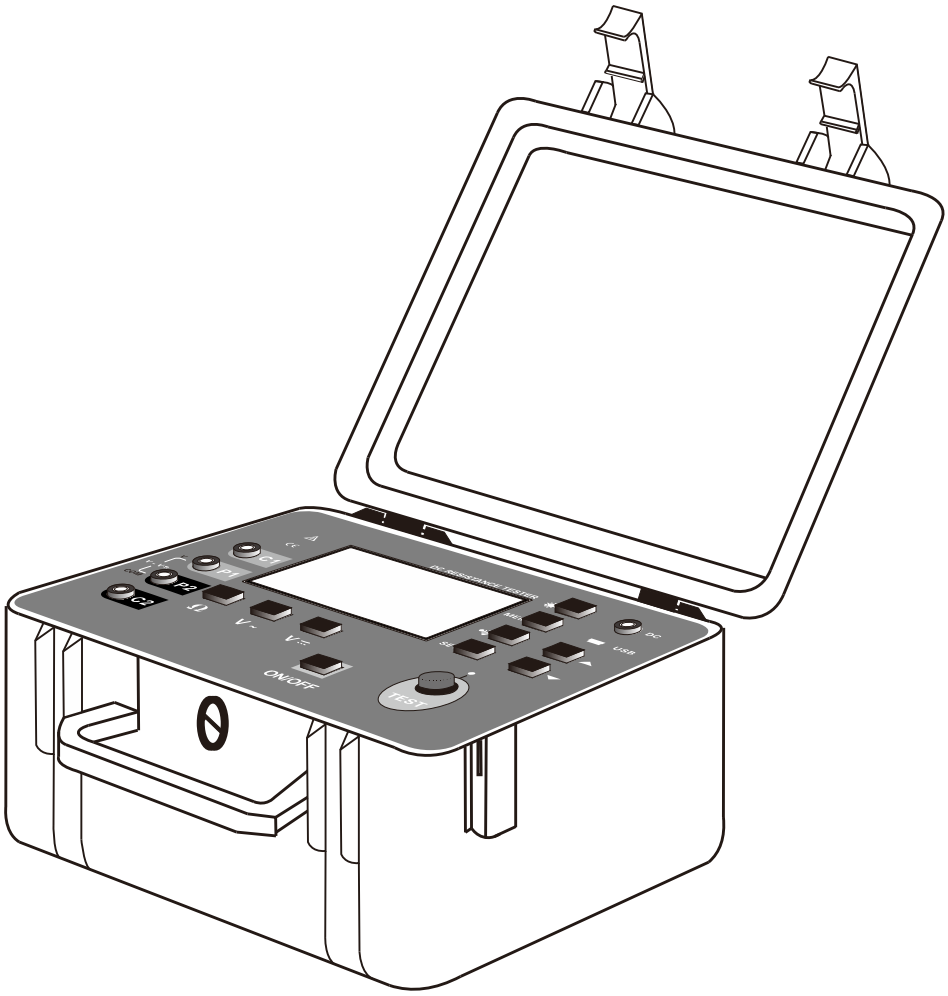
DC Resistance Tester



ES3050
USER MANUAL

Guangzhou Zhengneng Electronic Technology Co.,Ltd.

CONTENT

I．Safety Precautions and Procedures

Thank you for purchasing our **digital equipotential tester**. In order to use this product better, please be sure to:

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

—— **Strictly follow the safety rules and precautions listed in this manual**

- In any case, the use of this instrument should pay special attention to safety.
- To ensure measurement accuracy, use the four-wire method for testing. Each test interval is 30 seconds.。
- The tester is designed with overvoltage protection, but direct measurement of conductors with mains should be avoided。
- Battery voltage low symbol display, please charge in time, 8 to 10 hours per charge。
- The tester is not used for a long time. Please charge the battery every 1~2 months.
- When measuring voltage, C1 terminal and C2 terminal can not input signal, P1 terminal and P2 terminal should not over-range input voltage signal, otherwise it may damage the instrument。
- When the tester is in use and the test line breaks and the metal is exposed, stop using it.
- Do not place and store the tester for a long time under high temperature and humidity, in a place with condensation and direct sunlight.
- Precision instruments, have the regular maintenance, keep the body and test leads clean, do not drop。
- Use, disassembly, and maintenance of this tester must be performed by authorized personnel。
- Because of the reason of this tester, if it is dangerous to continue using it, it should be stopped immediately and sealed immediately, and handled by an authorized institution.
- The “ ⚠ ”hazard symbol on the tester and manual, the user must be safely operated according to the indication.

II. Introduction

Digital equalpotential tester is also known as micro-ohmmeter, ohmmeter, DC grounding resistance tester, using the most microprocessor technology, four-wire test, safe and reliable.It is a special instrument for detecting equipotential bonding quality between metal components of objects such as housings, lightning protection belts, ground beams, structures, cabinets, steel bars, pipes, windows, guardrails, radiators, and assembly lines.It can also measure the resistance of the connection conductors between various electrical equipments and earth ground, the DC resistance of transformers, and also can measure the contact resistance of switches and socket contacts, coils, metal wires, welding points and other low-value resistances.Widely used in telecommunications, electric power, meteorology, computer room, oil field, power distribution lines, iron tower transmission lines, gas stations, factory grounding grids, lightning rods, etc. It also has the function of measuring DC voltage and AC voltage.

Digital equipotential tester consists of a host computer, monitoring software, test leads, and communication lines.The mainframe large-screen LCD display is clear at a glance.Can store 500 sets of data, resistance measurement range: 0.0001 Ω ~ 30K Ω, DC voltage range: 0.0 ~ 1000V, AC voltage range: 0.0 ~ 750V.The monitoring software has on-line real-time monitoring and historical query functions, dynamic display, alarm value setting and alarm indication function, and functions such as reading, reviewing, saving, reporting and printing of historical data.

III. Rang and Accuracy

Measurement function	Range	Accuracy	Resolution
DC resistance	0.1mΩ～300.0mΩ	±1%rdg±10dgt	0.1mΩ
	301mΩ～3000mΩ	±1%rdg±5dgt	1mΩ
	3.01Ω～30.00Ω		0.01Ω
	30.1Ω～300.0Ω		0.1Ω
	301Ω～3000Ω		1Ω
	3.01kΩ～30.00kΩ		10Ω
DC voltage	0.1～100.0V AC	±1.5%rdg±5dgt	0.1V
	101～1000V		1V
AC voltage	0.1～100.0V AC	±1.5%rdg±3dgt	0.1V
	101～750V		1V

（Remark：23℃±5℃，below 75%rh）

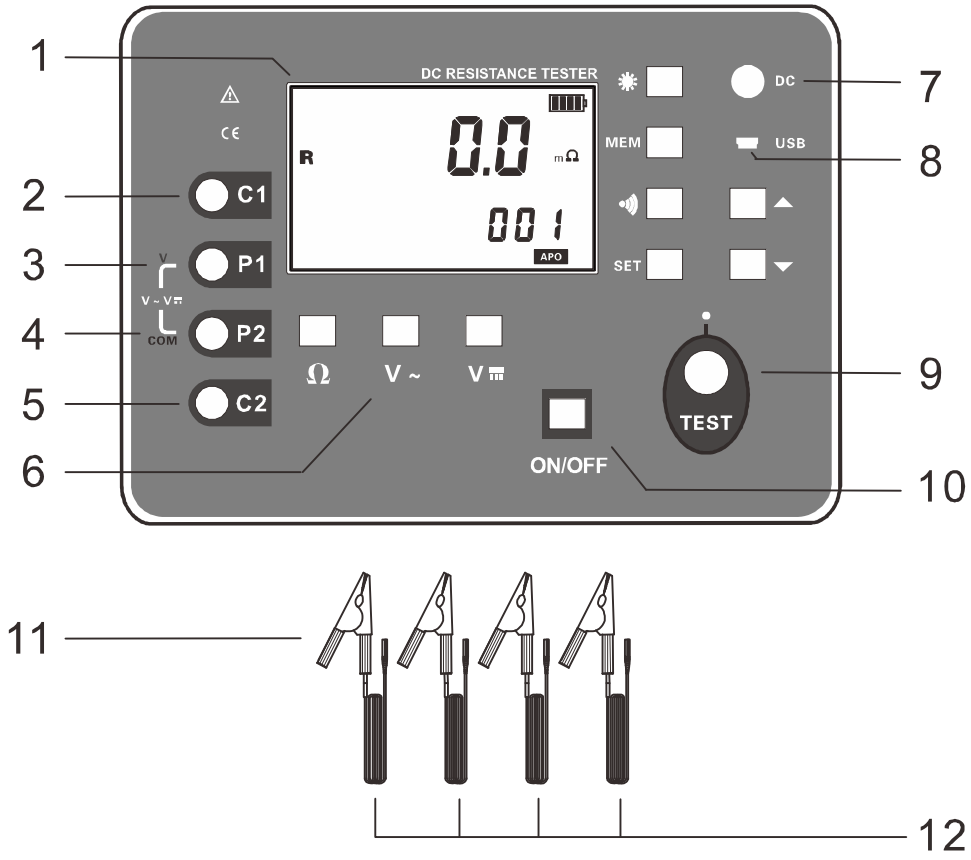
IV .Technical Specifications

Function	Equipotential bonding resistance test between metal components, low-value resistance test, resistance test of connecting conductors between ground and ground electrodes, contact resistance test, etc.
DC resistance range	0.0001Ω～30.00KΩ Accuracy±1%rdg±5dgt
Resistance resolution	0.0001Ω
Test method	Four-wire test
Test current	≥1A
Open circuit voltage	≤7V
Capacity factor	Measuring capacity factor≤15W
DC voltage range	0.0V～1000V DC Accuracy±1.5%rdg±5dgt
DC voltage resolution	0.1V
AC voltage range	0.0V～750V AC Accuracy±1.5%rdg±3dgt
AC voltage	0.1V

resolution	
Power	DC 6V 4.5Ah Large-capacity battery Continuous standby for more than 100 hours
Backlight	Controllable gray screen backlight, suitable for use in dim places
Display mode	4-bit large LCD display, gray screen backlight
Measurement instructions	LED flashing indicator during measurement, LCD countdown display
LCD 尺寸	108mm×65mm
Instrument size	L/W/H：277.2mm×227.5mm×153mm
Test line length	Red 5m，black 5m each 2PCS
Measure time	Resistance test：about 3second/time；Voltage test：about 2times/sec
USB interface	With USB interface, software monitoring, storage data can be uploaded to the computer, save and print
Communication Line	USB Communication Line 1PC
Data storage	500 groups，"MEM" stores indicates, the "FULL" symbol indicates that the storage is full
Data review	Data review function: "MR" symbol display
Overflow display	Over-range overflow function: "OL" symbol display
Alarm function	Alarm when the measured value exceeds the alarm setting value
Battery voltage	Real-time display of battery power, reminding timely charging when battery voltage is low
Automatic shut-down	"APO" indicates automatic shutdown after 15 minutes
Power consumption	Standby: 30mA Max(backlight off)
	Turn on backlight: 43mA Max
	Measure：2A Max(backlight off)
Weight	Instrument： 2397g(including battery)
	Test line：850g(including simple test line)
	Instrument box：1200g
Working temperature and humidity	-10℃～40℃；below 80%rh
Storage temperature and humidity	-20℃～60℃；below 70%rh
Overload protection	C1-C2 P1-P2 AC 280V/3 seconds between ports
Insulation resistance	Above 10MΩ(500V between circuit and housing)
Pressure resistance	AC 3700V/rms(between circuit and housing)

Electromagnetic properties	IEC61010-4-3，Wireless frequency electromagnetic field≤1V/m
Suitable for Safety Regulations	IEC61010-1, CAT III 600V, pollution degree 2, JJG724-1991 "DC digital ohmmeter verification procedure", JJG166-1993 "DC resistance verification procedure", "DL/T967-2005 loop resistance tester and DC resistance fast Tester verification procedure

V. Structure



1. LCD **2. C1 interface**：positive current
3.P1 interface：positive voltage **4. P2** interface：negative voltage
5. C2 interface：negative current **6.** Function button
7. DC Charging stand **8.** USB interface **9.** Test button
10. Power on/off button **11.** Safety alligator clip
12. Test line（red, black each 2PCS）

VI.Operation Method

1. Power On/Off

Press the "**ON/OFF**" button to switch on and off. “APO” is displayed in the lower corner

after power on, and automatically turned off after 15 minutes when not in operation.

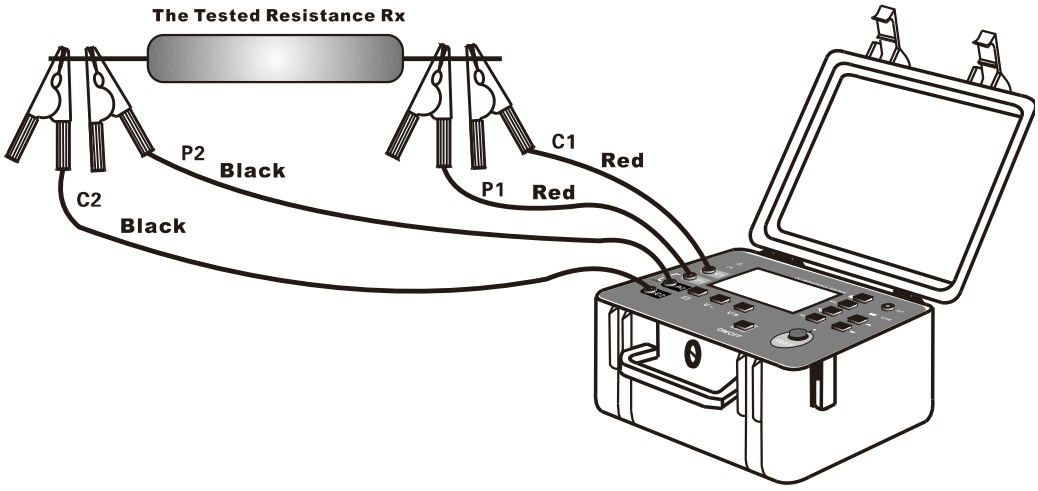
2. Battery Voltage Check

After the power is turned on, if the LCD displays the battery voltage low symbol "▭", it indicates that the battery is low, please charge it in time. The battery power is sufficient to ensure the accuracy of the measurement. When the battery power is reduced, the battery indicator is reduced.

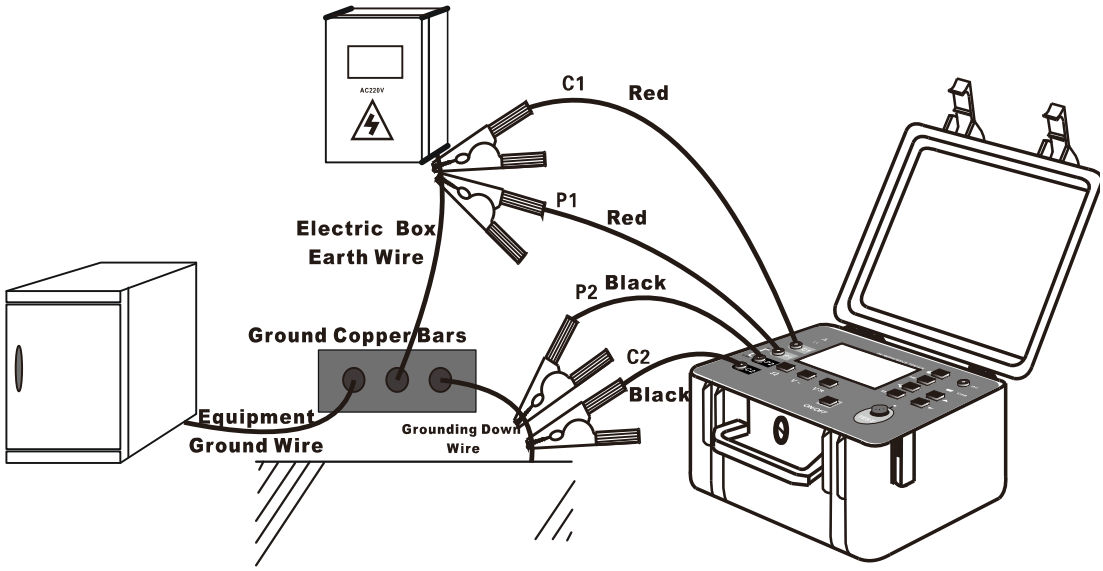
3. Precision Measurement of Equipotential Resistance

⚠	**In the test, first remove the insulating layer and oxide layer on the surface of the object to be tested.**
	Cannot be tested when measuring equipotential resistance or DC low resistance if electriferous
	The connection between the test line and the detector and the measured object should be reliable.
	Cause the component test line is heated, it will cause errors. It is recommended that the test result be more accurate every 30 seconds.
	During the test, the detector displays the OL symbol, indicating that the equipotential value between the two points measured exceeds the range, check the test line contact, may be tested open between two points.

After booting up, press the "**Ω**" button (the "**R**" symbol on the screen) to switch to the equipotential resistance test state, connect the test line to the measured object, as shown in the figure, press the "**TEST**" button to start the test,the measured resistance value is displayed after the countdown is completed.



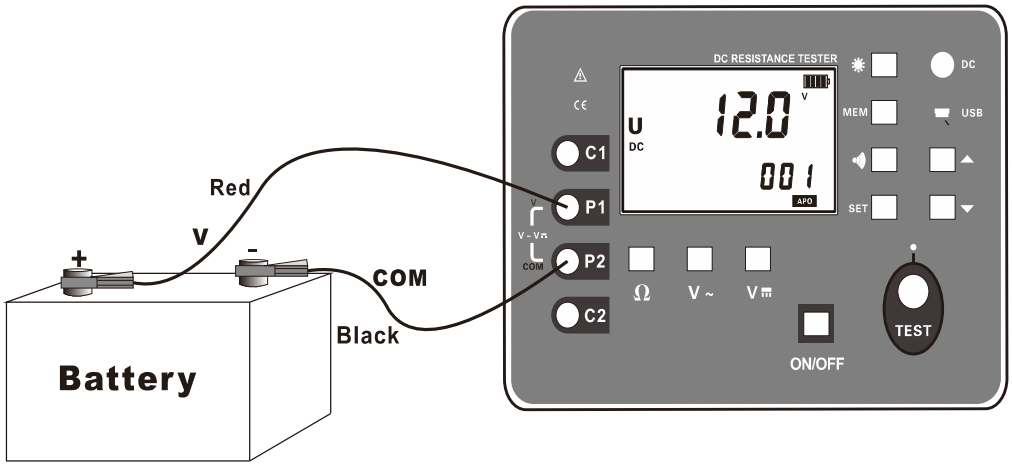
The figure below shows the equipotential resistance between the meter box and the ground and the lower line.。



4. DC Voltage Test

⚠	**Input instrument DC voltage can not exceed 1000V**
	When measuring DC voltage, only need to connect P1 and P2 terminals. Do not insert the C1 and C2 terminals into the test line. Otherwise, the instrument may be damaged.

After powering on, press the "V⎓" button (the "U" and "DC" symbols on the screen) to switch to the DC voltage test state, connect one end of the red test line and the V end (P1) terminal of the meter to the other end of the measured object's the positive pole . The black test line and the COM terminal (P2) is connected to the negative pole of the measured object. The LCD displays the real-time DC voltage value.

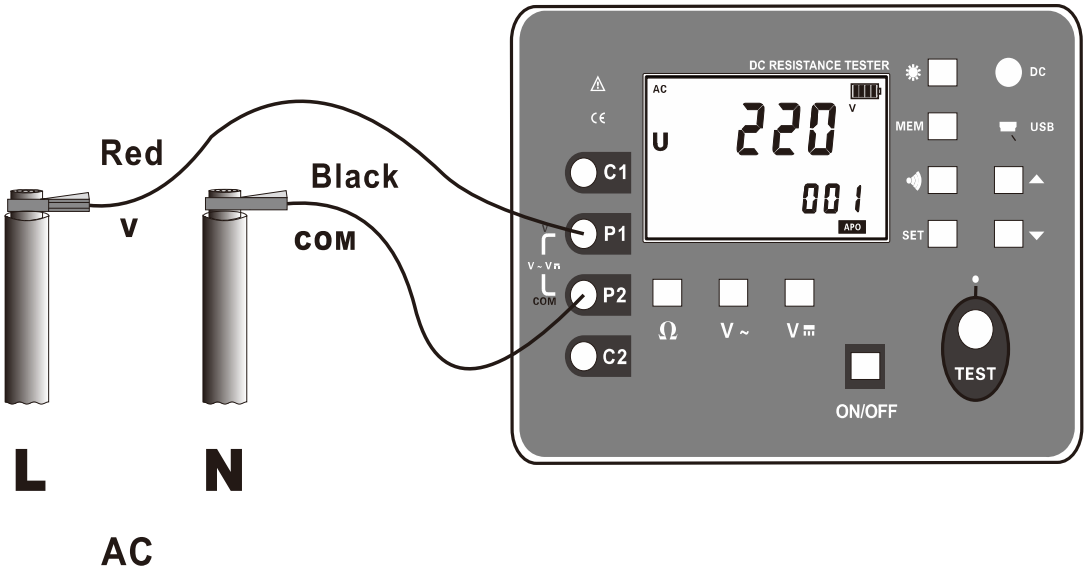


5. AC Voltage Test

⚠	**Input meter AC voltage can not exceed 750V**
	When measuring AC voltage, only need to connect P1 and P2 terminals. Do not insert the C1 and C2 terminals into the test line. Otherwise, the instrument may be damaged.

After powering on, press the "V ~" button (the "U" and "DC" symbols on the screen) to

switch to the AC voltage test state, connect one end of the red test line and the V end (P1) terminal of the meter to the other end of the measured live wire . The black test line and the COM terminal (P2) is connected to the measured null line. The LCD displays the real-time AC voltage value.



6. Backlight Control

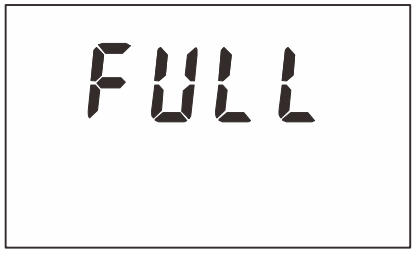
After power on, press "☀" key to turn the backlight on or off, and the backlight function is suitable for dim places. The default backlight turns off every time you turn it on.

7. Alarm Setting

After power on, long press "•))" to turn on and off the alarm function. Long press "**SET**" key to set the resistance alarm value. Press the "•))" button to move the cursor.Press "▲" or "▼" key to change the current digit size, then press "**SET**" key to save and exit. When the measured voltage value is greater than the alarm critical set value or the insulation resistance value is less than the alarm critical set value and the alarm function is turned on, the instrument flashes the "•))" symbol and issues a "beep-beep-beep--" alarm sound.

8. Data Lock/Storage

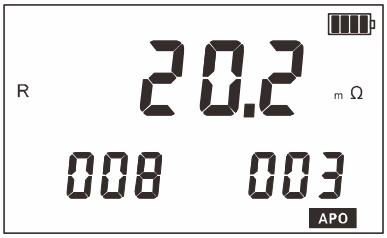
After the measurement is completed, short press "**MEM**" key to lock the current display data, and automatically serial storage. If the storage is full, the instrument displays the "**FULL**" symbol. As shown in the following figure: the measured data is 20.2mΩ, and the "**MEM**" display is stored as the fourth set of data.

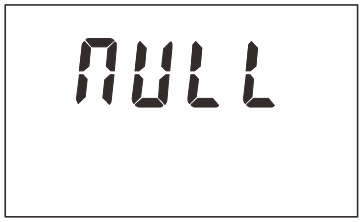


9. Data Review/Deletion

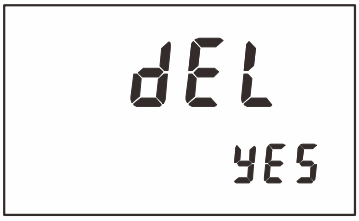
After booting or measuring, press the "**MEM**" button (more than 3 seconds) to enter the data lookup, and store the data read interface "**MR**" symbol display. Press the "▲ "or" ▼"key to select the data corresponding to the array number with a step value of 1, press " ▲"or"▼"to select the array number with a step value of 10, and press "**MEM**" to exit. See below

In the following figure, the number 3 is the current number of groups and 8 is the total number of groups. If there is no stored data， LCD display "**NULL**", see the figure below





In the data review state, press and hold the "**SET** " key to enter the data deletion, press "▲" or "▼" to select "**NO** " or "**YES** ", select "**NO** " and then press "**SET** " key to not return to the data review state. " **YES** " Press " **SET** " again to delete the stored data. After deletion, the following figure is displayed.



10．Data upload

Connect the USB communication cable of the computer and the instrument, turn on the instrument, run the monitoring software. If the USB connection is successful, you can read the stored historical data, upload the computer and save it.

The monitoring software has online real-time monitoring and history query function, dynamic display, alarm value setting and alarm indication function, with historical data reading, reviewing, saving, printing and other functions.

VII. Battery Description

⚠	**Generally charging 8 to 10 hours.**
	If the detector is not used for a long time, please charge the battery once every 1~2 months.
	Please use the original charger to charge.
	When charging, the charger red light is on, when it is full, the green light is on.

The meter is powered by a 6V battery. When the battery power is reduced, the battery indicator bar is reduced, and the battery symbol "▭" is displayed. Please charge it in time. The measurement accuracy is affected when the voltage is low.

VIII. Accessories

Instrument	1PC
Instrument box	1PC
Monitoring Software CD	1PC
USB communication lineUSB	1PC
Test line	4PCS（red 5m，black 5m each 2）
charger	1PC

Manual, certificate	1SET

The contents of this user manual cannot be used as a reason to use the product for special purposes.
The company is not responsible for other losses caused by the use.
The company reserves the right to modify the contents of the user manual. Any changes will be made without further notice.

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