

SPS6000X Series

Wide Range Programmable Switching DC Power Supply

User Manual

EN01B



SIGLENT TECHNOLOGIES CO.,LTD

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1 Introduction

This user manual includes important safety and installation information related to the SPS6000X series wide-range programmable switching DC power supply and includes simple tutorials for the basic operation of the supply.

2 Important Safety Information

This manual contains information and warnings that must be followed by the user for safe operation and to keep the product in a safe condition. In addition to the safety precautions indicated in this section, you must follow accepted safety procedures.

2.1 General Safety Summary

Carefully read the following safety precautions to avoid personal injury and prevent damage to the instrument and any products connected to it. To avoid potential hazards, please use the instrument as specified.

To avoid fire or personal injury, use the proper power cord.

Only use the state/locally approved power cord with the instrument. When sold to North America and other countries, it will be equipped with a power cord that meets local requirements.



	Warning: Do not use removable power cords with insufficient ratings.
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Ground the instrument.

The instrument grounds through the protective terra conductor of the power line. To avoid electric shock, the ground conductor must be connected to the earth. Make sure the instrument is grounded correctly before connecting its input or output terminals.

Review all terminal ratings before use.

To avoid fire or electrical shock, please look over all ratings and instructions for the instrument. Before connecting the instrument, please read the manual carefully to gain more information about the ratings and important use instructions for safe operation.

Do not operate with suspected failures.

If you suspect that there is damage to the instrument, halt use and contact your local **SIGLENT** dealer immediately.

Do not operate in wet/damp conditions.

Do not operate in an explosive atmosphere.

Keep the surface of the instrument clean and dry.

Anyone operating this equipment should refer to the instruction manual to understand the protection afforded by the equipment. Please use the instrument per regulations.

2.2 Safety Terms and Symbols

When the following symbols or terms appear on the front or rear panel of the instrument or in this manual, they indicate special care in terms of safety.

	This symbol is used where caution is required. Refer to the accompanying information or documents to protect against personal injury or damage to the instrument.
	This symbol warns of a potential risk of shock hazard.
	This symbol is used to denote an Earth ground connection.
	This symbol is used to denote a safety ground connection.
	This symbol shows that do not put electronic equipment as unsorted municipal waste management. Please separate collection or contact equipment suppliers.
	This symbol is used to represent an alternating current, or "AC".
CAUTION	The "CAUTION" symbol indicates a potential hazard. It calls attention to a procedure, practice, or condition which may be dangerous if not followed. Do not proceed until its conditions are fully understood and met.
WARNING	The "WARNING" symbol indicates a potential hazard. It calls attention to a procedure, practice, or condition that, if not followed, could cause bodily injury or death. If a WARNING is indicated, do not proceed until the safety conditions are fully understood and met.

2.3 Working Environment

Environment

This instrument is intended for indoor use and should be operated in a clean, dry environment.

Ambient temperature

Operating: 0 °C to +50 °C

Non-operation: -20 °C to +60 °C

Note:

Direct sunlight, radiators, and other nearby heat sources should be taken into account when assessing the ambient temperature.

Relative Humidity

Operating: 20% to 85% RH, 40 °C, 24 hours

Non-operating: 20% to 85% RH, 65 °C, 24 hours

Altitude

Operating: ≤ 2,000 m

Overvoltage category

This product is intended to be powered by MAINS that comply with Overvoltage Category II, which is typical of cord-and-plug connected equipment.

Note:

Measurement Category II. For measurements performed on circuits directly connected to the low-voltage installation.

Measurement Category III. For measurements performed in the building installation.

Measurement Category IV. For measurements performed at the source of low-voltage installation.

eOnly mains power supply circuits have an overvoltage category rating.

Degree of pollution

The power supply may be operated in environments of Pollution Degree II.

Note:

Degree of Pollution II refers to a working environment that is dry and non-conductive pollution occurs.

Occasional temporary conductivity caused by condensation is expected.

	Do not dispose of electronic equipment in unsorted municipal waste. To reduce the impact on the environment, please separate collection processing or contact equipment suppliers.
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IP rating

IP20 (as defined in IEC 60529).

2.4 Cooling requirements

This instrument relies on forced air cooling with internal fans and ventilation openings. Care must be taken to avoid restricting the airflow around the apertures (fan holes) at the back of the power supply. Please keep good ventilation when using, and regularly check the vents and fans.



CAUTION: Do not block the ventilation holes



CAUTION: Do not allow any foreign matter to enter the power supply through the ventilation holes, etc.

2.5 AC Power and ground connections

The instrument operates with a single-phase, 100 to 240 Vrms (+/-10%) AC power at 50/60 Hz (+/-5%)

To avoid electrical shock, always use a grounded power plug.

No manual voltage selection is required because the instrument automatically adapts to line voltages with the following specifications:

Voltage range: 100 to 240 Vrms (+/-10%) AC, Frequency range: 50/60 Hz (+/-5%)



CAUTION: When using the power supply in the United Kingdom, ensure the security of the power cord conforms to the following instructions

Wire colors must meet the following rules:

Black/Brown: Live wire

Green/Green-yellow: Earth wire

White/Blue: Neutral wire



The Black (American Standard) or Brown (European standard) wire should be connected to the lug labeled with the letter L.

The Green (American Standard) or Green-yellow (European standard) wire should be connected to the lug denoted by the earth symbol .

The White (American Standard) or Blue (European standard) wire should be connected to the neutral lug labeled with the letter N.

Finally, fix the metal cover on the casing with screws and tighten the black strain relief elements.

Wire connections must be made by a professional. If you have questions, please refer to the instructions or contact your local SIGLENT dealer.

2.6 Output Port connections

Make sure to turn off the power before connecting the cable to the output port, install the plastic protective shell and tighten the screws.



Warning: The power switch must be turned off before installing wiring at the power output terminal. The plastic protective shell must be installed before turning on the power supply.

Otherwise, there may be a risk of electric shock.

2.7 Cleaning

Clean only the exterior of the instrument, using a damp, soft cloth. Do not use chemicals or abrasive elements. Under no circumstances should you allow moisture to penetrate the instrument. To avoid electrical shock, unplug the power cord from the AC outlet before cleaning.



Warning: Electrical Shock Hazard!

No operator serviceable parts inside. Do not remove covers.

Refer servicing to qualified personnel

2.8 Abnormal conditions

Only operate the instrument for the purposes specified by the manufacturer.

Do not operate the power supply if there are any visible signs of damage or if it has been subjected to severe transport stresses.

If you suspect the power supply's protection has been impaired, disconnect the power cord, and

secure the instrument against any unintended operation.

Proper use of the instrument requires reading and understanding all of the instructions and labels.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



Warning: Any use of the power supply in a manner not specified by the manufacturer may impair the instrument's safety protection.

2.9 Documentation conventions

For the symbols appearing in the subsequent text, the convention with  represents the menu option on the front panel of the machine, the convention with  represents the menu option displayed by the machine, and the convention with  represents the selected item of the machine menu.

Informations essentielles sur la sécurité

Ce manuel contient des informations et des avertissements que les utilisateurs doivent suivre pour assurer la sécurité des opérations et maintenir les produits en sécurité.

Exigence de Sécurité

Lisez attentivement les précautions de sécurité ci - après afin d'éviter les dommages corporels et de prévenir les dommages aux instruments et aux produits associés. Pour éviter les risques potentiels, utilisez les instruments prescrits.

Éviter l'incendie ou les lésions corporelles.

Utilisez une ligne d'alimentation appropriée.

Seules les lignes d'alimentation en électricité réservées à l'usage exclusif d'instruments reconnus au niveau local peuvent être utilisées. Vendue en Amérique du Nord et dans d'autres pays, elle sera équipée de lignes électriques répondant aux exigences locales.



WARNING: N'utilisez pas de cordon d'alimentation amovible de faible puissance.

Posez vos instruments par terre.

L'appareil est mis à la Terre par des conducteurs téra protecteurs de lignes électriques. Pour éviter le contact électrique, le fil de masse doit être mis à la terre. Avant de connecter les bornes d'entrée ou de sortie, assurez - vous que l'instrument est correctement mis à la terre.

Connectez correctement la ligne de signal.

Le potentiel de la ligne de signaux est égal à la terre, de sorte que la ligne de signaux ne doit pas être connectée à une haute tension. Ne touchez pas les contacts ou les composants nus.

Affiche la valeur nominale de toutes les bornes.

Pour éviter les incendies ou les coupures d'électricité, consultez toutes les valeurs nominales et signez la description de l'instrument. Avant de connecter l'instrument, lisez attentivement le Manuel pour obtenir davantage d'informations sur la valeur nominale.

Ne pas travailler en cas de panne.

Si vous soupçonnez que l'appareil est endommagé, demandez au personnel d'entretien qualifié de l'examiner.

Ne pas fonctionner dans des conditions humides / humides.

Pas dans un environnement explosif.

Maintenez la surface de l'instrument propre et sec.

L'organisme ou l'opérateur responsable doit se référer au cahier des charges pour protéger la protection offerte par le matériel. Veuillez utiliser l'instrument prescrit.

Termes et symboles de sécurité

Lorsque les symboles ou termes suivants apparaissent sur le panneau avant ou arrière de l'instrument ou dans ce manuel, ils indiquent un soin particulier en termes de sécurité.

	Ce symbole est utilisé lorsque la prudence est requise. Reportez-vous aux informations ou documents joints afin de vous protéger contre les blessures ou les dommages à l'instrument.
	Ce symbole avertit d'un risque potentiel de choc électrique.
	Ce symbole est utilisé pour désigner la connexion de terre de mesure.
	Ce symbole est utilisé pour indiquer une connexion à la terre de sécurité.
	This symbol shows that do not put electronic equipment as unsorted municipal waste management. Please separate collection or contact equipment suppliers.
	Ce symbole est utilisé pour représenter un courant alternatif, ou "AC".
CAUTION	Le symbole "CAUTION" indique un danger potentiel. Il attire l'attention sur une procédure, une pratique ou une condition qui peut être dangereuse si elle n'est pas suivie. Ne continuez pas tant que ses conditions n'ont pas été entièrement comprises et remplies.
WARNING	Le symbole "WARNING" indique un danger potentiel. Il attire l'attention sur une procédure, une pratique ou une condition qui, si elle n'est pas suivie, pourrait entraîner des blessures corporelles ou la mort. Si un AVERTISSEMENT est indiqué, ne continuez pas tant que les conditions de sécurité ne sont pas entièrement comprises et remplies.

Environnement de travail

La conception de l'instrument a été certifiée conforme à la norme EN 61010-1, sur la base des valeurs limites suivantes:

Environnement

Cet instrument est utilisé à l'intérieur des locaux et doit être utilisé dans un environnement propre et sec.

Température ambiante

En fonctionnement: 0 °C à +50 °C

Hors fonctionnement: -20 °C à +60 °C

Note: pour évaluer la température de l'environnement, il convient de tenir compte des rayonnements solaires directs, des radiateurs thermiques et d'autres sources de chaleur.

Humidité

Fonctionnement: 20 à 85% HR, 40 °C, 24 heures

Hors fonctionnement: 20 à 85% HR, 65 °C, 24 heures

Altitude

Fonctionnement: ≤ 2000 m

Catégorie d'installation (surtension)

Ce produit est alimenté par une alimentation électrique conforme à l'installation (surtension) Catégorie II.

Installation (overvoltage) Category Definitions Définition de catégorie d'installation (surtension)

La catégorie II d'installation (surtension) est un niveau de signal applicable aux terminaux de mesure d'équipement reliés au circuit source. Dans ces bornes, des mesures préventives sont prises pour limiter la tension transitoire à un niveau inférieur correspondant.

La catégorie II d'installation (surtension) désigne le niveau local de distribution d'énergie d'un équipement conçu pour accéder à un circuit alternatif (alimentation alternative).

Degré de pollution

Alimentation électrique peut être utilisé dans un environnement Pollution Degree II.

Note: Pollution Degree II signifie que le milieu de travail est sec et qu'il y a une pollution non conductrice. Parfois, la condensation produit une conductivité temporaire.

IP Rating

IP20 (as defined in IEC 60529).

Exigences de refroidissement

L'appareil repose sur un ventilateur interne et un ventilateur de ventilation. Attention. Des mesures doivent être prises pour éviter de limiter le flux d'air autour de l'ouverture arrière de l'alimentation (orifice de ventilateur). Gardez une bonne ventilation lors de l'utilisation et vérifiez régulièrement les ventilateurs et les ventilateurs.



ATTENTION: Ne bloquez pas les orifices de ventilation de l'arrière de l'alimentation.



ATTENTION: Ne laissez aucun objet étranger entrer dans l'alimentation électrique, par exemple par le trou de ventilation.

Connexions d'alimentation et de terre

L'instrument fonctionne avec une alimentation CA monophasée de 100 à 240 Vrms (+/- 10%) à 50/60 Hz (+/- 5%)

Les bornes de mise à la terre de protection des prises d'alimentation en courant alternatif sont mises à la terre afin d'éviter les chocs électriques.

Il n'est pas nécessaire de sélectionner la tension manuellement, car l'instrument s'adapte automatiquement à la tension du circuit.

L'instrument s'adapte automatiquement aux entrées de lignes de communication dans les limites suivantes:

Plage de tension: 100 à 240 Vrms (+/- 10%) AC, plage de fréquence: 50/60 Hz (+/- 5%).



ATTENTION: Lorsque le Royaume-Uni utilise l'énergie électrique, la sécurité des lignes électriques est assurée conformément à la description ci-après.

La couleur du fil doit être conforme aux règles suivantes:

Noir / brun: conducteur vivant

Vert / vert-jaune: sol

Blanc / bleu: neutre



Les fils noirs (norme américaine) ou bruns (norme européenne) doivent être raccordés aux languettes marquées de la lettre L.

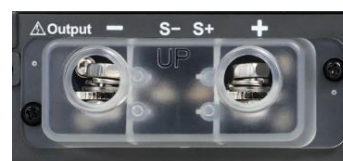
Le conducteur vert (norme américaine) ou vert - jaune (norme européenne) doit être relié au symbole de mise à la terre  .

Les fils blancs (norme américaine) ou bleus (norme européenne) doivent être raccordés aux languettes marquées de la lettre N.

Le câblage doit être effectué par un professionnel. Si vous avez des questions, consultez les instructions ou contactez votre revendeur siglent local.

Connexion du port de sortie

Assurez - vous d'éteindre l'alimentation avant de connecter le câble au port de sortie, d'installer un boîtier de protection en plastique et de serrer les vis.



	Avertissement: L'interrupteur d'alimentation doit être éteint avant que le câblage ne soit installé à la sortie d'alimentation. Un boîtier de protection en plastique doit être installé avant que l'alimentation ne soit allumée. Sinon, il peut y avoir un risque de choc électrique.
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Nettoyage

Nettoyez uniquement l'extérieur de l'instrument à l'aide d'un chiffon doux et humide. N'utilisez pas de produits chimiques ou d'éléments abrasifs. Ne laissez en aucun cas l'humidité pénétrer dans l'instrument. Pour éviter les chocs électriques, débranchez le cordon d'alimentation de la prise secteur avant de le nettoyer.

	Avertissement: risque de choc électrique! Aucune pièce réparable par l'opérateur à l'intérieur. Ne retirez pas les capots. Confiez l'entretien à un personnel qualifié
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Conditions anormales

Utilisez l'instrument uniquement aux fins spécifiées par le fabricant.

N'utilisez pas la lunette s'il y a des signes visibles de dommages ou si elle a été soumise à de fortes contraintes de transport.

Si vous doutez que la protection de l'alimentation électrique soit compromise, désactivez la ligne d'alimentation et fixez l'appareil afin d'éviter toute manipulation accidentelle.

Une bonne utilisation de l'instrument nécessite la lecture et la compréhension de toutes les instructions et étiquettes.

La protection offerte par le matériel peut être compromise si celui-ci est utilisé de manière non spécifiée par le fabricant.



Avertissement: L'utilisation de l'énergie de manière non prescrite par le fabricant peut compromettre la sécurité des instruments.

3 Delivery of The Power Supply

General Inspection

Note: Before your first use of the equipment, please check the condition using the steps below.

Inspection of transport packaging

If it is found that the packing box or foam plastic pad is seriously damaged, please save it for subsequent inspection. The carrier and shipper must be contacted for any damage caused during transport. **SIGLENT** is not responsible for any damage caused during shipment.

Check the equipment

If there is mechanical damage, missing parts, or the instrument fails to pass the electrical and mechanical tests, please contact the nearest **SIGLENT** office or distributor as soon as possible.

Check the accessories

Detailed information about included accessories is included at the end of this document. Please refer to this description to check whether the attachment is delivered completely. If there is any omission or damage, please contact the local **SIGLENT** customer service center or national distributors. If you fail to contact us in time in case of omission or damage, we will not be responsible for replacement.

3.1 About Warranty

The power supply has a 3-year warranty for normal use and operation from the date of delivery. **SIGLENT** may repair or choose to replace any product returned to the authorized service center during the warranty period. But to do so, we must first examine the product to determine that the defect is caused by the process or material, not by abuse, negligence, accident, abnormal conditions, or operation.

SIGLENT is not responsible for any situation caused by any defect, damage, or malfunction caused by the following:

- a) Maintenance or installation by personnel other than those authorized by **SIGLENT**
- b) Connection of incompatible equipment and improper connection
- c) Any damage or failure caused by the use of products not supplied by **SIGLENT** suppliers.

Also, **SIGLENT** will not be responsible for the maintenance of the modified or integrated power supply product if the product has been modified or integrated and these changes or integration increase the time or difficulty of power maintenance tasks.

All spare parts and replacement parts and maintenance are guaranteed for 90 days.

The power supply software has been fully tested and is considered to be functioning properly. However, the software is provided without any type of warranty covering detailed performance. Products not manufactured by **SIGLENT** are guaranteed by the OEM only.

3.2 Maintenance Agreement

We provide various services based on individual maintenance agreements. We offer extended warranties which can extend the warranty period beyond the standard period. We provide installation, training, enhancement and on-site maintenance, and other services through a dedicated supplemental support agreement. For details, please contact your nearest SIGLENT customer service center or national distributors.

4 Introduction of SPS6000X Series

The SIGLENT SPS6000X series is a programmable DC switching power supply with a wide range of single output and constant power features. It has a 200 V / 100 V rated output voltage value, 25 A / 50 A output current value, and 1500 W maximum output power level. Users can connect five SPS6000X supplies of the same model in parallel to expand the output power to meet different application requirements.

The SPS6000X series programmable DC switching power supply is equipped with a 3.12-inch high-brightness OLED display, a friendly user interface, and excellent performance. The minimum resolution is 10 mV / 10 mA. The output voltage and current rise time are adjustable. It has two output modes: Constant voltage and constant current. It also supports list sequence programming mode and includes over-voltage, over-current, a power limit, and over-temperature protection.

For remote control, the SPS6000X includes LAN / USB communication interface, analog output and an easy-to-use web interface. It is ideal for general laboratory testing, LED lighting industry, automotive electronics, and other fields.

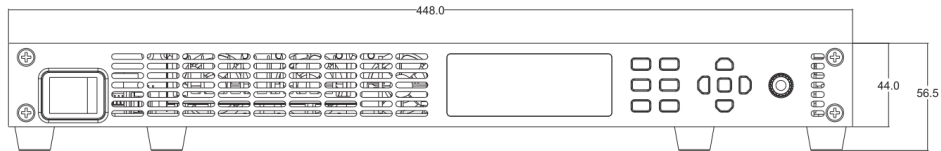
4.1 Performance and Features

-  Rated voltage: 200 V / 100 V
-  current: 25 A / 50 A
-  Rated output power: 1500 W
-  Constant power output, a wide range of voltage and current outputs, high efficiency switching power supply
-  CV, CC priority mode selection, better protection for the circuit / DUT
-  Fast output response time, < 2.5 ms
-  Voltage and current rise/fall rate adjustable
-  Set and read back resolution 10 mV, 10 mA
-  Built-in bleeder current control, the power in the output capacitor can be discharged below the circuit/DUT safe voltage after shutdown
-  Support remote voltage compensation Sense function
-  Support local list function 50 steps editing, USB import list sequence file
-  External analog voltage control, voltage, and current monitoring output
-  Overvoltage, over current, power limit, over-temperature protection, safe and reliable
-  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 height (1U) standard rack size profile
-  An Embedded web server provides remote computer control through a web browser without the need to install additional software on the host computer

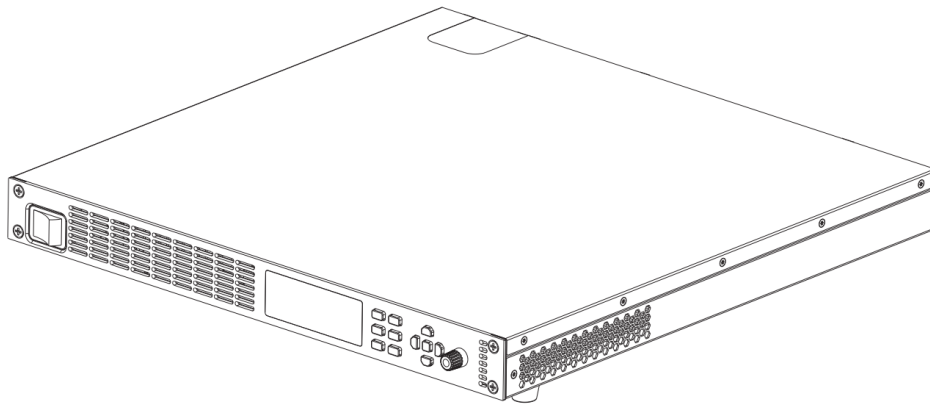
4.2 Size

This section describes the rack dimensions of the SPS6000X from the front and side, The numbers marked in the pictures are in millimeters

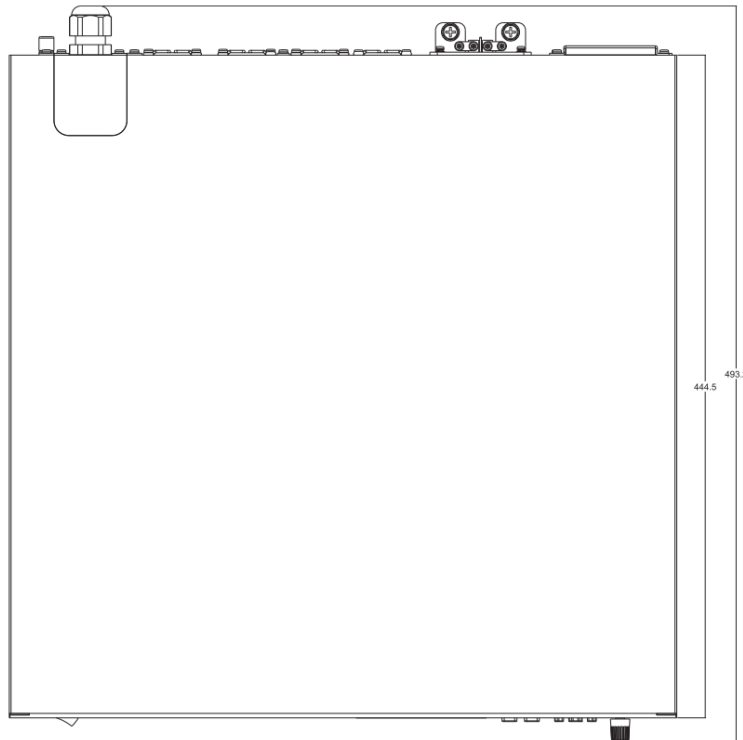
1) Front dimension drawing of the SPS6000X



2) Side dimension drawing of the SPS6000X



3) Top view of the SPS6000X

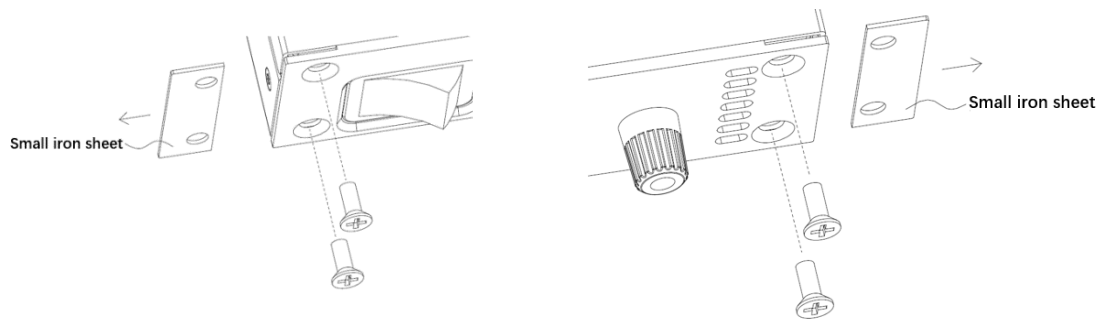


5 SPS6000X Series Overview

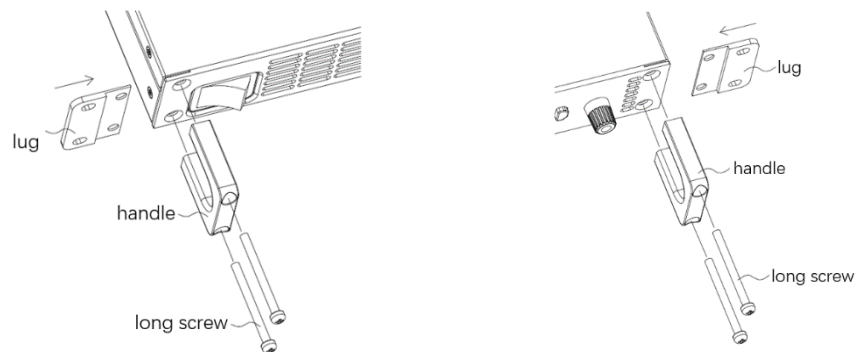
5.1 Rack mounting

The steps for installing the device on the rack are as follows:

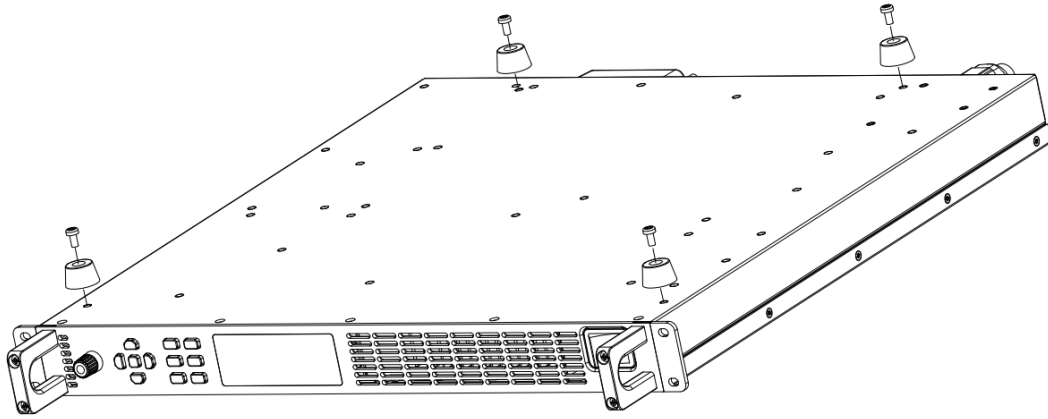
Step 1: Remove the countersunk screws fixing the small iron sheet on the left and right sides according to the figure, and move the small iron sheet outward in the direction of the arrow;



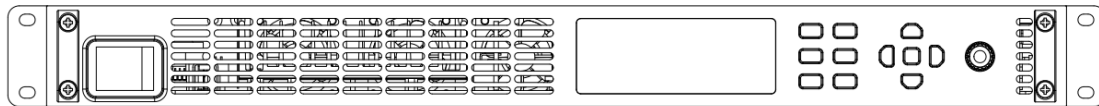
Step 2: In the figure, insert the lug in the direction of the arrow into the gap left by the small iron plate removed in the previous step as shown, and then use two M4 long screws to pass through the screw holes of the handle, align them with the screw holes of the front panel, and lock the screws. The screws fix the lugs together while fixing the handle.



Step 3: Remove the four screws fixing the foot pads at the bottom according to the figure to complete the removal of the four foot pads.



Step 4: Fix the device to the rack using screws through the screw holes on the left and right mounting ears



5.2 Appearance



A. Screen

All SPS supplies include a 3.12-inch OLED display for displaying system output status, system parameter settings, menu options, and promotion information.

B. Button



Used to view system information and configure power parameters.



(V/I) In the main interface, press this key to select and set the output voltage value or output current value.



Press **Menu** to enter the menu list, press this key to return to the previous menu.

When the power supply enters the protection state, long press the key to release the protection mode



Press this key to enter the List mode, you can set each group of output current, output voltage and running time, etc.

Press this key again to exit the List interface



Press this key to turn on the keyboard lock function. Long press to release the key lock.



Power output button used to turn the output on or off.



The left and right direction buttons are used to switch the digits of the value where the cursor is selected, and to move the cursor position or switch options.



The up and down direction buttons are used to select a menu item in the menu operation, and increase (decrease) the output voltage or current value

C. Direction knob

When setting parameters, turn the knob to increment or decrement the value at the cursor position.

When setting objects (voltage or current, operation mode, internal resistance configuration, etc.), rotate the knob to quickly move the cursor position or switch options, press the knob to set the current parameters, rotate the knob to increase or decrease the value at the cursor, and press again to make the current setting effective.

D. Power Switch

Used to turn the power on or off.

5.3 Rear Panel

Rear panels of SPS6000X series:



A. Output port (positive (+), negative (-))

Positive (+) and negative (-) output terminals are used to output current and voltage.

Sense terminals are used to detect the actual voltage at the load side.

B. Parallel interface

C. Analog connector port

Output for the monitor signals of voltage and current output. Also used for analog control of the current and voltage outputs.

D. LAN port

Supplies a connection between the power supply and a LAN. The SPS6000X conforms to the VXI-11 instrument standard and supports socket-based and remote commands, and remote control. It can quickly build a test system with other standard equipment and easily achieve system integration.

E. USB Device port

This interface can be connected to a PC for remote communication via USB using the USBTMC protocol. Provides remote computer control of the supply by sending commands through computer software.

F. USB Host port

Used to insert peripheral USB devices for file transfer and system upgrades.

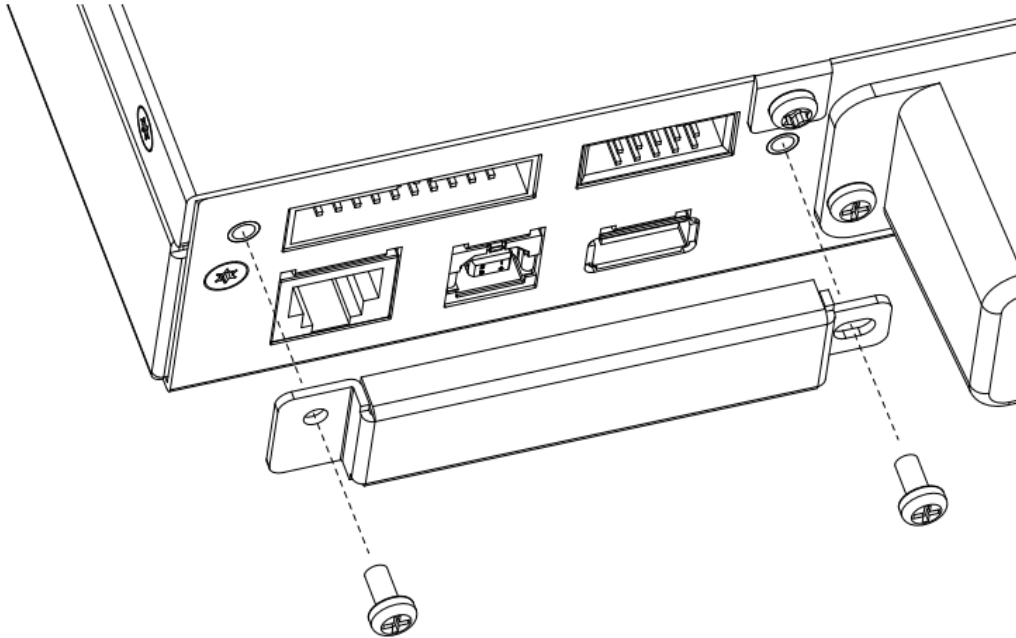
G. Fan port

The temperature-controlled fan effectively dissipates the heat of the power supply line.

H. AC power interface

The AC power supply supports 100 ~ 240 V, 47 Hz ~ 63 Hz. Please use the provided power cord to connect to MAINS. For different types of power interface connections, please refer to [7.1].

PS: B. Parallel interface and C. Analog control interface are protected by protective cover. As shown in the figure, the protective cover can be removed by removing the two screws fixing the protective cover; The ground installation of the protective cover is completed by securing the protective cover to the two holes shown on the bottom shell with two M3 screws



6 Theory of Operation

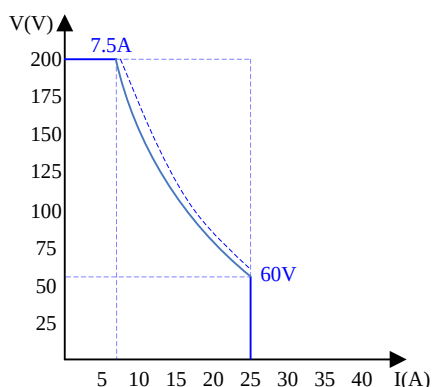
This chapter introduces the function and principles of operating the SPS6000X series power supply.

6.1 Operating Area Description

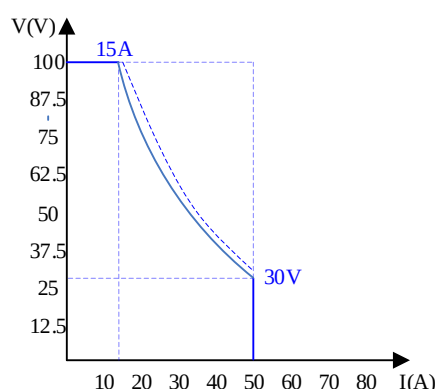
SPS6000X are DC switching power supplies with high voltage and current output. All models have continuous voltage (CV) and continuous current (CC) output control modes with working ranges limited only by the output power. The working area is determined by the rated output power and the rated voltage and current.

When the total output power of the power supply (voltage x current output) is less than the rated power output, the SPS operates as a typical constant voltage and constant current power supply.

When the total output power (voltage x current output) is greater than the rated power output, the effective output is limited to 102% of the rated power. When operating in this mode, the output voltage and current are related to the load value as shown below:



SPS6225X 1500W Output Operating Area



SPS6150X 1500W Output Operating Area

6.2 CC and CV Mode

When the power supply is operating in CV mode, the load receives a constant voltage and the current output changes with the load. When the load resistance is too low to maintain the constant voltage, the power supply switches to CC mode, and the current limit remains constant.

When the power supply is operating in constant current mode (CC), the load receives constant current. Even if the output voltage is changed, the current remains the same. If the load resistance increases to the current limit (Iset) or greater, the power supply switches to CV mode. This switching point is called the crossover point, and the local state is displayed as ALT.

The power supply operates in CV or CC mode, which is determined by the set voltage (V_{set}), set current (I_{set}), load resistance (R_L), and critical resistance (R_c , $R_c = V_{set}/I_{set}$). When $R_L > R_c$, the power supply runs in CV mode. At this time, $V_{out} = V_{set}$, $I_{out} < I_{set}$. If R_L decreases, when $I_{out} = I_{set}$, the power supply switches to CC mode.

When the load resistance is less than the critical resistance, the power supply operates in CC mode. In CC mode, the output current is equal to I_{set} and the output voltage is less than V_{set} .



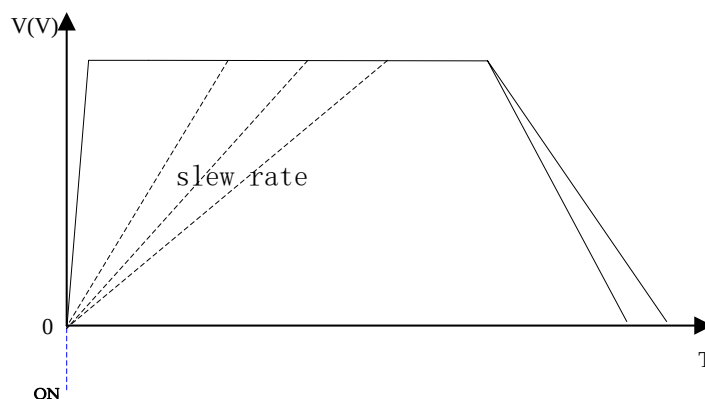
CV priority mode



CC priority mode

6.3 Slew Rate

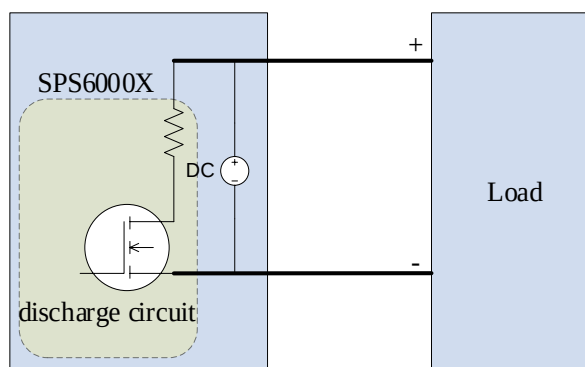
The slope of CV and CC mode can be set by the user to limit the voltage and current. The slope setting is divided into high-speed priority and slope priority. The high-speed priority mode does not allow setting the slope in CV or CC mode, while the rising and falling slopes can be set independently in the slope priority mode.



6.4 Bleed Circuit

The SPS power supplies feature a bleed resistor. When the power is turned off and the load is disconnected, the bleed resistor will consume the power in the output capacitor. Without a bleed resistor, the output capacitor will continue to be charged, causing potential danger.

The bleed resistance can also play a role in smoothing the voltage regulation rate.



Bleeder circuit



Note

The bleed resistor is turned on by default. In battery charging applications, make sure to turn off the bleed resistor when the instrument is turned off because the bleed resistor will discharge the connected battery. Alternately, connect diodes conforming to the specifications at the input end in series to prevent reverse current to protect the machine.

6.5 Alarms

The power supply has a protection function. When the protection alarm is set, the protection mechanism will be triggered and respond accordingly when the set conditions are reached.

OVP	The overvoltage protection (OVP) function prevents the load from being damaged by high voltage and triggers the output to be disconnected.
OCP	The overcurrent protection (OCP) function prevents the load from being damaged by a high current and automatically disconnects the output if the set value is exceeded.
OTP	The overtemperature protection function can prevent the instrument from overheating damage and automatically disconnect the output.
Alarm output	The alarm output is a separate open collector photocoupler output. When the protection settings (OCP, OVP, OTP) are exceeded, the power supply will automatically shut down and an alarm will be output via the analog control interface.

6.6 Considerations

The following conditions should be considered when using SPS power supplies:

6.6.1 Inrush current

The power supply generates an inrush current when it is turned on. Ensure that the AC input power supply is sufficient at the moment of starting, especially when multiple power supplies are turned on at the same time.



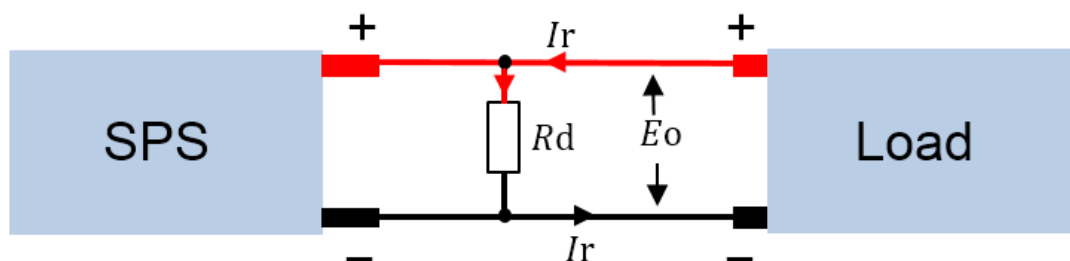
Note

In a short time, the switching power supply will generate an inrush current, reducing the service life of input fuses and power switches.

6.6.2 Pulsed or Peaked loads

The load is subject to current peaks or pulses, and the maximum current may exceed the average current value. The power supplies only display the average current value. For pulsed current loads, the actual current may be greater than the displayed value. At this time, the current limit must be increased or the large power supply must be turned off.

6.6.3 Reverse current regenerative load



When the power supplies are connected to regenerative loads (such as transformers and inverters), the reverse current will be fed back to the power supply and cannot be absorbed by the power supply. For such a load that can generate reverse current, a resistor must be connected in parallel with the power supply to avoid the inflow of reverse current. This method is only applicable when the bleed resistor is closed.

To calculate the resistance value (R_d) of the virtual resistor, first determine the maximum reverse current I_r and determine the output voltage E_o .

$$R_d (\Omega) \leq E_o / I_r$$

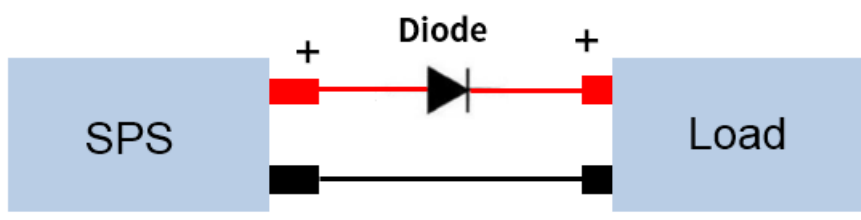
**Note**

As the output current is partially absorbed by the resistance, the actual current on load is decreased.

Ensure that the resistor used can withstand the power capacity of the power supply or load.

6.6.4 Reverse current connection method

When the power supplies are connected to a load such as a battery, reverse current may flow into the power supply. To prevent damage to the power supply, connect a reverse protection diode in series between the power supply and the load.

**Note**

Ensure that the reverse voltage of the protection diode can withstand 2 times the rated output voltage of the power supply and that it can withstand 3 ~ 10 times of the rated output current of the power supply in forward (conduction) current.

Ensure that the diode can withstand the subsequent heat generated by the maximum power that the supply can deliver.

When a diode is used to limit the reverse voltage, the remote measurement function should be turned off

6.6.5 Grounding

The output terminals of the power supplies are floating. They are independent of the protective ground terminal. When connected to a protective ground or floating low, the insulation capacity of the load, load line, and other connected equipment must be considered.

Floating

When the output terminal is floating, the load and all load wires must be insulated, and the insulation capacity should be greater than the maximum voltage of the power supply.

Grounded output terminal

If the positive/negative terminal is connected to the protective ground terminal, the insulation capacity required by the load and the load line will be greatly reduced. The insulation capacity only needs to be greater than the maximum output voltage of the power supply.

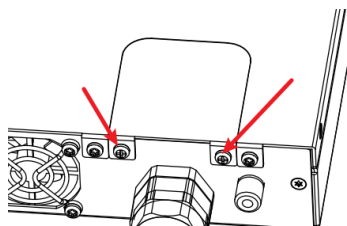
**Note**

If using external voltage control, please do not ground the external voltage terminal, otherwise, it will cause a short circuit.

7 Switch On / Off and Output Port

7.1 Connect the Power Cord

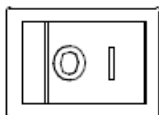
The following power cord connection method:



- 1) Remove the two screws, open the protective cover and follow the instructions below for wiring
- 2) Turn off the power switch;
- 3) Connect the AC input terminal to the AC power cord;
Black/Brown: The live/hot wire, connected to port L.
Green/Green-yellow: The ground wire is connected to the terminal with a grounding mark .
White/Blue: The neutral/zero line, connected to port N.
- 4) Install the protective cover.

7.2 Power On

The SPS6000X is powered on manually. After the power is connected to the AC power source through the power cord, manually press the power button to start the instrument and enter the boot interface.



When the switch is in 1 state, it means that the switch is on. At this time, if there is sufficient AC power from MAINS, the power supply is in the on state.



Note

The power supplies generate an inrush current when turned on. Please make sure that the AC input power supply is sufficient at the moment of turning on, especially when multiple power supplies are turned on at the same time.

7.3 Power Off

Press the switch button on the panel to set the 0 position to turn off the power.



Warning

It takes about 8 seconds for the power to be fully turned on and off.

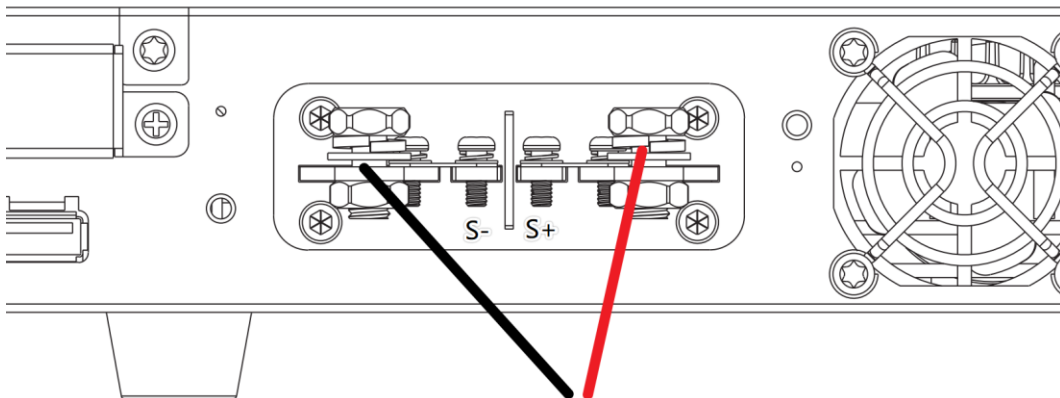
Do not turn the power on and off quickly. Please wait at least 10 seconds before changing the output switch state.

Attention

When the power supply is on, quickly changing the output state may damage the power supply. Do not continuously change the output state of the supply.

7.4 Output Port

Before connecting the output terminal to the load, consider the cable specifications and the maximum voltage of the load. Connect the output terminal and load line with an M6 screw (>25 A). If the remote voltage measurement is used, remove the connection terminals on S +, S -, and output, and connect the S +, S - detection lines to the load. For the most accurate power delivery, connect the S+ and S- as close to the load as possible.

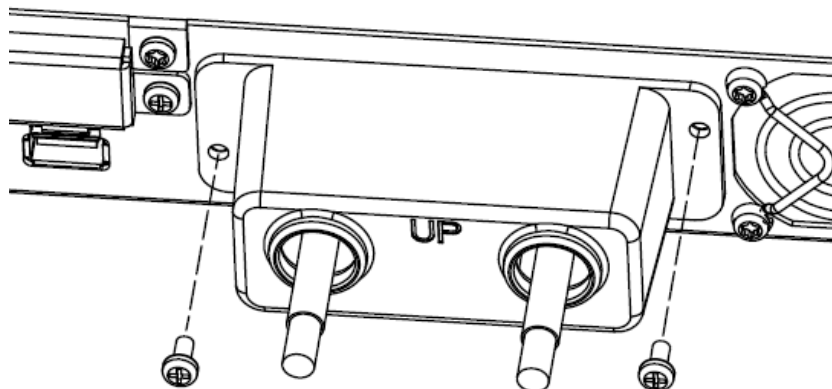


Warning

The power switch must be turned off before installing wiring at the power output terminal. The plastic protective shell must be installed before turning on the power supply.

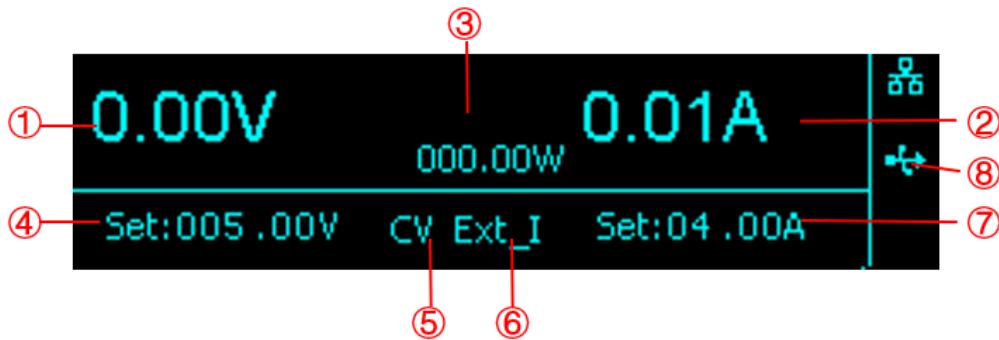
Otherwise, there may be a risk of electric shock.

Installation of the protective cover:



8 User Interface

User interface of the SPS6000X series:



- ① Output voltage value, take the average voltage.
- ② Output current value, take the average value of current.
- ③ Output power value.
- ④ Voltage setting value, you can set the size of the output voltage value.
- ⑤ Method: Press the **[V/I]** key to switch the cursor position, press the left and right direction keys to switch the cursor to the number of digits, press the up and down direction keys or turn the knob to increase or decrease the value, press the knob or **[SEL]** key confirm key to confirm, and the setting is complete.
- ⑥ Display the current status of the power supplies. The symbol display and meaning of the power supply are as follows:

Symbol	Representation
CV	CV mode
CC	CC mode
ALT	Critical mode

- ⑦ Display the current mode of the power supply, The symbol display and meaning of the power supply are as follows:

SYMBOL	REPRESENTATION
P	Parallel mode
S	Slave mode
P_LIMIT	Power limiting mode
EXT	External control mode
EXT_V, EXT_I, EXT_V/I	Voltage and current programming mode

- ⑧ Current setting value, you can set the size of the output current value.

- ⑨ Method: Press the  key to switch the cursor position, press the left and right direction keys to switch the cursor to the number of digits, press the up and down direction keys or turn the knob to increase or decrease the value, press the knob or  confirm key to confirm, and the setting is complete.
- ⑩ Display the status of the LAN network port or peripheral USB access. When the network cable is connected or the U disk is inserted, this place is highlighted.  means that a U disk has been read, and  means that the LAN cable is connected.

9 Basic Operation

This chapter will introduce the functions and operation methods of the control panel of SPS6000X in detail so that you can have a more comprehensive understanding of the SPS6000X for better work.

9.1 System Settings

9.1.1 View Version Information

Operation method: Press **Menu** → **1.System** → **1.About Device** on the panel to call up the system information interface.

The information that can be viewed on the interface includes: Boot times, vendor name, model, product specification, serial number, host version, and slave version.

9.1.2 Restore Default

Operation method:

- 1) Pressing **Menu** → **1.System** → **2.Default Setting** to enter the setting interface.
- 2) Press the up and down direction keys or turn the knob to select **Yes**.
- 3) Press the knob or **SEL** key to confirm, and automatically return to the main interface.

9.1.3 Beeper Setup

Operation method:

- 1) Pressing **Menu** → **1.System** → **3.Key sound** on the front panel.
- 2) Press the knob on the interface, turn the knob to On, press the knob to confirm, and the buzzer setting is turned **on**.
- 3) To set off, press the knob again to select **Off**, press the knob to confirm, and the beeper setting is off.

9.1.4 System Upgrade

Please follow the steps below to upgrade the firmware:

- 1) Download the firmware upgrade package from the official website.
- 2) Copy the .ADS file in the upgrade package to the root directory of the U disk (FAT32).
- 3) Insert the USB flash disk into the USB port of the front panel.
- 4) Press **Menu** → **1.System** → **4.Upgrade** on the front panel, and select the upgrade file.
- 5) Press the button to confirm. The upgrade progress bar will pop up. After the upgrade is successful, it will restart. If it fails, a prompt box will pop up.

Any operation that interrupts the upgrade process may cause upgrade failure or even the machine cannot be restarted. Do not remove the USB memory device or make any changes to the power supply while updating.

9.1.5 Parallel/Series Operation

The content of this chapter requires an external analog interface cable, which is optional. Users can purchase it on the official website according to their needs. For more option information, please click the official website (www.siglent.com).

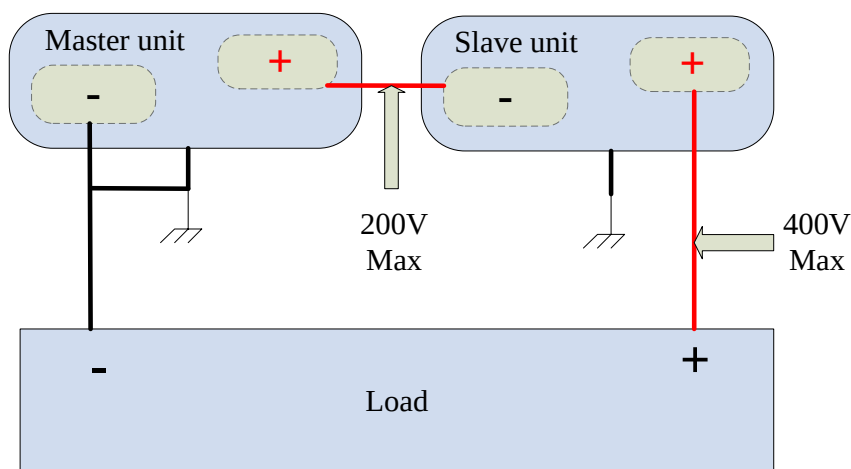
The content of this section is divided into two parts: series and parallel between independent machines

9.1.5.1 Series among multiple SPS6000X supplies

Two or more power supplies can be connected in series. Subject to the following restrictions:

- The positive terminal (DC+) and negative terminal (DC-) of the output terminal are connected to ground (PE) by a capacitance X
- The voltage of any DC output pole (DC+ or DC-) to ground (PE) of any product in series shall not exceed the value specified in the specification datasheet!
- Parallel terminals cannot be wired or used
- Remote compensation is not available
- Only products of the same rated current are allowed in series

Two products of the same model with a rated voltage of 200 V are connected in series, and the voltage transfer from DC output to PE is as follows:



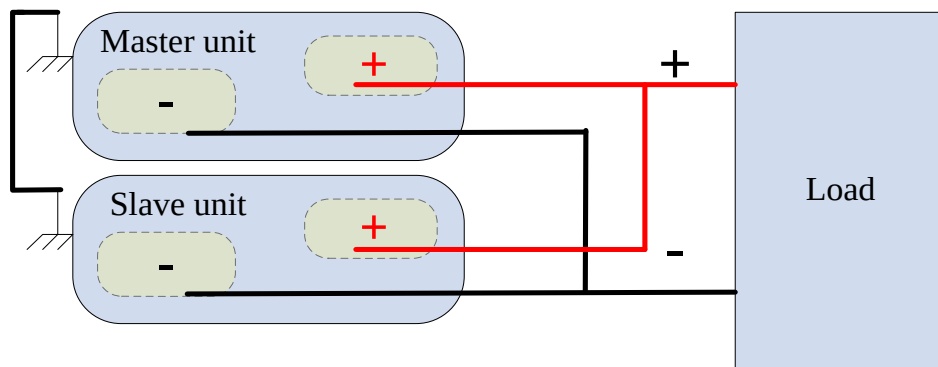
9.1.5.2 Parallel between multiple SPS6000X supplies

Mode setting

Setting method:

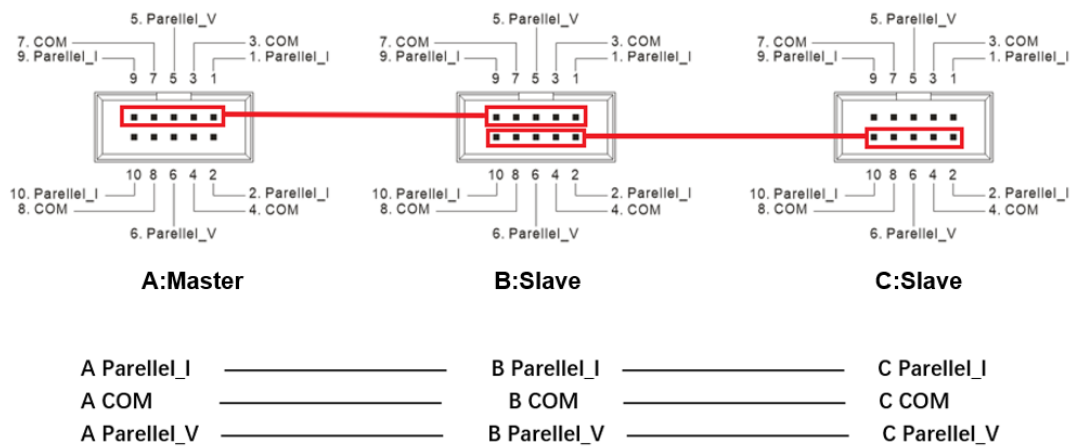
- 1) **Menu** → **2.Configure** → **8.Share Bus mode** to enter the setting interface.
- 2) Turn the knob or press the direction keys to select the configuration of the slave/slave mode
- 3) Press the knob or **SEL** key to make the setting effective.
- 4) After the configuration is successful, supply A functions as the host and supply B functions as the slave, The Set voltage and current button of B is unavailable, return to the main screen

Output port connection



Analog port connection

The user can use the analog connection line option to realize the analog port connection up to five power supplies. You can also make your own connections according to the corresponding relationship diagram of each port number, t Parallel_I port, COM port, Parallel_V port of multiple power supplies are interconnected to realize connection control between power supplies. The following figure takes three power supplies A, B, and C as an example:



When the product is output in parallel, the slave machine remains in the open state, and the Master (supply A) has output control of the whole parallel system.

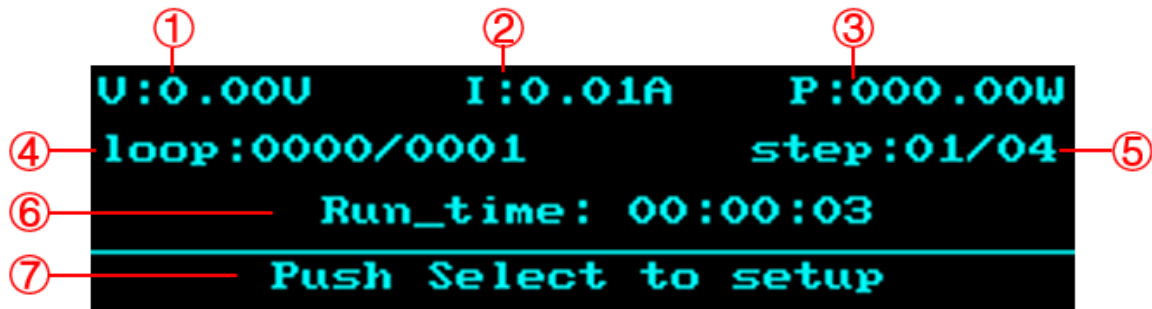
Pin number	Description
1, 2, 9, 10	Parellel_I Parallel current pin
3, 4, 7, 8	COM Parallel common pin
5, 6	Parellel_V Parallel voltage pin

When operating in parallel, slave machines keep an open state, the output of the whole parallel system is controlled by the master (supply A). The output voltage of the parallel system is the set output voltage of master A, The maximum output current of the whole parallel system is N times the current set by the master machine (N is the number of parallel machines).

9.2 Function Settings

9.2.1 Set List Function

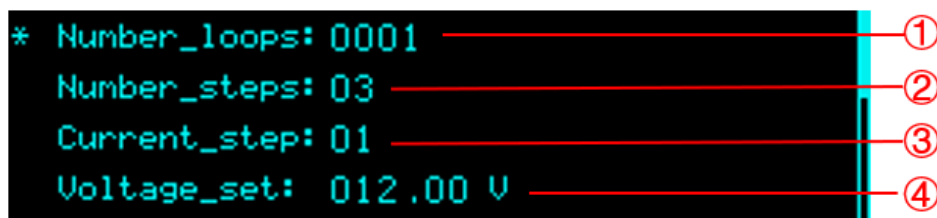
Press the **List** key directly on the operation panel to enter the List setting interface, and press the **List** key again to exit the List mode:

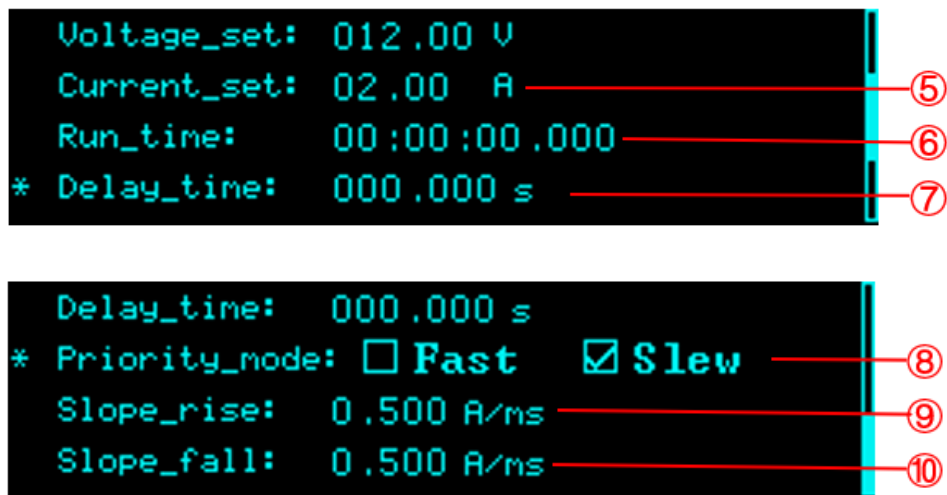


The main interface of the List function

- ① Voltage: Displays the real-time voltage at the output of the list.
- ② Current: Displays the real-time current at the output of the list.
- ③ Power: Displays the real-time power at the output of the list.
- ④ Display of the number of cycles: It is expressed in the form of the number of local cycles/total cycle times.
- ⑤ Display of running steps: It is expressed in the form of current running steps / total steps
- ⑥ Running time: displays the remaining time of the current steps. The time countdown is performed in the form of "hour: minute: seconds" when running the list.
- ⑦ Operation prompt: Press the knob in this interface to enter the list parameter configuration interface.

Enter the list parameter configuration interface, rotate the knob, or use the up and down direction keys to select parameters. Press the knob or **SEL** key at the point where the * sign points to set this parameter. After setting, press the knob or **SEL** key again to take effect.





- ① Number of cycles. Set the number of output cycles for the total number of steps (maximum 9999), and INF is infinite cycle.
- ② Total steps.
- ③ The number of steps of the current operation. 01 represents the first step.
- ④ Set the output voltage value for the current number of steps.
- ⑤ Set the output current value for the current number of steps.
- ⑥ The running time is expressed in the form of “hour: minute: seconds”.
- ⑦ Set the output delay time of the current number of steps.
- ⑧ The output priority mode of the current number of steps is fast priority by default.
When Slew is selected, ⑨ rising slope and ⑩ falling slope can be set.
- ⑨ Rising slope (Only shown in Slew mode, hidden in Fast mode)
- ⑩ Falling slope (Only shown in Slew mode, hidden in Fast mode)

9.2.2 Set OCP/OVP

The SPS6000X provides over-voltage protection, over-current protection, and over-power protection.

Setting method:

- 1) [Menu] → 2.Configure → 1.Protect to enter the setting interface.
- 2) Press the up and down direction keys or turn the knob to move the cursor. pressing the knob or [SEL] key to confirm.
- 3) select the knob or use the direction keys to change the value, and press the knob or [SEL] key to confirm the setting takes effect.

OCP has an additional switch for the OCP function. When it is displayed as **On**, it means that the OCP function is on.

Setting method:

- 1) Press the knob or **[SEL]** key on the setting interface, move the cursor to the shadow overlay On/Off.
- 2) Turn the knob or **[SEL]** key to select On or Off.
- 3) Press the knob to confirm and the setting will take effect.

When the display is **Off** , it means that the OCP function is turned off and the power supply will not trigger over-current protection.

Avoid loading the voltage at the output port that exceeds 10% of the rated voltage; otherwise, the internal components of the product may be damaged.

9.2.3 Set CC/CV Priority

The SPS6000X operation mode can be set to select CC high-speed priority, CC slope priority, CV high-speed priority, and CV slope priority. High-speed priority makes the voltage and current change at the fastest rate, and slope priority makes the power supply change in voltage and current at a specified slope.

Setting method:

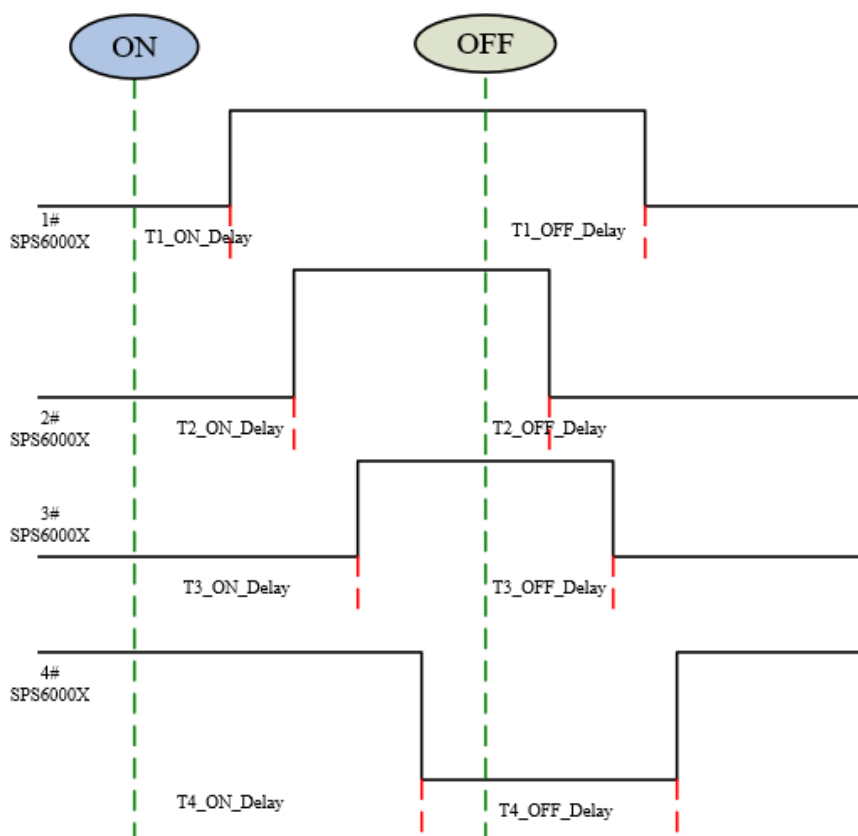
- 1) **[Menu]** → **2.Configure** → **2.Operating Mode** to proceed to the next submenu interface.
- 2) Press the knob or **[SEL]** key to enter the **1.Mode** interface , and you can select the CC/CV mode.
- 3) Pressing the knob or **[SEL]** key, turn the knob to switch between CC or CV.
- 4) Press the knob or **[SEL]** key to confirm and the setting takes effect.
- 5) When **CC** is displayed, it means that it is currently in CC mode. Press **[Esc]** to return to the previous menu.
- 6) Turn the knob or direction keys to **2.Priority mode**
- 7) Press the knob or **[SEL]** key to enter, you can set the mode as high-speed priority or slope priority. The setting method is the same as above.
- 8) When High Speed is displayed, it means that the current mode is high-speed priority mode, and the slope cannot be edited in this mode.
- 9) Press **[Esc]** to return to the previous menu.
- 10) When set to slope priority mode, press the knob to enter the **3.Slew value** interface, you can set the voltage rise/fall slope or current rise/fall slope.

9.2.4 Set Output On/Off Delay Time

The SPS6000X can be set to turn on the output delay function and turn off the output delay function.

Setting method:

- 1) **Menu** → **2.Configure** → **3.Output delay** to enter the setting interface.
- 2) Press the up and down direction keys or turn the knob to switch the setting of on delay or off delay.
- 3) Press the left or right direction keys to switch the number of digits, and press the up and down direction keys or turn the knob to change the value.
- 4) After the setting is completed, you need to press the knob to confirm.



9.2.5 Set Measurement Accuracy

The SPS6000X has three measurement accuracy modes to choose from: Low, Mid and High. When **Low** is selected, the measurement rate is the fastest but has less accuracy. **High** is the slowest measurement, but more accuracy. **High** is selected by default.

Setting method:

- 1) **Menu** → **2.Configure** → **4.Measure average** to enter the setting interface.
- 2) Press the up and down direction keys, or turn the knob to switch the cursor.
- 3) Press the knob or **SEL** key to confirm and the setting takes effect.

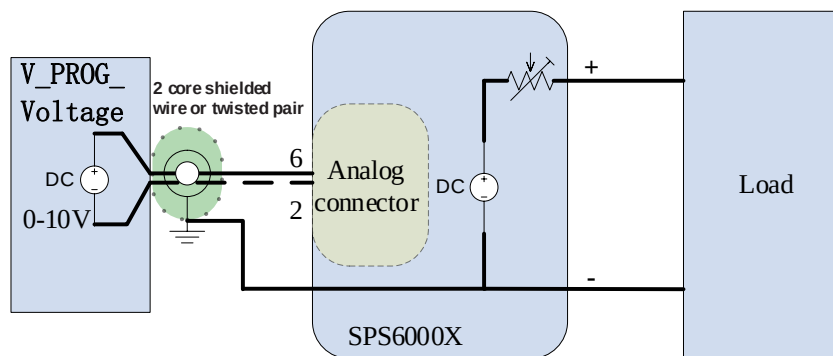
9.2.6 External Analog Control

There are two working modes for external analog control. Voltage controls voltage and voltage controls current. The output value can be controlled through the ports on the rear panel. In the external voltage control mode, an adjustable voltage of 0-10 V is connected to the input terminal to simulate the output from 0 to full-scale, to adjust the value of the voltage and current output by the power supply (10 V corresponds to the voltage or current value of the full-scale of the power supply).

External voltage control voltage output

Setting method:

- 1) **Menu** → **2.Configure** → **5.Voltage control** to enter the setting interface.
- 2) Press the up and down direction keys or turn the knob to select **Ext_V**, and then press the knob or the **SEL** button to confirm.

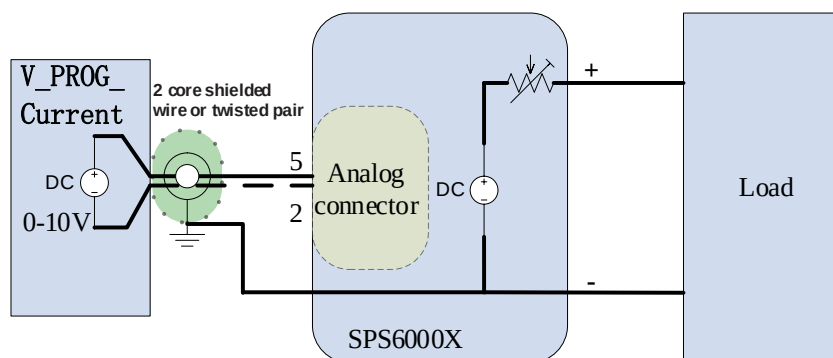


External voltage control voltage output

External voltage control current output:

Setting method:

- 1) **Menu** → **2.Configure** → **6.Current Program** to enter the setting interface.
- 2) Press the up and down direction keys or turn the knob to select **Ext_V**, and then press the knob or the **SEL** button to confirm.

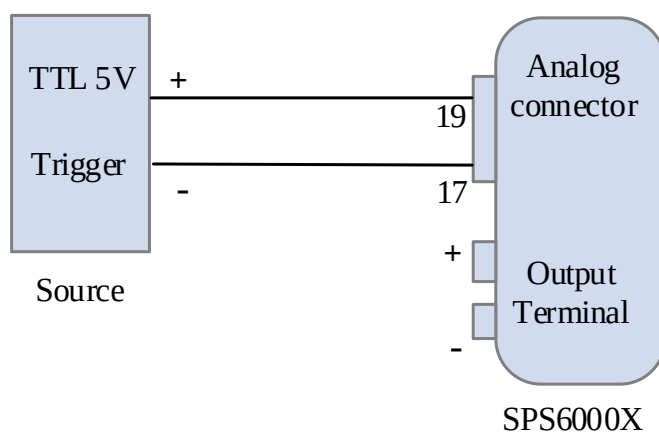


External voltage control current output

9.2.7 External Control Output On/Off

When set to Ext_ctrl_enable, the **Output** key on the front panel is invalid. The output is controlled by the rear analog interface pin 19 high-level effective control, and the reference ground is pin 17 (COM).

When set to Ext_trigger, the output will be triggered when a 5 V level is received, and the current output will be maintained.



External control output on / off



Note

If you use a switch to control multiple instruments, make sure that each instrument is independent and use a relay to complete the operation.

Setting method:

- 1) **Menu** → **2.Configure** → **7.Ext Control** to enter the setting interface.
- 2) Press the up and down direction keys or turn the knob to switch **Ext_off** ; **Ext_ctrl_enable** ; **Ext_trigger** .
- 3) Press the knob to confirm and the setting takes effect.

9.2.8 Save/Recall

SPS supports storing the current settings to an internal or external U disk, and the user can call the saved file to restore the settings.

Setting method:

- 1) **Menu** → **4.Storage** to enter the setting interface.
- 2) press the knob or **SEL** key to enter the following interface, on which you can select save mode and recall mode, as well as List save mode and List recall mode in List mode.

```

1.save
2.recall
3.List save
4.List recall

```

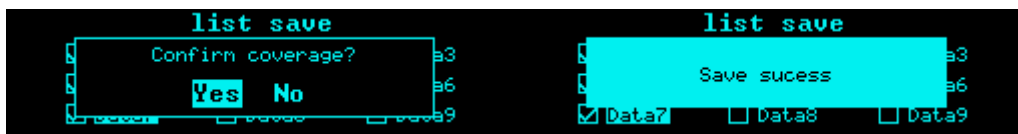
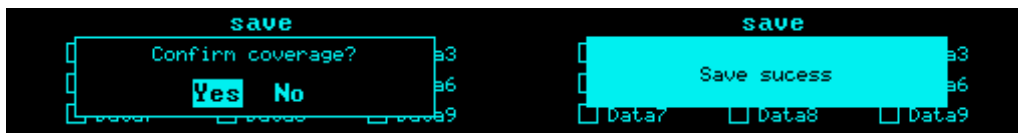
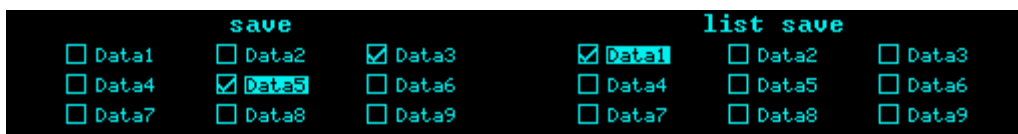
- 3) Select the corresponding mode and press the knob or **SEL** key again to select Internal or External.

```

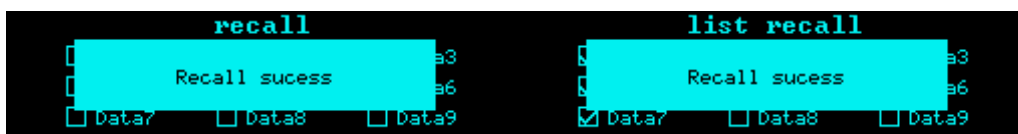
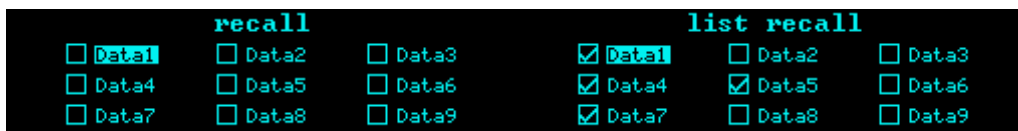
1.Internal
2.External

```

- 4) If stored in Internal, 9 groups of data can be stored. ☒ indicates that data items have been saved. To replace data items, select the data item with ☒ and press the knob or **SEL** key to overwrite it.



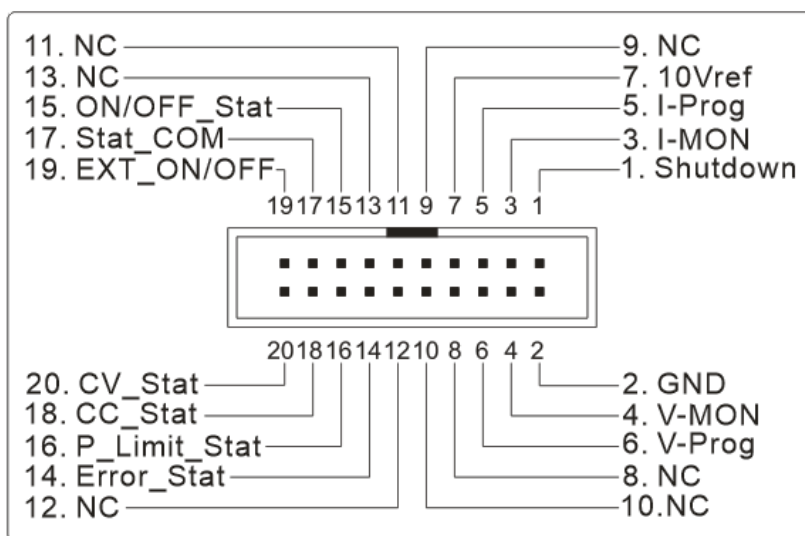
- 5) Recall mode is used to select the stored data.



- 6) If stored in External mode, data will be stored on the External USB flash drive. In Recall mode, data can be recalled by browsing a USB flash drive file

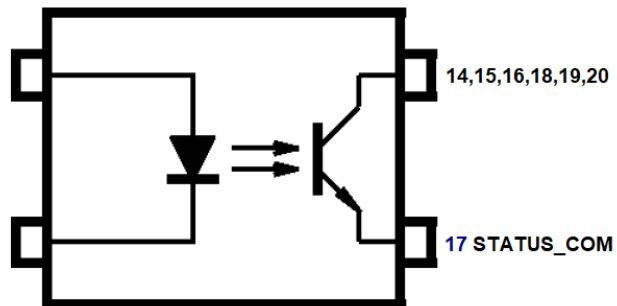
9.2.9 Analog Interface

Description of the SPS6000X analog interface pins



Pin number	Description
01	When a low TTL signal is applied to this pin, the output will be closed. This pin is pulled up to 5V with a 10kΩ resistor.
02	Control signal ground pin. This pin is connected internally with the negative output terminal (DC-)
03	Current Monitor Output pin. The output current from 0 to 100% of full scale is represented as a voltage from 0V to 10V.
04	Voltage Monitor Output pin. The output voltage from 0 to 100% of full scale is represented as a voltage from 0V to 10V.
05	External control of the current output. A voltage of 0~10V sets the output current value as 0%~100% of full-scale.
06	External control of the voltage output. A voltage of 0~10 V sets the output voltage value as 0%~100% of full-scale.
07	10V reference voltage pin, source max 5mA current.
14	In the ERROR state, this pin is low impedance to pin 17. (photo coupled open collector out)
15	When the output is on, this pin is low impedance to pin 17. (photo coupled open collector output)
16	When maximum power is sourced, this pin is low impedance to pin 17. (photo coupled open collector output)
17	State signal negative pin.
18	In the CC state, this pin is low impedance to pin 17. (photo coupled open collector out)

19	When the EXT_ON/OFF is open, a 5V or 0V voltage applied to this pin will control the source on, off or hold.
20	In the CV state, this pin is low impedance to pin 17. (photo coupled open collector out)



10 Communication interface settings

USB

USB cannot be edited, only viewing operations can be performed.

Operation method: **Menu** → **3.Communication** → **1.USB**. After entering the interface, you can view the resource information of the USB device.

GPIB

Setting method:

- 1) **Menu** → **3. Communication** → **2. GPIB** to enter the setting interface.
- 2) Press the knob or **SEL** key to display a cursor.
- 3) Press the up and down direction keys or turn the knob to change the value.
- 4) Press the knob or **SEL** key to make the setting effective.

LAN

SPS6000X supports DHCP. Users can set DHCP On to obtain an IP automatically or disable DHCP to set the IP address manually. You can set the DHCP switch, IP address, gateway address, and subnet mask address.

Setting method:

- 1) **Menu** → **3.Communication** → **3.LAN** to enter the LAN setting interface.
- 2) **Menu** → **3.Communication** → **3.LAN** → **1.DHCP** to enter the DHCP setting interface.
- 3) Press the knob or **SEL** key to display the cursor position.
- 4) Press the up and down direction keys or turn the knob to turn the **On /Off**.
- 5) Press the knob or **SEL** key to confirm the setting takes effect.
- 6) Return to the previous level, when **1.DHCP<ON>** is displayed, The IP address is automatically obtained; when **1.DHCP<OFF>** is displayed, you can set the IP manually.

```

IP: 010:011:014:181
Sub: 255:255:255:000
Gate: 010:011:014:001

```

- 7) **Menu** → **3.Communication** → **LAN** → **IP Address** to enter the setting interface.

```

IP: 000:000:000:000
Sub: 000:000:000:000
Gate: 000:000:000:000

```

- 8) In this interface, press the up and down direction keys or turn the knob to switch the Settings of IP: IP address, Sub: subnet mask, and Gate: gateway

- 9) Press the knob or **SEL** key to enter the setting, press the left and right direction keys or turn the knob to switch bits, press the up and down direction keys or turn the knob to change the size of the value.
- 10) After the setting is complete, press the knob or **SEL** key to confirm the setting.
- 11) **Menu** → **3.Communication** → **3.LAN** → **3.MAC** to enter the interface, You can view the physical address of the MAC.

11 Recalibration setting

The SPS6000X supports manual recalibration. Users can select default data or customized data to recalibrate the machine.

Factory Settings ensure one-year accuracy. Recommended calibration frequency: 1 time/year

Calibrate voltage/current

Setting method:

- 1) **Menu** → **4. Calibrate device** → **Voltage Calibration/Current Calibration** to enter the voltage/current calibration interface.
- 2) Press the up and down direction keys or turn the knob to switch voltage/current calibration points.
- 3) Press the knob or **SEL** key to enter the setting calibration point
- 4) Press the up and down direction keys or turn the knob to switch bits, press the up and down direction keys, or turn the knob to change the size of the value.
- 5) After the setting is complete, press the knob or **SEL** key to confirm the setting.
- 6) Select save to calibration file to save the calibration data

	Set value(V)	Measure(V)	Calibrate(V)		Set value(A)	Measure(A)	Calibrate(A)
U1:	010.00	001.12	000.000	A1:	05.00	01.12	00.000
U2:	100.00	102.45	000.000	A2:	15.00	11.52	00.000
U3:	180.00	185.78	000.000	A3:	20.00	24.86	00.000

Select calibration data

Setting method:

- 1) **Menu** → **Calibrate device** → **Select calibration file** to enter the calibration data selection interface.
- 2) Press the knob or **SEL** key to display the cursor position.
- 3) Press the up and down direction keys or turn the knob to select **Default** to select the default calibration data; Select **User** to select user-defined calibration data
- 4) Press the knob or **SEL** key to confirm the setting.

Clear calibration data

Setting method:

- 1) **Menu** → **4. Calibrate device** → **Clear volt calibration file/Clear curr calibration file** to clear the voltage calibration data and current calibration data.
- 2) Press the knob or **SEL** key to appear in the frame.
- 3) Press the knob or **SEL** key to select **yes** to clear the calibration data.

1.Voltage Calibration	2.Current Calibration
2.Cu Delete volt file?	3.Se Delete curr file?
3.Se Yes No	4.Cl Yes No
4.Cl Yes No	5.Cl Yes No

12 Remote Control

The SPS6000X supports communication with a computer via USB, LAN, and GPIB-USB interfaces using a SCPI (Standard Commands for Programmable Instruments) compliant command set.

This chapter will introduce how to build a programming environment and explain the SCPI commands supported by the SPS6000X.

12.1 Way to Control

Using NI-VISA

Users can develop remote control programs for the instrument by using NI-VISA of NI (National Instrument Corporation). Regarding NI-VISA, there is a complete and real-time version (Run-Time Engine version). The complete version includes NI device drivers and a tool called NI MAX. NI MAX is a user interface used to control the device. The real-time version is much smaller than the full version, and it only includes NI device drivers.

After installing NI-VISA, use a USB cable to connect the SPS6000X (via the USB Device interface on the rear panel) to the computer, or use a network cable to connect the SPS6000X (via the LAN interface on the rear panel) to the local area network where the computer is located.

Based on NI-VISA, users can remotely control SPS6000X in two ways, one is through web service; the other is by developing custom programming combined with SCPI commands. For more information, please refer to the programming examples.

Using Sockets

Users can also use Sockets to communicate with SPS6000X based on the TCP/IP protocol through the network port. Socket communication is a basic communication technology of computer networks, which allows applications to communicate through network hardware and standard network protocol mechanisms built into the operating system. This method requires two-way communication between the instrument and the computer network through an IP address and a fixed port number.

The port of SPS6000X for Socket communication is 5025.

After connecting the SPS6000X (via the LAN interface on the rear panel) to the local area network where the computer is located with a network cable, the user can combine SCPI commands for custom programming to realize remote control of the SPS6000X. For more information, please refer to the programming examples.

12.2 Grammatical Conventions

SCPI commands are a tree-like hierarchical structure, including multiple subsystems. Each subsystem is composed of a root keyword and one or several hierarchical keywords. Command keywords are separated by colons ' : ', keywords are followed by optional parameter settings, commands and parameters are separated by ' spaces ', for multiple parameters, parameters are separated by commas ' , '. A question mark ' ? ' is added after the command line, which means to query this function.

Most SCPI commands are a mixture of upper and lower case letters. Capital letters indicate the abbreviations of commands, namely short commands. If you want better program readability, you can use long commands. E.g:

[:SOURce]:VOLTage[:SET]? CH1

Among them, the keyword VOLTage. You can enter VOLT or VOLTage, and combine upper and lower case letters at will. Therefore, VolTaGe, volt, and Volt are all acceptable. Other formats (such as VOL and VOLTAG) will produce errors.

- Braces ({ }) enclose the parameter selection. The braces are not sent with the command string.
- The vertical line (|) divides the parameter selection.
- Angle brackets (< >) indicate that a value must be assigned to the parameter inside the bracket. The angle brackets are not sent with the command string.
- Optional parameters are enclosed in square brackets ([]). If you do not specify a value for the optional parameter, the instrument will use the default value. For example, the [:SET] in the above command can be omitted (for example: 'VOLT? CH1'), and the command will operate on the current channel. The square brackets are not sent with the command string.

12.3 Command Summary

- IEEE Common Command Subsystem.
- Source Configuration Command Subsystem.
- System Configuration Command Subsystem.
- Measure Configuration Command Subsystem.
- Storage Configuration Command subsystem

12.4 Command Description

12.4.1 IEEE Common Command Subsystem

12.4.1.1 *IDN?

Command format:	*IDN?
Description:	Get device information string (return string content includes: manufacturer, device model, device serial port number, and the software version number)
E.g:	*IDN?
Response:	Siglent Technologies, SPS6225X, SPS5X2022008, 1.1.1.5\n

12.4.1.2 *RST

Command format:	*RST
Description:	Restore the state of the device to the initial state.
E.g:	*RST

12.4.1.3 *CLS

Command format:	*CLS
Description:	Clear the values of all event registers and clear the error list at the same time
E.g:	*CLS

12.4.1.4 *ESE

Command format:	*ESE <number>
Description:	Set the enable value of the standard event status register
E.g:	*ESE 16

12.4.1.5 *ESE?

Command format:	*ESE?
Description:	Query the enable value of the standard event status register.
E.g:	*ESE?
Response:	0

12.4.1.6 *ESR?

Command format:	*ESR?
Description:	Query and clear the event value of the standard event status register.
E.g:	*ESR?
Response:	0

12.4.1.7 *OPC

Command format:	*OPC
Description:	Operation complete.
E.g:	*OPC

12.4.1.8 *OPC?

Command format:	*OPC?
Description:	Query whether the current operation is complete.
E.g:	*OPC?
Response:	1

12.4.1.9 *SRE

Command format:	*SRE<number>
Description:	Set the enable value of the status byte register
E.g:	*SRE 24

12.4.1.10 *SRE?

Command format:	*SRE?
Description:	Query the enable value of the status byte register
E.g:	*SRE?
Response:	24

12.4.1.11 *STB?

Command format:	*STB?
------------------------	-------

Description:	Query the event value of the status byte register
E.g:	*STB?
Response:	0

12.4.1.12 *TST?

Command format:	*TST?
Description:	Query the result of instrument self-test
E.g:	*TST?
Response:	0

12.4.1.13 *WAI

Command format:	*WAI
Description:	Wait for all outstanding operations to complete before executing any other commands
E.g:	*WAI

12.4.2 Source Command Subsystem

12.4.2.1 Set voltage value

Command format:	[[:SOURce]:VOLTage[:SET] {<value> MINimum MAXimum DEFault}
Description:	Set the voltage value of the selected channel
E.g:	:SOURce:VOLTage:SET 3
Description:	Set the voltage value to 3V
Command format:	[[:SOURce]:VOLTage[:SET]]?
Description:	Get the set voltage value of the channel
E.g:	:SOURce:VOLTage:SET?
Response:	3.000000\n

12.4.2.2 Set OVP value

Command format:	<code>[[:SOURce]:OVP {<value> MINimum MAXimum DEFault}</code>
Description:	Set the overvoltage value of the channel
E.g:	<code>:SOURce:OVP 25</code>
Description:	Set the OVP value to 25V
Command format:	<code>[[:SOURce]:OVP?</code>
Description:	Get the overvoltage value of the channel
E.g:	<code>:SOURce:OVP?</code>
Response:	25.000000\n

12.4.2.3 Set the voltage rise slope

Command format:	<code>[[:SOURce]:VOLTage:RISE:SLOPe {<value> MINimum MAXimum DEFault}</code>
Description:	Set the voltage rise slope value of the channel
E.g:	<code>:SOURce:VOLTage:RISE:SLOPe 3</code>
Description:	Set the voltage rising slope to 3V/ms
Command format:	<code>[[:SOURce]:VOLTage:RISE:SLOPe?</code>
Description:	Get the voltage rise slope value of the channel
E.g:	<code>:SOURce:VOLTage:RISE:SLOPe?</code>
Response:	3.000000\n

12.4.2.4 Set the voltage drop slope

Command format:	<code>[[:SOURce]:VOLTage:FALL:SLOPe <value> MINimum MAXimum DEFault}</code>
Description:	Set the voltage drop slope value of the channel
E.g:	<code>:SOURce:VOLTage:FALL:SLOPe 4</code>
Description:	Set the voltage drop slope to 4V/ms
Command format:	<code>[[:SOURce]:VOLTage:FALL:SLOPe?</code>

Description:	Get the voltage drop slope value of the channel
E.g:	:SOURce:VOLTage:FALL:SLOPe?
Response:	4.000000\n

12.4.2.5 Set the voltage response change mode

Command format:	[[:SOURce]:VOLTage[:RESPonse]:MODE {FAST SLOPE}
Description:	Set the voltage response change mode of the channel (FAST / SLOPE)
E.g:	:SOURce:VOLTage:RESPonse:MODE FAST
Description:	Set the voltage response to FAST (fast priority) (set to CV mode available)
Command format:	[[:SOURce]:VOLTage[:RESPonse]:MODE?
Description:	Get the voltage response change mode of the channel
E.g:	:SOURce:VOLTage:RESPonse:MODE?
Response:	Slope priority\n

12.4.2.6 Set current value

Command format:	[[:SOURce]:CURRent[:SET] {<value> MINimum MAXimum DEFault}
Description:	Set the current value of the channel
E.g:	:SOURce:CURRent:SET 2
Description:	Set the current value to 2A
Command format:	[[:SOURce]:CURRent[:SET]?]
Description:	Get the set current value of the channel
E.g:	:SOURce:CURRent:SET?
Response:	2.000000\n

12.4.2.7 Obtain the measured voltage value

Command format:	MEASure:VOLTage?
Description:	Get the voltage measurement value of the channel

E.g: MEASure:VOLTage? CH1

Response: 2.991442\n

12.4.2.8 Set current value

Command format: [:SOURce]:CURRent[:SET] <channel>,
{<value> | MINimum | MAXimum | DEFault}

Description: Set the current value of the channel

E.g: :SOURce:CURRent:SET CH1,2

Description: Set the CH1 channel current value to 3V

Command format: [:SOURce]:CURRent[:SET]? <channel>

Description: Get the set current value of the channel

E.g: :SOURce:CURRent:SET? CH1

Response: 2.000000\n

12.4.2.9 Set OCP value

Command format: [:SOURce]:OCP{<value> | MINimum | MAXimum | DEFault}

Description: Set the overcurrent value of the channel

E.g: :SOURce:OCP 8

Description: Set the OCP value to 8A

Command format: [:SOURce]:OCP?

Description: Get the overcurrent value of the channel

E.g: :SOURce:OCP?

Response: 8.000000\n

12.4.2.10 Set current rising slope

Command format: [:SOURce]:CURRent:RISE:SLOPe
{<value> | MINimum | MAXimum | DEFault}

Description: Set the current rising slope value of the channel

E.g:	:SOURce:CURRent:RISE:SLOPe 0.3
Description:	Set the current rising slope to 0.3A/ms
Command format:	[:SOURce]:CURRent:RISE:SLOPe?
Description:	Get the current rising slope value of the channel
E.g:	:SOURce:CURRent:RISE:SLOPe?
Response:	0.300000\n

12.4.2.11 Set current falling slope

Command format:	[:SOURce]:CURRent:FALL:SLOPe {<value> MINimum MAXimum DEFault}
Description:	Set the current falling slope value of the channel
E.g:	:SOURce:CURRent:FALL:SLOPe 0.4
Description:	Set the current falling slope of CH1 channel to 0.4A/ms
Command format:	[:SOURce]:CURRent:FALL:SLOPe? <channel>
Description:	Get the current falling slope value of the channel
E.g:	:SOURce:CURRent:FALL:SLOPe?
Response:	0.400000\n

12.4.2.12 Set current response change mode

Command format:	[:SOURce]:CURRent [:RESPonse]:MODE {FAST SLOPE}
Description:	Set the current response change mode of the channel (FAST / SLOPE)
E.g:	:SOURce:CURRent:RESPonse:MODE FAST
Description:	Set the current response to FAST (fast priority) (available when set to CC mode)
Command format:	[:SOURce]:CURRent [:RESPonse]:MODE?
Description:	Get the current response change mode of the channel
E.g:	:SOURce:CURRent:RESPonse:MODE?

Response:	Fast priority\n
------------------	-----------------

12.4.2.13 Set OPP value

Command format:	[[:SOURce]:OPP {<value> MINimum MAXimum DEFault}
------------------------	--

Description:	Set the overpower value of the channel
---------------------	--

E.g:	:SOURce:OPP 500
-------------	-----------------

Description:	Set the OPP value to 500W
---------------------	---------------------------

Command format:	[[:SOURce]:OPP?
------------------------	-----------------

Description:	Get the overpower value of the channel
---------------------	--

E.g:	:SOURce:OPP?
-------------	--------------

Response:	500.000000\n
------------------	--------------

12.4.2.14 Set voltage control mode

Command format:	[[:SOURce]:CTRL:VOLTage:MODE {LOCAL EXT_V }
------------------------	--

Description:	Set the voltage control mode of the channel (LOCAL EXT_V)
---------------------	--

E.g:	:SOURce:CTRL:VOLTage:MODE LOCAL
-------------	---------------------------------

Description:	Set the voltage control mode to LOCAL mode
---------------------	--

Command format:	[[:SOURce]:CTRL:VOLTage:MODE?
------------------------	-------------------------------

Description:	Get the voltage control mode of the channel
---------------------	---

E.g:	:SOURce:CTRL:VOLTage:MODE?
-------------	----------------------------

Response:	LOCAL\n
------------------	---------

12.4.2.15 Set current control mode

Command format:	[[:SOURce]:CTRL:CURREnt:MODE {LOCAL EXT_V }
------------------------	--

Description:	Set the current control mode of the channel (LOCAL EXT_V)
---------------------	--

E.g:	:SOURce:CTRL:CURREnt:MODE LOCAL
-------------	---------------------------------

Description:	Set the current control mode to LOCAL mode
---------------------	--

Command format:	<code>[[:SOURce]:CTRL:CURRent:MODE?</code>
Description:	Get the current control mode of the channel
E.g:	<code>:SOURce:CTRL:CURRent:MODE?</code>
Response:	<code>LOCAL\n</code>

12.4.2.16 Set external output enable state

Command format:	<code>[[:SOURce]:CTRL:EXT:STATe {OFF ON TRIG 0 1 2 }</code>
Description:	Set the external control status of a channel (OFF ON TRIG 0 1 2)
E.g:	<code>:SOURce:CTRL:EXT:STATe OFF</code>
Description:	Set the external control state of the channel to OFF
Command format:	<code>[[:SOURce] CTRL:EXT:STATe?</code>
Description:	Get the external control status of the channel
E.g:	<code>:SOURce:CTRL:EXT:STATe?</code>
Response:	<code>OFF \n</code>

12.4.2.17 Set output status

Command format:	<code>[[:SOURce]:OUTPut [:STATe] { OFF ON 0 1 }</code>
Description:	Set the output status of channel (OFF ON 0 1)
E.g:	<code>OUTPut 1</code>
Description:	Open output
Command format:	<code>[[:SOURce]:OUTPut [:STATe]</code>
Description:	Get the output status of all channels
E.g:	<code>OUTPut?</code>
Response:	<code>0\n</code>

12.4.2.18 Set output ON delay

Command format:	<code>[[:SOURce]: OUTPut:ON:DELay {<value> MINimum MAXimum DEFault}</code>
------------------------	---

Description:	Set the delay time of the output ON of the channel
E.g:	OUTPut:ON:DELAy 3
Description:	Set the output ON delay to 3 seconds
Command format:	[[:SOURce]:OUTPut:ON:DELAy?
Description:	Obtain the delay time of the channel's output ON
E.g:	OUTPut:ON:DELAy?
Response:	3.000000\n

12.4.2.19 Set output OFF delay

Command format:	[[:SOURce]: OUTPut:OFF:DELAy {<value> MINimum MAXimum DEFault}
Description:	Set the delay time of the output OFF of the channel
E.g:	OUTPut:OFF:DELAy 1
Description:	Set the output OFF delay to 1 seconds
Command format:	[[:SOURce]: OUTPut:OFF:DELAy?
Description:	Obtain the delay time of output OFF of the channel
E.g:	OUTPut:OFF:DELAy?
Response:	3.000000\n

12.4.2.20 Set output mode

Command format:	[[:SOURce]:OUTPut:MODE {NORMAL LIST}
Description:	Set the output mode of the channel(NORMAL LIST)
E.g:	SOURce:OUTPut:MODE NORMAL
Description:	Set the output mode to NORMAL.
Command format:	[[:SOURce]:OUTPut:MODE?
Description:	Obtain the output mode of the channel
E.g:	:SOURce:OUTPut:MODE?

Response: NORMAL MODE \n

12.4.2.21 Set channel CC/CV priority mode

Command format: [:SOURce][:CVCC]:PRIOrity {CC | CV }

Description: Set the CC/CV priority of the channel (CC | CV)

E.g: :SOURce: PRIOrity CC

Description: Set the operation mode to CC priority

Command format: [:SOURce][:CVCC]:PRIOrity?

Description: Get the CC/CV priority of the channel

E.g: :SOURce: PRIOrity?

Response: CC\n

12.4.2.22 Set the measurement average

Command format: [:SOURce]:MEASure:AVERage:GRADe {LOW| MIDDLE| HIGH}

Description: Set the average measurement value (LOW| MIDDLE| HIGH)

E.g: :SOURce:MEASure:AVERage:GRADe LOW

Description: Set the average measurement to LOW (measurement update fastest)

Command format: [:SOURce]:MEASure:AVERage:GRADe?

Description: Get average measurement value

E.g: :SOURce:MEASure:AVERage:GRADe?

Response: LOW\n

12.4.2.23 Restore the protected status of the channel

Command format: [:SOURce]:RESET: PROTeCt

Description: Restore the circuit protection status of the channel

E.g: :SOURce:RESET:PROTeCt

12.4.2.24 Set channel List mode status

Command format:	<code>[[:SOURce]:LIST[:STATe] { OFF ON 0 1}</code>
Description:	Set the List mode status of the channel (OFF ON 0 1)
E.g:	LIST 1
Description:	Set the channel to List mode
Command format:	<code>[[:SOURce]:LIST[:STATe]?]</code>
Description:	Get the List mode status of the channel
E.g:	LIST?
Response:	1\n

12.4.2.25 Set the number of cycles

Command format:	<code>[[:SOURce]:LIST:CYCLes[:COUNT] {<value> INF}</code>
Description:	Set the number of cycles
E.g:	<code>:SOURce:LIST:CYCLes:COUNT 3</code>
Description:	Set the list steps cycle of channel to 3 times
Command format:	<code>[[:SOURce]:LIST:CYCLes[:COUNT]?]</code>
Description:	Gets the number of return list cycles
E.g:	<code>:SOURce:LIST:CYCLes:COUNT?</code>
Response:	3\n

12.4.2.26 Set the total number of steps in List

Command format:	<code>[[:SOURce]:LIST:STEP <value></code>
Description:	Set the number of List steps of the channel
E.g:	<code>:SOURce:LIST:STEP 5</code>
Description:	Set the total number of steps in List to 5
Command format:	<code>[[:SOURce]:LIST:STEP?</code>

Description:	Get the number of List steps of the channel
E.g:	:SOURce:LIST:STEP?
Response:	5\n

12.4.2.27 Set the voltage value of the specified steps of List

Command format:	[[:SOURce]:LIST:VOLTage <step>, {<value> MINimum MAXimum DEFault}
Description:	Set the voltage setting value of the current step number of the channel List
E.g:	:SOURce:LIST:VOLTage 1,9
Description:	Set 1 step voltage value to 9V
Command format:	[[:SOURce]:LIST:VOLTage? <step>
Description:	Get the voltage setting value of the current step number of the channel List
E.g:	:SOURce:LIST:VOLTage? 1
Response:	9.000000\n

12.4.2.28 Set the current value of the specified steps of List

Command format:	[[:SOURce]:LIST:CURRent<step>, {<value> MINimum MAXimum DEFault}
Description:	Set the current setting value of the current step number of the channel List
E.g:	:SOURce:LIST:CURRent 1,5
Description:	Set the current value of step 1 to 5A
Command format:	[[:SOURce]:LIST:CURRent? <step>
Description:	Get the current setting value of the current step number of the channel List
E.g:	:SOURce:LIST:CURRent? 1
Response:	5.000000\n

12.4.2.29 Set the running time of the specified steps of List

Command format:	<code>[[:SOURce]:LIST:WIDTH <step>,<value></code>
Description:	Set the running time of the current step number of the channel List
E.g:	<code>:SOURce:LIST:WIDTH 1,5</code>
Description:	Set the running time of step 1 to 5 seconds
Command format:	<code>[[:SOURce]:LIST:WIDTH? <step></code>
Description:	Get the running time of the current step number of the channel List
E.g:	<code>:SOURce:LIST:WIDTH? 1</code>
Response:	<code>5.000000\n</code>

12.4.2.30 Set the delay time of the specified steps of List

Command format:	<code>[[:SOURce]:LIST: DELAY <step>,<value></code>
Description:	Set the delay time of the current step number of the channel List
E.g:	<code>SOURce:LIST:DELAY 1,5</code>
Description:	Set the delay time of step 1 to 5 seconds
Command format:	<code>[[:SOURce]:LIST: DELAY? <step></code>
Description:	Get the delay time of the current step number of the channel List
E.g:	<code>:SOURce:LIST:DELAY?</code>
Response:	<code>5.000000\n</code>

12.4.2.31 Set the slope mode of the specified steps of List

Command format:	<code>[[:SOURce]:LIST:SLOPe[:CTRL]:MODE <step>,{ FAST SLOPE }</code>
Description:	Set the delay time of the current step number of the channel List
E.g:	<code>:SOURce:LIST:SLOPe:CTRL:MODE 1, FAST</code>
Description:	Set the slope mode of step 1 to FAST
Command format:	<code>[[:SOURce]:LIST:SLOPe[:CTRL]:MODE? <step></code>
Description:	Get the slope mode of the current step number of the channel List

E.g: :SOURce:LIST:SLOPe:CTRL:MODE? 1

Response: Fast priority\n

12.4.2.32 Set the voltage rise slope of the specified steps of List

Command format: [:SOURce]:LIST:VOLTage:RISE:SLOPe <step>,<value>

Description: Set the voltage rise slope value of the channel steps in list mode

E.g: :SOURce:LIST:VOLTage:RISE:SLOPe 1,3

Description: Set the voltage rise slope of step 1 of channel 1 to 3V /ms

Command format: [:SOURce]:LIST:VOLTage:RISE:SLOPe? <step>

Description: Obtain the voltage rise slope value of the channel steps in list mode

E.g: SOURce:LIST:VOLTage:RISE:SLOPe? 1

Response: 3.000000\n

12.4.2.33 Set the voltage fall slope of the specified steps of List

Command format: [:SOURce]:LIST:VOLTage: FALL:SLOPe <step>,<value>

Description: Set the voltage fall slope value of the channel steps in list mode

E.g: :SOURce:LIST:VOLTage:FALL:SLOPe 1,2

Description: Set the voltage fall slope of step 1 of channel 1 to 2V /ms

Command format: [:SOURce]:LIST:VOLTage: FALL:SLOPe? <step>

Description: Obtain the voltage fall slope value of the channel steps in list mode

E.g: :SOURce:LIST:VOLTage:FALL:SLOPe? 1

Response: 2.000000\n

12.4.2.34 Set the current rise slope of the specified steps of List

Command format: [:SOURce]:LIST:CURREnt:RISE:SLOPe <step>,<value>

Description: Set the current rise slope value of the channel steps in list mode

E.g: :SOURce:LIST:CURREnt:RISE:SLOPe 1,0.3

Description:	Set the current rise slope of step 1 of channel 1 to 0.3A /ms
Command format:	<code>[[:SOURce]:LIST:CURRent:RISE:SLOPe? <step></code>
Description:	Obtain the current rise slope value of the channel steps in list mode
E.g:	<code>:SOURce:LIST:CURRent:RISE:SLOPe? 1</code>
Response:	0.300000\n

12.4.2.35 Set the pause state of LIST

Command format:	<code>[[:SOURce]:LIST:WAIT:STATe { OFF ON 0 1}</code>
Description:	Set the List pause state for the channel
E.g:	<code>:SOURce:LIST:WAIT:STATe ON</code>
Description:	Set the channel to pause
Command format:	<code>[[:SOURce]:LIST:WAIT:STATe?</code>
Description:	Get the list pause status of the channel
E.g:	<code>:SOURce:LIST:WAIT:STATe?</code>
Response:	0\n

12.4.2.36 Set Machine Lock Status

Command format:	<code>[[:SOURce]:LOCK[:STATe] { OFF ON 0 1}</code>
Description:	Set the lock state of the machine
E.g:	<code>:SOURce:LOCK:STATe ON</code>
Description:	Set machine to locked state
Command format:	<code>[[:SOURce]:LOCK[:STATe]?</code>
Description:	Get the lock status of the machine
E.g:	<code>:SOURce:LOCK:STATe?</code>
Response:	0\n

12.4.2.37 Query output remains unchanged

Command format:	<code>[[:SOURce]:LOCK[:STATe] { OFF ON 0 1}</code>
Description:	Query output remains unchanged status (when Ext_trigger mode is selected by external control)
E.g:	<code>:SOURce:OUTPut:KEEP:STATe?</code>
Response:	<code>OFF\n</code>
Command format:	<code>[[:SOURce]:LOCK[:STATe]?</code>
Description:	Get the lock status of the machine
E.g:	<code>:SOURce:LOCK:STATe?</code>
Response:	<code>0\n</code>

12.4.3 System Configuration Command Subsystem

12.4.3.1 Button sound settings

Command format:	<code>MENU:SOUNd:KEY { OFF ON 0 1}</code>
Description:	Set the button sound switch state
E.g:	<code>MENU:SOUNd:KEY 1</code>
Description:	Set open key sound
Command format:	<code>MENU:SOUNd:KEY?</code>
Description:	Get button sound switch status
E.g:	<code>MENU:SOUNd:KEY?</code>
Response:	<code>1\n</code>

12.4.3.2 Set warning sound

Command format:	<code>MENU:SOUNd:ALARm { OFF ON 0 1}</code>
Description:	Set warning sound switch state
E.g:	<code>MENU:SOUNd:ALARm 1</code>
Description:	Set warning sound on

Command format:	MENU:SOUND:ALARM?
Description:	Get warning sound switch status
E.g:	MENU:SOUND:ALARM?
Response:	1\n

12.4.3.3 Set OCP switch state

Command format:	SYStem:OCP:STATe{ OFF ON 0 1}
Description:	Set the ocp switch state of the channel
E.g:	SYStem:OCP:STATe 1
Description:	Set to open OCP function

Command format:	SYStem:OCP:STATe?
Description:	Get the ocp switch status of the channel
E.g:	SYStem:OCP:STATe?
Response:	1\n

12.4.3.4 Get network port connection status

Command format:	LAN:LINK?
Description:	Get the connection status of the network port
E.g:	LAN:LINK?
Response:	1\n

12.4.3.5 DHCP setting

Command format:	[:SYStem]:DHCP { OFF ON 0 1}
Description:	Set to dynamically obtain IP status
E.g:	DHCP 1
Description:	Set to open the DHCP function

Command format:	[:SYStem]:DHCP?
------------------------	-----------------

Description:	Get dynamic IP status
E.g:	DHCP?
Response:	1\n

12.4.3.6 Set IP address

Command format:	[:SYStem]:LAN:IPADdress <value>
Description:	Set IP address
E.g:	LAN:IPADdress 10.11.13.213
Command format:	[:SYStem]:LAN:IPADdress?
Description:	Get IP address
E.g:	LAN:IPADdress?

12.4.3.7 Set the subnet mask

Command format:	[:SYStem]:LAN:SMASk <value>
Description:	Set the subnet mask
E.g:	LAN:SMASk 255.255.255.0
Command format:	[:SYStem]:LAN:SMASk?
Description:	Get the subnet mask
E.g:	LAN:SMASk?

12.4.3.8 Set up the gateway

Command format:	[:SYStem]:LAN:GATeway <value>
Description:	Set up the gateway
E.g:	LAN:GATeway 10.11.13.1
Command format:	[:SYStem]:LAN:GATeway?
Description:	Get the gateway

E.g:	LAN:GATeway?
-------------	--------------

12.4.3.9 Set MAC address

Command format:	[:SYStem]:LAN:MAC <value>
------------------------	---------------------------

Description:	Set MAC address
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E.g:	LAN:MAC 00:00:00:00:a0:42
-------------	---------------------------

Command format:	[:SYStem]:LAN:MAC?
------------------------	--------------------

Description:	Get MAC address
---------------------	-----------------

E.g:	LAN:MAC?
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12.4.3.10 Set GPIB address

Command format:	[:SYStem]:GPIB:ADDRes <value>
------------------------	-------------------------------

Description:	Set GPIB address
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E.g:	GPIB:ADDRes 3
-------------	---------------

Command format:	[:SYStem]:GPIB:ADDRes?
------------------------	------------------------

Description:	Get GPIB address
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E.g:	GPIB:ADDRes?
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12.4.3.11 Restore factory settings data

Command format:	FACTory:RESET
------------------------	---------------

Description:	Restore factory settings data
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E.g:	FACTory:RESET
-------------	---------------

12.4.3.12 Restore default data

Command format:	DEFAult:RESET
------------------------	---------------

Description:	Restore default setting data
---------------------	------------------------------

E.g:	DEFAult:RESET
-------------	---------------

12.4.3.13 Get slave version information

Command format:	SYStem:SLAVE:VERsion?
Description:	Get the channel slave version
E.g:	SYStem:SLAVE:VERsion?

12.4.4 Measure Configuration Command Subsystem**12.4.4.1 Get the measured voltage value**

Command format:	MEASure:VOLTage?
Description:	Get the voltage measurement value of the channel
E.g:	MEASure:VOLTage?
Response:	2.991442\n

12.4.4.2 Get the measured current value

Command format:	MEASure:CURREnt?
Description:	Get the current measurement value of the channel
E.g:	MEASure:CURREnt?
Response:	1.999407\n

12.4.4.3 Get power measurement

Command format:	MEASure:POWER?
Description:	Get the electrical power measurement value of the channel
E.g:	MEASure:POWER?
Response:	19.959515\n

12.4.4.4 Get the running status of the channel

Command format:	MEASure[:RUN]:MODE?
Description:	Get the running status of the channel
E.g:	MEASure:RUN:MODE?
Response:	CV\n

12.4.5 Storage Configuration Command Subsystem

12.4.5.1 Get the specified generic data file

Command format:	[:STORage]:FILE:DATA:STATE?
Description:	Get whether the specified generic data file is valid
E.g:	:STORage:FILE:DATA:STATE? 1
Response:	Exist \n

12.4.5.2 Load the specified generic data file

Command format:	[:STORage]:FILE:DATA:LOAD
Description:	Load the specified generic data file
E.g:	:STORage:FILE:DATA:RECALL 1
Description:	Load the generic data file with NO.1

12.4.5.3 Save the current generic data to the specified generic data file

Command format:	[:STORage]:FILE:DATA:SAVE
Description:	Save the current generic data to the specified generic data file
E.g:	:STORage:FILE:DATA:SAVE 1
Description:	Save the current generic data to the generic data file with No. 1

12.4.5.4 Get the specified List general data file

Command format:	[:STORage]:FILE:LIST:STATE?
Description:	Get whether the specified List data file is valid
E.g:	:STORage:FILE:LIST:STATE? 1
Description:	Exist\n

12.4.5.5 Load the specified List data file

Command format:	[:STORage]:FILE:LIST:LOAD
Description:	Load the specified List data file
E.g:	:STORage:FILE:LIST:RECALL 1

Description:	Load the specified List data file with NO.1
---------------------	---

12.4.5.6 Save the current List data to the specified List generic data file

Command format:	[:STORage]:FILE:LIST:SAVE
------------------------	---------------------------

Description:	Save the current LIST data to the specified LIST data file
---------------------	--

E.g:	:STORage:FILE:LIST:SAVE 1
-------------	---------------------------

Description:	Save the current List I data to the List data file with No.1
---------------------	--

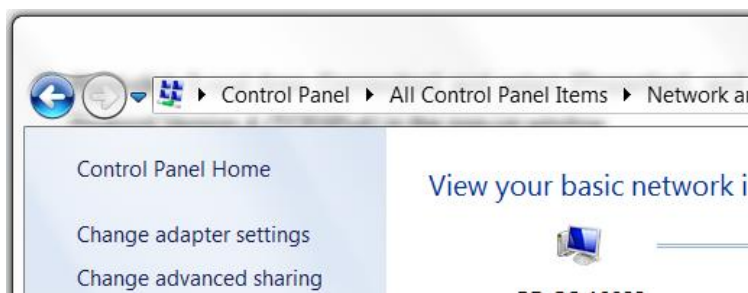
12.5 Web Service

The SPS6000X can be remotely controlled through its embedded web control interface.

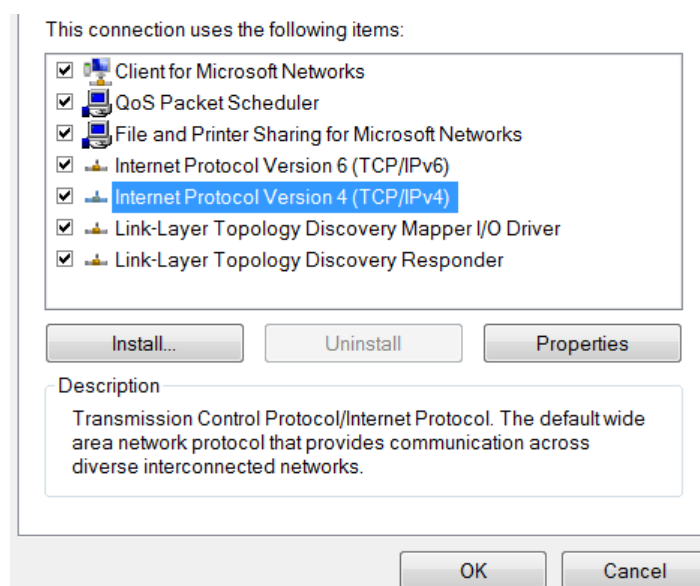
The first connection method:

The computer is not connected to the network, and the SPS6000X and the computer are directly connected through a network cable(cross-over cable). First, set up the computer. The following uses Windows 7 system as an example:

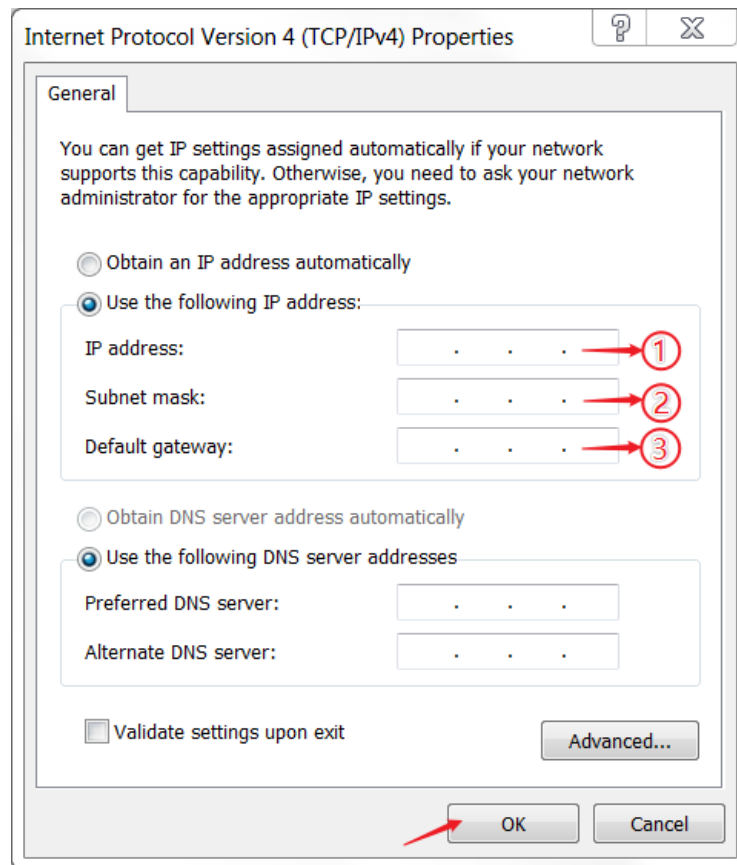
- 1) Open the Network Sharing Center in the control panel and click Change adapter settings



- 2) Right-click [Local Area Connection] and select [Properties], and double-click Internet Protocol Version 4 (TCP/IPv4) in the pop-up window



- 3) Select [Use the following IP address] to set the IP address, subnet mask and default gateway, and click OK after setting
- 4) The PC computer setting is completed.



- ① Set an IP address different from SPS
- ② Set the same subnet mask as SPS
- ③ Set the same gateway as SPS

Set the SPS power supply

Refer to the previous chapter [9.3.3] LAN settings, manually set SPS to be the same as the PC computer subnet mask and default gateway, and set a different IP address. At this point, the PC and SPS settings are completed, and the web page can be opened for remote control.

The second connection method:

SPS and PC are connected to the same network, SPS can automatically obtain IP or manually change the IP address to be connected.

Web interface

After obtaining the IP address of the SPS6000X by any of the above methods, open the Google browser on the PC and directly enter the IP address in the input field to enter.

After configuring the voltage and current on the main interface, you need to click the arrow at the arrow to submit, and the data will be sent to the power supply.

Main settings

	State	Voltage(V)	Current(A)	Power(W)	List	Vset(V)	Iset(A)	Output
CH1	CC	0.014	0.006	0.000	☐	0.5	0	☐ CC ☐ CV

List settings

Add Step: Cycles:

Download Import Export

Step	Vset(V)	Iset(A)	Delay Time(s)	Running Time(s)	Slope_rise(V/s)	Slope_fall(V/s)	Slope Switch	Operation
1							Fast	Delete
2							Fast	Delete
3							Fast	Delete
4							Fast	Delete
5							Fast	Delete
6							Fast	Delete
7							Fast	Delete
8							Fast	Delete

Operating:

Click [Configure] in the left column to switch to the configuration interface

After performing function configuration on the Configure interface, you need to click Submit at the arrow to send the data to the power supply.

Protect

OCP(A): 27.5

OVP(V): 220

OPP(V): 1600

OCP Switch: ☐ OFF ☒ ON

External Configure

Voltage Control: ☒ Local ☐ Ext_V

Current Control: ☒ Local ☐ Ext_V

External Control: ☒ Ext_Loff ☐ Ext_On ☐ Ext_Tripple

On delay time(s):

Off delay time(s):

Configure Output

Slope Mode: ☐ CC ☒ CV

Slope Switch: ☒ Fast ☐ Slope

Vrise(V/s): 4

Vfall(V/s): 4

Irise(A/s): 0.5

Ifall(A/s): 0.5

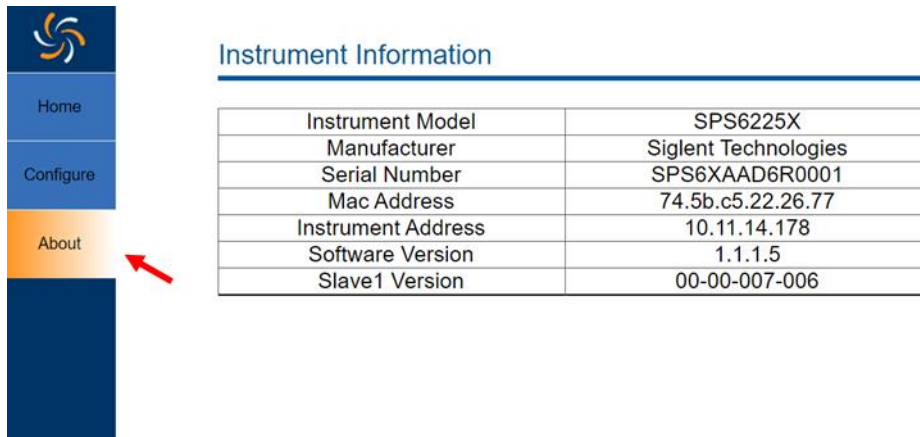
Other

Store Test mode: ☒ Master ☐ Slave

Measure Average: ☐ Low ☐ Middle ☒ High

Submit

Click [About] in the left column to view device information



Instrument Information

Instrument Model	SPS6225X
Manufacturer	Siglent Technologies
Serial Number	SPS6XAAD6R0001
Mac Address	74.5b.c5.22.26.77
Instrument Address	10.11.14.178
Software Version	1.1.1.5
Slave1 Version	00-00-007-006

12.5.1 List operation method:

- 1) Set the channel mode to List mode. Select List, click Submit

	State	Voltage(V)	Current(A)	Power(W)	List	Vset(V)	Iset(A)	Output
CH1	CC	0.008	0.005	0.000	☒	10	5	☐ OFF

- 2) Add the number of List steps

List settings

Add Step Cycles:

Step	Vset(V)	Iset(A)	Delay Time(s)	Running Time(s)	Slope_rise(A/s)	Slope_fall(A/s)	Slope Switch	Operation
1	0	0	0	0	0	0	Fast	Delete
2	0	0	0	0	0	0	Fast	Delete
3	0	0	0	0	0	0	Fast	Delete
4	0	0	0	0	0	0	Fast	Delete
5	0	0	0	0	0	0	Fast	Delete

- 3) Set the voltage and current parameters of each step, and click Download after the output is completed to send the List data to the power supply

List settings

Add Step Cycles:

Step	Vset(V)	Iset(A)	Delay Time(s)	Running Time(s)	Slope_rise(A/s)	Slope_fall(A/s)	Slope Switch	Operation
1	5	2	0	2	0	0	Fast	Delete
2	6	3	0	3	0	0	Fast	Delete
3	7	4	0	4	0.2	0.3	Slope	Delete
4	8	5	0	5	0	0	Fast	Delete
5	0	0	0	0	0	0	Fast	Delete

- 4) Turn on the Output switch of the channel and click Submit. After the setting is successful, the

power supply sets the output according to the number of List steps, and the setting is completed.

Main settings

	State	Voltage(V)	Current(A)	Power(W)	List	Vset(V)	Iset(A)	Output
CH1	CV	6.981	0.004	0.030	☒	10	5	☒ ON

Submit

12.5.2 List file export

The SPS webpage supports exporting the settings of the voltage, current, delay time, running time, and slope of the List steps to the outside in the form of .csv, and click Export to start the export operation.

The exported .csv file supports editing. After opening the .csv file, the user can customize the number of steps and other settings according to the format and then apply it to SPS.

List settings

Add Step Cycles:
Download Import **Export** 

Step	Vset(V)	Iset(A)	Delay Time(s)	Running Time(s)	Slope_rise(A/s)	Slope_fall(A/s)	Slope Switch	Operation
1	0	0	0	0	0	0	Fast ▾	Delete
2	6	3	0	3	0	0	Fast ▾	Delete

Click Import on the webpage and find the file path, then you can import the edited .csv file and apply it to SPS.

List settings

Add Step Cycles:
Download **Import** Export 

Step	Vset(V)	Iset(A)	Delay Time(s)	Running Time(s)	Slope_rise(A/s)	Slope_fall(A/s)	Slope Switch	Operation
1	0	0	0	0	0	0	Fast ▾	Delete
2	6	3	0	3	0	0	Fast ▾	Delete

In addition, the exported .CSV file can also be copied to a USB flash drive, and the application of List storage data can also be realized by inserting the USB flash drive into the power supply for external calling.

13 Troubleshooting

The following lists the power supply in the use of the process of possible failures and troubleshooting. When you encounter these faults, please follow the corresponding steps to deal with them. If you can't handle them, please contact siglent in time.

1. If the power on key is pressed, the power supply is still black, and there is no display:
 - Check whether the power connector is connected properly.
 - After checking, please restart the power supply.
 - If the power supply can not be started normally, please contact SIGLENT.
2. No voltage output by output
 - Check whether the voltage and current settings are correct
 - Check whether the supply is in host mode, whether EXT on/off is in the off state, Volt_ctrl and Curr_ctrl are in the Local state, whether the output delay time is too large, and the slope mode setting is too small, which causes the output voltage to rise slowly.
 - Use the default setting to reset the voltage and current output after restoring the factory settings.
 - If the power supply still cannot be used normally, please contact SIGLENT.
3. U disk cannot be recognized:
 - Check whether the U disk device can work normally.
 - Check whether the power USB HOST interface is working properly.
 - Make sure that the flash-type U disk is used, and that the power supply does not support hard disk-type U disk devices.
 - Re-plug the U disk, or restart the power and insert the U disk again.
 - If you still cannot use the U disk normally, please contact SIGLENT.



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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