

FIELD CALIBRATION PROCEDURE

ALTEK MODEL 222

Suggested Equipment

- Precision Millivolt Source, Accuracy ± 0.002 mV, Resolution 0.001 mV

OR

Precision DVM with ± 0.002 mV accuracy plus an adjustable stable mV source with 0.001 mV resolution

- Jumper wire with clip leads on each end
- Stable Ice Bath (See Note 1 for construction details)

Note: The Ice bath may be replaced with a Digital Thermocouple Thermometer, 0.2 Degree Accuracy with 0.1 Degree resolution, Fluke 2190A or equivalent

PRECAUTIONS

Please observe antistatic procedures.

Avoid touching thermocouple connections, as this will introduce temperature errors in calibration.

It is recommended that the Model 222 be handled as little as possible during calibration to reduce errors. If the unit is held, the heat from your body will cause uneven heating of temperature sensitive components.

Before any adjustments to the Model 222 are made, fresh batteries (Alkaline or Lithium 9 Volts are recommended) should be placed in the unit.

Refer to Diagram 2 for all Test Points (TP #_) and adjustment potentiometers (Pot #_).

CALIBRATION

Input Zero

Make sure the Model 222 Input wires have no connections

Connect a jumper wire between TP1 & TP2.

Move Mode Jumper to Test Mode (see Diagram 1)

Move the power slide switch to IN

Press the STORE/RESET push button until HIMAX appears on the LCD

Adjust Pot #1 to show 32.0 F on the display

1 Degree Calibration

Remove the jumper from the test points

Connect the mV Source to TP1 (+) & TP2 (-)

Press the STORE/RESET push button until LOMIN appears on the LCD

Adjust the millivolt source to the millivolt value listed in Table 1 for 1 degree positive calibration.

Adjust Pot #2 until the Model 222 displays the corresponding temperature.

Adjust the millivolt source corresponding to the millivolt value listed in Table 1 for 1 degree negative calibration.

Confirm that the temperature listed in the table appears on the display

0.1 Degree Calibration

Press the STORE/RESET push button until HIMAX appears on the LCD

Adjust the millivolt source to the millivolt value listed in Table 1 for 0.1 degree positive calibration.

Adjust Pot #3 until the Model 222 displays the corresponding temperature.

Adjust the millivolt source corresponding to the millivolt value listed in Table 1 for 0.1 degree negative calibration.

Confirm that the temperature listed in the table appears on the display

Cold Junction Compensation

Move Mode Jumper to C or F Mode (see Diagram 1)

Connect the leads of the Model 222 to a known good thermocouple of the correct type.

Move the power slide switch to OFF

Move the power slide switch back to IN while holding the STORE button

Make sure that the Quik-Chek switch is in the READ position

Place the thermocouple into the Ice Bath as described in Note 1

Wait 10 minutes for the bath and the Model 222 to stabilize

Adjust Pot #4 to display a temperature of 0.0 Degrees C or 32.0 Degrees F

Please allow approximately 10 seconds between adjustments to the Cold Junction Compensator (Pot #4) to allow the Model 222 to update the previous change.

Note: If the optional Digital Thermocouple Thermometer is used, connect it in place of the thermocouple and conduct the preceding test in OUT MODE. Make sure that the correct type of thermocouple wire is used to make the connection. Adjust the Model 222 to read the same as the Digital Thermometer.

FUNCTIONAL TEST

- Each feature of the Model 222 should be tested for proper function.

INPUT MODE

Note: The setup for testing INPUT MODE is the same as the previous test

Move Mode Jumper to C or F Mode (see Diagram 2)

Connect a known good thermocouple to the leads of the Model 222

Move the power slide switch to OFF

Move the power slide switch back to IN while holding the STORE button to put the unit in 0.1 degree resolution

Make sure that the Quik-Chek switch is in the READ position

Press the RESET button

Expose the thermocouple to temperatures above and below room temperature (a hot and a cold cup of water, oven, etc.) and observe that the display rises and falls.

MIN & MAX

Alternately switch between MIN & MAX and observe that differing temperatures have been stored in each.

Press the RESET button

Alternately switch between MAX, READ & MIN and observe that the same temperature appears in each position.

OUTPUT MODE

STORING QUIK-CHEK VALUES

Move power switch to OFF

Move power switch to OUT for 1 degree resolution

Move Quik-Chek switch to HI

Rotate the knob clockwise slowly and observe that the temperature on the display increments by 1. Rotate the knob rapidly and observe that the temperature increases rapidly. Continue until an easily remembered number appears on the display (1000 for example).

Press the STORE button

Move Quik-Chek switch to LO

Repeat the same procedure moving counterclockwise to obtain an easily remembered low temperature value (-100 for example).

Press the STORE button

RECALLING QUIK-CHEK VALUES

Move power switch to OFF

Move power switch to OUT

Alternately switch between HI and LO, allowing 5 seconds for display to update, and confirm that the temperature values previously stored have been recalled.

If the unit fails to meet any of its stated specifications after recalibration, it should be returned to the factory for repair

Diagram 1

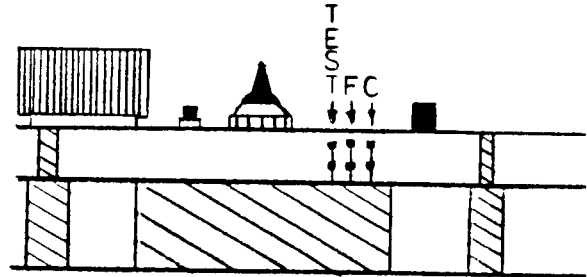


Diagram 2

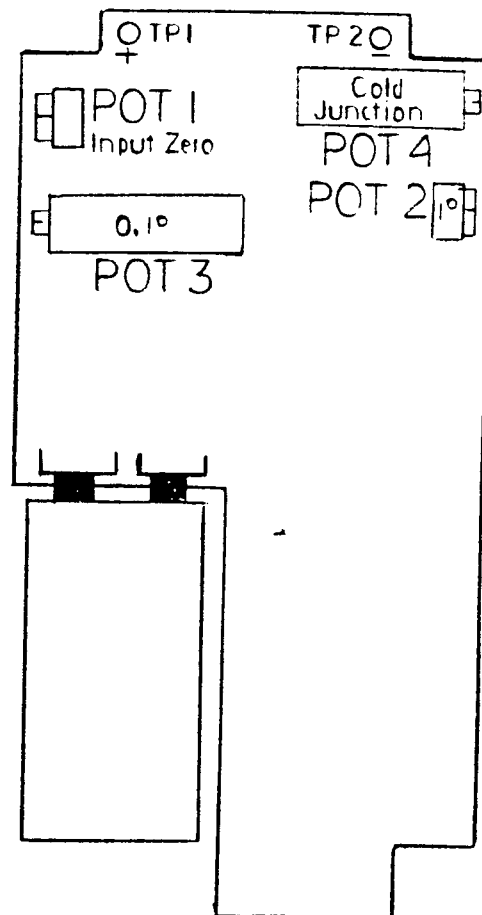


Table 1

Positive voltages (& temperatures) should be used for calibration. Negative voltages (& temperatures) should be used as a calibration check

| <u>TC Type</u> | <u>Millivolt Level</u> | <u>Calibrated Temperature</u> | <u>Resolution Range</u> |
|----------------|------------------------|-------------------------------|-------------------------|
| J | 69.536 | 2192 | One |
| | -7.519 | -300 | One |
| | 17.984 | 626.0 | Tenth |
| | -4.632 | -148.0 +/-0.3 | Tenth |
| K | 54.845 | 2500 | One |
| | -6.064 | -350 | One |
| | 17.664 | 806.0 | Tenth |
| | -3.553 | -148.0 +/-0.3 | Tenth |
| T | 20.869 | 750 | One |
| | -6.217 | -430 | One |
| | 9.268 | 392.0 | Tenth |
| | -3.378 | -148.0 +/-0.3 | Tenth |
| E | 76.358 | 1832 | One |
| | -9.112 | -350 | One |
| | 21.033 | 572.0 | Tenth |
| | -5.237 | -148 +/-0.3 | Tenth |

Note 1**ICE BATH CONSTRUCTION**

- 1) Prepare a Thermos (or equivalent vacuum insulated bottle) by drilling a hole in its cap to accept the thermocouple or use a standard laboratory cork
- 2) Fill the Thermos with shaved or crushed ice made from distilled water.
- 3) Fill the Thermos with enough distilled water so that the ice becomes slush, but not enough to float the ice.
- 4) Replace the Thermos cap or cork and insert the thermocouple

Drawing Number 1-475

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