

SPS6000X Series Wide Range Programmable Switching DC Power Supply



Data Sheet

EN01B



CALTRON PTE LTD

SIGLENT TECHNOLOGIES CO.,LTD

SPS6225X SPS6150X

Product Overview

The SPS6000X Series is a programmable switching DC power supply with a wide range of single output and constant power features. This series includes two models, the SPS6225X and SPS6150X, which feature rated output voltages and currents of 200 V / 25 A and 100 V / 50 A, with a maximum output power of 1500 W. Users can connect up-to-five SPS6000X chassis of the same model in parallel to expand the output power to meet different application requirements.

The SPS6000X series has a high brightness 3.12 inch OLED display, a user-friendly interface that enables easy control and performance monitoring, and excellent performance indicators. The minimum resolution is 10 mV / 10 mA. The output voltage and current rise times are adjustable. It has two output modes: Constant voltage and constant current. It also supports list sequence programming mode to easily perform voltage or current step profiles. Safety features include over-voltage, over-current, power limit, and over-temperature protection.

For remote control operation, the SPS6000X includes LAN / USB communication interfaces, an analog control interface, and a convenient web browser control. It can be widely used in a variety of demanding testing places, such as general laboratory testing, the LED lighting industry, automotive electronics, and other fields

Key Features

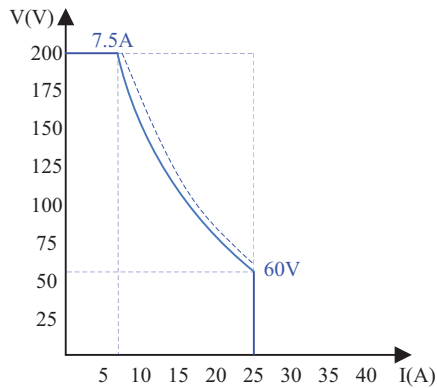
- Rated Voltage: 200 V / 100 V
- Rated Current: 25 A / 50 A
- Rated power: 1500 W
- Wide range of output voltage and current values in a high-efficiency power supply
- CV, CC priority mode selection, better protection of equipment under test
- Load transient recovery time (Load change from 50~100%) < 2.5 ms
- Adjustable voltage and current slew rates
- Setting and readback resolution: 10 mV, 10 mA
- User-enabled internal output discharge circuit to accelerate output voltage reduction
- Remote Sense function to decrease lead resistance error
- Local list function with up to 50 steps, USB import list sequence file
- External analog voltage control. Voltage and current monitoring outputs
- OVP, OCP, LPP, OTP protection
- 3.12-inch OLED high-brightness display with a wide viewing angle of 170 degrees
- Equipped with USB, LAN standard communication interface, optional USB-GPIB module
- 44 mm (1U) height, 19" width for convenient rack mounting
- Embedded Web Server offers remote control through a web browser without the need for drivers or additional software



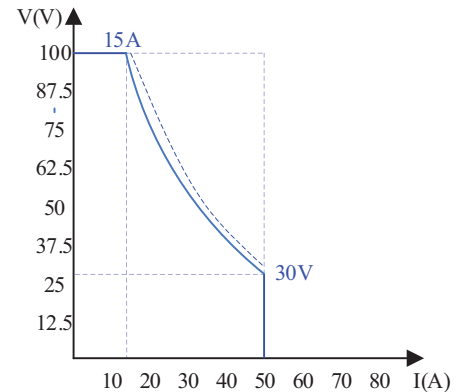
Design Features

Constant Output Power

In constant output power mode, the voltage and current range are switched automatically to maximize the voltage and current without sacrificing the supply's output power. This mode enables the supply to provide a higher output voltage at lower currents and a higher output current at lower voltages. Compared to the traditional rectangular output range of most supplies, the power supply provides a wider voltage and current output range, which greatly increases the utilization of the power supply.



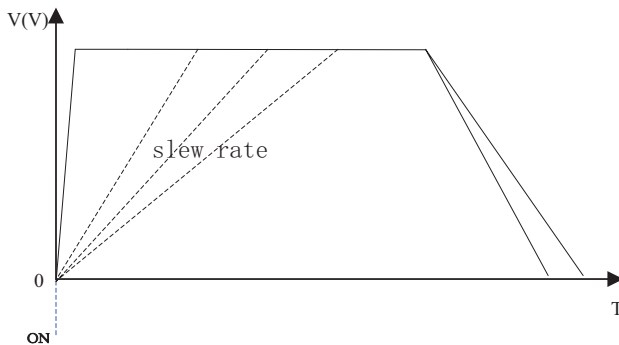
SPS6225X 1500W Output Operating Area



SPS6150X 1500W Output Operating Area

Adjustable Output Voltage, Current rising/falling Slew Rate

The power supply supports custom rise/fall slew rates of both voltage and current to verify the performance of the device under test as the voltage/current changes. This feature can effectively prevent the damage caused by inrush current to the DUT in applications such as the testing of capacitive current absorbing devices.



Output voltage, current up/down slew rate

CV/CC Priority Mode

When the power supply is set to CC priority mode, at the power output-on stage, it limits the inrush current spike and overshoot voltage when the power output is turned on.

In CV priority mode, the output voltage reaches the set voltage value quickly. In some applications, such as LED testing, when the power output is started, the surge current and overshoot voltage will appear when the voltage reaches the on-state voltage of the LEDs.



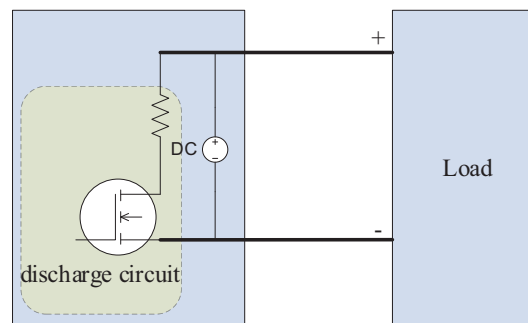
CV priority mode



CC priority mode

Built-in Discharge Circuit

The power supply is designed with a discharge circuit in parallel with the output terminal, which can be equivalent to a parallel resistance. When the power is turned off and the load is disconnected, the discharge circuit will discharge the power in the output filter capacitor. Without the discharge circuit, the output capacitance will remain charged, which may pose a dangerous voltage at the output terminals for some time.

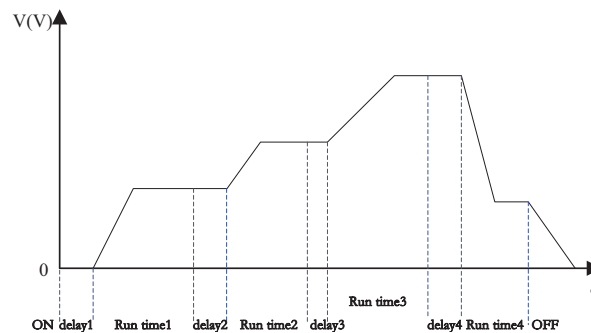


Discharge circuit

Intuitive List Operation Function

By editing the single-step setting value, duration, and slew rate, the List function can generate multiple complex sequences to meet complex test requirements. The user can edit the sequence by 50 steps natively or import the List sequence file via USB for multi-step running.

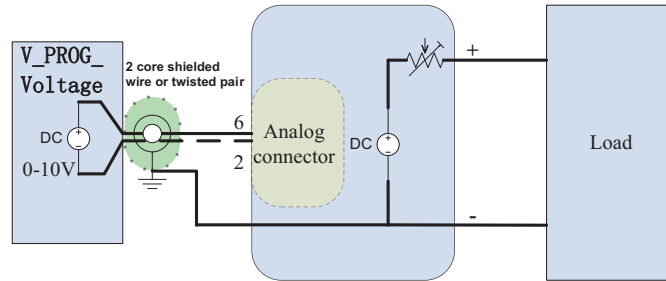
The minimum precision of the delay time is 1 ms. The minimum running time is 1 second.



List mode

External Analog Control

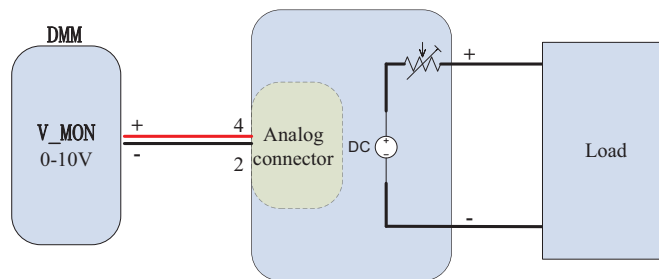
Two operating modes can be implemented using the analog port on the back of the unit; voltage-controlled voltage and voltage-controlled current. In external voltage control mode, when the terminal is connected with an adjustable voltage of 0-10 V, it can be used to adjust the output from 0 to full range (10 V corresponds to the voltage or current value of the full range of the power supply).



External voltage programming voltage output

Voltage, Current Monitor Output

The voltage and current output monitoring terminal output is a 0~10 V analog signal with the corresponding value representing the output current or voltage of the power supply from 0 to full range. The user can connect to a DMM, such as a SIGLENT SDM, or oscilloscope such as a SIGLENT SDS, to display the output current or voltage changes.

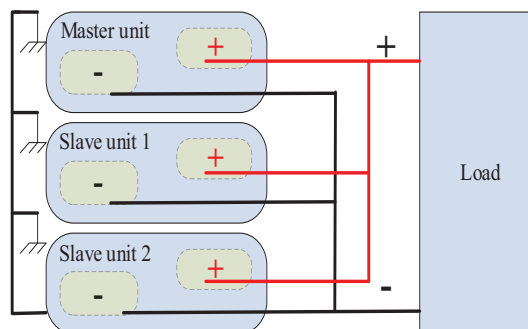


External DMM Monitoring of the Output Voltage

Parallel Function

Multiple single-channel SPS6000X series modules can be connected in parallel (5 units max), to increase the total output power. The SPS6000X series offers a highly flexible configuration concept to provide high power density that meets the needs of many applications.

(Typically, outputs of the supply float so the negative terminals are not connected to chassis ground. The negative terminals can also be connected to chassis ground.)



Parallel Connection

Multiple Policy Protection Patterns

The protection functions of the power supply include over-current protection (OCP), over-voltage protection (OVP), and over-temperature protection (OTP). If protection occurs, the power supply will turn off the output and enter protection mode. Protection can be released by pressing the Esc key for at least 2 seconds. Upon entering the Limited power protection (LPP), the system will start the power limitation mode, the maximum output power is about 102% of the rated power

Save/Recall Setting Parameters

The power supply allows users to save multiple types of files to memory for later recall. The power supply includes non-volatile internal memory and external memory via the USB host port with a user-provided USB memory device.

Rich Interface

The power supply includes USB and Ethernet communication interfaces an optional USB-GPIB converter module for GPIB communications. The embedded Web Server enables control and monitoring of the power supply directly from a web browser, eliminating the need to install software drivers or applications.

The screenshot displays the web server interface for the power supply. On the left is a navigation menu with 'Home', 'Configure', and 'About'. The main content area is divided into two sections: 'Main settings' and 'List settings'.

Main settings

| CH1 | State | Voltage(V) | Current(A) | Power(W) | List | Vset(V) | Iset(A) | Output |
|-----|-------|------------|------------|----------|--------------------------|---------|---------|----------------------|
| CH1 | CC | 0.014 | 0.006 | 0.000 | <input type="checkbox"/> | 0.5 | 0 | <input type="text"/> |

List settings

And/Or: Cycles:

| Step | Vset(V) | Iset(A) | Delay Time(s) | Running Time(s) | Slope_rise(V/s) | Slope_fall(V/s) | Slope Switch | Operation |
|------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------|-----------|
| 1 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 2 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 3 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 4 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 5 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 6 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 7 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |
| 8 | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Fast | Delete |

Web Server Interface

Specifications

Unless otherwise noted, all specifications are guaranteed within the temperature range of 25°C ± 5 °C with a warm-up time of 30 minutes.

| Model | SPS6225X | SPS6150X |
|--|---|---|
| Rated output voltage | 200 V | 100 V |
| Rated output current | 25 A | 50 A |
| Total rated output power | 1500 W | |
| Power Ratio | 3.33 | 3.33 |
| C.V Mode | | |
| Line Regulation | 40 mV (From 90 ~ 132 Vac or 170 ~ 265 Vac, constant load) | 5 mV (From 90 ~ 132 Vac or 170 ~ 265 Vac, constant load) |
| Load Regulation | 100 mV (From no load to full load, constant input voltage) | 50 mV (From no load to full load, constant input voltage) |
| Ripple and Noise ^(*1) | (Noise bandwidth 20 MHz; Ripple bandwidth 5 Hz ~1 MHz) | |
| RIPPLE (pk to pk)@220 Vac Input | 220 mV | 120 mV |
| RMS RIPPLE@220 Vac Input | 39 mV | 30 mV |
| Voltage programming Accuracy ^(*2) | 0.1% ± 10 mV | |
| Voltage programming resolution | 10 mV | |
| Voltage Readback Accuracy ^(*2) | 0.1% ± 20 mV | |
| Voltage Readback resolution | 10 mV | |
| Temperature coefficient | 100 ppm/°C from rated output voltage following 30-minute warm-up. | |
| Remote compensation voltage (single wire) | 0.6 V | |
| Rise Time | 10% ~ 90% of rated output voltage, rated resistance load | |
| Rated Load | 30 ms | |
| No Load | 30 ms | |
| Fall Time | 90% ~ 10% of rated output voltage, rated resistance load | |
| Rated Load | 15 ms | |
| output capacitance | 1100 uF | 1760 uF |
| Transient response time | 2.5 ms (Time for recovery to within 0.5% of its rated output after the transient from 10% to 90% of the rated output power) | |
| C.C Mode | | |
| Line Regulation | 40 mA (From 90 ~ 132Vac or 170 ~ 265Vac, constant load) | 30 mA (From 90 ~ 132Vac or 170 ~ 265Vac, constant load) |
| Load Regulation | 40 mA (From No load to Full load, constant input voltage) | 50 mA (From No load to Full load, constant input voltage) |
| r.m.s ^(*3) | 30 mA | 40 mA |
| Current Setting Accuracy | 0.2% ± 30 mA | |
| Current programming resolution | 10 mA | |
| Current Readback Accuracy | 0.2% ± 40 mA | |

| | | |
|---|---|------------------|
| Current Readback resolution | 10 mA | |
| Temperature coefficient | 200 ppm/°C from rated output current following 30-minute warm-up. | |
| Protection Function | | |
| OVP | | |
| Setting Range | 20 V ~ 220 V | 10 V ~ 110 V |
| Setting Accuracy | ± (2% of rated output voltage) | |
| OCP | | |
| Setting Range | 2.5 A ~ 25 A | 5.0 A ~ 55 A |
| Setting Accuracy | ± (2% of rated output current) | |
| OTP | Over temperature alarm and shut off output. | |
| Low AC Input Protection | Shut off output. | |
| LPP | The over power limit is approximately 102% of the rated output power. | |
| Rising/Falling Voltage Slew Rate: Only applicable if V-I Mode is set to CV Slew Rate Priority | | |
| | 0.001 ~ 4 V/ms | 0.001 ~ 2 V/ms |
| Rising/Falling Current Slew Rate: Only applicable if V-I Mode is set to CC Slew Rate Priority. | | |
| | 0.001~0.5 A/ms | 0.001 ~ 1.0 A/ms |
| Efficiency@220 Vac Input | | |
| Full power and full current output | >86% | >86% |
| Full power and full voltage output | >90% | >90% |
| Parallel capability | | |
| parallel | 5 Units | |
| Series capability^{(*)4} | | |
| series | The output voltage should not exceed 400 V when series connect the same rated current products | |
| Analog programming and monitoring | | |
| External Voltage Control of the Voltage Output | Accuracy: +0.5% of rated output voltage | |
| External Voltage Control of the Current Output | Accuracy: +1% of rated output current | |
| Output Voltage/ Current monitor accuracy | ±1% | |
| Shutdown control | Close output with LOW (0 V~0.5 V) or short circuit | |
| Output On/Off control | Use LOW (0 V~0.5 V) or hang to turn off the output Use HIGH (4.5 V~5 V) to turn on the output. | |
| CV/CC/ERR/ ON/OFF Status | Photo coupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA. | |
| Input Characteristics | | |
| Normal Rated Input | 100 Vac ~ 240 Vac, 50 Hz ~ 60 Hz, Single-phase | |
| Input Voltage Range | 90 Vac ~ 265 Vac | |
| Input Frequency Range | 47 Hz ~ 63 Hz | |

| | | |
|----------------------------------|---|-------|
| Input fuse (built-in) | T30 (6 X 32 mm) | |
| Maximum Input Current | | |
| 90Vac | ≈23.1 A | |
| Surge Current | < 30 A | |
| Maximum Input Power | 2100 VA | |
| Power factor | | |
| 90 Vac | 0.99 | |
| 220 Vac | 0.98 | |
| Communications Interfaces | | |
| USB | Type A: HOST, Type B: DEVICE, SPEED: 1.1/2.0 | |
| LAN | MAC address, Gateway IP address, Instrument IP address, Subnet Mask | |
| GPIB | Optional: USB-GPIB adapter | |
| Environment Conditions | | |
| Operating Temperature | 0°C ~ 50°C | |
| Storage temperature | -25°C ~ 70°C | |
| Operating humidity | 20% ~ 85% RH; No condensation | |
| Storage humidity | 90% RH or less; No condensation | |
| Altitude | ≤ 2000 m | |
| General specifications | | |
| Weight (host only) | 10 kg | 10 kg |
| Dimensions (WxHxD) | 483 mm x 44 mm x 468 mm | |
| Cooling | Internal fan-forced air cooling | |
| Safety standard | EN60950, EN61326, EN55022 Grade B/Class B | |
| Withstand Voltage | Input to Base: 2500 VAC for 1 minute without abnormality | |
| | Input to Output: 2500 VAC for 1 minute without abnormality | |
| | Output to Base: 400 VDC for 1 minute without abnormality | |
| Insulation Resistance | Input to Base: 500 VDC, ≥100 mΩ | |
| | Input and Output: 500 VDC, ≥ 100 mΩ | |
| | Output to Base: 500 VDC, ≥100 mΩ | |

*1: Use a probe to measure the positive and negative poles of the sense terminal, the bandwidth limit is 20 MHz.

*2: %output+offset, when the output voltage is less than 5 V, the offset is 200 mV.

*3: The bandwidth limit measured by the current probe is 1 MHz.

*4: The connection of multiple machines is subject to the connection restrictions between machines in the user's manual.

Ordering Information

| Product Model | Description |
|---------------|--|
| SPS6225X | 200V/25A 1500W Single channel programmable DC switching power supply |
| SPS6150X | 100V/50A 1500W Single channel programmable DC switching power supply |

| Standard Configurations | Quantity |
|-------------------------|----------|
| USB Cable | 1 |
| Quick Start | 1 |
| Calibration Certificate | 1 |
| Power Cord | 1 |
| Output guard | 1 |



About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

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