

THERMOCOUPLE OPERATION AND INSTALLATION INSTRUCTIONS

Thermocouples are installed by means of compression fittings, welded 1/2" x 1/2" NPT fittings, or bayonet fittings.

Follow these instructions for installation of a thermocouple with a 1/2" x 1/2" NPT fitting:

- (1) Insert thermocouple into process hole
- (2) Tighten probe into place by turning probe into threaded connection.

When installing a spring-loaded or beaded sensor, the wires should be disconnected from the terminal block to prevent twisting, breaking and/or shorting during installation. Beaded sensors should be installed loose inside protection tubes with their junctions offset one probe diameter from bottoming out. Spring loaded probes should never be installed in ceramic protection tubes!

INSTALLATION:

Place thermocouple in area not too close to heating element or direct flame.

When measuring very high temperatures, install thermocouple vertically, if possible, to avoid protection tube element sagging. Insert ceramic protection tubes into "Hot" processes at a rate of 1 inch per minute to prevent breakage from thermal shock.

Always use thermocouple extension wire to correlate with calibration of thermocouple and instrumentation being used.

Install thermocouple away from AC power lines, preferably more than one foot away.

Do not run thermocouple wires in the same conduit with other electrical wires.

Apply lacquer or silicon resin to screws to prevent effects of vibration and oxidation.

ELECTRICAL:

Make sure the extension wire is clean so a good electrical connection will result at the terminal block. Connect the positive extension wire to the positive thermocouple wire and the negative extension wire to the negative thermocouple wire. Wires are color coded for identification as follows, notice that the negative leg is always red.

	THERMOCOUPLE TYPE			EXTENSION WIRES		
	POS.	NEG.	OUTER JACKET	POS.	NEG*	OUTER JACKET
E	purple	red	brown	purple	red	purple
J	white	red	brown	white	red	black
K	yellow	red	brown	yellow	red	yellow
R	N/A	N/A	N/A	black	red	green
S	N/A	N/A	N/A	black	red	green
T	blue	red	brown	blue	red	blue
N	orange	red	brown	orange	red	orange

See Page 1-9 for IEC color codes for primary conductor and color codes. The outer jacket matches the primary conductor unless specified for an intrinsically safe area, in which case all outer jackets are blue.

*A tracer having the color corresponding to the positive extension may be used on the negative wire code. Occasionally, it is necessary to determine thermocouple polarity in the field. The above characteristics are helpful, along with the information on the following page.

**4, one hour sessions training video.
\$1200.00 - Call for information.**

To print, right click or press ctrl + P

TYPE E-The negative wire has lower resistance in ohms per foot than the positive element for the same size wire.

TYPE J-The positive element is frequently rusty and is magnetic. It has a lower resistance in ohms per foot for the same size wire.

TYPE K-The negative element is slightly magnetic. It has a lower resistance in ohms per foot for the same size positive wire.

TYPE R or S-The negative wire is softer. The positive wire has a lower resistance in ohms per foot for the same size wire.

TYPE T-The negative wire is silver in appearance. The positive wire has a lower resistance in ohms per foot for the same size wire, and is usually copper colored.

TYPE N-The positive leg has a higher resistance in ohms per foot for the same size wire.

Note: When in doubt, twist the wire together, and connect opposite ends to a volt meter. Heat the twisted end with a cigarette lighter. If the volts go up - polarity is correct ...

OPERATION:

The temperature of the connection head should be kept as near room temperature as possible to avoid errors due to the extension wires. The maximum recommended temperature at the terminal block is 400°F.

MAINTENANCE:

The quality and frequency of calibration checks must be determined for each individual application by noting the decalibration rate of each thermocouple at individual installations. Thermocouples will deteriorate due to contamination from their environments. Calibration is usually made by comparison with a working standard. The thermocouple may be removed from its installation and checked in an electric furnace with the working standard; however, check the thermocouple in its installed position and location if possible. See page VI.

Return thermocouples that were removed for tests to the same location and immersion depth for reliable and repeatable readings.

Do not use a thermocouple to measure a very low temperature if it has been used to measure a very high temperature previously.

Make sure protection tubes and thermowells are in good condition when protecting thermocouples with them.

Do not run a single thermocouple to two different instruments. This can result in instrument imbalance. A dual isolated thermocouple should be used instead.

STORAGE:

Store in a clean dry place. Avoid stacking probes in areas of excessive moisture or humidity (ie: dripping, condensation). Special packing with desiccant can be specified. (See page II)

