

## LCR Meter

### MODEL 11021/11021-L

#### Key Features

- Test frequencies: 100Hz, 120Hz, 1kHz and 10kHz (9.6kHz) (11021) 1kHz, 10kHz, 40kHz, 50kHz (11021-L)
- Basic accuracy: 0.1% (11021), 0.2% (11021-L)
- 0.1m $\Omega$  ~99.99 M $\Omega$  measurement range, 4½ digits resolution
- Lower harmonic-distortion affection
- Fast measurement speed (75ms)
- Standard RS-232 interface
- Optional GPIB & Handler interface
- Programmable trigger delay time is convenient for measurement timing adjustment in automatic production
- Bin-sorting function
- Comparator and pass/fail alarming beeper function
- Text mode 40x4 matrixes LCD display
- Friendly user interface
- Open/short zeroing
- On-line firmware refreshable (via RS-232)
- Input protection (1 Joule)



## LCR METER MODEL 11021/11021-L

The Chroma 11021/11021-L are the most cost-effective digital LCR Meters, provide 100Hz, 120Hz, 1kHz, and 10kHz test frequencies for the 11021 and 1kHz, 10kHz, 40kHz, 50kHz test frequencies for the 11021-L. Standard RS232 interface, optional GPIB & Handler interface, high speed and stable measurement capabilities enable the Chroma 11021/11021-L can be used for both component evaluation on the production line and fundamental impedance testing for bench-top applications.

#### Bin-sorting Function

The 11021/11021-L provides 8-bins sorting function with bin count statistics. It is very convenient for magnetic core sorting or capacitor sorting. And the bin count statistics can be used to analysis distribution of tested results or production quality.

#### HI/GO/LO Comparator

The 11021/11021-L has a comparator function to judge HI/GO/LOW of capacitance measured results, and to judge GO/NG of D factor. And an alarming beeper for total GO/NG judge.

#### Trigger Delay Time

For large capacitance measurement in automatic production, a RC (meter output resistance and unknown capacitance ) delay time for test signal transient is necessary. The 11021/11021-L provides trigger delay time for it, and is convenient for automatic equipment timing adjustment.

#### Input Protection

Un-discharged device (generally, a capacitor) under test is the most general reason causes destroy on a LCR Meter. The 11021/11021-L using an excellent input protection circuit to prevent it from this kind of damage.

#### Open/Short Zeroing

General low-end LCR meter just provides zero offset to substrate stay capacitance, residual resistance or residual inductance only for C, R, L measurement which can not accurately measure Q (quality factor) for L, R measurement and D (dissipation factor) for C measurement. The 11021/11021-L provides full open/short circuit zeroing function.

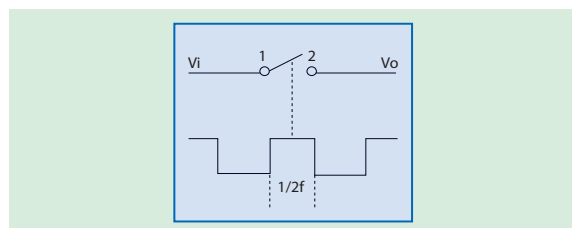


# Chroma

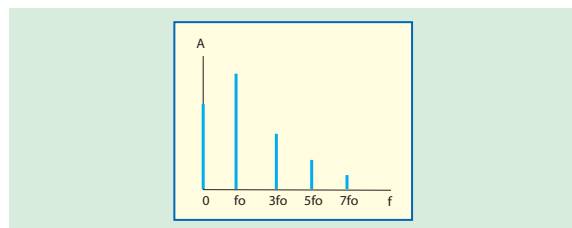


## Lower Harmonic-distortion Phase-detection Technology

The 11021/11021-L uses lower harmonic-distortion phase-detection technology to reduce affection of measurement accuracy caused by hysteresis distortion in magnetic component or high dielectric-coefficient capacitor measurement, which is not provided in general low-end LCR meters. General low-end LCR meters use half period integration method as phase detector. The 11021-L is the ideal selection for high frequency coil, core, choke, ect passive components incoming/outgoing material quality inspect and automatic production. The frequency spectrum of half period square wave is shown as figure 1 and 2, which non-ignorable 3<sup>rd</sup>, 5<sup>th</sup> order harmonics are included. For non-linear devices under testing, odd-order (3<sup>rd</sup>, 5<sup>th</sup>, 7<sup>th</sup>, etc.) harmonics may occur in measured potential or current signals. Then, this phase-detection method will cause obvious accuracy error because of same low order harmonics are included in both unknown signal and phase-detect signal. The 11021/11021-L uses eight steps sine-wave multiplier as phase detector to reduce low-order harmonics affection to an ignorable level.



**Figure 1** : The frequency spectrum of half period square wave (general low-end LCR meters)



**Figure 2** : Non-ignorable 3<sup>rd</sup>, 5<sup>th</sup> order harmonics (11021 uses eight steps sin-wave multiplier)

## SPECIFICATIONS

Model	11021	11021-L
<b>Measurement Parameter</b>		
Primary Display	L, C, R,  Z	
Secondary Display	Q, D, ESR, Xs, $\theta$	
<b>Test Signals Information</b>		
Test Level	0.25V / 1V, $\pm(10\% + 3\text{ mV})$	50mV/ 1V, $\pm 10\%+3\text{mV}$
Test Frequency	100Hz, 120Hz, 1kHz, 10kHz (9.6kHz)	1kHz, 10kHz, 40kHz, 50kHz
Frequency Accuracy	$\pm 0.25\%$	$\pm 0.02\%$
Output Impedance (Typical)	Varies as range resistors 25, 100, 1k, 10k, 100k	
<b>Measurement Display Range</b>		
Primary Parameter	L: 0.01 $\mu\text{H}$ ~ 9.999kH, C: 0.01pF ~ 99.99mF, R, Z : 0.1m. ~ 99.99M $\Omega$	
Secondary Parameter	Q: 0.1 ~ 9999.9, D: 0.0001 ~ 9999.9, $\theta$ : -180.00° ~ +180.00°	
Basic Accuracy *1	$\pm 0.1\%$	$\pm 0.2\%$
<b>Measurement Time (1KHz) *2</b>		
Fast	Freq = 1k/10kHz : 75ms Freq = 100/120Hz: 85ms	Freq = 1kHz/10kHz : 75ms Freq = 40kHz : 105ms Freq = 50kHz : 90ms
Medium	145ms	*3
Slow	325ms	*4
Trigger	Internal, Manual, External, BUS	
<b>Display</b>		
L, C, R,  Z , Q, D, R, $\theta$	40 x 4 (Character Module) LCD Display	
<b>Function</b>		
Correction	Open/Short zeroing	
Equivalent Circuit Mode	Series, Parallel	
<b>Interface &amp; Input/Output</b>		
Interface	RS-232 (Standard), Handler & GPIB (Optional)	
Output Signal	Bin-sorting & HI/GO/LOW judge	
Comparator	Upper/Lower limits in value	
Bin Sorting	8 bin limits in %	
Trigger Delay	0 ~ 9999mS	
<b>General</b>		
Operation Environment	Temperature : 10°C ~ 40°C, Humidity < 90 % R.H.	
Power Consumption	50VA max.	
Power Requirement	90 ~ 132Vac or 180 ~ 264Vac, 47 ~ 63Hz	
Dimension (H x W x D)	100 x 320 x 206.4 mm / 3.94 x 12.6 x 8.13 inch	
Weight	4 kg / 8.81 lbs	

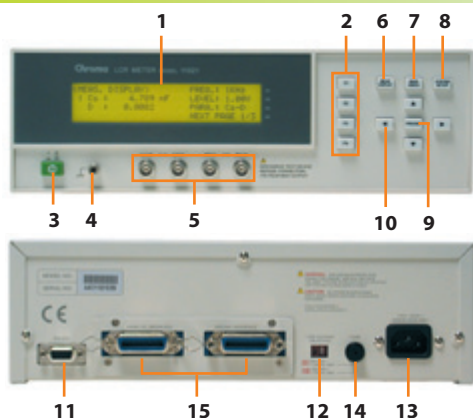
**Note\*1** : 23  $\pm$  5°C after OPEN and SHORT correction, slow measurement speed. Refer to operation manual for detail measurement accuracy descriptions.

**Note\*2** : Measurement time includes sampling, calculation and judge test parameter measurement.

**Note\*3** : Freq.=1kHz/10kHz 145ms Freq.=40kHz 185ms Freq.=50kHz 150ms

**Note\*4** : Freq.=1kHz/10kHz 325ms Freq.=40kHz 415ms Freq.=50kHz 400ms

## PANEL DESCRIPTION



1. LCD Display
2. Function Keys
3. Power Switch
4. Ground Terminal
5. Measurement Terminals
6. Measurement Display Key
7. Main Index Key
8. System Setup Key
9. Trigger Key
10. Cursor Keys
11. RS232 Interface
12. Power Voltage Selector
13. AC Line Input
14. Fuse
15. GPIB and Handler Interface

## ORDERING INFORMATION

- 11021 : LCR Meter 1kHz
- 11021 : LCR Meter 10kHz
- 11021-L : LCR Meter
- A110104 : SMD Test Cable #17
- A110211 : Component Test Fixture
- A110212 : Component Remote Test Fixture
- A110232 : 4 BNC Test Cable with Clip#18
- A110234 : High Frequency Test Cable
- A110235 : GPIB & Handler Interface
- A110236 : 19" Rack Mounting Kit
- A110242 : Battery ESR Test Kit
- A133004 : SMD Test Box
- A165009 : 4 BNC Test Cable with Probe

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