

CALIBRATION PROCEDURE

SCXI™-1308 Terminal Block

This document contains information and step-by-step instructions for verifying the precision resistors on the National Instruments SCXI-1308 terminal block.

What Is Calibration?

Calibration consists of verifying the measurement accuracy of a device and adjusting for any measurement error. *Verification* is measuring performance of a device and comparing the results to the factory specifications. Because the SCXI-1308 is not user-adjustable, calibrating this terminal block consists of verifying the performance only.

Why Should You Verify?

The accuracy of electronic components drifts with time and temperature, which can affect measurement accuracy as the terminal block ages. Verification ensures that the terminal block still meets National Instruments (NI) standards. If the results of the verification procedure indicate that the SCXI-1308 is out of specification, return it to NI for repair or replacement.

How Often Should You Verify?

The measurement accuracy requirements of your application determine how often you should verify the SCXI-1308 terminal block. NI recommends that you perform a complete calibration at least once every year. You can shorten this interval to 90 days or six months based on the demands of your application.

Equipment and Other Test Requirements

This section describes the equipment, software, documentation, and test conditions needed to verify the performance of the SCXI-1308.

Test Equipment

Verification requires a multiranging 5 1/2 digit digital multimeter (DMM) with 15 ppm accuracy.

NI recommends that you use the NI 4060 or Agilent 34401 DMM to verify the performance of an SCXI-1308.

If one of these instruments is not available, use the accuracy requirements listed above to select a substitute calibration standard.

Software and Documentation

No software is required to verify the performance of the SCXI-1308. All required documentation is found in this calibration procedure. If you want more information about the SCXI-1308, refer to the *SCXI-1308 32-Channel Current Input Terminal Block Installation Guide*.

Test Conditions

Use the following guidelines to optimize the connections and the environment during verification:

- Keep connections to the SCXI-1308 short. Long cables and wires act as antennae, picking up extra noise that can affect measurements.
- Use shielded copper wire for all cable connections to the SCXI-1308. Use twisted-pair wire to eliminate noise and thermal offsets.
- Keep relative humidity below 80%.
- Maintain the temperature between 15 and 35 °C.
- Use 4-wire resistive measurements when possible as they are generally more accurate than 2-wire measurements.

Verifying the Performance of the Precision Resistors

The precision resistors convert current to voltage. Use the following procedure to verify the performance of the SCXI-1308 precision resistors.

1. Open the terminal block enclosure by removing the top cover.
2. Locate R 0 in Figure 1 on the printed circuit board. This precision resistor is associated with channel 0 on the terminal block.

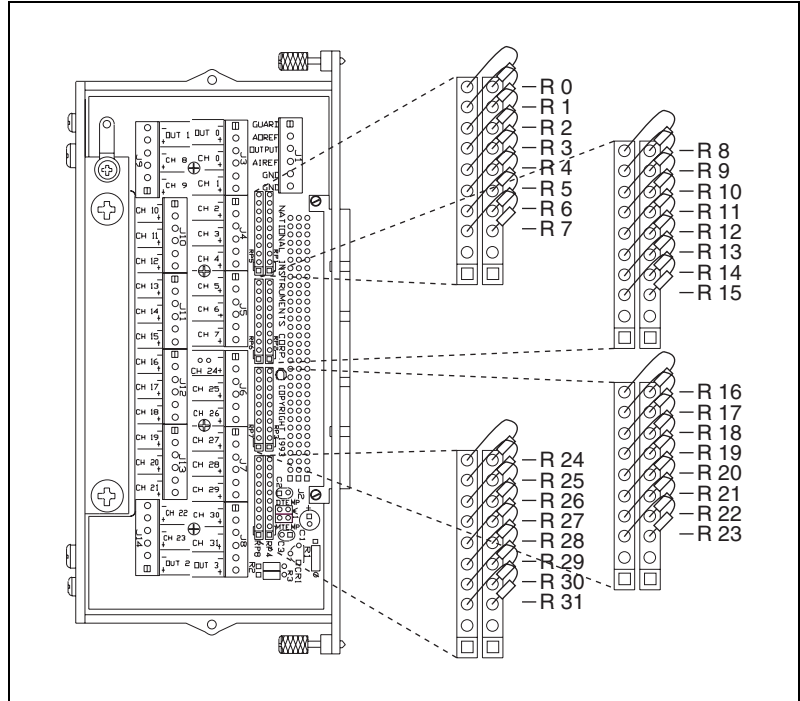


Figure 1. Precision Resistor Locations

3. Using a calibrated DMM, measure the resistance (R_{meas}) between the two exposed leads of the resistor.
4. Using a calibrated instrument, measure the ambient temperature (T_{amb} in $^{\circ}\text{C}$) of the terminal block.
5. Calculate the following:

$$R_{adj} = R_{meas} - (T_{amb} - 25) \times 0.00001$$

6. Determine if the resistor performance is meeting the specification.
 - If $248.751 \Omega \leq R_{adj} \leq 249.249 \Omega$, you have verified the performance of the resistor.
 - If $R_{adj} > 249.249 \Omega$, the terminal block is non-functional—repair or replace it.
 - If $R_{adj} < 248.751 \Omega$, the terminal block is non-functional—repair or replace it.
7. Repeat steps 2 through 6 for the remaining resistor locations R <1..31>, which correspond to channels <1..31> on the terminal block.

You have completed verifying the performance of the SCXI-1308.