



What is a Thermistor?

Overview

Thermistors are thermally sensitive resistors and have, according to type, a negative (NTC), or positive (PTC) resistance/temperature coefficient. Thermometrics product portfolio comprises a wide range of both types.

Manufactured from the oxides of the transition metals - manganese, cobalt, copper and nickel, NTC thermistors are temperature dependant semiconductor resistors. Operating over a range of -200°C to $+1000^{\circ}\text{C}$, they are supplied in glass bead, disc, chips and probe formats. NTCs should be chosen when a continuous change of resistance is required over a wide temperature range. They offer mechanical, thermal and electrical stability, together with a high degree of sensitivity.

The excellent combination of price and performance has led to the extensive use of NTCs in applications such as temperature measurement and control, temperature compensation, surge suppression and fluid flow measurement.

PTC thermistors are temperature dependent resistors manufactured from barium titanate and should be chosen when a drastic change in resistance is required at a specific temperature or current level. PTCs can operate in the following modes:

- Temperature sensing, switching at temperatures ranging from 60°C to 180°C , e.g. protection of windings in electric motors and transformers.
- Solid-state fuse to protect against excess current levels, ranging from several mA to several A (25°C ambient) and continuous voltages up to 600V and higher, e.g. power supplies for a wide range of electrical equipment.
- Liquid level sensor.

The unique patented design Composite Thermistor contains 2 NTC and 1 PTC thermistors and has a resistance temperature characteristic similar to a single NTC but with a region of constant resistance.



Overview (cont.)

Designed for driving automotive coolant temperature gauges, the composite sensor resistance is virtually constant over a specified range, which results in a steady centre dial gauge reading during normal engine operation. Hot and cold zone sensitivity is retained, so that motorists are warned of abnormal conditions. With careful selection of the plateau region, the same type of device can be used in a wide variety of operation systems, so that the production economics are compatible with the requirements of our automotive customers.

Composite Thermistors can be custom-designed to match the electrical and thermal characteristics of gauges and probe housings.