

User Manual

EPOS 3/3 100K~200KVA Online UPS

Uninterruptible Power Supply System



Please comply with all warnings and operating instructions in this manual. This equipment should only be installed, serviced, and maintained by qualified personnel. Do not operate this unit before reading through all safety information and operating instructions carefully.

Disclaimer

We assume no responsibility or liability for loss or damages, whether direct, indirect, consequential or incidental, which might arise out of the use of such information. The use of any such information will be entirely at the user's risk. Information in this manual is subject to change without notice. We make no commitment to update or keep current the information in this manual. If you find information in this manual that is incorrect, misleading, or incomplete, we would appreciate your comments and suggestions.

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1. Safety and EMC instructions

All safety instructions in this document must be read, understood and followed.

1-1. Transportation and Storage



Please transport the UPS system only in the original package to protect against shock and impact.



The UPS must be stored in the room where the temperature is well regulated. Ambient temperature must not exceed 40°C

1-2. Preparation



Condensation may form if the UPS system is moved immediately from cold to warm environment. The UPS system must be absolutely dry before being installed. Please allow at least two hours for the UPS system to acclimate the environment.



Do not install the UPS system near water or in moist environments.



Do not install the UPS system where it would be exposed to direct sunlight or nearby heat source.



Do not block ventilation holes on the UPS housing.

1-3. Installation



Do not connect appliances or devices which would overload the UPS (e.g. big motor-type equipment)) to the UPS output terminal.



Place cables in such a way that no one can step on or trip over them.



Do not block air vents on the housing of UPS. Ensure proper unit spacing of ventilation.



UPS came equipped with grounding terminal, in the final installation phase, connect grounding/earthing wire to the external UPS battery cabinets or appropriate grounding terminals.



The UPS can be installed only by qualified maintenance personnel.



An appropriate disconnection device such as short-circuit backup protection should be incorporated during installation.



An integral emergency shutoff switch which prevents additional load from the UPS in any mode of operation should be implemented during the installation.



Secure the grounding/earthing wire before connecting to any live wire terminal.



Installation and wiring must be performed in accordance with the local electrical laws and regulations.



The unit must be installed on level ground 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.



The disconnection device should be installed on the input current break line and neutral conductors - four poles for three phases.

1-4. Connection Warnings

- This UPS should be connected with **TN** grounding/earthing system.
- The power supply for this unit must be three-phase rated in accordance with the equipment nameplate. It also must be suitably grounded.

WARNING
HIGH LEAKAGE CURRENT
EARTH CONNECTION ESSENTIAL
BEFORE CONNECTING SUPPLY

- Use of this equipment in medical instrument or any life-sustaining equipment where failure of this equipment can reasonably be expected to cause the failure of the life-sustaining equipment or to significantly affect its safety or effectiveness is not recommended. Do not use this equipment in the presence of a flammable mixture with air, oxygen or nitrous oxide.
- Connect grounding terminal of power stage to a grounding electrode conductor.
- In accordance with safety standard EN-IEC 62040-1, installation has to be provided with a «Backfeed Protection» system, for example a contactor, which will prevent the appearance of voltage or dangerous energy in the input mains during a mains fault (see figure 24 and conforms to the wiring diagram of «Backfeed Protection» depending on the phase input).




There can be no derivation in the line that goes from the «Backfeed Protection» to the UPS, as the standard safety would be compromised.

- Warning labels should be placed on all primary power switches installed in places away from the unit to alert maintenance personnel of the presence of a UPS in the circuit. The label will bear the following or an equivalent text:

Before working on this circuit

- Isolate Uninterruptible Power Supply (UPS)
- Then check for Hazardous Voltage between all terminals including the protected earth



Risk of Voltage Backfeed

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

1-5. Operation



Do not disconnect the grounding/earthing conductor cable on the UPS or the building wiring terminals under any circumstance.



In order to fully disconnect the UPS system, first press the "OFF" button and then disconnect the Mains/live wires.



Ensure that no liquid or other foreign objects can enter into the UPS system.



The UPS can be operated by any individuals with no previous experience.

1-6. Standards

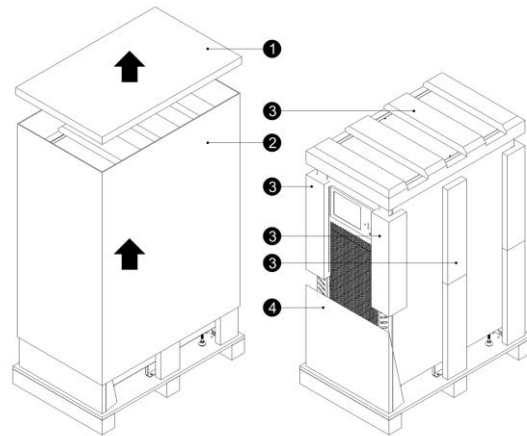
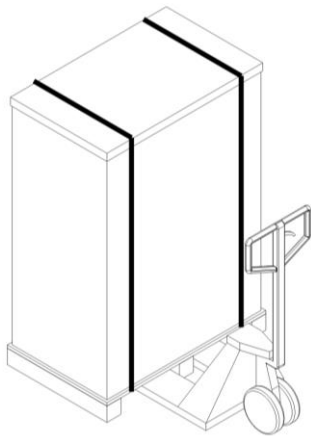
| | |
|---|-------------|
| * Safety | |
| IEC/EN 62040-1 | |
| * EMI | |
| Conducted Emission.....:IEC/EN 62040-2 | Category C3 |
| Radiated Emission.....:IEC/EN 62040-2 | Category C3 |
| *EMS | |
| ESD.....:IEC/EN 61000-4-2 | Level 3 |
| RS..... :IEC/EN 61000-4-3 | Level 3 |
| EFT..... :IEC/EN 61000-4-4 | Level 4 |
| SURGE..... :IEC/EN 61000-4-5 | Level 4 |
| CS..... :IEC/EN 61000-4-6 | Level 3 |
| Power-frequency Magnetic field..... :IEC/EN 61000-4-8 | Level 4 |
| 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. | |

2. Installation and Operation

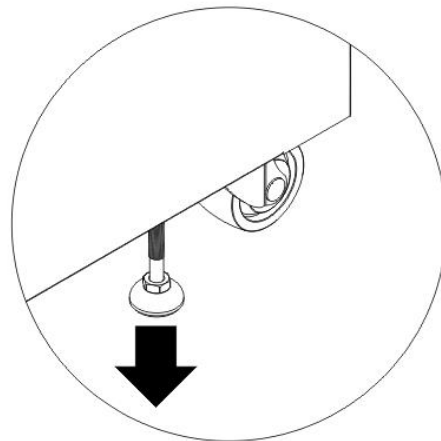
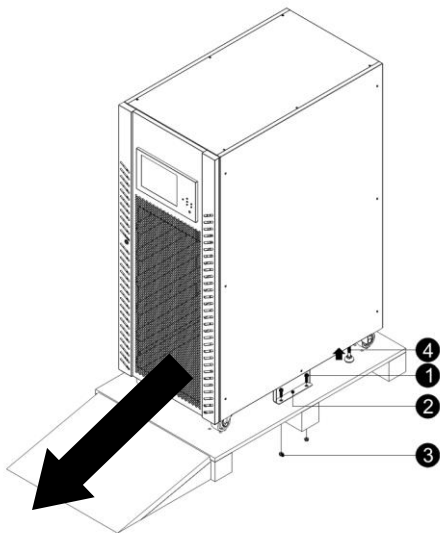
There are two different types of online UPS: single input and dual input models. Please refer to the following table.

| Model | Type | Model | Type |
|--------|--------------|-------------|------------|
| 100KVA | Single input | 100KVA DUAL | Dual input |
| 120KVA | | 120KVA DUAL | |
| 160KVA | | 160KVA DUAL | |
| 200KVA | | 200KVA DUAL | |

2-1. Unpacking and Inspection



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 unpacking order in Figure 2-2 to remove carton (① and ②) and foams (③).



3. Remove two fixing plates (①, ② and ③) located on the two sides of the unit. Loosen leveling feet (④) in figure by rotating them in counterclockwise. Then, move the cabinet from the pallet.
4. To fix the cabinet in position, simply rotate leveling feet clockwise.

Unpack the package and check the package contents. The shipping package contains:



User manual



Monitoring software CD



RS-232 cable



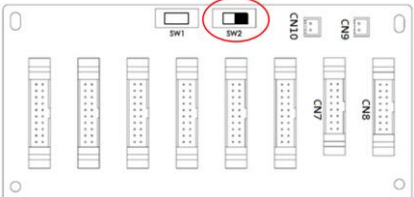
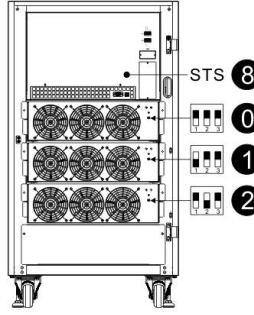
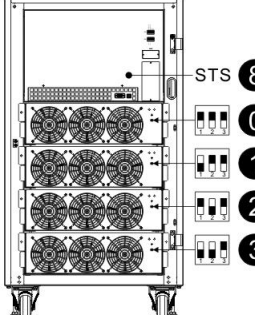
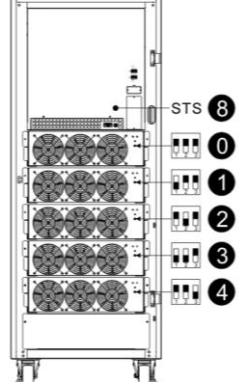
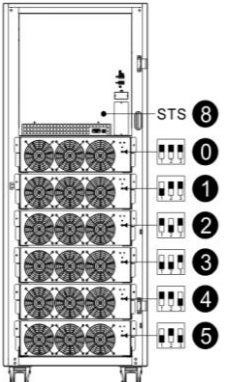
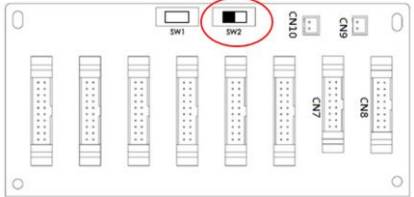
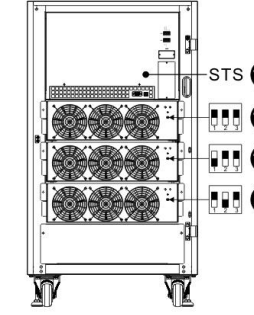
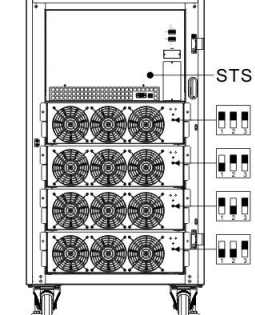
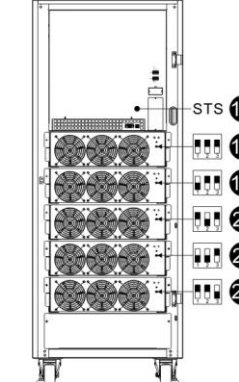
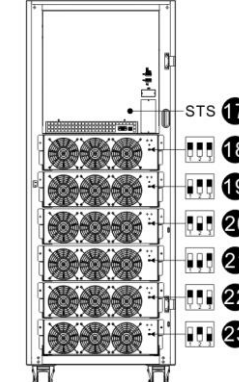
USB cable

NOTE: Before installation, please inspect the unit. Be sure that there is no physical damage to the unit. Do not turn on the unit and notify the carrier and dealer immediately if there is any damage or missing parts or accessories. Please keep the original packages for future use. It is recommended to keep each equipment and battery set in their original packaging because they have been designed to provide maximum protection during transportation and storage.

2-2. Open Front Panel View

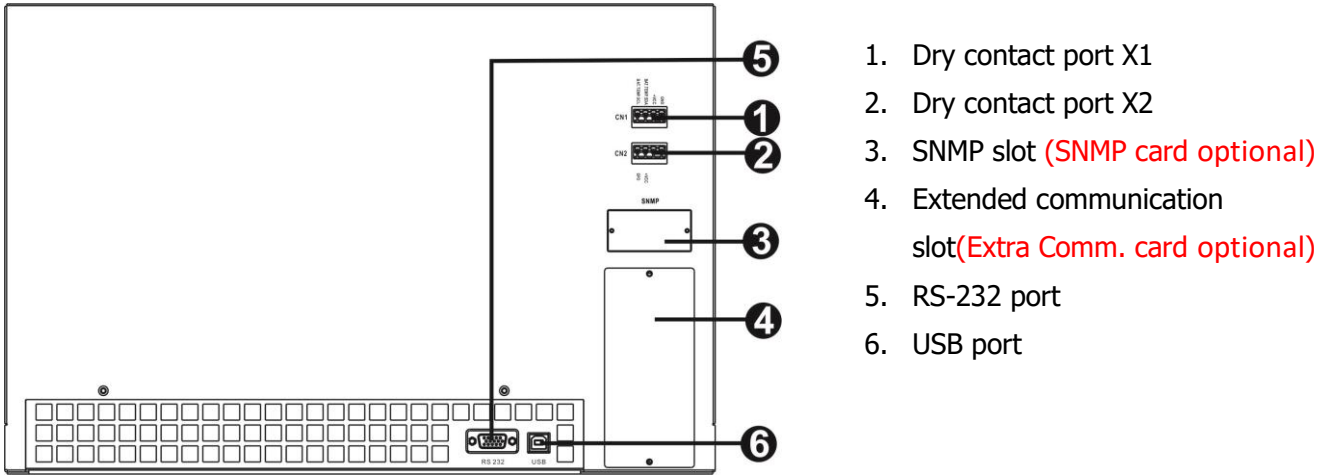
Each UPS comes equipped with a front door key. After opening the front door, you will see communication area and several power stages/modules inside. And from each power stage/module, you can easily identify their ID as shown below:

Table 2-1 Power Stage/Module ID

| | | | | |
|--|--|---|--|---|
| Install Parallel Board of UPS 1 |  | | | |
| Power Rating | 100K | 120K | 160K | 200K |
| stage ID |  |  |  |  |
| Install Parallel Board of UPS 2 (For Parallel) |  | | | |
| Power Rating | 100K | 120K | 160K | 200K |
| stage ID |  |  |  |  |

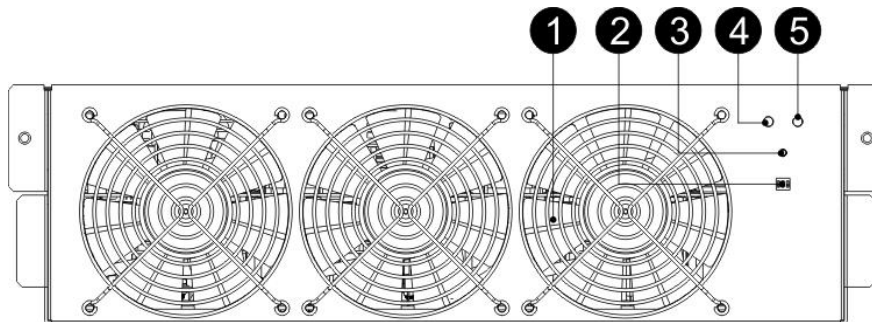
Interface and Communication

This UPS comes equipped with various communication devices. Please refer to chapter 4 Interface and Communication for further details.



Power Stage/Module

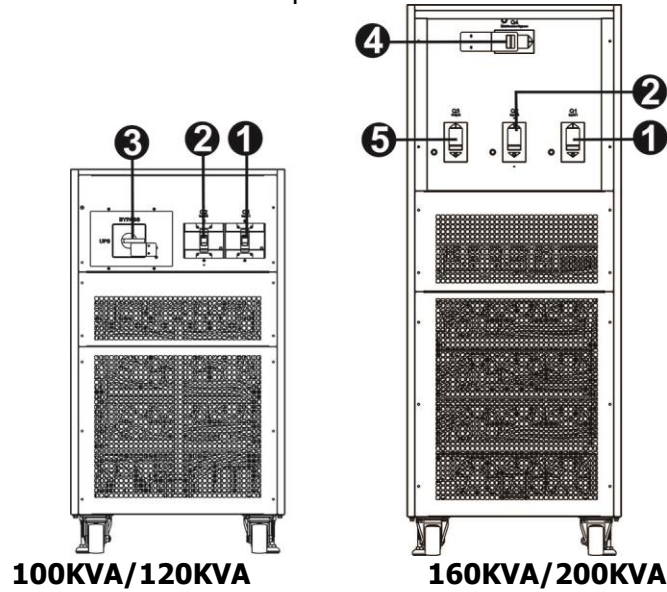
Each power stage/module includes a power factor correction rectifier, a battery charger, an inverter and control circuit.



| No. | Item | Description | |
|-----|----------------------|---|---|
| ① | Fan | Air enters the power stage/module through the front grills and exhausted through rear of the module. Please do not block the ventilation vent port. | |
| ② | DIP Switches | There are three DIP switches for power stage/module address setting. In the same cabinet, each power stage/module ID MUST be exclusive. Please refer to Table 2-1 Power Stage/Module ID | |
| ③ | Battery Start Button | When AC input is not existing, use this button to start battery power for UPS. | |
| ④ | FAULT LED | ON | The power stage/module is in fault condition. |
| | | ON/OFF 0.5 sec | The power stage/module IDs in conflict. |
| ⑤ | RUN LED | ON | The power stage/module normally works as a slave unit. |
| | | ON/OFF 0.5 sec | The power stage/module normally works as a master unit. |
| | | ON/OFF 0.15 sec | The CAN BUS communication doesn't work. |

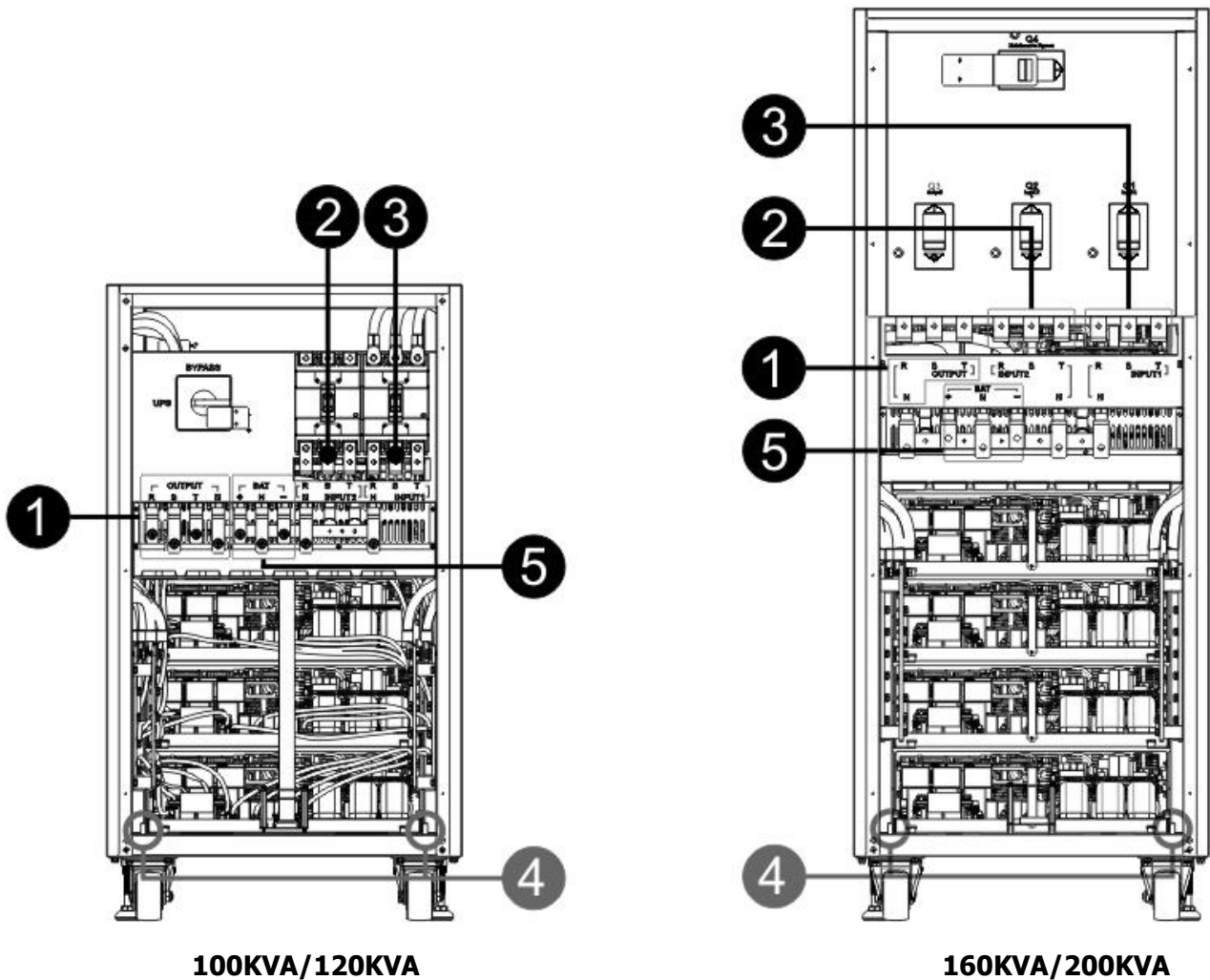
2-3. Rear Panel View

There are several breakers located on the rear panel of the UPS.

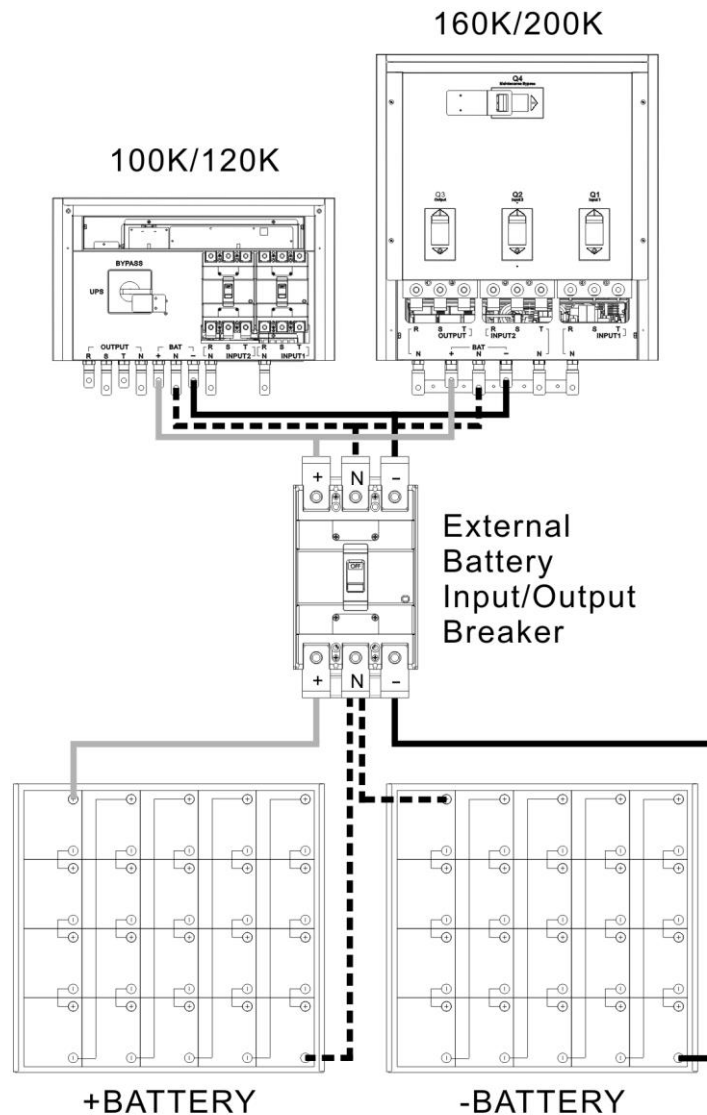


1. Input breaker Q1
2. Input breaker Q2 (only available for Dual Input Models)
3. Output and maintenance bypass switch
4. Maintenance bypass breaker (Q4)
5. Output breaker Q3

2-4. Wiring Terminal View



| No. | Item | Function | Description |
|-----|--|---|---|
| ① | Output Block | Connects to the critical loads | Includes R, S, T and Neutral terminals. |
| ② | Bypass Input Block (Q2, only available for dual input model) | Connects to bypass AC source | Includes R, S, T and Neutral terminals. |
| ③ | Main Input Block | Connects to 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 to an external battery cabinet | Includes: Positive (+), Negative (-) and Neutral (N) terminals. |



2-5. Single UPS Installation

Installation and wiring must conform in accordance with the local electric laws/regulations and execute the following instructions by professional personnel.

1) Make sure the mains wire and breakers in the building provide adequate power for the rated capacity of UPS to avoid the hazards of electric shock or fire.

NOTE: Do not use the wall receptacle as the input power source for the UPS, as its rated current is less than the UPS's maximum input current. Otherwise the receptacle may be shorted and destroyed.

2) Switch off the mains switch in the building before installation.

3) Turn off all the connected devices before connecting to the UPS.

4) Prepare wires based on the following table:

Table 2-2 Power Cable

| Model | Power cable (mm ² and AWG) | | | | |
|--------|---------------------------------------|----------------------------------|----------------------------------|---|----------------------------------|
| | Input(Ph) | Output(Ph) | Neutral | Battery | Ground |
| 100KVA | 70 mm ² (2/0AWG) | 70mm ² (2/0AWG) | 70mm ² (2/0AWG) | 150 mm ² (300 MCM) | 70 mm ² (2/0AWG) |
| 120KVA | 95 mm ² (3/0AWG) | 95 mm ² (3/0AWG) | 95 mm ² (3/0AWG) | 240 mm ² (500 MCM) | 95 mm ² (3/0AWG) |
| 160KVA | 150 mm ² (300 MCM) | 150 mm ² (300 MCM) | 150 mm ² (300 MCM) | 120mm ² x 2 (4/0AWG x 2) | 150 mm ² (300 MCM) |
| 200KVA | 185 mm ² (400 MCM) | 185 mm ² (400 MCM) | 185 mm ² (400 MCM) | 185mm ² x 2 (400 MCM x 2) | 185 mm ² (400 MCM) |

WARNING:

- Before connecting any wires, make sure the AC input and battery power is completely shut off.
- Make sure that the breakers, input1 breaker (Q1), input2 breaker (Q2 for dual input model), output breaker (Q3 for 160K/200K models), maintenance breaker (Q4 for 160K/200K models), and battery breaker are all in the "OFF" position.
- Make sure the maintenance bypass switch is in "UPS" position (only for 100K/120K models).

5) Remove the terminal block cover on the rear panel of UPS. Then, connect the input1, input2 (only available for dual input model), output and battery wires according to the function indicated on terminal block. (Connect the grounding/earthing wire first when making wire connection. Disconnect the grounding/earthing wire last when making wire disconnection!)

NOTE 1: Make sure that the wires are connected securely with the terminals.

NOTE 2: Please install the output breaker between the output terminal and the load. This breaker must have leakage current protective function.

6) Put the terminal block cover back to the rear panel of the UPS.



Warning:

- Make sure the UPS is not turned on before installation. The UPS should not be turned on during wiring connection.



Warning:

- Make sure a DC breaker or other protection device between UPS and external battery pack is installed. Switch off the battery breaker before installation.

NOTE: Set the battery pack breaker to "OFF" position and then install the battery pack.

- Pay special attention to the rated battery voltage marked on the label. If you want to change the numbers of the battery pack, please make sure you modify the setting accordingly. The connection with wrong battery voltage may cause permanent damage to the UPS.
- Make sure the protective grounding/earthing wiring is correct. The current spec, color, position, connection and conductance reliability of the wires needed be checked carefully.

- Make sure that the utility input & output wiring is correct. The current spec, color, position, connection and conductance reliability of the wires needed be checked carefully. Make sure the L/N is correct, not reverse or short-circuited.

2-6. UPS Installation for Parallel System

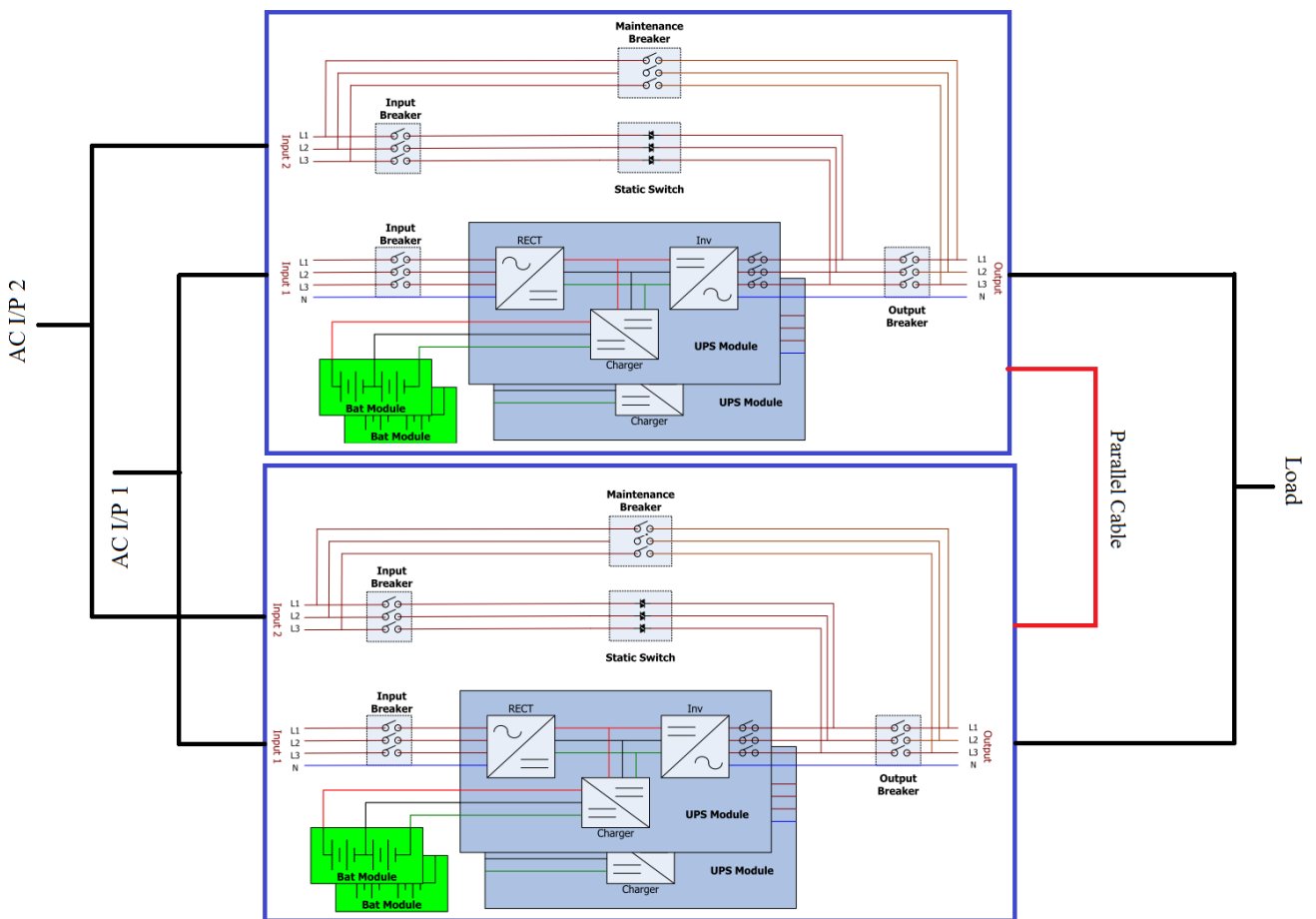
The section introduces how to install and set up the multiple UPSs to run parallel UPS system.

Warning:

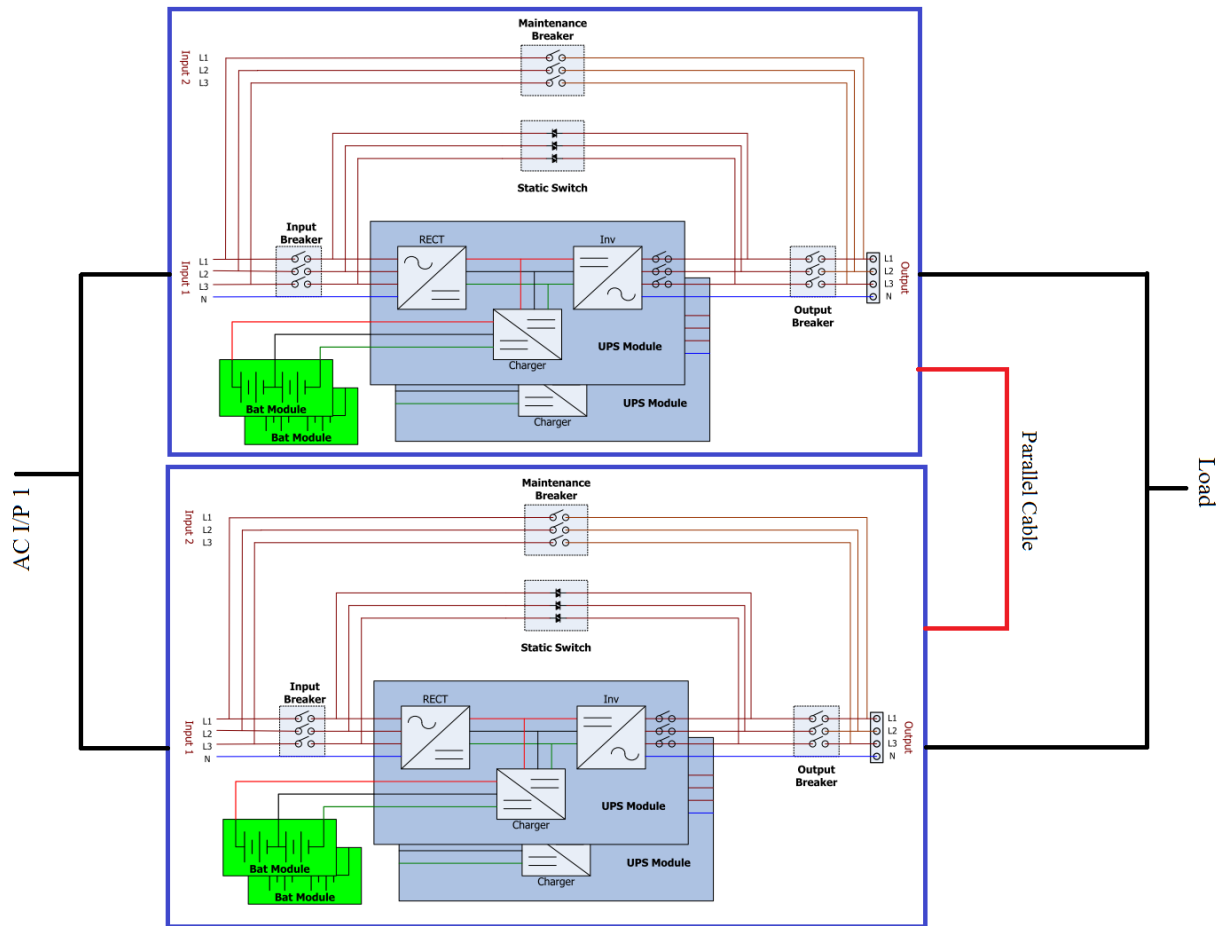
- The input harmonic current distortion will be between 3% and 4.5% in parallel UPS operation.
- You need one parallel kit for every two UPS systems.

2-6-1. Input and Output Wiring

1. When install the parallel system, the length of input wires (R, S, T, N) in the one of the UPS parallel system must be equal to another UPS input wires. Likewise, the length of output wires (R, S, T, N) must also be in equal length. Otherwise, it will cause the unbalance current on output load.
2. Refer to section "2-5. Single UPS Installation" about the input and output wiring and battery wiring methods in User Manual.



Dual input wiring in parallel system

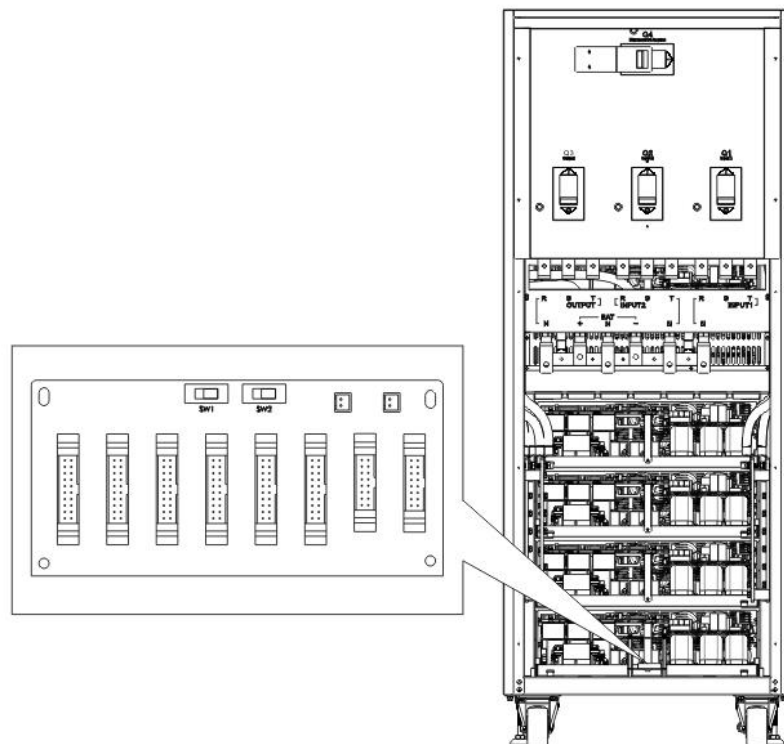


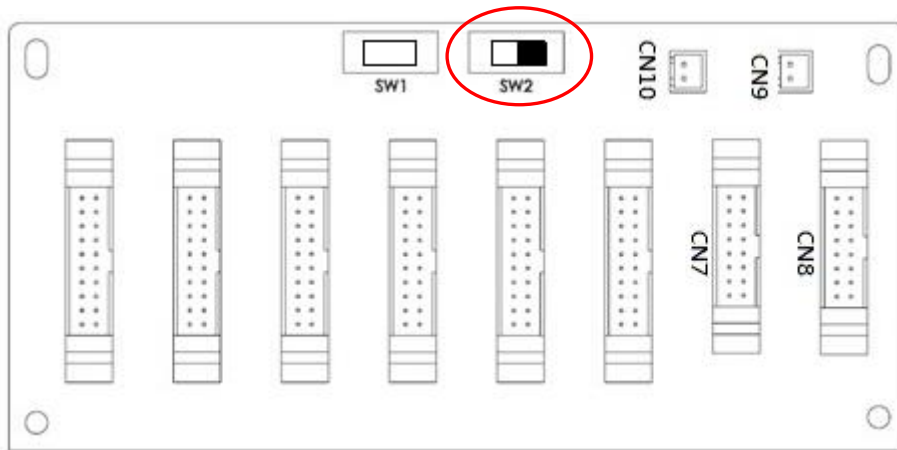
Single input wiring in parallel system

2-6-2. Parallel Board Setting

2-6-2-1. Install Parallel Board of UPS 1

1. Please set SW2 on the parallel board of the UPS 1 to the right side as shown in below figure.

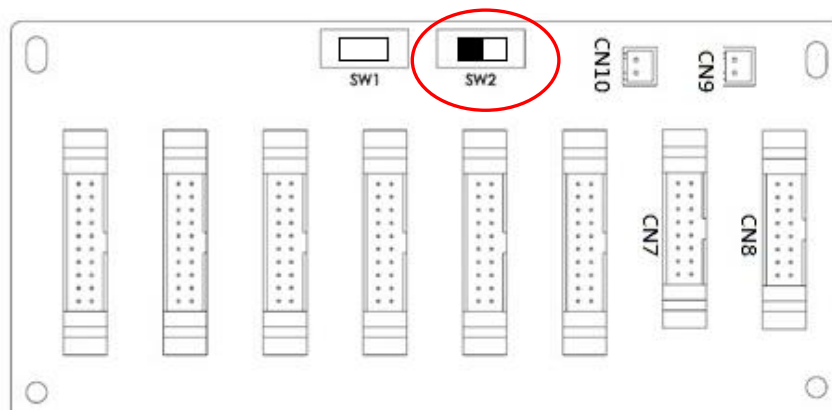
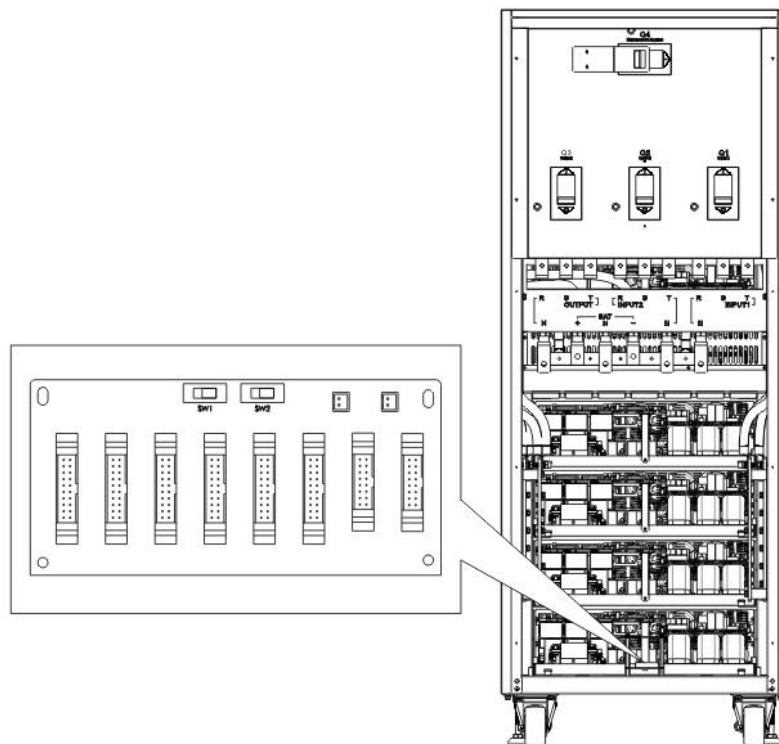




SW2 position on UPS 1

2-6-2-2. Install Parallel Board of UPS2

1. Please set SW2 on the parallel board of the UPS 2 to the left side as shown in below figure.



SW2 position on UPS 2

2-6-3. Parallel Function Setting

1. For the input and output wiring, please be sure to follow the instruction in section 2-6-1.
2. For the parallel board setting, please be sure to follow the instruction in section 2-6-2.

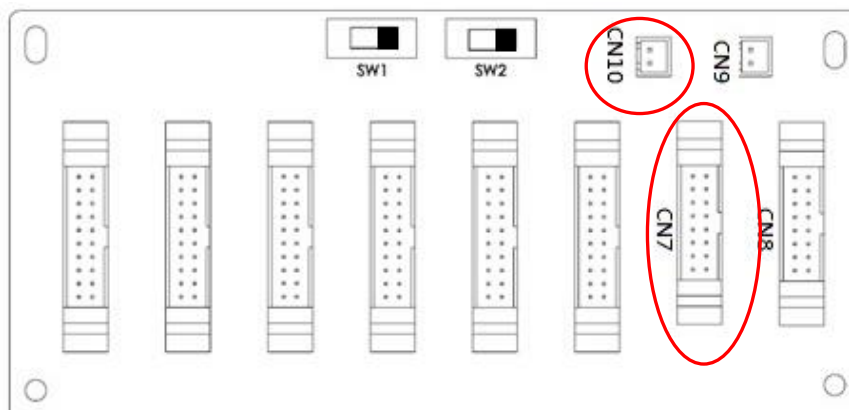
Once the two steps above have been completed correctly, and then set parallel function and battery configuration. Proceed with the following steps:

1. **Do not connect Parallel Cable until informed.**
2. Place the input breakers (Q1) of two UPSs to the "ON" position. But keep the output breakers (Q3) of two UPSs in the "OFF" position.
3. Turn on the battery breaker.
4. Turn on the external AC source breaker to apply AC input source to both UPS.
5. Wait for the completion of power-cycles. Proceed to set UPS 1.
6. Set up the parallel function through the LCD panel on UPS 1. Enter the "PARALLEL" menu in "SETUP" page. (Refer to User Manual 3-2-5-5. Setup-Parallel Screen)
7. Enable "UPS Parallel" function of UPS 1. (**Ignore the warning of "Parallel UPS Cable Loosen"**)
8. Choose the battery configuration as "independent" or "common" battery, depending on your preference.
9. Select the "Save Setting" icon in "General" screen of "SETUP" page to save your settings.
10. Proceed to set up UPS 2.
11. Setup the parallel function through the LCD panel on UPS 2. Enter the "PARALLEL" menu in "SETUP" page. (Refer to User Manual 3-2-5-5. Setup-Parallel Screen)
12. Enable "UPS Parallel" function of UPS 2. (**Ignore the warning of "Parallel UPS Cable Loosen"**)
13. Choose the battery configuration as "independent" or "common" battery, depending on your preference.
14. Select the "Save Setting" icon in "General" screen of "SETUP" page to save your settings.
15. Turn off the external AC source breaker and wait for complete shutdown of both UPS.
16. Turn off battery breakers.

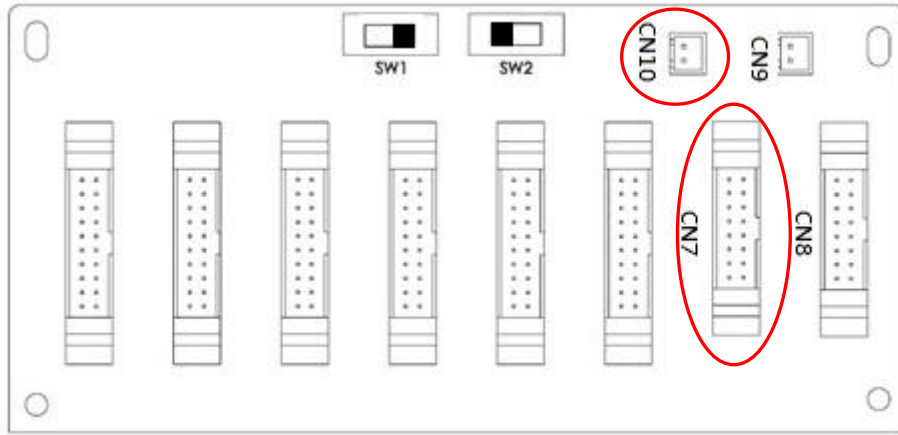
2-6-4. Parallel Cable Connection

There are two connectors at the end of each parallel cable. One is a 16-pin connector and the other is a 2-pin connector. Insert the 16-pin connector into the CN7 port of UPS 1 and 2-pin connector into the CN10 socket of UPS 2 and vice versa. Please refer to below figures for details.

For the UPS with two parallel boards, use any one of two boards.



UPS 1 Parallel Board



UPS 2 Parallel Board

Warning:

The parallel cable of each UPS must to be connected correctly. Incorrect connection will result in abnormal operations.

2-6-5. Parallel System Turn On Procedure

- 1 Please be sure that the sections 2-6-1 to 2-6-4 are correctly followed.
- 2 Please confirm the input breaker and output breakers of each UPS have been turned "ON".
- 3 Turn on the battery breaker.
- 4 Turn on the external AC source breaker to apply AC input source to both UPS.
- 5 Watch for any abnormal event message on the LCD display. (Refer to User Manual 3-2-7. Event Screen)
- 6 Switch on the UPS by pressing the power button at the front panel of the UPS or through control page on the LCD panel. (Refer to User Manual 3-2-3. Control Screen)

2-7. Software Installation

For optimal computer system protection, install UPS monitoring software to configure UPS shutdown operations.

3. Control Panel and LCD Operation

3-1. Introduction

This control panel and display screen are located at the front panel of the UPS. This interface monitoring all measured parameters, UPS status, battery status and alarms. The control interface is divided into four sections: (1) LCD display, (2) LED indications, (3) Power Button, (4) Audible Alarm, as shown in Figure 3-1.

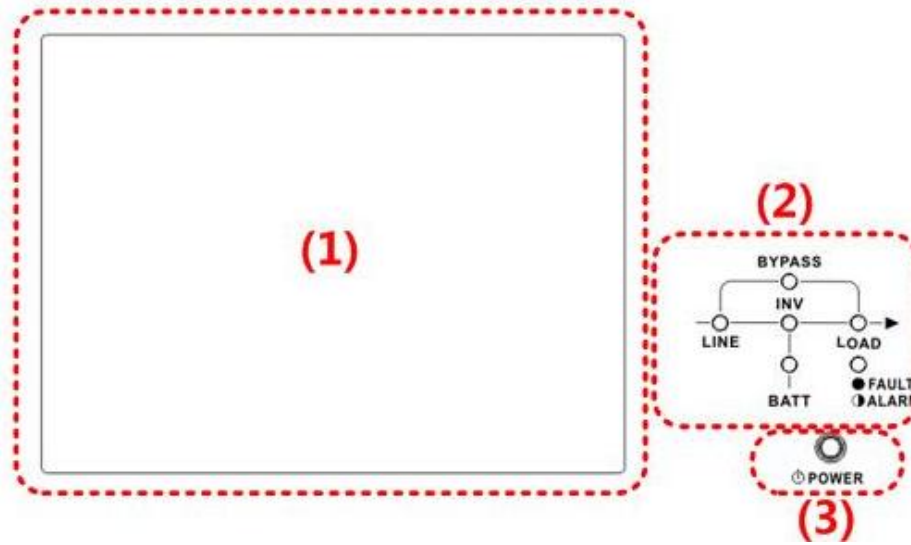


Figure 3-1 Control Panel

- (1) LCD display: Graphic display and all measured parameters.
- (2) LED indications. Refer to Table 3-1.
- (3) Power Button. Refer to Table 3-2.
- (4) Audible Alarm. Refer to Table 3-3.

Table 3-1: LED Indications

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

Table 3-2: Power Button

| Control Key | Description |
|--------------|---|
| Power On/Off | Turn on UPS or Turn off UPS. (hold 2-Sec) |

Table 3-3: Audible Alarm

| UPS condition | Description |
|---------------|----------------------------------|
| Power on/off | Buzzer sounds 2 seconds. |
| Battery mode | Buzzer sounds every 2 seconds. |
| Low battery | Buzzer sounds every 0.5 seconds. |
| UPS alarm | Buzzer sounds every 1 second. |
| UPS fault | Buzzer continuously sounds. |

3-2. Screen Description

3-2-1. Initial Screen

Upon powering on, the UPS will execute POST (Power-On Self-Test). The initial screen will remain approximately 5 seconds as shown below.

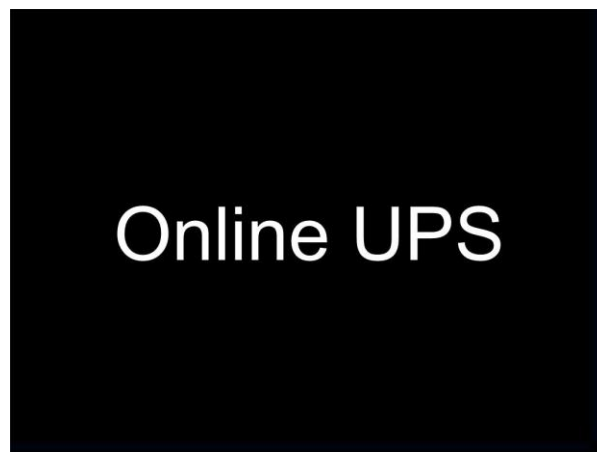


Figure 3-2 Initial Screen

3-2-2. Main Screen

After initialization, the main screen will display as shown in Figure 3-3. Main Screen is divided into six sections.

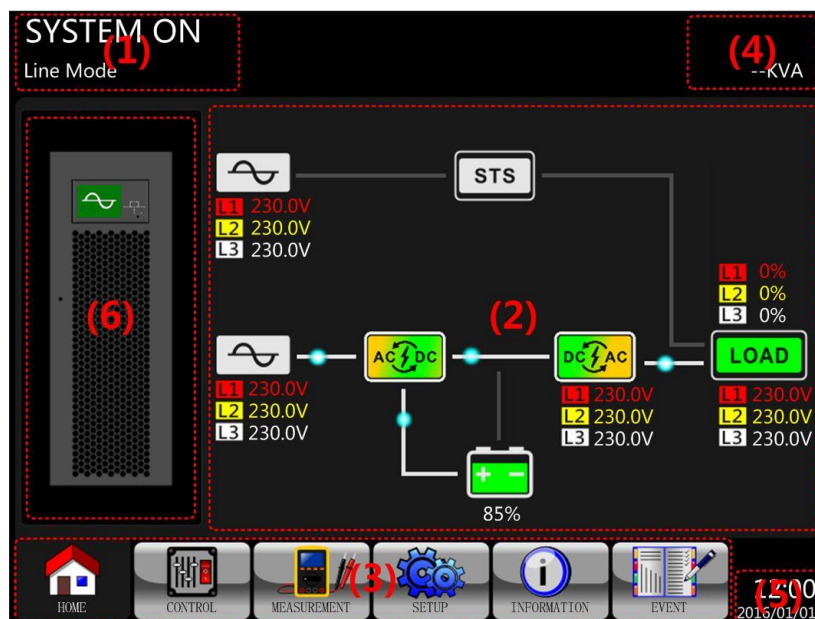


Figure 3-3 Main Screen

- (1) UPS operation mode: It shows UPS current operation mode and status.
- (2) UPS flow chart: It shows current flow chart and measurement data.

(3) Main menu: Touch each icon to enter submenu. Refer to Figure 3-4 for menu tree.

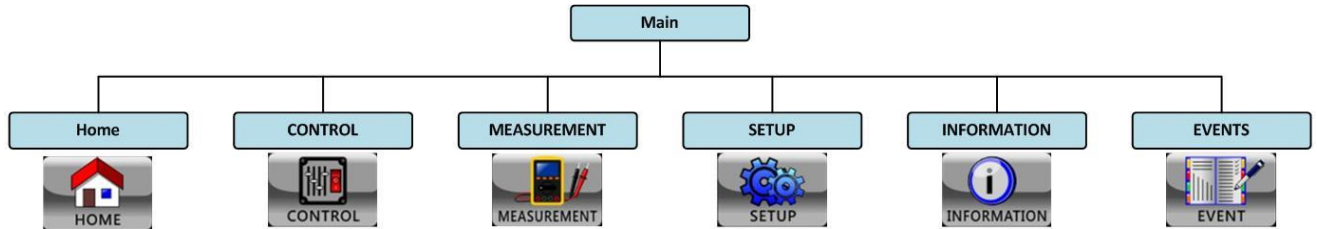







Figure 3-4 Menu Tree

(4) UPS power rating: It show UPS power rating.

(5) Date and time: It shows current date and time.

(6) UPS status: The meanings of each icon are listed as below.

| Icon | UPS status |
|---|--|
|  | UPS operates in Standby mode or Shutdown Mode. |
|  | UPS operates in Line mode or Converter Mode. |
|  | UPS operates in Bypass mode or ECO Mode. |
|  | UPS operates in Battery mode or Battery Test Mode. |
|  | UPS operates in Fault mode. |

3-2-3. Control Screen



Touch  icon to enter into the submenu as shown in Figure 3-5 and Figure 3-6.

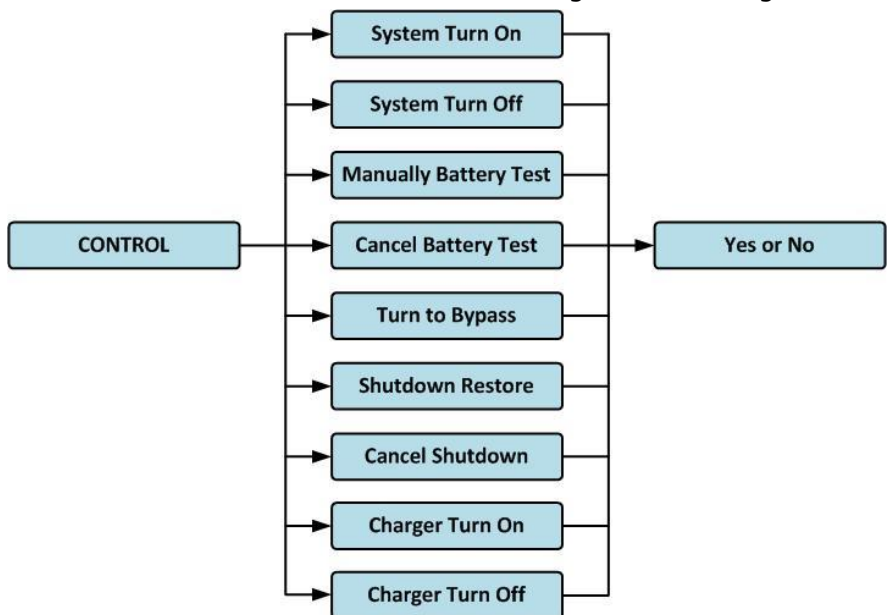




Figure 3-5 Control Menu Tree



Figure 3-6 Control Screen Page

Touch any option directly. Then, confirmation screen will pop up. Touch  icon to confirm command or touch  icon to cancel command as shown below.

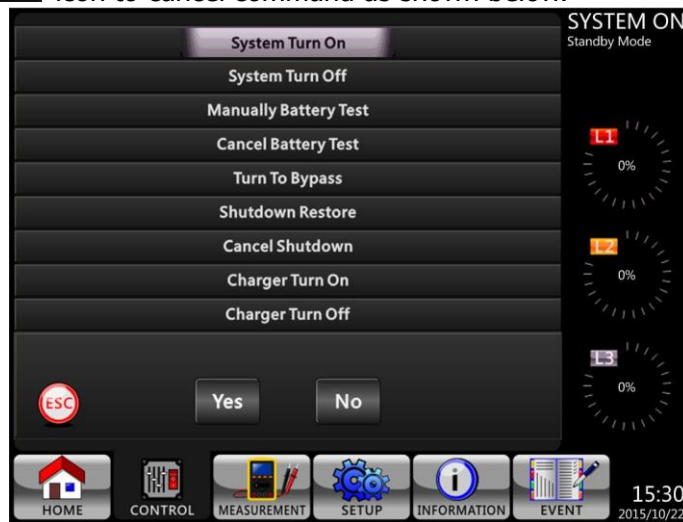



Figure 3-7 Confirmation Screen

3-2-4. Measurement Screen

Touch  icon to enter into the sub-menu. You may choose input, output, bypass, load or battery to monitor each detailed status. Please refer to Figure 3-8 and 3-9 for detailed descriptions. All detailed measurement items are listed in Table 3-4.

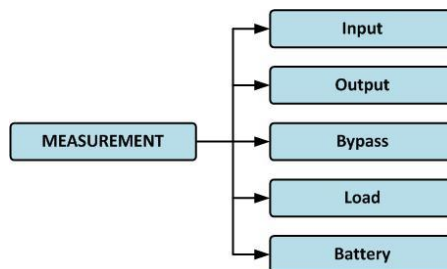


Figure 3-8 Measurement Menu

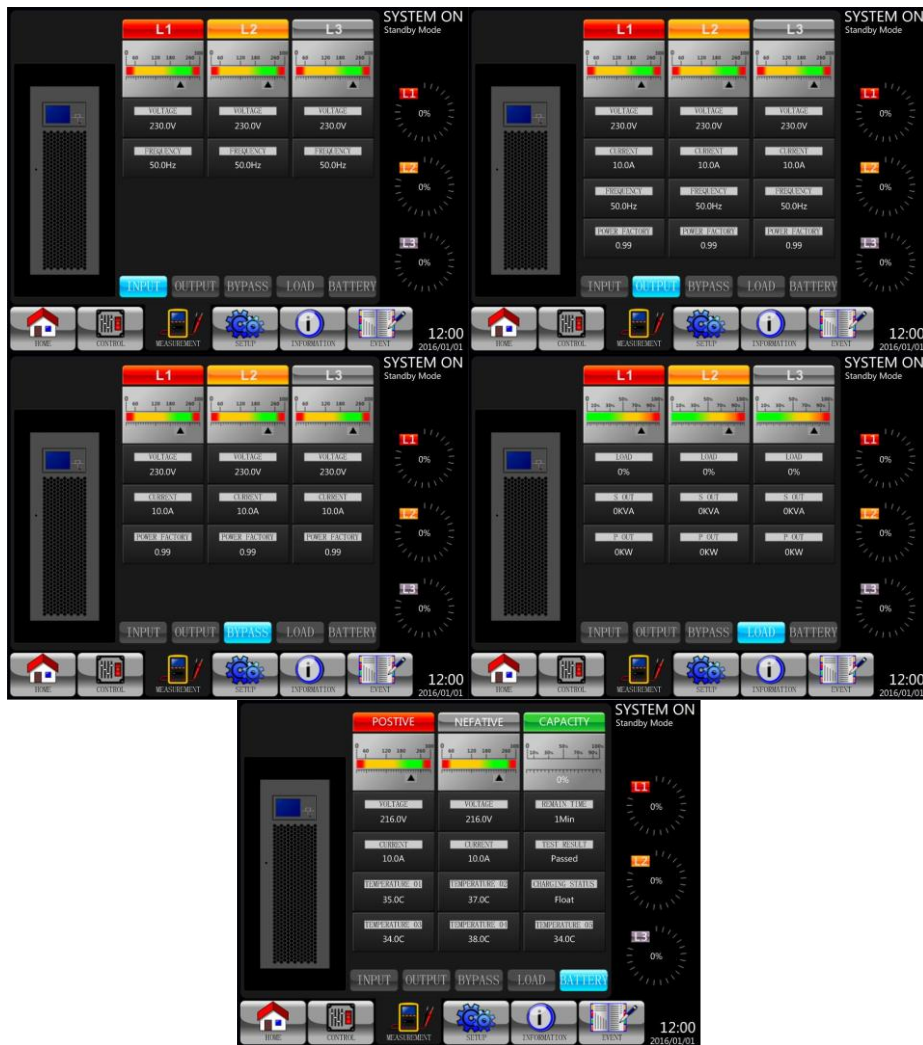



Figure 3-9 System Measurement Screens

Table 3-4: Measurement Items

| Submenu | 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 connected 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 remaining runtime. Units 1sec. |

| | |
|--------------------|--|
| Capacity (%) | The percentage of the battery capacity. Units 1%. |
| Test Result | Battery test result |
| Charging Status | Battery charging status |
| Temperature 01(°C) | Temperature of external battery pack. Units 0.1°C. |
| Temperature 02(°C) | Temperature of external battery pack through extra communication card T1. Units 0.1°C. |
| Temperature 03(°C) | Temperature of external battery pack through extra communication card T2. Units 0.1°C. |
| Temperature 04(°C) | Temperature of external battery pack through extra communication card T3. Units 0.1°C. |
| Temperature 05(°C) | Temperature of external battery pack through extra communication card T4. Units 0.1°C. |

3-2-5. Setup Screen

Touch the  to enter into the Setup submenu. It requires a password to access the GENERAL, SYSTEM, BATTERY and PRE-ALARM sub-menus as shown in Figure 3-10 and 3-11. The default password is "0000".

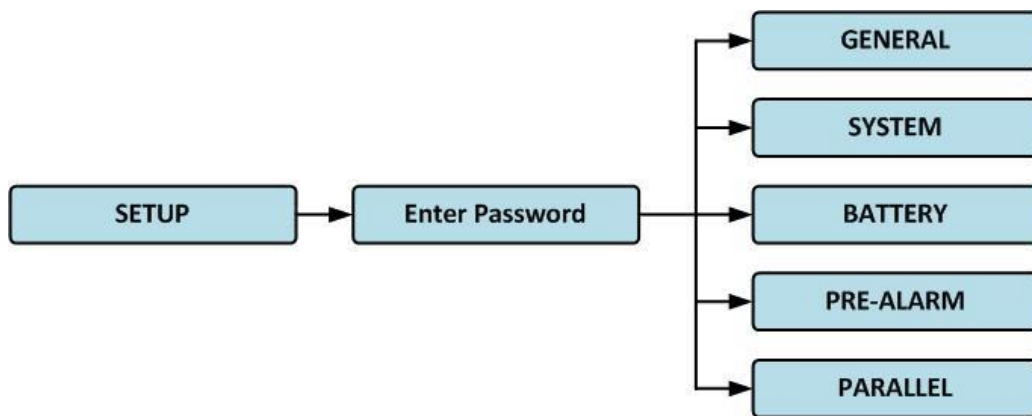



Figure 3-10 Setup Menu

Touch the grey column and you will be prompted with a number keyboard. Please enter 4-digit password and

press  to enter SETUP sub-menu. If incorrect password is entered, you may retry.

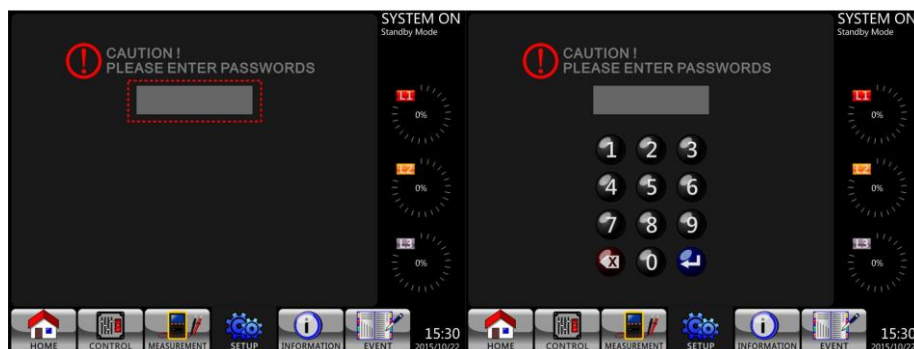




Figure 3-11 Enter Password Screen

There are two levels of password protection, user password and administrator password.

The default password for user is "0000". It could be changed by users.

The administrator password is owned by trained service personnel.

Different level of password can access to different settings. The setting can be changed in various operation modes. Please refer to Table 3-5 for details.

Table 3-5: 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 | Administrator | |
| 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 |
| Startup Screen | Y | Y | Y | Y | Y | Y | Y | Y | Y | | Y | |
| System | Output Voltage | Y | Y | | | | | | | | | Y |
| | Bypass Voltage Range | Y | Y | Y | Y | Y | Y | Y | Y | | | Y |
| | Bypass Frequency Range | Y | Y | | | | | | | | | Y |
| | Converter Mode | Y | | | | | | | | | | Y |
| | ECO Mode | Y | Y | Y | | | | | 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 | |
| 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 |
| | Auto-Restart Battery Voltage | Y | Y | Y | Y | Y | Y | Y | Y | | Y |
| | Pre-Alarm | Line Voltage Range | Y | Y | Y | Y | Y | Y | Y | Y | |
| Line Frequency Range | | Y | Y | Y | Y | Y | Y | Y | Y | | Y |
| Load | | Y | Y | Y | Y | Y | Y | Y | Y | | Y |
| Parallel | UPS Parallel | Y | Y | | | | | | | | Y |
| | Independent Battery | Y | Y | | | | | | | | Y |

"Y" indicates that available options in each given mode.

Setting Procedure

Step 1: Choose between GENERAL, SYSTEM, BATTERY and PRE-ALARM.

Step 2: Each item will show current value. Simply click current value and it will list all alternatives in the end.



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



Figure 3-12 Setting Procedure

3-2-5-1. Setup-General Screen

The Setup-General screen and setting options are shown in Figure 3-13 and Table 3-6. General Setting can be set in any operating mode.

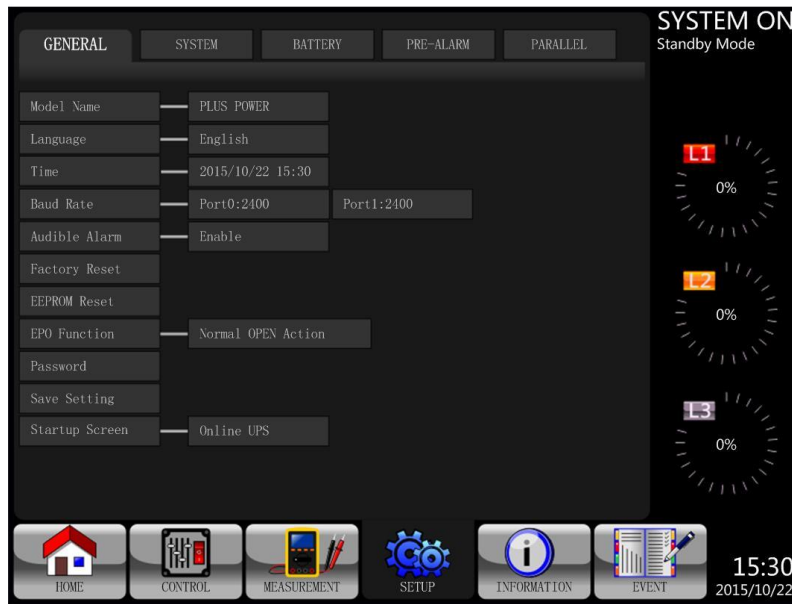


Figure 3-13 Setup-General Screen

Table 3-6: Setup-General Setting List

| Setting Item | Sub Item | Explanation |
|---------------|----------------------------|---|
| Model Name | | Set UPS Name (xxxxxxxxx). The max. length is 10 characters. |
| Language | -- | Provides 3 optional LCD languages: <ul style="list-style-type: none"> ● English (Default) ● Traditional Chinese ● Simplified Chinese |
| TIME | Adjust Time | Set current date and time. (yyyy / mm / dd hour : min : sec) MUST be set after UPS installation |
| | System Installed Date | Set system installed date (yyyy / mm / dd) 2015/1/1 (Default) MUST be set after UPS installation |
| | System Last Maintain Date | Set system latest maintenance date (yyyy / mm / dd) MUST be set after UPS installation |
| | Battery Installed Date | Set battery installed date (yyyy / mm / dd) MUST be set after UPS installation |
| | Battery Last Maintain Date | Set battery latest maintenance date (yyyy / mm / dd) MUST be set after UPS installation |
| Baud Rate | -- | Set COM Port0 Baud Rate <ul style="list-style-type: none"> ● 2400 (Default) ● 4800 ● 9600 Set COM Port1 Baud Rate <ul style="list-style-type: none"> ● 2400 (Default) ● 4800 ● 9600 |
| Audible Alarm | -- | Set Audible Alarm <ul style="list-style-type: none"> ● Disable ● Enable (Default) |

| | | |
|----------------|----|--|
| Factory Reset | -- | Restore to factory default setting Refer to Table 3-7 |
| EEPROM Reset | -- | Restore EEPROM to default setting Refer to Table 3-7 |
| EPO Function | -- | Set EPO active status <ul style="list-style-type: none"> ● Normal Close Active ● Normal Open Active (Default) |
| Password | -- | Set New Password. 0000 (Default) |
| Save Setting | -- | Save all settings to EEPROM. Use this feature to save the setting(s) you have done. |
| Startup Screen | | Set up initial screen. (xxxxxxxxxxxx). The max. length is 12 characters. |

Table 3-7: 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 | -- | -- |
| | Startup Screen | | |
| 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 |
| | 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 |
| | Auto-Restart Battery Voltage | Y | Y |
| Pre-Alarm | | Y | |

3-2-5-2. Setup-System Screen

The Setup-System Screen and setting options are shown in Figure 3-14 and Table 3-8. System Setting can only be access when UPS is operated in certain mode. Please refer to Table 3-5 for the details. If an option is not available under specific mode, a warning screen will appear such as in Figure 3-15.

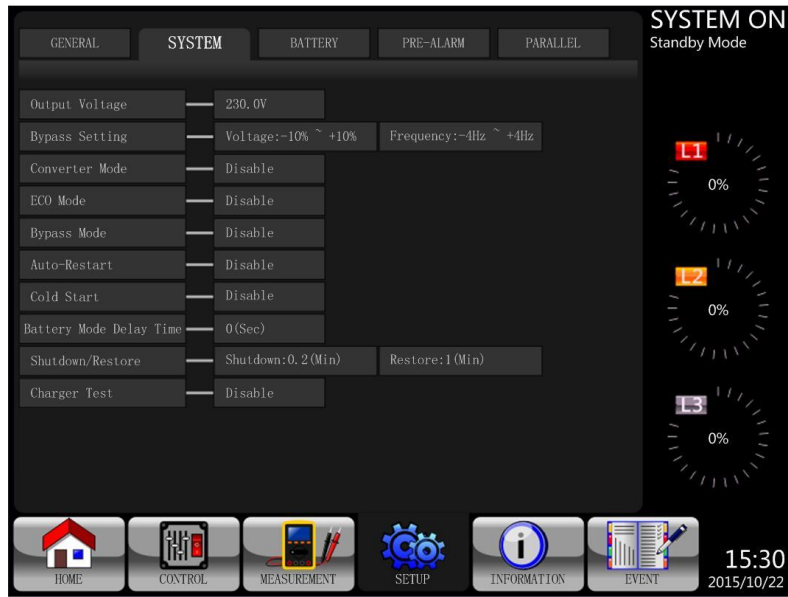


Figure 3-14 Setup-System Screen

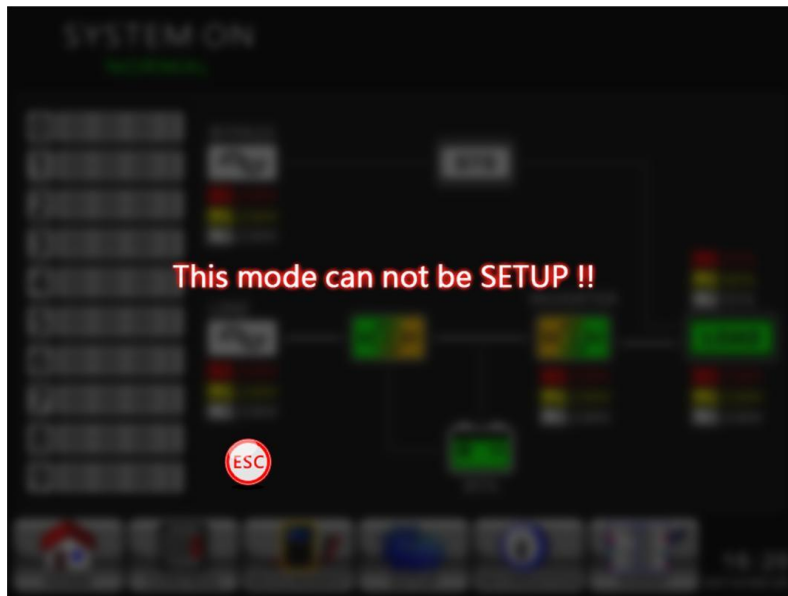


Figure 3-15 Warning Screen

Table 3-8: 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 <p>MUST be reviewed after UPS installation. If you need the Bypass power when UPS is OFF, please enable it.</p> |
| Auto-Restart | -- | Set auto-restart <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 | -- | Set cold start <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. (Refer to Section 6-2. Cold Startup.)</p> |
| Battery Mode Delay Time | -- | Set system shutdown delay time in battery mode (0~9990sec). <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> |
| Shutdown/ Restore | System Shutdown Time | Set system shutdown time (0.2~99min) <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 | Set system restore time (0~9999min) <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> |
| Charger Test | -- | Set charger test <ul style="list-style-type: none"> ● Disable (Default) ● Enable |

3-2-5-3. Setup-Battery Screen

The Setup-Battery Screen and Setting options are shown in Figure 3-16 and Table 3-9. Battery Setting can only be set when UPS is operated in STANDBY mode.

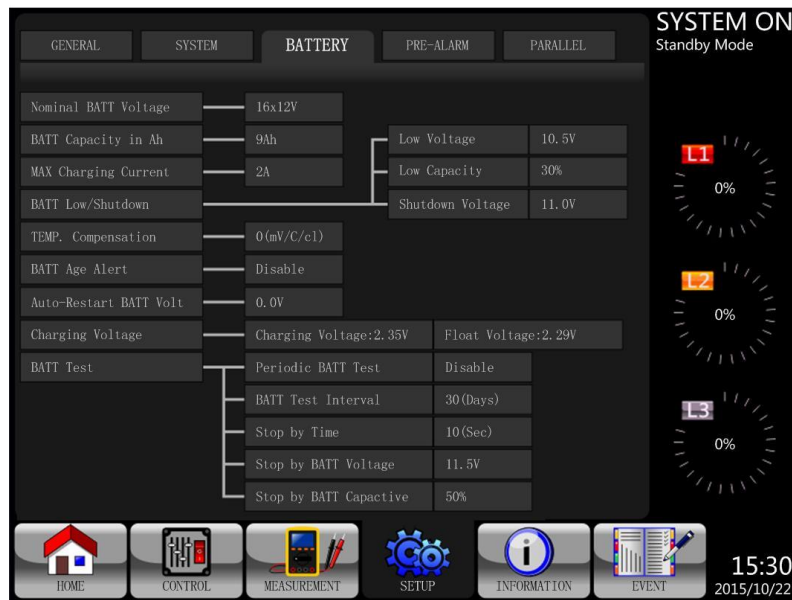


Figure 3-16 Setup-Battery Screen

Table 3-9: 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. (up to 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 (1~24A 100KVA/1~32A 120KVA/1~40A 160KVA/1~48A 200KVA) <ul style="list-style-type: none"> ● 2A (Default) MUST be set after UPS installation or Battery capacity is changed. |
| Battery Low/Shutdown Setting | Low Voltage | Set battery low voltage (10.5~11.5V)x(battery Number) <ul style="list-style-type: none"> ● 11V x Battery Number (Default) |
| | Low Capacity | Set battery low capacity (20~50%) <ul style="list-style-type: none"> ● 20% (Default) |
| | Shutdown Voltage | Set battery voltage point for system shutdown in battery mode (10.0~11V) x (battery Number) <ul style="list-style-type: none"> ● 10V x Battery Number (Default) |
| Battery Test | Periodic Battery Test | Set periodic battery test disable or enable <ul style="list-style-type: none"> ● Disable (Default) ● Enable |
| | Battery Test Interval | Set battery test interval (7~99 Days) <ul style="list-style-type: none"> ● 30 Days (Default) |
| | Stop by Time | Set testing time for battery test (10~1000sec) <ul style="list-style-type: none"> ● 10 sec (Default) |
| | Stop by Battery Voltage | Set stop battery voltage in battery test (11~12V) x (battery Number) <ul style="list-style-type: none"> ● 11V x Battery Number (Default) |
| | Stop by Battery Capacity | Set battery capacity to stop battery-testing. (20~50%) <ul style="list-style-type: none"> ● 20% (Default) |
| Battery Age Alert | Battery Age Alert (Months) | Set battery age for replacement. (Disable,12~60Months) <ul style="list-style-type: none"> ● 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) |
| Auto-Restart Battery Voltage | -- | Set auto-restart battery voltage. (0 or 12.0V~13.0V) ● 0V (Default) |

3-2-5-4. Pre-Alarm Screen

The Setup-Pre-Alarm Screen and Setting options are shown in Figure 3-17 and Table 3-10. Pre-Alarm Setting can be access in any operation mode.

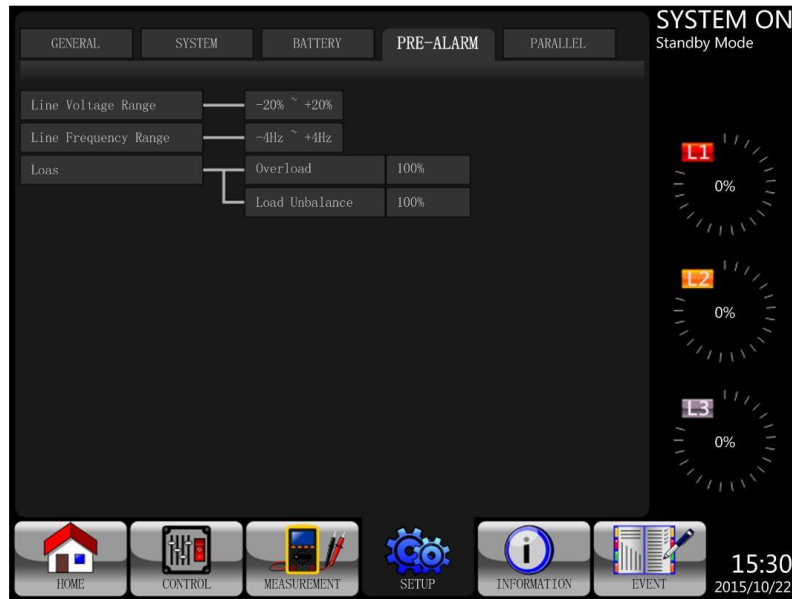


Figure 3-17 Setup-Pre-Alarm Screen

Table 3-10: Setup-Pre-Alarm Setting List

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

3-2-5-5. Setup-Parallel Screen

Simply touch on the "PARALLEL" tab to show parallel function page as shown below.

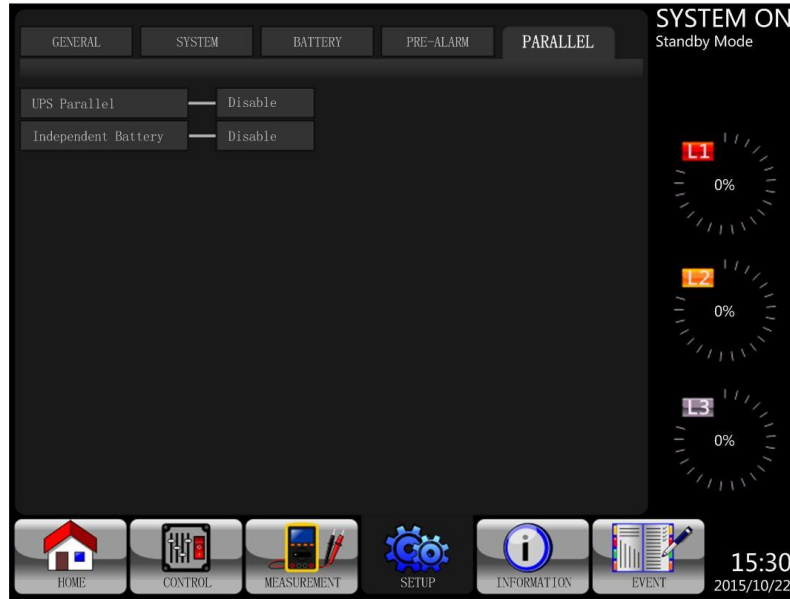


Figure 3-18 Setup-Parallel Screen


Refer to Table 3-11 for Setup-Parallel Setting List.

Table 3-11: 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 |

3-2-6. Information Screen



Touch  to enter the sub-menu. In this Information screen, you can check the UPS configurations. There are three sub-menus, Identification, System and Battery.

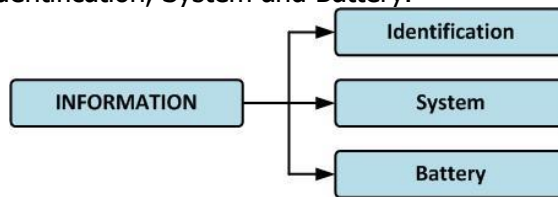


Figure 3-19 Information Menu

3-2-6-1. INFORMATION - Identification Screen

When Identification tab is touched, the Model Name, Serial No. and Firmware Version will be displayed as shown in Figure 3-20.



Figure 3-20 Identification Screen Page

3-2-6-2. INFORMATION - System Screen

When System submenu tab is touched, information such as the system power, nominal voltage, nominal frequency ... etc. will be displayed as shown in Figure 3-21 and Figure 3-22. Touch UP and DOWN arrows to switch between different pages.



Figure 3-21 INFORMATION System Screen Page 1

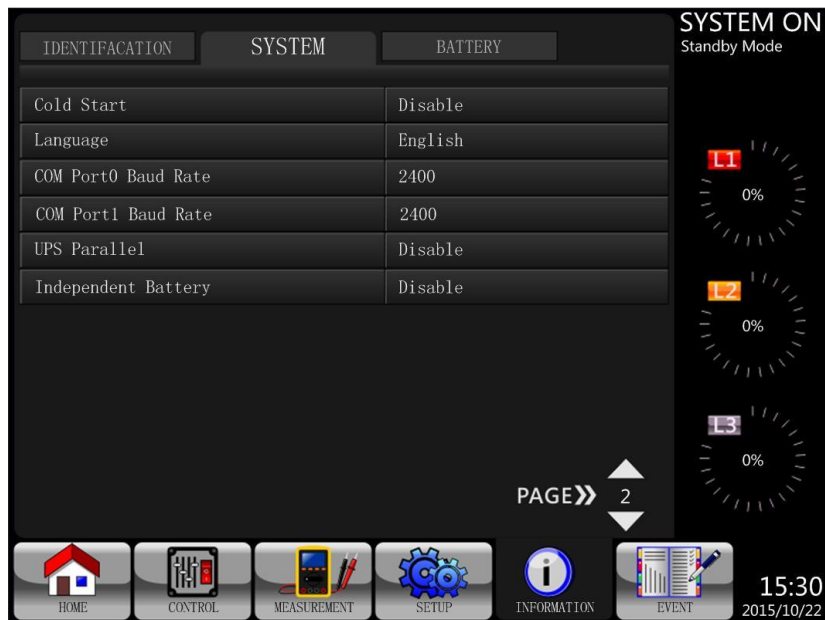


Figure 3-22 INFORMATION System Screen Page 2



3-2-6-3. INFORMATION - Battery Screen

When Battery submenu is selected, the information such as battery nominal voltage, capacity, charging current ... etc. will be displayed as shown in Figure 3-23..



Figure 3-23 INFORMATION Battery Screen Page

3-2-7. Event Screen

When an event occurs, you will see  flashing in the main screen as shown in Figure 3-24. You also can touch  to check the latest event, history events and reset all events. Refer to Figure 3-25 for menu tree.

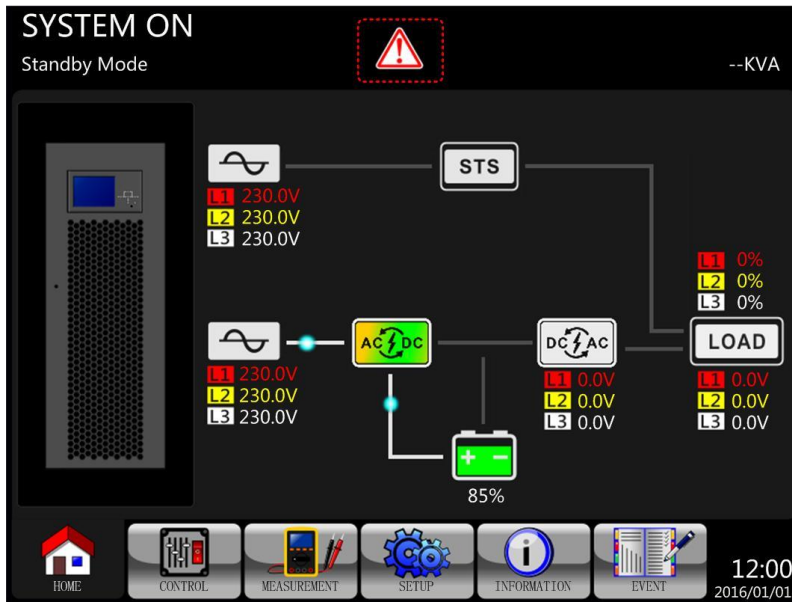


Figure 3-24 Alarm Warning Screen

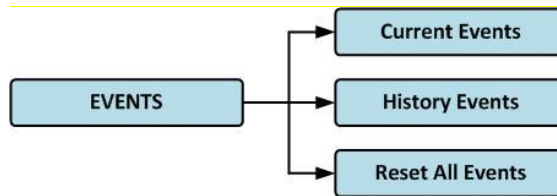



Figure 3-25 Events Menu

3-2-7-1. Current Events

When an event occurs, it will display power stage/module ID* and alarm code in Current Events screen. It can save up to 50 events. Only 10 events can be listed per page. Therefore, if it exceeds more than 10, you

have to touch  to read other event as shown in Figure 3-26..

***NOTE:** Please refer to section 2-2 Front Door Open View to identify power stage/module ID.



Figure 3-26 Current Events Screen

3-2-7-2. History Events

The detailed event information is saved in history events. It can save up to 500 events. When warning occurs, it will display alarm code, alarm time and power stage/module ID*. When fault event occurs, it will display alarm description, alarm time and power stage/module ID*. (Refer to Table 3-12 Alarm List) In order to record more historical information about the UPS system, the important changes in setting (refer to Table 3-13 Warning List For Changing Important Settings), UPS operation mode changes (refer to Table 3-14 UPS Mode Changes) and control action execution (refer to Table 3-15 Control Execution) will be saved in History Events. Refer to Figure 3-27 for the details.

***NOTE:** Please refer to section 2-2 Front Door Open View to identify power stage/module ID.



Figure 3-27 History Events Screen

3-2-7-3. Reset All Events

It's necessary to enter administrator password before accessing Reset All Events screen as shown in Figure 3-28.

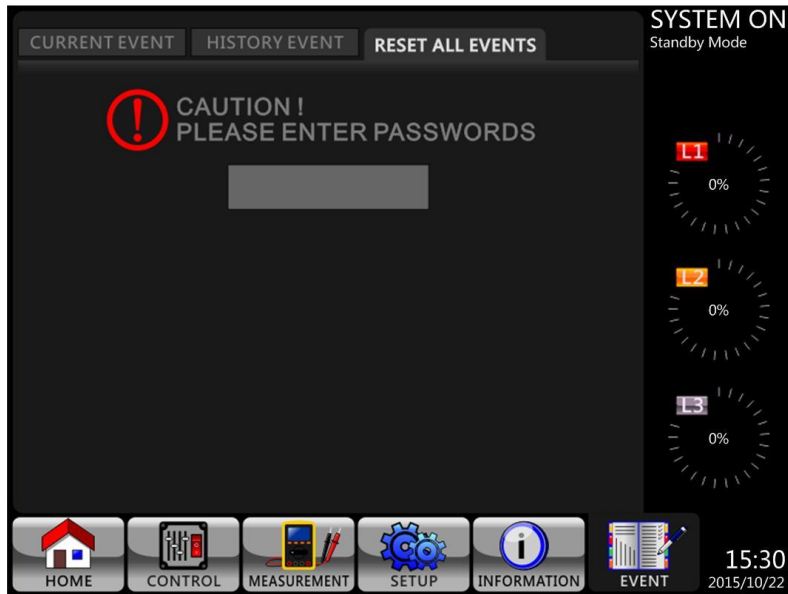


Figure 3-28 Reset All Events Screen

After entering a correct password, it will prompt for confirmed. Then, touch **Yes** to reset all events or touch **No** to cancel.

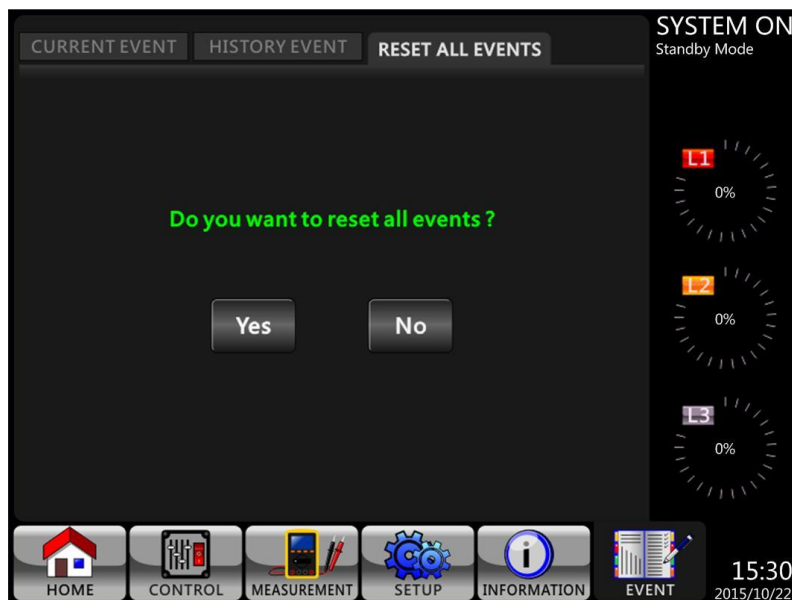


Figure 3-29 Reset All Events Confirmation Screen

3-3. Alarm List

In Table 3-12, it provides the complete list of UPS alarm messages.

Table 3-12: Alarm List

| Messages in the 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! 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. TRIG0 Fail | Communicate trigger signal fault |
| Warning! Power Stage loss | Power stage is not detected. |
| Warning! Parallel Sys Config. Wrong | Parallel system configuration error |
| Warning! Maintenance Bypass | Enter maintenance bypass status |
| Warning! Battery Age Alert | Battery life expiration |
| Warning! Parallel UPS Cable Loosen | As stated. |
| Warning! Parallel UPS Config. Wrong | Parallel UPS configuration error |
| Warning! Battery Voltage Low | Battery voltage is too low. |
| Warning! ID Conflict | Power stage/module ID in 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 |

3-4 History Record

Table 3-13: Warning List For Changing Important Settings

| 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 |
| 45 | Setup! Auto-Restart Battery Voltage | | |

Table 3-14: UPS Mode Changes

| 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 3-15: 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 | | |

4. Interface and Communication

As shown in Figure 4-1, there are Battery Temperature sensor port (X1), Emergency Power Off Port (X2), communication port (RS232/USB), SNMP Card slot and extra Comm. card slot on the front panel.

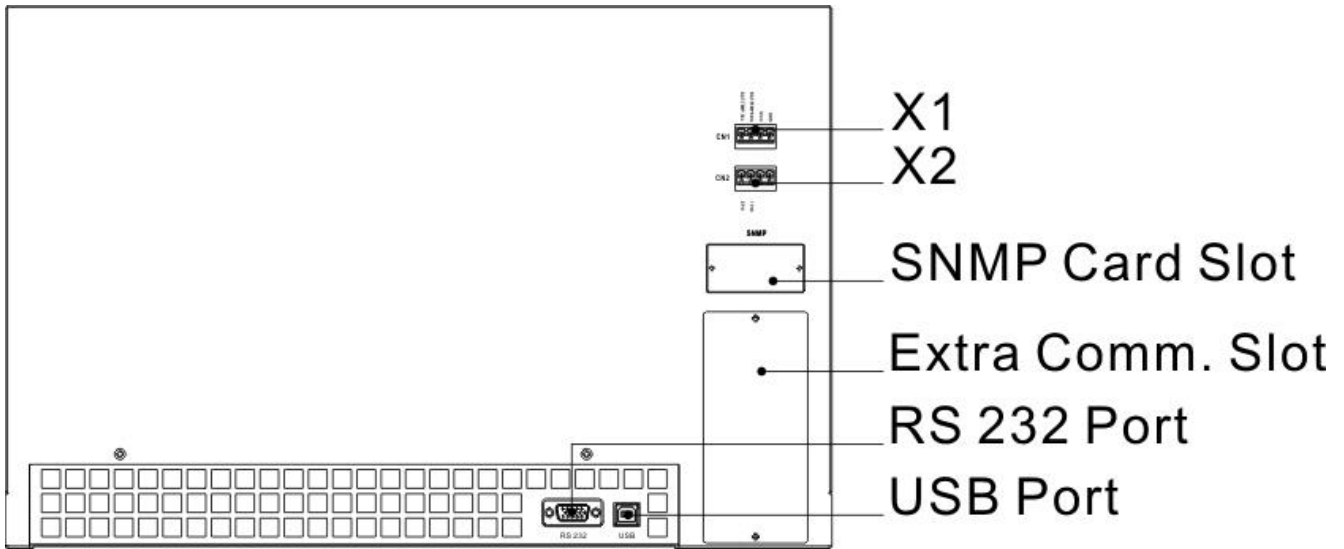


Figure 4-1 Dry Contact Ports and Communication Ports

| Dry Contact No. | Function |
|-----------------|------------------------------------|
| X1 | Battery Temperature Detection Port |
| X2 | Remote EPO input port |

4-1. X1- Temperature Detection Port for External Battery Pack

The UPS is equipped with battery temperature detection function. UPS can receive battery temperature signal through the temperature detection board. Communication between the UPS and battery temperature detection board is via I2C communication protocol. X1 is the battery temperature detection port. The port is shown in Figure 4-2 and described in Table 4-1.

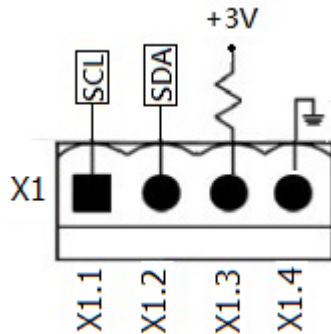


Figure 4-2 Battery Temperature Detection Port

Table 4-1 Description of Battery Temperature Detection Port

| Name | Position | Description |
|-----------|----------|---|
| SCL | X1.1 | I ² C communication SCL Signal |
| SDA | X1.2 | I ² C communication SDA Signal |
| +3.0V | X1.3 | 3V |
| Power GND | X1.4 | GND |

4-2. X2 - Remote EPO Input Port

The UPS is equipped with Emergency Power off (EPO) Function that can be operated by a remote contact assigned by the users. Users can set the logic (N.C or N.O) of this EPO Function through LCD panel.

X2 is the remote EPO input port. This port is shown in Figure 4-3 and described in Table 4-2.

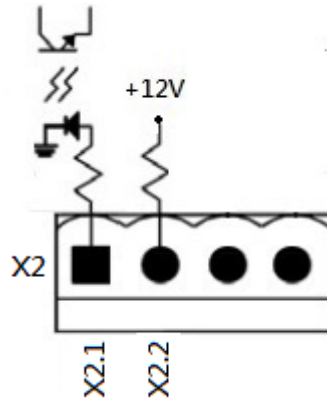


Figure 4-3 Remote EPO Input Port

Table 4-2 Description of Remote EPO Port

| EPO Logic Setting | Position | Description |
|-------------------|-------------|--|
| N.C | X2.1 & X2.2 | EPO activated when Opened X2.1 & X2.2 |
| N.O | X2.1 & X2.2 | EPO activated when Shorted X2.1 & X2.2 |

If EPO Logic setting is Normal Closed (N.C), EPO is triggered when pins 1 and pin 2 of X1 are opened. Otherwise, EPO Logic setting is Normal Opened (N.O). EPO is triggered when pin 1 and pin 2 of X2 are closed.

Note:

1. EPO action shuts down 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).

4-3. Other Communication Interface

4-3-1. Extra Comm. Slot

There is an optional slot to allow **Extra Comm. Card**. This option can enhance the communication capability of the UPS. It provides an additional SNMP slot, dry contact I/P & O/P signals and temperature sensor ports.

4-3-2. Local Communication Ports – RS232 & USB

This UPS is equipped with one RS-232 port and one USB port.

Note: The RS232 and USB ports **CANNOT** work simultaneously.

4-3-3. SNMP Slot

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

5. Operation Principles

5-1. Block diagram of UPS

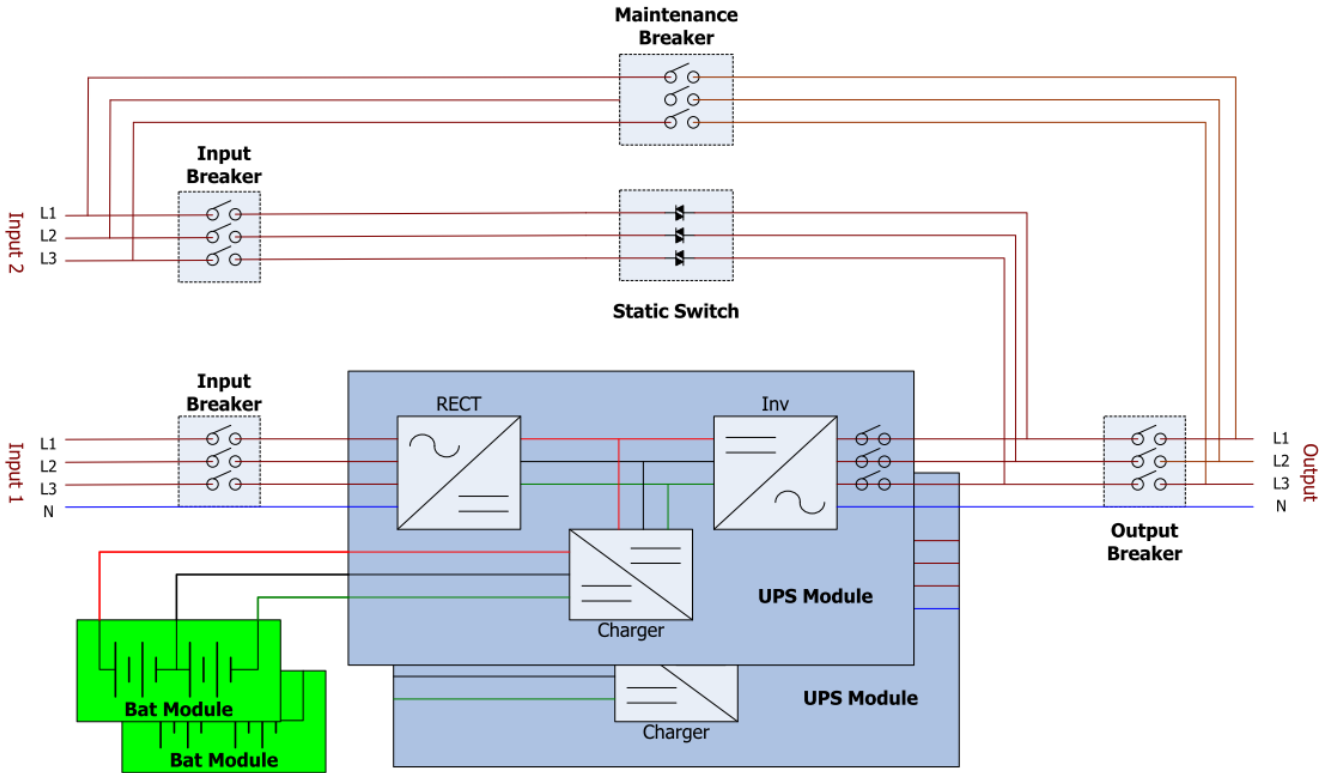


Figure 5-1 Wiring diagram for dual inputs

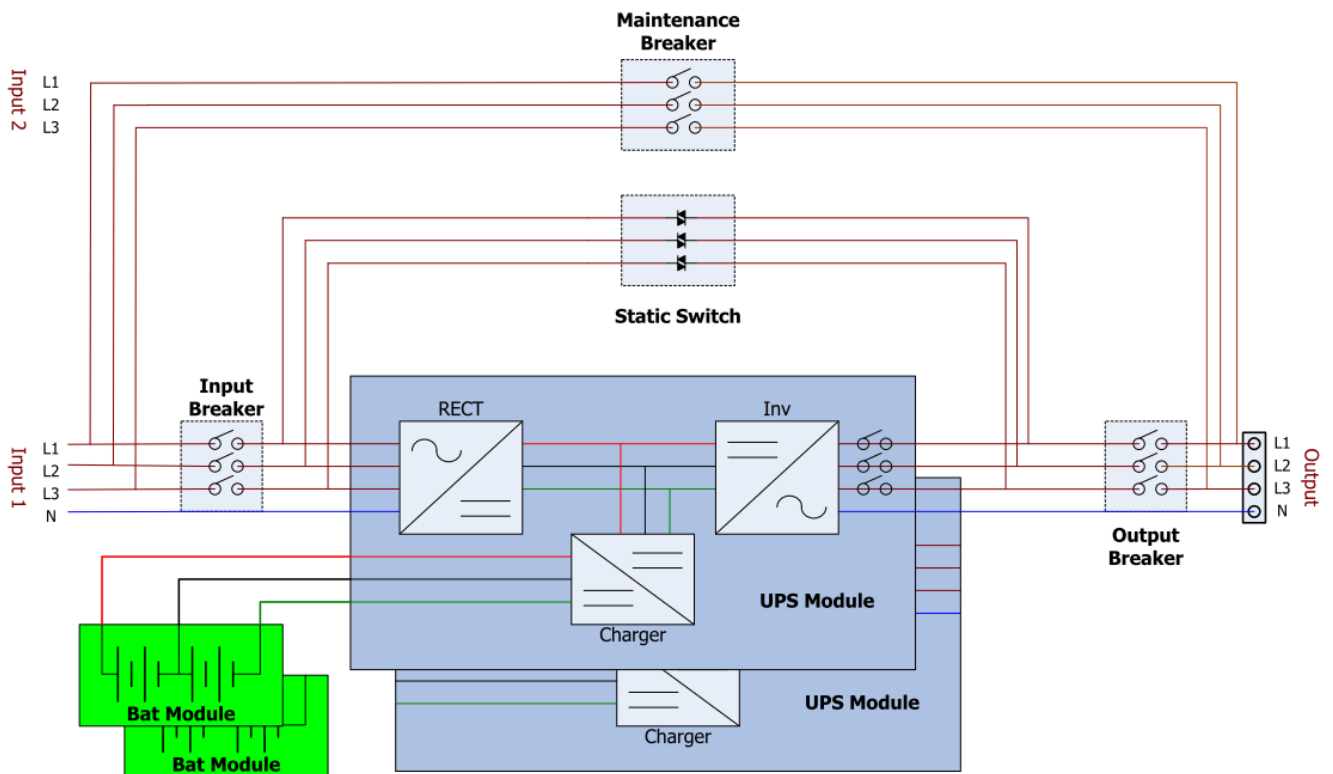


Figure 5-2 Wiring diagram for single input

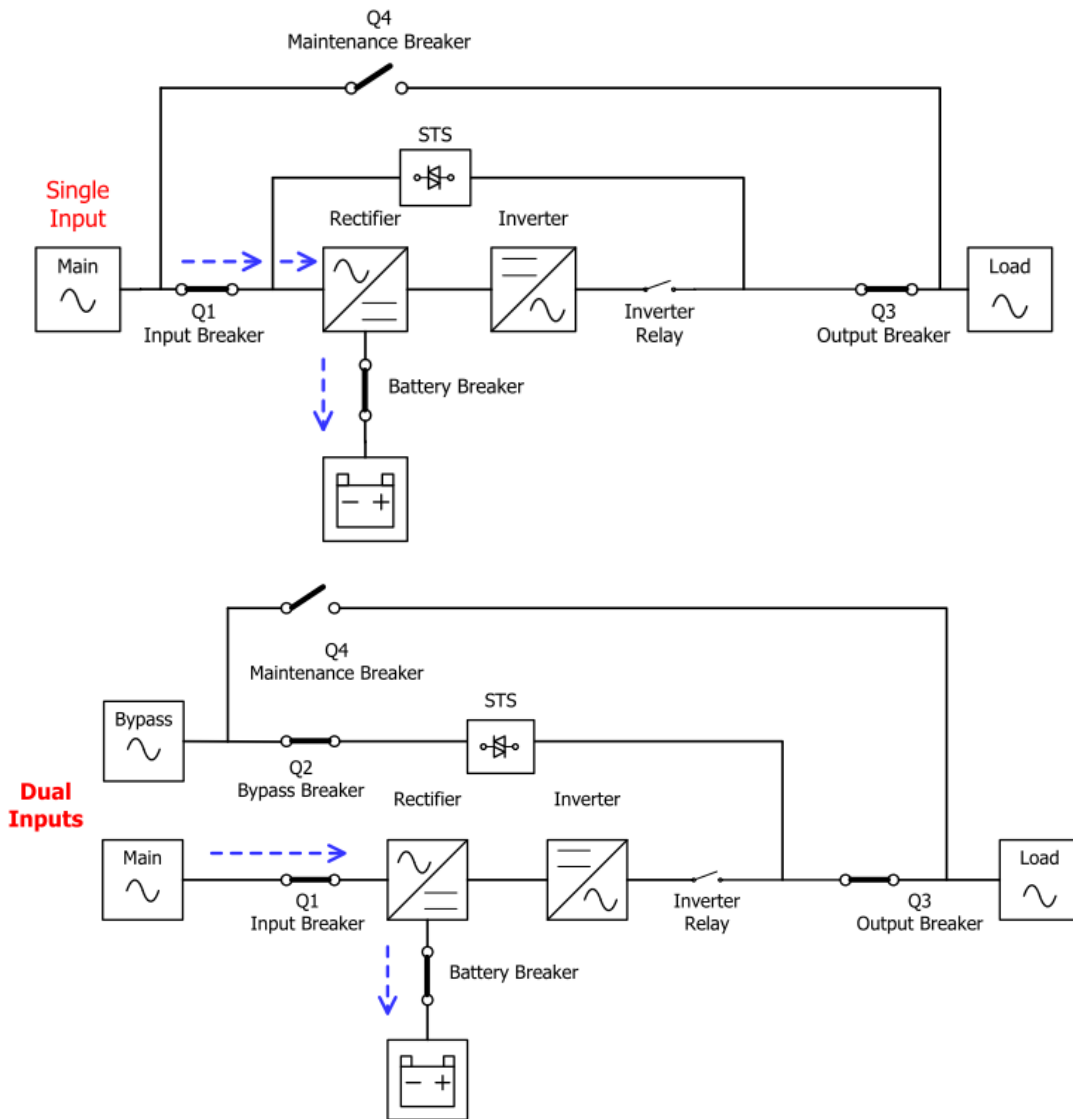
5-2. Operation Mode

This 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)

5-2-1. Standby Mode

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

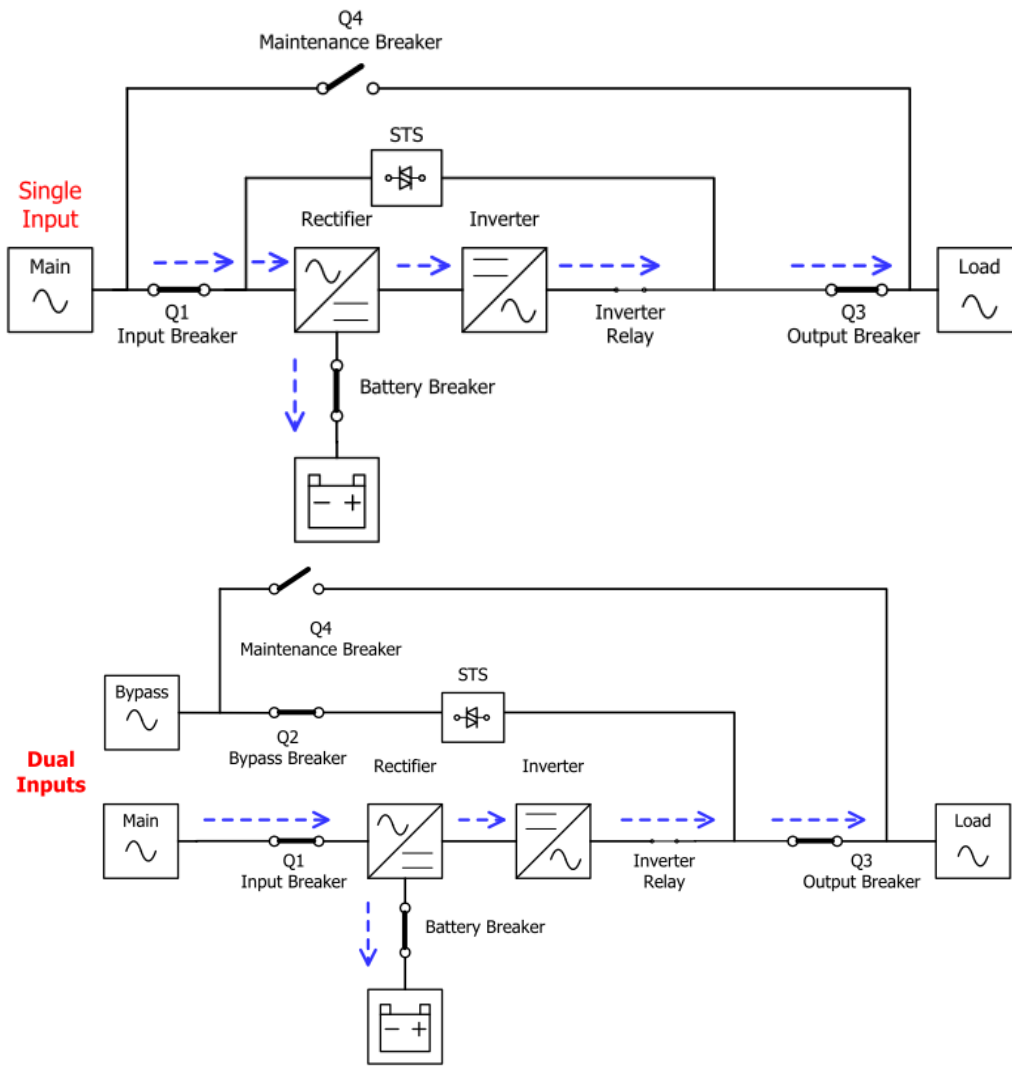


Standby Mode Diagram

5-2-2. Line Mode

In Line Mode, the rectifier delivers power from the mains 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

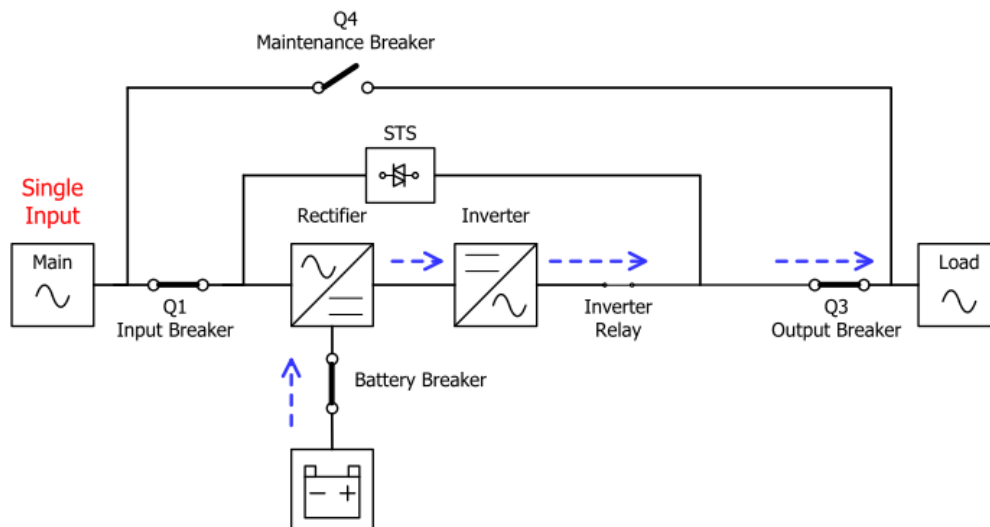
to the load.

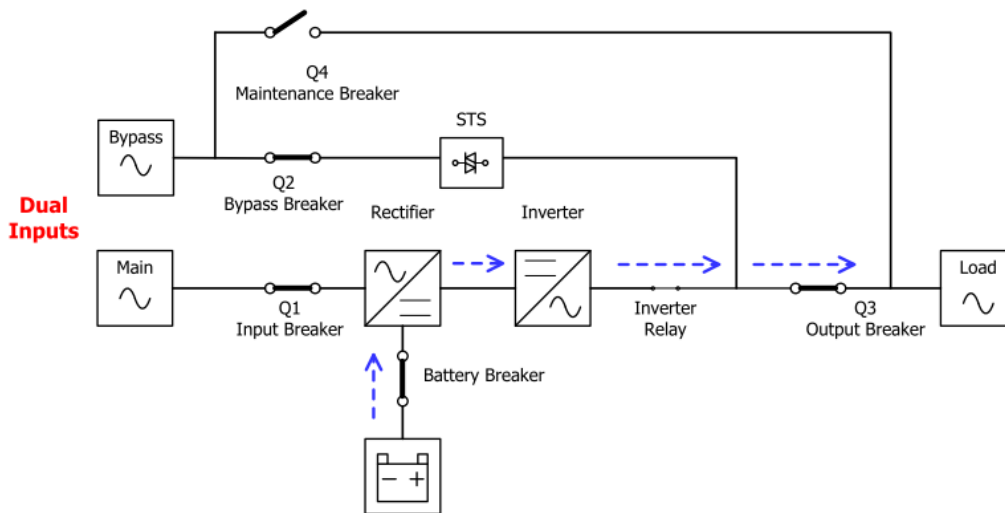


Line Mode Diagram

5-2-3. Battery Mode

The UPS automatically transfers to Battery mode if the Utility fails. There is no interruption to the load upon failure. In battery mode, the rectifier delivers 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.



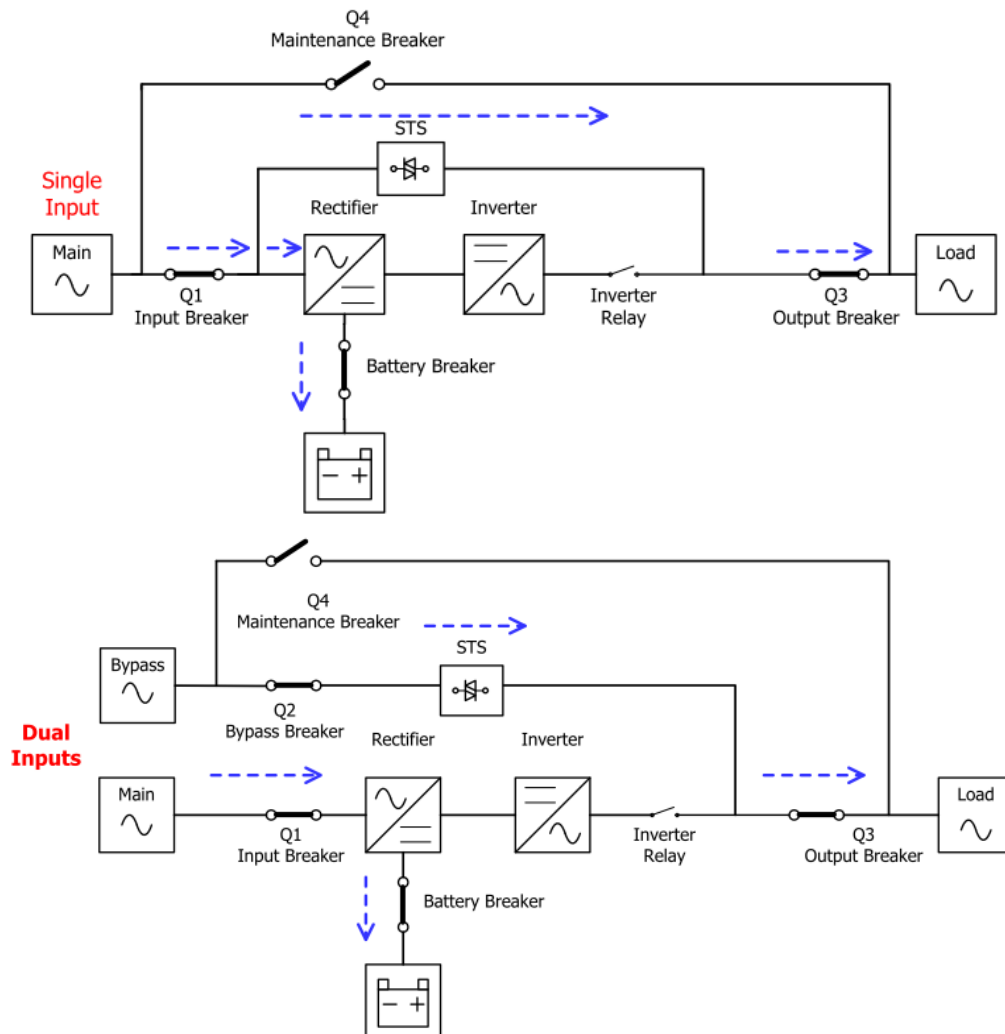


Battery Mode Diagram

5-2-4. 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 connected.

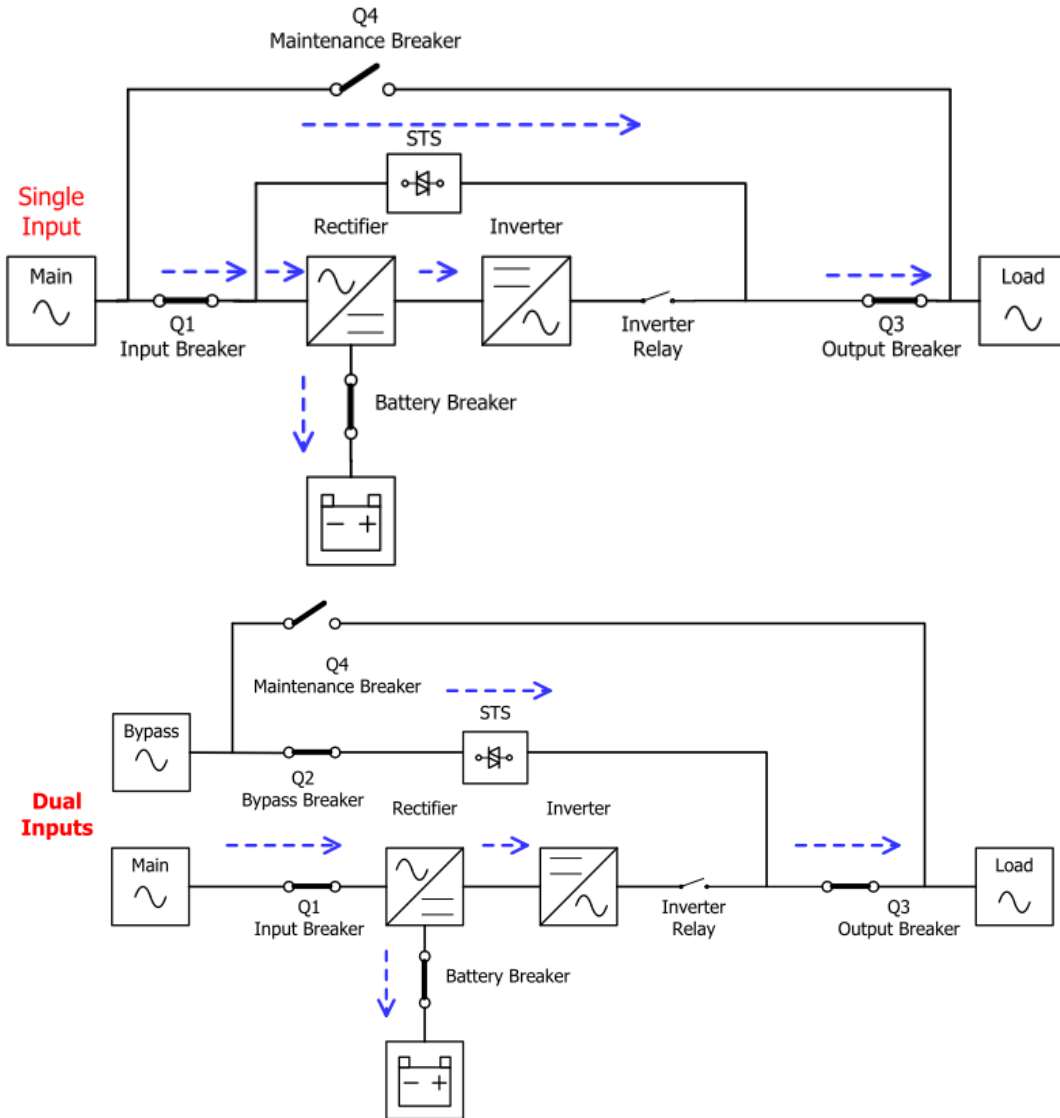
After UPS has been turned on, if the UPS encounters abnormal situations (over-temperature, overload ..., etc.), the static transfer switch will perform as a transference of the load from the inverter to the bypass source with no interruption. If the transference is caused by a recoverable reason, the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



Bypass Mode Diagram

5-2-5. ECO Mode

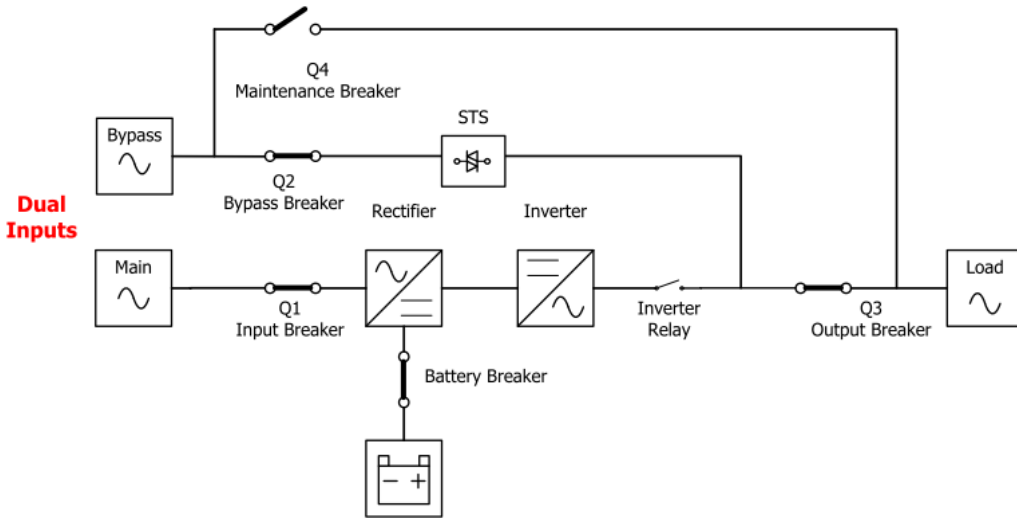
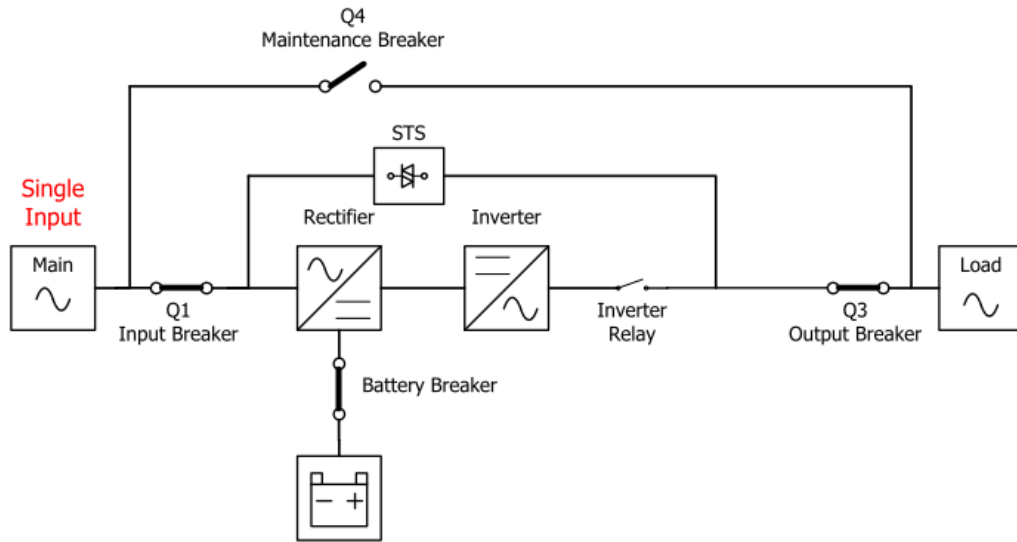
The ECO Mode can be enabled through the LCD control panel. In ECO mode, the load is diverted to bypass when the bypass voltage and frequency are within the acceptable ranges. If the bypass is out of range, the UPS will transfer the power source of load from bypass to inverter. In order to shorten the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



ECO Mode Diagram

5-2-6. Shutdown Mode

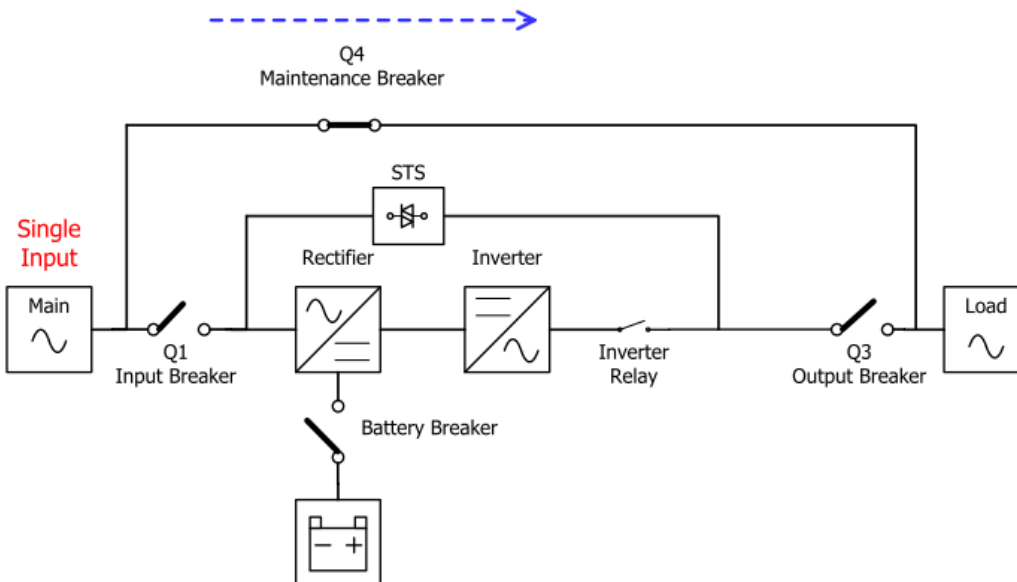
When the UPS is in the off state and the utility power source is absent, the UPS will enter into shutdown mode. Or when the UPS has discharged the battery to the cut-off level, the UPS will also enter into shutdown mode. When the UPS enters this mode, it is going to shut off the control power of UPS. The rectifier, charger and inverter will be all shutdown.

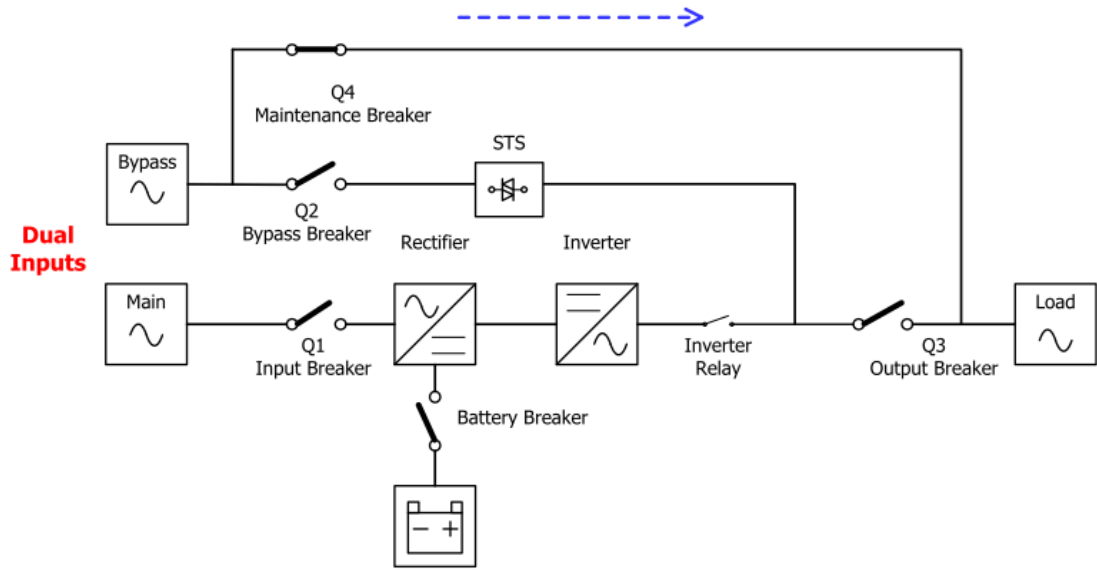


Shutdown Mode Diagram

5-2-7. 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.





Maintenance Bypass Mode Diagram

6. UPS Operation

Warning

- Do not start the UPS until the installation is completed.
- Make sure the wiring is connected correctly and the power cables are fixed firmly.
- Make sure the power stage/module ID have been configured correctly. Refer to section 2-2 Power Stage/Module for details.
- Make sure all the breakers are switch **OFF**.

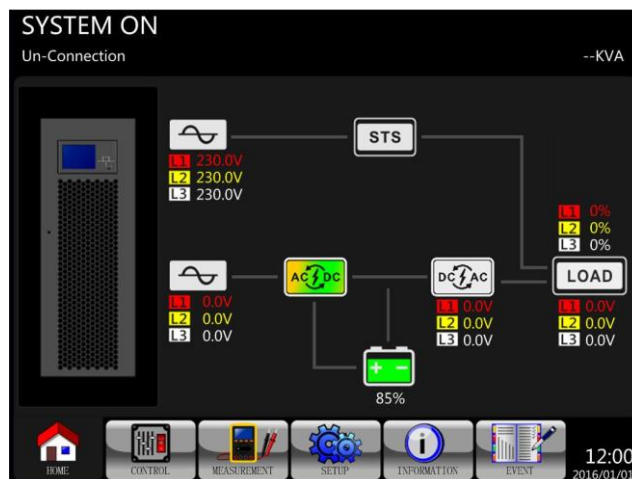
6-1. AC Startup

Use the following procedures when turning on the UPS from a fully powered-down state.

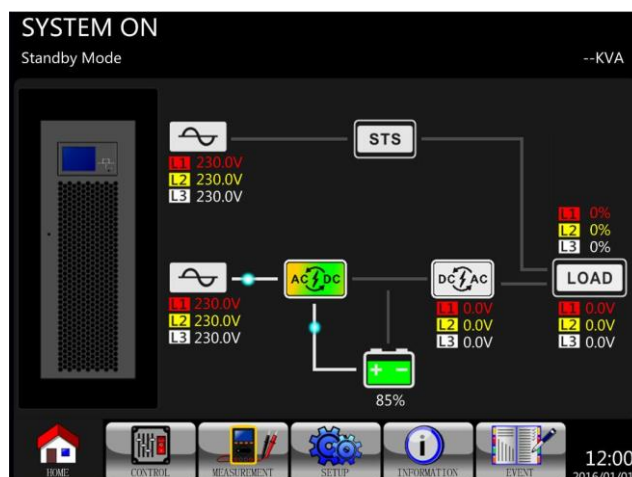
Step 1: Refer to "2-4. Wiring Terminal View" to connect the power cables and the battery required for the UPS system.

Step 2: Switch ON the battery breaker.

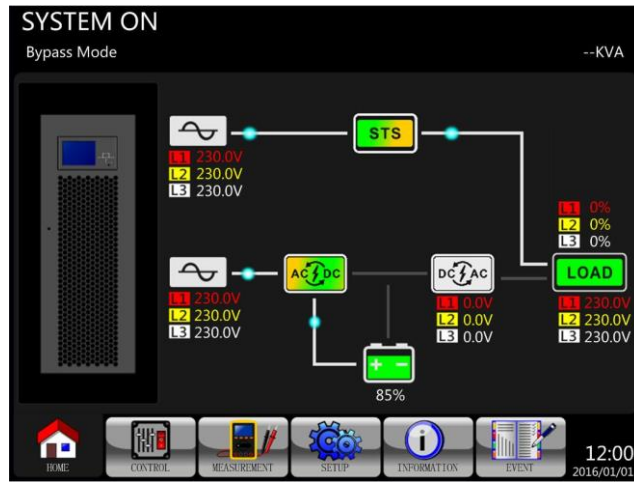
Step 3: Switch ON the external power switch to power the UPS. Then, LCD panel is displayed as shown below.



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

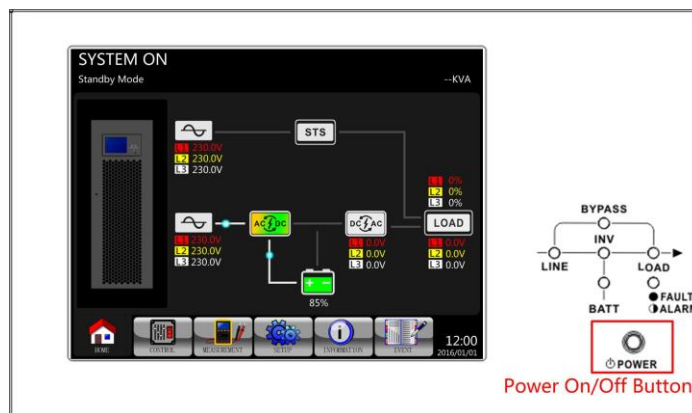


Or the UPS will enter into Bypass Mode, if the setting of Bypass mode is enabled

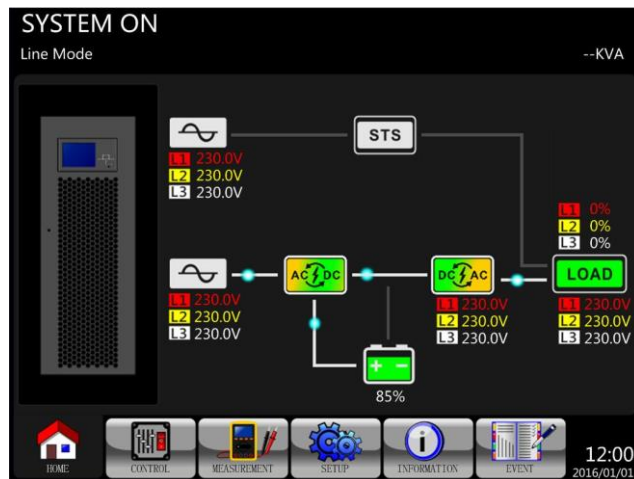


Step 5: Make sure that there is no warning or fault event. If yes, please refer to Chapter 7 Troubleshooting to resolve it.

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



After POST (Power-On Self-Test), the UPS will enter into the Line mode.



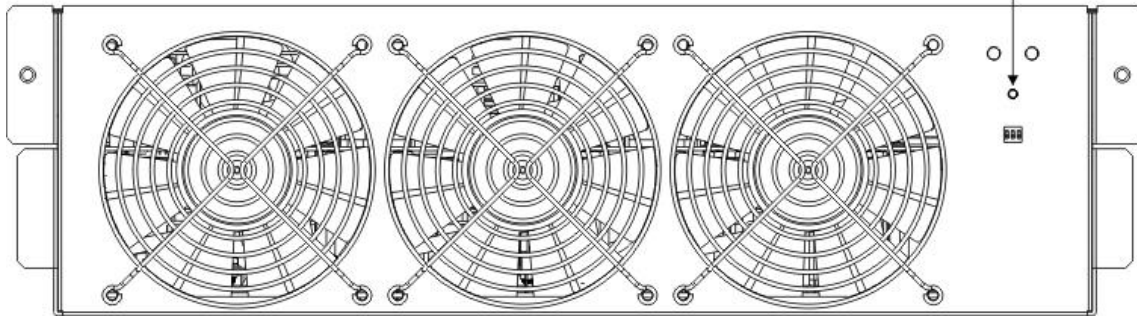
Step 7: Switch ON the output breaker (Q3). AC startup procedure is now complete.

6-2. Cold Start Startup

Step 1: Switch ON the battery Breaker.

Step 2: Press the "Battery Start" button on any one of power stages/modules to start up the control power.

Battery Start Button



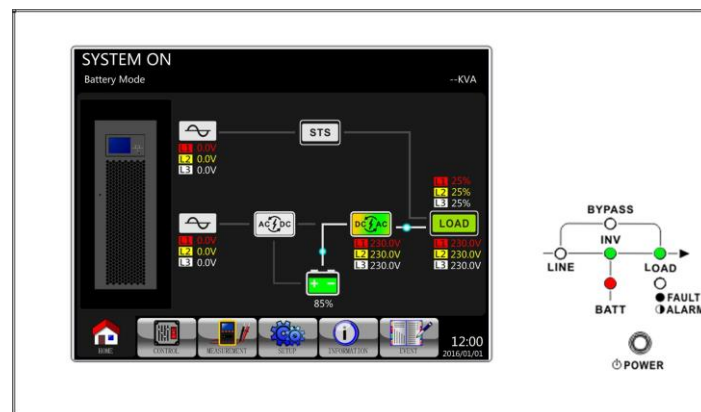
Step 3: After pressing the "Battery Start" button, UPS will enter into Standby mode. Refer to the diagram below for LCD display.



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



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

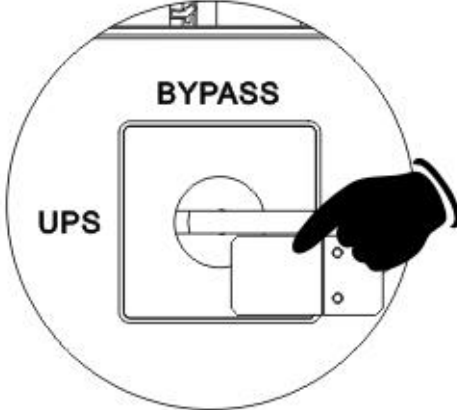
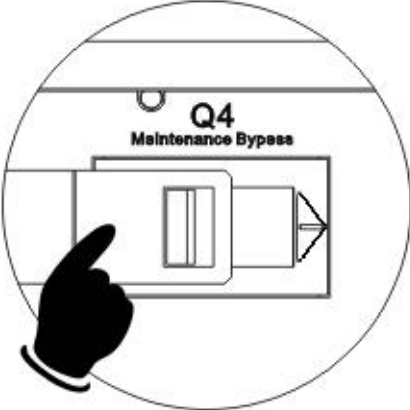
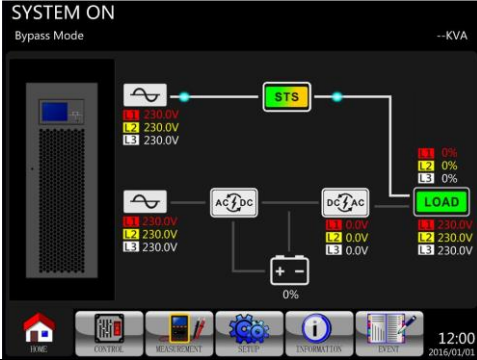

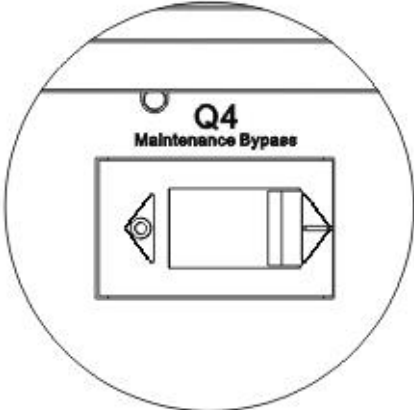


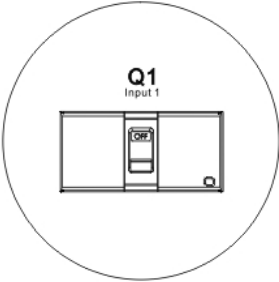
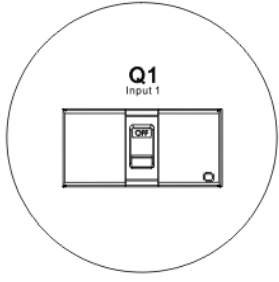
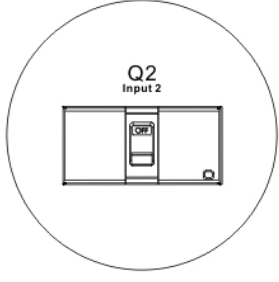
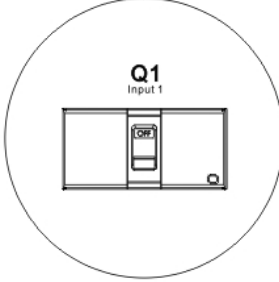
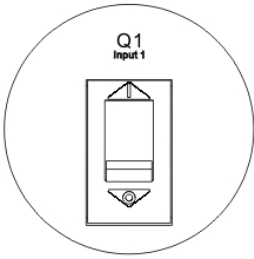
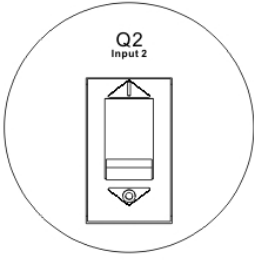
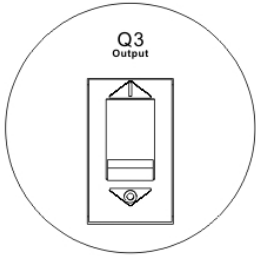
Step 6: Switch ON the output breaker (Q3). Cold start startup procedure is complete.

6-3. Maintenance Bypass Operation

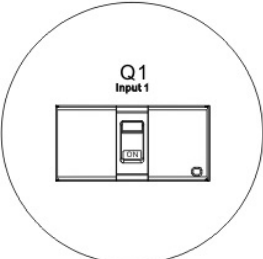
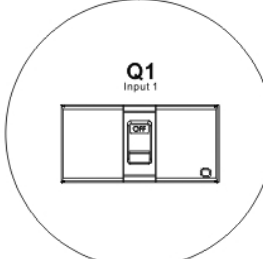
If any fault occurs on any one of power stages/modules, please follow below steps to transfer to maintenance bypass for maintenance and UPS protection as below.

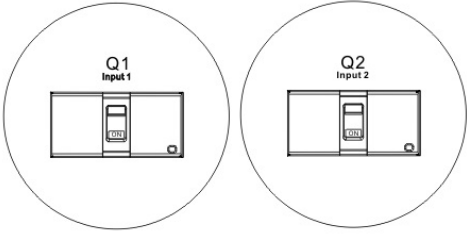
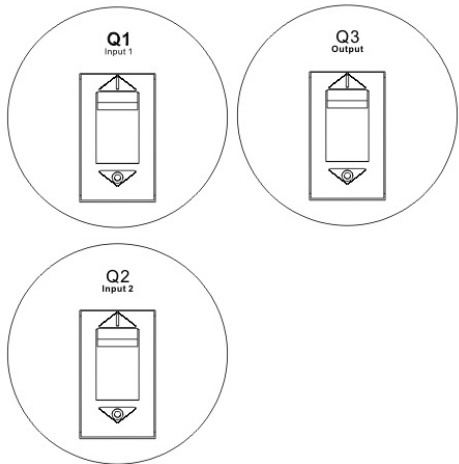
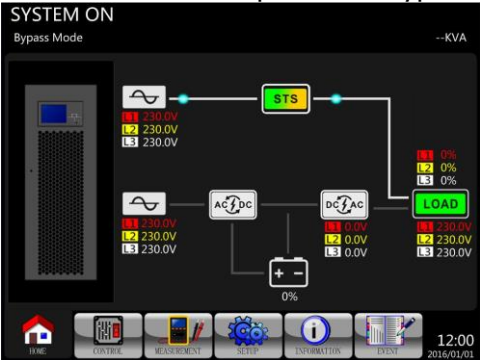
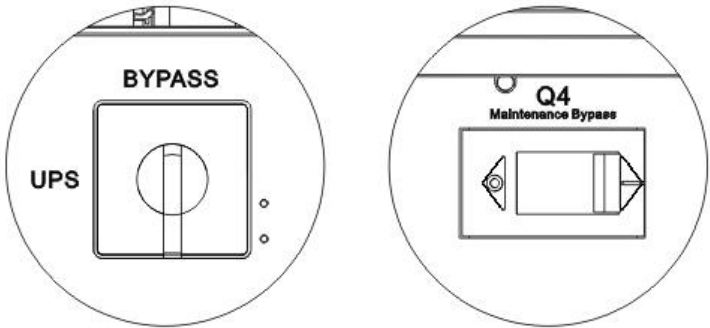
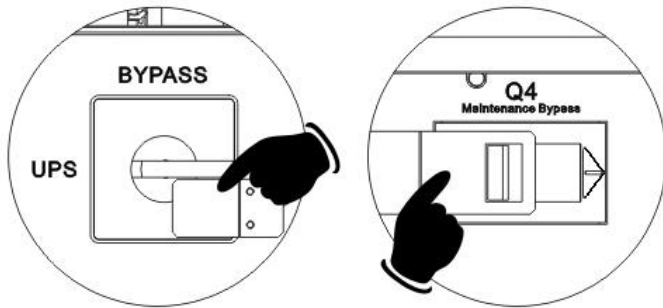
6-3-1. Transfer to maintenance bypass

| | |
|-----------------------|--|
| <p>Step 1:</p> | <p>Remove the mechanical lock plate of maintenance bypass.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>100KVA/120KVA</p> </div> <div style="text-align: center;">  <p>160KVA/200KVA</p> </div> </div> |
| <p>Step 2</p> | <p>Make sure the UPS operates in Bypass mode as shown below.</p> <div style="text-align: center;">  </div> |
| <p>Step 3</p> | <p>Switch ON the maintenance bypass breaker as shown below.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>100KVA/120KVA</p> </div> <div style="text-align: center;">  <p>160KVA/200KVA</p> </div> </div> |

| | | |
|----------------------|---|---|
| <p>Step 4</p> | <p>Single input model: Switch OFF the Input1 Breaker (Q1) as shown below.</p>  <p>100KVA/120KVA</p> <p>Dual input model : Switch OFF the Input1 Breaker (Q1) and Input2 Breaker (Q2) as shown below.</p>   <p>100KVA/120KVA</p> | <p>Single input model: Switch OFF the Input1 Breaker (Q1) as shown below.</p>  <p>160KVA/200KVA</p> <p>Dual input model : Switch OFF the Input1 Breaker (Q1), Input2 Breaker (Q2) and Output Breaker (Q3) as shown below.</p>    <p>160KVA/200KVA</p> |
| <p>Step 5</p> | <p>It is possible to change the power stage/module now.</p> | |

6-3-2. Transfer to UPS Protection

| | | |
|----------------------|--|--|
| <p>Step 1</p> | <p>Make sure the maintenance is complete. All power stages/modules have been installed well.</p> | |
| <p>Step 2</p> | <p>Single input model: Switch ON the Input1 Breaker (Q1) as shown below.</p>  <p>100KVA/120KVA</p> | <p>Single input model: Switch ON the Input1 Breaker (Q1) as shown below.</p>  <p>160KVA/200KVA</p> |

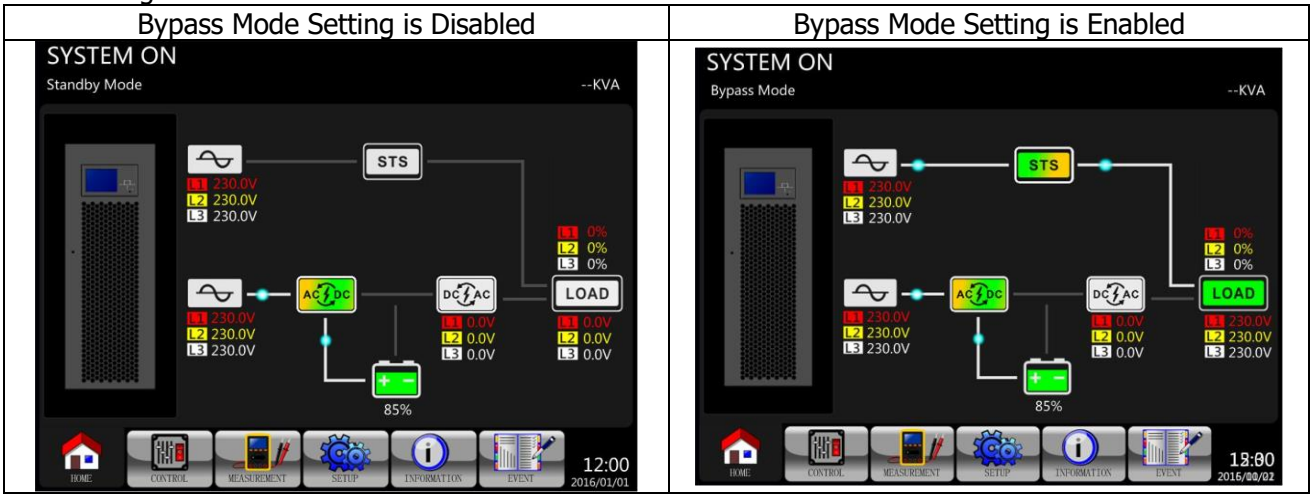
| | | |
|----------------------|--|---|
| | <p>Dual input model :</p> <p>Switch ON the Input1 Breaker (Q1) and Input2 Breaker (Q2) as shown below.</p>  <p style="text-align: center;">100KVA/120KVA</p> | <p>Dual input model :</p> <p>Switch ON the Input1 Breaker (Q1), Input2 Breaker (Q2) and Output Breaker (Q3) as shown below</p>  <p style="text-align: center;">160KVA/200KVA</p> |
| <p>Step 3</p> | <p>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.</p>  | |
| <p>Step 4</p> | <p>Turn off maintenance bypass breaker as shown below.</p>  <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>100KVA/120KVA</p> </div> <div style="text-align: center;"> <p>160KVA/200KVA</p> </div> </div> | |
| <p>Step 5</p> | <p>Lock back the mechanical lock plate as shown below.</p>  <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>100KVA/120KVA</p> </div> <div style="text-align: center;"> <p>160KVA/200KVA</p> </div> </div> | |

6-4. Turn off Operation

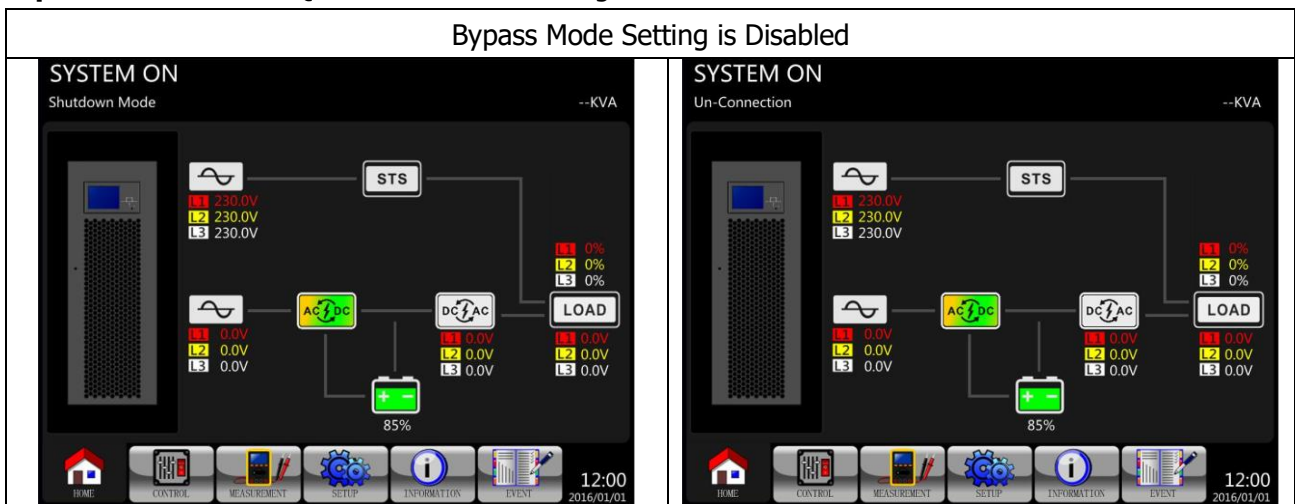
6-4-1. Turn Off Operation in Bypass Mode/ Standby Mode

When the UPS is neither turned on or off, the UPS operates in the Standby Mode or Bypass Mode, depending on the "Bypass Mode" Setting.

The LCD diagrams are shown below.

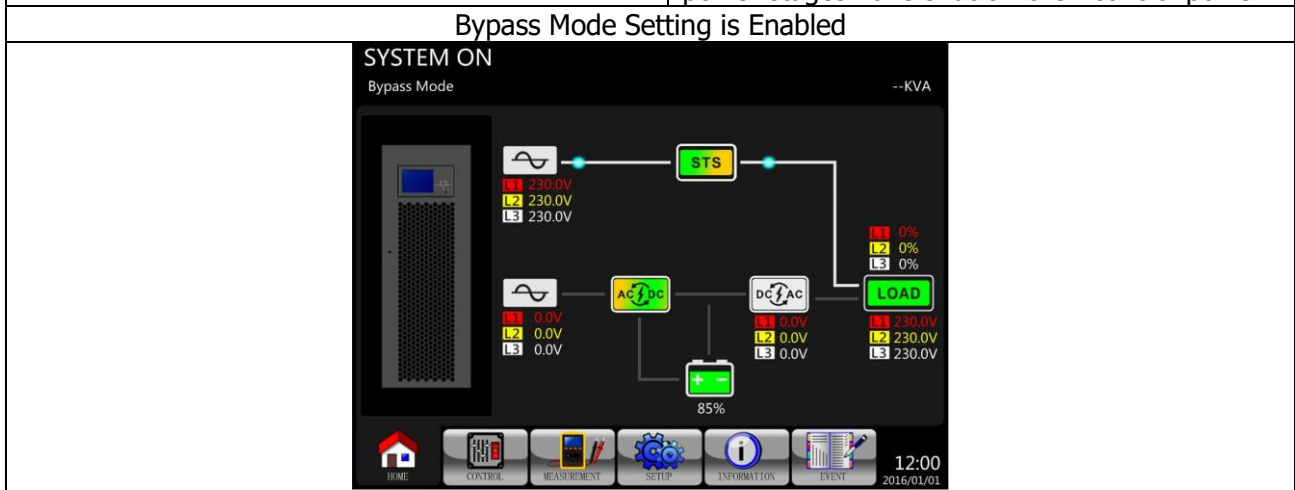


Step 1: Switch OFF the Q1 Breaker. The LCD diagrams are shown below.



UPS enters Shutdown Mode.

It is normal the Un-Connection is shown when power stages have shut off their control power.



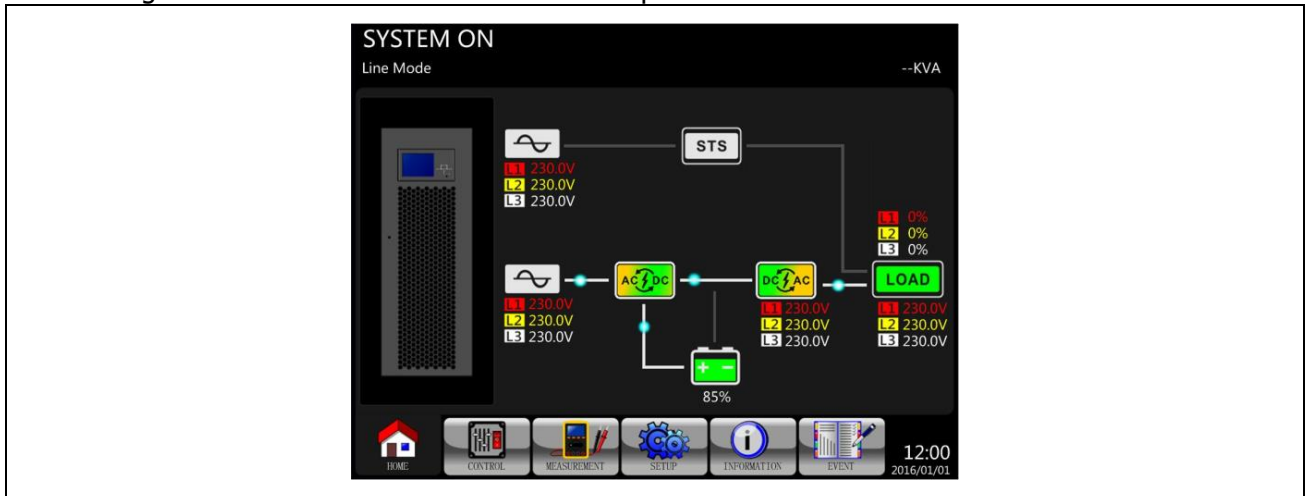
UPS stay in Bypass mode and No AC input is indicated.

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

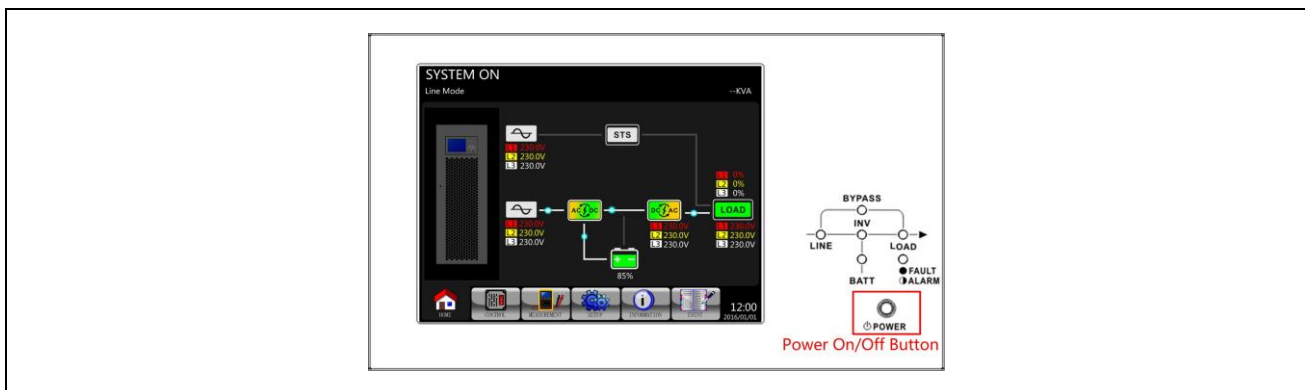
Step 3: Switch OFF the battery breaker if the UPS will disconnect from the AC power for a long time.

6-4-2. Turn Off Operation in Line Mode

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



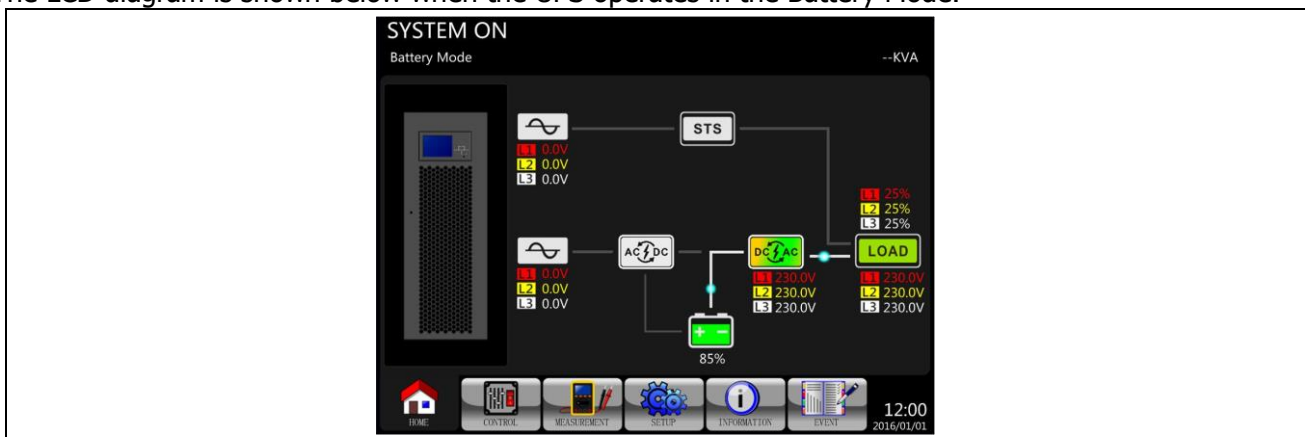
Step 1: Press "POWER" button for 2 seconds to turn off the UPS. Or use the Menu-Control-System Turn Off to turn off the UPS.



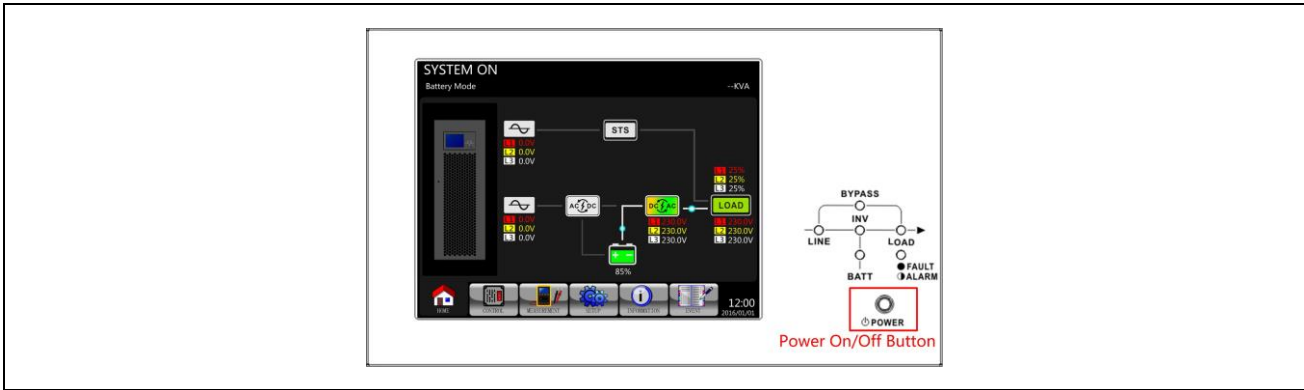
After turning off, the UPS will transfer to Standby Mode or Bypass Mode, depending on the "Bypass Mode" Setting.

6-4-3. Turn Off Operation in Battery Mode

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



Step 1: Press "POWER" button for 2 seconds to turn off the UPS. Or use the Menu-Control-System Turn Off to turn off the UPS.



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

7. Trouble Shooting

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 in specified duration. | Turn off UPS and then restart the UPS. If it fails again, contact service personnel. |
| Fault! Inverter Voltage Over | Inverter Voltage is 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 connection is 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 is 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! 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. TRIG0 Fail | Communicate Trigger signal fault | Contact service personnel. |
| Warning! Power Stage Loss | As stated. | Check if the number of power stage/module installed in the system is correct. |
| Warning! Parallel Sys | Parallel System Configure error | Contact service personnel. |

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

8. Storage and Maintenance

8-1. Storage

Before storing, charge the UPS at least 7 hours. Store the UPS covered and upright in a cool, dry location. During storage, recharge the battery in accordance with the following table:

| Storage Temperature | Recharge Frequency | Charging Duration |
|---------------------|--------------------|-------------------|
| -25°C - 40°C | Every 3 months | 1-2 hours |
| 40°C - 45°C | Every 2 months | 1-2 hours |

8-2. Maintenance



The UPS system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.



Before performing any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals of high capability capacitor such as BUS-capacitors.



Only qualified maintenance personnel may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.



Verify that no voltage between the battery terminals and the ground is present before maintenance or repair. In this product, the battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the grounding/earthing.



Batteries may cause electric shock and have a high short-circuit current. Please remove all wristwatches, rings and other conductive objects before maintenance or repair, and only use tools with insulated grips and handles for maintaining or repairing.



When replacing the batteries, install the same number and same type of batteries.



Do not attempt to dispose of batteries by burning them. This could cause battery explosion. The batteries must be disposed of according to local environmental regulations.



Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.



Please replace the fuse only with the same type and amperage in order to avoid fire hazards.



Do not disassemble the UPS system.

9. Specifications

| MODEL | 100KL | | 120KL | | 160KL | | 200KL | |
|--------------------------------------|---------------------------|---|----------------|--|----------------|--|----------------|--|
| CAPACITY | 100KVA / 90KW | | 120KVA / 108KW | | 160KVA / 144KW | | 200KVA / 180KW | |
| INPUT | | | | | | | | |
| Voltage Range | Nominal Voltage | 380V/400V/415V (220V/230V/240V) | | | | | | |
| | Voltage Range (Full Load) | 305V ~ 478V 100% load; (176V ~ 276V) | | | | | | |
| | Voltage Range (De-rating) | 208V ~ 304V 70% Load Max(120V ~ 175V*) | | | | | | |
| | Voltage Comeback | Low Loss Voltage +10V, High Loss Voltage -10V | | | | | | |
| Nominal Frequency | | 50Hz/60Hz(Auto-selectable) | | | | | | |
| Frequency Range | | 40Hz ~ 70Hz | | | | | | |
| Phase | | 3 Phase with Neutral(Three Phase, Neutral + Ground) | | | | | | |
| Synchronized Range | | +/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz) User Programmable | | | | | | |
| Power Factor | | ≥ 0.99 at 100% Load | | | | | | |
| THDi (100% load) | | < 3%@Full Load(@Linear Load) | | | | | | |
| * De-rating | | | | | | | | |
| | | | | | | | | |
| Mains Input (Bypass) | | | | | | | | |
| Voltage Range | Nominal Voltage | 380V/400V/415V | | | | | | |
| | Voltage Range | Upper limit: +10, +15 or +20, default: +15% Lower limit: -10, -20, -30 default: -20% | | | | | | |
| Nominal Frequency | | 50Hz/60Hz(Auto-selectable) | | | | | | |
| Frequency Range | | +/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz) | | | | | | |
| Phase | | 3 Phase with Neutral(Three Phase, Neutral + Ground) | | | | | | |
| Synchronized Range | | +/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz) User Programmable | | | | | | |
| OUTPUT | | | | | | | | |
| Phase | | 3 Phase with Neutral(Three Phase, Neutral + Ground) | | | | | | |
| Output voltage | | 380/400/415VAC (Ph-Ph) | | | | | | |
| | | 220/230/240VAC (Ph-N) | | | | | | |
| AC Voltage Regulation | | < 1% Typical (balanced load) < 2% Typical (unbalanced load) | | | | | | |
| Frequency Range (Synchronized Range) | | 40Hz ~ 70Hz | | | | | | |
| Frequency Range (Batt. Mode) | | 50 Hz ± 0.1 Hz or 60Hz ± 0.1 Hz | | | | | | |
| Overload | AC mode | 1 hour for 105 ~110%, 10 mins for 111~125%, 1 min for 126~150%, 200ms for >150% | | | | | | |
| | Battery mode | 1 hour for 105 ~110%, 10 mins for 111~125%, 1 min for 126~150%, 200ms for >150% | | | | | | |
| Current Crest Ratio | | 3:1 max | | | | | | |
| Harmonic Distortion | | 100% linear load: <2% 100% nonlinear load: <4% | | | | | | |
| Transfer Time | Line↔Battery | 0 ms | | | | | | |
| | Inverter↔Bypass | Synchronous transfer: ≤ 0ms Asynchronous transfer: < 1 cycle | | | | | | |
| | Inverter↔ECO | <20 ms | | | | | | |
| EFFICIENCY | | | | | | | | |
| AC mode | | 94%, Line mode @ 100% R Load 93.5%, Line mode @ 50% R Load | | | | | | |
| ECO Mode | | 98%, ECO Mode @ 100% R Load 97%, ECO Mode @ 50% R Load | | | | | | |
| Battery Mode | | 93 %, Battery mode @ 100% R Load 92.5%, Battery mode @ 50% R Load | | | | | | |

| MODEL | | 100KL | 120KL | 160KL | 200KL |
|----------------------------|--|------------------|--------------------------|------------------|--------------|
| BATTERY | | | | | |
| Type | Depending on applications | | | | |
| Numbers | 32 36 40 (adjustable) | | | | |
| Maximum charging current* | 24A** | 32A** | 40A** | 48A** | |
| Floating Voltage | 2.29V/cell | | | | |
| Boost Charging | 2.35V/cell | | | | |
| Charger Voltage Regulation | < 1% | | | | |
| Ripple Voltage | < 1% | | | | |
| Ripple Current (% C10) | < 5 | | | | |
| PHYSICAL | | | | | |
| Dimension D X W X H mm | | 945 x 567 x 1015 | | 995 x 567 x 1455 | |
| Single input Model | Net Weight(kg) | 194 | 229 | 301 | 335 |
| Dual Input Model | Net Weight(kg) | 197 | 232 | 309 | 343 |
| ENVIRONMENT | | | | | |
| Operation Temperature | 0 ~ 40°C | | | | |
| Operation Humidity | <95 % and non-condensing | | | | |
| Operation Altitude*** | <1000m** | | | | |
| Acoustic Noise Level | Less than 70dB @ 1 Meter | | Less than 73dB @ 1 Meter | | |
| MANAGEMENT | | | | | |
| Smart RS-232 or USB | Supports Windows® 2000/2003/XP/Vista/2008/7/8/10, Linux, Unix, and MAC | | | | |
| Optional SNMP | Power management from SNMP manager and web browser | | | | |

*NOTE 1:AC Input >200Vac

**NOTE 2:Scale=1A

***If the UPS is installed or used in a place where the altitude is above than 1000m, the output power must be de-rated 1% per 100m. Product specifications are subject to change without further notice.