PROGRAMMABLE DC ELECTRONIC LOAD MODEL 63000 SERIES

The 63000 series programmable DC electronic loads are reliable, precision instruments primarily designed to test switching power supplies, A/D power supplies, power electronic components, adapters, 3C batteries and chargers. Its maximum 350W rated power makes it suitable for testing numerous types of lower power devices.

The 63000 series offers operating voltage 150V models with 250W and 350W power levels up to 60A in a single unit. Their compact and light weight design make these loads easy to move around which is ideal for R&D and design validation.

Each model of the 63000 series has a unique user-defined waveform (UDW) function capable of simulating real-world custom waveforms. In addition, a data storage function has been built in for saving and recalling up to 100 stored settings at any time. For automated testing, these save and recall functions can save a great deal of time.

The 63000 series has 3 power ranges that can precisely measure the voltage and current in real time. Since short circuit testing is a critical test item, the 63000 provides short circuit simulation to effectively address application demands for power and automated testing.

The 63000 loads offer versatile front panel operation through the LCD and rotary knob. For remote operation, users are able to control each model via standard USB or optional Ethernet/LXI and GPIB interfaces. PWM fan speed control has been embedded to reduce ambient noise.

The 63000 has been equipped with over current, overpower, and over temperature protections as well as over voltage and polarity reverse alarms to improve product reliability. These DC loads are reliable, precision instruments ideal for design validation testing and automated test system integration.

Ethernet GPIB USB CE RoHS2 Compliant

MODEL 63000 SERIES

KEY FEATURES

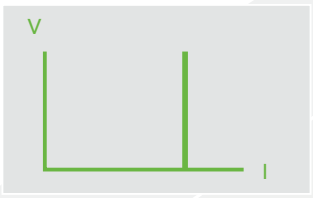
- Rated power: 250W, 350W
- Voltage range: 150V
- Current range: 60A max.
- CC, CR, CV & CP operation modes
- User-defined waveforms (UDW)
- CZ mode for turn on capacitive load simulation
- Real time power supply load transient response simulation
- User programmable 100 sequences via front panel
- High precision voltage & current measurement
- Voltage, current & Pmax measurement for OCP/OLP test
- Timing & discharging measurement for batteries
- Short circuit simulation
- Smart fan control
- Full protection: OC (adjustable), OT, OP (adjustable) protection & OV warning, polarity reverse alarm
- Standard USB, optional Ethernet and GPIB interfaces

Chroma

Static Load

The 63000 series electronic loads operate in constant voltage, current, resistance, power or impedance modes to satisfy a wide range of test requirements. For example, the CV mode can be used for battery charger testing applications.

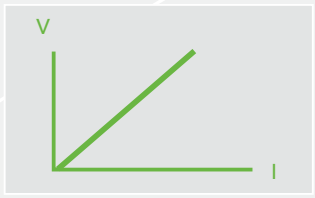
CC Mode



CC Applications

1. Load/cross regulation test for CV power supply
2. Battery discharge time test and life cycle test
3. Fuel cell testing
4. Loading pattern simulation for automotive wiper

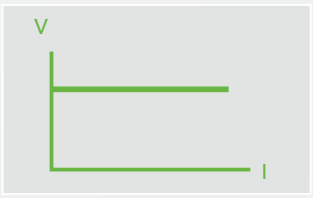
CR Mode



CR Applications

1. Test current limit point and slew rate for power supply
2. Test soft start for telecom power
3. Test loading simulation for automotive temperature controller

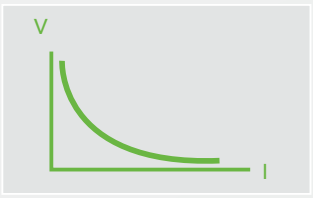
CV Mode



CV Applications

1. Charger test for mobile phone
2. Current limit test for fold back power supply
3. Fuel cell test
4. Current source test

CP Mode



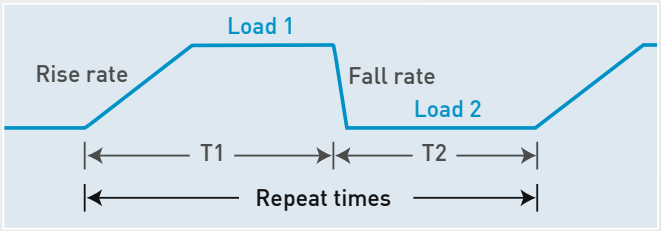
CP Applications

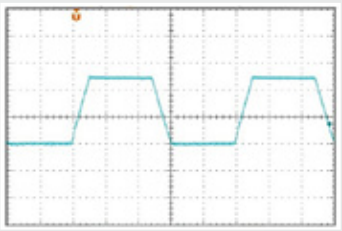
1. CP power test
2. Battery capacity test and capacity life cycle test
3. Pout vs Eff% curve test

Dynamic Load

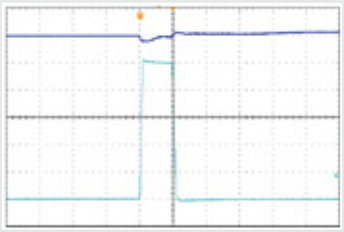
63000 series provides dynamic mode to meet the testing requirements of power devices operating at very high speeds with rapid transient response characteristics.

- Programmable parameters: current high/low level, T1/T2, rise/fall rate and execution times
- Execution time setting range is 1 ~ 65,535
- 150V model’s current rise minimum response time is 20μs
- Suitable for testing D/D converters
- One shot impulse current is loaded when it is set to execute once, which is very suitable for testing instant large withstand current of batteries





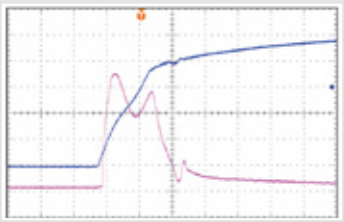
Dynamic Change up to 25kHz



One Shot Impulse Current

CZ Mode*1

To avoid charging the motherboard capacitors when the switching power supply turns on with the surge current (triggering the power supply over current protection mechanism causing a the power supply fail to turn on successfully), a turn on capacitive load test is required. The 63000 series provides CZ mode for turn on capacitive load simulation to tackle this testing demand. CZ mode simulates the actual inductance, impedance and capacitance for loading making the load current closer to real conditions.



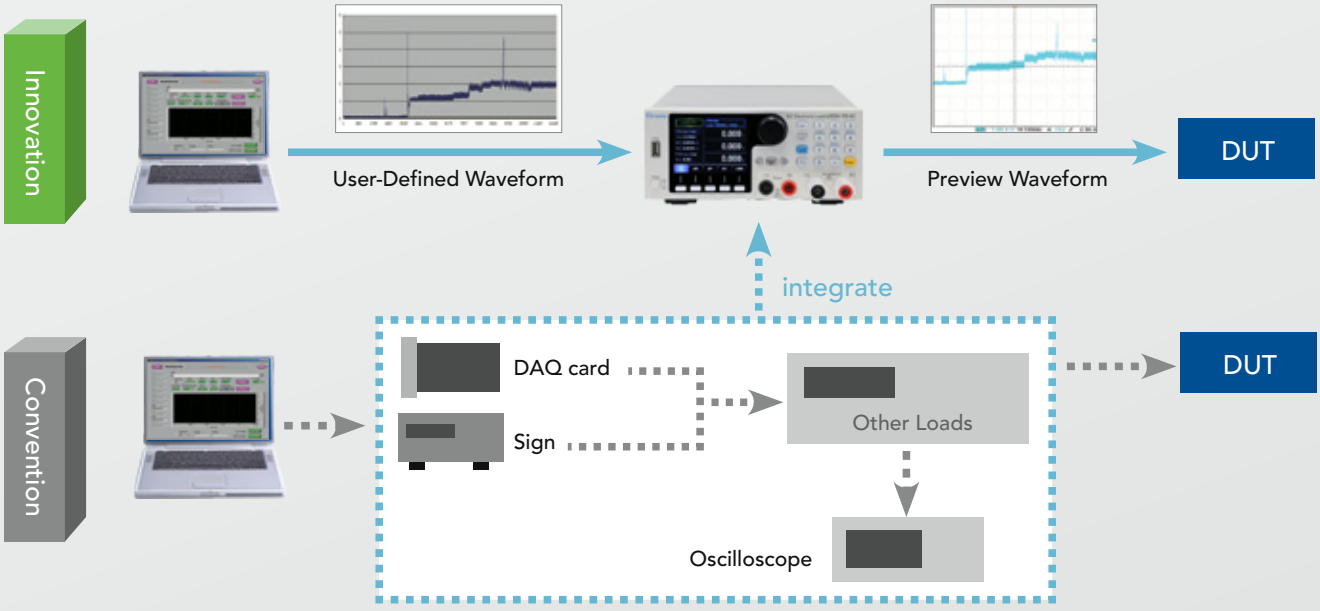
Three Ranges and High Precision Measurement

Unlike the two-range design, the 63000 series is capable of three ranges for settings and measurements, which can minimize error regardless of setting or measurement.

- High, medium, and low three operating and measurement ranges
- Voltage, current and power measurement specifications:
  - 0.02%+0.02%F.S. accuracy for voltage
  - 0.05%+0.05%F.S. accuracy for current
  - 0.1%+0.1%F.S. accuracy for power

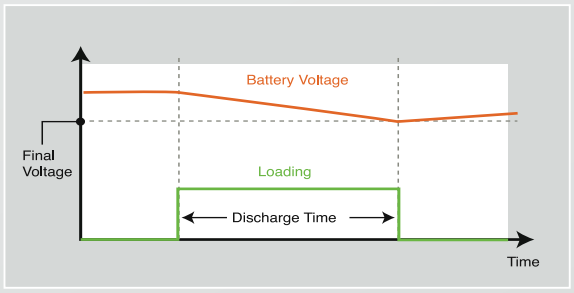
User-Defined Waveform (UDW)*1

The conventional way of loading a current waveform is through DAQ cards or function generators. The 63000 Series provides an enhanced feature, User Defined Waveform (UDW), to simulate the actual current profiles and waveforms. Each load is capable of storing up to 10 sets of waveforms with each containing up to 1.5 million data points in the built-in flash memory. It also provides voltage peak measurement during actual loading conditions avoiding the need for an oscilloscope which saves time and cost.



Battery Discharge Testing*1

- Configures three discharge modes: CC, CR, and CP
- Set cut off voltage and time (1~100,000 sec.) to stop loading and ensuring the battery is not damaged due to over discharge
- Measures the battery discharge power (WH, AH) and total discharge time
- Applies to super capacitor for discharge time testing and other related applications

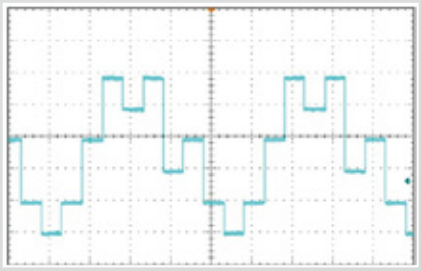


Battery Discharge Power (WH & AH) Calculation

Program Sequence

The 63000 series have program sequence functions for various load condition simulations; the minimum dwell time is 100μs. The following lists the applications for commonly programmed sequences:

1. Battery discharge (NPC, electric car, and electric locomotive, etc.) simulating various dynamic load current waveforms
2. Switching power supply mixed load modulation



100 Sequences

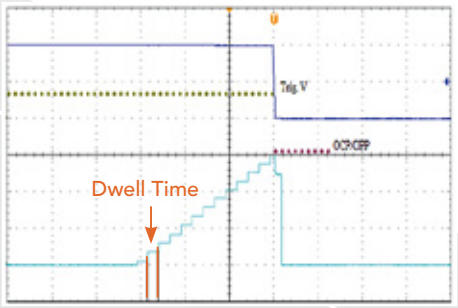
User-defined Hot Key Design

- 5 sets of user-defined hot keys
- Quick access of the operation mode

Over Current & Over Power Testing*1

The over current and over power functions can be used to verify whether OCP/OPP of the power supply is triggered or not.

- Set current orders to test overcurrent protections
- Set power orders to test overpower protections
- Automatically determine the test result as Pass or Fail
- Capture the maximum power (Pmax) during testing
- Verify the correctness of designed overcurrent and overpower without using an oscilloscope
- Save a lot of testing time



OCP Testing

Graphical Operation Software*2

User friendly software controls all functions of the 63000 loads and is easy to understand and operate. The 63000 series can be controlled via standard USB or optional GPIB/Ethernet interface for remote control and automated testing applications.

Note *1 : These functions can be upgraded by firmware and will be available in May, 2018.
Note *2 : Available in July, 2018

Panel Description

1. Power Switch
   Electronic load AC power switch
2. Shortcut Keys
   Loading mode switch
3. Arrow Keys and Enter/Edit Key
   Moving cursor and selecting menu
4. Remote Sense Connections
5. Load Positive/Negative Terminal
6. USB HOST (reserved)
   For user-defined waveform and programmed sequence data download as well as firmware upgrade
7. LCD Display
   Setup, measurement and load state information display
8. Rotary Knob
   Editing the setting to be input
9. Function Keys and ENTRY Keypad
   Including numerical keys and ENTER key, MODE, COFIG./EDIT, SHORT, RECALL, SAVE and CLEAR
10. Analog Outputs
    Proportional voltage and current waveforms
11. GPIB & Ethernet Card Slot
12. USB Port
13. AC Input Connector

SPECIFICATIONS - 1

Models	63003-150-40			63004-150-60		
Configuration	250W			350W		
Voltage *2	0~150V			0~150V		
Current	0~2A	0~4A	0~40A	0~2A	0~6A	0~60A
Power	0~90W	0~250W		0~90W	0~350W	
Static Mode						
Min. Operating Voltage (DC)	0.6V@2A	0.6V@4A	3.0V @40A 1.5V @20A	0.6V@2A	0.6V@6A	3.0V @60A 1.5V @30A
Constant Current Mode						
Range	0~2A	0~4A	0~40A	0~2A	0~6A	0~60A
Resolution	0.1mA	0.1mA	1mA	0.1mA	0.1mA	1mA
Accuracy *3	±(0.05%+0.05%F.S.)			±(0.05%+0.05%F.S.)		
Constant Resistance Mode						
Range	0.075Ω-375Ω (16V/250W) 25Ω-1875Ω (80V/250W) 90Ω-3750Ω (150V/250W)			0.05Ω-250Ω (16V/350W) 18Ω-1250Ω (80V/350W) 64Ω-2500Ω (150V/350W)		
Resolution	1mA/Vsense			1mA/Vsense		
Accuracy	Vin/Rset* (0.2%)+0.2% Irange F.S.			Vin/Rset* (0.2%)+0.2% Irange F.S.		
Constant Voltage Mode						
Range	0~16V	0~80V	0~150V	0~16V	0~80V	0~150V
Resolution	1mV	1mV	10mV	1mV	1mV	10mV
Accuracy	±(0.025%+0.025%F.S.)			±(0.025%+0.025%F.S.)		
Constant Power Mode						
Range	0~5W	0~25W	0~250W	0~7W	0~35W	0~350W
Resolution	2.5mW	25mW	250mW	3.5mW	35mW	350mW
Accuracy *4	±(0.1%+0.1% F.S.)			±(0.1%+0.1% F.S.)		
CZ Mode *7						
Range	C_L : 30μF-50,000μF R_L : The same with CR Range L_s : 0.1μH-20μH R_s : 30mΩ-20Ω			C_L : 30μF-50,000μF R_L : The same with CR Range L_s : 0.1μH-20μH R_s : 30mΩ-20Ω		
Resolution	CL : 1μF RL : 18-bit Ls : 0.1μH Rs : 1mΩ			CL : 1μF RL : 18-bit Ls : 0.1μH Rs : 1mΩ		
Dynamic Mode -CC						
Min. Operating Voltage	3V			3V		
T1&T2	0.05ms~99.999ms/ 100ms-99999ms			0.05ms~99.999ms/ 100ms-99999ms		
Resolution	1μs/1ms			1μs/1ms		
Accuracy	1μs/1ms+100ppm			1μs/1ms+100ppm		
Slew rate	0.1mA/μs~ 0.1A/μs	1mA/μs~ 0.2A/μs	10mA/μs~ 2A/μs	0.1mA/μs~ 0.1A/μs	1mA/μs~ 0.3A/μs	10mA/μs~ 3A/μs
Resolution	0.1mA/μs	0.1mA/μs	1mA/μs	0.1mA/μs	0.1mA/μs	1mA/μs
Accuracy	±(5%±10μs)			±(5%±10μs)		
Min. Rise Time *5	20μs (Typical)			20μs (Typical)		
Current						
Range	0~2A	0~4A	0~40A	0~2A	0~6A	0~60A
Resolution	0.1mA	0.1mA	1mA	0.1mA	0.1mA	1mA
Accuracy	±0.1%			±0.1%		
Program Mode						
Sequence No.	100 / Program			100 / Program		
Dwell / SEQ	1ms ~ 60s (Resolution : 1ms)			1ms ~ 60s (Resolution : 1ms)		
Load Setting	Refer to Static mode specifications			Refer to Static mode specifications		

• Continued on next page ➟

SPECIFICATIONS - 2

Models	63003-150-40			63004-150-60		
Measurement						
Voltage Read Back						
Range	0~16V	0~80V	0~150V	0~16V	0~80V	0~150V
Resolution	1mV	1mV	10mV	1mV	1mV	10mV
Accuracy	±(0.02%+0.02%F.S.)			±(0.02%+0.02%F.S.)		
Current Read Back						
Range	0~2A	0~4A	0~40A	0~2A	0~6A	0~60A
Resolution	0.1mA	0.1mA	1mA	0.1mA	0.1mA	1mA
Accuracy	±(0.05%+0.05%F.S.)			±(0.05%+0.05%F.S.)		
Power Read Back						
Range	0~250W			0~350W		
Accuracy *4	±(0.1%+0.1% F.S.)			±(0.1%+0.1% F.S.)		
Battery Discharge						
Range	1s~100,000s			1s~100,000s		
Resolution	1s			1s		
Accuracy	±0.01%			±0.01%		
Protection						
Over Current	Yes (Settable)			Yes (Settable)		
Over Voltage	Yes			Yes		
Over Power	Yes (Settable)			Yes (Settable)		
Over Temperature	Yes			Yes		
Reverse	Yes			Yes		
General						
Short Circuit *6	CC, CV, CP			CC, CV, CP		
Input Resistance (Load Off)	700kΩ(Typical)			700kΩ(Typical)		
Dimension (H x W x D)	88 x 215 x 354 mm /3.5 x 8.5 x 13.9 inch			88 x 215 x 354 mm /3.5 x 8.5 x 13.9 inch		
Height	2U			2U		
Weight	6kg / 13.23lbs			6kg / 13.23lbs		
Power Consumption	150VA (max)			150VA (max)		
Operating Temperature	0~40℃			0~40℃		
Line Voltage	90~130 / 175~253 VAC Auto Range / 47~63Hz			90~130 / 175~253 VAC Auto Range / 47~63Hz		
Safety & EMC	CE			CE		

Note *1 : The specifications are guaranteed to meet specified performance at temperature range of 25±5℃.
Note *2 : If the operating voltage exceeds the rated voltage for 1.05 times, it would cause permanent damage to the device.
Note *3 : If the operating current is below range 0.2%, the accuracy specification is 0.1% F.S.
Note *4 : Power F.S. = Vrange F.S. x Irang F.S.
Note *5 : The specification is valid only for loading current > 4% F.S.
Note *6 : The short circuit function simulates full power loading and thus it cannot perform mechanical short circuit.
Note *7 : CZ mode will be available in July, 2018.
* All specifications are subject to change without notice.

ORDERING INFORMATION

63003-150-40 : Programmable DC Electronic Load 150V / 40A / 250W
63004-150-60 : Programmable DC Electronic Load 150V / 60A / 350W
A600009 : GPIB cable (200cm)
A600010 : GPIB cable (60cm)
* A630000 : Graphic user interface softpanel for 63000 Series
A636000 : GPIB interface
A636010 : Ethernet interface
* A630000 will be available in July, 2018.

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