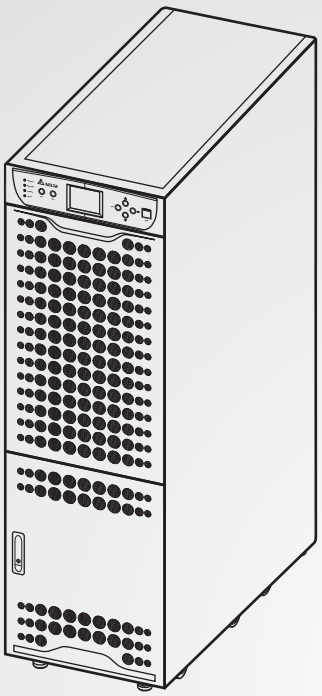


The power behind competitiveness

Delta UPS - Ultron Family

DPS Series, Three Phase
60~120 kVA

User Manual

www.deltapowersolutions.com

Smarter. Greener. Together.

Save This Manual

This manual contains important instructions and warnings that you should follow during the installation, operation, storage and maintenance of this product. Failure to heed these instructions and warnings will void the warranty.

Table of Contents

Chapter 1 : Important Safety Instructions

1.1 Important Safety Instructions

- This manual contains important instructions that you should follow during installation, operation, storage and maintenance of the UPS and batteries. All safety and operating instructions should be read thoroughly before attempting to wire or operate the unit.
- The three-phase on-line uninterruptible power supply (hereafter referred to as UPS) is applicable to IT industry and commercial environment. Please install it in a well ventilated area, away from excess moisture, heat, dust, flammable gas or explosives. Do not let the unit come in contact with water.
- External slits and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slits and openings must not be blocked or covered. Objects must never be inserted into ventilation slits or openings.
- Do not put beverage containers on the UPS.
- The UPS is designed to power all modern computer loads and associated peripheral devices, such as monitors, modems, cartridge tape drives, external floppy drives, etc. Do not use it for pure inductive or capacitive loads. It is not applicable to power life support equipment.
- It is strictly forbidden to connect the UPS to the following loads:
  1. Regenerative loads
  2. Asymmetrical loads (ex. half-wave rectifier)
- Do not open or remove the cover of the UPS to avoid high voltage electric shock. Only authorized engineers or service personnel can do so for installation or maintenance.
- The risk of dangerous high voltage is possible when batteries are still connected to the UPS even though the UPS is disconnected from AC power sources. Do not forget to cut off the battery breaker/ fuse to completely disconnect the battery source before any service is to be done on the UPS.
- Isolate the UPS before working on circuits. A readily accessible disconnect device shall be incorporated in the fixed wiring.
- HIGH LEAKAGE CURRENT – Earth connection is essential before connecting power source.
- If the UPS is supplied by a source whose neutral is grounded, the protective device installed as UPS input protection must be a 3-pole type. If the UPS is supplied by a source whose neutral is not grounded, the protective device installed as UPS input protection must be a 4-pole type.

- The risk of dangerous high voltage is possible when batteries are still connected to the UPS even though the UPS is disconnected from the mains. Do not forget to disconnect the battery source before maintenance or service.
- Do not dispose of the batteries in a fire. The batteries may explode.
- Do not open or damage the batteries. The released electrolyte is harmful to the skin and eyes and may be toxic.
- A battery can present a risk of electric shock and high short-circuit current. The following precautions should be observed before replacement of batteries:
  1. Remove watches, rings, or other metal objects.
  2. Use tools with insulated handles.
  3. Wear insulating gloves and boots.
  4. Do not lay tools or metal parts on the top of batteries.
  5. Disconnect the charging source prior to connecting or disconnecting the batteries' terminals.
- Follow the IEC 60364-4-42 standard to install the UPS.

1.2 Standard Compliance

- EN 62040-1
- EN 62040-2 Category C3
- IEC 61000-4-2 Level 4
- IEC 61000-4-3 Level 3
- IEC 61000-4-4 Level 4
- IEC 61000-4-5 Level 4
- IEC 61000-4-6

WARNING:
This is a Category C3 product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.

1.3 Glossary of Symbols

No.	Symbol	Description
1		ON key
2		OFF key
3		1. Moves up/ down. 2. Increases/ decreases number.
4		Confirms selection or goes back to Main Menu.
5		Goes back to previous screen or cancels current selection.
6		EPO key
7		Online mode LED indicator: green
8		Battery mode LED indicator: yellow
9		Bypass mode LED indicator: yellow
10		Fault LED indicator: red
11	R	R phase of AC Input/ UPS Output
12	S	S phase of AC Input/ UPS Output
13	T	T phase of AC Input/ UPS Output
14	N	AC Input neutral line/ UPS Output neutral line/ Battery Input neutral line
15		For UPS grounding
16		For critical load grounding/ For external battery cabinet grounding
17	+	Positive battery terminal
18	−	Negative battery terminal
19	⎓	Direct current
20	∅	Phase

Chapter 2 : Introduction

2.1 Product Description

Delta Ulton DPS series UPS (60-120 kVA), a three-phase four-wire on-line uninterruptible power supply, is designed for large-scale power systems applied in data centers, communication, networking, emergency systems and factory facilities. The UPS adopts innovative IGBT architecture and features higher efficiency, lower iTHD, lower noise and higher reliability as compared to other products in the market.

2.2 Functions and Features

- Power Rating: 60/ 80/ 100/ 120kVA.
- N+X parallel redundancy and capacity expansion. You can parallel at maximum four units without using any parallel card.
- High input power factor (pf > 0.99) and low input harmonic current (iTHD: < 3%) for saving installation costs and utility pollution reduction.
- Overall efficiency > 94%.
- Built-in manual and static bypass switches for maintenance.
- Built-in SRAM records up to 500 real-time event logs.
- Both auxiliary power and control circuit adopt redundancy design, which doubly enhances UPS reliability.
- Scheduled battery test and battery replacement warning.
- Local and remote emergency power off functions (LEPO and REPO).
- Compatible with generator design.
- Double conversion and IGBT technology.
- Multi-interface monitoring and controlling.
- User-friendly LCD display and LED indicators.

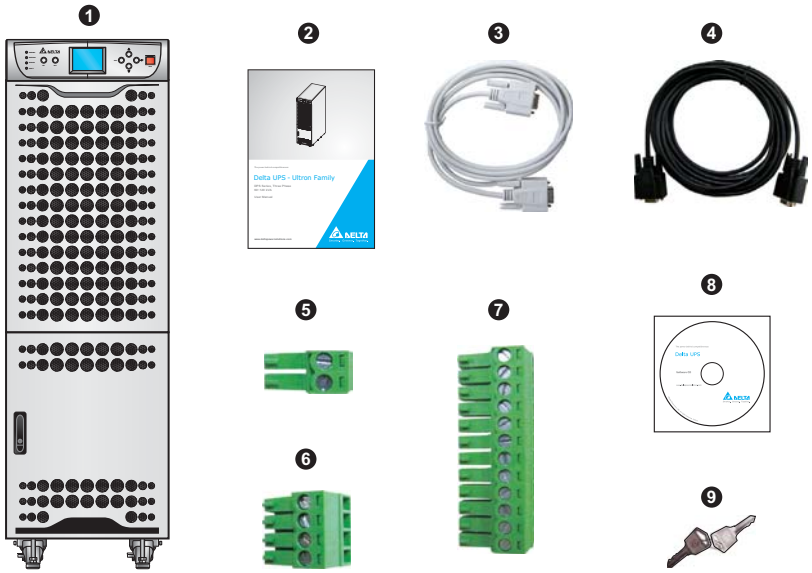
2.3 Package Inspection

- **External**

  During transportation, some unpredictable situations might occur. It is recommended that you inspect the exterior packaging. If you notice any damage, please immediately contact the dealer from whom you purchased the unit.

- **Internal**

1. Check the rating label stuck on the rear of the UPS and make sure the device No. and capacity match what you ordered.
2. Examine if any parts are loose or damaged.
3. The package contains the following items. Please check if any items are missing.



No.	Item	Quantity
❶	UPS	1 pc
❷	User Manual	1 pc
❸	RS-232 Cable	1 pc (1.8-meter long)
❹	Parallel Cable	1 pc (2-meter long)
❺	REPO Dry Contact Terminal Block	1 set (2-pin)
❻	Input Dry Contact Terminal Block	1 set (4-pin)
❼	Output Dry Contact Terminal Block	1 set (12-pin)
❽	Software CD-UPSentry 2012	1 pc
❾	Key	1 pc (two copies placed inside the UPS cabinet)

4. If there is any damage or anything missing, please immediately contact the dealer from whom you purchased the unit.
5. If the UPS needs to be returned, carefully repack the UPS and all of the accessories using the original packing material that came with the unit.

2.4 Storage Conditions for Delayed Installation

- If you have received the UPS and do not perform installation immediately, please store the UPS at a temperature between -15°C~50°C and relative humidity between 0%~90%.
- The carton and the original packaging must remain sealed to prevent any possible damage from rodents.
- If you perform the UPS installation six months later than you received the UPS, please charge batteries for at least 8 hours before the first use. The charging procedures are as follows:

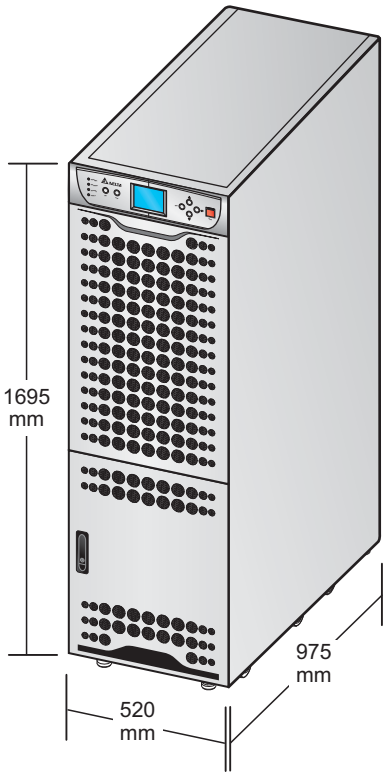
  1. Connect the UPS to the utility power and an external battery cabinet (at maximum four). Please see ***Chapter 5 : Installation and Wiring***.
  2. Follow ***Chapter 6 : Operation Procedures*** to turn on the UPS. After the UPS is turned on, the unit will automatically charge the batteries.

WARNING:

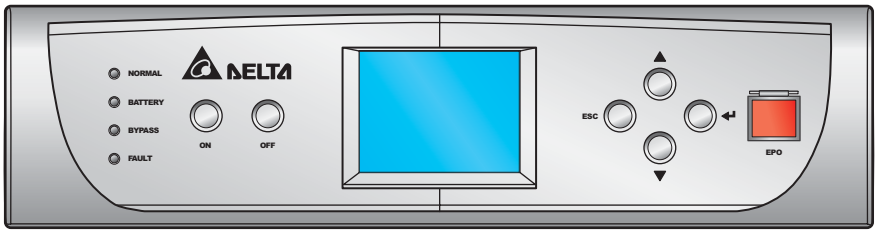
You can connect critical loads to the UPS only after the batteries are fully charged. This guarantees that the UPS can provide sufficient backup power to the connected critical loads when a power failure occurs.

Chapter 3 : General Overview

3.1 Exterior & Dimensions

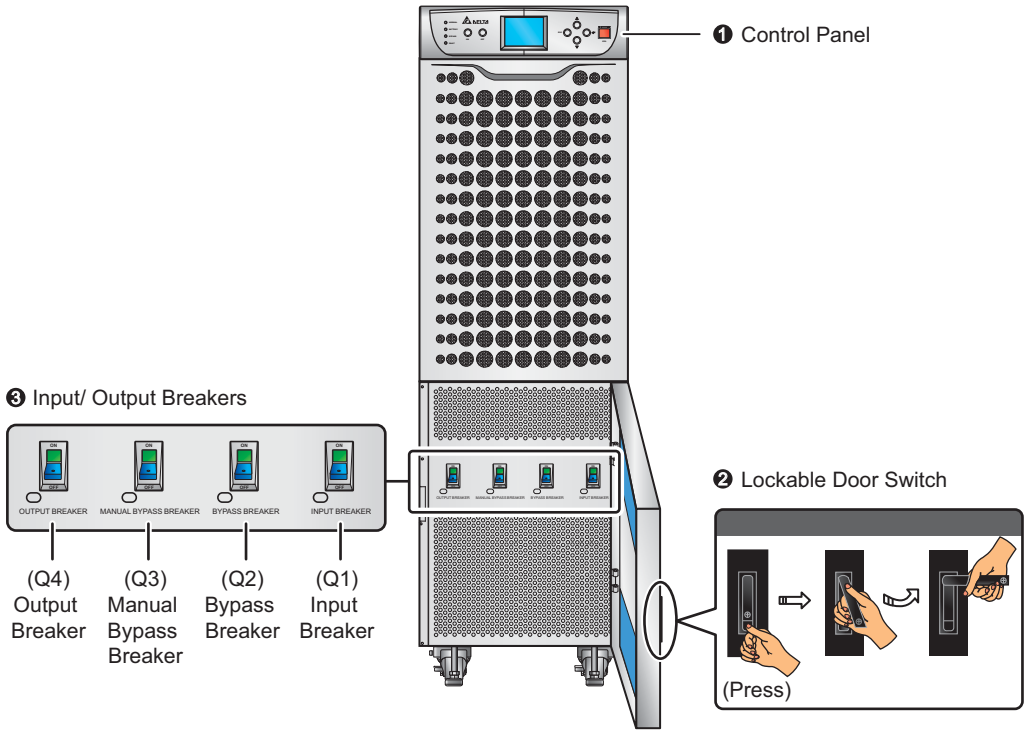


(Figure 3-1: Exterior & Dimensions of DPS 60-120kVA UPS)



(Figure 3-2: Control Panel)

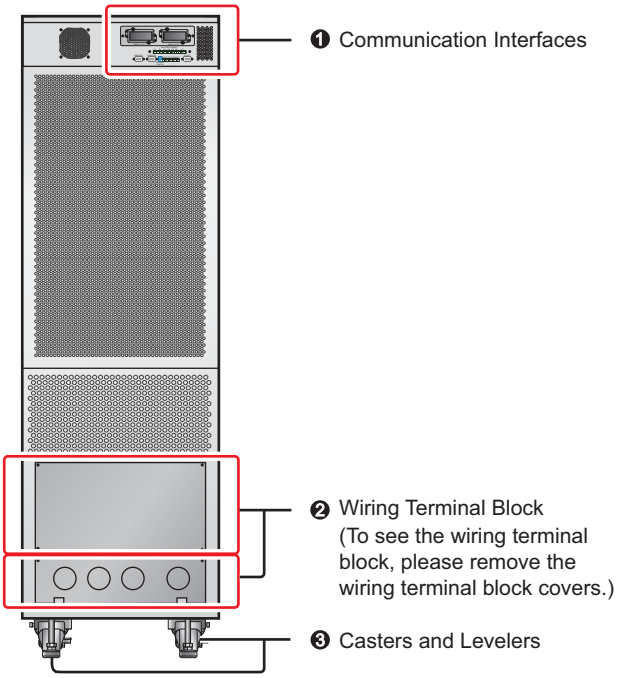
3.2 Front View



(Figure 3-3: Front View of DPS 60-120kVA UPS)

No.	Item	Description
❶	Control Panel	Control panel includes a LCD display, function keys and LED indicators. Please see ***Chapter 7 : LCD Display & Settings*** for more information.
❷	Lockable Door Switch	Please refer to ***Figure 3-3*** to open the front door. After opening the front door, you will see four breakers and two copies of keys.
❸	I/P and O/P Breakers	After opening the front door, you will see the UPS's four breakers, Input Breaker (Q1), Bypass Breaker (Q2), Manual Bypass Breaker (Q3), and Output Breaker (Q4). Each breaker is a non-fuse breaker.

3.3 Rear View

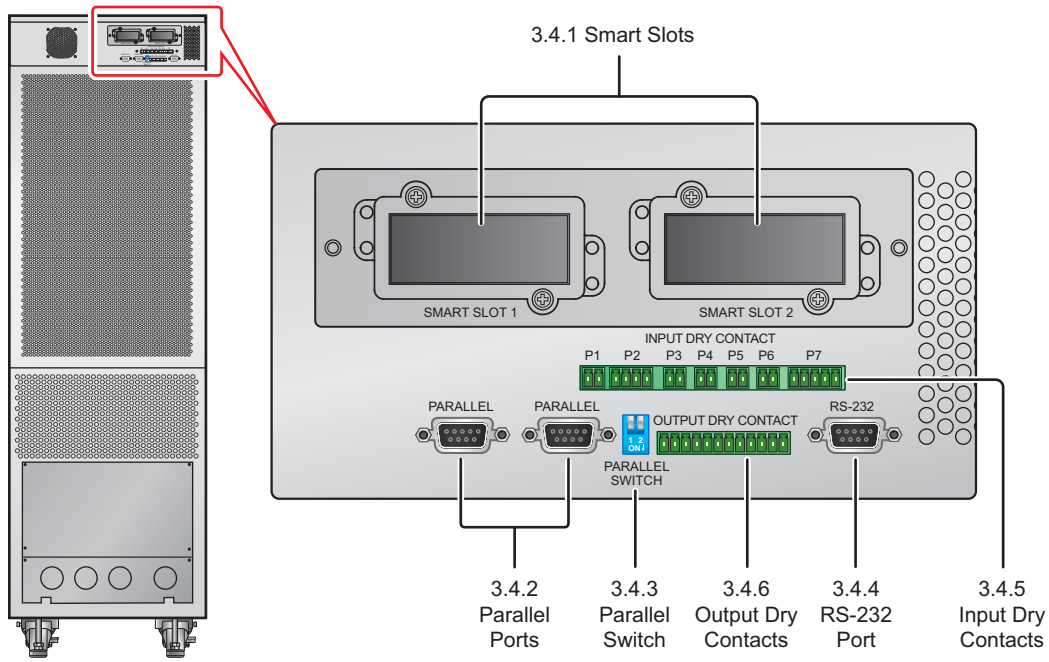


(Figure 3-4: Rear View of DPS 60-120kVA UPS)

No.	Item	Description
❶	Communication Interfaces	Communication interfaces include two smart slots, an RS-232 port, input dry contacts, two parallel ports, a parallel switch, and output dry contacts. For more information, please see ***3.4 Communication Interfaces***.
❷	Wiring Terminal Block	After removing the covers shown in ***Figure 3-4***, you can see the wiring terminal block. Please refer to ***Chapter 5 : Installation and Wiring*** to perform wiring.
❸	Casters and Levelers	The casters are designed to move the UPS for short distances, and the levelers fix the UPS to the floor.

3.4 Communication Interfaces

Communication interfaces locate at the rear of the UPS and include two smart slots, an RS-232 port, input dry contacts, two parallel ports, a parallel switch, and output dry contacts. Please see the figure below.



(Figure 3-5: Communication Interfaces)

NOTE:

1. The UPS can still function properly without making the connections below.
2. You can use all of the communication interfaces at the same time and it will not influence each interface's function.

3.4.1 Smart Slots

The UPS provides two smart slots. You can choose optional cards to monitor the UPS or to enhance the UPS function. You can use the two slots at the same time and it will not influence the function of the RS-232 port. The list of optional cards is shown in the table below.

Optional Card	Function
SNMP Card (IPv4 or IPv6)	Helps you remotely monitor the status of the UPS via internet.
Relay I/O Card	Increases the quantity of dry contacts.
ModBUS Card	Lets the UPS have ModBus communication.

NOTE:
If you wish to order any optional card, please contact your local dealer or Delta customer service.

3.4.2 Parallel Ports

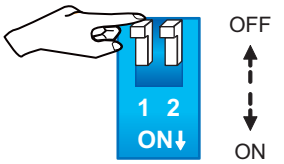
The two parallel ports are for UPS parallel communication. UPSs (at maximum four) with the same capacity, voltage and frequency can be coupled via the provided parallel cable to run in parallel mode.

WARNING:
The provided parallel cable is placed in the accessory package. Using other types of cables to connect the UPSs may cause malfunctions.

3.4.3 Parallel Switch

When you parallel UPSs, you need to set up the parallel switch to activate parallel function. The parallel switch includes two DIP switches. To turn on a DIP switch, switch the DIP to the down position; to turn off a DIP switch, switch the DIP to the up position.

- When two UPSs are paralleled, turn on each UPS's DIP switches.
- When three UPSs are paralleled, turn off the middle UPS's DIP switches and turn on the remaining UPSs' DIP switches.
- When four UPSs are paralleled, turn off the middle two UPSs' DIP switches and turn on the remaining UPSs' DIP switches.



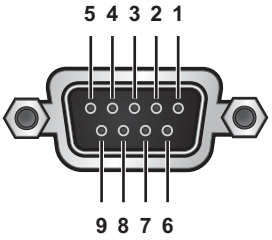
(Figure 3-6: Parallel Switch)

3.4.4 RS-232 Port

You can use the provided RS-232 cable to connect the RS-232 port with a computer, and use the included CD to install the UPSentry 2012 software (http://www.deltapowersolutions.com/en/mcis/software-center.php) to record UPS power events, set up alarms, and shut down the UPS safely. If you wish to monitor several UPSs placed in a computer room or a factory to facilitate centralized control, please contact your local dealer. Detailed information is as follows:

1. Monitors the load level, battery status, battery voltage, UPS operation mode, input voltage, input frequency, output voltage, and unit interior temperature.
2. Sets shutdown delay time.
3. Enables/ disables beep.
4. Supports remote shutdown.

5. Pin Assignment
   1) PIN 2: TXD <Transmitting Data>
   2) PIN 3: RXD <Receiving Data>
   3) PIN 5: GND <Signal Ground>
6. Hardware
   1) Baud Rate: 2400 bps
   2) Data Length: 8 bit
   3) Stop Bit: 1 bit
   4) Parity: None



(Figure 3-7: RS-232 Port)

NOTE: Other pins are reserved and cannot be used.

3.4.5 Input Dry Contacts

The UPS provides seven sets of dry contacts to receive external information of devices connected to the dry contacts. The function of each dry contact is described as follows.

P1: REPO (Remote Emergency Power Off)

P2: Input dry contacts (two sets)

P3: External battery cabinet temperature detection 1

P4: External battery cabinet temperature detection 2

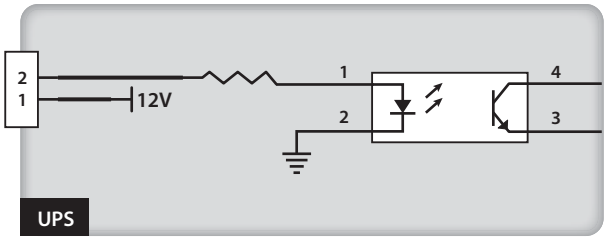
P5: External battery cabinet temperature detection 3

P6: External battery cabinet temperature detection 4

P7: Reserved

- **P1: REPO**

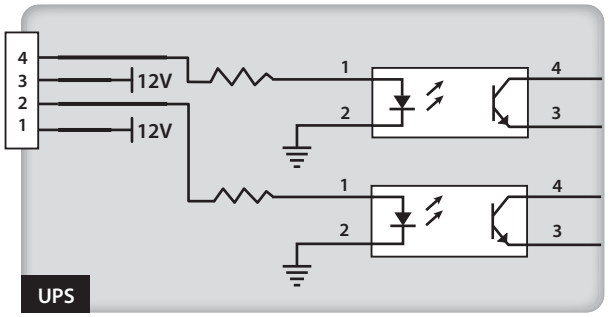
  This dry contact provides you with a quick and convenient interface to safely shut down the UPS when an emergency occurs. Connect this dry contact to a user-supplied switch and you can remotely shut down the UPS. The REPO dry contact is normally open in normal circumstances.



(Figure 3-8: REPO Port Configuration)

- **P2: Input dry contacts (two sets)**

  In normal conditions, the dry contacts are normally open. If you need to modify the default settings, please contact your local dealer.



(Figure 3-9: Two Sets of Input Dry Contacts)

- **P3~P6: External Battery Cabinet Temperature Detection**

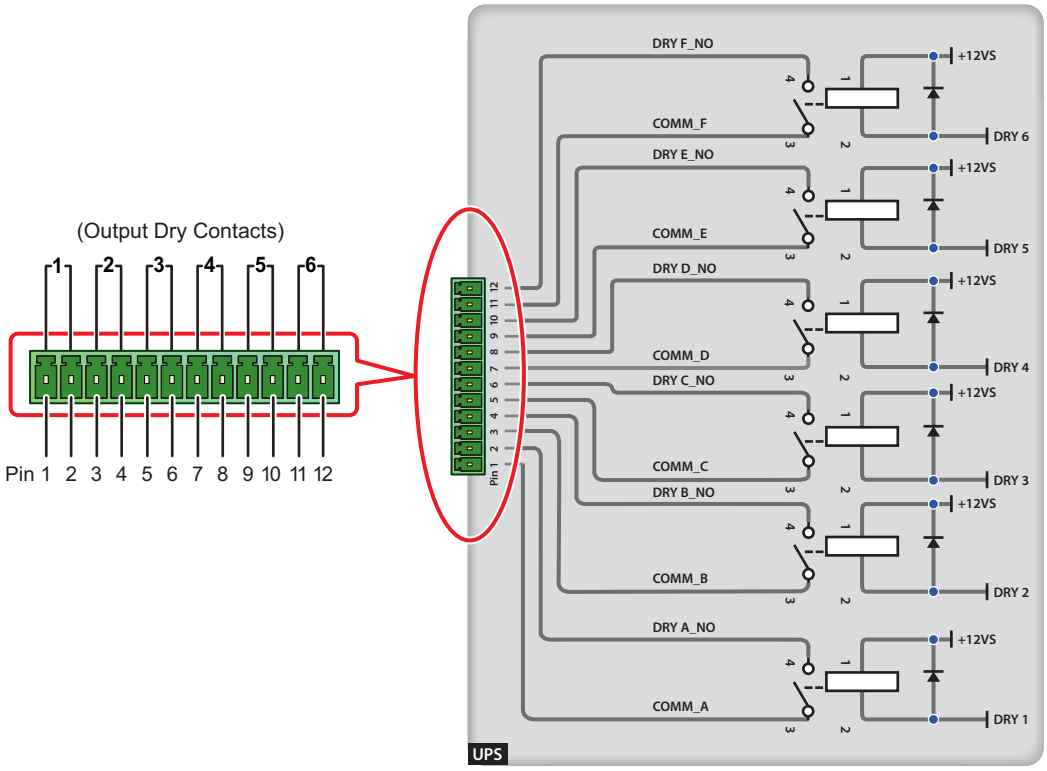
  You can purchase a battery cabinet temperature sensor cable shown in ***Figure 3-10*** to connect the UPS and an external battery cabinet and use it to detect the temperature of the battery cabinet. Please note that you can use at maximum four temperature sensor cables to connect the UPS and four external battery cabinets.

NOTE:

If you want to buy the battery cabinet temperature sensor cable, please contact your local dealer.

(Figure 3-10: External Battery Cabinet Temperature Detection)

3.4.6 Output Dry Contacts



(Figure 3-11: Output Dry Contacts)

The UPS provides six sets of output dry contacts. These contacts can be set as normally-open or normally-closed. The default settings are shown in the table below.

Contact	Event	Description
Pin 1-2	Load on inverter	The UPS works in normal mode.
Pin 3-4	Load on bypass	The UPS works in bypass mode.
Pin 5-6	Battery discharge/ Main input NOK	When the main AC source fails, the batteries supply power to the critical loads.
Pin 7-8	Low battery	When the UPS runs in battery mode, battery voltage is lower than the setup limit, 220Vdc.
Pin 9-10	Bypass input NOK	The bypass voltage, frequency or phase sequence is abnormal.
Pin 11-12	Battery test fail or battery missing	During the battery test, the battery voltage is out of the setup limit.

There are other 15 choices for you to change the default settings. Please see the table below. To learn how to set up, please contact your local dealer.

No.	Event	Description
1	Internal communication failure	Power unit's internal communication is abnormal.
2	External parallel communication loss	In parallel mode, parallel communication is abnormal.
3	Output overload warning/ Shutdown	The UPS is overloaded or the UPS shuts down to let the bypass supply power to the critical loads.
4	Power module fault shutdown	The power unit has abnormalities and it shuts down the UPS to let the bypass supply power to the critical loads.
5	Power module warning	The power unit has abnormalities but the UPS still runs in normal mode.
6	EPO activated	The EPO button is pressed to urgently power off the UPS.
7	Load on manual bypass	The Manual Bypass Breaker (Q3) is turned on and the UPS transfers to manual bypass mode.
8	Battery cabinet over temperature warning/ Shutdown	The external battery cabinet's temperature is too high.
9	Abnormal inverter voltage	The output voltage is too high or too low.
10	Battery needs replacement	Battery replacement date is due.
11	Bypass over temperature warning/ Shutdown	Bypass static switch temperature is too high.
12	Battery ground fault	The external battery cabinet has ground fault/ leakage issues.
13	Bypass static switch fault	The bypass static switch has open/ short issues.
14	General alarm	When any UPS alarm occurs.
15	Tripping of battery breaker	To trip the external battery cabinet's breaker.

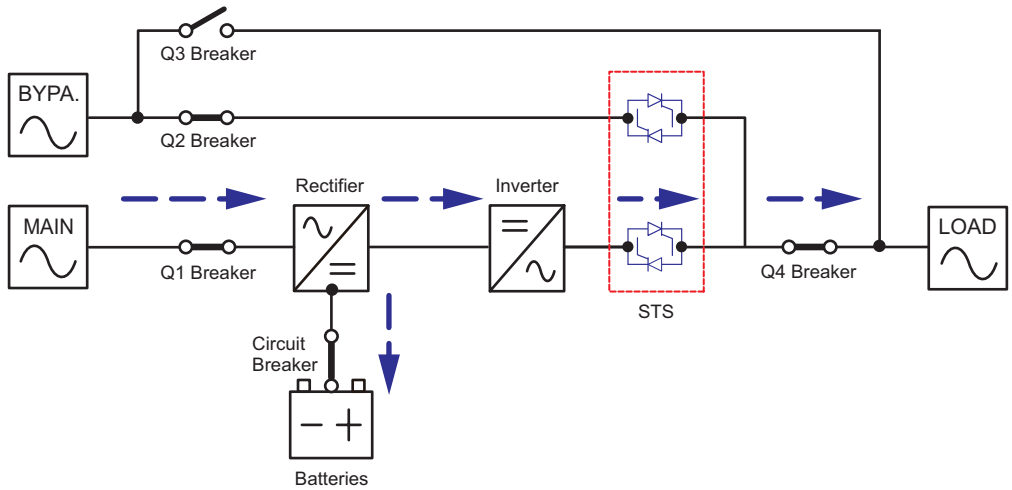
Chapter 4 : Operation Modes

The UPS system supplies power to the connected critical loads with four basic operation modes, which are normal mode, battery mode, bypass mode and manual bypass mode. The unit automatically switches between these modes as required to make sure that the critical loads are protected from power interruption. Besides these four operation modes, the UPS is also designed for ECO mode (for single unit only). Please see below for more descriptions.

NOTE:
The Q1, Q2, Q3 and Q4 Breakers shown in the following diagrams represent Input Breaker, Bypass Breaker, Manual Bypass Breaker, and Output Breaker respectively.

4.1 Normal Mode (Single)

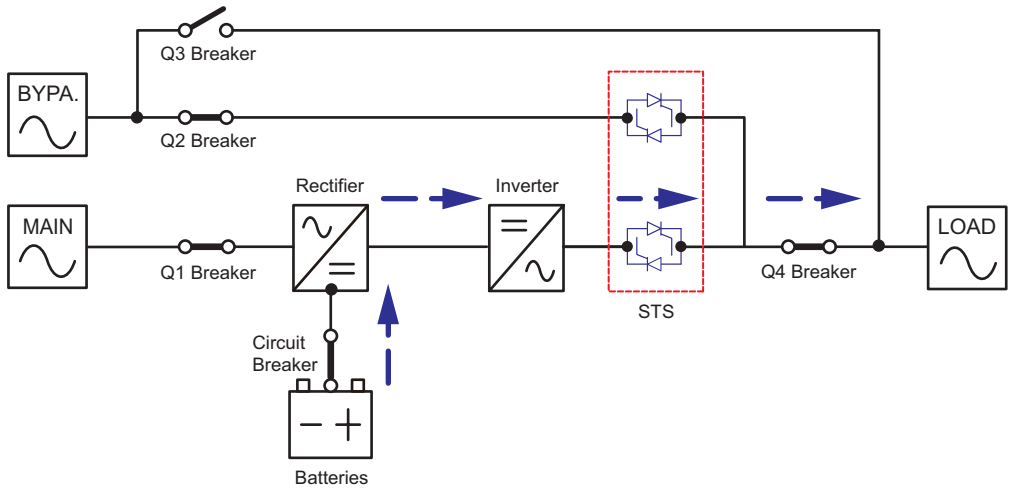
In Normal Mode, the main AC power supplies the rectifier via the Input Breaker (Q1). The rectifier converts the AC to DC power, supplies DC power to the inverter, and charges the batteries. The inverter converters and filters the DC power into pure and stable AC power, and supplies the AC power via the static switch and the Output Breaker (Q4) to the connected critical loads. Please see ***Figure 4-1***.



(Figure 4-1: Path of Electrical Power through the Single UPS in Normal Mode)

4.2 Battery Mode (Single)

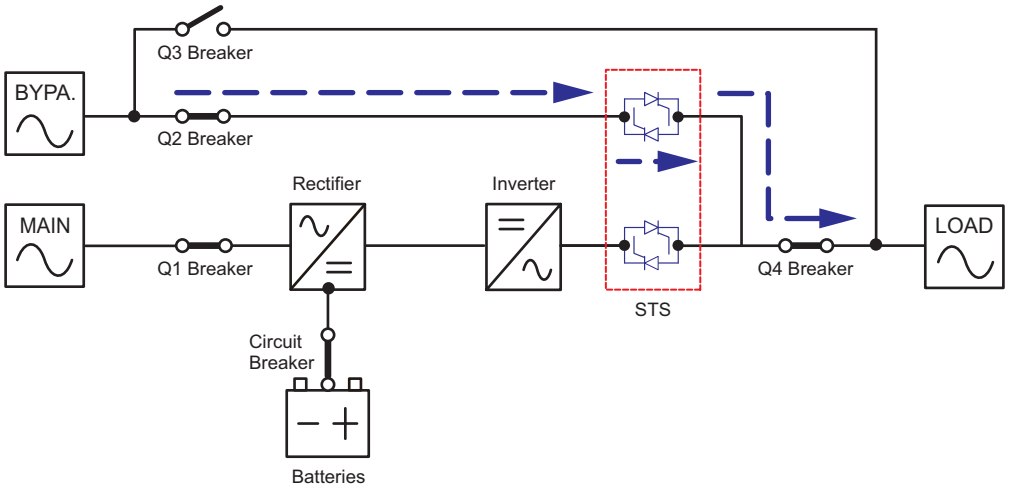
The UPS automatically transfers to Battery Mode if the main AC power fails, for example, when unstable voltage or a power outage occurs. In battery mode, the batteries provide DC power and the inverter converts it into AC power and supplies it to the connected critical loads via the static switch and the Output Breaker (Q4). During the transfer process, output voltage remains the same. Please see ***Figure 4-2***.



(Figure 4-2: Path of Electrical Power through the Single UPS in Battery Mode)

4.3 Bypass Mode (Single)

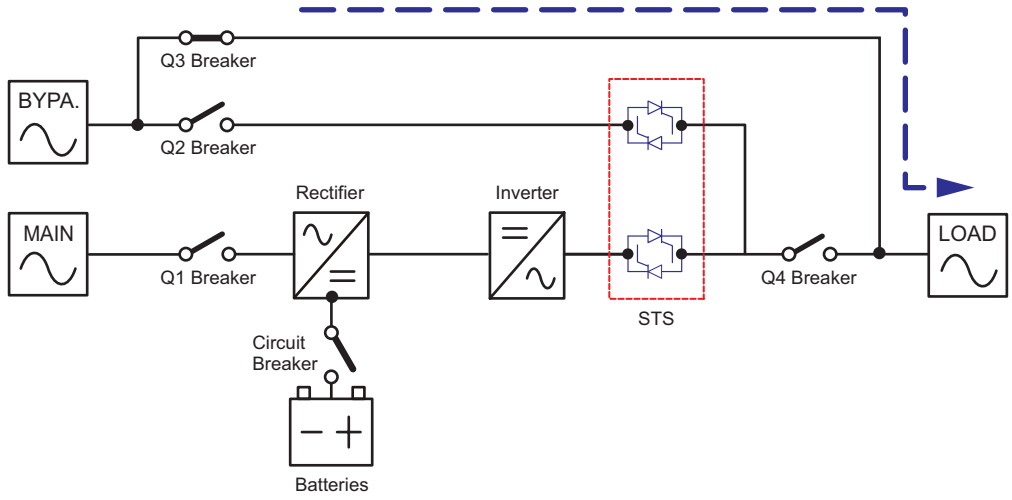
When the inverter encounters abnormal situations such as over temperature, overload, short circuit, abnormal output voltage or low battery, it shuts itself down to protect the UPS. If the bypass power is normal, the UPS will transfer to Bypass Mode to supply power to the critical loads. After the abovementioned abnormalities are cleared, the UPS will transfer back to Normal Mode. Please see ***Figure 4-3***.



(Figure 4-3: Path of Electrical Power through the Single UPS in Bypass Mode)

4.4 Manual Bypass Mode (Single)

When the UPS needs maintenance, you can manually switch the UPS to manual bypass mode after you have confirmed the bypass AC source is normal. In manual bypass mode, all power inside the UPS is completely cut off and maintenance personnel can perform maintenance safely. Please see ***Figure 4-4***.



(Figure 4-4: Path of Electrical Power through the Single UPS in Manual Bypass Mode)

WARNING:

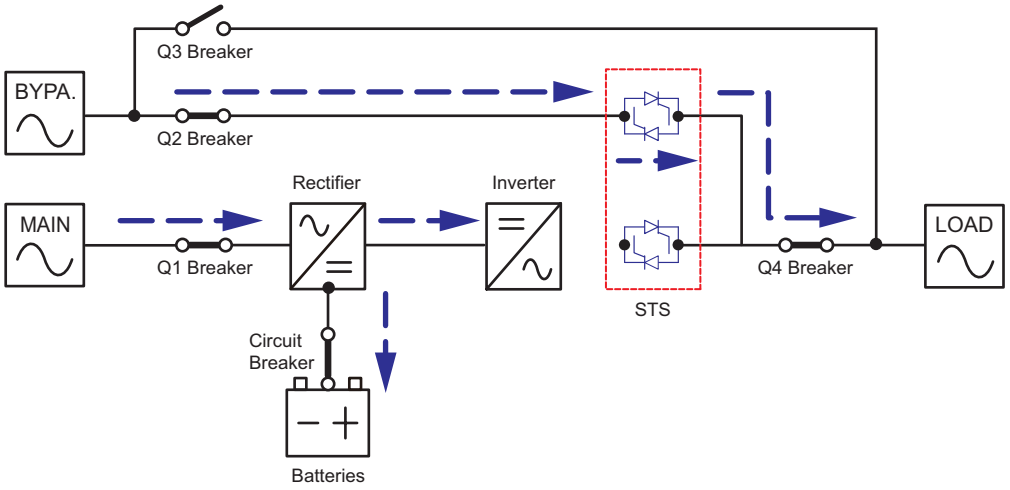
1. In Manual Bypass Mode, make sure all external battery cabinets' breakers are switched to the **OFF** position before working on the UPS's internal circuits. This avoids electrical shock.
2. During maintenance, if the UPS's input power is cut off, the connected critical loads won't be protected.

NOTE:

After the power inside the UPS has been completely cut off, there is no high voltage inside the UPS except the wiring terminal block and the Manual Bypass Breaker (Q3). Do not touch the wiring terminal block or the Manual Bypass Breaker (Q3) to avoid electrical shock.

4.5 ECO Mode (For Single Unit Only)

You can only use ECO mode for a single unit but not for parallel units. In ECO mode, when bypass AC source's input voltage and frequency are within the range of rating voltage ±10% and rating frequency ±5Hz, the UPS works in bypass mode. Otherwise, the UPS will work in normal mode. Please see ***Figure 4-5***.

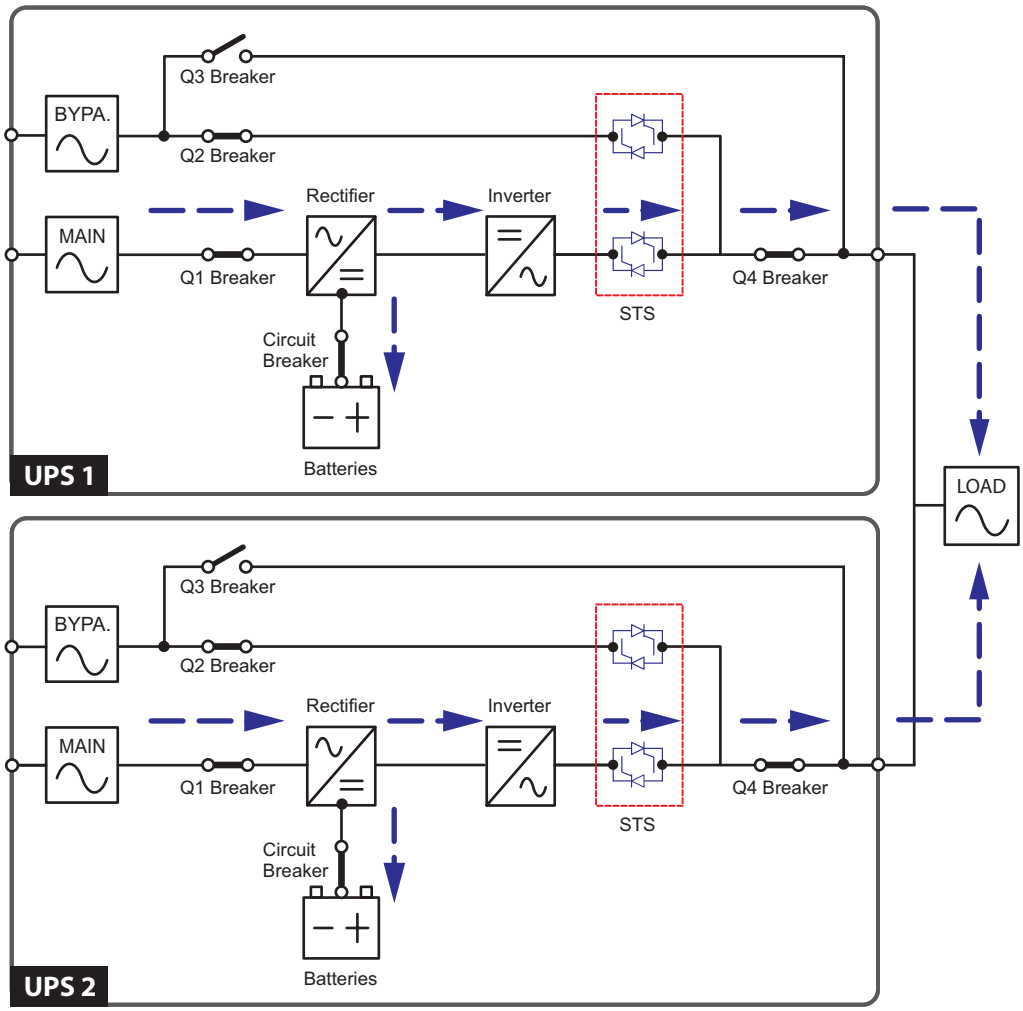


(Figure 4-5: Path of Electrical Power through the Single UPS in ECO Mode)

4.6 Normal Mode (Parallel)

Up to four UPSs can be paralleled for redundancy and capacity expansion. Only UPSs with the same capacity, voltage and frequency can be paralleled. In Normal Mode (parallel), the critical loads will be equally shared by the paralleled units.

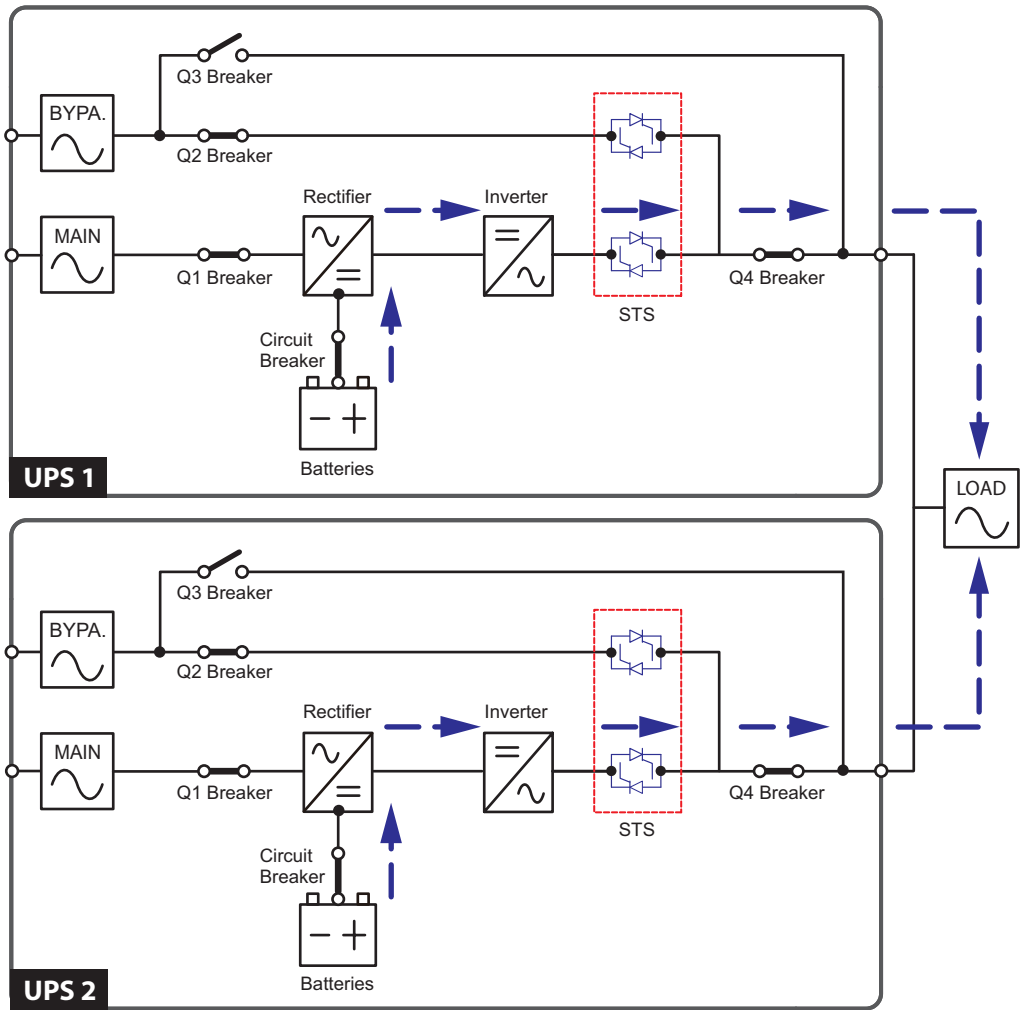
If a UPS fails and its load is less than the total capacity of the remaining parallel UPSs, its output will be cut off and its load will be equally shared by the other UPSs. If the failing UPS's load is larger than the total capacity of the remaining parallel UPSs, all UPSs' inverters will turn off and the total load will be supplied by bypass power. Please see ***Figure 4-6***.



(Figure 4-6: Path of Electrical Power through the Parallel UPS in Normal Mode)

4.7 Battery Mode (Parallel)

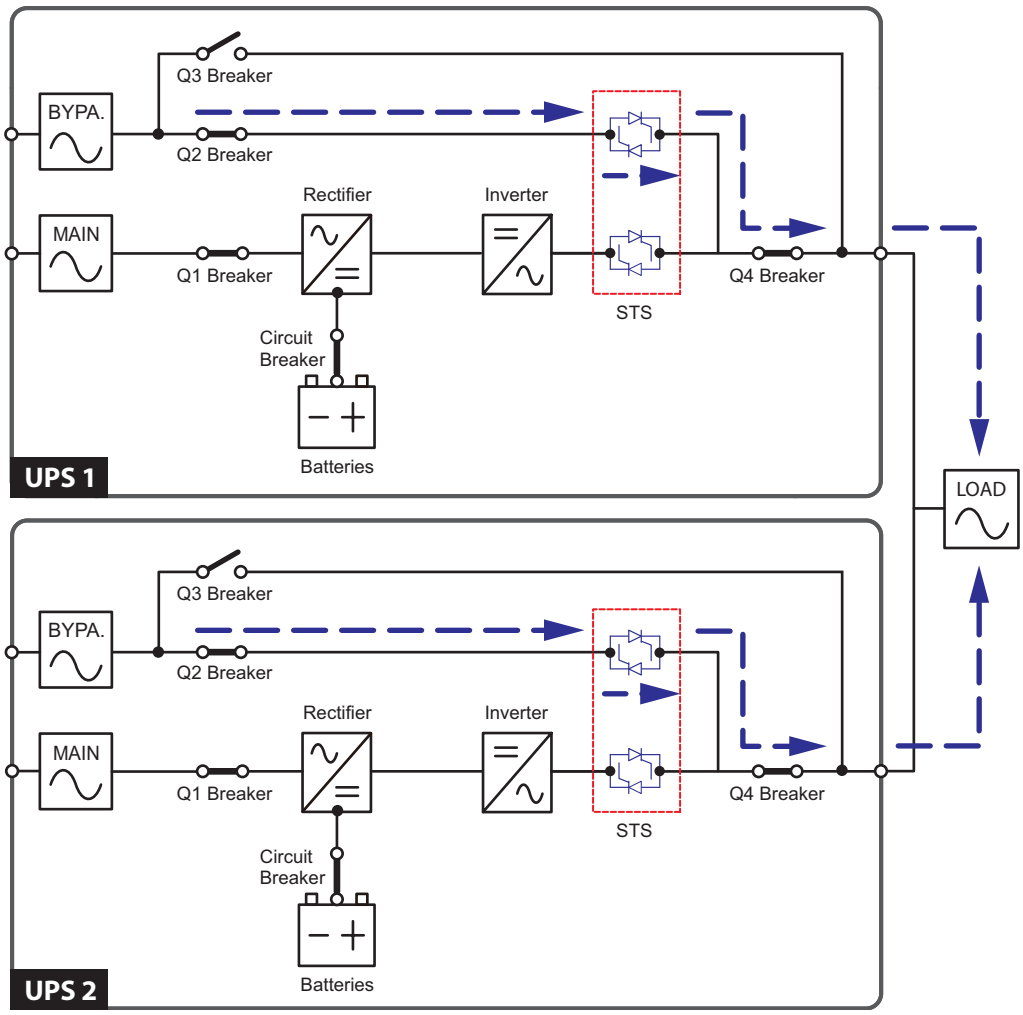
If the main AC power cannot supply power, for example, when voltage is unstable or a power outage occurs, all parallel UPSs will automatically transfer from Normal Mode to Battery Mode. During the transfer process, output voltage remains the same. Please see ***Figure 4-7***.



(Figure 4-7: Path of Electrical Power through the Parallel UPS in Battery Mode)

4.8 Bypass Mode (Parallel)

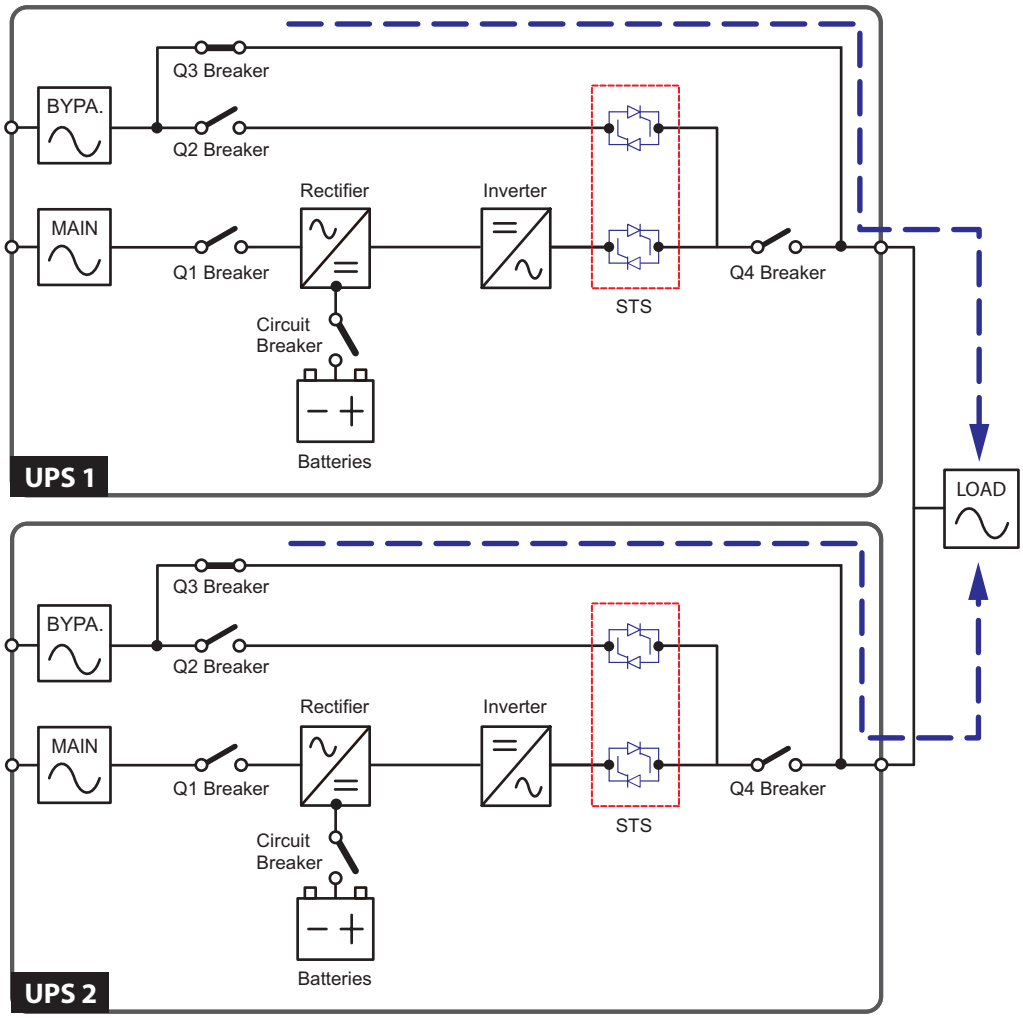
In parallel mode, when all inverters encounter abnormal situations such as over temperature, overload, short circuit, abnormal output voltage and battery depletion, they will automatically shut themselves down to protect the UPSs' systems. Meanwhile, if all UPSs detect the bypass AC source is normal, they will automatically switch to bypass mode to protect the connected critical loads from power interruption. The critical loads will be equally shared by all parallel units. After the abnormalities mentioned above are eliminated, the UPSs will switch back to normal mode from bypass mode. Please see ***Figure 4-8***.



(Figure 4-8: Path of Electrical Power through the Parallel UPS in Bypass Mode)

4.9 Manual Bypass Mode (Parallel)

In parallel mode, if you want a UPS to run in manual bypass mode, please confirm that the bypass AC source is normal. After confirmation, you can manually switch all UPSs to manual bypass mode. In manual bypass mode, all power inside the UPSs is completely cut off and maintenance personnel can perform maintenance safely. The connected critical loads will be equally supplied by the parallel units. Please see ***Figure 4-9***.



(Figure 4-9: Path of Electrical Power through the Parallel UPS in Manual Bypass Mode)

WARNING:

1. In Manual Bypass Mode, make sure all external battery cabinets' breakers are switched to the **OFF** position before working on the parallel UPSs' internal circuits. This avoids electrical shock.
2. During maintenance, if the parallel UPSs' input power is cut off, the connected critical loads won't be protected.

NOTE:

1. After the power inside all parallel UPSs has been completely cut off, there is no high voltage inside the UPSs except the wiring terminals and the Manual Bypass Breaker (Q3). Do not touch the wiring terminals or the Manual Bypass Breaker (Q3) to avoid electrical shock.
2. For parallel UPSs, if you want to turn off one of the parallel UPSs for maintenance, please make sure the connected critical loads will not exceed the remaining parallel units' total capacity.

Chapter 5 : Installation and Wiring

5.1 Precautions Prior to Installation and Wiring

Due to different installation environments, it is highly recommended that you read this user manual before installation and wiring. Only authorized Delta engineers or service personnel can perform installation, wiring, and maintenance. If you want to perform installation or wiring by yourself, installation and wiring must be under the supervision of authorized Delta engineers or service personnel. If you use a forklift or other equipment to move the UPS, please make sure its load bearing is sufficient. Please refer to ***Table 5-1***.

Table 5-1 DPS series UPS Floor Weight Loading Table

DPS Series UPS				
Rating (kVA)	60	80	100	120
Weight (Kg)	300	330	360	390
Weight Loading (kg/ m^2)	592	651	711	769

5.2 Installation Environment

- Install the UPS and the external battery cabinet indoors. Do not place them outdoors.
- 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 cabinets and forklifts. Please refer to ***Table 5-1*** for the UPS floor weight loading information.
- Keep the installation area clean and tidy. Please note that wiring routes must be hermetic to prevent possible damage from rodents.
- Keep the installation area's temperature around 25°C and humidity within 90%. The highest operating altitude is 3000 meters above sea level.
- Ensure that the installation area is big enough for maintenance and ventilation. Since the fans of the UPS ventilate from front to rear, it is recommended that you parallel the external battery cabinet next to the UPS and:

  1. Keep a clearance of 100cm from the front of the UPS and the external battery cabinet for maintenance and ventilation.
  2. Keep a clearance of 50cm from the back of the UPS and the external battery cabinet for maintenance and ventilation.
  3. Keep a clearance of 50cm from the top of the UPS for maintenance.

- For safety concerns, we suggest that you:

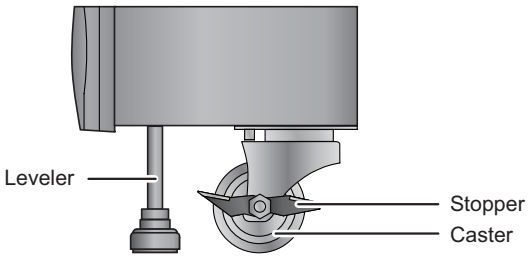
  1. Equip surroundings of the installation area with CO_2 or dry powder fire extinguishers.
  2. Install the UPS in an environment where fireproof materials are used to construct the walls, floors and ceilings.

- Do not allow unauthorized personnel to enter the installation area. Assign specified personnel to keep the UPS key.

WARNING:
Do not use air conditioners or similar equipment to blow into the rear side of the UPS and hinder ventilation.

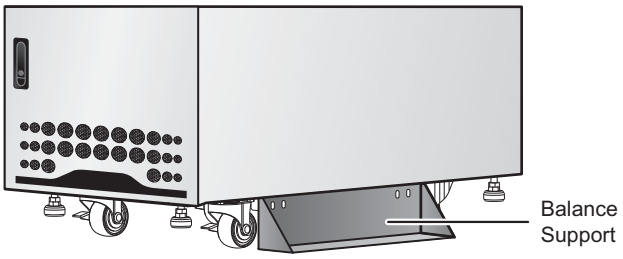
5.3 Transportation & Handling

- At the bottom of the UPS, there are four casters to help you to move the UPS to a designated area. Before you move the UPS, please turn the four levelers counterclockwise to raise them off the ground. This protects the levelers from damage when moving the UPS. Please use sufficient manpower (at least 3 people) and equipment (e.g. forklift) to carefully move the UPS from pallet to ground. Please pay attention to the movement of the casters to avoid accidents.



(Figure 5-1: Leveler, Caster, and Stopper)

WARNING:
The UPS is fixed on the pallet with two balance supports. When taking apart the two balance supports from the UPS, please pay attention to the movement of the casters to avoid accidents. Please refer to the **Unpacking Guide** attached to the UPS's external wooden box for location of balance supports.



(Figure 5-2: Balance Support)

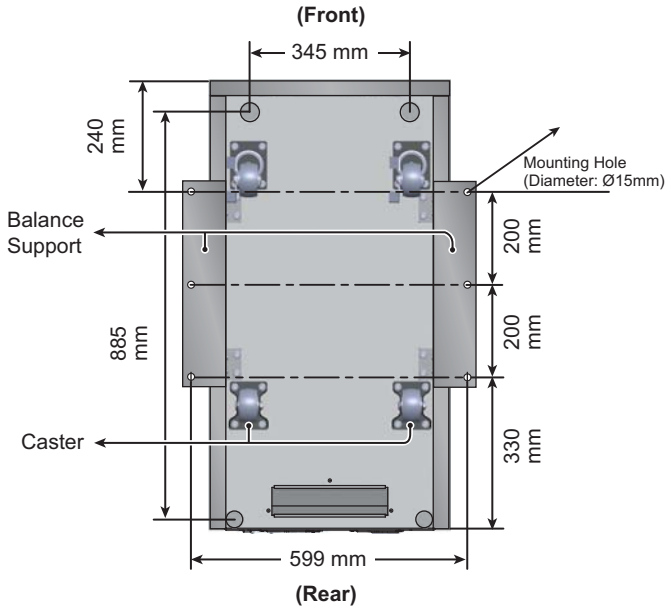
- The casters are designed to move on level ground. Do not move the UPS on an uneven surface. This might cause damage to the casters or tip the UPS which could damage the unit.
- After the UPS has been removed from the pallet to ground, we suggest that at least three people move the UPS to the installation area. One person use their hands to hold a lateral side of the UPS, one person hold the other lateral side of the UPS with their hands, and one person use their hands to push the UPS either from the front side or from the backside to move the unit to the installation area and avoid tipping the UPS.
- 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 the unit over a long distance.
- After moving the UPS to a designated area, use their stoppers shown in ***Figure 5-1*** to fix them to avoid movement, and turn their four levelers clockwise to let them stand on the ground levelly.

5.4 Installation

Please follow the steps below:

1. Before fixing the UPS in a designated area, please double check whether the area's floor weight loading is sufficient to bear the UPS and external battery cabinets to avoid accidents. Please refer to ***Table 5-1*** for the UPS floor weight loading information.

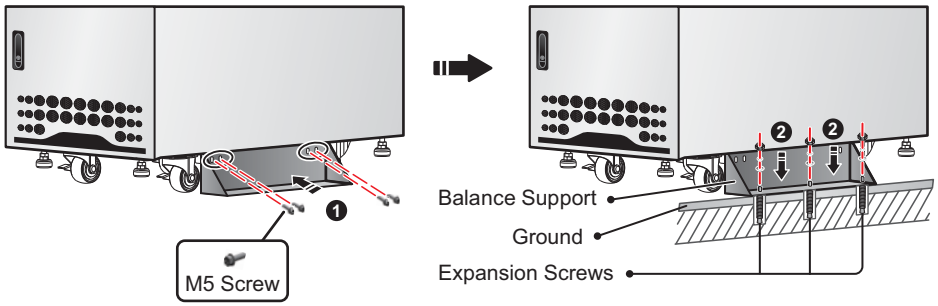
2. Before installation, please refer to ***Figure 5-3*** for mounting hole diagram.



(Figure 5-3: Mounting Hole Diagram)

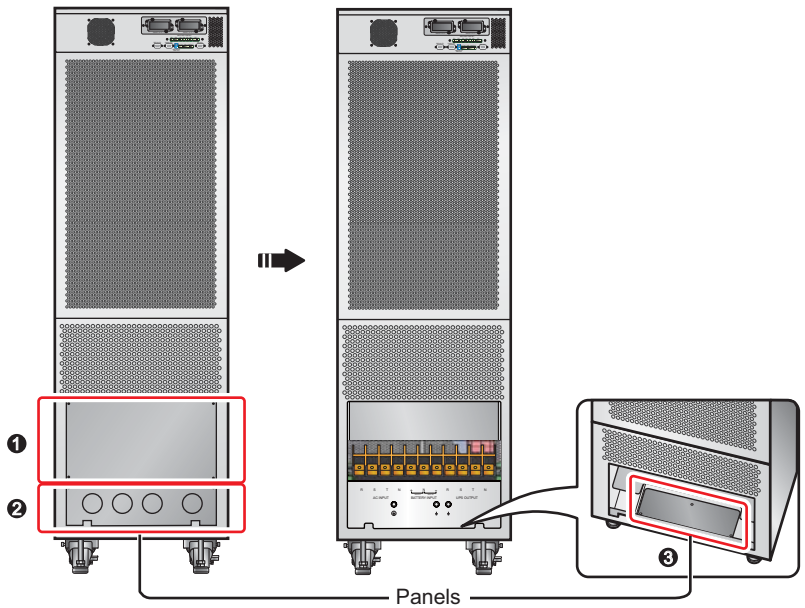
3 After moving the UPS to the designated area, please use a 17mm combination wrench to stabilize their levelers on the floor. Please note that the UPS must stand on the floor firmly and levelly without any tipping.

4 Use 10mm bushing tool and eight M5 screws ❶ (originally fixed the UPS's balance supports on the pallet) to install the two balance supports (removed from the UPS during the unpacking process) at both sides of the UPS. Use six expansion screws ❷ to fix the balance supports on the ground to avoid UPS movement. Please note that service personnel should provide the expansion screws. Please see ***Figure 5-4***.



(Figure 5-4: Fix the two Balance Supports on the Ground)

5 Face the back of the UPS. Follow on-site wiring situation to remove the UPS's wiring terminal block covers shown in ***Figure 5-5***.



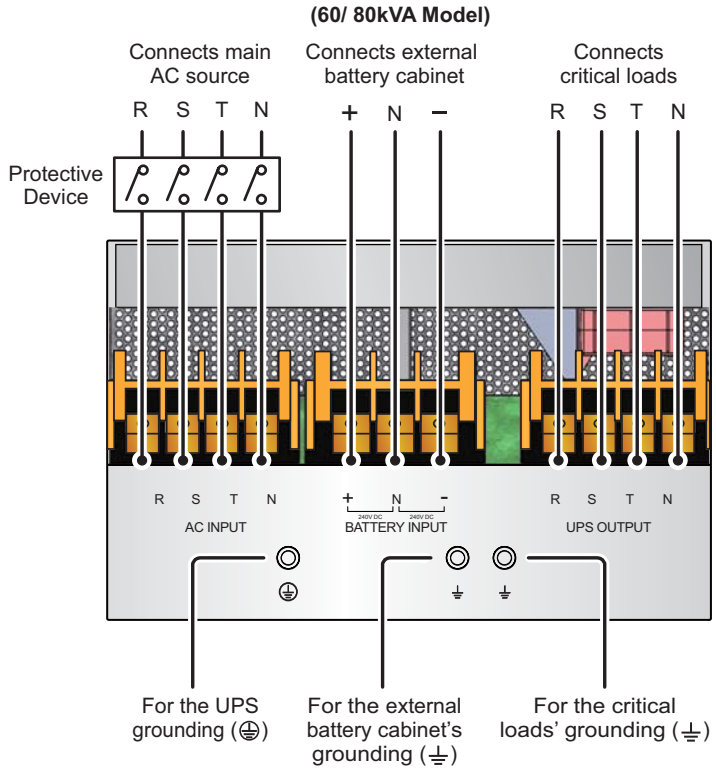
(Figure 5-5: Remove the UPS's Wiring Terminal Block Covers)

6 Follow ***5.5 Wiring*** to perform wiring. After wiring, follow on-site wiring situation to reinstall the UPS's wiring terminal block covers.

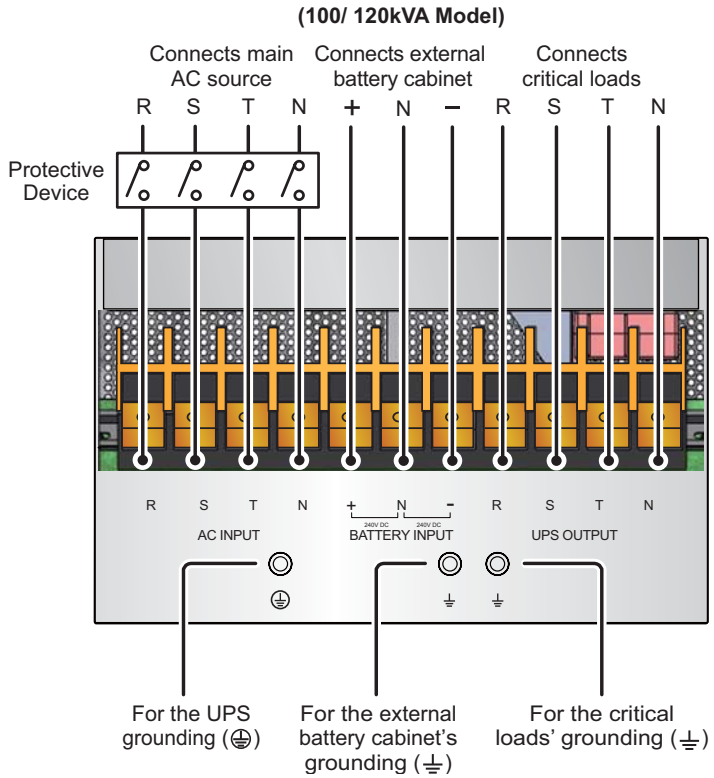
5.5 Wiring

5.5.1 Pre-wiring Warnings

- Only authorized professional personnel can perform wiring. If you want to perform wiring by yourself, wiring must be under the supervision of authorized Delta engineers or service personnel.
- Before wiring or making any electrical connection, make sure the power supplied to the input and output of the UPS is completely cut off.
- When connecting the UPS to the utility AC power, you must install the protective devices. The protective devices must use approved components that meet safety certifications. For the installation of the protective devices, please see ***Figure 5-6/ 5-7***.



(Figure 5-6: DPS 60/ 80kVA UPS Protective Device Installation Diagram)



(Figure 5-7: DPS 100/ 120kVA UPS Protective Device Installation Diagram)

- Check that the size, diameter, phase, and polarity are correct for each cable that needs connecting to the UPS. Please refer to ***Table 5-2***.

Table 5-2: Specifications of Input/ Output Cables and Circuit Breakers

UPS Rating	60kVA	80kVA	100kVA	120kVA
Input Breaker (Q1)	125A	160A	200A	225A
Bypass Breaker (Q2)	125A	160A	200A	225A
Manual Bypass Breaker (Q3)	125A	160A	200A	225A
Output Breaker (Q4)	125A	160A	200A	225A
Suggested Input Cable	35mm^2 x 1	25mm^2 x 2	35mm^2 x 2	50mm^2 x 2
Suggested Output Cable	35mm^2 x 1	25mm^2 x 2	35mm^2 x 2	50mm^2 x 2
Suggested Battery Cable	35mm^2 x 1	25mm^2 x 2	35mm^2 x 2	50mm^2 x 2
Suggested Grounding Cable	35mm^2 x 1	25mm^2 x 2	35mm^2 x 2	50mm^2 x 2

NOTE:

1. Please refer to national and local electrical codes for acceptable non-fuse breakers and cable size.
2. In accordance with National Electrical Codes (NEC), please install a suitable conduit and bushing.
3. Cables with PVC material and with temperature resistance up to 105°C are suggested.
4. The tightening torque for M8 screws should be 150 ±5Kgf.cm, and for M10 screws, 250 ±5Kgf.cm.

- If the input and output of the UPS is a Y connection, do not connect the UPS's neutral (N) with the ground (⏚).
- If there is a floating voltage between the input power's neutral (N) and the ground (⏚), and you require that the V_{NG} of the UPS should be zero, we suggest that you install an isolation transformer in front of the input side of the UPS, and connect the UPS neutral (N) with the ground (⏚).
- Three phases (R/ S/ T) of the AC power source must be in positive phase sequence, and R, S, T and N cables of the AC power source must be connected to the 'R', 'S', 'T' and 'N' terminals marked on the AC Input Block.
- Connect the positive (+), negative (-) and neutral (N) terminals of an external battery cabinet to the '+', '-' and 'N' terminals marked on the UPS's Battery Input Block. Do not make a wrong connection.
- Connect an external battery cabinet's grounding terminal to the grounding terminal (⏚) of the UPS's Battery Input Block. Do not connect the grounding terminal of the external battery cabinet to any other grounding system.
- The ground terminal (⏚) of the UPS must be grounded.

WARNING:

1. Wrong wiring will cause damage to the UPS and electric shock.
2. The UPS will not work normally if the input power's neutral (N) is not firmly connected or not connected to the AC Input Block's neutral (N) terminal.

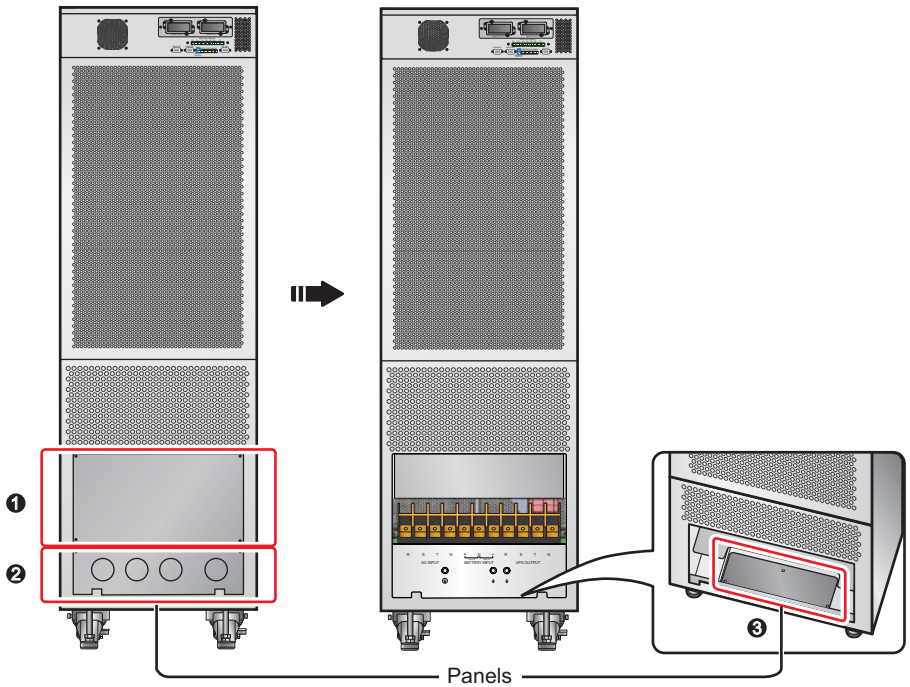
5.5.2 Single Unit Wiring Procedures

WARNING:

1. Before wiring, please read ***5.5.1 Pre-wiring Warnings***.
2. The UPS rating voltage is 220/ 380Vac or 230/ 400Vac.
3. The battery rating voltage is ±240Vdc.

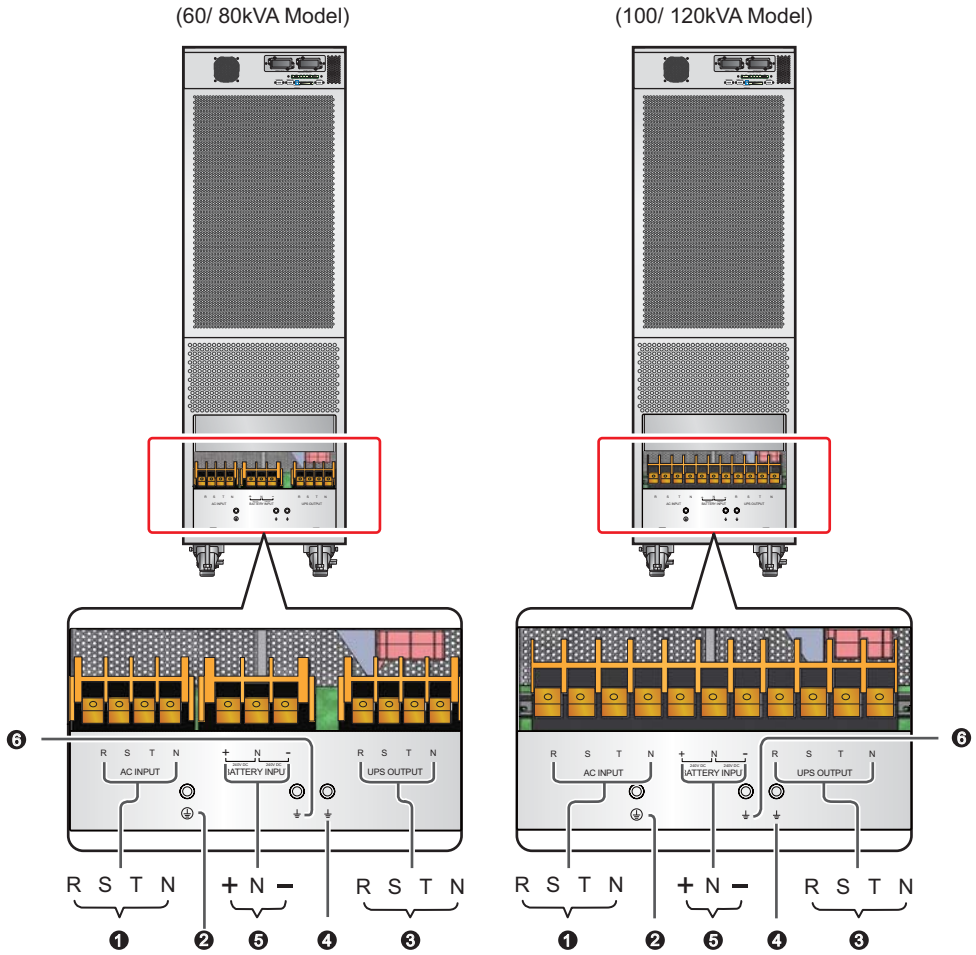
1 Make sure the UPS's Input Breaker (Q1), Bypass Breaker (Q2), Manual Bypass Breaker (Q3) and Output Breaker (Q4) are in the **OFF** position. Please refer to ***Figure 3-3*** for these four breakers' location.

2 Face the back of the UPS. Follow on-site wiring situation to remove the UPS's wiring terminal block covers shown in ***Figure 5-8***.



(Figure 5-8: Remove the UPS's Wiring Terminal Block Covers)

3 After removing the covers, you will see the UPS's wiring terminal block. Please see descriptions below.



(Figure 5-9: Wiring Terminal Block)

No.	Item	Function	Description
❶	AC Input Block	Connects the Main AC source.	Includes three phases (R, S, T) and neutral (N) terminals.
❷	⏚	For the UPS grounding	Includes one grounding terminal.
❸	UPS Output Block	Connects the critical loads.	Includes three phases (R, S, T) and neutral (N) terminals.
❹	⏚	For the critical loads' grounding	Includes one grounding terminal.
❺	Battery Input Block	Connects an external battery cabinet.	Includes positive (+), negative (-) and neutral (N) terminals.
❻	⏚	For an external battery cabinet's grounding	Includes one grounding terminal.

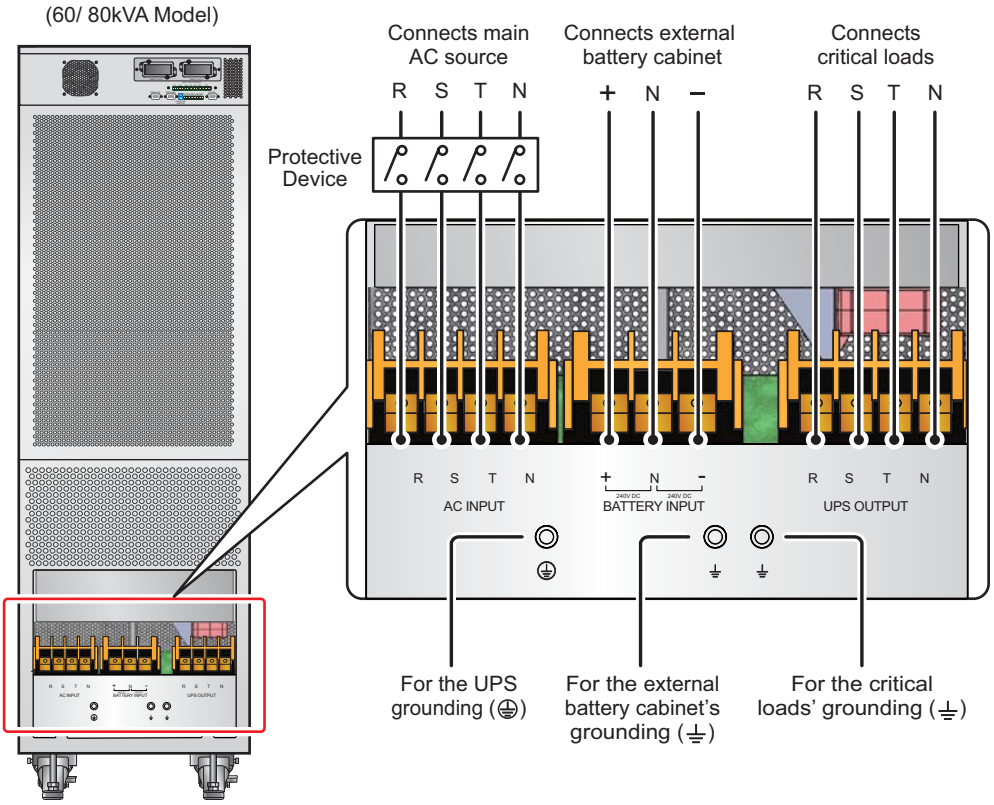
NOTE:

Different regions may have their own markings of power phases. The following table is a cross reference for possible use.

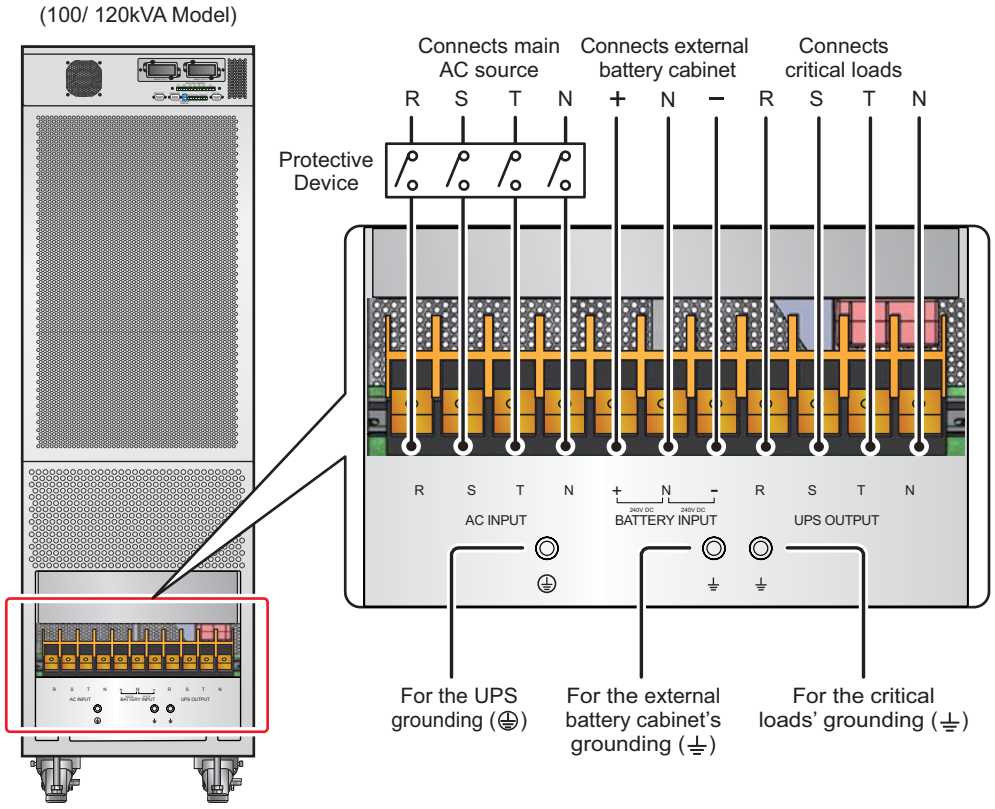
USA/ Asia	Europe	India
R	U	R
S	V	Y
T	W	B

4 Please follow ***Table 5-2*** to select appropriate cables.

5 Connect the cables of the main AC source/ critical loads/ external battery cabinet to the wiring terminal block. Do not forget to ground the UPS/ critical loads/ external battery cabinet. Please refer to ***Figure 5-10/ 5-11***.



(Figure 5-10: DPS 60/ 80kVA UPS Wiring Diagram)



(Figure 5-11: DPS 100/ 120kVA UPS Wiring Diagram)

6 After wiring, follow on-site wiring situation to reinstall the UPS's wiring terminal block covers.

5.5.3 Parallel Units Wiring Procedures

WARNING:

1. Before wiring, please read ***5.5.1 Pre-wiring Warnings***.
2. The UPS rating voltage is 220/ 380Vac or 230/ 400Vac.
3. The battery rating voltage is ±240Vdc.
4. Only UPSs with the same capacity, rating, voltage and frequency can be paralleled; otherwise, parallel functions will fail and accidents may happen. You can parallel at maximum four units.
5. When UPSs are paralleled, the length of each unit's input cables plus output cables must be the same. This ensures that the parallel UPSs can equally share the critical loads in bypass mode.

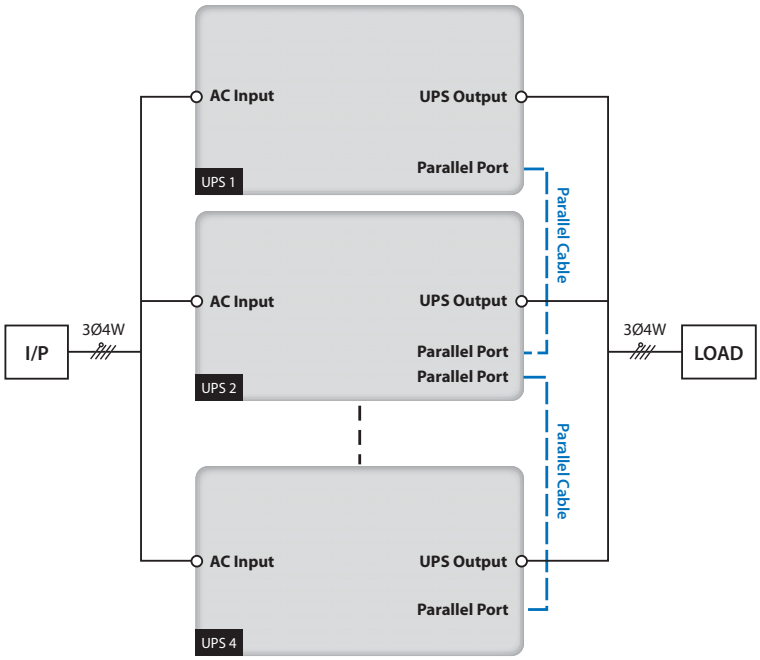
   i.e.: Input 1 + Output 1 = Input 2 + Output 2

   (Deviation must be less than 10%)

1 Follow the procedures 1 ~ 4 stated in ***5.5.2 Single Unit Wiring Procedures***.

2 Use the provided parallel cable to connect the parallel ports on the parallel units. Please see ***Figure 3-5*** for parallel port location.

3 Connect the cables of the main AC source/ critical loads/ external battery cabinet to the wiring terminal block. Do not forget to ground the UPS/ critical loads/ external battery cabinet. Please refer to ***Figure 5-12***.



(Figure 5-12: Parallel Units Wiring Diagram)

4 After wiring, follow on-site wiring situation to reinstall the UPS's wiring terminal block covers.

5.5.4 External Battery Cabinet

- You can connect up to four external battery cabinets to the UPS.
- If an external battery cabinet is idle for more than six months, please charge its batteries at least eight hours before operation. To do so, follow the steps below.

  1. Connect the UPS to an AC power source and an external battery cabinet. Please see ***Chapter 5 : Installation and Wiring***.
  2. See ***Chapter 6 : UPS Operation*** to turn on the UPS. After the UPS is turned on, it will automatically charge the batteries.

WARNING:

You can connect the critical loads to the UPS only after the batteries are fully charged. This guarantees that the UPS can provide sufficient backup power to the connected critical loads when a power failure occurs.

- Battery

  1. Charge Voltage
     1) Float voltage: ±272Vdc (default)
     2) Boost voltage: ±288Vdc (default)
  2. Charge Current
     1) Minimum: ±7A (default)
     2) Maximum: 60kVA → ±15A
        80kVA → ±20A
        100kVA → ±25A
        120kVA → ±30A
  3. Low Battery Shutdown: 200Vdc
  4. The Number of Batteries: 12V x 40 PCS

WARNING:

1. If you need to modify the charge current default setting and low battery shutdown default setting, please contact your local dealer or service personnel.
2. A battery can present a risk of electric shock and high short-circuit current. Only qualified service personnel can connect and replace batteries/ battery cabinets.

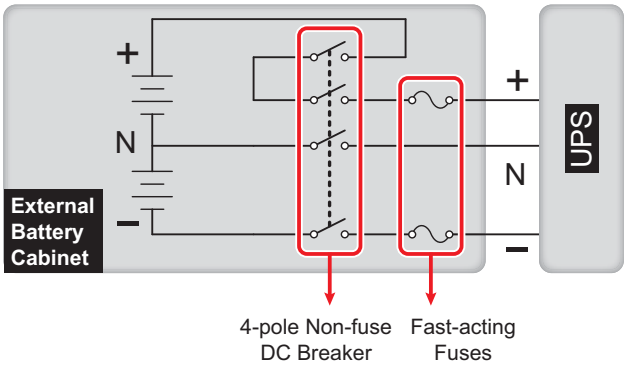
- Only use the same type of batteries from the same supplier. Never use old, new and different Ah batteries at the same time.
- The number of batteries must meet UPS requirements.
- Do not connect the batteries in reverse.
- Use the voltage meter to measure whether the total voltage, after the external battery cabinet connection, is around 12.5Vdc × the total number of batteries.
- When connecting an external battery cabinet to the UPS, it is compulsory to install an appropriate non-fuse DC breaker and fast-acting fuses (when short-circuit occurs, the melting current must be 5~6 times of the battery fuse's rating current).

- Please follow ***Table 5-3*** to select appropriate battery fuses for different rating-power UPSs.

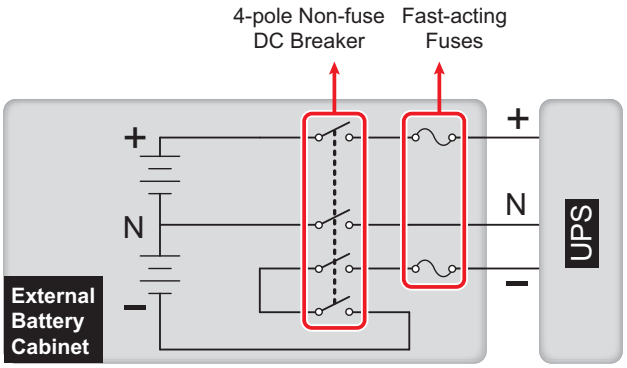
Table 5-3: External Battery Cabinet Configuration Data

UPS Rating	Circuit Breaker Rating Current (A)	Battery Cable (mm^2)	Battery Fuse (A)
60 kVA	125	$35mm^2$ ×1	125
80 kVA	160	$25mm^2$ ×2	160
100 kVA	200	$35mm^2$ ×2	200
120 kVA	250	$50mm^2$ ×2	250

- The breaker must be a 4-pole non-fuse DC breaker with characteristics of 1-pole 250Vdc, 2-pole 500Vdc, 3-pole 750Vdc and 35kA (or above) DC breaking capacity. Please follow ***Figure 5-13*** or ***Figure 5-14*** to install a 4-pole non-fuse DC breaker and fast-acting fuses between the UPS and the external battery cabinet.



(Figure 5-13: A 4-pole Non-fuse DC Breaker and Fast-acting Fuses Installation I)

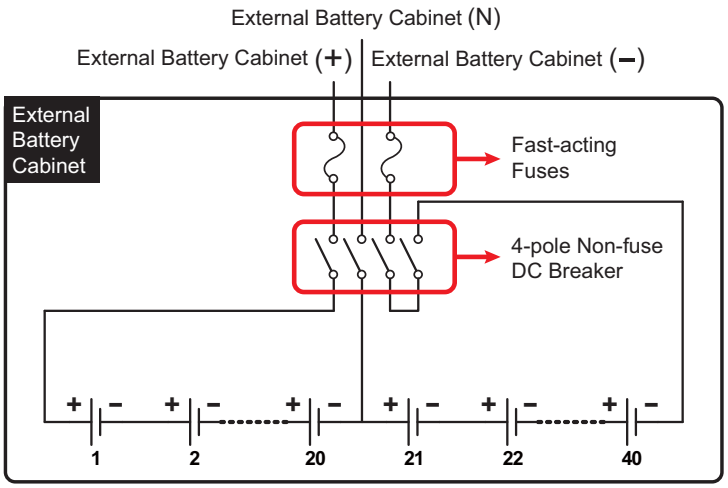


(Figure 5-14: A 4-pole Non-fuse DC Breaker and Fast-acting Fuses Installation II)

NOTE:

An external battery cabinet shall include 40 batteries connected in string and you should connect the cabinet's neutral to the middle 20th and 21st batteries. You should use three cables to connect an external battery cabinet with the '+', '-' and 'N' terminals marked on the UPS.

When connecting an external battery cabinet with the UPS, you must install an appropriate non-fuse 4-pole DC breaker and fast-acting fuses (please refer to ***Table 5-3***). Do not use an AC breaker. The closer the breaker and the fuses are to the batteries, the better. Please refer to the figure below.



(Figure 5-15: External Battery Cabinet Connection)

- The parallel UPSs can connect with common batteries.

WARNING:

A battery can present a risk of electric shock and high short-circuit current. Servicing of batteries and battery cabinets must be performed or supervised by qualified service personnel knowledgeable in batteries, battery cabinets and the required precautions. Keep unauthorized personnel away from batteries and battery cabinets.

- **External Battery Cabinet Alarm**

  When an external battery cabinet connected to the UPS has the following problems, the UPS system will sound an alarm. Please see the table below.

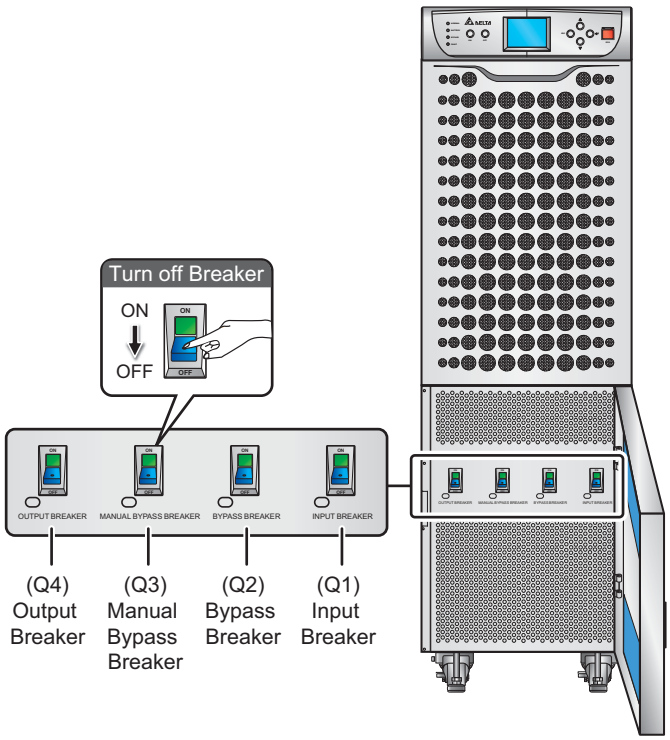
No.	External Battery Cabinet Status	Alarm
1	Battery Cabinet Over Temp	Beeps every 3 seconds (ON for 0.2 second/ OFF for 2.8 seconds).
2	Battery Test Fail	Beeps every 3 seconds (ON for 0.2 second/ OFF for 2.8 seconds).
3	Battery Low Warning	Beeps every 0.5 second (ON for 0.2 second/ OFF for 0.3 second).
4	Battery Replacement	Beeps every 3 seconds (ON for 0.2 second/ OFF for 2.8 seconds).
5	Battery Over Charge	Long beep
6	Battery Missing	Long beep

Chapter 6 : Operation Procedures

6.1 Single Unit Operation Procedures

- **Pre Start-up Warnings for Single Unit**

1. Ensure that all breakers, including the breakers or fuses of all external battery cabinets, are cut off and switched to the **OFF** position.



(Figure 6-1: Breaker Position)

2. Confirm that there is no voltage potential between the NEUTRAL (N) and the Ground (⏚).
3. Check if the wiring is correct and the AC power source's voltage, frequency, phase and battery type meet the UPS requirements.

- **Pre Turn-off Warnings for Single Unit**

If you perform turn-off procedures for single unit, all power supplies will be completely cut off. Please make sure the connected critical loads connected to the UPS have already been safely shutdown before you perform the turn-off procedures.

6.1.1 Normal Mode Start-up Procedures (Single)

1. Switch on the circuit breakers or fuses of all external battery cabinets, and ensure that the Manual Bypass Breaker (Q3) is in the **OFF** position.

2. Turn on the Bypass Input Breaker (Q2) and the Output Breaker (Q4). The LCD starts displaying. After initialization, the LCD will show **'ON AUTO BYPASS'**. In the meantime, the output of the UPS is supplied by the bypass source and the **BYPASS** LED indicator illuminates.

3. Turn on the Input Breaker (Q1). If the input power source is within tolerance range, the UPS power module will be ready to start up.

4. Press the **ON** button () for 3 seconds and release it after you hear a beep. At this time, the system begins synchronization with the bypass source. After synchronization, the UPS will automatically transfer from bypass mode to normal mode, and the inverter will supply power to the output. The **BYPASS** LED indicator shuts off and the **NORMAL** LED indicator lights up.

6.1.2 Battery Mode Start-up Procedures (Single)

1. Switch on the circuit breakers or fuses of all external battery cabinets, ensure that the Manual Bypass Breaker (Q3) is in the **OFF** position, and turn on the Output Breaker (Q4).

2. Press the **ON** button () for 3 seconds and release it after you hear a beep.

3. The power modules start running and the DC BUS voltage starts establishing. After that, the inverter will start up with default frequency.

4. After the inverter completes start-up, the UPS will transfer to battery mode and the **BATTERY** LED indicator lights up.

6.1.3 Bypass Mode Start-up Procedures (Single)

1. Switch on the Bypass Input Breaker (Q2). After initialization, the **BYPASS** LED indicator illuminates.

2. Turn on the Output Breaker (Q4). After that, the bypass supplies power to the output.

6.1.4 Manual Bypass Mode Start-up Procedures (Single)

WARNING:

1. Please note that you can only turn on the Manual Bypass Breaker (Q3) when the UPS needs maintenance. This ensures that the supply of power to the critical loads will continue. If you turn on the Manual Bypass Breaker (Q3) during normal mode, the inverter will shut down, the UPS will transfer from normal mode to manual bypass mode, and the output won't be protected.
2. In manual bypass mode, the manual bypass supplies power to the critical loads and maintenance personnel can perform maintenance without interrupting the power supply.
3. When the UPS is in manual bypass mode, there is no high voltage inside the UPS except the wiring terminal block and the Manual Bypass Breaker (Q3). Do not touch the wiring terminal block and the Manual Bypass Breaker (Q3) to avoid electrical shock.

- **From Normal Mode to Manual Bypass Mode (Single)**

  1 Press the **OFF** button (OFF) for 3 seconds and release it after you hear a beep. The LCD screen will show **'SHUTDOWN UPS?'**. Select **'YES'** and press (↵) to confirm your selection. At this moment, the UPS transfers to bypass mode.

  2 Confirm if the UPS is in bypass mode.

  3 Turn on the Manual Bypass Breaker (Q3) and turn off the Input Breaker (Q1), the Bypass Input Breaker (Q2) and the Output Breaker (Q4).

  4 Switch off the breakers or fuses of all external battery cabinets.

- **From Manual Bypass Mode to Normal Mode (Single)**

  1 Turn on the Bypass Input Breaker (Q2) and the Output Breaker (Q4).

  2 Switch off the Manual Bypass Breaker (Q3). The LCD shows **'ON AUTO BYPASS'**.

  3 Switch on the circuit breakers or fuses of all external battery cabinets.

  4 Turn on the Input Breaker (Q1).

  5 Press the **ON** button (ON) for 3 seconds and release it after you hear a beep.

  6 After synchronization, the UPS will automatically transfer from bypass mode to normal mode.

6.1.5 Shutdown Procedures (Single)

The shutdown procedures below can cut off all power supplies. Make sure that you have turned off the connected critical loads first! Please refer to the following steps.

1. Press the **OFF** button (OFF) for 3 seconds and release it after you hear a beep. The LCD screen will show **'SHUTDOWN UPS?'**. Select **'YES'** and press (↵) to confirm. If the UPS is originally in:
   A. Normal mode: The UPS will transfer to bypass mode. The LCD screen will show **'ON AUTO BYPASS'**.
   B. Battery mode: The UPS will shut down the inverter and cut off the output power.
2. Switch off the Input Breaker (Q1).
3. Switch off the Bypass Input Breaker (Q2).
4. Confirm if the UPS is turned off and all the circuits are off.
5. Switch off the circuit breakers or fuses of all external battery cabinets.
6. Switch off the Output Breaker (Q4).

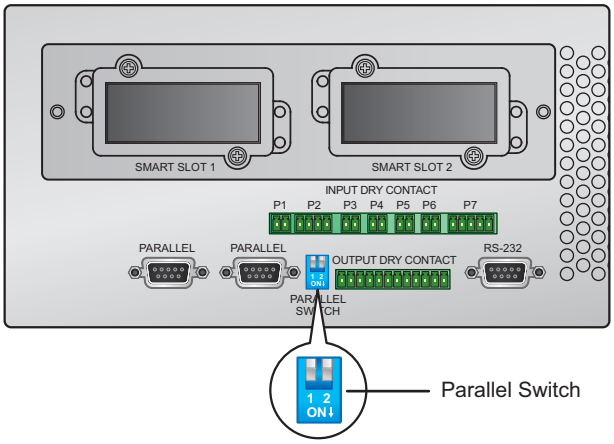
6.2 Parallel Units Operation Procedures

- **Pre Start-up Warnings for Parallel Units**

1. Only UPSs with the same capacity, rating, voltage and frequency can be paralleled; otherwise, parallel functions will fail and accidents may happen. You can parallel at maximum four units.
2. Ensure all breakers, including the breakers or fuses of all external battery cabinets, are cut off and switched to the **OFF** position. Please see ***Figure 6-1*** for UPS's breaker location.
3. Confirm that there is no voltage potential between the NEUTRAL (N) and the Ground (⏚).
4. Check if the wiring is correct and the AC power source's voltage, frequency, phase and battery type meet the UPS requirements.
5. Before paralleling UPSs, please confirm that each unit's capacity, voltage and frequency are the same. After confirmation, use the provided parallel cable to connect the UPSs and make sure the parallel cable is firmly fixed.

WARNING:

1. If you want to parallel UPSs (at maximum four), you should use the control panel to set each UPS's parallel group ID No. and parallel ID No. Please see ***7.7.5 Parallel Setup***.
2. When paralleling UPSs, you should set up the parallel switch (see ***Figure 6-2***). To know how to set up the parallel switch, please refer to ***3.4.3 Parallel Switch***.



(Figure 6-2: Parallel Switch Position)

- **Pre Turn-off Warnings for Parallel Units**

1. If you want to turn off one of the parallel UPSs, please check whether the remaining parallel UPS's total capacity exceeds the total critical loads. If the remaining UPS's total capacity is less than the total critical loads, it will be the bypass to supply power to the critical loads. Once a power event occurs, your critical loads won't be protected.
2. If you perform turn-off procedures for all parallel UPSs, all power supplies will be completely cut off. Please make sure the connected critical loads have already been safely shutdown before you perform the turn-off procedures.

6.2.1 Normal Mode Start-up Procedures (Parallel)

1. Switch on the circuit breakers or fuses of all external battery cabinets, and ensure that each parallel unit's Manual Bypass Breaker (Q3) is in the **OFF** position.

2. Turn on each parallel unit's Bypass Input Breaker (Q2). After initialization, each LCD will show **'ON AUTO BYPASS'**.

3. Turn on each unit's Input Breaker (Q1).

4. Press each unit's **ON** button () for 3 seconds and release it after hear a beep. In the meantime, each unit's inverter starts up and each system begins synchronization with the bypass source. After each unit's inverter voltage establishes, all parallel UPSs will transfer to normal mode at the same time.

5. Measure each UPS's voltage difference between phases (should be below 3V). If normal, turn on each unit's Output Breaker (Q4). If abnormal, please contact maintenance personnel.

6.2.2 Battery Mode Start-up Procedures (Parallel)

1. Switch on the circuit breakers or fuses of all external battery cabinets and ensure that each unit's Manual Bypass Breaker (Q3) is in the **OFF** position.

2. Press each unit's **ON** button () for 3 seconds and release it after you hear a beep.

3. Each unit's power modules start running and the DC BUS voltage starts establishing. After that, each inverter will start up with default frequency.

4. After each inverter starts up, each UPS will transfer to battery mode.

5. Measure each UPS's voltage difference between phases (should be below 3V). If normal, turn on each unit's Output Breaker (Q4). If abnormal, please contact maintenance personnel.

6.2.3 Bypass Mode Start-up Procedures (Parallel)

1. Switch on each UPS's Bypass Input Breaker (Q2). After initialization, the **BYPASS LED** indicator illuminates.

2. Turn on each unit's Output Breaker (Q4). After that, the bypass supplies power to the output.

6.2.4 Manual Bypass Mode Start-up Procedures (Parallel)

WARNING:

1. Please note that you can only turn on the Manual Bypass Breaker (Q3) when the UPS needs maintenance. This ensures that the supply of power to the critical loads will continue. If you turn on the Manual Bypass Breaker (Q3) during normal mode, the inverter will shut down, the UPS will transfer from normal mode to manual bypass mode, and the output won't be protected.
2. In manual bypass mode, the manual bypass supplies power to the critical loads and maintenance personnel can perform maintenance without interrupting the power supply.
3. When the UPS is in manual bypass mode, there is no high voltage inside the UPS except the wiring terminal block and the Manual Bypass Breaker (Q3). Do not touch the wiring terminal block and the Manual Bypass Breaker (Q3) to avoid electrical shock.

- **From Normal Mode to Manual Bypass Mode (Parallel)**

〈1〉 Press the **OFF** button (OFF) of the UPS that you want to shut down for 3 seconds and release it after you hear a beep. The LCD screen will show **'SHUTDOWN UPS?'**. Select **'YES'** and press (↵) to confirm.

A. If the remaining parallel UPS's total capacity exceeds the total critical loads, the inverter of the UPS that you turned off will automatically shut down and the critical loads will be supplied by the remaining parallel UPS. The LCD screen of the UPS that you turned off shows **'LOAD NOT POWERED'**, and the LCD screen of the remaining parallel UPS shows **'ONLINE MODE'**.

B. If the total critical loads exceed the remaining parallel UPS's total capacity, all of the parallel UPSs' inverters will shut down and all parallel UPSs will transfer to bypass mode. Each LCD screen shows **'ON AUTO BYPASS'**.

〈2〉 Repeat step 〈1〉 mentioned above for the remaining parallel UPS until all parallel UPSs' LCD screens show **'ON AUTO BYPASS'**.

〈3〉 Turn off each UPS's Input Breaker (Q1).

〈4〉 Ensure that all UPSs are in bypass mode. Confirm if each UPS completes discharging and all the circuits are off.

〈5〉 Switch on each UPS's Manual Bypass Breaker (Q3). The manual bypass supplies power to the critical loads and each UPS's LCD screen shows **'ON MANUAL BYPASS'**.

〈6〉 Turn off each UPS's Bypass Input Breaker (Q2) and Output Breaker (Q4).

〈7〉 Turn off all external battery cabinet's breakers or fuses.

- **From Manual Bypass Mode to Normal Mode (Parallel)**

  1 Switch on the circuit breakers or fuses of all external battery cabinets.

  2 Turn on each UPS's Bypass Input Breaker (Q2) and the Output Breaker (Q4).

  3 Switch off each UPS's Manual Bypass Breaker (Q3). Each LCD shows **'ON AUTO BYPASS'**.

  4 Turn on each UPS's Input Breaker (Q1).

  5 Press each UPS's **ON** button () for 3 seconds and release it after you hear a beep.

  6 After each unit's inverter voltage establishes, all parallel UPSs will transfer to normal mode at the same time.

6.2.5 Shutdown Procedures (Parallel)

If you need to shut down one of the parallel UPSs:

1 Press the **OFF** button () of the UPS that you want to shut down for 3 seconds and release it after you hear a beep. The LCD screen will show **'SHUTDOWN UPS?'**. Select **'YES'** and press () to confirm.

A. If the remaining parallel UPS's capacity exceeds the total critical loads, the inverter of the UPS that you turned off will automatically shut down and the critical loads will be supplied by the remaining parallel UPS. The LCD screen of the UPS that you turned off shows **'LOAD NOT POWERED'**, and the LCD screen of the remaining parallel UPS shows **'ONLINE MODE'**.

B. If the total critical loads exceed the remaining parallel UPS's total capacity, all of the parallel UPSs' inverters will shut down and all parallel UPSs will transfer to bypass mode. Each LCD screen shows **'ON AUTO BYPASS'**.

2 Switch off the Input Breaker (Q1) and the Output Breaker (Q4) of the UPS that you want to shut down.

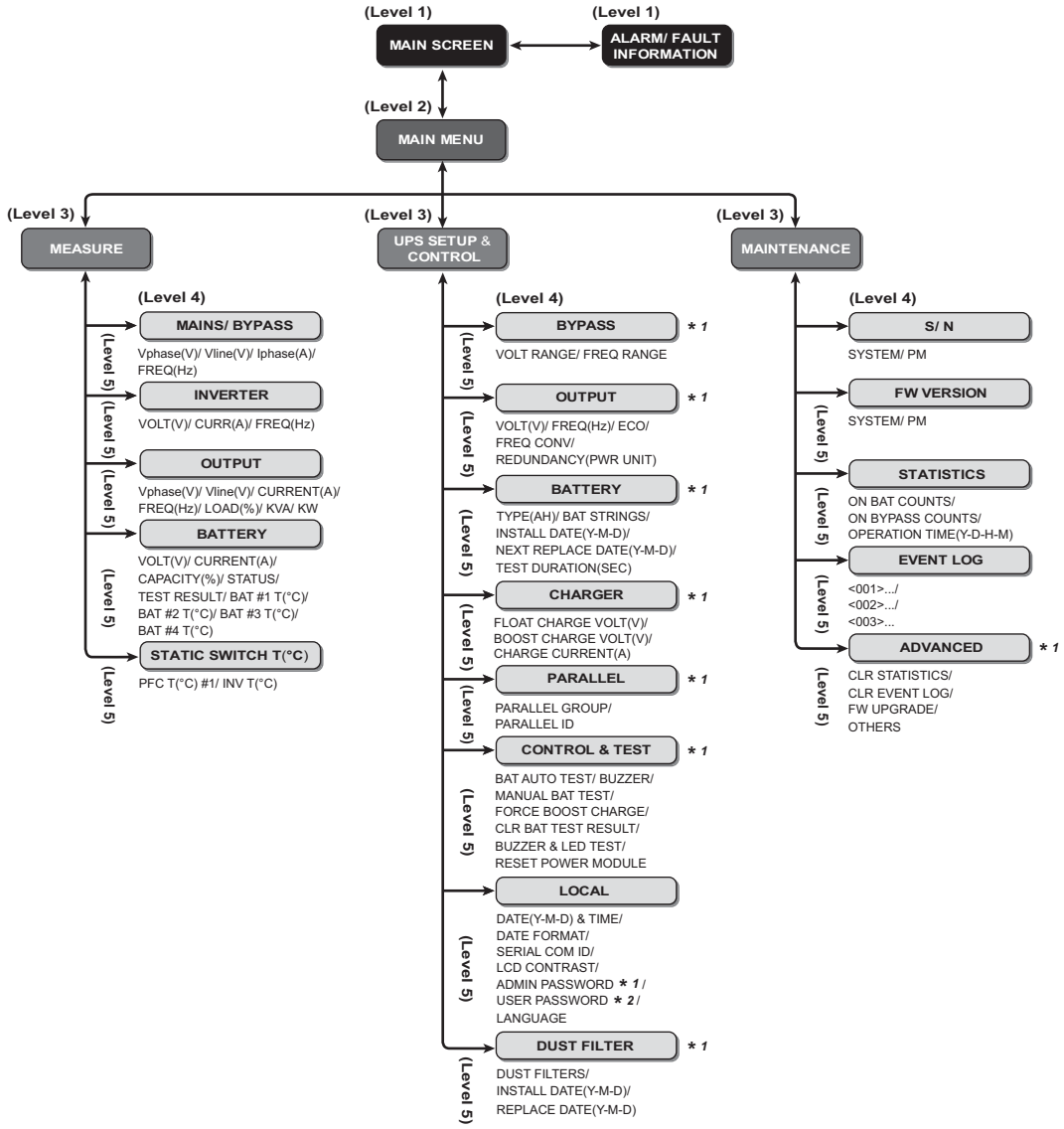
3 Switch off the Bypass Input Breaker (Q2) of the UPS that you want to shut down.

4 When the UPS that you want to shut down completes discharging, its LCD screen will shut off.

5 Switch off the breakers or fuses of all external battery cabinets connected to the UPS that you shut down.

Chapter 7 : LCD Display & Settings

7.1 LCD Display Hierarchy

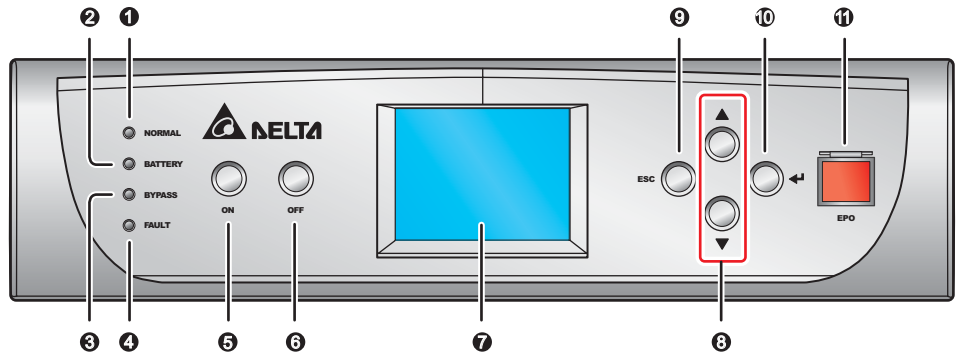


(Figure 7-1: LCD Display Hierarchy)

NOTE:

1. *1 means that **ADMINISTRATOR** password is needed and *2 means that **USER** password is needed. For password information, please refer to ***7.3 Password Entry***.
2. All unit No., UPS status, date, time, and event No. shown in the LCD diagrams presented in ***Chapter 7 : LCD Display & Settings*** are for reference only. Actual readings depend on the operation of the UPS.

7.2 LCD Display & Function Keys



(Figure 7-2: LCD Display and Function Keys)

The control panel includes the following items. Please refer to the table below.

No.	Item	Meaning
❶	NORMAL	Online mode LED indicator: green
❷	BATTERY	Battery mode LED indicator: yellow
❸	BYPASS	Bypass mode LED indicator: yellow
❹	FAULT	Fault LED indicator: red
❺	ON Button	Press the button for 3 seconds and release it after you hear a beep to start up the UPS (Inverter On).
❻	OFF Button	Press the button for 3 seconds and release it after you hear a beep to turn off the UPS (Inverter Off).
❼	LCD Display	Shows the UPS status and supports multi languages.
❽	▲ / ▼ Button	1. Moves up or moves down. 2. Increases or decreases number.
❾	ESC Button	Goes back to the previous screen or cancels current selection.
❿	↵ Button	Confirms current selection or goes to Main Menu.
⓫	EPO Button	Emergency Power Off. Press the button to completely shut down the UPS rectifier, inverter and output.

As for other symbols shown on the LCD display, please see the following.

No.	Item	Meaning
1	▶▶	Cursor
2	✎	When the symbol ▶▶ changes to the symbol ✎, it means that you can change your selected item's setting.
3	ⓘ	Flashes when an alarm/ event occurs.

If a screen is idle for 2 minutes, backlight shuts off. Press any button to resume the backlight. In a **Main Screen**, press the (↵) button to enter into **Main Menu** (please see ***7. 4 Main Screen*** and ***7. 5 Main Menu***).

The language default setting is English. If you want to change the default setting, please go to **Main Menu → UPS Setup & Control → Local → Language** to change your setting.

NOTE: The language default setting may be different according to countries.

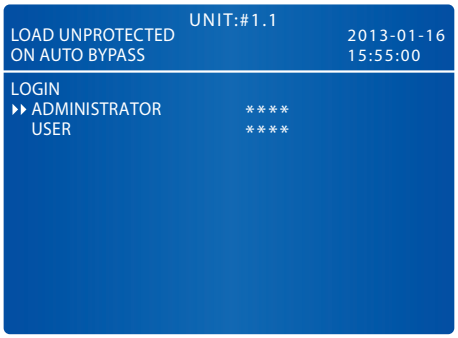
7.3 Password Entry

There are two levels of password protection:

ADMINISTRATOR password allows qualified installation and maintenance personnel to view and change all settings. General users are only allowed to set up (1) DATE & TIME, (2) DATE FORMAT, (3) LCD CONTRAST, (4) USER PASSWORD and (5) LANGUAGE.

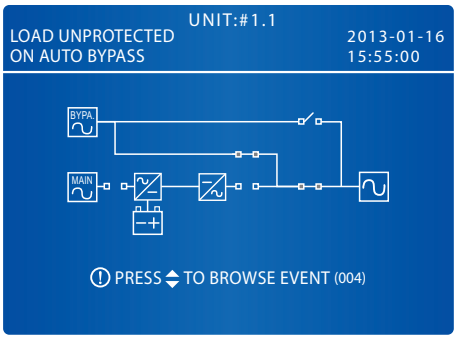
The default setting for **USER** password is 0000. For **ADMINISTRATOR** password, please contact service personnel. When you try to change a setting, the following screen prompts you to enter a corresponding password.

If the password is wrong, the system will go back to the screen that you have selected the item for setup change.



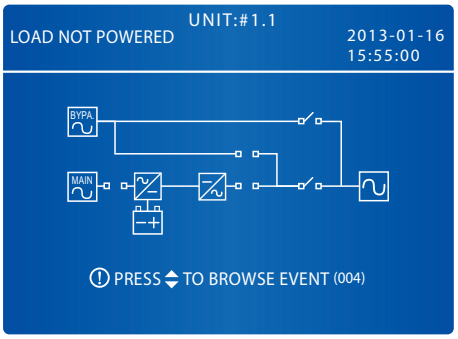
7.4 Main Screen

After the UPS stars up and completes self-test, the following screen appears. The system shows different screens depending on the status of the UPS. There are nine statuses, and each is called **Main Screen**.



The nine statuses of the UPS shown in the LCD display are as follows.

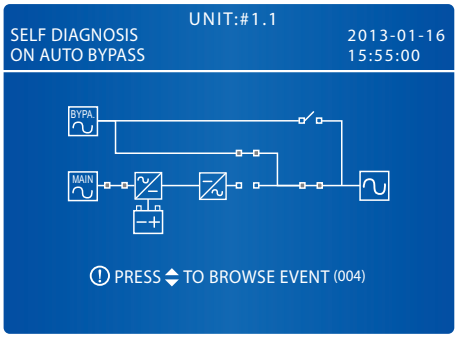
❶



When the screen above appears, it means that no power is supplied to the critical loads connected. The possible causes:

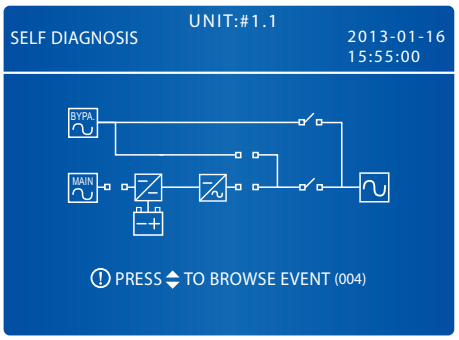
- The UPS automatically shuts down itself.
- Manually switch off the Output Breaker (Q4).

❷



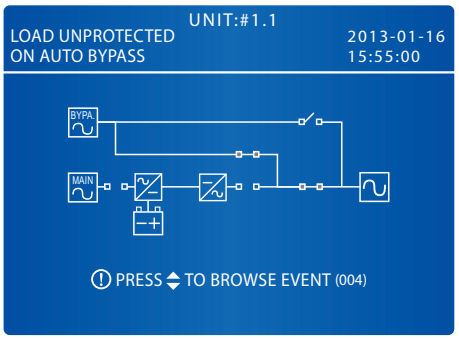
When the screen above appears, it means the bypass is supplying power to the critical loads.

❸



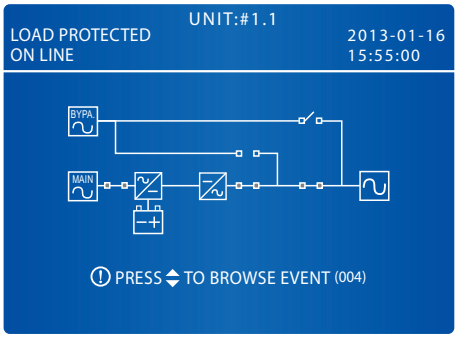
When the screen above appears, it means that batteries have started up the UPS.

❹



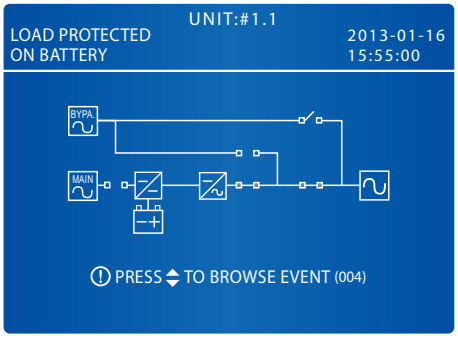
When the screen above appears, it means that the UPS is in bypass mode. The main AC source and the batteries are off. If the bypass AC source fails, the critical loads won't be protected.

❺



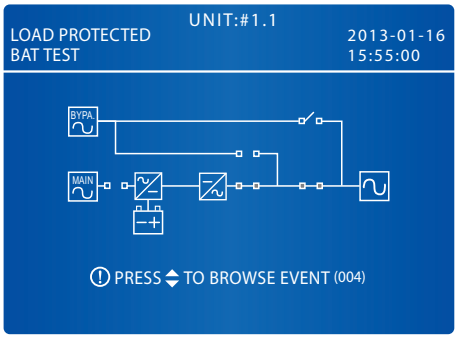
When the screen above appears, it means that the UPS is in normal mode.

❻



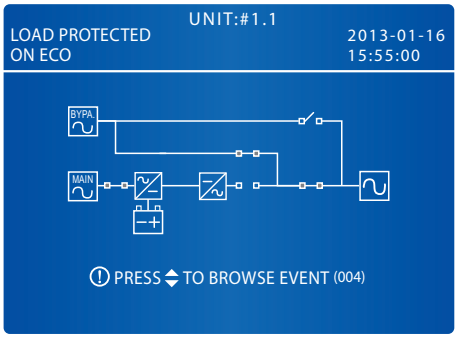
When the screen above appears, it means that the UPS is in battery mode.

❼



When the screen above appears, it means that the UPS is executing a battery test.

❽

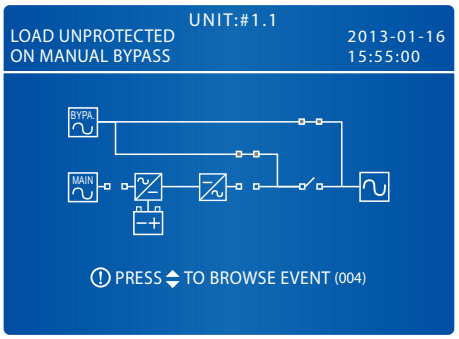


When the screen above appears, it means that the UPS is in ECO mode and the bypass supplies power to the critical loads. Please see ***7.7.2 Output Setup*** for ECO mode setup.

NOTE:

To ensure power supply quality, it is recommended that you set up the UPS in ECO mode only when the line power is stable. Only maintenance personnel can set up ECO mode.

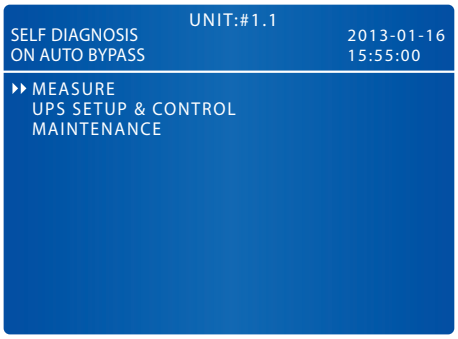
❾



When the screen above appears, it means that the UPS is in manual bypass mode. Before maintenance, do not forget to switch the UPS into manual bypass mode and cut off the main AC source and batteries. During this mode, if the bypass AC source fails, the critical loads won't be protected.

7.5 Main Menu

In a **Main Screen**, press the (↵) button to enter into the **Main Menu** shown below.



- **MEASURE**

  Check the unit's mains, bypass, inverter, output, battery, and static switch T (°C) readings.

- **UPS SETUP & CONTROL**

  Configure UPS's settings including bypass, output, battery, charger, parallel, control & test, local and dust filters.

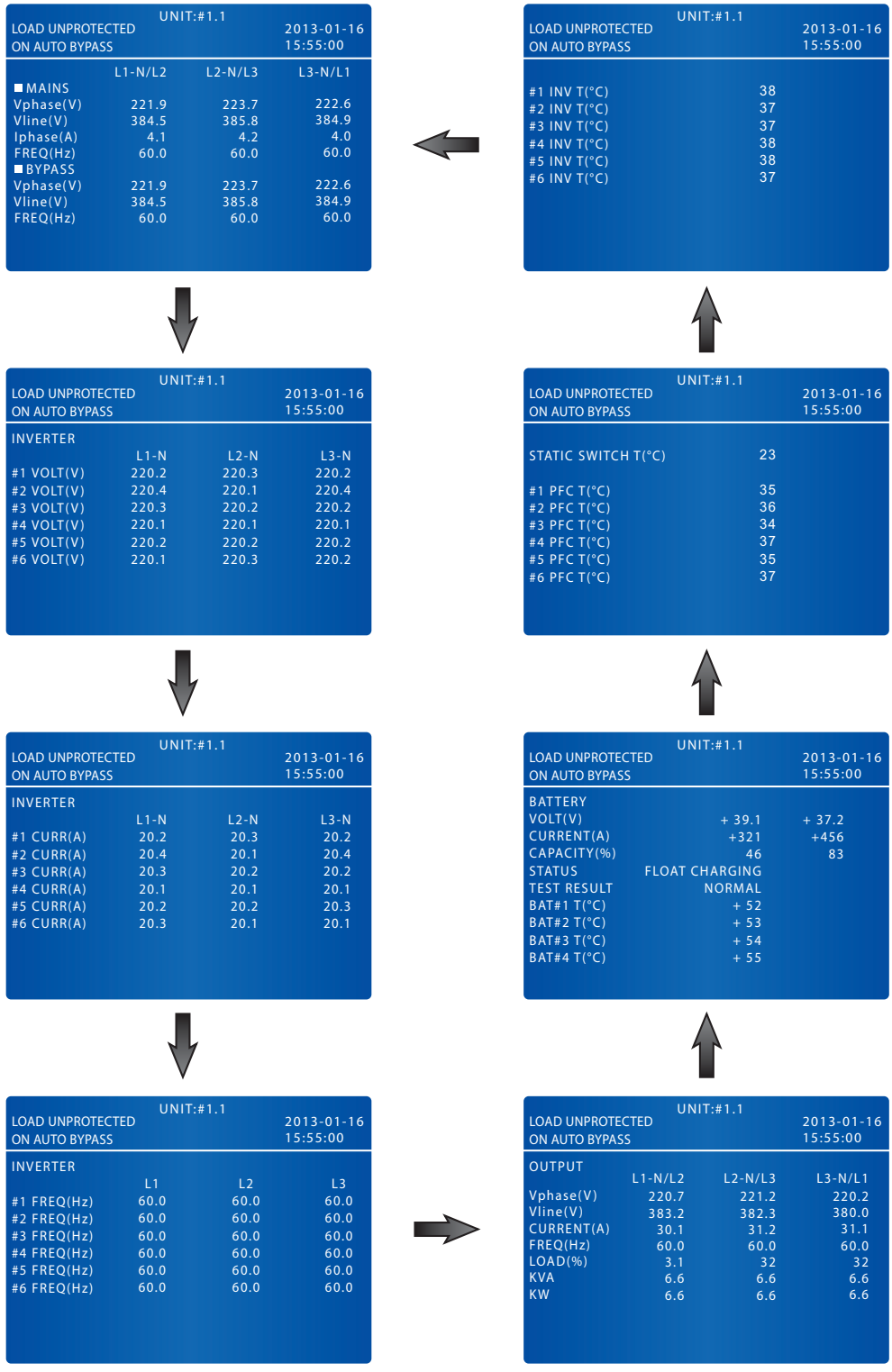
- **MAINTENANCE**

  Check/ clear event log and statistics, check/ upgrade firmware version, and check other power units' information.

7.6 Check System Readings

Route: Main Screen → Main Menu → Measure

Use the (▲) and (▼) buttons to check the unit's mains, bypass, inverter, output, battery, and static switch T(°C) readings.

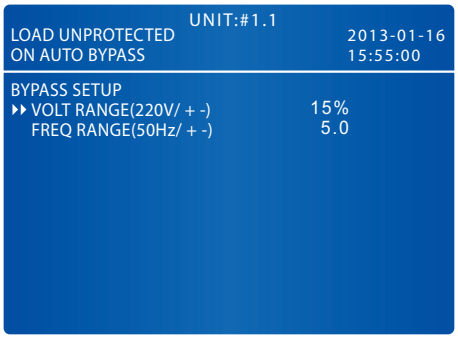

UNIT:#1.1
LOAD UNPROTECTED
ON AUTO BYPASS
2013-01-16
15:55:00
L1-N/L2 L2-N/L3 L3-N/L1
■MAINS
Vphase(V) 221.9 223.7 222.6
Vline(V) 384.5 385.8 384.9
Iphase(A) 4.1 4.2 4.0
FREQ(Hz) 60.0 60.0 60.0
■BYPASS
Vphase(V) 221.9 223.7 222.6
Vline(V) 384.5 385.8 384.9
FREQ(Hz) 60.0 60.0 60.0
INVERTER
L1-N L2-N L3-N
#1 VOLT(V) 220.2 220.3 220.2
#2 VOLT(V) 220.4 220.1 220.4
#3 VOLT(V) 220.3 220.2 220.2
#4 VOLT(V) 220.1 220.1 220.1
#5 VOLT(V) 220.2 220.2 220.2
#6 VOLT(V) 220.1 220.3 220.2
INVERTER
L1-N L2-N L3-N
#1 CURR(A) 20.2 20.3 20.2
#2 CURR(A) 20.4 20.1 20.4
#3 CURR(A) 20.3 20.2 20.2
#4 CURR(A) 20.1 20.1 20.1
#5 CURR(A) 20.2 20.2 20.3
#6 CURR(A) 20.3 20.1 20.1
INVERTER
L1 L2 L3
#1 FREQ(Hz) 60.0 60.0 60.0
#2 FREQ(Hz) 60.0 60.0 60.0
#3 FREQ(Hz) 60.0 60.0 60.0
#4 FREQ(Hz) 60.0 60.0 60.0
#5 FREQ(Hz) 60.0 60.0 60.0
#6 FREQ(Hz) 60.0 60.0 60.0
OUTPUT
L1-N/L2 L2-N/L3 L3-N/L1
Vphase(V) 220.7 221.2 220.2
Vline(V) 383.2 382.3 380.0
CURRENT(A) 30.1 31.2 31.1
FREQ(Hz) 60.0 60.0 60.0
LOAD(%) 3.1 32 32
KVA 6.6 6.6 6.6
KW 6.6 6.6 6.6
BATTERY
VOLT(V) + 39.1 + 37.2
CURRENT(A) +321 +456
CAPACITY(%) 46 83
STATUS FLOAT CHARGING
TEST RESULT NORMAL
BAT#1 T(°C) + 52
BAT#2 T(°C) + 53
BAT#3 T(°C) + 54
BAT#4 T(°C) + 55
STATIC SWITCH T(°C) 23
#1 PFC T(°C) 35
#2 PFC T(°C) 36
#3 PFC T(°C) 34
#4 PFC T(°C) 37
#5 PFC T(°C) 35
#6 PFC T(°C) 37
#1 INV T(°C) 38
#2 INV T(°C) 37
#3 INV T(°C) 37
#4 INV T(°C) 38
#5 INV T(°C) 38
#6 INV T(°C) 37

7.7 UPS Configurations

7.7.1 Bypass setup

Route: Main Screen → Main Menu → UPS Setup & Control → Bypass

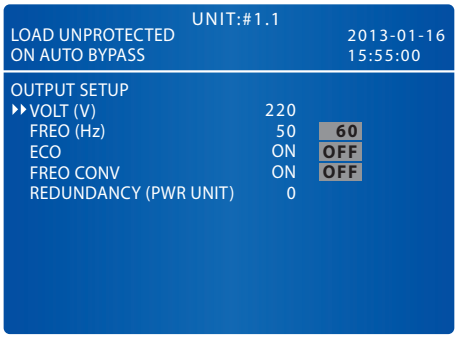
In the **BYPASS SETUP** screen shown below, you can set up bypass mode's voltage range and frequency range. Out of the range, the system will disable the bypass function.



7.7.2 Output Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Output

In the **OUTPUT SETUP** screen shown below, you can set up the following items.



- **VOLT (V)**

  Set up the output voltage.

- **FREQ (Hz)**

  The system will automatically select the bypass source's output frequency.

- **ECO**

  Set up the UPS in ECO mode. In ECO mode, it is the bypass to supply power to the critical loads. To ensure power supply quality, it is recommended that you set up the UPS in ECO mode only when the line power is stable. Only maintenance personnel can set up ECO mode.

- **FREQ CONV**

  Enable or disable frequency converter mode. Only in bypass mode can you set up this item. After enabling the frequency converter mode, you can press the **ON** button (ON) to start up the UPS.

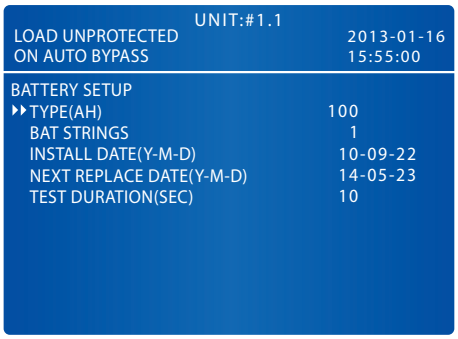
- **REDUNDANCY (PWR UNIT)**

  Set up how many power units that you want to reserve for redundancy.

7.7.3 Battery Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Battery

After entering the **BATTERY SETUP** screen shown below, you can set up the following items.



- **TYPE (AH)**

  Set up battery type.

- **BAT STRINGS**

  Set up how many battery strings are used.

- **INSTALL DATE (Y-M-D)**

  Set up battery installation date.

- **NEXT REPLACE DATE (Y-M-D)**

  Set up battery replacement date.

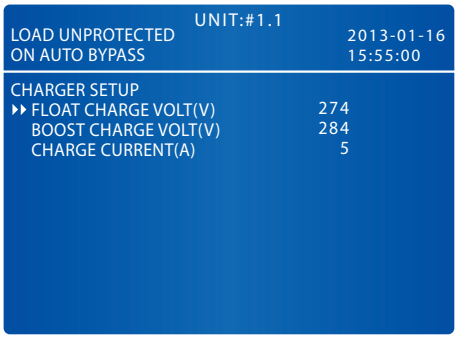
- **TEST DURATION (SEC)**

  Set up how long the battery test should last.

7.7.4 Charger Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Charger Setup

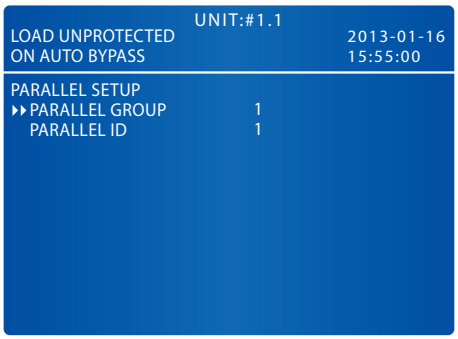
In the **CHARGER SETUP** screen shown below, you can set up float charge voltage, boost charge voltage, and charge current.



7.7.5 Parallel Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Parallel Setup

If you parallel UPSs, please go to **PARALLEL SETUP** screen shown below to set up a parallel group ID No. and parallel ID No. for each parallel UPS.



- **PARALLEL GROUP**

  Set up a parallel group ID No. (1~2) for each parallel UPS.

  If all parallel UPSs connect to the same group of critical loads, set each parallel UPS's parallel group ID No. as 1.

  If all parallel UPSs connected to different groups of critical loads (maximum group: two), set each UPS's parallel group ID No. as 1 or 2 accordingly.

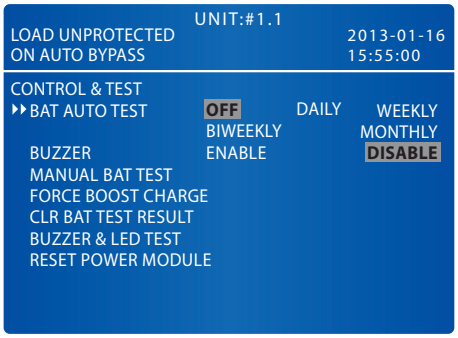
- **Parallel ID**

  Set up a parallel ID No. (1~8) for each parallel UPS.

7.7.6 Test and Buzzer & LED Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Control & Test

In the **CONTROL & TEST** screen shown below, you can execute some tests, enable/ disable buzzer and clear battery test result.



- **BAT AUTO TEST**

  Enable or disable battery auto test. If you wish to enable the battery auto test, please select the auto test frequency.

- **BUZZER**

  Enable/ disable buzzer.

- **MANUAL BAT TEST**

  Manually force the unit to perform battery test.

- **FORCE BOOST CHARGE**

  Manually force the unit to execute boost charge to increase charging voltage to charge the battery until the battery voltage reaches to the boost charge voltage that you set.

- **CLR BAT TEST RESULT**

  Clear battery test result.

- **BUZZER & LED TEST**

  Perform buzzer and LED test.

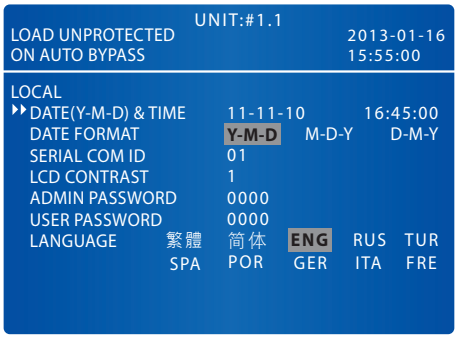
- **RESET POWER MODULE**

  If a Power Module is abnormal, select **RESET MODULE**. The system will automatically detect and reset the abnormal Power Module.

7.7.7 Local Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Local

In the **LOCAL** screen shown below, you can set up the items as follows.



- **DATE (Y-M-D) & TIME**

  Set up the date and time.

- **DATE FORMAT**

  Select a date format you like.

- **SERIAL COM ID**

  For standard RS-232 connection, this ID is meaningless. If you use other brand's RS-485/ RS-422 converter to connect to the RS-232 port, this ID should be set (0~ 99).

- **LCD CONTRAST**

  Adjust the LCD display contrast. The default setting is 5.

- **ADMIN PASSWORD**

  Change the administrator password (four-digit).

- **USER PASSWORD**

  Change the user password (four-digit).

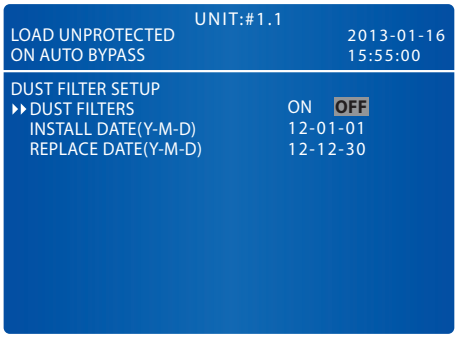
- **LANGUAGE**

  Change display language. The default setting is **ENGLISH**.

7.7.8 Dust Filter Setup

Route: Main Screen → Main Menu → UPS Setup & Control → Dust Filter Setup

In the **DUST FILTER SETUP** screen shown below, you can set up dust filter installation date and dust filter replacement date.



- **DUST FILTERS**

  Select **'ON'** to turn on dust filter cleaning/ replacement reminder.

- **INSTALL DATE (Y-M-D)**

  Set up the dust filters' installation date.

- **REPLACE DATE (Y-M-D)**

  Set up the replacement/ clean date for the dust filters. When the date is due, the LCD will automatically show ' DUST FILTER REPLACEMENT REQUIRED • PLS CLEAN/ REPLACE DUST FILTERS ' message.

7.8 System Maintenance

7.8.1 Check/ Clear Event Log

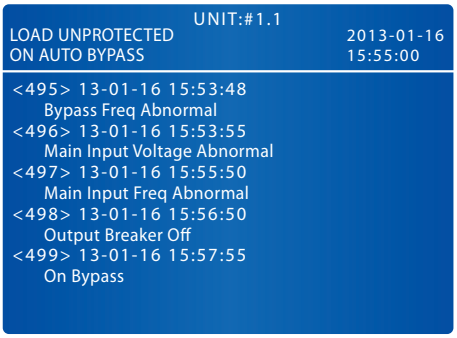
* To check event log, go to:

  Main Screen → Main Menu → Maintenance → Event Log

  The screen below provides event No., event date, time, and event descriptions. Use the (▲) and (▼) buttons to view other events.

  The greater the event number, the newer the event. The event code is shown in the < >.

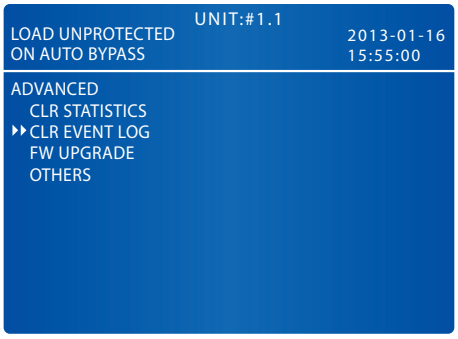
  Old events will be overwritten when the total number of events exceeds storage capacity (up to 500 entries can be saved).



* To clear event log, go to:

  Main Screen → Main Menu → Maintenance → Advanced → Clr Event Log

  Once you press the (↵) button, all events in the log are cleared. The administrator password is required.



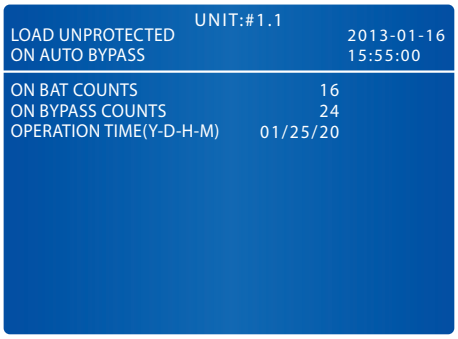
NOTE:

The event log provides important information for system analysis and maintenance. Do not clear the event log without the consent of qualified service personnel.

7.8.2 Check/ Clear Statistics

* To check statistics, go to:

  Main Screen → Main Menu → Maintenance → Statistics



- **ON BAT COUNTS**

  It means how many times the UPS runs in battery mode.

- **ON BYPASS COUNTS**

  It means how many times the UPS runs in bypass mode.

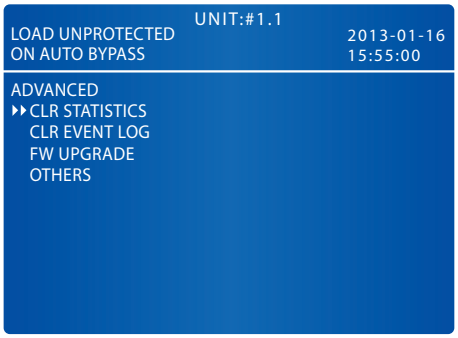
- **OPERATION TIME (Y-D-H)**

  Total operation time.

* To clear statistics, go to:

  Main Screen → Main Menu → Maintenance → Advanced → Clr Statistics

  Once you press the (↵) button, all statistics are cleared. The administrator password is required.



NOTE:

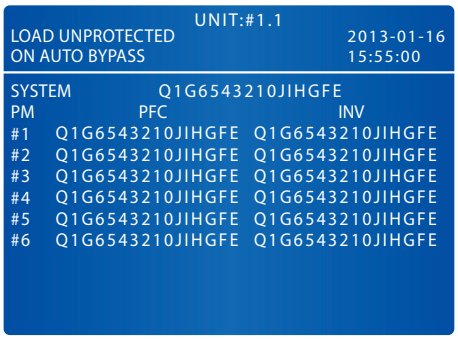
The statistics provide important information for system analysis and maintenance. Do not clear the statistics without the consent of qualified service personnel.

7.8.3 Check/ Upgrade Firmware

* To check firmware version, go to:

  Main Screen → Main Menu → Maintenance → FW Version

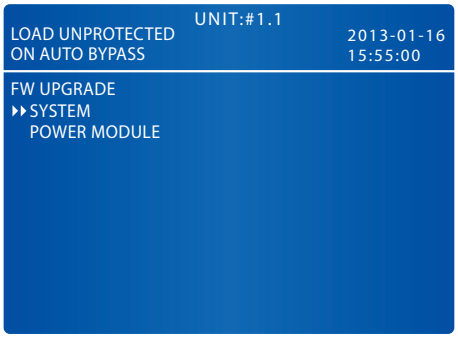
  The firmware version screen below shows you the system's firmware version.



* To upgrade firmware version, go to:

  Main Screen → Main Menu → Maintenance → Advanced → FW Upgrade

  If you select **'SYSTEM'**, the UPS will upgrade system's firmware. If you choose **'POWER MODULE'**, the UPS will upgrade power unit's firmware.

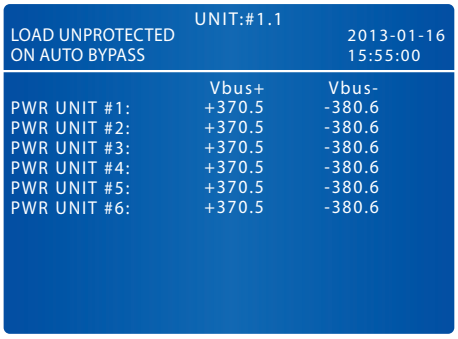


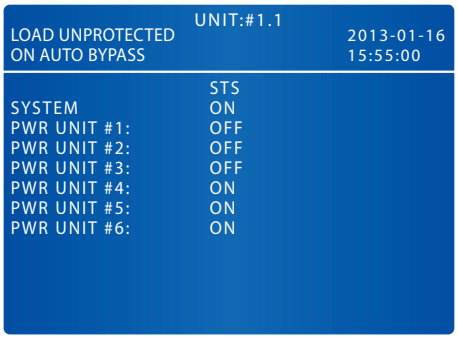
7.8.4 Others

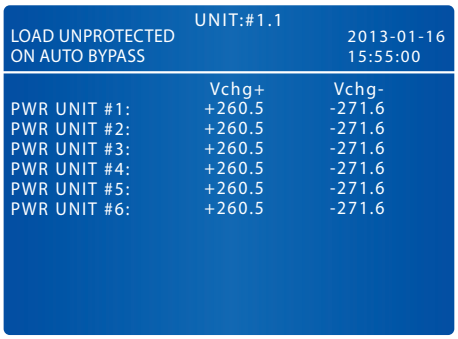
* If you want to know the UPS's DC bus voltage, static switch status, charge voltage and charge current, please go to:

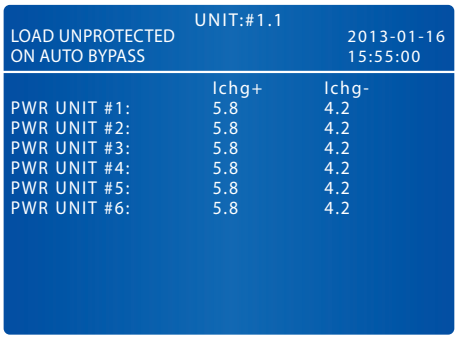
  Main Screen → Main Menu → Maintenance → Advanced → Others

  Vbus, STS, V-Chg, and I-Chg mean DC bus voltage, static switch status, charge voltage and charge current respectively.


UNIT:#1.1
LOAD UNPROTECTED
ON AUTO BYPASS
2013-01-16
15:55:00
Vbus+ Vbus-
PWR UNIT #1: +370.5 -380.6
PWR UNIT #2: +370.5 -380.6
PWR UNIT #3: +370.5 -380.6
PWR UNIT #4: +370.5 -380.6
PWR UNIT #5: +370.5 -380.6
PWR UNIT #6: +370.5 -380.6

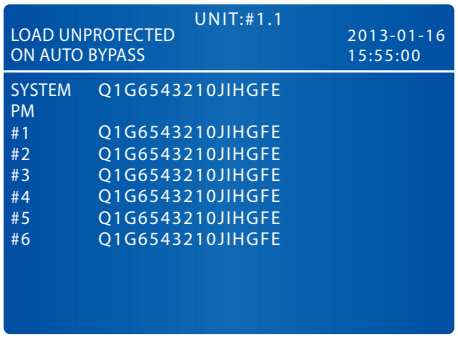

UNIT:#1.1
LOAD UNPROTECTED
ON AUTO BYPASS
2013-01-16
15:55:00
STS
SYSTEM ON
PWR UNIT #1: OFF
PWR UNIT #2: OFF
PWR UNIT #3: OFF
PWR UNIT #4: ON
PWR UNIT #5: ON
PWR UNIT #6: ON


UNIT:#1.1
LOAD UNPROTECTED
ON AUTO BYPASS
2013-01-16
15:55:00
Vchg+ Vchg-
PWR UNIT #1: +260.5 -271.6
PWR UNIT #2: +260.5 -271.6
PWR UNIT #3: +260.5 -271.6
PWR UNIT #4: +260.5 -271.6
PWR UNIT #5: +260.5 -271.6
PWR UNIT #6: +260.5 -271.6


UNIT:#1.1
LOAD UNPROTECTED
ON AUTO BYPASS
2013-01-16
15:55:00
Ichg+ Ichg-
PWR UNIT #1: 5.8 4.2
PWR UNIT #2: 5.8 4.2
PWR UNIT #3: 5.8 4.2
PWR UNIT #4: 5.8 4.2
PWR UNIT #5: 5.8 4.2
PWR UNIT #6: 5.8 4.2

* If you want to know the UPS's serial No., please go to:

Main Screen → Main Menu → Maintenance → S/N



Chapter 8 : Optional Accessories

There are several optional accessories available for this UPS. Please refer to the table below for the optional accessories and their descriptions.

No.	Item	Function
1	Dust Filter	Prevents dust from entering into the UPS to ensure UPS reliability and to prolong product life.
2	SNMP Card (IPv4 or IPv6)	Monitors the status of the UPS via internet.
3	Relay I/O Card	Increases the quantity of dry contacts.
4	ModBus Card	Lets the UPS have ModBus communication function.
5	Battery Cabinet Temperature Sensor Cable	Detects the temperature of an external battery cabinet connected to the UPS.

REFERENCE:

1. For detailed installation and operation of any accessory mentioned above, please refer to the **Quick Guide**, **User Guide**, or **Installation & Operation Guide** included in the package of the relevant optional accessory.
2. If you want to buy any accessory mentioned above, please contact your local dealer or customer service.

Chapter 9 : Maintenance

- **UPS**

  1. UPS Cleaning:

     Regularly clean the UPS, especially the slits and openings, to ensure that the air freely flows into the UPS to avoid overheating. If necessary, use an air-gun to clean the slits and openings to prevent any object from blocking or covering these areas.

  2. UPS Regular Inspection:

     Regularly check the UPS every half year and inspect:

     1) Whether the UPS, LEDs, and alarm function are operating normally.

     2) Whether the UPS works in bypass mode (normally, the UPS will work in normal mode). If yes, check if any error, overload, internal fault, etc. occurs.

     3) Whether battery voltage is normal. If the battery voltage is too high or too low, find the root cause.

- **Battery**

  The UPS uses sealed lead-acid batteries. The battery life depends on the temperature, the usage, and the charging/ discharging frequency. High temperature environments and high charging/ discharging frequency will quickly shorten the battery life. Please follow the suggestions below to ensure a normal battery lifetime.

  1. Keep usage temperature between 15°C~25°C.

  2. When the UPS needs to be stored for an extended period of time, the batteries must be recharged once every three months and the charging time must not be less than 24 hours each time.

- **Fan**

  Higher temperatures shorten fan life. When the UPS is running, please check if all fans work normally and make sure if the ventilation air can move freely around and through the UPS. If not, replace the fans.

NOTE:

Please ask your local dealer or customer service for more maintenance information. Do not perform maintenance if you are not trained for it.

Chapter 10 : Troubleshooting

When you see the following alarm messages appear on the LCD, please follow the solutions shown below.

No.	Message	Possible Cause	Solution
1	MAINS INPUT VOLT OR FREQ NOK	1. The Input Breaker (Q1) is turned off. 2. The main AC source's voltage or frequency is abnormal.	1. Check whether the Input Breaker (Q1) is turned off. If yes, turn it on. 2. If the Input Breaker (Q1) is turned on but the alarm still exists, contact service personnel. 3. Check if the main AC source's voltage or frequency is abnormal. If yes, please wait until the main AC source becomes normal.
2	MAINS INPUT PHASE SEQ NOK	Wrong wiring.	Check if the main AC source's wiring and phase sequence are correct. If not, please contact service personnel.
3	PWR UNIT #n PFC FUSE OPEN SHUTDOWN	PFC fuse is fused.	Contact service personnel.
4	PWR UNIT #n INV FUSE OPEN SHUTDOWN	Inverter fuse is fused.	Contact service personnel.
5	PWR UNIT #n GENERAL FAULT	Power unit's control circuit has abnormalities, e.g. abnormal auxiliary power, failing soft start, etc.	Contact service personnel.
6	SYSTEM GENERAL FAULT	System's auxiliary power is abnormal.	Contact service personnel.
7	BAT GROUND FAULT	1. Wrong battery wiring. 2. Battery leakage.	1. Check if battery wiring is correct or not. If not, contact service personnel. 2. Check if battery leakage occurs or not. If yes, contact service personnel to replace battery.

No.	Message	Possible Cause	Solution
8	BAT CABINET OVER HEAT	1. Battery cabinet's temperature is too high. 2. Battery cabinet has abnormalities.	1. Decrease the battery cabinet's temperature. 2. Check if the battery cabinet has any abnormality. If yes, contact service personnel.
9	BAT TEST FAIL	1. Wrong battery wiring. 2. Battery abnormality.	1. Check if battery grounding is correct or not. If not, contact service personnel. 2. Check if battery has abnormalities. If yes, contact service personnel to replace battery.
10	BAT LOW WARNING	Battery voltage is lower than warning limit.	If there is no backup power, immediately shut down the critical loads connected to the UPS.
11	LOW BAT CUT OFF	Battery voltage is lower than shutdown limit.	If there is no backup power, the UPS will automatically discontinue power supply to the critical loads to protect battery until battery power recovers.
12	BAT REPLACE REQUIRED	1. System date is wrongly set. 2. Battery replacement date is due.	1. Check if system date is set correctly. If not, correct it. 2. Check if battery replacement date is due. If yes, contact service personnel to replace battery(ies).
13	PWR UNIT #n CHARGER FAIL	Charger temperature is too high.	Contact service personnel.
14	BAT OVER CHARGE	Charger is abnormal.	Contact service personnel.
15	BAT BAD	1. Wrong battery wiring. 2. Insufficient battery voltage.	1. Check if battery wiring is correct or not. If not, contact service personnel. 2. Check if battery voltage is abnormal or not. If yes, contact service personnel.
16	AMBIENT OVER HEAT	1. The UPS is overloaded. 2. Ambient temperature is too high.	1. Decrease some critical loads. 2. Check the dust filters. If dirty or abnormal, clean or replace them. 3. Decrease the ambient temperature or improve ventilation.

No.	Message	Possible Cause	Solution
17	PWR UNIT #n FAN FAIL	1. Fans are abnormal. 2. Foreign matter is stuck in the fans.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel.
18	PWR UNIT #n PFC OVER HEAT WARNING	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.
19	PWR UNIT #n PFC OVER HEAT SHUTDOWN	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.
20	PWR UNIT #n INV OVER HEAT WARNING	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.
21	PWR UNIT #n INV OVER HEAT SHUTDOWN	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.

No.	Message	Possible Cause	Solution
22	PFC SCR FAULT SHUTDOWN	1. PFC SCR is damaged. 2. Driving circuit is damaged.	Contact service personnel.
23	PWR UNIT #n DC BUS NOK SHUTDOWN	DC BUS voltage is too high or too low.	Contact service personnel.
24	PWR UNIT #n INV OUTPUT NOK SHUTDOWN	Inverter's output voltage is too high or too low.	Contact service personnel.
25	UPS OUTPUT FAULT SHUTDOWN	Inverter's output voltage is too high or too low.	Contact service personnel.
26	INV OVERLOAD WARNING	1. The UPS is overloaded or the UPS is over temperature. 2. The UPS has abnormalities.	1. Decrease some critical loads. 2. Check if the fans or the dust filters have abnormalities. If yes, contact service personnel. 3. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel.
27	INV OVERLOAD SHUTDOWN	1. The UPS is overloaded. 2. The UPS has abnormalities.	1. Decrease some critical loads. 2. Check if the fans or the dust filters have abnormalities. If yes, contact service personnel. 3. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel.
28	INV OVER CURRENT	Output might have shorting issues.	Contact service personnel.
29	PWR UNIT #n INV SHORT CIRCUIT SHUTDOWN	Output might have shorting issues.	Contact service personnel.

No.	Message	Possible Cause	Solution
30	PWR UNIT #n INV STS FAIL SHUT-DOWN	1. Inverter's static switch is damaged. 2. Inverter's driving circuit is damaged.	Contact service personnel.
31	BYPASS STS OVER HEAT	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans. 3. UPS is overloaded.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.
32	BYPASS INPUT VOLT OR FREQ NOK	1. The Bypass Input Breaker (Q2) is turned off. 2. Bypass voltage or frequency is abnormal.	1. Check if the Bypass Input Breaker (Q2) is turned off. If yes, turn it on. 2. If the Bypass Input Breaker (Q2) is turned on but the alarm still exists, contact service personnel. 3. Check if bypass voltage or frequency is abnormal. If yes, please wait until bypass AC source becomes normal.
33	BYPASS INPUT PHASE SEQ NOK	Incorrect wiring.	Check if the bypass AC source's wiring and phase sequence are correct. If not, contact service personnel.
34	BYPASS STS OVER CURRENT	The UPS is overloaded.	Decrease some critical loads.
35	BYPASS STS FAIL	1. Bypass static switch is damaged. 2. Bypass driving circuit is damaged.	Contact service personnel.
36	EMERGENCY OFF	Emergent shutdown is executed.	Shut down the UPS. After emergency events are eliminated, follow turn-on procedures to start up the UPS.
37	PWR UNIT #n COMMUNICATION NOK	1. Internal communication cable is not firmly connected. 2. Communication circuit is abnormal.	Contact service personnel.

No.	Message	Possible Cause	Solution
38	EXT PARALLEL COMMUNICATION NOK	Parallel cable is not firmly connected.	Check if parallel cable is firmly connected or not. If not connect it firmly.
39	PARALLEL FAIL	1. Parallel UPSs are not compatible. 2. There are conflicts between parallel UPSs' IDs.	1. Check if there are conflicts between parallel UPSs' IDs. If yes, contact service personnel. 2. Check if parallel UPSs are compatible or not. If not, contact service personnel.
40	ON MANUAL BYPASS	The Manual Bypass Breaker (Q3) is turned on.	1. Check if the Manual Bypass Breaker (Q3) is turned on. If yes, turn it off. 2. If the Manual Bypass Breaker (Q3) is turned off and the alarm still exists, contact service personnel.
41	REDUNDANCY LOSS	Overload causes redundancy failure.	Decrease critical loads and reset redundancy.
42	INPUT TR OVER HEAT	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans. 3. UPS is overloaded.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.
43	OUTPUT TR OVER HEAT	1. Fans have abnormalities. 2. Foreign matter is stuck in the fans. 3. UPS is overloaded.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel. 3. Decrease some critical loads.
44	OUTPUT BREAKER OFF	The Output Breaker (Q4) is turned off.	1. Check if the Output Breaker (Q4) is turned off. If yes, turn it on. 2. If the Output Breaker (Q4) is turned on but the alarm still exists, contact service personnel.

No.	Message	Possible Cause	Solution
45	BYP OVERLOAD WARNING	1. The UPS is overloaded. 2. The UPS has abnormalities.	1. Decrease some critical loads. 2. Check if the fans or the dust filters have abnormalities. If yes, contact service personnel. 3. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel.
46	EXT BAT BREAKER OFF	Battery circuit breaker is turned off.	1. Check if the battery circuit breaker is turned off. If yes, turn it on. 2. If the battery circuit breaker is turned on but the alarm still exists, contact service personnel.
47	SYS FAN FAIL	1. System fans are abnormal. 2. Foreign matter is stuck in the fans.	1. Check if the fans have abnormalities. If yes, contact service personnel. 2. If foreign matter is blocking a fan, remove it. After removing the foreign matter, double check whether all fans can run normally. If not, contact service personnel.
48	DUST FILTER REPLACEMENT REQUIRED	1. System date is wrongly set. 2. Dust filter replacement/ clean date is due.	1. Check if the system date is set correctly. 2. Replace/ clean the dust filters and reset the replacement/ clean date.
49	PWR UNIT #n BATTERY FUSE OPEN	Battery fuse is fused.	Contact service personnel.

NOTE:

If all possible causes are eliminated but the alarm still appears, please contact your local dealer or customer service.

Appendix 1 : Technical Specifications

Model		DPS-60K	DPS-80K	DPS-100K	DPS-120K
Power Rating		60kVA	80kVA	100kVA	120kVA
Input	Nominal Voltage	220/380 Vac; 230V/400 Vac			
	Voltage Range	208 ~ 300 Vac (70% ~ 100% load); 300 ~ 477 Vac (100% load)			
	Input Current Harmonic Distortion	< 3% (full load) *1			
	Power Factor	> 0.99 (full load)			
	Frequency	50/60 Hz			
	Frequency Range	45 ~ 65 Hz			
Output	Voltage	220/380 Vac; 230V/400 Vac			
	Power Factor	0.9 *2			
	Frequency	50/60 Hz ± 0.05 Hz			
	Voltage Harmonic Distortion	≤ 3% (linear load)			
	Voltage Regulation	± 1%			
	Overload	≤ 125%: 10 minutes; ≤ 150%: 1 minute			
Efficiency	Online Mode	Up to 94%			
	ECO Mode	Up to 97%			
LED & LCD		LED indicators and Multi-language LCD display			
Communication Interfaces		RS-232 port x 1, Smart slot x 2, Input dry contact x 2, Battery cabinet temperature detection x 4, Output dry contact x 6, REPO x 1, Parallel port x 2			
Audible Noise		70 dBA	72 dBA	72 dBA	73 dBA
Others	Parallel Redundancy	Up to 4 units			
	EPO	Standard (Local and Remote)			
	SRAM Event Log	Yes (500 records)			
Physical	Dimensions (W x D x H)	520 x 975 x 1695 mm			
	Weight	300 Kg	330 Kg	360 Kg	390 Kg
Environ-mental	Operating Temperature	0°C ~ 40°C			
	Storage Temperature	-15°C ~ 50°C			
	Relative Humidity	0% ~ 90% (non-condensing)			

NOTE:

1. Please refer to the rating label for the safety rating.
2. All specifications are subject to change without prior notice.

*1: When input vTHD is < 1%.

*2: When temperature is < 30°C.

Appendix 2 : Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship within the warranty period. If the product has any failure problem within the warranty period, Seller will repair or replace the product at its sole discretion according to the failure situation.

This warranty does not apply to normal wear or to damage resulting from improper installation, operation, usage, maintenance or irresistible force (i.e. war, fire, natural disaster, etc.), and this warranty also expressly excludes all incidental and consequential damages.

Maintenance service for a fee is provided for any damage out of the warranty period. If any maintenance is required, please directly contact the supplier or Seller.

WARNING:

The individual user should take care to determine prior to use whether the environment and the load characteristic are suitable, adequate or safe for the installation and the usage of this product. The User Manual must be carefully followed. Seller makes no representation or warranty as to the suitability or fitness of this product for any specific application.

Smarter. Greener. Together.

5013202700