Operating Instructions

Wide Range Diaphragm Manometer

- **1 milliTorr to 1500 Torr**
- **.001 millibar to 2000 millibar**
- **0.1 Pascal to 200 kPascal**

Part No.: V795011
Price: $10.00

February, 2009

Contents

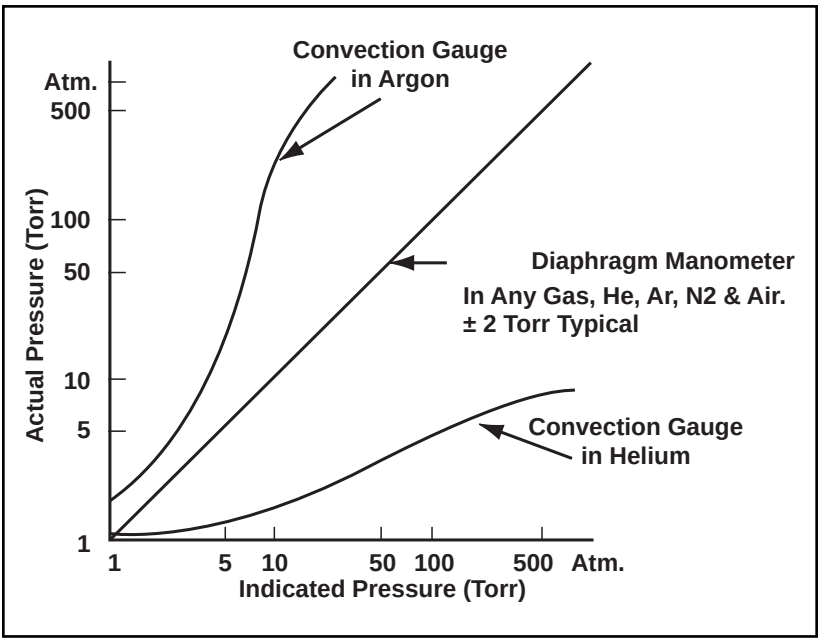
1. INTRODUCTION

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 milliTorr to one milliTorr the easy to read LED display is driven by a rugged Pirani sensor that is mounted in the transducer next to the Diaphragm sensor. The Diaphragm and Pirani sensors are both mounted in the same transducer body, and both are easily replaceable in the field.

This workhorse process control instrument uses a transducer body machined from a solid block of 316 stainless steel, and unlike convection gauges, our wide range accuracy is not affected by the transducer orientation or gas composition.

Two process control set points with front panel LED indicators can be set anywhere in the instruments range and each set point drives its own form C relay contacts rated 3 amps @ 115V, non-inductive. An optional model provides 4 set points and relays.

The standard version reads directly in Torr and milliTorr but ranges of 1 to 2000 millibar and 0.100 Pascals to 200 kPascals are available at no extra charge



2. SPECIFICATIONS

- **Measurement Range:** 1 milliTorr to 1500 Torr
- **Optional Range:** 0.1 Pascal to 200 kPascal
- **Optional Range:** .001 millibar to 2000 millibar
- **Sensor Characteristics:**

1 to 2000 milliTorr Range

Sensor Type: Platinum alloy Pirani

Resolution: ± 1 milliTorr (± .001 mbar)

Linearity: 3% of reading

Accuracy: 3% of reading or ±3 millitorr (± 003 mbar)

Response Time: Less than 1.25 Sec.

Hysteresis: 2 milliTorr (.002 mbar)

Analog Output: 0 to 2.000 VDC

Maximum Pressure w/o Calibration Change: 60,000 Torr (1250 PSIG)

Effect of Ambient Temp. Changes From

0 °C to 50 °C: Reading will change less than 0.2 mT per °C at 50 mT; less than 4 mT per °C at 900 mT

Maximum Transducer Temperature: 10 °C

2 to 1500 Torr Range

Sensor Type: Silicon Diaphragm

Optional: 316 Stainless Steel Diaphragm

Resolution: ± 1 Torr (± 1 mbar)

Repeatability: ± 1 Torr (± 1 mbar)

Linearity: 0.15% of F.S.

Accuracy: 1% of reading or ± 2 Torr (± 2 mbar)

Response Time: Less than 1 Sec.

Hysteresis: 2 Torr (2 mbar)

Analog Output: 0 to 1.500 VDC

Maximum Pressure w/o Calibration Change: 2,300 Torr (30 PSIG)

Effect of Ambient Temp. Changes From 0°C to 50 °C: Reading will change less than ± 0.02% per °C Maximum

- **Display:** 3 1/2 digit LED character height 11 mm (.43)
- **Set Points:** Two independent set points with LED's. From: panel adjustable over 100% of range.
- **Relays:** One SPDT relay for each set point; 3 Amp @ 115VAC, non-inductive.
- **Transducer Orientation:** Calibration is not affected by orientation
- **Power Required:** Less than 5 watts (with both relays energized).
- **Line Voltage:** 115V, 50/60 Hz standard; 220 V available.
- **Line Cord:** 1.7 meter (65 inch) attached, 3 conductor.
- **Mounting:** Bench or 1/4 DIN panel mount. Jack screws for panel mount included.
- **Transducer Cable:** 3 meter (10 ft.) Connectors on both ends, 10 conductors.
- **Extension Cable:** Cables up to 75 meters (250 ft.) 20 gauge wire can be used.
- **Weight:** Net 2.3 kg (5 lb.); Shipping 3 kg (6.5 lb.)

3. INSTALLATION

3.1 Unpacking Intructions

The display unit and transducer are carefully packaged to protect them during shipment. Use reasonable care when removing them from the shipping box.

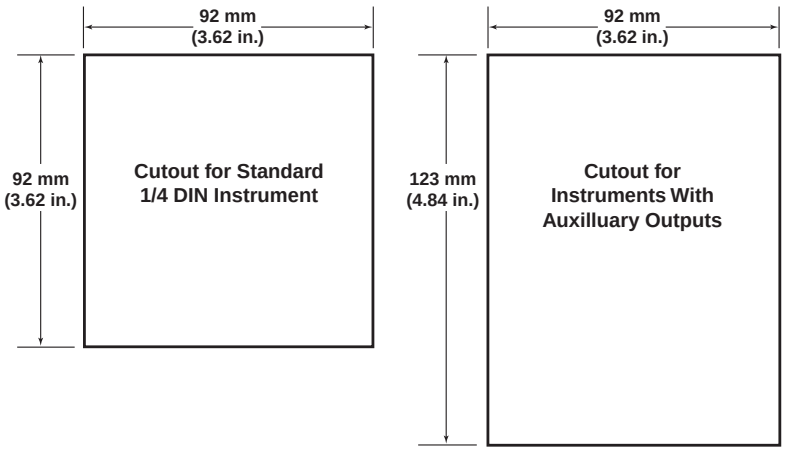
Inspect the instruments and transducers carefully when you receive them. Should either show any signs of damage, file a claim with the carrier immediately. Do not destroy the shipping container. It will be required by the carrier as evidence to support claims. Call the factory immediately for instructions on return and repair of the instruments.

Please fill out and return the Warranty Registration card so that we can register your instrument in our warranty records.

3.2. PANEL MOUNTING

This instrument may be operated while sitting on a bench or table or may be installed in a panel. For panel mounting, prepare a hole 92 mm X 92 mm (3.62 in. X 3/62 in)

Remove the jack screws from the sides of the display unit and slide the display unit into the hole from the front. While holding the display unit in place, install the jack screws and tighten sufficiently to hold the display unit in the panel. Be careful not to over-tighten, or damage to the instrument may result.



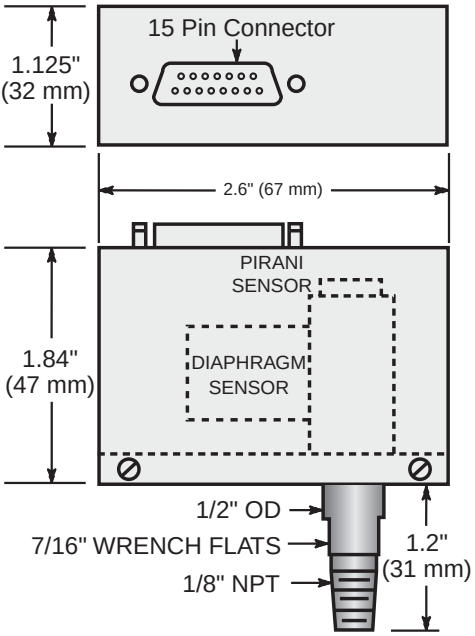
3.3 Transducer Installation

1. Thread the transducer into an 1/8 inch NPT female fitting (or NW-16 flange, whichever is compatible with your transducer), in the vauum system. The preferred mounting is with the open end pointing down so as to be self draining to any condensation. However, mounting in any position is acceptable.

2. An appropriate thread sealant is required to ensure that the threaded connection will not leak. Teflon thread tape may be used to seal the threads if care is used so it will not shred off and get inside the tube or vacuum system. It is better to use mini-seal or an epoxy sealer on the threads.

3. An excellent mounting system is to use an O-ring quick connect to install the transducer. These may be permanently installed in the system by welding, brazing or soldering. The quick connects are available from vacuum equipment suppliers such as the Kurt Lesker Co. (1-800-245-1656).

4. Another alternative is to use quick flange adapters. Transducers can be ordered with NW, VCR, and Mini-Conflat flanges.

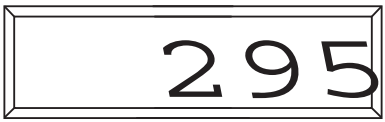


4. Operating Your Instrument

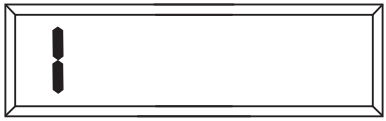
4.1 Readings on the Display

When the power is applied and the transducer connection is made, your instrument is in operation. After a short time period for stabilization, the digital display will show a reading of vacuum pressure.

At atmospheric pressure, and at pressures above the designed range of the instrument, the display will show a “1” with the other digits blanked out. This indicates saturation. After the saturation condition has subsided; that is, when the pressure drops below full scale; the instrument will resume reading vacuum pressure.



NORMAL DISPLAY



SATURATION

4.2. Adjusting and Programming the Control Points and Relays

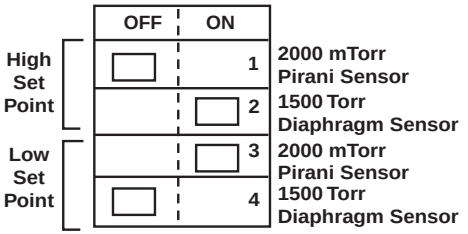
This instrument is built with 2 independent set points for alarm or process control. These are indentified as “High” and “Low” and each of the set points drives a relay as described below. These 2 set points can be adjusted to change state anywhere between 1 milliTorr and 1500 Torr, but because of the wide range of this instrument, some internal switches may require repositioning to accommodate your needs.

As shipped from the factory the “Low” set point will operate between 1 and 1970 milliTorr and the “High” set point from 2 to 1500 Torr.

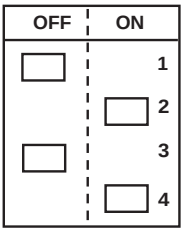
If some other combination would better suit your needs, remove the sheet metal cover from the display unit by removing four (4) screws in the base and two (2) screws from the top near the front panel. Reposition the slide switches on the printed circuit board to any combination shown below.

After the slide switches have been properly positioned, you can adjust the set point pressure for both set points from the front panel. While pressing the front panel button, use a small screwdriver to turn the adjustment potentiometer until the desired value is shown on the display.

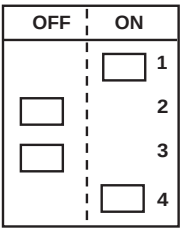
As Shipped from the factory: Low on Pirani and High on the Diaphragm Sensor



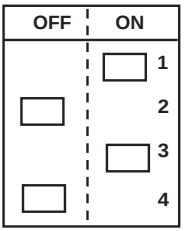
High and Low Both on 1500 Torr Diphragm Sensor



High on Pirani and Low on Diaphragm Sensor



High and Low Both on 2000 mTorr Pirani Sensor



The Red LED's on the front panel show the control action in the following manner:

- Relay energized, LED is ON; de-energized, LED is OFF
- Relays are de-energized when pressure is above the set-point (on atmospheric pressure side of set point).
- Atmospheric pressure = de-energized = loss of power
- "NORMAL" = de-energized relay
- No Power = in no power state relays are de-energized

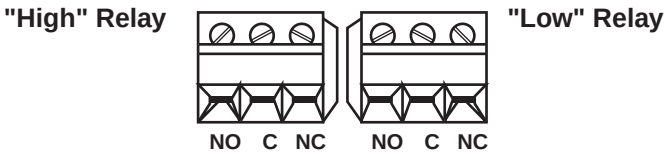
4.3. Relays

4.3.1. Relay Output Connector Wiring

Contact Rating:
-3 amps, 120 VAC, resistive
-1.5 amp, 230 VAC, resistive
-1.5 amp, 28 VAC, inductive

Gently pull the connectors on the rear panel and they will detach from their sockets for wiring. Plug back in when connections are made.

Relay Connectors On Rear of Controller



4.3.2. Auxilliary Output Relay Programming

The standard Wide Range Diaphragm Manometer includes 2 adjustable set points with relays, and 2 analog outputs: 0 to 2 VDC from the Pirani sensor and 0 to 1.5 VDC from the Diaphragm sensor. The auxilliary output option provides 2 additional set points and relays and 2 additional analog outputs. To provide the maximum flexibility for interface with your system the auxilliary outputs are programmable.

The pair of auxilliary relays can be assigned to either the 2000 mTorr Pirani sensor or the 1500 Torr Diaphragm sensor using switch “S3”.

To locate “S3”, remove the instrument’s outer wrap. “S3” is a 2 position dip switch on the left side of the bottom circuit board about 2.5 inches from the rear panel.
“Off is when the rocker nearest the edge of the circuit board is depressed. “ON” is when the rocker farthest from the PCB edge is depressed. Switch 1 is closest to the front panel, switch 2 is closest to the rear panel.

>>IMPORTANT: Do not put both switches in the “ON” position at the same time.

Unless specified on your order all wide range gauges supplied with the auxilliary setpoints and outputs will be shipped from the factory programmed in the following way.

- Standard relays No. 1 and No. 2 will be programmed to the 2 to 1500 Torr diaphragm sensor.

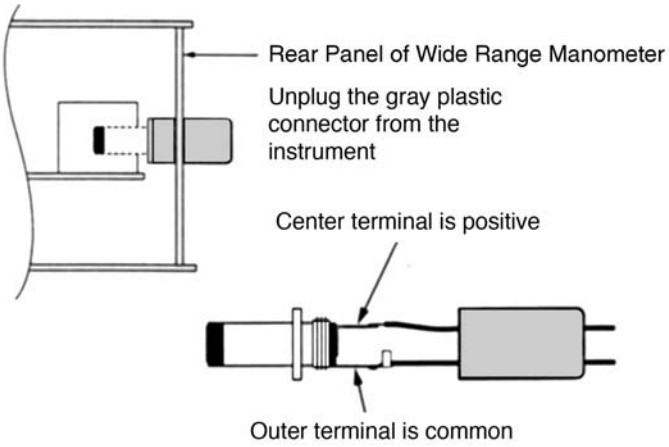
- The Auxilliary relays No. 3 and 4, will be programmed to the 1 to 2000 mTorr Pirani sensor.

S3 DIP SWITCH

Both Relays on the 2000 Torr Range		
Switch 1		**ON**
Switch 2	**OFF**	

To put Both Relays on the 1500 Torr Range		
Switch 1	**OFF**	
Switch 2		**ON**

4.4. Analog Output Signal



4.4.1. Standard Output

Vacuum gauges are shipped with two removeable connectors for analog output plugged into the rear of the instrument. Follow the steps below to wire the connector for output to remote recorders, dataloggers, etc. Because the range of this instrument is so wide (1.5 million to 1) a single analog output would not provide enough resolution for many applications. We therefore provide 2 simultaneous analog signals through plug-in connectors on the rear panel.

.001 to 2.000 Volt for the Pirani sensor, 1 mV = 1 mTorr
.001 to 1.500 VDC for Diaphragm sensor, 1 mV = 1 Torr

1. Unplug the gray connector from the rear panel.
2. Unscrew the gray plastic connector cover.
3. Feed your analog output wires through this cover.
4. Solder the positive wire to the center terminal.
5. Solder the common or negative wire to the outer terminal.
6. Reinstall the connector cover and plug into the gauge.

4.4.2. Programming of Analog Outputs

The output jacks for the two auxilliary analog outputs are at the bottom of the rear panel; 2000 mTorr Pirani on the left, 1500 Torr diaphragm on the right. Using the “S4” dip switch the auxilliary analog outputs can be programmed as 0 to 10 volts or 4 to 20 mA.

>>NOTE: The auxilliary analog output for the Pirani Sensor will be programmed as 0 to 10 VDC. 10.00 Volts = 2000 mTorr, 5 mV/mTorr. The auxilliary analog output for the diahragm sensor will be programmed as 0 to 10 VDC for 1000 Torr. 10.00 VDC = 1,000 Torr, 0 mV/Torr.

If the desired analog output is specified on your order the instrument will be programmed as requested. Otherwise, if the output dip switch positions are changed, recalibration will be required.

To locate S4, remove the instrument’s outer wrap. S4 is a 4 position dip switch on the left of the bottom circuit board about 1.5 inches from the rear panel. When the rocker nearest the edge of the circuit board is depressed, the switch is “OFF”. The switch is “ON” when the rocker farthest from the edge of the circuit board is depressed. Switch No. 1 is farthest from the rear panel.

S4 DIP SWITCH		1	2	3	4
Switch 1	1500 Torr 4-20 mA	ON	OFF		
Switch 2	1500 Torr 0 - 10 Volt	OFF	ON		
Switch 3	2000 Torr 4-20 mA			ON	OFF
Switch 4	2000 Torr 0 - 10 Volt			OFF	ON

4.4.3. Calibration of Auxilliary Analog Outputs

10 VDC Output: 2000 mTorr Range

Connect the 2000 mTorr calibrator to the gauge and move the switch to the “zero” position.

Let the instrument warmup for one hour. Connect a DVM to the 10 V output jack. Adjust the “span” pot for 4.515 volts.

$$\text{Formula: } \frac{\text{Indicated Pressure}}{2000} \text{ X 10.00 V = Volts Output}$$

10 VDC Output: 1500 Torr Range

Connect the 1500 Torr calibrator to the gauge. Let the instrument warm up for one hour. Switch Calibrator to “Span” (760 T) position. Adjust the “span” pot for 7.600 volts.

$$\text{Formula: } \frac{\text{Indicated Pressure}}{1000} \text{ X 10.00 V = Volts Output}$$

10 VDC Output: 1000 Torr Range

Connect the 1500 Torr Calibrator to the gauge. Let the instrument warm for one hour. Switch Calibrator to “Span” (760 T) position. Adjust the “span” pot for 7.600 volts.

$$\text{Formula: } \frac{\text{Indicated Pressure}}{1000 \text{ Torr}} \text{ X 10.00 V = Volts Output}$$

4 to 20 mA Output: 2000 mTorr range:

Connect a resistor (100 - 600 ohms) in series with an Ammeter to the 4-20 mA output jack. Connect 2000 mTorr Calibrator to gauge. Put calibrator Switch to the “Offset” position. Adjust the 4 mA pot for 4.000 mA on the current meter. Put calibrator switch to “Zero” position. Adjust “ Span” pot for 11.224 mA, repeat until readings are obtained. (“Span = 2000 mT)

$$\text{Formula: } \frac{\text{Indicated Pressure}}{2000 \text{ Torr}} \text{ X 16 + 4 = mA Out}$$

4 to 20 mA Output: 1500 Torr range:

Connect the 1500 Torr Calibrator to gauge. Put calibrator switch to the “Offset” position. Adjust the 4 mA pot fo 4.00 mA on the ammeter. Switch the calibrator to the “Span” position (760 T). Adjust “Span” pot for 16.16 mA. Repeat until unit is in calibration.

$$\text{Formula: } \frac{\text{Indicated Pressure}}{1000 \text{ Torr}} \text{ X 16 + 4 = mA Out}$$

4.5. Calibration Using Electronic Calibrator

The sensor for this instrument has a Pirani side and Diaphragm side. There are 3 calibration adjustments that are normally necessary to re-standardize the Pirani side of the instrument. One is an offset adjustment and the other two adjustments amount to a “zero” adjustment for hard vacuum, and a span adjustment to set up scale tracking at some known pressure.

There are 2 calibration adjustments for the Diaphragm side of the instrument. One is an “offset” adjustment for hard vacuum and the second is a span adjustment to set up scale tracking at some known pressure.

The adjustment pots are located on the rear of the instruments and are clearly marked. Plug in the power cord of the instrument and “warm up” the instrument for at least 30 minutes before calibrating.

Purchase a wide range calibrator kit from the manufacturer or your supplier. The calibrator kit includes two calibrator units and a connector cable for use in the calibration. The Pirani calibrator is marked with the proper settings for adjustment of zero, span, and offset. A simple toggle switch selects the “zero” and “span” and “offset” circuit so that you can make the proper adjustments using the associated zero, span, and offset pots. The diaphragm calibrator has only two positions: offset and span.

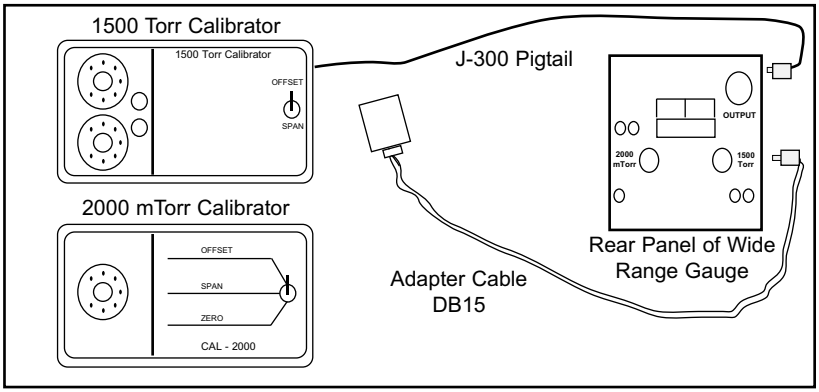
Follow the directions on the calibrator faceplate and make the adjustments in the following sequence:

First, Adjust offset

Second, Adjust zero

Third, Adjust span

Please note that the “zero” adjustment is not truly a zero setting, but a power adjustment at which a gauge tube will read zero when pumped to a pressure below its sensitive range. This is usually referred to as “hard vacuum.” For the gauge tubes supplied with these instruments, hard vacuum is any pressure one dedade below the lowest reading for that range or lower.



4.5.1. 1500 Torr Calibration Procedure

1. Connect adapter cable DB-15 to sensor cable connection on rear panel of wide range instrument and attach the round 8 pin octal connector to the upper connector on the 1500 Torr calibrator
2. Across the red and black binding posts, verify 1.150 $\pm$ .05vdc. This voltage is not adjustable, but must be present.
3. Move the round octal connector to the lower connection on the 1500 Torr calibrator and plug in the pigtail connection (J300) to the rear of the wide range instrument.
4. Move the toggle switch on the calibrator to the **OFFSET** position and adjust the OFFSET pot on the rear of the instrument to read 000 on the display.
5. Move the toggle switch on the calibrator to the **SPAN** position and adjust the **SPAN** pot on the rear of the instrument to read 760 on the display.
6. Repeat steps 4 & 5 until no adjustment is required.
7. Disconnect the adapter cable from the 1500 Torr Diaphragm calibrator.
8. Connect the adapter cable to the Pirani calibrator as shown in the illustration.
9. The calibrator is marked with the three proper settings for adjustment of zero, span and offset. A simple toggle switch selects the “zero” and “span” and “offset” circuits so that you can make the proper adjustments using the associated zero, span, and offset pot.

4.6. Calibration Using Vacuum System

This section outlines calibration of the instrument and sensor using a vacuum system rather than the reference calibrator kit. This method requires a high vacuum system and precision calibration "standards" such as capacitance manometers. If these are not available, use the electronic calibrator technique described previously.

4.6.1. Pirani Sensor Calibration

To set zero and span using a capacitance manometer for the 2000 milliTorr instrument requires a high vacuum system capable of pressures less than 1 X 10^{-4} Torr, and a precision calibration "standard" such as a capacitance manometer with a 1 Torr or 10 Torr head.

First, pump the tube to hard vacuum and hold it there for about 20-30 minutes to thoroughly outgass the tube. Adjust the zero adjustment until the meter reads 000.

Second, raise the pressure to 900 mTorr (for instruments of other ranges choose a pressure near mid-scale), and hold that pressure constant. Adjust the span adjustment pot to read the same pressure as the calibration standard. The instrument is now calibrated. If the span adjustment was far off, repeat the procedure.

The span adjustment permits you to trim the instrument for precise indication at a critical pressure, increasing the absolute accuracy at that point, although possibly sacrificing tracking at other points on the scale. The 900 mTorr point is best on a 2000 mT instrument for average tracking throughout the 1 to 2000 mTorr range.

NOTE: If neither an electronic calibrator nor a certified precision calibration standard are available, but you feel there is a need to calibrate the instrument, then pump to hard vacuum and set the zero only. Do not attempt to make the reading agree with other typical analog thermocouple or Pirani gauges upscale as this will result only in degraded performance of this gauge.

4.6.2. Diaphragm Sensor Calibration

1. Pump the transducer to “hard vacuum” (the term hard vacuum refers to any pressure lower than 0.1 Torr (100 mT). This is a “relative zero” below which the transducer no longer changes output. The exact pressure need not be known as long as you are sure it is this low.

2. Using a needle valve on your vacuum system, carefully increase the pressure while monitoring the instrument front panel. As soon as the indicator switches from mTorr to Torr stop the pressure increase and adjust the 1500 Torr **OFFSET** pot on the rear panel to make the front panel meter read 2 Torr.

3. Vent the transducer to atmosphere. Call the nearest airport weather station and obtain the immediate barometric pressure. Ask for “station pressure” not altimeter setting. Multiply the figure you are given for barometric pressure by 25.4 to convert to mmHg (Torr) from inches Hg. Then, adjust the SPAN pot until the display reads that pressure.

   For example, if you are in Pittsburgh and you are at 636 ft. altitude on a standard day the following is true: at sea level the Std. Barometric is 29.92 in Hg = 760 Torr (29.92 X 25.4 = 759.968 Torr).

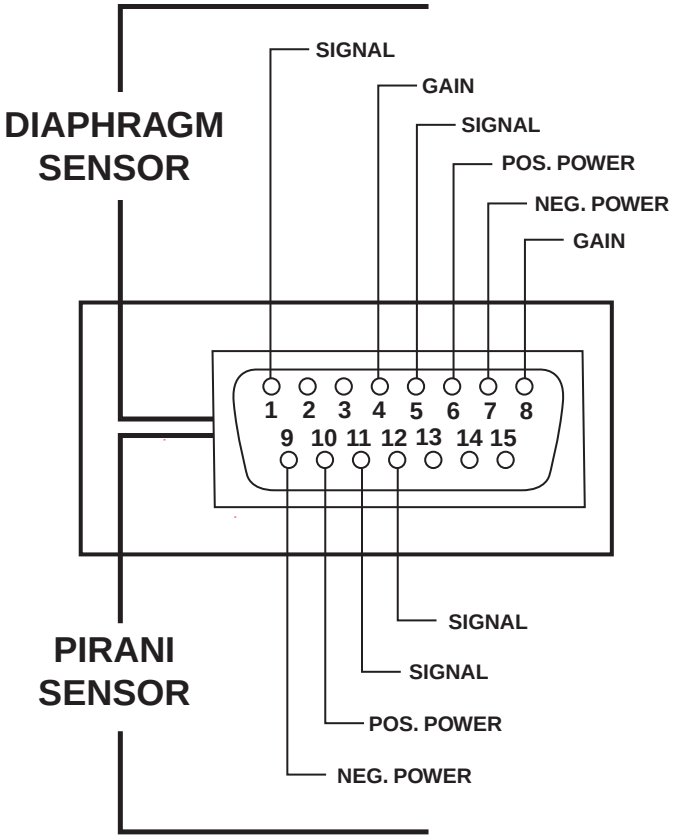
   This is the altimeter setting for an aircraft, so that at landing the plane’s altimeter reads 636 ft. (At sea level the altimeter reads 000).

   Station pressure is actually 29.24 in Hg.(29.24 X 25.4 = 742.696 Torr)

   Multiply the station pressure by 25.4 to convert inches Hg. to Torr and adjust the pan to read the calculated number which in the above example is 743 Torr.

   To obtain this information, look in the phone book under U.S. Government, Transportation Dept., Ask for the “Station Pressure.” Tell them your application is for industrial calibration purposes.

5. Sensor Troubleshooting



5.1. Transducer Wiring

The transducer can be checked with an ohmmeter to verify if sensors are good. Disconnect the cable from the transducer to make the resistance readings. See next page for diagram of transducer connector and proper resistance readings.

5.5.1. Pirani Sensor Check

1. Resistance between # 9 and # 11 should be less than 2.5 ohms. If the resistance is higher it is likely that the filament is burned out and the Pirani sensor should be replaced.

5.1.2. Diaphragm Sensor Check

1. Resistance between # 6 and #7 should be approximately 6K to 7K ohms.

2. Approximately 1/2 of the resistance between #6 and #7 should be measured between:

#7 and #1 #7 and #5 #6 and #1 #6 and #5

3. If the resistances are different than as described, it is likely that the diaphragm sensor is defective and should be replaced.

5.1.3. Sensor Replacement

The Wide Range Gauge transducer contains 2 sensors:

A. A Pirani type sensor that is used to measure from 1 to 2000 mTorr (.001 to 2.000 mbar or 1 to 200 Pascals). This sensor is located nearest to the transducer inlet.

B. A Diagram type sensor that is used to measure from 2 to 1500 Torr (2 to 2000 mbar or 0.2 to 200 kPa). Sensors with either Stainless Steel or silicon diaphragms are available.

To replace the sensors:

1. Remove the sheet metal cover from the transducer.

2. Remove the 2 screws holding the 15 pin connector to the cover. (Do not lose 3/16 X 4-40 screws).

3. Use an open end wrench to remove the defective sensor. This joint will be very tight and use of an adjustable wrench may cause injury. If available, use of a vise to hold the transducer body is recommended.

4. Remove any obstructions from the threads of the transducer base.

5. For replacement of Pirani sensor and silicon type sensor there are 2 styles of threads on the sensors as well as two different types of sealing surfaces. The older model gauge sensors used a 1/8" NPT with a teflon sealing nut on the stem of the sensor. The newer sensors use an O-ring seal which is located at the very tip or end of the sensor stem. Before attempting to install the new sensor first verify that you have the correct sensor for your transducer.

6. Install the new sensor while the transducer base is still in the vise and before unsoldering the old sensor leads.
Make sure the joint is tight.

7. Clamp 15 pin connector in vise clamp, gently, with leads up.

8. Unsolder old sensor leads from the connector pins, use 1/16" solder iron tip.

9. Resolder new leads to the connector pins. Refer to Table of Pin Connections below for correct connection.

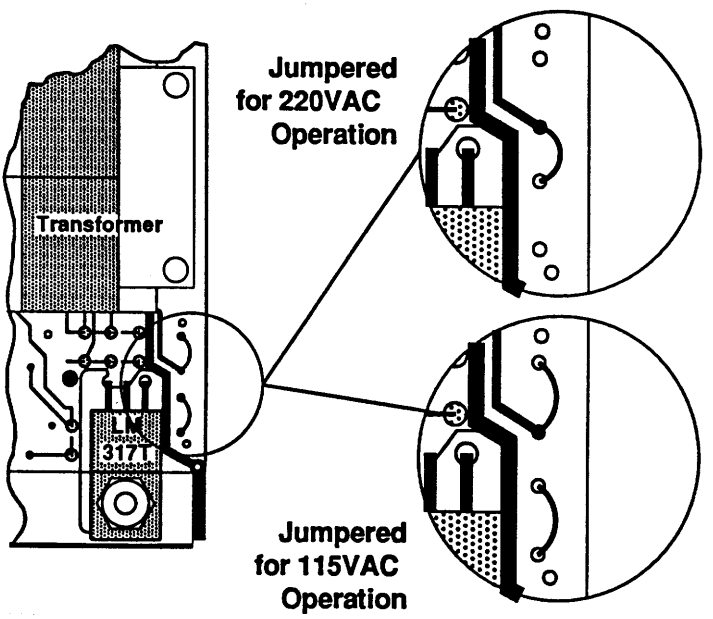
10. Re-install 15 pin connector and replace the cover.

Table of Pin Connections	
Pirani Sensor (pins on bottom row)	**Diaphragm Sensor (pins on top row)**
9 black (neg. power)	1 white (signal)
10 red (pos. power)	4 yellow (gain)
11 green (signal)	5 green (signal)
12 white (signal)	6 red (pos. power)
	7 black (neg. power)
	8 brown (gain)

5.2. Changing Operating Line Voltage

The operating voltage for instruments can be changed in the field by changing the connection across four pads on one of the circuit boards. For access to these pads, remove 4 screws on the bottom of the instrument to release the outer wrap. Slide the outer wrap toward the back of the instrument, completely away from the circuit boards. Locate the four pads on the edge of the circuit board where the power cord comes to the circuit board.

Instruments set for operation at 115 VAC have jumpers connecting the outside pairs of the four pads. Instruments set for operation at 220 VAC have jumpers connecting the inside pair of the four pads. See illustration below.



Clip the jumpers close to the pads and install new jumper(s) to change to the desired configuration.

5.3. Return Shipment Procedure

If repairs are required, return the instrument with cables and transducer to the manufacturer, prepaid. Include a purchase order and a statement as to the nature of the problem.

6. WARRANTY STATEMENT

The manufacturer warrants all instruments for a period of one year against defects of material and workmanship subject to the terms and conditions set forth below:

1. The warranty is in effect at date of shipment from the manufacturer to the original purchaser.

2. This warranty covers both parts and labor and includes both display unit and sensors, but does not apply to instruments subjected to abuse or misuse or sensor damage caused by exposure to liquids or pressure in excess of 30 PSIG (3 atmospheres).

3. Claims against this warranty for replacement parts and/or service shall be limited to defects in materials and workmanship. Malfunctions attributable to neglect, abuse, or repair and operational procedures not specifically recommended by the manufacturer are not warranted.

4. Service repairs and/or piece part replacement shall be warranted for a period of ninety (90) days commencing on date of return shipment or until expiration of the remaining term of original instrument warranty. whichever is later.

5. The manufacturer shall not be liable for consequential damages nor for labor, loss or expenses directly or indirectly arising from use of their products or equipment.

6. This warranty does not apply to shipping damage. Claims for damage incurred while products are in transit rest with the purchaser. Said claims are to be levied against the carrier.

7. Amendments, assumed corollaries or statements contrary to the terms of this warranty shall not be binding upon the manufacturer unless stated in writing and approved by an officer of the manufacturer.

8. THE MANUFACTURER MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, AND MAKES NO WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR ANY PARTICULAR PURPOSE.

9. Warranty service is F.O.B. point of manufacture. All Transportation charges to and from the manufacturer's plant shall be the responsibility of the purchaser.

7. Parts and Accessories

Transducer with Silicon Diaphragm

Transducer body is 316 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.
P/N 902058 with 1/8" maled pipe thread, P/N 902068 with NW-16 flange

Transducer with 316 Stainless Steel Diaphragm

Transducer body is 316 stainless steel.
Pirani gauge parts include 304 SS, platinum alloy and glass to metal seals.
Diaphragm sensor is all 304 stainless steel.
P/N 902057 with 1/8" male pipe thread, P/N 902067 with NW-16 flange.

Replacement Pirani Sensor

Interchangeable sensor for field replacement. Materials in the vacuum include 304 stainless steel, platinum alloy and glass to metal seals. P/N 902077

Replacement Silicon Diaphragm Sensor

Interchangeable sensor for field replacement.
Materials in the vacuum system are 304 stainless steel and pure silicon. P/N 902078

Replacement Stainless Steel Diaphragm Sensor

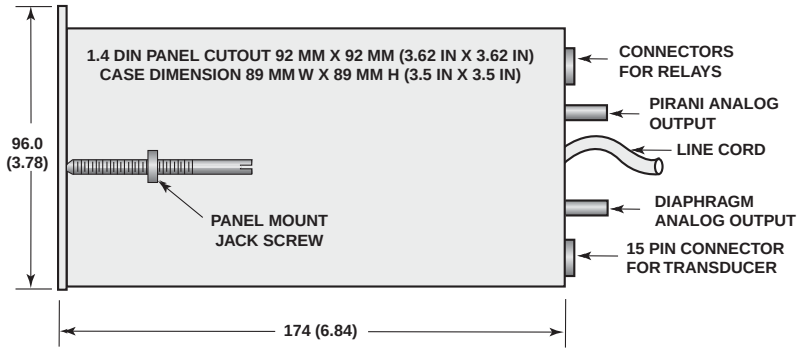
Interchangeable sensor for field replacement.
Materials in the vacuum system are all 316 stainless steel.
P/N 902079

Sensor Extension Cable

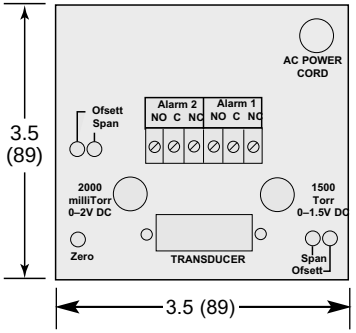
With mating connectors on both ends 75 Meter (250 ft.) maximum.
P/N 902080

8. Dimension Drawings

Overall Dimensions of Display Unit

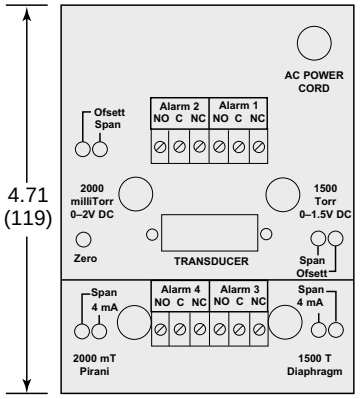


Standard Rear Panel



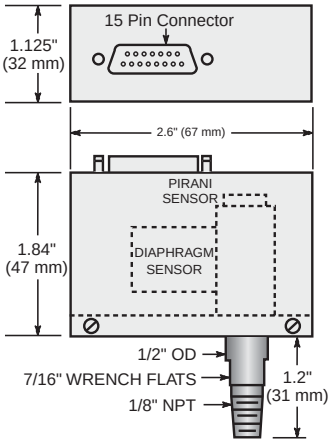
Panel Cutout Dimensions
92 X 92 mm

Rear Panel With Auxilliary Output



Panel Cutout Dimensions
92 mm Wide X 123 mm High

Transducers For Wide Range Diaphragm Manometer



1/2” OD

15 mm OD

NW-16

NW-25

1.33 Conflat

2.75 Conflat

VCR-8

VCO-8

VCR-4

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