APM TECHNOLOGIES

PROFESSIONAL INNOVATIVE BRANDING SERVICE

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SP-3U/6U Series

Wide-range High-power Programmable DC Power Supply

User Manual

Part NO. 18950-745-00

Contents

Version PA, updated June 2021

Preface

Dear Customer,
Thank you for using this SP-3U/6U Series Wide-range High-power Programmable DC Power Supply, a product developed & manufactured by APM Technologies. We sincerely hope this product will meet your needs.

The sections outlined in this user manual are suitable for the following product models.

Power / Voltage	3U			6U		
	6000W	12000W	18000W	24000W	30000W	36000W
80VDC	200A[1]	400A[1]	600A[1]	800A[1]	1000A[1]	1200A[1]
165VDC	-	180A[1]	-	360A[1]	-	540A[1]
250VDC	-	-	180A[1]	-	-	-
360VDC	42.5A	85A	127.5A	170A	212.5A	255A
500VDC	32A	64A	96A	128A	160A	192A
750VDC	21A	42A	63A	84A	105A	126A
1000VDC	-	32 A	-	64A	-	96A
1500VDC	-	21A	32A	42A	-	63A
2250VDC	-	-	21A	-	-	-

Model guide

SP □ ○
- □ Stands for Power
- ○ Stands for Voltage

For example: SP80VDC12000W
Note: SP stands for Switching Power.

[1] It is recommended that to decrease the output current to less than 90% of the rated current if the ambient temperature exceeds 30°C.

Available power levels of supplies in this series range from 6KW up to 36KW. The supplies are available in either Advanced or Professional versions, the second of which offers more features. Optional features can be ordered or added to both the Advanced and Professional versions. Please refer to the table below to compare the Professional and Advanced versions.

NO.	Description	Advanced Version	Professional Version
1	DDS arbitrary function generator	Not supported	Supported
2	Solar panel I-V curve simulation function	Not supported	Supported
3	Smart 3-stage charging algorithm simulation	Not supported	Supported
4	Battery simulator function	Not supported	Supported
5	Built-in Standard Automotive Power Network Voltage Curves	Not supported	Supported
6	Remote I/O control and monitor card	Optional feature	Optional feature
7	LAN & GPIB communication interface	Optional feature	Optional feature
8	Continuous source & sink function*	Optional feature	Optional feature

* This option must be specified at the time of order as it is installed in the factory prior to shipment.

Important Symbols


Warning!

This symbol highlights situations that are potentially dangerous, and highlights essential information that must be understood by the user.


Caution!

This symbol highlights the precautions that users need to take to avoid potential injury while operating equipment.


Note

This symbol highlights an important instruction that needs to be read before using the equipment.

This symbol indicates risk of exposure to high voltage and shock hazard.

This symbol indicates components of the supply that can be at high temperatures. Avoid touching these areas during or immediately after operation of the supply to prevent burns.

This symbol indicates that a grounded connection is required before operating the equipment. The input terminal with this label must be grounded to prevent possible electric shock.

In this manual, panel buttons are denoted by [ ], and software buttons / options are in bold type.

1 About this Manual

1.1 Scope

This manual provides the reader with detailed product information, as well as installation, operation and maintenance instructions. This manual also provides our company contact information, so that you may provide us with any comments about the performance of our products, so that we can continue to improve our product quality and level of service.

1.2 Targeted Audience

This manual is intended for product users and technical support personnel that are involved with installing, operating, and maintaining the product. Readers must be familiar with basic electrical and mechanical schematics.

1.3 Use of this Manual and Legal Notices

The content of this manual will continue to be updated and revised, as errors and discrepancies are inevitable. Please check for the latest version of this manual and further information at: www.apmtech.cn.

2 Unpacking

The procedures outlined in the following section should be followed when first unpacking a power supply from its box.

2.1 List of Contents

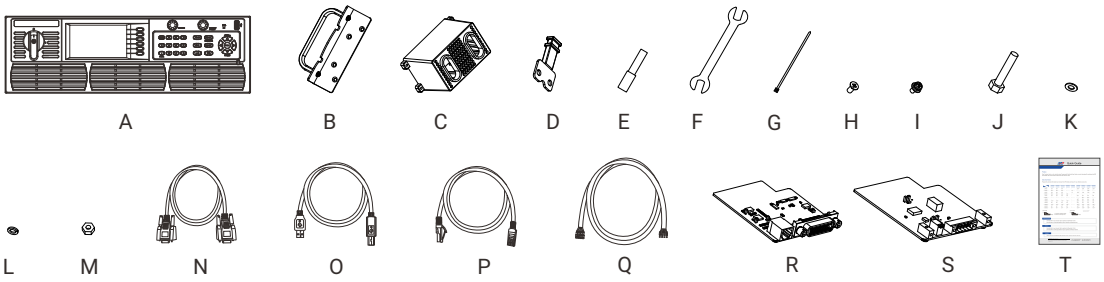
The following accessories are included with each DC power supply. The user should check that all components listed in the table below are present. If one or more of these is missing upon coming inspection of the product, please contact APM Technologies customer service.

Note that AC input and AC output wiring, grid connection devices are NOT included with the power supply.

Please visit our website enpps.apmtech.cn to download the operation manual, programming manual and monitoring software.

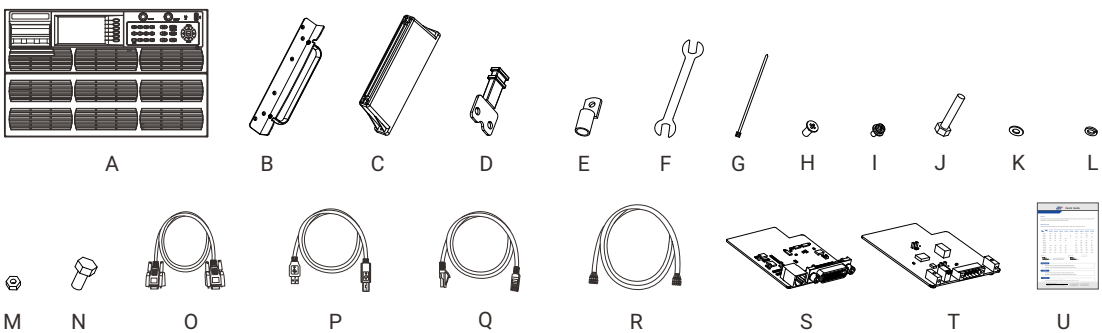
2.1.1 Packing List of 3U Models

Item	Item Included	QTY	Description
A	SP-3U/6U Series Wide-range High-power Programmable DC Power Supply	1	As ordered
B	Rack mount handles	2	Removable
C	Output protective cover	1	Standard
D	Strain relief bracket	2	Support DC output cables
E	Tube type terminals	8	Crimp the AC input cables
F	Wrench 11*13	1	Fasten item L
G	Cable ties	6	Fix input and output cables
H	M4*8 countersunk screws	8	Fasten item A
I	M3*12 screws	4	Fasten item B
J	M6*30 Allen head screws	4	Output terminal bolt
K	M6 flat gasket	8	Output terminal flat gasket
L	M6 spring gasket	8	Output terminal spring gasket
M	M6 Nut	4	Output terminal nut
N	RS-232 communication cable	1	Standard
O	USB communication cable	1	Standard
P	System bus cable	1	Standard
Q	Power cord (4M/10M)	1	Optional
R	GPIB&LAN card	1	Optional
S	CAN card	1	Optional
T	Quick guide	1	English version



2.1.2 Packing List of 6U Models

Item	Item Included	QTY	Description
A	SP-3U/6U Series Wide-range High-power Programmable DC Power Supply	1	As ordered
B	Rack mount handles	2	Removable
C	Output protective cover	2	Standard
D	Strain relief bracket	6	Support DC output cables
E	Ring type terminals	4	Crimp the AC input cables
F	Wrench 11*13	1	Fasten item L/M
G	Cable ties	8	Fix input and output cables
H	M4*8 countersunk screws	12	Fasten item A
I	M3*1 screws	4	Fasten item B
J	M6*30 Allen head screws	12	Output terminal bolt
K	M6 flat gasket	28	Flat gaskets for input and output connections
L	M6 spring gasket	28	Spring gaskets for input and output connections
M	M6 Nut	12	Output terminal nut
N	M6*16 Allen head screws	4	Fasten input cables
O	RS-232 communication cable	1	Standard
P	USB communication cable	1	Standard
Q	System bus cable	1	Standard
R	Power cord (4M/10M)	1	Optional
S	GPIB&LAN card	1	Optional
T	CAN card	1	Optional
U	Quick guide	1	English version



2.2 Optional Components

Item#	Item Included	QTY
1	LAN & GPIB communication card	1
2	LAN cable	1
3	GPIB cable	1
4	CAN communication card	1
5	Remote I/O control and monitor card	1
6	Rack-mount slide kit and screws	1 set
7	Continuous source & sink function*	As ordered

* This option must be specified at the time of order as it is installed at the factory before shipment.

2.3 Checking for Shipping Damage

All APM Technologies products have undergone stringent testing before delivery, but inevitably damage can happen during transportation. Once you receive the product, please immediately check for damage to the product. If you find damage related to the product delivery, please notify the transport company immediately. Make sure to document the damage with photos, and send them to us so that we can provide you with the best service.

⚠ Caution!

- Due to the large weight of the power supply, it is recommended that two people work together in removing the packing from the supply.
- The power supply should not be carried by the front facing handles as they are not designed to carry the entire weight of the supply. The front facing handles are present to assist in sliding the supply in and out of cabinets.

2.4 Product Damage and Repairs

In the unlikely event of product failure, please promptly contact APM Technologies or its dealer, and provide the serial number of the faulty DC power supply. Also provide detailed fault information and pictures to help us identify the cause of the failure. If the power supply does require repair, pack it in the original packing material. Please contact APM prior to any returns to receive authorization for the return.

3 Products Introduction

3.1 General Description

This series of programmable power supply provides high accuracy DC outputs in high power density units. The 19" enclosure design with standard RS232/RS485/USB communication interfaces is especially suitable for automated test systems.

3.2 Product Features

- Large color touch screen with an intuitive graphical user interface(GUI) that provides an excellent operational experience.
- 3-phase input without neutral meets worldwide power distribution regulations. AC mains voltages of 180~265VAC or 340~460VAC options* are available.
- Constant voltage (CV), constant current (CC), and constant power (CP) operation modes, together with CC or CV priority settings.
- DDS arbitrary function generator.
- Solar panel I-V curve simulation function.
- Smart 3-stage charging algorithm simulation function.
- Battery simulator function.
- Continuous source & sink function*, with APM DC electronic load to expand loading capability.
- List/Step programming modes.
- TTL/Analog control and monitoring inputs and outputs.
- Built-in standard automotive power network voltage curves.
- Protections include: OVP, OCP, OPP and OTP.
- Supports parallel or series connections of identical models.
- Supports SCPI commands, and supports web GUI function.

* This option must be specified at the time of order as they are installed at the factory prior to shipment.

3.3 Operating Instructions

This product is a precision instrument, please read this manual carefully before use. In order to ensure measurement accuracy, it is recommended that a calibration check be performed on this product every year by the dealer or suitably trained personnel.

3.4 Operating Environments

1. These power supplies must be used in a clean and dry laboratory or test facility environment with an ambient temperature between 0°C and 40°C, and a maximum relative humidity of 95% at 35°C, or 80% at 40°C.
2. Do not use this power supply in a high ambient temperature environment.
3. Fans cool the power supply by drawing air through the front intake and exhaust the air out its rear face. Please assure that 20 cm of non-obstructed space is allowed in front of, and behind the unit, for proper air flow.
4. Do not operate this product in an environment that contains a significant amount of dust, is subject to strong vibrations, is exposed to direct sunlight, or contains corrosive gases.

3.5 Protect Storage

Please store this product in an area with a temperature between -20 °C and 70 °C. Please keep it in the original carton or other similar packaging and store it in a cool & dry place, if the product is not in use for a long period.

3.6 Maintenance and Cleaning

Before cleaning, assure that the input power cord is disconnected. To clean the product's exterior, use a small amount of non-aqueous cleaning solution such as isopropyl alcohol on a clean cloth or a brush or sponge. Do not use corrosive or abrasive cleaning solutions to clean this product. The front panel display can be cleaned with lens cleaning cloth damped with lens cleaning solution. The clearing of dust buildup internal to the supply must be carried out with a low-pressure air gun. Extensive cleaning is best performed by an authorized dealer on behalf of the user.

3.7 Power Supply Voltage

Ensure that the AC input voltage to be connected is within the product's operating specification before wiring the source connections.

 Caution!

- The protective safety earth/ground connection must be connected before and disconnected after the AC line and neutral wires. All approved AC power connectors are designed to meet this requirement. If the input wires are directly connected to an AC mains circuit, assure that the mains voltage is deactivated prior to connecting or disconnecting the input.

3.8 Fuse

The AC input fuses installed inside the product are designed to protect the input from major failures and should not fail under normal operating conditions. Therefore, any sign of fuse failure is an indication that other parts of the product could be damaged. If the input fuse(s) fail, were commend that the product be sent back to the factory or dealer for repair.

 Warning!

- No user serviceable components are enclosed. Do not disassemble the power supply's enclosure/case to replace the fuse, as there is a danger of sustaining an electric shock.

3.9 Warm-up Time

Once the power supply is switched on, the start-up routine commences and only after it is finished will all features of the unit be operable. However, in order to achieve the specified operating accuracy, it is recommended to allow the power supply to operate for a warm-up time of 30 minutes before activating its output.

3.10 Unit Shutdown

When you have completed operating the unit, please assure that the front panel power switch is set to the “OFF” position. Please note that after the AC power is switched off the internal fan will continue to run for a few seconds to allow the internal capacitors to discharge.

3.11 Operation Precautions

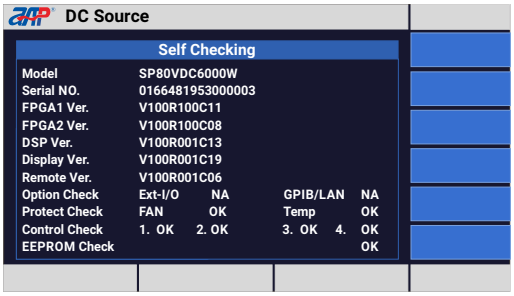
1. When the unit is first turned on, the DC output is normally disabled. It can be activated by pressing the output activation button located on the front panel, or by remote control command.

2. Before activating the DC output, check that all the setting values of the power supply are in accordance with the load requirements.

3.12 Start Procedure

The power source is turned ON using the power toggle switch located on the left-hand side of the front panel. A startup screen will appear as shown below.

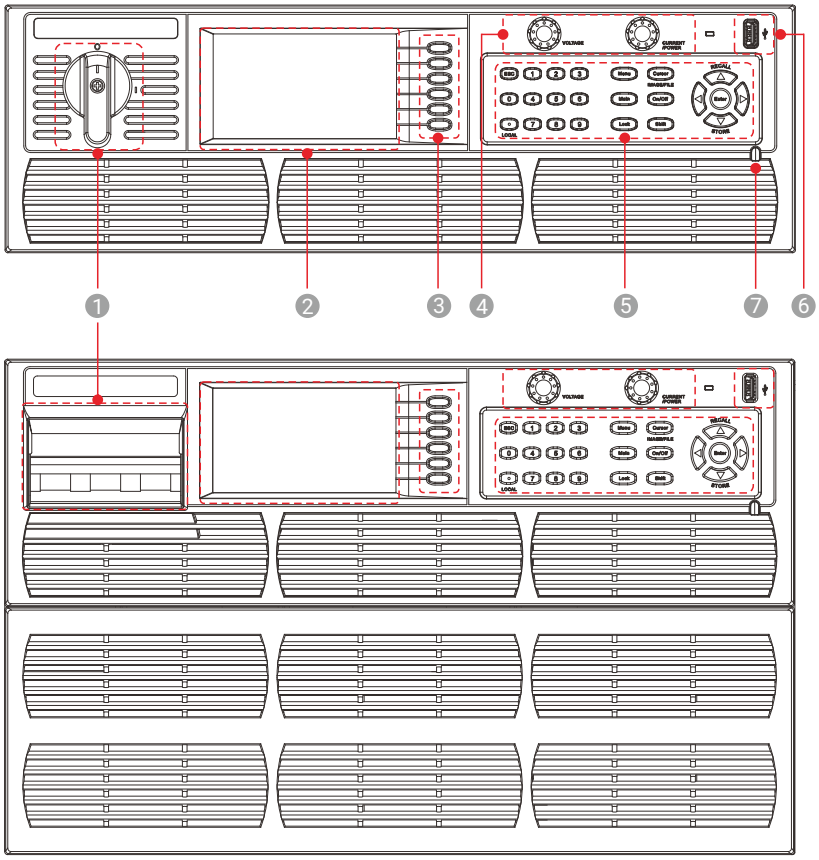
After several seconds, the LCD screen will display the start-up hardware verification and self-tests page.



Please contact APM customer service for support if there are any failed items on this self-checking page. The diagnostics will take several seconds to complete. Once the unit completes the self-tests, the display screen will revert to the main page.

4 Panel Description

4.1 Front Panel Description



❶ Power Switch

For 3U height models, smartly rotate the switch clockwise 90 degrees to turn on the unit. Likewise rotate the switch counterclockwise to turn off the unit. The 6U product is fitted with a mains input circuit breaker on the top left-hand side of the front panel. The power off position of the circuit breaker handle is marked "O". The power on position of the circuit breaker is marked " I".

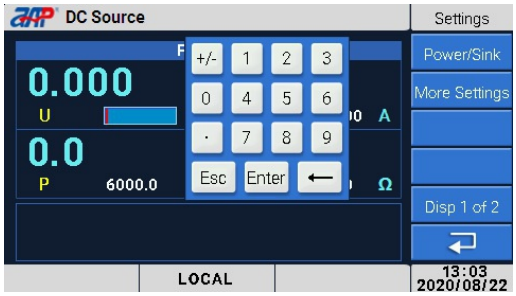
Caution!

- When turning the switch or breaker switch off and then back on, wait at least 30 seconds.

❷ LCD Touch Screen

The LCD touch screen displays all settings, measurements, menus, and warning messages. It is also be used to set parameter values and settings. The touch screen can be controlled by a fingertip or the included stylus ❼ located in the right of the front panel.

All parameters that appear on the screen as yellow characters can be set by the user. To enter parameter values using the LCD screen, press the region of the yellow characters and an on-screen decimal keypad will pop up. Touch the relevant keys on the screen to enter a value and press [Enter] to finalize. To abort an entry, press [ESC] and the source will revert to the previous value.



❸ Menu Selection Soft Keys

The six soft keys located along the right-hand side of the LCD touch screen are used to navigate the sources' menu pages. The labels of these soft keys will change when selecting different menu screens. To select a menu option, either press the menu label on the touch screen or press the soft key directly to the right of the label.

❹ Voltage & Current/Power Setting Knobs

The rotary knobs can be used to increment or decrement the voltage, current, or power settings. The setting value will be effective immediately without pressing the [Enter] key. The knobs operate one digit at a time. To cycle through the digit positions, momentarily press on the rotary knob. The default starting position of the cursor is the first digit after the decimal point.

Note

- If the front panel is locked (the Lock parameter is enabled), the rotary knob is disabled.

❺ Numeric and functional keys

Decimal Keypad

Keys	Purpose	Manual Reference
ESC	Return to previous screen or entry.	[ESC]
0 ~ 9	Allow direct entry of parameter values	[0]~[9]
· / (LOCAL)	Decimal point key/keypad unlock key. Pressing this key can also switch the control mode from remote control back to local/manual control.	[.] / [LOCAL]

Menu Keypad

Keys	Purpose	Manual Reference
Menu	Selects the function setting menu	[Menu]
Cursor / IMAGE/FILE	Selects value field or menu/Screen snapshot, importing and firmware upgrade	[Cursor]/[Shift]+[Cursor]
Main	Returns to the main screen	[Main]
On/Off	Toggles output On or Off	[On/Off]
Lock	Lock all the keys and rotary knob	[Lock]
Shift	This key enables the secondary function indicated by the word under the function keys	[Shift]
RECALL	Recalls the configuration stored in non-volatile memory	[Shift]+ [▲]
STORE	Stores the settings in non-volatile memory	[Shift]+ [▼]
◀	Move the cursor a position up	[◀]
▶	Move the cursor a position down	[▶]
Enter	Confirm key	[Enter]

The secondary function of a key can only be accessed when the [Shift] key is pressed. When the [Shift] key is pressed, it will become illuminated.

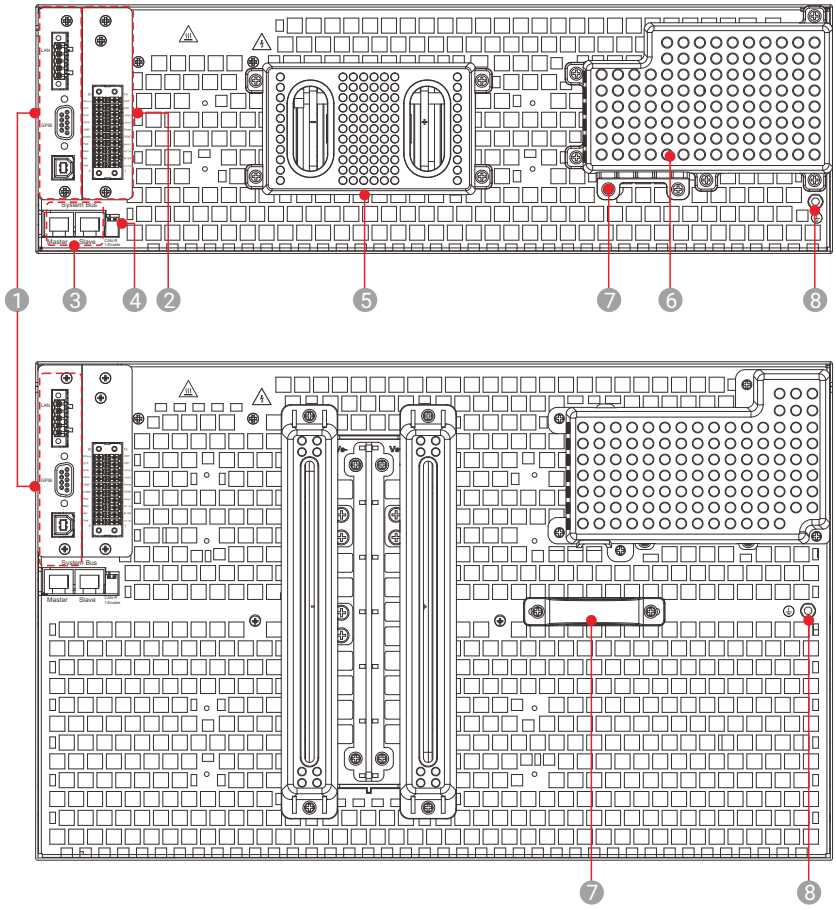
❻ USB Port

This USB port on the front panel is for data transfers and firmware upgrades.

❼ Stylus

For accurately touching the touch screen display.

4.2 Rear Panel Description



1. RS485/RS232/USB communication interface*.
2. External TTL/Analog control interface.
3. System Bus, for master/slave system data transmission.
4. Termination resistor CAN-R.
5. Vs+ and Vs- remote sense connections/DC output plus and minus terminals location
6. AC mains input connector location
7. Strain relief (pre-mounted)
8. Chassis Ground Screw

* The options will be installed in place of the standard RS485/RS232/USB interface, occupying the same physical slot.

5 Menu Operation

5.1 Menu Structure

The table below shows the entire menu system in a single document. Each menu item will be covered in subsequent sections in more detail.

There are three levels of nested menu items under the Main Screen. The main screen is always the first screen displayed after the power supply is turned on. All sub screens can be accessed using the front panel keys or touch screen.

Menu				Description
Setting				
	Power/Sink			
		Power		Enable output power mode only
		Sink		Enable sink mode only
		Power+Sink		Enable power and sink mode at the same time
	More Setting			
		Vdc Slew		
			Enable	Enable slew rate setting
			Rise-V/ms	Voltage rise slew rate setting
			Fall-V/ms	Voltage fall slew rate setting
		Idc Slew		
			Enable	Enable slew rate setting
			Rise-A/ms	Current rise slew rate setting
			Fall-A/ms	Current fall slew rate setting
		Averaging		
			SLOW	Set meter averaging time to 200ms
			MID	Set averaging time to 50ms
			FAST	Set averaging time to10ms
		CC/CV Priority		
			CC Priority	Set CC mode as priority
			CV Priority	Set CV mode as priority
			Rising Slope	Set the voltage or current slew rate regardless of the selected priority.
		HI-Variation		
			ON	Enable the internal minimum load
			OFF	Disable the internal minimum load

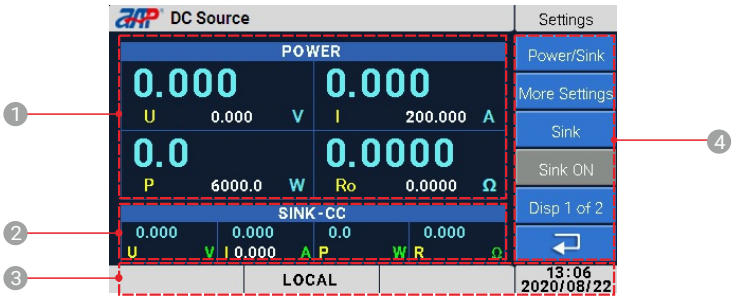
	Sink			
	Sink ON			
	Waveform			
	Limits			
		Vlimit		
			Vlimit-H/V	Set the maximum voltage limit
			Vlimit-L/V	Set the minimum voltage limit
		Ilimit		
			Ilimit-H/A	Set the maximum current limit
			Ilimit-L/A	Set the minimum current limit
		Plimit		
			Plimit-H/W	Set the maximum power limit
			Plimit-L/W	Set the minimum power limit
		Rlimit		
			Rlimit-H/Ω	Set the maximum programmable output resistance
			Rlimit-L/Ω	Set the minimum programmable output resistance
	Protection			
		OVP		
			Enable	Enable Over Voltage Protection
			Delay(s)	Set the OVP delay time
			Level(V)	Set the OVP level
		OCP		
			Enable	Enable Over Current Protection
			Delay(s)	Set the OCP delay time
			Level(A)	Set the OCP level
		OPP		
			Enable	Enable Over Power Protection
			Delay(s)	Set the OPP delay time
			Level(W)	Set the OPP level
		UVP		
			Enable	Enable Under Voltage Protection
			Delay(s)	Set the UVP delay time
			Level(V)	Set the UVP level
		RMP		
			Enable	Enable the Regulation Mode Protection function
			Delay(s)	Set the RMP delay time
			Range	CV-CC or CC-CV, this function turns off the output when the output mode is changed
	Lock			Lock the front panel keys and touch screen

Menu				Description
Menu				
	Config			
		Remote Setup		
			RS232	RS232 communication settings
			RS485	SRS485 communication settings
			USB/GPIB	USB/GPIB communication settings
			LAN	Ethernet communication settings
			CAN	CAN communication settings
		System Setup		
			Buzzer	Enable (ON) or disable (OFF) the audible indicator function
			P-out	Set the output enable control as either On with the set parameter values at shutdown or to OFF when the input power is turned on
			P/O Sta.	Set the default output parameters V, I, P, R, at Power-On
			Password	To enable the password to enter Limits and Protections menus
		EXT Control		
			Setup	External control mode settings
			Monitor	Monitor for external control mode
		System Info.		Product information
		Run Info.		Real time status of the unit (not for each individual 6KW power module)
	LCD Setup			
		Display		LCD brightness control
		Date/Time		Date & Time setting
		Color Test		LCD screen color accuracy test
	Calibration			Power/Sink Mode calibration menu
	Other			
		Recall Def		Recall original factory settings
		Warning Log		History of warning events
		Firmware Upd		Firmware update

Menu			Description
Output Mode			
	PLD Testing		
		List Mode	
		Load	Loads saved list files into the units settings
		Edit	Edits and saves list files
		Program	
		Load	Loads saved program files into the units settings
		Edit	Edits and saves program files
		Step	
		Load	Load saved step files into units settings
		Edit	Edits and saves step files
	Special Func		
		Test Mode	GO/NG testing function
		LV Mode	Enable this to reduce the output low voltage ripple
		Short Mode	Short-circuit protection settings
		MCurr Share	Current sharing for power modules
		Timer Func	ON/OFF Timer control
		Counting Func	Current/Voltage counter test

5.2 Main Page

The MAIN page is shown after power up or whenever the [Main] key is pressed. The purpose of the main page is to display the output parameter settings, metering, and status of the supply. The optional Sink function information is also visible in the lower portion of the page while in Power+Sink mode.



❶ Power Mode Settings & Metering

There are four output parameters that can be set in this area, including Voltage, Current, Power and programmable output resistance.

❷ Sink Mode Settings & Metering

There are four Sink input parameters can be set in this area, including Voltage, Current, Power and Resistance. The sink mode display will only appear if installed and enabled. While in Power +Sink mode, the Sink parameters will be displayed in this area. If the user enables Sink mode only, it will be displayed in area ❶.

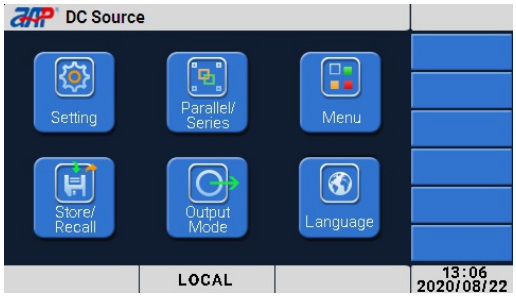
❸ Status bar

The status bar displays the active Operation Mode, Local or Remote states, Alarm information, and the date and time.

❹ Soft keys

There are six soft keys located along the right-hand side of the LCD touch screen used to navigate the various pages of the supplies LCD screen. The labels of these keys will change as the user navigates through the different pages. Menu selections can be made by using the soft keys, or by pressing the menu label text on the touch screen.

5.3 Navigation Page



To access the Navigation page the user can press [ESC] while in the Main page. This page directs the user to all of the supply's different settings and modes.

5.4 Operation Modes

This series of power supply supports three operation modes: Local Control mode, Remote Control mode, and External Control mode. Local Control is the default mode where the user will control the supply with the front panel interface. Remote Control is initiated by connecting the source to a computer. Under Remote Control, all front panel keys are locked except for the [.]/[LOCAL] key. In External Control mode the supply can also be controlled by external digital and analog signals wired to the rear panel of the supply.

5.5 Setting Menu

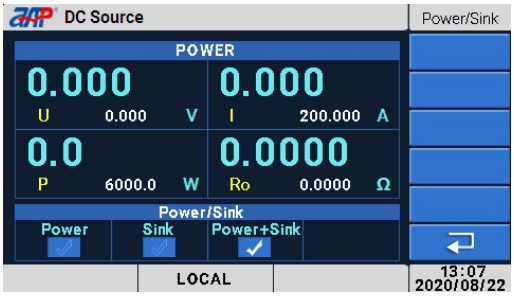
The following soft keys are available in the Settings Page.

- Power/Sink
- More Setting
- Sink *
- Sink On *
- Waveform
- Limits
- Protections
- Lock

* These functions are available on units with Continuous Source & Sink function installed.

5.5.1 Power/Sink Function

If the Sink option is included in your unit(s) the Power/Sink menu can be used to set the source as Power, Sink, or Power+Sink. Select the desired setting using the check-box.



After selecting Power+Sink mode, both the Power and Sink parameter settings are displayed on the Main page.

5.5.2 More Settings Page

This page allows control over the following output settings using the soft keys or touch screen menus:

- Vdc Slew (Output Voltage Slew Rate Control)
- Idc Slew (Output Current Slew Rate Control)
- Averaging (Meter Averaging Time)
- CC/CV Priority (Constant Current or Constant Voltage Priority)
- HI-Variation (Internal Minimum Load On / Off)

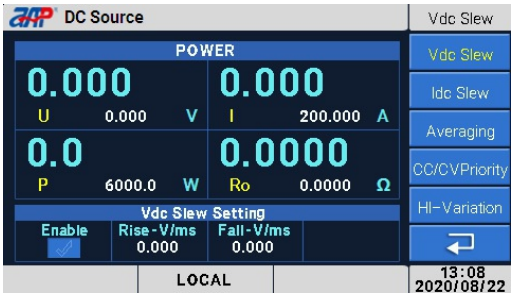
5.5.2.1 Vdc Slew (Output Voltage Slew Rate Control)

This menu allows the user to set the slew rate of the output voltage which includes:

Enable: Enables output voltage slew rate control.

Rise-V/ms: Specifies the voltage rise slew rate in Volts per millisecond.

Fall-V/ms: Specifies the voltage fall slew rate in Volts per millisecond.



5.5.2.2 Idc Slew (Output Current Slew Rate Control)

This menu allows the user to set the output current slew rate, which includes:

Enable: Enables output current slew rate control.

Rise-A/ms: Specifies the current rise slew rate in Amps per millisecond.

Fall-A/ms: Specifies the current fall slew rate in Amps per millisecond.

5.5.2.3 Averaging (Meter Averaging Time)

The **Averaging** soft key controls the amount of the time a reading is averaged for before displaying the result. The available averaging times are SLOW (200ms), MID (50ms) and FAST (10ms).

Using a longer averaging time will reduce reading variation but will slow the measurement update rate.

5.5.2.4 CC/CV Priority

This menu provides CC/CV priority function allows the user to select suitable mode correspond to test requirement, let the output be voltage high speed (CV Priority) or current no overshoot (CC Priority) mode. In CV Priority mode, the user can adjust the current rising slew rate to reduce the possible current overshoot. In CC Priority mode, the user can adjust the voltage rising slew rate to reduce the possible voltage overshoot.

5.5.2.5 HI-Variation

An internal minimum load can be enabled to shorten the output voltage fall time in high speed test applications. This feature should be used with caution, as it is not designed for all applications. The default setting is Auto.

Note

- DO NOT enable this function for applications such as battery testing or similar type loads, or this minimum load will sink the current from the battery.

5.5.3 Sink

This menu will only be available after installing Continuous source & sink function option. Which will enable the unit work as a two-quadrant power supply.

5.5.4 Sink ON

Turn on or turn off the sink function.

Press the **Disp1of 2** soft key to turn back to the first page of the setting menu.

5.5.5 Waveform

The Waveform function displays a visual time domain representation of the DC output.

5.5.6 Limits

The Limits soft key opens the user defined source limits page. User limits are useful to protect a device under test from operator error by setting the upper and lower bounds of a parameter. Once in the page use the soft keys or touch screen to select the particular limit page desired. The user limits must fall within the setting limits of the power source. The four limit parameters that can be set are:

- Vlimit
- Ilimit
- Plimit
- Rlimit

5.5.6.1 Vlimit

This page allows the user to set the upper and lower bounds of the output voltage. Touch the particular limit needing to be set and use the keypad or knob to adjust the parameter limit value.

5.5.6.2 Ilimit

This page allows the user to set the upper and lower bounds of the output current.

5.5.6.3 Plimit

This page allows the user to set the upper and lower bounds of the output power.

5.5.6.4 Rlimit

This page allows the user to set the upper and lower bounds of the programmable output resistance.

Note

- Please refer to 5.7.1.2.4 Password section to enable the password setting to enter into Limits page.

5.5.7 Protections

User defined output protection levels can be defined for output Over Voltage (OVP), output Over Current (OCP), and output Over Power (OPP). Other essential protections such as Over-Temperature Protection (OTP) of the source are always enabled but these cannot be adjusted from the factory setting. Output RMS protection can also be defined from this menu. To edit a particular protection setting, enter its page by selecting it with the soft keys or touch screen.

5.5.7.1 OVP (Over Voltage Protection)

The Over Voltage (OVP) threshold range is adjustable from 0.0V to 1.10 times the units' rated output voltage. The associated delay time value can be set from 1ms to 10s.

5.5.7.2 OCP (Over Current Protection)

The Over Current Protection (OCP) threshold range is adjustable from 0.0A to 1.10 times the units maximum rated current. The associated delay time setting can be set from 1ms to 10s.

5.5.7.3 OPP (Over Power Protection)

The Over-Power Protection (OPP) threshold range is adjustable from 0.0W to 1.1 times the units rated power. The associated delay time setting can be set from 1ms to 10s.

5.5.7.4 UVP (Under Voltage Protection)

The Under Voltage (UVP) threshold range is adjustable from 0.0V to 1.10 times the units' rated output voltage. The associated delay time value can be set from 1ms to 10s.

5.5.7.5 RMP (Regulation Mode Protection)

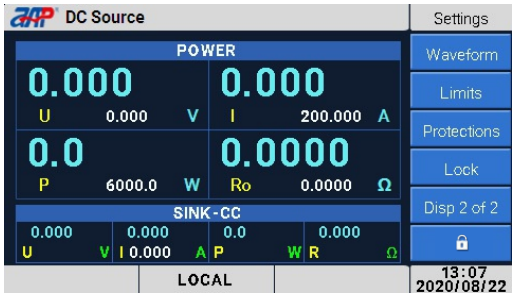
The Regulation Mode Protection function is an optional protection mechanism that will turn off the output when the output mode transitions between CV and CC mode. The protection can be chosen to engage on either the transition from CV to CC mode, or the transition from CC to CV mode. Only one of these two conditions can be enabled at any one time. The delay between the protected transition event and the RMP can be set with the delay time.

Note

- Please refer to 5.7.1.2.4 Password section to enable the password setting to enter into Protection page.

5.5.8 Lock

The front panel can be locked to prevent unwanted changes to the supply while it is in operation. A lock symbol will be displayed in the bottom right soft key position to indicate that the source is locked. Press the decimal [.] key on the numeric keypad to unlock the front panel.



5.6 Parallel and Series Operation

Parallel and Series configurations are described in Section 6 of this manual.

5.7 Menu

The following menu options are available on the Menu page:

- Config
- LCD Setup
- Calibration
- Other

5.7.1 Config

The Configuration page allows selection of the following aspects of the power source:

- Remote Setup
- System Setup
- EXT Control (External Control)
- System Info.
- Run Info.

5.7.1.1 Remote Setup

The remote setup page provides access to all six available remote communication interface configuration pages:

- RS232
- RS485
- USB/GPIB
- LAN
- CAN

To configure an interface, press the corresponding soft key and adjust the settings in the interface's menu.

Note

- For your particular unit(s) some of Remote Setup configuration pages may be not supported because the LAN, GPIB, and CAN interfaces are optional.

5.7.1.1.1 RS232 Settings

From the Remote Setup page, press the **RS232** soft key to enable and change the RS232 interface settings. Set the Baud-rate, Parity and Stop bits fields to the desired settings using the check boxes. Press the [Esc] key when finished to return to the Remote Setup page.

The R232 parameters are:
Enable: On/Off.
Length: Fixed at 8.
Baud Rate: 9600, 19200, 38400, 57600, 115200.
Parity: NONE, ODD, EVEN.
StopBits: 1, 1.5, 2.

5.7.1.1.2 RS485 Settings

From the Remote Setup page, press the **RS485** soft key to enable and change the RS485 interface settings. Set the Address, Baud-rate, Parity, Mode, and Stop bits fields to the desired settings using the check boxes. Press the [Esc] key when finished to return to the Remote Setup screen.

The R485 parameters are:
Enable: On/Off.
Length: Fixed at 8.
Addr (Address): 1~254
BaudRate: 9600, 19200, 38400, 57600, 115200.
Parity: NONE, ODD, EVEN.
Mode: SCPI, Modbus.
StopBits: 1, 1.5, 2.

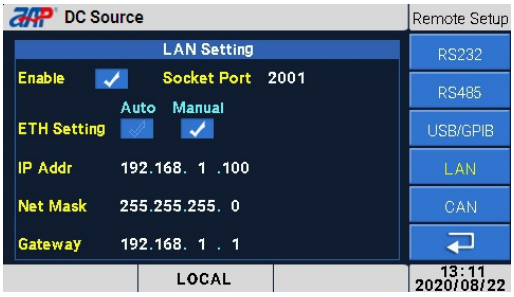
5.7.1.1.3 USB/GPIB Settings

From the Remote Setup page, press the **USB/GPIB** soft key to enable and change the USB/GPIB interface settings. Set communication mode GPIB address to the desired value if relevant. Press the [Esc] key when finished to return to the Remote Setup screen.

The USB/GPIB parameters are:
Enable/USB: On/Off (enables USB communication mode).
Enable/GPIB: On/Off (enables GPIB communication mode).
GPIB Address: 1~30.

5.7.1.1.4 LAN Settings

From the Remote Setup page, press the **LAN** soft key to enable and change the LAN interface settings and addresses. Press the [Esc] key when finished to return to the Remote Setup screen.

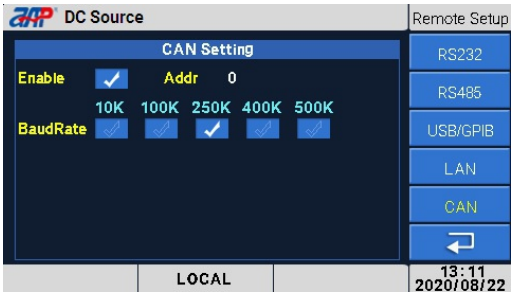


The LAN parameters are:
Enable: On/Off.
ETH Setting: Auto or Manual. Auto mode uses DHCP to allocate an IP address, and manual mode relies on the user to input a static IP address for the source to use.
IP Addr: 0~255.
Net Mask: 0~255.
Gate Way: 1~254.
Socket Port: Ethernet Socket Number.

The factory default Ethernet settings are:
ETH Setting = Manual
IP Address = 192. 168. 1.100
Net Mark = 255. 255. 255.000
Gate Way = 192.168. 1.1
Socket Port = 2001

5.7.1.1.5 CAN Settings

From the Remote Setup page, press the **CAN** soft key to enable and change CAN interface settings. Press the [Esc] key when done to return to the Remote Setup screen.

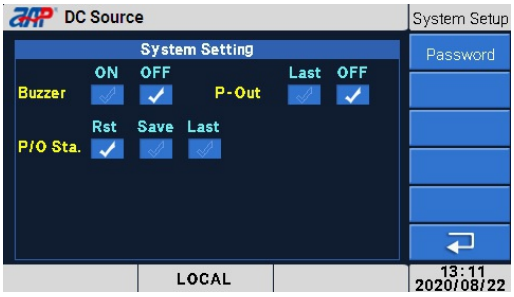


The CAN parameters are:
Enable: enables CAN communication mode.
Addr: 0~127.
BaudRate: 10K, 100K, 250K, 400K, 500K.

5.7.1.2 System Setup

The System setting page is used to configure the following resources of the power source:

- Buzzer
- P/O Sta. (Power On State)
- P-Out (Output State)
- Password



5.7.1.2.1 Buzzer

The audible indication buzzer can be turned on or off by selecting ON or OFF in the System Setup menu. When turned ON, an audible beep will sound each time a key or rotary knob is pressed. If audible indication is not desired, turn the buzzer sound OFF.

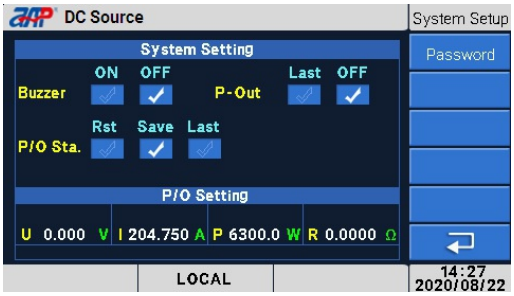
5.7.1.2.2 P/O Sta. (Power On State)

The Power On State function allows the source to be set to the previous voltage, current, power, and resistance values upon unit startup. Available selections are:

Rst (Reset): The power source will NOT store any settings when it is powered off and will initialize with factory defaults at the next power on.

Save: In this mode, a user-defined configuration can be assigned for recall when the power source is turned on. This means the power supply will always turn on with the values of this specific configuration. One can set the parameters shown under the P/O Setting heading near the bottom of the page to the desired values.

Last: The power supply will store the settings in effect when the supply was last powered off, and will recall the same settings at power on. This means the unit will power up in the same conditions as when it was turned off.



5.7.1.2.3 P-Out (Power on Output State)

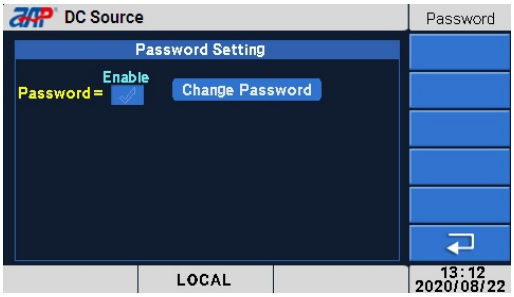
The Power on Output State controls whether or not the output is enabled directly after power on. The following the two options are available:

Last: The power supply will save the output settings in effect when it was last powered off, and will recall this same setting at power on.

OFF: The output of the power supply will remain off at power on.

5.7.1.2.4 Password

The user can enable the password to enter Limits and Protections menus in this page. The password must be a 6-digital password.



Enable: Enables password function.
Change Password: Click here to enter password setting page.
Original Password: The original password is a NULL password when first time to enable password function.
New Password: Enter the new password here.
Confirm Password: Re-enter the same password.
Apply: Confirm the changes.
Cancel: Click to cancel changes to password.

5.7.1.3 EXT Control

The power supply can be controlled and monitored using external digital and analog signals connected to the appropriate terminals on the back panel.

Note

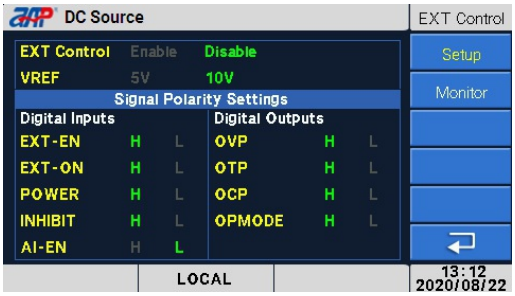
- Before you begin, please read these important notes about the use of the external control interface:

1. Before any hardware is connected to the analog interface, the user must ensure that the external hardware will not apply signal levels exceeding the maximum ratings of the interface (Please see table below to learn of these maximum signal levels).

2. Set signal pins such as Vset, Iset, Pset and Rset (if R mode is activated), cannot be left floating while using the control interface. If any inputs are not used for adjustment, they can be connected to a defined level such as VREF, which will act as the maximum value or connected to analog ground to act as the minimum value.

5.7.1.3.1 Setup

The external control Setup page defines the active levels of signals and event triggers depending on the needs of the test setup.



The external control parameters are:

EXT Control: Enables/disable external control mode.

VREF: The External Control reference voltage, can be set to either 5V or 10V.

Digital Inputs:

EXT-EN: Defines the polarity of the external control module enable signal. The default setting is High. And EXT-EN pin is prior than EXT Control setting. If EXT-EN is active, EXT Control Disable will be overridden, and the EXT Control interface will be enabled. Set EXT-EN to Low level will enable external control directly.

EXT-ON: Defines the polarity of the external control module output enable signal. The default setting is High. Set EXT-ON to Low level will enable the output directly.

POWER: Defines the power supply work in Power mode or Sink mode. The default setting is High, and the unit is in Power mode. When define this signal to Low level, the unit will work in Sink mode.

INHIBIT: Defines the polarity of the external inhibit signal, disables output when active. The output remains disabled until the Inhibit input is returned to logic-false. The default setting is High logic level.

AI-EN: Analog input enable. The default setting is Low logic level.

Digital Outputs:

OVP: Over voltage protection alarm active.

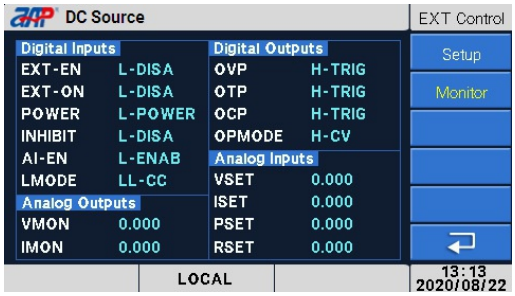
OTP: Over temperature protection alarm active.

OCP: Over current protection alarm active.

OPMODE: Indicates the operating state in Power mode.

5.7.1.3.2 Monitor

The Monitor page displays the state and polarity of the external control module pins. This page is for information purposes only as no settings can be configured using it.



Analog Interface Specification

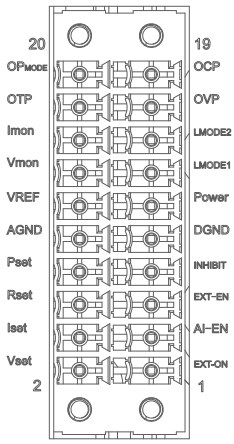
Pin	Name	Type*	Description	Default levels	Electrical specification
1	EXT-ON (corresponding to SW for early DC power supply)	DI	DC output ON/OFF	Active high; Logic low : Vin < 1V; Logic high : Vin > 4V;	Voltage range=0~30V, U Low<1V; Imax=-1mA at 5V; U Low to High typ.=3V Sender: Open collector referred to DGND
2	Vset	AI	Sets voltage value	0~VREF corresponds to 0~100% of Umax	Accuracy: <0.2%Umax Input impendence Ri> 40k
3	AI-EN (corresponding to NA for early DC power supply)	DI	Analog input enable/disable	Active low; Logic low : Vin < 1V; Logic high : Vin > 4V;	Voltage range=0~30V, U Low<1V; Imax=-1mA at 5V; U Low to High typ.=3V Sender: Open collector referred to DGND
4	Iset	AI	Sets current value	0~VREF corresponds to 0~100% of Imax	Accuracy: <0.2%Imax Input impendence Ri> 40k
5	EXT-EN (corresponding to ENAB for earlyDC power supply)	DI	External control mode enable/disable	Active low; Logic low : Vin < 1V; Logic high : Vin > 4V;	Voltage range=0~30V, U Low<1V; Imax=-1mA at 5V; U Low to High typ.=3V Sender: Open collector against DGND
6	Rset	AI	Sets internal resistance value	0~VREF corresponds to 0~100% of Rmax	Accuracy: <0.2%Rmax Input impendence Ri> 40k
7	Inhibit	DI	Inhibits (turn off) the output	Active high; Logic low : Vin < 1V; Logic high : Vin > 4V;	Voltage range=0~30V, U Low<1V; Imax=-1mA at 5V; U Low to High typ.=3V Sender: Open collector referred to DGND
8	Pset	AI	Sets power value	0~VREF corresponds to 0~100% of Pmax	Accuracy: <0.2%Pmax Input impendence Ri> 40k
9	DGND	POT	Ground for all digital signals		For control and status signals
10	AGND	POT	Ground for all analog signals		For parameter setting, monitoring and VREF signals

<table>
<tr><th>Pin</th><th>Name</th><th>Type*</th><th>Description</th><th>Default levels</th><th>Electrical specification</th></tr>
<tr><td>11</td><td>Power</td><td>DI</td><td>Switches the external control between Power mode and Sink mode</td><td>Active high;
Logic low : Vin < 1V;
Logic high : Vin > 4V;</td><td>Voltage range=0~30V, U Low<1V;
Imax=-1mA at 5V; U Low to High typ.=3V
Sender: Open collector referred to DGND</td></tr>
<tr><td>12</td><td>VREF</td><td>AO</td><td>Reference voltage</td><td>10V or 5V</td><td>Tolerance < 0.2% at I max = +5mA
Short-circuit-proof to AGND</td></tr>
<tr><td>13 & 15</td><td>LMODE1& LMODE2 (corresponding to L-M0&L-M1 for early DC power supply)</td><td>DI</td><td>Sets the operation mode for the Sink function</td><td><table><tr><th>LMODE 2</th><th>LMODE 1</th><th>Mode</th></tr><tr><td>Low</td><td>Low</td><td>CC</td></tr><tr><td>Low</td><td>High</td><td>CV</td></tr><tr><td>High</td><td>Low</td><td>CP</td></tr><tr><td>High</td><td>High</td><td>CR</td></tr></table>U Low<1V, U High >4V;</td><td>Voltage range=0~30V,
U Low<1V;
Imax=-1mA at 5V; U Low to High typ.=3V
Sender: Open collector referred to DGND</td></tr>
<tr><td>14</td><td>Vmon</td><td>AO</td><td>Output voltage monitor</td><td>0~10V or 0~5V correspond to 0~100% of Umax</td><td>Tolerance < 0.2% at I max = +2mA
Short-circuit-proof to AGND</td></tr>
<tr><td>16</td><td>Imon</td><td>AO</td><td>Output current monitor</td><td>0~10V or 0~5V correspond to 0~100% of Imax</td><td>Tolerance < 0.2% at I max = +2mA
Short-circuit-proof to AGND</td></tr>
<tr><td>17</td><td>OVP</td><td>DO</td><td>Overvoltage alarm</td><td>Alarm OVP=High,
U High>4V;
No alarm OVP=Low,
U Low<1V;</td><td>Quasi open collector with pull-up to Vcc (approx. 10V). With 5V on the pin max. flow= +1mA. Imax=-10mA at Vce=0.3V, Umax=30V. Short-circuit-proof to DGND.</td></tr>
<tr><td>18</td><td>OTP</td><td>DO</td><td>Over Temperature protection alarm</td><td>OTP alarm =High,
U High>4V;
No OTP alarm =Low,
U Low<1V;</td><td>Quasi open collector with pull-up to Vcc (approx. 10V). With 5V on the pin max. flow +1mA. Imax=-10mA at UCE=0.3V, Umax=30V. Short-circuit-proof against DGND.</td></tr>
<tr><td>19</td><td>OCP</td><td>DO</td><td>Over current alarm</td><td>OCP alarm =High,
U High>4V;
No OCP alarm =Low,
U Low<1V;</td><td>Quasi open collector with pull-up to Vcc (approx. 10V). With 5V on the pin max. flow= +1mA. Imax=-10mA at Vce=0.3V, Umax=30V. Short-circuit-proof to DGND.</td></tr>
<tr><td>20</td><td>OPMODE</td><td>DO</td><td>Indicates the operating state in Power mode</td><td>CV=Low,
U Low<1V;
CC/CP/CR=High,
U High>4V;</td><td>Quasi open collector with pull-up to Vcc (approx. 10V). With 5V on the pin max. flow= +1mA. Imax=-10mA at Vce=0.3V, Umax=30V. Short-circuit-proof to DGND.</td></tr>
</table>

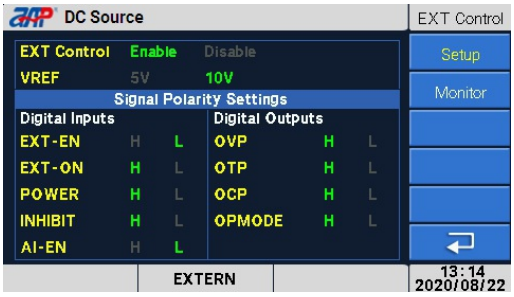
* AI=Analog Input, AO=Analog Output, DI=Digital Input, DO=Digital Output

5.7.1.3.3 External Control Example

Application examples

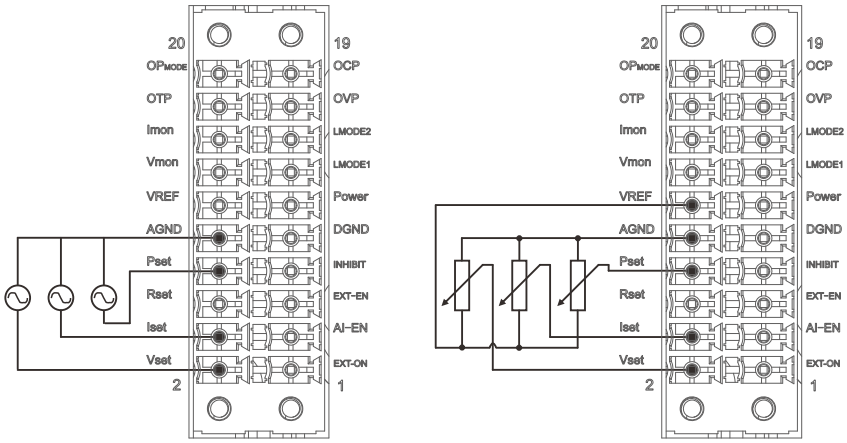


1) Enabling the interface with an active low EXT-EN.
Enable the EXT Control interface in the EXT Control page by setting EXT Control to Enable. The same effect can also be achieved by setting the polarity of 'EXT-EN' to 'L' in the menu but no need to grounding the pin.

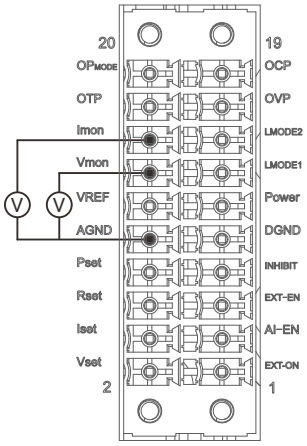


Note: If the EXT-EN signal is true, the enable will override the EXT Control Disable setting.

2) External Control with using external voltage sources or potentiometers.
The power source can be controlled through the external control interface by using voltage sources or potentiometers as in the picture below. Select the internal reference voltage to be 5V or 10V depending on the desired levels of the external hardware. Next adjust the external voltage inputs (0~5V or 0~10V) or external potentiometers (0~5kΩ or 0~10kΩ) to remotely adjust the power supply output voltage and current regulation settings, where VREF indicates the maximum level and 0V indicated the minimum level.

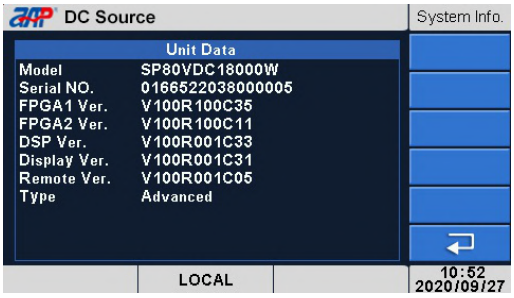


3) Reading the actual values:
Use a standard multimeter to monitor a representation of the output voltage and current as indicated by the control signals Vmon and Imon as in the image below.



5.7.1.4 System Info.

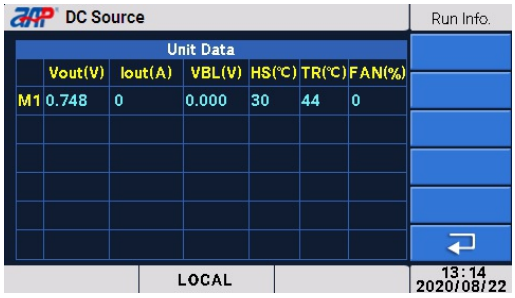
This page is for informational purposes only. The user may be asked to provide some of the information shown on this screen to assist customer service for remote service and diagnostics.



5.7.1.5 Run Info.

This page provides real time metrics of internal power module. This page is for informational and diagnostic purposes only.

Note: Below is not the running information for each power module, the location of the update data depends on the connection mode inside.



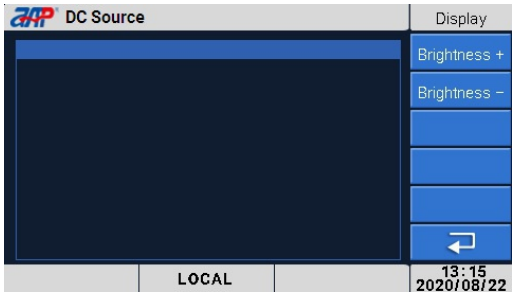
5.7.2 LCD Setup

The LCD Setup page allows selection of the following aspects of the LCD display screen adjustment.

- Display
- Date/Time
- Color Test

5.7.2.1 Display

The two soft keys on this page control the LCD brightness. The brightness can be adjusted by momentarily touching the **Brightness+** or **Brightness-** keys. Adjust the display brightness as needed for best viewing experience.

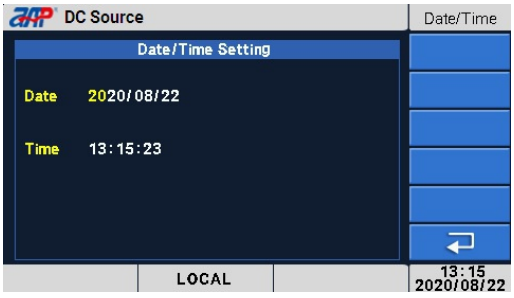


5.7.2.2 Date/Time

The power supply contains a real time clock that can track both date and time. The real time clock is initialized upon factory assembly, but will have to be adjusted to match the local date and time of the end user's location. The procedure to set the date and time is as follows:

Press the **Date/Time** soft key to display the present date and time settings. Select the year, month, day, hour, and second fields individually by pressing the digits of each time segment with the stylus.

Once a field is selected, use the [0] ~ [9] keys to adjust the selected segment of the local date and time. Press the [Enter] key to confirm each segment after entry.



5.7.2.3 Color Test

To verify that the LCD screen is working properly, the Color Test function displays a pattern of colors to confirm the color accuracy of the screen. This is simply a verification test and there are no adjustments to correct color accuracy.

5.7.3 Calibration

For calibration information, refer to Section 7.

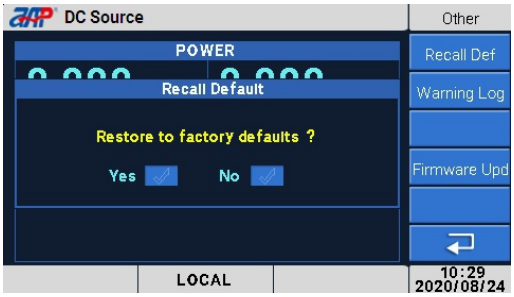
5.7.4 Other

The Other page contains some miscellaneous system settings. The following items can be configured from this page:

- Recall Def
- Warning Log
- Firmware Upd

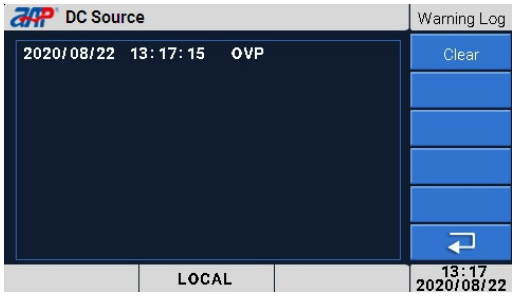
5.7.4.1 Recall Def (Recall Defaults)

The Recall Defaults pop-up page can be used to recall the original factory (default) settings of the power supply. Doing so will erase the current parameter settings and replace them with the default values.



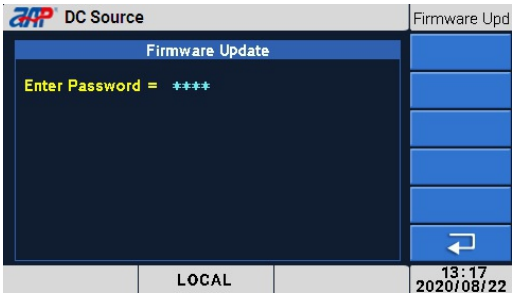
5.7.4.2 Warning Log

The warning log tracks all error and warning messages that have been generated by the power supply. For each event in the log a time and date stamp, error code, and a short description of the event is included. Press the **Clear** soft key will clear all the warning messages.



5.7.4.3 Firmware Upd (Firmware Update)

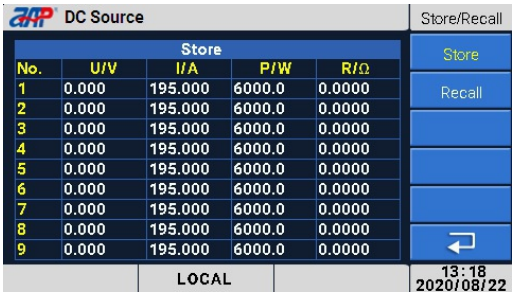
This page is used to initiate firmware updates. The APM factory or dealer will provide updated firmware to the user if an update is recommended.



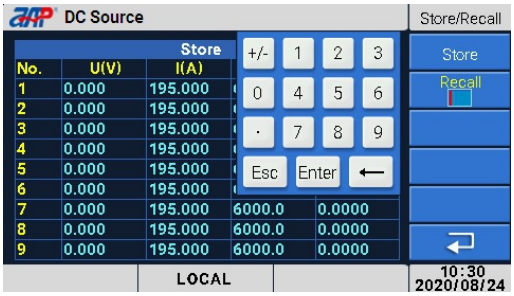
5.8 Store/Recall

The Store/Recall page is used to save and recall power supply parameter configurations. The power supply has 9 allocated non-volatile storage registers to save the units parameter settings including output V, I, P and R.

To save an output setting setup, first press the **Store** soft key, then press on the desired parameter setting to save, and use the [0]~[9] keys to enter the setting directly.



To recall an existing output setting, press the **Recall** soft key, and use the [0]~[9] keys to enter the register number to recall. Finish the entry with the [Enter] key to recall the output settings.



5.9 Output Mode

The Output Mode page provides access to special functions and built-in test modes.

The following soft keys are available from the Output Mode screen:

- PLS
- Special Func

5.9.1 PLS Testing

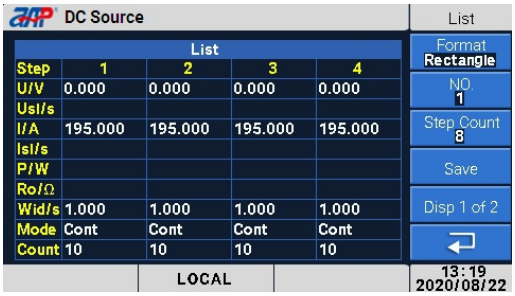
This page allows the user to program an output sequence in one of the following modes:

- List
- Program
- Step

5.9.1.1 List Mode

The List mode is the simplest and most versatile PLS output mode. It allows a sequence of output values to be programmed as a sequential list. Press the **Edit** soft key to enter the list file editor page to begin programming a sequence.

Non-volatile memory is allocated for up to 30 individual list files, corresponding to list # 1 up to list # 30. To begin writing a new list, select an unallocated list number and fill in the list parameter values. Previously saved lists can also be edited by selecting their list number in the editor. Press the **Save** key to finish the entry. A list must be saved in order to execute it.



The soft keys available in the List editor are:

Format: Includes three options: Rectangle, S-Ramp, and F-Ramp. Each option has progressively more controls in terms of slew rate and other limits.

NO. : List file number.

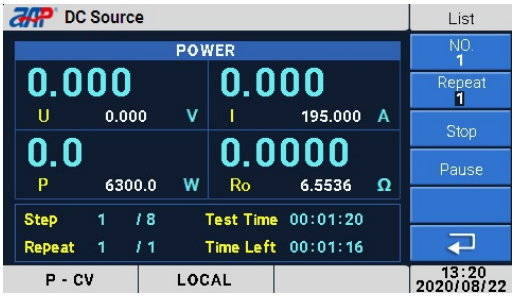
Step Count: Set the total number of steps in the current list file, which can range from 1 through 8.

Save: Saves the list to the memory when entry is completed.

The descriptions of the each setting in the list file editor is as follows:
U/V: Voltage setting.
Usl/s: Voltage slew rate.
I/A: Current setting.
Isl/s: Current slew rate.
P/W: Power setting.
Ro/Ω: Programmable output impedance setting.
Wid/s: Width of step in seconds.
Mode: List execution mode - Cont (continuous) or Step (once).
Count: Number of times the step will be repeated.

To run a saved sequence from memory, return to the List page and press the **Load** soft key to download all the settings to the units control.

Then the display will jump to the following page where a list file can be executed and monitored:



The available options on the list execution page are:
NO. : List file number.
Repeat: Specifies the number of times the selected list should be repeated. Setting this value to zero repeats the list indefinitely.
Trigger: Begins the execution of the selected list file. Once pressed, this soft key will change to Stop which when pressed will terminate the list execution.
Pause: Pauses the list execution. Once pressed, this soft key changes to Continue. Upon pressing Continue, the list execution will continue from where it was paused.

The progress of the list file execution can be seen in the bottom of the screen, showing the user which step is being executed, what repeat number the test is on, and test timing.

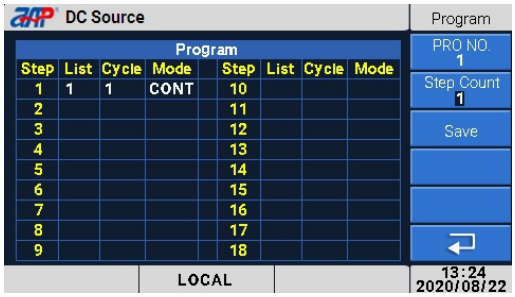
Note

- If the transient execution mode is set to Step, the output state will hold on the last step until the next pressing of the Trigger key.
- If a list execution is interrupted by pressing the Stop key, when in Cont mode it will start at the beginning of the list or when in Step mode it will resume from the current step.

5.9.1.2 Program mode

The Program mode allows the user to construct long sequences using multiple pre saved list files.

To begin making a program file, one or more list files should previously be saved in memory as per the List Mode section of this manual. Press the **Edit** soft key to make or edit program files in the Program File editor. To edit an existing program saved in memory, select its number in the program number field. A program file consists of steps just like a list file, except each program step executes an entire list file before continuing to another program step. To begin a new program file, select an unused program number (PRO NO.) before adding any entries.



The available menu options are:
PRO NO.: Program file number.
Step Count: Enter the total number of steps in the selected program file, which ranges from 1 through 18.
Save: Save the Program to memory when entry is complete.
List: List file number to load.
Cycle: Number of times to repeat the list file in a given program step.
Mode: Continuous or Step.

When the Program edits are complete, press the **Save** soft key to save all changes made to the program. A program cannot be executed unless it is first saved. Failure to save a list will also cause it to be lost when the power source is turned off. Press the [ESC] key return to the Program page.

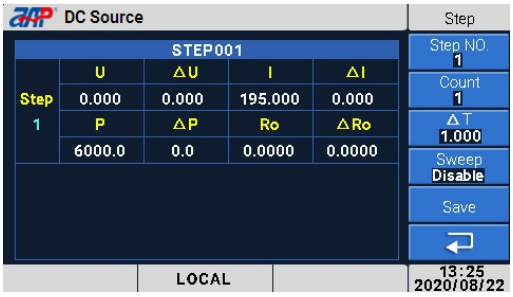
To execute a previously saved program, press the **Load** soft key to navigate to the Program Execution page. Then select the desired program number to load for execution.

The available menu options are:
NO.: Program file number to load.
Repeat: The number of times to repeat the program file. A repeat count of zero indicates infinite looping.
Trigger: Begins the execution of the chosen program file. Once pressed, this soft key will change to **Stop** which when pressed will terminate the program execution.
Pause: Pauses the program execution. Once pressed, this soft key changes to **Continue**. Upon pressing Continue, the program execution will continue from where it was paused.

5.9.1.3 Step Mode

The step mode allows the output state to perform a step function, changing any combination of voltage, current, power, or resistance. The step function consists of two points, which should differ in value across the available voltage, current, power, or resistance settings.

To begin making a step file, press the **Edit** soft key to enter the step file editor.
Write a new step file by selecting an unused step number, or edit an existing step by selecting an already allocated step number.



The available menu options are:
Step NO. : Step file NO.
Count: Number of times to repeat the step.
ΔT: The length of a step in seconds.
Sweep: Power sweep function enable/disable.
Save: Saves the step file under step number.

When the Step file edits are complete, press the **Save** soft key to save all changes made. A step file must be saved in order for it to execute. Failure to Save a step file will cause it to be lost when the power source is turned off.

To execute a step file, press **Load** from the step menu, and then press **Trigger** to execute the step file. A step file execution can be paused when running using the **Pause** soft key, or can be terminated using the **Stop** soft key.

The progress of the step function test is displayed near the bottom of the screen. This window will update in real time as the step file is running, showing the total run time and time remaining in the test.

Sweep Mode

The step mode has a built in sweep function that increments from a starting voltage to an ending voltage as a step ladder. In this mode, the steps are applied till the end value is reached after the specified number of counts. If Sweep mode is enabled, the measurements will be displayed at the end of the sweep.

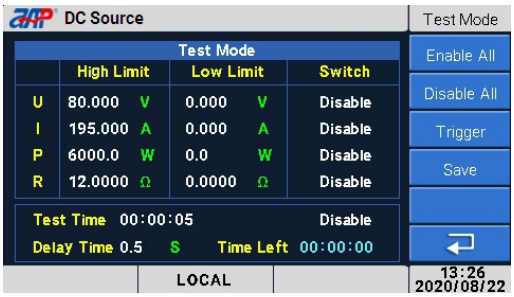
5.9.2 Special Func (Special Functions)

This series of power supply supports the following special test functions:

- Test Mode
- LV Mode (Low Voltage Mode)
- Short Mode
- MCurr Share (Module Current Share)
- Timer Func (Timer Function)
- Counting Func (Counting Function)

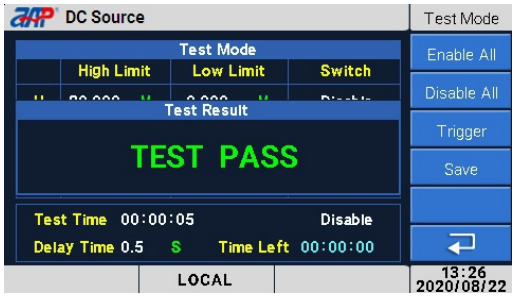
5.9.2.1 Test Mode

The Test Mode compares measurement values against a user defined set of measurement high and low limits, and shows a PASS or FAIL result if one or more measurements are out of range. This mode is useful for production test applications. Measurements include U, I, P and R.



Enable All: Enable all the parameters comparison at the same time.
Disable All: Disable all the parameters comparison at the same time.
Trigger: To run a limit test.
Save: Save the settings to memory when entry is complete.
Test Time: Duration of measurement and limit compare period. The test time will take effect only if enabled.
Delay Time: Time delay between enabling the output of the power source and the start of measurement pass/fail testing in seconds.
Time Left: Time to wait after end of Test time to turn output OFF.

Press the **Trigger** soft key to run a limit test. Once the output is turned on, after Delay time, the measurements will start and compare against the limits set for the period of time programmed. A TEST PASS or FAIL result will be displayed when the total time period is over. Press the [Enter] key to clear the test result.



5.9.2.2 LV Mode (Low Voltage Mode)

Users can enable Low Voltage Mode to reduce the output voltage ripple in the low voltage range. Low voltage range is defined as output voltages no higher than 10% of the rated voltage. Output voltages higher than this value cannot be set once the LV mode is activated.

5.9.2.3 Short Mode

Short Mode options allow the user to enable or disable the short circuit function according to their application. The default setting is ON. A short alarm will be triggered when the output voltage is less than user defined ActiveV. It is suggested to set Short mode to OFF when testing a breaker or cables.

Warning!

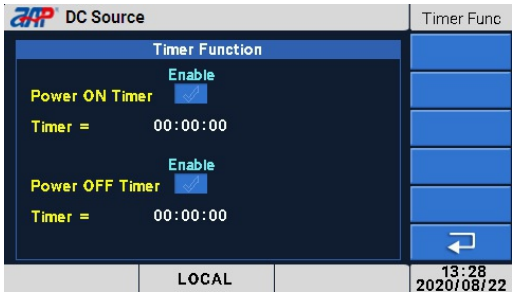
- The unit will save the Short Mode setting after turned off, please turn on the Short Mode setting to prevent the possible damage to the device for normal use.

5.9.2.4 MCurr Share (Module Current Share)

Enable this function to keep the output current balance between power modules in one chassis.

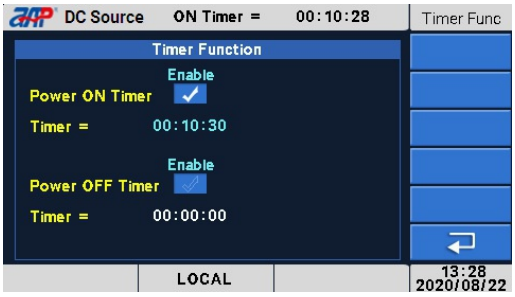
5.9.2.5 Timer Func (Timer Function)

There are two Timer control modes in this Timer function menu.



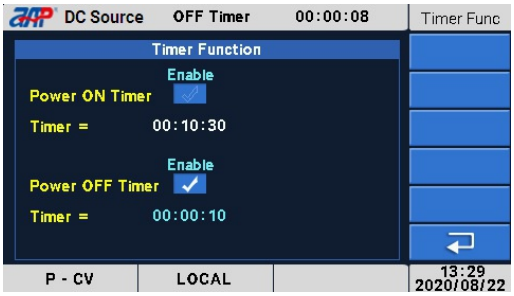
Power ON Timer.

First use touch screen or the [0]~[9] keys to enter the Timer directly. Then arm the Power ON Timer by click the Enable check-box. The timer will start to count down once activated. Press the [ESC] key to return to the main screen. Once the timer reaches down to zero, the supply will turn on the output automatically.



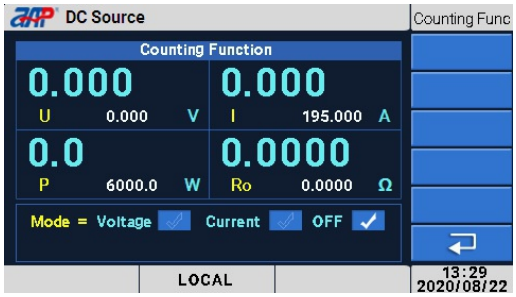
Power OFF Timer.

First use touch screen or the [0]~[9] keys to enter the Timer directly. Then arm the Power OFF Timer by click the Enable check-box. The timer will start to count down once activated. Press the [ESC] key to return to the main screen. Once the timer reaches down to zero, the supply will turn off the output automatically.



5.9.2.6 Counting Func

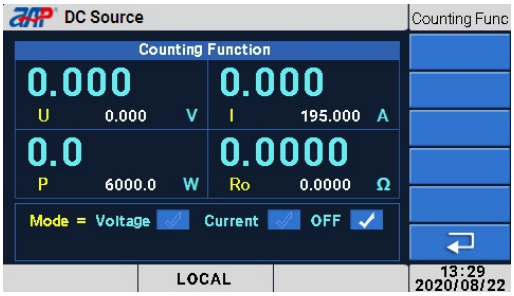
This function offers testing of the cutoff time of a breaker or a fuse.



The options include Voltage, Current and OFF.

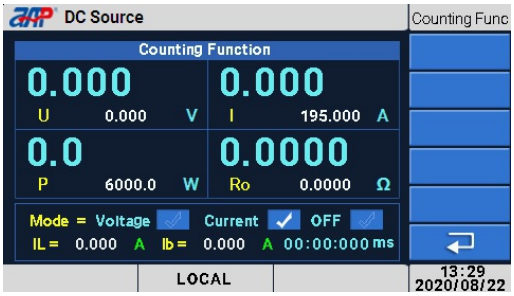
In Voltage counting mode, set the basic output parameters according to test requirement. Press [1]~[9] and [Enter] keys to set IL, which is the cut-off current for counting.

After the setting, press the [On/Off] key to turn on the output. The count starts from when output voltage has reached the setting and stop until the breaker or fuse is open.



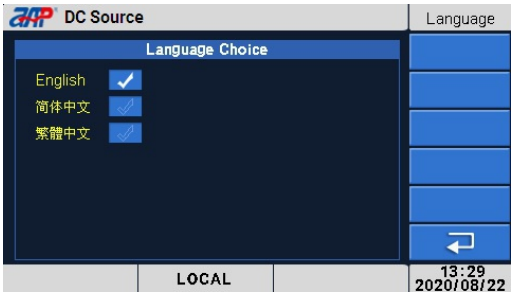
In Current counting mode, set the basic output parameters according to test requirement. Press [1]~[9] and [Enter] keys to set IL, which is the cut-off current for counting. Ib, the breaker or fuse current.

After the setting, press the [On/Off] key to turn on the output. The count starts from when output current has reached Ib setting and stop until the breaker or fuse is open, when the output current is less than IL setting.



5.10 Language

The language section changes the language in which all menus appear. The supported languages are English, Simplified Chinese, and Traditional Chinese.



6 Parallel/Series

Two or more power supplies of the same model can be connected in series or parallel to increase voltage current or current capabilities. Before two or more supplies can be operated in this manner, a Master/Slave connection must be made between all the supplies using the rear panel Master/Slave connectors and cables.

Up to 16 supplies of this series (15 slaves and 1 master) can be connected in parallel to increase output power and current. Up to two units of this series can be connected in series to increase output voltage.

Warning!

- DO NOT connect units in both series and parallel at the same time.
- DO NOT connect different models in series or parallel. All units must be the same model number.
- DO NOT exceed the number of maximum number of units connected in series or parallel.
- Always configure the slave units first, then set up the Master unit in Parallel or Series mode as appropriate.
- There can only be one Master unit in any Master/Slave configuration.
- Each Slave number must be unique or the Master/Slave connection cannot be set.

6.1 Configuring a Slave Unit

Press the **Parallel/Series** soft key on the Navigation page to enter the Master/Slave settings menu. Select the Slave option and set the Slave Number.

Mode: Selects Slave option
Slave No.: Sets Slave number.
ScreenSaver Mode: Enables slave# screen.
Delay: Enter into ScreenSaver Mode after this delay setting time.
Save: Stores the salve settings in the non-volatile memory. All the settings will be effective only after pressing the **Save** soft key.

After pressing the **Save** soft key, the slave configuration will be remembered after the next power off / power on cycle. The unit is now ready to be used in a Master/Slave configuration. Slave units will keep their output OFF until they are controlled by the Master unit.

Once a supply is configured as a slave, it cannot be controlled manually or remotely, or by the analog or digital interfaces.

If ScreenSaver Mode is enabled, after Delay time, the slave unit will display as below. It will return to display the main page after tapping the screen or pressing any key on the front panel.

Note

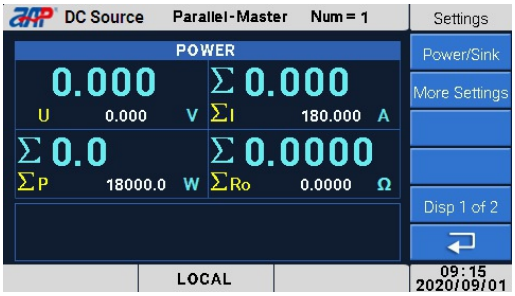
- The Slave unit can be unlocked using the [.] key on the front panel.

6.2 Configuring a Master Unit

Tap on the **Parallel/Series** soft key in the Navigation page to enter the Master/Slave settings page. Specify the unit as a Master with the Master check-box option.

Set the Keep After PWR OFF setting to Yes to save the Master configuration to non-volatile memory if desired. Select either Series or Parallel in the Output Mode field and then select the number of slaves to be used in the configuration. Pressing the **Search** soft key will establish a connection with all slaves once all the settings are entered properly. A pop-up will appear and display the search results.

Switch to the main page and confirm the number of slaves the master has detected by checking the Num field at the top of the screen. Once the connection to the slave units has been established, the master's meters will display the sum of all connected sources parameters.



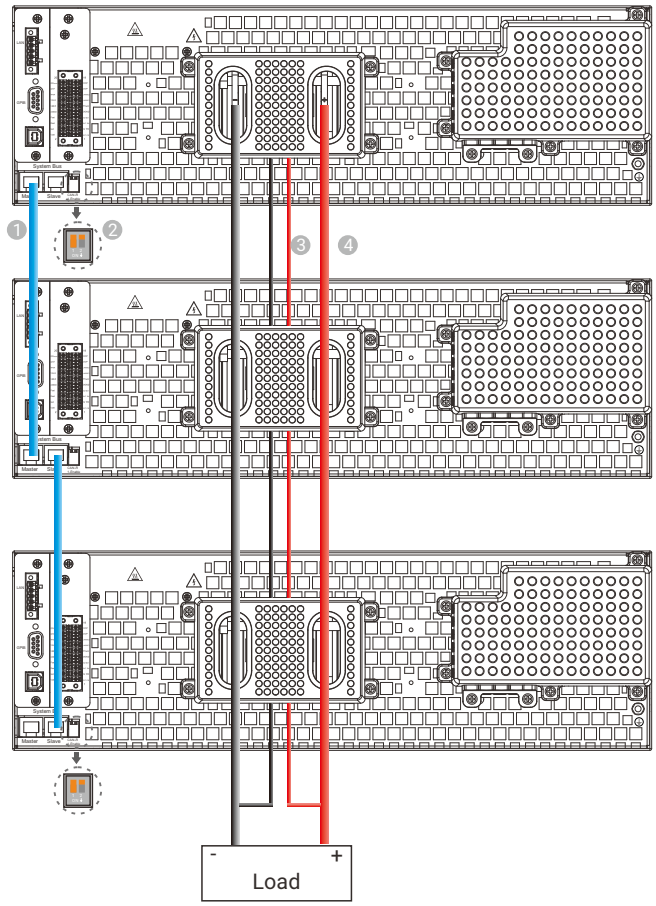
Note

- When powering on a set of connected sources, turn on all Slaves before turning on the Master source.
- It is recommended to turn off the connected sources in the Master-slave system together, or an error OFF-LINE may be displayed. It is normal to give an alarm when turning off the units in sequence and which will not affect the Master-slave system established automatically next time.

6.3 Disable Master-slave Configuration

To disable the Master-slave configuration, first set the Master unit to Single Mode, then the slave unit(s). Remove System Bus cables and paralleled DC output wires to complete the process.

6.4 Parallel Mode Connection Diagram



❶ System Bus Communication Cable

Either RJ45 sockets can be used for master or slave connections. The sockets are labeled as master and slave, but are completely interchangeable.

❷ CAN-R Termination Resistor

Move dip switch 1 position to downwards for ON position. Enable the CAN-R of the first and last units in the System Bus chain.

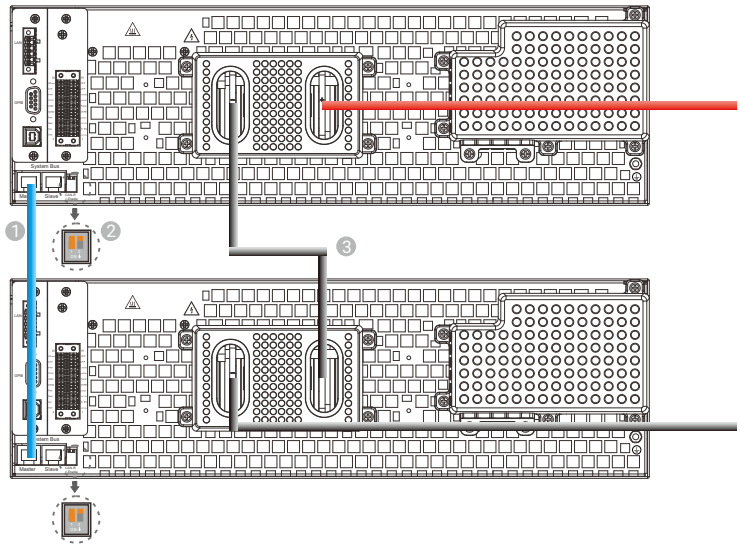
❸ Remote Sensing Wires

Use remote sensing in applications where load regulation at the load is critical. Use twisted or shielded wires to minimize noise pick-up. Please refer to section 8.9 for connection details.

❹ Output Connections

Connect all sources in parallel with identical polarities, using short cables or copper bars with sufficient current and voltage withstanding ranting.

6.5 Series Mode Connection Diagram



❶ System Bus Communication Cable

Either RJ45 sockets can be used for master or slave connections. The sockets are labeled as master and slave, but are completely interchangeable.

❷ Termination Resistor CAN-R

Move dip switch 1 position to downwards for ON position. Enable the CAN-R of the first and last units in the System Bus chain.

❸ Output Connections

Connect the two sources in series as shown in the Series Mode Connection Diagram, ensuring correct polarity. Connect the sources using short cables or copper bars with sufficient current and voltage withstanding ranting.

7 Calibration

All APM instruments are factory calibrated prior to shipment. The recommended calibration interval for this series of power supply is one year. Calibrate only as needed.

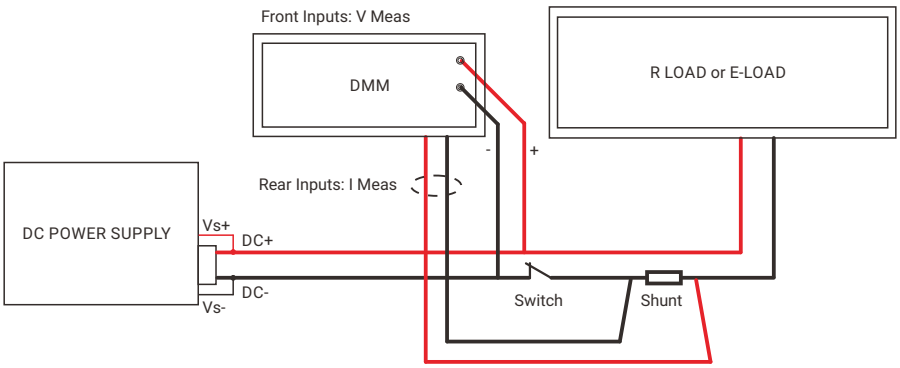
7.1 Calibration Equipment required

The following equipment is required to perform a calibration on any power supply of this series.

Item	Type	Rating
1	Digital Multimeters	Calibrated 6 or more digit rated for maximum DC supply output voltage.
2	Current Shunt	Precision Shunt Resistor, 0.01ohm, 0.005% accuracy.
3	Adjustable Resistive or Programmable Load	Suitable for maximum DC supply output current.

7.2 Calibration Equipment Setup

The calibration equipment should be connected as shown in the diagram below.



Note

- The DMM is used for both voltage and current measurements, requiring the operator to switch between two probing locations. Alternatively, a second DMM may be used for current measurements instead if preferred.
- The switch shown is used to disconnect any load when performing voltage calibrations.

7.3 Power Mode Calibration Procedure

The power source is calibrated through the front panel interface. There are no mechanical calibration adjustments inside the unit, so there is no need to remove the top cover.

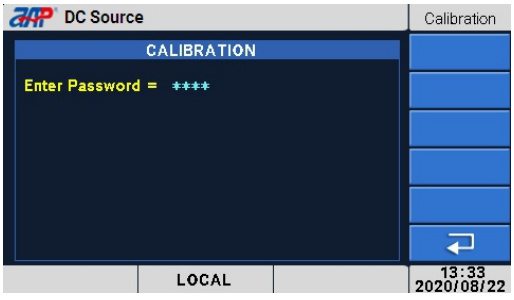
The following items require routine calibration:
U Set & Meas - Output voltage setting and measurement.
I Set & Meas - Output current limit setting and measurement.
P Set & Meas - Output power limit setting and measurement.
R Set & Meas - Programmable output resistance setting and measurement.

The **Clear** soft key can be used to clear improper calibration values if necessary. The user can perform their own calibration if needed. However, it is recommended that a calibration lab perform these calibrations to ensure traceability to national standards.

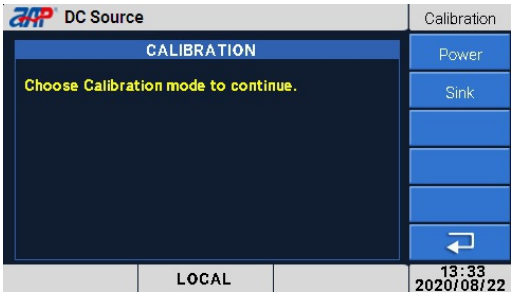
Each calibration algorithm uses two data points, one for the low range of the selected parameter and another for the high range of the selected parameter. The low range is always calibrated first, after which the high range calibration becomes available. In each calibration, the user enters a set value for the source to output according to its meters, and then the user will enter the true value of the setting according to an accurate multimeter.

7.3.1 Accessing Calibration Mode

The Calibration screen can be accessed from the main page. Press the **Calibration** soft key to begin the calibration process, and the calibration password screen will appear.



Press on the “Enter Password” field and enter the number “9527” as the password. Press the [Enter] key to confirm. The user can now select the Power mode to continue.

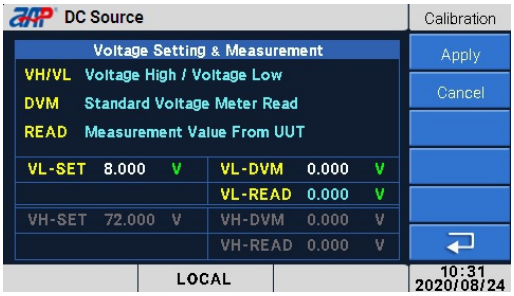


7.3.2 Voltage Setting & Measurement Calibration

Note

- When calibrating the source's voltage meter, no load should be applied to the source output.

Begin the voltage meter calibration by pressing the **U Set & Meas** soft key. Move the cursor to VL-SET field and use the touch keypad or the [0]~[9] keys to enter a low voltage set point, and press [Enter] to confirm. The supply will output this set point according to its own voltage meter. Wait for 5 seconds for the supply to set this value before continuing.



Next move the cursor to VL-DVM field then enter the DMM reading of the output using the touch keypad or [0] ~ [9] keys, and press the [Enter] key to confirm. Press the **Apply** soft key to finalize the calibration point. The source will automatically set VL-READ using its own meter, so there is no need for the user to interact with this field. Repeat this process for the high range.

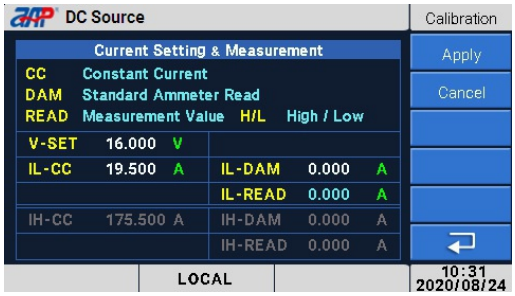
Note:
The recommended set value to use in low range voltage calibration (VL-SET) is between 2% to 18% rated voltage. The recommended set value to use in high range voltage calibration (VH-SET) is in the range of 82% to 98% rated output voltage.

7.3.3 Current Setting & Measurement Calibration

Note

- Please make sure the load in connected (switch is closed) before current calibration.
- Set the proper voltage and current based on the specification range of the calibration instruments.
- Apply a load resistance that forces the supply to operate in CC mode during current calibration. When using a programmable load, setup the load in CV mode, and set load voltage to be a little lower than the set voltage of the power supply.

Begin the current meter calibration by pressing the **I Set & Meas** soft key. The load should be off while setting up the measurement. Move the cursor to VL-SET field and use the touch keypad or the [0]~[9] keys to enter a low voltage set point, and press [Enter] to confirm. The recommended range of V-SET is less than 40% of the rated output voltage. Wait for 5 seconds for the supply to set this value before continuing. Move the cursor to the IL-CC field and use the touch keypad or [0]~[9] keys to set the supply's constant current limit, and press [Enter] to confirm. Wait 5 seconds to allow the source to set the constant current limit, and then enable the load.



The electronic load should now begin to draw a constant current approximately equal to IL-CC. Next move the cursor to the IL-DAM field, and enter the measured shunt current. The user will likely have to calculate the value of this shunt current from the measured shunt voltage and known shunt resistance. Press the **Apply** soft key to finalize the calibration point. The supply will automatically save a value to IL-READ, so the user does not have adjust this field. Repeat this procedure for the high range.

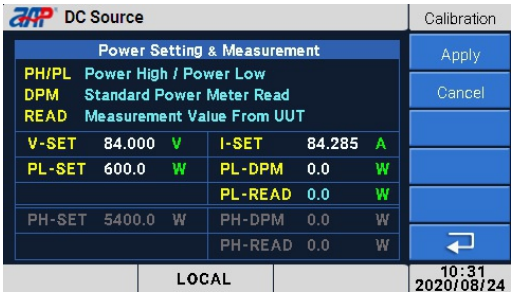
Note:
The recommended low range calibration current (IL-CC) is from 2% to 18% of the sources' rated current. The recommended high range calibration current (IH-CC) is from 82% to 98% of the sources' rated current.

7.3.4 Power Setting & Measurement Calibration

Note

- It is recommended to use the calculated power (voltage times current) instead of a power meter reading value due to the high range of currents.
- Set or adjust the load to ensure that the load will draw a constant power.

Begin the power meter calibration by pressing the **P Set & Meas** soft key. Use the touch keypad or [0]~[9] keys to enter a user defined V-SET, I-SET and PL-SET, and wait 5 seconds for the settings to register before continuing.



Move the cursor to the PL-DPM field then enter the calculated power based on the true voltage and current meter readings. Press the **Apply** soft key to finalize the low range calibration point. The source will record PL-READ, so the user does not have to interact with this field. Repeat this process for the high power range.

Note:
The recommended range for the low range calibration point (PL-SET) is from 2% to 18% rated power. The recommended range for and for the high range calibration point (PH-SET) is from 82% to 98% rated power.

7.3.5 Resistor Setting & Measurement Calibration

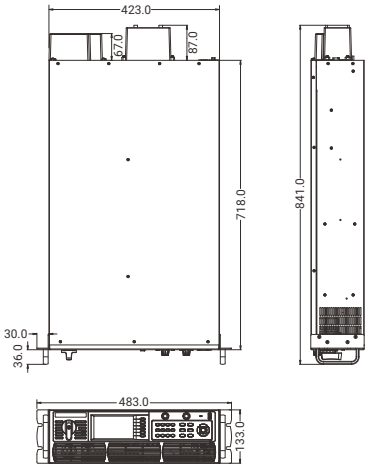
Not yet available.

7.4 Sink Mode Calibration Procedure

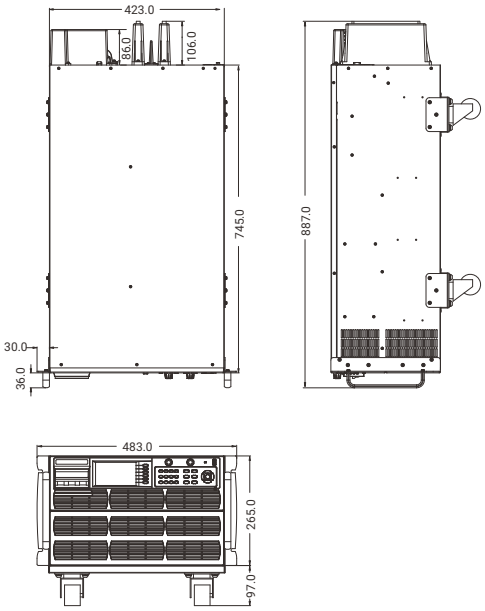
Not yet available.

8 Installation

8.1 Product Dimensions



Dimensions of 3U Models (mm)



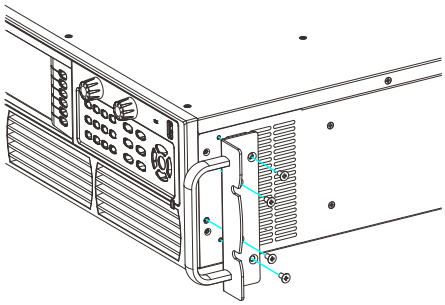
Dimensions of 6U Models (mm)

8.2 Installing Rack Mount Handles

Caution!

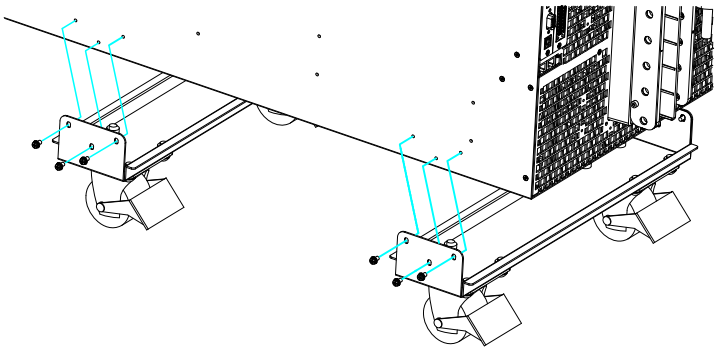
- The handles on the front side of the device are for rack manipulations, but are not designed to carry the whole weight of the supply. The supply should not be carried by the handles.

Install the rack mount handles provided in the ship kit onto the power source before mounting the unit in a rack. Refer to the illustration right for correct assembly. The handle screws are included in the ship kit.



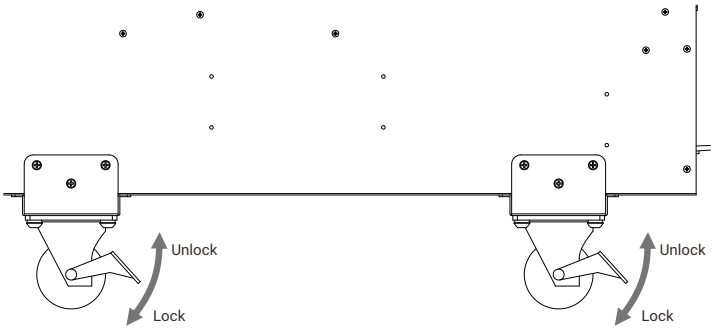
8.3 Casters Disassembly and Assembly

Refer to the illustration below for disassembling and assembling the casters of 6U height models when necessary.



8.4 Casters Lock and Unlock

For 6U height models, it is recommended to use the caster locks to ensure that the product stays in place when wiring. Below shows how to lock and unlock the casters.



8.5 Installation of An Optional Interface Card

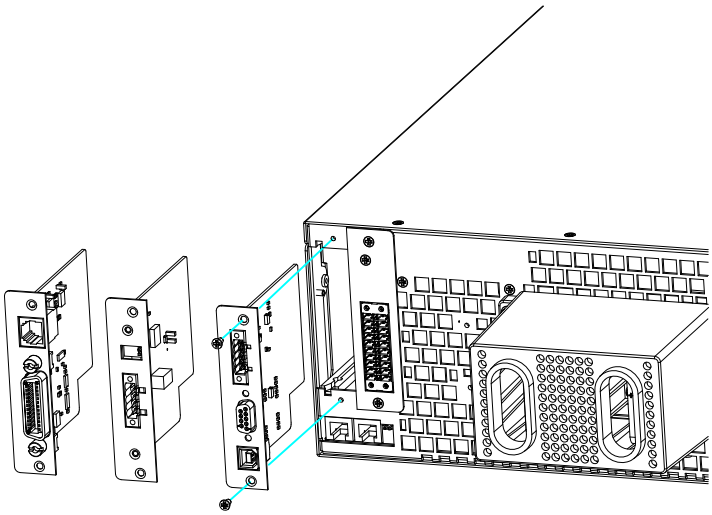
Caution!

- ESD protection procedures must be used when inserting or exchanging an interface card.
- The unit must be powered off before insertion or removal of an interface card.
- Do not insert hardware other than the specified interface card.
- If an interface card is removed or not used it is strongly recommended to install the card slot cover in order to avoid internal buildup of foreign particulate matter. Internal buildup of dust or particulate matter increases the risk of arc failure and shock hazards.

This series of power supply provides optional interface cards. The interface slot is located on the rear panel, making it easy to install and swap interface cards.

Installation steps:

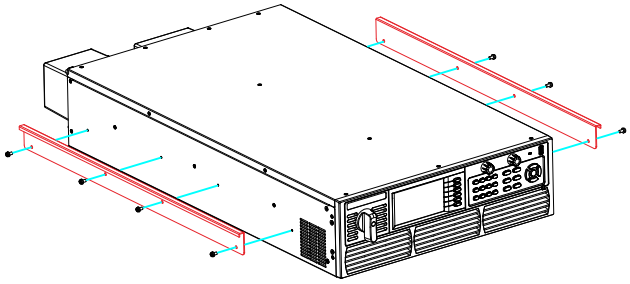
1. Use a suitable screw driver to remove the slot cover.
2. Insert the interface card into the slot and ensure that it is held at a 90° angle to the rear panel of the unit. Slide the card in assuring that the interface card is properly inserted into the connector inside of the unit.
3. Tighten the screws. After installation, the interface card is ready for use. The unit can now be controlled through the new interface.



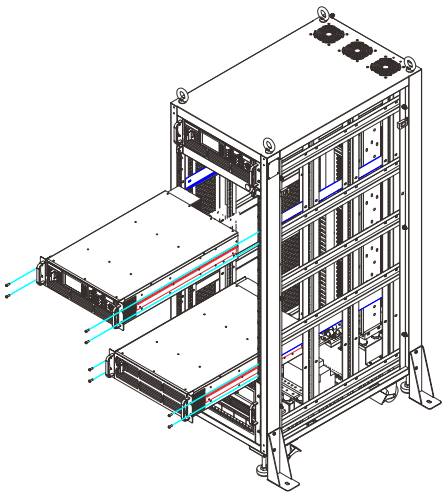
8.6 Shelf Mounting Diagram of The Unit

This series of power supply can be mounted in a standard 19-inch rack panel or cabinet. If using rack mount slides are desired, the user can select the optional rack-mount slide kit at the time of their order. Refer to the figures below for assembly instructions.

There are two parts in the rack-mount slide kit.
Part A (below in red color) attaches to each side of the source as shown below. To prevent internal damage to the source, use the screws provided with the rack-mount kit.



Part B, L-bracket supports (below in blue color) will be installed inside the cabinet. Once part B has been installed, the source can be inserted and slid to the end of the cabinet.



8.7 Input Connection


Warning!

- The connection of the AC input terminals should only be carried out by qualified personnel!
- The AC input connections must include a disconnect device (an external switch or circuit -breaker) as part of the installation. The disconnect device must be suitably located and easily reached and must be marked as the disconnecting device for the equipment. The disconnect device must disconnect all line conductors simultaneously.
- Be sure to disconnect the AC mains before any attempt to access the AC input terminals.
- Prior to connecting the AC power source to the local mains, it is important to check the product label on the unit to verify that its AC input configuration matches the local utility power.
- The power earth (PE) conductors are essential for safe operation and must always be used! Potential shock hazards exist if an earthed conductor not connected to the chassis earth terminal.
- After disconnecting grid power, ALWAYS wait at least 1 minute, then use a Digital Voltmeter (DMM) in VDC Mode to check for any residual DC voltage from each Line terminal to the Chassis ground stud to check for safe voltage levels (< 5 Vdc) before touching the unit or any terminal blocks or pins.


Note

- Instruction not to position the equipment so that it is difficult to operate the disconnecting device.
- The AC input cable should be double insulated, and should have a safe operating temperature of 60°C minimum. The cable must meet the maximum input current rating. Refer to the table below to assist in choosing cable and breaker sizes.

The table below gives the maximum input current of each phase. The AC input cable should be reasonably short, so as to minimize the effect of I*R voltage drop in the cable.

For 400VAC input:

Nominal Power	L1		L2		L3		Input Breaker
	Wire Size	Imax	Wire Size	Imax	Wire Size	Imax	
6kW	2.5mm^2	0A	2.5mm^2	19A	2.5mm^2	NA	32A
12kW	4mm^2	30A	4mm^2	19A	4mm^2	19A	40A
18kW	6mm^2	30A	6mm^2	30A	6mm^2	30A	40A
24kW	10mm^2	49A	10mm^2	49A	10mm^2	30A	80A
30kW	10mm^2	63A	10mm^2	49A	10mm^2	49A	100A
36kW	16mm^2	63A	16mm^2	63A	16mm^2	63A	100A

For 208VAC input

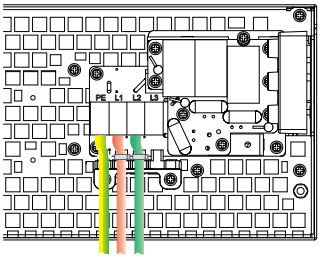
Nominal Power	L1		L2		L3		Input Breaker
	Wire Size	Imax	Wire Size	Imax	Wire Size	Imax	
6kW	6mm^2	38A	6mm^2	38A	6mm^2	NA	63A
12kW	16mm^2	60A	16mm^2	38A	16mm^2	38A	80A
18kW	16mm^2	60A	16mm^2	60A	16mm^2	60A	100A
24kW	25mm^2	103A	25mm^2	103A	25mm^2	103A	160A
30kW	25mm^2	125A	25mm^2	103A	25mm^2	103A	160A
36kW	25mm^2	125A	25mm^2	125A	25mm^2	125A	160A

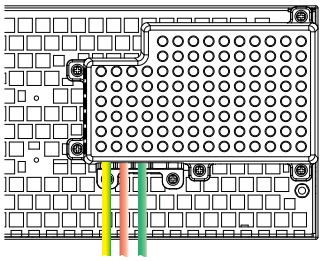
Connecting the AC input:

1. Locate the input terminal block input connector on rear face of the supply, shielded by a protective cover.
2. Unscrew and remove the input terminal's protective cover from the rear face of the supply.
3. Strip off insulation from the end of each wire in the power cable, leaving approximately 12mm of bare wire exposed. Then crimp the wire using an Tube type terminal included in ship kit. For 6U height models, use Ring type terminal included in ship kit to crimp the wire.
4. Loosen the earth ground terminal block and insert the yellow-green wire of the power cable. Tighten the terminal block with a suitably sized flat head screw driver while holding the wire securely in place.
5. Install the three other lines as in step 4.
6. Install the strain relief by using cable ties (included in ship kit), as depicted in the figure below.
7. Replace the protective cover to avoid electric shock.

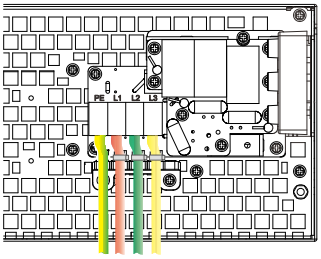
3U Height Models

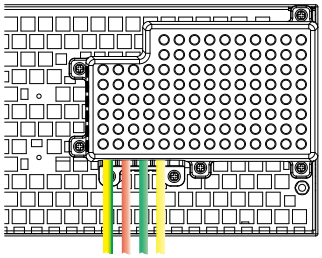
6000W Models



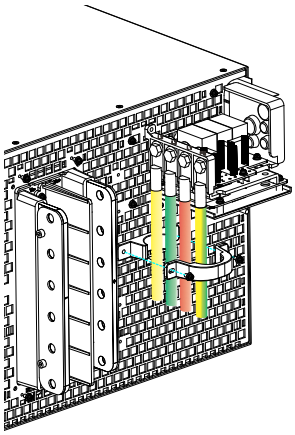


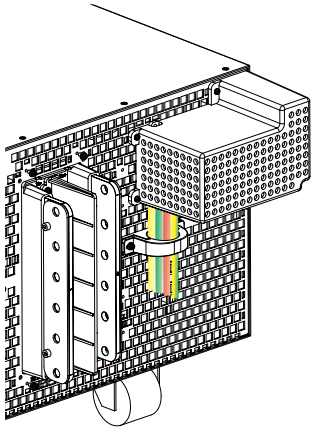
12000W/18000W Models





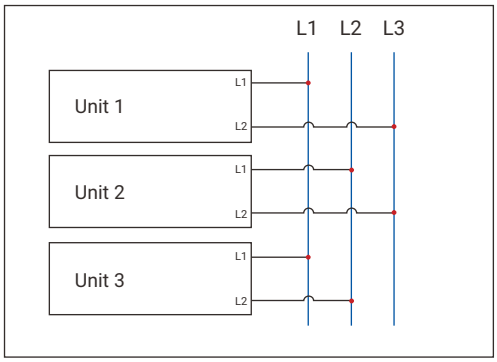
6U Height Models



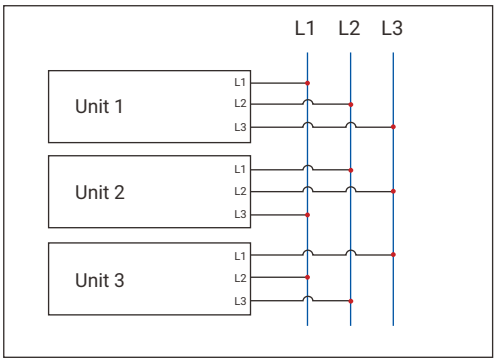


This series of power supply consists of 1-3 internal 6kW power modules, each of which is connected across a separate phase of the 3-phase AC mains. The following figures illustrate how to best install three 6kW units, or three 12kW units in order to obtain a balanced current draw on 3-phase AC mains source.

Phase balancing connection for three 6kW units



Phase balancing connection for three 12kW units



8.8 Connection to DC Loads

Warning!

- Always disconnect the AC mains before accessing the input or output connections.
- The protective cover must be tightly secured to meet the safety requirements.

Caution!

- Consider the following issues when connecting to a load.

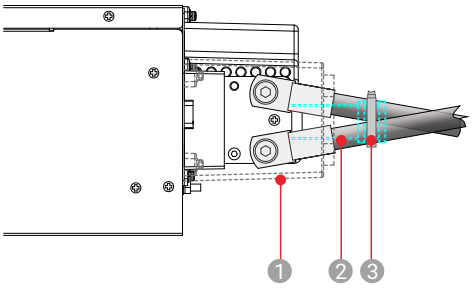
1. Ensure the wires connecting to the load meet maximum current and temperature requirements.
2. Ensure that the insulation of the wire has a voltage rating greater than the maximum output voltage of the supply or series connection of supplies.
3. In the case of an application with high nominal current and thick cables, it is necessary to take into account the weight of the cable and the strain imposed on the cable. A strain relief should be used on the cable, especially when mounted in a 19" cabinet or similar.
4. Load wires noise and impedance effect.

Refer to the table below to select cable size. Also consider temperature rating of the copper wires and voltage drop to the load.

Rated Current of equipment (A)	Minimum Conduct Sizes		Rated Current of equipment (A)	Minimum Conduct Sizes	
	Nominal Cross -sectional Area (mm²)	AWG or kcmil		Nominal Cross -sectional Area (mm²)	AWG or kcmil
13~16	1.5	14	125~160	50	0
16~25	2.5	12	160~190	70	000
25~32	4	10	190~230	95	0000
32~40	6	8	230~260	120	250 kcmil
40~63	10	6	260~300	150	300 kcmil
63~80	16	4	300~340	185	400 kcmil
80~100	25	2	340~400	240	500 kcmil
100~125	35	1	400~460	300	600 kcmil

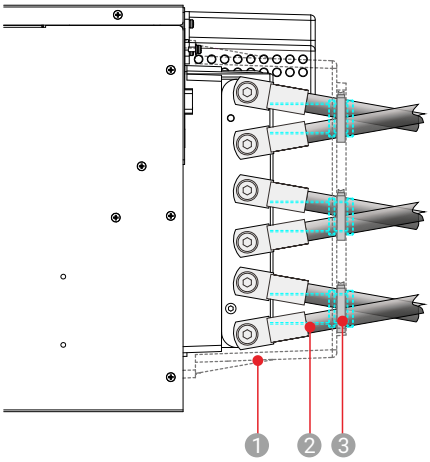
3U Height Models Output Connections

1. Protective Cover.
2. Strain relief.
3. Cable ties.



6U Height Models Output Connections

1. Protective Cover.
2. Strain relief.
3. Cable ties.



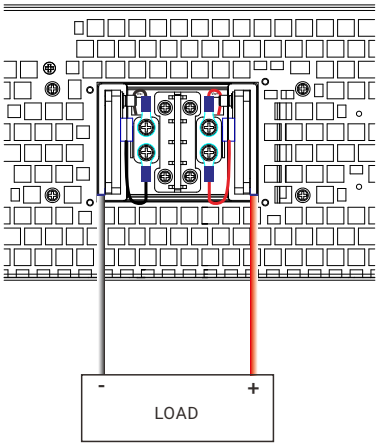
8.9 Remote Sensing

Note

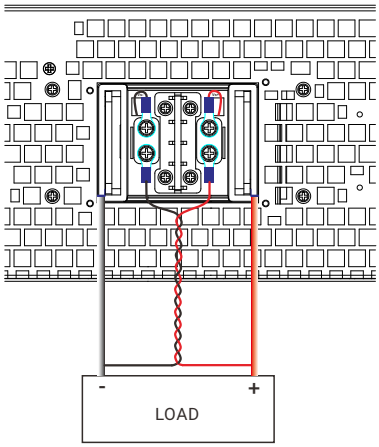
- If the output power of a single internal power module exceeds 6300W, an alarm will appear on the screen, notifying the user.
- The sense wires should be rated for the maximum power supply voltage and should be twisted together and laid close to the DC cables to reduce EMI.
- The plus sense wire must be connected to the positive output terminal or positive load terminal, and the minus sense wire terminal must be connected to the negative output terminal or negative load terminal.
- AWG 22 wire is recommended for establishing the remote sense connection.
- Load and sense wiring are NOT included with the power source and must be supplied by the end-user.

3U Height Models

Local Sensing

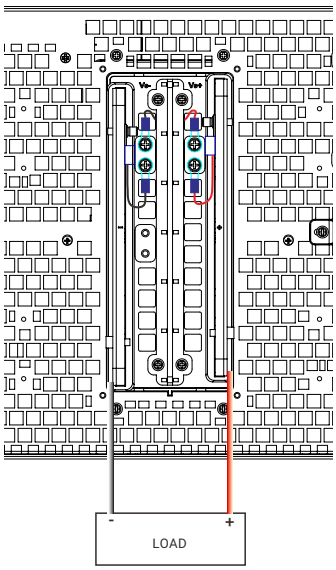


Remote sensing

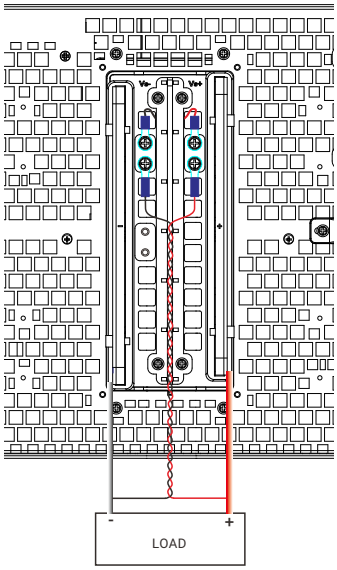


6U Height Models

Local Sensing



Remote sensing



If the sense lines are accidentally connected in reverse, follow the steps given below.

1. First disconnect the unit and paralleled / series units from the AC mains.
2. Disconnect one end of both the sense wires and reconnect them to the correct polarity.
3. Turn the unit back on.

9 Troubleshooting

Problem	Troubleshooting and Solutions
OVP	1. Check if the voltage measurement is always higher than the rated voltage. If yes, please remove all the DC output connections and check again. 2. Check if user defined OVP level is reasonable. Or, please ask your agent for help.
OCP	1. Check if user defined OCP level is reasonable. 2. Check if the loading current is higher than the rated current. Or, please ask your agent for help.
OPP	1. Check if user defined OPP level is reasonable. 2. Check if the loading current is higher than the rated power. Or, please ask your agent for help.
SCP	1. Please check if the load is shorted. 2. When testing Fuse or DUT similar, please turn off SHORT MODE. Or, please ask your agent for help.
PWR	1. Check if the voltage measurement is always higher than the rated voltage. If yes, please remove all the DC output connections and check again. 2. Look inside through the rear panel, if any one blue light becomes illuminated, please ask your agent for help.
DC-LOCK	1. Wait 5 minutes after powering off, then restart the unit to see if the alarm will be cleared. 2. Look inside through the rear panel, if any one blue light becomes illuminated, please ask your agent for help.
FAN	Look inside through the rear panel, if any one yellow light becomes illuminated, please ask your agent for help.

10 Recycling and Disposal

Do not discard this device and its accessories as solid waste. Please assure that this unit is properly recycled at the end of its lifetime per your local government regulations.

11 Contact Us

If you have any questions about APM's Wide-range High-power Programmable DC Power Supplies, please contact us per the contact information below. We will be happy to promptly answer any of your questions.

APM Technologies
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Land line: +86-769 22028588
Fax: +86-769 22026771
Website: en.apmtech.cn
E-mail: overseas@apmtech.cn

Appendix A Specifications

MODEL		SP80VDC6000W	SP80VDC12000W	SP80VDC18000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-0, L1, L2-38A	3P208 L1-60A, L2,L3-38A	3P208 L1,L2,L3-60A
		3P400 L3-0, L1,L2-19A	3P400 L1-30A, L2,L3-19A	3P400 L1,L2,L3-30A
Frequency		45~65Hz		
Connection		2ph, PE	3ph, PE	3ph, PE
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 7.1kVAmax, 3P400 6.9kVAmax	3P208 14.2kVAmax , 3P400 13.8kVAmax	3P208 21.3kVAmax , 3P400 20.7kVAmax
Efficiency[1]		3P208 ~90.5%@80V, 3P208 ~86.5%@200A	3P208 ~90.5%@80V, 3P208 ~86.5%@400A	3P208 ~90.5%@80V, 3P208 ~86.5%@600A
		3P400 ~92.2%@80V, 3P400 ~87.8%@200A	3P400 ~92.2%@80V, 3P400 ~87.8%@400A	3P400 ~92.2%@80V, 3P400 ~87.8%@600A
Output				
Voltage Range		0~80V		
Current Range[2]		0~200A	0~400A	0~600A
Power Range		0~6000W	0~12000W	0~18000W
Max. Setup Range	Voltage	0~84V(0~105%)		
	Current	0~204.75A(0~102%)	0~409.5A(0~102%)	0~614.25A(0~102%)
	Power	0~6300W(0~105%)	0~12600W(0~105%)	0~18900W(0~105%)
	Internal Resistance	0~12Ω	0~6Ω	0~4Ω
Accuracy	Voltage	<0.1% Umax(80mV)		
	Current	<0.2% Imax(400mA)	<0.2% Imax(800mA)	<0.2% Imax(1200mA)
	Power	<0.5%+30W	<0.5%+60W	<0.5%+90W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(16mV)		
	Current	<0.05% Imax(100mA)	<0.05% Imax(200mA)	<0.05% Imax(300mA)
	Power	<0.05% Pmax		
Load Regulation[3]	Voltage	<0.05%Umax(40mV) @Rated Voltage, <0.1%Umax(80mV) @Rated Current		
	Current	<0.15% Imax(300mA)	<0.15% Imax(600mA)	<0.15% Imax(900mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <55ms (Full Load)		
Drop Time	Voltage	<850ms (No Load) <15ms (Full Load)		
Transient Response Time[4]	Voltage	≤1.5ms/0.8V		
Display Resolution	Voltage	0.001V		
	Current	0.001A		
	Power	0.1W		
	Internal Resistance	0.0001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(80mV)		
	Current	<0.2% Imax(400mA)	<0.2% Imax(800mA)	<0.2% Imax(1200mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[5]	Voltage	<180mVpp, <15mVrms	<288mVpp, <23mVrms	<320mVpp, <25mVrms
	Current	<100mArms	<200mArms	<300mArms
Remote Compensation	Voltage	5%Umax(4V)		
Sink Function				
Input Voltage		0~80V		
Input Current		0~100A	0~200A	0~300A
Input Power		0~335W	0~660W	0~1000W
Min. Operating Voltage		3V@100A	3V@200A	3V@300A
CC Resolution		10mA	20mA	30mA

MODEL	SP80VDC6000W	SP80VDC12000W	SP80VDC18000W
CC Accuracy	<0.2% Imax(200mA)	<0.2% Imax(400mA)	<0.2% Imax(600mA)
CV Resolution	<4mV		
CV Accuracy	<0.1% Umax(80mV)		
CP Resolution	0.5W	1W	1.5W
CP Accuracy	<0.5% Pmax(1675mW)	<0.5% Pmax(3300mW)	<0.5% Pmax(5000mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2121VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature [2]	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	45dB Idle; 71dB Max;	45dB Idle; 73dB Max;	45dB Idle; 75dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x133.0x718.0 mm		
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm		
Unit Weight	27kg	38kg	50kg
Shipping Weight	37kg	48kg	60kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] It is recommended that the output current is derated by 10% when the operation environment is higher than 30°C.
[3] Load transient from 0% to 100% of rated output.
[4] Test value at 100% voltage and 100% power.
[5] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP80VDC24000W	SP80VDC30000W	SP80VDC36000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-60A , L1, L2-103A	3P208 L1-125A,L2,L3-103A	3P208 L1,L2,L3-125A
		3P400 L3-30A, L1,L2-49A	3P400 L1-63A,L2,L3-49A	3P400 L1,L2,L3-63A
Frequency		45~65Hz		
Connection		3ph, PE		
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 28.4kVAmax, 3P400 27.6kVAmax	3P208 35.5kVAmax, 3P400 34.5kVAmax	3P208 42.6kVAmax, 3P400 41.4kVAmax
Efficiency[1]		3P208 ~90.5%@80V, 3P208 ~86.5%@800A	3P208 ~90.5%@80V, 3P208 ~86.5%@1000A	3P208 ~90.5%@80V, 3P208 ~86.5%@1200A
		3P400 ~92.2%@80V, 3P400 ~87.8%@800A	3P400 ~92.2%@80V, 3P400 ~87.8%@1000A	3P400 ~92.2%@80V, 3P400 ~87.8%@1200A
Output				
Voltage Range		0~80V		
Current Range[2]		0~800A	0~1000A	0~1200A
Power Range		0~24000W	0~30000W	0~36000W
Max. Setup Range	Voltage	0~84V(0~105%)		
	Current	0~819A(0~102%)	0~1023.75A(0~102%)	0~1228.5A(0~102%)
	Power	0~26400W(0~105%)	0~31500W(0~105%)	0~37800W(0~105%)
	Internal Resistance	0~3.0Ω	0~2.4Ω	0~2.0Ω
Accuracy	Voltage	<0.1% Umax(80mV)		
	Current	<0.2% Imax(1600mA)	<0.2% Imax(2000mA)	<0.2% Imax(2400mA)
	Power	<1%+120W	<1%+150W	<1%+180W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(16mV)		
	Current	<0.05% Imax(400mA)	<0.05% Imax(500mA)	<0.05% Imax(600mA)
	Power	<0.05% Pmax		
Load Regulation[3]	Voltage	<0.05%Umax(40mV) @Rated Voltage, <0.1%Umax(80mV) @Rated Current		
	Current	<0.15% Imax(1200mA)	<0.15% Imax(1500mA)	<0.15% Imax(1800mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <30ms (Full Load)		
Drop Time	Voltage	<850ms (No Load) <15ms (Full Load)		
Transient Response Time[4]	Voltage	≤1.5ms/0.8V		
Display Resolution	Voltage	0.001V		
	Current	0.001A	0.01A	0.01A
	Power	0.1W		
	Internal Resistance	0.0001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(80mV)		
	Current	<0.2% Imax(1600mA)	<0.2% Imax(2000mA)	<0.2% Imax(2400mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[5]	Voltage	<320mVpp, <25mVrms		
	Current	<360mArms	<450mArms	<540mArms
Remote Compensation	Voltage	5% Umax(4V)		
Sink Function				
Input Voltage		0~80V		
Input Current		0~400A	0~500A	0~600A
Input Power		0~1300W	0~1600W	0~2000W
Min. Operating Voltage		3V@400A	3V@500A	3V@600A
CC Resolution		40mA	50mA	60mA

MODEL	SP80VDC24000W	SP80VDC30000W	SP80VDC36000W
CC Accuracy	<0.2% Imax(800mA)	<0.2% Imax(1000mA)	<0.2% Imax(1200mA)
CV Resolution	<4mV		
CV Accuracy	<0.1% Umax(80mV)		
CP Resolution	2W	2.5W	3W
CP Accuracy	<0.5% Pmax(6500mW)	<0.5% Pmax(8000mW)	<0.5% Pmax(10000mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2121VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature [2]	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	48dB Idle; 77dB Max;	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x265.0x745.0 mm		
Package Dimensions(WxHxD)	549.0x531.0x946.0 mm		
Unit Weight	75kg	86kg	97kg
Shipping Weight	101kg	112kg	123kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] It is recommended that the output current is derated by 10% when the operation environment is higher than 30°C.
[3] Load transient from 0% to 100% of rated output.
[4] Test value at 100% voltage and 100% power.
[5] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP165VDC12000W	SP165VDC24000W	SP165VDC36000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L1-60A, L2,L3-38A	3P208 L3-60A,L1,L2-103A	3P208 L1,L2,L3-125A
		3P400 L1-30A, L2,L3-19A	3P400 L3-30A,L1,L2-49A	3P400 L1,L2,L3-63A
Frequency		45~65Hz		
Connection		3ph, PE		
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 14.4kVAmax, 3P400 14.0kVAmax	3P208 28.8kVAmax, 3P400 28.0kVAmax	3P208 42.6kVAmax, 3P400 41.4kVAmax
Efficiency[1]		3P208 ~90.5%@165V, 3P208 ~85%@180A	3P208 ~90.5%@165V, 3P208 ~85%@360A	3P208 ~90.5%@165V, 3P208 ~85%@540A
		3P400 ~91.5%@165V, 3P400 ~85.5%@180A	3P400 ~91.5%@165V, 3P400 ~85.5%@360A	3P400 ~91.5%@165V, 3P400 ~85.5%@540A
Output				
Voltage Range		0~165V		
Current Range[2]		0~180A	0~360A	0~540A
Power Range		0~12000W	0~24000W	0~36000W
Max. Setup Range	Voltage	0~173.25V(0~105%)		
	Current	0~189A(0~105%)	0~378A(0~105%)	0~567A(0~105%)
	Power	0~12600W(0~105%)	0~25200W(0~105%)	0~37800W(0~105%)
	Internal Resistance	0~27.5Ω	0~13.75Ω	0~9.167Ω
Accuracy	Voltage	<0.1% Umax(165mV)		
	Current	<0.2% Imax(360mA)	<0.2% Imax(720mA)	<0.2% Imax(1080mA)
	Power	<0.5%+60W	<1%+120W	<1%+180W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(33mV)		
	Current	<0.05% Imax(90mA)	<0.05% Imax(180mA)	<0.05% Imax(270mA)
	Power	<0.05% Pmax		
Load Regulation[3]	Voltage	<0.05% Umax(82.5mV) @Rated Voltage, <0.1% Umax(165mV) @Rated Current		
	Current	<0.15% Imax(270mA)	<0.15% Imax(540mA)	<0.15% Imax(810mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <30ms (Full Load)		
Drop Time	Voltage	<900ms (No Load) <15ms (Full Load)		
Transient Response Time[4]	Voltage	≤1.5ms/1.65V		
Display Resolution	Voltage	0.001V		
	Current	0.001A		
	Power	0.1W		
	Internal Resistance	0.0001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(165mV)		
	Current	<0.2% Imax(360mA)	<0.2% Imax(720mA)	<0.2% Imax(1080mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[5]	Voltage	<540mVpp, <50mVrms		
	Current	<100mArms	<200mArms	<300mArms
Remote Compensation	Voltage	2%Umax(3.3V)		
General				
Graphic Display		4.3" Color touch LCD		
Operation Key Feature		Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles		Yes		
FAN		Temperature control		
Protection		OCP, OVP, OPP, OTP, HARD FAIL		

MODEL	SP165VDC12000W	SP165VDC24000W	SP165VDC36000W
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2121VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature[2]	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	45dB Idle; 73dB Max;	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x133.0x718.0 mm	423.0x265.0x745.0 mm	423.0x265.0x745.0 mm
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm	549.0x531.0x946.0 mm	549.0x531.0x946.0 mm
Unit Weight	38kg	75kg	97kg
Shipping Weight	48kg	101kg	123kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] It is recommended that the output current is derated by 10% when the operation environment is higher than 30°C.
[3] Load transient from 0% to 100% of rated output.
[4] Test value at 100% voltage and 100% power.
[5] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP250VDC18000W
Input		
Voltage[1]		187~265VAC
		340~460VAC
Current[1]		3P208 L1,L2,L3-60A
		3P400 L1,L2,L3-30A
Frequency		45~65Hz
Connection		3ph, PE
Fuse (Internal)[1]		T50A*2pcs
		T30A*2pcs
Power Factor		>0.99
Input Power		3P208 21.5KVAmax, 3P400 20.9KVAmax
Efficiency[1]		3P208 ~90.5%@250V, 3P208 ~85%@180A
		3P400 ~91.5%@250V, 3P400 ~85.5%@180A
Output		
Voltage Range		0~250V
Current Range[2]		0~180A
Power Range		0~18000W
Max. Setup Range	Voltage	0~262.5V(0~105%)
	Current	0~189A(0~105%)
	Power	0~18900W(0~105%)
	Internal Resistance	0~41.6667Ω
Accuracy	Voltage	<0.1% Umax(250mV)
	Current	<0.2% Imax(360mA)
	Power	<0.5%+90W
	Internal Resistance	R<2% Rmax, I<0.3% Imax
Line Regulation	Voltage	<0.02% Umax(50mV)
	Current	<0.05% Imax(90mA)
	Power	<0.05% Pmax
Load Regulation[3]	Voltage	<0.05% Umax(125mV) @Rated Voltage, <0.1% Umax(250mV) @Rated Current
	Current	<0.15% Imax(270mA)
	Power	<0.75% Pmax
Rise Time	Voltage	<15ms (No Load) <30ms (Full Load)
Drop Time	Voltage	<950ms (No Load) <15ms (Full Load)
Transient Response Time[4]	Voltage	≤1.5ms/2.5V
Display Resolution	Voltage	0.001V
	Current	0.001A
	Power	0.1W
	Internal Resistance	0.0001Ω
Measurement Accuracy	Voltage	<0.1% Umax(250mV)
	Current	<0.2% Imax(360mA)
	Power	<0.5% Pmax
	Internal Resistance	<0.4% Rmax
Ripple[5]	Voltage	<850mVpp, <75mVrms
	Current	<100mArms
Remote Compensation	Voltage	1%Umax(2.5V)
General		
Graphic Display		4.3" Color touch LCD
Operation Key Feature		Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware
Rack Mount Handles		Yes
FAN		Temperature control
Protection		OCP, OVP, OPP, OTP, HARD FAIL

MODEL	SP250VDC18000W
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)
Command Response Time	<3ms
Analog Interface(Optional)	
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.
Accuracy U/I/P/R	<0.2% F.S
Actual Output U/I	<0.2%
Control Signals	DC ON/OFF, External control Enable/Disable
Status Signals	CV, OVP, OT
Sampling Rate of Input & Output	45Hz
Galvanic Isolation to the Device	2121VDC
Master/Slave Control	
Series Output	MAX 2 units
Parallel Output	MAX 16 units
Environmental	
Operating Temperature[2]	0~40°C
Storage Temperature	-20~70°C
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C
Altitude	<2000m@40°C
Fan Noise	45dB Idle; 75dB Max;
Mechanical	
Dimensions(WxHxD)	423.0x133.0x718.0 mm
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm
Unit Weight	50kg
Shipping Weight	60kg
Miscellaneous	
Over Voltage Category	II
Protection Class	I
Pollution Degree	2
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.

[2] It is recommended that the output current is derated by 10% when the operation environment is higher than 30°C.

[3] Load transient from 0% to 100% of rated output.

[4] Test value at 100% voltage and 100% power.

[5] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP360VDC6000W	SP360VDC12000W	SP360VDC18000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-0, L1,L2-38A	3P208 L1-60A, L2,L3-38A	3P208 L1,L2,L3-60A
		3P400 L3-0, L1,L2-19A	3P400 L1-30A, L2,L3-19A	3P400 L1,L2,L3-30A
Frequency		45~65Hz		
Connection		2ph, PE	3ph, PE	3ph, PE
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 6.7kVAmax, 3P400 6.5KVAmax	3P208 13.4kVAmax, 3P400 13.0KVAmax	3P208 20.1kVAmax, 3P400 19.5KVAmax
Efficiency[1]		3P208 ~92.2%@360V, 3P208 ~90.5%@42.5A	3P208 ~92.5%@360V, 3P208 ~90.5%@85A	3P208 ~92.5%@360V, 3P208 ~90.5%@127.5A
		3P400 ~92.5%@360V, 3P400 ~91%@42.5A	3P400 ~92.5%@360V, 3P400 ~91%@85A	3P400 ~92.5%@360V, 3P400 ~91%@127.5A
Output				
Voltage Range		0~360V		
Current Range		0~42.5A	0~85A	0~127.5A
Power Range		0~6000W	0~12000W	0~18000W
Max. Setup Range	Voltage	0~378V(0~105%)		
	Current	0~44.63A(0~105%)	0~89.25A(0~105%)	0~133.88A(0~105%)
	Power	0~6300W(0~105%)	0~12600W(0~105%)	0~18900W(0~105%)
	Internal Resistance	0~440Ω	0~220Ω	0~147Ω
Accuracy	Voltage	<0.1%Umax(360mV)		
	Current	<0.2%Imax(85mA)	<0.2%Imax(170mA)	<0.2%Imax(255mA)
	Power	<1%+60W	<1%+90W	<1%+120W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(72mV)		
	Current	<0.05% Imax(22mA)	<0.05% Imax(43mA)	<0.05% Imax(64mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(180mV) @Rated Voltage, <0.1% Umax(360mV) @Rated Current		
	Current	<0.15% Imax(64mA)	<0.15% Imax(128mA)	<0.15% Imax(191mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)		
Drop Time	Voltage	<800ms (No Load) <15ms (Full Load)		
Transient Response Time[3]	Voltage	≤1.5ms/3.6V		
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(360mV)		
	Current	<0.2% Imax(85mA)	<0.2% Imax(170mA)	<0.2% Imax(255mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<320mVpp, <55mVrms		
	Current	<21mArms	<43mArms	<64mArms
Remote Compensation	Voltage	3%Umax(10.8V)		
Sink Function				
Input Voltage		0~360V		
Input Current		0~25A	0~50A	0~75A
Input Power		0~325W	0~650W	0~975W
Min. Operating Voltage		8V@16A	8V@24A	8V@40A
CC Resolution		2mA	4mA	6mA

MODEL	SP360VDC6000W	SP360VDC12000W	SP360VDC18000W
CC Accuracy	<0.2% Imax(50mA)	<0.2% Imax(100mA)	<0.2% Imax(150mA)
CV Resolution	<20mV		
CV Accuracy	<0.1% Umax(360mV)		
CP Resolution	0.5W	1.0W	1.5W
CP Accuracy	<0.5% Pmax(1625mW)	<0.5% Pmax(3250mW)	<0.5% Pmax(4875mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2818VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	45dB Idle; 71dB Max;	45dB Idle; 73dB Max;	45dB Idle; 75dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x133.0x718.0 mm		
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm		
Unit Weight	27kg	38kg	50kg
Shipping Weight	37kg	48kg	60kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP360VDC24000W	SP360VDC30000W	SP360VDC36000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-60A , L1, L2-103A	3P208 L1-125A,L2,L3-103A	3P208 L1,L2,L3-125A
		3P400 L3-30A, L1,L2-49A	3P400 L1-63A,L2,L3-49A	3P400 L1,L2,L3-63A
Frequency		45~65Hz		
Connection		3ph, PE		
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 26.8kVAmax, 3P400 26.0kVAmax	3P208 33.5kVAmax, 3P400 32.5kVAmax	3P208 40.2kVAmax, 3P400 39.0kVAmax
Efficiency[1]		3P208 ~92.2%@360V, 3P208 ~90.5%@170A	3P208 ~92.2%@360V, 3P208 ~90.5%@212.5A	3P208 ~92.2%@360V, 3P208 ~90.5%@255A
		3P400 ~92.5%@360V, 3P400 ~91%@170A	3P400 ~92.5%@360V, 3P400 ~91%@212.5A	3P400 ~92.5%@360V, 3P400 ~91%@255A
Output				
Voltage Range		0~360V		
Current Range		0~170A	0~212.5A	0~255A
Power Range		0~24000W	0~30000W	0~36000W
Max. Setup Range	Voltage	0~378V(0~105%)		
	Current	0~178.5A(0~105%)	0~223.13A(0~105%)	0~267.75A(0~105%)
	Power	0~26400W(0~105%)	0~31500W(0~105%)	0~37800W(0~105%)
	Internal Resistance	0~64Ω	0~51Ω	0~43Ω
Accuracy	Voltage	<0.1%Umax(360mV)		
	Current	<0.2%Imax(340mA)	<0.2%Imax(425mA)	<0.2%Imax(510mA)
	Power	<1%+180W	<1%+240W	<1%+360W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(72mV)		
	Current	<0.05% Imax(85mA)	<0.05% Imax(106mA)	<0.05% Imax(128mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(180mV) @Rated Voltage, <0.1% Umax(360mV) @Rated Current		
	Current	<0.15% Imax(255mA)	<0.15% Imax(319mA)	<0.15% Imax(383mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)		
Drop Time	Voltage	<800ms (No Load) <15ms (Full Load)		
Transient Response Time[3]	Voltage	≤1.5ms/3.6V		
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(360mV)		
	Current	<0.2% Imax(340mA)	<0.2% Imax(425mA)	<0.2% Imax(510mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<350mVpp, <60mVrms		
	Current	<85mArms	<106mArms	<128mArms
Remote Compensation	Voltage	3%Umax(10.8V)		
Sink Function				
Input Voltage		0~360V		
Input Current		0~100A	0~125A	0~150A
Input Power		0~1300W	0~1625W	0~1950W
Min. Operating Voltage		8V@56A	8V@64A	8V@80A
CC Resolution		8mA	10mA	12mA

MODEL	SP360VDC24000W	SP360VDC30000W	SP360VDC36000W
CC Accuracy	<0.2% Imax(200mA)	<0.2% Imax(250mA)	<0.2% Imax(300mA)
CV Resolution	<20mV		
CV Accuracy	<0.1% Umax(360mV)		
CP Resolution	2W	2.5W	3W
CP Accuracy	<0.5% Pmax(6500mW)	<0.5% Pmax(8125mW)	<0.5% Pmax(9750mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2818VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	48dB Idle; 77dB Max;	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x265.0x745.0 mm		
Package Dimensions(WxHxD)	549.0×531.0×946.0 mm		
Unit Weight	75kg	86kg	97kg
Shipping Weight	101kg	112kg	123kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP500VDC6000W	SP500VDC12000W	SP500VDC18000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-0, L1,L2-38A	3P208 L1-60A, L2,L3-38A	3P208 L1,L2,L3-60A
		3P400 L3-0, L1,L2-19A	3P400 L1-30A, L2,L3-19A	3P400 L1,L2,L3-30A
Frequency		45~65Hz		
Connection		2ph, PE	3ph, PE	3ph, PE
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 6.7kVAmax, 3P400 6.5KVAmax	3P208 13.4kVAmax, 3P400 13.0KVAmax	3P208 20.1kVAmax, 3P400 19.5KVAmax
Efficiency[1]		3P208 ~92.5%@500V, 3P208 ~91%@32A	3P208 ~92.5%@500V, 3P208 ~91%@64A	3P208 ~92.5%@500V, 3P208 ~91%@96A
		3P400 ~94%@500V, 3P400 ~92.5%@32A	3P400 ~94%@500V, 3P400 ~92.5%@64A	3P400 ~94%@500V, 3P400 ~92.5%@96A
Output				
Voltage Range		0~500V		
Current Range		0~32A	0~64A	0~96A
Power Range		0~6000W	0~12000W	0~18000W
Max. Setup Range	Voltage	0~525V(0~105%)		
	Current	0~33.6A(0~105%)	0~67.2A(0~105%)	0~100.8A(0~105%)
	Power	0~6300W(0~105%)	0~12600W(0~105%)	0~18900W(0~105%)
	Internal Resistance	0~469Ω	0~235Ω	0~157Ω
Accuracy	Voltage	<0.1% Umax(500mV)		
	Current	<0.2% Imax(64mA)	<0.2% Imax(128mA)	<0.2% Imax(192mA)
	Power	<1%+60W	<1%+90W	<1%+120W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(100mV)		
	Current	<0.05% Imax(16mA)	<0.05% Imax(32mA)	<0.05% Imax(48mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(250mV) @Rated Voltage, <0.1% Umax(500mV) @Rated Current		
	Current	<0.15% Imax(48mA)	<0.15% Imax(96mA)	<0.15% Imax(144mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)		
Drop Time	Voltage	<1500ms (No Load) <15ms (Full Load)		
Transient Response Time[3]	Voltage	≤1.5ms/5V		
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(500mV)		
	Current	<0.2% Imax(64mA)	<0.2% Imax(128mA)	<0.2% Imax(192mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<600mVpp, <150mVrms	<650mVpp, <160mVrms	<650mVpp, <160mVrms
	Current	<16mArms	<32mArms	<48mArms
Remote Compensation	Voltage	3%Umax(15V)		
Sink Function				
Input Voltage		0~500V		
Input Current		0~16A	0~24A	0~40A
Input Power		0~325W	0~650W	0~975W
Min. Operating Voltage		8V@16A	8V@24A	8V@40A
CC Resolution		1mA	2mA	3mA

MODEL	SP500VDC6000W	SP500VDC12000W	SP500VDC18000W
CC Accuracy	<0.2% Imax(32mA)	<0.2% Imax(48mA)	<0.2% Imax(80mA)
CV Resolution	<4mV		
CV Accuracy	<0.1% Umax(500mV)		
CP Resolution	0.5W	1.0W	1.5W
CP Accuracy	<0.5% Pmax(1625mW)	<0.5% Pmax(3250mW)	<0.5% Pmax(4875mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2818VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	45dB Idle; 71dB Max;	45dB Idle; 73dB Max;	45dB Idle; 75dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x133.0x718.0 mm		
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm		
Unit Weight	27kg	38kg	50kg
Shipping Weight	37kg	48kg	60kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP500VDC24000W	SP500VDC30000W	SP500VDC36000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L1-60A, L2,L3-103A	3P208 L1-125A,L2,L3-103A	3P208 L1,L2,L3-125A
		3P400 L1-30A, L2,L3-49A	3P400 L1-63A,L2,L3-49A	3P400 L1,L2,L3-63A
Frequency		45~65Hz		
Connection		3ph, PE		
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 26.8kVAmax, 3P400 26.0kVAmax	3P208 33.5kVAmax, 3P400 32.5KVAmax	3P208 40.2kVAmax, 3P400 39.0KVAmax
Efficiency[1]		3P208 ~92.5%@500V, 3P208 ~91%@128A	3P208 ~92.5%@500V, 3P208 ~91%@160A	3P208 ~92.5%@500V, 3P208 ~91%@192A
		3P400 ~94%@500V, 3P400 ~92.5%@128A	3P400 ~94%@500V, 3P400 ~92.5%@160A	3P400 ~94%@500V, 3P400 ~92.5%@192A
Output				
Voltage Range		0~500V		
Current Range		0~128A	0~160A	0~192A
Power Range		0~24000W	0~30000W	0~36000W
Max. Setup Range	Voltage	0~525V(0~105%)		
	Current	0~134.4A(0~105%)	0~168A(0~105%)	0~201.6A(0~105%)
	Power	0~26400W(0~105%)	0~31500W(0~105%)	0~37800W(0~105%)
	Internal Resistance	0~118Ω	0~94Ω	0~79Ω
Accuracy	Voltage	<0.1% Umax(500mV)		
	Current	<0.2% Imax(256mA)	<0.2% Imax(320mA)	<0.2% Imax(384mA)
	Power	<1%+180W	<1%+240W	<1%+360W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(100mV)		
	Current	<0.05% Imax(64mA)	<0.05% Imax(80mA)	<0.05% Imax(96mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(250mV) @Rated Voltage, <0.1% Umax(500mV) @Rated Current		
	Current	<0.15% Imax(192mA)	<0.15% Imax(240mA)	<0.15% Imax(288mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)		
Drop Time	Voltage	<1500ms (No Load) <15ms (Full Load)		
Transient Response Time[3]	Voltage	≤1.5ms/5V		
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(500mV)		
	Current	<0.2% Imax(256mA)	<0.2% Imax(320mA)	<0.2% Imax(384mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<650mVpp, <160mVrms		
	Current	<64mArms	<80mArms	<96mArms
Remote Compensation	Voltage	3% Umax(15V)		
Sink Function				
Input Voltage		0~500V		
Input Current		0~56A	0~64A	0~80A
Input Power		0~1300W	0~1625W	0~1950W
Min. Operating Voltage		8V@56A	8V@64A	8V@80A
CC Resolution		4mA	5mA	6mA

MODEL	SP500VDC24000W	SP500VDC30000W	SP500VDC36000W
CC Accuracy	<0.2% Imax(112mA)	<0.2% Imax(128mA)	<0.2% Imax(160mA)
CV Resolution	<4mV		
CV Accuracy	<0.1% Umax(500mV)		
CP Resolution	2W	2.5W	3W
CP Accuracy	<0.5% Pmax(6500mW)	<0.5% Pmax(8125mW)	<0.5% Pmax(9750mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	2818VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	48dB Idle; 77dB Max;	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x265.0x745.0 mm		
Package Dimensions(WxHxD)	549.0x531.0x946.0 mm		
Unit Weight	75kg	86kg	97kg
Shipping Weight	101kg	112kg	123kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.

[2] Load transient from 0% to 100% of rated output.

[3] Test value at 100% voltage and 100% power.

[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP750VDC6000W	SP750VDC12000W	SP750VDC18000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-0, L1,L2-38A	3P208 L1-60A, L2,L3-38A	3P208 L1,L2,L3-60A
		3P400 L3-0, L1,L2-19A	3P400 L1-30A, L2,L3-19A	3P400 L1,L2,L3-30A
Frequency		45~65Hz		
Connection		2ph, PE	3ph, PE	3ph, PE
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 6.7KVAmax, 3P400 6.5KVAmax	3P208 13.4KVAmax, 3P400 13.0KVAmax	3P208 20.1KVAmax, 3P400 19.5KVAmax
Efficiency[1]		3P208 ~92.5%@750V, 3P208 ~91%@21A	3P208 ~92.5%@750V, 3P208 ~91%@42A	3P208 ~92.5%@750V, 3P208 ~91%@63A
		3P400 ~92.7%@750V, 3P400 ~92%@21A	3P400 ~92.7%@750V, 3P400 ~92%@42A	3P400 ~92.7%@750V, 3P400 ~92%@63A
Output				
Voltage Range		0~750V		
Current Range		0~21A	0~42A	0~63A
Power Range		0~6000W	0~12000W	0~18000W
Max. Setup Range	Voltage	0~787.5V(0~105%)		
	Current	0~22.05A(0~105%)	0~44.1A(0~105%)	0~66.15A(0~105%)
	Power	0~6300W(0~105%)	0~12600W(0~105%)	0~18900W(0~105%)
	Internal Resistance	0~1072Ω	0~536Ω	0~358Ω
Accuracy	Voltage	<0.1% Umax(750mV)		
	Current	<0.2% Imax(42mA)	<0.2% Imax(84mA)	<0.2% Imax(126mA)
	Power	<1%+60W	<1%+90W	<1%+120W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(150mV)		
	Current	<0.05% Imax(10.5mA)	<0.05% Imax(21mA)	<0.05% Imax(31.5mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(375mV) @Rated Voltage, <0.1% Umax(750mV) @Rated Current		
	Current	<0.15% Imax(31.5mA)	<0.15% Imax(63mA)	<0.15% Imax(94.5mA)
	Power	<0.75% Pmax		
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)		
Drop Time	Voltage	<600ms (No Load) <20ms (Full Load)		
Transient Response Time[3]	Voltage	≤2ms/7.5V		
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(750mV)		
	Current	<0.2% Imax(42mA)	<0.2% Imax(84mA)	<0.2% Imax(126mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<900mVpp, <225mVrms	<1000mVpp, <250mVrms	<1000mVpp, <250mVrms
	Current	<11mArms	<22mArms	<33mArms
Remote Compensation	Voltage	3% Umax(22.5V)		
Sink Function				
Input Voltage		0~750V		
Input Current		0~10A	0~15A	0~25A
Input Power		0~325W	0~650W	0~975W
Min. Operating Voltage		5V@10A	5V@15A	5V@25A
CC Resolution		1mA	2mA	3mA

MODEL	SP750VDC6000W	SP750VDC12000W	SP750VDC18000W
CC Accuracy	<0.2% Imax(20mA)	<0.2% Imax(30mA)	<0.2% Imax(50mA)
CV Resolution	<4mV		
CV Accuracy	<0.1% Umax(750mV)		
CP Resolution	0.5W	1.0W	1.5W
CP Accuracy	<0.5% Pmax(1625mW)	<0.5% Pmax(3250mW)	<0.5% Pmax(4875mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	4242VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	45dB Idle; 71dB Max;	45dB Idle; 73dB Max;	45dB Idle; 75dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x133.0x718.0 mm		
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm		
Unit Weight	27kg	38kg	50kg
Shipping Weight	37kg	48kg	60kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.

[2] Load transient from 0% to 100% of rated output.

[3] Test value at 100% voltage and 100% power.

[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP750VDC24000W	SP750VDC30000W	SP750VDC36000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L3-60A, L1,L2-103A	3P208 L1-125A,L2,L3-103A	3P208 L1,L2,L3-125A
		3P400 L3-30A, L1,L2-49A	3P400 L1-63A,L2,L3-49A	3P400 L1,L2,L3-63A
Frequency		45~65Hz		
Connection		3ph, PE		
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 26.8KVAmax, 3P400 26.0KVAmax	3P208 33.5KVAmax, 3P400 32.5KVAmax	3P208 40.2KVAmax, 3P400 39.0KVAmax
Efficiency[1]		3P208 ~92.5%@750V, 3P208 ~91%@84A	3P208 ~92.5%@750V, 3P208 ~91%@105A	3P208 ~92.5%@750V, 3P208 ~91%@126A
		3P400 ~92.7%%@750V, 3P400 ~92%@84A	3P400 ~92.7%@750V, 3P400 ~92%@105A	3P400 ~92.7%@750V, 3P400 ~92%@126A
Output				
Voltage Range		0~750V		
Current Range		0~84A	0~105A	0~126A
Power Range		0~24000W	0~30000W	0~36000W
Max. Setup Range	Voltage	0~787.5V(0~105%)		
	Current	0~88.2A(0~105%)	0~110.25A(0~105%)	0~132.3A(0~105%)
	Power	0~26400W(0~105%)	0~31500W(0~105%)	0~37800W(0~105%)
	Internal Resistance	0~268Ω	0~215Ω	0~179Ω
Accuracy	Voltage	<0.1% Umax(750mV)		
	Current	<0.2% Imax(168mA)	<0.2% Imax(210mA)	<0.2% Imax(252mA)
	Power	<1%+180W	<1%+240W	<1%+360W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(150mV)		
	Current	<0.05% Imax(42mA)	<0.05% Imax(52.5mA)	<0.05% Imax(63mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(375mV) @Rated Voltage, <0.1% Umax(750mV) @Rated Current		
	Current	<0.15% Imax(126mA)	<0.15% Imax(157.5mA)	<0.15% Imax(189mA)
	Power	<0.75%Pmax		
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)		
Drop Time	Voltage	<600ms (No Load) <20ms (Full Load)		
Transient Response Time[3]	Voltage	≤2ms/7.5V		
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(750mV)		
	Current	<0.2% Imax(168mA)	<0.2% Imax(210mA)	<0.2% Imax(252mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<1000mVpp, <250mVrms		
	Current	<44mArms	<55mArms	<66mArms
Remote Compensation	Voltage	3% Umax(22.5V)		
Sink Function				
Input Voltage		0~750V		
Input Current		0~35A	0~40A	0~45A
Input Power		0~1200W	0~1500W	0~1800W
Min. Operating Voltage		5V@35A	5V@40A	5V@45A
CC Resolution		4mA	5mA	6mA

MODEL	SP750VDC24000W	SP750VDC30000W	SP750VDC36000W
CC Accuracy	<0.2% Imax(70mA)	<0.2% Imax(80mA)	<0.2% Imax(90mA)
CV Resolution	<4mV		
CV Accuracy	<0.1% Umax(750mV)		
CP Resolution	2W	2.5W	3W
CP Accuracy	<0.5% Pmax(6000mW)	<0.5% Pmax(7500mW)	<0.5% Pmax(9000mW)
Slew Rate	0.01~2.5A/us		
Dynamic Mode	20ms~50s		
General			
Graphic Display	4.3" Color touch LCD		
Operation Key Feature	Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles	Yes		
FAN	Temperature control		
Protection	OCP, OVP, OPP, OTP, HARD FAIL		
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	4242VDC		
Master/Slave Control			
Series Output	MAX 2 units		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	48dB Idle; 77dB Max;	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x265.0x745.0 mm		
Package Dimensions(WxHxD)	549.0x531.0x946.0 mm		
Unit Weight	75kg	86kg	97kg
Shipping Weight	101kg	112kg	123kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.

[2] Load transient from 0% to 100% of rated output.

[3] Test value at 100% voltage and 100% power.

[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP1000VDC12000W	SP1000VDC24000W	SP1000VDC36000W
Input				
Voltage[1]		187~265VAC		
		340~460VAC		
Current[1]		3P208 L1-60A, L2,L3-38A	3P208 L3-60A, L1,L2-103A	3P208 L1, L2,L3-103A
		3P400 L1-30A, L2,L3-19A	3P400 L3-30A, L1,L2-49A	3P400 L1, L2,L3-63A
Frequency		45~65Hz		
Connection		3ph, PE		
Fuse (Internal)[1]		T50A*2pcs		
		T30A*2pcs		
Power Factor		>0.99		
Input Power		3P208 13.8kVAmax, 3P400 13.4KVAmax	3P208 27.6kVAmax, 3P400 26.8KVAmax	3P208 40.2kVAmax, 3P400 39.0KVAmax
Efficiency[1]		3P208 ~92%@1000V, 3P208 ~90%@32A	3P208 ~92%@1000V, 3P208 ~90%@64A	3P208 ~92%@1000V, 3P208 ~90%@96A
		3P400 ~93.5%@1000V, 3P400 ~92%@32A	3P400 ~93.5%@1000V, 3P400 ~92%@64A	3P400 ~93.5%@1000V, 3P400 ~92%@96A
Output				
Voltage Range		0~1000V		
Current Range		0~32A	0~64A	0~96A
Power Range		0~12000W	0~24000W	0~36000W
Max. Setup Range	Voltage	0~1050V(0~105%)		
	Current	0~33.6A(0~105%)	0~67.2A(0~105%)	0~100.8A(0-105%)
	Power	0~12600W(0~105%)	0~26400W(0~105%)	0~37800W(0~105%)
	Internal Resistance	0~937.5Ω	0~468.75Ω	0~312.5Ω
Accuracy	Voltage	<0.1% Umax(1000mV)		
	Current	<0.2% Imax(64mA)	<0.2% Imax(128mA)	<0.2% Imax(192mA)
	Power	<1%+90W	<1%+180W	<1%+360W
	Internal Resistance	R<2% Rmax, I<0.3% Imax		
Line Regulation	Voltage	<0.02% Umax(200mV)		
	Current	<0.05% Imax(16mA)	<0.05% Imax(32mA)	<0.05% Imax(48mA)
	Power	<0.05% Pmax		
Load Regulation[2]	Voltage	<0.05% Umax(500mV) @Rated Voltage, <0.08% Umax(800mV) @Rated Current		
	Current	<0.15% Imax(48mA)	<0.15% Imax(96mA)	<0.15% Imax(144mA)
	Power	<0.75%Pmax		
Rise Time	Voltage	<15ms (No Load) <85ms (Full Load)	<15ms (No Load) <85ms (Full Load)	<15ms (No Load) <80ms (Full Load)
Drop Time	Voltage	<1700ms (No Load) <15ms (Full Load)		
Transient Response Time[3]	Voltage	≤2ms/10V	≤2ms/10V	≤1.5ms/5V
Display Resolution	Voltage	0.01V		
	Current	0.001A		
	Power	1W		
	Internal Resistance	0.001Ω		
Measurement Accuracy	Voltage	<0.1% Umax(1V)		
	Current	<0.2% Imax(64mA)	<0.2% Imax(128mA)	<0.2% Imax(192mA)
	Power	<0.5% Pmax		
	Internal Resistance	<0.4% Rmax		
Ripple[4]	Voltage	<1500mVpp, <320mVrms		
	Current	<22mArms	<26mArms	<48mArms
Remote Compensation	Voltage	3% Umax(30V)		
General				
Graphic Display		4.3" Color touch LCD		
Operation Key Feature		Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware		
Rack Mount Handles		Yes		
FAN		Temperature control		
Protection		OCP, OVP, OPP, OTP, HARD FAIL		

MODEL	SP1000VDC12000W	SP1000VDC24000W	SP1000VDC36000W
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)		
Command Response Time	<3ms		
Analog Interface(Optional)			
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power		
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.		
Accuracy U/I/P/R	<0.2% F.S		
Actual Output U/I	<0.2%		
Control Signals	DC ON/OFF, External control Enable/Disable		
Status Signals	CV, OVP, OT		
Sampling Rate of Input & Output	45Hz		
Galvanic Isolation to the Device	4242VDC		
Master/Slave Control			
Series Output	Not supported		
Parallel Output	MAX 16 units		
Environmental			
Operating Temperature	0~40°C		
Storage Temperature	-20~70°C		
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)		
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C		
Altitude	<2000m@40°C		
Fan Noise	45dB Idle; 73dB Max;	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical			
Dimensions(WxHxD)	423.0x133.0x718.0 mm	423.0x265.0x745.0 mm	423.0x265.0x745.0 mm
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm	549.0x531.0x946.0 mm	549.0x531.0x946.0 mm
Unit Weight	38kg	75kg	97kg
Shipping Weight	48kg	101kg	123kg
Miscellaneous			
Over Voltage Category	II		
Protection Class	I		
Pollution Degree	2		
Insulation	AC input <->DC output, 4242VDC, AC input <-> PE, 2818VDC		

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP1500VDC12000W	SP1500VDC18000W
Input			
Voltage[1]		187~265VAC	
		340~460VAC	
Current[1]		3P208 L1-60A, L2,L3-38A	3P208 L1,L2,L3-60A
		3P400 L1-30A, L2,L3-19A	3P400 L1,L2,L3-30A
Frequency		45~65Hz	
Connection		3ph, PE	
Fuse (Internal)[1]		T50A*2pcs	
		T25A*2pcs	T30A*2pcs
Power Factor		>0.99	
Input Power		3P208 13.8KVAmax, 3P400 13.4KVAmax	3P208 20.5KVAmax, 3P400 19.9KVAmax
Efficiency[1]		3P208 ~92%@1500V, 3P208 ~90.5%@21A	3P208 ~92%@1500V, 3P208 ~90%@32A
		3P400 ~92.5%@1500V, 3P400 ~91.5%@21A	3P400 ~93.5%@1500V, 3P400 ~92%@32A
Output			
Voltage Range		0~1500V	
Current Range		0~21A	0~32A
Power Range		0~12000W	0~18000W
Max. Setup Range	Voltage	0~1575V(0~105%)	
	Current	0~22.05A(0~105%)	0~33.6A(0~105%)
	Power	0~12600W(0~105%)	0~18900W(0~105%)
	Internal Resistance	0~2142Ω	0~1406.3Ω
Accuracy	Voltage	<0.1% Umax(1.5V)	
	Current	<0.2% Imax(42mA)	<0.2% Imax(64mA)
	Power	<1%+90W	<0.5%+90W
	Internal Resistance	R<2% Rmax, I<0.3% Imax	
Line Regulation	Voltage	<0.02% Umax(300mV)	
	Current	<0.05% Imax(10.5mA)	<0.05% Imax(16mA)
	Power	<0.05% Pmax	
Load Regulation[2]	Voltage	<0.05% Umax(750mV) @Rated Voltage, <0.08% Umax(1200mV) @Rated Current	
	Current	<0.15% Imax(31.5mA)	<0.15%Imax(48mA)
	Power	<0.75% Pmax	
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)	<15ms (No Load) <90ms (Full Load)
Drop Time	Voltage	<700ms (No Load) <20ms (Full Load)	<1800ms (No Load) <15ms (Full Load)
Transient Response Time[3]	Voltage	≤2ms/15V	
Display Resolution	Voltage	0.01V	
	Current	0.001A	
	Power	1W	0.1W
	Internal Resistance	0.001Ω	
Measurement Accuracy	Voltage	<0.1% Umax(1.5V)	
	Current	<0.2% Imax(42mA)	<0.2% Imax(64mA)
	Power	<0.5% Pmax	
	Internal Resistance	<0.4% Rmax	
Ripple[4]	Voltage	<2500mVpp, <600mVrms	<1950mVpp, <650mVrms
	Current	<11mArms	<22mArms
Remote Compensation	Voltage	3% Umax(45V)	
General			
Graphic Display		4.3" Color touch LCD	
Operation Key Feature		Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware	
Rack Mount Handles		Yes	
FAN		Temperature control	
Protection		OCP, OVP, OPP, OTP, HARD FAIL	

MODEL	SP1500VDC12000W	SP1500VDC18000W
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)	
Command Response Time	<3ms	
Analog Interface(Optional)		
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power	
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.	
Accuracy U/I/P/R	<0.2% F.S	
Actual Output U/I	<0.2%	
Control Signals	DC ON/OFF, External control Enable/Disable	
Status Signals	CV, OVP, OT	
Sampling Rate of Input & Output	45Hz	
Galvanic Isolation to the Device	5250VDC	
Master/Slave Control		
Series Output	MAX 2 units	
Parallel Output	MAX 16 units	
Environmental		
Operating Temperature	0~40°C	
Storage Temperature	-20~70°C	
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)	
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C	
Altitude	<2000m@40°C	
Fan Noise	45dB Idle; 73dB Max;	45dB Idle; 75dB Max;
Mechanical		
Dimensions(WxHxD)	423.0x133.0x718.0 mm	
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm	
Unit Weight	38kg	50kg
Shipping Weight	48kg	60kg
Miscellaneous		
Over Voltage Category	II	
Protection Class	I	
Pollution Degree	2	
Insulation	AC input <->DC output, 5040VDC, AC input <-> PE, 2818VDC	

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP1500VDC24000W	SP1500VDC36000W
Input			
Voltage[1]		187~265VAC	
		340~460VAC	
Current[1]		3P208 L1-60A, L2,L3-103A	3P208 L1,L2,L3-125A
		3P400 L1-30A, L2,L3-49A	3P400 L1,L2,L3-63A
Frequency		45~65Hz	
Connection		3ph, PE	
Fuse (Internal)[1]		T50A*2pcs	
		T25A*2pcs	
Power Factor		>0.99	
Input Power		3P208 27.6KVAmax, 3P400 26.8KVAmax	3P208 40.2KVAmax, 3P400 39.0KVAmax
Efficiency[1]		3P208 ~92%@1500V, 3P208 ~90.5%@42A	3P208 ~92%@1500V, 3P208 ~90.5%@63A
		3P400 ~92.5%@1500V, 3P400 ~91.5%@42A	3P400 ~92.5%@1500V, 3P400 ~91.5%@63A
Output			
Voltage Range		0~1500V	
Current Range		0~42A	0~63A
Power Range		0~24000W	0~36000W
Max. Setup Range	Voltage	0~1575V(0~105%)	
	Current	0~44.1A(0~105%)	0~66.15A(0~105%)
	Power	0~26400W(0-105%)	0~37800W(0-105%)
	Internal Resistance	0~1071Ω	0~714Ω
Accuracy	Voltage	<0.1% Umax(1.5V)	
	Current	<0.2% Imax(84mA)	<0.2% Imax(126mA)
	Power	<1%+180W	<1%+360W
	Internal Resistance	R<2% Rmax, I<0.3% Imax	
Line Regulation	Voltage	<0.02% Umax(300mV)	
	Current	<0.05% Imax(21mA)	<0.05% Imax(31.5mA)
	Power	<0.05% Pmax	
Load Regulation[2]	Voltage	<0.05% Umax(750mV) @Rated Voltage, <0.08% Umax(1200mV) @Rated Current	
	Current	<0.15% Imax(63mA)	<0.15%Imax(94.5mA)
	Power	<0.75% Pmax	
Rise Time	Voltage	<15ms (No Load) <80ms (Full Load)	
Drop Time	Voltage	<700ms (No Load) <20ms (Full Load)	
Transient Response Time[3]	Voltage	≤2ms/15V	
Display Resolution	Voltage	0.01V	
	Current	0.001A	
	Power	1W	
	Internal Resistance	0.001Ω	
Measurement Accuracy	Voltage	<0.1% Umax(1.5V)	
	Current	<0.2% Imax(84mA)	<0.2% Imax(126mA)
	Power	<0.5% Pmax	
	Internal Resistance	<0.4% Rmax	
Ripple[4]	Voltage	<2500mVpp, <600mVrms	
	Current	<22mArms	<33mArms
Remote Compensation	Voltage	3% Umax(45V)	
General			
Graphic Display		4.3" Color touch LCD	
Operation Key Feature		Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware	
Rack Mount Handles		Yes	
FAN		Temperature control	
Protection		OCP, OVP, OPP, OTP, HARD FAIL	

MODEL	SP1500VDC24000W	SP1500VDC36000W
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)	
Command Response Time	<3ms	
Analog Interface(Optional)		
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power	
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.	
Accuracy U/I/P/R	<0.2% F.S	
Actual Output U/I	<0.2%	
Control Signals	DC ON/OFF, External control Enable/Disable	
Status Signals	CV, OVP, OT	
Sampling Rate of Input & Output	45Hz	
Galvanic Isolation to the Device	5250VDC	
Master/Slave Control		
Series Output	Not supported	
Parallel Output	MAX 16 units	
Environmental		
Operating Temperature	0~40°C	
Storage Temperature	-20~70°C	
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)	
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C	
Altitude	<2000m@40°C	
Fan Noise	48dB Idle; 80dB Max;	48dB Idle; 82dB Max;
Mechanical		
Dimensions(WxHxD)	423.0x265.0x745.0 mm	
Package Dimensions(WxHxD)	549.0x531.0x946.0 mm	
Unit Weight	75kg	97kg
Shipping Weight	101kg	123kg
Miscellaneous		
Over Voltage Category	II	
Protection Class	I	
Pollution Degree	2	
Insulation	AC input <->DC output, 5040VDC, AC input <-> PE, 2818VDC	

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

MODEL		SP2250VDC18000W
Input		
Voltage[1]		187~265VAC
		340~460VAC
Current[1]		3P208 L1,L2,L3-60A
		3P400 L1,L2,L3-30A
Frequency		45~65Hz
Connection		3ph, PE
Fuse (Internal)[1]		T50A*2pcs
		T25A*2pcs
Power Factor		>0.99
Input Power		3P208 20.1KVAmax, 3P400 19.5KVAmax
Efficiency[1]		3P208 ~92%@2250V, 3P208 ~90.5%@21A
		3P400 ~92.5%@2250V, 3P400 ~91.5%@21A
Output		
Voltage Range		2250V
Current Range		0~21A
Power Range		0~18000W
Max. Setup Range	Voltage	0~2362.5V(0-105%)
	Current	0~22.05A(0-105%)
	Power	0~18900W(0~105%)
	Internal Resistance	0~3214Ω
Accuracy	Voltage	<0.1% Umax/(2.25V)
	Current	<0.2% Imax(42mA)
	Power	<0.5%+90W
	Internal Resistance	R<2% Rmax, I<0.3% Imax
Line Regulation	Voltage	<0.02% Umax(675mV)
	Current	<0.05% Imax(10.5mA)
	Power	<0.05% Pmax
Load Regulation[2]	Voltage	<0.05% Umax(1125mV) @Rated Voltage, <0.08% Umax(1800mV) @Rated Current
	Current	<0.15% Imax(31.5mA)
	Power	<0.75% Pmax
Rise Time	Voltage	<15ms (No Load) <85ms (Full Load)
Drop Time	Voltage	<800ms (No Load) <20ms (Full Load)
Transient Response Time[3]	Voltage	≤3ms/22.5V
Display Resolution	Voltage	0.01V
	Current	0.001A
	Power	0.1W
	Internal Resistance	0.001Ω
Measurement Accuracy	Voltage	<0.1% Umax(2.25V)
	Current	<0.2% Imax(42mA)
	Power	<0.5% Pmax
	Internal Resistance	<0.4% Rmax
Ripple[4]	Voltage	<3200mVpp, <750mVrms
	Current	<11mArms
Remote Compensation	Voltage	3% Umax(67.5V)
General		
Graphic Display		4.3" Color touch LCD
Operation Key Feature		Soft keys, Numberic keys, Rotary knod, USB port for transfer and upgrading firmware
Rack Mount Handles		Yes
FAN		Temperature control
Protection		OCP, OVP, OPP, OTP, HARD FAIL

MODEL	SP2250VDC18000W
Interface	RS232/RS485/USB(Standard), GPIB/LAN(Optional), CAN(Optional)
Command Response Time	<3ms
Set Value Inputs	Analog input 0~5V/0~10V or 0~5kΩ/0~10kΩ to set 0~105% voltage, current and power
Actual Value Output	Analog output 0~5V/0~10V to monitor the voltage and current.
Accuracy U/I/P/R	<0.2% F.S
Actual Output U/I	<0.2%
Control Signals	DC ON/OFF, External control Enable/Disable
Status Signals	CV, OVP, OT
Sampling Rate of Input & Output	45Hz
Galvanic Isolation to the Device	6300VDC
Master/Slave Control	
Series Output	Not supported
Parallel Output	MAX 16 units
Environmental	
Operating Temperature	0~40°C
Storage Temperature	-20~70°C
Temperature Coefficient	100ppm/°C(voltage), 150ppm/°C(current)
Relative Humidity	<95%RH(non-condensing)@35°C, <80%RH(non-condensing)@40°C
Altitude	<2000m@40°C
Fan Noise	45dB Idle; 75dB Max;
Mechanical	
Dimensions(WxHxD)	423.0x133.0x718.0 mm
Package Dimensions(WxHxD)	665.0x347.0x1009.0 mm
Unit Weight	50kg
Shipping Weight	60kg
Miscellaneous	
Over Voltage Category	II
Protection Class	I
Pollution Degree	2
Insulation	AC input <->DC output, 5040VDC, AC input <-> PE, 2818VDC

[1] For different input voltage standard option must be specified at the time of order as they are installed at the factory prior to shipment.
[2] Load transient from 0% to 100% of rated output.
[3] Test value at 100% voltage and 100% power.
[4] Vrms @ 300kHz, Vpp @ 20MHz, Arms @ 300kHz.

Appendix B Warranty

Thank you for purchasing the SP-3U/6U Series Wide-range High-power Programmable DC Power Supply of APM Technologies (referred to hereafter as “APM”). In order for you to use our products properly, APM provides you with the standard warranty service as stipulated below. Please read the following instructions carefully.

This warranty is applicable to APM's Programmable DC Power Supply.

All quality warranties and services offered by your distributors are not subject to or covered by this warranty card. Our company bears no responsibility for honoring any commitment or warranty in the respect for quality warranty or services made by the distributors.

Warranty Period

1. The warranty period of APM SP-3U/6U Series Wide-range High-power Programmable DC Power Supply is 2 (two) years unless otherwise agreed to in writing by APM.

2. The warranty period will not be extended or recalculated after a product or component replacement; repaired or replaced products are covered for the remainder of the original warranty period and subject to the conditions outlined in the original warranty.

Warranty Terms

1. In case of product malfunction within the warranty period, please send both the scanned copy of the warranty card and purchasing invoice to the APM Customer Service by email. APM will provide services for maintenance or replacement of defected products or components according to the actual conditions. Whatever method we may adopt, APM always strives to provide you with the highest standard and utmost professional after-sales services.

2. In case of product replacement, all replaced or exchanged parts which are removed under this warranty will become the property of APM. Please promptly return the original product and components to the original place of purchase so that APM can receive the replaced items in a reasonable period of time.

Liability Waiver

APM reserves the rights to refuse product warranty service under the following circumstances:

1. The product is out of warranty period.

2. Inability to provide the purchasing invoice issued either by the product distributer or the installer besides of unable to determine the product manufacturer as APM.

3. APM logo or product label is missing or not readable.

4. Product is without an warranty sticker or warranty stick is damaged.

5. Accessories included with each product are not in the product warranty scope.

6. Defects or damages caused by or resulting from inadequate or improper repairs carried out by any person, entity or service facility which is not authorized by APM to perform warranty services on its behalf.

7. Defects or damages caused by or resulting from failure to comply with the operating instructions and contents specified in the related product manuals.

8. Defects or damages due to operation in very harsh environments that are beyond the limitations specified in this product manual.

9. Defects or damages due to the use of non-standard parts or software or parts which are not developed or manufactured by APM.

10. Defects or damages caused by or resulting from force majeure (including but not limited to lightning, immersion in liquid, etc.).

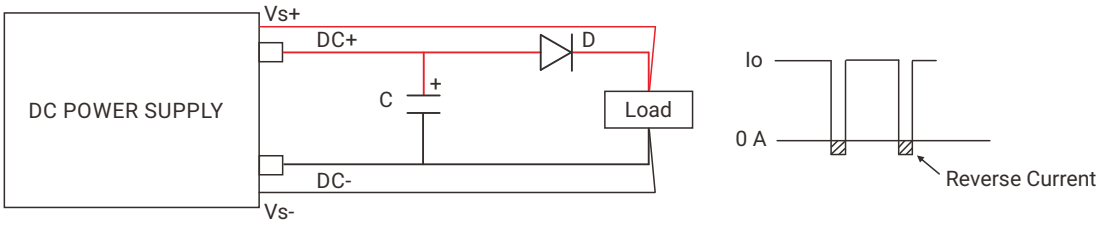
11. Defects or damages caused by or resulting from accidents or negligent use(including but not limited to transportation, storage, connection to incompatible voltage, improper operation, etc.).

12. Cosmetic defects or damages that do not affect normal operation of the product.

In the case of malfunction caused by one of the above-mentioned circumstances, APM or its authorized service facility is willing to provide paid service in response to the customer's request.

Appendix C Application Notes

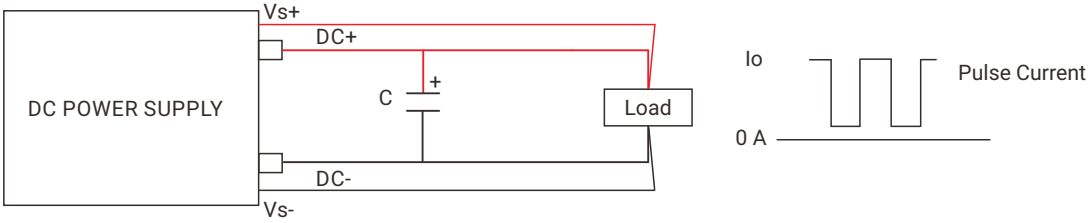
1. If the power supply is connected to a inductance load such as motor, connect a diode in series with the output port to prevent the load current from reversing and damage the power supply. The added capacitor (1000MF~10000uF) will smooth the output voltage.



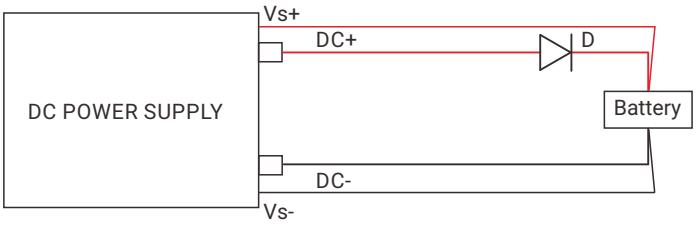
Caution!

- It is recommended to add a suitable circuit to absorb the reverse EMF generated by motor to ensure the safety of the operation.

2. For pulse current type load, or switchable power load applications, if the output cable is longer than 50cm, strand the load cable and parallel the capacitance at the load input to prevent any unexpected oscillation from occurring.



3. For battery application, connect a diode in series with the output port to prevent the load current from reversing.



Note

- Hi-Variation must be set to OFF when charging a battery.

Schedule

Product Information		
Distributor	Company Name	
	Contact Person	
	Phone Code	
	Address	
User's Information		
User	Name	
	Phone Code	
	Address	
	Fax	
	E-mail	
Product Malfunction Information		
Model		
Serial No.		
Warranty Period		
Date of Malfunction	Signature	Malfunction Description & Solutions

Please stick the product Serial number here.

Add: # 7, Link Information Industry Park, Shuilianshan Road, Nancheng, Dongguan, Guangdong, China
Tel: +86 769 2202 8588 E-mail: overseas@apmtech.cn
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