

# Problem: Reading Drift in Low Resistance Measurements

## Probable Cause: Thermoelectric Voltages

Thermoelectric voltages are the most common cause of reading drift in low resistance measurements. They are caused by differences in temperature between different parts of the measurement circuit.

## Remedies

A. *Current-Reversal Technique*—Cancel the thermal EMFs by making two measurements with currents of opposite polar-

ity. Apply the test current and measure the voltage. Then reverse the polarity of the test current and measure the voltage again. Add the two voltage measurements and divide the result by two. This completely cancels the thermal EMF in the measurement.

This method requires a low noise voltmeter with a response speed faster than the thermal time constant of the circuit. If the response speed is too slow, any changes in

the circuit temperature during the measurement cycle will cause changes in the thermal EMFs that will not be completely cancelled, and some error will result.

B. *Offset Compensation Technique*—Make two voltage measurements, one with the test current enabled, the other with the test current disabled. Subtract the results of the second measurement (which consists of the thermal EMF) from the first to get the true measurement. KEITHLEY

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