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Temperature Sensor Comparison Guide

Temperature Sensor Attributes Criteria	Thermocouple	RTD	Thermistor
Temperature Range	Very wide -450°F +4200°F	Wide -400°F +1200°F	Narrow -100°F +500°F
Interchangeability	Good	Excellent	Poor to fair
Long-term Stability	Poor to fair	Good	Poor
Accuracy	Medium	High	Medium
Repeatability	Fair	Excellent	Fair to good
Sensitivity (output)	Low	Medium	Very high
Response	Medium to fast	Medium	Medium to fast
Linearity	Fair	Good	Poor
Self Heating	No	Very low to low	High
Point (end) Sensitive	Excellent	Fair	Good
Lead Effect	High	Medium	Low
Size/Packaging	Small to large	Medium to small	Small to medium

Temperature Sensor Advantages and Disadvantages

Sensor	Advantages	Disadvantages
Thermocouple	• No resistance lead wire problems • Fastest response • Simple, rugged • Inexpensive • High temperature operation • Point temperature sensing	• Non-linear • Low voltage • Least stable, repeatable • Least sensitive
RTD	• Most stable, accurate • Contamination resistant • More linear than thermocouple • Area temperature sensing • Most repeatable temperature measurement	• Current source required • Self-heating • Slow response time • Low sensitivity to small temperature changes
Thermistor	• High output, fast • Two-wire ohms measurement • Economical • Point temperature sensing	• Non-linear • Limited range • Fragile • Current source required • Self heating