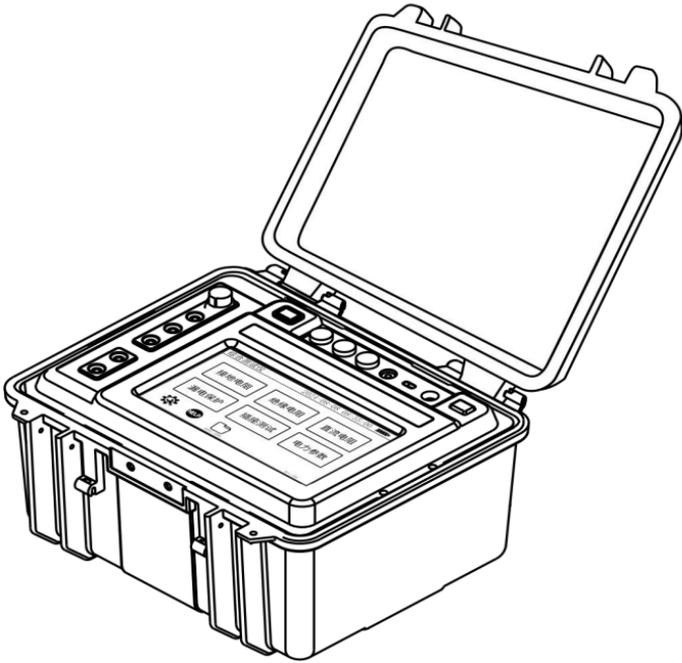


# ETCR<sup>®</sup>

**ELECTRICAL COMPREHENSIVE / INSTALLATION TESTER**

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ETCR7700



## MANUAL

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GUANGDONG ETCR ELECTRIC TECHNOLOGY CO.,LTD

[www.etcrmeter.com](http://www.etcrmeter.com)



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## Precaution For Use

Thank you for purchasing **ETCR7700 Electrical Comprehensive/Installation Tester** of our company. In order to better use of the product, please be certain:

—**Read this user instruction manual in detail.**

—**Comply with safety regulations and cautions listed in manual.**

- ◆ The tester design, production and test according to IEC61010 safety standard.
- ◆ In any case, should pay special attention to safety when using the instrument.
- ◆ Pay attention to the text labeled and symbol on the panel and backplane of the instrument.
- ◆ Before usage, please make sure that the instrument and accessories are in good condition, the insulation layer of the instrument and test wires are not damage, bare or broken wire. Please stop to using when metal is exposed due to rupture of case or test line.
- ◆ During the measurement, prohibit touch the bare conductor or the measuring circuit loop.
- ◆ **The tester has the automatic shutdown function, after customs setting time will automatic shutdown without any operation.**
- ◆ Please confirm the test mode before measurement.
- ◆ Make sure the connecting plug of the conductor is tightly inserted into the tester interface.
- ◆ Do not measure in flammable areas, sparks sites which may cause explosions.
- ◆ Do not place and store the instrument in high temperature&humidity or dewy places and under direct sunlight for a long time.
- ◆ If the tester is wet, please store it after drying.
- ◆ If the battery voltage is low and the symbol is displayed, please charge it in time.
- ◆ If the tester is not going to be used for a long period, please charge the battery once every 1-2 months.
- ◆ 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 agent.
- ◆ The "  " safety warning signs in the instrument and manual must be safely operated by the user in strict accordance with this manual contents.

## 1. Introduction

**ETCR7700 Electrical Comprehensive/Installation Tester** is specially developed and manufactured for on-site electrical safety comprehensive/Installation testing. The instrument designed with a new structural design and adopt with a combination of large-scale integrated analog circuits, digital circuits and microcomputer chips. It is suitable for insulation and grounding connection tests of various electrical equipment, and for maintenance, testing and verification of leakage protectors of various electrical equipment. It is a professional power electrical inspection tool in power and electrical engineering field.

The instrument equipped with 7-inch touch color screen and is easy to operate. It can perform earth resistance testing, insulation resistance testing, DC resistance testing, RCD leakage protector testing, electrical socket testing, current effective value testing, AC voltage testing, phase sequence testing and other parameter measurements; the instrument has more complete functions, and higher accuracy, stable performance, convenient and reliable operation.

## 2. Function Features

2.1. 7-inch touch color screen, test data is displayed on the same screen. Test operation and query history are very convenient.

2.2. Modular operation of various test functions such as earth resistance test, insulation resistance test, DC resistance test, RCD leakage protector test, electrical socket test, power parameter test, etc. which is clear and convenient.

2.3. Test diagrams and wiring connection marks are distinguished by different colors to facilitate users' different usage habits under different functions.

2.4. 7.4V 10400mAH large-capacity lithium battery to ensure long-term testing.

2.5. Customs setting shutdown time

2.6. Built-in wiring connection diagrams of each functional module, which is convenient for users to compare wiring.

2.7. Large-capacity test record memory, test records can be directly browsed and analyzed in instrument. It can automatically store 1000 sets of real-time test data with test date and test timing.

2.8. USB communication upload function, stored data can be uploaded to the computer for storage data statistical analysis.

2.9. Double-layer case structure, sturdy and durable, protection level IP65 (when the cover is closed).

## 3. Technical Specifications

<b>Function</b>	Earth resistance test, insulation resistance test, DC resistance test, RCD leakage protector test, electrical socket test, current effective value test, AC voltage test, phase sequence test.
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<b>Power Supply</b>	DC 7.4V 10400mAh rechargeable battery, full charge with DC 8.4V
<b>Display LCD</b>	7-inch touch colorful screen
<b>Earth Resistance Measurement Range</b>	0.10Ω~3000Ω
<b>Earth Resistance Accuracy</b>	±2%rdg ± 5dgt
<b>Insulation Resistance Measurement Range</b>	0.10MΩ~80GΩ
<b>Insulation Resistance Max. Accuracy</b>	±3%rdg ± 5dgt
<b>Leakage Initiating Current Gear</b>	Manual/Auto mode: 15mA, 30mA, 50mA, 60mA, 100mA, 200mA, 500mA; Ramp mode: 30mA, 100mA(test specific initiating current)
<b>Leakage Initiating Current Accuracy</b>	±10%rdg ± 5mA
<b>Leakage Initiating Time Range</b>	0.0ms~999ms
<b>Leakage Initiating Time Accuracy</b>	±5%rdg ± 5ms
<b>DC Resistance Measurement Range</b>	0.10Ω~3000Ω
<b>DC Resistance Accuracy</b>	±5%rdg ± 8dgt
<b>AC Voltage Measurement Range</b>	0.10V~500.00V
<b>AC Voltage Accuracy</b>	±2%rdg ± 5dgt
<b>AC Current Measurement Range</b>	0mA~300.0A
<b>AC Current Accuracy</b>	±2%rdg ± 5dgt
<b>Phase Range</b>	0.0° ~ 360.0°
<b>Frequency Range</b>	45.00Hz~65.00Hz
<b>Active Power Range</b>	0.0W~150kW
<b>Reactive Power Range</b>	0.0var~150kvar
<b>Power Factor Range</b>	-1.000~1.000
<b>Temperature Test Function</b>	Yes
<b>Phase Test Function</b>	Yes

<b>Harmonic Function</b>	3 orders harmonic ratio, 5 orders harmonic ratio
<b>Communication Port</b>	Equipped with TYPE-C interface, software monitoring, stored data can upload to computer to save and print
<b>Data Memory</b>	1000sets
<b>Automatic Shutdown</b>	Customs setting automatic shutdown time from 0~60 minutes, 0 is turn off automatic shutdown function
<b>Time Clock Setting</b>	Yes
<b>Bluetooth Communication</b>	Yes
<b>Low Voltage Indication</b>	When the battery voltage drop to DC7.4V±0.1V, will display low power symbol "  ", and remind to charge in time
<b>Power Consumption</b>	12W Max.
<b>Host Dimension</b>	280mmX260mmX160mm
<b>Instrument Weight</b>	Tester: approx.2720g(include battery)
	Current sensor: approx.200g
	Test wire: approx.1210g (include simple test wire /socket test wire / pen probe test wire)
	Auxiliary grounding stake: approx 347g(2pcs)
	Total weight: approx. 6.3kg (include accessories)
<b>Working Temperature &amp; Humidity</b>	-10°C~40°C; Below 80%RH
<b>Store Temperature &amp; Humidity</b>	-20°C~60°C; Below 70%RH
<b>Protection Level</b>	IP65(close the case)
<b>Overload Protection</b>	Measure earth resistance: between each interfaces of <b>E-P</b> , <b>E-C</b> , <b>AC</b> 280V/3seconds
<b>Insulation Resistance</b>	Exceed 10MΩ(between circuit loop and outside housing 500V)
<b>Withstand Voltage</b>	AC 3700V/rms (between circuit loop and outside housing)
<b>Electromagnetic Property</b>	IEC61010-4-3, radio frequency electromagnetic field ≤1V/m
<b>Suitable Safety Standard</b>	IEC61010-1 (CAT III 300V, CAT IV 150V pollution degree 2) IEC61010-031; IEC61557-1 (ground resistance); JJG 366-2004 (ground resistance tester); JJG 1005-2019 (Electronic insulation resistance tester) JJG 843-2007 (Leakage current tester) JJF 1283-2011 Calibration specification for residual current operated protective device action characteristic tester

## 4. Tester Structure

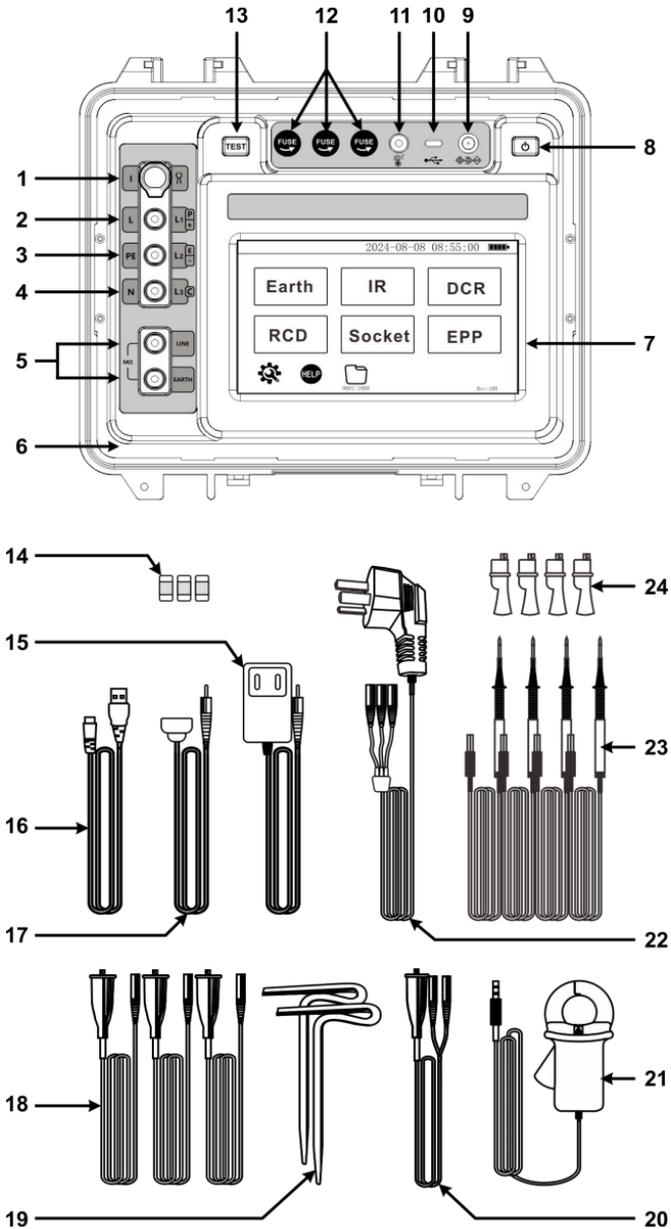


Figure1

1	Current sensor interface	13	<b>TEST</b> Button
2	L/L1/P+ test interface	14	Ceramic fuse tube
3	PE/L2/E- test interface	15	Charger
4	N/L3/C test interface	16	Type-C data cable
5	Insulation resistance test interface	17	Temperature test wire
6	Water proof case	18	Earth resistance test wires
7	LCD displayer	19	Ground rod
8	Power button	20	Simple test wire
9	Charging interface	21	Clamp current sensor
10	USB interface	22	Socket test wire
11	Temperature test interface	23	Pen probe test wire
12	L1,L2,L3 interface fuse	24	Alligator clip

## 5. LCD Display

### 5.1. Main Interface Introduce

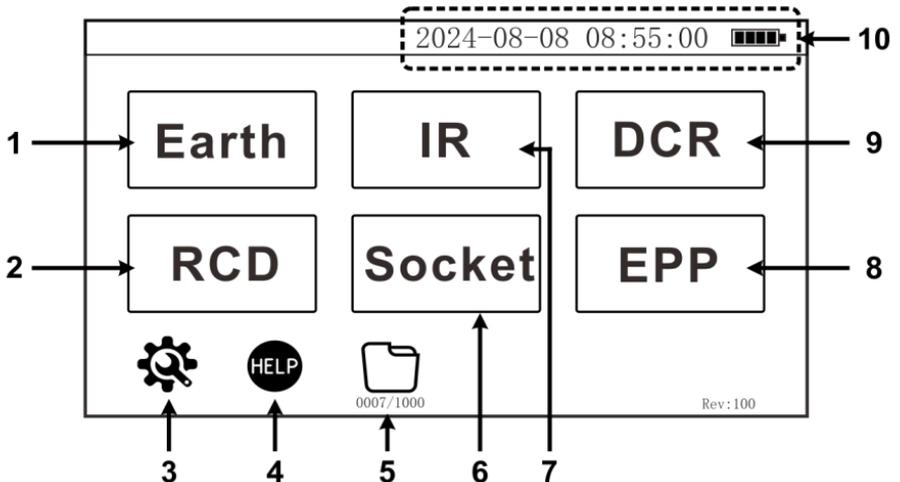


Figure2

1	Earth resistance measurement	6	Socket test
2	Leakage protection (RCD)	7	Insulation resistance(IR) measurement
3	System configure	8	Power parameters measurement
4	Wiring connection guide	9	DC resistance measurement
5	Record query	10	Time/battery power indication

## 5.2. Other Function Introduce

	Return back to main interface		Store 1 record
	Delete record key		Direction selection key

## 6. Earth Resistance Measurement

### 6.1. Measurement Range & Accuracy

Function	Range	Accuracy	Resolution
Earth Resistance	0.10Ω~30.00Ω	±2%rdg±5dgt	0.01Ω
	30.0Ω~300.0Ω	Auxiliary earth resistance:100Ω±5%, voltage to earth<10V)	0.1Ω
	300Ω~3000Ω		1Ω

(Note: 23°C±5°C, below 75%RH)

### 6.2. Measurement Principle

①.Voltage to earth measurement use the average value rectification method

②.The earth resistance measurement use the rated current pole changing method, that is, the rated AC current  $I$  (20mA Max) flows between the measured object  $E$  (grounding pole) and  $C$  (current pole); the potential difference  $V$  between  $E$  and  $P$  (voltage pole) is calculated, and then the earth resistance  $R_x$  is calculated. As shown Figure 3.

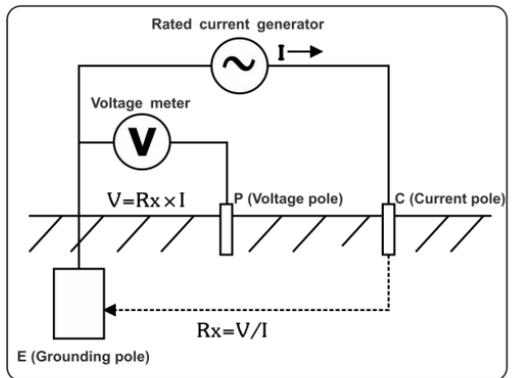


Figure3

③.The working error ( $B$ ) is the error

obtained within the rated working conditions, which is calculated from the inherent error ( $A$ ) and the variable error ( $E_i$ ) of the instrument.

$$B = \pm (|A| + 1.15 \times \sqrt{(E_1^2 + E_2^2 + E_3^2 + E_4^2 + E_5^2 + E_7^2 + E_8^2)})$$

**A:** Inherent error

**E1:** Variation due to position change

**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

**E7:** Variation due to system frequency change

**E8:** Variation due to system voltage change

### 6.3. Operation

Press and hold the power button for 1second and wait for the instrument to turn on. The instrument will display the measurement feature selection interface. If the instrument's automatic

shutdown time is setting to 0 minutes, press the power button to shut it down after using to avoid battery exhaustion.

The earth resistance measurement interface is shown in Figure 4

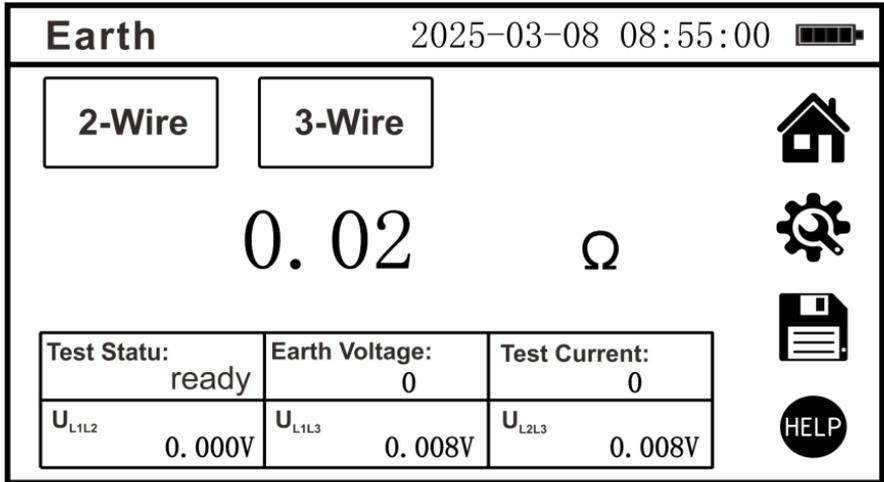


Figure4

	<p>Please insert the auxiliary ground rod into moist soil as much as possible. When encountering dry soil, sand, or gravel, water must be added to keep the auxiliary ground rod insertion moist. When encountering cement ground, lay the auxiliary ground rod flat and add water, and cover the ground rod with a wet towel before measuring.</p>
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#### 6.4. Line Resistance Calibration

In order to improve the precision and stability of earth resistance measurement on site, avoid errors caused by line resistance change due to long-term use of the test line; avoid errors caused by the test line not being fully inserted into the instrument interface or poor contact; avoid errors caused by the user replacing or lengthening the test line, etc., please perform line resistance checking before measurement, and subtract the line resistance value from the final measurement result.

After connecting the test line to the instrument, short-circuit the other end of all test lines, as shown in Figure 5, and press the test button to measure the line resistance.

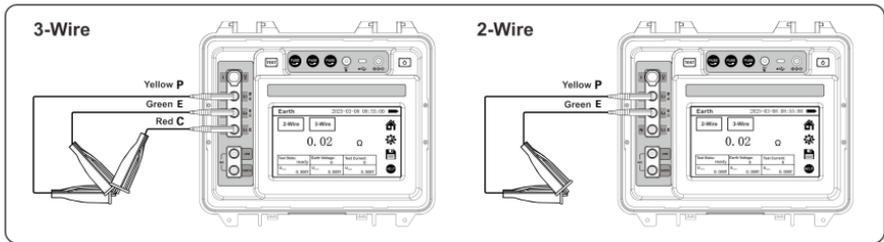


Figure5

## 6.5. Earth Resistance Measurement(3-wire method)

	<p>Before measuring, please make sure that the test line plug has been fully inserted into the corresponding interface of the instrument. If it is not fully inserted or poor contact, it may cause errors in the measured value.</p>
	<p>For low value earth resistance measurement, the measurement is more accurate after line resistance calibration</p>
	<p>When measuring earth resistance, a maximum AC voltage of approx. 14V will be generated between the E and C interfaces! Please do not apply voltage between the measurement interfaces, and be careful to avoid electric shock accidents.</p>
	<p>When measuring earth resistance, the test wires should not be mixed and should be measured separately.</p>
	<p>Auxiliary ground rods P and C should be buried as deep as possible in a place with more water to reduce the auxiliary grounding resistance value and thus reduce the test error.</p>

The earth resistance precise measurement use three-wire connection method. After the auxiliary ground rod and test wire are connected, press the TEST button to test. The wiring connection diagram is shown in the Figure6.

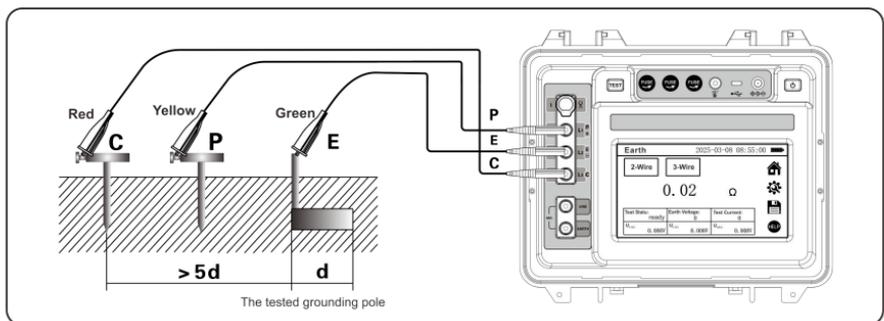


Figure6

## 6.6. Earth Resistance Measurement(2-wire method)



When using the commercial power system grounding as the auxiliary ground electrode for measurement, it is necessary to use a tester to confirm that it is the grounding electrode of the commercial power system.

This instrument cannot be used to check the grounding pole of a commercial power system.

This method is a simple measurement method without using auxiliary ground rods. The existing grounding electrode with the smallest ground resistance value is used as the auxiliary grounding electrode for testing. Metal water pipes, fire hydrants and other metal buried objects, common grounding of commercial power systems or lightning protection grounding electrodes of buildings can be used to instead the auxiliary ground rods C and P. When measuring, pay attention to removing the oxide layer at the connection point of the selected metal auxiliary grounding body. The 2-wire method measures earth resistance, and the tester reading is the sum of the earth resistance value of the measured grounding body and the grounding resistance value of the commercial ground body, that is:

$$RE = RX + re$$

Where: **RE** is the tester reading value;

**RX** is the grounding resistance value of the measured ground body;

**re** is the grounding resistance value of the common ground body such as the commercial power system.

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

$$RX = RE - re$$

Use the simple method to measure the earth resistance, and try to choose a grounding body with a small  $re$  value as the auxiliary grounding electrode, so that the tester reading is closer to the true value. When measuring, please consider the metal water pipes and fire hydrants as auxiliary grounding pole, and the wiring diagram as shown in Figure 7.

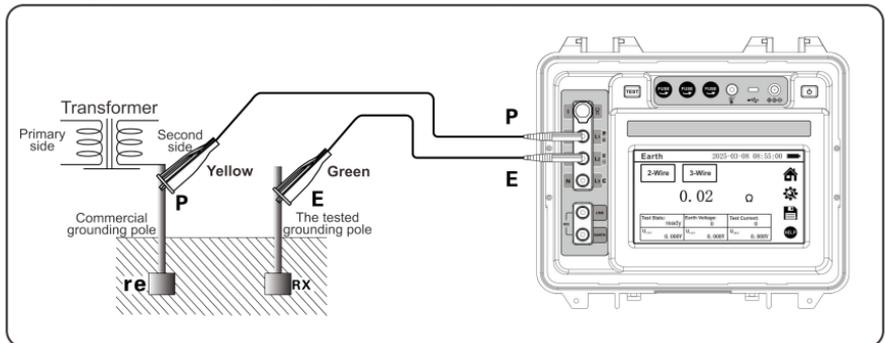


Figure7



Simple method measuring the earth resistance, must also first confirm that the voltage to earth value of the grounding wire must be below 10V. If the voltage to earth value is above 5V, the measured value of the earth resistance may cause errors. At this time, first cut off the power of the equipment of the measured grounding body, and then measure the earth resistance after the earth voltage drops.

## 7. Insulation Resistance Measurement

### 7.1. Measurement Range & Accuracy

Measure Function	Output Voltage	Range( $\Omega$ )	Accuracy	Resolution
Insulation Resistance	50V	100K~5M	$\pm 3\%rdg\pm 5dgt$	0.01M
		5M~100M	$\pm 5\%rdg\pm 5dgt$	0.1M
		100M~1G	$\pm 5\%rdg\pm 5dgt$	1M
		1G~4G	$\pm 10\%rdg\pm 5dgt$	10M
	250V	500K~25M	$\pm 3\%rdg\pm 5dgt$	0.01M
		25M~500M	$\pm 5\%rdg\pm 5dgt$	0.1M
		500M~5G	$\pm 5\%rdg\pm 5dgt$	1M
		5G~20G	$\pm 10\%rdg\pm 5dgt$	10M
	500V	1M~50M	$\pm 3\%rdg\pm 5dgt$	0.1M
		50M~1G	$\pm 5\%rdg\pm 5dgt$	1M
		1G~10G	$\pm 5\%rdg\pm 5dgt$	10M
		10G~40G	$\pm 10\%rdg\pm 5dgt$	0.1G
	1000V	2M~100M	$\pm 3\%rdg\pm 5dgt$	0.1M
		100M~2G	$\pm 5\%rdg\pm 5dgt$	1M
		2G~20G	$\pm 5\%rdg\pm 5dgt$	10M
		20G~80G	$\pm 10\%rdg\pm 5dgt$	0.1G

**Note:** Conversion of common electrical units

1 T $\Omega$  (Tera ohm)=1000G $\Omega$ = $10^{12}\Omega$

1 G $\Omega$  (Giga ohm)=1000M $\Omega$ = $10^9\Omega$

1 M $\Omega$  (Mega ohm)=1000K $\Omega$ = $10^6\Omega$

## 7.2. Measurement Principle

Insulation resistance measurement uses a voltage generator to generate a voltage  $V$ , which is applied to both ends of the measured resistance. By measuring the current  $I$  flowing at both ends of the resistance, the insulation resistance value  $R$  is calculated according to the formula

$$R = V / I.$$

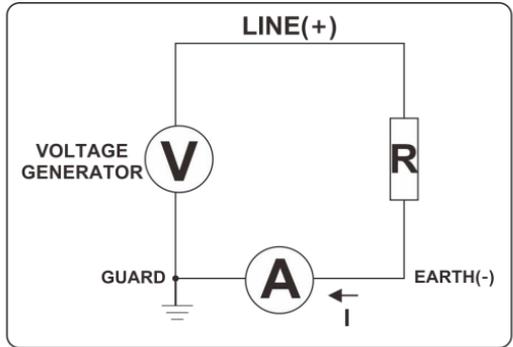


Figure8

## 7.3. Operation

Press and hold the power button for 1second and wait for the instrument to turn on. The instrument will display the measurement feature selection interface. If the instrument's automatic shutdown time is setting to 0 minutes, press the power button to shut it down after using to avoid battery exhaustion.

The insulation resistance measurement interface is shown in Figure 9. After connecting the wires according to the diagram in Figure 10 below, press the **TEST** button to testing.

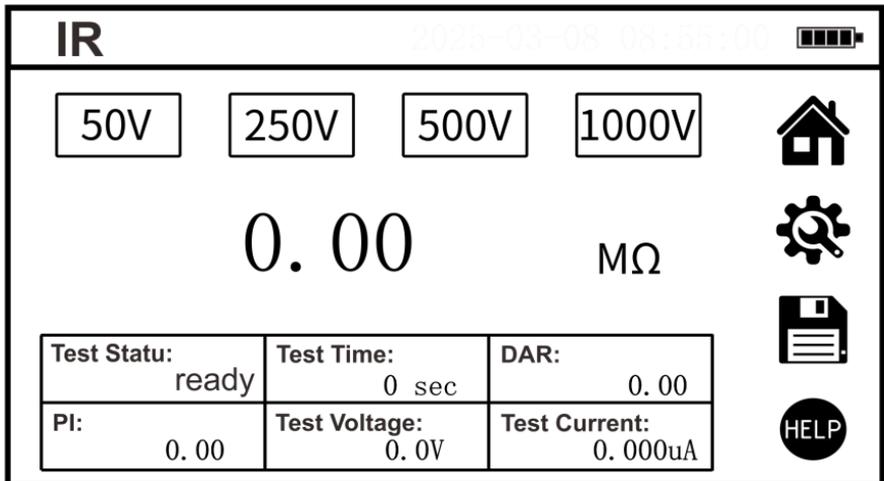


Figure9

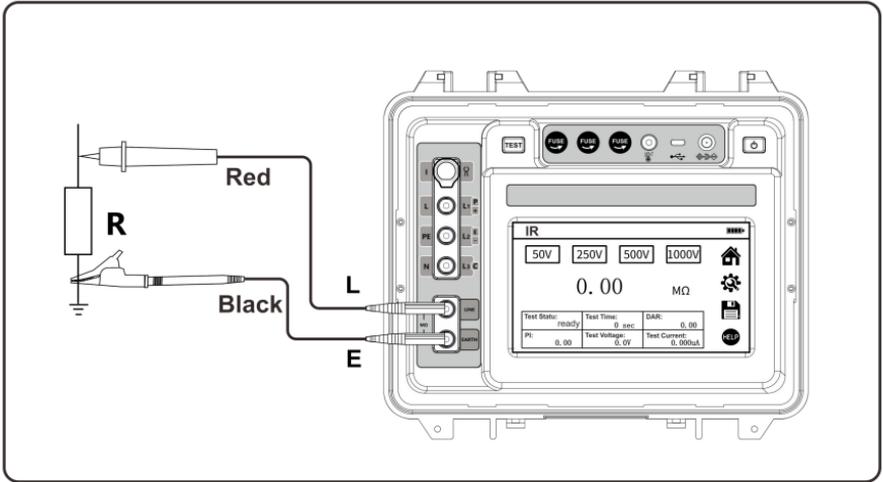


Figure10

	<p>The insulation resistance test can only be carried out on non-electricity load. Before the test, please check whether the test line and wires are in good condition and whether the tested circuit is live. If the tested loop circuit is live, the measurement accuracy may be affected or the instrument may be damaged.</p>
	<p>Please check whether the battery is undervoltage before the test. If there is a battery undervoltage symbol on the screen, the battery needs to be replaced, otherwise the test accuracy will be affected</p>
	<p>During the test, it cannot change the gear with live electricity. If you need to change the gear, must stop the output. it can change the gear when the voltage drops below the safety voltage.</p>
	<p>After the test, the meter will discharge automatically. At this time, the test loop circuit cannot be disconnected, the test operation cannot be carried out, and the gear cannot be shifted. The test can only continue until the discharge symbol is disappear.</p>
	<p>When measuring insulation resistance, press the test button, it will generate high voltage between the metal part of the test line and the tested loop circuit. Please pay attention to avoid touching.</p>
	<p>Do not touch the circuit immediately after the test. The stored charge may cause electric shock accident.</p>
	<p>After press the test button, start the test, and then finish the test immediately, indicate that the tested resistance exceeds the lower limit of the range of the voltage gear, so it is necessary to change the low voltage gear for measurement.</p>
	<p>It is recommended to test the resistance by the voltage of sampling test from low to high, so as to prevent the use of high voltage gear directly and the test of small value resistance resulting in the burning of the meter and other accidents.</p>

## 8. Leakage Protector(RCD) Measurement

### 8.1. Measurement Range & Accuracy

<b>Leakage Initiating Current Gear</b>	Manual/Auto mode: 15mA, 30mA, 50mA, 60mA, 100mA, 200mA, 500mA; Ramp mode: 30mA, 100mA(test specific initiating current)
<b>Leakage Initiating Current Accuracy</b>	$\pm 10\%rdg \pm 5mA$
<b>Leakage Initiating Time Range</b>	0.0ms~999ms
<b>Leakage Initiating Time Accuracy</b>	$\pm 5\%rdg \pm 5ms$

The leakage protection measurement interface is shown in Figure 11. After connecting the wires according to the diagrams in Figure 12 or 13 below, press the **TEST** button to testing.

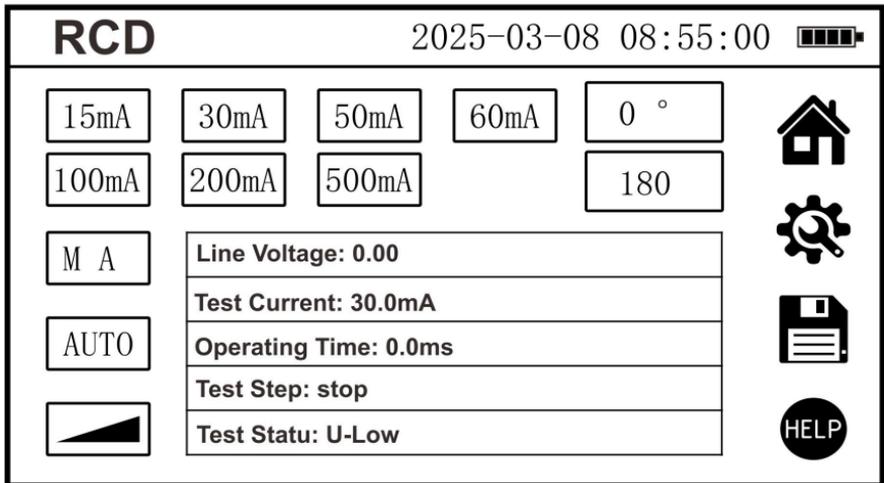


Figure11

Before testing, disassemble the load lead of the measured leakage protector to avoid damaging the load-end equipment. Then check the nameplate calibration value of the measured leakage protector, and determine the leakage current gear. (Generally, the rated initiating current of the indoor single-phase two-wire leakage protector is 30mA, the rated non-initiating current is 15mA, and the breaking time is  $\leq 0.1s$ , which is  $\leq 100ms$ )

Turn on the tester, select the test mode and rated leakage initiating current gear first. Wiring connection shown as below Figure.

**Wiring connection 1:** Insert one end of the black alligator clip test line into the black "N" interface of the tester, and clip the other end of the alligator clip to the grounding stake of the measured leakage protector; insert one end of the red test lead into the red "L" interface of the tester, and the another end of the pen probe touch the live wire of the output end (lower end) of the leakage protector for testing.

**Wiring connection 2:** Insert one end of the black alligator clip test line into the black "N" interface of the tester, and clip the other end of the alligator clip to the null line of the measured leakage protector; insert one end of the red test lead into the red "L" interface of the tester, and the another end of the pen probe touch the live wire of the output end (lower end) of the leakage protector for testing.

**Wiring connection 3:** Insert the black end of the dedicated socket test line into the "N" interface of the tester, insert the red end into the "L" interface of the meter, and insert or touch the three-pin plug into the socket for testing.

At this time, the leakage protector with normal performance will trip and disconnect, and the instrument LCD will display the disconnection time value of the tested leakage protector, such as "15 ms". If the leakage protector does not trip, the LCD will display the failure information "999ms". It may the testing of the rated action current gear is too small or the leakage protector is faulty.

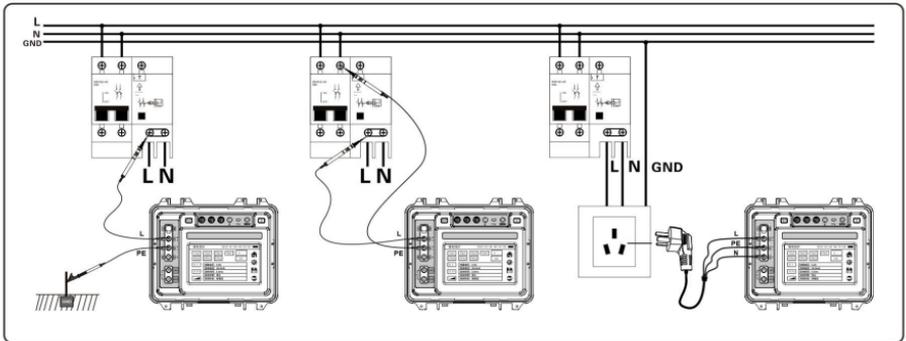


Figure12

If need to measure the three-phase circuit system, insert one end of the black alligator clip test line into the black "N" interface of the tester, and clip the other end of the alligator clip to the grounding wire or neutral wire of the tested leakage protector; insert one end of the red pen probe test line into the red "L" interface of the tester, and take the other end of the test lead to touch L1, L2, and L3 of the output end (lower end) of the leakage protector for testing.

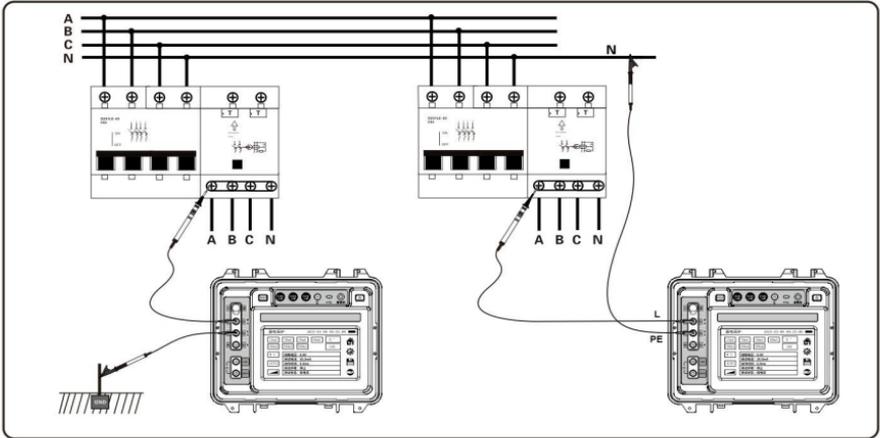


Figure13

The ramp mode can be used to detect the specific tripping current of the leakage protector.  
 0° /180° --- Select the phase angle at which the line test voltage starting.

## 9. Electrical Socket Measurement

The socket test interface is shown in Figure 14. After connecting the wires according to the diagram in Figure 13 below, press the **TEST** button to testing.

Socket
2025-03-08 08:55:00

1.Non-Voltage

<b>Ub(L-N):</b>	0.00V
<b>Ua(L-P):</b>	0.00V
<b>Uc(N-P):</b>	0.00V

Figure14

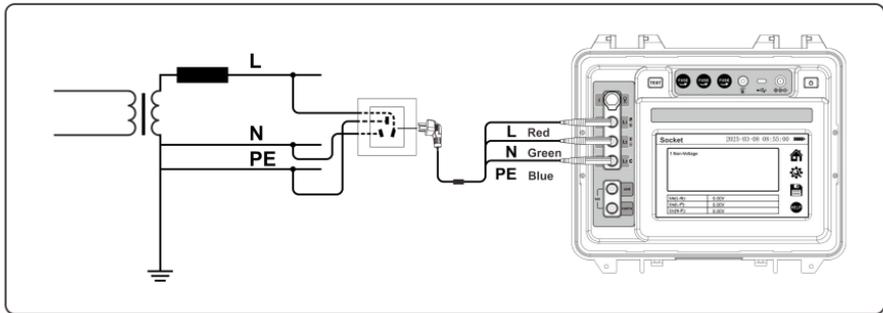


Figure15

## 9.1.Measurement Function

- 1. Line voltage normal or not
- 2. The instrument ground wire port wiring connection normal or not
- 3. The instrument neutral wire port wiring connection normal or not
- 4. The instrument live wire port wiring connection normal or not
- 5. the live-ground wire sequence normal or not
- 6. The live-neutral wire sequence normal or not
- 7. The neutral-ground wire sequence normal or not
- 8. The ground wire live and earth resistance status
- 9. Real-time voltage of the live-neutral terminals
- 10. Real-time voltage of the live-ground terminals
- 11. Real-time voltage of the neutral-ground terminals

## 10. DC Resistance Measurement

### 10.1. Measurement Range & Accuracy

Function	Range	Accuracy	Resolution
DC Resistance	0.10Ω~30.00Ω	±5%rdg±8dgt	0.01Ω
	30.0Ω~300.0Ω		0.1Ω
	300Ω~3000Ω		1Ω

Test current: 300mA MAX

Test voltage: DC 8V

**(Note:** 23°C±5°C, below 75%RH)

The DC resistance measurement interface is shown in Figure 16. After connecting the wires according to the diagram in Figure 17 below, press the **TEST** button to testing.

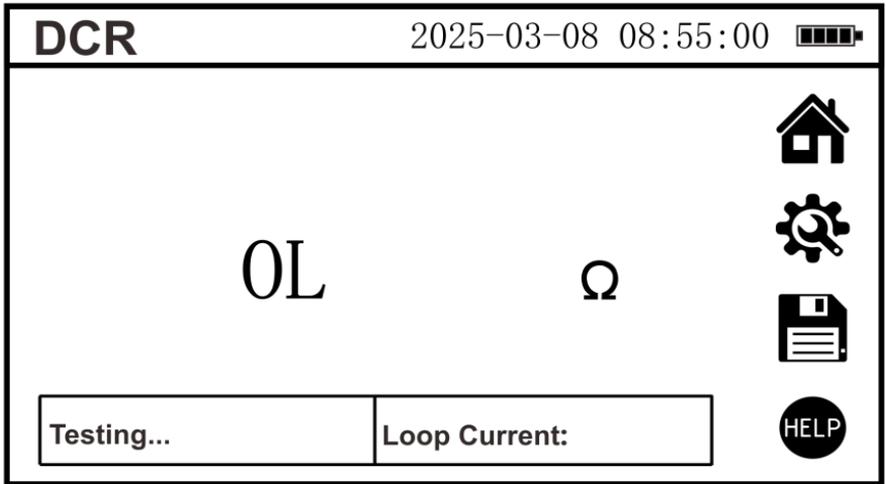


Figure16

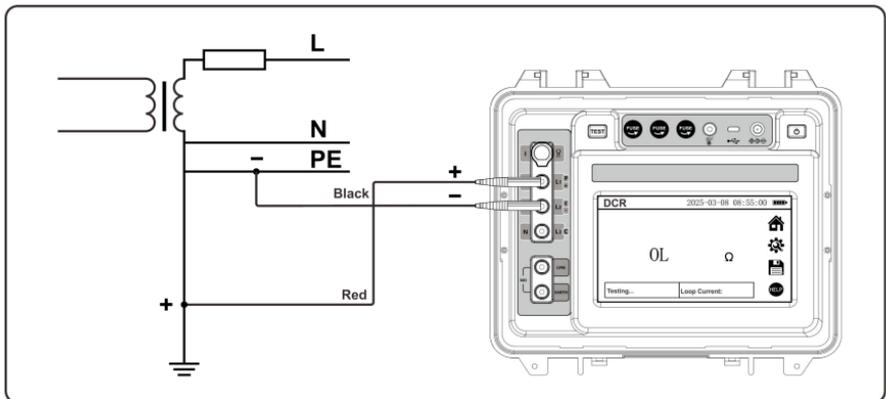


Figure17

## 11. Power Parameters Measurement

### 11.1. Baseline Conditions & Working Conditions

Influence Factor	Base Condition	Working Condition	Remark
Environment Temperature	23°C±1°C	-10°C~ 40°C	-----
Relative Humidity	40%~ 60%	<80%	-----
Signal Wave	Sine wave	Sine wave	β=0.01
Signal Frequency	50Hz±1Hz	45Hz~65Hz	

Tester Working Voltage	8V±0.2V	7.9V±0.5V	
Current Amplitude In Measuring Phase Frequency Sequence	1A±0.2A	2mA~20A	
Voltage Amplitude In Measuring Phase Frequency Sequence	100V±10V	10V~600V	
Current Amplitude In Measuring Power Factor	1A±0.2A	20mA~20A	
Voltage Amplitude In Measuring Power Factor	100V±10V	10V~600V	
External Electric Field, Magnetic Field	Should be avoided		
Tested Wire Position	Tested wire at the center of clamp jaw		

## 11.2. Measurement Range & Accuracy

Function	Range	Accuracy	Resolution
AC Voltage	0.10V~500.00V	±2%rdg±5dgt (Harmonic: ±5%rdg±10dgt)	0.01V
AC Current	0mA~999mA	±2%rdg±5dgt (Harmonic: ±5%rdg±10dgt)	1mA
	1.00A~9.99A		10mA
	10.0A~300.0A		0.1A
Phase	0.0°~360°	0.1°	±1°
Active Power	0.0W~150kW	0.1W	±(1.0%)
Reactive Power	0.0var~150kvar	0.1var	±(1.0%)
Apparent Power	0.0VA~150kVA	0.1VA	±(1.0%)
Frequency	45Hz~65Hz	0.01Hz	±(1.0%)
Power Factor	-1.000~1.000	0.001	±0.03

**Note:** Phase error under working conditions: 10mA~20A is  $\pm 3^\circ$  ; below 10mA is  $\pm 6^\circ$

The power parameter measurement interface is shown in Figure 18. After connecting the wires according to the diagrams in Figures 19 and 20 below, press the **TEST** button to testing.

# EPP

2025-03-08 08:55:00



Ua-LP: 0.00V	3rd: 0.0%	5th: 0.0%
Ub-LN:0.00V	3rd: 0.0%	5th: 0.0%
Uc-NP:0.00V	3rd: 0.0%	5th: 0.0%
Irms:0.0mA	3rd: 0.0%	5th: 0.0%
P:0.0W	Q:0.0var	S:0.0VA
F:50.0Hz	PF:0.687	PH:---
state:	testing	
Line:	L-N-P	



Figure18

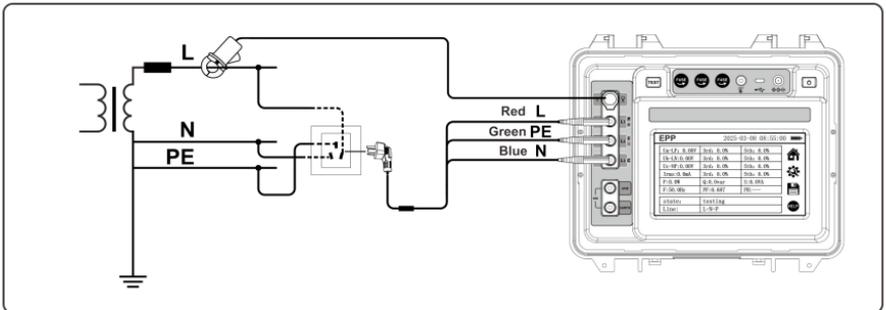


Figure19

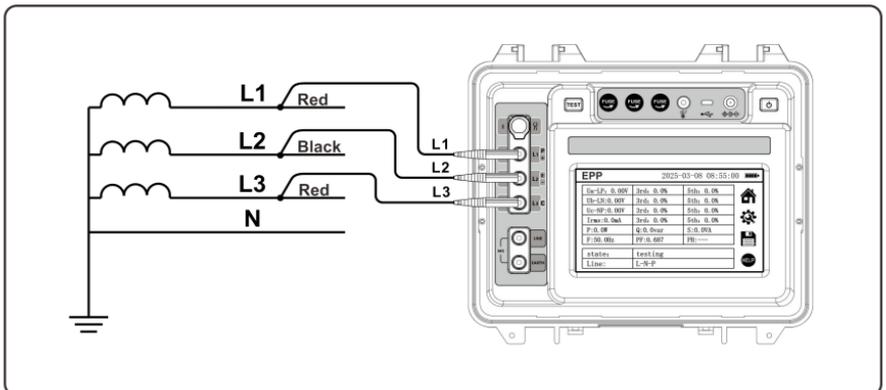


Figure20

## 12. Battery Charge

	Generally charge for 10 hours, and should not more than 15 hours.
	If the tester will not used for a long time, please charge the battery every 1-2 months
	When charging, the indicator light on the charger lights up red, and lights up green when fully charged.
	Must be charged using with the standard charger.

12.1. When the battery voltage drop to DC  $7.4V \pm 0.1V$ , the battery voltage symbol displays "□", reminding to be charged. The indicator light on the charger lights up red during charging, and lights up green when fully charged.

12.2. When charging, please make sure the tester is turned off, and then connect the charger to charge via main power.

12.3. After charging, please keep the charger for next use.

## 13. Standard Accessories

Tester	1 PCS
Clamp Current Sensor	1 PCS
Tool bag	1 PCS
Auxiliary ground rod	2 PCS
Ground Test Wire( Red 15m; Yellow 10m; Green 5m)	3 PCS
Simple Test Wire(Double end wire 1.6m)	1 PCS
Alligator Clip (Red 2PCS; Black 2PCS)	4 PCS
Pen Probe Test Wire(Red 2PCS; Black 2PCS 1.2m)	4 PCS
Socket Test Wire(3P, 1.5m)	1 PCS
Temperature Test Wire	1 PCS
Type-C Data Cable	1 PCS
Ceramic Fuse Tube(2A, 600V)	3 PCS
Charger(DC 8.4V)	1 PCS
User manual, warranty card, certificate	1 Set





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