REGENERATIVE AC ELECTRONIC LOAD MODEL 63800R SERIES

Chroma 63800R Series offers AC electronic loads with regenerative capability, featuring three models with power ratings of 9kVA, 12kVA, and 15kVA. This series boasts a high-power density design, providing a maximum load capacity of 15kVA within a compact 3U chassis. To accommodate higher power rating test requirements, you can parallel multiple units for increased load capacity while utilizing master-slave control.

The Chroma 63800R Series presents a highly efficient energy-saving solution with its regenerative feature, making it ideal for a broad spectrum of renewable energy applications, including ESS, hybrid PV inverters, AC EVSE, and bidirectional on-board chargers (BOBC) for V2L and V2H applications.

In contrast to traditional AC loads for UPS testing, the 63800R Series eliminates waste heat generation, significantly reducing electricity costs due to its regenerative capability. Furthermore, it meets the requirements of the IEC 62040-3 standard for UPS testing.

The Chroma 63800R Series utilizes advanced all-digital control technology and introduces a Stand-By function to handle rapid fluctuations in the voltage source of the Device Under Test (DUT). This function keeps the load in an active state when the DUT is in standby or off and instantly starts drawing power when the voltage source is activated. This functionality lends itself well to the implementation of fully automated testing in smart factories.

In addition to basic functions such as CC, CP, and CR, the Chroma 63800R Series offers advanced operating modes like Rectified and phase Lead/Lag mode. It can also simulate SCR and TRIAC component characteristics with its unique half-cycle load function.

The 63800R Series features a 5" LCD display with an intuitive user interface for seamless operation. Connectivity options include USB, LAN, and optional GPIB or CAN interfaces for swift remote and digital control via a PC using Chroma's SoftPanel software. Additionally, Chroma provides instrument drivers for LabVIEW-integrated system control.

LAN CAN USB GPIB CE RoHS2 Compliant

MODEL 63800R SERIES

KEY FEATURES

- Rated power: 9kVA, 12kVA, 15kVA
- Rated current: 87Arms, 96Arms, 105Arms
- Voltage range: 30Vrms-350Vrms
- Frequency range: 30Hz-100Hz
- Crest factor range: 1.414-3.000
- Power factor range: 0.100 -1.000 (lead/lag)
- 3U height with up to 15kVA high power density
- Intuitive Touch Panel Interface
- High precision, equivalent to linear load levels
- Selectable single-phase and three-phase load mode
- Regenerates reverse rated apparent power back to grid with 89% conversion efficiency
- Suitable for EVSE, off-grid inverter, and UPS product testing applications
- Rectified load mode
- Leading/lagging current load mode
- Current source mode
- Stand-By fast response functionality
- Inductive/capacitive load simulation function
- Positive/negative half-cycle load function
- Instant Load On Function
- User-defined waveforms*
- List Mode: advanced load programming*
- Configurable start/end loading current phase angles
- Configurable current load upper limit
- Response Speed adjustment function
- Universal AC Input Range
- Parallelable (three-phase mode) for higher power output
- Paralleling supported (split-phase mode)*
- Standard remote interfaces: USB, LAN
- Optional remote interfaces: GPIB, CAN

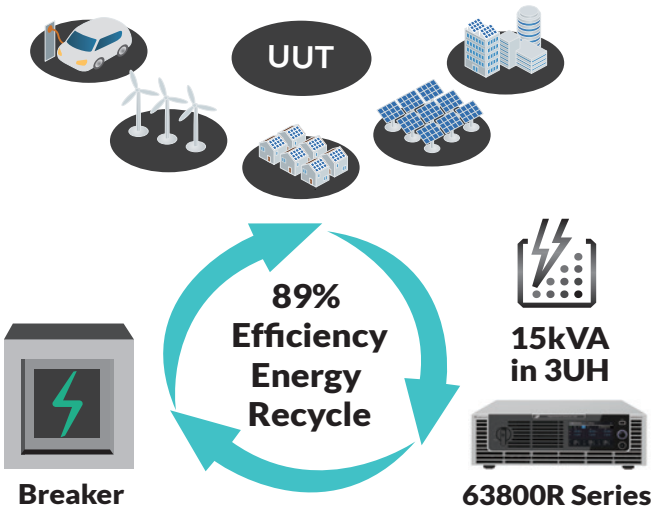
* Available on FW 1.10 and later.

Chroma
Advancing Excellence

HIGH-POWER DENSITY REGENERATIVE AC LOAD

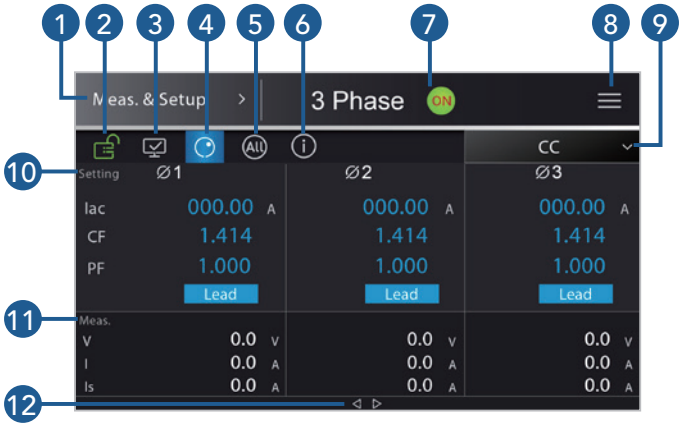
Chroma 63800R Series Electronic Loads are high-precision switching-type AC loads, achieving a maximum load capacity of 15kVA in a 3U chassis through high-power density design. Powered by leading-edge bidirectional power source technology, these regenerative units can feed energy consumed during the test back to the facility's power grid with up to 89% efficiency.

When a 63800R Series Regenerative AC Load is used with a test rack configuration, the 3U chassis height offers great flexibility and saves valuable rack space. The energy recovery feature addresses the wasted heat issues associated with traditional RLC load boxes and saves on cooling costs. Additionally, for testing various different devices, the single/three-phase functionality eliminates the need to use multiple traditional loads.



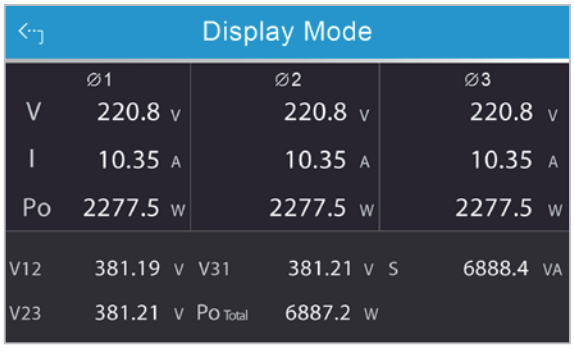
INTUITIVE TOUCHSCREEN UI

The 63800R Series Regenerative AC Load is equipped with a touchscreen interface, providing an easy-to-use UI that allows users to quickly configure and operate various settings. Advanced AC load functions are conveniently located under the "More Settings" option in the upper-right corner. The display mode can expand the measurement values to full screen, making it easy to view.



1. Function Menu
2. Screen Lock
3. Display Mode
   Show Only Measurement
4. Rotary Knob Input Mode
5. 3-Phase Unified setting
6. Total Output Power
7. Device Loading in Progress
8. Advanced Setting Options
9. Output Mode Selection
10. Load Parameter Settings
11. Measurement
12. More Measurement
    (Right/Left Swipe)

More Settings



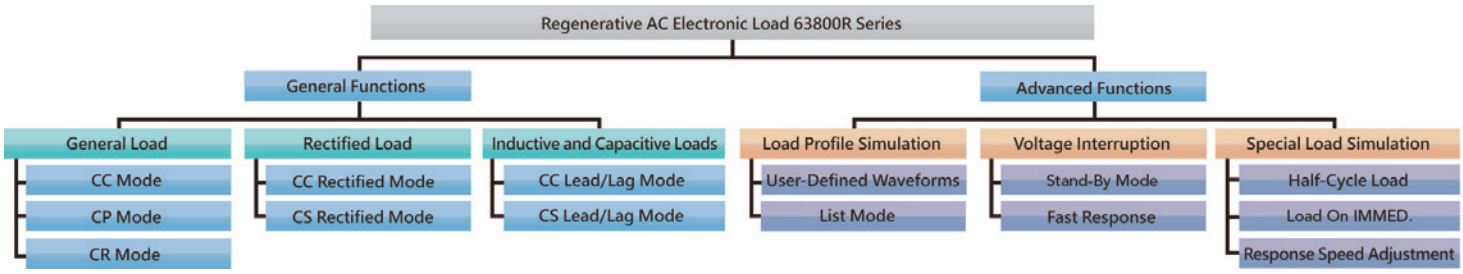
Display Mode

GRID CONNECTION AND ENERGY RECOVERY SAFETY MECHANISM

The regenerative design of the 63800R Series incorporates a comprehensive set of protective measures. When the 63800R Series detects abnormalities in the grid-side AC input, such as overvoltage, undervoltage, frequency anomalies, three-phase imbalance, or excessive current, the device issues an immediate warning and activates trip protection to comply with grid protection mechanisms.

COMPREHENSIVE AC LOAD SIMULATION FUNCTIONALITY

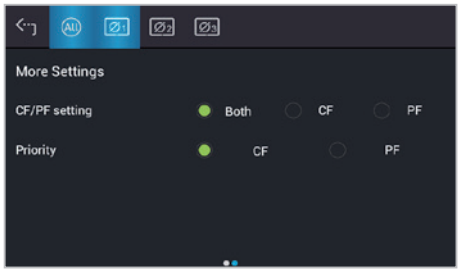
Chroma 63800R Series Regenerative AC Electronic Loads offer a full range of AC load simulation functions. Advanced load functions include user-defined waveforms, List mode, Stand-By mode, half-cycle loading, Instant Load On, and Response Speed adjustment, providing a versatile toolset for dynamic and precise load simulation.



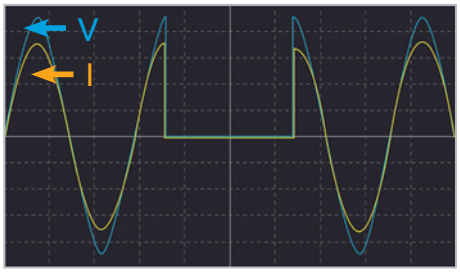
General Load

The 63800R Series offers a complete set of Constant Current (CC), Constant Power (CP), and Constant Resistance (CR) modes. In CC and CP modes, users can set the load's power factor (PF) or crest factor (CF), and use the Priority setting to define which parameter takes precedence when both are set simultaneously. In CR mode, the PF is fixed at 1, enabling simulation of linear impedance behavior with fast response to DUT source changes, suitable for applications like transient load tests for voltage interruption.

CC Mode Main Screen (Three Phase)



CF/PF Parameter Priority Settings

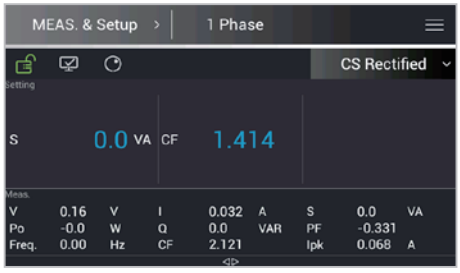


Voltage Interruption Load Testing (CR Mode)

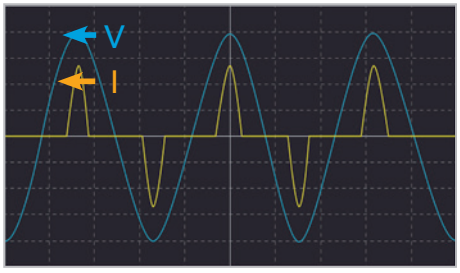
Rectified Load

For rectified or nonlinear loads such as traditional inverters, UPS systems, switch-mode rectifiers, audio/lighting control equipment, and electromechanical devices using variable frequencies, the 63800R Series offers dedicated CC Rectified and CS Rectified modes. By setting an appropriate CF value, the load can generate the required peak current, and with stable slew rate control, the system can accurately reproduce a wide variety of non-sinusoidal current waveforms.

CC Rectified Mode (Three Phase)



CS Rectified Mode (Single Phase)

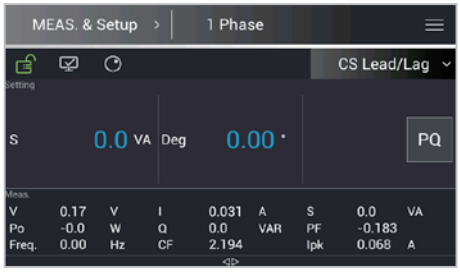


Rectified Mode (CF = 3)

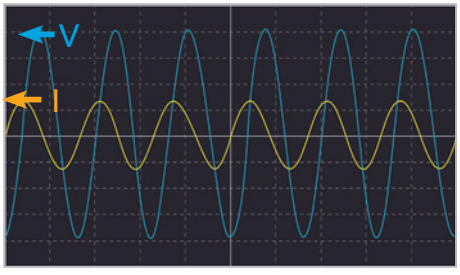
Inductive and Capacitive Loads

The CC Lead/Lag and CS Lead/Lag modes allow users to simulate inductive or capacitive load characteristics by adjusting the phase shift degree (Deg) between current and voltage under constant current or constant apparent power conditions. By making the current lead or lag behind the voltage, these modes accurately reproduce the behavior of real-world equipment affected by passive components.

CC Lead/Lag Mode (Three-Phase)



CS Lead/Lag Mode (Single Phase)

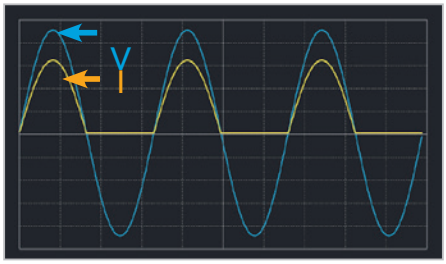


Lead/Lag Mode (Deg=90°)

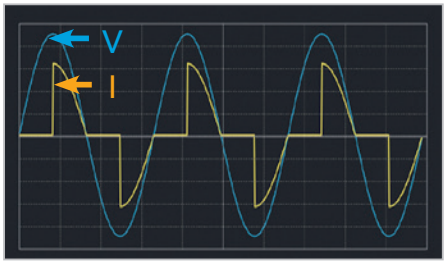
HALF-CYCLE LOAD FUNCTION

Chroma 63800R Series Regenerative AC Loads are equipped with a half-cycle load function in CC Rectified mode. This function is capable of supplying positive half-cycle, negative half-cycle load currents, and even 90-degree Leading Edge and Trailing Edge half-cycle loads, replicating the features of SCR and TRIAC switches. With this function, users can simulate load characteristics for household appliances, protective switches, and other devices employing SCR or TRIAC components.

Half-Cycle Load Function Menu



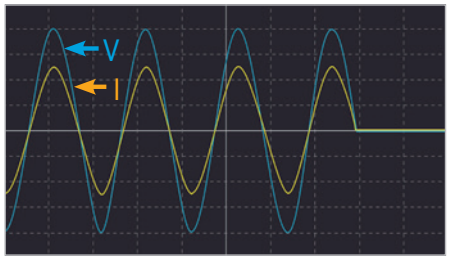
Positive Half-Cycle Load Waveform



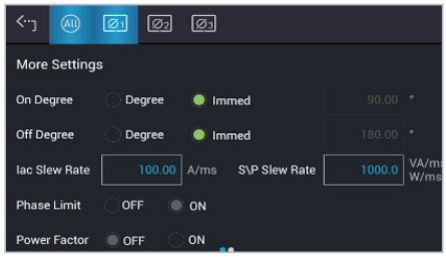
90° Leading Edge Load Waveform

STAND-BY FAST RESPONSE FUNCTIONALITY

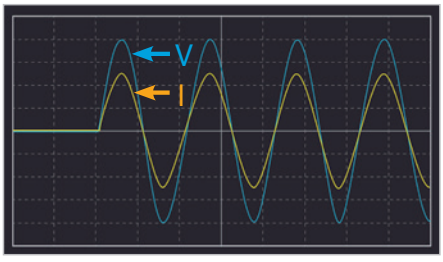
The 63800R Series feature a novel Stand-By fast response functionality, made possible by advanced control algorithms and precise, rapid circuit detection. In scenarios where the circuit is suddenly opened or the voltage source is interrupted, the load can quickly switch to a stand-by state by detecting the disappearance of the voltage from the DUT. In addition, the new Instant Load On function (Load On Immed.) allows the load to engage immediately as soon as the voltage source is activated, which enables load startup testing with near-zero delay. Users simply configure the load settings and activate Load On, after which the source can be interrupted or resumed at any point during the test. As a result, the 63800R Series is especially suitable for AC EVSE testing, including dynamic load testing, OCP/OPP load testing, card-swipe charging tests, as well as load startup and backup power switching tests for inverters and UPS systems.



Stand-By Function Used for DUT Interruption Testing



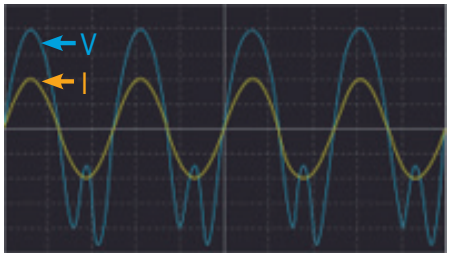
Load On Immed. Function Toggles



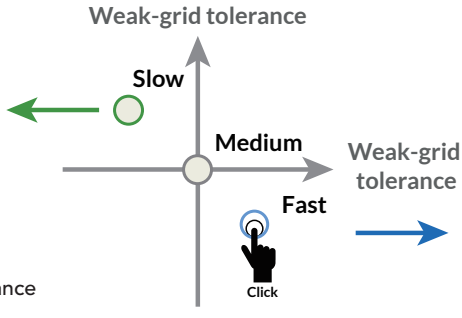
Stand-By Function Used for Rapid Startup Testing

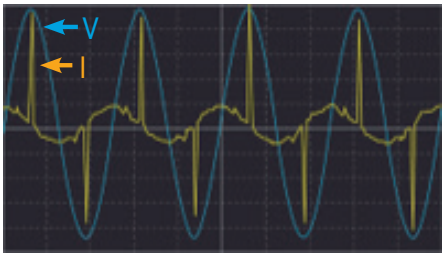
RESPONSE SPEED ADJUSTMENT FUNCTION

The Chroma 63800R Series offers high versatility through a Response Speed adjustment feature, enabled by a precision digital control algorithm that arranges the system response bandwidth. Users can simply switch between different load response types with a single setting, adapting the load behavior to suit a wide range of AC voltage-source DUTs. When testing voltage sources with high harmonic content, the Slow mode (designed for distorted voltage sources) delivers stable load performance well-suited for early development stages, when the voltage waveform may not yet meet standard sinewave criteria. Conversely, during later stages of voltage source development where precise current waveform control is essential, Fast mode enables highly accurate current loading. This is ideal for applications such as rectified load simulation, phase-lead/lag, half-cycle, user-defined waveform, and zero-delay startup loading.



Higher THD: prioritize weak-grid waveform tolerance





Lower THD: prioritize precise current control

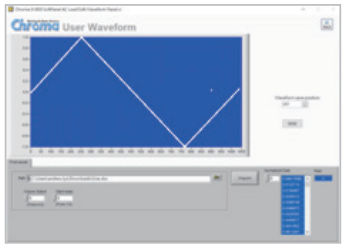
User Defined Waveform Function

For better replication of real-world load current behavior, the Chroma 63800R Series features a user-defined waveform (UDW) function*1. This allows users to capture current waveforms and data using an oscilloscope and store them in the instrument via the SoftPanel software's User Waveform feature*2. These stored waveforms can then be reproduced during load testing, providing targeted scenario simulations for voltage-source DUTs. The UDW function is especially useful for simulating diverse load characteristics in automotive applications, such as BOBCs and inverters for V2L testing.

The UDW function supports two modes: VAL and PU, each allowing storage and use of up to 200 waveforms. In VAL mode, the instrument replicates the actual current waveform exactly as captured. In PU mode, the waveform shape is normalized and scaled according to the user-specified peak current level. Additionally, users can manually edit current waveforms in Excel by defining one complete cycle (typically 1024 points) of current data. This custom waveform can then be imported into the instrument for flexible, scenario-based load testing.

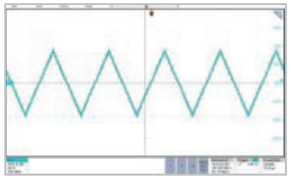
*1 Supported on FW 1.10 and later; not supported in Split Phase mode.

*2 Not yet released; this function can be operated via SCPI commands.

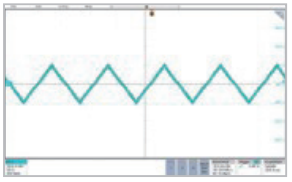


SoftPanel: User Waveform
Load externally captured/user-defined waveforms into the instrument

63800R Series
Regenerative AC Electronic Load



VAL mode: full replication of captured or user-defined waveforms



PU mode: freely set peak current for captured or user-defined waveforms

Advanced Programming with List Mode

The 63800R Series supports advanced programming functionality via List Mode*. Users can define up to 100 individual sequences to create a continuous, programmable load profile. Each sequence can be configured independently, with the option to control execution duration based on either a fixed time or a specified number of load cycles, allowing flexible combinations for dynamic load simulation. In List Mode, the initial sequence allows editing of the starting load phase angle, while subsequent sequences automatically follow the phase and angle of the voltage source. This design simplifies the creation of dynamic current waveforms that respond to changing load conditions in real-time.

* This function is only supported on FW versions 1.10 (inclusive) and above, and is not supported in Split Phase mode.

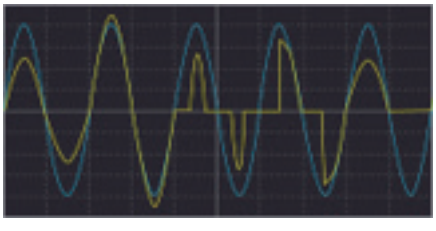
List Mode Main Page

List Mode Editing Page

Sequence Editing Page

When using CC Rectified Mode within List Mode, users can select from various load waveform shapes for each sequence, including sine wave, half-cycle wave, and user-defined waveforms (UDW). For UDW applications, an oscilloscope can be used to capture a complete segment of dynamic load current data. From this data, one cycle of each key waveform can be extracted and imported into the instrument individually. These waveforms can then be arranged across multiple sequences using List Mode, allowing users to reconstruct the original full waveform captured by the oscilloscope as a continuous, programmable sequence.

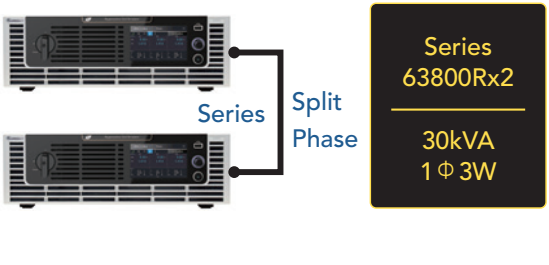
This functionality is particularly suited for dynamic load testing and V2L simulation for automotive products by reproducing the current characteristics of household appliances.

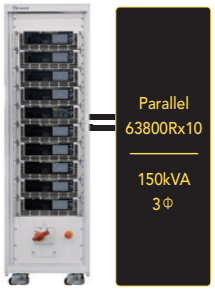


List Mode Load Waveform Composed of Multiple Current Types

MASTER-SLAVE PARALLEL FUNCTION

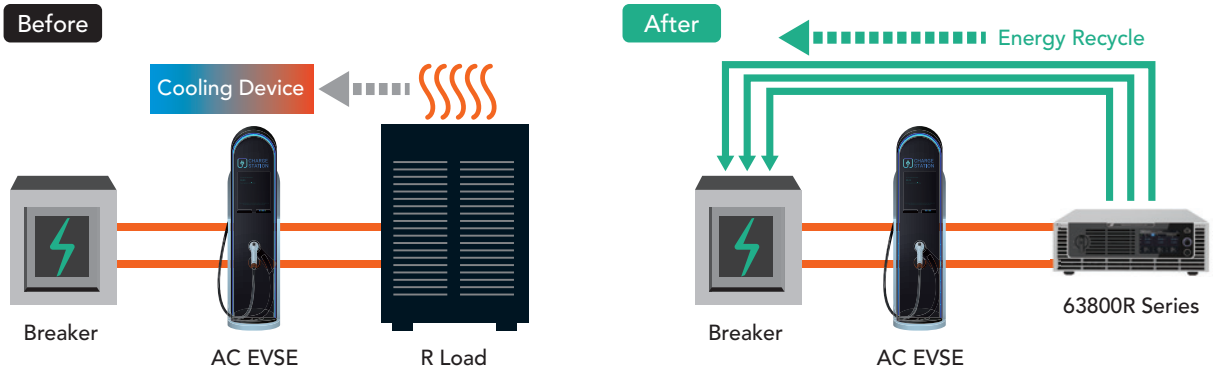
The Chroma 63800R Series supports parallel configurations of up to ten units, with one master controlling the other auxiliary units. This enables a total AC load capacity of 150kVA in three-phase mode. The 63800R also supports series connection* of two standalone units. Through a unique split-phase design, two standalone units can be combined into a single-phase three-wire configuration, with each phase capable of delivering current up to 105A. This is especially suitable for AC load testing of 19.2kW on-board chargers with 80A per phase in a single-phase three-wire setup.





ENERGY-SAVING TEST SOLUTION FOR AC ELECTRIC VEHICLE SUPPLY EQUIPMENT

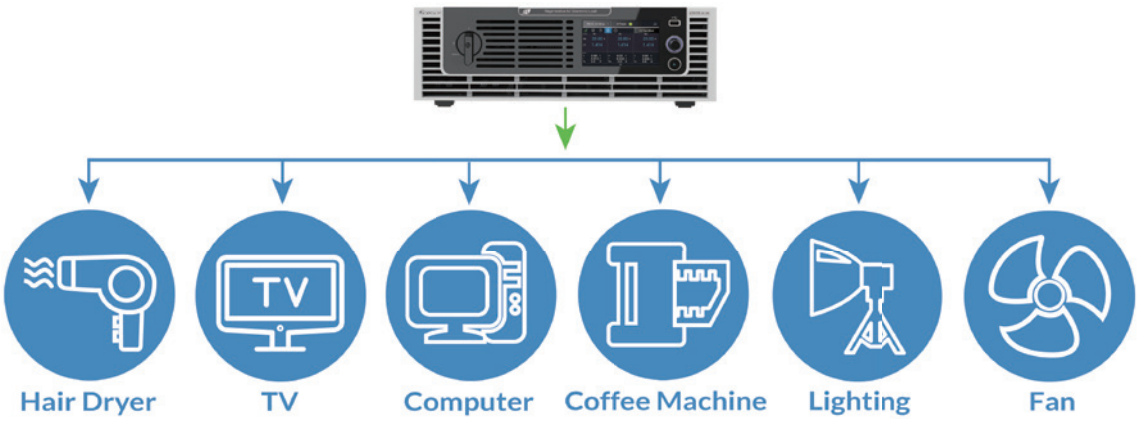
Chroma 63800R Series Regenerative AC Loads offer a new energy-efficient and carbon-saving solution for AC EVSE testing, thanks to their high power density and efficient energy recovery capability. Traditional load banks not only have a large footprint but also convert consumed power into heat, leading to significant energy consumption and requiring cooling systems to prevent overheating. In contrast, the Chroma 63800R Series achieves energy recovery with an efficiency of up to 89%. For instance, when operating at full load power, a single unit can save 116,946 kWh of electricity per year, which is equivalent to reducing 45,258 kg (99,777 lbs) of carbon emissions*1. The 63800R comes equipped with comprehensive CC, CP, and CR load modes and complies with the standardized CCID/RCD leakage current requirements for AC EVSE testing*2.



Note*1: According to the National Energy Information Administration, 1 kWh of power consumption results in approximately 0.855 pounds (0.387 kilograms) of carbon emissions
Note*2: Additional of Chroma 63800R dedicated Inrush Current Limiter Box is required for AC EVSE and AC EV Charger testing applications.

High-Efficiency Household Load Testing Solution

For V2H and V2L testing, EV charger manufacturers have traditionally relied on using actual household appliances as loads. This approach is not only cumbersome and time-consuming but also requires substantial costs and floor space. The 63800R Series solves this with seven load modes (CC, CP, CR, CC/CS Rectified, CC/CS Lead/Lag) and advanced features including half-cycle loading, Stand-By mode, Response Speed adjustment, UDW, and List Mode. This enables accurate simulation of load current characteristics across an array of household devices—from hair dryers, coffee machines, and TVs to dimmable and speed-controlled loads like lighting and fans. As a result, a single 3U unit eliminates the need for bulky appliances by switching easily between different load profiles, boosting test efficiency while cutting costs and saving space.



SPECIFICATIONS — Regenerative AC Load B618007

Optional AC Load Function	63809R-350-87	63812R-350-96	63815R-350-105
Operating (each phase)			
Phase	1 or 3 selectable	1 or 3 selectable	1 or 3 selectable
Power	9kVA	12kVA	15kVA*1
Current (RMS)	87A	96A	105A
Current (Peak)	261A	288A	315A
Voltage Range	30-350V	30-350V	30-350V
Frequency Range	30-100Hz	30-100Hz	30-100Hz
CC Mode (each phase)			
Current Range (RMS)	0-29A	0-32A	0-35A
Accuracy*2	0.3%+0.5% F.S.	0.3%+0.5% F.S.	0.3%+0.5% F.S.
Resolution	0.01A	0.01A	0.01A
Crest Factor Range	1.414-3.000	1.414-3.000	1.414-3.000
PF Range	0.100-1.000 (Lead or Lag)	0.100-1.000 (Lead or Lag)	0.100-1.000 (Lead or Lag)
CP Mode (each phase)			
Power Range	0-3kW	0-4kW	0-5kW*1
Accuracy	0.3%+0.3% F.S.	0.3%+0.3% F.S.	0.3%+0.3% F.S.
Resolution	1W	1W	1W
Crest Factor Range	1.414-3.000	1.414-3.000	1.414-3.000
PF Range	0.100-1.000 (Lead or Lag)	0.100-1.000 (Lead or Lag)	0.100-1.000 (Lead or Lag)
CR Mode (each phase)			
Resistance Range	1Ω-300Ω	1Ω-300Ω	1Ω-300Ω
Accuracy (Ω)	0.3% + 0.5%F.S.	0.3% + 0.5%F.S.	0.3% + 0.5%F.S.
Resolution (Ω)	0.001Ω	0.001Ω	0.001Ω
CC Rectified Mode (each phase)			
Current Range (RMS)	0-29A	0-32A	0-35A
Accuracy*2	0.3%+0.5% F.S.	0.3%+0.5% F.S.	0.3%+0.5% F.S.
Resolution	0.01A	0.01A	0.01A
Crest Factor Range	1.414-3.000	1.414-3.000	1.414-3.000
CS Rectified Mode (each phase)			
Power Range	0-3kVA	0-4kVA	0-5kVA*1
Accuracy	0.3% + 0.3%F.S.	0.3% + 0.3%F.S.	0.3% + 0.3%F.S.
Resolution	1VA	1VA	1VA
Crest Factor Range	1.414-3.000	1.414-3.000	1.414-3.000
CC Phase Lead/Lag Mode (each phase)			
Current Range (RMS)	0-29A	0-32A	0-35A
Accuracy*2	0.3% + 0.5%F.S.	0.3% + 0.5%F.S.	0.3% + 0.5%F.S.
Resolution	0.01A	0.01A	0.01A
Phase Degree Range	-90° to +90° (Current Source Mode: +90.01° to +180° & -90.01° to -180°)		
CS Phase Lead/Lag Mode (each phase)			
Power Range	0-3kVA	0-4kVA	0-5kVA*1
Accuracy	0.3% + 0.3%F.S.	0.3% + 0.3%F.S.	0.3% + 0.3%F.S.
Resolution	1VA	1VA	1VA
Phase Degree	-84.26°- +84.26°	-84.26°- +84.26°	-84.26°- +84.26°
PF Range	0.100-1.000 (Lead or Lag)	0.100-1.000 (Lead or Lag)	0.100-1.000 (Lead or Lag)
Measurement			
Voltage			
Voltage Range	0-350V	0-350V	0-350V
Accuracy	0.1%+0.2%F.S.	0.1%+0.2%F.S.	0.1%+0.2%F.S.
Current			
Current Range (Peak)	0-261A	0-288A	0-315A
Accuracy (RMS)	0.4%+0.3% F.S.	0.4%+0.3% F.S.	0.4%+0.3% F.S.
Accuracy (Peak)	0.4%+0.6% F.S.	0.4%+0.6% F.S.	0.4%+0.6% F.S.
Power			
Accuracy	0.4%+0.8% F.S.	0.4%+0.8% F.S.	0.4%+0.8% F.S.
Input Rating			
Voltage Operating Range	3Φ 200V-220V±10%V_{LL}/47-63Hz (100% output power) 3Φ 380V-480V±10%V_{LL}/47-63Hz (100% output power)		3Φ 200V-220V±10%V_{LL}/ 47-63Hz (80% output power) 3Φ 380V-480V±10%V_{LL}/ 47-63Hz (100% output power)
Current	39A max./phase (3Φ 200-240V±10%V_{LL}) 21A max./phase (3Φ 380V-480V±10%V_{LL})	51A max./phase (3Φ 200-240V±10%V_{LL}) 27A max./phase (3Φ 380V-480V±10%V_{LL})	51A max./phase (3Φ 200-240V±10%V_{LL}) 34A max./phase (3Φ 380V-480V±10%V_{LL})
Power Factor	0.98 (Typical)	0.98 (Typical)	0.98 (Typical)
Others			
Parallel Function*3	Max. 10 units		
Series Function*4	Max. 2 units		
Instant Load On	Load On Immed. Function*5 (min. delay time <0.1μs)		
Load Profile Simulation*4	List Mode, User Defined Waveform (UDW)		
Energy Saving Function	Sleep Mode		
Efficiency	89%		
Protection	OVP, OCP, OPP, OTP, FAN		
Safety & EMC	CE (includes EMC & LVD)		
Dimensions (H x W x D)	132.8 x 428 x 700 mm/5.23 x 16.85 x 27.55 inch		
Weight	50 kg/110 lbs	50 kg/110 lbs	50 kg/110 lbs

*1: The output power will be derated to 80% when using 3Φ 200Vac-220Vac as input voltage.
*2: Condition to meet specification: Irms≧0.5A and the DUT source is a defined sinusoidal voltage. (Vthd <0.5% @ 50Hz/60Hz, CF=1.414)
*3: 63800R series only support 3-phase mode in parallel.
*4: Only supported on FW 1.10 or later versions.
*5: The Load On Immed. function is only available in CC Rectified and CR mode.
* All specifications are subject to change without notice.

SoftPanel User Interface

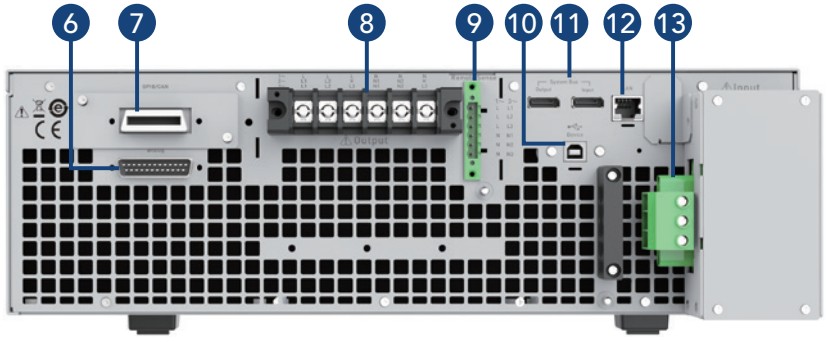
The Chroma 63800R Series supports Chroma's dedicated graphical control software, SoftPanel. With its multifunctional GUI panels and intuitive controls, SoftPanel provides users with a highly flexible testing environment. A dedicated, programmable Auto Run mode is also available for applications such as dynamic loading and cyclic/repeatable load testing.

Single-phase Load Setup Page

Three-phase Load Setup Page

Auto Run Mode

PANEL DESCRIPTION



1. Power ON/OFF Switch
2. 5" LCD Touch Panel
   Displays: measurements, setup, control, and status
3. USB HOST
   Screenshot, save/recall the setting parameters, firmware version updates
4. Selectable Rotary Knob
   Rotate to edit screen and set values; push to change setting digits
5. Output ON/OFF Key
   Press the ON key: light indicates Output ON, dark indicates Output OFF
6. Analog Programming Interface (Ext. V Reference/TTL I/O Port)
   External analog signal for voltage control and signal for system integration
7. GPIB/CAN Interfaces Shared Slot (alternative installation)
8. AC Load Terminal
9. Remote Sense Terminal
10. USB Interface (standard)
11. System Bus
    For master-slave parallel output function
12. LAN Interface (standard)
13. AC Input Terminal

ORDERING INFORMATION

63809R-350-87	Regenerative AC Electronic Load	9kVA
63812R-350-96	Regenerative AC Electronic Load	12kVA
63815R-350-105	Regenerative AC Electronic Load	15kVA
A618005	Single/Three Phase Switching Unit (option)	
A620039	GPIB remote interface (option)	
A620045	CAN remote interface (option)	
A638003	SoftPanel for 63800R Series	

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