User's Guide

JK625/JK625L

HANDHELD BATTERY INTERNAL RESISTANCE TESTER

Statement

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⚠ WARNING ⚡DANGER: To avoid possible electric shock and personal safety, follow these guidelines.

Disclaimer
Before you start using the instrument, please read the following safety information carefully. Jinko Instruments will not bear any responsibility for personal safety and property damage caused by the user's failure to comply with the following terms.

Instrument grounding
To prevent the risk of electric shock, connect the power ground wire.

Do not use the instrument in explosive atmospheres
Do not use the instrument in a flammable or explosive atmosphere, steam or dusty environment. Using any electronic device in such an environment is a personal risk.

Do not open the instrument case
Non-professional maintenance personnel must not open the instrument case in an attempt to repair the instrument. There is still a clean charge that has not been discharged for a period of time after the instrument has been switched off, which may cause an electric shock hazard to personnel.

Do not use the instrument in a manner not specified in this manual
Outside the range, the protection provided by the instrument will be invalidated.

⚠ Warning: Do not apply DC voltage or current to the test terminal, otherwise it will damage the instrument.

Safety sign: ▣ equipment is protected by double insulation or reinforced insulation

🗑 Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96 / EC

Do not throw away in the trash

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Contents

1.Installation and setup wizard

Thank you for purchasing our products! Please read this chapter carefully before use. The following descriptions are mainly based on JK625.

In this chapter you will learn the following:
● Packing list
● Power requirements
● Operating environment
● cleaning
● Replace the battery
● Adjust support

1.1 packing list

Before using the instrument officially:

1. Check whether the appearance of the product is damaged or scratched;

2. Check the instrument packing list for missing accessories.

If it is damaged or the accessories are insufficient, please contact Jinko Instrument Sales Department or the distributor immediately.

1.2 Power requirements

The instrument can only use our special AC power adapter and lithium battery.

AC power adapter:

Input voltage: 90V-260VAC, 49Hz ~ 62Hz

Power: up to 10VA

Warning: Do not use power adapters of other specifications. The instrument can only use our company's power supply and rechargeable lithium battery!

1.3 Operating environment

JK625 must be used under the following environmental conditions:

Temperature: 0 ℃ ～ 55 ℃,

Humidity: less than 70% RH at 23 ℃

Altitude: 0 ~ 2000 meters

1.4 Cleaning

Do not clean the inside of the instrument.

Note: Do not use solvents (alcohol or gasoline, etc.) to clean the instrument.

Use a clean cloth and a little water to clean the case and panel.

1.5 Replace the battery

The instrument has a built-in rechargeable lithium battery. The battery is already installed in the instrument's battery compartment when it leaves the factory. If you replace the battery, follow these steps

Figure 1-1 Battery replacement

1. Use a screwdriver to loosen the screws on the battery cover and remove the battery cover.

2. Remove the plug from the old battery and plug in the new battery, paying attention to the direction of the plug.

3. Insert the new battery into the battery compartment, close the battery cover, and tighten the screws.

1.6 Adjusting the support

The instrument supports 1 position for user convenience: 60 degrees.

Use the 60-degree position to make the instrument more stable.

Figure 1-2 Support position at 60 degrees

2. Overview

In this chapter you will learn:
- ● Introduction
- ● Main specifications
- ● Main functions

2.1 Introduction

Thank you for purchasing the JK625 Handheld DC Low Resistance Tester.

JK625 battery internal resistance tester is an instrument that can measure battery internal resistance and voltage online. It is controlled by a high-performance 32-bit ARM microprocessor. It is a miniature handheld instrument with automatic real-time detection and a built-in large-capacity lithium battery to achieve long standby JK625 has the superior performance of both portable and desktop instruments. The main performance is compatible with Nissho 3554. The instrument can test $0.01m\Omega \sim 3.3\Omega$ resistance and $0 \sim 60V$ DC voltage. The data display is stable. The maximum resistance is 3300 display digits. Voltage Maximum 6000 display digits.

The resistance measurement of the instrument uses the vector test principle, and the voltage measurement uses the differential test principle, so the open circuit voltage can be accurately measured. In addition, the instrument has a professional sorting function, a built-in sorting record, and GD / NG sorting results show the sorting sound setting, which is applied to the UPS online battery measurement automatic sorting system to complete a fully automatic assembly line test.

JK625 is equipped with 500 sets of data storage, which can save measurement data with one click, saving you the time of recording data. And can be equipped with a USB interface for remote control and data acquisition and analysis, making him very suitable for all kinds of battery assembly line inspection.

2.2 Main specifications

JK625 hand-held series of technical specifications, including the basic technical indicators of the instrument and the range allowed by the instrument test. These specifications are achievable at the factory.

- ● Basic accuracy: resistance: 0.5%, voltage: 0.05%
- ● Enter. Frequency: 1kHz
- ● Maximum display digits: resistance: 3300, voltage 60000
- ● Range automatic, manual or nominal test-Provides a test range of $0.001m\Omega$ to 3.3Ω.
- ● Test speed: 1 time / second
- ● Four-terminal test
- ● Provide high current and low current test modes-different test modes can be suitable for test pieces with different properties.
- ● Display-With 5.6 "inch true color LCD, the measured value and sorting result (GD / NG) are displayed at the same time.

2.3 Main functions
2.3.1 Calibration function

Full-scale short-circuit clear function.

2.3.2 Comparator function (sorting function)

Built-in sorting data for GD / NG judgment of the DUT.

● **Comparison method:**

Absolute tolerance ± TOL sorting: The absolute deviation between the measured value and the nominal value is compared with the limits of each file.

Percent Tolerance   TOL Sorting: The percentage deviation between the measured value and the nominal value is compared with the limits of each range.

Sequential comparison sorting: the measured value is directly compared with the upper and lower limits

● **Sound setting:**

Users can set OFF / GD / NG sound according to their needs.

2.3.3 System Settings

1. Serial switch function
2. Switch between Chinese and English
3. Date and time settings
4. I / O port switch setting
5. U disk switch setting
6. Automatic shutdown time setting

2.3.4 Remote control

Supports a maximum baud rate of 115200bps, compatible with SCPI protocol and ASCII transmission.
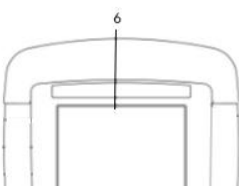
3. Get started

In this chapter you will learn:

● front panel
● Interface panel
● Use external power
● boot
● Test connection

3.1 front panel

Table 3-1 Front panel function description

Front panel	Serial number	Function
	1	Task bar function keys
	2	cursor keys
	3	test terminal
	4	Power switch
	5	ESC Enter

	6	LCD display window

3.2 Interface Panel

Figure 3-1 Interface panel function description
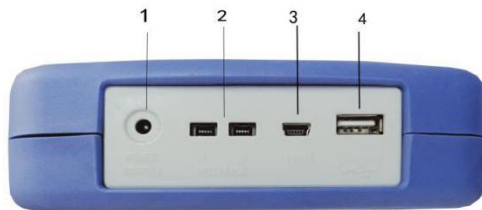
1. external power supply and charger interface
2. Mini-USB communication interface for remote communication.
3. RS485 expansion interface.
4.USB interface can save data.

3.3 Use of external power

The instrument comes standard with a power adapter.

In addition to supplying power to the instrument, this power supply also charges the lithium battery inside the instrument, so the power adapter cannot be replaced. It is recommended to use our company's special power supply.

Figure 3-2 Connecting the external power adapter to the instrument.

Plug the power adapter into the AC adapter input jack on the instrument.

3.3.1 Battery charging function

If the battery is not fully charged, the instrument's charging circuit will automatically start to charge the internal lithium battery after the power adapter is plugged in. The instrument's built-in indicator of the power switch key will light up to indicate that charging is in progress. This indicator will remain lit even after the instrument is turned off, until it goes out when the battery is fully charged.

3.4 boot

The keys are light touch keys. Press the power key to turn the instrument on or off.

3.5 Test connection

The instrument uses four-terminal tests to improve accuracy.

Before testing, please insert the test lead of the instrument into the instrument jack.

Figure 3-4 Connect the test terminal.

Warning: Do not apply DC voltage or current to the test terminal, otherwise it will damage the instrument.

Warning: When testing a charged device, make sure that its charge is discharged before measuring.

3.5.1 Test fixtures and cables

According to our company's long-term investigation of users, user-made or other company's test fixtures or test cables may cause incorrect measurement results. We recommend that you use our test fixtures or test cables.

The contact springs of our test fixtures are silver-plated or gold-plated, which will cause abrasion of the electroplated surface during long-term work (such as 1 ~ 2 years). It is recommended that you replace the new fixtures in time if you find that there are obvious deviations in several tests.

4. [Meas] Measurement display

In this chapter you will learn about all measurement display functions:

● <Measurement Display> page
● Short circuit clear
● <comparator settings> page

4.1 <Measurement Display> page

No matter what page you are on, just press the [Measurement Display] shortcut key to enter the <Measurement Display> page.

The <Measurement Display> page mainly highlights the measurement results. When comparison is turned on, sorting results and sorting parameters are displayed.

There are 6 common functions that can be set on this page, including:

● Trigger – trigger method

● Range-range setting.

● Upper limit of resistance – Upper limit of resistance

● Lower resistance limit – lower resistance limit

● Upper voltage limit – upper voltage limit

● Lower voltage limit – lower voltage limit

Note: The measurement data and sorting results are only valid on the <Measurement Display> page.

Figure 4‑1 <Measurement Display> page

4.1.1 Measurement [Trigger]

The instrument has 2 trigger modes: automatic trigger and manual trigger.

Table 4‑1 Trigger Mode Description

Trigger method	Description
Automatic	is also called continuous test. The trigger signal is continuously tested by the instrument according to the inherent cycle.
Manual	Each time the [Enter] key is pressed, the instrument performs a measurement cycle, and the instrument is in a waiting state at other times.

Table 4‑1 Trigger Mode Description

■ Set the trigger mode steps:

Step 1	Select the [Display] function key in the upper column to switch to the <Measurement Display> page	
Step 2	Use the cursor keys to select the [Trigger] field	
Step 3	Use the [Enter] function key to select the trigger mode.	
	Function key	Function
	Automatic	trigger mode
	Manual	trigger mode

4.1.2 Measurement [Range]

The instrument has 3 measuring ranges: automatic range, manual range and nominal range.

Table 4-2 Test range description

Method	Description	Advantages	Disadvantages
Automatic	The instrument automatically selects the best test range according to the resistance value, and the range number in the range field is set automatically.	The user does not need any participation.	The automatic range needs to predict the range, and the test speed will be lower than the manual range mode.
Manual	The instrument will always use the user-specified range for testing	The test speed is the fastest	Users need to participate in range selection
Nominal	The instrument will automatically select the best range for the test based on the nominal value.	The best way to sort the test. The fastest speed.	Only suitable for sorting test

Table 4-3 Range and corresponding measurement range

Range number	Range definition	Resistance measurement range
3	3Ω	320mΩ～3.3Ω
2	3mΩ	0mΩ～3.3mΩ
1	30mΩ	32mΩ ～ 330mΩ
0	300mΩ	32mΩ ～ 330mΩ

There are 3 measuring method

Range method	Description	Advantages	Disadvantages
Automatic	The instrument automatically selects the best test range according to the impedance value, and the range number in the range field is set automatically.	The user does not need any involvement.	The automatic range requires the predicted range, and the test speed will be lower than the manual range mode.
Manual	The instrument will always use the user-specified range for testing.	The test speed is the fastest.	Users need to participate in range selection
Nominal	The instrument will automatically select the best range for testing based on the nominal value. 。	The best way to sort tests. The fastest	Only suitable for sorting tests.

Note: For detailed specifications of JK625, please refer to the table on the specification page.

■ Steps for setting test range:

Step 1	Select the [Measurement Display] function key in the upper bar to switch to the <Measurement Display> page	
Step 2	Use the cursor keys to select the [Range] field	
Step 3	Use [Enter] to select the range mode	
	Function key	Function
	Automatic AUTO	instrument will automatically select range
	Keep HAND	instrument locked to current range
	The nominal NORMAL	instrument will select the best range based on the nominal value
	Increase INCR +	Increase the range number, while changing the range to manual range
	Decrease DECR-	Decrease the range number while changing the range to manual range

When the range is automatic, the instrument performs range prediction every measurement cycle, so the test speed is slightly slower than the locked range. Moreover, during automatic measurement, frequent range changes will cause slow response. Usually when the instrument is used for sorting measurement, the automatic range method is not suitable. For sorting users, please select the nominal range method

4.1.3 Upper and lower limit settings of resistance and voltage

Step 1	Select the [Measurement Display] function key in the upper bar to switch to the <Measurement Display> page
Step 2	Use the cursor keys to select the [Lower Resistance] or [Lower Voltage] field;
Step 3	enter data using the numeric keypad
Step 4	Use the cursor keys to select [Resistance Upper Limit] and [Resistance Lower Limit];
Step 5	enter data using the numeric keypad
Step 6	Repeat 2 ~ 5 to complete the data input of other files.
Enter data using the numeric keypad, then select the unit to complete the operation	

4.1.4 Information bar on <Measurement Display> page

Below the instrument test results, the instrument also displays the sorting results and related parameters. These information are modified in the <Comparer Settings> main page and are here for reference.

All pages include a status bar and task bar. When you use the cursor keys to make a selection, the status bar will prompt related help information, but you cannot operate the status bar. When using

Mini-USB communication, characters can be printed on the status bar.

4.1.6 Task bar of <Measurement Display> page

Below the status bar is the taskbar, which includes:

● Hold-the data remains unchanged and the instrument stops measuring

● System-Switch to the <System Configuration> page

● Key lock – locks the keyboard, but does not affect the measurement on the <Measurement Display> page

● Time-show time

4.1.7 Icon of <Measurement Display> Page

Table 4-5 Icon Functions

Icon	Function
	An internal power source is currently used, namely a lithium battery.
	External power is currently being used. At this time, the side light on the observation screen: On means charging is on; Off means charging is complete. Or observe the battery icon: there is a change in charge indicating that charging is in progress; no change indicates that charging is complete.
	USB flash drive is currently inserted.
H	The current data is held.
T	Temperature compensation is on (not available in AT518L)
20.0℃ (example)	Measured temperature (not available in AT518L).

4.2 Short-circuit clear

Press the [Display] shortcut key, and then press the [Short Circuit Clear] function key in the upper bar to clear the short circuit.

Users can complete the short-circuit zero calibration of the full range or single range under this page to compensate for external interference factors.

In order to achieve the accuracy specified by the technical indicators, short-circuit clearing is necessary. Replace the test fixture or test cable. Short-circuit again. When the temperature changes greatly, please perform short circuit reset in time.

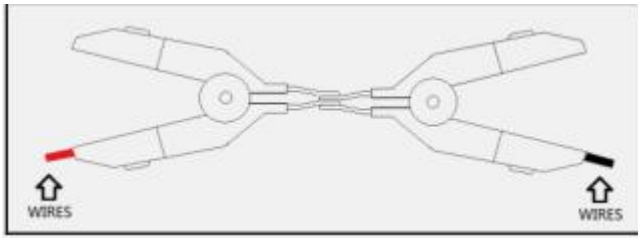Before starting to zero, please short the test clip as follows.

Figure 4-2 Correct test terminal short circuit method
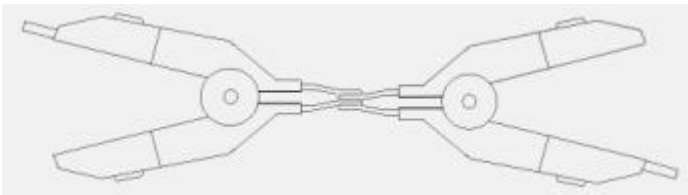
The following example is wrong!

Figure 4-3 Incorrect test terminal short circuit method

4.2.1 [Short circuit] Clear

The short-circuit calibration function of the instrument compensates for any remaining resistance (R) that may exist from the calibration surface determined by the length of the test cable to the connection point of the device under test.

■ Short-circuit clearing steps:

Step 1	Press the [Display] shortcut key to enter the measurement <measurement display> main page
Step 2	Press the [Short Circuit Clear] function key in the upper bar again.
	Cleared in about 3 seconds, the screen refreshes and flashes

5. [Setup] setting display

In this chapter you will learn about all the setting functions:
● <Measurement Settings> page

5.1 <Measurement Settings> page

At any time, as long as you press the [Measurement Settings] shortcut key, you can enter the <Measurement Settings> page.

The <Measurement Settings> page can complete all measurement-related settings, but the instrument does not display measurement results and sorting results, and the instrument is in a waiting state.

These settings include the following parameters:
● Trigger – trigger method
● Range-test range
● Speed-test speed
● Slam – Slam alarm

● Resistance and voltage comparison method

● Nominal value of resistance and nominal value of voltage

● Upper and lower limit settings

The [Trigger] and [Range] settings can also be set on the <Measurement Display> page. For the setting of these parameters, please refer to the [Measurement Display] section of the main measurement page.

Figure 5‑1 <Measurement Settings> page

5.1.1 Speed

According to user needs, the instrument supports 4 measurement speeds.

To set the speed:

Step 1	Select the [Measurement Settings] function key in the upper bar to switch to the <Measurement Settings> page
Step 2	Use the cursor keys to select the [Speed] field
Step 3	Select the speed you want to set
	Function key	Function
	Slow test	speed is slow
	medium speed	Test speed is medium speed
	Fast speed	Test speed is fast
	Top speed	Test speed is top speed

5.1.2 Sound

The beep function is effective only when the comparator function is turned on.

The beep setting allows pass, fail, or turn off beeps.

  Setting the beeping steps

Step 1	Select the [Measurement Settings] function key in the upper bar to switch to the <Measurement Settings> page
Step 2	Use the cursor keys to select the [Sound] field
Step 3	Select the desired settings
	Function key	Function

	Close	Off beep
	Pass	The buzzer sounds when the sorting result is pass (GD)
	Failed	The buzzer sounds when the sorting result is disqualified (NG

Setting the beeping steps

5.1.3 [Nominal value] input
The absolute and relative values must be entered in a nominal value. Direct reading value comparison method The nominal value does not participate in the calculation, but in the [standard [Setup] Setting display
Nominal] In the range mode, the nominal value of the resistance will participate in the range selection.
Method, you need to enter the correct nominal value of the resistor.

Enter the nominal value:
Step 1	Select the [Measurement Settings] function key in the upper bar to switch to the <Measurement Settings> page
Step 2	Use the cursor keys to select the [Nominal resistance] or [Nominal voltage] field;
Step 3	Use the numeric keys to enter data, and the unit to select using the function keys.

5.1.4 [Lower Limit] and [Upper Limit] settings
Step 1	Select the [Measurement Settings] function key in the upper bar to switch to the <Measurement Settings> page
Step 2	Use the cursor keys to select the [Lower Resistance] or [Lower Voltage] field;
Step 3	enter data using the numeric keypad
Step 4	Use the cursor keys to select [Resistance Upper Limit] and [Resistance Lower Limit]
Step 5	enter data using the numeric keypad
Step 6	Repeat 2 ~ 5 to complete the data input of other files.
Enter data using the numeric keypad, then select the unit to complete the operation.	

Note: The instrument shares the same storage space for the three comparison modes, so the comparator data needs to be reset after switching the comparison mode

6. System settings

In this chapter you will learn about the system settings of the instrument:
- System Settings Page
- System Information Page
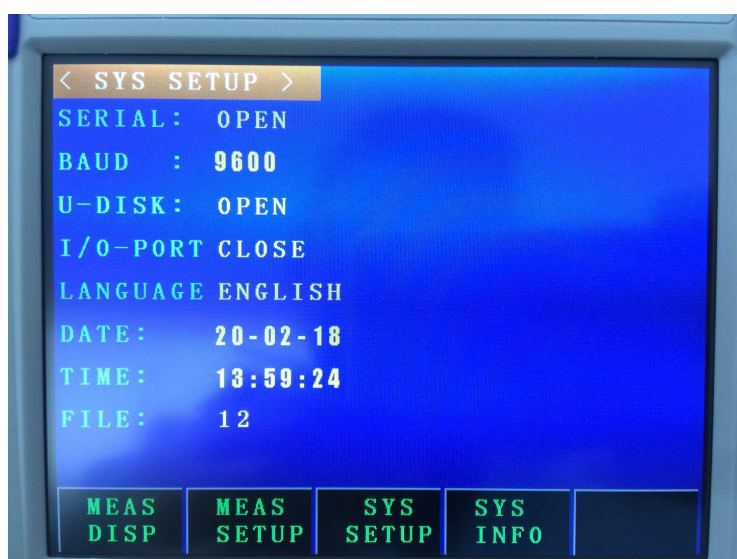
6.1 <System Configuration> page

The <System Configuration> page includes the following settings:
- Serial switch
- Baud rate
- U disk switch
- I / O port
- Display language
- Date
- time
- File name

All the settings on the <System Configuration> page will be automatically saved in the system and will be loaded automatically at the next boot.

Figure 6－1 <System Configuration> page;

6.1.1 Serial switch

The instrument supports two states of serial port opening and closing.

■ Set the serial port switch steps:

Step 1	Select the [System Settings] button in the task bar to enter the <System Settings> page	
Step 2	Use the cursor keys to select the [Serial Switch] field.	
Step 3	Select Set Serial Switch	
	Function key	Function
	On	Serial port switch on

	Off	Serial port switch off

6.1.2 Baud rate

Set [baud rate]

The instrument has a built-in Mini-USB interface. After sensing the signal conversion of the Mini-USB interface, the instrument communicates with the host at the set baud rate immediately, and the keyboard is locked.

In order to communicate correctly, please make sure that the baud rate is set correctly. If the baud rate between the host computer and the instrument is different, the communication cannot be performed correctly. Mini-USB is programmed using SCPI language.

The Mini-USB configuration is as follows:

● Data bits: 8 bits

● Stop bit: 1 bit

● Parity: None

● Baud rate: configurable

■ Set the baud rate steps:

Step 1	Select the [System Settings] button in the task bar to enter the <System Settings> page	
Step 2	Use the cursor keys to select the [Baud Rate] field	
Step 3	Select the baud rate to be set	
	Function key	Function
	2400	
	4800	
	9600	
	14400	
	19200	

6.1.3 U disk switch

The instrument supports two states of U disk open and close.

■ Steps of setting U disk switch:

Step 1	Select the [System Settings] button in the task bar to enter the <System Settings> page	
Step 2	Use the cursor keys to select the [U disk switch] field	
Step 3	Select the setting of U disk switch	
	Function key	Function
	On	U disk switch on
	Off	U disk switch off

6.1.4 I / O port

The instrument supports two states of I / O port opening and closing.

■ Setting I / O port switch steps:

Step 1	Select the [System Settings] button in the task bar to enter the <System Settings> page	
Step 2	Use the cursor keys to select the 【I / O port switch】field.I/O	
Step 3	Select the I / O port switch	
	Function key	Function
	On	Turn on the I / O port switch.
	Off	Turn off I / O port switch off

6.1.5 Display [Language]

The instrument supports Chinese and English languages.

■ Set the language steps:

Step 1	Select the [System Settings] button in the task bar to enter the <System Settings> page	
Step 2	Use the cursor keys to select the [Language] field	
Step 3	Press the 【enter】 key to set the language	
	Function key	Function
	CHINESE	CHINESE
	ENGLISH	ENGLISH

6.1.6 System [Date], [Time]

The instrument uses a 24-hour clock.

■ Set date steps:

Step 1	Press the display button to enter the main page	
Step 2	Select the [System] button in the task bar to enter the <System Settings> page	
Step 3	Use the cursor keys to select the 【Date / Time】field	
Step 4	Press the 【enter】key to set the date	
	Function key	Function
	Year +	+1 year
	Year-1	-1 year
	Mpnth +	+1 month
	Day +	+1 day
	Day -	-1 day

■ Set time steps:

Step 1	Press the display button to enter the main page
Step 2	Select the [System] button in the task bar to enter the <System Settings> page
Step 3	Use the cursor keys to select the 【Date / Time】 field
Step 4	Press the [enter] key to set the date
	Function key	Function
	Hour +	+1 hour
	Hour -	-1 hour
	Minute +	+1 minute
	Minute -	-1 minute
	Second +	+1 second
	Second -	-1 second

File name

6.2 <System Information> page

The <System Information> page has no user-configurable options.

Figure 6-2 <System Information> Page

■ View system information steps:

Step 1	Select the [System Information] button in the task bar to enter the <System Settings> page
Step 2	Select the [System Information] button in the task bar to enter the <System Information> page

7. Remote communication

You will learn the following:
- USB-232 connection.
- Select baud rate.
- Software agreement.

The instrument uses USB-232 interface (standard configuration) to communicate with the computer and complete all instrument functions. Pass standard

SCPI commands, users can also easily compile various acquisition systems suitable for themselves.

7.1 USB-232C

RS-232 is a widely used serial communication standard, also known as asynchronous serial communication standard. It is used to implement data communication between computers and computers, and between computers and peripherals. RS is the English abbreviation of "Recommended Standard" (Recommended Standard), 232 is the standard number, which is a standard officially published by the American Electronics Industry Association (EIA) in 1969. It stipulates that it is transmitted through a data line one bit at a time.

Since the new computer or laptop is not equipped with RS232 interface, we use USB-232 circuit inside the instrument, which is convenient for users to communicate with the instrument through USB virtual serial port.

Because USB-232 requires a driver, after connecting the instrument, please find the USB driver on the CD-ROM

installation.

7.1.1 USB-232C connection

The instrument has built-in USB-232 communication. Before use, just plug the USB cable into the instrument and use USB to communicate with the computer.
● Default communication settings of the instrument:

Transmission method: full-duplex asynchronous communication with start and stop bits

Data bits: 8 bits

Stop bit: 1 bit

Check Digit: None

7.2 Handshake protocol

Because the instrument uses the smallest subset of the RS-232 standard and does not use hardware handshake signals, in order to reduce the possibility of data loss or data errors in communication, the instrument can enable software handshake. Senior language software engineers should strictly follow the following handshake Agreement to compile computer communication software:

● The instrument command parser only accepts ASCII format, and the command response also returns ASCII code.

● The command string sent by the host must be terminated by NL ('\ n'). The instrument command parser only executes the command string after receiving the terminator.

● The instrument can set the instruction handshake: After receiving a character, the instrument immediately sends the character back to the host. The host can only send the next character after receiving the echoed character.

Tips: If the host cannot receive the data returned by the instrument, you can use the following methods to try to solve it:

1. The software handshake is turned off, please refer to the instrument <System Settings> page to turn it on.

2. The serial port connection is faulty, please check the cable connection.

3．Computer-side high-level language program communication format error. Please try to check if the serial port number, communication format is correct, and if the baud rate is the same as the instrument setting.

4．If the instrument is resolving the last command and the host cannot receive the response from the instrument, please try again later.

<The problem still cannot be solved, please consult Jinke Instruments technical engineer immediately>

7.3 SCPI language

SCPI-Standard Commands for Programmable Instruments is a general command set used by Jinke Instruments for testing instruments. SCPI, also known as TMSL-Test and Measurement System Language, was developed by Agilent Technologies based on the IEEE 488.2 extension and has been widely adopted by test equipment manufacturers to date.

See:　The instrument's built-in command parser is responsible for the user's various command format parsing. Since the command parser is based on the SCPI protocol, but is not completely consistent with SCPI, please read the "SCPI Command Reference" chapter carefully before you start working.

8. Specifications

In this chapter you will learn:
● Basic technical indicators
● Specifications

8.1 Technical indicators

The following data were measured under the following conditions:
● Temperature condition: 23 ℃ ± 5 ℃
● Humidity condition:　65% R.H.
● Zero value adjustment: test short clear
● Warm-up time:> 60 minutes
● Calibration time: 12 months

Measurement environment:
● Index: Temperature 15 ℃ ~ 35 ℃ Humidity <80% RH
● Operation: Temperature 10 ℃ ~ 40 ℃ Humidity 10 ~ 90% RH
● Storage: temperature 0 ℃ ~ 50 ℃ humidity 10 ~ 90% RH

Test current accuracy: 1%
Test current frequency accuracy: 1kHz ± 0.1Hz

AC resistance index:

RANGE		Max Reading	Resolution	SLOW	Test Current
0	3mΩ	3.300mΩ	1μΩ	0.5% ± 10	150mA
1	30mΩ	33.00mΩ	10μΩ	0.5% ± 5	150mA
2	300mΩ	330.0mΩ	100μΩ	0.5% ± 5	15mA
3	3Ω	3.300Ω	1mΩ	0.5% ± 5	1.5mA

DC voltage index:

RANGE		MaxReading	Resolution	SLOW
0	60V	60.000V	0.0001V	0.05%±5

8.2 Specifications

● Screen: TFT-LCD true color display, screen size 3.5 inches.

● Test range: 0.001mΩ ~ 33.000Ω

● Test speed: 1 time / second (manual range)

● Maximum reading: Resistance: 3300 Voltage: 60,000

● Range mode: automatic, manual and nominal

● Calibration: short-circuit full range clear

● Test terminal: Four-terminal test method

● Custom sorting sound

● Comparator: ABS, PER and SEQ

● Handler: 8 levels in total: 3 levels of resistance HI / IN / LO, 3 levels of voltage HI / IN / LO, 1 level is open, 1 level is always out of range

● Beep: off, pass, fail.

● Trigger: Internal, external, manual and remote trigger.

● Interface: USB-RS232 interface

● Programming language: SCPI

● Accessibility: keyboard lock

● Long continuous working time ≥8h

● Length, width and height: 229mm * 148mm * 46mm

● Weight: 650g