LCR Meter

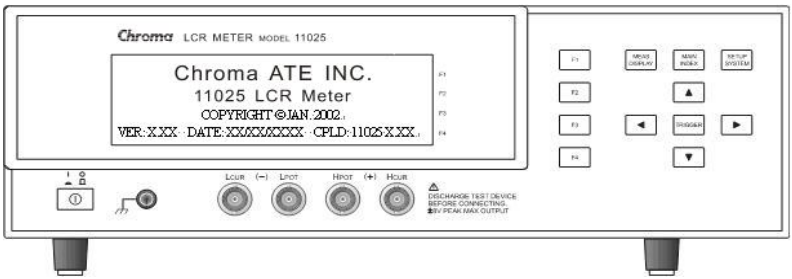
11025

Quick Start Guide

Chroma

www.chromaate.com

LCR Meter
11025
Quick Start Guide



Version 1.0
December 2009
P/N ITM-0102390

Legal Notices

The information in this document is subject to change without notice.

Chroma ATE INC. makes no warranty of any kind with regard to this manual, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Chroma ATE INC. shall not be held liable for errors contained herein or direct, indirect, special, incidental or consequential damages in connection with the furnishing, performance, or use of this material.

CHROMA ATE INC.
No. 66 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan 33383, Taoyuan County, Taiwan

Warranty

All Chroma instruments are warranted against defects in material and workmanship for a period of one year after date of shipment. Chroma agrees to repair or replace any assembly or component found to be defective, under normal use during this period. Chroma's obligation under this warranty is limited solely to repairing any such instrument, which in Chroma's sole opinion proves to be defective within the scope of the warranty when returned to the factory or to an authorized service center. Transportation to the factory or service center is to be prepaid by purchaser. Shipment should not be made without prior authorization by Chroma.

This warranty does not apply to any products repaired or altered by persons not authorized by Chroma, or not in accordance with instructions furnished by Chroma. If the instrument is defective as a result of misuse, improper repair, or abnormal conditions or operations, repairs will be billed at cost.

Chroma assumes no responsibility for its product being used in a hazardous or dangerous manner either alone or in conjunction with other equipment. High voltage used in some instruments may be dangerous if misused. Special disclaimers apply to these instruments. Chroma assumes no liability for secondary charges or consequential damages and in any event, Chroma's liability for breach of warranty under any contract or otherwise, shall not exceed the purchase price of the specific instrument shipped and against which a claim is made.

Any recommendations made by Chroma for use of its products are based upon tests believed to be reliable, but Chroma makes no warranty of the results to be obtained. This warranty is in lieu of all other warranties, expressed or implied, and no representative or person is authorized to represent or assume for Chroma any liability in connection with the sale of our products other than set forth herein.

CHROMA ATE INC.
No. 66 Hwa-Ya 1st Rd, Hwa-Ya Technical Park,
Kuei-Shan 33383, Taoyuan County, Taiwan
Tel: 886-3-327-9999
Fax: 886-3-327-2886
http://www.chromaate.com

Material Contents Declaration

Chroma provides material contents declaration for RoHS compliant products as below:

Part Name	Hazardous Substances					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyls	Polybromodiphenyl Ethers
	Pb	Hg	Cd	Cr^{6+}	PBB	PBDE
PCBA	O	O	O	O	O	O
CHASSIS	O	O	O	O	O	O
ACCESSORY	O	O	O	O	O	O
PACKAGE	O	O	O	O	O	O

“O” indicates that the level of the specified chemical substance is less than the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

“×” indicates that the level of the specified chemical substance exceeds the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

Disposal

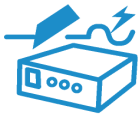
Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal at least for free of charge.

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or specific WARNINGS given elsewhere in this manual will violate safety standards of design, manufacture, and intended use of the instrument. *Chroma* assumes no liability for the customer's failure to comply with these requirements.

BEFORE APPLYING POWER
Verify that the power is set to match the rated input of this power supply.

PROTECTIVE GROUNDING
Make sure to connect the protective grounding to prevent an electric shock before turning on the power.



NECESSITY OF PROTECTIVE GROUNDING
Never cut off the internal or external protective grounding wire, or disconnect the wiring of protective grounding terminal. Doing so will cause a potential shock hazard that may bring injury to a person.

FUSES
Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.

DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE
Do not operate the instrument in the presence of flammable gases or fumes. The instrument should be used in an environment of good ventilation.

DO NOT REMOVE THE COVER OF THE INSTRUMENT
Operating personnel must not remove the cover of the instrument. Component replacement and internal adjustment can be done only by qualified service personnel.

Safety Symbols

DANGER – High voltage.

Explanation: To avoid injury, death of personnel, or damage to the instrument, the operator must refer to an explanation in the instruction manual.

Protective grounding terminal: To protect against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground before operation of equipment.

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

The **CAUTION** sign denotes a hazard. It may result in personal injury or death if not noticed timely. It calls attention to procedures, practices and conditions.

This indicates important information or tips for the procedures and applications, etc. The contents should be read carefully.

Table of Contents

1. Introduction

1.1 An Overview of Product

The **11025 LCR Meter** is an automatic instrument used for testing and analyzing components. The unit was designed to solve the problems of low labor efficiency and low product quality that have occurred since the electronics sector began to flourish.

The testing functions included in this unit are: L, C, R, Z, DCR, N, and M, which supply the perfect functions on the production line and in quality control.

By using the internal microprocessor, the unit can support fast, highly accurate and reliable testing at low cost. The functions are as follows: Hi or Lo-limit comparator; testing frequency; selector of testing voltage; data store and recall; GPIB or RS-232 (option) interface controls 11025 and data transfer; and statistics analysis function from PC. The unit can send the test results to an external unit for checking the response of the component by handler interface.

The multi-function testing device, ergonomic keyboard design, guided panel operation, extra-large LCD, and password protection makes 11025 easy to operate and ensures high accuracy.

The basic accuracy is 0.1%. The measurement device (optional) can perform the calibration by keying-in the measuring parameter. The calibration procedure can be finished easily for users by offering OPEN and SHORT.

If the unit requires external or extended testing, please be aware the correct connection of four terminals. In case of high-frequency measurement, it is necessary to consider the high-frequency response.

1.2 Brief Specifications

- **Measurement Parameter:**
  Primary parameters -- L, C, R, | Z |, L2A, L2B
  Secondary parameters – Q, D, θ, ESR, Xs, DCR, N, M, 1/N, R2
- **Basic Accuracy:** Basic 0.1% (1kHz/1V rms)
- **Measurement Range:**
  L – .001uH~ 99.999kH
  C – .001pF ~ 1.9999F
  R – .01mΩ ~ 99.99MΩ
  |Z| – .01mΩ ~ 99.99MΩ
  Q – .0001 ~ 9999
  D – .0001 ~ 9999
  θ – -180.00° ~ +180.00°
  L2A -- .001uH ~ 99.999kH
  L2B -- .001uH ~ 99.999kH
  M -- .001uH ~ 99.999kH
  N -- 0.001T ~ 9999.9
  1/N -- 0.001T ~ 9999.9
  R2 -- .01mΩ ~ 99.99MΩ
  DCR -- .01mΩ ~ 99.99MΩ
- **Measurement Frequency:** 50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz and 100kHz
- **Measurement Voltage** : 10mV to 1.0V rms, each step by 10mV
- **Equivalent Circuit** : Series, Parallel
- **Zeroing Calibration** : Open, Short
- **Interface** : GPIB, Handler and RS-232 interface (option)

1.3 Incoming Inspection

Upon receipt of this instrument, please check the items as following:

(1) Any damages or scratches on the surface of the product.
(2) Listed in Table 1-1 and Table 1-2 are accessories for this instrument.

If you found any damages or discover that accessories are missing, please contact our company, branches, or agents for prompt service.

Table 1-1 Standard Accessories

Item	Qty	Description
A110207 Test Box	1	Transformer test box
A110234 High Frequency Test Cable	1	4-Terminal high frequency test cable
Power Cord	1	1.8-meter power cord
Converter	1	Power plug 3P to 2P
Slow Blow Fuse 1A	2	For AC 110V use
Slow Blow Fuse 0.5A	2	For AC 220V use
Quick Start Guide	1	English

Table 1-2 Optional Accessories

Item	Qty	Description
A110211 Component Test Box	1	Test box for DIP type passive component
A110212 Component Remote Test Box	1	Remote test box (1 meter) of DIP type passive component
A110104 SMD Test Cable	1	Test cable for SMD type passive component
A110232 4 BNC Test Cable	1	4-Terminal test cable
A133004 SMD Test Box	1	Test box for SMD type passive component
50 Pin Handler Control Line	1	2-terminal 50 Pin Handler connector (M) control line (0.5 m)
50 Pin Handler Control Line	1	2-terminal 50 Pin Handler connector (M) control line (1.5 m)
24 Pin Handler Control Line	1	2-terminal 24 Pin Handler connector (M) control line (1 m)
Chroma 1320 Control Line	1	50 Pin Handler connector (M)/ 24 Pin

		Handler connector (M)/ 9Pin D-SUB (F) control line (2 m)
A110239 4 Terminals SMD Electrical Capacitor Test Box	1	Test box for SMD type electrical capacitor
A110236 Rack Mountain Kit	1	Fixed on system rack
A110242 Battery ESR Test Kit	1	Test box for isolating DUT DC voltage
A110244 High Capacitance Capacitor Test Fixture	1	Test cable for high capacitance electrical capacitor
A110245 Ring Core Test Fixture	1	For measuring ring core
A132574 SMD Test Box	1	Test box for SMD type Power Choke

Notice For further detailed descriptions, please refer user's manual CD.

2. Specifications (15°C ~ 35°C, RH ≤ 75%)

2.1 Measurement Functions

Primary Parameter:

L : Inductance	unit: uH, mH, H, kH
C : Capacitance	unit: pF, nF, uF, mF
R : Resistance	unit: mΩ, Ω, kΩ, MΩ
| Z | : Absolute value of impedance	unit: mΩ, Ω, kΩ, MΩ
L2A : Inductance value of A coil	unit: uH, mH, H, kH *
L2B : Inductance value of B coil	unit: uH, mH, H, kH *

Secondary Parameter:

Q : Quality factor	
D : Dissipation factor	
ESR : Equivalent series resistance	unit : mΩ, Ω, kΩ, MΩ
θ : Phase angle	unit : ° ; degree
Xs : Reactance	unit : mΩ, Ω, kΩ, MΩ
R2 : Primary of DC resistance	unit : mΩ, Ω, kΩ, MΩ *
DCR : DC resistance	unit : mΩ, Ω, kΩ, MΩ
N : Ratio of coil	*
1/N : Reciprocal of N	*
M : Mutual inductance	unit : uH, mH, H, kH *

Equivalent Measurement Circuit: Parallel and Series
Ranging: Auto and Manual
Trigger mode: Internal, Manual and External (GPIB, Handler and RS-232 interface)
Measurement terminals: 4-terminal.
Measurement speed: Fast, Medium and Slow.

Note: * means to use with Model A110207 transformer test fixture.

2.2 Test Signals

Frequency: 50Hz, 60Hz, 100Hz, 120Hz, 1kHz, 10kHz, 20kHz, 40kHz, 50kHz and 100kHz ± (0.01% ± 0.01Hz)
Accuracy of frequency: ±(0.01% ± 0.01Hz)
Voltage: 10mV ~ 1.0Vrms, 10mV/step

Output Impedance:
Constant mode 25 OHM : 25Ω ± 5%
Constant mode 100 OHM : 100Ω ± 5%
Constant mode 10 OHM/C.C : DUT impedance ≥10Ω is 10Ω ± 10%.
C.C : Constant Current. Lower than 10Ω inductive load is 100mA ± 5% (When test voltage is 1V).
Constant mode 100/25 OHM : 25Ω ± 5%, DUT impedance < 1Ω
100Ω ± 5%, DUT impedance ≥ 1Ω

2.3 Accuracy

- Within 1 year of factory calibration.
- Temperature: 23°C ± 5°C
- Relative humidity: 90% maximum
- Warm up: 30 minutes minimum
- Zero calibration under above conditions

1. | Z | - *θ* Accuracy
The basic accuracy is listed in Table 2-1.
- Measured by fast rate, the accuracy must be doubled.

| Z | (Ω)	50Hz	60Hz	100Hz	120Hz	1kHz	10kHz	20kHz	40kHz	50kHz	100kHz
10M	0.6% 0.8°	0.6% 0.8°	0.48% 0.5°	0.4% 0.45°	0.35% 0.4°					
1M	0.4% 0.6°	0.4% 0.6°	0.24% 0.33°	0.20% 0.3°	0.16% 0.08°	0.5% 0.12°	1.5% 0.12°	2% 0.24°	2% 0.24°	2% 0.4°
100k	0.3% 0.4°	0.3% 0.4°	0.2% 0.24°	0.2% 0.24°	0.12% 0.06°	0.5% 0.08°	1.5% 0.09°	1.8% 0.24°	1.8% 0.24°	2% 0.3°
10k	0.3% 0.2°	0.3% 0.2°	0.2% 0.2°	0.2% 0.2°	0.1% 0.05°	0.45% 0.07°	0.5% 0.08°	0.6% 0.08°	0.6% 0.08°	0.7% 0.2°
1k	0.3% 0.2°	0.3% 0.2°	0.2% 0.2°	0.2% 0.2°	0.1% 0.05°	0.2% 0.07°	0.36% 0.08°	0.4% 0.08°	0.4% 0.08°	0.45% 0.2°
100	0.4% 0.2°	0.4% 0.2°	0.25% 0.2°	0.25% 0.2°	0.24% 0.09°	0.26% 0.09°	0.36% 0.15°	0.4% 0.17°	0.4% 0.17°	0.5% 0.2°
10	0.5% 0.3°	0.5% 0.3°	0.45% 0.22°	0.4% 0.22°	0.32% 0.09°	0.35% 0.15°	0.4% 0.15°	0.5% 0.17°	0.5% 0.17°	0.6% 0.2°
1	0.8% 0.4°	0.8% 0.4°	0.7% 0.24°	0.5% 0.24°	0.35% 0.15°	0.35% 0.15°	0.4% 0.2°	0.7% 0.26°	0.7% 0.26°	0.9% 0.6°
0.1										

Frequency

Table 2-1 |Z|, θ Accuracy

2. L, C Accuracy

For Q ≥ 10 that is D ≤ 0.1, corresponds to accuracy of | Z |, where
| Z_L | = | 2 πfL |
| Z_C | = | 1/(2π fC) |
Refer to conversion chart between LC and | Z | in figure 2-1. If Q <10 that is D > 0.1, multiply L accuracy by (1+1/Q) and multiply C accuracy by (1+ D).

3. D, Q Accuracy

For all D value

Accuracy of D = $\pm \frac{\tan\theta_e \times (1 + D^2)}{1 - D \times \tan\theta_e}$

For Q ≥10

Accuracy of Q = $\pm \frac{\tan \theta e \times (1 + Q^2)}{1 - Q \times \tan \theta e}$

If Q < 10, multiply accuracy Q by (1+1/Q)

※ θe is θ error specification in Table 2-1.

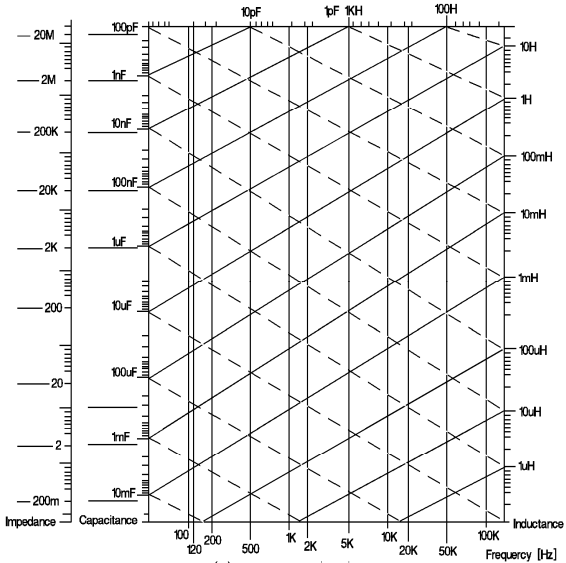
4. ESR, EPR Accuracy

For $Q \leq 0.1$

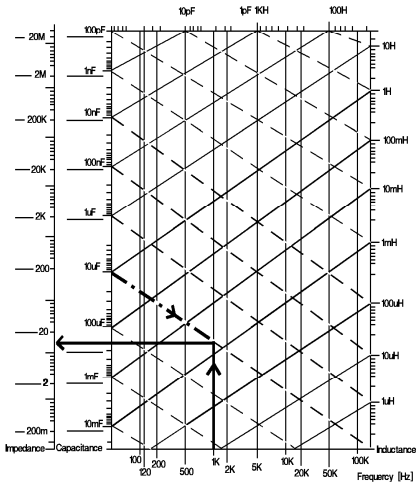
Accuracy of R = Accuracy of | Z |

If $Q \geq 0.1$, multiply accuracy by (1+Q)

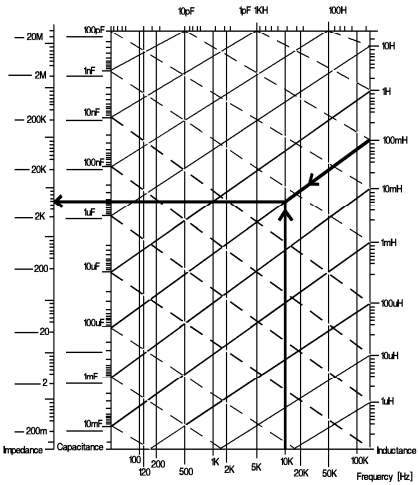
Figure 2-1 LC ← → | Z | conversion



(a). LC ← → | Z | coversion chart



(b). C → | Z | coversion chart



(c). L → | Z | coversion chart

5. Direct Current Resistance (DCR) Accuracy

Rx < 100Ω,

$$Ae\ [\%] = A + B \times \frac{Rs}{Rx} + \frac{C}{Rx} + 0.2m\Omega$$

Rx ≥ 100Ω,

$$Ae\ [\%] = A + B \times \frac{Rx}{Rs}$$

The relation between DC resistance Rx, Rs and parameter B:

Rx	Rs	A	B
1MΩ ≤ Rx ≤ 100MΩ	1MΩ	0.2	0.03
100kΩ ≤ Rx < 1MΩ	100kΩ	0.1	0.01
10kΩ ≤ Rx < 100kΩ	10kΩΩ	0.1	0.01
1kΩ ≤ Rx < 10kΩ	1kΩ	0.08	0.01
10Ω < Rx < 1kΩ	100Ω	0.08	0.01
1Ω < Rx ≤ 10Ω	10Ω	0.1	0.01
100mΩ < Rx ≤ 1Ω	1Ω	0.1	0.02
0mΩ ≤ Rx ≤ 100mΩ	100mΩ	0.2	0.03

Parameter C:

Length / Parameter	0 M	1 M	2 M
C	0	0.01Ω	0.02Ω

6. Turns Ratio Accuracy

$$Ne\ [\%] = A + \frac{L_C}{L_{2X}} \times 100 + B \times N_X$$

A:

Parameter	100Hz	120Hz	100Hz	120Hz	1kHz	10kHz	20kHz	40kHz	50kHz	100kHz
A	0.3%	0.3%	0.25%	0.25%	0.25%	0.25%	0.25%	0.3%	0.3%	0.3%

L_C:

Length	50Hz	60Hz	100Hz	120Hz	1kHz	10kHz	20kHz	40kHz	50kHz	100kHz
0m	30μH	30μH	20μH	20μH	2μH	2μH	2μH	2μH	2μH	2μH
1m, 2m	300μH	300μH	200μH	200μH	20μH	20μH	20μH	20μH	20μH	20μH

B:

Parameter	50Hz	60Hz	100Hz	120Hz	1kHz	10kHz	20kHz	40kHz	50kHz	100kHz
B	0.04%	0.04%	0.03%	0.03%	0.01%	0.01%	0.02%	0.03%	0.03%	0.05%

a. When the test voltage V_T is smaller than 0.1V, needs to multiply the B by $\frac{100mV}{V_T}$.

b. When the measurement speed at “MEDIUM” range, needs to multiply the B by 2.
When the measurement speed at “FAST” range, needs to multiply the B by 4.

2.4 Zero

Zero open:
It removes the measurement error of open stray impedance which caused by testing fixture.
Zero short:
It removes the measurement error of short residual impedance which caused by testing fixture.

2.5 Measurement Time

From the measurement to start, analog sampling calculation to Binning or Compare signal output measuring time. Please refer to the Table 2-2. (INTEG. CYCLE is set as “1”, please refer to section 4-6 in user’s manual.)

Item	Fast	Medium	Slow
4 terminals testing (without DCR)	21 mS 26 mS (50, 60Hz)	51 mS	360 mS
4 terminals testing (with DCR)	108 mS	208 mS	598 mS
2 terminals testing L2-N, 1/N, M	65 mS 100 mS (50, 60Hz)	126 mS	540 mS 760 mS (50, 60, 100, 120Hz)
2 terminals testing L2-R2	180 mS	280 mS	670 mS

Table 2-2 Measurement Time

2.6 Others

- **Power:** (1) 90V ~ 125V AC, 50Hz/60Hz. Power consumption is 65W, maximum.
  (2) 190V ~ 250V AC, 50Hz/60Hz. Power consumption is 65W, maximum.
- **Environment:** Operating -- 10°C to 40°C, 10 to 90% relative humidity.
  Storage -- 0°C to 50°C, 10 to 90% relative humidity.
- **Dimension:** 320(W) x 115(H) x 350(D)
- **Weight:** Approx 5.4kg.

3. Installation

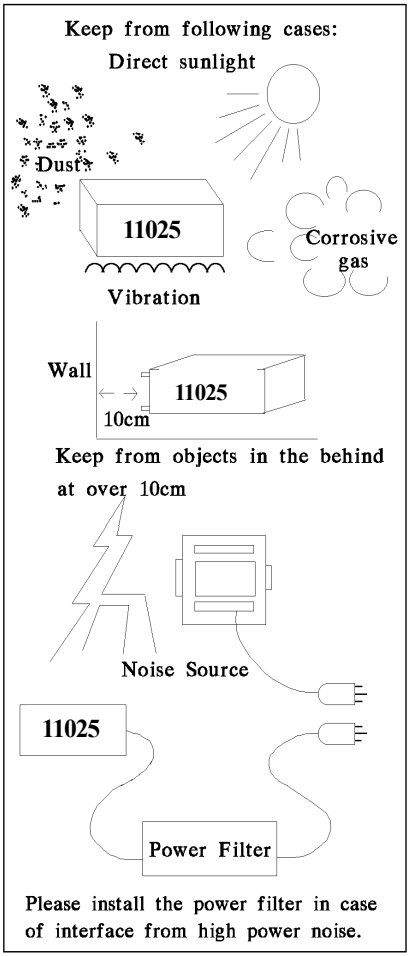
3.1 Ambient Environment

(1) Do not use the meter in a dusty or vibrating location. Do not expose it to sunlight or corrosive gas. Be sure that the ambient temperature is 10 ~ 40°C and that the relative humidity is below 90%.

(2) The rear of the meter is equipped with a cooling fan to keep the internal temperature down, so adequate ventilation should be ensured. The meter should be located at least 10cm from any object or wall behind it. Do not block the left and right ventilation holes to keep the meter in good precision.

(3) The meter has been carefully designed to reduce the noise from the AC power source. However, it should be used in as noise-free an environment as low as possible. If noise is inevitable, please install a power filter.

(4) The meter should be stored within the temperature range 0°C ~ 50°C. If the unit is not to be in use for a long time, please store it in the original or similar package and keep it from direct sunlight and humidity.



3.2 Power-Line Connection

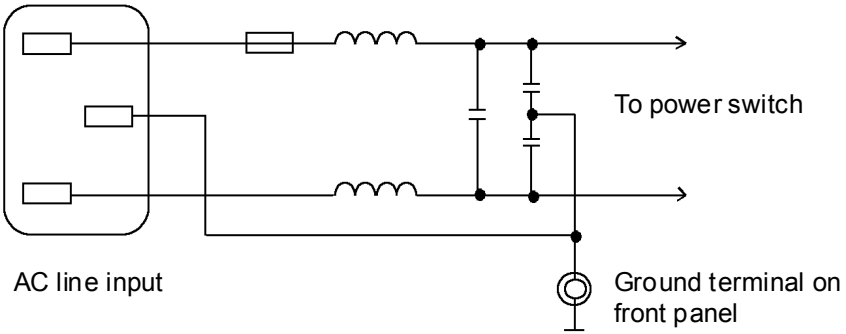
Before plugging in the power cord, please make sure the power switch is at the off position and that the voltage of the rear panel meets the required voltage. Please use the 50 Hz or 60Hz power supply frequency.

3.3 Fuse

There is one fuse installed in the rear panel. When replacing the fuse, please turn off the power and pull the plug from the power supply.

Fuse spec. AC 100V ~ 120V → T1A 250V
AC 220V ~ 240V → T0.5A 250V

For reasons of safety and noise reduction, use a power cord corresponding to the illustration in below figure:



3.4 Power Regulation

As this instrument is a precision electronic test device, so the accuracy is possible to be influenced lower by input power unstable after testing. There is ±10% changeable power even in the laboratory, so we suggest that use the regulator in power and test devices the only one way to avoid the reasons that cause by power unstable.

3.5 Connecting Unknown

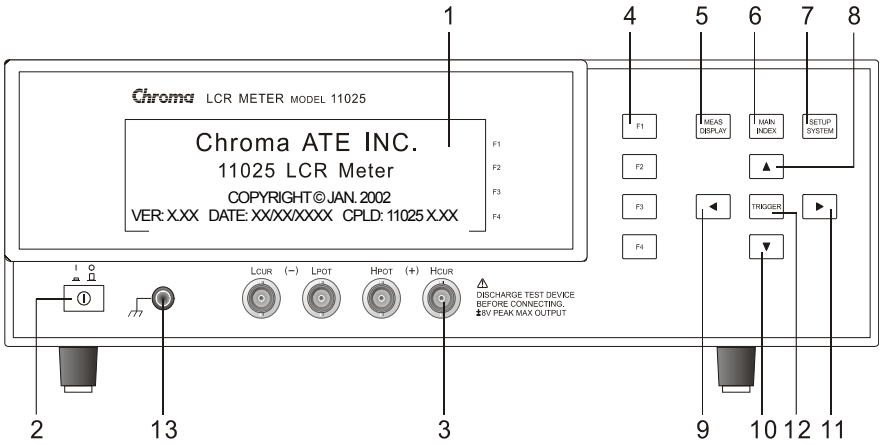
Due to the 11025 LCR METER connects to D.U.T (Unknown device), that can through the 4 BNC connectors which are Hcur, Hpot, Lpot and Lcur.

Notice

The Lcur and Lpot connect to DUT should be at the same terminal, Hcur and Hpot connect to another terminal.

4. Description of Panel

4.1 Front Panel



(1) LCD Display
The resolution of this instrument display is 64x240 Graphic mode LCD, so all the measurements and setting values can be shown clearly.

(2) POWER Switch
Turn the 11025 ON and OFF.

(3) Unknown Terminals
Four individual BNC sockets connect an external test device or wire for unknown testing.
HCUR : High terminal of current drive
HPOT : High terminal of potential detector
LPOT : Low terminal of potential detector
LCUR : Low terminal of current drive

CAUTION The "high" terminals for (+) and "low" terminals for (-) polarity are as marked on the front panel, while the polarized component is under test.

WARNING To avoid shocking the instrument, please discharge the unit before measuring the components with polarity.

(4) Function keys

The major function of these keys is to show the different conditions of each function or other options which may need to be selected depending on the user's requirements.

(5) Measure display key

Upon pressing this key, the instrument is in basic component measurement & analysis mode. Under this screen, each test parameter can be changed directly and the value can be read. For example, test frequency, test voltage, measuring parameter, test speed, series or parallel, etc.

(6) Main index key

Upon pressing this key allows entry to the main index screen. In this screen you may select what you want to test, for example, the analysis of unknown test result, open test, short test, compare function, etc.

(7) System setup key

Pressing this key gives access to the main system parameters setup, allowing each system parameter to be changed directly, e.g., the calibration of this instrument, memory management, selection and setting parameter of each system and measurement parameter (The functions of calibration and memory management requires a password for entry).

(8)~(11) Cursor keys

There are four keys, corresponding to up, down, left and right. These keys are for display in different conditions and control cursor, which can be useful when inputting each parameter. The keys can also be selective, e.g., for changing values such as setting frequency or voltage.

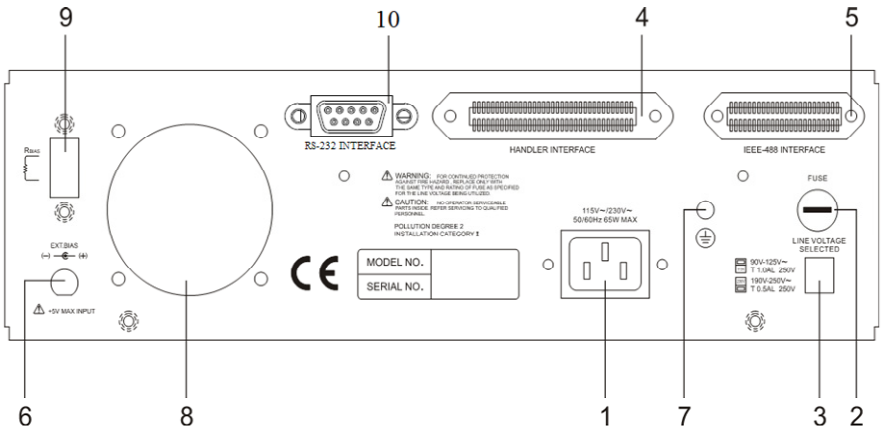
(12)Trigger key

When starting to test the unknown, press this key when the measure condition of the instrument is an manual trigger.

(13)Ground Terminal

This terminal connects the cover of the instrument directly to ground to avoid exterior obstruction that makes connection incomplete and the instrument unsafe.

4.2 Rear Panel



(1) AC Line Socket

This socket is an approved (by the International Electromechnical Commission) three-line socket 320. Please use the correct wire, such as Belden SPH-386 or similar (W12 010130).

(2) Fuse

1A or 0.5A slow flow fuse to prevent the instrument being affected by excess current in 90 ~ 125V or 190 ~ 250V.

(3) LINE Voltage Selector

Ensure power is off, then use screwdriver to switch to required voltage.

(4) Handler INTERFACE Socket

To component controller, output is GO/NG and status etc., input is "Start" signal. Receive Amphonol "Microribbon" plug P/N 57-30240 or equal object.

(5) IEEE-488 (GPIB) INTERFACE Socket

According to IEEE488-1978 standard input/output cord, the functions include total remote control, output selection result and with or without controller. It receives IEEE-488 interface connection cord.

(6) External DC Bias Terminal

External bias can connect to test system through rear panel BIAS INPUT BNC terminal. External bias should correspond to the

following specifications:

- Be sure voltage is not over 5V.
- Suggested voltage limit should be set on 1A.
- Use a good filter voltage is suggested. Because of bias, miscellaneous signal will influence test frequency and power frequency especially.
- External circuit should include any DUT bias application of switching test device and charge needs to be off before removal.
- Connect external bias and switched type circuit by using connection line W38 001270 through EXT. BIAS connector on rear panel.
- Notice the polarity which marked on the panel.

(7) Guard Terminal

This terminal connects the cover of the instrument directly, then connect to the terminal for avoiding exterior obstruction that makes instrument connection incomplete and the instrument unsafe.

(8) Fan

Heat dissipation fan keeps test instrument from overheating to ensure the most accurate measurement value.

(9) DC Bias Trimmer

The Bias can control DC output current of measuring terminals, also relate to the setting of constant mode. Please refer to the Table 4-1.

Constant Mode	Output R (Range)	Output current of measuring terminal I_{DC} (A)	I_{DC} (RDC < 100mΩ)	Maximum output current
25 OHM	25Ω	$(5V \times \frac{1k\Omega}{1k\Omega+RBIAS})/(25+RDC)$	$\frac{1k\Omega}{1k\Omega+RBIAS} \times 200mA$	200 mA
100 OHM	100Ω	$(5V \times \frac{1k\Omega}{1k\Omega+RBIAS})/(100+RDC)$	$\frac{1k\Omega}{1k\Omega+RBIAS} \times 50mA$	50 mA
100/25 OHM	100Ω	$(5V \times \frac{1k\Omega}{1k\Omega+RBIAS})/(100+RDC)$	$\frac{1k\Omega}{1k\Omega+RBIAS} \times 50mA$	50 mA
	25Ω	$(5V \times \frac{1k\Omega}{1k\Omega+RBIAS})/(25+RDC)$	$\frac{1k\Omega}{1k\Omega+RBIAS} \times 200mA$	200 mA
10 OHM/C.C	Without this function			

Table 4-1

R_{DC} : Resistance(Ω) of object
R_{BLAS} : It can gain the maximum output current, when connect external bias current source to short circuit (0Ω)

Example:

When the Constant Mode at 100/25, the frequency at 100kHz/0.1V and add the 8mA of DC Bias then measure a 1mH inductor:

1. $Z = 2\pi fL = 628\Omega > 1\Omega$ then refer to Table 4-1 that the Max. output current is 50mA.
2. If the DC resistance value of inductor R_{DC}<100mΩ, then $\frac{1k\Omega}{1k\Omega+R_{BIAS}} x\ 50mA = 8mA$. And $R_{BIAS} = 5.25k\Omega$.

The relation between R_{BIAS} resistance and DC voltage output at test terminal is as below Table 4-2.

Constant Mode	**Output R (Range)**	**Output voltage at testing terminal V_{DC} (V)**	**V_{DC} (RDC >> R_O)**	**Max. output voltage V_{DC}**
25 OHM	25 Ω	$(\frac{1k\Omega}{1k\Omega+RBIAS} \times 5V) \times \frac{RDC}{25\Omega+ RDC}$	$\frac{1k\Omega}{1k\Omega+RBIAS} \times 5V$	5V
100 OHM	100 Ω	$(\frac{1k\Omega}{1k\Omega+RBIAS} \times 5V) \times \frac{RDC}{100\Omega+ RDC}$		
100/25 OHM	100Ω (Z≥1Ω)	$(\frac{1k\Omega}{1k\Omega+RBIAS} \times 5V) \times \frac{RDC}{100\Omega+ RDC}$		
	25 Ω (Z<1Ω)	$(\frac{1k\Omega}{1k\Omega+RBIAS} \times 5V) \times \frac{RDC}{25\Omega+ RDC}$	---	---
10 OHM/C.C	Without this function			

Table 4-2

(10)RS-232 Interface (option)

The socket is for connecting RS-232 interface. The interface of GPIB and RS-232 can't be used simultaneously.

Headquarters 總公司

CHROMA ATE INC. 致茂電子股份有限公司

66, Hwa-ya 1st Rd., Hwaya Technology Park,

Kueishan 33383, Taoyuan, Taiwan

台灣桃園縣33383龜山鄉華亞科技園區華亞一路 66 號

TEL: + 886 - 3 - 327 - 9999

FAX: + 886 - 3 - 327 - 8898

e-mail: chroma@chroma.com.tw