

Thermocouple Wire



A Thermocouple is a temperature measuring device consisting of two conductors of dissimilar metals or alloys that are connected only at the ends. When the ends are at different temperatures a small voltage is produced in the wire that can be related directly to the temperature difference between the ends. If the temperature at one end is known, the temperature at the other end can be determined.

Thermocouple wire or extension grade wire is recommended to be used to connect thermocouples to the sensing or control instrumentation. The conditions of measurement determine the type of thermocouple wire and insulation to be used. Temperature range, environment, insulation requirements, response, and service life should be considered.

Calibration Type Characteristics

Type J (Iron vs Constantan(TM)) is used in vacuum, oxidizing, inert or reducing atmospheres. Iron element oxidizes rapidly at temperatures exceeding 1000°F (538°C), and therefore heavier gauge wire is recommended for longer life at these temperatures.

Type K (CHROMEL®* vs ALUMEL®*) is used in oxidizing, inert or dry reducing atmospheres. Exposure to vacuum limited to short time periods. Must be protected from sulfurous and marginally oxidizing atmospheres. Reliable and accurate at high temperatures.

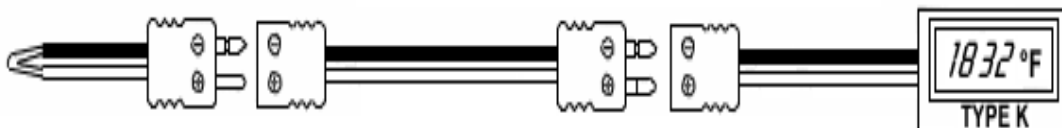
Type T (Copper vs Constantan(TM)) is used for service in oxidizing, inert or reducing atmospheres or in vacuum. It is highly resistant to corrosion from atmospheric moisture and condensation and exhibits high stability at low temperatures; it is the only type with limits of error guaranteed for cryogenic temperatures.

Type N (Nicrosil(TM) vs Nisil(TM)) is used in oxidizing, inert or dry reducing atmospheres. Must be protected from sulfurous atmospheres. Very reliable and accurate at high temperatures.

Thermocouple wire can be fabricated into an accurate and dependable thermocouple by joining the thermoelements at the sensing end.

Thermocouple wire or thermocouple extension wire of the same type must be used to extend thermocouples to indicating or control instrumentation. RED color code is negative throughout circuit.

Hook-up Red Colo Coded wire to negative terminal of instrument.



Temperature limit of the thermocouple depends on the thermocouple wire: wire size; wire insulation; and environmental factors.

Use thermocouple connectors if required, they are made of the same alloys and have the same color codes as extension wire. (Except Hi-Temp connectors are all colored red regardless of T/C type.) PMC thermocouple connectors are molded from strong, non-melting, glass filled thermocouple compounds.

Thermocouple Wire

Thermocouple wire is used to manufacture thermocouples. Their use & applications are so varied that it is not possible to list all available options here.

Insulation Material	“J”	“K”	“T”	“N”	“R”
Teflon/Teflon	J-PTFE 7/0.2	K-PTFE 7/0.2	T-PTFE 7/0.2		
PVC/PVC	J-G 7/0.2	K-G 7/0.2	T-G 7/0.2		
Fibreglass/ Fibreglass	J-H 7/0.2	K-H 7/0.2		N-H 7/0.2	R-H 7/0.2
Fibreglass/ Fibreglass +Stainless Steel Overbraid	J-H SOS 7/0.2	K-H SOS 7/0.2		N-H SOS 7/0.2	R-H SOS 7/0.2
MIMS	Various sizes from 1.5mm to 10.8mm	Various sizes from 1.5mm to 10.8mm	Various sizes from 1.5mm to 10.8mm	Various sizes from 1.5mm to 10.8mm	

Thermocouple Extension Wire

Insulation Material	“Jx”	“Kx”	“Tx”	“Nx”	“Rx”
Teflon/Teflon	Jx-PTFE 7/0.2	Kx-PTFE 7/0.2	Tx-PTFE 7/0.2		
PVC/PVC	Jx-G 7/0.2	Kx-G 7/0.2	Tx-G 7/0.2		
PVC/PVC Screened	Jx-G AIS 0.81	Kx-G AIS 0.81	Tx-G AIS 0.81		
Fibreglass/ Fibreglass	Jx-H 7/0.2	Kx-H 7/0.2		Nx-H 7/0.2	Rx-H 7/0.2
Fibreglass/ Fibreglass +Stainless Steel Overbraid	Jx-H SOS 7/0.2	Kx-H SOS 7/0.2		Nx-H SOS 7/0.2	Rx-H SOS 7/0.2

Thermocouple Extension/Compensation wire is used to link thermocouples to instruments. Their use & applications are so varied that it is not possible to list all available options here.

Thermocouple Colour Chart

	International	American	German	British	French	Japanese
B						
C						
D						
E						
G						
J						
K						
N						
R						
S						
T						

In some cases the outer insulation colour differs between measurement and extension grade wires. The radical differences between national standards will be noted.