Hantek

HT2810C series

LCR Meter

Quick Guide

202512

Warranties and Declarations

Copyright

Statement

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Product certification

Hantek certified the series LCR meter to meet China's national industry standards and has passed the CE certification.

Contact us

If you have any questions when using the products of Qingdao Hantek Electronic Co., LTD., you can obtain service and support through the following ways:
Email: service@hantek.com, support@hantek.com
Website: http://www.hantek.com

1 Safety Requirement

1.1 Summary of General Security

Read the following safety precautions carefully to avoid injury and to prevent damage to this product or any product connected. To avoid possible dangers, please use this product in accordance with the regulations.

- **Only professionally authorized personnel can perform repairs.**
- **Use the right power cable.**

  Use the power cable approved by the country in which the product is used only.
- **Do not operate with the cover open.**

  Do not run the product with the cover or panel open.
- **Avoid circuit exposure.**

  Do not touch exposed connectors and components after power is switched on.
- **Do not operate if the product is suspected to be faulty.**

  If you suspect that the product has been damaged, please ask qualified maintenance personnel to check it.
- **Maintain proper ventilation.**
- **Do not operate in a humid environment.**
- **Do not operate in inflammable or explosive environment.**
- **Please keep the product surface clean and dry.**

Warning:

Equipment that meets Class A requirements may not provide adequate protection for broadcast services in residential environments.

1.2 Safety Guidelines

To ensure the safe operation of the instrument, please adhere to the following guidelines:

- **Protective measures such as avoiding direct sunlight, preventing water and moisture ingress, shielding from electromagnetic radiation, and guarding against dust and explosions should be observed when using this instrument.**
- **Before use, please read and understand the warnings and safety information**

provided in this manual.

- **Operate the instrument only in accordance with the functional methods specified in the manual.**
- **When measuring components in a circuit, ensure that the circuit is powered off and all capacitors on the circuit are discharged before measurement.**
- **Prior to measurement, discharge any charged components, such as capacitors.**

1.3 Security Terms and Signs

Security terms in this manual:

Warning:

Indicates that the operation may not cause immediate damage to you.

Note:

Indicates that the operation may cause damage to the product or other property.

Safety terms on products:

Warning:

Indicates a potential hazard may be caused to you if you do not perform this operation.

Safety signs on the product:

Hazardous Voltage

Safety Warning

1.4 Measurement Category

Measurement category

This instrument can be used for measurement under class I.

Warning:

This instrument is only allowed to be used in the specified measurement class.

Measurement class definition

- **Class I refers to measurements taken on a circuit not directly connected to the main power supply.** For example, measurements made on circuits that are not exported from a main power supply, especially from a protected (internal) main

power supply. In the latter case, the instantaneous stress will change. Therefore, the user should understand the instantaneous capacity of the instrument.

- **Class II refers to measurements taken on a circuit directly connected to low-voltage instruments.** For example, measurements made on household appliances, portable tools, and similar equipment.
- **Class III refers to measurements taken on construction equipment.** For example, measurements made on switchboards, circuit breakers, circuits (including cables, busbars, junction boxes, switches, sockets) in fixed equipment, as well as equipment for industrial use and certain other equipment (for example, fixed motors permanently connected to fixed instruments).
- **Class IV refers to measurements taken at the source of low-voltage equipment.** For example, measurements made on electricity meters, primary overcurrent protection equipment, and pulse control units.

1.5 Ventilation Requirement

To ensure adequate ventilation, when using the instrument on a workbench or in a rack, maintain a clearance of at least 10 cm on both sides, above, and behind it.

Note:

Insufficient ventilation may cause the instrument to overheat, leading to damage to the instrument. Ensure proper ventilation during use.

1.6 Working Environment

Normal operating temperature for the instrument: 0°C to 40°C; operating humidity: 15% to 85% RH.

Warning:

To avoid short circuit or electric shock, do not operate the device in a damp environment.

Altitude

Operating: below 2 km
Non-operating: below 15 km

Installation (Overvoltage) Category

This product is powered by mains conforming to installation (overvoltage) category II.

Warning:

Ensure that no overvoltage (e.g. from lightning) reaches the product. Otherwise, the operator may be in danger of receiving electric shock.

Installation (Overvoltage) Category Definitions

Installation (overvoltage) category I refers to signal level which is applicable to equipment measurement terminals connected to the source circuit. Among these terminals, precautions are done to limit the transient voltage to a low level.
Installation (overvoltage) category II refers to the local power distribution level which is applicable to equipment connected to the AC line (AC power).

Pollution Degree

Pollution Degree 2

Pollution Degree Definition

- **Pollution Degree 1:** No pollution or only dry, nonconductive pollution occurs. The pollution has no effect. For example, a clean room or air-conditioned office environment.
- **Pollution Degree 2:** Normally only nonconductive pollution occurs. Temporary conductivity caused by condensation is to be expected. For example, indoor environment.
- **Pollution Degree 3:** Conductive pollution or dry nonconductive pollution that becomes conductive due to condensation occurs. To be found in industrial environment or construction sites (harsh environments). For example, sheltered outdoor environment.
- **Pollution Degree 4:** The pollution generates persistent conductivity caused by conductive dust, rain, or snow. For example, outdoor areas.

Security level

Class 1 - Grounded products

1.7 Environmental Considerations

The following symbols indicate that the product complies with the requirements of WEEE Directive 2002/96/EC.

Equipment recovery:

Producing the device requires the extraction and use of natural resources. Some substances contained in the equipment may be harmful to the environment or human health if the product is not disposed of properly. In order to avoid the release of harmful substances into the environment and reduce the use of natural resources, it is recommended that appropriate methods be used to recycle this product to ensure that most of the materials can be correctly reused.

2 Document Overview

This document describes how to quickly understand the front and back panels, user interfaces, and basic operation methods of the instrument.

Tip:

The latest version of this manual can be downloaded at (http://www.hantek.com).

Document number:

202512

Software version:

Software upgrade may change or increase product functionalities, please pay attention to Hantek website for the latest version.

Document format conventions:

1 Virtual keys and main interface icons

Use **[name]** to represent virtual keys and main interface icons. For example, **[Utility]** is for 

.

2 Menu

Use "menu text (bold) + color" to represent a label or a menu option. For example, **I/O** means to click the "I/O" option on the current operation interface to enter the function configuration menu of "I/O".

3 Operation steps

Use "->" to represent the next step. For example, **[Utility] ->** **Language** means click **Utility** label before clicking **Language** menu.

3 Quick Start

3.1 General Inspection

Check the shipping package

After receiving the oscilloscope, please follow the following steps to check the instrument: Check whether there is any damage caused by transportation: If the packaging cartons or protective foam pads are seriously damaged, please keep them until the whole machine and accessories pass the electrical and mechanical testing.

Check the accessories

The details of the accessories are provided in Appendix A: Accessories at the end of the user manual. If you find any accessory missing or damaged, please contact the dealer responsible for this business.

Check the machine

If you find the instrument is damaged, not working properly, or unable to pass the performance test, please contact the dealer responsible for this business.

3.2 Appearance and Dimension

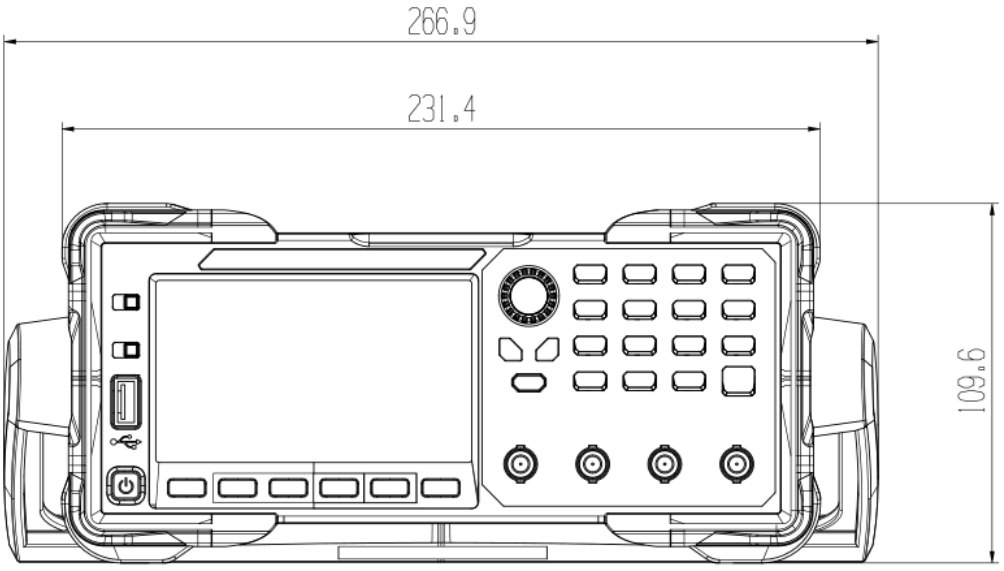

Figure 3.1 Front view

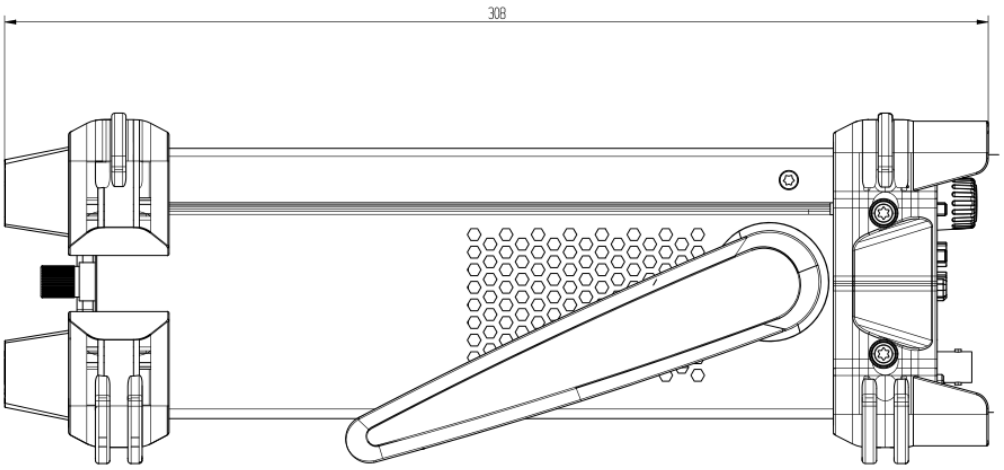

Figure 3.2 Side view

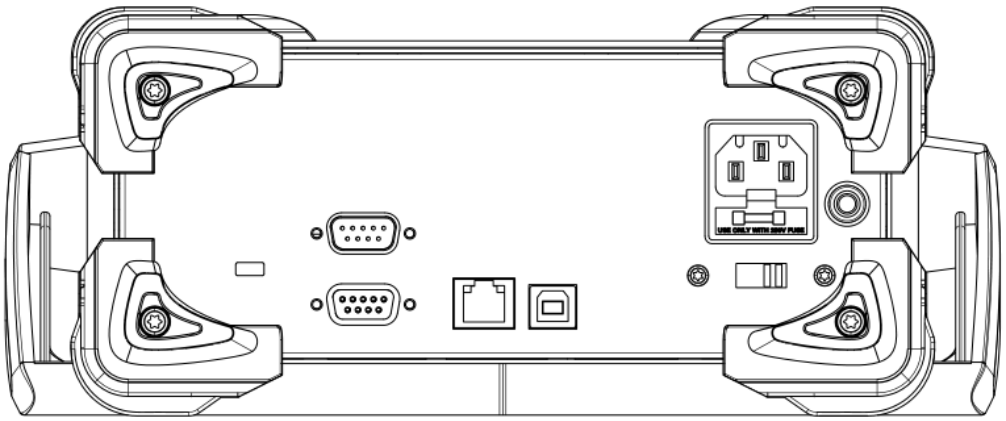

Figure 3.3 Rear view

3.3 Preparation before Use

1. To Connect to AC Power

Power Supply Input Voltage: AC 110V / 220V (switchable)
Frequency: 50Hz / 60Hz / 400Hz
Please connect this product to a power source using the power cable provided in the accessory pack.

Warning:

Before connecting to power, you must ensure the voltage selector switch is set to the position that exactly matches the local supply voltage (110V or 220V). Never switch the voltage setting while the unit is powered on. Failure to follow this instruction may cause equipment damage, fire, or electric shock hazard.

2. Frequency Compatibility Note

The input frequency of the instrument must match the power supply system frequency (50Hz, 60Hz, or 400Hz). Connecting to a power source with an incompatible frequency may affect measurement accuracy or damage internal components.

3. Turn-on Checkout

When the machine is properly plugged into a power source and the product is energized, press the power button located at the lower-left corner of the front panel to start the instrument. To shut down the instrument while it is powered on, press the power button.

4. Warm Up

- To ensure accurate measurement, the instrument should undergo a warm-up period of no less than 30 minutes after power-on.
- Avoid frequent power cycling to prevent potential disruption of internal data.

Test Fixture:

Please use the test fixture provided by our company. The test fixture and the pins of the device under test should be kept clean to ensure good contact between the tested device and the test fixture.
Connect the test fixture to the four test terminals on the front panel of the instrument: H FORCE, H SENSE, L SENSE, L FORCE. For the DUT with a shielding enclosure, the shielding layer can be connected to the grounding terminal on the front panel. The H FORCE and H SENSE terminals should be connected to the red clips, while the L SENSE and L FORCE terminals should be connected to the black clips.

3.4 Front Panel Overview

Figure 3.4 Front panel

Table 3.1 Front Panel Description

No.	Description
1	Power button
2	USB HOST Interface
3	**[?]** key, retrieve system information
4	**[P]** key, retrieve default setting
5	LCD display
6	Left and right arrow keys; 【Enter】key;
7	Multifunctional knob
8	Basic function keys
9	Menu soft keys, used for confirming the selection of menu items
10	Four-terminal test port, used to connect the four-terminal test fixture or test cable to measure the device under test.
11	Machine support frame

3.5 Rear Panel Overview

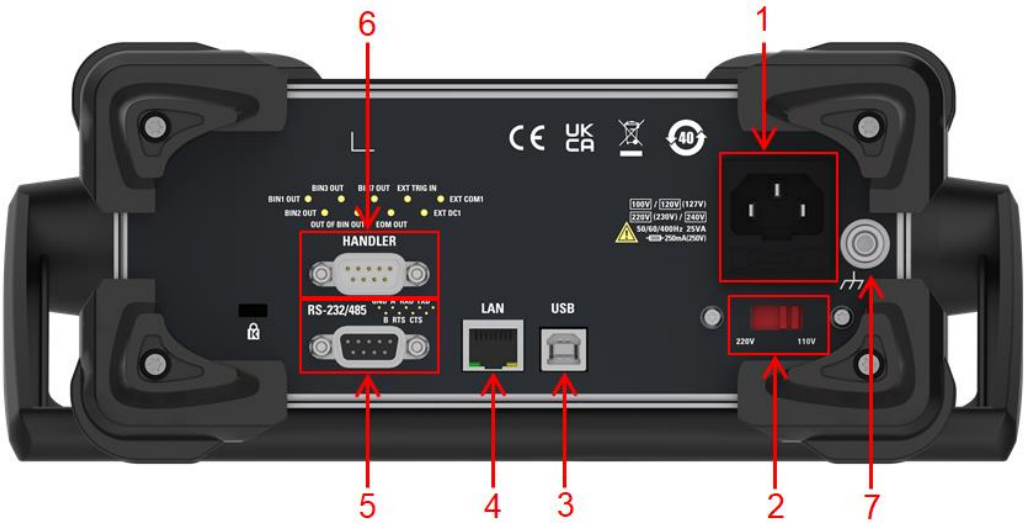

Figure 3.5 Rear panel

Table 3.2 Rear Panel Description

No.	Description
1	AC Power cord connector and fuse holder
2	Voltage selector
3	USB device interface, establish communication with the computer.
4	LAN interface
5	RS232/485 interface
6	Handler interface, carry out the sorting and output of the test results.
7	The grounding terminal of the casing. The terminal is connected to the casing of the instrument. It can be used for protection or shielding of the grounding connection.

3.6 User Interface

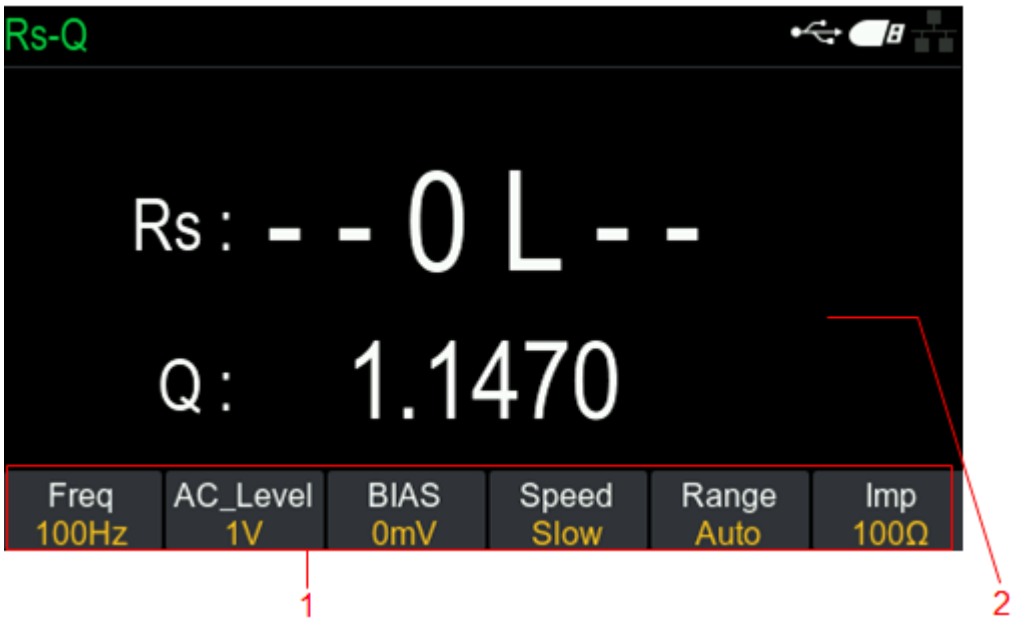

Figure 3.6 User interface

1. **Soft key menu/submenu area:**

   This area is used to display the function definitions of the soft keys. The default

interface is shown in the above picture. The definitions of the soft key menu vary depending on the key and have different functions.

2. **Measurement results show the area:**

   This area displays the test result information, including the main parameters and secondary parameters.

3.7 Usage of the Numeric Keypad

The settings for some parameters of this product (such as frequency, level, offset, etc.) can be done through digital keyboard input.

- Press the **[SHIFT]** key, and the "Shift" indicator will appear in the middle of the top of the screen.
- Press and hold the soft key corresponding to the menu until a digital input box appears, then release the button.
- Press the left and right arrow keys  to move the cursor position. Input the specific numbers by pressing the numeric keypad and press the **[Enter]** key to confirm, or adjust the values using the knob and press the **[Enter]** key to confirm.

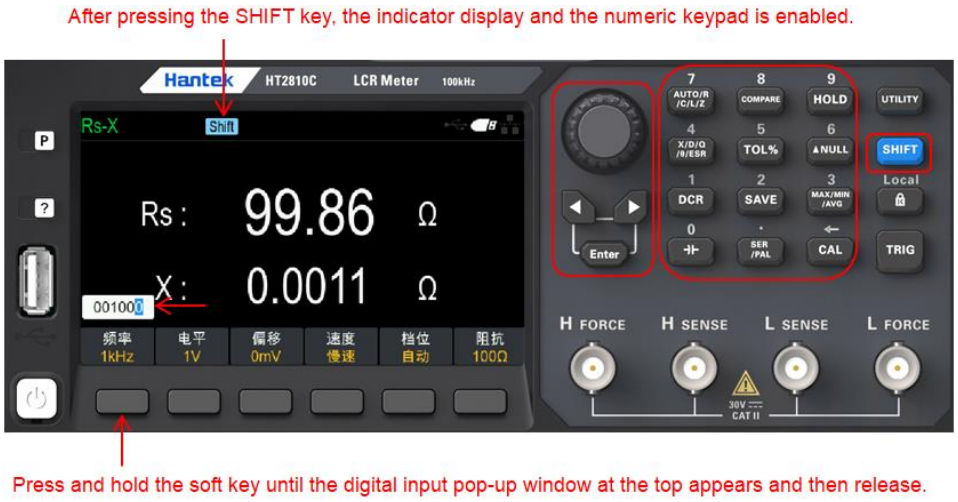

Figure 3.7 Numeric keypad

On the numeric keypad, you can also perform the following operations:

-  : Backspace key, user can delete the input parameter values.
-  : Input decimal point.

4 Remote Control

This product can communicate with a PC through the following interfaces:

- Controlled via USB
- Controlled via LAN
- Controlled via RS232/485

For remote control, the IOLibSuite must first be installed on the PC. The IO library version must be compatible with the current computer system.
This section details how to use the IO software to remotely control this product through various interfaces.

Note:

Before connecting the communication cable, please turn off the instrument to avoid damaging its communication interface.

5 External Interface Description

5.1 RS232/485 Interface

Using asynchronous serial communication, the interface of this instrument is not strictly based on the RS-232 standard but provides a simplified subset. As shown in the table below, "Transmit data" and "Receive data" are defined relative to this instrument.

Table 5.1 RS232 Pin Introduction

Pin	Abbreviation Identifier	Signal
3	TXD	Transmit data
2	RXD	Receive data
5	GND	GND
8	CTS	Clear-to-send
7	RTS	Request

Table 5.2 RS485 Pin Introduction

Pin	Abbreviation Identifier	Signal
4	A	Positive terminal
9	B	Negative terminal

The connector is a black DB9 female standard socket, with the pin sequence as shown in the figure below:

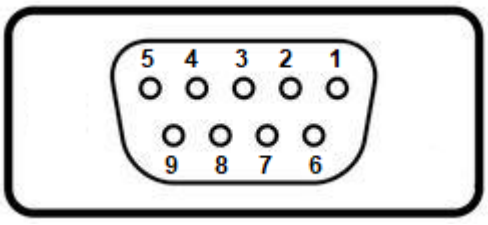

Figure 5.1 RS232/485 pin diagram

Note: To prevent electrical shock, always turn off the power before inserting or removing the connector.

Note: Do not short-circuit the output terminals or allow them to accidentally touch the chassis, as this may damage the components.

5.2 Handler Interface

The benchtop LCR meter provides users with a Handler interface, which supports the output of comparator sorting results and list sweep results.

5.2.1 Technical Description

Output signals: Active-low, open-collector output, opto-couplers isolated.
Input signals: opto-couplers isolated.
The power pin supports a DC supply voltage range of 3 V to 25 V.

5.2.2 Pin Definitions

The Handler interface is DB9 male standard socket. The specific pin definitions and their locations are as shown in the following figure and table.

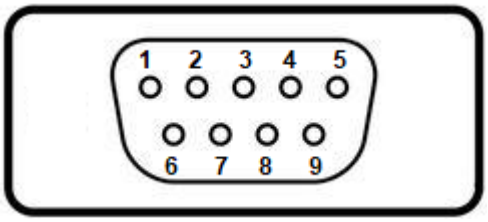

Figure 5.2 Handler interface pin diagram

Table 5.3 Pin Introduction

Pin	Identification	Function	Description
1	BIN1 OUT	Output	Comparator function, binned result output, BIN:1. List scanning function, output of result No. 1. A valid signal is output if the comparison result is H or L.
2	BIN3 OUT	Output	Comparator function, binned result output, BIN:3. List scanning function, output of result No. 3. A valid signal is output if the comparison result is H or L.
3	BIN7 OUT	Output	Comparator function, binned result output, BIN:AUX. List scanning function, output of result No. 7. A valid signal is output if the comparison result is H or L.
4	EXT TRIG IN	Input	External trigger signal input, rising edge trigger. High-level voltage is consistent with the external voltage source.
5	EXT COM1	GND	Reference ground for external DC power supply and output signals.
6	BIN2 OUT	Output	Comparator function, binned result output, BIN:2. List scanning function, output of result No. 2. A valid

			signal is output if the comparison result is H or L.
7	BIN OUT	Output	Comparator function, binned result output, BIN:OUT. List scanning function, overall comparison result after startup. A valid signal is output if any one of all sequence numbers has a result of H or L.
8	EOM OUT	Output	Measurement completion signal.
9	EXT DC1	Power Input	External DC voltage source input, with reference ground at EXTCOM1.

6 Basic Specification

6.1 Accuracy Graph

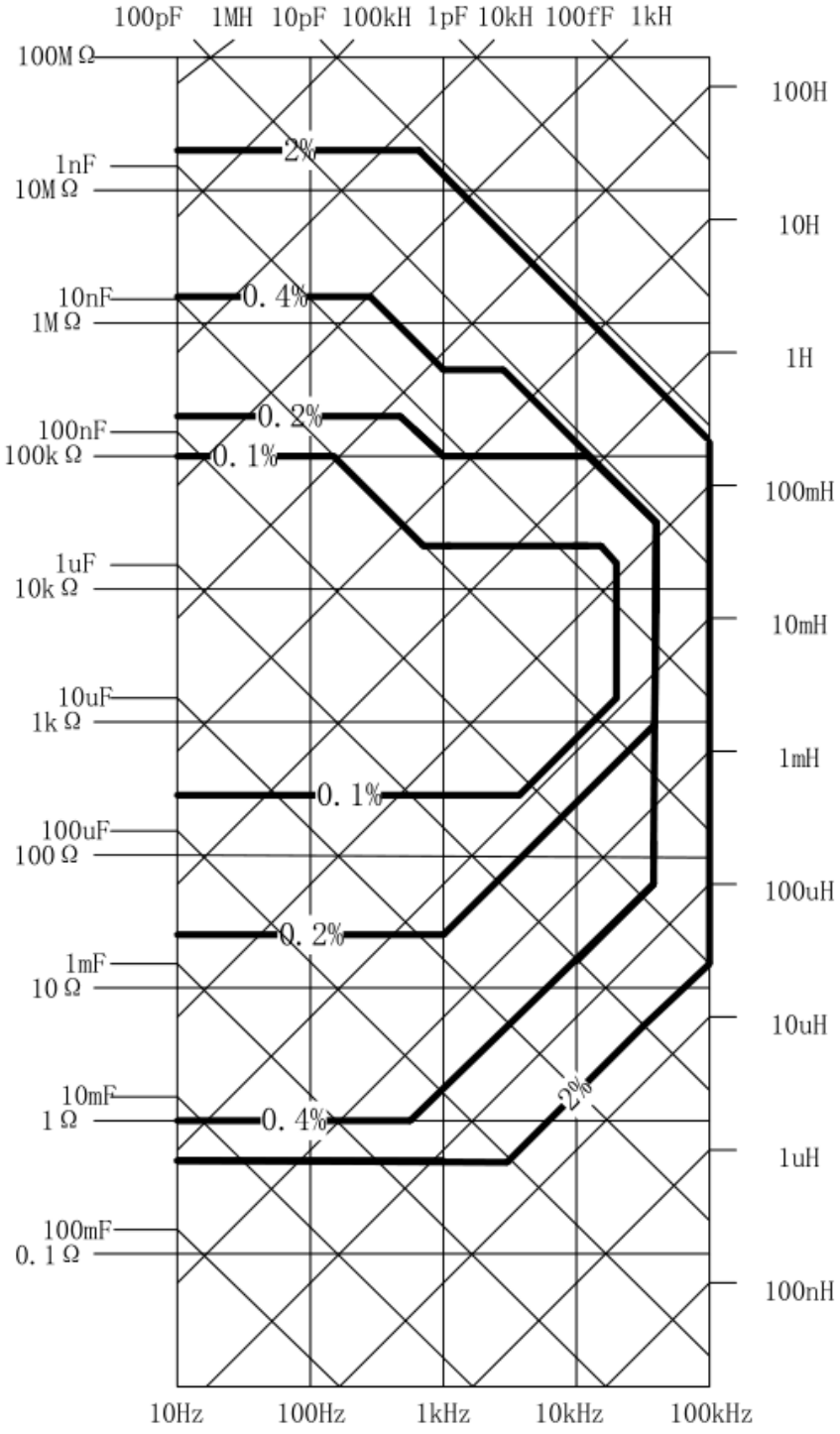

Figure 6.1 Accuracy Graph

Level is 1V, speed mode is Slow

6.2 DCR Accuracy

Table 6.1 Accuracy of DCR

Range	Display Range	Accuracy Re
100MΩ	20.00MΩ~99.99MΩ	10.0%+20 digit
20MΩ	10.00MΩ~20.00MΩ	5.0%+10 digit
10MΩ	1.000kΩ~9.999MΩ	2.0%+5 digit
4MΩ	400.0kΩ~3.9999kΩ	1.2%+3 digit
400kΩ	40.00kΩ~399.99kΩ	0.3%+3 digit
40kΩ	4.000kΩ~39.999kΩ	0.2%+2 digit
4kΩ	400.0Ω~3.9999kΩ	0.1%+2 digit
400Ω	40.00Ω~399.99Ω	0.2%+2 digit
40Ω	4.000Ω~39.999Ω	0.3%+3 digit
4Ω	0.400Ω~3.999Ω	1.0%+5 digit
0.4Ω	0.0000Ω~0.3999Ω	3.0%+10 digit

6.3 Technical Specification

Table 6.2 Technical specification

Test signal frequency	100Hz-100kHz continuously adjustable，1Hz steps	
Display digits	Main Parameter: 5 digits, Second Parameter: 5 digits	
Test Parameter	Main： R/C/ L/Z； Secondary：X/D/Q/θ/ESR	
Parameter display range	R	0.0001Ω - 99.99MΩ
	C	0.001pF – 9999μF
	L	0.001μH - 9999H

Basic accuracy	0.1%
Display speed	Slow: 2 times/second； Middle: 5 times/second; Fast: 10 times/second;
AC test signal level (Vrms)	100 - 2000mV continuously adjustable, 1mV steps
DC bias voltage	0 - 1500mV adjustable, 1mV steps
Range mode	Auto, Optional special range
Signal source output impedance	Selectable 30Ω, 100Ω, ±1%
Correction	Open, Short
Equivalent circuit	Serial, Parallel
Trigger mode	Auto, Bus, EXT
Save/Recall	Setting parameters can be saved internally with 6 sets of positions, which can be recalled by user.
DCR display range	0.0001Ω ~ 99.99MΩ
Comparator function	Tolerance range：-100% ~ +100%; 5 bins (BIN:1, BIN:2, BIN:3, BIN:OUT, BIN:AUX)
Interface	USB HOST, USB DEVICE, LAN, RS232/485, Handler
Language	Chinese, English
LCD display	Backlight brightness adjustable
Other function	Electrolytic Capacitor Test Mode，Keyboard Lock Function
Operating Environment	0℃-40℃, 15%-85%RH.
Dimensions	Including the sheath: 308*231.5*109.5mm（L*W*H） Not including the sheath: 263.6*213.6*88.6mm（L*W*H）

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