

Thermistor Temperature Sensor

JST-100



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The JST-100 is a precision thermistor enclosed in a ceramic weatherproof housing. It is designed for measuring air and soil temperatures with a datalogger.

The temperature measurement range is -50 to 70 C with an accuracy of 0.1 C above 0 C.

Converting Output to Temperature

The JST-100 uses a thermistor to measure temperature. The resistance of the thermistor (R_T) changes with temperature. Because most dataloggers don't measure resistance directly, a half-bridge measurement is used to determine resistance from the ratio of the measured voltage (V_{OUT}) and excitation voltage (V_{EX}):

$$R_T = 24900 \left(\frac{V_{EX}}{V_{OUT}} - 1 \right)$$

From resistance, temperature is calculated with the Steinhart-Hart equation and thermistor-specific coefficients.

$$T_K = \frac{1}{A = B \ln(R_T) + C (\ln(R_T))^3}$$

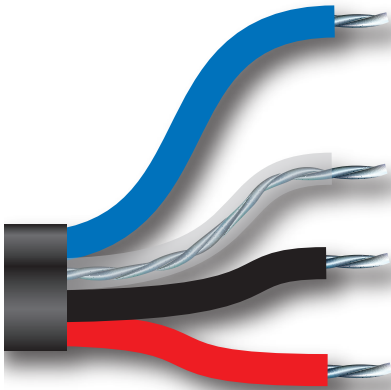
Where T_K is temperature in Kelvin. The Steinhart-Hart coefficients are:

$$A = 1.129241 \times 10^{-3}$$

$$B = 2.341077 \times 10^{-4}$$

$$C = 8.775468 \times 10^{-8}$$

Wiring the Sensor



Blue Analog ground
(negative thermistor
lead)

Clear Analog ground
(shield wire)

Black Single-ended channel
(positive thermistor
lead)

Red Excitation channel
(excitation for
thermistor)

Specifications

Sensor Dimensions

- 7 mm long by 0.6 mm diameter

Mass

- Sensor and wire 60 g

Accuracy

- ± 0.1 C from 0 to 70 C
- ± 0.2 C from -25 to 0 C
- ± 0.4 C from -50 to -25 C

Repeatability

- ± 0.02 C

Response Time

- 1 second

Equilibration Time

- 30 seconds

Input Power

- 2.5 V excitation

Self-Heating

- Maximum = 0.084 C at 5 C with continuous 2.5 V excitation

Operating Environment

- -80 to 70 C
- 0 to 100% relative humidity
- Water resistant
- Designed for continuous outdoor use

Cable

- 5 meters of twisted-pair wire
- Foil shield
- Santoprene jacket
- Additional cable is available in multiples of 5 meters

Warranty

- 1 year against defects in materials and workmanship