REGENERATIVE GRID SIMULATOR 61830HF/61845HF/61860HF

The Chroma 61830HF, 61845HF, and 61860HF are 30kVA, 45kVA, and 60kVA models in the 61800 Regenerative Grid Simulator series. Delivering up to 60kVA output in a compact 5U chassis, these models set a new benchmark for power density. They support both single-phase and three-phase output with a maximum phase voltage of 460V and line voltage of 797V; through single-phase three-wire configuration, the equivalent output voltage can reach up to 920V. For higher power requirements, units of the same power rating can be connected in parallel through master/slave control.

The 61830HF/61845HF/61860HF feature energy recovery capability, delivering a comprehensive energy-saving solution. Energy generated by the device under test (DUT) during testing is efficiently fed back to the grid rather than dissipated as heat. This makes the Chroma 61830HF/61845HF/61860HF well-suited for testing across a wide range of clean energy industries, including PV inverters, energy storage systems (ESS), power conditioning systems (PCS), microgrids, power hardware-in-the-loop (PHIL), electric vehicle supply equipment (EVSE), on-board chargers (OBC), and bidirectional on-board chargers (BOBC).

For power-related regulatory testing, the 61830HF/61845HF/61860HF support applications such as vehicle-to-grid (V2G) testing, energy storage system testing, IEC 61000-3-2 / -3-3 / -3-11 / -3-12 AC power test requirements, IEEE 1547 / IEC 62116 renewable-energy standards, SEMI F47 for semiconductor test equipment, and key power test specifications used for global AI server applications, including OCP ORv3, M-CRPS, and ITIC.

The 61830HF/61845HF/61860HF employ all-digital control technology, delivering full power across an output range of up to 460V phase voltage and 30Hz to 100Hz frequency. All models provide high-purity sine waves, with total harmonic distortion below 0.5% at full load (50/60Hz). In addition to pure AC output, the units also support DC output mode and AC+DC output mode, extending coverage to DC-only testing and AC testing with DC bias. Peak current capability reaches up to 2.5 times the RMS current, making these models suitable for DUT input inrush current testing.

The 61830HF/61845HF/61860HF also provide precise measurement capabilities, including RMS voltage, RMS current, real power, power factor, and current crest factor. With advanced DSP technology, these models can measure THD and current harmonic components up to the 50th order. The advanced programming functions LIST, PULSE, and STEP support AC/DC power line disturbance (PLD) simulation, while the Synthesis function allows users to edit harmonic components and create customized distorted waveforms.

The front panel combines a 5-inch LCD touchscreen with an intuitive UI and tactile numeric and function keys, providing a natural and efficient operating experience. Standard remote interfaces include USB and LAN, with optional GPIB or CAN. Remote digital control can be performed through a PC and Chroma SoftPanel software. The 61800 series also provides control drivers for integration with LabVIEW-based control systems.

MODEL 61830HF/61845HF/61860HF

KEY FEATURES

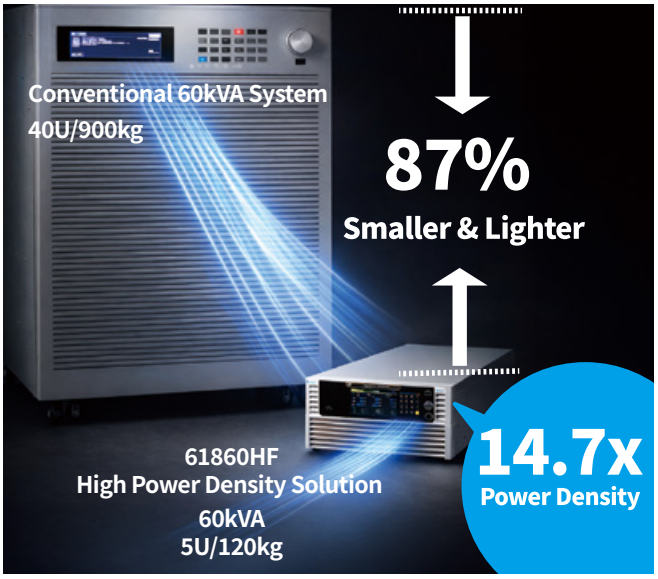
- Rated power
  61830HF: 30kVA
  61845HF: 45kVA
  61860HF: 60kVA
- Voltage range: 0 to 460VLN
- Frequency range: 30 to 100Hz/DC
- Up to 60kVA output in a 5U chassis for exceptional power density
- Dual-interface design combining a full touchscreen with tactile physical keys
- Selectable single-phase and three-phase output modes
- Split-phase output configurable through phase settings
- Regenerates rated apparent power back to grid with 90% conversion efficiency
- Modular power-stage design for serviceability
- Adjustable voltage and frequency slew rate settings
- Adjustable voltage and current output limits
- Configurable voltage waveform turn-on / turn-off angle (0 to 360°)
- Synchronous TTL transient signal for output voltage transitions
- Advanced LIST, STEP, and PULSE modes for power line disturbance (PLD) simulation
- Harmonic and interharmonic distorted waveform synthesis
- Measurement functions including individual current harmonic components
- Response Speed setting for output performance adjustment
- Automatic fan-speed control algorithm minimizes fan noise
- Standard USB and LAN interfaces
- Optional GPIB and CAN interfaces
- Higher output power through parallel configuration in three-phase mode
- Suitable for EV, PV inverter, and Smart Grid testing applications
- Suitable for AI server power applications such as Power Shelf and Rack Power systems
- Meets OCP ORv3, M-CRPS, and (pre-compliance) ITIC requirements for AI server applications

Chroma
Advancing Excellence

HIGH POWER DENSITY DESIGN, OUTSTANDING PERFORMANCE

Combining advanced digital control with next-generation thermal management technology, the Chroma 61830HF/61845HF/61860HF models set a new power density benchmark in the 61800 series, delivering up to 60kVA output power in a compact 5U chassis. Compared with earlier solutions in the same power class, this design shifts the platform from a floor-standing cabinet to a bench-top compatible form factor, reducing installation space and weight by more than 80% while allowing easy integration with other test equipment in a system rack.

The 61830HF/61845HF/61860HF support wide-range phase-voltage output up to 460V and include complete hardware capabilities such as single-phase and three-phase output modes, 100% power output in DC mode, and four-quadrant energy recovery. The high-bandwidth design also delivers excellent transient response, with output-voltage rise and fall slew rates reaching the 2 V/μs class. Stable output characteristics and a full suite of protection features position these models as a high-performance solution for demanding power test applications.



INTUITIVE TOUCH INTERFACE

The Chroma 61830HF/61845HF/61860HF combine a modern industrial design with practical operating logic, providing a dual-interface platform built around a full touchscreen and tactile physical keys. Users can choose between virtual and physical numeric keypads, while intelligently designed icons and shortcut keys improve operating efficiency. For protection settings, communication settings, advanced programming, and voltage ramp-up/ramp-down testing, the dual-interface design allows users to switch freely between smart touch control and precise physical feedback, enabling a complete and seamless operating experience.

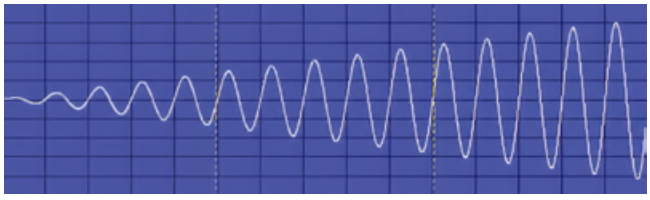
1. Main Page
2. Lock Screen
3. Full-Screen Mode (measurement values)
4. Unified Three-Phase Settings
5. Total Power Display
6. Three-Phase / Single-Phase / Split-Phase Mode
7. Output ON
8. Advanced Settings
9. Output Mode Selection
10. Numeric Keypad
11. Built-in Shortcuts
12. Custom Shortcuts (A to F)
13. Cursor Mode
14. Keypad Mode
15. Voltage / Frequency Settings
16. Measurement Display
17. More Measurements (swipe left / right)
18. Advanced Function Shortcut
19. Esc Key
20. Shift Shortcut Toggle

The touchscreen interface uses a clear and intuitive GUI to simplify the complex settings and measurement screens typically associated with AC power products. With easily recognizable icons and visual guidance, users can quickly understand each function without navigating deep menu structures, streamlining professional test workflows more intuitive and efficient.

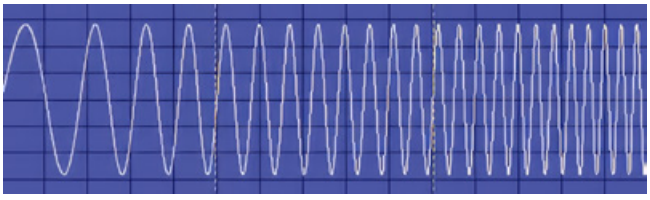
The physical keys support not only a standard numeric keypad, Cursor mode, and Keypad mode, but also Shift combination shortcuts that provide one-touch access to core function screens, greatly reducing time spent navigating layered menus. Custom shortcut keys also allow users to assign frequently used functions or setting pages to dedicated keys A through F, enabling a personalized workflow and greater operating efficiency.

VOLTAGE AND FREQUENCY SLEW-RATE SETTINGS

The Chroma 61830HF/61845HF/61860HF allow users to define the slew rate of voltage or frequency output. When the output voltage or frequency changes, it transitions gradually to the final value according to the selected rate. This is especially useful for verifying the operating range of power products. For example, frequency can be ramped gradually from 47Hz to 63Hz, or voltage from 90V to 264V, instead of testing only fixed input points such as 90V, 115V, 230V, and 264V. During DUT power-up, voltage can also be ramped from 0V to reduce input inrush current, suitable for motor start-up or simultaneous power-on testing of multiple products.



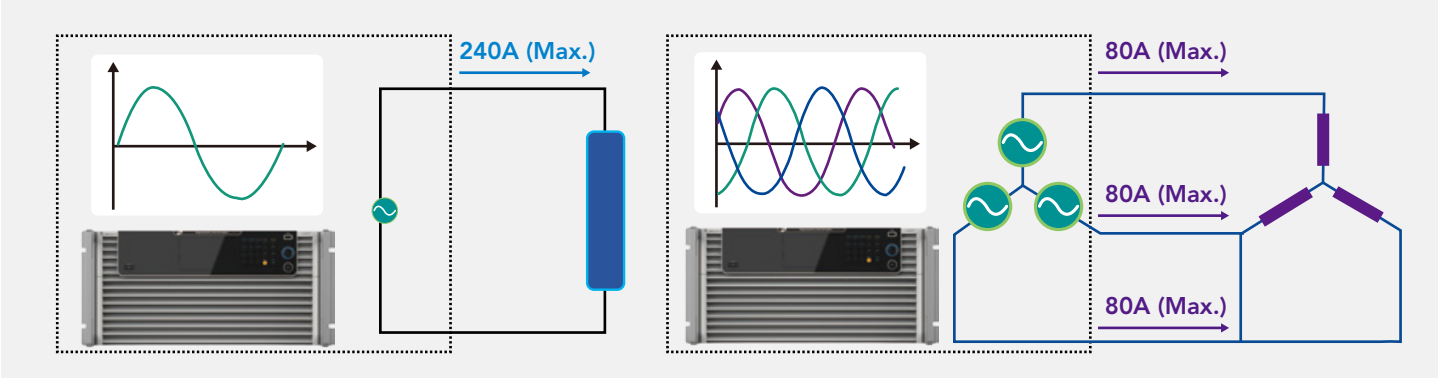
Output voltage waveform change via voltage slew rate setting



Output voltage waveform change via frequency slew rate setting

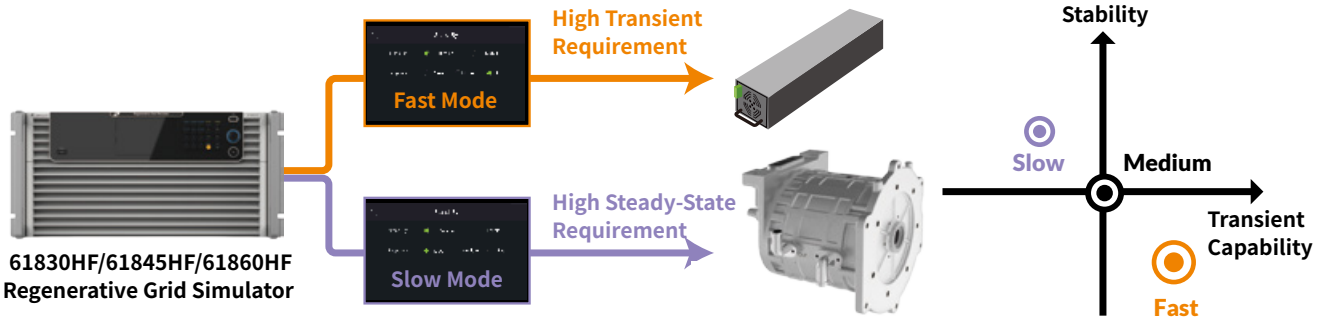
SINGLE-PHASE / THREE-PHASE OUTPUT MODE

The Chroma 61830HF/61845HF/61860HF support both single-phase and three-phase output. Through the internal output relay architecture, users can switch automatically between these modes either from the touchscreen GUI or through interfaces such as LAN, GPIB, USB, and CAN. Even in single-phase mode, the system maintains 100% of rated full-power output, providing a highly versatile power testing solution.



RESPONSE SPEED FOR OUTPUT PERFORMANCE ADJUSTMENT

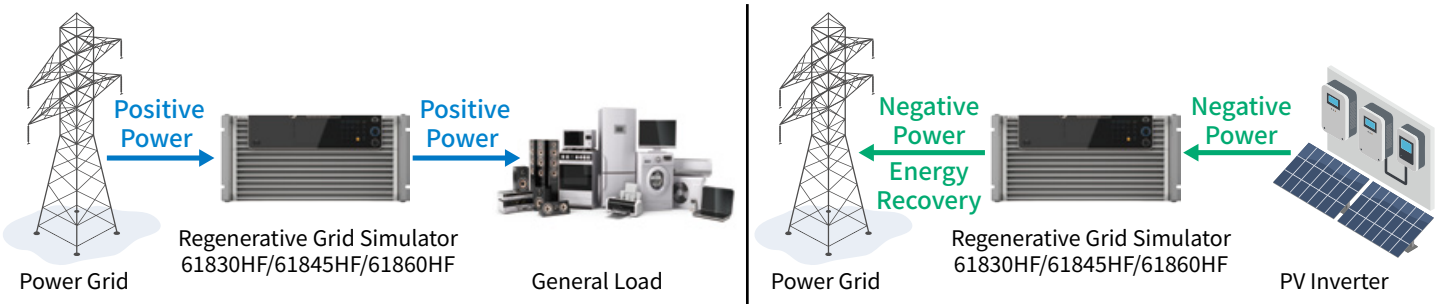
Different AC test applications demand different source characteristics, and DUT requirements generally fall along a transient-performance versus steady-state-stability spectrum. To address this, the Chroma 61830HF/61845HF/61860HF introduce a new Response Speed adjustment function. Using precise digital control algorithms to modify response bandwidth, users can select Fast for higher transient performance, Medium for balanced behavior, or Slow for greater stability. With one-touch switching between modes, the AC source can be matched closely to the DUT and the desired test conditions.



FOUR-QUADRANT REGENERATIVE GRID SIMULATION

The Chroma 61830HF/61845HF/61860HF are constant-voltage AC sources intended for general power testing of products such as home appliances, industrial power supplies, and switching power supplies. They support applications including simulation of utility abnormalities, harmonic voltage input, and user-defined waveform testing. With precise built-in protection settings, the platform can accommodate DUT loading conditions for test items such as inrush current and over-current/over-power behavior.

When testing products that return energy to the grid, such as solar PV inverters or bidirectional on-board chargers, the 61830HF/61845HF/61860HF can detect reverse power flow from the DUT while outputting voltage and activate energy recovery. Reverse current and returned power are fed back to the AC grid at over 90% conversion efficiency rather than being dissipated as heat, delivering excellent energy-saving performance. This makes the platform a true four-quadrant AC source, capable of providing positive and negative voltage while supporting bidirectional current flow for comprehensive grid-simulation applications.



GRID-CONNECTED TEST APPLICATIONS AND PROTECTION

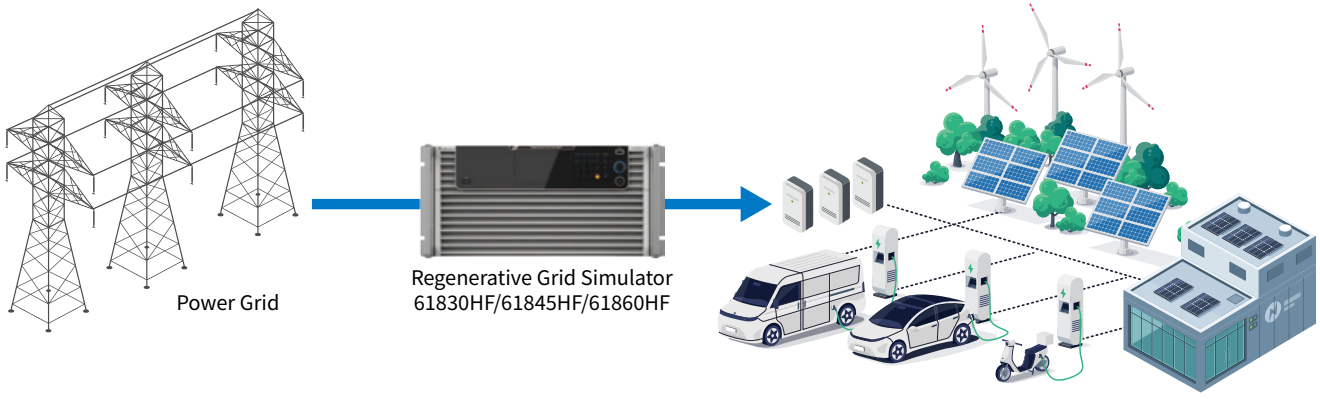
Grid-connected Distributed Generation Compliance Testing

The Chroma 61830HF/61845HF/61860HF support compliance-related testing for grid-tied distributed generation equipment, including UL 1741 SA, IEEE 1547, and IEC 62116. Major test items include:

- Grid Voltage Abnormality Test
- Grid Frequency Abnormality Test
- Anti-islanding Test
- Low Voltage Ride Through (LVRT) Test
- Immunity Test: voltage variation immunity testing under IEC 61000-4-11 / -4-34
- Limit Test: current harmonics and flicker limit testing under IEC 61000-3-2 / -3-3

Microgrid Testing

The 61830HF/61845HF/61860HF can generate the distorted voltage and frequency conditions required for microgrid testing. Through energy recovery, power generated by the DUT can be returned to the AC grid at up to 90% efficiency, meeting microgrid test requirements. This product's AC input side already includes an isolation design, so no additional isolation device is required on the DUT side.

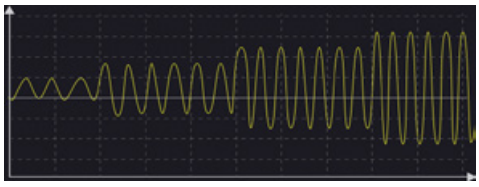


Grid-connection Safety Mechanism

The 61830HF/61845HF/61860HF support both grid connection and energy recovery, and include a complete protection design for regenerative operation on the grid side. If the system detects abnormal AC conditions at the grid connection, such as overvoltage, undervoltage, abnormal frequency, three-phase imbalance, or overcurrent, it immediately issues an alarm and stops loading. At the same time, the grid-side power module enters a lockout state to protect user safety. Once normal grid conditions are confirmed, the system can be restarted and reconnected, providing a comprehensive grid-protection mechanism.

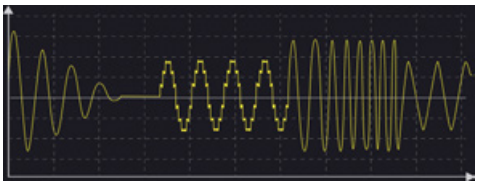
ADVANCED PLD PROGRAMMING

The Chroma 61830HF/61845HF/61860HF provide advanced PLD (Power Line Disturbance) programming functions for simulating a wide range of grid abnormalities and disturbance conditions. These include STEP, PULSE, and LIST modes, as well as harmonic- and interharmonic-related functions such as Synthesis, Inter-Harmonic, and Harmonic Measurement. STEP and PULSE modes support single-step or continuous voltage changes for simulating disturbances such as periodic voltage dips, transient overvoltage, and gradual voltage decline. LIST mode supports more complex waveform editing, with up to 100 programmable sequences and definable start and end states. Because waveform components can include both AC and DC, users can create nearly any required signal waveform. Together, these modes make it possible to simulate a wide range of voltage dips, interruptions, and waveform variations, and support IEC 61000-4-11 pre-compliance immunity testing as well as IEC 61000-4-13 / -4-14 / -4-28.



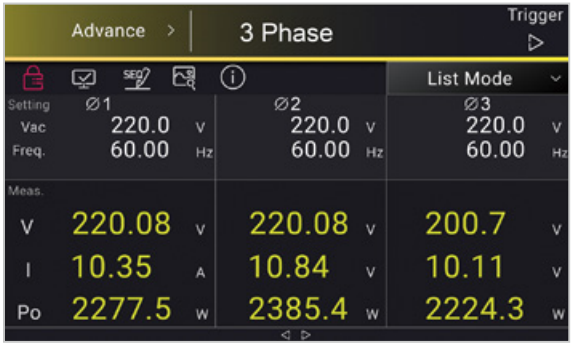
STEP Mode

PULSE Mode



LIST Mode

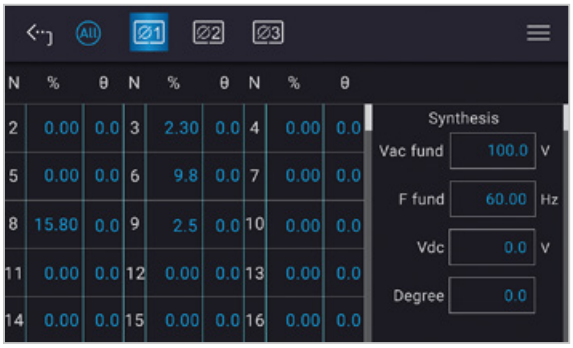
The new touchscreen interface further improves the usability of STEP, PULSE, and LIST functions. In LIST mode, for example, users can view settings for all sequences directly from the edit page and use search to locate the sequence they want to modify. Touch interactions such as tapping and swiping, together with quick editing tools such as copy and paste, make sequence programming more intuitive and efficient.



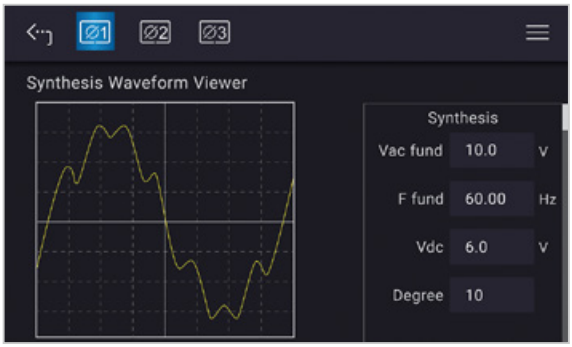
LIST Mode Main Page

LIST Mode Edit Page

The Synthesis function allows harmonic components up to the 50th order to be defined on a 50Hz or 60Hz fundamental, forming periodic distorted waveforms. Inter-Harmonic adds a non-harmonic variable-frequency component on top of the fundamental, with a sweep range from 0.01Hz to 3000Hz, helping users identify DUT input resonance points or immunity weak spots. Harmonic Measurement measures voltage or current harmonics up to the 50th order and displays values such as fundamental voltage, DC component, and total harmonic distortion.

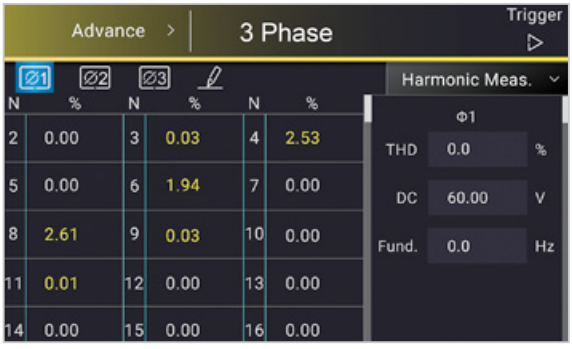


Synthesis Function



Synthesis Preview Screen

Inter-Harmonic Function

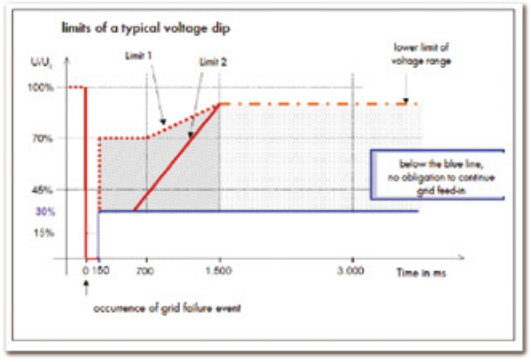


Harmonic Measurement Function

LOW-VOLTAGE RIDE-THROUGH (LVRT) TEST

When an abnormal grid-voltage event occurs (e.g., a voltage sag) a grid-connected PV inverter must maintain normal output for a specified period of time. The duration depends on the depth of the sag. For example, under the German BDEW standard, when voltage drops to 15% of nominal, the inverter must maintain normal output for 150ms. In addition to meeting the required ride-through duration, an LVRT-capable PV inverter must also generate reactive power that correctly corresponds to the sag depth.

Using the advanced LIST Mode programming function, the Chroma 61830HF/61845HF/61860HF can set output voltage and timing step by step according to the required test curve, allowing users to build LVRT test conditions with precision. The Synthesis function can also be used to simulate grid voltages with different harmonic components, making it possible to evaluate their impact on PV inverter output current THD. Together, these capabilities make for a precise and comprehensive LVRT test solution.



LVRT Test Curve

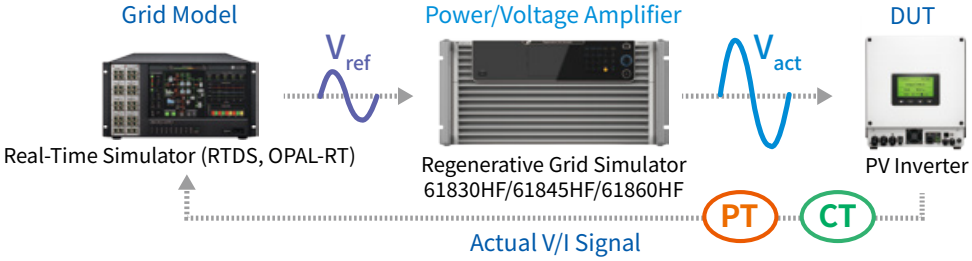
LVRT Stage Voltage / Time Settings

Test number	U/UN	LVRT duration (ms)
1	≦0.05	≧150
2	0.2 - 0.5	≧550
3	0.45 - 0.55	≧950
4	0.7 - 0.8	≧1400

HARDWARE-IN-THE-LOOP (HIL) APPLICATIONS

The Chroma 61830HF/61845HF/61860HF support external analog signal input, a key requirement for high-power power hardware-in-the-loop (PHIL) simulation. This allows analog signals generated by real-time digital simulators such as RTDS and OPAL-RT, or by arbitrary signal generators, to be amplified accurately. A major technical advantage is the system's extremely fast dynamic response: latency from external signal input to actual voltage output is under 100µs. This low-latency performance helps maintain simulation-loop stability and enables realistic reproduction of complex grid transients and dynamic behavior.

*All proprietary names mentioned belong to their respective owners.



SOFTPANEL INTERFACE

The Chroma 61830HF/61845HF/61860HF can be used with SoftPanel, the graphical control software designed for the 61800 series. Its multifunction graphical interface and easy operation provide users with a more flexible way to run tests. The software also includes preset IEC immunity test functions for related power-standard evaluations, including IEC 61000-4-11, -4-13, -4-14, -4-27, and -4-28.

Software Main Page

Transient Voltage Programming

Inter-Harmonic Testing

Voltage Dips, Short Interruptions, and Voltage Variations

Distorted Waveform Editing

Measurement Data Report

SPECIFICATIONS

Model	61830HF	61845HF	61860HF
AC Output Rating			
Output Phase	1 or 3 selectable	1 or 3 selectable	1 or 3 selectable
Max. Power	30kVA	45kVA	60kVA
			54kVA*
Per Phase	10kVA	15kVA	20kVA
			18kVA*
Voltage			
Range	0 to 400V_{LN} / 0 to 692.8V_{LL}		
	0 to 460V_{LN}* / 0 to 796.7V_{LL}*		
Accuracy	0.1% + 0.2%F.S.		
Resolution	0.1V	0.1V	0.1V
Distortion	< 0.5% @50/60Hz < 0.8% @30 to 100Hz	< 0.5% @50/60Hz < 0.8% @30 to 100Hz	< 0.5% @50/60Hz < 0.8% @30 to 100Hz
Line Regulation	0.10%	0.10%	0.10%
Load Regulation	0.20%	0.20%	0.20%
Maximum Current (1-phase mode)			
RMS	120A	180A	240A
Peak	600A	600A	600A
Maximum Current (each phase in 3-phase mode)			
RMS	40A	60A	80A
Peak	200A	200A	200A
Frequency			
Range	DC, 30 to 100Hz	DC, 30 to 100Hz	DC, 30 to 100Hz
Accuracy	0.01%	0.01%	0.01%
Resolution	0.01Hz	0.01Hz	0.01Hz
DC Output (1-phase mode)			
Power	30kW	45kW	60kW
			54kW*
Voltage	-566V_{dc} to 566V_{dc}		
	-651V_{dc} to 651V_{dc}*		
Accuracy	0.1% + 0.25%F.S.	0.1% + 0.25%F.S.	0.1% + 0.25%F.S.
Current	90A	135A	180A
DC Output (3-phase mode)			
Max. Power	10kW	15kW	20kW
			18kW*
Voltage	-566V_{dc} to 566V_{dc}		
	-651V_{dc} to 651V_{dc}*		
Accuracy	0.1% + 0.25%F.S.	0.1% + 0.25%F.S.	0.1% + 0.25%F.S.
Current	30A	45A	60A
Harmonic Synthesis Function			
Harmonic Range	up to 50th harmonics order @50/60Hz fundamental frequency		
Input Rating			
Voltage Operating Range	3Ø 380 to 480V_{LL} ± 10%V_{LL} , 47 to 63Hz		
Current	56A Max./Phase (3Φ 380 to 480V_{LL} ± 10%V_{LL})	85A Max./Phase (3Φ 380 to 480V_{LL} ± 10%V_{LL})	115A Max./Phase (3Φ 380 to 480V_{LL} ± 10%V_{LL})
Power Factor	> 0.99 (Typical)	> 0.99 (Typical)	> 0.99 (Typical)
Measurement			
Voltage			
Range	0 to 460V_{LN}		
Accuracy (AC)	0.1% + 0.2%F.S.		
Accuracy (DC, AC+DC)	0.1% + 0.25%F.S.		
Resolution	0.01V		
Current			
Range (Peak)	100A	150A	200A
Accuracy (RMS)	0.1% + 0.2%F.S.		
Accuracy (Peak)	0.1% + 0.2%F.S.		
Resolution	0.001A		
Power			
Accuracy	0.4%+0.4% F.S.		
Resolution	0.1W / 0.1VA		
Others			
Efficiency	90% (Typical)		
Energy Saving Function	Sleep Mode		
Protection	OVP, OCP, OPP, OTP, FAN		
Safety & EMC	LVD, EMS		
Dimensions (H x W x D)	221.5 x 428.0 x 960.6 mm / 8.72 x 16.85 x 37.82 inch		
Weight	120 kg / 264 lbs		

* Specifications shown when Extend Vout mode is enabled. Energy recovery is not supported when Extend Vout mode is enabled.

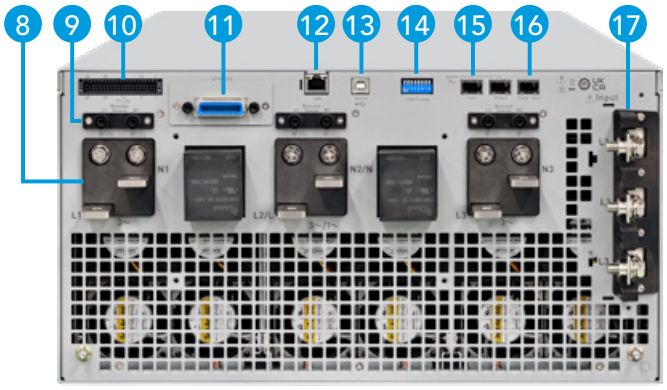
* All specifications are subject to change without notice.

MASTER / SLAVE PARALLEL OUTPUT MODE

Through a master/slave architecture that links one master unit with additional slave units, the Chroma 61830HF/61845HF/61860HF support parallel operation of up to four units with the same power rating, for a maximum output of 240kVA. Even in parallel operation, users can still switch automatically between single-phase and three-phase output modes with a single touch from the master-unit GUI, providing broader and more flexible power configuration options.

With this scalable power architecture, together with high-efficiency energy recovery and high-bandwidth transient performance, the 61830HF/61845HF/61860HF are well suited to automotive applications such as EVs and charging stations, green-energy systems such as PV inverters, microgrids, and energy storage, and AI data center power applications such as server power modules and server power racks or cabinets, delivering a comprehensive AC power testing solution.

PANEL DESCRIPTION



1. AC Power Switch
2. 5-inch LCD Touch Display
   Displays measurement, settings, control, and status information
3. Numeric Keys
4. Function Keys
   For quick access to function settings
5. USB Communication Interface (standard)
6. Rotary Push Knob
   Rotate to edit values; press to change active digit position
7. Output ON Key
   Light indicates Output ON; dark indicates Output OFF
8. AC Output Terminals
9. Remote Sense Terminals
10. Analog Control Interface
    (analog signal / TTL I/O input port)
11. Optional GPIB / CAN Interface (either-or)
12. LAN Interface (standard)
13. USB Interface (standard)
14. COM Config
    Communication for multi-unit parallel
15. System Bus
    For master/slave parallel operation
16. Digital Input Port
17. AC Input Terminals

ORDERING INFORMATION

61830HF: Regenerative Grid Simulator, 30kVA
61845HF: Regenerative Grid Simulator, 45kVA
61860HF: Regenerative Grid Simulator, 60kVA
A618001: SoftPanel for 61800 Series
A618002: Terminals for parallel connecting

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Search Keyword
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