



APM TECHNOLOGIES

PROFESSIONAL INNOVATIVE BRANDING SERVICE

www.apmtechate.com

SPST Series Linked 3-Phase AC Power Supply System

User Manual >>>



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Preface

Dear Customer,

Thank you for using SPST Series Linked 3-Phase AC Power Supply System, a product developed & manufactured by APM Technologies. We sincerely hope this product can meet your needs.

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

Data Download

Please kindly download the detailed user manual from APM website and keep it for your reference at any time.

Power <input type="radio"/>	1800W	3000W	4500W	6000W	9000W	12000W	15000W
Power <input type="checkbox"/>	16.8A/8.4A	27.6A/13.8A	41.4A/20.7A	48A/24A	82.8A/41.4A	96A/48A	138A/69A
<p>Model guide: SPST </p> <p>For example: SPST300VAC6000W-3-17 SPST stands for Switching Power System.</p>							

* This formula is the standard cabinet for SP-300 series 2U/3U/4U model. It is available to select cabinet with different specification according to exact situation. Detail please consults our area manager.

The following table lists the functions of SPST Series Linked 3-Phase AC Power Supply System and the information of the accessories.

NO.	Descriptions	SPST Series AC Power Supply System
1	Output frequency range	15~1000Hz
2	Support IEC standard waveform	IEC 61000-4-11
3	Integrated multifunctional power meter	Support
4	Adjustable phase angle/slope	Support
5	AC/DC Output	Support
6	High Crest Factor	Support
7	Output Simulation Sequence and Disturbance Simulation	Support
8	GPIB communication interface	Support, optional

Version C, Updated July 2022

Safety Notices



This symbol highlights operations that have the potential to endanger users, operation procedures and instructions must be completely understood before use.



Documentation must be consulted in all cases where this symbol is marked.



This symbol highlights important instructions that need to be read before using the equipment.



This symbol indicates of high voltage risk aspects of the product or its use.



This symbol indicates parts that may be at a high temperature. Please do not touch this part of the equipment to prevent scalding.



This symbol indicates that a grounded condition is required before operating the equipment; the terminal with this label must be grounded to prevent electric shock.

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

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 can tell us your suggestions and comments about the performance of our products in order that we can continue to improve our product quality and our level of service.

1.2 Targeted Audience

This manual is intended for product users and technical personnel that are involved with installing, operating and maintaining the product. Readers are required to have a certain degree of electrical and mechanical knowledge and be familiar with basic electrical and mechanical schematics.

1.3 Use of this Manual and Legal Notices

All materials (including but not limited to graphics, logos, symbols, data, etc.) in this manual are owned by the APM Technologies. No part of this manual can be reproduced without prior authorization from APM Technologies.

The content of this manual will continue to be updated and revised as inevitably there are slight discrepancies or errors. Please check for updates at en.apmtech.cn and download the latest version of this manual and information.

It is prohibited in any way to use all or part of the firmware or software developed by APM Technologies for other commercial purposes. It is prohibited to decompile, decrypt or otherwise damage the software developed by APM Technologies.

2 Unpacking

2.1 Packing List

Once you receive the product, please immediately check if there is any packaging damage that may indicate damage to the product. If you find damage related to product delivery, please immediately notify the transport company. Make sure to take photos documenting the damage to the product, and send them to us so that we can provide you with the best service.

Make sure that you receive the SPST Series AC Power Supply System and the following accessories at the same time, if any is missing, please contact your agent or APM Technologies.

No.	Descriptions	Quantity	Remarks
1	SPST Series AC Power Supply System	1	As Ordered
2	RS-232 Communication Cable	1	Standard
3	LAN Communication Cable (568A-568B)	1	Optional
4	USB Communication Cable	1	Standard
5	GPIB Communication Cable	1	Optional
6	Quick Guide	1	Standard

2.2 Checking for Shipping Damage

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



Caution!

- The handles on the front panel are for sliding in and out of the cabinet NOT for carrying.
- Because of its weight, transport by hand should be avoided where possible. If unavoidable then only the housing should be held and not on the exterior parts (handles, input/output terminals or rotary knobs).

2.3 Product Failure and Maintenance

In the unlikely event of product failure, please contact APM Technologies or its dealer in time to provide the serial number, detailed failure information and pictures of the faulty product to help us identify the cause of the failure. If the product need to be sent for repair, please pack it with the original packing material.

During the warranty period, the customer shall bear the freight and insurance costs for returning to the maintenance center, and APM bear the return cost to customer.

Please do not return the product without authorization from APM.

3 Products Introduction

3.1 Product Description

It is a 3-phase output programmable AC power supply which provides with high power density. With high speed DSP+CPLD control, high frequency PWM technology, active PFC design, It is able to provide not only stable DC/AC output power, but also 3-phase/1-phase output. It is featured with high power density, high reliability and high precision, meanwhile it possesses operation interface of touch screen and keys manually. It is able to analog output normal or abnormal power input for electrical device to meet test requirements, which is applicable to electric, lighting, aviation sectors, etc. It could be applied to enterprise's production test as well.

3.2 Products Features

- Large touch color screen, possess complete functions and easy to operate
- AC+DC mixed or independent output mode for voltage DC offset simulation
- Capable of setting output slope/phase angle, 0~359.9°
- Output frequency 15~1000Hz, capable of setting output slope of voltage and frequency
- High output crest factor could satisfy surge tests requirements
- Multiple current measuring level selection. Increase measurement accuracy
- Standard USB data interface, support CSV file waveform import
- OCP/OVP/OPP/OTP/ Short circuit protection
- Built-in power meter, which is capable of measuring 15 electrical parameters per phase, including voltage, current, power, etc
- With reverse current protection to avoid current flowing backward
- Capable of setting voltage and current output restriction, support for constant current output mode

3.3 Operating Instructions

This product is a precision instrument, please read this manual carefully before using. In order to ensure measurement accuracy it is recommended that this unit is calibrated annually by a calibration laboratory.

To ensure the user safety, the input power cable, connector and accessories of this product should be inspected at least annually.

3.4 Operating Environments

1. These power sources must be used in a clean and dry laboratory or testing environment with an ambient temperature of between 0°C and 40°C and a relative humidity of between 5% and 95%.
2. Do not use this power source in a high temperature ambient for a prolonged period. Please cease to use this product if its' case temperature of exceeds 45 degrees Celsius. Long term operation of this product at a high ambient temperature may cause OTP (over temperature protection) action.
3. For adequate air circulation please assure that 30 cm of space is present at the front and back of the unit. Internal fans cool the power source by drawing air through the front and exhausting it out the back.
4. Do not operate this product in an environment that contains large amounts of dust or corrosive gases. Please do not subject the unit to strong shock and vibration or expose it to intense direct sunlight.

3.5 Maintenance and Cleaning

Before cleaning, you must disconnect the input power cord of this power source. Gently wipe off any dust from the units exterior using a brush or sponge or one can use only a small amount of non-aqueous cleaning solution such as isopropyl alcohol on a clean cloth. Do not use a corrosive or abrasive cleaning solution to clean this product. The display front panel can be cleaned with cloth dampened in soft detergent. Cleaning of dust from the interior of this product must be carried out with a low pressure air gun, and to prevent damage to internal components we suggest that such cleaning be performed by an authorized dealer on behalf of the user.

3.6 Product Storage

Please store this product in an area with a temperature between -40 °C and 85 °C and with a relative humidity of between 5% and 95% non-condensing. If the product is not going to be used for a long period, please keep it in the original carton or other similar packaging and store it in a cool & dry place.

3.7 Power Supply Voltage

Make sure that the front panel power switch is in the OFF state and the AC input mains voltage is within the product's operating specification before plugging in or connecting to the AC mains.



Caution!

- The protective safety earth/ground connection must be connected first and disconnected after the AC mains 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 AC source is deactivated prior to making or disconnecting the connection.

3.8 Fuse

The input AC fuses installed inside the product are designed to protect the units' input from major component failures, and they should not fail under normal operating conditions. Accordingly, any fuse failure is an indication that other parts of the product are damaged. If the input fuses open circuit we recommend that the product be sent back to us for repair.



Warning!

- Danger of electric shock. No user serviceable components enclosed. Do not disassemble the power's enclosure / case to replace the fuse.

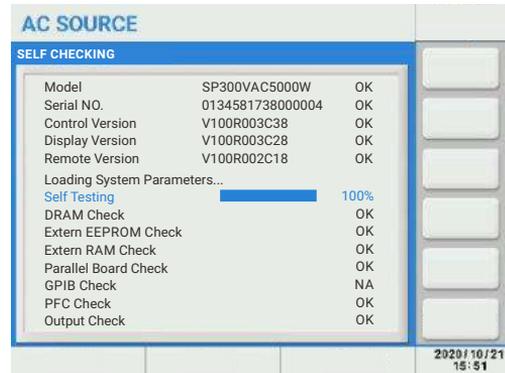
3.9 Warm-up Time

Once the power source is switched on the unit will enter a start-up routine that when completed which will verify proper unit operation. All features of the unit are operable after this routine has been successfully completed. In order to achieve the specified operating accuracy, it is recommended to allow the power supply to warm-up for a period of 30 minutes before use.

3.10 Starting Procedure

Plug in the AC power and turn on the power switch on the front panel, the programmable AC power source will execute a self-checking routine:

The company name APM Technologies will appear on the front panel display:



After 3 seconds, it will enter the self-testing mode;

DRAM Check, checks DRAM, if failed, shows as FAIL;

Extern EEPROM Check, checks the external EEPROM memory, if failed, shows as FAIL;

Extern RAM Check, checks the external RAM memory, if failed, shows as FAIL;

Parallel Board Check, checks whether remote I/O and parallel link board is installed and connected, if not, shows as NA.

GPIB Check, checks whether the GPIB communication board is being connected, if not, shows as NA.

PFC Check, checks the units PFC board operation, if not operating correctly it shows as FAIL.

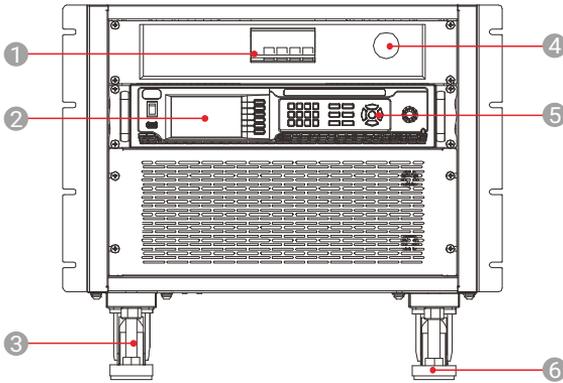
Output Check, checks the units output of 150V both 300V ranges, if the output voltage is not within 100V± 8V and 200V±8V it shows as FAIL.

Note: If the PFC Check or Output Check shows a FAIL result, the power source will not operate. If there is a FAIL result in any of the other tests, the power source is still operational. In this case, press the [Enter] key to proceed to the MAIN screen.

4 Panel Description

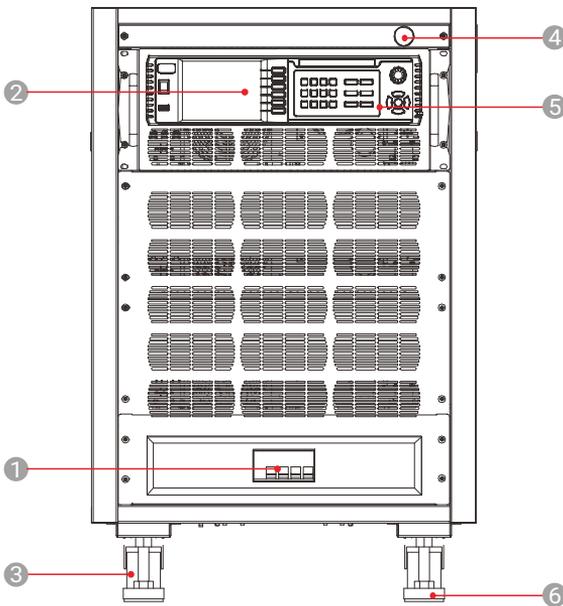
4.1 Front Panel Description

4.1.1 Front Panel Introduction



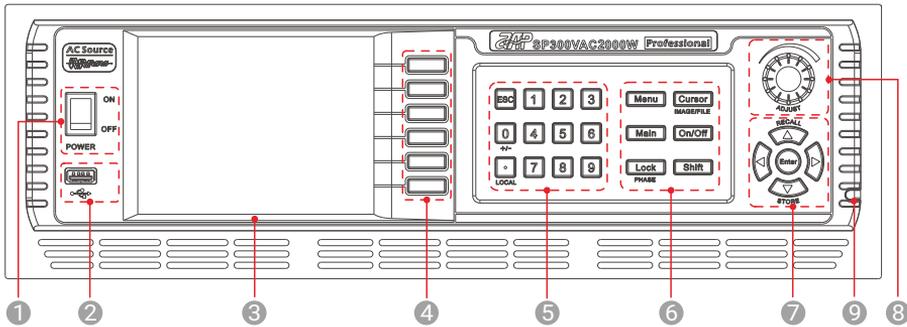
Front View of 9U Height 3-phase System

- ① AC input circuit breaker switch
- ② LCD screen
- ③ Caster (with caster lock)
- ④ Emergency stop
- ⑤ Keyboard and knob
- ⑥ Support bolt



Front View of 17U Height 3-phase System

4.1.2 Control Panel of The Master Unit



Front Panel-3U Models as example

- ① Input power switch.
- ② USB port is for data transfers and upgrading software.
- ③ 5.6" Color touch screen.
- ④ Operation selection soft keys, to select displayed menu functions.
- ⑤ Numeric and functional keys.

Keys	Name and the function	Manual Reference
[0]~[9]	Numeric keys.	[0]~[9]
[.]	Decimal point key.	[.]
[ESC]	Esc key.	[ESC]
+/- (Shift + [0])	To set the direction of DC offset.	[Shift]+[0]
LOCAL ([.])	To select front panel operation / keypad unlock function key, used to unlock the panel buttons.	Local([.])

6 Functional keys and multifunctional keys

Keys	Name and the function	Manual Reference
	To enter function setting items.	[Menu]
	Cursor to highlight desired selection.	[Cursor]
	Press to return to the Main screen.	[Main]
	To turn the output of AC source On or Off.	[On/Off]
	Press to lock the front panel keys.	[Lock]
	This shift key is used to select the alternate operation of a key, indicated by the word under the key.	[Shift]
IMAGE/FILE (Shift + )	Screen snapshot/importing/firmware upgrade.	[Shift]+[Cursor]
PHASE (Shift + )	1-phase mode or 3-phase mode.	[Shift]+[Lock]

7 Rotary knob, used to navigate menu items or for incrementing/decrementing values one step at a time or to move cursor position.

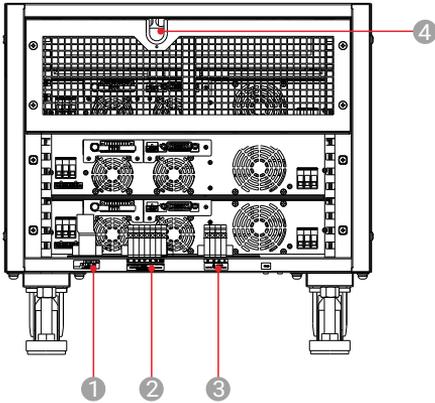
8 Confirm key and multifunctional keys.

Keys	Name and the function	Manual Reference
RECALL (Shift + )	Recall the setup from internal memory.	[Shift]+[▼]
STORE (Shift + )	Store the settings in non-volatile memory.	[Shift]+[▲]
	Up/Left key.	[◀]
	Down/Right key.	[▶]
	Confirm key.	[Enter]

9 Stylus (Touch pen) for accurately touching the touch screen display.

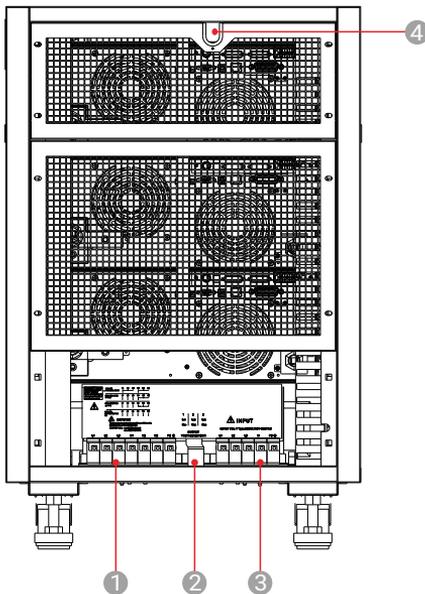
4.2 Rear Panel Description

4.2.1 Rear Panel Introduction



- ① Voltage sensor terminals.
- ② AC/DC output terminals.
- ③ Input terminals.
- ④ Threading hole for communication interface

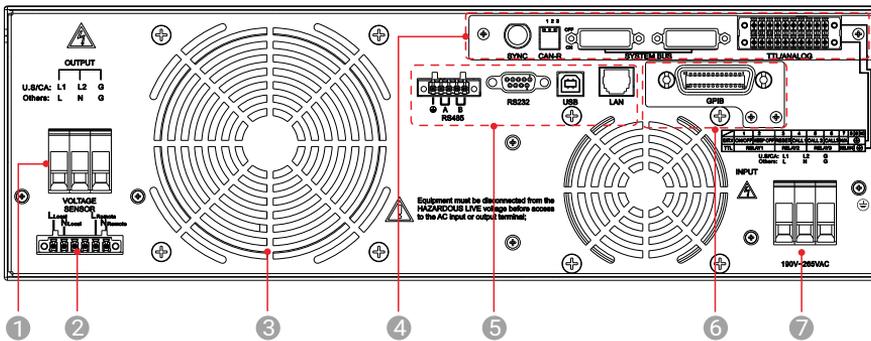
Rear View of 9U Height 3-phase System



- ① AC/DC output terminals.
- ② Voltage sensor terminals.
- ③ Input terminals.
- ④ Threading hole for communication interface

Rear View of 17U Height 3-phase System

4.2.2 Rear Panel of The Master Unit



Rear Panel-3U Models as example

- ① AC/DC output terminals.
- ② Voltage sensor terminals.
- ③ Cooling air outlets.
- ④ Remote I/O & Parallel Multiphase Link card.

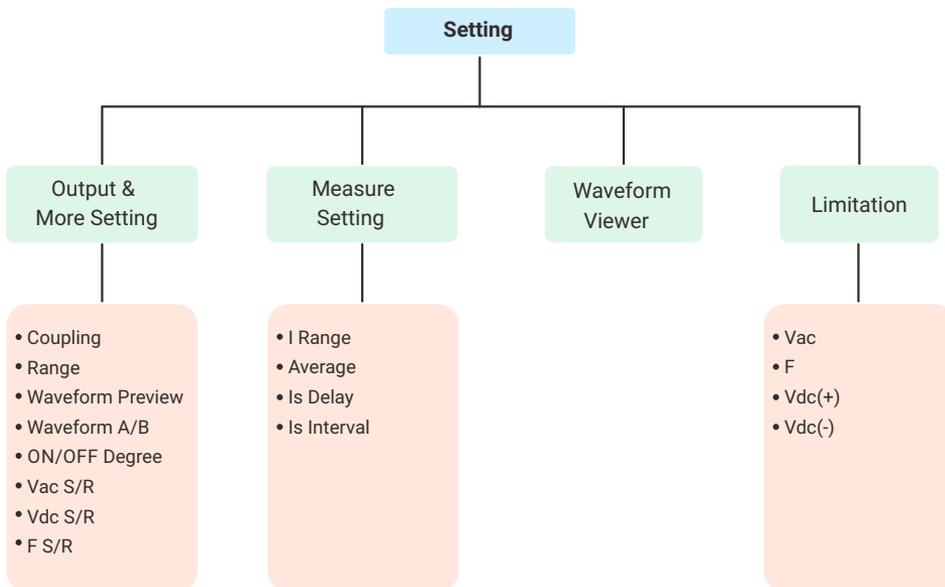
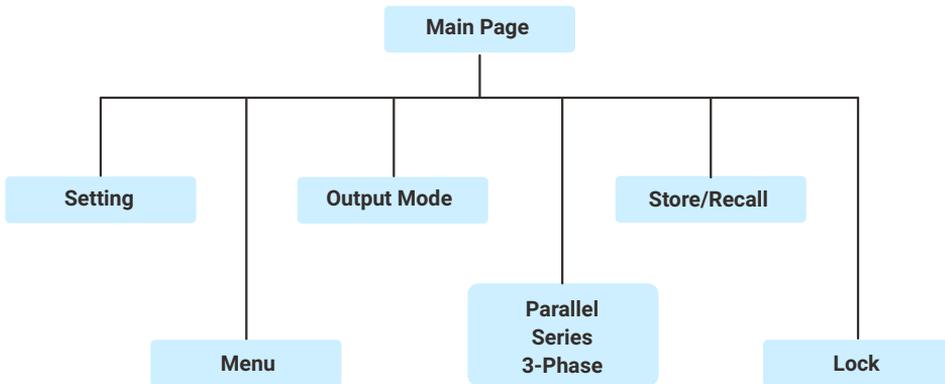
Interface	Description
SYNC	BNC connector input by external analog signal to control waveform amplitude.
CAN-R	Connect CAN-R in parallel mode.
SYSTEM BUS	Used for communication between master and slaves.

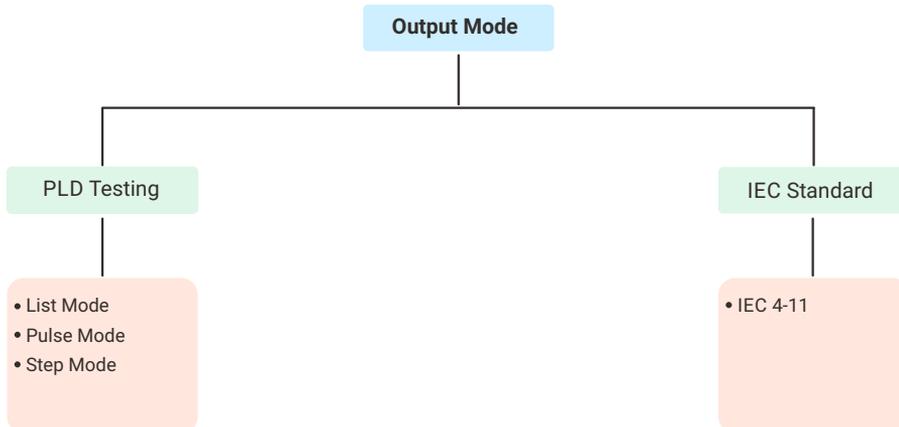
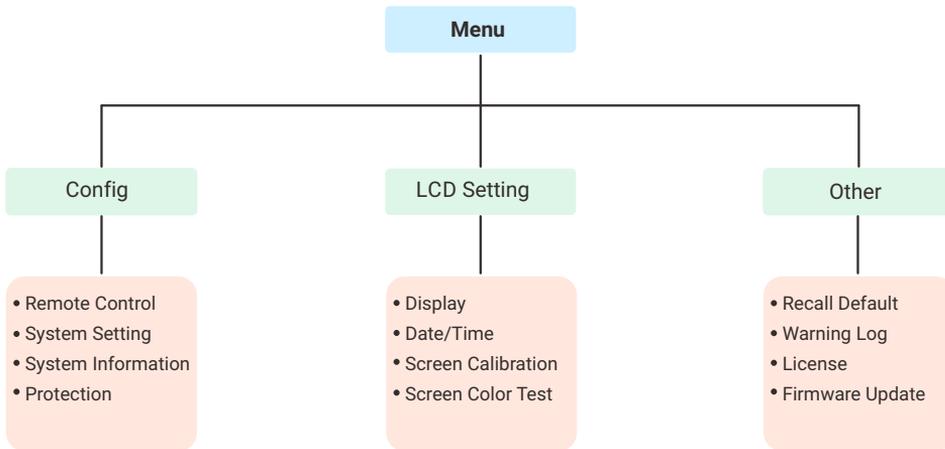
- ⑤ Standard communication interfaces, RS-485, RS-232, USB and LAN.
- ⑥ GPIB communication interface, optional.
- ⑦ Input terminals.

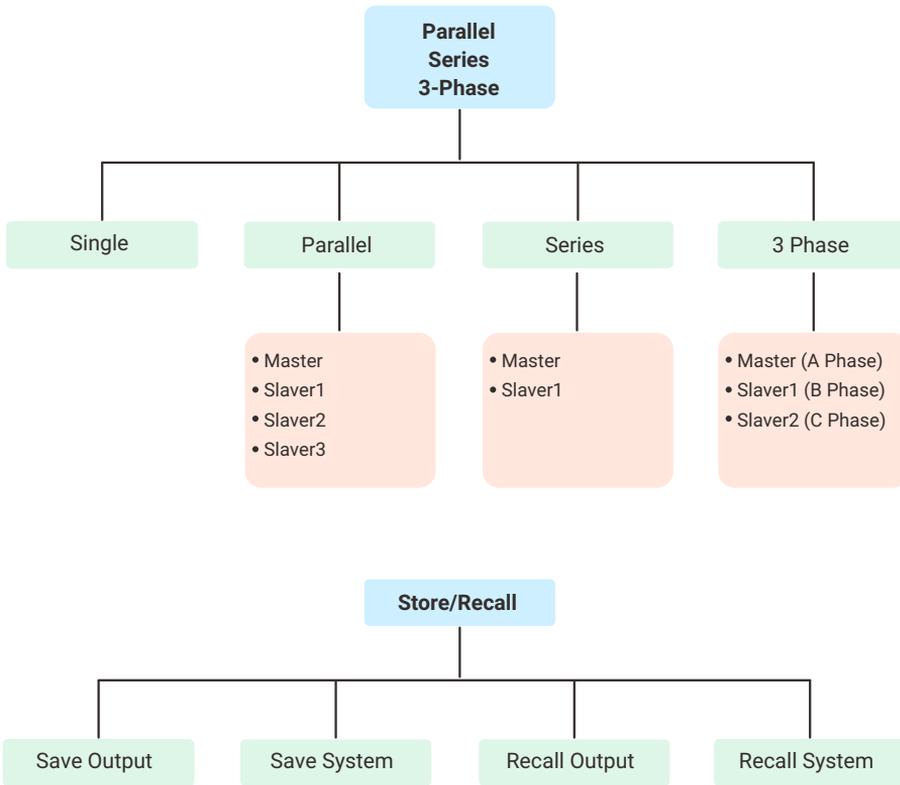
5 Menu Operation

5.1 Menu Introduction

5.1.1 Menu Structure







5.1.2 Introduction to Front Panel Operations



Note

- The Default setting values will be used if setting values are not saved before restarting.
1. Front panel **On/Off** key is used for turning the power source On or Off.
 2. Control modes include Front Panel control, Remote control and External control modes, the first two can be selected by a connected computer. The operating mode can be changed without affecting the power supply output.
 3. All front panel keys are functional when the power supply is in Front Panel operation mode.
 4. Under remote operation mode, all Front Panel keys except the decimal point key are locked.

5.1.3 Key Operations and Touch Screen Operations

Most of the menu function can be executed by front panel keys or touch screen. However, a few of the menu function can not be carried out by using the touch screen.

Voltage setting

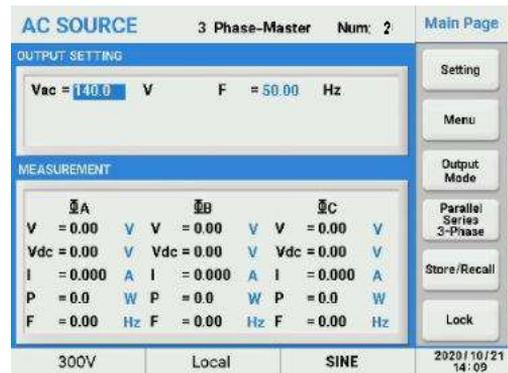
Option one (using front panel keys)

1. Press the [Cursor] key, then press the right or left arrow keys will to allow the cursor to scroll through the settable parameters.
2. Move the cursor to the value line of 'Vac=', press the numeric keys [0]~[9] to set the desired output voltage value, and then press the [Enter] key to confirm. The output frequency can be set in a similar manner.



OR

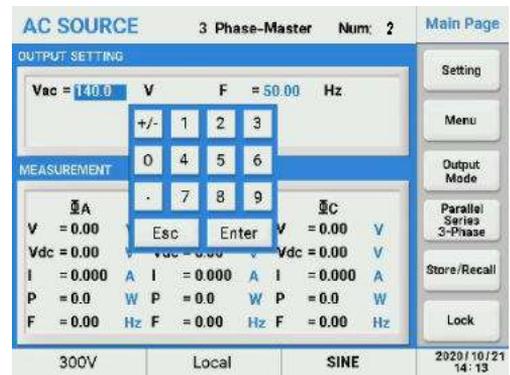
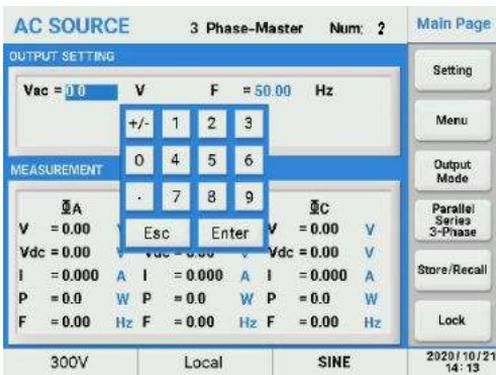
3. Once this value field is highlighted press the rotary knob, an underline cursor will be displayed under the value as show as below(left). Pressing the front panel knob again will change the cursor position, rotating the front panel knob or pressing the numeric keys will adjust the particular digits value. When the desired output voltage value is displayed press the [Enter] key to confirm.



Option two (using touch screen)

1. Touch the desired value area, a small keyboard will be displayed as shown below.
2. Touch the numeric keys [0]~[9] as desired, then touch the [Enter] key on the small keyboard to confirm.

Hint: Using the supplied stylus (touch pen) stored in the far right of the front panel is easier and more precise than using one's finger to touch the front panel screen. Be sure to place the Stylus back in its storage location after use to prevent loss.



Menu setting

Option one (using front panel keys)

1. Press the 'Coupling' soft key to display the output coupling options.
 2. Press the [▲] / [▼] key to highlight 'AC+DC' option, then press the [Enter] key to confirm.
- OR
3. Scroll knob to highlight AC+DC option, then press the knob to confirm.



Option two (using touch screen)

1. Touch the 'Coupling' soft key directly to display the options.
2. Touch the 'AC+DC' option to confirm.



5.2 Menu Operation

We will explain menu operation using the front panel keys as touch screen operation is self-explanatory.

5.2.1 Setting Item

The following Soft Keys are available in the Setting screen to access these setup screens.

- Output & More Setting
- Measure Setting
- Waveform Viewer
- Limitation



5.2.1.1 Output & More Setting

This screen allows control over the following output settings using these soft keys:

- Coupling
- Range
- Waveform Preview
- Zo Program
- Page Select



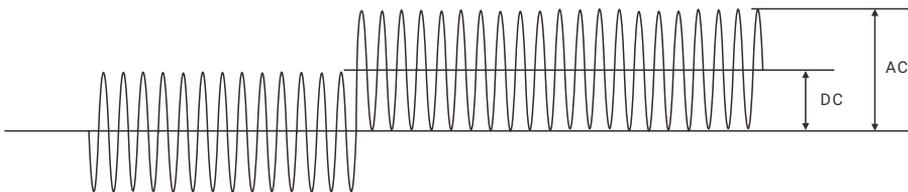
1. Output Coupling

This menu is for setting the output mode of the AC source including 'AC', 'DC', and 'AC+DC' modes. For example, to set 'Coupling' as 'AC+DC'.

1. In the 'More Settings' screen, press the 'Coupling' soft key to display the drop down list.
2. Rotate the front panel knob to highlight the 'AC+DC' option then press the front panel knob or the [Enter] key to confirm.



AC+DC



Note: In AC+DC coupling mode, any combination of AC and DC voltage may be selected as long as the positive or negative peak voltage of the combined output does not exceed the allowable maximum peak voltage. Refer to figure above.

2. Range

This menu is for setting the output range of the AC source which includes Low Range '150', High range '300', and 'Auto'. When Auto is chosen, the switchover between High range and Low range will be performed by the instrument automatically.

For example, to set 'Range' as 'Auto'.

1. In the 'More Settings' screen, press the 'Range' soft key to display the drop down list.
2. Rotate knob to highlight 'Auto' option then press the front panel knob or the [Enter] key to confirm.



Note

- When changing the range setting, turn off the AC source output first. The Range setting can not be changed if the output is on.
- There is a temporary OFF (approx. 300ms) to the AC source during the switchover of range.
- Range setting will be always display on the lower-left corner of the display.

3. Waveform Generators

The AC source provides the user with two independent waveform generators, A and B. Both of the waveform generators include SINE (sinusoidal), SQUARE, clipped sinusoidal (CSINE), FIXED (30 sets of built-in waveforms), USER (6 sets of user-defined waveforms) wave-shapes. For example, to set waveform B as SQUARE.

1. In the 'More Settings' screen, move the cursor to highlight the displayed Waveform A, then press the [Enter] key to change to Waveform B.
2. Move the cursor to the value field of Waveform B, then press the [Enter] key to show the waveform selection list, rotate the front panel knob to highlight 'SQUARE', then press the [Enter] key to confirm.

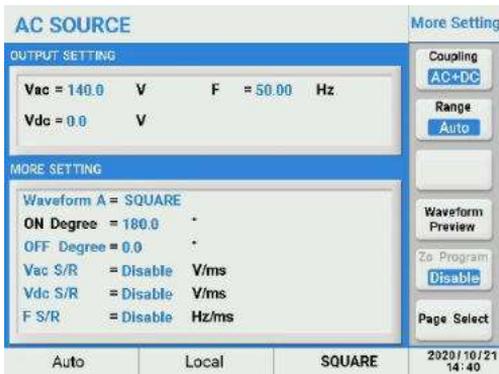


4. Degree Setting

This item is for editing the start and end angles of the AC output when the output is turned on and turned off. The 'ON Degree' (start angle) range is 0~359.9 degrees. The 'OFF Degree' (end angle) range is 0~359.9 degrees and 'Disable'. The AC source will stop its output immediately when the user turns the unit off when 'OFF Degree' is set as 'Disable'.

For example, to set 'ON Degree' as 180 degrees and 'OFF Degree' as 90 degrees.

1. In the 'More Settings' screen, move the cursor to highlight 'ON Degree = ' field, press [1]~[8]~[0] and [Enter] keys to confirm.
2. Move the cursor to highlight 'OFF Degree = ' field, press the [Enter] key to change to settable status, then press the [9]~[0] and [Enter] keys to confirm.



Note

- If the user programs a slew rate setting, the ON Degree (start phase angle) of an AC output waveform may not be directly visible. It can be inferred however from the waveform cycle and frequency setting.

5. Slew Rate Setting

This item is for setting the slew rate of AC output voltage, DC output voltage, and Frequency.

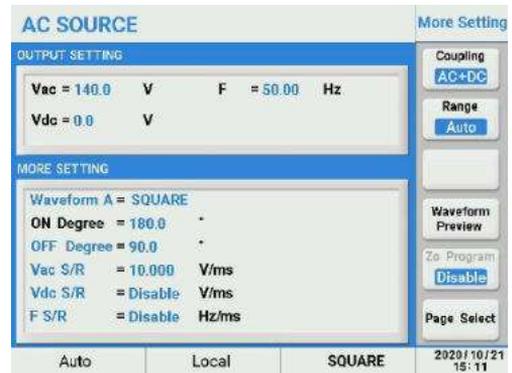
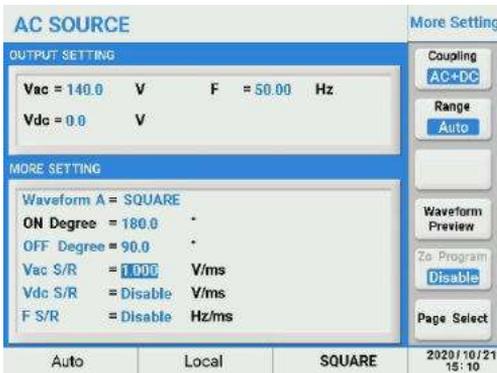
'Vac S/R' range is 0.001V/ms~1200.000V/ms, or Disable;

'Vdc S/R' range is 0.001V/ms~1000.000V/ms, or Disable;

'F S/R' range is 0.001Hz/ms~1600.00Hz/ms, or Disable;

For example, to set 'Vac S/R' as 10V/ms.

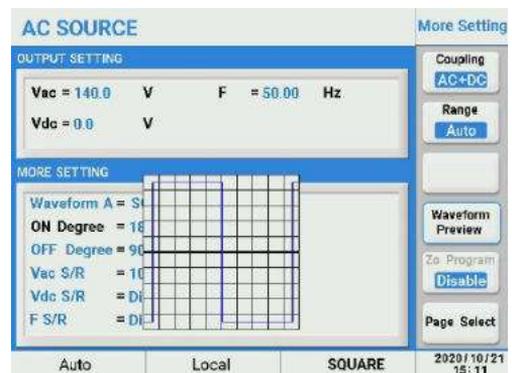
1. In the 'More Settings' screen, move the cursor to highlight 'Vac S/R', then press the [Enter] key to change to settable status.
2. Move the cursor to highlight 'Vac S/R =' field, then press [1]~[0] and [Enter] keys to confirm.



6. Waveform Preview

This item is for preview the currently selected waveform.

1. In the 'More Settings' screen, press the 'Waveform Preview' soft key to display the currently selected waveform.



5.2.1.2 Measurement Setting

The AC source support 15 different output measurements. All 15 can be displayed at the same time in the Measurement display area of the Main screen.

1. In the 'Settings' screen, press the 'MEASURE SETTING' soft key to display the 'Measure' screen shown below.
2. Move the cursor to highlight the position you would like to edit, then press the [Enter] key to display a on-screen touch pad containing all 15 measurements and a Hide button. Select the desired read-out at this position by pressing it or press Hide if you want no readout at this position.



Glossary of Terms

V, the RMS of total output voltage (Vac and Vdc), measured in volts.

Vac, AC output voltage, measured in volts.

Vdc, DC output voltage, measured in volts.

Vpk, Peak-peak output voltage, measured in volts.

I, the RMS of total output current (Iac and Idc), measured in amps.

Iac, AC output current, measured in amps.

Idc, DC output current, measured in amps.

Ipk, Peak-peak output current, measured in amps.

Is, surge current, measured in amps.

F, the output frequency, measured in Hz.

PF, output power factor, $PF=P/VA$.

CF, crest factor, $CF=Ipk/I$.

VAR, the power absorbed by capacitive or inductive elements in a circuit, measured in VAR.

P, active power, measured in watts.

VA, the apparent power consumed by the load due to real and reactive circuit components, measured in VA.

The following four Soft keys are available in the Measurement Settings screen:

- I Range
- Average
- Is Delay
- Is Interval



1. I Range

The I Range soft key allows selection of the current measurement range.

Available settings are High, Middle, Low, Auto and mA.

For example, to set I Range as Low.

1. In the 'Measure' screen, press the soft key to the right of 'I Range'.
2. Rotate knob to highlight 'Low' and press the [Enter] key to confirm.



- The Auto range selection will only switched between High and Middle range.
- To change settings between High/Middle and Low/mA ranges, the power source must be turned off first.



2.1 Average

The Average soft key changes the number of times a reading is averaged before the corresponding measurement parameter display is updated.

Available average values are 1, 2, 4, 8, 16 and 32.

For example, to set Average time as 2.

1. In the 'Measure' screen, press the 'Average' soft key to display the drop down list.
2. Rotate the front panel knob to highlight '2' and then press the [Enter] key to confirm.



3. Is Delay, Is Interval

Is Delay defines the delay time between the beginning of the output voltage transition to the start of the measurement of I surge.

Is interval defines the measurement time.

For example, to set 'Is Delay' as 10ms.

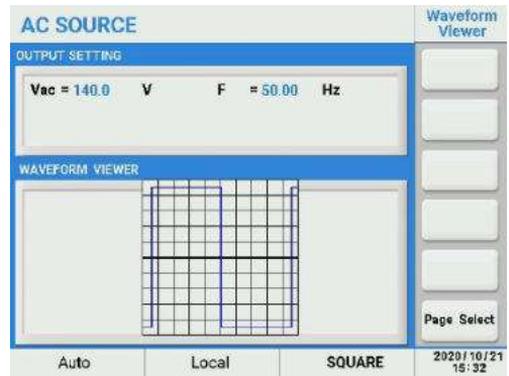
1. In the 'Measure' screen, press the soft key to the right of 'Is Delay'.
2. Press [1]~[0] and then [Enter] keys to confirm.



5.2.1.3 Waveform Viewer Setting

This item is for viewing the currently selected waveform.

In the 'Settings' screen, press the 'Waveform Preview' soft key to display the currently selected waveform. Press the [ESC] key to turn off the viewer.



5.2.1.4 Limitation Setting

The limitation soft key displays the user limit setting screen. User limits are useful to protect a unit under test from operator error by setting upper and or lower parameter value limits for key output parameters like voltage and frequency.

'Vac' range is 0~300V.

'F' range is 15~1200Hz.

'Vdc(+)' range is 0~424.2V, 'Vdc(-)' range is -424.2V~0.

For example, to set the maximum output AC voltage.

1. In the 'Limitation' screen, move the cursor to highlight 'Vac =' field, press the desired [0]~[9] keys and then [Enter] key to confirm.
2. Or, press the 'Set to Maximum' soft key directly.





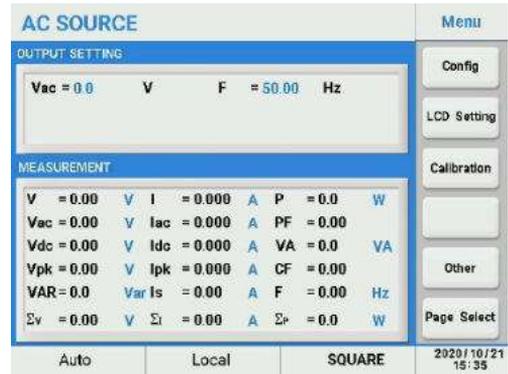
Note

- User limits are independent of the selected voltage range so an upper Vac limit setting higher than 150V will have no effect while on the 150V AC voltage range as the voltage range limit supersedes the user limit.

5.2.2 Menu Setting

The following soft keys are available in the Menu screen to access these settings:

- Config (Configuration)
- LCD Setting
- Calibration
- Other



5.2.2.1 Config Setting

The Config screen controls the following aspects of the power source:

- Remote Control
- System Setting
- System Information
- External Control
- Protection



1. Remote Control

The Remote Control screen provides access to RS-232, RS-485, GPIB and LAN interface.

1.1 RS232

Baud Rate, available rates are: 9600, 19200, 38400, 57600, 115200.

Parity Type: NONE, ODD, EVEN.

Stop Bits: 1, 2.

For example, to set Baud Rate to 19200.

1. In the 'Remote Control' menu, press the 'RS232' soft key to change RS232 interface settings.
2. Move the cursor to highlight 'Baud Rate =' field then press the [Enter] key to confirm.
3. Rotate the front panel knob to highlight '19200', and then press the [Enter] key to confirm.



1.2 RS485

Available Baud Rate are: 9600, 19200, 38400, 57600, 115200.

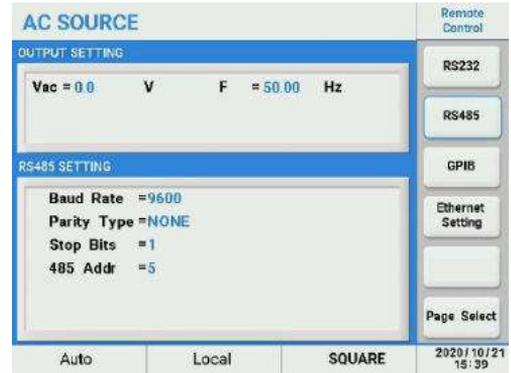
'Parity Type': NONE, ODD, EVEN.

'Stop Bits': 1, 2.

'485 Addr': 1~254.

For example, to set '485 Addr' as 5.

1. In the 'Remote Control' menu, press the 'RS485' soft key to change RS485 settings.
2. Move the cursor to highlight '485 Addr =' field, then press [5] and [Enter] keys to confirm.

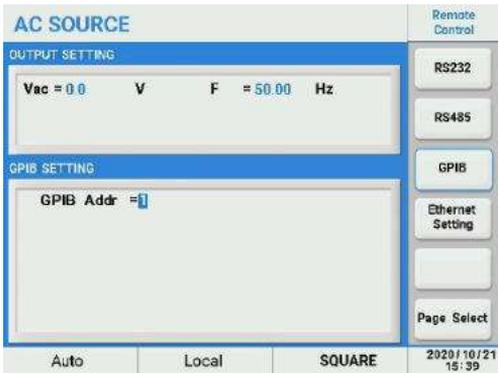


1.3 GPIB

'GPIB Addr': 1~30.

For example, to set 'GPIB Addr' as 5.

1. In the 'Remote Control' menu, press the 'GPIB' soft key to change GPIB interface settings.
2. Move the cursor to highlight 'GPIB Addr =' field, then press [5] and [Enter] keys to confirm.



1.4 Ethernet Settings

Parameter ranges are:

ETH Setting: Auto, Manual.

IP Address: 0~255

Net Mask: 0~255

Gate Way: 1~254

The default settings for the Ethernet interface are as follows:

ETH Setting = Manual

IP Address = 192.168.1.100

Net Mask = 255.255.255.000

Gate Way = 192.168.1.1

Listen Port = 2001

For example, to set IP Address as 192.168.1.99.

1. In the 'Remote Control' menu, press the 'Ethernet Setting' soft key to change LAN interface settings.
2. Move the cursor to highlight 'ETH Setting =' field, press the [Enter] key to confirm.
3. Rotate the front panel knob to highlight the 'Manual' item, press the [Enter] key to confirm.
4. Move the cursor to highlight the setting area and press [0]~[9] and [Enter] keys to confirm.



2. System Settings

This item is for setting the basic operation of the system including 'Buzzer', 'P/O State' and 'O/P Relay'.

2.1 Buzzer

The buzzer of the AC source beeps when the user presses the keypad on the front panel, or press the PRG knob. If the user does not want it to sound it can be disabled.

For example, to set 'Buzzer' to OFF.

1. In the 'System Setting' menu, press the 'Buzzer' soft key to change the state of the buzzer.
2. Rotate the front panel knob to highlight the 'OFF' option then press the [Enter] key to confirm.



2.2 P/O State

The AC source allows the user to store the output settings as the default settings before powering the unit off.

If **'OFF'** is selected the unit will NOT store any settings when powered off and initialize with factory default at power on.

If **'LAST'** is selected the unit will store the last setting in effect when powered off and recall this same setting at power on.

If **'USER'** is selected a user-defined setup can be assigned for recall when the power source is turned on.

For example, to set 'P/O State' as 'USER', 'Couple' set as 'AC+DC', 'Vac' set as 100V, 'F' set as 50 Hz, and 'Vdc' set as 20V.

1. In the 'System Setting' menu, press the 'P/O State' soft key and scroll to the User entry, then press the [Enter] key to confirm.
2. Move the cursor to highlight 'Couple =' field, then press the [Enter] key to confirm.
3. Rotate the front panel knob to highlight the 'AC+DC' option, then press the [Enter] key to confirm.
4. Use the [0]~[9] number keys as desired and [Enter] key to set 'Vac', 'F', and 'Vdc' settings.





Warning!

- O/P Relay set as ON is for special application, it is suggested to set as OFF in general application to protect the equipment.

3. System Information

The screen is for information only.
For remote service and diagnostics, the user may be asked to provide some of the information shown here to assist customer service.

AC SOURCE		System Information
UNIT DATA		
Model	SP300YAC2000W	<input type="button" value="Page Select"/>
Serial NO.	013474181500004	
Control Version	V100R003C56	
Display Version	V100R003C37	
Remote Version	V100R002C29	
Type	Professional	
Auto	Local	SQUARE
2020/10/21 15:45		

The AC source allows the user to make use of a controlling signal from external devices to determine its output. When 'Remote Inhibit' is 'ON', it will enable TTL or ANALOG control input signals. When 'Extern Control' is 'ON', it will enable BNC signals input. Extern Control provides three modes: 'Amplifier', 'Level' and 'Volt Set'.

5. Protection

This subsection is relevant to user-programmable protection, not internal hardware protection.

'OPP' (over power protection): setting range is from 0 through 1.02 times of rated power.

'OCP' (over current protection): setting range is from 0 through 1.02 times of rated current.

'OCP Delay': setting range is from 0 through 5s.

'CC (constant current) Mode': in this mode the output voltage will be automatically decreased to limit the output current when the output current increases too much.

For example, to set the OPP level.

1. In the 'Protection' mode screen, move the cursor to highlight 'OPP =' field, press [0]~[9] number keys as desired then press the [Enter] key to confirm.
2. Or press the soft key to the right of 'Set to Maximum' or 'Set to Minimum'.

AC SOURCE		Protection
OUTPUT SETTING		
Vac = 0.0	V	F = 50.00 Hz
<input type="button" value="Set to Maximum"/>		
<input type="button" value="Set to Minimum"/>		
PROTECTION SETTING		
OPP	=2040.0	W
OCP	=16.0	A
OCP Delay	=5.0	S
CC Mode	=Disable	
<input type="button" value="Page Select"/>		
Auto	Local	SQUARE
2020/10/21 15:46		

AC SOURCE		Protection
OUTPUT SETTING		
Vac = 0.0	V	F = 50.00 Hz
<input type="button" value="Set to Maximum"/>		
<input type="button" value="Set to Minimum"/>		
PROTECTION SETTING		
OPP	=2040.0	W
OCP	=16.0	A
OCP Delay	=5.0	S
CC Mode	=Enable	
<input type="button" value="Page Select"/>		
Auto	Local	SQUARE
2020/10/21 15:46		

 Note

- If the output power is 1~1.1 times of the OPP setting, the output will shut down in about 10s. If the output power greater than 1.1 times of the OPP setting, the output will shut down in about 1.2s.
- If the output current greater than 1.05 times of the OCP setting, the output will shut down in about 500ms. If the output current less than 1.05 times of the OCP setting, the output will shut down in the delay time setting, which range is from 0 through 5s.
- CC Mode response time is approx. 1400ms.

5.2.2.2 LCD Setting

LCD Setting menu includes:

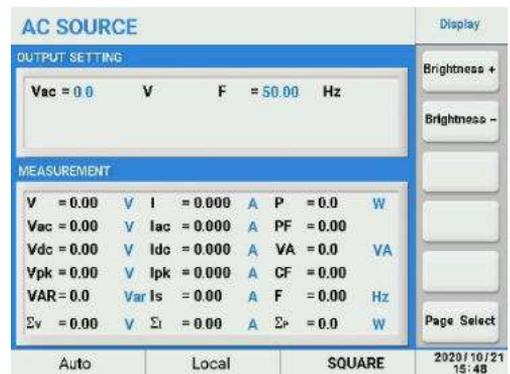
- Display
- Date/Time
- Screen Calibration
- Screen Color Test



1. Display

The two soft keys in this screen control LCD brightness adjustment for best viewing experience.

1. In the 'Display' screen press the soft key to the right of 'Display' to select brightness adjustment.
2. Then press 'Brightness+' to increase brightness, or 'Brightness-' to decrease the display brightness.



2. Date/Time

The power source has a real-time date and time clock. It is set at the factory at the time of shipment but will have to be adjusted for local date and time zone.

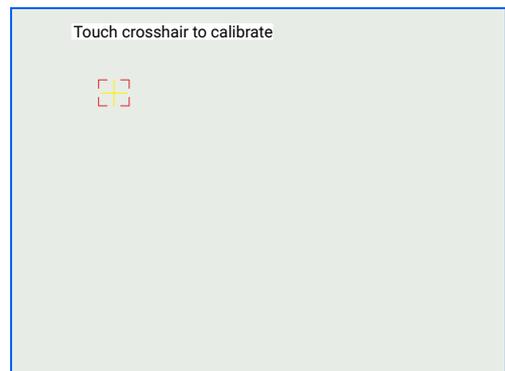
1. In the 'LCD setting' screen, press the soft key to the right of 'Date/Time'.
2. Move the cursor to highlight the item of year, month, day, hour, minute and second then press the [0]~[9] as desired and [Enter] keys to confirm for each selection.



3. Screen Calibration

The touch screen may require period calibration to ensure the on screen fields line up properly with the touch overlay grid.

1. In the 'LCD setting' screen, select the 'Screen Calibration' soft key to display the calibration screen.
2. A calibration cross hair symbol as right will appear. Press the center of the cross hair as best as possible with the stylus. This will complete the touch screen calibration process.



4. Screen Color Test

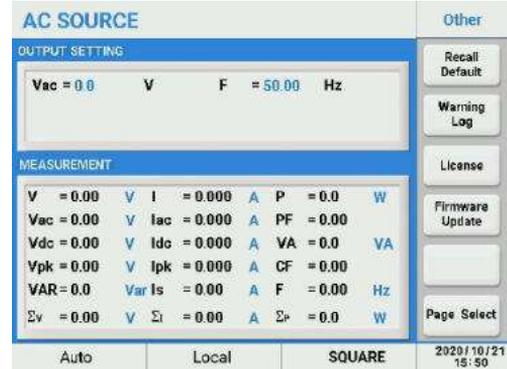
The screen color test displays a color pattern to check the color correctness of the LCD screen. This is a test only and there are no user adjustments.

5.2.2.3 Other Setting

The Other setting screen contains miscellaneous system settings.

The following items can be configured from this screen.

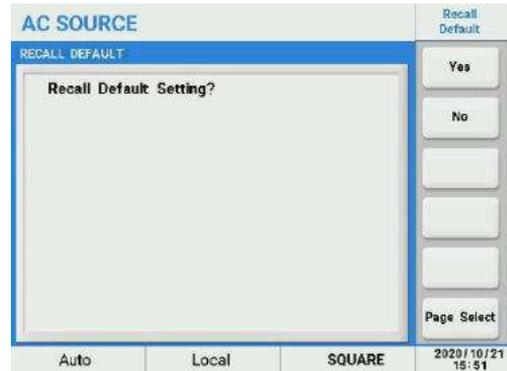
- Recall Default
- Warning Log
- License
- Firmware Update



1. Recall Default

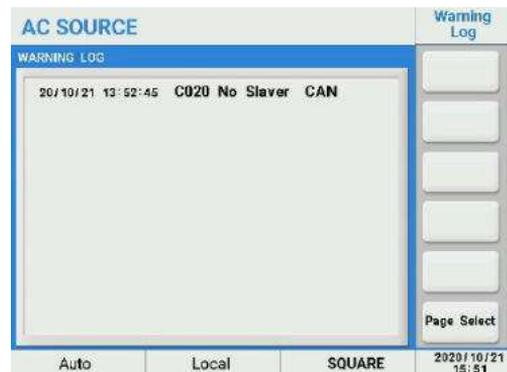
The Recall Default screen can be used to recall original factory (default) settings. Doing so will erase the current setup and replace it with default values.

1. Press the soft key to the right side of 'Recall Default'.
2. Press the 'Yes' soft key to restore the factory default setting.



2. Warning Log

The warning log keeps track of any error or warning messages that have been generated by the power since it was last turned on. For each event, the log contains a data stamp, error code and a short description of the event.



5.2.3 Output Mode

The following items can be configured from this screen.

- PLD Testing
- IEC Standard



5.2.3.1 PLD Testing

Power Line Distortion testing allows testing of a unit under test for immunity against commonly occurring voltage and or frequency anomalies. The unit supports three transient modes:

- List Mode
- Pulse Mode
- Step Mode



The AC source provides powerful functions to simulate a variety of power line disturbance situations. From the 'Output Mode' screen press the soft key to the right of 'PLD testing' to display the three PLD testing screen.

1. List Mode

This mode includes 50 generically named files. The user can rename and edit all these files. For example, to rename 'List 1' as 'TEST', with 3 steps, repeat 12 times.

1. In the 'PLD testing' screen press the 'List Mode' soft key to program the list file.
2. To rename list 1 for example, rotate the front panel knob to highlight the item 'List 1'.
3. Then press the soft key to the right of 'Rename', rotate and press the front panel knob as appropriate to rename this list. Available characters include A~Z, 0~9 and blank. Then press the [Enter] key to confirm.



4. With the desired List highlighted press the soft key to the right of 'Edit' to edit or create the list file using the parameters shown below.

Vac start, F start, Vdc start = start waveform parameters.

Vac end, F end, Vdc end = end waveform parameters.

Degree = start phase, 0~359.9°

Waveform, A or B can be selected.

Base = Time or Cycle.

Count = Current step repeat count, 0~9999, 0 means infinite loop.

Trigger = Cont (Continuous) or Step, the running mode of the current step.

Repeat: the complete list file repeats times, 0~9999, with 0 means infinite loop.

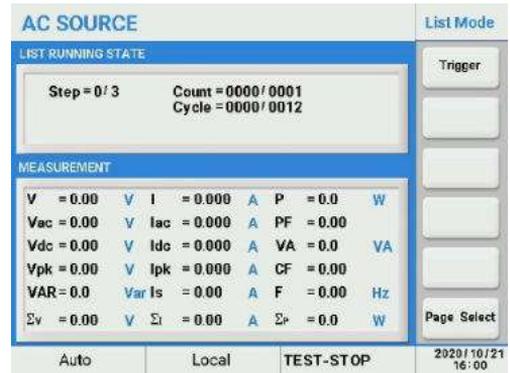
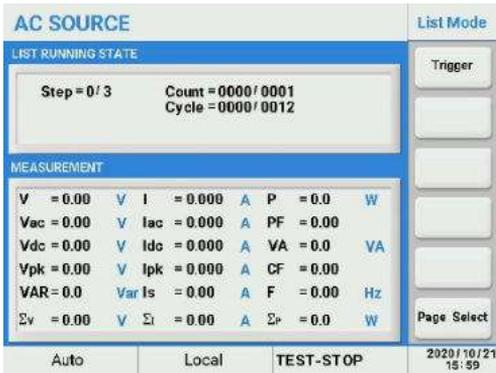
Last Step/Next Step.

Step: total number of steps.

Save: to save list file to assigned memory address for quickly recalling at any time. If you do not save the current list file it will be lost after the unit is turned off.



5. Press the [ESC] key to return to the previous screen, press the 'Trigger' soft key to load the settings.
6. Press the 'Trigger' soft key to execute the list file, and the 'Trigger' will change to 'Stop'.

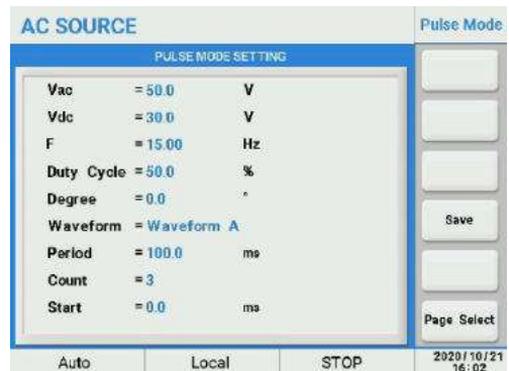


 Note

- If you execute the list file with the AC Source 'ON', it will return to the output to the settings of the main screen after the list file execution has completed, or it will turn 'OFF'.
- If the running mode is set as 'Step', the output will remain as the end waveform until the Trigger soft key is touched again.
- The parameters in list files are limited to the limit settings as programmed using the Limitation menu.
- If you stop running the list file, pressing the 'Trigger' soft key again will execute the list file from its beginning when the Trigger is set as 'Cont', or the list file will execute from the current step when 'Trigger' is set as 'Step'.
- The voltage range will be changed to 300V automatically in List mode.

2. Pulse Mode

1. In the 'PLD testing' screen press the 'Pulse Mode' to program the pulse file.
2. Press the soft key to the right of 'Edit'.



Vac, Vdc, F = pulse setting parameters.

Duty Cycle = duty cycle in % of period at step value.

Degree = start phase, 0~359.9°.

Waveform, A or B can be selected.

Period = duration time of one cycle.

Count = repeat count, 0~9999 with 0 meaning infinite loop.

Start: the time period to hold the present output set values before starting the pulse period(s).

Save: to save the settings to an assigned memory location for quickly recalling at a later time.

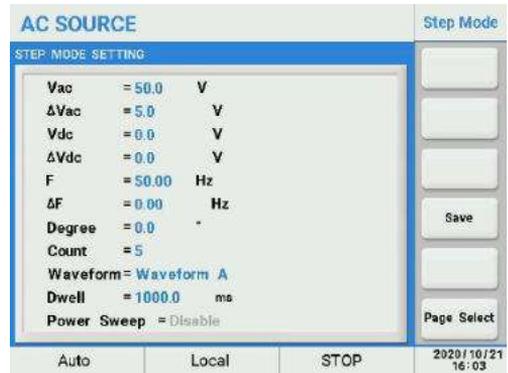
If you do not save the current Pulse mode file, it will be lost after the unit is turned off.

3. Press the [ESC] key to return to the previous screen then press the 'Trigger' soft key to load the settings.
4. Press the 'Trigger' soft key to execute the file, and the 'Trigger' will change to 'Stop'. During execution, the remaining period time is shown in the top part of the display. This value updates regularly while the pulse transient is running.



3. Step Mode

1. In the 'PLD testing' screen press the 'Step Mode' soft key.
2. Press the 'Edit' soft key.



Vac, Vdc, F = step mode start setting.

Vac, δVdc, δF = step value.

Degree = start phase, 0~359.9°.

Count = repeat count, 0~9999 with 0 meaning infinite loop.

Waveform: A or B can be selected.

Dwell: dwell time between steps.

Power Sweep, sweep function.

Save, to save setting to assigned memory room for quickly recall at any time. Do not save the setting, after power off the unit, current file will lose.

3. Press the [ESC] key to return to the previous screen, then press the 'Trigger' soft key to load the settings.

4. Press the 'Trigger' soft key to execute the file, and the 'Trigger' soft key will be changed to 'Stop'. You can press the 'Pause' soft key to temporarily stop the step function or 'Stop' to permanently stop execution of the Step function.

During execution, the remaining time is shown in the top part of the display. This value updates regularly while the step transient is running.

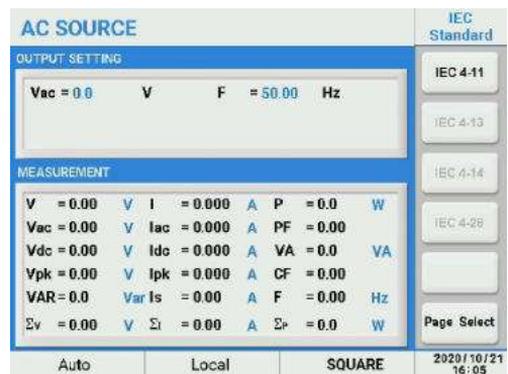


The sweep function is used to test efficiency of power supply and capture the voltage and frequency at the maximum power point. The voltage and frequency of power may be altered in the form of step ladder by setting the start voltage, start frequency, step voltage, step frequency and one-step time. As the test closes, voltage, frequency and current at the maximum power point may be displayed.

5.2.3.2 IEC Standard

The IEC 61000-4 test function support immunity testing to the following four IEC 61000-4 standards:

- IEC 4-11



1. IEC 4-11

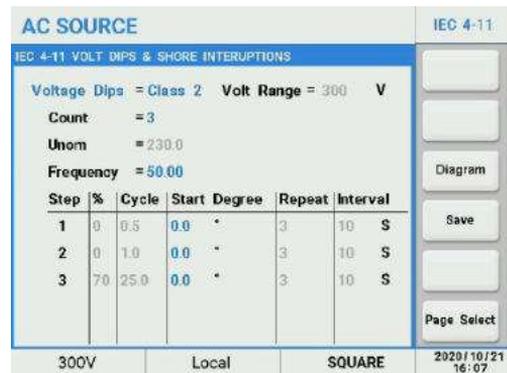
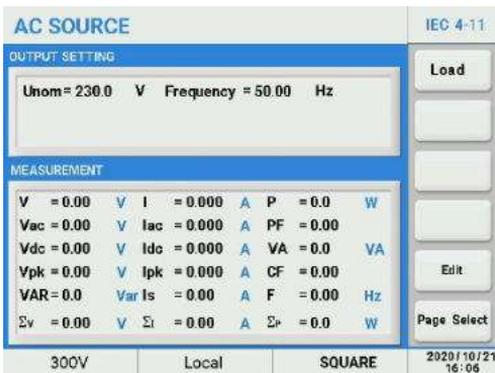
This menu enables users to perform the pre-compliance tests Voltage Dips and Voltage Variations against IEC 61000-4-11. These test items parameters can also be user-defined.

Voltage Dips Settings

1. In the 'IEC standards' screen press the 'IEC 4-11' soft key.
2. Press the 'Voltage Dips' soft key.



3. Press the 'Edit' soft key.
4. Move the cursor to highlight 'Voltage Dips =' field, then press the [Enter] key to display the drop down list.
5. Rotate the front panel knob to highlight Class 2, then press the [Enter] key to confirm.



6. Press the numeric keys and [Enter] key to set Count, the available range of which is 0~65535 where 0 means infinite loop.
7. Move the cursor to highlight 'Frequency =' field, then press the [Enter] key to switch between 50 and 60.

Step = test step number.

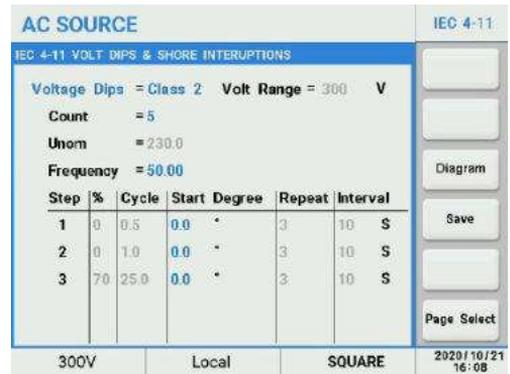
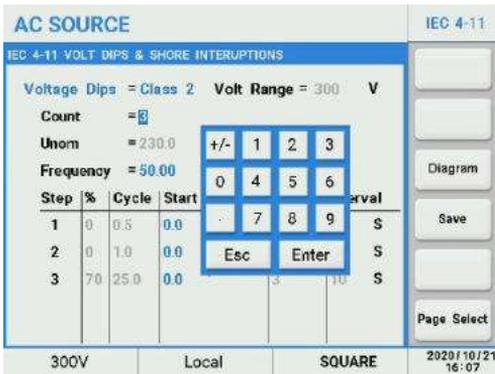
% = value in % of Unom.

Cycle, the duration of the dip, expressed in cycles.

Start Degree = start angle of the dip, 0~359.9 degrees.

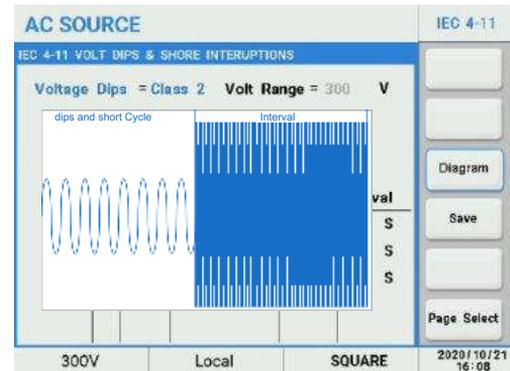
Repeat = the repeat count of the voltage dips.

Interval = time interval between dips.



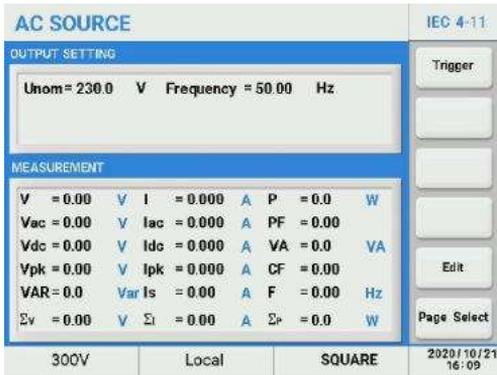
8. Press the 'Diagram' soft key to preview the outline of the test waveform.

9. Press the 'Save' soft key to store the settings in memory.



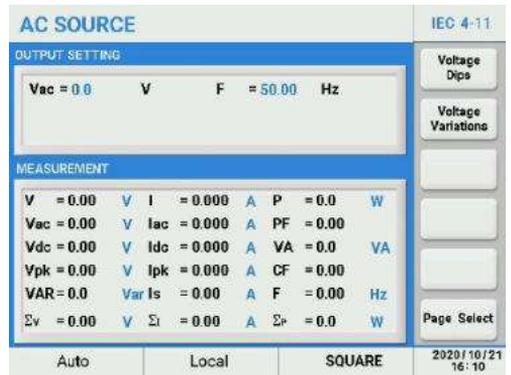
10. Press the [ESC] key to return to the previous screen then press the 'Load' soft key to load the settings.

11. Press the 'Trigger' soft key to execute the file, and the 'Trigger' will change to 'Stop'.

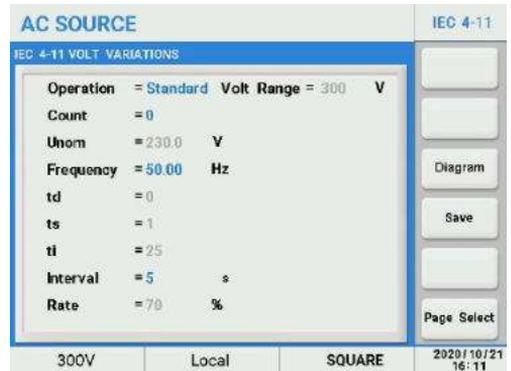
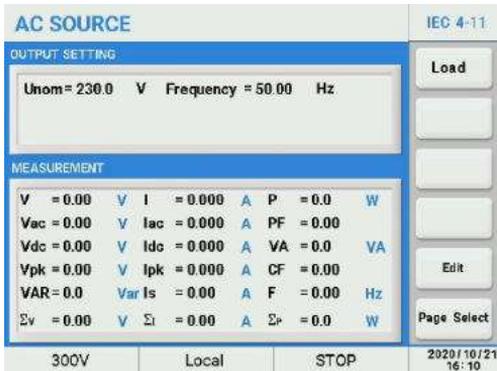


Voltage Variations Settings

1. In the 'IEC standards' screen press the 'IEC 4-11' soft key.
2. Press the 'Voltage Variations' soft key.



3. Press the 'Edit' soft key.
4. Move the cursor to highlight 'Operation =' field, then press the [Enter] key to switch between **Standard** and **User Def**. If User Def is selected adjust the voltage variation parameters below as desired using the cursor and front panel knob.



Count = number of repeat cycles. Range is 0~9999. A zero (0) settings means the test runs in an infinite loop.

1 count = Voltage variations + Interval.

Unom: fixed to 230V in Standard mode, can be set as desired in User Def. mode.

Frequency: fixed to 50Hz or 60Hz in Standard mode.

td = fall time for voltage, counted in cycles, fixed to 0 in Standard mode.

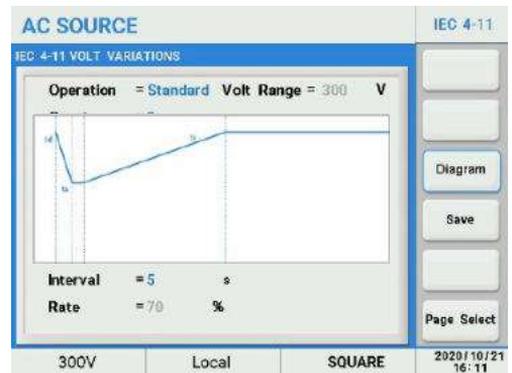
ts = duration at variation voltage, counted in cycles, fixed to 1 in Standard mode.

ti = rise time for voltage, counted in cycles.

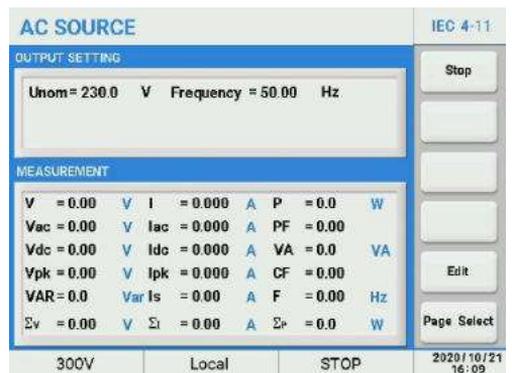
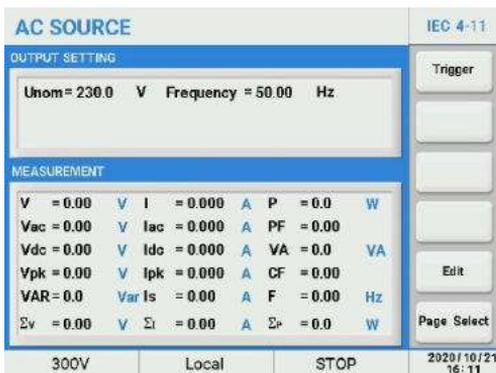
Interval = duration at Unom after variation is complete.

Rate = variation voltage level in percent of Unom.

5. Press the 'Diagram' soft key to preview the envelope of the test waveform.
6. Press the 'Save' soft key to store the settings in non-volatile memory.



7. Press the [ESC] key to return to the previous screen then press the 'Load' soft key to load the settings.
8. Press the 'Trigger' soft key to execute the file, and the 'Trigger' will change to 'Stop'.



5.2.5 Store/Recall

The memory resources are access using the following four soft keys:

- Save Output
- Save System
- Recall Output
- Recall System



In the 'Main Page' screen press the 'Save/Recall' soft key to enter the save/recall sub-menu.

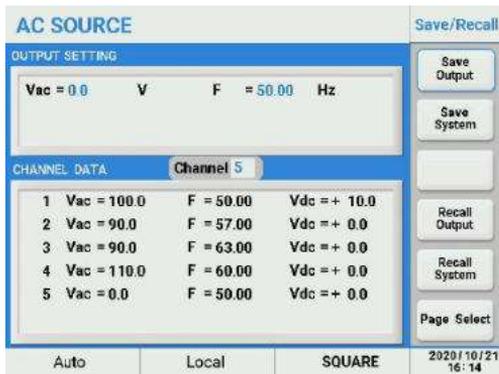
1. Save Output/Recall Output

This AC source provides 51 non-volatile memory registers to save instrument settings for recalling at a later time. Parameters that may be saved include 'Vac', 'F', 'Vdc'.

1. Press the 'Store/Recall' to save an output setting.
2. Move the cursor to the Channel field located in the middle of the screen. Use [0]~[9] keys to select a channel number from 1 through 51 and press [Enter] key to save the output settings to this Channel register.



3. To recall the output settings stored in Channel [3] for example. Press the 'Recall Output' soft key, then move cursor to the Channel field, use [3] + [Enter] keys to recall the output settings.



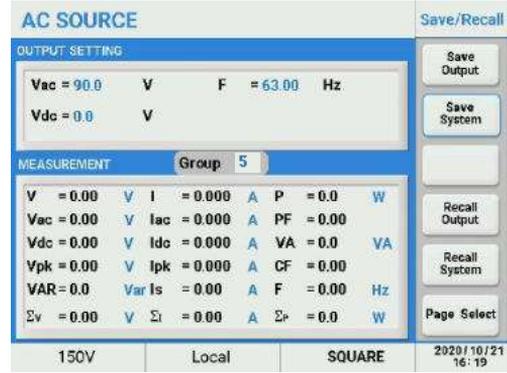
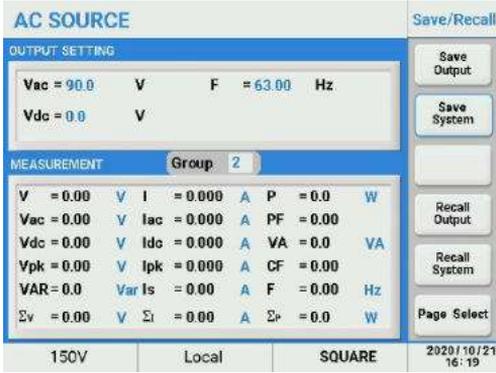
2. Save System/Recall System

This AC source provides 5 non-volatile memory groups to save instrument system settings for recalling at a later time.

1. Press the 'Store/Recall' to save a system setting.
2. Move the cursor to the Group field located in the middle of the screen. Use [0]~[9] keys to select a group number from 1 through 9 and press [Enter] key to save the system settings to this group register.



3. To recall the system settings stored in Group [5] for example. Press the 'Recall System' soft key, then move cursor to the Group field, use [5] + [Enter] keys to recall the system settings.



5.2.6 Lock

The front panel keys and touch screen operation can be locked to prevent unwanted changes to output settings and the AC source configuration. To lock the front panel keys and touch screen from the 'Main Page' screen press the soft key to the right of 'Lock'. A lock sign will be displayed on the bottom right of the screen. Press the period key [,] on the front panel to unlock the front panel keys and touch screen.



6 3-Phase System

The output of the 3-Phase system can be connected for three-phase four-wire (Y type) system or three-phase five-wire (Δ type) system.



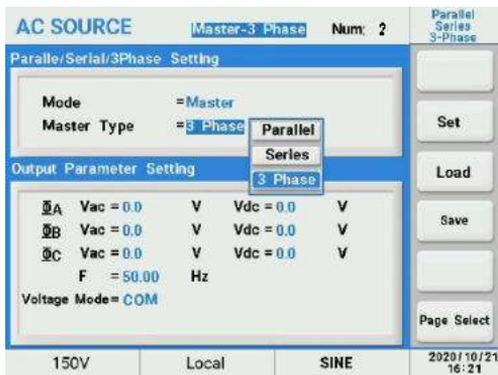
Note

- In this 3-phase system, the Master unit is always phase A, Slave1 is always phase B and Slave2 is always phase C.

 Note

- In this 3-phase system, the output voltage of phase B and C will be set to the same settings as that for phase A automatically if the Voltage Mode is set to COM. If the Voltage Mode is set to Multi, phase B and C output voltage can be set individually.
- The output frequency of phase B and C is always set to the same frequency as phase A. The phase difference between phase A and B is always 120° and between phase A and C is always 240° .
- In this 3-phase system, the waveform generator A or B only can be switched after the system output off.

Set 'Master Type' of the master unit as '3 Phase', then press the [Main] key to return to the main page.



AC SOURCE | Master: 3 Phase | Num: 2 | Parallel Series 3-Phase

Paralle/Serial/3Phase Setting

Mode = Master

Master Type = 3 Phase | Parallel | Series | 3 Phase

Output Parameter Setting

ⓂA	Vac = 0.0	V	Vdc = 0.0	V
ⓂB	Vac = 0.0	V	Vdc = 0.0	V
ⓂC	Vac = 0.0	V	Vdc = 0.0	V
F	= 50.00	Hz		

Voltage Mode = COM

150V | Local | SINE | 2020/10/21 16:21

Main page



AC SOURCE | 3 Phase-Master | Num: 2 | Main Page

OUTPUT SETTING

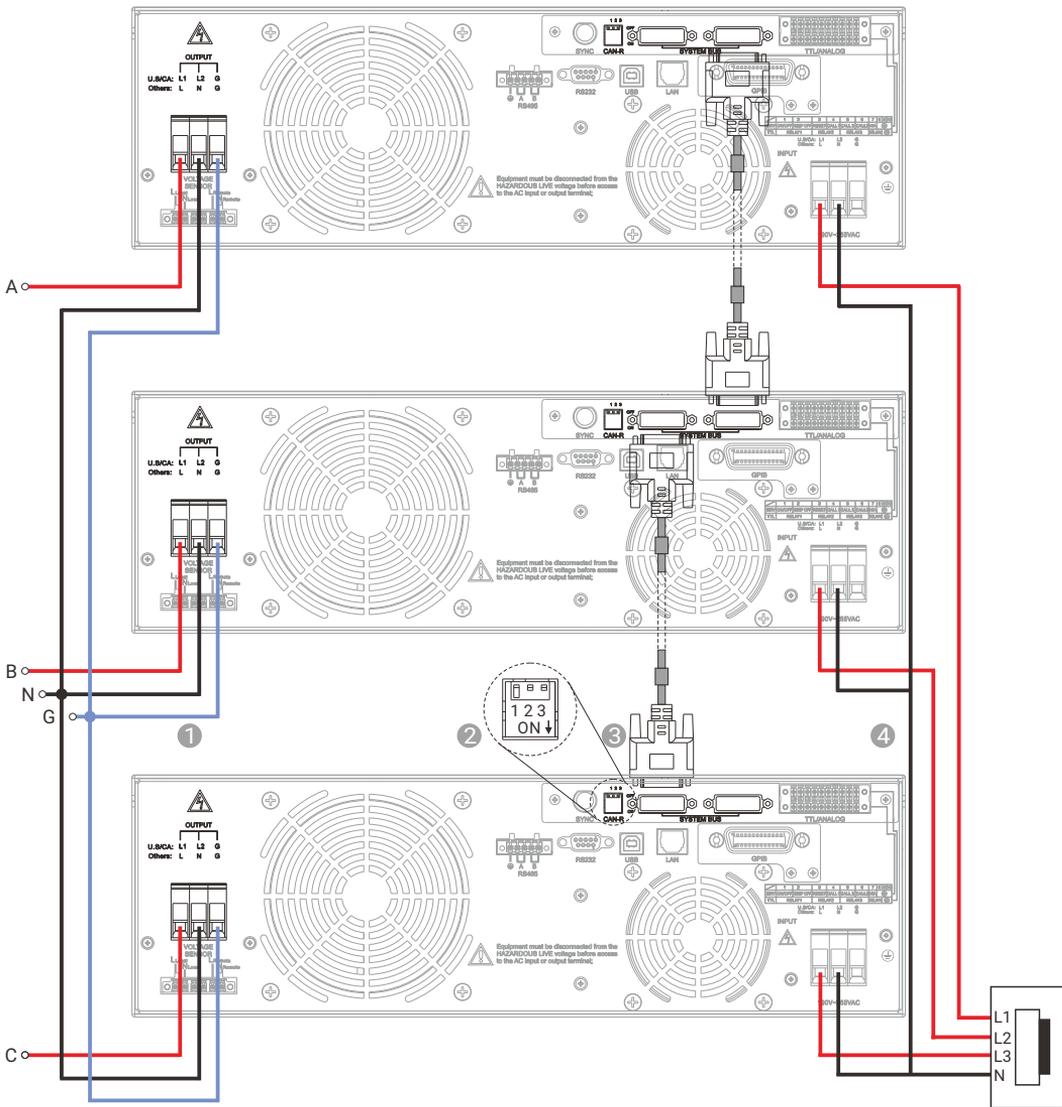
Vac = 0.0 V | F = 50.00 Hz

MEASUREMENT

ⓂA		ⓂB		ⓂC	
V	= 0.00 V	V	= 0.00 V	V	= 0.00 V
Vdc	= 0.00 V	Vdc	= 0.00 V	Vdc	= 0.00 V
I	= 0.00 A	I	= 0.00 A	I	= 0.00 A
P	= 0.0 W	P	= 0.0 W	P	= 0.0 W
F	= 0.00 Hz	F	= 0.00 Hz	F	= 0.00 Hz

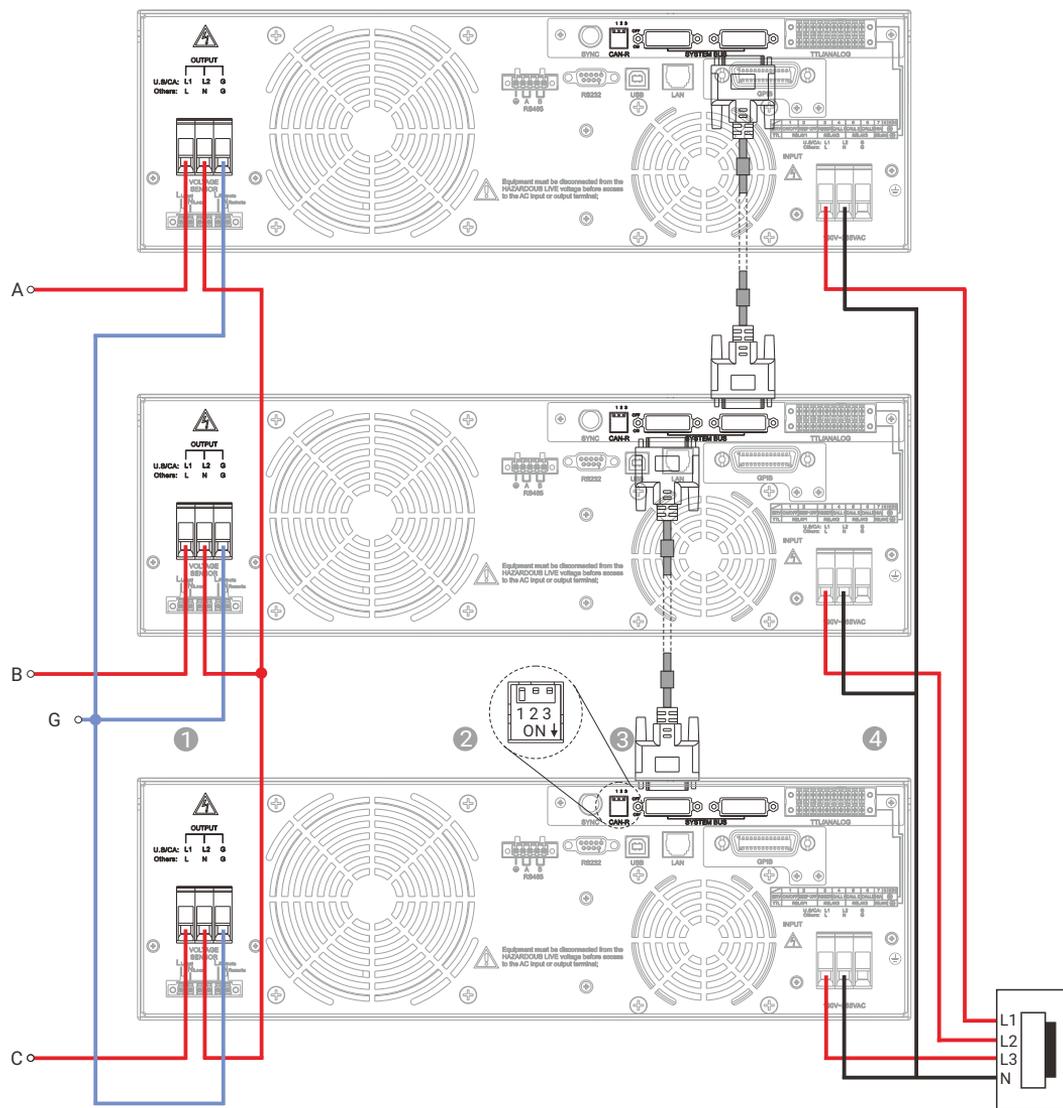
150V | Local | SINE | 2020/10/21 16:21

Three-phase five-wire (Y type) connection, the output voltage range is 0~300V.



- ① Output connection
- ② Termination resistor CAN-R, flip Dip Switch 1 of the Master unit to ON position
- ③ System Bus Communication Cable
- ④ Only support three-phase five-wire input connection

Three-phase four-wire (Δ type) connection, the output voltage range is 0~519V.



- ① Output connection
- ② Termination resistor CAN-R, flip Dip Switch 1 of the Master unit to ON position
- ③ System Bus Communication Cable
- ④ Only support three-phase five-wire input connection

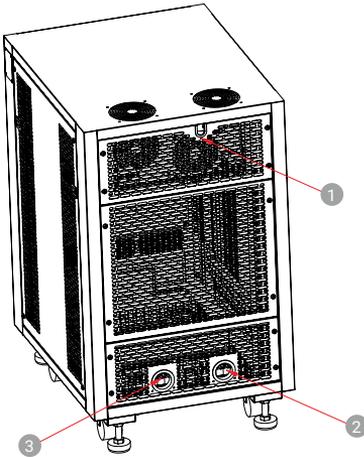
7 Installation

7.1 Power Supply Voltage

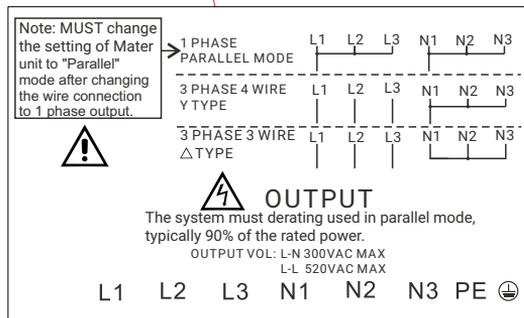
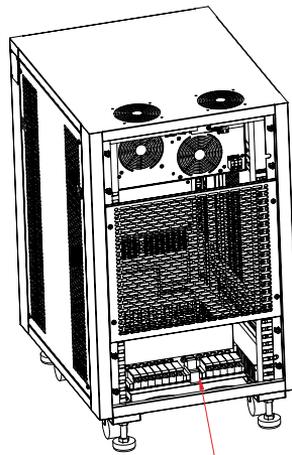
Make sure that the AC input voltage is within the product's operating specification before plugging in or connecting to the source, and that the power switch is in the OFF state.

 **Caution!**

- The protective safety earth/ground connection must connect first and disconnect 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 AC source is deactivated prior to making or disconnecting the connection.



- ① Communication cable outlet
- ② Input cable hole
- ③ Output cable hole

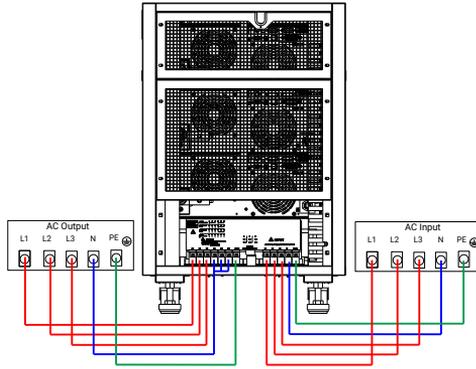


7.2 Fuse

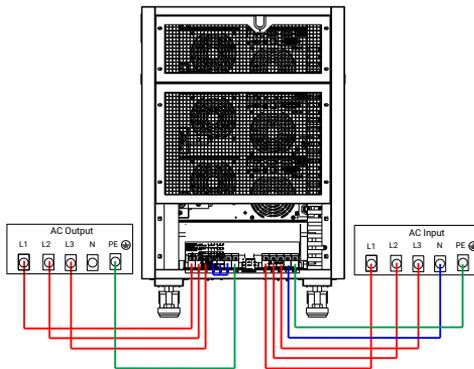
The AC mains fuses installed inside the product are designed to protect the input from major failures, and should not fail under normal operating conditions. Therefore, any sign of fuse failure is an indication that other part(s) of the product is damaged. If fuse melting happens, we recommend that the product be sent back to us for repair.

7.3 Input and Output Connections Diagram

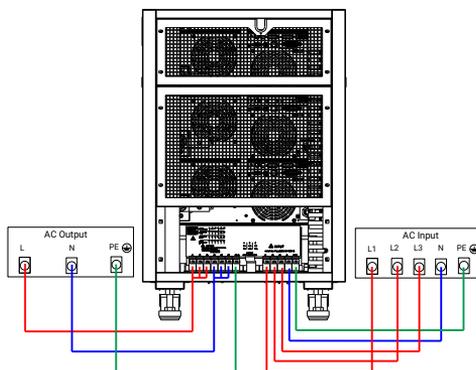
Three-phase five-wire (Y type) connection, the output voltage range is 0~300V.



Three-phase four-wire (Δ type) connection, the output voltage range is 0~519V.



Single phase output (Parallel mode)



8

Troubleshooting

Problem	Causes	Solutions
The screen shows the message C001 PRI_OTP.	Primary temperature is too high.	Ask your agent for help.
The screen shows the message C002 PRI_OCP.	Input over current.	Ask your agent for help.
Black screen.	Input over voltage.	Turn off the output and check the AC input to ensure the voltage can meet the requirement.
The screen shows the message C004 PRI_UVP.	Input under voltage.	Turn off the output and check the AC input to ensure the voltage can meet the requirement.
The screen shows the message C005 BUS_UVP.	Bus over current.	Ask your agent for help.
The screen shows the message C006 USB_OCP.	USB over current.	Check the USB memory and USB interface on the front panel.
The screen shows the message C007 DISPLAY EEPROM FAIL.	Display memory error.	Ask your agent for help.
The screen shows the message C008 DSP COMM. FAIL	Internal memory error.	Ask your agent for help.
The screen shows the message C009 OUTPUT OVP.	Output over voltage.	Check the output voltage range.
The screen shows the message C010 OUTPUT OCP.	Output over current.	Adjust the setting range of the current, or the OCP setting.
The screen shows the message C011 OUTPUT OPP.	Output over power.	Adjust the OPP setting.
The screen shows the message C012 SEC OTP	Secondary temperature is too high.	Ask your agent for help.
The screen shows the message C013 FAN ALARM	Fan failure.	Ask your agent for help.
The screen shows the message C014 SHORT ALARM	Output wires are short-circuited or the load connected to the power are short-circuited.	Turn off the output and check the cables to ensure they are properly connected before turning the power back on.
The screen shows the message C015 RCP ALARM	RCP circuit failure.	Ask your agent for help.
The screen shows the message C016 OUTPUT 1 OVP	Remote compensation voltage exceeds 5V.	Make sure the remote compensation voltage is no more than 5V.
The screen shows the message Self Test Fail	Self-checking failure.	Ask your agent for help.
The screen shows the message Unactivated	Activation failure.	Ask your agent for help.

9 Recycling and Disposal

Do not discard this device and its accessories as solid waste. Please contact your local government agencies to find out how to properly recycle the product properly.

10 Contact Us

If you have any questions about the SPST Series Linked 3-Phase AC Power Supply System, please contact us. We will be happy to answer any of your questions. Below are our contact details:

APM Technologies

Add: #7, Link Industry Park, Kechuang Road, Nancheng, Dongguan, Guangdong, China

Land line: +86-769 22028588

Fax: +86-769 22026771

Website: www.apmtechate.com

E-mail: overseask@apmtech.cn

Appendix A Specifications

MODEL	SPST300VAC1800W-2-9		SPST300VAC3000W-2-9		SPST300VAC4500W-2-9		
Input							
Voltage	90~265VAC		90~265VAC		100~265VAC		
Frequency	47~63Hz						
Phase	3 Phase,4Wire+Groud/Y Connect						
Max.Current	30A		45A		57A		
Power Factor at 220VAC Input,Full Load	≥0.96 Active PFC		≥0.98 Active PFC		≥0.98 Active PFC		
Efficiency	>81% (Peak) >80% at 220VAC,50Hz input/220VAC,50Hz output,Full Load		>85.5% (Peak) >85% at 220VAC,50Hz input/220VAC,50Hz output,Full Load		>87.5% (Peak) >87% at 220VAC,50Hz input/220VAC,50Hz output,Full Load		
3-Phase Output Mode(Per Phase)							
AC Power(Total)	1800VA		3000VA		4500VA		
AC Power(Per Phase)	600VA		1000VA		1500VA		
Max.Current (r.m.s)	0~150V(L)	5.6A	9.2A		13.8A		
	0~300V(H)	2.8A	4.6A		6.9A		
Max.Current (Peak)	0~150V(L)	32.4A	55.2A		82.8A		
	0~300V(H)	16.2A	27.6A		41.4A		
1-Phase Output Mode							
AC Power(Total) ^[1]	1620VA		2700VA		4050VA		
Max.Current (r.m.s)	0~150V(L)	15.12A	24.84A		37.26A		
	0~300V(H)	7.56A	12.42A		18.62A		
Max.Current (Peak)	0~150V(L)	87.48A	149A		223.56A		
	0~300V(H)	43.47A	74.52A		111.78A		
DC Power (Per Phase)	1620W		2700W		4050W		
Max.Current (Total)	L	10.69A	17.55A		L 26.35A		
	H	5.1A	8.9A		H 13.18A		
3-Phase Output Mode(Per Phase)							
Total Harmonic Distortion (THD)	<0.5% (Resistive Load) at 15.0~70.0Hz and output voltage within the 80~140VAC at Low Range or the 160~280VAC at High Range; <1% (Resistive Load) at 70.1~500Hz and output voltage within the 80~140VAC at Low Range or the 160~280VAC at High Range; <1% (Resistive Load) at 501~1000Hz and output voltage within the 100~140VAC at Low Range or the 160~280VAC at High Range;						
Crest Factor(CF)	≤ 6						
Load Regulation	±0.2%F.S. (Resistive Load) at 15~100Hz ±0.5%F.S. (Resistive Load) at >100Hz						
Line Regulation	± 0.1V						
Voltage(AC) (L-N)	Range	0~300VAC, 150V/300V/Auto Mode					
	Resolution	0.1V					
	Accuracy	0.2% of setting +0.4%F.S at Voltage>3V					
Phase Angle (Starting /Ending)	Range	0~359.9°					
	Resolution	0.1°					
	Accuracy	± 1° @45~65Hz					
	Range	0~424VDC					
Voltage(DC)	Resolution	0.1V					
	Accuracy	0.3% of setting +0.4%F.S at Voltage>3V					
	DC Power	600W		1000W		1500W	
		L	3.96A	L 6.5A		L 9.76A	
	Max.Current	H 1.89A		H 3.3A		H 4.88A	
		Ripple&Noise (Peak) L <700mVrms @Bandwidth 20Hz to 1MHz H <1100mVrms @Bandwidth 20Hz to 1MHz					
	Ripple&Noise (r.m.s)	<4000mVp-p @Bandwidth 20Hz to 1MHz					
Current OC Fold Mode	Resolution	0.01A					
	Accuracy	0.5% of setting +1.0%F.S.					
	Response Time	<1400ms					
Frequency	Range	15~1000Hz					
	Resolution	0.1Hz(15.0~99.9Hz),1Hz(100~1000Hz)					
	Accuracy	0.03% of setting					
Programmable Output Impedance	Not Support						
Harmonic & Interharmonics Simulation	Not Support						
Power Meter Function(Per Phase)							
Voltage	Range	AC 0~300VAC DC 0~424VDC					
	Resolution	0.1V					
	Accuracy	0.2% of setting +0.4%F.S. (Peak: 0.6% of setting +1%F.S.)					

MODEL		SPST300VAC1800W-2-9	SPST300VAC3000W-2-9	SPST300VAC4500W-2-9
Frequency	Range	15~1000Hz		
	Resolution	0.1Hz(15.0~99.9Hz),1Hz(100~1000Hz)		
	Accuracy	0.1% of setting		
Current ^[2] (r.m.s)	Range	H 0.15A~5.6A	H 0.3A~9.2A	H 0.3A~13.8A
		L 0.1A~3A	L 0.1A~3A	L 0.1A~3A
	Resolution	0.01A		
	Accuracy	0.4%+1.0%F.S.		
Current ^[2] (Peak)	Range	0A~32.4A	0A~55.2A	0A~82.8A
	Resolution	0.01A		
	Accuracy	0.4%+1.5%F.S.		
Power	Range	0~612W	0~1020W	0~1530W
	Resolution	0.1W		
	Accuracy	0.4% of setting +0.3%F.S. at PF>0.2, Voltage >5V		
Power Apparent(VA)	Range	0~612VA	0~1020VA	0~1530VA
	Resolution	0.1VA		
	Accuracy	Voltage*Irms, Calculated value		
Power Resistive (VAR)	Range	0~612VAR	0~1020VAR	0~1530VAR
	Resolution	0.1VAR		
	Accuracy	$\sqrt{(VA)^2-(W)^2}$, Calculated value		
Power Factor (PF)	Range	0.00~1.00		
	Resolution	0.01		
	Accuracy	W/VA, Calculated value		
Harmonic	Range	Not Support		
Extra Function				
Slew Rate	Range	AC Voltage 0.001~1200.000V/ms and Disable		
		DC Voltage 0.001~1000.000V/ms and Disable		
		Frequency 0.001~1600.000Hz/ms and Disable		
Remote Sense	Range	5V(rms), Max. Total power less than rated power		
Calibration	Firmware-based calibration through the digital interface or front panel display			
Test Function	Not Support			
Graphic Display	4.3" Color touch LCD			
Operation Key Feature	Soft key, Numeric key, Rotary Knob, USB port for transfer and upgrading firmware			
Rack mount Handles	Yes			
FAN	Temperature Control			
Protection Circuits	OCP,OVP,OPP,OTP,RCP, PRI_UVP,PRI_OVP,PRI_OTP,PRI_OCP,USB_OCP			
Interface	USB, RS485, RS232(Standard); LAN, GPIB(Optional)			
Environmental				
Operating Temperature	0°C~40°C			
Storage Temperature	-40°C~85°C			
Altitude	2000m			
Relative Humidity	5%~95%, non-condensing			
Temperature Coefficient	100ppm/°C at Voltage, 300ppm/°C at Current, 100ppm/°C at Frequency			
Mechanical				
Dimensions(W*H*D)	540.0*400.0*640.0 mm			
Package Dimensions (W*H*D)	660.0*710.0*760.0 mm			
Unit Weight	88.7kg	88.7kg	88.7kg	
Shipping Weight	108.7kg	108.7kg	108.7kg	
Regulatory Compliance				
CE Mark	Installation Overvoltage Category II; Class II equipment; indoor use only.			

[1] In single phase mode, the current shall be reduced to 90% for the consideration of current sharing.

[2] The tolerance will change slightly in high frequency condition;

All specifications are subject to change without notice.

MODEL		SPST300VAC6000W-3-17	SPST300VAC9000W-4-17	SPST300VAC12000W-4-17	SPST300VAC15000W-4-17
Input					
Voltage		190~265VAC			
Frequency		47~63Hz			
Phase		3 Phase,4Wire+Groud/Y Connect			
Max.Current		42A	60A	75A	90A
Power Factor at 220VAC Input,Full Load		≥0.99 Active PFC	≥0.98 Active PFC	≥0.99 Active PFC	≥0.99 Active PFC
Efficiency		>87% (Peak) >86% at 220VAC,50Hz input/230VAC,50Hz output,Full Load	>86% (Peak) >85% at 220VAC,50Hz input/230VAC,50Hz output,Full Load	>87% (Peak) >86% at 220VAC,50Hz input/230VAC,50Hz output,Full Load	>87% (Peak) >86% at 220VAC,50Hz input/230VAC,50Hz output,Full Load
3-Phase Output Mode(Per Phase)					
AC Power(Total)		6000VA	9000VA	12000VA	15000VA
AC Power(Per Phase)		2000VA	3000VA	4000VA	5000VA
Max.Current (r.m.s)	0~150V(L)	16A	27.6A	32A	46A
	0~300V(H)	8A	13.8A	16A	23A
Max.Current (Peak)	0~150V(L)	80A	165.6A	160A	184A
	0~300V(H)	40A	82.8A	80A	92A
1-Phase Output Mode					
AC Power(Total) ^①		5400VA	8100VA	10800VA	13500VA
Max.Current (r.m.s)	0~150V(L)	43.2A	74.52A	86.4A	124.2A
	0~300V(H)	21.6A	37.26A	43.2A	62.1A
Max.Current (Peak)	0~150V(L)	216A	447.12A	432A	496.8A
	0~300V(H)	108A	223.56A	216A	248.4A
DC Power (Per Phase)		5400W	8100W	10800W	13500W
Max.Current (Total)	L 30.51A		L 52.92A		L 88A
	H 15.26A		H 26.46A		H 44A
3-Phase Output Mode(Per Phase)					
Total Harmonic Distortion (THD)		<0.5% (Resistive Load) at 15.0~70.0Hz and output voltage within the 80~140VAC at Low Range or the 160~280VAC at High Range; <1% (Resistive Load) at 70.1~500Hz and output voltage within the 80~140VAC at Low Range or the 160~280VAC at High Range; <1% (Resistive Load) at 501~1000Hz and output voltage within the 100~140VAC at Low Range or the 160~280VAC at High Range;			
Crest Factor(CF)		≤5	≤6	≤5	≤4
Load Regulation		±0.2%F.S. (Resistive Load) at 15~100Hz ±0.5%F.S. (Resistive Load) at >100Hz			
Line Regulation		± 0.1V			
Voltage(AC) (L-N)	Range	0~300VAC, 150V/300V/Auto Mode			
	Resolution	0.1V			
	Accuracy	0.2% of setting +0.4%F.S at Voltage>3V			
Phase Angle (Starting /Ending)	Range	0~359.9°			
	Resolution	0.1°			
	Accuracy	± 1° @45~65Hz			
	Range	0~424VDC			
Voltage(DC)	Resolution	0.1V			
	Accuracy	0.3% of setting +0.4%F.S at Voltage>3V			
	DC Power	2000W	3000W	4000W	5000W
	Max.Current	L 11.3A	L 19.6A	L 22.6A	L 32.6A
		H 5.65A	H 9.8A	H 11.3A	H 16.3A
Ripple&Noise (Peak)	L <700mVrms @Bandwidth 20Hz to 1MHz		H <1100mVrms @Bandwidth 20Hz to 1MHz		
Ripple&Noise (r.m.s)	<4000mVp-p @Bandwidth 20Hz to 1MHz				
Current CC Fold Mode	Resolution	0.01A			
	Accuracy	2.0% of setting +1.0%F.S.			
	Response Time	<1400ms			
Frequency	Range	15~1000Hz			
	Resolution	0.1Hz(15.0~99.9Hz),1Hz(100~1000Hz)			
	Accuracy	0.03% of setting			
Programmable Output Impedance		Not Support			
Harmonic & Interharmonics Simulation		Not Support			
Power Meter Function(Per Phase)					
Voltage	Range	AC 0~300VAC DC 0~424VDC			
	Resolution	0.1V			
	Accuracy	0.2% of setting +0.4%F.S. (Peak: 0.6% of setting +1%F.S.)			

MODEL		SPST300VAC6000W-3-17	SPST300VAC9000W-4-17	SPST300VAC12000W-4-17	SPST300VAC15000W-4-17
Frequency	Range	15~1000Hz			
	Resolution	0.1Hz(15.0~99.9Hz),1Hz(100~1000Hz)			
	Accuracy	0.1% of setting			
Current ^[2] (r.m.s)	Range	H 0.15A~20A	H 0.3A~27.6A	H 0.3A~32A	H 0.3A~46A
		M -	M 0.2A~20A	M 0.2A~20A	M 0.2A~20A
		L 0.1A~5A	L 0.1A~5A	L 0.1A~5A	L 0.1A~5A
		mA 0.02A~1.5A	mA 0.02A~1.5A	mA 0.02A~1.5A	mA 0.02A~1.5A
	Resolution	0.01A			
Accuracy	0.4%+1.0%F.S.				
Current ^[2] (Peak)	Range	0A~81.5A	0A~168.6A	0A~163A	0A~188A
	Resolution	0.01A			
	Accuracy	0.4%+1.5%F.S.			
Power	Range	0~2040W	0~3060W	0~4080W	0~5100W
	Resolution	0.1W			
	Accuracy	0.4% of setting +0.3%F.S. at PF>0.2, Voltage >5V			
Power Apparent(VA)	Range	0~2040VA	0~3060VA	0~4080VA	0~5100VA
	Resolution	0.1VA			
	Accuracy	Voltage*Irms, Calculated value			
Power Resistive (VAR)	Range	0~2040VAR	0~3060VAR	0~4080VAR	0~5100VAR
	Resolution	0.1VAR			
	Accuracy	$\sqrt{(VA)^2-(W)^2}$, Calculated value			
Power Factor (PF)	Range	0.00~1.00			
	Resolution	0.01			
	Accuracy	W/VA, Calculated value			
Harmonic	Range	Not Support			
Extra Function					
Slew Rate	Range	AC Voltage 0.001~1200.000V/ms and Disable			
		DC Voltage 0.001~1000.000V/ms and Disable			
		Frequency 0.001~1600.000Hz/ms and Disable			
Remote Sense	Range	5V(rms), Max. Total power less than rated power			
Calibration	Firmware-based calibration through the digital interface or front panel display				
Test Function	Not Support				
Graphic Display	5.6" Color touch LCD				
Operation Key Feature	Soft key, Numeric key, Rotary Knob, USB port for transfer and upgrading firmware				
Rack mount Handles	Yes				
FAN	Temperature Control				
Protection Circuits	OCP,OVP,OPP,OTP,RCP, PRI_UVP,PRI_OVP,PRI_OTP,PRI_OCP,USB_OCP				
Interface	USB, RS485, RS232(Standard); LAN, GPIB(Option)				
Environmental					
Operating Temperature	0°C~40°C				
Storage Temperature	-40°C~85°C				
Altitude	2000m				
Relative Humidity	5%~95%, non-condensing				
Temperature Coefficient	100ppm/°C at Voltage, 300ppm/°C at Current, 100ppm/°C at Frequency				
Mechanical					
Dimensions(W*H*D)	560.0*754.0*700.0 mm				
Package Dimensions (W*H*D)	680.0*1146.0*820.0 mm				
Unit Net Weight	134.0kg	157.0kg	157.0kg	157.0kg	
Gross Weight	173.0kg	195.0kg	195.0kg	195.0kg	
Regulatory Compliance					
CE Mark	Installation Overvoltage Category II; Class II equipment; indoor use only.				

[1] In single phase mode, the current shall be reduced to 90% for the consideration of current sharing.

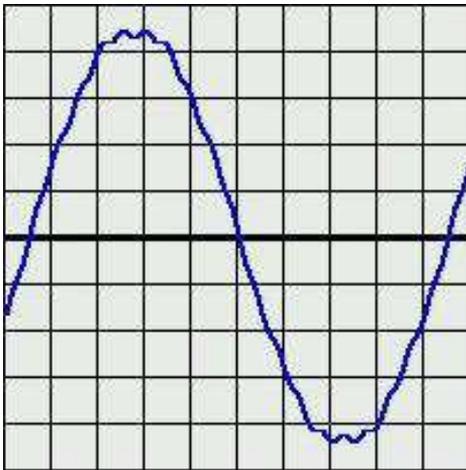
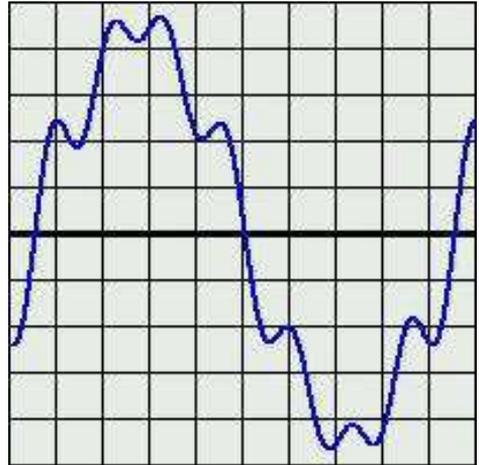
[2] The tolerance will change slightly in high frequency condition;

All specifications are subject to change without notice.

Appendix B Fixed Waveform

FIXED, NO.=0

Harmonic	%	θ
5	9.8	0
7	15.8	0
8	2.16	0

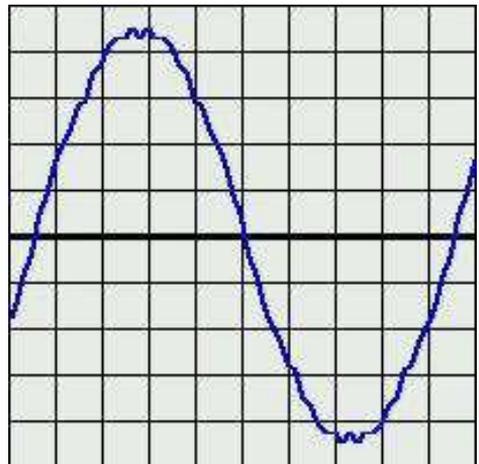


FIXED, NO.=1

Harmonic	%	θ
3	1.44	0
7	1.47	0
19	1.95	0

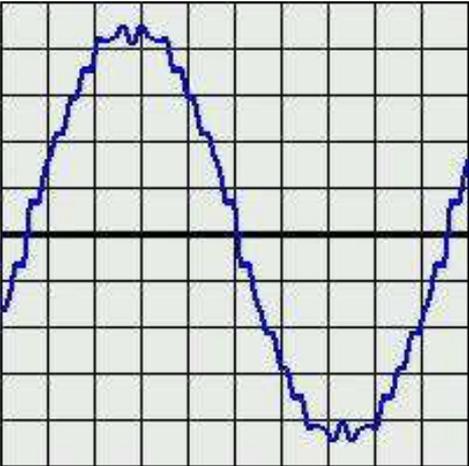
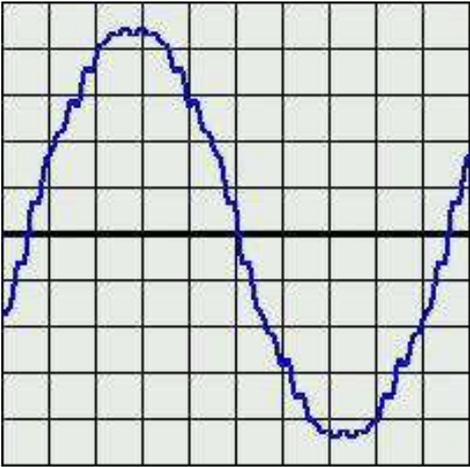
FIXED, NO.=2

Harmonic	%	θ
3	1.96	0
5	1.37	0
7	1.98	0
23	1.42	0
31	1	0



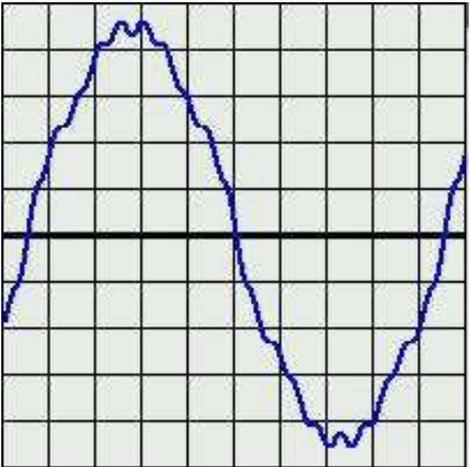
FIXED, NO.=3

Harmonic	%	θ
3	2.45	0
5	1.88	0
7	2.46	0
23	1.95	0
25	1.09	0
31	1.52	0
33	1.09	0



FIXED, NO.=4

Harmonic	%	θ
3	1.00	0
5	2.75	0
7	1.35	0
9	2.25	0
11	1.45	0

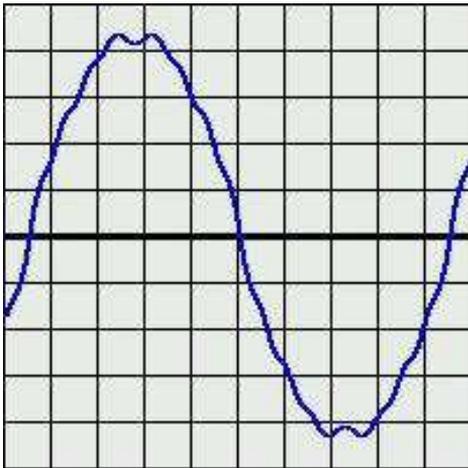
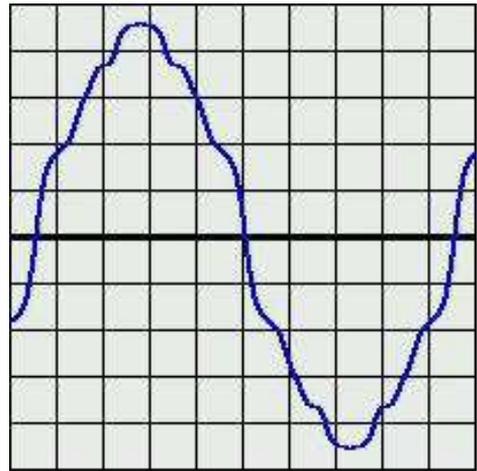


FIXED, NO.=5

Harmonic	%	θ
3	1.6	0
5	4.17	0
7	3.4	0
15	1.02	0
19	2.92	0

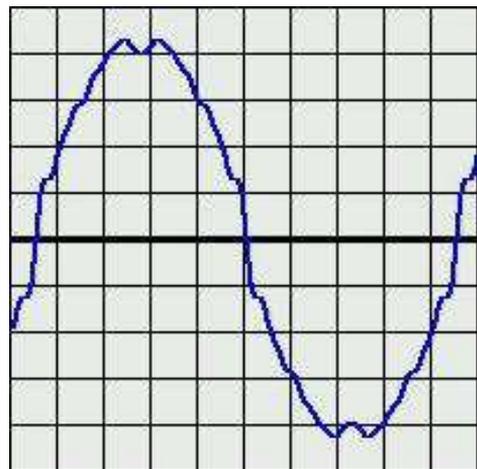
FIXED, NO.=6

Harmonic	%	θ
3	2.17	0
5	5.59	0
7	2.79	0
9	4.58	0
11	2.92	0
15	1.35	0
21	0.99	0



FIXED, NO.=7

Harmonic	%	θ
3	4.86	0
5	1.58	0
7	2.64	0
11	1.37	0
15	1.95	0
17	1.06	0

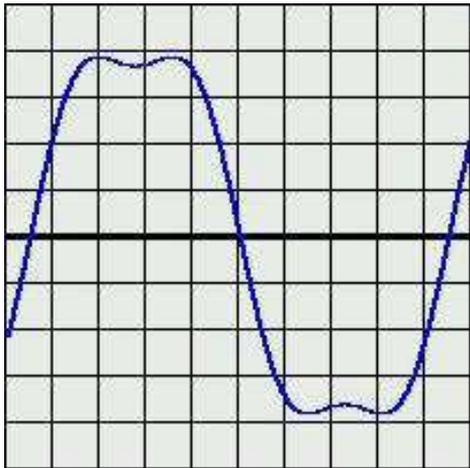
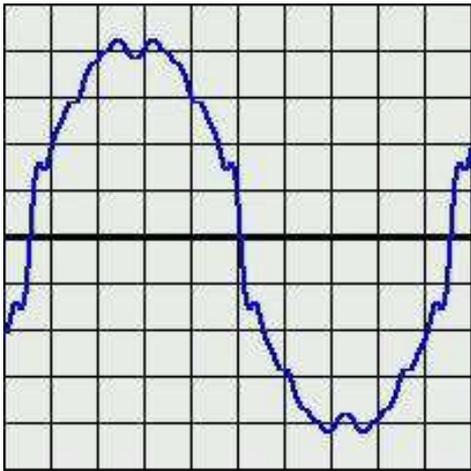


FIXED, NO.=8

Harmonic	%	θ	Harmonic	%	θ
3	7.27	0	17	1.59	0
5	2.39	0	19	1	0
7	4.01	0	21	1.04	0
11	2.07	0	23	1.19	0
13	1.03	0	25	1.03	0
15	2.94	0			

FIXED, NO.=9

Harmonic	%	θ	Harmonic	%	θ
3	9.78	0	15	3.92	0
5	3.19	0	17	2.13	0
7	5.37	0	19	1.34	0
9	1.17	0	21	1.39	0
11	2.76	0	23	1.59	0
13	1.37	0	25	1.36	0

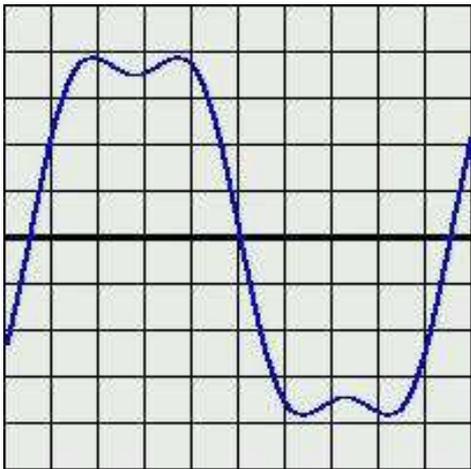


FIXED, NO.=10

Harmonic	%	θ
3	17.72	0

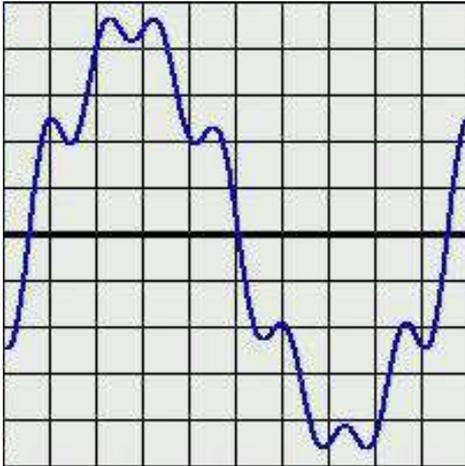
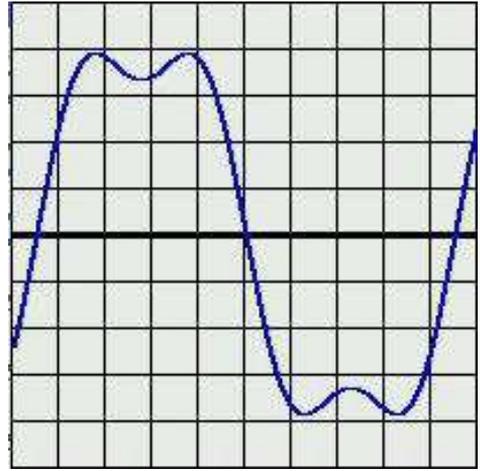
FIXED, NO.=11

Harmonic	%	θ
3	21.21	0



FIXED, NO.=12

Harmonic	%	θ
3	24.48	0

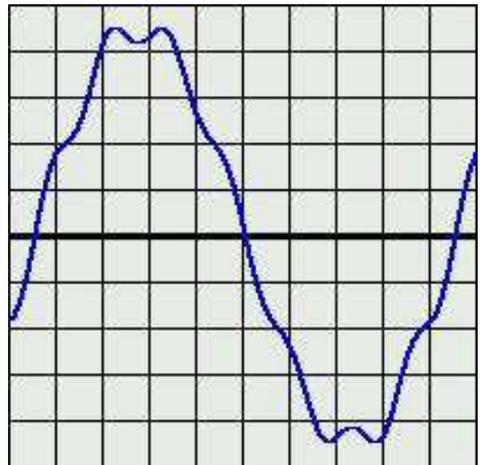


FIXED, NO.=13

Harmonic	%	θ
2	2.19	0
5	9.83	0
7	15.76	0

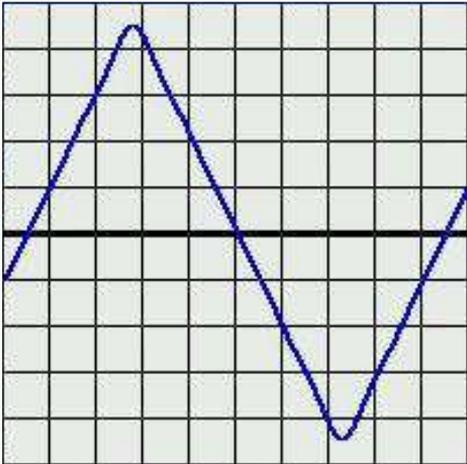
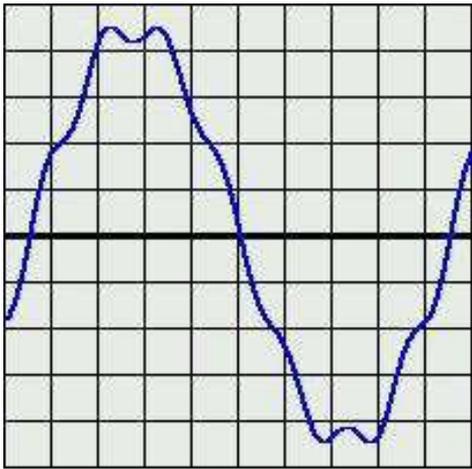
FIXED, NO.=14

Harmonic	%	θ
2	1.04	0
5	4.9	0
7	7.86	0
8	1.14	0



FIXED, NO.=15

Harmonic	%	θ
5	2.42	0
7	3.91	0

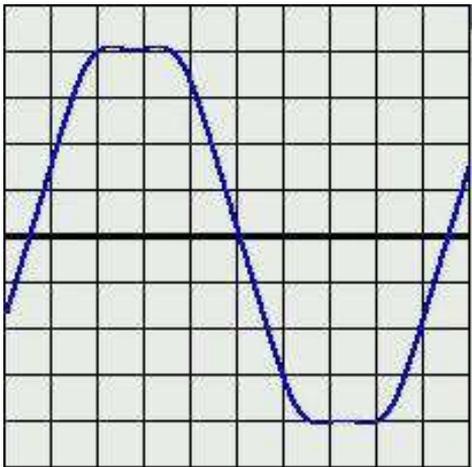


FIXED, NO.=16

Harmonic	%	θ
3	11.08	180
5	4.05	0
7	2.03	180
9	1.27	0

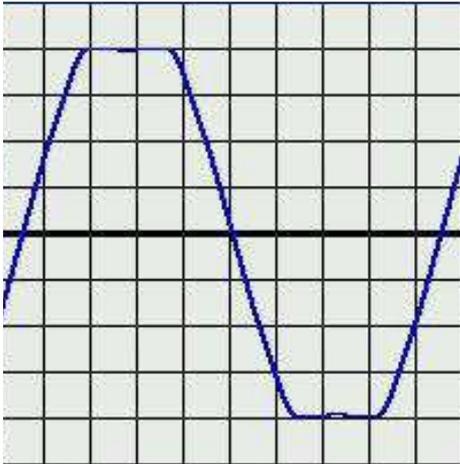
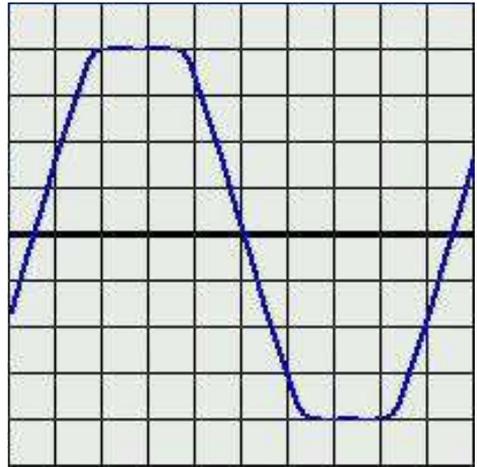
FIXED, NO.=17

Harmonic	%	θ
3	7.16	0
5	3.46	180



FIXED, NO.=18

Harmonic	%	θ
3	8.07	0
5	3.55	180
9	0.96	0
13	0.92	180

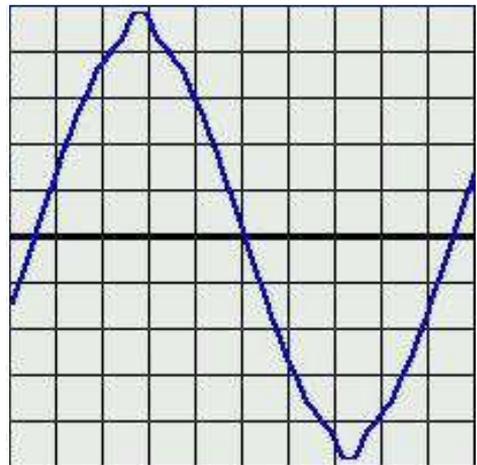


FIXED, NO.=19

Harmonic	%	θ
3	9.38	0
5	3.44	180
9	1.12	0
13	0.5	180

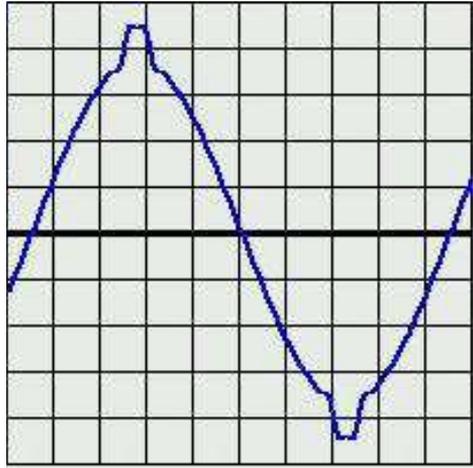
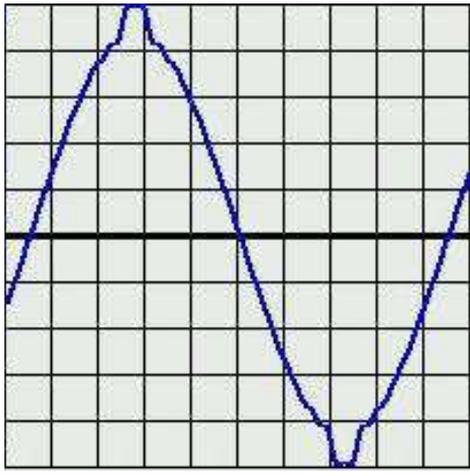
FIXED, NO.=20

Harmonic	%	θ
3	2.06	180
5	1.77	0
7	1.62	180
9	1.23	0
11	0.91	180
13	0.54	0
23	0.51	0
25	0.53	180



FIXED, NO.=21

Harmonic	%	θ	Harmonic	%	θ
3	3.08	180	21	0.62	180
5	2.72	0	23	0.73	0
7	2.43	180	25	0.77	180
9	1.97	0	27	0.69	0
11	1.41	180	29	0.56	180
13	0.86	0			

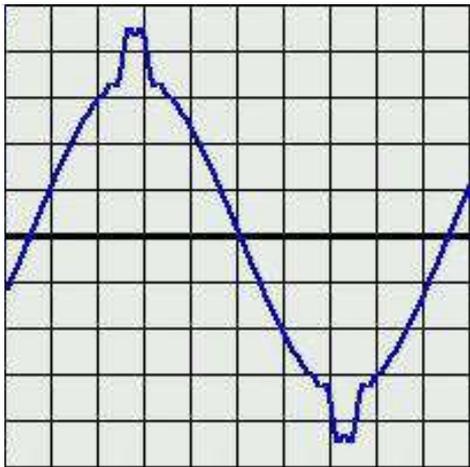


FIXED, NO.=22

Harmonic	%	θ	Harmonic	%	θ
2	0.13	180	15	0.55	180
3	4.28	180	19	0.46	180
5	3.77	0	21	0.83	0
7	3.27	180	23	0.97	180
9	2.57	0	25	1.04	0
11	1.93	180	29	0.75	180
13	1.22	0			

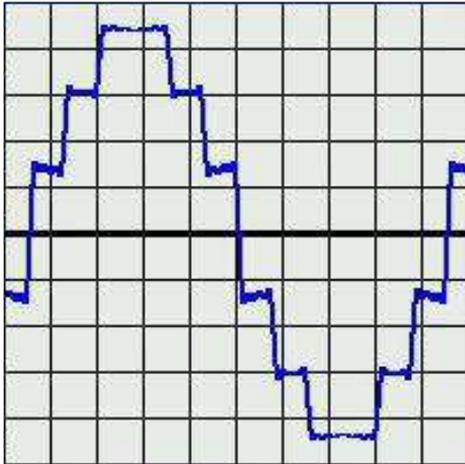
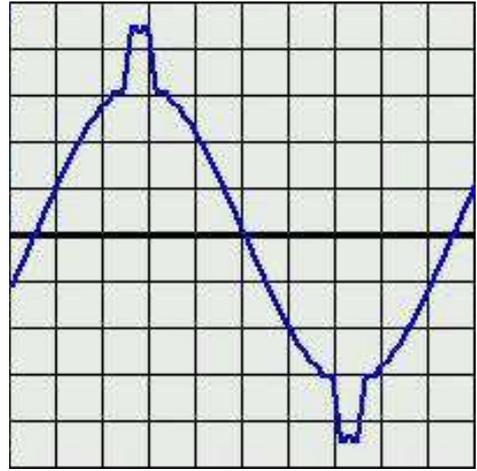
FIXED, NO.=23

Harmonic	%	θ	Harmonic	%	θ
3	5.74	180	19	0.61	0
5	5.11	0	21	1.07	180
7	4.44	180	23	1.28	0
9	3.52	0	25	1.35	180
11	2.63	180	27	1.22	0
13	1.65	0	29	0.98	180
15	0.8	180			



FIXED, NO.=24

Harmonic	%	θ	Harmonic	%	θ
3	7.35	180	19	0.74	0
5	6.6	0	21	1.35	180
7	5.74	180	23	1.64	0
9	4.57	0	25	1.73	180
11	3.41	180	27	1.56	0
13	2.16	0	29	1.24	180
15	1.04	180			



FIXED, NO.=25

Harmonic	%	θ	Harmonic	%	θ
5	3.41	0	23	3.88	0
7	2.55	0	25	3.56	0
11	9.22	0	31	0.5	0
13	7.68	0	35	2.34	0
17	0.9	0	37	2.21	0
19	0.9	0			

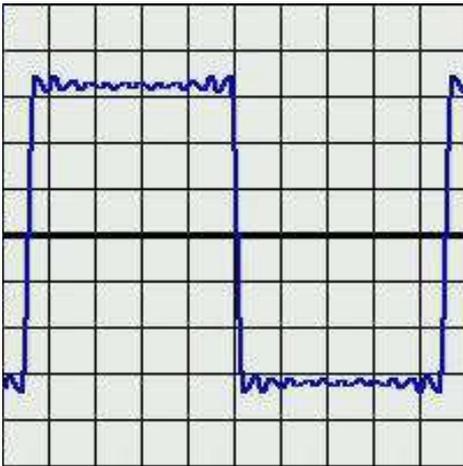
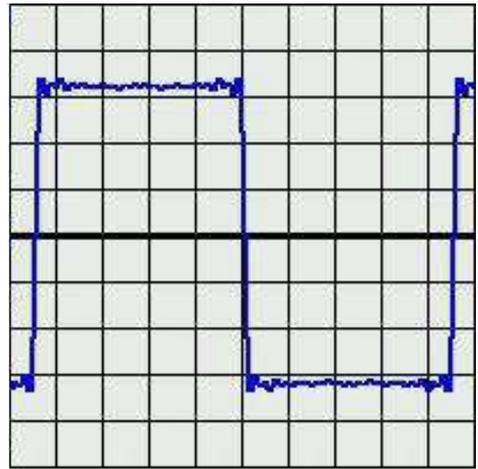


FIXED, NO.=26

Harmonic	%	θ
21	1.24	0
23	4.91	0
25	2.21	0

FIXED, NO.=27

Harmonic	%	θ	Harmonic	%	θ
3	33.39	0	23	4	0
5	20.01	0	25	3.49	0
7	13.76	0	27	2.91	0
9	10.7	0	29	2.45	0
11	8.39	0	31	1.94	0
13	7.06	0	33	1.95	0
15	5.85	0	35	1.91	0
17	4.86	0	37	1.89	0
19	4.86	0	39	1.83	0
21	4.52	0			

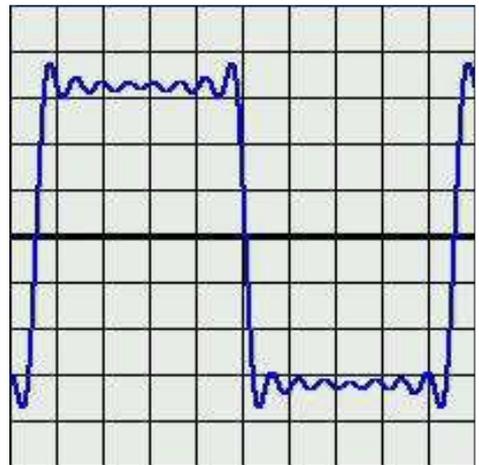


FIXED, NO.=28

Harmonic	%	θ	Harmonic	%	θ
3	33.39	0	23	3.93	0
5	20.01	0	25	0.89	0
7	13.75	0	27	0.92	0
9	10.71	0	29	0.94	0
11	8.37	0	31	0.94	0
13	7.05	0	33	0.94	0
15	5.84	0	35	0.93	0
17	4.84	0	37	0.92	0
19	4.83	0	39	0.91	0
21	4.48	0			

FIXED, NO.=29

Harmonic	%	θ
3	33.39	0
5	20.01	0
7	13.74	0
9	10.67	0
11	8.33	0
13	6.99	0
15	5.26	0



Appendix C Warranty

Thank you for purchasing the SPST Series Linked 3-Phase AC Power Supply System 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 the SPST Series Linked 3-Phase AC Power Supply System of APM.

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 aspect for quality warranty or services made by the distributors.

Warranty Period

1. The warranty period of APM SPST Series Linked 3-Phase AC Power Supply System is 1 (one) year, or refer to relevant Distributor Agreement terms.
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 warranty card and purchasing invoice to the APM Customer Service by email. APM will provide you services for maintenance and replacement of defected product 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 return the replaced product and components to the original place of purchase for APM to collect the replaced items in a certain 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 distributor 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 anti-dismantle label or the anti-dismantle label 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 environment that is 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. Cosmetics defects or damages which won't affect normal operation of the product.

For the malfunction caused by above-mentioned circumstances, APM or its authorized service facility based on its own judgment is willing to provide a paid service in respond to our customer's request.

Disclaimer

1. APM will bear no responsibility for the compensation of direct or consequential functional malfunction caused by or resulting from product failure. APM will not be responsible for the data loss caused by or resulting from improper operation or due to non-product quality problem. The user should appropriately back up the data by themselves. Nor will APM be responsible for the personal injury or property losses caused by or resulting from non-product quality problem. If in any situation APM puts forward or expresses the warranty commitments conflicting with the above clauses, it should be subject to the later one.
2. In order to uphold your warranty rights, please call or mail APM Customer Service to register your product and to put warranty coverage in force.
3. Only APM has the rights to revise the conditions of the warranty given; any trader, distributor or installer has no rights to make any modification to the warranty provided by APM, or represent APM to express any opinion and behavior; APM reserves the final interpretation rights.
4. Should any malfunction of product occurs, please contact your installer, distributor or dealer timely so as for us to provide you with corresponding and appropriate services.
5. If technicians of APM provide you an on-site service, please show the warranty card which should be filled out by the visiting technicians.

Remark

1. Please retain the schedule and your purchase invoice as the proofs for warranty.
2. Please show the schedule each time prior to beginning of work for the maintenance personnel to fill out.
3. The schedule should be properly kept within product warranty period as APM won't issue any replacement schedule after the loss of the original one.

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.





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Fax: +86 769 2202 6771 Web: www.apmtechate.com