



Installation, Operating, and Maintenance Instructions Thermocouple and RTD Assemblies

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Thermowell Use

The use of a thermowell is recommended for any pressurized application. The thermowell prevents damage to the sensor element, and also allows removal of the element without spilling process fluid.

Install thermowell into the process so a tight, non-leaking fit is achieved.

Coat the sensor element stem with a suitable heat transfer compound (e.g. A mixture of graphite and glycerin or petrolatum). Heat transfer compound is available.

NOTE: Above 350°F, some smoking of the heat transfer compound may occur as the liquid portion of the compound vaporizes, leaving dry graphite to perform the heat transfer function.

After coating the element stem, install the sensor element. The pipe threads on the element do not have to be sealed.

Thermocouple Instructions

Installation

1. Insert thermocouple into the thermowell. When inserting a spring-loaded stem, positive contact with the bottom of the well will be achieved. Make sure wires in connection head do not twist during insertion. If wires start to twist, disconnect the wires from the terminals and re-connect after screwing sensor into the thermowell.
2. Thermocouple wire of the same type as the sensor must be used to hook the thermocouple up to its instrumentation. Make sure the wire ends are clean and provide good electrical contact with the terminals.
3. When hooking up the extension wire, match up wires so the same colors are connected. (Thermocouple wire is color coded – the negative leg is always red, and the positive leg varies, e.g. type K = yellow; J= white; E = purple; T = blue)
4. Install the thermocouple and extension wire at least one foot away from AC power lines for best results. Do not run thermocouple wires in conduit with other wires.
5. The thermocouple connection head should not exceed 400 deg. F, and best results are obtained when the head is as near as possible to room temperature.
6. Insertion: Proper insertion depth insures best accuracy. For best results, minimum insertion of ten times the stem diameter into the process is recommended.

Maintenance

1. Calibration frequency: Thermocouple calibration will gradually deteriorate at a rate that varies with different applications. The frequency of calibration must be determined in each case by the user.
2. Calibration is achieved by comparing thermocouple output with a working standard. It is preferred to calibrate the thermocouple in its installed position. If the sensor is removed for calibration, the thermocouple should be returned to the same location and immersion depth for greatest reliability.
3. Periodically check the thermowell surface and the sensor sheath for corrosion or damage. If damage has occurred, replacement may be considered.
4. Moisture can cause corrosion and decalibration in some thermocouple wire (for instance, the positive leg of a J thermocouple is iron, and will readily rust). Take care to prevent moisture buildup at thermocouple wire terminals.

RTD Instructions

Installation

1. Insert sensor into the thermowell. When inserting a spring-loaded stem, positive contact with the bottom of the well will be achieved. Make sure wires in the connection head do not twist during insertion. If wires start to twist, disconnect the wires from the terminals and re-connect after screwing assembly into the thermowell.
2. Hook up RTD with clean copper wire. To ensure good calibration, all hookup wires should be the same gauge and the same length. Connect wires at terminals in connection head. The two sides of the RTD will have different color wires; same color wires are common legs.
3. Insertion: Proper insertion depth insures best accuracy. For best results, minimum insertion of ten times the stem diameter into the process is recommended.

Maintenance

1. Calibration frequency depends on a variety of factors including temperature cycling, vibration, and shock. The frequency of calibration must be determined in each case by the user.
2. Calibration is achieved by comparing RTD resistance with a working standard. It is preferred to calibrate the RTD in its installed position. If the sensor is removed for calibration, it should be returned to the same location and immersion depth for greatest reliability.
3. Periodically check the sensor sheath or the thermowell surface for corrosion or damage. If damage has occurred, replacement may be considered.

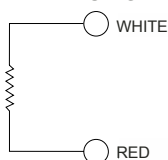
RTD Wiring Connections

Two-Wire: Provides one connection to each end of the element. This construction is suitable where the resistance of the lead wire may be considered as an additive constant in the circuit, and particularly where the changes in lead resistance due to ambient temperature changes may be ignored. Two-wire RTD instrumentation is very rare and mostly obsolete.

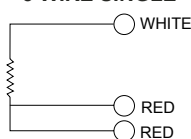
Three-Wire: Provides one connection to one end of the element and two to the other end of the element. Connected to an instrument designed to accept three wire input, sufficient compensation is usually achieved for leadwire resistance and temperature change in leadwire resistance. This is the most commonly used configuration.

Four-Wire: Provides two connections to each end of the element to completely compensate for leadwire resistance and temperature change in leadwire. Connected to an instrument designed to accept four-wire input, this configuration is used where highly accurate temperature measurement is vital.

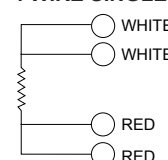
2 WIRE SINGLE



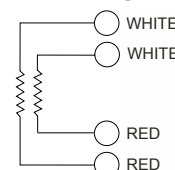
3 WIRE SINGLE



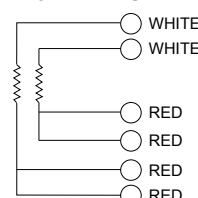
4 WIRE SINGLE



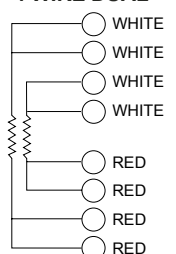
2 WIRE DUAL



3 WIRE DUAL



4 WIRE DUAL



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