OPERATING INSTRUCTIONS
for
AMPROBE
CLAMP-ON
GROUND RESISTANCE METER

Model DGC-1000

AMPROBE.
A United Dominion Company
Features Description

The clamp-on ground resistance tester enable the users to measure ground resistance of ground rod without the use of auxiliary ground rods. Clamp-on ground resistance tester can be used in multi-grounded systems without disconnecting the ground under test.

Precautions and Warnings

1. Use of rubber gloves is a good safety practice.
2. Safety is the responsibility of the operator.
3. Use extreme caution when using the instrument around energized electrical equipment.
4. Do not attempt to use the ground tester to twist or pry the ground electrode or ground wire away from the equipment being grounded.
5. All metal objects or wires connected to the electrical system should be assumed to be lethal until tested. Grounding system are no exception.

Definition of Symbols

⚠️ Caution: Refer to accompanying documents
⚠️ Caution: Risk of Electric Shock
☐ Double insulation

Overvoltage Category I (CAT I): Equipment for connection to circuits in which measures are taken to limit the transient overvoltages to an appropriate low level

Overvoltage Category II (CAT II): Energy-consuming equipment to be supplied from the fixed installation.

Overvoltage Category III (CAT III): Equipment in fixed installations.

Warning: If the clamp meter is used in a manner not specified by the manufacturer, the protection provided by the clamp meter may be impaired.

Front Panel

1. Jaws Assembly - To enclose electrode or ground wire. No air gap is allowed between two half jaws.
2. Hold Button - Press this button to hold the value in the LCD.
3. Rotary Switch - To turn power "On" and select function.
4. LCD - See Figure 2 for details
5. Trigger - Press trigger to open jaws
Panel Description

1. Digits - Display value from 0 to 9999 with decimal point.

2. Ohm - This symbol will be shown when in Ω and continuity functions.

3. mA - Display ground leakage current in mA or A

4. Continuity - This symbol will be shown when continuity function is selected.

5. Noise - When ground tester senses noise present in ground electrode or ground rod, this symbol will be shown in LCD

6. Jaw Open - When the jaw is open during measurement, this symbol and word OPEN will be shown in LCD.

7. Hold - When you see this symbol, there is a value on hold in the LCD.

8. Low Battery - When the battery voltage is lower than required, this symbol will be shown in LCD. Replace the battery with new battery (refer to section IX for replacement procedures).

Operating Instructions

A. Ground Resistance Measurement

1. Open the jaws and make sure the jaws mating surfaces are clean and free of dust, dirt or any foreign substance.

2. Snap (open and close) the jaws few times to let the jaws sit on the best mating position.

3. Turn the power on, set the rotary switch at Ω position. Do not clamp on to any conductor or open the jaws at this moment, during self calibration.

4. At powering on, clamp-on ground tester will do the self calibration for better accuracy. Users should wait for self calibration to be done. During the self calibration, LCD will show CAL7, CAL6, ..., CAL2, CAL1.

5. When the ground tester is ready, a beep sound will be heard.

6. Clamp on to the electrode or ground rod to be measured. Snap (open and close) the jaws few times for better accuracy.

7. Read the value of Rg (ground resistance) from LCD.

Notes:

For better measurement:
1. Snap (open and close) the jaws few times before powering on.
2. Do not clamp on to any conductor at the moment of powering on.
3. Snap the jaws few times after clamping on to ground electrode.

Note: If self calibration does not stop, it is because the self calibration is not complete. Ground tester will continue the process until a proper self calibration is done.
2. Check the jaw mating surfaces. If there is any dirt, dust, or any foreign substance, clean the surface.
3. Do not open the jaws during self calibration.

Note: Noise present in the electrode or ground rod.

If there is noise or a current of 30V in ground rod, a symbol or "NOISE" will be shown in LCD. Under the presence of noise, the reading is no longer accurate.

Note: If jaw assembly is opened during measurement, a symbol and word of "OPEN" will be displayed in LCD.
Operating Instructions

B. Continuity Loop Test

1. The testing procedures are the same as ground resistance measurement except a beep sound will be heard if resistance is less than 40Ω.

Fig. 3

C. Ground/Leakage Current Measurement

1. Turn the power on, and set the rotary switch at the mA or A position.
2. Clamp on to the electrode or ground rod.
3. Read the value of leakage current displayed in LCD.

Fig. 4

Principles of Operation

Figure 5 is a simplified typical grounded distribution system. Its equivalent circuit is shown in Figure 6. If R₁, R₂, R₃, ..., Rₙ are combined as Rₑq then only R₀ and Rₑq are left in the circuit (refer to Figure 7). If a constant voltage is applied to the circuit the following equation will be constructed:

\[
\frac{V}{I} = R₀ + Rₑq
\]

where

\[
Rₑq = \frac{\sum R_i}{n}, i=1,2,...,n
\]

If R₀ and R₁, R₂, ..., Rₙ are about the same, and n is a large number (such as 200), then Rₑq will be much less than R₀ and maybe approach zero.

\[
R₀ \approx (Rₑq \rightarrow 0)
\]

Example

If R₀ and R₁, R₂, ..., Rₙ are all 10Ω respectively and n = 200, then Rₑq by calculation equals

\[
Rₑq = \frac{1}{\frac{1}{10} + \frac{1}{10} + \ldots + \frac{1}{10}} = 0.05Ω
\]

\[
\frac{V}{I} = R₀ + Rₑq = 10 + 0.05 = 10.05 \rightarrow R₀
\]

In this example, we can see that as long as the number of multiple electrode is large enough, the equivalent resistance is negligible with respect to the ground resistance to be measured.
### Specifications

<table>
<thead>
<tr>
<th>Measurement Range</th>
<th>Resolution</th>
<th>Accuracy of Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.10 - 1500 A</td>
<td>2%</td>
<td>Ground Leakage Current</td>
</tr>
<tr>
<td>100 - 1000 mA</td>
<td>20</td>
<td>Low Impedance Module</td>
</tr>
<tr>
<td>35 - 60 A</td>
<td>1</td>
<td>High Impedance Module</td>
</tr>
</tbody>
</table>

**Principles of Operation**

- **Conductor Conducted**: Resonance Resistance Frequency: 500 KHz
- **Ground Leakage Module**: External Field: > 50 A/m, External Electrical Field: > 1 V/m

<table>
<thead>
<tr>
<th>Loop Resistance</th>
<th>Module Resistance</th>
<th>Accuracy of Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000 Ohm</td>
<td>100 Ohm</td>
<td>±0.1Ω ±0.001Ω ±0.0001Ω</td>
</tr>
<tr>
<td>5000 Ohm</td>
<td>500 Ohm</td>
<td>±0.2Ω ±0.002Ω ±0.0002Ω</td>
</tr>
<tr>
<td>10000 Ohm</td>
<td>1000 Ohm</td>
<td>±0.4Ω ±0.004Ω ±0.0004Ω</td>
</tr>
<tr>
<td>20000 Ohm</td>
<td>2000 Ohm</td>
<td>±0.8Ω ±0.008Ω ±0.0008Ω</td>
</tr>
<tr>
<td>40000 Ohm</td>
<td>4000 Ohm</td>
<td>±1.6Ω ±0.016Ω ±0.0016Ω</td>
</tr>
<tr>
<td>80000 Ohm</td>
<td>8000 Ohm</td>
<td>±3.2Ω ±0.032Ω ±0.0032Ω</td>
</tr>
</tbody>
</table>

**Safety Precautions**

- All specifications valid for 22°C ± 5°C temperature
**Battery Replacement**

1. Turn the power off.
2. Remove the screws of the bottom case.
3. Lift and remove the bottom case.
4. Remove the old battery.
5. Insert new battery.
6. Replace the bottom case and secure the screws.

**Specifications**

- **Dimensions:**
  - Height: 222 mm
  - Width: 100 mm
  - Depth: 47 mm

- **Operating Temperature:**
  - 4.0 to 29.0°C

- **Operating Humidity:**
  - Less than 85% relative

- **Battery Type:**
  - 9V alkaline

- **Power Consumption:**
  - 4.0 mA

- **Display:**
  - 4 digits 9999 counts LCD

- **Accuracy:**
  - ±0.1°C (±0.2°C at 25°C)

- **Response Time:**
  - 0.5 seconds (under normal conditions)