BEICH

CH2516 series DC low resistance tester
user's manual

USER MANUAL

English version

2019
Third edition Rev2.00

Changzhou BEICH Electronic Technology Co.,Ltd
CHANGZHOU BEICH Etch Co.Ltd
Persure
Perfect Condition

Table of contents

Foreword

Thank you for purchasing the products of Changzhou BEICH Electronic Technology Co., Ltd. Please read this manual carefully before use.

> In this chapter you will learn about the following:
> - Safety instructions
> - Company description
> - Security Information
> - Limited warranty and scope of responsibility

Safety instructions

This manual describes the information and precautions required to operate the instrument safely and maintain the safe state of the instrument. Please read carefully before proceeding. Please read the following safety-related items carefully to ensure safe and optimized use.

Disclaimer: Please read the following safety information carefully before starting to use the instrument.BEICH Electronic Technology Co.,Ltd will not assume any responsibility for personal safety and property losses caused by failure to comply with the following terms.

⚠**Caveat**　The instrument has been designed and tested safely before leaving the factory and shipped in a safe state. If the measurement method was incorrect, it may lead to personal accidents and instrument malfunction. Please read the instructions carefully and operate after fully understanding the content. In the event of an accident, we will not be responsible except for the reasons of our products.

⚠**Warning**

⚡**Danger**　When you find that the following abnormal conditions have occurred, please immediately terminate the operation and disconnect the power cord. Immediately contact BEICH Electronic Technology Co., Ltd. Sales Department for maintenance. Otherwise, it may cause fire or potential electric shock hazard to the operator.

- The instrument is operating abnormally.
- The instrument produces abnormal noise, odor, smoke or flash during operation.
- During operation, the instrument generates high temperatures or electric shocks.
- The power cord, power switch, or power outlet is damaged.
- Impurities or liquids flow into the instrument.

⚠ **Caveat:**　🚫 **This instrument strictly forbidslive testing of the tested piece!**

Security Information

Symbol on the instrument

⚠	Indicates attention and danger.When the symbol or display is on the instrument, please refer to the corresponding position of the manual.
∿	Indicates alternating current (ac)
⏚	Indicates earth (ground) terminal

Safety symbol: The precautions in this manual are marked as follows according to their importance.

⚠**Caveat**	Indicates attention and danger.
⚡**Danger**	Indicates an extremely high risk of death or serious injury to the user if an operational error or misuse occurs.
⚠**Note**	The product may cause damage to the product itself or other products under certain circumstances or in actual application.
🚫	Indicates prohibited behavior

Symbols related to standards:

🗑	Marking of laws and regulations on the abandonment of electrical and electronic equipment

Other symbols:

☝	Details: indicates tips, details
👉	Convention: indicates the agreement
🔍Or ⟹	Reference: indicates where the reference content or reference is located
⏚	Indicates earth (ground) terminal
⎓	Indicates direct current (dc)
∿	Indicates alternating current (ac)
Ι	Indicates that the power is "on"
Ο	Indicates that the power is "off"

Limited warranty and scope of responsibility

Changzhou BEICH Electronic Technology Co., Ltd. guarantees that every CH2514/2515/A series instrument you purchase is completely qualified in quality and measurement. This warranty does not include fuses.

BEICH promises that the instrument mainframe and accessories produced by BEICH will not have any defects in material and process defects during the warranty period. During the warranty period, if the product proves to be defective, BEICH will repair or replace it for free.

From the date of shipment, BEICH promises to guarantee the warranty of its product's mainframe for two years and other accessories for one year. For hardware and software failures caused by the quality of the product itself during the warranty period, please present the product warranty card and maintenance registration card, and the product will be repaired free of charge by BEICH Maintenance Department or BEICH authorized maintenance point. For products that exceed the warranty period, BEICH will perform paid repairs for the user.

For products that are repaired free of charge (no special problems), BEICH promises to repair and return to the user within five working days after receiving the instrument, and bear the transportation cost of the return journey.

BEICH will not carry out free repairs if one of the following conditions occurs:

1、 Accidental damage caused during transportation.

2、 Instrument malfunction or damage caused by incorrect installation or use in a non-product specified working environment.

3、 The appearance of the product is artificially damaged (such as surface scratches, deformation, etc.).

4、 Unauthorized dis-assembly of the machine for repair, modification, replacement of parts and tearing of the product warranty seal.

5、 Failure or damage caused by irresistible factors such as lightning strikes.

6、 Direct or indirect damage caused by improper user operation.

If the instrument is inaccurate or cannot be measured due to improper operation of the user, the instrument itself has no problem, and the return cost is borne by the user.

Jiangsu Province, China

Changzhou BEICH Electronic Technology Co., Ltd

Company description

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⚠**Note**

The descriptions in this manual may not be all the contents of the instrument. The information contained in the manual has been corrected before printing. However, as BEICH Electronic Technology Co., Ltd. continuously improves the products, it reserves the right to modify the product specifications, characteristics, internal structure, appearance, accessories, packaging and maintenance procedures of the produces in the future. Therefore, the contents may be changed without prior notice. The confusion caused by inconsistency between the instructions manual and the instrument can be contacted with our company by the address on the back cover of the manual; the latest news and content can also be found on the company website.

Chapter 1 Usage Precautions

Thank you for purchasing the products of Changzhou BEICH Electronic Technology Co., Ltd.

Please read this manual carefully before use.

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In this chapter you will learn about the following:
    ●   Packing content confirmation
    ●   Precautions for use
```

Packing content confirmation

Please confirm before use: When the instrument is delivered to your hand, please check and confirm:

1、Please check the appearance of the product for damage or scratches.

2、Check the instrument accessories for any omissions according to the following table:

Table 1-1 Instrument Accessories

Seri	Name	Specification	Quan	Unit	Remarks
1	instrument	CH2516/A/B	1	set	Standard
2	Four-terminal Kelvin test	CH26011	1	set	Standard
3	Three-phase power cord	CH25010	1	piece	Standard
4	fuse	CH25001	2	piece	Standard
5	Temperature probe	CH25010	1	piece	CH2516Standard
6	user's manual		1	set	Standard
7	Verification report		1	set	Standard
8	Product certification		1	piece	Standard
9	Warranty		1	set	Standard

If there is any damage or insufficient accessories, please contact the sales department or distributor of Changzhou BEICH Electronic Technology Co., Ltd. immediately.Whentransporting this instrument, please use the packaging materials at the time of delivery.

Table 1-2 Optional Accessories

Seri	Name	Specification	Quan	Unit	备注
1	Data acquisition software	CH2516	1	piece	Optional
2	Multimeter pen test clip	CH26011A	1	set	Optional
3	Smd Kelvin test cable	CH26011B	1	set	Optional
4	Equipment test cable	CH26021	1	set	Optional
5	RS232 communication cable	CH25061	1	set	Optional

Customers can choose according to their own requirements. If there is any damage or not matching with their own selection, please contact the sales department or distributor of Changzhou BEICH Electronic Technology Co., Ltd. immediately.

Precautions for use

In order to use the instrument safely and to make full use of its functions, please observe the following precautions.

⚠️**Note**	To prevent damage to the instrument, avoid vibration and collision during handling and use. Pay attention to failures caused by falling. When transporting the instrument, please use the packaging materials at the time of delivery.
⚠️**Caveat**	🚫 Please do not modify, disassemble or repair. Failure to do so may result in an accident or personal injury. 🚫 Do not let the instrument get wet or use wet hands to measure. Failure to do so may result in electric shock.

1. About the placement and environmental conditions of the instrument

● Environmental conditions

The CH2516/A/B series must be used under the following environmental conditions:

1) Temperature and humidity range: Temperature: 0 ~ 40 °C, Humidity: 80% RH below (no condensation)

2) Temperature and humidity range with guaranteed accuracy: 23 ± 5 °C, 80% RH or less (no condensation)

3) In order to ensure good ventilation, do not block the ventilation holes.

4) The instrument, especially the test leads connected to the device under test, should be kept away from strong electromagnetic fields to avoid interference with the measurement.

⚠️ **Caveat**	🚫 Please do not place the instrument in the following places, otherwise it will cause malfunction or accident of the instrument. ● Direct sunlight or high temperature places ● a place where corrosive gas or explosive gas is generated ● Places where strong electromagnetic waves are generated or near charged objects ● a place where mechanical vibration is frequent ● Wet, dew condensation ● Dustplace ● Near induction heating device (high frequency induction heating device, IH induction cooker, etc.) ● A place affected by water, oil, chemicals, solvents, etc.
⚠️ **Note**	Do not use near noise-generating devices. If the noise affects the test object, it may cause the measured value to be unstable.

●

● Placement method:

1) To prevent the temperature of the instrument from rising, be sure to keep a specified distance from the surroundings when placing it.

Over 50mm   Over 50mm   Over 10mm   back

2) Place the bottom side down. This instrument can be used when the stand is raised.

Note
- The method of cutting off the power supply of the instrument can be to unplug the power cord; in case of emergency, the plug of the po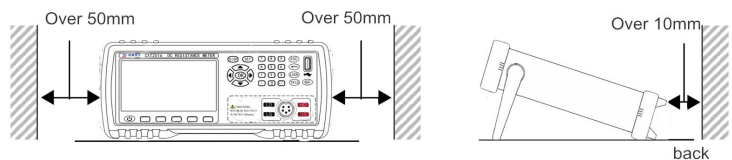wer cord can be unplugged to immediately power off; therefore, please ensure that there is no room for sufficient operation.
- Do not place on unstable pedestals or in inclined places. Otherwise it may fall or turn over and cause personal injury or host failure

2. Power requirements:

The CH2516/A/B series can only be used under the following power conditions:

Supply voltage range: 220V±10% AC (198~242V AC) Power supply frequency: 50Hz/60Hz (47.5~52.5Hz) Power supply range: ≤25VA

1)
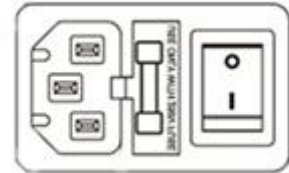
2) The power input phase line l, neutral line n, and ground line e should be the same as the power plug of the instrument.

3) This instrument has been carefully designed to reduce clutter interference from the ac power supply input. However, it should be used in a low noise environment. If it is unavoidable, install a power filter.

Danger
- To prevent electric shock, connect the power ground to the ground reliably.
- If the user replaces the power cord, make sure that the ground of the power cord is securely connected.

Caveat
- Check the outer skin of the power cord, test leads, etc. for damage or metal exposure before use. Since these damages may cause an electric shock, please replace it with the model specified by the company.
- Before turning on the power, please confirm that the power supply voltage listed on the power connection part of the instrument is consistent with the power supply voltage you are using. If the power supply voltage outside the specified range is used, it may cause damage to the instrument or electrical accident.
- To prevent electric shock and to ensure the safety of this instrument, please connect the power cord to the three-phase socket.

3. Fuse

1) The instrument is equipped with a fuse at the factory, and the user should use the fuse provided by the company.

2) Replace the instrument fuse. Open the fuse box on the rear panel power outlet for replacement.

Cavea To avoid personal injury, turn off the power before replacing the fuse.

4. Measurement considerations

⚡**Danger**

Do not short-circuit the top of the test leads and the lines with voltage. That is, the instrument is strictly prohibited from being tested with the test piece!

- **About the use of power cords, test cables, and wires**

Please use our company's power cord, test fixture or test cable. **User-made or other company test fixtures or test cables may result in incorrect measurement results.** The instrument test fixture or test cable should be kept clean and the pins of the tested device should be kept clean to ensure good contact between the device under test and the fixture.

⚡**Danger**

To avoid electric shock or short-circuit accidents, disconnect the power to the test object before connecting the test cable.

⚠**Note**

- In order not to damage the wires and test cables, do not step on or pinch the wires or test the cables.
- To prevent malfunction due to wire breakage, do not bend or pull the wire or cable connection.
- To prevent disconnection, when pulling the power cord out of the socket or the instrument, hold the plug part (outside the power cord) and pull it out.
- To prevent disconnection, when pulling out the connector, hold the insertion part (outside the cable) and pull it out.
- The tip of the needle test line is pointed and very dangerous. Please pay full attention when using it to avoid injury.
- If the wire is melted, the metal part will be exposed, which is very dangerous. Do not touch the hot part.
- The temperature probe is precision machined. Do not apply excessive voltage pulses or static electricity to avoid damage.
- Do not subject the temperature probe to excessive collisions or force the wires to be damaged.

- **Before measurement**

In order to achieve the test accuracy, the instrument should be warmed up for more than 30 minutes.

⚠**Note**

- To avoid damage to the instrument, do not input voltage or current to the measurement terminals.
- Do not measure the part to which the voltage is applied. Especially after the transformer or motor temperature rise test or the withstand voltage test, if measured immediately, the voltage or residual charge will be induced and the instrument will be damaged.
- The measurement of the internal resistance of the battery cannot be performed, otherwise the instrument may be damaged. When measuring the internal resistance of the battery, use the battery internal resistance tester.

Chapter 2 Product Overview

In this chapter you will learn about the following:
- Product summary and model description
- Technical specifications, features, main functions
- product description

2.2 Product Overview and Model Description

product Overview

CH2516/A/B series DC resistance tester features high-precision, wide-range and high-cost performance. It adopts the current mainstream 32bits CPU and high-density SMD placement technology, 24-bit color 4.3-inch color LCD screen and rotary encoder. The interface is intuitive and refreshing. Easy to operate. The instrument has high anti-interference; the range is: 1uΩ-2MΩ; the display digit is four and a half; the test speed is up to 20 times/second; the test accuracy is up to 0.05%; the temperature compensation can eliminate the ambient temperature test. The impact of the work; the instrument is equipped with advanced contact detection function, professional sorting function and data output function, with a variety of sorting signal settings, can also match the Handler interface, used in the automatic sorting system to complete the automatic pipeline test, And with contact testing capabilities, it can double the efficiency of non-automated manual testing. It can be equipped with an RS232 interface for remote control and data acquisition and analysis. The instrument is compact, compact and fully functional. Through the four-terminal test method, high-speed, high-precision measurement of various high, medium and low value resistors; various switch contact resistance; connector contact resistance; relay line package and contact resistance; transformer, inductor, motor, Deflection coil winding resistance; wire resistance; metal riveting resistance of cars, boats, airplanes; DC low resistance of fuses, resistors, DC resistance of conductive rubber, printed circuit board lines and hole resistance. Since the instrument is equipped with a temperature compensation function, it is suitable for measuring the object whose resistance value changes due to temperature. The instrument is widely used in research and development, production lines, feed inspection and other places.

Model Description

In order to meet the requirements of different users, the CH2516 series has 3 models to choose from.

Model	Measuring range
Standard type: CH2516	1uΩ-2MΩ
Jane type 1: CH2516a	1uΩ-200KΩ
Jane 2: CH2516b	10uΩ-20KΩ

See   See Appendix B for the complete version of the DC Resistance Tester.

☞ **Agreement**   The complete set of all versions is described in this manual.

2.2 Technical specifications, features, main functions

The CH2516/A/B series specifications contain the basic technical specifications of the instrument and the range allowed by the instrument test. These specifications are all achievable when the instrument is shipped from the factory.

See 🔍   The complete technical specifications are detailed in Appendix A.

1、High brightness, ultra clear four-color LCD display: display pixel: 480 * 272; direct reading, percentage error, sorting result, counting statistics, multiple parameters display at the same time

2、Range: 9 range automatic or manual test。

3、Measuring Range： CH2516：   1uΩ～2MΩ Temperature Test Range:-10-99.9℃

               CH2516A： 10uΩ～200KΩ

               CH2516B： 10uΩ～20KΩ

4、 Display range: four and a half digit display of resistance value. 0.001MΩ ～ 2mΩ, minimum resolution: 1 μΩ. Maximum reading: 20000.

5、Basic accuracy：0.05%-0.1%

6、Test Speed：FAST:20 times/sec, SLOW:10 times/sec。

7、Test end: 4-end test (including 2 Detection ends and 2 excitation ends).

8、Trigger methods: internal trigger, external trigger, manual trigger and touch trigger.

9、Correction function: full range short circuit clearing function.

10、Temperature test function: it can test the temperature through the external sensor, and the basic accuracy is as high as 0.1 ℃.

11、Comparator (sorting) function: there are 5 sorting data built in, which can judge whether the tested parts are qualified or unqualified.

12、Port Functions：

      Handler：Sorting result output, trigger signal input。

      RS232：Use three wire simple serial interface. Hexadecimal code transmission to complete all instrument functions.

      RS485(Optional)：RS485 interface can be used to complete the cascade of multiple instruments.

      USB HOST: Use external storage devices such as U disk to access the instrument, save test data and 5 sets of setting parameters for loading and calling.

13、Optional communication protocol：

      normal：Our special communication protocol is easy to use and communicate with PLC and PC.

      modbus：RTU Modbus protocol, convenient for communication with PLC.

2.3 Product introduction (name and function of each part)

2.3.1 Positive description
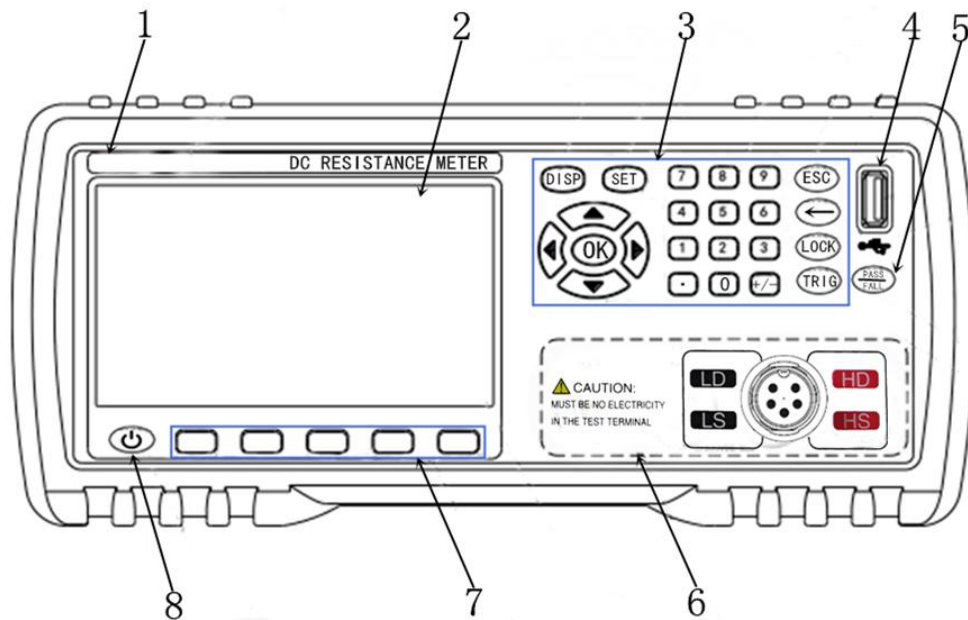
Figure 2-1 Front panel

1、Trademark and model

   Brand and model of instrument.

2、LCD display

   480 × 272 pixels, color TFT LCD screen, used to set test conditions and display measurement results.

3、Key area 2

   A group of multi-functional keys, including digital keys, direction keys, ESC keys, etc.

🔍 See   For details, see 2.3.2 "key area"

4、USB

   USB host interface. It is used to save test data and upgrade firmware.

5、PASS/FALL indicator light

   Sorting qualified indicator light. The green light indicates that the test data is qualified, and the red light indicates that the test data is unqualified.

6、Test end (input end)

The front test interface has been moved to the rear panel! The connection and usage method remains unchanged!

   Four end test end. It is used to connect the four terminal test cable and measure the tested parts.

🔍 See   For details, see 3.3 "connection of test end".

7、Soft key area

Used to select the function corresponding to the lower side of LCD screen。

🔍 **See**   For details, see 2.3.2 "key area"

8、Power standby key

Long press the standby key, the instrument is in standby mode, and the standby key is displayed in red.

Press and hold the standby key for a long time to turn to the working state, the instrument turns to the working state, and the standby key displays green,

You can turn off the power switch at the back of the chassis if you need to turn off the power during standby.

2.3.2 Key Area

1、Key area 1：May Function Soft Key

Used to select the function on the right side of the LCD screen. See the image to the above.

☞ **Agreem ent**   The four wordless "dark gray" keys on the button are the keypad one, the main function key. The function of one or four keys in the keypad is "soft", that is, their functions are not fixed, they have different functions on different display pages, and their current functions are correspondingly displayed in the "soft keys" under the LCD screen. Display area.

2、Key area 2: number key, direction (up, down, left, right) key, OK key, ESC key, backspace (←), lock key, trig key, set key and disp key.
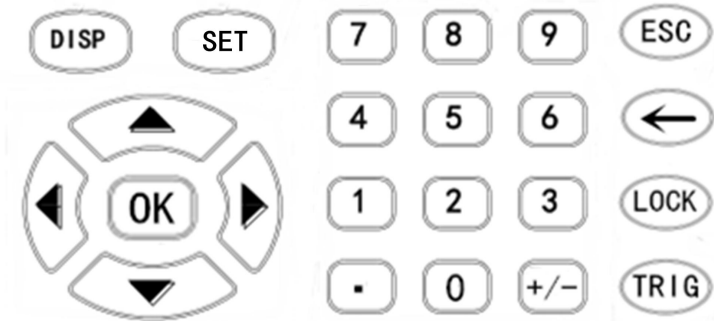
Figure 2-2 Key Area2

1）、Direction key

Up,down,left and right direction keys are used to move the cursor and select setting parameters.

2）、OK key

Used for confirmation after setting parameters such as values.

3）、DISP key

Press the [disp] key to enter the "MEAS DISP" interface.

4）、SET key

Press the [disp] key to enter the "SYS SET" interface.

5）、Number key

"0～9"、 "."、 "+/-"，used to type in the value. See 4.1 for the input method of the specific value.

6）、ESC key

No function。

7）、←key

Backspace key for numeric input.

8）、LOCK key

Key lock key. Press and hold for about 2 seconds, the key is locked, and the key lock light is on; press and hold for 2 seconds again, the key is unlocked, and the key lock light is off.

9）、TRIG key

Trigger key. When the trigger is set to manual trigger, press the trigger key once to test the instrument. If the start signal is valid during external triggering, this key flashes once, indicating that the instrument receives a start signal and tests once.

2.3.3 Rear Panel Overview
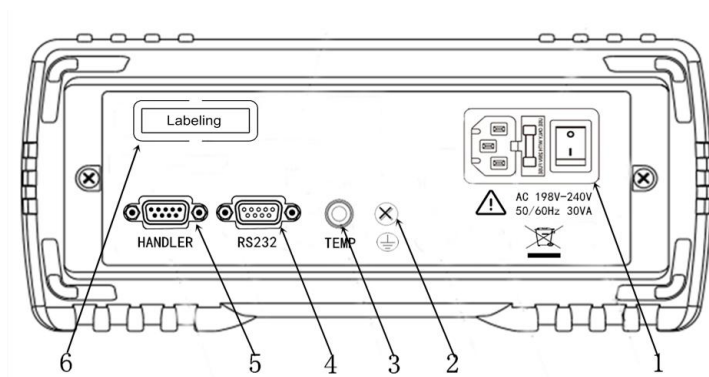
Figure 2-3Rear panel

1、Power socket, fuse and power switch

The power socket is used to input AC power, and the power switch is used to turn on or light off the power supply. The switch is in "I" position for power on, and "0" position for power off.

2、Grounding post

Instrument case grounding post.

3、Temperature interface（TEMP）

Connect the temperature sensor and test the external temperature.

4、RS232（or 485）interface

Connect with DB-9 cable. For 232 communication with upper computer.

5、HANDLER interface

Used for output comparator sorting signal and input external trigger signal.

6、Nameplate

Used to indicate instrument model and number.

2.3.4 Instrument base bracket

The instrument base bracket can be adjusted, and the base bracket close to the front can be propped up; when adjusting the bracket, pull the handle outwards, and put up the brackets on both sides of the instrument bottom. The base bracket can be removed for installation on the equipment rack. See the figure below.

⚠ **Note**   Do not apply force from above while the stand is placed upright.
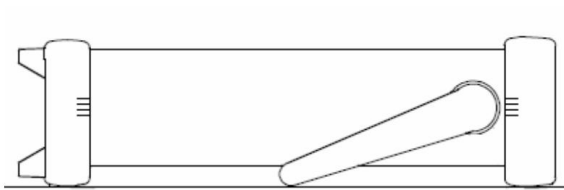
Visual position 1
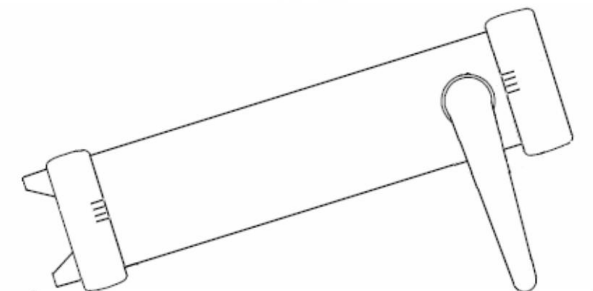
Portable position

Visual position 2

Remove handle position .(Pull to both sides until the handle is removed .)

Chapter 3 Preparation before Measurement

In this chapter you will learn about the following:

- Preparation process
- Connect the power cord
- Connection test cable
- External interface cable connection
- Turn the power on/off
- Instrument parameter setting
- Clear

3.1 Preparation Process

1. Inspection before measurement.

Before use, please confirm that there are no faults caused by storage and transportation, and use it after checking and confirming the operation. Confirmed as havingPlease contact the sales office or BEICH Instrument Company when the time is wrong.

Be sure to read the precautions before use.

2. The basic measurement process is as follows.

```
┌────────────────────────────────────────────────────────┐
│  Place this instrument - Reference Chapter 1 Usage Precautions │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Connect the power cord - Reference Chapter 3           │
│  "3.2 Connecting the power cord"                        │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Connect the test cable - Chapter 3 "3.3Connecting the test │
│  cable"                                                 │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Connect external interfaces (as required)- Reference Chapter 3, │
│  Chapter 5 and Chapter 7                               │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Switch on - Reference Chapter 3 "3.5 Turning the power │
│  on/off"                                                │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  To set up this instrument - Reference Chapter 4       │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Clear (as required) - Reference Chapter3 "3.7"        │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Connect the tested object - Reference Chapter3 "3.3"  │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Read measured values - Reference Chapter 3 and Chapter 4 │
└────────────────────────────────────────────────────────┘
                            │
                            ▼
┌────────────────────────────────────────────────────────┐
│  Turn off the power supply after use - Reference Chapter 3 │
│  "3.5 Turning the power on/off"                         │
└────────────────────────────────────────────────────────┘
```
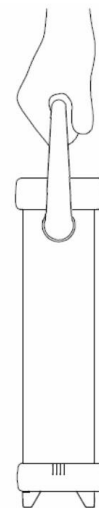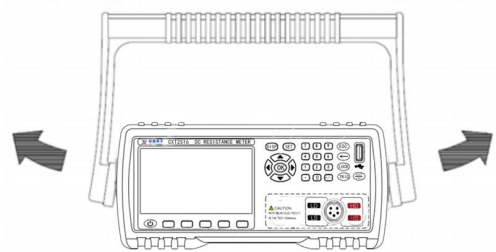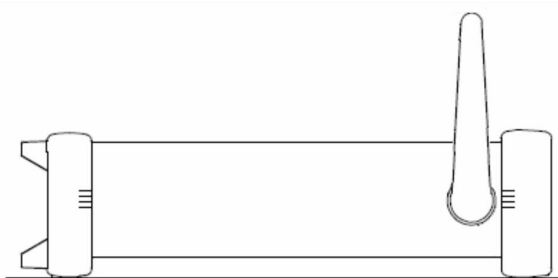
3.2 Connecting the power cord

1. Please confirm that the instrument's power switch is off.

2. Confirm that the power supply voltage is consistent with the instrument and put the power supply

   Wire the cable to the power input on the back.

3. Plug the power cord into the outlet.

AC 198V-240V
50/60Hz 30VA
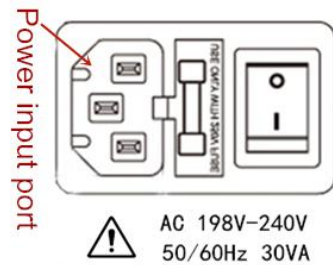
3.3 Connecting the test cable

The front test interface has been moved to the rear panel! The connection and usage method remains unchanged!

1. Connect the measuring probe or test fixture to the measuring terminal.

Please use the test cable or test cable (optional) produced by BEICH Company.

2. The company's optional accessories

See 🔍   For details, see "Optional Accessories" in "Chapter 1 Usage Precautions".

3. connection method.

   Please use the included Kelvin test clip for testing. Align the aeronautical head and screw it into the instrument test end.

   Connect the test cable to the instrument test end as follows. Where hd/ld is the current excitation high-end and current excitation end. hs/ls

   Sample the high side of the voltage and the low end of the voltage sample. The connection method is as follows:

⚠ **Caveat**

- Do not apply voltage to the measurement terminals as this may damage the instrument.
- Do not connect the current source directly to the test terminal, otherwise the instrument may be damaged.
- The energy storage element can be connected to the test end after being discharged. Doing so may cause damage to the instrument.
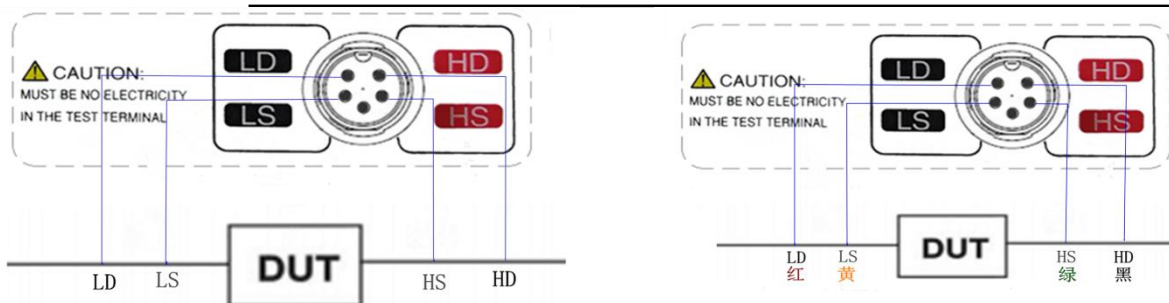- When pulling out the test terminal, be sure to hold it after unlocking.

Figure 3-1 Test terminal wiring method Figure 3-2 Test cable wiring method for automation equipment

3.4 Connection of external interface lines

1. Temperature sensor connection (as needed)

There is one type of temperature input: pt1000 (only CH2516 standard).

### 1) Before connecting the temperature probe

⚠️ **Note**	● To prevent equipment or temperature sensor failure, connect the power to the instrument after disconnecting it. ● Plug the temperature probe securely into the temp terminal on the

2）Connecting the temperature sensor

1. Verify that the instrument is in the power off state.

2. Connect the temperature sensor to the "temperature temp" terminal on the back of the instrumenton.Please fix it firmly.

Temperature probe

3. Place the tip of the temperature probe near the object to be tested。
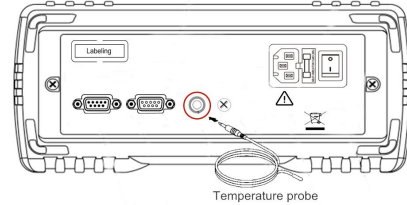
3）When using a temperature probe

⚠️ Note	● If the object to be temperature-compensated and the temperature probe are fully adapted to the environment, measure it again. If the measurement is performed under insufficient conditions, a large error will occur. ● If the temperature probe is held by bare hands, it will induce noise and may cause the measured value to be unstable ● The temperature sensor should be as close as possible to the object under test, but do not touch it,The temperature sensor should be as close as possible to the object under test, but do not touch it, etcThe temperature sensor should be as close as possible to the object under test, but do not touch it, etc.

2. RS232 communication cable connection (as needed)

See 🔍   For details, see "Chapter 7 Remote Control"

3. Connection of rs485 communication cable (as needed)

See 🔍   For details, see "Chapter 7 Remote Control"

4. Handler connection (as needed)

See 🔍   For details, see "Chapter 7 Remote Control"

5. U disk storage (as needed)

If the user needs to use the u disk to store the test data, insert the u disk on the usb host interface on the front panel of the instrument. Currently, the interface only supports

Holding usb2.0

See 🔍	For details, see "5.2 File System Description"

3.5 Turning the power on/off

1、Power on: the key marked on the top left of the rear panel (see the right figure) is the power switch。
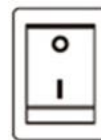
2、Standby key: under the LCD on the front panel (see the right figure）

When the instrument is in standby mode, the standby key is displayed in red. At this time, press and hold the standby key for a long time to make the instrument turn to the working state, and the standby key displays green. At this time, press and hold the standby key for a long time to turn to the standby state. You can turn off the power switch at the back of the chassis if you need to turn off the power in standby mode.

Startup sequence: Start the power switch and the instrument automatically completes the self-test process.

- The screen brightens
- Display the startup screen, showing the company name, model number and version number;
- Instrument self-test.

1. 3、Power On Default: After the instrument successfully completes the self-test process, it will display the last setting before shutdown.

When using for the first time, the initial setting is displayed, and the "parameter setting of the instrument" is referred to as needed.

2. Warm-up time: In order to achieve the specified accuracy, the instrument should be warmed up for at least 15 minutes after the power is turned on.

3. Turn off the power: press the power switch, the switch pops up, "see the picture above"

If the power cord is unplugged from the power input, it will automatically shut down.

When the power is turned on again, press the setting before turning off the power.

⚠️**Cave**	Do not switch the instrument quickly (or frequently). Instantaneous shocks may shorten the life of the instrument or even damage the

⚠️**Note**	- When the power is turned on, the power supply is cut off, and when power is supplied, the power can be turned on even if the power switch button is not pressed. - Do not flip the fixture arbitrarily during normal measurement. - After starting up for 15 minutes, connect the test fixture and short-circuit the test fixture before starting measurement.

3.60 ADJ

1、The instrument has an auto-zero function, and zero calibration is not required.

2、Turn the power on and after warming up, please clear it.

3、When the ambient temperature changes or the probe is changed, please clear it.

4、The base of the CH2516/2516a/2516b series is basically 0, so the user generally does not need to clear it; but we still guarantee the user

The clear function is left.

5、When the test wire clamp is short-circuited, the wire end of the test fixture should be clamped with the wire end, without the wire end clamp without the wire end; at this time, the LCD screen is displayed.

The base shown should be close to zero.If the test line clip is reversed, the test line data will vary greatly, or a large negative resistance value will be displayed;

When the test clip is reversed, the correct base can be obtained.At this time, the clear function is turned "on", and the instrument starts to clear the full range automatically.

zero.(Note: It takes about 3 seconds to clear the process, and wait until the full scale is cleared before it ends.) The following figure shows the correct zero test.

Fixture short circuit method.
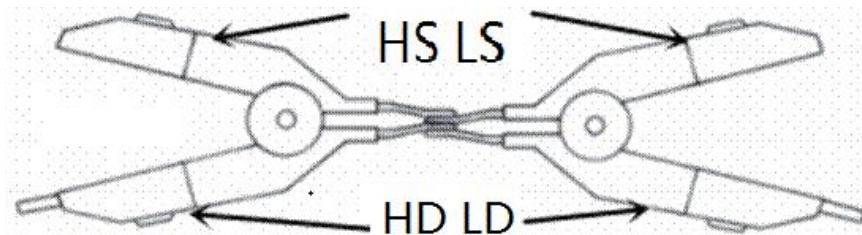
⚠ **Note**   The test fixture must be on the same side when cleared.

Chapter 4 Setting of Measurement Parameters

In this chapter you will learn about the following::
- Parameter setting and digital input method
- Measurement interface (main interface) settings

4.1 Parameter setting and numerical input method

⚠ **Note**   User-set parameters and data are automatically saved.

1. parameter settings

step 1：Use the arrow keys to move the green cursor to the menu bar where you want to set parameters.

step 2：After the user selects the required parameters through the function soft key under the instrument, the setting is completed.

2. Numerical input

step1 :the direction key to move the cursor to the menu bar where you need to type the value, and press any number key; after entering the value, press the "OK" key, and the cursor changes from green to red. At this point, the setup is complete. (the field will be displayed and selected by the cursor)。

step2：Through the number keys "0-9", decimal point "." /, "and plus or minus sign" + / "to complete the numerical value input; the function soft key at the bottom of the screen can select the unit for setting the numerical value; press the backspace key to delete the previously entered characters.

step3：After the user input the value, press the OK key, and the cursor changes from red to green. Now, the setup is complete.

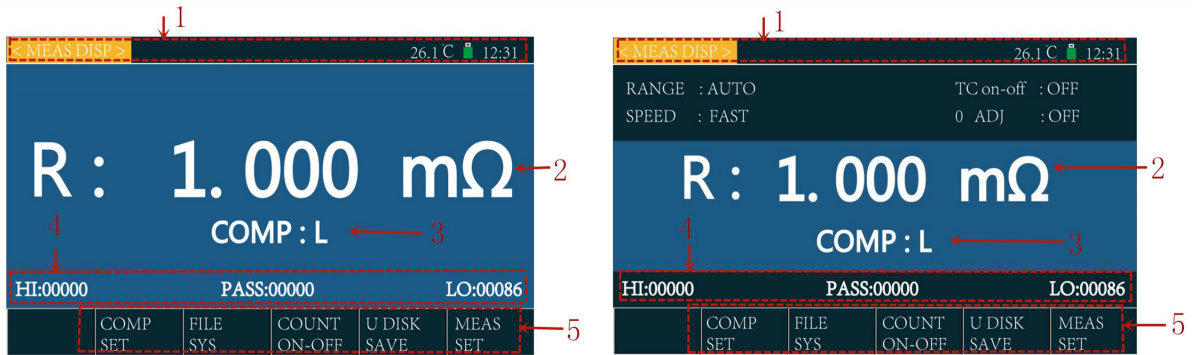☞ **Agree ment**   Parameter setting and numerical input are all operated as described.

4.2 Parameter setting of measurement interface (MEAS DISP)

After power on or press the [disp] key on the front panel, the instrument will enter the measurement interface. As shown in the figure below:

Next, we will introduce the parameters of the measurement interface:

1、status bar

Displays the name of the interface where the instrument is currently located.

If the model is 2516, the current ambient temperature is displayed (it is necessary to insert the temperature sensor and turn on the temperature compensation).

When a U disk is inserted, the U disk letter will be displayed; if the U disk record switch is turned on, the U disk letter will be green; if the U disk record switch is not turned on,The U disk letter is red).Do not display when there is no U disk inserted.

Show current time。

☞**Agreement** | The status bar of all interfaces conforms to the above format。

2、Measurement results display

Display the direct reading resistance measurement results of the instrument (when the display is selected as direct reading)

Display the percentage resistance measurement result of the instrument (when the display is selected as%).

3、Sorting results show that

Sorting result of display instrument: H represents upper

                    1-3 qualified representative

Lrepresents low

F represents sorting failure

4、Count result display

Display the sorting count value of the instrument (count the number of upper / qualified / lower).

When the count switch is off, the count value is displayed in gray;

When the count switch is on, the count value will be displayed in white and the previous count value will be cleared automatically.

5、Soft key

COMP SET: enter the sorting setting interface

File SYS: enter the file system interface

Count on-off: turn count statistics on / off

U disk Save: turn on / off the U disk data recording function

MEAS Set: enter the measurement setting interface

4.3Parameter setting of measurement interface

Press the instrument setting soft key in the main interface to enter the measurement setting interface. As shown on the right:

< MEAS SET >				26.1 ℃	12:31
AVERAGE:00			TRIGWAY :Fall		
STOTIME :00			COMTEMP:+00		
TEMPCOE:+0.000000			DELAY :0000ms		
RANGE :AUTO			0 ADJ :OFF		
TRIGGER :INT			TC on-off :OFF		
RING :OK			SPEED :FAST		
	↑↑ (++)	↑ (+)	↓ (-)	↓↓ (--)	
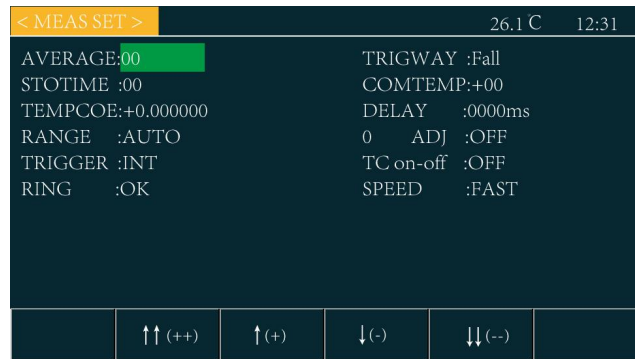
Next, we will introduce the parameters of the measurement setting interface:

1、AVERAGE

By setting the average, the instrument will smooth the measured data (Digital filtering) to make the data more stable.

⚠️**Note**　When the trigger mode is external or manual, the averaging function does not work regardless of the switch.

2、TRIGWAY(Trigger way)

There are two types of triggering methods: rising edge and falling edge.

When set to a rising edge, the start signal is valid on the rising edge.

When set to a falling edge, the start signal is valid on the falling edge.

See 🔍　For details, see "7.4 handler interface communication method".

3、STOTIME(Storage time)

If the user records data using the u disk and the trigger mode is internal continuous trigger test, the user can set the storage interval time.

That is, how often the data is recorded so that the user can analyze and record the test results.When the storage interval is "0", the instrument is still measured once and recorded once.

4、COMTEMP(Compensation temperature)

The compensation temperature when the temperature compensation function is set.

When the user needs to perform temperature compensation, the temperature sensor needs to be connected to the temperature interface on the rear panel of the instrument. Temperature display temperature sensing temperature value measured by the device.

The resistance value of the component obtained at the current ambient temperature is converted to the ambient temperature value set by the user.

Calculation formula: $Rt = Rt_0 / \{ 1 + \alpha * (tt_0) \}$

Rt The measured resistance value at the current ambient temperature

Rt_0 corrected resistance value

The compensation temperature set by t_0(usually set to 20℃or 25℃)

t ambient temperature value

Temperature coefficient of alpha material

When the user needs to perform temperature compensation, the temperature sensor needs to be connected to the temperature interface on the rear panel of the instrument.

For example, if the resistance value measured at 20℃is 100 Ω (assuming a material coefficient of 0.03930 pm), then the value of the resistance at 10℃ for: 96.22Ω

$R10 = Rt_0 / \{ 1 + \alpha * (t-t_0) \} = 100/1+0.03930 * （20-10） = 96.22Ω$

5、TEMPCOE(temperature coefficient)

Set the temperature coefficient used in the temperature compensation function. See "compensation temperature" above for details.

See the table below for the temperature coefficient of common metals：

Metallic materials	coefficient
silver	-0.0038
copper	-0.00393
aluminum	-0.0039
iron	-0.005
Nickel copper alloy	-0.0007

6、DELAY(Trigger delay)

When the trigger mode of the instrument is external trigger, the user can set the test delay time of the instrument.

The measurement delay can choose how long it will take to measure after receiving the start signal, so as to achieve the best test effect with the automation system.

7、RANGE

The user can select "Auto" or other range by rotating the knob to the "Range" button;

When Auto is selected, the instrument will automatically select the most appropriate range;

When you select another range, the instrument will jump to that range for measurement.

CH2516/A/B has 9 DC resistance test ranges: 20mΩ, 200mΩ, 2Ω, 20Ω, 200Ω, 2kΩ, 20kΩ, 200kΩ, 2MΩ (25kA is 200kΩ)

The current and resolution of each range are as follows:

CH2516/A:

Range	Current	Resolution
20mΩ	1A	1uΩ
200mΩ	100mA	10uΩ
2Ω	10mA	100 uΩ
20Ω	1mA	1mΩ
200Ω	100uA	10 mΩ
2KΩ	100uA	100 mΩ
20KΩ	100uA	1Ω
200KΩ	10uA	10Ω
2MΩ (Only CH25616)	1uA	100Ω

CH2516B:

Range	Current	Resolution
20mΩ	100mA	10uΩ
200mΩ	100mA	10uΩ
2Ω	10mA	100 uΩ
20Ω	1mA	1mΩ
200Ω	100uA	10 mΩ
2KΩ	100uA	100 mΩ
20KΩ	100uA	1Ω

8、0 ADJ

The clear base of CH2516/a/b is basically zero. Therefore, the user does not need to clear, but we still keep the zero function for the user.

🔍 **See**   For details, see "3.7 Clearing"

9、TRIGGER

Triggers are divided into internal, manual, external, and touch.

Select Internal: Continuously measure the DUT and display the results.

Select Manual: Press the panel "Trigger" button, the meter will make a measurement and output the result display, and it will be in the waiting state.

Select External: After receiving the "start" signal from the outside through the rear panel handler port, perform a measurement and output the measurement result. Then enter the wait state again.

Select Touch: When the user connects the test clamp to the tested piece, the instrument can automatically start measurement and select a stable value as the test junction. Results, judge and record. Then start waiting for the next test piece to be connected to the test fixture.

See 🔍   For details on selecting an external trigger, see "5.3 System Settings".

10、TC on-off(Temperature compensation on/off)

Turn on / off the temperature compensation and temperature measurement functions. When the temperature compensation is off, the temperature value will not be measured and displayed.

11、Ring

The user can set the sound mode by turning the knob to "sound". The instrument has three types: "off, qualified, and unqualified".

When the selection is qualified, the buzzer alarms when the sorting result is qualified;

When the selection fails, the sorting result is unqualified (h or l) buzzer alarm;

When the selection is off, the buzzer does not alarm.

See 🔍   For details, see "Chapter 6 Sorting Comparator".

12、SPEED

A test is completed from the test generation - analog to digital conversion - operation until the measurement results are displayed and the measurement results are sorted.

Test speed is the number of tests that can be completed per second.

The test speed of CH2516/2516a/2516b is mainly determined by the following factors:

a) Integral sampling period

b) Average number of times (number of measurements)

c) Measurement delay (time from start to start measurement)

d) Measurement result display time

Test speed setting steps:

The CH2516/2516a/2516b test result data is displayed in decimal point floating mode with 4 digits and a half digits.

The user can select the test speed you need by turning the knob to "Speed". The lower the measurement speed, the higher the test accuracy. Measurement

The higher the volume, the easier it is to accept the effects of the external environment.

The speed of the CH2516/2516a/2516b series is divided into two types: fast and slow: fast 20 times / second slow 10 times / second.

When the CH2516 temperature compensation is opened, the speed is: fast 15 times / second,

slow 7.5 times / second

See 🔍   For detailed speed information, see "Appendix A".

Chapter 5 File Management and System Settings

In this chapter you will learn about the following:
- Part of the file operation in the measurement interface
- Parameter setting of file interface
- File system description (storage/call function)
- System settings interface

5.1 Part of the file operation in the measurement interface

Insert the U-disk and wait for the U-disk letter to appear in the status bar.

In the main interface (measurement interface), press the soft key corresponding to "U disk record" at the bottom of the screen, the U disk letter turns green, at this time, the instrument will measure every time

The measurement data will be saved in the U disk.

Press the soft key corresponding to "U disk record" at the bottom of the screen again, the U disk letter turns red, at this time, the instrument no longer writes the measurement data to the U disk。

☞Agreement | The storage format of instrument measurement data in U disk is 2516save.xls (excel report)

5.2Parameter setting of file interface

The file system interface is mainly used to store and call parameters of external files (external storage settings such as U disk) and internal files (setting parameters are saved in the instrument).

The user can press the corresponding file system soft key at the bottom of the screen to enter the file system interface. As shown in the figure below:

NO.	External	Time	Status
01	2516DATA1	2019-11-30 18:28:31	Success
02	-------		
03	-------		
04	-------		
05	-------		

< FILE SYS >   12:31

LOAD   SAVE   DELETE   REFRESH   ESC

The following describes the parameters of the file interface：

1、Internal/External

Select the menu with the green cursor and select the internal or external file with the soft key at the bottom of the screen.

2、LOAD

Select the file with the green cursor and press the load soft key. Setting parameters in load file.

3、SAVE

Select the file with the green cursor and press the save soft key. Save the setting parameters of the instrument to the U disk.

3、DELETE

Select the file with the green cursor and press the delete soft key. Delete the file corresponding to the U disk.

4、REFRESH

When the U disk is inserted and the U disk letter is displayed in the status bar, refresh the file system interface to find the corresponding files on the U disk and display them in the table above.

5.3 File System Description (Storage/Recall Function)

Function of file calling / storage: save the parameters (upper and lower limits, measuring range, speed, etc.) set by the user of the instrument in the U disk or internal memory of the instrument. The user can call these parameters at any time, which saves the trouble of resetting the parameters by the user.

When selecting internal files, the instrument has 5 groups of parameters for users to store / call. Respectively: 2516data1; 2516data2; 2516data3; 2516data4; 2516data5

The following table describes the storage methods available and their uses:

preservation method		Is it callable?	use
Types of	file format		
external u disk	*.STA	YES	Save the measurement results to the u disk
Internal FLASH	HEX		Save setup parameters to the instrument

⚠
Note

Note the following when using the u disk on CH2516/a/b:
1. Use a u disk with interface usb2.0.
2. The u disk file system used should be fat16 or fat32 and formatted using the fat16 or fat32 standard.
3. Before connecting the u disk to the CH2516/a/b, it is recommended that the user back up the data saved on the u disk. When we do not use the usb storage device CH2516/a/b, we are responsible for data loss in the usb storage device.
4. In order to efficiently save the instrument data to the u disk, it is recommended that there are not too many files or folders in the u disk.

5.4 System Settings Interface

Press the instrument setting soft key in the main interface to enter the measurement setting interface, and then press the system setting soft key at the bottom of the screen again to enter the system setting interface. As shown on the right:

Next, we will introduce the parameters of the system setting interface:

1、BaudRate

Set the baud rate when the instrument 232 interface communicates with the upper computer (9600 / 19200 / 38400 optional).
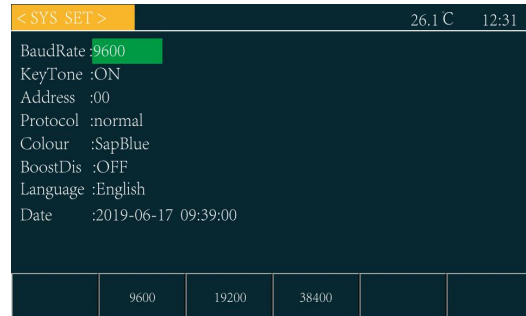
2、KeyTone

Set the switch of instrument key tone.

3、Address

Set the native address of the instrument. It is usually used when the user chooses 485 mode communication or Modbus protocol communication.

< SYS SET >		26.1 ℃ 12:31
BaudRate :9600		
KeyTone :ON		
Address :00		
Protocol :normal		
Colour :SapBlue		
BoostDis :OFF		
Language :English		
Date :2019-06-17 09:39:00		

9600	19200	38400

🔍 **See**   For details, see "Chapter 7 - remote control".

4、Protocol

Set the communication protocol type of the instrument.

🔍 **See**   For details, see "Chapter 7 - remote control".

5、Colour

Set the background color of the instrument measurement interface.

6、BoostDis

Set whether the instrument measurement interface is enlarged. If the enlarged display is on, the measurement display interface is as follows:

< MEAS DISP >   26.1 ℃ 12:31

R： 1.000 mΩ
COMP：L

HI:00000   PASS:00000   LO:00086

COMP SET	FILE SYS	COUNT ON-OFF	U DISK SAVE	MEAS SET
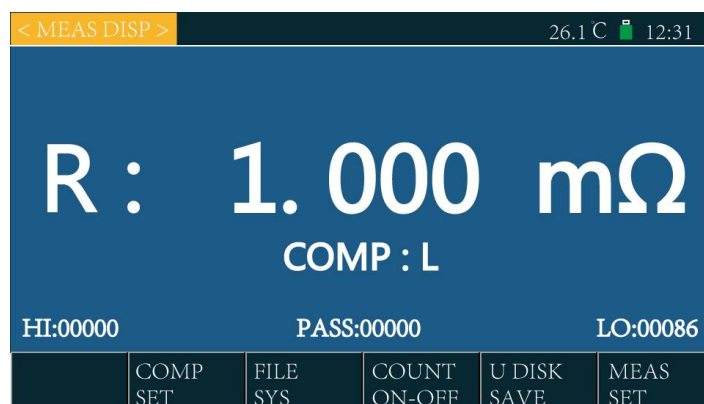
If the enlarged display is closed, the measurement display interface is as follows:

RANGE : AUTO   TC on-off : OFF
SPEED : FAST   0 ADJ   : OFF

R : 1.000 mΩ

COMP : L

HI:00000   PASS:00000   LO:00086

| COMP SET | FILE SYS | COUNT ON-OFF | U DISK SAVE | MEAS SET |

7、Data

Set the system time of the instrument. The setting method is:

1. Move the green cursor to the time menu bar

2. Press any number key to enter the time setting. At this time, the cursor turns red and a blue cursor appears

3. Set the numerical value of the blue cursor position through the number key or up and down keys

4. Move the blue cursor with the left and right keys to switch the time value position to be set

5. Press OK to end the setting

Chapter 6 Sorting Comparator

In this chapter you will learn about the following:
- Sorting mode
- Ring
- Count
- Parameter setting of Comparison setting interface
- Comparison process

6.1 Sorting mode

There are two sorting modes (comparator functions), one is "direct reading (abs absolute value judgment)", and the second is "% (percentage relative value judgment)".

If the judgment is set in advance using the nominal value or the upper and lower limits, the determination result may be output to the outside, or the upper limit (h) may be determined by the determination.

It is still below the lower limit (1), or the qualified product within the range of the set value (numbers 1~3 represent qualified files).

6.2 Ring

In the "Sound" menu bar of the measurement interface, you can set the alarm function of the comparator.

When the "Sound" is set to pass, the comparator output is acceptable and the buzzer sounds.

When the "Sound" is set to fail, the comparator output is unqualified and the buzzer sounds.

When the "Sound" is set to off, the buzzer does not ring.

6.3 Pass / fail indicator

The pass/fail indicator is the sorting indicator. According to the result of the sorting comparator output, it is displayed as super/lower or pass. See below.

- A green light indicates that the test data is acceptable.
- A red light indicates that the test data is unqualified.

6.4 Count

Press the count switch in the measurement interface to turn on / off the count statistics function.

When the count function is on, the count value is displayed in white, and when the count function is off, the count value is gray.

If the counting statistics is turned on, the instrument will unify the sorting results of upper super (HI), pass and lo for each test

The meter is in the measurement interface. The maximum number of each result is 99999. Do not count when exceeding.

If the sorting result is f, the sorting fails (the test result is smaller than the upper limit, larger than the lower limit, but not in any qualified gear). thisNo statistics。

6.5 Parameter setting of comparison setting interface

Press the "sorting setting" soft key in the main interface to enter the sorting setting interface. As shown in the figure below:

< COMP SET >		12:31

NOM:0.0000mΩ   BIN: 2   DIS: ABS

BIN	LOW	HIGH
1	2	1.0000mΩ
2	0.0000mΩ	0.0000mΩ
3	-------	-------

	uΩ	mΩ	Ω	kΩ	MΩ

Next, we will introduce the parameters of sorting setting interface:

1、Nominal

The user can set the percentage nominal value by turning the knob to "Nominal" and pressing the number keys.Used to calculate the resistance value compared to the nominal value

Percentage of tolerance.

The calculation formula is:[(resistance value - nominal value)/nominal value]×100%.

⚠ **Note** The nominal is only used when sorting is "%".

2、BIN

There are several qualified gears for setting comparator. See 6.6 sorting process for details. If it is set to "1", only one qualified gear will be set, and the other qualified gear will be ignored。

3、DIS(Display mode)

Set whether the test results of the measurement interface are displayed in direct reading mode or in percentage mode.

Set whether the upper / lower limit of sorting setting interface is direct reading or percentage.

4、Upper/lower limit

Upper / lower limit is used to judge the sorting result output of the instrument.

When the display is direct reading, set the upper and lower limit of direct reading; when the display is%, set the upper and lower limit of% in the range of - 99.9% to + 99.9%

The upper and lower limits of direct reading are set as follows:

Move the cursor to the upper and lower limit positions to be set with the "direction key", press any number key, then input the number through the number key dial (the symbols of the upper and lower limit can be set with the + / −) key, input the unit through the corresponding soft key at the bottom of the screen, and then press the "OK" key to finish

< COMP SET >		12:31
NOM:0.0000mΩ	BIN: 2	DIS: ABS
BIN	LOW	HIGH
1	2	1.0000mΩ
2	0.0000mΩ	0.0000mΩ
3	-------	-------
	uΩ mΩ Ω kΩ MΩ	

the setting. As shown in the right figure, when entering the upper and lower limit value settings, the function soft key at the bottom of the screen will be converted to unit selection. Press the corresponding soft key at the bottom of the screen to enter the unit.

The upper and lower limits of percentage are set as follows:

Move the cursor to the upper and lower limit positions to be set with the "direction key", press any number key, and then input the numbers through the number pad (the symbols of the upper and lower limit can be set by the + / −). Press "OK" to finish setting.

6.6 Sorting process

1、First set the upper and lower limits on the measurement interface。

1.   2、CH2516/a/b has 5 sorting output, which are: 1st gear upper limit; 1st gear lower limit; 3st grade is qualified.

⚠ Note
- Before sorting, we need to set the upper and lower limits in the "measurement interface". The upper limit set by the user must be greater than the lower limit, otherwise the comparator will not work properly.
- Note: If the measured resistance is negative, then the sorting result always outputs the lower limit; if the test range or open circuit is exceeded, the sorting result always outputs the upper limit.

The instrument will judge the sorting output of the measurement results according to the upper and lower limits set by the user. The specific sorting process is shown in the following figure. If the number of sorted gears is set to 1, only the upper and lower limits of gear 1 are used for comparison; if the number of gears is set to 2, only the upper and lower limits of gear 1 and gear 2 are used for comparison (at this time, the resistance output exceeds the upper limit, which needs to be greater than the upper limit of gear 1 and gear 2; the output exceedingthe lower limit needs to be less than the lower limit of gear 1 and gear 2)

```
┌─────────────────┐      ╱╲                        ┌──────────────┐
│ Obtain the      │     ╱  ╲  R>HI or Test    Y    │ Over the     │
│ maximum upper   │────▶    ▶ over range ─────────▶ │ upper limit  │
│ HI and the      │     ╲  ╱                        │ "H"          │
│ minimum lower HI│      ╲╱                         └──────────────┘
│ of each gear    │       │
└─────────────────┘       │ N
                          ▼
                         ╱╲                         ┌──────────────┐
                        ╱  ╲   R<LO          Y      │ Exceeding    │
                        ╲  ╱ ───────────────────────▶ the lower    │
                         ╲╱                         │ limit"L"     │
                          │                         └──────────────┘
                          │ N
                          ▼
                    ╱──────────╲                    ┌──────────────┐
                   ╱ R is within ╲   Y              │ Output       │
                   ╲ the upper and╱ ────────────────▶ qualified 1  │
                   ╱ lower limits ╲                 └──────────────┘
                   ╲ of the first ╱
                    ╲   gear     ╱
                     ╲──────────╱
                          │ N
                          ▼
┌──────────┐        ╱──────────╲                    ┌──────────────┐
│ Sorting  │   N   ╱ R is within ╲   Y              │ Output       │
│ failure  │◀─────╱ the upper and ╲─────────────────▶ qualified N  │
│ "F"      │      ╲ lower limits  ╱                 └──────────────┘
└──────────┘       ╲  of N gear  ╱
                    ╲──────────╱
```
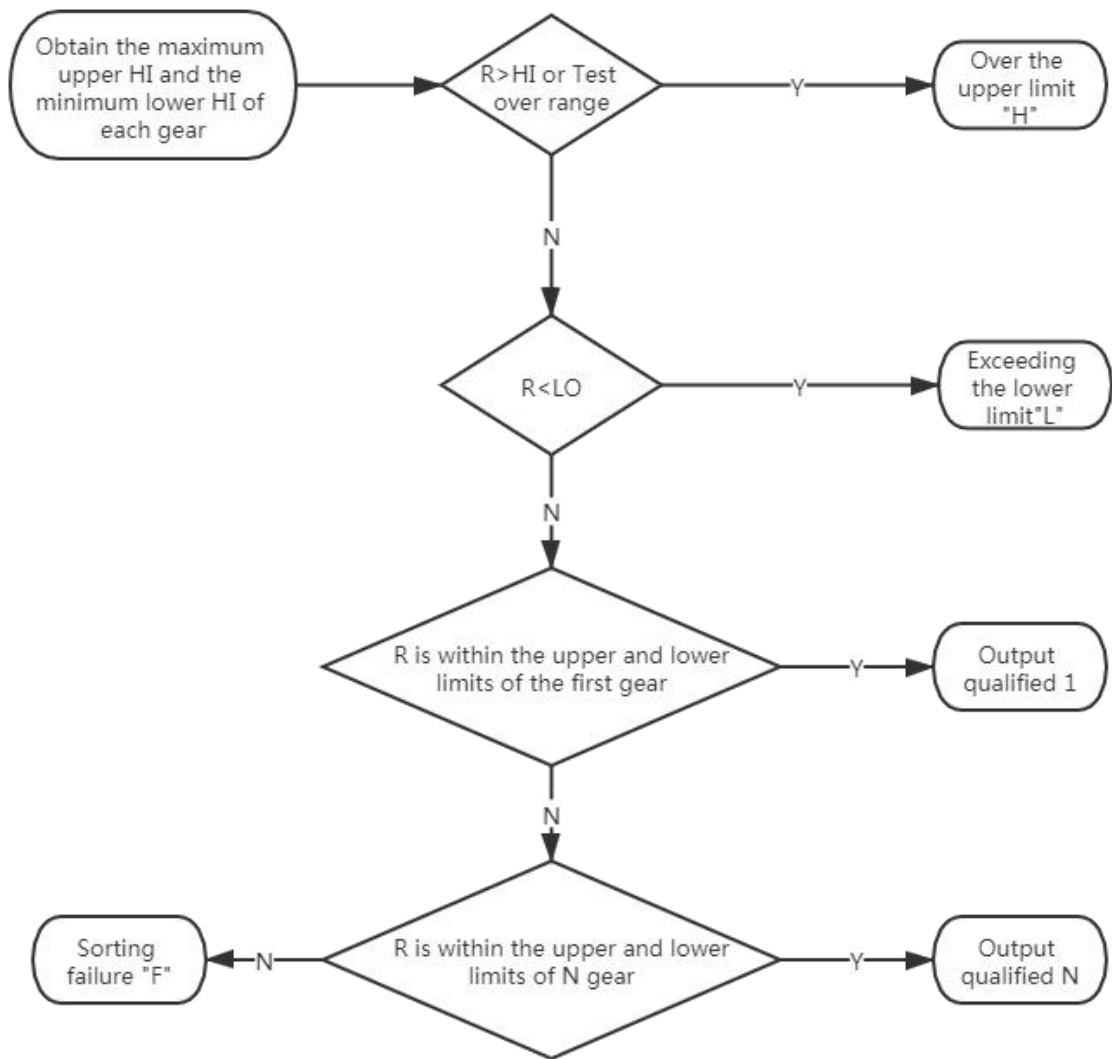
Chapter 7 Remote Control

In this chapter you will learn about the following:
- RS232/485 communication method
- Communication Protocol（normal）
- Communication Protocol（modbus）
- Handler interface communication method

7.1 RS232 / 485 communication method

1. Before connecting to the RS232c/485 connector

⚠Note
- To avoid accidents, do not plug or unplug the communication cable during operation.
- When connecting or removing the communication cable, be sure to turn off the power to the instrument and the device.Failure to do so may result in malfunction or malfunction.
- After connecting the communication cable, firmly fix the screws that come with the connector. If the connection is not secure, it may cause malfunction or malfunction.

2. Interface Description

The widely used serial communication standard is the RS-232 standard, which can also be called the asynchronous serial communication standard. The RS is: "Recommended Standrad" (recommended standard) English abbreviation, 232 is the standard number, thestandard is the Electronic Industries Association of America (IEA) in 1969
The officially published standard, which stipulates that each time a piece of land is transmitted via a data line.

⚠Note
Like most serial ports in the world, the serial interface of the instrument is not strictly based on the rs-232 standard, but only provides a minimal subset.
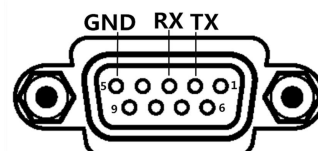
3. Wiring

Instrument RS232 signal and pin comparison table

Signal name	abbreviation	Connector pin number
Receive data	TX	2
send data	RX	3
Signal ground or shared return line	GND	5

- RS232 wiring method：
When connecting with RS232, please prepare directly connected to theinstrument specifications RS232cable.This

GND RX TX

34

instrument uses 2, 3, 5 needles,no other pins, RS232 wiring.

- **485 wiring method** (Optional):

    Rs485 is a standard for defining the electrical characteristics of drivers and receivers in a balanced digital multipoint system, which is defined by the Telecommunications Industry Association will be defined by the Electronic Industry Alliance.The digital communication network using this standard can be used under long distance conditions and in an environment with high electronic noise effective transmission of signals.

    The 485 interface is optional and is a standard 3-wire(a, b, GND)communication mode.

    High-speed communication over long distances.

    The specific wiring method of rs485 is as shown on the right:
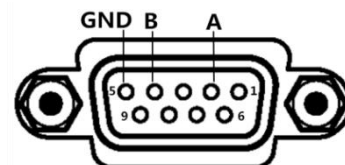
7.2 Communication Protocol(normal)

This instrument uses RS-232C standard asynchronous serial communication bus interface to communicate with external control equipment. The baud rate can be preset in the instrument (96001920038400 optional). 8 data bits, 1 stop bit, no check bit. The logic level of the signal is ± 12V, and the maximum transmission distance is 15m. The serial interface uses direct communication, only TXD (transmit), RXD (receive), GND (ground) three signal wires, and nine core standard interface socket.

1、Data sent by the instrument to the upper computer (22 bit data in total)

explain	Data bit	HEX	remarks
START	0	3AH	Start bit
ADR	1	00H-63H	Communication address. The range is 0-99 decimal. If the local address in the instrument system setting is 99, the bit is 63h
Spare bit	2	03H	
Spare bit	3	00H	
Spare bit	4	01H	
Spare bit	5	00H	
Resistance data	6-14	Resistance symbol + resistance value and unit + sorting result, all of which are ASCII code, 9-bit	If + 1.234 OH indicates positive 1.234 ohm, the sorting output is super high. (corresponding Hex is 2bh 31h 2eh 2eh 32H 33H 34h 20h 4fh 48h) Where, betwin 4 and o are spaces, corresponding to hex 0x20. The units are u, m, 0, K, m, u,%. They represent micro ohm, milliohm, ohm, kiloohm,

		data in total	megaohm, resistance open circuit, percentage resistance respectively. (the corresponding hex codes are 75h, 6dh, 4fh, 6bh, 4dh, 55h, 25h respectively.) The sorting results are divided into qualified level 1 / 2 / 3 (31h / 32H / 33H), unqualified level H / L (48h / 4CH) and sorting failure f (46h). The resistance value data and sorting results are fixed as 9-bit data
Temperature data	15-19		Current temperature value. If + 12.3 is received, it means + 12.3 ℃. If received, it means the temperature sensor is not inserted or the temperature compensation is closed. The temperature value data is fixed to 5 bits, which are ASCII characters like the resistance value.
END1	20	0DH	End bit 1
END2	21	0AH	End bit 2

For example: 3AH 01H 03H 00H 01H 00H 2BH 31H 2EH 32H 33H 34H 20H 6DH 48H 2BH 31H 32H 2EH 33H 0DH 0AH

The resistance of the representative instrument is + 1.234m Ω, and the sorting is over; the temperature test value is 12.3 degrees, and the local address is 01.

2、Write data to instrument

The format of upper computer writing data to the instrument is: ABH + machine number + high storage address + low storage address + 00h + 00h + 00h + data + AFH; fixed 18 bit data. See the following table for details

Serial number	Command function	Instruction data	Format / Notes
01	Set the upper resistance limit	10A1H	Gear(30h-33h)+3 digits before the decimal point + 5 digits after the decimal point (30h-39h,0-9 of ASCII) +Unit(u Ω ,m Ω , Ω ,k Ω ,M Ω ;The corresponding hex code is 75h,6dh,4f,6b,4dh, u,m,0,k,M of ASCII)
02	Set the lower limit of resistance	10A2H	ditto
03	Set percentage cap	10A3H	Gear(30h-33h)+Symbol(+/-,The corresponding hex code is 2BH and 2DH)++2 digits before the decimal point + 3 digits after the decimal point (30h-39h, 即 ASCII 的 0-9) +00H+ 00H+ 00H
04	Set the lower percentage limit	10A4H	ditto
05	Set nominal value	10A5H	3 digits before the decimal point + 5 digits after the decimal point (30h-39h,0-9 of ASCII) +Unit(u Ω,m Ω,Ω,k Ω,M Ω;The corresponding hex code is 75h,6dh,4f,6b,4dh, u,m,0,k,M of ASCII)+00H
06	Set 0 ADJ	10A6H	ON (01H)or OFF(00H) 00H 00H 00H 00H 00H 00H 00H 00H 00H

07	Set DIS	10A7H	Dis(00H:ABS 01H:%) 00H 00H 00H 00H 00H 00H 00H 00H 00H
08	Set speed	10A8H	Speed(00H:FAST 01H:SLOW) 00H 00H 00H 00H 00H 00H 00H 00H 00H
09	Set Range	10A9H	Range(00H:Auto 01H:20mΩ 02H:200mΩ 03H:2Ω 04H:20Ω 05H:200Ω 06H:2KΩ 07H:20KΩ 08H:200KΩ 09H:2MΩ) 00H 00H 00H 00H 00H 00H 00H 00H
010	Set Trigger	10AAH	Ttrigger(00H:INT 01H:EXT 02H:MAN 03H:TCH) 00H 00H 00H 00H 00H 00H 00H 00H 00H
011	Set TC on-off	10ABH	TC(00H:OFF 01H:ON) 00H 00H 00H 00H 00H 00H 00H 00H 00H
012	Set TEMPCOE	10ACH	Symbol (+(2bh)/-(2dh))+6 digits after the decimal point (30h-39h) +00H+00H+00H
013	Trigger signal	10ADH	Signal 01H 00H 00H 00H 00H 00H 00H 00H 00H 00H
014	Set AVERAGE	10AEH	Tens + ones (30h-39h,0-9 of ASCII).To set the average to 98, the data bit is 39H+38H+00H 00H 00H 00H 00H 00H 00H 00H
015	Set Norm	10B1H	Norm(00H:Fall 01H:Rise) 00H 00H 00H 00H 00H 00H 00H 00H 00H
016	Set Stotime	10B2H	Tens + ones (30h-39h,0-9 of ASCII)+ 00H 00H 00H 00H 00H 00H 00H 00H 00H
017	Set CTEMP	10B3H	Symbol (+(2bh)/-(2dh))+ Tens + ones (30h-39h,0-9 of ASCII) +00H 00H 00H 00H 00H 00H 00H
018	Set Ring	10B4H	Ring(0:OK 1:NG 2:OFF)+ 00H 00H 00H 00H 00H 00H 00H 00H 00H
019	Set DELAY	10B5H	Thousands + hundreds + tens + ones (30h-39h,0-9 of ASCII) +00H 00H 00H 00H 00H 00H
020	Set keytone	10B6H	Keytone(00H:ON 01H:OFF)+00H 00H 00H 00H 00H 00H 00H 00H 00H
021	Count on/off	10B7H	Count(00H:OFF 01H:ON)+00H 00H 00H 00H 00H 00H 00H 00H 00H
022	U disk save on/off	10B8H	U disk save(00H:OFF 01H:ON)+00H 00H 00H 00H 00H 00H 00H 00H 00H
023	Set BIN	10B9H	BIN(01H:1 02H:2 03H 3)+00H 00H 00H 00H 00H 00H 00H 00H 00H
024	Set colour	10BAH	Colour(00H Sapblue 01H:Black 02H:HazeBlue 03H Green)+00H 00H 00H 00H 00H 00H 00H 00H 00H

For example：Send ABH 01H 10H A1H 00H 00H 00H 31H 31H 30H 30H 32H 35H 00H 00H 00H 6DH AFH.The upper limit of the representative resistance value is 100.25 m Ω. The local address is 1.

Send ABH 01H 10H B4H 00H 00H 00H 01H 00H 00H 00H 00H 00H 00H 00H 00H 00H AFH.It means that the set tone is unqualified. The local address is 1.

7.3 Communication Protocol (modbus)

This instrument uses RS-232C standard asynchronous serial communication bus interface to communicate with external control equipment. The transmission baud rate can be preset in

the instrument (9600190038400 optional). 8-bit data bit, 2-bit stop bit, no check bit.

The logic level of the signal is ± 12V, and the maximum transmission distance is 15m. The serial interface adopts direct communication, only TXD (transmission), RXD (reception) and GND (ground) three signal wires are used, and nine core standard interface socket is used。

1、Read instruction (Function code is 03H)

Send format (7 bits in total):

Address	Function code	High address	Low address	00H	07H	CRC low	CRC high

Example: 01H 03H 00H 01H 00H 07H 55H C8H: query the test value of instrument 01 (resistance, sorting result, temperature value) on address 0001h.

When the upper computer requests the test value from the instrument, the value returned by the lower computer will return the complete test data regardless of the number of bytes in the sending command (i.e. 22 data numbers of resistance value + sorting + temperature value in total)

Return to format:

expla in	Data bit	HEX	Remarks
START			Rest period over 10ms
ADR	0	00H-63H	Communication address. The range is 0-99 decimal. If the local address in the instrument system setting is 99, the bit is 63h
CMD	1	03H	Function code
Numbe r of data	2	16H	The following resistance value, sorting result, temperature and length are 14 bits in total, so the data is converted to hexadecimal as 0x0e
Resis tance data	3-11	Resistance symbol + resistance value and unit + sorting result, all of which are ASCII code, 9-bit data in total	If + 1.234 OH indicates positive 1.234 ohm, the sorting output is super high. (corresponding Hex is 2bh 31h 2eh 2eh 32H 33H 34h 20h 4fh 48h) Where, betwin 4 and o are spaces, corresponding to hex 0x20. The units are u, m, O, K, m, u,%. They represent micro ohm, milliohm, ohm, kiloohm, megaohm, resistance open circuit, percentage resistance respectively. (the corresponding hex codes are 75h, 6dh, 4fh, 6bh, 4dh, 55h, 25h respectively.) The sorting results are divided into qualified level 1 / 2 / 3 (31h / 32H / 33H), unqualified level H / L (48h / 4CH) and sorting failure f (46h). The resistance value data and sorting results are fixed as 9-bit data
Tempe ratur	12-16		Current temperature value. If + 12.3 is received, it means + 12.3 ℃. If received, it means the temperature sensor is not inserted or the temperature compensation is closed. The temperature value data is

e data		fixed to 5 bits, which are ASCII characters like the resistance value.
CRC LOW	17	CRC check low
CRCHIGH	18	CRC check high
END		Rest period over 10ms

For example:01H 03H 00H 01H 00H 0EH 2BH 31H 2EH 32H 33H 34H 20H 6DH 48H 2BH 31H 32H 2EH 33H 87H 77H

The resistance of the representative instrument is + 1.234m Ω, the sorting is over, the temperature test value is 12.3 degrees, and the machine address is 01. CRC check value is 7787h.

2、Write instructions (Function code is 10H)

Send as:

Address	Function code	High address	Low address	High number of data (word)	low number of data (word)	Data volume (Byte)	Data bytes 1-n	CRC Low	CRC High

Return format is:

Address	Function code	High address	Low address	High number of data (word)	low number of data (word)	CRC Low	CRCHigh

Here's a detailed explanation of what each parameter means:

2.1 Address

　　Postal address.The range is decimal 0-99. If the local address in the instrument system settings is 99, the bit is 63H.

2.2 Function code

　　Write one or more bytes of data to the instrument. Function code 10H

2.3Address High+Address Low

　　Storage addresses for each parameter of the instrument. Detailed information in tables 6-1.

2.4.Number of data(word)

　　Write how many sets of data to the instrument parameter storage address. Fixed to 0001H.

2.5Data volume (Byte)

Write how many bytes of data to the instrument parameter storage address.

2.6 Data bytes 1-n.

See Table below for details.

Serial number	Command function	Instruction data	Format / Notes
01	Set the upper resistance limit	10A1H	Gear(30h-33h)+3 digits before the decimal point + 5 digits after the decimal point (30h-39h,0-9 of ASCII) +Unit(uΩ,mΩ,Ω,kΩ,MΩ;The corresponding hex code is 75h,6dh,4f,6b,4dh, u,m,O,k,M of ASCII)
02	Set the lower limit of resistance	10A2H	ditto
03	Set percentage cap	10A3H	Gear(30h-33h)+Symbol(+/-,The corresponding hex code is 2BH and 2DH)++2 digits before the decimal point + 3 digits after the decimal point (30h-39h,0-9 of ASCII) +00H+ 00H+ 00H
04	Set the lower percentage limit	10A4H	ditto
05	Set nominal value	10A5H	3 digits before the decimal point + 5 digits after the decimal point (30h-39h,0-9 of ASCII) +Unit(uΩ,mΩ,Ω,kΩ,MΩ;The corresponding hex code is 75h,6dh,4f,6b,4dh, u,m,O,k,M of ASCII)+00H
06	Set 0 ADJ	10A6H	ON (01H)or OFF(00H) 00H 00H 00H 00H 00H 00H 00H 00H 00H
07	Set DIS	10A7H	Dis(00H:ABS 01H:%) 00H 00H 00H 00H 00H 00H 00H 00H 00H
08	Set speed	10A8H	Speed(00H:FAST 01H:SLOW) 00H 00H 00H 00H 00H 00H 00H 00H 00H
09	Set Range	10A9H	Range(00H:Auto 01H:20mΩ 02H:200mΩ 03H:2Ω 04H:20Ω 05H:200Ω 06H:2KΩ 07H:20KΩ 08H:200KΩ 09H:2MΩ) 00H 00H 00H 00H 00H 00H 00H 00H 00H
010	Set Trigger	10AAH	Ttrigger(00H:INT 01H:EXT 02H:MAN 03H:TCH) 00H 00H 00H 00H 00H 00H 00H 00H 00H
011	Set TC on-off	10ABH	TC(00H:OFF 01H:ON) 00H 00H 00H 00H 00H 00H 00H 00H 00H
012	Set TEMPCOE	10ACH	Symbol (+(2bh)/-(2dh))+6 digits after the decimal point (30h-39h) +00H+00H+00H
013	Trigger signal	10ADH	Signal 01H 00H 00H 00H 00H 00H 00H 00H 00H 00H
014	Set AVERAGE	10AEH	Tens + ones (30h-39h,0-9 of ASCII).To set the average to 98, the data bit is 39H+38H+00H 00H 00H 00H 00H 00H 00H 00H
015	Set Norm	10B1H	Norm(00H:Fall 01H:Rise) 00H 00H 00H 00H 00H 00H 00H 00H 00H
016	Set Stotime	10B2H	Tens + ones (30h-39h,0-9 of ASCII)+ 00H 00H 00H 00H 00H 00H 00H 00H 00H

017	Set CTEMP	10B3H	Symbol (+(2bh)/-(2dh))+ Tens + ones (30h-39h,0-9 of ASCII) +00H 00H 00H 00H 00H 00H 00H
018	Set Ring	10B4H	Ring(0:OK 1:NG 2:OFF)+ 00H 00H 00H 00H 00H 00H 00H 00H 00H
019	Set DELAY	10B5H	Thousands + hundreds + tens + ones (30h-39h,0-9 of ASCII) +00H 00H 00H 00H 00H 00H
020	Set keytone	10B6H	Keytone(00H:ON 01H:OFF)+00H 00H 00H 00H 00H 00H 00H 00H 00H
021	Count on/off	10B7H	Count(00H:OFF 01H:ON)+00H 00H 00H 00H 00H 00H 00H 00H 00H
022	U disk save on/off	10B8H	U disk save(00H:OFF 01H:ON)+00H 00H 00H 00H 00H 00H 00H 00H 00H
023	Set BIN	10B9H	BIN(01H:1 02H:2 03H 3)+00H 00H 00H 00H 00H 00H 00H 00H 00H
024	Set colour	10BAH	Colour(00H Sapblue 01H:Black 02H:HazeBlue 03H Green)+00H 00H 00H 00H 00H 00H 00H 00H 00H

For example: send01H 10H 10H A1H 00H 01H 0AH 31H 31H 30H 30H 32H 35H 30H 30H 30H 6DH 29H 12H.Represents setting the upper limit of resistance value of machine 01 to 100.25 mΩ.

Send 01H 10H 10H B4H 00H 01H 01H 01H B3H 1CH.Represents setting 01 signal as NG.

2.7 16 Bit CRC Check

1、First define two 256-byte checklists

```
const BYTE chCRCHTalbe[]
=                                                          // CRC High Bit
Byte Value Table
{
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41,
```

```
0x00, 0xC1, 0x81, 0x40
};

//CRCLow Bit Byte Value Table

const BYTE chCRCLTalbe[]
=
{
0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06, 0x07, 0xC7,
0x05, 0xC5, 0xC4, 0x04, 0xCC, 0x0C, 0x0D, 0xCD, 0x0F, 0xCF, 0xCE, 0x0E,
0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09, 0x08, 0xC8, 0xD8, 0x18, 0x19, 0xD9,
0x1B, 0xDB, 0xDA, 0x1A, 0x1E, 0xDE, 0xDF, 0x1F, 0xDD, 0x1D, 0x1C, 0xDC,
0x14, 0xD4, 0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3,
0x11, 0xD1, 0xD0, 0x10, 0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3, 0xF2, 0x32,
0x36, 0xF6, 0xF7, 0x37, 0xF5, 0x35, 0x34, 0xF4, 0x3C, 0xFC, 0xFD, 0x3D,
0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A, 0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38,
0x28, 0xE8, 0xE9, 0x29, 0xEB, 0x2B, 0x2A, 0xEA, 0xEE, 0x2E, 0x2F, 0xEF,
0x2D, 0xED, 0xEC, 0x2C, 0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26,
0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0, 0xA0, 0x60, 0x61, 0xA1,
0x63, 0xA3, 0xA2, 0x62, 0x66, 0xA6, 0xA7, 0x67, 0xA5, 0x65, 0x64, 0xA4,
0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F, 0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB,
0x69, 0xA9, 0xA8, 0x68, 0x78, 0xB8, 0xB9, 0x79, 0xBB, 0x7B, 0x7A, 0xBA,
0xBE, 0x7E, 0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C, 0xB4, 0x74, 0x75, 0xB5,
0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71, 0x70, 0xB0,
0x50, 0x90, 0x91, 0x51, 0x93, 0x53, 0x52, 0x92, 0x96, 0x56, 0x57, 0x97,
0x55, 0x95, 0x94, 0x54, 0x9C, 0x5C, 0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E,
0x5A, 0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98, 0x88, 0x48, 0x49, 0x89,
0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42, 0x43, 0x83,
0x41, 0x81, 0x80, 0x40

};
```

2、Then calculate

```
WORD CRC16(BYTE* pchMsg, WORD wDataLen)
{
BYTE chCRCHi = 0xFF; // High CRC Byte Initialization
    BYTE chCRCLo = 0xFF; // Low CRC Byte Initialization
WORD wIndex;                         // Index in CRC Loop
while (wDataLen--)
    {
// Calculate CRC
wIndex = chCRCLo ^ *pchMsg++ ;
chCRCLo = chCRCHi ^ chCRCHTalbe[wIndex];
    chCRCHi = chCRCLTalbe[wIndex] ;
}
```

```
        return ((chCRCHi << 8) | chCRCLo) ;

    }
```

7.4 Handler communication method

⚠️ **Note**
- To avoid damage to the interface, do not exceed the power supply voltage requirements.
- To avoid damage to the interface, wire the instrument after it has been turned off.

1. Pin description:

1), start trigger start signal, optional rising edge or falling edge trigger, pulse width approx

    It is 4-30mS.A level trigger signal can only be measured once, if it has been

    Low level signals can only be measured once.

2), eom measurement end signal, active low, when low, indicates sort signal

    It is valid, only the results have not been displayed. If it is high, the device is still being measured.

3), Bin X sorting output signal, active low, when low, the sorting signal is valid, when it is high, the sorting signal is invalid.

    The sort output is set high each time it is measured.

Pin	Pin function
1	Start signal input (active low) A low level can only be initiated once.
2	Bin 2 compares the results to output the signal, low level is effective.
3	Over/Down Over/Sorting Failure Comparison Result Output Signal, Low Level Effective,
4	Empty foot.
5	External interface power input positive terminal (12-24v),When there is no external power input, the pin is internal + 10V
6	Bin1 compares the results to output the signal, low level is effective.
7	Bin3 compares the results to output the signal, low level is effective.
8	Measurement end signal eom, measurement is over when active low.
9	Negative end of external power supply (external power ground), when there is no external power input, this pin is internal suspended ground wire (non ground)

2、**Timing table**
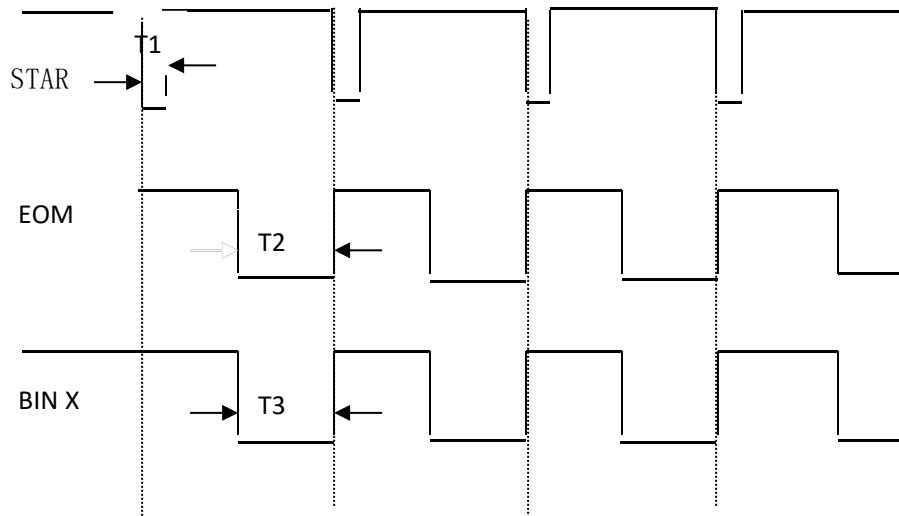
In the slow speed test, the sorting result is sent out about 110ms after the start signal (the time difference between the falling edge of T2 and T1 is 130ms),

During the fast test, the sorting result is sent out about 55ms after the start signal (the time difference between T2 and T1 is 70ms)

Chapter 8 Maintenance and Service

In this chapter you will learn about the following:
- About correction
- Packaging and transportation
- Storage
- Warranty
- clean
- About discarding

8.1 About correction

⚠ **Note** | IMPORTANT: In order to ensure that the measuring instrument obtains the correct measurement within the specified accuracy range, the instrument needs to be calibrated periodically.

The calibration period varies depending on the customer's usage or environment. It is recommended to determine the calibration period based on the customer's usage or environment. and

Entrusted BEICH Company to make regular corrections.

8.2 Packaging and Transportation

When transporting the instrument, please use the packaging materials at the time of delivery. The instrument should be handled with care, moisture, and drench during transportation.

When returning repair, please use the packaging that will not be damaged during transportation, and indicate the cause of the malfunction. We will not guarantee the damage caused by transportation.

8.3 Storage

The instrument should be stored in a ventilated room with an ambient temperature of -10 ° C ~ 50 ° C and a relative humidity of not more than 90%. The air should not contain corrosion measurements.

Harmful impurities of the instrument.

8.4 Warranty

Warranty period: The customer purchases the instrument from the company, calculated from the date of shipment of the company, and is shipped from the operating department.

The date is calculated and the warranty period is 2 years. A warranty card should be issued for the warranty. During the warranty period, the user is damaged due to improper operation of the user.

Repair costs are borne by the user. The instrument is repaired by the company for life.

The maintenance of this instrument must be repaired by professional technicians; please do not replace the internal components of the instrument without any repair;

The calibration needs to be re-calibrated to avoid affecting the test accuracy. For the blind maintenance of the user, the instrument damage caused by replacing the instrument parts is not a warranty.

The user should bear the maintenance cost.

8.5 Cleaning

- To prevent the risk of electric shock, unplug the power cord before cleaning.
- Wipe the case and panel gently with a clean, soft cloth dampened with a little water or a mild detergent.
- Do not clean the inside of the instrument.

⚠ **Note** | Do not use solvents (alcohol, benzine, acetone, ketone, thinner, oil-based detergents, etc.) to clean the instrument.

8.6 About discarding

When disposing of the instrument and options, please dispose of them according to the regulations of each region.

Appendix A: Specifications

Technical indicators

Test report The following data were measured under the following conditions:

Temperature condition: 23 ° C ± 5 ° C Humidity condition: ≤ 80% rh

zero value adjustment: clear before test

Warm-up time: >60 minutesTemperature test accuracy:0.2%±0.1℃

The resistance measurement range, measurement accuracy, display resolution and test current are as follows：

| Test Range		20mΩ	200mΩ	2Ω	20Ω	200Ω	2kΩ	20kΩ	200kΩ	2MΩ
Accuracy	2516	0.1 % ±5	0.05 %±3	0.05 %±3	0.05 %±3	0.05 %±3	0.05 % ±3	0.05% ±3	0.05%±3	0.2%±5
	2516A									None
	2516B	0.2 % ±5							None	
Test Current	2516	1A	100mA	100mA	10mA	1mA	100uA	100uA	10uA	1uA
	2516A	1A								None
	2516B	100mA							None	None
Reading Resolution	2516	1uΩ	10uΩ	100uΩ	1mΩ	10mΩ	100mΩ	1Ω	10Ω	100Ω
	2516A	1uΩ	10uΩ							None
	2516B	10uΩ							None	

Other specifications

Weight: about 4.5kg (with package weight).

Boundary dimension:

internal dimension: length * width * height: 335m m * 86mm * 216mm

External dimension: L * w * H: 361 mm * 107 mm * 264 mm

264

370

108

216

340

88
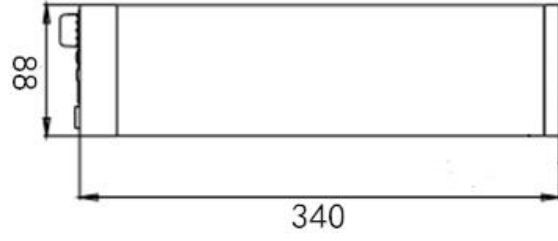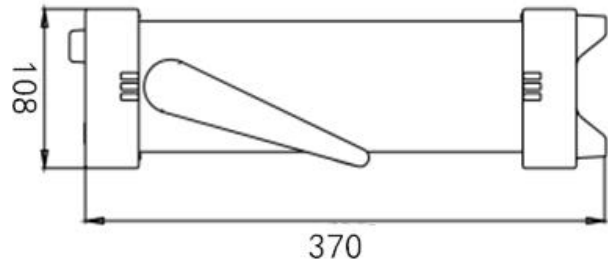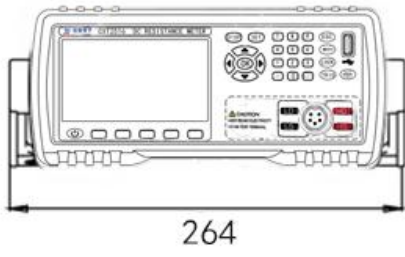
Appendix B: Selection Table

In Appendix b you will learn about the following: CH2511, CH2512, CH2516, CH2516a, CH2516b, CH2515, CH2515a, CH2514, CH2510, CH2520, CH2520a.

Characteristic model	Measuring range	Basic accuracy	Maximum test current	USB	RS-232	Handler	U disk interface	Temperature compensa	Comparison function
CH2511	10uΩ-20KΩ	0.1%	100mA		Optional	Optional			√
CH2512	1uΩ-2MΩ	0.05%	1A		Optional	√			√
CH2516	1uΩ-2MΩ	0.05%	1A		√	√	√	√	√
CH2516A	1uΩ-200KΩ	0.05%	1A		√	√	√		√
CH2516B	10uΩ-20KΩ	0.05%	100mA		√	√	√		√
CH2515	0.1uΩ-110MΩ	0.02%	1A	√	√	√	√	√	√
CH2515A	1uΩ-20MΩ	0.02%	1A	√	√	√	√	√	√
CH2514	0.1uΩ-110MΩ	0.01%	1A	√	√	√	√	√	√
CH2510	0.01uΩ-20KΩ	0.05%	10A	√	√	√	√	√	√
CH2520	1uΩ-2MΩ	0.02%	100mA	√	√	√	√		√
CH2520A	1uΩ-20MΩ	0.02%	100mA	√	√	√	√		√
CH2518	2/4/8/16/32 channels 10uΩ-300KΩ	0.05%	100mA	√	√	√		√	√
CH2560	0.1uΩ-10MΩ	0.02%	1A	√	√	√	√	√	√