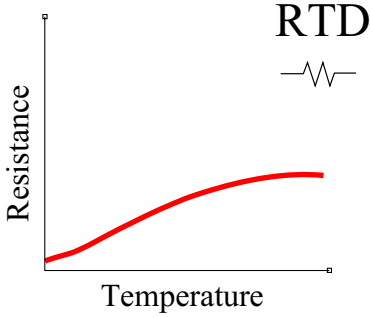
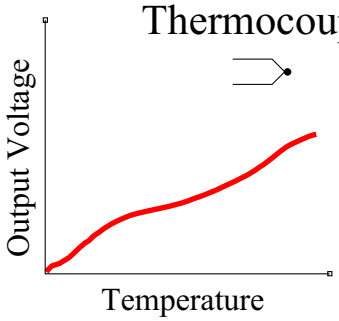
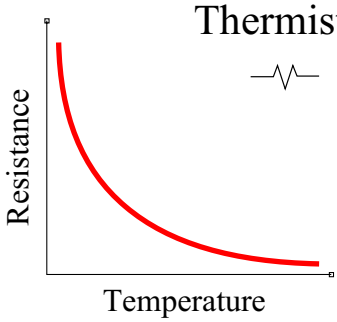
Temperature Sensors

RTD's • Thermocouples • Thermistors

General Comparisons

RTD	Thermocouple	Thermistor	
			Output Characteristics
• Most accurate • Best stability • Higher linearity • Best interchangeabilty • Wide temperature range	• Largest variety of styles • Self-powered • Rugged • Largest temperature range • Small size / fast response	• High resistance values • Large resistance change • Two wire ohms measurement • Low sensor cost • Small size / fast response	Advantages
• Current source required • Smaller resistance change • Low absolute resistance • Self heating • Higher sensor cost	• Lowest stability • Low voltage output • Nonlinear • Cold junction reference needed • Lowest sensitivity	• Limited temperature range • Current source required • Nonlinear • Self heating • Fragile	Disadvantages
-260 to 850°C	-200 to 1800°C	-80 to 300°C	Temperature Range

RTD

Resistance Temperature Detector's (RTD's) are constructed with a wire coil or a thin layer of metal to form a precision resistor. The resistance value changes very accurately and repeatedly in a positive direction when heated (Positive temperature coefficient). RTD assemblies can be used in a wide variety of configurations for all industries to give the highest accuracy of temperature measurement.

Thermocouple

Thermocouples are constructed of two dissimilar metals welded together to form a junction. When this junction is heated there is a thermoelectric potential (emf) created on the millivolt level. The heated junction when compared to a reference junction (same junction type at a known temperature, usually 0°C) has an output proportional to the difference in the two junctions temperatures.

Thermistor

Thermistors are constructed with metal oxides formed into a bead and encapsulated in epoxy or glass. The resistance of a Thermistor has a nonlinear large negative change as it is heated (Negative temperature coefficient). The change in resistance during a temperature change of a Thermistor is several times greater than an RTD making measurement easier, but the temperature range is limited.

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