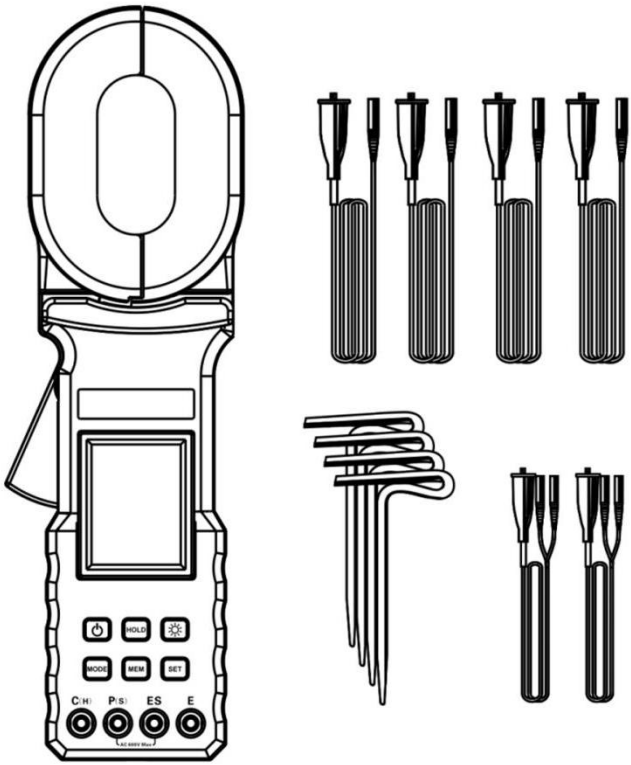
EITAI

COMPREHENSIVE DETECT GROUNDING SYSTEN TESTER

EITAI 2300
EITAI 2300B



MANUAL

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Precaution For Use

Thank you for purchasing **EITAI2300 series Comprehensive Detect Grounding System Tester**. In order to better use of the product, please be certain:

---Read the instruction manual in detail.

---Comply with safety regulations and cautions listed in manual.

- The tester design, production and test according to IEC61010 safety requirements.
- In any case, should pay special attention to safety when using the tester.
- The USB port and the internal circuit of the tester are non-isolated port. It is strictly forbidden to connect to the computer when the voltage is tested. Otherwise, the tester may be burned out or an electric shock accident may occur. The voltage test line must be unplugged from the tester before the USB charging.
- Pay attention to the text labeled on the panel and backplane of the tester.
- Pay attention to the measurement range and operation environment specified in the tester. Do not clamp and test power line current.
- Before starting up, press the trigger once or twice to ensure the clamp jaw is closed well.
- When starting up the tester, do not press the trigger, nor clamp any wires.
- After normal start up the tester and display "OL Ω" symbol, and then can clamp and test the measured object.
- The clamp contact surfaces must be kept clean, cannot rubbed with caustics and coarse material.
- Avoid any impact onto this tester, especially the clamp jaw contact surface.
- Confirm that the tester and accessories are in good condition, and the meter and test line insulation layer is not damaged, exposed or disconnected before use.
- During measurement, it is forbidden to touch bare conductors and the measuring circuit loop.
- Confirm that connector plug of line has been inserted in the tester interface closely.
- Please don't supply over 100V AC or DC voltage between testing device and interface. Otherwise, the tester may damage.
- Please don't measure in inflammable environment. The flame sparkle may cause explosion.
- Do not place and store the meter in high temperature&humidity or dewy places and under direct sunlight for a long time.
- If the tester get wet, please make dry before storage
- When the tester displays battery low voltage symbol "  ", please charge in time.
- If the tester will not use for a long time, please charge the battery once every 1-2 months, avoid the battery damage.
- 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 using, should stopped and sealed immediately ,and handled by an authorized institution.

1. Introduction

EITAI2300 series Comprehensive Detect Grounding System Tester is specially designed and manufactured for on-site measurement of earth resistance, soil resistivity, earth current and earth voltage. The instrument adopts advanced digital processing technology, with 2-wire method, 3-wire method, 4-wire method, selection method and other measurement methods; Import FFT (Fast Fourier Transform) technology, AFC (Automatic Frequency Control) technology, 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 instrument used large caliber current clamp design, can deal with all kinds of test requirements, can measure the grounding resistance value of the large size ground down lead, flexible measuring the grounding resistance value of the single point and grid grouding and all kinds of complex grounding structure, no need to disconnect any parallel connection earth pole when measuring parallel grounding system, greatly improves the convenience of measurement, for the grounding performance test provides a perfect solution.

EITAI2300 Comprehensive Detect Grounding System Tester is composed of host machine, test wires, auxiliary ground rod, data software and communication wires and so on. The tester equip with 2.5inch colorful LCD displayer. The tester with storage function, clock function, which can auto store 500 groups test result include the date and time. The tester with Bluetooth communication function supporting Android system. After the installation of APP, can test or read test records in the mobile terminal, bringing a new experience. The tester equip USB interface, and the stored data can be uploaded to the PC through the USB interface. The communication software can realize the functions of reading, consulting, saving, reporting and printing of the historical record data. Widely used in power, telecommunications, meteorology, oil fields, construction, lightning protection and industrial electrical equipment.

Product Model

Model	Resistance Range	Soil Resistivey Range	Earth Current Rnage	Earth Voltage Range	Bluetooth
EITAI2300	0.00Ω~20kΩ	0Ωm~9999kΩm	0.000mA~20A	0V~600.0V	Yes
EITAI2300B	0.00Ω~200kΩ	0Ωm~9999kΩm	0.000mA~45A	0V~600.0V	Yes

2. Technology Specification

2.1. Base Conditions and Working Conditions

Influence Quantity	Base Condition	Working Conditions	Remark
Ambient Temperature	23℃±1℃	-10℃-40℃	----
Ambient Humidity	40%-60%	< 80%	----
Working Voltage	DC 3.8V±0.2V	DC 3.5V±4.2V	----

Auxiliary Earth Resistance	＜100Ω	＜5kΩ	
Interference Voltage	Should avoid	＜5V	
Interference Current	Should avoid	＜1A	
Electrode Distance when measuring **R**	a＞5d	a＞5d	
Electrode Distance when measuring **ρ**	a＞20h	a＞20h	

2.2. General Specification

Model	EITAI2300	EITAI2300B
Earth Resistance Range	0.00Ω~20kΩ	0.00Ω~200kΩ
Soil Resistivity Range	0.00Ωm~9999kΩm	0.00Ωm~9999kΩm
Earth Current Range	0.000mA~20A	0.000mA~45A
Earth Voltage Range	0.0V~600.0V	0.0V~600.0V
Power Supply	DC 3.7V 2600mAh rechargeable battery, full charge about 4.2V	
Display Mode	2.5inch colorful LCD screen	
Earth Resistance Measurement Method	Clamp method, 2-wire method, 3-wire method, 4-wire method, selection method	
Test Frequency	128Hz/111Hz/105Hz/94Hz(AFC auto select frequency)	
Short-circuit Test Current	AC 10mA max	
Open-circuit Test Current	AC 14V max	
Electrode Distance Range	1m-100m	
CT Size	65X32 mm	
Tester Dimensions	307mm(H)X98mm(W)X56mm(H)	
Tester Weight	Clamp tester: 1112g(with battery), Total weight: 5.1kg(include all accessories)	
Test Wires	4 wires: each for red 20m, black 20m, yellow 10m, and green 10m	
Simple Test Wires	2 wires: each for red 1.6m and black 1.6m	
Auxiliary Grounding Rod	4PCS: Φ9mm X230mm	
Measuring Rate	Earth resistance: about 15s/times	
	Earth current: about 2tims/s	

	Earth voltage: about 2tims/s
Measuring Times	Over 5000 times (Short-circuit test, interval time should be at least 30 seconds)
Line Voltage	Measurement below AC 600V
Data Hold & Store	Data hold function: "**HOLD**" symbol display, and will auto store the hold data, which can store 500 groups max
Data Access	Data read function: "**READ**" symbol display
Overflow Display	Exceed measuring range overflow function: "**OL**" symbol display
Working Current	Measuring: 600mA Max(Max backlight)
Alarm Function	When the measured value exceeds the alarm setting value, will have "beep-beep-beep--" buzzer alarm prompt.
Battery Voltage	When battery voltage drop to DC 3.5V±0.1V, will display battery voltage low symbol" ▭ ", and remind to charge.
Automatic Shutdown	Automatically shut down after 5 minutes start up and without any operation.
Bluetooth Communication	Yes, support Android System.
USB Interface	Yes, only for charging
Working Temperature & Humidity	-10℃-40℃, below 80%rh
Storage temperature & humidity	-20℃-60℃, below 70%rh
Protection Level	IP65(close the case)
Overload Protection	Measure earth resistance: between each interfaces of **C(H)-E**、**P(S)-ES**,AC 280V/3 seconds
Insulation Resistance	Over 20MΩ(between circuit and outside shell is 500V)
Withstanding Voltage	AC 3700V/rms. (Between circuit and outside shell)
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(Grounding resistance meter) JJG 1054-2009(Clamp grounding resistance meter)

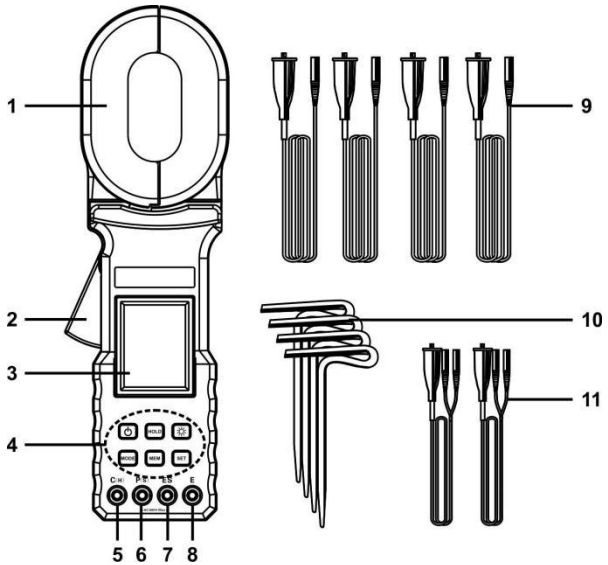
2.3. Range & Accuracy(Basic error under reference condition)

Measurement Function	Measurement Range	Accuracy	Resolution
Clamp Method Measure Earth Resistance	0.010Ω~0.099Ω	±（1%rdg＋0.05Ω）	0.001Ω
	0.10Ω~0.99Ω	±（1%rdg＋0.05Ω）	0.01Ω
	1.0Ω~49.9Ω	±（1%rdg＋0.5Ω）	0.1Ω
	50.0Ω~99.5Ω	±（2%rdg＋0.5Ω）	0.5Ω
	100Ω~199Ω	±（5%rdg＋1Ω）	1Ω
	*200Ω~395Ω	±（10%rdg＋5Ω）	5Ω
	*400~590Ω	±（15%rdg＋10Ω）	10Ω
	*600Ω~880Ω	±（20%rdg＋20Ω）	20Ω
	*900Ω~1200Ω	±（25%rdg＋30Ω）	~
	*1300Ω~1600Ω	±（30%rdg＋100Ω）	100Ω
2/3/4-wire method measure earth resistance	0.10Ω~20.00Ω	±2%rdg±5dgt	0.01Ω
	20.0Ω~200.0Ω	±2%rdg±5dgt	0.1Ω
	200Ω~2000Ω	±2%rdg±5dgt	1Ω
	2.00kΩ~20.00kΩ	±4%rdg±5dgt	10Ω
	*20.0kΩ~200.0kΩ	±4%rdg±5dgt	100Ω
Selection method measure earth resistance	0.10Ω~20.00Ω	±2%rdg±5dgt	0.01Ω
	20.0Ω~200.0Ω	±2%rdg±5dgt	0.1Ω
	200Ω~2000Ω	±2%rdg±5dgt	1Ω
Soil Resistivity	0.00Ωm~99.99Ωm	According to the measurement accuracy (ρ=2πaR a:1 m~100m; π=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 (50Hz/60Hz)	AC 0.0~600.0V	±2%rdg±5dgt	0.1V
Earth Current (50Hz/60Hz)	0.000mA~5.000mA	±(2.5%rdg＋1mA)	0.001mA

	5.0mA~100.0mA	±(2.5%rdg＋5mA)	0.1mA
	100mA~500mA	±(2.5%rdg＋10mA)	1mA
	0.50A~20.00A	±(2.5%rdg＋0.5A)	0.01A
	*20.0A~45.0A	±(2.5%rdg＋0.5A)	0.1A

Note: 1.rC max or rPmax: additive error≤±5%rdg±5dgt
(rC max: 4kΩ+100R＜50kΩ, rP max: 4kΩ+100R＜50kΩ)
when interference by 2.5V voltage, the additive error ≤±5%rdg±5dgt
2. * symbol description only for EITAI2300B

3. Tester Structure



3.1. Clamp jaw

3.2. Trigger

3.3. Display screen

3.4. Function button area

3.5. C(H) interface(current electrode)

3.6. P(S) interface(voltage electrode)

3.7. ES interface(auxiliary electrode)

3.8. E interface(earth electrode)

3.9. Test wires

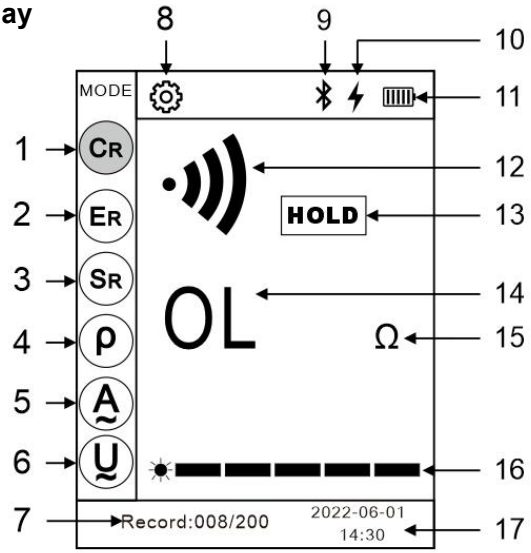
3.10. Ground spike

3.11. Simple test wires

Function Button

⏻	ON/OFF	MODE	Switch measurement mode, query previous data record
HOLD	Data hold and saved; When access data can delete record.	MEM	Enter into read data
☼	Background brightness 1-5	SET	Enter to parameters setting, access nex data record,confirm delete data record

4. LCD Display



4.1. Clamp method measure earth resistance (CR)

4.2. Ground pile meausre earth resistance(ER)

4.3. Select method measure earth resistance (SR)

4.4. Soil resistivity (ρ)

4.5. Measure current

4.6. Measure earth voltage

4.7. Record

4.8. Configure parameters

4.9. Bluetooth communication symbol

4.10. Charge symbol

4.11. Battery power symbol

4.12. Alarm symbol

4.13. Data hold & save symbol

4.14. Measure result

4.15. Measure result unit

4.16. Background brightness

4.17. Real time

5. Measurement Principle

5.1. Clamp Meter Resistance Measurement Principle

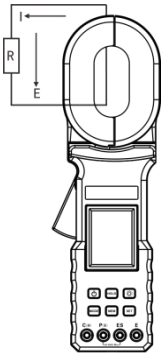


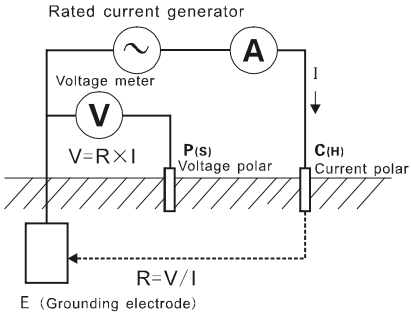
Figure 1

The basic principle of **the clamp earth resistance tester measure earth resistance is** measuring the loop resistance, as shown in the figure1. The clamp jaw part of the teter is comprised of voltage coil and current coil. The voltage coil provides excitation signal, and will induce a potential **E** on the measured loop. Under the effects of the potential **E**, the current **I** generate on the measured loop. The meter will measure **E & I,** and the measured resistance **R** can get by the following formula:

R=E/I

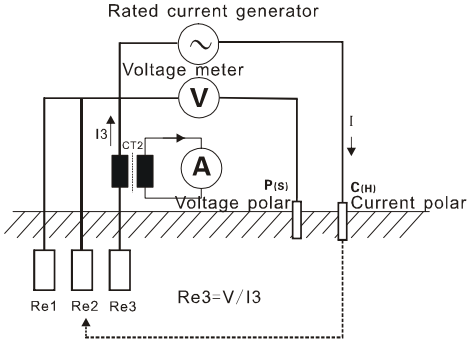
5.2. 3-wire method & 4-wire method Resistance measurement Principle

The 3-wires and 4-wires method measures the grounding resistance value measurement by the rated current pole-changing method (suitable for accurate measurement of single-point grounding system), 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.



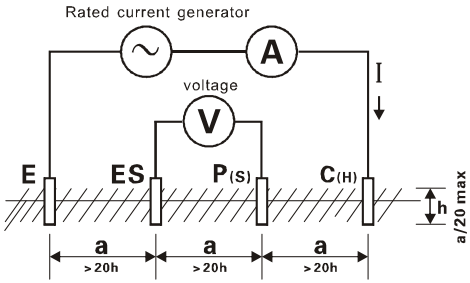
5.3. Selection Method Earth Resistance Measurement Principle

The selection method measure grounding resistance by current change-pole method (applicable to measure one of earth screen grounding resistance of parallel connection grounding system not split any circuit grounding wires), and applying an alternating current between the **Re1 Re2 Re3** grounding pole and the **C(H)** current pole **I**, the current **I3** flowing through **Re3** is measured by CT2, and the potential difference **V** between the **Re3** grounding pole and the **P(S)** voltage pole is measured, and the grounding resistance value **Re3** is calculated according to the formula **Re3=V/I3**.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.



5.4. Soil Resistivity Measurement Principle

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 **ρ=2πaR(Ωm)**. If the electrode distance of **C(H)-P(S)** is equal to **P(S)-ES** (both a) is Wenner method. In order to convenience the calculation, please make electrode distance **a** far more than embedding depth **h**, generally should meet **a**>20**h**, as shown below.



5.5. Measurement Error Calculate

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 **(Ei)** of the tester.

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

A: Inherent error

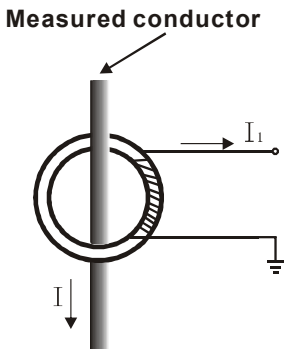
E2: Variation due to power supply voltage

E3: Variation due to temperature change

E4: Variation due to interference voltage change

E5: Variation due to contact electrode resistance

5.6. Earth Current Measurement Principle



The basic principle of measuring current is same with current sensor. As figure, The AC current on the measured Wire **I**, through the current magnetic loop and coil can generate an induction current I_1; The meter will measure I_1,The measured current **I** can be got by the following formula.

.

$$I = n \cdot I_1$$

Where: n is the turn ratio of the secondary side and the primary side coil.

6. Operation Method

6.1. Start Up/Shutdown

Press key to start up the tester. Ater 5mins the tester start up will shutdown automatic without any operation. Press the key to start up again after auto shutdown.

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. Clamp Method Measure Earth Resistance

After start up self-inspection, will display "OL Ω", then can measure earth resistance, press the trigger and open the clamp jaw, clamp the measured circuit loop and read the resistance value.

If the user necessary, can make a checking with the test ring as shown in Figure 6. The displayed value should be consistent with the nominal value on the test ring (5.1Ω) as shown in Figure 7. The nominal value on the test ring is the value at a temperature of 20°C. It is normal for the displayed value differ the nominal value with 1dgt. ie: when the nominal value of the test ring is 5.1Ω, it is normal to display 5.0Ω or 5.2Ω.

In the clamp and test situation, display "0L Ω ", indicate that the tested resistance exceed the tester measure range, as figure 8.

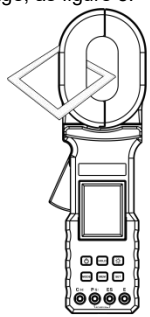


Figure 6

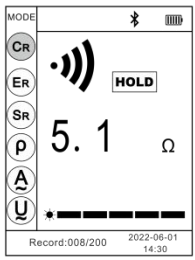


Figure 7

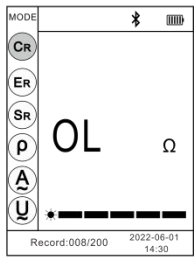


Figure 8

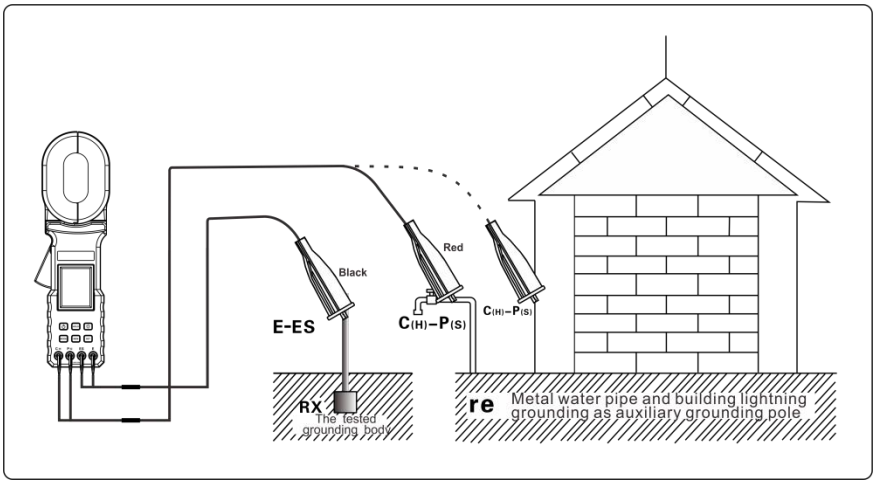
Intermittent "beep-beep-beep--", indicate that the measured resistance exceeds the resistance alarm threshold.

In **HOLD** state, press the **HOLD** key and exit the **HOLD** state, and then can measure again.

6.4. 2-Wires Simple Test Earth Resistance

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;

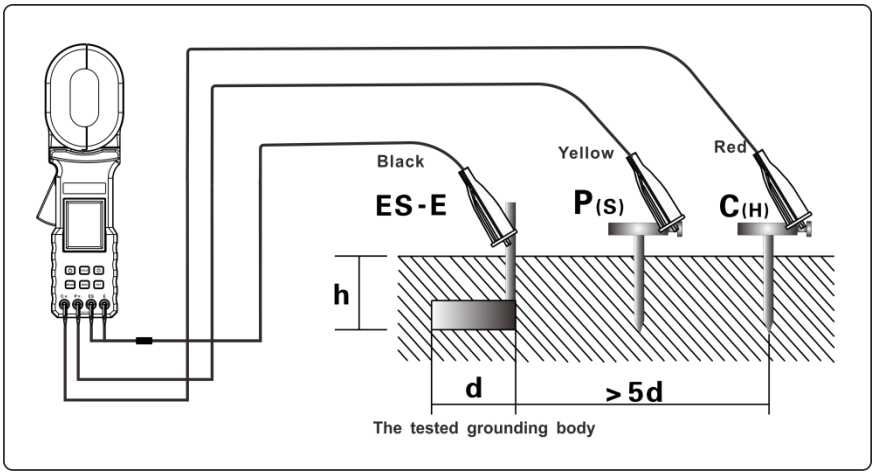
re--- the grounding resistance value of a common grounding body such as a commercial power system.

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

RX=R－re

6.5. 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.



6.6. 4-wires Precise Earth Resistance Measurement

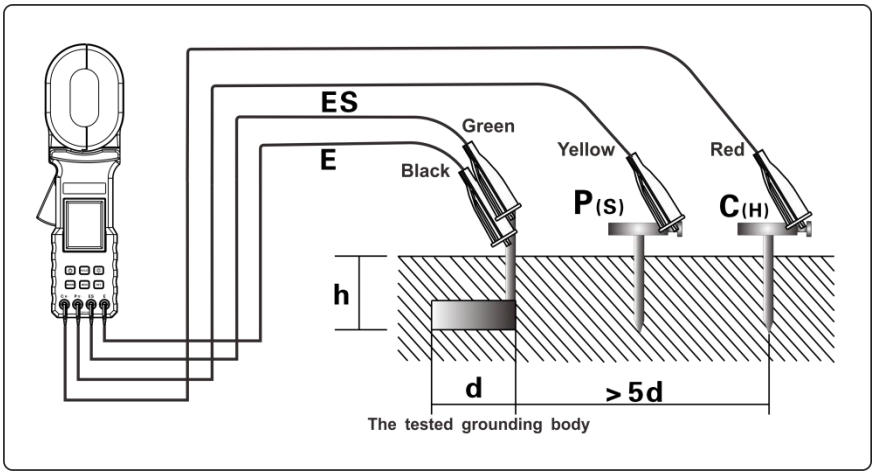
⚠	In the testing of the grounding resistance, firstly confirm the grounding voltage value of the grounding wire, that is, the voltage value of C(H) and E or P(S) and ES must be below 20V. If the grounding voltage is higher than 5V, the meter displays the NOISE symbol, and the measurement of the grounding 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.

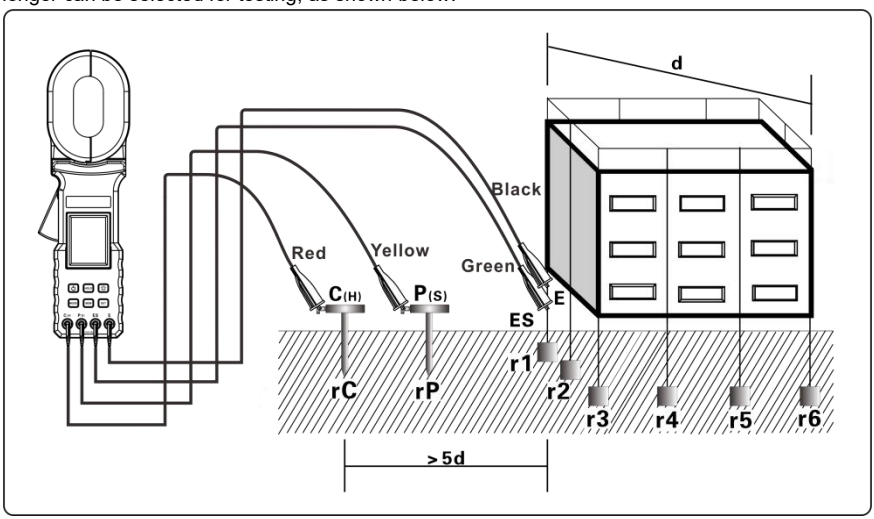
As shown in the figure below: Begin the object is measured, the **P(H)** and **C(H)** auxiliary grounding rods are buried in the ground in a straight line, and the grounding test lines (black, green, yellow, red) from the **E , ES,P(S)** and **C(H)** of the tester interface corresponding connect to be 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, test cables of 50m or longer can be selected for testing, as shown below:



R=r1 // r2 // r3 // r4 // r5 // r6 // … // rn(**r1**…**rn** are all independent grounding points)

R——The reading value on meter

r1…m——All are independent grounding points

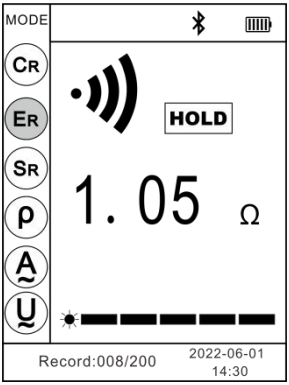
rC——The earth resistance of auxiliary current electrode **C(H)**.

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

After wires connection, press **MODE** key switch to "**Er**" and enter the earth resistance test mode, wait display stable data which is the earth resistance value **R** of the grounded body to be tested.

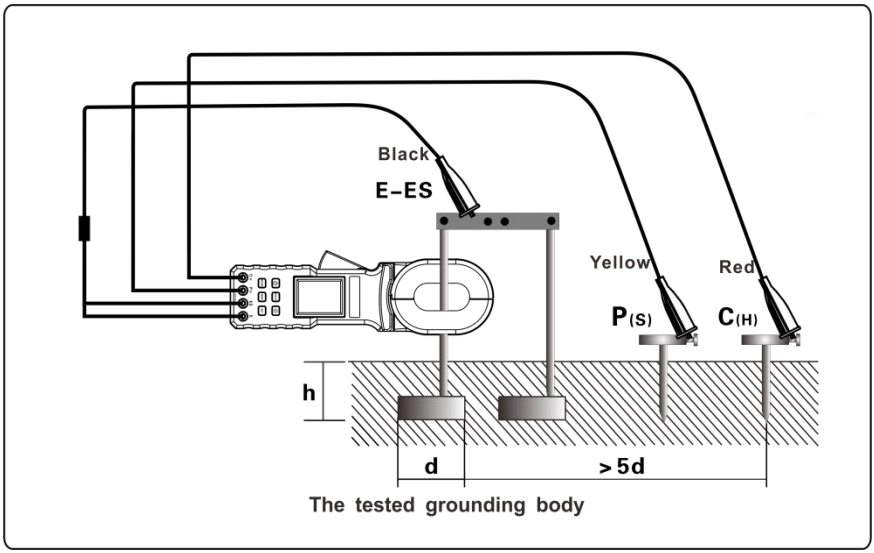
After testing, Press "**HOLD**" key to save the earth resistance value **R**.

As shown below, The tested earth resistance value is 1.05Ω, the tester has stored 8 groups of data.



6.7.Clamp 3-wires Selection Method Earth Resistance Measurement

3-wires selection method measurement test as shown below figure: 3 wires selection method means short circuit connection with the interface **ES, E** of meter, the tester operation is the same as 4-wires measurement test method. 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.



6.8. 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.

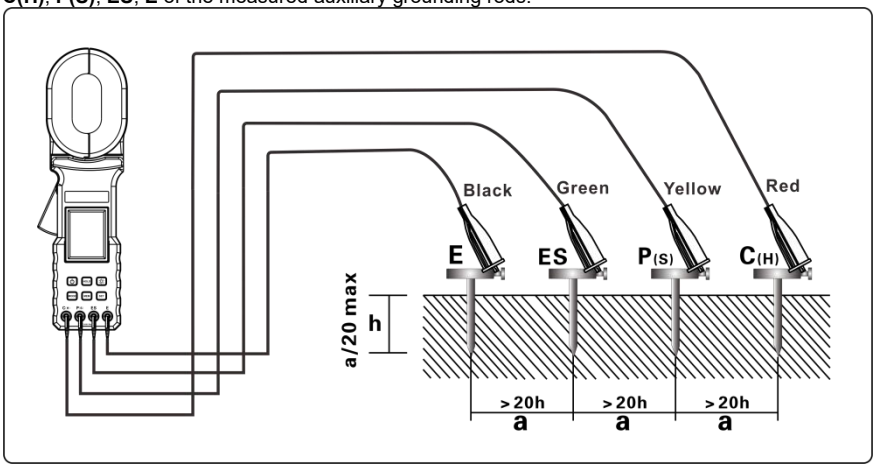
Soil resistivity measured by 4-pole method (Wenner method)

According to formula **ρ=2πaR(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.

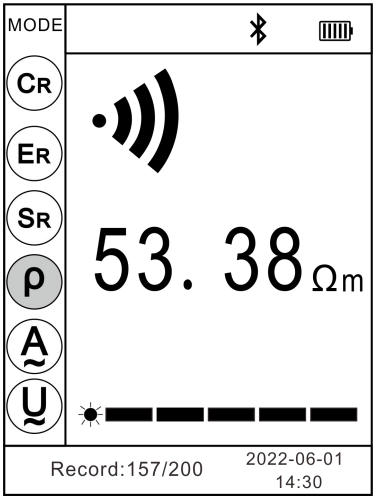


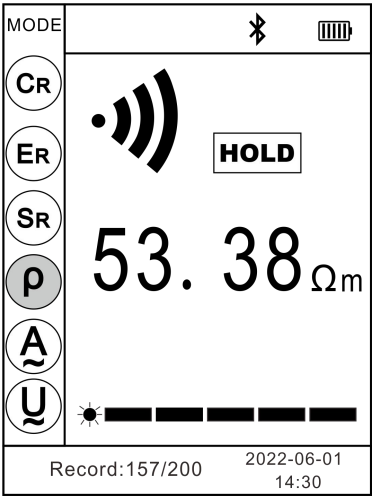
According to the Wenner method, the value of the measured soil resistivity is about the soil resistivity at the distance **a** of the two ground rods. The soil homogeneity can be checked by changing the a value to design a suitable grounding electrode.

Space distance of the auxiliary grounding rods setting: After wires connection, press function select key **MODE** switch to "**ρ**", and enter soil resistivity measurement mode, press "**SET**" key enter distance setting of parameters configure interface, short press "**MODE**" key to move the cursor to "P LEN", press "**HOLD**" or "**MEM**" key to change present data value (**a** range:1m-100m), then press "**SET**" key to save the setting value, and return to soil resistivity testing mode.

After setting **a** value, in soil resistivity measurement test mode,after the testing is completed and display stable data which is the soil resistivity value.

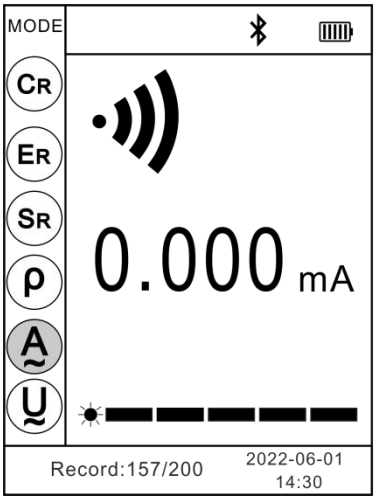
As shown below, the measured soil resistivity is 53.38Ωm, already stored 157 groups of data.

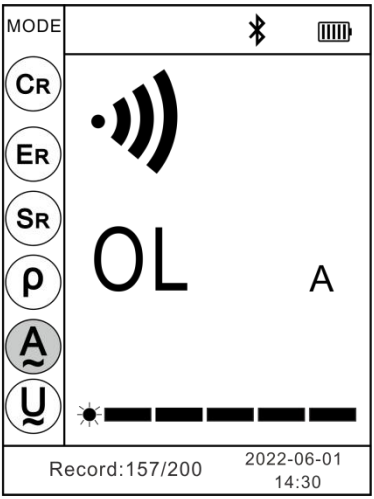


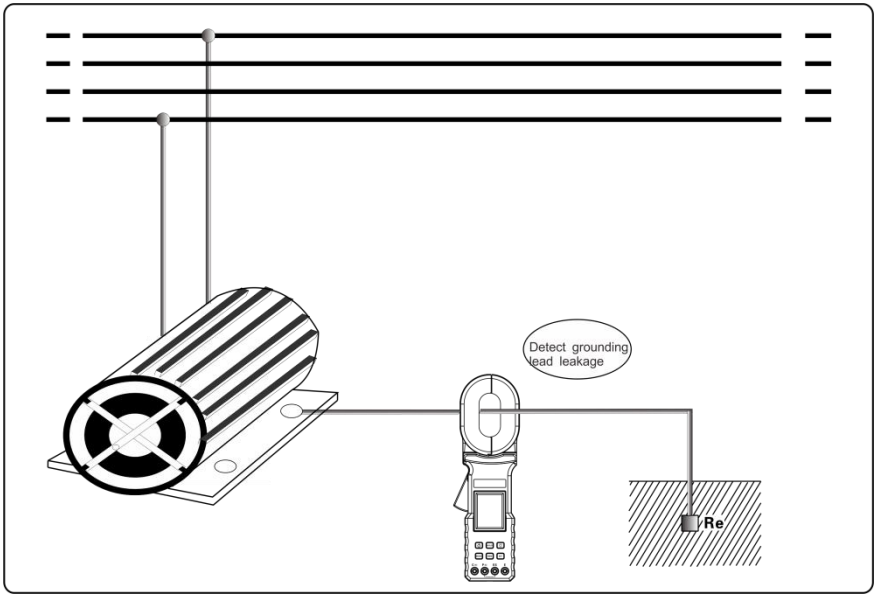


6.9. Earth Current Measurement

After start up the tester and finish self-checking, will auto enter into resistace measument mode, display “0L Ω”, press function select key “**MODE**” switch to “**A**”, and enter into current measurement mode, display “0.000mA”, as shown follow figure. At this time, open the clamp jaw to clamp the measured ground lead to read the current value. If the tester display “0L A” indicate that the measured current exceed the tester upper range, shown as follow figure.







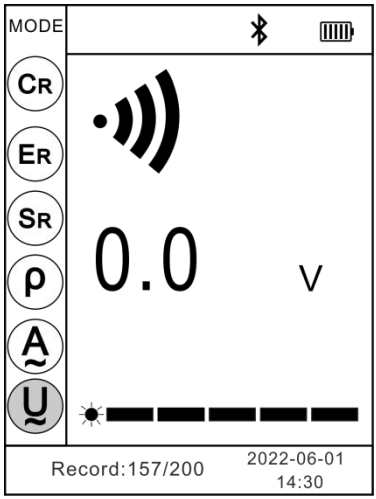
There is intermittent "beep-beep-beep--" sound, indicating that the measured current exceeds the setting current alarm threshold.

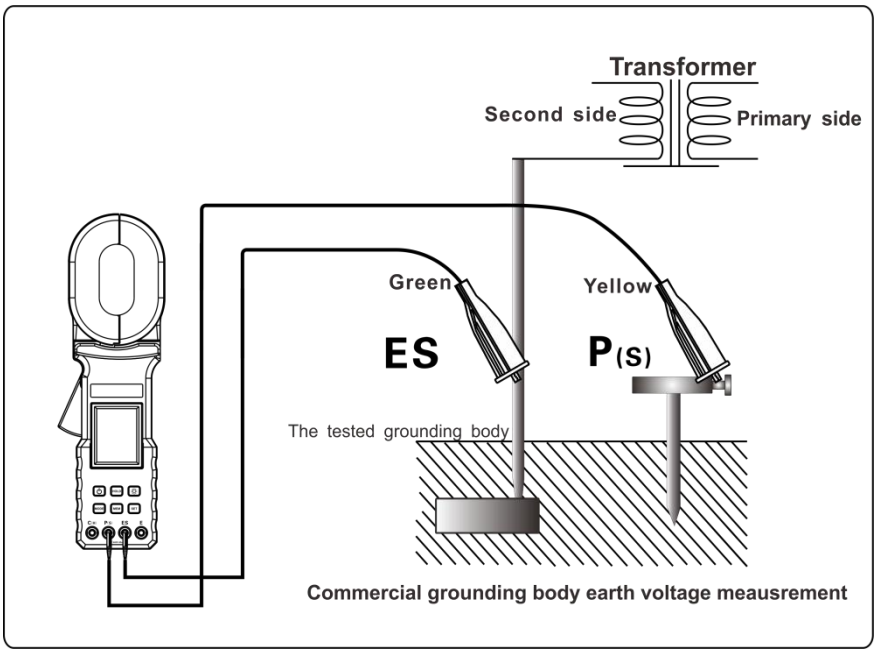
6.10. Earth Voltage Measurement

	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 cannot exceed 100 V.
	Cannot be used for commercial voltage test, or the meter may be damaged

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 figure: meter, auxiliary grounding rods, testing wires are all connected, press the function select key **MODE** switch to **"U**" and start to test, LCD will display the test results.





6.11. Backlight Control

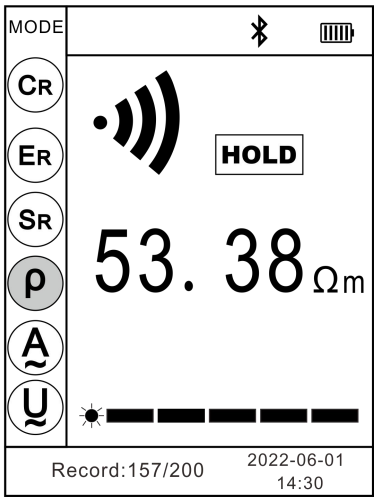
After start up the tester, pres "☼" key can change the backligh brightness, high backlight brightness situtable in the dark site. The default backlight brihtness is highest whn start up the tester.

6.12. Alarm & Time Setting

Start up and press "**SET**" key to enter into parameters configure interface, short press "**MODE**" key move the cursor, press "**HOLD**" or "**MEM**" key change present value, then press "**SET**" key save and exit. When the measured value is higher than the alarm critical setting value and the alarm function already on, "beep-beep-beep--" alarm sound will be issued.

6.13. Data Hold & Store

After the tester test result display stable, short press "**HOLD**" key hold and save present display data, and will display "**HOLD**" symbol, and store and number 1 group. Press "**HOLD**" key again to cancel hold state. As shown below figure: hold the tested soil resistivity 53.38Ωm, as the 157 groups data storage



6.14. Data Access/Delete

In the testing mode, short press "**MEM**" key enter into data access, press "**MODE**" or "**SET**" key to select the access data group, press "**MEM**" key exit to access.

When access without any stored data, LCD will display "----".

In the data access state, press "HOLD" key enter into data delete, press "SET" key delete all stored data, after delete LCD will display "----". The data delete function is to delete all stored data at one time, and cannot be restored after delete, please operate with caution.

7. Battery& Charge

	In generally charging for 2 hours, not more than 10 hours.
	If the meter is not used for a long time, please charge the battery once every 1~2 months.
	Must be charging with standard configuration charger

7.1. When the battery voltage drops to DC 3.5V±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 Introduce

This software is a mobile phone APP, which only supports mobile phones with Android system 4.0 or above. It is used to connect to the Bluetooth APP of the EITAI2300, and does not support other devices with Bluetooth functions.

8.2. Software Installation

Use mobile phone to scan the QR code to get the APP software download link, need to obtain the corresponding permissions when installing, please click Agree or Allow.

8.3. Software Usage

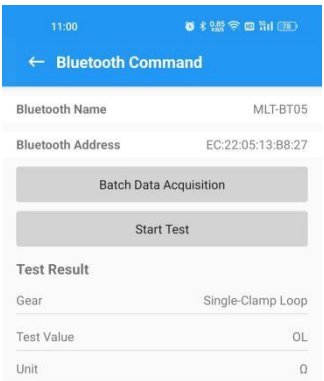
Software is divided into three modules, Bluetooth settings, History data and About.

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.

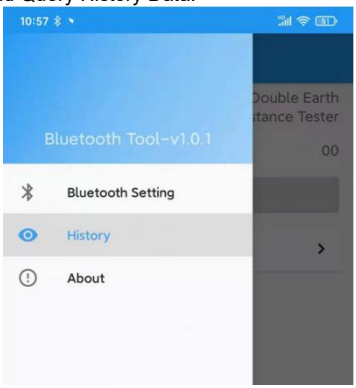
(3) Connect Bluetooth devices function: After clicking the search Bluetooth devices button, "Buletooth - Avaliable Device", the surrounding Bluetooth devices will appear. Click the Bluetooth name corresponding to the tester to start connecting the Bluetooth of the tester.If the connection is not the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

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

8.4. Software Uninstall

Use the uninstall function of mobile phone to uninstall

9. Accessories

Tester	1 PCS
Tool case	1 PCS
Auxiliary ground rod	4 PCS
Test Wires	4 PCS: each for red 20m, black 20m, yellow 10m, and green 10m
Simple testing Wire	2 PCS: each for red 1.6m and black 1.6m
USB communication cable	1 PCS
5V Charger	1 PCS
Test ring (5.1Ω)	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.

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