

Universal Temperature Probe MODEL EI-1022

Instruction Manual

October 16, 2008

Description

The EI-1022 is a universal temperature probe that consists of a National Semiconductor temperature sensor mounted in a plastic tube with a current limiting resistor. This probe when connected to 5 volts DC will output a nominal 3.0 volts at room temperature. The probe is suitable for air and surface applications.

The instruction manual for this unit shows how to configure the LJ Logger program to read out temperature in either degrees C or F. Instructions are also included to show the user how to calibrate the unit by adjusting the constants in the LJ Logger program.

The EI-1022 is intended to be connected to the Labjack for 5 volt power but can be used as a stand alone temperature sensor when connected to a DVM and a 5 volt source.

Multiple probes can be connected to the Labjack so that up to 8 sensors can be connected to one Labjack.

Electrical Connections

Three wires require connections; they are +5 volts (red), ground (black) and output (white). These wires can be connected to the appropriate terminal on the Labjack or other power supply in the case of using the sensor as a stand-alone unit. The output wire will normally output a voltage of approximately 3 volts at room temperature.

Labjack Setup

Once the temperature probe is connected to a channel on the Labjack it may be desirable to use the LJ Logger program to display temperature in degrees F or C. In order to make the LJ Logger readout in degrees C simply enter 100 for the multiplier and -273.15 for the offset in the appropriate row corresponding to the temperature sensor. In order to make the LJ Logger readout in degrees F simply enter 180 for the multiplier and -459.67 for the offset. The temperature will appear in the "scaled data" column.

U3-LV Special Considerations

When using the probe with the U3 the following should be considered. The probe outputs 10 mV per degree K. That means that at room temperature, the probe outputs about 3 volts. The high-voltage channels on the U3-HV can certainly handle this, but the normal single-ended range of the low voltage channels on the -HV and -LV is about 0-2.44 volts.

Specifications

Range: -40°C to 100°C (-40°F to 212°F)

Output: 10 mV per °K absolute

Sensor device in probe: LM335A

Cable length: 6 ft supplied 500 ft user extended

Probe dimensions: 4 in x 0.25 diameter

Power: +5 VDC at .001 Amp

Output Load: 50K or greater or 100 uA max

Accuracy:

+/- 1°C Typical	Room Temperature
+/- 3°C Max	Room Temperature
+/- 2°C Typical	-40°C to 100°C
+/- 5°C Max	-40°C to 100°C

FORMULAS TO CALCULATE TEMPERATURE FROM MEASURED PROBE VOLTAGE

$$^{\circ}\text{C} = 100 * \text{volts} - 273.15$$

$$^{\circ}\text{K} = 100 * \text{volts}$$

$$^{\circ}\text{F} = ((100 * \text{volts}) - 273.15) * 1.8 + 32$$

SPECIAL NOTICE REGARDING EI-1022 CABLE

Although the temperature sensor and associated electronics are rated for 100 degrees C, the cable is only rated for 80 degrees C. We have tested the cable, probe at 150 degrees C, and have noticed the cable gets soft at the high temperatures but continues to function. When the cable and probe were returned to normal temperatures, no degrading was observed in the cable or probe. Also at the low temperatures, the cable is only rated to -20 degrees C where the sensor and associated electronics are rated lower. Testing the probe with the wire at the lower temperatures showed normal operation and no degrading of the cable when returned to normal temperatures. The user should be aware that even though the probe itself can operate at the rated temperatures the use of the cable in environments of over 80 degrees C and lower than 20 degrees C is at your own risk.

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