

Fall of Potential resistance measurements using the MCM 400A or 400D Soil Resistance Meter

A resistance-to-earth measurement is comprised of 3 components: the resistance of the electrode itself (the resistance of the ground rod or anode material, for example) including test leads, the electrode-earth contact resistance and the resistance of the surrounding earth. Typically, the resistance of the surrounding earth is the largest component of the resistance-to-earth measurement.

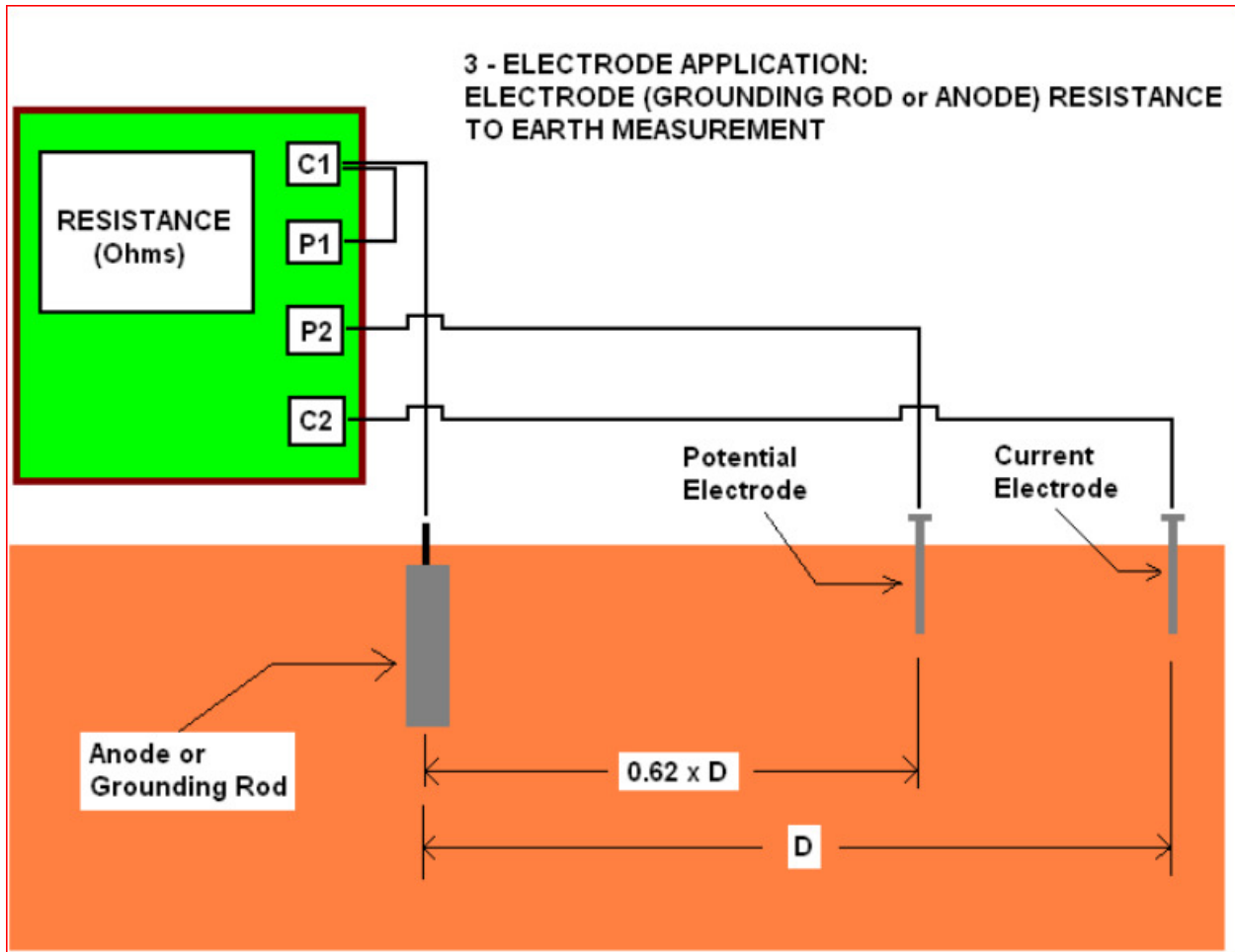
Before proceeding, the ground rod under test must be disconnected from the rest of the grounding system.

The C1 and P1 test leads are to be connected to the ground rod. The C2 test lead is connected to a soil test pin located a distance away.

Since a ground rod exhibits a “sphere of influence” in the earth equal to the depth to which it extends C2 must be positioned at least 10 times the length of the ground rod being tested. This places C2 outside the sphere of influence of the ground rod.

EXAMPLE: For a 10 ft. long ground rod, C2 should be placed at least 100 feet from the ground rod under test.

NOTE: If two or more ground rods are installed at the same location, the distance to C2 should be 10 times the combined length of the rods.



The three wire or "Fall of Potential" test can be performed as either a "Full" test or "Simplified" test.

FULL "FALL of POTENTIAL" TEST:

For a full test, the C1/P1 test leads are attached to the ground rod and C2 is connected to a test pin as described above. The P2 test lead is attached to a test pin that is placed at multiple locations between the ground rod and the C2 test pin.

The locations for P2 begin by taking a measurement at 1 meter from the ground rod and repeating by increasing the distance at chosen equal intervals. Resistance readings are obtained and recorded for each location.

When plotted on a graph, there should be an increase in resistance as the P2 pin is moved farther from the ground rod with a plateau as the pin approaches the 62% distance. The length of the plateau should be approximately from 52% to 72% distance and the resistance readings

should closely approximate the reading obtained at the 62% location. Beyond the plateau, the resistance should continue to increase.

If no plateau is found, the readings taken should be considered invalid and the distance from the ground rod to C2 should be increased so the test extends beyond the ground rod's sphere of influence.

SIMPLIFIED TEST:

To perform a simplified Fall of Potential test, the basic soil pin setup from the full test is used except for the location of the P2 test pin. In the simplified test, the P2 test pin is first located at the 62% distance and a resistance reading taken and recorded. Subsequent readings are then taken at 52% and 72% to validate the existence of the resistance plateau. If the second and third readings closely approximate that of the 62% resistance as shown below, the resistance measured at 62% can be considered valid.

