

REACH ELECTRICAL (S) PTE LTD

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Company's Reg. No. : 199004352W G.S.T Reg. No. M2-0095215-4



Cert. No.: SG02/00221

THERMOCOUPLE SENSOR

What Is A Thermocouple

Thermocouples are very simple and durable temperature sensors. They are comprised of two different materials joined at one end and separated at the other. The separated ends are considered the output, and they generate voltage in proportional to the heat they are measuring or monitoring. That is, the hotter the temperature, the higher the voltage. The fact that two metals generate voltage is known as the See-beck effect.



Thermocouple Technical Reference Data

Thermocouples are temperature sensors suitable for use with any make of instrument designed or programmed for use with the same type of thermocouple. Thermocouples are based on the principle that when two dissimilar metals are joined a predictable voltage will be generated that relates to the difference in temperature between the measuring junction and the reference junction (connection to the measuring device). The selection of the optimum thermocouple type (metals used in their construction) is based on application temperature, atmosphere, require length of service, accuracy and cost. When a replacement thermocouple is required, it is of the utmost importance that the type of thermocouple type used in the replacement matches that of the measuring instrument. Different thermocouple types have very different voltage output curves. It is also required that thermocouple or thermocouple extension wire, of the proper type, be used all the way from the sensing element to the measuring element. Large errors can develop if this practice is not followed.

Wire Size Of Thermocouple

Selecting the wire size used in the thermocouple sensor depends upon the application. Generally, when longer life is required for the higher temperatures, the larger size wires should be chosen. When sensitivity is the prime concern, the smaller sizes should be used.

Length Of Thermocouple Probe

Since the effect of conduction of heat from the hot end of the thermocouple must be minimized, the thermocouple probe must have sufficient length. Unless there is sufficient immersion, readings will be low. It is suggested the thermocouple be immersed for a minimum distance equivalent to four times the outside diameter of a protection tube or well.

Location Of Thermocouple

Thermocouples should always be in a position to have a definite temperature relationship to the workload. Usually, the thermocouple should be located between the workload and the heat source and be located approximately 1/3 the distance from the work load to the heat source.

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TYPES OF THERMOCOUPLE

Thermocouple Type	Names of Materials	Useful Application Range
T	Copper (+) Constantan (-)	-328°F - 662°F -200°C - 350°C
E	Chromel (+) Constantan (-)	-328°F - 1652°F -200°C - 900°C
J	Iron (+) Constantan (-)	32°F - 1382°F 0° - 750°C
K	Chromel (+) Alumel (-)	-4°F - 2282°F -20°C - 1250°C
N	Nicrosil (+) Nisil (-)	32°F - 2372°F 0°C - 1300°C
R	Platinum 13% Rhodium (+) Platinum (-)	32°F - 2912°F 0°C - 1600°C
S	Platinum 10% Rhodium (+) Platinum (-)	32°F - 2912°F 0°C - 1600°C
B	Platinum 30% Rhodium (+) Platinum 6% Rhodium (-)	32 - 3029°F 0 - 1700°C

