

Precision LCR Meter

LCR-800

USER MANUAL

GW INSTEK PART NO. 82CR-81900MK1

This manual contains proprietary information, which is protected by copyright. All rights are reserved. No part of this manual may be photocopied, reproduced or translated to another language without prior written consent of the Good Will Instrument company.

The information in this manual was correct at the time of printing. However, Good Will continues to improve products and reserves the right to change specifications, equipment, and maintenance procedures at any time without notice.



ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

Good Will Instrument Co., Ltd.
No. 7-1, Jhongsing Rd., Tucheng City, Taipei County 236, Taiwan.

Table of Contents

SAFETY INSTRUCTIONS	5
GETTING STARTED.....	10
Main Features	11
Measurement Type.....	12
Front Panel Overview.....	13
Rear Panel Overview	16
Power Up	18
Fixture Connection.....	20
Zeroing	24
Component Measuring Guidelines.....	26
BASIC MEASUREMENT	29
Measurement Item Description	30
Parameter Configuration.....	31
Running Measurement.....	43
Store Recall.....	45
BIN FUNCTIONS	48
Binning Menu	50
Set Bin Menu	61
Bin Summary Menu	68
RS232 REMOTE.....	72
LCR Setup	73
LCR Viewer.....	74
Terminal Connection	84
PROGRAMMING.....	87
Command Syntax	87
Commands	90

INTERFACE	111
RS232 Interface Configuration	112
Signal Overview	116
FAQ	121
APPENDIX	123
Fuse Replacement	123
Circuit Theory and Formula.....	124
Accuracy Definitions	132
Specifications	136
EC Declaration of Conformity.....	140
INDEX.....	141

SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you must follow when operating or storing the LCR-800. Read the following before any operation to insure your safety and to keep the LCR-800 in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the LCR-800.



Warning: Identifies conditions or practices that could result in injury or loss of life.



Caution: Identifies conditions or practices that could result in damage to the LCR-800 or to other properties.



DANGER High Voltage



Attention Refer to the Manual



Protective Conductor Terminal



Earth (ground) Terminal



Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.

Safety Guidelines

General Guideline



- Do not place any heavy object on the LCR-800.
- Avoid severe impact or rough handling that leads to damaging the LCR-800.
- Do not discharge static electricity to the LCR-800.
- Do not block or obstruct the cooling fan vent opening.
- Do not perform measurement at circuits directly connected to Mains (Note below).
- Do not disassemble the LCR-800 unless you are qualified as service personnel.

(Measurement categories) EN 61010-1:2001 specifies the measurement categories and their requirements as follows. LCR-800 falls under category I.

- Measurement category IV is for measurement performed at the source of low-voltage installation.
- Measurement category III is for measurement performed in the building installation.
- Measurement category II is for measurement performed on the circuits directly connected to the low voltage installation.
- Measurement category I is for measurements performed on circuits not directly connected to Mains.

Power Supply



- AC Input voltage: 100V-240V, 50-60/400Hz
- The power supply voltage should not fluctuate more than 110V-240V ±10%.
- Connect the protective grounding conductor of the AC power cord to an earth ground, to avoid electrical shock.

Fuse



- Fuse type: FUSE 5TT 3A/250V
- Make sure the correct type of fuse is installed before powering up.

- To ensure fire protection, replace the fuse only with the specified type and rating.
- Disconnect the power cord before fuse replacement.
- Make sure the cause of fuse blowout is fixed before fuse replacement.

Cleaning LCR-800

- Disconnect the power cord before cleaning.
- Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid.
- Do not use chemical or cleaner containing harsh material such as benzene, toluene, xylene, and acetone.

Operation Environment

- Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below)
- Relative Humidity: < 85%
- Altitude: < 2000m
- Temperature: 10°C to 50°C

(Pollution Degree) EN 61010-1:2001 specifies the pollution degrees and their requirements as follows. LCR-800 falls under degree 2.

Pollution refers to “addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity”.

- Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.
- Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected.
- Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.

Storage environment

- Location: Indoor
- Relative Humidity: < 85%
- Temperature: -20°C to 60°C

Disposal

Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

Power cord for the United Kingdom

When using the LCR-800 in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons



IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow:	Earth	
Blue:	Neutral	
Brown:	Live (Phase)	

As the colours of the wires in main leads may not correspond with the colours marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with the letter E or by the earth symbol or coloured Green or Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, cable of 0.75mm² should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any moulded mains connector that requires removal / replacement must be destroyed by removal of any fuse & fuse carrier and disposed of immediately, as a plug with bared wires is hazardous if engaged in live socket. Any re-wiring must be carried out in accordance with the information detailed on this label.

GETTING STARTED

This chapter describes the instrument's main features, front & rear panels, power up sequence, fixture connections and calibration.



Main Features	Main Features.....	11
	Model comparison	12
Measurement type	Measurement item	12
	Measurement combination.....	12
Panel overview	Front Panel Overview	13
	Rear Panel Overview.....	16
Setup	Power Up	18
	Tilt stand	18
	Power up	18
Fixture connection	Fixture Connection	20
	Fixture structure	20
	Fixture connection	21
Bias voltage connection	External voltage bias connection	22
Zeroing	Zeroing.....	24
	Zeroing calibration	24

Main Features

Performance	<ul style="list-style-type: none"> • 12Hz ~ 200kHz wide test frequency (LCR-821) • 5 digit measurement resolution • 2V DC bias voltage • 0.05% basic measurement accuracy (LCR-821/819/817) • 0.1% basic measurement accuracy (LCR-829/827/826)
Operation	<ul style="list-style-type: none"> • Automatic and manual measurements • Dual measurement display • Measurement in absolute values or as a deviation from a nominal value. • Precision four wire fixture • Component Sorting • Up to 30V DC external bias voltage • Internal memory • Large Dot matrix display, 240x128 resolution • Intuitive user interface, comprehensive measurement functions
Interface	<ul style="list-style-type: none"> • RS-232C (LCR-821), LCR-819/817/816 optional • Handler Interface (LCR-829/827/826)

Model comparison

	LCR model						
Test Frequency	821	819	829	817	827	816	826
(12Hz~200kHz)	•						
(12Hz~100kHz)		•	•				
(12Hz~10kHz)				•	•		
(100Hz~2kHz)					•	•	

Measurement Types

Measurement item

Primary measurements	Capacitance (C) Impedance (Z)	Inductance (L) Resistance (R)
Secondary measurements	Dissipation factor (D) Resistance (R)	Quality factor (Q)(=1/D) Phase Angle (θ)

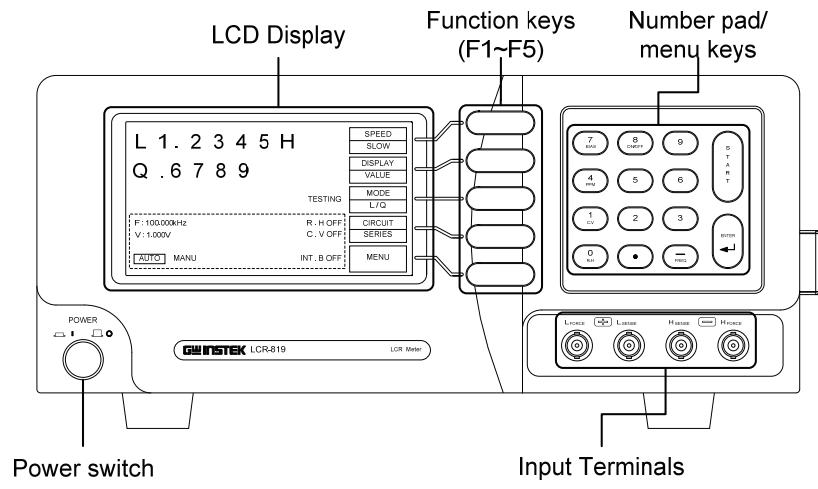
Measurement combination

●:Available, —:Not available

1st measurement	2nd measurement				Circuit model	
	Q	D	R	θ	Series	Parallel
Capacitance (C)	—	●	●	—	●	●
Inductance (L)	●	—	●	—	●	●
Impedance (Z)	—	—	—	●	●	—
Resistance (R)	●	—	—	—	●	●

*Only the LCR-821 can select L/R and Z/ θ measurement modes.

Front Panel Overview



LCD Display 240 by 128, dot matrix LCD display.

Function keys Assigned to the menu on the right side of the display.

Number pad/menu keys Used to enter numerical values or access secondary menu functions.

7. Bias



The bias key selects an internal or external bias. The bias will be displayed on the bottom of the LCD display as INT.B (internal bias) or EXT.B (external bias).

8. On/Off



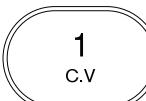
The On/Off key turns the internal or external bias on or off.

4. PPM



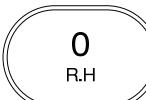
Measures Dissipation and Quality factor as PPM.

1. C.V



Turns constant voltage mode on or off.

0. R.H



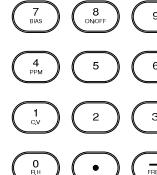
Used to turn Range Hold On or Off.

-. FREQ



Used to enter test frequencies.

Numerical numbers



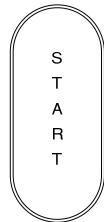
Used to enter numbers, decimals and negative values.

Enter



The Enter key is used to confirm menu and number entries.

Start



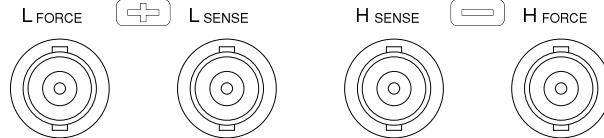
The Start key is used to start measuring when in manual mode. The start key can also be used to select automatic or manual measuring modes. Hold the Start key for 3 seconds to toggle between auto and manual mode.

Terminals

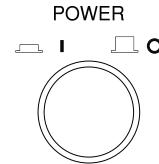
Force and Sense terminals

LFORCE	Current return
LSENSE	Low potential
HSENSE	High potential
HFORCE	Current output

Force and Sense terminals



Power Switch



Turns the power on or off.

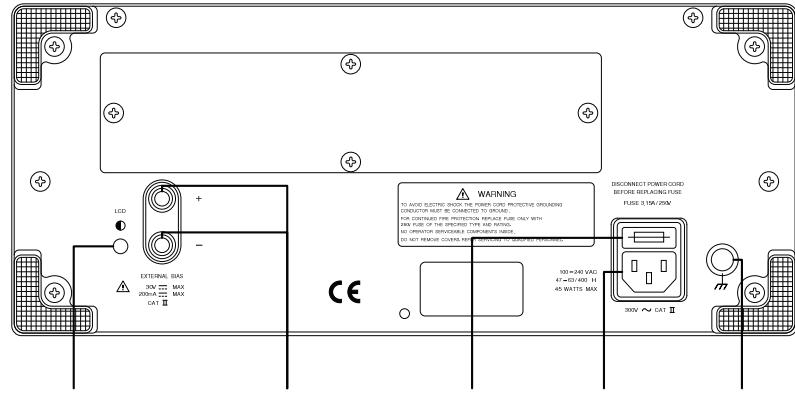


On

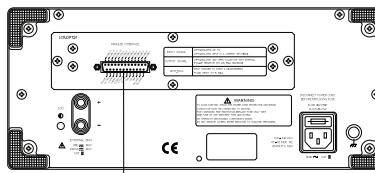


Off

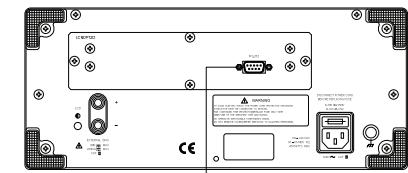
Rear Panel Overview



LCR-819, LCR-817, LCR-816



LCR-829, LCR-827, LCR-826



LCR-821

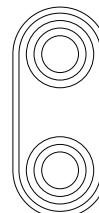
Contrast control

LCD

The LCD contrast control



External Bias

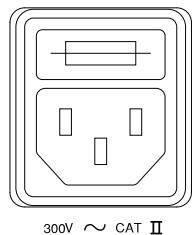


The positive and negative external bias.

30V (35V
tolerable) Max voltage

- 200mA Max current

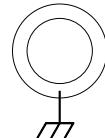
Fuse / Power
Socket



The fuse holder contains the main fuse, 5TT 3A/250V. For fuse replacement details, see page 123.

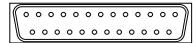
The mains socket accepts the power cord. See page 18 for power-up details.

Ground



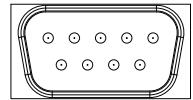
Ground input.

Handler Interface



Handler interface for binning
(LCR-829/827/826 only).

RS-232 Interface



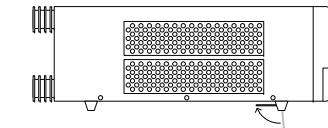
RS232 interface (LCR-821). RS232 interface is used for remote control with the LCR-Viewer software. RS232 is also available as a factory installed option (LCR-816/817/819).

Power Up

Tilt stand

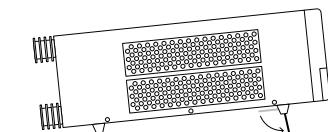
Low Angle

Ensure the stand is up.



High Angle

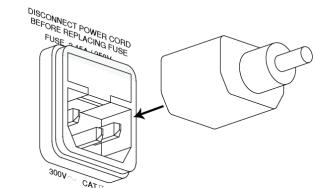
Ensure the stand is down.



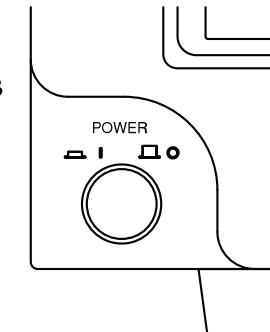
Power up

Panel operation

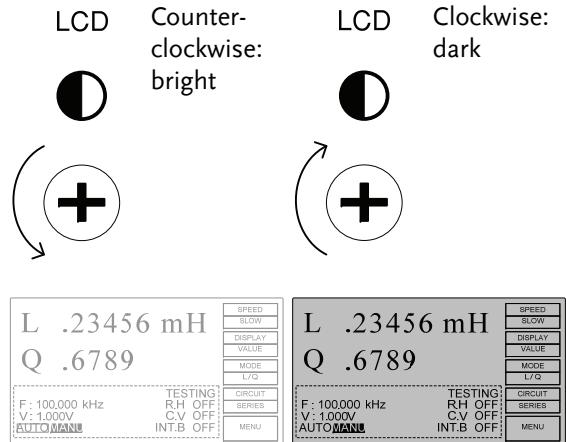
1. Connect the power cord to the socket.



2. Press the power button. The display becomes active in 2~3 seconds.



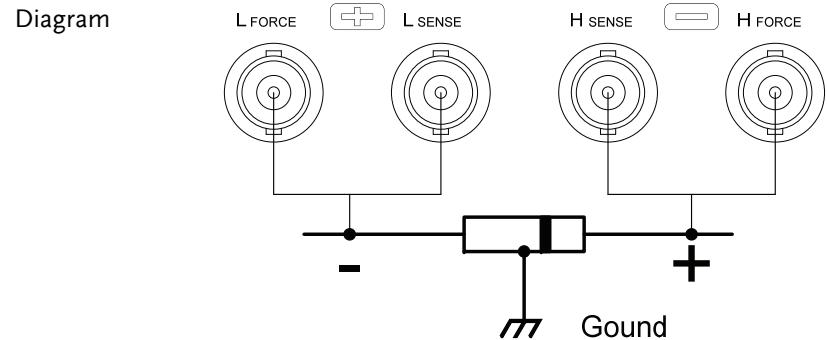
3. Use the contrast knob on the rear panel to adjust the LCD display contrast.



Fixture Connection

Fixture structure

Background The standard fixture is a four-wire type (Kelvin 4 wire). The outer terminals (Hforce and Lforce) provide the current and the inner terminals (Hsense and Lsense) measures the potential.

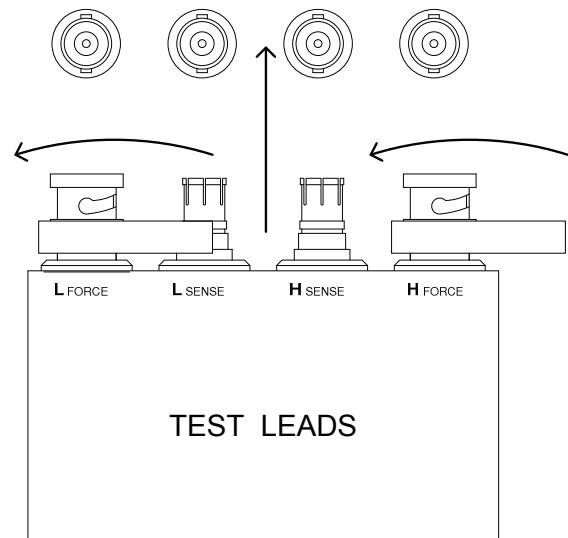


Description	HFORCE	Carries the signal current source. Connected to the + side of the device under test.
	HSENSE	Together with Lsense, monitors the Potential. Connected to the + side of the device under test.
	LSENSE	Together with Hsense, monitors the Potential. Connected to the - side of the device under test.
	LFORCE	Accepts the signal current return. Connected to the - side of the device under test.
	GND	If the test component has a large metal area NOT connected to either of the terminals, connect to the GND input to minimize noise level.

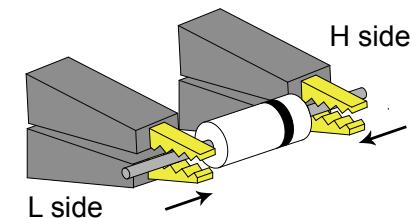
Fixture connection

Panel operation 1. Discharge the test component before connecting the fixture set.

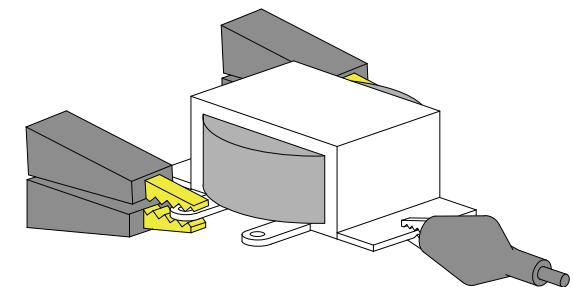
2. Connect the Kelvin clip test lead into the front terminals. Line the lead fixture up to the front terminals and slide in. Turn the BNC handle counter clockwise to unlock the fixture. Turn the handles clockwise to lock the fixture.



3. Connect the fixture to the test component. If the component has polarity, connect the H side to the positive lead and the L side to the negative lead. Make sure the distance between the lead base and fixture clip is short enough.



4. If the test component has an outer case unconnected to either of the leads, connect to the ground terminal for noise level reduction.

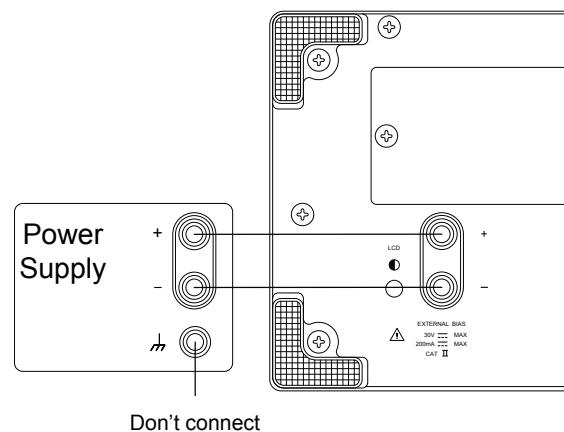


External voltage bias connection

Background

An external voltage bias of 0-30 volts with a maximum of 200mA can be applied to the external voltage bias terminals on the rear panel. The external bias voltage must be floating and not connected to ground. For details for setting the external bias voltage see page 34.

1. Connect the voltage bias terminals to a bias voltage. Leave ground floating.



Zeroing

Zeroing calibration

Background

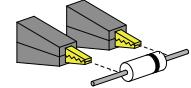
Open and short circuit calibration (zeroing) should be performed on a daily basis to correct for cable and fixture errors before taking measurements. When test fixtures or test cables are changed, the zeroing process should be performed again. All data performed during the calibration is stored in the internal memory of the LCR-800.

The Open circuit calibration determines the stray admittance and compensates high impedance measurements. The short calibration determines the residual impedance and is used when determining low impedance measurements.

Open circuit

The Open circuit calibration measures the stray admittance of the test fixture. This is used for high impedance measurements.

Procedure

1. Insert the test fixture or cable. Ensure the cables are not shorted and are open. 
2. Press the MENU key, then OFFSET, followed by CAP OFFSET.

MENU → OFFSET → CAP
OFFSET

3. Wait for the calibration to finish. If the OPEN TEST was successful, the screen will display the following message:

OPEN TEST

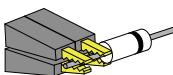
OK



If the test failed, ensure your cables or test fixtures are open and not shorted. Ensure R.H is OFF. After inspection try again.

Short circuit

The short test will calibrate the short circuit impedance of the cables or test fixtures. This is used for low impedance measurements



4. Short the cables or test fixtures using a short thick copper wire if necessary.

5. Press R/L offset in the offset menu.



6. Wait for the calibration to finish. If the SHORT TEST was successful the following message is displayed.

SHORT TEST

OK



If the test failed, ensure your cables or test fixtures are shorted. Ensure R.H is OFF. After inspection try again.

OPEN TEST

OK CAP

OFFSET

SHORT TEST

OK R/L

OFFSET

EXIT

7. Press EXIT when both tests are OK.

EXIT



Failure to pass both tests will result in erroneous measurements.

Component Measuring Guidelines

Background

For measuring Impedance, Capacitance, Inductance, and Resistance, series or parallel equivalent circuit models are available. Usually a component manufacturer will specify how a component should be measured and at what frequency. If not, use the guidelines below. Select the equivalent circuit and frequency according to the component value. For more information about equivalent circuit models and theory see page 124.

General Inductors Inductors have always traditionally been measured in series equivalent circuits. For large inductors a lower test frequency yields more accurate results. For small inductors, higher frequencies are more accurate.

Test Frequency	Expected Inductance			
	<10uH	10uH~1mH	1mH~1H	>1H
0.1kHz	—	—	—	Series
1kHz	—	—	Series	—
10kHz	—	Series	—	—
100kHz	Series	—	—	—

General Capacitors

Capacitors are usually measured in series except for extremely small capacitance. Like with inductors, larger capacitors should be measured with low frequencies. Small capacitors with high frequencies.

Test Frequency	Expected Capacitance			
	<10pF	10pF~400pF	400pF~1uF	>1uF
0.1~0.12 kHz	—	—	—	Series
1kHz	—	—	Series	—
10kHz	—	Series or Parallel	—	—
100kHz	Parallel	—	—	—

General Resistors

A series inductance circuit is the best equivalent circuit for low resistance ($<1k\Omega$) and a parallel capacitance circuit for high resistances ($>10M\Omega$).

Test Frequency	Expected Resistance		
	<1kΩ	1kΩ~10MΩ	>10MΩ
0.03kHz	—	—	Parallel
0.25kHz	—	Parallel	—
1kHz	Series	—	—

Metal component case connection

A large area of metal can add noise to the measurement. Here is how to minimize the effect.

If the metal is connected to one of the terminals, this should be connected to the Hforce terminal side.

If the metal is NOT connected to either of the terminals, connect to the GND terminal.

Wire capacitance

When measuring the wire capacitance, the fixture clips that are marked with H_F(High Force)/H_S (High Sense) should always be connected to the point that is influenced the most by noise.

Air-cored coils

Air-cored coils can pick up noise very easily, therefore they should be kept well clear of any test equipment that may contain power transformers or display scan circuitry. Also, keep the coils away from metal objects which may modify inductor characteristics.

Iron-cored and ferrite inductor

The effective value of iron-cored and ferrite inductors can vary widely with magnetization and test signal level. Measure them at the AC level and frequency in use. Unlike most inductors, a parallel equivalent circuit is most suitable for iron-cored inductors. When core materials are damaged by excessive magnetization (for example: tape heads and microphone transformers), check that the test signal is acceptable before connection.

BASIC MEASUREMENT

Basic Measurement details how to measure individual components and how to configure the LCR-800 settings. Basic Measurement also describes how to save and recall memory. Advanced functions such as the handler menu or remote control are detailed on page 48 and 72, respectively.

Measurement Description	Measurement Item Description	30
	Measurement combination.....	30
	Display overview	30
Configuration	Parameter Configuration.....	31
	Measurement Speed.....	31
	Select equivalent circuit type.....	33
	Set Bias voltage.....	34
	Set measurement frequency.....	35
	Set measurement voltage.....	37
	Set PPM for D/Q measurements.....	38
	Set constant voltage source	39
	Set Range hold.....	40
	Set Average	40
Measurement	Set Nominal Values	41
	Running Measurement.....	43
	Select Single measurement.....	43
Select Automatic measurement.....	44	
Store/Recall	Store Recall	45
	Store or Recall Memory Settings.....	45
	Recall Calibration Settings.....	46

Measurement Item Description

In general, two measurement items, primary and secondary, are combined in a single measurement. The following table shows the available combinations. Details of the measurement modes and the circuit theory and formula can be found in the appendix, page 124.

Measurement combination

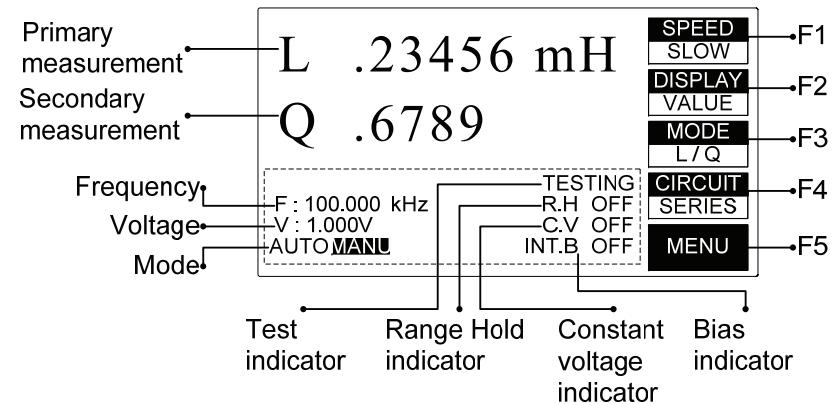
●:Available, —:Not available

1st measurement	2nd measurement				Circuit model	
	Q	D	R	θ	Series	Parallel
Capacitance (C)	—	●	●	—	●	●
Inductance (L)	●	—	●*	—	●	●
Impedance (Z)	—	—	—	●*	●	—
Resistance (R)	●	—	—	—	●	●

*LCR-821

Display overview

Normal mode



Parameter Configuration

Measurement Speed

Measurement Speed The LCR-800 series support 3 different measurement speeds: slow, medium or fast at approximately 1, 5 or 12 (LCR-829/827/826) measurements per second. The faster the measurement speed, the lower the accuracy. Conversely the slower the measurement speed, the higher the accuracy. The measurement speed and accuracy are dependent on the mode, voltage and frequency. For detailed information, see the specification table on page 136.

LCR-817/ 819/ 821	Accuracy	Measurements/second
Slow	0.05%	At least 1
Medium	0.1%	At least 3
Fast	0.24%	At least 7
LCR-816/826/827/829	Accuracy	Measurements/second
Slow	0.1%	At least 1
Medium	0.2%	At least 3
Fast	0.48%	At least 7

Panel operation 1. From the main menu, press the SPEED menu key to cycle between the various speeds.



Displayed measurement unit

Measurement units	All measurement unit results can be displayed as the absolute values, delta values or delta percentage values.
Value	Value will show the absolute value of the measurement in Ohms (Ω), Henries (H) or Farads (F). The primary measurement has resolution of 5 digits; the secondary has a resolution of 4 digits (0, 2 digits).
Delta%	Delta% will show the percentage deviation of L, C, R or Z from a nominal (stored) value.
Delta	Delta will show the deviation from a nominal value as an absolute value in Ohms (Ω), Henries (H) or Farads (F).
Units	
Value	Ω , H, F
Delta	Absolute deviation (Ω , H, F)
Delta%	% deviation

Panel operation 1. From the main menu, press the DISPLAY menu key to cycle between the display types.



Measurement Modes

Measurement mode The LCR-800 has a number of different measurement modes. Primary and secondary measurements are displayed on the screen simultaneously. For detailed information regarding the measurement combinations, see the specifications on page 136. The measurement combinations are shown in the table below.

(C/D)	Capacitance/Dissipation
(C/R)	Capacitance/Resistance
(L/R)*	Inductance/Resistance
(L/Q)	Inductance/Quality factor
(Z/ θ)*	Impedance/Angle
(R/Q)	Resistance/Quality factor

Panel operation 1. From the main menu, press the MODE menu key to cycle between the different modes.



*Only the LCR-821 can select L/R and Z/ θ measurement modes.

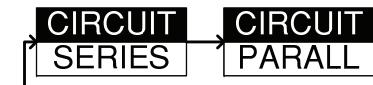
Select Equivalent Circuit Type

Background Series or Parallel equivalent circuits can be selected. Not all measurement modes can be used with both series and parallel equivalent circuits. For details about circuit types see the circuit theory chapter on page 124.

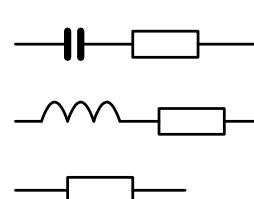
Measurement type	Series	Parallel
Capacitance (C)	●	●
Inductance (L)	●	●
Impedance (Z)	●	—
Resistance (R)	●	●

Panel operation 1. From the main menu, press the CIRCUIT menu key to cycle between the series or parallel equivalent circuits.

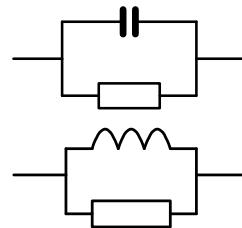
CIRCUIT SERIES



Series



Parallel



Set Bias voltage

Background

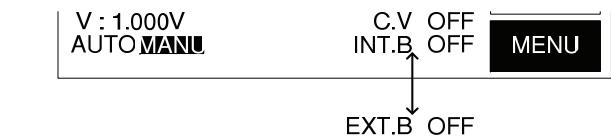
Voltage bias can be set internally or externally. An internal voltage bias of 2 volts is normally applied to a DUT. External voltage bias is able to accept 0 to 30 volts with a maximum current of 200mA. For external bias voltage connections see page 22. When measuring a DUT, please allow 1 second to stabilize a DUT after a bias voltage is applied. In general a bias voltage should only be applied to capacitors. If a bias voltage is applied to devices with low impedance, inaccurate measurements will occur.



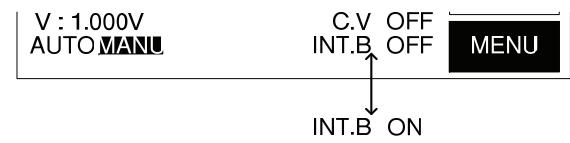
When an external voltage is applied, constant voltage mode (C.V.ON) must be enabled, page 39.

Panel operation

1. Press the 7/Bias key on the number pad to cycle from internal to external bias. The bottom of the screen will display internal or external bias.



2. Press 8/ON/OFF to turn the bias voltage on or off. The bottom of the screen will display the internal or external bias as on or off.



Set measurement frequency

Background

The measurement frequency, together with the measurement voltage is used to define the electrical characteristics of each measurement item. Make sure the appropriate frequency is selected according to the component characteristics.

The frequency range of each model is as follows:

100Hz~2kHz	LCR-816/826
12Hz~10kHz	LCR-817/827
12Hz~100kHz	LCR-819/829
12Hz~200kHz	LCR-821

The LCR-821 can provide 504 different frequencies with a 5 digit resolution including decimal places. Any frequency can be keyed from the number pad, and the closest available frequency (of 504) will be selected automatically. The LCR-818/829 has 503 different frequencies and the LCR-817/827 and LCR-816/826 have 489 and 245, respectively.

To calculate the different possible frequencies, use the tables below.

	Frequency range	Formula	n range
LCR-821	0.012 To 0.23077kHz	3kHz/n	13 to 250
	0.23438 To 15kHz	60kHz/n	4 to 256
	15.385 To 200kHz	200kHz/n	1 to 13
	Frequency range	Formula	n range
LCR-819/829	0.012 To 0.23077kHz	3kHz/n	13 to 250
	0.23438 To 15kHz	60kHz/n	4 to 256
	15.385 To 100kHz	200kHz/n	2 to 13
	Frequency range	Formula	n range
LCR-817/827	0.012 To 0.23077kHz	3kHz/n	13 to 250
	0.23438 To 10kHz	60kHz/n	6 to 256
	Frequency range	Formula	n range
LCR-816/826	0.10000 To 0.23077kHz	3kHz/n	13 to 30
	0.23438 To 2kHz	60kHz/n	30 to 256

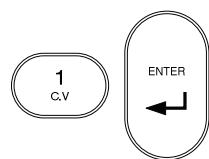
Panel operation

1. Press the -/FREQ key on the number pad.

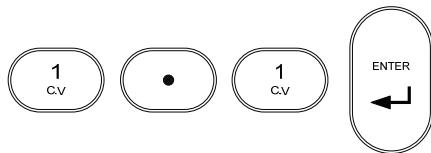


2. Enter the frequency using the numerical keys, and then press ENTER.

1.0kHz



1.1kHz



The nearest frequency will be selected from the 504(LCR-281) nominal frequencies, and updated in the display. Here, the nearest frequency to 1.1kHz is 1.0909kHz.

F : 1.0909 kHz



Note After the test frequency has been changed, the zeroing must be performed again. See page 24

Set measurement voltage

Background

Along with frequency, voltage can be set. Make sure the appropriate voltage is selected, according to the component characteristics.

Range 5mV ~ 1.275V (5mV steps) <200kHz
 100mV ~ 1.275 (5mV steps) @200kHz

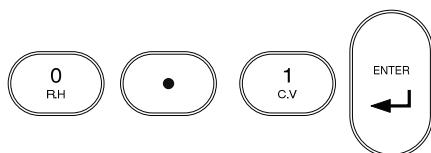
Voltage setting

- From the main menu, press MENU (F5) followed by SETTING (F3) and VOLT (F2)

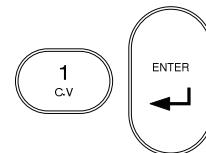


- Enter the voltage using the numerical keys, and then press ENTER.

100mV



1V



MEMORY NO: 1

VOLTAGE= 1.000

AVERAGE= 1

RECALL CALIBRATION

MEMORY	1
VOLT	1.000
AVGE	1
RECALL	
EXIT	

The voltage is updated in the display. If the voltage entered is outside the allowable voltage range, the nearest voltage is selected.

- Press (F5) EXIT to exit the Setting menu.

EXIT

Set PPM for D/Q measurements

Background

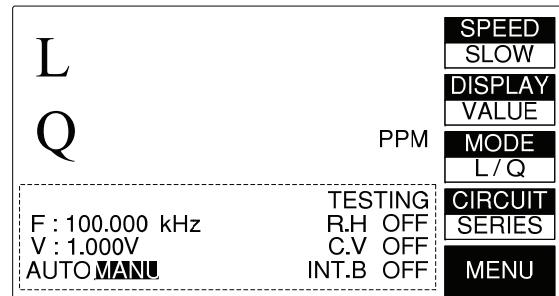
Dissipation and Quality Factor (D/Q) measurements can be shown in parts per million (PPM) if D/Q is less than 0.0100. This increases the resolution by a factor of 100. The units of D and Q are dimensionless and are expressed as a decimal ratio with a multiplier of 1,000,000.

Ensure the operating mode has a D or Q component. See page 33.

Panel operation

- Press 4/PPM to turn PPM on or off for all D/Q measurements

4
PPM



PPM will be displayed on the right hand side of the screen, next to mode.

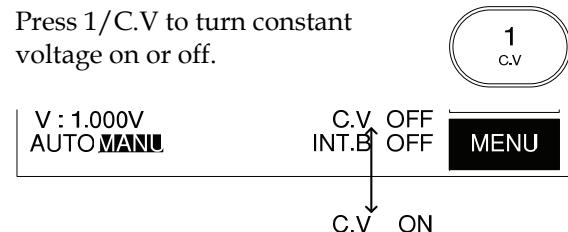
Set constant voltage source

Background

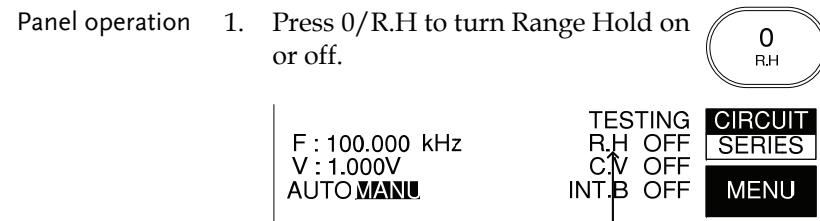
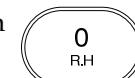
If a DUT needs to be tested at a set voltage, the constant voltage function can be used. Using the C.V. function the LCR will maintain a source resistance of 25Ω . Therefore the test voltage is constant for any DUT impedance greater than 25Ω . Using the constant voltage feature will reduce the accuracy of measurements by a factor of 3.

Panel operation

1. Press 1/C.V to turn constant voltage on or off.



C.V ON / OFF is toggled each time the 1/C.V button is pressed.



R.H ON

R.H ON / OFF is toggled each time the 0/R.H button is pressed.

Set Average

Background

An arbitrary number of tests can be averaged to produce an averaged test result. 1-255 tests can be averaged. The larger the number of tests that are averaged, the longer the test time.

Panel operation

1. From the main menu, press MENU, followed by SETTING and AVGE.



2. Enter the number of averages (tests) using the numerical keys, and then press ENTER.

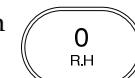
Set Range hold

Background

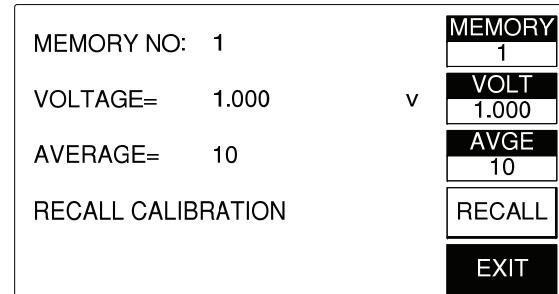
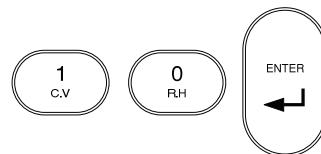
When DUTs are disconnected from the test cables/fixtures during continuous testing, Range Hold can be used to avoid range switching. This is particularly useful for repetitively testing a number of DUTs. For more information on Range and range hold, see the specifications, page 136.

Panel operation

1. Press 0/R.H to turn Range Hold on or off.



The average of 10 tests



The number of averages is displayed in the main panel and in the AVGE menu icon after a short processing time.

2. Press EXIT to exit to the main menu.

Set Nominal Values

Background The LCR-800 series are able to set nominal values when using the DELTA and DELTA% measuring modes. Nominal values can be set to up to 5 digits including decimal places. Each primary measuring unit can have the nominal value set.

Panel operation

1. From the main menu, choose the measuring mode that you wish to change by pressing (F3) MODE until the correct measuring mode is displayed.

For example, if L/Q mode is selected, an inductance (mH) nominal value can be set.

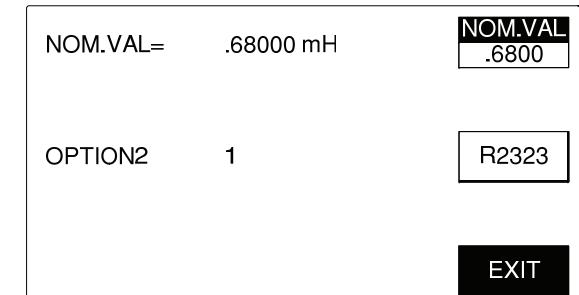
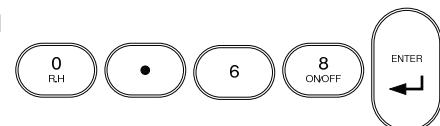
Inductance (L)	H, mH
Capacitance (C)	nF, uF, pF
Impedance (Z)	Ω , k Ω
Resistance (R)	Ω , k Ω

3. Press MENU (F5), followed by SORT (F2) and NOM.VAL (F1).



3. Enter the nominal number using the numerical pad, followed by ENTER. Up to 5 digits can be entered.

0.6800mH



The NOM.VAL key and screen will be updated when a nominal value is entered.

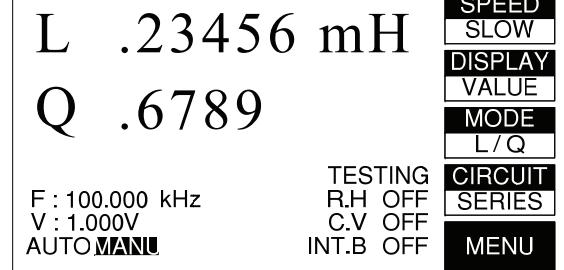
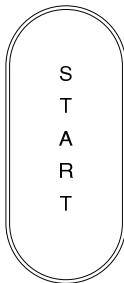
4. Press EXIT to exit to the main menu.

Running Measurement

Select Single measurement

Background Measurements can be manually controlled (MANU) or automatically updated (AUTO). In manual mode, one measurement is performed by pressing the start key.

Panel operation 1. Press the START key to manually perform a measurement when in manual mode.



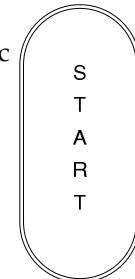
TESTING will appear on the screen, followed by the measurement results. The duration of the test will depend on the measurement accuracy and the number of averages used.

Select Automatic measurement

Background Measurement can be manually controlled (MANU) or automatically updated (AUTO).

In continuous mode (AUTO), measurements are automatically done and the display is updated according to the measurement speed setting.

- Panel operation**
1. Hold the START key for a few seconds to toggle between automatic (AUTO) and manual (MANU) mode.
 2. When in AUTO mode, measurements will start automatically until AUTO mode is switched back to MANU.



The bottom of the screen will indicate if AUTO or MANU mode is activated.

Testing will appear on the screen each time a measurement is completed.

Store Recall

Store or Recall Memory Settings

Background The LCR-800 series have 100 blocks of memory available for saving settings.

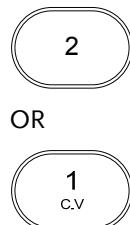
Note All memory is stored using an internal battery. The battery should last 3 years before replacement. If any files cannot be saved or recalled, please contact your local GW Insteek distributor to have the battery changed.

The LCR-827/829 can also use the stored memory settings for Binning (page 48)

Panel operation 1. From the main menu, press MENU, SETTING AND MEMORY.

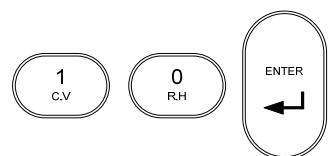


2. Press 2 to save the current measurement settings, or 1 to recall a previously saved memory setting. OR

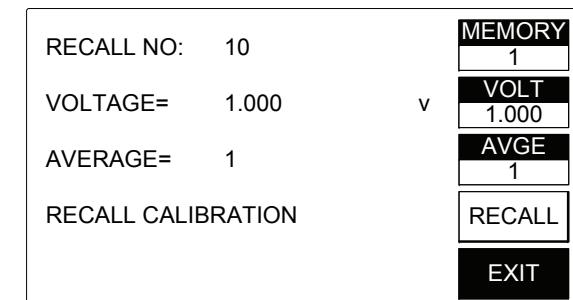


3. Use the number pad to select a memory number and ENTER to confirm the selection. Range: 1~100

Memory slot 10



- The RECALL NO. or STORE NO. will be set accordingly.

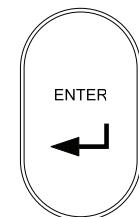


- Press EXIT to exit to the main menu.

EXIT

Cancel

- Press ENTER at any of the memory options to cancel.



Recall Calibration Settings

Background When measurement values are inaccurate, original calibration settings can be recalled.

Panel operation 1. From the main menu, press MENU, SETTING AND RECALL.



2. Press 1 to recall the calibration settings or 2 to cancel.

1
c.v

OR

2

3. When the status bar has completed, the calibration settings are recalled.

4. Press EXIT to exit to the main menu.

EXIT



If the function keys are not active after calibration settings have been recalled, DO NOT turn off the instrument. Wait a few minutes and try again.

BIN FUNCTIONS

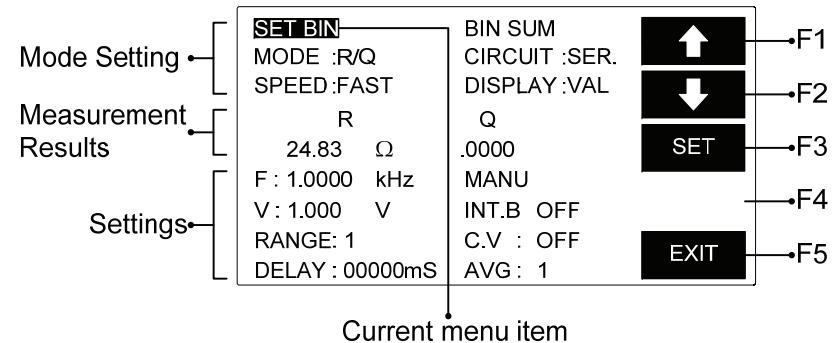
The Handler interface is used to sort components into different bins. The handler menu compares results from a number of different user defined limits. Component sorting can be accomplished in either manual or automatic mode. For more information on using the handler interface to sort components please see page 114.

Bin Functions	Handler Menu Overview	50
	Handler Menu	52
	Mode Setting	52
	Circuit Setting	53
	Speed Setting	53
	Display Setting	54
	Frequency Setting	54
	Select/Run Auto/Manu Sorting	55
	Voltage Setting	56
	Bias Setting	57
	Constant Voltage Setting	58
	Delay Setting	59
	Average Setting	60
Set Bin Menu	Set Bin Menu Overview	61
	Bin Menu	62
	Sort Type	63
	Bin Number	64
	Set Nominal Value	64
	Set Max/Min Absolute Limit	65
	Set Max/Min Percentage Limit	65
	Set Max/Min Secondary Measurement Limits	66
	Clear Bins	67
	Exit Set Bin Menu	67

Bin Summary Menu	Bin Summary Menu Overview	68
	Bin Summary/Results.....	70

Binning Menu

Handler Menu Overview



Mode Setting The mode setting area shows basic settings for the current bin mode.

SET BIN Configures the Bin settings

MODE Measurement mode

SPEED Measurement speed

BIN SUM Displays the Bin test results

CIRCUIT Selects between serial and parallel circuits

DISPLAY Selects what measurement unit is displayed.

Parameter BIN, VALUE, OFF

Measurement Results The primary and secondary measurement results are displayed.

Settings The testing settings for the DUT can be edited here.

F Frequency - model dependant

V Voltage – model dependant

Range Displays the current range

