

Calibrating Oven Temperature

Applicable for Model 400 Hybridization Incubators and Series 700 Microarray Ovens

Required part(s): Cat. #1051-52-0— Digital thermometer. Includes cable and NIST certificate.

Model 400, 700 and 777 ovens use a radiant heating system that warms the side walls of the stainless steel interior to provide uniform heating of air within the rotator compartment. The selected operating temperature (ambient + 5 to 99°C) is regulated to $\pm 0.2^\circ\text{C}$ from set point by means of a high performance temperature controller (Watlow 93) and a sensitive Resistive Thermal Device (RTD) used as temperature sensor. The RTD can be seen as a stainless steel probe, about the size of a pencil, protruding from the inside top of the rotator compartment.

In addition to having a highly regulated oven temperature, it is normally important to have *accurate* oven temperatures. In order to ensure accurate ($\pm 0.5^\circ\text{C}$) oven temperatures, the performance of the controller should be periodically checked. This is performed by comparing the temperature displayed on the controller to an accurate, NIST (National Institute of Standards and Technology) certified, thermal measurement device.

SciGene ovens are designed to simplify the controller calibration procedure. These units incorporate a *secondary* RTD mounted with the primary RTD (described previously) to provide a simple way to calibrate the controller and deliver accurate oven temperatures.



NOTE: Calibration need only be performed at a single temperature (e.g. 65°C) to achieve accurate oven temperatures over the full range of oven operating temperatures (ambient + 5 to 99°C).

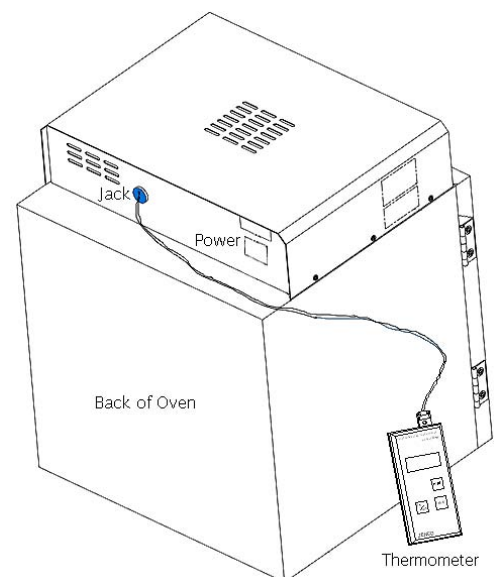
To perform a calibration, a NIST certified digital thermometer (SciGene Cat. #1051-52-0) is connected to the secondary RTD through the blue jack seen on the top back of the oven. With the oven temperature stabilized at 65°C, and the digital thermometer connected, the temperature shown on the thermometer should match that shown on the controller within $\pm 0.5^\circ\text{C}$. If not, follow the steps below to adjust the controller.



NOTE: The calibration method described below is the only method recommended by SciGene to achieve accurate oven temperatures. The use of inaccurate glass thermometers or a temperature sensor placed inside the oven, connected by wires to a digital thermometer through the door, should not be used.

CALIBRATION PROCEDURE

- 1) With the oven powered on, enter a temperature of 65°C on the controller and allow the temperature on the display to stabilize (about 20 minutes).
- 2) Using the cable provided with the digital thermometer, plug one end into the blue receptacle found on the back panel and the other into the digital thermometer. Turn ON the thermometer.
- 3) On the temperature controller, press the up and down arrows simultaneously for 3 seconds. The upper display will now read “3” and the lower display “Loc”.
- 4) Using the down arrow, set the upper display to “0” The controller is now unlocked and available for calibration. (— continued —)



- 5) Sequentially press the circle icon button until the display shows the Actual and Set temperatures of the oven.
- 6) Calculate the difference in temperature shown on the Actual display of the controller and the digital thermometer. For example, if the controller displays 52.5°C and the digital thermometer displays 51.0°C, the difference is 1.5°C.
- 7) Sequentially press the circle icon button until the lower display reads "Cal". The upper display shows the offset value between the controller and digital thermometer when the unit was last calibrated.
- 8) Using the up and down arrows, adjust the offset value to the difference in temperatures calculated in Step 6. For example, if the controller displays a temperature that is 1.5°C higher than the digital thermometer, adjust the offset value to *minus 1.5*.
- 9) Sequentially press the circle icon button until the display shows the Actual and Set temperatures. The Actual temperature on the display should now match the digital thermometer.
- 10) Press the circle icon button until "Loc" is shown on the lower display. Press the up arrow until 3 is shown in the upper display.
- 11) Sequentially press the circle icon button until the Actual and Set temperatures are again shown on the display.

Your oven is now calibrated to provide accurate temperatures between ambient + 5 to 99°C.