

## **Field Test and Adjustment Method for Temperature for the 61-310 Meter**

Most low cost instruments and Multimeters that measure temperature use Thermocouples {TC}.

Thermocouples are an inexpensive method of measuring temperature. TC can range in accuracy from 2% to as high as 20% depending on the purity of the metals and construction, so the better the accuracy the higher the cost of the TC. The TCs that come with low cost instruments are normally of low accuracy, typically 5% or more.

One nice fact is that regardless of the construction of the TC, if it is being used in normal environmental conditions the error can be compensated for.

One typically overlooked fact is that Water freezes at 32°F or 0°C and boils at 212°F or 100°C with very little error due to impurities of the water and barometric pressure.

This can provide a typical user an easy to construct calibration standard of suitable accuracy.

Fill one of those plastic thermal glasses that you have with crushed ice and add enough water to create the consistency of a slushy. At the same time bring a small pan of water to a boil. Remember that pure water will work best for this procedure.

There are TCs that are constructed to be submerged in water but most TCs that are packaged with low cost instruments come with a bead style TC which should not be used in liquids. If you have a bead type TC use something like a freezer bag or high temperature plastic wrap around the TC.

Now all you need to do is make the measurement.

For best accuracy during the measurement, slowly stir each batch of water as you are making the readings.

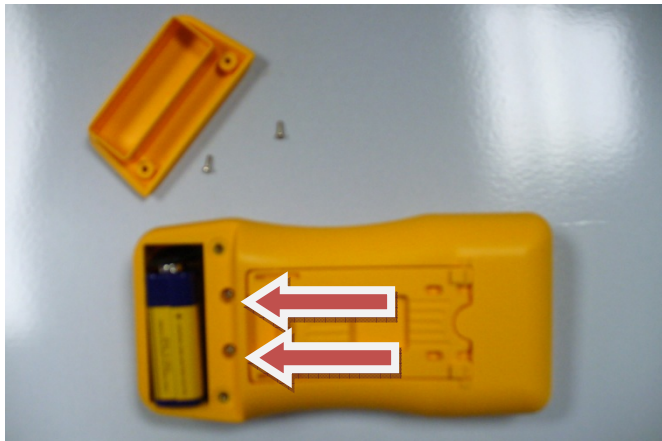
Following the steps below, you now have two reference values (the freezing and boiling points of water) which are 32 and 212 F or 0 and 100 C to allow you to do a two point calibration for each scale.

### **61-310 Field Adjustment for Temperature Steps:**

**Step 1:** Remove the rubber boot to expose the two screws for the battery compartment cover.



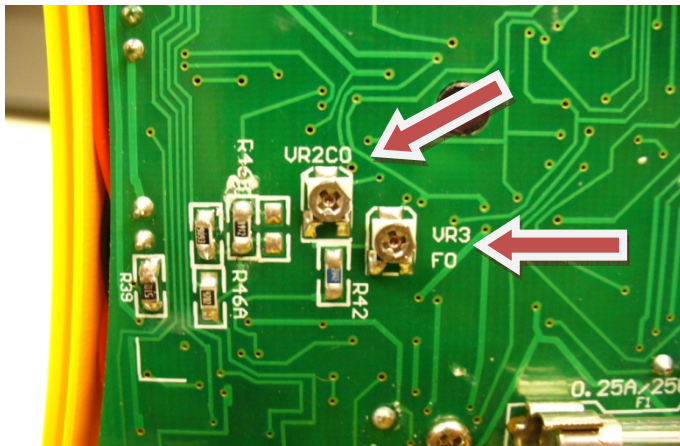
**Step 2:** Remove the two battery cover screws with a Philips head screw driver to expose two additional screws that hold the top and bottom halves of the meter together:



**Step 3:** Remove the two main body screws with a Philips head screw driver.



**Step 4:** Separate the two halves and locate VR2 CO and VR3 FO adjustment screws.



**CAUTION:** DO NOT ADJUST ANY OTHER VR ADJUSTMENT SCREWS

**Step 5:** Make the temperature measurements and adjustments to the meter:

**°C Calibration (Adjust VR2 CO)**

1. Set the rotary switch to the "°C " position.
2. Place the thermal couple into the slushy.
3. Using a small flat-tipped screwdriver, adjust VR2 CO for a 0 °C +/- 1°C (-1 to 1) display
4. Place the thermal couple into the boiling water.
5. Using a small flat-tipped screwdriver, adjust VR2 CO for a 100 °C +/- 1°C (99 to 101) display

**°F Calibration (Adjust VR3 FO)**

1. Set the rotary switch to the "°F " position.
2. Place the thermal couple into the slushy.
3. Using a small flat-tipped screwdriver adjust VR3 FO for a 32 °F +/- 1°F (31 to 33) display
4. Place the thermal couple into the boiling water.
5. Using a small flat-tipped screwdriver, adjust VR3 FO for a 212 °F +/- 1°C (211 to 213) display

**Step 6:** Reverse steps 1-4 to re-assemble the meter.

**CAUTION:** DO NOT TIGHTEN SCREWS PAST SLIGHTLY SNUG.