DC ELECTRONIC LOADS

DC electronic load applications

- Power supply performance testing
- Characterize and analyze batteries
- Solar panel IV curve simulation

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DC electronic loads are suitable for testing and characterizing a wide range of DC power sources, such as DC power supplies, batteries, fuel cells, solar cells and other power components. Unlike passive resistive loads, DC electronic loads offer a wide variety of voltage/current ranges and can operate under multiple modes such as constant current (CC), constant voltage (CV), constant power (CW), and constant resistance (CR).

B&K Precision's 8500 family line of affordable programmable DC electronic loads consist of a wide selection of models in the 300 W – 5000 W range. Each model shares user-friendly features such as flexible operating modes, high resolution meter and VFD display, built-in transient generator, and list mode functionality for custom programmed dynamic load testing.

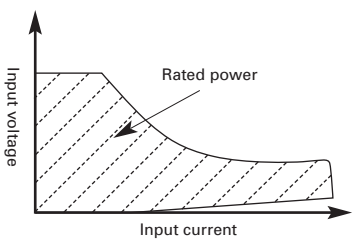
Model 8540 was designed for users requiring a basic DC load with a compact form factor at a rock bottom price. The 8540's specification are similar to the 8500 line, but without the extras such as programming interface, triggering, and ability to create dynamic test conditions.

Model 8540

Model 8510

DC ELECTRONIC LOADS
Selection Guide

	DC Electronic Loads							
	Category	Model #	Operation Voltage	Rated Current	Max. Power	Weight	Dimensions (W x H x D)	Page
8500 Series	Basic	8540	0.1 V to 60 V	30 A	150 W	6 lbs (2.7 kg)	3.5" x 6.9" x 11.1" (88 x 175 x 282) mm	26
	Bench Programmable	8500	0.1 V to 120 V	30 A	300 W	11.5 lbs (5.2 kg)	8.46" x 3.46" x 14" (215 x 88 x 355) mm	27-29
		8502	0.1 V to 500 V	15 A	300 W			
		8510	0.1 V to 120 V	120 A	600 W	31 lbs (14 kg)	16.9" x 3.46" x 14" (429 x 88 x 355) mm	
		8512	0.1 V to 500 V	30 A	600 W			
	High Power Programmable	8514	0.1 V to 120 V	240 A	1200 W			
		8518	0.1 V to 60 V	240 A	1200 W			
		8520	0.1 V to 120 V	240 A	2400 W	66 lbs (30 kg)	17.48" x 7.09" x 21.22" (444 x 180 x 539) mm	
		8522	0.1 V to 500 V	120 A	2400 W			
		8524	0.1 V to 60 V	240 A	5000 W	148 lbs (67 kg)	17.48" x 14.06" x 21.22" (444 x 357 x 539) mm	
		8526	0.1 V to 500 V	120 A	5000 W			



When selecting a DC load, it is important to consider not only voltage and current requirements, but also power ratings. The power used when testing must fall within the hashed region for the appropriate DC load.

Some applications may require high voltage/low current and low voltage/high current, which a single load may not be able to handle. B&K Precision's broad range of DC loads will allow you to select the optimal model for your requirements.

150 W DC Electronic Load

The 8540 DC electronic load is a very compact, economically priced instrument that is at home on both the bench and the production floor.

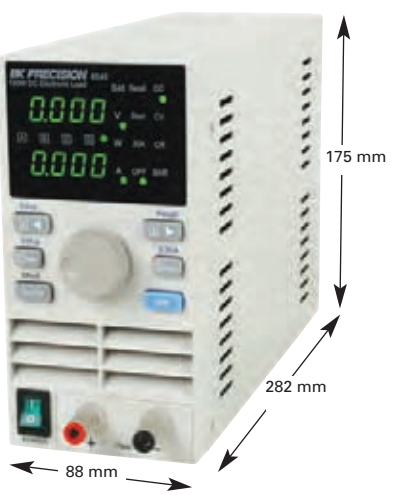
Though this is a DC load in a small package, it can reliably test a 5 volt power supply to 30 amps and do it continuously.

The 8540 DC electronic load can operate in CC, CV, or CR mode while voltage/current or resistance/power values are measured and displayed in real time, making it well suited to test a variety of DC power sources.

The 8540's performance is comparable to most full size bench DC loads, yet it does the job at half the price and takes up half the space on your bench.

Features & Benefits

- Operates between 0-60 VDC, 1 mA-30 A (150 W maximum)
- Easy operation
- Bright, easy-to-read display
- Very compact and light weight
- Two current ranges: 3 A (1 mA resolution) and 30 A (10 mA resolution)
- Constant current (CC), constant resistance (CR), and constant voltage (CV) operation
- Overcurrent and overvoltage protection
- Short mode to simulate shorts
- Save up to 400 instrument settings



The 8500 series programmable DC electronic loads can be used for testing and evaluating a variety of DC power sources. Their wide operating ranges of up to 500 V and 240 A, flexible operating modes and excellent measurement accuracy make the 8500 series well suited for characterizing DC power supplies, DC-DC converters, batteries, fuel cells, and solar cells.

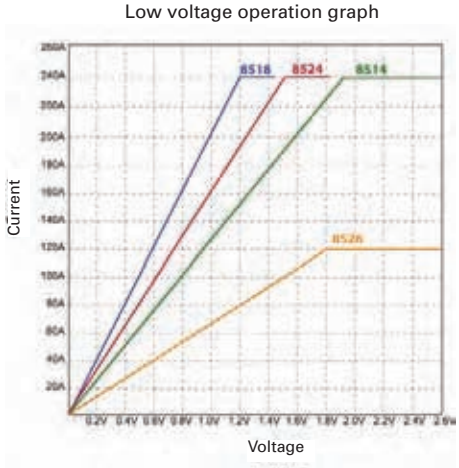
The loads can operate in CC, CV, CR, or CP mode while voltage/current or resistance/power values are measured and displayed in real time. Load terminals are isolated and floating. Extensive protection, including overtemperature, overpower, overvoltage, overcurrent and reverse polarity will help protect your valuable prototype.

These DC loads are easy to use. All parameters can be set quickly and precisely from the front panel, or programmed via RS232 or USB interfaces.

Low voltage operation

The 8500 series can operate well below 1 V which is important for low voltage application such as fuel cell and solar cell testing. All models can regulate (provide a stable input) down to 0.1 V. Model 8518, due to its particularly low input resistance, can operate at full scale current of 240 A at 1.2 V (see image).

Low voltage operation graph



Typical minimum operating voltage at full scale current

8500	8502	8510	8512	8514	8518	8520	8522	8524	8526
1.05 V	3 V	1.8 V	3 V	1.92 V	1.2 V	10.8 V	3.6 V	1.56 V	1.8 V

Features & Benefits

- Constant current (CC), resistance (CR), voltage (CV), and power (CP) operation
- Wide voltage and current range, 0 to 500 V, 0 to 240 A (5000 W max)
- Low minimum operating voltage of < 0.1 V and minimum input resistance of 5 mΩ (model 8518) allowing the load to sink high current at low voltages, required for fuel and solar cell applications
- Selected models operate up to 500 V, suitable for high voltage applications
- Built-in transient generator
- Short circuit test
- Built-in high resolution (0.1 mA/1 mV) voltage and current measurement (models 8500 & 8502)
- Bright, easy to read display (VFD technology)
- Overcurrent/overvoltage/overpower/overtemperature protection
- RS232 & USB to TTL serial converter cable and application software included
- List mode operation for increased throughput
- Battery testing mode to provide A*hr rating of battery (ending voltage level is adjustable)
- Flexible triggering: create trigger events by front panel keystroke, back panel TTL signal, or software
- Remote voltage sensing to compensate for the effect of voltage drop in wires
- Store 25 instrument setups
- Thermostatically-controlled fans allow operation in quiet environments with minimal disruption
- All models are rack mountable. Compact 300 W and 600 W models for bench use

DC ELECTRONIC LOADS
8500 Series

300 W form factor

600 W - 1200 W form factor

2400 W form factor

Hex-head screw terminals

Hex-head screw terminals allow for greater application of torque to reduce contact resistance between interface cables and terminal screws.

Present on high-power models 8518 through 8526.

Applications:

- DC power supply testing
- Characterization of rechargeable batteries. A battery test mode is provided that will measure the ampere*hour (A*hr) characteristic of a battery
- Fuel and solar cell test
- High voltage applications

Triggered operation

Triggering is used to allow synchronization of the DC Load's behavior with other events. You can generate a trigger event by front panel keystroke, by applying an external TTL signal to the back panel terminal, or by sending a command over the serial bus. The trigger can be used in pulse mode, transient mode, list mode, and works in CC, CR, CV and CP modes.

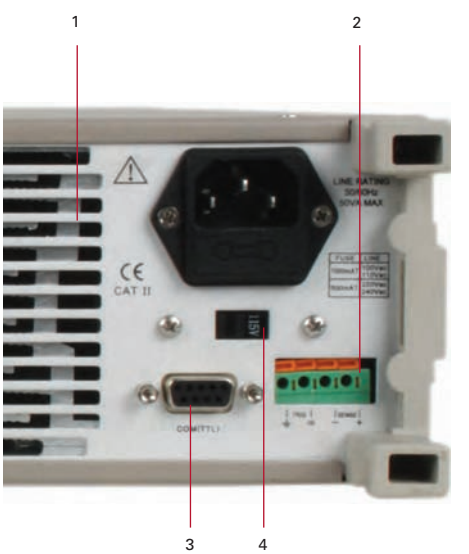
Rear features

1) **Air circulation**
Thermostatically-controlled cooling fan channels air front-to-rear through these vents to keep the temperature constant inside the system.

2) **Trigger and remote sensing terminal block**
Connect sensing lines to this terminal to compensate for voltage drops due to load wire resistance. This terminal block also contains the two connections for the remote TTL trigger input signal.

3) **Interface connection**
Serial interface connector for RS232 or USB communication.

4) **Voltage switch**
Line voltage selection switch (110 VAC or 220 VAC).



Flexible operating modes

CC, CR, CV and CP mode

In constant current (CC) mode, the load will sink a current according to the programmed current value regardless of the input voltage. (CC) mode can be used for load regulation testing of DC power supplies or for characterizing the discharge profile of a battery.

Constant power (CP) mode simulates a load whose power consumption is independent of the applied voltage. Constant power (CP) mode is useful for battery testing and simulating a realistic discharge curve.

In constant voltage (CV) mode, the load will attempt to sink enough current to control the source voltage to the programmed value. This mode is suitable for testing battery chargers. In constant resistance (CR) mode, the load will sink a current linearly proportional to the input voltage in accordance with the programmed resistance. Unlike conventional resistors, the load resistance stays constant regardless of the power level.

Model 8500

Transient generator

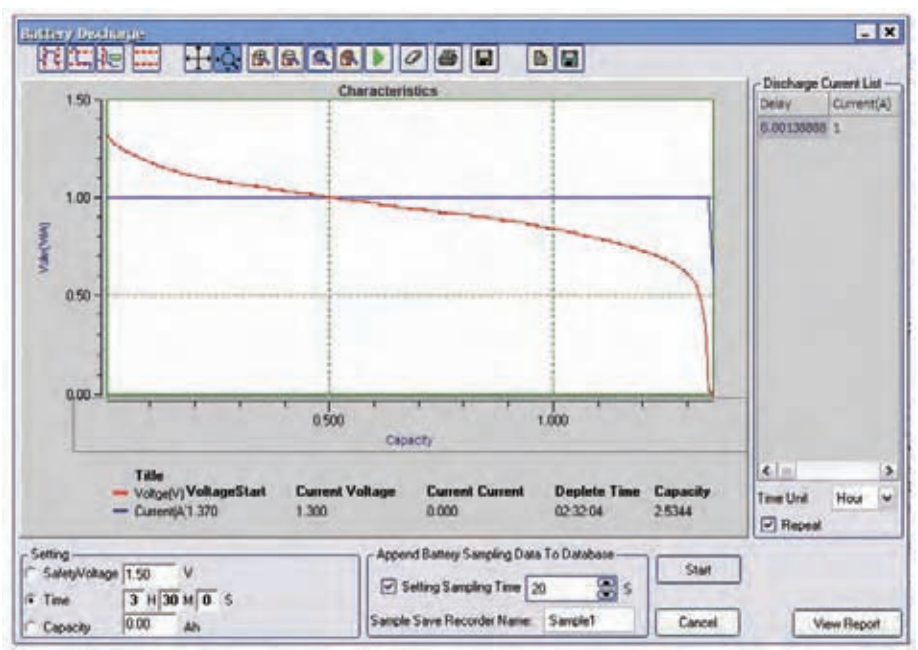
The 8500 series offers a variable frequency generator which can be used in all operating modes. The DC load will toggle between two preset levels at a frequency between 0.1 Hz to 1 kHz, either continuously or controlled by a trigger.

Remote control & application software

These DC loads can be remotely controlled from any PC with USB or RS232 interface, allowing the user to fully program and monitor all parameters. An RS232 & USB to TTL serial converter cable is included. For users wanting to write their own custom software, a set of example programs are available for download via the B&K Precision website.

List mode

A list of command sequences can be stored in non-volatile memory and executed independently of a computer. Execution in list mode greatly reduces command processing time and computer interaction during product testing. The command sequence can be entered manually from the front panel or downloaded from a PC via RS232 or USB interface.



An example of battery discharge characteristics of an AA alkaline battery

Application software

The included application software supports front panel emulation of the load and includes a battery test application which provides A*hr rating of a battery and adjustable ending voltage levels (safety voltage).

Whether designing a device with Nickel-Metal Hydride or Lithium-Ion batteries, the 8500 series DC electronic loads have the capabilities to test their characteristics.