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Application Note

Insulation Resistance of Cables

Measuring the insulation resistance of very long cables can produce different readings between instruments and also erratic or unstable readings on some instruments. There are several reasons for this and several steps can be taken to improve the repeatability of the measurement. Long cables appear to the instrument as very large capacitors with low leakage and a large series resistance. The capacitive effect causes long charge and discharge times and frequent current changes due to dielectric absorption and polarization. The physical configuration of the cables also makes the measurements very susceptible to noise and stray capacitance to ground. The noise can be the result of magnetic fields, vibration and static charge.

Typical measurement procedures that will improve measurement accuracy repeatability and accuracy are:

1. Connect the grounded terminal to the outer jacket of the cable. This may be either the (+) or (-) terminal depending on the instrument being used.

2. Use averaging if available. Older analog meters have a natural meter damping or averaging. Newer digital megohmmeters require an average selection.

3. Use shielded test leads. Zero the instrument with those leads installed.

4. Use a series-quieting resistor in the order of 100kΩ to 1MΩ. This resistor is used for current limiting and should be insignificant with respect to the value of the measured resistance

Figure 1 illustrates a cable IR measurement connection using the 1863/64 Megohmmeter. The GND terminal is connected to the (+) Unknown terminal with a shorting link.
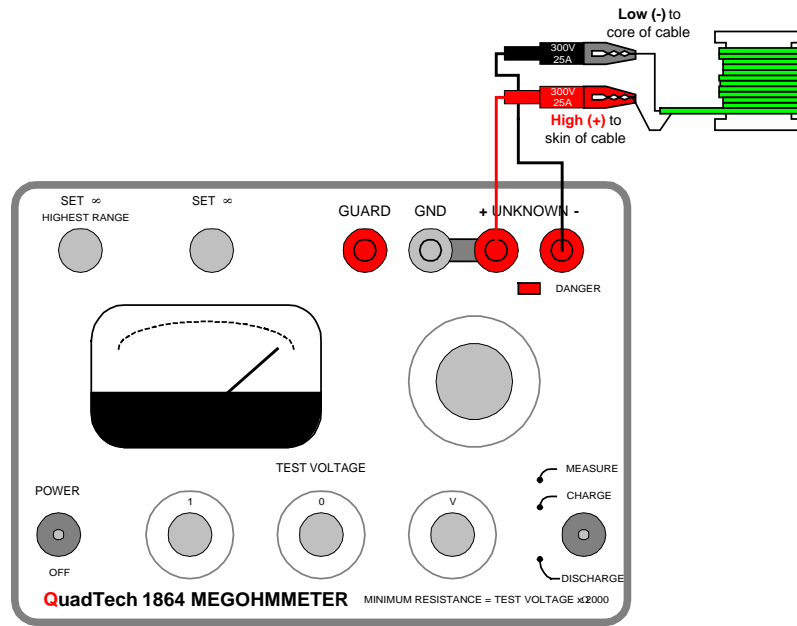
Connection to DUT

Figure 1: Cable IR Measurement with 1863/64 Megohmmeter

For complete product specifications on the 1863/1864 or any of IET's products, visit us at http://www.ietlabs.com/Genrad/1863_1864_Megohmmeter.html Do you have an application specific testing need? Call us at 1800-899-8436 or email engineering at sales@ietlabs.com and we'll work with you on a custom solution. Put IET to the test because we're committed to solving your testing requirements.