

RTDs VERSUS THERMOCOUPLES

APPLICATION NOTE

RTDs vs. Thermocouples — Sensor Comparison at a Glance

The following chart reveals the main differences between RTDs and Thermocouples.

Feature	RTD	Thermocouple
Accuracy	More Accurate	Less Accurate
Temperature Range	-200 to 600°C	-200 - 2000°C
Initial Cost	More Expensive	Less Expensive
Sensitivity	Many Available Lengths	Point Sensing Only
Response Time	1 to 7 Seconds	Less Than One Second
Robustness	Good	Excellent
Reference Junction	Not Required	Required
Long Term Stability	Excellent	Good, (subject to drift)
Output	Highly Linear Resistance .4 Ohm/ohm/°C	Voltage, 10-40 Microvolts/°C Approximately Linear
EMF Resistance	Less Susceptible	More Susceptible

RTDs

An RTD is a sensor whose resistance changes as its temperature changes. The resistance increases as the temperature of the sensor increases. The resistance vs temperature relationship is well known and is repeatable over time.

An RTD is a passive device. It does not produce an output on its own. External electronic devices are used to measure the resistance of the sensor by passing a small electrical current through the sensor to generate a voltage.

Thermocouples

A thermocouple is a device consisting of two different conductors (usually metal alloys) that produce a voltage proportional to a temperature difference between either ends of the pair of conductors. In contrast to most other methods of temperature measurement, thermocouples are self-powered and require no external form of excitation.

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Measurement Specialties, Inc.,
a TE Connectivity Company
1711 139th Lane NW
Andover, MN 55304
Tel +1 763 689 4870
Fax +1 763 689 5033
customercare.ando@te.com