



What precaution should we use when installing extension wire between a thermocouple and a thermocouple transmitter?



We recommend following the practice below:

1. Select the installation route which makes the length of extension wires as short as possible. For long transmission, install the transmitter near the thermocouple and transmit its current output over common copper wires.
2. Install extension wires at the place whose temperature is normal and relatively stable.
3. Avoid connection joints of extension wires as much as possible. When connecting them at a terminal block, you should use the terminal of the metal of the thermocouple or the extension wires, if available.
4. Install extension wires away from noise sources such as AC power transformers and electric motors.
5. Use twisted extension wires with a shield. Preferably install the wires in a steel conduit.
6. Make sure to connect the shield wire to the earth-ground only at one point, probably at the control room.

Follow the national and local electric codes for safety.

Extension wires which are widely used have the temperature-emf characteristic similar to those of thermocouples in a limited temperature range, especially in environmental temperature. Place the thermocouple junction box (=the compensation junction) at the area where it is near normal ambient temperature and relatively stable. Then use a thermocouple that is long enough to adequately reach the junction box connecting the extension wire.

The reason to avoid connections of extension wires as much as possible is to reduce the likelihood of increasing the measurement error. At the connections, electric resistance may increase; different metal, for example, solder, is inserted in the circuit.

The thermocouple emf is as low as 10mV, or less in some applications. Noise induction from AC power circuits reduces the signal-to-noise ratio of the emf, possibly increasing measurement error. Therefore the extension wires should be installed away from electric noise sources.

The shield wire should be earth-grounded at one point. This eliminates noise current generated by the difference in the ground potentials (ground-loops). ■