

Sensor Quick Reference: Sensors

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Transducer or Probe	Temperature Sensitive Parameter	Contact Method	Remarks
Resistor	Electrical resistance or voltage at constant current	Direct contact	Usually calibrated against a thermocouple
Thermocouple	Open Circuit Voltage	Direct contact	Useful as a "point sensor"
Diode or Transistor	Voltage, usually with constant forward bias current	Direct contact	Usually employed to measure an active device or IC temperature
Infrared or Radiation	Detector Voltage	Line-of-site or optical contact	Yields a temperature map or image. Not strictly quantitative unless sample emittance is known at all image points
Fluorescent Detector	Detector Voltage	Direct contact (proximity)	Approximate point detector; contact resistance a problem
Liquid Crystal	Color	Direct contact	Yields a temperature map; semi-quantitative unless a detailed calibration is performed to quantify color vs. temperature relation

Sensor Quick Reference : Thermocouples

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Thermocouple Type	Material A	Material B	V Output (μV)	Norm. error; lim.+/- °C	Remarks
B	Platinum -30%, rhodium	Platinum -6%, rhodium	1	0	Not useful below 50°C; best for very high temperature measurements
E	Nickel-chromium alloy	A copper-nickel alloy	62	1.7	Well-suited for low temperature measurements
J	Iron	A different copper-nickel alloy	51	2.2	Iron P leg subject to variations in Seebeck coefficients from impurities
K	Nickel-aluminum alloy (Alumel)	Nickel-chromium alloy (Alumel)	40	2.2	Very popular for electronics cooling experiments
R	Platinum -13%, rhodium	Platinum	7	5	Very stable
S	Platinum -10% rhodium	Platinum	7	5	
T	Copper	Copper-nickel alloy	40	1	Copper leg could create a conduction path (fin) insurface temperature measurements