

Programmable AC Power Source



PROGRAMMABLE AC POWER SOURCE MODEL 6500 SERIES

The global AC power testing requirements demand more sophisticated AC Power Source that is capable of simulating a wide variety of AC line conditions, harmonic waveforms, accurate power measurements and analysis. Chroma 6500 Series Programmable AC Power Source delivers the right solution to simulate all kinds of normal/abnormal input conditions and measure the critical characteristics of the products under test. It can be utilized in R&D design, production test, and QA verification for commercial, industrial, and aerospace electronic products.

Chroma 6500 Series AC Power Source delivers the maximum rated power for the output voltage up to 300 Vac, and the frequency between 15Hz to 2000Hz. It is suitable for commercial applications (47-63Hz) such as avionics, marine, and military applications at 400Hz or higher frequency ; or for electrical motor, airconditioner test applications at 20Hz. All models generate very clean sine or square waveforms output with typical distortion less than 0.5%.

Chroma 6500 Series has built in Direct Digital Synthesis (DDS) Waveform Generator to provide user programmable high precision waveform. For the product tests under AC line distortion conditions, clipped sine wave can be generated with 0% to 43% distortion and amplitude from 0% to 100%. It also can simulate all kinds of power line disturbances

such as cycle dropout, transient spike, brown out, phase angle, voltage and frequency ramp up (ramp down), etc. Up to 30 harmonic waveforms are factory-installed, and testing for compliance to AC line harmonic immunity standards can be easily achieved in the field.

The 6500 Series has built in 16-bit precision measurement circuit to offer precision and highspeed measurements for Vrms, Irms, Ipk+, Ipk-, power, frequency, crest factor, power factor, inrush current, VA, and VAR, etc. It is designed as an integral part of the PMS power measurement system. By adding the 6630 Power Analyzer it becomes an Automatic Test Equipment (ATE) to perform IEC 61000-3-2 harmonic tests and IEC 61000-3-3 flicker measurements.

The 6500 Series provides easy operation through the front panel keypad, or remote controller via GPIB, RS-232C bus or APG (Analog Programming) interface. Instrument drivers are available to integrate the AC source into the ATE application operations under Labview control.

Designed with self-diagnostic routine and protections against overload, overpower, over temperature, over current and fan fail, the 6500 Series instrument has the qualities and reliability that can suit for the most demanding production line applications.

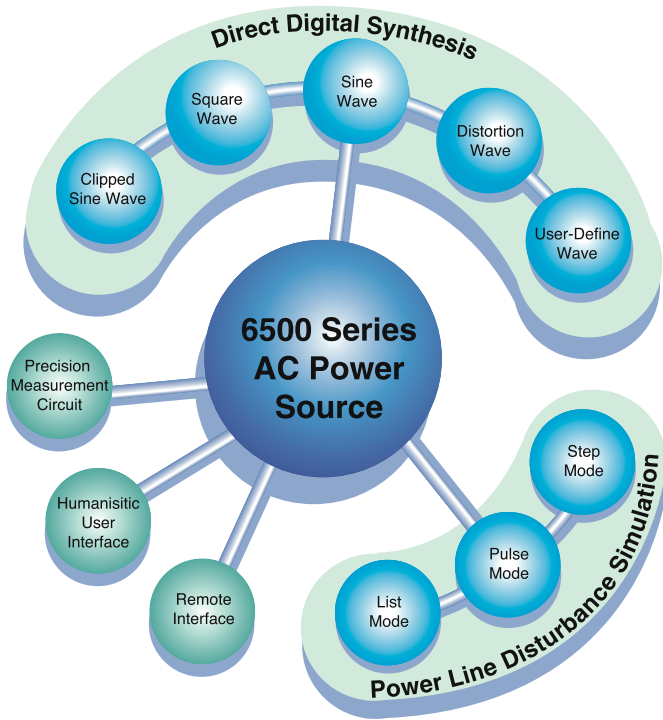
MODEL 6500 SERIES

Key Features:

- Output Rating :
Power : 1200VA, 1 σ (6512)
2000VA, 1 σ (6520)
3000VA, 1 σ (6530)
6000VA, 1 σ (6560)
9000VA, 1 σ or 3 σ (6590)
Voltage : 0-150V / 0-300V / Auto
(6512,6520, 6530)
0-150V /0-300V(parallel)(6560)
0-300V / 0-500V (series)(6560)
0-150V / 0-300V (6590)
- Direct Digital Synthesis (DDS) waveform generation.
- Programmable Sine, Square, or Clipped Sine waveform output
- Programmable voltage, current limit, frequency, phase, and distortion
- Power line disturbances simulation capability
- 30 factory-installed harmonic waveforms in the waveform library
- User programmable harmonic waveforms
- User programmable sequential output waveforms for auto-execution
- Powerful measurement of Vrms, Irms, Ipk+, Ipk-, power, frequency, crest factor, power factor, inrush current, VA, VAR, etc.
- Built-in power factor correction circuit provides input power factor over 0.98 to meet the IEC regulations
- Advanced PWM technology delivers high power output in a light and compact rack-mountable package
- Built-in output isolation relays
- User-definable power-on state
- TTL output to any signal output transition for ATE application
- Analog Programming Interface for external amplitude control
- Option GPIB and RS-232 bus interface
- LIST mode, transient power line disturbances simulation, Voltage Dip & Variation, for precompliance test IEC 61000-4-11
- Easy use graphic user interface : softpanel (Option)



Chroma



1. ADVANCED PWM TECHNOLOGY

The input AC to DC stage in the AC Source incorporates modern power factor correction circuit to increase the input power factor more than 0.98 to meet the IEC regulations. It reduces the input current requirement and raises the efficiency up to over 80%. Using the isolation provided by DC to DC stage, the final DC to AC output stage eliminates the heavy low frequency output transformer, and decreases the weight to 30 Kgs only. The model 6530, packaged in 8 3/4 inches height rack-mountable unit, delivers full 3,000 VA output at 110V or 220V (while many competitors specify 3KVAoutput at 140V or 280V only).

2. STATE-OF-THE-ART DDS WAVEFORM GENERATOR

Chroma 6500 Series AC Power Source has built in powerful Direct Digital Synthesis (DDS) waveform generator to provide low distortion (0.5%) sine or square waveform over a maximum frequency range from 15 to 2000Hz, with 0.01Hz (15 - 99.99Hz) resolution and 0.15% accuracy. For example, a unique clipped sine wave with 0% to 43% distortion and 0 to 100% amplitude can be generated by pressing the front panel keys for testing products under ac line distortion conditions.

3. COMPREHENSIVE WAVEFORM LIBRARY

Up to 30 different distortion waveforms including line conditioner, line filter, triangle wave, pulse wave, and peak spike, etc. are stored in the waveform library for execution. Users can preview the selected waveform on the LCD graphic display by pressing the "WAVE" soft key. To specify the waveform amplitude desired at each specific phase angle can modify the stored waveforms.

Testing for compliance to ac line harmonic immunity standards can be easily achieved. Sine wave with harmonic content specified by IEC 61000 standards can be recalled, downloaded into memory, and generated as needed.

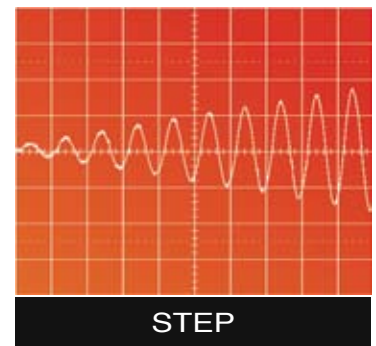
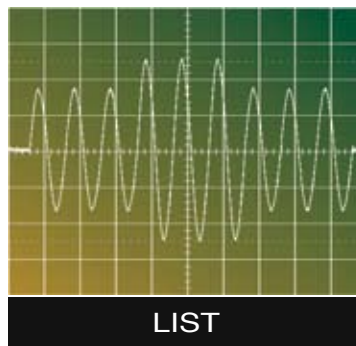
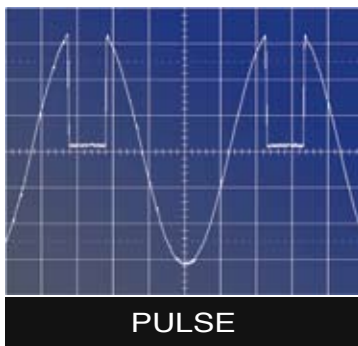
Additionally, Chroma 6500 Series AC Power Source offers six user-defined arbitrary waveform buffers. Users can create the desired waveforms from a host PC and download them to the instrument through IEEE488 or RS-232C interface.

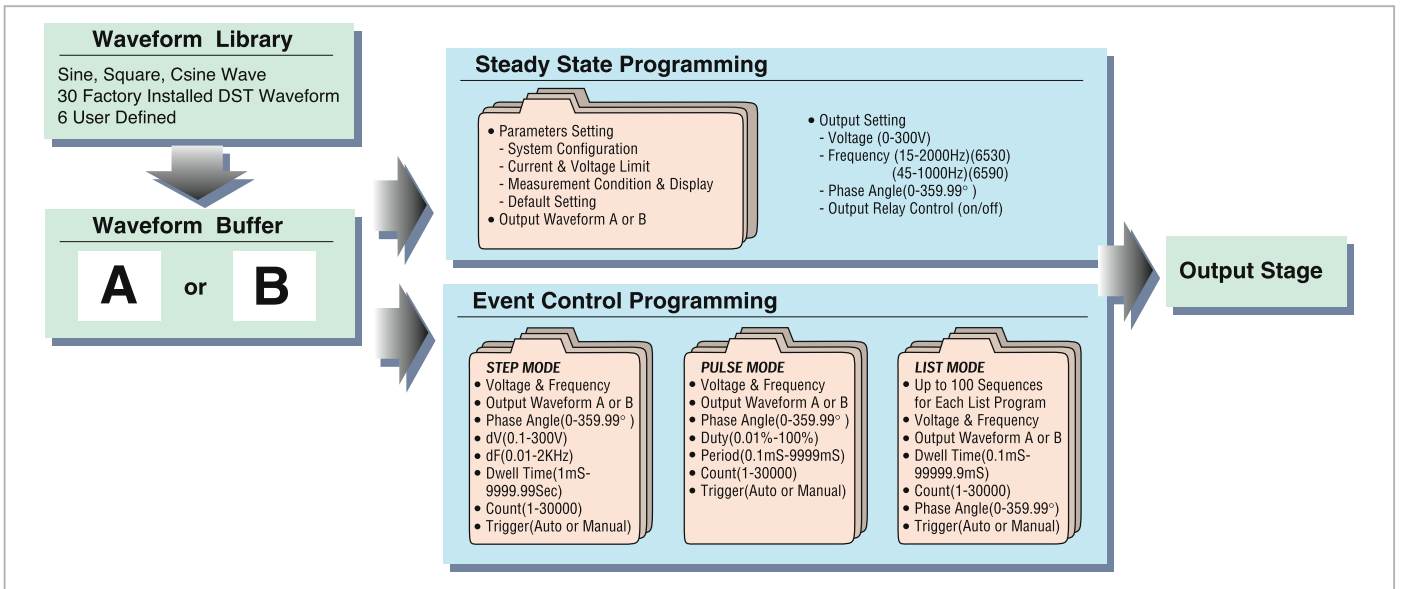


4. TRANSIENT POWER LINE DISTURBANCE SIMULATION

In addition to programming the steady output voltage and frequency, the AC Source provides a powerful tool to simulate all kinds of power line disturbance conditions. The step and pulse modes offer an easy and convenient method to execute single step or continue output changes. The output voltage amplitude, frequency, phase angle, and waveform shape can be controlled in response to input trigger generated from 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 ramp up, etc. This feature is very important for the maximum inrush current test when the UUT is switched on at 90 degrees, so is for the UUT's ride-through effect check when an AC input transient spike is applied.

The List transient mode extends this capability further for more complex waveform generation needs. Up to 40 sequences of output setting can be precisely executed in response to a triggered or paced dwell time programmed in advance without computer intervention. Output triggers can be generated at the beginning and the end of each List loop setup to synchronize external events and to simulate power line disturbances for precompliance test of IEC 61000-4-11 Voltage Dip & Variation.





5. POWERFUL MEASUREMENT

This instrument has 16-bit precision measurement circuit built-in and firmware utilities to measure the steady and transient responses of true RMS voltage, true RMS current, true power, power factor, frequency, peak repetitive current, inrush current, current crest factor, VA (apparent power), and VAR (reactive power). Using the high-speed sampling circuit, it can display the measured voltage and current as a waveform on the LCD display for transient state analysis without the need of a scope.

6. VERSATILE OPERATION

Chroma 6500 Series AC Source is easy to operate using the front panel keypad, or a remote controller. The printer interface is also available for printing out the instrument conditions or measurement readings. In ATE applications, model 6530 is controlled via IEEE 488, RS-232C, or Analog Programming Interface.

The instrument is designed with user friendliness in mind. It uses thermo-control DC Fan and the speed increases only when internal temperature rises and calls for more heat ventilation. This minimizes the acoustic noise from the fan during operation. The large size 320 x 240 LCD shows the test setup and operating status with the most comfortable visual effect possible. The software improves user interface by creating soft-keys to guide users during test execution. The rotary knob input enables users to adjust the voltage, frequency, and parameter setting on the fingertip with maximum speed and control

7. SELF DIAGNOSIS AND PROTECTION

The instrument has built in self-diagnosis routine to calibrate its performance and assist trouble shooting for failure. It is protected against over voltage, overload, over current, overpower, over temperature to ensure the instrument quality and performance for all kinds of applications in R&D, QA, Production, and field services.

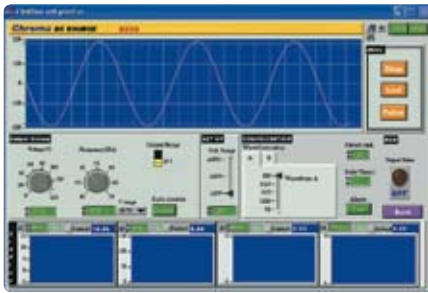


Model : 6560 6KVA

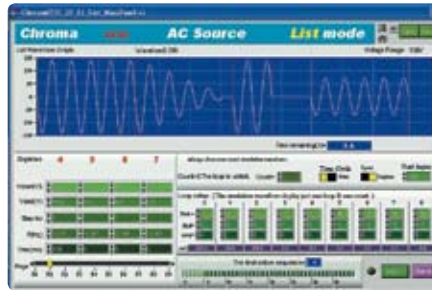
Model : 6590 9KVA

8. THE EASY-USE SOFTWARE : THE 6500 SERIES SOFTPANEL

Users can install the software in computer to control the AC source via IEEE488 and RS-232. The easy-use graphic interface help users to program or edit waveforms. All test program can be saved in a file for future recall.



Main Operation Menu



Transient Voltage Programming

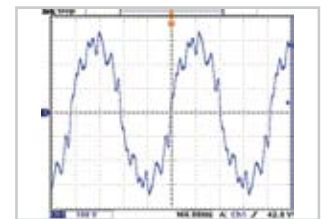


Waveform Editor

9. SIMULATE AC POWER DISTORTION

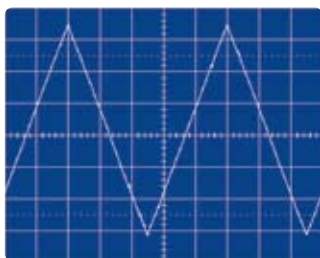
More and more electronics manufactures have expanded their business to acquire worldwide product distribution. When a problem is identified, sometimes it is necessary to check if the products are susceptible to ac line disturbances. However, precious time would be wasted on gathering and transferring 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 Power Analyzer 6630 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 waveform editor function of AC Source 6500's softpanel to re-build the original distorted waveform. It can help engineers quickly point out the problem and come up with a solution.

| No. | x | ang | No. | x | ang | No. | x | ang |
|-----|--------|-----|-----|------|-----|-----|------|-----|
| 1 | 100.00 | 0 | 35 | 0.33 | 22 | 29 | 0.50 | --- |
| 2 | 1.75 | 3 | 36 | 0.00 | --- | 30 | 0.00 | --- |
| 3 | 0.33 | 8.7 | 37 | 3.54 | 546 | 35 | 0.27 | -63 |
| 4 | 0.13 | --- | 38 | 0.01 | --- | 32 | 0.00 | --- |
| 5 | 0.20 | --- | 39 | 0.00 | --- | 33 | 0.00 | --- |
| 6 | 0.00 | --- | 40 | 0.00 | --- | 34 | 0.00 | --- |
| 7 | 0.70 | 3.1 | 41 | 1.52 | 204 | 25 | 0.51 | --- |
| 8 | 0.02 | --- | 42 | 0.00 | --- | 26 | 0.03 | --- |
| 9 | 0.70 | --- | 43 | 1.52 | --- | 27 | 0.02 | --- |
| 10 | 0.00 | --- | 44 | 0.00 | --- | 28 | 0.01 | --- |
| 11 | 0.20 | --- | 45 | 1.07 | --- | 29 | 0.00 | --- |
| 12 | 0.01 | --- | 46 | 0.00 | --- | 40 | 0.00 | --- |
| 13 | 0.70 | --- | 47 | 0.00 | --- | 40 | 0.00 | --- |
| 14 | 0.00 | --- | 48 | 0.00 | --- | 40 | 0.00 | --- |

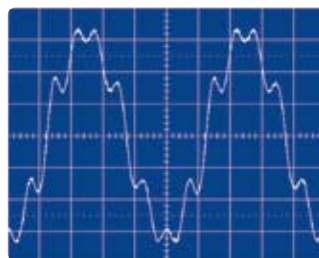


10. WAVEFORM LIBRARY

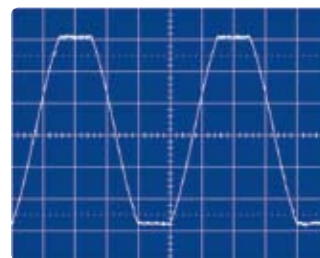
Up to 30 different Distortion Waveforms and 6 user-Define Wareforms are stored in the Waveform Library for user edit and execution.



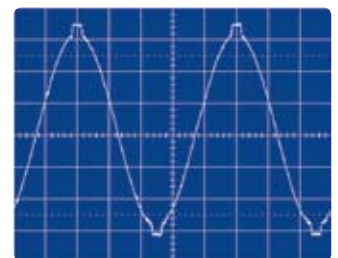
TRIANGLE WAVE



NON-LINEAR



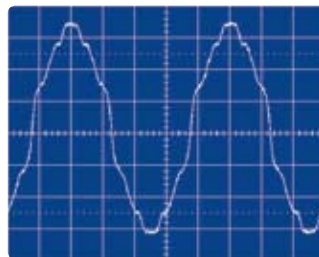
FLAT-TOP SINEWAVE



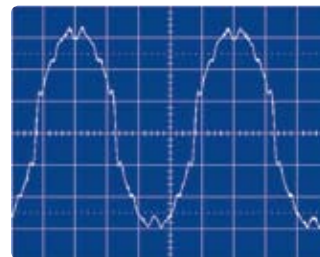
FLAT-TOP SINEWAVE



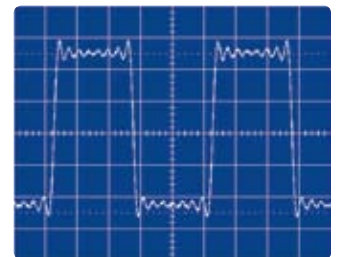
STEP INVERTER



FERRO-RESONANT XFMR



LINE-FILTER

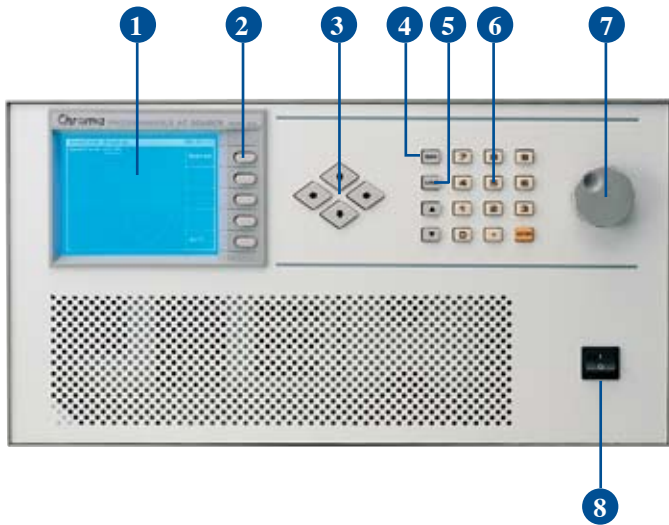


UPS

Please refer to the user's manual for more factory-installed Waveforms and specifications

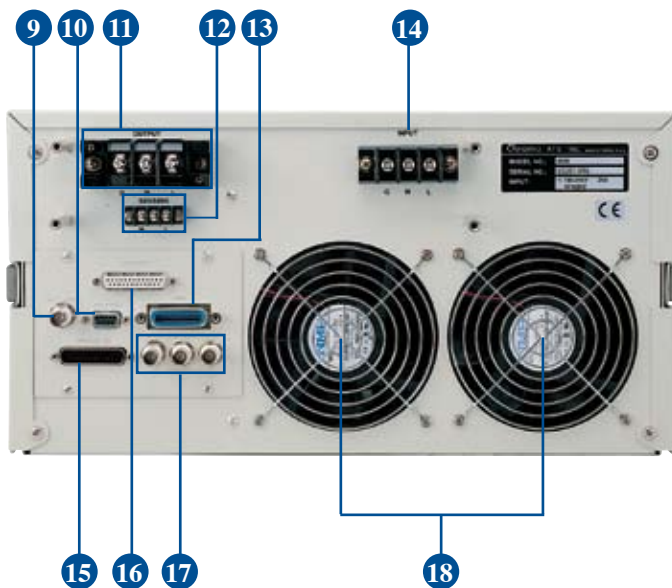
PANEL DESCRIPTION

Model 6530



FRONT PANEL

- 1. LCD Display**
320 x 240 graphic LCD display to show the test set up, operating status, readings and waveforms
- 2. Soft-Key**
5 soft-keys adjacent to the command block display on the LCD that provide users a menu driven interface to control the AC Source operation
- 3. Cursor Key**
For cursor movement
- 4. Edit Key**
To enter into editing mode for real voltage adjustment and frequency setting by pressing Up/ Down keys or Rotary Knob
- 5. Local Key**
Use to switch the system control from Remote Mode to Local Mode
- 6. Numeric Key**
For data setting
- 7. Rotary Knob**
Use to adjust the voltage, frequency and parameter setting
- 8. Power Switch**



REAR PANEL

- 9. External V Reference**
External programming voltage input
- 10. RS-232C Interface**
- 11. Output Terminal**
- 12. Remote Sense**
The remote sense/ feedback circuit guarantees the output accuracy and stability
- 13. GPIB Interface**
- 14. Input Terminal**
- 15. Special I/O Port**
- 16. Printer Interface**
- 17. System I/O Port**
The Sync, Clock, and Vref. ports for system expansion
- 18. Cooling Fan**

ORDERING INFORMATION

- 6512** : Programmable AC Source 0~300V/15~2KHz / 1.2KVA
6520 : Programmable AC Source 0~300V/15~2KHz / 2KVA
6530 : Programmable AC Source 0~300V/15~2KHz / 3KVA
6560-2 : Programmable AC Source 0~500V/45~1KHz / 6KVA I/P 3Ø 220V
6560-3 : Programmable AC Source 0~500V/45~1KHz / 6KVA I/P 3Ø 380V
6590-2 : Programmable AC Source 0~300V/45~1KHz / 9KVA 1Ø or 3Ø, 3000VA per phase, I/P 3Ø 220V
6590-3 : AC Power Source 0~300V/45~1KHz / 9KVA 1Ø or 3Ø, 3000VA per phase, I/P 3Ø 380V

- A650001** : Remote Interface for Model 6500 Series (External V Reference, RS-232 interface, Printer Interface, GPIB Interface, Special I/O Port , System I/O Port)
A650002 : 19" Rack Mounting Kit for Model 6512/6520/6530
A650003 : Softpanel for Model 6500 Series
A610004 : Universal Socket Center for Model 6512/6520/6530/6560 Series
A600009 : GPIB Cable (200cm)
A600010 : GPIB Cable (60cm)

SPECIFICATIONS

| Model | 6512 | 6520 | 6530 | 6560 | 6590 |
|---------------------------|--|--|--|---|---|
| Output Phase | 1 | 1 | 1 | 1 (parallel or series) | 1 or 3 selectable |
| Output Ratings | | | | | |
| Power | 1200VA | 2000VA | 3000VA | 6000VA | 3000VA per phase, 9000VA total |
| Voltage | | | | | |
| Range/phase | 150V / 300V / Auto | 150V / 300V / Auto | 150V / 300V / Auto | 150V / 300V (parallel) / 300V / 500V (series) | 150V / 300V |
| Accuracy | 0.2% +0.2% of F.S. | 0.2% +0.2% of F.S. | 0.2% +0.2% of F.S. | 0.2% +0.2% of F.S. | 0.2% +0.2% of F.S. |
| Resolution | 0.1V | 0.1V | 0.1V | 0.1V | 0.1V |
| Distortion *1 | 1% (15-45 Hz) 0.5% (> 45-500 Hz) 1% (> 500-1K Hz) 2% (> 1K-2K Hz) | 1% (15-45 Hz) 0.5% (> 45-500 Hz) 1% (> 500-1K Hz) 2% (> 1K-2K Hz) | 1% (15-45 Hz) 0.5% (> 45-500 Hz) 1% (> 500-1K Hz) 2% (> 1K-2K Hz) | 1% (45-1K Hz) | 1% (45-1K Hz) |
| Line Regulation | 0.1% | 0.1% | 0.1% | 0.1% | 0.1% |
| Load Regulation *2 | 0.1% | 0.1% | 0.1% | 0.2% (series), 0.8% (parallel) | 0.2% |
| Temp. Coefficient | 0.02% per°C | 0.02% per°C | 0.02% per°C | 0.02% per°C | 0.02% per°C |
| Max. Current/Phase | | | | | |
| rms | 12A/6A (150V / 300V) | 20A/10A (150V / 300V) | 30A/15A (150V / 300V) | 60/30/15A (150/300/500V) | 30A/15A (150V / 300V) / 90A/45A total |
| peak | 36A/18A (15-100Hz) 30A/15A (>100-1kHz) 24A/12A (>1K-2kHz) | 60A/30A (15-100Hz) 50A/25A (>100-1kHz) 40A/20A (>1K-2kHz) | 90A/45A (15-100Hz) 75A/38A (>100-1kHz) 60A/30A (>1K-2kHz) | 180/90/45A (45-100Hz) 150/75/38A (>100-1kHz) | 90A/45A (45-100Hz) 75A/38A (>100-1kHz) |
| Frequency | | | | | |
| Range | 15 ~ 2K Hz | 15 ~ 2K Hz | 15 ~ 2K Hz | 45 ~ 1K Hz | 45 ~ 1K Hz |
| Accuracy | 0.15% | 0.15% | 0.15% | 0.15% | 0.15% |
| Resolution | 0.01 Hz (15 ~ 99.9 Hz) 0.1 Hz (100 ~ 999.9 Hz) 0.2 Hz (1K ~ 2K Hz) | 0.01 Hz (15 ~ 99.9 Hz) 0.1 Hz (100 ~ 999.9 Hz) 0.2 Hz (1K ~ 2K Hz) | 0.01 Hz (15 ~ 99.9 Hz) 0.1 Hz (100 ~ 999.9 Hz) 0.2 Hz (1K ~ 2K Hz) | 0.01 Hz (45 ~ 99.9 Hz) 0.1 Hz (100 ~ 999.9 Hz) | 0.01 Hz (45 ~ 99.9 Hz) 0.1 Hz (100 ~ 999.9 Hz) |
| Input Ratings | | | | | |
| Voltage Range | 190 ~ 250 V, 1Ø | 190 ~ 250 V, 1Ø | 190 ~ 250 V, 1Ø | 190 ~ 250 V, 3Ø | 190 ~ 250 V, 3Ø |
| Frequency Range | 47 ~ 63 Hz | 47 ~ 63 Hz | 47 ~ 63 Hz | 47 ~ 63 Hz | 47 ~ 63 Hz |
| Current | 10A max. | 15A max. | 23A max. | 23A max./phase | 23A max./phase |
| Power Factor | 0.95 min. under full load | 0.97 min. under full load | 0.98 min. under full load | 0.98 min. under full load | 0.98 min. under full load |
| Measurement | | | | | |
| Voltage/Phase | | | | | |
| Range | 0 ~ 150V / 0 ~ 300V | 0 ~ 150V / 0 ~ 300V | 0 ~ 150V / 0 ~ 300V | 0 ~ 150V / 0 ~ 300V | 0 ~ 150V / 0 ~ 300V |
| Accuracy (rms) | 0.25% + 0.1% F.S. | 0.25% + 0.1% F.S. | 0.25% + 0.1% F.S. | 0.25% + 0.1% F.S. | 0.25% + 0.1% F.S. |
| Resolution | 0.1V | 0.1V | 0.1V | 0.1V | 0.1V |
| Current/Phase | | | | | |
| Range (peak) | 0 ~ 60 A | 0 ~ 100 A | 0 ~ 140 A | 0 ~ 280 A | 0 ~ 140 A |
| Accuracy (rms) | 0.4% + 0.25% F.S. | 0.4% + 0.15% F.S. | 0.4% + 0.1% F.S. | 0.4% + 0.1% F.S. | 0.4% + 0.1% F.S. |
| Accuracy (peak) | 0.4% + 0.5% F.S. | 0.4% + 0.3% F.S. | 0.4% + 0.2% F.S. | 0.4% + 0.2% F.S. | 0.4% + 0.2% F.S. |
| Resolution | 0.01A | 0.01A | 0.01A | 0.01A | 0.01A |
| Power/Phase | | | | | |
| Accuracy | 1% F.S. (CF<6) | 1% F.S. (CF<6) | 1% F.S. (CF<6) | 1% F.S. (CF<6) | 1% F.S. (CF<6) |
| Resolution | 0.01W | 0.01W | 0.01W | 0.01W | 0.01W |
| Frequency | | | | | |
| Range | 15 ~ 2K Hz | 15 ~ 2K Hz | 15 ~ 2K Hz | 45 ~ 1K Hz | 45 ~ 1K Hz |
| Accuracy | 0.01% +2 count | 0.01% +2 count | 0.01% +2 count | 0.01% +2 count | 0.01% +2 count |
| Resolution | 0.01Hz | 0.01Hz | 0.01Hz | 0.01Hz | 0.01Hz |
| Others | | | | | |
| Efficiency | 80% typical | 80% typical | 80% typical | 80% typical | 80% typical |
| Protection | OPP, OLP, OTP, FAN Fail | | | | |
| 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 LVD and EMC Requirement) | | | | |
| Dimension (H x W x D) | 221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch | 221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch | 221.5 x 425 x 567 mm / 8.72 x 16.73 x 22.32 inch | 765.9 x 546 x 700 mm / 30.16 x 21.5 x 27.56 inch | 888.5 x 546 x 700 mm / 34.98 x 21.5 x 27.56 inch |
| Weight | 26.4 kg / 58.15 lbs | 26.4 kg / 58.15 lbs | 26.4 kg / 58.15 lbs | 107 kg / 235.68 lbs | 156 kg / 343.61 lbs |

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

Note *1 : Test under output voltage from half to full range.

Note *2 : Test with sinewave & with remote sense.

Developed and Manufactured by :

CHROMA ATE INC.

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