MEIRUIKE INSTRUMENT

Manual

RK9950 series
Program controlled leakage current tester
Instruction manual
Shenzhen Meiruike Electronic Technology Co., Ltd.

Version history:

Due to the possible errors or omissions in the manual, improvement and perfection of instrument functions, updating of technology and upgrading of software, the manual will be adjusted and revised accordingly and continuously improved for the convenience of use.

Please pay attention to the software version and manual version.

October 2020.......................................Vision 1

Statement: the company may improve and improve the performance, function, software, structure, appearance, accessories, packaging and instruction manual of the product. Any modification is subject to no further notice!

If in doubt, please contact us.

Contents

Chapter 1   Safety Rules

The contents of the manual are subject to change without prior notice

Please contact our company directly if there is anything unknown in the manual

Regulations and matters needing attention before testing!

Warning: to prevent failure or damage to the tester, please use the tester within the specified voltage range.

1.1 General Provisions

Before using the tester, please read the manual carefully to understand the operation procedures and relevant safety signs to ensure safety.
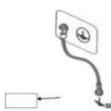
Before turning on the input power switch, please select the correct input voltage specification.

Chassis earthing symbol

警 告

Warning: it should be noted that the operation, application or condition carried out is highly dangerous, which may lead to personal injury or death.

The current generated by the tester is enough to cause casualties. In order to prevent accidental injury or death, when moving and using the tester, please observe clearly before operating.

1.2 Maintenance

1.2.1 in order to prevent electric shock, non professionals should not open the cover of the tester. All parts inside the tester should not be replaced without permission. If the tester is abnormal, please ask our company or the designated dealer for help.

1.2.2 regular maintenance

The tester, power line, test line and related accessories should be carefully inspected and calibrated at least once a year to ensure the safety of operators and the accuracy of the tester.

1.2.3 user modification

The user is not allowed to change the circuit or parts of the tester by himself, otherwise the warranty of our company will be invalid and we will not be responsible for the consequences.

1.3 Test environment

1.3.1 Working position

When operating the tester, it must be ensured that the tester is placed in a place that ordinary personnel cannot touch at will. If it cannot be done because of the arrangement of the production line, the test area must be isolated from other facilities and specially marked with "test work area".

1.3.2 Input power

The tester uses single-phase power supply of 220 V / 110 V and 50 Hz / 60 Hz. Before turning on the power switch, please ensure whether the power supply voltage meets the requirements.

The test area power supply must have a separate switch, installed at the entrance of the test area, to ensure that all personnel can identify. In case of emergency, turn off the power immediately.

警 告

In order to prevent the tester from failure, please use it within the specified voltage range.

1.3.3 workplace

Use non-conductive material as much as possible. The test site must be kept neat and clean at all times, and no disorder is allowed. Please put the unused tester and test line in a fixed position, so that all personnel can immediately distinguish the tested object, the object to be tested and the object to be tested.

The air in and around the test area shall not contain combustible gas, and the tester shall not be used beside combustible materials.

1.4 Operator Regulations

1.4.1 Operator Qualification

The output current of the tester is enough to cause personal injury or death in case of electric shock due to wrong operation, so it must be used and operated by trained and qualified personnel.

1.4.2 Safety rules

Operators must give education and training at any time to make them understand the importance of various operation rules, and operate the tester according to the safety rules, so as to ensure the safety of the tester.

In order to prevent the occurrence of electric shock accidents, please wear insulating gloves before using the tester.

1.4.3 Clothing regulations

Operators are not allowed to wear metal ornamented clothes or metal hand ornaments and watches. These metal ornaments are easy to cause accidental electric shock.

When you get an electric shock, the consequences will be even more serious.

1.4.4 Medical regulations

The tester must not be operated by people with heart disease or wearing a heart rate regulator.

Incorrect grounding or ungrounded may lead to electric shock accident.

1.5 Safety grounding regulations

The tester must be well grounded, and the ground wire must be well grounded before the test to ensure the safety of the operator. If the ground connection on the power plug is not reliable, an additional protective ground terminal is provided on the back panel of the tester to connect to the safe ground.

警　告

Incorrect grounding or ungrounded may lead to electric shock accident.

1.6 Regulations on fuse replacement

警　告

Please turn off the input power switch and disconnect the power plug before replacing the fuse,the Standard Fuse (100v-120v 47hz-63hz 3.15a; 200v-240v 47hz-63hz 5a) should be replaced.To avoid electric shock, be sure to replace the fuse after disconnecting the power cord.

1.7 Test safety regulations

After connecting the test line to the object to be tested, the connection shall be reliable. The operator must make sure that the switch and remote control switch can be operated completely independently and can not be controlled by other personnel. When the remote control switch is not in use, it should be placed in a fixed position and can not be placed at will.

警　告

Never use a tester on a live circuit board or equipment! Do not touch the test object or the object connected with the test object during the test!

1.8 Test exception provisions

Under some specific conditions, the tester will not respond to the reset key, the test time value will not move, and the display will be black screen, which is very dangerous. When these situations occur, please be sure to turn off the power switch and disconnect the power plug, do not use, please contact our company.

警　告

When the test is abnormal, turn off the power switch immediately and unplug the power plug!

1.9 Safety points

■ Unqualified operators and irrelevant personnel should stay away from the test area.

■ The test area must be kept in a safe and orderly state at all times.

■ During the test, it is not allowed to touch the test object or any object connected with the tested object.

■ In case of any problem, please turn off the output and input power immediately.

Chapter 2 Overview and technical indicators

2.1 Product Overview

Thank you for purchasing and using our products. Before using this instrument, please confirm it according to the "accessories" in the last chapter of this manual,

If there is any discrepancy, please contact us as soon as possible to protect your rights and interests.

2.1.1 Program controlled leakage current tester is 5 inch TFT LCD display, the tester uses 32 bit high-speed MCU and large scale digital circuit design.

Built in GB9706.1-2007 (IEC60601-1:1998) body impedance simulation network, the card card MD network interface contains MD-A (coincidence GB/T12113-2003 、 GB4793.1-2007) 、 MD-B(GB/T12113-2003、GB4793.1-2007、GB4706.1-2005、

GB4943.1-2011、GB8898-2011 、GB7000.1-2015)、MD-C(GB/T12113-2003、GB7000.1-2015)、MD-D(GB4793.1-2007)、MD-E(GB4943.1-2011、GB4793.1-2007)、MD-F(GB7000.1-2015).

Load voltage and current overrun protection; MD network multiple fast protection, safe and reliable. Dynamic and static two power test states; leakage current test automatically switches L (phase line) and N (zero line). Its setting and operation are very simple, and provides PLC remote control interface, RS232C, RS485, USB and other interfaces, which is convenient for users to quickly combine into a comprehensive test system.

2.1.2 The tester has the functions of unqualified identification, sound and light alarm and automatic control of test time, which can meet the needs of production line or quality inspection.

2.1.3 The tester can be used for leakage current test of household appliances, electronic instruments, electronic equipment, electric tools, electric heating appliances, etc.

2.1.4 Service conditions

Power supply voltage: 110V / 220V ($\pm$10%)

Power frequency: 50 Hz / 60 Hz ($\pm$ 5%)

2.1.5 Ambient temperature and humidity

Normal working temperature: 0 ℃ - 40 ℃, humidity: < 90% RH

Measuring environment temperature: 20 ℃$\pm$ 8 ℃, humidity: < 80% RH

Transportation environment temperature: 0 ℃ - 55 ℃, humidity: $\leqslant$ 93% RH

2.1.6 Preheating

Preheating time after startup: $\geqslant$ 30 minutes

2.1.7 Insulation resistance

Under metering working conditions, the insulation resistance between the power terminal and the shell shall not be less than 50m Ω.

Under the condition of hot and humid transportation, the insulation resistance between the power terminal and the shell shall not be less than 2m Ω.

2.1.8 Insulation strength

Under the metering working conditions, the power supply terminal and the shell can withstand the rated voltage of 1.5kV and frequency of 50 Hz AC power supply for 1 minute without

breakdown and flashover.

2.1.9 Electromagnetic compatibility and compliance standards

The transient sensitivity of the power supply is GB6833.4. Conduction sensitivity is GB6833.6. Radiation interference is required according to GB6833.10.

Standard for household electrical appliances (IEC60335, GB4706.1-2005) and luminaire standard (IEC60598-1-1999,GB7000.1-2007),information standard(GB8898-2011, GB12113 , GB4943.1-2011, IEC60065, IEC60590) and so on.

2.2 Technical Indicators

1、 Specific parameters

Model		RK9950（Passive）	RK9950A（500VA）	RK9950B（1000VA）	RK9950C
Basic functions	Screen size	5-inch TFT LCD screen			
	Number key	Parameter setting digital input			
	Coding switch	Parameter selection and confirmation function			
	Up, down, left and right function keys	Parameter setting up and down selection function			
	LOCK keyboard locking function	Prevent accidental modification of test conditions or prohibit modification of test conditions			
	Alarm function	Voice alarm			
	Communication interface	RS232C、 RS485、 USB			
	USB interface	Copy, copy and storage functions			
	Control interface	HANDLER(PLC)			
Test method	Dynamic, static				
Load voltage（AC）	Range	0-300V			
	Accuracy	+ (2% ×display value +0.5V)			
	Frequency	50/60Hz			

Load current（AC）	Maximum	25A		
Over current protection	Sound and light alarm, cut off the load output			
Leakage current setting	Upper limit setting			
	Range	0.001-20.00mA		
	Resolution	＜10mA，0.001/step　＞10mA，0.01mA/step		
	Lower limit setting			
	Range	0.000-20.00mA		
	Resolution	＜10mA，0.001/step　＞10mA，0.01mA/step		
	Explanation	The lower limit is set to 0 without judgment		
Leakage current measurement	Range and accuracy	0.001-0.050mA　　　DC-10KHz	± (5% × display value + 5 words)	
		0.050-20.00mA　　　DC-10KHz	± (2% × display value + 2 words)	
		0.050-20.00mA 10KHz-1MHz	± (5% × display value + 5 words)	
MD simulated human network	8 standard networks	MD-A(GB/T12113-2003、GB4793.1-2007)、MD-B B1(GB/T12113-2003、GB4793.1-2007、GB4706.1-2005、GB4943.1-2011、GB8898-2011、GB7000.1-2015)、MD-C(GB/T12113-2003、GB7000.1-2015)、MD-D（GB4793.1-2007）、MD-E（GB4943.1-2011、GB4793.1-2007）、MD-F(IEC60598-1:2014、GB4793.1-2007)、MD-G(GB4943.1-2011、IEC60950-1:2005、GB4793.1-2007、IEC61010-1:2001)		
Test time	Range	Single timing test: 0.1-999s ± 1%; closing time is continuous test		
	Explanation	When setting 0S test, only N-wire is tested，no L conversion		
Output power		Passive	500VA	1000VA	Three phase passive
External power supply		External connection	Built in	Built in	External connection

2、General technical index

General technical index	
Working temperature and humidity	0℃-40℃，≦75%RH
Power Supply	100V-121V，198V-242V，47.5-63Hz　　5A 250V

Fuse size	5A 250V	10A 110V		
External volume(D×H×W)	430mm×105mm×350mm			
Weight	13KG	16KG	18KG	14KG

Chapter 3　Front and back panel description

3.1 Front panel structure

3.1.1 Schematic diagram of front panel
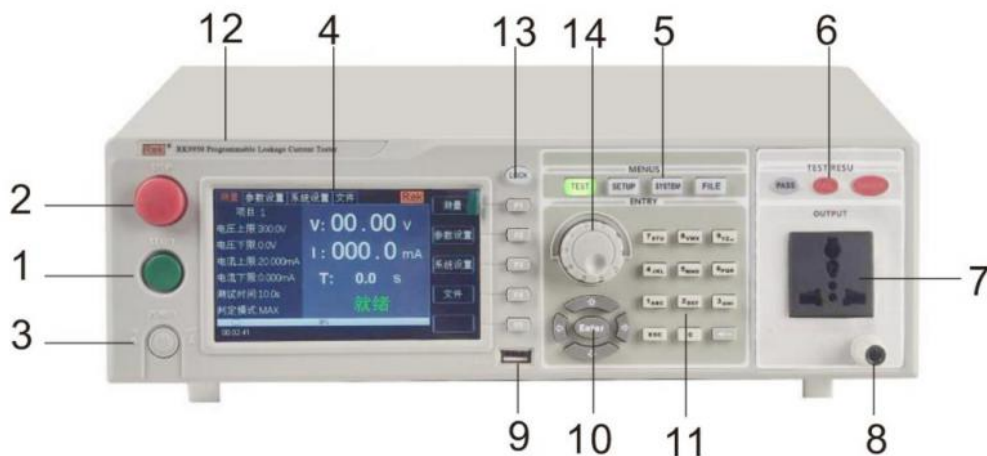
3.1.2 front panel description

1. start key (START)

The green instantaneous contact switch has the following functions:

Start switch for testing voltage output

2.reset key (STOP)

The red instantaneous contact switch has the following functions:

In the setting mode, it acts as a switch to leave the setting mode.

When testing, it can be used as a switch to interrupt the test.

At the end of the test, it is used as a switch to exit the test and enter the next state to be tested.

3. Power switch

Working power input of tester

4. LCD screen

Display various setting information and test data.

5. Function area

Operation area of various settings

6. Test result indication area

When the tester outputs current, the indicator light will be on, indicating that "there is current output, under test", indicating that the test has passed and failed.

7. Output terminal

Test the output voltage of the tested part

8. Ground return terminal

As the loop grounding terminal of the tested part. Suitable for two core power plug without ground wire.

9. USB storage area
As the interface of file data copy and copy.

10. up and down, left and right, and ENTER confirm key.

It is used to adjust the options when setting the parameter function. Enter is the confirmation function key.

11. 0-9 number pad

Enter the numeric value of the parameter

12. Tester model indication

13. LOCK lock key

It is used to press the panel function keys, and light up and lock the panel functions during the test, except stop and start keys.

14. Rotary encoder potentiometer

For parameter setting, you can adjust the potentiometer and press the key to confirm the setting.

3.1.3 Description of indication function area

1. Qualified lamp

It contains green LED indicator light, which will be on when the object to be tested passes the test.

2. Unqualified lamp

It contains red LED indicator light, which will be on when the test fails.

2. When the light DANGER is on, it means that the instrument should pay attention to safety during the test.

3.1.4 Parameter function area description

TEST Key is the function of test status, select this key to enter the test; SETUP key is the parameter setting key, select this key to enter the test parameter setting of the tester;

SYSTEM Key is the function setting key of the tester system. Select this key to set various functions of the tester system;

FILE Key is the function key of tester file. Select this key to copy, copy and delete the test data file.

3.2 Rear panel structure

3.2.1 Schematic diagram of rear panel
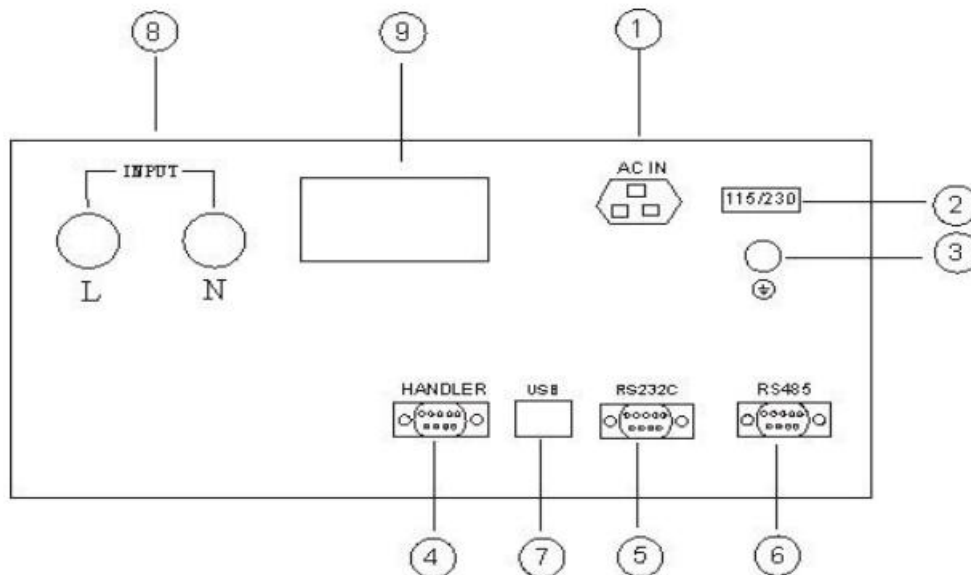
3.2.2 Rear panel description

1. Power socket

The standard input power socket provides working power for the tester. Pay attention to turn off the input power switch and disconnect the power plug before replacing the fuse, and replace the Standard Fuse (3.15A/250VAC, 5A / 110VAC).

2. 115V / 230V power conversion

3. Ground terminal

The safety grounding terminal of the tester must be properly grounded to ensure the safety of the operator.

4. PLC signal terminal

A standard 9-core D-type female terminal block provides remote control monitoring and control signal interface.

5. RS232C interface

RS232C serial communication function is provided

6. RS485 interface

Provide RS485 serial communication function

7. USB interface

Provide USB computer to connect U disk function

8. AC source input

L、N single phase AC source input.

9. Name plate

Tester model name, date of manufacture and serial number.

3.3 Screen display area definition

RK9950 uses 480 * 272 LCD 5 inch display. The contents displayed in the display are divided into the following display areas.

3.3.1 Measurement display page area

This area indicates the measurement parameter name of the current page.

3.3.2 File domain

Move the cursor to this area for file management. File management includes loading, saving and deleting.

3.3.3 Soft key area

This area is used to display the function definition of the soft key. The definition of soft key has different function definition according to the location of the cursor area.

3.3.4 Display area of measurement results

This area displays test result information and current test conditions.

3.3.5 Parameter setting area

This area displays the parameter settings

3.3.6 System settings

This area displays the parameter settings of the system.

3.3.7 Time display area

This area displays the current working time.

3.4 Main menu buttons and corresponding displayed pages

3.4.1 Main menu button of measurement display

Used for all kinds of measurement and display the home page. The function pages of this part include (use the "soft key" to select the following page functions, the same below):

Measurement display
Measurement setup
System settings
Document management

3.4.2 Main menu button of parameter setting

It is mainly used to enter the measurement setting interface corresponding to the measurement display. The main interfaces are as follows:

3.4.3 system setting main menu button

Used to enter the system settings home page. It is mainly about system settings. The function pages of this part are as follows:

3.4.4 Main menu button of file management

Used for file management settings.

Chapter 4 Operating Instructions

4.1 Boot instructions and boot screen

Before the power cord plug is connected to the mains, please turn off the input "power switch", check whether the specification of the fuse is correct, and connect the safety ground

wire to the "ground terminal" on the back panel of the tester.

The basic operations are as follows:

■Use the menu button（［TEST ］［SETUP ］［SYSTEM ］［FILE］）and the soft key to select the page you want to display.

■ move the cursor （［→］［←］［↑］［↓］） to the field you want to set by using the cursor. When the cursor moves to a field, the field turns blue. The so-called field is the area where the cursor can be set.

■The field where the current cursor is located can be set by coding potentiometer or number key. When the data input is finished, you can use the ［ ENTER ］ key or lightly press the coding potentiometer to confirm.

4.2 Operation steps

4.2.1 Setting tester parameters

Please refer to the section "parameter setting" to set the parameters.

4.2.2 Connect the tester to the object

Plug in the three wire power plug.

Note: keep the supply voltage at 90-121v AV (60Hz) or 198-242v AV (50Hz).

The power input phase line L, zero line N and ground line e shall be the same as the phase line and zero line on the power plug of the instrument.

Turn on the power supply and press the power switch at the upper and lower left corner of the front panel to turn on the instrument and display the power on screen. As shown in the picture above.

Please press the "reset" key once, and make sure that the test indicator is not on, the display works normally, and there is no current output. Connect two thick wires to the current output terminal, and two thin wires to the voltage detection terminal. Test the two ends of the object to be tested, and check whether all the wiring is reliable.

4.2.3 Press the "start" button to start the test

After pressing the "start" key, the tester outputs current. At this time, the test indicator on the front panel will light up, and the display will show "under test". At the same time, the current value will be displayed. The timer will start to work, and the data will be updated continuously.

4.2.4 determination of qualified products

After the test, the tester will automatically turn off the output, the qualified indicator light on the front panel will be on, and the sound will be emitted at the same time. The display will display "pass" and test data, indicating that the tester determines that the tested object is qualified.

If you want to continue the test, you can press the "start" key again to restart the test.

If you want to stop the test, you can press the "reset" key, the tester will stop the test immediately, and the display will keep the current test value.

4.2.5 determination of unqualified products

If the test fails, the tester will turn off the output immediately, the unqualified light on the front panel will turn on, and a warning sound will be given. The display will display the test failure prompt and test data, indicating that the tester determines that the tested object is unqualified. The test failure prompts are: upper limit failure, over-current protection.

To turn off the alarm sound, press the "reset" key.

4.2.6 Operation instructions of START and STOP

The START key is to start the test key. Press this button and the instrument starts to enter the test state.

The STOP key is reset and stop key. In the test state, press the STOP key to interrupt the test of the instrument once, the running lamp is DANGER, and the LOCK lamp is bright.

According to STOP two times, the instrument enters the reset state, and the DANGER and LOCK lights go out.

Chapter 5 PLC remote control interface

5.1 PLC remote control signal

The tester has remote monitoring and remote control connection interface, which can connect the working state of the tester to the monitoring center for monitoring, and can be connected to the remote controller for operation.

This terminal is a standard 9 PIND type terminal block, which contains three monitoring signal outputs of PROCESSING、PSASS、FALL, and two remote control input signals of TEST、STOP.

5.2 Wiring description of remote control output signal

The tester provides three "normally open" contact signals, which are respectively provided by three relays in the tester. The contact capacity is AC 250V 1.0A/DC 250V 0.5A,

These contacts have no limitation of positive and negative polarity, and each signal is connected independently without common ground wire.
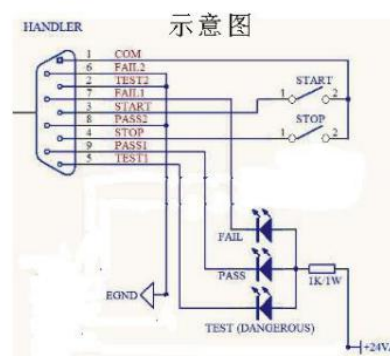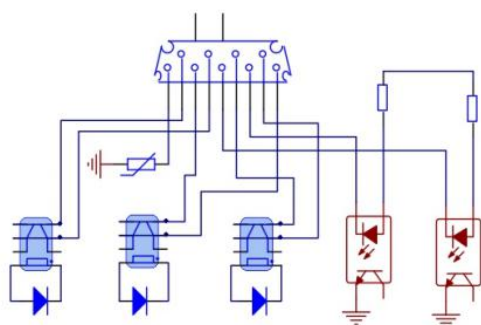
The terminal block is marked with pin number, and the wiring of output signal is as follows:

1, PROCESSING signal: the output signal is connected between PIN5 and PIN2.

2, PASS signal: the output signal is connected between PIN8 and PIN9.

3, FALL signal: the output signal is connected between PIN6 and PIN7.

4, START OUT: the output signal is connected between PIN3 and PIN1.

5, RESET OUT: the output signal is connected between PIN4 and PIN1.
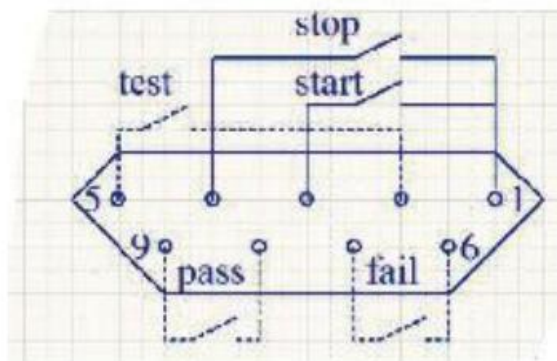
Chapter 6 Parameter setting

6.1 Instrument power on self test

6.1.1 Instrument self check items

When the tester runs power on self-test, the screen displays as follows:

```
OSCILLATOR--OK
EEPROM------OK
CPLD--------OK
SPIFLASH----OK
KEYBOARD----OK
SYSTEM------OK
DATA INIT---OK


WELLCOME
```

The self inspection items are as follows:

1. Internal crystal working state detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound, and can not enter the self inspection of the next project.

2. Input and output memory status detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound, and it can not enter the self inspection of the next project.

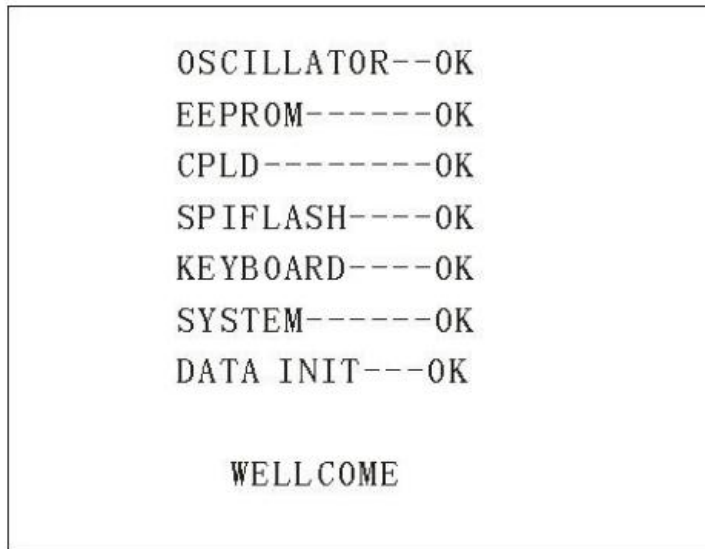3. Complex programmable logic state detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound, and it can not enter the self inspection of the next project.

4. Serial peripheral interface status detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound, and can not enter the self inspection of the next project.

5. Keyboard status detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound, and it can not enter the self inspection of the next project.

6. System status detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound, and can not enter the self inspection of the next project.

7. Data initialization status detection: if it is normal, it will display OK, if it is abnormal, it will give an alarm sound and cannot enter the self inspection of the next project.

If there is no error in the above self-test, the instrument self-test is successful. Enter the test interface, as shown in the following figure:

6.2 Parameter setting mode

Enter the parameter settings page according to the "SETUP" or "F2" key on the instrument panel at the measurement interface.
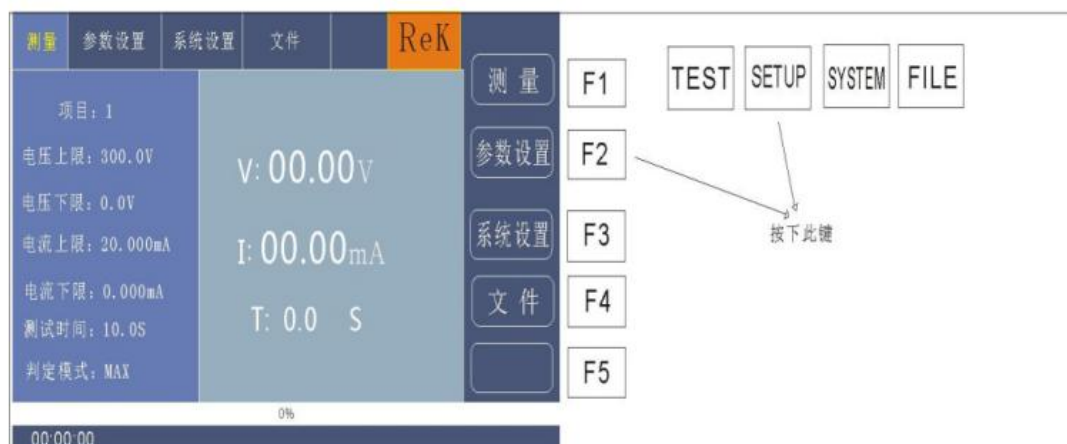
The parameter setting interface is as follows:

6.2.1 Upper limit of test power supply voltage: the upper limit of test power supply voltage is the maximum allowable test power supply voltage. When it is higher than this value, the tester will give an alarm and terminate the test. If the value is set to "0", the upper limit of the measured value will not be determined. The setting value of the upper voltage limit can be selected by the cursor ［↑］［↓］, and the setting value can be input by using the number key or adjusting the coding potentiometer. The setting range is 0-300V.

6.2.2 Lower limit of test power supply voltage: the lower limit of test power supply voltage is the minimum allowable test power supply voltage. When it is less than this value, the tester will give an alarm and terminate the test. If the value is set to "0", the lower limit of the measured value will not be determined. The setting of lower voltage limit can be selected by the cursor ［↑］［↓］, and the setting value can be input by the number key or adjusting the coding potentiometer. The setting range is 0-300V.

6.2.3 Test time: make judgment after the test current is stable to prevent misjudgment. When the decision time is "0", the test will continue without stopping, unless the test fails or stops artificially. You can select the setting item with the cursor of ［↑］［↓］, and input the setting value with the number key or the adjustment code potentiometer. This setting range is 0-999.9s.

6.2.4 Upper limit of current: the upper limit of leakage current is the maximum allowable leakage current. If the upper limit is exceeded, the test will be judged as failure.

　　If the upper limit of leakage current is "0", the upper limit of measured value will not be determined. The set value of upper limit of leakage current can be selected by the cursor ［↑］ ［↓］, and the set value can be input by the number key or adjusting the coding potentiometer. This setting is 0-20.000mA.

　　6.2.5 lower limit of leakage current: the lower limit of leakage current is the minimum allowable leakage current. If it is less than the lower limit, the test will fail. If the lower limit of leakage current is "0", the lower limit of measured value will not be determined. The set value of upper limit of leakage current can be selected by the cursor ［↑］［↓］, and the set value can be

input by the number key or adjusting the coding potentiometer. This is set to 0-20.000mA.

6.2.6 judgment mode: the mode of leakage current can be set as maximum judgment mode or final judgment mode. If it is set to the maximum value judgment mode, the judgment is based on the maximum value in the test process; if it is set to the final value judgment mode, the maximum value in the final value is selected as the judgment basis according to the final test value of each power state in the test process.

This setting has: MAX (maximum value) and END (terminal value).

6.2.7 test mode: this can set the working state of the device to be tested (dynamic HOT, static COLD).

6.2.8 MD human body network: the instrument has 8 kinds of analog human network (MD-A, MD-B, MD-B1, MD-C, MD-D, MD-E, MD-F, MD-G).

MD-A(兼容IEC60990图3的U1测试)   MD-B MD-B1 (兼容IEC60990图4 的U1、U2测试)   MD-C（兼容IEC60990图5的U3测试）

MD-D(电器产品安全法等)   MD-E(电器产品安全法等)   MD-F(IEC61029等)

MD-G(IEC60745等)
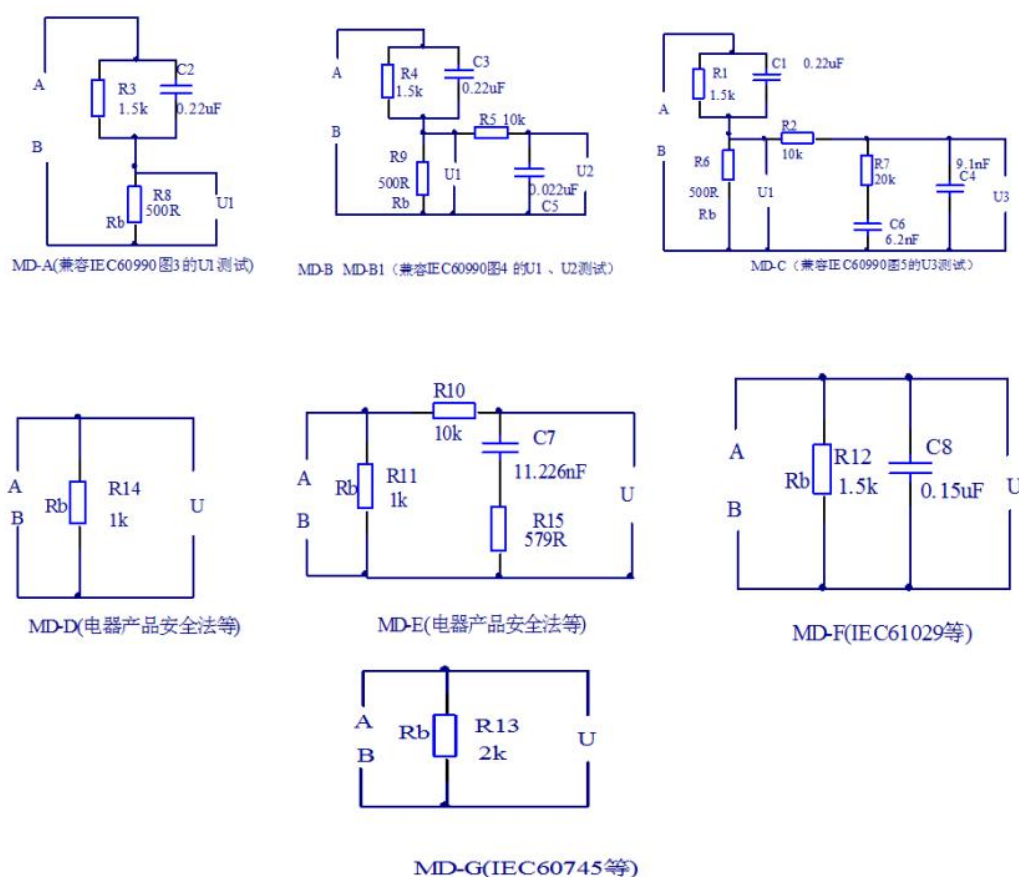
MD-A meets the criteria: GB/T12113-2003 (IEC60990:1999) and GB4793.1-2007 (IEC61010-1:2001).

MD-B meets the criteria: GB/T12113-2003 (IEC60990:1999) and GB4793.1-2007 (IEC61010-1:2001).

MD-B1 meets the criteria: GB4706.1-2005 (IEC60335-1:2004) and GB4943.1-2011

(IEC60065:2005).

GB8898-2011 (IEC60598-1:2014) and GB7000.1-2015 (IEC60598-1:2014)

MD-C meets the criteria: GB/T12113-2003 (IEC60990:1999) and GB7000.1-2015 (IEC60598-1:2014).

MD-D meets the criteria: GB4943.1-2011 (IEC60950-1:2005) and GB4793.1-2007 (IEC61010-1:2001).

MD-E meets the criteria: GB4793.1-2007 (IEC61010-1:2001).

MD-F meets the criteria: GB7000.1-2015 (IEC60598-1:2014).

MD-G meets the criteria: GB4943.1-2011 (IEC60065:2005) and GB4793.1-2007 (IEC61010-1:2001).

6.3 Parameter setting description

In the standby mode, press F2 or SETUP key on the instrument panel to enter the parameter setting interface. The specific operations are as follows: Note: all parameter settings can only be operated after the corresponding cursor flashes in the selected digits.

6.3.1 Parameter setting of upper limit of test power supply voltage

Press the "↓" key or code dial to move the cursor to the upper voltage limit value, as shown in the figure below: in this interface, press the "ENTER" key to edit the upper voltage limit value, and the voltage range is (0-300.0) V.

To change the voltage value, just enter the number key. For example, to input 200V voltage, just press the number keys "2、0、0、0" and "ENTER". Note: operate after the first cursor flashes.

6.3.2 Parameter setting of lower limit of test power supply voltage

Press the "↓" key or code dial to move the cursor to the lower voltage limit, as shown in the figure below: in this interface, press the "ENTER" key to edit the lower voltage limit, and the voltage range is (0-300.0) V. To change the voltage value, just enter the number key. For example, to input 200V voltage, just press the number keys "2、0、0、0" and "ENTER". Note: operate after the first cursor flashes.

6.3.3 Parameter setting of upper limit of leakage current

Press the "↓" key or code dial to move the cursor to the upper current limit value, as shown in the figure below: in this interface, press the "enter" key to edit the upper current limit value, and the current range is (0-20.000) MA. To change the current value, just enter the number key. For example, to input current 10mA, just press the number keys "0, 1, 0, 0" and "enter". Note: operate after the first cursor flashes.

6.3.4 Lower limit parameter setting of leakage current

Press the "↓" key or code dial to move the cursor to the lower limit of current, as shown in the figure below: in this interface, press the "enter" key to edit the lower limit of current, and the current range is (0-20.000) mA. To change the current value, just enter the number key. For example, to input current 10mA, just press the number keys "0, 1, 0, 0" and "enter". Note: operate after the first cursor flashes.

6.3.5 Test time: press the "↓" key or code dial to move the cursor to the time function item, as shown in the figure below:

In this interface, press the "ENTER" button to edit the time, with a range of (0.1-999.9) S. To change the time value, just enter the number key. For example, input 101.2, press "1", "0", "1", "2" and "ENTER" key.

6.3.6 Decision mode: press the "↓" key or code dial to move the cursor to the decision mode function item, as shown in the figure below:

In this interface, press the "ENTER" button to edit the test mode. The mode is MAX maximum and END terminal value two.

6.3.7   Test mode: press the "↓" key or code dial to move the cursor to the time function item, as shown in the figure below:

In this interface, press the "ENTER" button to edit the test mode. The mode is HOT dynamic and COLD static two.

6.3.8 MD human network: press the "↓" key or code dial to move the cursor to the MD human network function item, as shown in the figure below:

In this interface, press the "ENTER" button to edit the MD human body network. There are eight human networks: (MD-A, MD-B, MD-B1, MD-C, MD-D, MD-E, MD-F, MD-G).

New step: in the test interface, press "F1" key "new" on the panel to create a new test step. A total of 20 test steps can be created. Create a new test step after the current step. This new test step adopts the default test mode AC voltage.

Delete steps: in the test interface, press the "F2" key "delete" on the panel to delete the test steps. The tester will delete the current step and move the following steps to the current step.

Previous page: (step forward) in the test interface, press the "F3" key "previous page" on the panel to move forward the current step, that is, the content of the current test step is exchanged with that of the previous test step, which can easily realize the test step sorting function. However, when the current step is the first test step, the forward operation is invalid.

Next page: (step backward) in the test interface, press the "F4" key "next page" on the panel to move the current step backward, that is, the content of the current test step is exchanged with that of the next test step, which can easily realize the test step sorting function. However, when the current step is the last test step, the backward operation is invalid.

Save as file: in the test interface, press "F5" key "save as file" on the panel to save the current test steps in the form of file.
It is easy to access and use. Press save as to open the storage interface, as shown below:

After entering the interface above, press the number key on the board below, and the screen will display as follows: type the relevant characters on the screen, press the "enter" key, and the file will be saved in the memory of the tester.
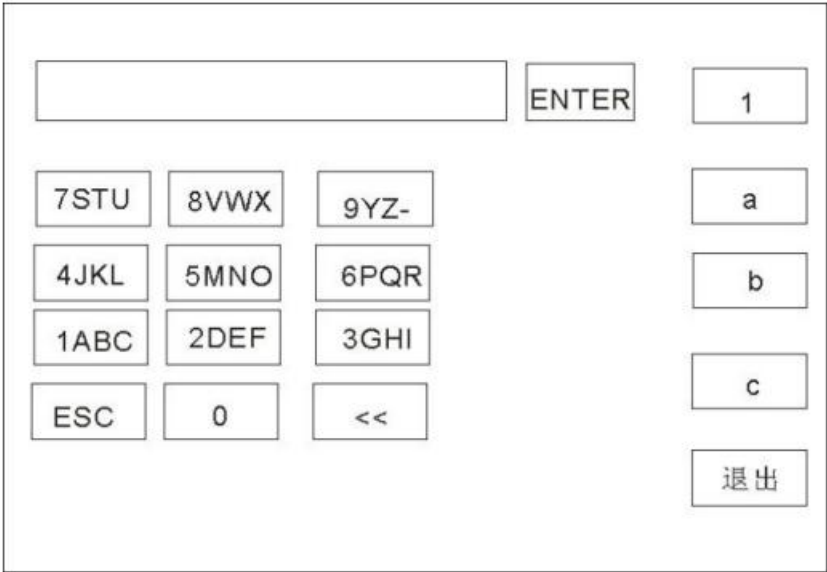
6.4 System settings parameter description

6.4.1 Qualified sound

This option has 2 functions, ON and OFF. You can select the setting item with the cursor of ［↑］ ［↓］【←】【→】, adjust the coding potentiometer, and select the function item to be set.

6.4.2 Failure

This option has 2 functions, ON and OFF. You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , adjust the coding potentiometer, and select the function item to be set.

6.4.3 Button sound

This option has 2 functions, ON and OFF. You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , adjust the coding potentiometer, and select the function item to be set.

6.4.4 Screen brightness

You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , adjust the coding potentiometer and select the value to be set.

6.4.5 Key brightness

You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , adjust the coding potentiometer and select the value to be set.

6.4.6 System language

This item is available in two languages, Chinese and English. You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , and adjust the coding potentiometer to select the item to be set.

6.4.7 Bus mode

There are two bus modes, RS232 and RS485. You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , and adjust the coding potentiometer to select the item to be set.

6.4.8 Baud rate

This item has four baud rates: 9600, 38400, 19200, 115200. You can select the setting item with the cursor of ［↑］ ［↓］ 【←】 【→】 , and adjust the coding potentiometer to select the item to be set.

6.4.9 System time

This item can set the current time of the instrument. Once the system time is set, the time function will continue regardless of the power on / off state, unless the internal battery fails. You

can select the setting item with the cursor of ［↑］［↓］【←】【→】, adjust the coding potentiometer and select the value to be set.

6.4.10 System date

This item can set the current time of the instrument. Once the system time is set, the time function will continue regardless of the power on / off state, unless the internal battery fails. You can select the setting item with the cursor of ［↑］［↓］【←】【→】, and adjust the coding potentiometer to select the setting item

6.4.11 Restore default

This function is to restore system settings, parameter settings and factory settings. All settings will be cleared. You can select the setting item with the cursor of ［↑］［↓］【←】【→】. Press enter to open the OK cancel interface. Press"ENTER" to confirm. Press the [Cancel] key to cancel.

6.4.12 System information

This item includes the model, software version, hardware version, startup times, test times and internal storage of the instrument.

6.5 Description of document parameters

6.5.1 Internal storage: storage capacity 16M.

6.5.2 U disk function: this item has external U disk storage function.

6.5.3 the soft keys on the right side of the screen have the functions of file loading, file copying, file deleting and refreshing, and the corresponding functions can be selected by selecting different soft keys.

Chapter 7 Remote control

7.1 RS232C interface description

At present, the widely used serial communication standard is RS-232 standard, which can also be called asynchronous serial communication standard,
The standard is officially promulgated by the American Electronics Industry Association (IEA) in 1969.
It must be transmitted by one data line at a time. Like most serial ports in the world, the serial interface of the instrument is not strictly based on RS-232 standard, but only provides a minimal subset. The results are as follows:

信号	缩写	连接器引脚号
发送数据	TXD	2
接收数据	RXD	3
接地	GND	5

Instrument RS232 signal and pin comparison

The reason is that the operation of three lines is much cheaper than that of five or six lines, which is the biggest advantage of serial communication. The connection between the instrument and the computer is shown in the figure:
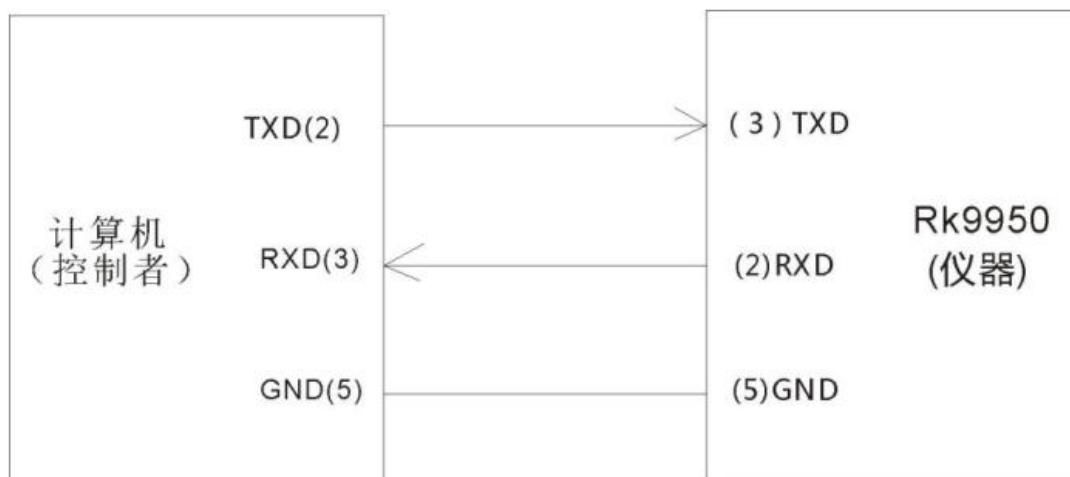
Schematic diagram of connection between computer and instrument

It can be seen from the figure that the pin definition of the instrument is different from that of the 9-core connector serial interface used by the computer. The baud rate of the RS232 interface can be 9600~115200 selected, no check (no parity), 8 bit data bits, and 1 bit stop bits. The instrument command conforms to SCPI standard

After sending the instrument to the instrument, you need to send LF (sixteen hexadecimal: 0AH) as the ending character. The maximum number of bytes of the SPCI command string that the instrument can receive at one time is 2kByte. For the result data format sent by the instrument to the computer, please refer to the instruction in the command reference section.

7.2 RS485 / 232C interface description

The communication interface of the tester can provide RS232C and RS485 serial communication interfaces for users to choose：

RS-485接口

RS-232C接口
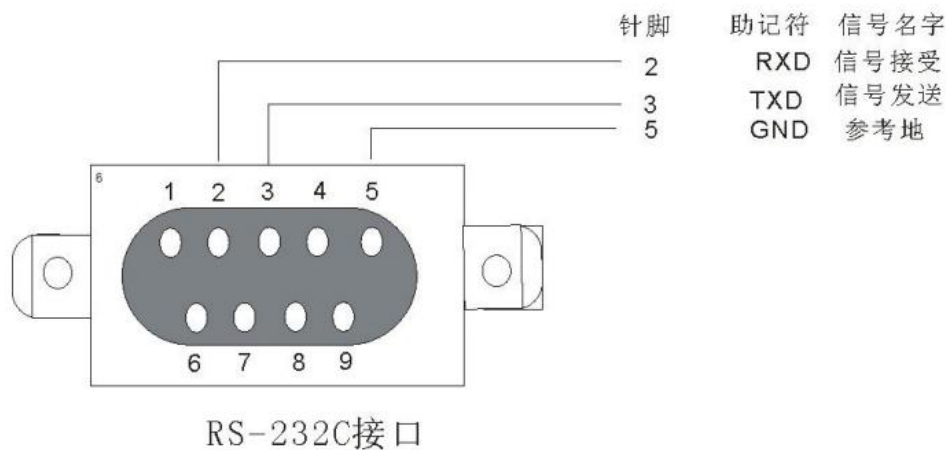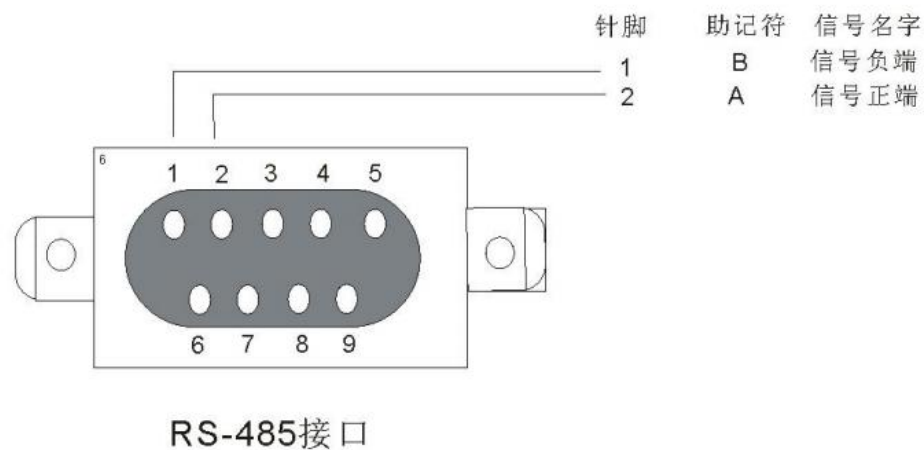
7.3 USBTMC remote control system

USB (Universal Serial Bus) remote control system controls the equipment through USB interface. The connection conforms to usbtmc-usb488 and USB2.0 protocol.

The USB interface on the rear panel of RK9950 is connected to the USB interface on the host through the USB cable.

Chapter 8 SCPI serial port instruction reference

8.1 Brief description of instruction format:

8.1.1 instrument instruction set only describes the actual characters received or sent by the instrument.

8.1.2 command characters are all ASCII characters.

8.1.3 the data "<???>"of the instruction are all ASCII strings. The default format of the system is integer or floating-point number, and the unit of data is the default value, which does not appear in the instruction.

8.1.4 the end of an instruction must have an end of instruction mark: an identifier of the end of an instruction, without which the instrument will not parse the instruction.

8.1.5 the default end marks are: carriage return (NL), print control (\ n), decimal number (10), hexadecimal number (0 × 0A).
The end of the IEEE-488 bus flag: the key word (^END) and the signal (EOI).

8.2 SCPI instruction set

RK9950 series instrument subsystem command

● DISPlay

● SYSTem

● FUNCtion

● MMEM

● FETC

8.3 DISPLAY subsystem command set

The command set of display subsystem is mainly used to set the display page of the instrument, character**?** You can query the current page.

DISPLay:PAGE

Command syntax:

DISPlay：PAGE <page name>

< page name > is as follows:

TEST

TESTSET

SYSSet

FLIE

Set display page to: measurement display page

Set display page to: survey setting page

Set display page to: system settings page

Set display page to: (internal) file list

Character**?** You can query the current page.

-- example:

Set the display page to: measurement display page.

Set instruction: DISP:PAGE TEST

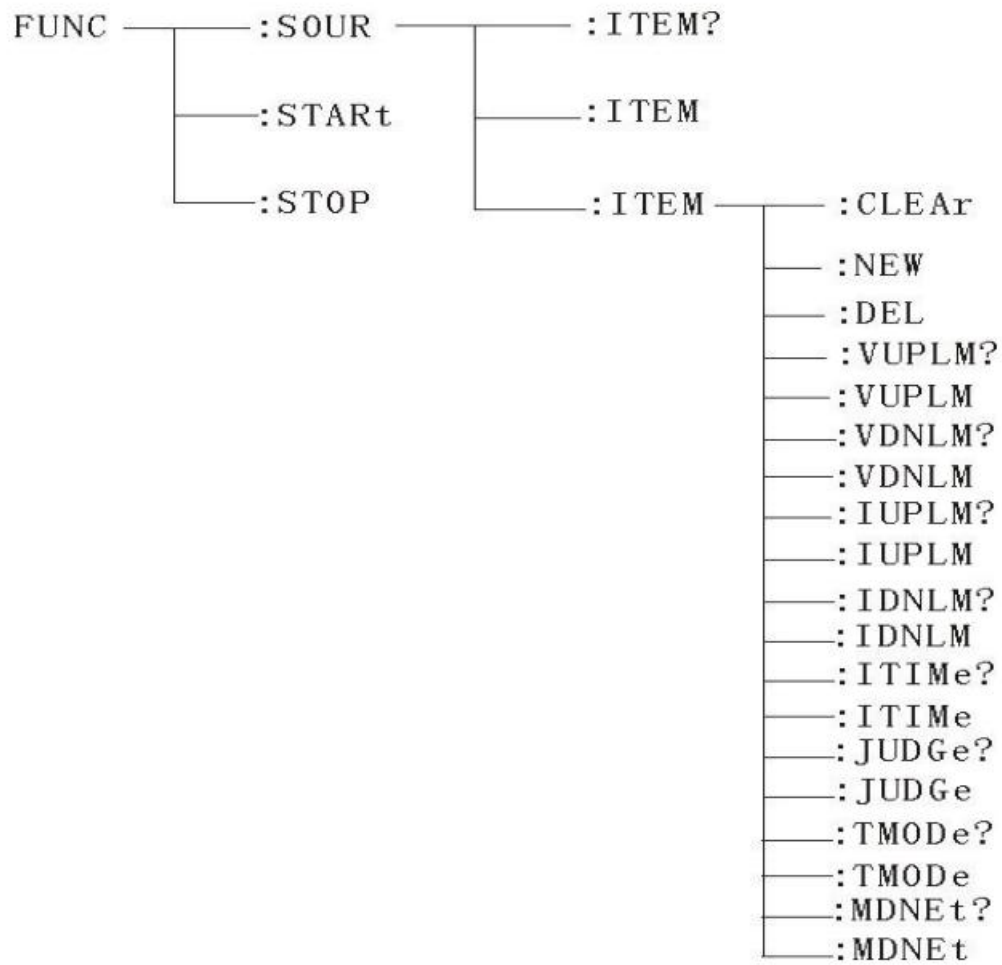Query instruction: DISPlay:PAGE?

Return value:

TEST32

8.4 FUNCtion subsystem command set

8.4.1 FUNCtion subsystem command set is mainly used to set test parameters of instrument test function.

Command tree:

```
FUNC ———————— :SOUR ———————— :ITEM?

          :STARt              :ITEM

          :STOP               :ITEM ———————— :CLEAr
                                              :NEW
                                              :DEL
                                              :VUPLM?
                                              :VUPLM
                                              :VDNLM?
                                              :VDNLM
                                              :IUPLM?
                                              :IUPLM
                                              :IDNLM?
                                              :IDNLM
                                              :ITIMe?
                                              :ITIMe
                                              :JUDGe?
                                              :JUDGe
                                              :TMODe?
                                              :TMODe
                                              :MDNEt?
                                              :MDNEt
```

8.4.2 PROG function command set

FUNC:STARt When the instrument is in the test interface, start the test.

FUNC:STOP When the instrument is in the test interface, stop the test.

FUNC:SOUR ITEM#: CLEAr clears a new test item in the existing test plan (ITEM).

FUNC:SOUR ITEM#: DEL removes the current test items in the existing test plan (ITEM).

FUNC:SOUR ITEM#: NEW, create an empty test plan to write a brand new test plan.

FUNC:SOUR ITEM? Query the current test plan.

8.4.3 ITEM# function command set

FUNC:SOURce ITEM#: VUPLM setting / inquiring the upper limit of voltage.

--Format

Set format: FUNCE:SOURce:ITEM#: VUPLM< voltage value >

Query format: FUNCE:SOURce:ITEM#: VUPLM?

--Data < voltage value >:

Data type: floating point number

Data range: 0-300.0

Data accuracy: 0.1

Data unit: V
Example: set the voltage value in ITEM to 300V.

Set command: FUNCE:SOURce:ITEM1:VUPLM 300

Query command: FUNCE:SOURce:ITEM1:VUPLM?
FUNC:SOURce ITEM#: VDNLM setting / inquiring voltage lower limit value.

--Format

Set format: FUNCE:SOURce:ITEM#: VDNLM< voltage value >

Query format: FUNCE:SOURce:ITEM#: VDNLM?

--Data < voltage value >:

Data type: floating point number

Data range: 0-300.0

Data accuracy: 0.1

Data unit: V
Example: set the voltage value in ITEM to 100V.

Set command: FUNCE:SOURce:ITEM#: VDNLM 100

Query command: FUNCE:SOURce:ITEM#: VDNLM?

FUNC:SOURce ITEM#: IUPLM setting / inquiring the upper limit of current.

--Format

Set format: FUNCE:SOURce:ITEM#: IUPLM< current value >

Query format: FUNCE:SOURce:ITEM#: IUPLM?

--Data < voltage value >:

Data type: floating point number

Data range: 0-20.000

Data accuracy: 0.001

Data unit: mA

Example: set the current value in ITEM to 10.000mA.

Set command: FUNCE:SOURce:ITEM1:IUPLM 10.000

Query command: FUNCE:SOURce:ITEM1:IUPLM?

FUNC:SOURce ITEM#: IDNLM setting / inquiring current lower limit value.

--Format

Set format: FUNCE:SOURce:ITEM#: IDNLM< current value >
Query format: FUNCE:SOURce:ITEM#: IDNLM?

--Data < voltage value >:

Data type: floating point number

Data range: 0-20.000

Data accuracy: 0.001

Data unit: mA

Example: set the current value in ITEM to 10.000mA.

Set command: FUNCE:SOURce:ITEM1:IDNLM 10

Query command: FUNCE:SOURce:ITEM1:IDNLM?

FUNC:SOURce : ITEM#: TTIMe setup / query test time

--Format

Format: FUNCE: SOURce:ITEM# TTIMe< time >

Query format: FUNCE: SOURce:ITEM# :TTIMe？

--Data < time value >

Data type: integer

Data range: 0-999.9

Data accuracy: 0.1

Data unit: S

Example: set the time value of ITIM to 1s

Set the command: FUNCE: SOURce:ITEM1 :TTIMe 1

Query command: FUNCE: SOURce:ITEM1 :TTIMe？

Return value: 1

FUNC:SOURce : ITEM#: JUDGe setup / query decision mode

--Format

Format: FUNCE: SOURce:ITEM# JUDGe< data >

Query format: FUNCE: SOURce:ITEM# :JUDGe？

--Data < time value >

Data type: integer

Data range: 0, 1 (0 for END final value determination, 1 for MAX maximum judgement)

Data accuracy: None

Data unit: None

Example: set the decision mode value of ITIM to 1

Set the command: FUNCE: SOURce:ITEM1 :JUDGe 1

Query command: FUNCE: SOURce:ITEM1 :JUDGe？

Return value: 1

FUNC:SOURce : ITEM#: TMODe setup / query test mode

--Format

Format: function: SOURce:ITEM# : tmode < data >

Query format: function: SOURce:ITEM# :TMODe？

--Data < time value >

Data type: integer

Data range: 0, 1 (0 is cold static mode, 1 is hot dynamic mode)

Data accuracy: None

Data unit: None

Example: set the decision mode value of ITIM to 1

Setting command: function: SOURce:ITEM1 :TMODe 1

Query command: function: SOURce:ITEM1 :TMODe？

Return value: 1

FUNC:SOURce : item #: mdnet set / query human body simulation network mode

--Format

Format: function: SOURce:ITEM# : mdnet < data >

Query format: function: SOURce:ITEM# :MDNEt？

--Data < time value >

Data type: integer

Data range: 1-8 (1 md-a, 2 md-b, 3 md-b1, 4 md-c, 5 md-d, 6 md-e, 7 md-f, 8 md-g)

Data accuracy: None

Data unit: None

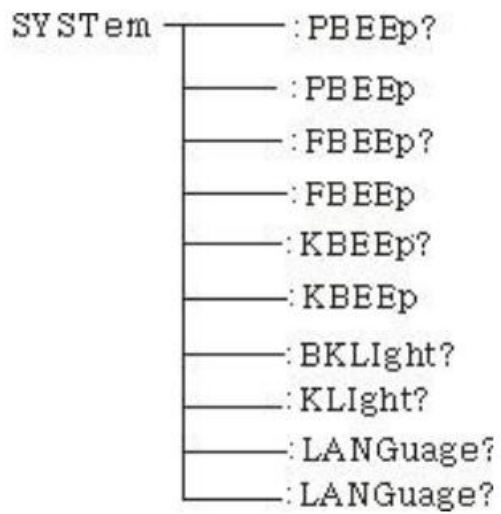Example: set the decision mode value of ITIM to 1

Setting command: function: SOURce:ITEM1 :MDNEt 1

Query command: function: SOURce:ITEM1 :MDNEt？

Return value: 1

8.4.3 SYSTEM function command set

Command tree

SYSTem ： PBEE/FBEE/KBEE

Set / query test pass / fail / key buzzer status

--Format

Format: SYST:PBEE<ON/OFF>OR<1/0>

Query format: SYST:PBEE?

- Data: <ON/OFF>

Data type: character

Data range: 0 (OFF), 1 (ON).

Example:

Set BEEP to 1

Set command: SYST:BEEP 1

--Return information

Query command: SYST:BEEP? , return value: buzzer status, such as 1

SYSTem:REset restore all default States

--Format:

Format: SYST:RES

8.4.4 MMEM subsystem command set

MMEM:SAVE saves the current file to the file number.

--Format:

Format: MMEM:SAVE< file name >

--Data < file name >

Data type: String

MMEM LOAD exports the file specified by the file number to the current

--Format:

Format: MMEM:LOAD< file name >
--Data < file name >

Data type: String

8.4.5 FETCH subsystem command set

FETCH is used to obtain measurement results of instruments.

--Format:

Format: FETCh:AUTO

Query format: FETCh:AUTO?

-- data <ON/OFF>or <1/0>

Data type: character

Data range: 0 (OFF), 1 (ON).

--Example:

Automatically return test data to ON

Command: FETCh:AUTO ON or FETCh:AUTO 1

--Return information

Query command: FETCh? To return the current measurement result of the instrument.

Command syntax: FETCh?

After receiving this command, the instrument will automatically send test results until the end of the test.

Return format:

Step: test item: test current (A) test resistance (M Ω) sorting results

1. The separator between step and test item, test item and data is (:)

2. The separator between test data is (,) the separator between different unit data is (;)

3. The delimiter between steps is (+ spaces), and the data terminator uyly (0X0A).

Note: 1, all data are integer or floating point format, ASCII string.

2, data unit default is the same as FCUN set instruction set.

The test results are as follows

STEP1: I: 30A, test resistance 100m Ω, result PASS.

Return data format:

STEP1 I :30,100,PASS；（SPACE）

8.4.6 other control command sets

*IDN query instrument model, version information

Query return: <manufacturer>, <model>, <firmware><NL^END>

Here: < manufacturer > gives the name of the manufacturer (REK)

<model> gives the machine type (e.g. RK9930).

<firmware> gives the software version number (such as Version 1.0.0).

For example, WrtCmd ("*IDN?")

Chapter 9 Maintenance guide

9.1 Daily maintenance

9.1.1 the tester shall be used in a well ventilated and dry environment without dust and electromagnetic interference.

9.1.2 if the tester is not used for a long time, it should be powered on regularly, usually once a month, and the power on time should be less than 30 minutes.

9.1.3 after the tester works for a long time, such as about 8 hours, it should be turned off for more than 10 minutes to keep the tester in good working condition.

9.1.4 the tester may have poor contact or open circuit after long-term use, so it should be

repaired regularly.

9.2 Simple troubleshooting

Fault phenomenon	processing method
After power on, there is no display button and no response	Please check whether the power supply is normal and whether the fuse is broken. If it is broken, please replace the fuse
After starting, the test lamp is not on but has output	The test lamp is out of order
After starting, the test lamp is not on and there is no output	The start button doesn't touch well
After starting, there is no current or voltage display	Please check whether the test line is open, the object is not in good contact or the object is open
After the test fails, the unqualified lamp does not light up	Unqualified lamp broken

If there is a problem that can not be eliminated in time, please contact our company or dealer as soon as possible, and we will provide you with service in time.

9.3 Software upgrade steps of instrument system

9.3.1 connect the USB interface on the back panel of the instrument to the computer, the power resource manager displays the USB disk, copies the upgrade file to the target disk of the instrument, and restarts the instrument to complete the system software upgrade.

If you encounter technical problems in upgrading, please contact us in time.

9.3.2 press the STOP+START button to restart the power, remove the data errors caused by the version changes, and restore the settings data as the default factory settings.