

# Clamp-On Ground Resistance Testing

The clamp-on ground resistance testing technique offers the ability to measure the resistance without disconnection the ground. This type of measurement also offers the advantage of including the bonding to ground and the overall grounding connection resistances.

## Principles of Operation

Usually, a common distribution line grounded system can be simulated as a simple basic circuit as shown in Figure A or an equivalent circuit, shown in Figure B. If voltage E is applied to any measured grounding pole Rx through a special transformer, current I flows through the circuit, thereby establishing the following equation.

$$E/I = R_x + \frac{1}{\sum_{k=1}^n \frac{1}{R_k}} \quad \text{where, usually} \quad R_x \gg \frac{1}{\sum_{k=1}^n \frac{1}{R_k}}$$

Therefore,  $E/I = R_x$  is established. If it is detected with E kept constant, measured grounding pole resistance can be obtained. Refer again to Figures A and B. Current is fed to a special transformer via a power amplifier from a 1.7 kHz constant voltage oscillator. This current is detected by a detection CT. Only the 1.7kHz signal frequency is amplified by a filter amplifier. This occurs before the A/D conversion and after synchronous rectification. It is then displayed on the LCD.

The filter amplifier is used to cut off both earth current at commercial frequency and high-frequency noise. Voltage is detected by coils wound around the injection CT, which is then amplified, rectified, and compared by a level comparator. If the clamp is not closed properly, an "open jaw" annunciator appears on the LCD.

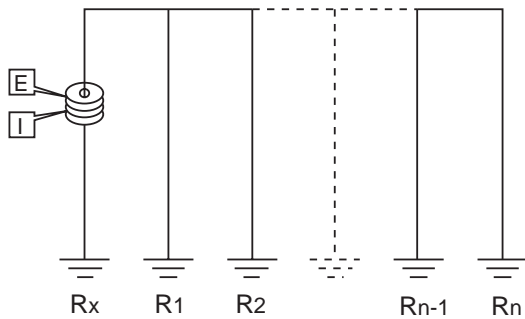


FIGURE A

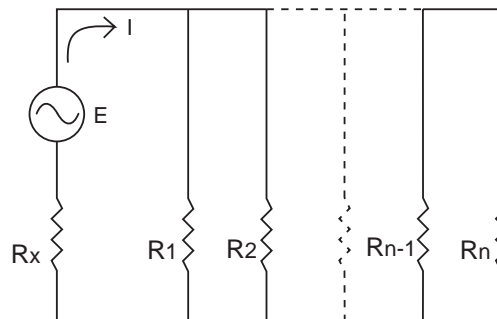


FIGURE B

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16 Midlake Blvd. S.E.  
 Calgary, Alberta T2X 2X7  
 (877) 766-5412 • (403) 256-3636  
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Chauvin Arnoux®, Inc. d.b.a. AEMC® Instruments  
 200 Foxborough Blvd.  
 Foxborough, MA 02035 USA  
 (800) 343-1391 • (508) 698-2115  
 Fax (508) 698-2118 • sales@aemc.com  
 App-Ground-Clamp-OnTesting-OptimumEnergy 01/05