

PROGRAMMABLE AC POWER SOURCE
MODEL 61501/61502/61503/61504/61505

Chroma AC power source 61500 series sets up the new standard for high performance AC power source. It equips with all powerful features such as power line disturbance (PLD) simulation, programmable output impedance, comprehensive measurement functions, wave-shape synthesis and regulation test software. These features make the 61500 series ideal for commercial, power electronics, avionics, and regulation test applications from bench-top testing to mass production.

Line up from 500VA to 4000VA with one phase output, the 61500 series give users the maximum choices from R/D design verification, quality assurance, to production test.

Using the state-of-the art PWM technology, the 61500 series is capable of delivering up to 6 times of peak current compared to its maximum rated current that makes it ideal for inrush current test.

The AC+DC modes extend the applications not only pure AC voltage but also DC component for testing DC offset in laboratory. Applying the advanced DSP technology, the 61500 series is able to provide precision and transient voltage waveform as well as measurements such as RMS voltage, RMS current, true power, power factor, current crest factor and up to 40 orders of current harmonic components.

The 61500 series allows users to compose different harmonic components to synthesize their own harmonic distorted wave-shapes. To simulate the natural waveform, the 61500 series also provides an external analog input to amplify the analog signal from arbitrary signal generator. Thus, it is capable of simulating the unique waveform observed in the field.

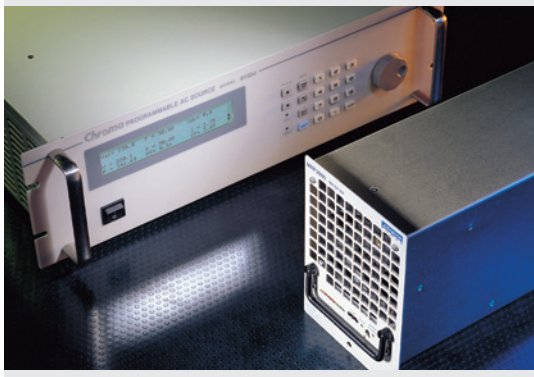
With the versatile programmable voltage functions and easy-use operation software, the 61500 series enables users to perform the pre-compliance tests against IEC 61000-4-11 and compliance test against IEC 61000-4-13/-4-14/-4-28 immunity test regulations. With low impedance and low voltage harmonic character, model 61505 can be a standard source for 230V/16A IEC 61000-3-2 testing. With programmable output impedance function, 61500 series provide a solution for testing IEC 61000-3-3 regulations by incorporating a flicker meter.

RS-232 GPIB LAN USB APG CE RoHS2 Compliant

MODEL 61501/61502/61503/ 61504/61505

KEY FEATURES

- Output Rating :
  Power : 500VA (61501), 1000VA (61502)
  1500VA (61503), 2000VA (61504)
  4000VA (61505)
  Voltage range: 0-150V/0-300V/Auto
- Compact size and weight attributable to advance PWM technology
- AC+DC output mode for voltage DC offset simulation
- Programmable slew rate setting for changing voltage and frequency
- Low output impedance for testing IEC 61000-3-2 (61505)
- Programmable output impedance for testing IEC 61000-3-3
- LIST, PULSE, STEP mode function for testing power line disturbance (PLD) simulation capability
- IEC 61000-4-11 voltage dips, short and variation simulation
- Harmonics, inter-harmonics waveform synthesizer for testing IEC 61000-4-13
- Programmable voltage, current limit
- Comprehensive measurement capability, including current harmonics
- High output current crest factor, ideal for inrush current testing
- Turn on, turn off phase angle control
- TTL signal which indicates output transient
- Analog programmable interface
- 3 units combined to 3-phase power output
- Easy-use software for operation and IEC regulation test
- Optional RS-232, GPIB, LAN, and USB interfaces



Chroma
Advancing Excellence

ADVANCED PWM TECHNOLOGY

Chroma AC power source 61500 series is able to provide the highest power density by its superior PWM mode design and the incorporated power factor correction function.

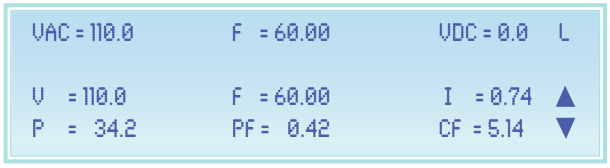


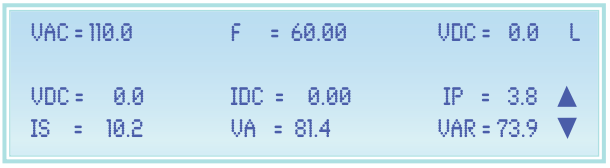
AC/ DC OUTPUT CAPABILITY

Chroma AC power source 61500 series provide output DC component for simulating AC voltage with DC offset condition. It can test the unbalance input current for rectified load. Users also can use an optional DC noise filter to get low noise and good stability DC voltage for testing.

COMPREHENSIVE MEASUREMENTS

Chroma AC power source 61500 series has built in a 16-bit measurement circuit and firmware utilities to measure the steady and transient responses of true RMS voltage, current, true power, VA(apparent power), VAR(reactive power), power factor, current crest factor, peak repetitive current and inrush current. Using the advanced DSP technology, it can measure up to 40 orders of current harmonics. It makes 61500 series not only a power source but also a powerful analyzer.

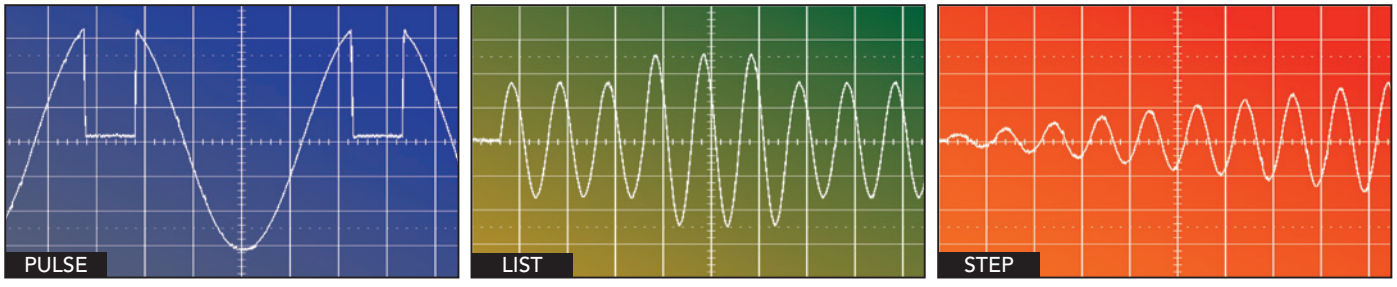




POWER LINE DISTURBANCE SIMULATION

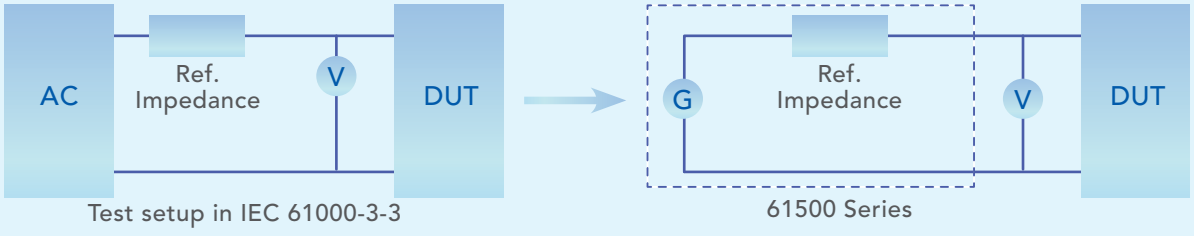
In addition to the steady output voltage and frequency programming, Chroma AC power source 61500 series provides powerful functions to simulate all kinds of power line disturbance conditions. The STEP and PULSE modes offer an easy and convenient method to execute a single step or continuous output changes. The changes may be triggered by an internal or external event. With this capability, it is easy to simulate power line disturbances such as cycle dropout, transient spike, brown out and etc.

The LIST Mode extends this function for more complex waveform generator needs. Up to 100 sequences with different start-end conditions, that can perform almost any waveform by AC and DC components. It also allows users to synchronize external events as well as measurement devices with output changes



PROGRAMMABLE OUTPUT IMPEDANCE

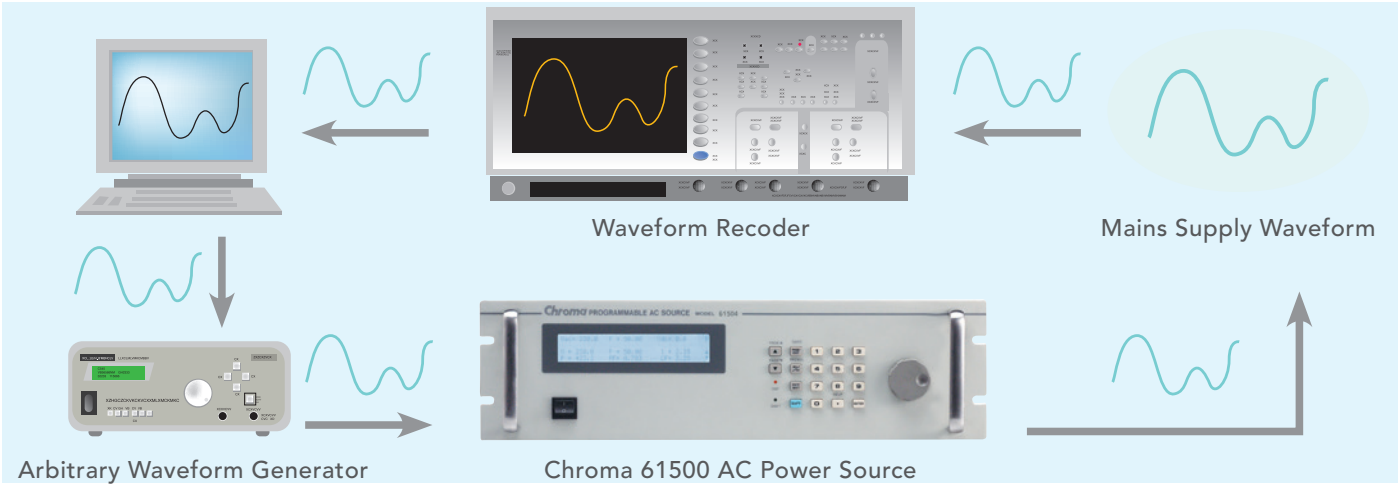
Chroma AC source 61500 series allows users to program output impedance. A current feedback control circuit makes the output voltage changed with the load. This feature is suitable for IEC 61000-3-3 Flicker tests or other test condition with particular output impedance requirement. It provides users a convenient and cost effective way to implement the reference impedance.



IEC 61000-3-3 Voltage Fluctuation & Flicker Test Setup

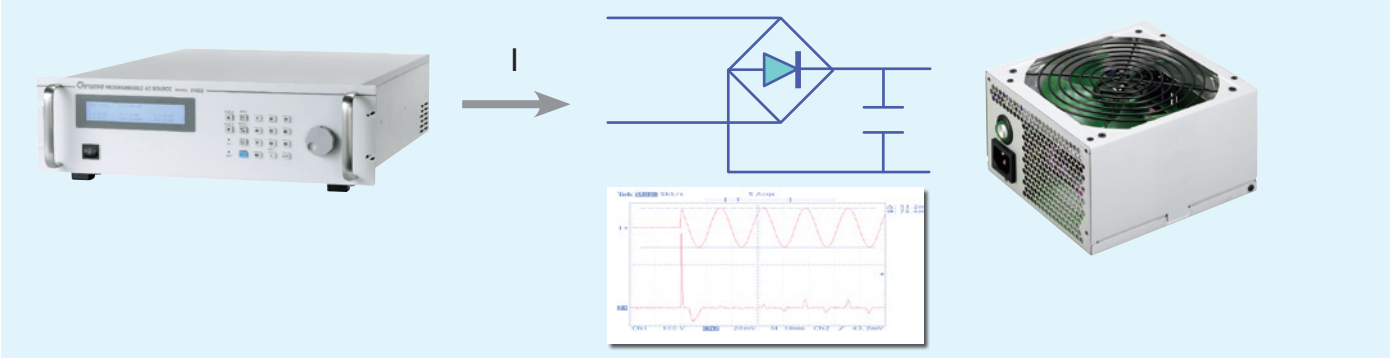
ARBITRARY POWER AMPLIFIER

The external voltage programming input of Chroma AC power source 61500 series allows users to feed any AC+DC waveform from an arbitrary signal generator. And amplify the signal accordingly. It can be used to simulate the real mains supply waveforms observed in the field.



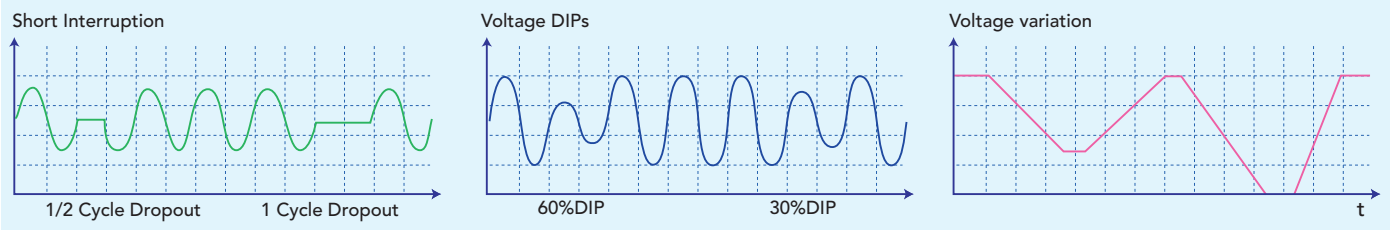
HIGH OUTPUT CURRENT CREST FACTOR AND TURN ON / OFF PHASE ANGLE CONTROL

Chroma AC power source 61500 series is capable of providing high output current crest factor (Max. 6). It delivers sufficient transient power required for testing most of the rectified input type power circuits. The programmable turn on (off) phase angle control makes the 61500 series AC source ideal for inrush current test.



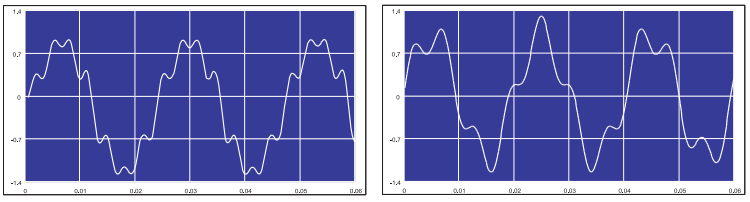
VOLTAGE DIPS AND VARIATION SIMULATION

IEC 61000-4-11 voltage dips, short interruption and variation standard have become mandatory in EMC directives for the CE mark. Chroma AC power source 61500 series is capable of simulating all sorts of voltage dips, interruptions and variation waveforms for IEC 61000-4-11 pre-compliance tests with an easy-use software.



HARMONICS, INTERHARMONICS SYNTHESIS

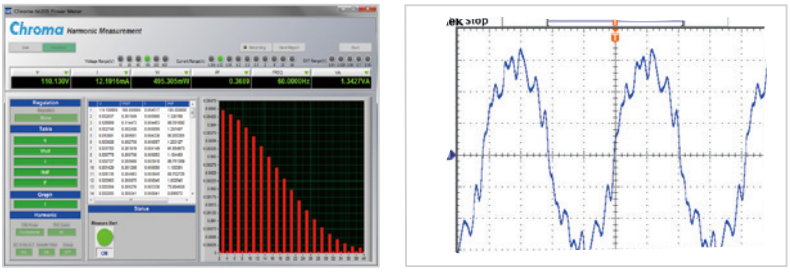
Traditional type of AC source only allows users to composite integer orders of harmonic components into a periodic harmonics distortion waveform. IEC 61000-4-13 standard requires not only the harmonics waveform, but also interharmonics simulation. This means the fundamental frequency will incorporate with components frequencies between harmonics frequencies. Chroma AC power source 61500 series uses advanced DSP technology to synthesis the harmonics and interharmonics waveforms. Therefore, it is capable of generating a non-periodic harmonic distorted waveform to perform IEC 61000-4-13 compliance test with an easy-use software.



APPLICATIONS

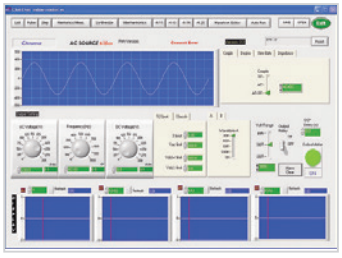
Simulate AC Power Distortion

More and more electronics manufactures have expanded their business to acquire worldwide product distribution. When a problem is identified, sometimes it is necessary to check if the products are susceptible to ac line disturbances. However, precious time would be wasted on gathering and transferring test equipment, man power and other resources to do a simple onsite test. The purpose of this application is to provide a solution using Chroma Digital Power Meter 66200 Series to measure the voltage harmonics of the ac main on site. All recorded data can be sent to the lab. According to the data, users can use synthesis function of AC source 61500 series to re-build the original distorted waveform. It can help engineers quickly point out the problem and come up with a solution.

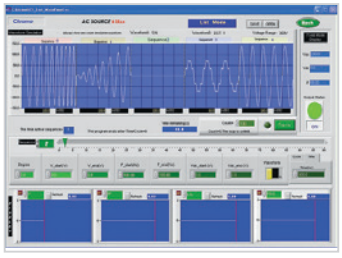


Re-build Distortion Waveform

The easy-use software : The 61500 Series Softpanel



Main Operation Menu



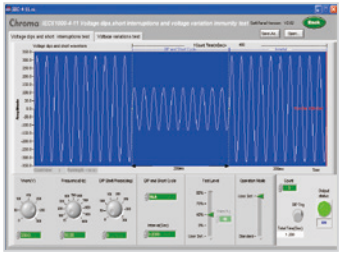
Transient Voltage Programming



Distorted Waveform Editor



Recording for Long Time Measurement



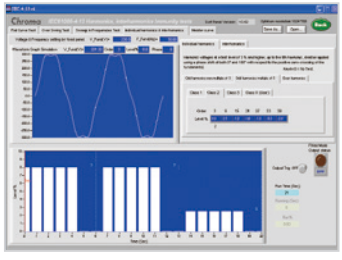
Voltage DIP, Short, Variation Regulation Test



Frequency Variation Test



Voltage Fluctuation Test



Voltage Harmonic & Interharmonics Test

3-Phase Mode and Series Conecting for High Voltage Output

The 61500 series AC source provides a 3-PHASE mode to let users connect 3 units for 3-phase output application. Users can set a unit as the Master, and set others the phase angle 120/240 degree as the Slaves. The Master unit will keep on Fixed mode and send a signal for synchronizing Slaves. Now, more and more UUTs need to test AC line transient with high voltage > 300V. An external boost transformer might raise the voltage, but the serious loading effect will make the voltage waveform with large distortion. Users can connect 2 units of 61500 in series and set the phase angle to zero (see figure) in 3-PHASE mode. In this way, users can program a 220V/0.5sec superimposed on 230V to get a 450V transient voltage easily.

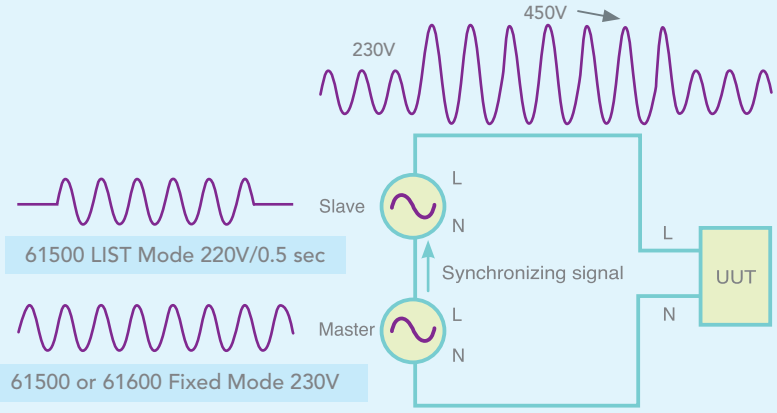
3-Phase output application



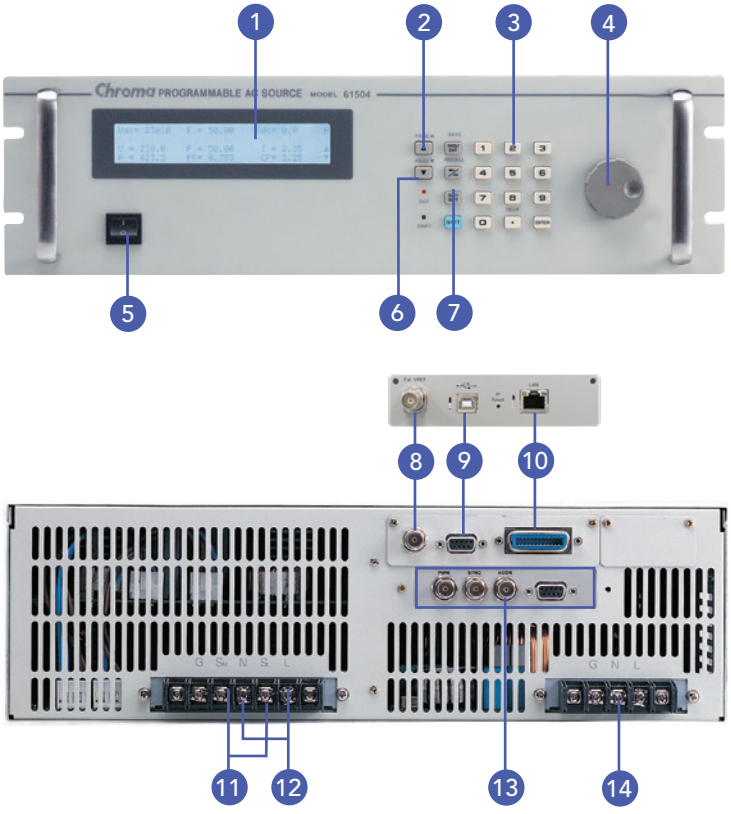


2 Units in series application





PANEL DESCRIPTION



1. LCD Display
   Show the test setup, operating status and readings
2. Page Up/Down Key
   Facilitate parameter data editing
3. Numeric Key
   Data entry for test parameters
4. Rotary Knob
   Regulate for voltage, frequency and parameter setting
5. Power Switch
6. Output Indicator
   Lighten when output is enable
7. Output Enable Key
   Enable or disable output
8. External V Reference
   External programming voltage input
9. RS-232 or USB Interface (alternative option)
10. GPIB or LAN Interface (alternative option)
11. Remote Sense Terminal
    Use to compensate the line drop between source and testing point
12. Output Terminal
    Connect output cable to the UUT
13. System Interface
    For synchronizing signal and transient signal
14. Input Terminal

ORDERING INFORMATION

61501 : Programmable AC Source 0~300V, 15~1kHz / 500VA, 1Ø
61502 : Programmable AC Source 0~300V, 15~1kHz / 1kVA, 1Ø
61503 : Programmable AC Source 0~300V, 15~1kHz / 1.5kVA, 1Ø
61504 : Programmable AC Source 0~300V, 15~1kHz / 2kVA, 1Ø
61505 : Programmable AC Source 0~300V, 15~1kHz / 4kVA, 1Ø
A615001 : Remote interface for 61501~61505 and 61601~61605 (External V Input, RS-232 interface, GPIB interface)
A615002 : Remote interface board (LAN and USB) for model 61500/61600/61700 series
A615003 : AC voltage transform unit for model 61500/61600 series
A615007 : Softpanel for model 61500/61600 series
A615008 : DC noise filter (max. 16A)
* Support higher than 300V output voltage capability, please contact Chroma sales representative for detailed information.

SPECIFICATIONS

Model	61501	61502	61503	61504	61505
Output Phase	1	1	1	1	1
Output Rating -AC					
Power	500VA	1000VA	1500VA	2000VA	4000VA
Voltage					
Range/Phase	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto	150V/300V/Auto
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Distortion*1	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)	0.3% @ 50/60Hz 1% @ 15-1kHz (Typical)
Line Regulation	0.1%	0.1%	0.1%	0.1%	0.1%
Load Regulation*2	0.2%	0.2%	0.2%	0.2%	0.2%
Max. Current					
R.m.s.	4A/2A (150V/300V)	8A/4A (150V/300V)	12A/6A (150V/300V)	16A/8A (150V/300V)	32A/20A (150V/300V)
Peak	24A/12A (150V/300V)	48A/24A (150V/300V)	72A/36A (150V/300V)	96A/48A (150V/300V)	192A/96A (150V/300V)
Frequency					
Range	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz	DC, 15 ~ 1kHz
Accuracy	0.15%	0.15%	0.15%	0.15%	0.15%
Output Rating-DC					
Power	250W	500W	750W	1000W	2000W
Voltage	212V/424V	212V/424V	212V/424V	212V/424V	212V/424V
Current	2A/1A (212V/424V)	4A/2A (212V/424V)	6A/3A (212V/424V)	8A/4A (212V/424V)	16A/8A (212V/424V)
Programmable Output Impedance					
Range	0Ω +200μH ~ 1Ω +1mH				
Harmonics & Inter-harmonics Simulation					
Bandwidth	2400Hz	2400Hz	2400Hz	2400Hz	2400Hz
Input Rating					
Voltage Range	1Ø 100~240V±10%V_{LN}	1Ø 100~240V±10%V_{LN}	1Ø 100~240V±10%V_{LN}	1Ø 100~240V±10%V_{LN}	3Ø 200~240V±10%V_{LN}
Frequency Range	47~63Hz	47~63Hz	47~63Hz	47~63Hz	47~63Hz
Current (per phase)	10A Max. @ 90V	18A Max. @ 90V	22A Max. @ 90V	28A Max. @ 90V	14A Max. @ 190V
Power Factor*4	0.97 Min.	0.97 Min.	0.98 Min.	0.98 Min.	0.98 Min.
Measurement					
Voltage					
Range	150V/300V	150V/300V	150V/300V	150V/300V	150V/300V
Accuracy	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.	0.2%+0.2%F.S.
Resolution	0.1V	0.1V	0.1V	0.1V	0.1V
Current					
Range (peak)	24A	48A	72A	96A	192A
Accuracy (r.m.s.)	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.	0.4%+0.3%F.S.
Accuracy (peak)	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.	0.4%+0.6%F.S.
Power					
Accuracy	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.	0.4%+0.4%F.S.
Resolution	0.1W	0.1W	0.1W	0.1W	0.1W
Harmonics					
Range	2~40 orders	2~40 orders	2~40 orders	2~40 orders	2~40 orders
Others					
Interface	USB, LAN, GPIB, RS-232 (optional)				
Temperature					
Operating	0 ~ 40°C	0 ~ 40°C	0 ~ 40°C	0 ~ 40°C	0 ~ 40°C
Storage	-40 ~ +85°C	-40 ~ +85°C	-40 ~ +85°C	-40 ~ +85°C	-40 ~ +85°C
Safety & EMC	CE (include EMC & LVD)				
Dimensions (HxWxD)	133.35x82.6x569.5mm/ 5.25x19x22.42 inch	133.35x482.6x569.5mm/ 5.25x19x22.42 inch	133.35x482.6x569.5mm/ 5.25x19x22.42 inch	133.35x482.6x569.5mm/ 5.25x19x22.42 inch	266.7x482.6x569.5mm/ 10.5x19x22.42 inch
Weight	20 kg / 44.05 lbs	20 kg / 44.05 lbs	20 kg / 44.05 lbs	20 kg / 44.05 lbs	41 kg / 90.31 lbs

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Model 61505 can also use single-phase connecting method of input AC power, the maximum input current is 28A @ 190V.
Note*4 : Input power factor is tested on input 220V, full load condition.

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61505

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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, 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

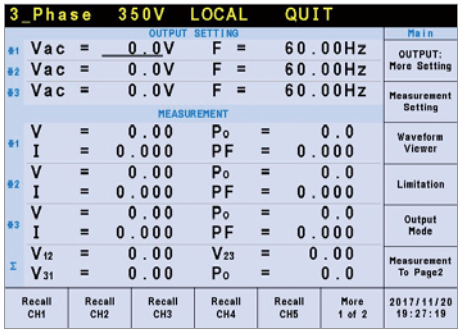
- Power rating
  61509/61609: 6kVA
  61508/61608: 4.5kVA
  61507/61607: 3kVA
- Voltage range: 0-175V/0-350V/Auto
- Frequency: DC, 15Hz-2kHz (5kHz option)
- 5U high power density design
- Single-phase or three-phase output selectable
- Programmable slew rate setting for changing voltage and frequency
- 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 interfaces: GPIB, RS-232, USB, and Ethernet
- Higher output power capability by implementing master-slave parallel output function

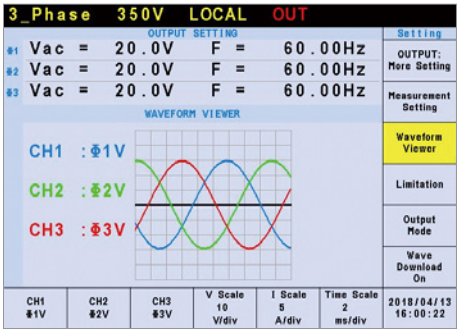


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COMPREHENSIVE MEASUREMENTS

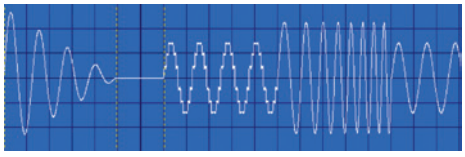
Chroma AC Power Source 61500/61600 series have built-in 16-bit measurement circuits and firmware utilities to measure the true RMS voltage, current, true power, apparent power, reactive power, power factor, current crest factor, repetitive peak current, and inrush current. Using advanced DSP technology, 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.



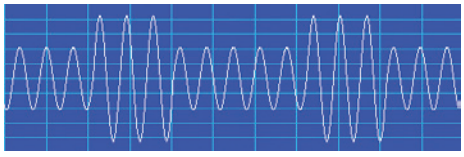


POWER LINE DISTURBANCE SIMULATION (61500 SERIES)

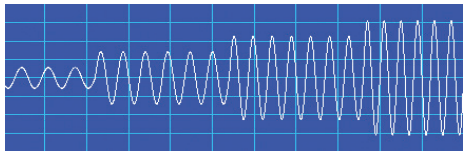
In addition to the ability to program steady output voltage and frequency, The Chroma 61500 series provides powerful functions to simulate all kinds of power line disturbance conditions. The STEP and PULSE modes offer easy and convenient methods to execute single step or continuous output changes. The 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



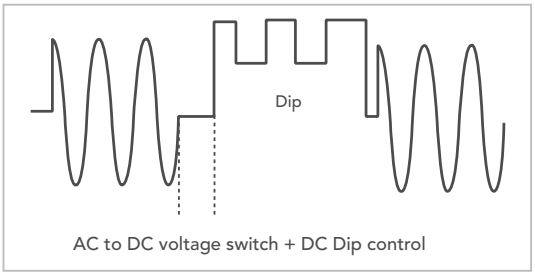
STEP Mode



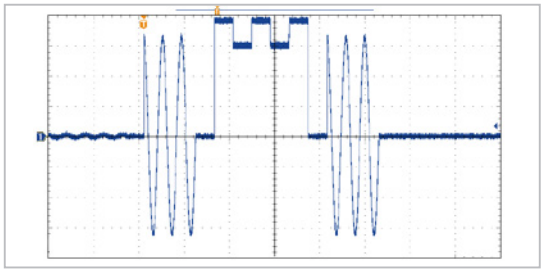


Server Power

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

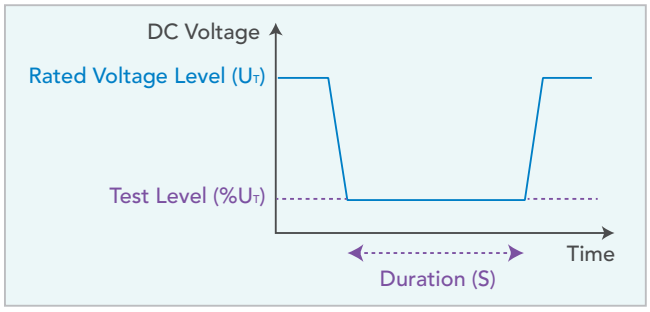


Voltage waveform test requirement



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.



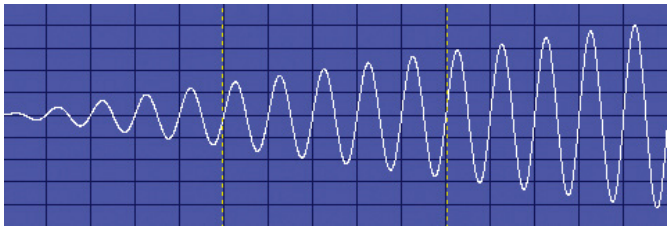
DC Input Power Immunity Test

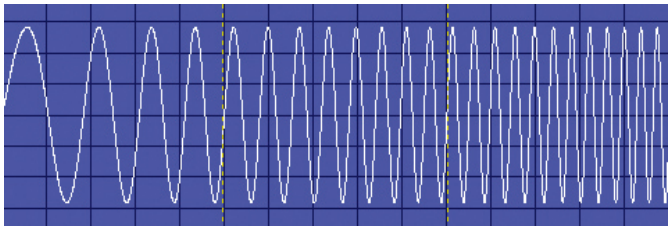
Test Conditions	Test level (%UT)	Duration (s)
Voltage Dips	40%~70% of rated DC voltage	0.01~1
Short Interruptions	0% of rated DC voltage	0.001~1
Voltage Variations	80%~120% of rated DC voltage	0.1~10

* 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.

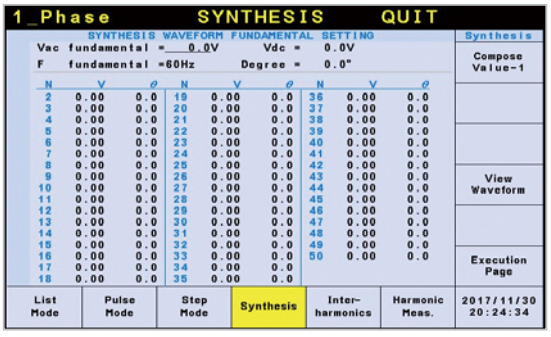

Output voltage waveform based on voltage of slew rate setting

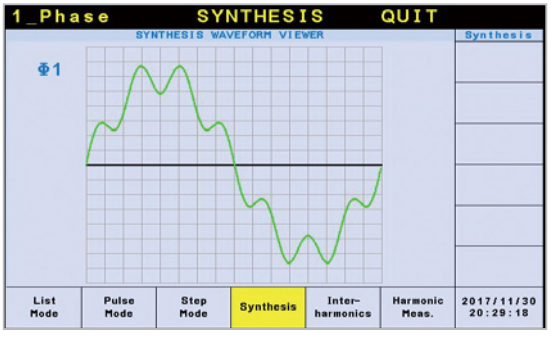

Output voltage waveform based on frequency of slew rate setting

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.

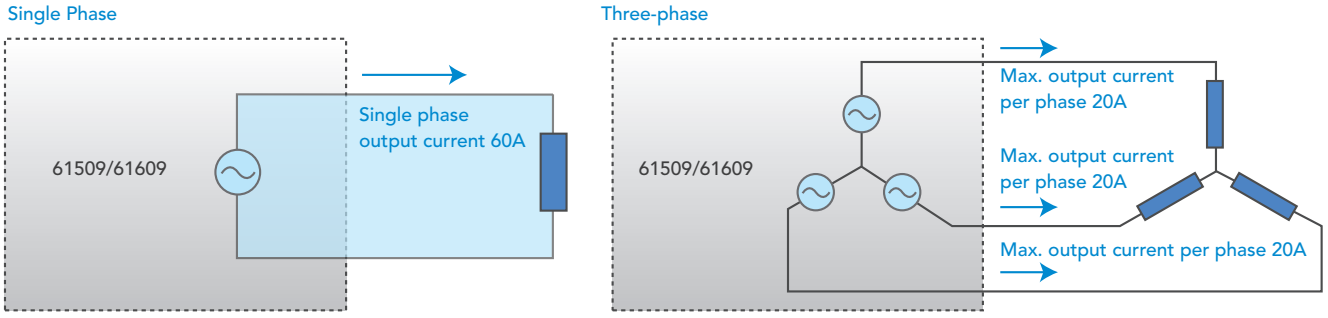
The Chroma 61500 series allows user to compose up to 50 orders of harmonics based on 50Hz or 60Hz; the output will be a periodic harmonics distortion waveform. It also provides sweeping inter-harmonics functions. This means the fundamental frequency will be incorporated with a frequency sweeping component 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

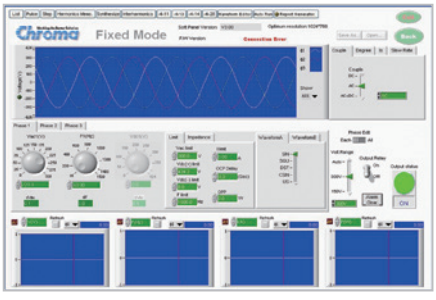
The 61509/61508/61507/61609/61608/61607 AC source models provide (Master-Slave) parallel output functions, which enable users to extend the AC source power output ability by connecting up to 2 units in parallel configuration. For example: connection two 61509 6kVA units will achieve total output power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

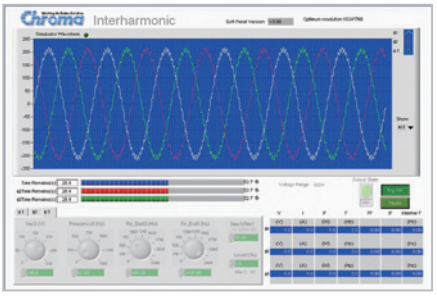


SOFTPANEL

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.



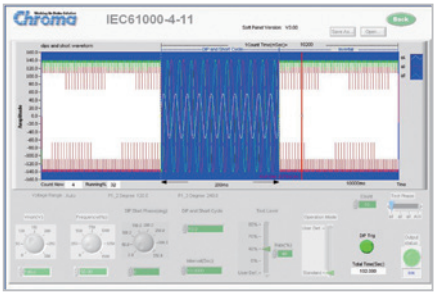
Main Operation Menu



Interharmonic Test



Transient Voltage Programming



Voltage DIP, Short Interruption, Variation Test



Distorted Waveform Editor



Recording Function

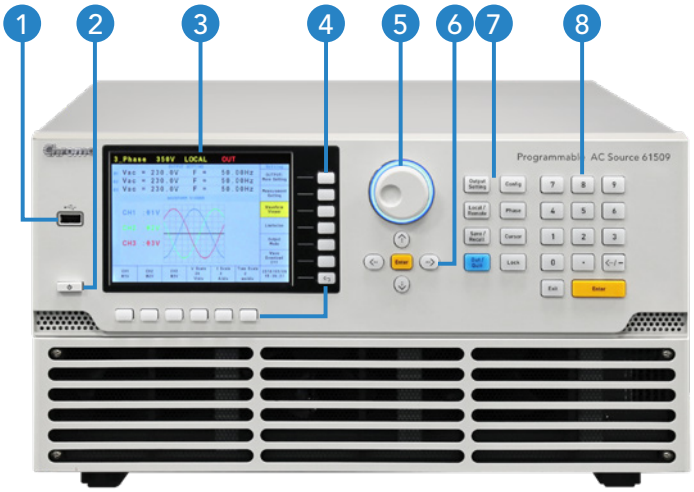
SPECIFICATIONS

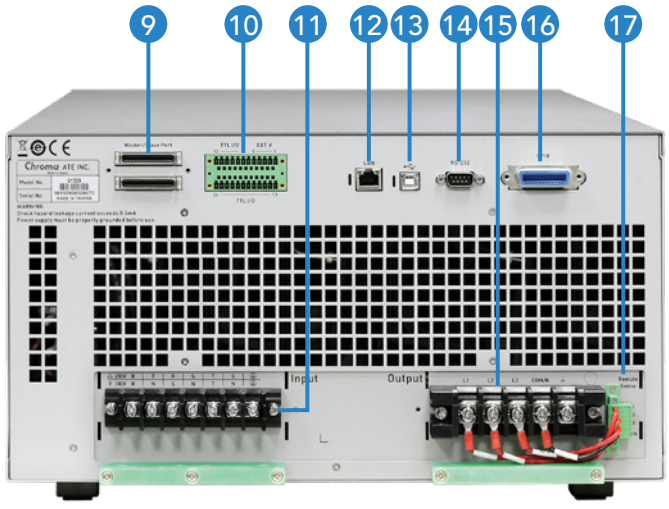
Model		61507	61607	61508	61608	61509	61609
AC Output Rating							
Output Phase		1 or 3 selectable					
Max. Power		3kVA		4.5kVA		6kVA	
Per Phase		1kVA		1.5kVA		2kVA	
Voltage							
Range		0~175V/0~350V/Auto					
Range	@15Hz~3000Hz	0~175V/0~350V	--	0~175V/0~350V	--	0~175V/0~350V	--
(5kHz Option)	@3001Hz~5000Hz	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	--	0Ω+0.2mH ~ 1Ω+2mH	--	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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MODEL 61511/61512 61611/61612

KEY FEATURES

- Power rating:
  61511/61611: 12KVA
  61512/61612: 18KVA
- Voltage range: 0~150V/0~300V/auto
- Frequency: DC, 15Hz~1500Hz
- 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, ideal for inrush current testing
- Turn on, 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, inter harmonics waveform synthesizer
- Comprehensive measurement capability, including current harmonics
- Analog programmable interfaces
- Standard GPIB, RS 232, USB interfaces
- Optional Ethernet interface
- Capable of delivering power output up to 90KVA by implementing master slave parallel operation

PROGRAMMABLE AC POWER SOURCE MODEL 61511/61512/61611/61612

The global market for AC power testing has created demand for a more sophisticated, high performance AC power source that is capable of simulating a wide range of AC line conditions. The Chroma 61500/61600 series programmable AC sources are the solution to meet this demand. These sources provide the ability to simulate various AC line input conditions as well as the measurement of critical characteristics for products under test. These features make the 61500/61600 series ideal for commercial, power electronics, avionics, and regulation test applications from bench-top R/D design verification to quality assurance and mass production.

Using state of the art PWM technology, the 61511/61512/61611/61612 models can deliver a maximum output voltage of up to 300Vac and an output frequency from 15Hz to 1500Hz. The AC+DC modes extend the abilities by not only providing pure AC voltage, but also a DC component for DC offset testing in the laboratory.

The 61511/61512/61611/61612 AC sources are capable of delivering up to 4 times the peak current compared to the maximum rated current which makes it ideal for inrush current tests. All models possess the ability to generate a 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 more. By applying advanced DSP technology, the 61511/61512 models can easily simulate power line disturbance (PLD) through LIST, PULSE and STEP modes.

The Chroma 61500/61600 series allow users to compose different harmonic components to synthesize various harmonic distorted waveforms. By applying this advanced feature, users can program a sweeping frequency component incorporated with the fundamental voltage for finding resonance points of the UUT, thus providing the user with in depth analysis results.

To simulate the natural waveform, the 61500/61600 series include an external analog input used to amplify the analog signal generated from an arbitrary signal generator. Users can implement this feature to duplicate any unique waveform observed in the field.

The user friendly interface allows user quick access to the 61511/61512/61611/61612 AC source's functions through a large LCD display on the front panel, with a clearly indicated keypad. Standard GPIB (IEEE488.2), RS-232, USB, and optional Ethernet interfaces are available for remote control of the AC source.



RS-232 Ethernet USB GPIB CE RoHS2 Compliant

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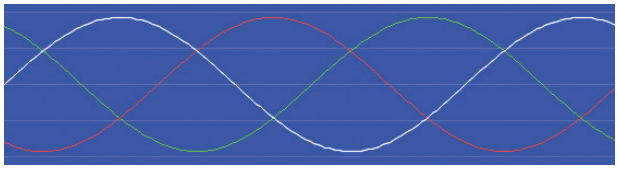
ADVANCED PWM TECHNOLOGY

The Chroma 61500/61600 series AC power sources are able to provide the highest power density through an advanced high speed PWM mode design. The modularized power stage design offers outstanding performance and high reliability. This design also allows service personnel to identify trouble spots more efficiently and minimize downtime. With no transformer at the output stage, it not only reduces output impedance, but also allows the 61500/61600 series to be able to program a DC component for simulating AC voltage with a DC offset condition. This function allows users to simulate test conditions for unbalanced input currents for rectified loads.



SINGLE-PHASE AND THREE-PHASE OUTPUT

Model 61511/61512/61611/61612 AC sources are capable of delivering either single or three-phase output depending on the application. Users can select these output modes easily through front panel or via remote control. Model 61511/61512/61611/61612 AC sources are able to provide full power output without derating even with the output configured as single phase.



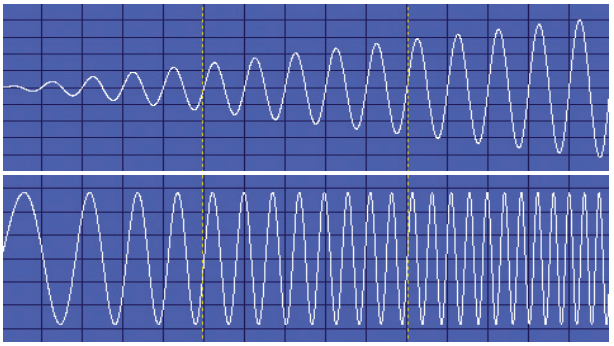
Phase Waveform



Panel

SLEW RATE SETTING FOR VOLTAGE AND FREQUENCY

Model 61511/61512/61611/61612 AC sources let users set the slew rate for voltage and frequency. It will follow the slew rate to reach the final setting when the output voltage or frequency is changed. This function can help users verify the operation range of input power. For example, a user can implement this feature to sweep the voltage gradually from 90V to 264V, instead of only checking several points like 90V, 115V, 230V and 264V. Slew rate can also be used to reduce the inrush current during motor startup or power on of multiple UUT.



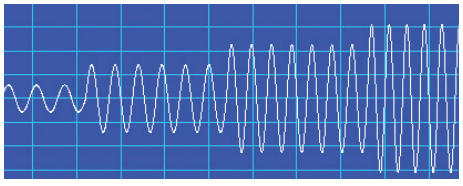
COMPREHENSIVE MEASUREMENTS

The Chroma model 61500/61600 AC power sources have a built in 16-bit measurement circuit and firmware utilities for measuring true RMS voltage, current, true power, VA (apparent power), VAR (reactive power), power factor, current crest factor, peak repetitive current, and inrush current. Using the advanced DSP technology, 61500 series can measure THD and up to 40 orders of current harmonics. This makes the 61500 series not only a sophisticated power source, but also a powerful electrical analyzer.

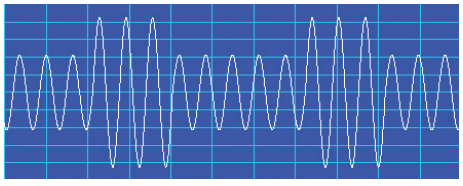
POWER LINE DISTURBANCE SIMULATION (61500 SERIES)

In addition to steady output voltage and frequency programming, Chroma AC power source 61500 series provides powerful functions to simulate a variety of power line disturbance conditions. The STEP and PULSE modes offer an easy and convenient method to execute either single step or continuous output changes. These changes may be triggered by either internal or external events. With this capability, it is easy to simulate power line disturbances like cycle dropouts, transient spikes, brown outs, and more.

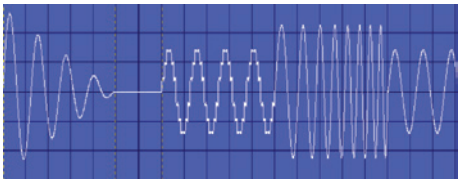
The LIST Mode extends these functions for more complex waveform generation needs. With up to 100 sequences of different start-end conditions, the source can perform almost any waveform possible for AC and DC components. In this way, the Chroma AC power source 61500 series is capable of simulating all sorts of voltage dips, interruptions, and variation waveforms for IEC 61000-4-11, IEC 61000-4-14, and IEC 61000-4-28 compliance tests. It also allows users to synchronize external events and measurement devices with output changes.



STEP Mode



PULSE Mode

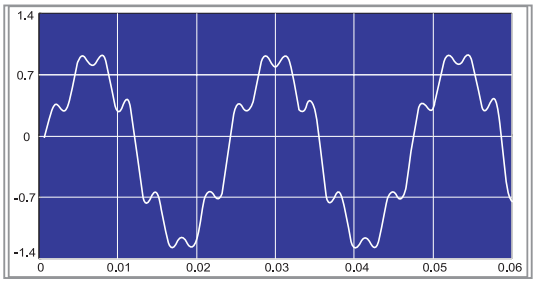


LIST Mode

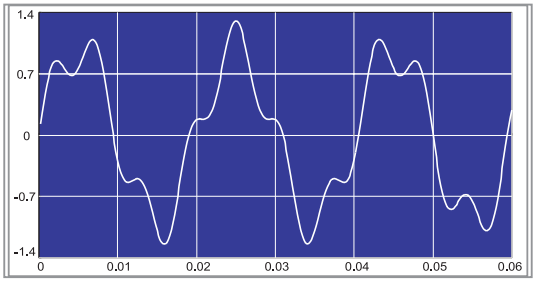
DISTORTION WAVEFORM, HARMONICS, INTERHARMONICS SYNTHESIS (61500 SERIES)

Traditional types of AC sources only provide an output voltage with a sine waveform, and this type of AC source is unable to meet and keep up with the latest test requirements for simulating input voltage abnormal conditions with distortion waveforms. The WAVEFORM function allow user to set square, clipped-sine wave and 30 stored distortion waveforms.

The 61500 series allows users to composite up to 40 orders of harmonic components based on a 50Hz or 60Hz fundamental. The output will be a periodic harmonics distorted waveform. It also provides a sweeping interhamonics function. This means that the fundamental frequency will incorporate with a frequency sweeping component between harmonic frequencies. It can help to find the resonance or the weakest points of a UUT. The Chroma AC source 61500 series uses advanced DSP technology to synthesize the harmonic and interharmonics waveforms. Therefore it is capable of generating a periodic harmonic and non-periodic harmonic distorted waveform to perform IEC 61000-4-13 compliance tests.



Harmonic Waveform



Interharmonics Waveform

PROGRAMMABLE OUTPUT IMPEDANCE (61500 SERIES)

The Chroma AC source 61500 series allows users to program output impedance. A current feedback control circuit causes the output voltage to change with the load. This feature is suitable for IEC 61000-3-3 Flicker tests, or other test conditions with a particular output impedance requirement. It provides users a convenient and cost effective way to implement the reference impedance.

AC SOURCE - MASTER - SLAVE - PARALLEL OPERATION

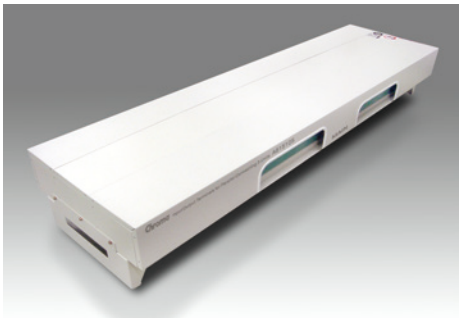
The 61511/61512/61611/61612 AC source models provide Master-Slave parallel operation, which allows users to extend the AC source power output capability by connecting multiple AC sources in parallel. The maximum allowable number of AC sources that can be implemented in parallel operation is 5 units. Users can achieve a maximum power output up to 90KVA by combining 5 units of assorted AC source of 18KVA in Master-Slave parallel operation. The user could also use the A615103 Power Stage as an alternative cost effective solution for parallel operation, by implementing it as slave unit. Please refer to the following figures to setup for parallel operation of AC source models 61511/61512/61611/61612.


Master Mode Slave Mode


Master Mode Slave Mode Slave Mode

Combine two units of Model 61512 for obtaining 36KVA power output or combine AC source models 61512 + 61511 for obtaining 30KVA power output

Combine AC source Model 61512 with two units of A615103 (18KVA) for obtaining 54KVA power output

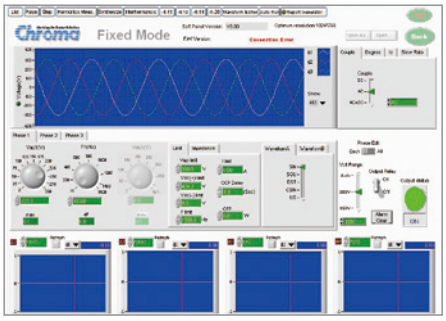


A615104: Input/Output terminal fixture for connecting 2 parallel AC source units.

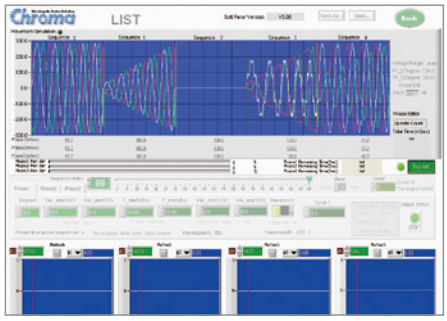
To reduce the hassle of arranging the input and output wiring of multiple AC sources connected for parallel operation, users can implement the Chroma input/output terminal fixture (A615104/A615105) designed specifically to make the wiring simple.

THE 61500/61600 SERIES SOFTPANEL*

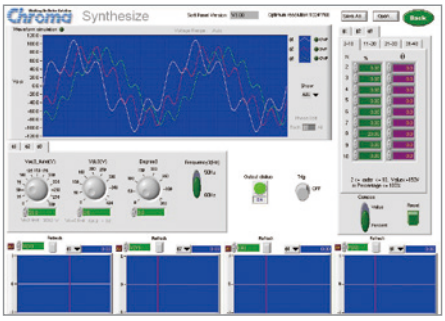
The Chroma Softpanel is a graphical user interface which provides extraordinary capability and convenience to users for remote control and operation of the unit. The 61500/61600 series Softpanel is designed specifically for offering users control of the AC source by applying a user friendly interface in a graphical, instrument like setting. The self-explanatory graphical interface makes configuration of the extensive functions of the AC source easy with just few clicks of the mouse. Users are able to perform online and offline waveform editing with the implementation of the Softpanel. The Softpanel is also designed with data recording functions so that multiple measurements can be recorded simultaneously. One of the most powerful features of the Softpanel is the availability of a test environment configured specifically for conducting IEC regulation tests like IEC 61000-4-11, IEC 61000-4-13, IEC 61000-4-14, and IEC 61000-4-28.



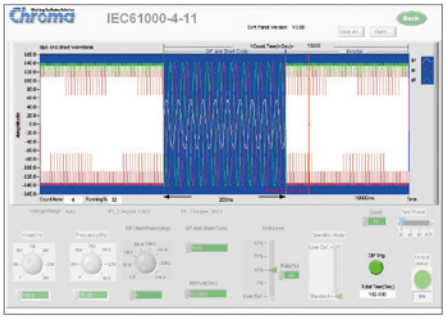
Main Operation Menu



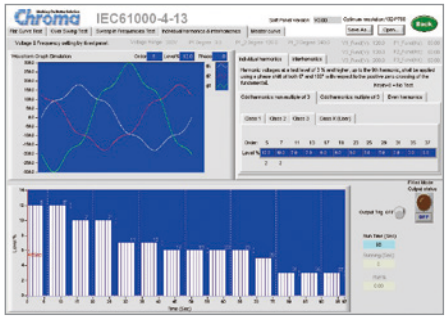
Transient Voltage Programming



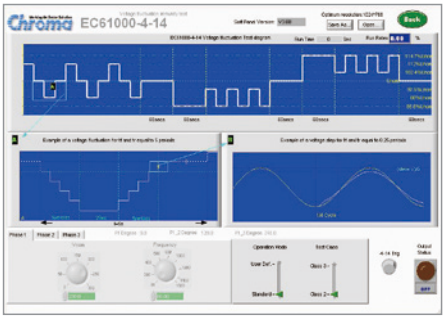
Distorted Waveform Editor



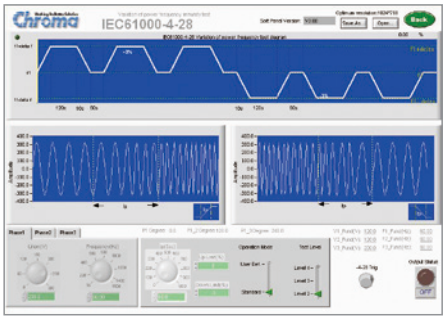
Voltage DIP, Short Interruption, Variation Regulation Test



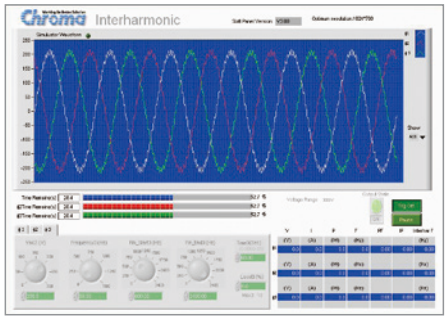
Voltage Harmonic & Interharmonic Test



Voltage Fluctuation Test



Frequency Variation Test



Interharmonic Test



Recording Function

* Softpanel support functions are actually depending on the AC Source model being implemented. For instance, Softpanel will not provide support for LIST mode function if 61600 series AC Source is implemented.

SPECIFICATIONS

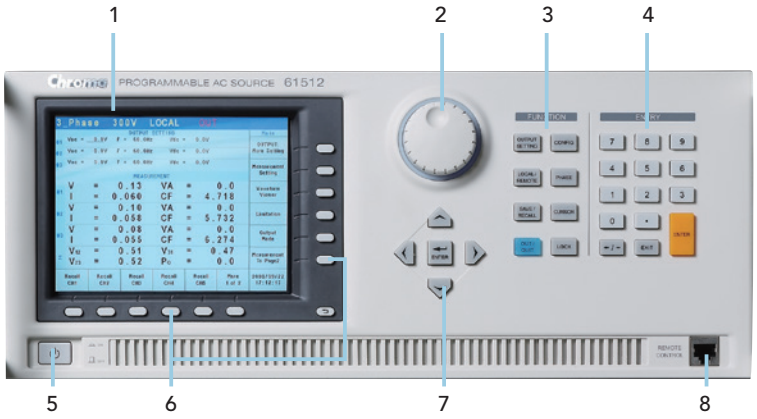
Model	61511	61611	61512	61612	61511+A615103	61611+A615103	61512+A615103	61612+A615103
Output Phase	1 or 3 selectable							
Output Rating-AC								
Power	12kVA		18kVA		30kVA		36kVA	
Each Phase	4kVA		6 kVA		10kVA		12kVA	
Voltage								
Range	0~150V/0~300V							
Accuracy	0.1%+0.2%F.S.							
Resolution	0.1 V							
Distortion *1	0.3% @ 50/60Hz , 1% @ 15~1kHz,1.5% @ >1kHz							
Line Regulation	0.1%							
Load Regulation *2	0.2%							
Temp. Coefficient	0.02% per degree from 25˚C							
Max Current (1-phase mode)								
RMS	96A / 48A		144A / 72A		240A / 120A		288A / 144A	
Peak (CF=4)	384A / 192A		576A / 288A		960A / 480A		1152A / 576A	
Max Current (each phase in 3-phase mode)								
RMS	32A / 16A		48A / 24A		80A / 40A		96A / 48A	
Peak (CF=4)	128A / 64A		192A / 96A		320A / 160A		384A / 192A	
Frequency								
Range	DC, 15~1.5kHz							
Accuracy	0.01%							
Resolution	0.01 Hz							
Phase								
Range	0 ~ 359.9˚							
Resolution	0.3˚							
Accuracy	<0.8˚ @ 50/60Hz							
DC Output (1-phase mode)								
Power	6kW		9kW		15kW		18kW	
Voltage	212V / 424V		212V / 424V		212V / 424V		212V / 424V	
Current	48A / 24A		72A / 36A		120A / 60A		144A / 72A	
DC Output (3-phase mode)								
Power	2kW		3kW		5kW		6kW	
Voltage	212V / 424V		212V / 424V		212V / 424V		212V / 424V	
Current	16A / 8A		24A / 12A		40A / 20A		48A / 24A	
Input AC Power (each phase)								
AC type	3-phase, Delta or Y connecting							
Voltage Operating Range *3	3Ø 200~240V±10%V_{LN} (Delta: L-L ; Y: L-N)							
Frequency Range	47-63 Hz							
Max. Current	Delta: 80A ; Y: 70A*6		Delta: 120A ; Y: 90A *6		Delta: 200A ; Y: 160A *6		Delta: 240A ; Y: 180A *6	
Measurement								
Voltage								
Range	150V / 300V							
Accuracy	0.1%+0.2%F.S.							
Resolution	0.1 V							
Current								
Range	128/32/8 A peak		192/48/12 A peak		320/80/20 A peak		384/96/24 A peak	
Accuracy (RMS)	0.4%+0.3%F.S.							
Accuracy (peak)	0.4%+0.6%F.S.							
Resolution	0.1 A							
Power								
Accuracy	0.4%+0.4% F.S							
Resolution	0.1 W							
Others								
Power Line Distortion Simulation	LIST/PULSE/ STEP functions	--	LIST/PULSE/ STEP functions	--	LIST/PULSE/ STEP functions	--	LIST/PULSE/ STEP functions	--
Waveform Synthesis	40 orders @ 50/60Hz	--	40 orders @ 50/60Hz	--	40 orders @ 50/60Hz	--	40 orders @ 50/60Hz	--
Harmonic Measurement	Voltage/Current 40 orders @50/60Hz	--	Voltage/Current 40 orders @50/60Hz	--	Voltage/Current 40 orders @50/60Hz	--	Voltage/Current 40 orders @50/60Hz	--
Programmable Impedance	0Ω+200μH ~ 1Ω+1mH	--	0Ω+200μH ~ 1Ω+1mH	--	0Ω+200μH ~ 1Ω+1mH	--	0Ω+200μH ~ 1Ω+1mH	--
Efficiency *4	0.75 (Typical)							
Protect	UVP, OCP, OPP, OTP, FAN							
Interface	Standard: GPIB, RS-232, USB ; Option: Ethernet							
Temperature								
Operating	0˚C ~40˚C							
Storage	-40˚C~85˚C							
Humidity	30 %~90 %							
Safety & EMC	CE (include EMC & LVD)							
Dimension (H x W x D)	1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch *5				1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch x 2 units *5			
Weight	229.4 kg / 505.29 lbs		242.4 kg / 533.92 lbs		480 kg / 1057.27 lbs		495 kg / 1090.31 lbs	

Note*1 : Maximum distortion is tested on output 125VAC (150V RANGE) and 250VAC (300V RANGE) with maximum current to linear load.
Note*2 : Load regulation is tested with sine wave and remote sense.
Note*3 : Models with 277V_{LN}/480V_{LL}(5 Wires) AC input voltage are available upon request.
Note*4 : Efficiency is tested on input voltage 230V.
Note*5 : Dimension (H X W X D) with wheelsets : 1246x546x700 mm / 49.05x21.5x27.56 inch
Note*6 : Maximum current on input neutral line
All specifications are subject to change without notice.

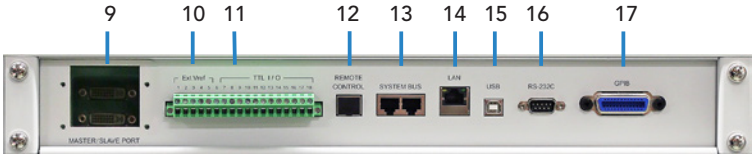
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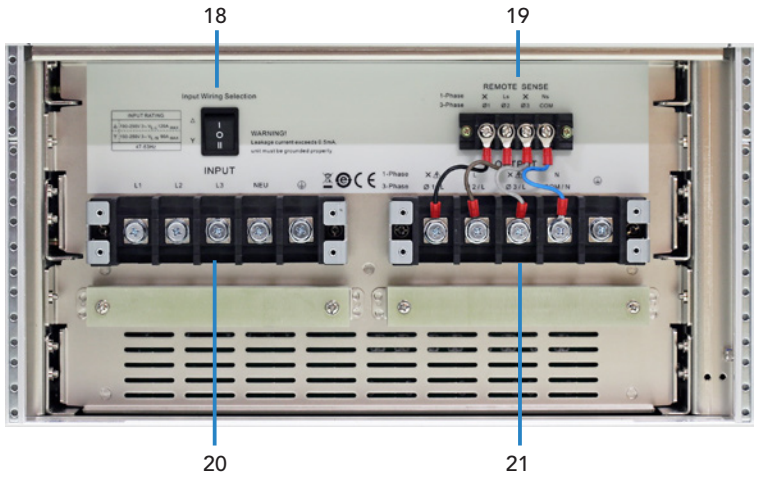
PANEL DESCRIPTION

FRONT PANEL OVERVIEW



REAR PANEL OVERVIEW





1. LCD Display :
   6.5 inches graphic LCD display for settings and measurements read back
2. Rotary Knob
   Use to adjust the voltage, frequency and parameters setting
3. Function key
   Hot keys for quick parameter setting
4. Numeric key
   For data setting
5. Power Switch
6. Soft Keys
   The soft-keys adjacent to the command block display on the LCD that provides users a menu driven interface to control the AC source operation
7. Cursor Key
   For cursor movement
8. Remote Control Port
9. Master/Slave Port
   For Master-Slave parallel operation
10. External V reference
    External analog signal for voltage control
11. TTL I/O
    Signals for system integration
12. Remote Control Port
13. System Bus
14. Ethernet Interface (option)
15. USB Interface
16. RS-232 Interface
17. GPIB Interface
18. Input Power Selection Switch
    △ or Y 3-phase connection selection
19. Remote Sense
    Use to compensate the line drop between AC source and testing point
20. Input Terminal
21. Output Terminal

ORDERING INFORMATION

61511: Programmable AC Source 0~300V, 15~1.5KHz/12KVA, 1ø/3ø
61512: Programmable AC Source 0~300V, 15~1.5KHz/18KVA, 1ø/3ø
61611: Programmable AC Source 0~300V, 15~1.5KHz/12KVA, 1ø/3ø
61612: Programmable AC Source 0~300V, 15~1.5KHz/18KVA, 1ø/3ø
A615007: Softpanel for 61500/61600 Series

A615103: Parallable power stage unit 18KVA, 1ø/3ø
A615104: Input/Output terminals for parallel connecting (2 units)
A615105: Input/Output terminals for parallel connecting (3 units)
A615106: Reverse Current Protection Unit for 61511/61512/61611/61612
A92-000502: GPIB-Ethernet Controller (Ethernet interface)

* Option for 277V_{LN}/480V_{LL}(5 Wires) AC input voltage are available with 61511/61512/61611/61612/A615103 models. Please contact with local sales representative for ordering information.

Get more information by downloading Chroma ATE APP

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Search Keyword: 61512

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