Dear Client,

Thank you for Purchasing our HTHL-200A Micro Ohmmeter. Please read the manual in detail prior to first use, which will help you use the equipment skillfully.



Our aim is to continually improve and perfect the company's products, so there may be slight differences between your purchase equipment and its instruction manual. You can find the changes in the appendix. Sorry for the inconvenience. If you have further questions, welcome to contact with our service department.



The input/output terminals and the test column may bring voltage, when you plug/draw test wire or power outlet, they will cause electric spark. PLEASE CAUTION RISK OF ELECTRICAL SHOCK!

◆ SERIOUS COMMITMENT

Within three months from the date of delivery, if our products have quality defects, implementation of replacement; in one year (including one year), repair for free; more than one year, implementation of lifetime maintenance and appropriate fees are required. Except otherwise provided by contract.

◆ SAFETY REQUIREMENTS

Please read the following safety precautions carefully to avoid body injury and prevent the product or other relevant subassembly damage. In order to avoid possible danger, this product can only be used within the prescribed scope.

Only qualified technician can carry out maintenance or repair work.

--To avoid fire and personal injury:

Use Proper Power Cord

Only use the power wire supplied by the product or meet the specification of this produce.

Connect and Disconnect Correctly

When the test wire is connected to the live terminal, please do not connect or disconnect the test wire.

Grounding

The product is grounded through the power wire; besides, the ground pole of the shell must be grounded. To prevent electric

shock, the grounding conductor must be connected to the ground.

Make sure the product has been grounded correctly before connecting with the input/output port.

Pay Attention to the Ratings of All Terminals

To prevent the fire hazard or electric shock, please be care of all ratings and labels/marks of this product. Before connecting, please read the instruction manual to acquire information about the ratings.

Do Not Operate without Covers

Do not operate this product when covers or panels removed.

Use Proper Fuse

Only use the fuse with type and rating specified for the product.

Avoid Touching Bare Wire and Charged Metal /Conductor

Do not touch the bare connection points and parts of energized equipment.

Do Not Operate with Suspicious Failures

If you encounter operating failure, do not continue. Please contact with our maintenance staff.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in Explosive Atmospheres.

Ensure Product Surfaces Clean and Dry.

—Security Terms

Warning: indicates that death or severe personal injury may result if proper precautions are not taken

Caution: indicates that property damage may result if proper precautions are not taken.

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I. Overview

Nowadays Power Systems widely use model QJ44 DC double arm bridge to measure contact resistance (DC resistance and Loop resistance of high-voltage circuit breaker) while the minimum current of such model is 1mA which hardly find the decrease of cross-sectional area of transformers' conductive circuit conductor. The measurement of loop resistance of high voltage switchgear is affected by oil layer and oxide between static and dynamic contact port, so the resistance measurement value will be several times larger, and can not reflect the true value of contact resistance. Therefore, the Ministry of Electric Power in national standards SD301-88 "AC 500KV Electrical Equipment Transfer and Preventive Test Procedure" and new version of " Electrical Equipment Preventive Test Procedure" stipulate that the testing current of circuit breaker and isolating switch contact resistance is not less than 100A to ensure accurate test results.

HTHL-200A Micro Ohmmeter measures up to the latest power system standards--DL/T845.4-2004 designed for measuring loop resistance of Switching Control Equipment using High-frequency switching power supply technology and digital circuit technology. Test current of the Tester is DC-100mA

Or DC-200mA which is recommended in the national standards. The tester can measure the loop resistance at those values and display results in digital. It is high precision and good stability and can meet most power systems' requirements in onsite high-voltage switches maintenance and high-voltage switches factory loop resistance measurement. (It performances accurately and stably)

II. Functions

HTHL-200A Micro Ohmmeter is suitable for measuring loop resistance of high-voltage switches in high-precision. It also applies on other test occasions that need high current and micro resistivity.

III. Features

(1) High current: For latest power supply technology, the tester can continuously output high current which overcomes the weakness of instantaneous current produced by pulsed power. It can effectively breakdown/puncture the oxide layer of the switches and then get precise results.

(2) Strong anti-interference ability: The last number of test data will stably show in the LCD screen only with ±1 error even in strong Interference situation.

(3) Long service life: All the precise resistances used in the tester can reduce the temperature's impact on the measurement results and military connectors can enhance vibration resistance.

(4) Convenience: Small size, light weight.

IV. Specifications

1. Measurement Range：1～1999μΩ

2. Resolution：1μΩ

3. Test Current： DC 50A, DC 100A, DC 150A, DC 200A, four fixed outputs.

4. Work Mode：continuous

5. Measurement Accuracy：0.5%±1d

6. Display：three and a half LCD

7. Power Supply：AC220V±10% 50Hz

8. Work Environment：

Temperature：－10℃～40℃ Humidity：≤80 %RH

9. Dimension：380×350×260 mm

10. Weight：5Kg（Accessories excluded）

V. Panel Layout

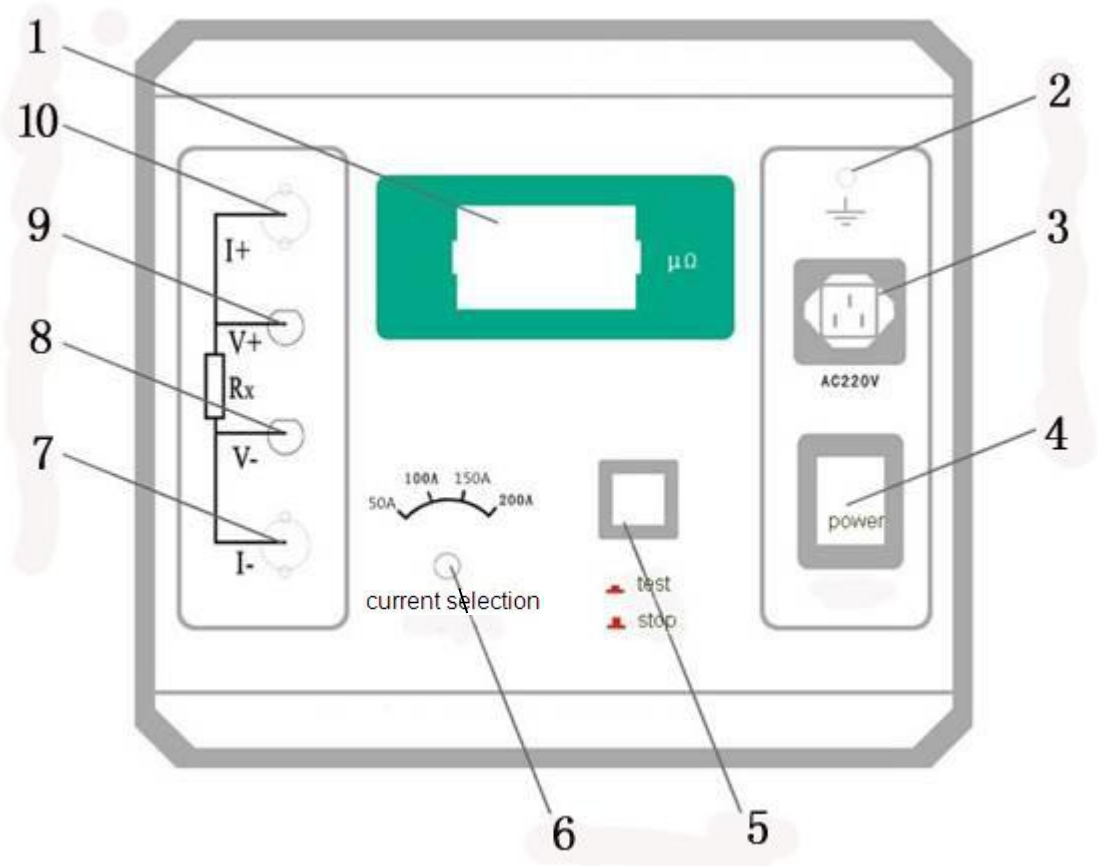


Figure 1 Panel Layout diagram

1、Resistance Display（μΩ）	2、Ground	3、Power Outlet
4、Power Switch	5、Measurement Switch	6、Current Selection
7、Current Output I－	8、Measurement Input V－	9、Measurement Input V＋
10、Current Output I+		

VI. Work Principle

HTHL-200A Micro Ohmmeter bases on the Current-voltage testing principle that also known as Four-line method testing technology. More details show in Figure 2.

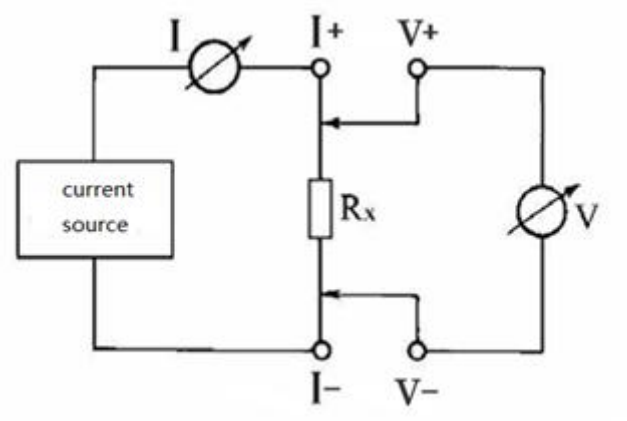


Figure 2 Schematic diagram

The current goes through I+ and I- ports to the resistance Rx, current value can be got from the ammeter I, and the voltage between V+ and V- will be shown in the voltmeter V. Based on data I and V, the resistance value can be calculated.

VII. Operation Methods

1. Wire as shown in the Figure 3.

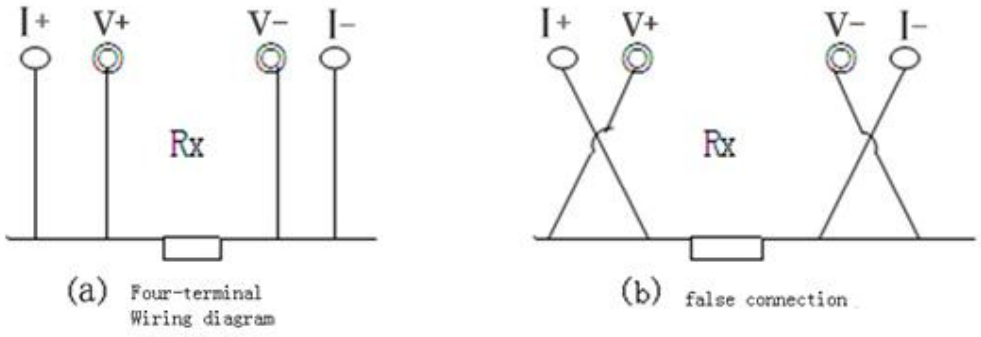


Figure 3 Four-terminal Wiring diagram

2. The junction of panel and test lines should be tightly screwed.

3. You should use Four-terminal wiring method in which current line should be fasten to I+ and I- ports and voltage line should be fasten to V+ and V- ports. Current and voltage must have the same polarity.

4. After checking the connection of tester and test lines, access/contact to

220V AC and start the tester.

5. Adjust the “Current Selection” knob to you need fixed output and then press the “Measurement Switch” button, the data displayed in the monitor is the test value of loop resistance. Displaying 1 indicates the loop resistance value is beyond the measurement range.

6. Completed measurement, please disconnect the power switch and put the test lines into accessories bag.

VIII. Problems and Solutions

Problems	Solutions
No respond after powering on	Check if AC power is on
	Check the power Cables
	Check if the Fuse is Burn out.
Display 0 during measurement	Check if “Test” button is pressed.
	Check if current output lines have poor contact.
	Check if the fixed output of “Current Selection” is correct
Display actual current values but resistance value is evidently larger or 1 (beyond range)	Check if resistance value is too large
	Check if current lines places laterally
	Check if current output lines have poor contact or the port connected to the test piece is oxidized.

IX. Notes

1. Please read the manual carefully before using this tester.
2. Please wire properly as recommended in this manual.
3. This tester cannot measure resistance that is in a live circuit.

4. Ground should be connected during the use of this equipment.

5. Arbitrary replacement of current lines is forbidden.

6. The tester should be put in ventilated, dry, cool and cleaning place. Pay attention to humid or erosive gas that may damage this equipment.

Appendix A：Basic Knowledge about Contact Resistance

1. What is contact resistance?

Contact resistance is the additional resistance caused by the connection of static contact and dynamic contact.

2. What are the components of circuit breaker contact resistance?

Circuit breaker contact resistance is composed of shrink resistance and surface resistance of static contact and dynamic contact.

3. What caused circuit breaker contact resistance out of work?

1) Contacts are burned because of Short.

2) If circuit breaker contact resistance is poor connected, that will cause changes in itinerary. Serious Excess load/Overload will cause the contact pressure or contact area changes.

3) Finished installation, the breaker has not been put into use for a long time, so the dynamic/static contacts are oxidized and the Surface Resistance becomes larger.

4) Due to long-term running the spring out of shape, which cause the contact pressure drop.

5) Long-term operation cause machine wear.

6) For less oil circuit breaker, unqualified insulating oil will lead the occurrence of acid reaction, the result is the contact surface being eroded. And insulating oil is mixed with impurities, after breaking the short-circuit current between dynamic contact and static contact, the residual carbon particles or metal powder will boost the contact resistance.

4. What can affect contact resistance?

1) Material properties: Resistivity, hardness, chemical properties,

mechanical strength and resistivity of metallic compound.

2) Contact form: Point contact, line contact and area contact.

3) Situations of contact area: The oxide film formed in contact area (the Silver exception), whose resistance is larger than that of metal.

4) Contact pressure

5) Roughness of contact area

Appendix B： Standard Reference for Conducting Loop Resistance of Circuit Breaker

Model	Loop Resistance of Each Phase （μΩ）	Model	Loop Resistance of Each Phase （μΩ）
SN1-10	<95	DW1-60G	200
SN2-10G	75	SW1-110	700
SN4-10	50—60	SW2-110I	180
SN4-20	50—60	SW3-110	160
SN4-10G	20	SW4-110	300
SN4-20G	20	SW6-110	180—220
SN5-10	100	SW2-220	400
SN6-10	80	SW4-220	600
SN10-35	<75	SW6-220	<400
DW1-35	550	SW7-220	<190
DW1-60	500	KW1-220	400
DW3-110	1100—1300	KW2-220	170
DW2-110	800	KW3-220	110
KW1-110	150	KW4-220	130
KW3-110	45	DW2-220	1520
KV4-110A	60	DW3-220	1200
DW3-110G	1600—1800	SW6-330	＞600