

LCR-6000 Series High Precision LCR Meter

New Production Announcement

GW Instek introduces the brand new high precision LCR meter—LCR-6000 series, which, with five models, has a test frequency range extending from 2kHz/20kHz/100kHz/200kHz/300kHz (maximum) and with 0.05% basic accuracy. The compact size design, 2U height and 1/2 rack, is one of the practical features of the series which is the optimum space saver suitable for either bench top or system rack. The compacted LCR-6000 series with abundant features is absolutely the excellent tool for R&D, production test, IQC, etc. on implementing each test stages for passive components.



The LCR-6000 series provides rich functionalities with the compact size. First of all, the entire series adopts 3.5-inch color LCD and features opulent display parameters. In addition to simultaneously displaying setting criteria and measurement results, the series increases two additional monitoring parameters. In other words, there are four parameters, primary/secondary and two monitoring, simultaneously shown on the screen that tremendously enhances the measurement efficiency. The enlarge display mode not only emphasizes the measurement results, but also provides PASS/FAIL judgment to facilitate a rapid and convenient test result.

Convenience is one of the unique features. The LCR-6000 series comes equipped with two zero methods, which are full frequency range and spot. Users, without turning off the power and changing test fixture, can freely change frequency within the provided frequency range to conduct measurements. By so doing, tremendous time can be saved from repeatedly executing zero operation. Additionally, frequency range of the series is consecutive that allows users to input precise frequency value to conduct the most genuine test on components.

The LCR-6000 series also features diverse ancillary measurements to meet the measurement requirements of different materials. For instance, the series provides the automatic level control (ALC) function to satisfy the test voltage requirement of MLCC. For inductive component measurements, the series provides the adjustable test current function and the D.C. resistance measurement function. The optional external bias current adapter ($\pm 2.5A$) is to satisfy the measurement requirements. With respect to the D.C. bias voltage test for capacitive components requirements, the series allows users to conduct verification measurement on materials by its internal $\pm 2.5V$ adjustable voltage or via an optional external bias voltage adapter ($\pm 45V$). Furthermore, 10 steps of listed test functionalities allow users to set testing parameters (either by frequency, or voltage, or current) for each step based on users' requirements in order to observe the trend of DUT characteristics.

The LCR-6000 series has 10 memory sets defined by panel setting criteria to facilitate users in selecting test criteria and saving time in repeated settings. 10,000 measurement result storage capability can easily record measurement results instantaneously. The USB host allows easy access to recorded results without

connecting the series to the PC. The USB host also allows USB to retrieve and save screen so as to assist users in compiling setting guidelines.

For the external control, the LCR-6000 series provides handler interface and collocates with its measurement sorting function (9BIN, AUX: 1BIN) to facilitate the connection with sorting machine so as to sort out the materials. For remote control and measurement result retrieval requirements, the LCR-6000 series provides RS-232C to assist setting control or measurement result retrieval via the PC commands. Additionally, the free PC software gives users an instant tool to store measurement results that saves time in developing programs.

The brand new compacted LCR-6000 series can effectively improve the limitation of space. Diverse measurement functionalities and display methods are making the series the high CP ratio choice in meeting the requirements of R&D, component assessment for engineering departments, category sorting requirements for component production, and IQC for verification on component specifications.

Consecutive frequency and Convenient zero function

The LCR-6000 series, within the provided frequency range, features consecutive and adjustable frequency capability which allows users to conduct measurement and analysis on components with the most genuine frequency requirements. For OPEN/SHORT fixture compensation function, the LCR-6000 series is equipped with full frequency range zero and spot zero selections. After executing full frequency range zero, users, under the conditions of not turning off the power and not changing test fixture, can freely change test frequency for the LCR-6000 series to execute component measurements that tremendously saves time in repeatedly zeroing test fixture after changing frequency.



Consecutive and adjustable frequency

Freely input frequency within provided frequency range



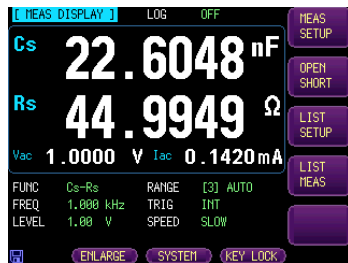
Selectable fixture zeroing methods

Full frequency range zero or spot zero

Rich and diverse information display

The measurement result display of the LCR-6000 series not only reveals primary and secondary measurement parameters but also includes two monitoring parameters. Therefore, four DUT related parameters can be simultaneously shown on the display screen to save time if repeated measurements are required. With respect to display screen, the LCR-6000 series features diverse display to meet users'

observation requirements. For instance, MEAS display shows setting parameters and measurement results at the same time; ENLARGE display focuses on measurement results and PASS/FAIL judgment is available, which is conducive to assist engineers to swiftly obtain the validity of measurement results.



MEAS display

Parameter setting and four measurement parameters



ENLARGE display

Enlarge measurement results and include PASS/FAIL judgment

10 points listed tests and PC software

The LCR-6000 series provides the 10 points listed test function, which allows users to define a set of DUT measurement parameters (such as Cs- Rs) and to set 10 test criteria of category (either by frequency or by voltage or by current) but different values to conduct measurements. Through this function, users can rapidly and clearly obtain DUT' s characteristic variation trend to determine the adaptability of DUT' s practical applications. The measurement results can be recorded directly in the internal memory and be transferred to the PC through USB. The LCR-6000 series also provides free PC software (maximum 1,000 points listed tests) in order to satisfy users' analytical requirements on delicate variation.

<p>The LIST MEAS screen displays a table with columns: No., FREQ(Hz), Cs, Rs, CIP. The table contains 10 rows of test parameters.</p>	<p>The software interface shows a graph titled 'Sweep Graph' with a green curve on a grid, representing the characteristic variation trend of the DUT.</p>
<p>Listed tests</p> <p>Variation criteria based upon frequency or voltage/current</p>	<p>On software — characteristic curve</p> <p>Provide more delicate characteristic variation trend</p>

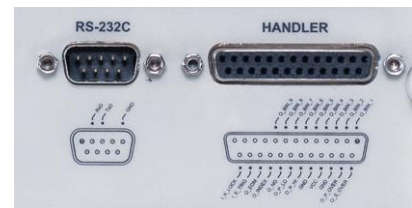
Diverse ancillary measurement functions

To satisfy the diverse measurement application requirements for different components and materials, the LCR-6000 series collocates with many auxiliary measurement functions. For capacitor measurement, Automatic Level Control (ALC) is mainly for component which requires a constant or rated test voltage such as multi-layer ceramic capacitor (MLCC). An internal D.C. bias voltage ($\pm 2.5V$, internal) is allowing simulating A.C. and D.C. coexistence to learn capacitance variation. For inductor measurement, the D.C. resistance measurement function is to validate D.C. resistance characteristics. Additional, the LCZ function is to quickly identify components' characteristics. When the function is activated, the LCR-6000 series will automatically determine DUTs' characteristics and reveal the optimum parameters to show the measurement results.

<p align="center">Automatic level control</p> <p>Ideal for measuring components with voltage requirements</p>	<p align="center">Internal bias ($\pm 2.5V$ adjustable)</p> <p>Ideal for capacitive components' characteristic tests</p>	<p align="center">D.C. resistance measurement</p> <p>Ideal for inductive components' D.C. characteristics verification</p>

Standard interface

For interface connectivity, the LCR-6000 series comes equipped with handler interface and RS-232C interface. Handler outputs 10 BIN (9BIN, AUX: 1BIN) sorting results that is best for external connection control, for instance, connecting to a sorting machine to conduct components' sorting operation. RS-232C is suitable for remote control and measurement results retrieval. The PC gives commands to control settings or to read measurement results so as to achieve the requirements of verifying automotive applications.

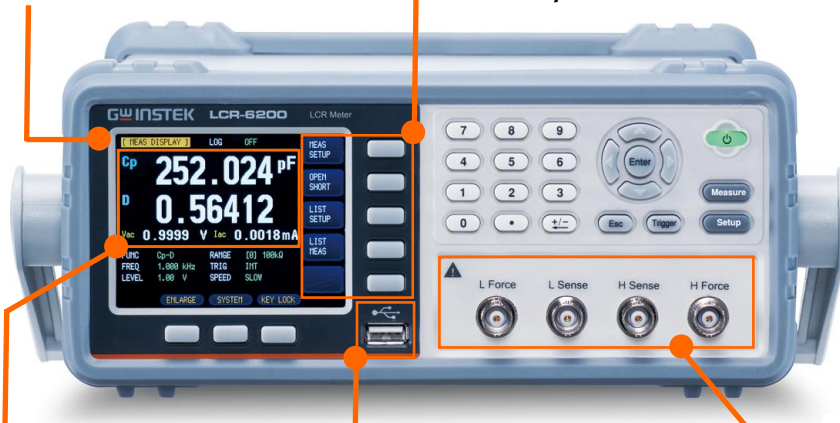


Features

- 3.5" color LCD
- 5 models (10Hz~2kHz/20kHz/100kHz/200kHz/300kHz)
- Consecutive test frequency
- Basic accuracy : 0.05%
- Measuring speed up to 25ms (max.)
- Full frequency range or spot OPEN/SHORT
- 16 major/secondary parameter measurement combinations and two additional monitoring parameters(maximum four different parameters can be shown simultaneously)
- DCR measurement and internal D.C. bias voltage ($\pm 2.5V$)
- PASS/FAIL judgment
- Auto Level Control (ALC) function
- BIN function provides 9BIN and 1AUX, totally 10 BIN
- 10 steps listed tests to select different frequency, voltage and current criteria
- Standard interface : RS-232C, Handler and USB storage
- Compact size, ideal for automatic equipment (2U,1/2 RACK)

3.5" large TFT LCD provides setting parameters and measurement result observation simultaneously

Corresponding functional keys provide more intuitive and fast operation



Maximum 4 measuring parameters can be shown simultaneously

USB host for data storage and display screen retrieval

Four wire measurement terminal

RS-232C port (standard)

Handler port (standard)

Universal power input AC 100-240V





Comparison ~ LCR-6200 vs LCR-821

Compared with the existing product, the LCR-6000 series provides more test capabilities, including consecutive frequency, D.C. resistance measurement, automatic level control (ALC), and 10 points listed measurement, etc. to facilitate users in accomplishing test missions.

Specifications highlighted in red represent better performance

“X” represents “function not available”



		GW LCR-6200	GW LCR-821
Outlook			
Frequency range		10 Hz to 200 kHz (in continue adjustable)	12 Hz to 200 kHz (in specific points)
Test signal level		10mV ~ 2 Vrms / 100μA ~ 20mA	1.275 Vrms
Test signal level monitor		Yes	No
ALC		Yes	No
Measurement Parameters	R, X, Z	0.00001Ω ~ 99.9999MΩ	0.00001Ω ~ 99999kΩ (X, Z only)
	G, B, Y	0.01nS ~ 999.999S	-----
	L	0.00001μH ~ 9999.99H	0.00001mH ~ 99999H
	C	0.00001pF ~ 9999.99mF	0.00001pF ~ 99999μF
	D	0.00001 ~ 9.99999	0.0001 ~ 9999
	Q	0.00001 ~ 99999.9	0.0001 ~ 9999
	θd	-179.999° ~ 179.999°	-180.00° ~ 180.00°
	θr	-3.14159 ~ 3.14159	-----
	DCR	0.00001Ω ~ 99.9999MΩ	-----
	Δ%	-99999% ~ 99999%	-----
Basic accuracy		0.05%	0.05%
Measurement speed (med.)		100ms	896 ms
DC bias signal level (Int.)		±2.5V adjustable	2 V fixed
Primary / Secondary combinations		Cs-Rs, Cs-D, Cp-Rp, Cp-D, Lp-Rp, Lp-Q, Ls-Rs, Ls-Q, Rs-Q, Rp-Q, R-X, Z-θr, Z-θd, Z-D, Z-Q, DCR	R/Q, C/D, C/R, L/Q, Z/θ, L/R
Monitoring parameters		Z, D, Q, θr, θd, R, X, G, B, Y, Vac, Iac, Δ, Δ%	No
DCR measurement		Yes	No
Auto LCZ function		Available	No
Compensation		Open/Short	Open/Short
Cable length correction		No	No
List sweep		10 steps with Test frequency or signal (voltage/current)	No
Comparator BIN sort		Yes	No
Communication interface		RS-232C	RS-232C
USB Storage		Yes	No
Handler interface		Yes (Standard)	No
Scanner interface		No	No
Dimensions		265(W) x 107(H) x 312(D) mm	322(W) x 149(H) x 433(D) mm

Comparison ~ GW LCR-6300 vs Keysight E4980AL-300

The main features and specifications of the LCR-6000 series are no less than that of the competitor. The series is absolutely the best tool and is worth every penny for users.

Specifications highlighted in red represent better performance

“X” represents “function not available”

	Keysight E4980AL-300	GW LCR-6300
		
Frequency range	20 Hz to 300 kHz	10 Hz to 300 kHz
Test signal level	2 Vrms / 20mA	10mV ~ 2 Vrms / 100µA ~ 20mA
Test signal level monitor	Yes	Yes
ALC	Yes	Yes
Measurement Parameters	R, X, Z ± 1.000000 aΩ to 999.9999 EΩ G, B, Y ± 1.000000 aS to 999.9999 ES L ± 1.000000 aH to 999.9999 EH C ± 1.000000 aF to 999.9999 EF D ± 0.000001 to 9.999999 Q ± 0.01 to 99999.99 θd ± 0.0001 deg to 180.0000 deg θr ± 1.000000 arad to 3.141593 rad DCR ± 1.000000 aΩ to 999.9999 EΩ Δ% ± 0.0001% to 999.9999%	R, X, Z 0.00001Ω ~ 99.9999MΩ G, B, Y 0.01nS ~ 999.999S L 0.00001uH ~ 9999.99H C 0.00001pF ~ 9999.99mF D 0.00001 ~ 9.99999 Q 0.00001 ~ 99999.9 θd -179.999° ~ 179.999° θr -3.14159 ~ 3.14159 DCR 0.00001Ω ~ 99.9999MΩ Δ% -99999% ~ 99999%
Basic accuracy	0.05%	0.05%
Measurement speed (med.)	118 ms	100ms
DC bias signal level (Int.)	1.5 V, 2 V	±2.5V adjustable
Primary / Secondary combinations	Ls-D, Ls-Q, Ls-Rs, Ls-Rdc, Cp-D, Cp-D, Cp-G, Cp-Rp, Cs-D, Cs-Q, Cs-Rs, Lp-D, Lp-Q, Lp-G, R-X, Lp-Rp, Lp-Rdc, Z-θr, Z-θd, G-B, Y-θr, Y-θd	Cs-Rs, Cs-D, Cp-Rp, Cp-D, Lp-Rp, Lp-Q, Ls-Rs, Ls-Q, Rs-Q, Rp-Q, R-X, Z-θr, Z-θd, Z-D, Z-Q, DCR
Monitoring parameters	Vac, Iac, Vdc, Idc	Z, D, Q, θr, θd, R, X, G, B, Y, Vac, Iac, Δ, Δ%
DCR measurement	Yes	Yes
Auto LCZ function	No	Available
Compensation	Open/Short/Load	Open/Short
Cable length correction	1/2/4 m	No
List sweep	201 points with Test frequency or signal (voltage/current)	10 steps with Test frequency or signal (voltage/current)
Comparator BIN sort	Yes	Yes
Communication interface	USB/LAN	RS-232C
USB Storage	Yes	Yes
Handler interface	Yes (Option 201)	Yes (Standard)
Scanner interface	Yes (Option 301)	No

Target markets and associated features

■ R&D and engineering

- Broad frequency range; and consecutive and adjustable frequency can be applied to the measurement simulating components' realistic applications.
- Various auxiliary measurement functions satisfy the measurement requirements for different components or materials.
- The listed test function can simultaneously set 10 points test criteria (based on frequency, voltage or current) to conduct tests for observing components' or materials' characteristic variation.
- Free PC software to save program development time; and the software also provides maximum 1,000 points test criteria settings so as to obtain components' delicate characteristic variation.
- The 2U height and 1/2 rack design is the optimum space saver suitable for either bench top or system rack.

■ Quality Assurance Verification

- High measurement display resolution (6 digits) and accuracy (0.05%) provide accurate measurements on components' specification characteristics.
- Broad frequency and diverse auxiliary measurement functions satisfy the measurement requirements for different components.
- Enlarge display mode, Pass/Fail judgment, and sound response function can effectively expedite the verification time.
- The listed test function can simultaneously set 10 points test criteria (based on frequency, voltage or current) to conduct tests for observing components' or materials' characteristic variation.
- Free PC software can rapidly retrieve and record measurement results to facilitate the follow-on component analysis.

■ Education Lab and Training Institution

- Broad frequency and diverse auxiliary measurement functions satisfy the measurement requirements for different components.
- High measurement display resolution (6 digits) and accuracy (0.05%) provide accurate measurements on components' specification characteristics.
- The listed test function can simultaneously set 10 points test criteria (based on frequency, voltage or current) to conduct tests for observing components' or materials' characteristic variation.
- Free PC software can rapidly retrieve and record measurement results to facilitate the follow-on component analysis.
- The 2U height and 1/2 rack design is the optimum space saver suitable for either bench top or system rack.

■ **Component or material manufacturing**

- Broad frequency and diverse auxiliary measurement functions satisfy the measurement requirements for different components.
- High measurement display resolution (6 digits) and accuracy (0.05%) provide accurate measurements on components' specification characteristics.
- The standardly equipped Handler interface and the sorting function can be applied to connect with sorting machine so as to sort out materials.
- The 2U height and 1/2 rack design is the optimum space saver suitable for either bench top or system rack.

Key dates for product announcement

1. Distributor Announcement & Demo Unit Order and Shipping (3rd of September)
2. Global Market Announcement & Mass Quantity Order Fulfillment (25th of September)

Service policy

1. **1 year warranty**
2. **Service Support**

The service instructions in the Service Manual will help distributors repair defective units promptly. Should the board replacement is necessary to fix the defective unit, the board swapping service support is provided by Good Will Instrument to facilitate the repair jobs done at the distributor's site.

3. GW Instek continually provides the after-sales support through its website. The most up-to-date version of service manual and Marcom material of the LCR-6000 series will be posted on the distributor zone of GW Instek Website at <http://www.gwinstek.com>

SPECIFICATIONS

TEST FREQUENCY

LCR-6300: 10Hz~300kHz(±0.01%) (4 digits resolution)
 LCR-6200: 10Hz~200kHz(±0.01%) (4 digits resolution)
 LCR-6100: 10Hz~100kHz(±0.01%) (4 digits resolution)
 LCR-6020: 10Hz~ 20kHz(±0.01%) (4 digits resolution)
 LCR-6002: 10Hz~ 2kHz(±0.01%) (4 digits resolution)

OUTPUT IMPEDANCE

30Ω / 50Ω / 100Ω selectable

BASIC ACCURACY

Slow / Med 0.05%
 Fast 0.1%

TEST SPEED

FAST: 25ms / MED: 100ms / SLOW: 333ms

TEST SIGNAL LEVELS

Voltage 10.00mV- 2.00V (±10%) CV :10.00mV- 2.00V(±6%)
 Current 100.0uA- 20.00mA (±10%) CC :100.0uA- 20.00mA(±6%) (@2VMax)

DC BIAS

Internal ±2.5V (0.5%+0.005V)

DISPLAY RANGE

R, X, |Z| 0.00001Ω ~ 99.9999MΩ
 G, B, |Y| 0.01nS ~ 999.999S
 L 0.00001uH ~ 9999.99H
 C 0.00001pF ~ 9999.99mF
 D 0.00001 ~ 9.99999
 Q 0.00001 ~ 99999.9
 θd -179.999° ~ 179.999°
 θr -3.14159 ~ 3.14159
 DCR 0.00001Ω ~ 99.9999MΩ
 Δ% -99999% ~ 99999%

TEST MODE

16 Combinations Cs-Rs, Cs-D, Cp-Rp, Cp-D, Lp-Rp, Lp-Q, Ls-Rs, Ls-Q,
 Rs-Q, Rp-Q, R-X, Z-θr, Z-θd, Z-D, Z-Q, DCR
 Monitor parameter (2 selectable) Z, D, Q, Vac, Iac, Δ, Δ%, θr, θd, R, X, G, B, Y

LISTED MODE

10 steps

BIN FUNCTION

Comparator (9BIN,AUX:1BIN)

MEMORY

INT – panel setting 10 file name
 INT – measured data 10000 Data(.csv)
 USB storage 10 file name for setting, 9999 file name for data, 999 Log file for LCD screen

OTHER FUNCTION

Auto Level Control (ALC) ON/OFF
 Average 1~256 times
 Trigger INT / MAN / EXT / BUS
 Delay 0ms~60s
 Judgment PASS / FAIL
 Auto LCZ ON / OFF
 Screen Capture Saving in to USB (Bmp form)

DISPLAY

3.5' LCD, RGB color (320x240)

INTERFACE

RS-232(SCPI), Handler, USB Host

POWER SOURCE

AC 90V-250V, 50-60Hz, Max. 30VA

DIMENSION & WEIGHT

265(W)x107(H)x312(D) mm, Approx. 3kg

Product appearance



Front panel



Rear panel

Ordering information

LCR-6300	10Hz ~ 300kHz	High Precision LCR Meter
LCR-6200	10Hz ~ 200kHz	High Precision LCR Meter
LCR-6100	10Hz ~ 100kHz	High Precision LCR Meter
LCR-6020	10Hz ~ 20kHz	High Precision LCR Meter
LCR-6002	10Hz ~ 2kHz	High Precision LCR Meter

Accessories

Safety Sheet x 1, Power Cord x 1, Test Fixture LCR-06A x 1, CD x1(User manual / PC software)

Optional Accessories

LCR-05	Test Fixture for Axial & Radial Lead Components
LCR-06A	Kelvin Clip Test Lead
LCR-07	Test Fixture, Two-Wire with Alligator Clips
LCR-08	Test Fixture (Tweezers) for SMD/Chip Components
LCR-15	Test Fixture for SMD/Chip Components (0201 to 1812)
LCR-16	Test Fixture – ±45V DC Bias Voltage Box
LCR-17	Test Fixture – ±2.5A DC Bias Current Box
GTL-232	RS-232C Cable, 9-pin Female to 9-pin, null Modem for Computer, Approx. 2m

Should you have any questions about the LCR-6000 series announcement, please don't hesitate to contact us.

Sincerely yours,

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