LCR Handheld Bridge
Instruction for Use

Contents

1. Safety

These security measures are applicable to the operation and maintenance personnel who should pay attention to them during service and maintenance.

- ***Do not use in explosive environments***

Avoid using it in dusty environment, in direct sunlight, in environment with high humidity or strong electromagnetic radiation or other harsh environments.

- ***Non-professional maintenance personnel should not open the back cover***

Maintenance, replacement of components or adjustment of the instrument should be done by professional maintenance personnel. Please contact the dealer and the service department of SHENZHEN YISHENG VICTOR TECHNOLOGIES CO.,LTD.

- ***Do not arbitrarily break down or modify the instrument***

Partial replacement or unauthorized modification may prevent the instrument from recovering its performance

- ***Security warning***

One should abide by the relevant terms in the manual regarding safety or injury to human body or damages to the product, as well as operation or environment which may result in test failure.

2. Instruction on safety

To allow safe use of equipment, follow these guidelines:

- The instrument is suitable for indoor use and an altitude of less than 2,000 meters. In case of short-term outdoor use, prevent it from direct sunlight, water, electromagnetic radiation, dust, etc.
- Before the use, please read and understand the warning and safety information mentioned in this manual.
- Use the instrument according to the function specified in the manual.
- If the component needs measurement, make sure the circuit is turned off and all capacitors in the circuit are discharged before the measurement.
- Before the measurement, components such as capacitors shall be discharged.
- The lithium battery of 5V and 2600mAh, or mini_USB is used to provide power for the instrument. It can be charged with mini_USB.

Safety Symbols

 Security warning to remind the user to following the instruction in the manual

Environmental conditions

Working environment: 0 ℃ ~ 40 ℃;

Humidity: 15% to 85% R.H;

Storage temperature: 0 ℃ ~ 40 ℃;

Pollution degree: 2;

3. Introduction

This LCR Meter handheld LCR is a portable hand-held measuring instrument for measuring the parameters of inductors, capacitors, resistors and other components. It is small with a 5V lithium battery, suitable for table-type application. It is also portable and mobile.。

This LCR Meter provides a resolution of four and a half digits for main parameters and a resolution of 0.0001 for secondary parameter. Its highest measurement frequency is 100kHz, and can measure the level of 0.6Vrms, and 0.3Vrms. Its automatic range can display the results in the fast, medium, or slow mode. It can automatically select the appropriate measurement parameters according to the characteristics of the component. Its measurement accuracy can reach 0.2%. It combines the convenience of a handheld instrument and good performance of a table-type one.

The operation is simple, and users can see the test frequency, parameters, and speed by pressing the corresponding key; it also has the recording mode to take readings; the convenient operation of open and short circuit correction function helps improve the measurement accuracy. The buzzer, automatic power off and languages can be set on the configuration menu

The standard instrument is equipped with remote communication function. The remote control and data acquisition are achieved by connecting it to the PC through Mini-USB cable.

4. Overview of front panel

Figure 1 Front panel

4.1. Front panel

The front panel is described below, See figure 1 (Note: the long press in the manual indicates to press and hold the key for more than 2 seconds. There is the short press and long press for the multifunction key, but only short press for other keys)

1 Display 2.8" TFT LCD screen, which displays all functions of the instrument.

2 Data holding recording multifunctional key short press to turn on or off the data holding function; long press to turn on or off the data recording function.

3 Power key long press it to turn on or off the instrument;

4 Main parameter shortcut key to switch the main parameters quickly.

5 Relative and correction multifunctional key short press to turn on or off the relative function, long press to turn on the correction function.

6 Secondary parameter shortcut key to quickly switch the secondary parameters.

7 Frequency shortcut key to quickly switch the fixed Frequency points.

8 Level shortcut key to quickly switch the fixed-point level.

9 Bias voltage and electrolytic capacitance mode multifunctional key short press to enter the electrolytic capacitance mode; long press to quickly select bias voltage.

10 Equivalent shortcut key to quickly switch equivalents.

11 Interface switch key to quickly switch between "measurement display" and "System Settings".

12 Comparator switch and tolerance limits shortcut multifunctional key short press to quickly switch deviation tolerance limit; long press to turn on or off the

comparator.

13 Measuring speed shortcut key to quickly switch the required measurement speed.

14 Range shortcut key to quickly switch the required range.

15 Arrow keys *left and right arrow keys* to control the movement of the cursor; up and down arrow keys to select the parameter.

16 Enter key to confirm the selection of a certain parameter or function.

17 5-terminal test notch

18 3-terminal test jack

Note: please see the label on the adapter for its input parameters; use the supplied adapter, or purchase the specified power adapter from our company. The use of other adapters may cause unnecessary damage.

Reminder: after the external power supply is normal, the internal battery power supply circuit will be automatically cut off and charge the battery, This LCR Meter have an independent charging management controller—even when the instrument is turned off, the charging control still works normally.

4.2. User's interface

4.2.1. Measurement interface

Figure 2 Measurement interface

1 Page title used to identify the page displayed.

2 Measurement parameter settings

3 Main parameter display "*" indicates the data holding state.

4 Secondary parameter display

5 Status Bar "USB": USB connection, displayed when it is connected to the PC and hidden at any other time;

"Main Parameter Auto": the main parameters are displayed in automatic mode and hidden at any other time;

"Slow": measurement speed display;

The icon of the battery indicates the remaining power to remind the user of charging the instrument.

6 Comparator display shows the deviation percentage of the value of the tested component to the nominal value, the green and P represent that it is within the set tolerance, and red and F indicate that it exceeds the set tolerance. The bar is closed when the comparator is turned off.

4.2.2. System settings interface

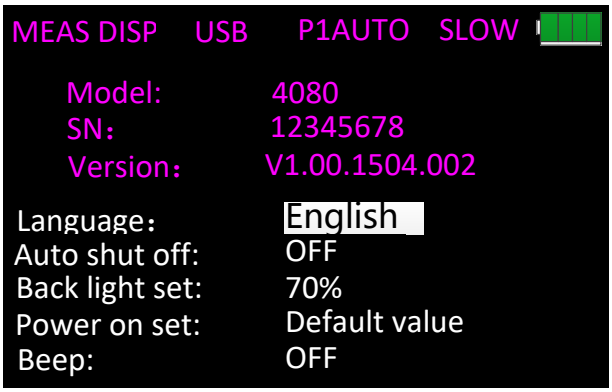

Figure 3 system settings interface

On the system settings interface users can view the product model, serial number and version number. The language, automatic power-off, brightness, power-on, and buzzer can be set.

4.3. Test port

This LCR Meteruses the 3- and 5-terminal test ports at the same time, which is to combine convenience and high accuracy for the test. See figure 4 for the test terminal.

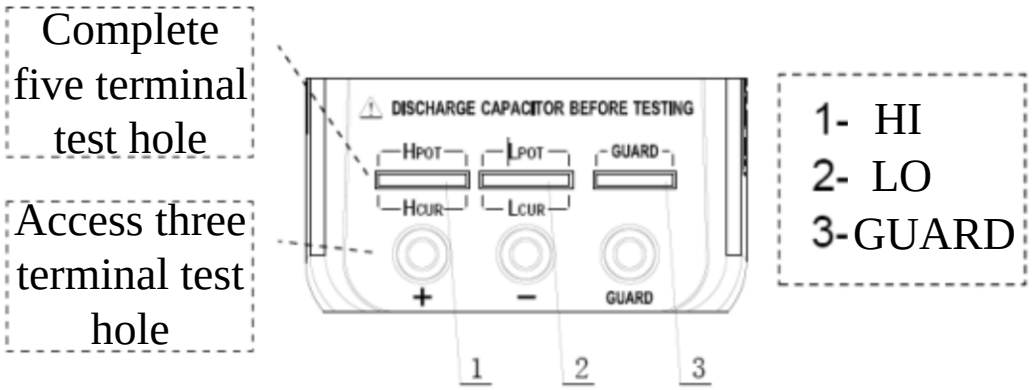

Figure 4 Test port

The three-terminal test port of the instrument uses the standard rubber jack; therefore

the inexpensive rubber plug - alligator clip can be used as the test line. It is very convenient to apply the extended test, but it has the drawback of low testing accuracy.

To improve the accuracy of the test line when using the extension line, This LCR Meter is also equipped with the five-terminal test notch for dedicated test fixture. It renders possible the complete four-terminal measurement of the extension line, so as to ensure the high testing accuracy.

5. Operation instruction

5.1. Startup and shutdown

Long press the power key to start the instrument and the measurement interface is shown (default); press and hold the key (for more than 2 seconds) to turn off the instrument.

5.2. Selection of parameter

5.2.1. Selection of frequency

handheld LCR applies AC test signal to the DUT for measurement. Frequency is one of the main parameters of the AC source. Due to the presence of the non-ideal and distributed parameters of elements, and the impact of the distributed parameters between the test end, the same element may have different results with different test frequencies. Therefore, before the measurement the appropriate frequency should be selected.

There are two ways to change the test frequency:

Method One: press FREQ to switch between different frequencies.

Method Two: Press the right and left arrow keys to select frequency on the interface as shown in figure 5, and press the up and down arrow keys to switch frequencies.

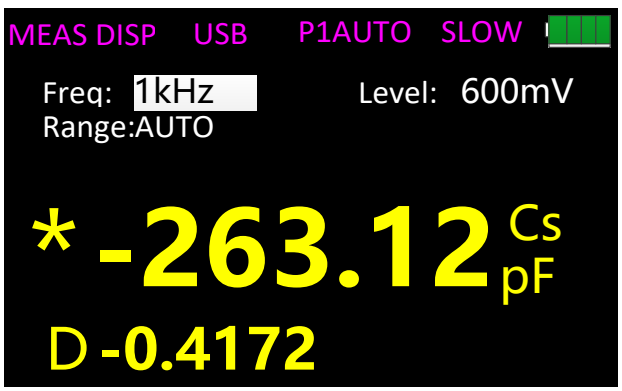

Figure 5

5.2.2. Selection of level

This LCR Meter handheld LCR applies AC test signal to the DUT for measurement. Both the frequency and signal level can be changed.

There are two ways to change the test signal level:

Method One: press LEVEL to switch between different test signals.

Method Two: Press the right and left arrow keys to select level on the interface as shown in figure 6, and press the up and down arrow keys to switch levels.

Figure 6

5.2.3. Selection of range

There are two ways to change the range:

Method One: turn on the instrument and the measurement display is shown, press the left and right arrow keys to move the cursor to the range, and the up and down arrow keys to switch the range (AUTO, 100Ω, 1kΩ, 10kΩ, 100kΩ).

Method Two: Press RANGE to switch directly to the next range, move the cursor to the range at the same time.

5.2.4. Selection of measurement speed

Turn on the instrument and the measurement display is shown, press SPEED to switch to the next measurement speed (fast, medium, slow). Above the status bar the corresponding measurement speed is displayed. Fast (4 times / s), the speed (2 times / s), Slow (1 time / s).

5.2.5. Selection of L/C/R/Z main parameters

Select the type of measurement parameter, and first select the main parameter.

Press AUTO/R/C/L/Z to switch between the following main parameters in sequence:

R (resistance), C (capacitance), L (inductance), Z (impedance) and AUTO (automatic).

When AUTO is selected for the main parameter, "Automatic Main Parameter" is displayed above the status bar.

5.2.6. Selection of X/D/Q/θ/ESR secondary parameters

If necessary, press the secondary parameter key to select secondary parameter.

Press X/D/Q/θ/ESR to select the following secondary parameters:

D (loss), Q (quality factor), θ (phase angle), ESR (equivalent series resistance), X (reactance).

5.2.7. Selection of nominal

The method of setting the nominal is as follows:

1. Turn on the instrument and the measurement display is shown, the element with required nominal should be placed on the test clip of the instrument.

2. Press TOL% to turn on the comparator, and the nominal value is the value of the measured element with one digit after the decimal point, but it cannot be less than the minimum unit (for example, if the measured element is 1.0694kΩ , then the nominal is 1kΩ; for example, if the measured element is 330.92Ω, then the nominal is 330Ω).

3. If the nominal value is not the required one, use the left and right arrow keys to move the cursor to the nominal, press ENTER to enter the interface for changing the nominal value.

5.2.8. Selection of equivalent

Due to the non-ideal and distributed parameters of elements, the actual elements tend to be equivalent with the combination of ideal elements. LCR tester generally uses two simple equivalent models—series and parallel. Selecting the proper equivalent model will lead to better measurement results. In general, low-impedance elements (such as that below 100Ω) should use the series equivalent model; a high impedance element (such as that above 10kΩ) should use the parallel equivalent model; the equivalent model affects less the measurement result of the one in between the two above models. Press AUTO/SER/PAL to switch to the next equivalent (SER, PAL).

5.3. Relative mode

Short press ▲NULL to turn on the relative function and the current value is used as reference. The reference value and relative value will be shown respectively on the secondary and main display.

5.4. Reading hold mode (HOLD)

The data hold function is used to freeze the displayed data. The measurement is still in progress, but the data on the LCD is not updated as the measurements proceed.

Turn on reading hold:

To turn on the reading hold function, press the HOLD key, and "*" will be shown on the LCD to indicate that the data hold function is activated. And measurement results for the main and secondary parameters are those displayed before pressing the HOLD key.

Turn off reading hold:

To turn off the reading hold function, press again the HOLD key, and "*" disappears from the LCD; the instrument returns to normal measurement mode.

5.5. Data recording function (maximum, minimum, average)

If the measurement data of the DUT see poor stability and fluctuate within a certain range, use the data recording mode to acquire the readings. In the data recording mode, the maximum, minimum and average can be dynamically obtained within a certain range.

Turn on the recording function:

Long press HOLD to turn on the data recording function, and the recorded value is shown on the secondary display, and at this moment the HOLD function is not available, short press HOLD to select the display of the maximum, minimum, or average.

Turn off the recording function:

Long press HOLD to turn off the data recording function.

Reminder: After changing the type of the measurement parameter, it will automatically exit from the data recording function.

5.6. Correction function

The correction function applies to the open and short circuit. By correcting it can effectively reduce the error of distributed parameters caused by the test line. The short circuit correction can reduce the impact of the contact resistance and lead resistance on the measurement of low impedance element; and the open circuit correction can reduce the impact of the distributed capacitance and resistance between the two ends of the test line on the measurement of high impedance element.

The method of correction is shown as follows:

1. Before entering the correction function, please ensure that the test terminals are open- or short-circuited. Press ▲NULL to enter the correction interface, then the instrument automatically identify whether it is open or short circuit as shown in Figure 7;

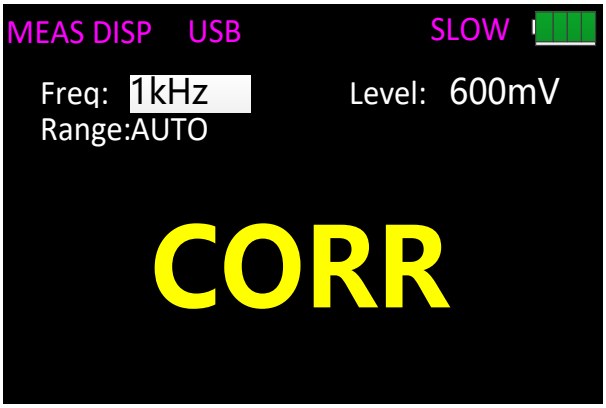

Figure 7

2. Short press ▲NULL for open (OPEN) or short (SHORT) circuit correction and the interface is shown as in Figure 8. If the correction is successful, the secondary display shows "SUCESS"; or it shows "FAILED".

Note: Do not change the state of the test terminals during the correction.

3. After the correction ends, short press ▲NULL to return to the measurement display.

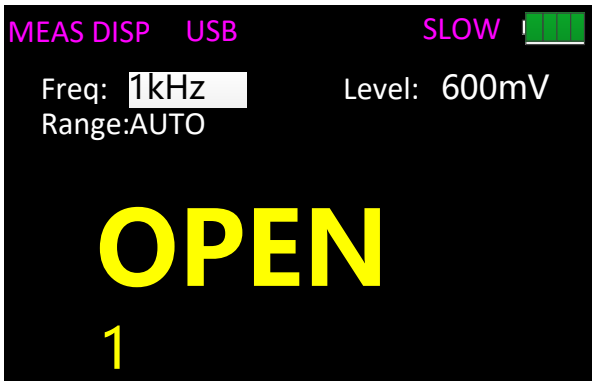

Figure 8

6. Rapid application guide

Warning:

- **Do not measure the charged capacitor, or it may cause damage to the instrument.**
- **In case of measurement of on-board devices, make sure the power is turned off. The active circuit cannot be measured directly.**
- **When used in the dusty environment, the instrument is easy to gather dirt, so it should be cleaned periodically to protect the test port to prevent the dust from entering the instrument. The accumulation of dust will be conductive and affect the use of the instrument.**
- **Do not place the instrument directly in the environments with**

explosives, direct sunlight and excessive heat.

Reminder: To achieve the proper measurement accuracy, refer to the "correction function" section for open and short circuit correction before the measurement. The test fixture can be rubber plug - alligator clip (see figure 9), Kelvin test fixture (figure 10), or the component can be directly inserted into the position 17 in figure 1 (notch). The rubber plug - alligator clips are mainly used in the following examples.

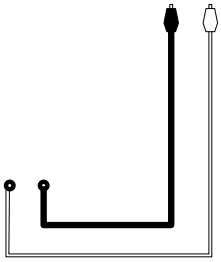

Figure 9

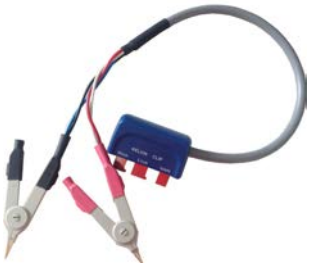

Figure 10

6.1. Resistance measurement

See figure 11 for the connection test.

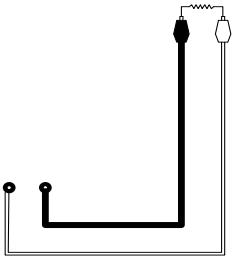

Figure 11

1. Long press the power key to start the instrument;
2. Press the AUTO/R/C/L/Z key until Rs is displayed on the interface which means to select resistance measurement, shown in figure 12;

Figure 12

3. Insert the resistor into the test notch, or choose the appropriate test accessories (rubber plug - alligator clip, Kelvin test fixture, etc.) and connect it with the measured resistance;
4. Press the FREQ key to select the desired test frequency, press LEVEL to select the

desired level;
5. To select another secondary parameter, press X/D/Q/θ/ESR
6. Read the measurement results from the screen.

Reminder: the AC signal is used by the instrument to measure the resistance, so the test result reflects the AC resistance characteristics of the instrument instead of its DC resistance.

6.2. Capacitance measurement

Warning: Make sure that the capacitor has been fully discharged before measuring.

See figure 13 for the connection test.

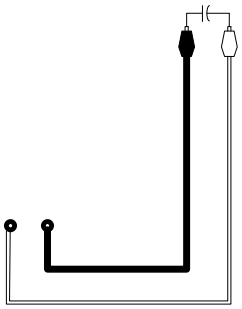

Figure 13

1. Long press the power key to start the instrument;
2. Press the AUTO/R/C/L/Z key until Cs is displayed on the interface which means to select capacitance measurement, shown in figure 14;

Figure 14

3. Insert the capacitor into the test notch, or choose the appropriate test accessories (rubber plug - alligator clip, Kelvin test fixture, etc.) and connect it with the measured capacitor;
4. Press the FREQ key to select the desired test frequency, press LEVEL to select the desired level;
5. To select another secondary parameter, press X/D/Q/θ/ESR
6. Read the measurement results from the screen.

Note: the capacitor or capacitive device must be fully discharged

before the test; the capacitor with large capacity may need longer time to discharge. If the capacitive device not fully discharged is connected, it can damage the components inside the instrument.

6.3. Inductance measurement

See figure 15for the connection test.

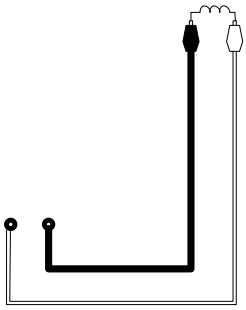

Figure 15

1. Long press the power key to start the instrument;
2. Press the AUTO/R/C/L/Z key until Ls is displayed on the interface which means to select inductance measurement, shown in figure 16;

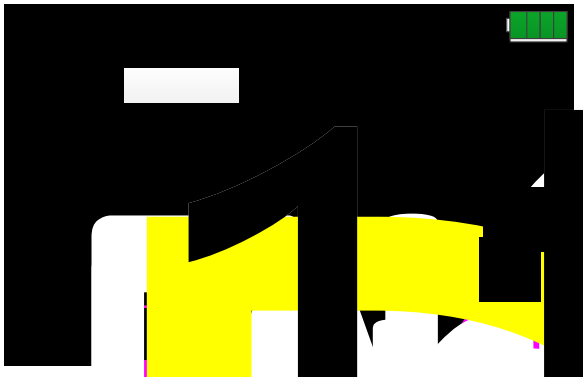

Figure 16

3. Insert the inductor into the test notch, or choose the appropriate test accessories (rubber plug - alligator clip, Kelvin test fixture, etc.) and connect it with the measured inductor;
4. Press the FREQ key to select the desired test frequency, press LEVEL to select the desired level;
5. To select another secondary parameter, press X/D/Q/θ/ESR
6. Read the measurement results from the screen.

6.4. Impedance measurement

1. Long press the power key to start the instrument;
2. Press the AUTO/R/C/L/Z key until Zs is displayed on the interface which means to select impedance measurement, shown in figure 17;

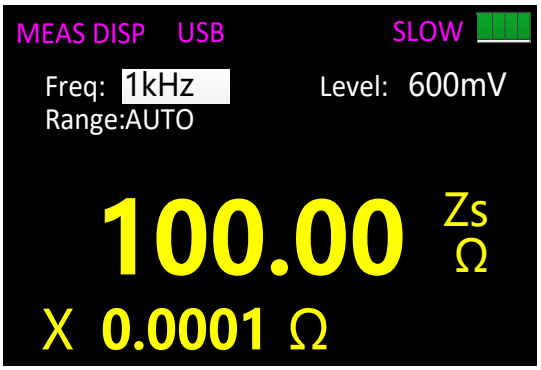

Figure 17

3. Insert the impeder into the test notch, or choose the appropriate test accessories (rubber plug - alligator clip, Kelvin test fixture, etc.) and connect it with the measured impeder;
4. Press the FREQ key to select the desired test frequency, press LEVEL to select the desired level;
5. To select another secondary parameter, press X/D/Q/θ/ESR
6. Read the measurement results from the screen.

7. Telecommunication

The instrument can be connected to PC through the Mini-USB interface. After installing the driver on the PC, This LCR Meter handheld LCR can be controlled from or the test results acquired by the PC through the virtual serial port.

Connect the instrument to the PC:

1. Locate the USB driver software in the CD.

2. Use the Mini-USB cable to connect the instrument to the USB port of the PC, shown in Figure 18, press and hold the power key to start the instrument.

3. Install the USB drive;

4. After the installation is completed, check the serial number in Windows' Device Manager.

Figure 18

- Flow Control：None

Configuration of virtual serial port:

- This LCR Meter employ the serial communication parameters with variable Baud rates:
- □ Baud rate: 9600 or others;
- □ Data bits: 8
- □ Check: None
- □ Stop bit: 1
- □ Flow Control: None

Remote Control State:

When the This LCR Meter receives the remote operation state instruction from the host, the instrument automatically enters into the remote control state. "RMT" is displayed on the LCD screen to show the entry into the remote control state. To exit the remote control state, send the “SYSTem: LOCal” command.

Command Protocol:

This LCR Meter handheld LCR uses SCPI command set to transfer control command and return query information and data with string. The terminator specified by the protocal shows the end of a command line or information enquiry line.

Using SCPI command set enables the interaction control of PC over the instrument by programming. The command format meets the standard which is easy to understand and use.

Public command: the command applied universally to various kinds of instrument defined by the public command IEEE488, the public command starts with *,This LCR Meter supports only * IDN?

Terminator: the command line sent from the PC to the instrument must end with the specified terminator. Only after the instrument receives the terminator will it analyze and process the command string. The terminator is 0x0a.

Query return format: when the instrument responds to a query command, it will return the search results: <Result> + <NL>; Result is the results, NL the carriage return.

Data type: the data in the form of ASCII characters transmitted on the bus may have the following types

Type	Meaning	Example
<NR1>	Integer	+ 800, -200,100, -50
<NR2>	Decimal	+ 1.56 -0.001,10.5
<NR3>	Exponential floating number	+ 2.345678E + 04 -1.345678E-01
<NRf>		NR1 NR2 NR3
<NL>	Enter	an integer of 10

Conventions for marks: These marks are part of the command which is in line with the rules of grammar:

Rules of grammar	Definition
:	Colon, enter the next level of the command
;	Semicolon, the same level of command
*	Asterisk, public command
,	Comma, multi-parameter separator
?	Question mark indicates the query
Spacing, separating commands and parameters	
“ ”	Quotes for quoted part

These marks are added in order to specify the command format, but are not part of the command

Marks	Definition
[ ]	The optional command parameters are given in the square brackets
|	Division mark—to select one from many
< >	The definition of the variable parameter is given or the variable parameters listed in the angle brackets
( )	Interpretation which is not seen in the

actual command

Abbreviations and capitalization:

- The command has full format and abbreviated format, in the following descriptions of the command, capitalization represents abbreviation, and the abbreviated command has the same effect with the complete command;
- Abbreviations are generally expressed by four letters of the complete command, the random abbreviation which does not appear in the command table will be considered as the wrong command;
- There is no difference regarding capitalization for ASCII command actually transmitted on the bus and the letters of parameter.
-

Reference: Refer to the communication protocol of This LCR Meter for specific commands.

8. Instrument parameters

ere are the general indicators and measurement accuracy indicators for This LCR Meter,**which apply to the** This LCR Meter。

8.1. General parameters

Measurement parameters	Main parameter：L/C/R/Z Secondary parameter：X/D/Q/θ/ESR
Equivalent mode	Series, parallel
Mode of range	Manual, automatic
Measurement speed	Fast（4 times/s）, medium（2 times /s）, slow（1 times /s）
Configuration of the test terminal	3-terminal, 5-terminal
Correction function	Short circuit, Open circuit
Communication interface	Mini-USB（virtual serial port）

8.2. Accuracy indicator

Notes:

- ***Ambient temperature: 20 ℃±2℃; Humidity: ≤80% R.H;***

- ***Preheat the instrument for at least 30 minutes before the test;***
- ***Test at the test notch on the end face of the instrument;***
- ***It is better to conduct open and short circuit correction before the test;***
- ***Measure with the recommended equivalent mode;***
- ***The percentage in terms of error indicates:***
- ***± (% of the reading + last digit)***
- ***If the actual measurement of the instrument and the display exceeds the scope specified in the table, the accuracy of the excessive part will not be given;***
- ***□ The meaning of the subscript***
- ***S- series equivalent; p- parallel equivalent; e- accuracy***
- ***Some parameters cannot be given in the data table, and it can only be calculated based on the measurement results;***

8.2.1. Accuracy indicator

Capacitance C and loss D

- **100Hz/120Hz**

Range	Range of display	Accuracy Ce	Accuracy De	Equivalent mode recommended
20mF	4.000mF~20.000mF	8.00%+5 digits	0.0800	Series
4mF	400.0μF~3.9999mF	2.00%+3 digits	0.0200	Series
400μF	40.00μF~399.99μF	0.60%+2 digits	0.0060	Series
40μF	4.000μF~39.999μF	0.40%+2 digits	0.0040	Series
4μF	400.0nF~3.9999μF	0.40%+2 digits	0.0040	----
400nF	40.00nF~399.99nF	0.4%+2 digits	0.0040	Parallel
40nF	4.000nF~39.999nF	0.5%+3 digits	0.0050	Parallel
4nF	0pF~3.999nF	1.5%+5 digits	------	Parallel

- **1kHz**

Range	Range of display	Accuracy Ce	Accuracy De	Equivalent mode recommended
1000uF	400.0uF~999.9uF	3.00%+5 digits	0.0300	Series
400μF	40.00μF~399.99μF	1.50%+3 digits	0.0150	Series
40μF	4.000μF~39.999μF	0.60%+2 digits	0.0060	Series
4μF	400.0nF~3.9999μF	0.40%+2 digits	0.0040	----

400nF	40.00nF~399.99nF	0.4%+2 digits	0.0040	Parallel
40nF	4.000nF~39.999nF	0.6%+3 digits	0.0060	Parallel
4nF	400.0pF~3.9999nF	0.6%+3 digits	0.0060	Parallel
400pF	0.0pF~399.9pF	3%+5 digits	------	

- **10kHz**

Range	Range of display	Accuracy Ce	Accuracy De	Equivalent mode recommended
100μF	40.00μF~100.00μF	4.00%+5 digits	0.0400	Series
40μF	4.000μF~39.999μF	2.0%+3 digits	0.0200	Series
4μF	400.0nF~3.9999μF	0.60%+2 digits	0.0060	Series
400nF	40.00nF~399.99nF	0.4%+2 digits	0.0040	Series
40nF	4.000nF~39.999nF	0.4%+2 digits	0.0040	------
4nF	400.0pF~3.9999nF	0.4%+2 digits	0.0040	Parallel
400pF	40.00pF~399.99pF	0.6%+3 digits	0.0060	Parallel
40pF	0.00pF~39.99pF	2.5%+5 digits	------	Parallel

- **40kHz**

Range	Range of display	Accuracy Ce	Accuracy De	Equivalent mode recommended
100μF	40.00μF~100.00μF	6.00%+5 digits	0.0600	Series
40μF	4.000μF~39.999μF	4.0%+3 digits	0.0400	Series
4μF	400.0nF~3.9999μF	1.0%+2 digits	0.0100	Series
400nF	40.00nF~399.99nF	0.6%+2 digits	0.0060	Series
40nF	4.000nF~39.999nF	0.6%+2 digits	0.0060	------
4nF	400.0pF~3.9999nF	0.6%+2 digits	0.0060	Parallel
400pF	40.00pF~399.99pF	1%+3 digits	0.0100	Parallel
40pF	0.000pF~39.999pF	3%+5 digits	------	Parallel

- **100kHz**

Range	Range of display	Accuracy Ce	Accuracy De	Equivalent mode recommended
10μF	4.000μF~10.000μF	8.0%+20 digits	0.0800	Series
4μF	400.0nF~3.9999μF	5.0%+10 digits	0.050	Series
400nF	40.00nF~399.99nF	1.5%+5 digits	0.0150	Series
40nF	4.000nF~39.999nF	1%+2 digits	0.0100	Series
4nF	400.0pF~3.999nF	1%+2 digits	0.0100	------

400pF	40.00pF~399.99pF	1.5%+2 digits	0.0150	Parallel
40pF	4.000pF~39.999pF	2%+5 digits	0.0200	Parallel
4pF	0.000pF~3.999pF	5%+10 digits	------	Parallel

Inductance L and quality factor

➢ 100Hz/120Hz

Range	Range of display	Accuracy Le	Accuracy De*	Equivalent mode recommended
1000H	400.0H~999.9H	2.00%+3 digits	0.0200	Parallel
400H	40.000H~399.99H	0.60%+2 digits	0.0060	Parallel
40H	4.000H~39.999H	0.40%+2 digits	0.0040	Parallel
4H	400.0mH~3.9999H	0.40%+2 digits	0.0040	----
400mH	40.00mH~399.99mH	0.4%+2 digits	0.0040	Series
40mH	4.000mH~39.999mH	0.6%+3 digits	0.0060	Series
4mH	0uH~3.999mH	3.0%+5 digits	------	Series

1kHz

Range	Range of display	Accuracy Le	Accuracy De*	Equivalent mode recommended
100H	40.00H~100.00H	2.0%+3 digits	0.0200	Parallel
40H	4.000H~39.999H	0.60%+2 digits	0.0060	Parallel
4H	400.0mH~3.9999H	0.40%+2 digits	0.0040	Parallel
400mH	40.00mH~399.99mH	0.4%+2 digits	0.0040	------
40mH	4.000mH~39.999mH	0.4%+2 digits	0.0040	Series
4mH	400.0uH~3.9999mH	1%+3 digits	0.0100	Series
400uH	0.0uH~399.9uH	3.0%+5 digits	------	Series

10kHz

Range	Range of display	Accuracy Le	Accuracy De*	Equivalent mode recommended
1H	400.0mH~999.9mH	1.50%+3 digits	0.0150	Parallel
400mH	40.00mH~399.99mH	0.4%+2 digits	0.0040	Parallel
40mH	4.000mH~39.999mH	0.4%+2 digits	0.0040	------
4mH	400.0uH~3.9999mH	0.4%+2 digits	0.0040	Series
400uH	40.00uH~399.99uH	0.8%+3 digits	0.0080	Series
40uH	0.00uH~39.99uH	3.0%+5 digits	------	Series

➢ 40kHz

Range	Range of display	Accuracy Le	Accuracy De*	Equivalent mode recommended
1H	400.0mH~999.9mH	2.0%+4 digits	0.0200	Parallel
400mH	40.00mH~399.99mH	0.8%+2 digits	0.0080	Parallel
40mH	4.000mH~39.999mH	0.8%+2 digits	0.0080	------
4mH	400.0uH~3.9999mH	0.8%+2 digits	0.0080	Series
400uH	40.00uH~399.99uH	1.5%+3 digits	0.0150	Series
40uH	0.000uH~39.999uH	4.0%+5 digits	------	Series

Note*: please calculate the quality factor according to the formula to calculate the accuracy of Q.

➢ 100kHz

Range	Range of display	Accuracy Le	Accuracy De	Equivalent mode recommended
100mH	40.00mH 399.99mH	2.5%+2 digits	0.0250	Parallel
40mH	4.000mH 39.999mH	1.5%+2 digits	0.0150	Parallel
4mH	400.0uH 3.9999mH	1.0%+2 digits	0.0100	------
400uH	40.00uH~399.99uH	1.0%+2 digits	0.0100	Series
40uH	4.000uH~39.999uH	1.5%+5 digits	0.0150	Series
4uH	0.000uH~3.999uH	4%+10 digits	------	Series

Impedance Z and phase angle θ

➢ 100Hz, 120Hz, 1kHz, 10kHz

Range	Range of display	Accuracy Ze	Accuracy θ_e	Equivalent mode recommended
20MΩ	4.000MΩ~20.000MΩ	3.0%+10 digits	3.4°	Parallel
4MΩ	400.0kΩ~3.9999MΩ	1.2%+3 digits	0.7°	Parallel
400kΩ	40.00kΩ~399.99kΩ	0.3%+3 digits	0.2°	Parallel
40kΩ	4.000kΩ~39.999kΩ	0.25%+2 digits	0.1°	------
4kΩ	400.0Ω~3.9999kΩ	0.25%+2 digits	0.1°	Series
400Ω	40.00Ω~399.99Ω	0.25%+2 digits	0.1°	Series
40Ω	4.000Ω~39.999Ω	0.5%+3 digits	0.3°	Series
4Ω	0.4000Ω~3.9999Ω	2.0%+3 digits	1.1°	Series
0.4Ω	0.0000Ω~0.3999Ω	4.0%+3 digits	------	Series

➢ 40kHz

Range	Range of display	Accuracy Ze	Accuracy θ_e	Equivalent mode recommended
20MΩ	4.000MΩ~20.000MΩ	7.0%+41 digits	4.0°	Parallel
4MΩ	400.0kΩ~3.9999MΩ	2.5%+3 digits	1.4°	Parallel
400kΩ	40.00kΩ~399.99kΩ	1.0%+4 digits	0.6°	Parallel
40kΩ	4.000kΩ~39.999kΩ	1.0%+4 digits	0.6°	------
4kΩ	400.0Ω~3.9999kΩ	0.5%+3 digits	0.3°	Series
400Ω	40.00Ω~399.99Ω	0.5%+3 digits	0.3°	Series
40Ω	4.000Ω~39.999Ω	0.7%+4 digits	0.4°	Series
4Ω	0.4000Ω~3.9999Ω	2.0%+6 digits	1.1°	Series
0.4Ω	0.0000Ω~0.3999Ω	5.0%+10 digits	------	Series

- **100kHz**

Range	Range of display	Accuracy Ze	Accuracy θ_e	Equivalent mode recommended
20MΩ	4.000MΩ~20.000MΩ	9.0%+20 digits	5.2°	Parallel
4MΩ	400.0kΩ~3.9999MΩ	4.0%+10 digits	2.3°	Parallel
400kΩ	40.00kΩ~399.99kΩ	1.5%+4 digits	0.9°	Parallel
40kΩ	4.000kΩ~39.999kΩ	1.0%+2 digits	0.6°	Parallel
4kΩ	400.0Ω~3.9999kΩ	0.7%+2 digits	0.4°	------
400Ω	40.00Ω~399.99Ω	0.7%+2 digits	0.4°	Series
40Ω	4.000Ω~39.999Ω	1.0%+5 digits	0.6°	Series
4Ω	0.4000Ω~3.9999Ω	3.0%+10 digits	1.7°	Series
0.4Ω	0.0000Ω~0.3999Ω	7%+20 digits	------	Series

9. Maintenance

Warning: Do not arbitrarily repair the instrument; it should be maintained and repaired by professionals.
Warning: keep the instrument away from liquid; do not leave articles especially conductive objects in the instrument.

9.1. Overhaul

If the equipment fails and cannot be switched on, you should first check the battery and external power supply, power jack, etc.; check whether the key is invalid;

If the test result is abnormal, first check if the test accessories have problems, and if there is damage of the spring in the test notch; at the same time review the specification to

confirm if the operation is correct;

Do not arbitrarily replace the components and specific parts, please contact the relevant dealer or service company for problems which cannot be confirmed,.

9.2. Clean

Before cleaning, it must be shut down, the battery and external power supply should be removed.

Prevent water or other liquids from entering the instrument through the test slot, keys, or other joints, if it happens by accident, you should immediately stop using it and remove the power supply and battery.

Please clean with a soft cloth and diluted neutral detergent, and carefully wipe the dirty parts to prevent scratches on the surface.

After cleaning, the instrument should be completely dry before used.

10.Packing list

The packing box of This LCR Meter is equipped according to the following list:

- This LCR Meter handheld LCR (lithium battery installed)
- a guidance manual
- CD
- a Mini-USB communication cable
- an AC power adapter
- a pair of red / black rubber plugs –alligator clip test line
- a short-circuit bar

Please check according to the packing list after the box is opened, if any component is missing, please immediately contact the company or the related dealer.