

User Manual

Modular Online UPS For 30KW Power Module

Uninterruptible Power Supply System

Version: 4.1

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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.
- 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.

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.

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 around 30°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.

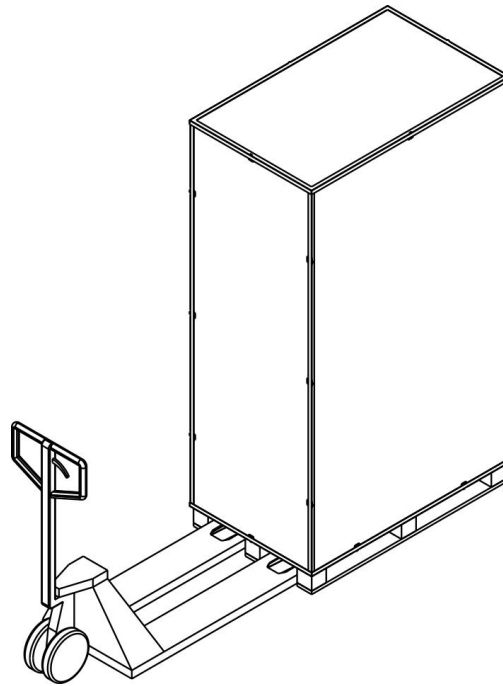


Figure 2-1

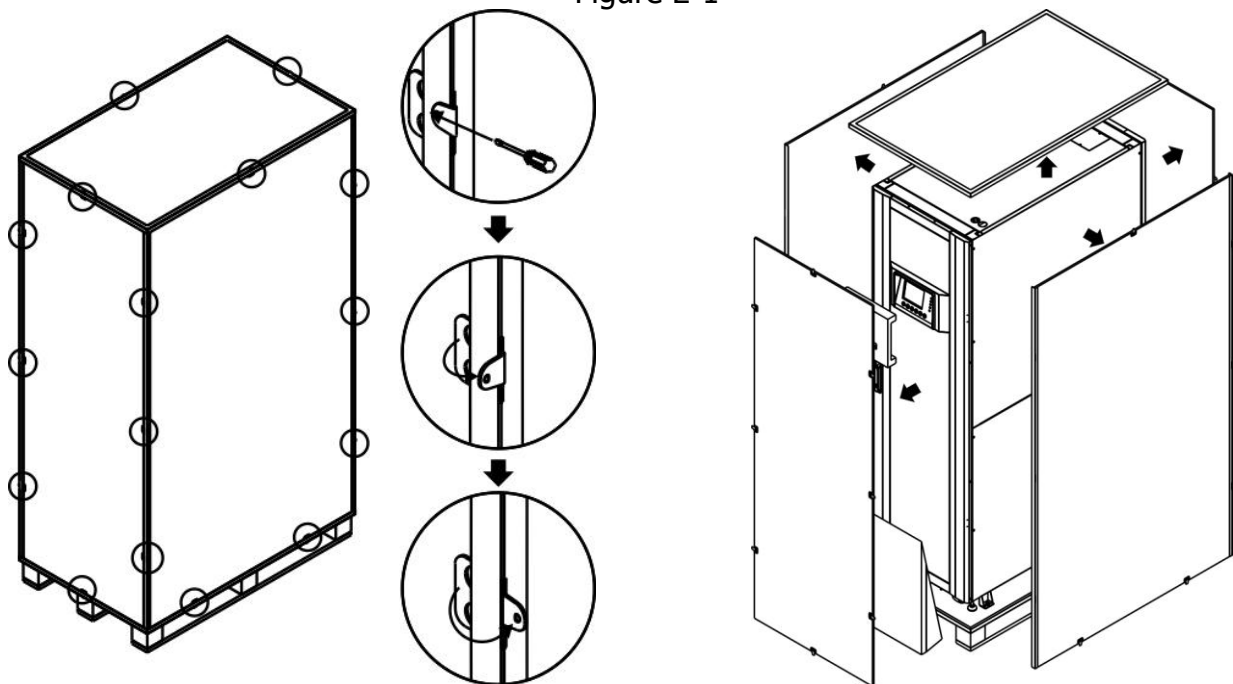


Figure 2-2

- Put a ramp in the front of the cabinet and insert small wood into groove. Then, remove two side panels. Refer to Figure 2-3.

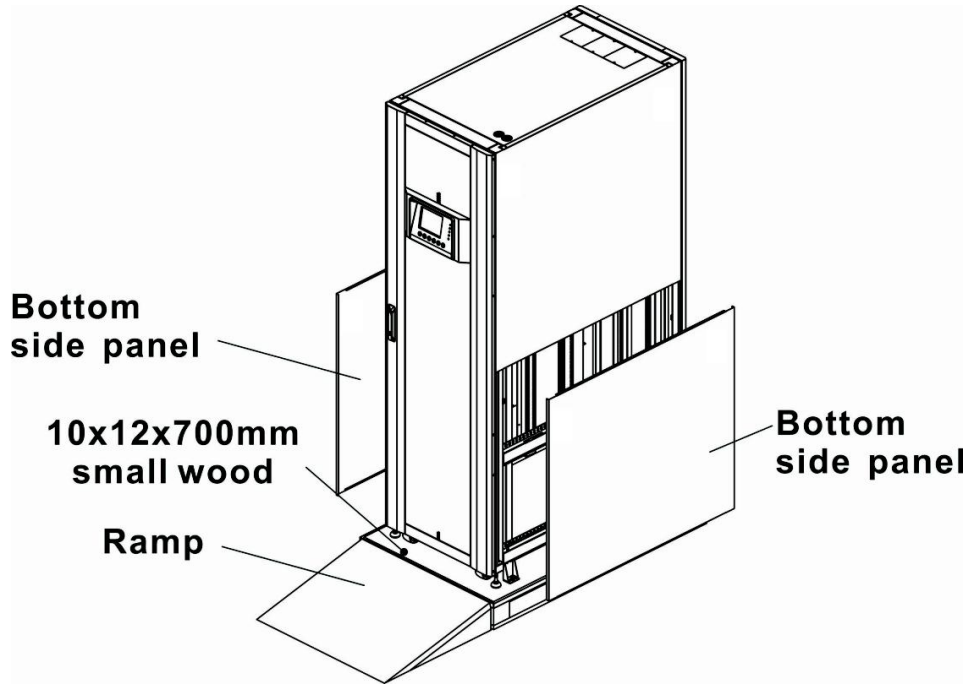


Figure 2-3

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

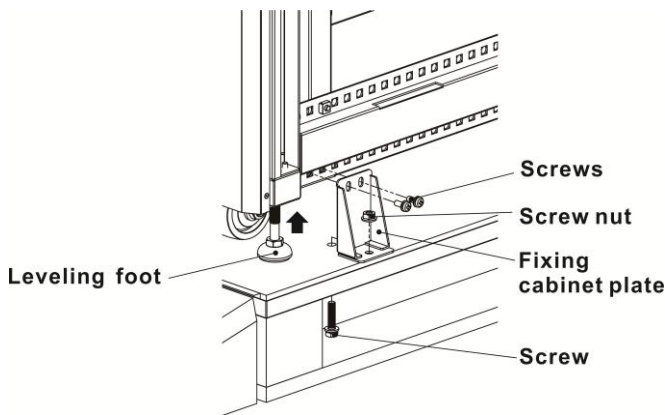


Figure 2-4

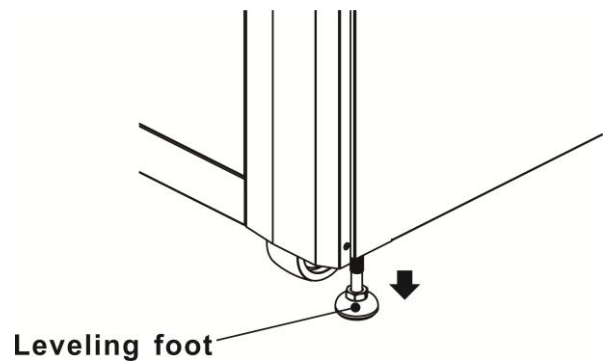
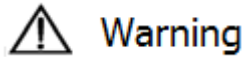


Figure 2-5

2.4 Moving the Cabinet



The UPS is fixed on the pallet with 4 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. Refer to Figure 2-6.

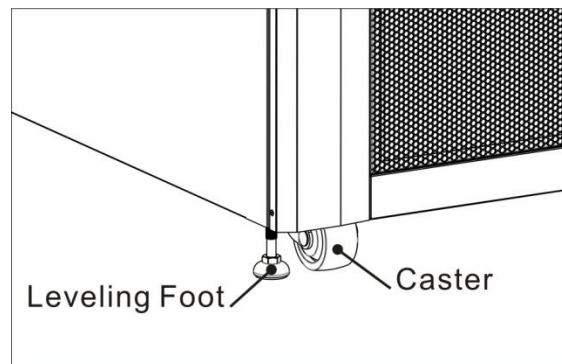


Figure 2-6

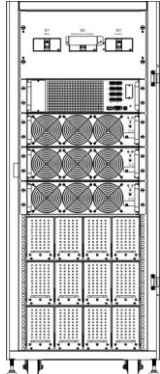
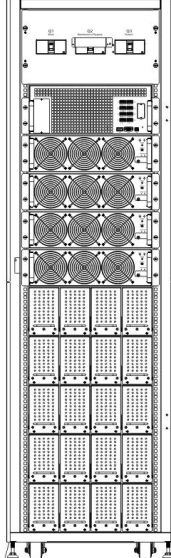
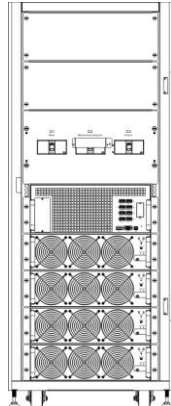
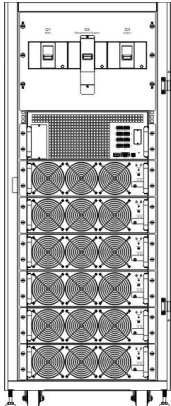
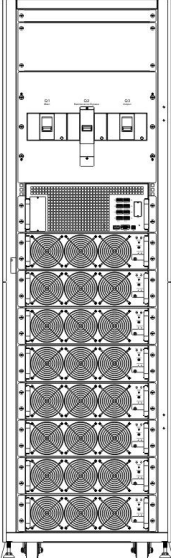
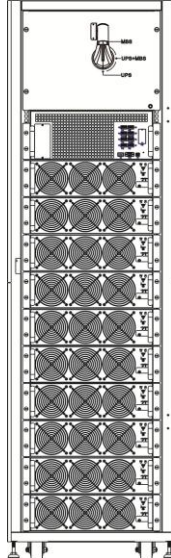
2.5 Types of UPS Cabinet

There are two series of UPS cabinets, standard and extended for different requirements.

The standard cabinets have the battery modules inside and they can work as a stand-alone UPS or be connected to battery externally.

The extended 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.

| | Standard Series | | Extended Series | | | |
|-------------------|--|--|--|---|--|--|
| Photo |  |  |  |  |  |  |
| Cabinet Height | 30U | 42U | 30U | 30U | 42U | 42U |
| Switch Unit | 1 | 1 | 1 | 1 | 1 | 1 |
| STS | 1 | 1 | 1 | 1 | 1 | 1 |
| Max. Power Module | 3 | 4 | 4 | 6 | 8 | 10 |
| Battery Module | 12 | 20 | N/A | N/A | N/A | N/A |

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 Module, Power Module slots and Battery module slots (Battery Module Slots is only for standard series). All wiring terminal blocks are located in the back of cabinet.

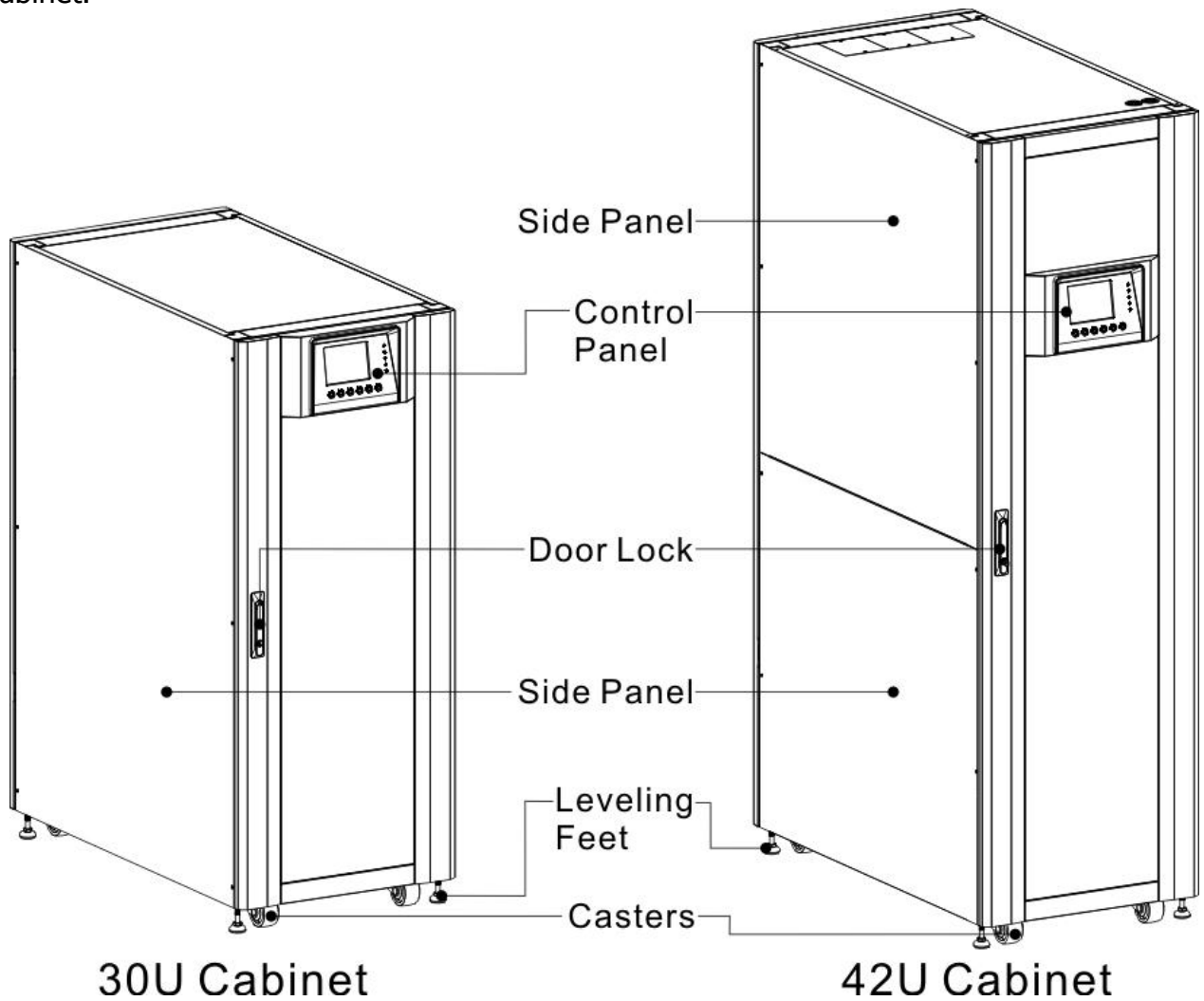
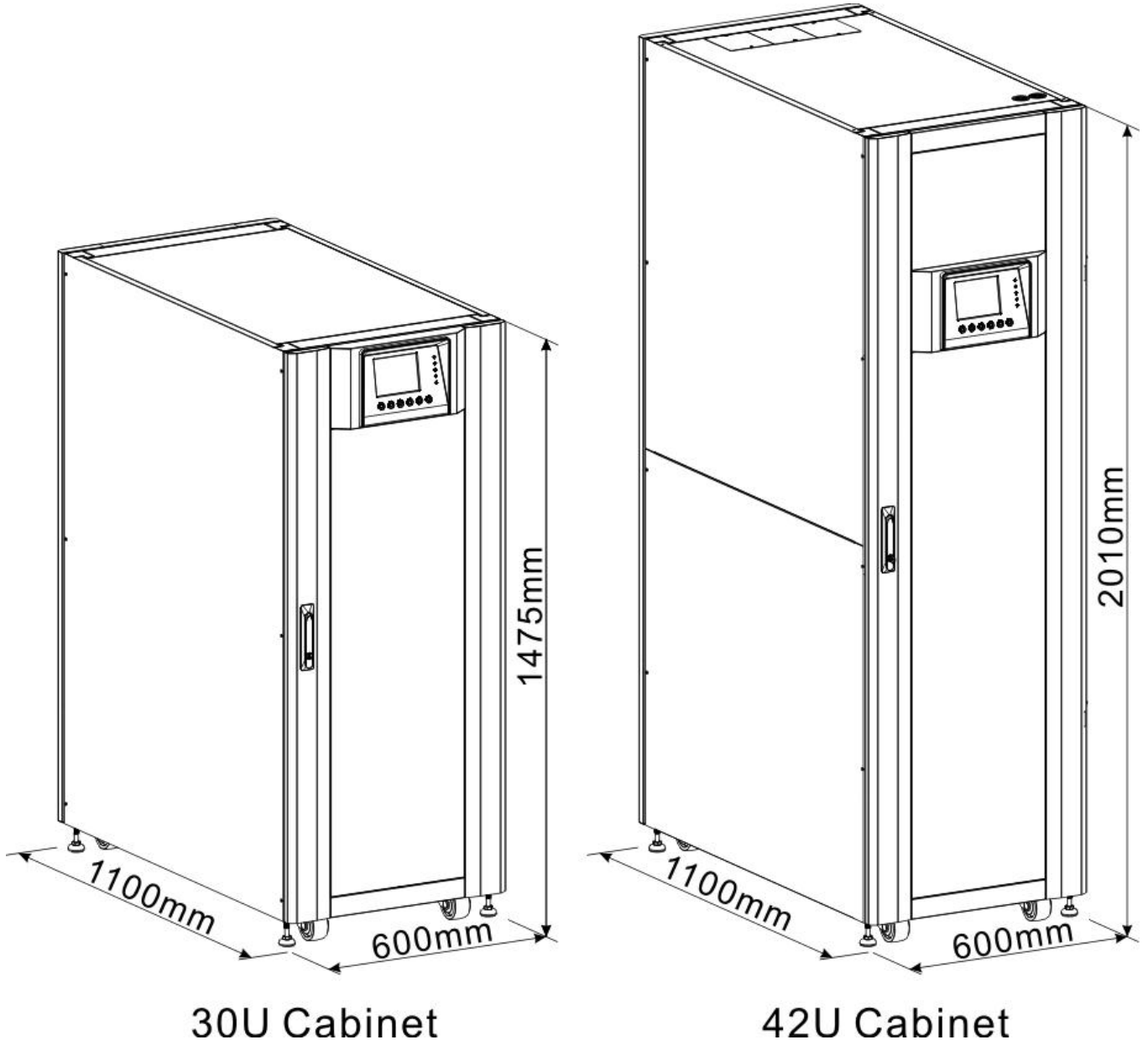


Figure 2-7 Exterior

2.6.1 Mechanical Data

| Dimensions | | | |
|-------------|-------|-------|--------|
| UPS cabinet | Width | Depth | Height |
| 30U | 600mm | 1100m | 1475mm |
| 42U | 600mm | 1100m | 2010mm |



30U Cabinet

42U Cabinet

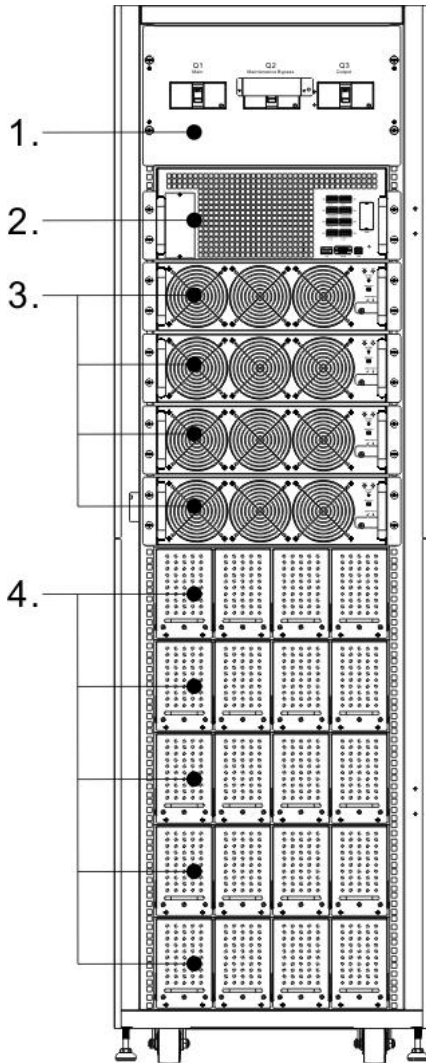
Figure 2-8 Dimensions

2.6.2 Front View

Unlock and open the front door and you will see the Main Breaker (Q1), Maintenance Breaker (Q2), Output Breaker (Q3), STS Module, Power Module slots and Battery Module slots (Battery Module Slots is only for standard series).

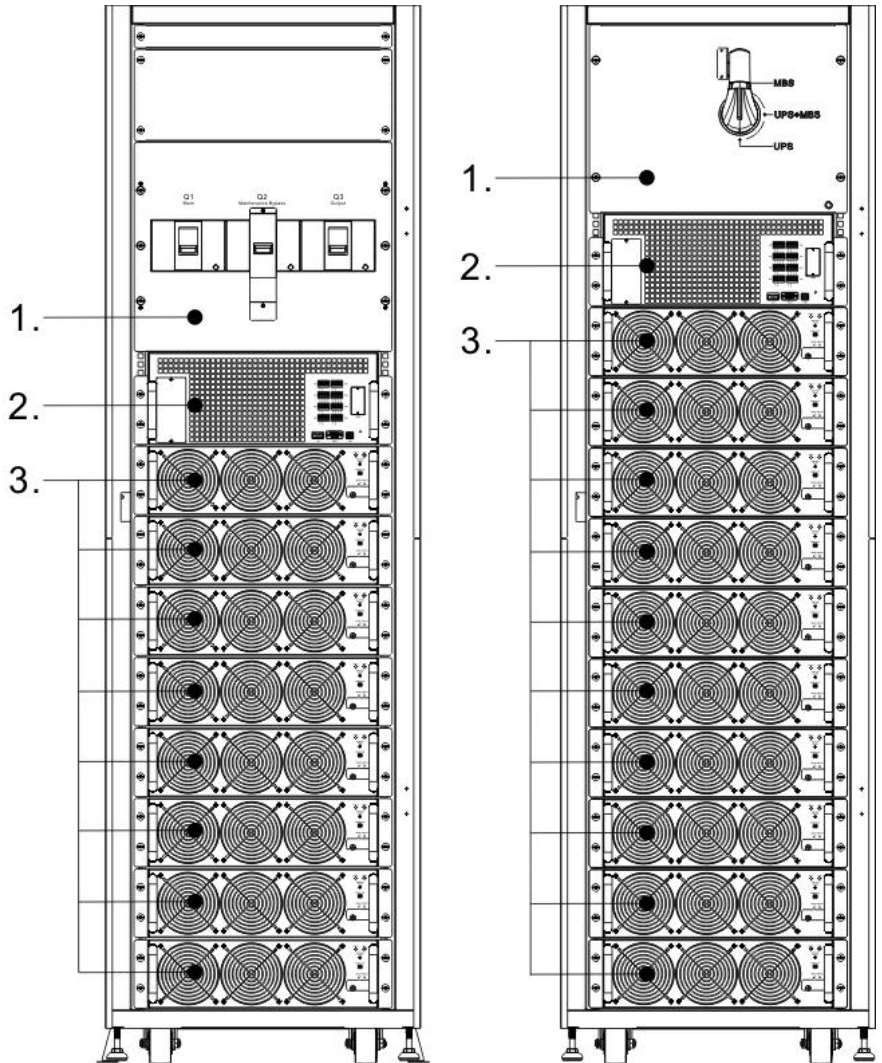
The cabinet of 300K Model has Maintenance Bypass Switch Only.

Standard Series



- 1. Switch Unit
- 2. STS Module

Extended Series



- 3. Power Module
- 4. Battery Module

2.6.3 Rear View

Unlock and open the rear door and you will see the rear panel of UPS. There is a Battery Breaker for internal battery modules in the standard series, but there isn't any in the extended series.

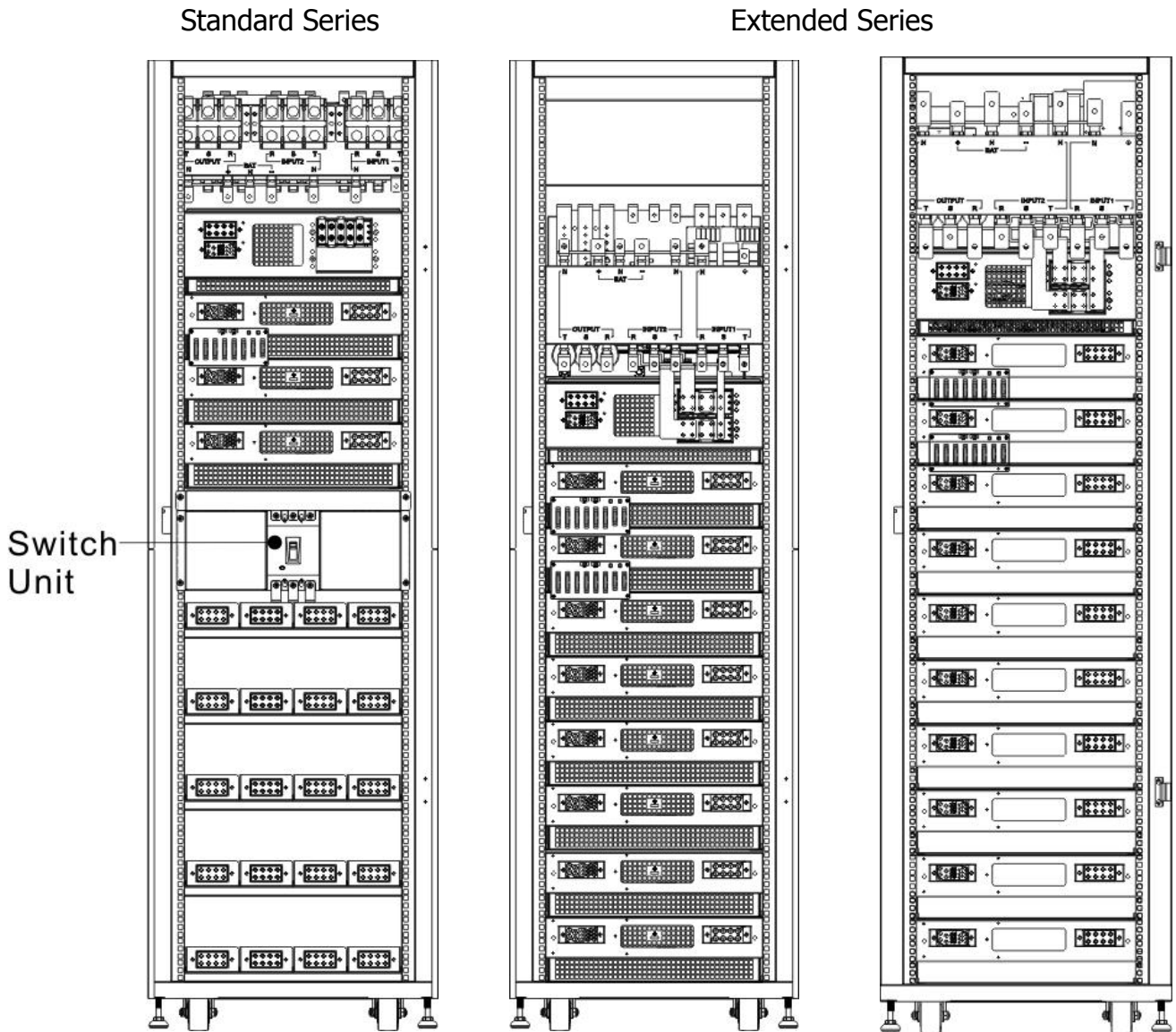


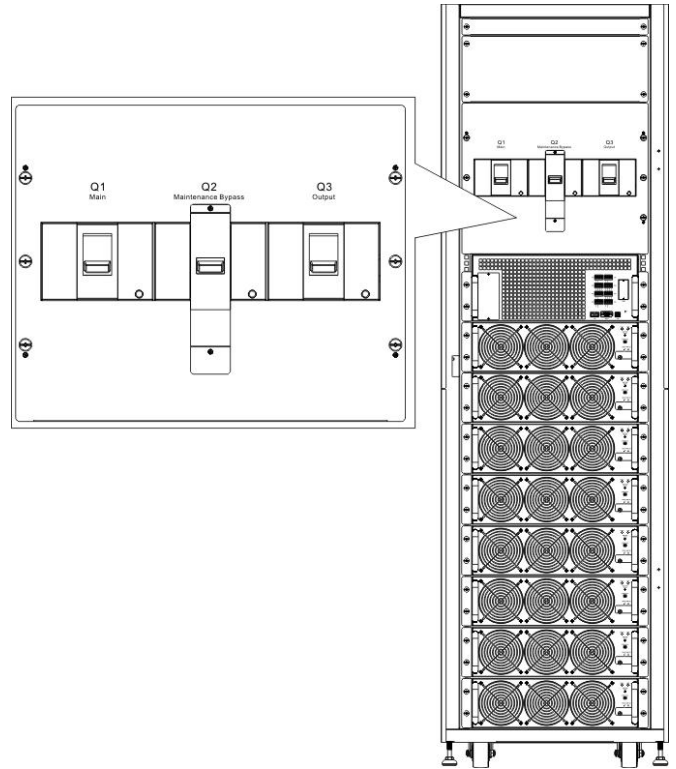
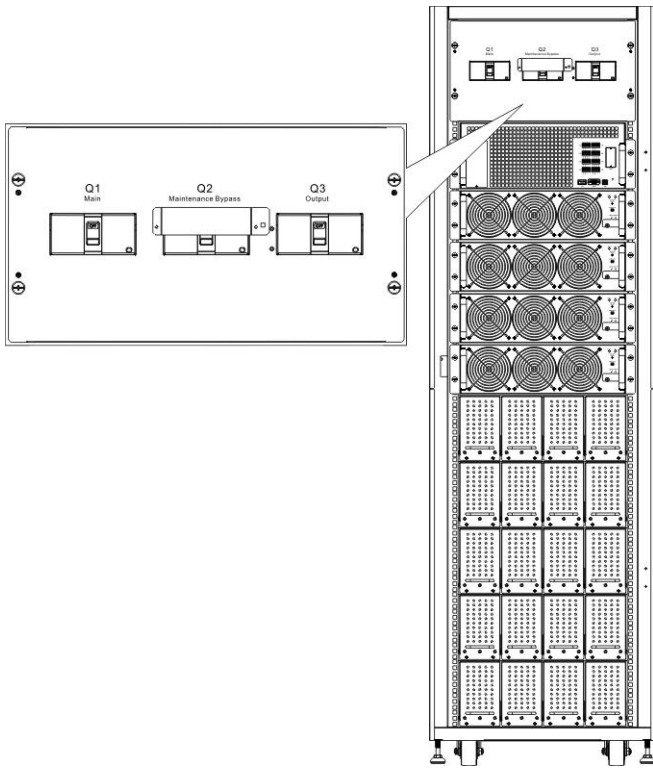
Figure 2-10 Rear View

2.7 Internal Mechanisms

2.7.1.1 Breakers

After opening the front door, there are three breakers, Main Breaker (Q1), Maintenance Breaker (Q2) and Output Breaker (Q3).

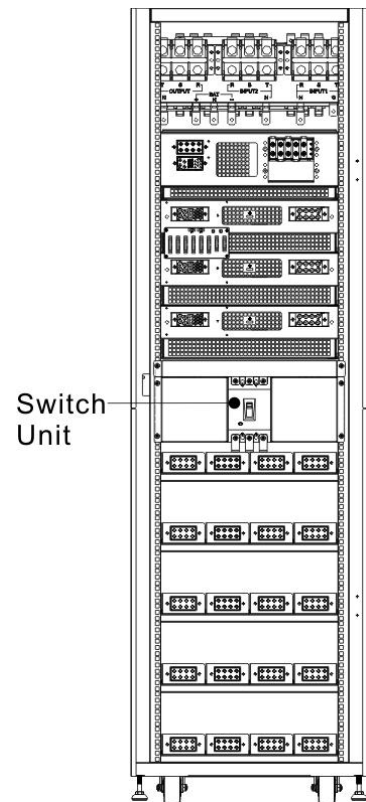
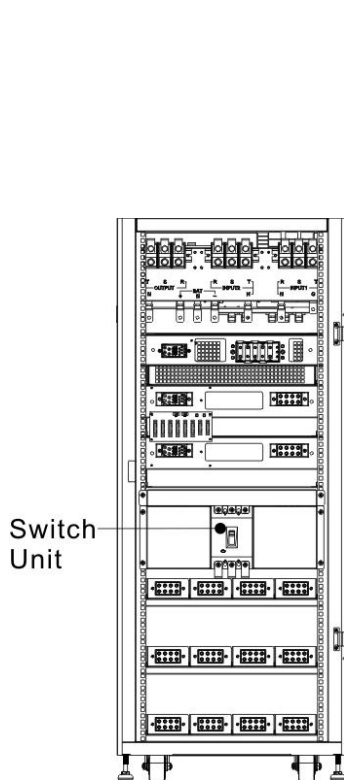
For the standard series, there is a battery breaker for internal battery modules. You can see it when you open the rear door.



Standard Series (42U Front)

Extended Series (42U Front)

Figure 2-11 Front Breakers



Standard Series (30U Rear)

Standard Series (42U Rear)

Figure 2-12 Rear Breaker

2.7.1.2 Maintenance Bypass Switch

After opening the front door, there is one Maintenance Bypass Switch in the 300K cabinet.

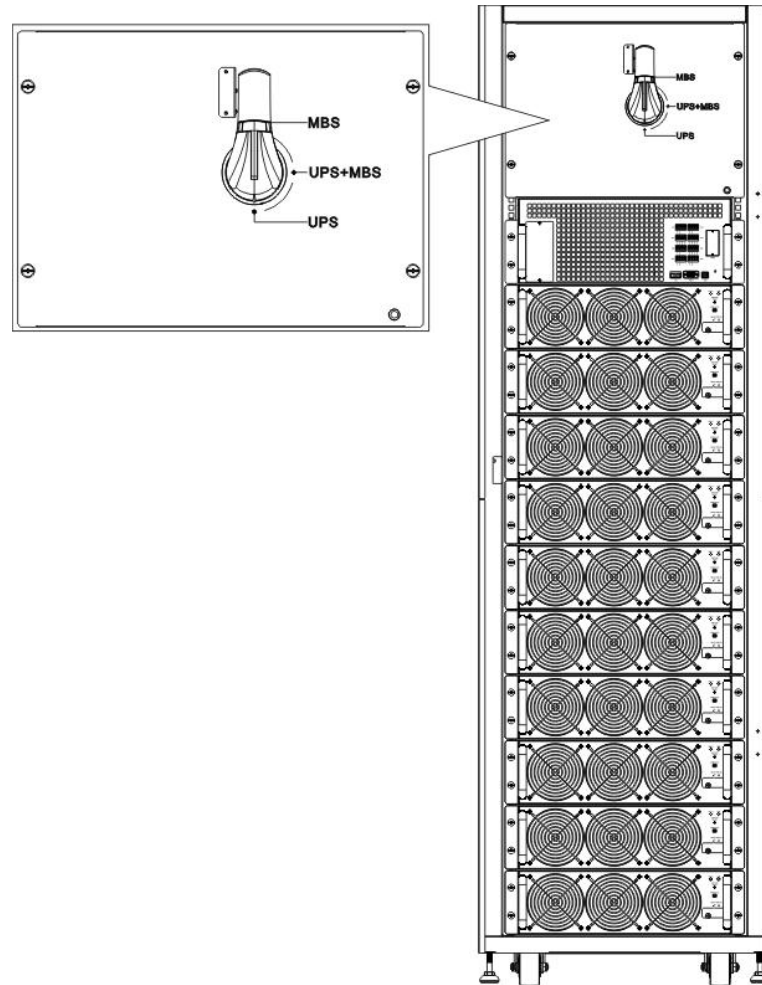


Figure 2-12.1 Maintenance Bypass Switch

2.7.2 Wiring Terminal Blocks

Open the UPS's back doors and you will see the wiring terminal block. 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. |

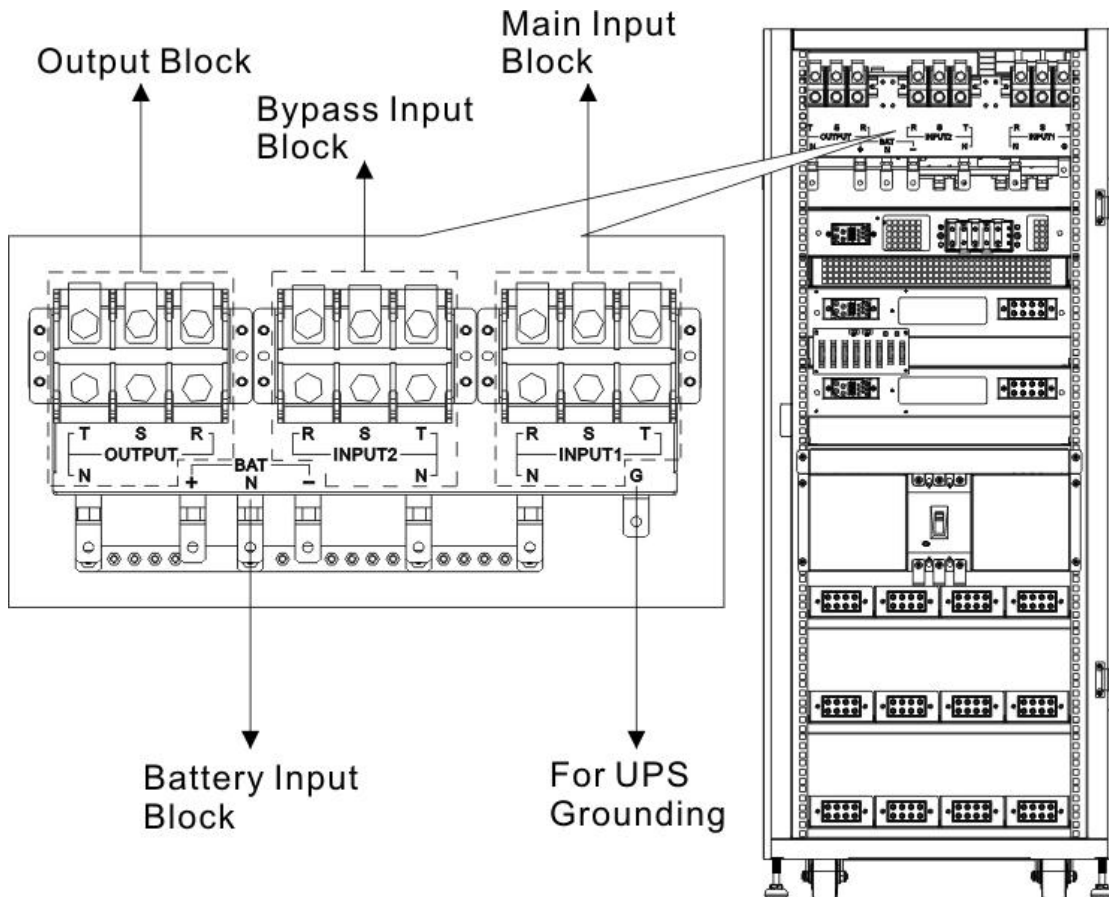


Figure 2-13 Standard Series (30U) Terminal Blocks

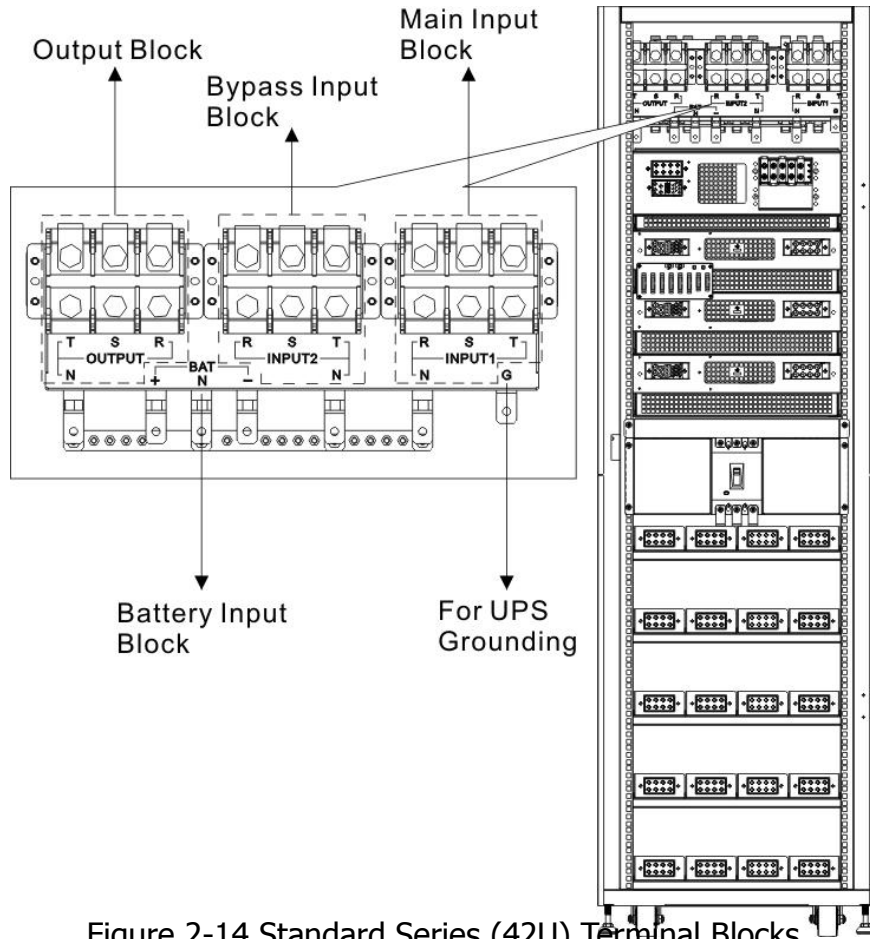


Figure 2-14 Standard Series (42U) Terminal Blocks

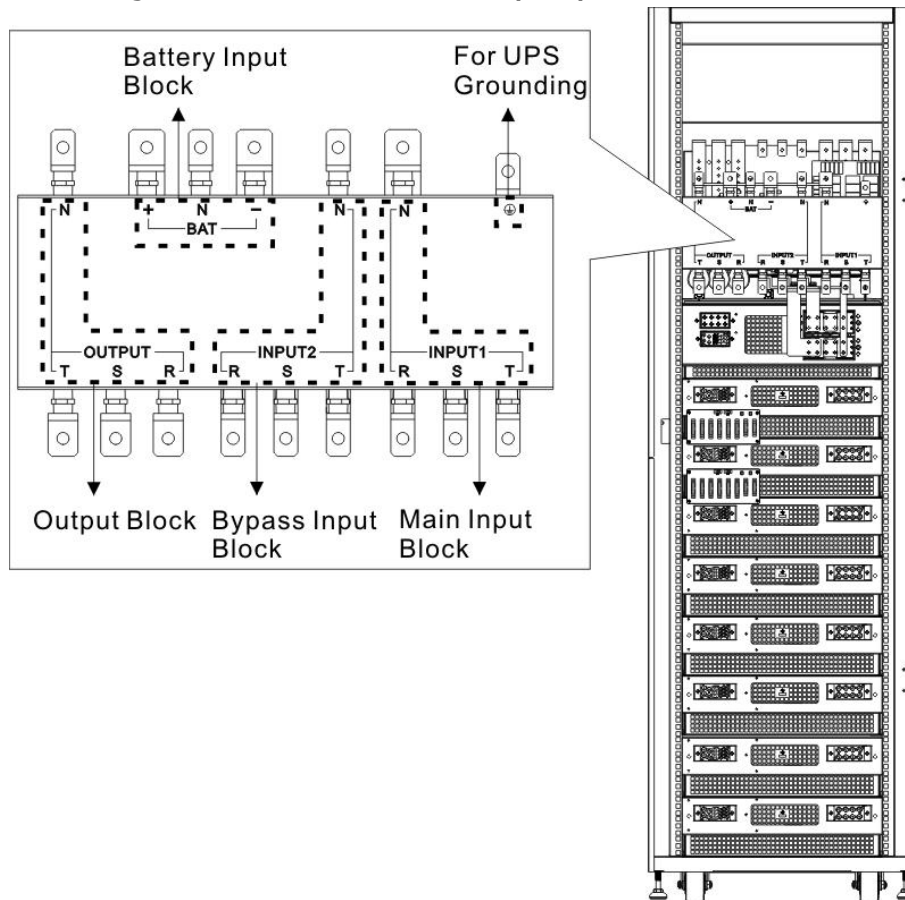


Figure 2-15 Extended Series (42U) Terminal Blocks

2.8 Control Panel

2.8.1 LCD Display

Through the graphic 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.

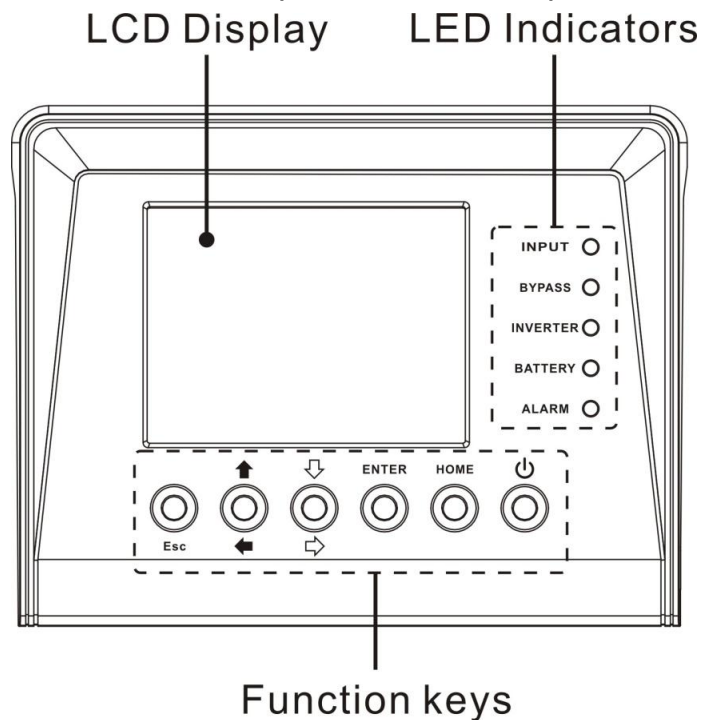


Figure 2-16 Control Panel

2.8.2 LED Indicators

| LED | Color | Status | Definition |
|----------|--------|----------|--|
| INPUT | 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 not operating. |
| INVERTER | Green | On | Load on inverters. |
| | | Off | Inverters not operating. |
| BATTERY | Red | On | Load on Battery. |
| | | Flashing | Low battery |
| | | Off | Battery converter is normal and battery is charging. |
| ALARM | Red | On | UPS fault. |
| | | Flashing | UPS alarm. |
| | | Off | Normal. |

2.8.3 Function Keys

| Control Key | Description |
|--------------------|---|
| Esc | <ul style="list-style-type: none">● When it is in Main screen, you can enter menu by pressing ESC key.● Return to previous screen, when screen is not in Main screen.● Return to previous value in the same row, so you can change it. For example, when changing 4-digit password, press "Esc" to allow cursor back to previous digit. |
| ↑ (Up) ← (Left) | Key for menu page navigation or digit modification. |
| ↓ (Down) ⇒ (Right) | Key for menu page navigation or digit modification. |
| Enter | Confirmation of commands, or cursor displacement. |
| Home | Return to Main screen. |
| ⏻ Power On/Off | Turn on UPS or turn off UPS. |

2.9 Introduction of Modules

The design of STS Module, Power Module and Battery Module make maintenance and replacement quick and easy.

The modular and hot-swappable design of Power Module makes it a highly cost-effective solution to meet your power requirement. The number of Power Modules installed in the UPS can be based on the initial needs. Once the power requirement increases, you can easily install more Power Modules without interrupting the operation of the system.

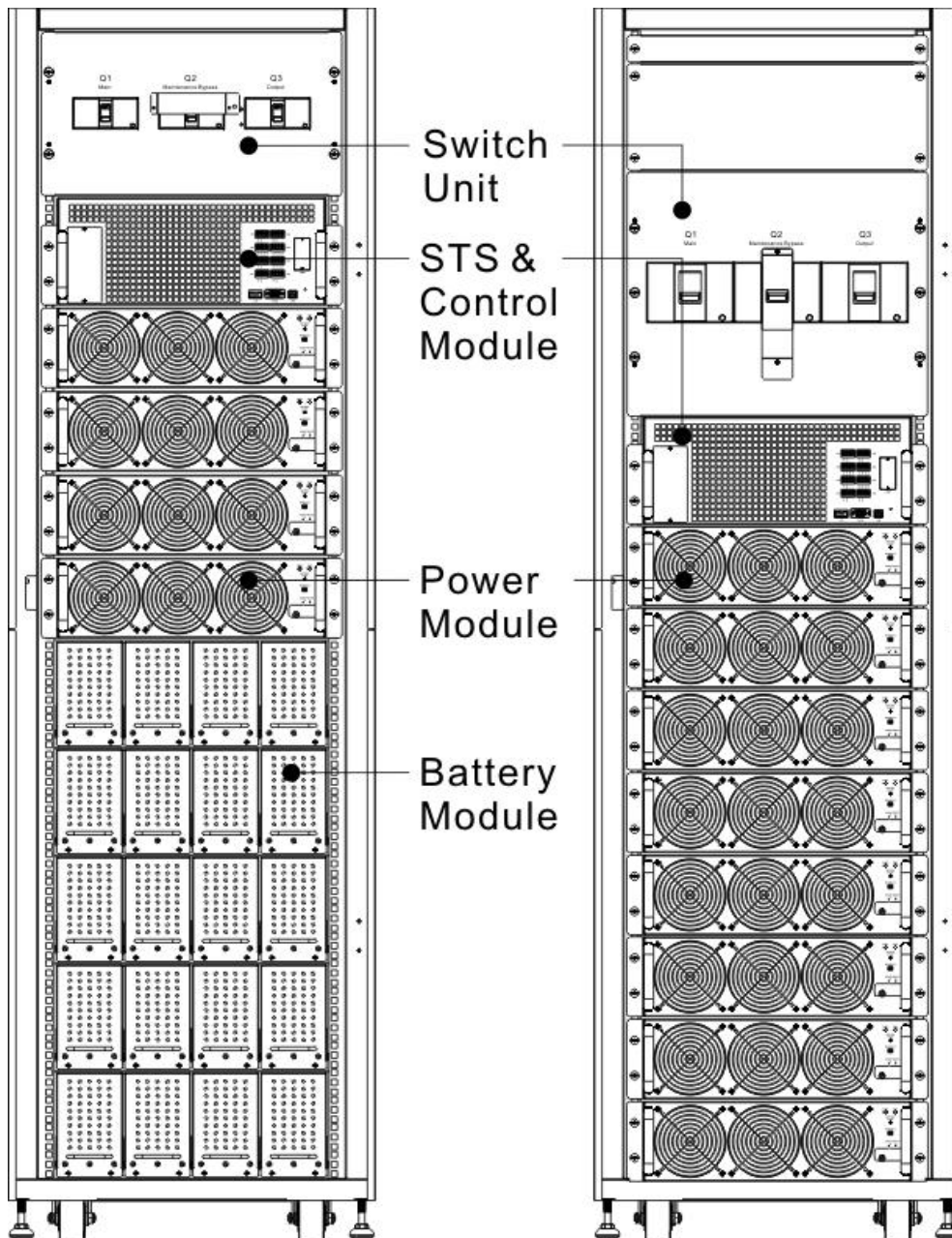


Figure 2-17 Front View of Module

2.9.1 STS Module

The STS Module is installed before leaving factory. It provides the bypass power when UPS is in Bypass Mode.

In addition to offering bypass power, it includes some communication interfaces. For detailed information, please refer to Charter 5.

| No. | Item | Description |
|-----|-------------------|--|
| ① | Extra Comm. Slot | This slot can insert an optional card, Extra Comm. card which can enhance the communication capability of UPS system. It can provide another SNMP slot and some dry contact ports. |
| ② | LCD Port | This port connects to Control Panel with a factory installed cable. |
| ③ | RS232 port | Local communication interface. |
| ④ | USB port | Local communication interface. |
| ⑤ | SNMP Slot | This slot can work with optional cards, SNMP, AS400 or Modbus card. |
| ⑥ | Dry contact ports | CN1 ~ CN8. For detailed information, please refer to Chapter 5. |

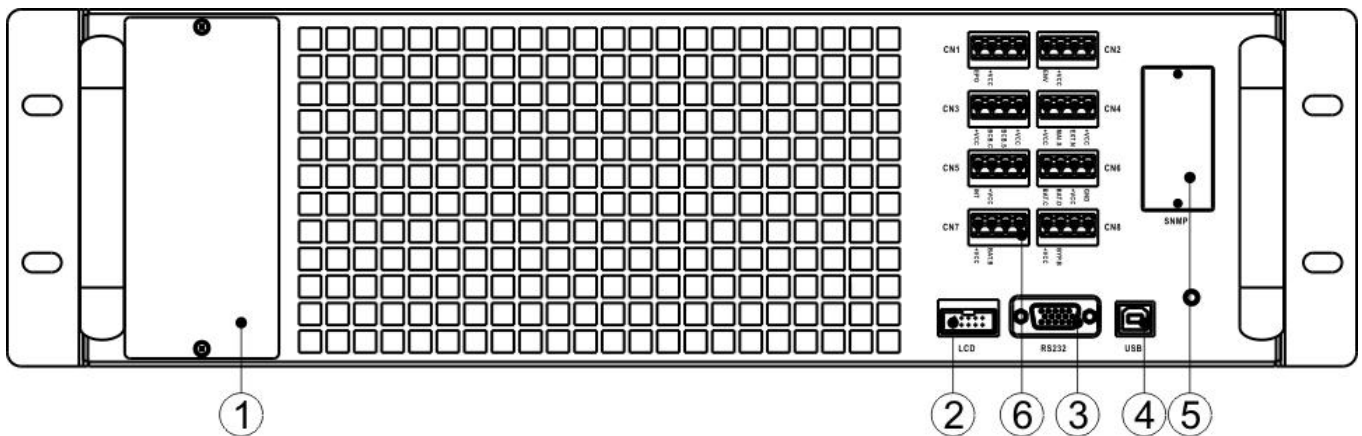


Figure 2-18 STS Module

2.9.2 Power Module

Each Power Module is shipped with its own package. It has to be installed during the UPS system installation.

The capacity of each Power Module is 30kVA/30kW. It includes a power factor correction rectifier, a battery charger, an inverter and control circuit.

| No. | Item | Description | |
|-----|----------------------|---|---|
| ① | 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. | |
| ② | Ready Switch | Unlock it before removing the Power Module. Lock it when the Power Module is well installed. Then the Power Module can start to work. | |
| ③ | DIP Switches | There are three 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 . | |
| ④ | Battery Start Button | When AC input is not existing, use this button to start battery power for UPS. | |
| ⑤ | 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. |
| ⑥ | 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 | The CAN Bus communication doesn't work. |

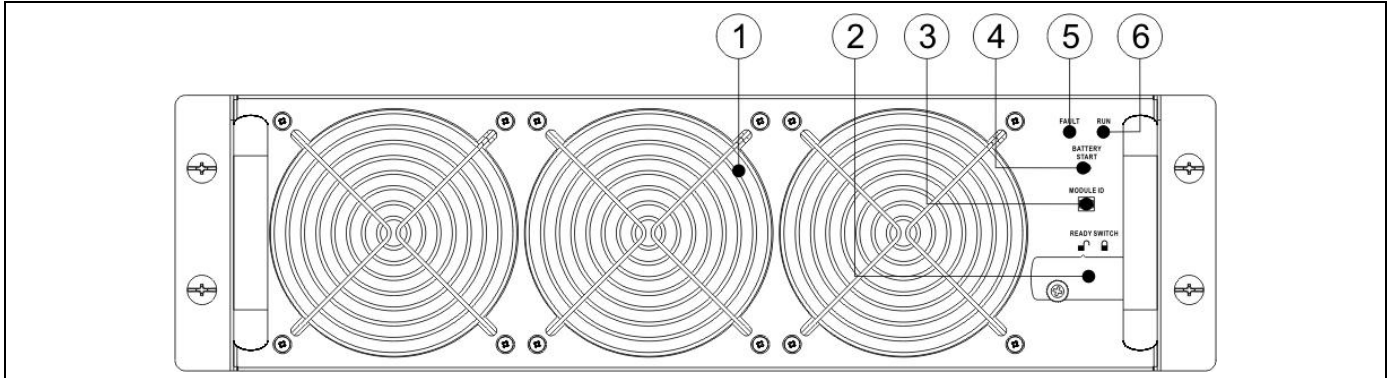


Figure 2-19 Power Module

| Module Address | DIP SWITCH | Module Address | DIP SWITCH |
|----------------|------------|----------------|------------|
| 0 | | 1 | |
| 2 | | 3 | |
| 4 | | 5 | |
| 6 | | 7 | |

Table 2-1 DIP switch setting and Module Address

Power Module ID Assignment

According to the Module Address and the position of SW1 and SW2, the Power Module's ID is assigned. The Module ID is shown in **Table 2-2**.

These two switches, SW1 & SW2 are mounted in the Parallel board which is located at the back of UPS cabinet. Refer to Figure 2-20.

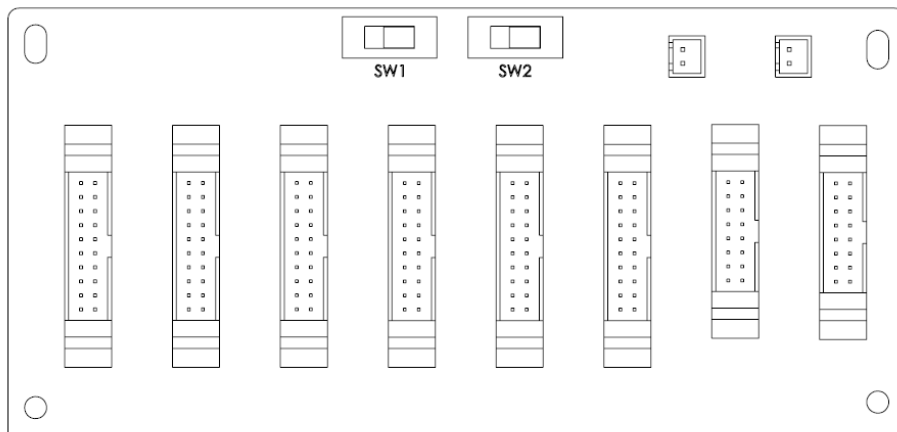


Figure 2-20 Parallel Board

The SW1 and SW2 position have been well installed 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 Rack System" to adjust SW2.

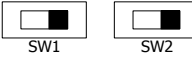
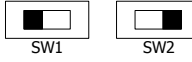
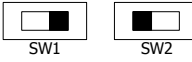
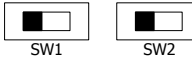
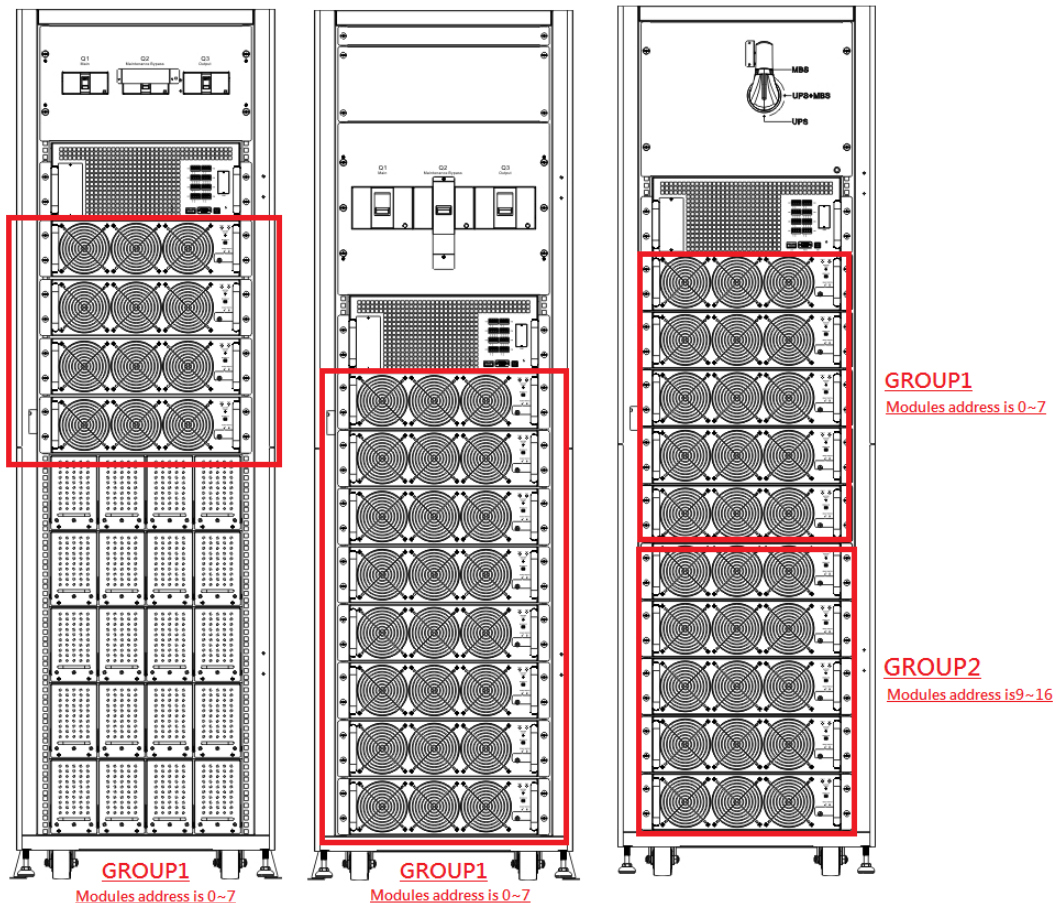
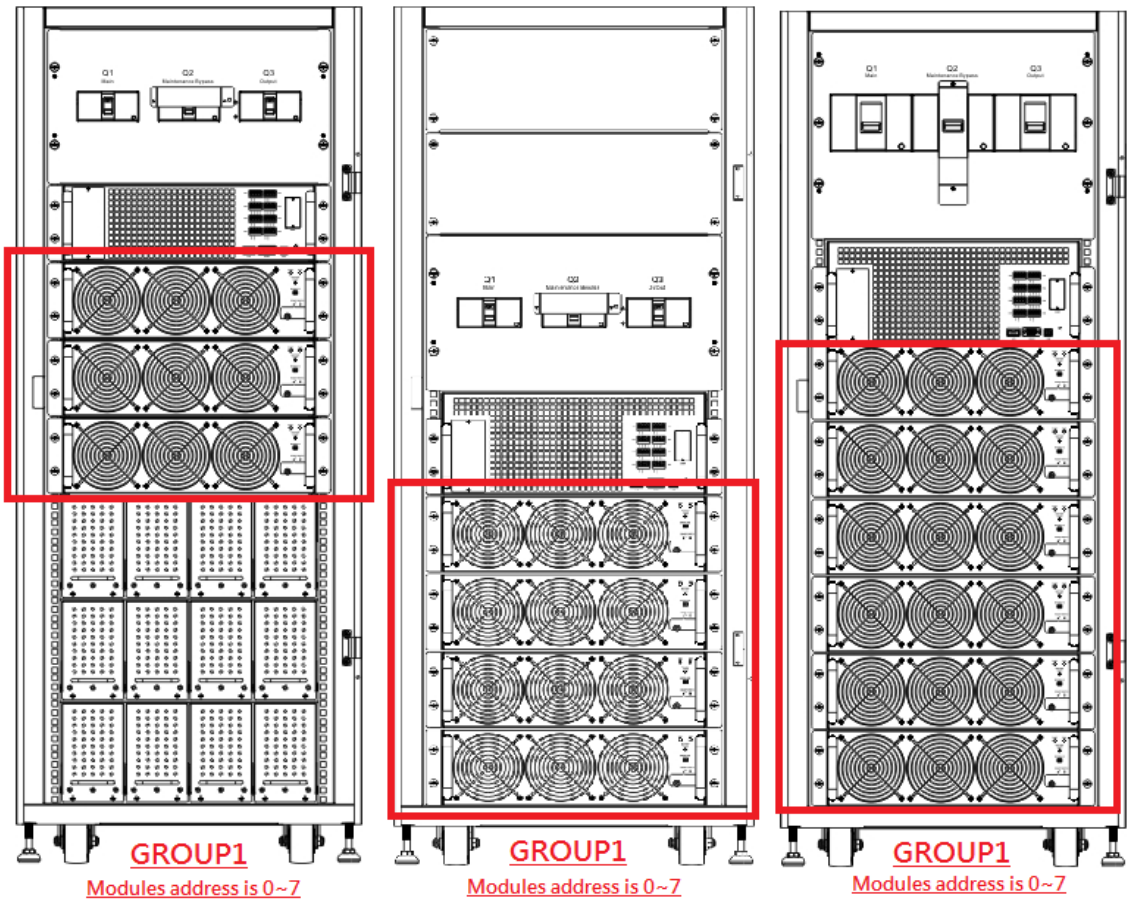
| SW1 & SW2 | Module Address | Module ID | SW1 & SW2 | Module Address | Module ID |
|---|----------------|-----------|--|----------------|-----------|
|  | 0 | 0 |  | 0 | 9 |
| | 1 | 1 | | 1 | 10 |
| | 2 | 2 | | 2 | 11 |
| | 3 | 3 | | 3 | 12 |
| | 4 | 4 | | 4 | 13 |
| | 5 | 5 | | 5 | 14 |
| | 6 | 6 | | 6 | 15 |
| | 7 | 7 | | 7 | 16 |
|  | 0 | 18 |  | 0 | 27 |
| | 1 | 19 | | 1 | 28 |
| | 2 | 20 | | 2 | 29 |
| | 3 | 21 | | 3 | 30 |
| | 4 | 22 | | 4 | 31 |
| | 5 | 23 | | 5 | 32 |
| | 6 | 24 | | 6 | 33 |
| | 7 | 25 | | 7 | 34 |

Table 2-2 Module ID Assignment





2.9.3 Battery Module

The Battery Module is shipped with its own package. The inside batteries can be installed at factory or installed by the end user. A Battery Module contains 10 pcs of 12V/9Ah batteries at maximum.

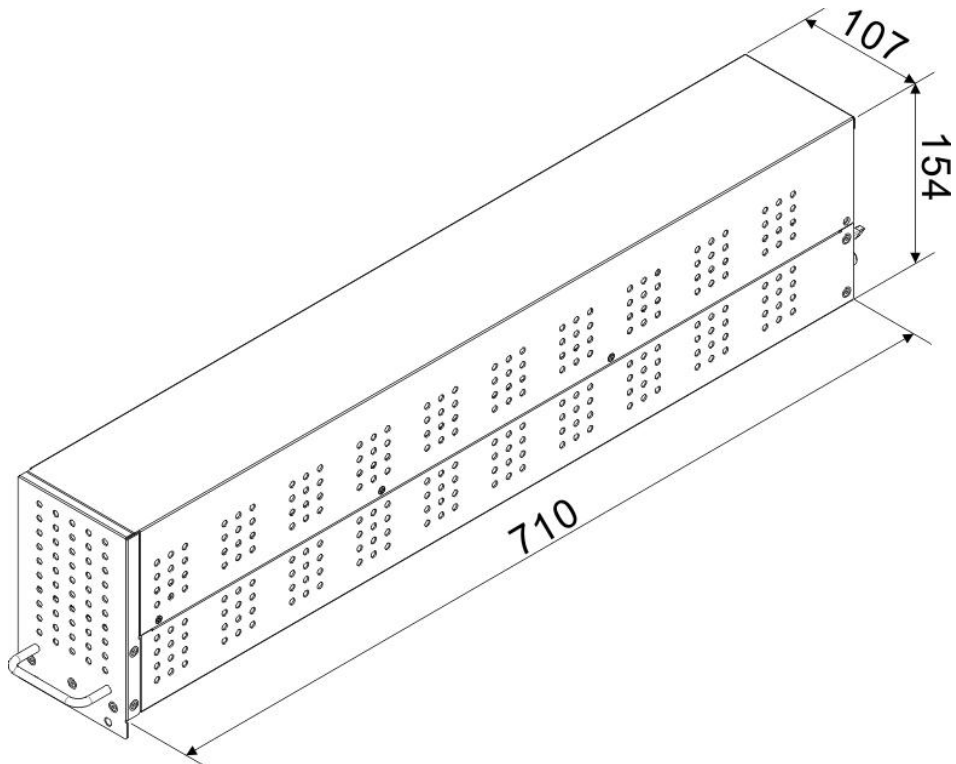


Figure 2-21 Battery Module

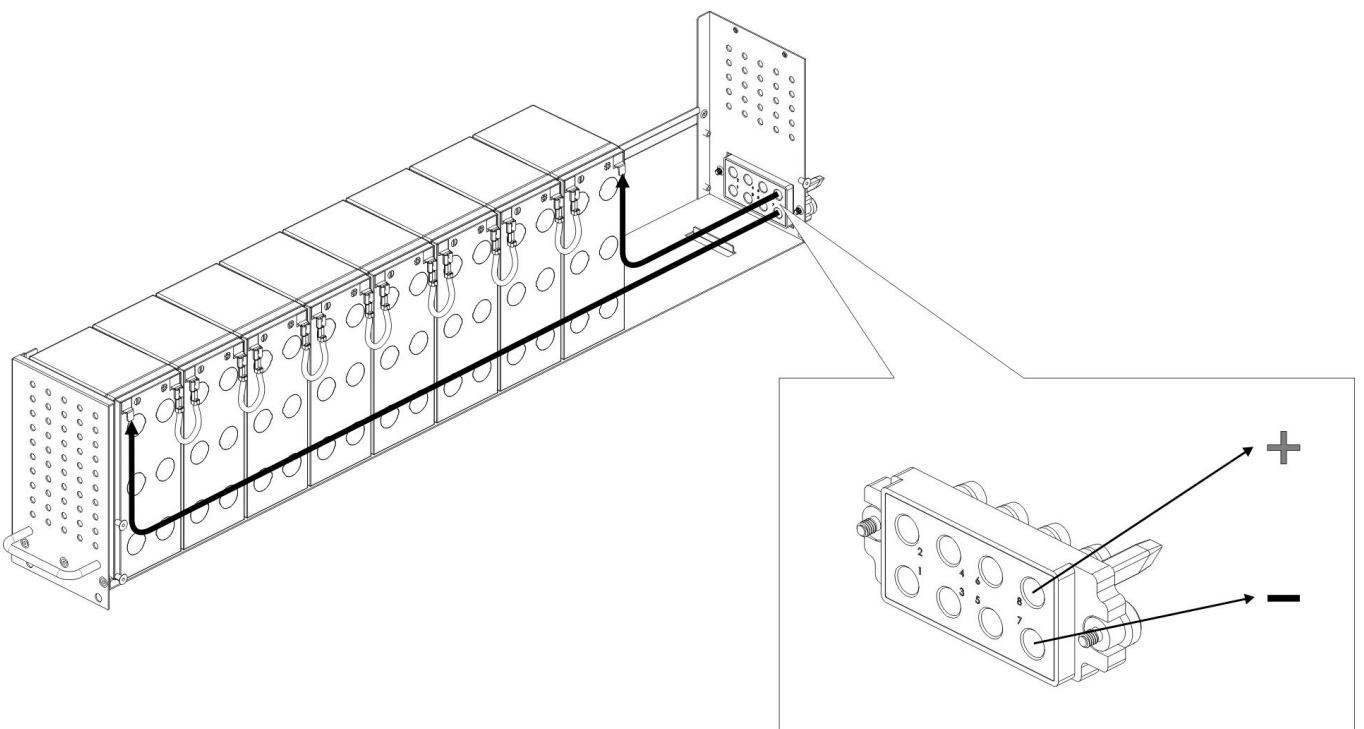
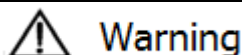


Figure 2-22 Internal Wiring of Battery Module

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 maximum current and power cable configuration.

For standard model in 30U cabinet (Battery inside)

| Model | 30KVA | 60KVA | 90KVA |
|--------------------------------|-------|-------|-------|
| Current (A) | 55 | 110 | 165 |
| Power cable (mm ²) | 10 | 35 | 70 |
| Fixation torque force (lb-in) | 20 | 20 | 20 |

For standard model in 42U cabinet (Battery inside)

| Model | 30KVA | 60KVA | 90KVA | 120KVA |
|--------------------------------|-------|-------|-------|--------|
| Current (A) | 55 | 110 | 165 | 220 |
| Power cable (mm ²) | 10 | 35 | 70 | 95 |
| Fixation torque force (lb-in) | 20 | 20 | 20 | 20 |

For extended series in 30U & 42U cabinet

| Model | 30KVA | 60KVA | 90KVA | 120KVA | 150KVA |
|--------------------------------|--------|--------|--------|--------|--------|
| Current (A) | 55 | 110 | 165 | 220 | 275 |
| Power cable (mm ²) | 10 | 35 | 70 | 95 | 150 |
| Fixation torque force (lb-in) | 20 | 20 | 20 | 20 | 20 |
| Model | 180KVA | 210KVA | 240KVA | 270KVA | 300KVA |
| Current (A) | 330 | 385 | 440 | 495 | 550 |
| Power cable (mm ²) | 240 | 300 | 300 | 120*2 | 150*2 |
| Fixation torque force (lb-in) | 20 | 20 | 20 | 20 | 20 |

Notice: Installer has to consider the max. current and wiring gauge when considering future extension.

2.10.2 DC input maximum current and power cable configuration.

For standard series in 30U cabinet (Battery inside)

| Model | 30KVA | 60KVA | 90KVA |
|--------------------------------|-------|-------|-------|
| Current (A) | 100 | 200 | 300 |
| Power cable (mm ²) | 25 | 95 | 150 |
| Fixation torque force (lb-in) | 20 | 20 | 20 |

Warning:

1. When Load is less than 30KVA, at least two layers of battery modules (8 modules) have to be installed.
2. When Load is between 30KVA and 60KVA, three layers of battery modules (12 modules) have to be installed in total.
3. When Load is larger than 60KVA, the external battery cabinet must be installed.
4. The same type of battery has to be used, if the battery is in parallel application.

For standard series in 42U cabinet (Battery inside)

| Model | 30KVA | 60KVA | 90KVA | 120KVA |
|--------------------------------|-------|-------|-------|--------|
| Current (A) | 100 | 200 | 300 | 400 |
| Power cable (mm ²) | 25 | 95 | 150 | 240 |
| Fixation torque force (lb-in) | 20 | 20 | 20 | 20 |

Warning:

1. When Load is less than 30KVA, at least two layers of battery modules (8 modules) have to be installed.
2. When Load is between 30KVA and 60KVA, at least three layers of battery modules (12 modules) have to be installed.
3. When Load is between 60KVA and 90KVA, at least five layers of battery modules (20 modules) have to be installed.
4. When Load is larger than 90KVA, the external battery cabinet must be installed.
5. The same type of battery has to be used, if the battery is in parallel application.

For extended series in 30U & 42U cabinet

| Model | 30KVA | 60KVA | 90KVA | 120KVA | 150KVA |
|--------------------------------|---------|---------|--------|--------|---------|
| Current (A) | 100 | 200 | 300 | 400 | 500 |
| Power cable (mm ²) | 25 | 95 | 150 | 240 | 120 x 2 |
| Fixation torque force (lb-in) | 20 | 20 | 20 | 20 | 20 |
| Model | 180KVA | 210KVA | 240KVA | 270KVA | 300KVA |
| Current (A) | 600 | 700 | 800 | 900 | 1000 |
| Power cable (mm ²) | 150 x 2 | 240 x 2 | 240*2 | 300*2 | 185*3 |
| Fixation torque force (lb-in) | 20 | 20 | 20 | 20 | 20 |

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 (Q1), Maintenance Breaker (Q2), Output Breaker (Q3) 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 top of the cabinet. Or the cables will block the cooling ventilation and make the over temperature failure.

2.11.1 Installation Drawing

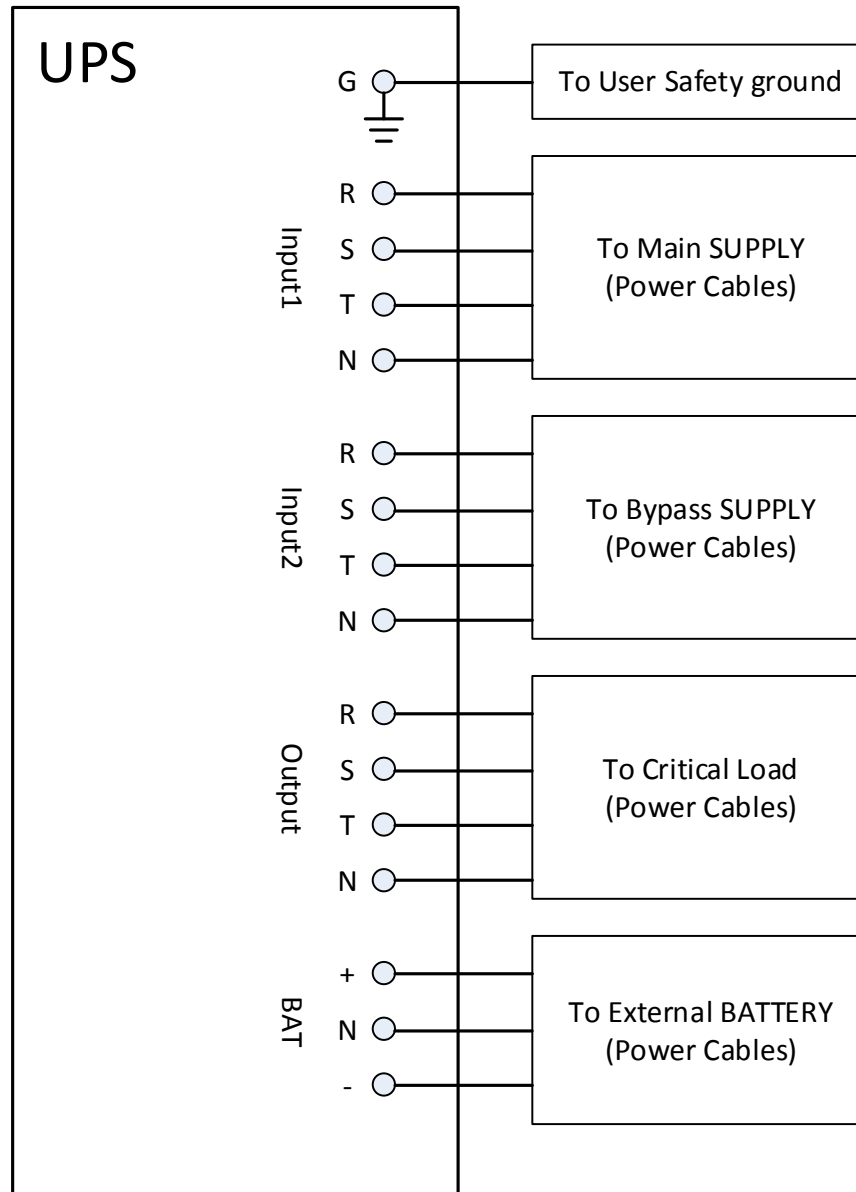


Figure 2-23 UPS Cabinet Wiring

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.

There is no Breaker between Input2 and STS Module, the STS module is waked up when Input2 is powered, though the Q1 Breaker is OFF.

For the 300K cabinet, there is no input breaker nor output breaker. These breakers have to be installed externally.

2.11.3 External Battery Cabinet Connection

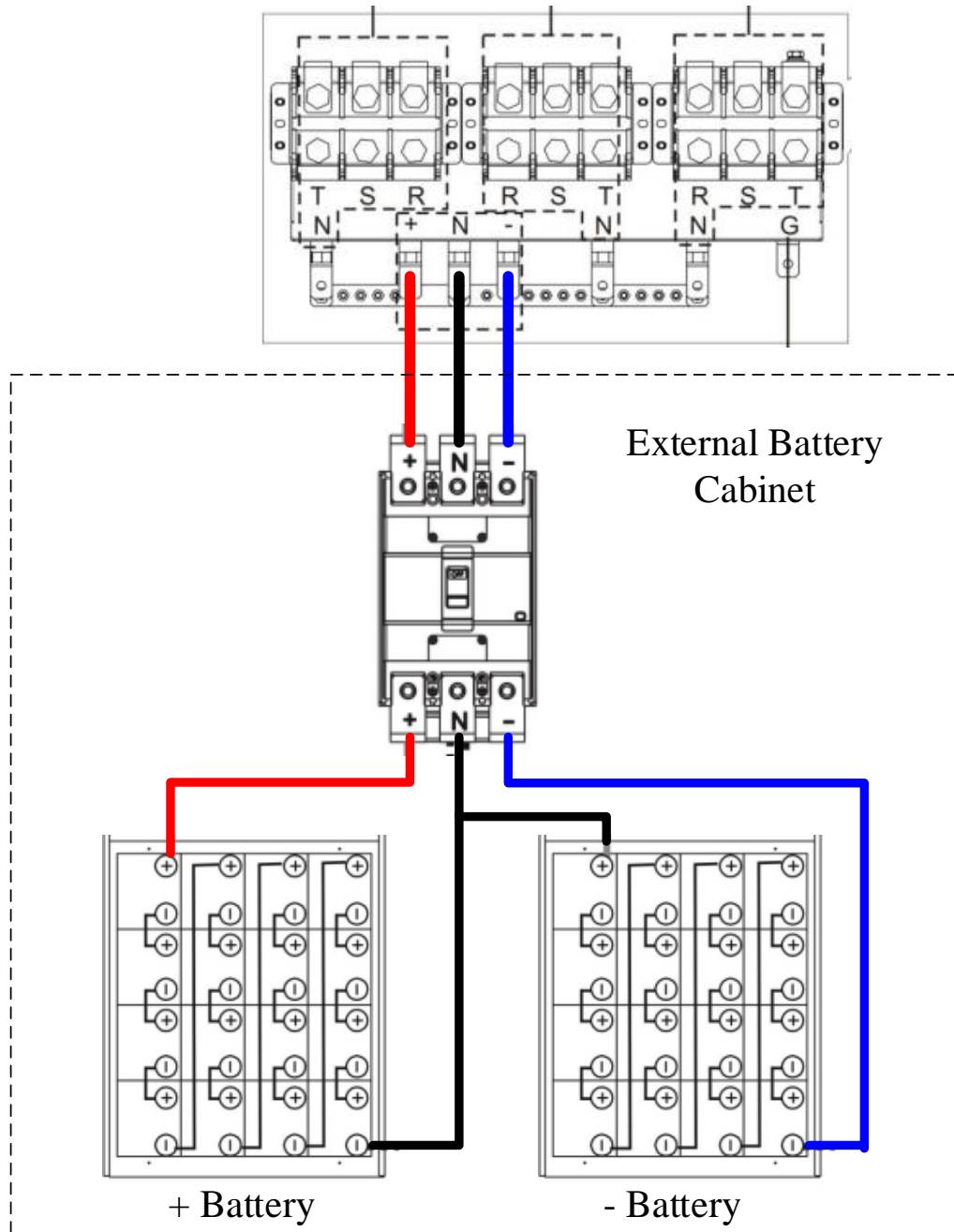
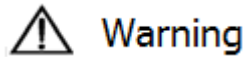


Figure 2-24 External Battery Cabinet Wiring

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 Power Module Installation

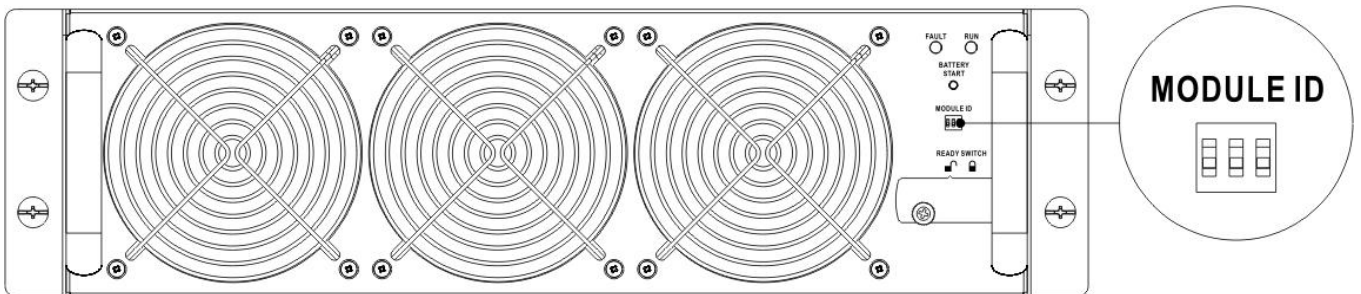



Warning

The weight of Power Module is over 30Kg so at least two persons are required for handling.

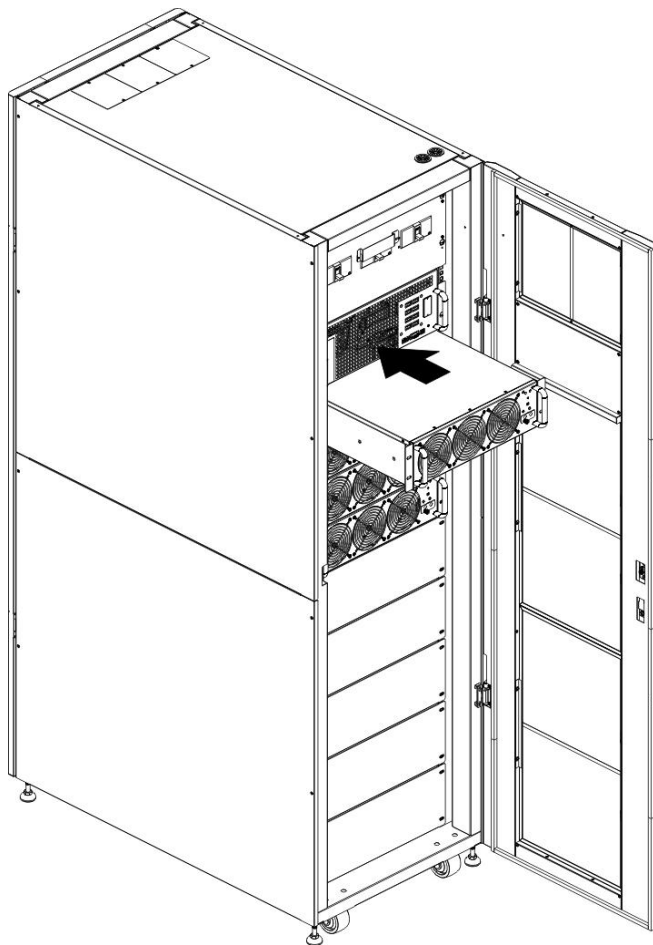
2.12.1 Insert the Power Module

(1.) Adjust the DIP switch positions to set the different Module Address. Refer to **Table 2-1**.

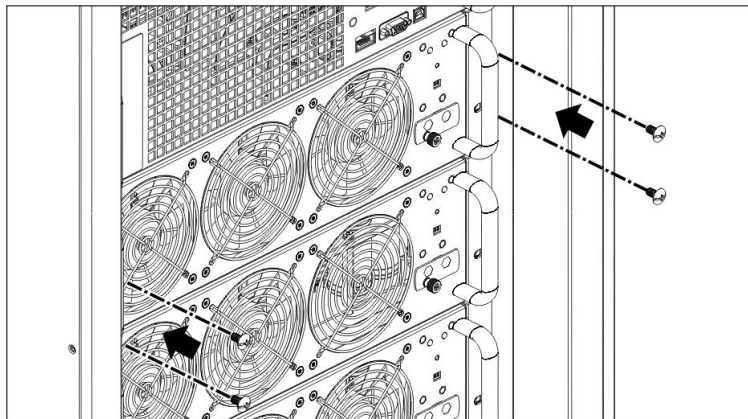


(2.) Place the ready switch on the front panel of the module to the “” position (i.e., in unready state).

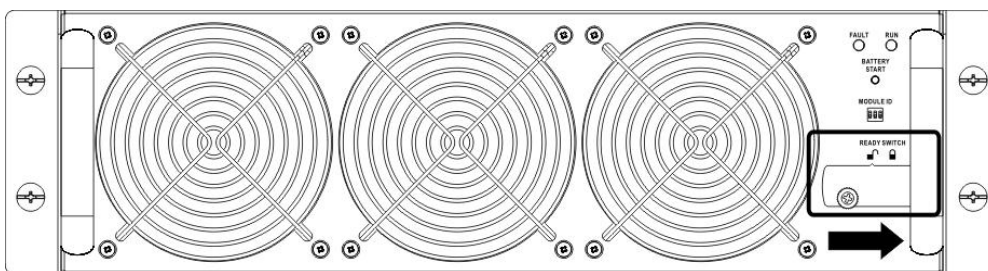
(3.) Insert the Power Module into an unoccupied slot by two persons.



(4.) Secure the Power Module to the cabinet by fixing the screws at the front panel of the Power Module.



(5.) Move the ready switch to the "🔒" position (i.e., in ready state).

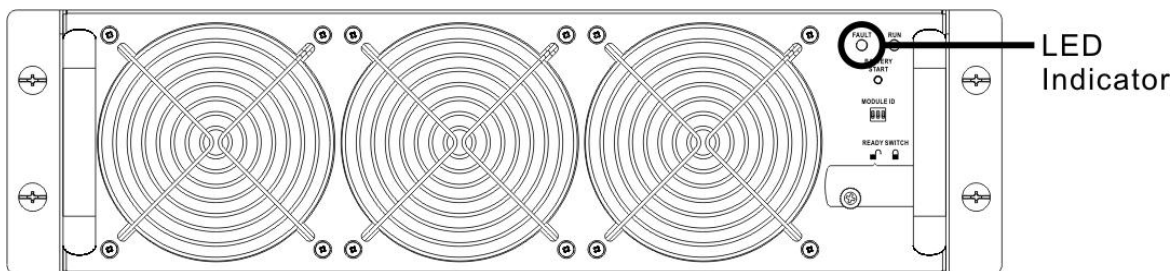


2.12.2 Remove the Power Module

Warning

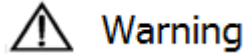
- Before removing any Power Module, make sure the remaining Power Modules can support the critical loads.
- At least one Power Module MUST stay in the UPS cabinet except the UPS system is operating in Maintenance Bypass Mode.

- (1.) Turn the ready switch to the "🔒" position.
- (2.) The Power Module FAULT LED (RED) indicator is lit to indicate the Power Module output is off and disconnected from UPS system.



- (3.) Use a screwdriver to remove the four screws from fixing holes.
- (4.) Two people pull out together and remove the Power Module from its slot.

2.13 Battery Module Installation

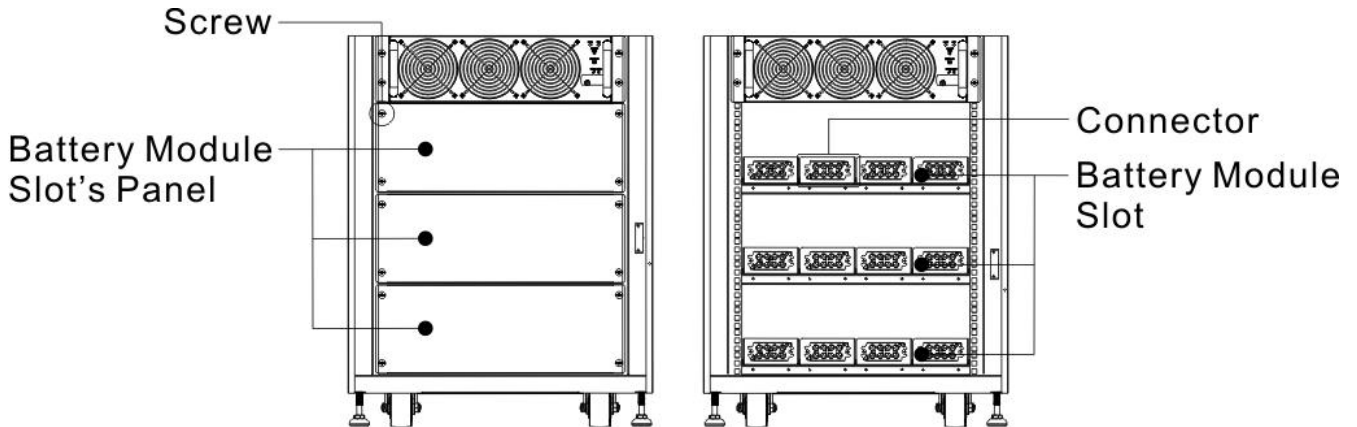


Warning

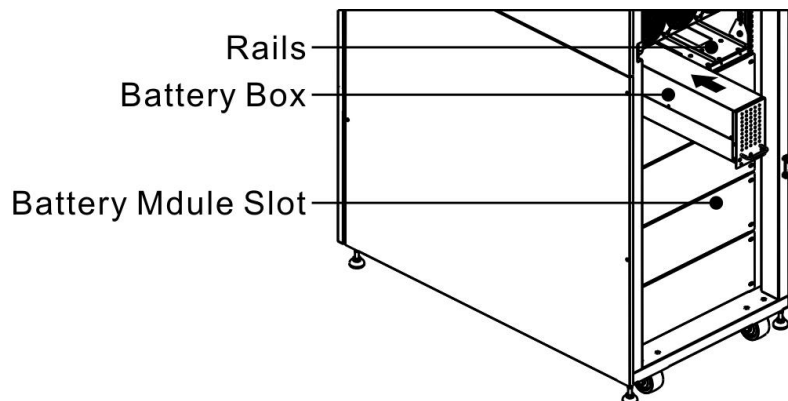
- The weight of Battery Module is heavy so at least two persons are required for handling.
- Before performing the Battery Module installation/ replacement, make sure the Battery Breaker is in the **OFF** position.

2.13.1 Insert the Battery Module (Only Standard Series Cabinet)

(1.) Open the UPS's front door and remove the panel of battery module slot.

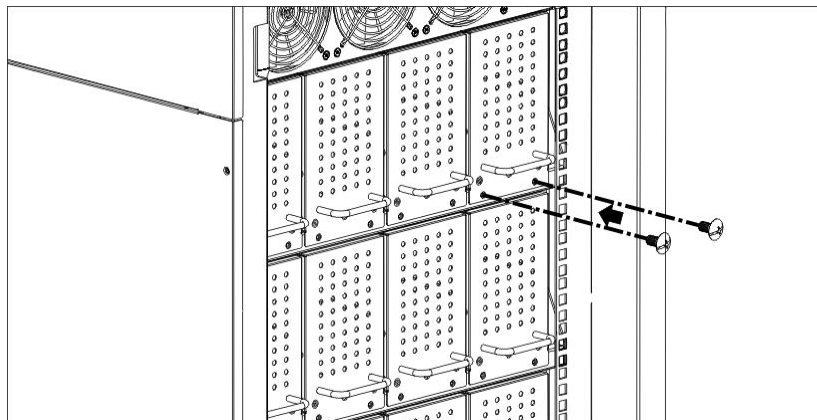


(2.) There are 4 rails for inserting the Battery Modules in the same layer. Four Battery Modules **MUST** be installed to form a set of Battery.



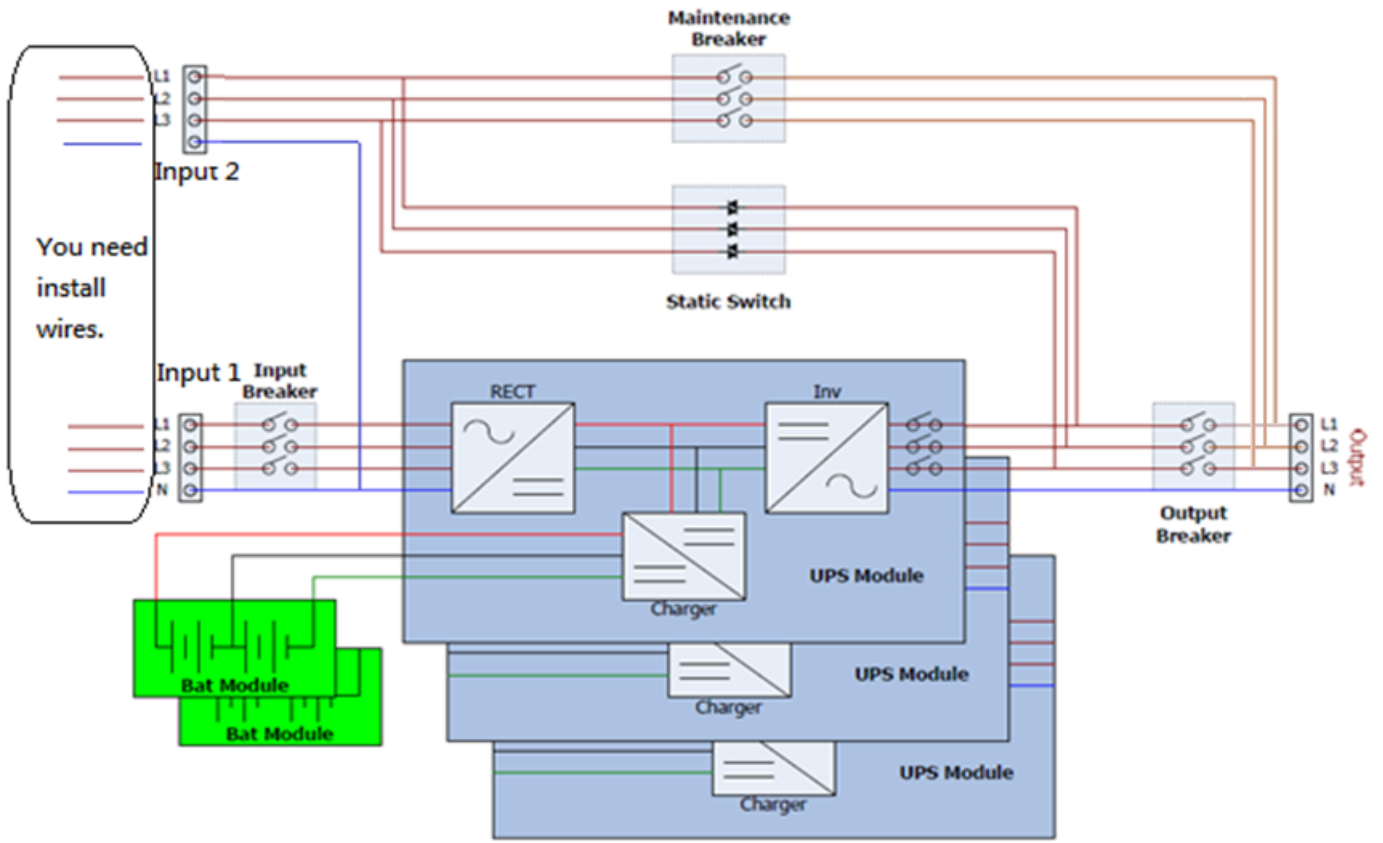
(3.) Regarding the maximum load of power modules, please refer to section 2.10.2 to install the required Battery Modules.

(4.) Secure the Battery Module to the cabinet by fixing the screws of the Battery Module.

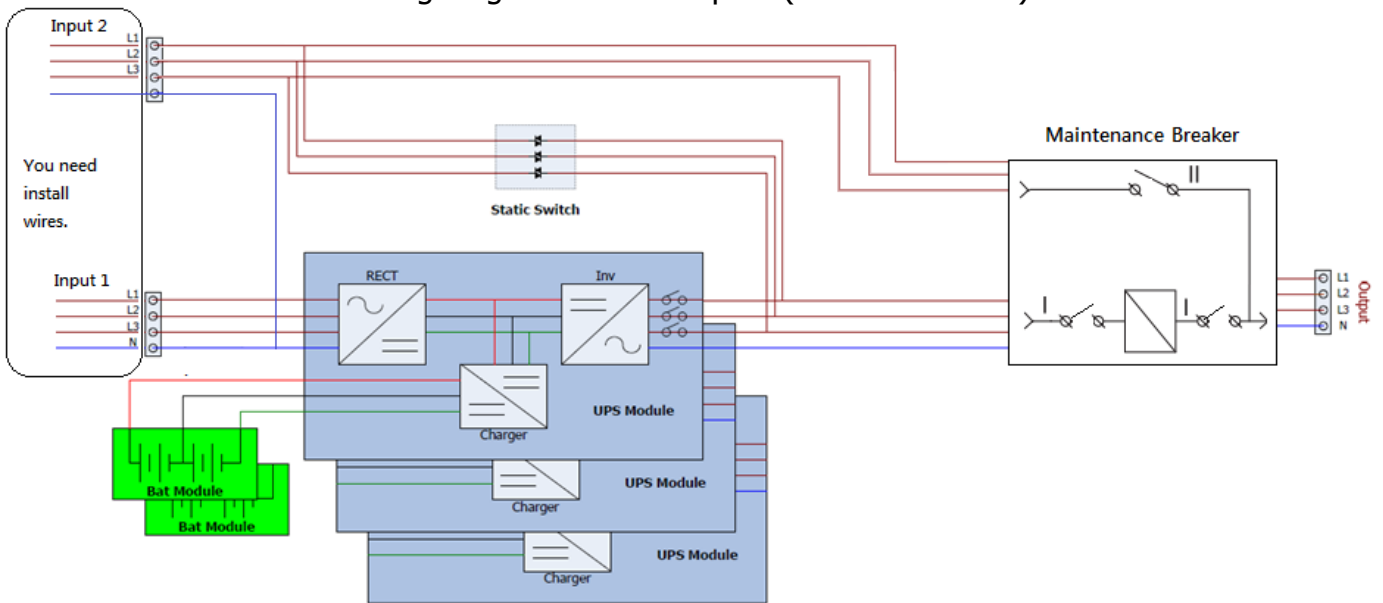


3. Operation Mode and UPS Operation

3.1 Block diagram of UPS

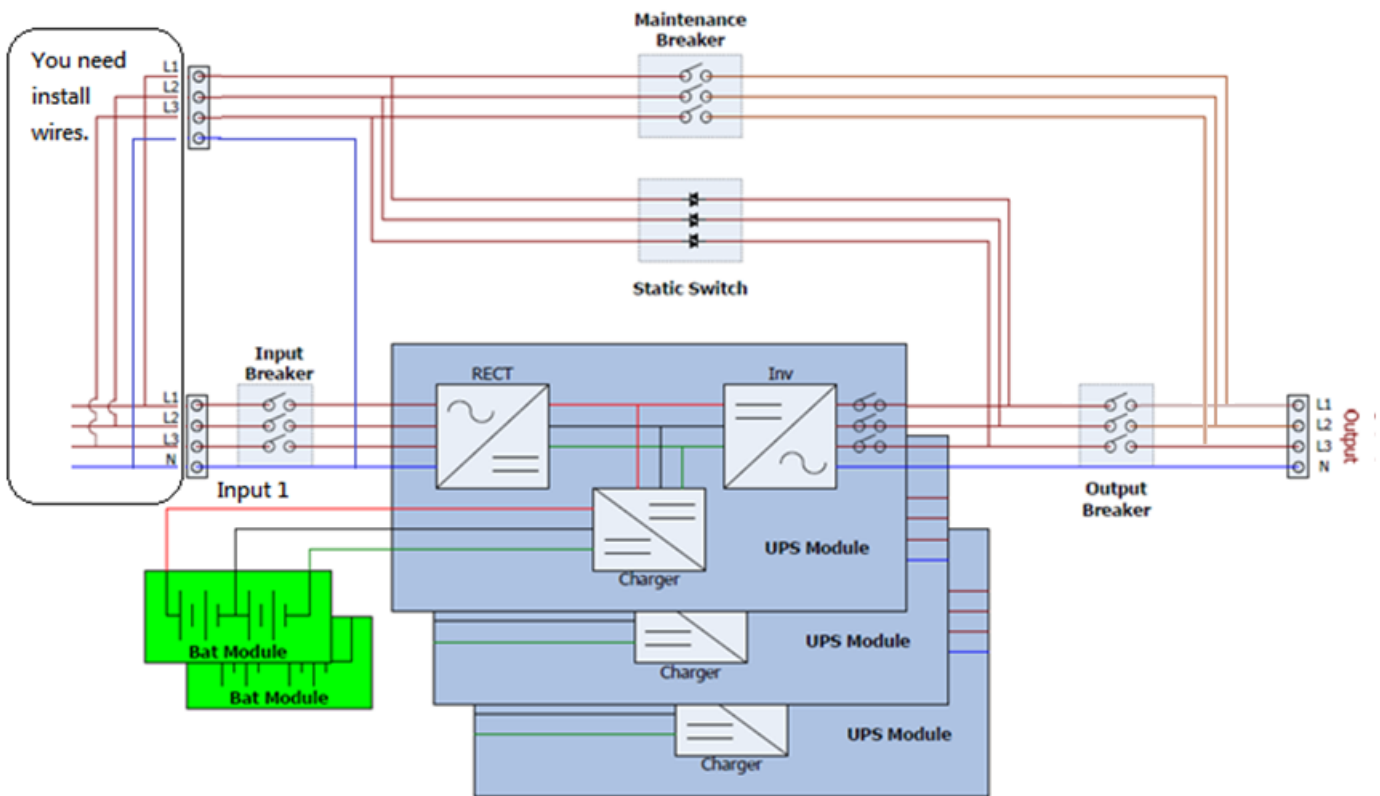


Wiring diagram for dual inputs (90KVA~210KVA)

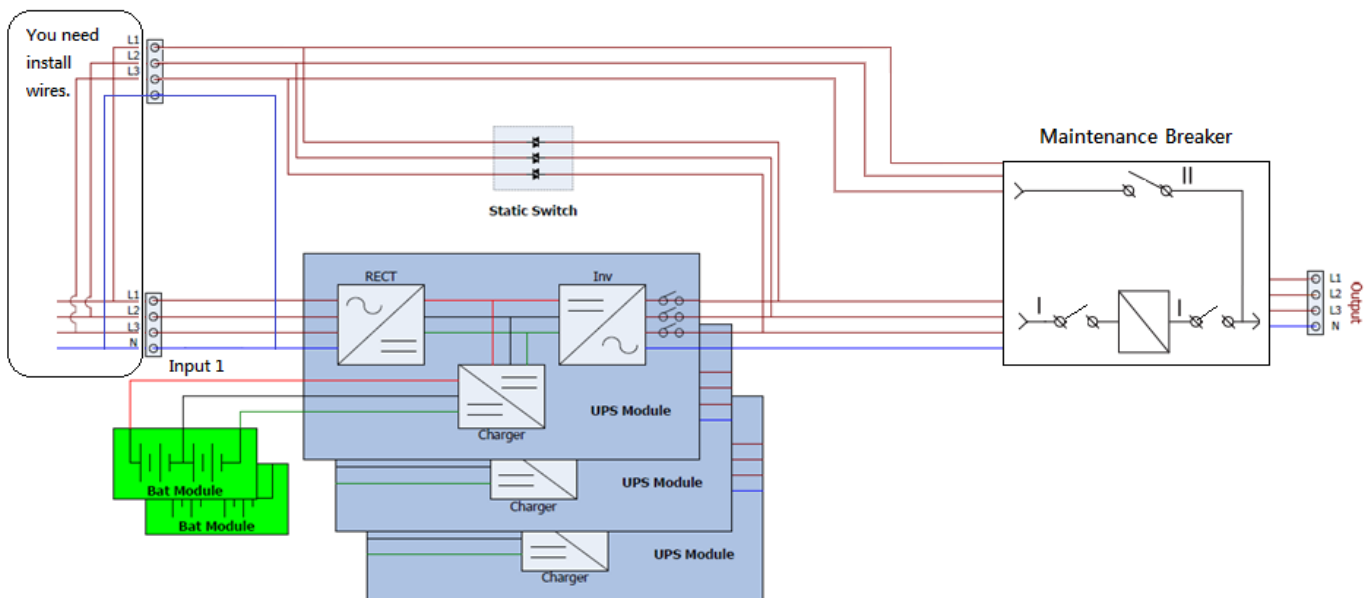


Wiring diagram for dual inputs (300KVA)

Figure 3-1



Wiring diagram for single input (90KVA~210KVA)



Wiring diagram for single input (300KVA)
Figure 3-2

3.2 Operation Mode

This modular UPS is a three-phase, four wire on-line, double-conversion and reverse-transfer 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.

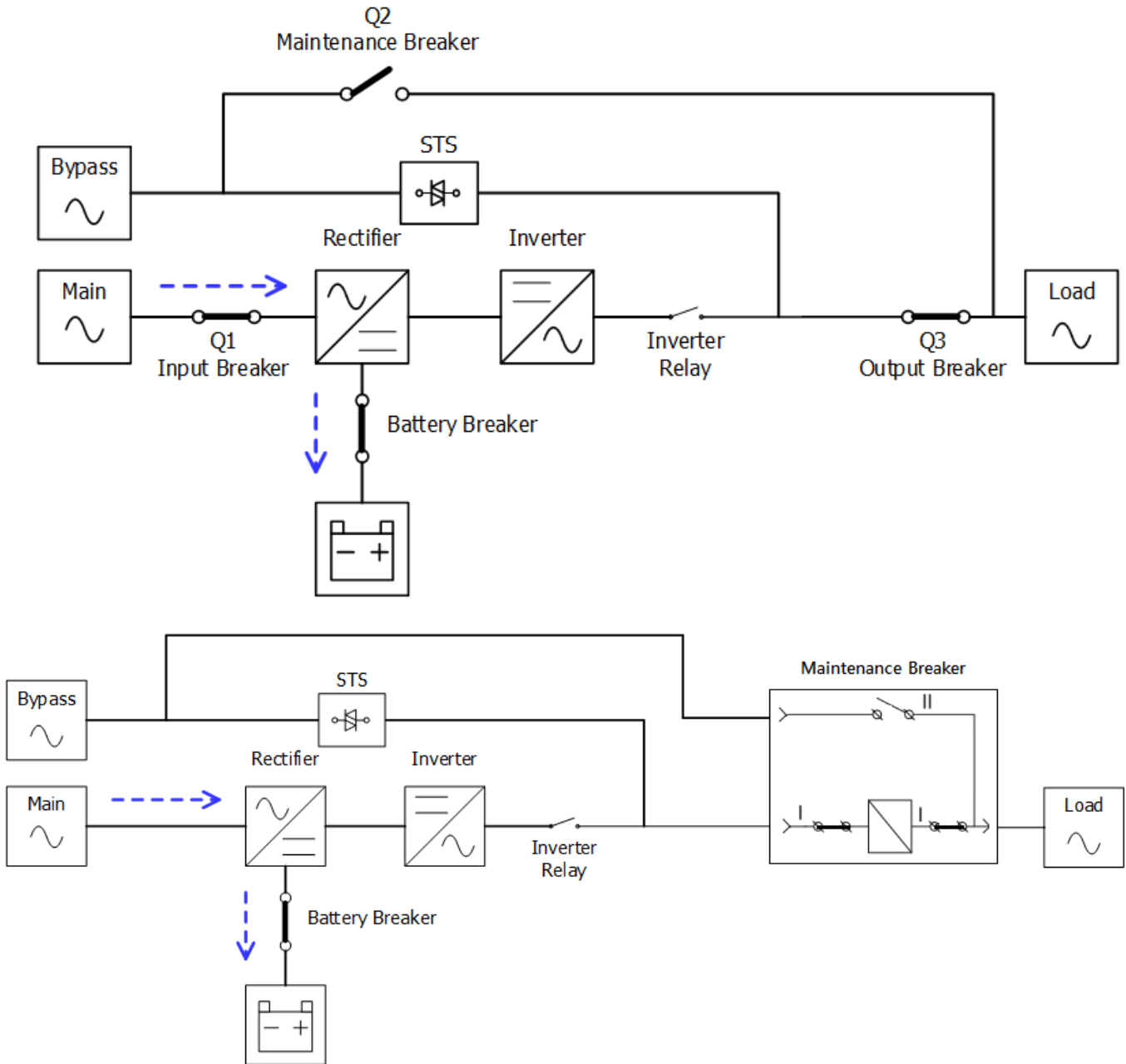


Figure 3-3 : Standby Mode Diagram

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.

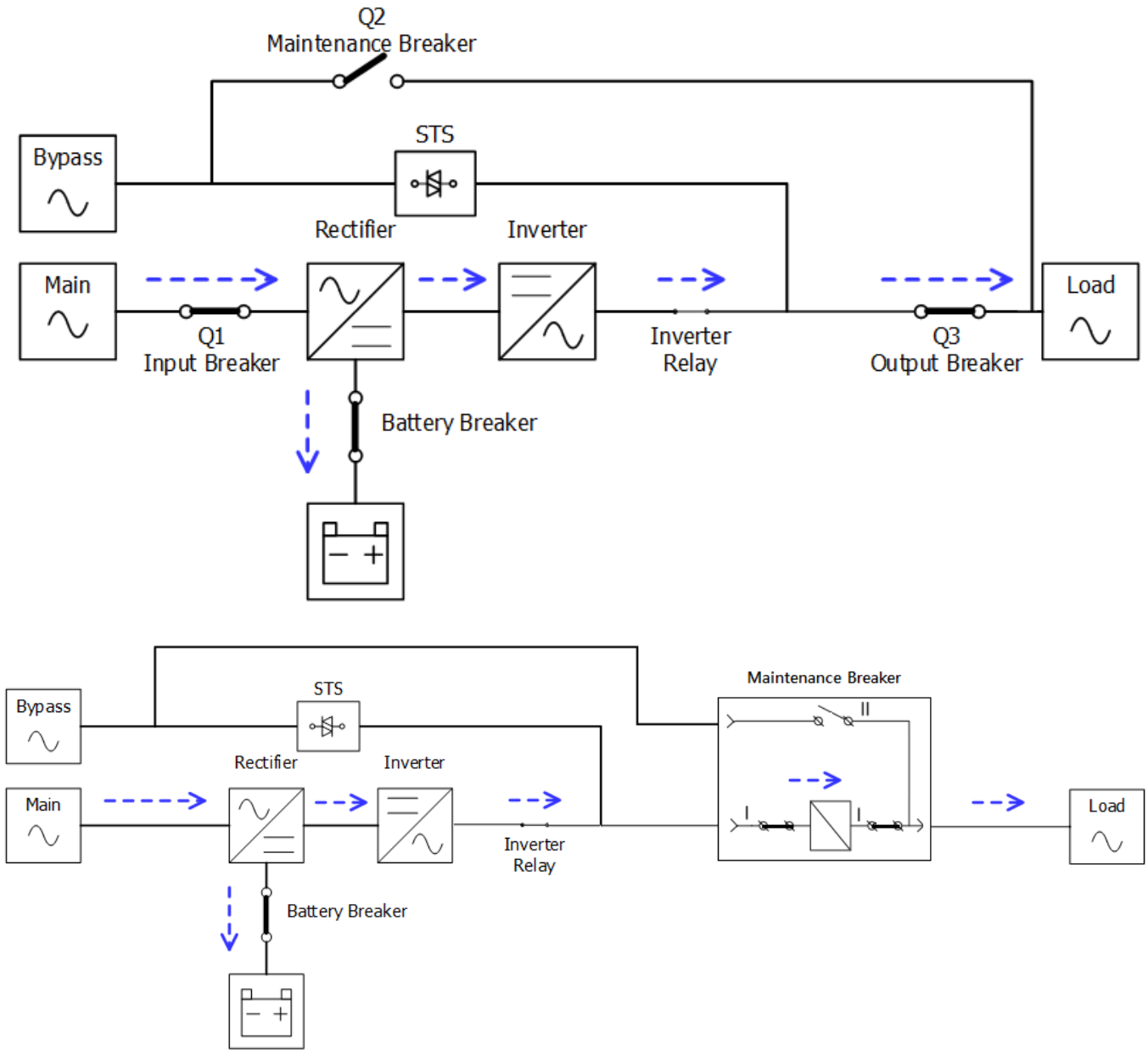


Figure 3-4 : Line Mode Diagram

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.

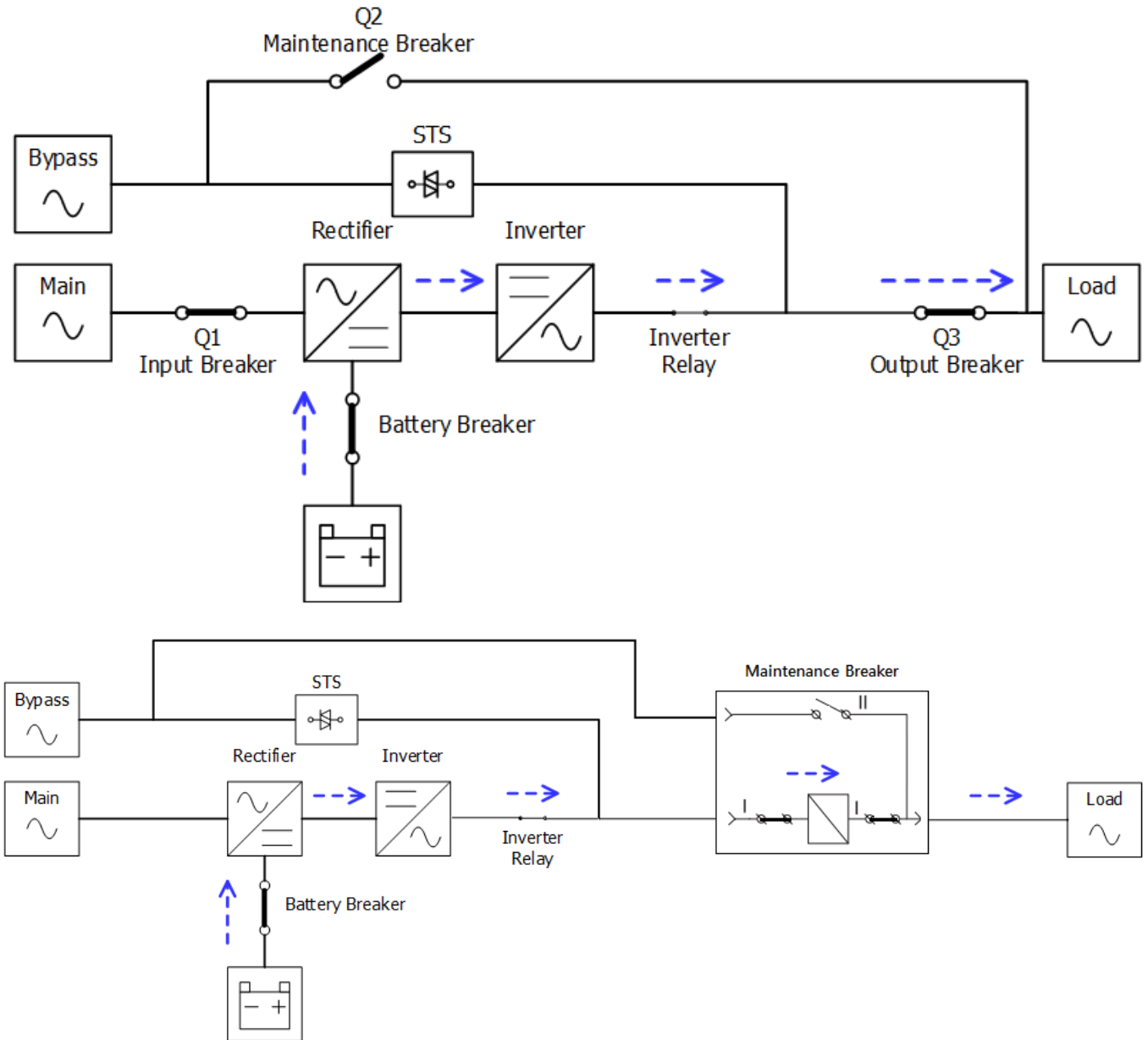


Figure 3-5 : Battery Mode Diagram

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 ..., 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.

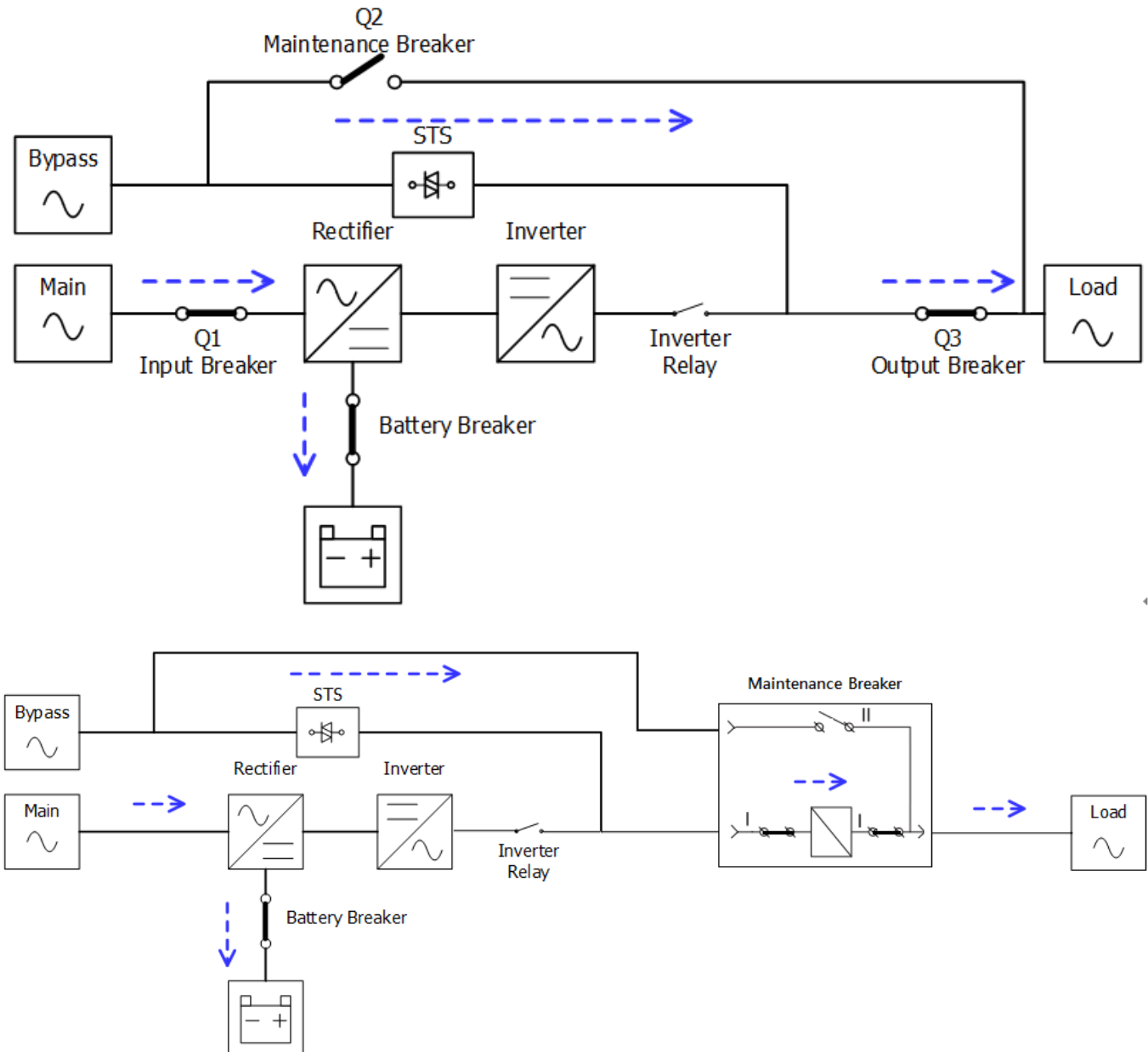


Figure 3-6 : Bypass Mode Diagram

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.

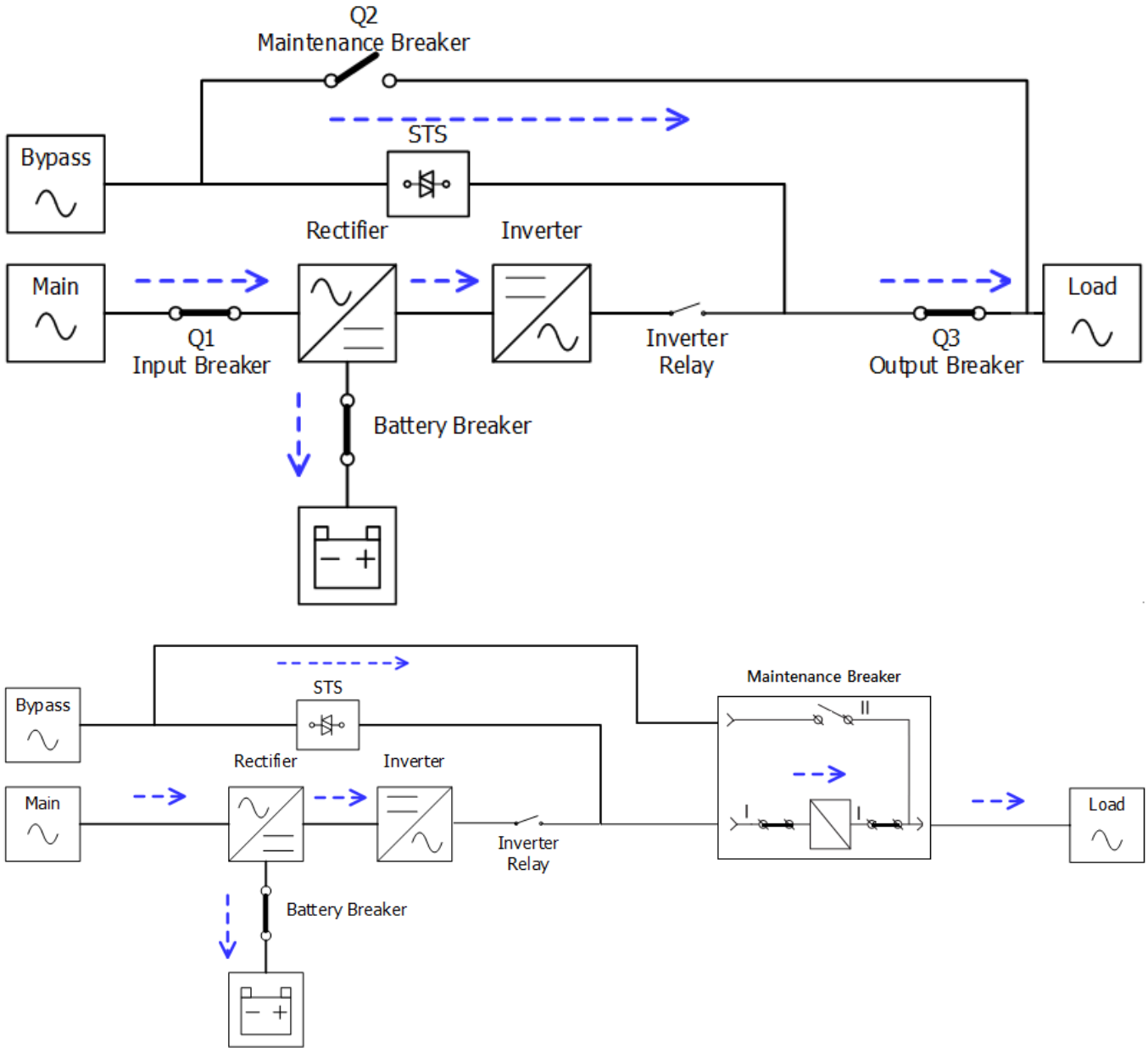


Figure 3-7 : ECO Mode Diagram

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.

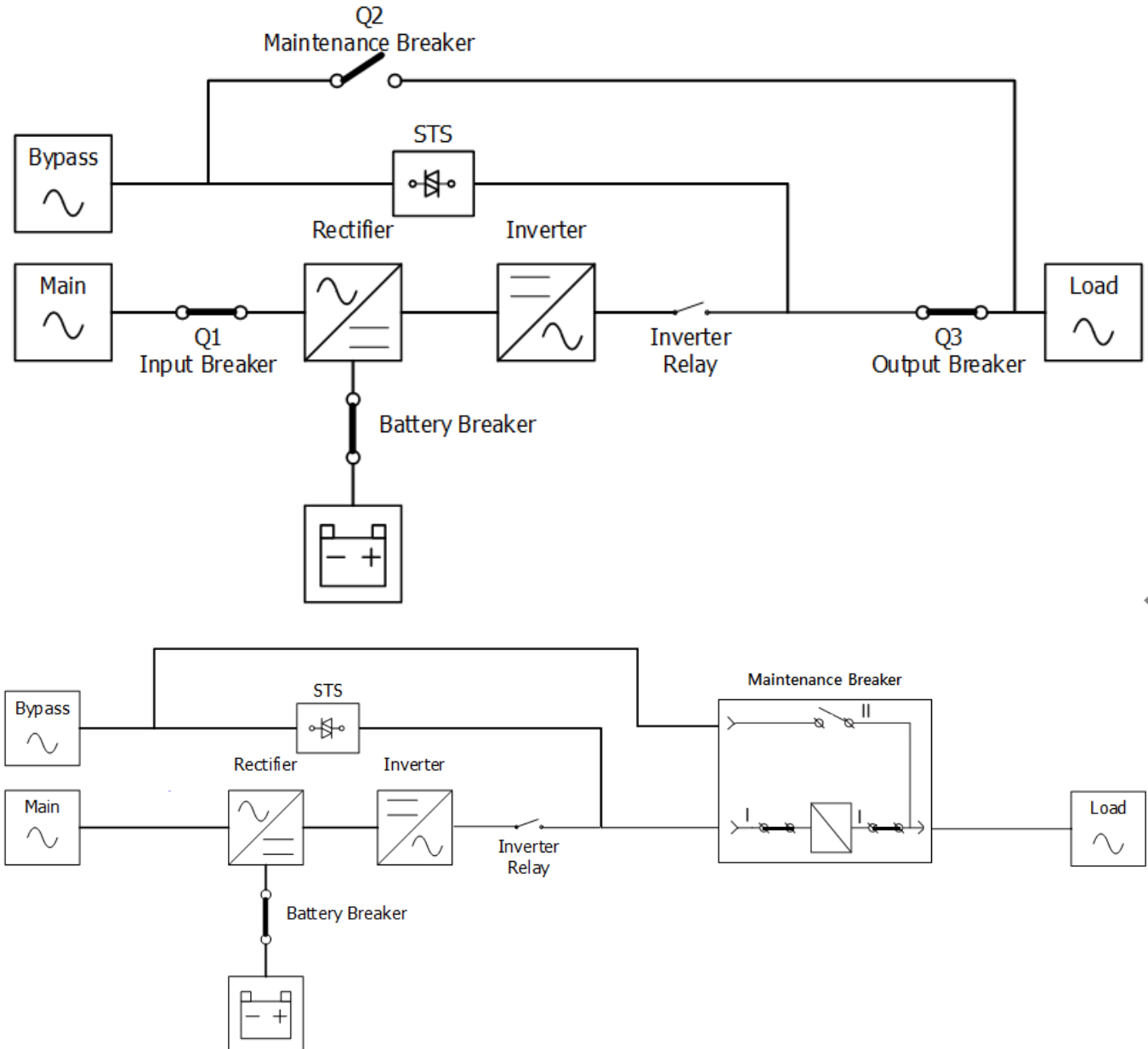


Figure 3-8 : Shutdown Mode Diagram

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.

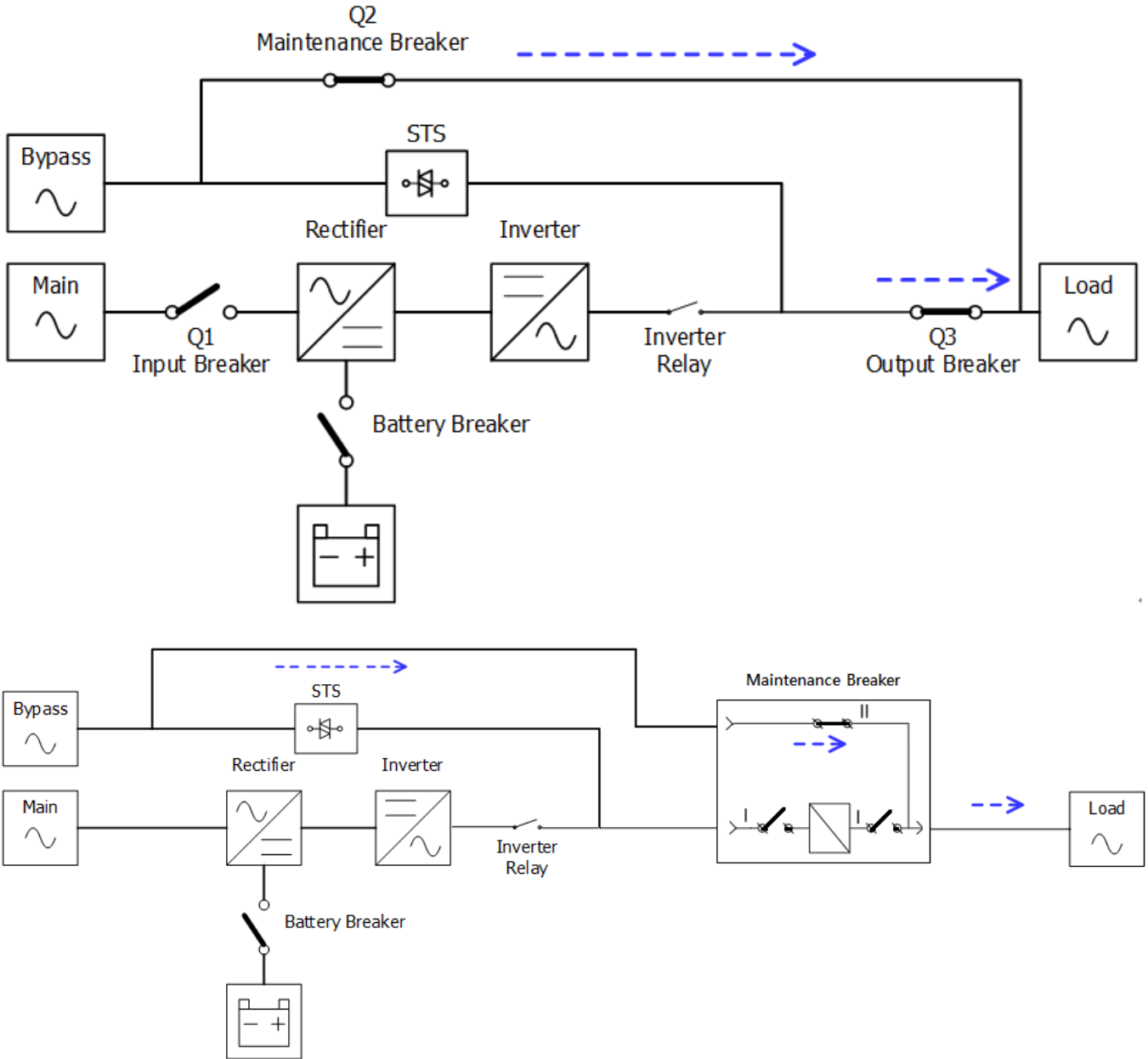


Figure 3-9 : Maintenance Bypass Mode Diagram

3.3 UPS Operation

Warning

- 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 the ready switch on the Power Module has been moved to the "Locked" position.
- Make sure all the breakers are switch **OFF**.

3.3.1 AC Startup

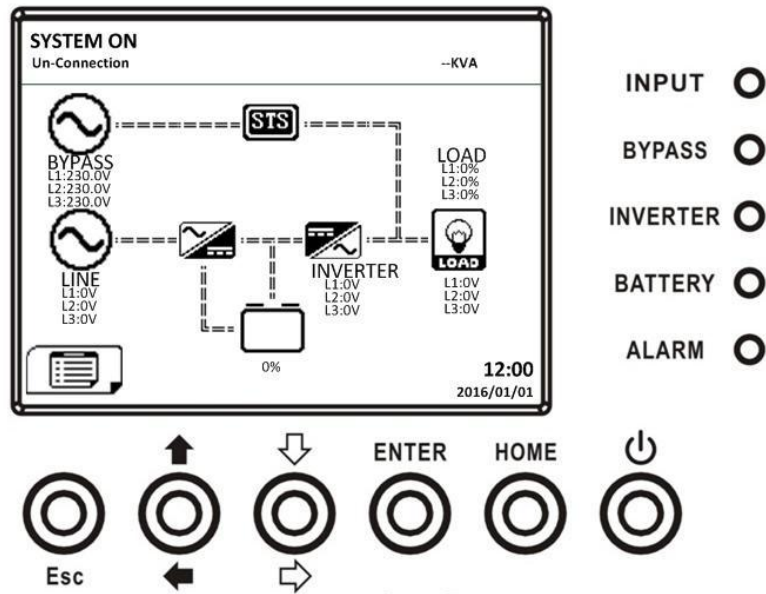
Ensure to follow this procedure when turning on the UPS from a fully powered-down condition.

The operating procedures are as follows:

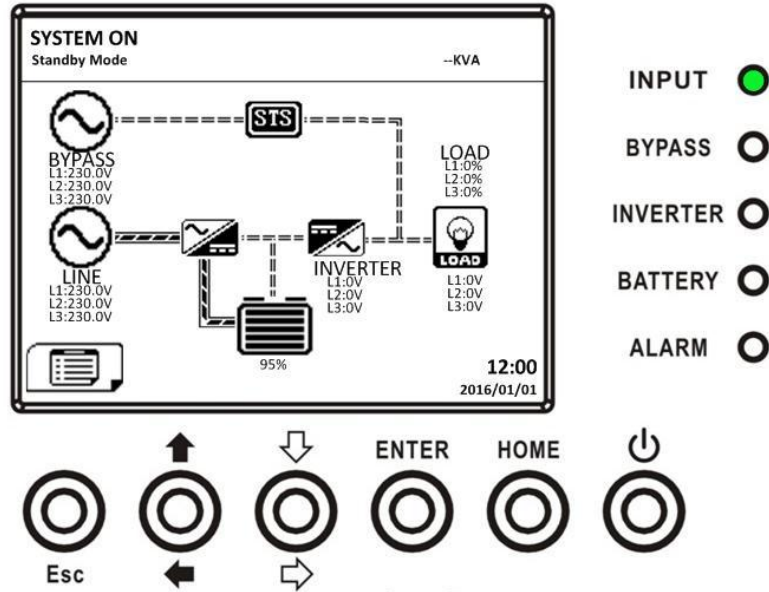
Step 1: Refer to "Chapter 2 Installation" to connect the power cables and install the Power Modules and the battery required for the UPS system.

Step 2: Switch ON the battery breaker.

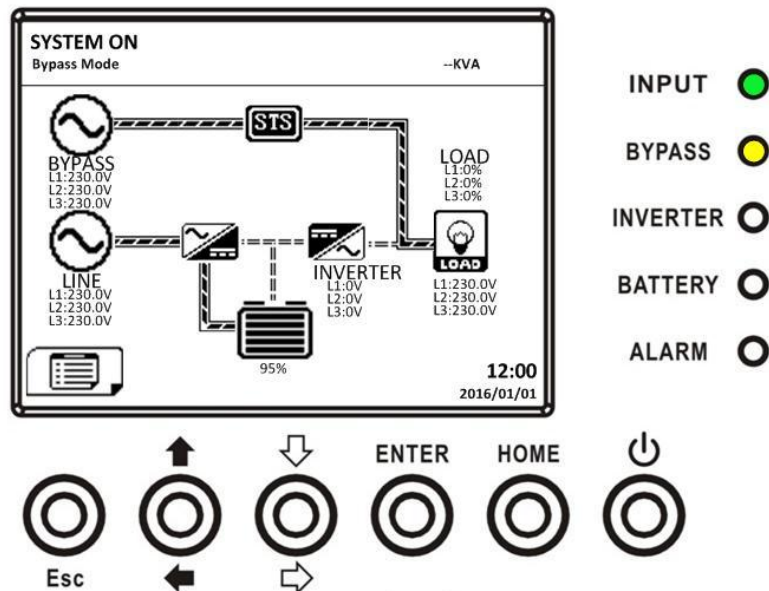
Step 3: Switch ON the external power switch to power the UPS. The STS module starts running and the LCD panel is displayed.



Step 4: Switch ON the input breaker (Q1). The UPS will enter into Standby Mode, if the setting of Bypass mode is disabled.

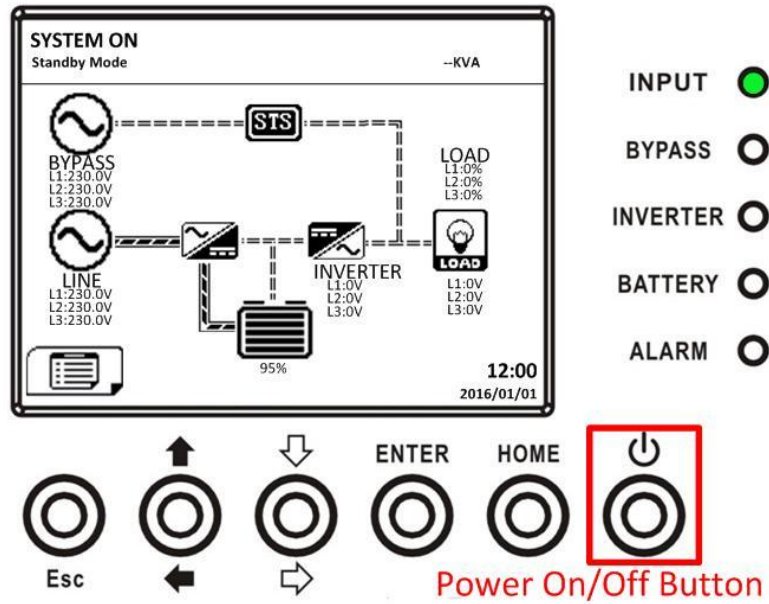


Or the UPS will enter into Bypass Mode, if the setting of Bypass mode is enabled.

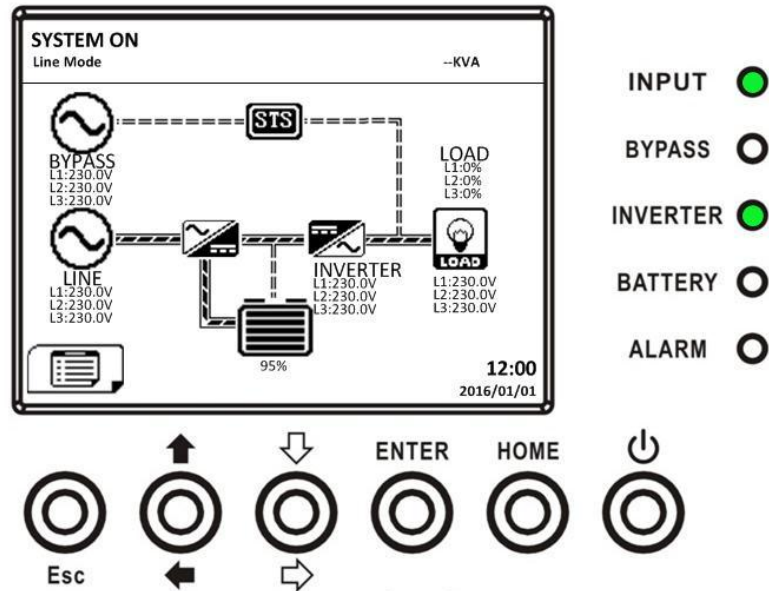


Step 5: Make sure there is no warning or fault event happening. If yes, please refer to Chapter 6 Troubleshooting to solve it.

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



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

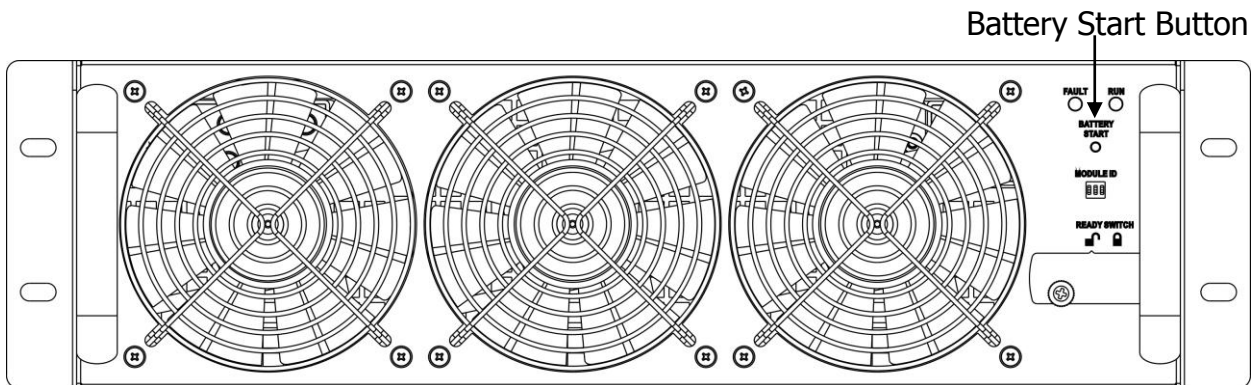


Step 7: Switch ON the output breaker (Q3). AC startup procedure is complete.

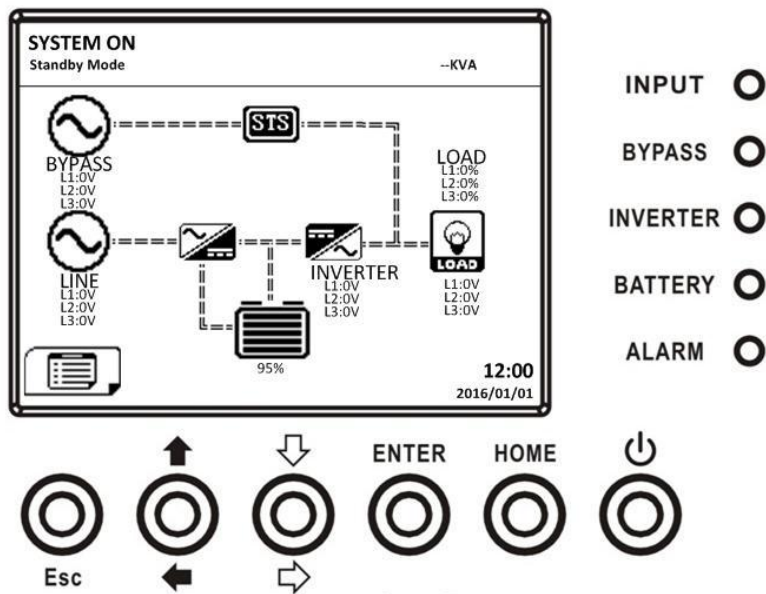
3.3.2 Cold Start Startup

Step 1: Switch ON the battery Breaker.

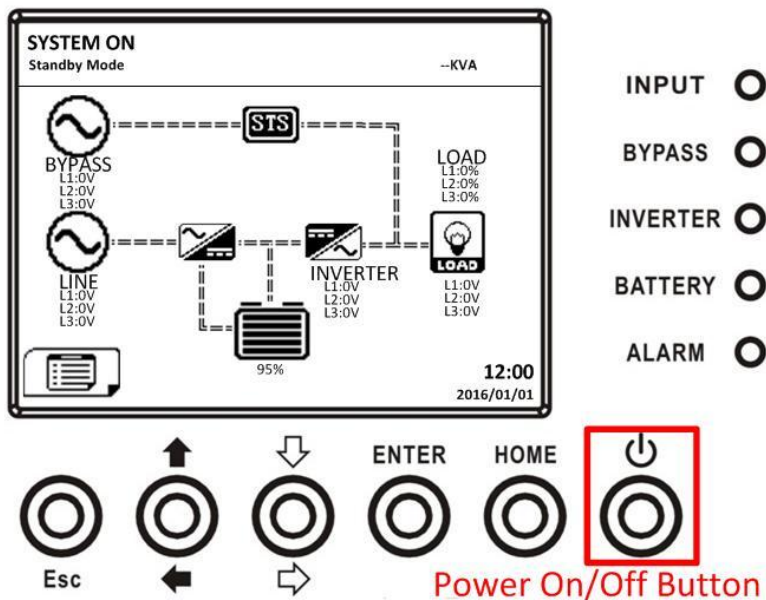
Step 2: Press the "Battery Start" button on any one of Power Modules to start up the control power of all Power modules and STS module as shown below.



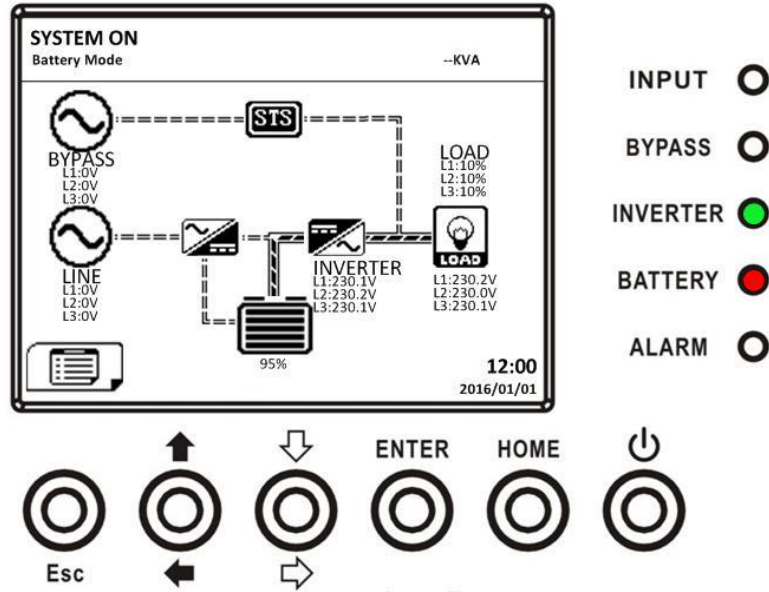
Step 3: After pressing the "Battery Start" button, UPS will enter into Standby mode. Refer to the diagram below for LCD display.



Step 4: Before UPS enters into shutdown mode, please press "Power On/Off" 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.



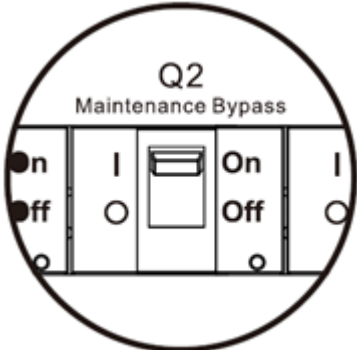
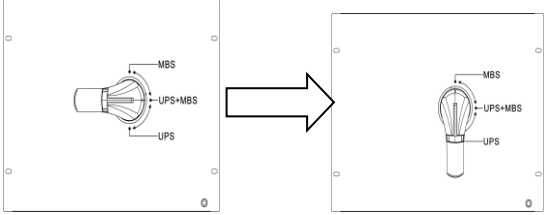
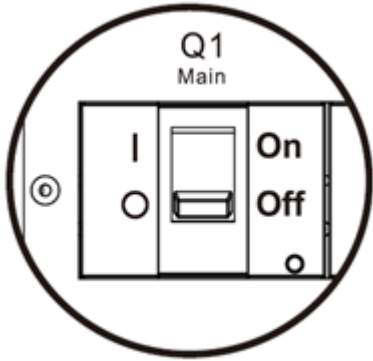
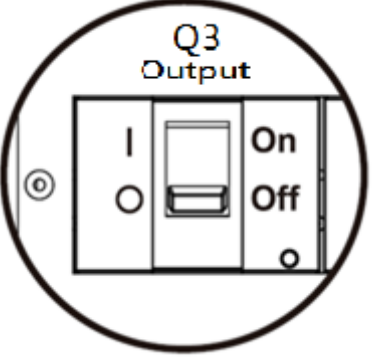
Step 6: Switch ON the output breaker (Q3). Cold start startup procedure is complete.

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

| | 90KVA~210KVA. | 300KVA |
|----------------|--|---|
| Step 1: | <p>Remove the mechanical lock plate of Maintenance Bypass Breaker.</p> | <p>Remove the mechanical lock plate of Maintenance Bypass Switch.</p> |
| Step 2 | <p>Make sure the UPS operates in Bypass mode as shown below.</p> | <p>Make sure the UPS operates in Bypass mode as shown below.</p> |

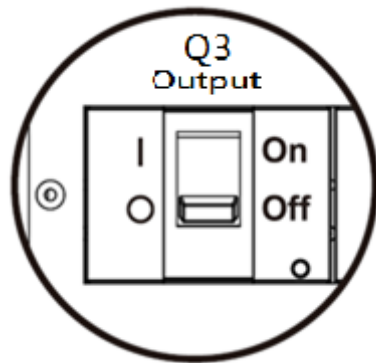
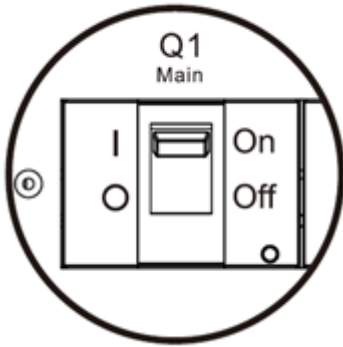
| | | |
|----------------------|--|---|
| <p>Step 3</p> | <p>Switch ON the Maintenance Bypass Breaker as shown below.</p>  | <p>Switch the handle toward upside as shown below.</p>  |
| <p>Step 4</p> | <p>Switch OFF the Main Breaker (Q1) and Output Breaker (Q3) as shown below.</p>   | <p>It is possible to change the STS module, Power Module.</p> |
| <p>Step 5</p> | <p>It is possible to change the STS module, Power Module and Battery Module.</p> | |

3.3.3.2 Transfer to UPS Protection

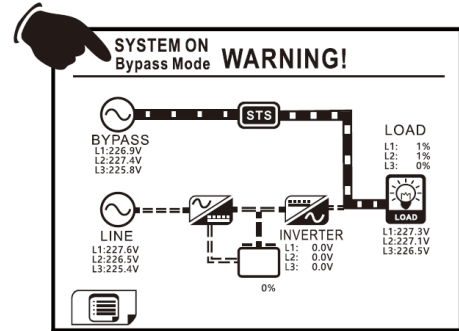
| | | |
|----------------------|--|--|
| | <p>90KVA~210KVA.</p> | <p>300KVA</p> |
| <p>Step 1</p> | <p>Make sure the maintenance is complete. The Power Modules and STS module have been installed well.</p> | <p>Make sure the maintenance is complete. The Power Modules and STS module have been installed well.</p> |

Step 2

Switch ON the Main Breaker (Q1) and Output Breaker (Q3) as shown below.

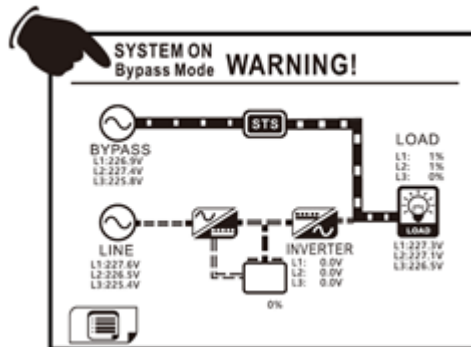


Please enter LCD SETUP MENU and choose "SYSTEM" to ensure that the "Bypass mode" is enabled. If the "Bypass mode" is disabled, you have to set it enabled. Then, exit the SETUP menu and check if the UPS operates in bypass mode.

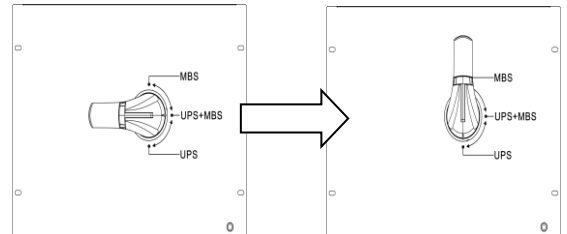


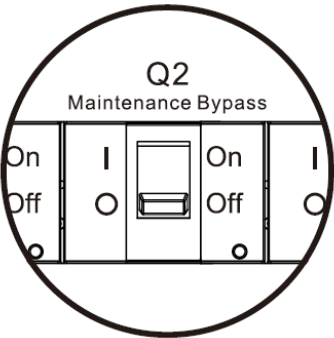
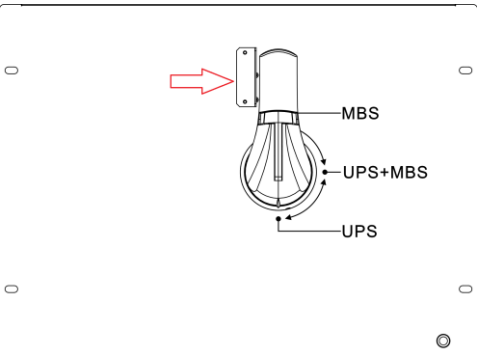
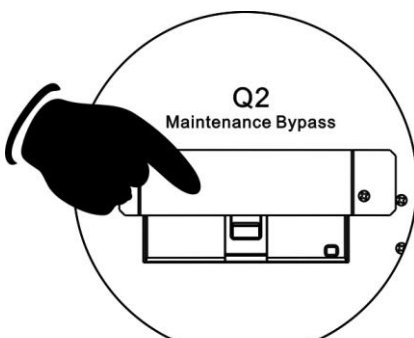
Step 3

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 enabled. Then, exit the SETUP menu and check if the UPS operates in bypass mode.



Switch the handle toward downside as shown below.



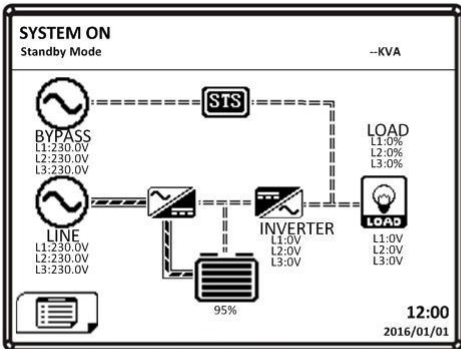
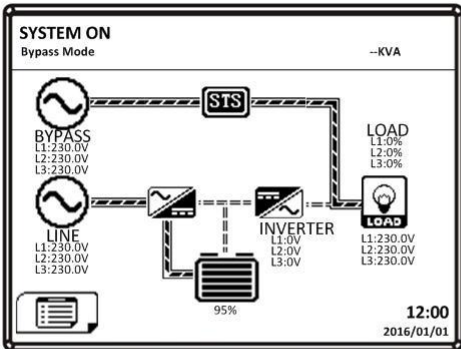
| | | |
|----------------------|---|---|
| <p>Step 4</p> | <p>Turn off Maintenance Bypass Breaker as shown below.</p>  | <p>Lock back the mechanical lock plate as shown below.</p>  |
| <p>Step 5</p> | <p>Lock back the mechanical lock plate as shown below.</p>  | |

3.3.4 Turn off Operation

3.3.4.1 Bypass Mode/ Standby Mode Turn Off Operation

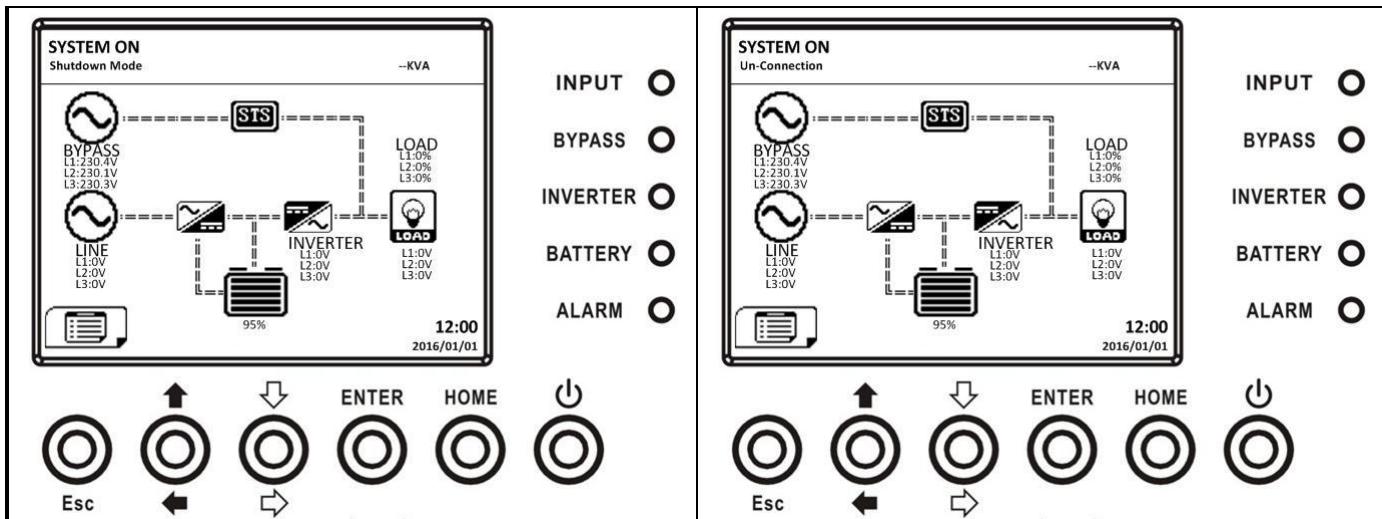
When the UPS neither is turned on nor turned off, the UPS operates in the Standby Mode or Bypass Mode. It depends on the "Bypass Mode" Setting.

The LCD diagrams are shown below.

| Bypass Mode Setting is Disabled | Bypass Mode Setting is Enabled |
|--|--|
|  <ul style="list-style-type: none"> INPUT <input checked="" type="radio"/> BYPASS <input type="radio"/> INVERTER <input type="radio"/> BATTERY <input type="radio"/> ALARM <input type="radio"/> <p>Esc ← ↓ ENTER HOME ⏻</p> |  <ul style="list-style-type: none"> INPUT <input checked="" type="radio"/> BYPASS <input checked="" type="radio"/> INVERTER <input type="radio"/> BATTERY <input type="radio"/> ALARM <input type="radio"/> <p>Esc ← ↓ ENTER HOME ⏻</p> |

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

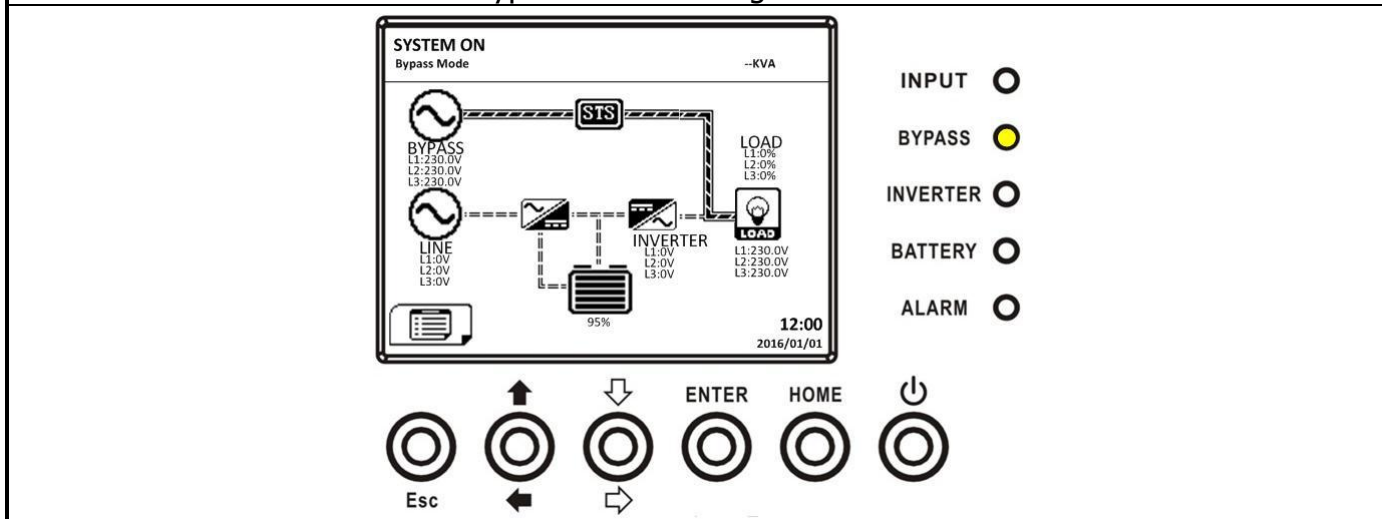
Bypass Mode Setting is Disabled



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



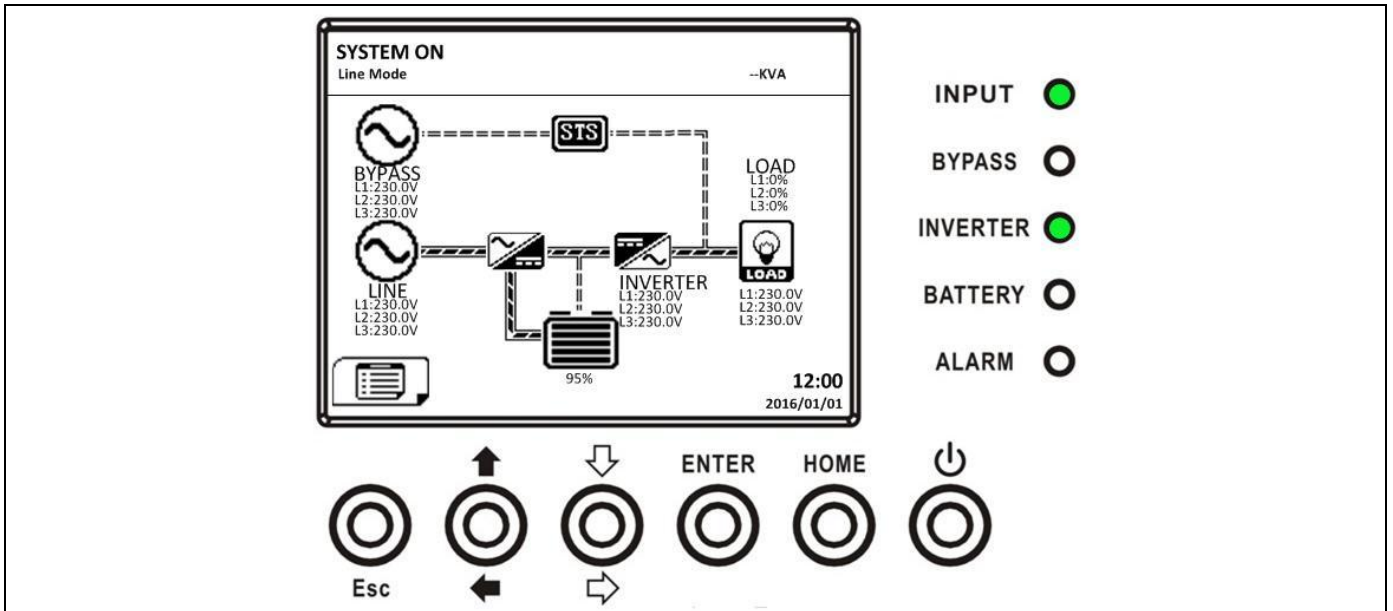
UPS stay in Bypass mode and No AC input is indicated.

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

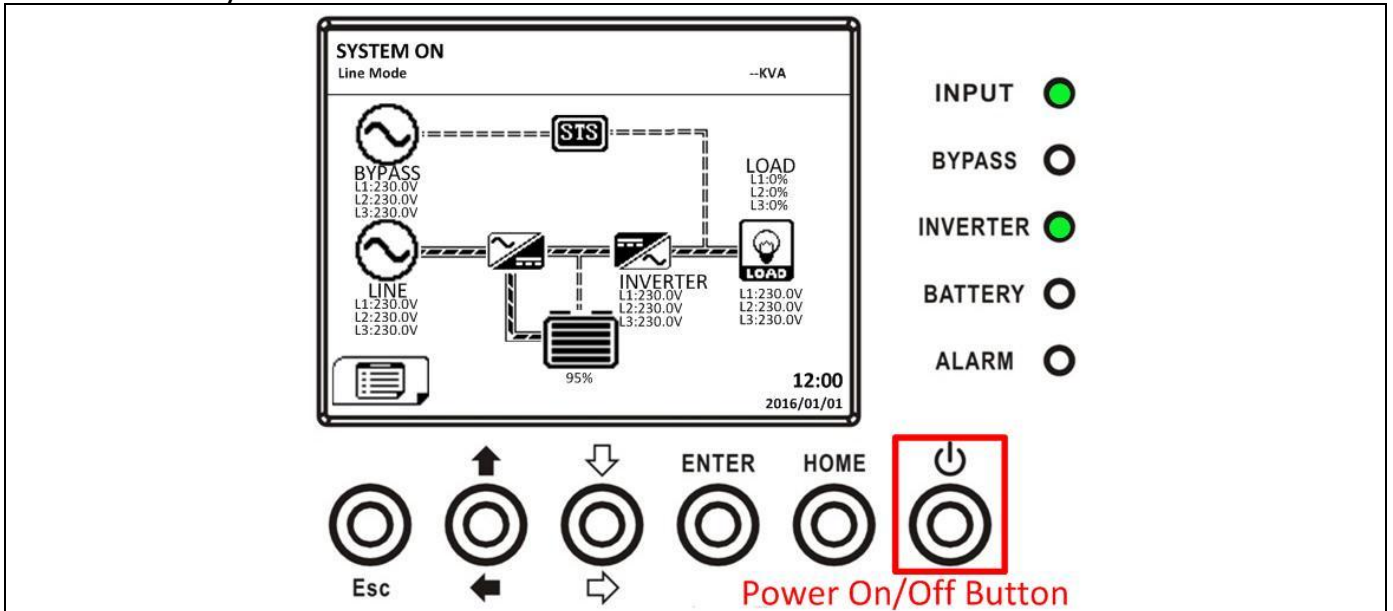
Step 3: Switch OFF the battery breaker, if the UPS will disconnect the AC power for a long time.

3.3.4.2 Line Mode Turn Off Operation

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



Step 1: Press "Power On/Off" button for 2 second to turn off the UPS. Or use the Menu-Control-System Turn Off to turn off the UPS.

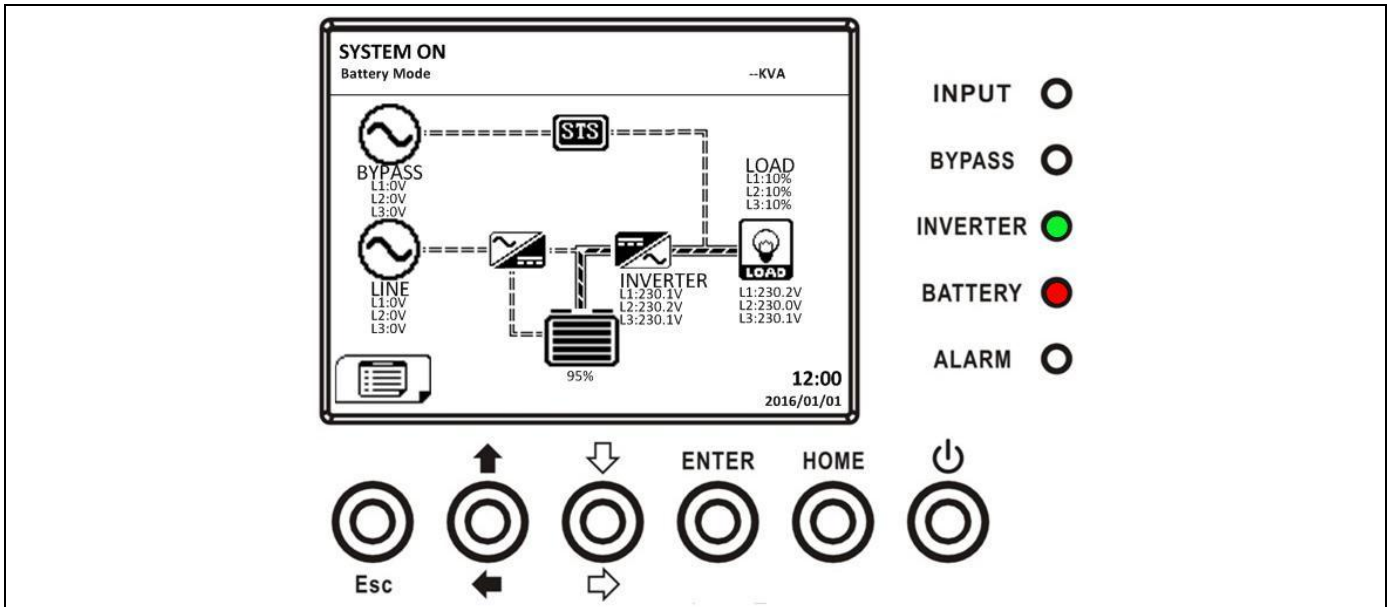


After turning off, the UPS will transfer to Standby Mode or Bypass Mode. It depends on the "Bypass Mode" Setting.

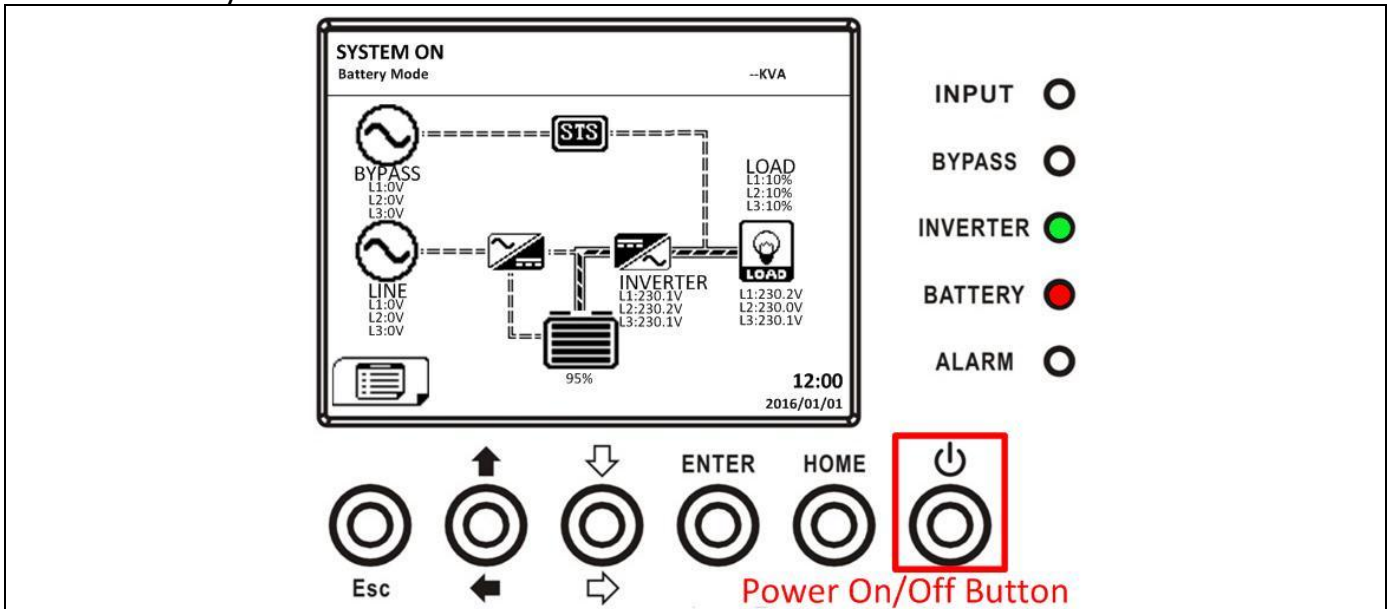
Next, follow the **Bypass Mode/ Standby Mode Turn Off Operation** procedure.

3.3.4.3 Battery Mode Turn Off Operation

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



Step 1: Press "Power On/Off" button for 2 second to turn off the UPS. Or use the Menu-Control-System Turn Off to turn off the UPS.



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

Next, follow the **Bypass Mode/ Standby Mode Turn Off Operation** 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. It is the USER control, monitoring of all measured parameters, UPS and battery status and alarms. The control panel and display description are divided into four functional areas: (1) LCD display, (2) LED indications, (3) Control keys, (4) Audio Alarm, as shown in Figure 4-1.

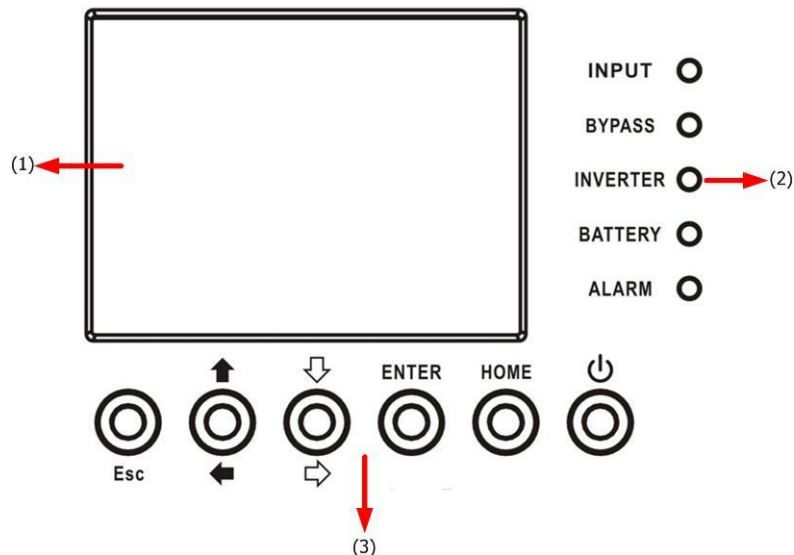


Figure 4-1 Control panel

- (1) LCD display: Graphic display and all measured parameters.
- (2) LED indications. Refer to **Table 4-1**.
- (3) Control keys. Refer to **Table 4-2**.
- (4) Audible Alarm. Refer to **table 4-3**.

Table 4-1: LED indications

| LED | Color | Status | Definition |
|----------|--------|----------|--|
| INPUT | 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 not operating. |
| INVERTER | Green | On | Load on inverters. |
| | | Off | Inverters not operating. |
| BATTERY | Red | On | Load on Battery. |
| | | Flashing | Low battery |
| | | Off | Battery converter is normal and battery is charging. |
| ALARM | Red | On | UPS fault. |
| | | Flashing | UPS alarm. |
| | | Off | Normal. |

Table 4-2: Function Keys

| Control Key | Description |
|--------------------|---|
| Esc | <ul style="list-style-type: none"> When screen is in Main screen, it will enter into main menu by pressing ESC key. Return to previous screen, when screen is not in Main screen. Return to previous value in the same row, so you can change it. For example, when changing 4-digit password, press "Esc" to allow cursor back to previous digit. |
| ↑ (Up) ← (Left) | Key for menu page navigation or digit modification. |
| ↓ (Down) ⇒ (Right) | Key for menu page navigation or digit modification. |
| Enter | Confirmation of commands, or cursor displacement. |
| Home | Return to Main screen. |
| ⏻ Power On/Off | Turn on UPS or Turn off UPS. |

Table 4-3: Audible Alarm

| Audio Type | Description |
|--------------|-----------------------------------|
| Power on/off | Buzzer sounds two 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. |

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.

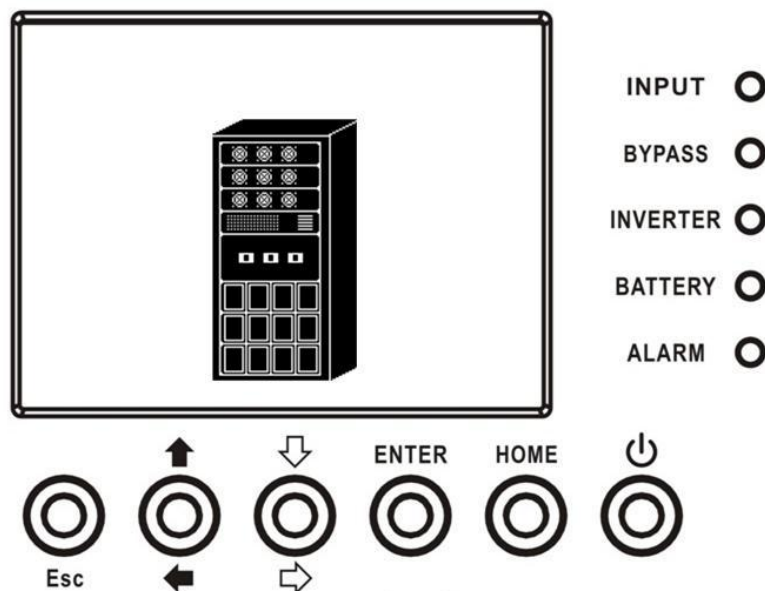


Figure 4-2 Initial screen

4.2.2 Main Screen

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

- (1) UPS Mode: Current Operation Mode.
- (2) UPS Flow Chart: Current flow chart and measurement data.
- (3) Menu: Press ESC button to enter Menu screen.
- (4) UPS model name with power rating. If the power rating followed with (R) means the UPS system has redundant configuration.

(5) Date and Time.

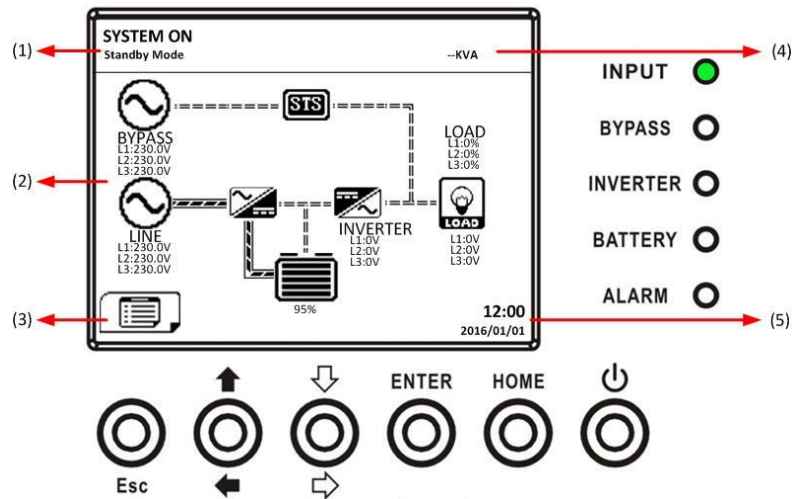


Figure 4-3 Main screen

4.2.3 MENU Screen

In the Main Screen, press ESC button to enter the **MENU** screen

Use UP and DOWN buttons to choose different menus, and Press ENTER to enter the sub screen, as shown in Figure 4-4 and 4-5.

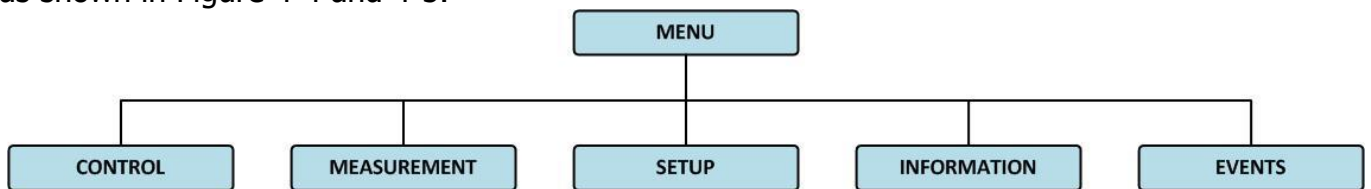


Figure 4-4 Menu tree

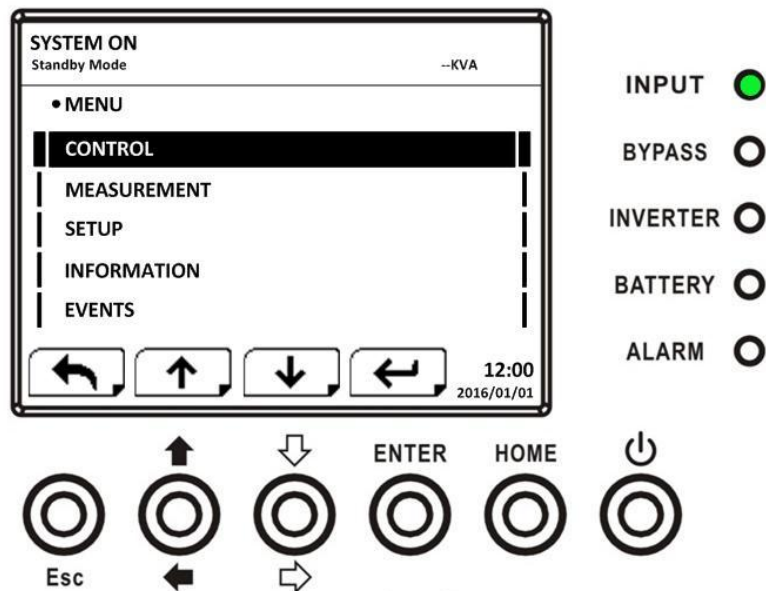


Figure 4-5 Menu screen

4.2.4 Control Screen

Use UP and DOWN buttons to choose CONTROL option, and press ENTER button to enter the submenu, as shown in Figure 4-6, 4-7 and 4-8.

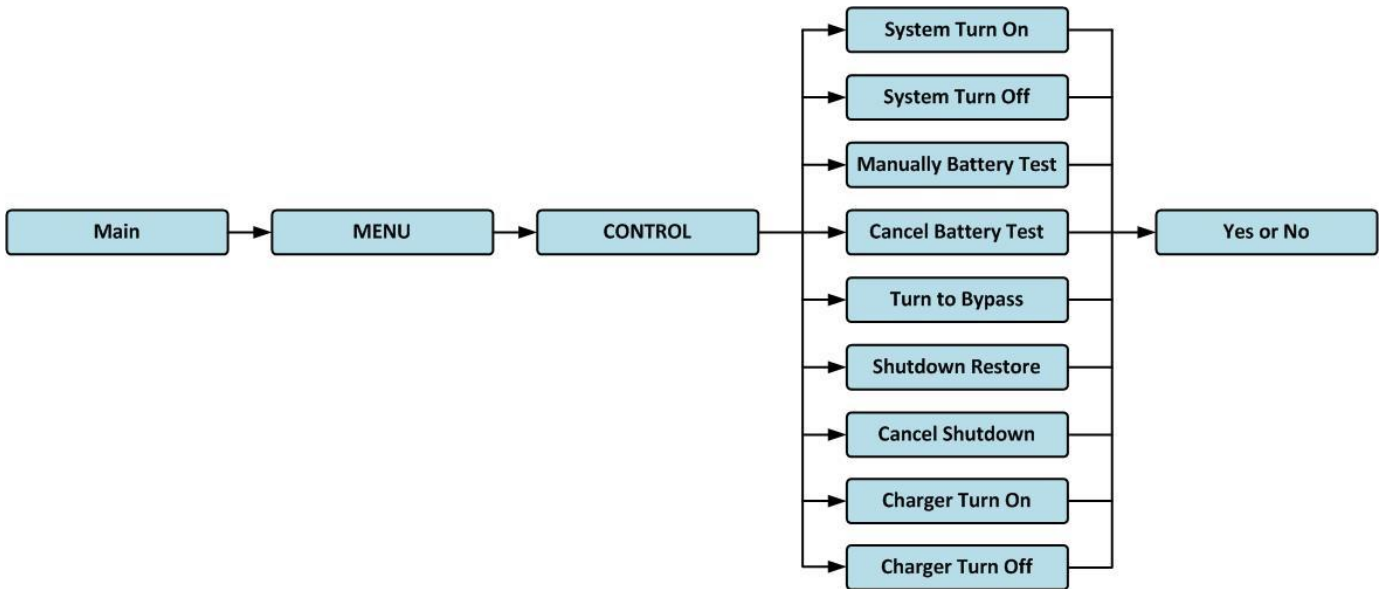


Figure 4-6 Control menu

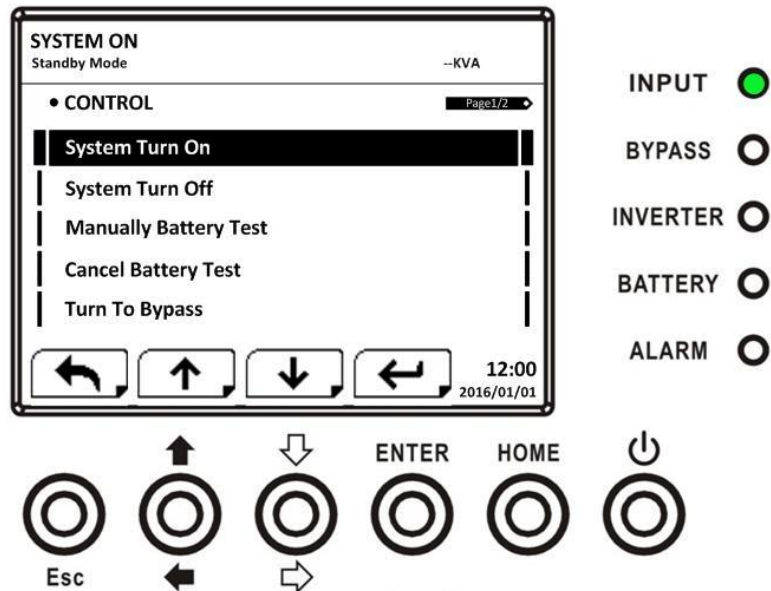


Figure 4-7 Control screen page 1

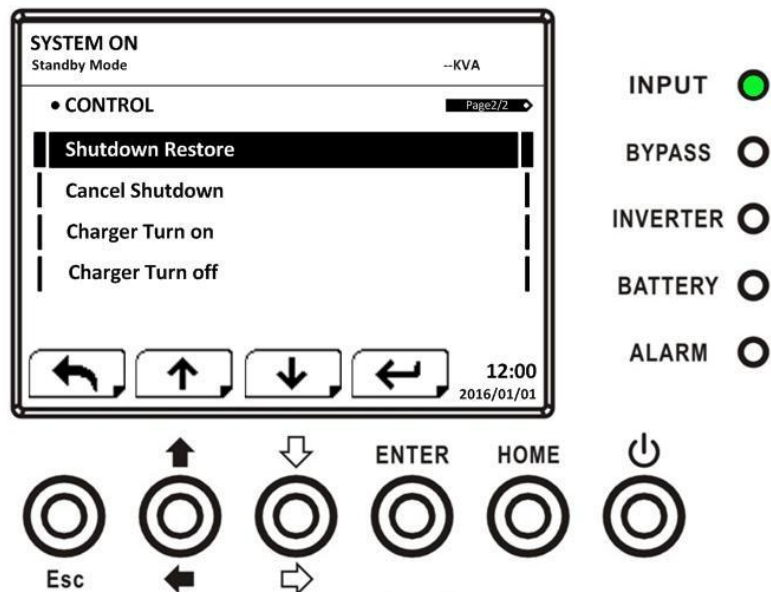


Figure 4-8 Control screen page 2

When the control option is selected by pressing ENTER button, the confirmation screen will pop up. Use LEFT and RIGHT buttons to choose YES or NO. Choose YES and press ENTER button to confirm command or choose NO to cancel command, as shown in Figure 4-9.

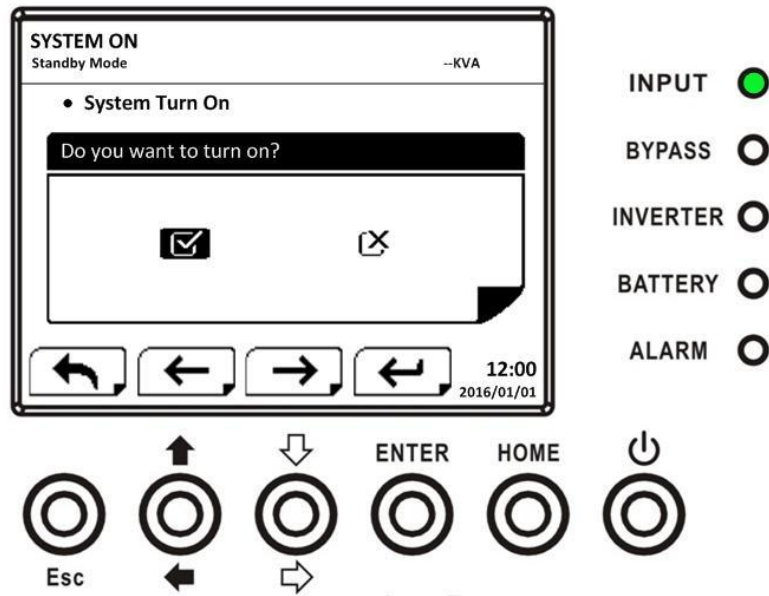


Figure 4-9 Confirmation screen

4.2.5 Measurement Screen

Use UP and DOWN buttons to choose MEASUREMENT option, and press ENTER button to go into the submenu, as shown in Figure 4-10, 4-11.

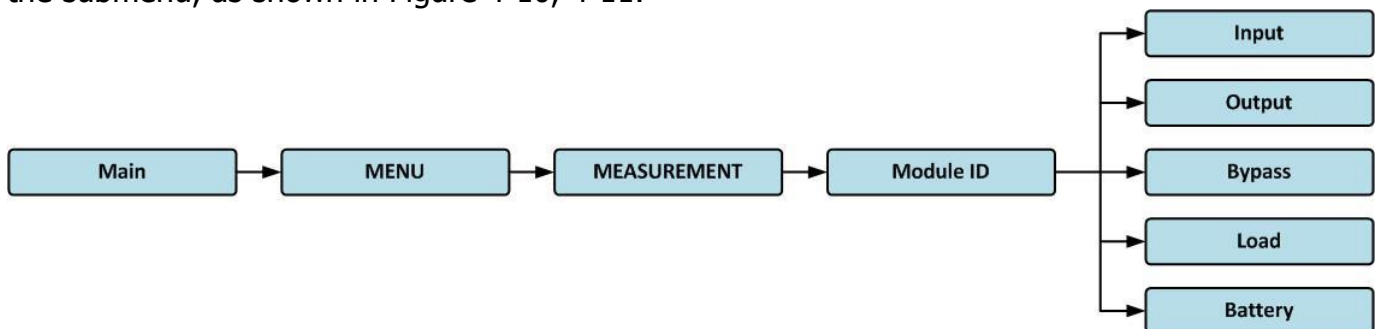


Figure 4-10 Measurement menu

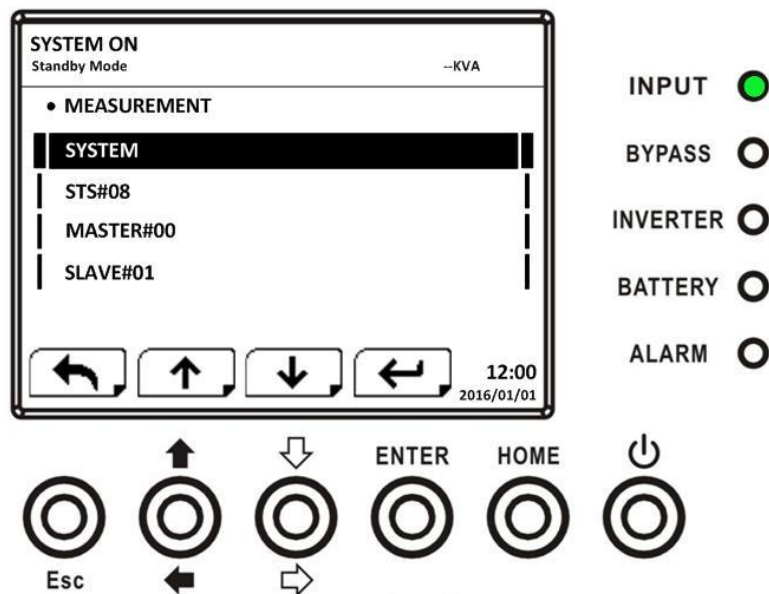


Figure 4-11 Measurement Menu Screen

Use UP and DOWN buttons to choose System, STS, Power Module option, and press ENTER button to go into the submenu, as shown in Figure 4-12.

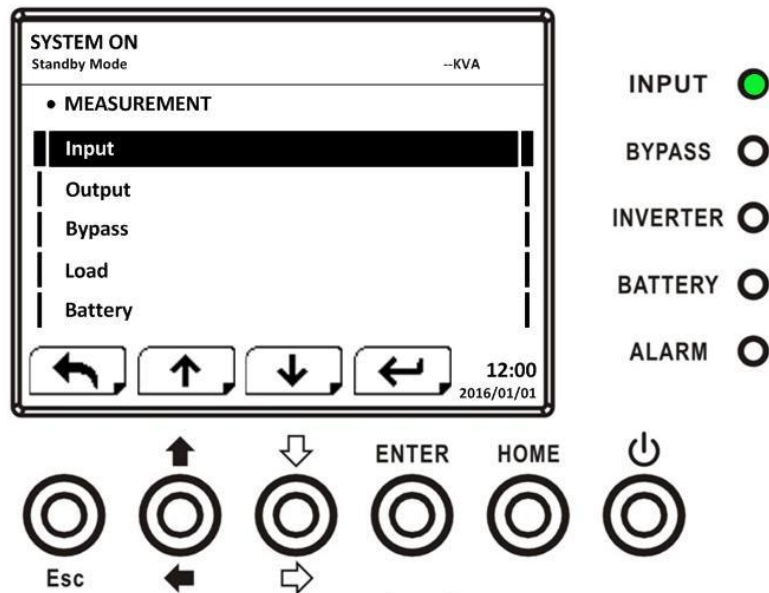


Figure 4-12 Measurement source selection Screen

Use UP and DOWN buttons to choose Input, Output, Bypass, Load, and Battery option, and press ENTER button to go into submenu. 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(°C) | Battery cabinet temperature of STS module. Units 0.1°C. |
| | Temperature2(°C) | Battery cabinet temperature of extra communication card T1. Units 0.1°C. |
| Temperature3(°C) | Battery cabinet temperature of extra communication card T2. Units 0.1°C. | |
| Temperature4(°C) | Battery cabinet temperature of extra communication card T3. Units 0.1°C. | |

| | | |
|--|------------------|--|
| | Temperature5(°C) | Battery cabinet temperature of extra communication card T4. Units 0.1°C. |
|--|------------------|--|

4.2.6 Setup Screen

Use UP and DOWN buttons to choose SETUP options. It's required to enter password to access General, SYSTEM, BATTERY, PRE-ALARM and PARALLEL sub-menus, as shown in Figure 4-13.

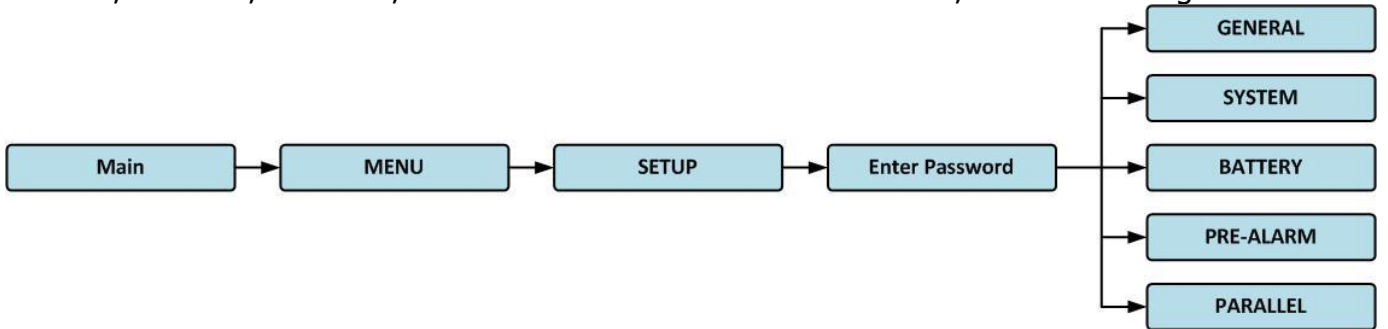


Figure 4-13 Setup menu

When the SETUP option is selected by pressing ENTER button, it will pop up a screen requesting to enter password, as shown in Figure 4-14.

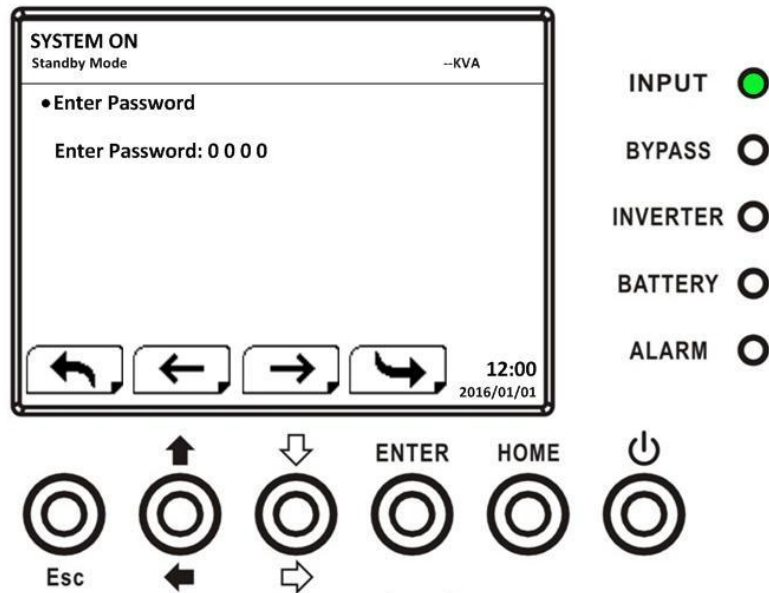


Figure 4-14 Enter password Screen

It's required to enter 4-digit password to enter SETUP submenu. If incorrect password is entered, the LCD screen will ask for re-entry.

If correct password is entered, the LCD will enter the SETUP submenu, as shown in Figure 4-16.

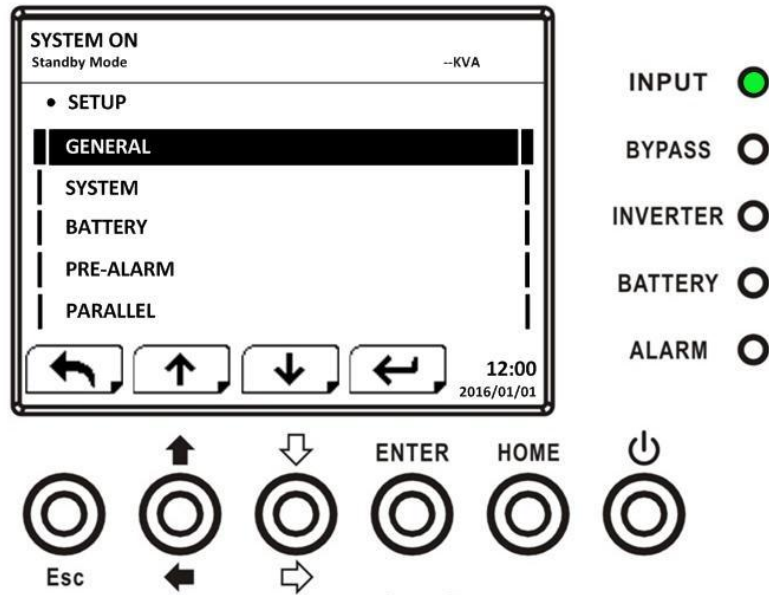


Figure 4-16 SETUP Submenu Screen

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 differnet 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

| Setting item | UPS operation Mode | 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 | |
| | Change Password | Y | 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 |
| | Save Setting | 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 | | | | | Y | | | Y |
| | Bypass Mode | Y | Y | | | | | | | | | Y |
| | Auto-Restart | Y | Y | Y | Y | Y | Y | Y | Y | | | Y |
| | Cold Start | 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 |
| | Redundancy | Y | Y | Y | Y | Y | Y | Y | Y | | Y |
| | Power Rating Setting | Y | | | | | | | | | Y |
| | Charger Test | 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 |
| | 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 |
| | Stop by Battery Capacity | Y | 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 |
| Charging Voltage | Y | Y | | | | | | | | | Y |
| | Pre-Alarm | Y | Y | Y | Y | Y | Y | Y | Y | | Y |
| Parallel | UPS Parallel | Y | Y | | | | | | | | Y |
| | Independent Battery | Y | Y | | | | | | | | Y |

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

4.2.6.1 Setup-General Screen

Use UP and DOWN buttons to choose between different sub-menus, and press ENTER button to go into the GENERAL setting screen, as shown in Figure 4-17, 4-18. General setting can be set in any operating mode and Setup-General setting list is shown in **Table 4-6**.

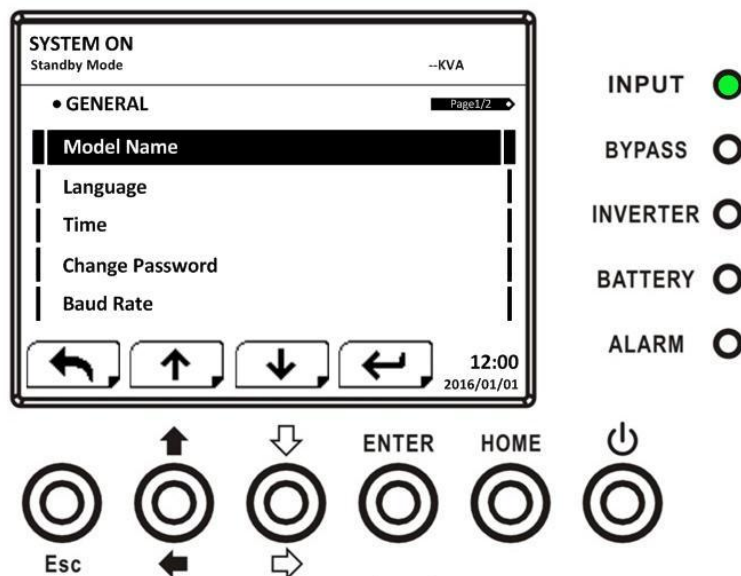


Figure 4-17 Setup-General Screen page 1

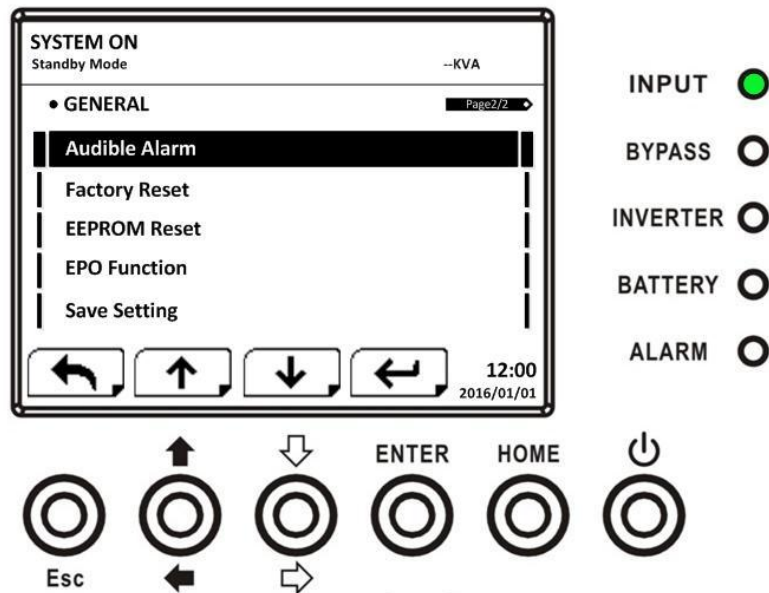


Figure 4-18 Setup-General Screen page 2

Use LEFT and RIGHT buttons to choose the setting options for setting requirement, then press ENTER. The confirmation screen will pop up, use LEFT and RIGHT buttons to choose YES or NO. Choose YES and press ENTER button to confirm setting or choose NO to cancel the setting, as shown in Figure 4-19.

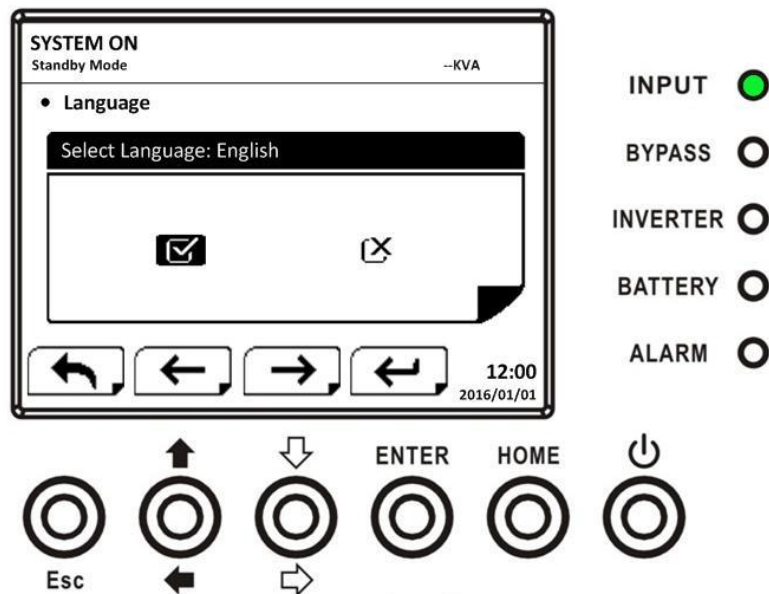


Figure 4-19 SETUP Confirmation screen

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: <ul style="list-style-type: none"> ● English (Default) ● Traditional Chinese ● Simplified Chinese ● Deutsch |
| 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 |
| Change Password | -- | Set New Password. 0000 (Default) |
| 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 |
| EEPROM Reset | -- | Set EEPROM default Refer to Table 4-7 |
| EPO Function | -- | Set EPO active status ● Normal Close Active ● Normal Open Active (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 | | |
| | Language | Y | Y |
| | Adjust Time | | |
| | System Installed Date | | Y |
| | System Last Maintain Date | | Y |
| | Battery Installed Date | | Y |
| | Battery Last Maintain Date | | Y |
| | Change Password | | Y |
| | Baud Rate | | Y |
| | Audible Alarm | Y | Y |
| | Factory Reset | -- | -- |
| | EEPROM Reset | -- | -- |
| | EPO Function | | Y |

| | | | |
|-----------|------------------------------|----|----|
| | Save Setting | -- | -- |
| System | Output Voltage | | 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 |
| | Cold Start | | Y |
| | Battery Mode Delay Time | Y | Y |
| | System Shutdown Time | Y | Y |
| | System Restore Time | Y | Y |
| | Redundancy | | Y |
| | Power Rating Setting | Y | Y |
| | Charger Test | -- | -- |
| 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 |
| Pre-Alarm | | | Y |

4.2.6.2 Setup-System Screen

Use UP and DOWN buttons to choose between different sub-menus, and press ENTER button to go into the SYSTEM setting screen, as shown in Figure 4-20, 4-21, 4-22.

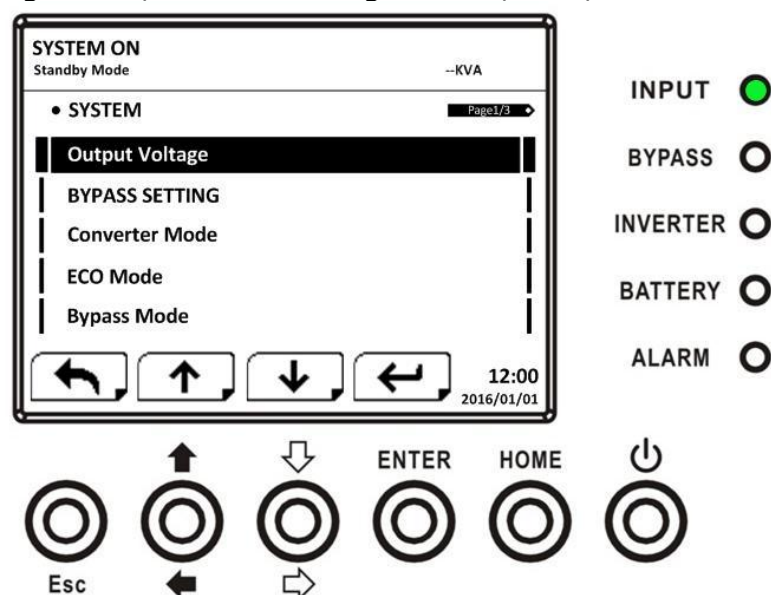


Figure 4-20 Setup-System Screen page 1

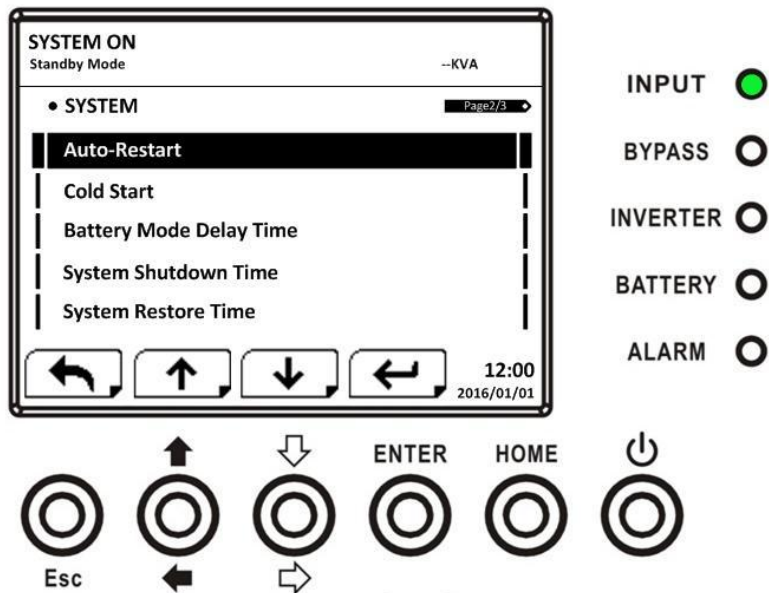


Figure 4-21 Setup-System Screen page 2

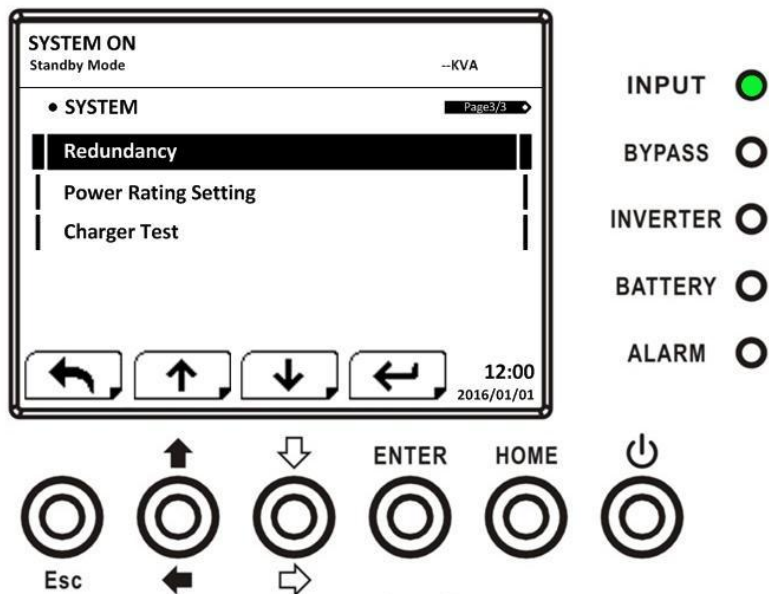


Figure 4-22 Setup-System Screen page 3

System setting can be set only when UPS is operating in certain mode. Please check available setting item in **Table 4-5** for the details. If it's not set up in specific mode, the warning screen will appear, as shown in Figure 4-23.

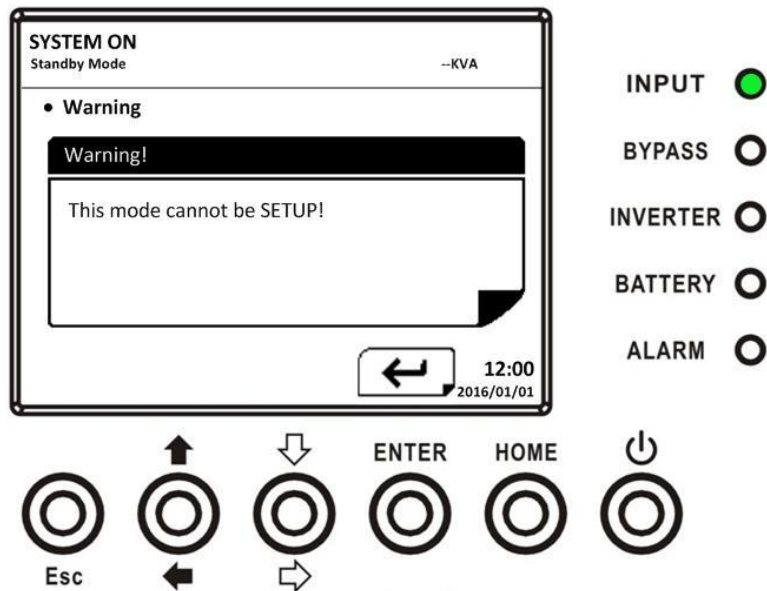


Figure 4-23 Warning screen

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 <ul style="list-style-type: none"> ● 220Vac (Default) ● 230Vac ● 240Vac MUST be reviewed after UPS installation |
| BYPASS SETTING | Bypass Voltage Range | Set bypass voltage range: Upper limit <ul style="list-style-type: none"> ● +10% ● +15% (Default) ● +20% Lower limit <ul style="list-style-type: none"> ● -10% ● -20% (Default) ● -30% |
| | Bypass Frequency Range | Set bypass Frequency range: Upper/ Lower limit <ul style="list-style-type: none"> ● +/- 1Hz ● +/- 2Hz ● +/- 4Hz (Default) |
| Converter Mode | -- | Set converter mode <ul style="list-style-type: none"> ● Disable (Default) ● Enable |
| ECO Mode | -- | Set ECO mode <ul style="list-style-type: none"> ● Disable (Default) ● Enable |
| Bypass Mode | -- | Set bypass mode <ul style="list-style-type: none"> ● Disable (Default) ● Enable MUST be reviewed after UPS installation. If you need the Bypass power when UPS is OFF, please enable it. |

| | | |
|-------------------------|----|---|
| Auto-Restart | -- | <p>Set auto-restart</p> <ul style="list-style-type: none"> ● Disable ● Enable (Default) <p>After "Enable" is set, once UPS shutdown occurs due to low battery and then utility restores, the UPS will return to line mode.</p> |
| Cold Start | -- | <p>Set cold start</p> <ul style="list-style-type: none"> ● Disable ● Enable (Default) <p>After "Enable" is set, the UPS can be turned on without connecting to utility by pressing Battery Start Button. Refer to cold start operation for the details.</p> |
| Battery Mode Delay Time | -- | <p>Set system shutdown delay time in battery mode (0~9990sec).</p> <ul style="list-style-type: none"> ● 0: Disable (Default) ● Not 0: Enable <p>When this feature is enabled, UPS will shut off output after UPS operates in Battery mode for certain seconds.</p> |
| System Shutdown Time | -- | <p>Set system shutdown time (0.2~99min)</p> <ul style="list-style-type: none"> ● 0.2 min (Default) <p>This delay time will start counting when the CONTROL-Shutdown Restore command is executed.</p> |
| System Restore Time | -- | <p>Set system restore time (0~9999min)</p> <ul style="list-style-type: none"> ● 1 min (Default) <p>This delay time will start counting after shutdown time is elapsed when the CONTROL-Shutdown Restore command is executed.</p> |
| Redundancy | -- | <p>Set total power and redundancy</p> <p>Total Power: the QTY of Power Modules</p> <p>Redundancy: the QTY of redundant power module</p> <p>MUST be set after UPS installation or the QTY of Power Module is changed</p> |
| Power Rating Setting | | <p>Set Power Module Rating</p> <ul style="list-style-type: none"> ● 20KVA ● 30KVA (Default) <p>The 30K cabinet can be inserted with all 20KVA power modules. For this kind of application, the Power Rating has to be set to 20KVA.</p> <p>If setting is not corresponding to power capacity of power module, it will show error message.</p> <p>MUST be reviewed after UPS installation</p> |
| Redundancy | -- | <p>Set total power and redundancy</p> <p>Total Power: the QTY of Power Modules</p> <p>Redundancy: the QTY of redundant power module</p> <p>MUST be set after UPS installation or the QTY of Power Module is changed</p> |
| Charger Test | -- | <p>Set charger test</p> <ul style="list-style-type: none"> ● Disable (Default) ● Enable |

4.2.6.3 Setup-Battery Screen

Use UP and DOWN buttons to switch different sub-menus. Press ENTER button to go into the BATTERY setting screen, as shown in Figure 4-24, 4-25.

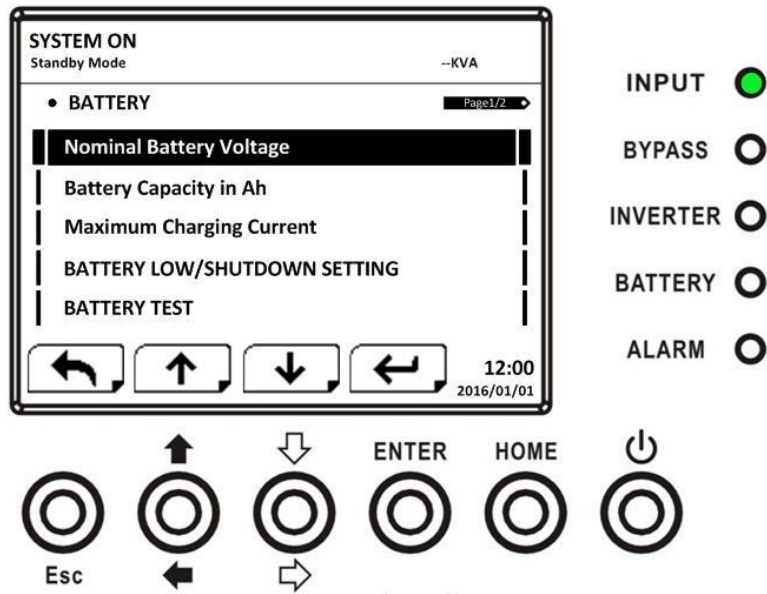


Figure 4-24 Setup-Battery Screen page 1

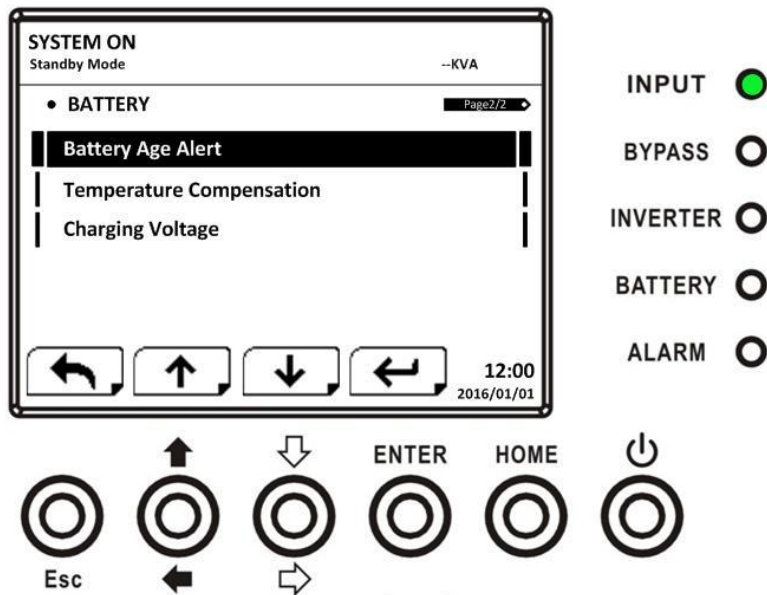


Figure 4-25 Setup-Battery Screen page 2

Battery setting can be set only when UPS is operating in standby mode. If it's not in standby mode, the warning screen will appear as shown in Figure 4-23. See Setup-Battery setting list in **Table 4-9**.

Table 4-9: Setup-Battery setting list

| Setting Item | Sub Item | Explanation |
|-------------------------|----------|--|
| Nominal Battery Voltage | -- | Set battery nominal voltage <ul style="list-style-type: none"> ● 16x12V (Default) ● 18x12V ● 20x12V MUST be set after UPS installation |
| Battery Capacity in Ah | -- | Set battery capacity. (0~999) <ul style="list-style-type: none"> ● 9Ah (Default) MUST be set after UPS installation or Battery |

| | | |
|------------------------------|----------------------------|---|
| | | capacity is changed. |
| Maximum Charging Current | -- | Set battery maximum charging current (1~128A) ● 2A (Default) MUST be set after UPS installation or Battery capacity is changed. |
| Battery Low/Shutdown SETTING | Battery Low Voltage | Set battery low voltage (10.5~11.5V)x(battery Number) ● 11V x Battery Number (Default) |
| | Battery Low Capacity | Set battery low capacity (20~50%) ● 20% (Default) |
| | Battery Shutdown Voltage | Set battery voltage point for system shutdown in battery mode (10.0~11V) x (battery Number) ● 10V 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) |
| Charging Voltage | -- | Set battery charging voltage. (2.30~2.35V) ● 2.35V (Default) Set battery float voltage. (2.23~2.35V) ● 2.29V (Default) |

4.2.6.4 Pre-Alarm Screen

Use UP and DOWN buttons to switch different sub-menus. Press ENTER button to go into the Pre-Alarm setting screen, as shown in Figure 4-26.

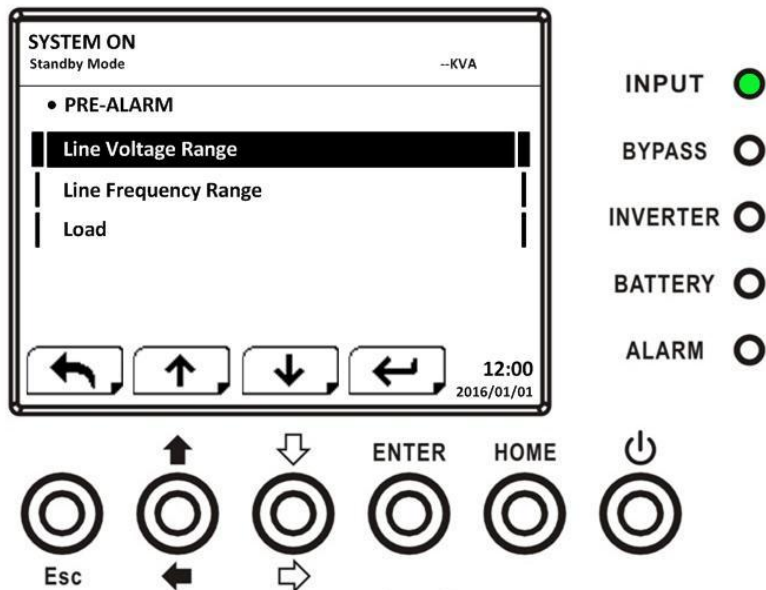


Figure 4-26 Setup-Pre-Alarm screen

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 <ul style="list-style-type: none"> ● +5% ● +10% ● +15% ● +20% (Default) Lower limit <ul style="list-style-type: none"> ● -5% ● -10% ● -15% ● -20% (Default) |
| Line Frequency Range | -- | Set line frequency range: Upper / Lower limit <ul style="list-style-type: none"> ● +/- 1Hz ● +/- 2Hz ● +/- 3Hz ● +/- 4Hz (Default) |
| Load | -- | Set UPS Overload percentage (40~100%) <ul style="list-style-type: none"> ● 100% (Default) Set UPS load unbalance percentage (20~100%) <ul style="list-style-type: none"> ● 100% (Default) |

4.2.6.5 Setup-Parallel Screen

Use UP and DOWN buttons to switch between different sub-menus. Press ENTER button to go into the PARALLEL setting screen, as shown in Figure 4-27.

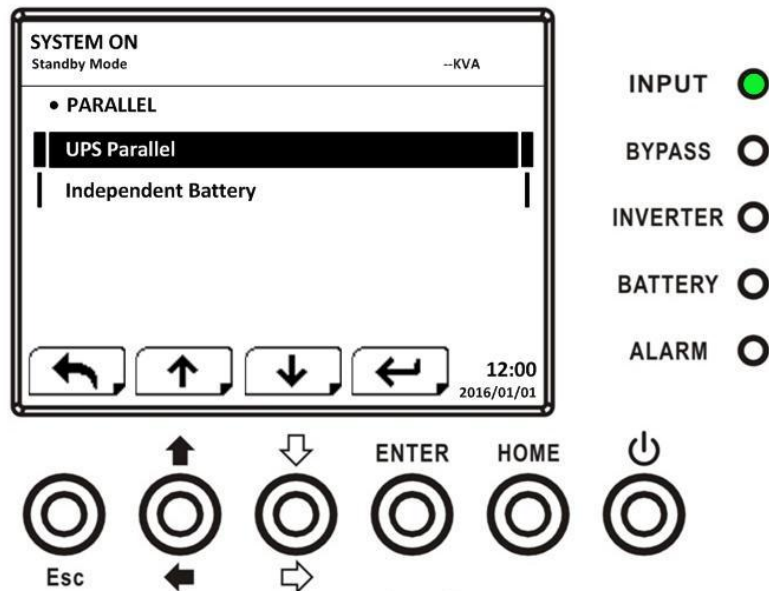


Figure 4-27 Setup-Parallel screen

See Setup-Parallel setting list in **Table 4-11**.


|  Warning | |
|--|--|
| <ul style="list-style-type: none"> ● The warning “Warning! Parallel Firmware Error” will appear in current event when the parallel setting is enabled, but the firmware does not support this feature. ● The way to release this warning is to turn off the AC power source and shut down the system. After the system shutdown completely, turn on the AC power to restart the UPS. | |

Table 4-11: Setup-Parallel setting list

| Setting Item | Sub Item | Explanation |
|---------------------|----------|---|
| UPS Parallel | -- | Set UPS parallel <ul style="list-style-type: none"> ● Disable (Default) ● Enable |
| Independent Battery | -- | Set Independent Battery <ul style="list-style-type: none"> ● Disable (Default) ● Enable |

4.2.7 Information Screen

In INFORMATION menu, you can check the serial number, firmware versions, system configuration and settings of the UPS. There are submenus under the INFORMATION, including Identification, System and Battery, as shown in Figure 4-28, 4-29.

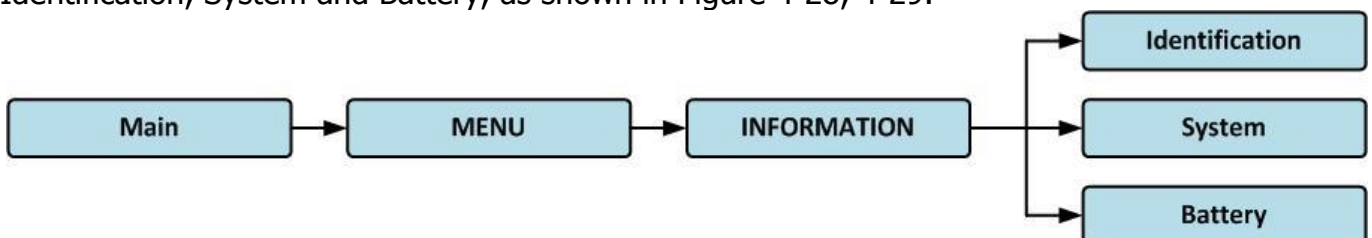


Figure 4-28 Information menu

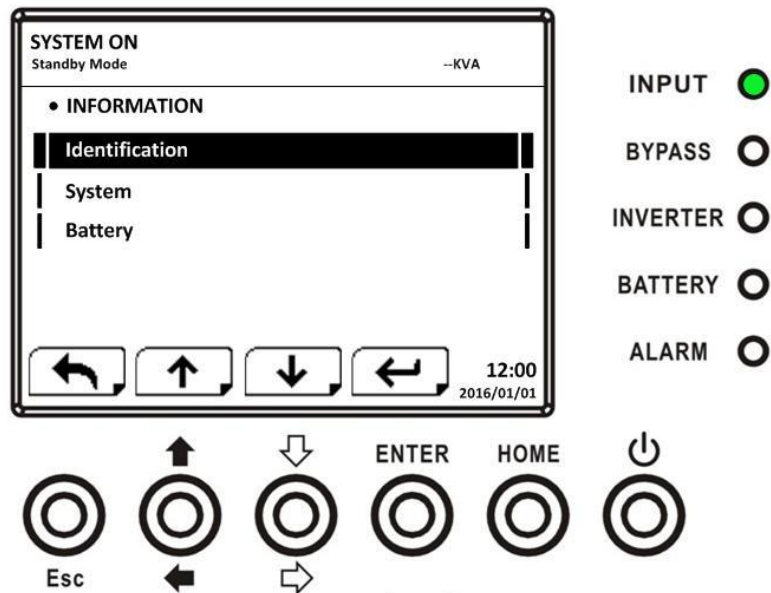


Figure 4-29 INFORMATION screen

4.2.7.1 INFORMATION - Identification Screen

When Identification submenu is selected, the Model Name, Serial No. and Firmware Version will be displayed, as shown in Figure 4-30, 4-31. Use UP and DOWN buttons to switch between different pages.

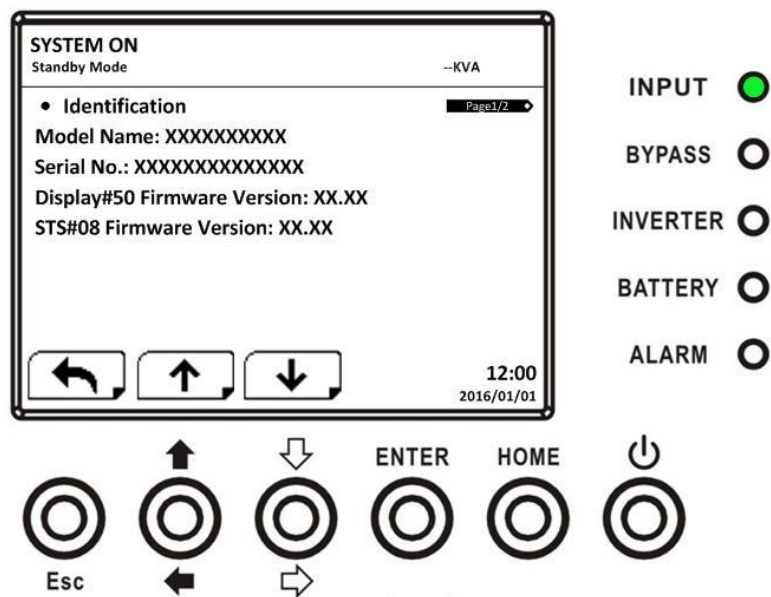


Figure 4-30 Identification screen page 1

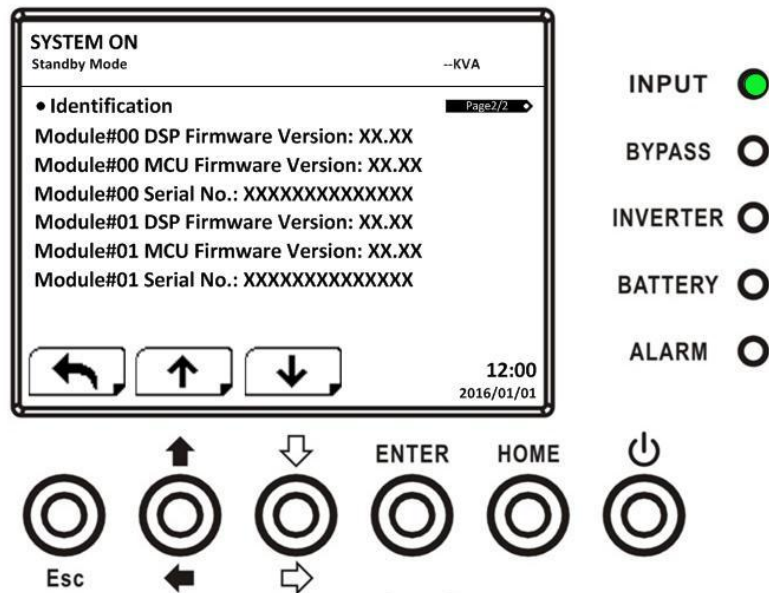


Figure 4-31 Identification screen page 2

4.2.7.2 INFORMATION - System Screen

When System submenu is selected, the system power, nominal voltage, nominal frequency ... etc. information will be displayed, as shown in Figure 4-32, 4-33, 4-34. Use UP and DOWN buttons to switch between different pages.

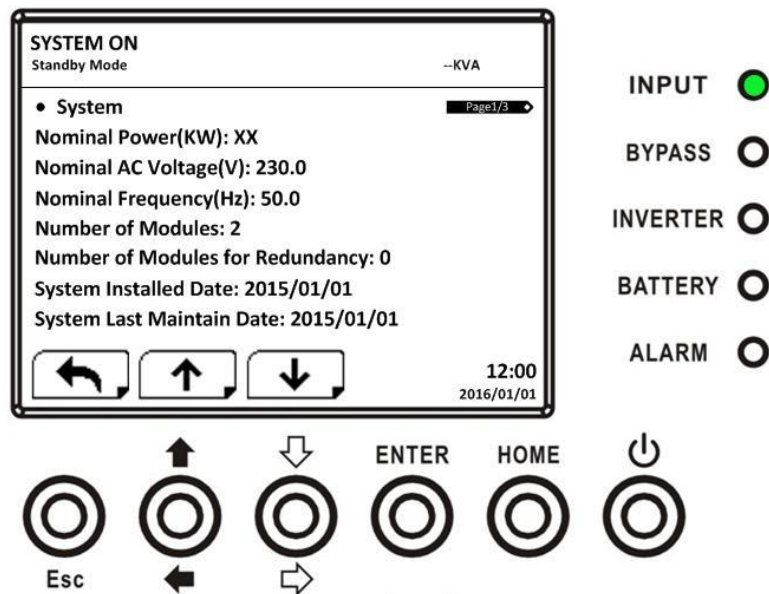


Figure 4-32 INFORMATION System screen page 1

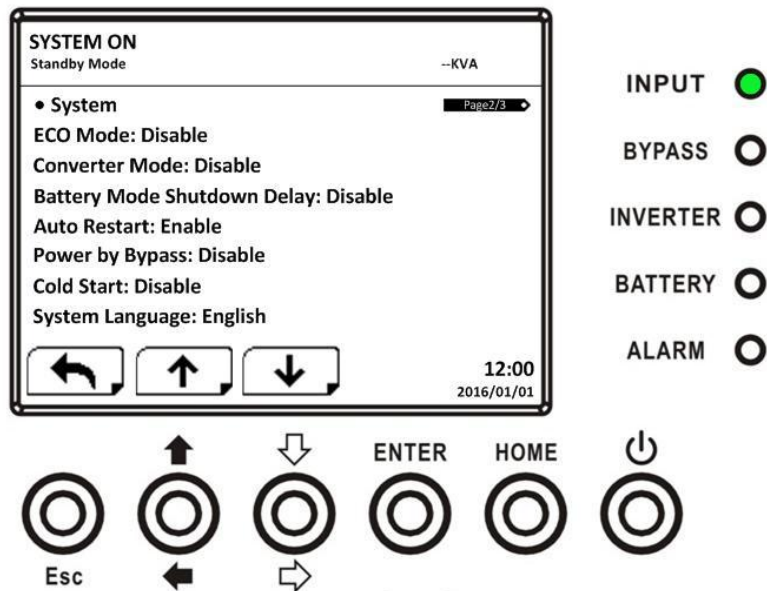


Figure 4-33 INFORMATION System screen page 2

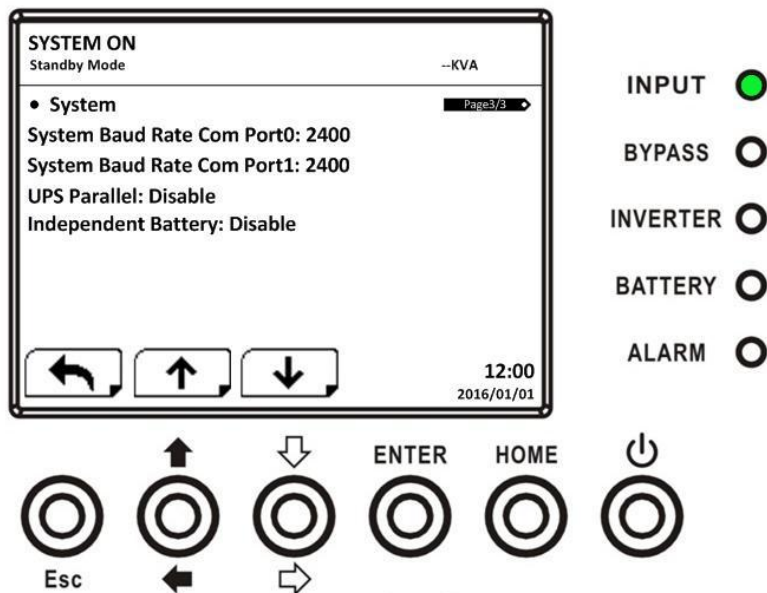


Figure 4-34 INFORMATION System screen page 3

4.2.7.2 INFORMATION - Battery Screen

When Battery submenu is selected, the Battery nominal voltage, capacity, charging current ... etc. information will be displayed, as shown in Figure 4-35, 4-36. Use UP and DOWN buttons to switch different pages.

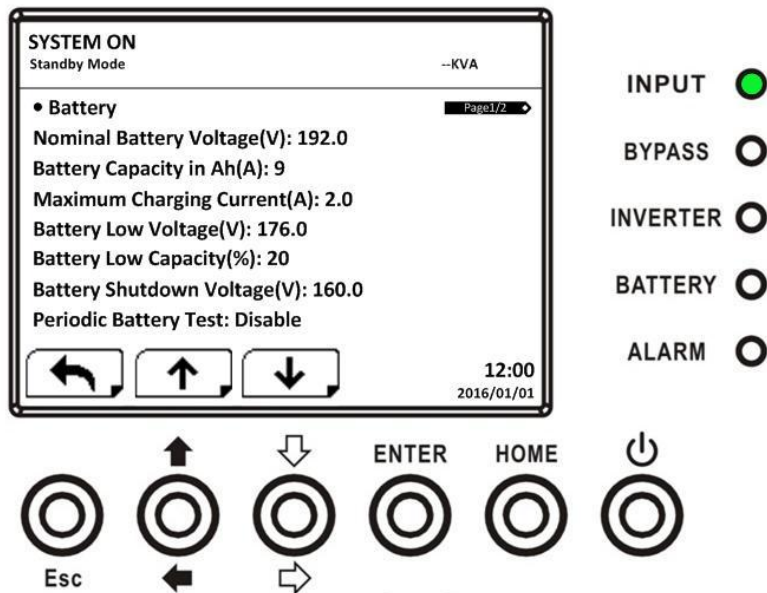


Figure 4-35 INFORMATION Battery screen page 1

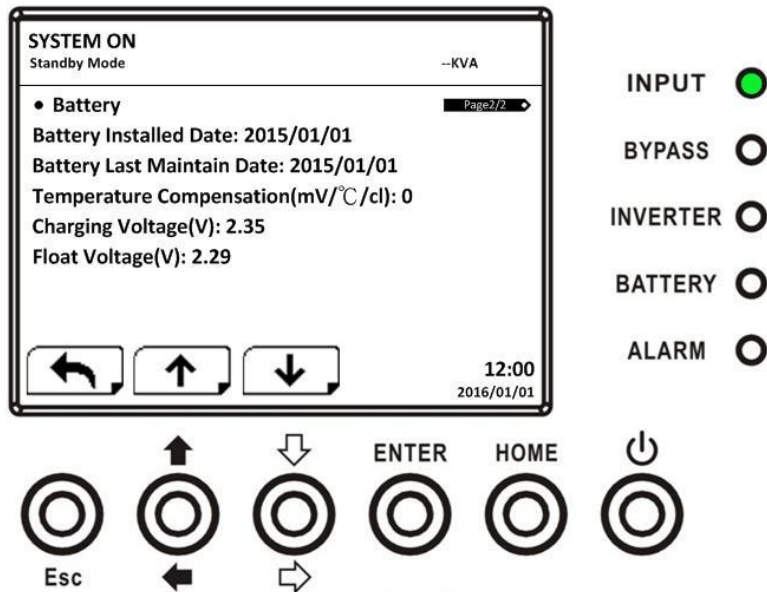


Figure 4-36 INFORMATION Battery screen page 2

4.2.8 Events Screen

In EVENT menu, you can check the current events, history events and reset all events, as shown in Figure 4-37, 4-38.

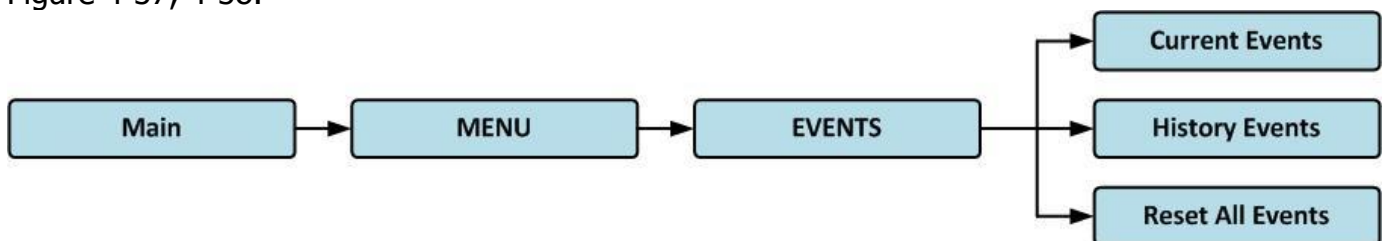


Figure 4-37 Events menu

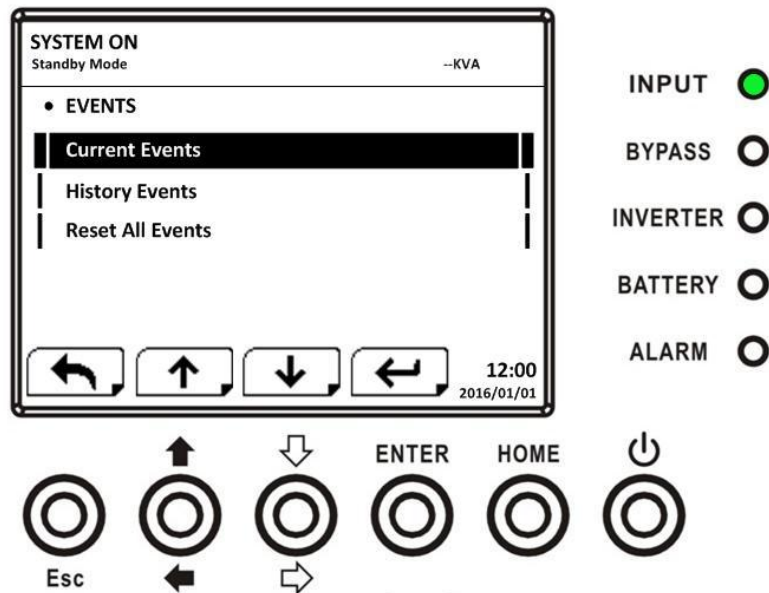


Figure 4-38 Events screen

When event occurs, you will see flashing warning text in the Main Screen as shown in Figure 4-39.

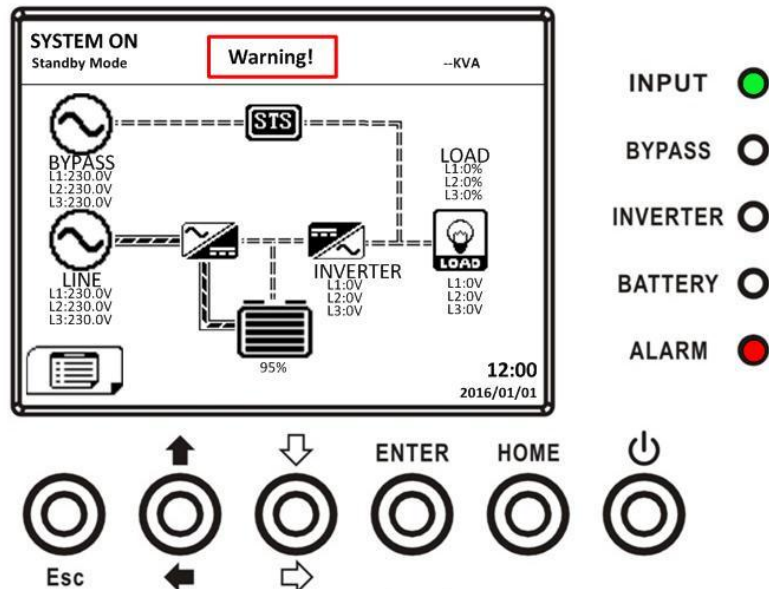


Figure 4-39 Alarm warning screen

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 4 events can be listed in one page. Therefore, if it exceeds more than four, you have to press UP or DOWN button to read other events as shown in Figure 4-40.

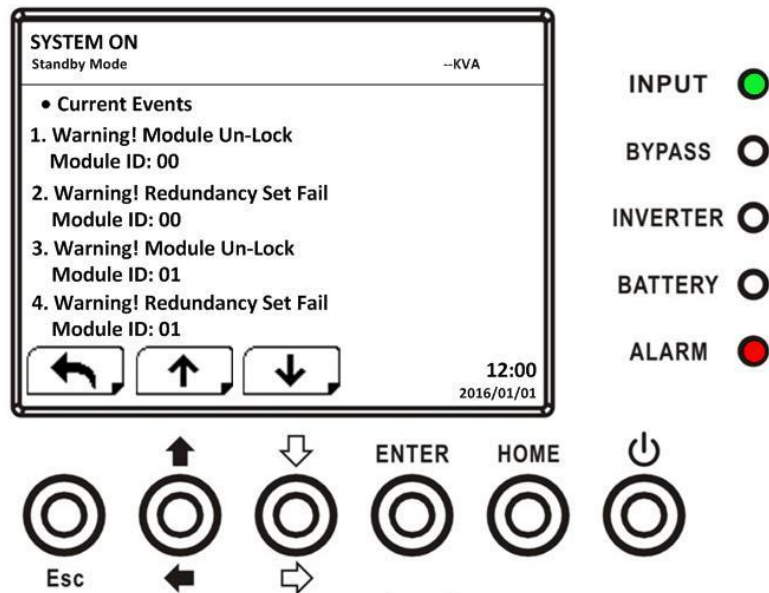


Figure 4-40 Current Events screen

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 code, alarm time, Module ID and data 1~2. (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 4-41 for display screen.

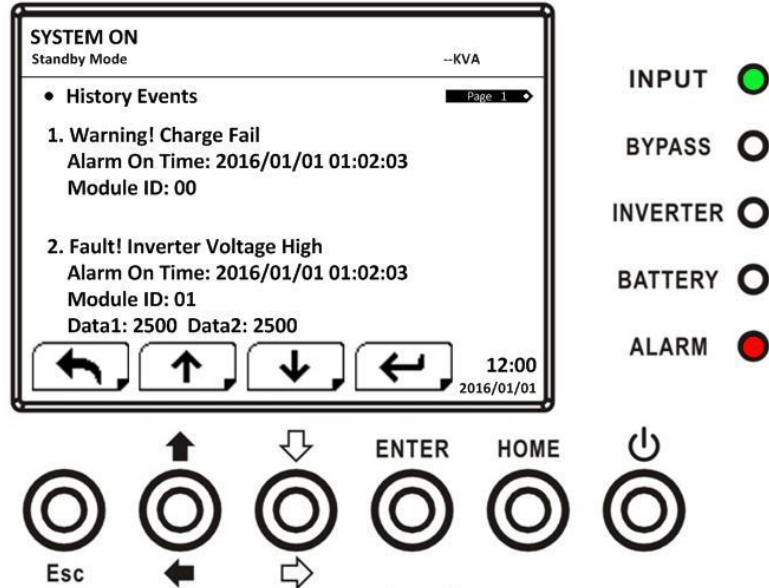


Figure 4-41 History Events screen

4.2.8.3 Reset All Events

The Maintainer password is required to enter Reset All Events screen as shown in Figure 4-42. Then, use LEFT and RIGHT buttons to choose YES or NO. Choose YES and press ENTER button to reset all events or choose NO to cancel this action as shown in Figure 4-43.

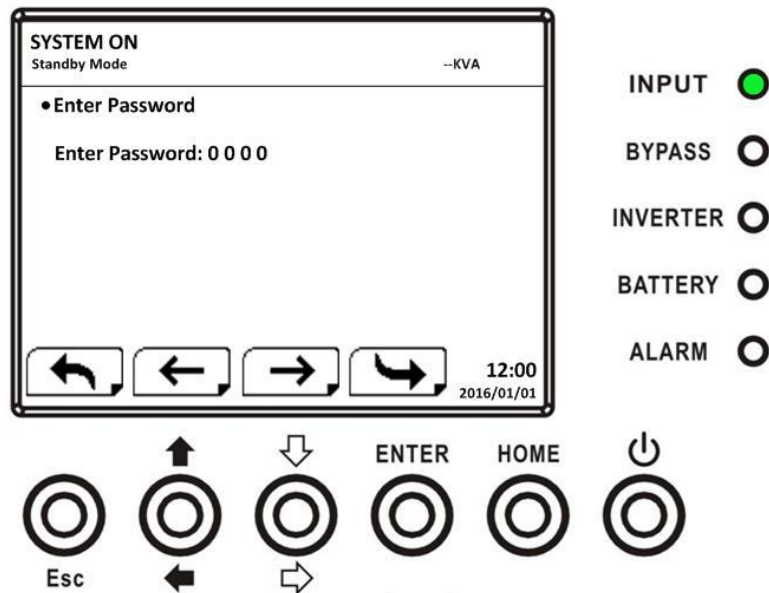


Figure 4-42 Reset All Events screen

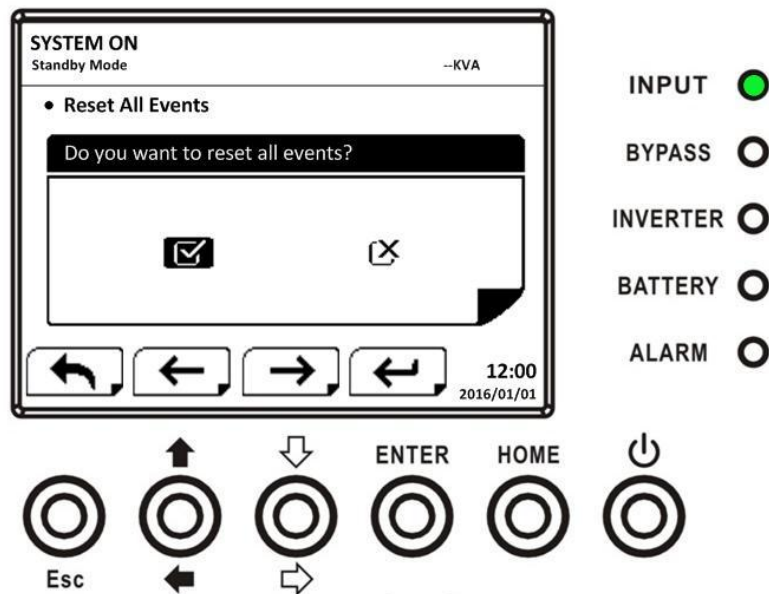


Figure 4-43 Reset All Events Confirmation screen

4.3 Alarm List

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

Table 4-12: Alarm List

| Representation in display LCD | Explanation |
|-------------------------------------|--|
| Fault! Bus Over Voltage | DC bus voltage is too high |
| Fault! Bus Under Voltage | DC bus voltage is too low |
| Fault! Bus Voltage Unbalance | DC bus voltage is not balanced |
| Fault! Bus Short | DC bus is short |
| Fault! Bus Soft Start Time Out | The rectifiers can't start due to low DC bus voltage within specified duration |
| Fault! Inverter Soft Start Time Out | Inverter bus voltage cannot reach desired voltage within specified duration |
| Fault! Inverter Voltage Over | Inverter Voltage is over Peak Value. |

| | |
|------------------------------------|--|
| Fault! Inverter Voltage High | Inverter Voltage is too high |
| Fault! Inverter Voltage Low | Inverter Voltage is too Low |
| Fault! R Inverter Voltage Short | R phase inverter Output is short-circuited. |
| Fault! S Inverter Voltage Short | S phase inverter Output is short-circuited. |
| Fault! T Inverter Voltage Short | T phase inverter Output is short-circuited. |
| Fault! RS Inverter Voltage Short | R-S inverter Output is short-circuited. |
| Fault! ST Inverter Voltage Short | S-T inverter Output is short-circuited. |
| Fault! TR Inverter Voltage Short | T-R inverter Output is short-circuited. |
| Fault! Inverter R Negative Power | R phase inverter Output Negative Power over range |
| Fault! Inverter S Negative Power | S phase inverter Output Negative Power over range |
| Fault! Inverter T Negative Power | T phase inverter Output Negative Power over range |
| Fault! Over Load Fault | Heavy overload causes UPS fault. |
| Fault! Battery Fault | Batteries reversed |
| Fault! Over Temperature | Make sure adequate space is allowed for air ventilation and the fan is working |
| Fault! CAN Fault | CAN communication fault |
| Fault! TRIGO Fault | Synchronized trigger signal fault |
| Fault! Relay Fault | Inverter relay fault |
| Fault! Line SCR Fail | Line SCR short circuit fault |
| Fault! EEPROM Fault | EEPROM operation error |
| Fault! Parallel Cable Loosen Fault | As stated. |
| Fault! DSP MCU Stop Communicate | As stated. |
| Fault! Bypass Temperature Fault | As stated |
| Fault! Bypass SCR Fault | As stated. |
| Line Fail | Utility lost or abnormal |
| Line Restore | Utility recovered to normal |
| Warning! EPO Active | Check the EPO connector |
| Warning! Over Load Fail | The load devices are demanding more power than the UPS can supply. Line mode will transfer to Bypass mode. |
| Warning! Communicate CAN Fail | CAN communication error |
| Warning! Over Load | In Line mode, the load devices are demanding more power than the UPS can supply. |
| Warning! Battery Open | Battery not connected |
| Warning! Battery voltage High | Battery voltage is too High |
| Warning! Module Un-Lock | As stated. |
| Warning! Turn On Abnormal | As stated. |
| Warning! Charge Fail | As stated. |
| Warning! EEPROM Fail | EEPROM operation error |
| Warning! Fan Lock | As stated. |

| | |
|--------------------------------------|---|
| Warning! Line Phase Error | As stated. |
| Warning! Bypass Phase Error | As stated. |
| Warning! N Loss | Neutral loss |
| Warning! Internal Initial Fail | As stated. |
| Warning! Comm Syn Signal Fail | Communicate Synchronization Signal Fail |
| Warning! Comm. TRIGO Fail | Communicate Trigger signal fault |
| Warning! Redundancy Set Fail | As stated. |
| Warning! Parallel Sys Config. Wrong | Parallel System Configure error |
| Warning! Maintenance Bypass | Enter maintenance |
| Warning! Battery Age Alert | Battery Life expiration |
| Warning! Parallel Rack Cable Loosen | As stated. |
| Warning! Parallel Rack Config. Wrong | Parallel Rack Configure error |
| Warning! Parallel Firmware Error | Power module parallel firmware error |
| Warning! Battery Voltage Low | Battery voltage is too low. |
| Warning! ID Conflict | Power module ID conflict. |
| Pre-Alarm! Line Voltage Fail | Line voltage over range |
| Pre-Alarm! Line Voltage Normal | Line voltage recovered to normal |
| Pre-Alarm! Line Frequency Unstable | Line frequency over range |
| Pre-Alarm! Line Frequency Normal | Line frequency recovered to normal |
| Pre-Alarm! Over Load | Output Load over range |
| Pre-Alarm! Load Normal | Output Load recovered to normal |
| Pre-Alarm! Load Unbalance | Output Load unbalance |

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! Cold Start |
| 23 | Setup! EEPROM Reset | 24 | Setup! Battery Mode Delay Time |
| 25 | Setup! EPO Function | 26 | Setup! Shutdown Restore Time |
| 27 | Setup! Save Setting | 28 | Setup! Redundancy |
| 29 | Setup! Power Rating Setting | 30 | Setup! Charger Test |
| 31 | Setup! Nominal Battery Voltage | 32 | Setup! Battery Capacity in Ah |
| 33 | Setup! Maximum Charging Current | 34 | Setup! Battery Low Voltage |

| | | | |
|----|------------------------------|----|---------------------------------|
| 35 | Setup! Battery Low Capacity | 36 | Setup! Battery Shutdown Voltage |
| 37 | Setup! Periodic Battery Test | 38 | Setup! Stop By Time |
| 39 | Setup! BATTERY Age Alert | 40 | Setup! Temperature Compensation |
| 41 | Setup! Charging Voltage | 42 | Setup! PRE-ALARM |
| 43 | Setup! UPS Parallel | 44 | Setup! Independent Battery |

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 Static Transfer Switch (STS) Module includes dry contact Ports (X1~X8), Extra Comm. Slot, SNMP Slot and communication port (RS232 Port, USB port) on the front panel.

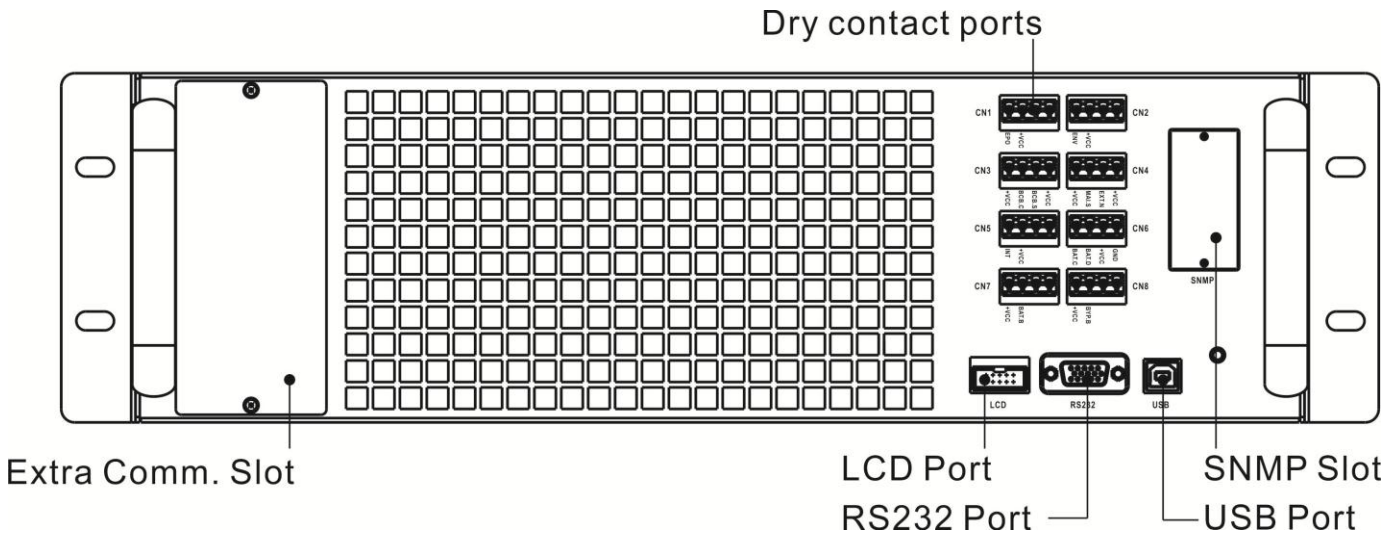


Figure 5-1 Dry contact ports and communication ports

| Dry Contact No. | Function |
|-----------------|--|
| 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 |

5.1 Dry Contact Port

5.1.1 X1-Remote EPO Input Port

The Emergency Power off (EPO) Function in UPS can be operated by an assigned remote contact. Users can set the logic (N.C or N.O) of this EPO Function through LCD panel.

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

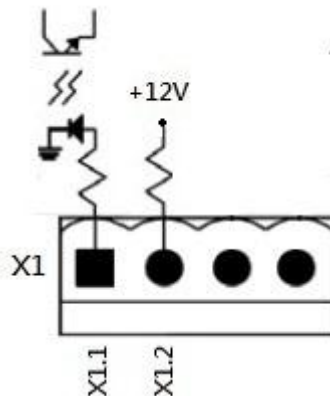


Figure 5-2 Remote EPO input port

Table 5-1: Description of remote EPO port

| EPO Logic Setting | Position | Description |
|-------------------|-------------|---|
| N.C | X1.1 & X1.2 | EPO is activated when X1.1 & X1.2 opened |
| N.O | X1.1 & X1.2 | EPO is activated when X1.1 & X1.2 shortened |

If EPO Logic setting is Normal Closed (N.C), EPO is triggered when pins 1 and 2 of X1 are opened. Otherwise, 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.
2. The default setting of the EPO function logic is Normal Opened (N.O).

5.1.2 X4-Maintenance Bypass Switch State Port

X4 is the maintenance bypass switch port. The port is shown in Figure 5-3 and described in **Table 5-2**.

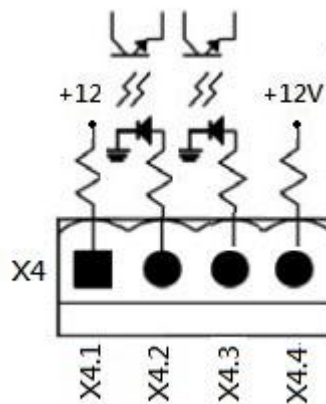


Figure 5-3 Maintenance Bypass Switch State port

Table 5-2: 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 X6-Battery Cabinet Temperature Detection Port

There is battery cabinet temperature detection function in the UPS. The temperature of UPS 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 5-3**.

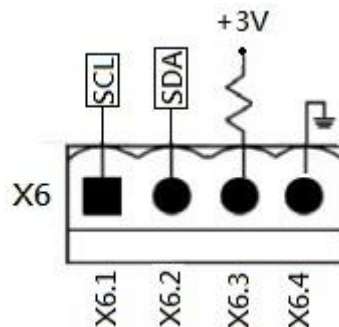


Figure 5-4 Battery Cabinet Temperature Detection Port

Table 5-3: Description of Battery Cabinet Temperature Detection Port

| Name | Position | Description |
|-----------|----------|---|
| SCL | X6.1 | I ² C communication SCL Signal |
| SDA | X6.2 | I ² C communication SDA Signal |
| +3.0V | X6.3 | 3V |
| Power GND | X6.4 | GND |

5.2 Extra Comm. Slot

There is an optional card, **Extra Comm. Card** which can be inserted into this slot. This option can 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.

5.3 Local Communication Ports – RS232 & USB

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

5.4 SNMP Slot

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

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 Short | DC bus is short | 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 Over | Inverter Voltage over (Peak Value) | 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! Battery Fault | Battery reverse | Check the polarity of battery connection and contact service personnel. |
| 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! TRIG0 Fault | Synchronized trigger signal fault | Contact service personnel. |
| Fault! Relay Fault | Inverter relay fault | Contact service personnel. |
| Fault! Line SCR Fail | Line SCR short circuit fault | Contact service personnel. |
| Fault! EEPROM Fault | EEPROM operation error | Contact service personnel. |
| Fault! Parallel Cable Loosen Fault | As stated. | Check if the parallel cable is loose and contact service personnel. |

| | | |
|-------------------------------------|--|---|
| Fault! DSP MCU Stop Communicate | As stated. | Contact service personnel. |
| Fault! Bypass Temperature Fault | As stated | Check if the ambient temperature is over specification. Or 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 mode will transfer to Bypass mode. | Reduce some load and check output Load-Capacity and specification |
| 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 | <ol style="list-style-type: none"> 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! Module Un-Lock | As stated. | Check if module is locked well. |
| Warning! Turn On Abnormal | As stated. | Check if the input voltage or frequency is out of range. |
| 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! Internal Initial Fail | As stated. | Contact service personnel. |
| Warning! Comm. Syn. Signal Fail | Communicate Synchronization Signal Fail | Contact service personnel. |
| Warning! Comm. TRIGO Fail | Communicate Trigger signal fault | Contact service personnel. |
| Warning! Redundancy Set Fail | As stated. | Check the redundancy setting is correct and contact service personnel. |
| Warning! Parallel Sys Config. Wrong | Parallel System Configure error | Contact service personnel. |
| Warning! Maintenance Bypass | Enter maintenance | Check if the connector is loose when it acts abnormally. |
| Warning! Battery Age Alert | Battery Life expiration | Check if the battery has been used over its service age. Or contact service |

| | | |
|--------------------------------------|--------------------------------------|---|
| | | personnel. |
| Warning! Parallel Rack Cable Loosen | As stated. | Check if the Parallel Rack Cable is loose and contact service personnel. |
| Warning! Parallel Rack Config. Wrong | Parallel Rack Configure error | Check the Parallel Rack Setting is correct and contact service personnel. |
| Warning! Parallel Firmware Error | Power module parallel firmware error | The firmware version does not support Rack Parallel feature. Contact service personnel. |
| Warning! ID Conflict | Power module ID conflict. | There are two Power Modules with the same ID numbers. Change the repeated ID to release it. Or contact service personnel. |

7. Service



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

Warning:

1. Only the customer service engineers can service the power modules, bypass module and battery modules.
2. Remove the power modules, bypass module and battery modules from top to bottom, so as to prevent cabinet from toppling due to high center of gravity.
3. **The static transfer switch module is NOT hot pluggable.** It should be replaced only when the UPS is in maintenance bypass mode or completely powered off.

7.1 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. Turn ready switch to “” position
 2. The Power Module FAULT LED (RED) indicator is lit to indicate the Power Module output is off and disconnected from UPS system.
 3. Use a screwdriver to remove the four screws from fixing holes.
 4. Two people pull out together and remove the Power Module from its slot.
 5. After servicing the module, confirm that the DIP switch of the module is set correctly and the ready switch is in unready state “”.
 6. Push the module into the cabinet and tighten the screws on both sides. If it's more than one power module to re-install, please wait 30-second before installing another module.
 7. The re-installed Power Module will be turned on automatically when UPS is in line mode.

7.2 Replacement Procedures Of STS Module

Warning:

- Confirm the UPS is operating in Maintenance Bypass Mode.
1. Follow Section “3.3.3.1 Transfer to maintenance bypass” procedure to transfer UPS into Maintenance Bypass operation.
 2. Remove the fixing screws on both sides of the front panel of the module and pull the module out from the cabinet.
 3. After servicing the module, push the module into the cabinet and tighten the screws on both sides.
 4. Follow chapter “3.3.3.2 Transfer to UPS Protection” procedure to transfer UPS into Bypass operation
 5. Press menu →control → system turn on →YES to turn UPS on.

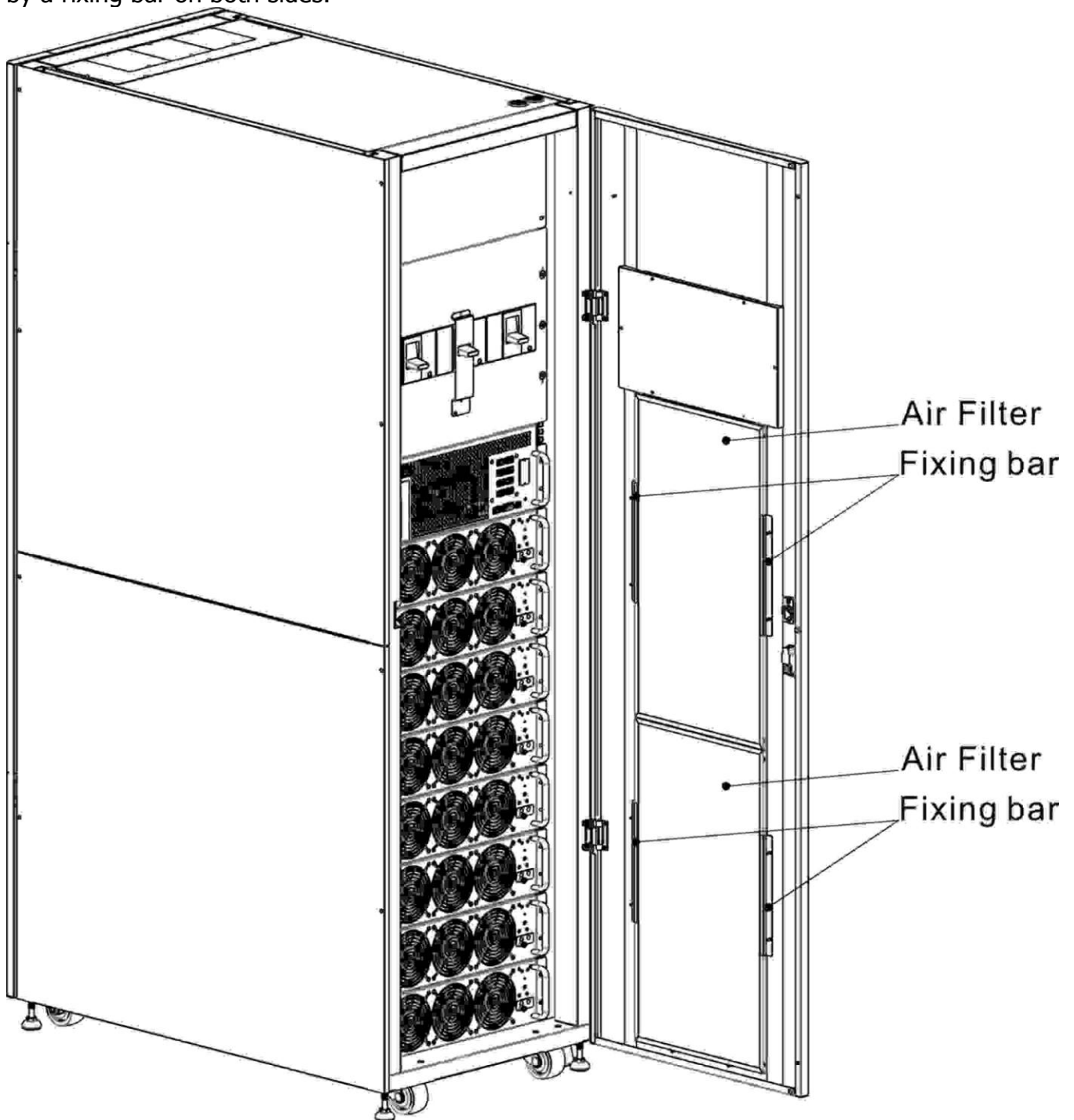
7.3 Replacement Procedures Of Battery Module

Warning:

- Confirm the types of battery are the same.
1. Remove the fixing screws on both sides of the front panel of the module, and pull out the battery module.
 2. Push the new battery module into cabinet and fix it with screws on both sides of the front panel.

7.4 Replacement Procedures Of Air Filter

As shown below, the UPS provides four air filters on the back of the front door. Each filter is fixed by a fixing bar on both sides.



The replacement procedures of air filter are as follows:

1. Open the front door of the UPS and the air filters are on the back of the door.
2. Remove a fixing bar on either side of the air filter.
3. Remove the air filter, and insert a clean one.
4. Replace the fixing bar.

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 |
| Method of specifying the performance and test requirements of UPS | IEC/EN62040-3 |
| 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 3 |
| 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. 73 |
| Altitude | m | ≤1000, derate power by 1% per 100m between 1000m and 2000m |
| Relative humidity | % RH | 0 ~ 95, non-condensing |
| Operating temperature | °C | 0 ~ 40°C (Output capacity will be derated when temperature is over 30°C. It will be derated to 90% at 35°C and 80% at 40°C.) |
| Storage and transport temperature for UPS | °C | -15 ~ 60 |

8.3 Mechanical Characteristics

Table 8-3: Mechanical characteristics

30U

| Model | | 30U-90HV | 30U-120HV | 30U-180HV |
|--------------------------------|------|---|-----------|-----------|
| Rated power (kVA) | Unit | 90 | 120 | 180 |
| Dimensions, W x D x H | mm | 600 x 1100 x 1475 | | |
| Weight | kg | 675 | 335 | 437.5 |
| Color | N/A | Black | | |
| Protection degree, IEC (60529) | N/A | IP20 (front door and back door is open or closed) | | |

42U

| | | | | |
|--------------------------------|------|---|--|-----------|
| Model | | 42U-120HV | 42U-210HV | 42U-300HV |
| Rated power (kVA) | Unit | 120 | 210 | 300 |
| Dimensions, W x D x H | mm | 600 x 1100 x 2010 | | |
| Weight | kg | 932 | 7 Power Modules: 514.5 8 Power Modules: 549 | 618 |
| Color | N/A | Black | | |
| Protection degree, IEC (60529) | N/A | IP20 (front door and back door is open or closed) | | |

8.4 Electrical Characteristics (Input Rectifier)

Table 8-4: Rectifier AC input (mains)

| | | |
|-----------------------------|--------|---|
| Rated power (kVA) | Unit | 30~300 |
| Rated AC input voltage | Vac | 380/400/415 (3-phase and sharing neutral with the bypass input) |
| Input voltage tolerance | Vac | 305 ~ 478; 208 ~ 304(output derated below 70%) |
| Frequency | Hz | 50/60 (tolerance: 40Hz ~ 70Hz) |
| Power factor | kW/kVA | 0.99 (0.98) full load(half load) |
| Harmonic current distortion | THDI% | <3 (full load) |

8.5 Electrical Characteristics (Intermediate DC Circuit)

Table 8-5: Battery

| | | | | | | | |
|---|-----------|---|------------|------------|------------|------------|------------|
| Intermediate DC circuit | | | | | | | |
| Model | | 30U-90 HV | 42U-120 HV | 30U-120 HV | 30U-180 HV | 42U-210 HV | 42U-300 HV |
| Rated power (kVA) | Unit | 90 | 120 | 120 | 180 | 210 | 300 |
| 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 | 2.3V/cell Constant current and constant voltage charge mode | | | | | |
| Temperature compensation | mV/°C/cl | 0~-5 | | | | | |
| Ripple voltage | % V float | ≤1 | | | | | |
| Ripple current | % C10 | ≤5 | | | | | |
| Boost voltage | VRLA | 2.35V/cell Constant current and constant voltage charge mode | | | | | |
| EOD voltage | V/cell | 1.67V/cell | | | | | |
| Battery charge | V/cell | Limit current and constant voltage charge mode Floating Voltage 2.3V/cell Boost charging 2.35V/cell | | | | | |
| Battery charging power ¹ max current | A | 8 / per power module (adjustable) | | | | | |

Note:

1. At low input voltage the UPS recharging capability increases and load decreases (up to the maximum capacity indicated).

8.6 Electrical Characteristics (Inverter Output)

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

| | | |
|---|------|---|
| Rated power (kVA) | Unit | 30 ~ 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 | % | 105%~110% for 60min 110%~125% for 10min 126%~150% for 1min >150% for 200ms |
| Neutral current capability | % | 170% |
| Steady state voltage stability | % | ±1 (balanced load), ±2 (100% unbalanced load) |
| Total harmonic voltage | % | <2 (linear load), <4 (non-linear load ³) |
| Synchronization window | | +/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz) |
| 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 | 30 ~ 300 |
| Rated AC voltage ¹ | Vac | 380/400/415 (Three-phase four-wire, sharing neutral with the rectifier input and providing neutral reference to the output) |
| Rated current | A | 30U for 90KW → 171, 380V / 164, 400V / 157, 415V 42U for 120KW → 228, 380V / 218, 400V / 209, 415V 42U for 210KW → 397, 380V / 380, 365V / 329, 415V 42U for 300KW → 570, 380V / 546, 365V / 532, 415V |
| 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. |
| Current rating of neutral cable | A | 1.7 × I _n |
| Frequency | Hz | 50/60 Auto Selectable |
| Transfer time (between bypass and inverter) | ms | Synchronous transfer: ≤20ms |
| Bypass voltage tolerance | %Vac | Upper limit: +10, +15 or +20, default: +15 Lower limit: -10, -20, -30 default: -20 (delay time to accept steady bypass voltage: 10s) |
| 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 Rack System

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

Warning:

- The input harmonic current distortion will be higher than 3% and less than 4.5% in parallel rack system.
- You need to order the parallel cable for this kind of application. The parallel is required for the installation and operation.
- The firmware version of power module must be 10.58 or higher and firmware version of LCD must be 11.50 or higher.
- If you want to install the UPS to parallel rack system by yourself, installation must be under the supervision of authorized engineers or service personnel.
- The parallel rack feature only support eight power modules with 210K maximum power in one rack. One of the eight power module is configured as redundancy power module. The parallel rack system's maximum power can be 210K + 210K.

9.1 Input and Output Wiring

1. When install the parallel rack system, the input wires (R, S, T, N) length of the Rack must be equal to another Rack input wires. Likewise, the output wires (R, S, T, N) length of the Rack must be equal to another Rack output wires. The same length of input and output wires of two Racks are required, or 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 in User Manual.

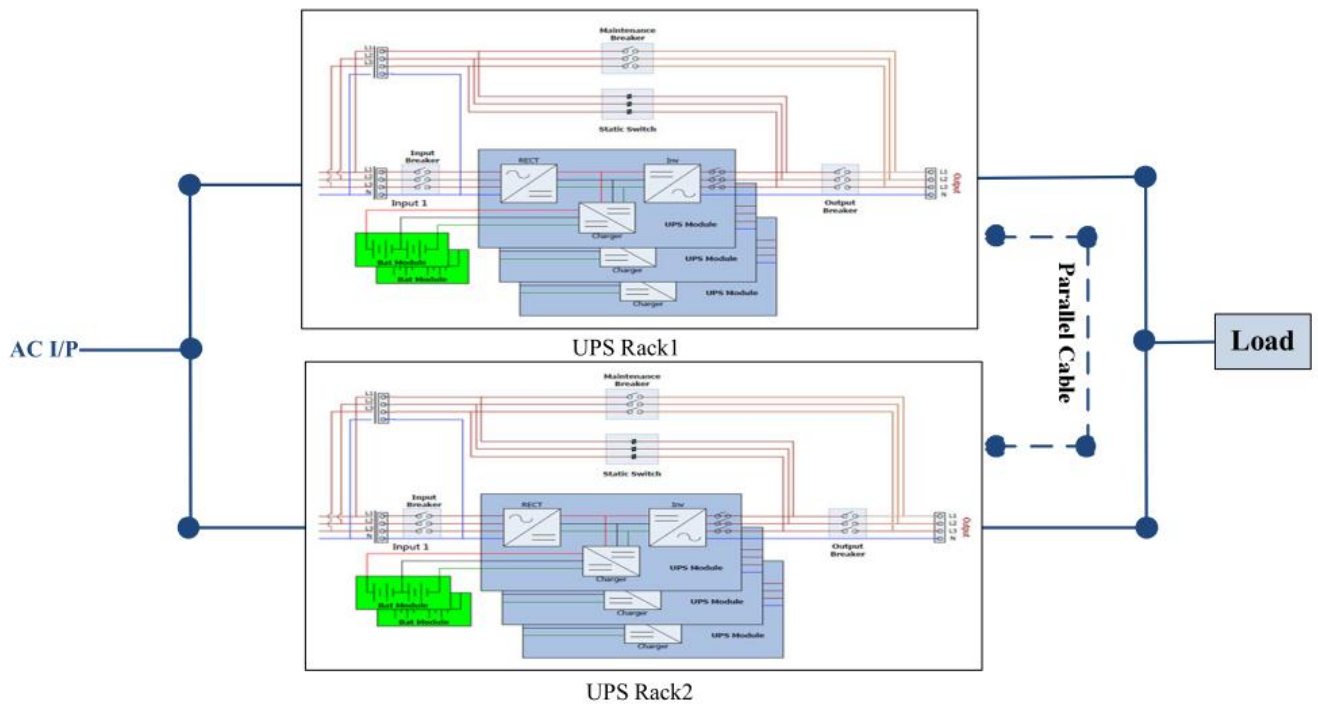


Figure 9-1 Parallel System Wiring

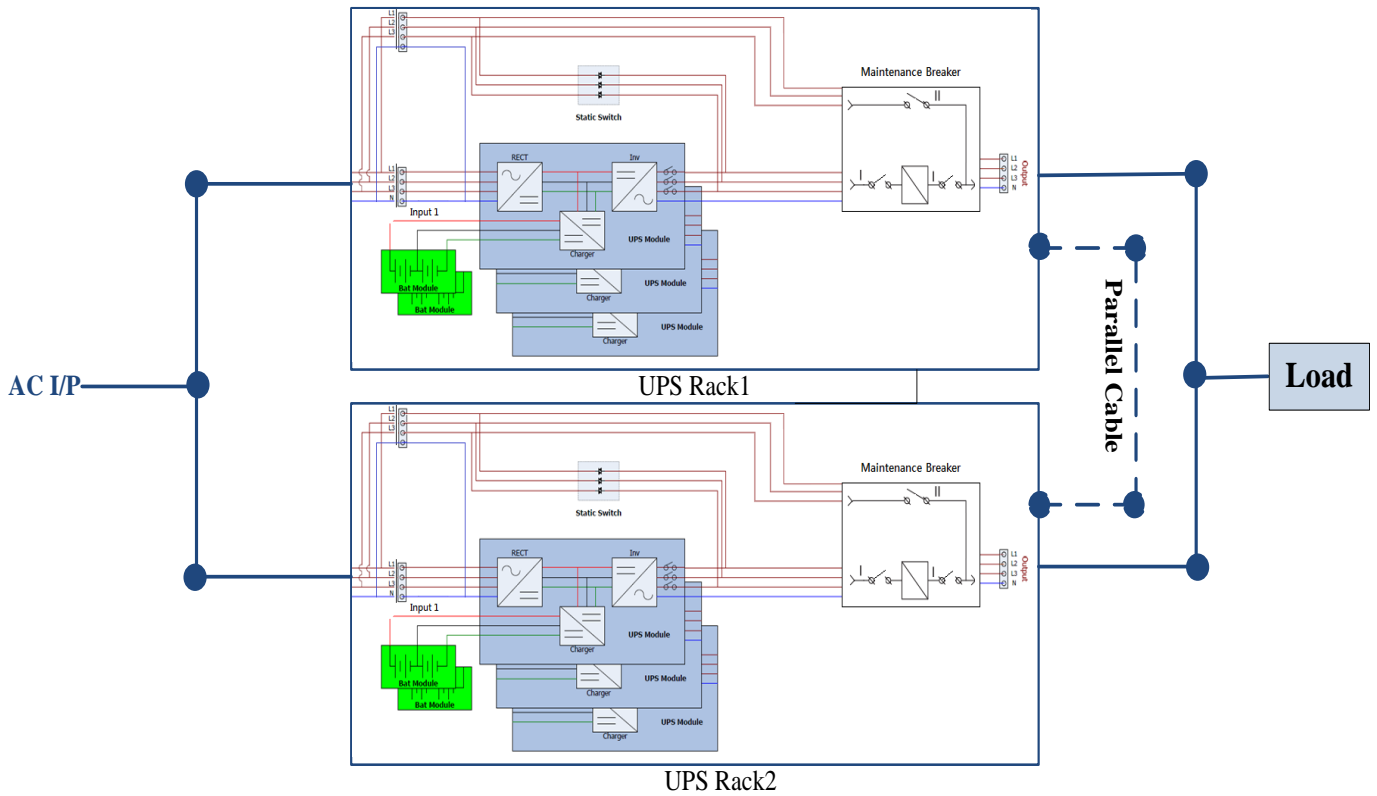


Figure 9-2 Parallel System Wiring

9.2 Parallel Board Setting and Power Module

9.2.1 Install Power Module of Rack1

1. The parallel board(s) of the Rack 1, the SW2 must be set to the right side, please refer to the figure 9-2 as below.

Warning:

For the cabinets which can insert more than 5 power modules, there are two parallel boards inside the cabinet. Both of these two SW2 have to be adjusted simultaneously.

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

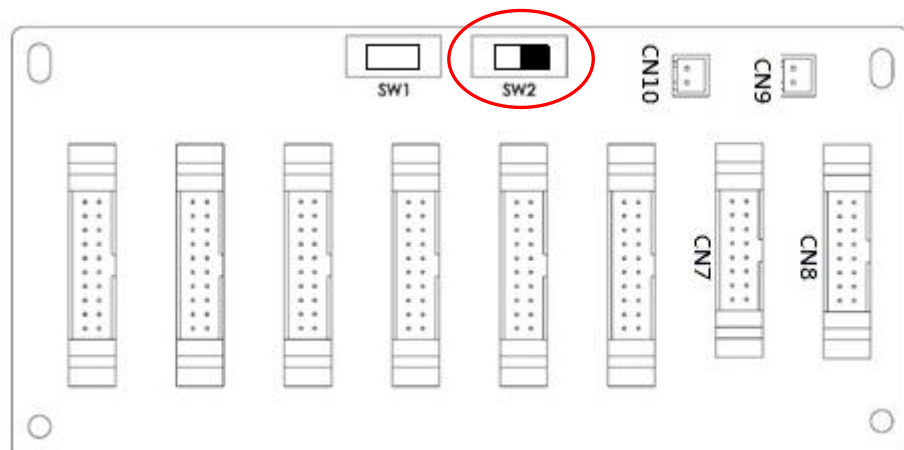


Figure 9-2 Rack 1 SW2 set to the right side

9.2.2 Install Power Module of Rack2

1. The parallel board(s) of the Rack 2, the SW2 must be to set the left side, please refer to the figure 9-3 below.

Warning:

For the cabinets which can insert more than 5 power modules, there are two parallel boards inside the cabinet. Both of these two SW2 have to be adjusted simultaneously.

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

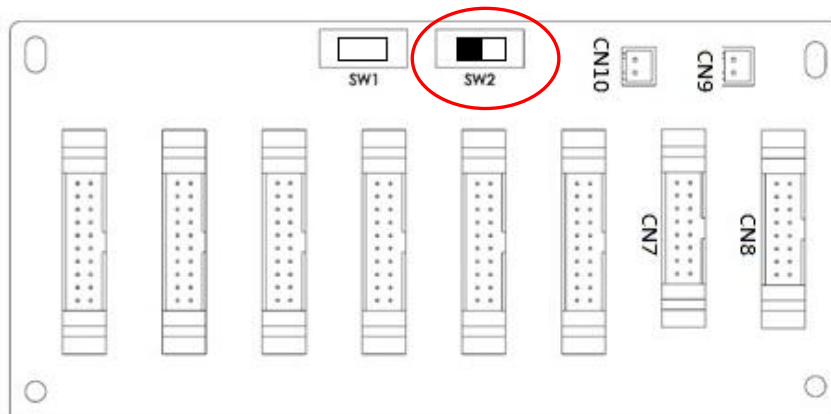


Figure 9-3 Rack 2 SW2 set to the left side

9.3 Parallel Function Setting

1. For the input and output wiring, please be sure to follow section 9.1 Input and Output Wiring and confirm that.
2. For the Parallel Board Setting and Install Power Module, please sure to follow section 9.2 Parallel Board Setting and Power Module process and confirm that.

Please confirm if the two steps above have been completed correctly, and then set parallel function and Battery configuration. Please follow the steps below:

1. **Do not connect Parallel Cable until informed.**
2. Place the Input breakers (Q1) of two Racks in the "ON" position. But keep the Output breakers (Q3) of two Racks in the "OFF" position.
3. Turn on the battery breaker.
4. Turn on the external AC source breaker to apply AC Input source to two Racks.
5. Wait for the wake-up of UPSs. Then start to set Rack 1.
6. Through the panel of the UPS 1(Rack 1), set up the parallel function. Enter the "PARALLEL" item in "SETUP" page. (Refer to User Manual 4.2.6.5 SETUP operation method)
7. Enable the "UPS Parallel" function of UPS 1(Rack 1). (**Ignore the warning of "Parallel Rack Cable Loosen"**)
8. Setting the Battery configuration is independent or common battery, depending on the actual application.
9. After setting these two parameters, use the "Save Setting" item in "General" page of "SETUP" to save settings.
10. Continue the setting of Rack 2.
11. Through the panel of the UPS 2(Rack 2) to setup the parallel function. Enter the "PARALLEL" item in "SETUP" page. (Refer to User Manual 4.2.6.5 SETUP operation method)
12. Enable the "UPS Parallel" function of UPS 2(Rack 2). (**Ignore the warning of "Parallel Rack Cable Loosen"**)
13. Setting the Battery configure is independent or common battery, depend on the actual application.
14. After setting these two parameters, use the "Save Setting" item in "General" page of "SETUP" to save settings.
15. Turn off the external AC Source Breaker and wait for complete shutdown of UPSs.
16. Turn off Battery Breaker.

9.4 Parallel Cable Connection

There are two connectors at the end of Parallel Cable, one is 16-pins and the other is 2-pins. Insert the 16-pins connector into the CN7 and 2-pins connector into the CN10. Both racks use the same way to connect the parallel cable. Please refer to connector's position as shown in figure 9-4 & 9-5 below.

For the cabinet with two parallel boards, please insert the connectors into any one of two boards.

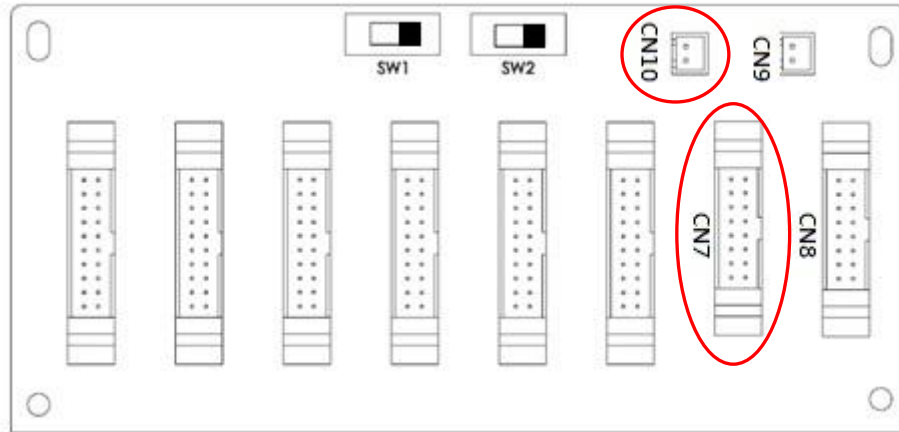


Figure 9-4 Rack 1 Parallel Board

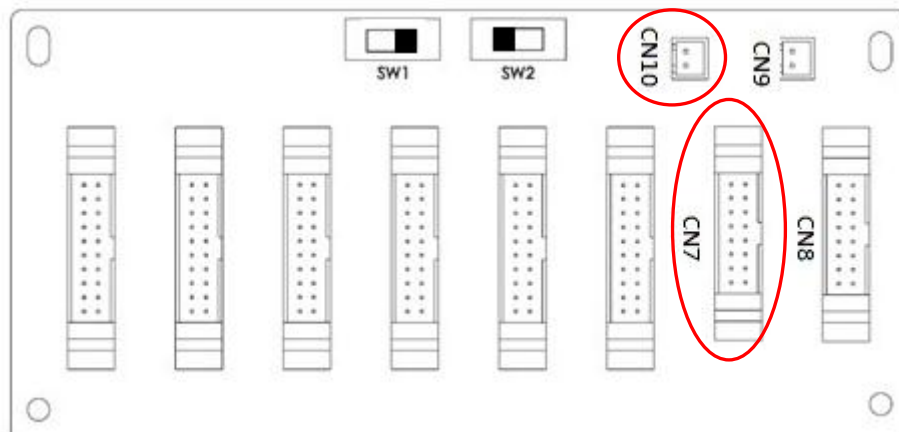


Figure 9-5 Rack 2 Parallel Board

Warning:

The parallel cable of each UPS must to be connected correctly, the wrong connection will cause the UPS system cannot operate normally.

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 (Rack) 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 two Racks.
- 5 Through the panel of the UPS 1(Rack 1) or UPS 2(Rack2), 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(Rack 1) or UPS 2(Rack2), 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)