USER MANUAL

Three phases Modular UPS Solutions:
60 kVA to 600 kVA HV
With 60 kVA modules

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INFOSEC UPS SYSTEM - 15, rue du Moulin - 44880 Sautron - FRANCE - www.infosec-ups.com
Hot Line – Tel + 33 (0)2 40 76 15 82 - Fax + 33 (0)240 94 29 51 - hotline@infosec.fr – 05 24 AA 59 201 05

1. Safety

1.1 Important Safety Instructions

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

WARNING:

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

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

Risk of Voltage Backfeed

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

1.2 CE conformity

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.

CE This logo means that the 220V/230V/240V HV product answers to the EMC and LVD standards (regarding to the regulation associated with the electric equipment voltage and the electromagnetic fields).

This is a category C3 UPS product. This category includes UPS with an output current exceeding 16 A and intended for use in the second environment. Such UPS are suitable for use in commercial or industrial installations having a minimum boundary of 30 m from other buildings classified as first environment (HV versions only).

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WARNING:

An UPS belongs to the electronic and electrical equipment category. At the end of its useful life it must be disposed of separately and in an appropriate manner.
This symbol is also affixed to the batteries supplied with this device, which means they too have to be taken to the appropriate place at the end of their useful life.
Contact your local recycling or hazardous waste centre for information on proper disposal of the used battery.

1.3 Installation information

WARNING:

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

1.4 Maintenance

WARNING:

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

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1.5 Recycling the used battery

WARNING:

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

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

2. Installation

2.1 Initial Inspection

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

2.2 Installation Environment

1. The UPS is designed for indoor use only and should be located in a clean environment with adequate ventilation to keep the environmental parameters within the required specification.
2. Make sure that transportation routes (e.g. corridor, door gate, elevator, etc.) and installation area can accommodate and bear the weight of the UPS, the external battery cabinet and handling equipment.
3. The UPS uses forced convection cooling by internal fans. Cooling air enters the module through ventilation grills located at the front of the cabinet and exhausted through grills located in the rear part of the cabinet. Please do not block the ventilation holes.
4. Ensure that the installation area is spacious for maintenance and ventilation.
5. Keep the temperature of installation area around 30°C and humidity within 90%. The highest operating altitude is 1000 meters above sea level.
6. If necessary, install a system of room extractor fans to avoid formation of room temperature. Air filters are necessary if the UPS is operated in a dusty environment.
7. It is recommended that you parallel the external battery cabinets to the UPS. The following instructions of clearances are suggested:
   - Keep a clearance of 100cm from the top of the UPS for maintenance, wiring and ventilation.
   - Keep a clearance of 100cm from the back of the UPS and the external battery cabinets for ventilation.
   - Keep a clearance of 150cm from the front of the UPS and the external battery cabinets for maintenance and ventilation.
8. For safety concerns, we suggest that you shall:
   - Equip with CO2 or dry powder fire extinguishers near the installation area.

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- Install the UPS in an area where the walls, floors and ceilings were constructed by fireproof materials.

9. Do not allow unauthorized personnel to enter the installation area. Assign specific personnel to keep the UPS key.

2.3 Unpacking

Before installation, please inspect the unit. Make sure that nothing inside the package is damaged. Please keep the original package in a safe place for future use. S versions means without batteries space.

Voltage
3 x 380V + N
3 x 400V + N
3 x 415V + N

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

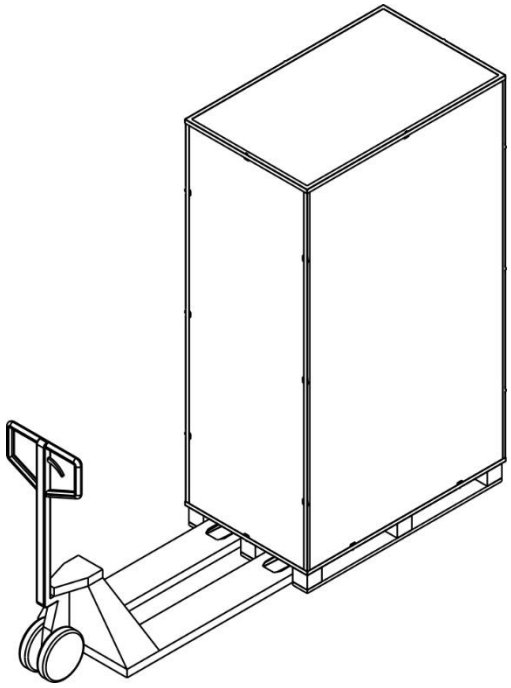

Figure 2-1

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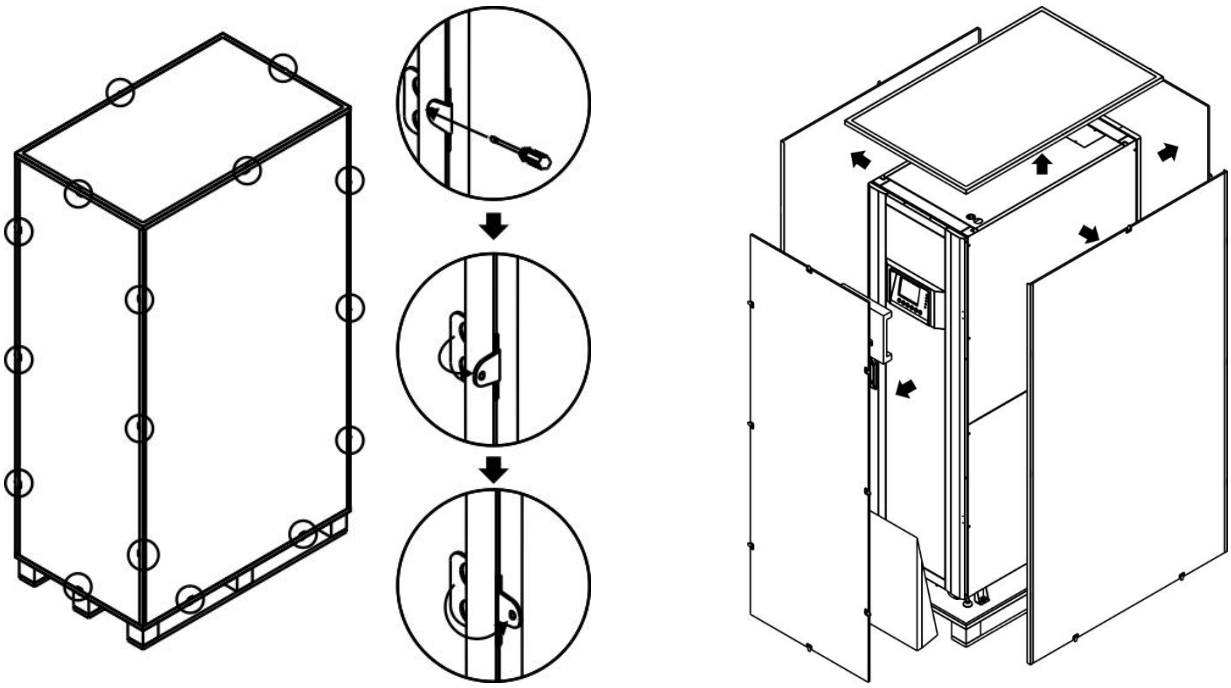


Figure 2-2

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

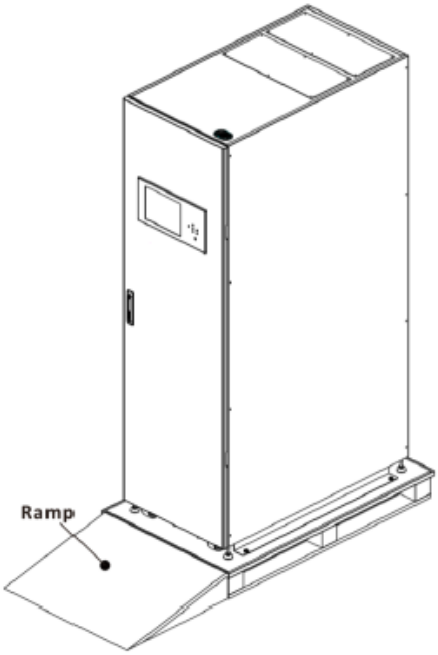


Figure 2-3

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

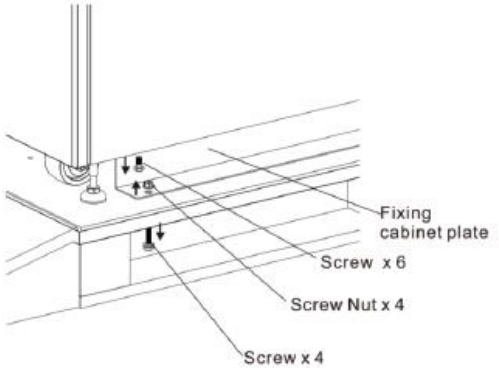


Figure 2-4

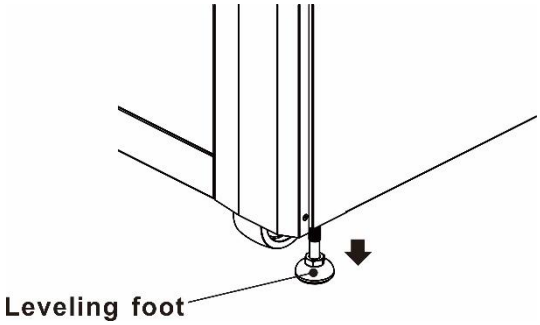


Figure 2-5

2.4 Moving the Cabinet

⚠ Warning
The UPS is fixed on the pallet with 4 fixing cabinet plates. When removing it, pay attention to the movement of the casters to avoid accidents. The cabinet can be pushed forward or backward only. Pushing it sideward is not allowed. When pushing the cabinet, pay attention not to overturn it as the gravity center is high.

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

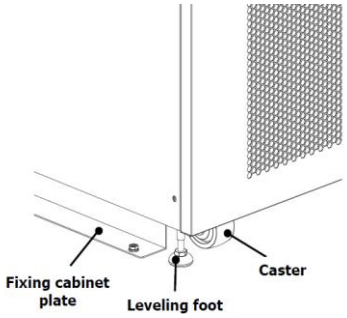
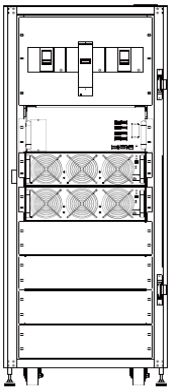
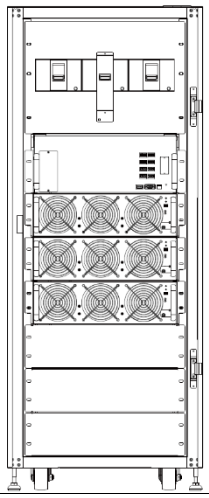
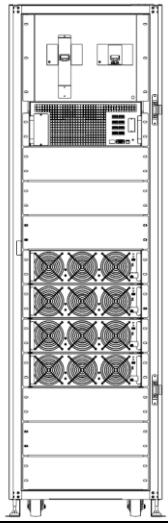
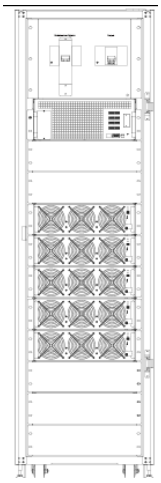


Figure 2-6

2.5 Types of UPS Cabinet

The extended cabinets don't have the battery module compartments. The battery has to be connected externally.
Please consider the external battery space and wiring gauge for installation.

Extended Series				
Model	Mod5T 120/60 (30U)	Mod5T 180/60 (30U)	Mod5T 240/60 (42U)	Mod5T 300/60 (42U)
Photo				
Cabinet Height	30U	30U	42U	42U
Switch Unit	3	3	2	2
STS	1	1	1	1
Max. Power Module	2	3	4	5
Max Power	120kVA	180kVA	240kVA	300kV

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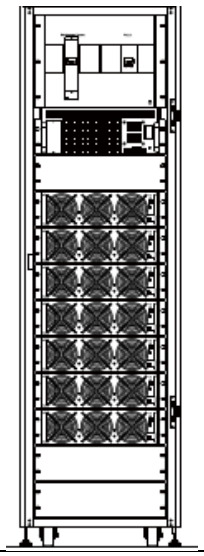
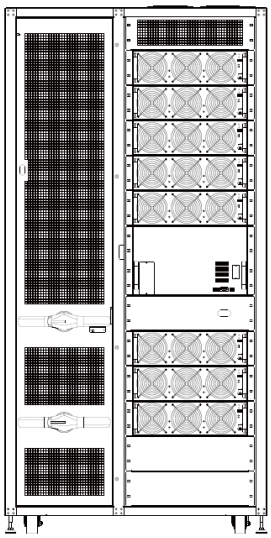
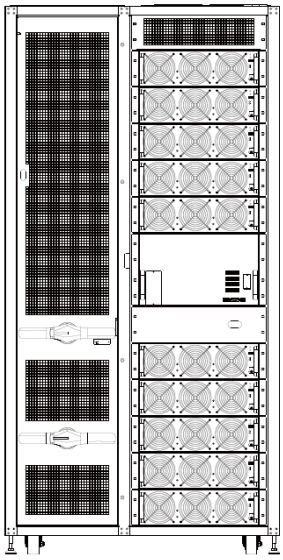
Extended Series			
Model	Mod5T 420/60 (42U)	Mod5T 480/60 (42U)	Mod5T 600/60 (42U)
Photo			
Cabinet Height	42U	42U	42U
Switch Unit	2	2	2
STS	1	1	1
Max. Power Module	7	8	10
Max Power	420kVA	480kVA	600kVA

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2.6 Exterior

In the front of the UPS, there are control interface (LCD Panel) and door lock.
The side panels are lockable. The casters at the bottom of the UPS cabinet can be used to move over short distances. There are four leveling feet to fix and stabilize the UPS cabinet on the ground. Refer to Figure 2-7.
Inside the cabinet, there are Breakers, STS Module, Power Module slots and Battery module slots. All wiring terminal blocks are located in the back of cabinet.

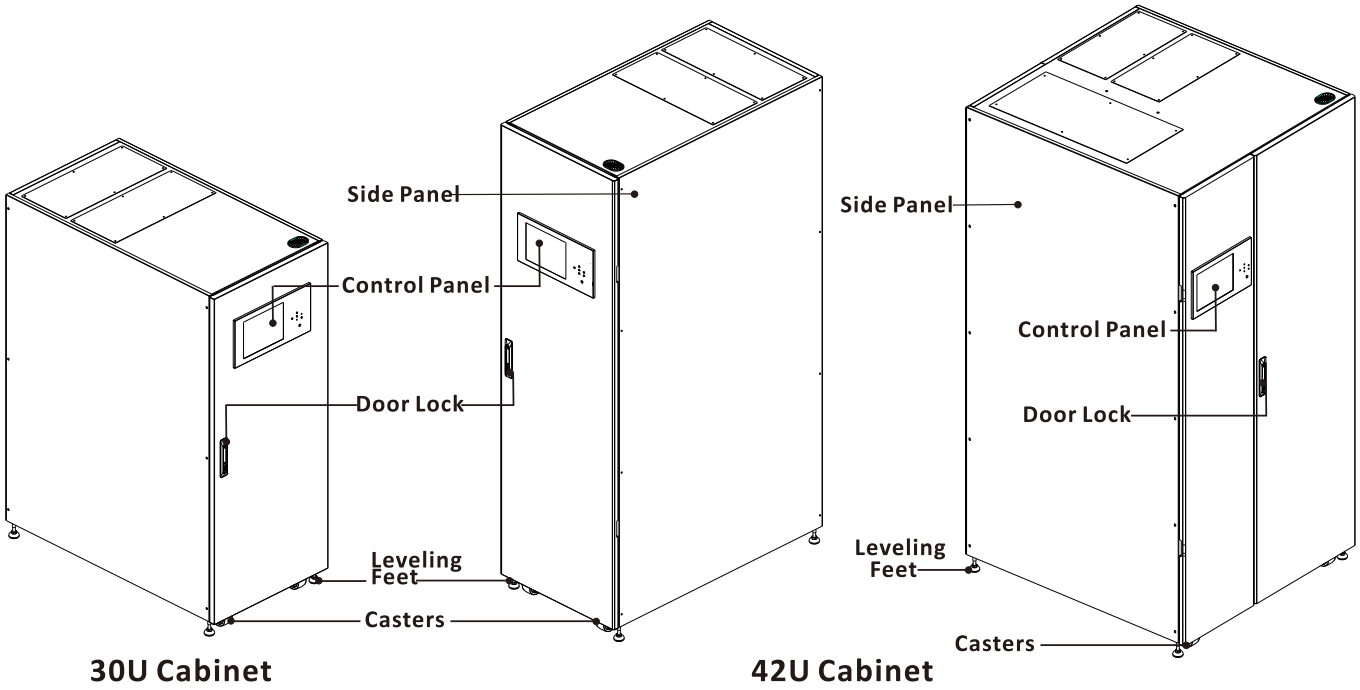


Figure 2-7 Exterior

2.6.1 Mechanical Data

Dimensions			
UPS cabinet	Width	Depth	Height
30U	600mm	1100m	1475mm
42U	600mm	1100m	2010mm
42U	1000mm	1065m	2000mm

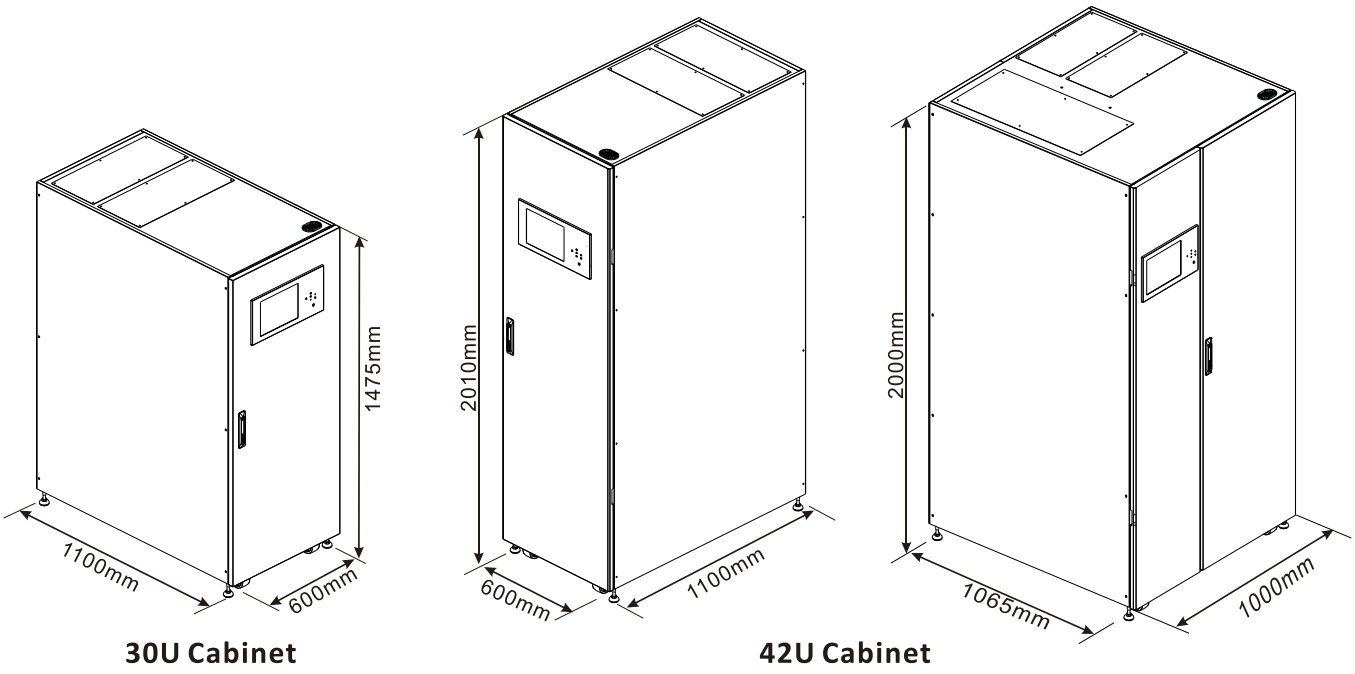
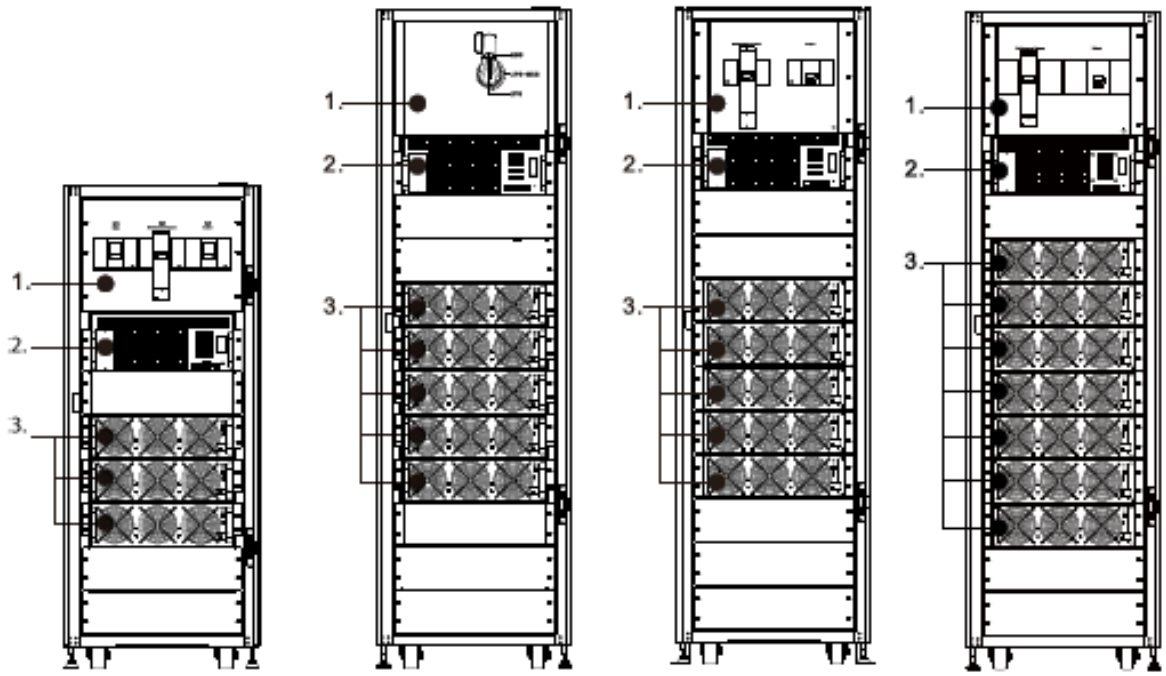


Figure 2-8 Dimensions

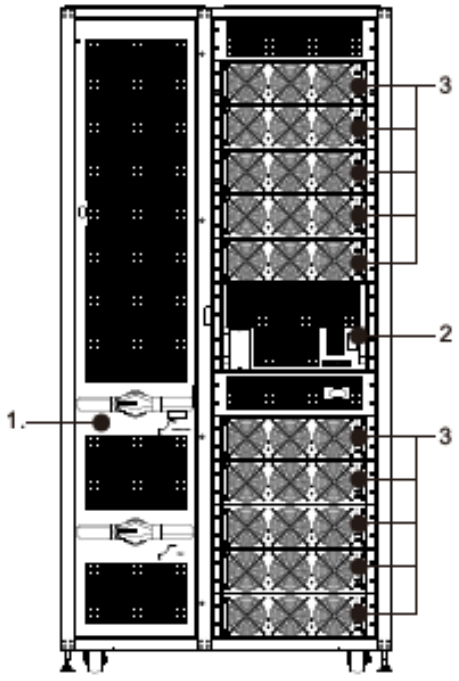
2.6.2 Front View

Unlock and open the front door and you will see the Main Breaker (Q1), Maintenance Breaker (Q2), Output Breaker (Q3), STS Module, Power Module slots.

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



30U-120/30U-180 42U-300 42U-420



42U-480/42U-600

Figure 2-9 Front View

1. Switch Unit
2. STS Module
3. Power Module

2.6.3 Rear View

Unlock and open the rear door and you will see the rear panel of UPS.

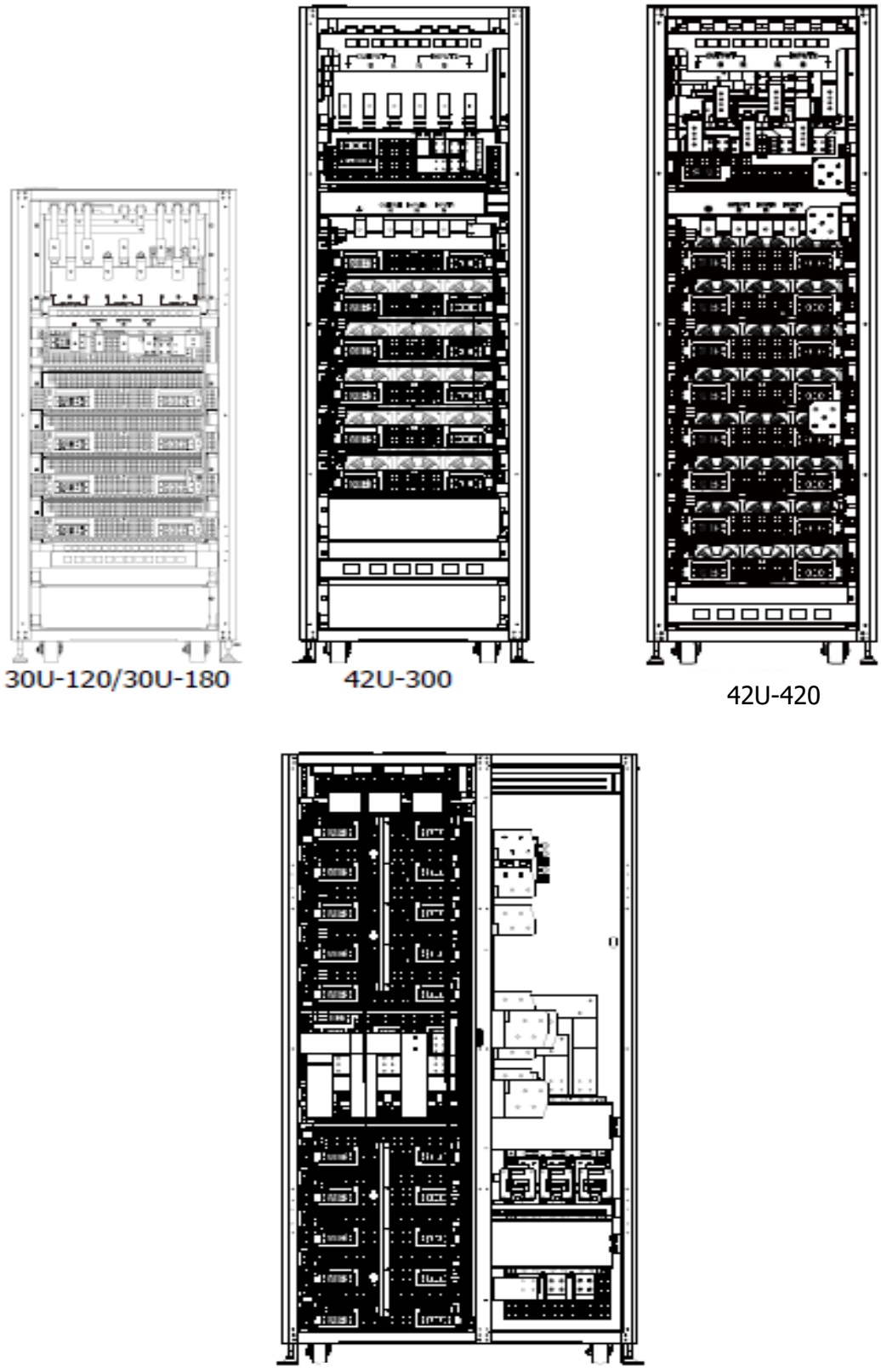


Figure 2-10 Rear View

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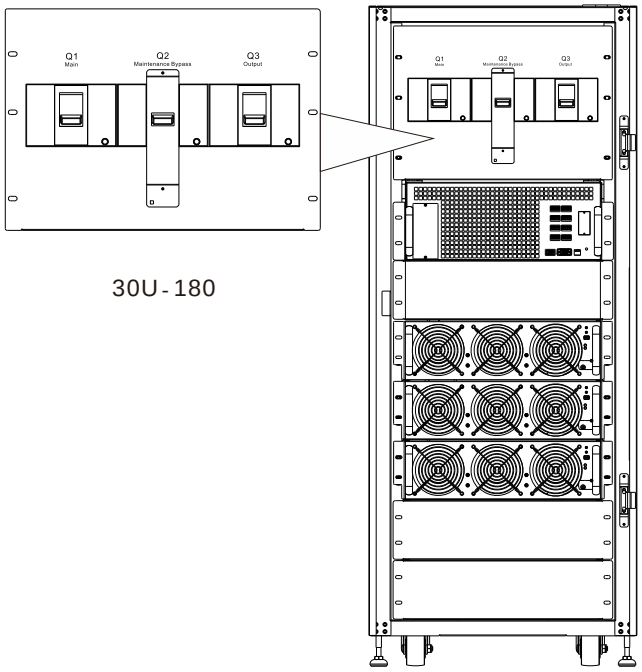
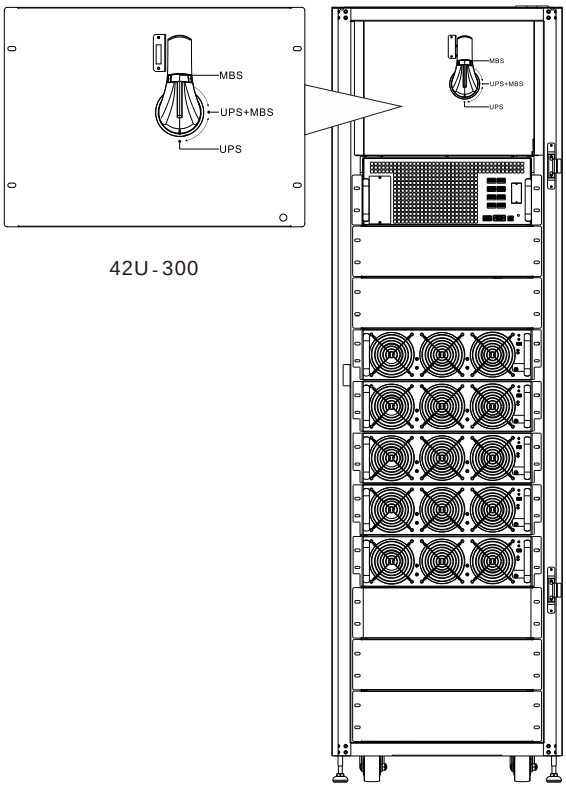
2.7 Internal Mechanisms

2.7.1 Breakers

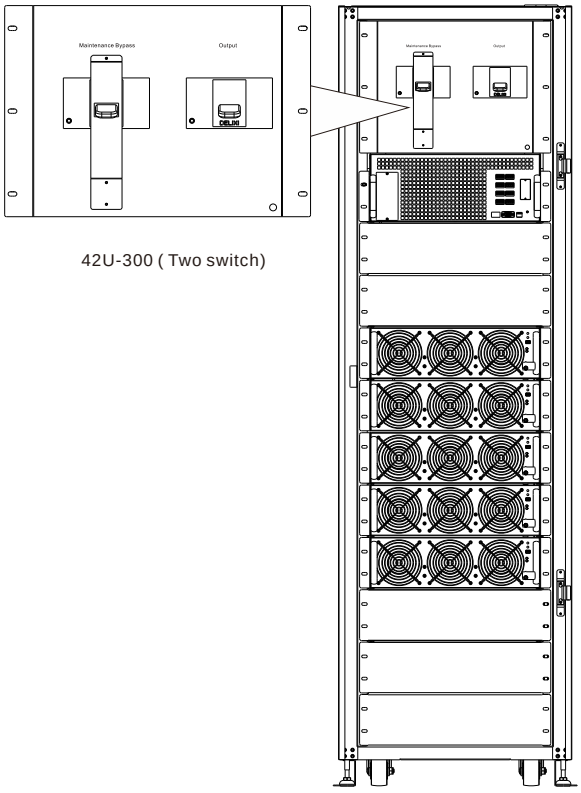
After opening the front door, there are three breakers, Main Breaker (Q1), Maintenance Breaker (Q2) and Output Breaker (Q3) in 180K cabinet.
One Maintenance Bypass Switch or two breaker in 300K cabinet
And two Switch in 600K cabinet



30U - 180



42U - 300



42U-300 (Two switch)

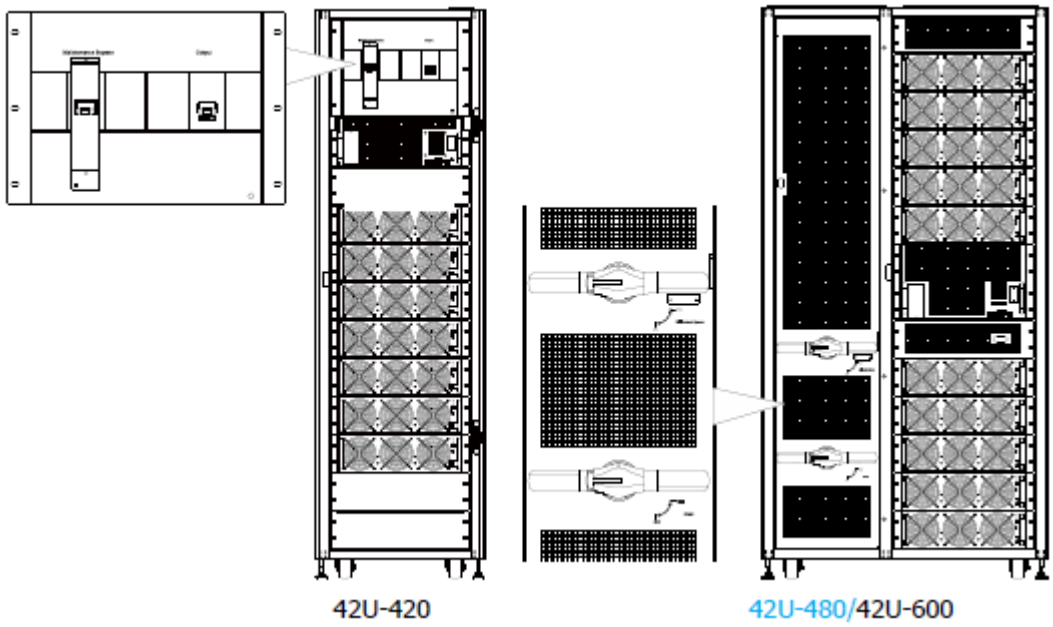
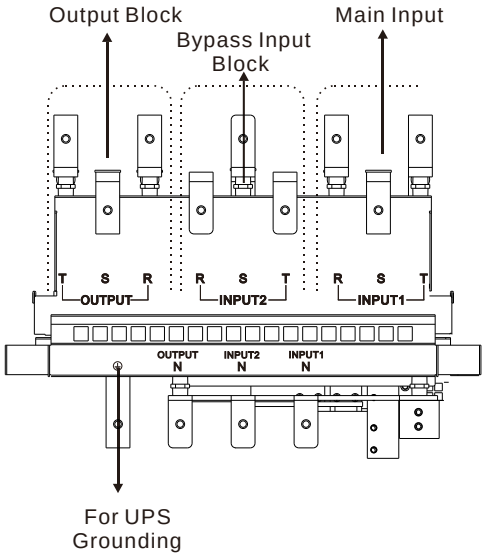


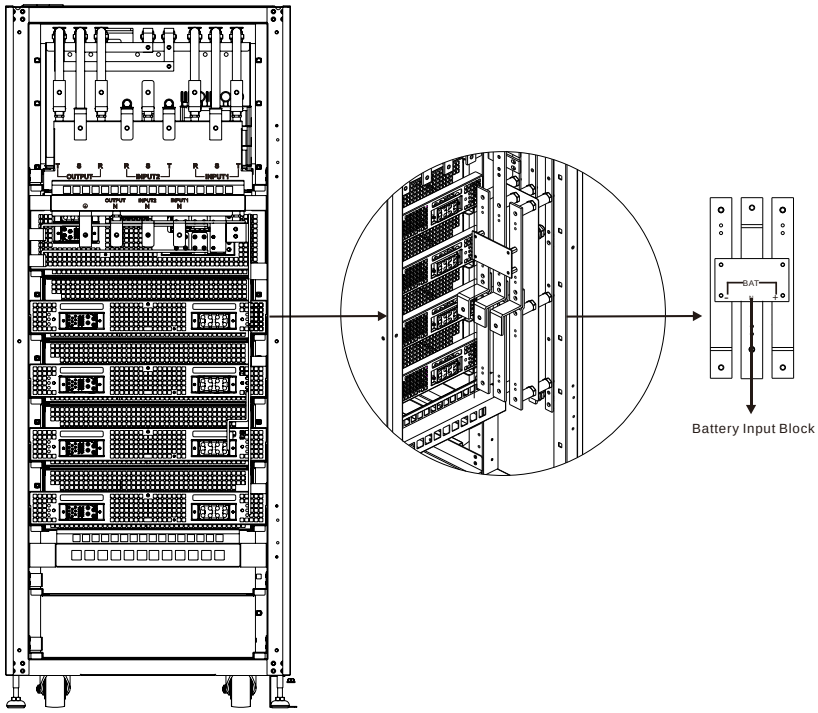
Figure 2-11 Switch (front view)

2.7.2 Wiring Terminal Blocks

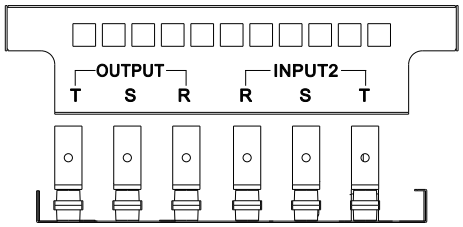
Open the UPS's back doors and you will see the wiring terminal block. For UPS cabinet wiring, please refer to Figure 2-13.

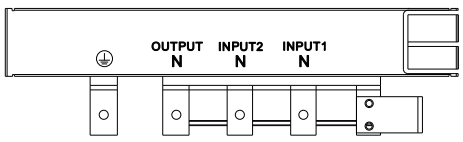
No.	Item	Function	Description
①	Output Block	Connects the critical loads	Includes R, S, T and Neutral terminals.
②	Bypass Input Block	Connects bypass AC source	Includes R, S, T and Neutral terminals.
③	Main Input Block	Connects main AC source	Includes R, S, T and Neutral terminals.
④	For UPS Grounding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

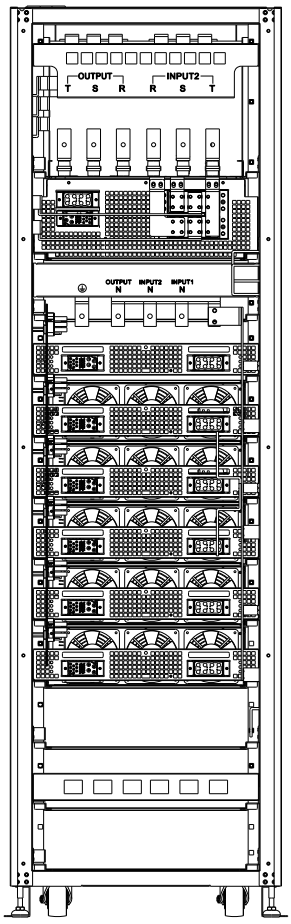


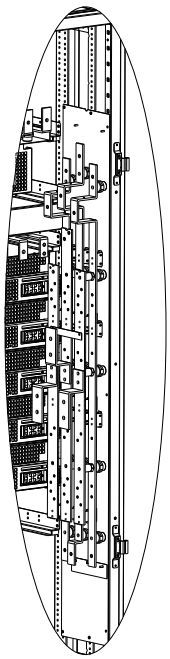


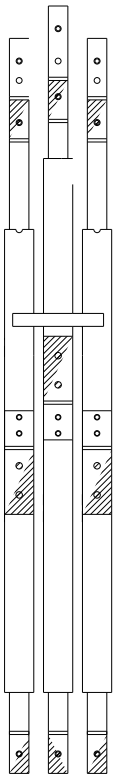
30U-120/30U-180











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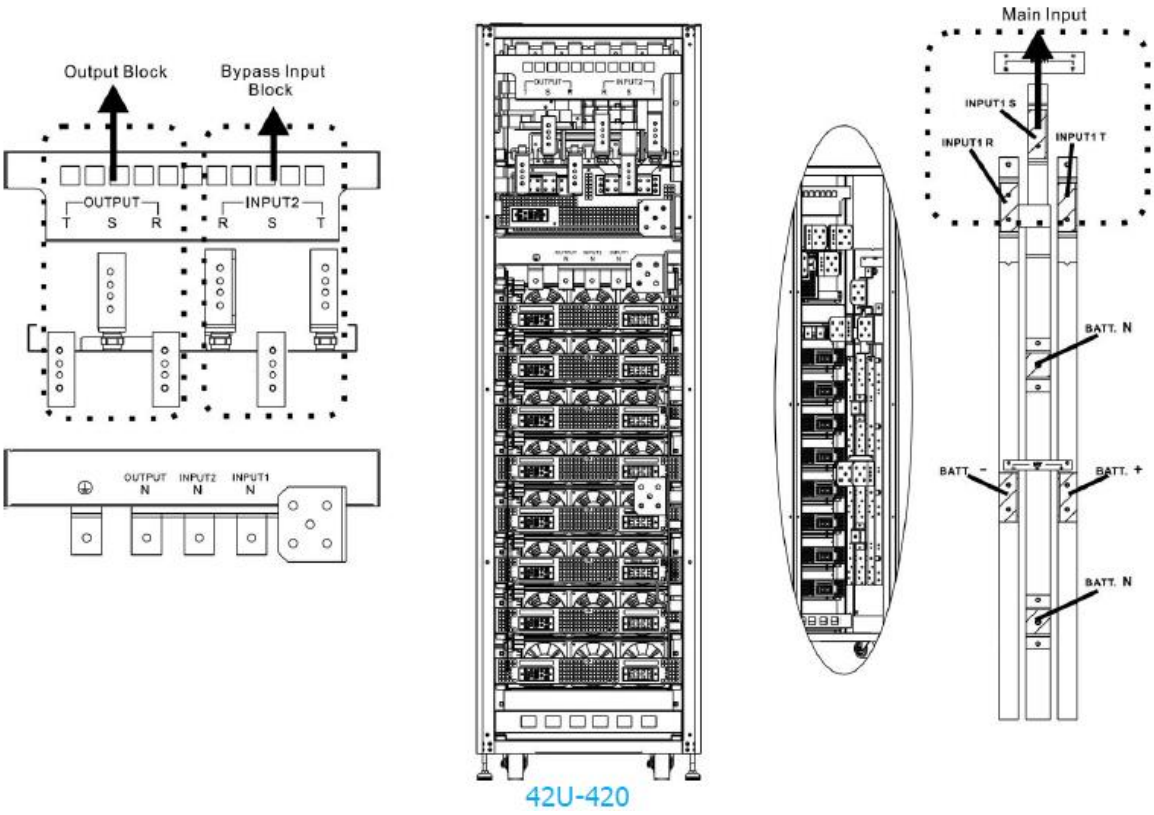

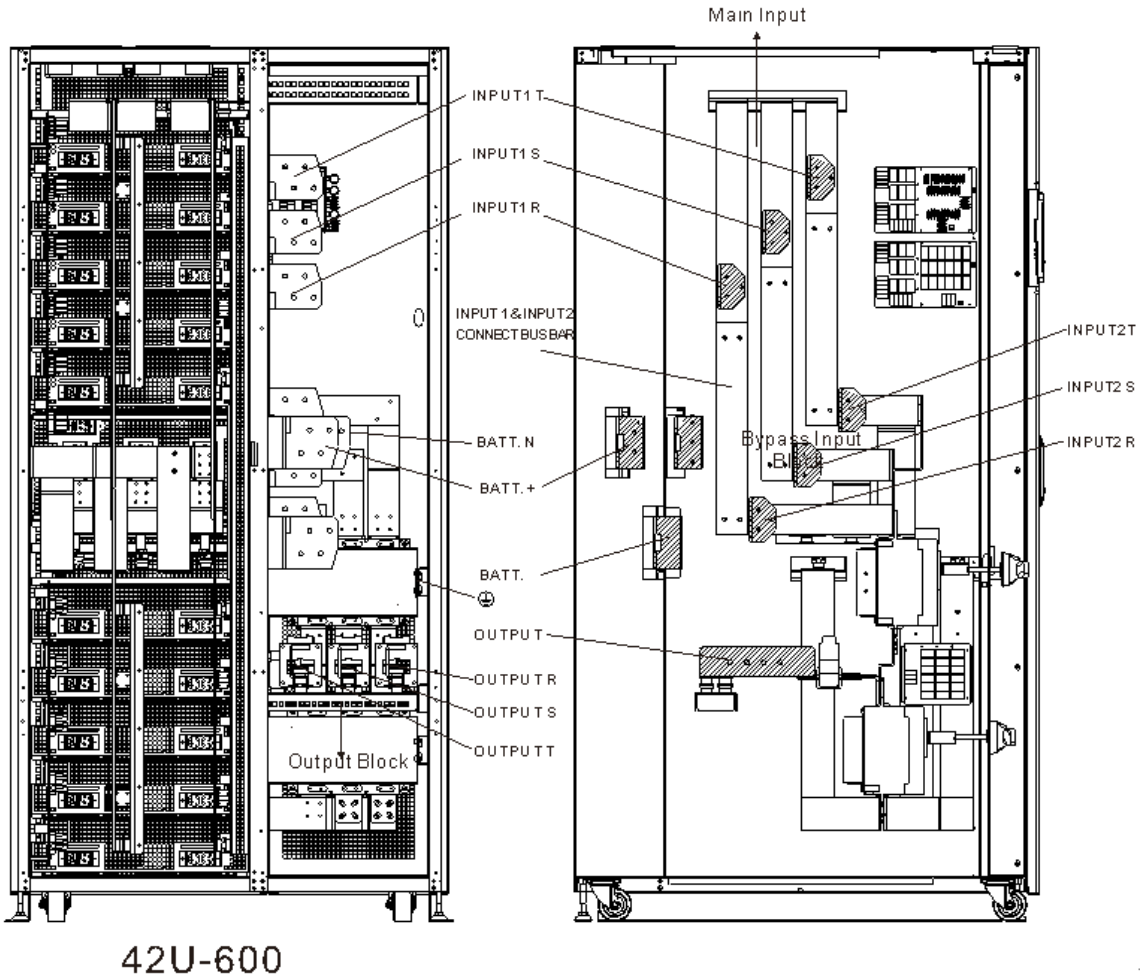

Figure 2-13 Terminal Blocks

2.8 Control Panel

2.8.1 LCD Display

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

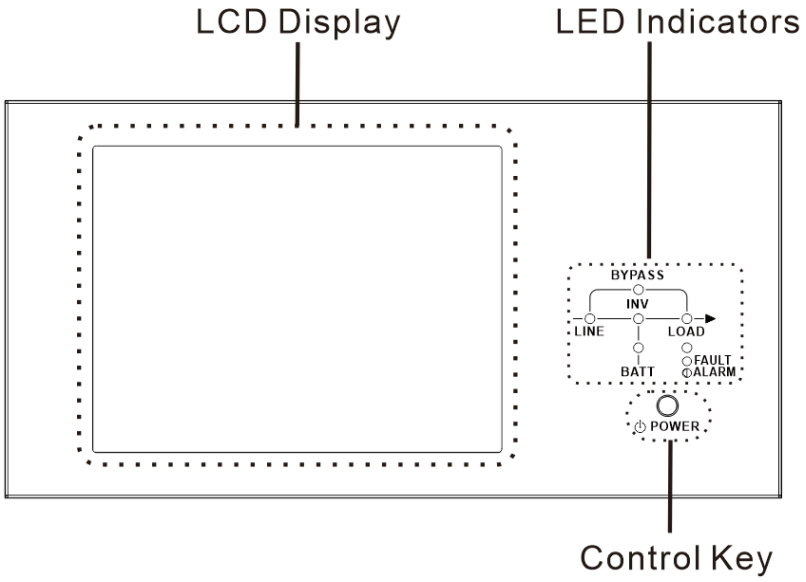

Figure 2-14 Control Panel

2.8.2 LED Indicators

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

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FAULT/ ALARM	Red	On	UPS fault.
		Flashing	UPS alarm.
		Off	Normal.

2.8.3 Function Keys

Turn on or turn off the UPS.

2.9 Introduction of Modules

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

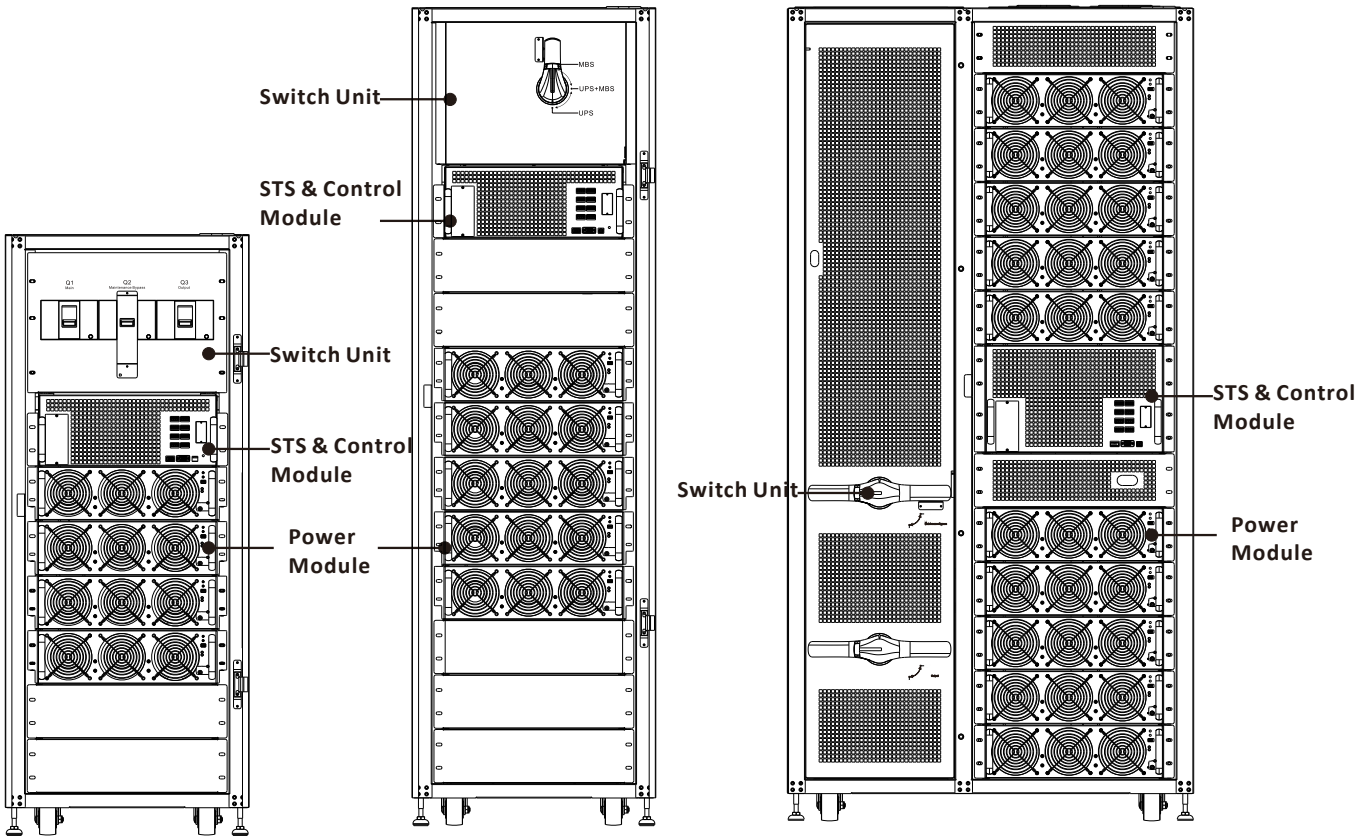


Figure 2-15 Front View

2.9.1 STS Module

The STS Module is installed before leaving factory. It provides the bypass power when UPS is in Bypass Mode.
In addition to offering bypass power, it includes some communication interfaces. For detailed information, please refer to Chapter 5.

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

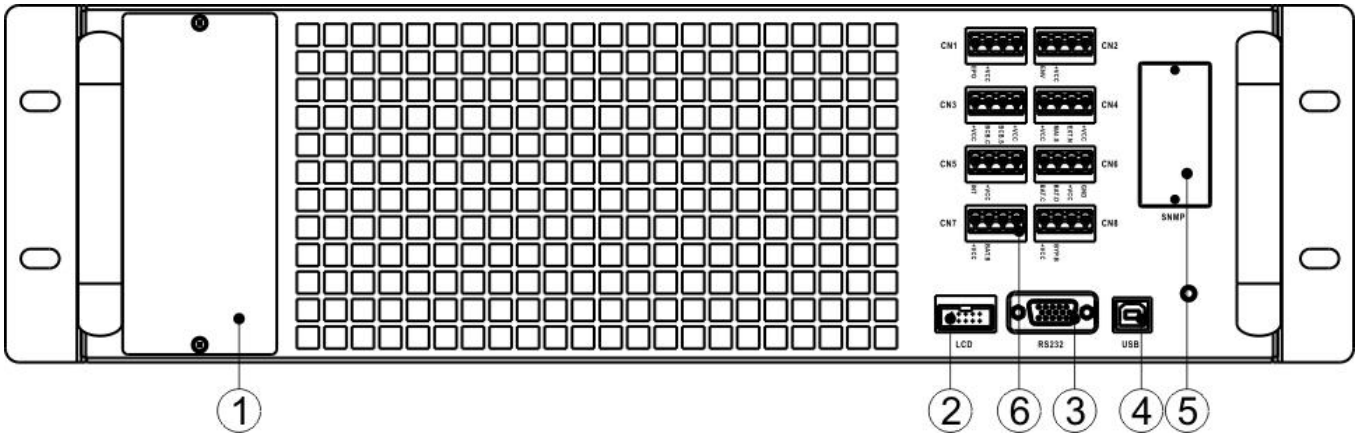


Figure 2-16 STS Module

2.9.2 Power Module

Each Power Module is shipped with its own package. It has to be installed during the UPS system installation.
The capacity of each Power Module is 60kVA/60kW. It includes a power factor correction rectifier, a battery charger, an inverter and control circuit.

No.	Item	Description	
①	Fan	The Power Module uses forced convection cooling by these fans. Cooling air enters the module through ventilation grills and exhausted through grills located in the rear of the module. Please do not block the ventilation area.	
②	Ready Switch	Unlock it before removing the Power Module. Lock it when the Power Module is well installed. Then the Power Module can start to work.	
③	DIP Switches	There are three DIP switches for Power Module address setting. In the same cabinet, each Power Module ID MUST be exclusive. The setting method is shown in **Table 2-1**.	
④	Battery Start Button	When AC input is not existing, use this button to start battery power for UPS.	
⑤	FAULT LED	ON	The Power Module is in fault condition or the Ready Switch is unlocked.
		ON/OFF 0.5 sec	The Power Module IDs conflict.
		ON/OFF 0.15 sec	The STS Module is not found.
⑥	RUN LED	ON	The Power Module normally works as a slave module.
		ON/OFF 0.5 sec	The Power Module normally works as a master module.
		ON/OFF 0.15 sec	The CAN Bus communication doesn't work.

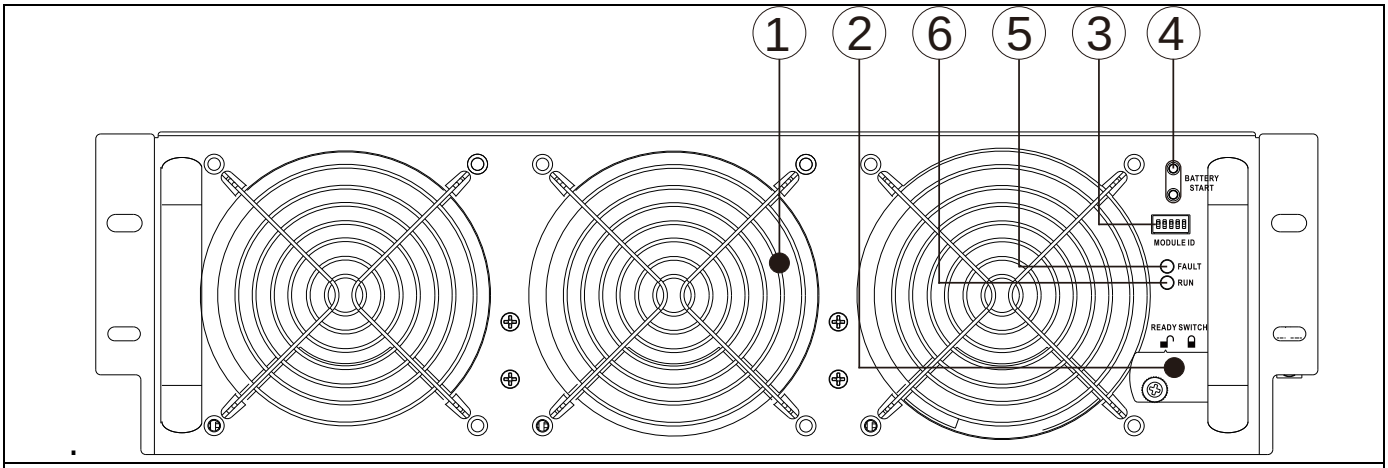


Figure 2-17 Power Module 60kVA

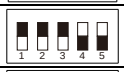
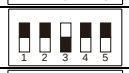
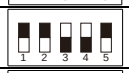
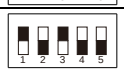
RACK 1		RACK 2	
Module Address	DIP SWITCH	Module Address	DIP SWITCH
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	

Table 2-1 DIP switch setting and Module Address

Power Module ID Assignment

The Power Module's ID shown in **Table 2-1**. The DIP switches (#3) are mounted in the front panel as shown in Fig 2-17.

The DIP switch position have been well set before leaving factory. It's not necessary to change it for single UPS (RACK 1) system application. But for Parallel UPS system application, please follow the instructions in Chapter 9 " UPS Installation for Parallel Rack System

2.10 Power Cable

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

2.10.1 AC input and output maximum current and power cable configuration.

For extended series in 30U & 42U cabinet

Power rating	60KVA	120KVA	180KVA	240KVA	300KVA
Current (A)	110	220	330	440	550
Power cable (mm^2)	35	95	240	300	150*2
Fixation torque force (lb-in)	60	60	60	60	60

Power rating	360KVA	420KVA	480KVA	540KVA	600KVA
Current (A)	660	770	880	990	1100
Power cable (mm^2)	185*2	240*2	300*2	185*3	240*3
Fixation torque force (lb-in)	60	60	60	60	60

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

2.10.2 DC input maximum current and power cable configuration.

For extended series in 30U & 42U cabinet

Power rating	60KVA	120KVA	180KVA	240KVA	300KVA
Current (A)	200	400	600	800	1000
Power cable (mm^2)	95	240	150 x 2	240*2	185*3
Fixation torque force (lb-in)	60	60	60	60	60

Power rating	360KVA	420KVA	480KVA	540KVA	600KVA
Current (A)	1200	1400	1600	1800	2000
Power cable (mm^2)	240*3	240*4	240x 4	300x 4	300x 4
Fixation torque force (lb-in)	60	60	60	60	60

2.11 Wiring

WARNING:

- Before connecting any wire, make sure the AC input and battery power is completely cut off.
- Make sure the breakers, Main Breaker (Q1), Maintenance Breaker (Q2), Output Breaker (Q3) and battery breaker are all in the **OFF** position.
- Make sure the Maintenance Bypass Switch is in UPS position.
- In order to have good heat dissipation, the power cables MUST come into the cabinet from top of the cabinet. Or the cables will block the cooling ventilation and make the over temperature failure.

2.11.1 Installation Drawing

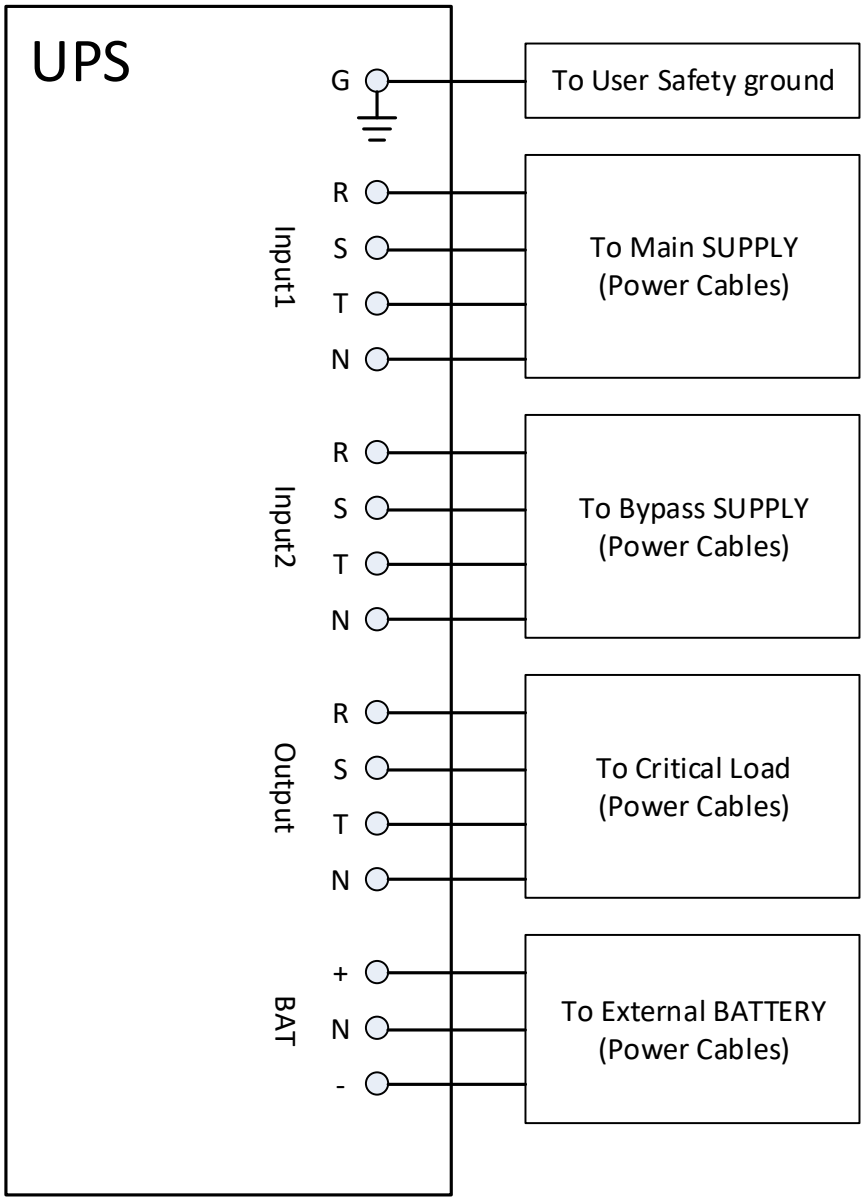


Figure 2-18 UPS Cabinet Wiring

2.11.2 AC source connection

For **Single input** application, connect Input1 to the AC power source and use 3 short wires to connect Input1 and Input2.
For **Dual input** application, connect input1 to the Main AC power source and connect input2 to the Bypass power source.

The sequence of three phase, R, S and T must be connected accordingly. The wrong sequence will alarm a warning when the UPS is powered.
The N must be connected firmly. A warning message will be indicated, if the N is not connected well.
There is no Breaker between Input2 and STS Module, the STS module is waked up when Input2 is powered, though the Q1 Breaker is OFF.
installed externally.

For the 42U-300 with two-breaker cabinet, there is no input breaker. This breaker have to be installed externally.
For the 42U-300 with one switch, 42U-480 and42U-600 cabinet, there is no input breaker nor output breaker. These breakers have to be installed externally.

2.11.3 External Battery Cabinet Connection

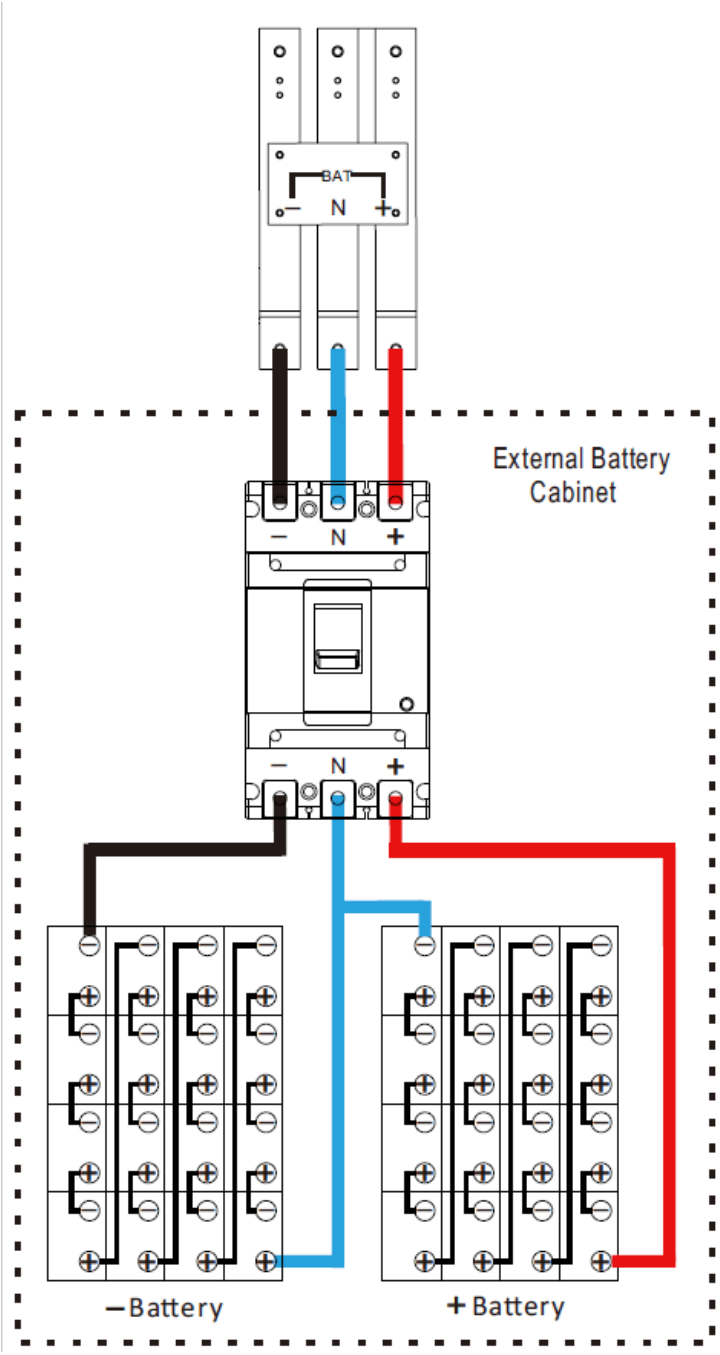


Figure 2-24 External Battery Cabinet Wiring

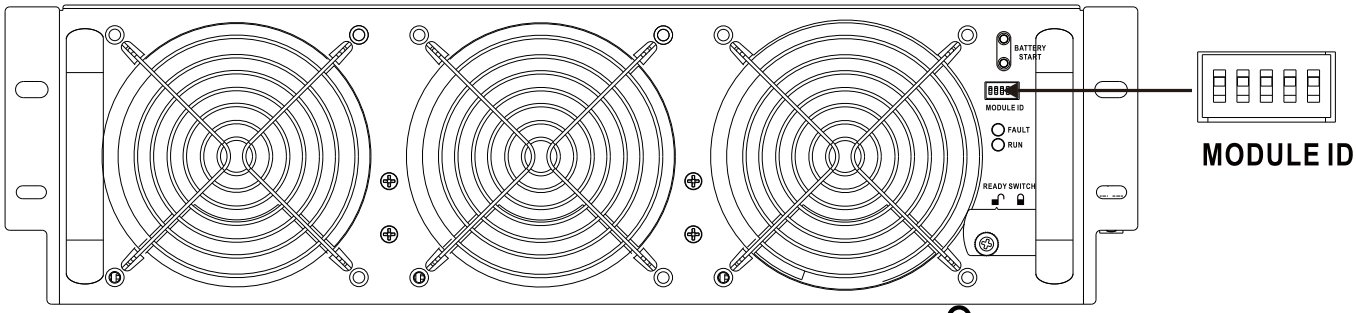
After the battery is completely installed, be sure to set up nominal battery voltage, battery capacity and maximum charging current in LCD setting. Otherwise, if battery setting is different from actual installation, the UPS will keep warning. Please refer to section 4.2.6.3 and **Table 4-9** for the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

2.12 Power Module Installation

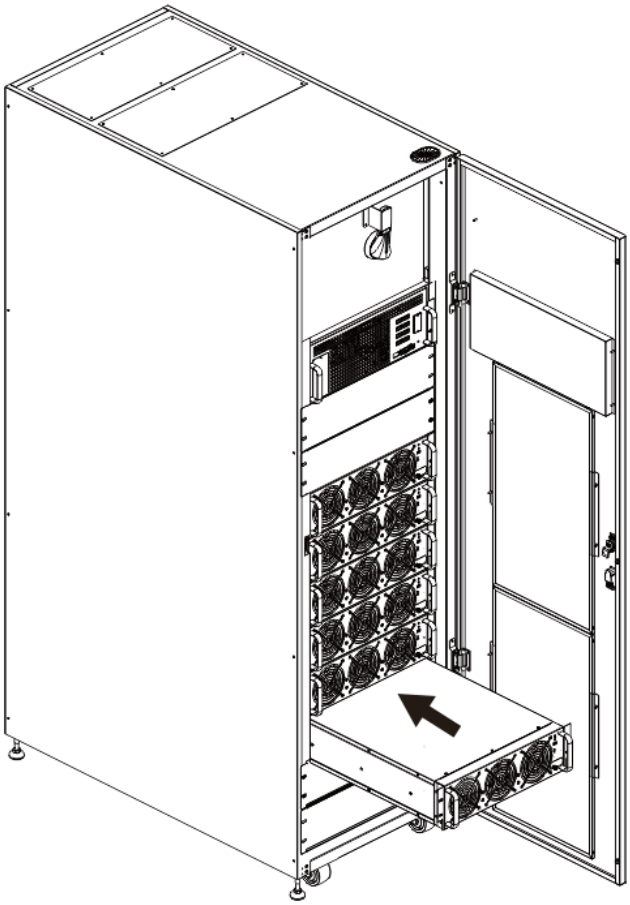
⚠ Warning
The weight of Power Module is over 30Kg so at least two persons are required for handling.

2.12.1 Insert the Power Module

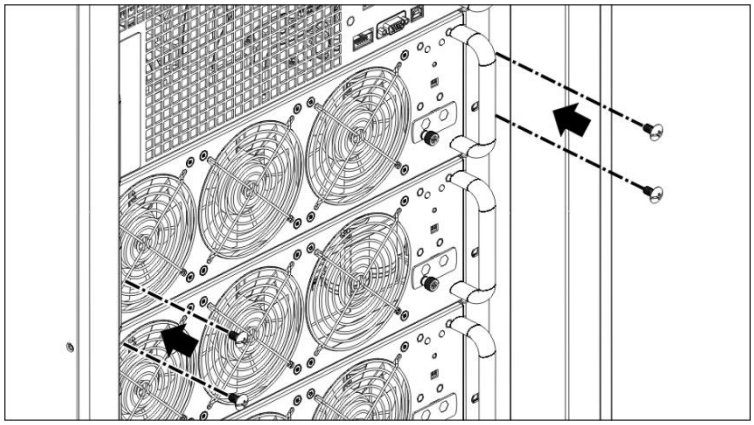
(1.) Adjust the DIP switch positions to set the different Module Address. Refer to **Table 2-1**.



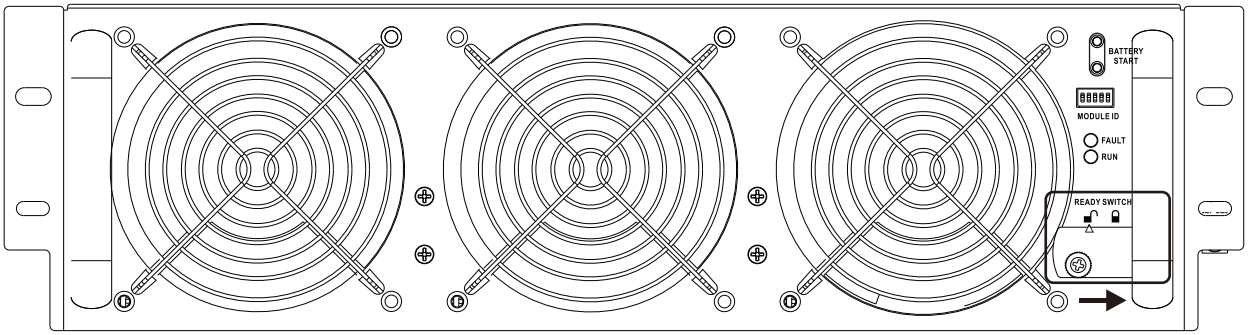
(2.) Switch the ready switch on the front panel of the module to the "🔓" position.
(3.) Insert the Power Module into an unoccupied slot by two persons.



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



(5.) Move the ready switch to the "🔒" position.

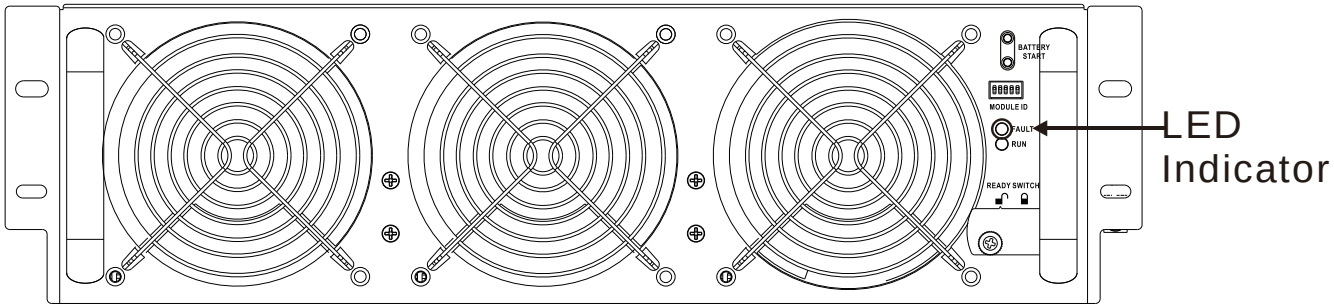


2.12.2 Remove the Power Module

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

(1.) Switch the ready switch to the "🔓" position.

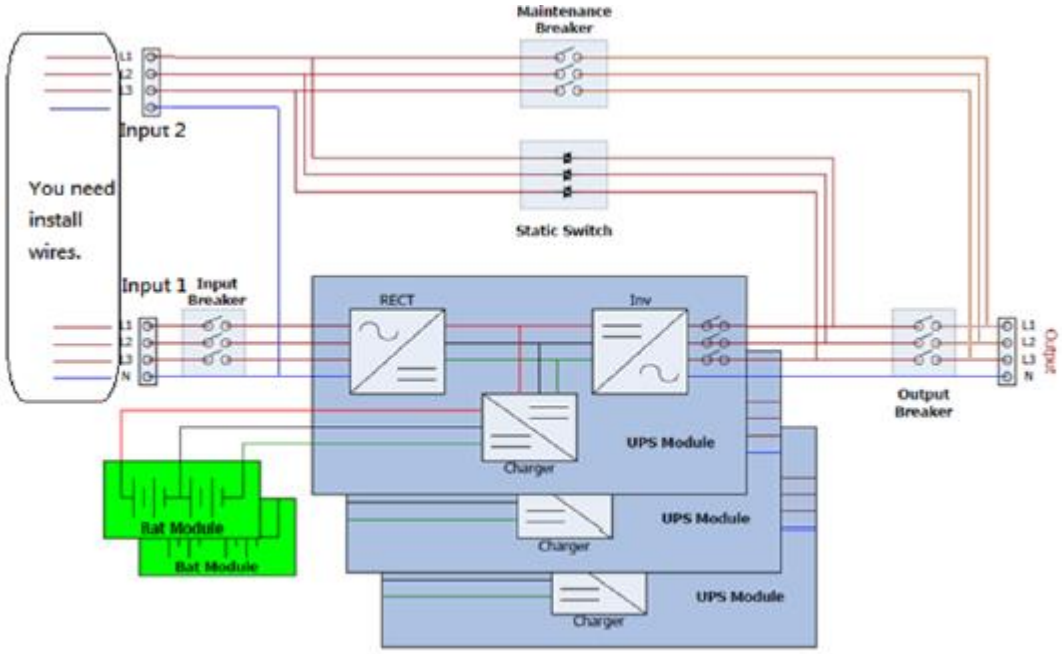
(2.) FAULT LED (RED) indicator is lit to indicate the Power Module output is off and disconnected from UPS system.



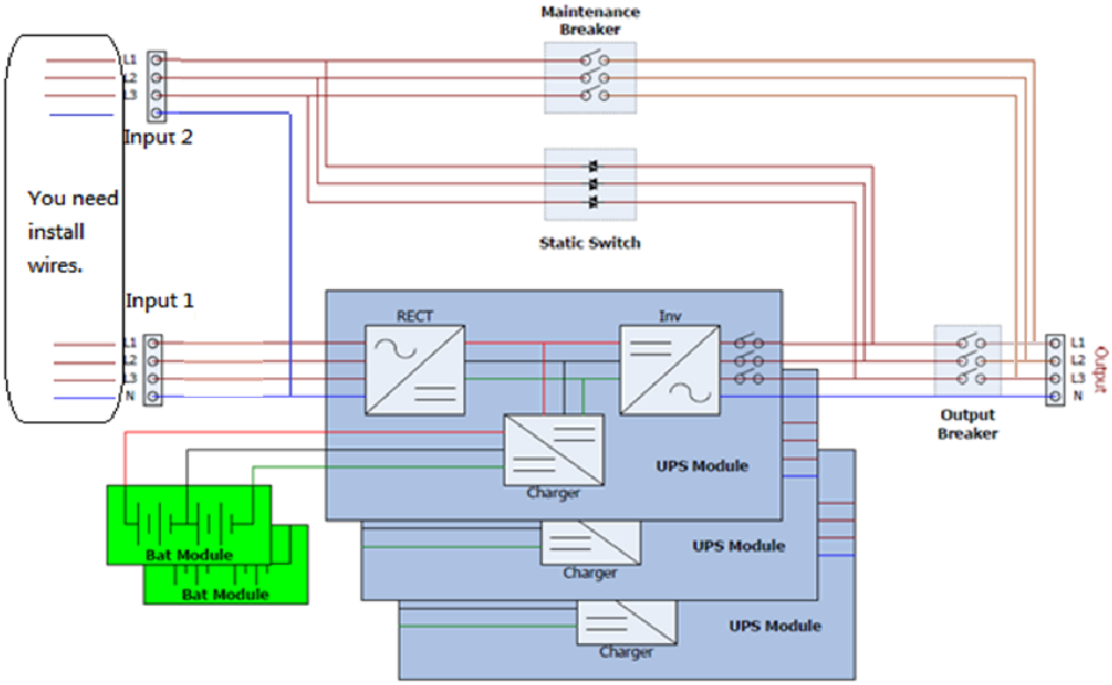
(3.) Use a screwdriver to remove the four screws from fixing holes.
(4.) Two people pull out together and remove the Power Module from its slot.

3. Operation Mode and UPS Operation

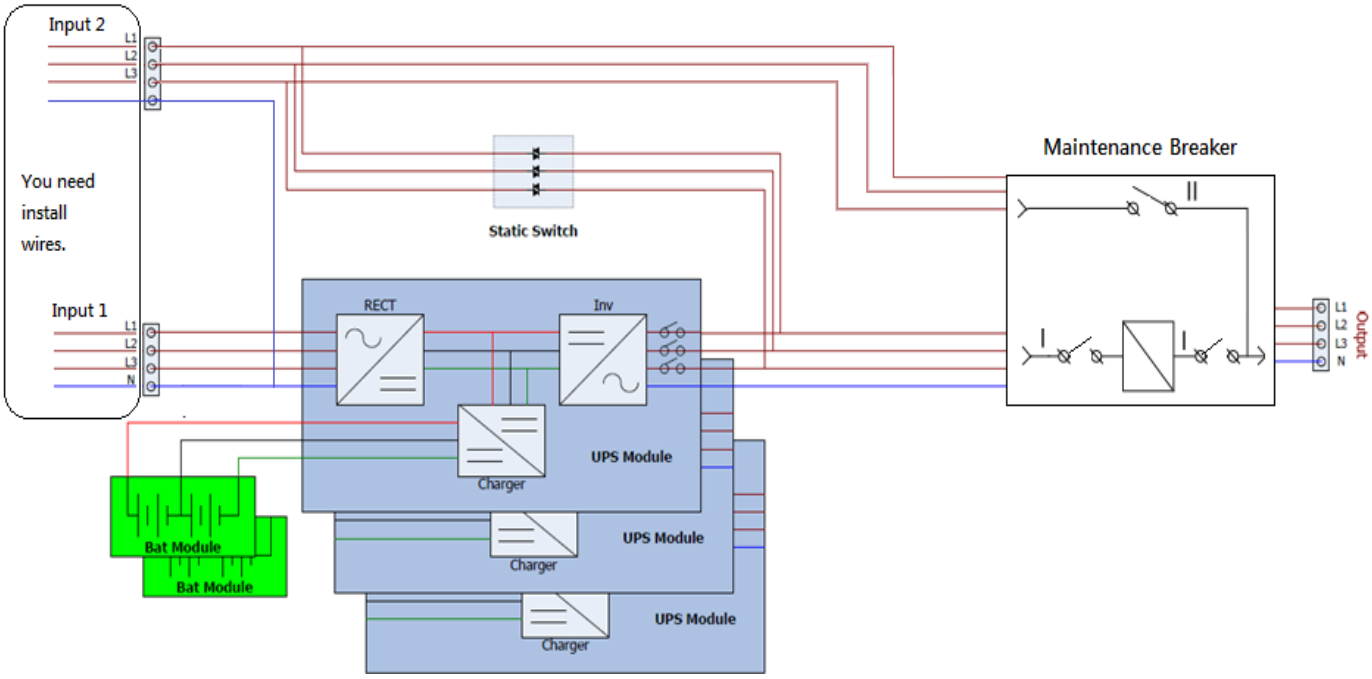
3.1 Block diagram of UPS



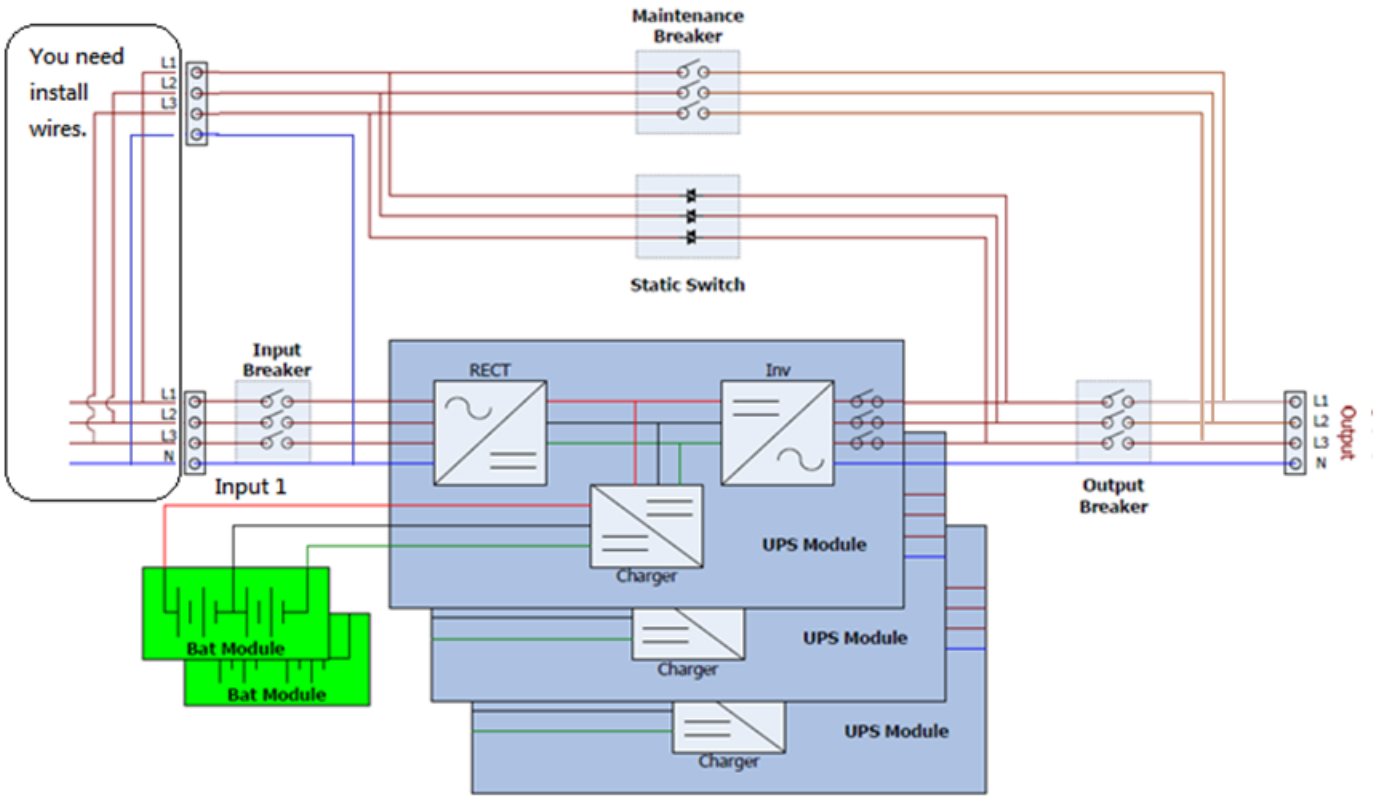
Wiring diagram for dual inputs with three breakers



Wiring diagram for dual inputs with two switch



Wiring diagram for dual inputs with one maintenance bypass switch
Figure 3-1



Wiring diagram for single input with three breakers

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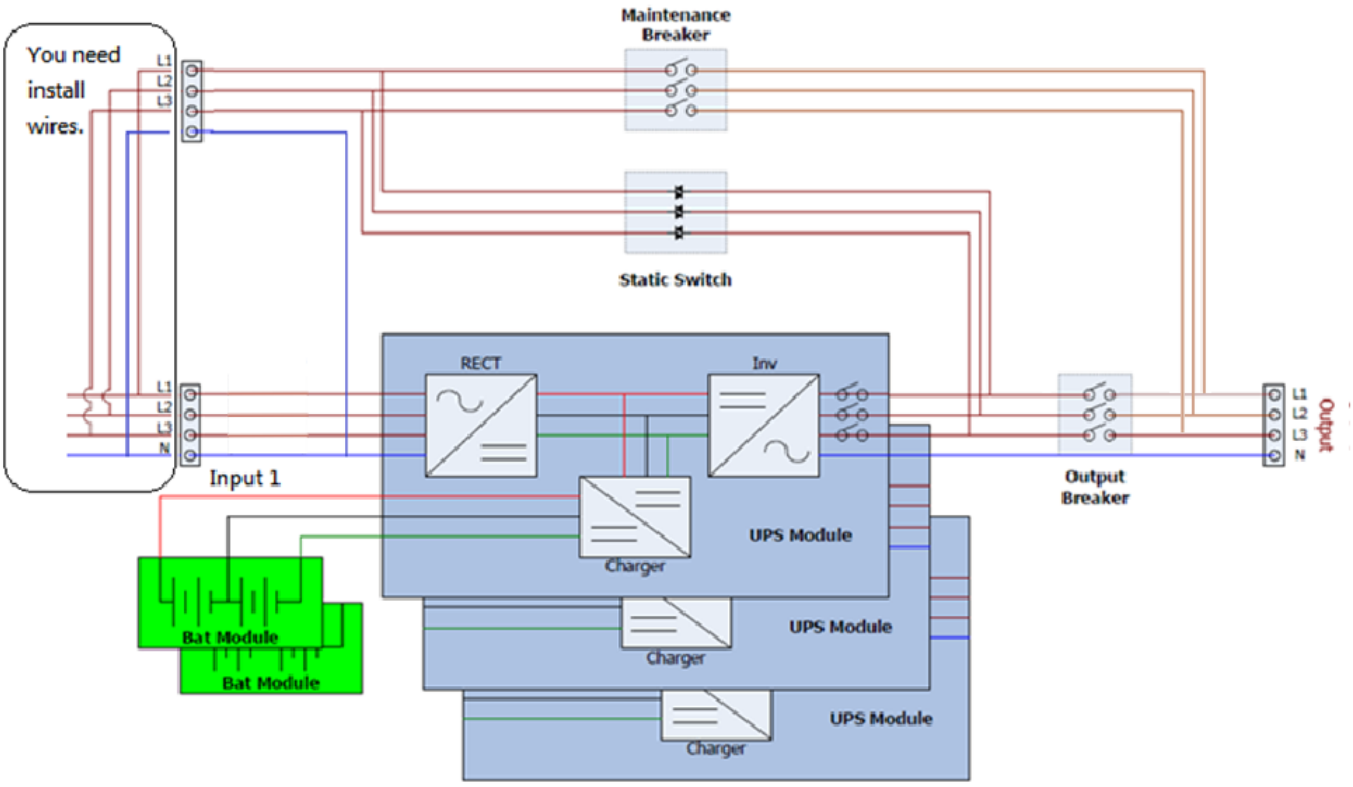
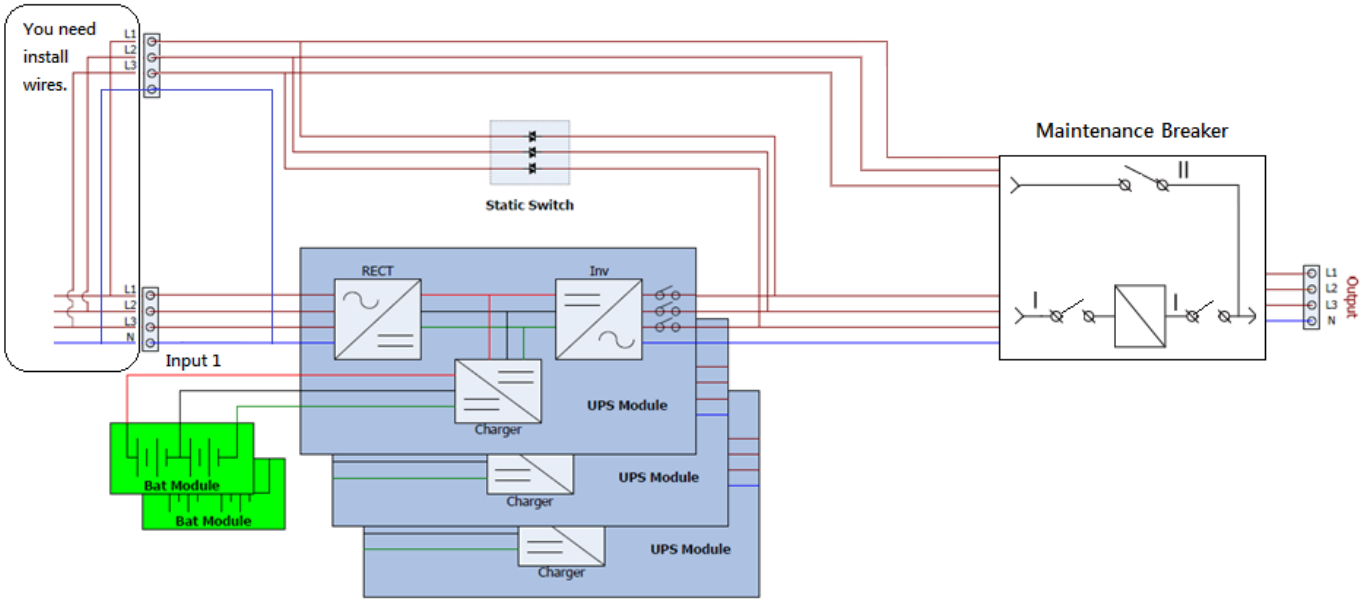


Wiring diagram for single input with two breakers



Wiring diagram for single input with one maintenance bypass switch
Figure 3-2

3.2 Operation Mode

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

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

3.2.1 Standby Mode

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

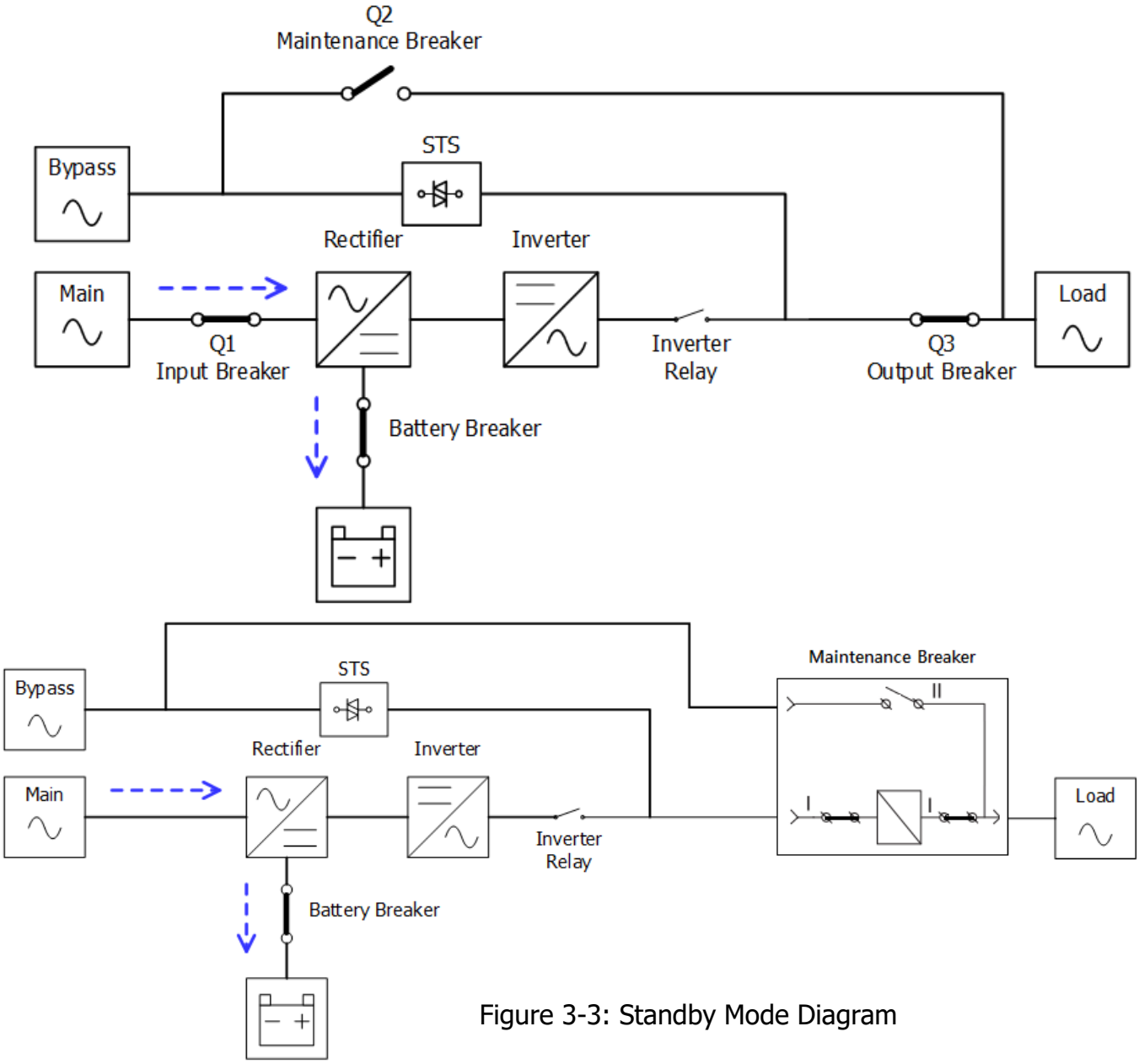


Figure 3-3: Standby Mode Diagram

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3.2.2 Line Mode

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

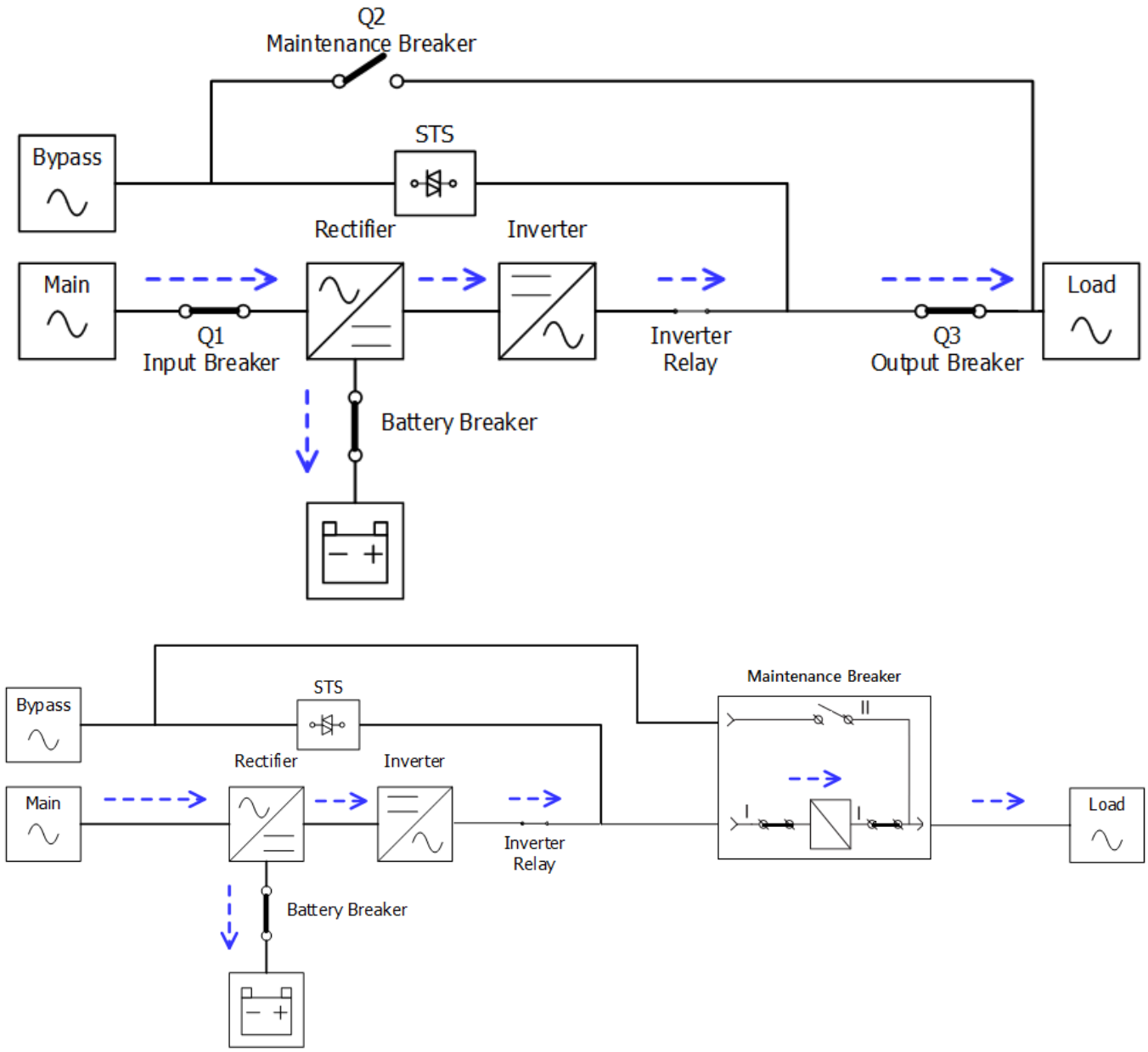

Figure 3-4 : Line Mode Diagram

3.2.3 Battery Mode

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

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

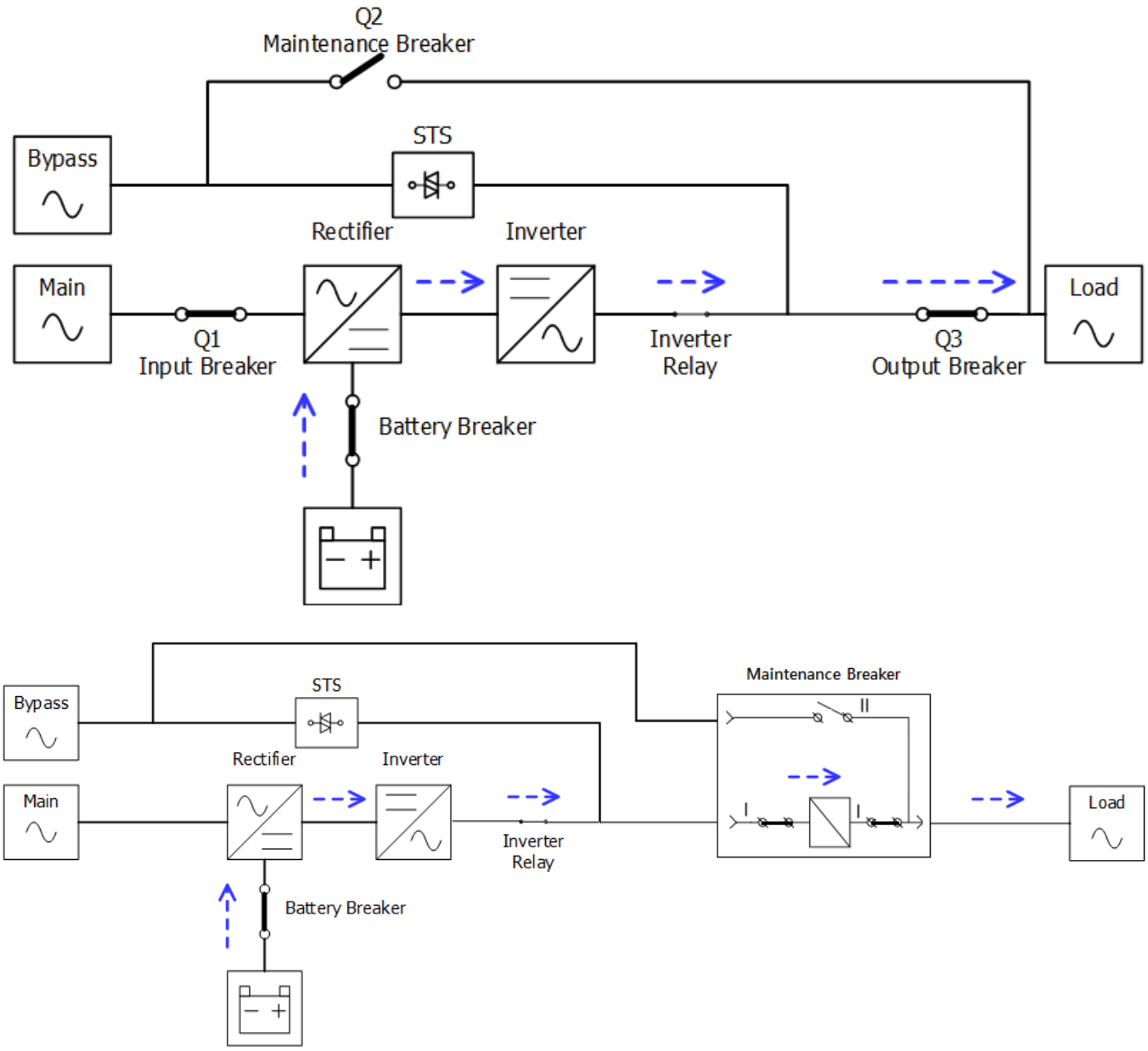

Figure 3-5: Battery Mode Diagram

3.2.4 Bypass Mode

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

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

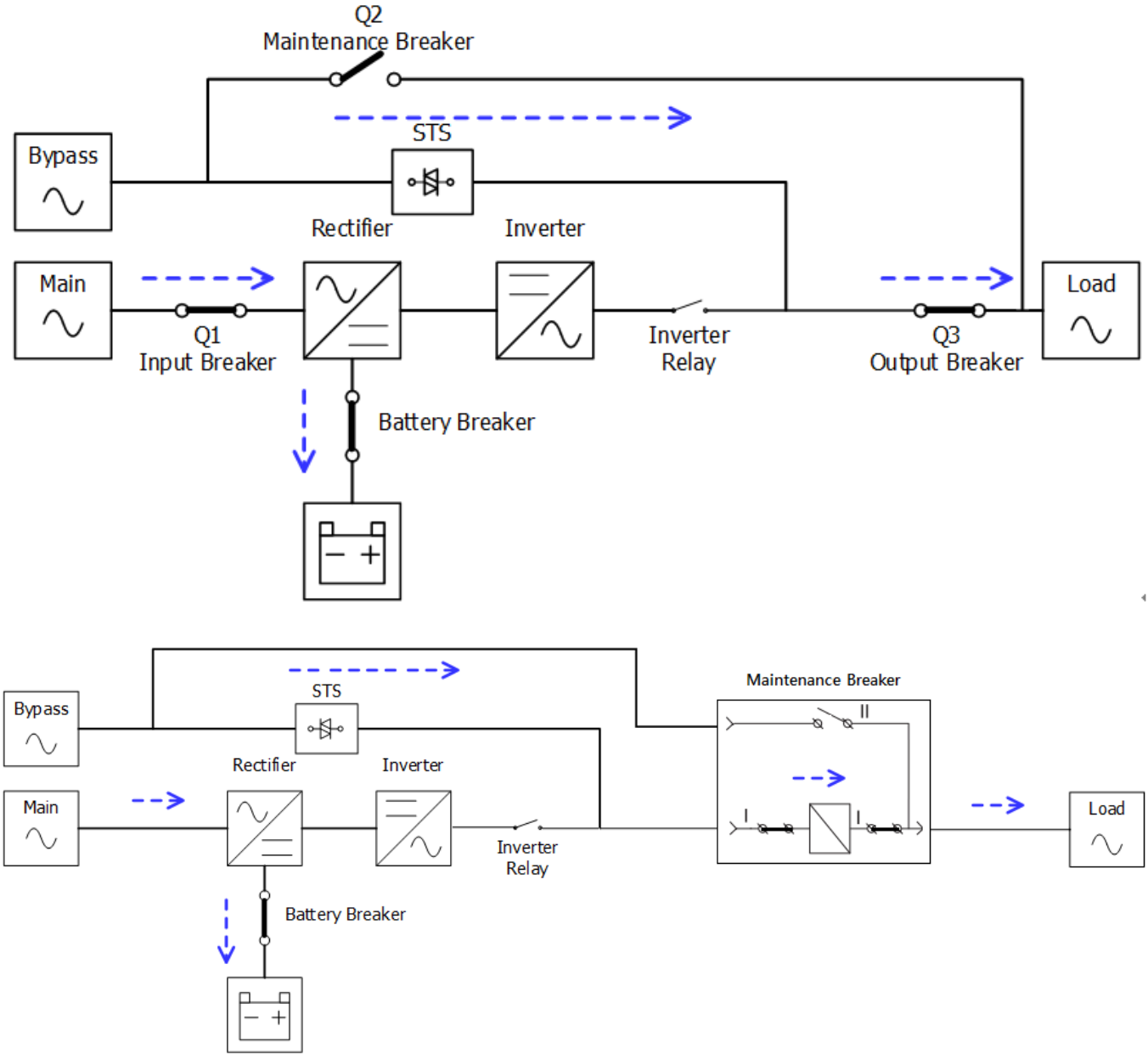

Figure 3-6: Bypass Mode Diagram

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3.2.5 ECO Mode

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

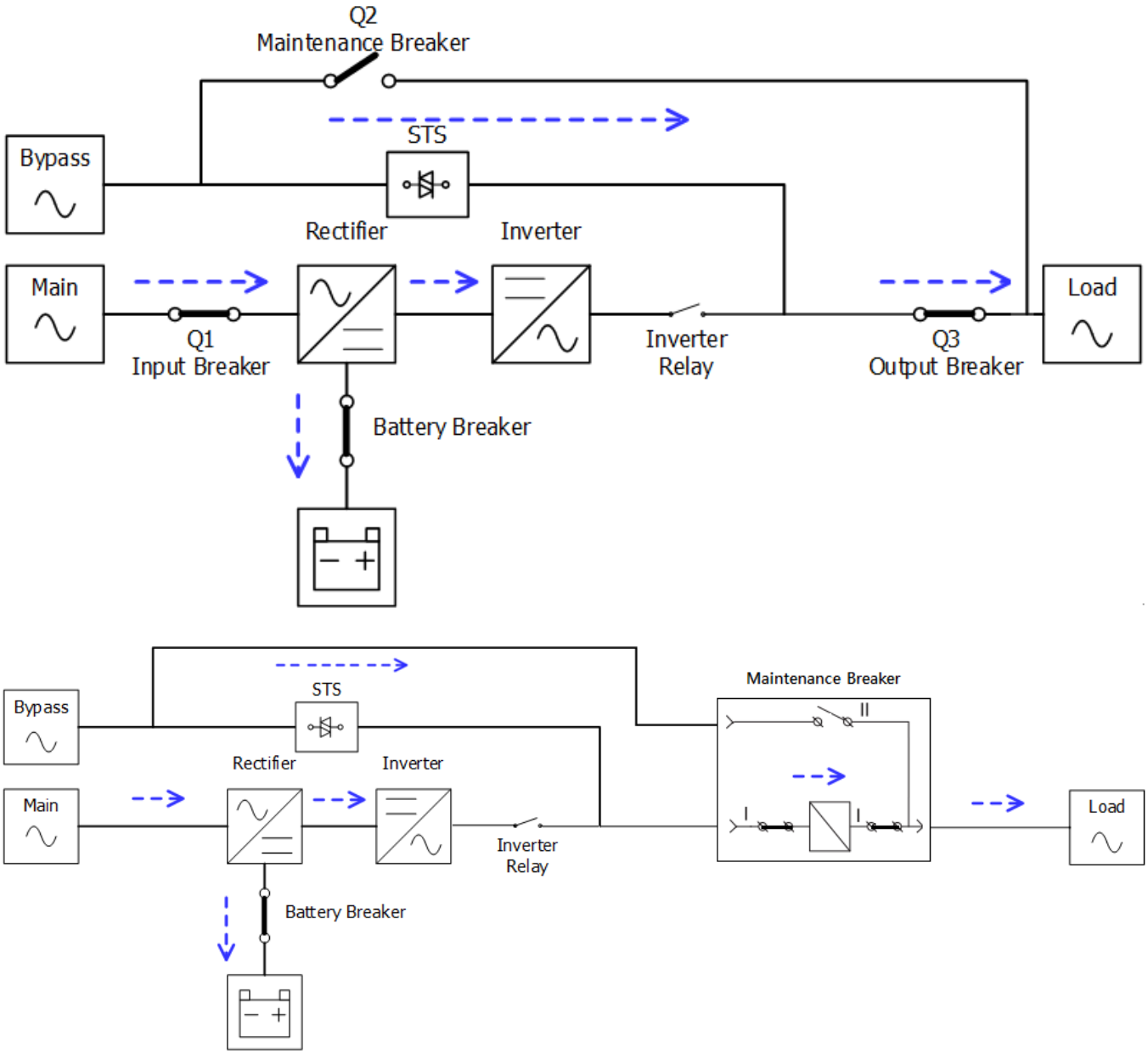

Figure 3-7: ECO Mode Diagram

3.2.6 Shutdown Mode

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

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

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

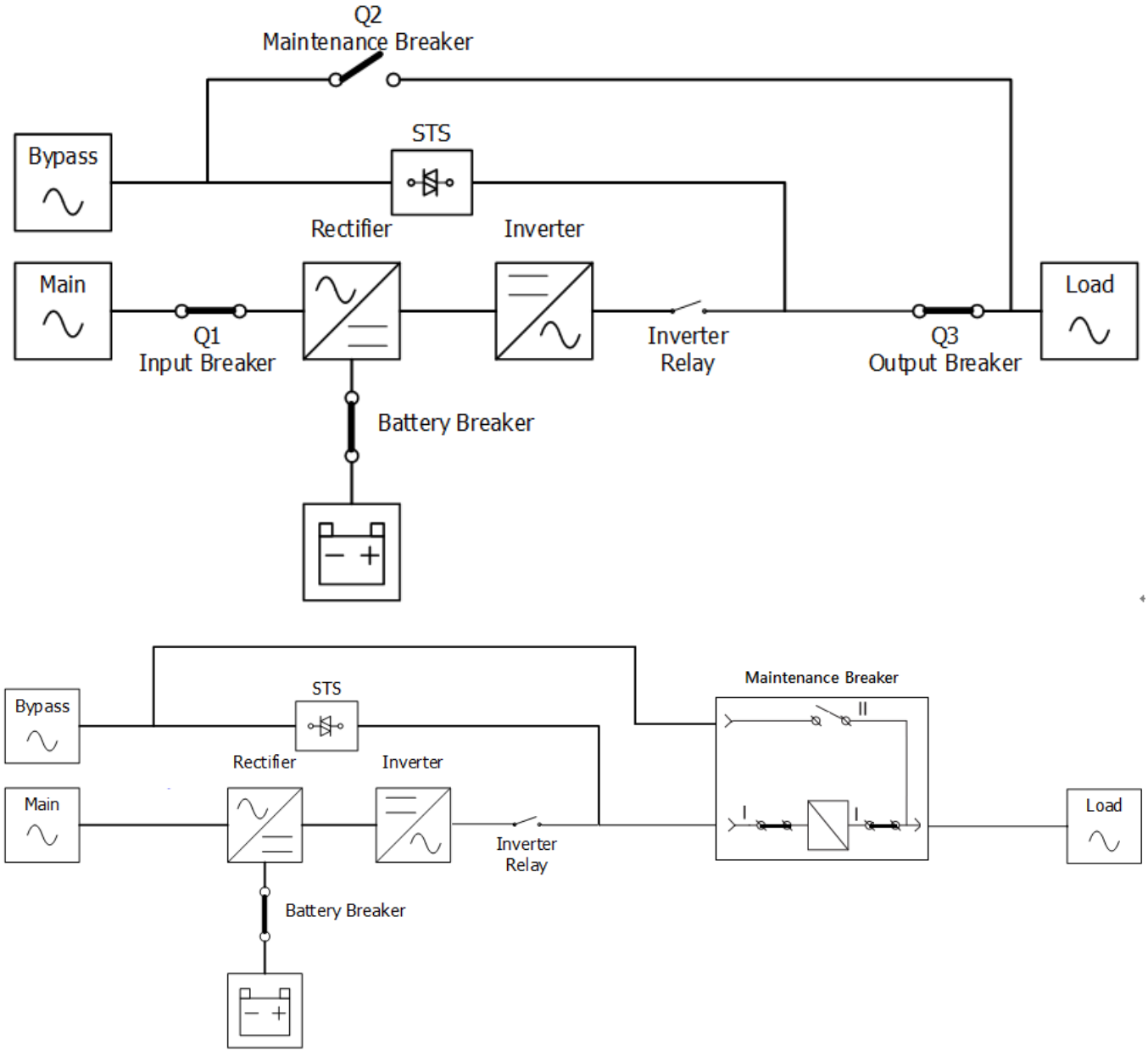

Figure 3-8: Shutdown Mode Diagram

3.2.7 Maintenance bypass Mode

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

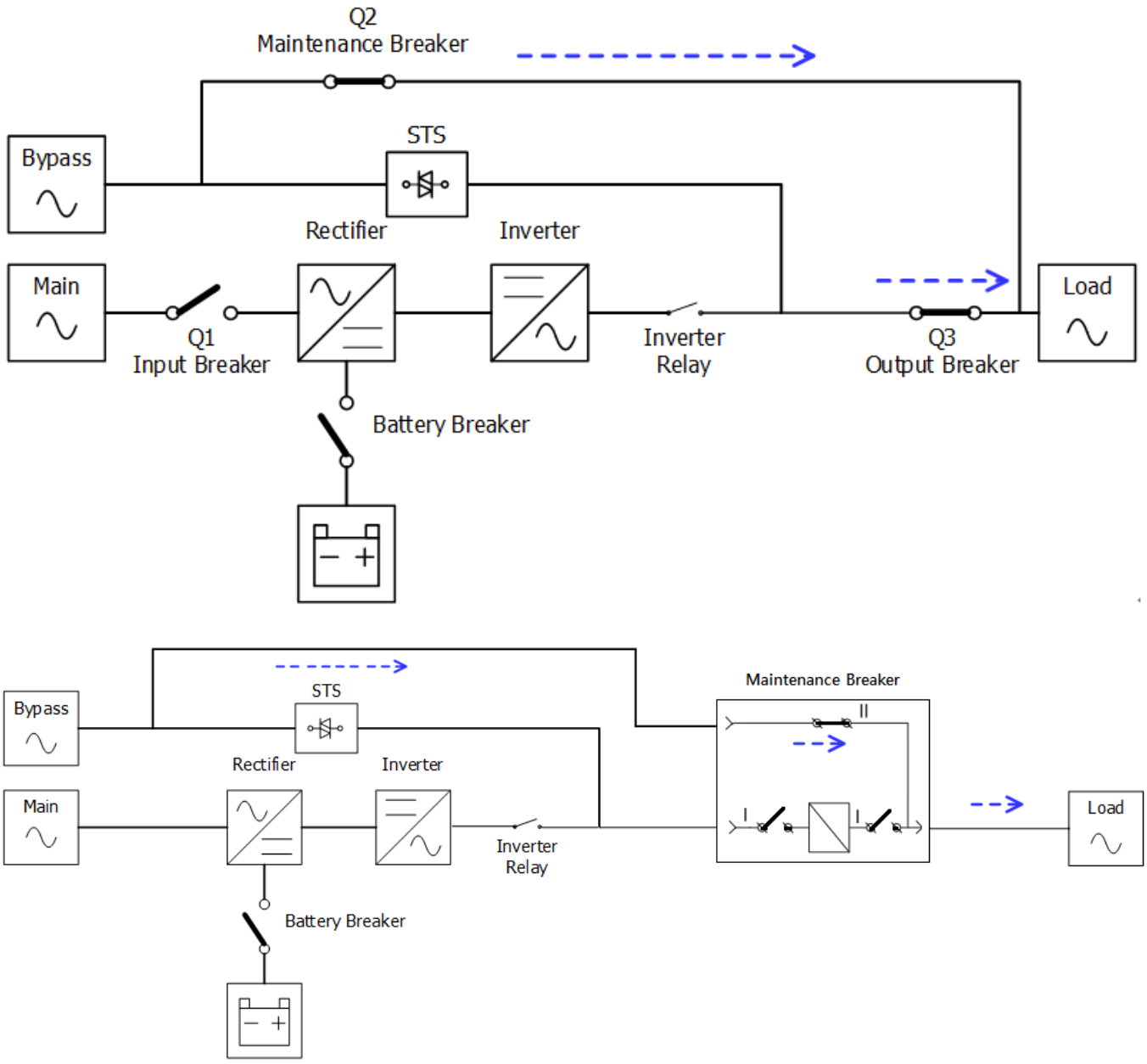

Figure 3-9: Maintenance Bypass Mode Diagram

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3.3 UPS Operation

⚠ Warning
● Do not start the UPS until the installation is completed. ● Make sure the wiring is correct and the power cables are fixed firmly. ● Make sure the Power Modules' address have been configured. Refer to section 2.9.2 Power Module ● Make sure the ready switch on the Power Module has been moved to the "Locked" position. ● Make sure all the breakers are switch **OFF**.

3.3.1 AC Startup

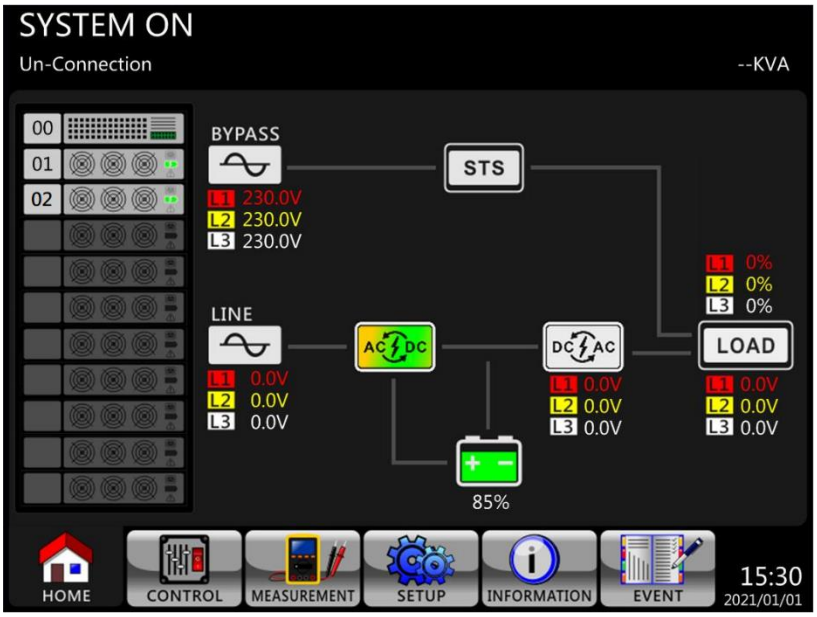
Ensure to follow this procedure when turning on the UPS from a fully powered-down condition.

The operating procedures are as follows:

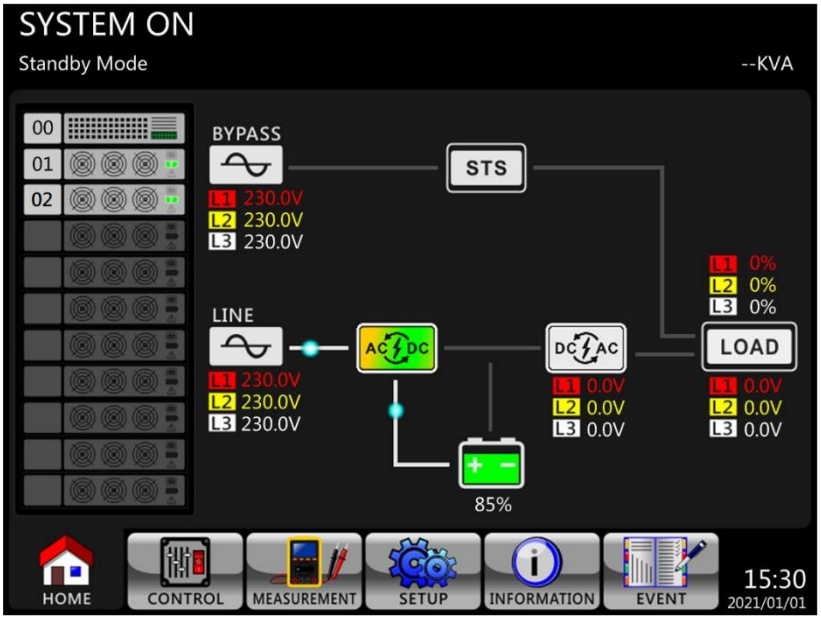
Step 1: Refer to "Chapter 2 Installation" to connect the power cables and install the Power Modules and the battery required for the UPS system.

Step 2: Switch ON the battery breaker.

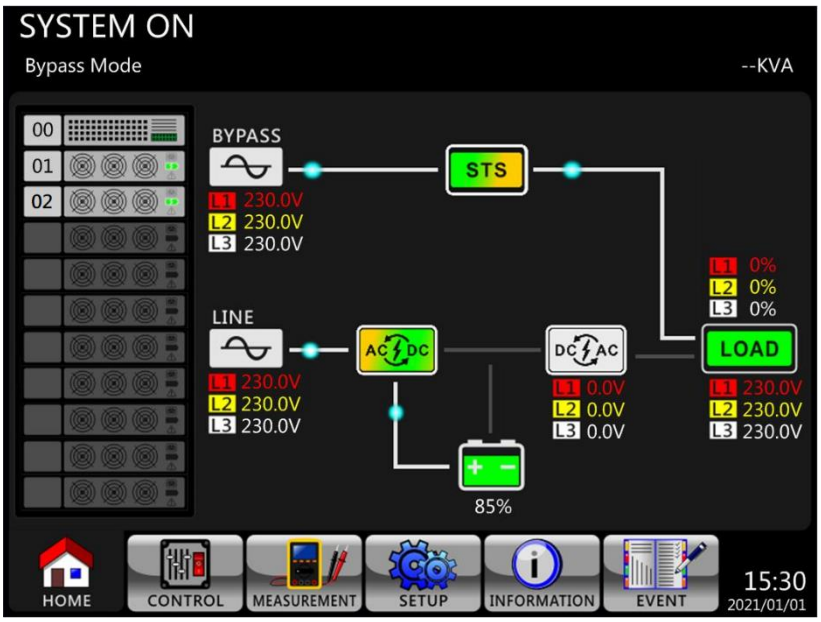
Step 3: Switch ON the external power switch in distribution panel to power the UPS. The STS module starts running and the LCD panel is displayed.



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

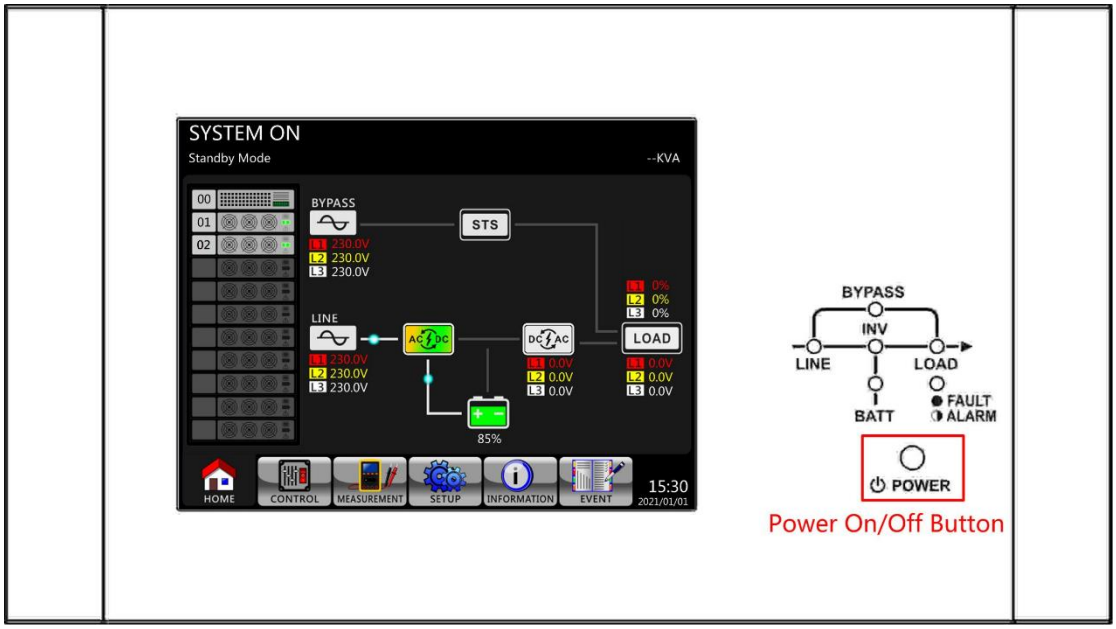


Or the UPS will enter into Bypass Mode, if the setting of Bypass mode is enabled.

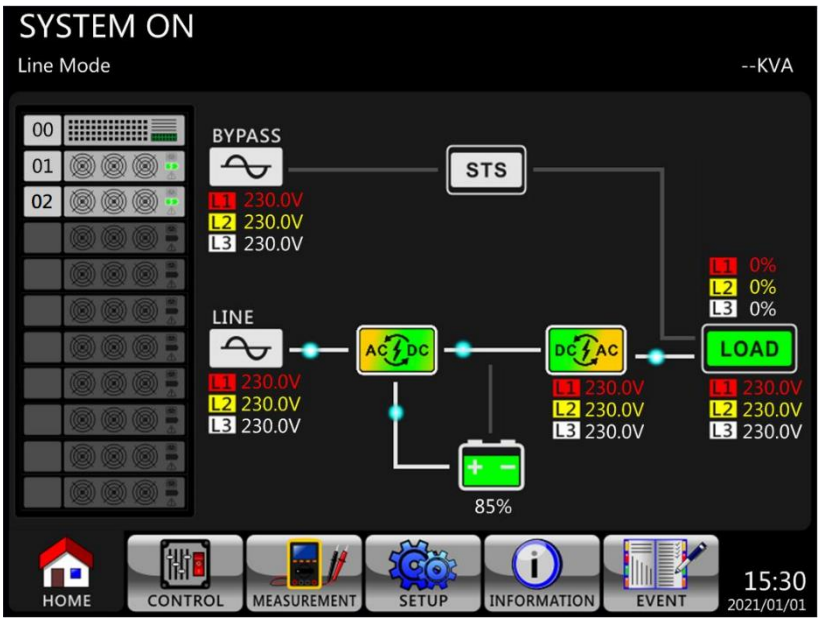


Step 5: Make sure that no warning or fault event occurs. If yes, please refer to Chapter 6 Troubleshooting to solve it.

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



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

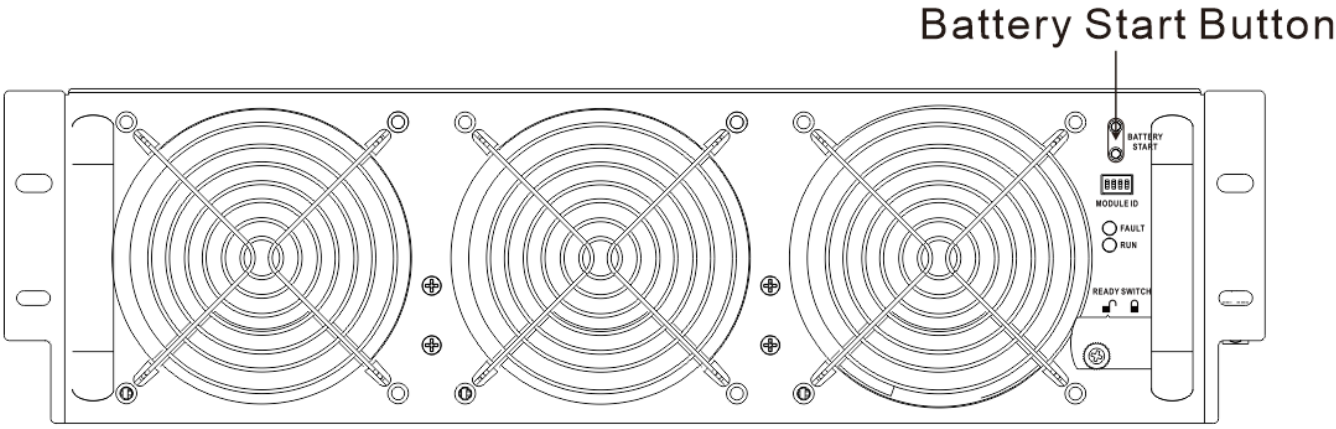


Step 7: Switch ON the output breaker (Q3). AC startup procedure is complete.

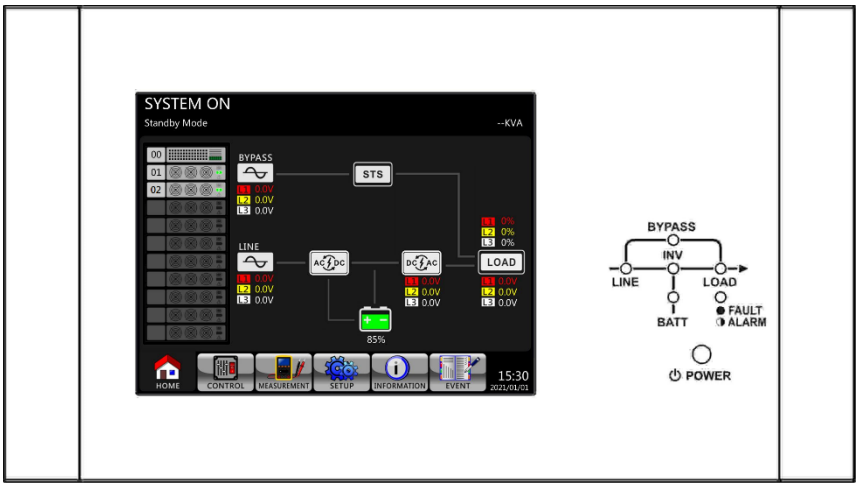
3.3.2 Cold Start Startup

Step 1: Switch ON the battery Breaker.

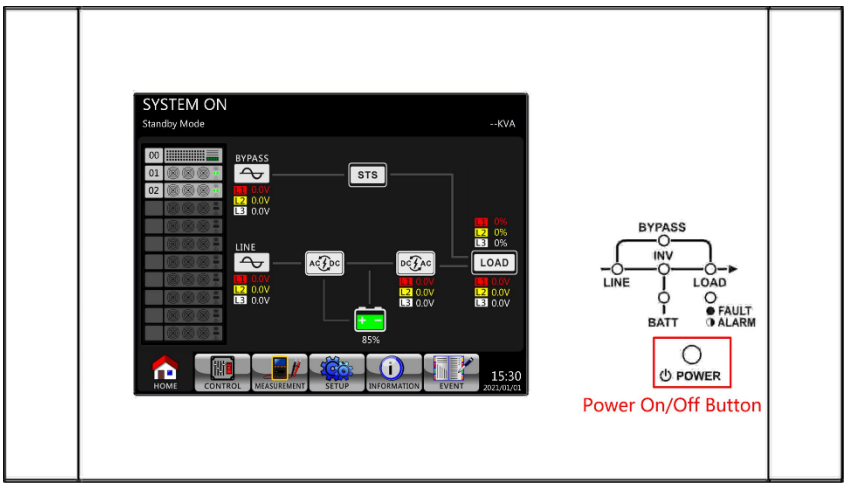
Step 2: Press the "Battery Start" button on any one of Power Modules to start up the control power of all Power modules and STS moodule as shown below.



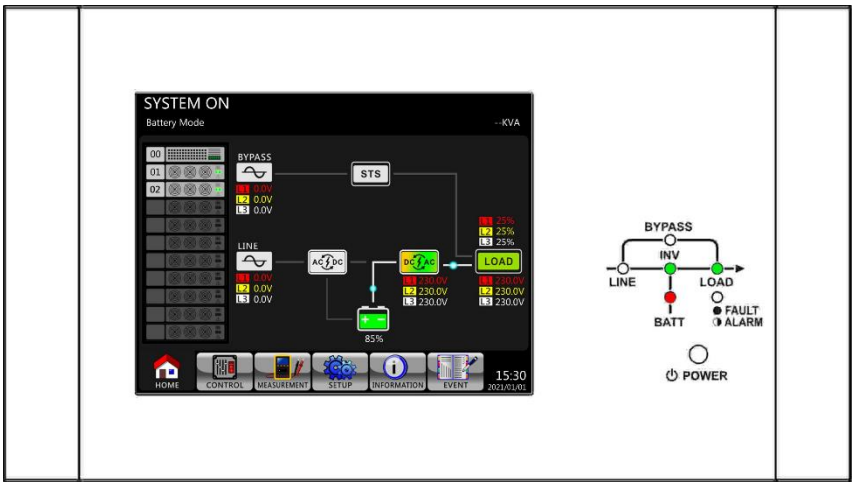
Step 3: After pressing the "Battery Start" button, UPS will enter into Standby mode. Refer to the diagram below for LCD display.



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



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

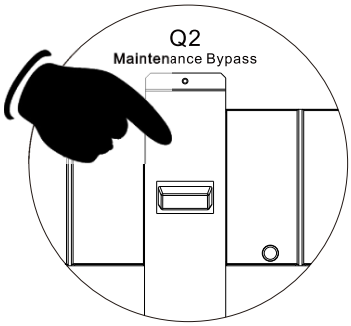
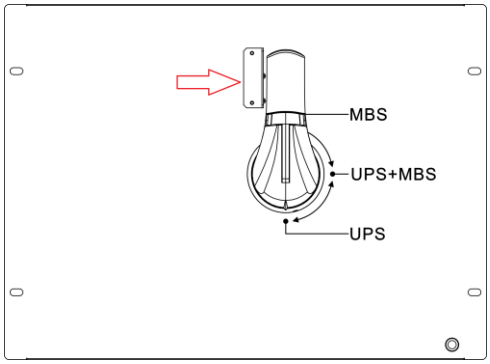


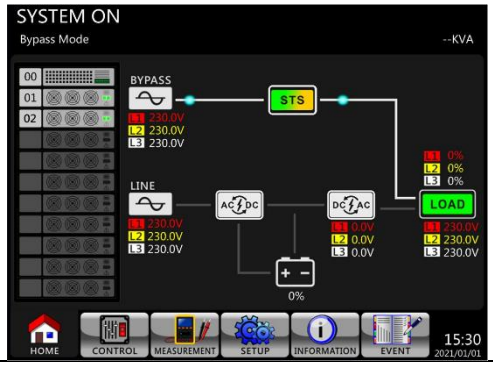
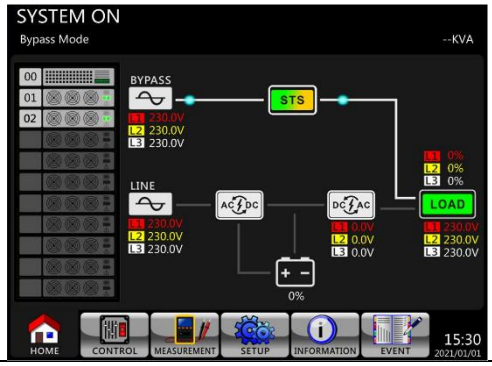
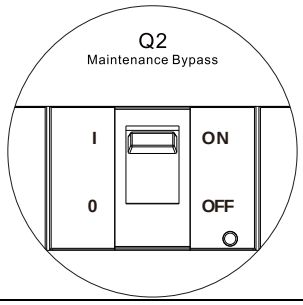
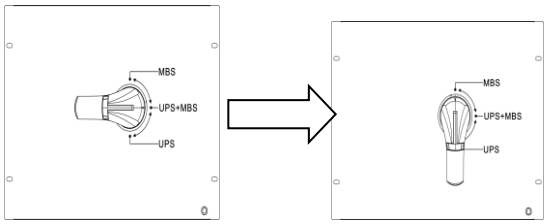
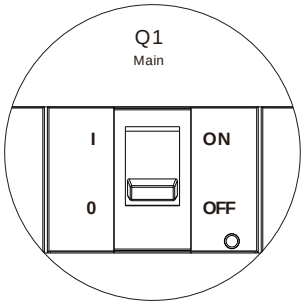
Step 6: Switch ON the output breaker (Q3). Cold start startup procedure is complete.

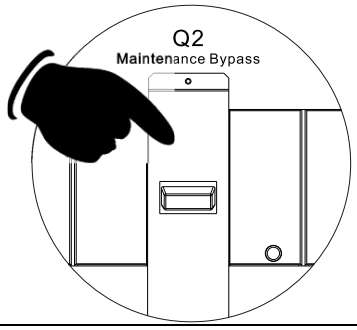
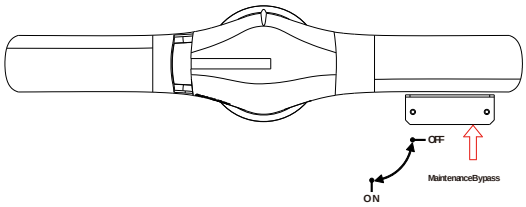
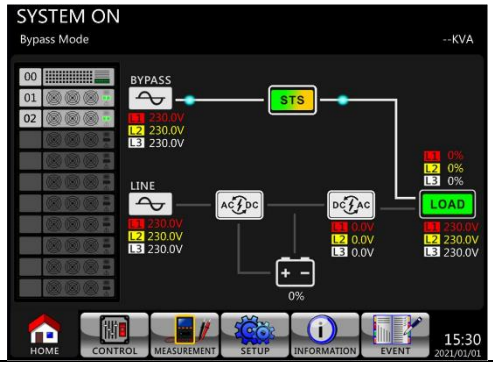
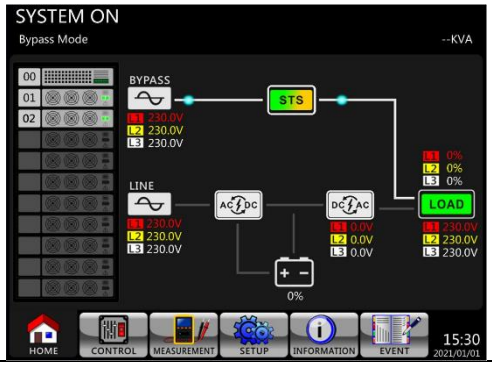
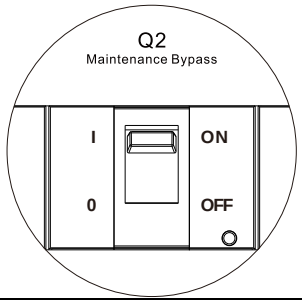
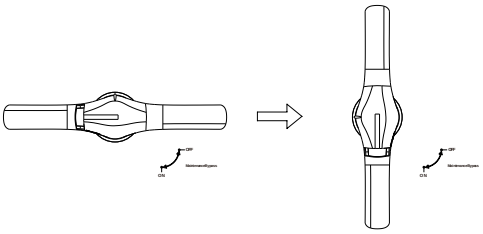
3.3.3 Maintenance Bypass Operation

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

3.3.3.1 Transfer to maintenance bypass

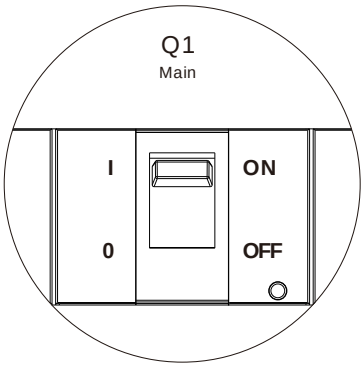
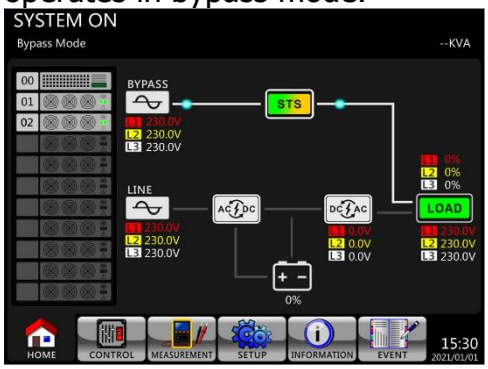
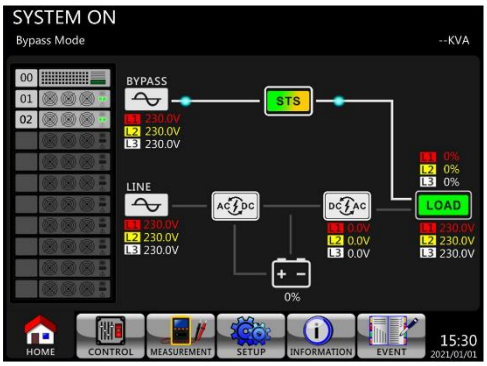
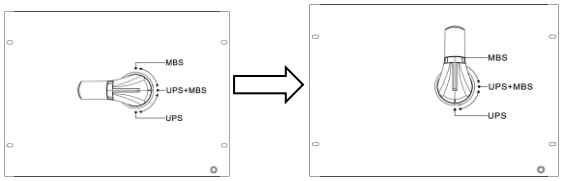
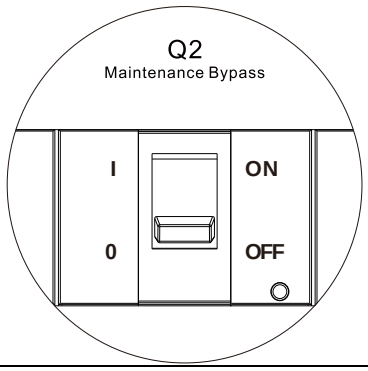
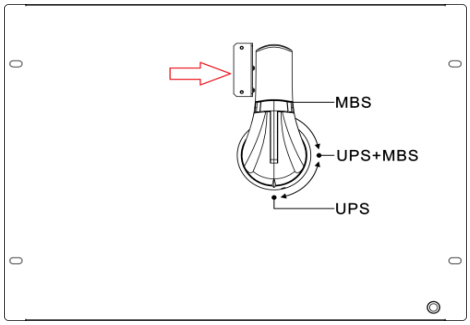
	60KVA~180KVA.	300KVA
Step 1:	Remove the mechanical lock plate of Maintenance Bypass Breaker. 	Remove the mechanical lock plate of Maintenance Bypass Switch. 

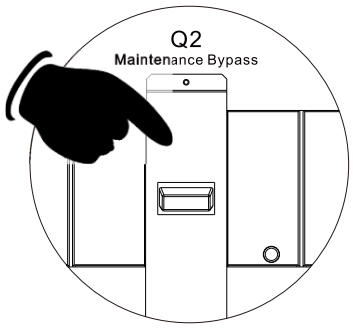
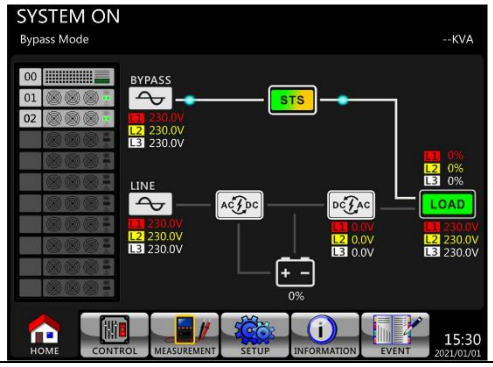
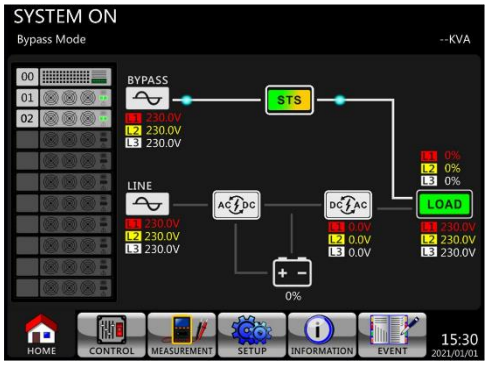
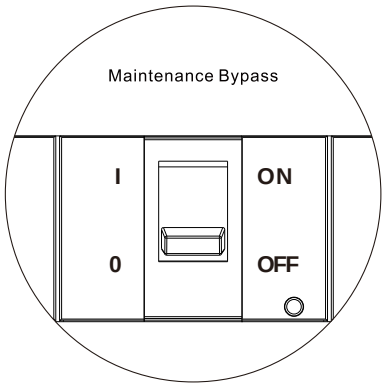
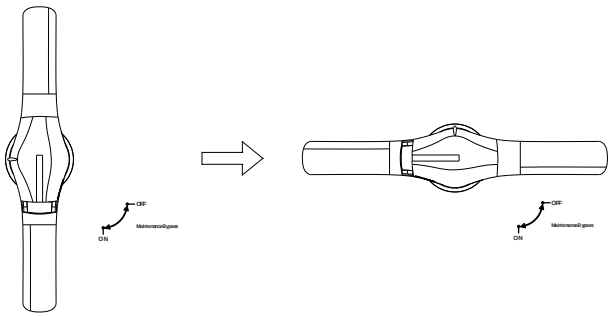
Step 2	Make sure the UPS operates in Bypass mode as shown below. 	Make sure the UPS operates in Bypass mode as shown below. 
Step 3	Switch ON the Maintenance Bypass Breaker as shown below. 	Switch the handle toward upside as shown below. 
Step 4	Switch OFF the Main Breaker (Q1) as shown below. 	It is possible to change the STS module and Power Module.
Step 5	It is possible to change the STS module, Power Module and Battery Module.	

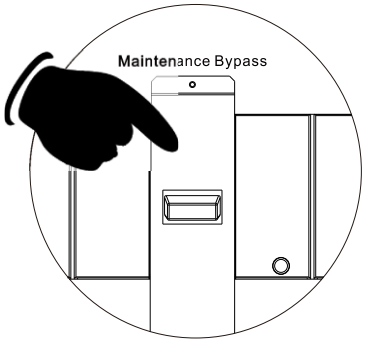
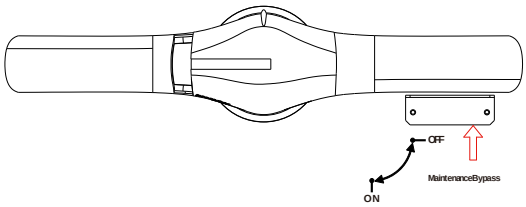
	300KVA(two switch)	480KVA/600KVA
Step 1:	Remove the mechanical lock plate of Maintenance Bypass Breaker. 	Remove the mechanical lock plate of Maintenance Bypass Switch. 
Step 2	Make sure the UPS operates in Bypass mode as shown below. 	Make sure the UPS operates in Bypass mode as shown below. 
Step 3	Switch ON the Maintenance Bypass Breaker as shown below. 	Switch ON the Maintenance Bypass Switch as shown below 
Step 4	It is possible to change the STS module and Power Module	It is possible to change the STS module and Power Module.

3.3.3.2 Transfer to UPS Protection

	60KVA~180KVA.	240KVA/300KVA
Step 1	Make sure the maintenance is complete. The Power Modules and STS module have been installed well.	Make sure the maintenance is complete. The Power Modules and STS module have been installed well.

Step 2	Switch ON the Main Breaker (Q1) as shown below. 	Please enter LCD SETUP MENU and choose "SYSTEM" to ensure that the "Bypass mode" is enabled. If the "Bypass mode" is disabled, you have to set it as "enabled". Then, exit the SETUP menu and check if the UPS operates in bypass mode. 
Step 3	Please enter LCD SETUP MENU and choose "SYSTEM" to ensure that the "Bypass mode" is enabled. If the "Bypass mode" is disabled, you have to set it as "enabled". Then, exit the SETUP menu and check if the UPS operates in bypass mode. 	Switch the handle toward downside as shown below. 
Step 4	Turn off Maintenance Bypass Breaker as shown below. 	Lock back the mechanical lock plate as shown below. 

Step 5	Lock back the mechanical lock plate as shown below. 	
	300KVA(two switch)	600KVA
Step 1	Make sure the maintenance is complete. The Power Modules and STS module have been installed well.	Make sure the maintenance is complete. The Power Modules and STS module have been installed well.
Step 2	Please enter LCD SETUP MENU and choose "SYSTEM" to ensure that the "Bypass mode" is enabled. If the "Bypass mode" is disabled, you have to set it as "enabled". Then, exit the SETUP menu and check if the UPS operates in bypass mode. 	Please enter LCD SETUP MENU and choose "SYSTEM" to ensure that the "Bypass mode" is enabled. If the "Bypass mode" is disabled, you have to set it as "enabled". Then, exit the SETUP menu and check if the UPS operates in bypass mode. 
Step 3	Turn off Maintenance Bypass Breaker as shown below. 	Switch the handle toward downside as shown below. 

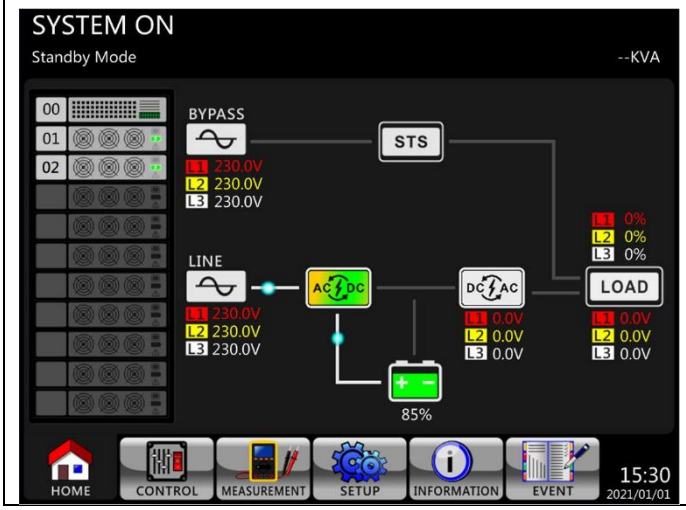
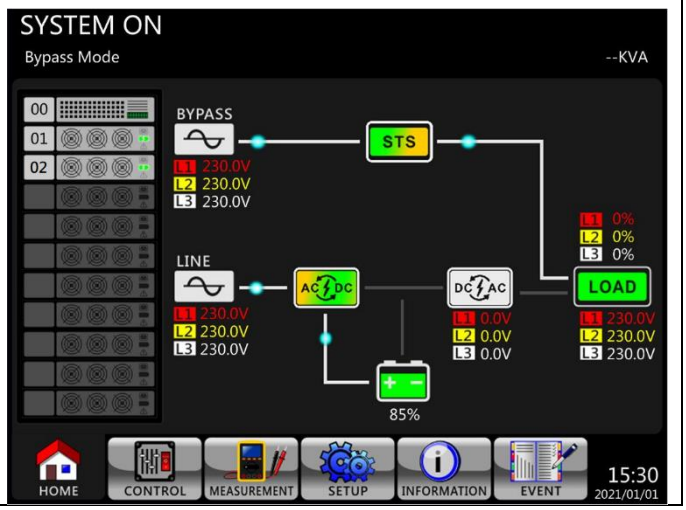
Step 4	Lock back the mechanical lock plate as shown below. 	Lock back the mechanical lock plate as shown below. 

3.3.4 Turn off Operation

3.3.4.1 Turn Off Operation in Bypass Mode/ Standby Mode

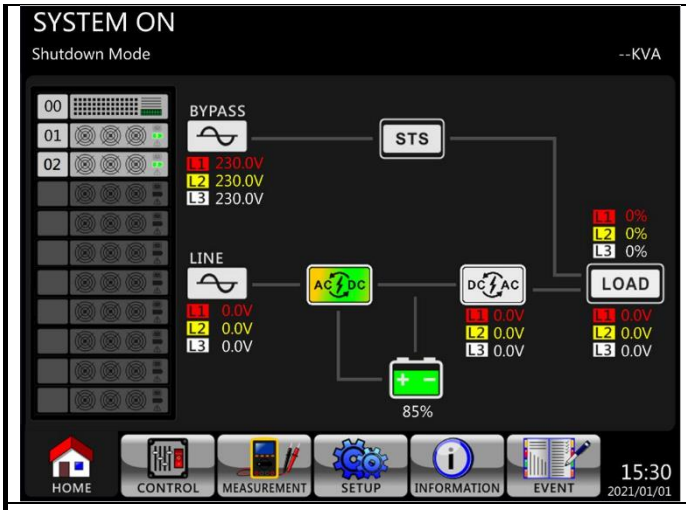
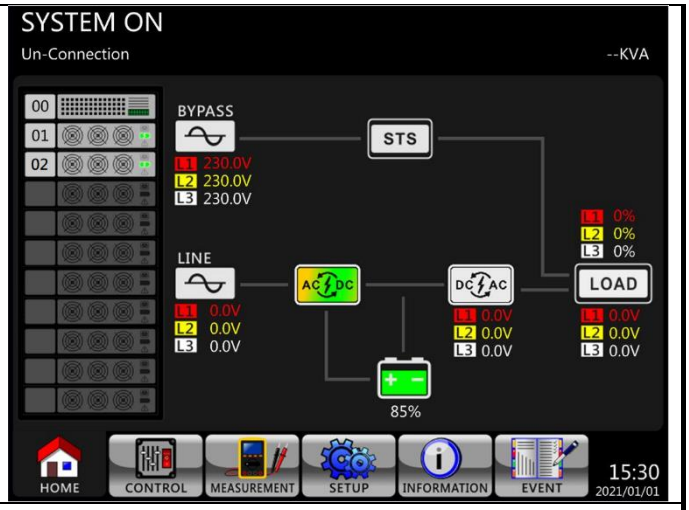
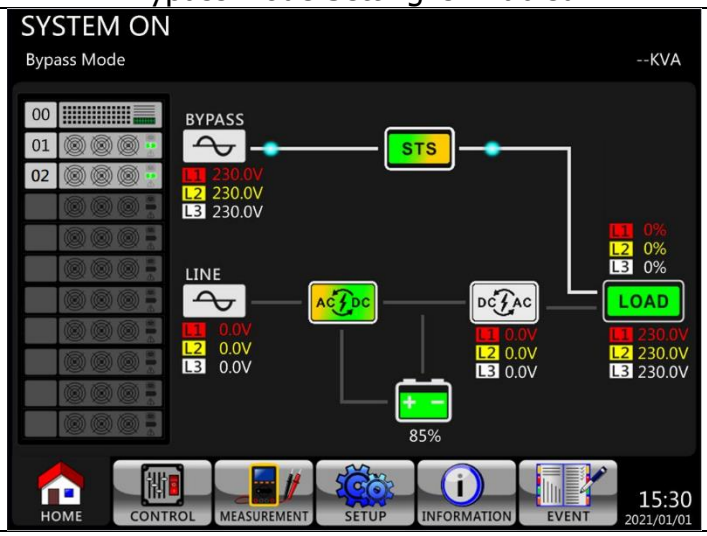
When the UPS neither is turned on nor turned off, the UPS operates in the Standby Mode or Bypass Mode. It depends on the "Bypass Mode" Setting.

The LCD diagrams are shown below.

Bypass Mode Setting is Disabled	Bypass Mode Setting is Enabled
	

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

Bypass Mode Setting is Disabled

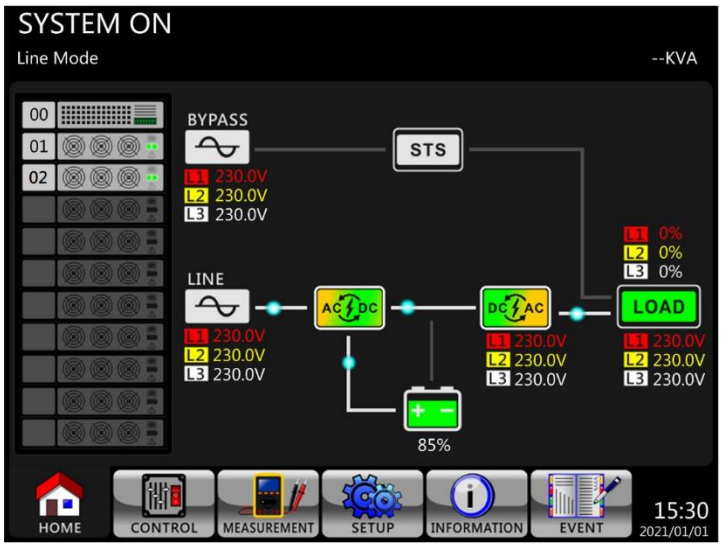
<table>
<tr>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>UPS enters Shutdown Mode.</td>
<td>It is normal the Un-Connection is shown when Power Modules have shut off their control power.</td>
</tr>
<tr>
<td colspan="2">Bypass Mode Setting is Enabled</td>
</tr>
<tr>
<td colspan="2"> 
</td>
</tr>
<tr>
<td colspan="2">UPS stay in Bypass mode and No AC input is indicated.</td>
</tr>
</table>

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

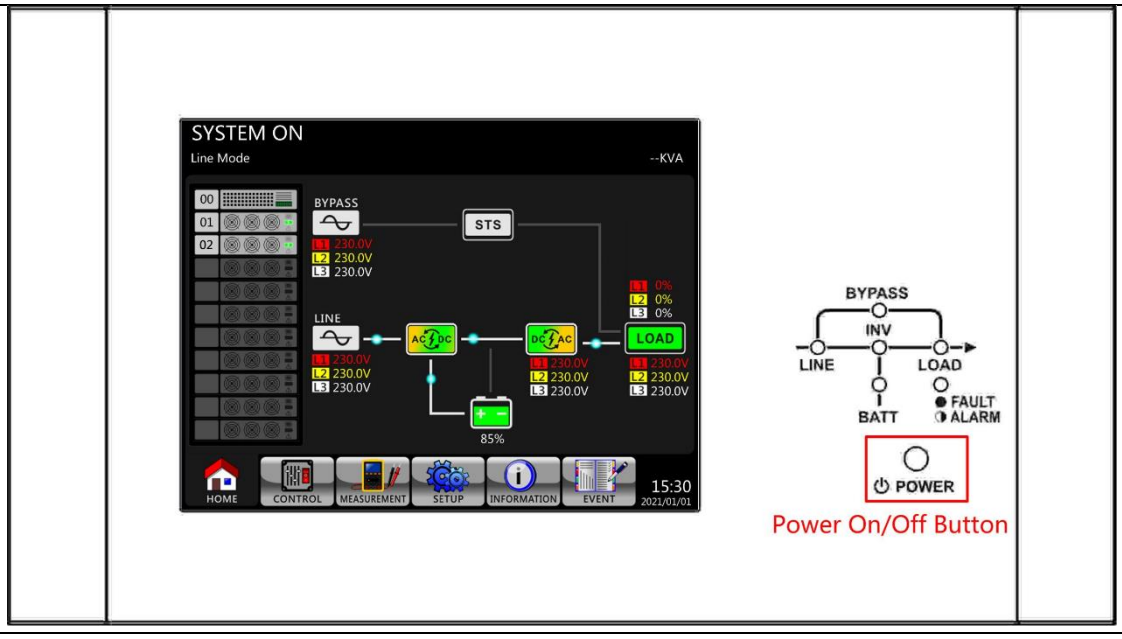
Step 3: Switch OFF the battery breaker if the UPS will disconnect from AC power for a long time.

3.3.4.2 Turn Off Operation in Line Mode

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



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

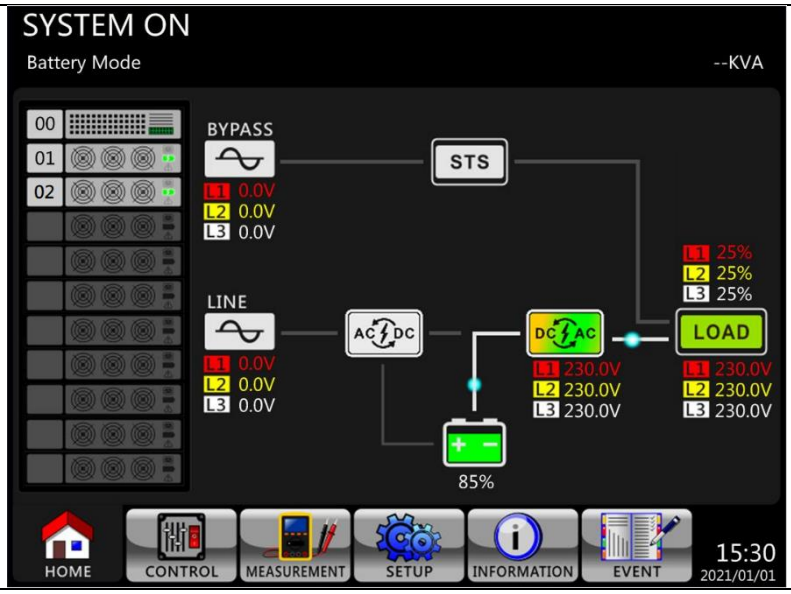


After turning off, the UPS will tranfer to Standby Mode or Bypass Mode depending on the "Bypass Mode" Setting.

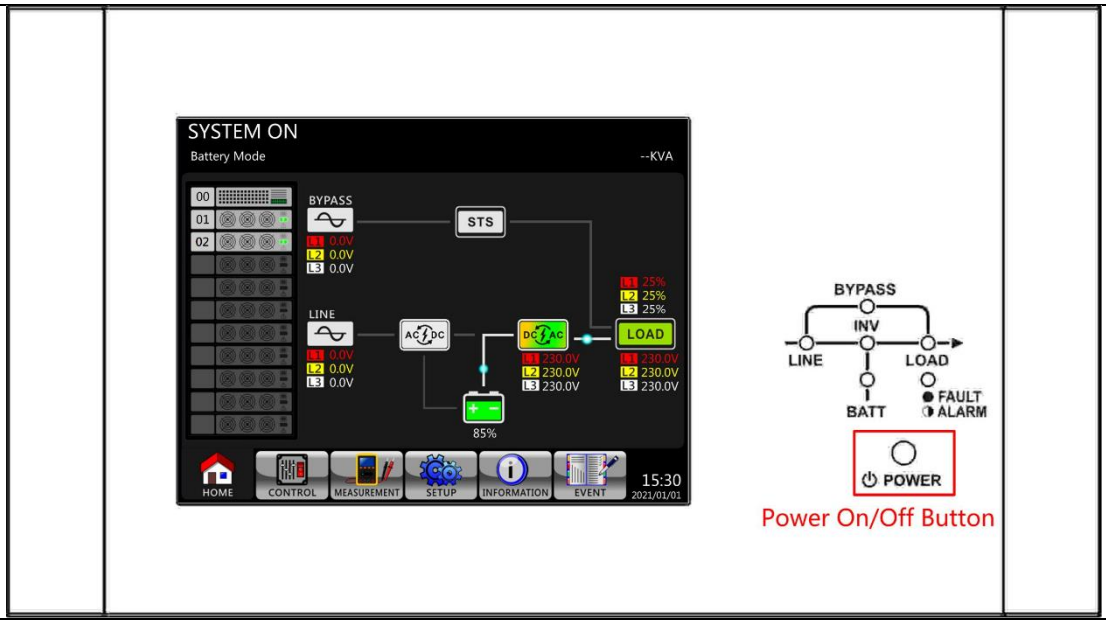
Next, follow the **Turn Off Operation in Bypass Mode/ Standby Mode** procedure.

3.3.4.3 Turn Off Operation in Battery Mode

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



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



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

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

4. Control Panel and Display Description

4.1 Introduction

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

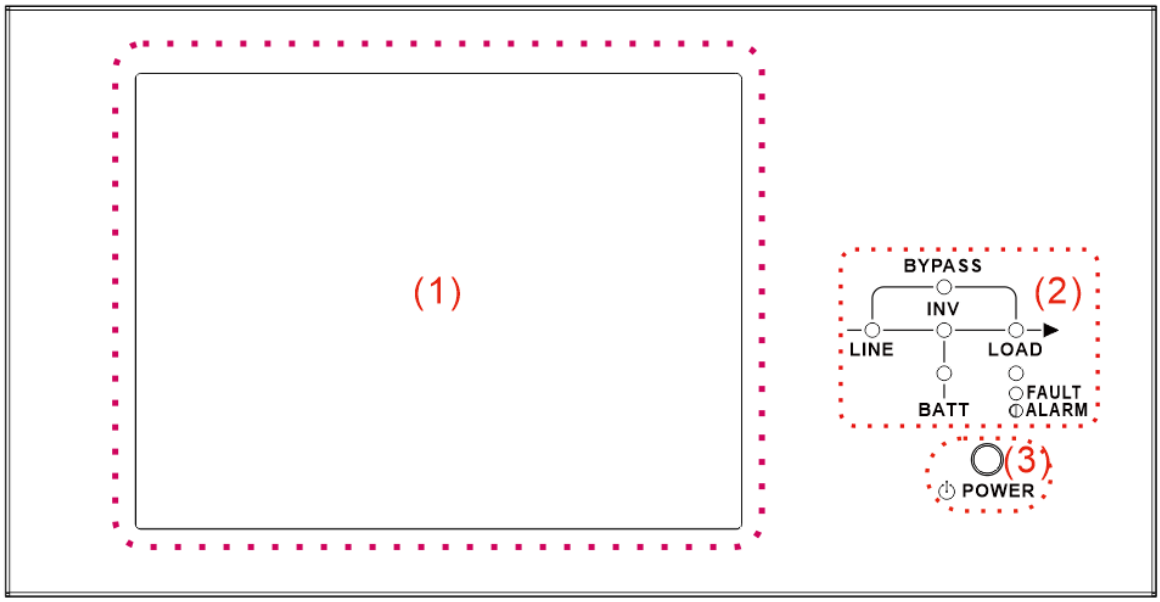


Figure 4-1 Control panel

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

Table 4-1: LED indications

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

		Off	Battery converter is normal and battery is charged.
FAULT/ ALARM	Red	On	UPS fault.
		Flashing	UPS alarm.
		Off	Normal.

Table 4-2: Control key table

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

Table 4-3: Audible Alarm

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

4.2 Screen Description

4.2.1 Start Screen

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

Figure 4-2 Initial screen

4.2.2 Main Screen

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

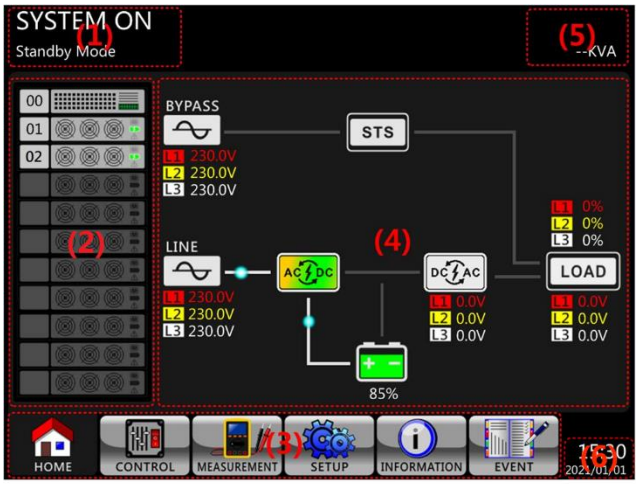


Figure 4-3 Main screen

(1) UPS Mode: Current operation mode.

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

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

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

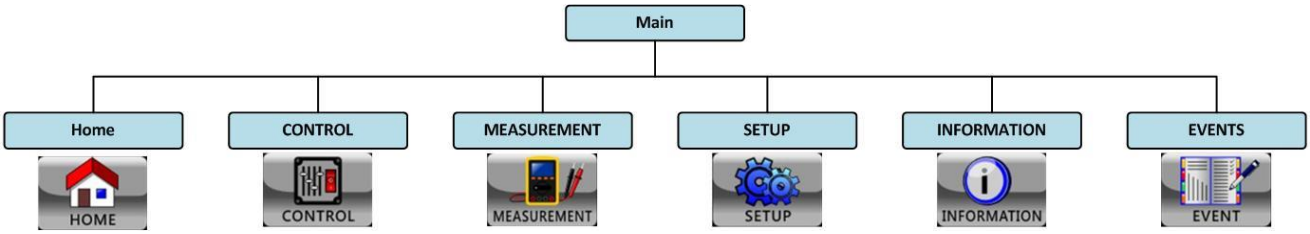


Figure 4-4 Menu tree

(4) UPS Flow Chart: Current flow chart and measurement data.
(5) UPS power rating.
(6) Date and Time.

4.2.3 Control Screen

Touch 

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

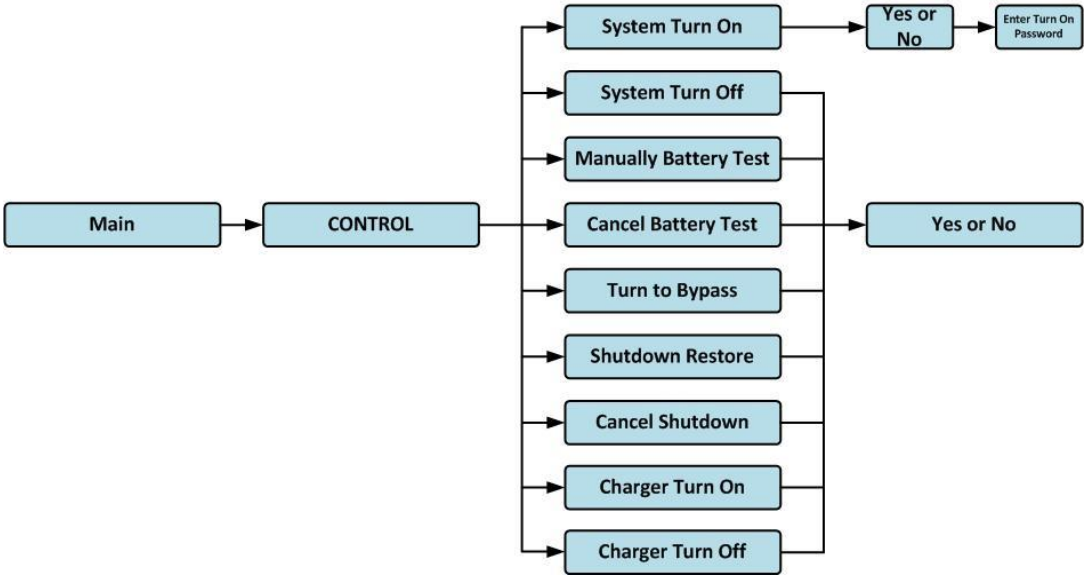


Figure 4-5 Control menu tree

INFOSEC UPS SYSTEM - 15, rue du Moulin - 44880 Sautron - FRANCE - www.infosec-ups.com
Hot Line – Tel + 33 (0)2 40 76 15 82 - Fax + 33 (0)240 94 29 51 - hotline@infosec.fr – 05 24 AA 59 201 05

Figure 4-6 Control screen page

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

Figure 4-7 Confirmation screen

4.2.4 Measurement Screen

Touch 

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

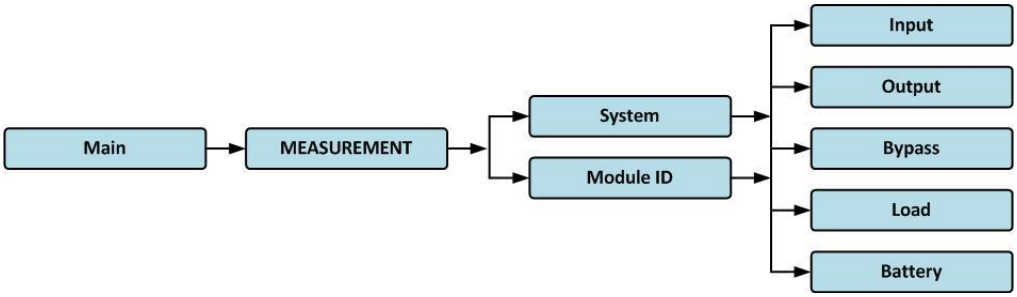


Figure 4-8 Measurement menu

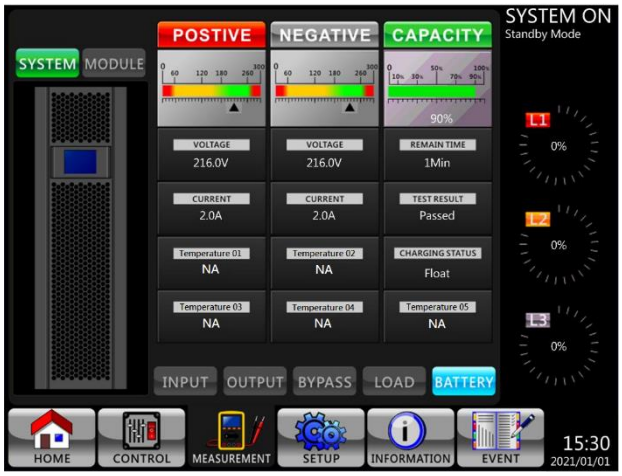


Figure 4-9 System Measurement Screens

Touch MODULE icon to monitor module measurement value.

Figure 4-10 Module Measurement Screens

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

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

4.2.5 Setup Screen

Touch the 

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

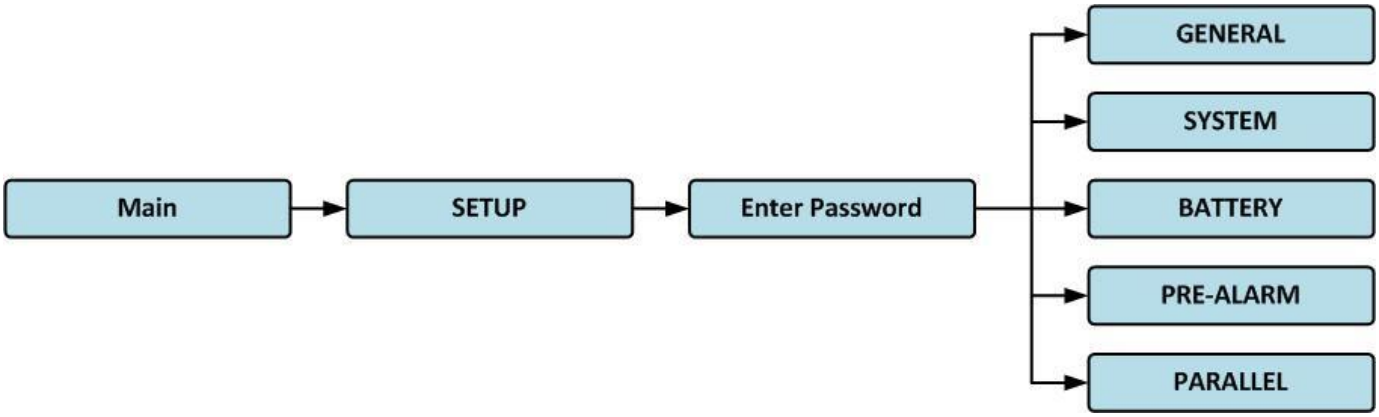


Figure 4-11 Setup menu

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

Figure 4-12 Enter password screen

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

Table 4-5: All setting items in Setup Menu

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

	Delay Time										
	System Shutdown Time	Y	Y	Y	Y	Y	Y	Y	Y		Y
	System Restore Time	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Redundancy	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Power Rating Setting	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Nominal Battery Voltage	Y	Y								Y
	Battery Capacity in Ah	Y	Y	Y			Y	Y	Y		Y
	Maximum Charging Current	Y	Y								Y
	Battery Low/Shutdown Setting	Y	Y	Y			Y	Y	Y		Y
	Periodic Battery Test	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Battery Test Interval	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Stop by Time	Y	Y	Y	Y		Y	Y	Y		Y
	Stop by Battery Voltage	Y	Y	Y	Y		Y	Y	Y		Y
	Stop by Battery Capacity	Y	Y	Y	Y		Y	Y	Y		Y
	Battery Age Alert	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Temperature Compensation	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Charging Voltage	Y	Y								Y
Pre-Alarm	Line Voltage Range	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Line Frequency Range	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Overload	Y	Y	Y	Y	Y	Y	Y	Y		Y
	Load Unbalance	Y	Y	Y	Y	Y	Y	Y	Y		Y

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

Setting Procedure

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

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

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

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Figure 4-13 Setting procedure

4.2.5.1 Setup-General Screen

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

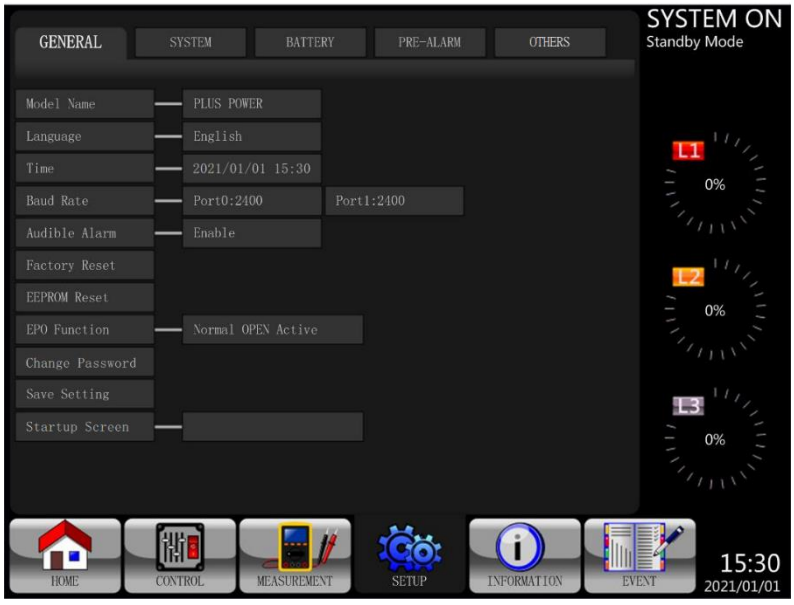

Figure 4-14 Setup-General screen

Table 4-6: Setup-General setting list

Setting Item	Sub Item	Explanation
Model Name		Set UPS Name (xxxxxxxxxx). The max. length is 10 characters.
Language	--	Provides 3 optional LCD languages: ● English (Default) ● Traditional Chinese ● Simplified Chinese
TIME	Adjust Time	Set current date and time.

		(yyyy / mm / dd hour : min : sec) **MUST be set after UPS installation**
	System Installed Date	Set system installed date (yyyy / mm / dd) 2015/1/1 (Default) **MUST be set after UPS installation**
	System Last Maintain Date	Set system latest maintenance date (yyyy / mm / dd) **MUST be set after UPS installation**
	Battery Installed Date	Set battery installed date (yyyy / mm / dd) **MUST be set after UPS installation**
	Battery Last Maintain Date	Set battery latest maintenance date (yyyy / mm / dd) **MUST be set after UPS installation**
Baud Rate	--	Set COM Port0 Baud Rate ● 2400 (Default) ● 4800 ● 9600 Set COM Port1 Baud Rate ● 2400 (Default) ● 4800 ● 9600
Audible Alarm	--	Set Audible Alarm ● Disable ● Enable (Default)
Factory Reset	--	Restore to factory default setting Refer to **Table 4-7**
EEPROM Reset	--	Set EEPROM default Refer to **Table 4-7**
Password	--	Set New Password. 0000 (Default)
Save Setting	--	Save EEPROM **Use this feature to save the setting(s) you have done.**

Table 4-7: EEPROM Reset Category list

Setting Item		Factory Reset	EEPROM Reset
General	Model Name		
	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

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	Audible Alarm	Y	Y
	Factory Reset	--	--
	EEPROM Reset	--	--
	EPO Function		Y
	Save Setting	--	--
System	Output Voltage		Y
	Bypass Voltage Range	Y	Y
	Bypass Frequency Range	Y	Y
	Converter Mode	Y	Y
	ECO Mode	Y	Y
	Bypass Mode	Y	Y
	Auto-Restart	Y	Y
	Battery Mode Delay Time		Y
	System Shutdown Time	Y	Y
	System Restore Time	Y	Y
	Redundancy		Y
	Power Rating Setting		Y
	Charger Test	--	--
Battery	Nominal Battery Voltage		Y
	Battery Capacity in Ah		Y
	Maximum Charging Current		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

4.2.5.2 Setup-System Screen

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

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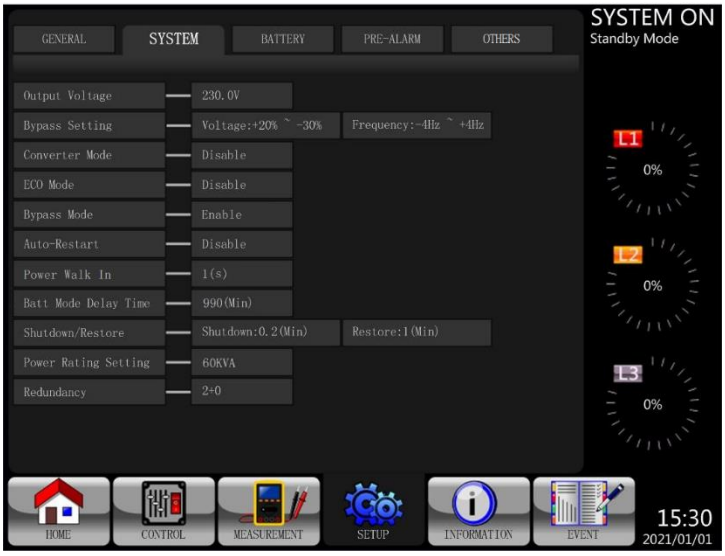

Figure 4-15 Setup-System screen

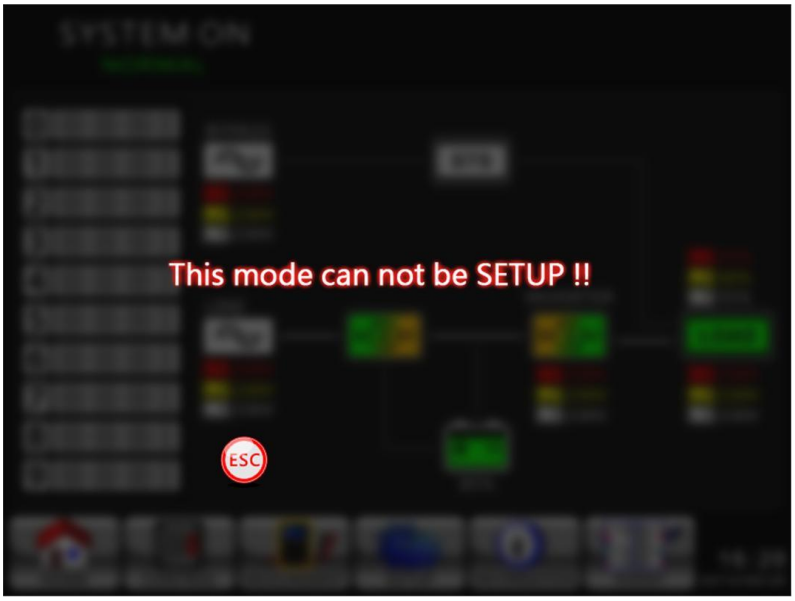

Figure 4-16 Warning screen

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

Table 4-8: Setup-System setting list

Setting Item	Sub Item	Explanation
Output Voltage	--	Set output voltage ● 220Vac ● 230Vac (Default) ● 240Vac **MUST be reviewed after UPS installation**
BYPASS SETTING	Bypass Voltage Range	Set bypass voltage range: Upper limit ● +10%

		● +15% ● +20% (Default) Lower limit ● -10% ● -20% ● -30% (Default)
	Bypass Frequency Range	Set bypass Frequency range: Upper/ Lower limit ● +/- 1Hz ● +/- 2Hz ● +/- 4Hz (Default)
Converter Mode	--	Set converter mode ● Disable (Default) ● Enable ● 50Hz ● 60Hz ● AUTO
ECO Mode	--	Set ECO mode ● Disable (Default) ● Enable
Bypass Mode	--	Set bypass mode ● Disable ● Enable (Default) **MUST be reviewed after UPS installation.** If you need the Bypass power when UPS is OFF, please enable it.
Auto-Restart	--	Set auto-restart ● Disable ● Enable (Default) After "Enable" is set, once UPS shutdown occurs due to low battery and then utility restores, the UPS will return to line mode.
Power Walk in		Set power walk in upper/lower limits ● +/- 1s time step (setting range: 1s ~ 10s)
Battery Mode Delay Time	--	Set system shutdown delay time in battery mode (0~990min). ● 0: Disable (Default) ● Not 0: Enable When this feature is enabled, UPS will shut off output after UPS operates in Battery mode for certain minute.
Shutdown/ Restore	System Shutdown Time	Set system shutdown time (0.2~99min) ● 0.2 min (Default) This delay time will start counting when the CONTROL-Shutdown Restore command is executed.
	System Restore Time	Set system restore time (0~9999min) ● 1 min (Default) This delay time will start counting after shutdown time is elapsed when the CONTROL-Shutdown Restore command is executed.

Power rating setting	--	Set power rating value per module ● 60KVA ● 50KVA
Redundancy	--	Set total power and redundancy Redundancy: the QTY of redundant power module **MUST be set after UPS installation or the QTY of Power Module is changed**

4.2.5.3 Setup-Battery Screen

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

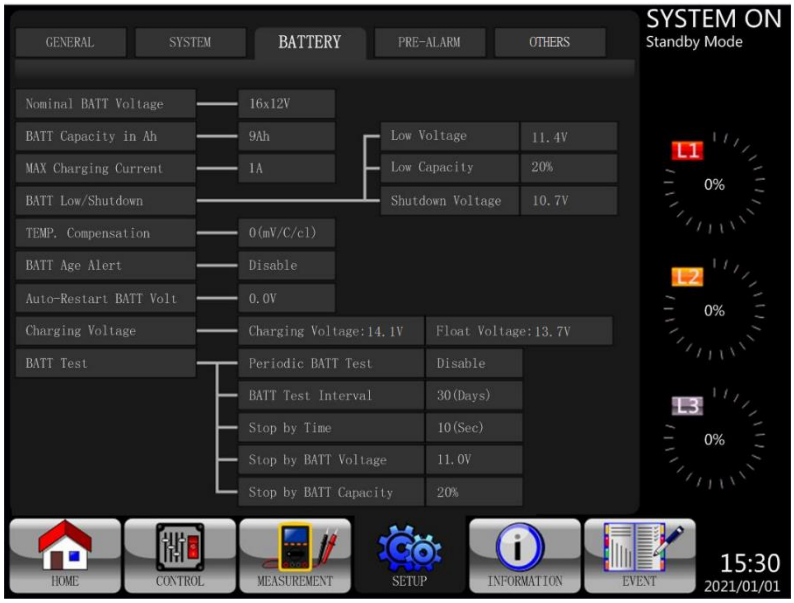

Figure 4-17 Setup-Battery Screen

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

Table 4-9: Setup-Battery setting list

Setting Item	Sub Item	Explanation
Nominal Battery Voltage	--	Set battery nominal voltage ● 16x12V (Default) ● 18x12V ● 20x12V **MUST be set after UPS installation**
Battery Capacity in Ah	--	Set battery capacity. (0~999) ● 9Ah (Default) **MUST be set after UPS installation or Battery capacity is changed.**
Maximum	--	Set battery maximum charging current (1~128A)

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Charging Current		1A (Default) **MUST be set after UPS installation or Battery capacity is changed.**
Battery Low/ Shutdown Setting	Low Voltage	Set battery low voltage (10.5~11.5V)x(battery Number) ● 11.4V x Battery Number (Default)
	Low Capacity	Set battery low capacity (20~50%) ● 20% (Default)
	Shutdown Voltage	Set battery voltage point for system shutdown in battery mode (10.0~11V) x (battery Number) ● 10.7V x Battery Number (Default)
Battery Test	Periodic Battery Test	Set periodic battery test disable or enable ● Disable (Default) ● Enable
	Battery Test Interval	Set battery test interval (7~99 Days) ● 30 Days (Default)
	Stop by Time	Set testing time for battery test (10~1000sec) ● 10 sec (Default)
	Stop by Battery Voltage	Set stop battery voltage in battery test (11~12V) x (battery Number) ● 11V x Battery Number (Default)
	Stop by Battery Capacity	Set battery capacity to stop battery-testing. (20~50%) ● 20% (Default)
Battery Age Alert	Battery Age Alert (Months)	Set battery age for replacement. (Disable,12~60Months) ● Disable (Default) If this feature is enabled and the battery has been installed over this period, there is a warning "Battery Age Alert" to indicate it.
Temperature Compensation	--	Set battery temperature compensation. (0~-5 (mV/C/cl)) ● 0(mV/C/cl) (Default)
Auto Restart BATT Volt	--	Set battery auto restart voltage ● 0V (Default)
Charging Voltage	--	Set battery charging voltage. (14.1~14.4V) ● 14.1V(Default) Set battery float voltage. (13.5~14.0V) ● 13.7V(Default)

4.2.5.4 Pre-Alarm Screen

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

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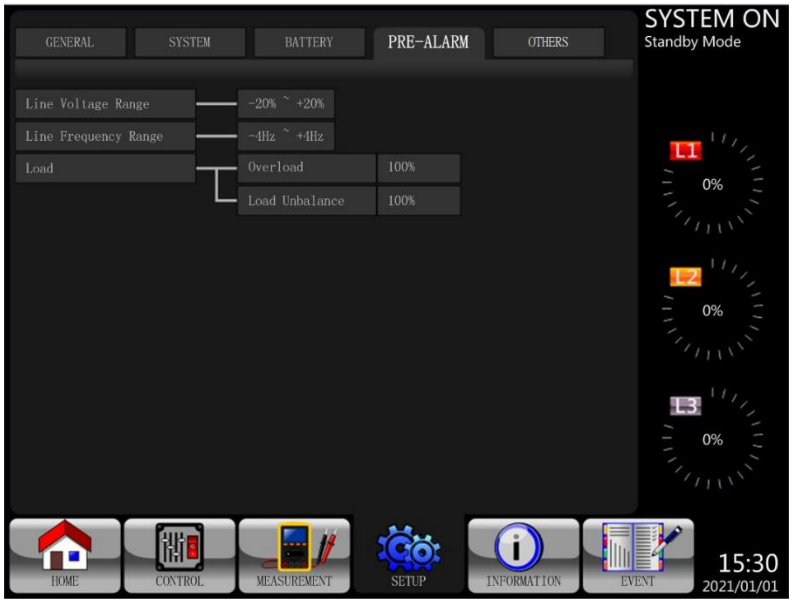


Figure 4-18 Setup-Pre-Alarm screen

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

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

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

4.2.5.5 Setup-OTHERS Screen

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

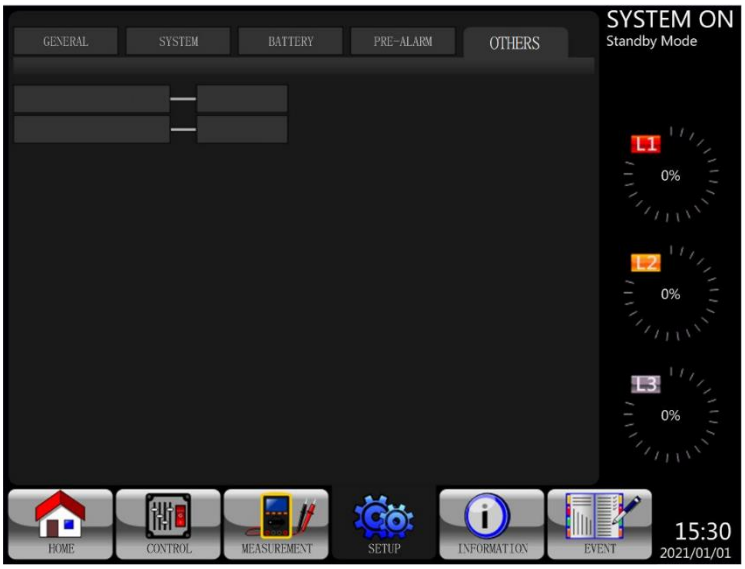
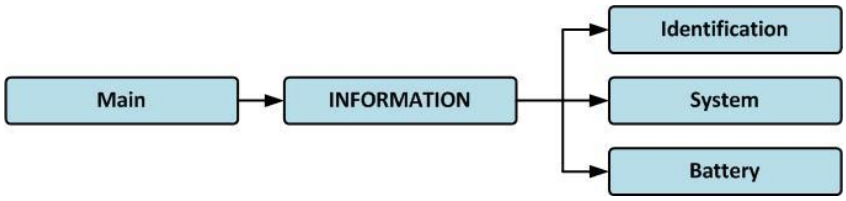


Figure 4-19 Setup-**OTHERS** screen

4.2.6 Information Screen

Touch 

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



4.2.6.1 INFORMATION - Identification Screen

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

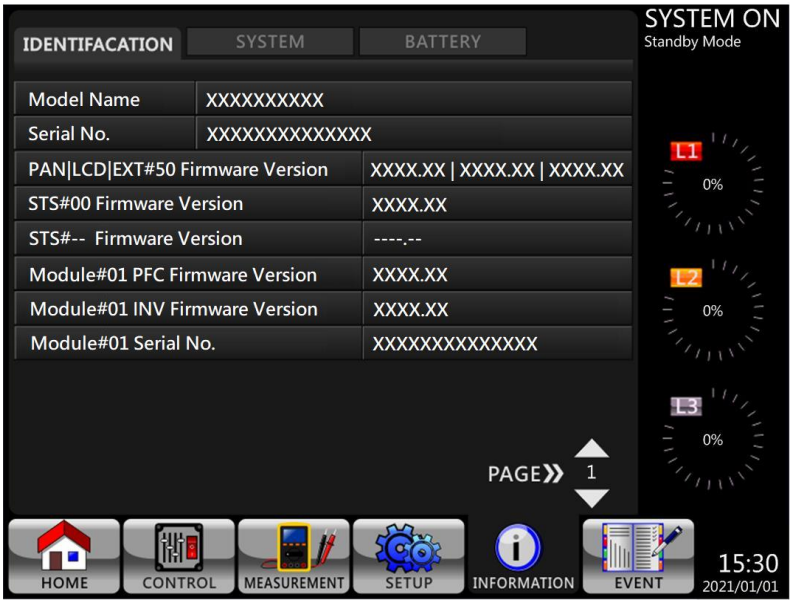


Figure 4-21 Identification screen page

4.2.6.2 INFORMATION - System Screen

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

Figure 4-22 INFORMATION System screen page 1

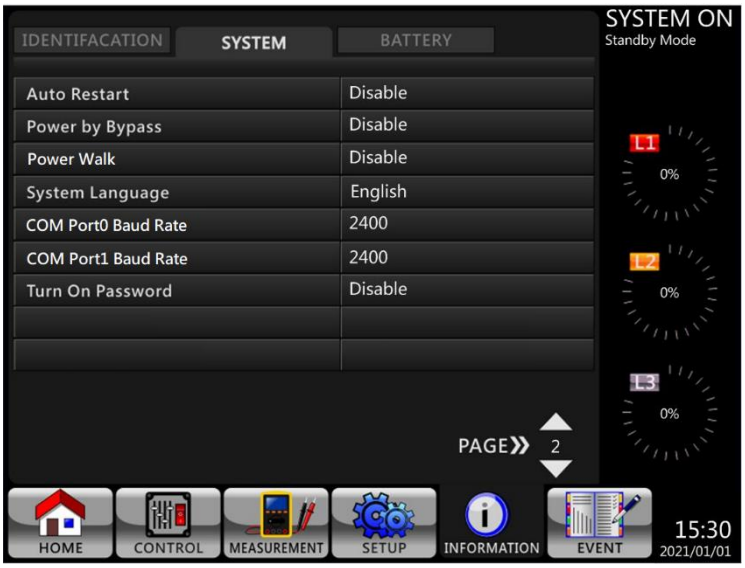


Figure 4-23 INFORMATION System screen page 2

4.2.6.3 INFORMATION - Battery Screen

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

Figure 4-24 INFORMATION Battery screen page

4.2.7 Events Screen

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

You also can touch 

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

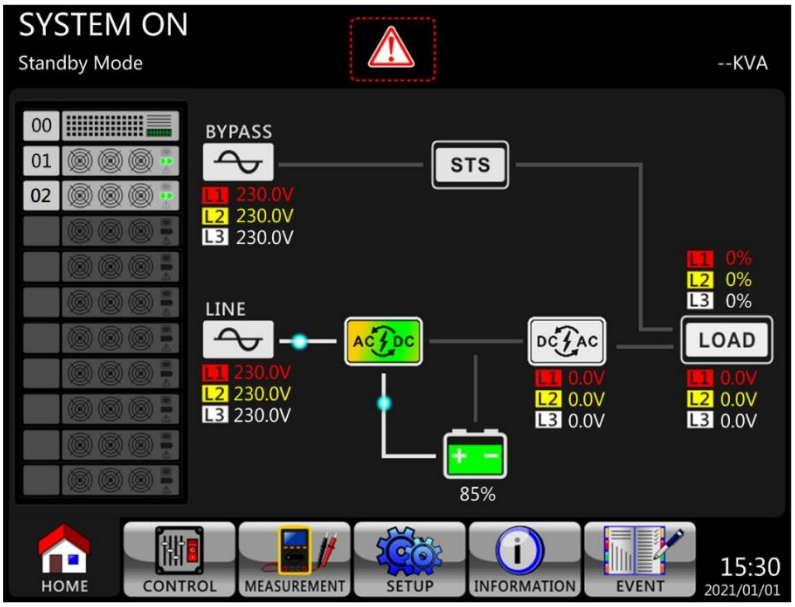


Figure 4-25 Alarm warning screen

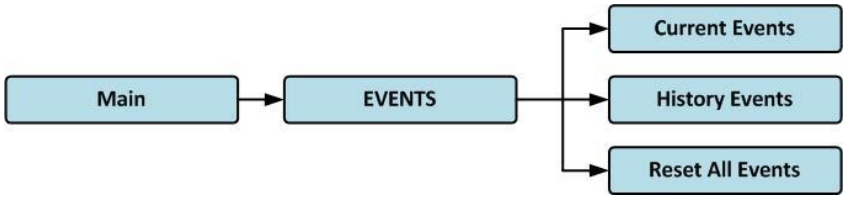


Figure 4-26 Events menu

4.2.7.1 Current Events

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

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

Figure 4-27 Current Events screen

4.2.7.2 History Events

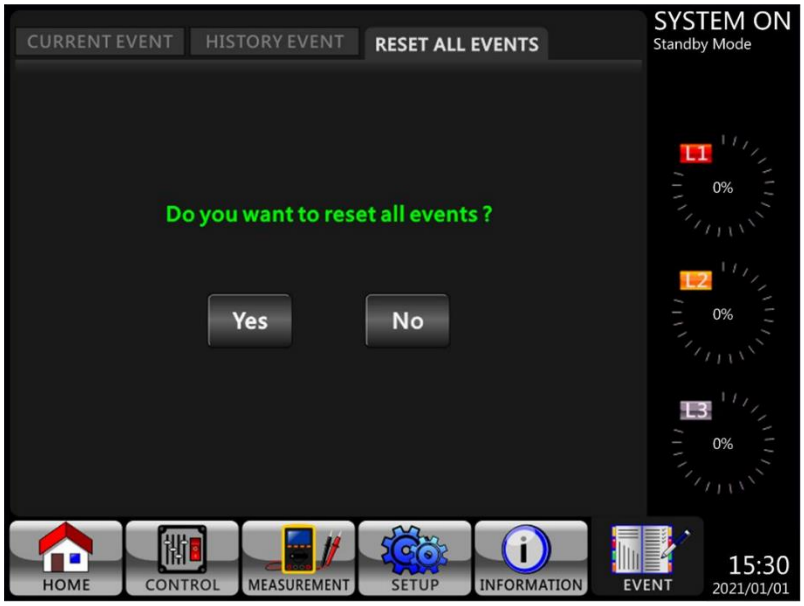
The detailed event information is saved in history events. It can save up to 500 events in history events. When warning occurs, it will display alarm code, alarm time and Module ID. When fault event occurs, it will display alarm details, alarm time and Module ID. (Refer to **Table 4-12** Alarm List)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

1. Figure 4-28 History Events screen

4.2.7.3 Reset All Events

The Maintainer password is required to enter Reset All Events screen as shown in Figure 4-29. After entering correct password, it will pop up reconfirmed screen. Then, touch Yes icon to reset all events or touch No icon to cancel this action as shown in Figure 4-30.

Figure 4-29 Reset All Events screen



4.3 Alarm List

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

Table 4-12: Alarm List

Representation in display LCD	Explanation
Fault! <01>Bus start fail	BUS soft start failed
Fault! <02>Bus over	BUS voltage high
Fault! <03>Bus under	BUS voltage low
Fault! <04>Bus unbalance	BUS voltage unbalanced
Fault! <05>Bus dec fast	BUS voltage drop too fast
Fault! <06>Conv over cur	Converter over current
Fault! <11>INV start fail	Inverter soft start failed
Fault! <12>High INV VOL	Inverter voltage high
Fault! <13>Low INV VOL	Inverter voltage low
Fault! <14>INV A out SC	Phase A (Line to Neutral) output short circuited
Fault! <15>INV B out SC	Phase B (Line to Neutral) output short circuited
Fault! <16>INV C out SC	Phase C (Line to Neutral) output short circuited
Fault! <17>INV AB out SC	Phase A-Phase B (Line to Line) output short circuited
Fault! <18>INV BC out SC	Phase B-Phase C (Line to Line) output short circuited
Fault! <19>INV AC out SC	Phase C-Phase A (Line to Line) output short circuited
Fault! <1A>INV A N-fault	Phase A output negative power fault
Fault! <1B>INV B N-fault	Phase B output negative power fault
Fault! <1C>INV C N-fault	Phase C output negative power fault
Fault! <21>BATT SCR SC	Battery SCR short circuited
Fault! <23>INV relay open	Inverter relay open circuited
Fault! <25>In&out swop	Line wiring fault
Fault! <29>BATT fuse broken	Battery fuse open circuited
Fault! <31>Par commu fail	Parallel communication failed
Fault! <36>Par out cur unb	Parallel output current unbalanced
Fault! <41>Over temp	Over temperature
Fault! <42>DSP commu fail	DSP communication failed
Fault! <43>Overload	Heavy overload causes UPS fault
Fault! <45>Charger error	As stated.
Fault! <46>Incorrect UPS set	Incorrect UPS setting
Fault! <47>DSP&MCU commu fail	MCU communication failed
Fault! <49>In&out phase incomp	Input and output phase error
Fault! <61>BYP SCR SC	Bypass SCR short circuited
Fault! <62>BYP SCR open	Bypass SCR open circuited
Fault! <63>INV R wave abnormal	Voltage waveform abnormal in R phase
Fault! <64>INV S wave abnormal	Voltage waveform abnormal in S phase
Fault! <65>INV T wave abnormal	Voltage waveform abnormal in T phase
Fault! <66>CT saturation	As stated.
Fault! <67>BYP out SC	Bypass output short circuited
Fault! <68>BYP out line SC	Bypass output line to line short circuited
Fault! <69>INV SCR SC	Inverter Relay short circuited
Fault! <6C>Bus-VOL dec fast	BUS voltage drop too fast
Fault! <6D>CUR detect err	Current sampling error value
Fault! <6E>SPS Power fault	SPS Power fault

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Fault! <6F>BATT reversal	Battery polarity reverse
Fault! <71>R PFC IGBT fault	PFC IGBT over-current in R phase
Fault! <72>S PFC IGBT fault	PFC IGBT over-current in S phase
Fault! <73>T PFC IGBT fault	PFC IGBT over-current in T phase
Fault! <74>R INV IGBT fault	INV IGBT over-current in R phase
Fault! <75>S INV IGBT fault	INV IGBT over-current in S phase
Fault! <76>T INV IGBT fault	INV IGBT over-current in T phase
Fault! <77> ISO Over temp	Isolation transformer over temperature
Fault! <79> Power Module Connect Fail	As stated.
Warning! <01> BATT open	Battery not connected
Warning! <02> IP N loss	Input N loss
Warning! <03> IP site fail	Input site failed
Warning! <04> Line phase error	As stated.
Warning! <05> Bypass phase error	As stated.
Warning! <06> Bypass FRE unstable	Bypass frequency unstable
Warning! <07> BATT over charge	Battery over charge
Warning! <08> BATT low	Battery voltage is too low
Warning! <09> Overload warning	As stated.
Warning! <0A> Fan lock warning	As stated.
Warning! <0B> EPO active	As stated.
Warning! <0D> Over temperature	As stated.
Warning! <10> L1 IP fuse fail	L1 Input fuse failed
Warning! <11> L2 IP fuse fail	L2 Input fuse failed
Warning! <12> L3 IP fuse fail	L3 Input fuse failed
Warning! <21> Line connect dif	Line connect different
Warning! <22> Bypass connect dif	Bypass connect different
Warning! <24> Par INV vol dif	Parallel output voltage setting different
Warning! <33> Lock BYP OL 3 times	Locked in bypass after overload 3 times in 30 min
Warning! <34> AC input CURR unb	Three-phase AC input current unbalanced
Warning! <35> Bat Phase loss	Battery phase loss
Warning! <36> INV CURR unb	Inverter current unbalanced
Warning! <3A> maintain is open	Cover of maintain switch is open
Warning! <3B> Auto Adapt Fail	Phase Auto Adapt failed
Warning! <3C> Utility ext unb	Utility extremely unbalanced
Warning! <3D> Bypass unstable	As stated.
Warning! <3E> BATT VOL High	Battery voltage is too High
Warning! <3F> BATT VOL Unbalance	Battery voltage unbalanced
Warning! <40> Charge Short	As stated.
Warning! <41> Bypass Loss	As stated.
Warning! <42> ISO Over temp	Isolation transformer over temperature
Warning! <43> BUS soft Error	BUS soft start failure
Warning! <44> Redundancy Error	As stated.
Warning! <45> cRedundancy OverLoad	As stated.
Warning! <46> EEPROM Fail	EEPROM operation error
Warning! <47> STS Lost	STS module loss
Warning! <48> Power module unlock	As stated.

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4.4 History Record

Table 4-13: Important setting changed

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

Table 4-14: UPS mode change

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

Table 4-15: Control execution

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

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5. Interface and Communication

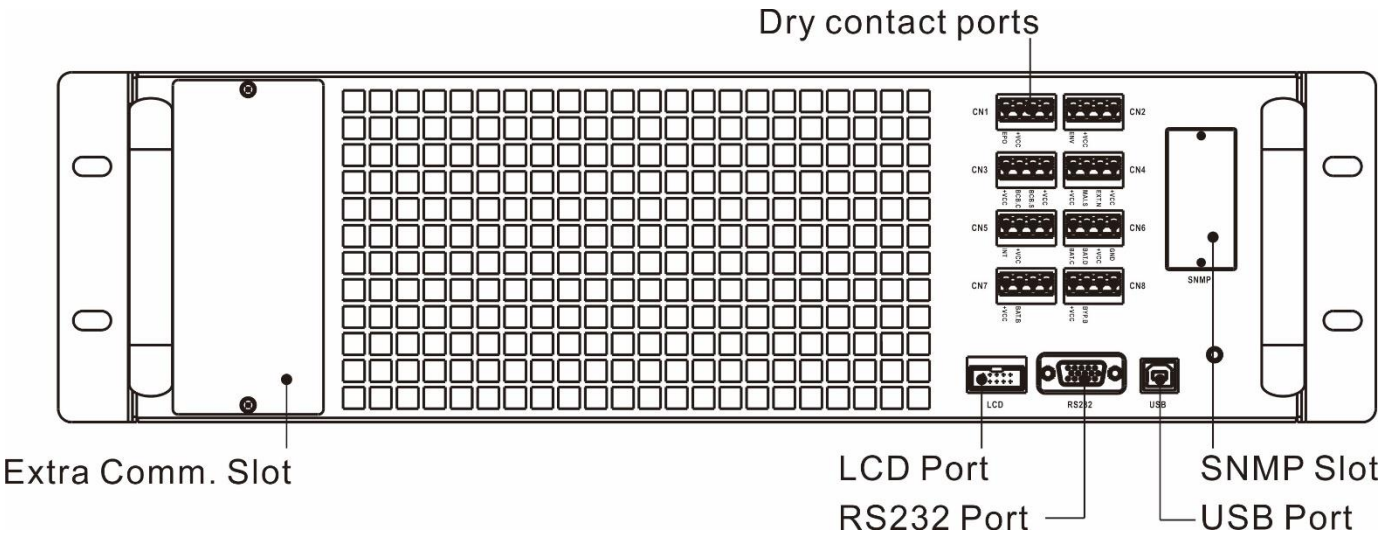
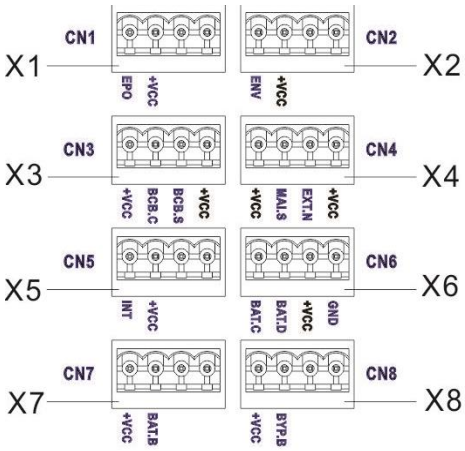


Figure 5-1 Dry contact ports and communication ports



Dry Contact No.	Function
X1	Remote EPO input port
X2	No use
X3	No use
X4	Maintenance Bypass Switch State Port
X5	No use
X6	Battery Cabinet Temperature Detection Port
X7	No use
X8	No use

5.1 Dry Contact Port

5.1.1 X1-Remote EPO Input Port

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

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

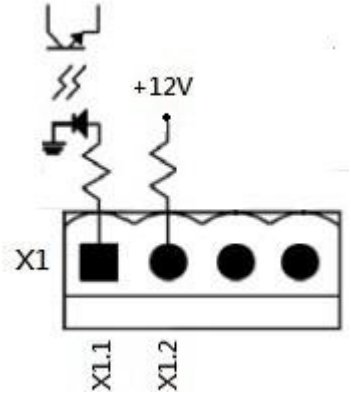


Figure 5-2 Remote EPO input port

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Table 5-1: Description of remote EPO port

EPO Logic Setting	Position	Description
Short	X1.1 & X1.2	EPO is activated when X1.1 & X1.2 opened
Open	X1.1 & X1.2	EPO is activated when X1.1 & X1.2 shortened

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

Note:

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

5.1.2 X4-Maintenance Bypass Switch State Port

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

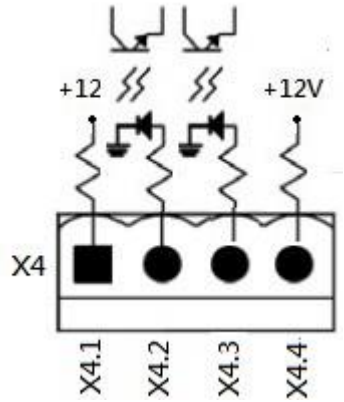

Figure 5-3 Maintenance Bypass Switch State port

Table 5-2: Description of Maintenance Bypass Switch State port

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

5.1.3 X6-Battery Cabinet Temperature Detection Port

There is battery cabinet temperature detection function in the UPS. The temperature of UPS battery cabinet can be detected through the external battery cabinet temperature detection sensor. Communication between the UPS and Battery temperature detection board was through I2C communication protocol. X6 is the battery cabinet temperature detection port. The port is shown in Figure 5-4 and described in **Table 5-3**.

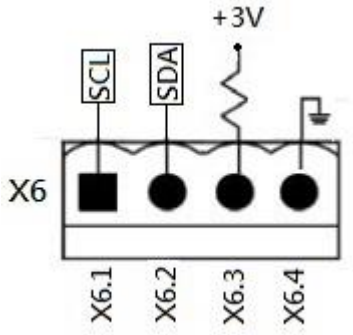

Figure 5-4 Battery Cabinet Temperature Detection Port

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

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

5.2 Extra Comm. Slot

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

5.3 Local Communication Ports – RS232 & USB

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

5.4 SNMP Slot

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

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6. Troubleshooting

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

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

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

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7. Service

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

Warning:

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

7.1 Replacement Procedures Of Power Module

Warning:

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

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

7.2 Replacement Procedures Of STS Module

Warning:

- Confirm the UPS is operating in Maintenance Bypass Mode.

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

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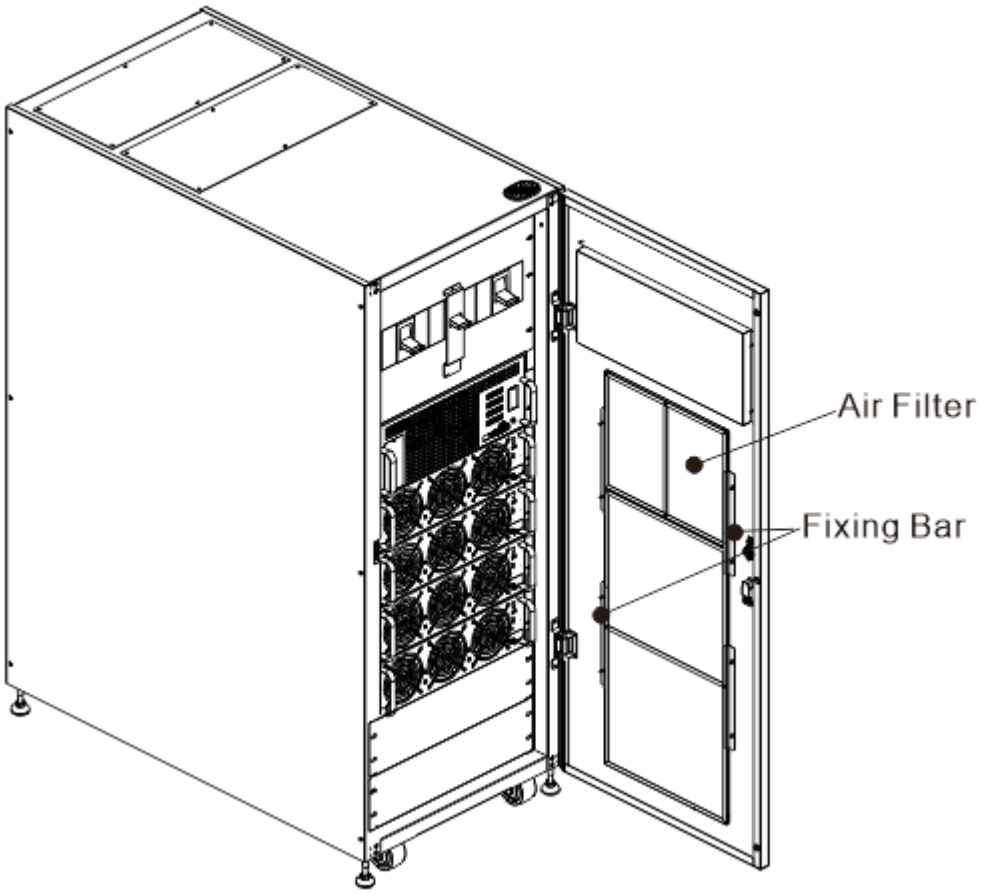
7.3 Replacement Procedures Of Air Filter

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



The replacement procedures of air filter are as follows:

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

8. Specifications

The chapter states the specifications of UPS.

8.1 Conformity And Standards

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

Table 8-1: European and international standards

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

8.2 Environmental Characteristics

Table 8-2: Environmental characteristics

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

8.3 Mechanical Characteristics

Table 8-3: Mechanical characteristics

30U

Model		30U-120		30U-180		
Rated power (kVA)	Unit	60	120	60	120	180
Dimensions, W x D x H	mm	600 x 1100 x 1475				
Weight	kg	264	308	264	308	352
Color	N/A	Black				
Protection degree, IEC (60529)	N/A	IP20 (front door and back door is open or closed)				

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42U

Model	Unit	42U-240 /42U-300				
Rated power	kVA/kW	60	120	180	240	300
Dimensions, W x D x H	mm	600 x 1100 x 2010				
Weight	kg	340	284	428	466	510
Color	N/A	Black				
Protection degree, IEC (60529)	N/A	IP20 (front door and back door is open or closed)				

Model	Unit	42U-420				
Rated power	kVA/kW	180	240	300	360	420
Dimensions, W x D x H	mm	600 x 1100 x 2010				
Weight	kg	492	536	580	624	668
Color	N/A	Black				

Model	Unit	42U-480/42U-600				
Rated power	kVA/kW	360	420	480	540	600
Dimensions, W x D x H	mm	1000 x 1065 x 2000				
Weight	kg	842	887	931	976	1020
Color	N/A	Black				
Protection degree, IEC (60529)	N/A	IP20 (front door and back door is open or closed)				

3U Power Module

Model	Unit	PM-60
Rated power	kVA/kW	60KVA/60KW
Dimensions, W x D x H	mm	750x438x130
Weight	kg	44

8.4 Electrical Characteristics (Input Rectifier)

Table 8-4: Rectifier AC input (mains)

Rated power (kVA)	Unit	60~600	
Rated AC input voltage	Vac	380/400/415 (3-phase and sharing neutral with the bypass input)	
Input voltage tolerance	Vac	305 ~ 478; 208 ~ 304(output derated below 70%)	
Frequency	Hz	50/60 (tolerance: 40Hz ~ 70Hz)	
Power factor	kW/kVA	0.99 (0.98) full load(half load)	
Harmonic current distortion	THDI%	<3 (full load)	
Max. current / phase	A	60kVA	110
		120kVA	220
		180kVA	330

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		240kVA	440
		300kVA	550
		360kVA	660
		420kVA	770
		480kVA	880
		540kVA	990
		600kVA	1100
Icc	kA	≤ 10kA	

8.5 Electrical Characteristics (Intermediate DC Circuit)

Table 8-5: Battery

Intermediate DC circuit		
Battery		External battery
Number of lead-acid cells	Nominal	216 (6cells x 36 12V battery block)
	Maximum	240 (6cells x 40 12V battery block)
	Minimum	192 (6cells x 32 12V battery block)
Float voltage	V/cell	2.28V/cell
Temperature compensation	mV/℃/cl	0~-5
Ripple voltage	% V float	≤1
Ripple current	% C10	≤5
Boost voltage	VRLA	2.35V/cell
EOD voltage	V/cell	1.67-1.83V/cell (adjustable)
Battery charge	V/cell	Constant current and constant voltage charge mode
Battery charging power[1] max current	A	18A / per power module (adjustable)
Note: 1. At low input voltage the UPS recharging capability increases and load decreases (up to the maximum capacity indicated).		

8.6 Electrical Characteristics (Inverter Output)

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

Rated power (kVA)	Unit	60 ~ 600	
Rated AC voltage[1]	Vac	380/400/415 (three-phase four-wire, with neutral reference to the bypass neutral)	
Frequency	Hz	50/60 Auto Selectable	
Overload	%	100%~110% for 60min 110%~125% for 10min 126%~150% for 1min >150% for 200ms	
Steady state voltage stability	%	±1 (balanced load), ±2 (100% unbalanced load)	
Total harmonic voltage	%	<2 (linear load), <4 (non-linear load)	
Synchronization window		+/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz)	
Output rated current (380/400/415V)	A	60kVA	91/87/83
		120kVA	182/173/167
		180kVA	273/260/250A
		240kVA	364/346/334

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		300kVA	456/433/417
		360kVA	546/520/500
		420kVA	637/607/583
		480kVA	728/694/666
		540kVA	819/781/749
		600kVA	912/868/832
Note: 1. Factory setting is 400V. 380 or 415V is selectable by commissioning engineer.			

8.7 Electrical Characteristics (Bypass Mains Input)

Table 8-7: Bypass mains input

Rated power (kVA)	Unit	60 ~ 600
Rated AC voltage1	Vac	380/400/415 (Three-phase four-wire, sharing neutral with the rectifier input and providing neutral reference to the output)
Overload	%	105%~110% for 60min 110%~125% for 10min 126%~150% for 1min >150% for 200ms
Upstream protection, bypass line	N/A	Circuit breaker, rated up to 100% of nominal output current.
Frequency	Hz	50/60 Auto Selectable
Transfer time (between bypass and inverter)	ms	Line ←→Battery 0ms Inverter ←→Bypass 0ms (When phase lock fails, <4ms interruption occurs from inverter to bypass) Inverter ←→ECO ≤10ms
Bypass voltage tolerance	%Vac	Upper limit: +10, +15 or +20, default: +15 Lower limit: -10, -20, -30 default: -20
Frequency Range	Hz	+/- 1Hz, +/- 2Hz, +/- 4Hz (default: 4Hz)
Note: 1. Factory setting is 400V. 380V or 415V is selectable by commissioning engineer.		

9. UPS Installation for Parallel Rack System

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

Warning:

- The input harmonic current distortion will be higher than 3% and less than 4.5% in parallel rack system.
- You need to order the parallel cable for this kind of application. The parallel cable is required for the installation and operation.
- If you want to install the UPS to parallel rack system by yourself, installation must be under the supervision of authorized engineers or service personnel.
- The parallel rack power capacity will be 90% of rated load
- Maximum 10 pieces power modules can be connected in parallel so maximum 300kVA per simple rack system

9.1 Input and Output Wiring

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

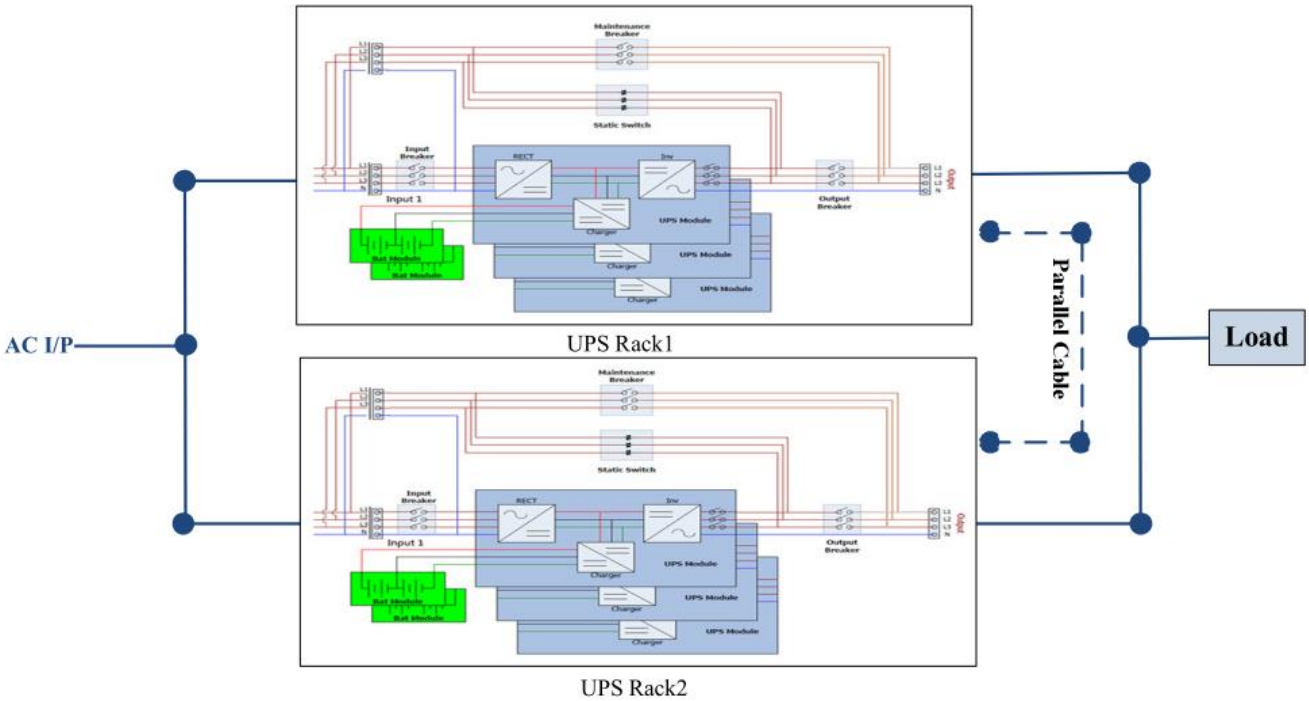


Figure 9-1 Parallel System Wiring with three Breaker

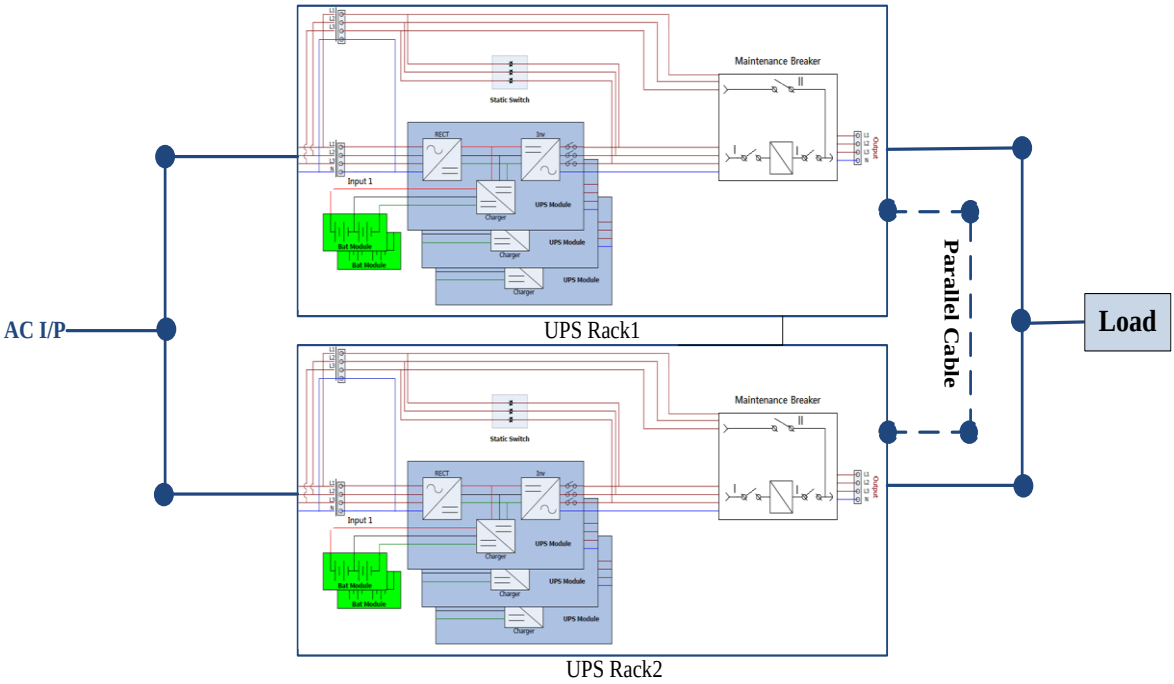


Figure 9-2 Parallel System Wiring with one maintenance bypass switch

9.2 Parallel Board Setting and Power Module

9.2.1 Install Power Module of Rack1

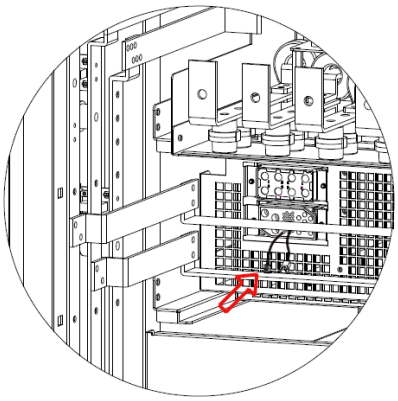
1. Refer to Table 2-1 to set the module address.

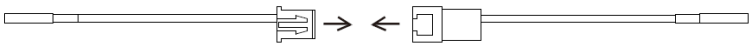
9.2.2 Install Power Module of Rack2

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

9.3 Parallel Function Setting

1. For the input and output wiring, please be sure to follow section 9.1 Input and Output Wiring to prepare.
2. For the Module Address Setting and Install Power Module, please be sure to follow section 9.2.
3. Please confirm if the two steps above have been completed correctly, and then for the rack2, please plugin the connector, refer to the below Figure 9-4
4. For the rack1 , keep the connector open.





5. Refer to section 9.4 to connect the parallel cable

9.4 Parallel Cable Connection

Parallel cable is equipped with 20-pins connectors. Insert the 20-pins connector into the parallel board shown in figure 9-2. Both racks use the same way to connect the parallel cable. Please refer to dip switch position as shown in Figure 9-5. The pin 5 is set according to the position in Figure 9-5 for every module address.

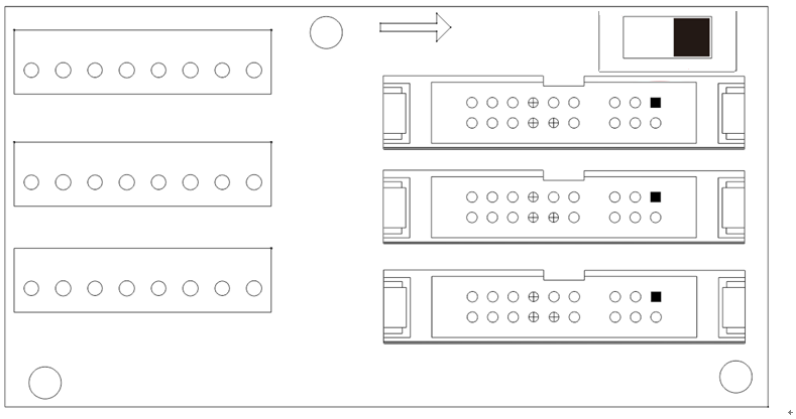
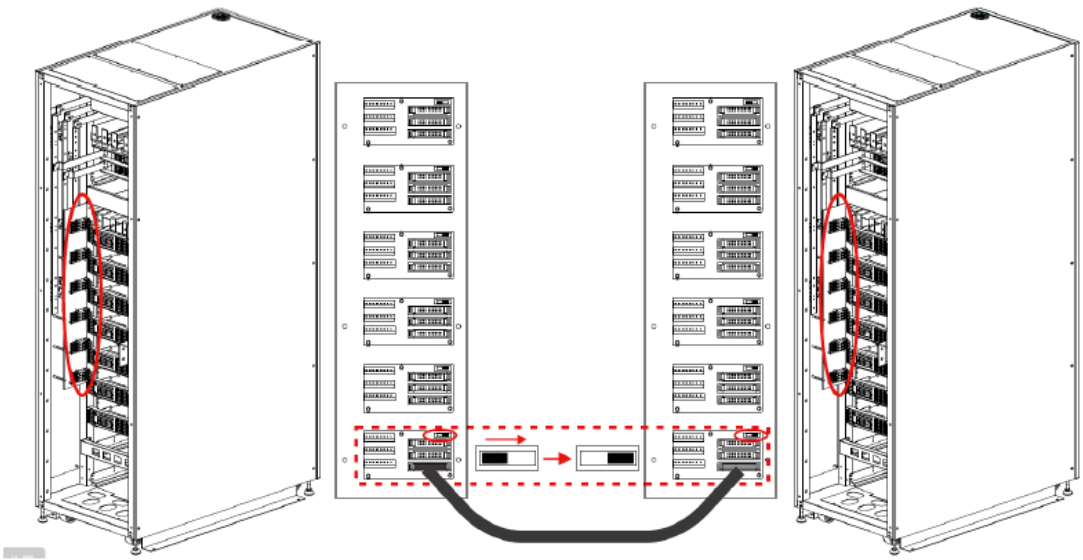


Figure 9-4

After connect the parallel cable, please set the switchas shown in Figure 9-5.



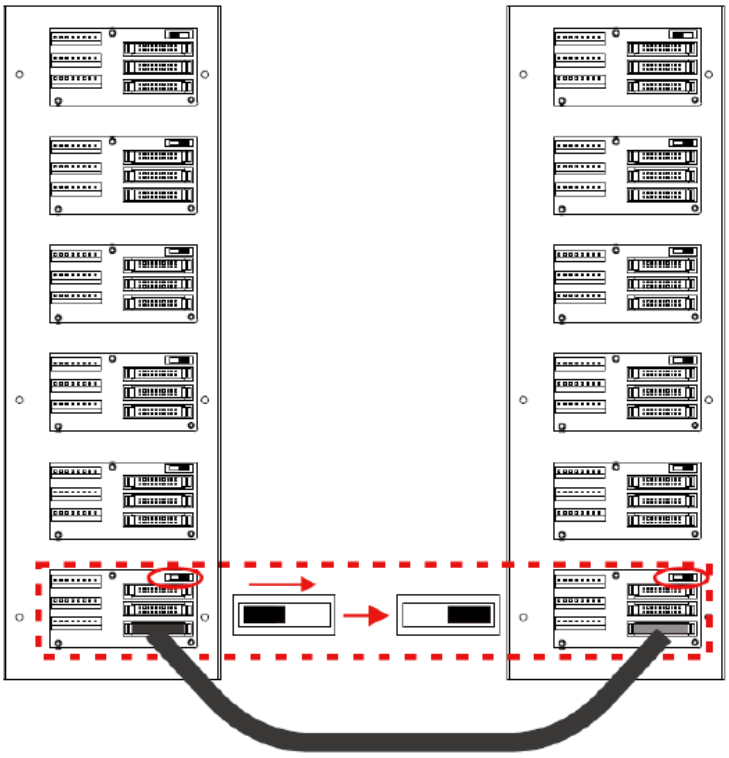


Figure 9-5

Please refer to dip switch position as shown in Figure 9-6. The pin 5 is set according to the position in Figure 9-6 for every module address.

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RACK 1		RACK 2	
Module Address	DIP SWITCH	Module Address	DIP SWITCH
1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	

Figure 9-6 DIP switch PIN 5 setting in parallel connection

Warning:
The parallel cable of each UPS must to be connected correctly. Any wrong connection will cause the UPS system to operate abnormally.

9.5 Parallel System Turn On Procedure

1 Please make sure the section 9.1 ~ 9.4 has been well followed.
2 Please confirm the Input breaker and output breakers of each UPS (Rack) have already been turned "ON".
3 Turn On the battery Breaker.
4 Turn on the external AC source breaker to apply AC Input source to two Racks.
5 Through the panel of the UPS 1(Rack 1) or UPS 2(Rack2), set up the total power module number and redundant number. (Refer to User Manual 4.2.6 SETUP Screen).
6 Through the panel of the UPS 1(Rack 1) or UPS 2(Rack2), get all module information , and confirm the information of all module can be display on the panel.(Refer to User Manual 4.2.5 MEASUREMENT Screen)
7 Please confirm the system without any abnormal event through the panel display.(Refer to User Manual 4.2.8 EVENTS Screen)
8 Turn on the UPS through the ON switch or control page of the panel. (Refer to User Manual 4.2.4 Control Screen)

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