GAZELLE®

G9305

Operating Manual



Digital Earth Tester

1.Safety Information

This operation manual includes the safety information related to the operation of the tester, please read them carefully before using the tester.

- Before using the Tester, please read and understand the operating manual.
- Please keep the Operating Manual properly for future use.
- Use the Tester as specified in the Operating Manual.
- Please understand in detail the Safety Information section of the manual.
- Strictly follow the Safety Information, otherwise it may cause personal injury or damage to the Tester.

Safety sign " ⚠ "has 3 meanings in this manual, the user has to pay attention to this sign " ⚠ " during operation.

Danger — identifies conditions and actions that most likely pose severe or fatal hazard(s) to the users
Warning — identifies conditions and actions that may pose severe or fatal hazard(s) to the users.
Caution — identifies conditions and actions that will pose hazard(s) or damage the Tester.

⚠ **Danger**

- Do not use the Tester around explosive environment, which may cause fire and explosion.
- Do not make any connections when the Tester is wet or the operator's hands are wet.
- Do not apply any voltage beyond the rating or specified range of the Tester.
- Do not open battery compartment while testing.

⚠ **Warning**

- Do not use the Tester if it is damaged or metal part is exposed.
- Do not disassemble the tester randomly. If it needs repair, please contact our after-sales services or our agents.
- Do not change battery or open battery compartment when the Tester is wet. clean it with dry soft cloth first.
- Make sure the Tester is turned off when changing battery or opening the battery compartment.

⚠ **Caution**

- Ensure test lead is inserted into the corresponding port before measurement.
- Take the battery out from the Tester if it is not used for a long time.
- Do not expose the Tester in extreme temperature and wet environment.
- Soft cloth and mild detergent should be used to clean the surface of the Tester No abrasive and solvent should be used
- Dry the tester before storing if it is wet.

Electrical Symbols are used on the Tester or in the manual:

⚠ danger, warning, caution	double or reinforced insulation
~ AC	Grounding
CE Conforms to Standards of European Union	

2.Features

The Tester is designed with intelligent micro-controller chip to maintain high accuracy and reliability. It can measure earth resistance of earth ground devices for electric power installations, electrical appliances, lightening protection systems, etc, and also measure earth voltage(It is highly recommended not to use the Tester under severe outdoor environments such as raining or thunder).

- Backlight LCD;
- Battery Check;
- Data Hold& Data Storage(up to 20 sets);
- Auto Power Off;
- Offers Precision Three-Wire & Simple Two-Wire Measurements;
- "- - - - Ω" Indication for Bad Connection to C or E Terminal When Measuring Earth Ground Resistance;
- "OL" Overloaded Indication;
- Double-or Reinforced-Insulated Structural Design.

3.Technical Specifications Specifications

Measuring range and accuracy(under 20℃±5℃&⩽75%RH):

Functions		Measure Range	Best Accuracy
Earth Voltage		0V~400V(50/60Hz)	±(1.0%+6)
Earth Resistance	40Ω	0.00Ω~40.00Ω	± (2.0%+20) (40Ω range)
	400Ω	0.0Ω ~400.0Ω	± (2.0%+3)(400Ω or 4000Ω range)
	4000Ω	0Ω ~4000Ω	(Auxiliary earth resistance 500Ω (accuracy ±5%);earth voltage ⩽10Vac)

Compliances:

IEC 61010-1 CATIII 600V; Pollution Degree 2
IEC 61557-1,5
IEC 61010-2-31

Measure modes:

(1) Earth Voltage measurement: average respond
(2) Earth Resistance measurement: test signal frequency : around 820Hz, current: around 3.2mA at 40Ω range.

Measuring scope (Max. deviation:±30%):

40Ω Range: 5.00Ω ~40.00Ω
400Ω Range: 40.0Ω ~400.0Ω
4000Ω Range :400Ω ~4000Ω

Working condition:

Temperature:5ºC~40ºC
Relative humidity:⩽80%RH(no fog)
Altitude:⩽2000 m

Storage condition:

Temperature:-20ºC~60ºC
Relative humidity:⩽75%RH(no fog)

Power: [1.5V Alkaline Battery (AA)*6]

Overload protection:

Earth resistance ranges: 200 Vac (10 seconds)
Earth voltage ranges: 600 Vac (30 seconds)

Insulation impedance:

＞20MΩ between measure circuits and the casing.

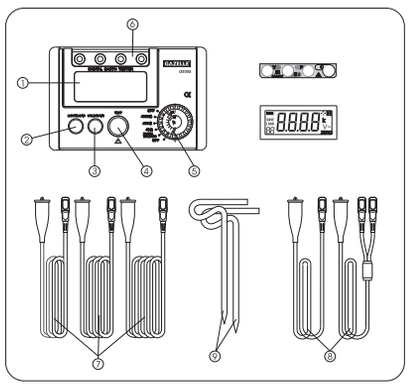
Product size: 160mmx70.5mmx100mm.

Product Weight: around 560g.

Accessories:

Green test lead (5m)	1 pc
Yellow test lead (10m)	1 pc
Red test lead (20m)	1 pc
Auxiliary earth stakes	2 pcs
Simple test leads with alligator clips	1 set
1.5V Alkaline Battery (AA)	6 pcs
Carrying bag	1 set
English manual	1 pc

4. Tester Structure&Accessories (Figure 1)



① LCD Display
② LIGHT/LOAD button
③ HOLD/SAVE button
④ TEST button
⑤ Rotary switch
⑥ Input terminals
⑦ Standard 3-Wires test leads
⑧ Simple 2-Wires test leads
⑨ Auxiliary earth stakes

Figure 1

5. Preparation before measurement

5.1 Battery Check: Set the rotary switch to earth voltage or earth ground resistance ranges, if " ▭ " shows, it indicates the battery is very low and needs to be replaced timely, otherwise the Tester may be unable to work normally.

Battery sign	Battery Voltage
▮▮▮▮	⩾8.2V
▮▮▮	7.8V~8.2V
▮▮	7.4V~7.8V
▮	7.0V~7.4V
▭	⩽ 7V

5.2 Test Leads Connection

Make sure all the test leads are firmly connected to the Tester input terminals; Poor connection will affect measurement accuracy.

6. Making Measurements

> ⚠**Warning**
> The voltage up to 50Vac will be present between E and C input terminals during earth ground resistance measurement. To avoid any electric shock, do not touch exposed metal part of test leads and auxiliary earth stakes.

6.1 Precision Measurement (with use of standard test leads)

a. Insert P and C earth stakes deep into the soil, make sure the earth stakes and tested object are in a straight line and at a distance of 5m~10m from each other. See Figure 2 for the wire connections
(Note: Ensure the earth stakes are inserted into damp soil, if the soil is dry, fill in enough water. Stony or sandy soils also need to be dampened before test. If the test sites are covered with concrete in the city area, which makes it impossible to insert the ground stakes, you can place two 25cmx25cm steel plates (or the auxiliary stakes) horizontally on the concrete, cover them with towels damped sufficiently with enough water, then measuring electrodes are produced and under general circumstances, the measurement can begin now.)

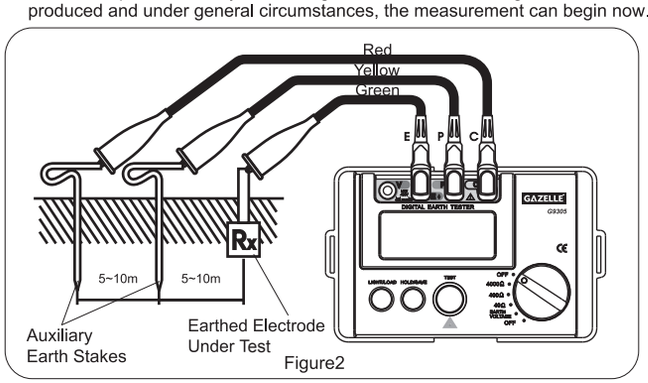


Figure2

C: auxiliary electrode P: potential electrode E: earth electrode

b. Measuring Earth Voltage:

1) Set the rotary switch to EARTH VOLTAGE, LCD shows the Tester enters into earth voltage test status.
2) Insert test leads into V and E terminals and then connect them to tested points. (Do not make any connection to other terminals)
3) The measured earth voltage shows on LCD(No need to press TEST button). If the measured voltage is ＞10V, please switch off all related electrical equipments and wait until this voltage decreases before you makes any earth resistance measurement, otherwise it may affect the accuracy of earth resistance measurement.

⚠**Warning:**
Only V and E input terminals are used for earth voltage measurement, do not make any connection to C and P terminals. Otherwise, it will cause danger and damage the Tester.

c. Measuring Earth Ground Resistance:

1) Set the rotary switch to earth ground resistance 4000Ω range.
2) Press “TEST” button, the button will be illuminated, indicating the instrument is under measurement status. And LCD shows the measured earth resistance value.

If measured earth resistance:＜400Ω, turn the rotary switch to 400Ω range;
＜40Ω, turn the rotary switch to 40Ω range;

Or you can select earth resistance range in an order you like, however, to obtain accurate value, make sure you have selected the best range for your measurement.

⚠**Caution:**

- If C or E input terminal is not well contacted, or auxiliary earth resistance or measured earth ground resistance is too large or input terminal are opened (＞14kΩ at 40Ω range), the LCD will show “- - - -Ω”. Please check if the test leads are firmly connected or the soil is too dry or the auxiliary earth stake has been properly inserted into the earth or not.
- When measured earth resistance is out of range, and it is＜14kΩ at 40Ω range or ＜26kΩ at 400Ω range or ＜78kΩ at 4000Ω range, LCD will show “OL” icon (Overloaded).
- The reading may be affected if auxiliary stakes are bent or in contact with other objects. So please clean the earth stakes before connecting the test leads, otherwise it may cause deviations to the readings if the auxiliary stake has a large resistance.

d. Auto Power Off: The Tester will automatically switch off to conserve the energy after the buttons and rotary switch keep inactive for 10 minutes (except under earth resistance test status.)

e. Backlight: When making measurements in dimly lit sites, press “Light/Load” button to turn on the backlight, and its icon indicates on LCD accordingly. Press again to turn off the backlight.

f. Data Hold: During the measurement, gently press “Hold/Save” to freeze the measured value, indicated by HOLD icon on LCD, press again to disable the function.

g. Data Storage:

1. Save Data: Long press “Hold/Save” button for 2seconds to enable Data Save function and meanwhile save the data accordingly, then gently press the button again to save the second set of data, circulate so on and so forth. To cancel the function, long press “Hold/Save” for 2s to exit.

2. View Data: Long press “Light/Load” for 2s to recall NO.01 data, then gently press the button to recall NO.02 data…. up to 20sets of data. To return to previous set, gently press “Hold/Save” button.(Under this status, “Hold/Save” and “Light/Load”(gently press) buttons are used as Up and Down buttons). To exit the function, long press “Light/Load” button for 2s.

3. Clear Data

press"Hold/Save"button and "Light/Load"button simultaneously, then switch-on the Tester, LCD display will show"C L .",
Meanwhile, all the data in the memory will be deleted(no matter whether the memory is full or not).

6.2 Simple Measurement (with use of simple test leads):

This method is applied when auxiliary stake is impossible to use, which uses an exposed object with low earth resistance as one electrode, such as metal water slot, pipe, common earth of power supply wiring, earth ground terminal of buildings, etc.(using E and P&C terminals).
See Figure 3 for wire connection:

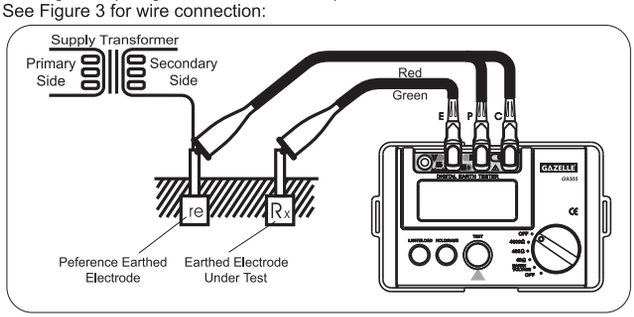


Figure 3

When using this method, P and C have already been connected together.

> ⚠ **Danger**
> Please take extreme caution about the electric shock when using earth ground terminal of commercial power system as a reference test point.

7. Maintenance & Repair

7.1 Maintenance

7.1.1 Replacing the Battery (See Figure 4)
Please replace the battery timely when low battery indicator shows. Follow the steps as below:

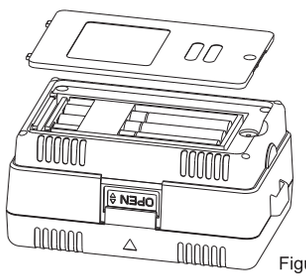


Figure 4

a. switch-off the Tester and remove all the test leads.
b. release the screw in bottom part,and open battery compartment.
c. Replacing all old battery (6) with new battery.
d. After replacing the battery, rejoin the battery compartment and firmly screw. Remove all the batteries if not used for a long time in order to avoid the leakage and corrosion in the battery compartment.

7.1.2 Cleaning the Tester
Soft cloth and mild detergent should be used to clean the surface of the Tester, no solvent or alcoholic is allowed for it may damage the display.

7.1.3 Protection from Moisture

7.2 Repair

7.2.1 Contact our after-sales service department or agents when the following incidents:
a. The Tester is being damage.
b. LCD display abnormally.
c. Unreasonable deviation when in normal use.
d. Buttons do not function properly.

7.2.2 when the Tester needs repair, please have it serviced by qualified professional personnel or authorized service center.

END

This operating manual is subject to change without notice.