

HZRG-III
Capacitance And Inductance
Tester

USER MANUAL

Dear user:

Thank you for choosing HZRG-III Capacitance And Inductance Tester.

We hope that this instrument can make your work easier and more enjoyable, so that you can get the feeling of office automation in the test and analysis work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the manual to prolong its service life. "Just a light press, the test will be completed automatically" is the operating characteristics of this instrument.

If you are satisfied with this instrument, please tell your colleagues; if you are not satisfied with this instrument, please call (0312) 6775656 to tell you to serve you at all times-Baoding Huazheng Electric Manufacturing Co., Ltd., our company will definitely make you satisfied !

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I.Overview

Reactive power compensation capacitor is an important equipment to satisfy the reactive power balance of the power system. In recent years, the problem of reactive power has received general attention from the electrical industry, and a large number of reactive power compensation devices have been put into operation in the distribution network. Power supply requires real-time balance of active and reactive power in the system. Therefore, the reactive power compensation device should meet the requirements of automatic tracking and real-time compensation, which inevitably requires frequent switching and switching of reactive power compensation capacitor banks. The switching operation of the capacitor bank will produce overcurrent and overvoltage shocks, which will cause damage to the capacitor. In order to ensure the reliability of the equipment, early detection of capacitor defects and avoid the expansion of faults, regular inspections are required. In the field, capacitors are all connected in groups in parallel. The traditional method is to remove the capacitor bus and then measure with an old-fashioned capacitor meter. Since the capacitor bank is composed of dozens to hundreds of small capacitors, it is necessary to disconnect the wires to measure the capacitance. The amount is large, and frequent removal of the wires will cause the screws to slip or not tighten, leaving a safety hazard, and it is also easy to cause secondary damage to the capacitor. Therefore, it is very desirable to have a test instrument that can measure the capacitance of each small capacitor without removing the wires, reduce the burden on maintenance personnel, improve the efficiency of maintenance work, and improve the safety of the distribution network operation.

In view of the actual situation on the spot, our company finally developed this kind of instrument that uses the new test method to measure. The instrument can measure the individual capacitors of a group of parallel capacitors without disconnecting the wires, using advanced measurement principles and four-terminal measurement technology, which can accurately measure and have good test repeatability; in line with SJ-255-10300 capacitance measuring instrument National standard. At the same time, it can also measure the inductance of various reactors. The instrument has convenient wiring and

simple operation, which reduces the workload of maintenance personnel, greatly improves the efficiency of on-site testing, and provides security for the normal operation of the power grid.

II.Features

1. This instrument can measure the single capacitance of a group of parallel capacitors (both single-phase capacitance and three-phase capacitance can be measured) without disconnecting the wires. At the same time, this instrument can also measure the inductance of various reactors to meet the requirements of the site. Kind of use.

Three-phase capacitance measurement is wired once according to the connection method of the capacitor bank according to the wiring diagram. The built-in automatic commutation wiring function of the instrument eliminates the cumbersome wiring commutation short-circuit operation, and the result is automatically output after the test is completed.

2. During the measurement, the instrument can display the measured voltage, current, power, frequency, impedance, phase angle and other data while measuring the capacitance value or inductance value, so as to better analyze the quality of the sample;

3. The instrument uses an 8.0-inch 800×600 graphic dot matrix K600+ core 65K DGUS screen, touch operation, clear observation during day and night, English menu prompts, easy operation.

4. The instrument has built-in large-capacity non-volatile memory: 200 groups of measurement data can be stored.

The instrument is equipped with a U disk interface, which can store any group of measurement data (limited by the capacity of the U disk).

5. The instrument has a built-in high-precision real-time clock function: date and time calibration can be performed.

6. The instrument comes with a high-speed micro thermal printer: it can print measurement and historical data.

7. Instrument test power supply overcurrent protection function: short circuit of power output will not damage the instrument.

III、 Technical index

1. Test voltage: AC 25V±10%, 50Hz

AC 1.25V±10%, 50Hz 25VA

2. Measuring range and accuracy:

Measurable capacitance range: 0.1uF~6800uF±(reading 1%+0.01uF)

Measurable inductance range: 50uH~20H ±(reading 3%+0.05uH)

Measurable current range: 5mA~20A±(reading 3%+0.05mA)

Measurable resistance range: 20mΩ~20kΩ±(reading 3%+0.1mΩ)

3. Dimensions: 400mm×300mm×200mm

IV、 Conditions of Use

Environmental temperature: -20℃~40℃

Environmental humidity: ≤85%RH

Power supply:AC220V±10%, 50±1Hz

V、 Panel introduction

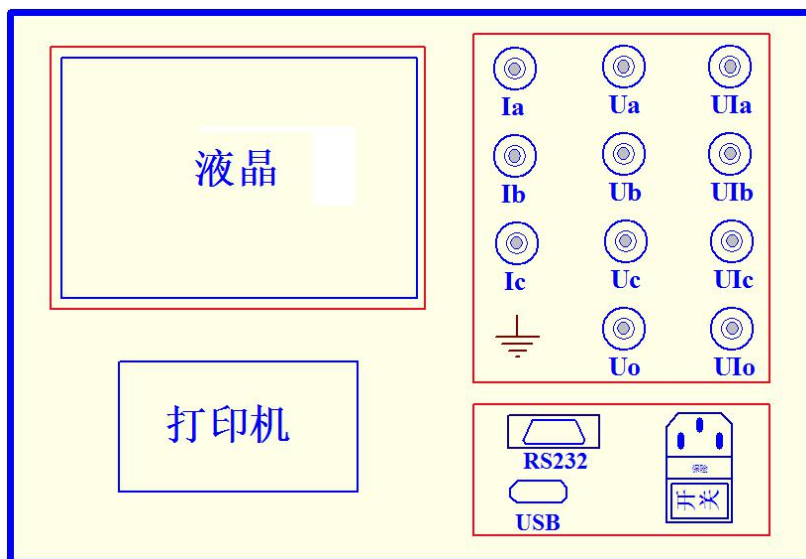


Figure (1)

The four terminals of yellow, green, red and black are respectively for power output (large terminal connected to current line) and voltage input (small terminal connected to voltage line) of A phase, B phase, C phase and neutral point O;

Ia, Ib, Ic: current clamp wiring lead-in terminals, corresponding to A, B, C three-phase;

Liquid crystal screen: display operation prompts and measurement data; touch screen:
touch operation of various functions of the instrument;

Power socket: connect and disconnect AC power; USB: U disk interface

⏏ : Instrument ground terminal RS232: extended spare

VI、Instructions

When the instrument is connected to the test line and power cord as required, turn on the power switch, and the LCD displays the boot interface:



Figure (2)

After a few seconds, the LCD will display the main menu, as shown in the figure below:



Figure (3)

1、Three-phase capacitance and inductance test

If capacitance test is needed, click the "parameter setting" icon button in the main menu screen to enter the capacitance measurement parameter setting screen, as shown in the figure below:



Figure (4)

In the parameter setting interface, directly click the input box or icon button to set the parameters, click the "Save" icon button to save the current parameters, and click the "Test" icon button to enter the following test interface:

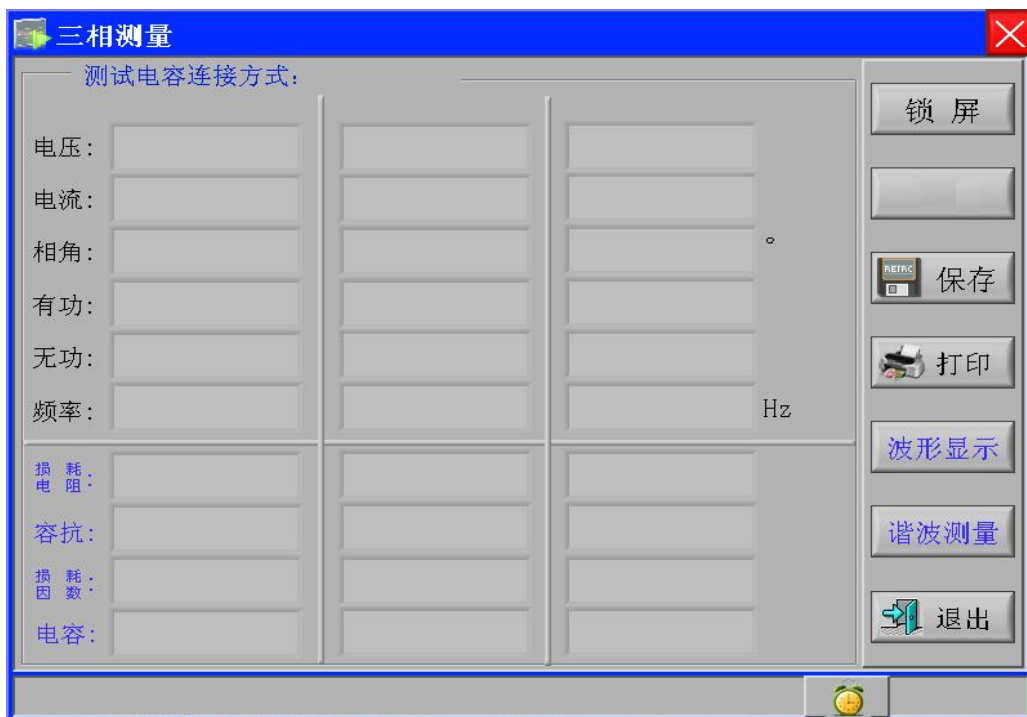


Figure (5)

After a few seconds of testing, the test results are displayed and the screen is automatically locked, waiting for the user to save or print. Click the corresponding icon button directly for each operation.

If you want to print the data, click the "print" icon button; to store the data, click the "save" icon button, if you still need to measure, click the "retest" icon button; click the "exit" icon button to return to the main interface.

Three-phase test interface description:

The entire interface can be seen as the upper and lower parts, the upper "black body" title item is the measured electrical parameter part of the test product; the upper "blue body" title item is the capacitance parameter of each phase of the test product calculated according to the measured electrical parameter of the test product, from left to right On the right are the A-phase, B-phase, and C-phase capacitance parameters.

2、Single-phase capacitance and inductance test

Single-phase capacitance measurement: Click the "single-phase capacitance test" icon button on the "main interface" to directly perform single-phase capacitance measurement.

The display interface is as follows:



Figure (6)

After a few seconds of testing, after the test results are stable, click the lock screen button to lock the screen or continue measurement and wait for the instrument to automatically lock the screen. In the locked screen state, the user can save or print. Click the corresponding icon button directly for each operation.

If you want to print the data, click the "print" icon button; to store the data, click the "save" icon button, if you still need to measure, click the "retest" icon button; click the "exit" icon button to return to the main interface.

3. Inductance test

Connect the test wire and click the "Inductance Test" icon button on the "Main Interface" to directly perform inductance measurement. The display interface is as follows:



Figure (7)

The test process is similar to the capacitance test, you can refer to the "single-phase capacitance measurement" operation.

4、Resistance test

Connect the test wire and click the "resistance test" icon button on the "main interface" to directly perform resistance measurement. The display interface is as follows:

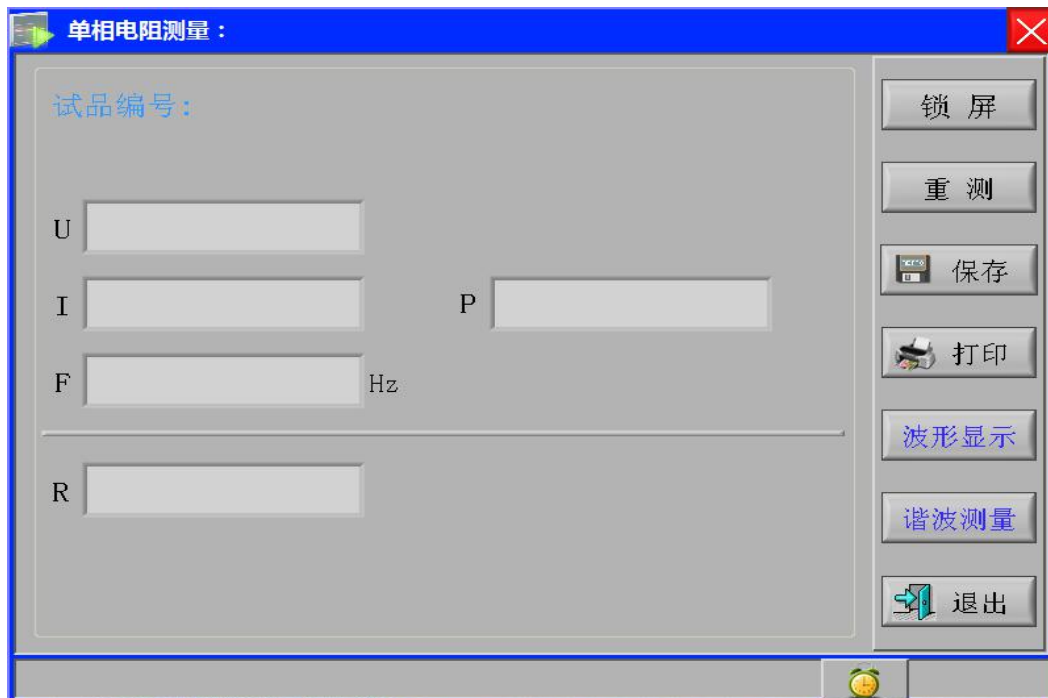


Figure (8)

The resistance test is similar to the single-phase capacitance test, so the introduction will not be repeated.

5、 Other operations

[System Settings] You can set the time and other operations, just click the corresponding icon button in the "Main Interface", it's very simple. The interface is as follows:

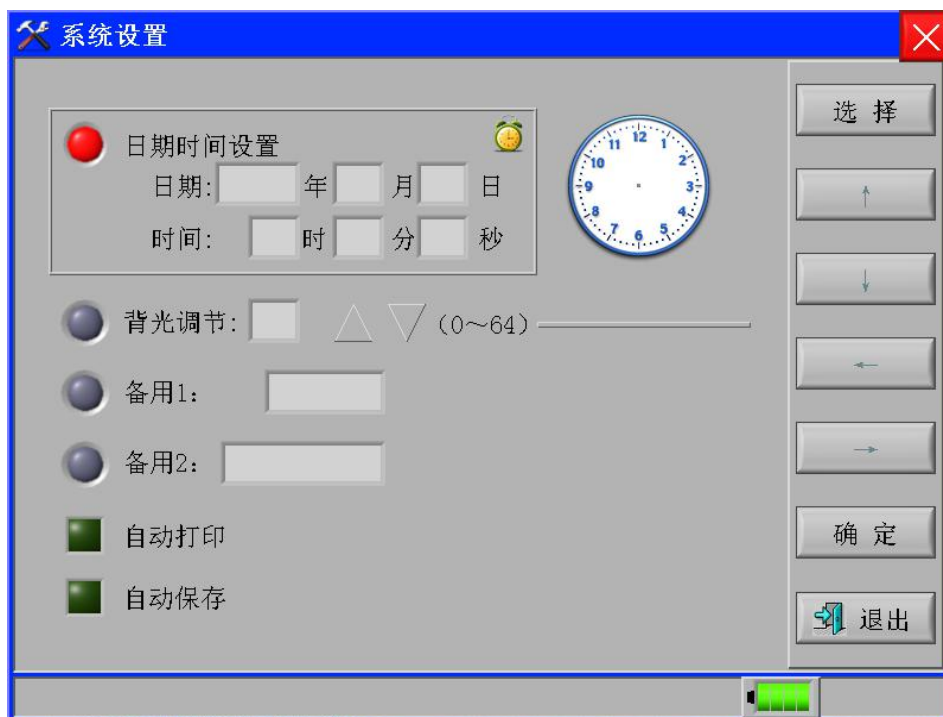


Figure (9)

[Factory Setting] The "Factory Setting" icon function button on the main interface is the parameter setting during factory calibration. It is recommended that customers not change the setting data, otherwise the test data will be inaccurate. If you need to change it again, it must be carried out under the guidance of our company's technicians, and the set value before the change must be recorded first, so that the initial value can be restored when the setting fails.

[Data Processing] If you want to query the stored records, you can click the "Data Processing" icon button in the main menu to enter the "Data Processing" interface, and click the icon to operate.

6、 The meaning of each symbol in the test data:

(1), I: the effective value of the current of the capacitor (reactor) under test, the unit is A

(ampere);

(2), U: The effective value of the voltage of the measured capacitor (reactor), the unit is V (volt);

(3), P: The effective value of active power of the capacitor (reactor) under test, in W (watts);

Q: The effective value of reactive power of the measured capacitor (reactor), in Var (Var);

(4)、 Φ : The phase angle of the tested product, the unit is o (degree)

(5), F: the current frequency of the output power, the unit is Hz (hertz);

(6), C: the capacitance value of the capacitor under test, the unit is uF (microfarad);

(7), L: the current measured inductance value of the reactor under test, the unit is H (Hen);

(8), X: the capacitive reactance of the capacitor under test, the unit is Ω (ohm);

The inductive reactance of the reactor under test, in Ω (ohm);

(9), R: the loss resistance of the tested product, the unit is Ω (ohm);

(10), D: The loss factor of the tested product (the relationship with the quality factor is the reciprocal of each other);

(11)、Ca: The A-phase capacitance value of the measured three-phase capacitor, the unit is uF (microfarad);

(12), Cb: B-phase capacitance value of the measured three-phase capacitor, the unit is uF (microfarad);

(13), Cc: C-phase capacitance value of the measured three-phase capacitor, in uF (microfarad);

VII.Test wiring

(1) Measurement of single-phase capacitance:

The A phase measurement is used by default, the power output is yellow and black binding posts, and the current input uses A phase clamp:

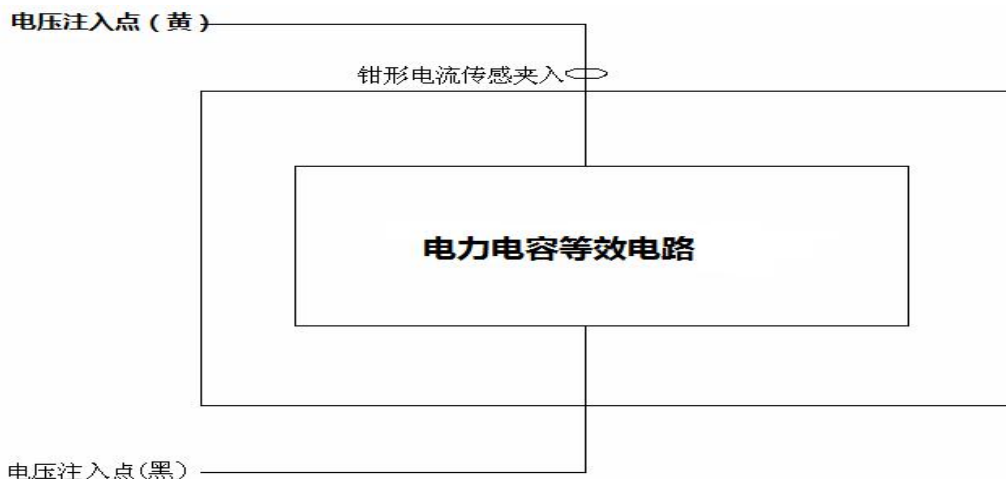


Figure (10)

(2) Measurement of three-phase delta-shaped capacitance:

Three-phase Δ -shaped measurement wiring method, the measurement line is connected by the measurement output terminal of the instrument according to the color corresponding to the A, B, C phases, and then the current measurement line is tightened on the instrument interface, and the clamp sensor should be placed above the lead of the high-voltage capacitor bank. measuring. The wiring diagram is as follows:

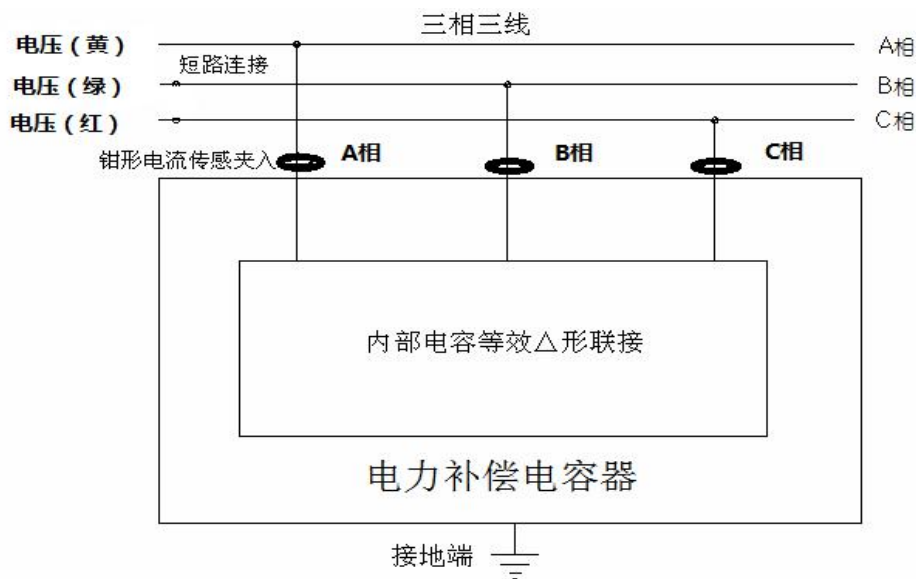


Figure (11)

(3) Measurement of three-phase Y-shaped capacitance:

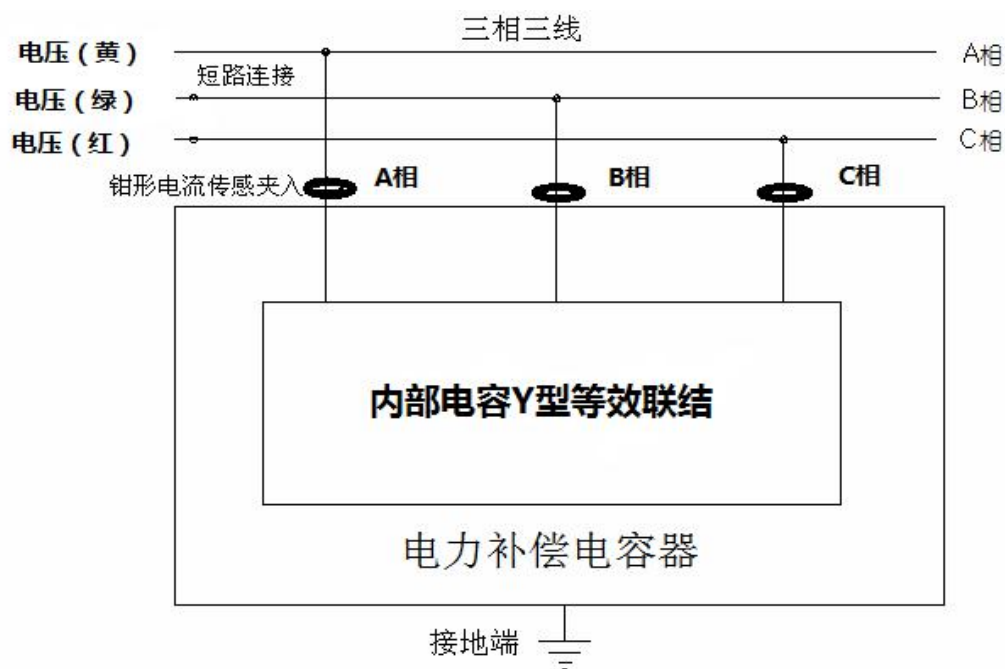


Figure (12)

Three-phase Y-shaped measurement wiring method, the measurement line is connected by the measurement output terminal of the instrument according to the corresponding A, B, and C phases, and then the current measurement line is tightened on the instrument interface, and the clamp sensor should be placed above the phase lead of the high-voltage capacitor bank Measurable.

(4) Measurement of three-phase Yn-shaped capacitance:

The three-phase four-wire Yn-shaped measurement wiring is equivalent to the three-phase Y-type wiring, or the single-phase measurement method is adopted for the phase measurement.

(5) Measurement of three-phase III-shaped capacitance:

The three-phase type III measurement wiring is equivalent to the three-phase Y-type wiring method, or the single-phase measurement method is adopted to measure the phases.

(6) Reactor inductance measurement:

The A phase measurement is used by default, the power output is yellow and black binding posts, and the current input uses A phase clamp.

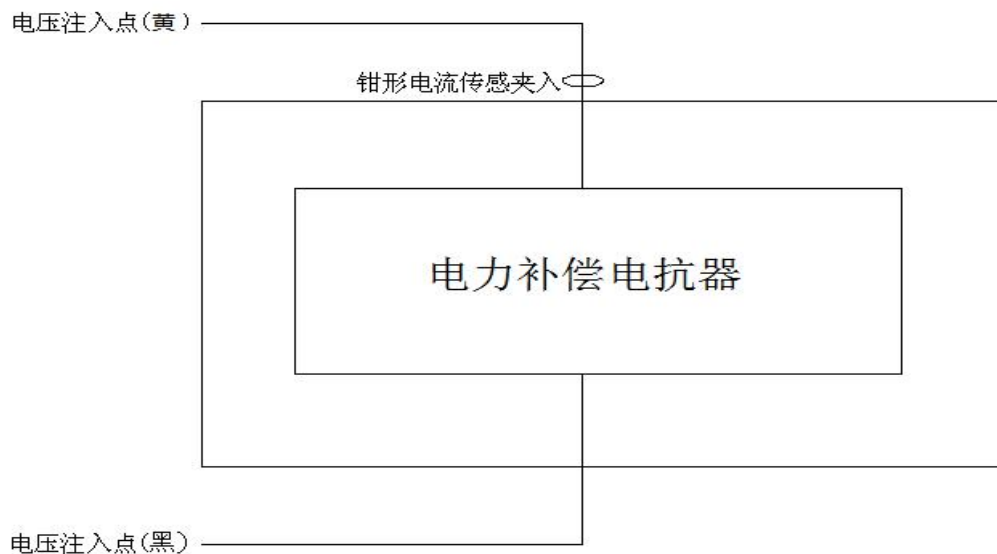


Figure (13)

Wiring diagram (13) Inductance and reactance measurement wiring method, the measurement line is inserted according to the color corresponding to the measurement output end of the instrument, the yellow clip is clamped to one end of the busbar, the black clip is clamped to the other end, and then the current measuring line is connected to the instrument Tighten the interface, and the clamp sensor should be placed above the lead of the reactor for measurement.

(7) Resistance measurement

By default, phase A is used for measurement, the power supply outputs yellow and black binding posts, and the current input uses phase A clamps.

The measuring line is connected by the measuring output terminal of the instrument according to the corresponding color. The red clip is clamped to one end of the resistor and the black clamp is clamped to the other end. The clamp sensor should be placed on the current line for measurement.

Note: The test wire is connected, the thick wire is connected to the current, and the thin wire is connected to the voltage.

VIII.Precautions

1. Please read the instruction manual carefully before using this instrument, and check that the wiring is correct and the grounding is good.

2. The high-precision current clamp is a key part of the instrument, so be careful during use.
3. The instrument, especially the connecting test lead and clamp meter, should be kept away from strong electromagnetic fields to avoid interference to the measurement.
4. The instrument test leads, clamps, and clamp meters should be kept clean to ensure good testing.
5. If the current direction is reversed during the test, just adjust the current clamp.
6. The instrument must be grounded reliably before testing.
7. When testing the wiring, the wiring clamp must be in good contact with the tested product to avoid voltage open circuit.
8. Do not remove the wiring before the test is completed during the measurement process.
9. If there are problems that cannot be solved, please contact our company in time.

IX.After-sales service

The instrument will be repaired and replaced free of charge for product quality problems within one year from the date of purchase, and maintenance and technical services will be provided for life. If you find any abnormalities or malfunctions in the instrument, please contact the company in time to arrange the most convenient solution for you.

V.Packing List

No.	Item	Qty
1	Capacitance and inductance tester	1
2	Test line	1
3	power cable	1
4	Clamp current sensor	3
5	Ground wire	1
6	2A insurance tube 250V	2