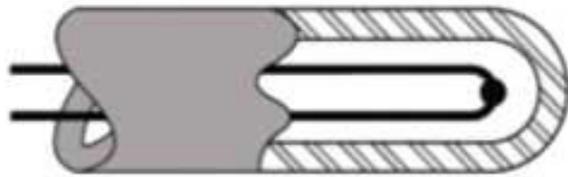
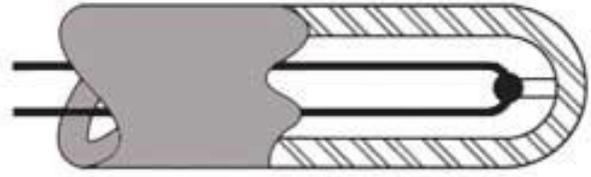


There are three types of thermocouple hot ends: grounded, non-grounded, and **grounded thermocouple**. Which structure to choose? It needs to be decided according to the site situation, but the non-grounded type is more widely used in the market. The grounded type is connected to the front end of the protection tube of the temperature measurement contact; it responds quickly, but is easily affected by interference.

**grounded thermocouple** structure



Ungrounded



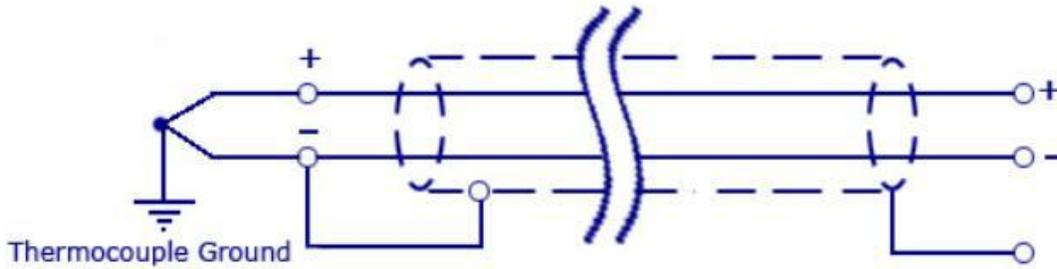
Grounded



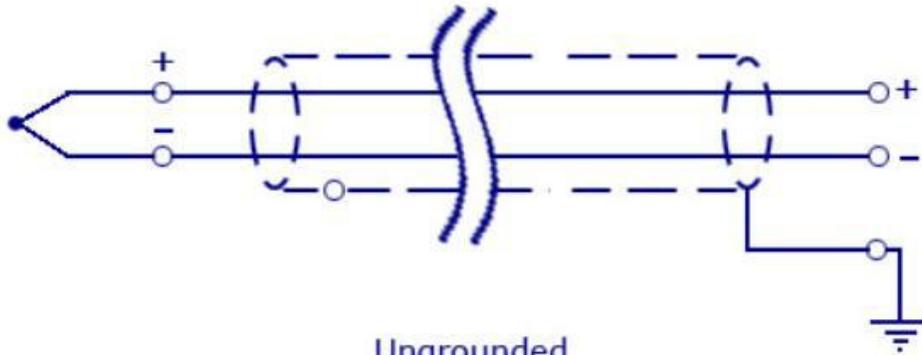
Exposed

## Thermocouple Junctions

grounded thermocouple systems used with DCS are shown below.



Grounded



Ungrounded

**grounded thermocouple** is the shell type, the working end is welded to the top of the protection tube, so it is connected to the shell, and it is also connected to the equipment shell, so it is called the grounding type. The grounding type thermal lag time constant is small, and the response speed is fast. The insulated working end does not touch the protection tube and has certain insulation requirements. The time constant during measurement should be greater than that of the grounded type, and the response sensitivity is lower than that of the grounded type. There is no strict difference between the usage and requirements of the secondary instrument. If you consider the impact of equipment leakage on the meter, the meter needs to be grounded strictly. From a safety point of view, try to use insulated sensors. Unless the measurement sensitivity is very high, especially the fast response temperature is required, use the grounding type.

Comparison of grounded and non-grounded thermocouples:

1. Non-grounded internal structure: insulation between protective sleeve and thermocouple  
Benefits: The temperature measuring contact and the protection tube are completely insulated; the response is worse than the grounding type, but it is not easily affected by interference; this type is usually used.
2. Grounding type internal structure: conduction between protective sleeve and thermocouple  
Benefits: The **grounding type thermocouple** is connected to the front end of the protection tube of the temperature measurement contact; it responds quickly, but it is easily affected by interference; it is a high-yield, low-cost type.