



EARTH RESISTANCE/SOIL RESISTIVITY TESTER

ERT-40R



MANUAL

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Precaution for Use

Thanks for your purchase our product of **ERT-40R Earth Resistance/Soil Resistivity Tester**. In order to better for use of the product, please be certain:

---Read this user manual in details.

---Comply with the operating cautions in this manual.

- ◆ The tester is according IEC61010 safety requirements to design, production and test.
- ◆ The USB interface of the instrument and the internal circuit are non-isolated interfaces. It is strictly forbidden to connect the computer when the voltage is tested. Otherwise, the instrument may be burned out or an electric shock accident may occur. The voltage test line must be unplugged from the meter before the USB data cable can be connected to the computer and read the data. Online monitoring in the instruction does not apply to monitoring voltages.
- ◆ Under any circumstance, shall pay special attention on safety in using this tester.
- ◆ Pay attention about words and symbols stick on the tester.
- ◆ It shall make sure that tester and accessories are in good condition before use; it can be used only there is no damaged, naked or broken part on testing wires and insulation layer.
- ◆ During measurement, it is forbidden to touch bare conductors and circuit under measurement.
- ◆ Before measurement, please confirm **FUNCTION** rotary switch position.
- ◆ Confirm that connector plug of lead has been inserted in the tester interface closely.
- ◆ Please don't supply over 600V grounding voltage between testing device and interface. Otherwise, it may damage the meter.
- ◆ Please don't measure in an inflammable environment. The flame sparkle may cause explosion.
- ◆ During usage, please stop to using when exposed metal is caused by outside shell or testing wires broken.
- ◆ Do not place and store the tester for a long time under high-temperature and humidity, condensation and direct sunlight.
- ◆ If the instrument is wet, please store after drying.
- ◆ Please confirm that the test wire has been removed from the meter before charging. The battery is a rechargeable battery pack, and must be charging with the designated charger.
- ◆ The meter has automatic shutdown function.

- ◆ When the meter displays battery low voltage symbol , should charge the battery, and the green light indicates the completion of charging.
- ◆ If the tester is not going to be used for a long period, Please charge the battery every 1 ~ 2 months.
- ◆ Pay attention to measuring range and usage environment stipulated for the Tester.
- ◆ Use, disassembly, calibration, and repair of this tester must be performed by authorized personnel.
- ◆ Due to the reason of this instrument, if it is dangerous to continue to using, should be stopped and sealed immediately, and handled by an authorized institution.
- ◆ The safety warning signs  in the manual must be safely operated by the user in strict accordance with these manual contents.

1. Introduction

ERT-40R Earth Resistance Soil Resistivity Tester is specially designed and manufactured for on-site measurement of earth resistance, soil resistivity, earth voltage. Apply digital processing technology, precision 4-wire method, 3-wire method and simple 2-wire method to measure grounding resistance; Adopt FFT (fast Fourier transform) technology, AFC (automatic frequency control) technology, automatic identification of interference and selection of measurement frequency, to minimize the impact of interference, provide more accurate earth resistance value. With unique anti-interference ability and environmental adaptability, high repeated test consistency, ensuring high precision, high stability and high reliability for long-term measurement. The tester case is made of waterproof protection box, anti-collision, anti-drop, waterproof (protection grade IP65), strong and durable, and also equipped with a large-capacity rechargeable lithium battery pack, especially suitable for outdoor construction. Widely used in power, telecommunications, meteorology, oil fields, construction, lightning protection and industrial electrical equipment, such as grounding resistance, soil resistivity, grounding voltage.

ERT-40R Earth Resistance Soil Resistivity Tester is composed of host machine, monitoring software, testing wires, auxiliary ground pillars, communication wires etc. The large LCD display of host machine, with white backlight and bar graph indicating that can be seen clearly. At the same time it can store 300 sets of data, fulfilling historical inquiry and online real-time monitoring through monitoring software, dynamic display, alarm indicator, and with the functions as historical data access, reading, preservation, report forms, printing and so on.

ERT-40R Earth Resistance Soil Resistivity Tester also named: Precision Earth Resistance Tester, 4-pole Earth Resistance Tester, 2/3/4-pole Earth Resistance Tester, Soil Resistivity Tester.

Model Category

Product Name	Model	Function	Remark
Earth resistance / Soil Resistivity Tester	ERT-40R	Earth resistance test Earth voltage test Soil resistivity test	
Double Clamp Earth Resistance Tester	ERT-50R	Earth resistance test Earth voltage test Soil resistivity test Current, leakage current test	


2. Technical Specifications

2.1. Base Conditions and Working Conditions

Influence Constant	Base Condition	Working Conditions	Remark
Ambient Temperature	23°C±1°C	-10°C-40°C	----
Ambient Humidity	40%-60%	< 80%	----
Working Voltage	DC 7.8V±0.1V	DC 7.8V±0.6V	---
Auxiliary Earth Resistance Value	<100Ω	<30kΩ	---
Interference Voltage	None	<20V	----
Interference Current	None	<2A	
Electrode Distance of measuring R	a>5d	a>5d	----
Electrode Distance of measuring ρ	a>20h	a>20h	----

2.2. General Specification

Function	2/3/4-pole measurement for earth resistance, soil resistivity, earth voltage
Power Supply	DC 7.4V 2600mAh rechargeable lithium battery, full of about 8.4V
Measurement Range	Earth Resistance: 0.00Ω-30.00kΩ
	Soil Resistivity: 0.00Ωm-9000kΩm
	Earth Voltage: 0V~600V
Measurement Mode	Precise 4-pole measurement, 3-pole measurement, simple 2-pole measurement of earth resistance
Measurement Method	Earth Resistance: rated current change-pole method, test current 20mA Max Soil Resistivity: 4-pole method (Wenner method) Earth Voltage: average rectification(between P(S)-ES)
Test Frequency	128Hz/111Hz/105Hz/94Hz(AFC)
Short-circuit Test Current	AC 20mA max
Open-circuit Test Voltage	AC 40V max
Test Voltage Wave	Sine wave
Electrode Distance Range	1m-100m
Shift	Earth resistance: 0.00Ω-30.00kΩ automatic shift
	Soil Resistivity: 0.00Ωm-9000kΩm automatic shift
Backlight	Controllable white screen backlight, suitable for dim places
Display Mode	4-digital super-large LCD display, white screen backlight
Measurement Indicator	During measurement, LED flash indicator, LCD count down display, progress bar indicator
LCD Frame Dimension	128mm×75mm
LCD Display Area	124mm×67mm
Meter Dimension	280mm(L)×260mm(W)×160mm(H)
Standard Test Wire	4 wires: each for red 20m, black 20m, yellow 10m, and green 10m
Simple Test Wire	2 wires: each for red 1.6m and black 1.6m

Auxiliary Ground Rod	4 wires: $\Phi 10\text{mm} \times 250\text{mm}$
Measurement Rate	Voltage to earth: about 3 times/second
	Earth resistance, soil resistivity: about 5 seconds/time
Measuring Times	Over 5000 times (Short-circuit test, interval time should be at least 30 seconds)
Circuit Voltage	below AC 600V
Communication Interface	USB interface, software monitoring, storage data can be uploaded to computer, saved or printed.
Communication Wire	USB communication cable 1PCS, length 1.5m
Data Storage	300 sets, " MEM " symbol storage indicator, flash display " FULL " symbol indicate storage full
Data Hold	Data hold function: " HOLD " symbol display
Data Access	Data read function: " READ " symbol display
Overflow Display	Over range overflow function: " OL " symbol display
Interference Test	Recognize interference signal automatically, " NOISE " symbol display when interference voltage exceed 5V
Auxiliary Earth Test	With auxiliary earth resistance test function, $0.00\text{k}\Omega$ - $30\text{k}\Omega$ ($100\text{R}+\text{rC}<50\text{k}\Omega$, $100\text{R}+\text{rP}<50\text{k}\Omega$)
Alarm Function	Measurement value exceeds alarm setting value, will "Toot-toot-toot" alarm hint
Auto-shut off	Automatically shut down after 10 minutes of power on
Battery Voltage	While battery voltage decreases to around 7.5V, will display battery voltage low symbol "  ", and reminding to charge
Working Power	Standby: about 20mA (Backlight shut off)
	Boot up and with backlight: about 45mA (25mA without backlight)
	Measurement: about 100mA (Backlight shut off)
Weight	Tester: 2290g
	Tester bag: 915g
	Test wires: 1560g
	Auxiliary ground rods: 935g (4pcs)
Working Temperature &	-10°C - 40°C , below 80%rh

Humidity	
Storage temperature & humidity	-20℃-60℃, below 70%rh
Overload Protection	Measuring earth resistance: between each interfaces of C(H)-E 、 P(S)-ES , AC 280V/3 seconds
Protection Level	IP65(close the case)
Insulation Resistance	Over 20MΩ (between circuit and enclosure it is 500V)
Withstand Voltage	AC 3700V/rms (Between circuit and enclosure)
Electromagnetic Features	IEC61326(EMC)
Protection Type	IEC61010-1 (CAT III 300V、CAT IV 150V、Pollution 2), IEC61010-031, IEC61557-1 (Earth resistance), IEC61557-5 (Soil resistivity), JJG 366-2004

2.3. Intrinsic error and performance indicators under base conditions

Measurement Function	Measurement Range	Accuracy	Resolution
Earth Resistance (R)	0.00Ω-30.00Ω	±2%rdg±3dgt	0.01Ω
	30.0Ω-300.0Ω	±2%rdg±3dgt	0.1Ω
	300Ω-3000Ω	±2%rdg±3dgt	1Ω
	3.00kΩ-30.00kΩ	±4%rdg±3dgt	10Ω
Soil Resistivity (ρ)	0.00Ωm-99.99Ωm	$(\rho=2\pi aR \quad a:1$ $m\sim 100m;$ $\pi=3.14)$	0.01Ωm
	100.0Ωm-999.9Ωm		0.1Ωm
	1000Ωm-9999Ωm		1Ωm
	10.00kΩm-99.99kΩm		10Ωm
	100.0kΩm-999.9kΩm		100Ωm
	1000kΩm-9000kΩm		1kΩm
Earth Voltage	AC 0.0-600V	±2%rdg±3dgt	0.1V

Note: 1. **rC** max or **rP** max, additional error≤±3%rdg±5dgt.

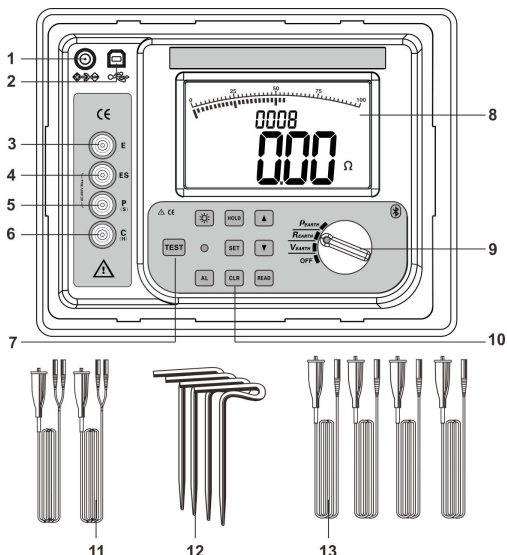
(**rC** max: 4kΩ+100R<50kΩ, **rP** max: 4kΩ+100R<50kΩ)

2. Interference voltage with 5V, additional error≤±5%rdg±5dgt.

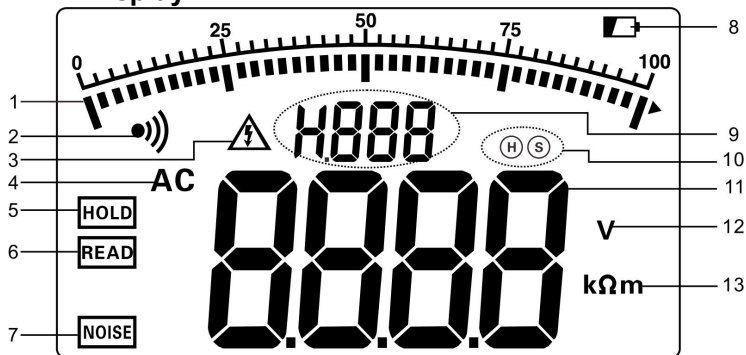
Warning: Voltage measurement is strictly prohibited when the instrument is charged, connected to a computer, or supplied with external power

3. Tester Structure

- 3.1. Charge interface
- 3.2. USB Interface
- 3.3. E interface: Earth electrode
- 3.4. ES interface:
Auxiliary earth electrode
- 3.5. P(S) interface:
Voltage electrode
- 3.6. C (H) interface:
Current electrode
- 3.7. TEST button
- 3.8. LCD display screen
- 3.9. Rotary switch
- 3.10. Button area
- 3.11. Simple test wires
- 3.12. Auxiliary grounding rod
- 3.13. Test wires



4. LCD Display



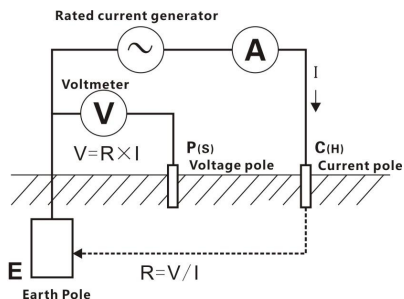
- 4.1. Test progress bar (Dynamic display the progress of test)
- 4.2. Alarm indicator symbol (Start alarm function will display, exceed the alarm value will flash display).
- 4.3. Exceed voltage symbol (Measure voltage exceed 30V will display, remind and pay attention to safety)
- 4.4. AC indicator

- 4.5. Data hold symbol (Press **HOLD** to hold data and display)
- 4.6. Data access symbol (Long press **READ** for at least 3 seconds to access data and display)
- 4.7. Interference signal symbol (Interference voltage exceed 5V will display)
- 4.8. Low battery symbol (Battery voltage below 7.5V will display)
- 4.9. Display the group number of stored data, and display countdown.
- 4.10. Interference electrode symbol (The electrode exceed 5V interference voltage will display)
- 4.11. Test data
- 4.12. Voltage unit symbol
- 4.13. Resistance, soil resistivity, length unit symbol (Ω , $k\Omega$, Ωm , $k\Omega m$, m)

5. Measurement Principle

5.1. Earth voltage measurement adopts average value rectification method.

5.2. Earth resistance measurement with rated current change-pole method. that is, the AC rated current I flows between the measuring object E grounding pole and the $C(H)$ current pole, The potential difference V between the grounding pole of the E and the voltage of the $P(S)$ voltage, and the grounding resistance value R is calculated according to the formula $R=V/I$. In order to ensure the accuracy of the test, the 4-wire method is used to increase the ES -assisted ground pole. In actual test, the ES and E are clamped at the same point of the grounding body. The 4-wires method can eliminate influence of contact resistance (usually result from dirty or rusty) between the tested grounding body, auxiliary ground rods, test clips, meter input interface. The 4-wires method can also eliminate influence of line resistance, more precision.

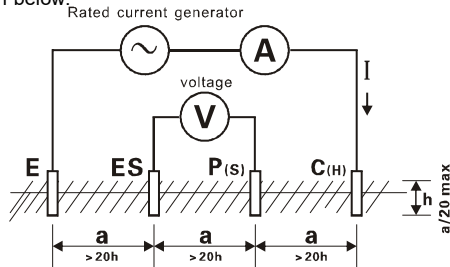


5.3. In the above methods, the working error (B) is the error obtained within the rated working conditions, which is calculated from the inherent error (A) and variation error (E_i) of the tester.

$$B = \pm (|A| + 1.15 \times \sqrt{E_2^2 + E_3^2 + E_4^2 + E_5^2})$$

- A: Intrinsic error
- E2: Variation due to power supply voltage
- E3: Variation due to temperature change
- E4: Variation due to interference voltage change
- E5: Variation due to contact electrode resistance

5.4. The Soil resistivity (ρ) measure by 4-pole method (wenner method): the AC current I flows between grounding electrode E and current electrode $C(H)$, get the potential difference V between $P(S)$ voltage electrode and ES auxiliary grounding electrode, the potential difference V divided by AC current I to get the middle of two resistance value R , the electrode distance is $a(m)$, then soil resistivity is got according to formula $\rho=2\pi aR(Qm)$. If the electrode distance of $C(H)-P(S)$ is equal to $P(S)-ES$ (both a) which is Wenner method. In order to convenience the calculation, please make electrode distance a far more than embedding depth h , generally should meet $a>20h$, as shown below.




6. Operation Methods

6.1. Switch On/Off

Rotary knob to switch the machine, and the knob indicates the "OFF" position to turn OFF. This meter has no automatic shutdown function, please shut down after use, in case the battery is exhausted.

6.2. Battery Voltage Check

After power on, if the LCD displays the battery voltage low symbol "  " indicating that the battery is low, please follow the instructions to replace the battery. The battery power is sufficient to ensure the accuracy of the measurement.

6.3. 4-wires Precise Earth Resistance Measurement

In the testing of the grounding resistance, firstly confirm the grounding voltage value of the grounding wire, that is, the voltage value of $C(H)$ and E or $P(S)$ and ES must be below 20V. If the grounding voltage is higher than



5V, the meter displays the **NOISE** symbol, and the measurement of the grounding resistance may cause an error. At this time, the grounding device be tested should powered off, ensure the grounding voltage is lowered and then test the grounding resistance again

4-wires test: The 4-wire test eliminates the influence of the contact resistance between the surface of the grounded body, the auxiliary grounding rod, the test clamp, and the instrument input interface (usually with dirt or rust) on the measurement, and eliminates the effect of the line resistance change on the measurement. Better than the 3-wire test.

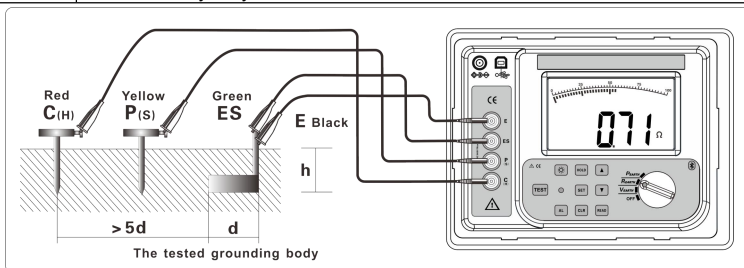
As shown in the figure below: Begin the object is measured, in general interval 5-20m, the **P(H)** and **C(H)** auxiliary grounding rods are buried in the ground in a straight line, and the grounding test wires (black, green, yellow, red) from the **E** , **ES,P(S)** and **C(H)** of the tester interface corresponding connect to be tested of the grounded electrode **E** , the auxiliary voltage pole **P(S)**, and the auxiliary current pole **C(H)**.



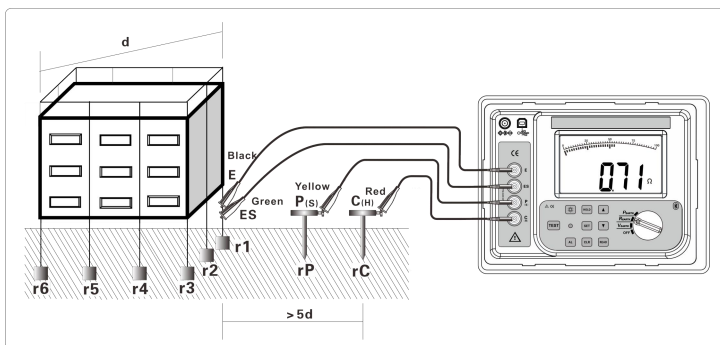
The distance between the grounding body **E** to the current pole **C(H)** should be at least 5 times the subsurface depth (**h**) of the tested grounded body, or the buried ground electrode length (**d**) of the grounded body to be tested 5 times.

Measure the total grounding resistance of a complex grounding system with a distance **d** should be the distance from the largest diagonal of the grounding system.

The test leads cannot be entangled with each other in testing; otherwise the test accuracy may be affected.



For multi-point independent grounding systems or larger grounding grids, users can choose a longer test wires. The distance between electrodes is 5 times longer than the maximum diagonal of the tested ground grid, as shown below:



$R=r1 // r2 // r3 // r4 // r5 // r6 // \dots // rn$ ($r1 \dots rn$ are all independent grounding points)

R —the reading value on meter, the total grounding resistance value of the whole grounding system

$r1 \dots m$ —All are independent grounding points, the grounding bodies are not connected under the ground

rC —The earth resistance of auxiliary current electrode $C(H)$.

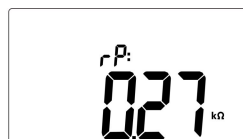
rP —The earth resistance of auxiliary voltage electrode $P(S)$.

n —The number of independent grounding point, the more points, the smaller of R value

After wires connection, firstly rotate rotary switch to “ R_{EARTH} ” and enter the grounding resistance test mode, press “**TEST**” button to start testing. During the test, there is a countdown indication and a test progress bar graph indication. After the test is completed and display stable data which is the grounding resistance value R of the grounded body to be tested.

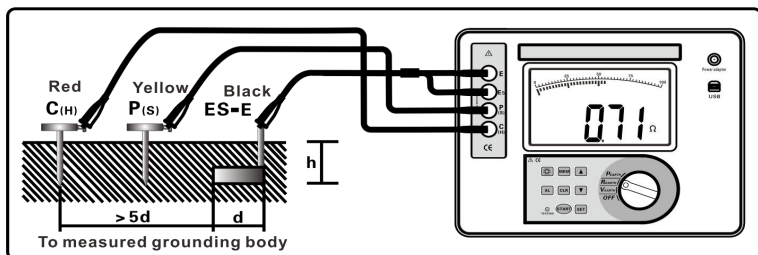
After testing, Press “**SET**” button again to check the grounding resistance value rC , rP , rC , rP of the auxiliary current pole $C(H)$ and the auxiliary voltage pole $P(S)$, automatic return and display the ground resistance value R .

As shown below, The tested grounding resistance value is 2.05Ω , the tester has stored 8 sets of data; the auxiliary current pole $C(H)$ of grounding resistance value rC is $0.36k\Omega$; the auxiliary voltage pole $P(S)$ of grounding resistance value rP is $0.27k\Omega$.



6.4. 3-Wires Earth Resistance Measurement

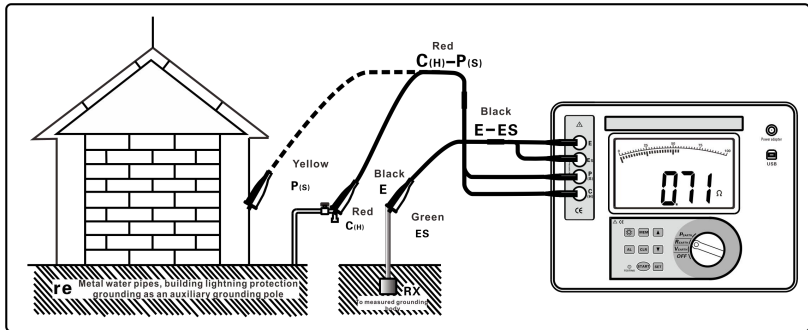
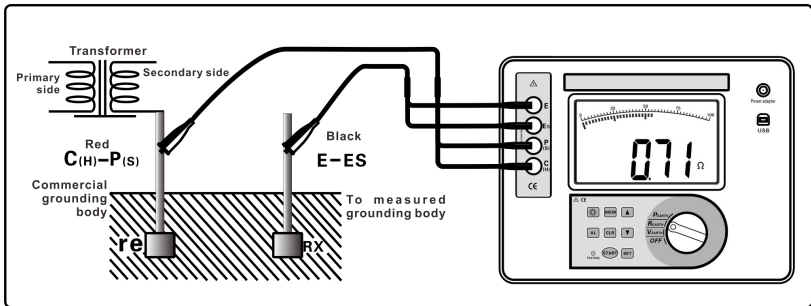
3-wires measurement: As shown below, short-circuit connected with **ES** and **E** interface that is 3-wires measurement test. The 3-wire test cannot eliminate the influence of the line resistance change on the measurement, nor can eliminate the influence of the contact resistance change between the meter and the test line, the test line and the auxiliary ground rod on the measurement. The oxide layer on the surface of the tested grounded body needs to be removed in the measurement.



6.5. 2-Wires Simple Measurement

2-wires method measurement test: This method is a simple measurement method without using an auxiliary grounding rod. The existing grounding electrode with the lowest grounding resistance value is used as the auxiliary grounding pole, and two simple test leads are connected (i.e., the **C(H)**-**P(S)** interface connect shorted, **E-ES** interface connect shorted). Used the metal ground pipe, fire hydrant and other metal burial materials, the common grounding of the commercial power system or the lightning protection grounding pole of the building to instead of the auxiliary grounding rods **C(H)** and **P(S)**, and oxide layer of the selected metal auxiliary grounding body connection point should be removed during the measurement. Wire connection is as following figure, and refers to 4-wires measurement for other operations.

	Using the commercial power system grounding as the auxiliary grounding pole measurement, it must be confirmed that the grounding pole of the commercial power system. Otherwise, the circuit breaker may start and dangerous.
	The grounding resistance is measured by the simple 2-wire method. Try to select the grounding body with a small Re value as the auxiliary grounding pole, so that the meter reading is closer to the true value. In measuring, please choose metal water pipe and metal fire hydrant as auxiliary grounding pole.



The 2-wire simple method measures the grounding resistance, the meter reading is the sum of the grounding resistance of the grounded body to be measured and the grounding resistance of the commercial grounding body.

$$R = RX + re$$

R --- The tester reading value;

RX ---The grounding resistance value of measured grounding object;

re--- the grounding resistance value of a common grounding body such as a commercial power system.

Then, the earth ground resistance value of measured grounding body is:

$$RX = R - re$$

6.6. Soil Resistivity Measurement

Soil resistivity ρ is a determining factor of grounding resistance of grounding body. Different soil properties with different soil resistivity, as the same soil, and the soil resistivity will change significantly due to differences in temperature and water content. Therefore, in order to have a correct basis for the grounding device, the designed

grounding device can better meet the needs of actual work, soil resistivity measurement is very essential.

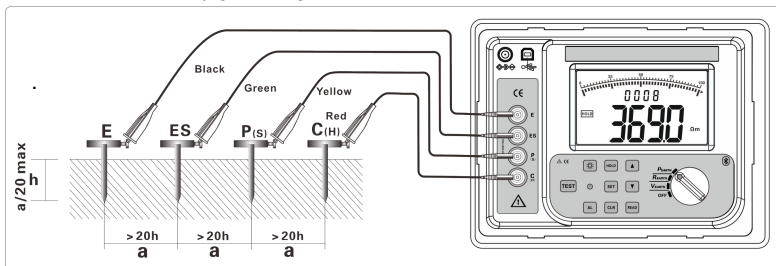
Soil resistivity measured by 4-pole method (Wenner method)

According to formula $\rho=2\pi aR$ (Ωm) calculating soil resistivity ρ , unit is Ωm :

a —electrode distance

R —soil resistivity between electrode **P(S)**-**ES**

4-pole method (Wenner method): Connect testing wires as shown below: pay attention to the distance and the embedding depth between auxiliary grounding rods. Respectively **C(H)**, **P(S)**, **ES**, **E** auxiliary grounding rods deep into the earth as a straight line, and then the test wires (red, yellow, green, black) which lead from the tester **C(H)**, **P(S)**, **ES**, **E** interface are corresponding connect to **C(H)**, **P(S)**, **ES**, **E** of the measured auxiliary grounding rods.




Space distance of the auxiliary grounding rods setting: After wires connection, firstly rotate **FUNCTION** rotary switch to “**pEARTH**”, and enter soil resistivity measure mode, long press “**SET**” button (about 3 seconds) to enter setting, short press “**SET**” button to move the cursor, press “**▲**” or “**▼**” button to change current data value (a range: 1m-100m), then long press “**SET**” button to save the setting a value, and return to soil resistivity testing mode.

After setting a value, in soil resistivity measurement test mode, press the “**TEST**” button to start test, there is a countdown indication and a test progress bar graph indication. After the test is completed and display stable data which is the soil resistivity value.

As shown below, the measured soil resistivity is 53.38 Ωm , already stored 157 sets of data. Press “**SET**” button and display the earth resistance value r_C of auxiliary current electrode **C(H)** and earth resistance value r_P of auxiliary voltage electrode **P(S)** and then automatically return display of measured soil resistivity ρ

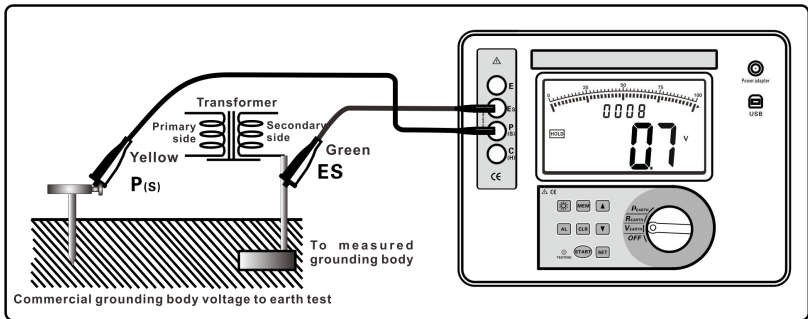


6.7. Earth Voltage Measurement


	Warning: Voltage measurement is strictly prohibited when the instrument is charged, connected to a computer, or supplied with external power
	Earth voltage measurement needs an auxiliary grounding rod.
	The meters connect with earth only by test wires and auxiliary grounding rods. Other test wires of meter interface cannot connect with commercial power line L, N, otherwise may cause current leakage; the circuit breaker may start and is dangerous.
	Earth voltage measurement should not exceed 600 V.

Earth voltage: when a ground fault occurs in an electrical equipment, the potential difference which between grounding device outer shell, grounding wire, grounding body etc. and the zero potential point, the grounding voltage is the reference point of the earth, the potential difference with the earth, and the ground is zero potential point.



Earth voltage measurement needs one auxiliary grounding rod. Please pay attention to the difference from commercial AC voltage measurement. As shown below: meter, auxiliary grounding rods, testing wires are all connected, rotate rotary switch to “EARTH VOLTAGE” and start to test, LCD will display the test results.




6.8. Backlight Control

After power on, press “” button to turn on or off backlight. The backlight function is suitable to dark place; only backlight working current about 25mA. The default backlight is turned off each time to starting up

6.9. Alarm Settings

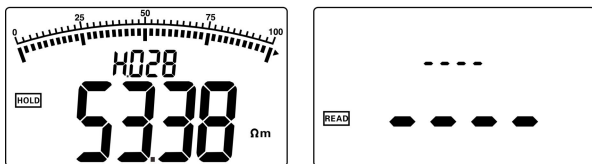
After startup, rotate rotary switch to select function, press “**AL**” button to open or shut off alarm function, long press “**AL**” button (about 3 seconds) to enter alarm critical value settings, press “” or “” to change current digital, press “**AL**” button to move cursor and then press “**AL**” button to store and exit. When

measurement value is larger than alarm critical settings value and the alarm function started up yet, the tester will flash indicator “





6.10. Data Lock/Storage

In test mode, press “**HOLD**” button lock present displayed data, display “**HOLD**”, “**MEM**” symbol and automatically store with serial numbers. If storage is full, the tester will display “**FULL**” symbol, and then press “**HOLD**” button to remove lock.



As shown in the left figure below: the lock measurement data of soil resistivity is 53.38Ωm, as the 28th group of data storage.



6.11. Data Access/Delete

In test mode, long press “**READ**” button to enter data access, press “” or “” button to select reading data group number by step value 1, press “” or “” button constantly to select reading data group number by step value 10. When the present data set is earth resistance or soil resistivity value, press “**SET**” button to read data value of rC, rP and a, and then press “**READ**” button to exit from reading.

In reading if there is no storage data, LCD will display “----”, see the above right figure.


In data reading status, press “**CLR**” button to enter data delete mode, press “” or “” to select “**No**” or “**YES**”, selecting “**No**” and then pressing “**CLR**” button for not deleting and return data reading status, selecting “**YES**” and then pressing “**CLR**” button for deleting stored data and LCD will show “----” as above right figure after deletion. The data deletion function is to delete all stored data at one time, and cannot be restored after deletion, please be careful.


6.12. Data Upload

The stored data can upload to computer. Connect computer with USB communication wire of the tester, switch on the tester and run data software, if the software displays that serial port is open and the connected successfully, then it can read the stored historical data, upload to computer and save. Data software has functions such as reading, reviewing, saving, and printing historical data.

Monitoring software has the function of online real-time monitoring and historical inquiry, dynamic display, with alarm value settings and alarm indicator, and the function of historical data access, reading, preserve, print and other functions.

7. Battery Replacement

	Please don't replace battery in flammable spot
	Please don't replace battery during measurement
	Pay attention to battery polarity and specification, and don't mix use of new and used battery to avoid damage on Tester
	When the enclosure of Tester is wet, please do not open battery cover
	Please put the used batteries in appointed collection place.

7.1. When the battery voltage drops to DC $7.2V \pm 0.1V$, the meter displays the “” symbol and indicates that the battery is low. Please charge it in time. The charger indicator will light up in red in charging, and light up in green indicate full.

7.2. Shut down the meter and confirm that in off state; connect the charger to charging with the power source.

7.3. Please keep the charger after charging, so that can used next time.

8. Bluetooth Software Operation

8.1. Software Introduction

This software is a mobile APP, which only supports mobile phones with Android system above 4.0 version. It is used to connect the Bluetooth APP of ERT-40R double-clamp multi-function earth resistance tester, and does not support other devices with Bluetooth function.

8.2. Software Use

Software is divided into three modules, Bluetooth settings, History data and About.

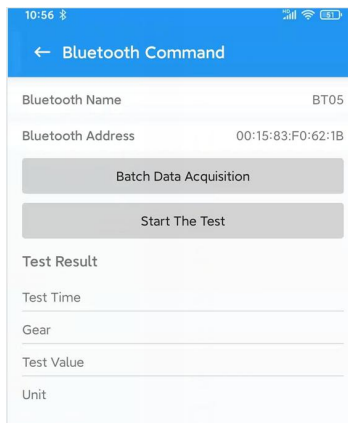
8.3.1. The Bluetooth setting module contains five functions, including turn on (off) Bluetooth, search Bluetooth devices, connect Bluetooth devices, send test commands and acquire data in batches. The function of send test commands and acquire data in batch is displayed after connect the Bluetooth device.

(1) Turn on (off) Bluetooth function: in "Bluetooth Settings - Bluetooth", click the right button to apply the bluetooth, the switch on the left is off, the switch on the right is on.

(2) Search Bluetooth Devices function: in "Bluetooth Settings - Search Bluetooth Devices", click the button to start searching the surrounding Bluetooth devices, and the search time is 5 seconds.



(3) Connect Bluetooth devices function: After clicking the search Bluetooth devices button, "Bluetooth - Available Device", the surrounding Bluetooth devices will appear. Click the Bluetooth name corresponding to the tester to start connecting the Bluetooth of the tester. If the connection is not the tester will appear failure prompt.

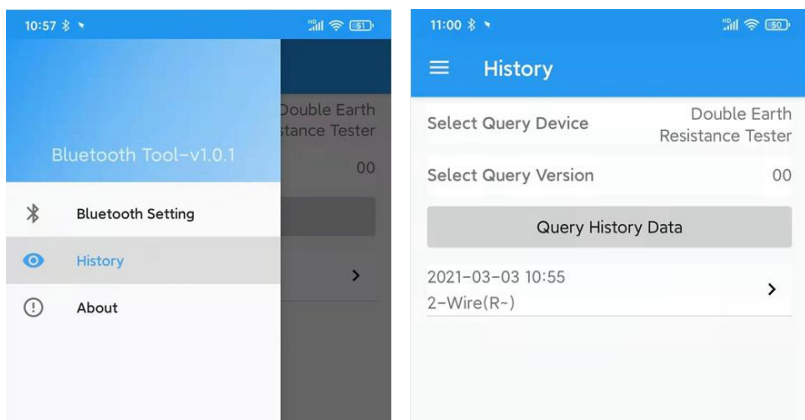


(4) Send test command functions: in the "Bluetooth Setting - Bluetooth Command - start the test", connected to the tester after enter the bluetooth command interface, click the start test button, then will send "start test" command to the tester, the test finish will return the test data, which will include test time, gear, test values and units,

the default test time is 30 seconds.

(5) Batch Data Acquisition function: in the "Bluetooth Setting - Bluetooth Command - Batch Data Acquisition", connected to the tester after entering the bluetooth command interface, click the batch data acquisition button, the send the command of batch get the data to the tester , batch obtain the data is that obtain the tester history data, stored in the phone, can view the historical data and analysis.The acquired batch data is stored in the historical data module.

8.3.2.The history data module contains three functions: Select Query Device, Select Query Version and Query History Data.



(1) Select Query Device function: in "History - Select Query Device", select the device name of all tester devices saved in the phone.

(2) Select Query Version function: in "History - Select Query Version", select the version information of all tester devices saved in the phone.

(3)Query History Data function: in "History - Query History Data", query the selected device and version of all the batch to obtain data information.

9.3.3. There is a function in the About module that clears data. This function is used to clean up the batch history data acquisition.

8.3. Software Uninstall

Use the uninstall function of mobile phone to uninstall

9. Accessories

Tester	1 PCS
Tester Bag	1 PCS
Auxiliary grounding Rod	4 PCS
Standard testing Wire	4 wires: each for red 20m, black 20m, yellow 10m, and green 10m
Simple testing Wire	2 wires: each for red 1.6m and black 1.6m
Monitoring Software Disk	1 Copy
USB Communication Cable	1 PCS
Manual/Warranty Card/ Qualification Certificate	1 SET

**The company is not responsible for other losses caused by use.
The contents of this user manual cannot be used as a reason to use
the product for special purposes.
The company reserves the right to modify the contents of the user
manual. If there are any changes, no further notice will be given.**