CTI-CRYOGENICS
HELIX TECHNOLOGY CORPORATION

Cryo-Torr® Temperature Indicator
Installation and Operation Instructions

The Cryo-Torr Vacuum-Pump Temperature Indicator, Part No. 8042001G003, or G004 shown in Figure 1, is used with Cryo-Torr 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 setpoint, 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 setpoints.

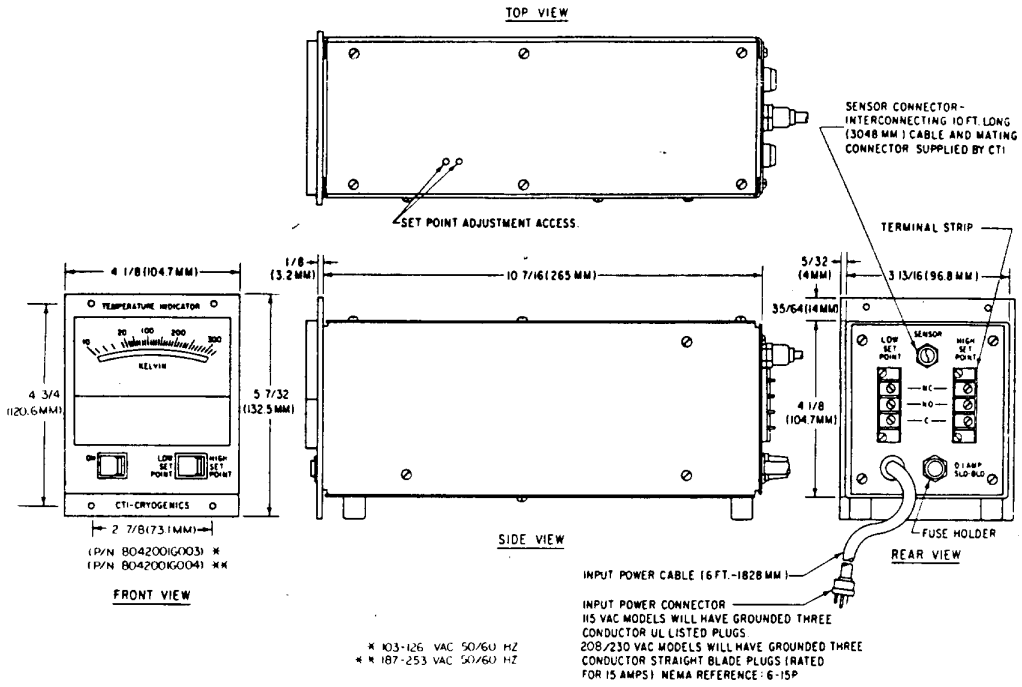

Figure 1: Cryo-Torr Temperature Indicator

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Specifications

Electrical

103 - 126V, Single Phase, 50/60Hz or

187 - 253V, Single Phase, 50/60Hz

6 - foot input power cable

0.1 amp fuse on rear panel

10.0 - microampere constant current output to diode

System Accuracy

10 - 27K:	± 2.5K	+2.5% of meter reading
27 - 80K:	± 3.5K	-2.5%, +2.5% of meter reading
80 - 90K:	± 4.5K	-2.5%, +2.5% of meter reading
90 - 100K:	± 5.5K	-2.5%, +2.5% of meter reading
100 - 320K:	± 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).

Setpoints

2 set points adjustable over 10K to 320K range. Screwdriver adjustable through holes in top panel. Relays - SPDT with 1.0amp 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. Contact CTI-CRYOGENICS if the supplied cable is too short to order a longer cable.
2. Insert input power cable plug in appropriate power receptacle. The unit is furnished with either 115V or 208/230V 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 setpoint 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 setpoint reading on the meter. Pressing the paddle switch to the right will display the HI setpoint reading on the meter.

NOTE: *The NC (normally closed) contacts of the LO setpoint relay are closed until the temperature of the sensor drops below the LO setpoint. The NC (normally closed) contacts of the HI setpoint relay are closed until the temperature of the sensor drops above the HI setpoint. Refer to Table 1.*

Table 1: Relay Contact Truth Table

Temperature	HI-NC	HI-NO	LO-NC	LO-NO
Above HI Setpoint	Open	Closed	Closed	Open
Between Setpoints	Closed	Open	Closed	Open
Below LO Setpoint	Closed	Open	Open	Closed

Table 2: Troubleshooting

Fault	Possible Cause	Corrective Action
Panel meter fails to indicate a reading.	Power switch is off.	Turn switch on.
	Power cord not plugged in.	Plug in power cord
	Fuse blown on rear panel of indicator.	Replace the fuse.
	No power coming from power source.	Check the service fuses, circuit breakers, and wiring associated with power source and repair as needed.
	Defective interconnecting cable.	Check continuity and replace. if needed.
	CAUTION When checking diode or connections to diode, do not use a multi meter 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. Connections to the diode sensor are loose or disconnected.	Check the continuity at the cryopump connections pins 3 and 4. Repairs must only be made by a qualified technician.
	Polarity of diode connection is incorrect.	Check the polarity.
	Defective front panel meter.	Check the millivolt output of electronics. It should be 0-35 mv. Replace the meter if the signal is present and the meter is not reponding.
	Defective electronics.	Repair as required by a qualified technician.

Table 2: Troubleshooting (Continued)

Fault	Possible Cause	Corrective Action
Solenoid valves or indicator are not being operated at proper temperature in accordance with Table 1.	Defective relays or electronics.	Check to see if the proper signal is being provided by the electronics. Repair as required by a qualified technician.