

## I Overview

LW-2811C-type LCR Digital Bridge is an intelligent parameter test instrument. It base on microprocessor processing technology to automatically measure inductance (L), capacitance(C), impedance(R), dissipation factor (D) and quality factor (Q). This instrument has features of practical function, good performance and convenient operation, which is variously used in factories, colleges, and institutes for accurate measurement of device parameters.

The instrument makes use of advanced measurement principle and the five-side measurement technology and can accurately measure for a long time without special adjustment. In order to ensure accurate measurement of the instrument, please use clear function to clear stray capacitance and lead resistance caused by the test fixture.

## II Notes before use

### 1. Check the power supply voltage

The input voltage of LW-2811C is  $220\text{ V} \pm 10\%$ , 50Hz. Power socket is located in the back of the instrument panel while fuses are located inside of the power socket. If replacing fuses, please take steps as follows

- Use a screwdriver to open the cover of the fuse holder
- Fitted with slow-melting 1A, 25V fuse.
- Close the cover of the fuse holder

**Warning:** In order to avoid lightning strikes, please use a grounded AC power socket

**Warning:** To avoid personal injury, when loading the fuse, please firstly unplug the power cord

### 2. Operating Environment

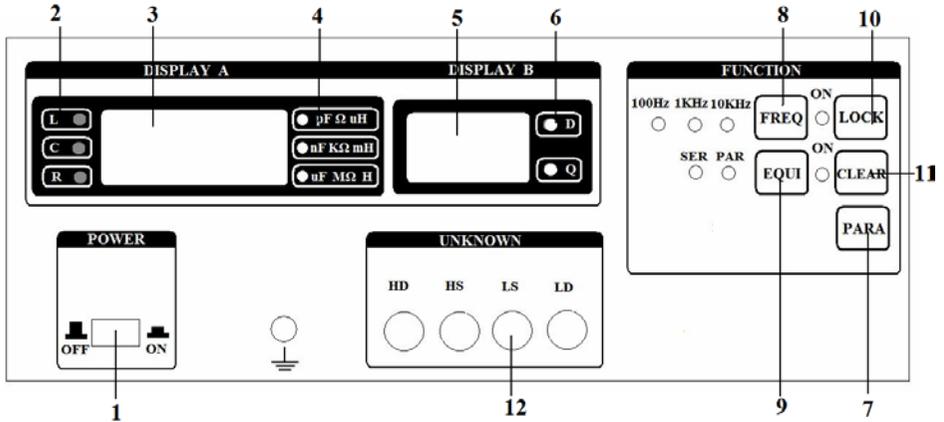
The range of the room temperature for LW-2811C normal operation is  $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$ . If beyond this range may cause equipment failure.

Do not use the instrument under a strong magnetic field environment or a strong electric field, as the results of measurement may be loss of accuracy.

### 3. Installation and operation

Please put LW-2811C in a well-ventilated place to prevent it from damage caused by overheating.

### 4. Keep test fixture or test equipment cables should be kept clean to ensure good contact with the test pieces



1. **power switch:** Control power on or off
2. **Function instructions:** three LED lights, used to indicate the present measurement parameters: L, C, R.
3. **Primary parameter displays:** 5LED lights, used to display the value of the parameters: L, C and R
4. **Primary parameter unit displays:** 3LEDlighes, used to indicate the unit of major parameter displayed currently.
5. **Secondary Parameter displays:** 4LED digital tubes, used to display the value of D or Q
6. **Function instructions:** 2LED lights, used to indicate the Secondary parameter D, Q
7. **Parameter key:** Press the button to select the major parameters, L, C or R
8. **Frequency key:** Press the button to choose the test signal frequency imposed on the measured components, which is indicated by three LED lights.
9. **Equivalent key:** Press the button to select the equivalent circuit when

instruments are tested, there are two kinds of circuits: series and parallel.

10. **Lock key:** When the light on shows that measuring range is locked, which can improve the testing speed when test a bulk of devices. While the light off shows atomically select range.

11. **Clear key:** Light on shows clear operation.

12. **Test terminals: HD HS LS LD test signal terminal**

HD: High Voltage Drive

HS: High Voltage Sampling

LS: Low Voltage Sampling

LD: Low Voltage Drive

### III Use method

1. Insert the power plug and turn panel power switch on. The display window will show the changing figures, otherwise, please restart the equipment.

2. Make the equipment warm up 10 minutes to keep heat balance, and to start the normal test.

3. According to the measured device to select the appropriate test fixture or test cables. Lead of tested pieces should be clean and in good contact with the test terminal.

4. According to the request of tested device to select corresponding test conditions.

(1)Test frequency

Select appropriate frequency in accordance with the test standard or use requirements of the tested device. Pressing the **FREQ** key to make the meter at the specified frequency

LW-2811C: 100Hz 1KHz 10KHz

(2)Measurement parameters

Press the **PARA** button to select the appropriate measurement parameters L, C, R. The parameters selected in the instrument panel are indicated by LED lights.

(3)Equivalent circuit

Press the **EQUI** button to select the appropriate equivalent circuit for measurement. Normally for low-impedance component (usually they are high capacitors and low inductances) should use serial equivalent circuit; as for the high-impedance component (usually they are low capacitors and high inductances) should use parallel equivalent circuit. At the same time, in accordance with the actual use of components to determine what equivalent circuit should be used. Such as for capacitors, series equivalent circuit should be used for power filter, while for LC oscillation should use parallel equivalent circuit.

#### (4) Ways of selecting range

Two range ways: Automatic or lock selected by **LOCK** key.

The equipment has five ranges which determine the different measuring range. When under the automatic test mode, the equipment will automatically select optimal range according to the tested date. At this time, it may take 3 times to complete the final measurement

When under the lock mode, the equipment will not select range. To complete the measurement under the locked range can improve the test speed.

Usually when test a number of the same components should select range lock. Before setting, firstly test device need to insert to test fixtures, then press **LOCK** key after the date stable, then the indication light will on.

#### (5) Clear function

The impure resistance existed in test cable or test fixture, are removed by the equipment to improve the accuracy of the test. The impedance superimpose on the measured device in the forms of series or parallel. Use the clear functions can measure these parameters and store them in the equipment. When measuring component these parameters will automatically disappear so as to ensure the accuracy of measuring instruments.

The clear function has two forms: short circuit clear and open circuit clear. When measuring capacitance, firstly open the circuit of the fixture or cable, then press the **CLEAR** button to turn the light on. When measuring resistance or inductance, use short, thick naked-wire to make the test fixture or test

cables short-circuit, Also press the **CLEAR** button to make the light on.

If need re-clear, firstly press the **CLEAR** button to make the light off, then press the button again to make the light on. Then it finish the clear again.

Power off protection function can ensure that previous clear is still in force when the equipment is restart. If a larger environmental factors change (such as temperature, humidity, Electromagnetic field and so on) it should be re-cleared.

## **IV Maintenance and performance checks**

### **1. Notice before the maintenance**

- (1) If the equipment needs to be maintained, it needs professionals to do that.
- (2) When repairing equipment, Please do not arbitrarily replace standard frequency and resistance devices of the equipment. Part of the above replaced, the equipment has to be recalibrated to avoid affecting test accuracy.
- (3) Results caused by blind maintenance and replacement of equipment component, do not belong to the scope of warranty.

### **2. Performance testing**

- (1) Press any function key, functions can be changed correctly.
- (2) The equipment has checked all the basic circuit under the normal operation. It doesn't need to be re-calibrated as frequency and resistance standard are stable. According to the actual situation, user can inspect roughly the work situation of the equipment by using the follow devices.

## Selecting the follow kinds of Capacitances

Name	Type	Nominal value	Capacitance error	Loss value	Applicable frequency
Mica	CY	100pF	0.1%	<0.0010	10KHz
Mica	CY	1nF	0.1%	<0.0010	1 KHz、10 KHz
Polystyrene	CB	10nF	0.1%	<0.0010	1 KHz、10 KHz
Polystyrene	CB	0.1μF	0.1%	<0.0010	1 KHz、10 KHz
Polypropylene	CBB	1μF	0.1%	<0.0010	100Hz、1 KHz
Polypropylene	CBB	10μF	0.1%	<0.0010	100Hz

The tested results should be the capacity of error <0.30%, loss readings <0.0030.

(3) When changing to another type after one type component tested, if date error is greatly, please switch instrument from lock to auto-range selection state

## V Technological indicators

### 1. Measuring parameters

Inductance: L

Capacitance: C,

Resistance: R,

Quality Factor: Q,

Dissipation Factor: D

### 2. Measuring frequency

LW-2811C:100Hz、1KHz、10KHz ± 0.02%

### 3. Measuring range

Parameters	Frequency	Measuring range
L	100Hz	1 $\mu$ H~9999H
	1KHz	0.1 $\mu$ H~999.9H
	10KHz	0.01 $\mu$ H~99.99H
C	100Hz	1pF~9999 $\mu$ F
	1KHz	0.1pF~999.9 $\mu$ F
	10KHz	0.1pF~99.99 $\mu$ F
R		0.1 $\Omega$ ~99.99M $\Omega$
Q		0.001~9999
D		0.0001~9.999

### 4. Measuring accuracy

Parameters	Frequency	Measuring accuracy
L	100Hz	$\pm [1\mu\text{H}+0.25\%(1+L/200\text{H}+2\text{mH}/L)](1+1/Q)$
	1KHz	$\pm [0.1\mu\text{H}+0.25\%(1+L/200\text{H}+0.2\text{mH}/L)](1+1/Q)$
	10KHz	$\pm [0.01\mu\text{H}+0.5\%(1+L/10\text{H}+0.04\text{mH}/L)](1+1/Q)$
C	100Hz	$\pm [1\text{pF}+0.25\%(1+1000\text{pF}/C_x+C_x/1000\mu\text{F})](1+D_x)$
	1KHz	$\pm [0.1\text{pF}+0.25\%(1+100\text{pF}/C_x+C_x/100\mu\text{F})](1+D_x)$
	10KHz	$\pm [0.01\text{pF}+0.5\%(1+20\text{pF}/C_x+C_x/4\mu\text{F})](1+D_x)$
R		$\pm [1\text{m}\Omega+0.25\%(1+R/2\text{M}\Omega+2\Omega/R)](1+Q)$
Q	100Hz、1KHz	$\pm [0.020+0.15(Q_x+1/Q_x)\%]$
	10KHz	$\pm [0.020+0.2(Q_x+1/Q_x)\%]$
D	100Hz、1KHz	$\pm 0.0010 (1+D_x^2)$
	10KHz	$\pm 0.0015 (1+D_x^2)$

5. Test signal level  
0.3Vrms±10% (Empty) @ 1 KHz
6. Test speed  
4-6 times per second
7. Temperature: 0°C ~ 40°C
8. Humidity: ≤85% RH
9. Power supply voltage  
Voltage: AC198V~242V    Frequency: 50Hz±5%  
Power consumption : <30W
10. Volume and weight  
Dimensions: LW-2811C : 360×125×320mm  
Weigh: about 3.5Kg

## **VI Complete sets of equipment**

Instruments should have the follows:

- A LCR Digital Bridge
- 1 LCR005 Test Fixture
- 1 LCR001 measuring cable
- A power cord
- A product manual