Gauge**

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**NIST Certification,
Gauge Calibrators, and
Calibration Manifolds**

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**IP-65 Water Proof &
Dust Proof Gauges**
3 Ranges
Diaphragm and Pirani

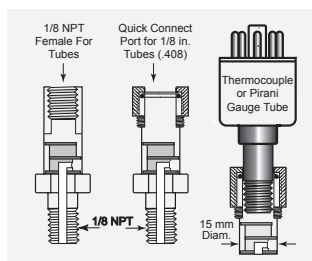
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**Gauges in Explosion
Proof UL, CSA, FM
Approved Enclosures**
ATEX Certified

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Hazardous Area Sensors
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**Baffles & Traps
For Gauge Tube
Protection**

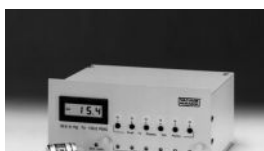
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**NW Clamps, Centering
Rings, Vacuum Hose
& Hose Clamps**
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**Pirani, Diaphragm or
Convection Gauge on
a Circuit Board**
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**10 Bar Diaphragm
Gauge**
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**Dual Gauges Pirani &
Diaphragm**
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**Extension Cables and
Selected Popular Gauge
Accessories**
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All of our vacuum instruments can be provided with displays and analog outputs reading directly in mbar. To specify a Vacuum Research gauge calibrated in mbar simply add the suffix "mbar" to any of our gauge p/n's. There's no extra cost and all specifications other than the unit of measure are the same as those shown in this catalog for our gauges calibrated in Torr. The transducers and gauge tubes used with Torr and mbar instruments are identical and do not require any suffix.

Wide Range Diaphragm Manometer

BUY NOW



1 X 10⁻³ to 2000 mbar

(1 mTorr to 1500 Torr)

Ordering Information and Complete Specifications on Page 6

Large Easy-To-Read Green LED in 1/4 DIN Enclosure. Two Set Points With 3 Amp, 220 V Relays. 4 Set Points Optional.

Wide Range Gauge Display Units: Digital display unit with 2 set points and 2 analog outputs; 1/4 DIN cabinet. Transducer not included.

P/N: 902075\$1197

Wide Range with Auxiliary Outputs: 4 set points plus 0-10 VDC and 4-20 mA. Built to CSA standards. Transducer not included.

P/N: 902126\$1,580

Pirani Gauge

BUY NOW



.01 X 10⁻³ to 2000 mbar

(0.01 to 100 mTorr)

Ordering Information and Complete Specifications on Page 14

± .01 x 10⁻³ Pa resolution over entire range. Replaces Cold Cathode or Penning Gauges. Linear 0 to 1 VDC analog output, 4 to 20 mA and 0 to 10 VDC outputs optional.

Dual Set Point Controller with digital display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902096-Pascal\$1,262

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards.

Gauge tube not included. P/N: 902095-mbar\$962

Diaphragm Manometer

BUY NOW



1 to 2000 mbar

(1 to 1500 Torr)

Ordering Information and Complete Specifications on Page 9

Range: 1 to 2000 mbar ± 1 mbar Resolution • 316 SS Diaphragm Sensor Measures Gas or Liquid. Linear 0 to 2 VDC Analog Out. 0 to 10V and 4 to 20 mA Outputs Optional.

Dual Set Point Controller with digital display in 1/4 DIN enclosure. Built to CSA standards. Sensor not included. P/N: 902094-mbar\$925

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Sensor not included. P/N: 902093-mbar\$655

Pirani Gauge

BUY NOW



0.01 to 20.00 mbar

(.01 to 20 Torr)

Ordering Information and Complete Specifications on Page 16

± .01 Pa Resolution Over Range of .01 to 20.00 Pa. Shock Resistant Digital Display; No Fragile Meters Linear 0 to 2.0 VDC Analog Output, 4 to 20 mA, 0-10 VDC Optional.

Dual Set Point Controller with digital display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902098-mbar\$1,003

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards.

Gauge tube not included. P/N: 902097-mbar\$730

Convention Gauges

BUY NOW



1 X 10⁻³ to 1000 mbar

(1 X 10⁻³ Torr to atm.)

Ordering Information and Complete Specifications on Page 12

Circuit Board Only See Page 38

Linear Analog Outputs for Computer Interface. Large Easy-To-Read Green LED Display in 1/4 DIN Enclosure.

Digital Dual Set Point Convection Gauge Controller: Two adjustable set points plus 3 linear analog outputs. 1/4 DIN enclosure. Built to CSA standards. .001 mbar to atmosphere.

P/N: 902176\$962

Digital Convection Gauge Indicator: Three linear analog outputs.

1/4 DIN enclosure with jack screws for panel mounting. Built to CSA standards. .001 mbar to atmosphere. P/N: 902179\$662

Pirani Gauge

BUY NOW



0.001 to 2.000 mbar

(1 to 2000 mTorr)

Ordering Information and Complete Specifications on Page 15

± .001 Pascal Resolution Over Range of .001 to 2 Pa Shock Resistant Digital Display; No Fragile Meters. Linear 0 to 2.0 VDC Analog Output, 4-20 mA, 0-10 VDC Optional.

Dual Set Point Controller: with digital display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902100-mbar\$925

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards.

Gauge tube not included. P/N: 902099-mbar\$653

All of our vacuum instruments can be provided with displays and analog outputs reading directly in Pascal. To specify a Vacuum Research gauge calibrated in Pascal simply add the suffix "Pascal" to any of our gauge p/n's. There's no extra cost and all specifications other than the unit of measure are the same as those shown in this catalog for our gauges calibrated in Torr. The transducers and gauge tubes used with Torr and Pascal instruments are identical and do not require any suffix.

Wide Range Diaphragm Manometer

BUY NOW



0.1 to 200,000 Pa

(1 mTorr to 1500 Torr)

Ordering Information and Complete Specifications on Page 6

Large Easy-To-Read Green LED Display in 1/4 DIN Enclosure. Two Set Points With 3 Amp, 220 V Relays. 4 Set Points Optional.

Wide Range Gauge Display Units: Digital display unit with 2 set points and 2 analog outputs; 1/4 DIN cabinet. Transducer not included.
P/N: 902076\$1,197

Wide Range with Auxiliary Outputs: 4 set points plus 0-10 VDC and 4-20 mA. Built to CSA standards. Transducer not included.
P/N: 902127\$1,580

Pirani Gauge

BUY NOW



.001 to 13.333 Pa

(0.01 to 100 mTorr)

Ordering Information and Complete Specifications on Page 14

$\pm .01 \times 10^{-3}$ Pa resolution over entire range. Replaces Cold Cathode or Penning Gauges. Linear 0 to 1 VDC analog output, 4 to 20 mA and 0 to 10 VDC outputs optional.

Dual Set Point Controller with digital display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902096-Pascal\$1,262

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902095-Pascal\$962

Diaphragm Manometer

BUY NOW



0.1 to 200.0 kPa

(1 to 1500 Torr)

Ordering Information and Complete Specifications on Page 9

Range: 0.1 to 200.0 kPa ± 0.1 kPa Resolution. 316 SS Diaphragm Sensor Measures Gas or Liquid. Linear 0 to 2 VDC Analog Out. 0 to 10V and 4 to 20 mA Outputs Optional.

Dual Set Point Controller with digital display in 1/4 DIN enclosure. Built to CSA standards. Sensor not included. P/N: 902094-Pascal.....\$925

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Sensor not included. P/N: 902093-Pascal\$655

Pirani Gauge

BUY NOW



1 to 2000 Pa

(.01 to 20 Torr)

Ordering Information and Complete Specifications on Page 16

$\pm .01$ Pa Resolution Over Range of .01 to 20.00 Pa. Shock Resistant Digital Display; No Fragile Meters Linear 0 to 2.0 VDC Analog Output, 4 to 20 mA, 0-10 VDC Optional.

Dual Set Point Controller with digital display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902098-Pascal.....\$1,003

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902097-Pascal\$730

Convention Gauges

BUY NOW



0.1 to 100,000 Pa

(1 X 10⁻³ Torr to atm.)

Ordering Information and Complete Specifications on Page 12
Circuit Board Only See Page 38

Linear Analog Outputs for Computer Interface. Large Easy-To-Read Green LED Display in 1/4 DIN Enclosure.

Digital Dual Set Point Convection Gauge Controller: Two adjustable set points plus 3 linear analog outputs. 1/4 DIN enclosure. Built to CSA standards. 0.1 to 100,000 PA, P/N: 902177.....\$962

Digital Convection Gauge Indicator: Three linear analog outputs. 1/4 DIN enclosure with jack screws for panel mounting. Built to CSA standards. 0.1 to 100,000 PA, P/N: 902180.....\$662

Pirani Gauge

BUY NOW



0.1 to 200.0 Pa

(1 to 2000 mTorr)

Ordering Information and Complete Specifications on Page 15

$\pm .001$ Pascal Resolution Over Range of .001 to 2 Pa Shock Resistant Digital Display; No Fragile Meters. Linear 0 to 2.0 VDC Analog Output, 4-20 mA, 0-10 VDC Optional.

Dual Set Point Controller: with digital display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902100-Pascal\$925

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902099-Pascal\$653



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^{-3} to 1500 Torr
- **Linear With Any Gas** from 2 to 1500 Torr
- **Available in** .001 to 2000 mbar & 0.1 Pa to 200 kPa
- **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 39

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 \$729

Standard and Auxiliary Output Model Specifications	1 to 2000 milli Torr Pirani Sensor	2 to 1500 Torr Diaphragm Sensor
Sensor Type:	Platinum alloy Pirani	Silicon or 316 SS Diaphragm
Resolution and Repeatability:	± 1 mTorr	± 1 Torr
Linearity:	3% of Reading	0.15% of Full Scale
Accuracy	3% of Reading or 3 mTorr	1% of reading or 2 Torr
Response Time	Less than 1.25 seconds	Under 400 msec. for 100 % of step change
Hysteresis: (to prevent chatter, up to 5% available)	Less than 2 mTorr minimum	Less than 2 Torr minimum
Analog Output (Standard Model):	0 to 2.000 VDC	0 to 1.500 VDC
Analog Output (Auxiliary Output Model):	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
Maximum Pressure without Calibration Change:	60,000 Torr (1250 PSIG)	2,300 Torr (30 PSIG)
Effect of Ambient Temp. Changes from 0 °C to 50 °C Reading will change less than:	0.2 mT per oC at 50 mT; 4 mT per oC at 900 mT	± 0.02% per oC
Maximum Transducer Bakeout Temperature:	100°C	
Display:	3 1/2 Digit, Green LED character height 0.47 in. (11 mm).	
Set Points and Relays:	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.	
Transducer Orientation:	Calibration is not affected by orientation.	
Line Voltage and Power:	95 to 120V, 50/60 Hz standard; 220 V available. 5 watts with both relays energized.	
Line Cord:	65 inch (1.7 meter) attached, 3 conductor.	
Bench or Panel Mounting:	Panel cutout: 3.62 in. W X 4.68 in. H (92 X 119 mm). Panel mount jack screws included.	
Dimensions & Internal Volume:	Dimensions: See page 41. Internal Volume: 3.3 cc (1/8 NPT & SS Diaphragm).	
Transducer Cables (see pg. 39 for extension cables):	10 ft. (3 m) with connectors on both ends. Cables up to 250 ft. (75 m) available.	
Weight with Transducer (Standard / Aux. Output):	Net 4 lb. (1.8 kg); Shipping 6.0 lb. (2.7 kg); add 1 lb. (2.2 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)	\$1,197
.001 to 2000 millibar, P/N: 902075 (220VAC 50/60 Hz)	\$1,197
0.1 PA to 200 kPa, P/N: 902076 (220VAC 50/60 Hz)	\$1,197
1 mTorr to 1500 Torr, P/N: 902056 (115VAC 50/60 Hz)	\$1,197
.001 to 2000 millibar, P/N: 902072 (115VAC 50/60 Hz)	\$1,197
0.1 PA to 200 kPa, P/N: 902073 (115VAC 50/60 Hz)	\$1,197

Wide Range Display Units with Auxiliary Outputs

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 or 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	\$1,580
0.1 Pa to 200 kPa (115VAC 50/60 Hz) P/N: 902127	\$1,580
.001 to 2000 millibar (115VAC 50/60 Hz) P/N: 902126	\$1,580

Replacement Sensors for Mini Transducers, 1999 & later

Pirani Sensor; Mini Transducer, P/N: 902300	\$233
Silicon Diaphragm Sensor; Mini Transducer, P/N: 902301	\$305
Stainless Steel Diaphragm Sensor; Mini Transducer, P/N: 902079	\$528

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	\$510 plus old transducer
Exchange Transducer with new Stainless Steel Diaphragm and Pirani Sensors. Calibrated and ready to operate. P/N 902308	\$734 plus old transducer

BUY NOW! Go to www.vacuumresearch.com to order online

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

Mini Transducers with Silicon Diaphragm

The new Mini Transducers operate with all models of VRC 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	\$860
1/2 in. OD tube	P/N: 902055-mini	\$860
15 mm OD tube	P/N: 902122-mini	\$860
NW-16 flange	P/N: 902068-mini	\$861
NW-25 flange	P/N: 902147-mini	\$861
VCR-4, Male	P/N: 902085-mini-MAL	\$895
VCR-4, Female	P/N: 902085-mini-FEM	\$895
VCR-8, Male	P/N: 902091-mini-MAL	\$895
VCR-8, Female	P/N: 902091-mini-FEM	\$895
VCO-8, Male	P/N: 902146-mini-MAL	\$895
VCO-8, Female	P/N: 902146-mini-FEM	\$895
1.33 in. Conflat®	P/N: 902153-mini	\$861
2.75 in. Conflat®	P/N: 902210-mini	\$861

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 L stainless steel including the diaphragm itself. SS Sensor Max. Pressure w/o Damage: 4,500 Torr, burst 6,000 Torr.

1/8 in. NPT	P/N: 902057-mini	\$1,000
1/2 in. OD tube	P/N: 902052-mini	\$1,000
15 mm OD Tube	P/N: 902121-mini	\$1,000
NW-16 flange	P/N: 902067-mini	\$1,063
NW-25 flange	P/N: 902151-mini	\$1,063
VCR-4, Male	P/N: 902051-mini-MAL	\$1,096
VCR-4, Female	P/N: 902051-mini-FEM	\$1,096
VCR-8, Male	P/N: 902092-mini-MAL	\$1,096
VCR-8, Female	P/N: 902092-mini-FEM	\$1,096
VCO-4, Male	P/N: 902157-mini-MAL	\$1,096
VCO-4, Female	P/N: 902157-mini-FEM	\$1,096
VCO-8, Male	P/N: 902150-mini-MAL	\$1,096
VCO-8, Female	P/N: 902150-mini-FEM	\$1,096
1.33 in. Conflat®	P/N: 902154-mini	\$1,063
2.75 in. Conflat®	P/N: 902211-mini	\$1,063

Diaphragm Manometer; 0.5 to 1200.0 Torr $\pm$ 0.1 Torr



Photo shows the indicator and 1200 Torr head with Conflat® flange.

The Vacuum Research Diaphragm Manometers are compact vacuum measurement and control instruments that are unaffected by gas composition. The sensors have 316 L stainless steel diaphragms and any sensor can measure liquid or gas pressure as well as vacuum.

Response time is less than 400 milliseconds for full scale and sensors are available with a variety of flanges including VCR or NW styles. With any sensor, these instruments offer the precision

- 0.5 to 1200.0 Torr Range; $\pm$ 0.1 Torr Resolution
- 316 S.S. Diaphragm Measures Gas Or Liquid
- Available 0.5 to 1600.0 mbar & 0.1 to 160.00 kPa
- Dual Set Point Controller With 2 Relays
- Easy To Use; No Keyboards or Scrolling Menus
- Linear 0 to 10 VDC Output; 4-20 mA Optional
- Fast Response; Less Than 400 mSec. Full Scale

and high resolution of digital electronics at the same price as analog instruments. Both indicator and controllers are provided in 1/4 DIN enclosures.

The Dual Set Point Controller operates two control relays. Set point values are adjusted from the front panel and displayed on the meter. Push-to-set switches simplify display of the set point pressures. Relays have 3 Amp contacts, SPDT, and have screw terminal connectors on the rear of the instruments.

Specifications

Pressure Range: 0.5 to 1200 Torr; $\pm$ 0.1 Torr.

SS Sensor Max. Pressure w/o Damage: 4,500 Torr, burst 6,000 Torr.

Resolution: $\pm$ 0.1 Torr over entire range.

Display: 4 1/2 digit red LED; characters .47 in. (12 mm) high.

Calibration: Any gas, liquid or vacuum compatible with sensor materials.

Accuracy: 1% of reading or 1 Torr.

Response Time: Less than 400 msec. for response to a step change.

Linearity: $\pm$ 0.15% Full Scale. Sensitivity: $\pm$ 0.1 Torr

Analog Output: 0 to 10 Volt DC into 2000 Ohm load or higher. 2 pin connector included. 4 to 20 mA output in addition to 0 to 10 Volt D.C. available.

Sensor: See "ordering Information" below for list of sensor heads.

Materials: All parts in contact with process are 316 L Stainless Steel.

Set Point Range: Full Scale, 0.5 to 1200 Torr. Repeatability: $\pm$ 1 Torr.

Relays: Controller model includes 2 relays; SPDT contacts rated 3A @ up to 220 VAC non-inductive.

Sensor Internal Volume: 1.25 ml for stainless steel sensor.

Line Power: 115 VAC, 50/60 Hz; 230 VAC or 24 VDC optional at no additional cost.

Wattage: Less than 1 Watt for indicator; 2 Watts for controller.

Line Regulation: $\pm$ 20% change in line voltage produces less than 1% change in reading.

Temperature Effects: When changes occur in ambient temperature between 0°C and 50°C, reading will change no more than $\pm$ 0.02% per C°.

Bakeout Temperature: Sensor can be baked to 100°C (212 oF) in air or vacuum.

Dimensions: 1/4 DIN enclosure. See drawing on page 40.

Mounting: Panel mounting hardware is standard. Bench mount and portable cabinets are also available, see page 39.

Sensor Cables: 10 ft. (3m) attached.

Extension Cables: Change sensor cable length without recalibration. Extensions to 250 ft. (75 m) can be used. see page 39.

Line Cord: 3 wire, 65 inch (170 cm) attached.

Net Weight: Indicator 1 lb., 2 oz. (0.5 kg); Controller 1 lb., 6 oz. (0.6 kg)

Shipping Wt.: Indicator 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.3 kg)

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

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Digital Indicator and Controller

Dual Set Point Controller With Digital Display in 1/4 DIN enclosure. Included are 2 adjustable set points with SPDT relays. Contacts rated 3 Amps up to 220 VAC non-inductive. 10 ft (3 m) sensor head cable, power line cord, and jack screws for panel mounting. 0 to 10 VDC analog output. Built to CSA standards. Sensor not included.

P/N: 902226\$1,270

Digital Indicator only in 1/4 DIN enclosure. Includes 10 ft (3 m) sensor head cable, power line cord, and jack screws for panel mounting. 0 to 10 VDC analog output. Built to CSA standards. Sensor not included.

P/N: 902225\$952

4 to 20 mA Output in addition to 0 to 10 VDC analog output.

P/N: V801082 add \$326

Calibrator for 0.5 to 1200 Torr Instruments See page 33 for a complete description of the calibrator. P/N: 912300\$509

Gauge and sensor accessories see pages 35, 36, 37 and 39
24VDC for 1/4 DIN enclosures Add \$105

1200 Torr Sensor Heads, 316 SS Diaphragms

Sensor Heads with Stainless Steel Diaphragm outer case and wetted parts 316 L stainless steel. Connector pins are nickel plated Kovar. Maximum bake-out temperature 100°C.

1200 Torr Head, SS Diaphragm, 1/4 in. NPT. P/N: 912261\$582

1200 Torr Head, SS Diaphragm, VCR-8 Female, P/N: 912262\$733

1200 Torr Head, SS Diaphragm, VCR-4 Female, P/N: 912263\$653

1200 Torr Head, SS Diaphragm, NW-16 Flange, P/N: 912264\$653

1200 Torr Head, SS Diaphragm, NW-25 Flange, P/N: 912265\$653

1200 Torr Head, SS Diaphragm, 1.33 in. Conflat®, P/N: 912266\$653

1200 Torr Head, SS Diaphragm, 1/2 in. OD Tube, P/N: 912267\$653

1200 Torr Head with All Stainless External Parts for outdoor applications or wherever the use of all stainless steel is appropriate. All external parts are 316 SS except connector pins which are 304SS.

Add SS suffix to sensor P/N and to price:add \$61



Photo shows the indicator with standard enclosure on the left, and dual set point controller in the 1/4 DIN enclosure on the right.

The Vacuum Research Diaphragm Manometers are compact vacuum measurement and control instruments. The sensors are available with either 316 SS or pure silicon diaphragms and any sensor can measure liquid or gas pressure as well as vacuum. Response time is less than 400 milliseconds for full scale and sensors are available with a variety of flanges including 15 mm, VCR, and NW-16. With any sensor, these instruments offer the precision and high resolution of digital electronics at the same price as analog instruments. Both indicator and controllers are provided in 1/4 DIN or standard cylindrical enclosures.

Specifications

Pressure Range: 1 to 1500 Torr; ± 1 Torr (± 0.1 Torr optional).
SS Sensor Max. Pressure w/o Damage: 4,500 Torr, burst 6,000 Torr.
Calibration: Any gas, liquid or vacuum compatible with sensor materials.
Accuracy: 1% of reading or 2 Torr.
Response Time: Less than 400 msec. for response to a step change.
Linearity: $\pm 0.15\%$ Full Scale. Sensitivity: ± 1 Torr.
Analog Output: 0 to 1.500 Volt into 2000 Ohm load or higher. 2 pin connector included. 4 to 20 mA and 0 to 10 VDC output in addition to 0 to 1.500 Volt D.C. available for instruments in 1/4 DIN enclosure.
Transducer: See "ordering Information" below for list of transducers.
Materials: All parts in contact with process are 316 or 304 SS, or silicon.
Set Point Range: Full Scale, 1 to 1500 Torr. Repeatability: ± 2 Torr.
Sensor Internal Volume: 1.25 ml for SS; 0.5 ml for Silicon.
Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.
Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.

- 1 to 1500 Torr Range; ± 1 Torr Resolution
- ± 0.1 Torr Resolution Available as Option
- Available in 1 to 2000 mbar & 0.1 to 200 kPa
- 316 S.S. Diaphragm Measures Gas Or Liquid
- Dual Set Point Controller With 2 Relays
- Easy To Read Large Backlit Digital Display
- Linear 0 to 1.5 VDC Output; 4-20 mA Optional
- Fast Response; Less Than 400 mSec. Full Scale

The Dual Set Point Controller operates two control relays. Set point values are adjusted from the front panel and displayed on the meter. Push-to-set switches simplify display of the set point pressures. Relays have 3 Amp contacts, SPDT, and have screw terminal connectors on the rear of the instruments.

For applications that require maximum resolution a special display unit is available with a 4 1/2 place LED display. To specify this feature add to the part number "HI-RES" suffix and add \$265.00 to the price.

Wattage: Less than 1 Watt for indicator; 2 Watts for controller.

Temperature Effects: When changes occur in ambient temperature between 0°C and 50°C, reading will change no more than $\pm 0.02\%$ per C°.

Bakeout Temperature: Gauge tube can be baked to 100°C (212°F) in air or vacuum.

Dimensions: DIN enclosure: 92X92 mm panel cutout, 122 mm F to B. Standard enclosure: 2.75 in. diameter panel cutout, 4.8 in. F to B.

Mounting: Panel mounting hardware is standard. Bench mount and portable cabinets are also available, see page 39.

Transducer Cables: 10 ft. (3m) attached.

Extension Cables: Change sensor cable length without recalibration. Extensions to 500 ft. (150m) can be used. see page 39.

Line Cord: 3 wire, 65 inch (170 cm) attached.

Net Weight: Indicator 1 lb., 2 oz. (0.5 kg); Controller 1 lb., 6 oz. (0.6 kg)

Shipping Wt.: Indicator 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.3 kg)

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Dual Set Point Controller With Digital Display in standard enclosure. Transducer not included. P/N: 902019\$870

Dual Set Point Controller With Digital Display in 1/4 DIN enclosure. Built to CSA standards. Transducer not included. P/N: 902094.....\$925

Digital Indicator only in standard enclosure. Transducer not included. P/N: 902020\$594

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Transducer not included. P/N: 902093\$655

High Resolution Option For higher resolution, instruments can be ordered with a 4 1/2 place LED display for resolution of ± 0.1 Torr. Add suffix "Hi-Res" and P/N V801302. Additional cost\$311

4 to 20 mA or 0 to 10 VDC Output in addition to 0 to 1.5 VDC analog output. Only available for instruments in 1/4 DIN enclosure P/N: V801082..... add \$326

Calibrator for 1 to 1500 Torr Instruments See page 33 for a complete description of the calibrator. P/N: 912027.....\$343

Gauge and transducer accessories see pages 35, 36, 37 and 39.

Transducer with Stainless Steel Diaphragm outer case, connector pins, and wetted parts 316 stainless steel. Maximum bake-out temperature 125°C. 1/4 in. NPT. P/N: 912022\$561
 24VDC for 1/4 DIN enclosures Add \$105

BUY NOW! Go to www.vacuumresearch.com to order online

Stainless Steel Diaphragm with VCR-8 FEM , P/N: 902050.....	\$719
Stainless Steel Diaphragm with VCR-4 FEM , P/N: 912219.....	\$671
Stainless Steel Diaphragm with NW-16 Flange , P/N: 912151.....	\$619
Stainless Steel Diaphragm with NW-25 Flange , P/N: 912117	\$619
Stainless Steel Diaphragm with 1.33 in. Conflat® , P/N: 912191.....	\$619
Stainless Steel Diaphragm with 1/2 in. OD Tube , P/N: 912210	\$619
Stainless Steel Diaphragm with 1/8 in. NPT , P/N: 912129	\$619

Transducer with Silicon Diaphragm body is 304 SS, connector pins are nickel plated Kovar®. Maximum bake-out 125°C.					
Flange	P/N	Price	Flange	P/N	Price
1/8" NPT Male Thread	912091	\$347	3/8". OD Tube	912311	\$401
VCR-4 Fitting	912025	\$457	1/2". OD Tube	912211	\$401
NW-16	912023	\$412	NW-25	912119	\$412
1.33" Conflat®, non-rotatable				912026	\$401
All 304 Stainless External Parts & Pins for outdoor applications or wherever the use of 304 SS is appropriate.				Add SS to P/N	add \$61



Indicator in standard enclosure shown on the left, controller with dual set points and 1/4 DIN enclosure shown on the right.

These are compact vacuum/pressure measurement and control instruments that offer the precision and high resolution of digital electronics at the same price as analog instruments. These instruments utilize a rugged silicon diaphragm transducer with a 1/8 inch NPT connection in a stainless steel housing. Transducers with stainless steel diaphragm and stainless steel housing are also available. The meter display reads from -30.0 to +150.0, with the minus sign indicating vacuum in inches of mercury, and the positive sign indicating pressure in PSIG.

Specifications

Pressure Range: 30 in. Hg vacuum to 150.0 PSIG pressure. Transducer can withstand overpressure to 200 PSIG.

Calibration: Air or nitrogen.

Accuracy: 2% of full scale.

Display: 3 1/2 Digit Green Backlit LCD.

Analog Output: Minus 300 millivolts to 0.0 Volts at atmosphere; 0 to 1.50 Volts D.C. from atmosphere to 150 PSIG. 4 to 20 mA and 0 to 10 VDC output in addition to 0 to 1.50 Volt D.C. available for instruments in 1/4 DIN enclosure.

Transducers: Silicon diaphragm with 1/8 NPT male thread port standard. Optional is 316 SS stainless steel diaphragm with 1/4 NPT male port. Set

Point Range: Full Scale, 30 in. Hg to 150.0 PSIG.

Set Point Repeatability: ± 0.2 in. Hg; ± 0.2 PSIG.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

- 30 Inches Hg Vacuum to 150.0 PSIG Pressure
- ± 0.1 Inches Hg and 0.1 PSIG Resolution
- Easy To Read 3 1/2 Digit Backlit Display
- Dual Set Point Controller With 2 Relays
- Analog Output Scaled In PSI and Inches Hg
- Change Cable Length Without Re-calibrating
- Fits Hastings, Varian, TeleVac Panel Cut-Outs

The dual set point controller operates two independently-set control relays. Set point values are easily adjusted from the front panel and displayed on the meter with push-to-set switches. Each relay has 3 Amp contacts, form C. Screw terminals for the relay outputs are provided on the rear panel.

Both the indicator and the controller instruments are available in either 1/4 DIN or 2.75 inch diameter standard enclosures. The 2.75 inch diameter standard enclosure fits the same panel cut out as Hastings, Varian, Televac and other analog meters. Mounting hardware is included with both styles.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.33% per C°.

Bakeout Temperature: Transducer can be baked to 100 °C (212°F) in air or vacuum.

Dimensions: See page 40.

Mounting: Panel mount hardware is standard. Bench mount and portable cabinets are also available, see page 39.

Transducer Cables: 10 ft. (3m) attached.

Transducer Extension Cables: Change transducer cable length without recalibration. Extensions to 500 ft. (150 m) can be used, see page 39.

Line Cord: 3 wire, 65 inch (170 cm) attached.

Net Weight: Indicator: 1 lb., 2 oz. (0.5 kg); Controller: 1 lb., 6 oz. (0.6 kg)

Shipping Wt.: Indicator: 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.3 kg)

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Dual Set Point Controller With Digital Display in standard enclosure. Transducer not included. P/N: 904001\$981

Dual Set Point Controller With Digital Display in 1/4 DIN enclosure. Built to CSA standards. Transducer not included. P/N: 904008.....\$1,042

Digital Indicator only in standard enclosure. Transducer not included. P/N: 904002.....\$662

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Transducer not included. P/N: 904007\$723

4 to 20 mA or 0 to 10 VDC Output in addition to the standard analog output. Only available for instruments in 1/4 DIN enclosure.

P/N: V801082 add \$326

Calibrator for 30" Hg - 150.0 PSIG Instruments

See page 33 for a complete description of the calibrator.

P/N: 912021\$344

24VDC for 1/4 DIN enclosures Add \$105

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Silicon Diaphragm Transducer for 30 Inches Hg to 150.0 PSIG. Transducer body is 304 SS, connector pins are nickel plated Kovar. 1/8 in. NPT male thread. P/N: 912065 \$347

Silicon Diaphragm Transducers with All Stainless External Parts for outdoor applications or wherever the use of 304 SS is appropriate. All external parts and connector pins are 304 SS. Add SS suffix to tube P/N and to tube price: add \$61

Standard Stainless Steel Diaphragm Transducer for 30 In. Hg to 150 PSIG instruments. Diaphragm and all wetted parts are 316 SS, all other parts are 304 SS. 1/4 in. NPT male thread. P/N: 912093..... \$542

Quick connect couplings, waterproof vacuum sensors, gauge tube selector switch, bench mount cabinets, extension cable, and explosion-proof gauges see pages 35 and 39.

Diaphragm Pressure Gauge; 0.01 to 200 PSIG



Photo shows the indicator with standard enclosure on the left, and dual set point controller in the 1/4 DIN enclosure on the right.

The Vacuum Research pressure gauges are compact pressure measurement and control instruments that offer the precision and high resolution of digital electronics at the same price as analog instruments. These instruments use a rugged and stable silicon diaphragm type transducer with a 1/8 inch NPT connection in a stainless steel housing.

The dual set point controller instruments operate two independently set control relays. Set point values are easily adjusted from the front

- 0.01 to 20 or 0.1 to 200 PSIG Ranges
- ± 0.1 PSIG Resolution Over Entire Range
- Easy To Read 3 1/2 Digit Backlit Display
- Dual Set Point Controller With 2 Relays
- Linear 0 to 2.0 Volt D.C. Analog Output
- Change Cable Length Without Re-calibrating
- Fits Hastings, Varian, TeleVac Panel Cut-Outs

panel and displayed on the meter with push-to-set switches. Each relay has 3 Amp contacts, form C. Screw terminals for the relay outputs are provided on the rear panel.

Both the indicator and the controller instruments are available in either 1/4 DIN or 2.75 inch diameter standard enclosures. The 2.75 inch diameter standard enclosure fits the same panel cut out as Hastings, Varian, Televac and other analog meters. Mounting hardware is included with both styles.

Specifications

Pressure Range: 0.01 to 20 PSIG or 0.1 to 200 PSIG

Calibration: Air or Nitrogen.

Accuracy: 2% of full scale range.

Display: 3 1/2 Digit Green Backlit LCD.

Analog Output: 0 to 2.000 Volts into 2000 Ohm load or higher (or 0 to 1.000 Volts for 200 PSIG). 2 pin connector included. 4 to 20 mA and 0 to 10 VDC output in addition to analog voltage output available for instruments in 1/4 DIN enclosure.

Set Point Range: Full scale, 0 to 20 or 0 to 200 PSIG.

Repeatability: ± 2 digits.

Transducer: 1/8 NPT male thread.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Ambient Operating Range: Minus 40°C to 100°C.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.33% per C°.

Bakeout Temperature: Gauge tube can be baked to 100°C (212°F) in air or vacuum.

Dimensions: See page 40.

Mounting: Panel mounting hardware is standard. Bench mount and portable cabinets are also available, see page 39 for specifications.

Transducer Cables: 10 ft. (3m) attached.

Extension Cables: Change transducer cable length without recalibration. Extensions to 500 ft. (150 m) can be provided, see page 39.

Line Cord: 3 Wire, 65 inch (170 cm) attached.

Net Weight: Indicator: 1 lb., 2 oz. (0.5 kg); Controller: 1 lb., 6 oz. (0.6 kg)

Shipping Wt.: Indicator: 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.3 kg)

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

0.01 to 20 PSIG Dual Set Point Controller With Digital Display in standard enclosure. Gauge tube not included. P/N: 904005\$913

0.1 to 200 PSIG Dual Set Point Controller With Digital Display in standard enclosure. Gauge tube not included. P/N: 904003\$913

0.01 to 20 PSIG Digital Indicator only in standard enclosure. Gauge tube not included. P/N: 904006\$594

0.1 to 200 PSIG Digital Indicator only in standard enclosure. Gauge tube not included. P/N: 904004\$566

4 to 20 mA or 0 to 10 VDC Output in addition to 0 to 2.000 VDC or 0 to 1.000 VDC analog output. Only available for instruments in 1/4 DIN enclosure. P/N: V801082.....add \$326

Calibrators for Pressure Instruments..... See page 33

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Silicon Diaphragm Transducer for Pressure Instruments. Wetted parts are silicon and 304 SS. Transducer body is 304 SS, connector pins are nickel plated Kovar.

0.01 to 20 PSIG With 1/8 in. NPT Male Thread, P/N: 912075\$347

0.1 to 200 PSIG With 1/8 in. NPT Male Thread, P/N: 912100.....\$347

0.1 to 200 PSIG Stainless Steel, 1/4 in. NPT, P/N: 912094.....\$542

All Stainless Steel Gauge Tubes For Outdoor Applications or wherever the use of 304 SS is appropriate. All external parts and connector pins are 304 SS. Add SS suffix to tube P/N and to tube price:.....add \$61

Gauge tube baffles and trapssee page 36

Quick connect couplings, tube selector switch, extension cable, and other accessories.....see pages 35 and 39



Photo shows digital Convection Gauge Controller with two adjustable setpoints and angle style 1/8" NPT gauge tube

Wide Range and Low Cost

The convection gauge is the lowest cost instrument that can provide continuous monitoring and control of your vacuum system from atmosphere all the way down to 1 mTorr. The gauge tube is all stainless steel and has both 1/8 inch NPT and 1/2 inch O.D. smooth tubulation for sealing in compression ports. Optional flanges include NW and Conflat® and are described in the order-ing information section below.

Specifications for Digital Convection Gauges

Range of Measurement: 1 milliTor to Atmosphere; Pa, mbar available.

Sensor Type: Thermal convection.

Resolution: ± 1 milliTor from 1 to 2000 milliTor; ± 1 Torr above 2 Torr.

Response Time: Less than 1 second for 90% of an increase in pressure, less than 4 secs. for a decrease in pressure from atmosphere to 1 mTorr.

Hysteresis: Minimum hysteresis is less than 2 mTorr from 1 to 2000 mTorr and less than 2 Torr from 2 Torr to atmosphere. To prevent relay chatter hysteresis is adjustable to as high as 5% of full range.

Maximum Pressure without Calibration Change: 2300 Torr (30 PSIG)

Maximum Gauge Tube Temperature: 100 °C (212 °F) maximum bake out of gauge tubes in air or vacuum. Automatic compensation 0 to 35°C.

Display: 3 1/2 digit, Green LED character height 11 mm (.47 in.)

2 ranges: 1 mTorr to 1999 mTorr and 1 Torr to 777 Torr.

Analog Outputs: Convection Gauge has 3 simultaneous outputs:

1 mTorr to 2000 mTorr: 1 mV per mTorr (0 to 2 VDC Linear)

2 Torr to 20 Torr: 100 mV per Torr (0.2 to 2 VDC Linear)

20 Torr to 800 Torr: 1 mV per Torr (.020 to .800 VDC Linear)

Gauge Tube Orientation: Axis of tube must be horizontal.

Line Power: 95 to 125 VAC, 50/60 Hz; 220 VAC optional, no extra cost. Wattage: 5 watts with both relays energized.

Line Cord: 3 wire 1.7 meter (65 inch) attached.

Gauge Tube Cable: Standard length is 3 m (10 ft.) attached to cabinet. Use up to 150 m (500 ft.) without affecting calibration.

Mounting: 1/4 DIN enclosure suitable for panel or bench mounting. Panel mounting jack screws included. Carry handle also available.

Weight with Gauge Tube: Net: 1 lb. 2 oz. (0.5 kg); Ship: 3 lbs. (1.4 kg.)

Optional Set Points and Relays: 2 independent set points with front panel LED indicators and 2 SPDT relays 3 amp @ 115 VAC, non-inductive. Adjustable from front panel over 100% of range.

- Wide Range; 1 mTorr to Atmosphere
- Select Calibration in Torr, Pascal, or mBar
- Linear Analog Outputs for Computer Interface
- Large Easy To Read Green LED Display
- 1/4 DIN Bench or Panel Mount Enclosure
- Two Set Points with 3 Amp Relays Optional
- Single Sensor Covers Entire Range
- Under 1 Second Response to Rising Pressure
- All Cables and Mounting Hardware Included
- Extension Cables Available up to 500 Feet

Nitrogen, Argon and Other Gases

As a general purpose instrument for monitoring the pump down of systems vented to air or nitrogen, the convection gauge is an excellent choice. The convection gauge can be provided to read directly for argon or other gases. But, if your system uses a variety of gases, or if accuracy between 2 Torr and 800 Torr is critical in your process, then our diaphragm manometer instruments may be a better selection.

Ordering Information: Digital Convection Gauges

BUY NOW! Go to www.vacuumresearch.com to order online

Digital Dual Set Point Convection Gauge Controller

Two adjustable set points plus 3 linear analog outputs. 1/4 DIN enclosure with jack screws for panel mounting. Standard power 95 to 125 VAC

50/60 Hz, 220 VAC optional at no extra cost. Built to CSA standards. All cables are included but gauge tube is not. Use angle or inline style.

1 mTorr to atmosphere, P/N: 902171	\$962
.001 mbar to atmosphere, P/N: 902176-mbar	\$962
0.1 Pa to atmosphere, P/N: 902177-Pascal	\$962

Digital Convection Gauge Indicator 1 mTorr to Atmosphere

Three linear analog outputs, no serial I/O or setpoints. 1/4 DIN enclosure with jack screws for panel mounting. Standard power 95 to 125 VAC 50/60 Hz, 220 VAC optional at no extra cost. Built to CSA standards. All cables are included but gauge tube is not. Use angle or inline style.

1 mTorr to atmosphere, P/N: 902178	\$662
.001 mbar to atmosphere, P/N: 902179	\$662
0.1 Pa to atmosphere, P/N: 902180	\$662

Angle Style Convection Gauge Tubes (Interchangeable with Inline)

Gauge Tube body and all wetted parts are 304 SS. Connector pins are nickel plated Kovar.

With 1/8 inch NPT and 1/2 inch OD Tube, P/N: 912161	\$150
With NW-16 Flange, P/N: 912162 • NW-25 Flange, P/N: 912201	\$205
With 15 mm OD Tube, P/N: 912167	\$205
With 1.33 in. OD Conflat® (rotatable), P/N: 912163	\$205
With 2.75 in. OD Conflat® (rotatable), P/N: 912164	\$205
With VCR-8 FEM, P/N: 912165	\$237
With VCR-4 FEM, P/N: 912166	\$237

All Stainless Steel Gauge Tubes for outdoor applications. All wetted parts as well as all external parts and connector pins are 304 SS.

Add SS suffix to tube P/N and to tube price: add \$61

3 Position Gauge Tube Selector, P/N: 902027 \$519

Calibrators for Digital Convection Gauge Indicator or Controller

P/N: 912170

24VDC for 1/4 DIN enclosures Add \$103



Analog Convection Gauge with optional dual set points

Wide Range and Low Cost

The convection gauge is the lowest cost instrument that can provide continuous monitoring and control of your vacuum system from atmosphere all the way down to 1 mTorr. The gauge tube is all stainless steel and is very rugged and reliable. The standard gauge tube has both 1/8 inch NPT and 1/2 inch O.D. smooth tubulation for sealing in compression ports. Optional flanges include NW and Conflat® and are described in the ordering information section below.

Temperature Compensated

An internal temperature compensator virtually eliminates the errors due to ambient temperature changes that are so troublesome with other convection gauges.

Specifications for Analog Convection Gauges

Range of Measurement: 1 milliTorr to Atmosphere.

Sensor Type: Thermal convection.

Resolution: ± 2 milliTorr from 1 to 25 milliTorr; or 2% of meter full scale.

Response Time: Less than 1 second for 90% of an increase in pressure, less than 4 secs. for a decrease in pressure from atmosphere to 1 mTorr.

Hysteresis: Minimum hysteresis is less than 2 mTorr from 1 to 25 mTorr and less than 2% of full scale to atmosphere. To prevent relay chatter hysteresis is adjustable to as high as 5% of full scale.

Maximum Pressure without Calibration Change: 2300 Torr (30 PSIG)

Maximum Gauge Tube Temperature: 100°C (212°F) maximum bake out of gauge tubes in air or vacuum. Automatic compensation 0 to 35°C.

Display: Precision analog meter.

Analog Output: 0 to 5 VDC, non linear.

Gauge Tube Orientation: Axis of tube must be horizontal.

Line Power: 95 to 125 VAC, 50/60 Hz; 220 VAC optional, no extra cost.

Wattage: 5 watts with both relays energized.

Line Cord: 3 wire 1.7 meter (65 inch) attached.

Gauge Tube Cable: Standard length is 3 m (10 ft.) attached to cabinet. Use up to 150 m (500 ft.) without affecting calibration.

Mounting: 1/4 DIN enclosure suitable for panel or bench mounting. Panel mounting jack screws included. Carry handle also available.

Weight with Gauge Tube: Net: 4 lb. (1.8 kg); Ship: 4.8 lbs. (2.2 kg.)

Optional Set Points and Relays: 2 independent set points with front panel LED indicators and 2 SPDT relays 3 amp @ 115 VAC, non-inductive. Adjustable from front panel over 100% of range.

- Wide Range; 1 mTorr to Atmosphere
- 5 VDC Analog Output for Computer Interface
- 1/4 DIN Bench or Panel Mount Enclosure
- Two Set Points with 3 Amp Relays Optional
- Single Sensor Covers Entire Range
- Under 1 Second Response to Rising Pressure
- All Cables and Mounting Hardware Included
- Extension Cables Available up to 500 Feet

Safe With Mercury and Fluorine

Mercury and Fluorine vapors are no problem for the Vacuum Research convection gauge. Our filament is a platinum alloy which operates below 100°C and all other gauge tube components exposed to vacuum are 300 series stainless steel. For outdoor applications, or for corrosive environments, gauge tubes are also available with stainless steel connector pins.

Nitrogen, Argon and Other Gases

The convection gauge can be provided to read directly for argon or other gases. But, if your system uses a variety of gases, or if accuracy between 2 Torr and 800 Torr is critical in your process, then the Vacuum Research Wide Range Diaphragm Manometer instruments may be a better selection.

Ordering Information; Analog Convection Gauges

BUY NOW! Go to www.vacuumresearch.com to order online

Analog Convection Gauge Controller

Two adjustable set points and a non-linear 0 to 5 VDC analog output. Large analog meter calibrated from 1 milliTorr to atmosphere, 760 Torr. 1/4 DIN enclosure with jack screws for panel mounting. Standard power is 95 to 125 VAC 50/60 Hz, 220 VAC optional at no extra cost. Add "220" suffix to P/N. Built to CSA standards. All cables included but gauge tube is not. (Use angle or inline style.) P/N: 902215.....\$784

Analog Convection Gauge Indicator

Large analog meter calibrated from 1 milliTorr to atmosphere, 760 Torr. 1/4 DIN enclosure with jack screws for panel mounting. Standard power is 95 to 125 VAC 50/60 Hz, 220 VAC optional at no extra cost. Add "220" suffix to P/N. Built to CSA standards. All cables included but gauge tube is not. (Use angle or inline style.) P/N: 902214.....\$490

Inline Style Convection Gauge Tube (Interchangeable with Angle)

Gauge Tube body and all wetted parts are 304 SS. Connector pins are nickel plated Kovar®.

With 1/8 inch NPT and 1/2 inch OD Tube, P/N: 912232	\$134
With NW-16 Flange, P/N: 912233 • NW-25 Flange, P/N: 912234.....	\$189
With 15 mm OD Tube, P/N: 912235	\$189
With 1.33 in. OD Conflat® (non-rotatable), P/N: 912236	\$189
With 2.75 in. OD Conflat® (non-rotatable), P/N: 912237	\$189
With VCR-8 FEM, P/N: 912238	\$218
With VCR-4 FEM, P/N: 912239	\$218

For Leak 1/4 in. NPT, P/N: 912105	\$170
Detectors 1/2 in. OD Tube, P/N: 912280	\$170

All Stainless Steel Gauge Tubes for outdoor applications. All wetted parts as well as all external parts and connector pins are 304 SS. Add SS suffix to tube P/N and to tube price: add \$61

3 Position Gauge Tube Selector, P/N: 902027 \$519

5 Position Gauge Tube Selector, P/N: 902026 \$701

Calibrator for Analog Convection Gauge, P/N: 912183 \$331



Photo shows the dual set point controller with standard enclosure on the left, and indicator in the 1/4 DIN enclosure on the right.

These compact vacuum measurement and control instruments offer the precision and high resolution of digital electronics at the same price as analog instruments. Our extremely rugged sensor is constructed with a solid, inert, noble metal that maintains calibration over long periods. Because no gold is used, these gauges are compatible with both mercury and oil pumps. The low 125°C operating temperatures in our Pirani type gauge tube (half that of thermopile gauges), enhances stability as does a unique temperature compensation network. Gauge tubes are matched so they can be replaced without recalibration, and they can withstand working pressures to 300 PSI, tested to 1200 PSI.

Specifications

Pressure Range: 0.01 to 100.00 mTorr (10^{-5} to 10^{-1} mm Hg.)
Calibration: Air or Nitrogen.
Accuracy: Better than 5% of value or ± 0.03 mTorr, whichever is larger.
Response Time: For 90% of step change; 1 mT to Atmos. ~ 1 sec., 10 mT to 100 mT 7 sec., 1 mT to 10 mT 18 sec.
Display: 4 1/2 Digit Green Backlit LCD. Decimal display is standard (.01 to 100.00 mTorr). Exponential display is optional (1.0×10^{-5} to 1.0×10^{-1})
Analog Output: 0 to 1.000 Volt D.C. into 2000 Ohm load or higher. 2 pin connector included. 4 to 20 mA and 0 to 10 VDC output in addition to 0 to 1.000 Volt D.C. available for instruments in 1/4 DIN enclosure.
Gauge Tubes: Have 3/4 inch O.D. smooth tubulation to fit standard gauge quick connects. NW or Conflat® flanges available.
Set Point Range: Full Scale, 0.01 to 100 mT. Repeatability: ± 0.02 mTorr.
Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost. Line
Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Dual Set Point Controller With Digital Display in standard enclosure. Gauge tube not included. P/N: 902005\$1,205
Dual Set Point Controller With Digital Display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902096.....\$1,262
Digital Indicator only in standard enclosure. Gauge tube not included. P/N: 902006\$915
Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902095.....\$962
4 to 20 mA or 0 to 10 VDC Output in addition to 0 to 1.000 VDC analog output. Only available for instruments in 1/4 DIN enclosure. P/N: V801082add \$326
 See page 33 for a complete description of the calibrator. P/N: 912019.....\$337
Gauge and gauge tube accessories.....see pages 35, 36, 37 and 39.
 24VDC for 1/4 DIN enclosures Add \$105

- 0.01 to 100 mTorr Range (10^{-5} to 0.1 Torr)
- .01 to 100 X 10^{-3} mbar or .001 to 13.333 Pa
- Safe to Operate, No High Voltage, No Magnets
- ± 0.01 mT Resolution Over Entire Range
- Easy To Read Decimal or Exponential Display
- Dual Set Point Controller With 2 Relays
- Linear 0 to 1.0 VDC Output; 4-20 mA Optional
- 3/4" O.D. Tube Fits Standard Quick Connects
- Fits Hastings, Varian, TeleVac Panel Cut-Outs

The Dual Set Point Controller operates two control relays. Set point values are adjusted from the front panel and displayed on the meter. Push-to-set switches simplify display of the set point pressures. Relays have 3 Amp contacts, form C, and have screw terminal connectors on the rear of the instruments.

Both the indicator and the controller instruments are available in either 1/4 DIN or 2.75 inch diameter standard enclosures. The 2.75 inch diameter standard enclosure fits the same panel cut out as Hastings, Varian, Televac and other analog meters. Mounting hardware is included with both styles.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.004 mTorr per C° at hard vacuum and 0.4 mTorr at 50 mTorr.

Bakeout Temperature: Gauge tube can be baked to 100°C (212°F) in air or vacuum.

Dimensions: See page 40.

Mounting: Panel mounting hardware is standard. Bench mount cabinets are also available, see page 39 for complete specifications.

Gauge Tube Cables: 10 ft. (3m) attached.

Extension Cables: Change gauge tube cable length without recalibration. Extensions to 500 ft. (150 M) can be used. see page 39.

Line Cord: 3 Wire, 65 inch (170 cm) attached.

Net Weight: Indicator: 1 lb., 2 oz. (0.5 kg); Controller: 1 lb., 6 oz. (0.6 kg)

Shipping Wt.: Indicator: 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.3 kg)

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Gauge Tube For 0.01 to 100 mTorr Instruments

Gauge tube body is 304 SS, connector pins are nickel plated Kovar.

With Smooth 3/4 in. O.D. Tubulation, P/N: 912018\$173
With NW-16 Flange, P/N: 912037 • **NW-25 Flange,** P/N: 912113\$229
With 1.33 in. Conflat® Flange, Tapped holes, P/N: 912179\$229
With 1.33 in. Conflat® Flange, Through holes, P/N: 912160.....\$229
With 2.75 in. Conflat® Flange, non-rotatable, P/N: 912038\$229
With 15 mm Diameter Tube, P/N: 912101\$229
With 1/8 NPT, P/N: 912125\$229

All Stainless Steel Gauge Tubes For Outdoor Applications Or Wherever The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 3/4 in. OD, NW-16, Conflat®, and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price:..... add \$59

Stainless Steel Dust Baffle to keep particles out of the gauge tube. Fits 3/4" quick connect. Has 3/4" quick connect for the gauge tube.
 P/N: 912153\$398.



Photo shows the dual set point controller with standard enclosure on the left, and indicator in the 1/4 DIN enclosure on the right.

These compact vacuum measurement and control instruments offer the precision and high resolution of digital electronics at the same price as analog instruments. Our extremely rugged sensor is constructed with a solid, inert, noble metal that maintains its calibration over long periods. Because no gold is used, these gauges are compatible with both mercury and oil pumps. The low 125°C operating temperatures in our Pirani type gauge tube (half that of thermopile gauges), enhances stability as does a unique temperature compensation network. Gauge tubes are matched and can be replaced without recalibration, and they can withstand working pressures to 300 psi, tested to 1200 psi.

Specifications

Pressure Range: 1 to 2000 milliTorr (~ 0 to 2 mmHg.)

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 3 mTorr, whichever is larger.

Response Time: 0.3 second time constant.

Display: 3 1/2 Digit Green Backlit LCD

Analog Output: 0 to 2.000 Volts into 2000 Ohm load or higher. 2 pin connector included. 4 to 20 mA and 0 to 10 VDC output in addition to 0 to 2.000 Volt D.C. available for instruments in 1/4 DIN enclosure.

Gauge Tube: Standard gauge tubes have a 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available. Internal Volume: 0.79 cc (1/8 NPT).

Set Point Range: Full Scale, 1 to 2000 mTorr; Repeatability: ± 2 mTorr.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

- 1 to 2000 mTorr Range (~ 0 to 2 mm Hg)
- Available in .001 to 2.000 mbar or .1 to 200.0 Pa
- ± 1 mT Resolution Over Entire Range
- Easy To Read 3 1/2 Digit Backlit Display
- Dual Set Point Controller With 2 Relays
- Linear 0 to 2.0 VDC Output; 4-20 mA Optional
- Change Cable Length Without Re-calibrating
- Fits Hastings, Varian, TeleVac Panel Cut-Outs

The Vacuum Research Dual Set Point Controller operates two control relays. Set point values are adjusted from the front panel and displayed on the meter. Push-to-set switches simplify display of set point pressures. Relays have 3 Amp contacts, form C, and have screw terminal connectors on the rear of the instruments.

Both the indicator and the controller instruments are available in either 1/4 DIN or 2.75 inch diameter standard enclosures. The 2.75 inch diameter standard enclosure fits the same panel cut out as Hastings, Varian, Televac and other analog meters. Mounting hardware is included with both styles.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.2 mT per C° at 50 mT; less than 4 mT per C° at 900 mT.

Bakeout Temperature: Standard gauge tube can be baked to 100°C (212°F) in air or vacuum. For 250°C (482°F) bakeout see page 37.

Dimensions: See page 40.

Mounting: Panel mounting is standard. Bench mount and portable cabinets are also available, see page 39 for complete specifications.

Gauge Tube Cables: 10 ft. (3 m) attached.

Extension Cables: Change gauge tube cable length without recalibration. Extensions to 500 ft. (150 m) can be used. see page 39.

Line Cord: 3 wire, 65 inch (170 cm) attached.

Net Weight: Indicator: 1 lbs., 2 oz. (0.5 kg); Controller: 1 lb, 6 oz. (0.6 kg)

Shipping Wt.: Indicator: 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.4 kg)

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Dual Set Point Controller With Digital Display in standard enclosure. Gauge tube not included. P/N: 902001 \$870

Dual Set Point Controller With Digital Display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902100 \$925

Digital Indicator only in standard enclosure. Gauge tube not included. P/N: 902002 \$593

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902099 \$654

4 to 20 mA or 0 to 10 VDC Output in addition to 0 to 2.000 VDC analog output. Only available for instruments in 1/4 DIN enclosure. P/N: V801082 add \$326

Calibrator for 2000 mTorr Instruments

See page 33 for a complete description of the calibrator. P/N: 912008 \$337

Gauge and gauge tube accessories..... see pages 35, 36, 37 and 39 24VDC for 1/4 DIN enclosures Add \$105

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Gauge Tube For 1 to 2000 mT Instruments

Gauge tube body is 304 SS, connector pins are nickel plated Kovar.

With 1/8 in. NPT Male Thread, P/N: 912001 \$115

With 1/4 in. NPT Male Thread, P/N: 912303 \$137

With 1/4 in. SAE 45° Flare, Male, P/N: 912284 \$169

With 3/8 in. OD Tube, P/N: 912313 \$160

With NW-16 Flange, P/N: 912005 • **NW-25 Flange**, P/N: 912202 \$169

With NW-40 Flange, P/N: 912270 \$179

With 1.33 in. Conflat® Flange, non-rotatable, P/N: 912067 \$169

With VCR-4 FEM Fitting, P/N: 912068 \$216

With 15 mm Diameter Tube, P/N: 912102 \$160

All Stainless Steel Gauge Tubes For Outdoor Applications Or Wherever The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 1/8 in. NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price: add \$61



Photo shows the dual set point controller with standard enclosure on the left, and indicator in the 1/4 DIN enclosure on the right.

These compact vacuum measurement and control instruments offer the precision and high resolution of digital electronics at the same price as analog instruments. Our extremely rugged sensor is constructed with a solid, inert, noble metal that maintains its calibration over long periods. Because no gold is used, these gauges are compatible with both mercury and oil pumps. The low 125°C operating temperatures in our Pirani type gauge tube (half that of thermopile gauges), enhances stability as does a unique temperature compensation network. Gauge tubes are matched and can be replaced without recalibration, and they can withstand working pressures to 300 psi, tested to 1200 psi.

Specifications

Pressure Range: 0.01 to 20 Torr.

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 0.03 Torr, whichever is larger.

Response Time: 0.3 second time constant.

Analog Output: 0 to 2.000 Volts = 0 to 20 Torr into 2000 Ohm load or higher. 2 pin connector included. 4 to 20 mA & 0 to 10 VDC out in addition to 0 to 2.000 Volt D.C. available for instruments in 1/4 DIN enclosure.

Display: 3 1/2 Digit Green Backlit LCD.

Gauge Tube: Standard gauge tubes have 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available. Internal Volume: 0.79 cc (1/8 NPT).

Set Point Range: Full Scale, 0.01 to 20 Torr. Repeatability: ± 0.02 Torr.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

- 0.01 to 20 Torr Range
- ± 0.01 Torr Resolution Over Entire Range
- Available in .01 to 20.00 mbar and 1 to 2000 Pa
- Easy To Read Backlit 3 1/2 Digit Display
- Dual Set Point Controller With 2 Relays
- Linear 0 to 2.0 VDC Output; 4-20 mA Optional
- Change Cable Length Without Re-calibrating
- Fits Hastings, Varian, TeleVac Panel Cut-Outs

The Dual Set Point Controller operates two control relays. Set point values are adjusted from the front panel and displayed on the meter. Push-to-set switches simplify display of the set point pressures. Relays have 3 Amp contacts, form C, and have screw terminal connectors on the rear of the instruments.

Both the indicator and the controller instruments are available in either 1/4 DIN or 2.75 inch diameter standard enclosures. The 2.75 inch diameter standard enclosure fits the same panel cut out as Hastings, Varian, Televac and other analog meters. Mounting hardware is included with both styles.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.01 Torr per C°.

Bakeout Temperature: Gauge tube can be baked to 100°C (212°F) in air or vacuum.

Dimensions: DIN enclosure: 92 X 92 mm panel cutout, 122 mm F to B.

Standard enclosure: 2.75 in. diameter panel cutout, 4.8 in. F to B.

Mounting: Panel mounting hardware is standard. Bench mount cabinets are also available, see page 39 for complete specifications.

Gauge Tube Cables: 10 ft. (3m) attached.

Extension Cables: Change gauge tube cable length without recalibration. Extensions to 500 ft. (150 m) can be used. see page 39.

Line Cord: 3 wire, 65 inch (170 cm) attached.

Net Weight: Indicator: 1 lb., 2 oz. (0.5 kg); Controller: 1 lb., 6 oz. (0.6 kg)

Shipping Wt: Indicator: 2 lbs., 8 oz. (1.1 kg); Controller: 3 lbs. (1.3 kg)

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Dual Set Point Controller With Digital Display in standard enclosure. Gauge tube not included. P/N: 902015.....\$943

Dual Set Point Controller With Digital Display in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902098.....\$1,003

Digital Indicator only in standard enclosure. Gauge tube not included. P/N: 902016.....\$675

Digital Indicator only in 1/4 DIN enclosure. Built to CSA standards. Gauge tube not included. P/N: 902097.....\$730

4 to 20 mA or 0 to 10 VDC Output in addition to 0 to 2.000 VDC analog output. Only available for instruments in 1/4 DIN enclosure. P/N: V801082.....add \$326

Calibrator for 20 Torr Instruments

See page 33 for a complete description of the calibrator.

P/N: 912009.....\$337

Gauge tube baffles and traps.....see page 36

24VDC for 1/4 DIN enclosures.....Add \$105

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Gauge Tube For .01 to 20 Torr Instruments

Gauge tube body is 304 SS, connector pins are nickel plated Kovar.

With 1/8 in. NPT Male Thread, P/N: 912011.....\$121

With 1/4 in. SAE 45° Flare, Male, P/N: 912285.....\$174

With NW-16 Flange, P/N: 912072 • **NW-25 Flange**, P/N: 912204.....\$174

With 1.33 in. Conflat® Flange, non-rotatable, P/N: 912073.....\$174

With VCR-4 FEM Fitting, P/N: 912074.....\$225

With 3/8 in. OD Tube, P/N: 912314.....\$174

With 15 mm Diameter Tube, P/N: 912103.....\$156

All Stainless Steel Gauge Tubes For Outdoor Applications Or Wherever The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 1/8 in. NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price:.....add \$61

Quick connect couplings, tube selector switch, extension cable, and other accessories.....see pages 35, 36, 37 and 39



Super bright red LED displays are 1.8 in. high & readable from more than 100 ft. NEMA-12 (IEC 529) splashproof enclosure is standard.

Choose a Big Digit Vacuum Gauge from these ranges:

- Pirani 1 to 2,000 mTorr ± 1 mTorr
- Pirani .01 to 20.00 Torr ± 0.01 Torr
- Diaphragm 1 to 1500 Torr ± 1 Torr
- Diaphragm 30 Inches Hg to 150 PSI Gauge

Indicators have 3 1/2 digit display & optional linear analog output. Controllers have, in addition, 2 adjustable set points with SPDT relays. Relay contacts are unpowered and rated at 3A@115 or 220 VAC, 18 inch pigtail with mating connector is provided. Sensors or gauge tubes can be up to 500 feet from the display without affecting calibration and can tolerate 300 PSI overpressure. The Splashproof enclosure is 9 in. x 4 1/2 in. x 3 in. F to B (229 x 115 x 75 mm), net weight 3.8 lbs (1.7 kg).

1 to 1500 Torr or 30 In. Hg to 150 PSI

Pressure Ranges: 1 to 1500 Torr; ± 1 Torr (± 0.1 Torr optional), or 30 Inches Hg to 150 PSI Gauge.

Calibration: Any gas, liquid or vacuum compatible with sensor materials.

Accuracy: 1% of reading or 2 Torr.

Response Time: Less than 400 msec. for response to a step change.

Linearity: $\pm 0.15\%$ Full Scale. Sensitivity: ± 1 Torr.

Analog Output (Optional): 0 to 1.500 V into 2000 Ohm load or higher. 18" Pigtail with mating connector included. 4 to 20 mA and 0 to 10 VDC also available at extra cost.

Transducer: See "ordering Information" below.

Materials: All parts in contact with process are 316 or 304 SS, or silicon.

Set Point Range: Full Scale, 1 to 1500 Torr or 30 Inches Hg to 150 PSI Gauge. Repeatability: ± 2 Torr.

Sensor Internal Volume: 1.25 ml for SS; 0.5 ml for Silicon.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost. 65 in. (170 cm) power line cord.

Wattage: Less than 1 Watt for indicator; 2 Watt for controller.

Temperature Effects: When changes occur in ambient temperature between 0 °C and 50°C, reading will change no more than $\pm 0.02\%$ per C°.

Pirani Gauge; 1 to 2000 mT

Pressure Range: 1 to 2000 milliTorr

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 3 mTorr, whichever is larger.

Response Time: 0.3 second time constant.

Analog Output (Optional): 0 to 2.000 V into 2000 Ohm load or higher. Pigtail with mating connector included. 4 to 20 mA and 0 to 10 VDC also available at extra cost.

Gauge Tube: Standard gauge tubes have a 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available.

Set Point Range: Full Scale, 1 to 2000 mTorr; Repeatability: ± 2 mTorr.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost. 65 in. (170 cm) power line cord.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.2 mT per C° at 50 mT; less than 4 mT per C° at 900 mT.

Pirani Gauge; .01 to 20 Torr

Pressure Range: 0.01 to 20 Torr.

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 0.03 Torr, whichever is larger.

Response Time: 0.3 second time constant.

Analog Output (Optional): 0 to 2.000 V into 2000 Ohm load or higher. Pigtail with mating connector included. 4 to 20 mA and 0 to 10 VDC also available at extra cost.

Gauge Tube: Standard gauge tubes have 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available.

Set Point Range: Full Scale, 0.01 to 20 Torr.

Repeatability: ± 0.02 Torr.

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost. 65 in. (170 cm) power line cord.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1% change in reading.

Wattage: Less than 1 Watt for indicator, 2 Watts for controller.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.01 Torr per C°.

BUY NOW! Go to www.vacuumresearch.com to order online

Ordering Information

Dual Set Point Controller With Digital Display in standard NEMA 12 enclosure. Transducer not included. 1 to 1500 Torr P/N: 902019-BD..... \$1,321

Digital Indicator only in standard NEMA 12 enclosure. Transducer not included. 1 to 1500 Torr P/N: 902020-BD \$1,035

Select a transducer on page 9 with diaphragm material and flange style of your choice.

Linear Analog Output complete with 18 inch long pigtail and mating connector, 0 to 1.500 VDC. P/N: V805124 \$5

Carry Handle installed directly to the top of the NEMA 12 enclosure. P/N: V805005..... \$30

Calibrator for 1500 T instruments,..... see page 33

Analog Output 4-20 mA and 0 to 10 VDC. P/N: V801082.....add \$326

Ordering Information

Dual Set Point Controller With Digital Display in standard NEMA 12 enclosure. Gauge tube not included. P/N: 902001-BD \$1,271

Digital Indicator only in standard NEMA 12 enclosure. Gauge tube not included. P/N: 902002-BD \$995

Select a gauge tube with your choice of flange style from the list on page 15.

Linear Analog Output with 18 inch pigtail & mating connector, 0 to 2.000 VDC. P/N: V805124 \$65

Carry Handle installed directly to the top of the NEMA 12 enclosure. P/N: V805005 \$30

Calibrator for 2000 mT instruments, pg 33.

Analog Output 4-20 mA and 0 to 10 VDC. P/N: V801082add \$326

Ordering Information

Dual Set Point Controller With Digital Display in standard NEMA 12 enclosure. Gauge tube not included. P/N: 902015-BD \$1,393

Digital Indicator only in standard NEMA 12 enclosure. Gauge tube not included. P/N: 902016-BD \$1,105

Select a gauge tube with your choice of flange style from the list on page 16.

Linear Analog Output with 18 inch pigtail and mating connector, 0 to 2.000 VDC. P/N: V805124 \$65

Carry Handle installed directly to the top of the NEMA 12 enclosure. P/N: V805005 \$30

Calibrator for 20 Torr instruments, pg 33.

Analog Output 4-20 mA and 0 to 10 VDC. P/N: V801082add \$320



Photo shows sensors with 1/8 inch NPT and NW-16 flanges to the left of portable gauge model with optional bumpers and handle for easy transport.

This precision vacuum gauge indicates vacuum from 1 to 2000 Microns with a 3 1/2 digit green display, then extends its range to 20,000 Microns with pressure levels indicated by an easy to read, brightly lit LED bar graph. These solid state displays can withstand shock and vibration much better than analog meters, so the gauge can be mounted directly on pump stands or used in the field without damage. A breakthrough in thermal sensor design permits this gauge to outperform conventional instruments by a wide margin. The sensor is constructed with a solid, inert metal that maintains its calibration over long periods. It withstands fluorine, mercury vapor, oxidizers, and other corrosives extremely well. The gauge tubes withstand working pressures to 300 PSI, tested to 1200 PSI, and the tube's outer shell is so rugged you can stand on it.

Specifications

Pressure Range: Digital display: 1 to 2000 Microns;
Bar Graph Segments: 3,000 - 5,000 - 10,000 - 15,000 - 20,000 Microns.
Calibration: Air or Nitrogen.
Accuracy: Better than 5% of pressure or ± 5 Microns, whichever is larger.
Sensitivity: 1 Micron on 1 to 2000 Micron range.
Response Time: 0.3 second time constant.
Gauge Tube: (purchase separately) Standard gauge tubes have 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.), NW, VCR and Conflat® flanges are also available.
Gauge Tube Internal Volume: 0.79 cc (1/8 NPT).
Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.
Line Regulation: $\pm 20\%$ change in voltage from 95 to 130V or 200 to 250V produces less than 1% change in reading.
Power Consumption: Approximately 4 Watts.
Line Cord: 3 wire, 65 inch (170 cm) attached.

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Portable Gauge, 1 to 20,000 Microns with carry handle and urethane bumpers (order gauge tube separately) P/N: 902426\$544
Panel or Bench Mount Gauge, 1 to 20,000 Microns, panel mounting hardware included (order gauge tube separately) P/N: 902425\$500
Urethane Bumpers, pair, P/N: V805001.....\$65
Carry Handle installed on instrument, P/N: V805005.....\$30
Calibrator for Dual Range Instruments
 See page 33 for a complete description of the calibrator.
 P/N: 912010.....\$337
Quick connect couplings, tube selector switch, extension cable, and other accessories..... see pages 35, 36, 37 & 39
Gauge tube baffles and traps..... see page 36

- 1 to 20,000 Microns; Rough and High Vacuum
- Bright and Easy to Read Green LED Display
- Handle and Protective Bumpers Included
- Also Available with Panel Mounting Kit
- Fast Response Time, 0.3 Sec. Time Constant
- Perfect For Refrigeration and Leak Detection
- Also Available as 1 to 20,000 milliTor
- Optional Scale; .001 to 20.00 millibar

This instrument is perfect for applications such as refrigeration where a typical pump down cycle will show water boiling off starting at 20,000 Microns, yet also requires high resolution in the high vacuum range for finish pressures. Now, this single instrument can cover the entire range while providing sensitivities of 1 Micron from 1 to 2000 Microns. The high sensitivity of this gauge also makes it extremely useful for detecting leaks.

Two standard configurations are available. The portable gauge includes a steel reinforced handle and heavy duty urethane bumpers for protection from bumps. The panel mount version comes complete with the hardware needed for mounting in a panel cutout 3.62 inches wide by 1.81 inches high.

Temperature Effects: Changes in ambient temperature between 32°F (0°C) and 120°F (50°C) change the reading less than 0.1 Micron per °F at 50 Microns; less than 2 Microns per °F at 900 Microns.
Bakeout Temperature: Gauge tube can be baked to 212°F (100°C) in air or vacuum.
Dimensions: Without bumpers or handle, 3.5" wide X 1.84" high X 7.4" front to back (89 X 47 X 188 mm).
 With bumpers and handle, 4.325" wide X 2.575" high (4.5" high with handle extended) X 7.9" front to back (110 X 65 X 200 mm).
Gauge Tube Cables: 10 ft. (3m) attached.
Extension Cables: Change gauge tube cable length without recalibration. Extensions to 500 ft. (150m) can be used. see page 39. Weight: Net: 1 lb., 2 oz. (0.5 kg); Shipping: 2 lbs., 8 oz. (1.1 kg)

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Gauge Tube For 1 to 20,000 Micron Instruments
 Gauge tube body is 304 SS, connector pins are nickel plated Kovar.
With 1/8 in. NPT Male Thread, P/N: 912057\$121
With 1/4 in. SAE 45° Flare, Male, P/N: 912283\$174
With 3/8 in. OD Tube, P/N: 912315.....\$174
With NW-16 Flange, P/N: 912066 • **NW-25 Flange**, P/N: 912205\$174
With 1.33 in. Conflat® Flange, non-rotatable, P/N: 912076\$174
With VCR-4 FEM Fitting, P/N: 912077\$222
With 15 mm Diameter Tube, P/N: 912127\$161
All Stainless Steel Gauge Tubes For Outdoor Applications or Wherever the Use of 304 SS is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 1/8 inch NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided.
 Add "SS" suffix to any tube P/N and to standard tube price: add \$61



Photo shows the Model 2000-20 with the standard enclosure for panel mounting on the left, and with the optional cabinet and handle on the right.

This low cost vacuum gauge indicates vacuum from 1 to 2000 mTorr with a 3 1/2 digit display, then extends its range to 20 Torr with pressure levels of 3, 5, 10, 15, and 20 Torr indicated by an easy to read, brightly lit LED bar graph. These solid state displays can withstand shock and vibration much better than analog meters, so the gauge can be mounted directly on pump stands. It is well suited to both portable and mobile applications. A breakthrough in thermal sensor design permits this gauge to outperform conventional instruments by a wide margin. The sensor is constructed with a solid, inert metal that maintains its calibration over long periods. It withstands fluorine, mercury vapor, oxidizers, and other corrosives extremely well. The gauge tubes withstand working pressures to 300 PSI, tested to 1200 PSI, and the tube's outer shell is so rugged you can stand on it.

Specifications

Pressure Range: 0 to 20 Torr; Green LED digital display: 0 to 2000 mT; Bar Graph Segments: 3 - 5 - 10 - 15 - 20 Torr.

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of pressure or ± 5 Microns, whichever is larger.

Sensitivity: 1 mTorr on 1 to 2000 mTorr range.

Response Time: 0.3 second time constant.

Gauge Tube: (purchase separately) Standard gauge tubes have 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.), NW, VCR and Conflat® flanges are also available.

Gauge Tube Internal Volume: 0.79 cc (1/8 NPT).

Line Power: 115 VAC, 50/60 Hz; 230 VAC optional at no additional cost.

Line Regulation: $\pm 20\%$ change in voltage from 95 to 130V or 200 to 250V produces less than 1% change in reading.

Power Consumption: Approximately 4 Watts.

Ordering Information Specify 115 or 230 V 50/60 Hz or 24 VDC

Digital Indicator without Set Points; 1 to 2000 mTorr and 3 to 20 Torr in standard enclosure P/N: 902025 \$561

Digital Indicator without Set Points; 1 to 2000 x 10⁻³ mbar and bargraph segments 3, 5, 10, 20, 30 mbar,
P/N: 902025-mbar \$561

0 to 5 Volt Non-linear Analog Output, P/N V801241 \$65

Calibrator for Dual Range Instruments

See page 33 for a complete description of the

calibrator. P/N: 912010 \$337

Gauge tube baffles and traps.....see page 36

Quick connect couplings, waterproof vacuum sensors, gauge tube selector switch, explosion-proof gauges, and extension cable..... see pages 35 and 39

- 1 to 2000 mTorr Range — Extended to 20 Torr
- Available in .001 to 2.000 mbar—to 20.00 mbar
- Digital Green LED Display For 1 to 2000 mTorr
- Bargraph LED Indicator For 3, 5,10,15, 20 Torr
- Fast Response Time, 0.3 Sec. Time Constant
- Perfect For Refrigeration and Leak Detection
- Withstands Vibration, Mount On Pump Stands
- Fits Hastings, Varian, TeleVac Panel Cut-Outs

This instrument is perfect for applications such as refrigeration where a typical pump down cycle will show water boiling off starting at 20 Torr, yet also requires high resolution in the milliTor range for finish pressures. Now, this single instrument can cover the entire range while providing sensitivities of only 1 mTorr in the 1 to 2000 mTorr range! The high sensitivity of this gauge also makes it extremely useful for detecting leaks.

This instrument features simple, single hole panel installation. Panel mounting hardware is included with every instrument. Bezels for mounting in 1/4 DIN panel cutouts and cabinets for bench or portable applications are available.

Gauges calibrated in mbar:

In mbar the digital display reads from 1 to 2000 X 10⁻³ mbar. The bargraph segments indicate 3, 5, 10, 20 and 30 mbar. Add "mbar" suffix to the part number.

Line Cord: 3 wire, 65 inch (170 cm) attached.

Temperature Effects: Changes in ambient temperature between 32°F (0°C) and 120°F (50°C) change the reading less than 0.1 mT per F° at 50 mT; less than 2 mT per F° at 900 mT.

Bakeout Temperature: Gauge tube can be baked to 212°F (100°C) in air or vacuum.

Dimensions: See page 40.

Mounting: Panel mounting hardware is standard. Bench mount and portable cabinets are also available, see page 39.

Gauge Tube Cables: 10 ft. (3m) attached.

Extension Cables: Change gauge tube cable length without recalibration. Extensions to 500 ft. (150m) can be used. see page 39.

Weight: Net: 1 lb., 2 oz. (0.5 kg); Shipping: 2 lbs., 8 oz. (1.1 kg)

BUY NOW! Go to www.vacuumresearch.com to order online

Standard Gauge Tube For 1 mT to 20 Torr Instruments

Standard Gauge Tube For 1 mT to 20 Torr Instruments

Gauge tube body is 304 SS, connector pins are nickel plated Kovar.

With 1/8 in. NPT Male Thread, P/N: 912057 \$121

With 1/4 in. SAE 45° Flare, Male, P/N: 912283 \$174

With 3/8 in. OD Tube, P/N: 912315 \$174

With NW-16 Flange, P/N: 912066 • NW-25 Flange, P/N: 912205 \$174

With 1.33 in. Conflat® Flange, non-rotatable, P/N: 912076 \$174

With VCR-4 FEM Fitting, P/N: 912077 \$222

With 15 mm Diameter Tube, P/N: 912127 \$161

All Stainless Steel Gauge Tubes For Outdoor Applications or

Wherever the Use of 304 SS is Appropriate. All wetted parts as

well as all external parts and connector pins are 304 SS. 1/8 inch NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided.

Add "SS" suffix to any tube P/N and to standard tube price: add \$61



Panel Mount Indicator on left
1/4 DIN Dual Set Point Controller
on right.



Inset photo shows Bench Mount
Cabinet with optional carry
handle and 3 position gauge
tube selector switch.

- **Reliable T/C Gauge 1 to 1000 mTorr (Microns)**
- **Indicator Only or Indicator with 2 Set Points**
- **Stainless Tubes & Special Flanges Available**
- **Stem and Flanges 300 Series Stainless Steel**
- **Operates With Power From 90 to 240 V, 50/60 Hz**
- **0 to 5 Volt Output For Computer I/O or Control**
- **Fits Same Cutout As Hastings, Televac & Varian**
- **Use With VRC-6 or Hastings DV-6 Gauge Tubes**

Vacuum Research's thermocouple vacuum gauge is a simple and low cost instrument for vacuum measurement in the popular 1 to 1000 mTorr range (microns). It operates with any line voltage from 90 to 240V at 50 or 60 Hz, and can be used with our VRC-6 or Hastings DV-6 gauge tubes. A 0 to 5 VDC analog output is standard on both the indicator and dual set point controller models.

Ordering Information

BUY NOW! Go to www.vacuumresearch.com to order online

Dual Set Point Controller

Thermocouple gauge, 1 to 1000 mTorr range with 0 to 5 VDC analog output plus 2 adjustable set points each with its own SPDT relay contacts rated 3 Amps up to 220 VAC non-inductive. Operates from any line power between 90 and 240 volts, 50 or 60 Hz. 1/4 DIN enclosure with panel mounting jack screws included. Gauge tube not included.

P/N 902109\$684

Indicator; 1 to 1000 mTorr Meter

Thermocouple gauge, 1 to 1000 mTorr range with 0 to 5 VDC analog output, operates with any line power between 90 and 240 volts, 50 or 60 Hz. Gauge tube not included. See drawing on page 40 for dimensions. P/N 902111\$347

Bench Mount Stand with Carrying Handle

5.3 in. wide X 4 in. F to B X 4.7 in. High (6.7 in. handle extended)
(134 X 100 X 120 mm) P/N: 902112\$77

3 Position Thermocouple Gauge Indicator; 1 to 1000 mTorr Meter

Includes 3 cables 10 ft. (3 m) long and 3 connectors, bench mount stand and carry handle, gauge tubes not included. Cable length up to 500 ft; (60 m) available. P/N: 902113\$533

5 position Thermocouple Gauge Indicator 1 to 1000 mTorr Similar to above 3 position indicator P/N 902181\$626

Standard T/C Gauge Tubes Interchangeable with Teledyne-Hastings DV-6M & DV-6R. All parts in contact with the process are stainless steel: cup, stem, and flange. The connector pins are nickel plated Kovar.

VRC-6M 1/8" NPT Stainless Steel Body, P/N: 912086\$82

VRC-6M 1/4" SAE 45° Flare, Male S.S. Body, P/N: 912302\$145

VRC-6M NW-16 Stainless Steel Body, P/N: 912096\$145

VRC-6M NW-25 Stainless Steel Body, P/N: 912203\$145

VRC-6M VCR-4 FEM Stainless Steel Body, P/N: 912082\$167

VRC-6M 1.33" Conflat® Stainless Steel Body, P/N: 912083\$145

VRC-6M 1/2" OD Smooth Flange SS Body, P/N: 912085\$82

VRC-6M 2.75 Conflat® Stainless Steel Body, P/N: 912178\$210

VRC-6M VCR-8 FEM Stainless Steel Body, P/N: 912079\$173

Thermocouple Gauge Tubes with Stainless Steel Connector Pins

For outdoor use or applications that require frequent unplugging of the gauge tube connector. All parts are stainless steel: cup, stem, flange, and connector pins.

VRC-6R 1/8" NPT Stainless Steel Pins & Body, P/N: 912087\$149

VRC-6R 1/4" SAE 45° Flare, Male S.S. Body, P/N: 912302SS\$206

VRC-6R NW-16 Stainless Steel Pins & Body, P/N: 912098\$206

VRC-6R VCR-4 FEM Stainless Steel Pins & Body, P/N: 91209\$230

VRC-6R 1.33" Conflat® S.S. Pins & Body, P/N: 912084\$206

VRC-6R 2.75 Conflat® Stainless Steel Pins & Body, P/N: 912213\$230

Thermocouple Gauge Tubes

The VRC-6M and 6R are direct plug-in replacements for the Teledyne-Hastings DV-6M and DV-6R gauge tubes. No adjustment to your instrument is required; just plug them in. These T/C gauge tubes are tested to 1200 PSIG for operation up to 300 PSIG without damage. There is no fragile plastic header, and no easy-to-break plastic key. The result of 30 years of vacuum gauge experience, all tubes have stainless steel bodies with heavy plated metal key and connector pins. For outdoor applications select our 'R' version which has stainless steel connector pins as well as our standard all stainless steel body.

Specifications

Pressure Range: 1 to 1000 milliTorr (1 to 1000 Microns). Air/N₂

Accuracy: Better than ± 1 mTorr from 1 to 20 mTorr. Better than 5% from 20 to 1000 mTorr.

Response Time: 1 mTorr up to atmosphere: less than 1 sec.

Analog Output: 0 to 5 VDC into 10 K ohms minimum.

Gauge Tube: Gauge tubes available with 1/8 inch NPT, NW-16, VCR-4, 1.33 O.D. Conflat® flanges and all stainless steel bodies. This instrument also operates with Hastings DV-6 thermocouple gauge tubes.

Bakeout Temperature: 100 °C (212 °F) in air or vacuum.

Operating Temperature: 4 to 60 °C (39 to 140 °F).

Temperature Coefficient: $\pm$ (1% of reading +0.2 mTorr)/°C.

Power: Any voltage from 90 to 240 V, 50 / 60 Hz under 2 watts.

Line Regulation: Reading changes less than $\pm 0.3\%$ for line voltage change from 90 to 240 Volts.

Relays on Controller Model: Separate relays for each set point. Form C, SPDT, contacts rated 3 amps non-inductive at voltages up to 250 VAC.

Mounting

Indicator Dimensions: See page 40.

Controller: 1/4 DIN panel mount is std. Jack screws included.

Cables: 10 ft. (3 m) cable with connector and 6 ft. line cord provided. Extension cables up to 200 ft. (60 m) available.

Net Weight: Indicator: 0.5 lbs. (0.2 kg); Controller: 1.4 lbs. (0.6 kg).

Ship Weight: Indicator: 2 lbs. (0.9 kg); Controller: 3 lb. (1.4 kg).



Panel Mount Indicator on left
1/4 DIN Dual Set Point Controller
on right

Inset photo shows Bench Mount
Cabinet with optional carry
handle and 3 position gauge
tube selector switch.

Thermocouple Gauge Tubes

The VRC-531 tubes are direct plug-in replacements for the Varian 531 & 536 gauge tubes. No adjustment to your instrument is required; just plug them in. There is no fragile plastic header, and no easy-to-break plastic key. The result of 30 years of vacuum gauge experience, all tubes have stainless steel bodies with metal key and connector pins. For outdoor applications select our 'SS' version which has stainless steel connector pins as well as our standard all stainless steel body.

Specifications

Pressure Range: 1 to 2000 milliTor (1 to 2000 Microns). Air/N₂

Accuracy: Better than ± 2 mTorr from 1 to 20 mTorr. Better than 5% from 20 to 2000 mTorr.

Response Time: Less than 1 sec. from 1 mTorr up to 2000 mTorr.

Analog Output: 0 to 5 VDC into 10 K ohms minimum.

T/C Fail: Indicates gauge tube disconnected.

Gauge Tube: Gauge tubes available with 1/8 inch NPT, NW-16, VCR-4, 1.33 O.D. Conflat® flanges and all stainless steel bodies. This instrument also operates with Varian 531 or 536 thermocouple gauge tubes.

Bakeout Temperature: 100°C (212°F) in air or vacuum.

Power: For controller, specify 100 to 120 volts or 200 to 240 volts, 50/60 Hz. For indicator, any voltage from 90 to 240 volts, 50/60 Hz.

Relays on Controller Model: Separate relays for each set point. Form C, SPDT, contacts rated 3 amps non-inductive at voltages up to 250 VAC. Not available on indicator models.

Indicator Mounting Dimensions: See page 40.

Controller: 1/4 DIN panel mount is standard. Jack screws included.

Cables: 10 ft. (3 m) gauge tube cable with connector and 6 ft. line cord provided. Extension cables available.

Extension Cables: No change in calibration with up to 500 ft. 150 m) of 18 gauge wire or up to 50 ft (15 m) of 24 gauge wire.

Net Weight: Indicator: 0.5 lbs. (0.2 kg); Controller: 1.4 lbs. (0.6 kg).

Ship Weight: Indicator: 2 lbs. (0.9 kg); Controller: 3 lb. (1.4 kg).

- Reliable T/C Gauge 1 to 1000 mTorr (Microns)
- Indicator Only or Indicator with 2 Set Points
- Stainless Tubes & Special Flanges Available
- Stem and Flanges 300 Series Stainless Steel
- Operates With Power From 90 to 240 V, 50/60 Hz
- 0 to 5 Volt Output For Computer I/O or Control
- Fits Same Cutout As Hastings, Televac & Varian
- Use With VRC-6 or Hastings DV-6 Gauge Tubes

Vacuum Research's thermocouple vacuum gauge is a simple and low cost instrument for vacuum measurement in the popular 1 to 2000 mTorr range (microns). A 0 to 5 VDC analog output is standard on both the indicator and dual set point controller models. Operates with the gauge tubes listed below or any Varian 531 or 536 tube.

Ordering Information

BUY NOW! Go to www.vacuumresearch.com to order online

Dual Set Point Controller; 1 to 2000 mTorr

Thermocouple gauge, 1 to 2000 mTorr range with 0 to 5 VDC analog output plus 2 adjustable set points each with its own SPDT relay. Contacts are rated 3 Amps at up to 220 VAC non-inductive. 1/4 DIN enclosure with panel mounting jack screws included. Gauge tube not included.

P/N 8810-2CONT-115V (for operation on 100 to 120V, 50/60 Hz)\$651

P/N 8810-2CONT-220V (for operation on 200 to 240V, 50/60 Hz)\$651

Indicator; 1 to 2000 mTorr

Thermocouple gauge, 1 to 2000 mTorr range with 0 to 5 VDC analog output, operates with any line power between 90 and 240 volts, 50 or 60 Hz. Gauge tube not included. See drawing on page 40 for dimensions.

P/N 8801-INDIC-90-240V (for 90 to 240 V 50/60 Hz. operation).....\$330

Bench Mount Stand with Carrying Handle for Indicator

5.3 in. wide X 4 in. F to B X 4.7 in. High (6.7 in. H with handle extended)

(134 X 100 X 120 mm) P/N: 902112.....\$71

3 Position Thermocouple Gauge Indicator; 1 to 2000 mTorr
Includes 3 cables 10 ft. (3m) long bench mount stand and carry handle. Gauge tubes not included cable length to 500 ft. (60 m) available.

P/N: 902293.....\$527

5 Position Thermocouple Gauge Indicator; 1 to 2000 mTorr similar to

above 3 position indicator. P/N 902294\$596

VRC Thermocouple Gauge Tubes are interchangeable with Varian 531 & 536. All parts in contact with the process are stainless steel: cup, stem, and flange. The connector pins are nickel plated Kovar.

VRC-531 1/8" NPT Stainless Steel Body, P/N: 531 SS304 1/8NPT.....\$95

VRC-531 NW 16 Stainless Steel Body, P/N: 531 SS304 NW16.....\$156

VRC-531 NW-25 Stainless Steel Body, P/N: 531 SS304 NW25\$156

VRC-531 VCR-4 Female, SS Body, P/N: 531 SS304 VCR4F\$175

VRC-531 1.33" O.D. Conflat® SS Body, P/N: 531 SS304 1.33CF\$156

VRC-531 1/2" OD Stem, SS Body, P/N: 531 SS304 1/2OD.....\$95

VRC-531 2.75 Conflat® SS Body, P/N: 531 SS304 2.75CF\$163

VRC-531 VCR-8 Female, SS Body, P/N: 531 SS304 VCR8F\$163

All Stainless Steel Gauge Tubes For Outdoor Applications Or Wherever

The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 3/4 in. OD, NW-16, Conflat®, and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price:add \$59



Gauge on left shown with optional bumpers and handle, gauge on right shown in standard benchmount cabinet with rubber feet.

3 Popular Ranges

- 0.01 to 50 Torr Pirani Gauges
- 1 to 1500 Torr Diaphragm
- 30 Inches Hg to 150 PSIG

Standard Features

- NW-16, 1/8" NPT or Conflat® Flanges
- Bright, Easy to Read Green LED Display
- Bench Mount Cabinet with Rubber Feet
- Bracket Included For 1/8 DIN Panel Mount

BUY NOW! Go to www.vacuumresearch.com to order online

.01 to 50 Torr Digital Pirani Gauge

Benchmount cabinet with rubber feet. Clip for mounting in 1/8 DIN panel cutout included. Sensor cable 10 ft (3m) long. Gauge operates from 15 to 24 VDC, less than 200 mA. An external wall mount supply is included with each instrument. 90 to 240V. 50/60 Hz input and 15 VDC output.

3.5" Wide X 7.4" F to B X 1.84" H.
190 mm W X 188 mm F-B X 46 mm H.
Sensor not included.

P/N: 902142\$592

Sensor, 1/8" NPT, all wetted parts stainless steel.
P/N: 912011\$123

Sensor NW-16, all wetted parts stainless steel.
P/N: 912072\$151. Sensor 1.33" OD Conflat®, non-rotatable, all wetted parts stainless steel.
P/N: 912073\$177

Sensor VCR-4 FEM, all wetted parts stainless steel. P/N: 912074\$227

1 to 1500 Torr Digital Diaphragm Gauge

Benchmount cabinet with rubber feet. Clip for mounting in 1/8 DIN panel cutout included. Sensor cable 10 ft (3m) long. Gauge operates from 15 to 24 VDC, less than 200 mA. An external wall mount supply is included with each instrument. 90 to 240V. 50/60 Hz input and 15 VDC output.

3.5" Wide X 7.4" F to B X 1.84" H.
90 mm W X 188 mm F-B X 46 mm H.

Sensor not included.
P/N: 902143\$623

Sensor 1/8" NPT, Silicon Diaphragm
P/N: 912091\$354

Sensor NW-16, Silicon Diaphragm
P/N: 912023\$408

Sensor with 1.33" OD Conflat® flange, non-rotatable, and Silicon Diaphragm.
P/N: 912026\$408

Sensor with Stainless Steel Diaphragm
1/4" NPT P/N: 912022\$561

See page 11 for more flange options.

30 Inches Hg to 150 PSIG Digital Diaphragm Gauge

Benchmount cabinet with rubber feet. Clip for mounting in 1/8 DIN panel cutout included. Sensor cable 10 ft (3m) long. Gauge operates from 15 to 24 VDC, less than 200 mA. An external wallmount supply is included with each instrument. 90 to 240V. 50/60 Hz input and 15 VDC output.

3.5" Wide X 7.4" F to B X 1.84" H.
90 mm W X 188 mm F-B X 46 mm H.
Sensor not included.

P/N: 902144\$674

Sensor 1/8" NPT, Silicon
Diaphragm P/N: 912149\$354

All Stainless Steel Gauge Tubes For Outdoor Applications or Wherever The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 1/8 in. NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price:..... add \$61



3 & 5 Position Vacuum Gauges

Ordering Information

Vacuum gauge & switch built into a 1/4 DIN enclosure suitable for bench or panel mounting. Standard sensor cables are each 10 ft. long. Cables up to 500 feet are available.

.01 to 50 Torr, 5 Position P/N: 902255\$954
.01 to 50 Torr, 3 Position P/N: 902267\$879

1 to 1500 Torr, 5 Position P/N: 902256\$986
1 to 1500 Torr, 3 Position P/N: 902268\$986

30" Hg to 150 PSIG, 5 Pos. P/N: 902257\$1,101
30" Hg to 150 PSIG, 3 Pos. P/N: 902269\$1,025

Urethane bumpers, pair,
P/N: V805001\$65

Carry handle installed on instrument,
P/N: V805005\$30

Power Supply for all 3 Ranges

100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output. Wallmount style with adapter plugs for US, UK, Europe, Australia. P/N: V104124\$79

Power Supplies for instruments shipped in 2005 and before.

115 V 50/60 Hz input, 12 VAC @ 800 mA output. P/N: V104098\$21

220 V 50/60 Hz input, 12 VAC @ 800 mA output. P/N: V104123\$105



Pirani Gauge 1 to 1200 milliTorr

These compact vacuum instruments offer the precision and high resolution of a digital display at the same price as analog instruments. Our extremely rugged sensor is constructed with a solid, inert, noble metal that maintains its calibration over long periods. Because no gold is used, these gauges are compatible with both mercury and oil pumps. The low 125°C operating temperatures in our Pirani type gauge tube (half that of thermopile gauges), enhances stability as does the unique temperature compensation network.

Specifications

Pressure Range: 1 to 1200 milliTorr (.001 to 1.500 mbar optional)

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 3 mTorr, whichever is larger.

Response Time: 0.3 second time constant.

Analog Output: 0 to 1.2 Volts into 2000 Ohm load or higher. 2 pin connector included.

Vacuum Connection: is 1/8 NPT male thread or fits into quick connects sized for 1/8 inch pipe (0.405" dia.). NW, VCR and Mini Conflat® available. Refer to ordering information below.

Materials: Wetted parts 300 series stainless steel and platinum alloy.

Power: Gauge operates from 15 to 24 VDC, less than 200 mA. An external wall mount supply is included with each instrument. 90 to 240V. 50/60 Hz input and 15 VDC output.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.2 mT per C° at 50 mT; less than 4 mT per C° at 900 mT.

Operating Temperature: 0 to 50 oC (32 to 120 oF).

Maximum Positive Pressure: 50 PSIG.

Dimensions: 2.5 x 2.5 x 1.25 inches (63 x 63 x 32 mm).

Mounting: Sensor and display in one integrated package. Mount directly on your vacuum system.

Gauge Tube Cables: None required.

Weight: Approximately 6 ounces (170 grams.)

Ordering Information

BUY NOW! Go to www.vacuumresearch.com to order online

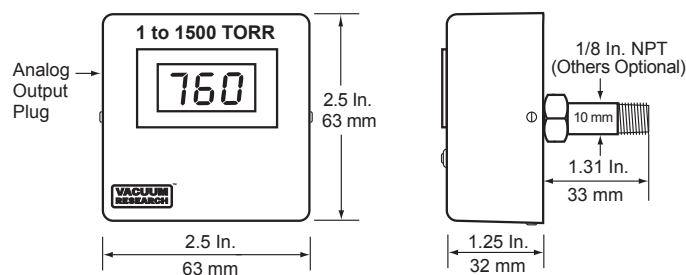
Integral Sensor Pirani Gauge

1 to 1200 milliTorr Digital Display with 0 to 1.2 VDC linear output. Sensor and display integrated into one package.

Vacuum Connection 1/8 in. NPT, P/N: 902034.....	\$369
Vacuum Connection NW-16, P/N: 902022.....	\$426
Vacuum Connection NW-25, P/N: 902031	\$426
Vacuum Connection 1.33 cf, P/N: 902023	\$426
Vacuum Connection 1/2 in. OD Tube, P/N: 902024	\$426

Rebuild or Repair Integral Sensor Pirani Gauge

Use original P/N plus "RBLD" suffix, e.g.; 902034-RBLD. Return old gauge to factory or local distributor with purchase order.....\$127



Diaphragm Manometer 1 to 1500 Torr

The Vacuum Research Integral Sensor Diaphragm Manometer uses a silicon or 316L SS diaphragm that can measure liquid or gas pressure as well as vacuum. Response time is less than 400 milliseconds for full scale and instruments are available with a variety of flanges including 15 mm, VCR, and NW-16. These instruments offer the high resolution of a digital display plus linear outputs for PLCs or data acquisition systems.

Specifications

Pressure Range: 1 to 1500 Torr, (1 - 2000 mbar & 0.1 - 200 kPa available)

Calibration: Any gas, liquid or vacuum compatible with sensor materials

Accuracy: 1% of reading or 2 Torr.

Response Time: Less than 400 msec. for response to a step change.

Linearity: $\pm 0.15\%$ Full Scale. Sensitivity: ± 1 Torr.

Analog Output: 0 to 1.500 V into 2000 Ohm load. Connector included

Vacuum Connection: Refer to ordering information below.

Materials: in contact with process are 316, 304 SS, or silicone & silicon.

Sensor Internal Volume: Approximately 0.5 ml.

Line Regulation: $\pm 20\%$ change in line voltage produces less than 1 % change in reading. From 10 - 240V.

Line Power: 90 to 240 VAC, 50/60 Hz.

Wattage: Less than 1 Watt. Operating

Temperature: 0 to 50°C (32 to 120°F).

Temperature Effects: When changes occur in ambient temperature between 0° and 50°C, reading will change no more than $\pm 0.02\%$ per C°.

Dimensions: 2.5 x 2.5 x 1.25 inches (63 x 63 x 32 mm).

Mounting: Sensor and display mount directly on your vacuum system.

Transducer Cables: None required.

Weight: Approximately 6 ounces (170 grams.)

Ordering Information, Silicon Diaphragm

Integral Sensor Diaphragm Gauge, 1 to 1500 Torr Digital Display with 0 to 1.5 VDC linear output. Sensor and display integrated into one package.	
Vacuum Connection 1/8 in. NPT, P/N: 902158	\$435
Vacuum Connection NW-16, P/N: 902163	\$490
Vacuum Connection 1.33 cf, P/N: 902164	\$490
Vacuum Connection 1/2 in. OD Tube, P/N: 902165	\$490

Ordering Information, 316L SS Diaphragm

1/8 in. NPT, P/N: 902324.....	\$643	1.33 CF, P/N: 902325	\$697
NW-16, P/N: 902321.....	\$697	2.75 CF, P/N: 902326	\$697
NW-25, P/N: 902323	\$697	VCR-8 FEM, P/N: 902327	\$726
1/2 in. O.D., P/N: 902328.....	\$643	VCR-4 FEM, P/N: 902329	\$726
15 mm O.D., P/N: 902322	\$697		

SS Sensor Max. Pressure w/o Damage: 4,500 Torr, burst 6,000 Torr.

Rebuild Integral Sensor Diaphragm Gauge

Use original P/N plus "RBLD" suffix. Return old gauge to vendor.

Silicon Diaphragm	\$1816	316L SS Diaphragm	\$431
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Available in 5 ranges from 10-5 Torr to 1500 Torr. Pirani and Stainless Steel Diaphragm Sensors.

Specifications

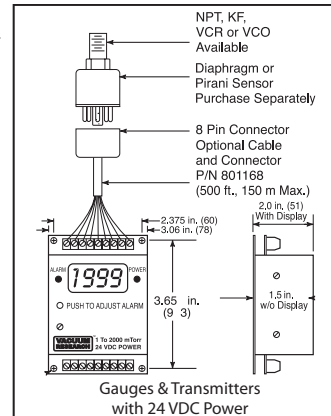
Power: Gauges operate from 12 to 35 VDC power, 150 mA. for all ranges except .01 to 20 Torr which requires 300 mA.

Response time: With Vacuum Research Pirani; 0.3 sec time constant. With Vacuum Research Diaphragm tubes; less than 400 milliseconds.

Accuracy: Pirani Gauges better than 5% of value or ± 3 mTorr, whichever is larger. Diaphragm Gauges 1% of reading or ± 2 Torr whichever is larger.

Display (Optional): 3 1/2 place LCD.

Relay: SPDT contacts for 5A @ 115 VAC, non-inductive



Ordering Information: Sensors for 24 Volt Gauges & Transmitters

BUY NOW! Go to www.vacuumresearch.com to order online

10⁻⁵ to 10⁻¹ Torr • Pirani Sensor

(.01 X 10⁻³ to 100 X 10⁻³ mbar & .001 to 13.3 Pa also available)

Gauge with Digital Display, Linear 0-1 V output and adjustable setpoint with relay. P/N 902219.....\$647

Transmitter (No Display), Non Linear 0-5 V output, setpoint and relay included. P/N 902167.....\$316

Bare Circuit Board, Non-Linear, 0-5 V output no enclosure. P/N V801240.....\$252

1 to 2000 mTorr • Pirani Sensor

(10-3 to 2 mbar & 0.1 to 200 Pascal also available)

Gauge with Digital Display, Linear 0-2 V output and adjustable setpoint with relay. P/N 902217.....\$564

Transmitter (No Display), Non Linear 0-5 V output, setpoint and relay included. P/N 902169.....\$316

Bare Circuit Board Non-Linear, 0-5 V output no enclosure. P/N V801159.....\$231

.01 to 20 Torr • Pirani Sensor

(.01 to 20 mbar & 1 to 2000 Pascal also available)

Gauge with Digital Display, Linear 0-2 V output and adjustable setpoint with relay. P/N 902218.....\$564

Transmitter (No Display), Non Linear 0-5 V output, setpoint and relay included. P/N 902170.....\$316

Bare Circuit Board Non-Linear, 0-5 V output no enclosure. P/N V801181.....\$246

1 to 1500 Torr • Diaphragm Sensor

(1 to 2000 mbar & 0.1 to 200.0 kPa also available)

Gauge with Digital Display, Linear 0-1.5 V output and adjustable setpoint with relay. P/N 902216.....\$583

Transmitter (No Display), Linear 0-1.5 V output, setpoint with relay included. P/N 902172.....\$316

Bare Circuit Board, Linear, 0-1.5 V output, no enclosure. P/N V801170.....\$260

30 Inch Hg to Atmosphere (Gauge Pressure) • Diaphragm Sensor

Gauge with Digital Display, Linear 0-300 mV output and adjustable setpoint with relay. P/N 902213.....\$564

Transmitter (No Enclosure), Linear 0-300 mV output and adjustable setpoint with relay included. P/N 902173.....\$316

Bare Circuit Board, Linear, 0-300 mV output, no enclosure. P/N V801187.....\$246

Cable Assembly includes a connector for the sensor on one end and stripped and tinned leads on the other end to connect to the terminal strip. Connector on only one end allows the cable to be pulled through conduit or to more easily enter your cabinet. Specify length. P/N 801168- xxx feet\$32. plus \$3./ft.

Power Supply 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output. Wallmount style with adapter plugs for US, UK, Europe, Australia. P/N: V104124.....\$79. each

Standard Pirani Gauge Tube For 0.01 to 100 mTorr Instruments

With Smooth 3/4 In. O.D. Tubulation, P/N: 912018.....\$173

With 1/8 NPT, P/N: 912125.....\$229

With NW-16 Flange, P/N: 912037 • **NW-25 Flange**, P/N: 912113.....\$229

With 1.33 Conflat® Tapped holes P/N: 912179.....\$229

With 1.33 Conflat® Through holes P/N: 912160.....\$229
(More styles on Page 14)

Standard Pirani Gauge Tube For 1 to 2000 mT Instruments

With 1/8 in. NPT Male Thread, P/N: 912001.....\$115

With NW-16 Flange, P/N: 912005 • **NW-25 Flange**, P/N: 912202.....\$169

With 1.33 Conflat® P/N: 912067 ..\$154. **VCR-4 FEM** P/N: 912068.....\$169

With 15 mm O.D., P/N: 912102.....\$160

(More styles on Page 15)

Standard Gauge Tube For .01 to 20 Torr Instruments

With 1/8 in. NPT Male Thread, P/N: 912011.....\$121

With NW-16 Flange, P/N: 912072 • **NW-25 Flange**, P/N: 912204.....\$174

With 1.33 Conflat® P/N: 912073 ..\$164. **VCR-4 FEM** P/N: 912074.....\$222

With 15 mm O.D., P/N: 912103.....\$156

(More flange styles on Page 16)

Transducer with Stainless Steel Diaphragm

1/4 in. NPT P/N: 912022\$534. **1/8 in. NPT** P/N: 912129.....\$619

Stainless Steel Diaphragm With NW-16 Flange, P/N: 912151.....\$619

With NW-25 Flange, P/N: 912117.....\$619

With 1.33 Conflat® P/N: 912191.....\$601. **VCR-4 FEM** P/N: 912219.....\$698

(More flange styles on Page 9)

Transducer With Standard Stainless Steel Diaphragm

for 30 In. Hg Diaphragm and wetted parts are 316 SS

1/4 in. NPT P/N: 912093.....\$542

Silicon Diaphragm in Stainless Steel Housing,
1/8 In. NPT P/N: 912065.....\$347

(More flange styles on Page 10)

Electronic Calibrators Absolute pressure gauges can be adjusted to factory specifications using our compact electronic calibrators. No electronics training is required to operate these calibrators which allow you to adjust zero and full scale without using a vacuum system. See page 33 for P/Ns and prices for each of the ranges listed above.

Rack for Bare PCBs

Rack to hold 6 Bare PCBs. 3 X 7 X 3 inch F to B. Tabs for surface mount included. P/N V801186.....\$261



Available in 5 ranges from 10-5 Torr to 1500 Torr. Pirani and Stainless Steel Diaphragm Sensors.

Vacuum and Pressure Atmospheric pressure as reference, reads zero at atmosphere.

Choose Any Unit Calibration in PSIG, in. Hg, In. H₂O, mm Hg.

Choose Any Range Some standard ranges are shown below, but any range is available.

Best Value Gauges Although low in cost these rugged instruments include all the features you need. Adjustable set point, analog output and more.

Diaphragm Sensors are available with any flange style: NW, NPT, VCR, VCO, etc.

Digital Display (optional) 3 1/2 place LCD gives high resolution over entire gauge range.

Millisecond Response for Alarm Built in relay and set point provide msec. response for alarm; adjustable relay does not have to wait for slow scanning data systems.

Cable Length to 500 feet Add or change the cable length between sensor and gauge up to 500 Ft. (150m) No affect on calibration.

Control or Alarm These gauges provides an inexpensive and straightforward way to control your vacuum system. Use the adjustable set point with built-in relay to control backfill pressure on pump and purge operations. Or, feed the Fast Response analog output into your PC or PLC and let the digital system make the control decisions based on the signal.

Specification

Power: Gauges operate from 12 to 35 VDC, 150 mA. for all ranges.

Response time: Less than 400 milliseconds.

Accuracy: Whichever is larger dependent on range, 1% of reading, or:

± .01 PSIG with 1 PSIG range; ± 0.15 PSIG with 15 PSIG range;
± .02 in Hg with 2 in Hg range; ± 0.3 In. Hg with 30 In. Hg range;
± .02 In. H₂O with 20 In. H₂O range.

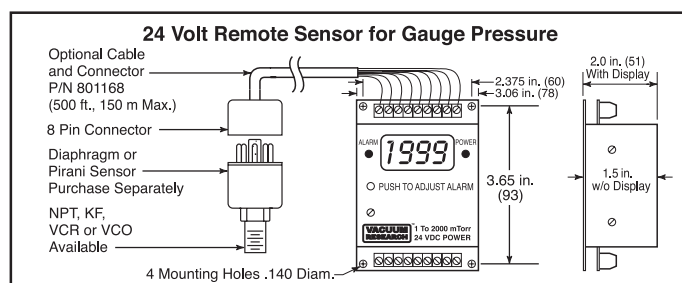
Analog Output: Included in all models.

Display (Optional): 3 1/2 Place LCD.

Relay: SPDT contacts rated for 5A @ 115 VAC, non-inductive.

Sensor Material: 316 Stainless Steel.

Sensor Cable Length: Purchase cable separately, up to 500 ft. (150 M.) See below for ordering information.



Ordering Information: Sensors for 24 Volt Gauges & Transmitters

BUY NOW! Go to www.vacuumresearch.com to order online

Gauge Pressure Instruments (Zero at atmosphere)	Order With or Without Digital Display	Sensors for Gauge Pressure Instruments (316 Stainless Steel Diaphragm)
± 1 PSIG Includes linear 0 to 1 VDC output and adjustable set point with 5 A relay. Digital display is optional. Sensor and cable purchased separately.	With Digital Display P/N 902270.....\$583 No Digital Display P/N 902271.....\$330	1/4 in. NPT P/N 912350.....\$565 1/8 in. NPT P/N 912353.....\$637 NW-16 Flange P/N 912351.....\$637 NW-25 Flange P/N 912354.....\$637 VCR-8 Female P/N 912352.....\$719 1/2 in. OD Tube P/N 912355.....\$637
± 15 PSIG Includes linear 0 to 1.5 VDC output and adjustable set point with 5 A relay. Digital display is optional. Sensor and cable purchased separately.	With Digital Display P/N 902272.....\$583 No Digital Display P/N 902273.....\$330	1/4 in. NPT P/N 912356.....\$549 1/8 in. NPT P/N 912359.....\$637 NW-16 Flange P/N 912357.....\$618 NW-25 Flange P/N 912360.....\$637 VCR-8 Female P/N 912358.....\$698 1/2 in. OD Tube P/N 912361.....\$637
± 2 In. Hg Includes linear 0 to 2 VDC output and adjustable set point with 5 A relay. Digital display is optional. Sensor and cable purchased separately.	With Digital Display P/N 902274.....\$583 No Digital Display P/N 902275.....\$330	Instruments calibrated for ± 2 In. Hg use the same sensors as shown above for the ± 1 PSIG instruments.
± 30 In. Hg Includes linear 0 to 0.3 VDC output and adjustable set point with 5 A relay. Digital display is optional. Sensor and cable purchased separately.	With Digital Display P/N 902276.....\$583 No Digital Display P/N 902277.....\$330	Instruments calibrated for ± 30 In. Hg use the same sensors as shown above for the ± 15 PSIG instruments.
± 20 In. H₂O Includes linear 0 to 2 VDC output and adjustable set point with 5 A relay. Digital display is optional. Sensor and cable purchased separately.	With Digital Display P/N 902278.....\$583 No Digital Display P/N 902279.....\$330	Instruments calibrated for ± 20 In. H ₂ O use the same sensors as shown above for the ± 1 PSIG instruments.

Cable Assembly includes a connector for the sensor on one end and stripped and tinned leads on the other end to connect to the terminal strip. Connector on only one end allows the cable to be pulled through conduit or to more easily enter your cabinet. Specify length up to 500 ft. (150 M.).
P/N 801168- xxx feet\$32. plus \$3./Ft.

Power Supply 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output. Wallmount style with adapter plugs for US, UK, Europe, Australia.
P/N: V104124\$79. each



The instrument on the left shows the optional digital display. All models provide both 0 - 10 V and 4 - 20 mA linear outputs for your PLC.

Specifications For Active Pirani

Pressure Ranges: 1 to 2000 mTorr, 1 to 2000 Microns
(select one) .001 to 2.000 mbar, 0.1 to 200.0 Pa

Pressure: Tested to 150 PSIG (10 kg/cm²).

Power & Analog Output Connector: RJ-45 Female.

Power: 12 to 35 VDC, less than 100 mA.

Analog Outputs: Linear 0 to 10 VDC and 4 - 20 mA.

Accuracy: Better than 5% of value or ± 3 mTorr, whichever is larger.

Response Time: 0.3 second time constant.

Optional Display: 3 1/2 Digit LCD.

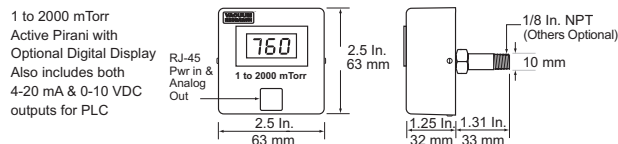
Connection to System: Standard gauge has a 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available.

Temperature Effects: Changes in ambient temperature between 0°C and 50 °C change the reading less than 0.2 mT per C° at 50 mT; less than 4 mT per C° at 900 mT.

Bakeout Temperature: Active Pirani tube can be baked to 50°C (120°F) in air or vacuum.

Mounting: Flange for system connection supports the gauge.

Net Wt.: 6 Ounces (180 grams). Shipping Wt.: Approx. 1lb. (.45 kg).



Ordering Information, 12 to 35 VDC Power Required

Active Pirani Indicator & Transmitter, 3 1/2 digit display, 1-2000 mTorr
plus 4-20 mA and 0-10 VDC output

With 1/8 Inch NPT Male Thread, P/N: 902383	\$500
With 1/4 Inch 45° SAE Flare, Male, P/N: 902373	\$515
With NW-16 Flange, P/N: 902384 • NW-25 Flange, P/N: 902385	\$515
With 1.33 Inch Conflat® Flange, P/N: 902386	\$515
With VCR-4 FEM, P/N: 902387	\$573
With 15 mm O. D. Tube, P/N: 902388	\$573
With 1/2 Inch O. D. Tube, P/N: 902389	\$554

Active Pirani Transmitter only, No display, 1-2000 mTorr
plus 4-20 mA and 0-10 VDC outputs

With 1/8 Inch NPT Male Thread, P/N: 902376	\$400
With 1/4 Inch 45° SAE Flare, Male, P/N: 902374	\$455
With NW-16 Flange, P/N: 902377 • NW-25 Flange, P/N: 902378	\$455
With 1.33 Inch Conflat® Flange, P/N: 902379	\$455
With VCR-4 FEM, P/N: 902380	\$500
With 15 mm O. D. Tube, P/N: 902381	\$440
With 1/2 Inch O. D. Tube, P/N: 902382	\$455

mTorr is the standard but there is no charge for calibration in microns, mbar or Pa. Add micron, mbar, or Pa to P/N.

- Sensor and Gauge in One Compact Package
- 12 to 35 Volt DC Power; Less Than 100 mA
- Linear Outputs for PLC or Data System
- 0 to 10 VDC and 4-20 mA Standard Outputs
- Optional Outputs to Match Any T/C Gauge
- Optional 3 1/2 Digit Liquid Crystal Display
- Stem, Flanges, Enclosure All Stainless Steel



Display and Power Up To 7 Gauges

7 position switch and digital LED display provides power and continuous 4-20 mA output from each gauge. Seven RJ-45 female connectors on rear panel, plus a DB-15 connector for the seven 4-20 mA linear outputs. Cables with RJ-45 connectors must be ordered separately. 1/4 DIN panel mountable. Power required is 100 to 240 V, 50/60 Hz.

7 Channel Display and Power Supply,

P/N: 902394 (cables not included) \$579

DB-15 Connector with cable for 4-20mA linear outputs from the rear panel (to connect to your PLC or Data Acquisition System)

P/N: V801328 - XX feet..... \$66. plus \$2.00 per ft.

BUY NOW! Go to www.vacuumresearch.com to order online

Cable Options (Not Included in Gauge Price):

RJ-45 male one end. Stripped and tinned conductors on the other end. Lengths up to 500 feet (150 m) available.

P/N: V801318 -XX (Length in feet)\$18. plus \$3.00 per ft.

RJ-45 male one end 25 feet, standard color gray. (black, blue, green, red, orange, purple, white, yellow avail.)

P/N: V801318-color (1 RJ45)..... \$51. ea.

RJ-45 male both ends 25 feet, standard color gray. (black, blue, green, red, orange, purple, white, yellow avail.) P/N: V801318-color (2 RJ45) ... \$54. ea.

Cable 5 Ft. with RJ-45 male both ends. P/N: V801318 (5 ft.)..... \$32. ea.

Power Supply with RJ-45 Connector 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output with adapter plugs for US, UK, Europe, Australia.

6 ft. cord. Screw terminals for connection of 0-10 VDC and 4-20 mA output.

P/N: V801330\$108 ea.

RJ-45 Connector Adapter (shown at right) with screw terminals for 24V power in and 4-20 mA, 0-10 VDC outputs.

P/N: V801324.....\$41 ea.

902383-REBUILD\$123

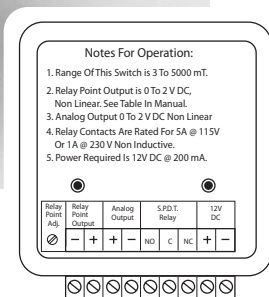
Send to factory by RGA



RJ-45 Connector



Gauge Tube Mount Active switch shown on Pirani tube with NW-16 Flange. 1/8" NPT, VCR & Conflat® also available.



- Ranges From 10^{-5} Torr to 2 Atmospheres
- Active Switch, Plugs Directly Onto Sensor
- Pirani, Diaphragm or Thermocouple Gauge Tubes
- Use With Hastings DV-6 or VRC Gauge Tubes
- Adjustable Setpoint, SPDT Relay, 5A @ 115 V
- Analog Output for PLC or Computer Interface
- Uses Less than 200 mA @ 12 Volts DC or 24 VDC

The Active Vacuum Switch provides an inexpensive and straightforward way to control your vacuum system. Use the Pirani Switch directly to initiate crossover after roughing, or the Diaphragm Switch to control backfill pressure on pump and purge operations. Or, feed the Active Switch output into your PC or PLC and let the digital system make the control decisions based on the output signal.

Specifications

Size: Switch is 3.08 X 3.5 X 1.5 in. high (78 X 89 X 38 mm)

Materials: Base plate is 300 series stainless steel. Standard cover is ABS plastic. Stainless steel cover is optional.

Relay: SPDT contacts rated for 5A @ 115 VAC, non-inductive.

Power: Standard vacuum switches operate from 12 VDC power, 200 mA. Vacuum switches shipped to customers in the USA include an external wall mount style power supply with 115 VAC in/12 VDC out. Customers outside the USA must provide 200 mA @ 12 VDC. See below for optional 220 V 50 Hz power supply.

Response time: With Vacuum Research Pirani; 0.3 sec time constant. With Diaphragm tubes; less than 400 milliseconds.

Accuracy: With Pirani better than 1% of value or ± 3 mT. With Diaphragm Sensor 1% of reading or 2 Torr.

Ordering Information: Sensors for 24 Volt Gauges & Transmitters

BUY NOW! Go to www.vacuumresearch.com to order online

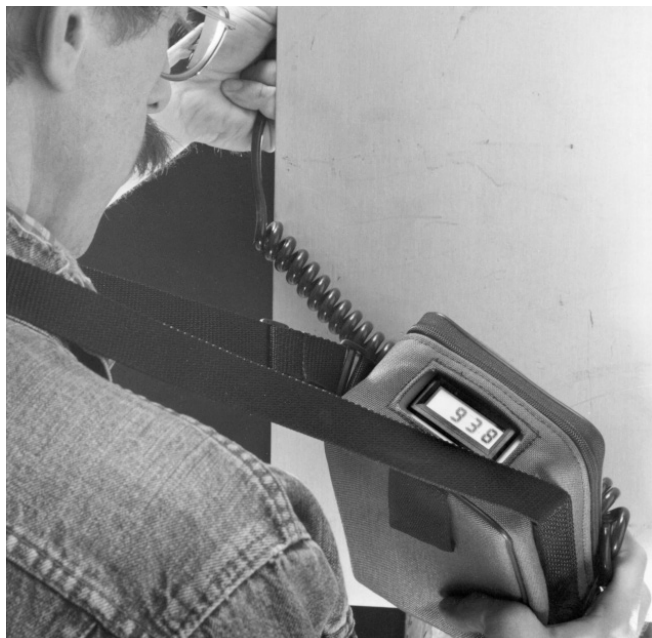
Vacuum Range • Sensor Type • Analog Output	Sensors for Vacuum Switch
10^{-5} to 10^{-1} Torr • Pirani Sensor Analog Output 0 - 1 VDC (.01 X 10^{-3} to 100 X 10^{-3} mbar, .001 to 13.3 Pa) P/N: 902134\$401	Standard Pirani Gauge Tube For 0.01 to 100 mTorr Instruments (More styles on Page 14) With Smooth 3/4 In. O.D. Tubulation, P/N: 912018\$168. • 1/8 NPT, P/N: 912125\$229 With NW-16 Flange, P/N: 912037 • NW-25 Flange, P/N: 912113\$229
1 to 1000 mTorr • Thermocouple Sensor Output 0 - 5 VDC (1 X 10^{-3} to 1 mbar, 0.1 to 100 Pa) P/N: 902130\$316	Standard Thermocouple Gauge Tubes (More flange styles on Page 20) Interchangeable with Teledyne-Hastings DV-6M & DV-6R. With VRC-6M 1/8" NPT Stainless Steel Body, P/N: 912086\$81 With VRC-6M NW-16 Stainless Steel Body, P/N: 912096\$145 With VRC-6M NW-25 Stainless Steel Body, P/N: 912203\$145
3 to 5000 mTorr • Pirani Sensor Analog Output 0 - 2 VDC (10^{-3} to 2 mbar, 0.1 to 200 Pa) P/N: 902136\$303	Standard Pirani Gauge Tube For 1 to 2000 mT Instruments (More styles on Page 15) With 1/8 in. NPT Male Thread, P/N: 912001\$115 With NW-16 Flange, P/N: 912005 • NW-25 Flange, P/N: 912202\$174
.01 to 20 Torr • Pirani Sensor Analog Output 0 - 5 VDC (.01 to 20 mbar, 1 to 2000 Pa) P/N: 902155\$303	Standard Gauge Tube For .01 to 20 Torr Instruments (More flange styles on Page 16) With 1/8 in. NPT Male Thread, P/N: 912011\$121 With NW-16 Flange, P/N: 912072 • NW-25 Flange, P/N: 912204\$174
1 to 1500 Torr • Diaphragm Sensor Output 0 - 1.5 VDC (1 to 2000 mbar, 0.1 to 200.0 kPa) P/N: 902138\$401	Transducer with Stainless Steel Diaphragm (More flange styles on Page 9) 1/4 in. NPT P/N: 912022\$550 Stainless Steel Diaphragm with NW-16 Flange, P/N: 912151\$619 Stainless Steel Diaphragm with NW-25 Flange, P/N: 912117\$619
30 In. Hg to Atmosphere • Diaphragm Sensor Output 0 to negative 300 mV DC P/N: 902140\$401	Transducer With Standard Stainless Steel Diaphragm (More flange styles on Page 10) for 30 In. Hg Diaphragm and wetted parts are 316 SS 1/4 in. NPT P/N: 912093\$542

Explosion Proof Enclosure, Class 1 Group C or D, Div. 1
 Meets NEMA-4 & IP66 Water Resistance Specifications.
 Order from page 35. P/N V805010\$516

Optional Stainless Steel Cover in place of Standard ABS
 I Cover P/N: V700271 add \$46

Power Supply 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output. Wallmount style
 with adapter plugs for US, UK, Europe, Australia. P/N: V104124\$77. each

Switches Wired for 24 VDC power instead of standard 12 VDC.
 Add suffix 24 V to P/N.....add \$45



Easy to read, rugged digital display.

These battery powered Pirani and diaphragm gauges were designed for reliable vacuum measurement on applications such as over-the-road cryogenic trailers. The easy to read digital display eliminates the fragile meter movements used in old style instruments. Our gauge tube stem and cup are all stainless steel and are strong enough to stand on and resist the corrosive effects of rain and road salt.

- 4 Models of Diaphragm and Pirani Gauges
 - 1 to 1500 Torr Diaphragm
 - 30 in. Hg To 200 PSI Gauge
 - 1 to 2000 mTorr Pirani
 - .01 to 20.00 Torr Pirani
- Available in Torr, Microns, Pascal, in. Hg, or mbar
- 2000 mTorr Pirani Also Reads DV-6 Tubes
- Rugged Digital Display; No Fragile Meters!
- Long Life Batteries and Built-in Charger

Lower operating temperatures in our Pirani gauge tubes are half that of thermopile gauges. This enhances stability as does a unique temperature compensation network. Gauge tubes are matched so they can be replaced without recalibration and they can withstand working pressures to 300 psi, tested to 1200 psi. Gauge tubes are available with 1/8 NPT male thread (fit into quick connects sized for 1/8 inch pipe (0.405" dia.). NW flanges, VCR-4 fittings, 15 mm diameter tube, and Mini Conflat® flanges are also available.



Gauge Pressure vs. Absolute Pressure

Most of the instruments in this catalog are built to measure pressure in "Absolute" units such as Torr, Microns, and mbar. But "Gauge" pressure units such as inches Hg are also available. "Gauge" pressure means that atmospheric pressure is used as the reference for zero and 29.92 in. Hg (or some other unit of measure) designates high vacuum. "Gauge" pressure measurement can be useful in certain applications such as determining if a vacuum chamber is actually at atmospheric pressure so that the door can be opened safely. But, because the zero of "Gauge" measurements changes with atmospheric pressure the entire scale also changes. For example, if you are reading 28.00 inches Hg and the next day your instrument reads 28.39 inches Hg it may be that your pump is working better or it may be that a storm moved into your area and atmospheric pressure dropped. Changes in altitude also affect the readings of "Gauge" pressure instruments. There is a difference of 5 inches Hg (127 Torr) between sea level and Denver, CO.

For most vacuum measurements we recommend "Absolute" measurement systems, but if "Gauge" pressure is preferred add the suffix "Gauge" and the unit of measure to the part number. For most units of measure there is no additional charge.

Common Specifications

Battery Life: Approximately 150 readings of 1 minute each can be made without recharging. Gauge automatically turns off after 1 minute.

Battery Charger: Built-in and completely regulated against over-charge. 115VAC is standard. 230 VAC available at extra cost.

Battery Recharge Time: Approximately 10 hours. **Recharge Power:** Less than 5 Watts. **Display:** Easy to read 3 1/2 digit LCD

Line Voltage for Recharger Power Supply: 115 VAC, 50/60 Hz is standard; 230 VAC, 50 Hz optional for an additional cost.

Dimensions: 4.25 in. W x 6.5 in. H x 2.5 in. D (108 mm W x 165 mm H x 63 mm D)

Gauge Tube Cable: 5 ft. coil cord (1.5M) attached. **Line Cord For Recharger:** 3 wire, 65 inch (170 cm), socket provided.

Net Weight Including Case: 1 lb., 2 oz. (0.5 kg) **Shipping Weight Including Case:** 2 lbs., 8 oz. (1.1 kg)

Model Specifications

Diaphragm Gauge; 1 to 1500 Torr

Pressure Range: 1 to 1500 Torr; ± 1 Torr

(± 0.1 Torr resolution available at extra cost).

Alternate Range: 30" Hg to 200 PSI Gauge.

Calibration: Any gas, liquid or vacuum compatible with sensor materials.

Accuracy: 1% of reading or 2 Torr.

Response Time: Less than 400 msec. for response to a step change.

Linearity: $\pm 0.15\%$ Full Scale. Sensitivity: ± 1 Torr.

Transducer: See "ordering Information" below.

Materials: Parts in contact with process are 316, 304 SS, silicone & silicon.

Sensor Internal Volume: 1.25 ml for SS; 0.5 ml for Silicon.

Temperature Effects: When changes occur in ambient temperature between 0 °C and 50 °C, reading will change no more than $\pm 0.02\%$ per °C.

Bakeout Temperature: Gauge tube can be baked to 100 °C (212 °F) in air or vacuum.

Pirani Gauge; 1-2000 mT

Pressure Range: 1 to 2000 milliTorr.

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 0.03 Torr, whichever is larger.

Response Time: 0.3 second time constant.

Gauge Tube: Standard gauge tubes have a 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available.

Tube Internal Volume: 0.79 cc (1/8 NPT).

Materials: Parts in contact with the process are 304 SS platinum alloy or Ni plated Kovar.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.2 mT per °C at 50 mT; less than 4 mT per °C at 900 mT.

Bakeout Temperature: Standard tube can be baked to 100°C (212°F) in air or vacuum. Tubes for 250°C (482°F) bakeout available.

Pirani Gauge; 0.01-20 Torr

Pressure Range: 0.01 to 20 Torr.

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 0.03 Torr, whichever is larger.

Response Time: 0.3 second time constant.

Gauge Tube: Standard gauge tubes have 1/8 NPT male thread or fit into quick connects sized for 1/8 inch pipe (0.405" dia.) NW, VCR and Mini Conflat® available.

Tube Internal Volume: 0.79 cc (1/8 NPT).

Materials: Parts in contact with the process are 304 SS platinum alloy or Ni plated Kovar.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.01 Torr per °C.

Bakeout Temperature: Gauge tube can be baked to 100°C (212°F) in air or vacuum. Tubes for 250°C (482°F) bakeout available.

Ordering Information Specify 115 or 230 V, 50/60 Hz Power for Battery Charger When Ordering

BUY NOW! Go to www.vacuumresearch.com to order online

1 to 1500 Torr Battery Powered

Portable Digital Indicator; Reads 1 to 1500 Torr with Vacuum Research gauge tubes. Gauge tubes and carry case must be ordered separately. Battery charger for 115V 50/60 Hz included. Charger for 220V, 50/60 Hz must be purchased separately. P/N: 902014.....\$794

Transducer with Stainless Steel Diaphragm wetted parts 316 SS. Max. bake-out temp. 125 °C.

1/4 in. NPT, P/N: 912022.....\$550

VCR-8 FEM, P/N: 902050.....\$719

VCR-4 FEM, P/N: 912219.....\$698

NW-16 Flange, P/N: 912151.....\$619

NW-25 Flange, P/N: 912117.....\$619

1.33 in. Conflat®, P/N: 912191.....\$619

1/2 in. OD Tube, P/N: 912210.....\$619

Transducer with Silicon Diaphragm body is 304 SS, connector pins are nickel plated Kovar. Maximum bake-out temperature 125 °C.

1/8 in. NPT Male Thread, P/N: 912091.....\$347

1/2 in. OD Tube, P/N: 912211.....\$401

NW-16 Flange, P/N: 912023.....\$401

NW-25 Flange, P/N: 912119.....\$401

1.33 in. Conflat® Flange, non-rotatable, P/N: 912026.....\$401

VCR-4 Fitting, P/N: 912025.....\$448

Diaphragm Transducers with All Stainless External Parts for outdoor applications or wherever the use of 304 SS is appropriate. All external parts and connector pins are 304 SS. Add SS suffix to tube P/N and to standard tube price..... add \$61

Gauge and gauge tube accessories. See pages 35, 36, 37 & 39.

Calibrator for 1500 T instruments, See page 33.

Dust Baffles see page 36.

Spare battery charger 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output. Wallmount style with adapter plugs for US, UK, Europe, Australia.

P/N: V104124.....\$77

1 to 2000 mTorr Battery Powered Portable Digital

Indicator; Reads 1 to 1500 Torr with Reads 1 to 2000 mTorr with VRC Pirani gauge tubes, and 1 to 200 mTorr with Teledyne-Hastings DV6R, KJL-6000 and VRC-6 T/C tubes. Gauge tubes and carry case must be ordered separately. Battery charger for 115V 50/60 Hz included. Charger for 220V, 50/60 Hz must be purchased separately.

P/N: 902017.....\$830

Standard Gauge Tube For 1 to 2000 mT Instruments

Gauge tube body is 304 SS, connector pins are nickel plated Kovar.

1/8 in. NPT Male Thread, P/N: 912001.....\$115

1/4" SAE 45° Flare, Male, P/N: 912284.....\$169

NW-16 Flange, P/N: 912005.....\$169

NW-25 Flange, P/N: 912202.....\$169

1.33 in. Conflat® Flange, non-rotatable,

P/N: 912067.....\$169

VCR-4 FEM Fitting, P/N: 912068.....\$216

15 mm Diameter Tube, P/N: 912102.....\$160

All Stainless Steel Gauge Tubes For Outdoor

Applications Or Wherever The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS. 1/8 in. NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price:..... add \$61

Gauge and gauge tube accessories for the 2000 mT & 20 Torr Pirani Gauges. See pages 35, 36, 37 & 39.

Calibrators.....see page 33.

Dust Baffles.....see page 36.

Spare battery charger 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output. Wallmount style with adapter plugs for US, UK, Europe, Australia.

P/N: V104124.....\$74

.01 to 20 Torr Battery Powered

Portable Digital Indicator

Reads .01 to 20 Torr with Vacuum Research gauge tubes. Gauge tubes and carry case must be ordered separately. Battery charger for 115V 50/60 Hz included. Charger for 220V, 50/60 Hz must be purchased separately.

P/N: 902011.....\$794

Standard Gauge Tube For .01 to 20 Torr Instruments

Gauge tube body is 304 SS, connector pins are nickel plated Kovar.

1/8 in. NPT Male Thread, P/N: 912011.....\$121

1/4" SAE 45° Flare, Male, P/N: 912285.....\$169



New! 1/4 inch SAE 45o Flare tube available for mTorr, Torr and micron Pirani gauges

NW-16 Flange, P/N: 912072.....\$174

NW-25 Flange, P/N: 912204.....\$174

1.33 in. Conflat® Flange, non-rotatable,

P/N: 912073.....\$174

VCR-4 FEM Fitting, P/N: 912074.....\$222

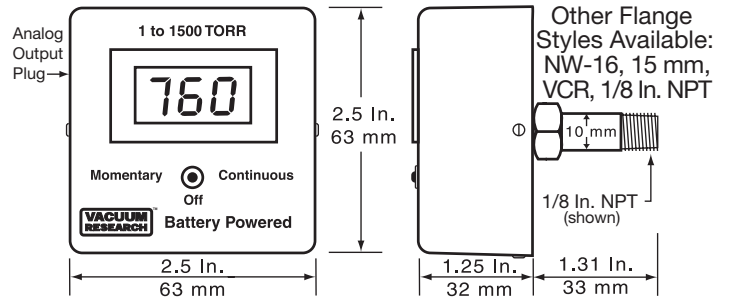
15 mm Diameter Tube, P/N: 912103.....\$156

All Stainless Steel Gauge Tubes For Outdoor Applications Or Wherever The Use Of 304 SS Is Appropriate. All wetted parts as well as all external parts and connector pins are 304 SS.

1/8 in. NPT, NW-16, Conflat®, VCR-4 and special flanges can be provided. Add "SS" suffix to any tube P/N and to standard tube price:..... add \$61



- Sensor and Display in One Compact Package
- 9V Battery Gives 2,000 Readings or 80 Hours
- Rugged Digital Display; No Fragile Meters!
- Variety of Flanges Available: NW-16, VCR, 15 mm
- Momentary or Continuous Easy to Read Display



Battery Powered Integral Gauge

Powered by a standard 9 volt alkaline battery, Vacuum Research Integral Sensor Diaphragm Manometers are compact vacuum measurement instruments with silicon or Stainless Steel diaphragms that measure liquid or gas pressure as well as vacuum. Response time is less than 400 milliseconds for full scale and the instruments are available with a variety of flanges including VCR, 15 mm, 1/8 NPT, and NW-16. These instruments offer the precision and high resolution of digital electronics at very competitive prices. Output of 1 mV per Torr is standard.

Specifications

Pressure Range: 1 to 1500 Torr ± 1 Torr or differential with zero at atmosphere. (1 - 2000 mbar & 0.1 - 200 kPa available)

SS Sensor Max. Pressure w/o Damage: 4,500 Torr, burst 6,000 Torr.

Calibration: Any gas or vacuum compatible with sensor materials.

Accuracy: 1% of reading or 2 Torr.

Response Time: Less than 400 msec. for response to a step change.

Linearity: $\pm 0.15\%$ Full Scale.

Sensitivity: ± 1 Torr.

Vacuum Connection: 1/8 NPT male thread or fits into quick connects sized for 1/8 inch pipe (0.405" dia.). NW, VCR and Mini Conflat® available.

Analog Output: 0 to 1.5 VDC (1 mV/Torr) 6 X 6 modular jack with 7 foot (2 m) cable with spade lugs. Extensions may be added up to 10,000 ohms.

Materials: Parts in contact with process are 316, 304 SS silicone & silicon.

Sensor Internal Volume: Approximately 0.5 ml.

Power: Powered by standard 9 volt alkaline battery.

Battery Life: In continuous display position battery operates up to 80 hours.

Momentary Display: Push switch to display reading for approx. 100 secs.

Continuous Display: Displays continuously until switch is turned Off.

Operating Temperature: 0 to 50°C (32 to 120°F).

Temperature Effects: When changes occur in ambient temperature between 0° and 50°C, reading will change no more than $\pm 0.05\%$ per C°.

Dimensions: 2.5 x 2.5 x 1.25 inches (63 x 63 x 32 mm).

Mounting: Sensor and display in one integrated package. Mount directly on your vacuum system.

Transducer Cables: None required.

Weight: Approximately 6 ounces (170 grams.)

Ordering Information; Silicon Diaphragm

BUY NOW! Go to www.vacuumresearch.com to order online

Differential Gauge Pressure Instrument with Sensor and display integrated into one package. Linear analog output included as standard. (Zero at atmosphere.) 9V Battery Powered.

0 to ± 20 In. H ₂ O, 1/8 Inch NPT P/N: 902261	\$453
0 to ± 20 In. H ₂ O, with 1/2 In. O.D. Tube P/N: 902262	\$506
0 to ± 20 mmHg, 1/8 Inch NPT P/N: 902258	\$453
0 to ± 20 mmHg, with 1/2 Inch O.D. Tube P/N: 902263	\$506
0 to ± 15 PSI with 1/8 Inch NPT P/N: 902264	\$453
0 to ± 15 PSI with 1/2 Inch O.D. Tube P/N: 902265	\$555

Absolute Pressure Diaphragm Gauge

1 to 1500 Torr Digital Display and sensor integrated into one package. 0 to 1.5 VDC linear analog output included as standard. 9V battery powered. Sensor and display integrated into one package

Vacuum Connection 1/8 in. NPT, P/N: 902159	\$433
Vacuum Connection NW-16, P/N: 902160	\$487
Vacuum Connection 1/2 in., P/N: 902161	\$487
Vacuum Connection 1.33 cf, P/N: 902162	\$487

Ordering Information; 316L SS Diaphragm

BUY NOW! Go to www.vacuumresearch.com to order online

Absolute pressure, 1 to 1500 Torr (mbar & Pa available) 1 to 1500 Torr digital display and sensor integrated into one package. 0 to 1.5 volt linear output is standard. 9V battery is included.

Vacuum Connection 1/8 in. NPT, P/N: 902334	\$652
Vacuum Connection NW-16, P/N: 902331	\$704
Vacuum Connection NW-25, P/N: 902333	\$704
Vacuum Connection 1/2 in. O.D., P/N: 902338	\$652
Vacuum Connection 15 mm O.D., P/N: 902332	\$704
Vacuum Connection 1.33 CF, P/N: 902335	\$704
Vacuum Connection 2.75 CF, P/N: 902336	\$704
Vacuum Connection VCR-8 FEM., P/N: 902337	\$740
Vacuum Connection VCR-4 FEM., P/N: 902339	\$740

Rebuild Integral Sensor Battery Diaphragm Gauge

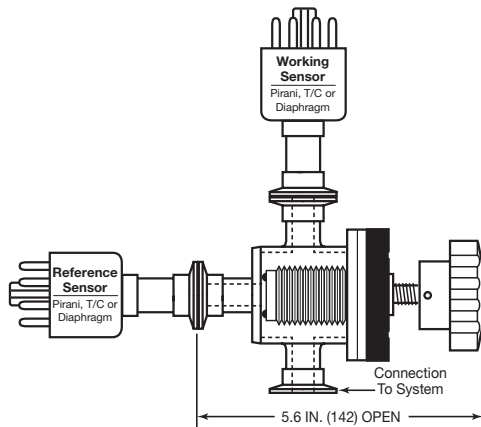
Use original P/N plus "RBLD" suffix, e.g.: 902159-RBLD. Return old gauge to factory or local distributor with purchase order.

Silicon Diaphragm.....\$185.	316L SS Diaphragm.....\$448
Spare Analog Output Cable (7 ft. or 2 M) P/N: V801152	\$13

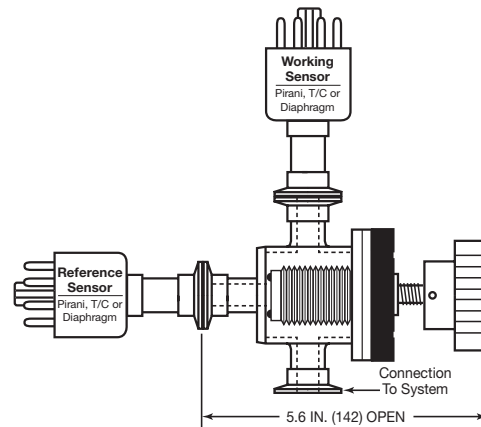


- **Verify complete system; sensor and display**
- **Easily confirm vacuum gauge calibration**
- **Satisfy ISO-9000 auditors and inspectors**
- **Choose Manual or Electro-pneumatic actuator**
- **Use with any brand or type of vacuum gauge**

With ever increasing needs to verify vacuum gauge accuracy many gauge manufacturers, including Vacuum Research, now offer electronic calibrators or "reference tubes." Although such devices are helpful they only deal with the control or display part of the gauge and do nothing to evaluate the sensor. This is unfortunate because in the real world most vacuum gauge errors involve the sensor. Vacuum Research developed these manifolds to make it easy to compare your working gauge with a reference gauge or a certified standard gauge. Burned out filaments and ruptured diaphragms are easy to diagnose but the most typical failure mode of a vacuum gauge is a gradual shift in calibration due to pump fluid and dirt on the sensor. Such changes can be easily detected with these manifolds because the two sensors are only inches apart.



Manifold with Manual Actuator



Manifold with Air Open-Spring Close Actuator

Ordering Information

BUY NOW! Go to www.vacuumresearch.com to order online

Our standard manifolds have 300 series stainless steel bodies and NW-16 ports for sensor and system connection. Other flanges such as NW-25 are available as are compression type quick connects for 1/8 inch NPT, 1/2 inch O.D. and 0.75 inch O.D. All manifolds use a welded bellows stem seal.

NW-16 Calibration Manifold, Manual Actuator Stainless steel manifold body with welded bellows. All 3 ports NW-16.
P/N: 912274\$622

NW-16 Calibration Manifold, Air Open - Spring Close

Stainless steel manifold body with welded bellows. All 3 ports NW-16. (Solenoid and Position Indicators not included.)
P/N: 912275\$652

3 Way Solenoid for Air Open-Spring Close Manifold Add suffix to manifold P/N: SOL-120 VAC, SOL-230 VAC or SOL-24 VDC To manifold costAdd \$204

Position Indicators

Air open-spring close manifolds can be equipped with a pair of SPST switches to indicate valve open and closed. These unpowered switches have contacts rated for 1 amp @ 300V, non-inductive. Add the suffix 'PI' to P/N & to price of manifoldAdd \$173./pair

Additional Port for Roughing

Add an additional NW-16 port for connection of a roughing pump to the reference tube side of the manifold. Add suffix 'RP' to P/N & to price of manifoldAdd \$161



NIST Traceable Certification of VRC Vacuum Gauges

All Vacuum Research gauges are carefully calibrated before they are shipped. However, in certain very critical applications your customer or your own Quality or Meteorology department may require written assurance of traceability of calibration. For such situations we can provide a certificate for any of our gauges. Our calibration quality system complies with ANSI/NCSL Z540-1-1994.

All you have to do is contact our customer service department for an "RGA" number and ship your instrument and sensor to us. We'll adjust the zero and full scale of your instrument to agree with our NIST calibration standards. We'll also compare your instrument to these standards throughout the entire range, and certify the actual readings.

This certification can be provided on new instruments or on older instruments whenever you require it. Price is FOB our plant. Shipping costs to and from our plant are not included. Usual time required for certification is seven to 10 days after we receive your instrument.

Ordering Information

Pirani, Convection, or Diaphragm Gauges

Certificates after repair or adjustment only

P/N: 912900 \$299

Certificates for as received plus after repair or adjustment

P/N: 912901 \$482

100 mTorr Pirani Gauges

Certificates after repair or adjustment only

P/N: 912911 \$453

Certificates for as received plus after repair or adjustment

P/N: 912912 \$600

Wide Range Diaphragm Manometers

Certificates after repair or adjustment only

P/N: 912902 \$447

Certificates for as received plus after repair or adjustment

P/N: 912903 \$704

NIST Traceable Vacuum Gauge Calibration Certificate

VACUUM RESEARCH

We certify that the "Calibration Standards" used in this test are traceable to NIST calibration standards, that the data presented below are true and correct and that the instrument tested met all of manufacturer's performance specifications at the time of this test.

Calibration Quality System complies with ANSI/NCSL Z540-1-1994.

This Test performed by: _____ John F. Hartnett,
Signature _____ Date _____ President
Name _____ Vacuum Research Corp.

Customer Name _____ Customer Asset No. _____

Address _____

VRC Device Being Certified: _____

Instrument P/N: _____

S/N: _____

Transducer P/N: _____

S/N: _____

Calibration Standard Used (Primary): _____

Instrument Model: _____

S/N: _____

Transducer Model: _____

S/N: _____

Accuracy of Standard: _____

Standard's Calib. Date: _____

Calibration Standard Used (2nd if Needed): _____

Instrument Model: _____

S/N: _____

Transducer Model: _____

S/N: _____

Accuracy of Standard: _____

Standard's Calib. Date: _____

Ambient Conditions During Test:
Temp.: _____ °F % RH: _____

Was Calibration Adjusted Prior To As Received Test? Yes _____ No _____

Were Repairs Required? Yes _____ No _____

Remarks: _____

Calibration Standard	Device As Received	Device As Calibrated	Limit Allowed		4 to 20 mA Output
			Min.	Max.	
0 mTorr			0	0	
5 mTorr			2	8	
10 mTorr			7	13	
25 mTorr			22	28	
50 mTorr			47	53	
75 mTorr			71	78	
100 mTorr			95	105	
250 mTorr			237	262	
500 mTorr			475	525	
750 mTorr			712	787	
900 mTorr			855	945	
1000 mTorr			950	1050	
1250 mTorr			1187	1312	
1500 mTorr			1425	1575	
1750 mTorr			1662	1837	
2000 mTorr			1900	2100	



Vacuum Research Corporation • 100 Chapel Harbor Dr. #4 • Pittsburgh, PA 15238 USA
Phone: (800) 426-9340 • (412) 261-7630 • FAX: (412) 261-7220 • e-mail: VRC@vacuumresearch.com
Revised 8/28/2015

Pressures Used for NIST Calibrations at Vacuum Research

Wide Range Gauge Calib. Points	100 mTorr Pirani Gauge Calib. Points	2000 mTorr Pirani Gauge Calib. Points	20 Torr Pirani Gauge Calib. Points	50 Torr Pirani Gauge Calib. Points	Convection Gauge Calib. Points	1500 Torr Gauge Calib. Points
000 mT	0.00 mT	0 mT	0.00 mT	0.00 Torr	000 mT	0 Torr
10 mT 2 Torr	.10 mT	5 mT	.50 mT	.10 Torr	10 mT	5 Torr
50 mT 5 Torr	1.00 mT	10 mT	100 mT	.25 Torr	25 mT	10 Torr
100 mT 10 Torr	2.50 mT	25 mT	250 mT	.50 Torr	50 mT	25 Torr
250 mT 50 Torr	5.00 mT	50 mT	500 mT	1.00 Torr	75 mT	50 Torr
500 mT 100 Torr	7.50 mT	75 mT	750 mT	2.50 Torr	100 mT	75 Torr
750 mT 200 Torr	10.00 mT	100 mT	1000 mT	5.00 Torr	250 mT	100 Torr
900 mT 300 Torr	12.50 mT	250 mT	2.50 Torr	9.25 Torr	500 mT	200 Torr
1000 mT 400 Torr	15.00 mT	500 mT	5.00 Torr	10.00 Torr	750 mT	250 Torr
1250 mT 500 Torr	17.50 mT	750 mT	7.50 Torr	12.50 Torr	1000 mT	300 Torr
1500 mT 600 Torr	20.00 mT	900 mT	9.25 Torr	15.00 Torr	5 Torr	400 Torr
1750 mT ATM	30.00 mT	1000 mT	10.00 Torr	17.50 Torr	10 Torr	500 Torr
	40.00 mT	1250 mT	12.50 Torr	20.00 Torr	20 Torr	600 Torr
	50.00 mT	1500 mT	15.00 Torr	30.00 Torr	30 Torr	700 Torr
	75.00 mT	1750 mT	17.50 Torr	50.00 Torr	50 Torr	ATM
	100 mT	2000 mT	20.00 Torr			



Easy To Use, No Electronics Training Needed

These compact and easy to use electronic calibrators allow you to adjust both zero and full scale of any Vacuum Research gauge without the use of a vacuum system, and without any electronics training. Just follow the step by step procedure on the calibrator front panel to insure performance the same as a new gauge.

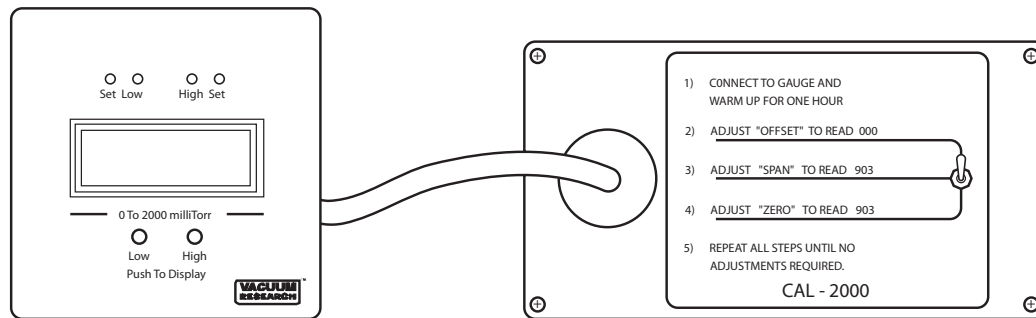
Making sure that your vacuum gauges are working properly has never been easier. These calibrators do not require any electronics training yet they allow you to adjust your Vacuum Research Gauge exactly to like new factory specification.

The procedure is simple. You begin by unplugging the vacuum gauge sensor cable from the gauge tube and plugging it into the calibrator. After allowing one hour for warm up you adjust the offset on the rear of your gauge to read "000".

You then adjust the "span" to the specified value. Repeat the procedure two or three times until no adjustment is needed and the job is done. Your gauge calibration is now the same as it was when leaving the factory.

After calibrating the electronic portion of your vacuum gauge you may want to install a factory fresh gauge tube. Because the tube is exposed to pump fluid vapors and other dirt from your process it may become contaminated and give erroneous readings. It is good practice to compare on a regular basis the readings with our "working" gauge tube and a brand new tube or one that is known to be clean.

BUY NOW! Go to www.vacuumresearch.com to order online



NIST Traceable Certification of Vacuum Gauge Calibrators

All Calibrators are tested to strict standards prior to shipment. In addition to this you need certification of the testing, it is available for new and existing calibrators. For recertification of your existing calibrators, please contact the factory for an "RGA" number, and return the calibrator freight prepaid with your purchase order. Time required for certification is 5 to 7 days.

Certificate of NIST Traceable Calibration both as received and after repair and adjustment

For Wide Range and Convection Gauge Calibrators
P/N: 912904 \$443
For Pirani, Diaphragm and Thermocouple Gauge Calibrators
P/N: 912905 \$226

Certificate of NIST Traceable Calibration after repair or adjustment only

For Wide Range and Convection Gauge Calibrators
P/N: 912906 \$284
For Pirani, Diaphragm and Thermocouple Gauge Calibrators
P/N: 912907 \$144

Ordering Information

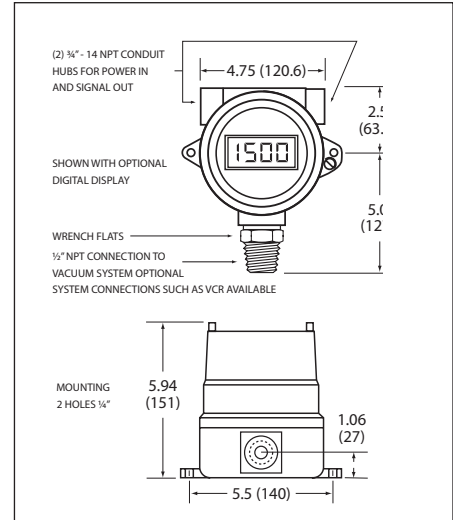
0.5 - 1200 Torr Manometer Calibrator	P/N: 912300	\$509
Wide Range Manometer Calibrator Kit	P/N: 912110	\$780
Calibrator for Digital Convection Gauge	P/N: 912170	\$693
Calibrator for Analog Convection Gauge	P/N: 912183	\$343
100 mTorr Pirani Gauge Calibrator	P/N: 912019	\$343
2000 mTorr Pirani Gauge Calibrator	P/N: 912008	\$343
20 Torr & 50 Torr Pirani Gauge Calibrator	P/N: 912009	\$343
Dual Range Pirani Gauge Calibrator.....	P/N: 912010	\$343
1500 Torr Diaphragm Gauge Calibrator.....	P/N: 912027	\$343
30" Hg to 150.0 PSIG Gauge Calibrator	P/N: 912021	\$343
Thermocouple Gauge Calibrator.....	P/N: 902114	\$353
0.1 to 20 PSIG Calibrator	P/N: 912039	\$343
0.1 to 200 PSIG Calibrator	P/N: 912040	\$343
1 to 1000 PSIG Calibrator	P/N: 912041	\$343
912105 Gauge Tube Calibrator.....	P/N: 912279	\$399



Dust and Water Proof Enclosure Rated IP-65, shown with optional display.

Available in 3 Ranges

- 1 to 1500 Torr Stainless Steel Diaphragm
- 1 to 2000 mTorr & .01 to 20 Torr Pirani Gauges
- Linear 0 to 10 VDC and 4-20 mA Outputs
- Power Required 12 to 35 Volt DC, 200 mA



SS Diaphragm Gauge 1 to 1500 Torr 1 to 2000 mbar 0.1 to 200 kPa

Specifications

Measurement Range: 1 to 1500 Torr (1 to 2000 mbar and 0.1 to 200 kPa).

Calibration: Any gas.

Resolution: ± 1 Torr.

Response Time: Less than 1 sec. for 90% of an increase in pressure. ≈ 1.5 sec. for decrease from atmosphere to 1 Torr.

Power: 12 to 35 volt DC; less than 100 mA.

Analog Output: Linear 0 to 10 V and 4 to 20 mA standard.

Temperature Effects: Automatic compensation from 0° to 35 °C.

Bake Out Temperature: Gauge can be baked to 100°C (212 °F) in air or vacuum.

Vacuum Connection: 1/4 NPT male. Others such as NW, VCR and 1/2" O.D. tube available.

Materials: All wetted parts 300 series S.S.

SS Sensor Max. Pressure w/o Damage: 4,500 Torr, burst 6,000 Torr.

Dimensions: Enclosure 3 X 3 X 2 In. 1/4 In. NPT. vacuum connection is 1 5/8 In. (41 mm) long.

Mounting: Gauge can be supported by the vacuum connection and oriented in any plane.

Net Wt.: 0.75 lb. (0.3 kg) Ship: 1 lb. (0.45 kg)

Pirani Gauge 1 to 2000 milliTorr 0.001 to 2.000 mbar 0.1 to 200.0 Pa

Specifications

Measurement Range: 1 to 2000 milliTorr (.001 to 2 mbar, and 0.1 to 200 Pa)

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 3 mTorr, whichever is larger.

Response Time: 0.3 second time constant.

Power: 12 to 35 volt DC; less than 200 mA.

Analog Output: Linear 0 to 10 VDC & 4 to 20 mA standard.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.2 mT per C° at 50 mT; less than 4 mT per C° at 900 mT.

Bakeout Temperature: Gauge can be baked to 100°C (212°F) in air or vacuum.

Vacuum Connection: 1/4 NPT male. Others such as NW, VCR and 1/2" O.D. tube available.

Dimensions: Enclosure 3 X 3 X 2 In. (76 X 76 X 50 mm) 1/4 In. NPT vacuum connection is 1 5/8 In. (41 mm) long.

Mounting: Gauge can be supported by the vacuum connection and oriented in any plane.

Net Wt.: 0.75 lb. (0.3 kg) Ship: 1 lb. (0.45 kg)

Pirani Gauge .01 to 20 Torr 0.01 to 20.00 mbar 1.0 to 2000 Pa

Specifications

Measurement Range: 0.01 to 20 Torr (.01 to 20 mbar, and 1 to 2000 Pa)

Calibration: Air or Nitrogen.

Accuracy: Better than 5% of value or ± 0.03 Torr, whichever is larger.

Response Time: 0.3 second time constant.

Power: 12 to 35 volt DC; less than 200 mA.

Analog Output: 0 to 10 VDC, non-linear standard. Linear 0-10 V & 4-20 mA optional.

Temperature Effects: Changes in ambient temperature between 0°C and 50°C change the reading less than 0.01 Torr per C°.

Bakeout Temperature: Gauge tube can be baked to 100°C (212°F) in air or vacuum.

Vacuum Connection: 1/4 NPT male. Others such as NW, VCR and 1/2" O.D. tube are available.

Dimensions: Enclosure 3 X 3 X 2 In. (76 X 76 X 50 mm) 1/4 In. NPT vacuum connection is 1 5/8 In. (41 mm) long.

Mounting: Gauge can be supported by the vacuum connection and oriented in any plane.

Net Wt.: 0.75 lb. (0.3 kg) Ship: 1 lb. (0.45 kg)

BUY NOW! Go to www.vacuumresearch.com to order online

Ordering Information

1 to 1500 Torr Stainless Steel Diaphragm Vacuum Transducer. 12 to 35 VDC power. IP-65 dust & water proof enclosure. 1/4 In. NPT Vacuum Connection. Others such as NW, VCR and 1/2 In. O.D. tube available. Linear 0 to 10 VDC and 4 to 20 mA output.

P/N: 912384-Torr (1 to 1500 Torr)\$1,901
P/N: 912384-mbar (1 to 2000 mbar)\$1,901
P/N: 912384-Pa (0.1 to 200.0 kPa)\$1,901
Optional display\$203

Ordering Information

1 to 2000 mTorr Vacuum Transducer. 12 to 35 VDC power IP-65 dust & water proof enclosure. 1/4 In. NPT Vacuum Connection. Others such as NW, VCR and 1/2 In. O.D. tube available. Linear outputs of 0 to 10 VDC and 4 to 20 mA.

P/N: 912365-mTorr (1 to 2000 mTorr)\$1,701
P/N: 912365-mbar (0.001 to 2000 mbar)\$1,701
P/N: 912365-Pa (0.1 to 200.0 Pa)\$1,701
Optional display\$203

Ordering Information

0.01 to 20 Torr Vacuum Transducer. 12 to 35 VDC power IP-65 dust & water proof enclosure. 1/4 In. NPT Vacuum Connection. Others such as NW, VCR and 1/2 In. O.D. tube available. Linear outputs of 0 to 10 VDC and 4 to 20 mA.

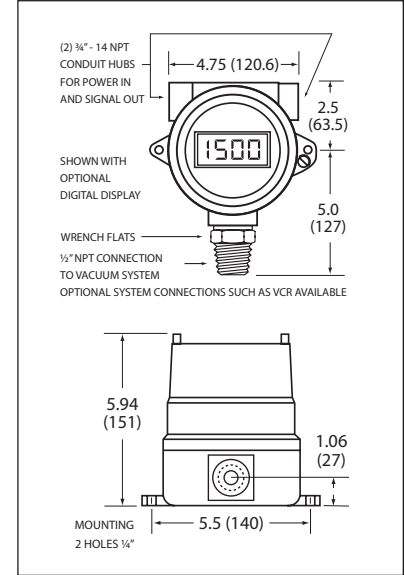
P/N: 912367-Torr (0.01 to 20 Torr)\$1,701
P/N: 912367-mbar (0.01 to 20.00 mbar)\$1,701
P/N: 912367-Pa (1 to 2000 Pa)\$1,701
Optional display\$203

Gauges in Explosion Proof Enclosures, Class 1, Div. 1, ATEX Certificate



Sensor and gauge with & without optional digital display. Both provide 4 - 20 mA and 0-10 VDC output. Enclosures meet ATEX 95 equipment directive 94/9/EC requirements for Apparatus Group II, Categories 2G/2D: II 2 G EEx e II T3-T4; II 2 G EEx D IIC T3-T4; II 2 D IP66 TI 10°C - T140°C.

VRC offers two approaches to measuring high vacuum in hazardous areas. The first is with the sensor, gauge and optional display built into a Killark enclosure approved by UL, CSA and FM. ATEX certificate is provided with all gauges. All gauges provide both 4-20 mA and 0-10 VDC linear outputs. The alternate approach described at the bottom of this page is to have only the sensor located in the hazardous area with the gauge and display located in a non-hazardous area that can be up to 500 feet away. Power required is 15 to 35 VDC.



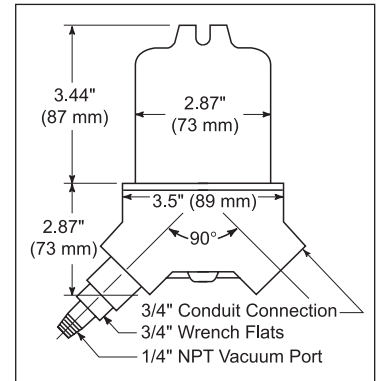
Ordering Information: Gauge, Sensor and Optional Display

Measurement Range, Sensor Type	Maximum Working Pressure	Performance Specifications Catalog Page	Gauge & Sensor with Display & 4-20, 0-10 V Analog Output		Gauge & Sensor with 4-20, 0-10 V Output but No Display		Replacement Sensor Only	
			Part No.	Price	Part No.	Price	Part No.	Price
0.01 to 100 mTorr; Pirani	300 PSIG	14, 24	913050	\$1928	913056	\$1559	902049	\$251
1 to 2000 mTorr; Pirani	300 PSIG	15, 17, 24	913051	\$1797	913057	\$1420	902077XP	\$193
0.01 to 20.00 Torr; Pirani	300 PSIG	16, 17, 24	913052	\$1797	913058	\$1420	902089XP	\$193
1 to 1500 Torr; 316L Diaph.	30 PSIG	9, 17, 24	913053	\$1944	913059	\$1576	902079XP	\$680
-30" Hg to 150 PSIG; 316 Diaph.	150 PSIG	10, 17, 24	913054	\$1944	913060	\$1576	902086	\$680
0.1 to 200 PSIG; 316L Diaph.-30"	300 PSIG	11	913055	\$1944	913061	\$1576	902088	\$680

Sensors for Hazardous Areas



These explosion proof Diaphragm and Pirani sensors can be used with any of the indicators and controllers described in this catalog. These sensors are complete and ready to install in any Class 1, Group C or D, Div. 1 area. Simply select the range that fits your application from the table below. Like standard Vacuum Research sensors, these explosion-proof sensors are unaffected by lead length and can be located up to 500 feet (150 m) from the display unit.

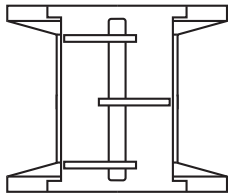


Ordering Information

Measurement Range	Sensor Type	Performance Specifications Catalog Page	Maximum Working Pressure	Complete Enclosure with Sensor: 1/4" NPT standard, 1/2" NPT optional		Replacement Sensor Only	
				Part No.	Price	Part No.	Price
1 to 2000 mTorr	Pirani	15, 17, 24	300 PSIG	913006	\$1084	902077XP	\$193
.01 to 20 Torr	Pirani	16, 17, 24	300 PSIG	913007	\$1084	902089XP	\$193
1 to 1500 Torr	316L Diaph.	9, 17, 24	30 PSIG	913001	\$1806	902079XP	\$680
-30" Hg to 150 PSIG	316L Diaph.	10, 17	150 PSIG	913003	\$1806	902086	\$680
0.1 to 200 PSIG	316L Diaph.	11	300 PSIG	913005	\$1525	902088	\$680

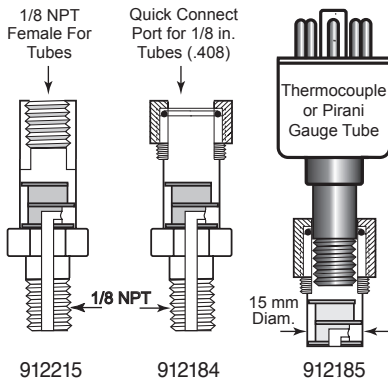


Stainless steel dust baffle for NW-25 gauge tubes



High conductance baffles for gauges operating below 10-3 Torr.

NW-16 912278
NW-25 912249



Brass baffles 1/8" NPT or quick connect O-Ring seal

Stainless Steel Baffles designed for applications where dust, dirt and pump fluid can shorten gauge tube life. Typical applications include freeze drying, vacuum melting, and steel degassing. These inexpensive baffles are easy to use. Just connect the baffle into the vacuum system then connect tube into the back end of the baffle.

All Stainless Steel baffles are made from 300 Series SS and leak checked to 5×10^{-10} SCC/S.

Sensor Side Connection	System Side Connection	Part No.	Price
1/8 NPT female	1/8 NPT male	912007	\$171
NW-25	NW-25	912307	\$194
NW-25	NW-16	912308	\$194
NW-25	1/8 NPT male	912309	\$194
NW-16	1/8 NPT male	912003	\$213
VCR-8 male	VCR-8 female	912305	\$363
High conductance baffles for gauges below 10-3 Torr			
NW-16 (1.4" overall length)	NW-16	912278	\$229
NW-25 (1.4" overall length)	NW-25	912249	\$229

Snubber Style Baffle; 1/8" NPT Inlet & Outlet Protects diaphragm sensors from fatigue failure when installed on the discharge side of Roots type blowers. 300 series S.S.

P/N: 912016 \$179

Dust Baffle for 3/4" OD Tubes; 100 mTorr Gauges Fits into 3/4 inch quick connect and has 3/4 inch quick connect for the gauge tube. 300 series S.S. P/N: 912153.....\$386

Brass Baffles with Quick Connect or 1/8 NPT Threads

These baffles will extend the life of your gauge tubes by keeping dust and oil vapors from condensing in the tube. It provides a labyrinth with eight 90° turns between the tube and the vacuum system but the large internal diameters provide fast response and are easy to clean. Note that standard 1/8 in. NPT thermocouple and Pirani tubes are .403 in. outside diameter. O-Ring in quick connect is Buna-N.

Sensor Side Connection	System Side Connection	Part No.	Price
0.403 inch O.D. quick connect	1/8 NPT male	912184	\$260
0.500 inch O.D. quick connect	1/8 NPT male	912187	\$244
0.403 inch O.D. quick connect	15 mm O.D.	912185	\$244
0.500 inch O.D. quick connect	15 mm O.D.	912182	\$212
1/8 NPT female thread	Threaded with 15 mm O.D.	912214	\$140
1/8 NPT female thread	1/8 NPT male thread	912215	\$195

Wax & Binder Traps for Sintering

BUY NOW! Go to www.vacuumresearch.com to order online

These traps require no cooling water but rely on the large surface of the body fins for convection cooling. The tortuous path and large internal surface area provide ample space for waxes and binders to condense before reaching the gauge tube. The trap can be opened, cleaned and returned to service in a matter of minutes and no tools are required. The standard trap has 1/8 inch NPT on both gauge and system side but any pipe size or NW Style flange can be provided.

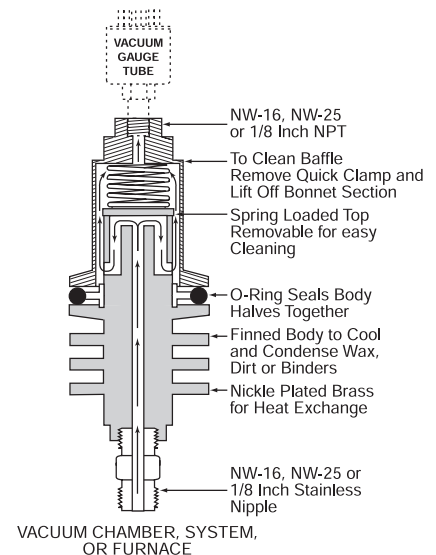
1/8 inch NPT both gauge and system side
P/N: 912224 \$703

1/8 inch NPT gauge side, NW-16 system side
P/N: 912221 \$782

NW-25 gauge side, NW-25 system side
P/N: 912297 \$838

NW-16 gauge side, NW-16 system side
P/N: 912223 \$864

NW-25 gauge side, 1/8 inch NPT system side
P/N: 912222 \$910

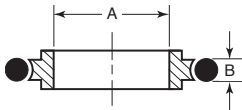




Stainless Steel Bellows

- 304 Stainless Steel Formed Bellows
- Leak Rate Better Than 2×10^{-10} scc/s
- ISO, ANSI, and JIS Flanges Available
- Custom Lengths To Fit Your System
- Interchangeable with NW & QF Components

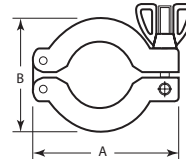
500 mm (19 inches)		1000 mm (38 inches)	
Part No.	Price	Part No.	Price
BEL-16-500	\$166	BEL-16-1000	\$198
BEL-25-500	\$166	BEL-25-1000	\$206
BEL-40-500	\$223	BEL-40-1000	\$319
BEL-50-500	\$241	BEL-50-1000	\$338



Centering Rings

304 Stainless Steel
With Viton O-Rings

Flange Size	A	B	Part Number	Price
NW-16	0.63 (16)	0.21 (5.3)	CTR-RING 16	\$10.00
NW-25	0.984 (25)	0.21 (5.3)	CTR-RING 25	\$11.00
NW-40	1.575 (40)	0.21 (5.3)	CTR-RING 40	\$15.00
NW-50	1.969 (50)	0.21 (5.3)	CTR-RING 50	\$18.00



Clamps

Aluminum Clamps With Wing
Nut & Screw Fastener

Flange Size	A	B	Part Number	Price
NW-16	1.69 (43)	2.24 (57)	AL-Clamp 16	\$10.00
NW-25	2.17 (55)	2.76 (70)	AL-Clamp 25	\$11.00
NW-40	2.76 (70)	3.39 (88)	AL-Clamp 40	\$15.00
NW-50	3.70 (94)	4.33 (110)	AL-Clamp 50	\$18.00

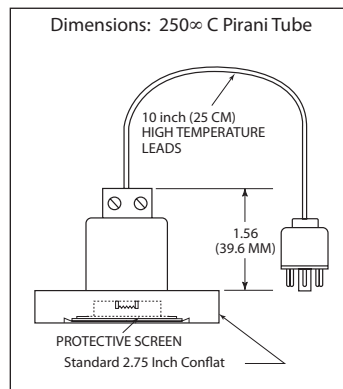
Rubber and PVC Vacuum Hose; SS Hose Clamps



Hose Material	Hose I.D.	Hose I.D.	Part No.	Price
Rubber	.188 inch	.563 inch	HOSE-RUB-3/16"	\$15.00/Foot
Rubber	.25 inch	.625 inch	HOSE-RUB-1/4"	\$25.00/Foot
Rubber	.75 inch	1.5 inch	HOSE-RUB-3/4"	\$28.00/Foot
Rubber	1 inch	2 inch	HOSE-RUB-1"	\$40.00/Foot
Reinforced PVC	1.5 inch	1.8125 inch	HOSE-PVC-1.5"	\$24.00/Foot
Reinforced PVC	2 inch	2.375 inch	HOSE-PVC-2"	\$29.00/Foot

Stainless Steel Hose Clamps, Outside Diameter of Hose		Part No.	Price
	For 1.5 " O.D. Rubber Hose	HOSE CLAMP 1.5	\$7.00
	For 2 " O.D. Rubber Hose	HOSE CLAMP 2.0	\$6.00
	For 1.8 " O.D. PVC Hose	HOSE CLAMP 2.0	\$6.00
	For 2.4 " O.D. PVC Hose	HOSE CLAMP 2.5	\$6.00

High Temperature Pirani Bakeable to 250°C Without Damage



- Bakeout Temperature up to 250 oC, Operate 0 to 50°C
- 1-2000 mTorr & .01-20 Torr Use With Any VRC Instruments
- Standard 2.75 in. CF Flange; Extension Cables To 250 ft.

1 to 2000 mTorr Nude Design Pirani Gauge Tube mounted on 2.75 Conflat® flange with 25 cm (10 inch) long pigtail with high temperature insulation.
P/N 912078.....\$601

.01 to 20 Torr Nude Design Pirani Gauge Tube mounted on 2.75 Conflat® flange with 2 cm (10 inch) long pigtail with high temperature insulation.
P/N 912260.....\$601

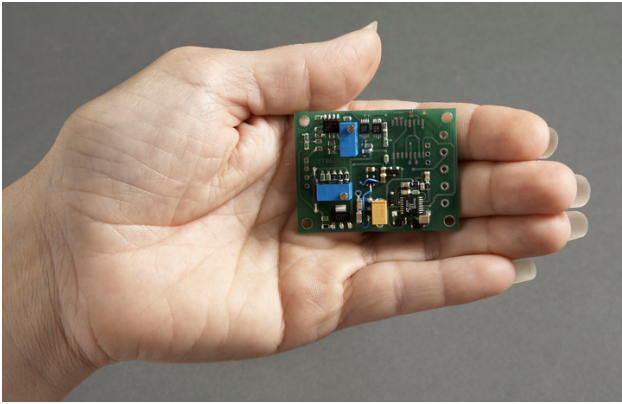


Photo shows PC Board convection gauge. Gauge tubes available with various flange styles.

Convection Gauge 1 mTorr to Atmosphere

(Choose any Sensor on Page 12)

Convection gauges are popular because they can measure from atmosphere to 1 mTorr. More properly described as Convection Enhanced Pirani Gauges, these rugged and inexpensive instruments can directly interface with your PLC to control crossovers and initiate substrate heat down to 1×10^{-3} Torr. Other units of measure such as mbar and Pascal can be easily selected.

P/N V801188, 12 to 35 VDC Power, 0 to 5 VDC non-linear output. Dimensions 1.8" (47 mm) X 3.5" (89 mm)
Calibrated and ready to operate \$319

For more information on PC Board Gauges contact factory or go to www.vacuumresearch.com and type "PC Board" in the Search field.

Pirani Gauge 1 to 2000 mTorr (Choose any Sensor on Page 15)

P/N V801097, 12 to 35 VDC Power, 0 to 5 VDC non-linear output.

Dimensions 2.75" (70 mm) X 3.5" (89 mm)

Calibrated and ready to operate \$253

2000 mTorr Pirani with Sensor & cable; no Enclosure

P/N 905005, 12 VAC Power, 0 to 2 VDC linear output. Includes

sensor and 1 ft. cable. Dimensions 2.1" (54 mm) X 4.6" (118 mm)

Calibrated and ready to operate \$618

Pirani Gauge 0.01 to 20 Torr (Choose any Sensor on Page 16)

P/N V801181, 12 to 35 VDC Power, 0 to 5 VDC non-linear output

Dimensions 2.5" (63 mm) X 3.5" (89 mm)

Calibrated and ready to operate \$269

Diaphragm Gauge 1 to 1500 Torr (Choose any Sensor on Page 9)

P/N V801170, 12 to 35 VDC Power, 0 to 1.5 VDC linear output

Dimensions 2.5" (63 mm) X 3.5" (89 mm)

Calibrated and ready to operate \$285

Pirani Gauge 0.01 to 100 mTorr (Choose any Sensor on Page 14)

P/N 910256, 12 to 35 VDC Power, 0 to 1 VDC non-linear output.

Dimensions 2.75" (70 mm) X 3.5" (89 mm)

Calibrated and ready to operate \$237

Accessories for Circuit Board Gauges

Cable Assembly includes a connector for the sensor on one end and stripped and tinned leads on the other end to connect to the terminal strip. Specify length.

P/N 801168- xxx feet \$35. plus \$3./Ft.

Power Supplies 100 to 240 V, 50-60 Hz input, 15 VDC @ 1.0 A output.

Wallmount style with adapter plugs for US, UK, Europe, Australia.

P/N: V104124 \$86. each

Electronic Calibrators Absolute pressure gauges can be adjusted to factory specifications using our compact electronic calibrators. These calibrators allow you to adjust zero and full scale without using a

10 Bar Diaphragm Vacuum Gauge With 6 Independent Set Points With Relays



Designed for pressure quench heat treat furnaces, this Diaphragm Vacuum and Pressure Gauge covers the entire range from 30 inches Hg vacuum to 150 PSIG.

The instrument includes 6 independent set points which are adjustable over the entire range and each set point drives a separate relay. Each of the six relays has SPDT contacts rated for 3 amps @ 115 or 220 VAC non-inductive.

P/N 902090 \$2,270

P/N 912065, Silicon Diaphragm Sensor 1/8 NPT \$388

P/N 912093, 316L SS Diaphragm Sensor 1/4 NPT \$605

For complete specifications, transducers, and prices go to www.vacuumresearch.com or contact factory

Dual Display Gauges 1 - 2000 mTorr Pirani or 1 - 1500 Torr Diaphragm



These compact instruments use the same sensors and gauge tubes as our original instruments but now the display portion is in an 1/8 DIN enclosure panel space! With the combination Diaphragm and Pirani Gauge you can now measure from 10^{-3} Torr to Atmosphere with a single 1/8 DIN instrument. Each instrument has an independent DC analog output and an adjustable set point with a built in relay for process control. Relays have 3 Amp contacts, form C, and have screw terminal connectors on the rear of the instruments.

For complete specifications, transducers, and prices go to www.vacuumresearch.com or contact factory



Airborne Sensors

Our Pirani sensor technology uses an extremely low mass filament (less than .08 mg). The resulting low inertia and reduced fatigue contribute to long life and high shock & vibration resistance. The enclosure is optimized for the vehicle. In some cases the sensor enclosure is fabricated by our customer and shipped to us for sensor installation and calibration. A no charge license and schematic for sensor power is available.



Gauge Tube Selector Switch

The gauge tube selector allows any VRC gauge to display the output of up to 5 gauge tubes just by turning the switch. Each gauge tube selector includes 3 or 5 gauge tube cables 10 ft. (3 m) long and one 12 inch (30 cm) cable to connect to your vacuum gauge. See below if longer cables are required.

3 Position Switch for Pirani, Diaphragm, Convection Gauges, P/N: 902027	\$554
5 Position Switch for Pirani, Diaphragm, Convection Gauges, P/N: 902026	\$749
3 Position Switch for Wide Range Diaphragm Manometers, P/N: 902156	\$631



Quick Connect Couplings

Reliable brass quick connect adapters give a leak tight seal without the use of tools. The quick connect seals on the unthreaded (.404 inch diameter) portion of our standard 1/8" NPT gauge tubes. For the permanent connection to your system select either 1/8" NPT or 15 mm diameter.

Brass QC .404 X 1/8" NPT P/N: 912108	\$150.	Brass QC .404 X 15mm P/N: 912109	\$155
For Stainless Steel Body (Brass Nut) Add "SS" suffix to part number and to the price		add \$102	



Waterproof Vacuum Sensors

Totally waterproof boot that fits all VRC gauge tubes. With this option, sensors can be installed in wet and high humidity areas. Even 100% RH with condensation occurring is acceptable because with this boot in place the only parts exposed to the moisture are the 300 series stainless steel stem and cup used on all VRC vacuum sensors and gauge tubes.

Waterproof Boot for Gauge Tubes P/N: 902416	\$54
Vinyl Cap for Gauge Tube Connector Pins P/N: 912124	\$8



LED Displays

Many VRC instruments are built with backlight liquid crystal displays (BLLCDs). However, in some places where vacuum gauges are used light level is low and a light emitting diode (LED) display may be a better choice. Green LED displays are available on all gauges and can be retrofitted to existing gauges.

LED instead of LCD installed at time of original purchase			
3 1/2 place P/N: V801300	\$133.	4 1/2 place P/N: V801301	\$335
LED Retrofit Kit in existing gauges 3 1/2 place	\$167	4 1/2 place	\$367



Bench Mount Cabinets

Bench mount cabinets can accept one or two standard enclosure gauges, or one gauge and a gauge tube selector switch. When the optional handle is purchased, your instrument can be easily transported. Rubber feet are included on all cabinets to protect your bench tops. Handle can also be installed directly to the top of either 1/4 DIN or standard enclosures.

Single Cabinet P/N: V805002	\$170.	Double Cabinet P/N: V805003	\$191
Handle Installed on Cabinet or Instrument P/N: V805005		\$31	



All extension cables are shipped ready to use with connectors at both ends. Two jacket types are now available: PVC or abrasion resistant urethane.

Gauge Tube Extension Cables

Extension Cable for Wide Range Diaphragm Manometer Transducers

Up to 75 Meter (250 ft.) max. with 2 connectors P/N: 902080 \$70. plus \$3.00 per foot.

Extension Cable for Pirani, Thermocouple, Convection, & Diaphragm Gauge Tubes

Up to 150 Meter (500 ft.) max. with 2 connectors.

Standard PVC jacket P/N: 912063 \$43. plus \$3.00 per foot.

Abrasion resistant urethane jacket P/N: 912401 \$42. plus \$8.00 per foot.

Cable Only without Connectors In one piece or installed as extra length on new gauges.

Standard PVC jacket P/N: V122195 \$800 per foot.

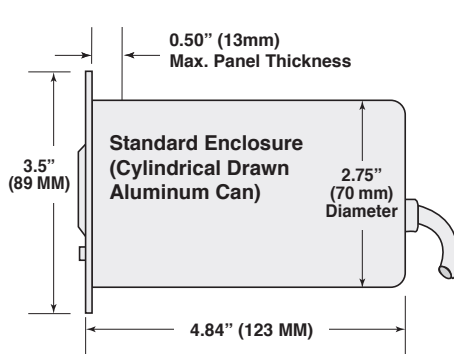
Abrasion resistant urethane jacket P/N: V122178 \$12.00 per foot.

Connector Assemblies for Pirani, Thermocouple, Convection, and Diaphragm Gauges

Socket, Boot and Strain Relief included on both Male and Female Connector Assemblies.

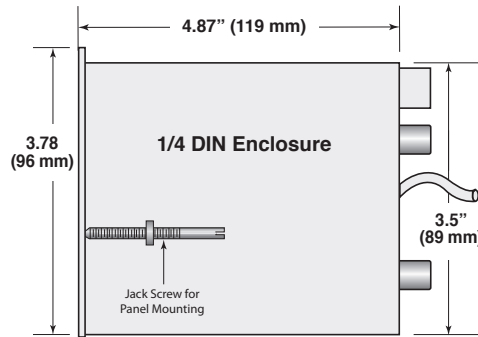
Male P/N: V805008.....\$36. each Female P/N: V805009..... \$36. each

Pirani, Thermocouple and Diaphragm Gauge Enclosure



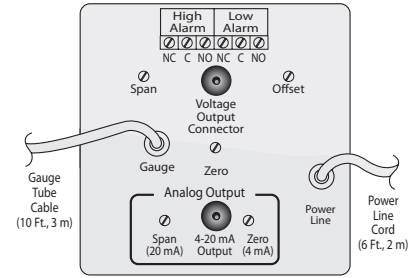
Standard Enclosure

Standard enclosure has a cylindrical body that fits the same 2.8 inch panel cutout as Hastings, Televac and other gauges. Panel mounting hardware is included with standard enclosure.



1/4 DIN Enclosure

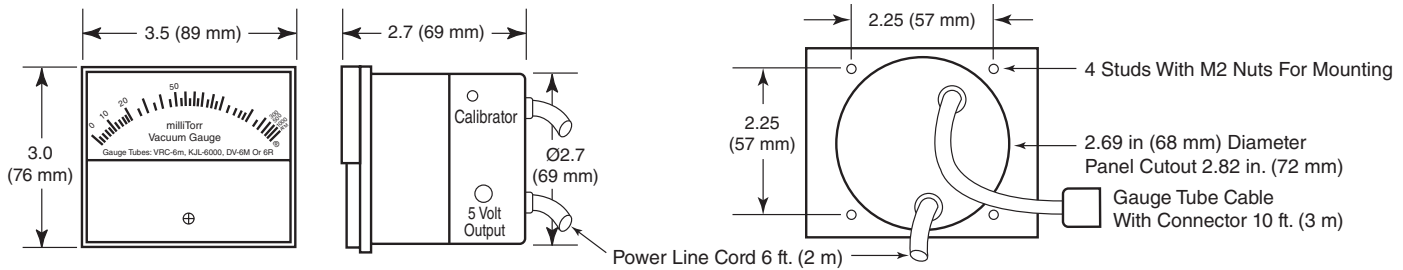
The 1/4 DIN enclosure is rectangular and fits the standard 92 mm x 92 mm panel cutout. Panel mounting jackscrews are included with 1/4 DIN enclosures.



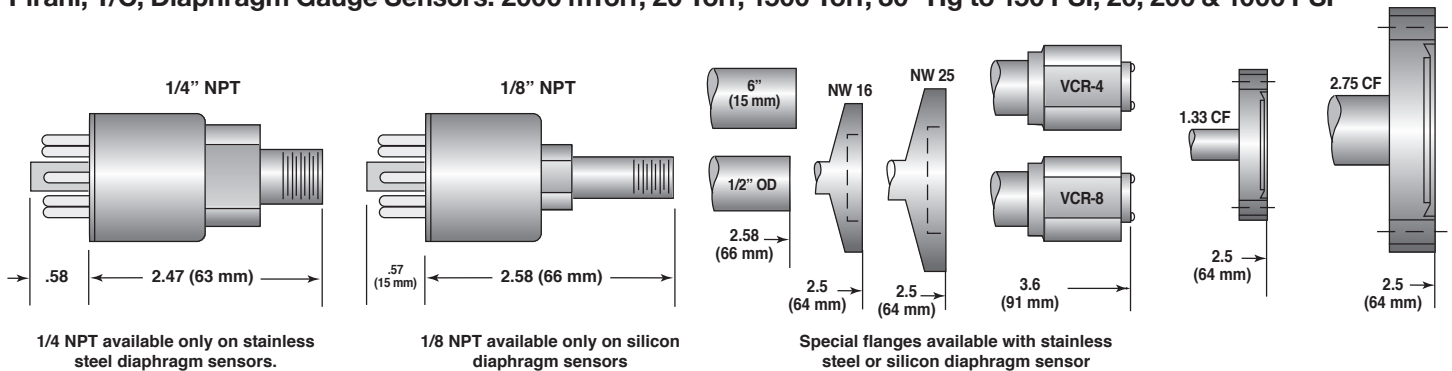
Rear Panel

Rear Panel shows optional two set points and 4-20 mA output.

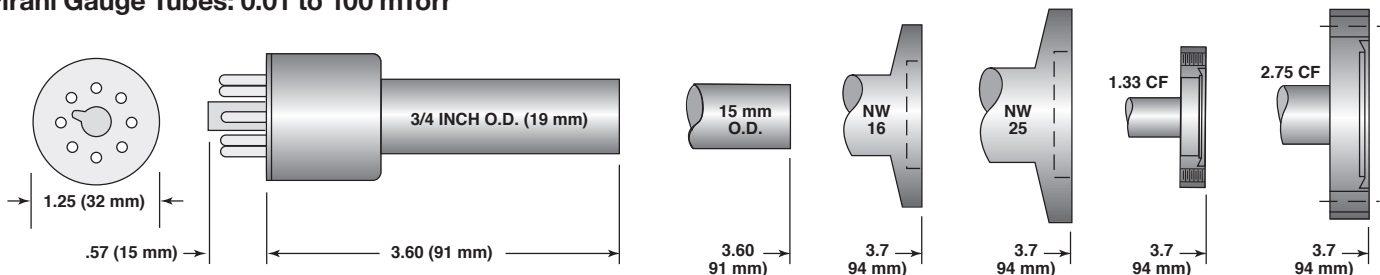
Thermocouple Gauge Dimensions

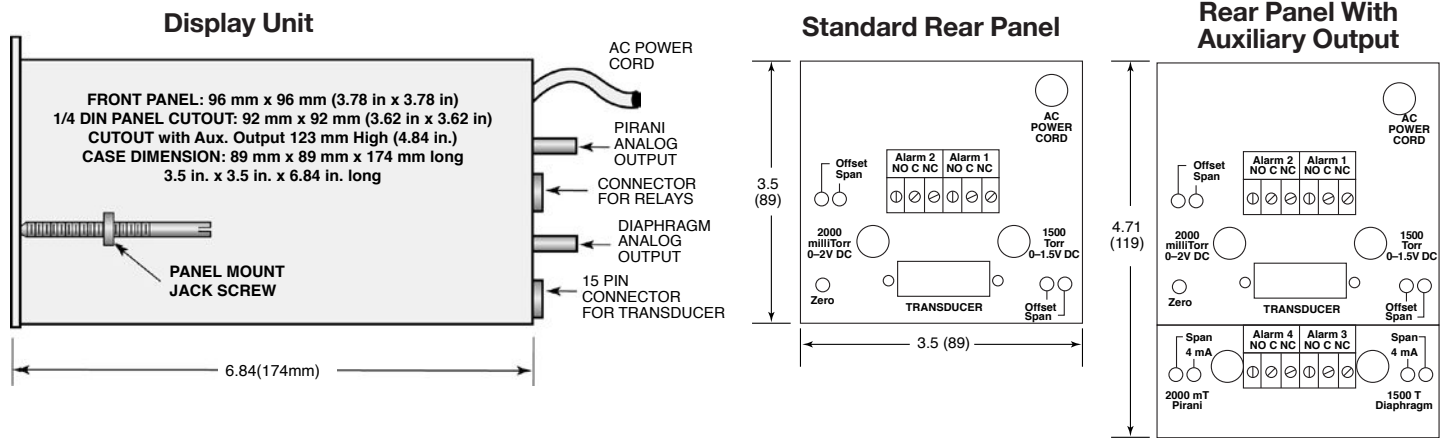


Pirani, T/C, Diaphragm Gauge Sensors. 2000 mTorr, 20 Torr, 1500 Torr, 30" Hg to 150 PSI, 20, 200 & 1000 PSI

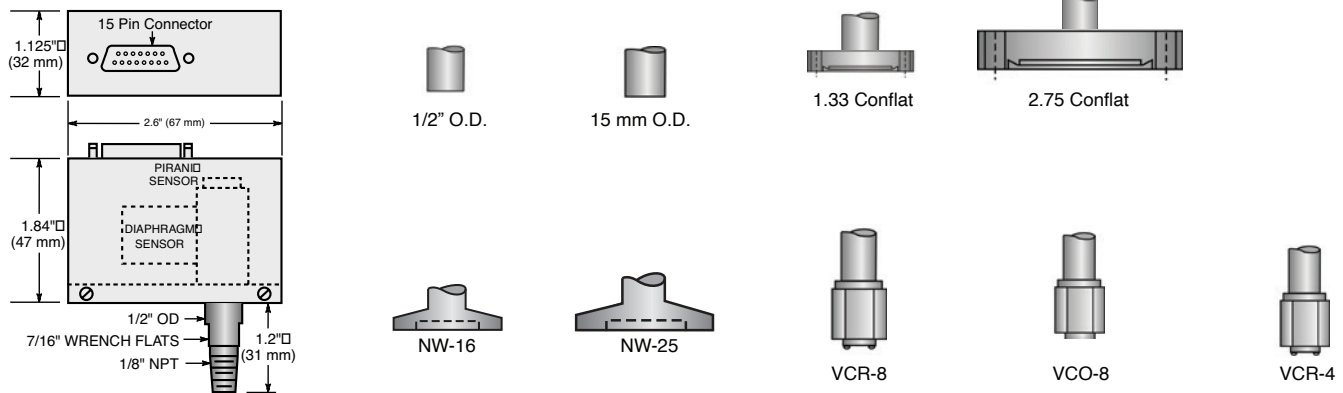


Pirani Gauge Tubes: 0.01 to 100 mTorr

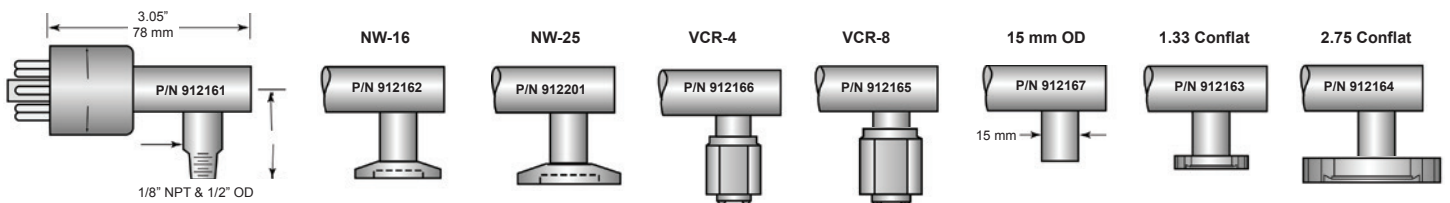




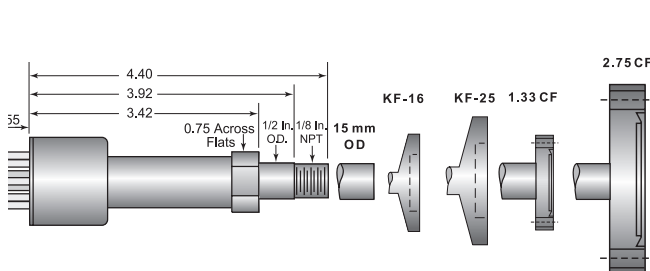
Transducers For Wide Range Manometer



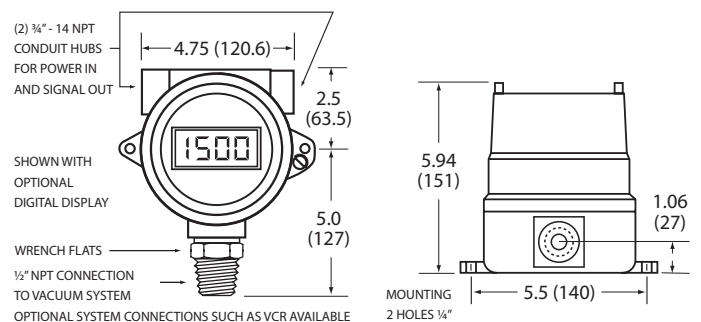
Angle Style Convection Gauge Tubes



Inline Style Convection Gauge Tubes



Killark Explosion Proof Enclosure



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