

Chroma Systems Solutions, Inc.

63600 DC Electronic Load

Sine Wave Dynamic Parallel Mode

63600 DC Electronic Loads

Keywords: DC Current, DC Electronic Load, Transient Load, Dynamic Load, Transient Measurements, Transient Response, Sine Wave Dynamic

Title: **63600 DC Electronic Load
Sine Wave Dynamic Parallel
Mode**

Product Family: **63600 DC Electronic Loads**

Abstract

Sine wave Dynamic loading is one method used for verifying the transient response of a Power Supply or testing the internal resistance of a Battery or Fuel cell.

Solution

The Chroma 63600 family of DC Electronic loads have advanced features for many types of applications. One of these features is the Sine Wave Dynamic loading feature. The load can have a DC current setting with a sine wave current added. The sine wave current has a frequency range of 0.01Hz to 20KHz.

The load setting for the I_{ac} p-p can not be greater than 2 times the I_{dc} , the combined peak current must not exceed the Loads Max Current rating and the Peak Power must not exceed the Loads maximum power rating. For higher Current and Power the loads can be paralleled.

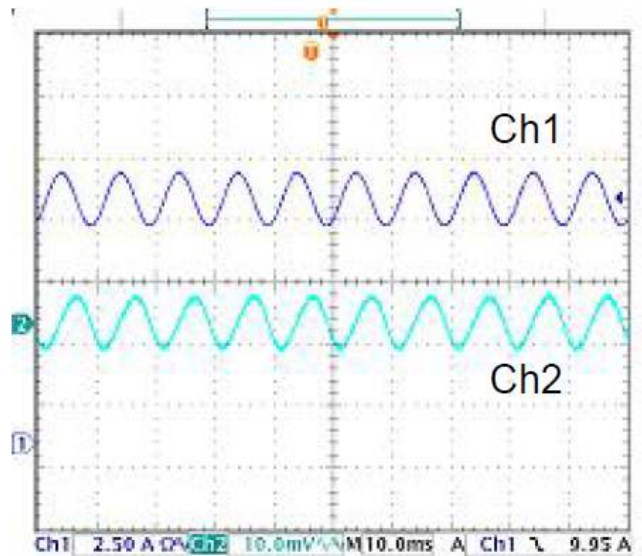
The settings can be made manually from the front panel on the load modules, or controlled from a program using the SCPI commands.

This Application Note will show the manual steps to set the load for Sine Wave Dynamic and show a list of the SCPI commands used to program the Sine Wave Dynamic load.

Reference

See section 4.6.2 Setup Sine Wave Dynamic Function in the 63600 Operating & Programming Manual, Version 1.6 dated March 2013

- 1.0 If high power and current is needed set multiple loads in parallel using the Parallel Master Slave settings before setting the SINE WAVE DYNA.
- 2.0 Set the load in Sine Wave Mode manually using the front panel of the load module is as follows.
- 3.0 To select the SINE WAVE DYNA press the ADVA button on the load module then using the KNOB turn it until "2. SINE WAVE DYNA" is highlighted and press enter.
- 4.0 The screen will change to show [SINE WAVE DYNA] and a mV+ and mV- display.
- 5.0 Press the EDIT button to change the parameters for the SINE WAVE DYNA load.
- 6.0 The parameters will show:
 - I_DC : 0.0000A
 - I_AC : 0.0000A
 - FREQ: 00.000HZ
- 7.0 Set the I_DC first and then set the I_AC which must be < 2X the I_DC setting.
- 8.0 The FREQ setting can be from 0.01Hz to 20KHz.
- 9.0 After setting these parameters press the EDIT button again to leave EDIT mode and then press the blue LOAD button to activate the load.
- 10.0 If more power and current are needed then use the MASTER/SLAVE Parallel settings on the Load Module.





The above photo shows 3 63630-600-15 loads in parallel with the output voltage set to 75Vdc

The peak current is $(I_DC + (0.5 \times I_AC)) = 11.5$ Amps peak

The peak power is $11.5A \times 75V = 862$ Watts

Determine the Parameters based on the Maximum power rating of the loads and the voltage applied:

P_{max} = maximum combined power rating of the loads in parallel

V_x = the applied voltage to the load terminals

I_{max} = maximum current based on the P_{max}/V_x

I_DC = the dc portion of the current through the load

I_AC = the ac portion of the current through the load

Example:

$P_{max} = 3$ loads \times 300 watts = 900 Watts

$V_x = 120Vdc$

$I_{max} = 900/120 = 7.5$ Amps peak

$I_DC = 7.5$ amps / 2 = 3.75 Amps

$I_AC = 7.5A$ p-p max

Current can never go negative

PROGRAMMING:

Programming the 63630-600-15 from one of the remote interface buss such as GPIB, USB or ETHERNET can be accomplished with the following SCPI (Standard Commands for Programmable Instruments)

Prior to sending these commands the loads that are to be paralleled will need to be set in MASTER/SLAVE control which is covered in the 63600 User Manual.

CHAN 1 ; this selects the Channel of the MASTER load
MODE SWDH ; this sets the MODE to SINE WAVE DYNAMIC HIGH range
ADV:SINE:FREQ 120 ; this sets the frequency to 120 hz
ADV:SINE:IDC 2 ; this sets the DC current level to 2Amps
ADV:IAC:1 ; this sets the AC current level to 1 Amp pk-pk
LOAD ON ; this sets the LOAD ON.

For MODE SWDH there are also MODE SWDM for mid range and SWDL for low range. The FREQ setting can be from .1 to 20Khz
And the DC current can be up to the combined total for all the loads in parallel.