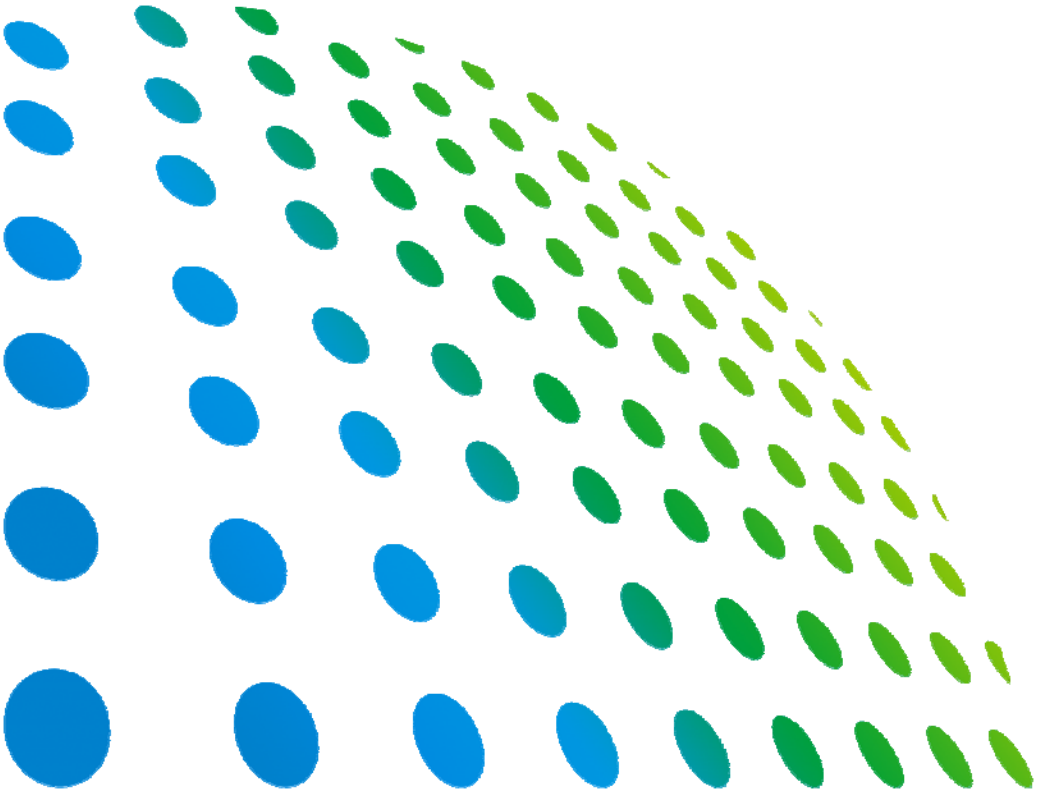




Programmable DC Electronic Load

63600 Series

Quick Start Guide



Programmable DC Electronic Load 63600 Series Quick Start Guide



Version 1.2
May 2012
P/N A11 001318

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CHROMA ATE INC.

66 Hwaya 1st Rd., Kueishan Hwaya Technology Park, Taoyuan County 33383, Taiwan

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Material Contents Declaration

The recycling label shown on the product indicates the Hazardous Substances contained in the product as the table listed below.

  : See <Table 1>.

  : See <Table 2>.

<Table 1>

Part Name	Hazardous Substances					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyls	Polybromodiphenyl Ethers
	Pb	Hg	Cd	Cr ⁶⁺	PBB	PBDE
PCBA	0	0	0	0	0	0
CHASSIS	0	0	0	0	0	0
ACCESSORY	0	0	0	0	0	0
PACKAGE	0	0	0	0	0	0

"0" indicates that the level of the specified chemical substance is less than the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

"x" indicates that the level of the specified chemical substance exceeds the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

Disposal

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal at least for free of charge.



<Table 2>

Part Name	Hazardous Substances					
	Lead	Mercury	Cadmium	Hexavalent Chromium	Polybrominated Biphenyls	Polybromodiphenyl Ethers
	Pb	Hg	Cd	Cr ⁶⁺	PBB	PBDE
PCBA	×	○	○	○	○	○
CHASSIS	×	○	○	○	○	○
ACCESSORY	×	○	○	○	○	○
PACKAGE	○	○	○	○	○	○

“○” indicates that the level of the specified chemical substance is less than the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

“×” indicates that the level of the specified chemical substance exceeds the threshold level specified in the standards of SJ/T-11363-2006 and EU 2005/618/EC.

1. Chroma is not fully transitioned to lead-free solder assembly at this moment; however, most of the components used are RoHS compliant.
2. The environment-friendly usage period of the product is assumed under the operating environment specified in each product's specification.

Disposal

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging your health and well-being. When replacing old appliances with new one, the retailer is legally obligated to take back your old appliances for disposal at least for free of charge.





Declaration of Conformity

For the following equipment :

Programmable DC Electronic Load

(Product Name/ Trade Name)

63600-5, 63610-80-20, 63630-80-60, 63640-80-80 / Chroma

(Model Designation)

Chroma ATE Inc.

(Manufacturer Name)

66 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien, Taiwan.

(Manufacturer Address)

Is herewith confirmed to comply with the procedures given in European Council Directive (2004/108/EC) and Low-voltage Directive (2006/95/EC). For the evaluation regarding the Directives, the following standards were applied :

EN 61010-1:2001

EN 61326:1997+A1:1998+A2:2001+A3:2003

EN 61326-1:2006, Table 2 ; CISPR 11:2003+A1:2004+A2:2006

EN 61000-3-2:2000+A2:2005; EN 61000-3-3:1995+A1:2001+A2:2005

IEC 61000-4-2:1995+A1:1998+A2:2000; IEC 61000-4-3:2002+A1:2002; IEC 61000-4-4:2004;

IEC 61000-4-5:1995+A1:2000; IEC 61000-4-6:1996+A1:2000; IEC 61000-4-8:1993+A1:2000

IEC 61000-4-11:2004

The following importer/manufacturer or authorized representative established within the EUT is responsible for this declaration :

Chroma ATE Inc.

(Company Name)

66 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien, Taiwan.

(Company Address)

Person responsible for this declaration:

Mr. Benjamin Huang

(Name, Surname)

T & M BU Director

(Position/Title)

Taiwan

2010.04.26

(Place)

(Date)


(Legal Signature)



Declaration of Conformity

For the following equipment :

DC Electronic Load

(Product Name/ Trade Name)

63600-1 Mainframe For 1 Modules; 63640-80-80 DC Load

(Model Designation)

Chroma ATE INC.

(Manufacturer Name)

66 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien 333, Taiwan

(Manufacturer Address)

Is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (2004/108/EC), For the evaluation regarding the Electromagnetic Compatibility (2004/108/EC), the following standards were applied :

EN 61326-1:2006, Table 2

CISPR 11:2003+A1:2004+A2:2006,(Class A)

IEC 61000-4-2:1995+A1:1998+A2:2000, IEC 61000-4-3:2006, IEC 61000-4-4:2004

IEC 61000-4-5:1995+A1:2000, IEC 61000-4-6:1996+A1:2000, IEC 61000-4-11:2004

EN 61000-3-2:2006, EN 61000-3-3:1995+A1:2001+A2:2005

EN 61010-1:2001

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Chroma ATE INC.

(Company Name)

66 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien 333, Taiwan

(Company Address)

Person responsible for this declaration:

Mr. Benjamin Huang

(Name, Surname)

T & M BU Director

(Position/Title)

Taiwan

2009.03.24

(Place)

(Date)

(Legal Signature)



Declaration of Conformity

For the following equipment :

Programmable DC Electronic Load

(Product Name/ Trade Name)

63600-2 Mainframe

(Model Designation)

Chroma ATE INC.

(Manufacturer Name)

68 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien, Taiwan.

(Manufacturer Address)

The Measurements Shown In This Test Report Were Made In Accordance With The Procedures Given In **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**. The Equipment Was Passed The Test Performed According To :

EN 61326 : 2006

EN 55011: 2007 CLASS A, EN 61000-3-2:2006, EN 61000-3-3:1995/A1:2001/A2:2005

IEC 61000-4-2: 1995/A1:1998/A2:2000, IEC 61000-4-3:2002, IEC 61000-4-4 :2004,

IEC 61000-4-5 :1995/A1:2000, IEC 61000-4-6:2003, IEC 61000-4-8:1993/A1:2000,

IEC 61000-4-11:2004

EN 61010-1 : 2001

The following importer/manufacturer or authorized representative established within the EUT is responsible for this declaration :

Chroma ATE INC.

(Company Name)

68 Hwa-Ya 1st Rd., Hwa-Ya Technical Park, Kuei-Shan Hsiang, Taoyuan Hsien, Taiwan.

(Company Address)

Person responsible for this declaration:

Mr. Benjamin Huang

(Name, Surname)

T & M BU Director

(Position/Title)

Taiwan

2009.10.29

(Place)

(Date)

(Legal Signature)



Declaration of Conformity

For the following equipment :

Programmable DC Electronic Load

(Product Name/ Trade Name)

63630-600-15

(Model Designation)

Chroma ATE Inc.

(Manufacturer Name)

66 Hwaya 1st Rd., Kueishan Hwaya Technology Park, Taoyuan County 33383, Taiwan

(Manufacturer Address)

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EN 61326-1: 2006, Table 2

CISPR 11:2003+A1:2004+A2:2006 (Class A)

IEC 61000-4-2:2008; IEC 61000-4-3:2006+A1:2007; IEC 61000-4-4:2004;

IEC 61000-4-5:2005; IEC 61000-4-6:2008; IEC 61000-4-8:2009; IEC 61000-4-11:2004

EN 61000-3-2: 2006+A1: 2009+A2: 2009 (Class A), EN 61000-3-3: 2008

EN 61010-1: 2010 and EN 61010-2-030: 2010

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Chroma ATE Inc.

(Company Name)

66 Hwaya 1st Rd., Kueishan Hwaya Technology Park, Taoyuan County 33383, Taiwan

(Company Address)

Person responsible for this declaration:

Mr. Benjamin Huang

(Name, Surname)

T&M BU Division Vice President

(Position/Title)

Taiwan

2012.05.08

(Place)

(Date)

Benjamin Huang
(Legal Signature)

Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or specific WARNINGS given elsewhere in this manual will violate safety standards of design, manufacture, and intended use of the instrument. *Chroma* assumes no liability for the customer's failure to comply with these requirements.



BEFORE APPLYING POWER

Verify that the power is set to match the rated input of this power supply.



PROTECTIVE GROUNDING

Make sure to connect the protective grounding to prevent an electric shock before turning on the power.



NECESSITY OF PROTECTIVE GROUNDING

Never cut off the internal or external protective grounding wire, or disconnect the wiring of protective grounding terminal. Doing so will cause a potential shock hazard that may bring injury to a person.



FUSES

Only fuses with the required rated current, voltage, and specified type (normal blow, time delay, etc.) should be used. Do not use repaired fuses or short-circuited fuse holders. To do so could cause a shock or fire hazard.



DO NOT OPERATE IN AN EXPLOSIVE ATMOSPHERE

Do not operate the instrument in the presence of flammable gases or fumes.



DO NOT REMOVE THE COVER OF THE INSTRUMENT

Operating personnel must not remove the cover of the instrument. Component replacement and internal adjustment can be done only by qualified service personnel.

Safety Symbols



DANGER – High voltage.



Explanation: To avoid injury, death of personnel, or damage to the instrument, the operator must refer to an explanation in the instruction manual.



High temperature: This symbol indicates the temperature is now higher than the acceptable range of human. Do not touch it to avoid any personal injury.



Protective grounding terminal: To protect against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground before operation of equipment.



The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.



The **CAUTION** sign denotes a hazard. It may result in personal injury or death if not noticed timely. It calls attention to procedures, practices and conditions.



The **Notice** sign denotes important information in procedures, applications or the areas that require special attention. Be sure to read it carefully.

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1. General Information

1.1 Introduction

This Quick Start Guide contains installation and operation of 63600 Programmable DC Electronic Load.

Chroma 63600 Programmable DC Electronic Load System consists of model 63600-1, 63600-2, 63600-5 mainframes and Electronic Load modules.

1.2 Description

The 63600-5 Electronic Load mainframes contain slot for 5 load modules. The mainframe 63600-5 contains a processor, two System Bus ports, a USB port, a GPIB card (optional), an Ethernet card (optional), front-panel keypad, a memory channel indicator, and other circuits common to all the load modules.

The Electronic Load, composed of any of a mainframe plugged-in with at least any of a module, offers stand-alone operation mode. In addition, the mainframe 63600-5 can be controlled via A636000 GPIB or A636001 Ethernet or USB bus by a remote computer or via a System Bus by the remote controller.

The functions of Electronic Loads are all the same except the variations on input voltage, load current, and power ratings. An individual module may have one or two channels. Each channel has its own channel number, load & measurement connectors, and operates independently in constant current (CC) mode, constant resistance (CR) mode, constant voltage (CV) mode, constant power (CP) mode, or Constant Impedance (CZ) mode....etc.

The 63600 Programmable DC Electronic Load System is used for design, manufacturing, and evaluation of DC power supplies, batteries, and power components. This chapter contains specifications of Electronic Load modules that apply to the Chroma 63600-5 Electronic Load mainframes, as well as key features concerning application. The remaining chapters in this

manual contain instructions for installing and operating the Electronic Load. Figure 1-1 shows the Chroma 63600-5 Mainframe.

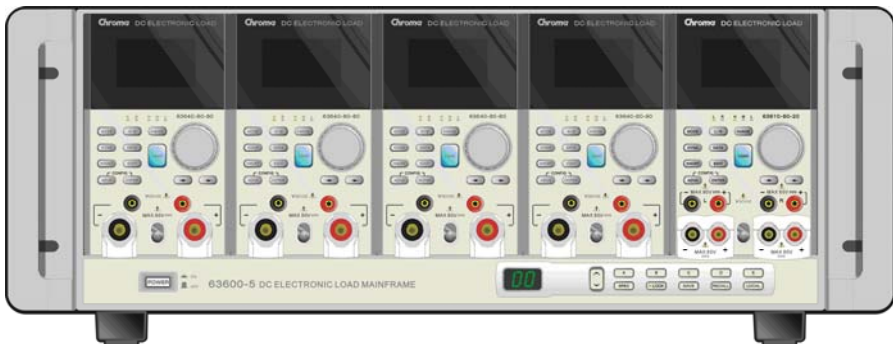


Figure 1-1 63600-5 Mainframe (Mounted with 5 Load Modules)

1.3 Key Features Overview


1.3.1 Mainframe


- Flexible configuration using plug-in electronic load modules to mainframes.
- Local operation from front panel keypad.
- Computer control via GPIB or Ethernet or USB and Remote controller via System Bus interface.
- Photo coupler isolation offers true floating Load.
- Automatic fan speed control to reduce noise.
- Up to 10 channels for one Mainframe.

1.3.2 Load

- Constant current (CC), constant resistance (CR), constant voltage (CV), constant power (CP), and constant impedance (CZ) operation modes.
- Programmable slew rate, load levels, load periods and conduct voltage (V_{on}).

- Programmable dynamic loading with speed up to 50kHz.
- Minimum input resistance allows load to sink high current even with low input voltage (0.8 V).
- Selective voltage and current ranges.
- Remote sensing capability.
- 100 sets of memories to save/recall user-definable setups.
- 10 sets of programs to link files for automatic test.
- 16-bit A/D converter with precision measurement.
- Short circuit simulation.
- Master/Slave parallel control mode, allow synchronous load control under static and dynamic loading mode
- Automatic GO/NG inspection to examine if UUT within spec.
- Independent GO/NG signals for each channel.
- Protection Over voltage, Over current, Overpower, Over temperature, Reverse polarity.

 **CAUTION** ■ This equipment is not intended for performing
■ measurements on CAT II, III or IV.

-  **Notice** ■
- 1. The equipment is for indoor use only.
 - 2. The altitude up to 2,000 meters is allowed to use the equipment.
 - 3. All specifications are tested under 20°C ~ 30°C except otherwise stated.
 - 4. The range of operation temperature is 0°C ~ 40°C.
 - 5. The relative humidity is from 10% to 90%.
 - 6. The specifications of DC current accuracy are tested after the input is applied for 30 seconds.
 - 7. The pollution degree of the equipment is 2.
 - 8. The power of the load module of 63600 series is supplied from 63600-5 mainframe.
 - 9. The module is not allowed to hot swap when the power is on.

2. Installation

2.1 Introduction

This chapter describes how to install the 63600. It also discusses turn-on check procedure and application considerations as well.

2.2 Inspection

As soon as the instrument is unpacked, inspect any damage that might have occurred in shipping. Keep all packing materials in case that the instrument has to be returned. If any damage is found, please file a claim to the carrier immediately. Do not return the instrument to Chroma without prior approval.

In addition to this Quick Start Guide, be sure that the following items are also received along with the Mainframe and Load.

Mainframe: Power Cord, Tailor-Made Load Connection Spanner, Manual
CD

Load Module: Measurement and Load Cables

2.3 Explanation of Taking Apart

Please refer to Figure 2-1 when taking the instrument apart. Before using, please remove the protective plate, and then plug the power cord so as to avoid short circuit. The sequences of taking apart are as follows:

1. Three Screws on the bottom.
2. Four Screws on the two sides.
3. Protective plate

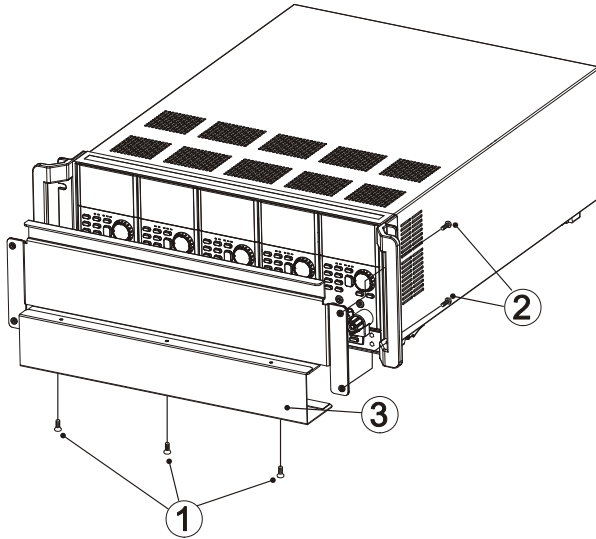


Figure 2-1

2.4 Installing the Modules

⚡ CAUTION ■■■ Load module can be damaged by electronic discharge (static electricity). Use standard anti-static work practices when you handle and install modules. Avoid ■■■ touching the connector and the circuit board.

Chroma 63600-5 Mainframe has room for five single-width Loads that can be combined in the Mainframe in any order. The module installation procedures for all Mainframes are the same. No special tools are required to install Load Module to Mainframe.

Procedures

1. Power off the Mainframe and disconnect the power cord.
2. Remove any packing materials on the Mainframe.
3. Start to install the modules in the slot (see Figure 2-2).
4. Plugging and sliding the load module into the Mainframe slot along the rail until it locked and fastened.
5. Install each additional module in the next slot likewise.

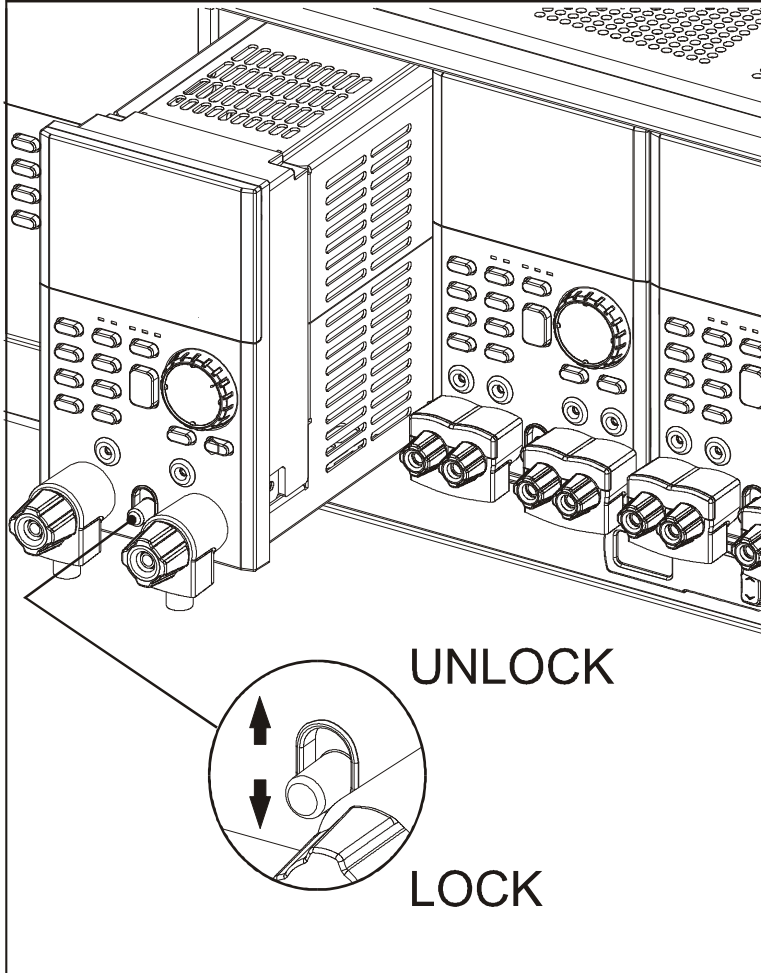


Figure 2-2 Installing Modules in the Electronic Load

WARNING

If the Mainframe is not installed with all modules, the empty slot must be covered with the panel cover for safety and airflow.

To unplug it, lift up the switch between the load connectors, using load connectors to help you draw the module out of the mainframe.

2.4.1 Channel Number

The channel number of the Load is determined by the module location in the Mainframe starting from the farthest left slot. As some Load (63610-80-20) has two channels in one module, channel 1 and 2 are always on the farthest left slot of the Mainframe, and channel 9 and 10 on the farthest right. The channel number is fixed for Mainframe even the Load module is empty. Figure 2-3 shows the channel assignments for a Chroma 63600-5 Mainframe containing two Loads of 63630-80-60 single channel module, and two Loads of 63610-80-20 dual channel module. Channel number is automatically assigned to 1, 3, 5, 6, 7, and 8. Channel 2 and 4 are skipped as single module is applied.

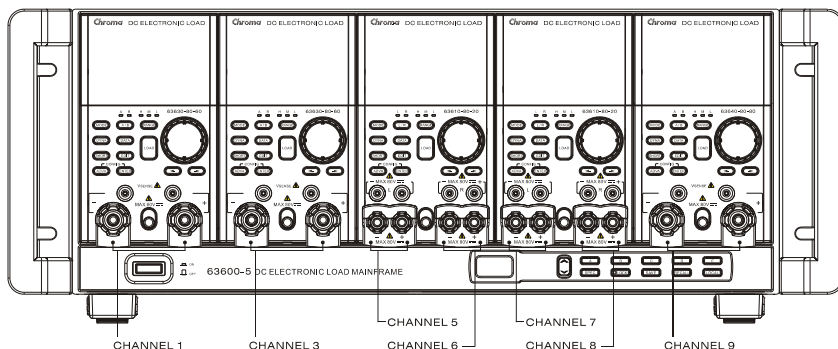


Figure 2-3 Example of Channel Number

2.5 Installing the Mainframe

The Electronic Load can operate well within the temperature range from 0°C to 40°C. However, you must install the Electronic Load in an area that has enough space around for adequate air flow. You must leave at least 10cm (4 inch) space above the unit for air circulation. Note that the unit foot stand has enough vertical space for air circulation when it is stacked. The Mainframe foot stand can be removed for rack mount.

If installing the equipment on top of the Electronic Load in a cabinet, a filter panel must be used above the unit to ensure adequate air circulation. A 1U (EIA standard) panel is sufficient.

2.5.1 Turn-On Self-Test

Check the following before turning on the Load.

1. The nominal line voltage of the AC input socket is in the range of 90-130/175-253 Vac.
2. The power cord is connected to the AC input socket.

⚠ WARNING

The power cord supplies a chassis ground through a third connector. Be sure that your outlet is of three-conductor type with the correct pin connected to ground.

Power on the Load by the front panel switch on Mainframe and observe the display. Immediately after turning on, the Electronic Load executes a self-test that checks firmware and communication. The Load Module displays,



and then displays the model number as well as firmware version,

```
63630-80-60
G_FW : 1.00
C1_FW: 1.00
```

< --- Model Number
< --- F/W version
< --- F/W version

If any error is found during self-test, the display will stop here. Check the Load and Mainframe connection when an error occurs. When the self-test completes, the VFD will display measurement V & I. The dual channel module goes to L channel.

In case of failure, return the Mainframe or Load module to Chroma sales or service office for repair.

2.6 Application Connection

2.6.1 Load Connections

WARNING

To satisfy safety requirements, load wires must be heavy enough not to overheat while carrying the short-circuit output current of the device connected to the Electronic Load.

Notice

To satisfy our higher slew rate load spec requirement and performance, load wires which have over 2.0uH inductance must be avoided from the UUT to our load. We have made the adaptable Load Cables along with the Load. They are better for application connection being the interface between UUT and the load.

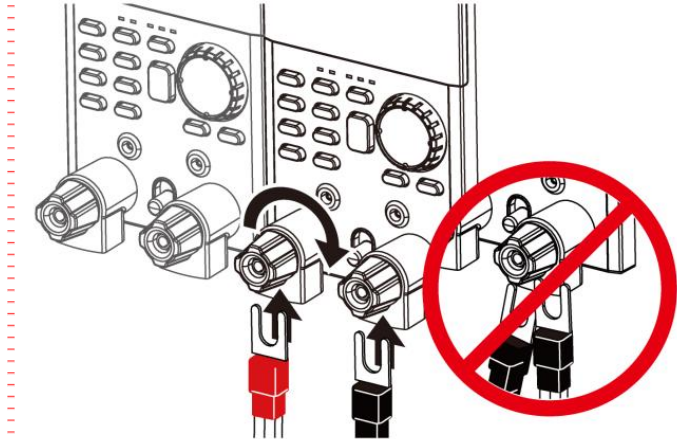
Input connections are made to the + and – terminal connectors on the front of each Load module. The major considerations for input connections are the wire size, length and polarity. The minimum wire size required to avoid overheating may not be enough to maintain good regulation. The wires should be large enough to limit the voltage drop to less than 0.5V per lead. The wires should be as short as possible, and bundled or tied together to minimize inductance and noise. Connect the wire from the PLUS (+) terminal on the module to the HIGH potential output terminal of the power supply (UUT). Connect the wire from the MINUS (–) terminal on the module to the LOW potential output terminal of the power supply (UUT). Figure 2-4 illustrates the typical setup of the Load module to the UUT. The connecting way is: First Put the Y-type terminal wire into Load terminal from the bottom of the load terminal, and let Y-type terminal touch the metal post of the load terminal tightly. Then, turn the banana binding socket of the Load terminal for connection by your hands, and finally use a tailor-made spanner to make the connection tightly. Figure 2-5 shows the Load connection with the tailor-made spanner.

WARNING

Each terminal with banana binding socket can easily use the banana plug to make load connection. It is the other way for load connection. But normally the banana plug can carry only 20 or 10 Amps at most. Before you use the banana plugs for connections, you must check the maximum current rating of the banana plugs and the

■ wire. The connection with the banana plug isn't fixed in the banana binding socket tightly. So, when the output voltage of the power supply (UUT) is equal to or over 70VDC, to prevent accidental contact with hazardous voltage, the banana plugging connection can't be used.

⚠ WARNING



■ When using Y-type (U-type) terminal to connect the load terminal, do not overlap 2 (or more) terminals at the same time and the torque cannot exceed 30kgf-cm when securing it using Chroma terminal fixture.

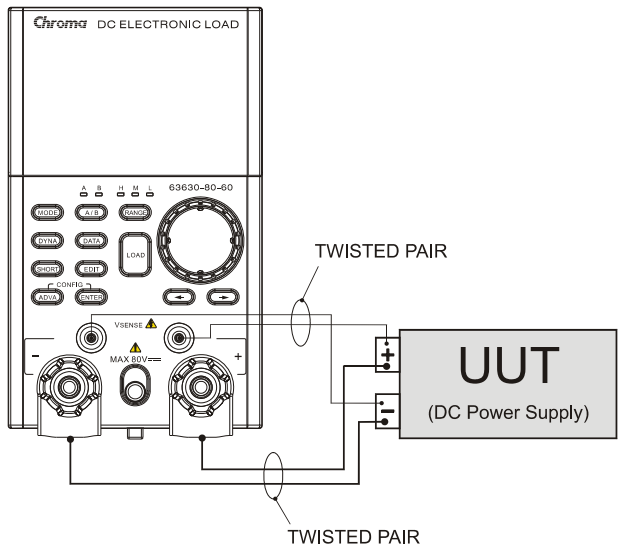
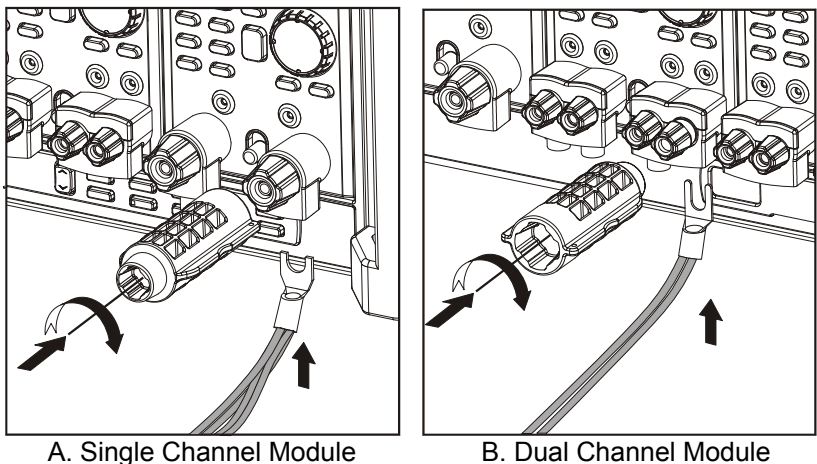


Figure 2-4 Load & Remote Sensing Connection



A. Single Channel Module

B. Dual Channel Module

Figure 2-5 Load Connection with the Tailor-made Spanner

2.6.2 Remote Sensing Connections

There are two sensing points in the Electronic Load module. One is measurement at Load terminal, and another is at Vsense. The Load module will automatically switch to Vsense when Vsense terminals are connected to UUT, otherwise it will measure at Load terminals. Remote sensing compensates for voltage drop in applications that require long lead lengths. It is useful when a module is operating in CV or CR mode, or when it needs precise measurement. Figure 2-4 also illustrates a typical setup for remote sensing operation.

Notice : The potential of Vsense red connector must be higher than that of Vsense black connector.

2.6.3 Parallel Connections

Figure 2-6 illustrates how modules can be paralleled to increase power dissipation. Modules can be directly paralleled in CC, CR or CP mode. Modules cannot be paralleled in CV mode. Each module will dissipate the power it has been programmed. For example, if two modules are connected in parallel, one is programmed 10A, and another is 15A, the total current drawn from the source is 25A. Restriction on number of parallel modules depends only on total modules available in the multi-mainframe environment described in the next section.

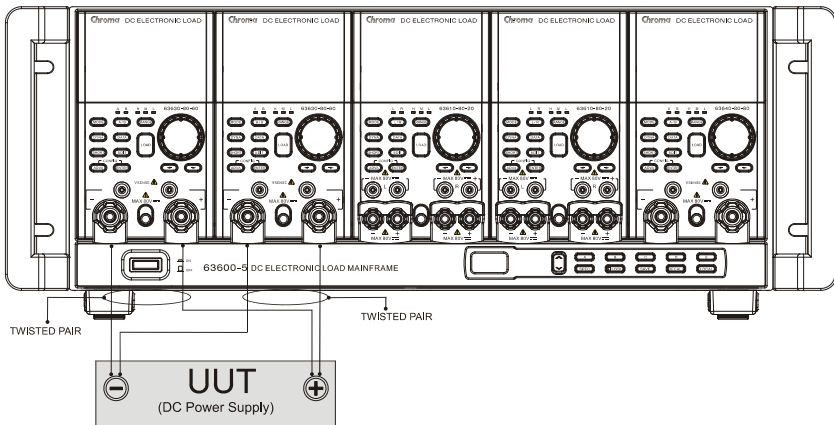


Figure 2-6 Parallel Connection

2.6.4 Multi-Mainframe Connections

The Electronic Load system offers multi-mainframe synchronized connectivity for up to 4 mainframes. The user is allowed to connect either System Bus1 or System Bus2 port on rear panel of a mainframe as input from previous mainframe, and use the remainder as output to the next mainframe. For a systematic configuration, it is strongly recommended to connect 2 mainframes in the way as from System Bus1 on a mainframe to System Bus2 on the other mainframe. Figure 2-7 indicates how to connect mainframe1 and mainframe2 along with extend to mainframe3.

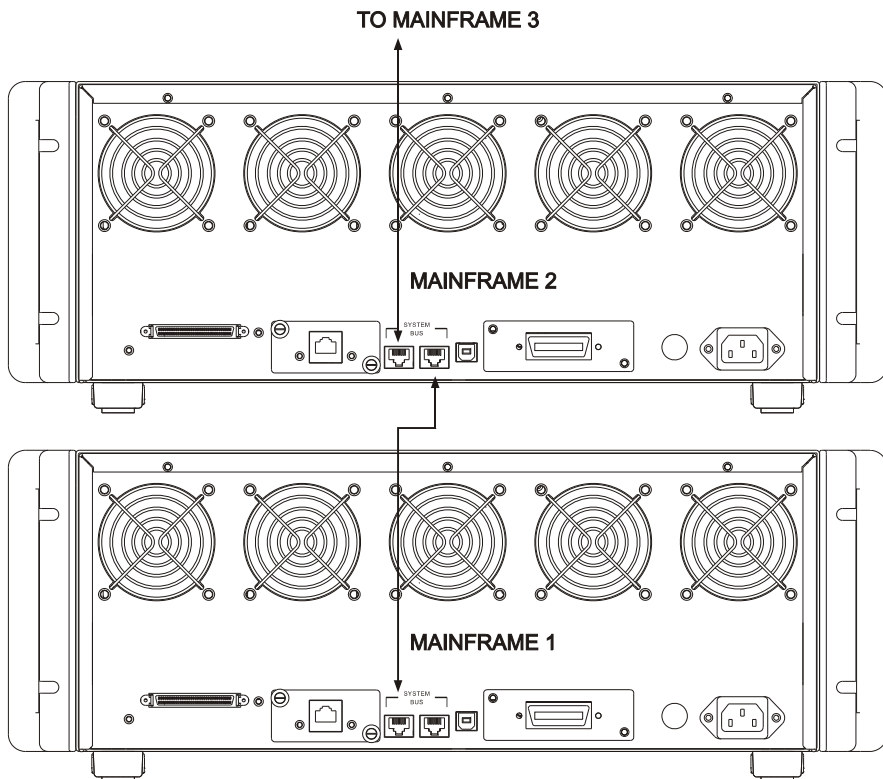


Figure 2-7 Multi-Mainframe Connections Modes

2.7 Remote Control Connection

The remote operation of Load can be done through GPIB, Ethernet, or USB interface. These connectors on the rear panel connect the Load to the controller or computer. The GPIB and Ethernet interface of the electronic load is optional. Connect the Remote Controller to the Electronic Load before powering it on. If you have not done this, Load will shut down, or the fuse for remote controller in Mainframe will be broken.

3. Operation Overview

3.1 Front Panel Description

The Mainframe front panel includes a 2 characters 7-segment LED display, and keypads. Figure 3-1 and Figure 3-3 show the front panel of Mainframe 63600-5, 63600-2, 63600-1.

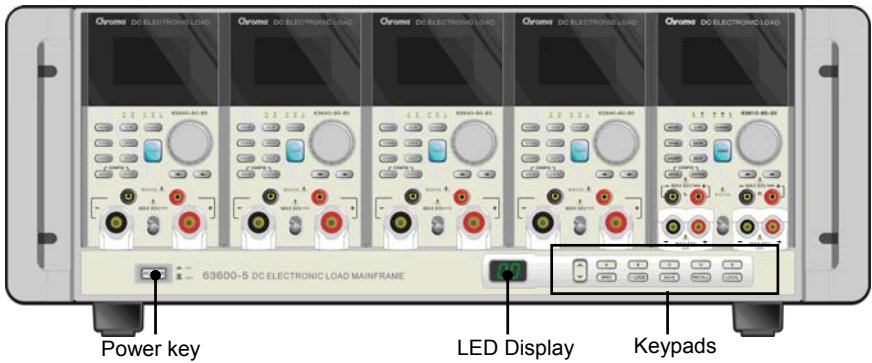


Figure 3-1 Front Panel of 63600-5

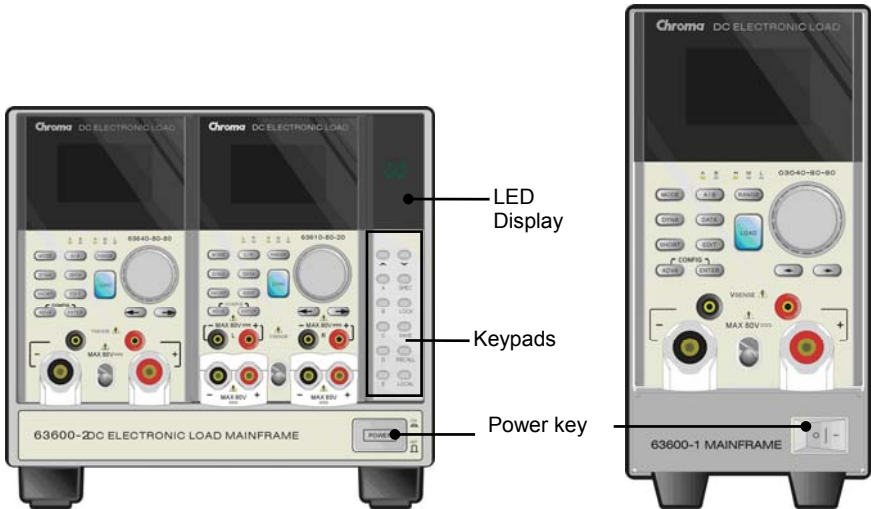


Figure 3-2 Front Panel of 63600-2

Figure 3-3 Front Panel of 63600-1

3.2 Rear Panel Description

The Mainframe rear panel includes two System Bus ports, a USB port, an optional GPIB connector, an optional Ethernet connector, a System I/O port, an AC LINE socket, a fuse holder, and five air holes of the fan cooling. Figure 3-4, Figure 3-5 and Figure 3-6 show the rear panel of Mainframe 63600-5, 63600-2, 63600-1.

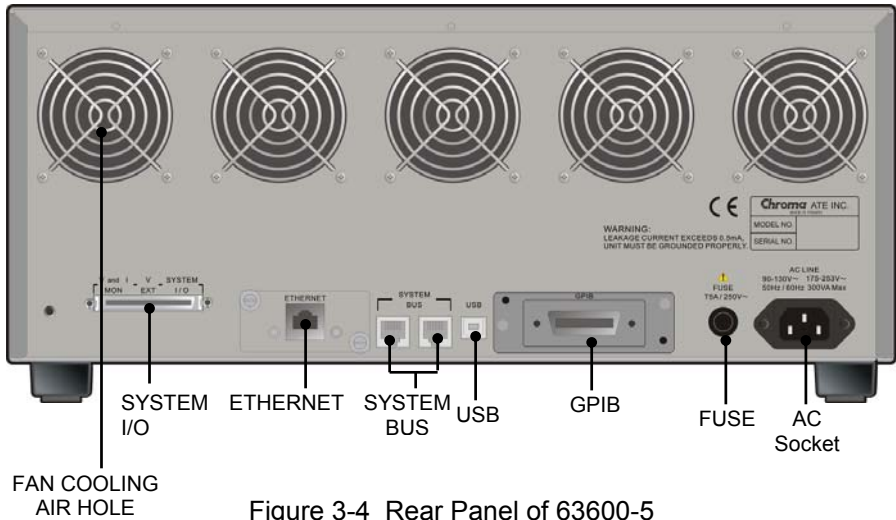


Figure 3-4 Rear Panel of 63600-5

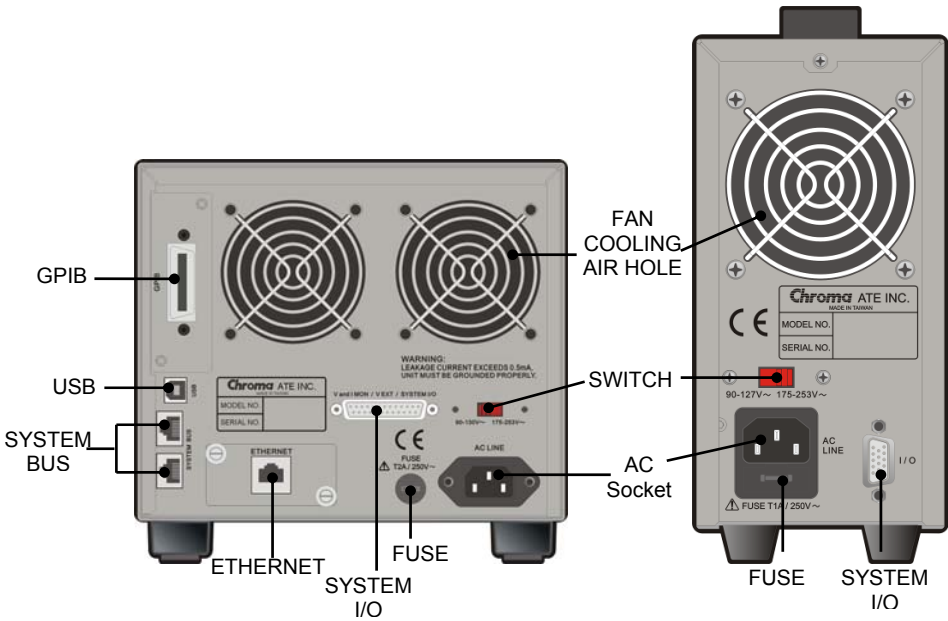


Figure 3-5 Rear Panel of 63600-2

Figure 3-6 Rear Panel of 63600-1

Item	Description
1	<i>GPIB Interface:</i> A GPIB interface for connecting remote controller using a computer.
2	<i>Ethernet Interface:</i> An Ethernet interface for connecting remote controller using a computer.
3	<i>USB Interface:</i> An USB interface for connecting remote controller using a computer.
4	<i>System Bus Interface:</i> Connectors to enable multi-mainframe synchronous operation, with USB/Ethernet/GPIB/MANUAL control. A System Bus port also for connecting remote controller.
5	<i>System I/O:</i> Connector with which includes Analog signals: voltage and current monitor and external wave input, and Digital System Input/Output signals. The Digital System Input/Output signals are TTL Compatible. The signal is connected to module with isolation.
6	<i>Fuse:</i> Safe guard against over loading.
7	<i>AC Line:</i> AC power connector, which supplies power to all the modules in the mainframe.
8	<i>Fan Cooling Air Holes:</i> Air holes with metal fan guard on the rear of the mainframe for air flow. Fan is on the module and the cooling fan speed automatically increases or decreases as load power rises or falls in each individual load module.

Table 3-1 Definition for Rear Panel Connectors on the Mainframe

3.3 Local/Remote Control

Local (front panel) control is in effect immediately after the power is applied. The front panel keypad and display allow manual control of individual module when Load is used in bench test applications. Remote control goes into effect as soon as the Mainframe receives a command via GPIB / Ethernet / USB / System Bus interface. When the remote control is in effect, only the computer/remote controller can control the Load. The front panel keypad has no effect except the **LOCAL** key. You can return to local control by pressing **LOCAL** key.

Most of the functions that perform remotely can be done locally too at the Load Module front panel. The keypads on the Mainframe can perform simple functions like specific setting, data lock operation, save/recall setting.

Details of local operation and Fundamentals of remote programming are given in the Chapter 4 and 5 of *Programmable DC Electronic Load 63600 Series Operation & Programming Manual*.

3.4 Modes of Operation

There are five modes of operation: Constant Current (CC), Constant Resistance (CR), Constant Voltage (CV), Constant Power (CP), and Constant Impedance (CZ).

When you press **MODE** key to program a mode, the module will change to a new mode. In change of modes the module's input is momentarily disabled before a new mode is enabled. This ensures the minimum overshoots during mode change. The parameters in current, resistance or voltage mode can be programmed easily when the mode is selected.

All data set in CC/CR/CV/CP/CZ mode will be rescaled to fit the resolution of current/voltage levels or slew rate. In local mode any value can be set from the keypad. But, if there is no upper and lower limit that would cause an error. The Load automatically selects data, which is rescaled from the programmed value, truncates and checks high, low boundary before fitting it into the memory. When the programmed data is over the boundary, the Load will set the maximum or minimum level. In remote mode the programmed value cannot be over boundary. An error will occur when the data is over the maximum or minimum value.

For the rest of the introduction, please refer to the *Programmable DC Electronic Load 63600 Series Operation & Programming Manual* in the CD shipped along with the device.



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