User Manual

Online UPS

60K-300K

Uninterruptible Power Supply System

Version: 1.7

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1. Safety

1.1 Important Safety Instructions

This UPS contains LETHAL VOLTAGES. All repairs and service must be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER SERVICEABLE PARTS inside the UPS.

WARNING:

- The UPS designed for commercial and industrial purpose, it is forbidden to apply for any life sustainment and support.
- The UPS system contains its own energy source. The output terminals may carry live voltage even when UPS is disconnected to an AC source.
- To reduce the risk of fire or electrical shock, UPS installation has to be in a controlled room where temperature and humidity are monitored. Ambient temperature must not exceed 40°C. The system is only for indoor use.
- Ensure all power is disconnected before installation or service.
- Service and maintenance should be performed by qualified personnel only.

Before working on this circuit

- Isolate Uninterruptible Power System (UPS)
- Then check for Hazardous Voltage between all terminals including the protective earth.

**Risk of Voltage Backfeed**

The isolation device must be able to carry the UPS input current.

1.2 EMC

WARNING: This is a product for commercial and industrial application in the second environment - installation restrictions or additional measures may be needed to prevent disturbances.

1.3 Installation information

WARNING:

- Installation must be performed by qualified personnel only.
- The cabinets must be installed on a level floor suitable for computer or electronic equipment.
- The UPS cabinet is heavy. If unloading instructions are not closely followed, cabinet may cause serious injury.
- Do not tilt the cabinets more than 10 degree.
- Before applying electrical power to the UPS, make sure the Ground conductor is properly installed according to the instructions.
- Installation and Wiring must be performed in accordance with the local electrical laws and regulations.
- The disconnection device should be chosen based on the input current and should break line and neutral conductors - four poles for three phases.

Power rating(Model)	60	80-A	80	100	120	150-A	160-A	160	180	200	240	300
Current (A)	125	160	200	250	250	315	315	400	400	400	630	630

- The short-circuit capacity of the upstream protective devices must be equal to or larger than the capacity of the UPS's input protective devices.
- The battery disconnection device should be chosen based on the DC input current and should break Battery +, Battery - and neutral conductors - three poles for three phases.

Model	60	80-A	80	100	120	150-A	160-A	160	180	200	240	300
Current (A)	200	275	275	350	400	550	550	550	600	700	800	1000

1.4 Maintenance

WARNING:

- Only qualified service personnel should perform the battery installation.
- The following PRECAUTIONS should be observed
  (1.) Remove watches, rings, or other metal objects.
  (2.) Use tools with insulated handles.
  (3.) Wear rubber gloves and boots.
  (4.) Do not lay tools or metal parts on top of batteries or battery cabinets.
  (5.) Disconnect the charging source prior to connecting or disconnecting terminal.
  (6.) Check if the battery is inadvertently grounded. If it is, remove the source of grounding. Contacting with any part of the ground might result in electrical shock. The likelihood of such shock can be prevented if such grounds are removed during installation and maintenance.
- UPS is designed to supply power even when disconnected from the utility power. After disconnect the utility and DC power, authorized service personnel should attempt internal access to the UPS.
- Do not disconnect the batteries while the UPS is in Battery mode.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- Batteries can result in a risk of electrical shock or burn from high short circuit current.
- When replacing batteries, use the same number of sealed, lead-acid batteries.
- Do not open or mutilate the battery. Release electrolyte is harmful to the skin and eyes, and may be toxic.

1.5 Recycling the used battery

WARNING:

- Do not dispose of the battery in a fire. Battery may explode. Proper disposal of battery is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed properly. For more information, contact your local recycling/reuse or hazardous waste center.
- Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

CAUTION：

RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTION.

2. Installation

2.1 Initial Inspection

1. Visually examine if there is any damage inside and outside of packages in the process of the transportation. If any damage, report it to the carrier immediately.
2. Verify the product label and confirm the consistency of the equipment.
3. If the equipment needs to be returned, carefully repack the equipment by using the originally packing material that came with.

2.2 Installation Environment

1. The UPS is designed for indoor use only and should be located in a clean environment with adequate ventilation to keep the environmental parameters within the required specification.
2. Make sure that transportation routes (e.g. corridor, door gate, elevator, etc.) and installation area can accommodate and bear the weight of the UPS, the external battery cabinet and handling equipment.
3. The UPS uses forced convection cooling by internal fans. Cooling air enters the module through ventilation grills located at the front of the cabinet and exhausted through grills located in the rear part of the cabinet. Please do not block the ventilation holes.
4. Ensure that the installation area is spacious for maintenance and ventilation.
5. Keep the temperature of installation area below 40°C and humidity within 90%. The highest operating altitude is 1000 meters above sea level.
6. If necessary, install a system of room extractor fans to avoid formation of room temperature. Air filters are necessary if the UPS is operated in a dusty environment.
7. It is recommended that you parallel the external battery cabinets to the UPS. The following instructions of clearances are suggested:
   - Keep a clearance of 100cm from the top of the UPS for maintenance, wiring and ventilation.
   - Keep a clearance of 100cm from the back of the UPS and the external battery cabinets for ventilation.
   - Keep a clearance of 150cm from the front of the UPS and the external battery cabinets for maintenance and ventilation.
8. For safety concerns, we suggest that you shall:
   - Equip with CO2 or dry powder fire extinguishers near the installation area.
   - Install the UPS in an area where the walls, floors and ceilings were constructed by fireproof materials.
9. Do not allow unauthorized personnel to enter the installation area. Assign specific personnel to keep the UPS key.

2.3 Unpacking

1. Use a forklift to move the product to installed area. Refer to Figure 2-1. Please make sure the bearing capacity of forklift is sufficient.
2. Please follow the orders in Figure 2-2 to remove carton and foams.

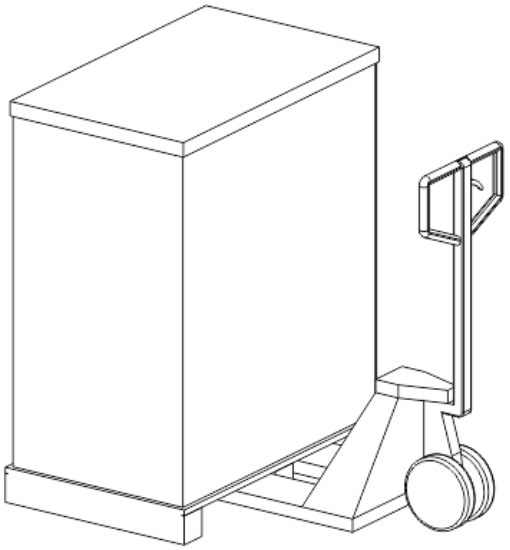


Figure 2-1

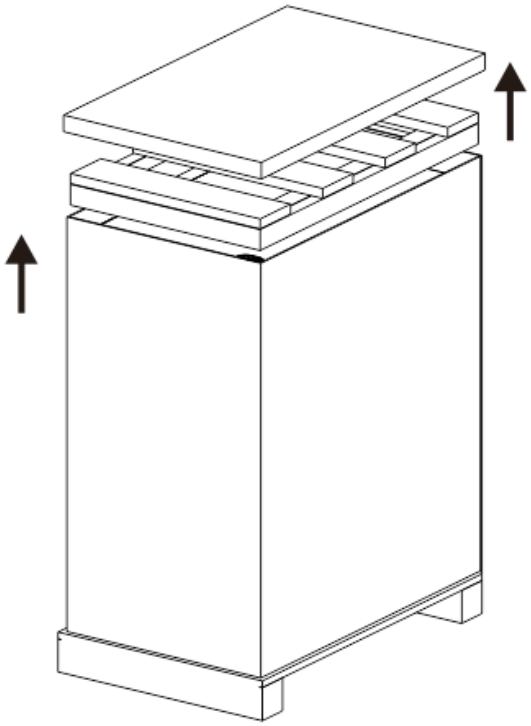


Figure 2-2

3. Put a ramp in the front of the cabinet. Refer to Figure 2-3.

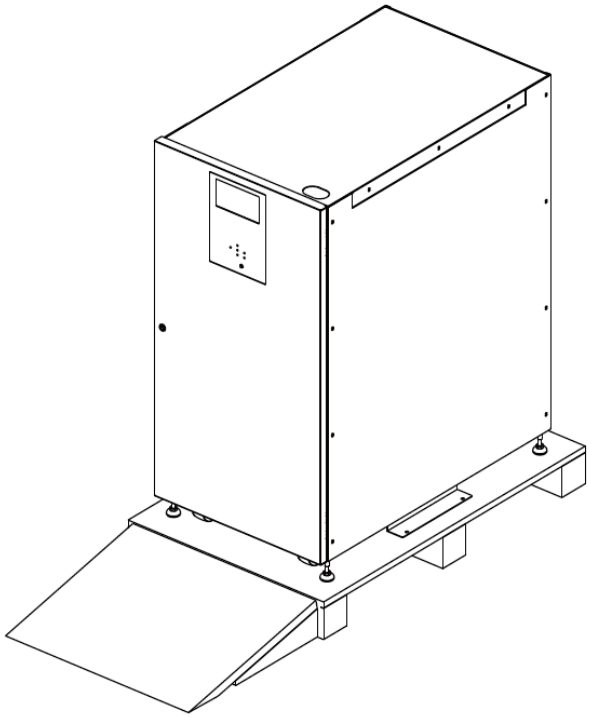


Figure 2-3

4. Remove 2 fixing cabinet plates and loosen leveling feet by rotating them counterclockwise. Then, move the cabinet from the pallet. Refer to Figure 2-4.
5. To fix the cabinet in position, simply rotate leveling feet clockwise and fix cabinet plates .Refer to Figure 2-5.

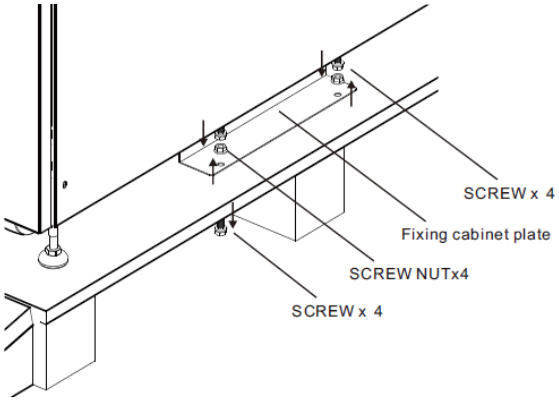


Figure 2-4

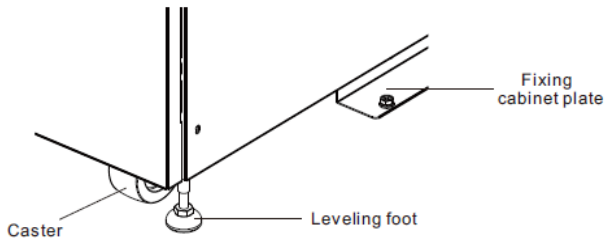


Figure 2-5

2.4 Moving the Cabinet

⚠ Warning
The UPS is fixed on the pallet with 2 fixing cabinet plates. When removing it, pay attention to the movement of the casters to avoid accidents. The cabinet can be pushed forward or backward only. Pushing it sideward is not allowed. When pushing the cabinet, pay attention not to overturn it as the gravity center is high.

1. If you need to move the UPS over a long distance, please use appropriate equipment like a forklift. Do not use the UPS casters to move over a long distance.
2. After the UPS has been removed from the pallet to ground, we suggest that at least three people move the UPS to the installation area. One person holds a lateral side of the UPS with hands, another holds the other lateral side of the UPS with hands, and the other person pushes the UPS either from the front side or from the back side to the installation area and avoid tipping the UPS.
3. The casters are designed to move on level ground. Do not move the UPS on an uneven surface. This might cause damage to the casters. Toppling the UPS could also damage the unit.
4. Ensure that the weight of UPS is within the designated bearing capacity of any handling equipment.
5. At the bottom of the UPS, the four casters help you to move the UPS to a designated area. Before you move the UPS, please turn the four leveling feet counterclockwise to raise them off the ground. This protects the leveling feet from damage when moving the UPS.
6. Fix the cabinet firmly to the ground with screwing the fixing cabinet plate. Refer to Figure 2-6.

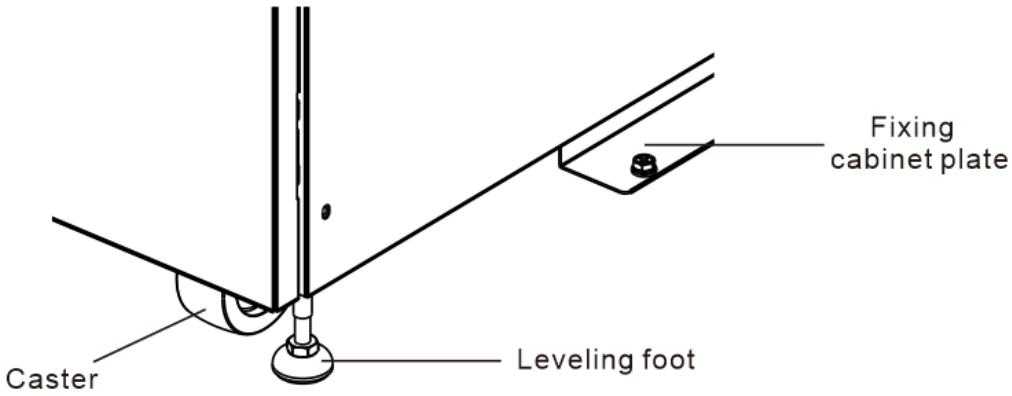
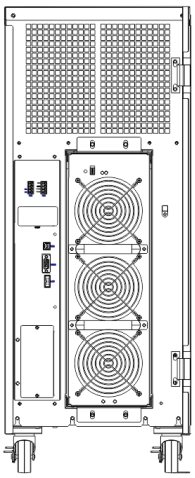
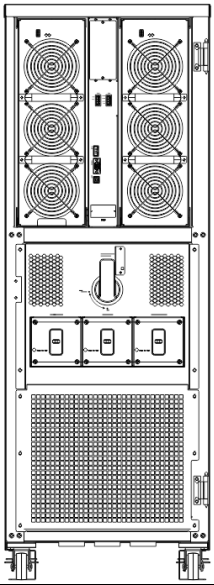
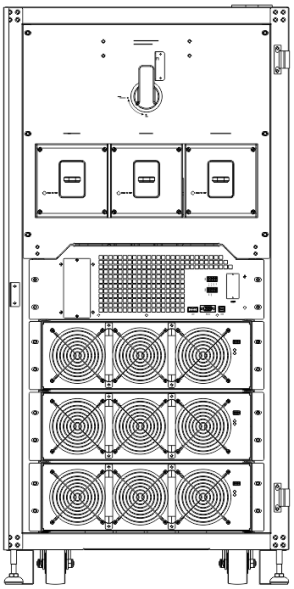
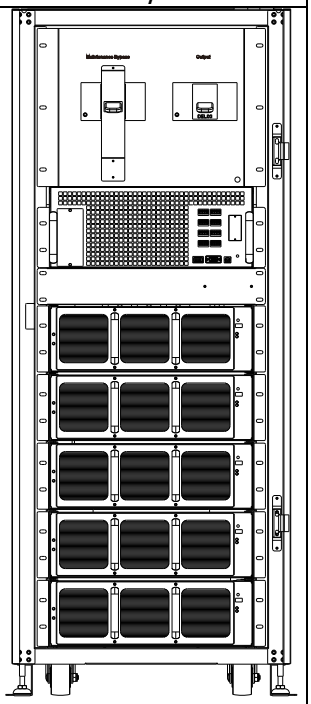


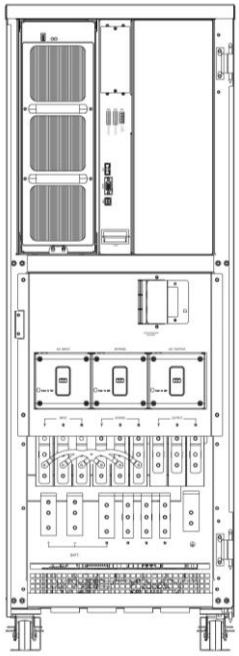
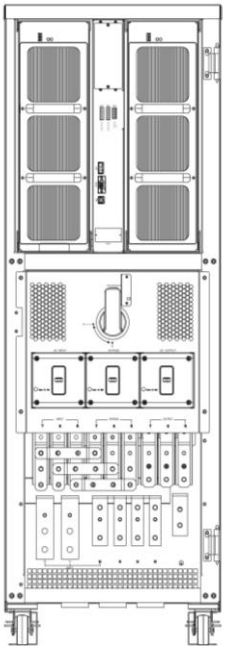
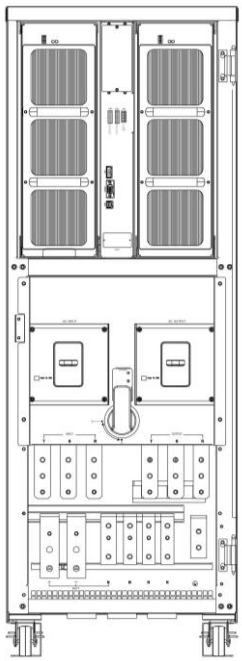
Figure 2-6

2.5 Types of UPS Cabinet

The cabinets don't have the battery module compartments. The battery has to be connected externally.

Please consider the external battery space and wiring gauge for installation.

Model	60K	80K/100K/120K	180K/200K	240K/300K
Photo				
Dimension D x W x H(mm)	1000x320x800	1000x430x1200	1000x600x1200	1100x600x1475
Switch Unit	4	4	4	2
Max Power	60kVA	120kVA	200kVA	300kVA
Slot	1	2	3	5

Model	80-A	150-A	160-A
Photo			
Dimension D x W x H(mm)	1000x430x1200	1000x430x1200	1000x430x1200
Switch Unit	4	4	3
Max Power	80kVA	150kVA	160kVA
Slot	1	2	2

Note: The models with "-A" are represented as 80k module cabinet. The connector of 80k module are different from other modules and cannot be used interchangeably.

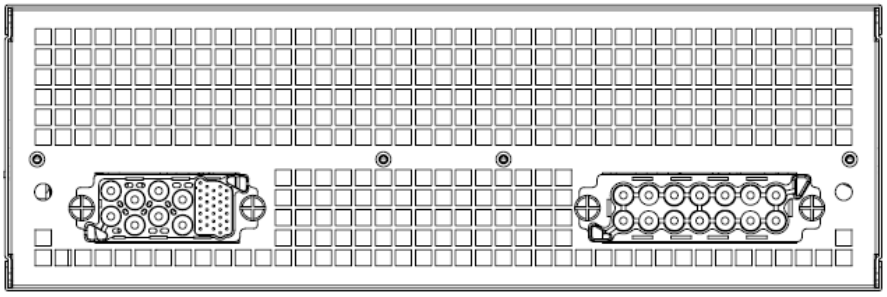


Figure 2-6.1 Connector of "-A" series

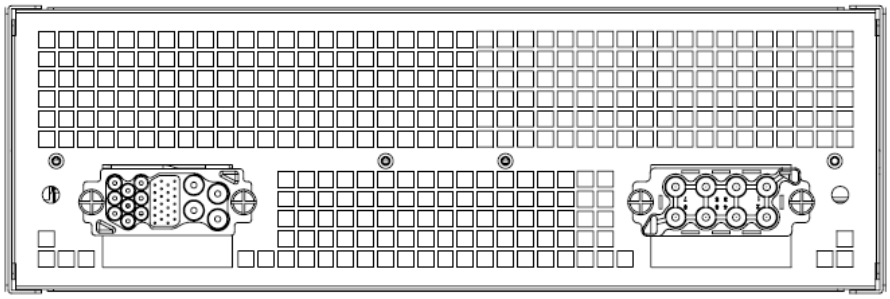
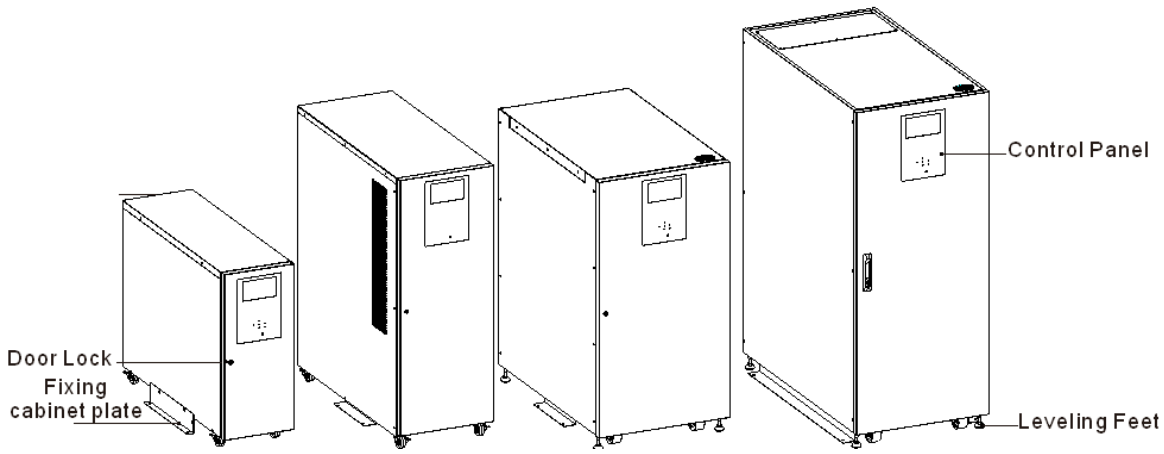


Figure 2-6.2 Connector of other models

2.6 Exterior

In the front of the UPS, there are control interface (LCD Panel) and door lock.
The side panels are lockable. The casters at the bottom of the UPS cabinet can be used to move over short distances. There are four leveling feet to fix and stabilize the UPS cabinet on the ground. Refer to Figure 2-7.
Inside the cabinet, there are Breakers, STS and Power Module slots. For 100K/120K/80-A/150-A/160-A, wiring terminal blocks are located in the front of cabinet. For 60K/180K/200K/240K/300K, wiring terminal block are located in the back of cabinet.

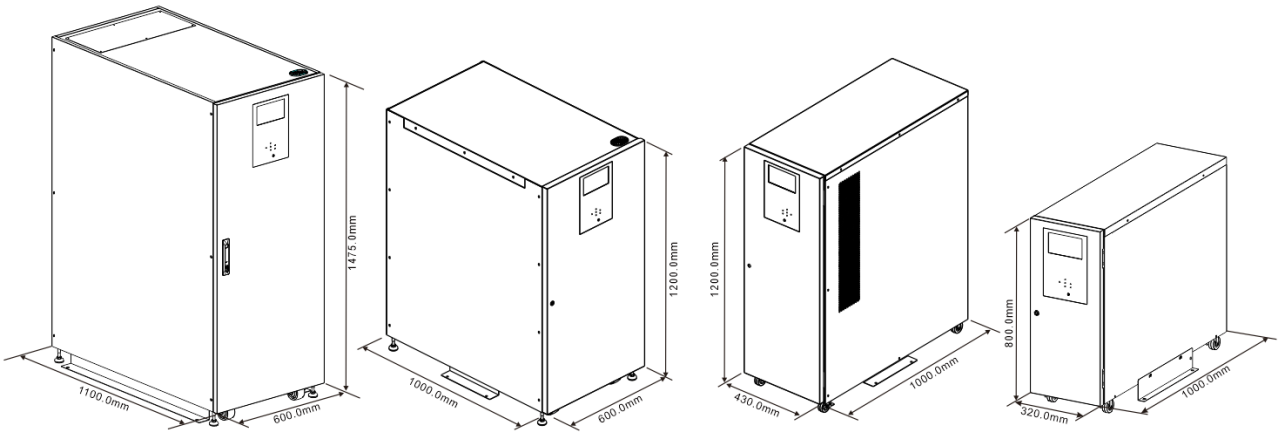


60K 80K/100K/120K 80-A/150-A/160-A 180K/200K 240K/300K

Figure 2-7 Exterior

2.6.1 Mechanical Data

Dimensions			
UPS MODEL	Width	Depth	Height
60K	320mm	1000mm	800mm
80K	430mm	1000mm	1200mm
100K	430mm	1000mm	1200mm
120K	430mm	1000mm	1200mm
80-A	430mm	1000mm	1200mm
150-A	430mm	1000mm	1200mm
160-A	430mm	1000mm	1200mm
180K	600mm	1000mm	1200mm
200K	600mm	1000mm	1200mm
240K	600mm	1100mm	1475mm
300K	600mm	1100mm	1475mm



240K/300K 180K/200K 80K/100K/120K 80-A/150-A/160-A 60K

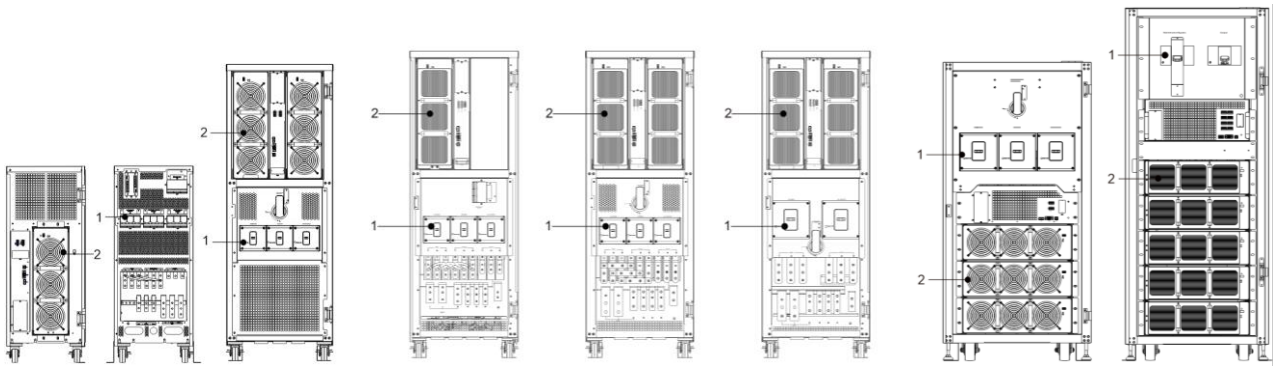
Figure 2-8 Dimensions

2.6.2 Front View

For 240K/300K models, unlock and open the front door and you will see the Maintenance Breaker, Output Breaker, and Power Module slots.

For 80K/100K/120K/180K/200K/80-A/150-A/160-A models, unlock and open the front door and you will see the AC Input Breaker, Bypass Breaker, Maintenance Breaker, Output Breaker, and Power Module slots.

For 60K model, AC Input Breaker, Bypass Breaker, Maintenance Breaker and Output Breaker are located on the back panel.



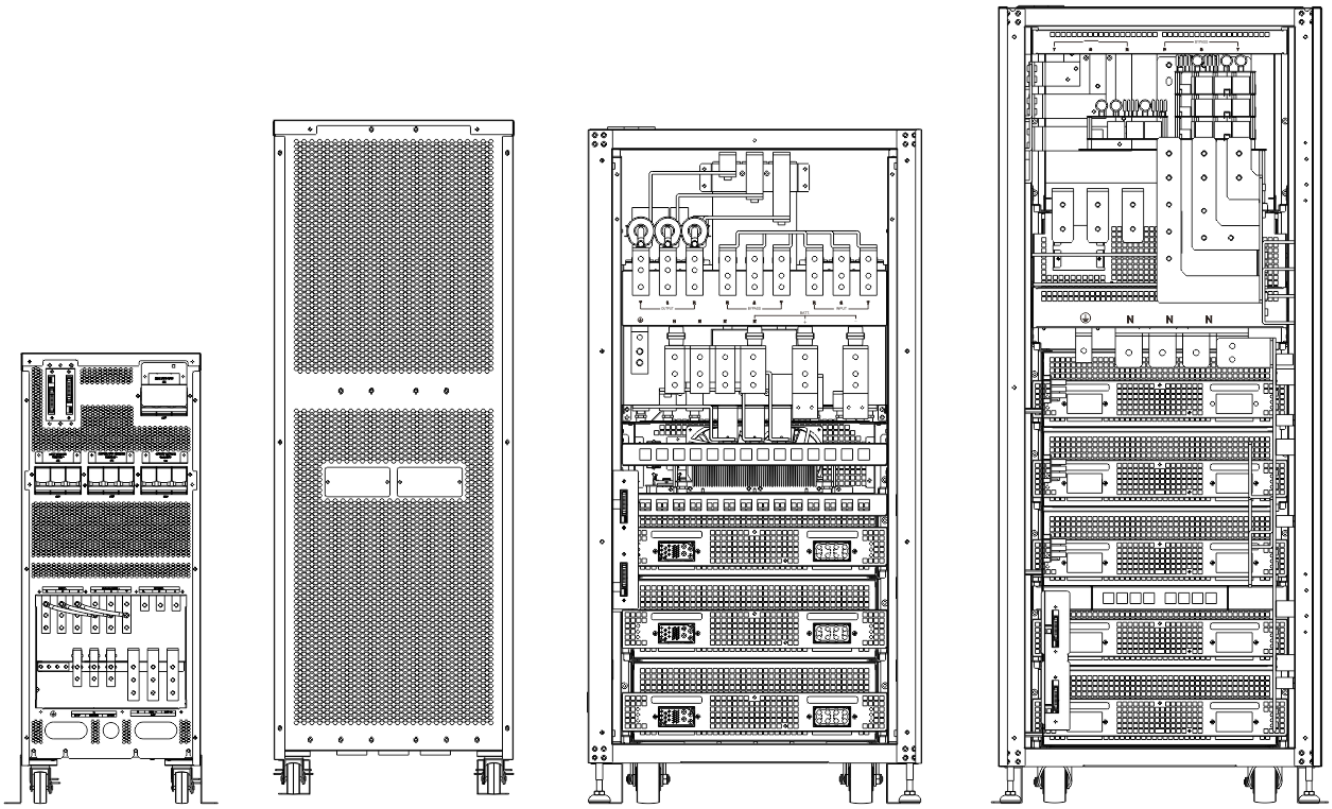
60K 80K/100K/120K 80-A 150-A 160-A 180K/200K 240K/300K

Figure 2-9 Front View

1. Switch Unit 2. Power Module

2.6.3 Rear View

Open the rear panel and you will see the bus bars of the UPS. Only the 80K/100k/120K/80-A/150-A/160-A models cannot open the back panel door.



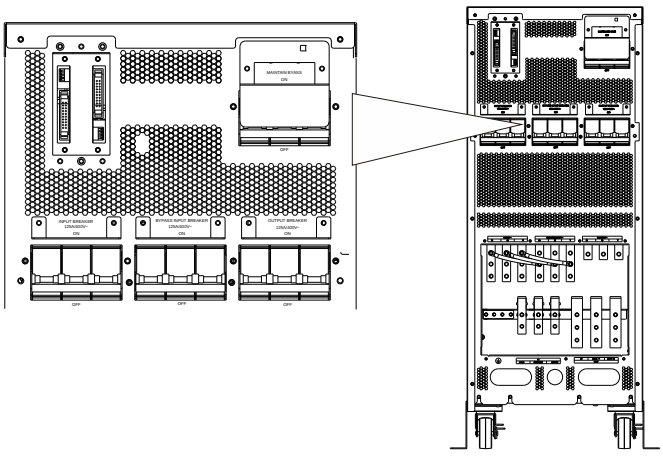
60K | 80K/100K/120K/ 80-A/150-A/160-A | 180K/200K | 240K/300K

Figure 2-10 Rear View

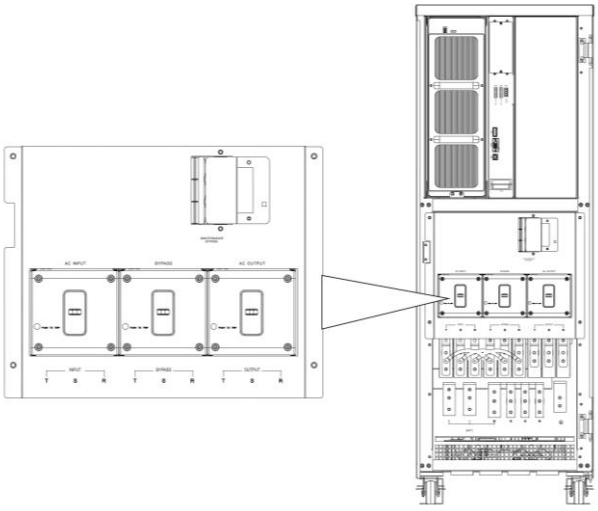
2.7 Internal Mechanisms

2.7.1 Breakers

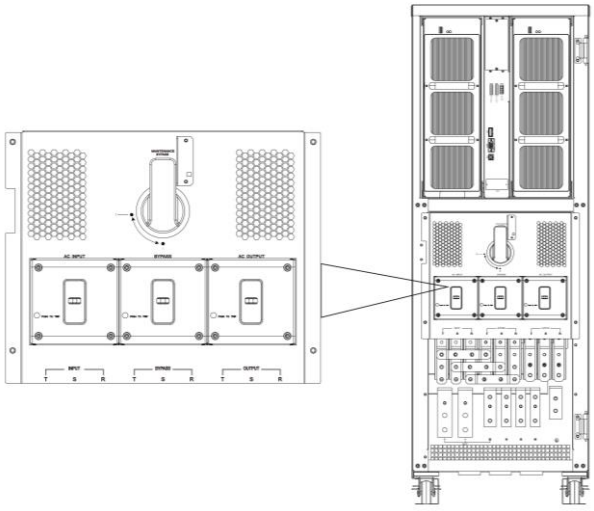
After opening the front door, there are four breakers, AC Input Breaker, Bypass Breaker, Maintenance Breaker and Output Breaker.



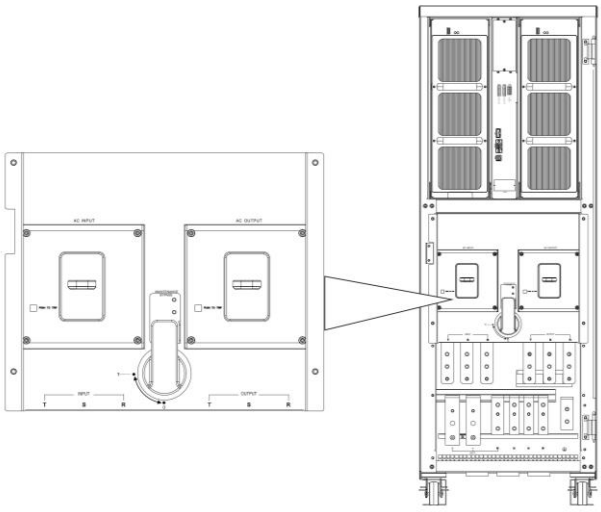
60K



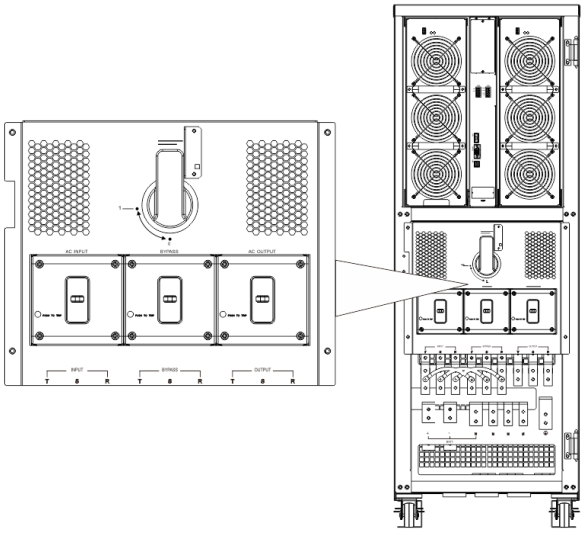
80-A



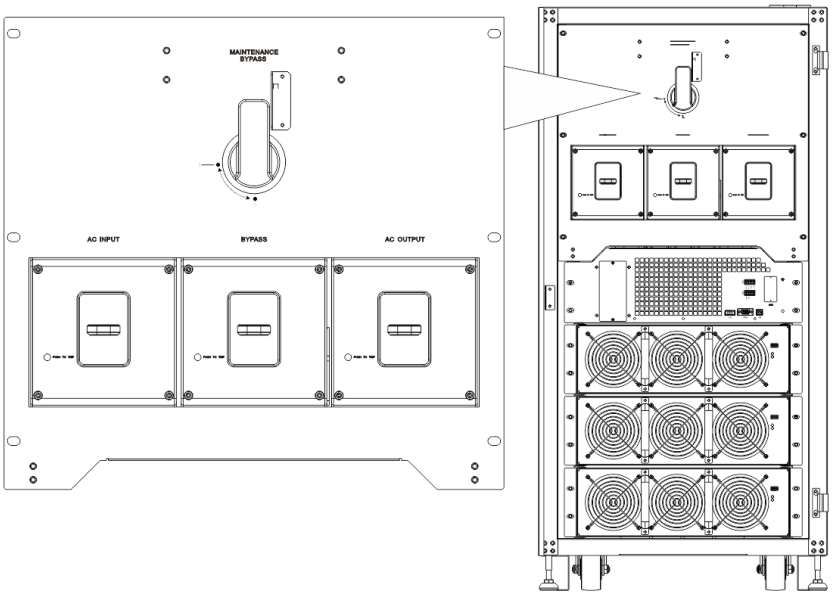
150-A



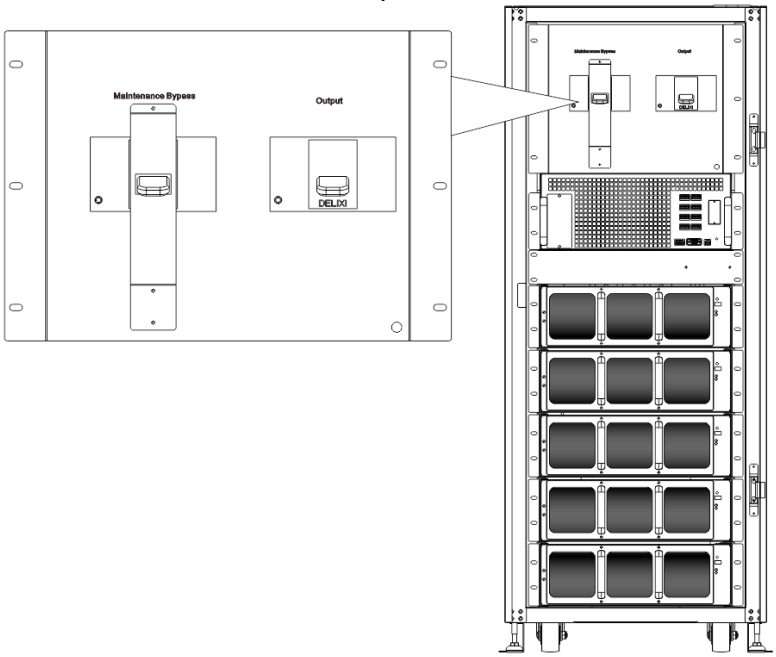
160-A



80K/100K/120K



180K/200K



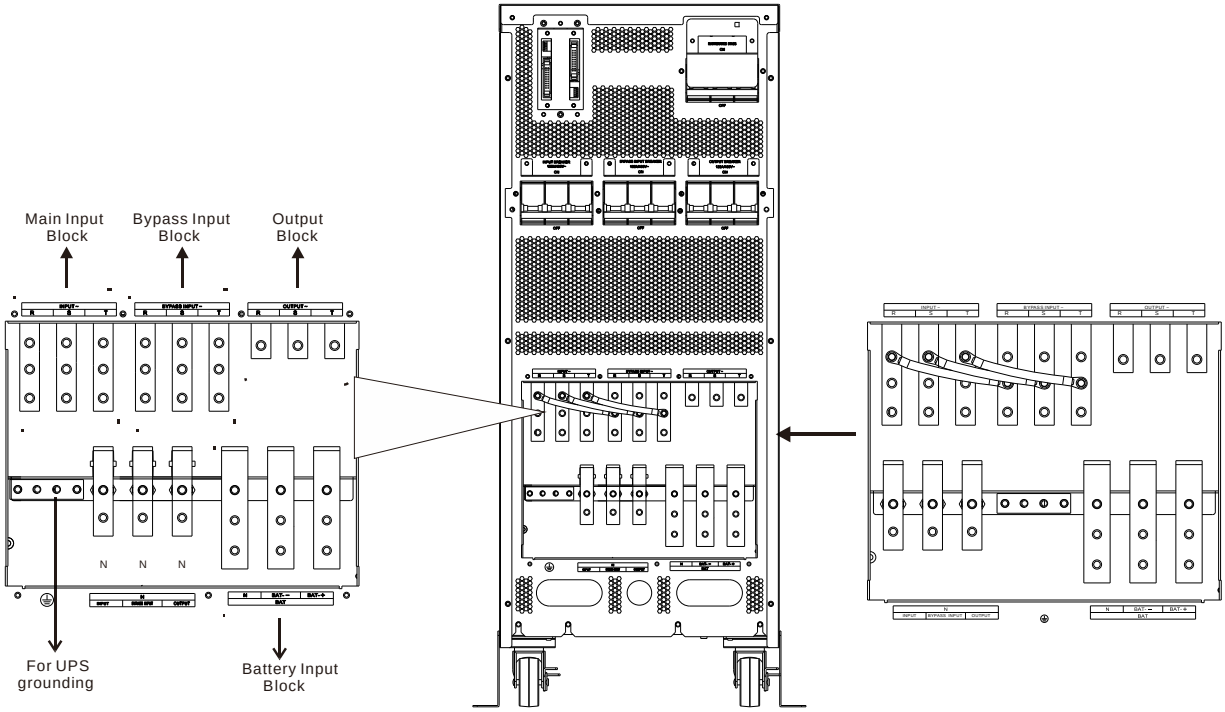
240K/300K

Figure 2-11 Switch (front view)

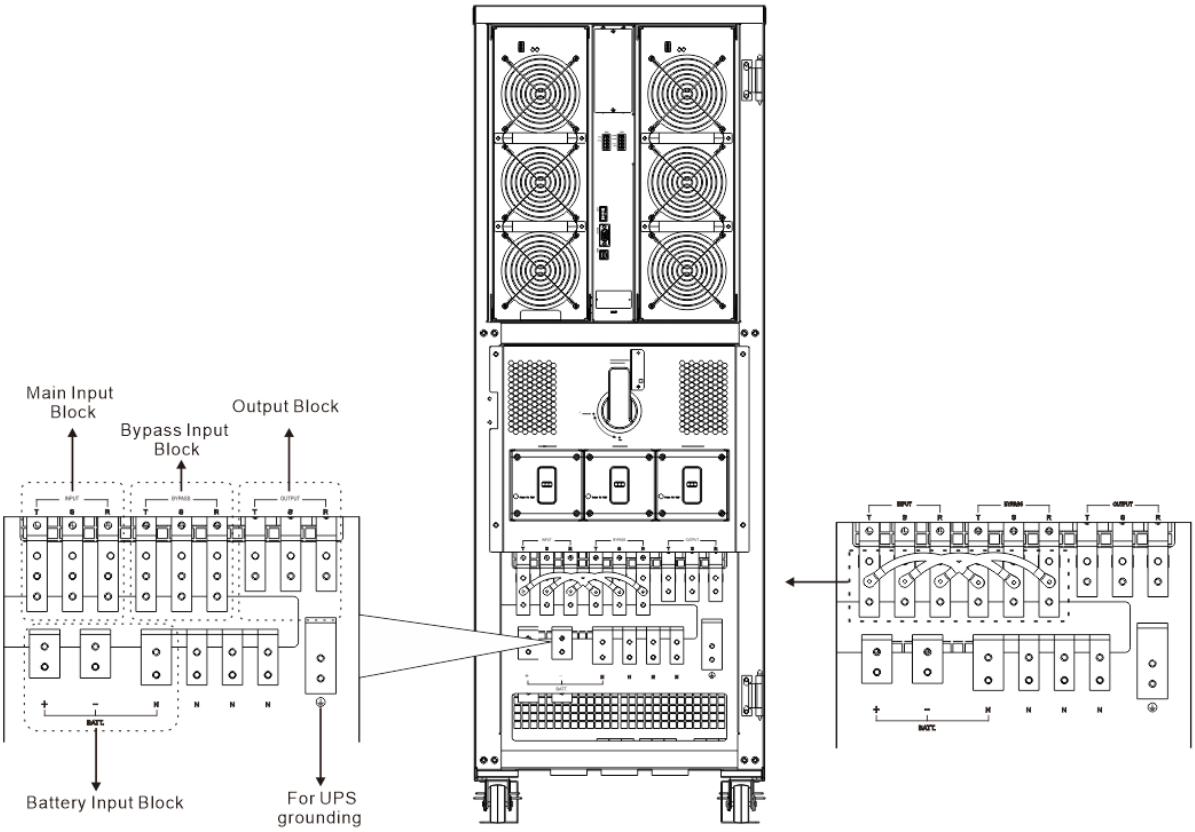
2.7.2 Wiring Terminal Blocks

. For UPS cabinet wiring, please refer to Figure 2-13.

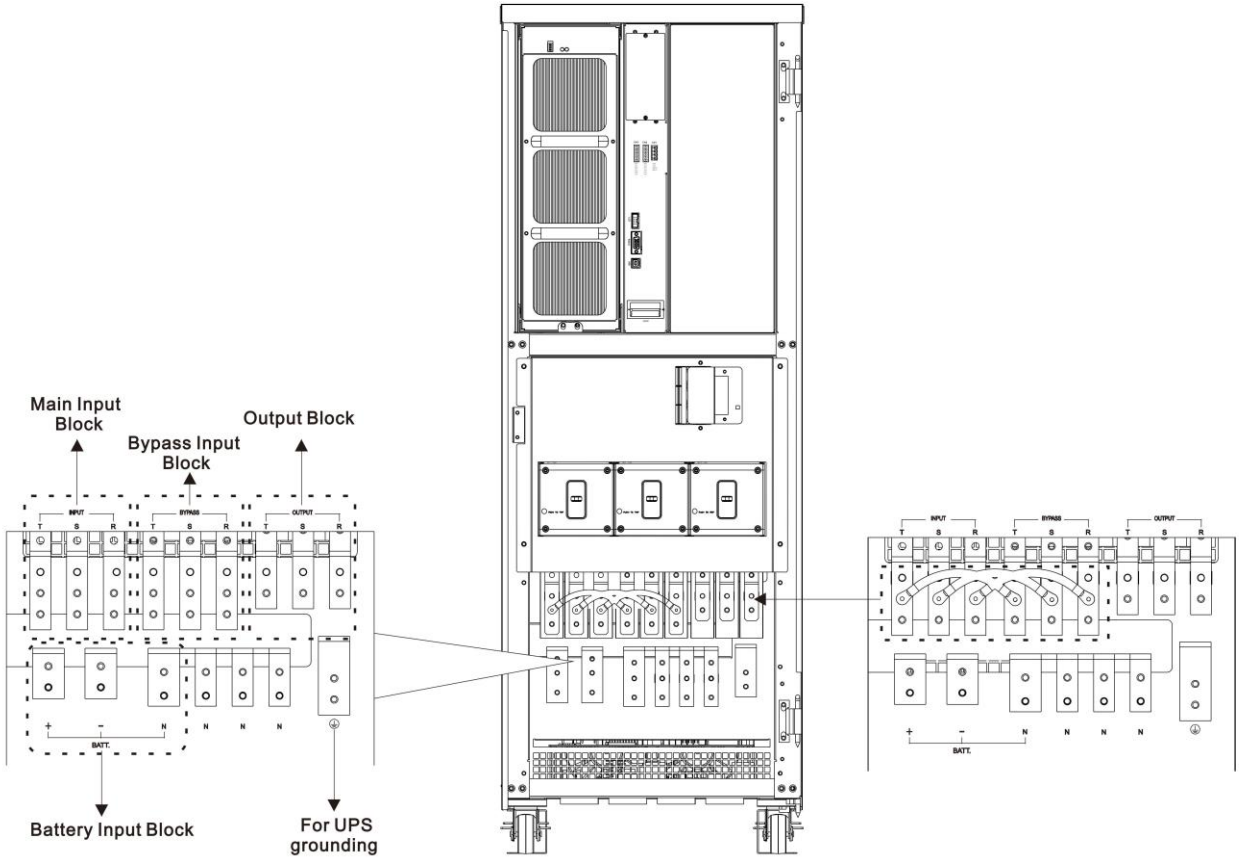
No.	Item	Function	Description
①	Output Block	Connects the critical loads	Includes R, S, T and Neutral terminals.
②	Bypass Input Block	Connects bypass AC source	Includes R, S, T and Neutral terminals.
③	Main Input Block	Connects main AC source	Includes R, S, T and Neutral terminals.
④	For UPS Grounding	For UPS grounding	Includes one grounding terminal.
⑤	Battery Input Block	Connects an external battery cabinet	Includes Positive (+), Negative (-) and Neutral (N) terminals.



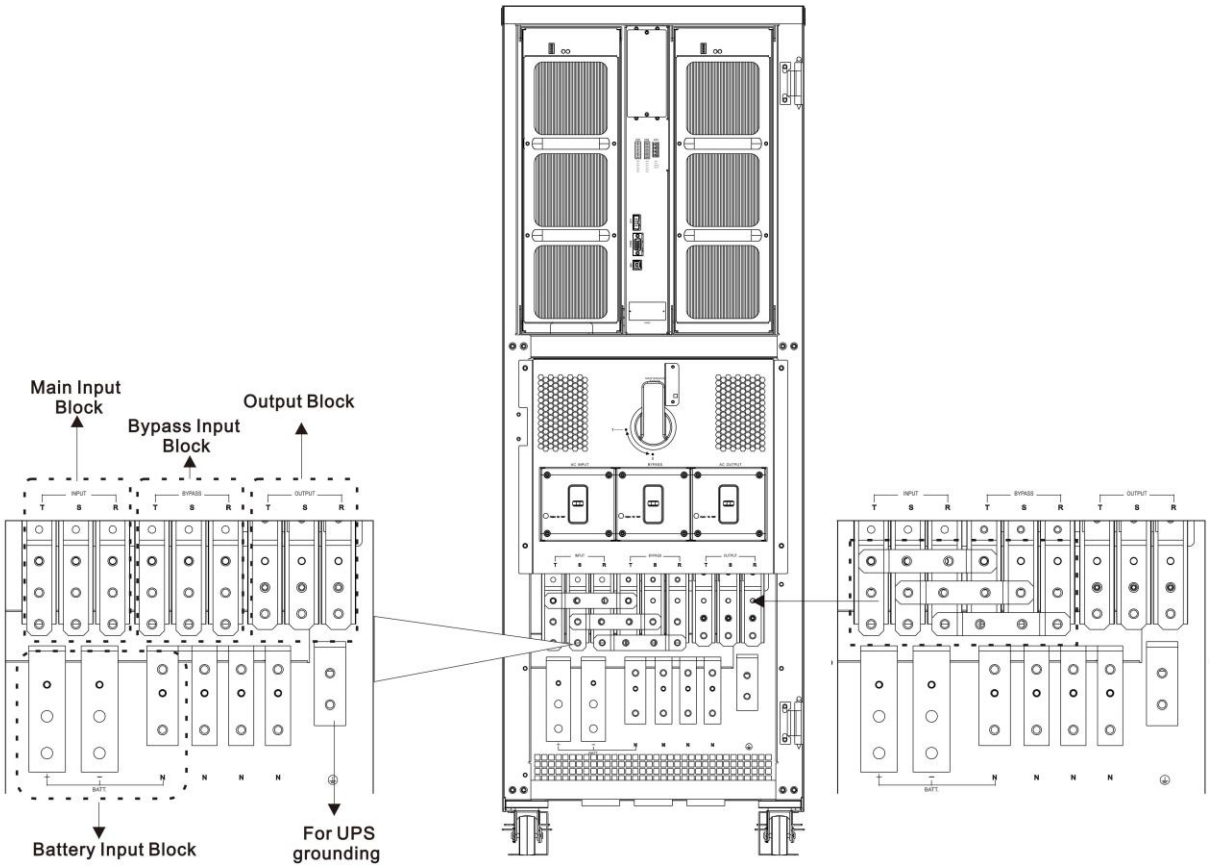
60K



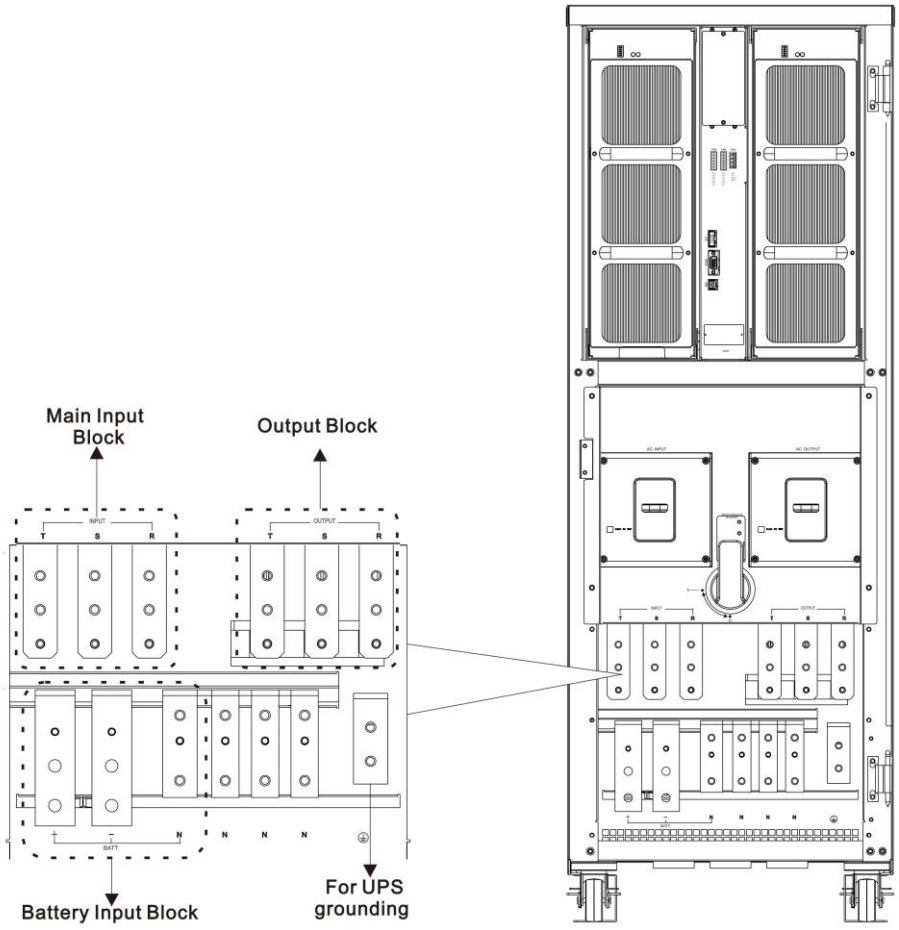
80K/100K/120K



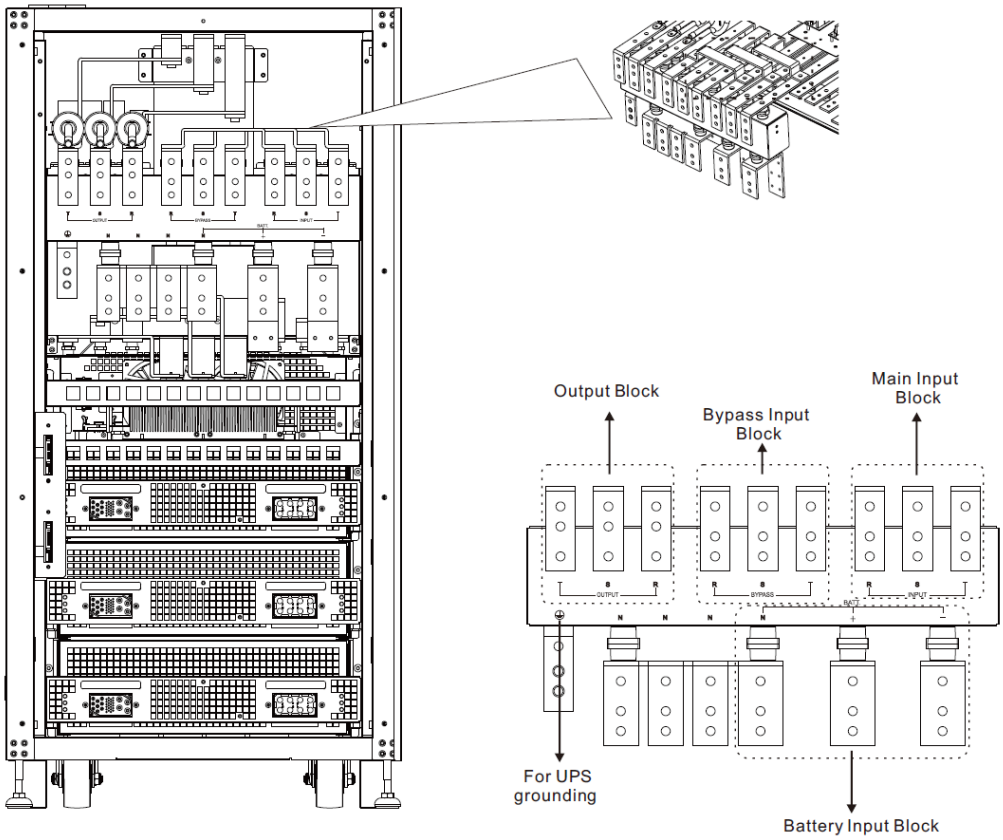
80-A


Main Input Block
Bypass Input Block
Output Block
Battery Input Block
For UPS grounding

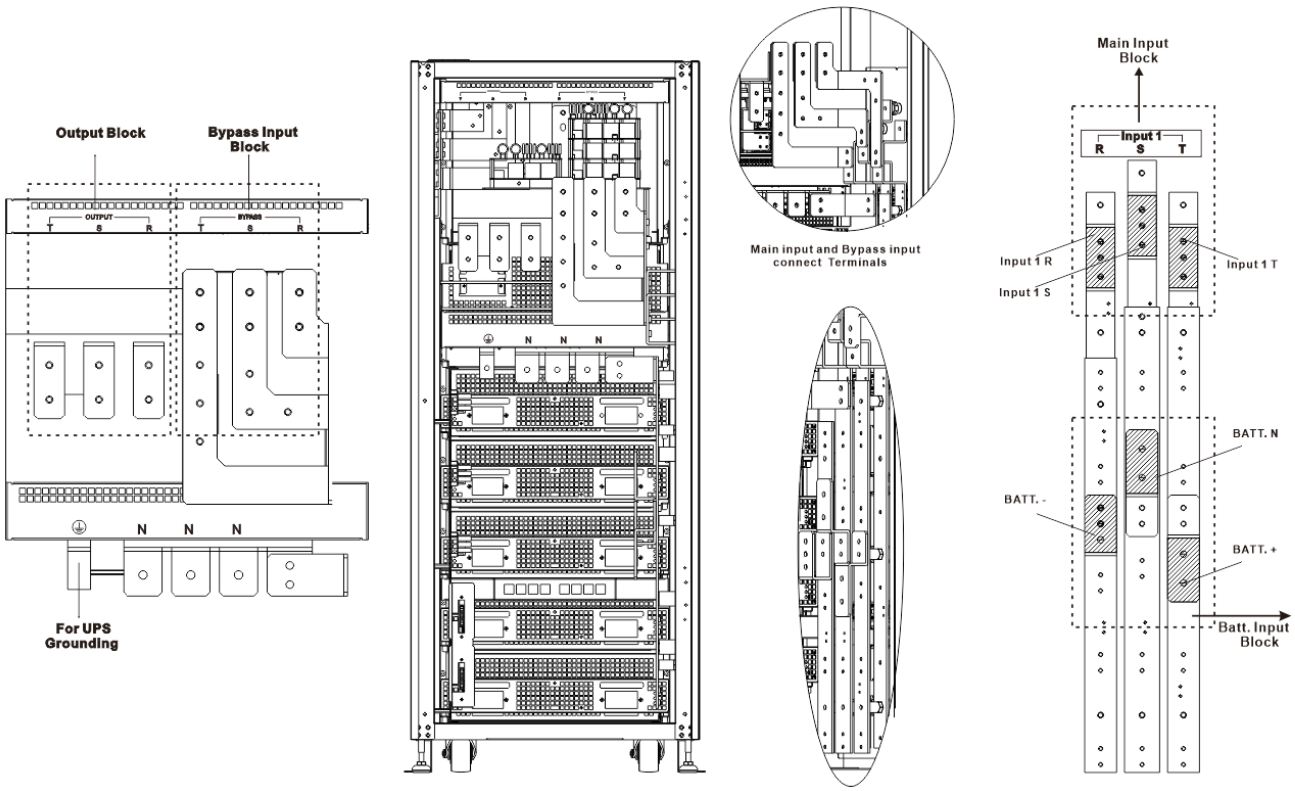
150-A


Main Input Block
Output Block
Battery Input Block
For UPS grounding

160-A



180K/200K



240K/300K

Figure 2-13 Terminal Blocks

2.8 Control Panel

2.8.1 LCD Display

Through the touch LCD display, the user can easily understand the operation mode of UPS. In addition, the measurement, parameters, versions of firmware and warnings can be browsed in the friendly interface. For detailed information, please refer to Chapter 4.

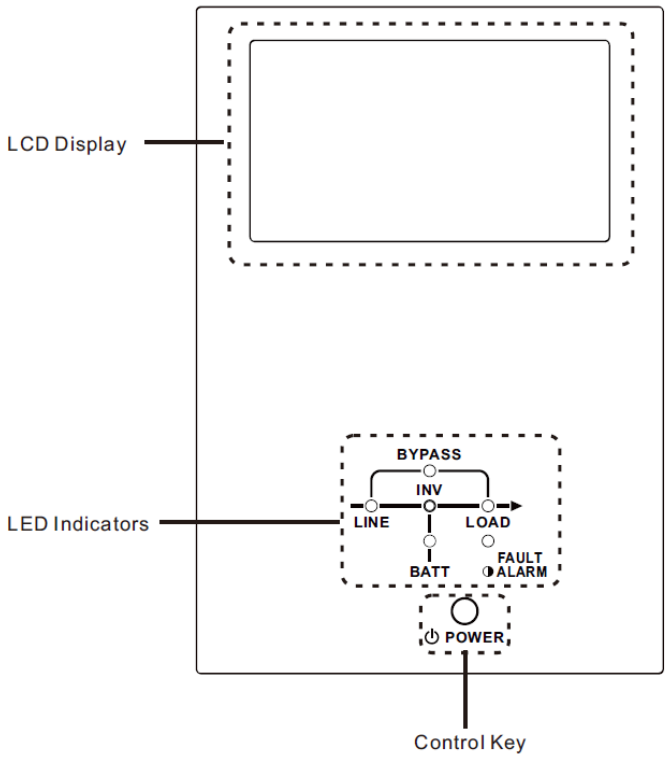


Figure 2-14 Control Panel

2.8.2 LED Indicators

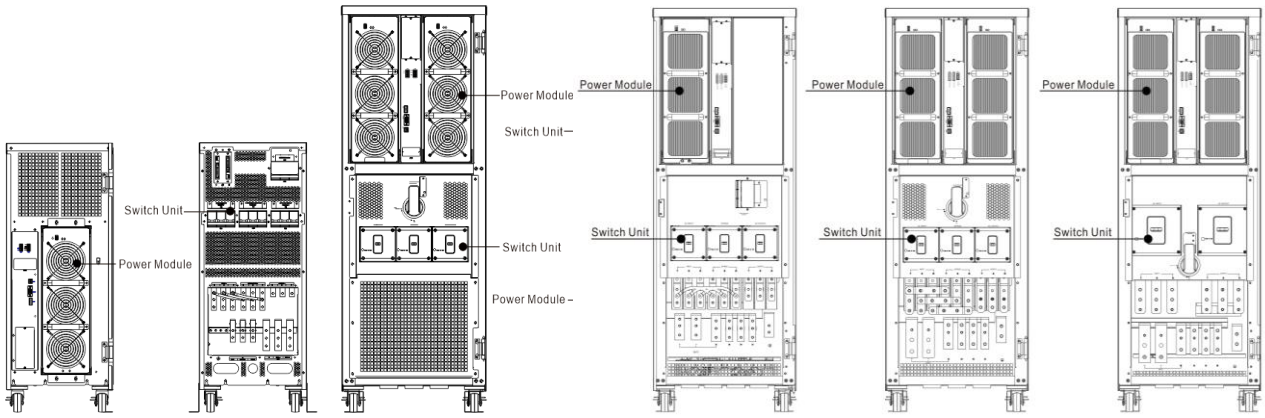
LED	Color	Status	Definition
LINE	Green	On	Input source is normal.
		Flashing	Input source is abnormal.
		Off	No input source
BYPASS	Yellow	On	Load on Bypass.
		Flashing	Input source is abnormal.
		Off	Bypass circuit is not operating.
LOAD	Green	On	There is power output for the load.
		Off	There is no power output for the load.
INV	Green	On	Load on inverters.
		Off	Inverter circuit is not operating.
BATTERY	Red	On	Output power from Battery.
		Flashing	Low battery
		Off	Battery converter is normal and battery is charged.
FAULT/ ALARM	Red	On	UPS fault.
		Flashing	UPS alarm.
		Off	Normal.

2.8.3 Control Key

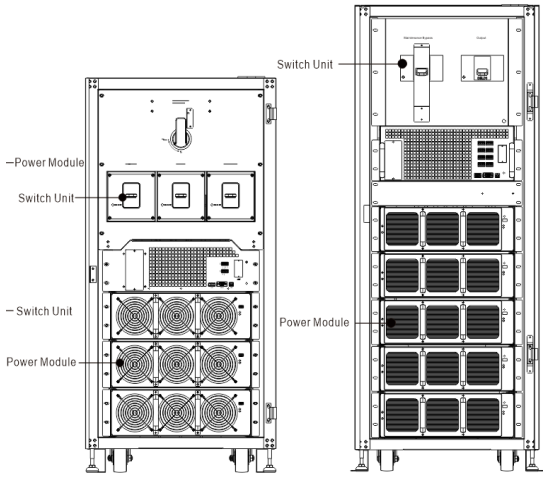
Turn on or turn off the UPS.

2.9 Introduction of Modules

The design of Power Module make maintenance and replacement quickly and easily. The modular and hot-swappable design of Power Module makes it a highly cost-effective solution to meet your power requirement.



60K 80K/100K/120K 80-A 150-A 160-A



180K/200K 240K/300K

Figure 2-15 Front View

2.9.1 communication interfaces

For detailed information, please refer to Chapter 5.

No.	Item	Description
①	SNMP Slot	This slot can work with an optional card such as SNMP, AS400 or Modbus card.
②	LCD Port	This port connects to Control Panel with an installed cable from factory.
③	RS232 port	Local communication interface.
④	USB port	Local communication interface.
⑤	Dry contact ports	For detailed information, please refer to Chapter 5.
⑥	Extra Comm. Slot (Optional)	This slot can insert an optional card, Extra Comm. Card. This card can enhance the communication capability of UPS system and provide another SNMP slot and some dry contact ports.

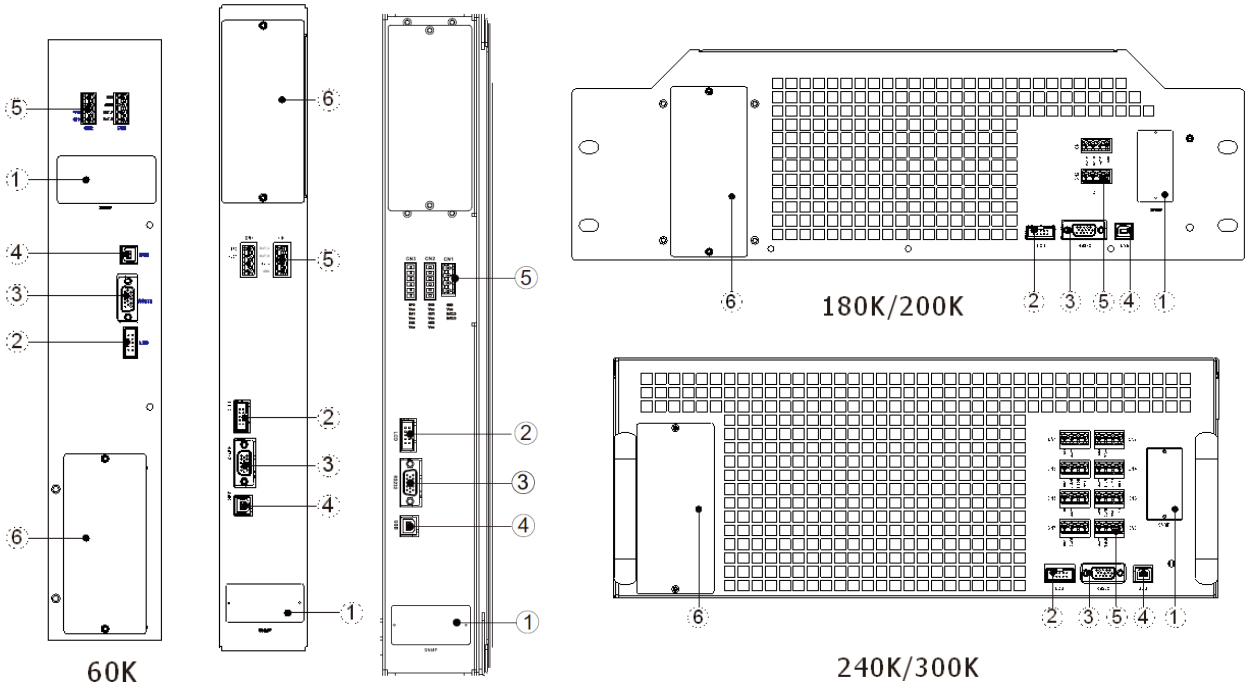


Figure 2-16 Communication interface

2.9.2 Power Module

Each Power Module includes a power factor correction rectifier, a battery charger, an inverter and control circuit.

No.	Item	Description	
①	Battery Start Button	When AC input is not existing, use this button to start battery power for UPS.	
②	DIP Switches	There are four DIP switches for Power Module address setting. In the same cabinet, each Power Module ID MUST be exclusive. The setting method is shown in **Table 2-1**.	
③	RUN LED	ON	The Power Module normally works as a slave module.
		ON/OFF 0.5 sec	The Power Module normally works as a master module.
		ON/OFF 0.15 sec	CAN Bus communication failure.
④	FAULT LED	ON	The Power Module is in fault condition or the Ready Switch is unlocked.
		ON/OFF 0.5 sec	The Power Module IDs conflict.
		ON/OFF 0.15 sec	The STS Module is not found.
⑤	Fan	The Power Module uses forced convection cooling by these fans. Cooling air enters the module through ventilation grills and exhausted through grills located in the rear of the module. Please do not block the ventilation area.	

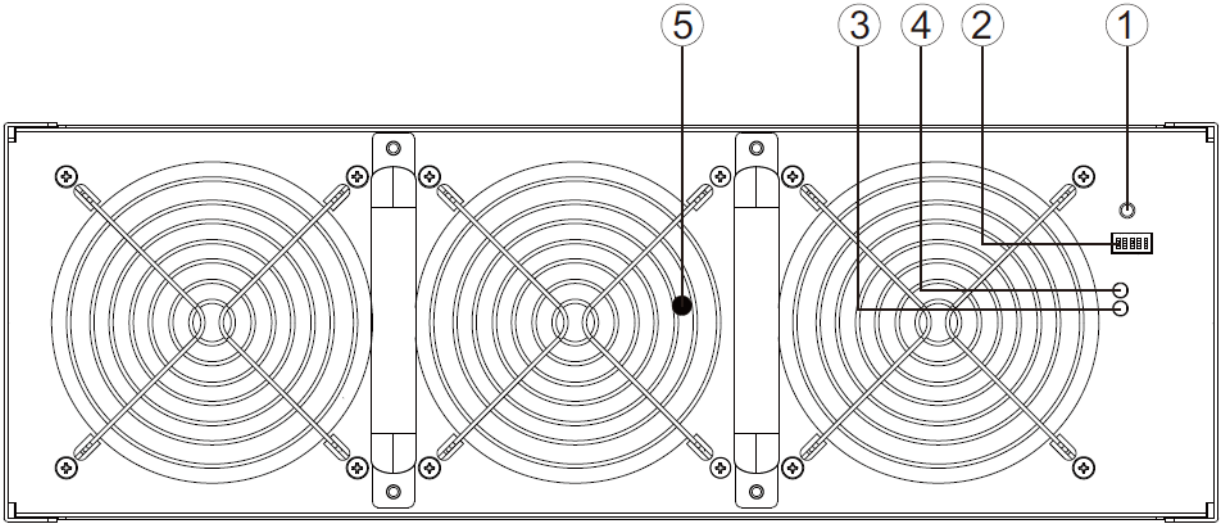


Figure 2-17 Power Module

Cabinet A		Cabinet C	
Module Address	DIP SWITCH	Module Address	DIP SWITCH
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
Cabinet B		Cabinet D	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
Table 2-1 DIP switch setting and Module Address			

Power Module ID Assignment

The Power Module's ID shown in **Table 2-1**. The DIP switches are mounted in the front panel as shown in Fig 2-17.

The DIP switch position have been well set before leaving factory. It's not necessary to change it for single UPS system application. But for Parallel UPS system application, please follow the instructions in Chapter 9 " UPS Installation for Parallel System "

2.10 Power Cable

⚠ Warning
Please follow the local wiring regulations. Follow environmental conditions and refer to IEC60950-1.

2.10.1 AC input and output current and power cable configuration.

Power rating	60KVA	80KVA	100KVA	120KVA
Current (A)	110	147	175	215
Power cable (mm^2)	35	70	70	95
Fixation torque force (lb-in)	60	60	60	60

Power rating	180KVA	200KVA	240KVA	300KVA
Current (A)	330	375	440	550
Power cable (mm^2)	95x2	95x2	300	150x2
Fixation torque force (lb-in)	60	60	60	60

Power rating	80-A	150-A	160-A
Current (A)	147	250	295
Power cable (mm^2)	70	70x2	70x2
Fixation torque force (lb-in)	60	60	60

2.10.2 DC input current and power cable configuration.

Power rating	60KVA	80KVA	100KVA	120KVA
Current (A)	166	221	277	332
Power cable (mm^2)	95	150	150	185
Fixation torque force (lb-in)	60	60	60	60

c	180KVA	200KVA	240KVA	300KVA
Current (A)	498	554	664	830
Power cable (mm^2)	120 x 2	150 x 2	240 x 2	185 x 3
Fixation torque force (lb-in)	60	60	60	60

Power rating	80-A	150-A	160-A
Current (A)	221	415	442
Power cable (mm^2)	150	120x2	120x2
Fixation torque force (lb-in)	60	60	60

2.11 Wiring

WARNING:

- Before connecting any wire, make sure the AC input and battery power is completely cut off.
- Make sure the breakers, Main Breaker, Bypass Breaker, Maintenance Breaker, Output Breaker and battery breaker are all in the **OFF** position.

- Make sure the Maintenance Bypass Switch is in UPS position.
- In order to have good heat dissipation, the power cables MUST come into the cabinet from of the cabinet. Or the cables will block the cooling ventilation and make the over temperature failure.

2.11.1 Installation Drawing

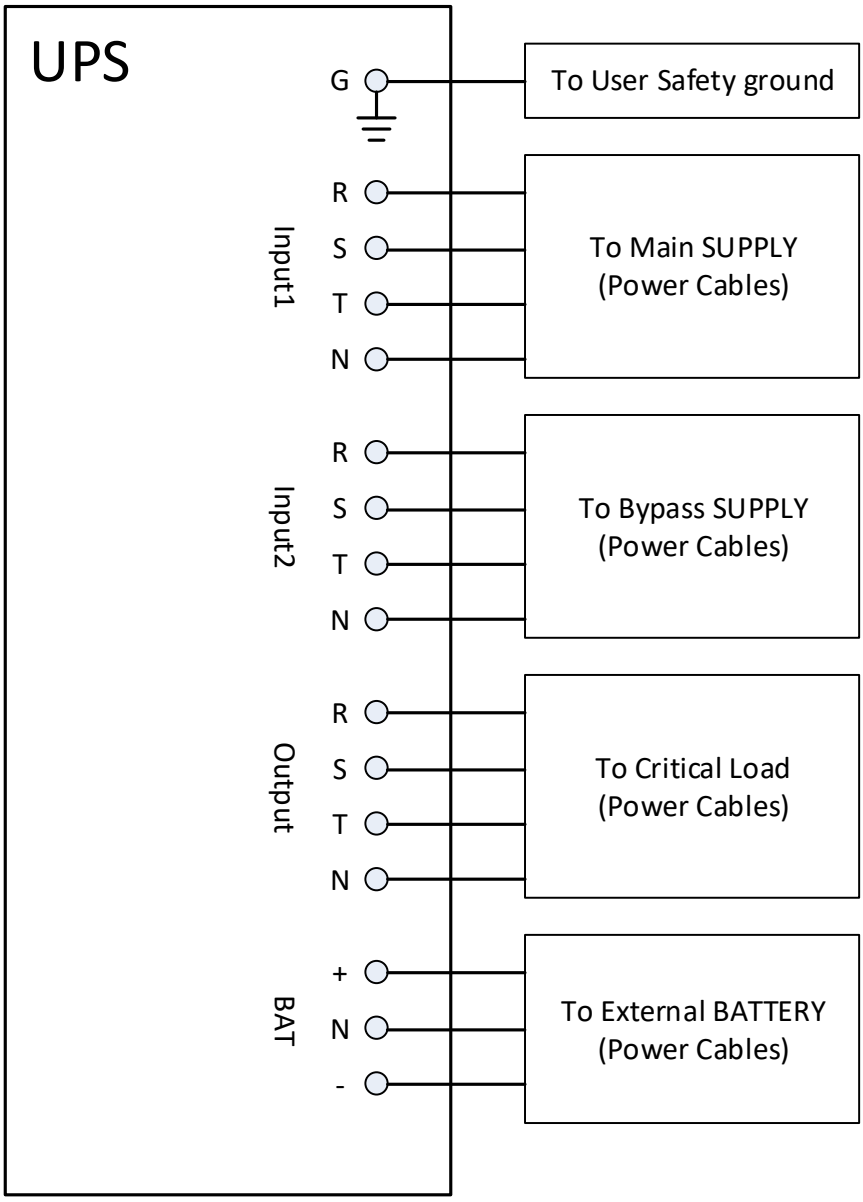


Figure 2-18 UPS Cabinet Wiring

2.11.2 AC Source Connection

For **Single input** application, connect Input1 to the AC power source and use 3 short wires to connect Input1 and Input2.
For **Dual input** application, connect Input1 to the Main AC power source and connect Input2 to the Bypass power source.

The sequence of three phase, R, S and T must be connected accordingly. The wrong sequence will alarm a warning when the UPS is powered.
The N must be connected firmly. A warning message will be indicated if the N is not connected well.

NOTE: For a 60k UPS, threat the input1 wires through the core provided in the package as shown in the figure 2-19.

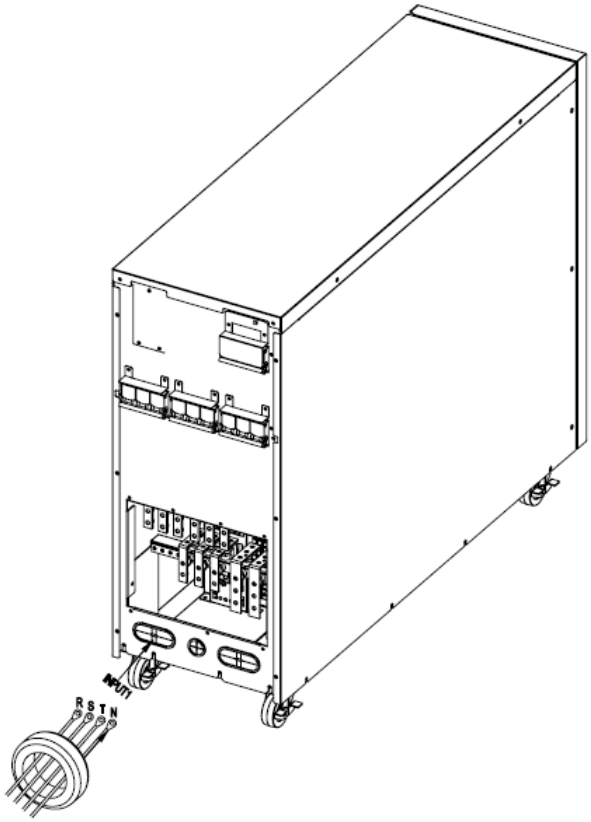


Figure 2-19

2.11.3 External Battery Cabinet Connection

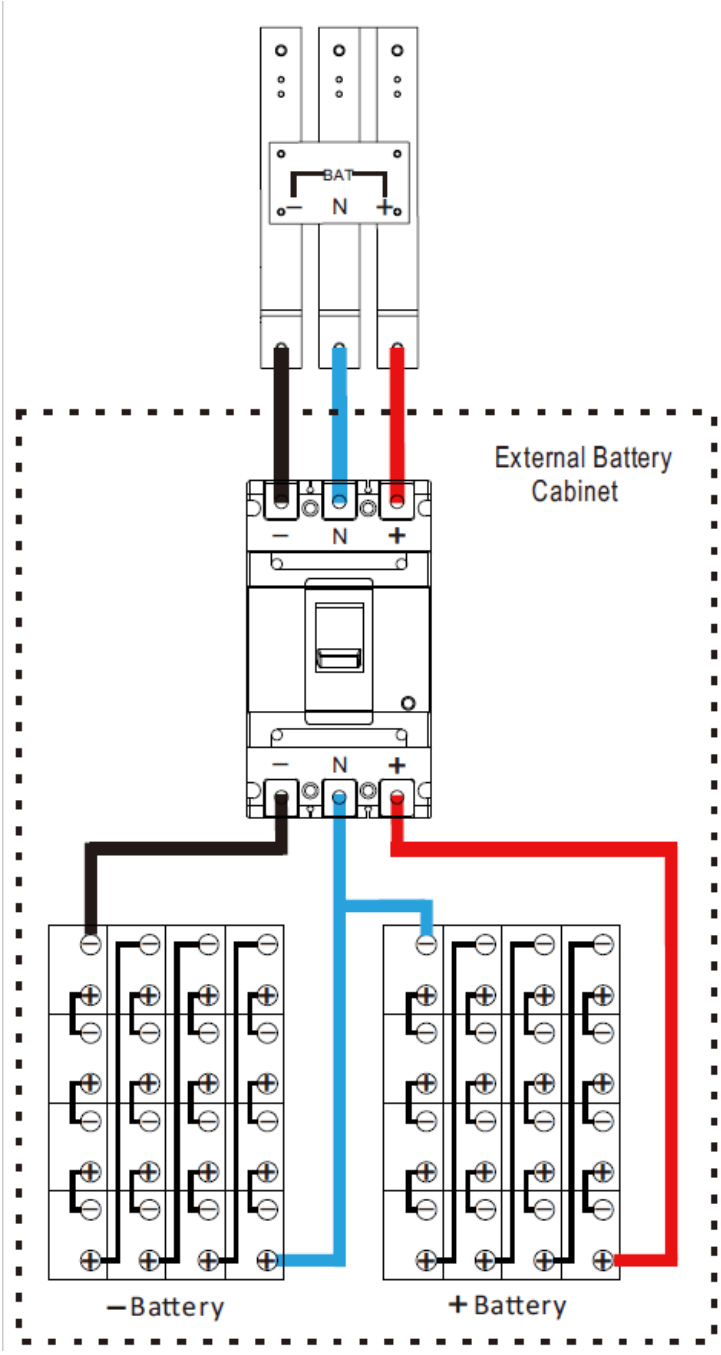


Figure 2-20 External Battery Cabinet Wiring

After the battery is completely installed, be sure to set up nominal battery voltage, battery capacity and maximum charging current in LCD setting. Otherwise, if battery setting is different from actual installation, the UPS will keep warning. Please refer to section 4.2.6.3 and **Table 4-9** for the details.

2.12 Backfeed Protection

Backfeed protection device shields the bypass line from static switch failure.
The UPS has no backfeed device inside. It should be installed externally by following method.

- An external disconnect device, coil is energized by input voltage. When input AC is lost, it will open the contactor.

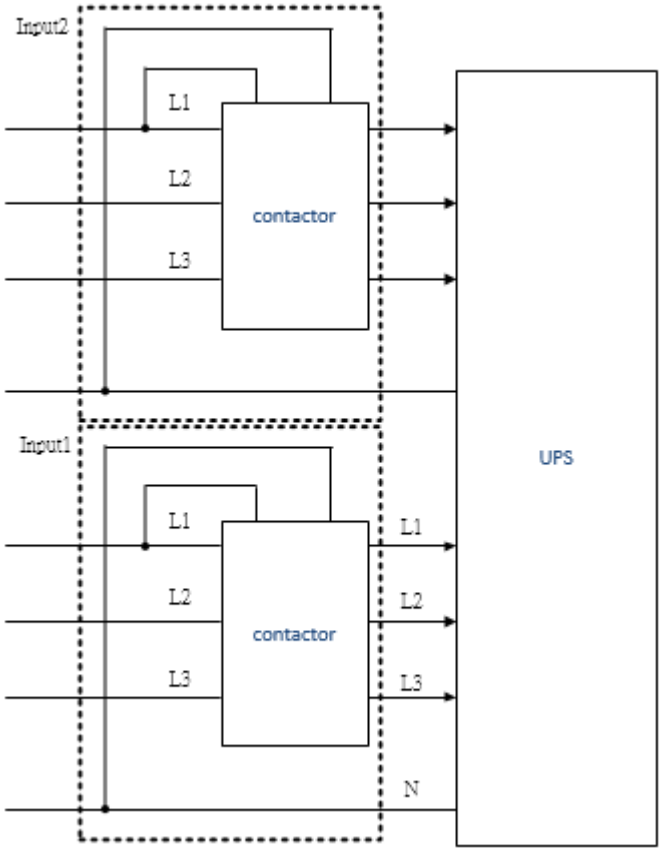
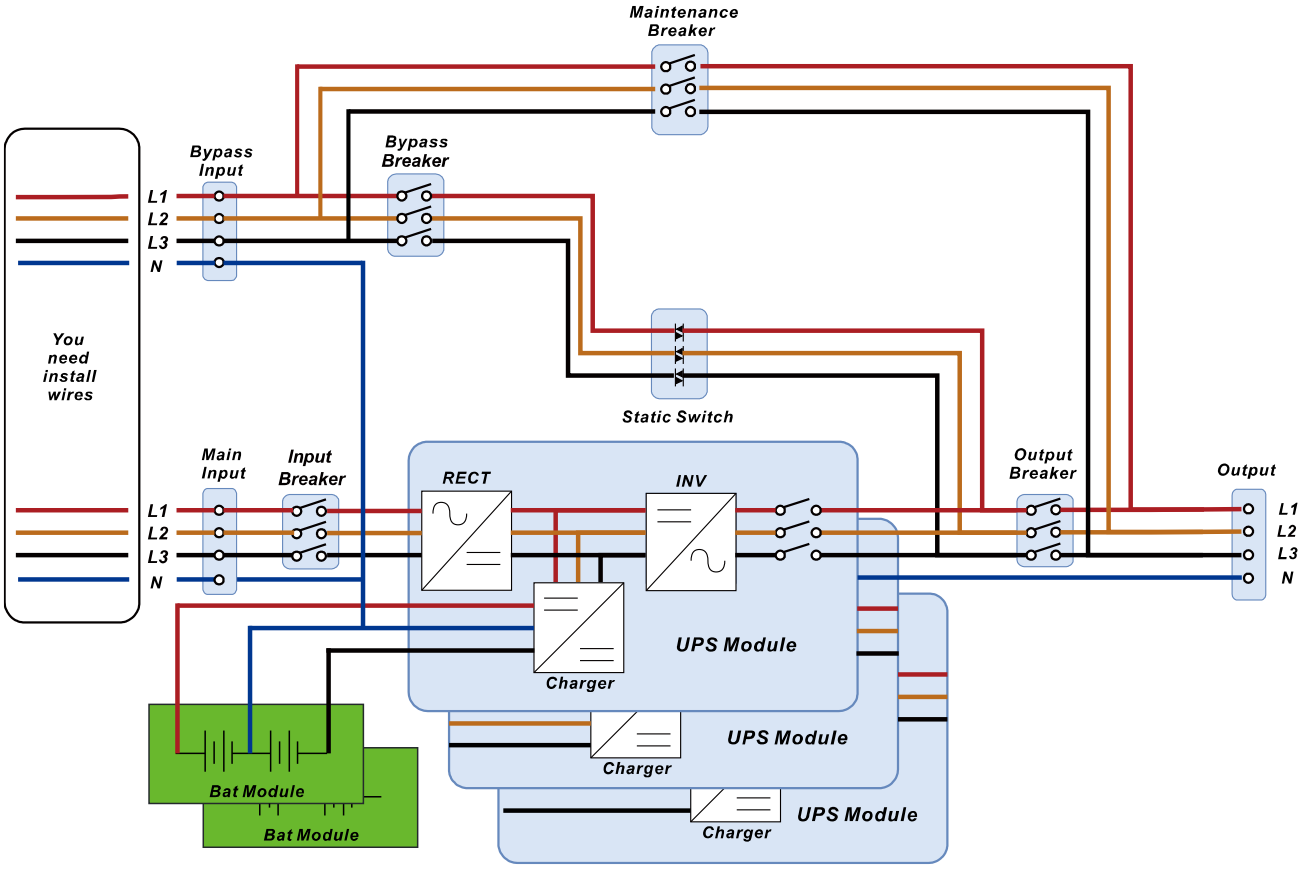


Figure 2-21 external contactor

An external disconnect device is controlled by UPS interface. When input power is loss, it will open the contact controlled by UPS. Please refer to extra communication card SOP. Use extra com. configuration software tool to set backfeed function. Refer to chapter 5.

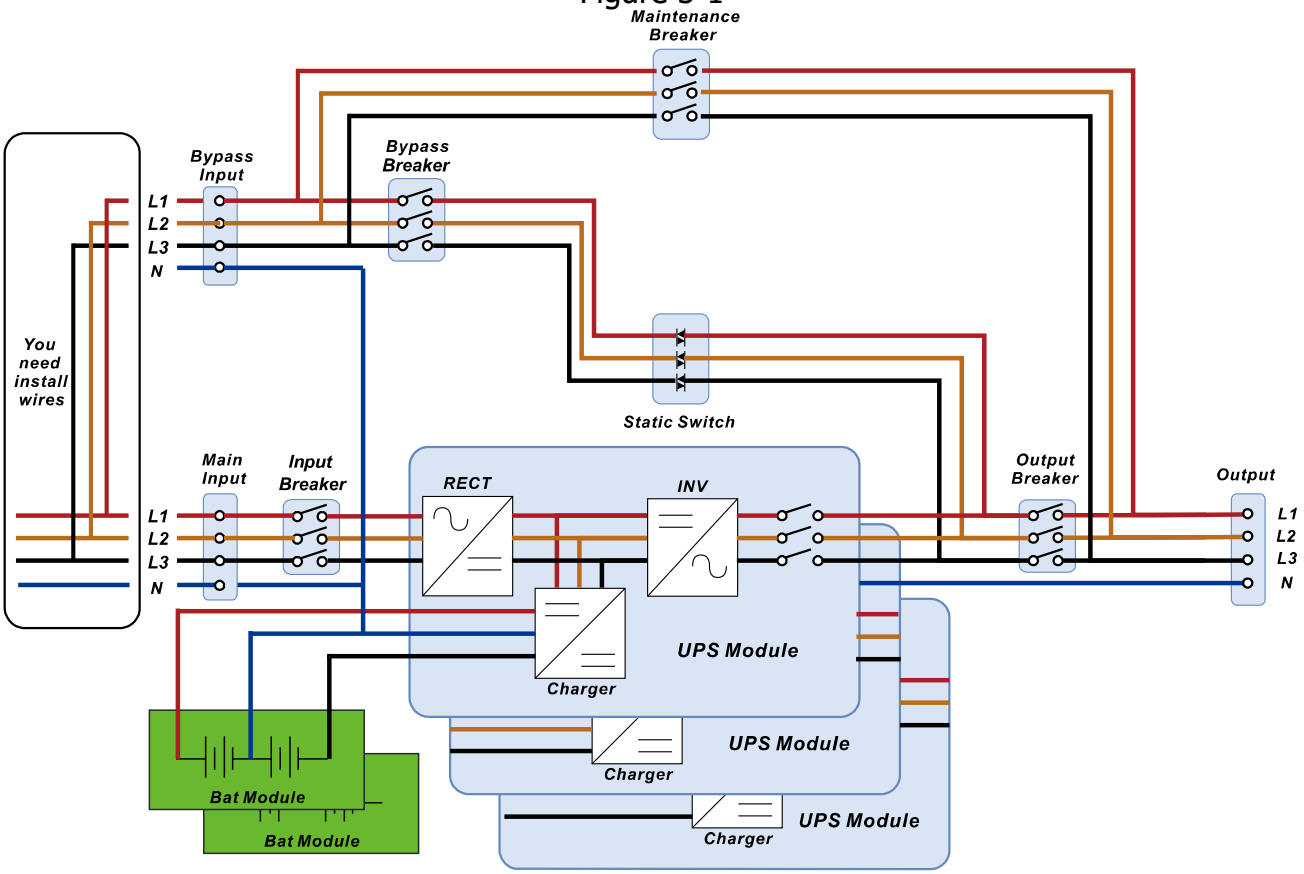
3. Operation Mode and UPS Operation

3.1 Block diagram of UPS



Wiring diagram for dual inputs

Figure 3-1



Wiring diagram for single input

Figure 3-2

3.2 Operation Mode

This UPS is a three-phase, four wire on-line, double-conversion UPS that permits operation in the following modes:

- Standby Mode
- Line Mode
- Battery Mode
- Bypass Mode
- ECO Mode
- Shutdown Mode
- Maintenance Bypass Mode (manual bypass)

3.2.1 Standby Mode

Upon connecting to utility input power, the UPS is in Standby mode before UPS is turned on (if BYPASS enable setting is Disabled), and charger function will be active when the battery is present. The load is not powered under this mode.

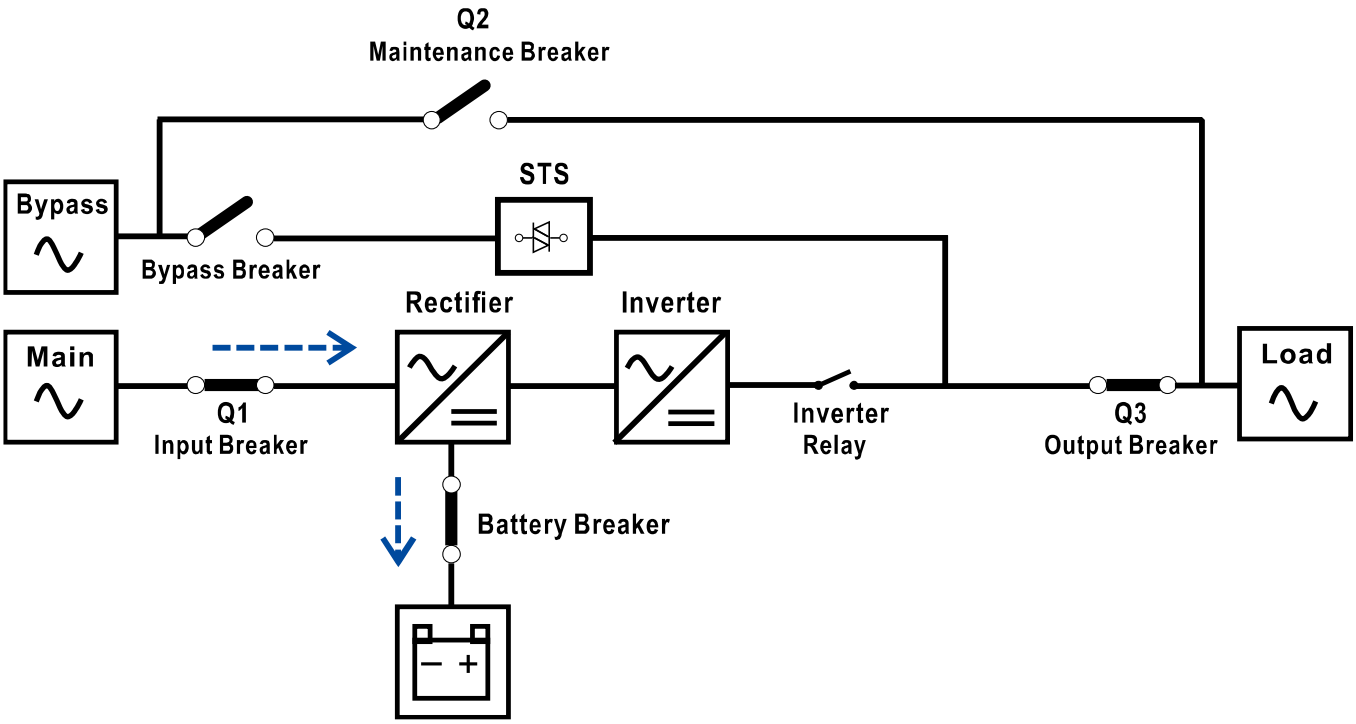


Figure 3-3 : Standby Mode Diagram

3.2.2 Line Mode

In Line Mode, the rectifier derives power from the utility power and supplies DC power to the inverter and the charger charges the battery. The inverter filters the DC power and converts it into pure and stable AC power to the load.

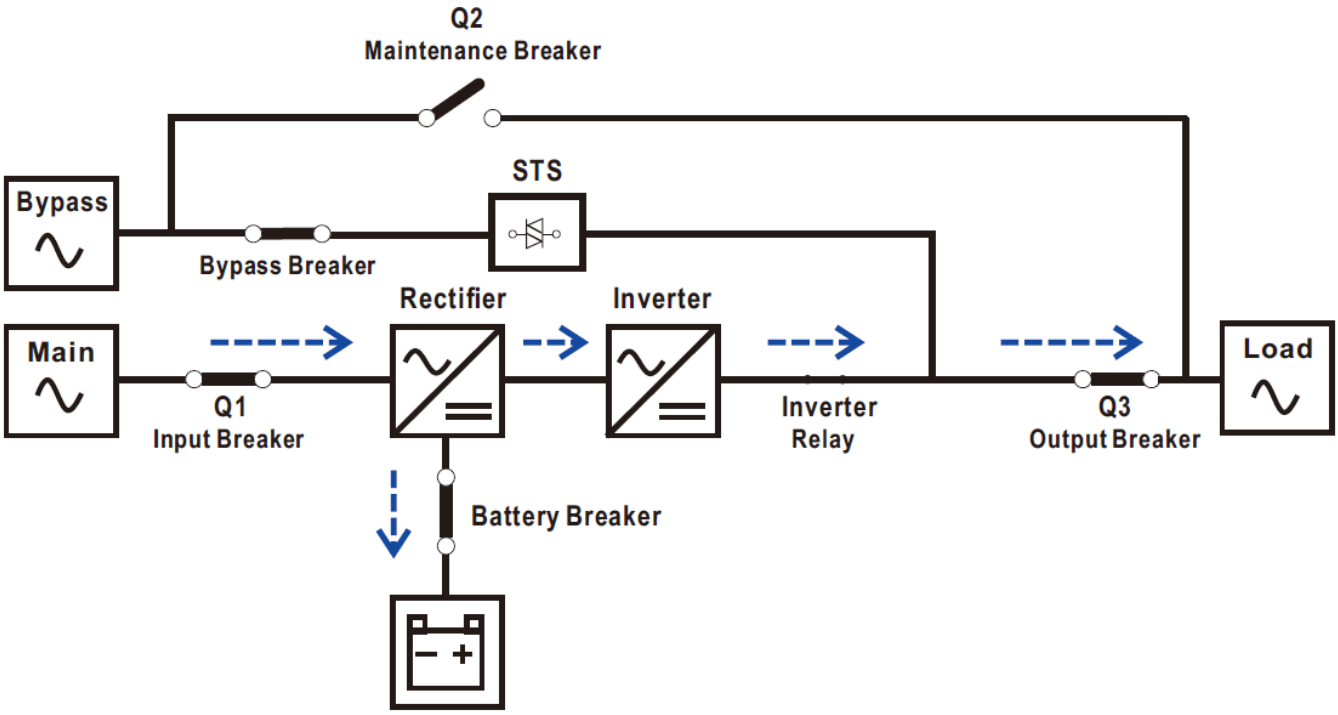


Figure 3-4 : Line Mode Diagram

3.2.3 Battery Mode

The UPS automatically transfers to Battery mode if the utility power fails. There is no interruption in power to the critical load upon failure.

In battery mode, the rectifier derives power from the battery and supplies DC power to the inverter. The inverter filters the DC power and converts it into pure and stable AC power to the load.

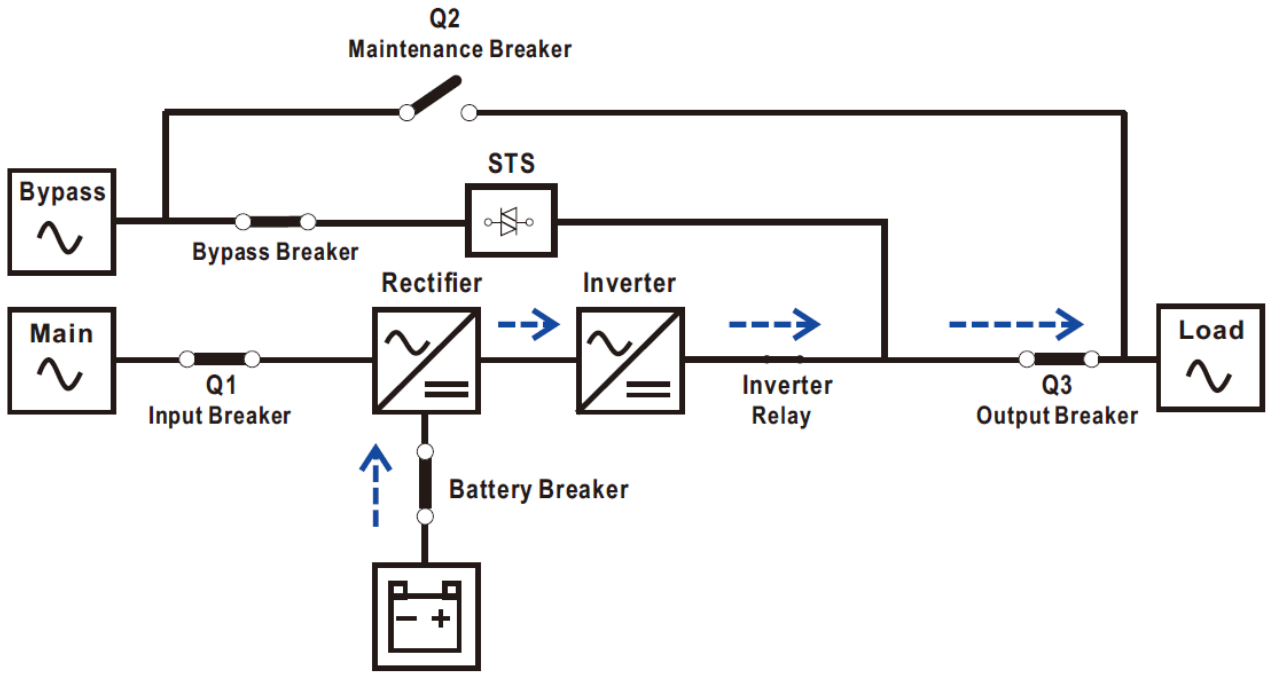


Figure 3-5 : Battery Mode Diagram

3.2.4 Bypass Mode

Upon connecting to utility input power, the UPS is in Bypass mode before UPS is turned on (if BYPASS enable setting is Enabled), and charger function will be active when battery is present.

After UPS has been turned on, if the UPS encounters abnormal situations (over-temperature, overload, and etc.), the static transfer switch will perform as a transference of the load from the inverter to the bypass source with no interruption. If the transference is caused by a recoverable reason, the UPS will turn back to line mode when abnormal situation is solved.

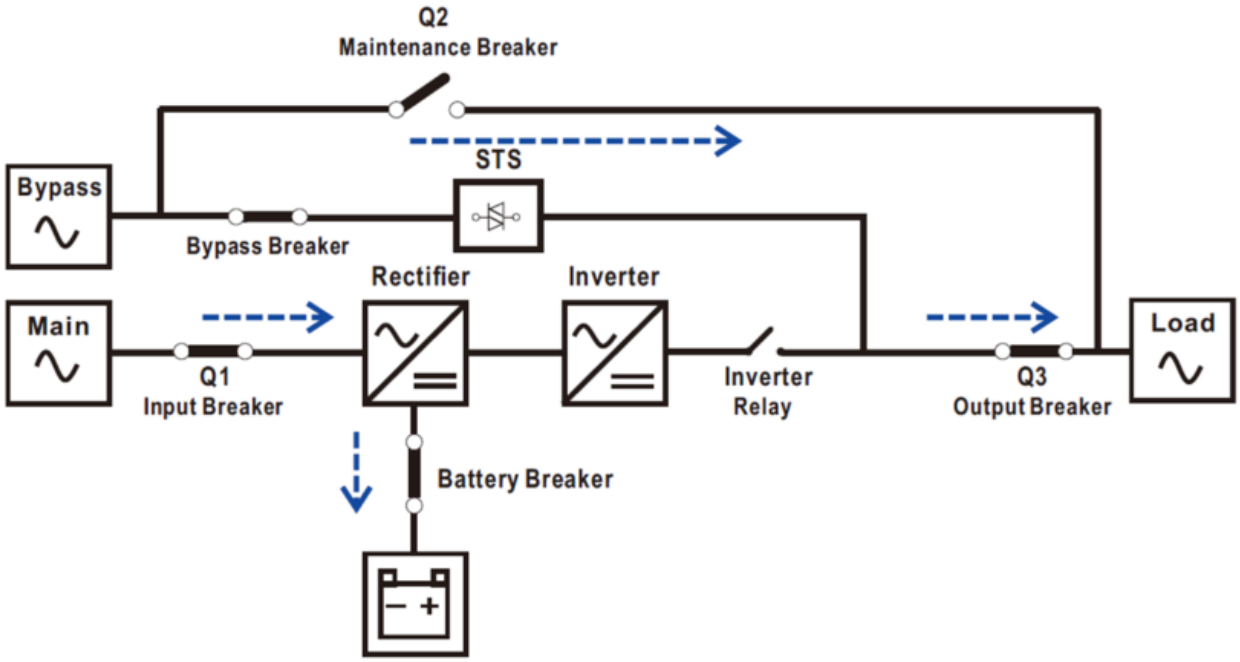


Figure 3-6 : Bypass Mode Diagram

3.2.5 ECO Mode

The ECO Mode is enabled through the setting menu of LCD panel. In ECO mode, the load is powered by bypass when the bypass voltage and frequency are within the acceptable ranges. If the bypass is out of range, the UPS will transfer the power source of load from bypass to inverter. In order to shorten the transfer time, the rectifier and inverter are working when the UPS is in ECO mode.

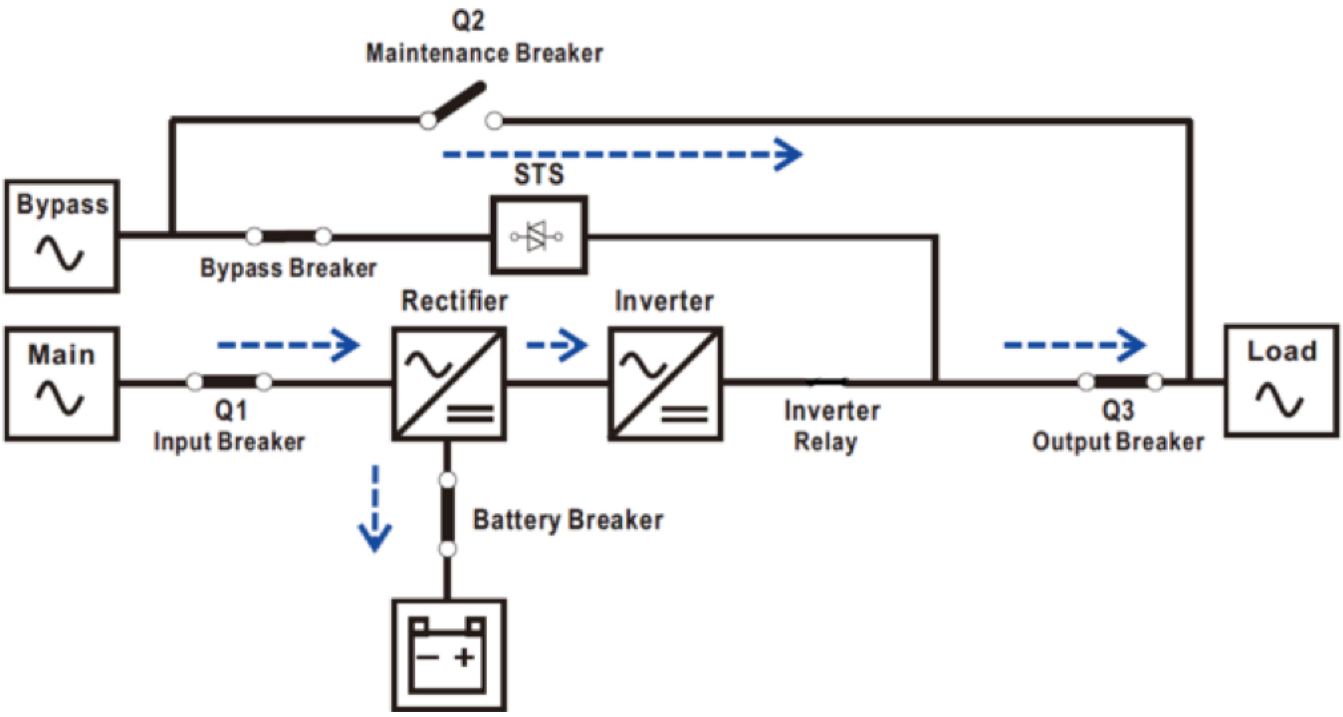


Figure 3-7 : ECO Mode Diagram

3.2.6 Shutdown Mode

When the UPS is in the off state and the utility power source is absent, the UPS will enter into shutdown mode.

Or when the UPS has discharged the battery to the cut-off level, the UPS will enter into shutdown mode as well.

When the UPS enters this mode, it is going to shut off the control power of UPS. The rectifier, charger and inverter are all in off state.

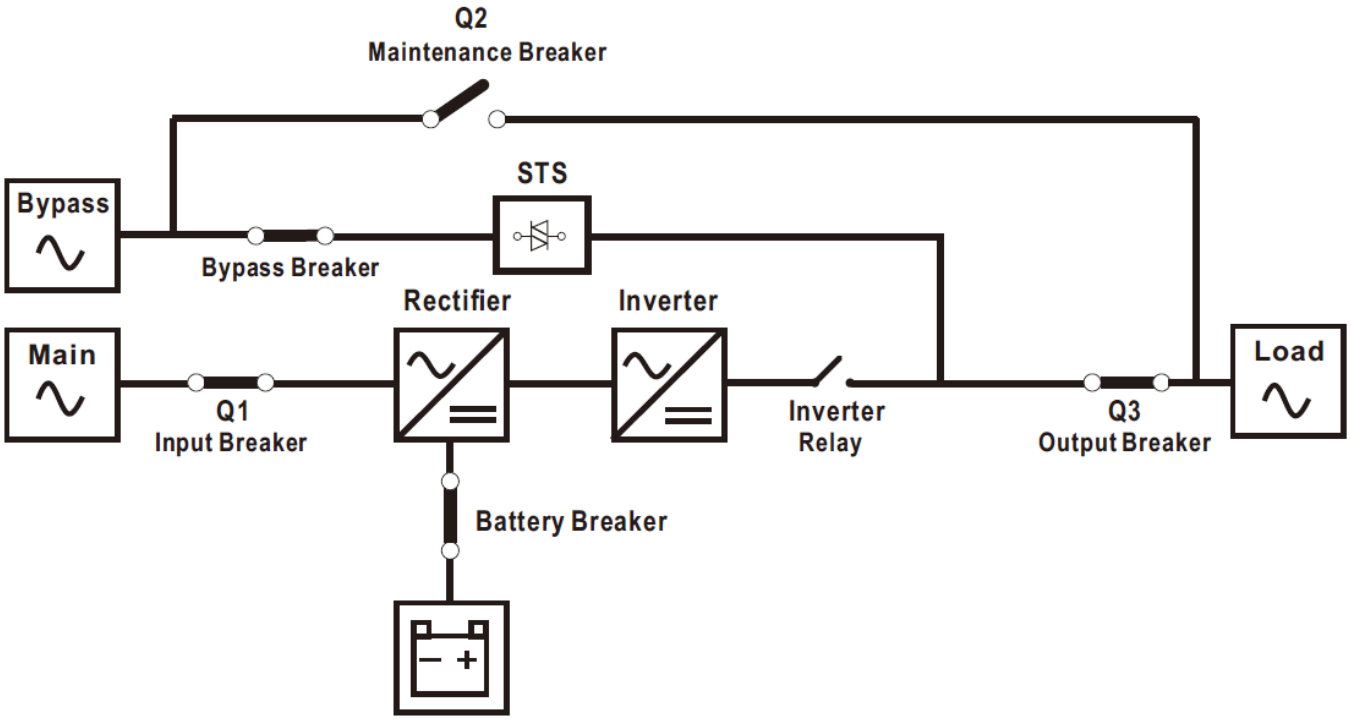


Figure 3-8 : Shutdown Mode Diagram

3.2.7 Maintenance bypass Mode

A manual bypass switch is available to ensure continuity of supply to the critical load when the UPS becomes unavailable e.g. during a maintenance procedure. Before entering the maintenance bypass mode, make sure the bypass power source is normal.

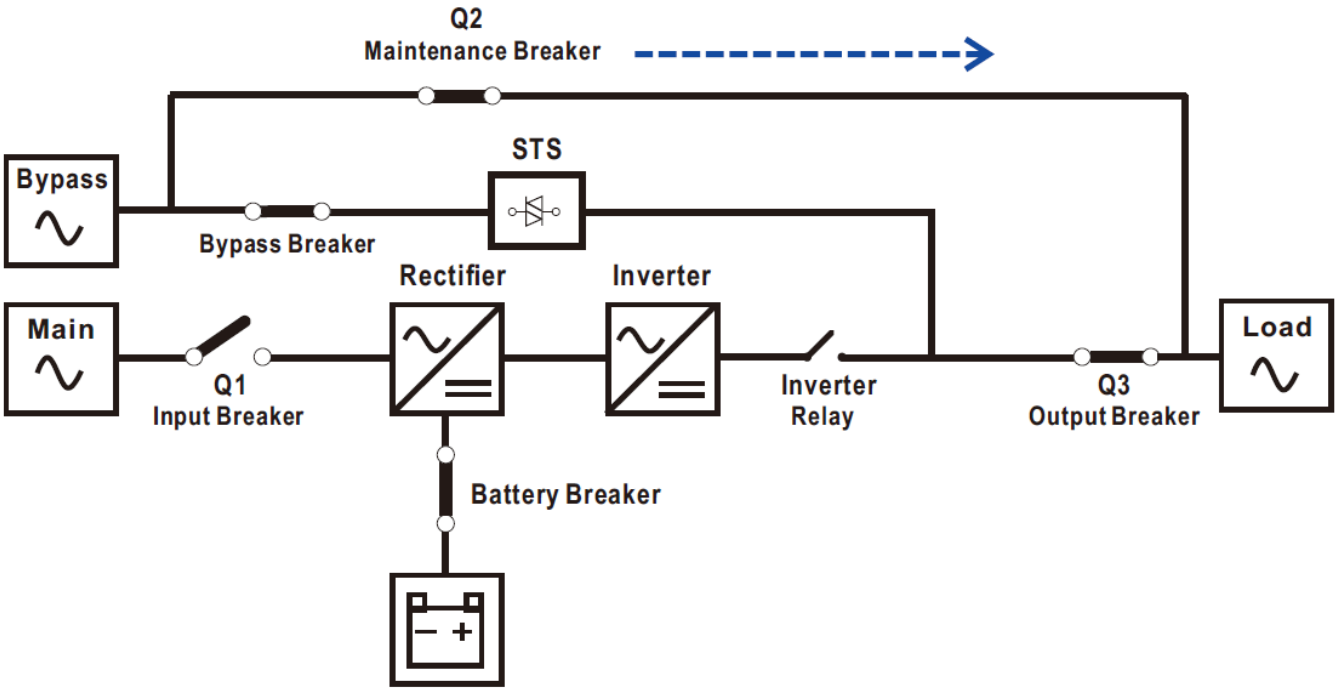


Figure 3-9 : Maintenance Bypass Mode Diagram

3.3 UPS Operation

⚠ Warning
● Please confirm that the firmware versions of the module and the cabinet are compatible. If not, please update the firmware. For more information, please contact service personnel. ● Do not start the UPS until the installation is completed. ● Make sure the wiring is correct and the power cables are fixed firmly. ● Make sure the Power Modules' address have been configured. Refer to section 2.9.2 Power Module ● Make sure all the breakers are switch **OFF**.

3.3.1 AC Startup

Ensure to follow this procedure when turning on the UPS from a fully powered-down condition.

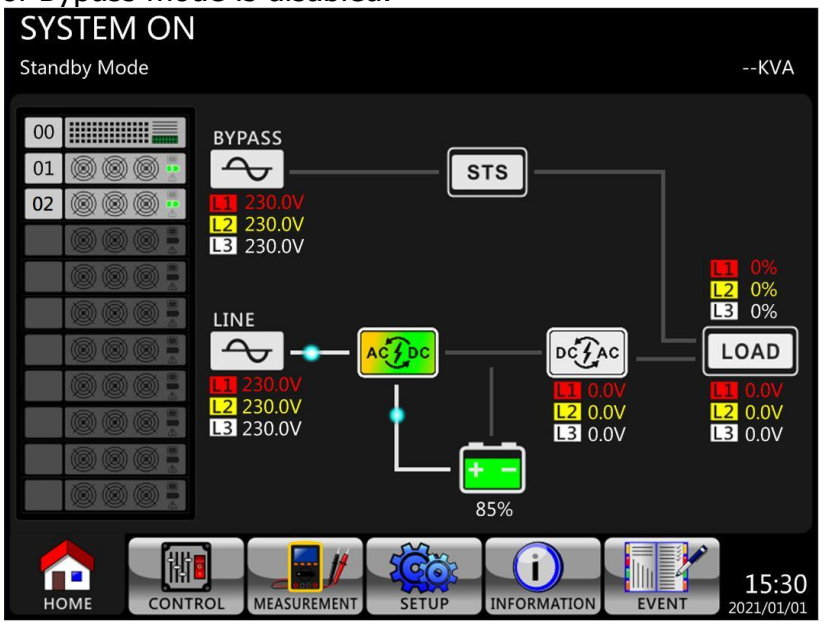
The operating procedures are as follows:

Step 1: Refer to "Chapter 2 Installation" to connect the power cables and install the battery required for the UPS system.

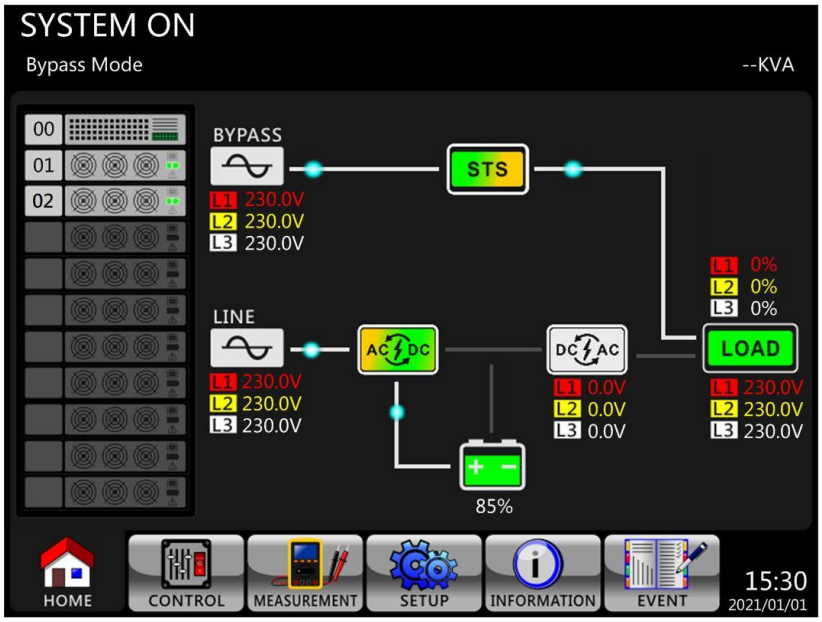
Step 2: Switch ON the battery breaker.

Step 3: Switch ON the external power switch in distribution panel to power the UPS.

Step 4: Switch ON the input/bypass breaker. The UPS will enter into Standby Mode, if the setting of Bypass mode is disabled.

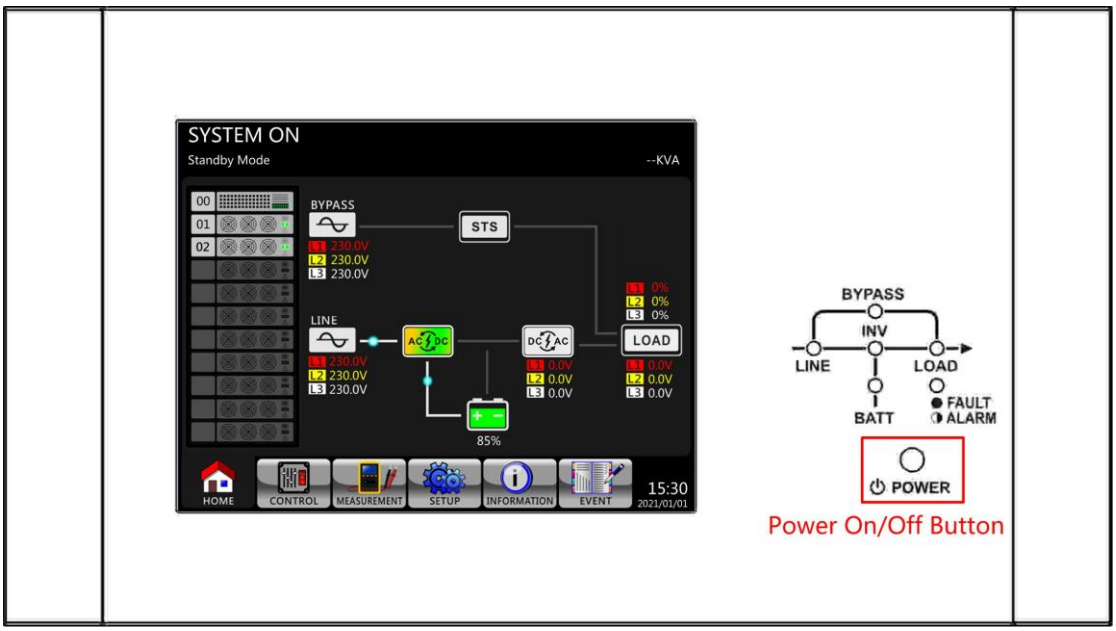


Or the UPS will enter into Bypass Mode, if the setting of Bypass mode is enabled.

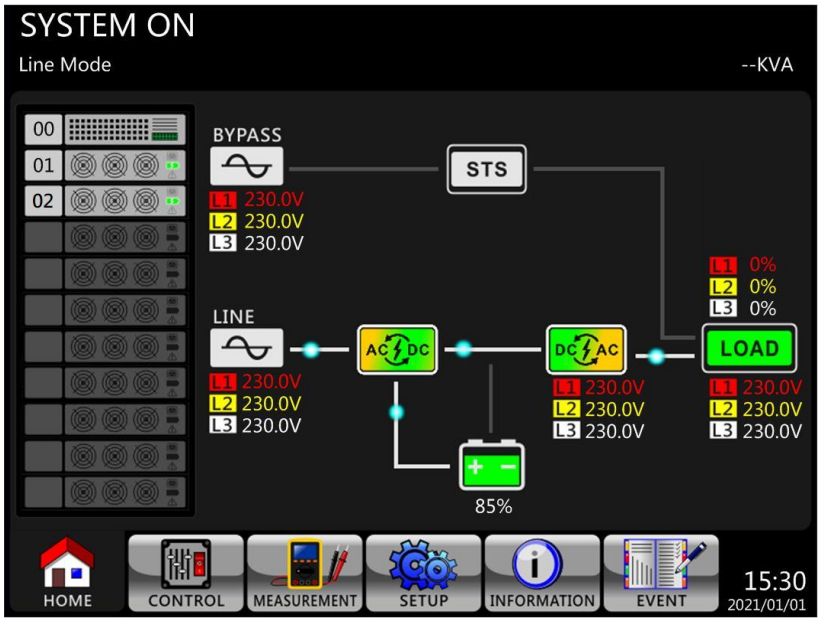


Step 5: Make sure that no warning or fault event occurs. If yes, please refer to Chapter 6 Troubleshooting to solve it.

Step 6: Press "Power" button for two seconds to enter into Line Mode as shown below.



After turning on, UPS will do self-test and start up inverter. UPS will be transferred to Line mode when all power modules are ready.

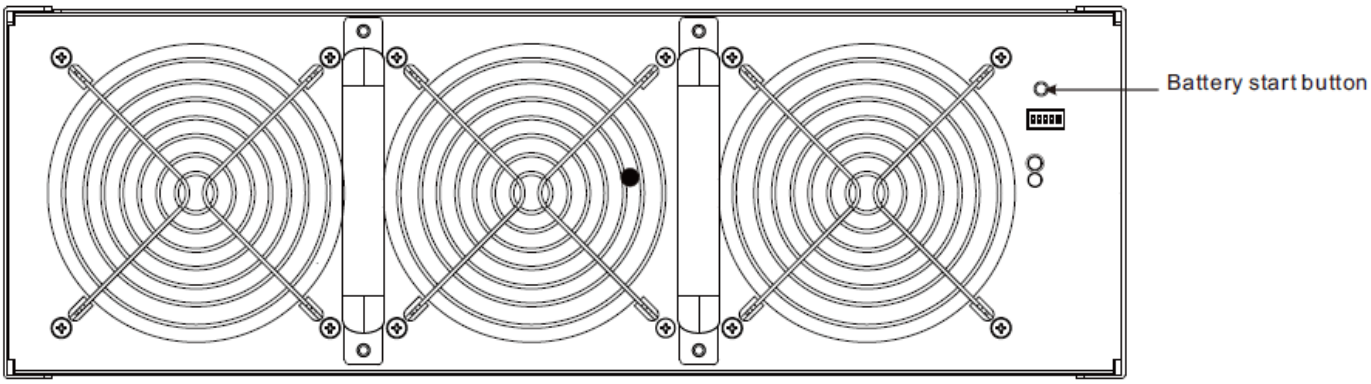


Step 7: Switch ON the output breaker. AC startup procedure is complete.

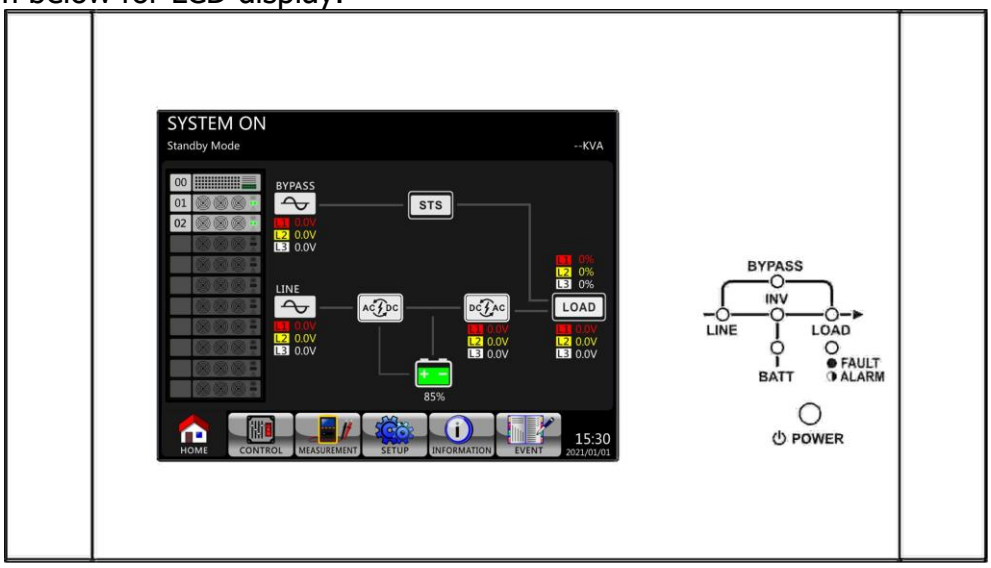
3.3.2 Cold Start Startup

Step 1: Switch ON the battery Breaker.

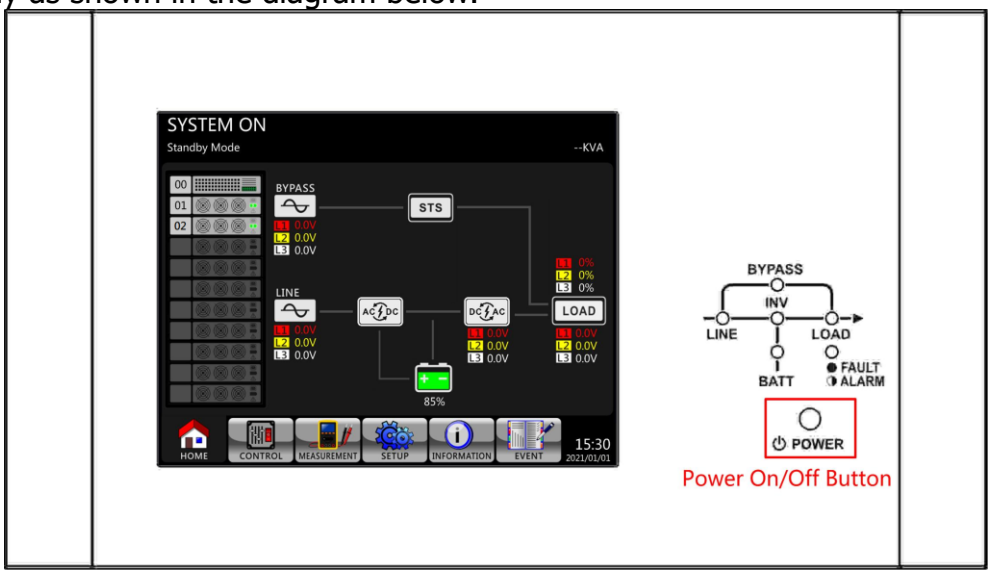
Step 2: Press the "Battery Start" button on any one of Power Modules to start up the control power as shown below.



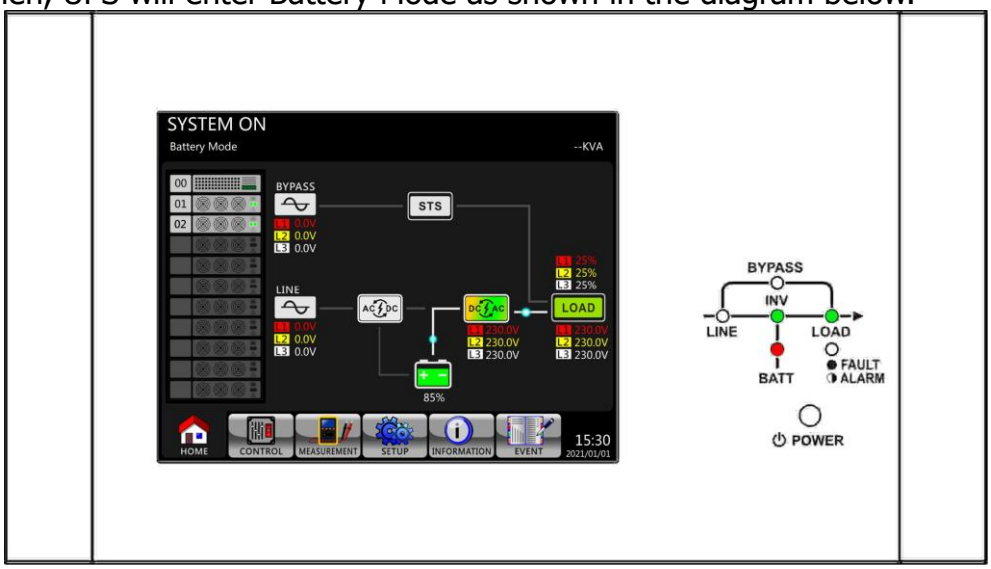
Step 3: After pressing the "Battery Start" button, UPS will enter into Standby mode. Refer to the diagram below for LCD display.



Step 4: Before UPS enters into shutdown mode, please press "POWER" button for 2 second immediately as shown in the diagram below.



Step 5: Then, UPS will enter Battery Mode as shown in the diagram below.

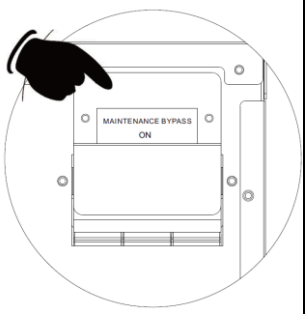
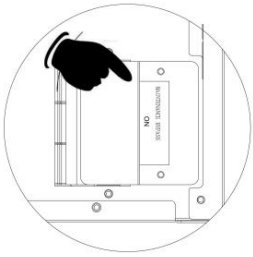
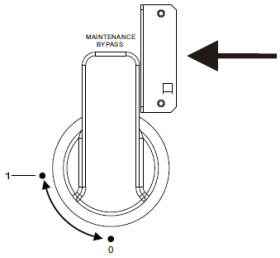
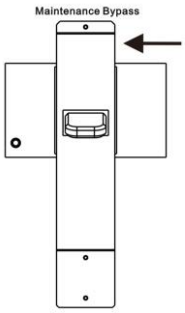
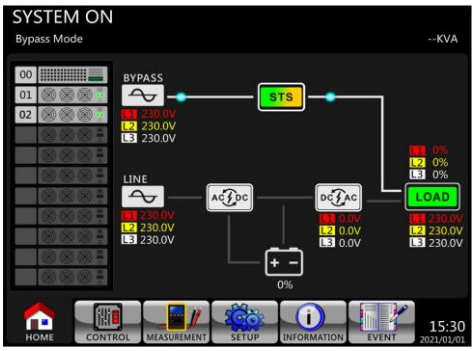


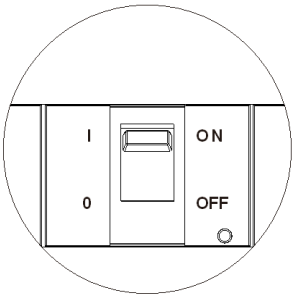
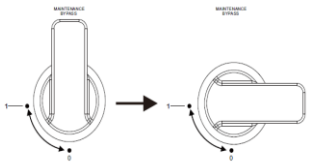
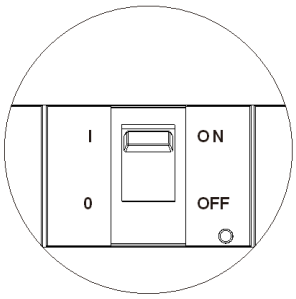
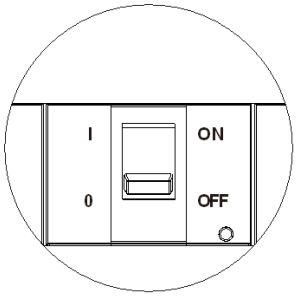
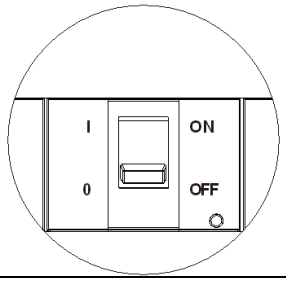
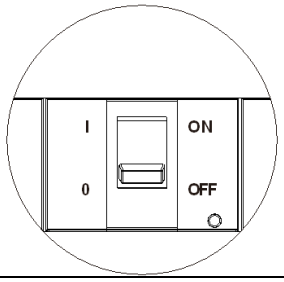
Step 6: Switch ON the output breaker. Cold start startup procedure is complete.

3.3.3 Maintenance Bypass Operation

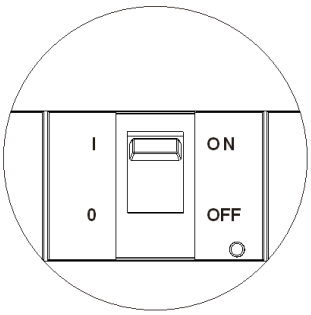
Follow the instruction to transfer to Maintenance Bypass and UPS protection as below.

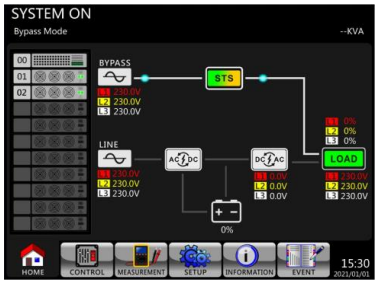
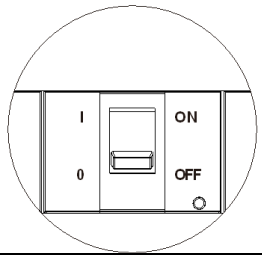
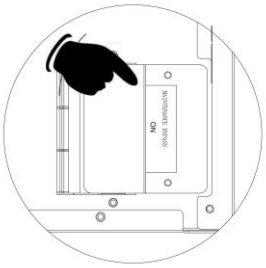
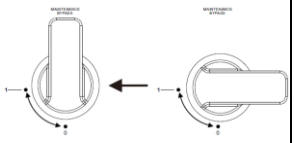
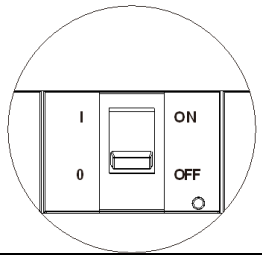
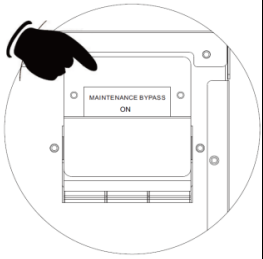
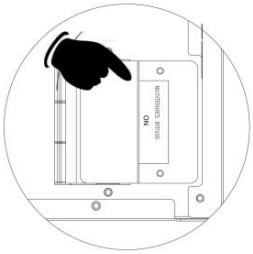
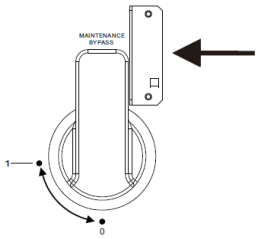
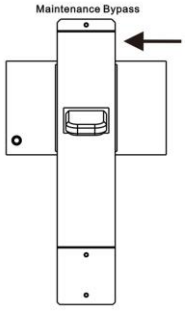
3.3.3.1 Transfer to maintenance bypass

	60KVA	80-A	80KVA~200KVA	300KVA
1	Remove the mechanical lock plate of Maintenance Bypass Breaker. 	Remove the mechanical lock plate of Maintenance Bypass Breaker. 	Remove the mechanical lock plate of Maintenance Bypass Breaker. 	Remove the mechanical lock plate of Maintenance Bypass Breaker. 
2	Make sure the UPS operates in Bypass mode as shown below. 			

3	Switch ON the Maintenance Bypass Breaker as shown below. 	Switch ON the Maintenance Bypass Breaker as shown below. 	Switch ON the Maintenance Bypass Breaker as shown below. 
4	Switch OFF the AC Input /bypass/output Breaker as shown below. 	Switch OFF the AC Input/bypass/output Breaker as shown below. 	Switch OFF the AC Input / bypass / output Breaker as shown below 
5	It is possible to change the Power Module.		

3.3.3.2 Transfer to UPS Protection

	60KVA	80-A	80KVA~200KVA	300KVA
1	Make sure the maintenance is complete. The Power Modules have been installed well.			
2	Switch ON the AC Input/bypass/output Breaker as shown below. 			

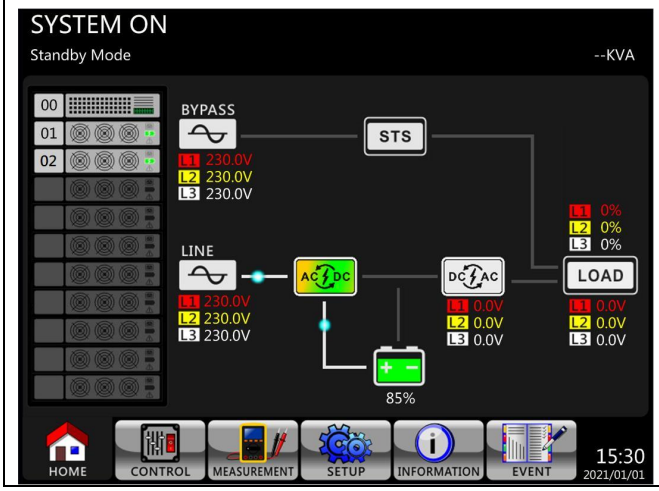
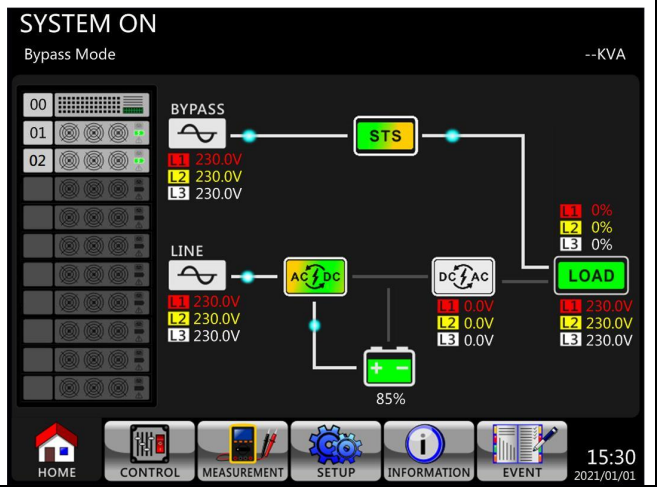
<table>
<tr><td>3</td><td colspan="4">Please enter LCD SETUP MENU and choose “SYSTEM” to ensure that the “Bypass mode” is enabled. If the “Bypass mode” is disabled, you have to set it as “enabled”. Then, exit the SETUP menu and check if the UPS operates in bypass mode.

</td></tr>
<tr><td>4</td><td>Turn off Maintenance Bypass Breaker as shown below.

</td><td>Turn off Maintenance Bypass Breaker as shown below.
</td><td>Turn off Maintenance Bypass Breaker as shown below.
</td><td>Turn off Maintenance Bypass Breaker as shown below.

</td></tr>
<tr><td>5</td><td>Lock back the mechanical lock plate as shown below.

</td><td>Lock back the mechanical lock plate as shown below.
</td><td>Lock back the mechanical lock plate as shown below.

</td><td>Lock back the mechanical lock plate as shown below.

</td></tr>
</table>

3.3.4 Turn off Operation

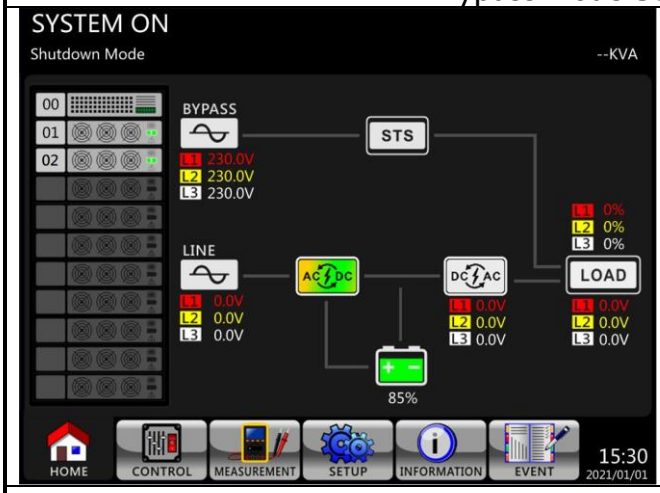
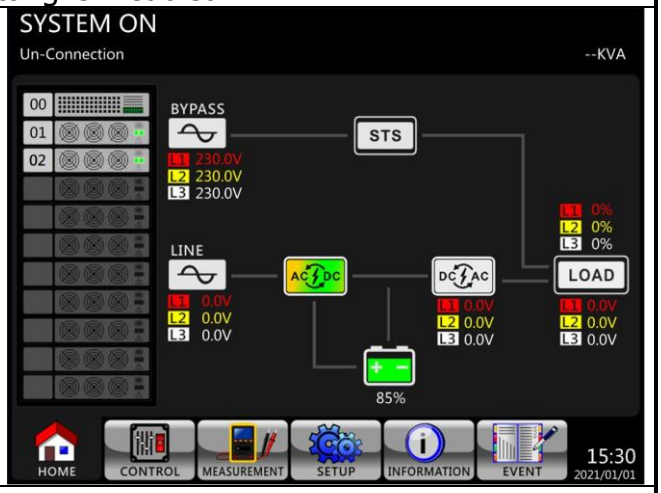
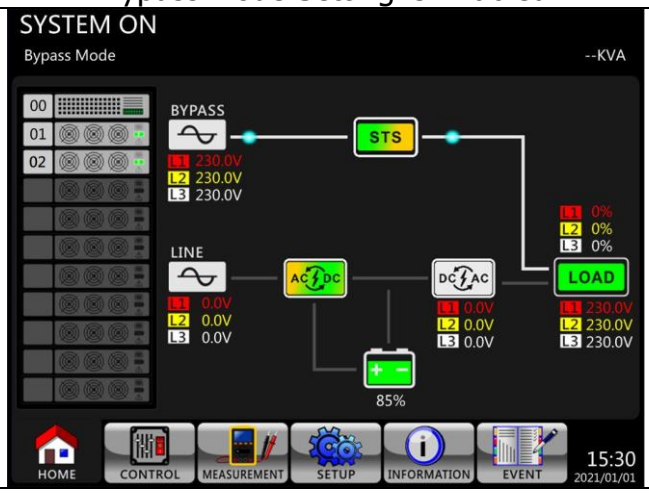
3.3.4.1 Turn Off Operation in Bypass Mode/ Standby Mode

When the UPS neither is turned on nor turned off, the UPS operates in the Standby Mode or Bypass Mode. It depends on the “Bypass Mode” Setting.

The LCD diagrams are shown below.

Bypass Mode Setting is Disabled	Bypass Mode Setting is Enabled
	

Step 1: Switch OFF the Breaker. The LCD diagrams are shown below.

Bypass Mode Setting is Disabled	
	
UPS enters Shutdown Mode.	It is normal the Un-Connection is shown when Power Modules have shut off their control power.
Bypass Mode Setting is Enabled	
	
UPS stay in Bypass mode and No AC input is indicated.	

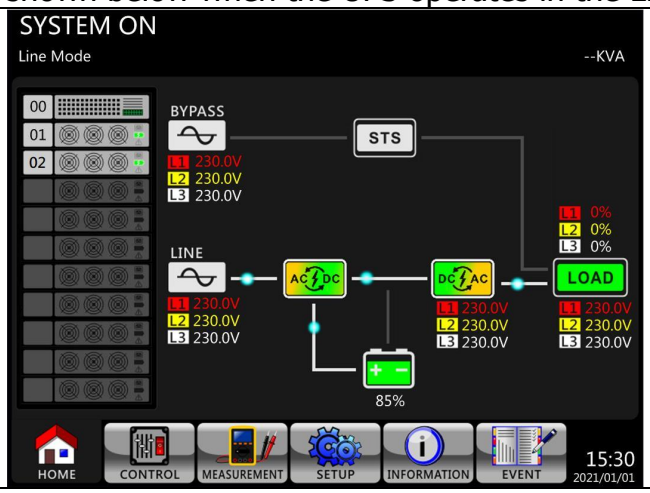
Step 2: Switch OFF the external power switch to disconnect the AC power to the UPS. Wait until the LCD is OFF.

Step 3: Switch OFF the battery breaker if the UPS will disconnect from AC power for a long

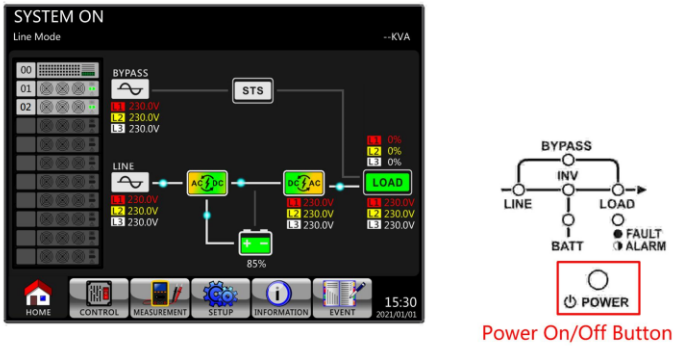
time.

3.3.4.2 Turn Off Operation in Line Mode

The LCD diagrams are shown below when the UPS operates in the Line Mode.



Step 1: Press "POWER" button for 2 second to turn off the UPS. Or use the LCD operation (Control➔ Turn Off) to turn off the UPS.

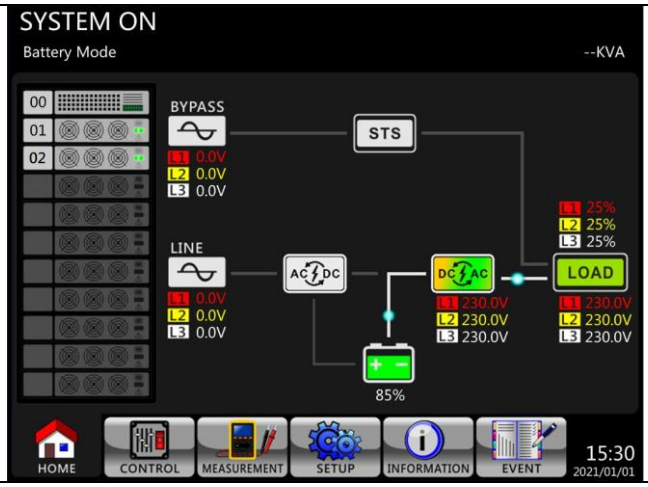


After turning off, the UPS will tranfer to Standby Mode or Bypass Mode depending on the "Bypass Mode" Setting.

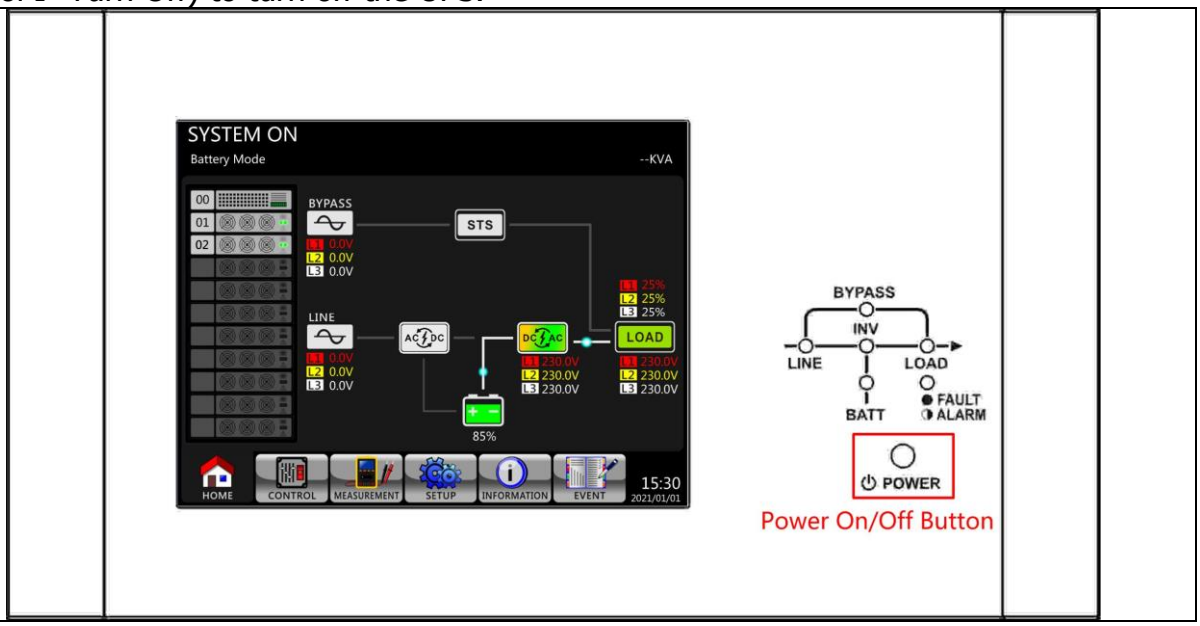
Next, follow the **Turn Off Operation in Bypass Mode/ Standby Mode** procedure.

3.3.4.3 Turn Off Operation in Battery Mode

The LCD screen is shown below when the UPS operates in the Battery Mode.



Step 1: Press "POWER" button for 2 seconds to turn off the UPS. Or use the LCD operation (Control➔ Turn Off) to turn off the UPS.



After turning off, the UPS will tranfer to Standby Mode.

Next, follow the **Turn Off Operation in Bypass Mode/ Standby Mode** procedure.

4. Control Panel and Display Description

4.1 Introduction

This control panel and display description are located on the front door of the UPS cabinet. It is the USER control, monitoring of all measured parameters, UPS and battery status and alarms. The control panel is divided into four functional areas: (1) LCD display, (2) LED indications, (3) Control keys, (4) Audio Alarm, as shown in Figure 4-1.

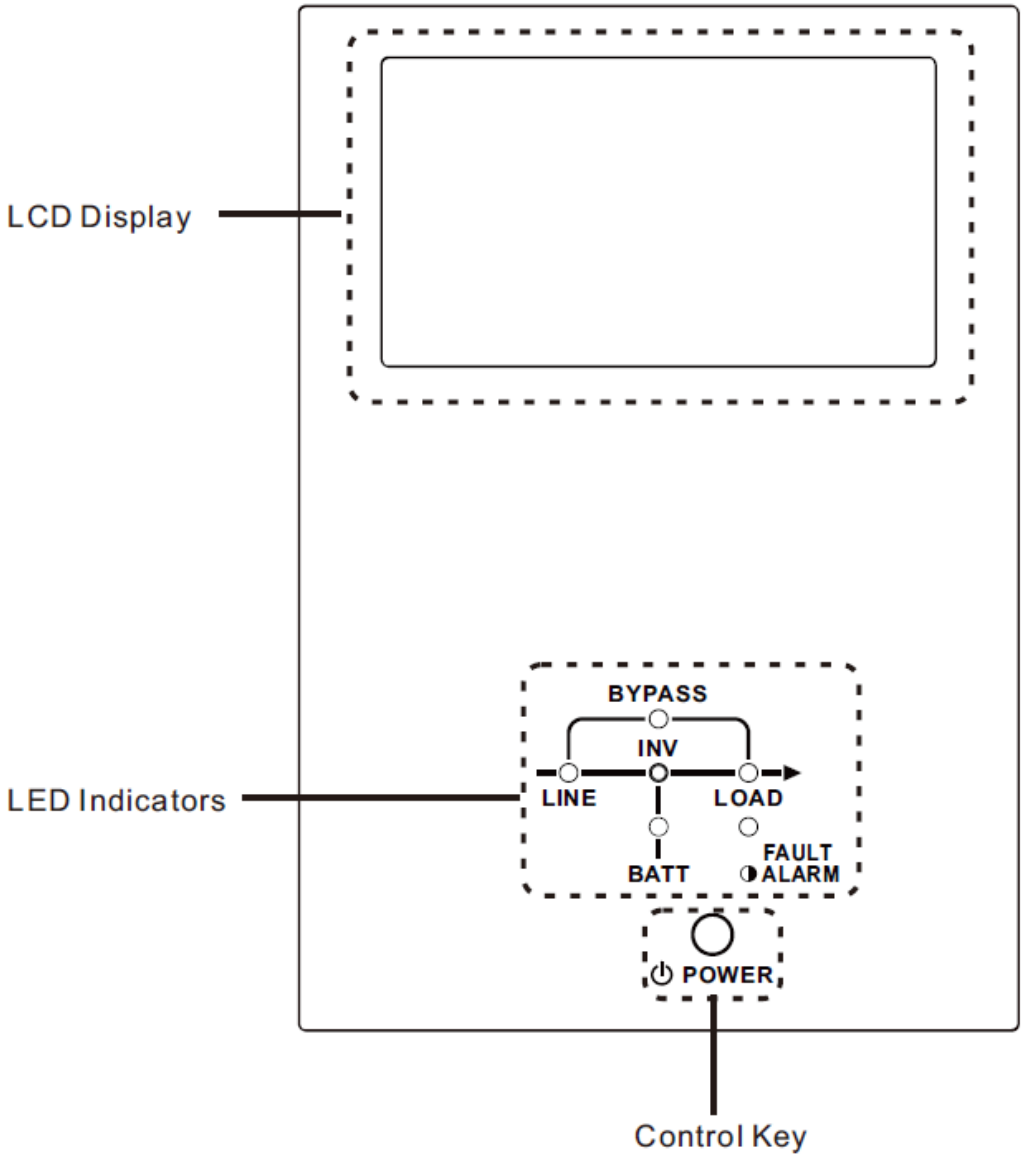


Figure 4-1 Control panel

(1) LCD display: Graphic display for real-time UPS status and all measured parameters.
(2) LED indications. Refer to **Table 4-1**.
(3) Control key. Refer to **Table 4-2**.
(4) Audible Alarm. Refer to **Table 4-3**.

Table 4-1: LED indications

LED	Color	Status	Definition
LINE	Green	On	Input source is normal.
		Flashing	Input source is abnormal.
		Off	No input source
BYPASS	Yellow	On	Load on Bypass.
		Flashing	Input source is abnormal.
		Off	Bypass circuit is not operating.
LOAD	Green	On	There is power output for the load.
		Off	There is no power output for the load.
INV	Green	On	Load on inverters.
		Off	Inverter circuit is not operating.
BATTERY	Red	On	Output power from Battery.
		Flashing	Low battery
		Off	Battery converter is normal and battery is charged.
FAULT/ ALARM	Red	On	UPS fault.
		Flashing	UPS alarm.
		Off	Normal.

Table 4-2: Control key table

Control Key	Description
POWER	Turn on UPS or Turn off UPS. (hold 2 seconds)

Table 4-3: Audible Alarm

Audio Type	Description
Power on/off	Buzzer sounds 2 seconds.
Battery mode	Buzzer sounds every 2 seconds.
Low battery	Buzzer sounds every half seconds.
UPS alarm	Buzzer sounds every 1 second.
UPS fault	Buzzer continuously sounds.

NOTE: Panel and display are powered by bypass utility or battery.

4.2 Screen Description

4.2.1 Start Screen

Upon starting, the UPS executes self-test. The initial screen displays and remains still in approximately 5 seconds as shown in Figure 4-2.



Figure 4-2 Initial screen

4.2.2 Main Screen

After initialization, the main screen will display as Figure 4-3. Main screen is divided into six parts.

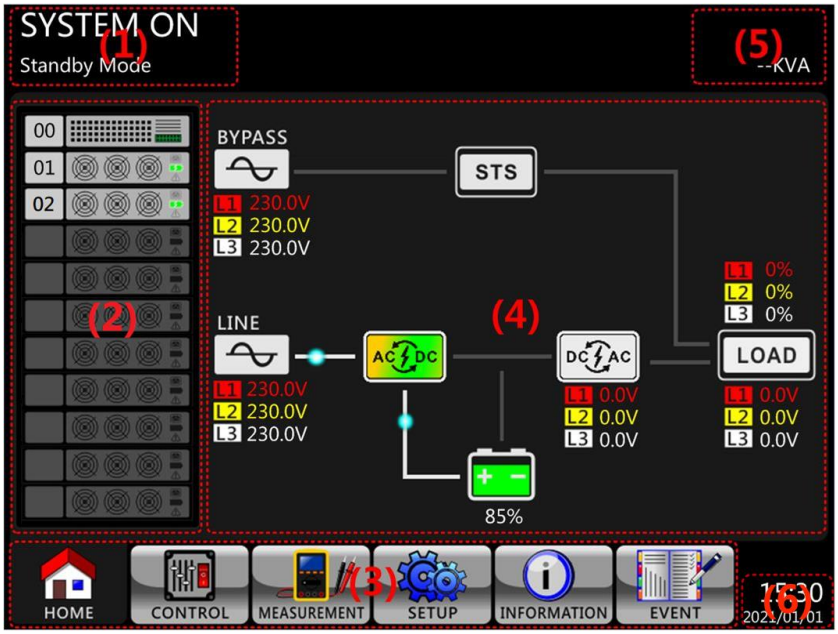


Figure 4-3 Main screen

(1) UPS Mode: Current operation mode.

(2) Module Status: It will show active module no. Touch each module icon to enter measurement screen. The meanings of each icon are listed as below.

Module icon	Explanation
	STS icon with ID no.
	Power module icon with ID no.
	No power module
	Power module output on
	Power module output off
	Power module charger on
	Power module charger off
	Power module fault
	Power module is operated normally.
	Power module unlock

(3) Main Menu: Touch icon to enter sub screen.

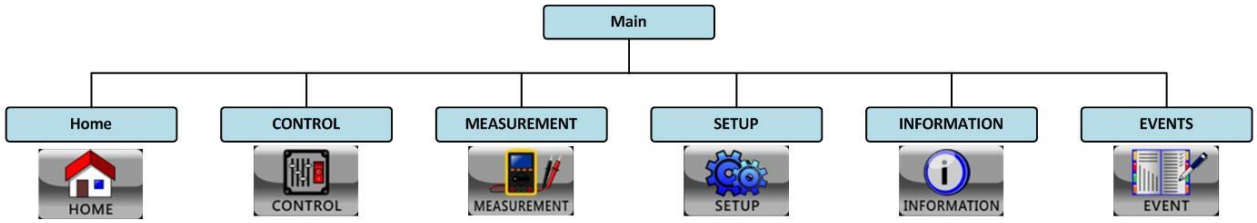


Figure 4-4 Menu tree

(4) UPS Flow Chart: Current flow chart and measurement data.

(5) UPS power rating.

(6) Date and Time.

4.2.3 Control Screen

Touch 

icon to enter into the sub-menu as shown in Figure 4-5 and 4-6.

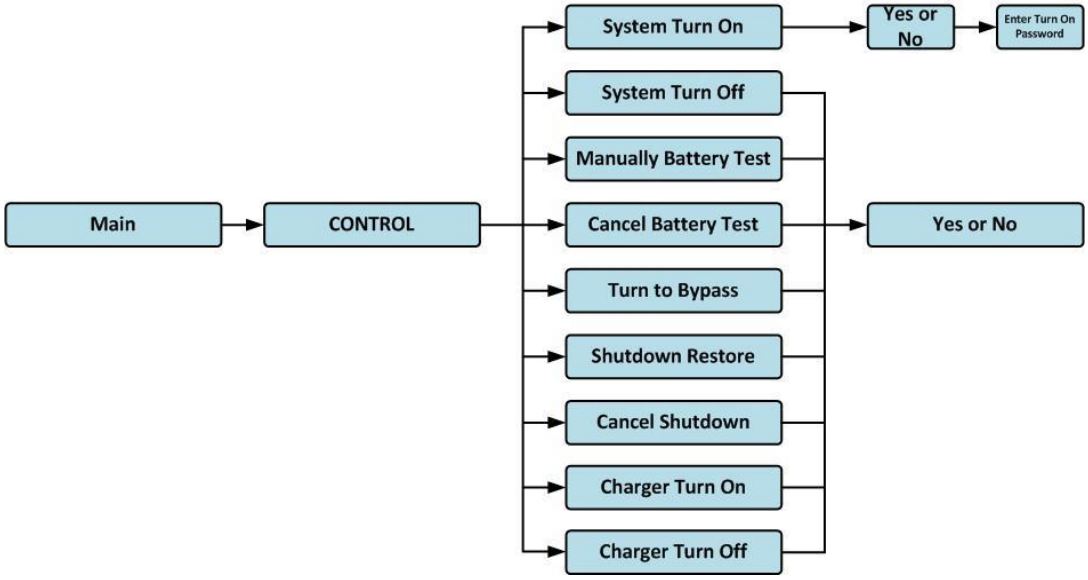


Figure 4-5 Control menu tree



Figure 4-6 Control screen page

Touch any control option directly. Then, confirmation screen will pop up. Touch Yes icon to confirm command or touch No icon to cancel command as shown in Figure 4-7.

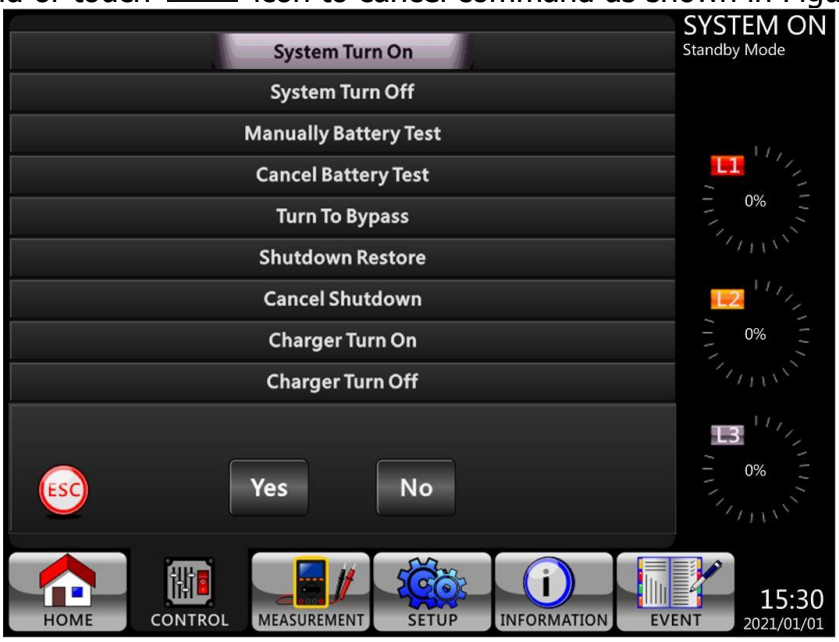


Figure 4-7 Confirmation screen

4.2.5 Measurement Screen

Touch MEASUREMENT icon to enter into the sub-menu. There are two sub-menus, system measurement and module measurement. Touch SYSTEM icon to monitor system measurement value or MODULE icon to monitor module measurement value. You may choose Input, Output, Bypass, Load or Battery to monitor detailed status under "System" or "Module" directory. Please refer all screens in Figure 4-8 and 4-9. All detailed measurement items are listed in Table 4-4.

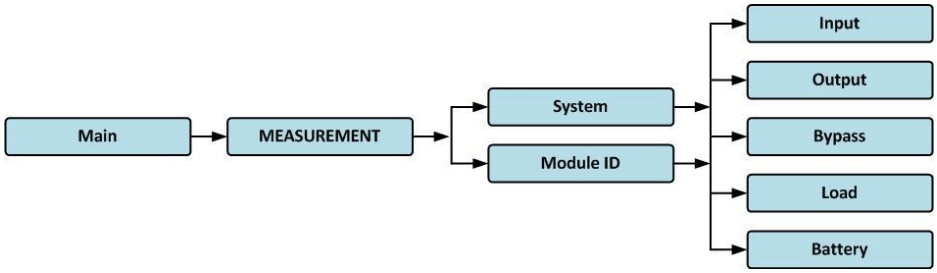


Figure 4-8 Measurement menu



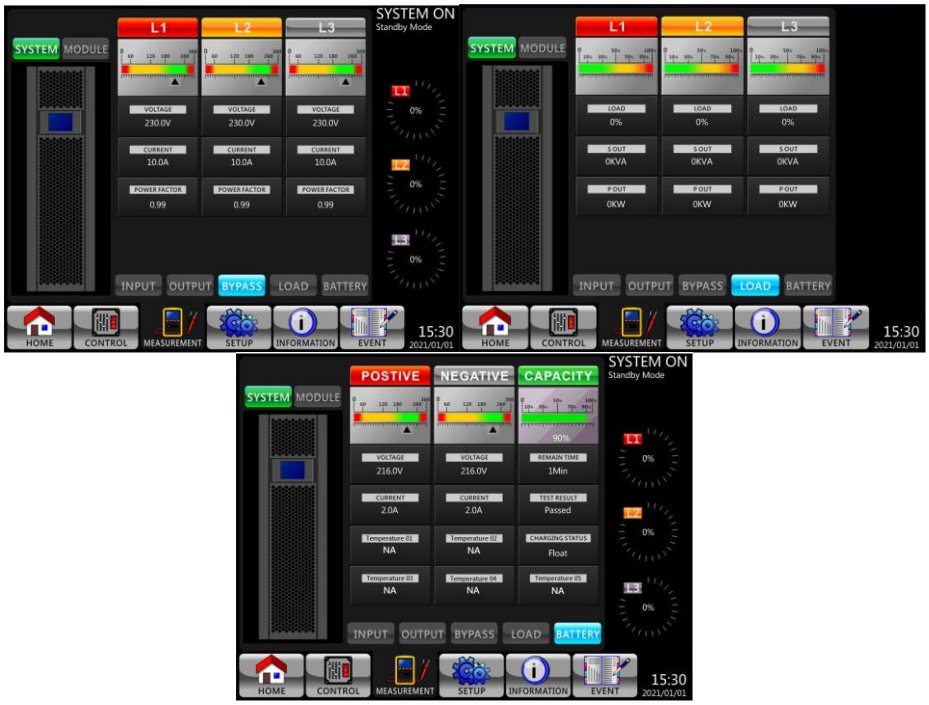


Figure 4-9 System Measurement Screens

Touch MODULE icon to monitor module measurement value.



Figure 4-10 Module Measurement Screens

The measurement can be read listed in **Table 4-4**.

Table 4-4: Measurement data

Menu	Item	Explanation
Input	L-N Voltage (V)	Input phase voltage (L1, L2, L3). Units 0.1V.
	Frequency (Hz)	Input Frequency (L1, L2, L3). Units 0.1Hz.
Output	L-N Voltage (V)	Output phase voltage (L1, L2, L3). Units 0.1V.
	L-N Current (A)	Output phase current (L1, L2, L3). Units 0.1A.
	Frequency (Hz)	Output Frequency (L1, L2, L3). Units 0.1Hz.
	Power Factor	Output Power Factor (L1, L2, L3).
Bypass	L-N Voltage (V)	Bypass phase voltage (L1, L2, L3). Units 0.1V.
	Frequency (Hz)	Bypass Frequency (L1, L2, L3). Units 0.1Hz.
	Power Factor	Bypass Power Factor (L1, L2, L3).
Load	Sout (KVA)	Apparent power. Units 0.1KVA.
	Pout (KW)	Active power. Units 0.1KW.
	Load Level (%)	The percentage of the UPS rating load. Units 1%.
Battery	Positive Voltage (V)	Battery Positive Voltage. Units 0.1V.
	Negative Voltage (V)	Battery Negative Voltage. Units 0.1V.
	Positive Current (A)	Battery Positive Current. Units 0.1A.
	Negative Current (A)	Battery Negative Current. Units 0.1A.
	Remain Time (Sec)	Battery run time remaining. Units 1sec.
	Capacity (%)	The percentage of the capacity of the battery. Units 1%。
	Test Result	Battery test result
	Charging Status	Battery charging status
	Temperature1(℃)	Battery cabinet temperature of STS module. Units 0.1℃.

4.2.6 Setup Screen

Touch the 

icon to enter into the sub-menu. It's required to enter password to access General, SYSTEM, BATTERY and PRE-ALARM sub-menus as shown in Figure 4-11 and 4-12.

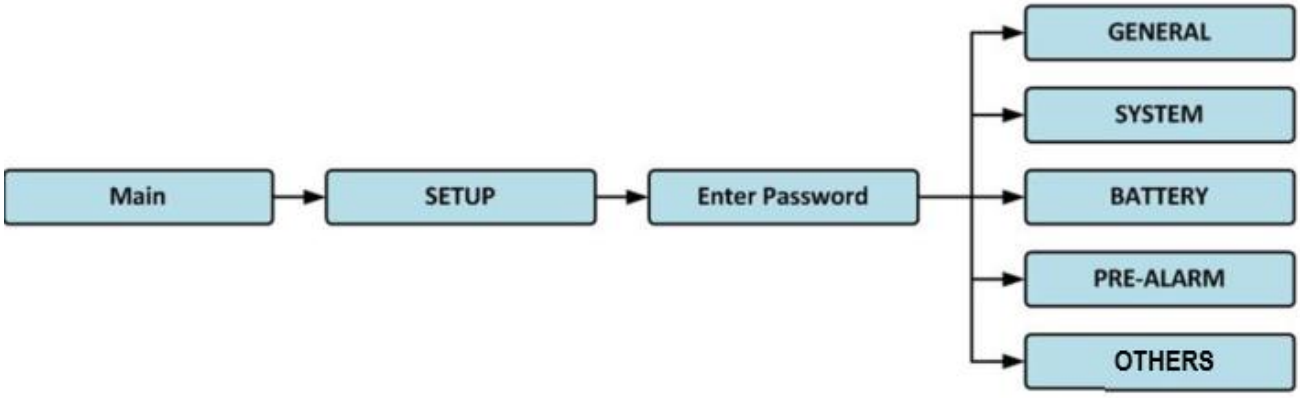


Figure 4-11 Setup menu

Touch the grey column and it will pop up number keyboard. Please enter 4-digit password and select  icon to enter SETUP sub-menu. If incorrect password is entered, the LCD screen will ask for retry.



Figure 4-12 Enter password screen

There are two levels of password protection, user password and maintainer password.
The default password for user is "0000". It could be change by user.
The manitainer password is owned by service personnel.
Entering different level of password can access to different settings. The setting can be changed in different operation mode. The **Table 4-5** lists the relevant information.

Table 4-5: All setting items in Setup Menu

UPS operation Mode / Setting item		Standby Mode	Bypass Mode	Line Mode	Battery Mode	Battery Test Mode	Fault Mode	Converter Mode	ECO Mode	Authorization	
										User	Maintainer
General	Model Name	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Language	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Time	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Baud Rate	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Audible Alarm	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Factory Reset	Y									Y
	EEPROM Reset	Y									Y
	EPO Function	Y									Y
	Change Password	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Save Setting	Y	Y							Y	Y
	Startup Screen	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Multi-Settings	Y	Y	Y	Y	Y	Y	Y	Y		Y
System	Output Voltage	Y	Y								Y
	Bypass Voltage Range	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Bypass Frequency Range	Y	Y								Y
	Converter Mode	Y									Y
	ECO Mode	Y	Y								Y
	Bypass Mode	Y	Y								Y
	Auto-Restart	Y	Y	Y	Y	Y	Y	Y	Y		Y

	Power Walk in	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Battery Mode Delay Time	Y	Y	Y			Y	Y	Y		Y
	System Shutdown Time	Y	Y	Y	Y	Y	Y	Y	Y		Y
	System Restore Time	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Power Rating Setting	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Redundancy	Y	Y	Y	Y	Y	Y	Y	Y		Y
	CT Ratio Setting	Y		Y	Y	Y	Y	Y			Y
Battery	Nominal Battery Voltage	Y	Y								Y
	Battery Capacity in Ah	Y	Y	Y			Y	Y	Y		Y
	Maximum Charging Current	Y	Y								Y
	Battery Low/Shutdown Setting	Y	Y	Y			Y	Y	Y		Y
	Battery Age Alert	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Temperature Compensation	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Auto Restart Battery Voltage	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Charging Voltage	Y	Y								Y
	Periodic Battery Test	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Battery Test Interval	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Stop by Time	Y	Y	Y	Y		Y	Y	Y		Y
	Stop by Battery Voltage	Y	Y	Y	Y		Y	Y	Y		Y
Pre-Alarm	Shown on Current Event	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Line Voltage Range	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Line Frequency Range	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Overload	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Load Unbalance	Y	Y	Y	Y	Y	Y	Y	Y		Y
Others	Dynamic Password	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Customer ID	Y	Y	Y	Y	Y	Y	Y	Y		Y
	ISO Function	Y	Y				Y		Y		Y
	Sleep Function	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Generator Input	Y	Y	Y	Y	Y	Y	Y	Y		Y

"Y" means that this setting item can be set in this operation mode.

Setting Procedure

Step 1: Choose the setting item from GENERAL, SYSTEM, BATTERY and PRE-ALARM.

Step 2: Select modified item and it will show current value and setting in the screen. Simply choose current setting and it will list all alternatives. Please choose the modified setting.

Step 3: Choose  icon to confirm the setting change or choose  icon to cancel the setting.

Step 4: After finish the setting, please save the setting in GENERAL screen.

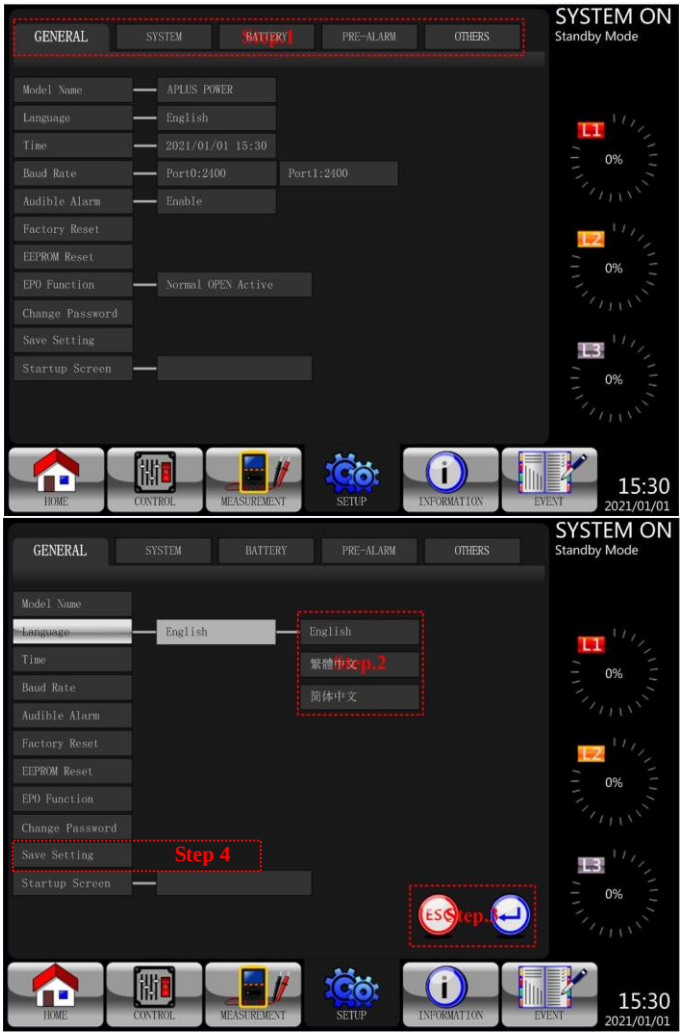


Figure 4-13 Setting procedure

4.2.6.1 Setup-General Screen

The Setup-General screen and setting list are shown in Figure 4-14 and **Table 4-6**. General setting can be set in any operating mode.

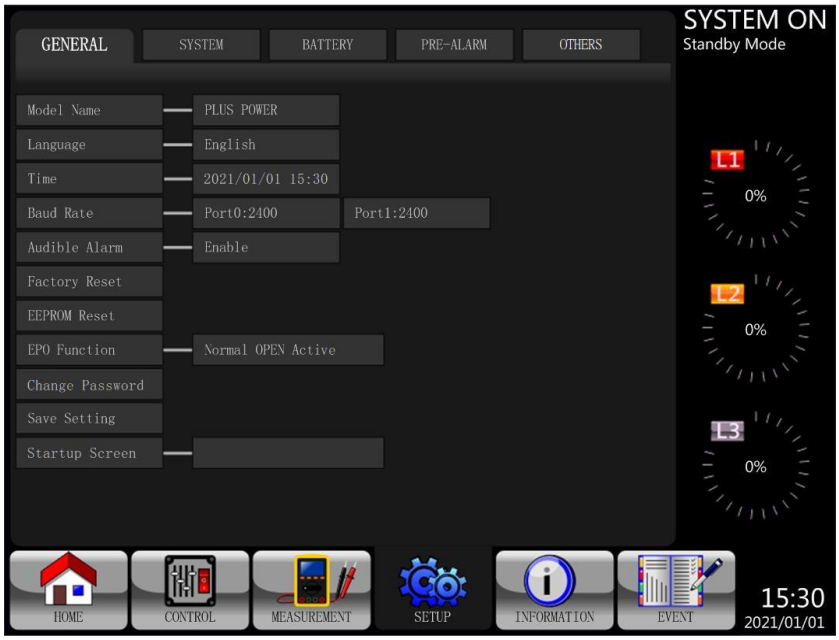


Figure 4-14 Setup-General screen

Table 4-6: Setup-General setting list

Setting Item	Sub Item	Explanation
Model Name		Set UPS Name (xxxxxxxxxx). The max. length is 10 characters.
Language	--	Provides 3 optional LCD languages: ● English (Default) ● Traditional Chinese ● Simplified Chinese
TIME	Adjust Time	Set current date and time. (yyyy / mm / dd hour : min : sec) **MUST be set after UPS installation**
	System Installed Date	Set system installed date (yyyy / mm / dd) 2015/1/1 (Default) **MUST be set after UPS installation**
	System Last Maintain Date	Set system latest maintenance date (yyyy / mm / dd) **MUST be set after UPS installation**
	Battery Installed Date	Set battery installed date (yyyy / mm / dd) **MUST be set after UPS installation**
	Battery Last Maintain Date	Set battery latest maintenance date (yyyy / mm / dd) **MUST be set after UPS installation**
Baud Rate	--	Set COM Port0 Baud Rate ● 2400 (Default) ● 4800 ● 9600 Set COM Port1 Baud Rate ● 2400 (Default)

		● 4800 ● 9600
Audible Alarm	--	Set Audible Alarm ● Disable ● Enable (Default)
Factory Reset	--	Restore to factory default setting Refer to **Table 4-7**
EPO Function		Set EPO function ● Normal open (Default) ● Normal close
EEPROM Reset	--	Set EEPROM default Refer to **Table 4-7**
Password	--	Set New Password. 0000 (Default)
Save Setting	--	Save EEPROM **Use this feature to save the setting(s) you have done.**

Table 4-7: EEPROM Reset Category list

Setting Item		Factory Reset	EEPROM Reset
General	Model Name	Y	Y
	Language	Y	Y
	Adjust Time	Y	Y
	System Installed Date	Y	Y
	System Last Maintain Date	Y	Y
	Battery Installed Date	Y	Y
	Battery Last Maintain Date	Y	Y
	Change Password	Y	Y
	Baud Rate	Y	Y
	Audible Alarm	Y	Y
	Factory Reset	--	--
	EEPROM Reset	--	--
	EPO Function	Y	Y
	Save Setting		Y
	Serial Number		Y
System	Output Voltage	Y	Y
	Bypass Voltage Range	Y	Y
	Bypass Frequency Range	Y	Y
	Converter Mode	Y	Y
	ECO Mode	Y	Y
	Bypass Mode	Y	Y
	Auto-Restart	Y	Y
	Battery Mode Delay Time	Y	Y
	System Shutdown Time	Y	Y
	System Restore Time	Y	Y
	Redundancy	Y	Y
	Power Rating Setting	Y	Y
	Charger Test		Y
	Calibration Data		Y

Battery	Nominal Battery Voltage	Y	Y
	Battery Capacity in Ah	Y	Y
	Maximum Charging Current	Y	Y
	Battery Low/Shutdown Setting	Y	Y
	Periodic Battery Test	Y	Y
	Battery Test Interval	Y	Y
	Stop by Time	Y	Y
	Stop by Battery Voltage	Y	Y
	Stop by Battery Capacity	Y	Y
	Battery Age Alert	Y	Y
	Temperature Compensation	Y	Y
	Charging Voltage	Y	Y
	Auto-Restart Battery Voltage	Y	Y
Pre-Alarm		Y	Y

4.2.6.2 Setup-System Screen

The Setup-System screen and setting list as shown in Figure 4-15 and table 4-8. System setting can be set only when UPS is operated in certain mode. Please check setting item availability table 4-5 for the details. If it's not set up under specific mode, the warning screen will appear. Refer to figure 4-16.

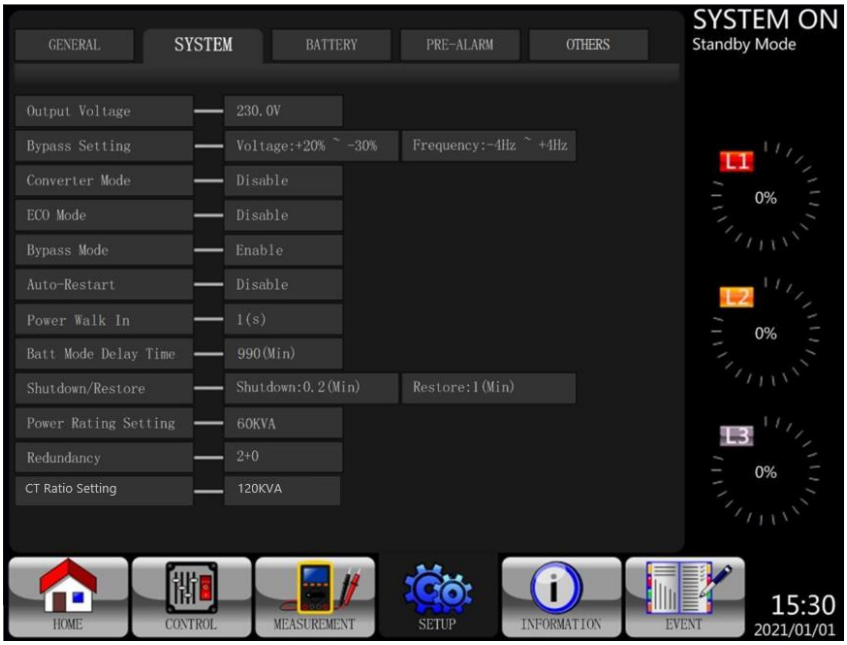


Figure 4-15 Setup-System screen



Figure 4-16 Warning screen

Setup-System setting list is shown in **Table 4-8**.

Table 4-8: Setup-System setting list

Setting Item	Sub Item	Explanation
Output Voltage	--	Set output voltage ● 220Vac ● 230Vac (Default) ● 240Vac **MUST be reviewed after UPS installation**
BYPASS SETTING	Bypass Voltage Range	Set bypass voltage range: Upper limit ● +10% ● +15% ● +20% (Default) Lower limit ● -10% ● -20% ● -30% (Default)
	Bypass Frequency Range	Set bypass Frequency range: Upper/ Lower limit ● +/- 1Hz ● +/- 2Hz ● +/- 4Hz (Default)
Converter Mode	--	Set converter mode ● Disable (Default) ● Enable ● 50Hz ● 60Hz ● AUTO
ECO Mode	--	Set ECO mode ● Disable (Default) ● Enable

Bypass Mode	--	Set bypass mode ● Disable ● Enable (Default) **MUST be reviewed after UPS installation.** If you need the Bypass power when UPS is OFF, please enable it.
Auto-Re start	--	Set auto-restart ● Disable ● Enable (Default) After "Enable" is set, once UPS shutdown occurs due to low battery and then utility restores, the UPS will return to line mode.
Power Walk in		Set power walk in upper/lower limits ● +/- 1s time step (setting range: 1s ~ 10s)
Battery Mode Delay Time	--	Set system shutdown delay time in battery mode (0~990min). ● 0: Disable (Default) ● Not 0: Enable When this feature is enabled, UPS will shut off output after UPS operates in Battery mode for certain minute.
Shutdo wn/ Restore	System Shutdown Time	Set system shutdown time (0.2~99min) ● 0.2 min (Default) This delay time will start counting when the CONTROL-Shutdown Restore command is executed.
	System Restore Time	Set system restore time (0~9999min) ● 1 min (Default) This delay time will start counting after shutdown time is elapsed when the CONTROL-Shutdown Restore command is executed.
Power rating setting	--	Set power rating value per module ● 0-99 KVA ● Rating display enable ● Rating display disable(default)
Redund ancy	--	Set total power and redundancy Redundancy: the QTY of redundant power module **MUST be set after UPS installation or the QTY of Power Module is changed**
CT ratio setting		Set the BYPASS CT ratio ● 60KVA (for 60 KVA) ● 120KVA (for 80~120KVA) ● 200KVA (for 150~200KVA) ● 300KVA (for 240~300KVA) For –A models ● 80KVA (for 80-A model) ● 150KVA (for 150-A model) ● 160KVA (for 160-A model)

4.2.6.3 Setup-Battery Screen

The Setup-Battery screen and setting list as shown in Figure 4-17 and table 4-9. Battery setting can be set only when UPS is operated in standby mode. If it's not in standby mode, the warning screen will appear as shown in Figure 4-16. See Setup-Battery setting list in

Table 4-9.

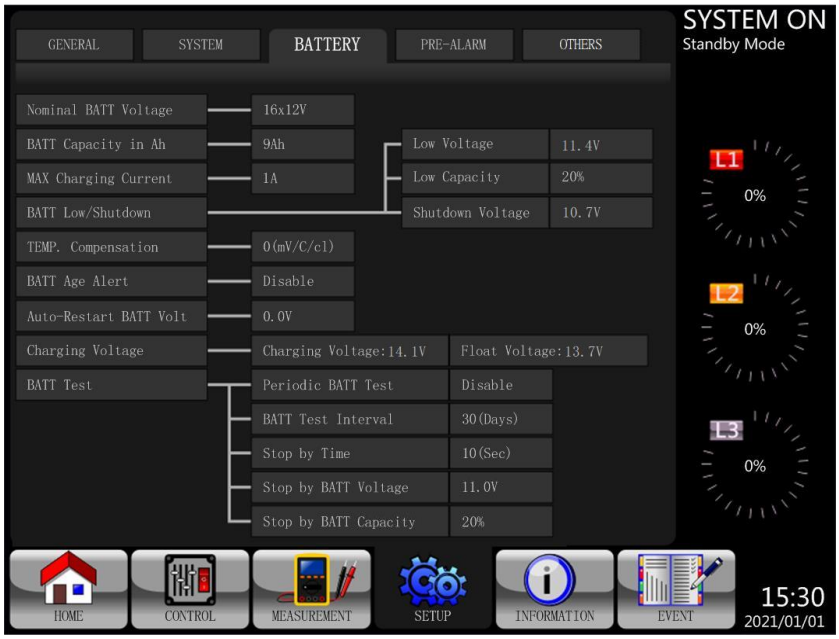


Figure 4-17 Setup-Battery Screen

Table 4-9: Setup-Battery setting list

Setting Item	Sub Item	Explanation
Nominal Battery Voltage	--	Set battery nominal voltage ● PB 16x12V (Default) ● PB 18x12V ● PB 20x12V ● Li 204.8V TP 80 ● Li 256.8V TP 100 ● Li 204.8V TP 160 ● Li 256.0V TP 200 **MUST be set after UPS installation**
Battery Capacity in Ah	--	Set battery capacity. (0~999) ● 9Ah (Default) **MUST be set after UPS installation or Battery capacity is changed.**
Maximum Charging Current	--	Set battery maximum charging current (1~360A) 1A (Default) **MUST be set after UPS installation or Battery capacity is changed.**
Battery Low/ Shutdown Setting	Low Voltage	Set battery low voltage (10.5~11.5V)x(battery Number) ● 11.4V x Battery Number (Default)
	Low Capacity	Set battery low capacity (20~50%) ● 20% (Default)
	Shutdown Voltage	Set battery voltage point for system shutdown in battery mode (10.0~11V) x (battery Number) ● 10.7V x Battery Number (Default)
Battery Test	Periodic Battery Test	Set periodic battery test disable or enable ● Disable (Default) ● Enable

	Battery Test Interval	Set battery test interval (7~99 Days) ● 30 Days (Default)
	Stop by Time	Set testing time for battery test (10~1000sec) ● 10 sec (Default)
	Stop by Battery Voltage	Set stop battery voltage in battery test (11~12V) x (battery Number) ● 11V x Battery Number (Default)
	Stop by Battery Capacity	Set battery capacity to stop battery-testing. (20~50%) ● 20% (Default)
Battery Age Alert	Battery Age Alert (Months)	Set battery age for replacement. (Disable,12~60Months) ● Disable (Default) If this feature is enabled and the battery has been installed over this period, there is a warning "Battery Age Alert" to indicate it.
Temperature Compensation	--	Set battery temperature compensation. (0~-5 (mV/C/cl)) ● 0(mV/C/cl) (Default)
Auto Restart BATT Volt	--	Set battery auto restart voltage ● 0V (Default)
Charging Voltage	--	Set battery charging voltage. (14.1~14.4V) ● 14.1V(Default) Set battery float voltage. (13.5~14.0V) ● 13.7V(Default)

4.2.6.4 Pre-Alarm Screen

The Setup-Pre-Alarm screen and setting list as shown in Figure 4-18 and table 4-9. Pre-Alarm setting can be set in any operation mode.

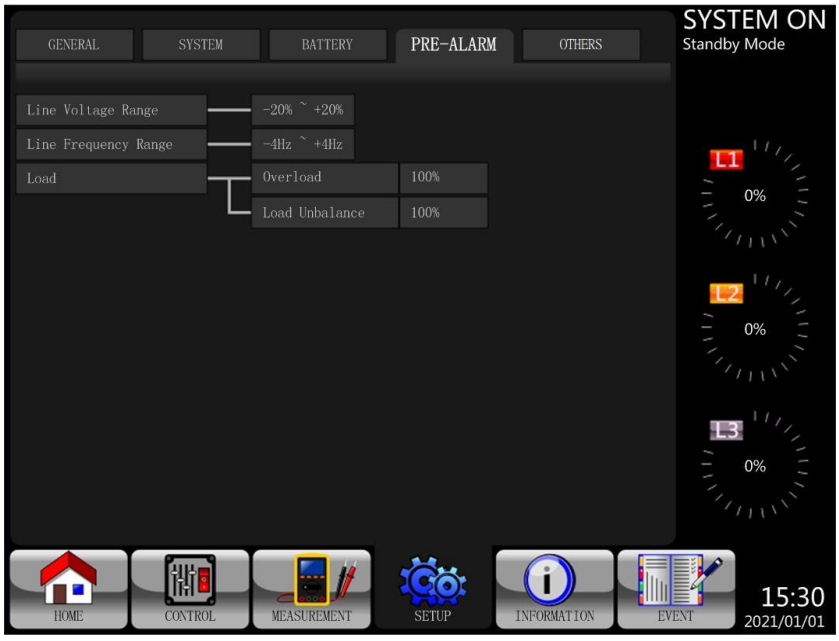


Figure 4-18 Setup-Pre-Alarm screen

Pre-Alarm setting can be set in any operation mode. See Setup-Pre-Alarm setting list in **Table 4-10**.

Table 4-10: Setup-Pre-Alarm setting list

Setting Item	Sub Item	Explanation
Line Voltage Range	--	Set line voltage range: Upper limit ● +5% ● +10% ● +15% ● +20% (Default) Lower limit ● -5% ● -10% ● -15% ● -20% (Default)
Line Frequency Range	--	Set line frequency range: Upper / Lower limit ● +/- 1Hz ● +/- 2Hz ● +/- 3Hz ● +/- 4Hz (Default)
Load	--	Set UPS Overload percentage (40~100%) ● 100% (Default) Set UPS load unbalance percentage (20~100%) ● 100% (Default)

4.2.6.5 Setup-OTHERS Screen

Use UP and DOWN icons to switch different sub-menus. Press ENTER icon to go into the **OTHERS** setting screen, as shown in Figure 4-19.



Figure 4-19-1 Setup-**OTHERS** screen

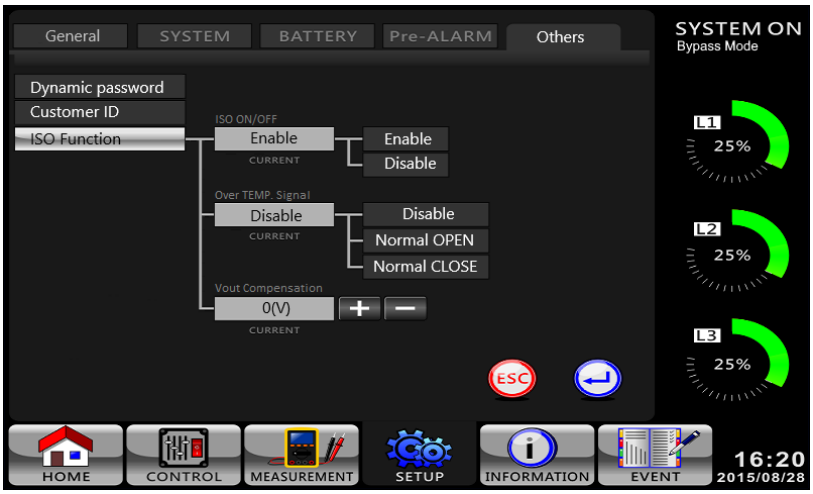


Figure 4-19-2 ISO function sub menu screen

Please refer to Table 4-11 for the setting details.

Table 4-11: Setup-Dynamic password setting list

Setting Item	Sub Item	Description
Dynamic Password	--	Set Dynamic Password disable or enable ● Disable (Default) ● Enable
Customer ID	--	● The default customer code is "0000000"
ISO Function	ISO ON/OFF	Turn on or off voltage compensation ● Disable(Default) ● Enable
	Over TEMP. Signal	Transformer over-temperature detection ● Disable(Default) ● Normal OPEN ● Normal CLOSE
	Vout compensation	Magnitude of voltage compensation ● From -15 to 15 volt except 0 (Default 7)
Generator Input	Generator mode ON/OFF	Set Generator mode disable or enable ● Disable (Default) ● Enable

4.2.7 Information Screen

Touch 

icon to enter into the sub-menu. In this Information screen, you can check the UPS configuration of the unit. There are three sub-menus, Identification, System and Battery.

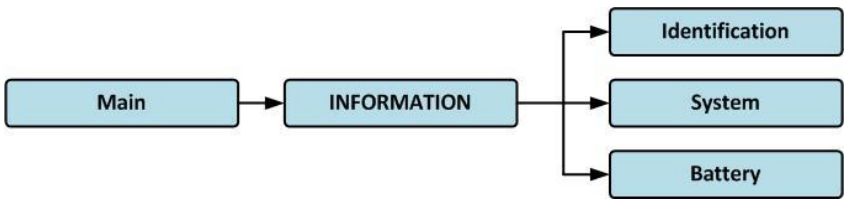


Figure 4-20 Information menu

4.2.7.1 INFORMATION - Identification Screen

When Identification submenu is clicked, the Model Name, Serial No. and Firmware Version will be displayed, as shown in Figure 4-21.

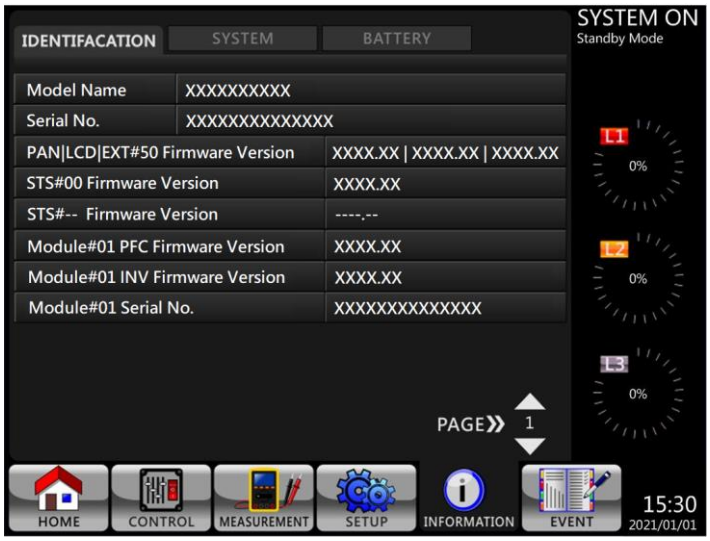


Figure 4-21 Identification screen page

4.2.7.2 INFORMATION - System Screen

When System submenu tab is touched, the system power, nominal voltage, nominal frequency … etc. information will be displayed, as shown in Figure 4-22 and 4-23. Touch UP and DOWN arrows to switch different pages.



Figure 4-22 INFORMATION System screen page 1



Figure 4-23 INFORMATION System screen page 2

4.2.7.3 INFORMATION - Battery Screen

When Battery submenu tab is touched, the Battery nominal voltage, capacity, charging current … etc. information will be displayed, as shown in Figure 4-24.



Figure 4-24 INFORMATION Battery screen page

4.2.8 Events Screen

When event occurs, you will see flashing  icon in the Main Screen as shown in Figure 4-25. You also can touch 

icon to check the latest event lists, history events and reset all events as shown in Figure 4-26.

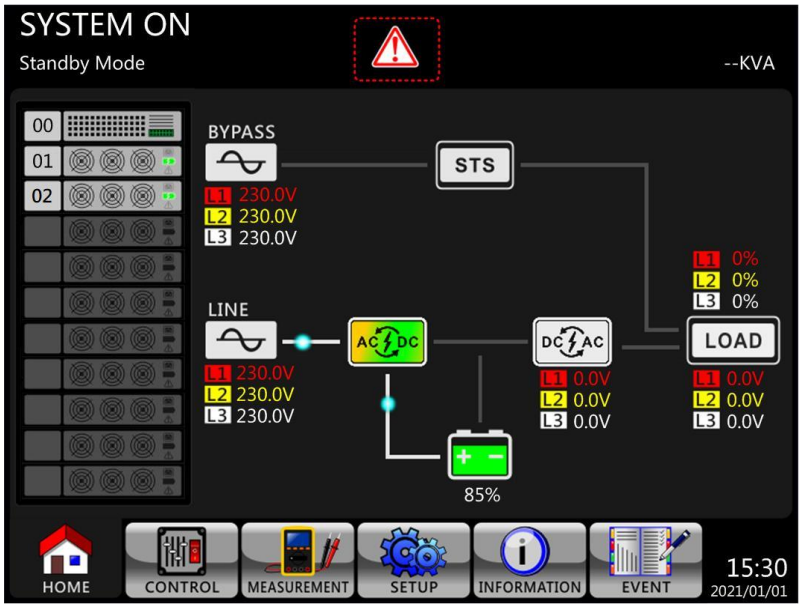


Figure 4-25 Alarm warning screen

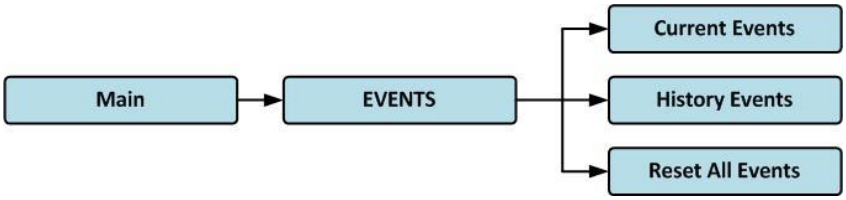


Figure 4-26 Events menu

4.2.8.1 Current Events

When event occurs, it will display Module ID and alarm code in Current Events screen. It can save up to 50 events in current list. Only 10 events can be listed in one page. Therefore, if it exceeds more than 10, you have to press 

icon to read other event as shown in Figure 4-27.



Figure 4-27 Current Events screen

4.2.8.2 History Events

The detailed event information is saved in history events. It can save up to 500 events in history events. When warning occurs, it will display alarm code, alarm time and Module ID. When fault event occurs, it will display alarm details, alarm time and Module ID. (Refer to **Table 4-12** Alarm List) In order to record more historical information about the UPS system, the important setting changed (refer to **Table 4-13** Important setting changed), UPS operation mode changes (refer to **Table 4-14** UPS mode change) and control action executes (refer to **Table 4-15** Control execution) will be saved in History Events. Refer to Figure 4-28 for display screen.



Figure 4-28 History Events screen

4.2.8.3 Reset All Events

The Maintainer password is required to enter Reset All Events screen as shown in Figure 4-29. After entering correct password, it will pop up reconfirmed screen. Then, touch 

icon to reset all events or touch 

icon to cancel this action as shown in Figure 4-30.



Figure 4-29 Reset All Events screen

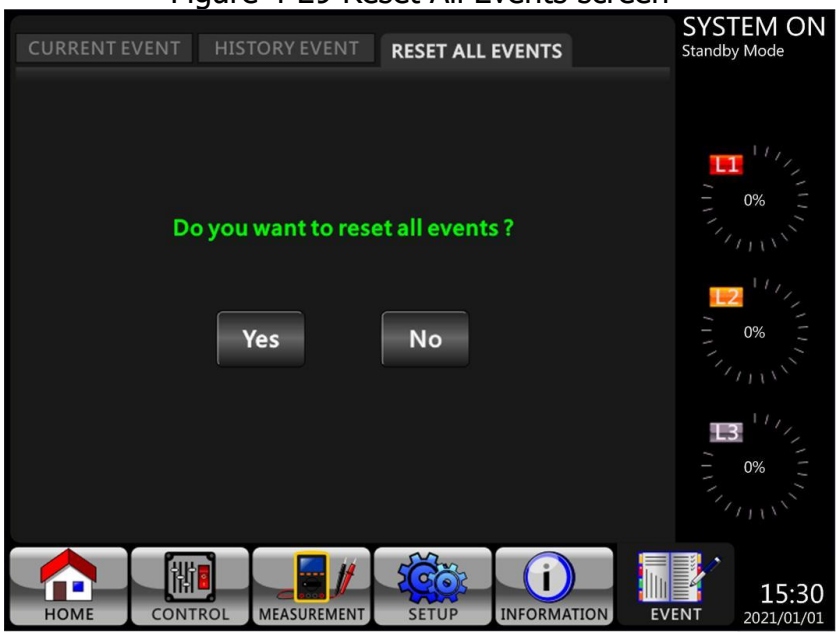


Figure 4-30 Reset All Events Confirmation screen

4.3 Alarm List

In **Table 4-12**, it provides the complete list of UPS alarm messages.

Table 4-12: Alarm List

	Explanation
Fault! <01>Bus start fail	BUS soft start failed
Fault! <02>Bus over	BUS voltage high
Fault! <03>Bus under	BUS voltage low
Fault! <04>Bus unbalance	BUS voltage unbalanced
Fault! <05>Bus dec fast	BUS voltage drop too fast
Fault! <06>Input overload	Converter over current
Fault! <11>INV start fail	Inverter soft start failed
Fault! <12>High INV VOL	Inverter voltage high
Fault! <13>Low INV VOL	Inverter voltage low
Fault! <14>INV A out SC	Phase A (Line to Neutral) output short circuited
Fault! <15>INV B out SC	Phase B (Line to Neutral) output short circuited
Fault! <16>INV C out SC	Phase C (Line to Neutral) output short circuited
Fault! <17>INV AB out SC	Phase A-Phase B (Line to Line) output short circuited
Fault! <18>INV BC out SC	Phase B-Phase C (Line to Line) output short circuited
Fault! <19>INV AC out SC	Phase C-Phase A (Line to Line) output short circuited
Fault! <1A>INV A N-fault	Phase A output negative power fault
Fault! <1B>INV B N-fault	Phase B output negative power fault
Fault! <1C>INV C N-fault	Phase C output negative power fault
Fault! <28>BATT VOL low	Battery voltage is low
Fault! <31>Par commu fail	Parallel communication failure
Fault! <36>Output Status Error	Output error occurs in parallel system
Fault! <41>Over temp	Over temperature
Fault! <42>DSP commu fail	DSP communication failed
Fault! <43>Overload	Heavy overload causes UPS fault
Fault! <45>Charger error	As stated.
Fault! <49>In&out phase incomp	Input and output phase error
Fault! <60>INV Over Current	Inverter over current
Fault! <61>BYP SCR SC	Bypass SCR short circuited
Fault! <62>BYP SCR open	Bypass SCR open circuited
Fault! <6C>Bus-VOL dec fast	BUS voltage drop too fast
Fault! <6D>CUR detect err	Current detected error
Fault! <6E>SPS Power fault	SPS power fault
Fault! <6F>BATT reversal	Battery polarity reverse
Fault! <71>R PFC IGBT fault	PFC IGBT over-current in R phase
Fault! <72>S PFC IGBT fault	PFC IGBT over-current in S phase
Fault! <73>T PFC IGBT fault	PFC IGBT over-current in T phase
Fault! <74>R INV IGBT fault	INV IGBT over-current in R phase
Fault! <75>S INV IGBT fault	INV IGBT over-current in S phase
Fault! <76>T INV IGBT fault	INV IGBT over-current in T phase
Fault! <77> ISO Over temp	Isolation transformer over temperature
Fault! <7A> Power Module Connect Fail	Power module connection failure
Warning! <01> BATT open	Battery not connected
Warning! <02> IP N loss	Input N loss
Warning! <04> Line phase error	As stated.

Warning! <05> Bypass phase error	As stated.
Warning! <07> BATT over charge	Battery over charge
Warning! <08> BATT low	Battery voltage is too low
Warning! <09> Overload warning(W)	As stated.
Warning! <0A> Fan lock warning	As stated.
Warning! <0B> EPO active	As stated.
Warning! <0C> Battery low capacity	As stated.
Warning! <0D> Over temperature	As stated.
Warning! <0E> Charge Fail	As stated.
Warning! <11> Line SCR Short	As stated.
Warning! <12> Bypass SCR Short	As stated.
Warning! <1A> Syn line error	Synchronize signal loss
Warning! <1C> Host line error	Host signal loss
Warning! <21> Line connect dif	Line connect different
Warning! <22> Bypass connect dif	Bypass connect different
Warning! <24> Par INV vol dif	INV voltage is different in parallel system
Warning! <33> Lock BYP OL 3 times	Bypass overload 3 times
Warning! <34> AC input CURR unb	AC input current unbalanced
Warning! <36> INV CURR unb	Inverter current unbalanced
Warning! <37> ECO Unstable	As stated.
Warning! <38> BATT replace	Battery need to replaced
Warning! <3A> maintain is open	Maintain bypass cover is opened
Warning! <3C> Utility ext unb	Utility extremely unbalanced
Warning! <3D> Bypass unstable	As stated.
Warning! <3E> BATT VOL High	Battery voltage is too High
Warning! <3F> BATT VOL Unbalance	Battery voltage unbalanced
Warning! <41> Bypass Loss	As stated.
Warning! <43> BUS soft Error	BUS soft start failure
Warning! <44> Redundancy Error	As stated.
Warning! <46> EEPROM Fail	EEPROM operation error
Warning! <47> STS Lost	As stated.
Warning! <48> Power module unlock	As stated.
Warning! <49> Dry Con. Input Alarm 1	Dry contact input alarm 1
Warning! <4A> Dry Con. Input Alarm 2	Dry contact input alarm 2
Warning! <4B> Line Loss	Input line failure
Warning! <4C> Overload Warning (A)	Output current overload
Warning! <4D> Output Status Abnormal	Output error in parallel system
Warning! <4E> Overload Warning (U)	Bus overload
Warning! <4F> Overload Warning (V)	INV overload

4.4 History Record

Table 4-13: Important setting changed

Item No.	Description	Item No.	Description
1	Setup! Model Name	2	Setup! Turn On Password
3	Setup! Language	4	Setup! Change Turn On Password
5	Setup! Adjust Time	6	Setup! Nominal Power Display
7	Setup! System Installed Date	8	Setup! Output Voltage
9	Setup! System Last Maintain Date	10	Setup! Bypass Voltage Range
11	Setup! Battery Installed Date	12	Setup! Bypass Frequency Range
13	Setup! Battery Last Maintain Date	14	Setup! Converter Mode
15	Setup! Change Password	16	Setup! ECO Mode
17	Setup! Baud Rate	18	Setup! Bypass Mode
19	Setup! Audible Alarm	20	Setup! Auto-Restart
21	Setup! Factory Reset	22	Setup! Battery Mode Delay Time
23	Setup! EEPROM Reset	24	Setup! Shutdown Restore Time
25	Setup! EPO Function	26	Setup! Redundancy
27	Setup! Save Setting	28	Setup! Charger Test
29	Setup! Power Rating Setting	30	Setup! Battery Capacity in Ah
31	Setup! Nominal Battery Voltage	32	Setup! Battery Low Voltage
33	Setup! Maximum Charging Current	34	Setup! Battery Shutdown Voltage
35	Setup! Battery Low Capacity	36	Setup! Stop By Time
37	Setup! Periodic Battery Test	38	Setup! Temperature Compensation
39	Setup! BATTERY Age Alert	40	Setup! PRE-ALARM
41	Setup! Charging Voltage	42	Setup! Independent Battery
43	Setup! UPS Parallel	44	Setup! Auto-Restart Battery Voltage

Table 4-14: UPS mode change

Item No.	Description	Item No.	Description
1	UPS Mode! Power On Mode	2	UPS Mode! Standby Mode
3	UPS Mode! Bypass Mode	4	UPS Mode! Line Mode
5	UPS Mode! Battery Mode	6	UPS Mode! Battery Test Mode
7	UPS Mode! Fault Mode	8	UPS Mode! Converter Mode
9	UPS Mode! ECO Mode	10	UPS Mode! Shutdown Mode
11	UPS Mode! Un-Connection		

Table 4-15: Control execution

Item No.	Description	Item No.	Description
1	Control! System Turn On	2	Control! System Turn Off
3	Control! Manual Battery Test	4	Control! Cancel Battery Test
5	Control! Turn To Bypass	6	Control! Shutdown Restore
7	Control! Cancel Shutdown	8	Control! Charger Turn On
9	Control! Charger Turn Off		

5. Interface and Communication

As shown in figure 5-1, the UPS includes dry contact ports, SNMP slot, LCD connection port and serial communication ports (RS232 port, USB port) on the front panel.

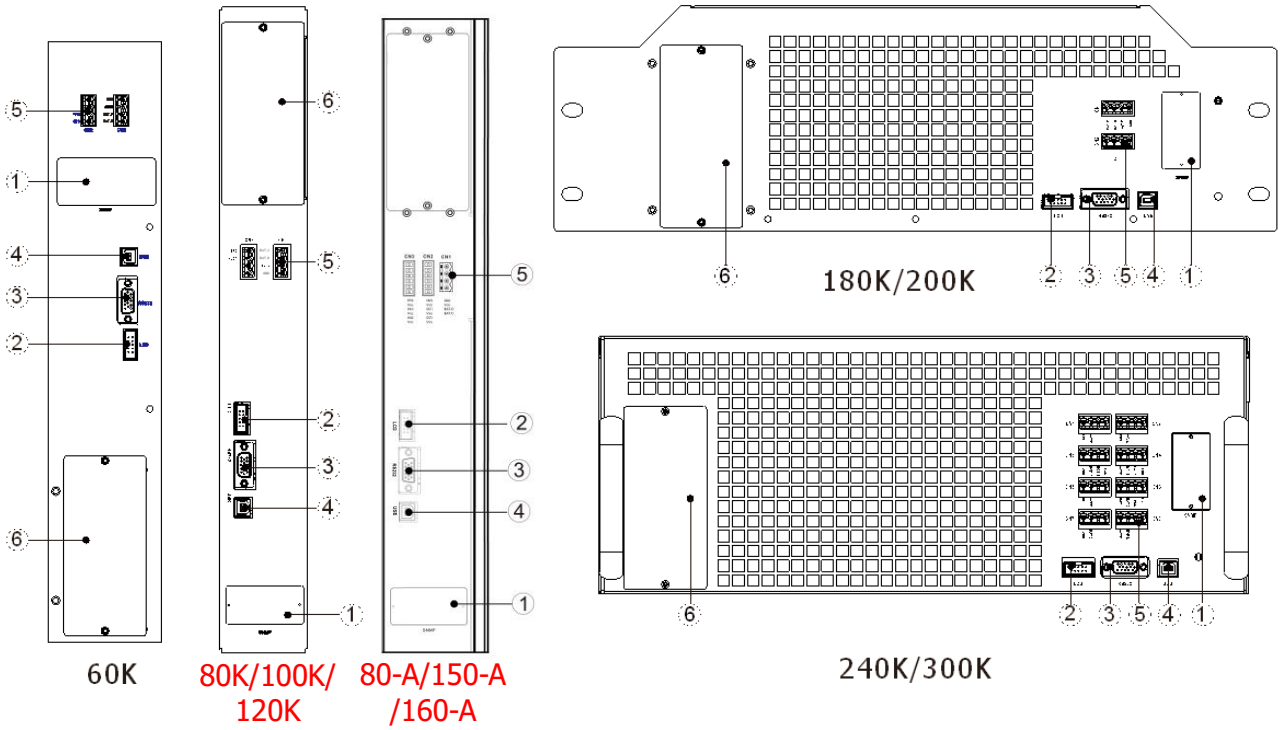
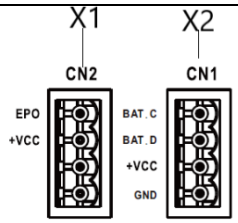
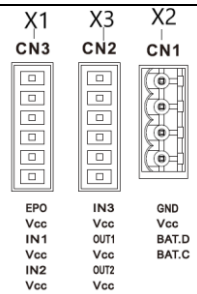
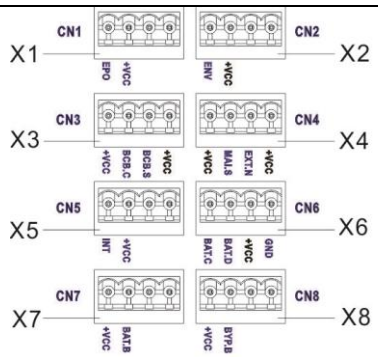


Figure 5-1 Front view of communication port

	Dry Contact No.	Function (60k - 200k)
	X1	Remote EPO input port
	X2	Battery Cabinet Temperature Detection Port)

	Dry Contact No.	Function(only for "–A" series)
	X1.1&X1.2	Remote EPO input port
	X2.1-X2.4	Battery Cabinet Temperature Detection Port
	X3.3&X3.4	Line & Bypass Backfeed output port
	X3.1&X3.2	Input port A (To be defined)
	X1.5&X1.6	Input port B (To be defined)
	X1.3&X1.4	Input port C (To be defined)
	X3.5&X3.6	Output port (To be defined)

	Dry Contact No.	Function (only for 240K/300K)
	X1	Remote EPO input port
	X2	No use
	X3	No use
	X4	Maintenance Bypass Switch State Port
	X5	No use
	X6	Battery Cabinet Temperature Detection

		Port)
	X7	No use
	X8	No use

Table 5-1: Description of dry contact port

5.1 Dry Contact Port

5.1.1 60K to 200K model

5.1.1.1 X1-Remote EPO Input Port

The Emergency Power off (EPO) function in UPS can be operated by an assigned remote contact. Logic N.C. turns off the UPS.

X1 is the remote EPO input port. The port is shown in Figure 5-2 and described in **Table 5-1.1.1**

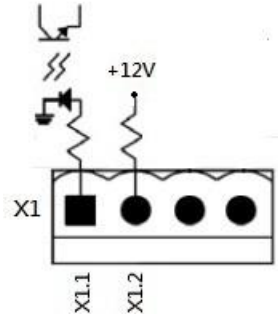


Figure 5-2 Remote EPO input port

Table 5-1.1.1: Description of remote EPO port

EPO Logic Setting	Position	Description
Short	X1.1 & X1.2	EPO is not activated when X1.1 & X1.2 shortened
Open	X1.1 & X1.2	EPO is activated when X1.1 & X1.2 opened

EPO Logic setting is Normal opened (N.O), EPO is triggered when pins 1 and 2 of X1 are closed.

Note:

1. EPO function activates shutdown of the rectifiers, inverters and static transfer switch. But it does not internally disconnect the input power supply.

5.1.1.2 X2-Battery Cabinet Temperature Detection Port

There is battery cabinet temperature detection function in the UPS. The temperature of battery cabinet can be detected through the external battery cabinet temperature detection sensor. Communication between the UPS and Battery temperature detection board was through I2C communication protocol. X6 is the battery cabinet temperature detection port. The port is shown in Figure 5-4 and described in **Table 5-1.1.2**.

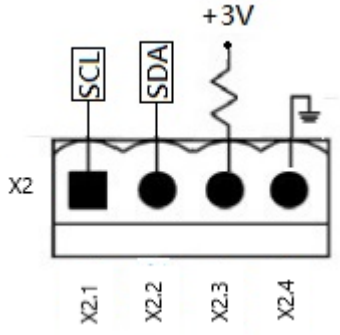


Figure 5-3 Battery Cabinet Temperature Detection port

Table 5-1.1.2: Description of Battery Cabinet Temperature Detection port

Name	Position	Description
SCL	X2.1	I²C communication SCL Signal
SDA	X2.2	I²C communication SDA Signal
+3.0V	X2.3	3V
Power GND	X2.4	GND

5.1.2 80-A/150-A/160-A model

5.1.2.1 X1.1&X1.2-Remote EPO Input Port

The Emergency Power off (EPO) function in UPS can be operated by an assigned remote contact. Logic N.C. turns off the UPS.

X1.1&X1.2 are the remote EPO input port. The port is shown in Figure 5-2 and described in **Table 5-1.2.1**.

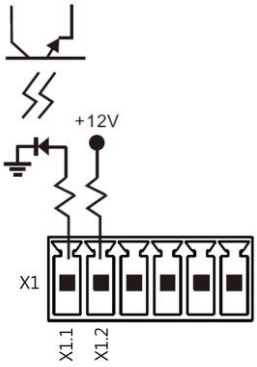


Figure 5-4 Remote EPO input port

Table 5-1.2.1: Description of remote EPO port

EPO Logic Setting	Position	Description
Open	X1.1&X1.2	EPO is not activated when X1.1&X1.2 opened
Close	X1.1&X1.2	EPO is activated when X1.1&X1.2 closed

EPO Logic setting is Normal Open (N.O.), EPO is triggered when X1.1&X1.2 are closed.

Note:

2. EPO function activates shutdown of the rectifiers, inverters and static transfer switch. But it does not internally disconnect the input power supply.

5.1.2.2 X2-Battery Cabinet Temperature Detection Port

There is battery cabinet temperature detection function in the UPS. The temperature of battery cabinet can be detected through the external battery cabinet temperature detection sensor. Communication between the UPS and Battery temperature detection board was through I2C communication protocol. X2 is the battery cabinet temperature detection port. The port is shown in Figure 5-3 and described in **Table 5-1.2.2**.

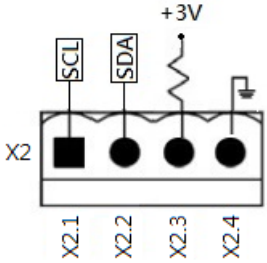


Figure 5-5 Battery Cabinet Temperature Detection port

Table 5-1.2.2: Description of Battery Cabinet Temperature Detection port

Name	Position	Description
SCL	X2.1	I²C communication SCL Signal
SDA	X2.2	I²C communication SDA Signal
+3.0V	X2.3	3V
Power GND	X2.4	GND

5.1.2.3 X3.3&X3.4-Line & Bypass Backfeed Output Port

A external disconnect device , coil controlled by Ups interface. when input ac Loss, it will open the contact controlled by UPS . The port is shown in Figure 5-4 and described in **Table 5-1.2.3**.

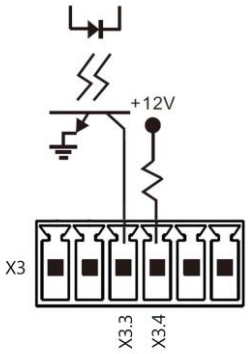


Figure 5-6 Line & Bypass Backfeed output port

Table 5-1.2.3: Description of Line & Bypass Backfeed output port

Name	Position	Description
Line & Bypass Backfeed	X3.3	Line & Bypass Backfeed
+VCC	X3.4	+VCC with 1kohm

5.1.2.4 X3.1&X3.2, X1.5&X1.6, X1.3&X1.4, X3.5&X3.6 Reserved Ports

The X3.1&X3.2, X1.5&X1.6, X1.3&X1.4, X3.5&X3.6 are the reserved ports which the X3.1&X3.2, X1.5& X1.6, X1.3& X1.4 are the input ports and the X3.5& X3.6 are the output ports. These ports are shown in Figure 5-5, Figure5-6 and described in **Table 5-1.2.4**. The reserved ports can be defined for users in future.

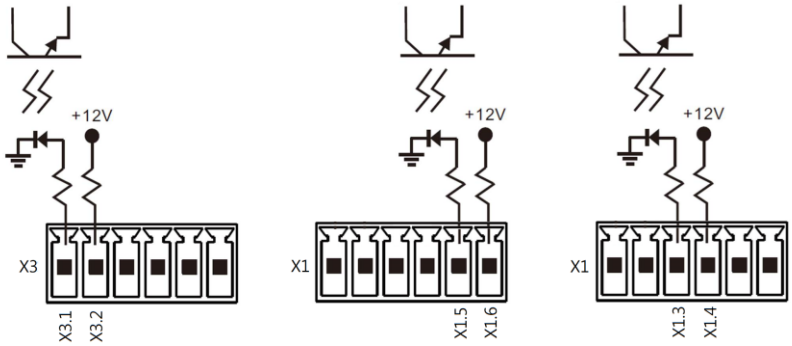


Figure 5-7 X3.1&X3.2, X1.5& X1.6, X1.3& X1.4 Reserved input ports

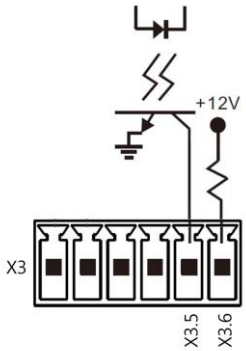


Figure 5-8 X3.5&X3.6 Reserved output ports

Table 5-1.2.4: Description of reserved ports

Logic Setting	Position	Reason
Short	X3.1&X3.2	Warning! <25> InputA active
Short	X1.5& X1.6	Warning! <26> InputB active
Short	X1.3& X1.4	Warning! <27> InputC active

5.1.3 240K to 300K model

5.1.3.1 X1-Remote EPO Input Port

The Emergency Power off (EPO) function in UPS can be operated by an assigned remote contact. Logic N.C. turns off the UPS.

X1 is the remote EPO input port. The port is shown in Figure 5-2 and described in **Table 5-1.3.1**

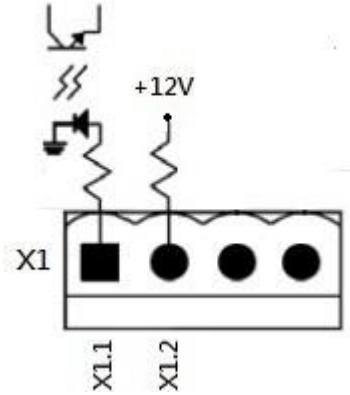


Figure 5-9 Remote EPO input port

Table 5-1.3.1: Description of remote EPO port

EPO Logic Setting	Position	Description
Short	X1.1 & X1.2	EPO is not activated when X1.1 & X1.2 shortened
Open	X1.1 & X1.2	EPO is activated when X1.1 & X1.2 opened

EPO Logic setting is Normal Closed (N.C), EPO is triggered when pins 1 and 2 of X1 are opened.

Note:

3. EPO function activates shutdown of the rectifiers, inverters and static transfer switch. But it does not internally disconnect the input power supply.

5.1.3.2 X4-Maintenance Bypass Switch Port

X4 is the maintenance bypass switch port. The port is shown in Figure 5-3 and described in **Table 5-1.3.2**.

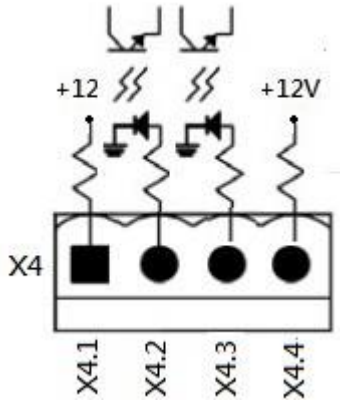


Figure 5-10 Maintenance Bypass Switch State port

Table 5-1.3.2: Description of Maintenance Bypass Switch State port

Name	Position	Description
Maintain Bypass Pin1	X4.1	Maintenance bypass switch state
Maintain Bypass Pin 2	X4.2	Maintenance bypass switch state
	X4.3	No use
	X4.4	No use

5.1.3.3 X6-Battery Cabinet Temperature Detection Port

There is battery cabinet temperature detection function in the UPS. The temperature of battery cabinet can be detected through the external battery cabinet temperature detection sensor. Communication between the UPS and Battery temperature detection board was through I2C communication protocol. X6 is the battery cabinet temperature detection port. The port is shown in Figure 5-4 and described in **Table 5-1.3.3**.

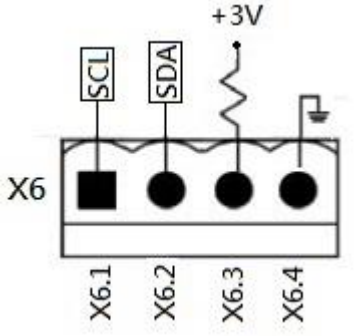


Figure 5-11 Battery Cabinet Temperature Detection port

Table 5-1.3.3: Description of Battery Cabinet Temperature Detection port

Name	Position	Description
SCL	X6.1	I²C communication SCL Signal
SDA	X6.2	I²C communication SDA Signal
+3.0V	X6.3	3V
Power GND	X6.4	GND

5.2 Local Communication Ports – RS232 & USB

Simply use USB cable or RS232 cable to connect USB port or RS-232 port to the PC as local communication.

Note: The RS232 and USB ports can't work simultaneously.

5.3 SNMP Slot

The SNMP, AS400 or Modbus card can be inserted into this slot to work with the UPS.

5.4 Extra Comm. Slot

There is an optional card called **Extra Comm. Card.** This card can be inserted into this slot to enhance the communication capability of the modular UPS. It provides an additional SNMP slot, dry contact I/P & O/P signals and temperature sensors ports.

5.4.1 Product Outlook

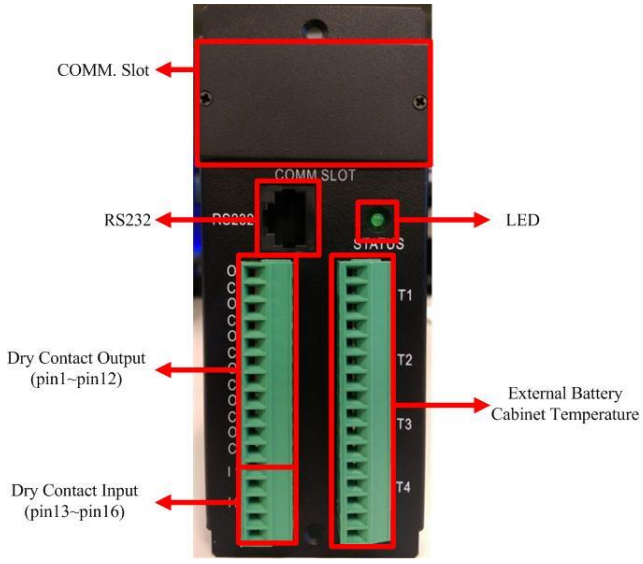


Figure 5-12

5.4.2 Product Introduction

Extra communication card is a device with additional interface functionality. This device can provide a variety different applications for UPS. The communication interfaces of extra communication card are listed below:

- RS232 port
- COMM. Slot
- Dry Contact Output
- Dry Contact Input
- External Battery Cabinet Temperature
- LED

A. RS232 port

The RS232 port can use for not only monitoring UPS status via monitoring software but also setting dry contact function with supplied utility tool.

B. COMM. Slot

This extra communication card has facility of internally fitted optional SNMP card.

C. Dry Contact Output

These 6 dry contact outputs can be set to normally open or normally close by setting jumper. Please refer to the Chapter 5 Jumper Set-up for the details. It's also able to set the feature of each dry contact output port through the Extra Com Config tool software. Please refer to Chapter 4 Configuration for the details.

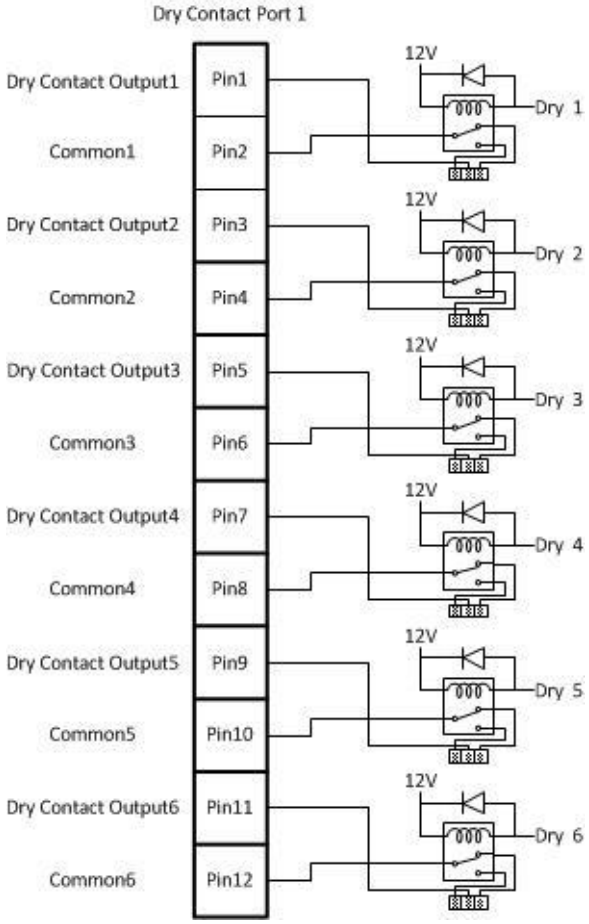


Figure 5-13

D. Dry Contact Input

There are two sets of dry contact input to receive external signals for UPS to take response.

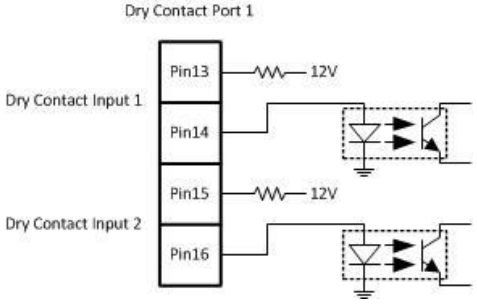


Figure 5-14

E. External Battery Cabinet Temperature (Option)

You may order "sensor kit" (optional accessory) to detect the temperature of external battery cabinet.

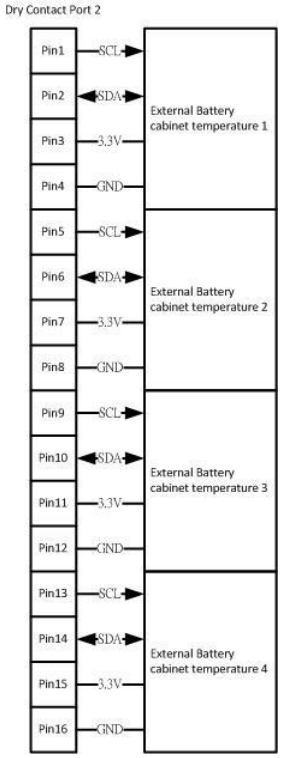


Figure 5-15

F. LED

The green LED represents operation status of the extra communication card. Please refer to below table.

Color	Status	Definition
Green	Flashing	Communications: On/0.1s, Off/0.4s. Un-Connection: On/0.1s, Off/0.1s.
	Off	ID conflict or Power off

5.4.2 Installation

Step 1. Remove cover of slot on the STS module.



Figure 5-16

Step 2. Insert extra communication card into slot.



Figure 5-17

Step 3. The cover of extra communication card should attach close to STS module. Secure the extra communication card to the STS module chassis with 2 screws.



Figure 5-18

Step 4. Use a RJ45 cable to connect UPS and equipment to implement remote monitoring and control.



Figure 5-19

5.4.3 Configuration

Step 1: Please access www.power-software-download.com to install utility tool for Extra Communication in your computer. After software is installed successfully, it will pop up a plug icon in the tray.

Step 2: Start Extra Com Config software tool in your computer. Then, it will pop up a screen as Figure 5-20.

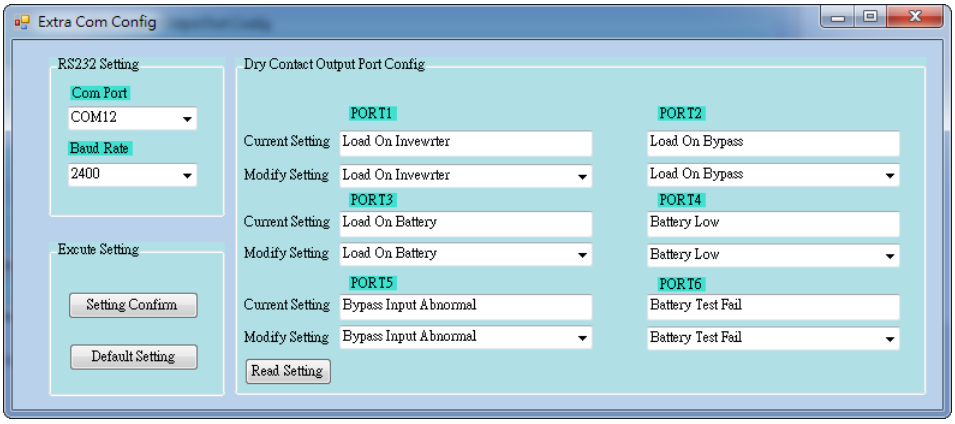


Figure 5-20

Step 3: Click "Read Setting" button to check the current setting of the dry contact output port. Refer to screen in Figure 5-21.

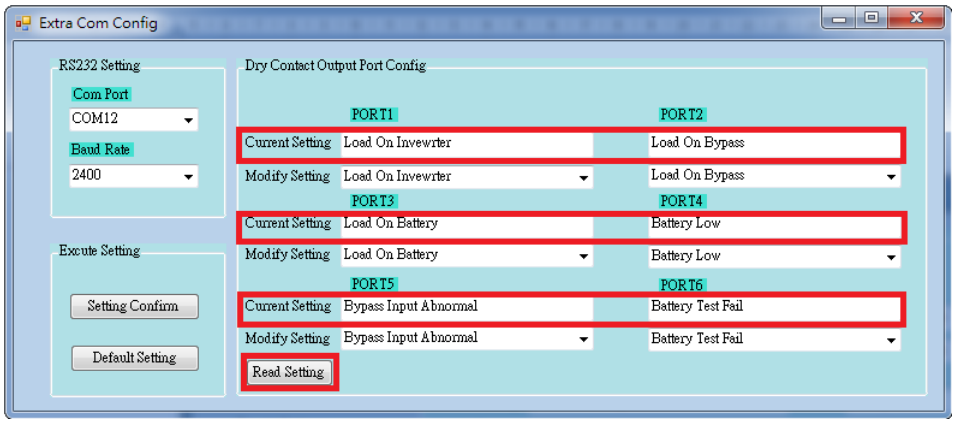


Figure 5-21

Step 4: Check all settings.
There are 20 messages to select for contact and listed in table 1. Once dry contact output settings are selected, click "Setting Confirm" button.

Table 1:

Contact	Message	Description
1	Load on inverter	The UPS is working normally.
2	Load on bypass	The UPS is in Bypass mode.
3	Load on Battery	The UPS is in Battery mode.
4	Low battery	The battery voltage is low.
5	Bypass input abnormal	The bypass voltage or frequency is abnormal.
6	Battery test failure	Performs the battery test. The battery test fails.
7	Internal communication failure	DSP and MCU stop communication in power module.
8	External parallel communication failure	Communication error between power modules.
9	Output overload warning/shutdown	Connected load is over rated output of the UPS.
10	Power module fault shutdown	The module fails and the UPS shuts down.
11	Power module warning	The module has errors, but the UPS can still function normally.
12	EPO Active	Urgently power off the UPS.
13	Maintain Bypass	The UPS transfers to Maintain bypass mode.
14	Module over temperature warning/shutdown	The temperature is too high.
15	No defined	NC
16	Bypass over temperature warning/shutdown	Bypass "static transfer switch" is over temperature.
17	Bypass static switch fault	The bypass "static transfer switch" is abnormal.
18	Line AC fail	Power failure
19	Bypass failure	Bypass source fails
20	Redundancy failure	Redundancy setting error.
21	SummaryAlarm	bypass mode/battery mode/bat open/bypass loss/fault/warning/line fail

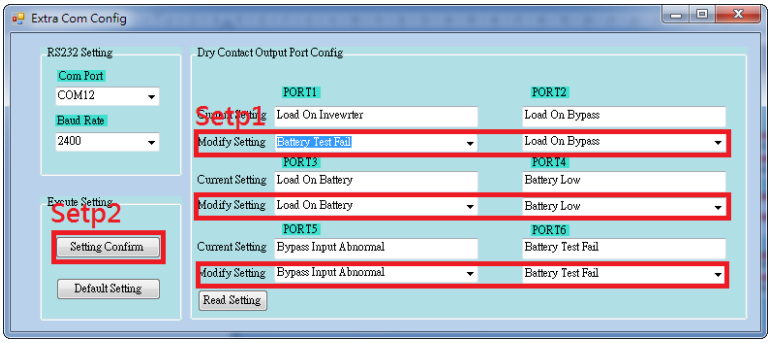


Figure 5-22

"Default Setting" button: It's to set all configurations back to default value. Refer to Figure 5-23.

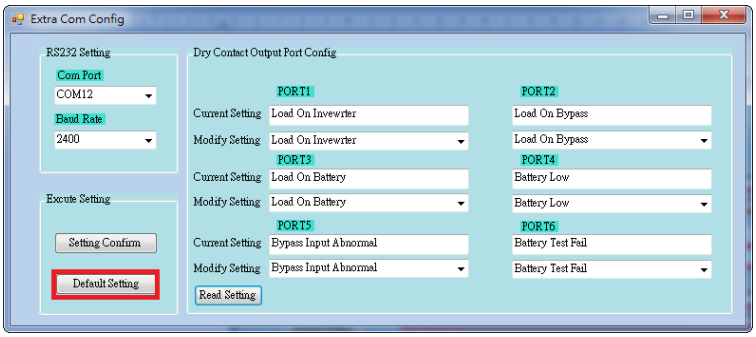


Figure 5-23

5.4.4 Jumper Set-up

Dry contact output port can be set normally open or normally close from JP1 to JP6. The 3-pin connectors can be easily found just nearby relay. The ID number of the Extra communication card can be set 60 or 61 in JS1. Please refer to Figure 5-24.

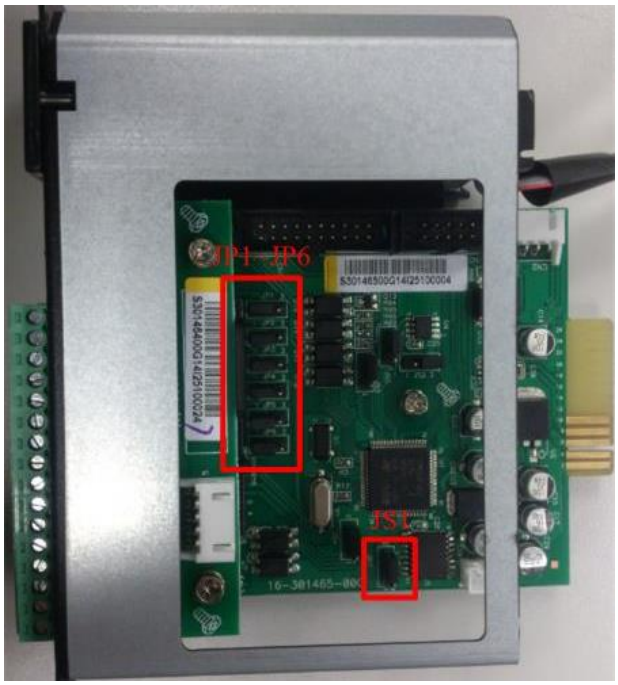


Figure 5-24

Connect pin 1 and pin 2 of JP1 to set normally open type for dry contact output port. Same connection is applied from JP1 to JP6. Refer to Figure 5-25.

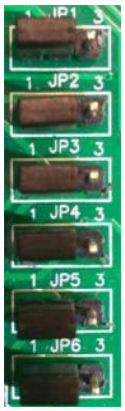


Figure 5-25

Connect pin 2 and pin 3 of JP1 to set normally close type for dry contact output port. Same connection is applied from JP1 to JP6. Refer to Figure 5-26.

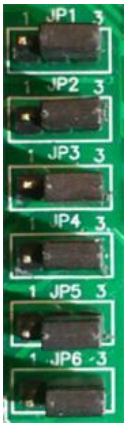


Figure 5-26

Please connect pin 1 and pin 2 of JS1 to set ID number of Extra communication card as 60 in JS1. Refer to Figure 5-27.



Figure 5-27

Please connect pin 2 and pin 3 of JS1 to set ID number of Extra communication card as 61in JS1. Refer to Figure 5-28.



Figure 5-28

6. Troubleshooting

Most of the Fault and Warning need to be released by authorized service personnel. Few of them can be solved by users themselves.

LCD Message	Explanation	Solution
Fault! Bus Over Voltage	DC bus voltage is too high	Contact service personnel.
Fault! Bus Under Voltage	DC bus voltage is too low	Contact service personnel.
Fault! Bus Voltage Unbalance	DC bus voltage is not balanced	Contact service personnel.
Fault! Bus Soft Start Time Out	The rectifiers could not start due to low DC bus voltage within specified duration	Turn off UPS and then restart the UPS. If it fails again, contact service personnel.
Fault! Inverter Soft Start Time Out	Inverter voltage cannot reach desired voltage within specified duration	Turn off UPS and then restart the UPS. If it fails again, contact service personnel.
Fault! Inverter Voltage High	Inverter Voltage is too high	Contact service personnel.
Fault! Inverter Voltage Low	Inverter Voltage is too Low	Contact service personnel.
Fault! R Inverter Voltage Short	R phase inverter Output is shorted	Contact service personnel.
Fault! S Inverter Voltage Short	S phase inverter Output is shorted	Contact service personnel.
Fault! T Inverter Voltage Short	T phase inverter Output is shorted	Contact service personnel.
Fault! RS Inverter Voltage Short	R-S inverter Output is shorted	Contact service personnel.
Fault! ST Inverter Voltage Short	S-T inverter Output is shorted	Contact service personnel.
Fault! TR Inverter Voltage Short	T-R inverter Output is shorted	Contact service personnel.
Fault! Inverter R Negative Power	R phase inverter Output Negative Power over range	Contact service personnel.
Fault! Inverter S Negative Power	S phase inverter Output Negative Power over range	Contact service personnel.
Fault! Inverter T Negative Power	T phase inverter Output Negative Power over range	Contact service personnel.
Fault! Over Load Fault	Heavy overload causes UPS fault.	Reduce some load.
Fault! Over Temperature	Make sure adequate space is allowed for air vents and the fan is working	Check if the ambient temperature is over specification. Or contact service personnel.
Fault! CAN Fault	CAN communication fault	Contact service personnel.
Fault! DSP MCU Stop Communicate	As stated.	Contact service personnel.
Fault! Bypass SCR Fault	As stated.	Contact service personnel.
Warning! EPO Active	Check the EPO connector	Check if the connector is loose when EPO acts abnormally.
Warning! Over Load Fail	The load devices are demanding more power than the UPS can supply. Line	Reduce some load and check output Load-Capacity and specification

	mode will transfer to Bypass mode.	
Warning! Communicate CAN Fail	CAN communication error	Contact service personnel.
Warning! Over Load	In Line mode, the load devices are demanding more power than the UPS can supply.	Reduce some load and check output Load-Capacity and specification
Warning! Battery Open	Battery not connected	1. Check battery breaker. 2. Check if the battery connection is well connected. 3. Check the setting of Nominal Battery voltage. 4. Contact service personnel if necessary
Warning! Battery voltage High	Battery voltage is too High	Check the setting of Nominal Battery voltage and contact service personnel.
Warning! Charge Fail	As stated.	Contact service personnel.
Warning! EEPROM Fail	EEPROM operation error	Contact service personnel.
Warning! Fan Lock	As stated.	Check if the fan is blocked or contact service personnel.
Warning! Line Phase Error	As stated.	Check if the Mains phase sequence is correct and contact service personnel.
Warning! Bypass Phase Error	As stated.	Check if the Bypass phase sequence is correct and contact service personnel.
Warning! N Loss	Neutral loss	Check if the Neutral connection is well and contact service personnel..
Warning! Redundancy Set Fail	As stated.	Check the redundancy setting is correct and contact service personnel.
Warning! Maintenance Bypass	Enter maintenance	Check if the connector is loose when it acts abnormally.

7. Service

This chapter introduces the UPS service, including the service procedures of the power module, and the replacement of air filter.

Warning:

1. Only the customer service engineers can service the power modules
2. **The static transfer switch (STS) is NOT hot pluggable.** It should be replaced only when the UPS is in maintenance bypass mode or completely powered off.

7.1 Hot Swap for Power Modules

1. If any fault occurs on modules, the background color representing the module ID will change from white to red as shown in Figure 7-1. The fault information is shown on event page. At this time, the inverter with fault mode is turned off and also cut off output. It will stop running. Then, go to step 4 directly.

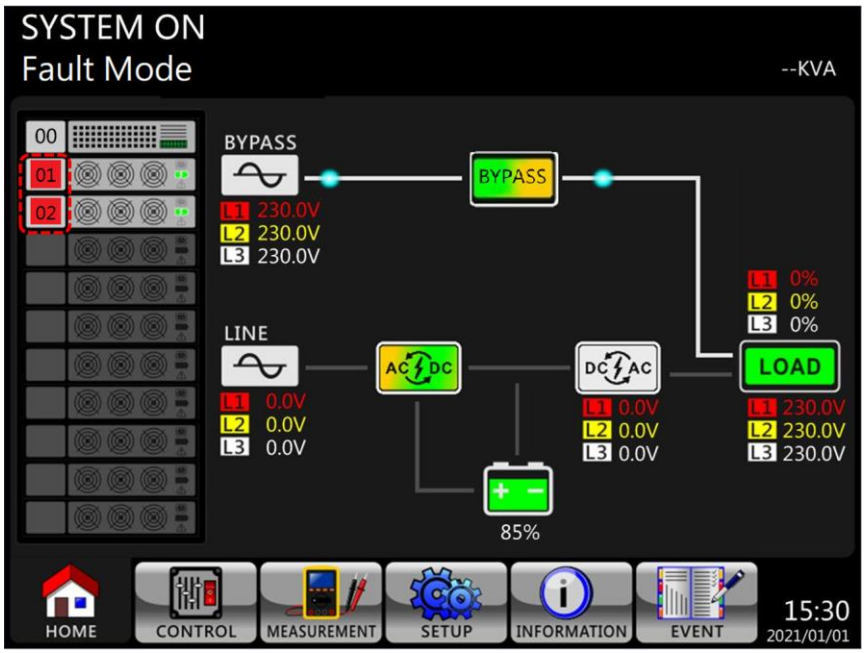


Figure 7-1 The screen of the Power Module in Fault Mode

2. If modules are working normally, press Module ID (marked in red square) twice in 3 second to turn it off on LCD Main page as shown in Figure 7-2.

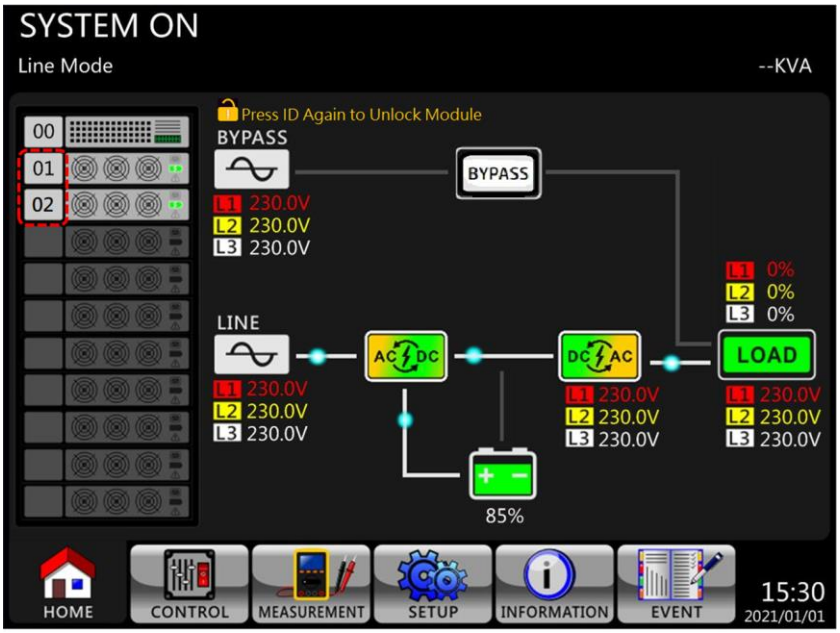


Figure 7-2 The Screen of the Power Module working normally

3. After pressing, the background color of Module ID Number icon turns to yellow to represents the module is unlocked as shown in Figure 7-3, meanwhile the red LED of the module lights on. The warning information (Warning-48 Power module unlock) is shown on event page as shown in Figure 7-4. After unlocked, the inverter with unlocked is turned off and also cut off output. It stops running.

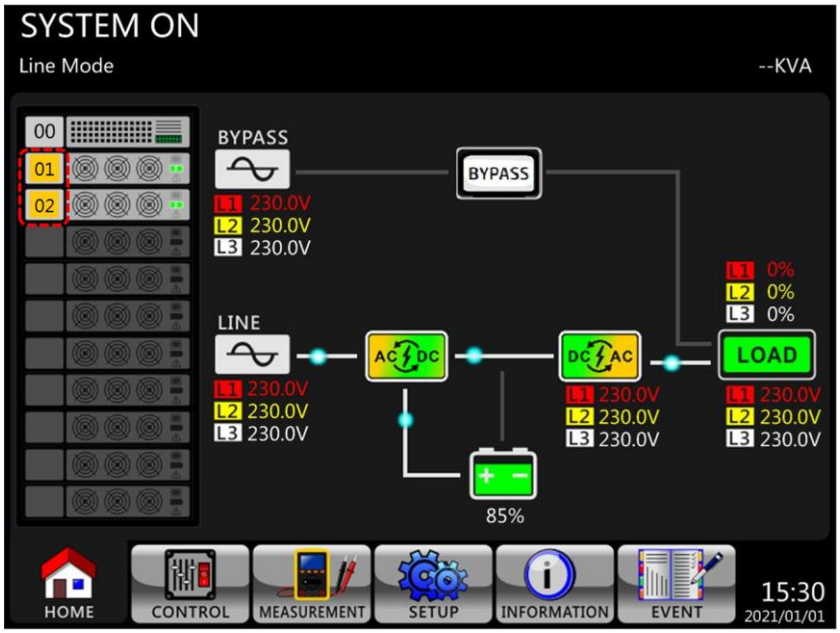


Figure 7-3 The Screen of the Power Module in Unlock Status



Figure 7-4 The Screen of the Warning Information in Current Event

4. You can remove the module which is unlocked or in fault mode.
5. After replacing the power modules, press the unlock module's Module ID Number twice in 3 second, and then the background color recovers to white which means the status of the module is locked. The warning information is gone. The module turns to Line Mode automatically in a few minutes.

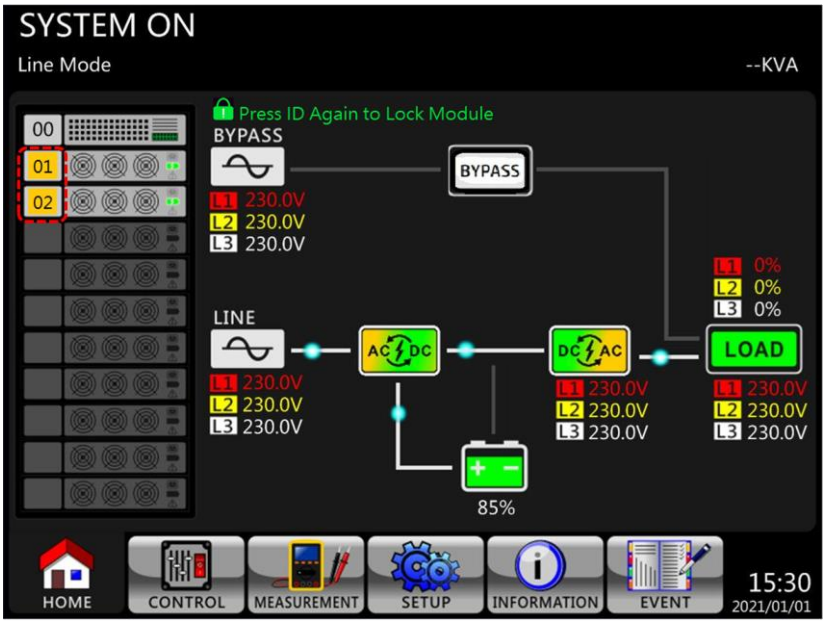


Figure 7-5 Locked Screen of the Module ID

6. If the original status of UPS is Line Mode, it turns on to Line Mode automatically in a few minutes after the new module is inserted.

7.2 Replacement Procedures Of Power Module

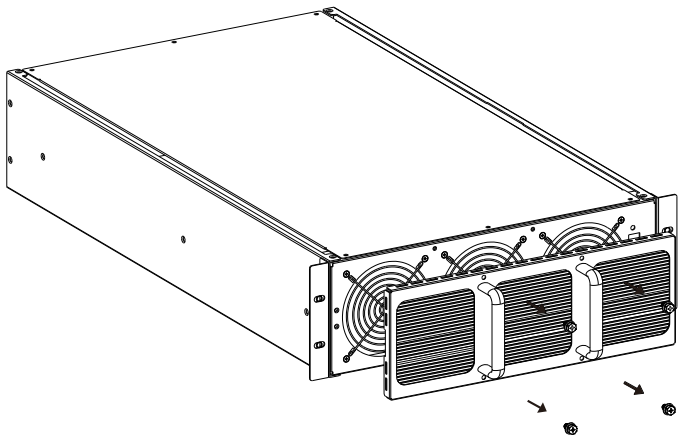
Warning:

- Confirm UPS is in Line mode or Bypass mode.
- Confirm at least one Power Module remains in the UPS cabinet after one Power Module is removed
- If all power modules have to be removed, the replacement MUST be under Maintenance Bypass Operation Mode.

1. The Power Module FAULT LED (RED) indicator is lit to indicate the Power Module output is off and disconnected from UPS system.
2. Use a screwdriver to remove the screws from fixing holes.
3. Two people pull out together and remove the Power Module from its slot.
4. After servicing the module, confirm that the DIP switch of the module is set correctly.
5. Push the module into the cabinet and tighten the screws on both sides.
6. The re-installed Power Module will be turned on automatically when UPS is in line mode.

7.3 Procedures Of Clean Air Filter

As shown below, the UPS provides air filters on the front panel of the Power module. Each filter is secured by 4 screws.



The clean procedures of air filter are as follows:

1. Loosen the 4 screws that secure the Air filter
2. Use a brush to remove dust from the air filter.
3. Re-secure the air filter with 4 screws.
4. The dust filter must be cleaned every three months.

8. Specifications

The chapter states the specifications of UPS.

8.1 Conformity And Standards

The UPS has been designed to conform to the European and international standards listed in **Table 8-1**.

Table 8-1: European and international standards

Item	Normative reference
Uninterruptible power systems (UPS) –Part 1: General and safety requirements for UPS	IEC/EN62040-1
Electromagnetic compatibility (EMC) requirements for UPS	IEC/EN62040-2
Notes:	
ESD	IEC/EN 61000-4-2 Level 3
RS	IEC/EN 61000-4-3 Level 3
EFT	IEC/EN 61000-4-4 Level 3
Surge	IEC/EN 61000-4-5 Level 3
CS	IEC/EN 61000-4-6 Level 3
Power-Frequency Magnetic field	IEC/EN 61000-4-8 Level 4
Low Frequency Signals	IEC/EN 61000-2-2 Level 10V
Conduction	IEC/EN62040-2 Category C3
Radiation	IEC/EN62040-2 Category C3

8.2 Environmental Characteristics

Table 8-2: Environmental characteristics

Item	Unit	Specifications
Noise within 1 m	dB	Max. 75
Altitude	m	≤1000, derate power by 1% per 100m
Relative humidity	% RH	0 ~ 95, non-condensing
Operating temperature	°C	0 ~ 40°C
Storage and transport temperature for UPS	°C	-15 ~ 60

8.3 Mechanical Characteristics

Table 8-3: Mechanical characteristics

Model		60K	80K	100K	120K
Rating power (kVA)	Unit	60	80	100	120
Dimensions, D x W x H	mm	1000 x 320 x 800	1000 x 430 x 1200		
Weight	Kgs	94	169	169	169
Color	N/A	Black			

Model		80-A	150-A	160-A
Rating power (kVA)	Unit	80	150	160
Dimensions, D x W x H	mm	1000 x 430 x 1200		
Weight	Kgs	159	219	227
Color	N/A	Black		

Model		180K	200K	240K	300K
Rating power (kVA)	Unit	180	200	240	300
Dimensions, D x W x H	mm	1000 x 600 x 1200		1100 x 600 x 1475	
Weight	Kgs	249	249	360	396
Color	N/A	Black			

8.4 Electrical Characteristics (Input Rectifier)

Table 8-4: Rectifier AC input (mains)

Rated power (kVA)	Unit	60~300	
Rated AC input voltage	Vac	380/400/415 (3-phase and sharing neutral with the bypass input)	
Input voltage tolerance	Vac	110~300Vac	
Frequency	Hz	50/60 (tolerance: 40Hz ~ 70Hz)	
Power factor	kW/kVA	0.99 (0.97) full load(half load)	
Harmonic current distortion	THDI%	< 4% @ 100%(for 80k-300k) (5% for 60k)	
Max. current / phase	A	60kVA/60kW	110
		80kVA/80kW	150
		100kVA/100kW	183
		120kVA/120kW	220
		180kVA/180kW	330
		200kVA/200kW	366
		240kVA/240kW	440
		300kVA/300kW	550
		80kVA/80kW (80-A)	147
		150kVA/150kW(150-A)	250
		160kVA/160kW(160-A)	294
Icc	kA	≤ 10kA	
NOTE: 40Hz~70Hz by setting generator mode			

8.5 Electrical Characteristics (Intermediate DC Circuit)

Table 8-5: Battery

Intermediate DC circuit		
Battery		External battery
Number of lead-acid cells	Nominal	216 (6cells x 36 12V battery block)
	Maximum	240 (6cells x 40 12V battery block)
	Minimum	192 (6cells x 32 12V battery block)
Float voltage	V/cell	2.28V/cell
Temperature Compensation (option)	mV/℃/cl	0~-5
Ripple voltage	% V float	≤1
Ripple current	% C10	≤5
Boost voltage	VRLA	2.35V/cell
EOD voltage	V/cell	1.67-1.83V/cell (adjustable)
Battery charge	V/cell	Constant current and constant voltage charge mode
Battery charging power[1] max	A	18A(adjustable) @ 60K/80-A Model 24A(adjustable) @ 80K/100K Model

current		36A(adjustable) @ 120K/150-A/160-A Model 54A(adjustable) @ 180K/200K Model 72A(adjustable) @ 240K Model 90A(adjustable) @ 300K Model

Note:

1. At low input voltage the UPS recharging capability increases and load decreases (up to the maximum capacity indicated).
2. –A series battery voltage : recommend 240 (6cells x 40 12V battery block)

8.6 Electrical Characteristics (Inverter Output)

Table 8-6: Inverter output (to critical load)

Rated power (kVA)	Unit	60~300	
Rated AC voltage[1]	Vac	380/400/415 (three-phase four-wire, with neutral reference to the bypass neutral)	
Frequency	Hz	50/60 Auto Selectable	
Overload	%	100%~110% for 60min 110%~125% for 10min 126%~150% for 1min >150% for 200ms	
Steady state voltage stability	%	±1 (balanced load), ±2 (100% unbalanced load)	
Total harmonic voltage	%	<2 (linear load), <4 (non-linear load)	
Synchronization window		+/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz)	
Output rated current (380/400/415V)	A	60kVA/60kW	91/86/83
		80kVA/80kW	121/116/111
		100kVA/100kW	152/145/139
		120kVA/120kW	182/173/167
		180kVA/180kW	273/260/250A
		200kVA/200kW	304/290/278
		240kVA/240kW	364/346/330
		300kVA/300kW	456/433/417
		80kVA/80kW (80-A)	121/116/111
		150kVA/150kW(150-A)	227/217/208
		160kVA/160kW(160-A)	242/232/222

Note:
1. Factory setting is 400V. 380 or 415V is selectable by commissioning engineer.

8.7 Electrical Characteristics (Bypass Mains Input)

Table 8-7: Bypass mains input

Rated power (kVA)	Unit	60~300
Rated AC voltage1	Vac	380/400/415 (Three-phase four-wire, sharing neutral with the rectifier input and providing neutral reference to the output)
Overload	%	105%~110% for 60min 110%~125% for 10min 126%~150% for 1min >150% for 200ms
Upstream protection, bypass line	N/A	Circuit breaker, rated up to 100% of nominal output current.
Frequency	Hz	50/60 Auto Selectable
Transfer time (between bypass and inverter)	ms	Synchronous transfer: Line ←→Battery 0ms Inverter ←→Bypass 0ms (When phase lock fails, <4ms interruption occurs from inverter to bypass) Inverter ←→ECO ≤10ms
Bypass voltage tolerance	%Vac	Upper limit: +10, +15 or +20, default: +15 Lower limit: -10, -20, -30 default: -20
Frequency Range	Hz	+/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz)
Note: 1. Factory setting is 400V. 380V or 415V is selectable by commissioning engineer.		

9. UPS Installation for Parallel Cabinet System

The chapter introduces how to install and set up the single cabinet system to parallel cabinet system.

Warning:

- The input harmonic current distortion will be higher than 4% in parallel cabinet system.
- You need to order the parallel cable for this kind of application. The parallel cable is required for the installation and operation.
- If you want to install the UPS to parallel cabinet system by yourself, installation must be under the supervision of authorized engineers or service personnel.
- The parallel rack power capacity will be 90% of rated load
- The parallel system must be use common battery

9.1 Input and Output Wiring

1. When installing the parallel cabinet system, the input wires (R, S, T, N) length of the cabinet must be equal to another cabinet input wires. Likewise, the output wires (R, S, T, N) length of the cabinet must be equal to another cabinet output wires. The same length of input and output wires of two cabinets are required. Otherwise, it will cause the unbalance current of output load.
2. Refer to Chapter "3. Installation" about the input and output wiring and battery wiring methods.

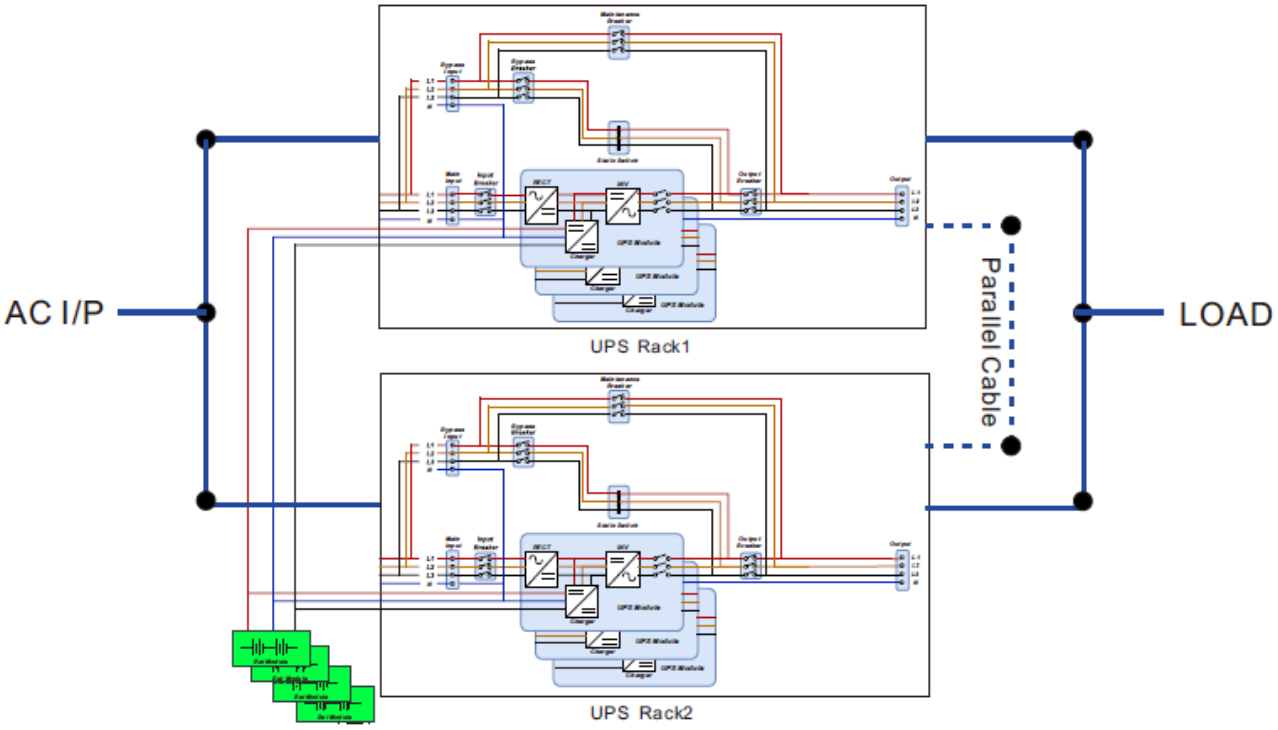


Figure 9-1 Parallel System Wiring

9.2 Parallel Board Setting and Power Module Setting

9.2.1 Install Power Module of cabinet A

1. Refer to Table 2-1 to set the module address.
2. Refer to Table 9-1 to set the Cabinet.

9.2.2 Install Power Module of Cabinet B

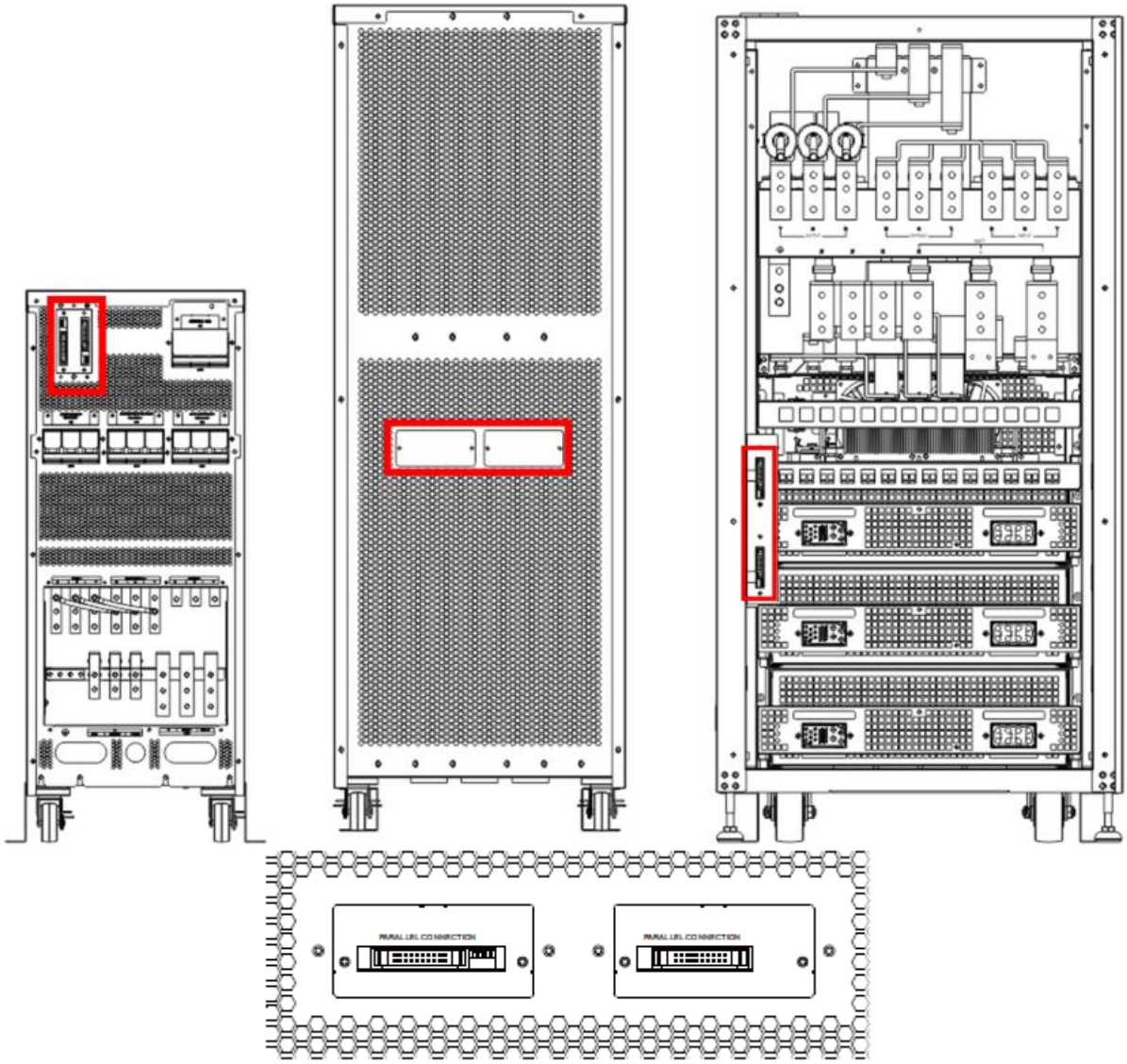
1. Refer to Table 2-1 to set the module address.
2. Refer to Table 9-1 to set the Cabinet.

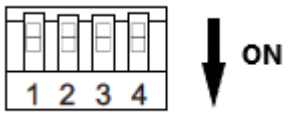
9.2.3 Install Power Module of Cabinet C & D

1. Please follow table2-1，if there are more than 2 cabinet in parallel
2. Refer to Table 9-1 to set the Cabinet.

9.2.4 Parallel Board information

The parallel board is on the back of the cabinet. Please follow table 9-1 to set the parallel units.



	DIP SW 1	Terminal resistance
	DIP SW 2	Parallel set pin
	DIP SW 3	Parallel set pin
	DIP SW 4	NC

Cabinet A	SW2 ON SW3 ON
Cabinet B	SW2 OFF SW3 ON
Cabinet C	SW2 ON SW3 OFF
Cabinet D	SW2 OFF SW3 OFF

Table 9-1

9.3 Parallel Function Setting

1. For the input and output wiring, please be sure to follow section 9.1 Input and Output Wiring to prepare.
2. For the Module Address Setting and Cabinet setting, please be sure to follow section 9.2.
3. Please confirm that the ID setting of the module and the cabinet must be matched correctly, so as not to affect the normal operation of parallel connection. Please follow table2-1

9.4 Parallel Cable Connection

Parallel cable is equipped with 20-pins connectors. Insert the 20-pins connector into the parallel board shown in figure 9-2. Both cabinets use the same way to connect the parallel cable.

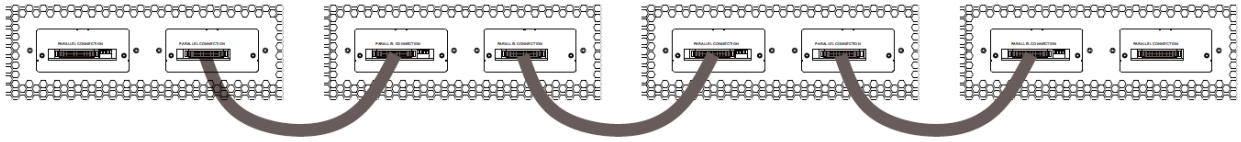
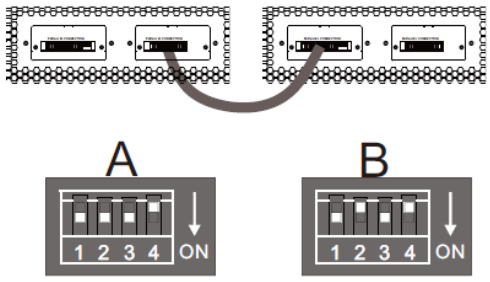


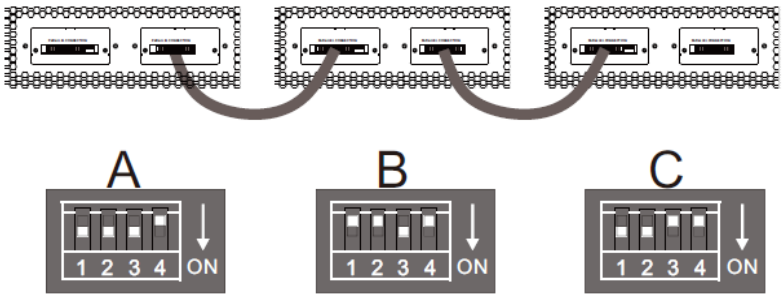
Figure 9-2

After connect the parallel cable, please set the terminal resistance (SW1) as shown in Figure 9-3.

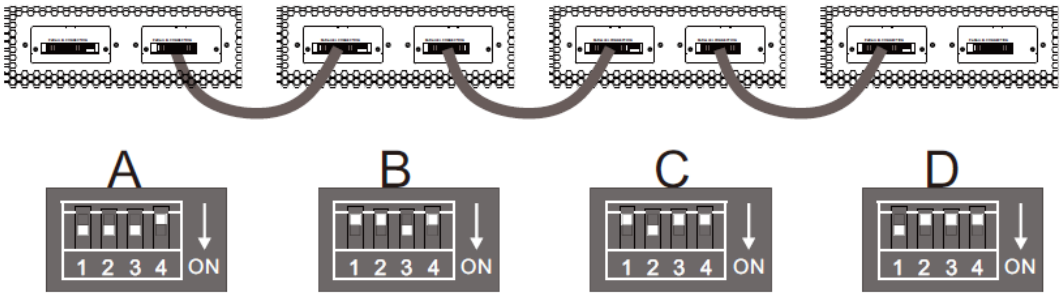
If there are more than 2 cabinet, turn on sw1 of the first and last two cabinets, others keep the sw1 off.



Two cabinets in parallel



Three cabinets in parallel



Four cabinets in parallel

Figure 9-3

Warning:

1. **The parallel cable of each UPS must to be connected correctly. Any wrong connection will cause the UPS system to operate abnormally.**
2. **Please confirm that the ID setting of the module and the cabinet must be matched correctly, so as not to affect the normal operation of parallel connection. Please follow table2-1**

9.5 Parallel System Turn On Procedure

1 Please make sure the section 9.1 ~ 9.4 has been well followed.
2 Please confirm the Input breaker and output breakers of each UPS have already been turned "ON".
3 Turn On the battery Breaker.
4 Turn on the external AC source breaker to apply AC Input source to UPS .
5 Through the panel of the UPS 1(Cabinet A) set up the total power module number and redundant number. (Refer to User Manual 4.2.6 SETUP Screen).
6 Through the panel of the UPS 1(Cabinet A) get all module information , and confirm the information of all module can be display on the panel.(Refer to User Manual 4.2.5 MEASUREMENT Screen)
7 Please confirm the system without any abnormal event through the panel display.(Refer to User Manual 4.2.8 EVENTS Screen)
8 Turn on the UPS through the ON switch or control page of the panel. (Refer to User Manual 4.2.4 Control Screen)

NOTE: After all the settings of the parallel UPSs are completed, all UPSs will become a whole system. When one of the UPSs is turned on or off, all the UPSs will be turned on or off at the same time. Once EPO is activated, all UPSs will shut down at the same time.