PROGRAMMABLE AC POWER SOURCE MODEL 61509/61508/61507/ 61609/61608/61607

The global market for AC power testing demands for a more sophisticated, high performance AC source capable of simulating a wide range of AC line conditions. To meet these demands, Chroma has developed a high power density, low form factor (5U) instrument. The Chroma 61509/61508/61507 /61609/61608/61607 models are the latest of the 61500/61600 series AC Source. The Chroma 61500/61600 series programmable AC source are the right solutions to meet complex single and three phase requirements due to their ability to simulate AC line conditions and measure critical product characteristics during testing. These features make the 61500/61600 series ideal for commercial, power electronics, avionics, military, and regulation test applications from bench-top R/D design verification and quality assurance to mass production. DC functionality enhancements, with DC power ratings of up to 100% of full output power, has further extended test application capabilities especially for AC/DC server PSU.

Using state of the art PWM technology, the 61509/61508/61507/61609/61608/61607 models deliver maximum output voltage of up to 350Vac and output frequency of 15Hz to 2000Hz. All models possess the ability to generate pure sine waveform output with typical distortion of less than 0.3% at 50/60Hz.

The Chroma 61500/61600 series are able to provide precision measurements such as RMS voltage, RMS current, true power, power factor, current crest factor, and so on. By applying the advanced DSP technology, the 61509/61508/61507 models easily simulate power line disturbance (PLD) by LIST, PULSE, and STEP modes.

The Chroma 61500 series allow users to compose different harmonic components to synthesize various harmonic and distorted waveforms. By applying this advanced feature, users can program a sweeping frequency component incorporated with the fundamental voltage for finding the resonance points of the UUT, thus providing users with in-depth analytical results.

To simulate the natural waveforms, the Chroma 61500/61600 series provide an external analog input to amplify the analog signal generated by an arbitrary signal generator. Thus, users can implement this feature to duplicate unique waveforms observed in the field. The user friendly interface allows for quick access to the 61509/61508/61507/61609/61608/61607 AC sources' functions through a large graphic LCD display front panel with an easy to use keypad. The GPIB, RS-232, USB, and Ethernet interfaces are available to control the AC source remotely.

RS-232 Ethernet USB GPIB CE RoHS2 Compliant

MODEL 61509/61508/61507/ 61609/61608/61607

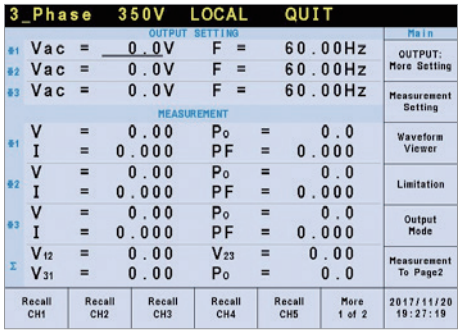
KEY FEATURES

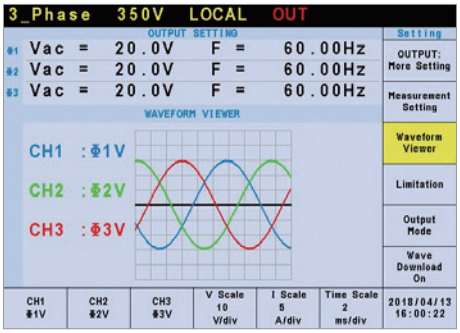
- Power rating
  61509/61609: 6kVA
  61508/61608: 4.5kVA
  61507/61607: 3kVA
- Voltage range: 0-175V/0-350V/Auto
- Frequency: DC, 15Hz-2kHz (5kHz option)
- 5U high power density design
- Single-phase or three-phase output selectable
- Programmable slew rate setting for changing voltage and frequency
- Programmable voltage and current limit
- High output current crest factor for inrush current testing
- Turn on and turn off phase angle control
- TTL signal which indicates output transient
- LIST, PULSE, STEP mode functions for testing Power Line Disturbance (PLD) simulation
- Voltage dips, short interruption, and voltage variation simulation
- Harmonics and inter-harmonics waveform synthesizer
- Comprehensive measurement capability including current harmonics
- Analog programmable interfaces
- Remote interface: GPIB, RS-232, USB, and Ethernet
- Higher output power capability by implementing master-slave parallel output function

Chroma

COMPREHENSIVE MEASUREMENTS

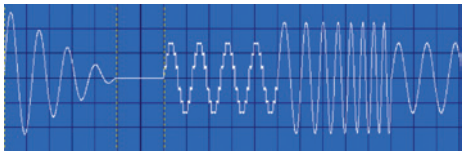
Chroma AC Power Source 61500/61600 series have built-in 16-bit measurement circuits and firmware utilities to measure the true RMS voltage, current, true power, apparent power, reactive power, power factor, current crest factor, repetitive peak current, and inrush current. Using advanced DSP technology, the 61500 series can measure THD and up to 50 orders of current harmonics. The 5.7" Color LCD provide users with easy to operate interface by integrating parameters and functions on a single display page. The panel is also capable of voltage and current measurement waveform display.



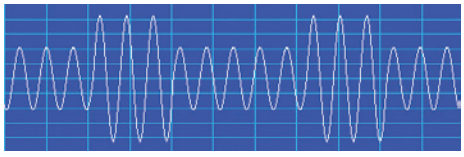


POWER LINE DISTURBANCEI SIMULATION (61500 SERIES)

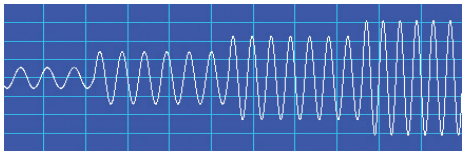
In addition to the ability to program steady output voltage and frequency, The Chroma 61500 series provides powerful functions to simulate all kinds of power line disturbance conditions. The STEP and PULSE modes offer easy and convenient methods to execute single step or continuous output changes. The changes may be triggered by an internal or external event. This allows for an easy simulation of power line disturbances such as cycle dropout, transient spike, brown out, etc. The LIST mode extends this function for more complex waveform generator needs of up to 100 sequences with different start-end conditions that can perform almost any waveform by AC and DC components. The Chroma AC power source 61500 series is also capable of simulating all sorts of voltage dips, interruptions, and variation waveforms for IEC 61000-4-11 pre-compliance tests and IEC61000-4-14/IEC61000-4-28 compliance tests.



LIST Mode



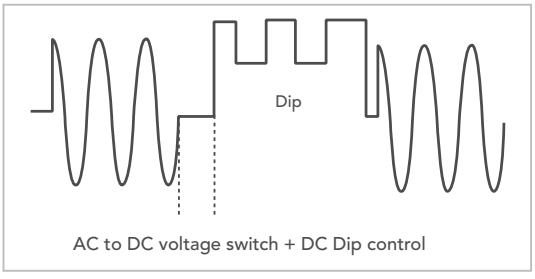
PULSE Mode



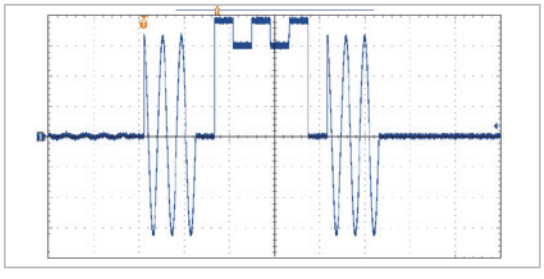
STEP Mode

Server Power

The 61509/61508/61507 models are capable of simulating the below voltage waveform test requirements for dual input AC/DC server PSU.

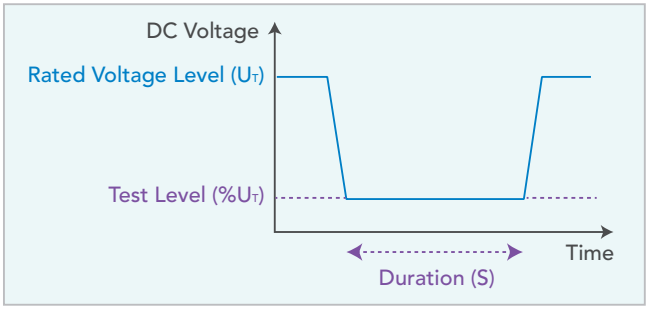


Voltage waveform test requirement



Actual output voltage waveform

The 61509/61508/61507 models are capable of simulating the voltage dips, short interruptions and voltage variations test conditions for the IEC 61000-4-29* Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests with test levels (%UT)) listed in the table below.



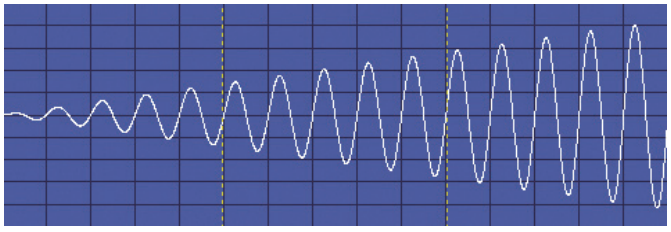
DC Input Power Immunity Test

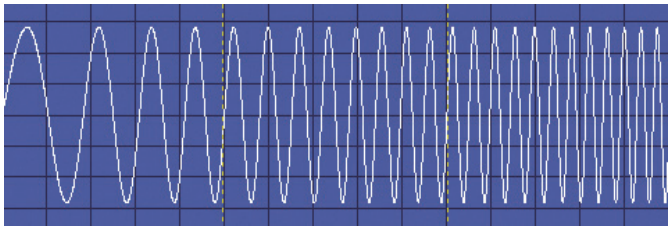
Test Conditions	Test level (%UT)	Duration (s)
Voltage Dips	40%~70% of rated DC voltage	0.01~1
Short Interruptions	0% of rated DC voltage	0.001~1
Voltage Variations	80%~120% of rated DC voltage	0.1~10

* Pre-compliance for IEC 61000-4-29 Standard

SLEW RATE SETTING FOR VOLTAGE AND FREQUENCY

Both 61500 and 61600 models allow users to set the slew rate of voltage and frequency. The program will follow the slew rate used to reach the final setting when the output voltage or frequency is changed. This function helps users verify the operating range of input power. For example, users can sweep voltage gradually from 90V to 264V instead of only measuring in steps such as 90V, 115V, 230V, and 264V. Additionally, in order to reduce the inrush current during motor startup or UUT power-up, users can decrease the slew rate setting to minimize peak current demands.

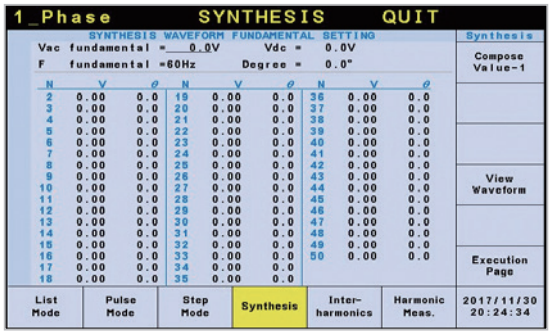

Output voltage waveform based on voltage of slew rate setting

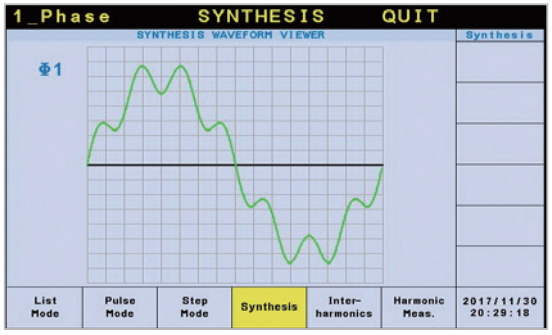

Output voltage waveform based on frequency of slew rate setting

DISTORTION WAVEFORM, HARMONICS, AND INTERHARMONICS (61500 SERIES)

Traditional types of AC sources only provide output voltages with SIN waveforms; these types of AC sources are unable to meet or keep up with the latest test requirements needed for simulating the input voltage's abnormal conditions with distorted waveforms. The WAVEFORM function allows users to set square, clipped-sine waves and 30 stored distortion waveforms. Besides that, IEC 61000-4-13 standard requires interharmonics simulations as well as harmonic waveforms.

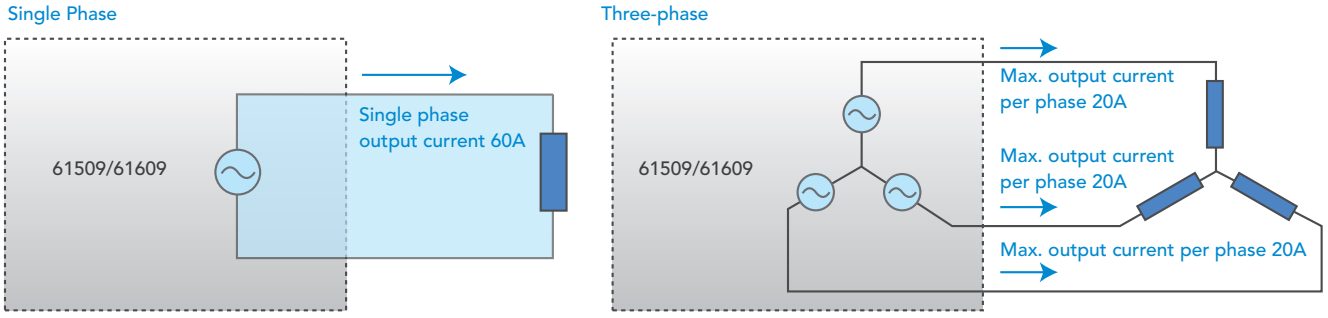
The Chroma 61500 series allows user to compose up to 50 orders of harmonics based on 50Hz or 60Hz; the output will be a periodic harmonics distortion waveform. It also provides sweeping inter-harmonics functions. This means the fundamental frequency will be incorporated with a frequency sweeping component between harmonic frequencies. It can help find the resonance or the weakest points of the UUTs. The Chroma 61500 series uses advanced DSP technology to synthesize the harmonic and inter-harmonics waveforms. Therefore, it is capable of generating periodic harmonic and non-periodic harmonic distorted waveforms to perform IEC 61000-4-13 compliance tests.





SINGLE PHASE AND THREE PHASE OUTPUT

Model 61509/61508/61507/61609/61608/61607 AC sources are capable of delivering single or three-phase output depending on the application. Users can select these output modes easily through the front panel or by remote control. All models are able to provide full power output without derating even in single phase output configuration.



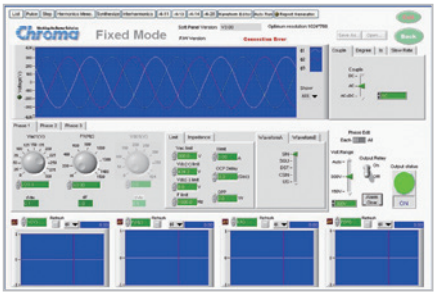
AC SOURCE PARALLEL OUTPUT FUNCTION

The 61509/61508/61507/61609/61608/61607 AC source models provide (Master-Slave) parallel output functions, which enable users to extend the AC source power output ability by connecting up to 2 units in parallel configuration. For example: connection two 61509 6kVA units will achieve total output power of 12kVA or connecting one 61509 6kVA with one 61607 3kVA unit will achieve total output power of 9kVA.

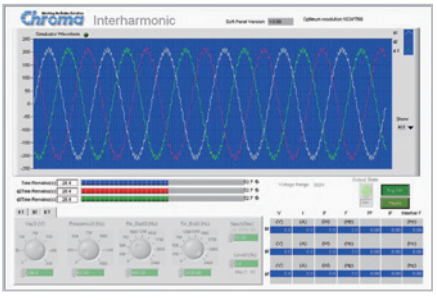
In addition, in order to meet higher power requirements, the maximum number of parallel units specifically based on 6kVA models such as 61509 and 61609 can further extend up to 5 units (this is not applicable for 61507/61607 and 61508/61608 models).

SOFTPANEL

Chroma's Softpanel is a graphical user interface that provides extraordinary capabilities and convenience by delivering control of the unit remotely. The 61500/61600 series Softpanel is designed to offer users control of the AC source by applying user friendly interfaces configured in graphical and instrument like settings. The user-friendly graphical interface makes enabling extensive functions of the AC source possible with just a few clicks.

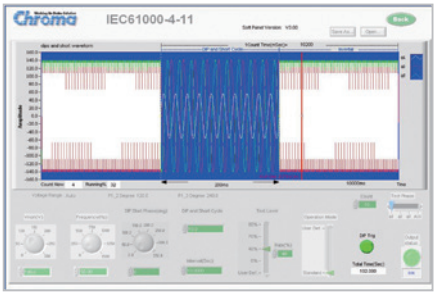


Main Operation Menu



Interharmonic Test

Transient Voltage Programming



Voltage DIP, Short Interruption, Variation Test

Distorted Waveform Editor

Recording Function

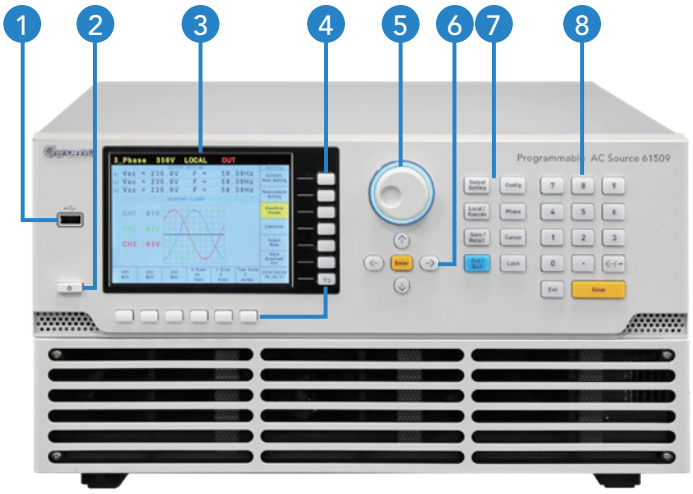
SPECIFICATIONS

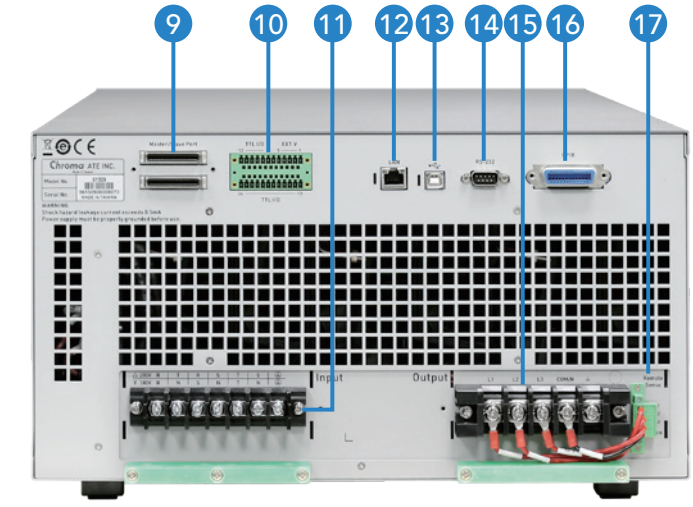
Model		61507	61607	61508	61608	61509	61609
AC Output Rating							
Output Phase		1 or 3 selectable					
Max. Power		3kVA		4.5kVA		6kVA	
Per Phase		1kVA		1.5kVA		2kVA	
Voltage							
Range		0~175V/0~350V/Auto					
Range	@15Hz~3000Hz	0~175V/0~350V	--	0~175V/0~350V	--	0~175V/0~350V	--
(5kHz Option)	@3001Hz~5000Hz	0~115V/0~230V	--	0~115V/0~230V	--	0~115V/0~230V	--
Setting Accuracy		0.1% of RD+0.2% of FS					
Resolution		0.1 V					
Distortion *1		< 0.3% @50/60Hz ; < 1% @15Hz ~ 500Hz ; 1% maximum to 500Hz, add 0.5%/kHz up 2kHz					
Line Regulation		0.10%					
Load Regulation *2		0.20%					
Maximum Current (1-Phase Mode)							
RMS		30A/15A		45A/22.5A		60A/30A	
Peak (CF=4)		120A/60A		180A/90A		240A/120A	
Maximum Current (each phase in 3-Phase Mode)							
RMS		10A/5A		15A/7.5A		20A/10A	
Peak (CF=4)		40A/20A		60A/30A		80A/40A	
Frequency							
Range		15Hz~2000Hz					
Range (5kHz Option)		15Hz~5000Hz	--	15Hz~5000Hz	--	15Hz~5000Hz	--
Accuracy		0.01%					
DC Output (1-Phase Mode)							
Power		3kW		4.5kW		6kW	
Voltage		247.5V/495V		247.5V/495V		247.5V/495V	
Current		30A/15A		45A/22.5A		60A/30A	
DC Output (3-Phase Mode)							
Power		1kW		1.5kW		2kW	
Voltage		247.5V/495V		247.5V/495V		247.5V/495V	
Current		10A/5A		15A/7.5A		20A/10A	
Input Rating							
Voltage Operating Range *3		3Ø 200-240V±10%VLN (WYE) ; 3Ø 200-240V±10%VLL (Delta)					
Current		15A Max./Phase (3Ø 200-240V±10%V_{LL})		20A Max./Phase (3Ø 200-240V±10%V_{LL})		25A Max./Phase (3Ø 200-240V±10%V_{LL})	
Power Factor		0.97 (Typical)					
Measurement							
Voltage							
Range		0~175V/0~350V/Auto					
Accuracy		0.1% of RD+0.2% of FS					
Current							
Accuracy (RMS)		0.2% of RD+0.2% of FS					
Accuracy (peak)		0.2% of RD+0.4% of FS					
Power							
Accuracy		0.2% of RD+0.4% of FS					
Power Line Distortion Simulation		LIST/PULSE/ STEP functions	--	LIST/PULSE/ STEP functions	--	LIST/PULSE/ STEP functions	--
Waveform Synthesis		50 orders @50/60Hz	--	50 orders @50/60Hz	--	50 orders @50/60Hz	--
Harmonics Measurement		Voltage/Current 50 orders @50/60Hz	--	Voltage/Current 50 orders @50/60Hz	--	Voltage/Current 50 orders @50/60Hz	--
Others							
Programmable Impedance		0Ω+0.2mH ~ 1Ω+2mH					
Efficiency *4		>80%(Typical)					
Protection		OVP, OCP, OPP, OTP, FAN					
Safety & EMC		CE mark					
Dimension (H x W x D)		221.5 x 425 x 680mm / 8.72 x 16.73 x 26.77inch					
Weight		50kg / 110 lbs					

Note *1 : Maximum distortion is tested on output 125VAC (175V RANGE) and 250VAC (350V RANGE) with full output power under linear load.
Note *2 : Load regulation is tested with sine wave and remote sense.
Note *3 : Support input voltage in WYE (3 phase 5 wire) connection; Delta (3 phase 4 wire) connection.
Note *4 : Efficiency is tested on input voltage 220V.

* All specifications are subject to change without notice.

PANEL DESCRIPTION





1. USB Host
2. ON/OFF Power Switch
3. LCD Display
   5.7 inch graphic LCD display for settings and measurements read back
4. Soft key
   Supports menu driven interface
5. Rotary Knob
   For adjusting voltage, frequency, and other parameter settings
6. Cursor key
   For cursor movement
7. Function key
   Hot keys for quick parameter settings
8. Numeric key
   For data setting
9. Master/Slave Port
   For parallel application
10. External V reference/TTL I/O Port
    External analog signal for voltage control and signal for system integration
11. Input Terminal
12. Ethernet Interface
13. USB Interface
14. RS232 Interface
15. Output Terminal
16. GPIB Interface
17. Remote Sense
    For output voltage compensation

ORDERING INFORMATION

61507 : Programmable AC Source 0~350V, 15~2kHz / 3kVA
61508 : Programmable AC Source 0~350V, 15~2kHz / 4.5kVA
61509 : Programmable AC Source 0~350V, 15~2kHz / 6kVA
61607 : Programmable AC Source 0~350V, 15~2kHz / 3kVA
61608 : Programmable AC Source 0~350V, 15~2kHz / 4.5kVA
61609 : Programmable AC Source 0~350V, 15~2kHz / 6kVA
A615007 : Softpanel for Model 61500 Series
B615000 : 5kHz output frequency option (for 61507/61508/61509 only) (factory installation)

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61509

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