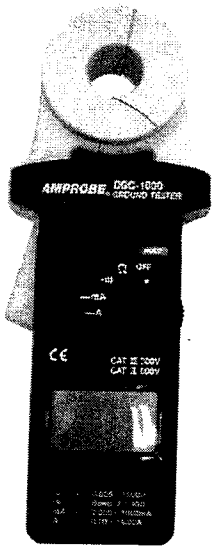
OPERATING INSTRUCTIONS
for
AMPROBE

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

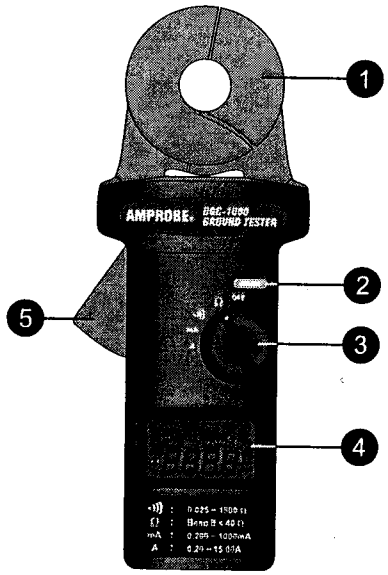


Fig. 1

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

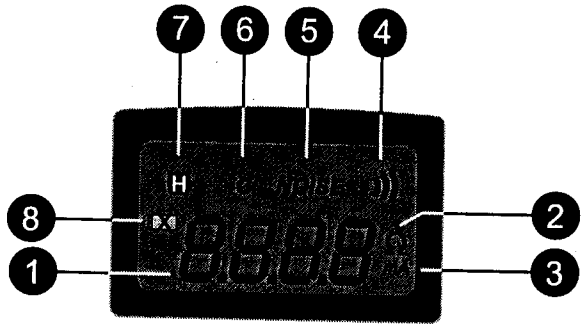


Fig. 2

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 replacemet 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 R_g (ground resistance) from LCD.

Note: 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,
1. That 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 more than 3A current or 30V in ground rod, a symbol of "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.

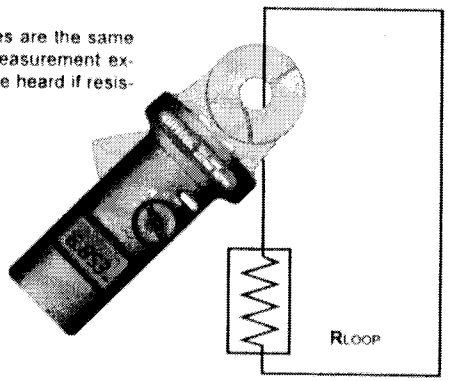


Fig. 3

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.

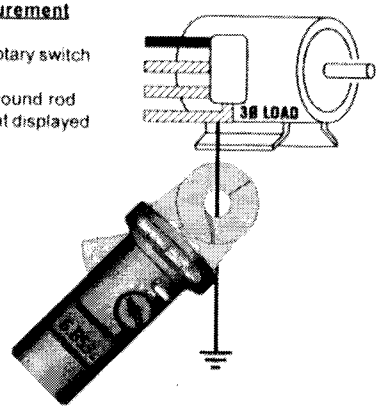


Fig. 4

Principles of Operation

Figure 5 is a simplified typical grounded distribution system. Its equivalent circuit is shown in figure 6. If R_1, R_2, R_3, ... R_n, is combined as R_{eq}, then only R_G and R_{eq}, are left in the circuit (refer to Figure 7). If a constant voltage is applied to the circuit, the following equation will be constructed.

$$\frac{V}{I} = R_G + R_{eq}$$

where

$$R_{eq} = \frac{1}{\sum \frac{1}{R_i}}, i = 1, 2, \ldots, n$$

If R_G and R_1, R_2, ... R_n, are about the same, and n is a large number (such as 200), then R_{eq}, will be much less than R_G and maybe approach zero.

$$R_G \gg (R_{eq} \rightarrow 0)$$

Example:
If R_G and R_1, R_2, ... R_n, are all 10Ω, respectively and n = 200, then R_{eq} by calculation equals

$$R_{eq} = \frac{1}{\frac{1}{10} + \frac{1}{10} + \ldots + \frac{1}{10}} = 0.05\Omega$$

$$\frac{V}{I} = R_G + R_{eq} = 10 + 0.05 = 10.05 \rightarrow R_G$$

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.

Principles of Operation

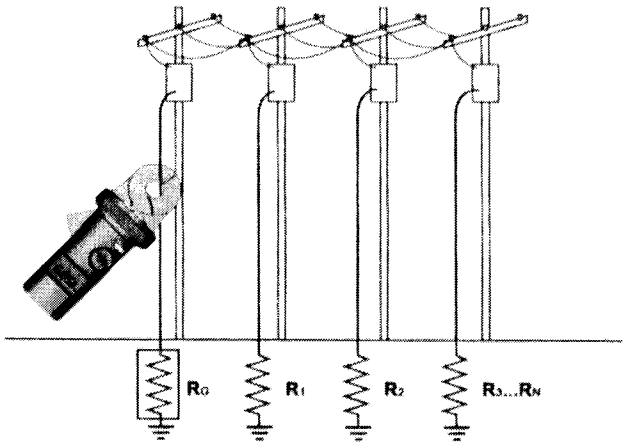


Fig. 5

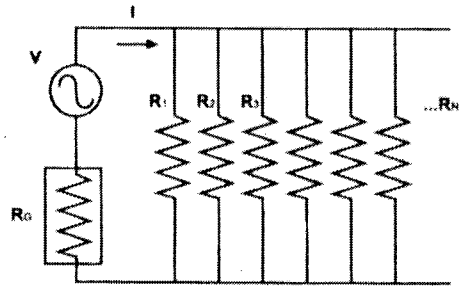


Fig. 6

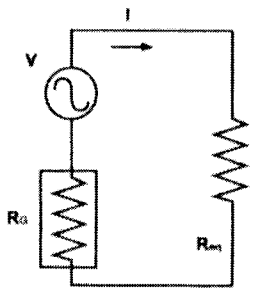


Fig. 7

Specifications

All specifications rated for 23°C ± 5°C Temperature

Ground Resistance (Autorange):

Measurement Range	Resolution	Accuracy of Reading[1]
0.025 - 0.250 Ω	0.002 Ω	± 1.5% ± 0.05Ω
0.250 - 9.999 Ω	0.02 Ω	± 1.5% ± 0.1Ω
10.00 - 99.99 Ω	0.04 Ω	± 2.0% ± 0.3Ω
100.0 - 199.9 Ω	0.4 Ω	± 3.0% ± 1.0Ω
200.0 - 400.0 Ω	2 Ω	± 5.0% ± 5Ω
400.0 - 600.0 Ω	5 Ω	± 10% ± 10Ω
600.0 - 1500 Ω	20 Ω	± 20% (aprox.)

[1] Loop resistance noninductive, external field < 50 A/m, external electrical field < 1 V/m, conductor centered

[2] Resistance Measurement Frequency: 1.667 KHz

Continuity

Beep if resistance < 40.00 Ω (Approximately)

Ground / Leakage Current
(Autorange, 50/60 Hz, True RMS, Crest Factor < 3.0)

Measurement Range	Resolution	Accuracy of Reading
0.200 - 1.000 mA	0.001 mA	± 2.5% ± 0.05 mA
1.00 - 10.00 mA	0.01 mA	± 2.5% ± 0.05 mA
10.0 - 100.0 mA	0.1 mA	± 2.0% ± 0.3 mA
100 - 1000 mA	1 mA	± 2.0% ± 3 mA
0.20 - 1500 A	0.01 A	± 2.0% ± 0.03 A

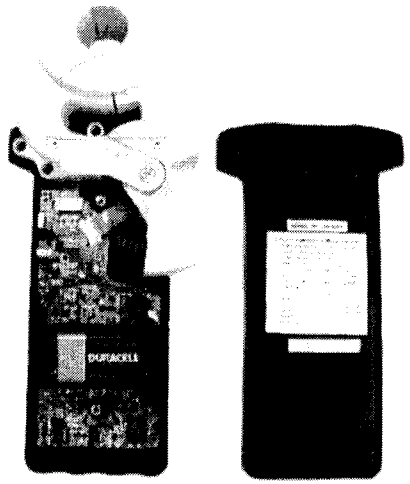
Specifications

Temperature Coefficient (4 - 18°C and 28 - 50°C)
0.15* (specified accuracy) / °C

Conductor Size:	0.9" (23mm approx.)
Battery Type:	9V Alkaline
Display:	4 Digits 9999 counts LCD
Range Selection:	Auto
Overload Indication:	OL
Low battery Indication:	[X]
Power Consumption:	40 mA
Sampling Time:	0.4 sec
Operating Temperature:	14°F to 122°F (4°C to 50°C)
Operating Humidity:	less than 85% relative
Storage Temperature:	-14°F to 122°F (-20°C to 60°C)
Storage Humidity:	less than 75% relative
Dimension:	257mm (L) x 100mm (W) x 47mm (H)
	10.7" (L) x 3.9" (W) x 1.9" (H)
Weight:	1.4 lbs. (640 g) batteries included
Accessories:	Carrying bag x 1
	Users anual x 1
	9V battery x 1 (Installed)
	Resistance calibration plate x 1

Current Overload Protection:
100A Continuous, 200A (<60 seconds) 50/60 Hz.

Battery Replacement



When the low battery symbol is displayed on the LCD, replace the old battery with new battery.

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 9V battery.
6. Replace the bottom case and secure the screws.

WARNING: Do not touch or adjust any parts inside the power clamp when the bottom case is open.

Maintenance & Cleaning

Servicing not covered in this manual should only be performed by qualified personnel. Repairs should only be performed by qualified personnel.

Periodically wipe the case with a damp cloth and detergent, do not use abrasive or solvents.

Notes