

# INSTRUCTIONS FOR THE INSTALLATION AND OPERATION OF THE CRYO-TORR<sup>®</sup> TEMPERATURE INDICATOR

The Cryo-Torr<sup>™</sup> Vacuum-Pump Temperature Indicator, Part No. 8042001G003, or G004 shown in Figure 1, is used with Cryo-Torr<sup>(R)</sup> high-vacuum pumps, to monitor cryopump operating temperatures. With User-supplied switch gear, the indicator can be used in multiple installations. In cryopumps provided with a silicon diode sensor, the indicator is easily connected to the cryopump with an electrical cable. The panel readout is in Kelvin, and has a range from 10K to 320K. The indicator has two set points that are adjustable over this range. When the vacuum pump temperature reaches either set point, electrical contacts on the rear terminal board can be used to activate indicators or operate solenoid valves for controlling temperature-related functions. A switch on the front panel permits momentary display of the two set points.

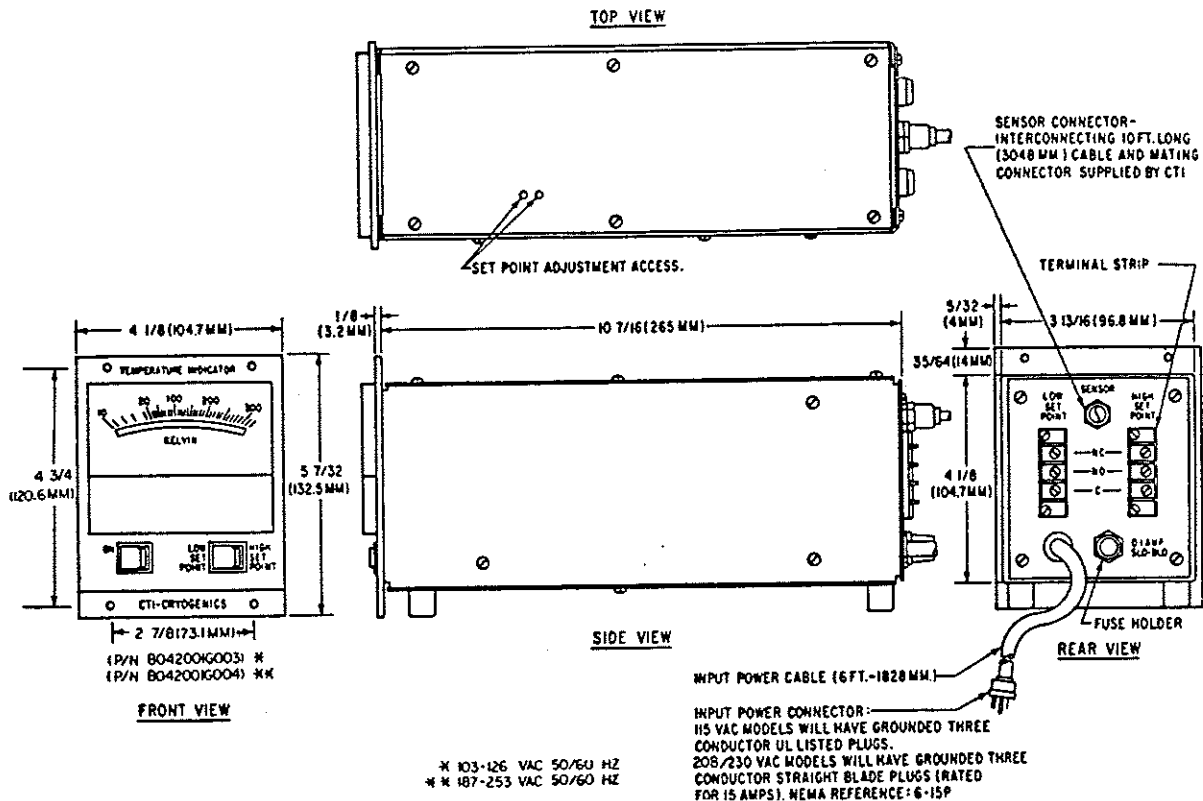


FIGURE 1. CRYO-TORR<sup>™</sup> TEMPERATURE INDICATOR

## SPECIFICATIONS

### ELECTRICAL:

103-126V, Single Phase, 50/60 Hz, or  
187-253V, Single Phase, 50/60 Hz  
6-foot input power cable  
0.1-amp fuse on rear panel  
10.0-microampere constant current output to diode

### SYSTEM ACCURACY:

10-27K:  $\pm 2.5K$ , +2.5% of meter reading  
27-80K: +3.5K, -2.5K, +2.5% of meter reading  
80-90K: +4.5K, -2.5K, +2.5% of meter reading  
90-100K: +5.5K, -2.5K, +2.5% of meter reading  
100-320K:  $\pm 2.5K$ , +2.5% of meter reading

### READOUT METER:

Analog Panel Meter with temperature scale in Kelvin range  
10K to 320K (100 microampere full scale)

### SET POINTS:

2 set points adjustable over 10K to 320K range. Screwdriver adjustable through holes in top panel. Relays - SPDT with 1.0 amp contact. Both NC and NO contacts on terminal board on rear panel.

SHIPPING WEIGHT: 5 pounds

## INSTALLATION

- (1) Connect the cryopump to the temperature-indicator SENSOR connector, using the 10-foot interconnecting cable provided with the indicator. If the supplied cable is too short, contact CTI to order a longer cable.
- (2) Insert input power cable plug in appropriate power receptacle. The unit is furnished with either a 115-volt or 208/230-volt three-prong as specified in the sales order.

## OPERATION

- (1) Connect the contacts of the HI and LO relays, on the two terminal strips on the rear panel, either to indicators or to solenoid valves, as desired.
- (2) Turn the rocker power switch on the left side of the front panel to ON. The panel meter will read the temperature in Kelvin.

- (3) Check the set point readout by operating the paddle switch located on the right side of the front panel. Pressing the paddle switch to the left will display the LO set point reading on the meter; pressing the paddle switch to the right, the HI set point reading.
- (4) To adjust the set points, insert a small screwdriver through the appropriate hole in the top cover (labeled LO or HI) and, while holding the paddle in either the LO or HI position, turn the screwdriver until the desired set point is indicated on the meter.

Note

The normally-closed (NC) contacts of the LO set point relay are closed until the temperature of the sensor drops below the LO set point; the normally-closed (NC) contacts of the HI set point relay are closed until the temperature of the sensor goes above the HI set point. This information is summarized in the following truth table:

RELAY CONTACT TRUTH TABLE

<u>TEMPERATURE</u>	<u>HI-NC</u>	<u>HI-NO</u>	<u>LO-NC</u>	<u>LO-NO</u>
ABOVE HI SET PT	OPEN	CLOSED	CLOSED	OPEN
BETWEEN SET PTS	CLOSED	OPEN	CLOSED	OPEN
BELOW LO SET PT	CLOSED	OPEN	OPEN	CLOSED

TROUBLESHOOTING TABLE

<u>FAULT</u>	<u>POSSIBLE CAUSE</u>	<u>CORRECTIVE ACTION</u>
#1 Panel meter fails to indicate a reading.	1) Power switch is off. 2) Power cord not plugged in. 3) Fuse blown on rear panel of indicator. 4) No power coming from the power source.	1) Turn switch to ON. 2) Plug in power cord. 3) Replace the fuse. 4) Check service fuses, circuit breakers, and wiring associated with power source, and repair as required.

## TROUBLESHOOTING TABLE (Cont.)

FAULT	POSSIBLE CAUSE	CORRECTIVE ACTION
#1 Panel meter fails to indicate a reading. (Cont.)	5) Interconnecting cable is faulty.	5) Check continuity and replace, if necessary.
	<p><u>CAUTION</u></p> <p>WHEN CHECKING DIODE OR CONNECTIONS TO DIODE, DO NOT USE A MULTIMETER WHICH COULD SUBJECT THE DIODE TO MORE THAN FIVE MILLIAMPERES FORWARD CURRENT, OR MORE THAN 200 VOLTS REVERSE BIAS. EXCESS CURRENT OR VOLTAGE WILL PERMANENTLY DAMAGE THE DIODE.</p>	
#2 Solenoid valves or indicator are not being operated at proper temperature in accordance with relay contact truth table.	6) Connections to the diode sensor are loose or disconnected.  7) Polarity of diode connection is wrong.  8) Defective front panel meter.  9) Defective electronics.	6) Check continuity at the cryopump connections at pins 3 and 4. If faulty, they must be repaired only by a qualified technician.  7) Check the polarity.  8) Check millivolt output of electronics. It should be 0-35 mv. If front panel meter is receiving appropriate signal but not responding, replace the meter.  9) If no signal is coming from the electronics, they must be repaired only by a qualified technician.
	#2 Solenoid valves or indicator are not being operated at proper temperature in accordance with relay contact truth table.	1) Defective relays or electronics.