TECH NOTE

LDT-5910C Temperature Stability

OVERVIEW

This technical note illustrates the temperature control stability achieved by the LDT-5910C Thermoelectric Temperature Controller.

TEST SET UP

A LDT-5910C was connected to the TE-550 Case Temperature Control of an LDM-4984 Butterfly Laser Diode Mount. An aluminum test load with two adjacent calibrated thermistors was clamped to the mounting pad of the LDM-4984.

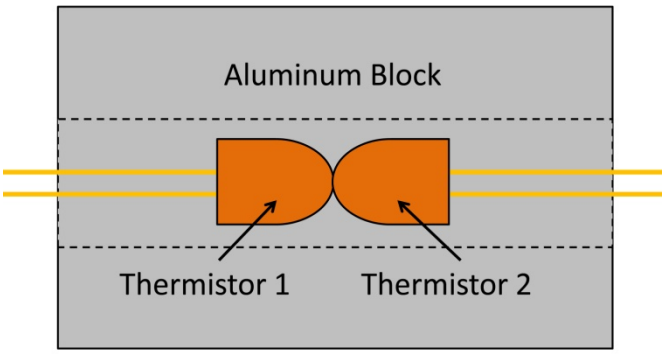


Figure 1: An internal view of the test load that shows the adjacent thermistors encased in the aluminum test load.

Thermistor 1 was used as the temperature feedback sensor for the LDT-5910C and Thermistor 2 was measured with a Hewlett Packard 3458A 8 ½ Digit Multimeter. The test load was covered with the LDM-4984 ESD protection cover to minimize air flow. To further isolate the test load from environmental fluctuations, a two inch layer of foam packaging material was placed over the ESD cover and secured to the mount.

The test setup is shown in Figure 2.

A third calibrated thermistor, Thermistor 3 (see Figure 2), was placed near the test load to record the environmental temperature and was measured with an Agilent 34401A 6 ½ Digit Multimeter.

TEST PROCEDURE

The resistances of Thermistor 2 and Thermistor 3 were measured every sixty seconds for 25 hours. Recording 25 hours of measurements provides data for both the 1 hour initial warm-up period as well as the 24 hour period. The resistance data was converted to temperature data using the specified Steinhart-Hart constants for each thermistor. The temperature stability figure was calculated by subtracting each temperature measurement from the average temperature over the second hour.

RESULTS

A graph of the temperature stability of the LDT-5910C is displayed in Figure 3.

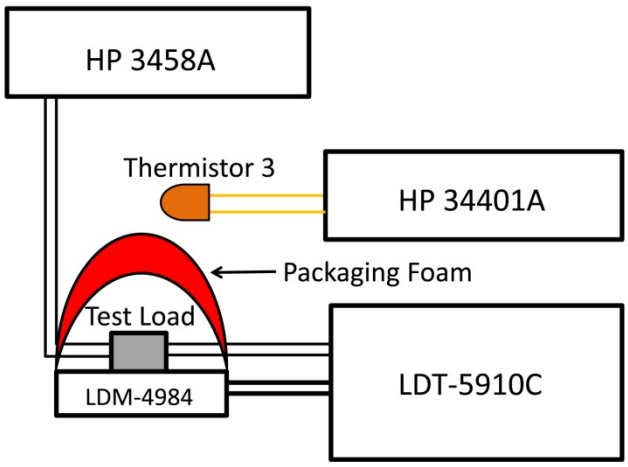
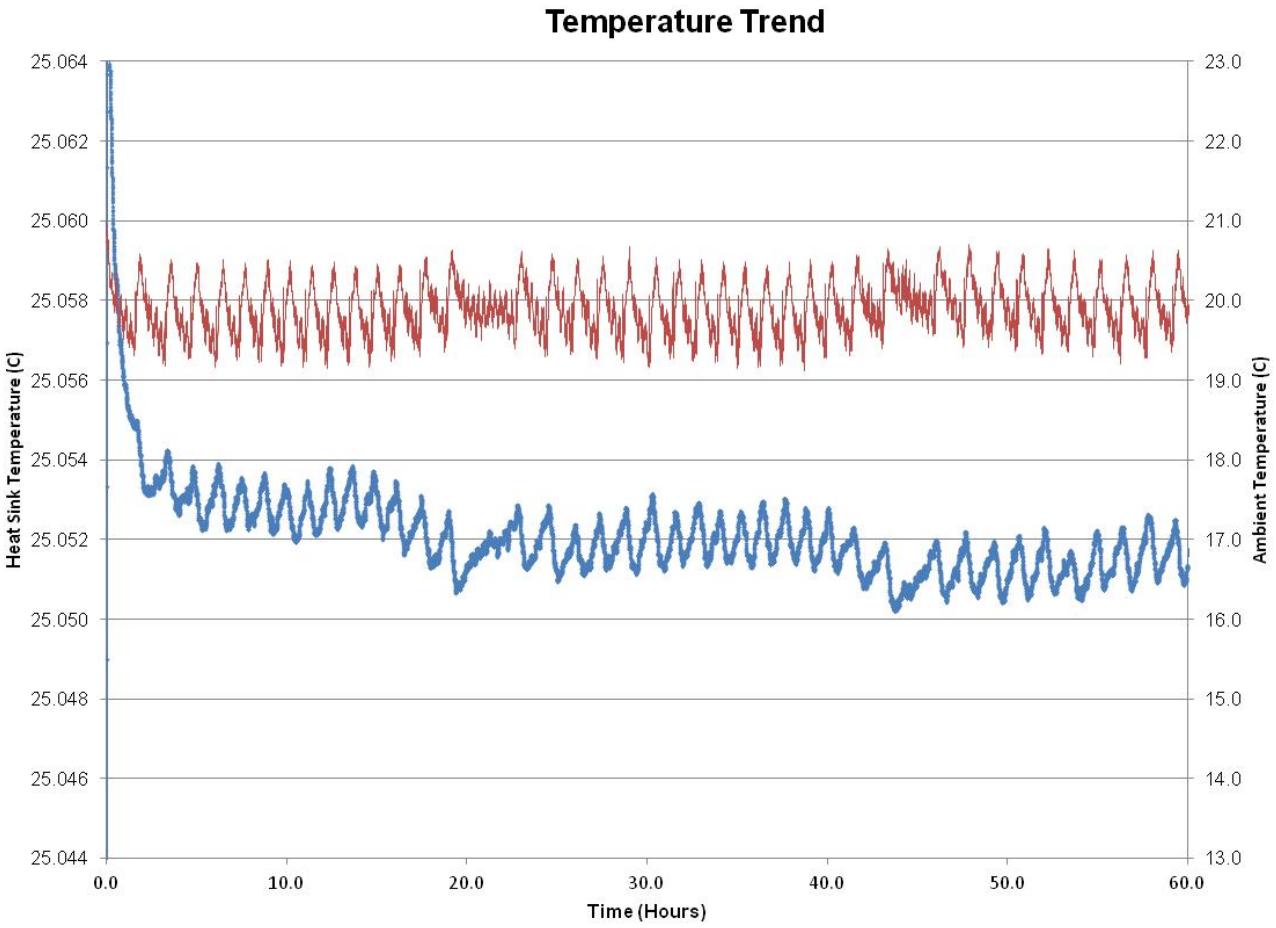


Figure 2: The temperature stability test setup.

TECH NOTE



This graph is a plot of the ambient temperature of the testing room and the stability of the LDT-5910C. The green line indicates a one hour warm-up. The purple line indicates 24 hours beyond the one hour warm-up.

During the course of the test, the room temperature peaked at 0.5 °C above the average.

The change in the room temperature had some affect on the temperature of the aluminum test load controlled by the LDT-5910C.

The test load temperature had a peak of 0.002 °C above the average and -0.0018 °C below the average.

CONCLUSION

The LDT-5910C High Power Thermoelectric Temperature Controller controlled the temperature of the test load to within ±0.0019 °C, which is within the published specification for long term temperature stability of ±0.002 °C.