KEITHLEY A GREATER MEASURE OF CONFIDENCE

Problem: Noisy Readings in Low Resistance Measurements

Probable Cause: Magnetic Interference

The most common cause of noisy low resistance measurement is magnetic interference.

Low resistance measurements are, in general, low voltage measurements, and are susceptible to the low voltages generated by magnetic interference. Faraday's law states that a voltage will be induced in any conductor exposed to a changing magnetic field. This can happen in two ways:

1. The field changes with time.
2. There is relative motion between the circuit and the field.

Changing magnetic fields can come from local AC currents in the test system or from the deliberate ramping of the magnetic field, such as for magnetoresistance measurements. Relative motion can come from something that seems as harmless as dangling leads, which can generate nanovolts as they move in the earth's magnetic field. To avoid this in extremely sensitive voltage measurements, the leads must be kept short and rigidly secured.

Remedies

A. Use twisted pair cables, which reduce the enclosed area in the magnetic field and minimize the induced voltage.

B. Consider using shielded twisted pair cables. At the very least, run leads close together.

C. Tie down the cables to minimize movement.

D. If necessary, shield the test setup with Mu metal, a special alloy with high permeability at low magnetic flux densities.

E. Filter out AC signals from magnetic fields at the input of the instrument.

F. Try moving the instrument farther from the source of an interfering magnetic field. KEITHLEY

KEITHLEY

Keithley Instruments, Inc. 28775 Aurora Road • Cleveland, Ohio 44139 • 440-248-0400 • Fax: 440-248-6168
1-888-KEITHLEY (534-8453) • www.keithley.com

No. 2565
1004