

Dear Client,

Thank you for choosing our HTHL-100B Micro Ohmmeter. Please read this manual carefully before your initial use, and this manual will help you use our equipment skillfully.



There may be a little bit differences between the equipment you got for our trial to improve and perfect our products. You can find the changes in the appendix. Sorry for all the inconvenience caused to you. You can contact us if you have any doubts of our tester.



Voltage of terminals side may be Hazardous that would cause Electrical Discharge when you attach and detach test side. Be careful for risk of electric shock and personal injury.

◆ **SERIOUS WARRANTY**

All products of our company carry a three-month limited warranty from the date of shipment. If any such product proves defective during this warranty period we will provide a replacement in exchange for the defective product without charge. In one year (including one year) the product will be maintained and repaired for free if it proves to be defective. Beyond one year, lifetime maintenance and repair with charge is available.

◆ **SAFETY REQUIREMENTS**

Please read the following safety precautions to avoid personal injury and to prevent this product or any other attached products being damaged. In order to avoid possible danger, this product can only be used within the scope of the provision.

Only qualified technician can carry out maintenance or repair work.

—To avoid fire hazard or personal injury

Use Proper Power Cord. Use only the product-specific power cord and the power cord must be in line with the specifications of the product.

Connect and Disconnect Correctly. When the testing wire is connected to the charged terminal, do not connect or disconnect to test wire at will.

Ground the Product. In addition to this product being grounded through the grounding conductor of the power cord, the grounding

column of the product shell must also be grounded. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, please do check that the product is properly grounded.

Pay Attention to the Ratings of All Terminals. In order to prevent the fire hazard or electric shock, please be care of all ratings of this product and labels. Before connecting this product, please read the product manual to acquire information about the ratings in further detail.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Use Proper Fuse. Use only the fuse type and rating specified for this product.

Avoid Touching Bare Wire and Conductor. When the product is charged, do not touch the bare connection point and parts.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in Explosive Atmosphere.

Keep the Surface of the Product Clean and Dry.

— **Security Terms**

Warning: Warning statements identify conditions or practices that could result in injury or loss of life.

Caution: Caution statements identify conditions or practices that could result in damage to this product or other property.

Contents

I、 Overview	6
II、 Performance characteristics	7
III、 Performance characteristics	7
IV、 Technical indicators	8
V、 Panel structure	9
VI、 Working principle	10
VII、 Operating method	10
VIII、 Matters needing attention	12
IX、 Fault Phenomenon And Elimination	13
X、 Packing list	14
Appendix I: Basic knowledge of contact resistance	15
Appendix II: Circuit Breaker Conductive Loop Resistance Standard Reference Value	17

I、 Overview

At present, the conventional QJ44 double-arm DC bridge is widely used in the measurement of contact resistance in the power system, and the test current of this type of bridge is only mA level, so it is difficult to find the defect of reducing the cross-sectional area of the circuit conductor. When measuring the contact resistance of the conductive circuit of the high-voltage switch, due to the influence of the oil film and oxide layer between the contacts, the measured value is several times larger, which cannot truly reflect the contact resistance value. For this reason, the Ministry of Electric Power Standard SD301-88 "AC 500KV Power Equipment Handover and Preventive Test Procedure" and the new version of "Preventive Test Procedure for Power Equipment" stipulate that the measured current of contact resistance of circuit breakers and disconnectors shall not be less than DC 100A to ensure the accuracy of test results.

The instrument is designed according to the latest power standard DL/T845.4-2004 of the People's Republic of China, using the combination of high-frequency switching power supply technology and digital circuit technology. It is applicable to the measurement of circuit resistance of switch control equipment. Its test current adopts DC 100A and 200A recommended by the national standard. The circuit resistance can be measured directly at the

current of 100A, or at the current of 200A. The final test results are displayed in figures. The instrument is accurate in measurement and stable in performance, and meets the requirements of on-site high-voltage switch maintenance and high-voltage switch factory circuit resistance test of the power and power supply departments.

II、 Performance characteristics

This instrument is applicable to high-precision measurement of contact resistance (loop resistance) of high-voltage switch, and also applicable to other occasions requiring large current and micro-resistance measurement.

III、 Performance characteristics

1. Large current: using the latest power supply technology, it can continuously output large current for a long time, overcome the disadvantage of instantaneous current of pulse power supply, effectively break through the oxide film of switch contact, and obtain good test results.

2. Strong anti-interference ability: under severe interference conditions, the last digit of the LCD screen can be stable within ± 1 word, with stable reading and good repeatability.

3. Long service life: all high-precision resistors are used to effectively eliminate the impact of ambient temperature on the

measurement results. At the same time, the use of military connectors enhances the anti-vibration performance.

4. Convenient to carry: small size and light weight.

IV、 Technical indicators

1. Measurement range: 1 ~ 1999 $\mu\Omega$
2. Discrimination: 1 $\mu\Omega$
3. Test current: DC 50A, 100A two-speed fixed output
4. Measurement accuracy: 0.5% \pm 1d
5. Working mode: continuous
6. Display mode: three and a half LCD
7. Working power supply: AC220V \pm 10% 50Hz
8. Ambient temperature: temperature - 10 ° C ~ 40 ° C humidity \leq
80 % RH
9. Volume: 390 (length) \times 300 (width) \times 150 (height) mm³
10. Quality: 6kg (without accessories)

V、 Panel structure

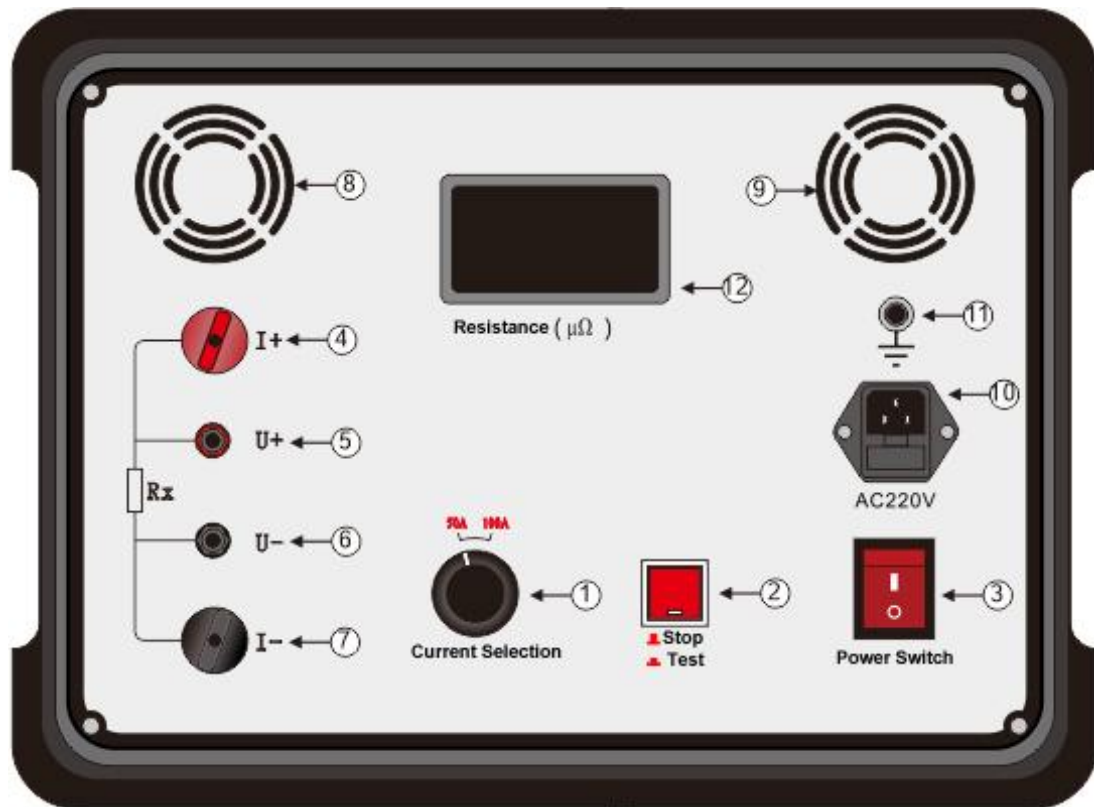


Figure 1 Panel structure diagram

- | | | |
|------------------------|------------------------|----------------------------|
| 1.Current Selection | 2.Measure Switches | 3.Power switch |
| 4.Current output I + | 5.Measurement inputU + | 6.Measurement inputU — |
| 7.Current output I — | 8.Heat sink | 9.Heat sink |
| 10.Power supply socket | 11.Ground | 12.Resistance display (μΩ) |

VI、 Working principle

The instrument adopts the current and voltage method test principle, also known as the four-wire method test technology. See Figure 2 for the schematic block diagram.

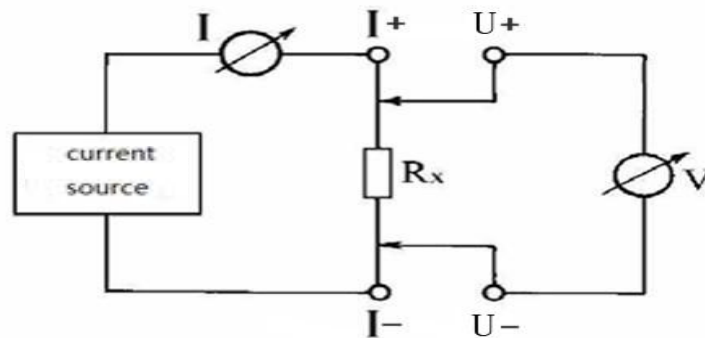


Figure 2 Test schematic diagram

The current source supplies the measured resistance R_x current through the "I+" and "I -" ports (also known as "I" ports). The current is read by the ammeter I, and the voltage drop "U+" and "U -" ports (also known as "V" ports) at both ends of R_x are taken out and read by the voltmeter V. The resistance value of the measured resistance can be calculated by measuring I and U.

VII、 Operating method

- 1、 Connect according to the wiring method shown in Figure 3.

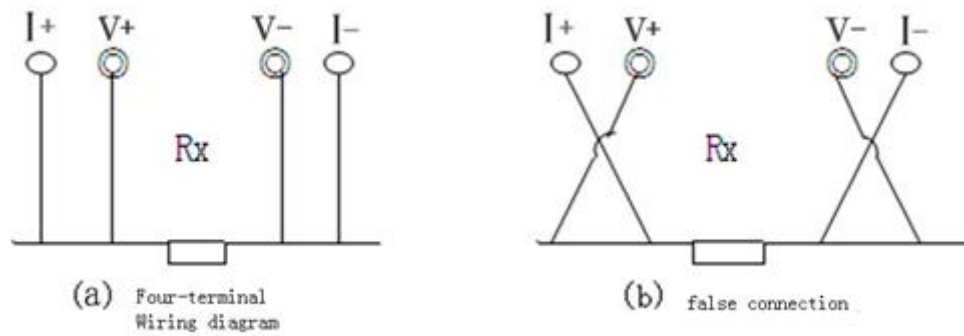


Fig. 3 and 4 terminal wiring diagram

2. The connection between the instrument panel and the test line shall be tightened without looseness.

3. The wiring should follow the four-terminal method, that is, the current line should be clamped at the outside of the tested object, and the voltage line should be clamped at the inside of the tested object. The current and voltage must be of the same polarity.

4. After checking and confirming that there is no error, connect 220V AC power, close the power switch, and the instrument enters the startup state.

5. Adjust the "Current Selection" knob, select the current gear to be selected, and then press the "Measure" key. At this time, the displayed value of the ohmmeter is the measured circuit resistance value. If 1 is displayed, it indicates that the measured loop resistance value is out of range.

6. After the measurement, disconnect the power switch, put the test wire clip away and put it into the accessory bag.

VIII、Matters needing attention

Precautions 1. Please read the instructions carefully before using the instrument.

2. Please wire according to the correct wiring method in the manual.

3. The instrument shall not test the circuit resistance in the live circuit.

4. The instrument must be reliably grounded during use.

5. The current line user shall not change it at will.

6. When the instrument is not in use, it should be stored in a ventilated, dry, cool, and clean place, and attention should be paid to moisture-proof and corrosion-resistant gases.

IX、 Fault Phenomenon And Elimination

Fault Phenomenon	Fault elimination
No response after startup, no LCD display	Check for AC power supply
	Check the power cable
	Check whether the fuse tube in the fuse tube base is burnt
The resistance value is displayed as 0 during the test	Check whether the fuse tube in the fuse tube base is burnt
	Check whether the current output line is connected properly and whether it has poor contact
	Check whether the "current selection" key is selected correctly
During the test, the resistance value is obviously too large or 1 (out of range)	Check whether the measured resistance value is too large
	Check whether the voltage input line is connected to the inside of the current output line
	Check whether the voltage output line is connected properly and whether the connector of the tested part is oxidized

X、 Packing list

1、 Host	1
2、 Special test line (two high current lines 6m, two high current test clips, two voltage test lines 6m)	1
3、 Ground wire	1
4、 5A Fuse	3
5、 Accessory package	1
6、 AC220V Power Cord	1
7、 Instruction manual	1
8、 Certificate	1
9、 Inspection report	1

Appendix I: Basic knowledge of contact resistance

1.What is contact resistance?

Contact resistance is the additional resistance that occurs when the static contact contacts with the moving contact.

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

It is composed of shrinkage resistance and surface resistance of the contact part of the moving and stationary contacts.

3.Reasons for unqualified contact resistance of circuit breaker?

- The contact is burnt when breaking large short circuit current.

- The stroke changes due to poor adjustment and fixation of the mechanism. When the over-stroke is seriously unqualified, the contact pressure or contact area changes.

- After the commissioning and installation of the circuit breaker, it has not been put into operation for a long time, resulting in oxidation of the surface of the moving and stationary contacts and increased contact surface resistance.

- Long-term operation deforms the spring and reduces the contact pressure.

- Mechanical wear caused by long-term operation of mechanical parts.

- For oil-less circuit breakers, the contact surface may also be corroded by acid reaction due to unqualified acid value of insulating oil. Or floating impurities in the oil, after breaking short circuit current between moving and stationary contacts. Residual particulate carbon and metal powder increase the contact resistance.

4.Factors affecting contact resistance?

- Material properties: resistivity, hardness, chemical properties, mechanical strength and resistivity of metal compounds.

- Contact form: point contact, line contact and surface contact.

- Contact surface condition: when the contact surface forms an oxide film (except for silver), the resistance of the oxide film is much greater than that of the metal itself.

- Contact pressure.

- Roughness of contact surface.

Appendix II: Circuit Breaker Conductive Loop

Resistance Standard Reference Value

Model	Contact resistance of each phase ($\mu\Omega$)	Model	Contact resistance of each phase ($\mu\Omega$)
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