APPLICATION NOTE

102

Method For Verifying Short (Zero) Connection When Using Kelvin Klips

Kelvin Klips are four-terminal connector clips designed to provide rapid, precise connections to a device or unit under test (DUT, UUT). Used properly, Kelvin Klips eliminate measurement errors caused by lead resistance and/or improper connections.

Kelvin Klips Require Zero Verification

To insure proper operation of an instrument with Kelvin Klips, a short (zero) verification should be part of your standard work practices. This ensures that all four wires of a Kelvin Klip set are intact and firmly operational. Without this verification, you run the risk of significant measurement error.

This app note provides step-by-step procedures for a proper Kelvin Klips short test. Specific reference is made to TEGAM's digital instrument models in the 1700 Series, 252/253/254 Series and 2150/2160 Series.

Procedures for a Proper Short (Zero) Test

Short (zero) tests should be performed when:

1. The test instrument/meter has not been used for a period of 6 hours or more.
2. The test set-up has been changed.
3. The DUT/UUT has changed significantly.
4. Test procedures call for such verification.
5. Uncertainty or change has been introduced into the test set-up or environment, such as a power outage/fluctuation, temperature change, etc.

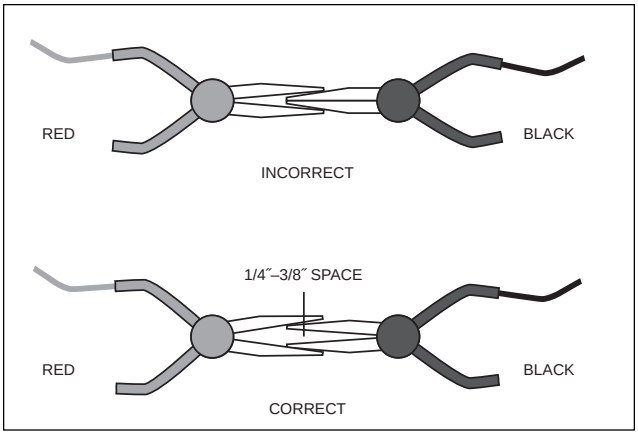

FIGURE 1. SHORTING KELVIN KLIPS

The basic procedures follow:

1. Apply power to the instrument and allow adequate warm-up. In a temperature controlled lab, you should allow at least 20 minutes warm-up time for stable readings. If the instrument's environment is not well controlled, allow 60 minutes for warm-up.
2. Connect the leads of the Kelvin Klips to the input jacks, typically located on the front of the instrument.
3. Establish instrument settings, as described below for the following TEGAM models:
   a. **1750:** "Delayed Cont. Mode" (MENU/CLEAR, 7/ TRIGGER, ENTER), 2mΩ range
   b. **1701B, 1705B, SP3779B:** All function buttons in OUT position, Range set to LOWEST.
   c. **252/253 (SP2598)/254 (SP2599):** Function button to "R," zero at Range 0 (low), then 3 (mid).
   d. **2150/2160:** Function to "G/R," Range to 200mΩ.
4. Short the Kelvin Klips together as shown in Figure 1. With the black clip entirely closed, attach the red clip to the black clip as shown. Open the black clip slightly, creating a 1/4 - 3/8 inch space between its jaws. DO NOT CLAMP KELVIN KLIPS DIRECTLY TOGETHER WHEN PERFORMING A SHORT CIRCUIT, ZERO CORRECTION.
5. Verify that the reading on the digital instrument display is within 5 counts of zero.

If a good zero reading can not be obtained, examine and tighten all connections as necessary. Repeat the short (zero) test.

For more information on test instrument application and operation, test leads/fixtures, and calibration, refer to the service manual or contact TEGAM Technical Sales and Service.

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