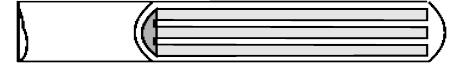


THERMOCOUPLE - JUNCTION STYLES

GROUNDING JUNCTION

The wires in the thermocouples are welded into the tip of the sheath material making it a junction . This junction has a faster response than an ungrounded junction. It is recommended for the measurement of static or flowing gas and liquid temperatures and for high pressure applications. It is the most commonly supplied junction type.



UNGROUNDING JUNCTION (Electrically Isolated)

In this type of thermocouple, the wires are insulated from the sheath with magnesium oxide powder (soft). This type of junction should be used where the thermocouple may come in contact with electrical lines or where the control system requires an ungrounded input. Applications are the same as for the grounded type, but response time is slower than the grounded junction.



EXPOSED JUNCTION

The thermocouple wires are completely exposed for fastest response time. The wires are completely exposed to the environment so that this type of junction should only be used in suitable environments. The sheath insulation is sealed at the factory, where the wires emerge, to prevent moisture or gas penetration of the magnesium oxide insulation. It is recommended for the measurement of static



THERMOCOUPLE - APPLICATION GUIDE

THERMOCOUPLE CALIBRATION APPLICATIONS

THERMO-COUPLE TYPE	TEMPERATURE RANGE	STANDARD	SPECIAL	APPLICATION INFORMATION
T	0-350°C(32-700°F)	±1° or ±0.75%	±0.5° or ±0.4%	Useable in oxidizing, reducing or inert atmospheres as well as vacuum. Not subject to corrosion in moist atmospheres. Limits of error published for sub-zero temperature ranges
J	0-750°C(32-1400°F)	±2.2° or ±0.75%	±1.1° or ±0.4%	Suitable for vacuum, reducing, or inert atmosphere, oxidizing atmosphere with reduced life. Iron oxidizes rapidly above 1000°F (538°C) so only heavy gauge wire is recommended for high temperature. Bare elements should not be exposed to sulphurous atmospheres above 1000°F (585°C)
K	0-1250°C(32-2300°F)	±2.2° or ±0.75%	±1.1° or ±0.4%	Recommended for continuous oxidizing or neutral atmospheres. Mostly used above 1000°F (538°C) Subject to failure if exposed to sulphur./ Preferential oxidation of chromium in positive leg at certain low oxygen concentrations causes "green rot" and large negative calibration drifts most serious in the 1500 - 1900°F(816-1038°C). Ventilation of or inert sealing of protection tube can prevent this.
R or S	0-1450°C(32-2700°F)	±1.5° or ±0.25%	±0.6° or ±0.1%	Recommended for continuous high temperatures. Must be protected with non-metallic protection tube and ceramic insulators. Confined high temperature usage causes grain growth which can lead to mechanical failure. Negative calibration drift caused by rhodium diffusion to pure leg as well as from rhodium volatilization. R Type R is used in industry, type S is used in laboratory.

THERMOCOUPLE - UPPER TEMPERATURE RECOMMENDED

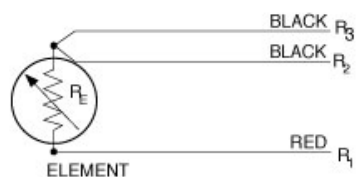
UPPER TEMPERATURE LIMITS

CALIBRATION	1/25"	1/16"	1/8"	3/16"	1/4"	5/16"	7/16"
J	900°F	1000°F	1000°F	1200°F	1200°F	1200°F	1200°F
T	300°F	400°F	400°F	700°F	700°F	700°F	700°F
K	1400°F	1800°F	1800°F	2000°F	2000°F	2000°F	2100°F
E	800°F	1000°F	1000°F	1000°F	1100°F	1200°F	1300°F

RTD TOLERANCE CHART AND WIRE CONFIGURATION

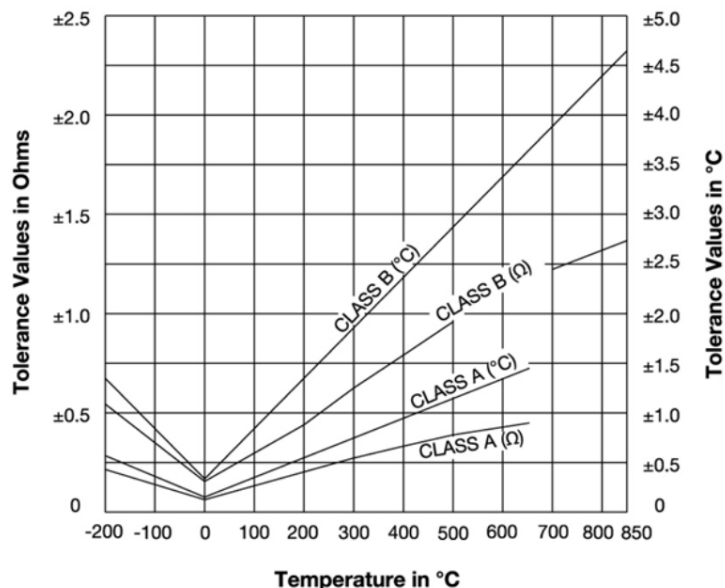
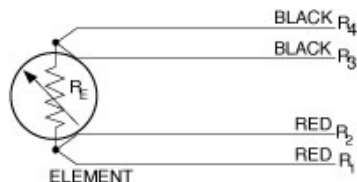
3 WIRE CONSTRUCTION

Lead configuration 3 provides one connection to one end and two to the other end of the sensor. Connected to an instrument designed to accept three wire input, compensation is achieved for lead resistance and temperature change in lead resistance. This is the most commonly used configuration



4 WIRE CONSTRUCTION

Lead configuration 4 provides two connections to each end of the sensor. This construction is used for measurement of the highest precision.



SHEATH MATERIAL TEMPERATURE LIMITS

MATERIAL RATINGS AND APPLICATIONS

ORDERING CODE	SHEATH MATERIAL	MAXIMUM TEMPERATURE	APPLICATION NOTES
S	Stainless Steel 304	1650°F	General purpose austenitic Stainless Steel. Subject to carbide precipitation in the 900 to 1600F range. Corrosion resistant in the annealed condition. Not affected by sterilizing solutions, foodstuffs, most dyestuffs, organic chemicals and mamny inorganic chemicals
S310	Stainless Steel 310	2100°F	Very high elevated temperature strength and scale resistance. Superior to 304 in many high temperature applications. Good resistance to carburizing and redicing environments. Subject to carbideprecipitation in the 900 to 1600F range
316	Stainless Steel 316	1650°F	Higher corrosion resistance than type 304. High creep strength. Withstands sulphuric acid compounds, resists tendency to pit in phosphoric and acetic acids. Subject to carbide precipitation in the 800 to 1500F range
I600	Inconel 600	2100°F	Good in severely corrosive environments at elevated temperatures. High hot-strength and resistance to progressive oxidation and fatigue. Non-magnetic. Use in sulfur free atmosphere.
I800	Inconel 800	2100°F	Good resistance to oxidation, carbinization and other harmful effects of high temperature exposure.