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Application Engineer



*The Sencore PSL60 is an electronically adjustable load that accurately substitutes for the circuit load of a power supply and dynamically analyzes the DC power supply's output.*



# Dynamically

## Load Test DC Power Supplies!

You can now dynamically and accurately load test DC power supplies to pinpoint defects and reduce your troubleshooting time!

All electronic systems that are AC line powered use a regulated DC power supply to provide DC voltages to its circuitry. The circuitry draws current from the power supply and is said to "load" the supply. The product of the output voltage and current to the circuitry is the power usage or load displayed in watts on the power supply output.

When a defect occurs in an electronic system, the output voltage from the power supply is often altered from normal. Techs face the challenge of determining whether the power supply is defective or if the load circuitry has adversely affected the power supply's operation and output voltage. This is especially true in the increasing number of electronic systems that employ switching mode power supplies.

Symptoms may be isolated to the power supply or load circuitry by opening the current path to the load circuitry and connecting a substitute load. A substitute load offers a resistance that draws about the same current as the normal

operating load circuitry. Normal power supply operation with a substitute load confirms a circuit defect, while abnormal operation confirms a power supply defect.

Attempts to use power resistors and light bulbs as substitute power supply loads are complicated by the wide range of power supply output voltages and power capabilities. Errors in choosing the proper resistor or light bulb values frequently cause inaccurate and misleading test results or may damage the power supply. These difficulties confuse and mislead technicians prolonging the troubleshooting process. Also, the high heat produced by a light bulb or load resistor poses a safety hazard.

### Introducing the PSL60 - An Electronically Adjustable DC Load

The Sencore PSL60 is an electronically adjustable load that accurately substitutes for the circuit load of a power supply and dynamically analyzes the DC power supply's output. The PSL60 provides an electronically variable load resistor using power transistors and resistors. The equivalent resistance of the load is controlled electronically from approximately .5 ohms to over 20,000 ohms and can dissipate up to 60 watts.

Electronic control circuitry adjusts the resistance of the electronic load by setting the level of current flowing in the



PSL60 DC  
Power Supply  
Load

load. Setting the load current rather than resistance provides an easier reference when working with a wide range of voltages and power settings.

that best matches the power supply's output voltage and power capability. Open the circuit load and connect the test leads from the PSL60 to the power supply's output.

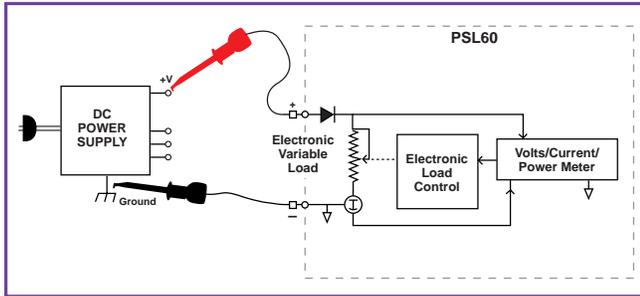


Fig. 1 Block diagram of the PSL60's DC electronic load.

Apply power to the DC power supply and increase the PSL60's substitute load current by increasing the Current Set Control.

## Universal substitute load pinpoints symptoms to the power supply or load circuits.

A wide variety of DC power supplies exist in electronic systems for computer, industrial, commercial and consumer applications. The output voltages and power capabilities of these power supplies vary. Common output voltages include 5, 12, 15, 24, 28 and 48 volts. Output voltages in consumer DC power supplies include outputs near 80 volts and upwards of 180 or 190 volts. You would need over 100 different resistors or light bulb values and power ratings to properly duplicate all these circuit loads. Even more values would be required for testing of AC power adapters and batteries.

If the power supply's output voltage indicated by the PSL60 is normal, you know that the power supply is working and capable of outputting the current and power required to operate the load circuitry. If the voltage remains higher or lower than normal or the power supply cannot deliver the needed output power, then the power supply has a defect that must be repaired.

The PSL60 can be used as a substitute load on DC power supplies with both positive and negative output voltages. Simply reverse the test lead connections to the power supply to agree with the output voltage polarity. A blocking diode protects the PSL60 against improper polarity connections.

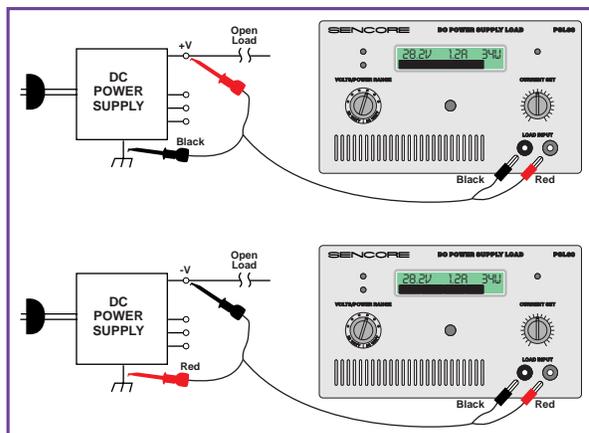


Fig. 2. Substitute for the circuit load of any positive or negative DC power supply output ranging from 4 to 200 volts.

The Sencore PSL60 DC Power Supply Load provides a substitute circuit load for any DC power supply output ranging from 4 to 200 volts. Simply select the Volts/Power Range on the PSL60

## 5 Load Ranges to analyze the power output capability of any DC power supply from 4 to 200 volts.

The PSL60's electronic load can be optimized to the output voltage and power capability to test a wide range of DC power supplies. The Volts/Power Range switch serves as an on/off control and range selector. The PSL60 offers a 20 watt power range for voltages ranging from 4 to 60 volts and a 60 watt power range for voltages ranging from 4 to 200 volts. The power ranges are further divided into 3 voltage ranges. These ranges enable the PSL60 to offer a large number of load current settings (load resistance values) for all types of DC power supplies. It further guards against potential damage to the DC power supply and PSL60 if a testing error occurs.

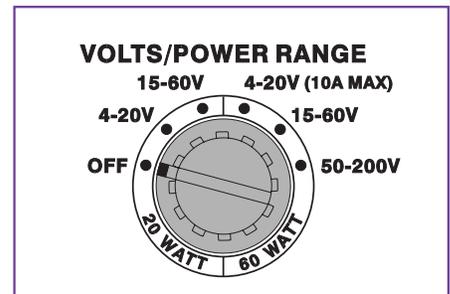


Fig. 3 Power and voltage ranges optimize the electronic load while protecting the DC power supply and PSL60.

## Variable load current simulates all possible power demands or loads from 1 to 60 watts to duplicate symptoms, test current limiting.

Electronic control of the current flow in the PSL60's load effectively changes the resistance of the load. Over 200 current settings (load

resistance values) are available in each of the 5 Volts/Power Ranges providing an equivalent of over 1000 different load values. With the PSL60 you can slowly increase load currents and test the power supply through its full range of output current or power. Dynamically changing load currents from minimum to the power supply's maximum output lets you analyze voltage regulation, current limiting and other power supply performance parameters.

Volts/Power Range	Current Range
20W, 4-20V	.01-5A
20W, 15-60V	.01- 1.3A
40W, 4-20V	.1-10A
40W, 15-60V	.01-3.4 A
40W, 50-200V	.01-1A

Chart 1. The ranges of PSL60 load current settings.

## See the power supply output voltage, substitute load current and power at a glance with simultaneous display readouts.

The digital display panel of the PSL60 indicates the power supply voltage, current and power to the electronic load. The voltage readout shows precisely how the DC power supply's output voltage changes as the load is applied or increased. The current readout centered in the PSL60's display panel indicates the current in the PSL60's load and permits presetting of the load current. A power meter calculates the power dissipation (volts X current) of the PSL60's electronic load.

The bottom portion of the digital display is both a bar graph watt meter and message center. When the PSL60's electronic load is

active, the bottom portion of the display provides a bar graph indication of the power (watts) in the electronic load. The bar graph permits easy interpretation of increasing or decreasing power levels. When the load is not active or opened by the PSL60, the display shows helpful messages.

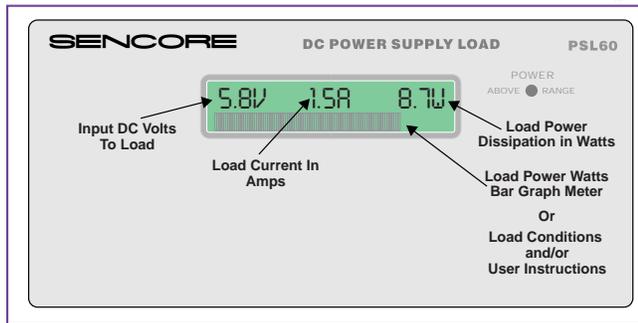


Fig. 4 The digital display shows the power supply's output DC voltage, load current and power along with user messages.

## Above and below range protection reduces the chance of testing errors and damage.

The PSL60 automatically opens and closes the current path in its internal electronic load. This protects the electronic load and the DC power supply being tested.

The maximum power (volts X current) in the electronic load is limited to 20 or 60 watts. Current settings of 20 or 60 watts fill the bar graph power meter in the bottom half of the display. Further increases in the Current Set control do not increase load current and are accompanied by a ">20W" or ">60W" display readout, an illuminated Power Above Range Light and a "LOWER CURRENT SET" message.

A second feature of PSL60 that further protects the

DC power supply being tested is a below or above voltage interrupt. A DC power supply that is overloaded or cannot output normal current or power greatly decreases its output voltage stressing components. The voltage ranges and voltage below range detection of the PSL60 combine to lessen the chance of damaging a DC power supply in these overloaded conditions. If the DC power supply's output voltage drops below the volts range of the Volts/Power Range Switch,

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the electronic load is switched open. Likewise, a voltage exceeding the range of the Volts/Power Range Switch opens the electronic load.

## Discover the ease and versatility of the Sencore PSL60

The Sencore PSL60 permits easy diagnosis of power supply

regulation, current limiting, over voltage shutdown and other power supply stage defects. It takes the guesswork and mistakes out of selecting resistors and light bulbs as substitute loads. It permits you to load test without the safety hazard of overheating resistors and light bulbs.

The PSL60 can be used on all types of DC power supplies, converters,

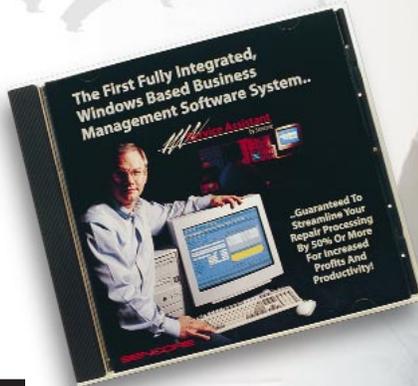
AC adapters, battery packs and most other DC voltage sources. Discover the ease, versatility and affordability of load testing DC power supplies with the Sencore PSL60.

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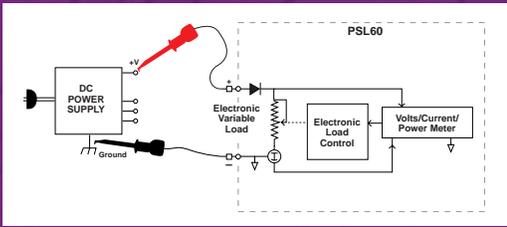
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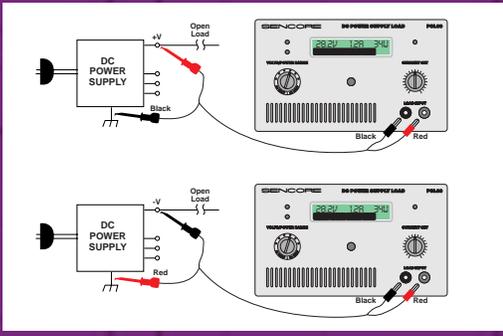
## NEW PRODUCT

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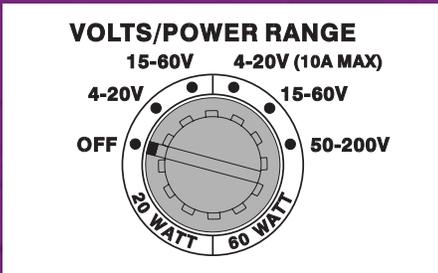
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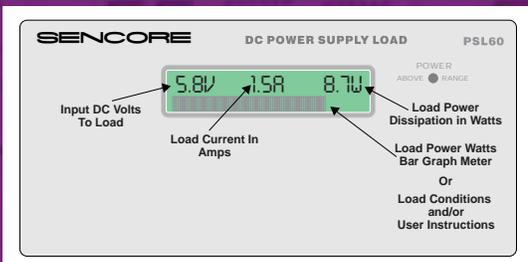
## Electronically Adjustable DC Load



## Universal Substitute Load



## 5 Load Ranges



## Simultaneous Display Readouts



# PSL60

## universal power supply load

- Determine if the system's defects are in the power supply or the load circuitry
- Simulates different power demands or "loading" on the power supply output to duplicate symptoms and identify power supply problems
- Analyzes the power output capability of any power supply that outputs 4 to 200 volts
- Analyzes the current limiting circuits of a switching power supply to identify limiting defects

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