Power Electronics Testing

Programmable AC Power Sources
Programmable DC Power Supplies
Programmable AC Electronic Loads
Programmable DC Electronic Loads
Digital Power Meters
Automated Test Systems
Electrical Safety Equipment
Programmable AC Power Sources

MODEL

61500/61600 Series

High Power

**Advance IEC Test & Measurement**

**Cost Effective AC Power Sources**

The 61500 series defines a new standard in high performance AC power sources. It's equipped with powerful features such as power line disturbance simulation, programmable output impedance, comprehensive measurement functions and regulation test software. With the same H/W power stages, the 61600 series delivers pure, instrument grade AC power at a very low cost.

Chroma also provides a software suitable for aerospace testing, including MIL-STD-704F, RTCA DO-160D, and ABD100. These features make Chroma's 61500 Series ideal for commercial, power electronics, avionics, marine, military and regulation test applications from bench-top testing to mass productions.

**61700 Series**

Three-phase AC Power Sources

The 61700 series AC Power Source delivers pure, 5-wire, 3-phase AC power. Unlike traditional 3-phase AC power sources, it includes low power rating models at a very low cost. Users can program voltage, frequency and measure the critical characteristics of the output on its LCD display. It delivers the right solution to simulate many input conditions of a UUT, which makes it ideal for R&D and QA applications. It is also suitable for commercial applications including laboratory testing to mass production.

**6400/6500 Series**

AC Sources with advanced features up to 9kVA

The 6400 series Programmable AC Power Source delivers pure, instrument grade AC power at a very low cost.

The 6500 series is capable of simulating a wide variety of AC line conditions, harmonic waveforms, accurate power measurement and analysis. It delivers the right solution to simulate all kinds of normal/abnormal input conditions and measures the critical characteristics of the product under test.
Key Features:
- Power rating: 600W ~ 5000W
- Voltage range: 0~600V
- Current range: 0~120A
- Wide range of voltage & current combinations with constant power
- High-speed Programming
- Precision V&I Measurements
- Current sharing for parallel operation with Master/Slave Control
- Auto Sequencing Programming: 10 Programs/100 Sequences/8 bit TTL
- Voltage & Current Slew Rate Control
- OVP, Current Limit, Thermal protection

High power density (15KW) in 3U Programmable DC Power Supply
The new 62000H series Programmable DC Power Supplies offer many unique advantages for telecom, automated test systems & integration, industrial, battery charge & simulation for hybrid car. These advantages include high power density of 15kW in 3U, precision readback of output current and voltage, output trigger signals, as well as the ability to create complex DC transient waveforms to test device behavior with spikes, drops, and other voltage deviations.

Model 62150H-600S/1000S provides unique features to simulate the output characteristics of a solar array. This function is useful for MPPT performance evaluation of solar inverters.

Key Features:
- Power range: 5kW/10kW/15kW
- Voltage range: 0~1000V, Current range: 0~375A
- High power density (15kW in 3U)
- Current sharing operation
- Voltage ramp function (time range: 10 ms ~ 99 hours)
- Sequencing Programming: 10 Programs/100 Sequences
- Standard Analog Programming interface
- USB/RS232/RS485 Interface, Optional: GPIB/Ethernet

Modular DC Power Supply
The 62000B series Modular DC Power Supplies offer many unique features for Burn-in and plating/electrolysis applications. The features include a N+1 redundancy, high power densities, hot-swappable maintenance, remote ON/OFF and programmable control via the CAN bus.

The 62000B offers 5 power modules ranging from 1V to 150V and current from 10A to 90A in three or six module mainframes. The six module mainframe houses up to six modules in paralleled operation for 9kW power output. Easily parallel up to fourteen mainframes to 120kW with current sharing and CAN bus control for bulk power applications.

Key Features:
- Voltage range: 1 ~ 150V
- Current range: Up to 2000A (System)
- Power range up to 1.5kW per module up to 120kW per system
- N+1 Redundancy
- Hot-swappable
- Remote Sense
- Remote ON / OFF
- CAN Bus Control
Programmable DC Electronic Loads

**MODEL**

63600 Series

**Key Features:**
- Max. Power: 100W×2(Dual), 300W & 400W
- Voltage Range: up to 80V
- 5 module mainframe Max. 2000W, load modules up to 400W/ea
- Up to 10 channels in one mainframe
- 0.4V @ 80A (Typical) low voltage operating characteristics
- Flexible CC, CR, CV and CP operation modes
- CZ mode for turn on capacitive load simulation
- Auto frequency sweep up to 50kHz
- Voltage, current and Pmax measurement for OCP/OLP testing

**High power density DC loads with unique CZ operation mode**
New generation 63600 series DC Electronic Load provides innovative Dynamic Sweep mode with Vpk measurements. Dynamic mode can be run independently on each module or in parallel for high power loading. Also provided are three measurement ranges for precise voltage and current measurements making it ideal for Energy Star testing requirements.

With the VFD display and rotary knob, the 63600 loads offer versatile front panel operation. Users are able to control the 63600 family remotely via Ethernet, USB, or GPIB interface.

**Cost effective Modular Electronic Loads, up to 8 channels in one chassis**
The 6310A loads are economical modular loads designed for power supply testing applications. Up to eight independent channels maybe configured into a single mainframe. Instruments come standard with front panel controls & RS232 or optional GPIB. Load modules are available from a wide range covering 0.1VDC to 500VDC, up to 240A and 1200W.

The 6310A series is the enhanced version of 6310 series, with advanced new features including USB interface, Constant Power (CP) mode, OCP test, Timing mode and Digital I/O.

**MODEL**

6310A Series

**Key Features:**
- Power Levels: 200W, 100x2(Dual), 30W & 250W, 300W, 350W, 600W, 1200W
- Wide range 0~500V operating voltage
- Up to 8 channels in one mainframe, excellent for testing multiple output SMPS
- CC, CR, CV & CP operation modes
- Minimum input resistance allowing load to sink high current at low voltage
- High/Low limits of testing parameters to test GO/NG
- LED Load Simulator (63110A / 63113A)

**LED Load Simulator**
Chroma has created the first LED load simulator, model 63110A / 63113A, for testing LED power driver from 6310A series electronic loads. It provides a standard instrument that improve the life cycle and temperature variation of real LEDs. By setting the expected voltage, current and resistance of the LED operation point, 63110A / 63113A can simulate the different kind of LED’s characteristics. It is also capable of simulating LED assembled in series, LED light bar, to test the matching character of LED power drivers.

**Key Features:**
- 63110A: Dual channel, Power: 100W, Voltage: 100V/500V, Current: 0.6A/2A
- 63113A: Single channel, Power: 300W, Voltage: 60V/300V, Current: 5A/20A
- Unique LED mode for LED driver test
- Programmable LED operating resistance (Rd)
- Fast response for PWM dimming test
- Up to eight channels in one mainframe (6314A)
- 16-bit precision voltage and current measurement with dual-range
- Full Protection: OC, OP, OT protection and OV alarm
High Power Loads with 2.5X times surge
The 63200 series loads are designed for telecom, fuel cell and other applications requiring high power or high current DC loading. Instruments use FET technology and are air cooled for simple operation and maintenance. Loads are parallelable allowing for loading systems of up to 93.6kW. Instruments come standard with front panel controls, RS-232C & GPIB.

Programmable AC&DC Electronic Loads

AC Loads with programmable Power Factor and Crest Factor
The 63800 series AC&DC electronic loads are designed for testing uninterruptible power supplies (UPS), Off-Grid Inverters, AC sources and other power devices such as switches, circuit breakers, fuses and connectors. The 63800’s state of the art design uses DSP technology to simulate non-linear rectified loads in a unique RLC operation mode.

All the models within the 63800 series can be used together for both parallel and 3-phase functions as well as paralleled in a 3-phase configuration.

Digital Power Meters

Ideal for Energy-star & High Precision Measurement
The 66200 series Digital Power Meter is designed for single-phase measurements of AC power signals and related parameters common to most electronic products. Instead of traditional analog measurement circuits, the 66200 uses state-of-the-art DSP digitizing technology. The internal 16 bits analog/digital converters with sampling rates of up to 240kHz providing both high speed and highly accurate measurements, which is unmatched in the industry for this class of power meters.
Switching Power Supply Testing
Chroma is the leading worldwide supplier of automated testing equipment in the power conversion industries. Automated systems are available for R&D, design verification and production applications.

Key Features :
☑ Open architecture software platform
☑ Support any instrument with GPIB/RS-232/RS-485/i2C/CAN interface
☑ Test command optimizer helps to improve test speed
☑ Capability in coding for any power supply application
☑ Cost effective
☑ Windows 98/NT/2000/XP/7 or higher based software
☑ Comprehensive hardware modules provide high accuracy and repetitive measurements
☑ Statistical and user editable test report
☑ User editable test item/ test program
☑ Remote monitoring via internet
☑ Support CAN Bus card for Car Electronics Testing application
☑ Capability in testing LED power board

Electric Vehicle Power Electronics Testing
The power conversion section of the EV/HEV is composed of several power electronic units, which include the EVSE (EV Supply Equipment), on-board charger, DC/DC converter, motor driver, etc. The following pictures of the Chroma ATS show some applications for EV/HEV.
LED Power Driver ATS

Chroma 8491 LED Power Driver ATS is the ultimate test system for LED power driver. It is able to test Multi-UUT/Multi-output concurrently to improve the productivity significantly. The hardware devices available for selection include AC/DC power supply, power meter, PCI interface function card, transducer unit and the industries first LED load simulator for simulating LED loading with 6330A series electronic loads.

The PCI interface function card containing LED Power Driver Measurement Card & Control Card, industrial measures dimming current / frequency / duty and provides BL control signal (DC level, PWM, SM BUS) and Enable ON/OFF signal. Furthermore the Timing /Noise Card is used in ripple current measurement at 20MHz bandwidth.

Key Features :
- For LED Power Driver testing (lighting & TV backlight)
- Capable of testing Multi-UUT/Multi-output concurrently to improve productivity
- Provide optimized standard test items for the Unit Under Test (LED Power Driver) to deliver excellent test performance
- Windows 98/2000/NT/XP/7 based software
SAFETY ANALYZER

The 19032 series Safety Analyzer is able to perform several safety tests in one unit including AC/DC Hipot, Insulation Resistance, Ground Bond, Open/Short Check and Leakage Current for compliance testing of IEC, UL, TUV, CSA, EN and other standards including IEC60601-1, UL2601-1, IEC950, UL544, UL60950. The time-saving TwinPort™ feature performs Hipot and Ground Bond simultaneously cutting time for these tests in half. The 19032’s open / short check function (OSC) checks for an open connection or a DUT short during testing. The 19032 Safety Analyzer’s leakage current scanners can provide up to 20A input current capability for functional run testing as well as earth, enclosure, patient and line leakage current test. The 19032 is flexible enough to combine 11 different scanners to satisfy various safety test requirements. UL, TUV, CE

Key Features:
► Programmable output voltage to 5kV AC and 6kV DC
► Insulation resistance to 50GΩ/1000V DC
► Ground bond up to 30A (Option up to 40A / 60A)
► Leakage current scanners up to 20A
► Open/Short check function and Twin-Port™ feature
► ARC detection (Flashover)

MODEL 19032 SERIES

Model 19050/70 SERIES

GENERAL PURPOSE HIPOT TESTERS

The 19050 series hipot or dielectric withstanding testers are advanced digital instruments with load and line regulation to ensure measurement integrity. Multi-step capabilities allow users to perform multiple tests in a sequence such as AC hipot followed by insulation resistance testing. The 19070 series is a compact, low-cost entry to hipot testing. Both series include Chroma’s patented Open Short Check (OSC) feature, Flashover Detection, Ground Continuity Check, Ground Fault Interrupt (GFI), and Quick Discharge. Both meet UL Hipot Tester Requirements. UL, TUV, CE

Key Features:
► AC 5kV and DC 6kV output
► 1kV Insulation resistance test
► IR range 1MΩ - 50MΩ
► Ground Fault Interrupt (GFI)
► Ground continuity check (GC)
► Quick discharge of DUT

MODEL 19020

MULTI-CHANNEL HIPOT TESTER

The Guardian 19020 hipot tester comes equipped with the world’s first sync hipot test function. A single unit can perform 10 channels sync output and measurements simultaneously. Up to 10 units (master & slave) can be controlled simultaneously to have 100 channels in total. They can be grouped for output to avoid creating voltage difference due to adjacent tests as well as to improve productivity.

Key Features:
► 10/4 channels in one design
► 10 sets of sync output and measurement
► AC/DC/IR 3 in 1 EST test
► Master/Slave link (up to 10 units)
► Programmable V-output and limits
► OSC (Open/Short Check)

MODEL 19056/57

HIPOT ANALYZER

Chroma’s Guardian 19056/19057 Hipot Analyzer is specially designed for testing and analyzing ultra-high withstand voltage. The series of models include 10kVac/12kVdc/20kVdc with maximum AC20mA/DC10mA output that can perform AC/DC withstand voltage and insulation resistance tests with contact check during production line test. In addition to the patented OSC (Open Short Check), High Voltage Contact Check is added to test the components with high insulation capability when high voltage outputs to improve the testing reliability and efficiency.

Key Features:
► 10kV AC & 20kV DC withstand voltage test
► 0.1MΩ~50GΩ insulation impedance test
► BDV (BreakDown Voltage test)
► HVCC (High Voltage Contact Check)
► HFCC (High Frequency Contact Check)
► OSC (Open Short Check)
**Ground Bond Tester**
The 19572 is an instrument dedicated to measuring grounding resistance within the range of 0.1~510 mΩ and AC current output up to 45A. Its compact design and easy operation is most suitable for ground testing in the production line. The built-in resistance compensation function results in highly reliable test results. The 19572 can be incorporated into an automated manufacturing environment with remote start and GO/NOGO results output through the rear panel PLC interface. **UL, CE**

**Key Features:**
- High performance AC current output: 45A
- Wide resistance range: 10 ~ 510mΩ
- Meet UL, CSA, TUV, VDE CE safety test requirements
- Built-in resistance compensation function
- Standard RS-232 interface
- CE Certified

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**Wound Component EST Scanner**
Chroma’s 19035 Wound Component EST Scanner is a production safety tester designed for test requirements of three-phase motors, double-wound transformers and heater related wound components. Quality verification test items for wound components consist of AC/DC Hipot (dielectric withstanding), Insulation Resistance (IR), and Impulse Winding tests. The 19035 integrates these tests into one unit. **CE**

**Key Features:**
- Programmable output voltage to 5kV AC and 6kV DC
- Trip current programmable to 30mA AC and 10mA DC
- Insulation resistance to 50GΩ / 5kV DC
- DCR 10mΩ – 100kΩ
- Built-in 8 ch. scanner
- DWX Series - Impulse Winding Tester compatible

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**Wound Component EST Analyzer**
The Chroma 19036 is the industry’s first Wound Component Electrical Safety Test (EST) Analyzer that combines the functions of impulse test, hipot, insulation resistance and DC resistance measurements. It has 5kVac/ 6kVdc high voltage output, 5kV insulation resistance, 6kV layer short impulse voltage and 4-wire DC resistance measurement that can comply with the wound components test demands by providing maximum 10 channels output for multichannel scanning tests to save time and labor costs.

**Key Features:**
- 5 in 1 composite analyzer (10 channels)
- Hi-pot test (5kVac / 6kVdc)
- Insulation Resistance test (5kV Max)
- Impulse Winding Test (6kV at 200MHz)
- DCR measurement
- Up to 40 channels scanning test

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**Hipot Analyzer**
The 19055 Series Hipot Analyzers are designed for hipot testing and analysis. AC, DC, and IR tests can be programmed in AC 5kV/100mA - DC 6kV/20mA with 500VA output rating which complies with EN50191 requirements. The Guardian 19055-C adds Corona Discharge Detection (CDD). Corona Discharge Detection and Discharge Level Analysis (DLA) are used to specify the Corona Discharge Start Voltage (CSV), Flashover Start Voltage (FSV) & BreakDown Voltage (BDV).

**Key Features:**
- 500V output rating
- Hipot: AC 5kV/100mA - DC 6kV/20mA
- Insulation: 5kVmax - 1MΩ~50GΩ
- Floating output complies with EN50191
- Corona Discharge Detection (CDD, 19055-C)
- Flashover Detection
- Discharge Level Analysis (DLA)

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**Sentinal I, II and III**

**Medical Test Systems**
The Sentinel family of Automated Test Systems provides various solutions, from an operator manually changing leads to fully automated Electrical Safety Testing. Based on the system selection, they are designed to meet IEC60601-1, IEC 60601-2-49 (Multifunctional Patient Monitoring Equipment) standards, Class I, Class II, mains and Internally Powered medical devices.

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**Tests / Specifications**

<table>
<thead>
<tr>
<th>Mains Voltage</th>
<th>Sentinel I</th>
<th>Sentinel II</th>
<th>Sentinel III</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 300VAC</td>
<td>4400VA</td>
<td>1500VA</td>
<td>4400VA</td>
</tr>
<tr>
<td>Main Frequency</td>
<td>15Hz to 1KHz</td>
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<td>15Hz to 1KHz</td>
</tr>
<tr>
<td>B-Type Patient Connections</td>
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<td>1</td>
<td>4, 8, 12 or 16</td>
</tr>
<tr>
<td>IEC 60601-1</td>
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<td></td>
<td>Yes</td>
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<tr>
<td>Earth (line) Leakage Current</td>
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<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Enclosure Leakage Current</td>
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<td>Yes</td>
</tr>
<tr>
<td>Patient Leakage Current</td>
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<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>IEC 60601-2-49</td>
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<td>No</td>
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<tr>
<td>F-Type Leakage Current (Mains-on-Applied Part)</td>
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<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Device Stays Powered-On During Scanning</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Medical Electrical Equipment – IEC60601-1
► 19032 Electrical Safety Analyzer with built in Leakage Current Scanner. Provides AC/DC Hipot, IR, GB, and OSC. Our scanner provides up to 20A input current capability for functional run, earth, enclosure, patient, patient auxiliary as well as line leakage current testing.
► Our 8910 Medical Electrical Safety ATS is a complete and flexible hardware and software solution that supports special product tests and various instrument combinations through user programming and saves data for analysis and data mining.

Household and Appliance Products – UL60335-1, IEC60335-1
► 19070 & 19050 Series Hipot Testers – Provides, low cost solutions such as AC/DC Hipot, IR, GB, and OSC to help meet standards.
► 19032 Safety Analyzer – Multi-function tester combines all solutions including leakage current into 1 box plus Twin-Port feature to save test time.
► 19572 Ground Bond Tester – Integrity of ground/ground resistance – helps meet CSA 22.2 No. 0.4 requirements.

Information Technology Equipment (ITE) – UL60950, IEC60950-1, UL1950, CSAC22.2 No. 950
► 19070 & 19050 Series Hipot Testers – Provides, low cost solutions such as AC/DC Hipot, IR, GB, and OSC to help meet standards.
► 19032 Safety Analyzer – Multi-function tester combines all solutions including leakage current into 1 box plus Twin-Port feature to save test time.
► 19572 Ground Bond Tester – Integrity of ground/ground resistance – helps meet CSA 22.2 No. 0.4 requirements.

Audio/Video Equipment – IEC60065-1
► 19070 & 19050 Series Hipot Testers – Provides, low cost solutions such as AC/DC Hipot, IR, GB, and OSC to help meet standards
► 19032 Safety Analyzer – Multi-function tester combines all solutions including leakage current into one 1 plus Twin-Port feature to save test time.
► 19572 Ground Bond Tester – Integrity of ground/ground resistance – helps meet CSA 22.2 No. 0.4 requirements.

Transformers - UL 506, UL 1411, UL 1876
► 19035 Wound Component Scanner – designed with OSC and DCR functions for test requirements of transformer wound components.
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Generators, Motors, & Heaters
► 19035 Wound Component Scanner – designed with OSC and DCR functions for test requirements of transformer wound components.
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► 19572 Ground Bond Tester – Integrity of ground/ground resistance – helps meet CSA 22.2 No. 0.4 requirements.

Components, Power Supplies, Adapters & Chargers
► 19070 & 19050 Series Hipot Testers – Provides, low cost solutions such as AC/DC Hipot, IR, GB, and OSC to help meet standards
► 19032 Safety Analyzer – Multi-function tester combines all solutions including leakage current into 1 box plus Twin-Port feature to save test time.
► 19572 Ground Bond Tester – Integrity of ground/ground resistance – helps meet CSA 22.2 No. 0.4 requirements.