

SPS6000X Series Wide Range Programmable Switching DC Power Supply



Data Sheet

EN01B



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

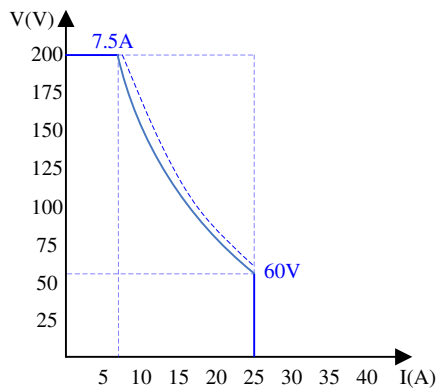
- Rated Voltage: 200 V / 100 V
- Rated Current: 25 A / 50 A
- Rated power: 1500 W
- Wide range of output voltage and current values in a high-efficiency power supply
- CV, CC priority mode selection, better protection of equipment under test
- Load transient recovery time (Load change from 50~100%) < 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



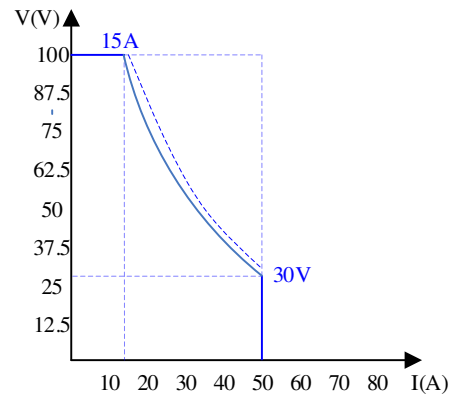
Design Features

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.



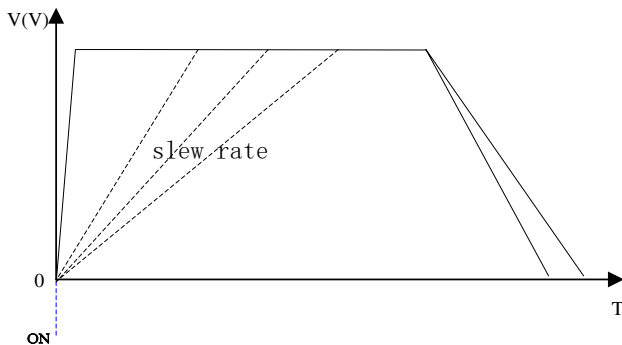
SPS6225X 1500W Output Operating Area



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.



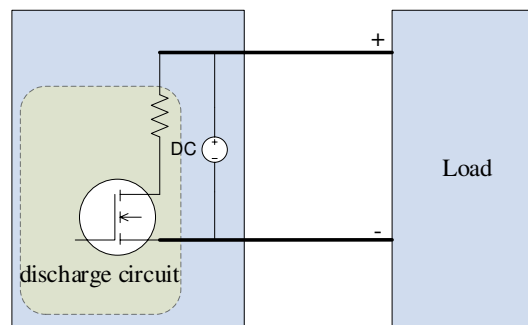
CV priority mode



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.

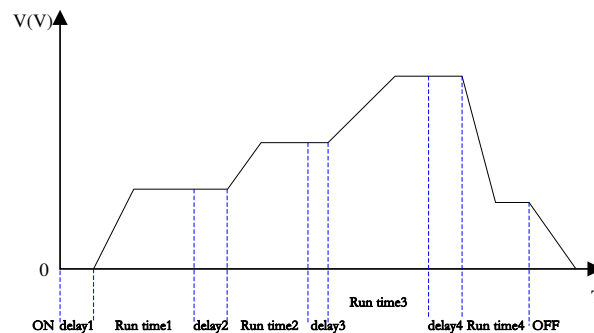


Discharge circuit

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.

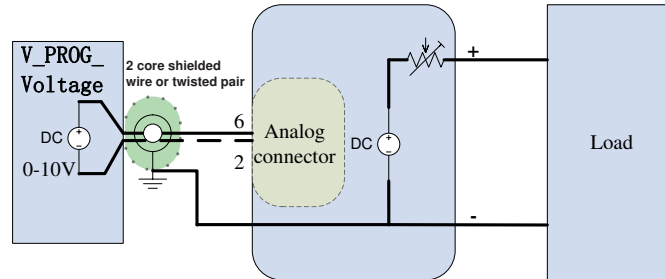
The minimum precision of the delay time is 1 ms. The minimum running time is 1 second.



List mode

External Analog Control

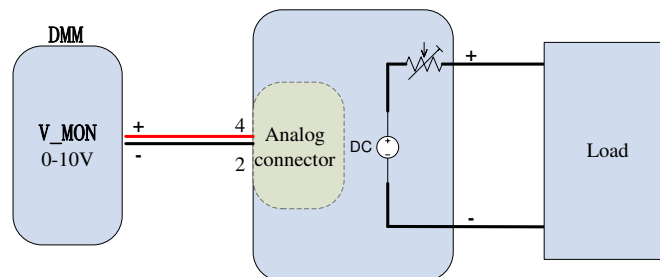
Two operating modes can be implemented using the analog port on the back of the unit; voltage-controlled voltage and voltage-controlled current. In external voltage control mode, when the terminal is connected with an adjustable voltage of 0-10 V, it can be used to adjust the output from 0 to full range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

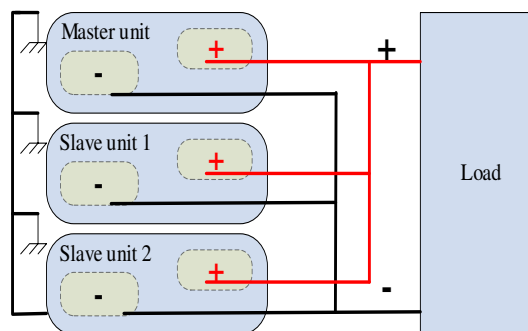


External DMM Monitoring of the Output Voltage

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. It features a navigation menu on the left with 'Home', 'Configure', and 'About' options. The main content area is divided into two sections: 'Main settings' and 'List settings'.

Main settings: A table showing the current status of the power supply.

State	Voltage(V)	Current(A)	Power(W)	List	Vset(V)	Iset(A)	Output
CC	0.014	0.000	0.000	<input type="checkbox"/>	0.0	0.0	0.0000

List settings: A table for configuring protection patterns.

Step	Vset(V)	Iset(A)	Delay Time(s)	Recovery Time(s)	Repeat mode(N)	Repeat delay(s)	Repeat Ratio	Operation
1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
7	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete
8	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	Test ↓ Delete

Web Server Interface

Specifications

Unless otherwise noted, all specifications are guaranteed within the temperature range of $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 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% \pm 10 mV	
Voltage programming resolution	10 mV	
Voltage Readback Accuracy ^(*2)	0.1% \pm 20 mV	
Voltage Readback resolution	10 mV	
Temperature coefficient	100 ppm/ $^{\circ}\text{C}$ 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 μF	1760 μF
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% \pm 30 mA	
Current programming resolution	10 mA	
Current Readback Accuracy	0.2% \pm 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

Warranty

Three-year warranty, excluding accessories.



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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