

## Programmable AC Power Source



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

The global market for AC power testing demands for more sophisticated, high performance AC power source that is capable of simulating a wide range of AC line conditions. Chroma 61500/61600 series programmable AC source are the right solution to meet the market requirements by providing the ability to simulate various AC line input conditions and measurement of critical characteristic for products under test. 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, quality assurance to mass production.

Using the state of the art PWM technology, the models 61511/61512/61611/61612 can deliver the maximum output voltage up to 300Vac and output frequency from 15Hz to 1500Hz. The AC+DC modes extend the applications not only for providing pure AC voltage, but also DC component for DC offset testing in laboratory. The 61511/61512/61611/61612 AC sources are capable of delivering up to 4 times of peak current compared to its maximum rated current that makes it ideal for inrush current test. All models possess the ability to generate pure sine waveform output with typical distortion less than 0.3% at 50/60Hz.

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, model 61511/61512 can easily simulate power line disturbance (PLD) by LIST, PULSE and STEP modes.

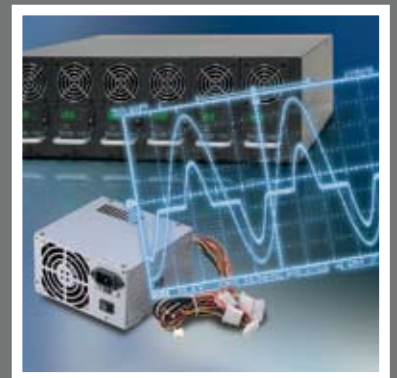
Chroma 61500/61600 series allow users to compose different harmonic components to synthesize various harmonic distorted waveforms. By applying this advance feature, users can program a sweeping frequency component incorporate with fundamental voltage for finding the resonance points of UUT, thus provide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

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

The user friendly interface allows user quick access to 61511/61512/61611/61612 AC source's functions through large graphic LCD display front panel with clear indicated keypad. The GPIB (IEEE488.2), RS-232, USB and Ethernet interface are available for users to control the AC source remotely.

#### 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
- Remote interface: GPIB, RS-232, USB and Ethernet
- Capable of delivering power output up to 90KVA by implementing Master-slave parallel operation



# Chroma

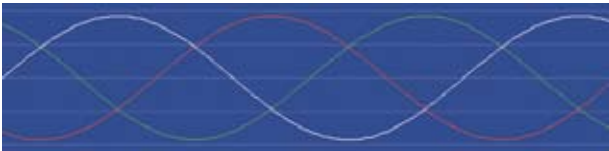


## 1. ADVANCED PWM TECHNOLOGY

Chroma 61500/61600 series AC power source are able to provide highest power density by its advanced high speed PWM mode design. The modularized power stage design offer outstanding performance and high reliability. The modularized design allows service personnel to identify the trouble spot more efficiently and minimize the downtime. With no transformer at the output stage, it not only reduces the output impedance, but also lets 61500/61600 series be able to program DC component for simulating AC voltage with DC offset condition. This function allows user to simulate the test condition of unbalanced input current for rectified load.

## 2. SINGLE-PHASE AND THREE-PHASE OUTPUT

Model 61511/61512/61611/61612 AC sources are capable of delivering single or three-phase output depending on the user's 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 is configured as single phase.



Phase Waveform

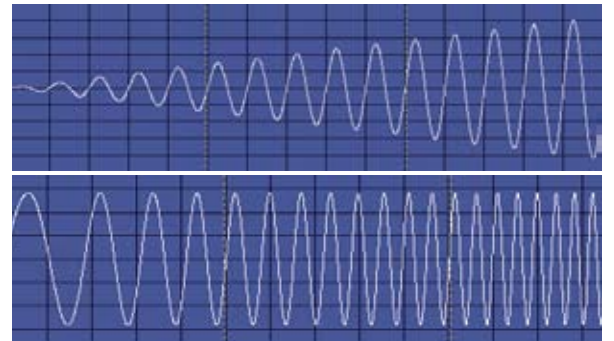


Panel



## 3. SLEW RATE SETTING FOR VOLTAGE AND FREQUENCY

Model 61511/61512/61611/61612 AC sources let users set the slew rate of 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 the users to verify the operation range of input power. For example, 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. Another application is; in order to reduce the inrush current during motor startup or power on multiple UUT, the user can decrease the slew rate setting to achieve the objective.



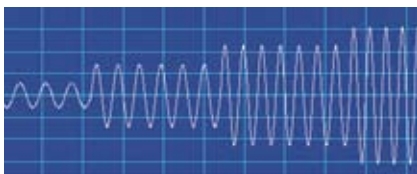
## 4. COMPREHENSIVE MEASUREMENTS

Chroma AC power source 61500/61600 series has a built in 16-bit measurement circuit and firmware utilities to measure the 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. It makes 61500 series not only a sophisticated power source but also a powerful analyzer.

## 5. POWER LINE DISTURBANCE SIMULATION (61500 SERIES)

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's 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. In this way, 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 test and IEC61000-4-14/IEC61000-4-28 compliance tests. It also allows users to synchronize external events as well as measurement devices with output changes.



STEP Mode



PULSE Mode

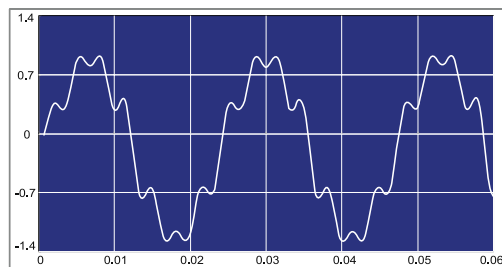


LIST Mode

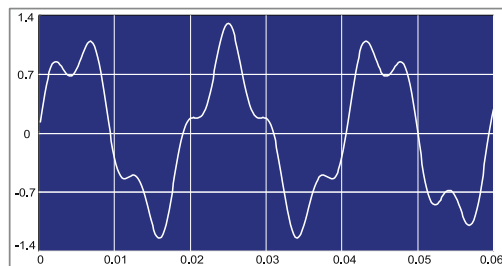
## 6. DISTORTION WAVEFORM, HARMONICS, INTERHARMONICS SYNTHESIS (61500 SERIES)

Traditional type of AC source only provides output voltage with sine waveform and this type of AC source is unable to meet and keep up with the latest test requirements for simulating the input voltage abnormal condition with distortion waveform. The WAVEFORM function allow user to set square, clipped-sine wave and 30 stored distortion waveforms. Besides that, IEC 61000-4-13 standard requires not only the harmonics waveform, but also interharmonics simulation.

Model 61500 series allow users to composite integer up to 40 orders of harmonic components based on 50Hz or 60Hz fundamental. The output will be a periodic harmonics distortion waveform. It also provides sweeping interharmonics function. This means 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 UUT. 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 test.



Harmonic Waveform



Interharmonics Waveform

## 7. PROGRAMMABLE OUTPUT IMPEDANCE (61500 SERIES)

Chroma AC source 61500 series allow 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.

## 8. AC SOURCE (MASTER-SLAVE) PARALLEL OPERATION

The 61511/61512/61611/61612 AC source models provide the (Master-Slave) parallel operation function, which enable users to extend the AC source power output ability by connecting AC sources in parallel. The maximum allowable number of AC source implemented for the parallel operation is 5 units. Therefore, 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 mode. The user could also use A615103 Power Stage as an alternative cost effective solution for the parallel operation, by implementing it as slave unit. Please refer to the following figures for AC source models 61511/61512/61611/61612 setup for parallel operation configuration.



Master 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



Master Mode

Slave Mode

Slave Mode

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



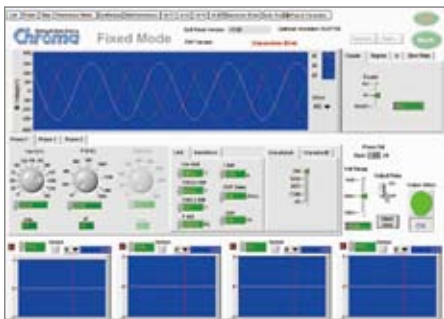


To save the hassle with arranging the input and output wiring of multiple AC sources connection in parallel operation. Users can select and implement the Chroma input/output terminal fixture (A615104/A615105) designed specifically to solve the wiring issue.

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

## 9. THE 61500/61600 SERIES SOFTPANEL

Chroma Softpanel is a graphical user interface which provides extraordinary capability and convenience to user for delivering control to the unit. The 61500/61600 series Softpanel is designed specifically for offering users to control the AC source by applying user friendly interface configured in a graphical, instrument like settings. The self explanatory graphical interface makes the enabling of extensive functions of AC source with just few clicks of button. Users are able to perform online and offline waveform editing with the implementation of Softpanel. The Softpanel is also equipped with data recording function as multiple measurement data can be recorded simultaneously. One of the most powerful features for Softpanel is the availability of test environment configured specifically for conducting IEC regulation test, such as IEC 61000-4-11, IEC61000-4-13, IEC61000-4-14 and IEC61000-4-28.



Main Operation Menu



Transient Voltage Programming



Distorted Waveform Editor



Voltage DIP,  
Short Interruption,  
Variation Regulation Test



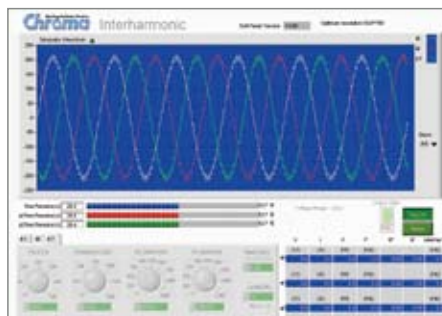
Voltage Harmonic & Interharmonic Test



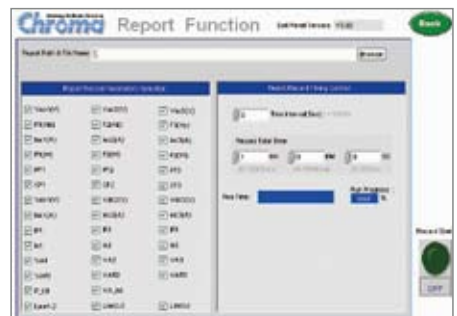
Voltage Fluctuation Test



Frequency Variation Test



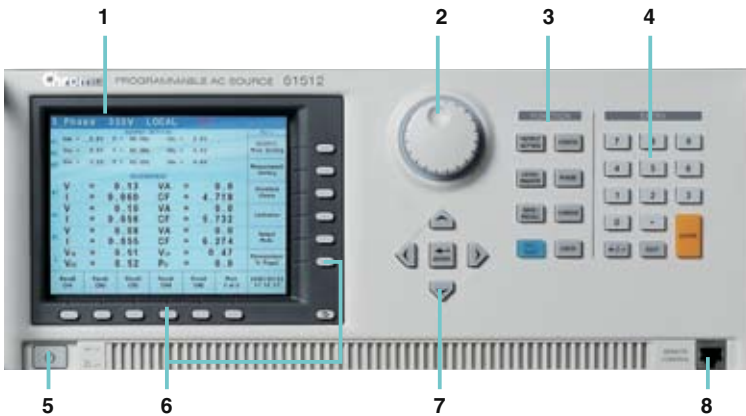
Interharmonic Test



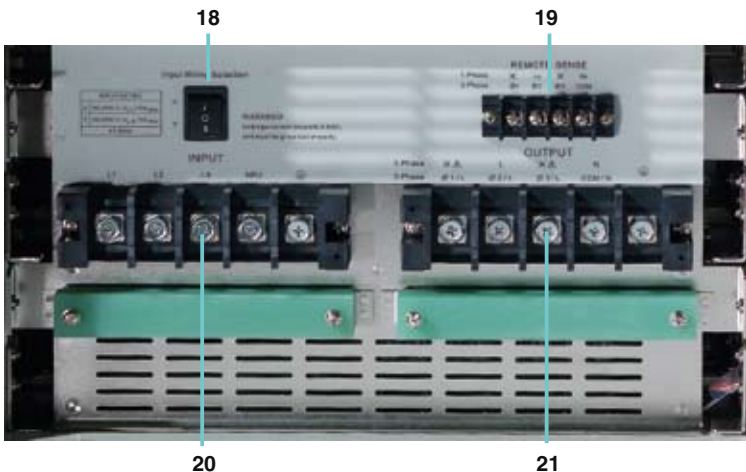
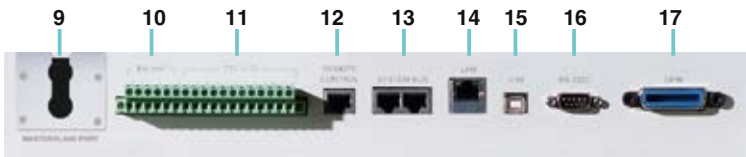
Recording Function

## PANEL DESCRIPTION

### FRONT PANEL OVERVIEW



### REAR PANEL OVERVIEW



**A615101**

#### 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

For optional remote controller

#### 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

For optional remote controller

#### 13. System Bus

#### 14. Ethernet Interface

#### 15. USB Interface

#### 16. RS-232 Interface

#### 17. GPIB Interface

#### 18. Input Power Selection Switch

Δ 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

#### 22. A615101

AC Source Remote Controller

## ORDERING INFORMATION

**61511:** Programmable AC Source 0~300V, 15~1.5KHz/12KVA, 1φ/3φ

**61512:** Programmable AC Source 0~300V, 15~1.5KHz/18KVA, 1φ/3φ

**61611:** Programmable AC Source 0~300V, 15~1.5KHz/12KVA, 1φ/3φ

**61612:** Programmable AC Source 0~300V, 15~1.5KHz/18KVA, 1φ/3φ

**A615007:** Softpanel for Model 61501~61505 Series

**\*A615101:** AC Source Remote Controller for 61511/61512/61611/61612

**A615103:** Parallellable power stage unit 18KVA, 1φ/3φ

**A615104:** Input/Output terminals for parallel connecting (2 units)

**A615105:** Input/Output terminals for parallel connecting (3 units)

Option for 277V<sub>LN</sub>/480V<sub>LL</sub>(5 Wires) AC input voltage are available with 61511/61512/61611/61612/A615103 models. Please contact with local sales representative for ordering information.

\* Call for availability

# SPECIFICATION

| Model   | 61511   | 61611 | 61512                 | 61612 | 61511+A615103   | 61611+A615103 | 61512+A615103        | 61612+A615103 |
|---|---|-------|-----------------------|-------|---|---------------|----------------------|---------------|
| <b>Output Phase</b>                             | 1 or 3 selectable                               |       |                       |       |   |               |                      |               |
| <b>Output Rating-AC</b>                         |   |       |                       |       |   |               |                      |               |
| Power   | 12KVA   |       | 18KVA                 |       | 30KVA   |               | 36KVA                |               |
| Each phase                                      | 4KVA  |       | 6 KVA                 |       | 10KVA   |               | 12KVA                |               |
| <b>Voltage</b>                                  |   |       |                       |       |   |               |                      |               |
| Range   | 0~150V/0~300V                                   |       |                       |       |   |               |                      |               |
| Accuracy  | 0.2%+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                      |       |                       |       |   |               |                      |               |
| <b>Max Current (1-phase mode)</b>               |   |       |                       |       |   |               |                      |               |
| RMS   | 96A / 48A                                       |       | 144A / 72A            |       | 240A / 120A   |               | 288A / 144A          |               |
| Peak (CF=4)                                     | 384A / 192A                                     |       | 576A / 288A           |       | 960A / 480A   |               | 1152A / 576A         |               |
| <b>Max Current (each phase in 3-phase mode)</b> |   |       |                       |       |   |               |                      |               |
| RMS   | 32A / 16A                                       |       | 48A / 24A             |       | 80A / 40A   |               | 96A / 48A            |               |
| Peak (CF=4)                                     | 128A / 64A                                      |       | 192A / 96A            |       | 320A / 160A   |               | 384A / 192A          |               |
| <b>Frequency</b>                                |   |       |                       |       |   |               |                      |               |
| Range   | DC, 15-1.5KHz                                   |       |                       |       |   |               |                      |               |
| Accuracy  | 0.15%   |       |                       |       |   |               |                      |               |
| <b>Phase</b>                                    |   |       |                       |       |   |               |                      |               |
| Range   | 0 ~ 360°  |       |                       |       |   |               |                      |               |
| Resolution                                      | 0.3°  |       |                       |       |   |               |                      |               |
| Accuracy  | <0.8°@50/60Hz                                   |       |                       |       |   |               |                      |               |
| <b>DC Output (1-phase mode)</b>                 |   |       |                       |       |   |               |                      |               |
| Power   | 6kW   |       | 9kW                   |       | 15kW  |               | 18kW                 |               |
| Voltage   | 212V / 424V                                     |       | 212V / 424V           |       | 212V / 424V   |               | 212V / 424V          |               |
| Current   | 48A / 24A                                       |       | 72A / 36A             |       | 120A / 60A  |               | 144A / 72A           |               |
| <b>DC Output (3-phase mode)</b>                 |   |       |                       |       |   |               |                      |               |
| Power   | 2KVA  |       | 3KVA                  |       | 5KVA  |               | 6KVA                 |               |
| Voltage   | 212V / 424V                                     |       | 212V / 424V           |       | 212V / 424V   |               | 212V / 424V          |               |
| Current   | 16A / 8A  |       | 24A / 12A             |       | 40A / 20A   |               | 48A / 24A            |               |
| <b>Input AC Power (each phase)</b>              |   |       |                       |       |   |               |                      |               |
| AC type   | 3-phase, Delta or Y connecting                  |       |                       |       |   |               |                      |               |
| Voltage range *3                                | 190-250V (Delta: L-L, Y: L-N)                   |       |                       |       |   |               |                      |               |
| Frequency range                                 | 47-63 Hz  |       |                       |       |   |               |                      |               |
| Max. current                                    | Delta: 80A Y: 70A                               |       | Delta: 120A Y: 90A    |       | Delta: 200A Y: 160A                                       |               | Delta: 240A Y: 180A  |               |
| <b>Measurement</b>                              |   |       |                       |       |   |               |                      |               |
| <b>Voltage</b>                                  |   |       |                       |       |   |               |                      |               |
| Range   | 150V / 300V                                     |       |                       |       |   |               |                      |               |
| Accuracy  | 0.2%+0.2%F.S.                                   |       |                       |       |   |               |                      |               |
| Resolution                                      | 0.1 V   |       |                       |       |   |               |                      |               |
| <b>Current</b>                                  |   |       |                       |       |   |               |                      |               |
| 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   |       |                       |       |   |               |                      |               |
| <b>Power</b>                                    |   |       |                       |       |   |               |                      |               |
| Accuracy  | 0.4%+0.4% F.S                                   |       |                       |       |   |               |                      |               |
| Resolution                                      | 0.1 W   |       |                       |       |   |               |                      |               |
| <b>Efficiency *4</b>                            | 0.75 (Typical)                                  |       |                       |       |   |               |                      |               |
| <b>Protect</b>                                  | UVP, OCP, OPP, OTP, FAN                         |       |                       |       |   |               |                      |               |
| <b>Interface</b>                                | GPIB, RS-232, USB, Ethernet (standard)          |       |                       |       |   |               |                      |               |
| <b>Temperature</b>                              |   |       |                       |       |   |               |                      |               |
| Operation                                       | 0°C ~40°C                                       |       |                       |       |   |               |                      |               |
| Storage   | -40°C~85°C                                      |       |                       |       |   |               |                      |               |
| Humidity  | 30 %~90 %                                       |       |                       |       |   |               |                      |               |
| <b>Safety &amp; EMC</b>                         | CE  |       |                       |       |   |               |                      |               |
| <b>Dimensions (H x W x D)</b>                   | 1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch |       |                       |       | 1163 x 546 x 700 mm / 45.78 x 21.5 x 27.56 inch x 2 units |               |                      |               |
| <b>Weight</b>                                   | 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<sub>L-N</sub>/480V<sub>L-L</sub>(5 Wires) AC input voltage are available upon request.

**Note\*4** : Efficiency is tested on input voltage 230V.

| Others                 | 61511                                 | 61512 | 61511 + A615103 | 61512 + A615103 |
|------------------------|---------------------------------------|-------|-----------------|-----------------|
| Waveform Synthesis     | 40 orders @ 50/60Hz                   |       |                 |                 |
| Harmonic measurement   | Voltage / Current 40 orders @ 50/60Hz |       |                 |                 |
| Programmable impedance | 0Ω +200μH ~ 1Ω +1mH                   |       |                 |                 |

All specifications are subject to change without notice. Please visit our website for the most up to date specifications.

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