

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 faster response than an un-grounded junction. It is recommended for the measurement of static or flowing gas and liquid temperatures and for high pressure applications. It's most commonly supplied junction type.



UN - GROUNDED JUNCTION

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 or flowing non-corrosive gas temperatures where fast response time is required.



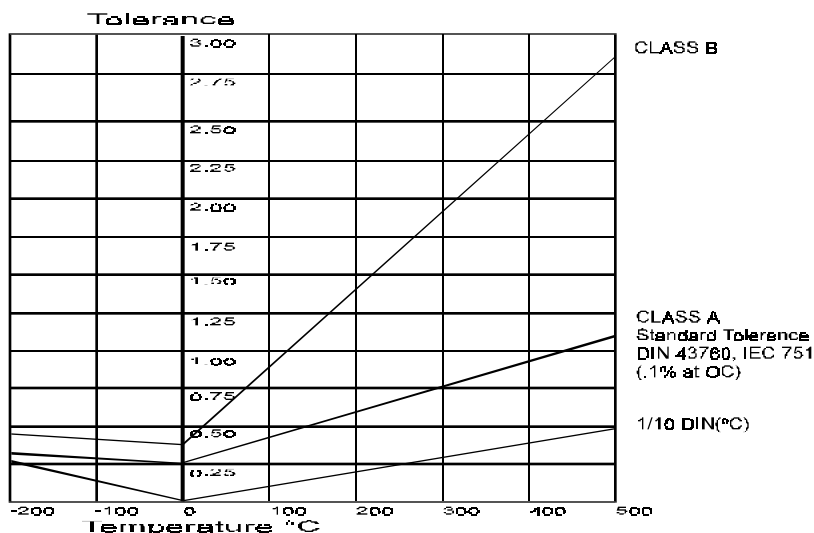
THERMOCOUPLE APPLICATION GUIDE AND ERROR CHARTS

Limits Of Error					
Thermocouple Type	Temperature Range		Standard	Special	Application Information
	°C	°F	°C (whichever is greater)	°C (whichever is greater)	
T	0 to 350	32 to 700	-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 to 750	32 to 1400	-2.2 or -0.75%	-1.1 or 0.4%	Suitable for vacuum, reducing, or inert atmospheres, 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 to 1250	32 to 2300	-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 range (816 - 1038°C). Ventilation or inert-sealing of the protection tube can prevent this.
R or S	0 to 1450	32 to 2700	-1.5 or -0.25%	-0.6 or 0.1%	Recommended for high temperature. Must be protected with non-metallic protection tube and ceramic insulators. Continued high temperature usages 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. Type R is used in industry; type S in the laboratory.

UPPER TEMPERATURE RECOMMENDED

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

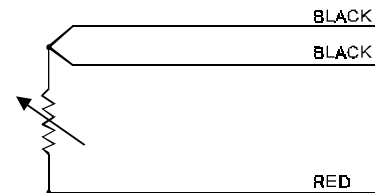


RTD WIRE CONFIGURATION

3 WIRE CONSTRUCTION

ELEMENT

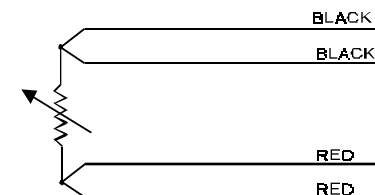
Lead configuration 3 provides one connection to one end and two to the other end of the sensor. Connected to an instrument designed to accept three wire input, compensation is achieved for lead resistance and temperature change in lead resistance. This is the most commonly used configuration



4 WIRE CONSTRUCTION

ELEMENT

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

Ordering Code	Sheath Material	Maximum Temp. (const. service. air)	Application Notes
S	Stainless Steel 304	1650° F	General purpose austenitic Stainless Steel. Subject to carbide precipitation in the 800 to 1600° F range. Corrosion resistant in the annealed condition. Not affected by sterilizing solutions, foodstuffs, most dyestuffs, organic chemicals and many 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 reducing environments. Subject to carbide precipitation in the 800 to 1600° F 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 1500° F range.
1600	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.
1800	INCLOY® 800	2100° F	Good resistance to oxidation, carburization and other harmful effects of high temperature exposure.

* International Nickel Co., Inc. registered trademark

DIE CAST ALUMINIUM (AL)

FEATURES:

Material : Die Cast Aluminium

Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Good corrosion resistance
- Light weight
- Bayonet cover readily removed without tools
- Moisture and dust-resistant



FDA COMPLAINT PLASTIC-SCREW TOP (FDA)

FEATURES:

Material : Polypropylene

Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Good protection against dust rain, splashing water
- Good resistance to most acid solutions, alkalines & salt water
- Light weight



CAST IRON (I)

FEATURES:

Material : Cast Iron

Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Rugged construction
- Screw cover with inside thread



FDA COMPLIANT PLASTIC HINGED-FLIP TOP (FDAF)

FEATURES:

Material : FDA White Polypropylene

Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Flip-Flop Design for easy Access & Closure
- Hinges Pins and Latches of Stainless Steel
- Silicon Gasket, Temperature Rated to 600°F
- Provision for Security Tags
- Nema 4X rated



CAST ALUMINIUM EXPLOSION RESISTANT (ALE)

FEATURES:

Material : Cast Aluminium

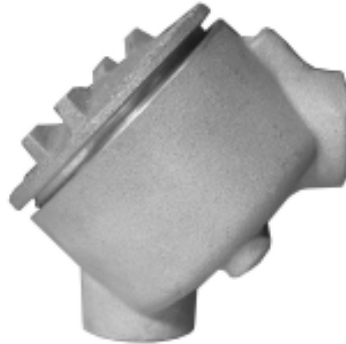
Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Explosion resistant head for 2-wire transmitter
- Rated for :
 - Class I, Groups B, C, D, E, F, G
 - Class II, Groups B, C, D, E, F, G
- Screw cover with inside thread
- Moisture and dust-resistant



EPOXY COATED ALUMINIUM (E)

FEATURES:

Material : Epoxy Coated Aluminium

Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Good corrosion resistance
- Light weight
- Bayonet cover readily removed without tools
- Easy accessibility to terminal block
- Moisture and dust-resistant



WIRE INSULATION RATING GUIDE

Insulation Material	Maximum Continuous Temperature	Abrasion Resistance	Chemical Resistance
Fibrous Insulation			
FG - Fiberglass	950°F	Good	Good
FH - Filaflex	1400°F	Good	Good
Plastic Insulations			
T - Teflon* FEP	400°F	Excellent	Excellent
K - Kapton*	300°F	Good	Excellent
P - PVC	221°F	Very Good	Excellent

PLASTIC HEAD (PL)

FEATURES:

Material : Delrin

Protection : 1/2" NPT

Tube Entry

Extension : 3/4" NPT

Wire Entry

- Light weight
- Easy accessibility to terminal block
- Moisture and dust resistant
- Good resistance to most acid solutions, alkaline & salt water

