USER MANUAL

ARRAY 4~24kVA

(A UPS)

Thank you for choosing Santak ARRAY system.

Safety information and operating instructions are included in this manual. To ensure correct use of the UPS system, please read this manual thoroughly before operating it.

Save this manual properly for future reference.

Contents

1. I NTRODUCTION

1.1 Product overview

ARRAY 4~24kVA system is of single phase output and compatible with either three-phase or single phase mains input, and adopts a drawer-type high intelligent modular design with high efficiency and performance. It is a scalable power protection system in the range of 4 to 24kVA, this gives you to protect your investment while enabling your system to grow.

The system frame can hold a maximum of six UPS-Modules. The standard UPS-Module of 4kVA is hot-swappable, it becomes easy and simple for future power protection demands by adding or removing UPS-Module(s) without interruption to the load connected.

ARRAY contains a Communication Module which is to monitor and communicate with all the UPS-Modules and provides comprehensive information about the UPS system to the user interface.

Designed with the proven on-line, double conversion architecture, ARRAY offers the greatest degree of availability in power protection and provides continuous, high-quality AC power to connected critical equipment, protecting them against any power disturbances due to blackouts, surges, spikes, lightning and line noise interference.

1.2 Description of Commonly Used Symbols

Symbol & Description	
Symbol	Description
⚠	Alert you to pay special
⚠	Caution of high
~	Alternating current source(AC)
⎓	Direct current source(DC)
⏚	Protective ground
♻	Recycle
☒	Do not dispose with ordinary trash

1. I NTRODUCTION

1.3 Product standard

This product complies with the following criterion levels:

EMC:

EMI	EMS
IEC62040-2 Class A GB7260.2 Class A	IEC: 61000-4-2(ESD) GB/T17626.2 Electrostatic discharge immunity 61000-4-3(RS) GB/17626.3 Radiated,radio-frequency,electro magnetic field immunity 61000-4-4(EFT) GB/17626.4 Electrical fust transient/burst immunity 61000-4-5(SURGE) GB/17626.5 Surge immunity

Safety

I E C 62040-1-1

1.4 Technical specifications

- INPUT

Connection: Hardwired, three-phase (3φ4W + G) or single phase (1φ2W + G); “N” must be installed

Voltage range: three-phase (204~520)VAC/single-phase (118~300)VAC

Frequency range: (46~54) for 50Hz or (56~64) for 60Hz

Bypass voltage range: three-phase (140~457)VAC/single-phase (80~264) VAC

Power factor: > 0.98

- OUTPUT

Connection: Hardwired, single phase (1φ2W + G)

Voltage: 220/230/240 x (1±2%) VAC (Default 220VAC) or

2 sets of 110/115/120 x (1±2%) VAC (Option. With down-voltage ISO Transformer)

Frequency : Synchronized to mains input or 50/60±0.2Hz in battery mode

Power factor: 0.7 lag

Overload capacity: 110%~130%(±5%) transfer to bypass mode in 30sec

130%(±5%) transfer to bypass mode in 2sec

- Nominal Battery voltage: 120VDC
- Nominal Charge Voltage: 137VDC
- Noise: < 62dB
- Operating Environment

Operating temperature: 0℃~40℃

Ambient humidity: 20%~90%

Altitude: 0 – 5000m

Storage temperature: -25℃~55℃

1. I NTRODUCTION

- Dimensions and weights

Name	Dimensions W x D x H (mm)	Net Weight (kg)
UPS-Module	405 x 530 x 87	15
Frame	442 x 700 x 965	75
Frame with Down-Voltage ISO Transformer (Option)	442 x 700 x 1265	211

※ *Note： If the UPS is installed or used in a place where the altitude is above than 1000m, the output power must be derated in use, please refer to Section 5.1 in page 10 for details*

2. SAFETY INSTRUCTIONS

2.1 SAFETY INSTRUCTIONS

Save this manual properly for future reference. This manual contains important safety instructions. Read this manual carefully and thoroughly before operating the UPS. Comply with all the warnings and operating instructions on the unit and in the manual strictly.

- The earth ground connection must be provided and installed properly before power-on.
- Do not open or mutilate the battery or batteries. It may cause an electrolyte leakage that is toxic and harmful to the skin and eyes.
- Do not make the positive and negative terminals of the battery or batteries short circuit; otherwise it may cause electric shock or fire.
- Do not dispose of batteries in a fire. They may explode.
- Do not attempt to open the case of the UPS. There are potential hazards of electric shock.
- Do not plunge or insert any objects into the air vents and other inlets. Install the UPS in a room with good ventilation. Avoid direct sunlight.
- This equipment shall be installed in a controlled environment. Keep away from excessive temperature and humidity, flammable gas and caustic substance.
- When planning the installation, the floor's loading ability must be taken into consideration because of the heavy weight of the UPS system and the battery pack(s).
- The floor's ability for handling the weight of the unit and the battery pack should be taken into consideration before installation.
- In any emergency, switch off the mains input breaker and the breaker of the battery pack of the UPS system first.
- Only qualified service personnel should perform the electrical installation. Risk of electrical shock.

CAUTION: EARTH Connection essential before connecting supply.

CAUTION: Do not dispose of batteries in fire, they may explode

CAUTION: Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes, it may be toxic

WARNING: he equipment is without internal automatic backfeed isolation, a warning label, with the following or equivalent wording:

"ISOLATION UNINTERRUPTIBLE POWER SUPPLY(UPS) BEFORE WORK ON THIS CIRCUIT"

shall be labeled on all primary power isolators installed remote from the equipment area.

3. UNPACKING

3.1 UNPACKING

※Note： Carefully inspect the outer packaging for evidence of the damage during transit. Don't install a damaged unit. Report any damage to the carrier and notify the local dealer immediately.

1) Remove the wrapping trap and the packing carton (Refer to Fig.1)

2) Remove the protective material (Refer to Fig.2);

3) Remove the subassemblies and the protective material from the frame (Refer to Fig.3);

4) Carefully unload the frame from the packing pallet and move it to its intended location for installation.

5) To stabilize the frame in its operating location and turn the four Brake Pads counter-clockwise tight against the floor. If the floor is uneven and the frame is tilted or unstable, it is necessary to place a thin steel plate under a wheel. Don't use the Brake Pads to level the frame.

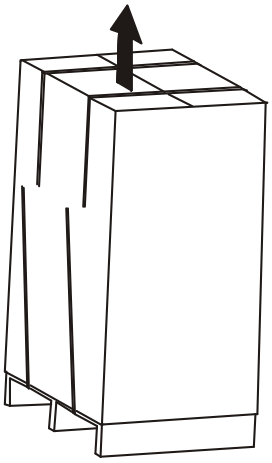


Fig.1

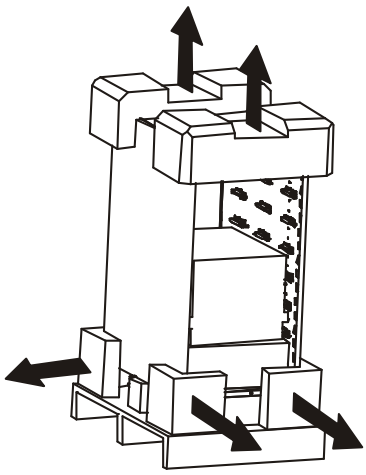


Fig.2

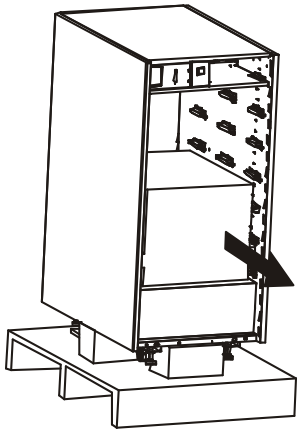
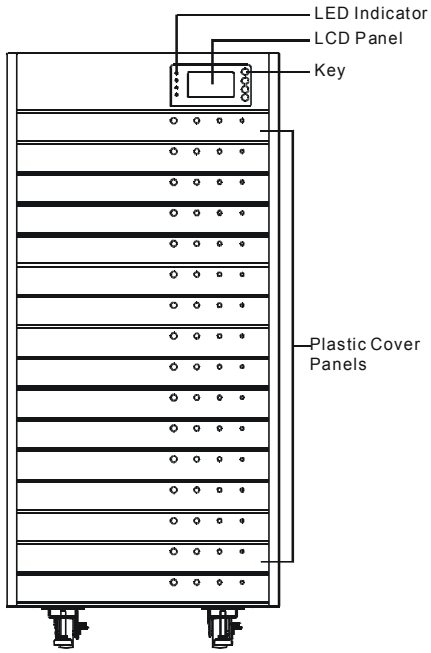


Fig.3

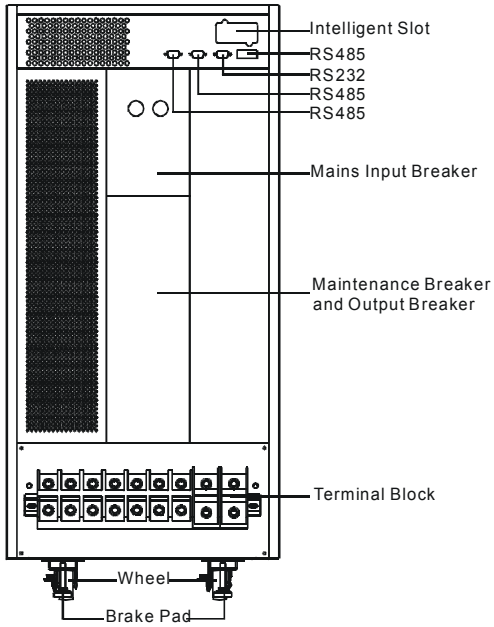
4. APPEARANCE

4.1 Appearance of the Frame

Standard:

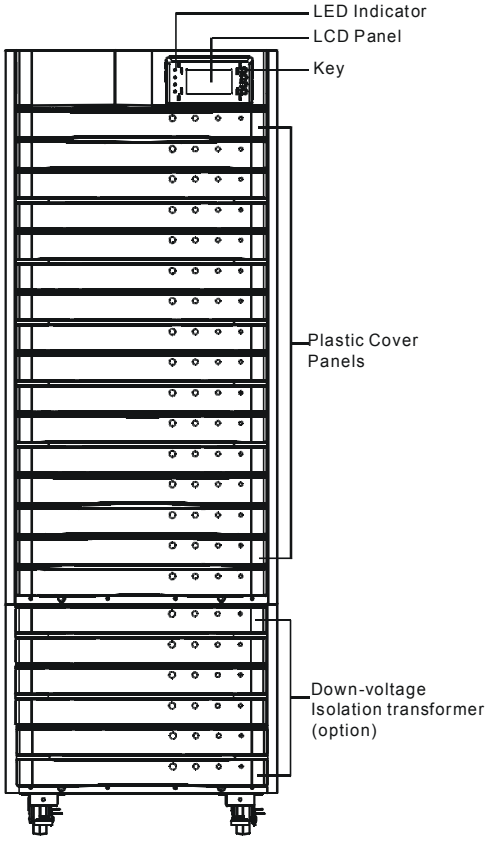


FRONT

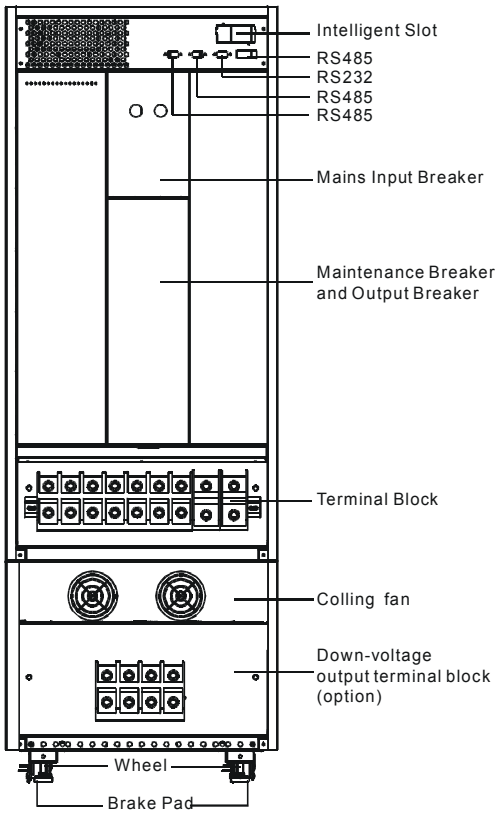


REAR

Option:



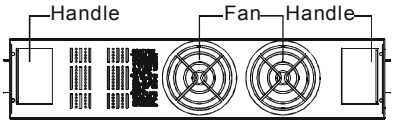
FRONT



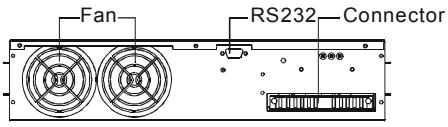
REAR

4. APPEARANCE

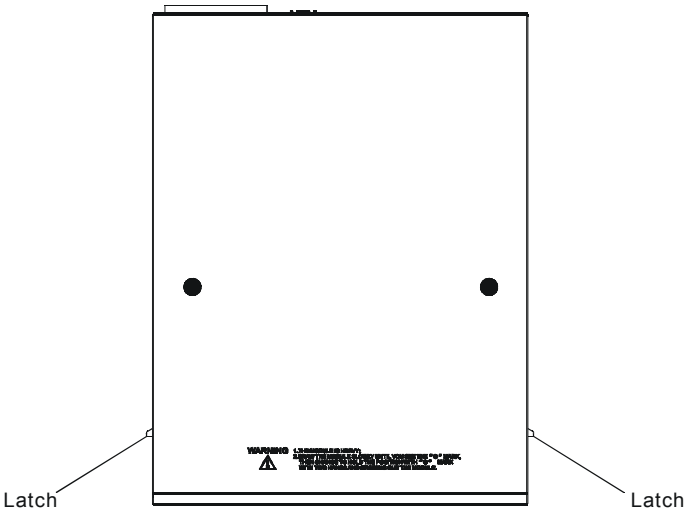
4.2 Appearance of the UPS-Module



FRONT VIEW

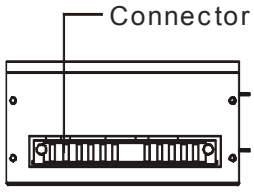


REAR VIEW

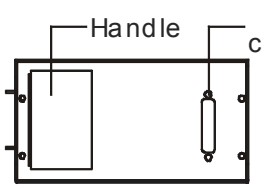


Top Panel

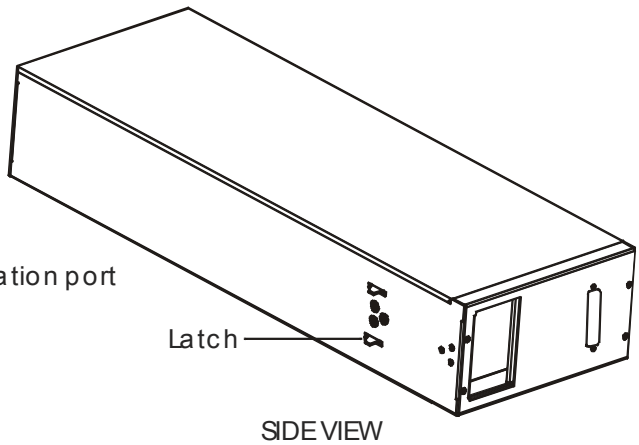
4.3 Appearance of the Communication Module



REAR VIEW



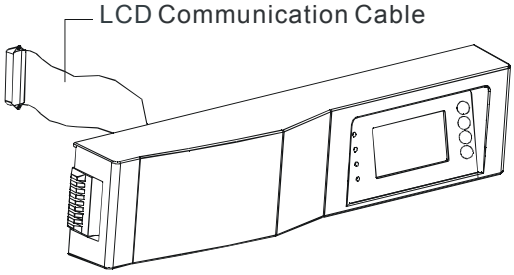
FRONT VIEW



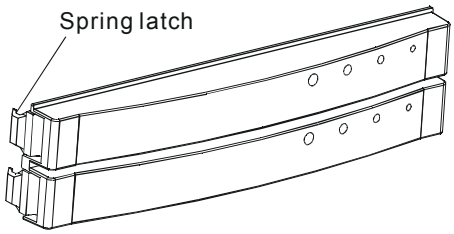
SIDE VIEW

4. APPEARANCE

4.4 The Appearance of the LCD Panel and the Plastic cover Panel



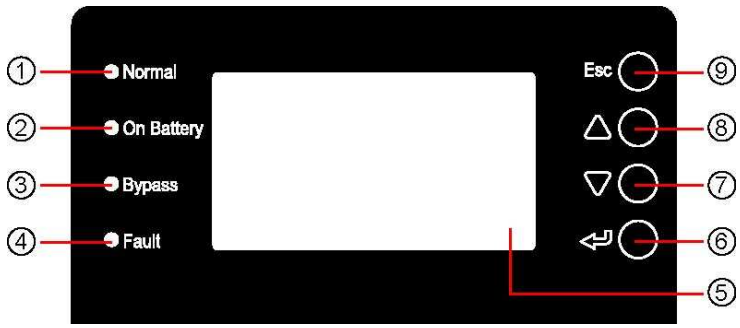
LCD Panel



Plastic Cover Panel

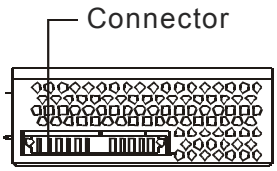
4. APPEARANCE

4.5 LCD Display Panel

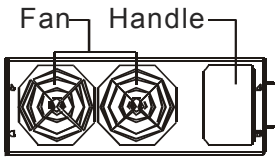


1. Normal: The UPS system is working normal and powering the load via INVERTER if this green LED is on.
2. On Battery: The UPS system is powering the load from the battery via INVERTER if this yellow LED is on.
3. Bypass: The output power of the UPS system is supplied by mains via bypass when this yellow LED lights up.
4. Fault: The UPS system is in fault condition if this red LED is on. There are two states of fault warning: red LED is solid on with continuous audible alarm; red LED is flashing with interval audible alarm.
5. LCD screen: Shows the information and the status of the UPS system.
6. ↵ **:** Enter
7. ▼ **:**Page-down
8. ▲ :Page-up
9. ESC: Exit

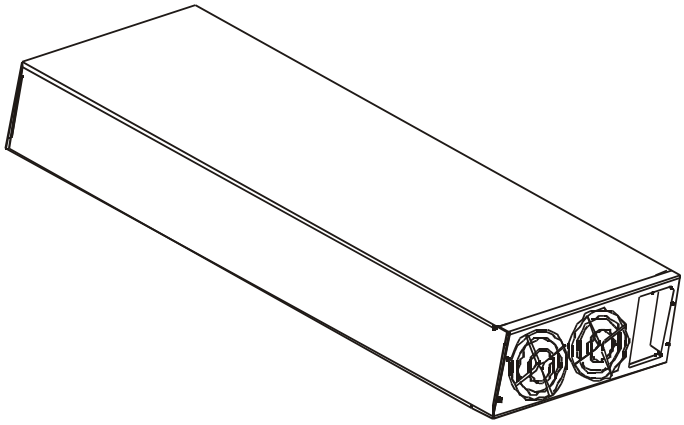
4.6 Appearance of the Charger Module (optional)



REAR VIEW



FRONT VIEW



SIDE VIEW

5. INSTALLATION

5.1 Notice for Installation

1. The installation of this unit must be performed by professional personnel and in accordance with local electrical code.
2. Install the UPS in a clean and stable environment that is free of vibration, dust, high humidity, flammable gas, flammable liquid and caustic substance.
3. The ambient temperature for the normal operation of the UPS should be at 0℃~40℃. If the UPS is installed or used in a place where the ambient temperature is than 40℃, the maximum load capacity should be derated in use by 12% of nominal capacity for the temperature increment of every 5℃. The maximum ambient temperature should be less than 50℃.
4. It is recommended that the battery pack be used at the temperature of 15℃-25℃.
5. The altitude is required to be below 1000 meters for the UPS's normal operation. If the UPS is installed or used above 1000 meters, the output power should be derated in use. Refer to the following.

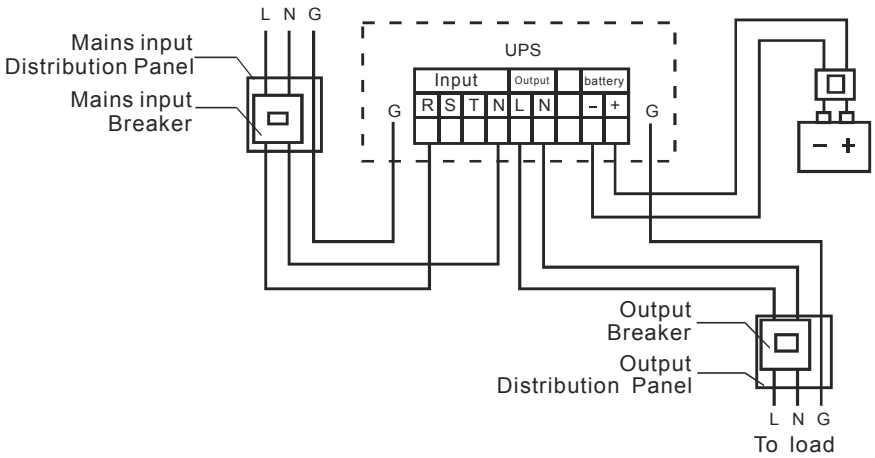
(Derating power = the maximum power capacity in a high altitude area ÷ nominal power capacity of the UPS)

Altitude (M)	1000	1500	2000	2500	3000	3500	4000	4500	5000
Derating power	100%	95%	91%	86%	82%	78%	74%	70%	67%

6. The UPS utilizes fans for forced cooling, the air inlet at the lower part of the front panel and the air vent on the rear panel should not be blocked. It is also necessary to reserve adequate space for future maintenance. Refer to Fig.6 for space requirement.
7. The nominal voltage of the external Battery Pack(s) is 120VDC. There are 10 pieces of 12V Sealed Lead Acid battery in series for each group. The principle of same type, same capacity for the battery pack should be followed. You may choose more groups of the battery pack to extend longer backup time if necessary.
8. Input wirings: ARRAY 4~24kVA is compatible with either three-phase or single phase mains input. The default setting is for three-phase mains input. For single phase mains input, it is recommended to start up the UPS system in utility power mode, it can automatically sense the power source.

5. INSTALLATION

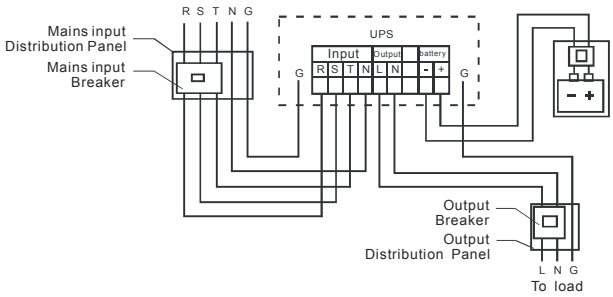
1) Wiring for single-phase input



Single-phase Input Connection Diagram

※Note： *For the single-phase input wiring, the live (L) wire must be connected to the R-phase of the input terminals, not to the S or T phase terminal, otherwise, the UPS will consider the utility power abnormal*

2) Wiring for three-phase input



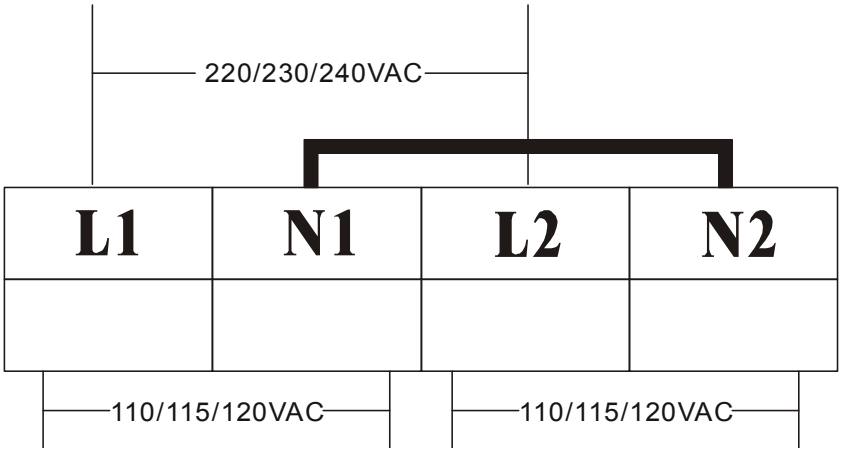
Three-phase input connection diagram

Remark: the three phases are marked with R, S and T. If adopting A, B and C mark, the R-phase, S-phase and T-phase correspond to the A-phase, B-phase and C-phase.

※Note： *Make sure that the phase sequence is correct for three-phase mains input wiring, If the phase sequence is wrong, the UPS cannot start up and will emit warning alarm and the LCD will display "phase sequence error". The N wire of mains input must be connected to the N terminal of the input for input wiring of the UPS system!*

5. INSTALLATION

3) Output connection with down-voltage ISO transformer (Option)



To have the 110/115/120Vac output, you may have to order the UPS system frame with down-voltage ISO transformer. The output terminal block of down-voltage transformer is at the lower section of the rear panel of the frame. It is recommended to divide the total load as equally as possible between L1/N1 and L2/N2 for low voltage output. However, the L1 and L2 terminals represent 220/230/240VAC.

※*Note： DO NOT connect the load over 12kVA on 110/115/120VAC terminal blocks. For safety, it is recommended to install a breaker panel between the terminal block and the loads. Please refer to below table for the output current ratings.*

Load	110VAC	115VAC	120VAC	220VAC	230Vac	240VAC
	Current	Current	Current	Current	Current	Current
2KVA	18.2 A	17.4 A	16.7 A	9.1 A	8.7 A	8.3 A
4KVA	36.4 A	34.8 A	33.3 A	18.2 A	17.4 A	16.7 A
6KVA	54.5 A	51.2A	50 A	27.3 A	26.1 A	25 A
8KVA	72.7 A	69.6 A	66.7 A	36.4 A	34.8 A	33.3 A
10KVA	90.9 A	87 A	83.3 A	45.5 A	43.5 A	41.7 A
12KVA	109.1 A	104.4 A	100 A	54.5 A	51.2A	50 A
14KVA	Not Allowed	Not Allowed	Not Allowed	63.6 A	60.9 A	58.3 A
16KVA	Not Allowed	Not Allowed	Not Allowed	72.7 A	69.6 A	66.7 A
18KVA	Not Allowed	Not Allowed	Not Allowed	81.8 A	78.3 A	75 A
20KVA	Not Allowed	Not Allowed	Not Allowed	90.9 A	87 A	83.3 A
22KVA	Not Allowed	Not Allowed	Not Allowed	100 A	95.7A	91.7 A
24KVA	Not Allowed	Not Allowed	Not Allowed	109.1 A	104.4 A	100 A

5. INSTALLATION

9. Recommended wires

<table>
<tr><td colspan="2">Diameter of the utility power input wires</td><td colspan="2">Diameter of the UPS output wires</td><td>Diameter of the battery positive /negative wires</td><td>Diameter of the earth wire</td><td>Input Breaker rating of the utility power</td><td>Output Breaker rating of the UPS</td><td>Battery Breaker</td></tr>
<tr><td>R-phase</td><td>1AWG /35mm^2</td><td rowspan="2">Diameter of the output live wire (L)</td><td rowspan="2">1AWG /35mm^2</td><td rowspan="4">0AWG /50mm^2</td><td rowspan="4">6AWG /16mm^2</td><td rowspan="4">175A /220VAC</td><td rowspan="4">125A /220VAC</td><td rowspan="4">250A /150VDC</td></tr>
<tr><td>S-phase</td><td>6AWG /16mm^2</td></tr>
<tr><td>T-phase</td><td>6AWG /16mm^2</td><td rowspan="2">Diameter of the output neutral wire (L)</td><td rowspan="2">1AWG /35mm^2</td></tr>
<tr><td>N wire</td><td>1AWG /35mm^2</td></tr>
</table>

※Note：

(1) The battery positive/negative(+/-) wires are for connection between the system frame and the battery back. Red wire for positive (+) connection and black wire for negative (-) connection of the output of the battery pack are recommended.

(2) The user should prepare the wirings according to the above table before installation.

(3) The user should prepare and install breakers on mains distribution panel and output distribution panel respectively.

(4) Each end of the connecting wires should attach by crimping with an appropriate ring terminal for connection to the terminal block or the terminal of the breaker.

(5) Conductor screw torque for connection ring terminals on the terminal block in 120kgf.cm is recommended.

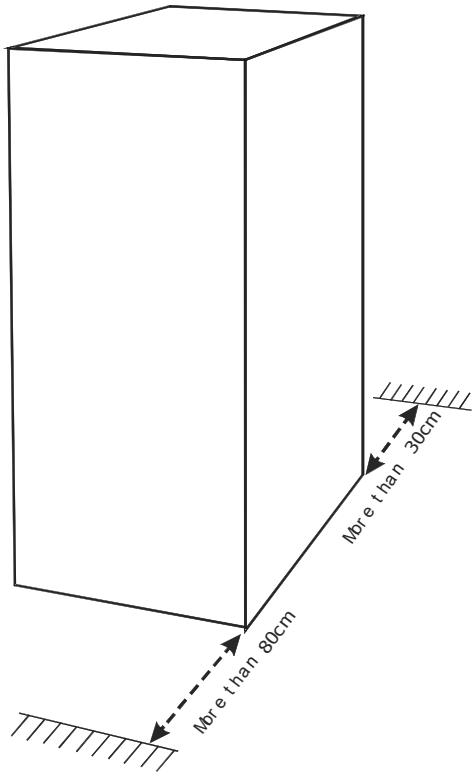
(6) Separate the conduits for the wirings of mains input, output of the UPS system and the external battery pack.

10. If necessary, connect a standard RS232 communication cable between the RS232 Port of the UPS system and the COM port of your computer to remote monitor and manage the system via WinPower.

5. INSTALLATION

5.2 Space requirement

A recommended space of 80cm and 30cm from the front panel and the rear panel respectively should be reserved for ventilation and future maintenance. Keep the surroundings clean and don't place any objects close to the UPS.



5.3 Installation

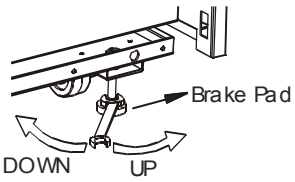


Fig.4

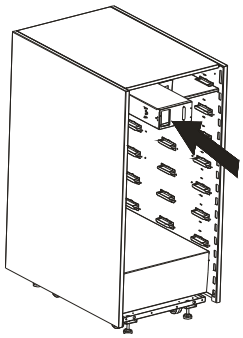


Fig.5

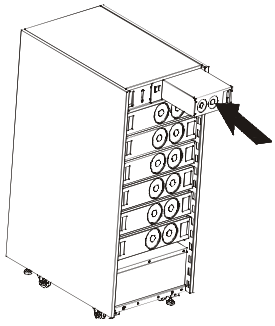


Fig.6

1)Place the unit in its intended location and then turn the four brake pads counter-clockwise with a wrench until they reach tightly against the floor to secure the unit. The brake pads are at the four corners of the bottom of the frame.

2) Insert the Communication Module into the bay at the top left corner of the frame (Refer to Fig.5).

3) Insert the Charger Module into the bay at the top right corner of the frame if any. (Refer to Fig.6)

4) Insert all the UPS-Modules into the bays of the frame one after another. (Refer to Fig.7-Fig.9)

※*Note： Push each module firmly until it is latched to the frame. Repeat for each additional module.*

5) Install the plastic cover panels one by one in ascending order. (Refer to Fig.10).

6) Install the LCD panel: plug the communication cable on the LCD panel to the port of the communication module. Secure the connector of the LCD communication cable with attached screws, then install the panel on the front top of the frame.

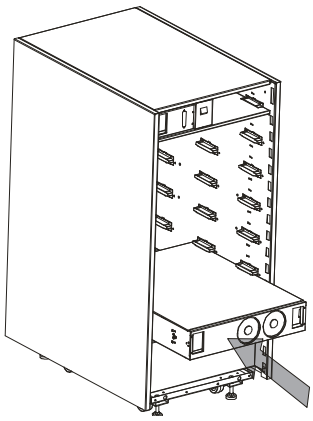


Fig. 7

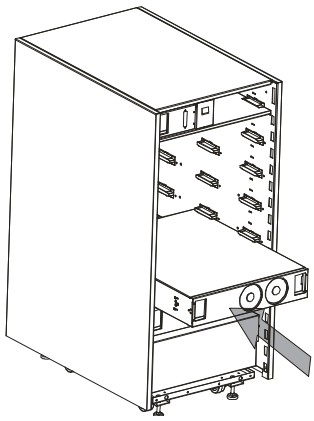


Fig. 8

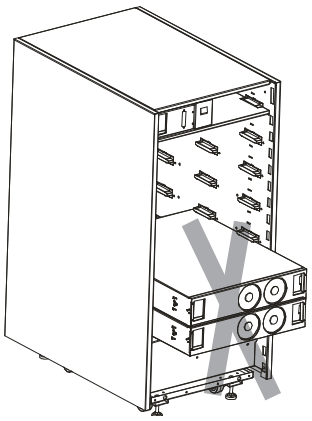


Fig. 9

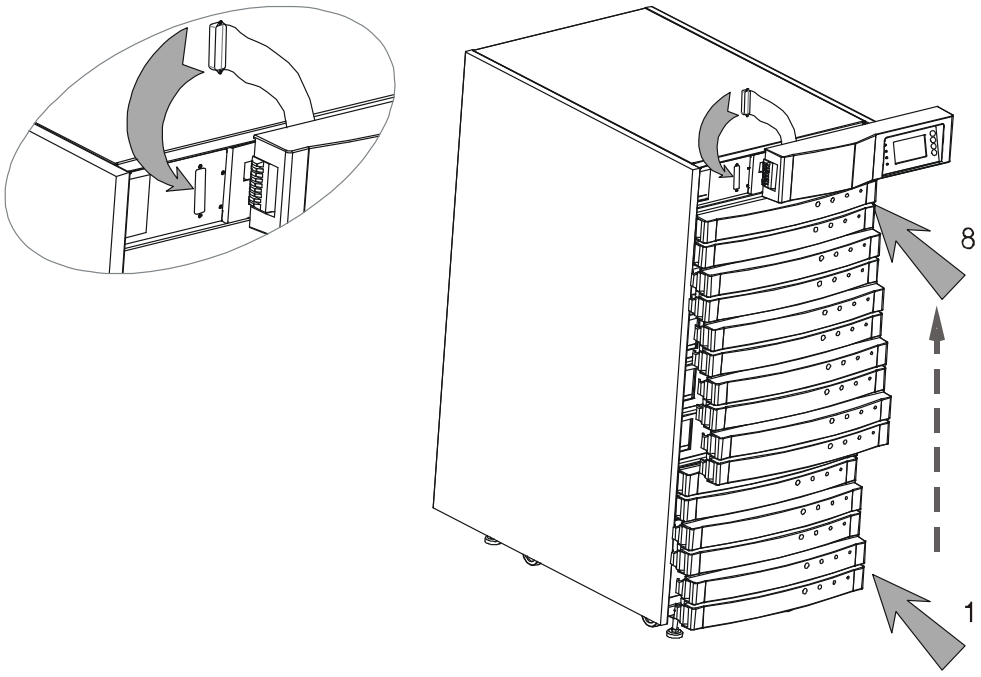


Fig. 10

6. OPERATION OF ADDING / REMOVING UPS-MODULES

6.1 Parallel redundancy introduction

N+X is currently the most reliable structure in power protection. N represents the minimum number of UPS-Modules of the UPS system that the total load needs; X represents the number of the redundant UPS-Modules of the UPS system, i.e. the number of the fault UPS-Modules that the system can handle simultaneously. The bigger X is, the higher the system reliability is. For example, five UPS-Modules are capable of supplying a total of 20kVA, if a total load requires only 10kVA, each UPS-Module supplies 2kVA to the output. If one UPS-Module is removed or for some reason fails, each of the four remaining UPS-Modules supplies 2.5kVA to the output. In this case, there are two more UPS-Modules installed for redundancy, N=3, X=2, in other words, a maximum number of two for redundancy is considered for the application. Therefore the reliability has been improved significantly. For occasions where reliability is highly depended on, N+X is the optimal mode.

The UPS system can be configured with up to six UPS-Modules. It is easy and convenient by adding or removing the UPS-Module(s) to realize power redundancy and power expansion, or load sharing. With N+X redundancy configuration, it allows the failure of one or more UPS-Modules without causing the UPS system to lose any functionality.

6.2 Installing and removing the UPS-Modules

ARRAY 4~24kVA adopts the hot swappable, modular design, it is able to add or remove the UPS-Modules no matter the UPS system is off or is operating. However, please pay attention to the UPS system, if the UPS system is supply power for load, you should make sure that the remained UPS-Modules can provide enough power output for the load before removing some of the UPS-Modules to prevent from overload.

6.2.1 Procedures of installing the UPS-Module

1) Remove the plastic cover panel from the position where the UPS-Module is going to be installed;
2) Insert the UPS-Module into the frame. There are two positioning marks "●" and warning label on the top of the UPS-Module, use two hands to hold the UPS-Module with the marks and warning label upward, and push the module firmly until it is fully inserted and latched into the frame.
3) Reinstall the plastic cover panel.

6.2.2 Procedures of removing the UPS-Module

1) Remove the plastic cover panel from the position where you want to remove the UPS-Module.

2) Use two hands to hold the handle and press the latch-levers in the handle units to slide the UPS-Module slowly out of the frame until you see the marks "●"on the top of the UPS-Module, then hold the UPS-Module on the left and right sides to pull it out from the frame.

※*Note： Do not use too much strength when pulling the module to avoid it dropping.*

7. OPERATION AND MAINTENANCE

7.1 Operation

7.1.1 For three-phase mains input, make sure the phase sequence is correct; For single phase mains input, please confirm “L” is connected to R-phase(A-phase) on the terminal block of the input before supplying mains power to the UPS.

※Note： N wire must be connected correctly.

7.1.2 Switch ON the breaker on the rear panel of the Battery Pack(s).

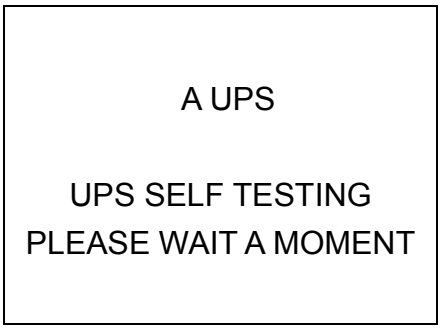
※Note： Before turning on the breaker please ensure that the polarities of +, - of the connections between the UPS system frame and the Battery Pack are correct.

7.1.3 Switch ON the input breaker on the rear panel of the UPS frame. The cooling fans start to rotate.

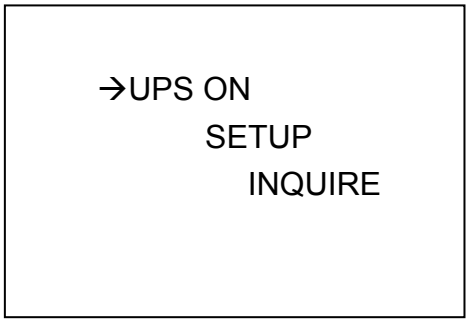
7.1.4 Switch the “System Startup Switch” on the back of the LCD panel to the ON position, and refer to the LCD display in the following to operate.

※Note : The parameters below are for quick reference only and may vary from actually application. The example here is with three-phase mains input.

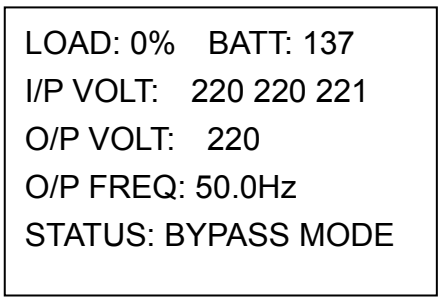
1) Power On



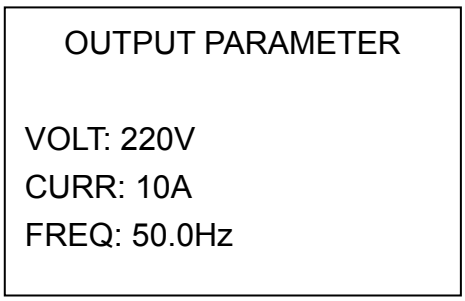
2) In about 18 seconds



4) Press ESC, or in 12 mins without pressing any key



4) Press ▼



*UPS STATUS: BYPASS MODE, 3PHASE I/P(R PHASE I/P),
BATTERY MODE, UPS SELFTEST, REMOTE SHUTD.
“BATT OPEN”=” BATT DISCONNECT”

5) Press ▼to continue

```
INPUT PARAMETER
     RN    SN    TN
VOLT: 220   220   221
FREQ: 50.0Hz
```

*R-phase inputs when being single-phase

6) Press ▼ to continue

```
POWER PARAMETER
          kW      kVA
TOTAL: 0.00       0.00
UPS1:   0.00      0.00
UPS2:   0.00      0.00
```

*The status of Each UPS-Module will be shown circularly in the last two lines

7) Press ▼ to continue (utility power mode)

```
BATTERY PARAMETER
BAT VOLT: 137V
VOLUME: 100%
STATUS: CHARGING
```

*The battery status will be “CHARGING”, “DISCHARE” ,”BATT LOW” or “BATT OPEN” etc.

7.1.5 Startup of the UPS system

1) Startup menu
press “ESC” and press ▲ or ▼ to select “UPS ON”

```
→UPS ON
  SETUP
  INQUIRE
```

2) Press ↵

```
CONFIRM
    TURN UPS ON
→NO, CANCEL
  YES, CONFIRM
```

5) Select “YES, TO CONFIRM” to start up the UPS system

```
UPS IS TURNING ON

PLEASE WAIT…
```

4) Normal startup

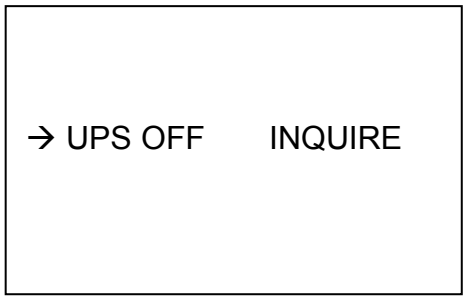
```
LOAD: 0%   BATT: 137
I/P VOLT:  220 220 221
O/P VOLT:  220
O/P FREQ:  50.0Hz
STATUS:  R PHASE I/P
```

*The status will be”3PHASE I/P(R PHASE I/P)” or “BATTERY MODE”.

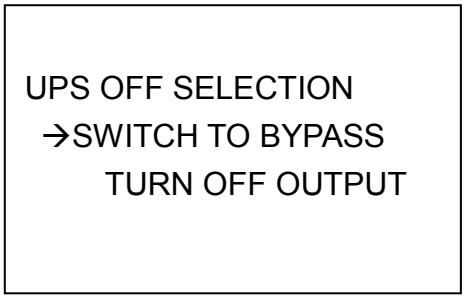
7. OPERATION AND MAINTENANCE

7.1.6 Shutdown of the UPS system

1) Shutdown menu
press “ESC” and press ▲ or ▼ to select “UPS OFF”

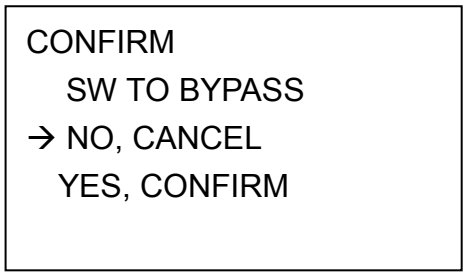


2) Press ↵

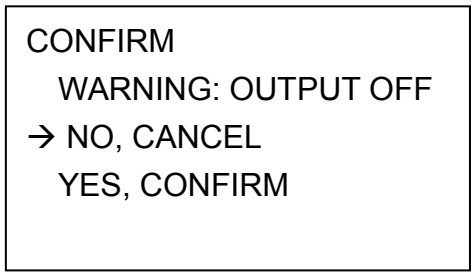


*If there is only one UPS module the UPS OFF will automatically select to “SWITCH TO BYPASS”. If the utility power fails, the UPS OFF will automatically select to “TURN OFF OUTPUT”

3) Shutdown to bypass mode by selecting “YES, CONFIRM” to continue, or “NO, CANCEL” to exit.

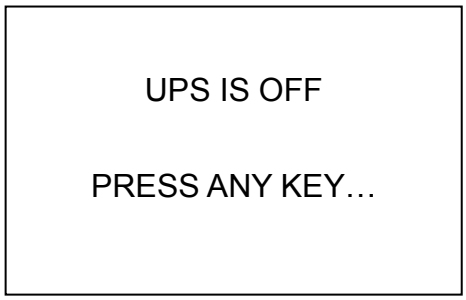


4) Further confirmation after selecting “TURN OFF OUTPUT” in previous page.



5) Select “YES, CONFIRM” to shut down the UPS system

6) The UPS system has already been shut down in Utility Power mode

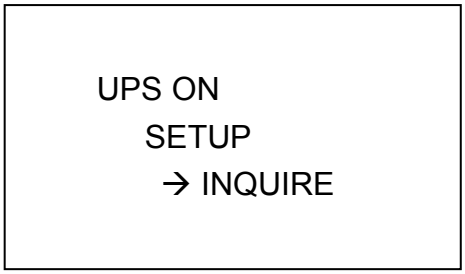


7. OPERATION AND MAINTENANCE

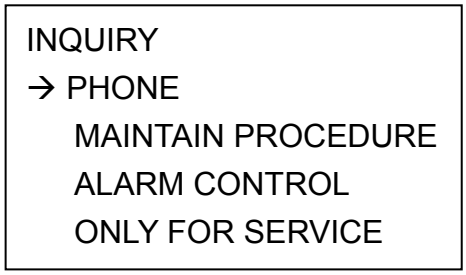
7.1.7 Query

1) Query menu

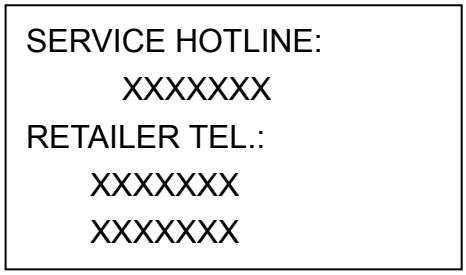
press “ESC” and press ▲or ▼ to select for other “INQUIRY” information.



2) Press ↵ to continue



6) Press▲or▼to select “PHONE” to query the distributor’s telephone number

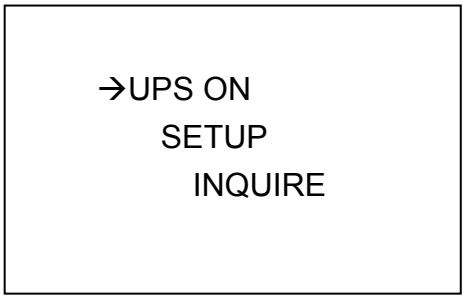


*Please enter the telephone number of the distributor in the “SETUP” menu

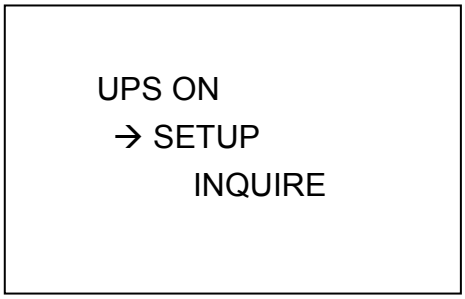
7.1.8 SETUP (Press “ESC” to exit the current menu)

The SETUP feature is password protected, the default password is 1234 which can be changed in the SETUP. (Refer to the following)

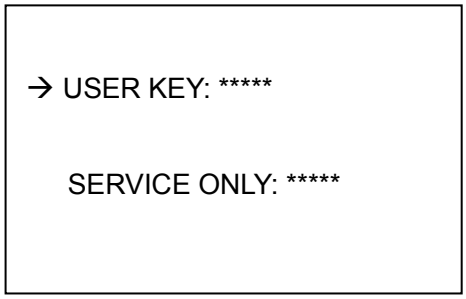
1) Press “ESC” to the following menu (without the UPS system)



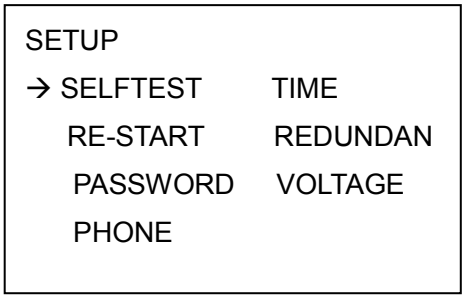
2) Press the ▼select SETUP andStartup of press ↵ to continue



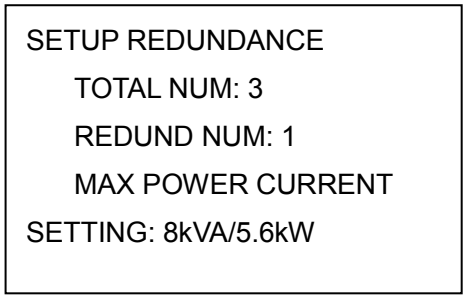
3) Enter the password (default is “1234”) by using ▲or ▼



4) After pressing ↵

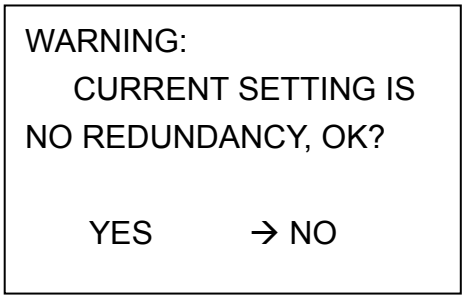


5) Select REDUNDAN and press ↵ to set up the number of the UPS-Module for redundancy



*The redundancy setup will be valid after leaving the redundancy setup menu. If you want the UPS system to notify you when the number of redundant UPS-Module is less than a specified level, enter a redundancy level for the UPS system. This setting only affects the warning alarm, the UPS system continues to operate even if the parameter is left at default of “0” due to increment of the output load or removing the UPS-Module.

6) If the number of the redundancy module is set to “0” (as default), that means warning of preset redundancy level is not activated.

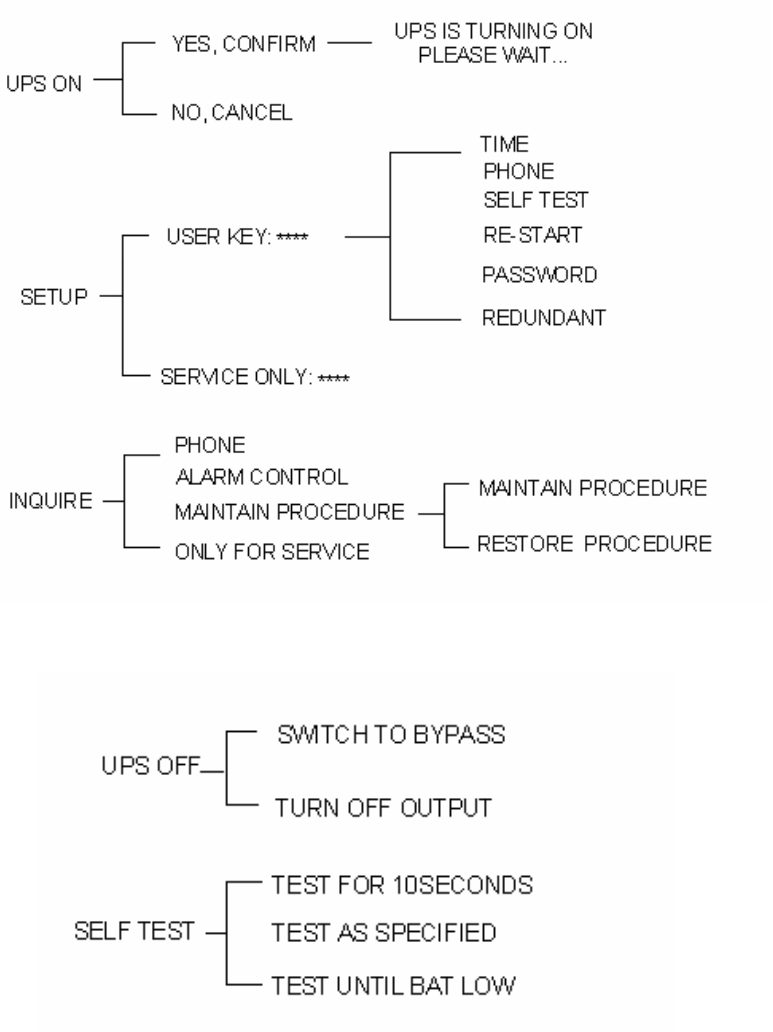


* Select “↵“ or “ESC“ will return to the setup menu.

7) Turn on the UPS system in the battery mode, please make sure that the battery pack(s) has/ have been connected correctly before switching the “system startup switch” from OFF to ON. The LCD display menu is similar to the one in the utility power mode. Perform the UPS system ON/OFF in battery mode according to the menu display. If you do not turn on the UPS system within 15 seconds, the UPS system will automatically power off

and shut down the LCD display in 10 minutes.

8). Menu overview



7.2 Maintenance

1.The maintenance and battery replacement of the UPS system should be performed by trained service personnel.

2.The Battery Pack(s) should be charged once every three months under normal temperature (Refer to the specifications), or every two months at a higher temperature if the UPS system has not been used for a long time.

2. There are three breakers on the rear panel of the UPS system frame, including INPUT BREAKER, OUTPUT BREAKER and MAINTENANCE BREAKER. Switch ON the input breaker to supply the AC power to the UPS system and switch ON the output breaker to supply AC power to the output terminal of the UPS system. The maintenance breaker can only be operated by professional personnel. The INVERTER of the UPS system must be turned off before operating this maintenance breaker.

7. OPERATION AND MAINTENANCE

※*Note：* *Make sure that the unit has transferred to the bypass mode before operating the maintenance breaker. The UPS system delivers AC power to the output directly from the utility power when the maintenance breaker is transferred in the position of "MAINTENANCE". The maintenance breaker is for the purposes of servicing of the UPS system carried out by qualified personnel only.*

8. COMMUNICATION INTERFACE

The ARAAY 4~24kVA provides two paths of communications, one is RS232, the other is RS485 and Intelligent Slot. You may opt for AS400 card of Dry-contact interface for remote monitoring or WebPower card for remote monitoring and management of the UPS system.

1. The standard RS232 port is applicable to WinPower software.
2. The standard RS485 port is appropriate for monitoring and controlling of the UPS from a remote location through a computer installed with WinPower software. You may opt for an RS485/RS232 converter for the application.
3. The Intelligent Slot is applicable to the WebPower Card (optional) or AS400 card (optional).

Please consult service centre or the distributor for further information of the communications interface.

9. TROUBLESHOOTING

In the event of fault of the UPS system, please refer to the following table to check out the fault condition and take corresponding troubleshooting measures. If the problems cannot be properly handled, please contact Service Center.

1. Check that the UPS mains input wiring is correct
2. Check that the input voltage is in compliance with the specifications

When you contact the service centre, please provide the following information:

1. The model number of the unit and the serial number, which can be found on the rear panel of the system frame (or queried from the LCD display)
2. The fault state of the UPS system, such as fault code shown on LCD display as well as the LED indicators, and complete descriptions of the problem.

ABNORMAL CONDITIONS TABLE		
PROBLEM	POSSIBLE CAUSE	SOLUTION
The Fault LED is on, periodic beeps	Overload in bypass or INV operation mode	Remove non-critical load
	The utility power abnormity	Check if the input wiring and input voltage are normal
	Battery disconnected	Check if the battery breaker and battery wiring are fully engaged
The Fault LED is on, continuous beeps	UPS fault	Contact customer service center
The battery discharging time is below 1/3 of the initial value	Battery exhausted	
	Charger fault	
LCD panel displays nothing or error	Check if the connecting cable is well-connected	Check the connection of the two ends of the LCD cable. Secure the connection or unplug the communication module and then insert it into the slot again
The Winpower or Webpower can not sense the UPS	The editions of the Winpower and the Webpower cards are too old or there is something wrong with the computer configuration	Contact the service or the distributor for latest software or opt for latest Webpower card , check the connecting cable as well
The LCD can not sense the modules	The modules and the cabinet of the unit are not connected correctly	Pull out the module and slide it into the bay again or change another bay to insert the UPS-Module again
The utility power is on, but the UPS does not work	The utility power is abnormal (phase loss or the phase sequence error) or the maintenance cover is open	Check the utility power and the maintenance cover

10. DESCRIPTIONS OF LED INDICATORS AND WARNINGS

No.	Operating conditions	LED Display				Audible alarm	LCD display	Remark
		Normal	Battery	Bypass	Fault			

1. Normal mode

	The utility Power is normal	●				None		
	The Voltage is too High or too Low, the UPS 'works in the battery mode	●	●		★	One beep every 4 seconds	The utility power is Abnormal	

2. Battery mode

	The Battery voltage is normal	●	●		★	One beep every 4 seconds	The utility power is abnormal	
	The Battery voltage is abnormal	●	★		★	One beep every 2 seconds	The battery voltage is too low, take off some load	

3. Bypass mode

	The utility power is normal (Bypass mode)			●	★	One beep every 2 minutes		The alarm will be turned off when the UPS is turned on
	High voltage warning (Bypass mode)				★	One beep every 4 seconds	The utility power is abnormal, and there is no output voltage	
	Low voltage warning (Bypass mode)				★	One beep every 4 seconds	The utility power is abnormal, and there is no output voltage	

4. Warning if the Battery Pack is not connected

	Bypass mode			●	★	One beep every 4 seconds	The UPS is not connected to the battery pack	Check if the battery breaker is on
	Normal mode	●			★	One beep every 4 seconds	The UPS is not connected to the battery pack	Check if the battery breaker is on

5. Warning for phase loss or phase sequence error

	Phase loss (Bypass mode)				★	One beep every 2 seconds	Utility power failure, phase sequence error. No output and the UPS will shut down in 30 seconds	Check the mains input wiring
	Utility power failure (Normal mode)	●	●		★	One beep every 4 seconds	Utility power failure. Fault code : 020309	Check if the sequence of the mains input and the mains input wiring
	Sequence error				★	One beep every 2 seconds	Utility power failure and sequence error. No output and UPS will shut down in 30 seconds	Check the sequence of the mains input

6. Overload protection

	Overload in the utility power mode	●			★	One beep every 2 seconds	Output overload	Remove some non-critical load
	Overload in the utility power mode			●	●	Continuous beep	Fault code : 46	Remove some non-critical load
	Overload in the battery mode	●	●		★	One beep every 2 seconds	Output overload	Remove some non-critical load
	Overload in the battery mode	●	●		●	Continuous beep	Fault code : 46	Remove some non-critical load

7. Warning for overload in the bypass mode

	Warning for overload in the bypass mode			●	★	One beep every 2 seconds	Output overload	Remove some non-critical load

8. No UPS modules

	No UPS modules					None		

If some other conditions that are not mentioned above, please contact the distributor or the service center for assistance.

● - LED indicator is on

★ – LED indicator flashes

11. CONFIGURATION OF THE BATTERY PACK(S)

The minimum number of the battery bank:

According to the requirements of the batteries' specifications, please refer to the following to choose proper battery groups (each group or each string consists of 10 pieces of 12V battery in series) for the Battery Pack(s) in order to maintain longer service life of the batteries and to safely use the batteries for the UPS system as well.

The configuration table of the number of the battery packs:

(the part with no color in the table indicates that the configuration is not allowed)

1. Configuration of 12V24Ah battery

Power	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4kVA						
8kVA						
12kVA						
16kVA						
20kVA						
24kVA						

2.Configuration of 12V38Ah battery

Power	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4kVA						
8kVA						
12kVA						
16kVA						
20kVA						
24kVA						

3. Configuration of 12V65Ah battery

Power	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4kVA						
8kVA						
12kVA						
16kVA						
20kVA						
24kVA						

11. CONFIGURATION OF THE BATTERY PACK(S)

4. Configuration of 12V100Ah battery

Power	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4kVA						
8kVA						
12kVA						
16kVA						
20kVA						
24kVA						

※*Note :*

(1) The information above is for reference only.

(2) There are 10 pieces of 12V battery in series for each group (each string).

(3) Please consult service center and/or the distributor for further details of the configuration of the b battery bank.

11. CONFIGURATION OF THE BATTERY PACK(S)

Typical Backup Time of the Battery configuration for reference

1. w/ configuration of 12V24Ah Battery

	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4 kVA	30 min	1 hr	1.7 hr	2.2 hr	3 hr	4 hr
8 kVA	10 min	30 min	45 min	1 hr	1.3 hr	1.7 hr
12 kVA	--	15 min	30 min	40 min	50 min	1 hr
16 kVA	--	10 min	20 min	30 min	40 min	45 min
20 kVA	--	--	15 min	20 min	30 min	40 min
24 kVA	--	--	10 min	15 min	20 min	30 min

2. w/ configuration of 12V38Ah Battery

	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4 kVA	40 min	1.5 hr	2.5 hr	3.5 hr	4.5 hr	6 hr
8 kVA	10 min	40 min	1.2 hr	1.5 hr	2 hr	2.5 hr
12 kVA	--	17 min	40 min	1 hr	1.2 hr	1.5 hr
16 kVA	--	10 min	30 min	40 min	1 hr	1.2 hr
20 kVA	--	--	15 min	30 min	40 min	1 hr
24 kVA	--	--	10 min	17 min	30 min	40 min

3. w/ configuration of 12V65Ah Battery

	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4 kVA	1.5 hr	3.5 hr	5.5 hr	7 hr	9 hr	11 hr
8 kVA	30 min	1.5 hr	2.5 hr	3.5 hr	4.5 hr	5.5 hr
12 kVA	20 min	50 min	1.5 hr	2 hr	2.5 hr	3 hr
16 kVA	10 min	30 min	1.2 hr	1.5 hr	2 hr	2.5 hr
20 kVA	--	25 min	50 min	1.2 hr	1.5 hr	2 hr
24 kVA	--	20 min	30 min	50 min	1.2 hr	1.5 hr

4. w/ configuration of 12V100Ah Battery

	1 string	2 strings	3 strings	4 strings	5 strings	6 strings
4 kVA	2.5 hr	5.5 hr	9 hr	12 hr	15 hr	18 hr
8 kVA	1 hr	2.5 hr	4 hr	5.5 hr	7 hr	9 hr
12 kVA	30 min	1.5 hr	2.5 hr	3.5 hr	4.5 hr	5.5 hr
16 kVA	20 min	1 hr	2 hr	2.5 hr	3 hr	4 hr
20 kVA	10 min	40 min	1.5 hr	2 hr	2.5 hr	3 hr
24 kVA	--	30 min	1 hr	1.5 hr	2 hr	2.5 hr

11. CONFIGURATION OF THE BATTERY PACK(S)

* "--" means not applicable

* The backup time mentioned above for reference only may vary from actual load, operating temperature, etc.