

**Instruction Manual For
Thermocouple Vacuum Gauge
*GTC-390***



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THERMOCOUPLE VACUUM GAUGE TYPE GT-390

1.0 INTRODUCTION

1.1 *Product Description*

The GTC-390 thermocouple vacuum gauge is a dual station thermal conductivity type gauge and controller housed in a DIN-style case. The unit uses the rugged and proven GTC-036 sensor and covers a pressure range of 1 mtorr to 5000 mtorr. Pressures are displayed simultaneously for both stations on two 40-segment bar graph displays. Each station includes a relay set point that can be set within the range of the gauge. The relay set point for each station may be viewed by pressing the “View” buttons on the front panel. Adjusting the set points is accomplished by turning the front panel potentiometers marked “Set”. An LED indicator displays the output status of each relay control output.

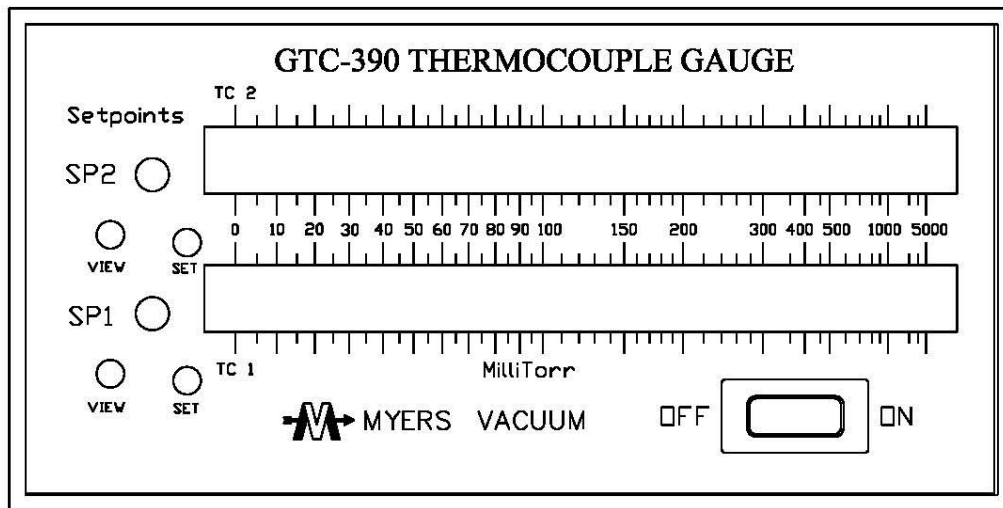
1.2 *Operating Principles*

The GTC-390 thermocouple gauge consists of two identical pressure measurement and control circuits that function as follows: A constant current source is supplied to the heating element of the GTC-036 sensor. The thermocouple junction in the sensor generates a voltage signal that varies with the temperature of this heating element. A decrease in pressure reduces the number of gas molecules available to transfer heat away from the heating element, resulting in a temperature rise and an increased output from the sensor. This small voltage signal is filtered, amplified, and inverted resulting in a signal with a span of several volts that is proportional to pressure. This pressure signal is then passed through a signal selection circuit to the display drivers where it is compared to a high and a low reference and the proper display segments are illuminated. A voltage comparator is used to activate the set point relay as well as the front panel set point indicator. There is a small amount of hysteresis built into this circuit. The “View” button causes the signal selection circuit to send the pressure set point level to the display drivers rather than the pressure.

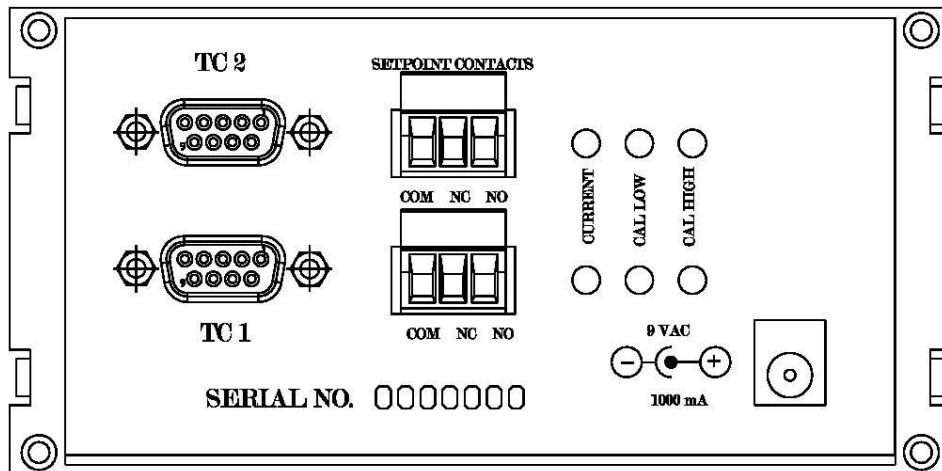
1.3 Specifications

GT-390 Thermocouple Vacuum Gauge

Power Input	100-120 VAC 50/60 Hz 40 watts or 9 VDC 9 watts
Pressures Scales	1 mtorr to 5000 mtorr on a 40- segment bar-graph
Number of Sensing Stations	1 or 2
Pressure Sensing Tube	Type GTC-036 with 1/8" pipe thread or 0.406" diameter O-Ring sealing surface.
Tube Cable	10 ft length standard with both 9-pin gauge and octal sensor connector
Cabinet Dimensions	5.67" wide 5.10" deep 2.84" high
Mounting Hole Dimensions	5.45" wide x 2.68" high (allow 8" for mounting depth)
Relay Connections	One removable three position terminal block for each station with common, normally closed, normally open connections
Relay Trip Point Adjustment	1 mtorr to 5000 mtorr
Relay Types	SPDT 5 Amp 250 VAC Max



FRONT VIEW



REAR VIEW

INSTALLATION

2.1 *Unpacking*

Unpack and inspect the carton and contents for damage or shortages. Damages in transit are normally the responsibility of the Transportation Company and should be reported to them.

2.2 *Installing the Pressure Sensing Tube.*

The tube may be installed in any position. For accurate pressure response and freedom from zero drift, the tube elements must remain clean. Therefore, the tube should be installed to minimize the entrance of oil vapor or process contaminants.

Install the sensing tube in any of the following ways:

Thread the tubulation into a mating 1/8" pipe thread opening in the vacuum system. Seal the threads with Teflon tape, Celvaseal Leak Sealant (Part No. 271375), or other low vapor pressure sealing material.

Or

Place the end of the tubulation tightly against a similar-sized tube installed in the system and enclose the butt joint in a short piece of heavy-wall rubber vacuum tubing. Put a thin coat of vacuum grease, such as Celvacene-Medium, on the tubulation and the system connections. The grease lubricates the connecting parts and provides a vacuum seal.

Or

Place the tubulation end of the sensor into a 0.406" diameter O-Ring seal..

2.3 *Installing the Gauge Unit*

The gauge can be used either as a bench top unit or mounted into a panel. To install into a panel you must make a panel cut out of 5.45" wide x 2.68" high and allow ~8" for mounting depth (allow 1.0" space between each unit). Insert the unit into the mounting cut out. From the back of the gauge install the two side mounting clamps (supplied with gauge) and tighten the Phillip screw on each side. Do not over tighten, over tightening could damage the mounting bracket.

2.4 *Electrical Connections*

Plug the tube cable(s) octal end into the sensing tube(s) and the 9-pin end into the rear of the GTC-390 gauge.

The gauge is provided with a 100-120 Vac to 9Vdc adaptor. Plug the power cord into a suitable 50/60 Hz outlet.

2.5 *Connecting Load To Relay Control Contacts*

The relay-controlled output of the GTC-390 unit is available at the 3-pin removable screw terminal block connector on the rear panel. Relay contact connections are marked on the panel. The relay contacts are rated at 250VAC at 5 Amperes.

The relay coil is controlled by the signal from the gauge. Power must be supplied to the relay contacts.

3.0 OPERATION

3.1 *Measuring Pressure*

After proper installation and connection, the gauge may be turned on. Allow 1 minute for warm-up time. The thermocouple gauge tubes are not harmed by operation at pressures up to full atmospheric pressure.

The pressure meter(s) will indicate the pressure within the sensing tube in units of "MilliTorr". The gauge is calibrated for dry air.

3.2 *Adjusting Relay Control Set Points*

The relay set point is adjustable by means of the marked screw adjustment on the front panel. To view the set point, press the switch marked view ("SP2" or "SP1). The set points can be viewed as they are being adjusted. There are two LED's on the front panel to indicate if the relay output circuit is energized.

4.0 MAINTENANCE

4.1 *Cleaning The Sensing Tube*

Disconnect and remove the tube from the vacuum system. Wash the tube interior with a hot water and detergent solution (Joy and Alconox are good). Agitate gently.

Rinse thoroughly with hot water.

Rinse with clean acetone or isopropyl alcohol.

Dry tube by heating moderately for several hours and/or by evacuating on a water aspirator. Do not use compressed air.

4.2 *Re-calibration*

The GT-390 Gauges are carefully calibrated at the factory before shipment. Each GTC-036 Sensing Tube is also pre-calibrated so that it can be plugged into a gauge circuit and used without the need for further adjustment.

Drift in the calibration or zero setting of the gauge reading is usually due to contamination of the sensing tube by oil vapor or process contaminants. Cleaning as specified in Section 4.1 will frequently restore the original accuracy. Should this fail, installation of a new GT-036 Tube is recommended.

4.3 *Gauge Circuit Calibration*

All gauge circuits are factory adjusted to produce a specified output under standard operating conditions. When new pre-calibrated tubes are connected to a correctly adjusted gauge circuit, the pressure should read properly over the entire scale. Some variation is to be expected at the atmospheric end of the scale.

Should the gauge fail to read properly when used with a new tube, the following adjustments should be made.

Locate the six adjustment potentiometers located on the back of the instrument. There are three adjustments for each station labeled current, cal low and cal high.

The following will need to be completed for the station that needs calibration

With the sensing tube exposed to atmospheric pressure and at normal room temperature, measure the current that is being supplied to the heating element of the GTC-036 on the station that is not reading properly then adjust the potentiometer labeled “current” for that station and bring the reading to 86 milliamps.

Pump the sensing tube down to less than 1 millitorr and adjust the “cal low” potentiometer for the station.

Recheck the atmospheric full-scale reading and adjust the potentiometer labeled “cal high”.

Recheck the above steps. If the gauge is still reading incorrectly see assistance in section 7.0.

5.0 REPLACEMENT PARTS LIST FOR THE GT-390

DESCRIPTION	PART NO.
Sensing Tube, Type GTC-036	5504358
Power Supply 9VDC	500618

6.0 ACCESSORIES

Cable Assemble for Sensing Tube

	Station 1 & 2
10 ft. length	500601-1
15 ft. length	500601-2
25 ft. length	500601-3
50 ft. length	500601-4
100 ft. length	500601-5

Leak Sealant, Celvaseal Silicone, Brush Bottle 271375

Leak Sealant, Celvaseal Silicone, Spray Can 271373-6

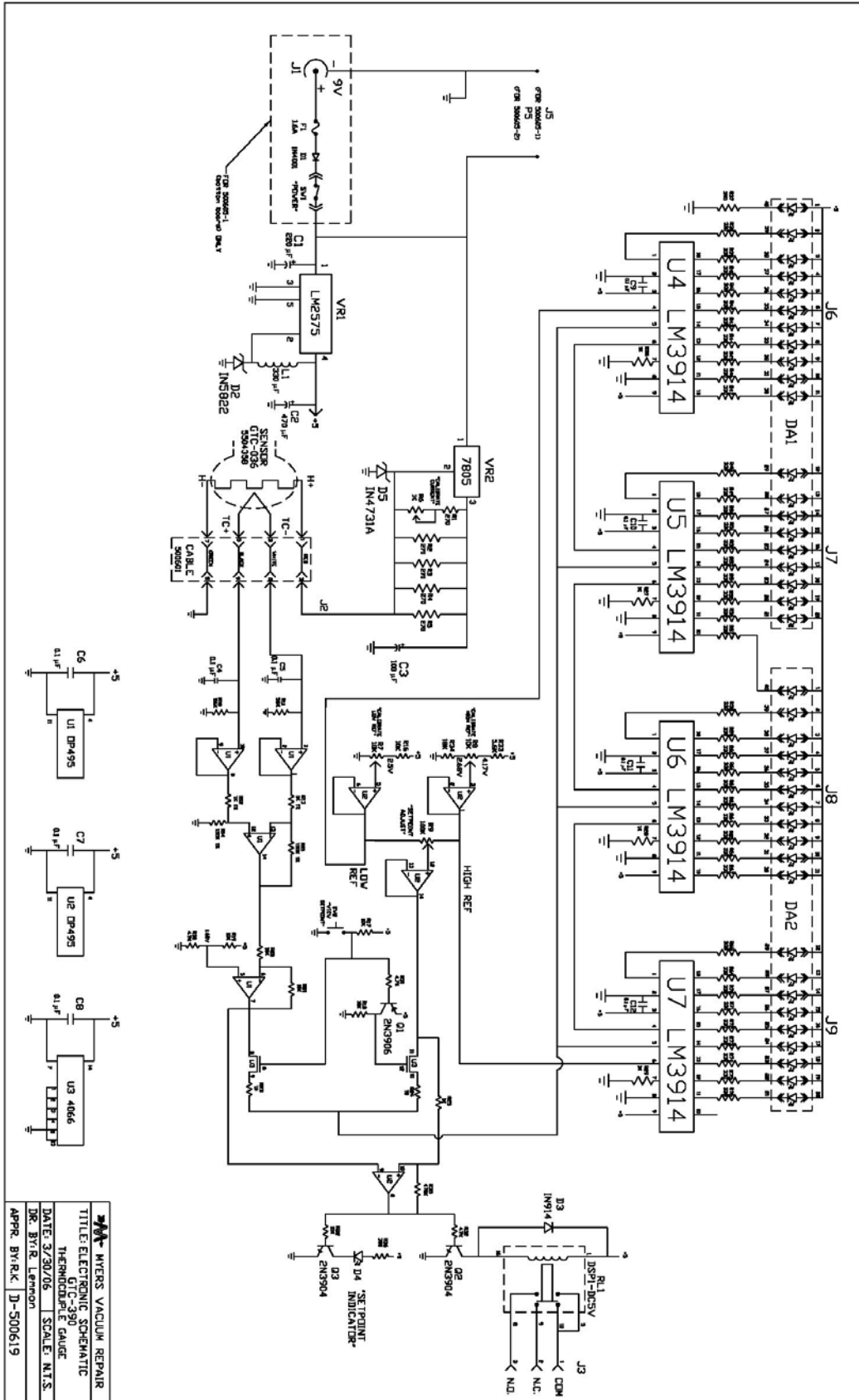
7.0 ASSISTANCE FROM MYERS VACUUM

Gauge repair and re-calibration service is available at the factory. For information, contact the local MYERS VACUUM sales office or the MYERS VACUUM Order Service Dept. Myers Vacuum, Kittanning, Pa 16201.

8.0 SCHEMATIC

This section contains the following Electrical Schematics:

500619D
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 MYERS VACUUM REPAIR
 TITLE: ELECTRONIC SCHEMATIC
 GTC-390 GAUGE
 DATE: 3/20/06 SCALE: N.T.S.
 DR. BIR LEMMON
 APPR. BY: RAK DJ-500619