

# Problem: Measurements are Low in High Resistance Measurements

*There can be several reasons for measurements that read low when making high resistance measurements.*

## Probable Cause: Low Insulation Resistance

The insulation resistance of the test fixture could be in parallel with the device under test.

## Remedy

Use a test fixture and connecting cables with higher insulation resistance. The use of a driven guard also effectively increases the shunt resistance.

## Probable Cause: Low Input Resistance in the Meter

The input resistance of the voltmeter could be too low for the measurement.

## Remedy

Use the force voltage and measure current technique to measure the high resistance. In this technique, the unknown resistance is put in series with a picoammeter or electrometer ammeter and a constant voltage is applied. This voltage can come from the picoammeter's internal source function or an external source. Since the ammeter has very low resistance, essentially all the voltage appears across the unknown resistance. The resulting current is measured by the ammeter and the resistance calculated using Ohm's law.

## Probable Cause: Offset Current

## Remedies

A. Adjust the zero baseline of the meter. Meters often have some offset in the front end circuitry. After power-up, allow the meter to reach thermal equilibrium, then

cancel the offset by selecting the correct reading range and using the zero function of the meter.

B. Use the alternate polarity technique. Offset currents may be due to charge stored in the material (dielectric absorption), static or triboelectric charge, or piezoelectric effects, and can be equal to or greater than the current stimulated by the applied voltage. To use the alternating polarity method, make the measurement once and record the result. Then reverse the polarity of the applied voltage and measure again. Taking the average of the readings should give an accurate result. The polarity reversal process can be repeated any number of times, and the resistance calculated based on a weighted average of the most recent current measurements. 

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