

## **THERMOCOUPLE**

### **GENERAL INFO AND TOOLS**




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### Thermocouple Temperature Ranges

 <b>J</b> IRON/CONSTANTAN + -	<b>TEMPERATURE RANGE</b> <b>0°C to 750°C</b> (32°F to 1382°F)	<b>STANDARD ERROR LIMITS</b> +/- 2.2°C or 0.75%	<b>SPECIAL ERROR LIMITS</b> +/- 1.1°C or 0.4%
 <b>K</b> CHROMEL/ALUMEL + -	<b>TEMPERATURE RANGE</b> <b>0°C to 1204°C</b> (32°F to 2200°F)	<b>STANDARD ERROR LIMITS</b> +/- 2.2°C or 0.75%	<b>SPECIAL ERROR LIMITS</b> +/- 1.1°C or 0.4%
 <b>T</b> COPPER/CONSTANTAN + -	<b>TEMPERATURE RANGE</b> <b>-128°C to 350°C</b> (-200°F to 662°F)	<b>STANDARD ERROR LIMITS</b> +/- 1.0°C or 0.75%	<b>SPECIAL ERROR LIMITS</b> +/- 0.5°C or 0.4%

### Insulation Temperature Ranges

Type of Insulation	Max Continuous Temp	Max Single Reading	Abrasion Resistance	Moisture Resistance	Chemical Resistance
Polyvinyl/ Nylon	105°C/221°F	120°C/248°F	Excellent	Excellent	Good
Polyvinyl	105°C/221°F	105°C/221°F	Good	Excellent	Good
Nylon	150°C/302°F	130°C/266°F	Excellent	Good	Good
PVC	105°C/221°F	105°C/221°F	Good	Excellent	Good
FEP	204°C/400°F	260°C/500°F	Excellent	Excellent	Excellent
Kapton®	316°C/600°F	427°C/800°F	Excellent	Excellent	Excellent
PFA	260°C/500°F	290°C/550°F	Excellent	Excellent	Excellent

Temperature ratings for insulations may vary based on what the overall thermocouple construction cable consists of.



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## Extension Cable Types

**COILED CABLE** - Flexible and compact, the coiled cable comes standard with a molded mini-connector and measures 5 feet when fully extended. Coiled cables can withstand up to 200°F (93°C).



**PVC** - This Polyvinyl Chloride offers great protection against moisture and corrosion and is able to withstand up to 200°F (93.3°C).



**FEP** - This fluoropolymer offers great corrosion and moisture resistance along with the ability to withstand up to 400°F (200°C). Add stainless steel overbraid for additional abrasion protection.



**FIBERGLASS** - Able to withstand temperatures up to 900°F (482°C). This insulation is ideal for a wide range of temperature requirements. It is not recommended for use in applications where moisture may be present. Add stainless steel overbraid for additional abrasion protection.



## Insulation Types

**FEP** : Fluorinated Ethylene Propylene (FEP) is resistant against corrosion and moisture with the ability to withstand up to 400°F (200°C). Add stainless steel overbraid for additional abrasion protection in harsh environments.

FEP INSULATION



FEP INSULATION WITH SS OVERBRAID



**Fiberglass** : Ideal for general use and able to see temperatures up to 900°F (482°C). It is not recommended in application where moisture may be present. Add stainless steel overbraid for additional abrasion protection in harsh environments.

FIBERGLASS INSULATION



FIBERGLASS INSULATION WITH SS OVERBRAID



**Kapton** : Light weight insulation with the ability to withstand up to 600°F (343°C). Add stainless steel overbraid for additional abrasion protection in harsh environments.

KAPTON INSULATION



KAPTON INSULATION WITH SS OVERBRAID



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## Element Types

### SINGLE ELEMENT



Single Elements read temperature from one junction point at the tip of the probe.

### DUAL ELEMENT



Dual Elements read temperature from two junction points at the tip of the probe.

## Junction Types



**GROUNDING JUNCTION:** These junctions are physically connected to the tip of the outer metal sheath. This produces faster response times but may cause less accurate readings.



**UNGROUNDING JUNCTION:** These junctions are isolated from the outer metal sheath. This junction type provides a more accurate reading but may produce slightly slower response times.










**EXPOSED JUNCTION:** These junctions are the fastest possible response time method. Keep in mind this method leaves the junction exposed to outside elements.



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### Probe Shaft Types

<b>GENERAL PURPOSE SST SHEATH</b>  <b>PENETRATION SST SHEATH</b> 	Designed for use with foods, liquids, gases and semi-solid materials depending on your application. 316 Stainless Steel can reach a maximum temperature of 1650°F (900°C).
<b>SST REDUCED TIP .156" TO .093"</b>  <b>SST REDUCED TIP .250" TO .125"</b> 	This shaft design creates a more rugged probe that narrows down at the last 1/2" of the tip. This allows for faster response times that won't act as a heat sink. 316 Stainless Steel can reach a maximum temperature of 1650°F (900°C).
<b>GENERAL PURPOSE INCONEL SHEATH</b>  <b>PENETRATION INCONEL SHEATH</b> 	Designed for use with liquids, gases, and semi-solid materials depending on your application. Inconel 600 is resistant against corrosion and can reach a maximum temperature of 2150°F (1175°C).
<b>PFA COATED SHEATH</b> 	PFA acts as a cover for the sheath material. This protects against corrosive environments such as chemicals and acids. PFA can reach a maximum temperature of 400°F (204°C).

### Handle Types

#### ABS PLASTIC HANDLE



Light weight and economical, ABS Plastic Handles can withstand up to 220°F (104°C).

#### SST HANDLE



With a durable and rugged design, 316 Stainless Steel Handles can withstand up to 450°F (232°C).

#### TRANSITION FITTING WITH SPRING



Made from 304 Stainless Steel, the transition fitting with spring can withstand up to 450°F (232°C).



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## Connection Head Types

**ALUMINUM  
CONNECTING HEAD**



**STAINLESS STEEL  
CONNECTING HEAD**



**CAST IRON  
CONNECTING HEAD**



Connection thermocouple heads are designed to provide easy access to the sensor and the instrument wiring. This also provides protection from the surrounding environment.

All Connecting Heads come with a TB style ceramic terminal block. These blocks come with a center hole for spring loaded assemblies or without. All Heads have a ½" NPT process and ½" conduit size.

All our Connecting Heads are NEMA 4X.

## Flex Armor Types

**SST FLEX ARMOR**



Provides added protection to wire while still allowing it to flex and bend.

Please keep in mind Flex Armor is not water tight.

**FEP INSULATION OVER  
SST FLEX ARMOR**



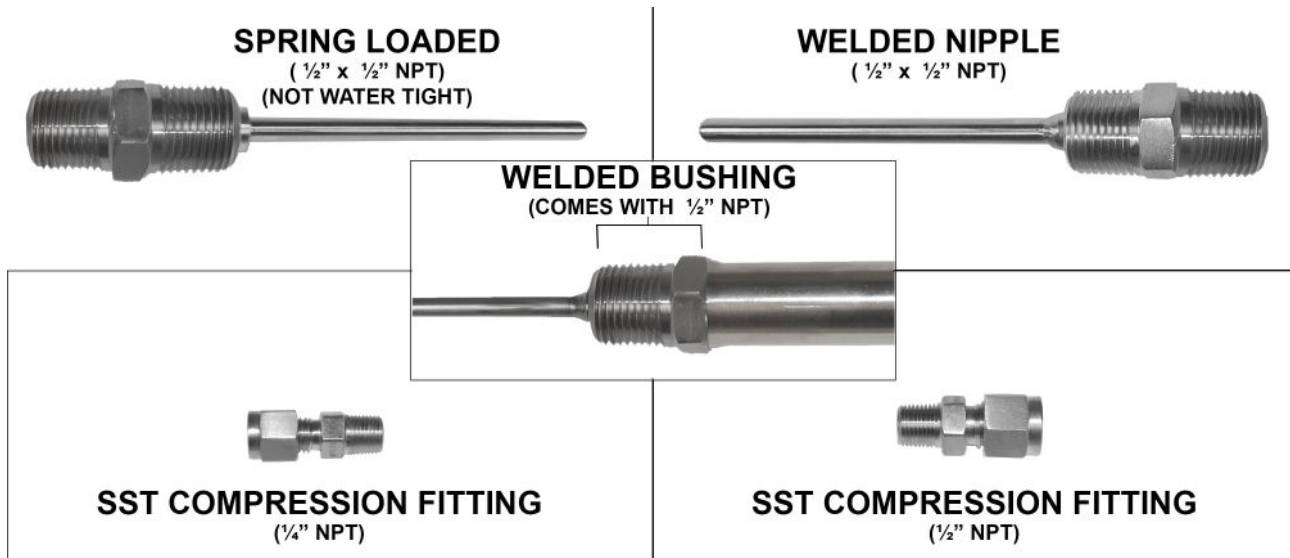
Provides added protection to wire while still allowing it to flex and bend.

FEP insulation will protect against corrosive chemicals and acids.



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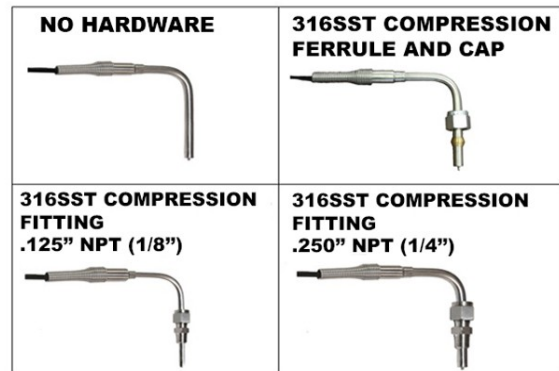
## Industrial Hardware Types



## EGT Hardware Types

Choose the best method to install your EGT. Compression fittings allow you to adjust the depth of the probe into your system. All compression fittings are made from 316SST (Stainless Steel) and include dual ferrules.

If you already have a system in place then the nut and ferrule option may be all you need.


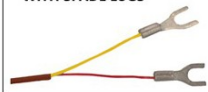






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## Terminal Types

This option allows you to choose which connection method is best suited for your meter, data logger, or other device.

Each connector is ANSI color coded  
| Type J - Black | Type K - Yellow | Type T - Blue |  
for easy identification.

<b>STRIP WIRE</b> 	<b>STRIP WIRE WITH SPADE LUGS</b> 
<b>STANDARD PLUG (ROUND PINS)</b> 	<b>STANDARD JACK (ROUND PINS)</b> 
<b>MINI PLUG (FLAT PINS)</b> 	<b>MINI JACK (FLAT PINS)</b> 



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