

# Checking the Temperature Calibration

Mini-sys software ver. 2.00 and higher

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1. Connect a digital voltmeter directly to the thermocouple (see Figure 1 and 2; NB! Be careful not to short circuit the thermocouple when the test pins are connected)
2. Place a thermometer on the thermocouple connections to measure the temperature of the connector block
3. Open the reader and remove the sample carousel. Close the lid again
4. Open the “Control” program
5. Connect to MiniSys
6. Select the “Services” tab
7. Switch on the Nitrogen and lift the heater plate
8. In the field “Set Temperature To” enter “50” and press “Go”. The Thermocouple will now ramp the temperature to 50°C.
9. Read the voltage on the voltmeter and the connector temperature on the thermometer
10. Convert the voltage reading ( $x$ ) into temperature. This can be done by using the Excel Spreadsheet “Temp calibration Check”. Enter the connector temperature (cell E3), the set temperature (i.e. “50” in cell F6) and the voltage reading ( $x$ ) (in cell F7): The spreadsheet calculates the actual temperature using a 6<sup>th</sup> degree polynomial with the following parameters:

$$\begin{aligned}x^6 & : -0.0000006782449 \\x^5 & : 0.00005292144 \\x^4 & : -0.001319532 \\x^3 & : 0.008238798 \\x^2 & : 0.06280513 \\x^1 & : 23.9038 \\x^0 & : 0.8888392\end{aligned}$$

These parameters were determined using the ITS-90 table for type K thermocouple.

11. Repeat the measurement at 100°C, 200°C, etc.
12. The spreadsheet “Temp calibration Check” plots the deviation of actual temperature to set point temperature. The deviation should not be more than approximately 1.0°C. The deviation at 700°C may be considerably higher if the reader has been calibrated for 50 to 650°C operating range.



Figure 1: Reading the thermocouple voltage (range 100 mV max)

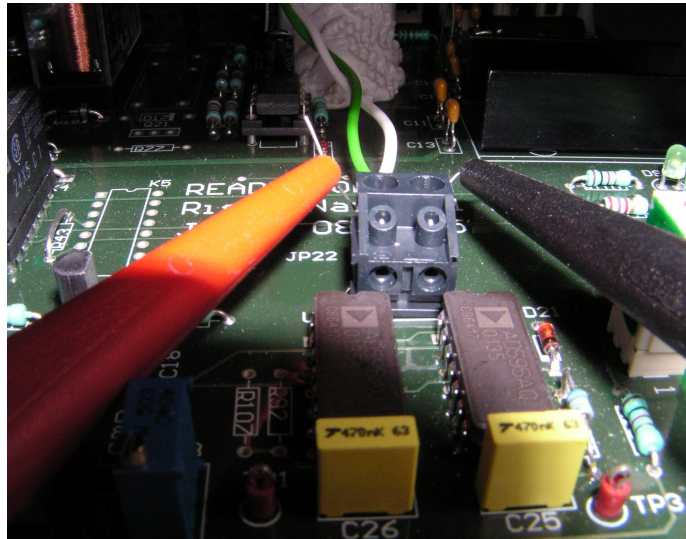


Figure 2: Close up of reading the thermocouple voltage (range 100 mV max)