

## Engineer's Notebook

## Revolution in Ground Testing Adapted from Understanding Ground Resistance Testing

*The clamp-on ground tester has revolutionized the ability of power companies, manufacturers, and communications companies to measure ground resistance values. This measurement method is a departure from the conventional fall of potential (FOP) test. But in an appropriate environment, there are several benefits.*

1. *Fall of potential tests are done with the ground system disconnected from the protected system. This may require either shutting down power or operating without ground protection for a period of time. When using a clamp-on tester, ground resistance can be measured without disconnecting the ground from the power system. This adds an extra measure of safety.*
2. *The clamp-on tester saves time when performing the tests. The FOP method typically requires the stringing of leads (at times hundreds of feet). This creates the need for two operators as well as additional time required to set up the equipment.*
3. *The clamp-on instrument is easy to operate. The operator simply clamps the tester on the ground rod or conductor leading to the ground rod and pushes the button. Within seconds the operator measurement is displayed.*



This type of measurement also offers the advantage of indicating the integrity of connections to the ground system as well as the overall ground resistance value. This provides an accurate and complete resistive representation of the path a lightning strike or ground fault must pass through to earth.

There are situations where a clamp-on tester is not appropriate for ground resistance measurements. In particular, it will not work if there are multiple connections from the same system to a common ground. However, for many applications, a clamp-on tester is appropriate, and easier to use.

### Typical Testing Procedure

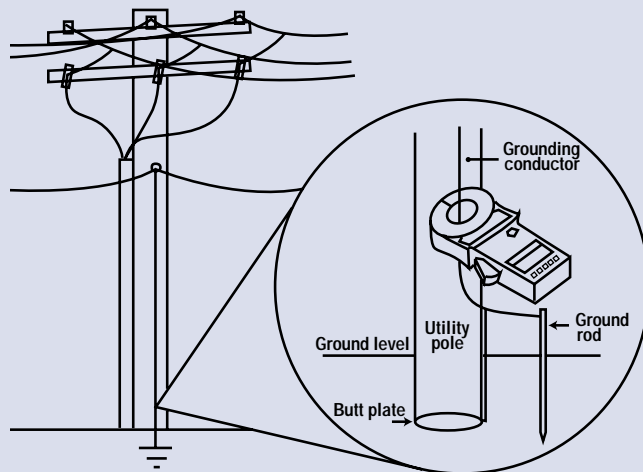
Remove any molding covering the ground conductor, and provide sufficient room for the jaws of the clamp-on ground tester. The clamp must be placed in such a way that the jaws are in an electrical path from the system neutral or a ground rod or rods as the circuit provides.

Clamp onto the ground conductor and measure the ground current. The maximum range is 30A. If the ground current exceeds 30A, ground resistance measurements are not possible. Do not proceed further with the measurement. Remove the clamp-on from the circuit, noting the location for maintenance, and continue to the next test location.

Having noted the ground current, select the ground resistance range " $\Omega$ " and measure the resistance directly. The reading you measure with the ground tester indicates not just the resistance of the rod, but of the connection to the system neutral and all bonding connections between the neutral and the rod.

**Note:** A high reading indicates one or more of the following:

- A) poor ground rod
- B) open ground conductor
- C) high resistance bond on the rod or splices on the connector; watch for buried split butts, clamps, and hammer-on connections.



### These clamp-on testers are ideal for:

- Pole-mounted transformers
- Service entrances and meters
- Pad-mounted transformers
- Transmission towers
- Anywhere in your plant or building where access is limited

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