

	MODEL 520/521 FIELD CALIBRATION PROCEDURE	DOCUMENT NO. 520/521-0300	841 Holt Road Suite 1 Webster New York 14580 Business: (585) 872-9350 Fax: (585) 872-2638
Created by: M. Kieck	DATE: 5-1-03	Sheet 1 of 4	

Rev.	Date	Appd	BRIEF CHANGE DESCRIPTION
A	5-1-03	MJK	INITIAL RELEASE
B	7-28-04	LBD	UPDATES AND ADDED FIGURES
C	2-21-06	LBD	COLD JUNCTION FIGURE AND PROCEDURE UPDATED

Equipment Needed:

1. Precision Voltage Meter with an accuracy of 0.0066% at 80.000mV
 2. Precision thermistor probe with accuracy of $\pm 0.063^{\circ}\text{C}$ or Better.
- OR
3. A stable ice bath or thermocouple ice point calibrator and a NIST traceable thermocouple wire stable to within $\pm 0.063^{\circ}\text{C}$.

Practical Instruments Electronics recommends using a direct junction temperature measurement technique for the most accurate and reliable calibrations of our equipment. This technique uses accurate RTD or thermistor probes to measure the reference junction (cold junction) temperature. While measuring the junction voltage with a DVM and ice bath technique will work. This method is less reliable due to complexity and is generally less accurate due to cumulative errors.

Precautions:

Avoid touching thermocouple connections, as this will cause temperature errors in calibration. It is recommended that the Model 520/521 be handled as little as possible during calibration to reduce errors. The heat from your body may cause uneven heating of temperature sensitive components.

Enabling Calibration:

Place in fresh batteries and allow 15 minutes for the Model 520/521 to stabilize to the ambient temperature. Remove the EZ-Dial™ Knob, battery cover and the four black Phillips head screws. While holding the Model 520/521 face down in one hand, carefully separate the top and bottom of the housing. Place the unit into calibration mode by shorting the calibration via located on the bottom left side on the PCB with tweezers and turning the UUT on. Verify the Model 520/521 is in calibration mode by viewing the top left of the LCD for the word "CAL".

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Source mV Calibration:

Connect the Model 520/521 terminals to a Voltage Meter (See Figure 2).

LO Calibration:

1. Slide the EZ-Check™ Switch to the LO position indicated by displaying a “LO” on the left side of the LCD.
2. Dial the Model 520/521 so the meter reads 0.000 mV.
3. Press the EZ-Dial™ Knob down.
4. The display will flash “STORED” to confirm that the value was stored.

HI Calibration:

1. Slide the EZ-Check™ Switch to the HI position indicated by displaying a “HI” on the left side of the LCD.
2. Dial the Model 520/521 so the meter reads 80.000 mV.
3. Press the EZ-Dial™ Knob down.
4. The display will flash “STORED” to confirm that the value was stored.

Cold Junction Calibration:

Double click the EZ-Dial™ Knob to enter the Cold Junction Calibration Mode.

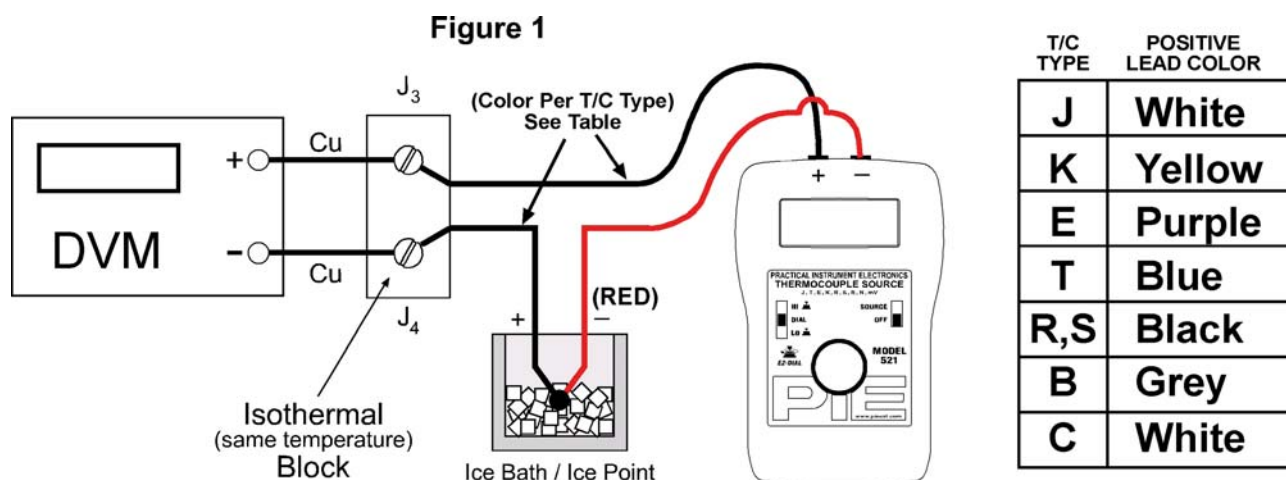
Using a Thermistor Probe:

1. Connect the thermistor probe to the + side of the T/C connector (See Figure 3).
2. Connect the other side of the thermistor probe to the OHM meter.
3. Let the temperature settle for 15 minutes.
4. Record the resistance measurement on the Ohm Meter and determine its equivalent temperature value according to the thermistor probe’s calibration.
5. Compare the Cold Junction Temperature of the UUT, located on the bottom right of the LCD, with the equivalent temperature value of the thermistor probe.
6. If the UUT’s reading is out of specification, then dial the EZ-Dial™ Knob to the equivalent temperature value of the thermistor probe.
7. Press the EZ-Dial™ Knob down.
8. The display will flash “STORED” to confirm that the value was stored.
9. Verify the UUT (bottom right side of the LCD) Cold Junction Temperature is tracking with the temperature reading of the thermistor probe. Repeat steps 4-9 if necessary.

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Using an Ice Bath or Ice Point Calibrator:

1. Connect the Model 520/521 as shown in Figure 1. The positive thermocouple lead (colored specific to the thermocouple type, see table in Figure 1) is connected to a Volt Meter via an isothermal block. The negative thermocouple lead (typically colored Red) is connected to a second positive thermocouple lead and placed in the Ice Bath/Ice Point.
2. Let the temperature settle for 15 minutes.
3. Record the voltage measurement on the Volt Meter and determine its equivalent temperature value according to a T/C Chart.
4. Compare the Cold Junction Temperature of the UUT, located on the bottom right of the LCD, with the equivalent temperature value from the Volt Meter.
5. If the reading is out of specification then dial the EZ-Dial™ to the correct reading from the Volt Meter and T/C chart.
6. Press the EZ-Dial™ Knob down.
7. The display will flash “STORED” to confirm that the value was stored.
8. Verify the UUT (bottom right side of the LCD) Cold Junction Temperature is tracking with the temperature reading of the DVM and T/C Table. Repeat steps 3-7 if necessary.



Completion of Calibration:

For the Model 520 only: double click the EZ-Dial™ Knob to enter the settings screen. Enter the customer's requested T/C type and press the EZ-Dial™ Knob to select. This sets the T/C type for the Model 520 and cannot be changed without reprogramming.

Turn the Model 520/521 OFF. Next time the unit is turned on the Model 520/521 will be calibrated and in normal operational mode.

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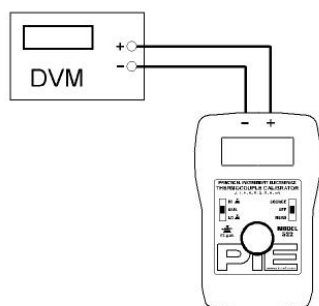


FIGURE 2 (Source mV)

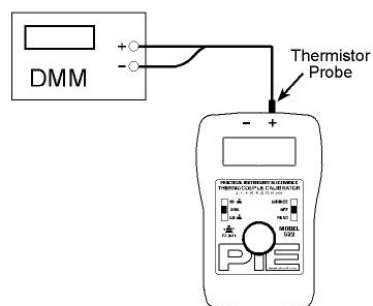


FIGURE 3 (Cold Junction Cal)