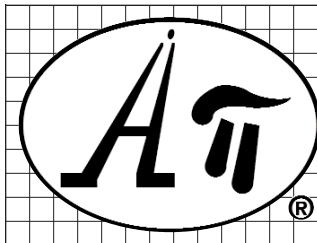


- **General Info**
- **Temperature**
- **Pressure**
- **Flow**
- **Speed**
- **Weighing**
- **Process**



**Absolute Process Instruments, Inc.**  
 Manufacturer of Quality Signal Conditioners Transmitters & Isolators

# Application Notes

## Common Thermocouple Sensors

Type	Polarity & Material	Wire ID Properties	Wire Color	Practical Temp Range	Outer Insulation	Limits of Error
<b>J</b>	+ Iron	Very magnetic	White	32 to 1336°F	Black (Ext. grade)	±4°F or 0.8% of rdg
	- Constantan		Red	0 to 724°C	Brown (T/C grade)	±2°F or 0.4% rdg
<b>K</b>	+ Chromel		Yellow	32 to 2282°F	Yellow (Ext. grade)	±4°F or 0.8% of rdg
	- Alumel	Slightly magnetic	Red	0 to 1250°C	Brown (T/C grade)	±2°F or 0.4% rdg
<b>N</b>	+ NICROSIL	Greater stiffness	Orange	32 to 2282°F	Orange (Ext. grade)	±4°F or ±0.8% of rdg
	- NISIL		Red	0 to 1250°C	Brown (T/C grade)	±2°F or ±0.4% of rdg
<b>T</b>	+ Copper	Copper color	Blue	-299 to 700°F	Blue (Ext. grade)	±1.5°F or 0.8% of rdg, ±1% rdg <32°F
	- Constantan		Red	-184 to 371°C	Brown (T/C grade)	±0.9°F or 0.4% rdg, ±0.8% rdg <32°F
<b>E</b>	+ Chromel	Greater stiffness	Purple	32 to 1652°F	Purple (Ext. grade)	±3°F or 0.5% rdg
	- Constantan		Red	0 to 900°C	Brown (T/C grade)	±1.8°F or 0.4% rdg
<b>R</b>	+ Pt 13%Rh	Greater stiffness	Black	32 to 2700°F	Green (Ext. grade)	±5°F or ±0.5% of rdg
	- Platinum		Red	0 to 1482°C	Green (T/C grade)	±2.5°F or ±0.25% of rdg
<b>S</b>	+ Pt 10%Rh	Greater stiffness	Black	32 to 2700°F	Green (Ext. grade)	±5°F or ±0.5% of rdg
	- Platinum		Red	0 to 1482°C	Green (T/C grade)	±2.5°F or ±0.25% of rdg

Extend thermocouples up to 2000 feet or 100 Ohms maximum resistance.  
 Extension wire must be the same type as the thermocouple.

Atmosphere for exposed junction

- Type **J** Reducing
- Type **K** or **N** Clean oxidizing
- Type **T** Mildly oxidizing and reducing or with moisture
- Type **E** Vacuum, inert mildly oxidizing or reducing
- Type **R** or **S** Resists oxidation and corrosion, but contaminated by hydrogen, carbon, and metal vapors

### TEMPERATURE CONVERSION

$$^{\circ}\text{F} = (^{\circ}\text{C} \times 9/5) + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5/9$$



**FREE APPLICATION ASSISTANCE**

Call Customer Service

**800-942-0315**