Dynaload Applications

Constant Current Mode

- Power supply testing, load regulation of constant voltage sources
- V/I characterization of Batteries and fuel cells
- V/I characterization of solar cells
- Discharge cycling of batteries
- RPM/V/I characterization of alternators and generators
- Circuit breaker and fuse testing
- Current regulation for electro-plating
- Current regulation for shunt manufacturing

Constant Resistance Mode

- Power supply testing, Load regulation of constant voltage and constant current sources
- Power supply testing, Characterization of current limit foldback circuitry

Constant Voltage Mode

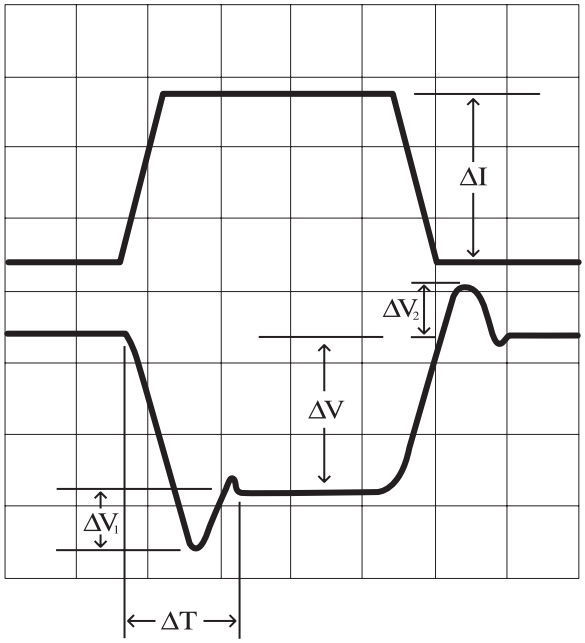
- Battery Simulation for Chargers
- Shunt regulator applications

Constant Power Mode

- DC-DC simulation for battery backup simulation

Pulse Mode

- Transient response characterization of power supplies
- Internal impedance determination for fuel cells and batteries



Load Current Waveform

Power Supply Output Voltage

ΔV = Load Regulation
ΔT = P.S. Loop Response
ΔV1 = Undershoot
ΔV2 = Overshoot
ΔI = Change in Load Current

Power Supply Testing

For basic testing, the Dynaload is used to simulate many current levels in both constant current mode and constant resistance mode. The load regulation at various current levels is obtained by monitoring the change in output voltage. The Dynaload is also used to determine the current limit characteristics down to the point of short circuit current. The response characteristics of the power supply may be analyzed with the use of an oscilloscope when operating in pulse mode. Characteristics such as loop response, overshoot, undershoot, and load regulation may be determined from a single high-speed current pulse.

When testing a battery charger, the constant voltage mode will verify the operation of the charger into a constant voltage load, thus simulating a battery.

Battery Testing

The Dynaload is used to test batteries by both analyzing life cycle and establishing the V/I characteristics. The load is operated in the constant current mode which freezes one of the variables when calculating the battery's power level. Some batteries require exotic waveform testing in order to simulate real life uses. This is accomplished by using the Dynaload's internal pulse generator. Many different waveforms can be created through the use of variable current levels, frequency, duty cycle, and slew rate. The load may be controlled through the analog remote programming input for situations where the required waveforms are extremely complex. This input, scaled 0 to 10 volts, is directly proportional to the selected full-scale current.

The constant power mode is used to test batteries designed for UPS backup systems. This mode emulates the changing current demand as the battery voltage decays. These are the characteristics of both DC to DC converters and inverter input simulations.

Fuel Cell Testing

In the constant current or constant voltage mode, the Dynaload is ideal for characterizing power output versus hydrogen flow rates. The pulse mode may be used to determine the effects of instantaneous current change; thus, assisting in establishing stability under real world applications.

With it's high speed response characteristics, the Dynaload may be used to determine the output impedance of the fuel cell. The two established methods include the current dump method and the sine wave method. The current dump method requires the load to transition from a peak current to zero current in less than 10 microseconds. Then the internal impedance is derived from the rate of voltage rise of the fuel cell. Care should be taken when performing this test, because of transient fly-back voltages created by the inductance of the load cables. The sine wave method requires a sine wave current and the measurement of the phase angle between the current and voltage waveforms. This is a little less dramatic than the current dump method and the results are the same.

Similar to the testing of batteries, the Dynaload may be used for fuel cell life cycle testing.

Other Applications

Virtually any DC source can be characterized using a Dynaload. These include solar cells, generators, and alternators. Each can be characterized based on its input source, such as light conductance or RPM.
Dynaloads can also be used as current regulators when connected in series with a bulk power source. In this configuration the Dynaload may be used to regulate the currents in plating operations, circuit breakers, fuses or battery charging. They may also be used to control the current for shunt manufacturing and calibration.

Custom Load Applications

Custom load systems are available using standard or tailored products as building blocks. Dynaload's broad product range facilitates custom systems created from proven "off-the-shelf" technology. Our agile engineering team and world class production facility deliver custom products quickly without compromising quality.

The following are a few custom systems previously developed by Dynaload

- ARSR-4 Turn-Key Power System Test Station
- High Power, High Current, Battery Charge Discharge System
- Ultra-Low Voltage, High Current, Water Cooled Fuel Cell Load Bank
- High Power, High Current, Water Cooled Fuel Cell "Stack" Load
- High Speed, High Current, Load to Determine Fuel Cell Impedance
- High Voltage, 1000V, 3000W Load

Dynaload Applications

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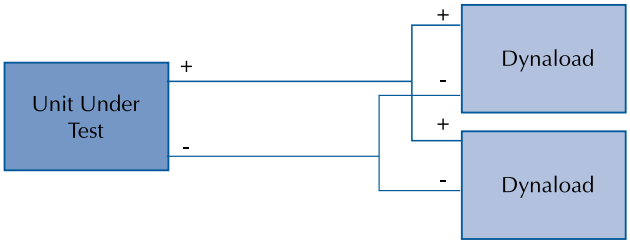
Typical Constant Current, Resistance, Voltage, Power Loading

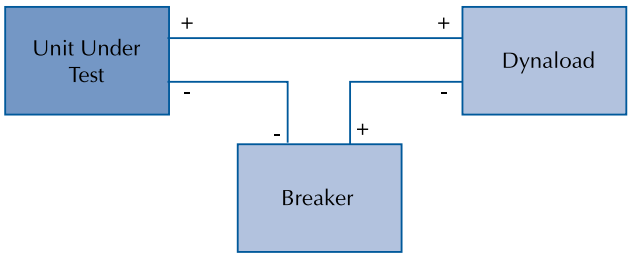
Parallel Operation



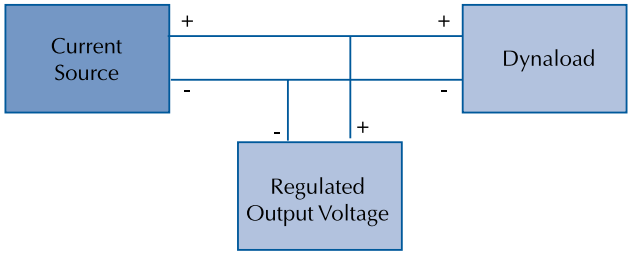
AC Load (with a rectifier)

Battery Simultation

Pulse Current Testing Of Circuit Breaker

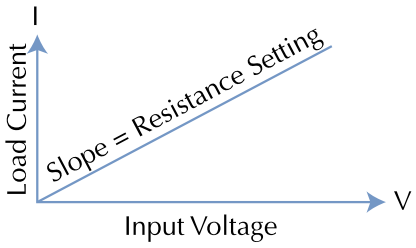


Shunt Voltage Regulation

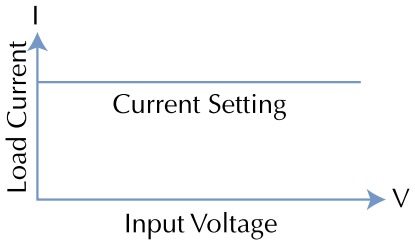


Standard Load Profiles

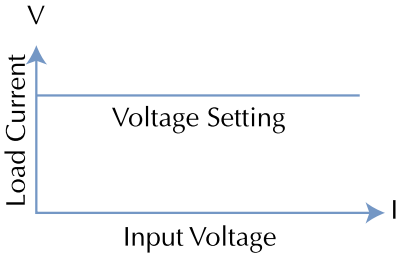
Constant Resistance Mode



Constant Current Mode



Constant Voltage Mode



Constant Power Mode