EI-1034 Datasheet

Description

The EI-1034 is a universal temperature probe that consists of a silicon type temperature sensor mounted in a waterproof stainless steel tube. It uses the highest grade available of the LM34 sensor from National Semiconductor with a typical room temperature accuracy of ±0.4 °F (±1.0 °F max). Because of the high-level linear voltage output and high accuracy, this probe is easier to use and superior to thermocouples, thermistors, or RTDs, for many applications in the range of 0 to 300 °F (temperature range varies with positive supply voltage, negative supply voltage, and LabJack model). The probe is suitable for air and liquid applications, and can be conveniently secured into pipes, vessels and chambers by using available ¼ inch compression fittings.

The EI-1034 is intended to be connected to a LabJack for 5-volt power but can be used as a stand-alone temperature sensor when connected to a DVM and a power supply in the range of 5 to 30 volts.

Electrical Connections

Three wires require connections; they are +5 volts (red), ground (black) and signal 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 (white) connects to an analog input and will normally output a voltage of approximately 0.77 volts at room temperature.

Cable Length

The maximum cable length of the probe can be extended to 25 ft without serious degradation in performance. If the user desires to extend the length of the cable beyond 25 ft (up to 500 ft) then a resistor of 10K ohms should be inserted in series with the white wire. The resistor should be placed at the 5 ft length of the probe. When using a series resistor of 10K ohm the user should consider the voltage drop across the resistor when calculating the final temperature measurement.

Low Temperature Operation

The low temperature range of the EI-1034 can be extended to -50 °F by adding a 100K resistor to a negative supply voltage (typically -5 volts) as shown in Figure 1. Note that if you don't have a negative voltage available but do have an isolated voltage available such as a battery or wall-wart, you can connect it backwards to make a negative voltage. A standard wall plug-in supply can be used in the range of 5 to 15 volts. A 9-volt battery is also a good source for a negative voltage. Care must be taken to connect the positive terminal of the isolated supply to the GND wire (black) of the EI-1034 and the negative terminal of the supply in series with a 100K resistor to the white wire of the EI-1034.

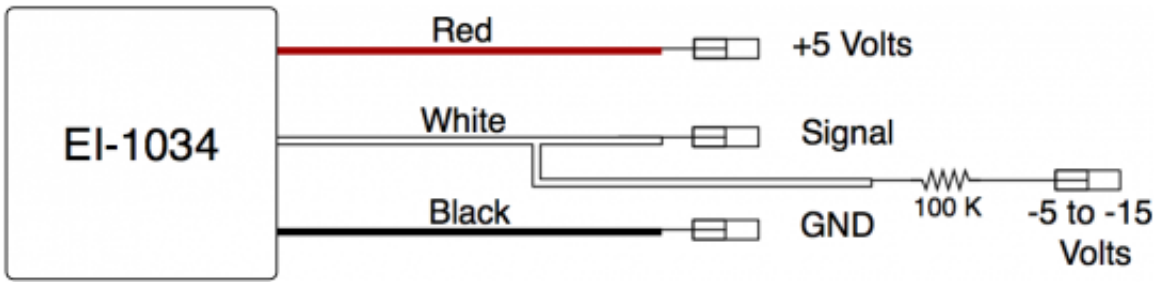

Figure 1

Specifications

Range with 0/5 volt supply:

+10 to +300 °F (-12 to +150 °C) with the LabJack U12

0 to +300 °F (-17 to +150 °C) for the LabJack U3 or UE9

Accuracy:

+/- 0.4°F Typical Room Temperature

+/- 1°F Max Room Temperature

+/- 2°F Max 0°F to 230°F

+/- 3°F Max -40°F to 0°F

+/- 1°F Typical -50 °F to 300 °F

Sensor device in probe: LM34CAZ

Cable length: 6 ft supplied max 25 ft user extended

Probe dimensions: 6 in x 0.25in diameter

Power: +4 to 35 VDC at 100-400 uA

Output Current: 10 mA

Note: When operating at voltages less than 5 Volts the maximum operating temperature is reduced, typically at 4 Volts supply the maximum temperature limit is 200 °F

Formulas to Calculate Temperature From Measured Probe Voltage

°F = 100*volts

°K = (55.56*volts) + 255.37

°C = (55.56*volts) + 255.37 - 273.15

Special Notice Regarding The EI-1034 Cable

Although the temperature sensor and associated electronics are rated for 150 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.

Manufactured by:

ELECTRONIC INNOVATIONS CORP

3333 S. WADSWORTH BLVD. UNIT A104

LAKEWOOD CO 80227

303-987-2441 FAX 303-980-6581

Email: jk@designcircuit.com

Web: www.designcircuit.com