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Delta UPS - Ultron Family

DPM Series, Three Phase
500/ 550/ 750/ 825 kVA

User Manual

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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.

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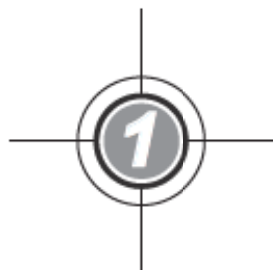
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Important Safety Instructions

- 1.1 Installation Warnings
- 1.2 Connection Warnings
- 1.3 Usage Warnings
- 1.4 Storage Warnings
- 1.5 Standard Compliance

1.1 Installation Warnings

- This is a three-phase three-wire on-line uninterruptible power supply (hereafter referred to as 'UPS'). It can be used for commercial and industrial applications.
- Install the UPS in a well-ventilated indoor area, away from excess moisture, heat, dust, flammable gas or explosives.
- Leave adequate space around all sides of the UPS for proper ventilation and maintenance. Please refer to *5.2 Installation Environment*.
- Only authorized Delta engineers or service personnel can perform installation and maintenance. If you want to install the UPS by yourself, please install it under the supervision of authorized Delta engineers or service personnel.
- Follow the IEC 60364-4-42 standard to install the UPS.

1.2 Connection Warnings

- Before applying electrical power to the UPS, make sure the UPS is grounded to avoid a possible risk of current leakage.
- The UPS is a completely integrated system that incorporates a UPS system cabinet and two or three power modules.
- You can parallel at maximum eight UPS units.

For 500/ 550kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 3 power modules.

For 750/ 825kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 4 power modules.

- The UPS must be connected with at least one external battery cabinet (user-supplied, handled and configured by Delta service personnel). Please refer to *5.5 External Battery Cabinet Connection Warnings* for relevant information.
- The UPS must be connected with an external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). For the external maintenance bypass cabinet's configurations, please refer to the following:
 1. For single input, an input breaker, a manual bypass breaker and an output breaker should be configured.
 2. For dual input, an input breaker, a bypass breaker, a manual bypass breaker and an output breaker should be configured.
 3. Each breaker mentioned above must be a 3-pole (L1/ L2/ L3) device and meets the specifications defined in *Table 5-5*.

4. Each breaker mentioned above should be configured with an auxiliary switch. The auxiliary switch must have a normally open (NO) contact and a normally closed (NC) contact connected to the UPS system cabinet's dry contacts to detect each breaker's ON/ OFF status. Please refer to **4.1.5 External Breaker Detection Dry Contacts**.
 5. It is suggested that you install the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel) next to the UPS or align it with the UPS for convenient operation.
- The installation of protective devices is highly recommended when the UPS is connected to power sources and critical loads.
 - The protective devices connected to the UPS must be installed near the UPS and easily accessible for operation.
 - Protective Devices:
 1. For single input, please install (1) a protective device between the main AC source and the UPS and (2) a protective device between the connected critical loads and the UPS.
 2. For dual input, please install (1) a protective device between the main AC source and the UPS, (2) a protective device between the bypass source and the UPS and (3) a protective device between the connected critical loads and the UPS.
 3. Each protective device could be a breaker or a fuse. For the protective device's rating current, please refer to the table below.

500kVA	550kVA	750kVA	825kVA
750A	750A	1125A	1125A

4. Each protective device should have the functions of over current protection, short circuit protection, insulating protection and shunt trip feature. Please refer to the table below for different UPS's cut off current (I_{cc}).

500kVA	550kVA	750kVA	825kVA
65kA	65kA	65kA	65kA

5. When selecting the protective devices, please take each power cable's current capacity and the system's overload capacity (please refer to **Appendix 1: Technical Specifications**) into consideration. Besides, the short-circuit capacity of the upstream protective devices must be equal to or larger than the capacity of the UPS's input protective devices.
6. When the UPS has abnormalities and input short-circuit current reaches 20kA, the UPS's internal semi-conductor fast-acting fuses need 8 ~ 10ms to be blown. Thus, the upstream protective devices' reaction time should be more than 10ms so that the UPS's semi-conductor fast-acting fuses would have sufficient time to block the system breakdown and let the UPS transfer to bypass mode.

1.3 Usage Warnings

- The UPS is a class-A product. In a domestic environment, the product may cause radio interference, in which case, the user may be required to take additional measures.
- Before installation, wiring and working on the UPS's internal circuits, please completely cut off all power supplying to the UPS, including the input power and battery power.
- The UPS is specifically designed for information technology equipment and used to power computers, servers, and associated peripheral devices. If you want to connect any capacitive loads or non-linear loads (that have serious surge current) to the UPS, it needs to be de-rated according to on-site applications. For such special applications, please contact Delta service personnel for the accurate UPS sizing. The UPS is not suitable for connecting with any asymmetrical loads.
- The external slits and openings in the UPS are provided for ventilation. To ensure reliable operation of the UPS and to protect the UPS from overheating, these slits and openings must not be blocked or covered. Do not insert any object into the slits and openings that may hinder ventilation.
- Before applying electrical power to the UPS, you must allow the UPS to adjust to room temperature (20°C ~ 25°C) for at least one hour to avoid moisture condensing inside the UPS.
- Do not put beverages on the UPS, external battery cabinet(s), external maintenance bypass cabinet or any other accessory associated with the UPS.
- Do not open or remove the covers or panels of the UPS to avoid high voltage electric shock. Only authorized Delta engineers or service personnel can do so for installation or maintenance. If you want to open or remove the covers or panels, do it only under the supervision of authorized Delta engineers or service personnel.
- It is strictly forbidden to connect the UPS to the following loads:
 1. Regenerative loads
 2. Asymmetrical loads (ex. half-wave rectifier)
- The risk of dangerous high voltage is possible when batteries are still connected to the UPS even though the UPS is disconnected from the power sources. Before maintenance, please turn off every external battery cabinet's circuit breaker to completely cut off the battery power from the UPS.
- Do not dispose of the battery or batteries in a fire. The batteries may explode.
- Do not open or damage the battery or batteries. The released electrolyte is harmful to the skin and eyes and may be toxic.

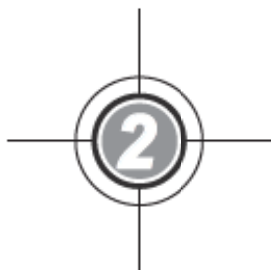
- The UPS is electronic equipment that runs 24 hours continuously. To ensure its normal lifetime, regular maintenance of the UPS and batteries is of vital importance and necessary.
- Some components like batteries, power capacitors, and fans will become worn-out due to long-term usage, and this will increase the risk of UPS failure. To replace and maintain the components, please contact Delta customer service.
- 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.
- You must contact Delta customer service if either of the following events occur:
 1. Liquid is poured or splashed on the UPS.
 2. The UPS is deformed.
 3. Any conductive powders or metals enter into the UPS.
 4. The UPS does not run normally after you carefully followed the instructions in this *User Manual*.

1.4 Storage Warnings

- Use the original packing material to pack the UPS to prevent any possible damage from rodents.
- If the UPS needs to be stored prior to installation, it should be placed in a dry indoor area. The allowable storage temperature is below 40°C and relative humidity is below 90%.

1.5 Standard Compliance

- UL 1778



Introduction

2.1 General Overview

2.2 Package Inspection

2.3 Functions & Features

2.4 Exterior & Dimensions

2.5 UPS System Cabinet

2.6 Power Modules

2.7 Fans

2.8 Tri-color LED Indicator
& Buzzer

2.1 General Overview

The DPM series UPS, a three-phase three-wire on-line uninterruptible power supply (hereafter referred to as "UPS"), is a dedicated design for large scale power systems such as data centers, communication systems, satellite systems, network rooms, medical systems, emergency systems, monitoring systems and factory facilities.

For input, the unit adopts high power factor rectification technique to decrease input current harmonic distortion (< 3%) without using any additional filter device. For output, the unit applies advanced IGBT technology to provide perfect, clean, pure sine wave and high quality output power to connected critical loads. It features good power quality, high efficiency, low heat generation, low noise and high reliability.

The output power factor reaches up to unity, and efficiency in On-Line mode and in ECO mode reach up to 96% and 99% respectively, which effectively lower electricity consumption and decrease the operating cost.

The UPS is a completely intergraded system that incorporates a UPS system cabinet and two or three power modules. A multilingual and graphical 7" color touch panel is equipped for you to easily operate and clearly understand the UPS's status. Besides, multiple communication interfaces and a SMART slot are provided for remote monitoring. With the installation of UPSentry 2012 software (<https://www.deltapowersolutions.com/en/mcis/software-center.php>), you can monitor several UPSs placed in a computer room or a factory to facilitate centralized control, save manpower, and enhance the unit's availability and reliability.

With its outstanding features, the UPS not only provides safe, reliable and uninterruptible power to your sensitive electronic equipment at all times, but also achieves greater electric power efficiency at less cost. The DPM series UPS is an ideal selection for stabilizing power supply.

2.2 Package Inspection

- External

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

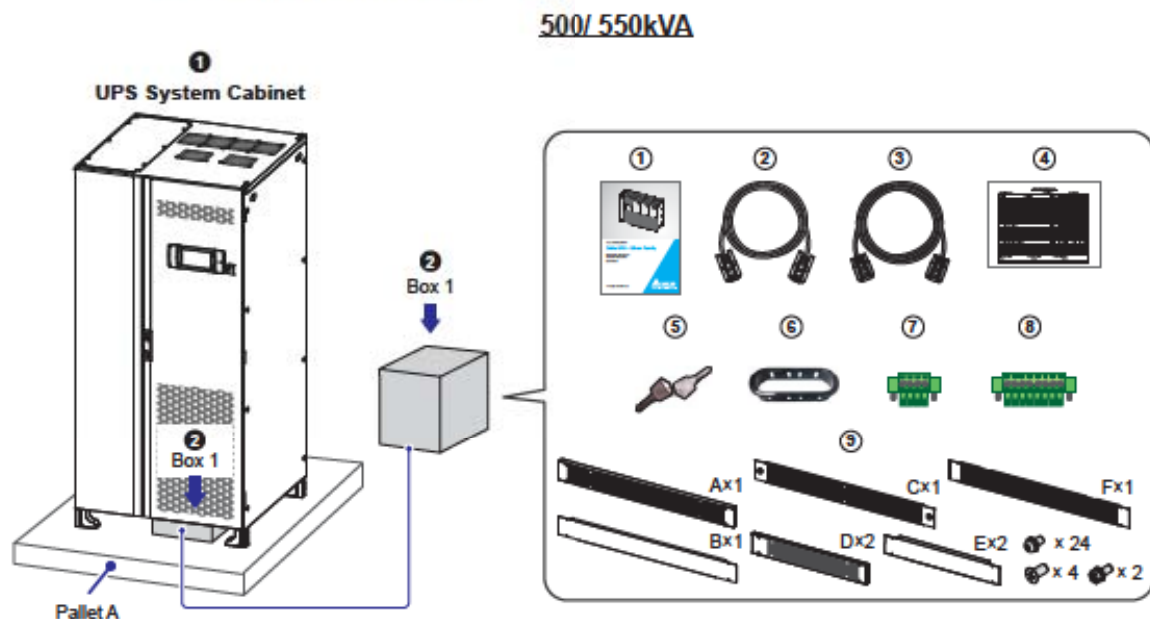
- Internal

1. Check the rating label attached to the UPS and make sure the device No. and capacity match what you ordered.
2. Examine if any parts are loose or damaged.
3. Please check if any items are missing according to **2.2.1 500/ 550kVA UPS Package List** and **2.2.2 750/ 825kVA UPS Package List**.
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.

2.2.1 500/ 550kVA UPS Package List

The 500/ 550kVA UPS is a completely integrated system that incorporates a UPS system cabinet and two power modules. Upon delivery, the UPS is placed on two pallets: pallet A and pallet B.

1. For pallet A, it carries one UPS system cabinet and one box placed underneath (see *Figure 2-1*). For pallet A's package list, please refer to *Table 2-1*.
2. For pallet B, it carries two power modules and two boxes placed underneath (see *Figure 2-2*). For pallet B's package list, please refer to *Table 2-2*.



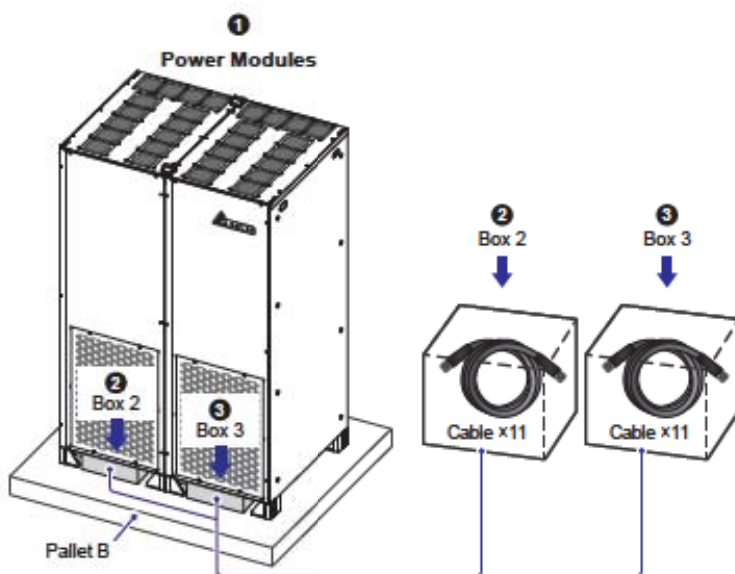
(Figure 2-1: Pallet A, UPS System Cabinet & Box 1)

Table 2-1: 500/ 550kVA UPS_ Pallet A's Package List

No.	Item	Q'ty
①	UPS System Cabinet	1 PC
②	Box 1	1 PC

② Box 1		
No.	Item	Q'ty
①	User Manual	1 PC
②	RS-232 Cable (1.8 meters)	1 PC

2 Box 1		
No.	Item	Q'ty
③	Parallel Cable (10 meters)	1 PC
④	Test Card	1 PC
⑤	Key	1 PC (two copies placed inside the UPS cabinet)
⑥	Snap Bushing	2 PCS
⑦	4-Pin Dry Contact Terminal Block	4 PCS (already been installed on the UPS system cabinet's dry contacts; please refer to 4. Communication Interfaces for relevant location)
⑧	8-Pin Dry Contact Terminal Block	4 PCS (already been installed on the UPS system cabinet's dry contacts; please refer to 4. Communication Interfaces for relevant location)
⑨	Rodent Shield A/ B/ C/ D/ E/ F	Rodent Shield A: 1 PC Rodent Shield B: 1 PC Rodent Shield C: 1 PC Rodent Shield D: 2 PCS Rodent Shield E: 2 PCS Rodent Shield F: 1 PC (include twenty-four M4 round-head screws, four flat-head screws and two M5 screws)



(Figure 2-2: Pallet B, Power Modules, Box 2 & Box 3)

Table 2-2: 500/ 550kVA UPS_ Pallet B's Package List

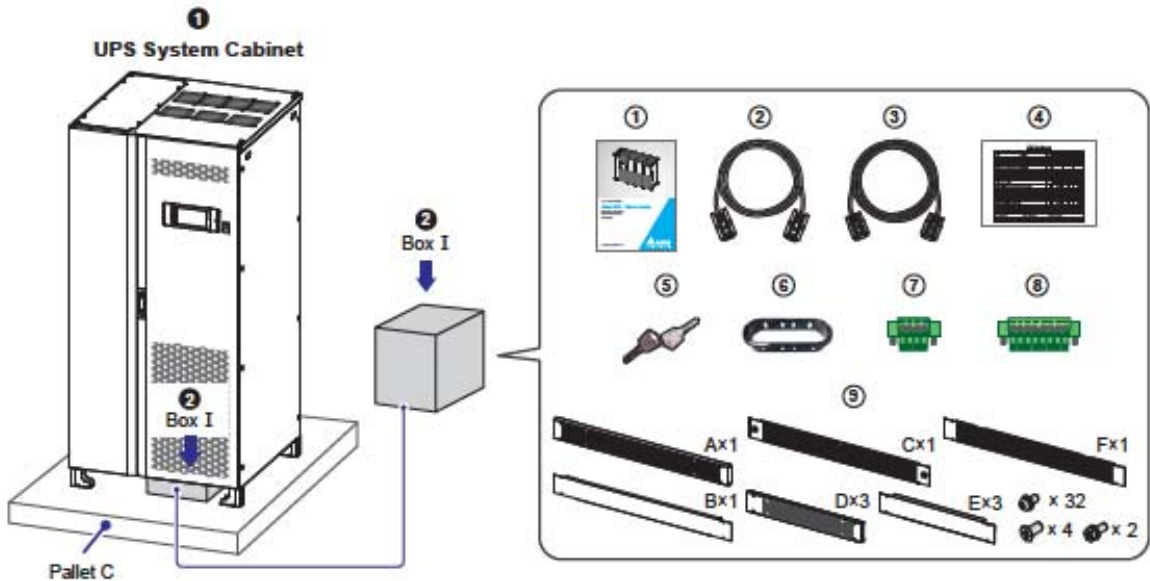
No.	Item	Q'ty
①	Power Module	2 PCS
②	Box 2	1 PC (There are 11 internal cables packed in box 2 for you to perform internal wiring. Please refer to 5.4.3 <i>Internal Wiring between the UPS System Cabinet and Power Modules</i>).
③	Box 3	1 PC (There are 11 internal cables packed in box 3 for you to perform internal wiring. Please refer to 5.4.3 <i>Internal Wiring between the UPS System Cabinet and Power Modules</i>).

2.2.2 750/ 825kVA UPS Package List

The 750/ 820kVA UPS is a completely integrated system that incorporates a UPS system cabinet and three power modules. Upon delivery, the UPS is placed on two pallets: pallet C and pallet D.

1. For pallet C, it carries one UPS system cabinet and one box placed underneath (see *Figure 2-3*). For pallet C's package list, please refer to *Table 2-3*.
2. For pallet D, it carries three power modules and three boxes placed underneath (see *Figure 2-4*). For pallet D's package list, please refer to *Table 2-4*.

750/ 825VA



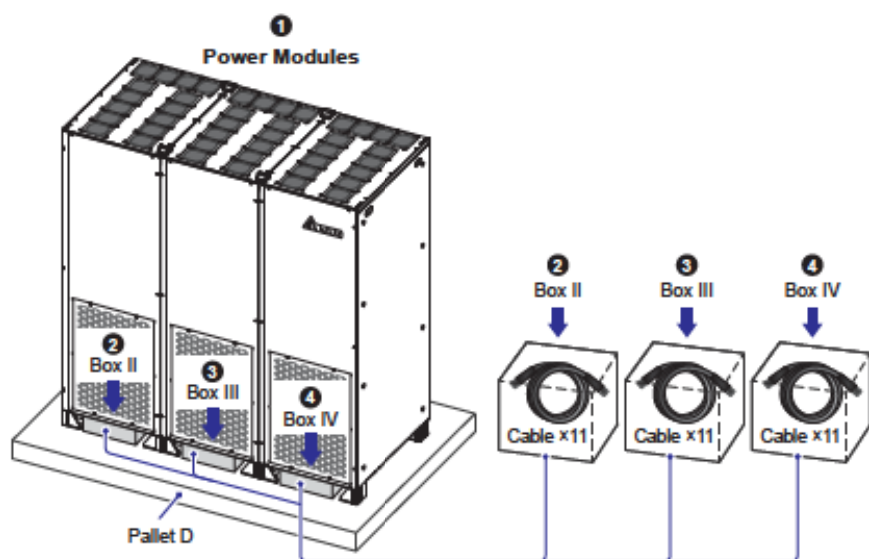
(Figure 2-3: Pallet C, UPS System Cabinet & Box I)

Table 2-3: 750/ 825kVA UPS_ Pallet C's Package List

No.	Item	Q'ty
①	UPS System Cabinet	1 PC
②	Box I	1 PC

② Box I		
No.	Item	Q'ty
①	User Manual	1 PC
②	RS-232 Cable (1.8 meters)	1 PC
③	Parallel Cable (10 meters)	1 PC
④	Test Card	1 PC
⑤	Key	1 PC (two copies placed inside the UPS cabinet)
⑥	Snap Bushing	2 PCS

② Box I		
No.	Item	Q'ty
⑦	4-Pin Dry Contact Terminal Block	4 PCS (already been installed on the UPS system cabinet's dry contacts; please refer to 4. <i>Communication Interfaces</i> for relevant location)
⑧	8-Pin Dry Contact Terminal Block	4 PCS (already been installed on the UPS system cabinet's dry contacts; please refer to 4. <i>Communication Interfaces</i> for relevant location)
⑨	Rodent Shield A/ B/ C/ D/ E/ F	Rodent Shield A: 1 PC Rodent Shield B: 1 PC Rodent Shield C: 1 PC Rodent Shield D: 3 PCS Rodent Shield E: 3 PCS Rodent Shield F: 1 PC (include thirty-two M4 round-head screws, four flat-head screws and two M5 screws)



(Figure 2-4: Pallet D, Power Modules, Box II, Box III & Box IV)

Table 2-4: 750/ 825kVA UPS_ Pallet D's Package List

No.	Item	Q'ty
①	Power Module	3 PCS
②	Box II	1 PC (There are 11 internal cables packed in box II for you to perform internal wiring. Please refer to <i>5.4.3 Internal Wiring between the UPS System Cabinet and Power Modules</i>).
③	Box III	1 PC (There are 11 internal cables packed in box III for you to perform internal wiring. Please refer to <i>5.4.3 Internal Wiring between the UPS System Cabinet and Power Modules</i>).
④	Box IV	1 PC (There are 11 internal cables packed in box IV for you to perform internal wiring. Please refer to <i>5.4.3 Internal Wiring between the UPS System Cabinet and Power Modules</i>).

2.3 Functions & Features

- True on-line double-conversion UPS adopts DSP chip and IGBT technology to protect your sensitive electronic equipment from power interruption.
- Input power factor > 0.99 and input THDi < 3% save on installation cost and diminish power contamination.
- Efficiency > 96% saves on operation cost.
- Wide AC input voltage range (360Vac ~ 552Vac) reduces frequent transfer from normal mode to battery mode to save battery consumption and prolong battery life.
- Automatic input frequency detection enables operation at 50Hz or 60Hz.
- Batteries power on the UPS to provide stable AC power when there is no AC line available.
- AC start-up function even when the UPS is not connected to the batteries.



WARNING:

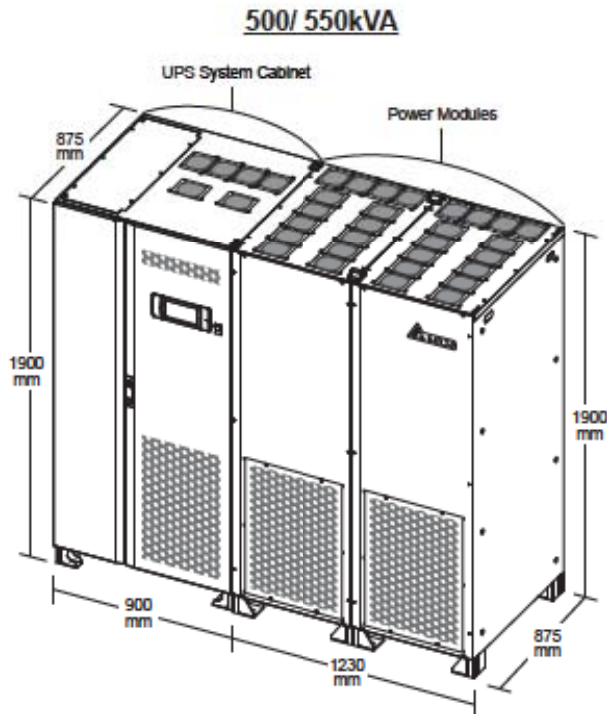
Please note that when the UPS is not connected to the batteries, it will not protect your equipment if the utility power is lost.

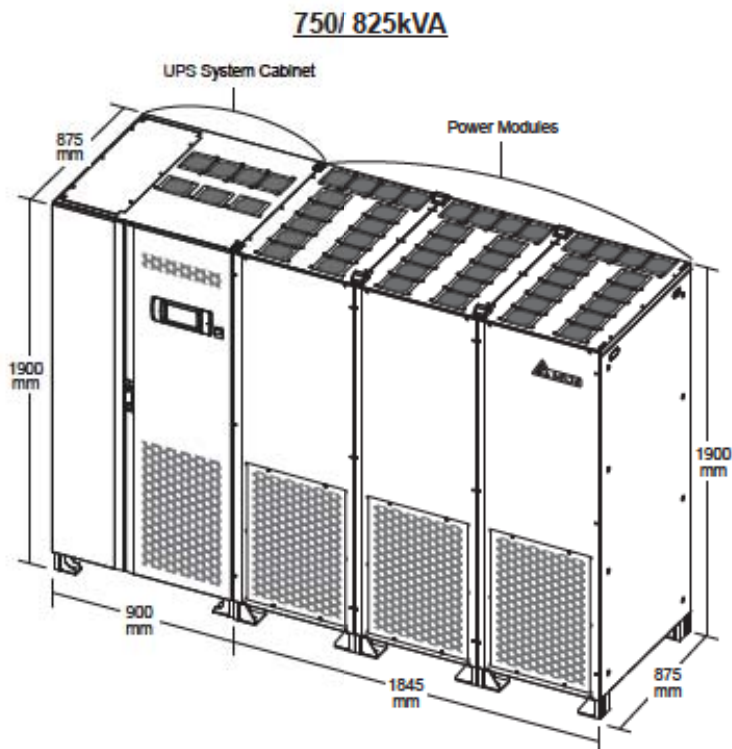
- Optional ECO Mode: when bypass input voltage and frequency are within the range of rating voltage $\pm 10\%$ and rating frequency $\pm 5\text{Hz}$, it will be bypass power to supply power to the connected loads; under such condition, the UPS's efficiency reaches 99%. If out of the above mentioned range, it will be the inverter to supply power to the loads.

- Dual-input design features an independent rectifier and a bypass static switch.
- Automatic Restart
 1. The UPS will restart in normal mode automatically right after the AC line resumes following a low battery shutdown.
 2. The UPS returns automatically to normal mode from bypass mode after an overload condition or a short circuit condition is cleared.
- Surge protection and EMI filter functions.
- Both of auxiliary power and control circuit adopt redundancy design, which doubly enhances UPS reliability.
- Battery test schedule and battery replacement alarm are settable.
- Smart battery charger design allows auto-charging or manual-charging to reduce charging time.
- Input/ output cables entry from top, bottom or lateral sides.
- Local and remote emergency power off functions.
- Generator compatible.
- The special modularized design and structure of power modules ensure high reliability and realize easy maintenance.
- Provides diversified communication interfaces and a SMART slot. You can install an optional SNMP, Relay I/O, or MODBUS card into the SMART slot to let the UPS have network, dry contact or MODBUS communication. For detailed information, please refer to **4. Communication Interfaces**.
- Built-in USB port and RS-232 port allow monitoring and management of the UPS via the UPSentry 2012 software (<http://www.deltapowersolutions.com/en/mcis/software-center.php>). For more information, please refer to **4. Communication Interfaces**.
- State-of-the-art DSP chip with microprocessor technology (1) performs self-detection for IGBT temperature, DC capacitors' temperature, AC capacitors' current and fan speed in real time, and (2) provides complete and detailed UPS operating status on the LCD.
- 7-inch graphic and color touch panel enables users to easily operate the UPS and understand the UPS status.
- Built-in SRAM records at maximum 5,000 event logs.
- Fan speed auto adjustment prolongs fan life and reduces noise when the critical loads decrease, and fan failure detection circuit is established.

2.4 Exterior & Dimensions

1. The UPS is a completely integrated system that incorporates a UPS system cabinet and two or three power modules.
 - For 500/ 550kVA UPS, its package includes two shipping pallets, where the UPS system cabinet and two power modules are placed on respectively. Please refer to *Figure 2-1, Figure 2-2, Table 2-1 and Table 2-2.*
 - For 750/ 825kVA UPS, its package includes two shipping pallets, where the UPS system cabinet and three power modules are placed on respectively. Please refer to *Figure 2-3, Figure 2-4, Table 2-3 and Table 2-4.*
2. Please follow *5. Installation and Wiring* to assemble the UPS system cabinet and power modules. After assembly, the UPS exterior and dimensions are as follows (see *Figure 2-5*).





2.5 UPS System Cabinet

2.5.1 Front View



NOTE:

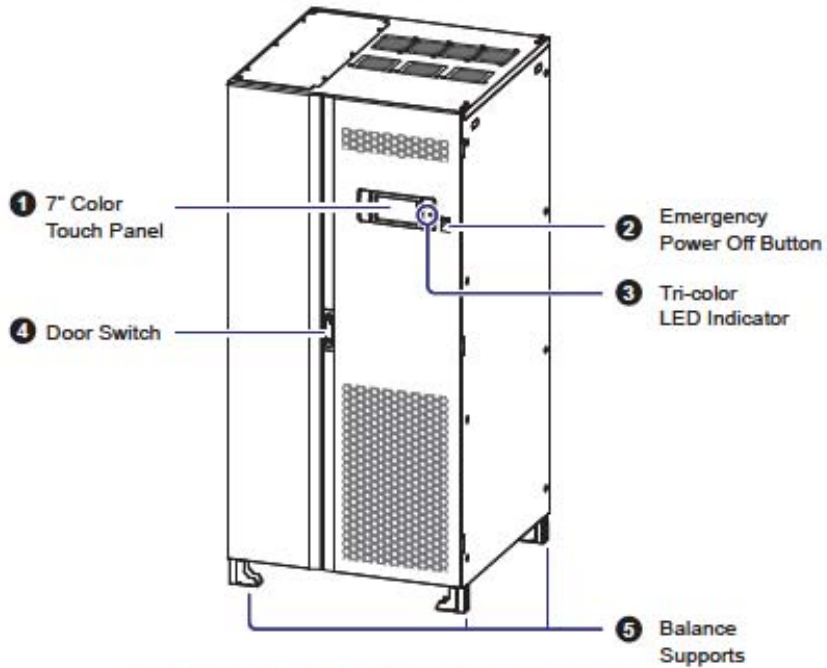
For 500/ 550kVA UPS and 750/ 825kVA UPS, their external views of UPS system cabinets are the same, except that their total number of fans located on the top are different. Hence, in **2.5.1 Front View**, only the illustration of 750/ 825kVA UPS system cabinet is taken for example.

On the front of the UPS system cabinet, there is a 7" color touch panel, a tri-color LED indicator, an emergency power off button, a door switch and four balance supports. Please see **Figure 2-6**.

- ❶ For information about the 7" color touch panel, please refer to **7. LCD Display & Settings**.
- ❷ When an emergency occurs, press the emergency power off button located on the front of the UPS system cabinet to shut down the UPS rectifier, inverter and output.
- ❸ For information about the tri-color LED indicator, please refer to **2.8 Tri-color LED Indicator & Buzzer**.

750/ 825kVA

(UPS System Cabinet)

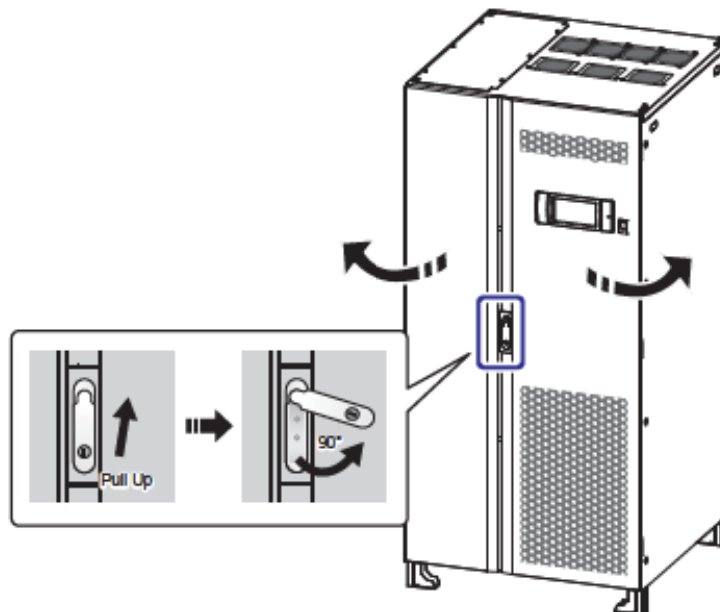


(Figure 2-6: Front View of the UPS System Cabinet)

4 Please refer to *Figure 2-7* for how to open the UPS system cabinet's two front doors.

750/ 825kVA

(UPS System Cabinet)



(Figure 2-7: How to Open the UPS System Cabinet's Two Front Doors)

- 5 The four balance supports at the bottom of the UPS system cabinet firmly fix and stabilize the UPS system cabinet on the ground. Please refer to *5.3 Fixing the UPS* for relevant information.

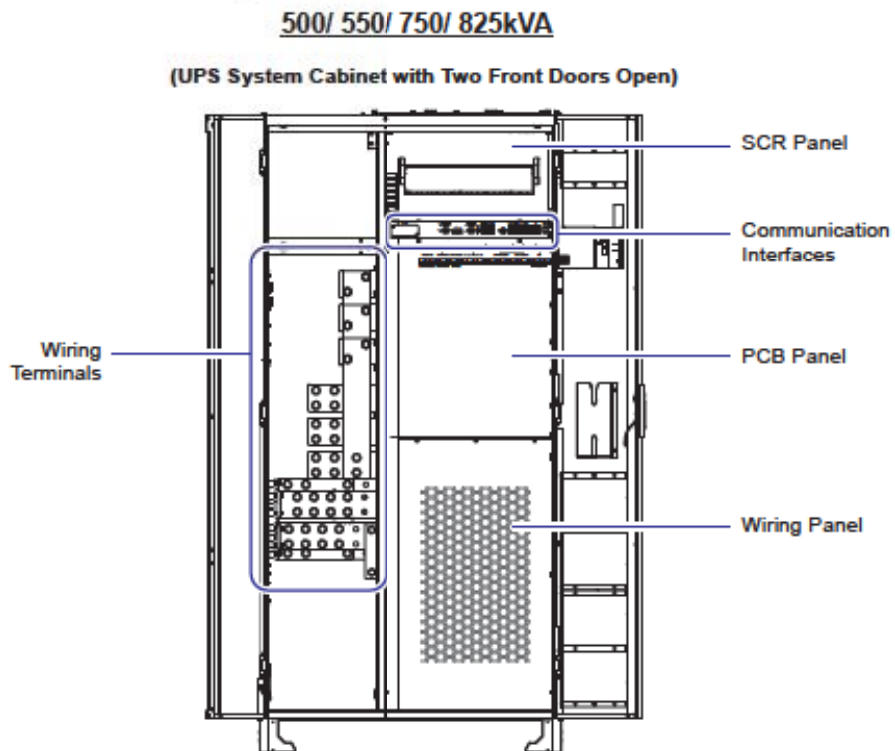
2.5.2 Internal View



WARNING:

Only authorized Delta engineers or service personnel can perform installation, wiring, panel/ cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.

After you open the UPS system cabinet's two front doors, you will see the internal mechanisms including communication interfaces, SCR/ PCB/ wiring panels, and wiring terminals. Please refer to *Figure 2-8*.

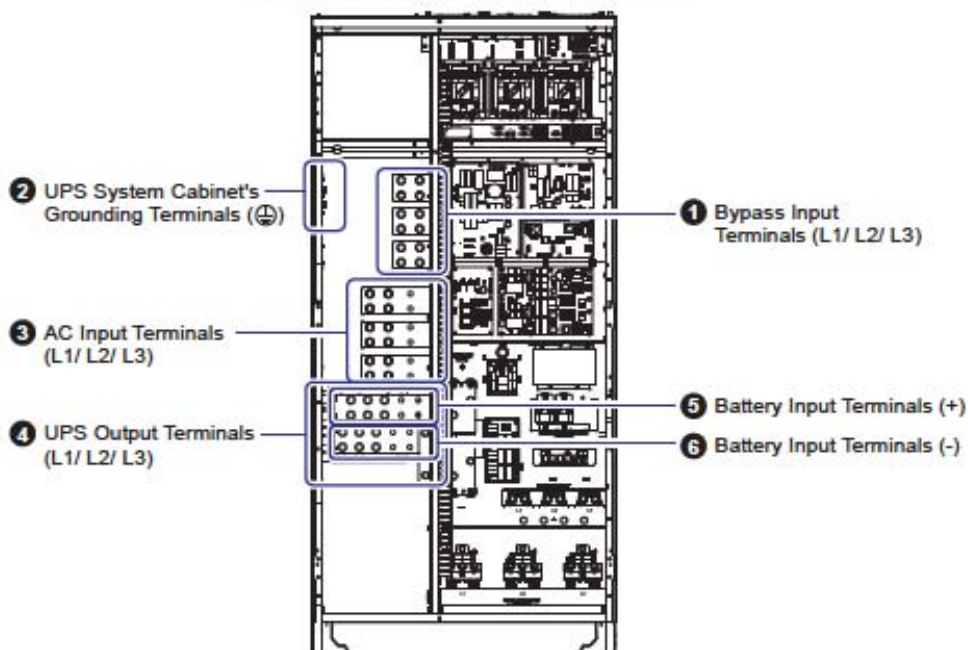


(Figure 2-8: Internal View of the UPS System Cabinet with Two Front Doors Open)

If you remove all panels shown in *Figure 2-8*, you will see more wiring terminals (show in *Figure 2-9*). For how to perform wiring, please refer to *5.4 Wiring*.

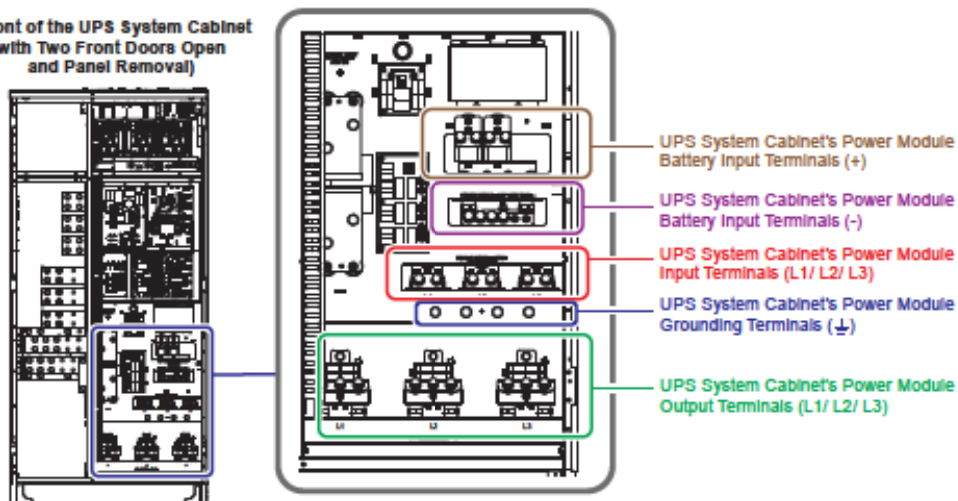
500/ 550kVA

(Front of the UPS System Cabinet with Two Front Doors Open and Panel Removal)

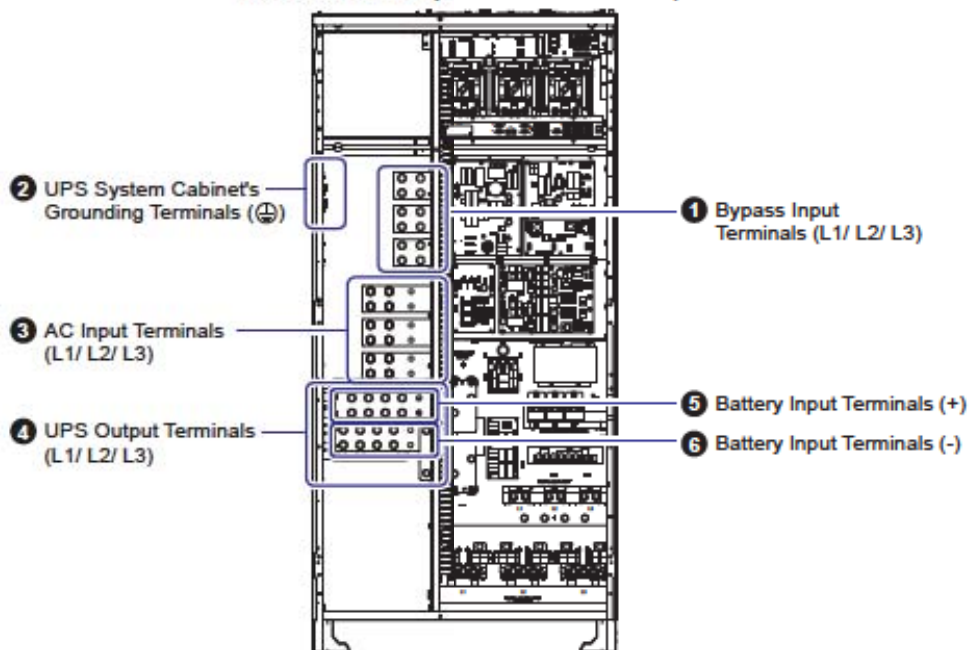


500/ 550kVA

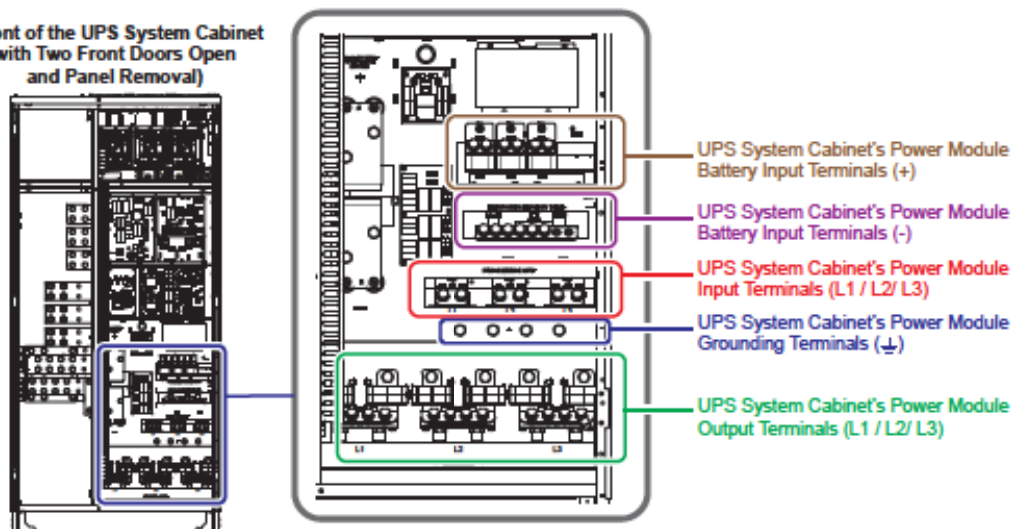
(Front of the UPS System Cabinet with Two Front Doors Open and Panel Removal)



750/ 825kVA

(Front of the UPS System Cabinet with
Two Front Doors Open and Panel Removal)

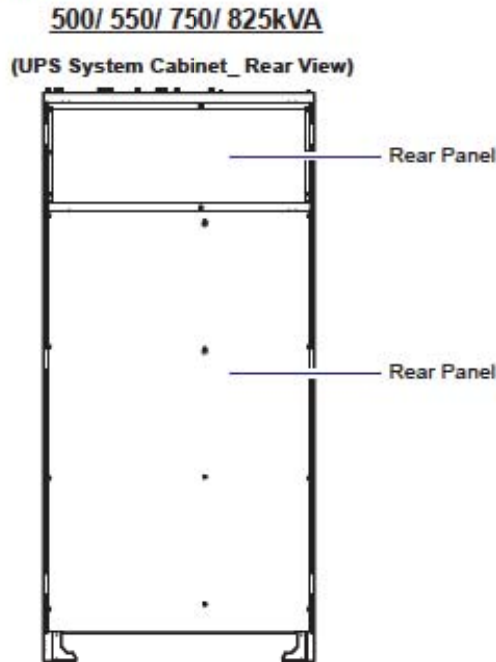
750/ 825kVA

(Front of the UPS System Cabinet
with Two Front Doors Open
and Panel Removal)

(Figure 2-9: Wiring Terminals inside the UPS System Cabinet)

2.5.3 Rear View

The rear view of the UPS system cabinet is shown in *Figure 2-10*. There are no user operable or replaceable parts at the rear.



(Figure 2-10: Rear View of the UPS System Cabinet)

2.6 Power Modules

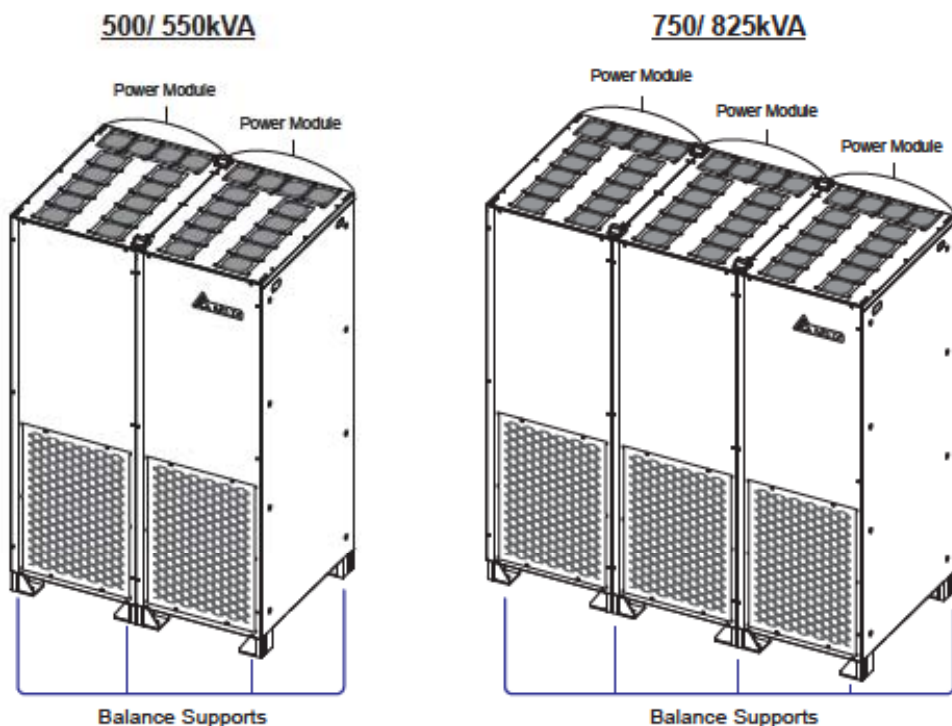
2.6.1 Front View

- For 500/ 550kVA UPS, it has two power modules and they must be installed at the right side of the UPS system cabinet. Please see *Figure 2-11*.
- For 750/ 825kVA UPS, it has three power modules and they must be installed at the right side of the UPS system cabinet. Please see *Figure 2-11*.
- Per power module capacity is listed below.

	500kVA UPS	550kVA UPS	750kVA UPS	825kVA UPS
Per Power Module Capacity	250kVA/ 250kW	275kVA/ 250kW	250kVA/ 250kW	275kVA/ 250kW

**NOTE:**

For 500/ 550kVA UPS and 750/ 825kVA UPS, each power module's structure, exterior and dimensions are the same. Only the total number of the power modules is different. The four balance supports at the bottom of each power module firmly fix and stabilize the power module on the ground. Please refer to 5.3 *Fixing the UPS* for relevant information.



(Figure 2-11: Front View of the Power Modules)

2.6.2 Internal View

**WARNING:**

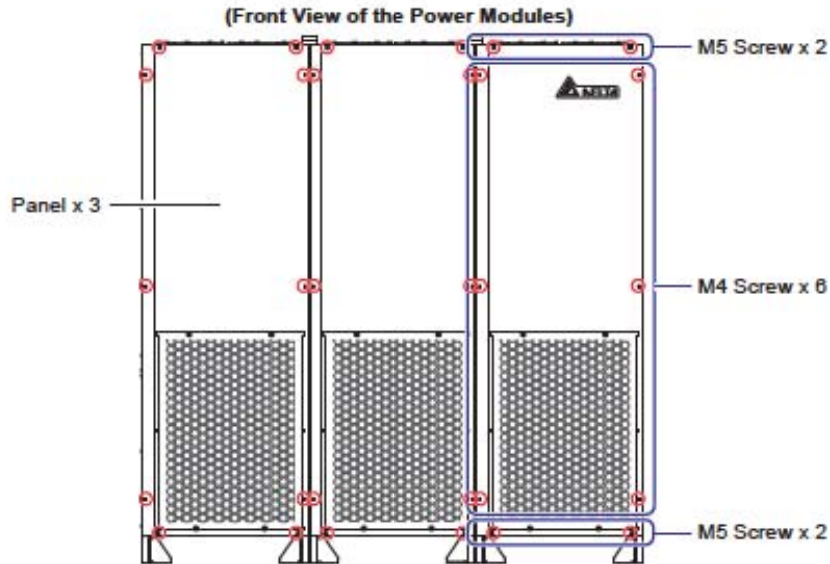
Only authorized Delta engineers or service personnel can perform installation, wiring, panel/ cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.

**NOTE:**

For 500/ 550kVA UPS and 750/ 825kVA UPS, each power module's structure, exterior and dimensions are the same. Only the total number of the power modules is different. The 500/ 550kVA UPS has two power modules and 750/ 825kVA UPS has three. Hence, in 2.6.2 *Internal View*, only the power module illustration of 750/ 825kVA UPS is taken for example.

- 1 To see the power modules' internal view, remove each power module's front panel and screws. Each front panel has four M5 screws and six M4 screws. Below, only the power module illustration of 750/ 825kVA UPS is taken for example.

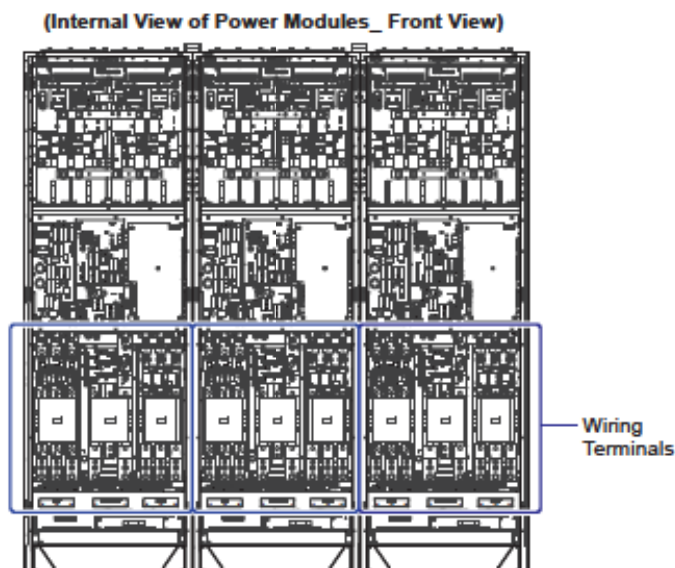
750/ 825kVA



(Figure 2-12: Location of the Power Modules' Front Panels & Screws)

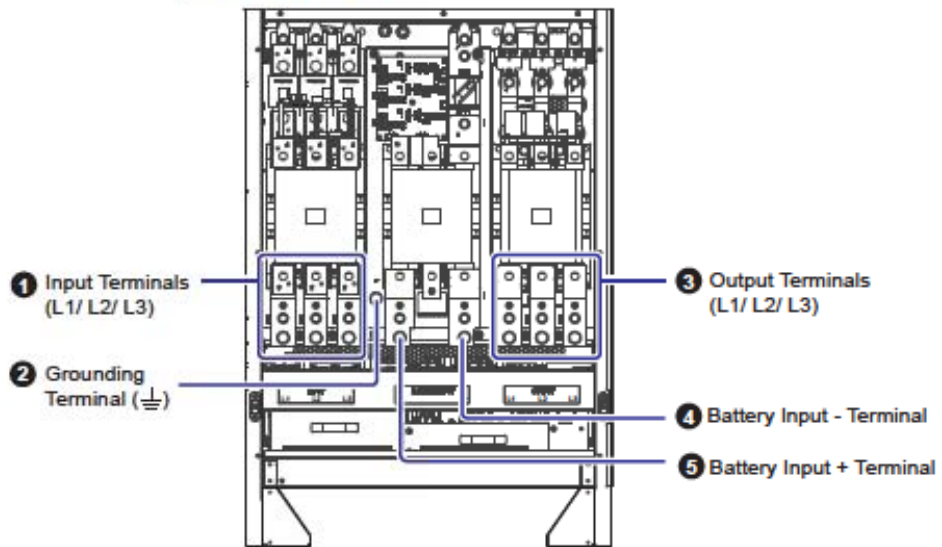
- 2 After removing each power module's front panel, you will see the power modules' internal mechanisms shown in *Figure 2-13* and *Figure 2-14*. For how to perform wiring, please refer to *5.4 Wiring*.

750/ 825kVA



(Figure 2-13: Location of the Power Modules' Wiring Terminals)

(Internal View of Each Power Module_ Front View)



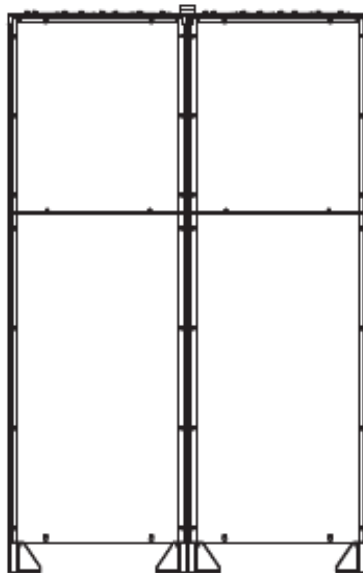
(Figure 2-14: Power Module's Wiring Terminals)

2.6.3 Rear View

The rear view of the power modules is shown in *Figure 2-15*. There are no user operable or replaceable parts at the rear.

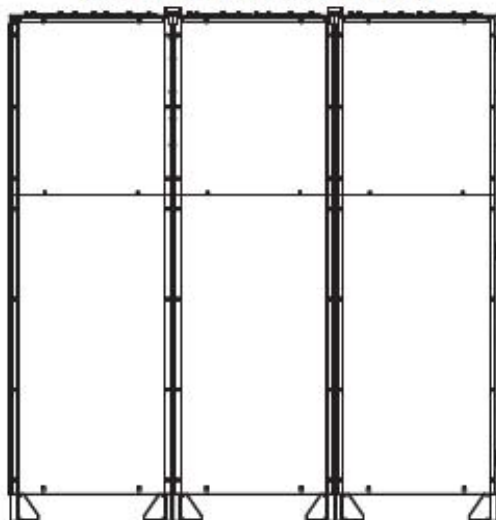
500/ 550kVA

(Rear View of the Power Modules)



750/ 825kVA

(Rear View of the Power Modules)

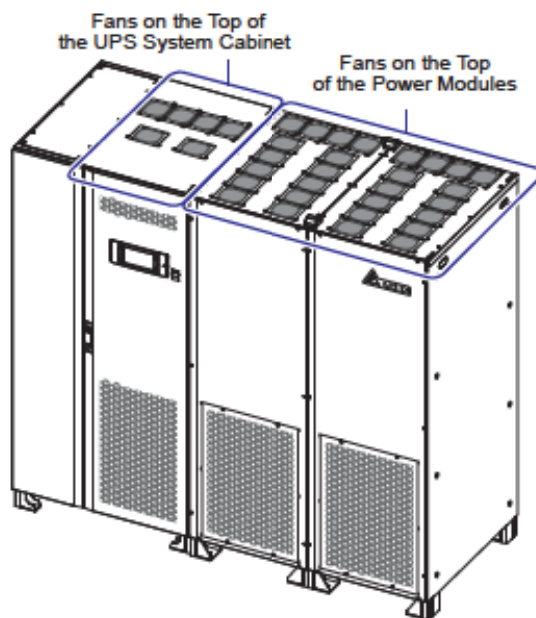


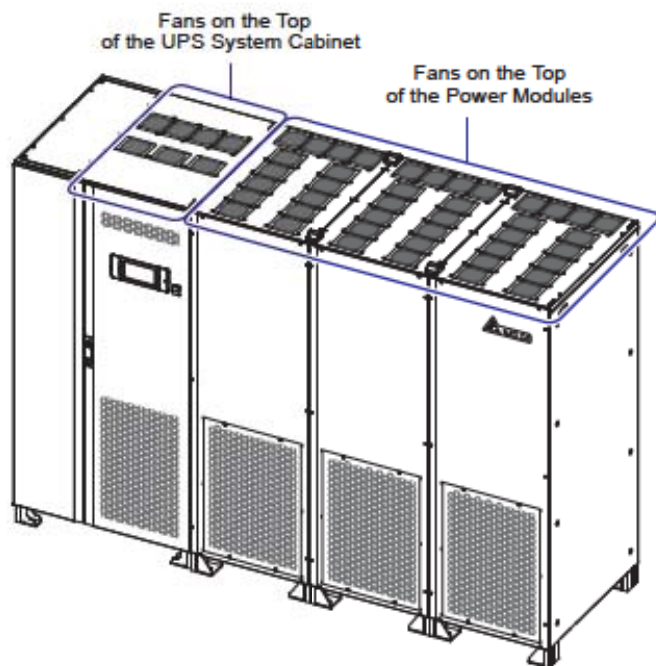
(Figure 2-15: Rear View of the Power Modules)

2.7 Fans

There are fans on the top of the UPS system cabinet and the power modules to assist ventilation. Please see *Figure 2-16* for fans' location. The system senses the critical loads connected and decides the fan speed. Fans will run at the highest speed only when an over-current condition occurs (battery over temperature is excluded).

500/ 550kVA

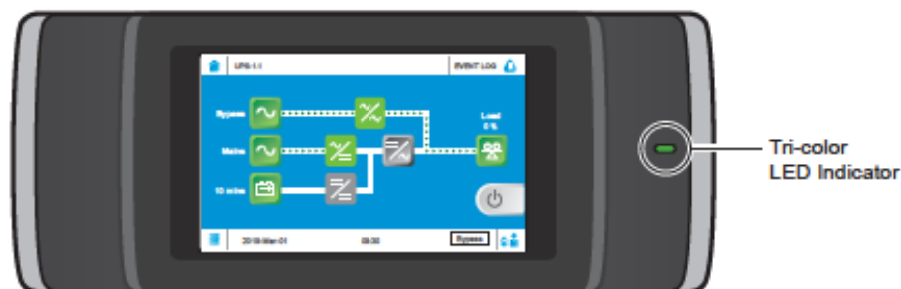


750/ 825kVA

(Figure 2-16: Location of Fans)

2.8 Tri-color LED Indicator & Buzzer

Please see *Figure 2-17* for the location of the tri-color LED indicator. For information about the tri-color LED indicator, please refer to *Table 2-5*. For information about the 7" color touch panel, please refer to *7. LCD Display & Settings*.



(Figure 2-17: Tri-color LED Indicator Location)

Face the front of the UPS system cabinet, open its two front doors and find the buzzer at the rear of the right-side door. Please see *Figure 2-18*.

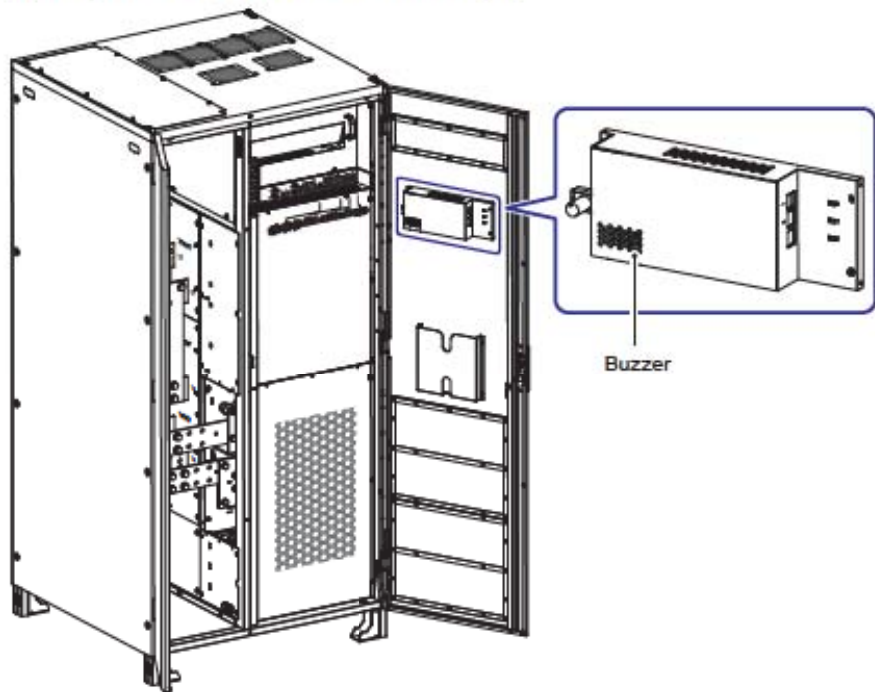


NOTE:

For 500/ 550kVA UPS and 750/ 825kVA UPS, their external views of UPS system cabinets are the same, except that their total number of fans located on the top are different. Hence, in *2.8 Tri-color LED Indicator & Buzzer*, only the illustration of 500/ 550kVA UPS system cabinet is taken for example.

500/ 550kVA

(UPS System Cabinet with Two Front Doors Open)

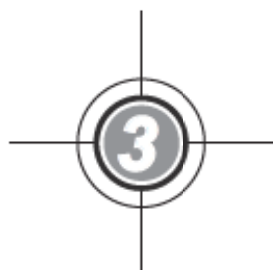


(Figure 2-18: Buzzer Location)

For the correlation among the tri-color LED indicator, UPS operation mode and buzzer, please refer to *Table 2-5*.

Table 2-5: Correlation among Tri-color LED Indicator, UPS Operation Mode & Buzzer

Tri-color LED Indicator	Status	Meaning														
Green	ON	<ul style="list-style-type: none"> Indicates that the UPS is operating in one of the following modes with the corresponding text shown in the lower right corner of the LCD. <table border="1"> <thead> <tr> <th>UPS Operation Mode</th> <th>LCD Display</th> </tr> </thead> <tbody> <tr> <td>On-Line Mode</td> <td>'AC'</td> </tr> <tr> <td>ECO Mode</td> <td>'ECO'</td> </tr> </tbody> </table>	UPS Operation Mode	LCD Display	On-Line Mode	'AC'	ECO Mode	'ECO'								
UPS Operation Mode	LCD Display															
On-Line Mode	'AC'															
ECO Mode	'ECO'															
Yellow	ON	<ul style="list-style-type: none"> Indicates that the UPS is operating in one of the following modes with the corresponding text shown in the lower right corner of the LCD. <table border="1"> <thead> <tr> <th>UPS Operation Mode</th> <th>LCD Display</th> </tr> </thead> <tbody> <tr> <td>Battery Mode</td> <td>'DC'</td> </tr> <tr> <td>Bypass Mode</td> <td>'Bypass'</td> </tr> <tr> <td>Softstart Mode</td> <td>'Softstart'</td> </tr> </tbody> </table> <ul style="list-style-type: none"> Indicates that there is a minor or medium warning and the buzzer sounds. <table border="1"> <thead> <tr> <th>Warning Level</th> <th>Buzzer Frequency</th> </tr> </thead> <tbody> <tr> <td>Minor</td> <td>Sounds 50ms every 3 seconds.</td> </tr> <tr> <td>Medium</td> <td>Sounds 50ms every second.</td> </tr> </tbody> </table> <p>To clear the warning, please refer to <i>10. Troubleshooting</i>.</p>	UPS Operation Mode	LCD Display	Battery Mode	'DC'	Bypass Mode	'Bypass'	Softstart Mode	'Softstart'	Warning Level	Buzzer Frequency	Minor	Sounds 50ms every 3 seconds.	Medium	Sounds 50ms every second.
UPS Operation Mode	LCD Display															
Battery Mode	'DC'															
Bypass Mode	'Bypass'															
Softstart Mode	'Softstart'															
Warning Level	Buzzer Frequency															
Minor	Sounds 50ms every 3 seconds.															
Medium	Sounds 50ms every second.															
Red	ON	<ul style="list-style-type: none"> Indicates that there is a major warning and the buzzer sounds. <table border="1"> <thead> <tr> <th>Warning Level</th> <th>Buzzer Frequency</th> </tr> </thead> <tbody> <tr> <td>Major</td> <td>Long beep</td> </tr> </tbody> </table> <p>To clear the warning, please refer to <i>10. Troubleshooting</i>.</p>	Warning Level	Buzzer Frequency	Major	Long beep										
Warning Level	Buzzer Frequency															
Major	Long beep															



Operation Modes

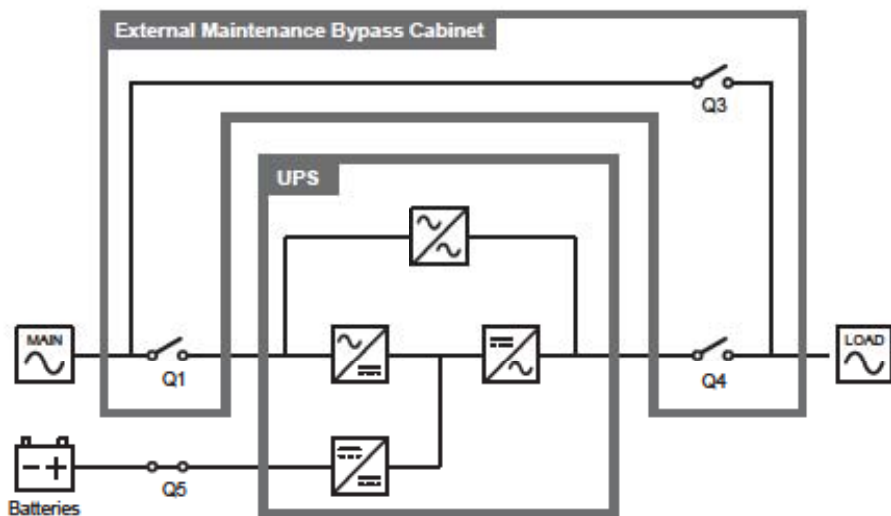
- 3.1 Single Input
- 3.2 Dual Input
- 3.3 Hot Standby Redundancy
(Only for Dual Input & At
Least Two UPSs)
- 3.4 Common Battery (Only for
Parallel UPSs Connecting
to the Same External
Battery Cabinet(s))

The UPS runs in five basic operation modes, which are On-Line mode, Battery mode, Bypass mode, Manual Bypass mode and ECO mode. Besides these five operation modes, the UPS is also designed for common battery application and hot standby redundancy. Please see the following sections for relevant information.

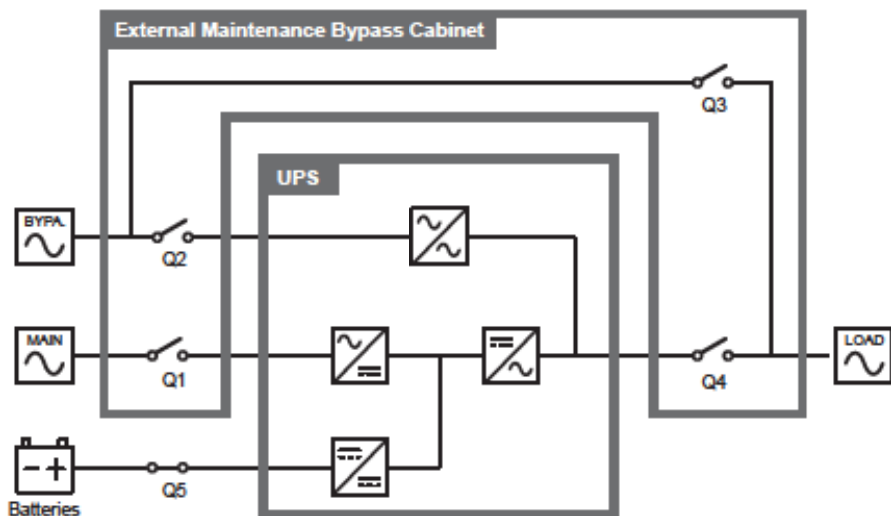


NOTE:

1. The UPS must be connected with an external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). For the external maintenance bypass cabinet's configurations, please refer to **1.2 Connection Warnings**.
2. The structure of the UPS and the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel) is shown in **Figure 3-1** (single input application) and **Figure 3-2** (dual input application).



(Figure 3-1: Single Input Application_ UPS & External Maintenance Bypass Cabinet's Structure)



(Figure 3-2: Dual Input Application_ UPS & External Maintenance Bypass Cabinet's Structure)

3. In this user manual, the meaning of Q1, Q2, Q3, Q4 and Q5 represents the following.

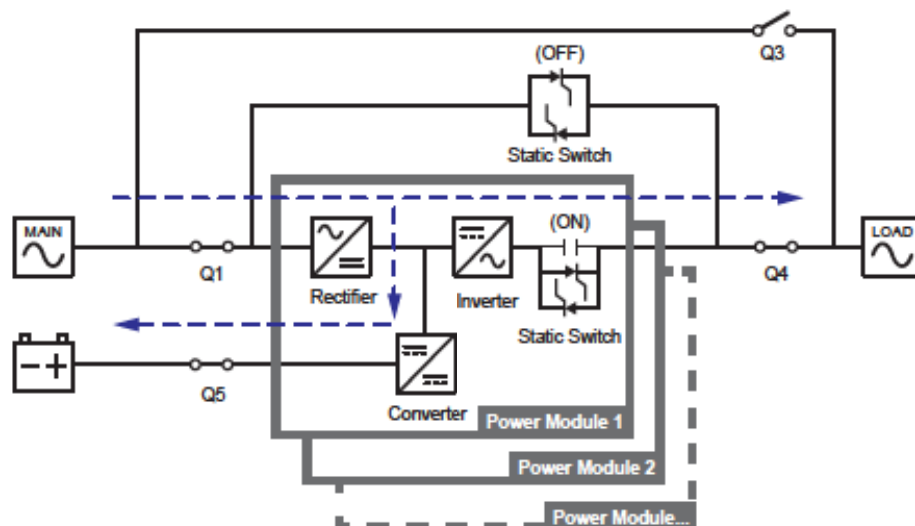
Code	Meaning
Q1	External Maintenance Bypass Cabinet's Input Breaker.
Q2	External Maintenance Bypass Cabinet's Bypass Breaker.
Q3	External Maintenance Bypass Cabinet's Manual Bypass Breaker.
Q4	External Maintenance Bypass Cabinet's Output Breaker.
Q5	External Battery Cabinet's Breaker

4. Only UPSs with the same capacity, voltage, frequency and version can be paralleled. For version information, please refer to **7.10.8 Version**. Please only use the provided parallel cable to parallel the UPS units; otherwise, parallel functions will fail. For more parallel information, please refer to *Pre Start-up Warnings for Parallel Units* stated in *Page 6-4*.

3.1 Single Input

3.1.1 On-Line Mode_ Single Input_ Single Unit

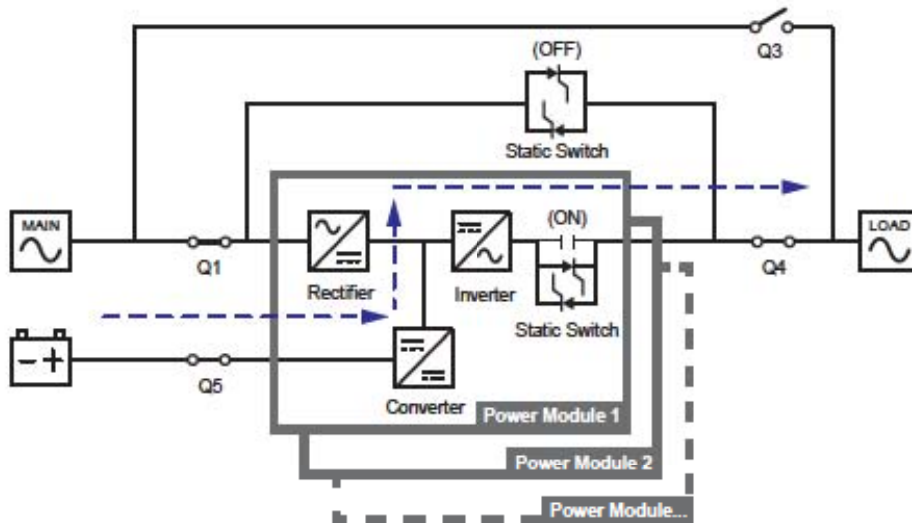
In On-Line mode, the main AC source supplies AC power via the external maintenance bypass cabinet's Input Breaker (Q1) to the rectifier, and the rectifier converts the AC power to DC power and supplies the DC power to the inverter. In the meantime, the rectifier provides charging power to the batteries. After receiving the DC power, the inverter converts it into clean and stable AC power to the connected critical loads via the external maintenance bypass cabinet's Output Breaker (Q4). Please refer to *Figure 3-3*. During On-Line mode, the UPS's tri-color LED illuminates green and the text 'AC' appears in the lower right corner of the screen.



(Figure 3-3: On-Line Mode Diagram_ Single Input Single Unit)

3.1.2 Battery Mode_ Single Input_ Single Unit

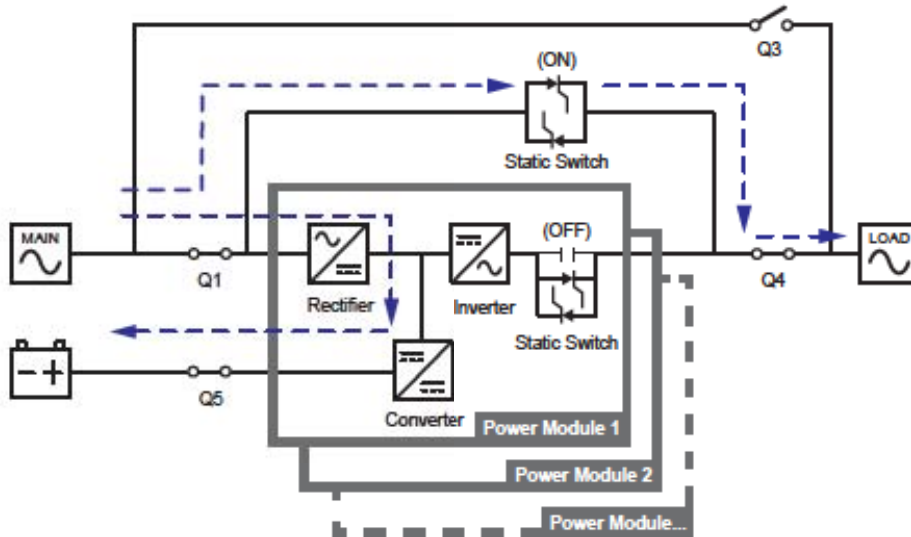
The UPS transfers to Battery mode automatically if the main AC source is abnormal, for example, when unstable voltage or a power outage occurs. In Battery mode, the batteries provide DC power and the UPS converts it into AC power and supplies it to the connected critical loads via the external maintenance bypass cabinet's Output Breaker (Q4). During the conversion process, output voltage remains the same. Please see *Figure 3-4* for Battery mode diagram. During Battery mode, the UPS's tri-color LED illuminates yellow and the text 'DC' appears in the lower right corner of the screen.



(Figure 3-4: Battery Mode Diagram_ Single Input Single Unit)

3.1.3 Bypass Mode_ Single Input_ Single Unit

When the inverter encounters abnormal situations such as over temperature, overload, short circuit, abnormal output voltage or low battery, it will automatically shut itself down. If the UPS detects the bypass AC source is normal, it will automatically switch to Bypass mode to protect the connected critical loads from power interruption. Please refer to *Figure 3-5*. After the above-mentioned abnormalities are eliminated, the UPS will switch back to On-Line mode from Bypass mode. During Bypass mode, the UPS's tri-color LED illuminates yellow and the text 'Bypass' appears in the lower right corner of the screen.



(Figure 3-5: Bypass Mode Diagram_ Single Input Single Unit)


3.1.4 Manual Bypass Mode_ Single Input_ Single Unit



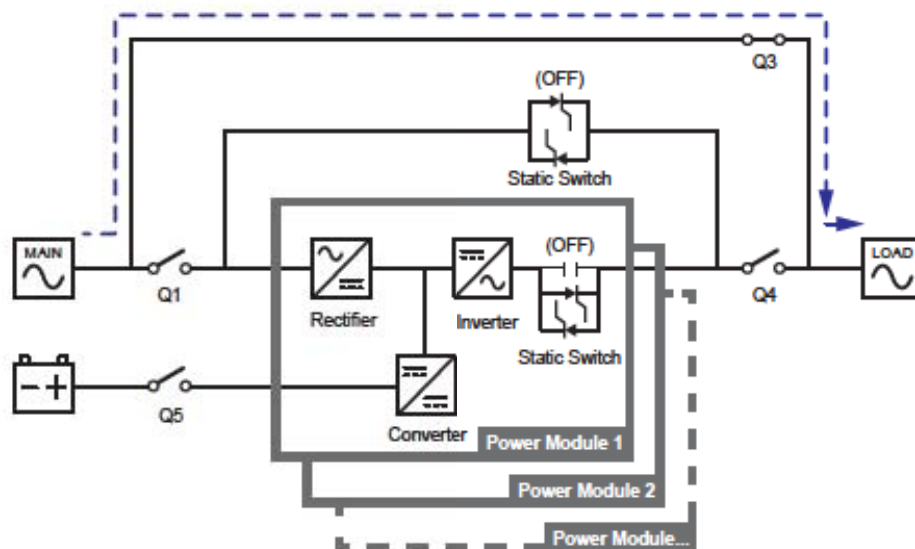
WARNING:

1. In Manual Bypass mode, make sure that all of the breakers (except the external maintenance bypass cabinet's Manual Bypass Breaker (Q3)) are in the OFF position before working on the UPS's internal circuits. This avoids electric shock.
2. After the power inside the UPS is completely cut off, there is no high voltage inside the UPS and maintenance can be performed safely. However, to avoid electric shock, please do not touch the following parts:
 - (a) The external maintenance bypass cabinet's AC Input terminal block, Bypass Input terminal block, UPS Output terminal block, Battery Input terminal block, grounding terminals and any copper bars connected to the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
 - (b) Every external battery cabinet's battery input terminal block.These parts mentioned above may carry high voltage.
3. During Manual Bypass mode, the UPS's input power is completely cut off and the connected critical loads are not protected.

When the UPS needs maintenance, you can manually switch the UPS to Manual Bypass mode. To let the UPS run in Manual Bypass mode, please follow the procedures below:

- 1 Confirm that the bypass AC source is normal.
- 2 Tap the LCD's ON/ OFF Button () and the screen 'Are you sure to set Inverter to OFF?' will pop up to ask if you want to power off the UPS's inverter. Please select 'YES'.
- 3 Turn ON the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
- 4 Turn OFF the external maintenance bypass cabinet's Input Breaker (Q1) and Output Breaker (Q4).
- 5 Turn OFF each external battery cabinet's breaker (Q5).

In Manual Bypass mode, all power inside the UPS is completely cut off and maintenance personnel can perform maintenance safely. Please see *Figure 3-6* for Manual Bypass mode diagram. During Manual Bypass mode, the UPS's tri-color LED and LCD are both off.

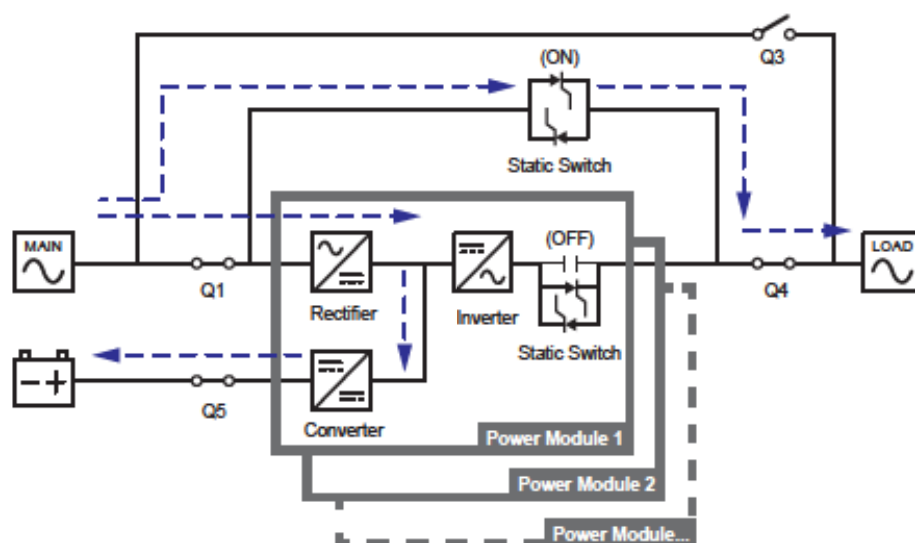


(Figure 3-6: Manual Bypass Mode Diagram_ Single Input Single Unit)

3.1.5 ECO Mode_ Single Input_ Single Unit

To activate ECO mode, please refer to **6.2.5 ECO Mode Start-up Procedures**, **7.6 Main Screen** and **7.9.2 Mode Setting**.

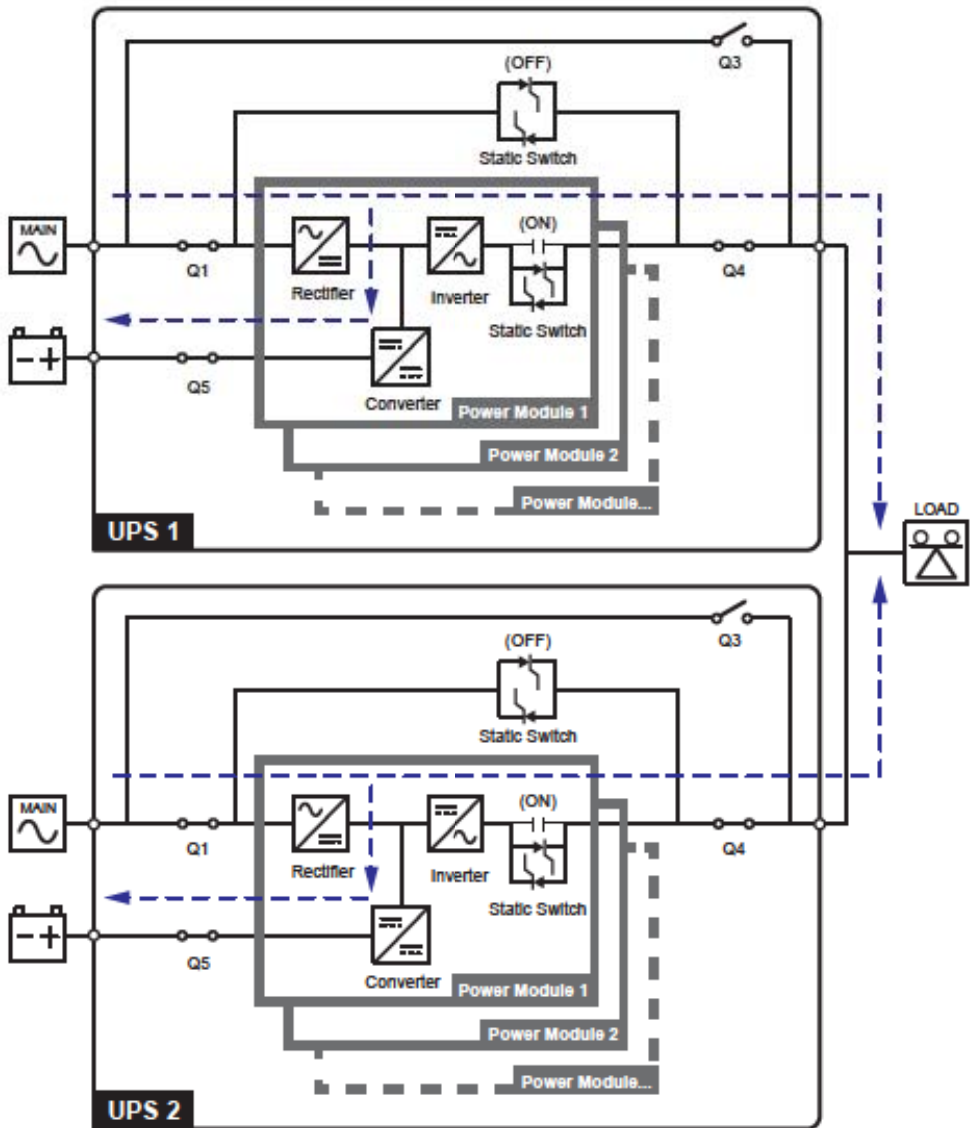
In ECO mode, when bypass AC source's input voltage and frequency are within the range of rating voltage $\pm 10\%$ and rating frequency $\pm 5\text{Hz}$ respectively, it will be bypass power to supply power to the connected loads; otherwise, it will be the inverter to supply power to the loads. For ECO mode diagram, please see **Figure 3-7**. During ECO mode, the UPS's tri-color LED illuminates green and the text 'ECO' appears in the lower right corner of the screen.



(Figure 3-7: ECO Mode Diagram_ Single Input Single Unit)

3.1.6 On-Line Mode_ Single Input_ Parallel Units

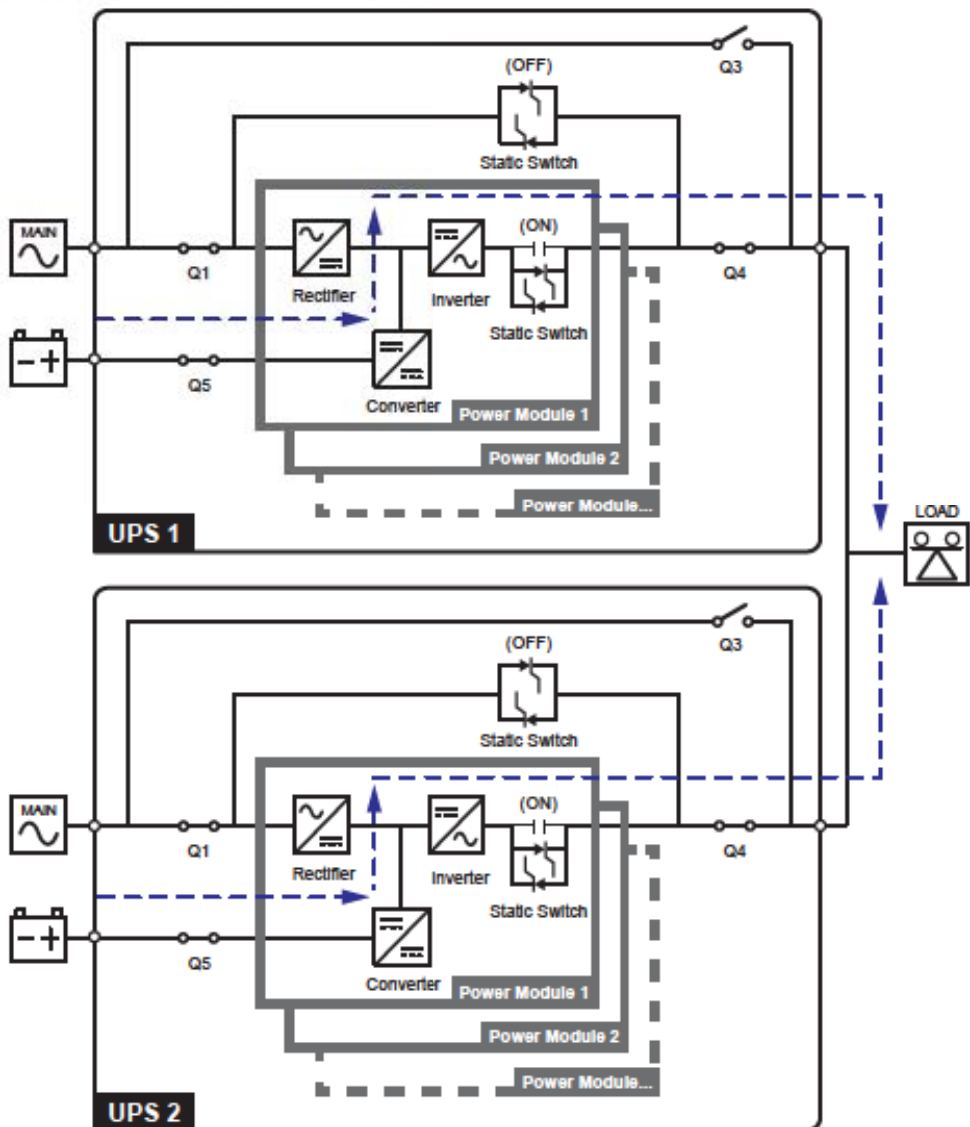
In On-Line mode (parallel), the total loads will be equally shared by parallel UPSs. If one of the parallel units fails and its load is less than the total capacity of the remaining parallel units, the failing UPS's output will be switched off and its load will be equally shared by the remaining parallel units. If the failing UPS's load is larger than the total capacity of the remaining parallel units, all UPSs' inverters will turn off and the total loads will be supplied by bypass power. During On-Line mode (parallel), each UPS's tri-color LED illuminates green and each UPS's LCD shows the text 'AC' in the lower right corner. Please refer to *Figure 3-8* for the path of electrical power through the parallel UPSs in On-Line mode.



(Figure 3-8: On-Line Mode Diagram_ Single Input Parallel Units)

3.1.7 Battery Mode_ Single Input_ Parallel Units

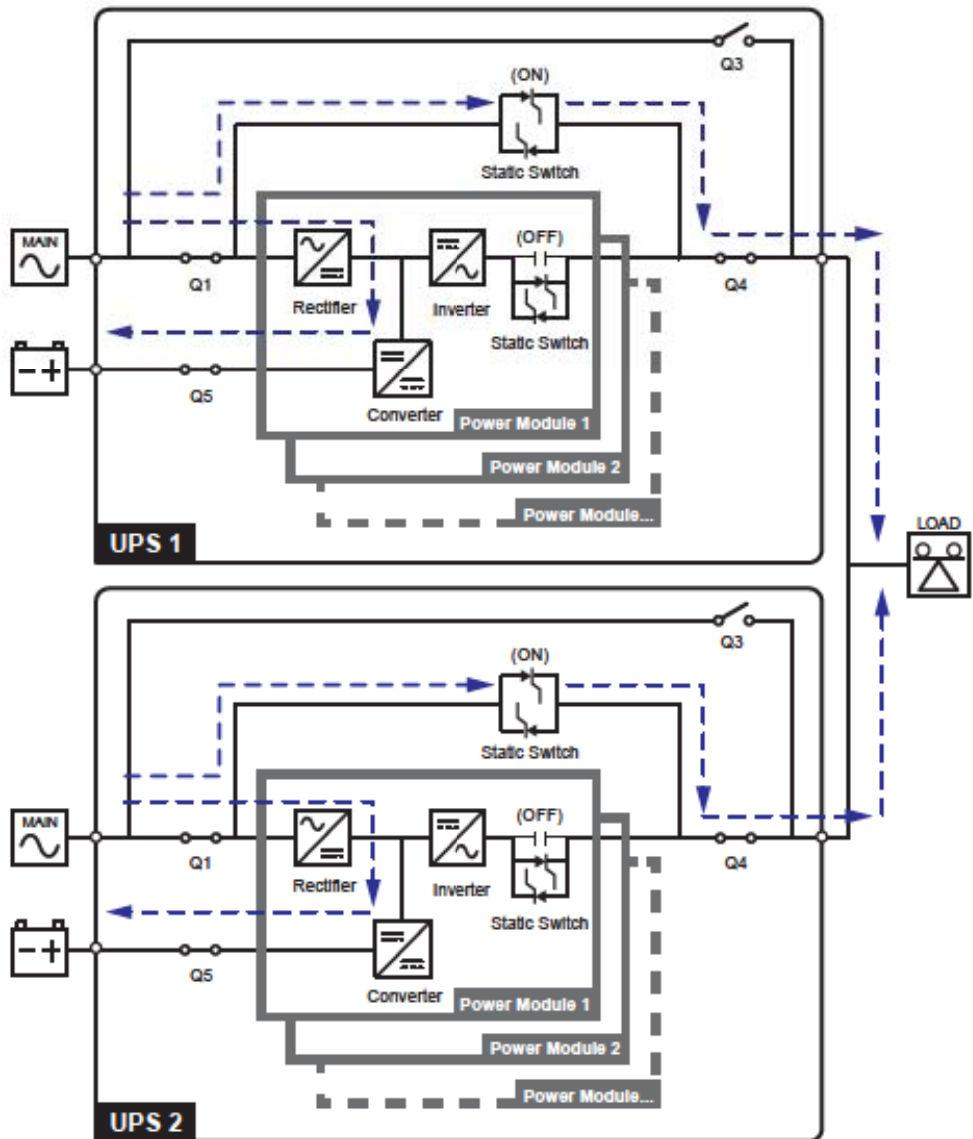
If the main AC source is abnormal, for example, when unstable voltage or a power outage occurs, all parallel UPSs will automatically transfer from On-Line mode to Battery mode. During the conversion process, output voltage remains the same. During Battery mode (parallel), each UPS's tri-color LED illuminates yellow and each UPS's LCD shows the text 'DC' in the lower right corner. Please refer to *Figure 3-9* for the path of electrical power through the parallel UPSs in Battery mode.



(Figure 3-9: Battery Mode Diagram_ Single Input Parallel Units)

3.1.8 Bypass Mode_ Single Input_ Parallel Units

In Bypass mode (parallel), when all inverters encounter abnormal situations such as overload, short circuit, abnormal output voltage or low battery, they will automatically shut themselves down. Meanwhile, if all parallel 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 parallel UPSs will switch back to On-Line mode from Bypass mode. During Bypass mode (parallel), each UPS's tri-color LED illuminates yellow and each UPS's LCD shows the text 'Bypass' in the lower right corner. Please refer to *Figure 3-10* for the path of electrical power through the parallel UPSs in Bypass mode.



(Figure 3-10: Bypass Mode Diagram_ Single Input Parallel Units)


3.1.9 Manual Bypass Mode_ Single Input_ Parallel Units



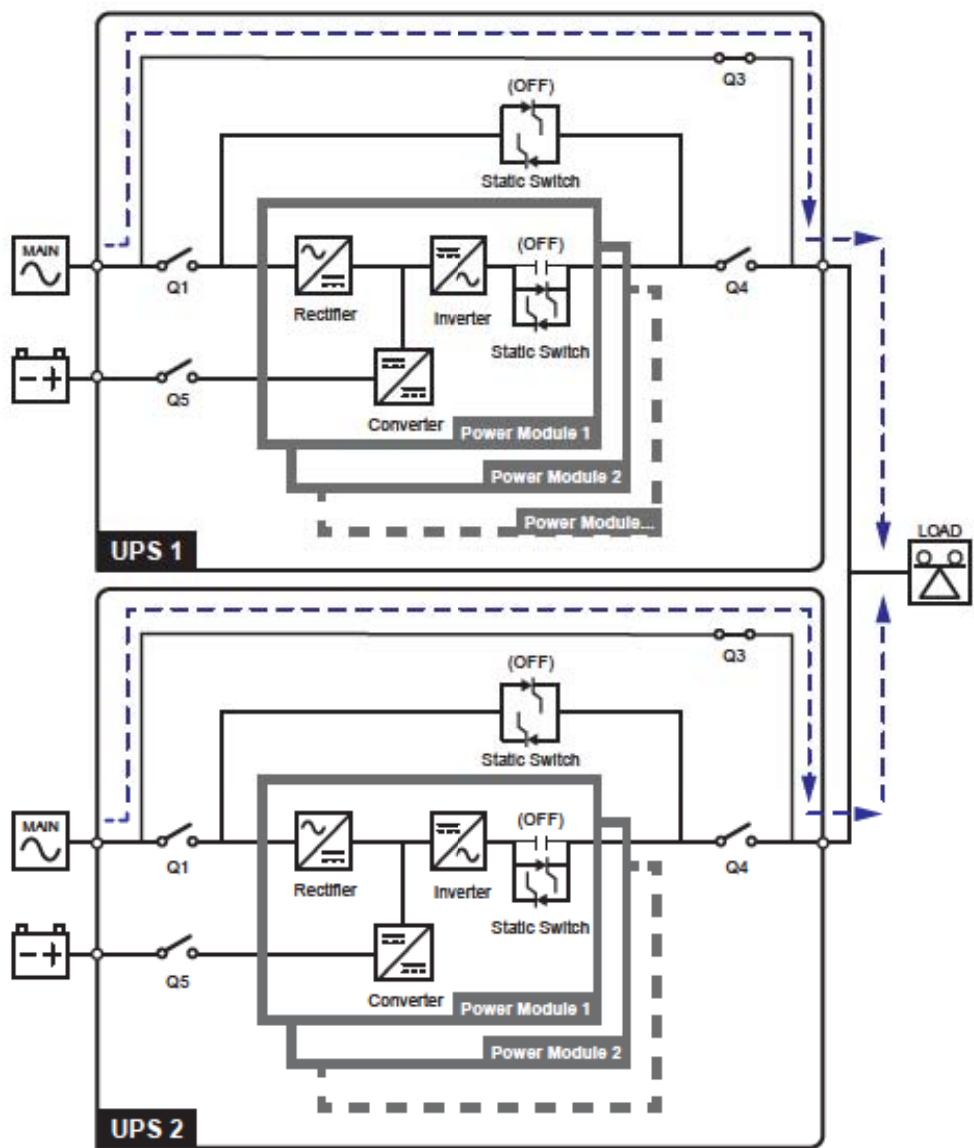
WARNING:

1. In Manual Bypass mode, make sure that all of the breakers (except the external maintenance bypass cabinet's Manual Bypass Breaker (Q3)) are in the OFF position before working on any of the parallel UPSs' internal circuits. This avoids electric shock.
2. After the power inside each of the parallel UPSs is completely cut off, there is no high voltage inside all parallel UPSs and maintenance can be performed safely. However, to avoid electric shock, please do not touch the following parts:
 - (a) Each external maintenance bypass cabinet's AC Input terminal block, Bypass Input terminal block, UPS Output terminal block, Battery Input terminal block, grounding terminals and any copper bars connected to the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
 - (b) Each external battery cabinet's battery input terminal block.
 These parts mentioned above may carry high voltage.
3. During Manual Bypass mode, each parallel UPS's input power is completely cut off and the connected critical loads are not protected.
4. For parallel UPSs, if you want to turn off one of the parallel UPSs for maintenance, please make sure the total connected critical loads will not exceed the remaining parallel units' total capacity.

In Manual Bypass mode (parallel), if one of the parallel UPSs needs maintenance, please first confirm that the bypass AC source is normal. After confirmation, please follow the procedures below to manually switch each of the parallel UPSs to Manual Bypass mode:

- 1 Tap the LCD's ON/ OFF Button () and the screen 'Are you sure to set Inverter to OFF?' will pop up to ask if you want to power off the UPS's inverter. Please select 'YES'.
- 2 Turn ON the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
- 3 Turn OFF the external maintenance bypass cabinet's Input Breaker (Q1) and Output Breaker (Q4).
- 4 Turn OFF each external battery cabinet's breaker (Q5).

In Manual Bypass mode, all power inside the parallel UPSs is completely cut off and maintenance personnel can perform maintenance safely. Power of the connected critical loads will be supplied by manual bypass. During Manual Bypass mode (parallel), all parallel UPSs' tri-color LEDs and LCDs are off. Please see *Figure 3-11* for the path of electrical power through the parallel UPSs in Manual Bypass mode.

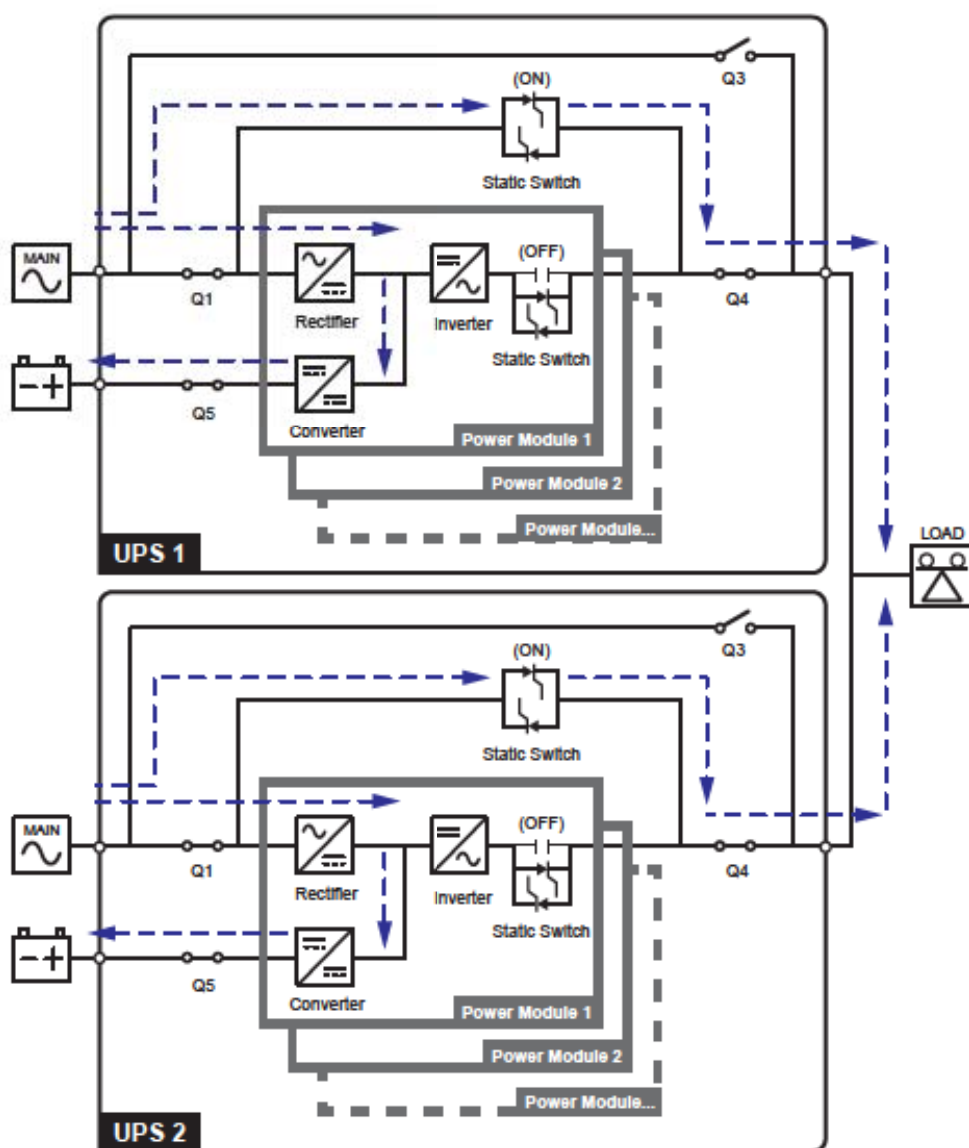


(Figure 3-11: Manual Bypass Mode Diagram_ Single Input Single Unit)

3.1.10 ECO Mode_ Single Input_ Parallel Units

To activate ECO mode, please refer to **6.2.5 ECO Mode Start-up Procedures**, **7.6 Main Screen** and **7.9.2 Mode Setting**.

In ECO mode (parallel), when each parallel UPS's bypass input voltage and frequency are within the range of rating voltage $\pm 10\%$ and rating frequency $\pm 5\text{Hz}$ respectively, it will be bypass power to supply power to the connected loads; otherwise, it will be the inverter to supply power to the loads. During ECO mode (parallel), each UPS's tri-color LED illuminates green and each UPS's LCD shows the text 'ECO' in the lower right corner. Please see **Figure 3-12** for the path of electrical power through the parallel UPSs in ECO mode.

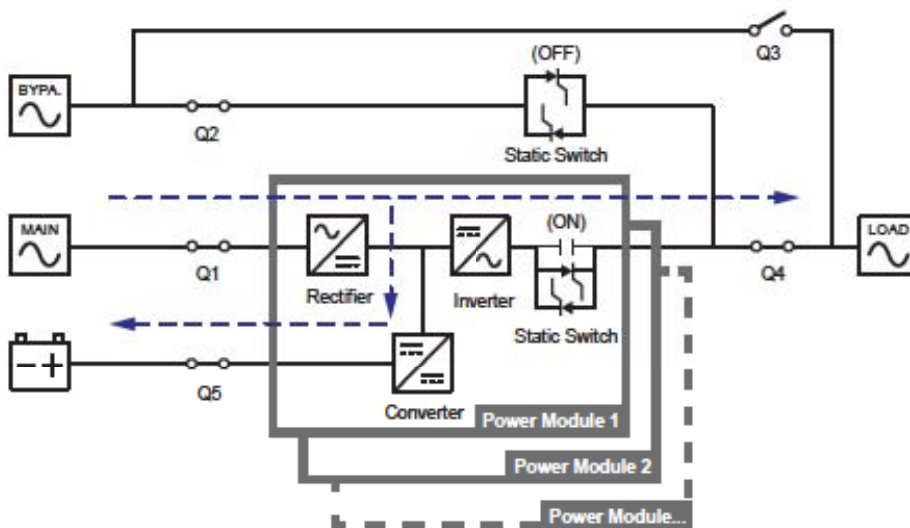


(Figure 3-12: ECO Mode Diagram_ Single Input Single Unit)

3.2 Dual Input

3.2.1 On-Line Mode_Dual Input_Single Unit

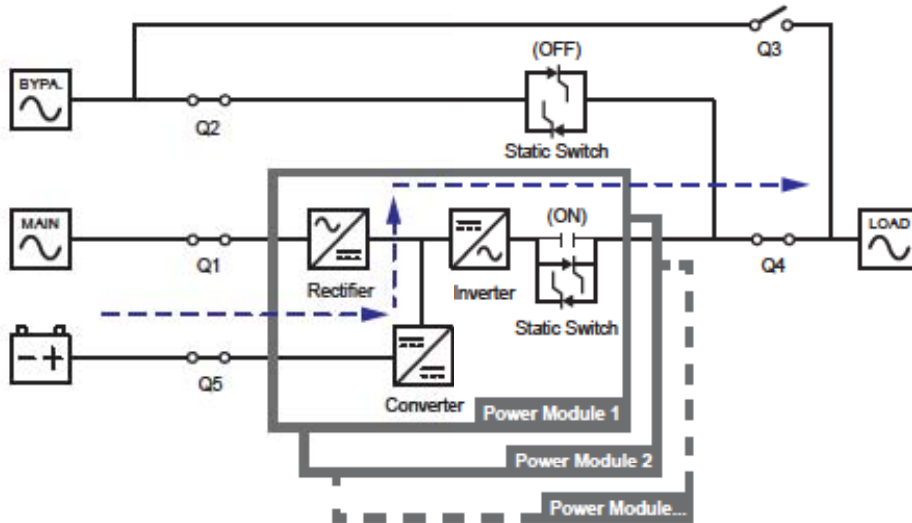
In On-Line mode, the main AC source supplies AC power via the external maintenance bypass cabinet's Input Breaker (Q1) to the rectifier, and the rectifier converts the AC power to DC power and supplies the DC power to the inverter. In the meantime, the rectifier provides charging power to the batteries. After receiving the DC power, the inverter converts it into clean and stable AC power to the connected critical loads via the external maintenance bypass cabinet's Output Breaker (Q4). Please refer to *Figure 3-13*. During On-Line mode, the UPS's tri-color LED illuminates green and the text 'AC' appears in the lower right corner of the screen.



(Figure 3-13: On-Line Mode Diagram_Dual Input Single Unit)

3.2.2 Battery Mode_ Dual Input_ Single Unit

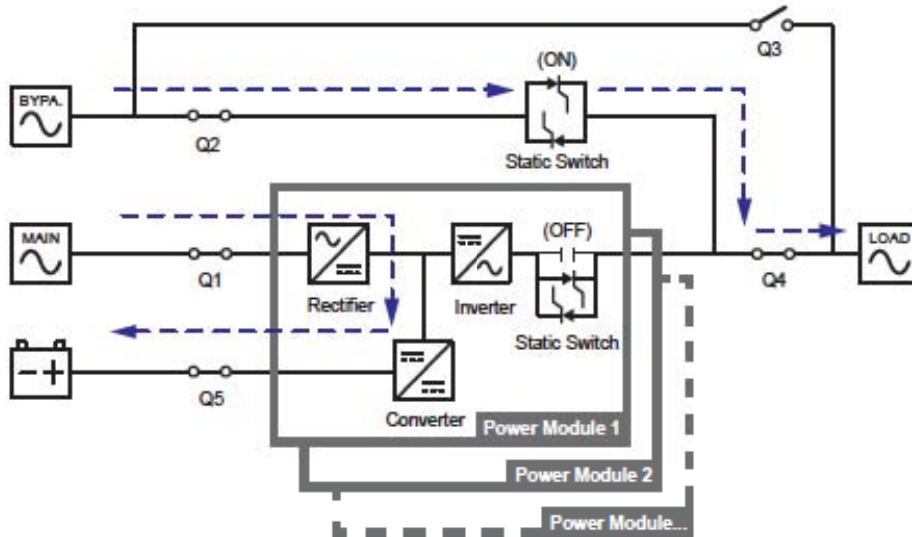
The UPS transfers to Battery mode automatically if the main AC source is abnormal, for example, when unstable voltage or a power outage occurs. In Battery mode, the batteries provide DC power and the UPS converts it into AC power and supplies it to the connected critical loads via the external maintenance bypass cabinet's Output Breaker (Q4). During the conversion process, output voltage remains the same. Please see *Figure 3-14* for Battery mode diagram. During Battery mode, the UPS's tri-color LED illuminates yellow and the text 'DC' appears in the lower right corner of the screen.



(Figure 3-14: Battery Mode Diagram_ Dual Input Single Unit)

3.2.3 Bypass Mode_ Dual Input_ Single Unit

When the inverter encounters abnormal situations such as over temperature, overload, short circuit, abnormal output voltage or low battery, it will automatically shut itself down. If the UPS detects the bypass AC source is normal, it will automatically switch to Bypass mode to protect the connected critical loads from power interruption. Please refer to *Figure 3-15*. After the above-mentioned abnormalities are eliminated, the UPS will switch back to On-Line mode from Bypass mode. During Bypass mode, the UPS's tri-color LED illuminates yellow and the text 'Bypass' appears in the lower right corner of the screen.



(Figure 3-15: Bypass Mode Diagram_ Dual Input Single Unit)


3.2.4 Manual Bypass Mode_ Dual Input_ Single Unit



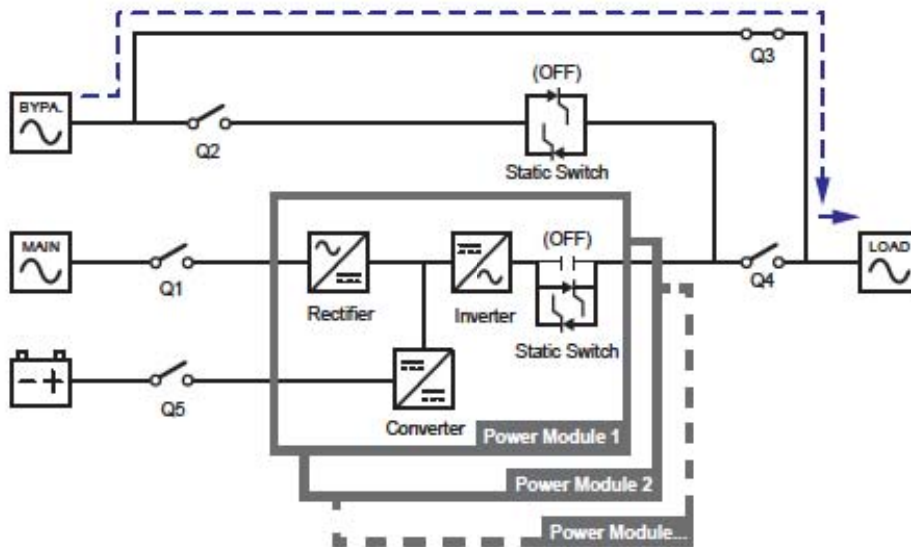
WARNING:

1. In Manual Bypass mode, make sure that all of the breakers (except the external maintenance bypass cabinet's Manual Bypass Breaker (Q3)) are in the OFF position before working on the UPS's internal circuits. This avoids electric shock.
2. After the power inside the UPS is completely cut off, there is no high voltage inside the UPS and maintenance can be performed safely. However, to avoid electric shock, please do not touch the following parts:
 - (a) The external maintenance bypass cabinet's AC Input terminal block, Bypass Input terminal block, UPS Output terminal block, Battery Input terminal block, grounding terminals and any copper bars connected to the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
 - (b) Every external battery cabinet's battery input terminal block.
 These parts mentioned above may carry high voltage.
3. During Manual Bypass mode, the UPS's input power is completely cut off and the connected critical loads are not protected.

When the UPS needs maintenance, you can manually switch the UPS to Manual Bypass mode. To let the UPS run in Manual Bypass mode, please follow the procedures below:

- 1 Confirm that the bypass AC source is normal.
- 2 Tap the LCD's ON/ OFF Button () and the screen 'Are you sure to set Inverter to OFF?' will pop up to ask if you want to power off the UPS's inverter. Please select 'YES'.
- 3 Turn ON the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
- 4 Turn OFF the external maintenance bypass cabinet's Bypass Breaker (Q2).
- 5 Turn OFF the external maintenance bypass cabinet's Input Breaker (Q1) and Output Breaker (Q4).
- 6 Turn OFF each external battery cabinet's breaker (Q5).

In Manual Bypass mode, all power inside the UPS is completely cut off and maintenance personnel can perform maintenance safely. Please see *Figure 3-16* for Manual Bypass mode diagram. During Manual Bypass mode, the UPS's tri-color LED and LCD are both off.

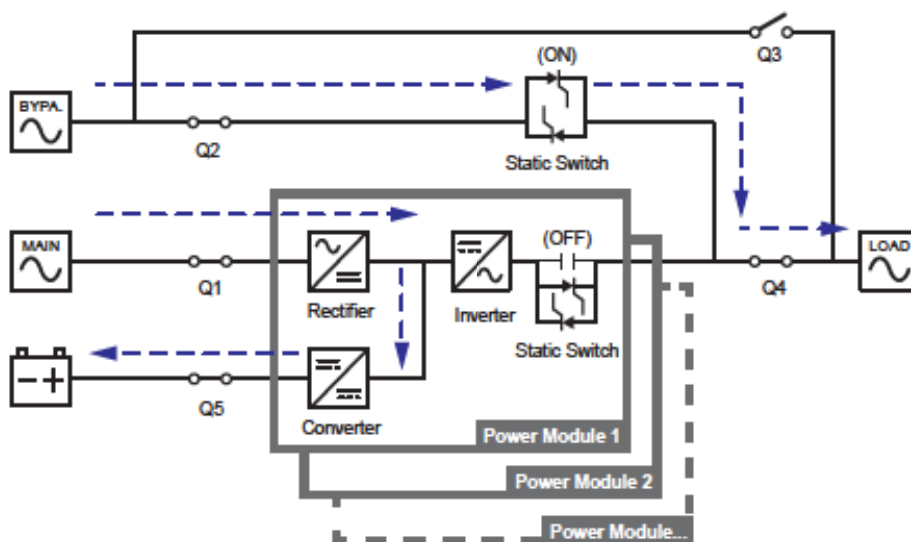


(Figure 3-16: Manual Bypass Mode Diagram_Dual Input Single Unit)

3.2.5 ECO Mode_Dual Input_Single Unit

To activate ECO mode, please refer to 6.2.5 *ECO Mode Start-up Procedures*, 7.6 *Main Screen* and 7.9.2 *Mode Setting*.

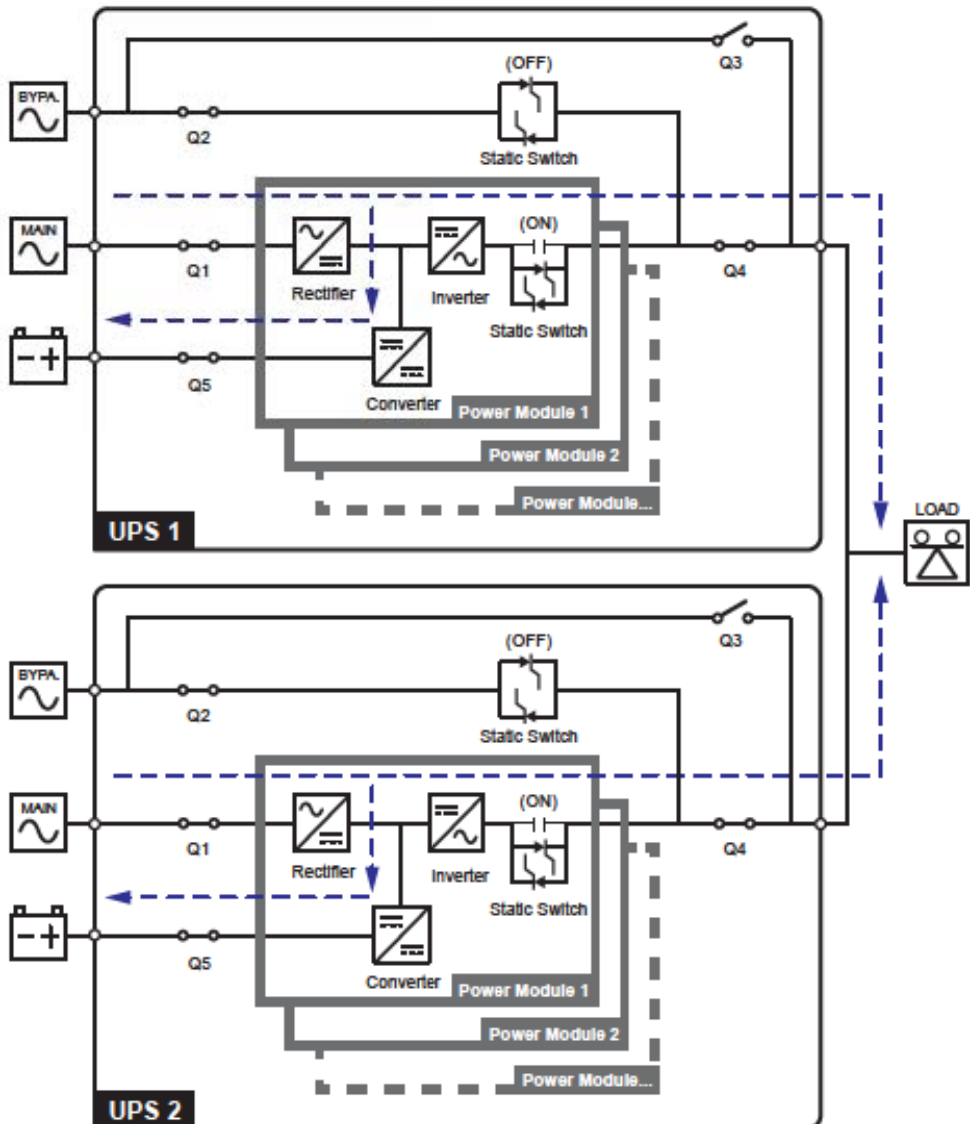
In ECO mode, when bypass AC source's input voltage and frequency are within the range of rating voltage $\pm 10\%$ and rating frequency $\pm 5\text{Hz}$ respectively, it will be bypass power to supply power to the connected loads; otherwise, it will be the inverter to supply power to the loads. For ECO mode diagram, please see Figure 3-17. During ECO mode, the UPS's tri-color LED illuminates green and the text 'ECO' appears in the lower right corner of the screen.



(Figure 3-17: ECO Mode Diagram_Dual Input Single Unit)

3.2.6 On-Line Mode_Dual Input_Parallel Units

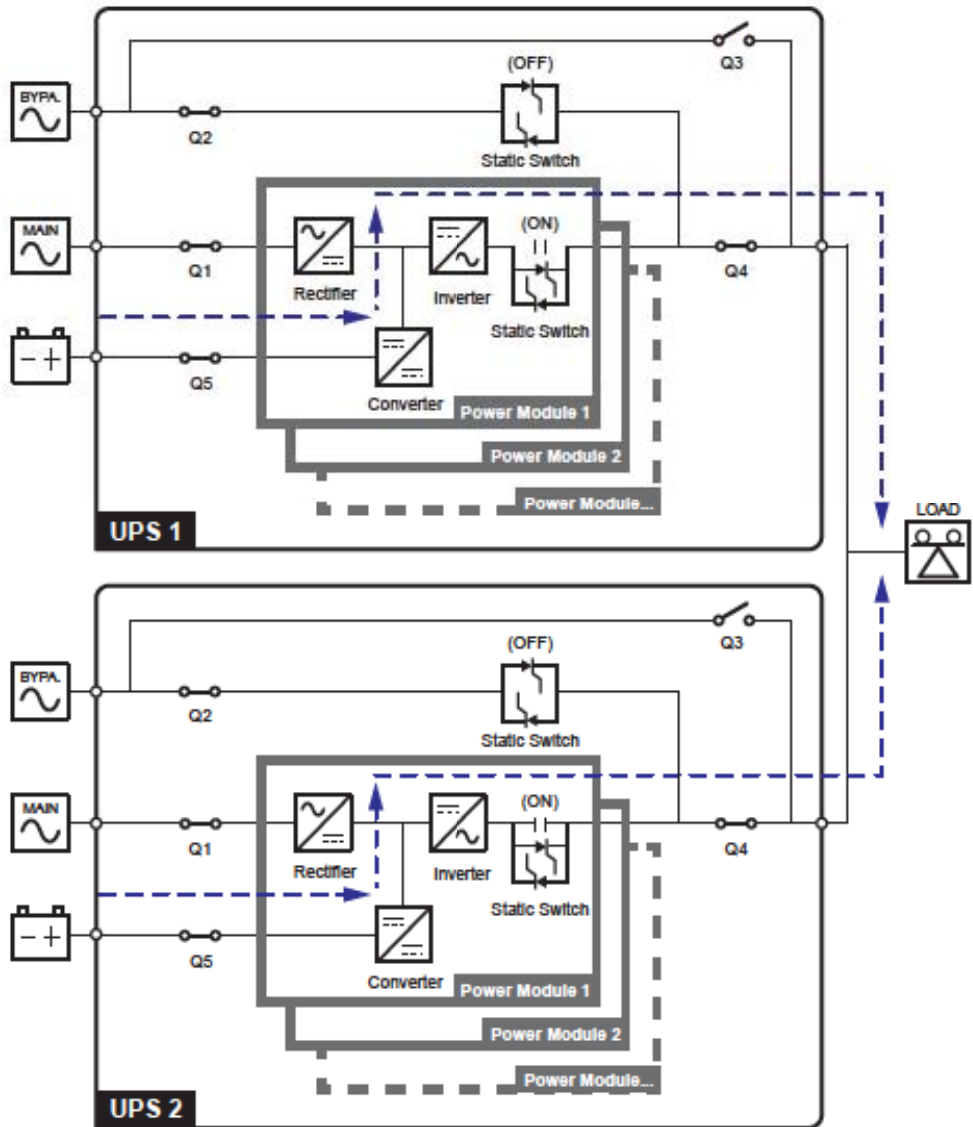
In On-Line mode (parallel), the total loads will be equally shared by parallel UPSs. If one of the parallel units fails and its load is less than the total capacity of the remaining parallel units, the failing UPS's output will be switched off and its load will be equally shared by the remaining parallel units. If the failing UPS's load is larger than the total capacity of the remaining parallel units, all UPSs' inverters will turn off and the total loads will be supplied by bypass power. During On-Line mode (parallel), each UPS's tri-color LED illuminates green and each UPS's LCD shows the text 'AC' in the lower right corner. Please refer to *Figure 3-18* for the path of electrical power through the parallel UPSs in On-Line mode.



(Figure 3-18: On-Line Mode Diagram_Dual Input Parallel Units)

3.2.7 Battery Mode_ Dual Input_ Parallel Units

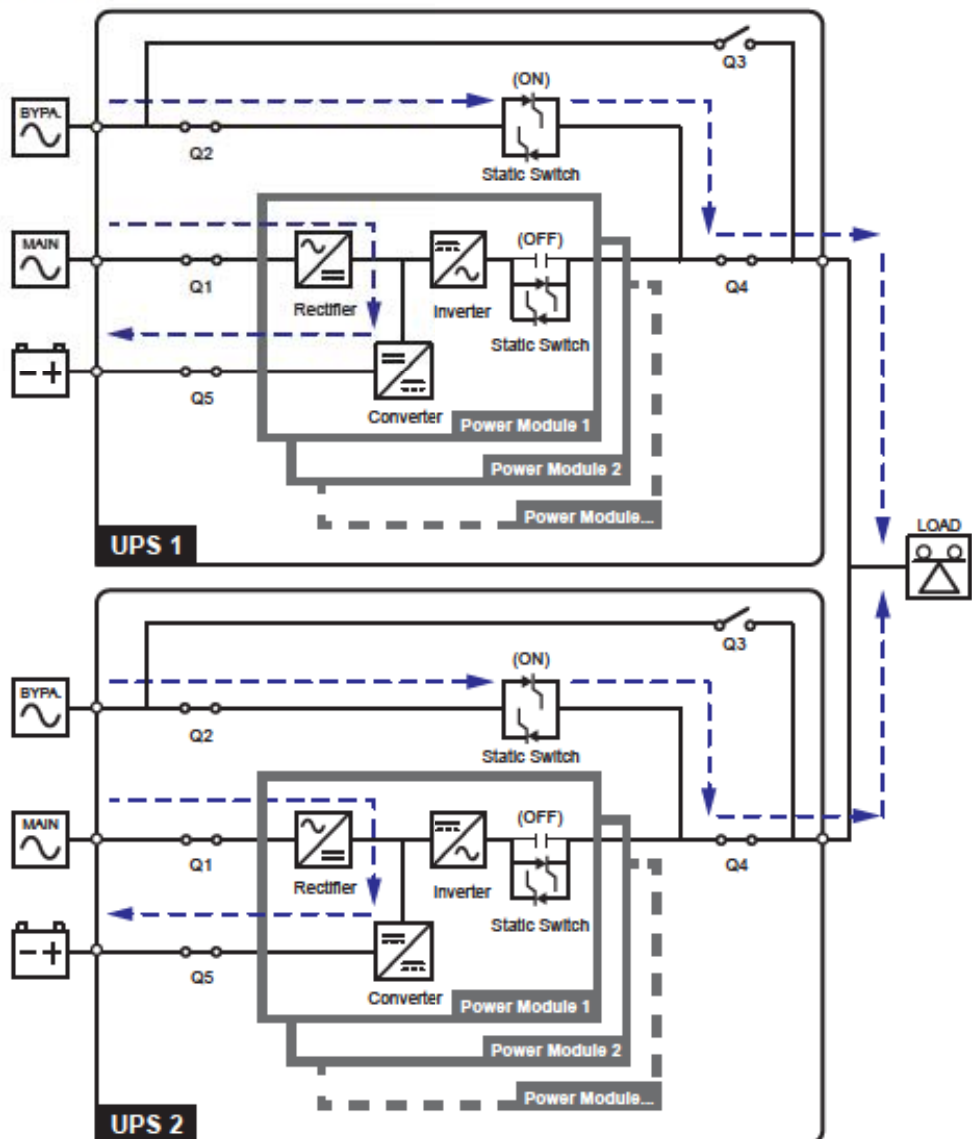
If the main AC source is abnormal, for example, when unstable voltage or a power outage occurs, all parallel UPSs will automatically transfer from On-Line mode to Battery mode. During the conversion process, output voltage remains the same. During Battery mode (parallel), each UPS's tri-color LED illuminates yellow and each UPS's LCD shows the text 'DC' in the lower right corner. Please refer to *Figure 3-19* for the path of electrical power through the parallel UPSs in Battery mode.



(Figure 3-19: Battery Mode Diagram_ Dual Input Parallel Units)

3.2.8 Bypass Mode_Dual Input_Parallel Units

In Bypass mode (parallel), when all inverters encounter abnormal situations such as overload, short circuit, abnormal output voltage or low battery, they will automatically shut themselves down. Meanwhile, if all parallel 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 parallel UPSs will switch back to On-Line mode from Bypass mode. During Bypass mode (parallel), each UPS's tri-color LED illuminates yellow and each UPS's LCD shows the text 'Bypass' in the lower right corner. Please refer to *Figure 3-20* for the path of electrical power through the parallel UPSs in Bypass mode.



(Figure 3-20: Bypass Mode Diagram_Dual Input Parallel Units)


3.2.9 Manual Bypass Mode_ Dual Input_ Parallel Units



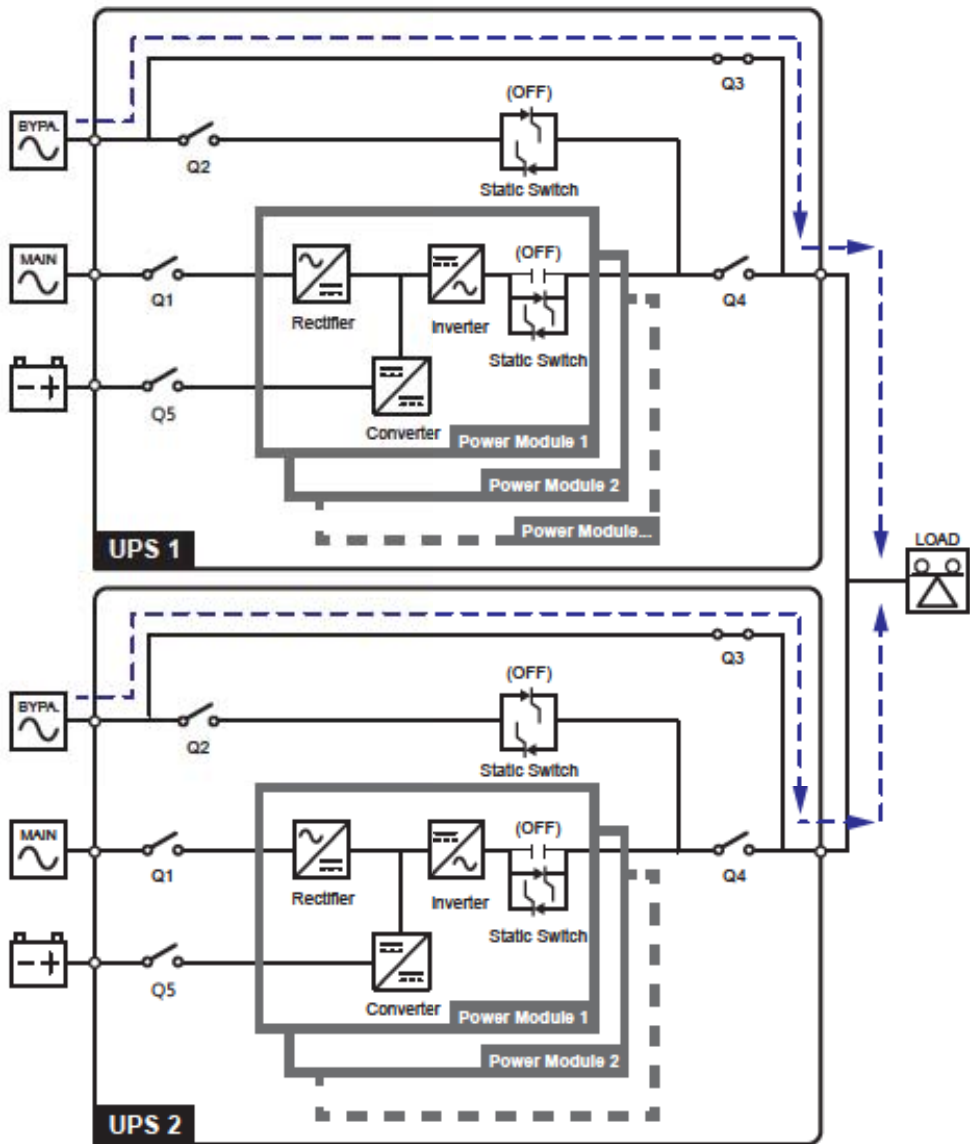
WARNING:

1. In Manual Bypass mode, make sure that all of the breakers (except the external maintenance bypass cabinet's Manual Bypass Breaker (Q3)) are in the OFF position before working on any of the parallel UPSs' internal circuits. This avoids electric shock.
2. After the power inside each of the parallel UPSs is completely cut off, there is no high voltage inside all parallel UPSs and maintenance can be performed safely. However, to avoid electric shock, please do not touch the following parts:
 - (a) Each external maintenance bypass cabinet's AC Input terminal block, Bypass Input terminal block, UPS Output terminal block, Battery Input terminal block, grounding terminals and any copper bars connected to the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
 - (b) Each external battery cabinet's battery input terminal block.These parts mentioned above may carry high voltage.
3. During Manual Bypass mode, each parallel UPS's input power is completely cut off and the connected critical loads are not protected.
4. For parallel UPSs, if you want to turn off one of the parallel UPSs for maintenance, please make sure the total connected critical loads will not exceed the remaining parallel units' total capacity.

In Manual Bypass mode (parallel), if one of the parallel UPSs needs maintenance, please first confirm that the bypass AC source is normal. After confirmation, please follow the procedures below to manually switch each of the parallel UPSs to Manual Bypass mode:

- 1 Tap the LCD's ON/ OFF Button () and the screen 'Are you sure to set Inverter to OFF?' will pop up to ask if you want to power off the UPS's inverter. Please select 'YES'.
- 2 Turn ON the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
- 3 Turn OFF the external maintenance bypass cabinet's Bypass Breaker (Q2).
- 4 Turn OFF the external maintenance bypass cabinet's Input Breaker (Q1) and Output Breaker (Q4).
- 5 Turn OFF each external battery cabinet's breaker (Q5).

In Manual Bypass mode, all power inside the parallel UPSs is completely cut off and maintenance personnel can perform maintenance safely. Power of the connected critical loads will be supplied by manual bypass. During Manual Bypass mode (parallel), all parallel UPSs' tri-color LEDs and LCDs are off. Please see *Figure 3-21* for the path of electrical power through the parallel UPSs in Manual Bypass mode.

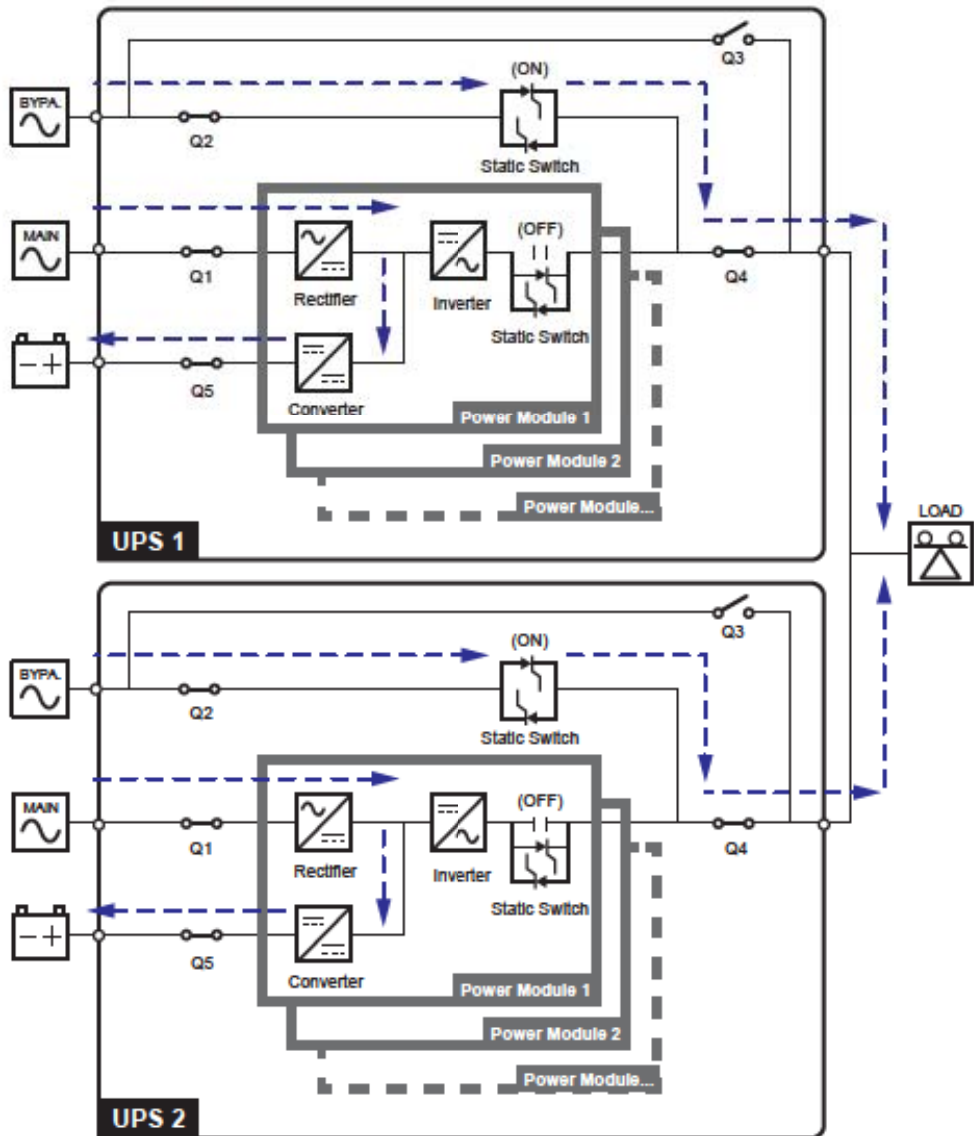


(Figure 3-21: Manual Bypass Mode Diagram_ Dual Input Single Unit)

3.2.10 ECO Mode_Dual Input_Parallel Units

To activate ECO mode, please refer to **6.2.5 ECO Mode Start-up Procedures**, **7.6 Main Screen** and **7.9.2 Mode Setting**.

In ECO mode (parallel), when each parallel UPS's bypass input voltage and frequency are within the range of rating voltage $\pm 10\%$ and rating frequency $\pm 5\text{Hz}$ respectively, it will bypass power to supply power to the connected loads; otherwise, it will be the inverter to supply power to the loads. During ECO mode (parallel), each UPS's tri-color LED illuminates green and each UPS's LCD shows the text 'ECO' in the lower right corner. Please see **Figure 3-22** for the path of electrical power through the parallel UPSs in ECO mode.



(Figure 3-22: ECO Mode Diagram_Dual Input Single Unit)

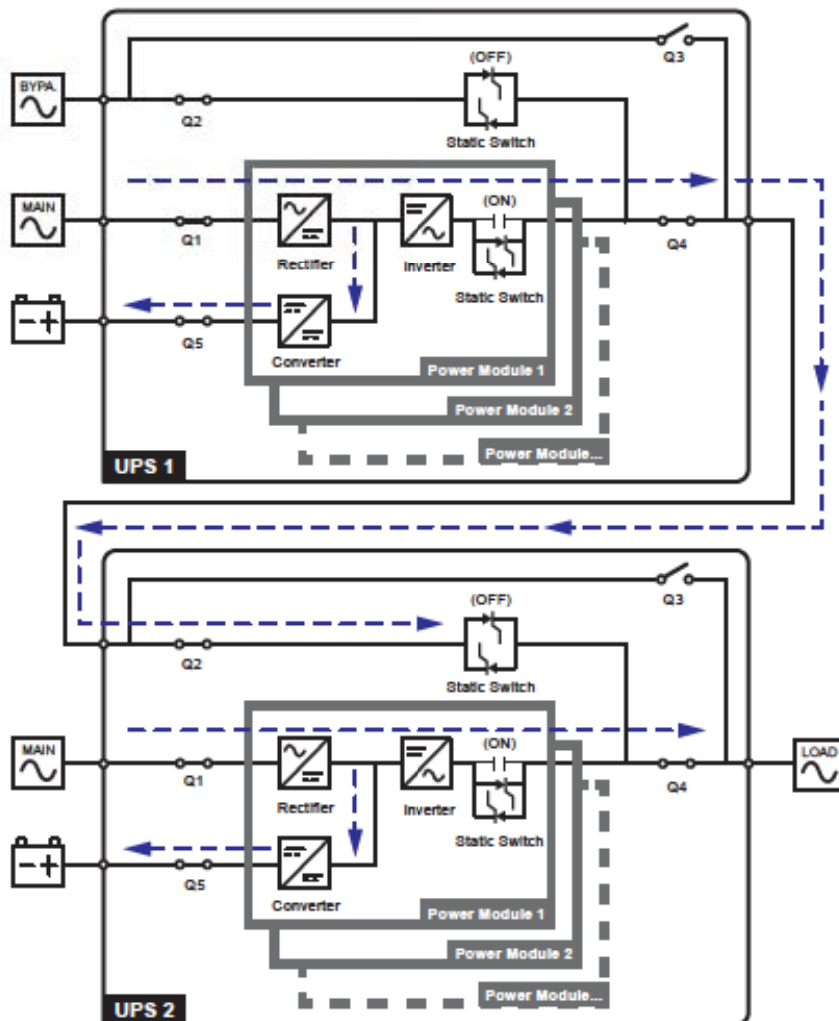
3.3 Hot Standby Redundancy (Only for Dual Input & At Least Two UPSs)

To provide customers more application choices, the UPS with dual-input configurations can have a hot standby redundancy function. If you use two UPSs and wish them to work in hot standby redundancy mode, please connect the output of UPS1 to the bypass input of UPS 2. Please see *Figure 3-23*.

For more information about the hot standby redundancy application, please contact service personnel.

In normal condition, it is the UPS 2 inverter that supplies power to the critical loads. Both UPS 1 & UPS 2 tri-color LEDs illuminate green.

When the UPS 2 inverter becomes abnormal, the UPS 2 will automatically transfer to bypass mode and the UPS 1 inverter will supply power to the critical loads. Under such circumstances, the UPS 1 tri-color LED illuminates green and the UPS 2 tri-color LED illuminates yellow.



(Figure 3-23: Hot Standby Redundancy Diagram (only for Dual Input & at Least Two UPSs))

3.4 Common Battery (Only for Parallel UPSs Connecting to the Same External Battery Cabinet(s))



NOTE:

1. The 'common battery' information stated in this chapter is only applicable to the UPS using lead-acid batteries. If you need information about the lithium-ion batteries, please refer to the user manual of the lithium-ion batteries or contact Delta customer service.
2. Whether you use the lead-acid batteries or the lithium-ion batteries, please contact Delta service personnel for any battery/ battery cabinet's setup and configurations.

To save on your costs and installation space, the parallel UPSs can share their connected external battery cabinet(s). For common battery application, please install a protective device between each parallel UPS and its connected external battery cabinet(s). For relevant information about the protective device, please refer to *5.5 External Battery Cabinet Connection Warnings*. Please see *Figure 3-24* for two parallel UPSs sharing one external battery cabinet as an example.

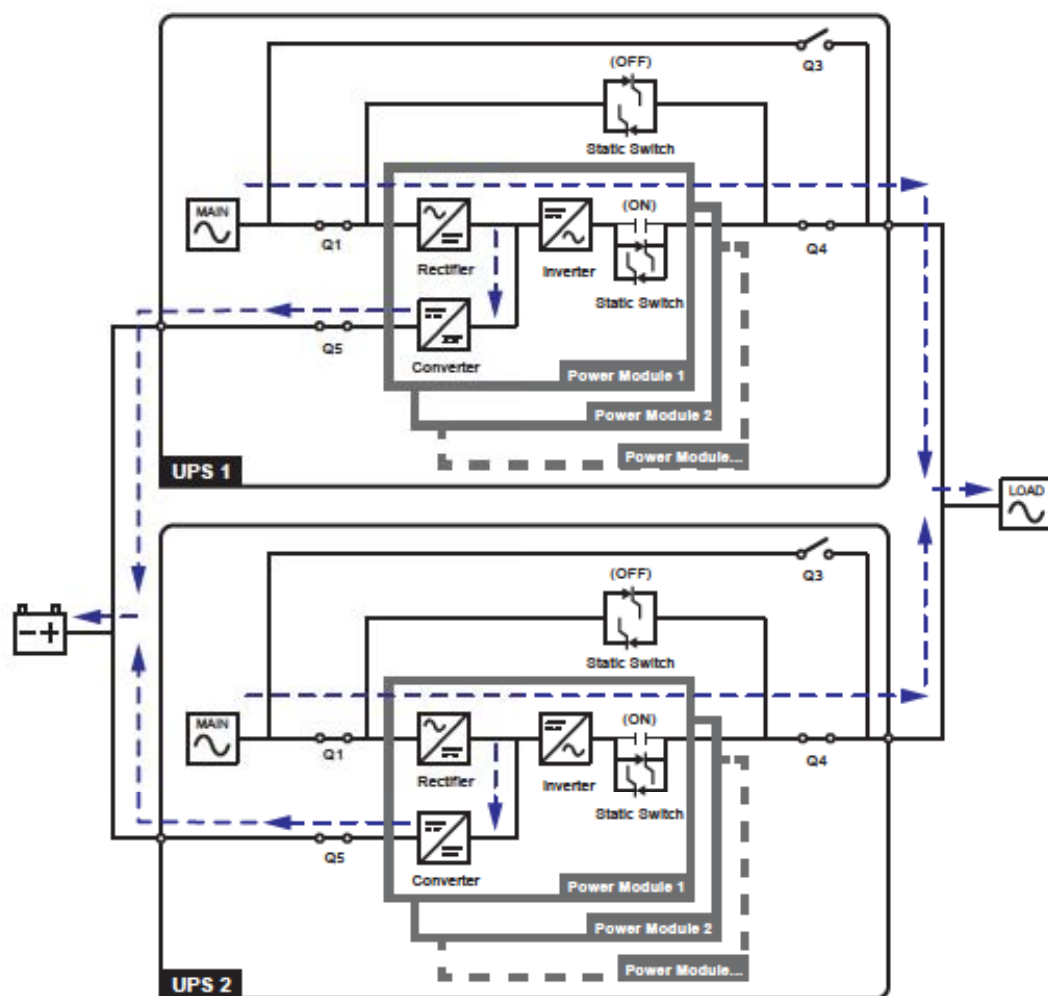
If the parallel UPSs share the external battery cabinet(s), you should use the LCD to set up relevant parameters such as 'Battery Type', 'Battery Capacity', 'Battery Strings', 'Float Charge Voltage', 'Equalized Charge Voltage', 'Charge Current', etc. For more information, please refer to *7.9.4 Battery Setting*, *7.9.5 Charge Setting* and *7.9.6 Parallel Setting*.



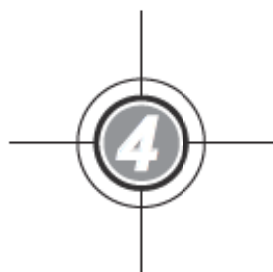
NOTE:

For common battery application, please use the LCD to 'Enable' common battery function (please refer to *7.9.6 Parallel Setting*), and set each UPS's battery setting the same, charge setting the same, and charge current even. For example:

When (1) two UPSs are paralleled and share one external battery cabinet, (2) the lead-acid batteries are used, (3) the battery capacity is 120AH, (4) there are a total of 12 battery strings, and (5) the charge current is 144A, please use the LCD to set each UPS's 'Battery Type' as 'Lead-acid', 'Battery Capacity' as 120AH, 'Battery Strings' as 6, and 'Charge Current' as 72A.



(Figure 3-24: Common Battery Diagram_ only for Parallel UPSs Connecting to the Same External Battery Cabinet(s))



Communication Interfaces

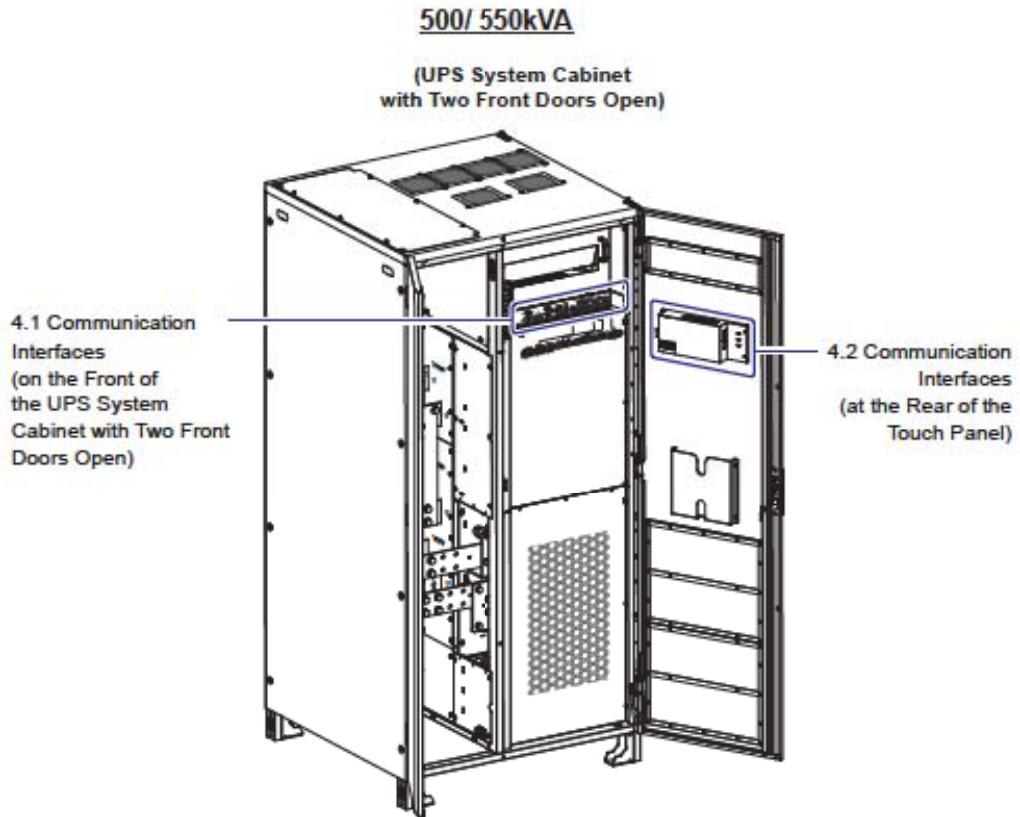
- 4.1 Communication Interfaces on the Front of the UPS System Cabinet with Two Front Doors Open
- 4.2 Communication Interfaces at the Rear of the Touch Panel

Communication interfaces are located at two different places. One is on the front of the UPS system cabinet with two front doors open and the other is at the rear of the touch panel. Please see *Figure 4-1*.



NOTE:

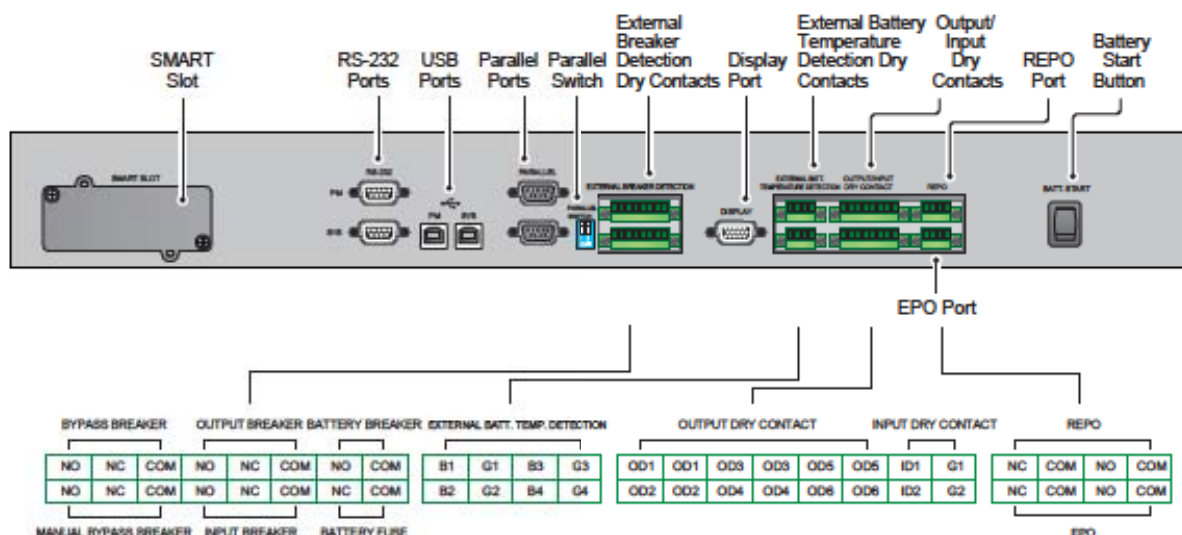
For 500/ 550kVA UPS and 750/ 825kVA UPS, their external views of UPS system cabinets are the same, except that their total number of fans located on the top are different. Hence, in *4. Communication Interfaces*, only the illustration of 500/ 550kVA UPS system cabinet is taken for example.



(Figure 4-1: Location of Communication Interfaces)

4.1 Communication Interfaces on the Front of the UPS System Cabinet with Two Front Doors Open

The following communication interfaces (see *Figure 4-2*) are located on the front of the UPS system cabinet with two front doors open. For each function description, please refer to *4.1.1 SNMP Slot ~ 4.1.10 EPO Dry Contacts*.



(Figure 4-2: Communication Interfaces_ on the Front of the UPS System Cabinet with Two Front Doors Open)

4.1.1 SNMP Slot

You can install one of the following optional cards in the SNMP slot. For each card's function, please refer to the table below.

Optional Card	Function
SNMP Card ^{*1}	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:

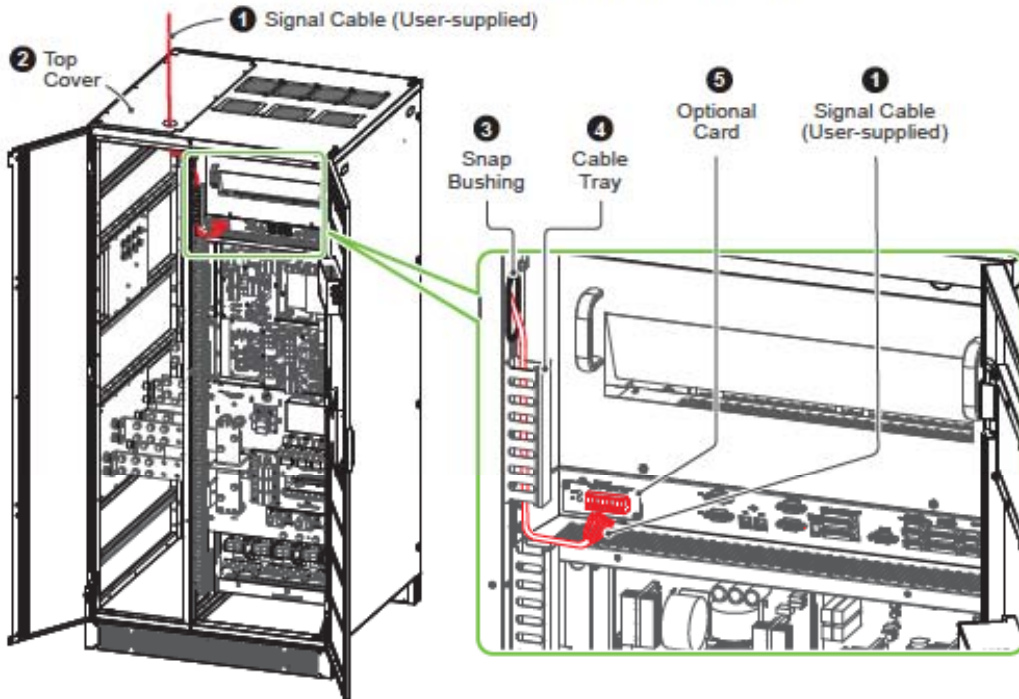
- If you need any optional card, please contact your local dealer or customer service.
- ^{*1} The UPS has a built-in SNMP card, which is located at the rear of the touch panel (please see *Figure 4-31*). If the touch panel's IC is damaged, which causes that you cannot use the built-in SNMP card, you can purchase the optional SNMP card as a substitute and install it into the SNMP slot. For more information about the built-in SNMP card, please refer to *Page 4-21* and *Page 4-22*.

After you install the optional card in the SNMP slot, please follow the instructions below to route the signal cable (user-supplied).

For top entry, please route the user-supplied signal cable (1) from the top cover (2), the oval snap bushing (3) and the cable tray (4) to connect the cable (1) to the optional card (5). Please refer to *Figure 4-3* and *Figure 4-4*.

750/ 825 kVA

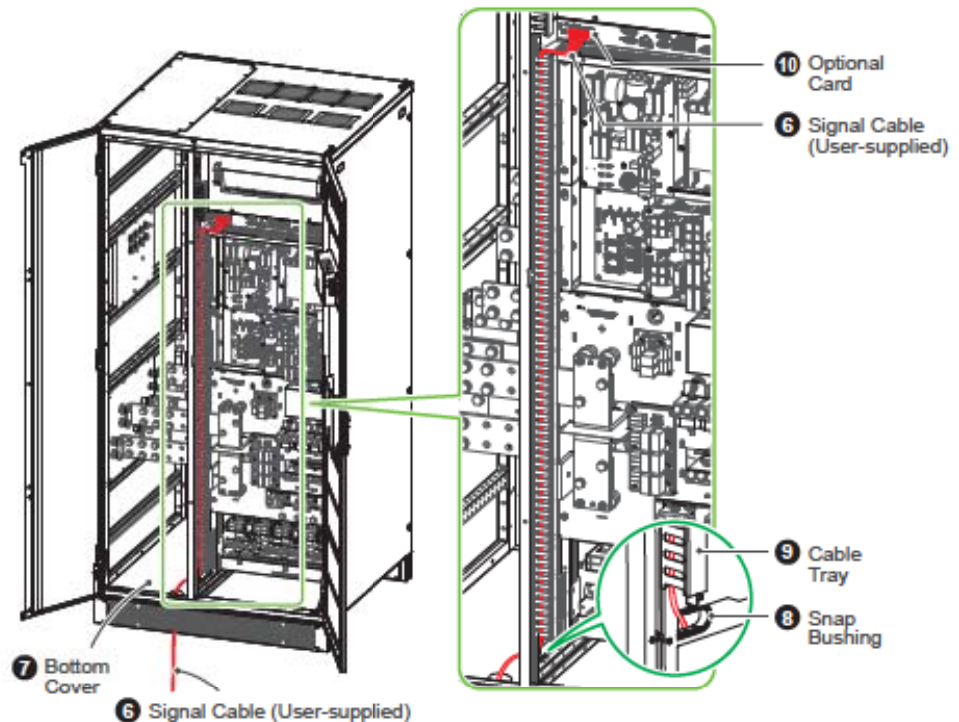
(Front View of UPS System Cabinet with Two Front Doors Open)



(Figure 4-3: Top Entry_ Optional Card's Signal Cable (User-supplied) Routing Path)

(Figure 4-4: Top Entry_ Location of Top Cover, Snap Bushing, Cable Tray, Signal Cable (User-supplied) & Optional Card)

For bottom entry, please route the user-supplied signal cable (6) from the bottom cover (7), the oval snap bushing (8) and the cable tray (9) to connect the cable (6) to the optional card (10). Please refer to *Figure 4-5* and *Figure 4-6*.

750/ 825 kVA**(Front View of UPS System Cabinet with Two Front Doors Open)**

(Figure 4-5: Bottom Entry_ Optional Card's Signal Cable (User-supplied) Routing Path)

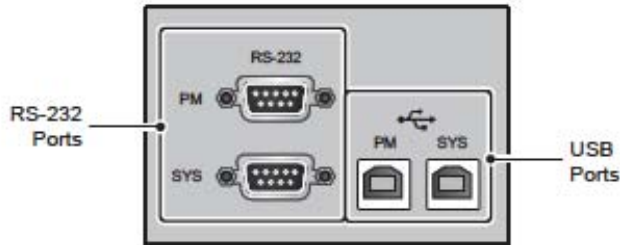
(Figure 4-6: Bottom Entry_ Location of Bottom Cover, Snap Bushing, Cable Tray, Signal Cable (User-supplied) & Optional Card)

**NOTE:**

1. For 500/ 550kVA UPS and 750/ 825kVA UPS, their signal cable (user-supplied) connection method and routing path are the same. Thus, in *Figure 4-3*, *Figure 4-4*, *Figure 4-5* and *Figure 4-6*, only the illustration of 750/ 825kVA UPS system cabinet is taken for example.
2. In accordance with National Electrical Codes (NEC), please install a suitable conduit and bushing for cable protection.
3. Please refer to national and local electrical codes for acceptable cable size.

4.1.2 RS-232 Ports & USB Ports

You can use the RS-232 cable (provided) or the USB cable (not provided) to connect the UPS's RS-232 port or USB port with a computer and install the UPSentry 2012 software (<https://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 Delta customer service.



(Figure 4-7: RS-232 Ports & USB Ports)

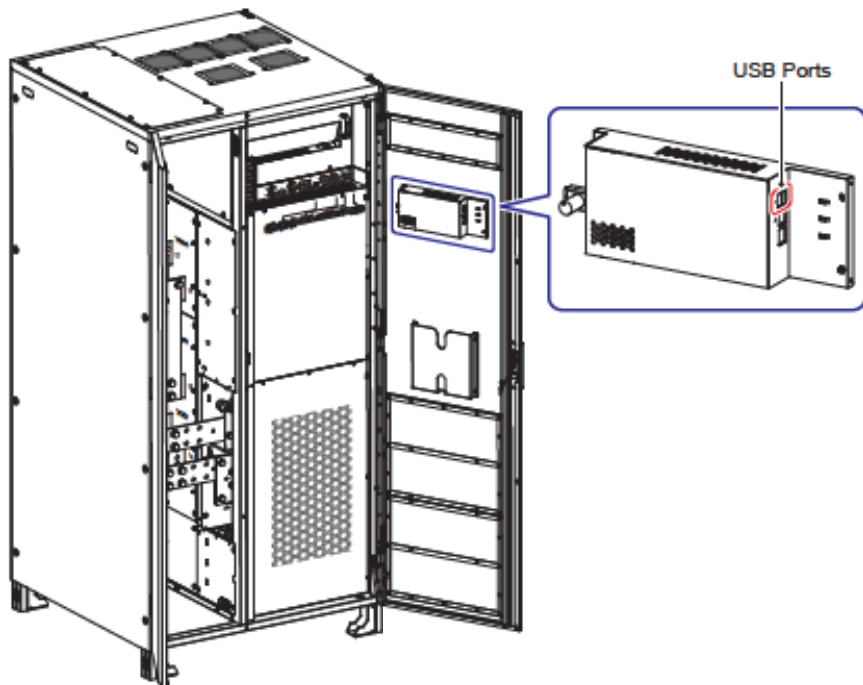


NOTE:

1. There are two RS-232 ports and USB ports (see *Figure 4-7*). The RS-232 port (SYS) and USB port (SYS) are for UPS system cabinet's application, and the RS-232 port (PM) and USB port (PM) are for power modules' application.
2. Do not simultaneously use the RS-232 port (SYS) and USB port (SYS).
3. Do not simultaneously use the RS-232 port (PM) and USB port (PM).
4. The USB port (SYS) is used for upgrading the UPS system cabinet's firmware, and the USB port (PM), for upgrading the power modules' firmware.
5. There are other two USB ports located at the rear of the touch panel (see *Figure 4-8*). For their function, please refer to *Page 4-21*.

500/ 550kVA

(UPS System Cabinet with Two Front Doors Open)



(Figure 4-8: Other USB Ports' Location)

4.1.3 Parallel Ports

1. The parallel ports (see *Figure 4-9*) are used to connect parallel UPSs to increase the system capacity and redundancy.
2. You can parallel at maximum eight UPS units.

For 500/ 550kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 3 power modules.

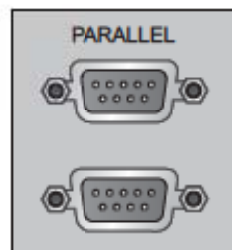
For 750/ 825kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 4 power modules.

3. With the provided parallel cable, UPSs with the same capacity, voltage, frequency and version can be paralleled. For version information, please refer to *7.10.8 Version*. Please only use the provided parallel cable to parallel the UPS units; otherwise, parallel functions will fail.



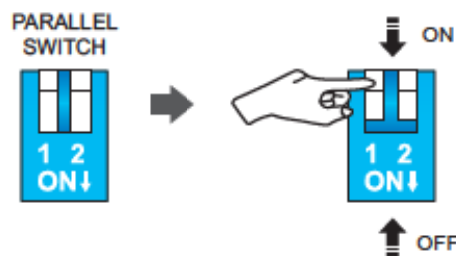
WARNING:

The provided parallel cable is placed in the accessory package. Using other types of cables to connect the parallel UPSs may cause parallel failure, malfunctions and accidents.



(Figure 4-9: Parallel Ports)

4.1.4 Parallel Switch



(Figure 4-10: Parallel Switch)

When paralleling UPSs, you should set up the parallel switch shown in *Figure 4-10* to activate parallel function. The parallel switch includes two DIP switches. To turn on a DIP switch, set the DIP switch to the down position. To turn off a DIP switch, set the DIP switch to the up position.

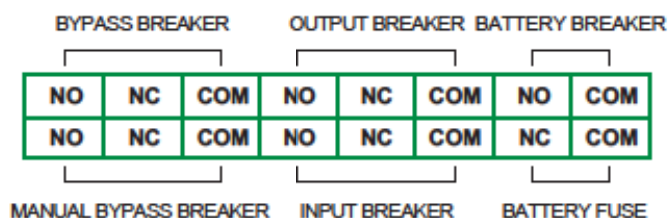
- (1) When two UPSs are paralleled, turn on each UPS's DIP switches.
- (2) When three UPSs are paralleled, turn off the middle UPS's DIP switches and turn on the remaining UPSs' DIP switches.
- (3) When four UPSs are paralleled, turn off the middle two UPSs' DIP switches and turn on the remaining UPSs' DIP switches.
- (4) When five UPSs are paralleled, turn off the middle three UPSs' DIP switches and turn on the remaining UPSs' DIP switches.
- (5) When six UPSs are paralleled, turn off the middle four UPSs' DIP switches and turn on the remaining UPSs' DIP switches.
- (6) When seven UPSs are paralleled, turn off the middle five UPSs' DIP switches and turn on the remaining UPSs' DIP switches.
- (7) When eight UPSs are paralleled, turn off the middle six UPSs' DIP switches and turn on the remaining UPSs' DIP switches.



NOTE:

1. You can parallel at maximum eight UPS units.
 For 500/ 550kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 3 power modules.
 For 750/ 825kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 4 power modules.
2. For more parallel information, please refer to *Pre Start-up Warnings for Parallel Units* stated in *Page 6-4*.

4.1.5 External Breaker Detection Dry Contacts



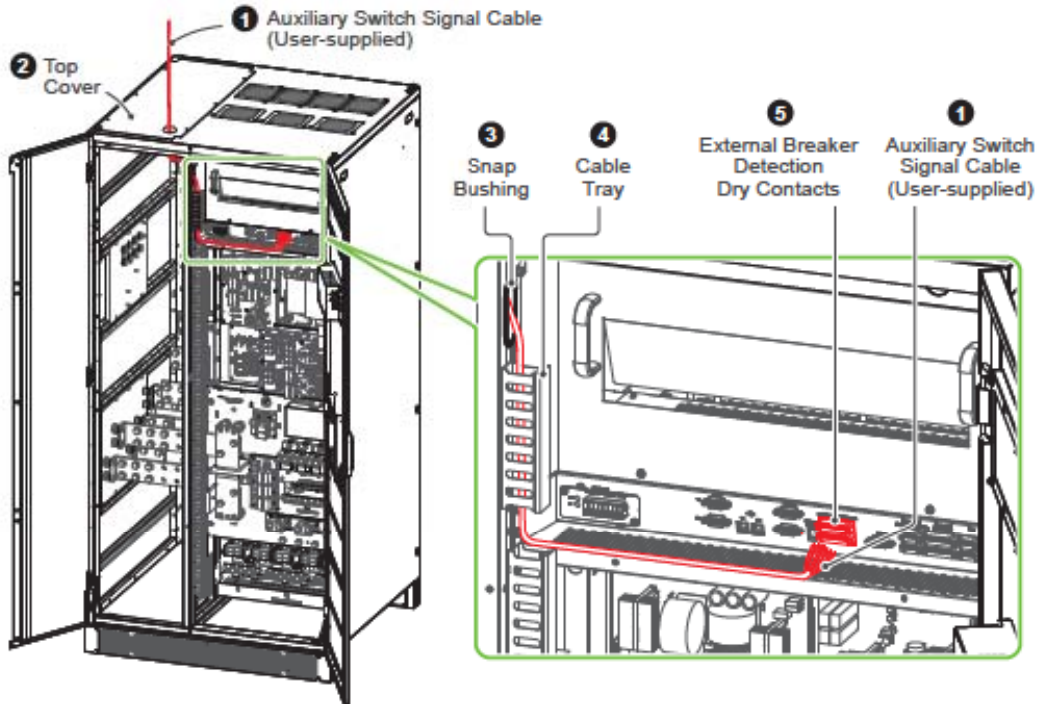
(Figure 4-11: External Breaker Detection Dry Contacts)

The user-supplied signal cable of the auxiliary switch should connect to the External Breaker Detection Dry Contacts shown in *Figure 4-11*. For how to route the auxiliary switch signal cable (user-supplied), please follow the instructions below.

For top entry, please route the user-supplied auxiliary switch signal cable (1) from the top cover (2), the oval snap bushing (3) and the cable tray (4) to connect the cable (1) to the External Breaker Detection Dry Contacts (5). Please refer to *Figure 4-12* and *Figure 4-13*.

750/ 825 kVA

(Front View of UPS System Cabinet with Two Front Doors Open)



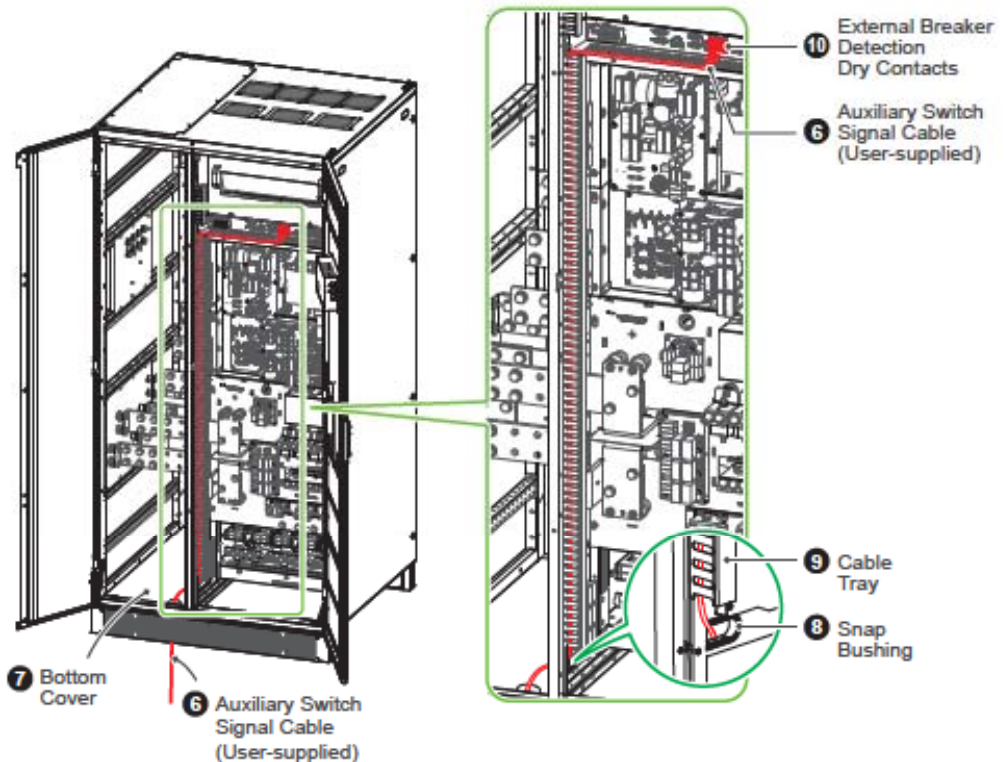
(Figure 4-12: Top Entry_ Auxiliary Switch Signal Cable (User-supplied) Routing Path)

(Figure 4-13: Top Entry_ Location of Top Cover, Snap Bushing, Cable Tray, Auxiliary Switch Signal Cable (User-supplied) & External Breaker Detection Dry Contacts)

For bottom entry, please route the user-supplied auxiliary switch signal cable (6) from the bottom cover (7), the oval snap bushing (8) and the cable tray (9) to connect the cable (6) to the External Breaker Detection Dry Contacts (10). Please refer to *Figure 4-14* and *Figure 4-15*.

750/ 825 kVA

(Front View of UPS System Cabinet with Two Front Doors Open)



(Figure 4-14: Bottom Entry_Auxiliary switch Signal Cable (User-supplied) Routing Path)

(Figure 4-15: Bottom Entry_Location of Bottom Cover, Snap Bushing, Cable Tray, Auxiliary Switch Signal Cable (User-supplied) & External Breaker Detection Dry Contacts)



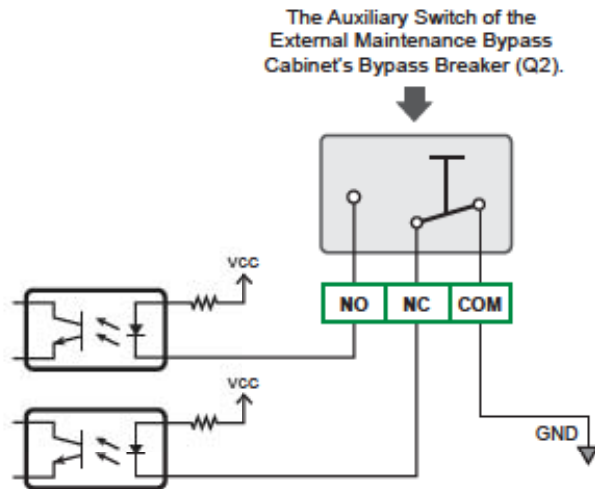
NOTE:

1. For 500/ 550kVA UPS and 750/ 825kVA UPS, their user-supplied auxiliary switch signal cable connection method and routing path are the same. Thus, in *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*, only the illustration of 750/ 825kVA UPS system cabinet is taken for example.
2. In accordance with National Electrical Codes (NEC), please install a suitable conduit and bushing for cable protection.
3. Please refer to national and local electrical codes for acceptable cable size.

- **Bypass Breaker Detection Dry Contacts**

If your external maintenance bypass cabinet's bypass breaker (Q2) has the auxiliary switch design, and you connect the auxiliary switch to the Bypass Breaker Detection Dry Contacts shown in *Figure 4-16*, you can monitor the bypass breaker's status. If not, the default setting of the external maintenance bypass cabinet's bypass breaker (Q2) shown on the LCD is ON.

For how to route the auxiliary switch signal cable (user-supplied), please refer to *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*.



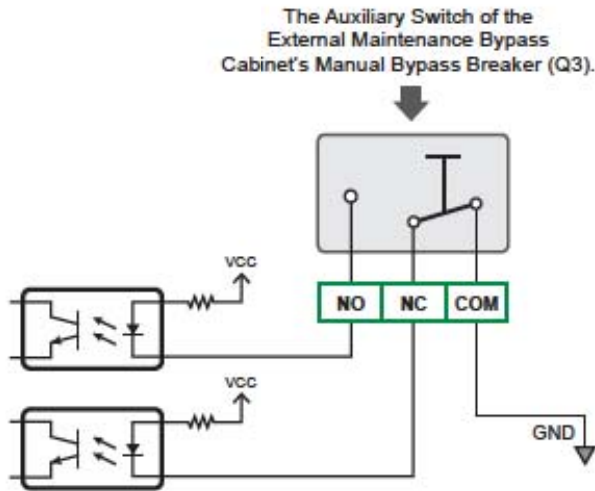
(Figure 4-16: Bypass Breaker Detection Dry Contacts_ Pins' Location and Wiring Diagram)

- **Manual Bypass Breaker Detection Dry Contacts**

Your external maintenance bypass cabinet's manual bypass breaker (Q3) must have the auxiliary switch design, and you must connect the auxiliary switch to the Manual Bypass Breaker Detection Dry Contacts shown in *Figure 4-17* in order to monitor the manual bypass breaker's status.

If not, the UPS's inverter will be damaged once you turn on the external maintenance bypass cabinet's manual bypass breaker (Q3) in On-Line mode.

For how to route the auxiliary switch signal cable (user-supplied), please refer to *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*.

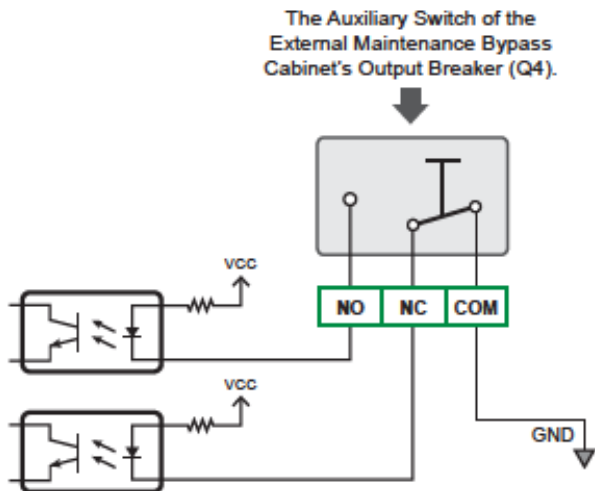


(Figure 4-17: Manual Bypass Breaker Detection Dry Contacts_ Pins' Location and Wiring Diagram)

- **Output Breaker Detection Dry Contacts**

If your external maintenance bypass cabinet's output breaker (Q4) has the auxiliary switch design, and you connect the auxiliary switch to the Output Breaker Detection Dry Contacts shown in *Figure 4-18*, you can monitor the output breaker's status. If not, the default setting of the external maintenance bypass cabinet's output breaker (Q4) shown on the LCD is ON.

For how to route the auxiliary switch signal cable (user-supplied), please refer to *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*.

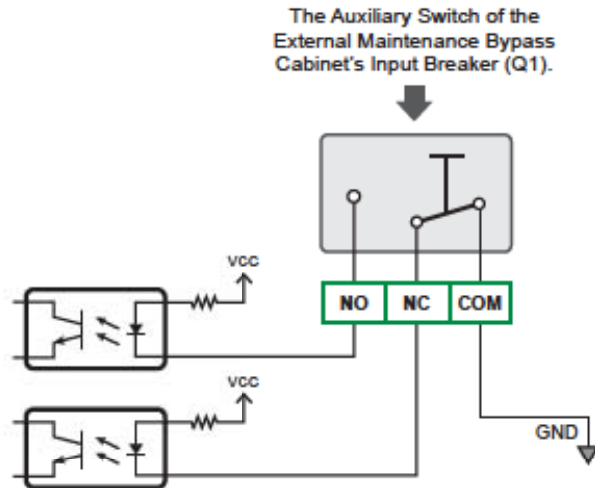


(Figure 4-18: Output Breaker Detection Dry Contacts_ Pins' Location and Wiring Diagram)

- **Input Breaker Detection Dry Contacts**

If your external maintenance bypass cabinet's input breaker (Q1) has the auxiliary switch design, and you connect the auxiliary switch to the Input Breaker Detection Dry Contacts shown in *Figure 4-19* you can monitor the input breaker's status. If not, the default setting of the external maintenance bypass cabinet's input breaker (Q1) shown on the LCD is ON.

For how to route the auxiliary switch signal cable (user-supplied), please refer to *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*.

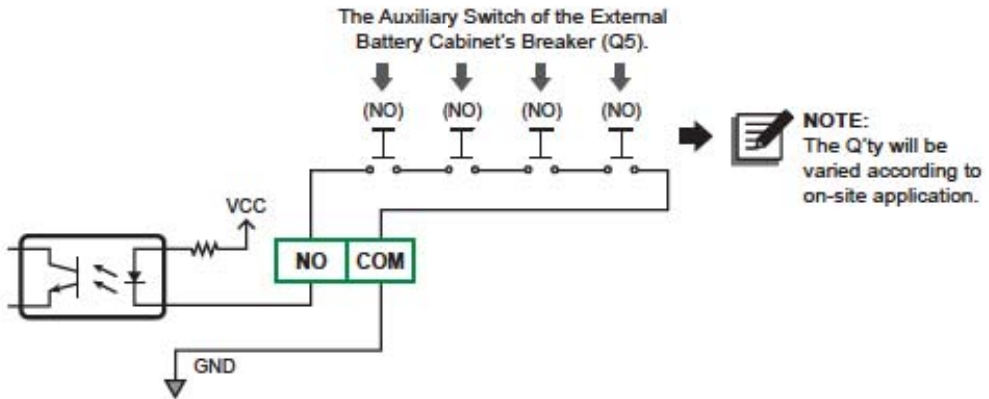


(Figure 4-19: Input Breaker Detection Dry Contacts_ Pins' Location and Wiring Diagram)

- **Battery Breaker Detection Dry Contacts**

If your external battery cabinet's breaker (Q5) has the auxiliary switch design, and you connect the auxiliary switch to the Battery Breaker Detection Dry Contacts shown in *Figure 4-20*, you can monitor the status of the external battery cabinet's breaker (Q5). If not, the default setting of the external battery cabinet's breaker (Q5) shown on the LCD is ON.

For how to route the auxiliary switch signal cable (user-supplied), please refer to *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*.

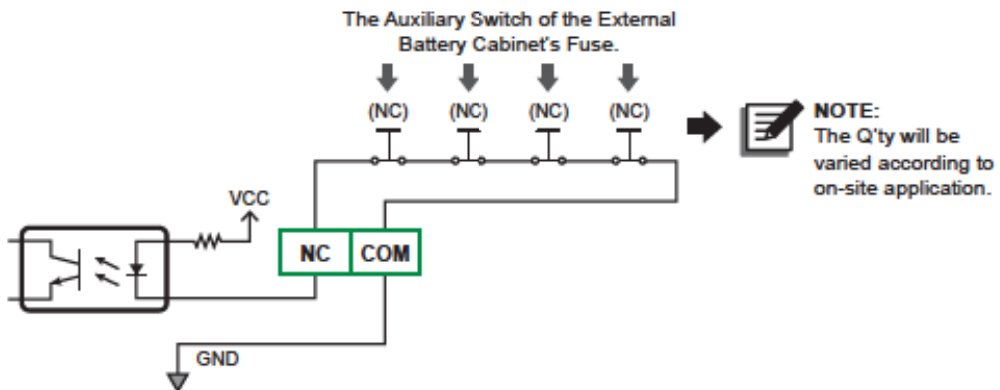


(Figure 4-20: Battery Breaker Detection Dry Contacts_ Pins' Location and Wiring Diagram)

- **Battery Fuse Detection Dry Contacts**

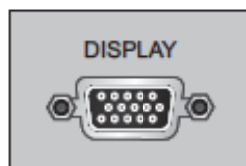
If your external battery cabinet's fuse has the auxiliary switch design, and you connect the auxiliary switch to the Battery Fuse Detection Dry Contacts shown in *Figure 4-21*, you can monitor the status of the external battery cabinet's fuse. If not, the default setting of the external battery cabinet's fuse status is normal.

For how to route the auxiliary switch signal cable (user-supplied), please refer to *Figure 4-12*, *Figure 4-13*, *Figure 4-14* and *Figure 4-15*.



(Figure 4-21: Battery Fuse Detection Dry Contacts_ Pins' Location and Wiring Diagram)

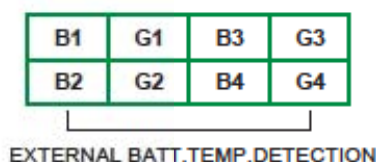
4.1.6 Display Port



(Figure 4-22: Display Port)

Before shipment, the display port has been connected to the 7" touch panel with the designated D-SUB15 communication cable in Delta factory. For how to operate the touch panel, please refer to 7.2 *How to Turn on the LCD* and 7.3 *ON/ OFF Button*.

4.1.7 External Battery Temperature Detection Dry Contacts



(Figure 4-23: External Battery Temperature Detection Dry Contacts)

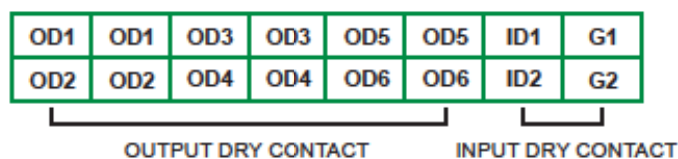
You can use the external battery temperature detection dry contacts (B1-G1, B2-G2, B3-G3 and B4-G4) to detect at maximum four external battery cabinets' temperature. You need to purchase the battery cabinet temperature sensor cable (optional).



NOTE:

If you need any optional accessories, please contact your local dealer or customer service. Please refer to 8. *Optional Accessories*.

4.1.8 Output/ Input Dry Contacts



(Figure 4-24: Output/ Input Dry Contacts)

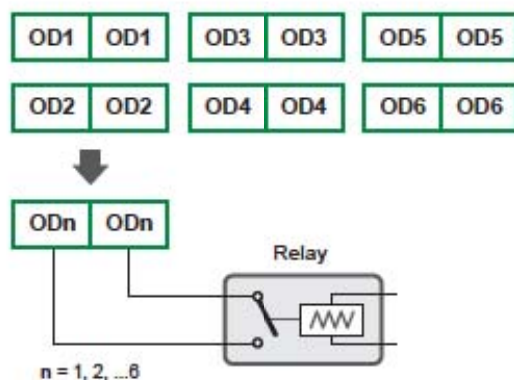
- Output Dry Contacts (OD1~OD6)

The UPS provides six sets of programmable output dry contacts for you to receive UPS events. The output dry contacts are normally open and have no default setting. There are twenty-two events for you to select, and you can choose six of them to set up the output dry contacts. To learn more how to set up, please contact your local dealer or customer service. For the twenty-two events, please refer to the table below.





NOTE:

Since the output dry contacts belong to the secondary circuit, the voltage of each output dry contact's connected device should not exceed 250Vac to avoid electric shock and insufficient insulation.



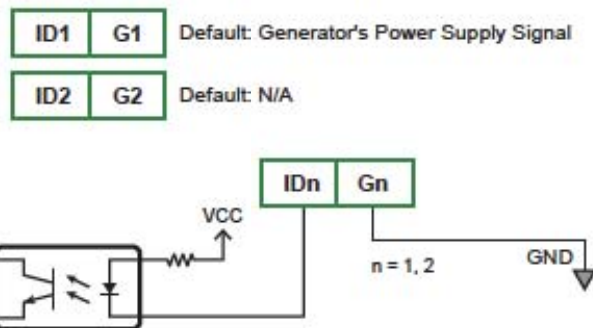
(Figure 4-25: Output Dry Contacts_ Pins' Location and Wiring Diagram)

No.	Event	Description
①	Load on inverter	The UPS works in normal mode.
②	Load on bypass	The UPS works in bypass mode.
③	Battery discharge/ Main input NOK	When the main AC source fails, the batteries supply power to the critical loads.
④	Low battery	When the UPS runs in battery mode, battery voltage is lower than the setup limit 440Vdc.
⑤	Bypass input NOK	The bypass voltage, frequency or phase sequence is abnormal.
⑥	Battery test fail or battery missing	During the battery test, the battery voltage is out of the setup limit.
⑦	Internal communication failure	The #n power module's internal communication is abnormal.
⑧	External parallel communication loss	In parallel mode, parallel communication is abnormal.
⑨	Output overload warning/ shutdown	The UPS is overloaded or the UPS shuts down to let the bypass supply power to the critical loads.
⑩	Power module fault shutdown	The #n power module has abnormalities and it shuts down the UPS to let the bypass supply power to the critical loads.
⑪	Power module warning	The #n power module has abnormalities but the UPS still runs in normal mode.

No.	Event	Description
12	EPO activated	The EPO button  is pressed to urgently power off the UPS.
13	Load on manual bypass	The external maintenance bypass cabinet's Manual Bypass Breaker (Q3) is turned on and the UPS transfers to manual bypass mode.
14	Battery cabinet over temperature warning/ shutdown	The external battery cabinet's temperature is too high.
15	Abnormal inverter voltage	The output voltage is too high or too low.
16	Battery needs replacement	The battery replacement date is due.
17	Bypass over temperature warning/ shutdown	The bypass static switch temperature is too high.
18	Bypass static switch fault	The bypass static switch has an open/ short issue.
19	General alarm	When any UPS alarm occurs.
20	External battery breaker shunt trip	When the EPO button  is pressed, the UPS will send a signal to the connected external shunt trip device to cut off the battery power.
21	Backfeed protection	When the UPS has backfeed voltage.
22	Load on ECO	The UPS works in ECO mode.

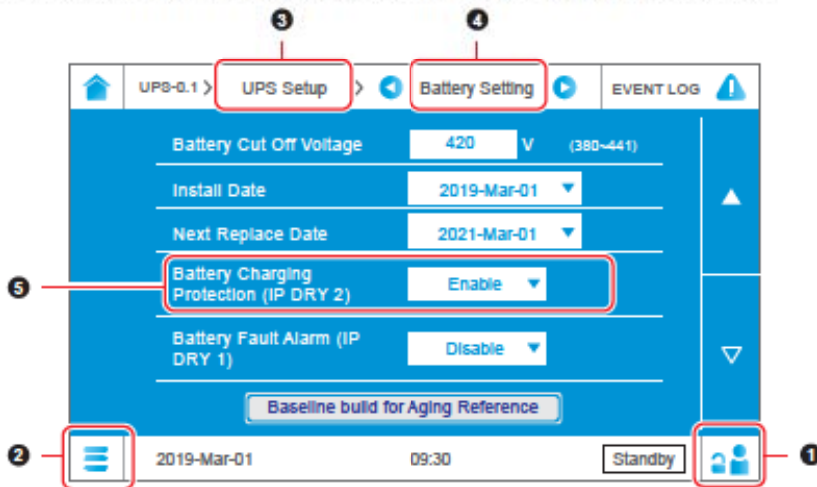
- **Input Dry Contacts (ID1~ ID2)**

The UPS provides two sets of input dry contacts to receive external signals of devices connected to the input dry contacts so the UPS can perform controlling and monitoring of the connected devices. In normal conditions, the input dry contacts are normally open (NO). Please refer to *Figure 4-26* for the default setting. If you need to modify the default settings, please contact your local dealer or customer service.



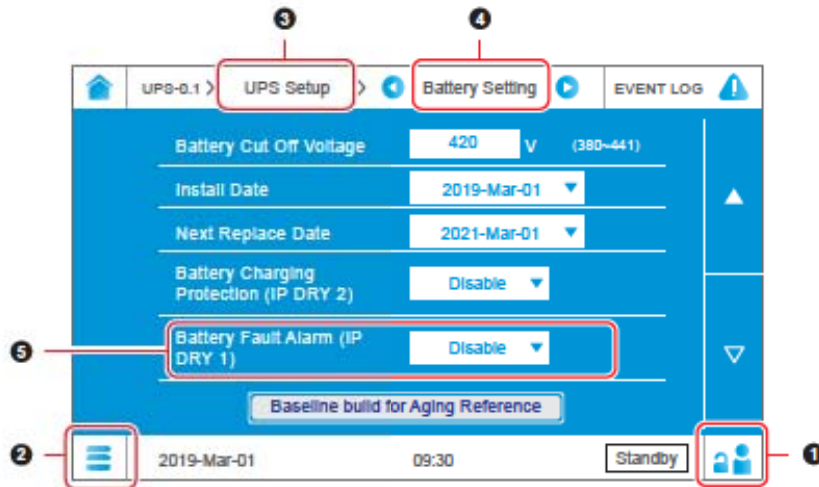
(Figure 4-26: Input Dry Contacts_Pins' Location and Wiring Diagram)

If you want to detect the external battery cabinet's charging protection, please use the LCD to log in as an Administrator. For the Administrator password, please contact service personnel. After you log in as an Administrator, tap the **Main Menu** icon located in the lower left corner of the LCD and select **UPS Setup** → **Battery Setting** to enable 'Battery Charging Protection (IP DRY 2)'. Please follow ❶ ~ ❺ shown in *Figure 4-27* to complete the set-up procedures mentioned above. After that, connect the external battery cabinet's signal cable to the input dry contacts (ID2 G2). When the UPS receives relevant signal, the UPS will stop charging the batteries.



(Figure 4-27: Battery Charging Protection (IP DRY 2) Setup)

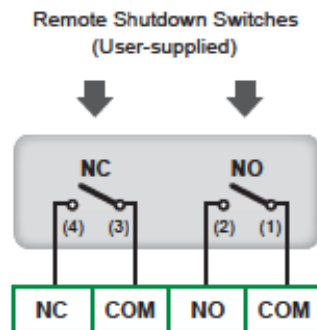
If you want to detect the external battery cabinet's fault alarm, please use the LCD to log in as an Administrator. For the Administrator password, please contact service personnel. After you log in as an Administrator, tap the **Main Menu** icon located in the lower left corner of the LCD and select **UPS Setup** → **Battery Setting** to enable 'Battery Fault Alarm (IP DRY 1)'. Please follow ❶ ~ ❺ shown in *Figure 4-28* to complete the set-up procedures mentioned above. After that, connect the external battery cabinet's signal cable to the input dry contacts (ID1 G1). When the UPS receives relevant signal, the UPS will initiate an alarm.



(Figure 4-28: Battery Fault Alarm (IP DRY 1) Setup)

4.1.9 REPO Dry Contacts

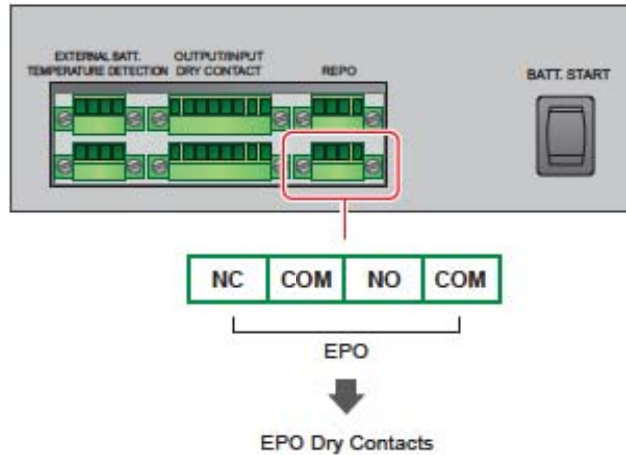
The REPO dry contacts provide you with quick and convenient interfaces to shut down the UPS safely when an emergency occurs. You must connect the REPO dry contacts to user-supplied switches so you can remotely shut down the UPS. Please refer to *Figure 4-29*.



(Figure 4-29: REPO Dry Contacts_ Pins' Location and Wiring Diagram)

4.1.10 EPO Dry Contacts

Before shipment, the EPO dry contacts have been connected to the emergency power off button (■) located at the front of the UPS system cabinet. When an emergency occurs, turn off the button to shut down the UPS rectifier, inverter and output.



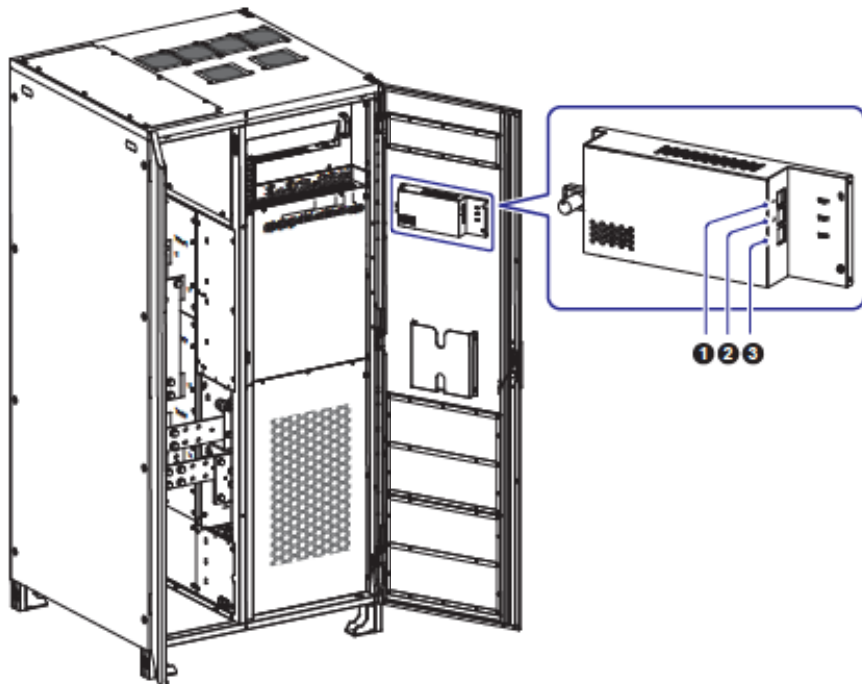
(Figure 4-30: EPO Dry Contacts)

4.2 Communication Interfaces at the Rear of the Touch Panel



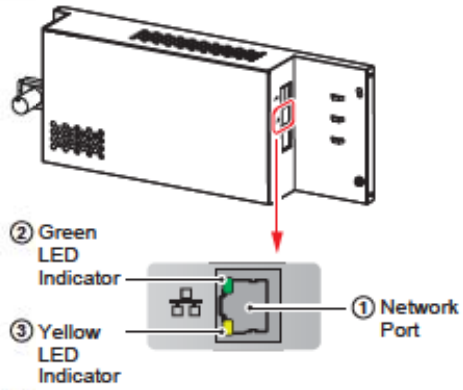
The following communication interfaces are located at the rear of the touch panel. Please refer to *Figure 4-31* and the table below.


500/ 550kVA

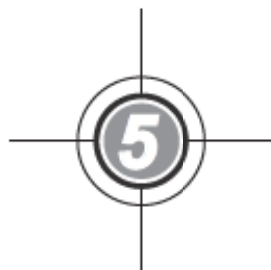
(UPS System Cabinet with Two Front Doors Open)



(Figure 4-31: Communication Interfaces _ at the Rear of the Touch Panel)

No.	Item	Function									
①	 (USB Ports)	There are two USB ports. Connect a user-supplied USB flash drive to any of the two USB ports to upgrade the LCD's firmware.									
②	 (Built-in SNMP Card)	<div style="text-align: center;">  <p>② Green LED Indicator</p> <p>③ Yellow LED Indicator</p> <p>① Network Port</p> </div> <p>The built-in SNMP card has three interfaces, a network port ①, a green LED indicator ② and a yellow LED indicator ③. It can connect to the Ethernet network, communicate with the UPS and acquire the UPS's information so you can remotely manage the UPS. It supports public protocols including SNMP and HTTP. Via the network, you can easily obtain the UPS's status and manage the UPS well. For more information, please visit http://www.deltapowersolutions.com/en/mcis/software-center.php.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No.</th> <th>Item</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>①</td> <td>Network Port</td> <td>Connects to the Ethernet network.</td> </tr> <tr> <td>②</td> <td>Green LED Indicator</td> <td> Presents the network connection status. <ol style="list-style-type: none"> 1. ON: Network connection is established and the IPv4 address is useable. 2. OFF: The built-in SNMP card is not connected to the network. 3. Flashing slowly (every 500ms): The IP address is not correct. </td> </tr> </tbody> </table>	No.	Item	Function	①	Network Port	Connects to the Ethernet network.	②	Green LED Indicator	Presents the network connection status. <ol style="list-style-type: none"> 1. ON: Network connection is established and the IPv4 address is useable. 2. OFF: The built-in SNMP card is not connected to the network. 3. Flashing slowly (every 500ms): The IP address is not correct.
No.	Item	Function									
①	Network Port	Connects to the Ethernet network.									
②	Green LED Indicator	Presents the network connection status. <ol style="list-style-type: none"> 1. ON: Network connection is established and the IPv4 address is useable. 2. OFF: The built-in SNMP card is not connected to the network. 3. Flashing slowly (every 500ms): The IP address is not correct. 									

No.	Item	Function		
②	 (Built-in SNMP Card) (Continued)	No.	Item	Function
		③	Yellow LED Indicator	Presents the linking status between the built-in SNMP card and the UPS. <ul style="list-style-type: none"> • Flashing rapidly (every 50ms): The UPS is linked with the built-in SNMP card. • Flashing rapidly (every 500ms): The UPS is not linked with the built-in SNMP card.
③	CONSOLE Port	Reserved.		



Installation and Wiring

- 5.1 Before Installation and Wiring
- 5.2 Installation Environment
- 5.3 Fixing the UPS
- 5.4 Wiring
- 5.5 External Battery Cabinet Connection Warnings

5.1 Before Installation and Wiring

- Please read this user manual thoroughly before installation, wiring and operation. Only authorized Delta engineers or service personnel can perform installation, wiring, panel/cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action 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*.
- The UPS must be connected with at least an external battery cabinet (user-supplied, handled and configured by Delta service personnel). Please refer to *5.5 External Battery Cabinet Connection Warnings* for relevant information.
- The UPS must be connected with an external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). For the external maintenance bypass cabinet's configurations, please refer to *1.2 Connection Warnings*.
- In this user manual, the meaning of Q1, Q2, Q3, Q4 and Q5 represents the following.

Code	Meaning
Q1	External maintenance bypass cabinet's Input Breaker.
Q2	External maintenance bypass cabinet's Bypass Breaker.
Q3	External maintenance bypass cabinet's Manual Bypass Breaker.
Q4	External maintenance bypass cabinet's Output Breaker.
Q5	External battery cabinet's breaker.

5.2 Installation Environment

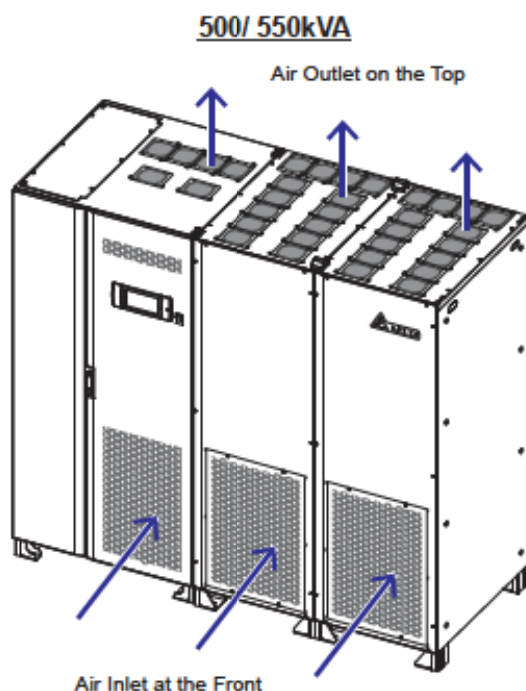
- Install the UPS indoors. Do not place it outdoors.
- Make sure that transportation routes (e.g. corridors, door gates, elevators, etc.) and installation area can accommodate and bear the weight of the UPS, external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel), external battery cabinet (user-supplied, handled and configured by Delta service personnel) and handling equipment. Please refer to *Table 5-1* for floor weight loading information.

Table 5-1: UPS Floor Weight Loading Table

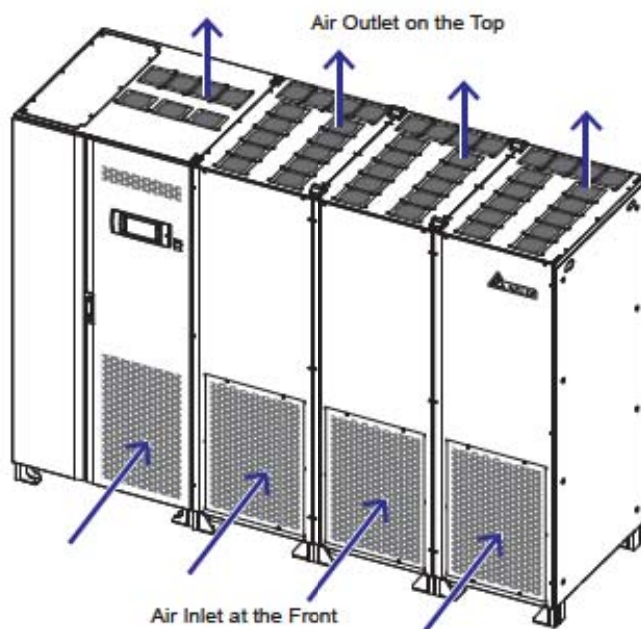
	500kW/ 500kVA 500kW/ 550kVA		750kW/ 750kVA 750kW/ 825kVA	
	Weight (kg)	Weight Loading (kg/m ²)	Weight (kg)	Weight Loading (kg/m ²)
UPS System Cabinet	310	394	367	466

	500kW/ 500kVA 500kW/ 550kVA		750kW/ 750kVA 750kW/ 825kVA	
	Weight (kg)	Weight Loading (kg/m ²)	Weight (kg)	Weight Loading (kg/m ²)
Power Modules	1184	1100	1776	1100
UPS System Cabinet & Power Modules	1494	816 (including 27kg cables)	2143	912 (including 48kg cables)

- Ensure that the installation area is big enough for maintenance and ventilation. Since the UPS is a completely integrated system that incorporates a UPS system cabinet and two or three power modules, and both of the UPS system cabinet and the power modules adopt the design of air inlet at the front and air outlet on the top (see *Figure 5-1*), it is suggested that the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel) and the UPS are installed side by side for sufficient ventilation to achieve heat dissipation. You may install the external battery cabinet (user-supplied, handled and configured by Delta service personnel) at the front or at the rear of the UPS by keeping a distance of 60cm. For UPS clearance, we suggest that you:
 1. Keep a distance of 100cm from the front of the UPS for maintenance and ventilation.
 2. Keep a distance of 100cm from the top of the UPS for maintenance and ventilation. If you install wind shields on the top of the UPS, please ensure that the openings of the wind shields are sufficient and try to minimize the length of the wind shields.



750/ 825kVA



(Figure 5-1: Air Inlet & Air Outlet Direction)

- Keep the installation area clean. 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 1000 meters above sea level.
- For safety concerns, we suggest that you:
 1. Equip surroundings of the installation area with CO₂ or dry powder fire extinguishers.
 2. Install the UPS in an environment where fireproof materials are used to construct the walls, floors and ceilings.
 3. Install the UPS on a floor that is made of noncombustible materials.
- Do not allow unauthorized personnel to enter the installation area. Assign specified personnel to keep the UPS key.



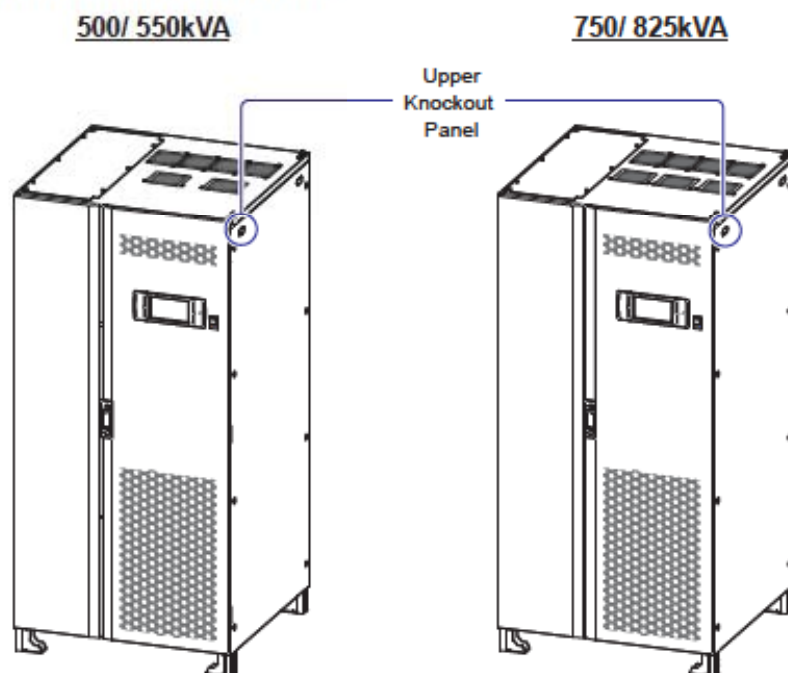
WARNING:

Do not use air conditioners or similar equipment to blow into the top of the UPS and hinder ventilation.

5.3 Fixing the UPS

- 1 The UPS system cabinet and power modules must be installed side by side. Before fixing the UPS system cabinet and power modules in a designated area, please double check whether the area's floor weight loading is sufficient to avoid accidents. Please refer to *Table 5-1*.
- 2 There is an upper knockout panel at the right side of the UPS system cabinet. Please see *Figure 5-2*. Remove the upper knockout panel, take out the snap bushing from the package bag, and install the snap bushing on the location where you removed the upper knockout panel.

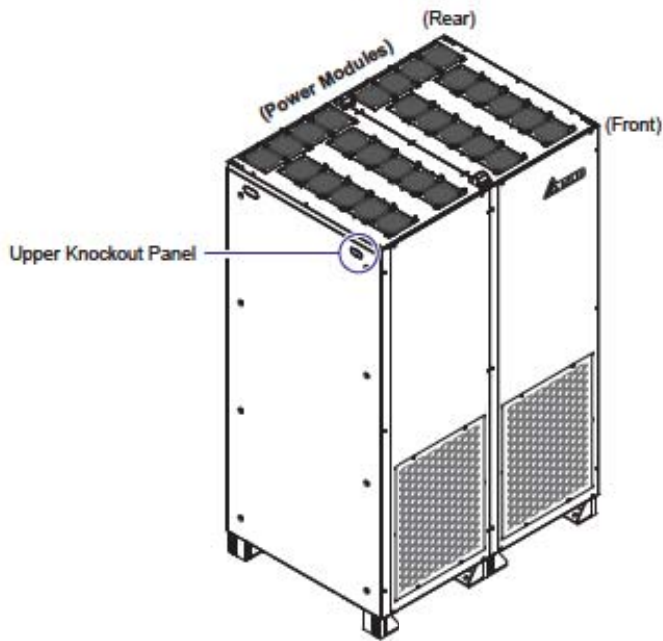
The location where you remove the upper knockout panel is for the route of the D-SUB15 communication cable connection between the UPS system cabinet and the power modules. Before shipment, the D-SUB15 communication cable has already been attached to the power modules' PF4 power board (CNPF411B) shown in *Figure 5-13*. For more information, please refer to step 6.



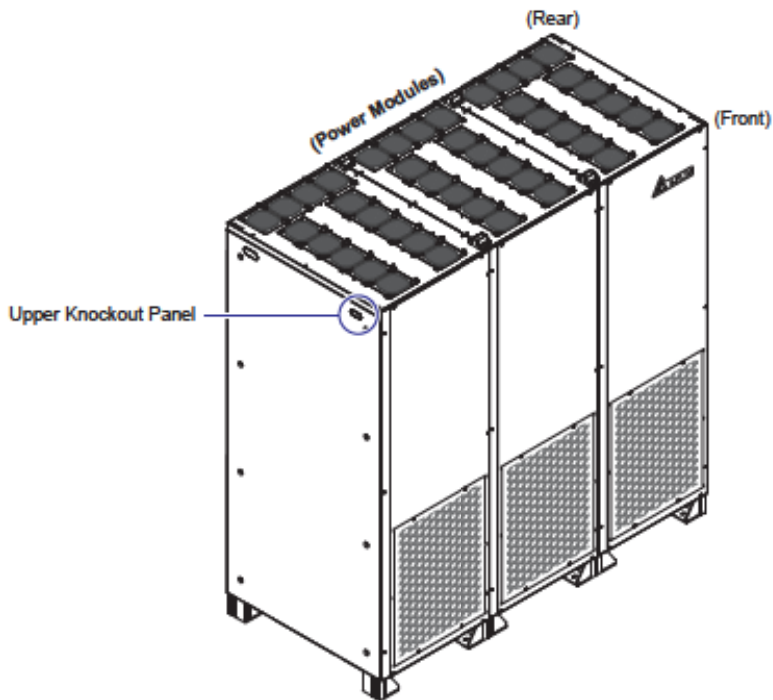
(Figure 5-2: Knockout Panel Location of the UPS System Cabinet)

- 3 There is an upper knockout panel at the left side of the power modules. Please see *Figure 5-3*. Please remove the upper knockout panel. The location where you remove the upper knockout panel is for the route of the D-SUB15 communication cable connection between the UPS system cabinet and the power modules. Before shipment, the D-SUB15 communication cable has already been attached to the power modules' PF4 power board (CNPF411B) shown in *Figure 5-13*. For more information, please refer to step 6.

500/ 550kVA



750/ 825kVA

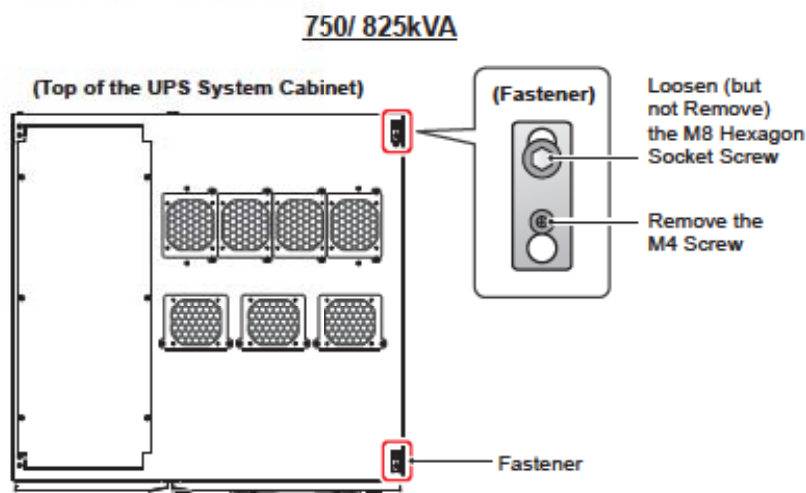


(Figure 5-3: Upper Knockout Panel Location of the Power Modules)

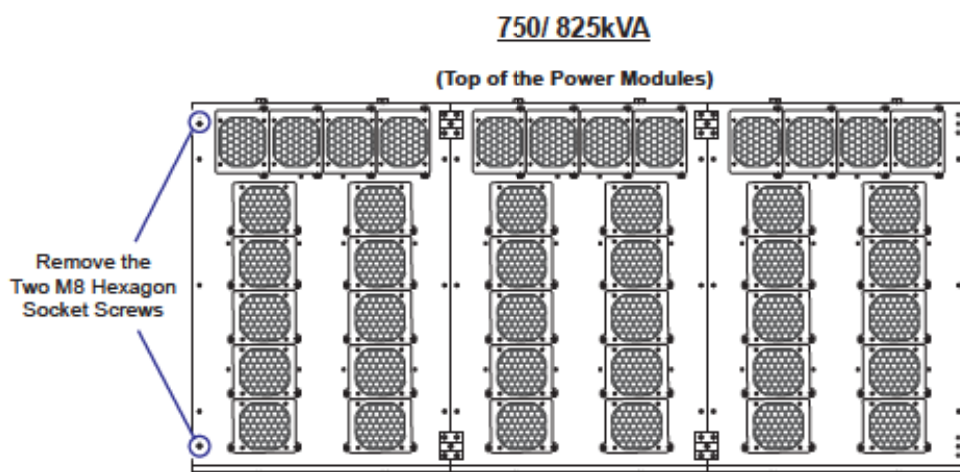
- 4 There are two fasteners on the top of the UPS system cabinet (see *Figure 5-4*) and two screw holes on the top of the power modules (see *Figure 5-5*). After the UPS system cabinet and the power modules are placed in the designated area, please follow *Figure 5-4 ~ Figure 5-6* to firmly fix the two fasteners on the two screw holes in order to join the top of the UPS system cabinet and top of the power modules together.

**NOTE:**

The above mentioned step 4 is applicable to 500/ 550kVA UPS and 750/ 825kVA UPS. For 500/ 550kVA UPS and 750/ 825kVA UPS, (1) their external views of UPS system cabinets are the same, except that their total number of fans located on the top are different, and (2) their appearance of each power module is the same, except that their total number of power modules are different. The 500/ 550kVA UPS has two power modules and 750/ 825kVA UPS has three. Below, only the illustration of 750/ 825kVA UPS is taken for example.

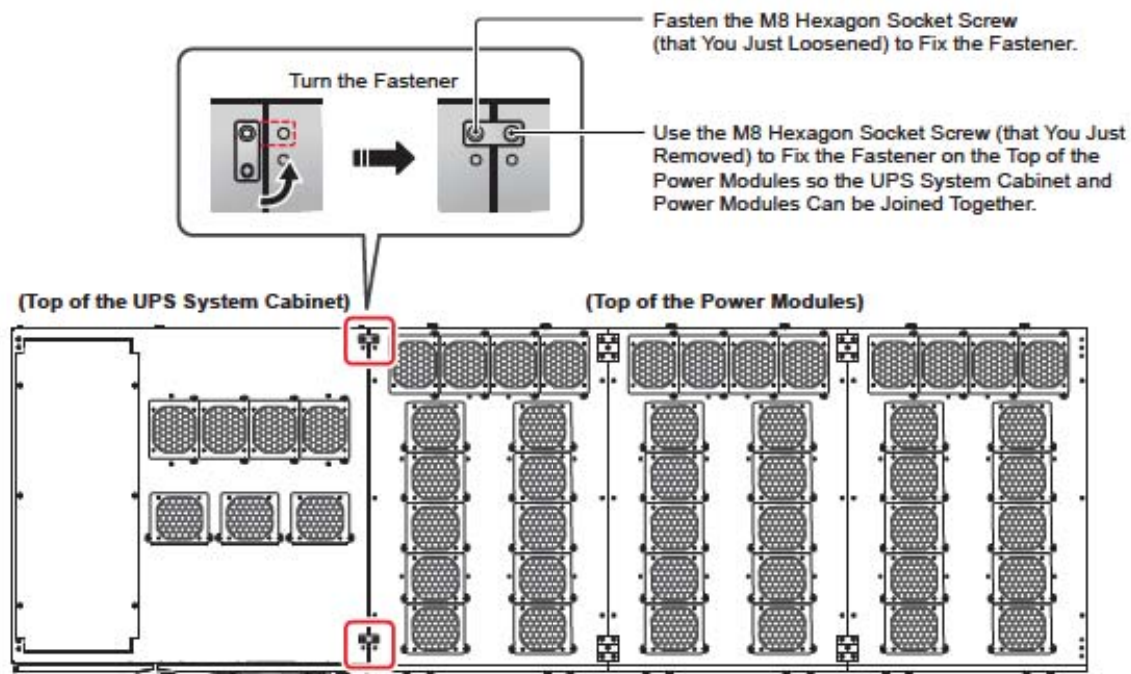


(Figure 5-4: Remove the Two M4 Screws & Loosen the Two M8 Hexagon Socket Screws of the Two Fasteners Located on the Top of the UPS System Cabinet)



(Figure 5-5: Remove the Two M8 Hexagon Socket Screws Located on the Top of the Power Modules)

750/ 825kVA

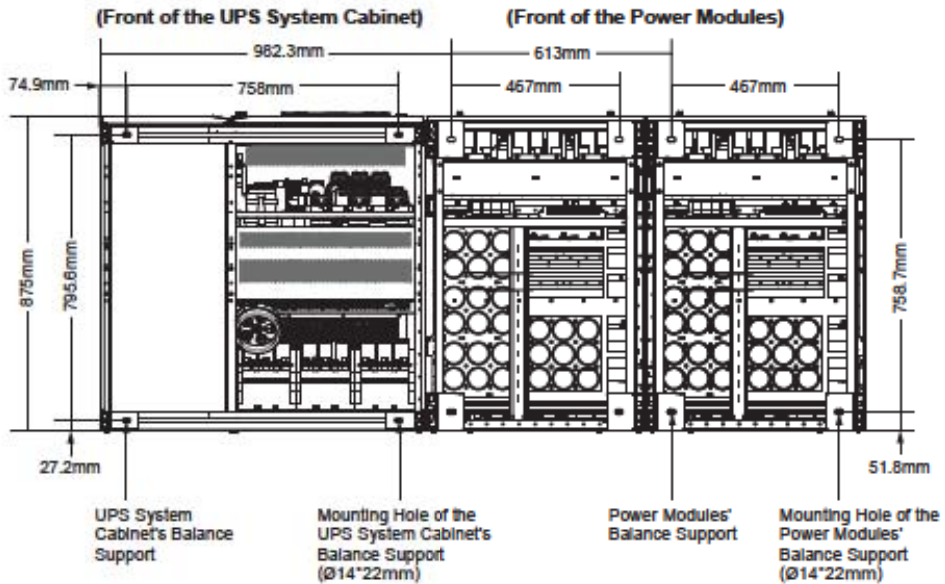
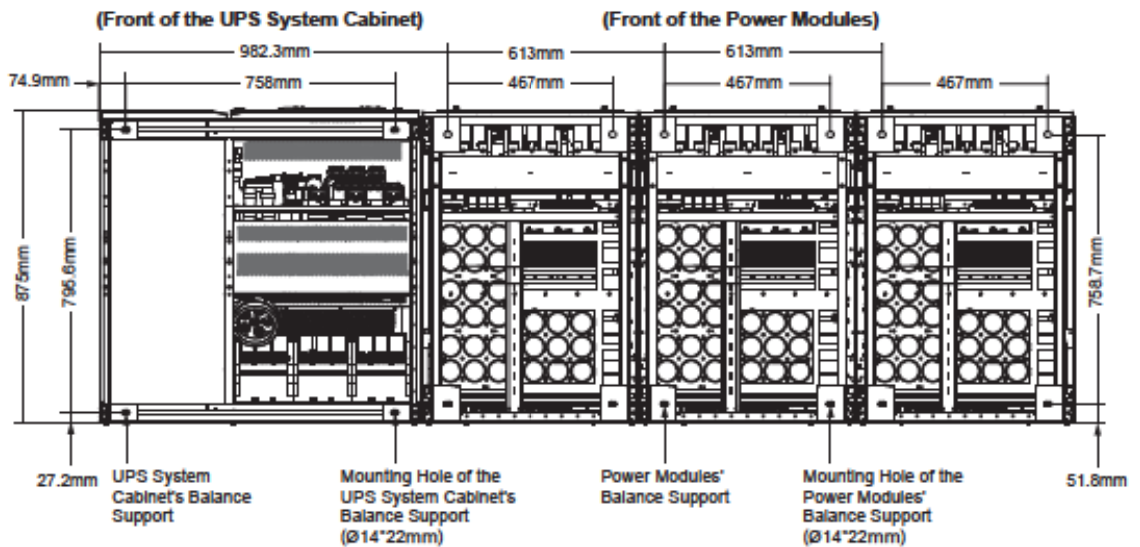


(Figure 5-6: Turn the Two Fasteners and Use the Two Fasteners to Join the Top of the UPS System Cabinet and the Top of the Power Modules Together)

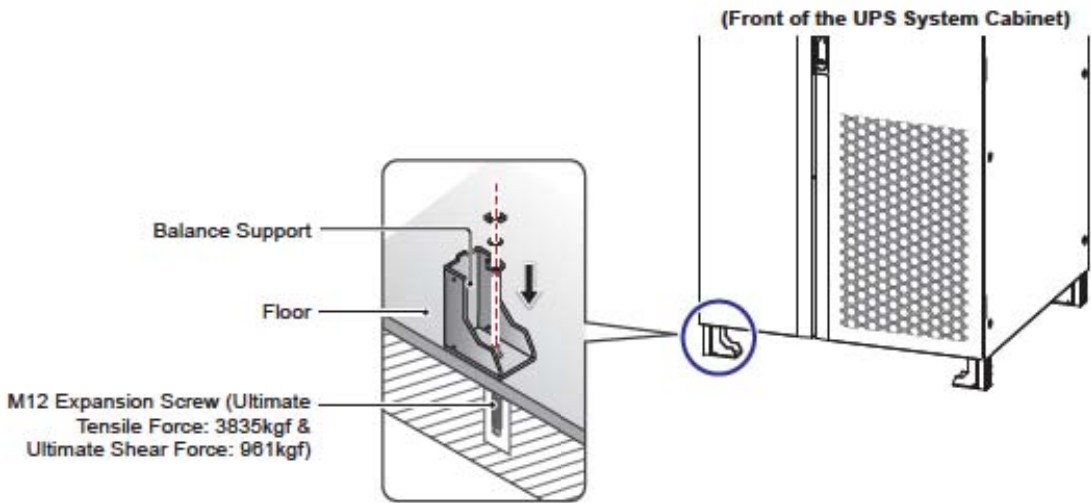
- 5 For 500/ 550kVA UPS, there are four and eight balance supports at the bottom of the UPS system cabinet and the power modules respectively. Please use a 19mm socket wrench and twelve M12 expansion screws (provided by the service personnel) to fix all of the balance supports on the ground.

For 750/ 825kVA UPS, there are four and twelve balance supports at the bottom of the UPS system cabinet and the power modules respectively. Please use a 19mm socket wrench and sixteen M12 expansion screws (provided by the service personnel) to fix all of the balance supports on the ground.

Please refer to *Figure 5-7 ~ Figure 5-9* to firmly fix the balance supports of the UPS system cabinet and power modules on the ground.

500/ 550kVA**750/ 825kVA***(Figure 5-7: Mounting Hole Diagram)*

500/ 550/ 750/ 825kVA



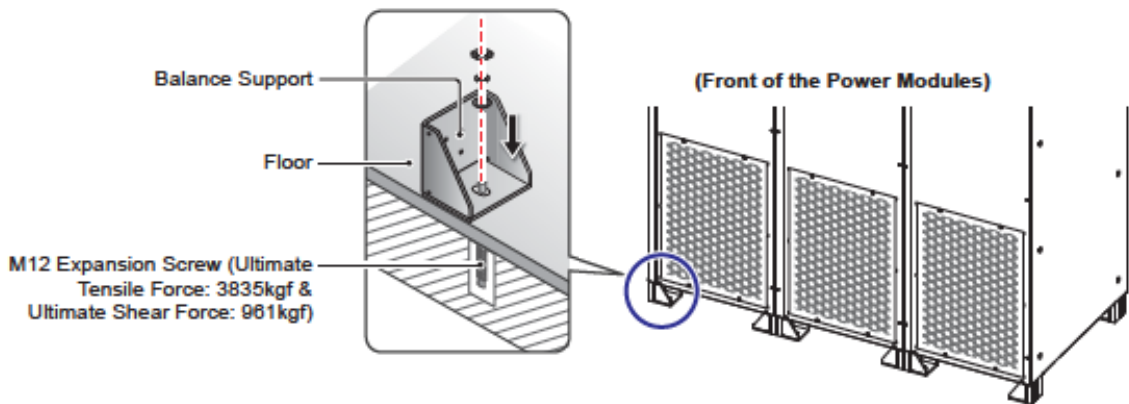
(Figure 5-8: Balance Support Installation Method for the UPS System Cabinet)



NOTE:

The power modules' balance support installation methods are the same for 500/ 550kVA UPS and 750/ 825kVA UPS. In *Figure 5-9*, only the illustration of 750/ 825kVA UPS's power modules is taken for example.

750/ 825kVA

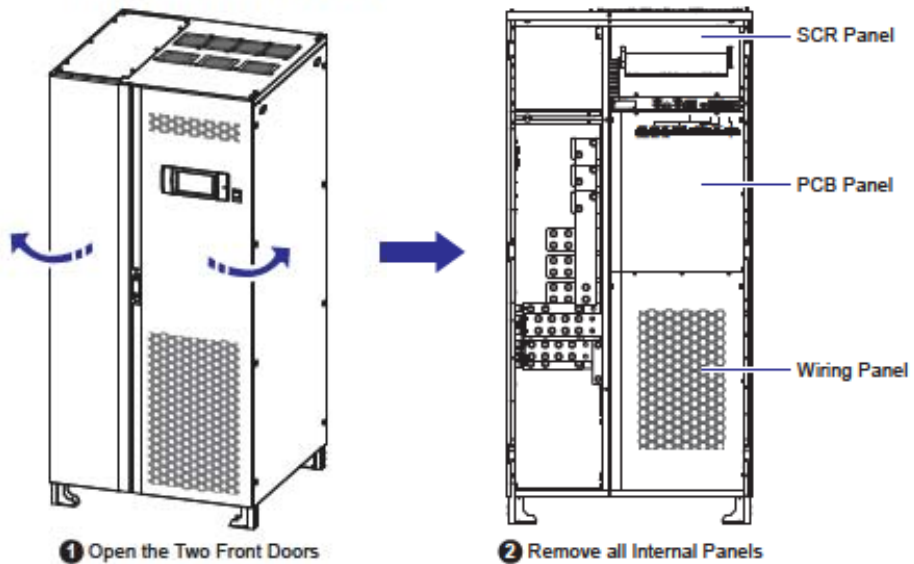


(Figure 5-9: Balance Support Installation Method for the Power Modules)

- 6 a. Open the UPS system cabinet's two front doors (1) and remove its all internal panels (2).

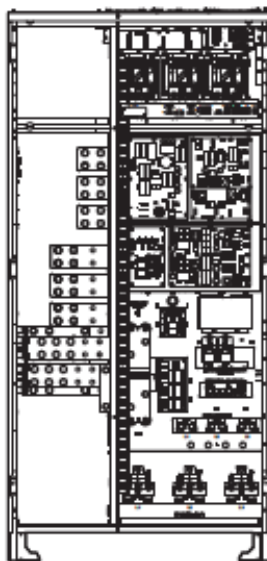
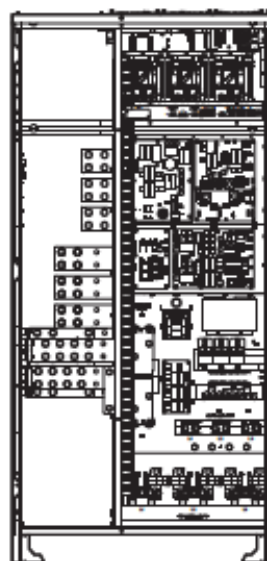
500/ 550/ 750/ 825kVA

(Front View of the UPS System Cabinet with Two Front Doors Open)



(Figure 5-10: Internal Panels Location of the UPS System Cabinet)

- b. After that, you will see the internal mechanisms of the UPS system cabinet. Please refer to *Figure 5-11*.

500/ 550kVA750/ 825kVA

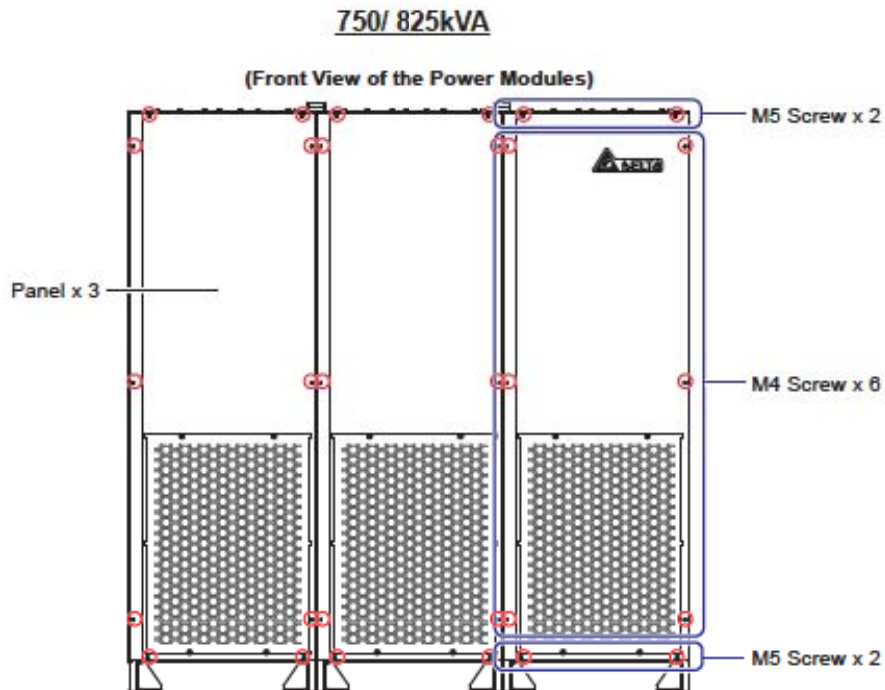
(Figure 5-11: Internal Mechanisms of the UPS System Cabinet)

- c. Remove the power modules' front panels. Each of the front panels has four M5 screws and six M4 screws. Please see *Figure 5-12*.



NOTE:

For 500/ 550kVA UPS and 750/ 825kVA UPS, each power module's structure, exterior and dimensions are the same. Only the total number of the power modules is different. The 500/ 550kVA UPS has two power modules and 750/ 825kVA UPS has three. Below, only the illustration of 750/ 825kVA UPS's power modules is taken for example.



(Figure 5-12: Location of the Power Modules' Front Panels & Screws)

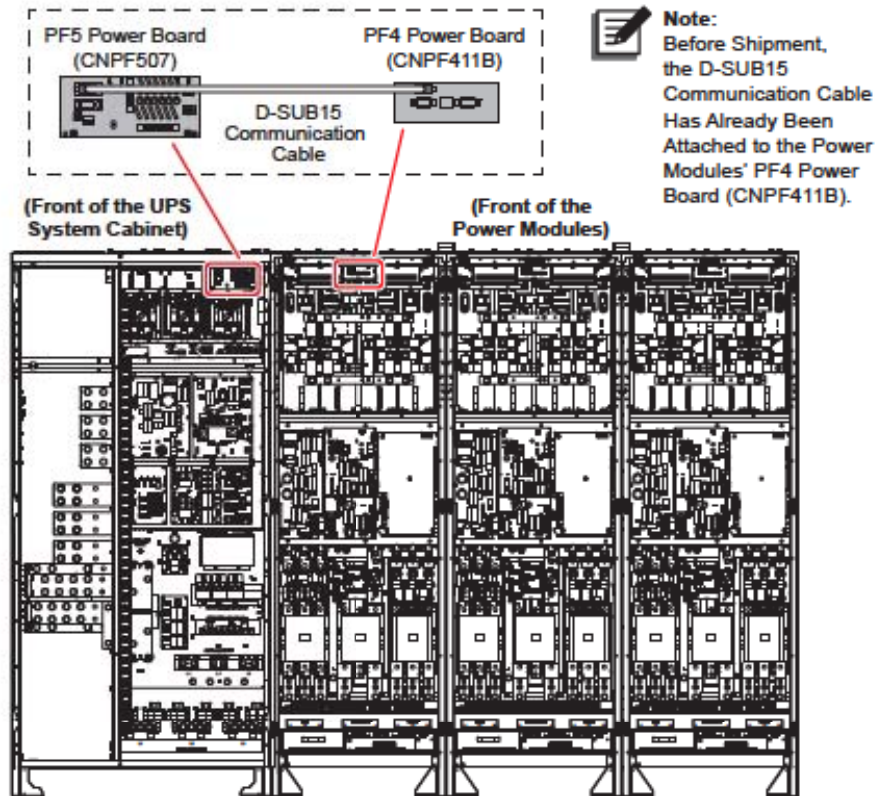
- d. Use the D-SUB15 communication cable (that has already been attached to the power modules' PF4 power board (CNPF411B) before shipment) to connect the UPS system cabinet's PF5 power board (CNPF507). Please refer to *Figure 5-13*. When connecting the D-SUB15 communication cable, please route it via the snap bushing. For information about the snap bushing, please refer to step **2** mentioned above.



NOTE:

Figure 5-13 is the example of 750/ 825kVA UPS. Since 500/ 550kVA UPS has the same design of PF5 power board (CNPF507) and PF4 power board (CNPF411B) as 750/ 825kVA UPS does, the illustration of 500/ 550kVA UPS won't be presented here. Please follow the procedures mentioned above to connect the D-SUB15 communication cable between the 500/ 550kVA UPS's PF5 power board (CNPF507) and PF4 power board (CNPF411B).

750/ 825kVA



(Figure 5-13: Connect the D-SUB15 Communication Cable to the UPS System Cabinet's PF5 Power Board (CNPF507))

e. For internal wiring between the UPS system cabinet and the power modules, please follow *5.4.1 Pre-Wiring Warnings* and *5.4.3 Internal Wiring between the UPS System Cabinet and the Power Modules*.

- 7 It is suggested that you install the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel) next to the UPS or align it with the UPS for convenient operation. Before installation, please ensure that the area's floor weight loading is sufficient to avoid accidents. For the configurations of the external maintenance bypass cabinet, please refer to *1.2 Connection Warnings*.
- 8 Please follow *5.4 Wiring* to perform wiring among the UPS system cabinet, power modules and external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel).

- 9 After wiring, please reinstall all panels and close the two front doors.
- 10 To prevent possible damage from rodents, please install the rodent shields (provided).

For 500/ 550kVA UPS, take the provided eight rodent shields (including twenty four M4 round-head screws, four M4 flat-head screws and two M5 screws) out of the box 1 placed underneath the UPS system cabinet and above the pallet A. For the location of box 1 and pallet A, please refer to *Figure 5-25*. Follow *Figure 5-14 ~ Figure 5-18* to install the rodent shields on the 500/ 550kVA UPS. The provided rodent shields have six types, A, B, C, D, E and F. Each type's quantity information is shown in *Table 5-2*.

Table 5-2: Rodent Shield Type & Quantity for 500/ 550kVA UPS

Rodent Shield Type	A	B	C	D	E	F
Q'ty	1 PC	1 PC	1 PC	2 PCS	2 PCS	1 PC

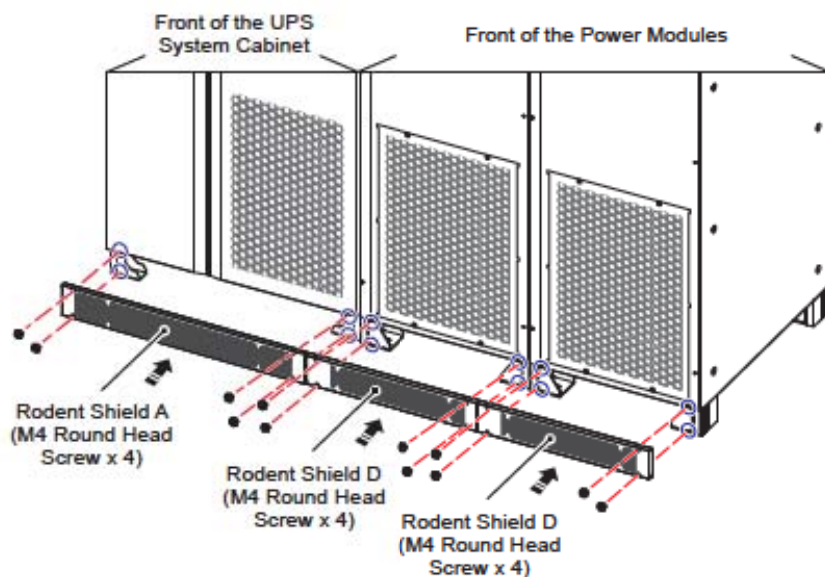
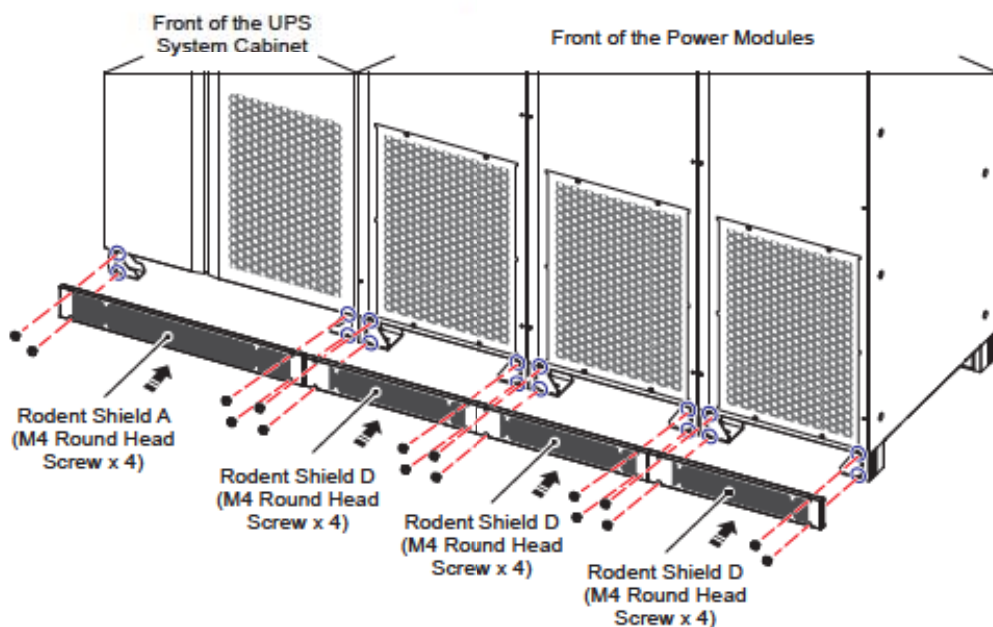
For 750/ 825kVA UPS, take the provided ten rodent shields (including thirty two M4 round-head screws, four M4 flat-head screws and two M5 screws) out of the box I placed underneath the UPS system cabinet and above the pallet C. For the location of box I and pallet C, please refer to *Figure 5-27*. Follow *Figure 5-14 ~ Figure 5-18* to install the rodent shields on the 750/ 825kVA UPS. The provided rodent shields have six types, A, B, C, D, E and F. Each type's quantity information is shown in *Table 5-3*.

Table 5-3: Rodent Shield Type & Quantity for 750/ 825kVA UPS

Rodent Shield Type	A	B	C	D	E	F
Q'ty	1 PC	1 PC	1 PC	3 PCS	3 PCS	1 PC

- 11 For 500/ 550kVA UPS, follow *Figure 5-14* to install a rodent shield A at the front bottom of the UPS system cabinet and install the two rodent shields D at the front bottom of the power modules.

For 750/ 825kVA UPS, follow *Figure 5-14* to install a rodent shield A at the front bottom of the UPS system cabinet and install the three rodent shields D at the front bottom of the power modules.

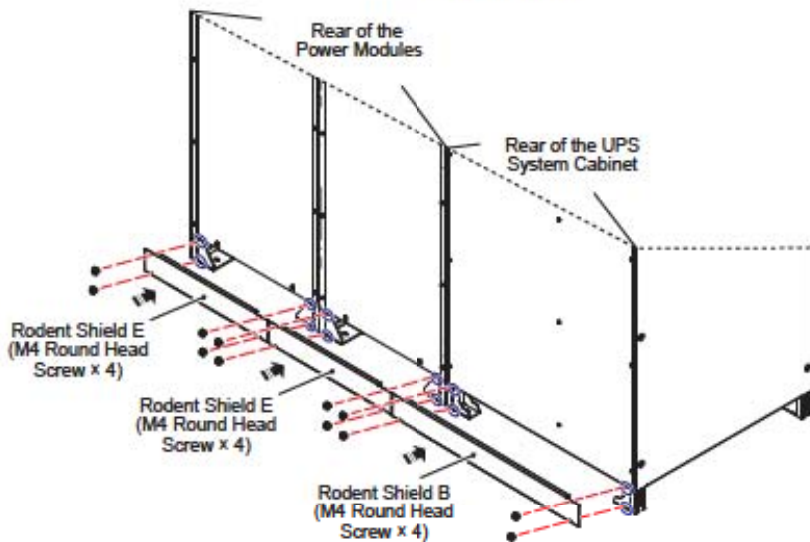
500/ 550kVA**750/ 825kVA**

(Figure 5-14: Install the Rodent Shields at the Front Bottom of the UPS System Cabinet and the Power Modules)

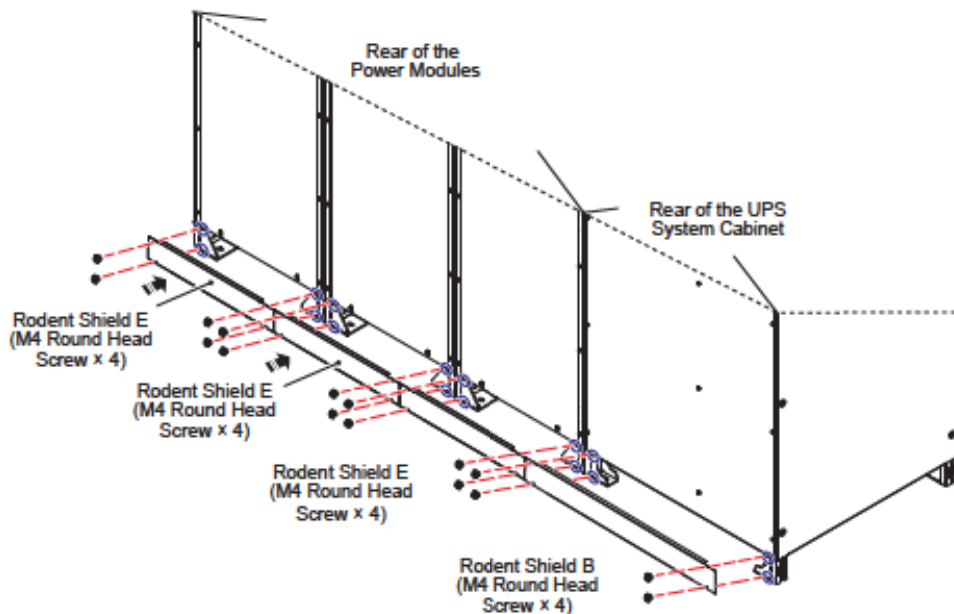
- 12 For 500/ 550kVA UPS, follow *Figure 5-15* to install a rodent shield B at the rear bottom of the UPS system cabinet and install the two rodent shields E at the rear bottom of the power modules.

For 750/ 825kVA UPS, follow *Figure 5-15* to install a rodent shield B at the rear bottom of the UPS system cabinet and install the three rodent shields E at the rear bottom of the power modules.

500/ 550kVA

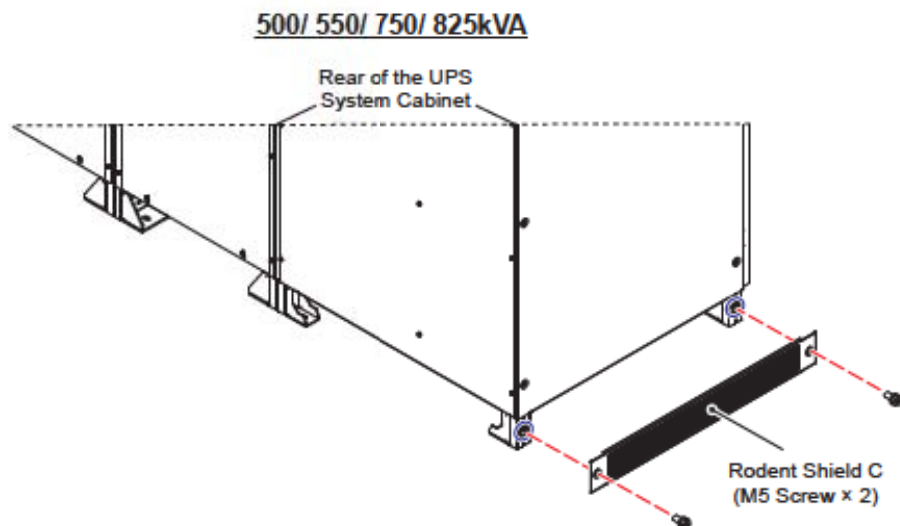


750/ 825kVA



(Figure 5-15: Install the Rodent Shields at the Rear Bottom of the UPS System Cabinet and the Power Modules)

- 13 For 500/ 550kVA UPS and 750/ 825kVA UPS, face the rear of the UPS system cabinet and follow *Figure 5-16* to install the rodent shield C at the right bottom side of the UPS system cabinet.



(Figure 5-16: Face the Rear of the UPS System Cabinet & Install the Rodent Shield C at the Right Bottom Side)

- 14 For 500/ 550kVA UPS and 750/ 825kVA UPS, face the front of the power modules and follow *Figure 5-17* to install the rodent shield F at the right bottom side of the power modules.

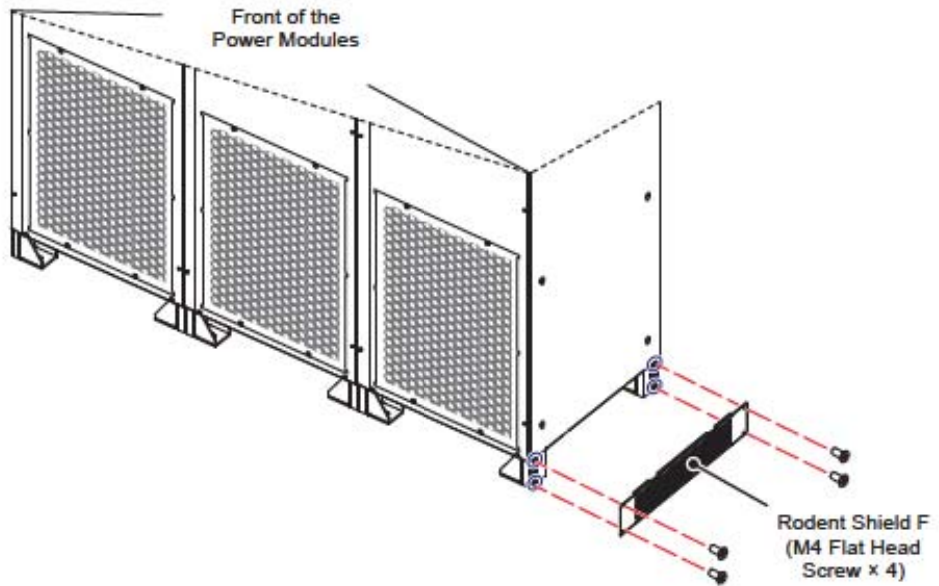


NOTE:

For 500/ 550kVA UPS and 750/ 825kVA UPS, the appearance of every power module is the same, except that the total number of power modules is different. The 500/ 550kVA UPS has two power modules and 750/ 825kVA UPS has three.

Below, only the illustration of 750/ 825kVA UPS's power modules is taken for example.

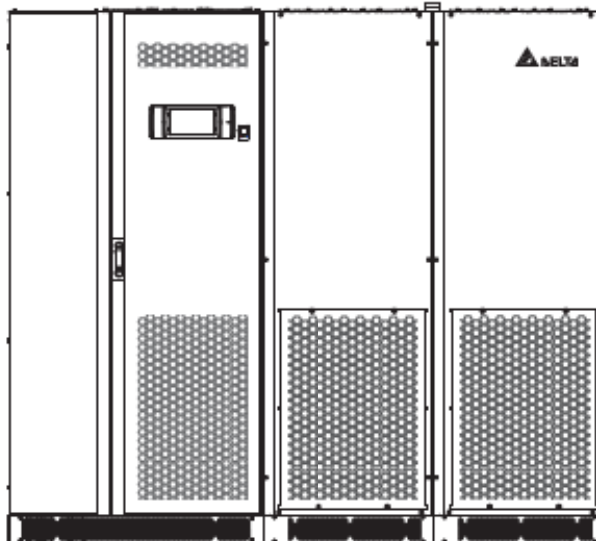
750/ 825kVA

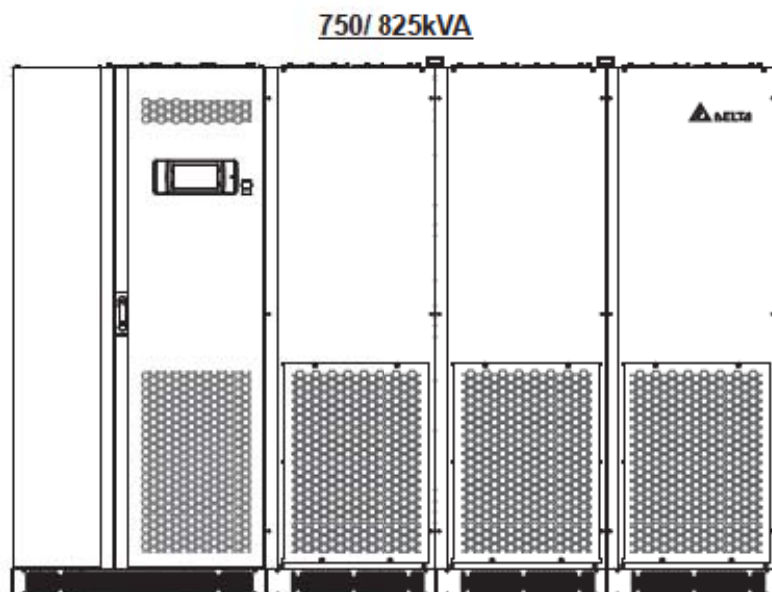


(Figure 5-17: Face the Front of the Power Modules & Install the Rodent Shield F at the Right Bottom Side)

- 16 After you complete the procedures above, the front view of the UPS is as follows.

500/ 550kVA





(Figure 5-18: Front View after Rodent Shields Installation)

5.4 Wiring

5.4.1 Pre-Wiring Warnings



NOTE:

1. Before wiring, please ensure that you have followed **5.3 Fixing the UPS** to fix the UPS in the designated installation area firmly.
2. Before wiring, please read **5.4 Wiring** thoroughly.
3. Only authorized Delta engineers or service personnel can perform installation, wiring, panel/ cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.
4. The UPS must be connected with an external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). For the configurations of the external maintenance bypass cabinet, please refer to **1.2 Connection Warnings**.
5. Please follow the table below to perform wiring.

Table 5-4: Local/ Regional Phase Symbol Table

USA/ Asia
L1
L2
L3

- Before wiring or making any electrical connection, make sure that the power supplied to the input and output of the UPS is completely cut off.
- Check that the size, diameter, phase, polarity are correct for each cable that needs connecting to the UPS, external battery cabinet (user-supplied, handled and configured by Delta service personnel) and external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). Please refer to *Table 5-5* for the specifications of input, output, battery and breakers.

Table 5-5: Specifications of Input, Output, Battery and Breakers

UPS Capacity		500kW/ 500kVA 500kW/ 550kVA	750kW/ 750kVA 750kW/ 825kVA
Input	Rated current at input voltage 480V with battery charging	750A	1100A
	Recommended cable size (L1/ L2/ L3/ PE)	300 kcmil x 4 PCS PE: 1/0 AWG	400 kcmil x 4 PCS PE: 4/0 AWG
	Maximum cable size (L1/ L2/ L3/ PE)	500 kcmil x 3 PCS PE: 500 kcmil	500 kcmil x 4 PCS PE: 500 kcmil
	Cable lug width	46mm	46mm
	Screw size	M12	M12
Output	Rated current at output voltage 480V	602A 662A	901A 992A
	Recommended cable size (L1/ L2/ L3/ PE)	300 kcmil x 3 PCS PE: 1/0 AWG	350 kcmil x 4 PCS PE: 4/0 AWG
	Maximum cable size (L1/ L2/ L3/ PE)	500 kcmil x 3 PCS PE: 500 kcmil	500 kcmil x 4 PCS PE: 500 kcmil
	Cable lug width	46mm	46mm
	Screw size	M12	M12
Battery	Nominal discharge current (condition: 12V x 40 PCS)	1400A	2100A
	Recommended cable size (+/- PE)	300 kcmil x 6 PCS	400 kcmil x 8 PCS
	Maximum cable size (+/- PE)	500 kcmil x 5 PCS	500 kcmil x 8 PCS
	Cable lug width	46mm	46mm
	Screw size	M12	M12
Tightening Torque		M12=500±20kgf·cm	M12=500±20kgf·cm

UPS Capacity	500kW/ 500kVA 500kW/ 550kVA	750kW/ 750kVA 750kW/ 825kVA
External Maintenance Bypass Cabinet's Input Breaker (Q1)	800A (3 Pole)	1250A (3 Pole)
External Maintenance Bypass Cabinet's Bypass Breaker (Q2)	800A (3 Pole)	1250A (3 Pole)
External Maintenance Bypass Cabinet's Output Breaker (Q3)	800A (3 Pole)	1250A (3 Pole)
External Maintenance Bypass Cabinet's Manual Bypass Breaker (Q4)	1000A (3 Pole)	1400A (3 Pole)

**NOTE:**

- In accordance with National Electrical Codes (NEC), please install a suitable conduit and bushing for cable protection.
 - Please refer to national and local electrical codes for acceptable non-fuse breakers and cable size.
 - The above mentioned cable size is based on (1) cable type THHN, THWN & THWN-2 with temperature resistance up to 194°F (90°C) at ambient temperature 86°F (30°C), and (2) NEC specifications for 104°F (40°C) ambient rated conductors.
 - The tightening torque for M12 screws should be 500±20kgf-cm.
- Each cable gland can accommodate at maximum three cables/ wires.
 - To avoid UPS failure, the input of the UPS must be Y connection and only L1/ L2/ L3 cables should be connected to the UPS. Do not connect the neutral (N) to the UPS.
 - If there is a floating voltage between the input power's neutral (N) and the ground (⊕), and you require that the VNG 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 isolation transformer's secondary neutral (N) and the ground (⊕) to the nearest place of the transformer.
 - The utility AC power must be a three-phase (L1/ L2/ L3) system and meets the specifications specified on the UPS's rating label. When connecting the utility AC power to the UPS, make sure it is in positive phase sequence.
 - Check the battery polarity when connecting the external battery cabinet(s) to the UPS. Do not connect the battery polarity in reverse. For battery connection relevant information, please refer to *5.5 External Battery Cabinet Connection Warnings*.
 - Connect the external battery cabinet's grounding terminal (⊕) to the UPS's grounding terminal (⊕). Do not connect the external battery cabinet's grounding terminal to any other grounding system.

- The UPS's grounding terminal (⊕) must be grounded. Please use ring-type terminals when wiring.



WARNING:

1. Wrong wiring will cause damage to the UPS and electric shock.
2. If the UPS is not grounded, the power boards and components might be damaged after the UPS is powered on.

5.4.2 Single Input/ Dual Input Modification



WARNING: Only authorized Delta engineers or service personnel can modify single input/ dual input setup.



NOTE:

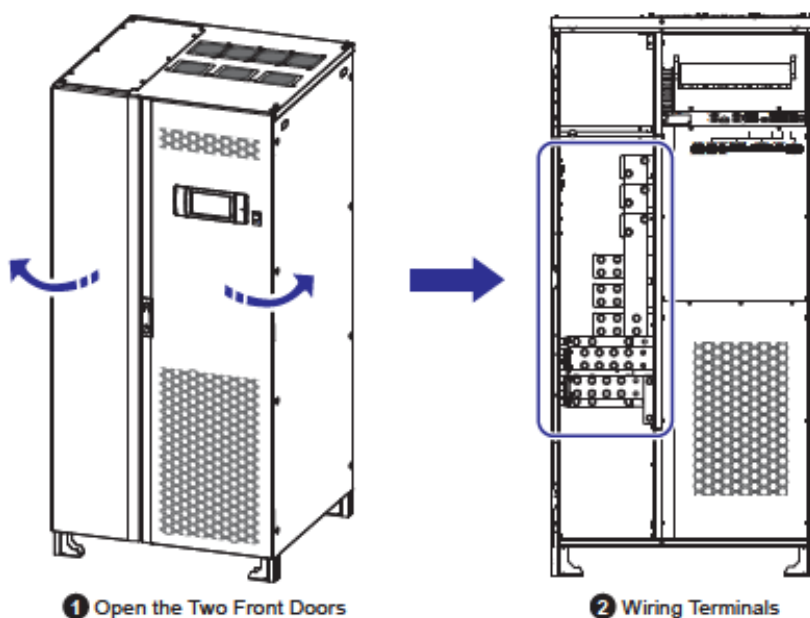
For 500/ 550kVA UPS and 750/ 825kVA UPS, their single input/ dual input modification methods are the same and only their UPS system cabinets rather than power modules need to be modified. Thus, in **5.4.2 Single Input/ Dual Input Modification**, only the UPS system cabinet illustration of 750/ 825kVA UPS is taken for example.

The UPS default setting is single input. If you want to modify it into dual input, please follow the following steps.

- 1 Open the UPS system cabinet's two front doors. After that, you will see the wiring terminals at your left-hand side. See *Figure 5-19*.

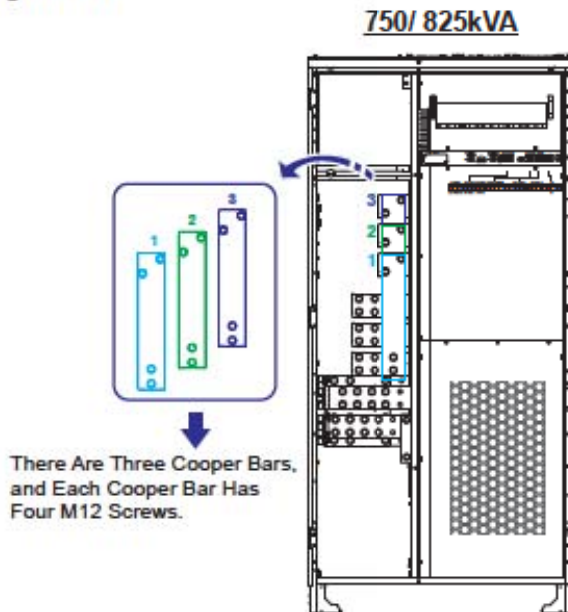
750/ 825kVA

(Front View of the UPS System Cabinet with Two Front Doors Open)



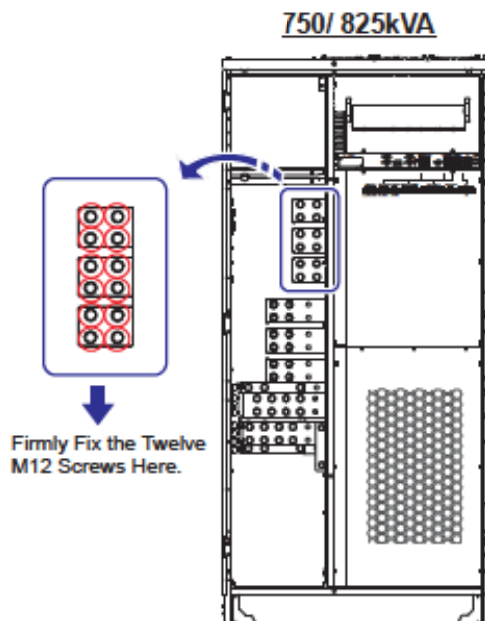
(Figure 5-19: UPS System Cabinet's Front View with Two Front Doors Open)

- 2 There are three cooper bars in total, and each cooper bar has four M12 screws. Use a socket wrench to remove the twelve M12 screws and three cooper bars shown in *Figure 5-20*.



(Figure 5-20: Location of the Three Copper Bars & M12 Screws)

- 3 Firmly fix the twelve M12 screws that you just removed on the designated areas shown in *Figure 5-21*. Please note that the tightening torque should be $500\pm 20\text{kgf}\cdot\text{cm}$. After that, the dual input setup is completed.



(Figure 5-21: Firmly Fix the M12 Screws)



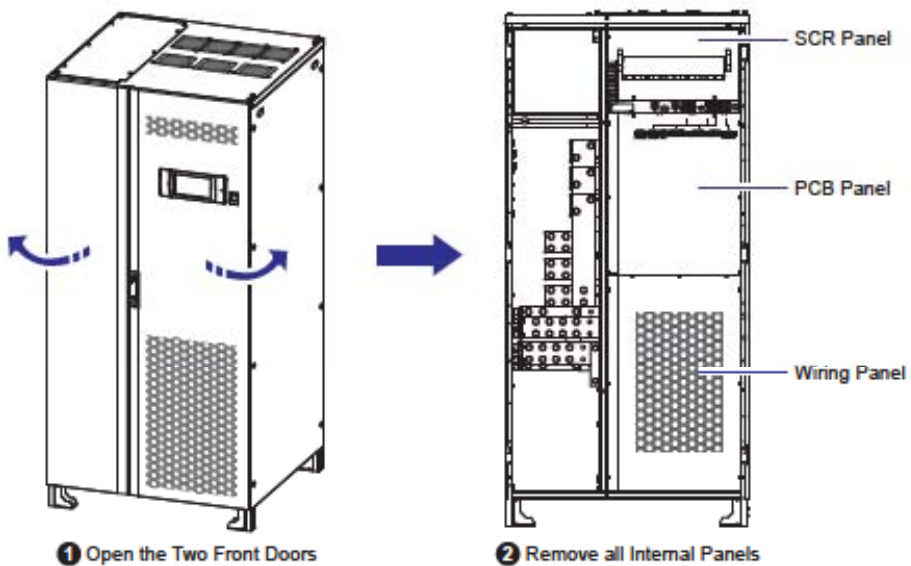
NOTE: If you want to modify the UPS from dual input into single input, please use the socket wrench to reinstall the three copper bars.

5.4.3 Internal Wiring between the UPS System Cabinet and the Power Modules

- 1 Open the UPS system cabinet's two front doors (1) and remove all internal panels (2).

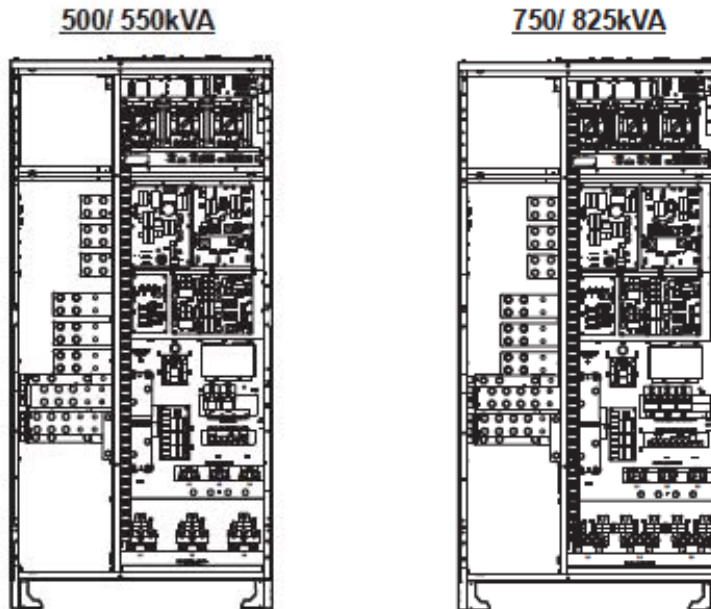
500/ 550/ 750/ 825kVA

(Front View of the UPS System Cabinet with Two Front Doors Open)



(Figure 5-22: Internal Panels Location of the UPS System Cabinet)

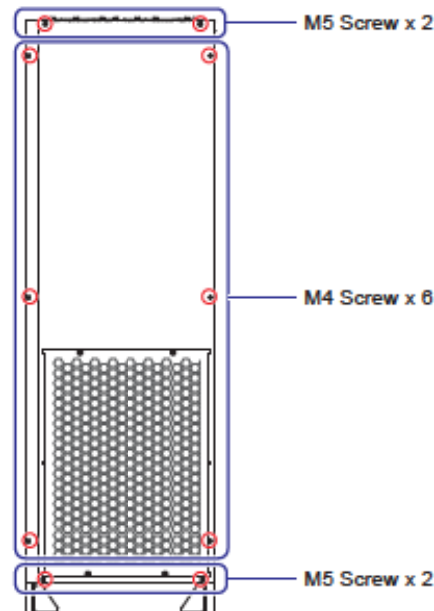
- 2 After that, you will see the internal mechanisms of the UPS system cabinet. Please refer to *Figure 5-23*.



(Figure 5-23: Internal Mechanisms of the UPS System Cabinet)

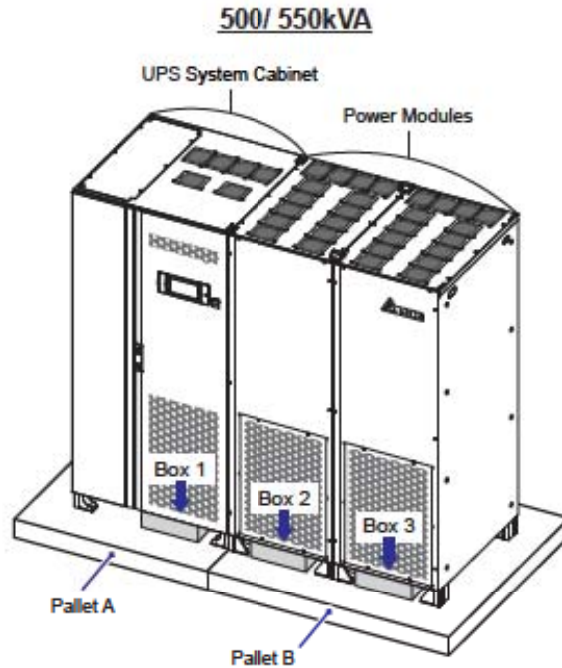
- 3 For 500/ 550/ 750/ 825kVA UPS, please remove every power module's front panel. Each front panel has four M5 screws and six M4 screws. Please see *Figure 5-24*.

(Front View of the Power Module)



(Figure 5-24: Removal of Every Power Module's Front Panel)

- 4 Upon delivery, the 500/ 550kVA UPS is placed on two pallets: pallet A and pallet B. For pallet A, it carries one UPS system cabinet and one box placed underneath. For pallet B, it carries two power modules and two boxes placed underneath. See *Figure 5-25* for these three boxes' location.



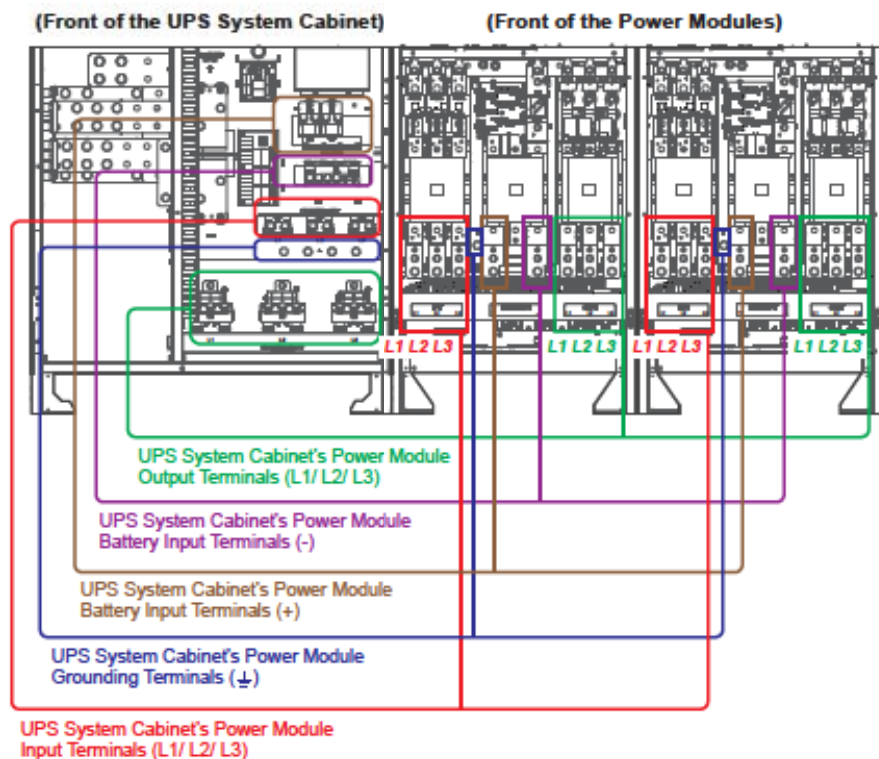
(Figure 5-25: Three Boxes' Location)

Open the box 2 and box 3 and you will see 22 cables. Each cable is marked with a number. Please follow the number marked on each cable, the table below and *Figure 5-26* to perform internal wiring between the UPS system cabinet and the power modules.

Cable Q'ty	Cable No.	Function
6 cables in total	For power module 1 : M11/ M12/ M13 For power module 2 : M21/ M22/ M23	The 6 cables connect the UPS system cabinet's Power Module Input Terminals (L1/ L2/ L3) and the power modules' Input Terminals (L1/ L2/ L3).
6 cables in total	For power module 1 : M16/ M17/ M18 For power module 2 : M26/ M27/ M28	The 6 cables connect the UPS system cabinet's Power Module Output Terminals (L1/ L2/ L3) and the power modules' Output Terminals (L1/ L2/ L3).

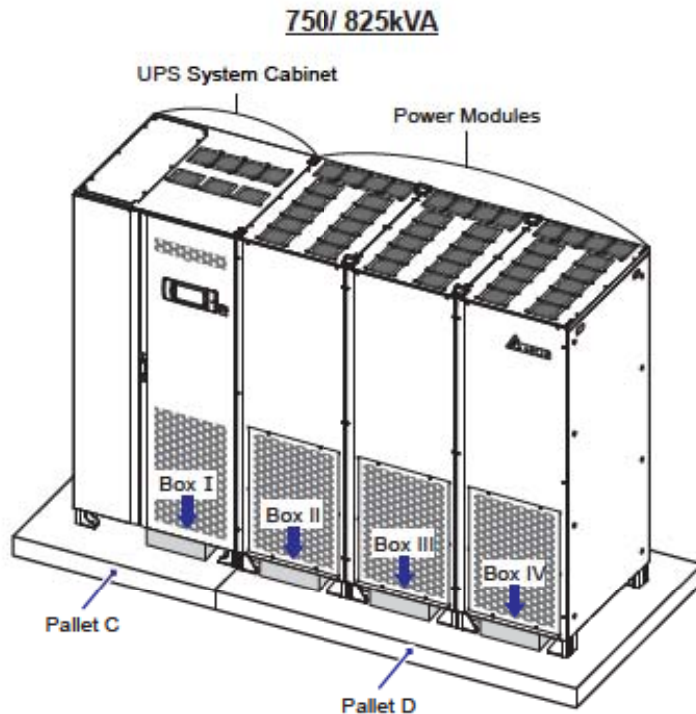
Cable Q'ty	Cable No.	Function
4 cables in total	For power module 1 : M14 x 2 PCS For power module 2 : M24 x 2 PCS	The 4 cables connect the UPS system cabinet's Power Module Battery Input Terminals (+) and the power modules' Battery Input Terminals (+).
4 cables in total	For power module 1 : M15 x 2 PCS For power module 2 : M25 x 2 PCS	The 4 cables connect the UPS system cabinet's Power Module Battery Input Terminals (-) and the power modules' Battery Input Terminals (-).
2 cables in total	For power module 1 : M19 For power module 2 : M29	The 2 cables connect the UPS system cabinet's Power Module Grounding Terminals (\perp) and the power modules' Grounding Terminals (\perp).

500/ 550kVA



(Figure 5-26: Internal Wiring between the UPS System Cabinet and the Power Modules_ 500/ 550kVA UPS)

- 5 Upon delivery, the 750/ 825kVA UPS is placed on two pallets: pallet C and pallet D. For pallet C, it carries one UPS system cabinet and one box placed underneath. For pallet D, it carries three power modules and three boxes placed underneath. See *Figure 5-27* for these three boxes' location.



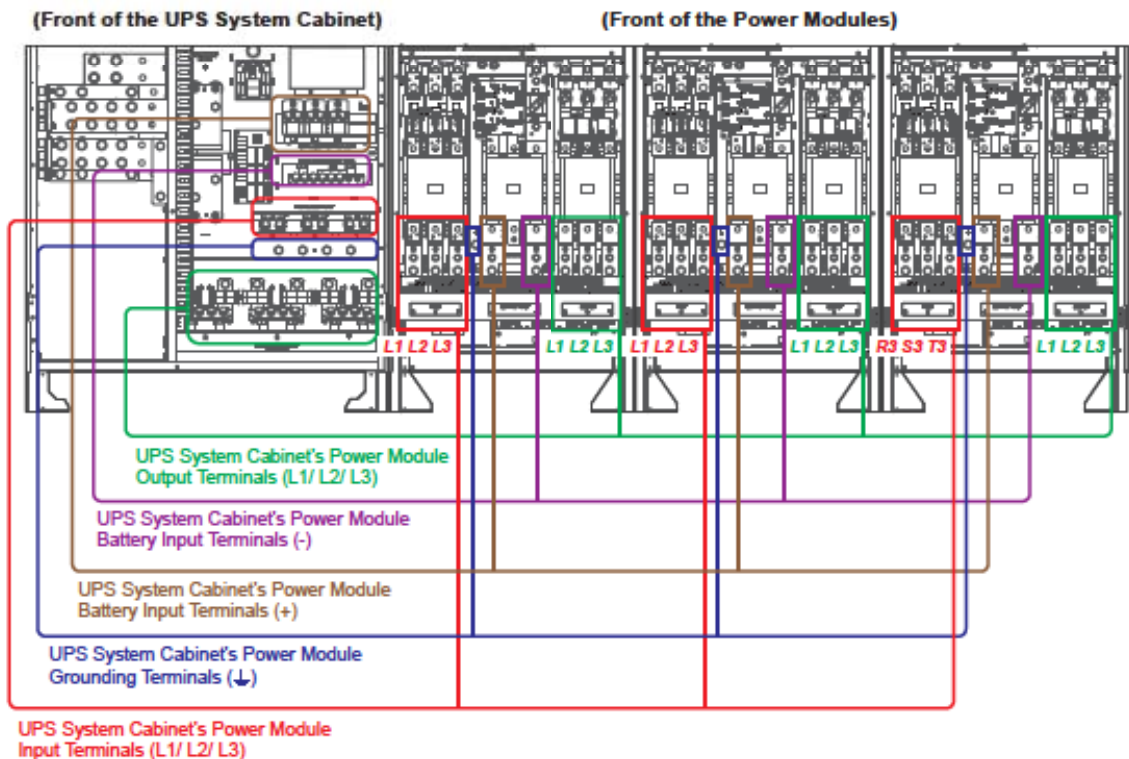
(Figure 5-27: Four Boxes' Location)

Open the box I ~ box IV and you will see 33 cables. Each cable is marked with a number. Please follow the number marked on each cable, the table below and *Figure 5-28* to perform internal wiring between the UPS system cabinet and the power modules.

Cable Q'ty	Cable No.	Function
9 cables in total	For power module 1 : M11/ M12/ M13 For power module 2 : M21/ M22/ M23 For power module 3 : M31/ M32/ M33	The 9 cables connect the UPS system cabinet's Power Module Input Terminals (L1/ L2/ L3) and the power modules' Input Terminals (L1/ L2/ L3).
9 cables in total	For power module 1 : M16/ M17/ M18 For power module 2 : M26/ M27/ M28 For power module 3 : M36/ M37/ M38	The 9 cables connect the UPS system cabinet's Power Module Output Terminals (L1/ L2/ L3) and the power modules' Output Terminals (L1/ L2/ L3).

Cable Q'ty	Cable No.	Function
6 cables in total	For power module 1 : M14 x 2 PCS For power module 2 : M24 x 2 PCS For power module 3 : M34 x 2 PCS	The 6 cables connect the UPS system cabinet's Power Module Battery Input Terminals (+) and the power modules' Battery Input Terminals (+).
6 cables in total	For power module 1 : M15 x 2 PCS For power module 2 : M25 x 2 PCS For power module 3 : M35 x 2 PCS	The 6 cables connect the UPS system cabinet's Power Module Battery Input Terminals (-) and the power modules' Battery Input Terminals (-).
3 cables in total	For power module 1 : M19 For power module 2 : M29 For power module 3 : M39	The 3 cables connect the UPS system cabinet's Power Module Grounding Terminals (\perp) and the power modules' Grounding Terminals (\perp).

750/ 825kVA



(Figure 5-28: Internal Wiring between the UPS System Cabinet and the Power Modules_ 750/ 825kVA UPS)

5.4.4 Single Unit Wiring



NOTE:

1. Only authorized Delta engineers or service personnel can perform installation, wiring, panel/ cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.
2. The UPS rating voltage is 480Vac.
3. The external battery cabinet's rating voltage is 480Vdc.
4. Before wiring, please read *5.4 Wiring* thoroughly and make sure relevant conditions have been met.
5. For 500/ 550kVA UPS and 750/ 825kVA UPS, their wiring methods are the same. Thus, in *5.4.4 Single Unit Wiring*, only the illustration of 750/ 825kVA UPS system cabinet is taken for example.

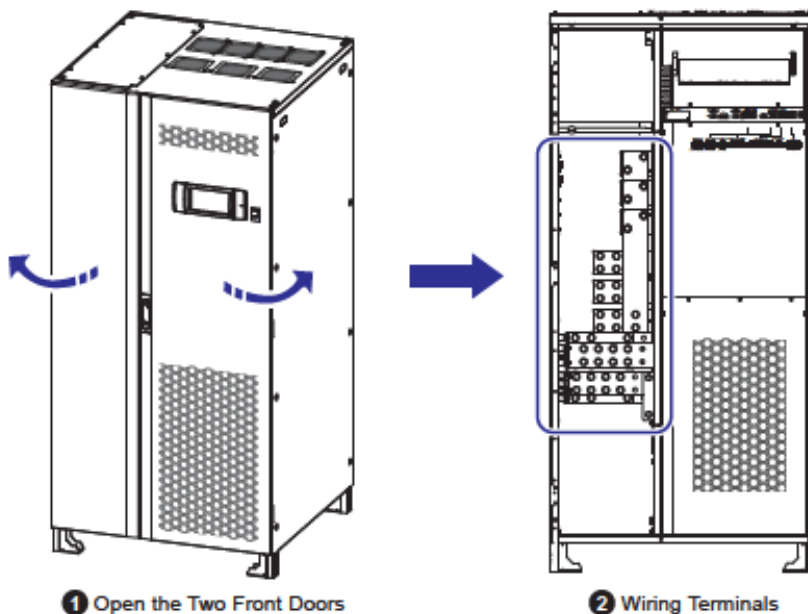
• Single Input (Single Unit)

When there is only one AC power source, single unit wiring procedures are as follows.

- 1 Ensure that the internal wiring between the UPS system cabinet and the power modules has been completed. Please refer to *5.4.3 Internal Wiring between the UPS System Cabinet and the Power Modules*.
- 2 Open the UPS system cabinet's two front doors. After that, you will see the wiring terminals at your left-hand side. Please refer to *Figure 5-29*.

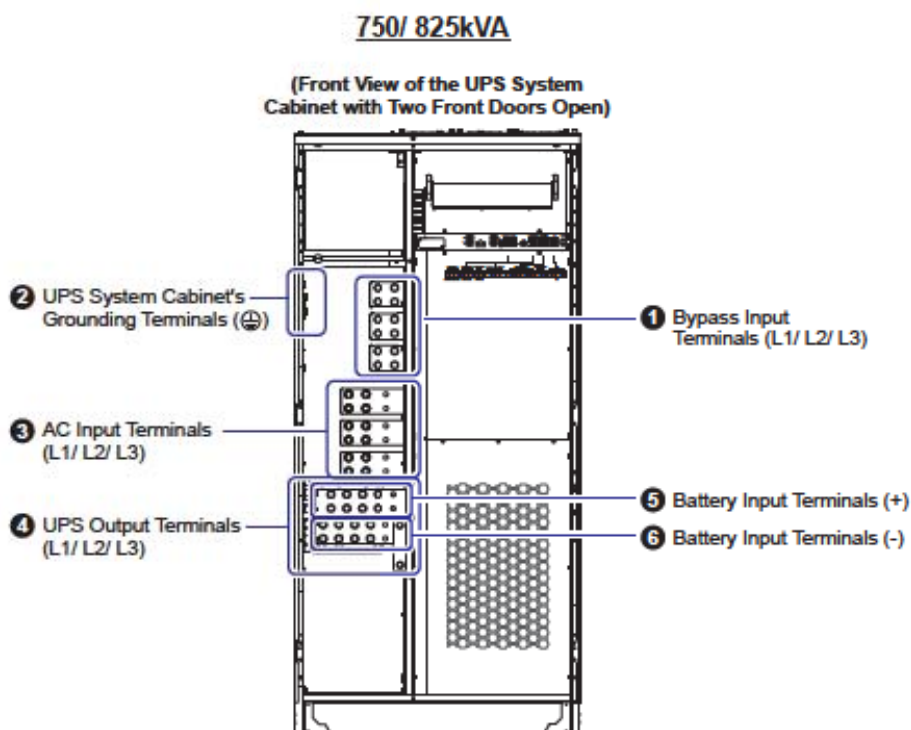
750/ 825kVA

(Front View of the UPS System Cabinet with Two Front Doors Open)



(Figure 5-29: UPS System Cabinet's Front View with Two Front Doors Open)

- 3 For the UPS system cabinet's wiring terminals that need to connect to the user-supplied external maintenance bypass cabinet, please refer to *Figure 5-30*. For the configurations of the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel), please refer to *1.2 Connection Warnings*.



(Figure 5-30: Wiring Terminals of the UPS System Cabinet)

- 4 For how to perform wiring between the UPS system cabinet and the user-supplied external maintenance bypass cabinet, please refer to *Table 5-6*.

Table 5-6: Wiring between the UPS System Cabinet and the External Maintenance Bypass Cabinet

No.	Item*1	Description	Function
1	Bypass Input Terminals	Include L1/ L2/ L3 terminals.	For dual input, the terminals connect to the external maintenance bypass cabinet's bypass breaker.
2	⊕	For the UPS's protective earthing.	The terminal connects to the external maintenance bypass cabinet's grounding terminal (\perp) and the external battery cabinet's grounding terminal (\oplus).

No.	Item ^{*1}	Description	Function
③	AC Input Terminals	Include L1/ L2/ L3 terminals.	The terminals connect to the external maintenance bypass cabinet's input breaker.
④	UPS Output Terminals	Include L1/ L2/ L3 terminals.	The terminals connect to the external maintenance bypass cabinet's output breaker.
⑤ / ⑥	Battery Input Terminals	Include +/ - terminals.	The terminals connect to the external battery cabinet.



NOTE:

^{*1} The terminals listed in the above 'Item' column are all located at the front of the UPS system cabinet. Please refer to *Figure 5-30*.

- ⑤ For the user-supplied external maintenance bypass cabinet's wiring information, please refer to *Table 5-7*.

Table 5-7: External Maintenance Bypass Cabinet Wiring Information

No.	Item ^{*2}	Description	Function
①	Input Breaker (Q1)	Includes L1/ L2/ L3 terminals.	The breaker connects to the main AC power.
②	Bypass Breaker (Q2) (only for dual input application)	Includes L1/ L2/ L3 terminals.	The breaker connects to the bypass power.
③	Manual Bypass Breaker (Q3)	Includes L1/ L2/ L3 terminals.	The breaker connects to the bypass power and the critical loads.
④	Output Breaker (Q4)	Includes L1/ L2/ L3 terminals.	The breaker connects to the critical loads.
⑤	⊕	Includes one grounding terminal.	For the external maintenance bypass cabinet's protective earthing.
⑥	⊕	Includes at least two grounding terminals.	The two grounding terminals shall connect to 1. the UPS system cabinet's grounding terminal (⊕), 2. the connected critical loads' grounding terminal (⊕). Please refer to <i>Figure 5-32</i> & <i>Figure 5-40</i> .

**NOTE:**

*2 The breakers and terminals listed in the above 'Item' column shall be installed in the user-supplied external maintenance bypass cabinet. For the configurations of the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel), please refer to **1.2 Connection Warnings**.

- 6 Confirm that the user-supplied external maintenance bypass cabinet's Input Breaker (Q1), Bypass Breaker (Q2) (only for dual input application), Manual Bypass Breaker (Q3) and the Output Breaker (Q4) are in the OFF position.
- 7 Follow **Table 5-5** to select proper input and output cables.
- 8 Connect the main AC source/ output/ external battery cabinet/ UPS system cabinet/ external maintenance bypass cabinet's cables to the designated wiring terminals. Please refer to the following to perform wiring.

Figure 3-1: Single Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

Figure 3-2: Dual Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

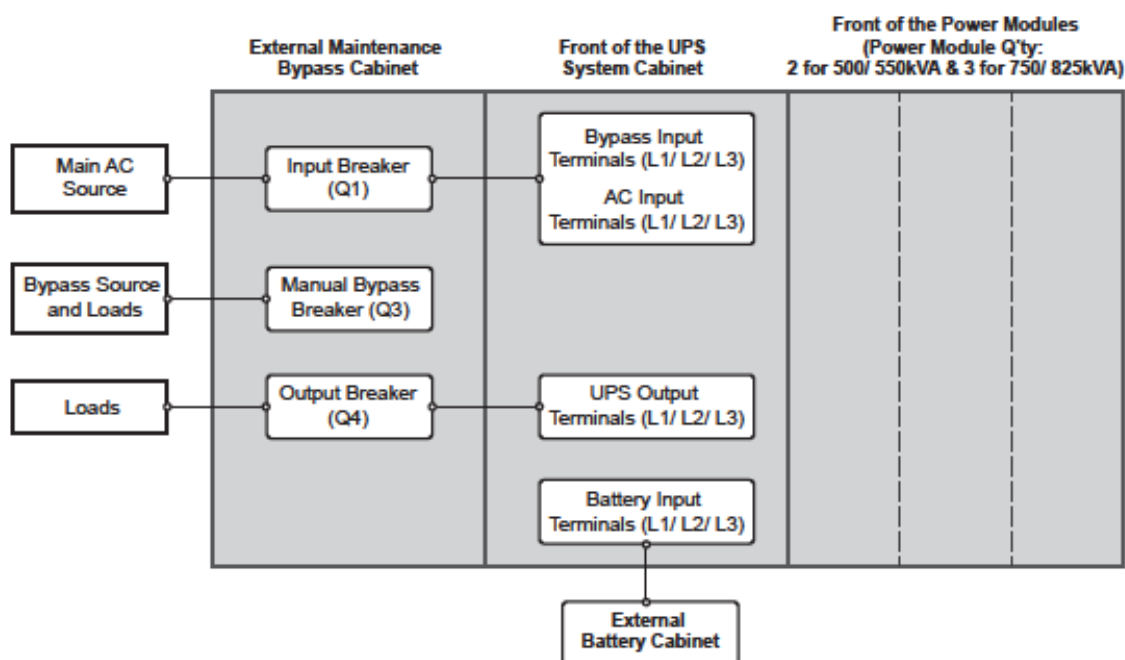
Figure 5-30: Wiring Terminals of the UPS System Cabinet

Table 5-6: Wiring between the UPS System Cabinet and the External Maintenance Bypass Cabinet

Table 5-7: External Maintenance Bypass Cabinet Wiring Information

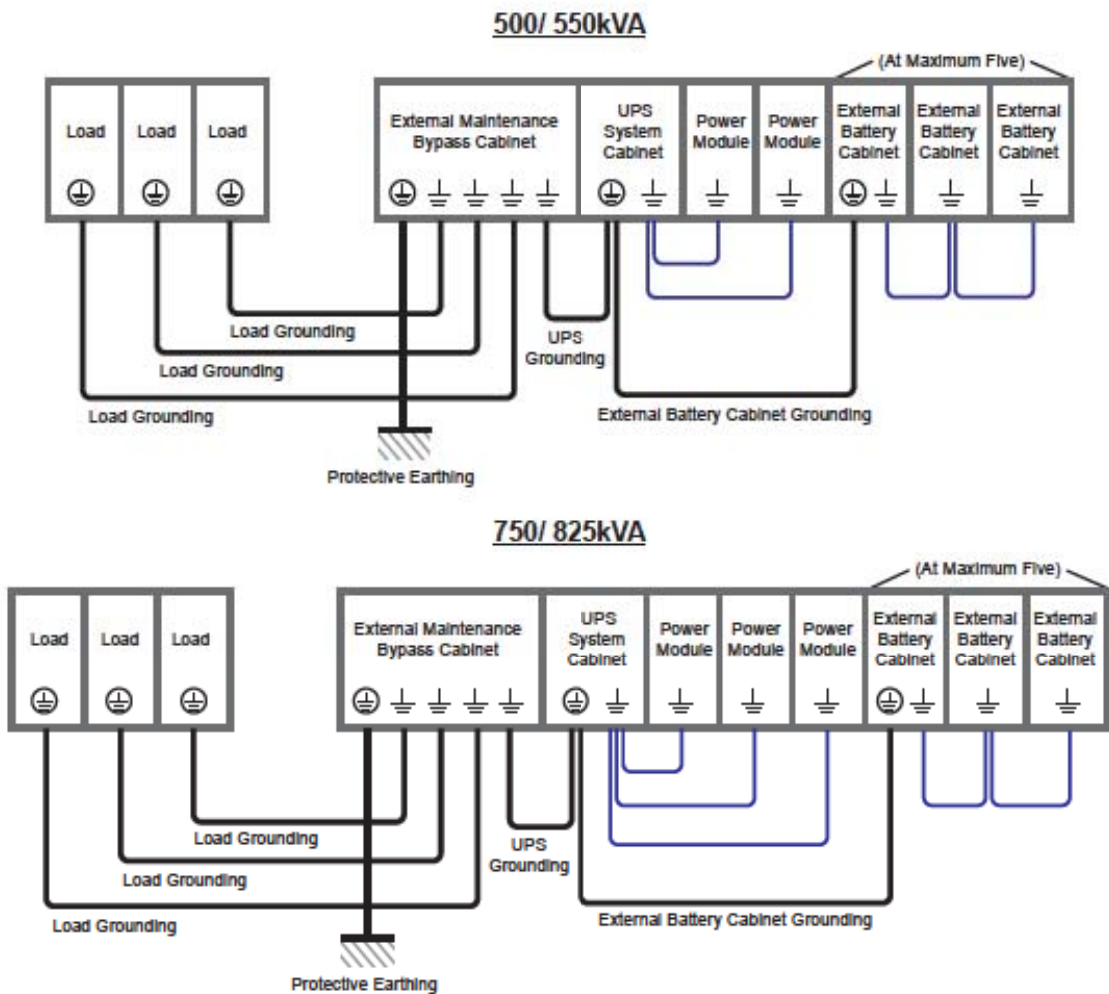
Figure 5-31: Single Unit Single Input Wiring Diagram

5.5 External Battery Cabinet Connection Warnings



(Figure 5-31: Single Unit Single Input Wiring Diagram)

- 9 Follow *Figure 5-32* to ground the UPS system cabinet, power modules, external battery cabinet(s), external maintenance bypass cabinet and connected critical loads.



(Figure 5-32: Grounding Diagram_ Single Unit)

- **Dual Input (Single Unit)**

When there are two AC power sources, single unit wiring procedures are as follows.

- 1 Follow *5.4.2 Single Input/ Dual Input Modification* to modify the UPS from single input into dual input.
- 2 Follow the procedures 1 ~ 7 stated in the section of *Single Input (Single Unit)*.

- 3 Connect the main AC source/ bypass AC source/ output/ external battery cabinet/ UPS system cabinet/ external maintenance bypass cabinet's cables to the designated wiring terminals. Please refer to the following to perform wiring.

Figure 3-1: Single Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

Figure 3-2: Dual Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

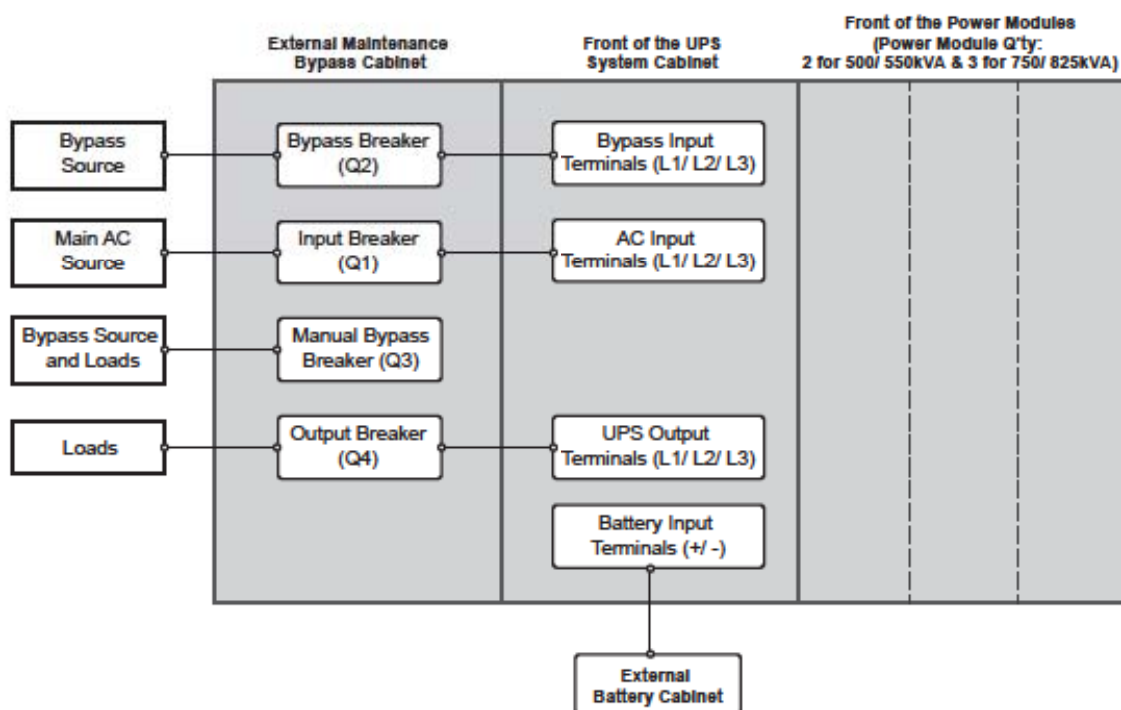
Figure 5-30: Wiring Terminals of the UPS System Cabinet

Table 5-6: Wiring between the UPS System Cabinet and the External Maintenance Bypass Cabinet

Table 5-7: External Maintenance Bypass Cabinet Wiring Information

Figure 5-33: Single Unit Dual Input Wiring Diagram

5.5 External Battery Cabinet Connection Warnings



(Figure 5-33: Single Unit Dual Input Wiring Diagram)

- 4 Follow *Figure 5-32* to ground the UPS system cabinet, power modules, external battery cabinet(s), external maintenance bypass cabinet and connected critical loads.



WARNING:

The phase of the main AC source must be the same as that of the bypass source.

5.4.5 Parallel Units Wiring



NOTE:

1. Only authorized Delta engineers or service personnel can perform installation, wiring, panel/ cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.
2. You can parallel at maximum eight UPS units.
For 500/ 550kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 3 power modules.
For 750/ 825kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 4 power modules.
3. Only the UPSs with the same capacity, voltage, frequency and version can be paralleled. For version information, please refer to **7.10.8 Version**. Please only use the provided parallel cable to parallel the UPS units. Otherwise, parallel functions will fail.
4. When the 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.
5. The UPS rating voltage is 480Vac.
6. The external battery cabinet's rating voltage is 480Vdc.
7. Before wiring, please read **5.4 Wiring** thoroughly and make sure relevant conditions have been met.

- **Single Input (Parallel Units)**

When there is only one AC power source, parallel units' wiring procedures are as follows.

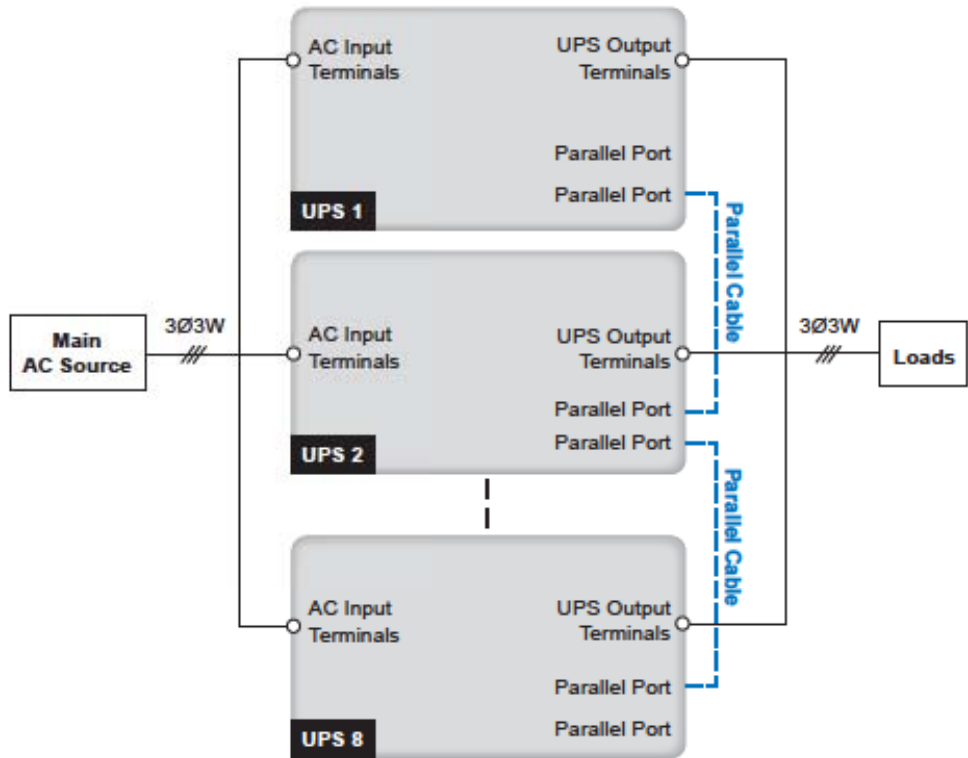
- 1 Please follow steps 1 ~ 7 stated in the section of **Single Input (Single Unit)**.
- 2 Connect the main AC source/ output/ external battery cabinet/ UPS system cabinet/ external maintenance bypass cabinet's cables to the designated wiring terminals. Please refer to the following to perform wiring.

Figure 3-1: Single Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

Figure 3-2: Dual Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

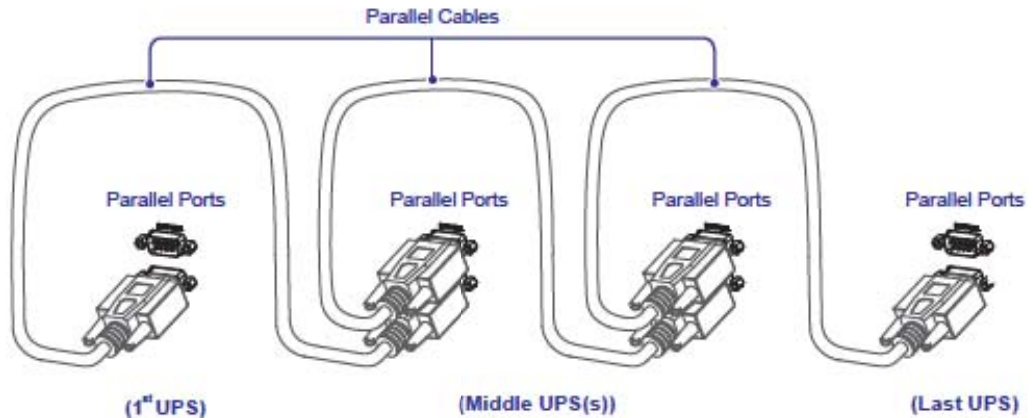
Figure 5-30: Wiring Terminals of the UPS System Cabinet

Table 5-6: Wiring between the UPS System Cabinet and the External Maintenance Bypass Cabinet

Table 5-7: External Maintenance Bypass Cabinet Wiring Information**Figure 5-31: Single Unit Single Input Wiring Diagram****Figure 5-34: Parallel Units Single Input Wiring Diagram****5.5 External Battery Cabinet Connection Warnings****(Figure 5-34: Parallel Units Single Input Wiring Diagram)**

- 3 Use the provided parallel cables to connect the parallel UPSs' parallel ports. For the parallel ports' location, please refer to *Figure 4-9*.

Each UPS has two parallel ports and you can choose either of them for parallel cable connection. Please note that, for any middle parallel UPS, its two parallel ports need to be connected; for the 1st and the last parallel UPSs, only one parallel port needs to be connected. Please refer to *Figure 5-35*.

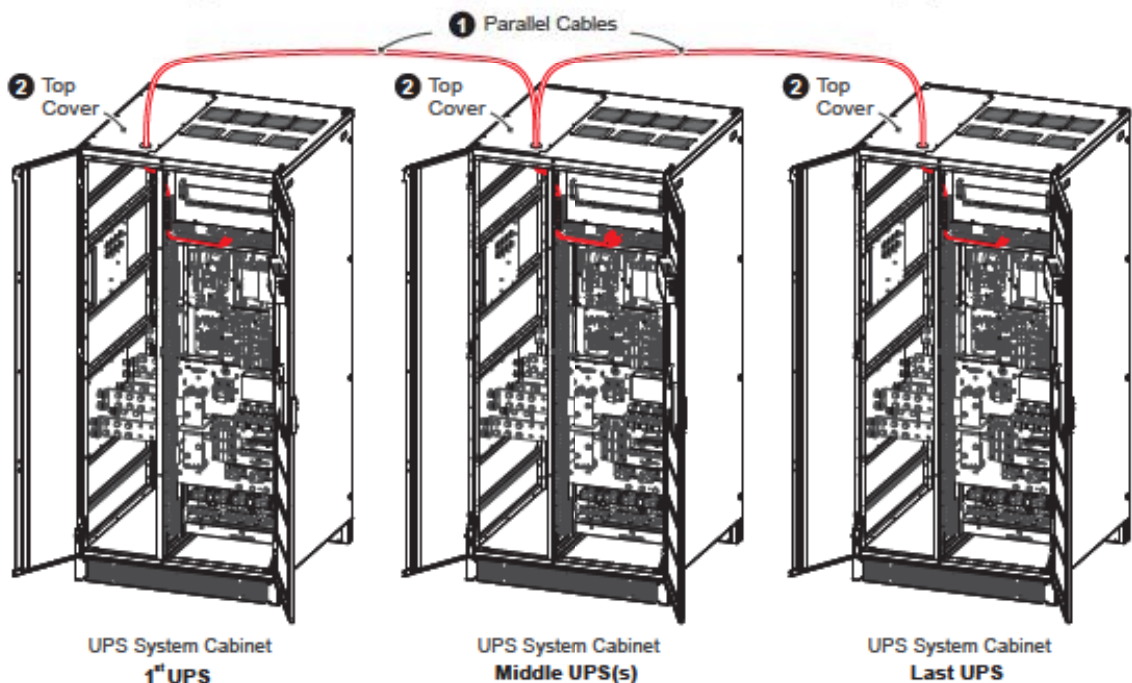


(Figure 5-35: Parallel Ports Connection among the Parallel UPSs)

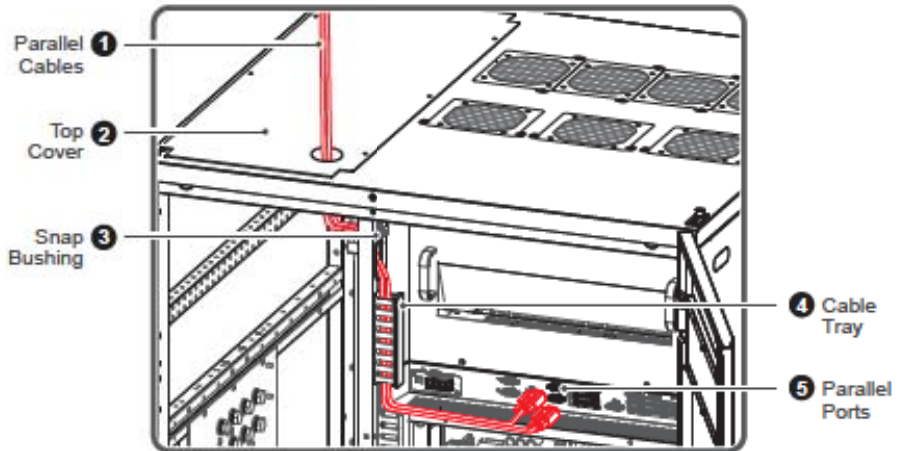
For top entry, please route the provided parallel cables (1) from the top cover (2), the oval snap bushing (3) and the cable tray (4) to connect the cables (1) to the parallel ports (5). Please refer to Figure 5-35, Figure 5-36 and Figure 5-37.

750/ 825kVA

(Front View of Each UPS System Cabinet with Its Two Front Doors Open)



(Figure 5-36: Top Entry_ Parallel Cables Routing Path among the Parallel UPSs)

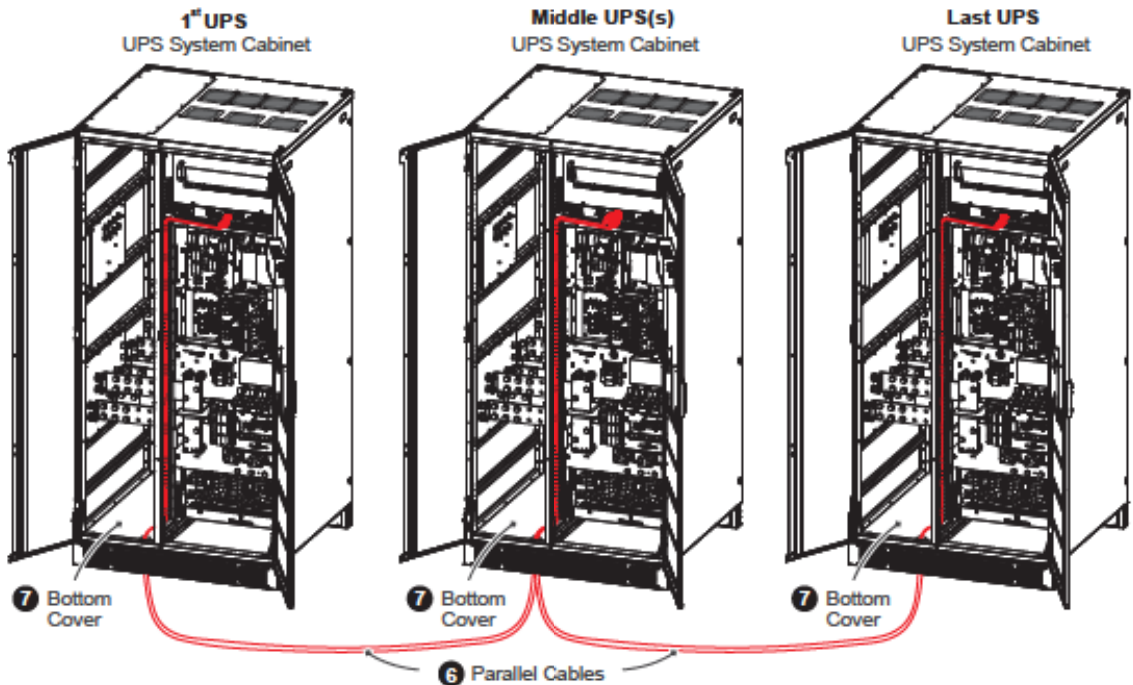


(Figure 5-37: Top Entry_ Location of Top Cover, Snap Bushing, Cable Tray, Parallel Cables & Parallel Ports)

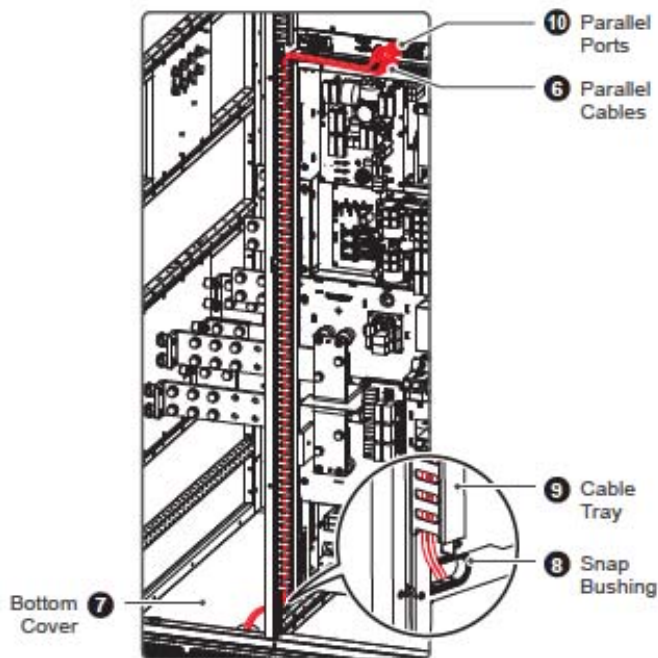
For bottom entry, please route the provided parallel cables (6) from the bottom cover (7), the oval snap bushing (8) and the cable tray (9) to connect the cables (6) to the parallel ports (10). Please refer to Figure 5-35, Figure 5-38 and Figure 5-39.

750/ 825kVA

(Front View of Each UPS System Cabinet with Its Two Front Doors Open)



(Figure 5-38: Top Entry_ Parallel Cables Routing Path among the Parallel UPSs)



(Figure 5-39: Bottom Entry_ Location of Bottom Cover, Snap Bushing, Cable Tray, Parallel Cables & Parallel Ports)



NOTE:

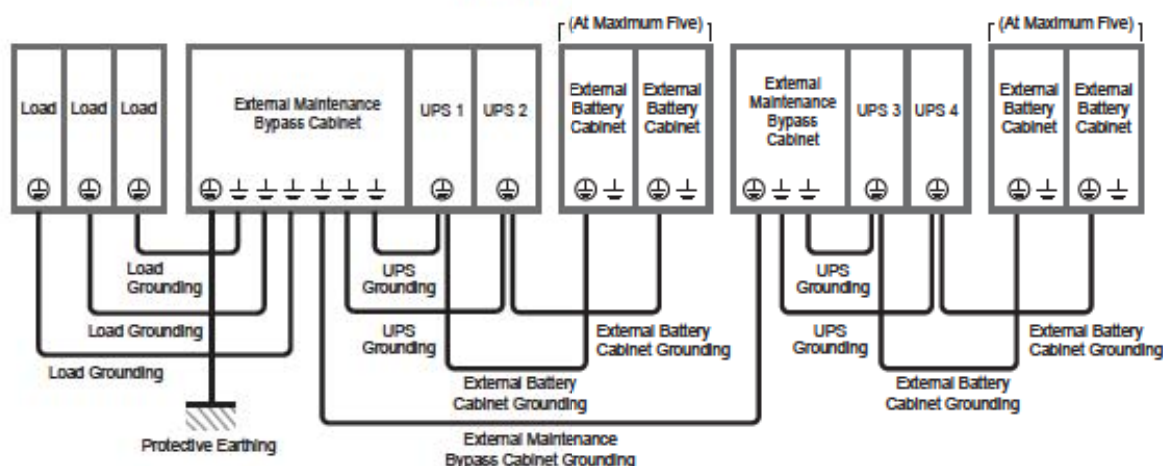
1. For 500/ 550kVA UPS and 750/ 825kVA UPS, their parallel cable connection method and routing path are the same. Thus, in *Figure 5-36*, *Figure 5-37*, *Figure 5-38* and *Figure 5-39*, only the illustration of 750/ 825kVA UPS system cabinet is taken for example.
 2. In accordance with National Electrical Codes (NEC), please install a suitable conduit and bushing for cable protection.
 3. Please refer to national and local electrical codes for acceptable cable size.
- 4 Follow *Figure 5-40* to ground the parallel UPSs, external battery cabinet(s), external maintenance bypass cabinets and connected critical loads.



WARNING:

Before start-up of the parallel units, qualified service personnel must set each UPS's 'Parallel Group ID' (1 or 2) and 'Parallel ID' (1 ~ 8) through the LCD. Otherwise, the parallel UPSs cannot be started. Please refer to *6.2.3 Bypass Mode Start-up Procedures* and *7.9.6 Parallel Setting*.

500/ 550/ 750/ 825kVA



(Figure 5-40: Grounding Diagram_ Parallel Units)

- Dual Input (Parallel Units)

When there are two AC power sources, parallel units' wiring procedures are as follows.

- 1 Follow 5.4.2 *Single Input/ Dual Input Modification* to modify the parallel UPSs from single input into dual input.
- 2 Please follow steps 1 ~ 7 stated in the section of *Single Input (Single Unit)*.
- 3 Connect the main AC source/ bypass AC source/ output/ external battery cabinet/ UPS system cabinet/ external maintenance bypass cabinet's cables to the designated wiring terminals. Please refer to the following to perform wiring.

Figure 3-1: Single Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

Figure 3-2: Dual Input Application_ UPS & External Maintenance Bypass Cabinet's Structure

Figure 5-30: Wiring Terminals of the UPS System Cabinet

Table 5-6: Wiring between the UPS System Cabinet and the External Maintenance Bypass Cabinet

Table 5-7: External Maintenance Bypass Cabinet Wiring Information

Figure 5-33: Single Unit Dual Input Wiring Diagram

Figure 5-41: Parallel Units Dual Input Wiring Diagram

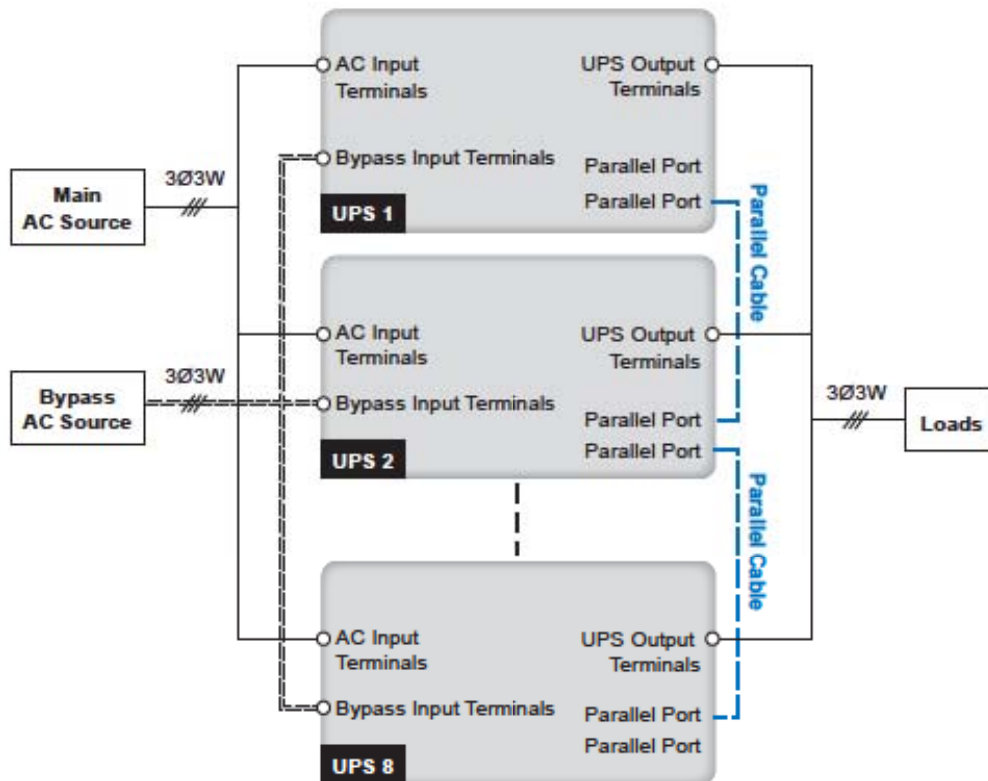
5.5 External Battery Cabinet Connection Warnings

- 4 Please follow step 3 stated in the section of *Single Input (Parallel Units)*. The relevant page No. are from *Page 5-37 to Page 5-40*.
- 5 Follow *Figure 5-40* to ground the parallel UPSs, external battery cabinet(s), external maintenance bypass cabinets and connected critical loads.



WARNING:

Before start-up of the parallel units, qualified service personnel must set each UPS's 'Parallel Group ID' (1 or 2) and 'Parallel ID' (1 ~ 8) through the LCD. Otherwise, the parallel UPSs cannot be started. Please refer to *6.2.3 Bypass Mode Start-up Procedures* and *7.9.6 Parallel Setting*.



(Figure 5-41: Parallel Units Dual Input Wiring Diagram)

5.5 External Battery Cabinet Connection Warnings



NOTE:

1. The information stated in *5.5 External Battery Cabinet Connection Warnings* is only applicable to the lead-acid batteries.
2. Whether you use the lead-acid batteries or the lithium-ion batteries, please contact Delta service personnel for any battery/ battery cabinet's setup and configurations.

You should connect the DPM series UPS with at least one external battery cabinet (at maximum five) to ensure that the critical loads connected are protected when a power failure occurs.

- To ensure that the batteries are fully charged, please charge the batteries at least 8 hours before initial use of the UPS. The charging procedures are as follows.
 1. Connect (1) the UPS to the external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel), (2) the external maintenance bypass cabinet to the AC power source, and (3) the UPS to the external battery cabinet(s). Please see 5. *Installation and Wiring*.
 2. Follow 6. *UPS Operation* to turn the external maintenance bypass cabinet, UPS and external battery cabinet(s). After the UPS is powered on, the unit 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 critical loads connected when a power failure occurs.

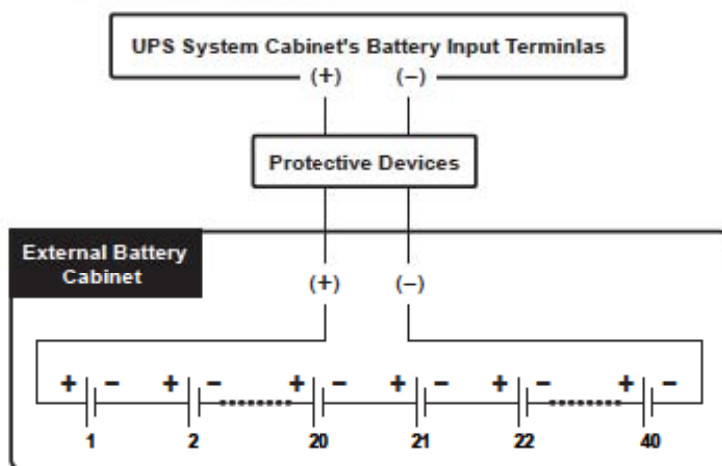
- **Battery Parameters**

No.	Item	500kW/ 500kVA 500kW/ 550kVA	750kW/ 750kVA 750kW/ 825kVA
1	Charge Voltage	Float voltage: 544Vdc (default)	Float voltage: 544Vdc (default)
		Boost voltage: 560Vdc (default)	Boost voltage: 560Vdc (default)
2	Charge Current	Minimum: 10A	Minimum: 15A
		Maximum: 140A	Maximum: 210A
		Default: 10A	Default: 15A
3	Low Battery Shutdown Voltage	380~440Vdc (default: 400Vdc)	380~440Vdc (default: 400Vdc)
4	The Number of Batteries	12V x 40 PCS (default)	12V x 40 PCS (default)

**NOTE:**

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. You can follow on-site requirements to choose 12V × 38 PCS or 12V × 42 PCS batteries. The change of the number of batteries will influence the applied specifications. For battery selection, installation and replacement, please contact your local dealer or customer service.
3. The number of batteries that you set up via the LCD must be the same as that of on-site installation; otherwise, the batteries will be over charged, not fully charged or even seriously damaged.

- 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 $12.5\text{Vdc} \times$ the total number of batteries.
- The default number of batteries is 40 PCS of 12V batteries connected in string. You should use battery cables to connect the external battery cabinet(s) with the '+' and '-' terminals marked on the UPS system cabinet. Please refer to *Figure 5-42*.
- In battery mode, when you execute a 750Ah battery discharge test, the result of the actual discharge time is about 7 to 8 minutes.



(Figure 5-42: External Battery Cabinet Connection)



WARNING:

A battery leak can short-circuit the batteries and lead to serious accidents. For safety's sake, you must insulate the batteries from their touched metal cabinets by installing insulated devices (e.g. insulated trays or boxes) in-between. For relevant information about the insulated materials for such application, please contact Delta customer service.

- Please follow your UPS rating to install an appropriate protective device for each external battery cabinet. There are two installation methods for selection.
 1. A 2-pole DC circuit breaker or DC isolated switch connected in series with a DC fuse
 2. A 2-pole DC circuit breaker

For relevant values, please refer to *Table 5-8*; for relevant installation diagrams, please refer to *Figure 5-43 ~ Figure 5-44*.

- **Table 5-8: External Battery Cabinet's Protective Device (Default Battery Q'ty: 12Vdc × 40 PCS)**

UPS Rating	2-Pole DC Circuit Breaker or 2-Pole DC Isolated Switch (Per Pole Voltage ≥ 500Vdc)	DC fuse (Voltage ≥ 500Vdc)
500kW/ 500kVA 500kW/ 550kVA	1400A	1400A x 2 PCS
750kW/ 750kVA 750kW/ 825kVA	2100A	2100A x 2 PCS

**NOTE:**

1. *Table 5-8* is for 12Vdc × 40 PCS batteries (default). If you install a different number of batteries, please contact Delta service personnel for protective device's current and voltage.
 2. The above-mentioned DC circuit breaker, DC isolated switch and DC fuse are optional. If you want to buy any of them, please contact Delta service personnel.
 3. If you need to parallel multiple units of external battery cabinets, please contact Delta service personnel for relevant information.
 4. To extend backup time, you can parallel up to five units of external battery cabinets to the UPS. Please note that (1) the number of batteries in each of the parallel external battery cabinets, (2) the battery capacity of each parallel external battery cabinet and (3) the cable length of each string of the batteries must be the same.
- Please note that only authorized Delta engineers or service personnel can perform wiring or you can perform wiring only under the supervision of authorized Delta engineers or service personnel. To connect the external battery cabinet(s) to the UPS system cabinet, please refer to:

Figure 2-5: Wiring Terminals inside the UPS System Cabinet

5.4.4 Single Unit Wiring

Table 5-6: Wiring between the UPS System Cabinet and the External Maintenance Bypass Cabinet

Figure 5-31: Single Unit Single Input Wiring Diagram

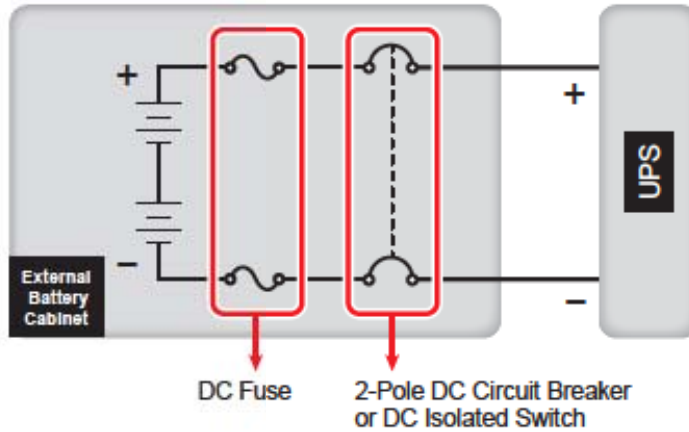
Figure 5-33: Single Unit Dual Input Wiring Diagram

Table 5-8: External Battery Cabinet's Protective Device (Default Battery Q'ty: 12Vdc × 40 PCS)

- For the external battery cabinet's grounding information, please refer to:
Figure 5-32: Grounding Diagram_ Single Unit
Figure 5-40: Grounding Diagram_ Parallel Units
- The external battery cabinet's protective device must be planned and designed by qualified service personnel. For installation of the external battery cabinet's protective device, there are two selections, which are (1) a 2-pole DC circuit breaker or DC isolated switch connected in series with a DC fuse and (2) a 2-pole DC circuit breaker. For relevant values, please refer to *Table 5-8*. When choosing the external battery cabinet's protective device, please take the following factors into consideration: (1) over current between the UPS and battery circuit, (2) short circuit, (3) wire/ cable materials, and (4) local electrical regulations. If you have any questions about the external battery cabinet's protective device, please contact Delta service personnel. For installation methods of the external battery cabinet's protective device, please refer to *Figure 5-43 ~ Figure 5-44*.
- The protective device is optional, and its type must be fast-acting DC circuit breaker or/ and fast-acting DC fuse. When choosing the protective device, please follow the instructions below.
 1. The protective device's rated current must comply with the current values shown in *Table 5-8*.
 2. The specifications of the protective device's short-circuit protection (i.e. the tripping current of the fast-acting DC circuit breaker or/ and the melting current of the fast acting DC fuse) must be 4 ~ 6 times the values shown in *Table 5-8*. Besides, the response time of the protective device must be less than 20ms.
 3. For the choice of the fast-acting DC fuse mentioned above, the A50QS series from the supplier *Ferraz Shawmut* is suggested. Please contact Delta customer service for relevant information.
 4. The maximum tripping current of the fast-acting DC circuit breaker or/ and the maximum melting current of the fast-acting DC fuse mentioned above are 6 times the values shown in *Table 5-8*. These maximum values are suggested for general applications only. For actual maximum values, the maximum short-circuit capacity of the on-site batteries must be taken into consideration. Please contact Delta customer service for relevant information.

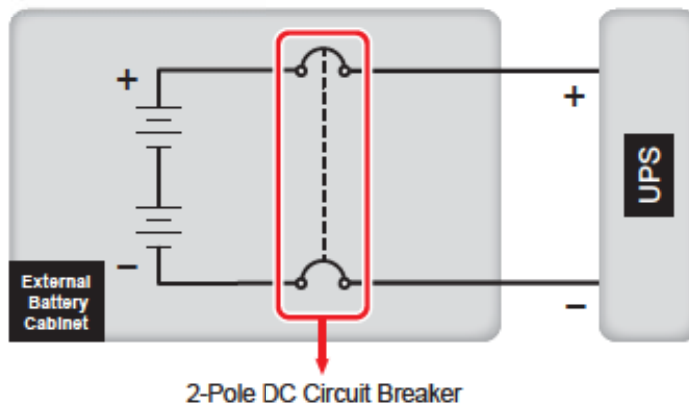
- The external battery cabinet's protective device installation methods are as follows.

Option 1: Installation of a 2-pole DC circuit breaker or DC isolated switch (per pole voltage $\geq 500\text{Vdc}$) connected in series with a DC fuse (voltage $\geq 500\text{Vdc}$)



(Figure 5-43: Installation of a 2-Pole DC Circuit Breaker or DC Isolated Switch Connected in Series with a DC Fuse)

Option 2: Installation of a 2-pole DC circuit breaker (per pole voltage $\geq 500\text{Vdc}$)



(Figure 5-44: Installation of a 2-Pole DC Circuit Breaker)

- To save on your costs and installation space, the parallel UPSs can share their connected external battery cabinet(s). For relevant information, please refer to *3.4 Common Battery (Only for Parallel UPSs Connecting to the Same External Battery Cabinet(s))* and *5.4.5 Parallel Units Wiring*.



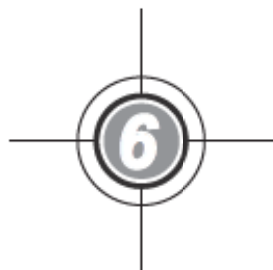
WARNING:

1. Before performing battery/ battery cabinet replacement, please turn off the external battery cabinet's breaker (Q5) to isolate the battery power from the UPS completely.
2. 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 any 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 Abnormal - Reversed	Sounds 50ms every second.
2	Battery Ground Fault	Sounds 50ms every second.
3	Battery Over Temperature	Sounds 50ms every second.
4	Battery Breaker Off	Sounds 50ms every 3 seconds.
5	Battery Disconnected (Missing)	Sounds once every second.
6	Battery Over Charged	Long beep
7	Battery Test Fail	Sounds 50ms every second.
8	Battery End of Discharge Imminent	Sounds 50ms every second.
9	Battery End of Discharge	Long beep
10	Battery Life Time Expired	Sounds 50ms every 3 seconds



UPS Operation

- 6.1 Pre Start-up & Pre Turn-off Warnings for Single Unit and Parallel Units
- 6.2 Start-up Procedures
- 6.3 Turn-off Procedures



6.1 Pre Start-up & Pre Turn-off Warnings for Single Unit and Parallel Units

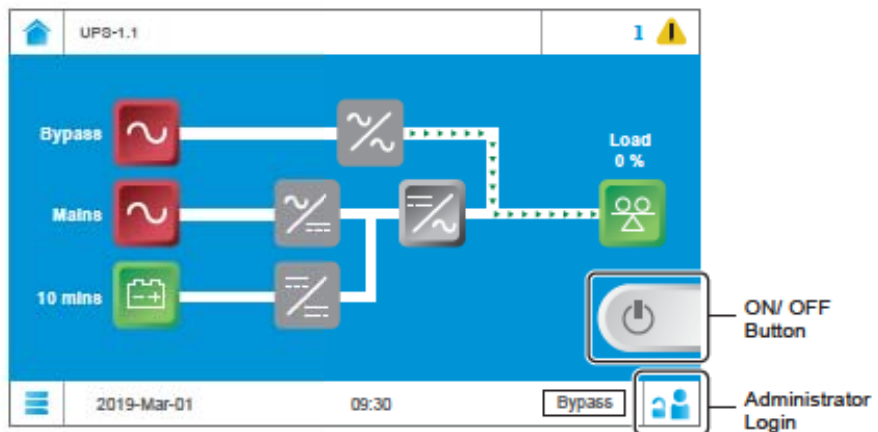



NOTE:

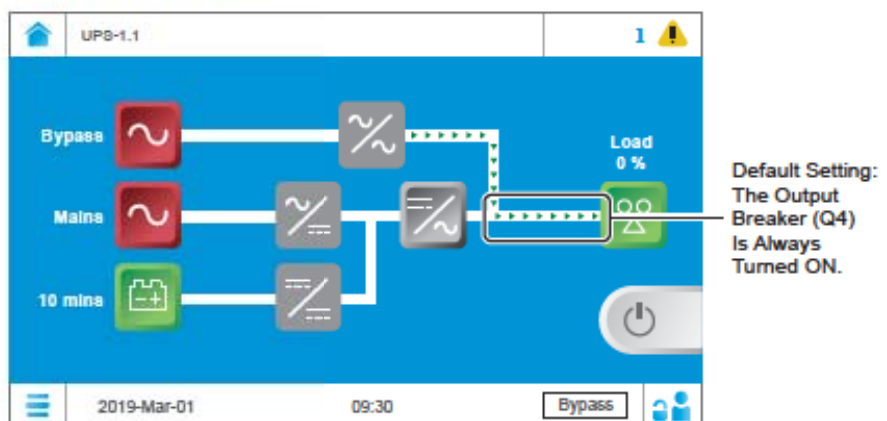
1. All unit No., UPS status, date, time, warning No., event No., load (%), battery remaining time, user login, administrator login, etc. shown in the LCD diagrams presented in 6. *UPS Operation* are for reference only. Actual readings depend on the operation of the UPS.
2. The UPS must be connected with an external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). For the configurations of the external maintenance bypass cabinet, please refer to 1.2 *Connection Warnings*.
3. In this user manual, the meaning of Q1, Q2, Q3, Q4 and Q5 represents the following.

Code	Meaning
Q1	External maintenance bypass cabinet's Input Breaker.
Q2	External maintenance bypass cabinet's Bypass Breaker.
Q3	External maintenance bypass cabinet's Manual Bypass Breaker.
Q4	External maintenance bypass cabinet's Output Breaker.
Q5	External battery cabinet's breaker.

4. Before operation, ensure that installation and wiring have been completely done according to 5. *Installation and Wiring*, and relevant instructions have been followed.
5. Before operation, please refer to 2.8 *Tri-color LED Indicator & Buzzer* and 7. *LCD Display & Settings*.
6. Only after you are in the **Administrator** login status can you see the ON/ OFF button  on the **Main Screen**. Each **Main Screen** presented in 6. *UPS Operation* has the ON/ OFF button  shown because the scenario is set as 'Administrator Login'. Please refer to the figure below.



7. For the ON/ OFF button  information, please refer to 7.3 ON/ OFF Button. For the Main Screen information, please refer to 7.6 Main Screen.
8. The default setting of the external maintenance bypass cabinet's output breaker (Q4) is ON. Thus, in 6. UPS Operation, the power flow shown on each Main Screen presents that the output breaker (Q4) is always turned ON. Please refer to the following figure.



Single Unit

• Pre Start-up Warnings for Single Unit

1. Make sure that all of switches and breakers, including every external battery cabinet's breaker (Q5), are turned to the OFF position.
2. Check if the wiring is correct. Ensure that the AC power's voltage, frequency, phase sequence and battery type meet the UPS's requirements.

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

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

Parallel Units

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

1. You can parallel at maximum eight UPS units.

For 500/ 550kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 3 power modules.

For 750/ 825kVA UPS, you can parallel at maximum 8 UPS system cabinets, and each UPS system cabinet can connect to up to 4 power modules.

2. Make sure that all of switches and breakers, including every external battery cabinet's breaker (Q5), are turned to the OFF position.
3. With the provided parallel cable, UPSs with the same capacity, voltage, frequency and version can be paralleled. For version information, please refer to **7.10.8 Version**. Please only use the provided parallel cable to parallel the UPS units; otherwise, parallel functions will fail.
4. For parallel units, ensure that each parallel cable (provided) is connected well.
5. Please set up each parallel UPS's parallel switch. Please refer to **4.1.4 Parallel Switch**.
6. Check if the wiring is correct. Ensure that the AC power's voltage, frequency, phase and battery type meet the UPS's requirements.
7. Before start-up of the parallel units, qualified service personnel must set each UPS's 'Parallel Group ID' (1 or 2) and 'Parallel ID' (1 ~ 8) through the LCD. Otherwise, the parallel UPSs cannot be started. Please refer to **6.2.3 Bypass Mode Start-up Procedures** and **7.9.6 Parallel Setting**.
8. For parallel units, ensure that every operation procedure is synchronized to all parallel UPSs.
9. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

- **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 units' total capacity exceeds the total critical loads. If the remaining parallel units' total capacity is less than the total critical loads, all parallel units will shut down due to overload.

- If you perform turn-off procedures for all parallel UPSs, all power will be completely cut off. Please make sure that the critical loads connected to the parallel UPSs have already been safely shut down before you perform the turn-off procedures.

6.2 Start-up Procedures

6.2.1 On-Line Mode Start-up Procedures



WARNING:


- For parallel units, please follow **6.2.3 Bypass Mode Start-up Procedures** to turn on each parallel UPS. After confirming that parallel operation works normally, follow the procedures below step by step.
- For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
- For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

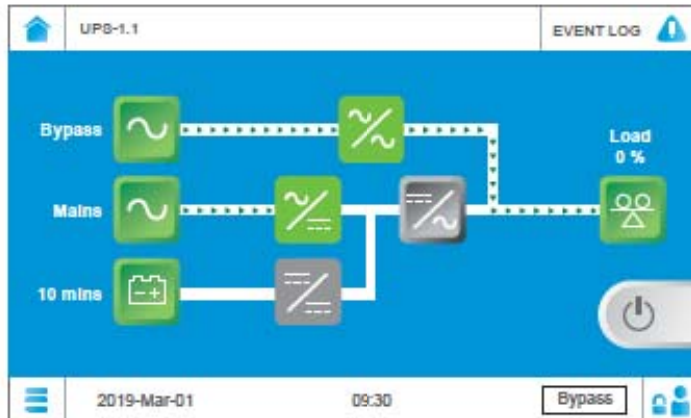
1 Switch ON each external battery cabinet's breaker (Q5). At this moment, the UPS's tri-color LED indicator is off. For the tri-color LED indicator's location, please refer to *Figure 2-13*.

2 (a) **Single Input:**

Switch ON the external maintenance bypass cabinet's input breaker (Q1) and output breaker (Q4). After that, the LCD will be on (see the figure below) and the tri-color LED indicator will illuminate yellow.



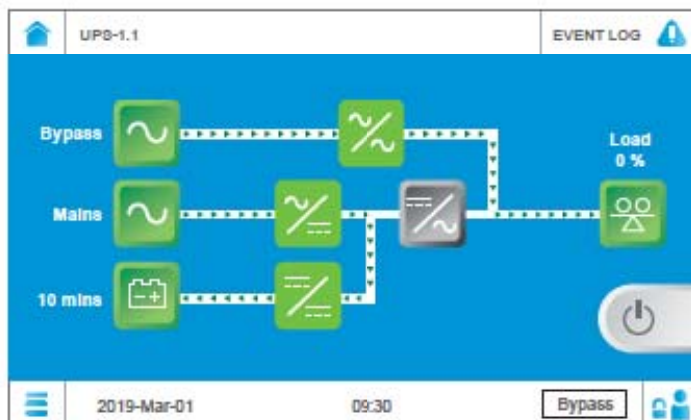
After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below. Now, the bypass static switch icon () illuminates green, the rectifier starts running and establishing the DC BUS voltage, but the charger converter has not charged the batteries yet. During this time, the tri-color LED indicator remains yellow.



NOTE:

For the **Main Screen** information, please refer to **7.6 Main Screen**.


After the DC BUS voltage is established, the charger converter will start up and begin to charge the batteries. Meanwhile, it will be the bypass source to supply power to the connected loads.

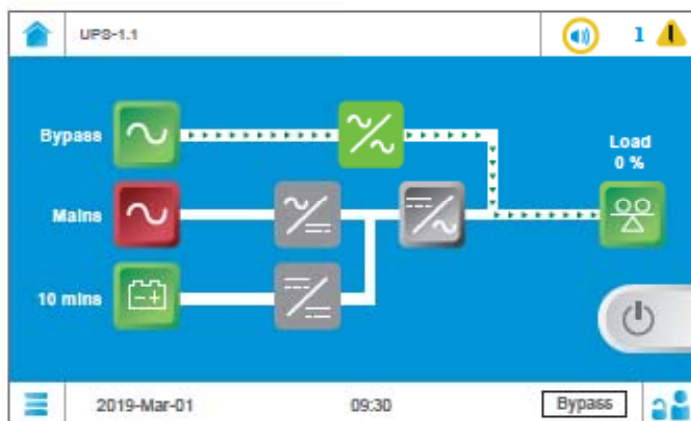


(b) Dual Input:

Switch **ON** the external maintenance bypass cabinet's bypass breaker (Q2) and output breaker (Q4). After that, the LCD will be on (see the figure below) and the tri-color LED indicator will illuminate yellow.



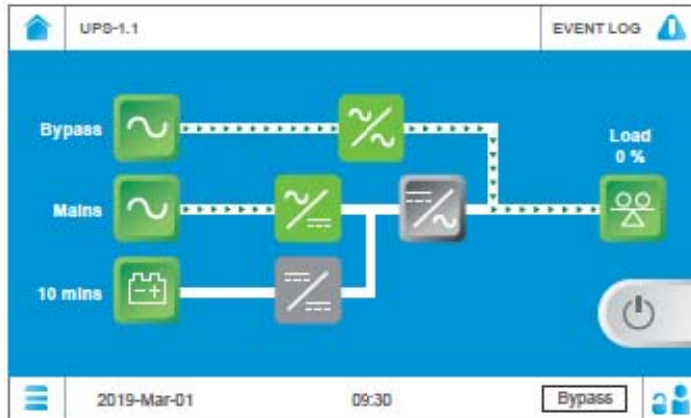
After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below, and the bypass static switch icon () will illuminate green.



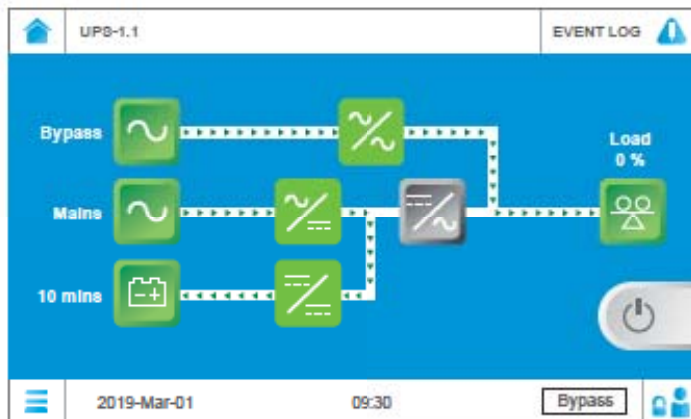
NOTE:


For the **Main Screen** information, please refer to **7.6 Main Screen**.

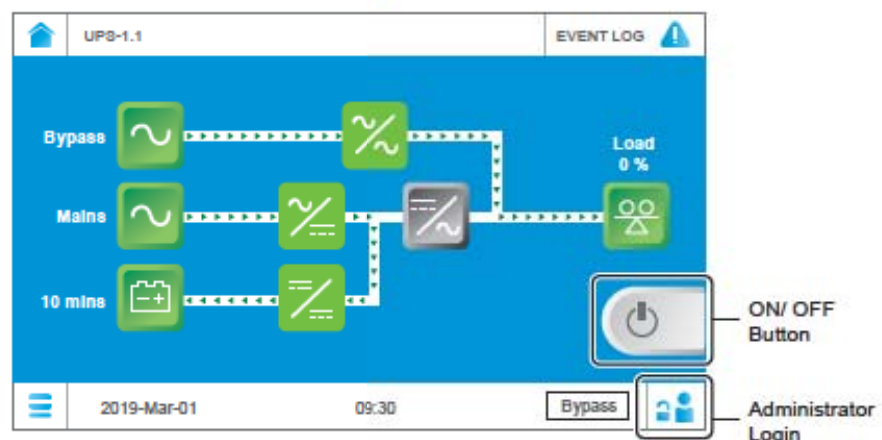
Turn on the external maintenance bypass cabinet's input breaker (Q1). Now, the rectifier starts running and establishing the DC BUS voltage, but the charger converter has not charged the batteries yet. During this time, the tri-color LED indicator remains yellow



After the DC BUS voltage is established, the charger converter will start up and begin to charge the batteries. Meanwhile, it will be the bypass source to supply power to the connected loads.




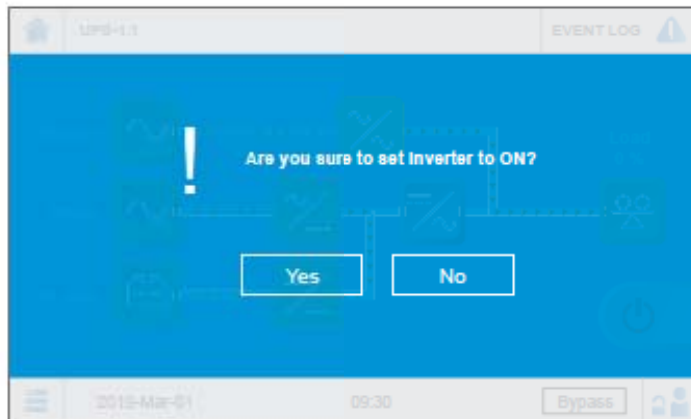
- 3 Please ensure that you are in the Administrator login status. For the Administrator password, please contact service personnel. After you are in the log in as an Administrator login status, the ON/ OFF button  will appear on the Main Screen. Please refer to the figure below.



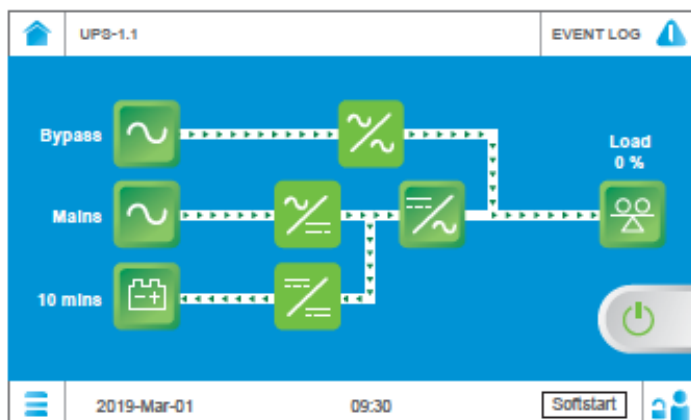
**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.

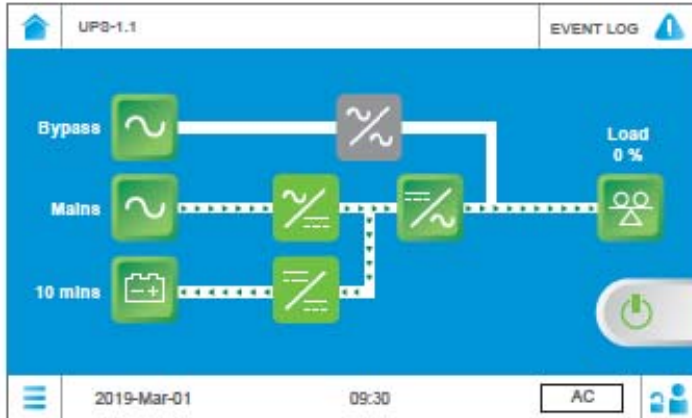
- 4 Tap the ON/ OFF button  shown on the **Main Screen** (please see the figure above for the button location) and the following screen will pop up to ask you if you want to power on the UPS's inverter. Please select 'YES'.



- 5 After selection of 'YES' to start up the UPS's inverter, the UPS will perform self-inspection, the system will begin synchronization with the bypass AC source and the tri-color LED indicator will remain yellow.



- 6 After the self-inspection and synchronization are both completed, the UPS will automatically transfer from bypass to inverter and let the inverter supply power to the connected loads. After the online mode start-up procedures are completed, the LCD will show the following screen and the tri-color LED indicator will illuminate green.



6.2.2 Battery Mode Start-up Procedures

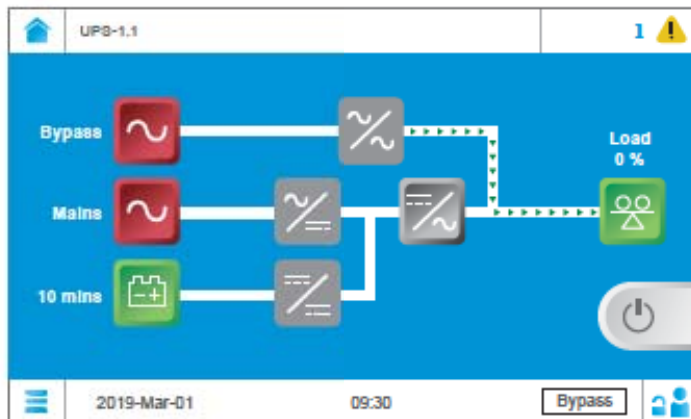


WARNING:

1. For parallel units, please follow **6.2.3 Bypass Mode Start-up Procedures** to turn on each parallel UPS. After confirming that parallel operation works normally, follow the procedures below step by step.
 2. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
 3. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.
- 1 Switch **ON** each external battery cabinet's breaker (Q5) and the external maintenance bypass cabinet's output breaker (Q4). At this moment, the UPS's tri-color LED indicator is off. For the tri-color LED indicator's location, please refer to *Figure 2-13*.
 - 2 Open the UPS system cabinet's two front doors and press the **BATT. START** button for 3 seconds and release it. For the location of the **BATT. START** button, please refer to *Figure 4-2*. Now, the LCD is on (see the figure below) and the tri-color LED indicator illuminates yellow.




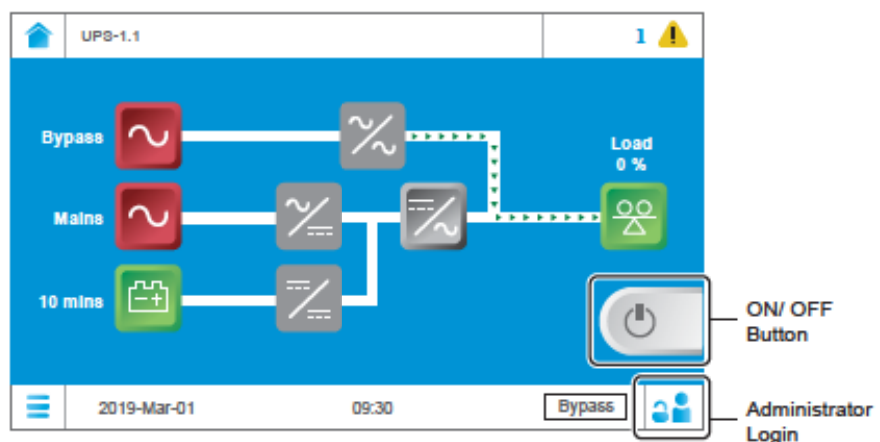
After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below.



NOTE:


For the **Main Screen** information, please refer to **7.6 Main Screen**.

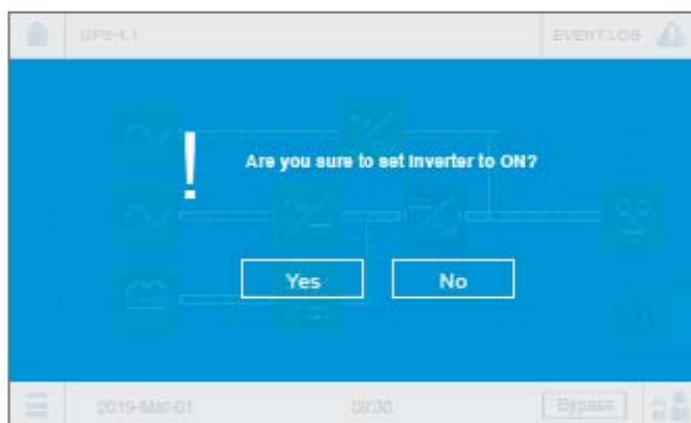
- 3 Please ensure that you are in the **Administrator** login status. For the **Administrator** password, please contact service personnel. After you are in the **Administrator** login status, the ON/ OFF button  will appear on the **Main Screen**. Please refer to the figure below.



NOTE:

For the **Main Screen** information, please refer to **7.6 Main Screen**.

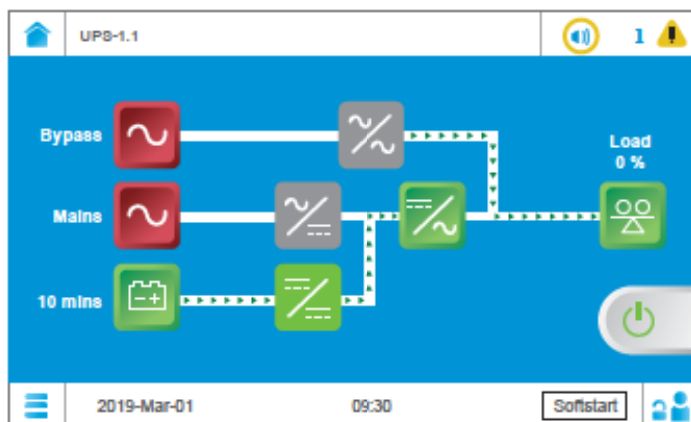
- 4 Tap the ON/ OFF button  shown on the **Main Screen** (please see the figure above for the button location) and the following screen will pop up to ask you if you want to power on the UPS's inverter. Please select 'YES'.




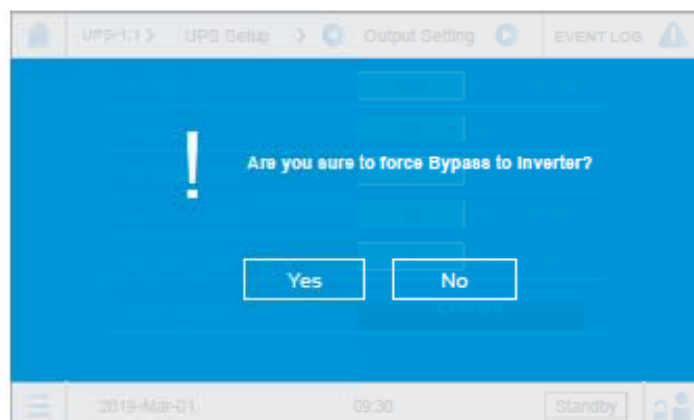
NOTE:

For the **Main Screen** information, please refer to **7.6 Main Screen**.

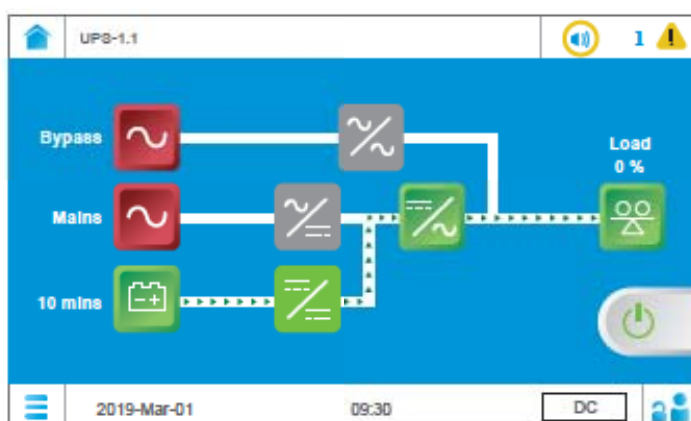
- 5 After selection of 'YES', the battery converter will start running and establishing the DC BUS voltage. During this time, the tri-color LED indicator remains yellow.



- 6 After the DC BUS voltage is established, the inverter will start up and the UPS will perform self-inspection. Now, tap the **Main Menu** icon  located in the lower left corner of the LCD and select **UPS Setup** → **Output Setting** → **Force Bypass to Inverter**. Next, the following screen will pop up to ask you if you want to manually force the UPS to run from bypass to inverter. Please select 'YES'.



- 7 After it is the inverter to supply power to the connected loads, the battery mode start-up procedures are completed. In battery mode, the LCD screen shows as follows and the tri-color LED indicator illuminates yellow.



6.2.3 Bypass Mode Start-up Procedures




WARNING:

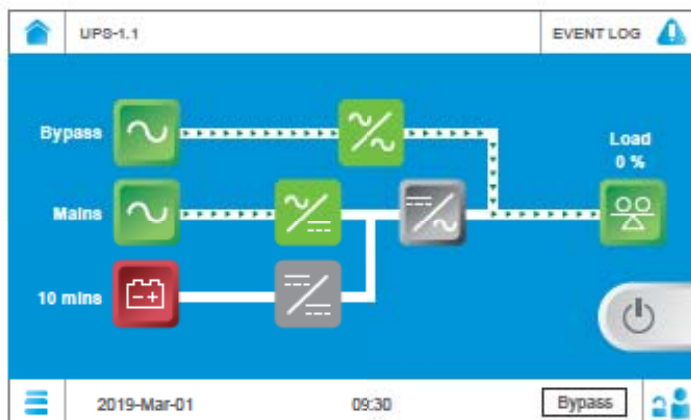
1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

1 (a) Single Input:

Switch ON the external maintenance bypass cabinet's input breaker (Q1). Now, the LCD is on (see the figure below) and the tri-color LED indicator illuminates yellow. For the location of the tri-color LED indicator, please refer to *Figure 2-13*.



After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below. Now, the bypass static switch icon () illuminates green.




NOTE:

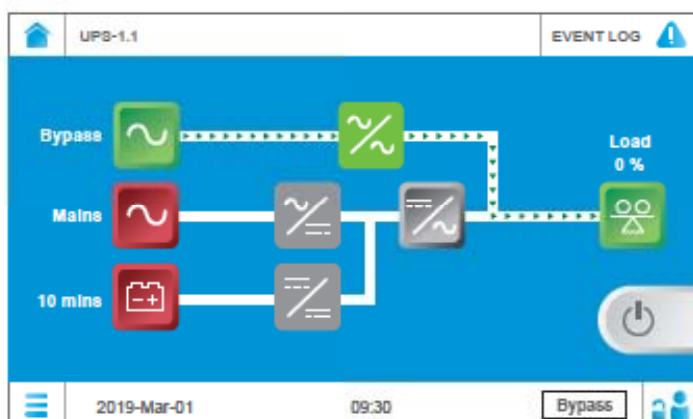
For the **Main Screen** information, please refer to **7.6 Main Screen**.

(b) Dual Input:

Switch **ON** the external maintenance bypass cabinet's bypass breaker (Q2). Now, the LCD is on (see the figure below) and the tri-color LED indicator illuminates yellow. For the location of the tri-color LED indicator, please refer to **Figure 2-13**.





After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below, and the bypass static switch icon () will illuminate green.

**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.

- 2 For parallel application, please use the LCD to set each UPS's 'Parallel Group ID' (1 or 2) and 'Parallel ID' (1 ~ 8). Please note that each parallel UPS's parallel ID No. must be different, and parallel group ID No., input, output and battery settings must be the same.

For setup, tap the **Main Menu** icon  located in the lower left corner of the LCD and select **UPS Setup** → **Parallel Setting** → **Parallel Group ID/ Parallel ID**.

After setup, the UPS's 'Parallel Group ID' and 'Parallel ID' information will appear at the right side of the **Main Menu** icon . Please refer to the figure below.



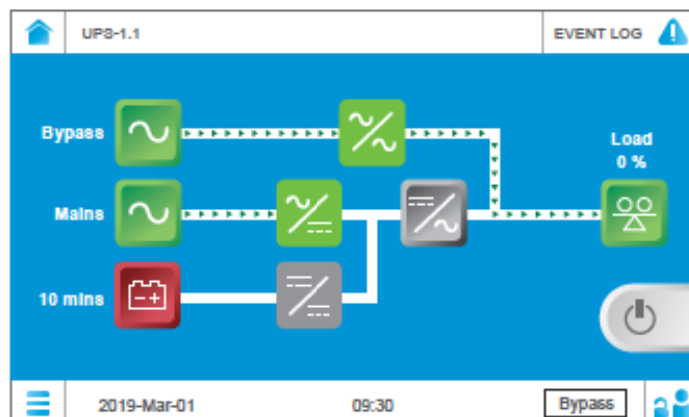
WARNING:

The setup of each UPS's 'Parallel Group ID' (1 or 2) and 'Parallel ID' (1 ~ 8) through the LCD must be completed before start-up of the parallel units. Otherwise, the parallel UPSs cannot be started. For other relevant information, please refer to *7.9.6 Parallel Setting*.

- 3 For single unit, turn ON the external maintenance bypass cabinet's output breaker (Q4).
For parallel units, ensure that the output voltage difference between each parallel UPS is below 5V. If larger than 5V, it is abnormal; please contact service personnel immediately. If below 5V, turn ON each parallel UPS's external maintenance bypass cabinet's output breaker (Q4).

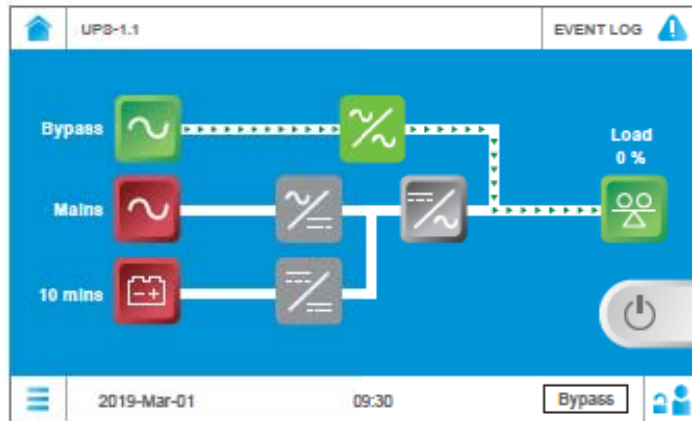
- 4 (a) **Single Input:**

After the steps mentioned above is finished, it will be the bypass source to supply power to the connected loads. Once the bypass start-up procedures are completed, the following screen appears and the tri-color LED indicator remains yellow.



(b) Dual Input:

After the steps mentioned above is finished, it will be the bypass source to supply power to the connected loads. Once the bypass start-up procedures are completed, the following screen appears and the tri-color LED indicator remains yellow.



6.2.4 Manual Bypass Mode Start-up Procedures

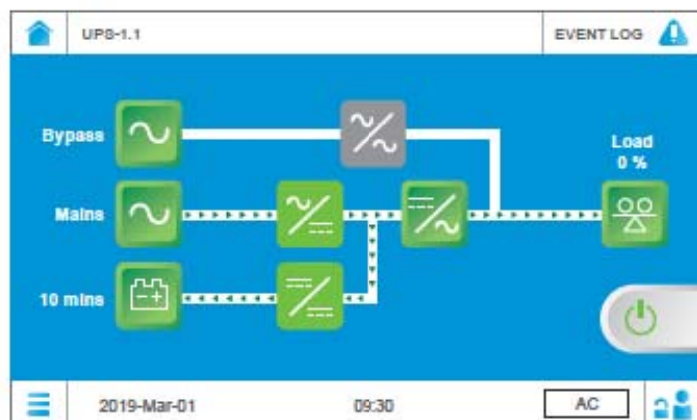
**WARNING:**

1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.
3. Please note that you can turn on the external maintenance bypass cabinet's manual bypass breaker (Q3) only when the UPS needs maintenance. In manual bypass mode, power supply of the connected critical loads comes from the manual bypass and the output is not protected. Please ensure that the bypass AC source is normal.
4. In Manual Bypass mode, power supply of the critical loads comes from the manual bypass; thus, maintenance personnel can perform maintenance without interrupting the power supplying to the critical loads.
5. In manual bypass mode, ensure that all of the breakers and switches (except the external maintenance bypass cabinet's manual bypass breaker (Q3)) are in the OFF position, and use a voltmeter to check if there is any high voltage inside the UPS. Only after you have confirmed that there is no high voltage in the UPS can service personnel perform UPS maintenance.
6. During UPS maintenance process, to avoid electric shock, do not touch the following parts:
 - (a) The external maintenance bypass cabinet's AC Input terminal block, Bypass Input terminal block, UPS Output terminal block, Battery Input terminal block, grounding terminals and any copper bars connected to the external maintenance bypass cabinet's Manual Bypass Breaker (Q3).
 - (b) Every external battery cabinet's battery input terminal block.

These parts mentioned above may carry high voltage


- **Switching from online mode to manual bypass mode**

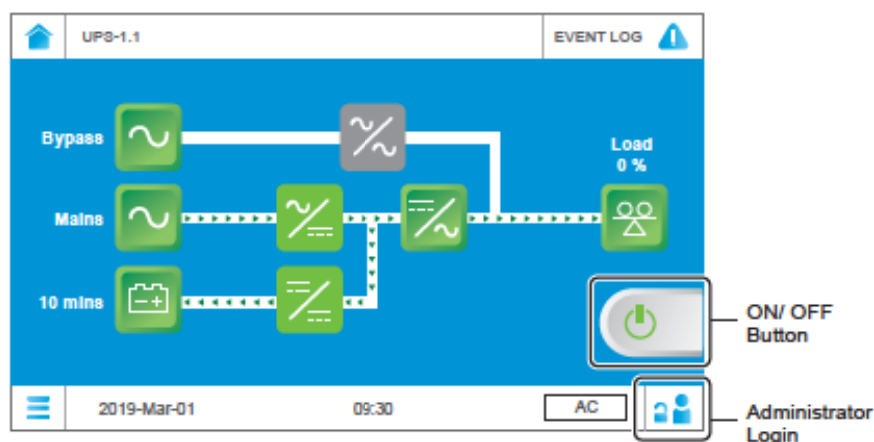
- 1 In online mode, the LCD's **Main Screen** shows as follows and the tri-color LED indicator illuminates green. For the location of the tri-color LED indicator, please refer to *Figure 2-13*.



NOTE:


For the **Main Screen** information, please refer to *7.6 Main Screen*.

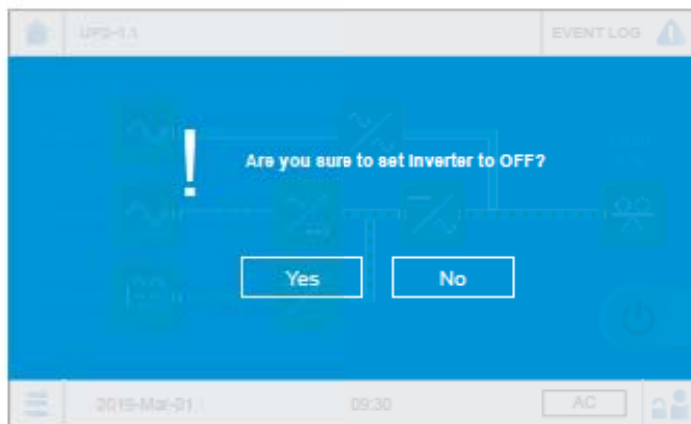
- 2 Please ensure that you are in the **Administrator** login status. For the **Administrator** password, please contact service personnel. After you are in the **Administrator** login status, the **ON/ OFF** button  will appear on the **Main Screen**. Please refer to the figure below.



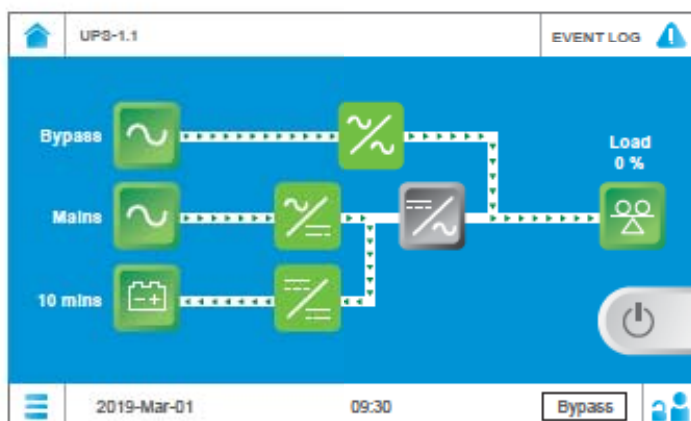
NOTE:

For the **Main Screen** information, please refer to *7.6 Main Screen*.



- 3 Tap the ON/ OFF button  shown on the **Main Screen** (please see the figure above for the button location) and the following screen will pop up to ask you if you want to power off the UPS's inverter. Please select 'YES'.





- 4 After selection of 'YES', the invert will shut down and stop running. Next, the UPS will transfer from inverter to bypass and let the bypass source to supply power to the connected loads, and the tri-color LED indicator will illuminate yellow.







- 5 (a) **Single Input:**

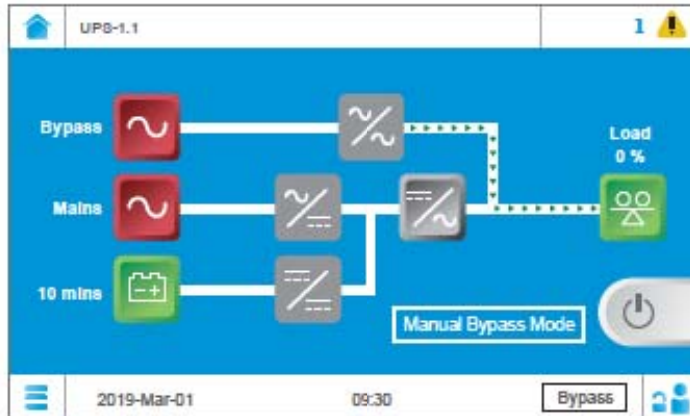
Turn **ON** the external maintenance bypass cabinet's manual bypass breaker (Q3) and turn **OFF** the external maintenance bypass cabinet's input breaker (Q1). Now, the grey inverter icon  becomes green .

At this moment, it is manual bypass to supply power to the connected loads and the UPS begins shutdown. About 3~5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow.

(b) Dual Input:

Turn **ON** the external maintenance bypass cabinet's manual bypass breaker (Q3) and turn **OFF** the external maintenance bypass cabinet's bypass breaker (Q2) and input breaker (Q1). Now, the grey inverter icon  becomes green .

At this moment, it is manual bypass to supply power to the connected loads and the UPS begins shutdown. About 3 ~ 5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow.



- ⑥ Switch **OFF** each external battery cabinet's breaker (Q5). After that, both of the LCD and the tri-color LED indicator are off.

- **Switching from manual bypass mode to online mode**

- ① Switch **ON** each external battery cabinet's breaker (Q5). At this moment, the LCD and the tri-color LED indicator are both off. For the tri-color LED indicator's location, please refer to *Figure 2-13*.

- ② **(a) Single Input:**

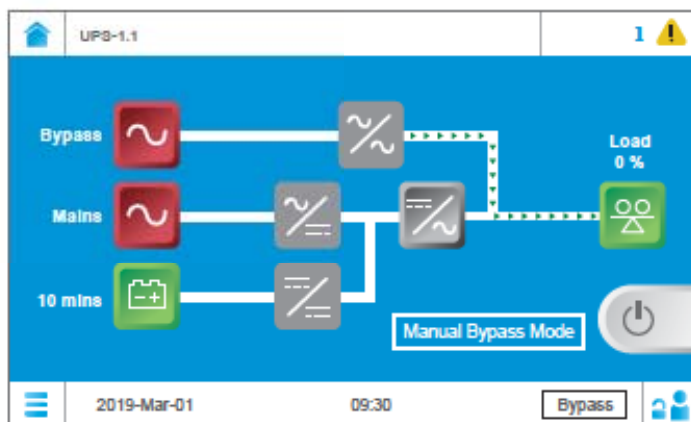
Switch **ON** the external maintenance bypass cabinet's input breaker (Q1) and output breaker (Q4). Now, the LCD is on (see the figure below) and the tri-color LED indicator illuminates yellow.

- (b) Dual Input:**

Switch **ON** the external maintenance bypass cabinet's bypass breaker (Q2), input breaker (Q1) and output breaker (Q4). Now, the LCD is on (see the figure below) and the tri-color LED indicator illuminates yellow.

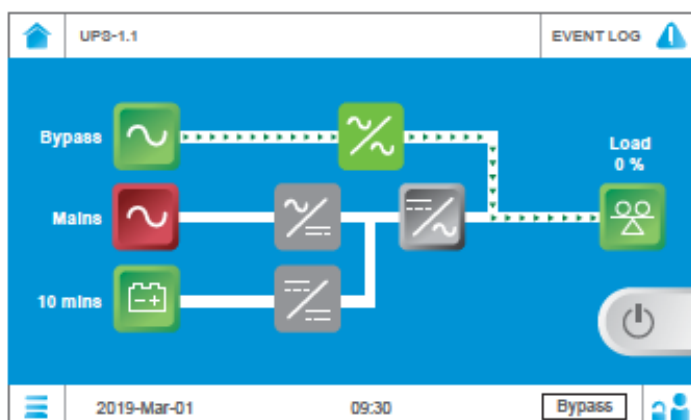


- 3 After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below.

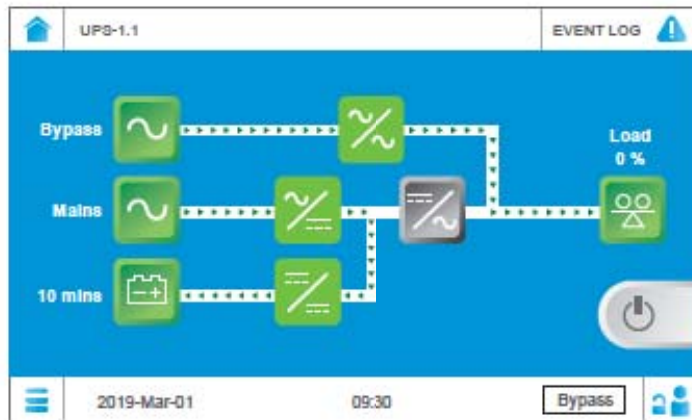
**NOTE:**


For the **Main Screen** information, please refer to **7.6 Main Screen**.

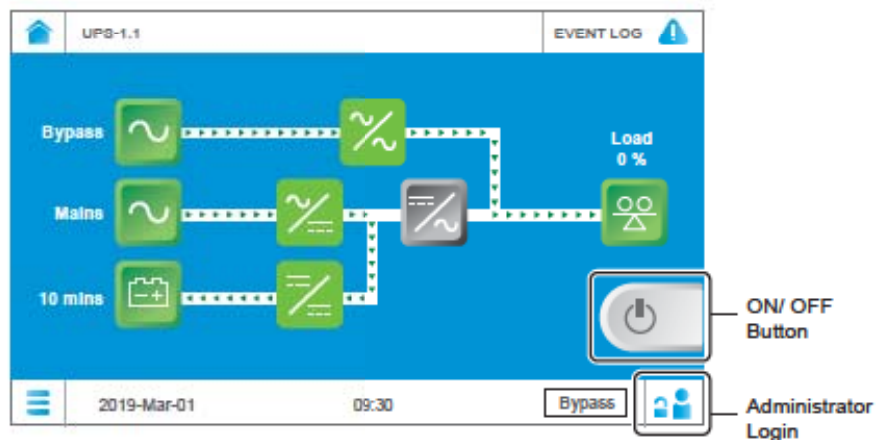
- 4 Turn **OFF** the external maintenance bypass cabinet's manual bypass breaker (Q3). After that, it will be the bypass source to supply power the connected loads. During this time, the tri-color LED indicator remains yellow.



- 5 Now, the rectifier starts running and establishing the DC BUS voltage. After the DC BUS voltage is established, the charger converter will start charging the batteries. During this time, the tri-color LED indicator remains yellow.




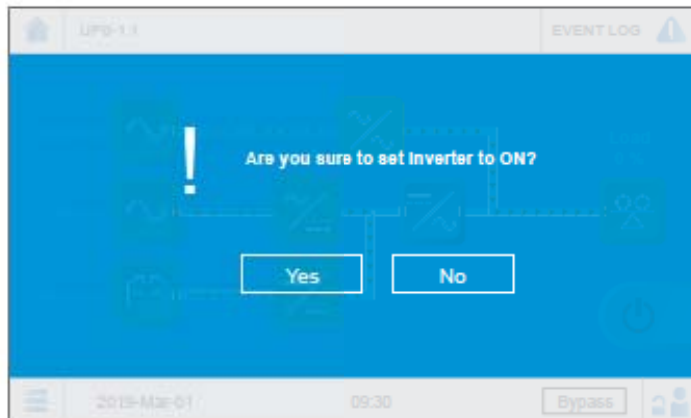
- 6 Please ensure that you are in the Administrator login status. For the Administrator password, please contact service personnel. After you are in the Administrator login status, the ON/ OFF button  will appear on the Main Screen. Please refer to the figure below.



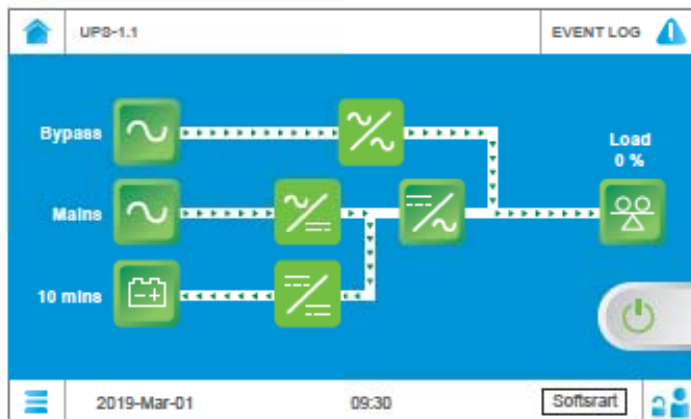
NOTE:

For the **Main Screen** information, please refer to **7.6 Main Screen**.

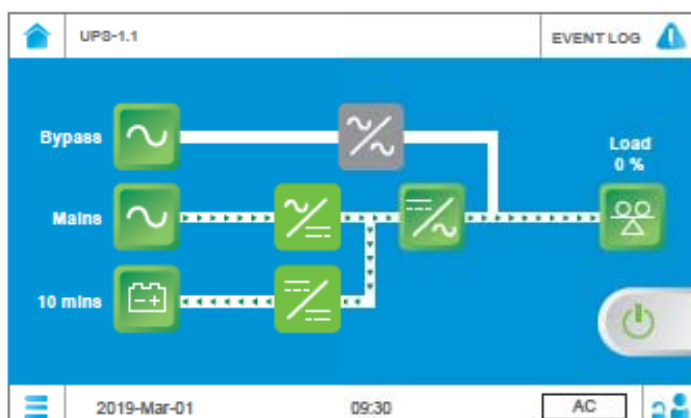
- 7 Tap the ON/ OFF button  shown on the **Main Screen** (please see the figure above for the button location) and the following screen will pop up to ask you if you want to power on the UPS's inverter. Please select 'YES'.



- 8 After selection of 'YES', the UPS's inverter will start up, the UPS will perform self-inspection, the system will begin synchronization with the bypass AC source and the tri-color LED indicator will remain yellow.



- 9 After the self-inspection and synchronization are both completed, the UPS will automatically transfer from bypass to inverter and let the inverter supply power to the connected loads. Once the manual bypass mode transferring to online mode procedures are completed, the LCD will show the following screen and the tri-color LED indicator will illuminate green.



6.2.5 ECO Mode Start-up Procedures



WARNING:


1. For parallel units, please follow **6.2.3 Bypass Mode Start-up Procedures** to turn on each parallel UPS. After confirming that parallel operation can be normally run, follow the following procedures step by step.
2. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
3. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

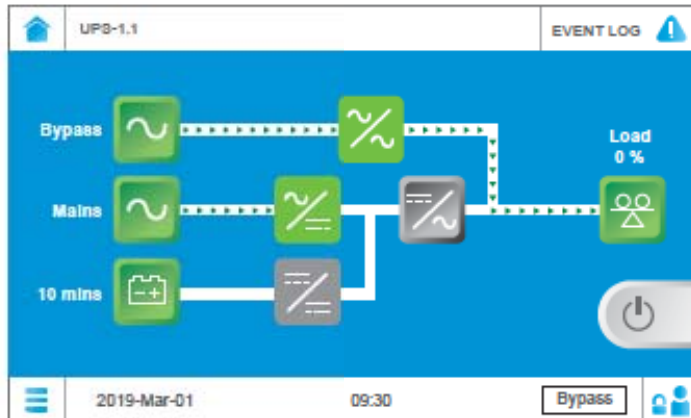
➊ Switch **ON** each external battery cabinet's breaker (Q5). At this moment, the UPS's tri-color LED indicator is off. For the tri-color LED indicator's location, please refer to **Figure 2-13**.

➋ (a) **Single Input:**

Switch **ON** the external maintenance bypass cabinet's input breaker (Q1) and output breaker (Q4). After that, the LCD will be on (see the figure below) and the tri-color LED indicator will illuminate yellow.

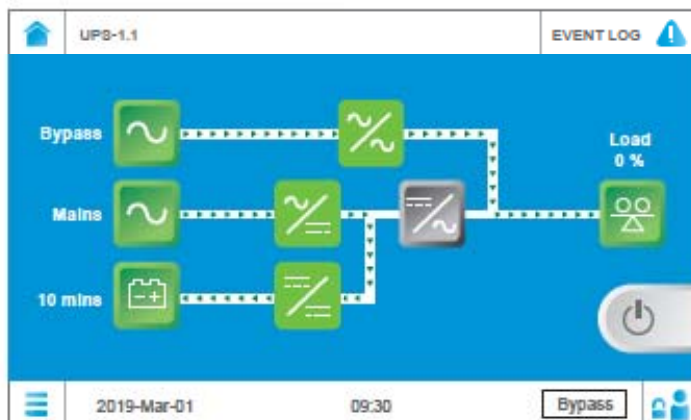


After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below. Now, the bypass static switch icon () illuminates green, the rectifier starts running and establishing the DC BUS voltage, but the charger converter has not charged the batteries yet. During this time, the tri-color LED indicator remains yellow.

**NOTE:**


For the **Main Screen** information, please refer to **7.6 Main Screen**.

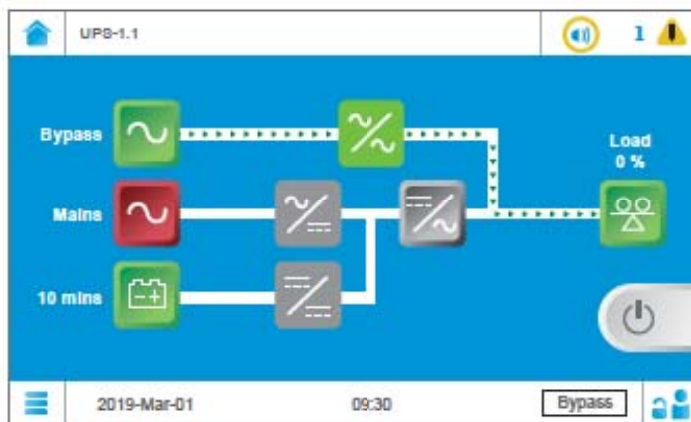
After the DC BUS voltage is established, the charger converter will start up and begin to charge the batteries. Meanwhile, it will be the bypass source to supply power to the connected loads.

**(b) Dual Input:**

Switch **ON** the external maintenance bypass cabinet's bypass breaker (Q2) and output breaker (Q4). After that, the LCD will be on (see the figure below) and the tri-color LED indicator will illuminate yellow.



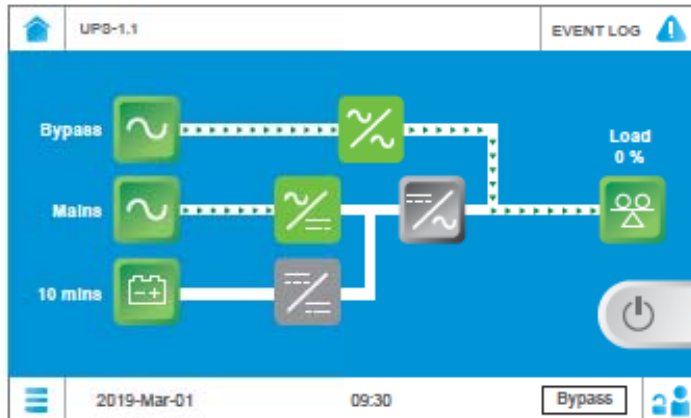
After 1 minute of LCD initialization, the LCD will enter the **Main Screen** as shown in the figure below, and the bypass static switch icon () will illuminate green.



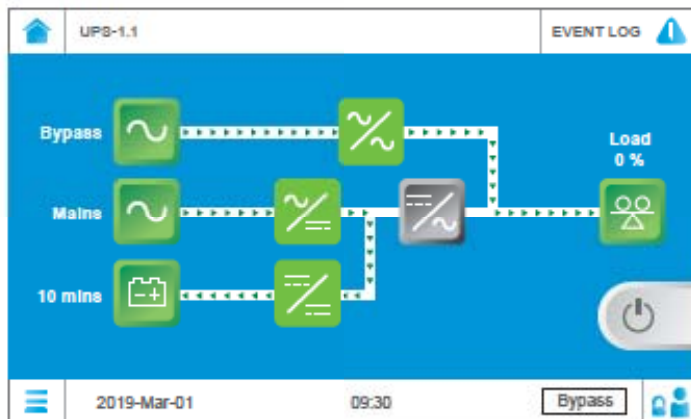
NOTE:


For the **Main Screen** information, please refer to **7.6 Main Screen**.

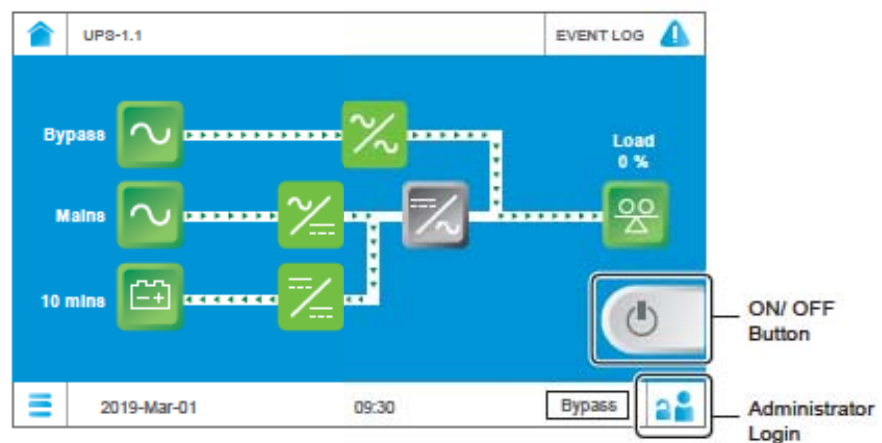
Turn **ON** the external maintenance bypass cabinet's input breaker (Q1). Now, the rectifier starts running and establishing the DC BUS voltage, but the charger converter has not charged the batteries yet. During this time, the tri-color LED indicator remains yellow.



After the DC BUS voltage is established, the charger converter will start up and begin to charge the batteries. Meanwhile, it will be the bypass source to supply power to the connected loads.




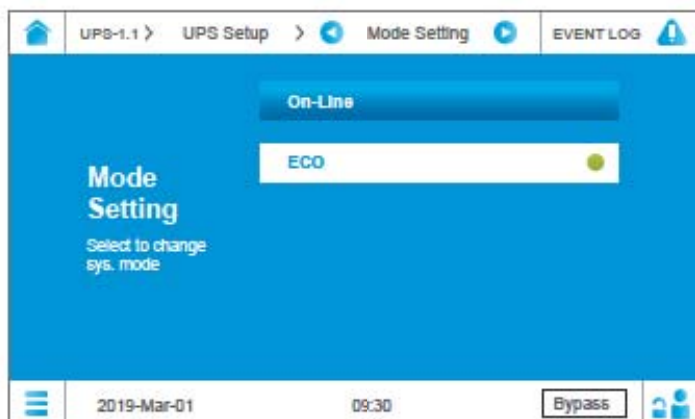
- 3 Please ensure that you are in the **Administrator** login status. For the **Administrator** password, please contact service personnel. After you are in the **Administrator** login status, the **ON/ OFF** button  will appear on the **Main Screen**. Please refer to the figure below.





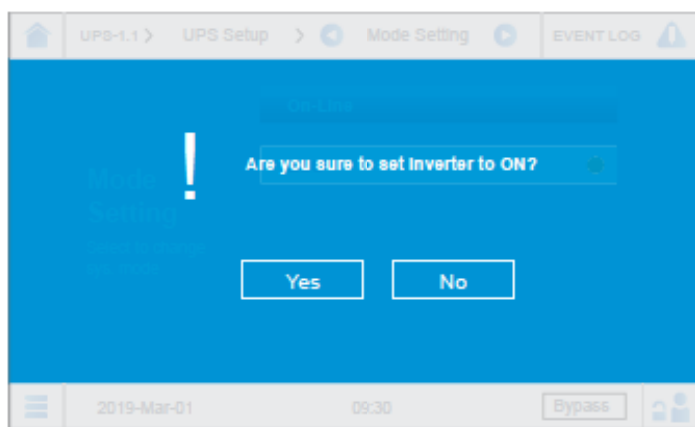
**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.

- 4 Tap the Main Menu icon  located in the lower left corner of the LCD and select **UPS Setup** → **Mode Setting** → **ECO**. Next, the following screen appears.

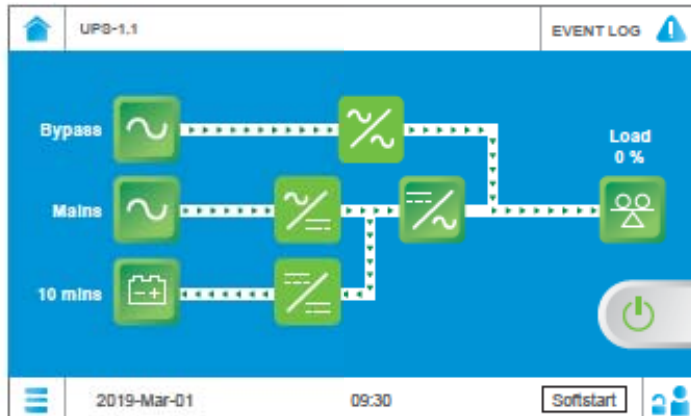


- 5 After manually selecting ECO mode via the LCD, tap the icon  located in the upper left corner of the LCD to go back to the **Main Screen**.
- 6 Tap the ON/ OFF button  shown on the **Main Screen** and the following screen will pop up to ask you if you want to power on the UPS's inverter. Please select 'YES'.

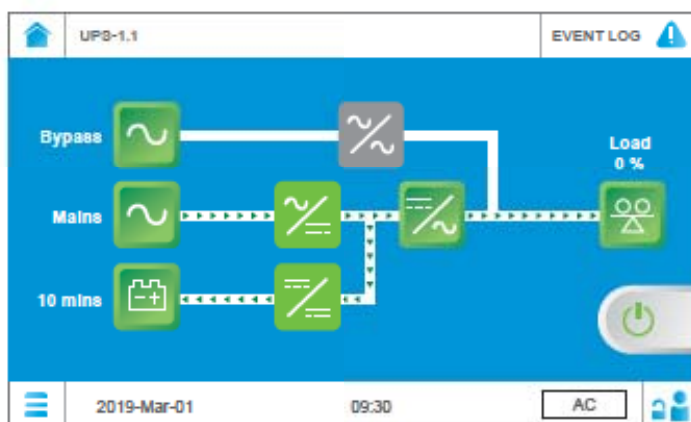
**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.

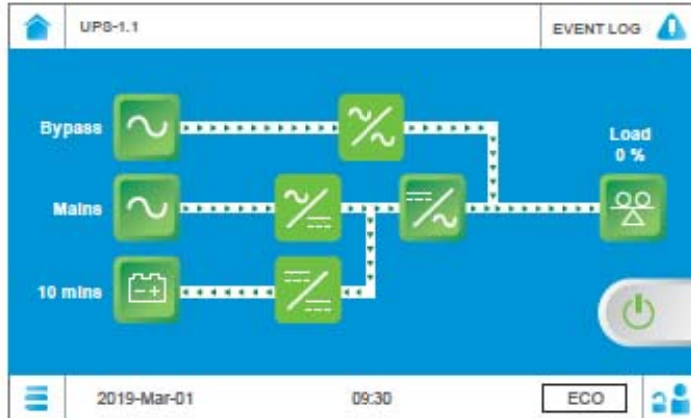
- 7 After selection of 'YES' to start up the UPS's inverter, the UPS will perform self-inspection, the system will begin synchronization with the bypass AC source and the tri-color LED indicator will remain yellow.



- 8 After the self-inspection and synchronization are both completed, the UPS will automatically transfer from bypass to inverter and let the inverter supply power to the connected loads. After the online mode start-up procedures are completed, the LCD will show the following screen and the tri-color LED indicator will illuminate green.



- 9 When bypass input voltage and frequency are within the range of rating voltage $\pm 10\%$ and rating frequency $\pm 5\text{Hz}$, it will be bypass power to supply power to the connected loads. If out of the above mentioned range, it will be the inverter to supply power to the loads. In ECO mode, the tri-color LED indicator illuminates green.



6.3 Turn-off Procedures

6.3.1 On-Line Mode Turn-off Procedures

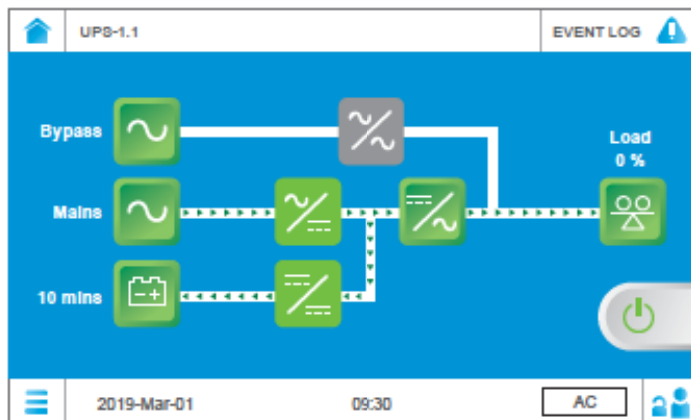


WARNING:

1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.




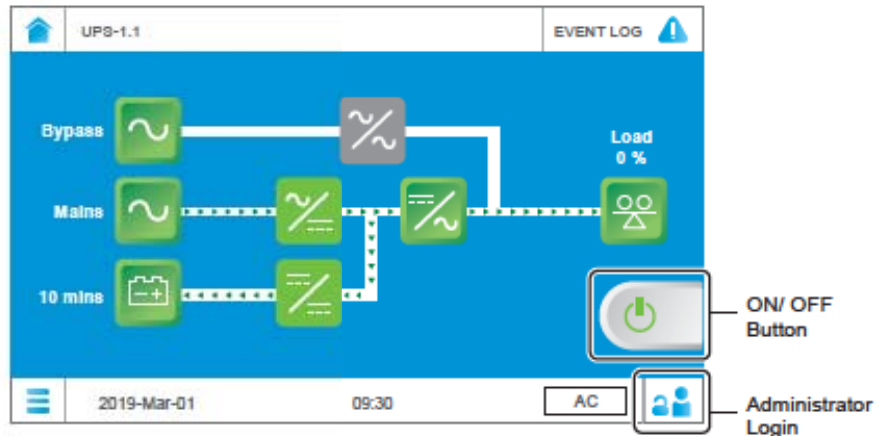
In online mode, the LCD's **Main Screen** shows as follows and the tri-color LED indicator illuminates green. For the location of the tri-color LED indicator, please refer to *Figure 2-13*.




NOTE:

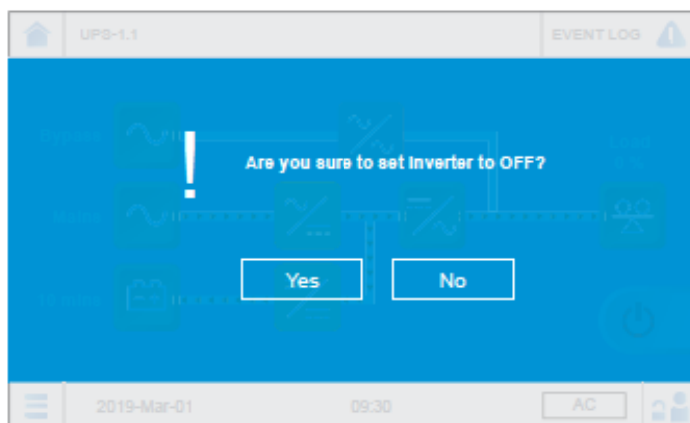
For the **Main Screen** information, please refer to *7.6 Main Screen*.

- 2 Please ensure that you are in the **Administrator** login status. For the **Administrator** password, please contact service personnel. After you are in the **Administrator** login status, the ON/ OFF button  will appear on the **Main Screen**. Please refer to the figure below.

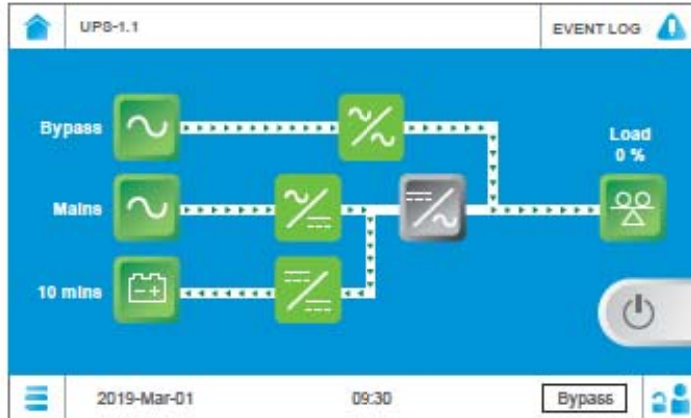
**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.





- 3 Tap the ON/ OFF button  once and the following screen will pop up to ask you if you want to power off the UPS's inverter. Please select 'YES'.

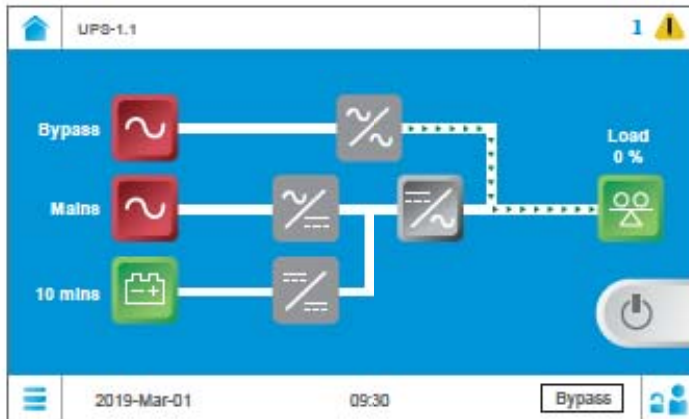


- 4 After selection of 'YES', the inverter will shut down. At the same time, the UPS will transfer from inverter to bypass and let the bypass source supply power to the connected loads, and the tri-color LED indicator will illuminate yellow.







5 (a) **Single Input:**

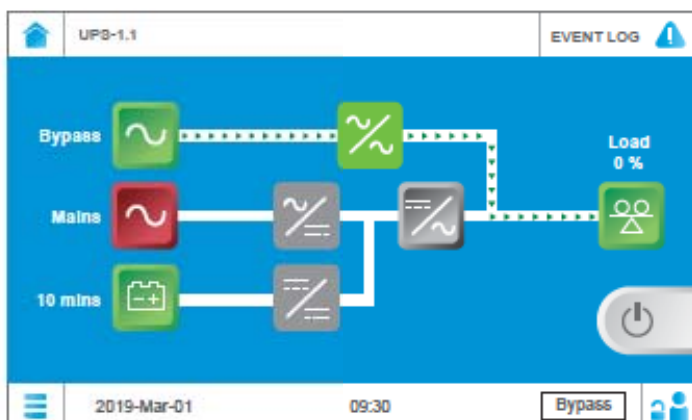
Switch OFF the external maintenance bypass cabinet's input breaker (Q1). After that, the grey inverter icon  will become green  and the UPS will begin shutdown. About 3 ~ 5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow. Please see the figure below.



Next, switch OFF the external maintenance bypass cabinet's output breaker (Q4) and each external battery cabinet's breaker (Q5). Then, the LCD and the tri-color LED indicator are both off.

(b) **Dual Input:**

Switch OFF the external maintenance bypass cabinet's input breaker (Q1). After that, the grey inverter icon  will become green  and the UPS will begin shutdown. About 3 ~ 5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow. Please see the figure below.



Next, turn OFF the external maintenance bypass cabinet's output breaker (Q4) and each external battery cabinet's breaker (Q5). At this moment, the tri-color LED indicator still illuminates yellow.

Now, switch OFF the external maintenance bypass cabinet's bypass breaker (Q2), and then, the LCD and the tri-color LED indicator are both off.

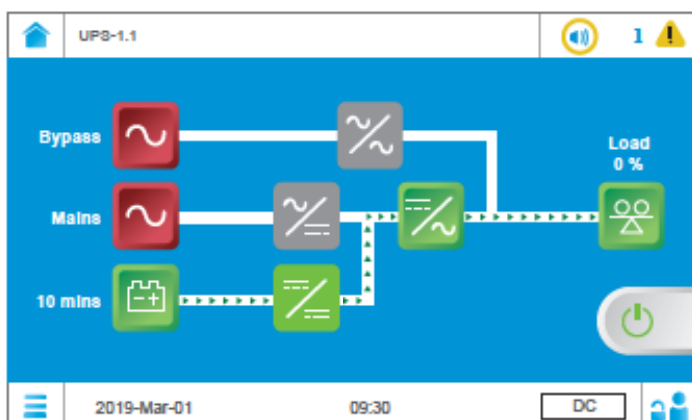
6.3.2 Battery Mode Turn-off Procedures



WARNING:


1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

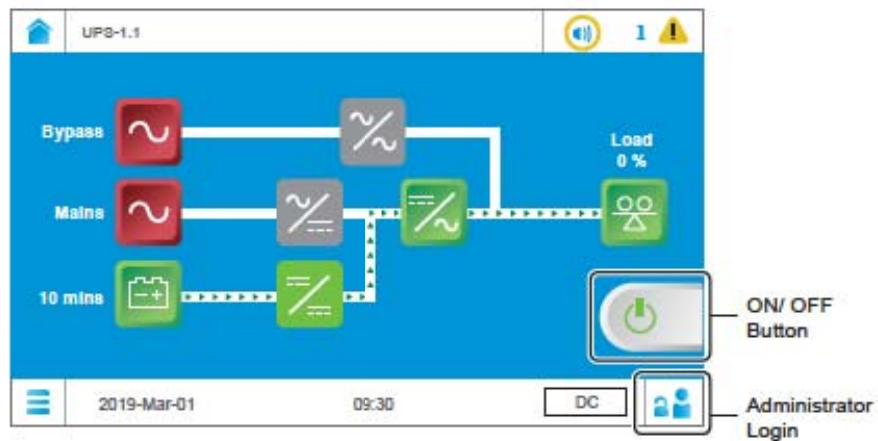
- 1 In battery mode, the **Main Screen** shows the following diagram and the tri-color LED indicator illuminates yellow. For the tri-color LED indicator location, please refer to *Figure 2-13*.




**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.



- 2 Please ensure that you are in the **Administrator** login status. For the **Administrator** password, please contact service personnel. After you are in the **Administrator** login status, the ON/ OFF button  will appear on the **Main Screen**. Please refer to the figure below.

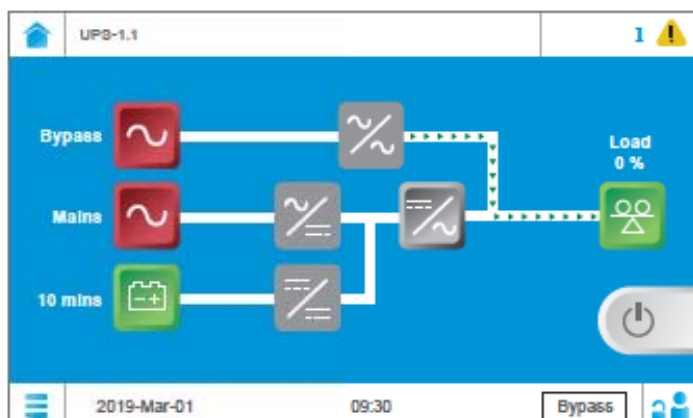
**NOTE:**

For the **Main Screen** information, please refer to **7.6 Main Screen**.

- 3 Tap the ON/ OFF button  once and the following screen will pop up to ask you if you want to power off the UPS's inverter. Please select 'YES'.



- 4 After selection of 'YES', the inverter will shut down, and the UPS will stop supplying power to the connected loads and start up shut-down procedures. About 3 ~ 5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow.



- 5 Switch OFF the external maintenance bypass cabinet's output breaker (Q4).
- 6 Turn OFF each external battery cabinet's breaker (Q5). After that, both of the LCD and the tri-color LED indicator will be off.

6.3.3 Bypass Mode Turn-off Procedures

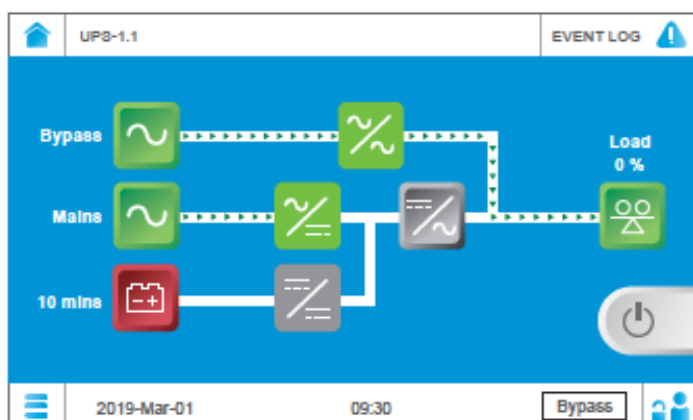


WARNING:

1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

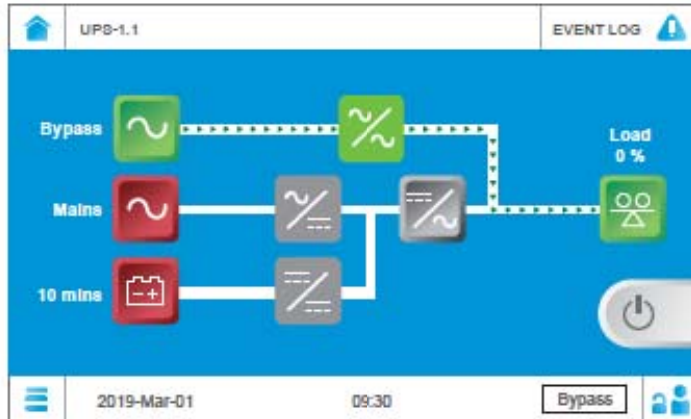
1 (a) Single Input:

In bypass mode, the **Main Screen** shows the following diagram and the tri-color LED indicator illuminates yellow. For the tri-color LED indicator location, please refer to *Figure 2-13*.



(b) Dual Input:

In bypass mode, the **Main Screen** shows the following diagram and the tri-color LED indicator illuminates yellow. For the tri-color LED indicator location, please refer to *Figure 2-13*.



NOTE:

For the **Main Screen** information, please refer to *7.6 Main Screen*.

2 (a) **Single Input:**

Switch OFF the external maintenance bypass cabinet's input breaker (Q1), output breaker (Q4) and each external battery cabinet's breaker (Q5). After that, the LCD and the tri-color LED indicator will be both off.

(b) Dual Input:

Switch OFF the external maintenance bypass cabinet's input breaker (Q1), output breaker (Q4) and each external battery cabinet's breaker (Q5). During this time, the tri-color LED indicator remains yellow.

Next, switch OFF the external maintenance bypass cabinet's bypass breaker (Q2). After that, both of the LCD and the tri-color LED indicator will be off.

6.3.4 Manual Bypass Mode Turn-off Procedures



WARNING:

1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

In manual bypass mode, the LCD and the tri-color LED indicator are both OFF. For either single input or dual input, please directly switch OFF the external maintenance bypass cabinet's manual bypass breaker (Q3) to completely shut down the UPS.

**NOTE:**

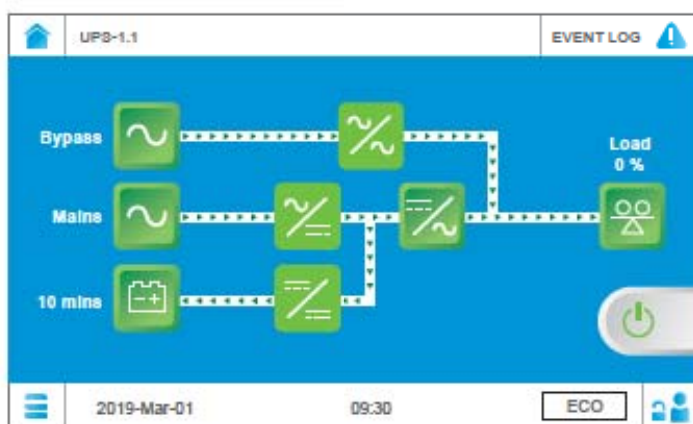
1. Please make sure that the LCD, all LED indicators and fans are OFF.
2. Please make sure that all switches, breakers, and power are OFF.

6.3.5 ECO Mode Turn-off Procedures


**WARNING:**

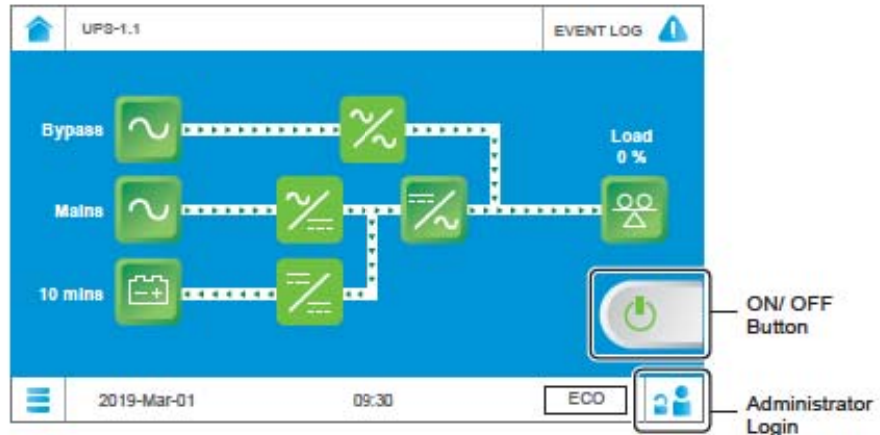
1. For parallel units, ensure that every operation procedure mentioned below is synchronized to all parallel UPSs.
2. For parallel application, if you just want to operate a specific UPS but not all parallel ones, please contact service personnel.

- 1 In ECO mode, the **Main Screen** shows the following diagram and the tri-color LED indicator illuminates green. For the tri-color LED indicator location, please refer to *Figure 2-13*.

**NOTE:**


For the **Main Screen** information, please refer to *7.6 Main Screen*.

- 2 Please ensure that you are in the **Administrator** login status. For the **Administrator** password, please contact service personnel. After you are in the **Administrator** login status, the ON/ OFF button  will appear on the **Main Screen**. Please refer to the figure below.



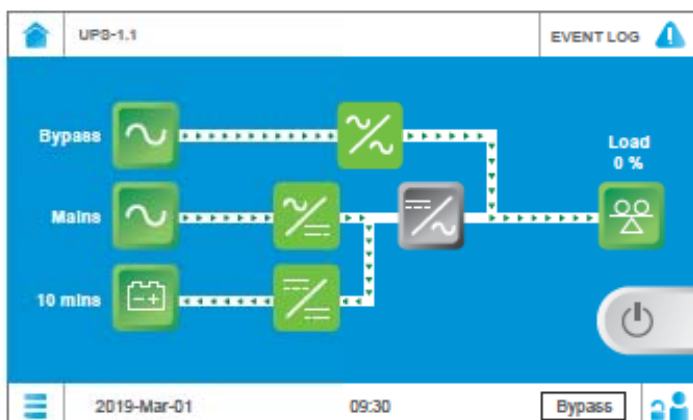
NOTE:


For the **Main Screen** information, please refer to **7.6 Main Screen**.

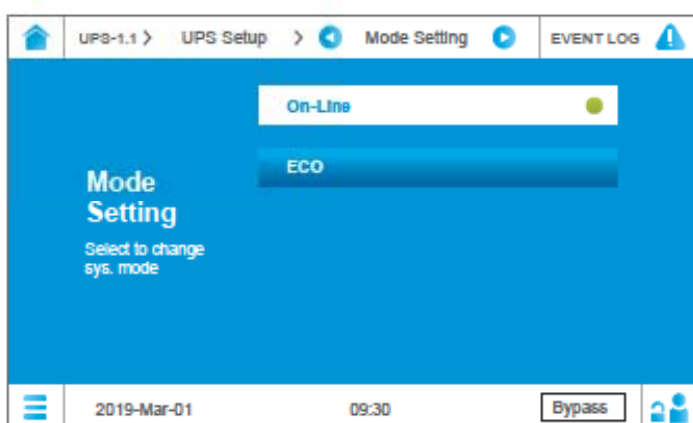
- 3 Tap the ON/ OFF button  once and the following screen will pop up to ask you if you want to power off the UPS's inverter. Please select 'YES'.




- 4 After selection of 'YES', the inverter will shut down. Now, the bypass source supplies power to the connected loads and the tri-color LED indicator illuminates yellow.







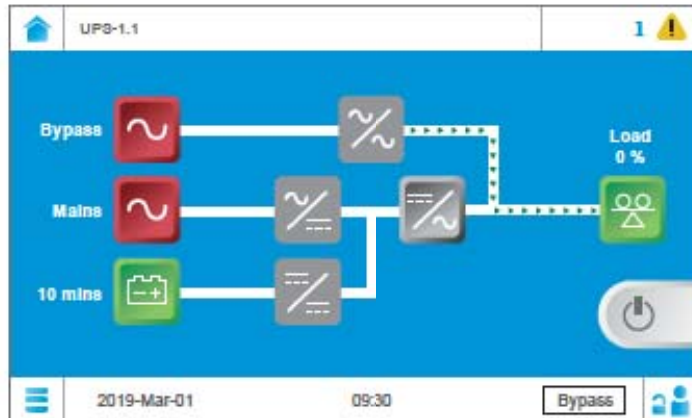
- 5 Tap the Main Menu icon  located in the lower left corner of the LCD and select **UPS Setup** → **Mode Setting** → **On-Line**. Next, the following screen appears.



- 6 After manually selecting **On-Line** mode via the LCD, tap the icon  located in the upper left corner of the LCD to go back to the **Main Screen**.





- 7 (a) **Single Input:**

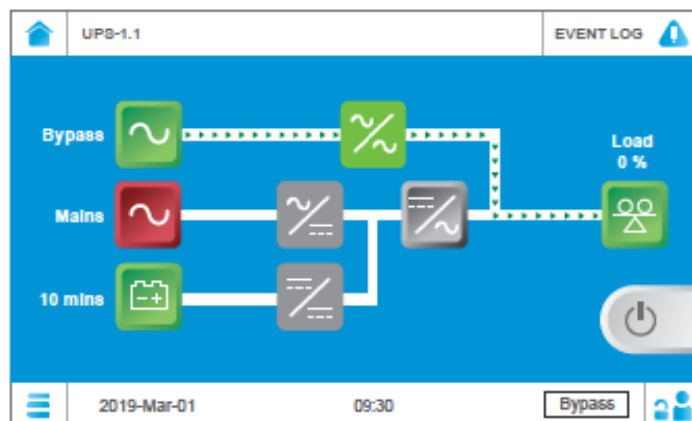
Switch OFF the external maintenance bypass cabinet's input breaker (Q1). After that, the grey inverter icon  will become green  and the UPS will begin shutdown. About 3 ~ 5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow. Please see the figure below.



Next, switch OFF the external maintenance bypass cabinet's output breaker (Q4) and each external battery cabinet's breaker (Q5). Then, the LCD and the tri-color LED indicator are both off.

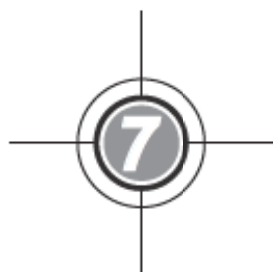
(b) Dual Input:

Switch OFF the external maintenance bypass cabinet's input breaker (Q1). After that, the grey inverter icon  will become green  and the UPS will begin shutdown. About 3 ~ 5 minutes, the green inverter icon  becomes grey  and the tri-color LED indicator remains yellow. Please see the figure below.



Next, turn OFF the external maintenance bypass cabinet's output breaker (Q4) and each external battery cabinet's breaker (Q5). At this moment, the tri-color LED indicator still illuminates yellow.

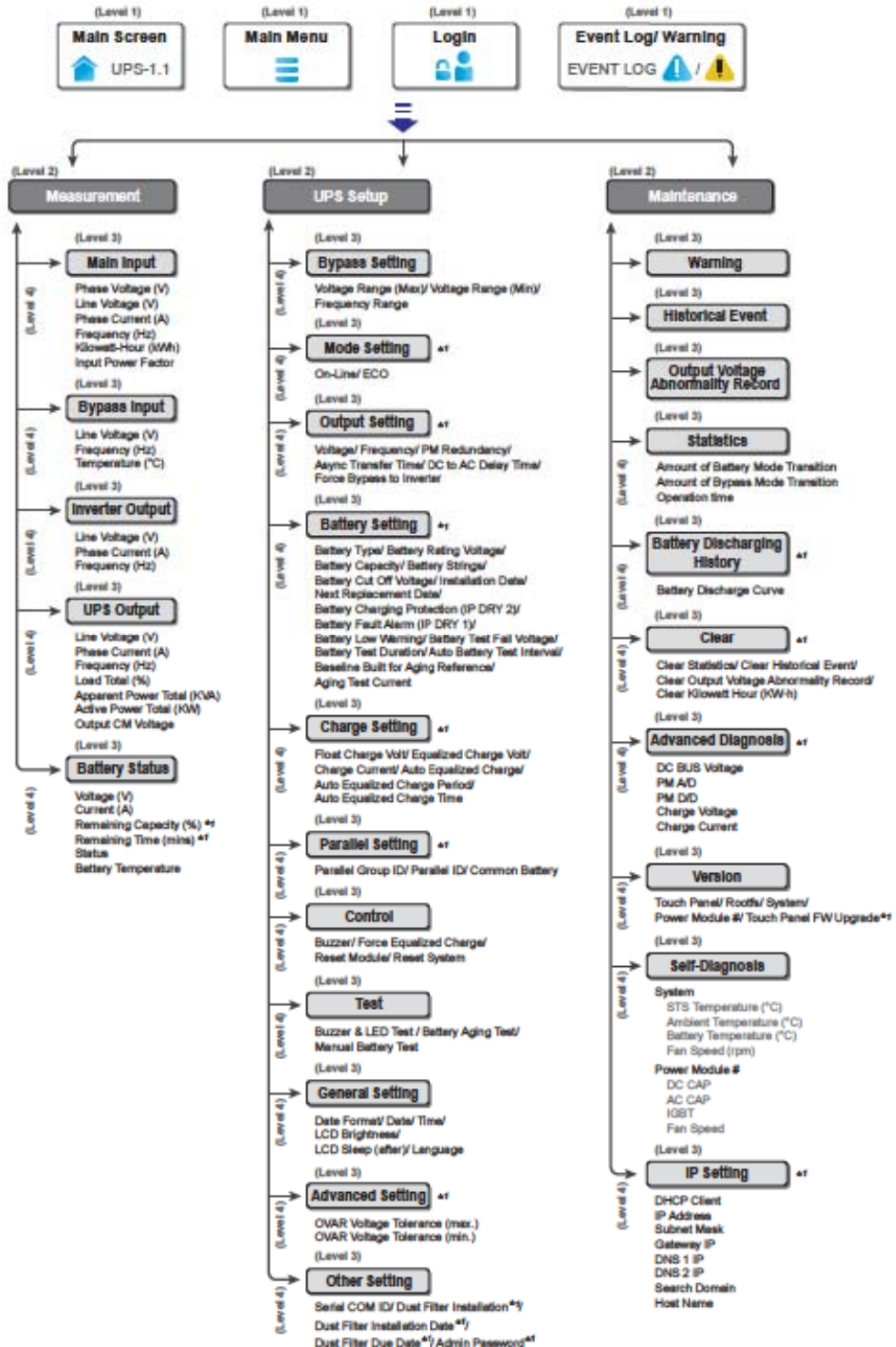
Now, switch OFF the external maintenance bypass cabinet's bypass breaker (Q2), and then, the LCD and the tri-color LED indicator are both off.



LCD Display & Settings



- 7.1 LCD Display Hierarchy
- 7.2 How to Turn on the LCD
- 7.3 ON/ OFF Button
- 7.4 Introduction of Touch Panel and Function Keys
- 7.5 Password Entry
- 7.6 Main Screen
- 7.7 Main Menu
- 7.8 Check System Readings
- 7.9 UPS Settings
- 7.10 System Maintenance

7.1 LCD Display Hierarchy



(Figure 7-1: LCD Display Hierarchy)

**NOTE:**

1. *1 means that the **Administrator** password is needed. For password information, please refer to *7.5 Password Entry*.
2. The information on the LCD screen presented in *7. LCD Display & Settings*, including the UPS operation mode, machine number, date, time, total number of alarms, load (%), battery remaining time, and user/ administrator login are for reference only. The actual screen of display depends on the operation situation.
3. To turn on the touch panel, please refer to *7.2 How to Turn on the LCD* and *7.3 ON/ OFF Button*.
4. Only when you are logged in as an **Administrator** can you see the ON/ OFF Button  and battery remaining time  on the LC.

7.2 How to Turn on the LCD

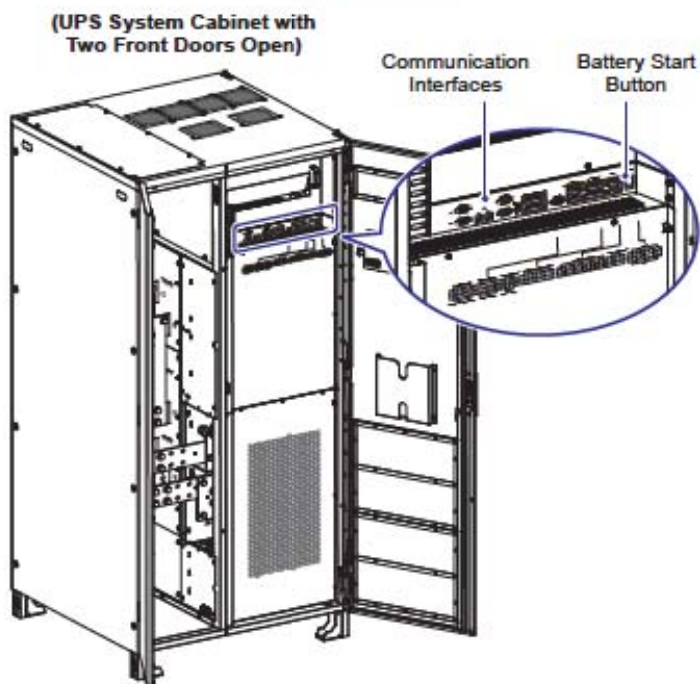
**NOTE:**

The UPS must be connected with an external maintenance bypass cabinet (user-supplied, handled and configured by Delta service personnel). For the external maintenance bypass cabinet's configurations, please refer to *1.2 Connection Warnings*.

To turn on the LCD, please follow the steps below:

- 1 Perform one of the options (a. ~ c.) below; after that, the LCD will be on and the LCD initial screen will appear.
 - a. Turn on the external maintenance bypass cabinet's Input Breaker (Q1); or
 - b. Turn on the external maintenance bypass cabinet's Bypass Breaker (Q2); or
 - c. Turn on the external battery cabinet's breaker (Q5), open the UPS system cabinet's two front doors, and press the battery start button (see *Figure 7-2*) for 3 seconds and release it.

500/ 550kVA



(Figure 7-2: The Position of Battery Start Button)



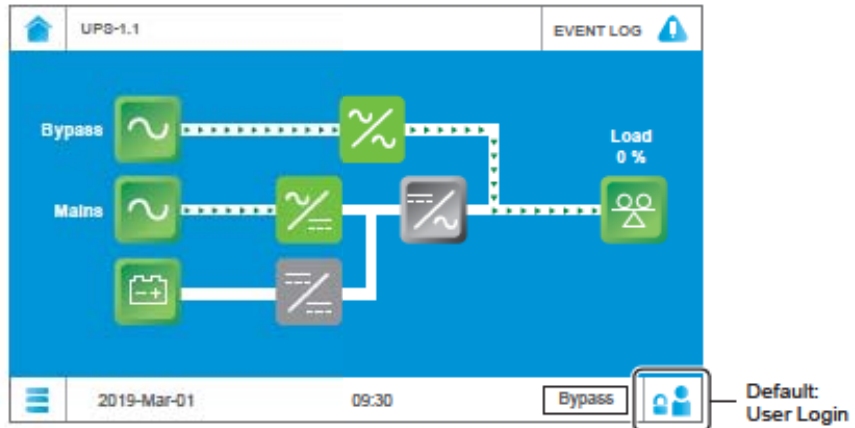
NOTE:

For 500/ 550kVA UPS and 750/ 825kVA UPS, their external views of UPS system cabinets are the same, except that their total number of fans located on the top are different. Hence, in 7. LCD Display & Settings, only the illustration of 500/ 550kVA UPS system cabinet is taken for example.

- 2 About one minute after the LCD initial screen (see *Figure 7-3*) is on, the **Main Screen** will appear (see *Figure 7-4*). After you see the **Main Screen**, you can operate the LCD. Please note that the **Main Screen** appears in the User login status as default (see *Figure 7-4*).





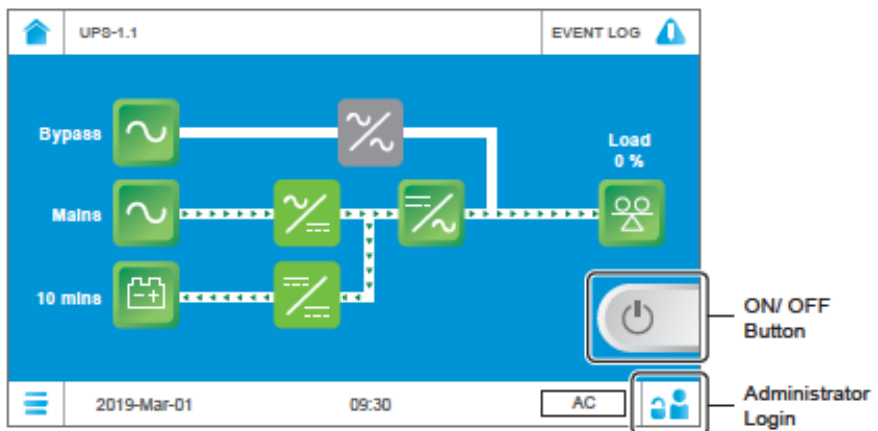
(Figure 7-3: LCD Initial Screen)



(Figure 7-4: Main Screen_ User Login)


7.3 ON/ OFF Button


After you turn on the touch panel in accordance with the steps stated in *7.2 How to Turn on the LCD*, the **Main Screen** will appear in the **User login** status as default. To see the **ON/ OFF Button** , please log in as an **Administrator**. For the **Administrator password**, please refer to *7.5 Password Entry*. After you are logged in as an **Administrator**, you will see the **ON/ OFF Button**  shown in *Figure 7-5*.



(Figure 7-5: Main Screen_ Administrator Login & ON/ OFF Button Location)

- **Power On**


When the ON/ OFF Button is gray , it indicates that the UPS's inverter is in the OFF status. Tap the button once and a reminder window shown below will pop up to ask for confirmation of 'POWER ON'.

After selection of 'Yes', the ON/ OFF Button will turn green , indicating that the power-on process is completed.

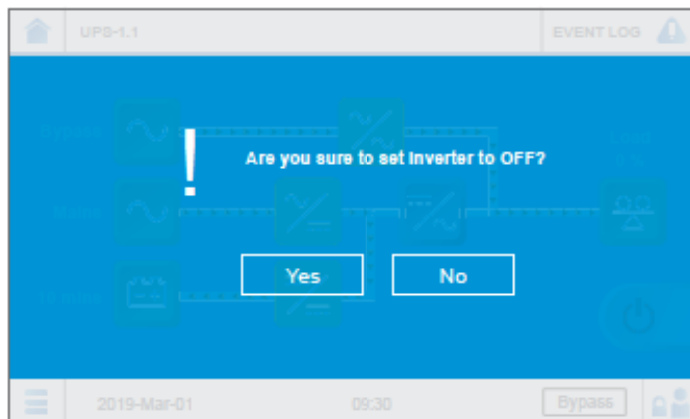


(Figure 7-6: Power on Reminder Window)

- **Power Off**

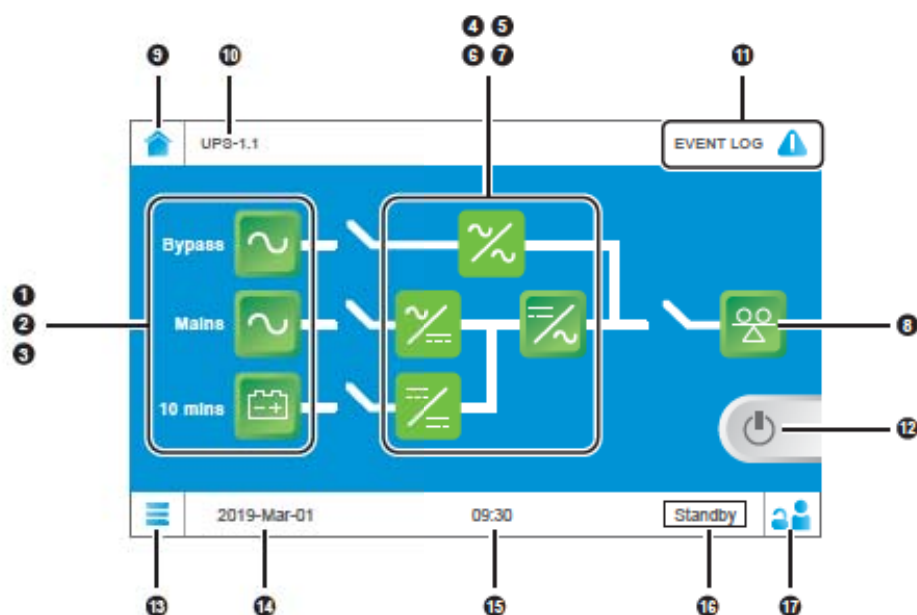
When the ON/ OFF Button is green , it indicates that the UPS's inverter is in the ON status. Tap the button once and a reminder window shown below will pop up to ask for confirmation of 'POWER OFF'.

After selection of 'Yes', the ON/ OFF Button will turn gray , indicating that the power-off process is completed.



(Figure 7-7: Power off Reminder Window)






7.4 Introduction of Touch Panel and Function Keys




(Figure 7-8: Introduction of Touch Panel and Function Keys)










No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
1		✓		✓	1. Bypass input status (Green: Normal; Red: Abnormal). 2. Bypass input screen shortcut icon.
2		✓		✓	1. Main input status (Green: Normal; Red: Abnormal). 2. Main input screen shortcut icon.
3		✓	✓	✓	1. Battery status (Green: Normal; Red: Abnormal). 2. Battery remaining time (minutes). 3. Battery status screen shortcut icon.

No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
4				✓	Bypass static switch status (Green: ON; Red: Abnormal; Gray: OFF).
5				✓	Rectifier status (Green: Normal; Red: Abnormal; Gray: Waiting or OFF).
6		✓		✓	1. Inverter status (Green: Normal; Red: Abnormal; Gray: Waiting or OFF). 2. Inverter output screen shortcut icon.
7				✓	DC converter status (Green: Normal; Red: Abnormal; Gray: Waiting or OFF).
8		✓	✓	✓	1. Output status (Green: Normal; Red: Abnormal). 2. Load capacity (%). 3. UPS output screen shortcut icon.
9		✓			Main Screen icon.
10	UPS-1.1		✓		The UPS's parallel group ID (the former number) and the parallel ID (the latter number). Please refer to <i>Page 6-15 ~ Page 6-16</i> .
11	EVENT LOG	✓		✓	1. Event log shortcut icon EVENT LOG Tap the icon to check all the event logs. 2. When the warning icon is blue, it indicates that there is no warning.

No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
11	 No. ⚠️  No. ⚠️	✓	✓	✓	<p>1. Warning event shortcut icon No. ⚠️.</p> <p>2. Buzzer icon 🔔.</p> <p>3. When the warning icon ⚠️ is yellow, it indicates that there is a warning. At this time, the buzzer will sound and the buzzer icon 🔔 will appear and light up. The numerical value at left side of the yellow warning icon indicates the total number of warning events.</p> <p>By tapping the buzzer icon 🔔, the buzzer will be muted. At this time, the buzzer disabled icon 🔇 will appear. If there is any warning event afterwards, the buzzer will sound and the buzzer icon 🔔 will appear and light up again.</p>
12		✓		✓	ON/ OFF Button. For more information, please refer to <i>7.2 How to Turn on the LCD</i> and <i>7.3 ON/ OFF Button</i> .
13		✓			Main Menu icon.
14	2019-Mar-01		✓		Indicates the date.
15	09:30		✓		Indicates the time.
16	<div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Standby</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">AC</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">DC</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Bypass</div> <div style="border: 1px solid black; padding: 2px;">ECO</div>		✓		Indicates the UPS's current operation status (the actual display depends on the actual operation status).
17		✓		✓	Indicates login as a User. Tap the icon to change the login permission. For more information, please refer to <i>7.5 Password Entry</i> .


No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
17		✓		✓	Indicates login as an Administrator. Tap the icon to change the login permission. For more information, please refer to <i>7.5 Password Entry</i> .

Other icons on the touch panel are shown in the table below.




No.	Icon	Function
1		Goes to the previous page.
2		Goes to the next page.
3		Goes to the top page.
4		Goes to the last page.
5		Moves up.
6		Moves down.
7		Increases number(s).
8		Decreases number(s).
9		1. Enters into parameter setup. 2. Goes to a specific item or page No.



NOTE:

- After the back light is turned off, you can tap the LCD to return to the **Main Screen**. For information about the **Main Screen**, please refer to *7.6 Main Screen*.
- The sleep time for the back light can be adjusted. Please refer to *7.9.9 General Setting*.
- If you are logged in as an **Administrator** (the **Administrator** password is required; please refer to *7.5 Password Entry*), you will be logged out when the backlight is off. Tap to wake up the LCD screen, and it will go back to the **Main Screen** in the **User** login status. Even if you set up the backlight in 'Never Sleep' mode, you will still be logged out after the screen is idle for 5 minutes.
- The default language is English. To change the displayed language of the screen, please go to **Main Menu**  → **UPS Setup** → **General Setting** → **Language**. The default language will be different according to different countries.

7.5 Password Entry

1. Password entry is only required for login as an **Administrator**. User login does not require a password.
2. Tap  → enter the **Administrator** password (please contact service personnel for the default password) → the icon  appears, indicating that the **Administrator** login is successful.
3. To change the **Administrator** password, please go to **Main Menu**  → **UPS Setup** → **Other Setting** → **Admin Password** → **Change Administrator's Password** (4 digits).

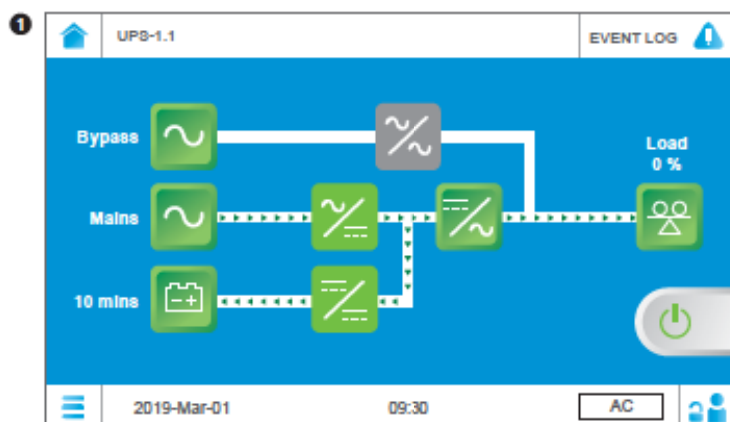


NOTE:

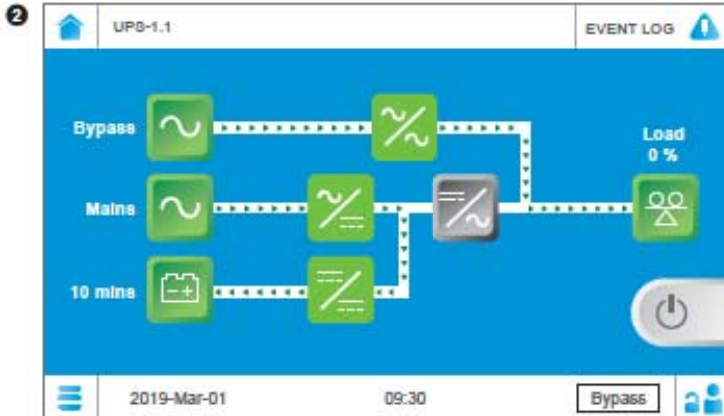
Different login IDs (Administrator/ User) have different access to different screens, inspection items and setup items. Please refer to *7.1 LCD Display Hierarchy*.

7.6 Main Screen

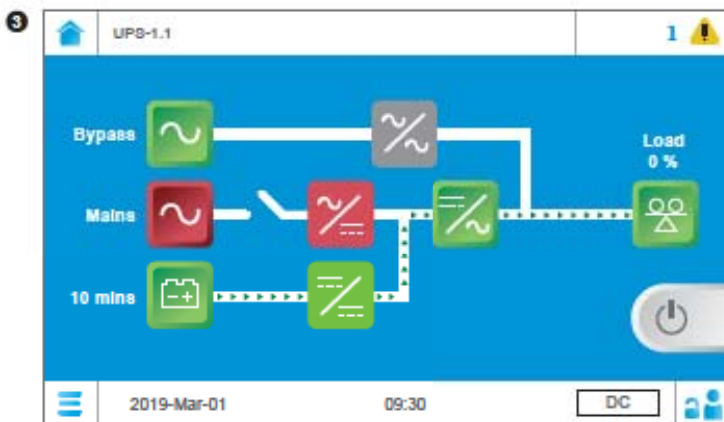
1. Please refer to *7.2 How to Turn on the LCD* and *7.3 ON/ OFF Button* to enter the **Main Screen**.
2. The system shows different power flow screens depending on the status of the UPS. Each power flow screen is a **Main Screen**. See the examples below.



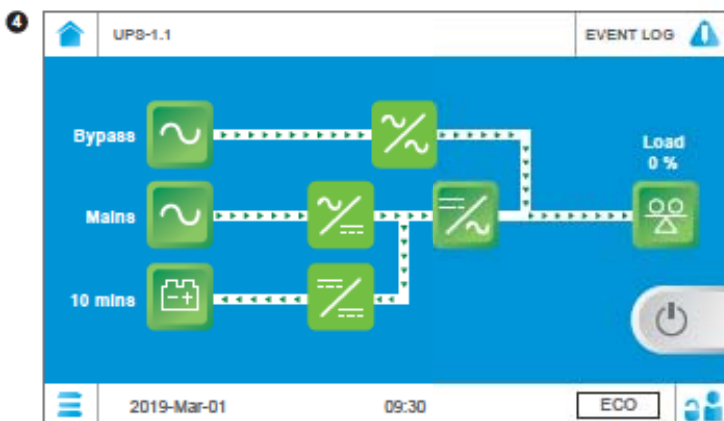
The screen above indicates that the UPS is in **AC** mode, and power supply of the loads comes from the inverter. Please refer to *7.9.2 Mode Setting* and *6.2.1 On-Line Mode Start-up Procedures*.



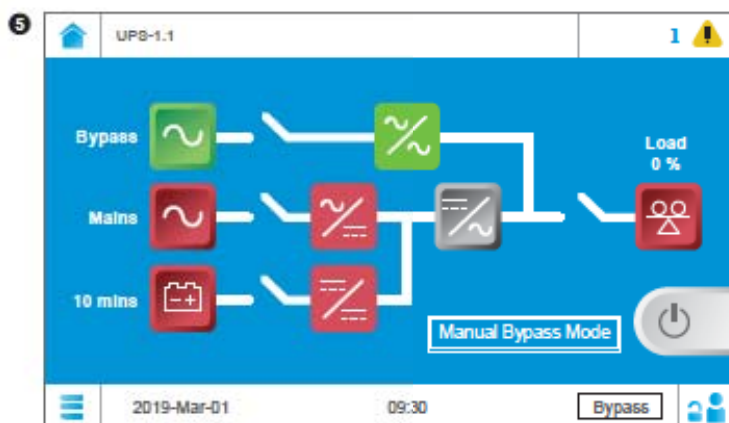
The screen above indicates that the UPS is in **Bypass** mode and the inverter is off. Please refer to **6.2.3 Bypass Mode Start-up Procedures**.



The screen above indicates that the UPS is in **DC** mode, and power supply of the loads comes from the batteries. Please refer to **6.2.2 Battery Mode Start-up Procedures**.



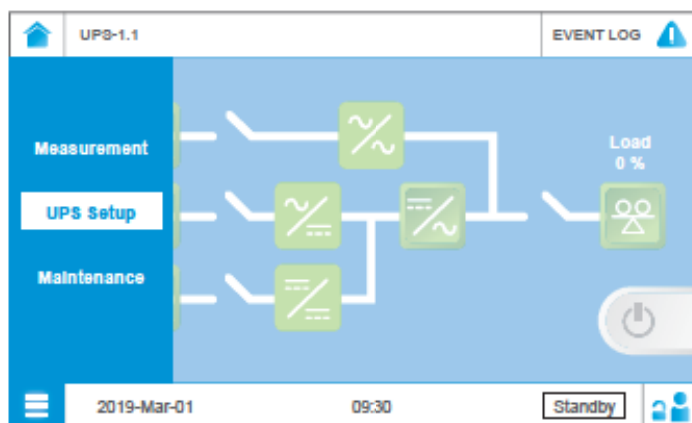
The screen above indicates that the UPS is in ECO mode. The inverter is in the ready-to-power-on status, and the power supply of the loads comes from the bypass. For ECO mode settings, please refer to **7.9.2 Mode Setting** and **6.2.5 ECO Mode Start-up Procedures**.



After the external maintenance bypass cabinet's Manual Bypass breaker (Q3) is turned on, the UPS will be switched to **Manual Bypass** mode and the screen above will appear. Before maintenance, the UPS must be switched to this mode and you must ensure that the external maintenance bypass cabinet's Input Breaker (Q1), Bypass Breaker (Q2) and external battery cabinet's breaker (Q5) are turned OFF. After that, the LCD will be off and the loads will not be protected. If there is any sudden malfunction in the bypass source, the loads will lose power. Please refer to **6.2.4 Manual Bypass Mode Start-up Procedures**.

7.7 Main Menu

Tap the **Main Menu** and you will see the **Main Menu** includes **Measurement**, **UPS Setup** and **Maintenance** as shown below.



Main Menu	Description
<p>Measurement</p>	<p>In the Measurement Menu, you can check the UPS's readings including the following:</p> <ol style="list-style-type: none"> 1. Main Input 2. Bypass Input 3. Inverter Output 4. UPS Output 5. Battery Status <p>For more information, please refer to 7.8 Check System Readings.</p>
<p>UPS Setup</p>	<p>In the UPS Setup Menu, you can set up the following:</p> <ol style="list-style-type: none"> 1. Bypass Setting 2. Mode Setting 3. Output Setting 4. Battery Setting 5. Charge Setting 6. Parallel Setting 7. Control 8. Test 9. General Setting 10. Advanced Setting 11. Other Setting <p>For more information, please refer to 7.9 UPS Settings.</p>
<p>Maintenance</p>	<p>In the Maintenance Menu, you can (1) check the warning events/ historical events/ statistics/ battery discharging history records/ relevant readings/ firmware versions, (2) clear the statistics/ historical events/ output voltage abnormality records, and (3) upgrade relevant firmware.</p> <p>In the Maintenance Menu, it includes the following items.</p> <ol style="list-style-type: none"> 1. Warning 2. Historical Event 3. Output Voltage Abnormality Record 4. Statistics 5. Battery Discharging History 6. Clear 7. Advanced Diagnosis 8. Version 9. Self-Diagnosis 10. IP Setting <p>For more information, please refer to 7.10 System Maintenance.</p>

**NOTE:**

Different login IDs (Administrator/ User) have different access to different screens, inspection items and setup items. Please refer to *7.1 LCD Display Hierarchy*.

7.8 Check System Readings

7.8.1 Main Input

Path: Main Menu → Measurement → Main Input

After entering the **Main Input** screen (shown in the figure below), you can view the readings of **Line Voltage**, **Phase Current**, **Frequency**, **Kilowatt-Hour** and **Input Power Factor**.

For more information about **Kilowatt-Hour**, please refer to *7.8.1.1 Check Kilowatt-Hour*.

UPS-1.1 > Measurement > Main Input		EVENT LOG	
Line Voltage(V)	500.4	500.5	501.4
Phase Current(A)	69.5	61.6	71.2
Frequency(Hz)	60.1		
Kilowatt-Hour(kWh)	5405		
Input Power Factor	0.00		

2019-Mar-01 09:30 Standby

7.8.1.1 Check Kilowatt-Hour

Path: Main Menu → Measurement → Main Input → kWH icon

UPS-1.1 > Measurement > Main Input		EVENT LOG	
Line Voltage(V)	500.4	500.5	501.4
Phase Current(A)	69.5	61.6	71.2
Frequency(Hz)	60.1		
Kilowatt-Hour(kWh)	5405		
Input Power Factor	0.00		

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kWH Icon

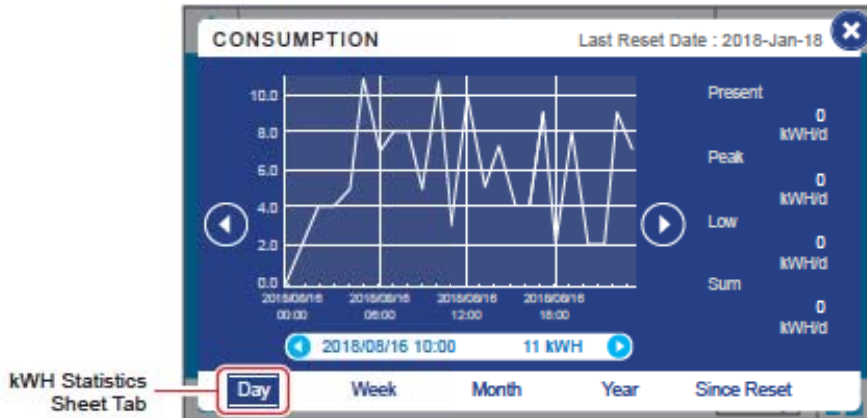
Tap the kWH icon , and you can check the kWH statistics of the UPS main input in the following window.



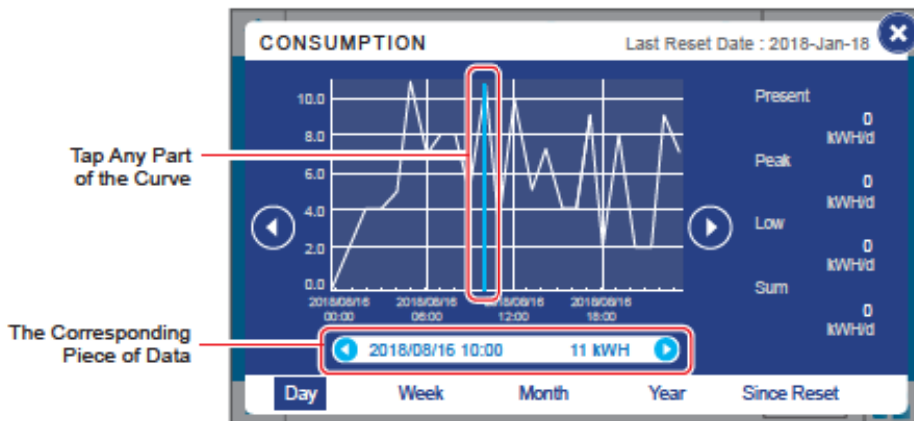
No.	Item	Description
1	kWH Statistics Sheet Tabs (Day/ Week/ Month/ Year/ Since Reset)	Tap the tabs of different sheets to view the kWH statistics and curve charts of different time scales.
2	Curve Chart	<ol style="list-style-type: none"> Shows the UPS's main input kWH statistics, with time on X-axis and kWH on Y-axis. Tap any part of the curve and the corresponding piece of data will appear below the chart. Please refer to <i>Page 7-16 ~ 7-23</i> for relevant information.
3	Present/ Peak/ Low/ Sum (kWH/d)	Shows today's statistics: the present value/ the highest value (so far)/ the lowest value (so far)/ the sum (so far). Regardless of different kWH statistics sheets, these four items only indicate today's statistics.
4	Last Reset Date	The last date when 'Clear Kilowatt Hour' was executed. Please refer to <i>7.10.6 Clear</i> for relevant information.

Descriptions of the kWH Statistics Sheet Tabs

- A. Tap the kWH statistics sheet tab (**Day**), and you can view the daily kWH statistics of the UPS main input by hour, as shown in the figure below.



- On the X-axis
 - (1) Minimum unit: one hour (a piece of data); interval: 6 hours.
 - (2) Interval marks: 00:00/ 06:00/ 12:00/ 18:00 of the day.
 - (3) 24 pieces of data (00:00~23:00) are shown in the curve chart of the day.
- Tap the icon (◀ ▶) on either side of the chart to view the statistics of the previous/ next day.
- Tap any part of the curve, and the corresponding piece of data will appear below the chart, as shown in the figure below.



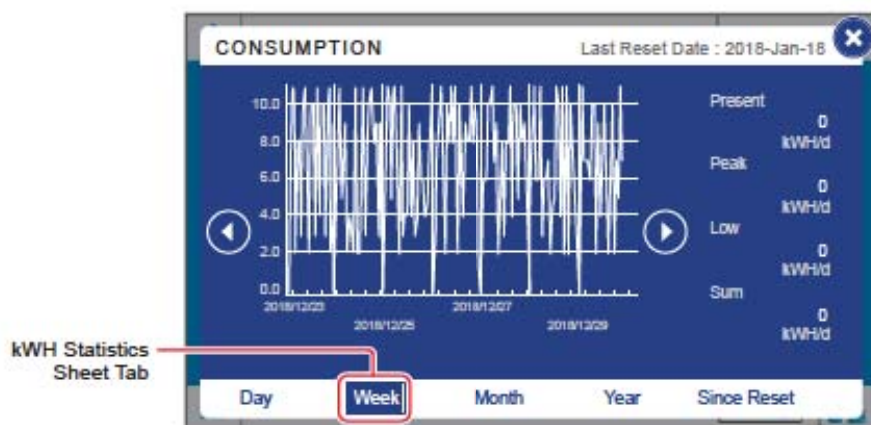
- (1) Take the figure above as an example; if you tap the curve '2018-08-16 10:00', the data bar that shows the corresponding piece of data will appear below the chart and show the kWH statistics '11 kWH' of the UPS main input from 10:00 ~ 11:00 on that date.

Tap the icon (◀ ▶) on either side of the data bar, and you can view the statistics of the previous/ next hour.

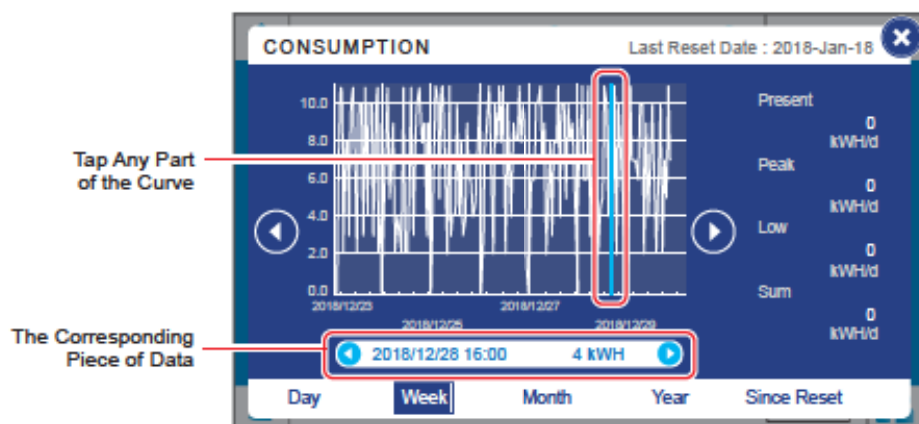
- (2) At the moment of viewing, if it is still within the hour (the minimum unit), the window shows the current statistics and will keep updating.

For example, if you view the kWh statistics at 10:30 (still within the minimum unit of the hour 10:00 ~ 11:00), the statistics of the curve shown on the chart is from 10:00~10:30, and will keep updating.

- B. Tap the kWh statistics sheet tab (**Week**), and you can view the weekly kWh statistics of the UPS main input by hour, as shown in the figure below.



- On the X-axis
 - (1) Minimum unit: one hour (a piece of data); interval: 24×2 hours.
 - (2) Interval marks: Sun. 00:00/ Tues. 00:00/ Thurs. 00:00/ Sat. 00:00 of the week.
 - (3) 168 pieces of data (24 hours \times 7 days) are shown in the curve chart of the week.
- Tap the icon () on either side of the chart to view the statistics of the previous/next week.
- Tap any part of the curve, and the corresponding piece of data will appear below the chart, as shown in the figure below.



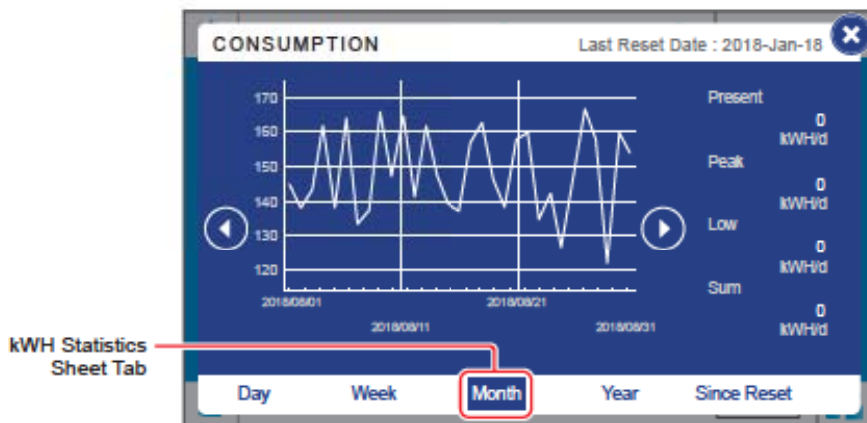
- (1) Take the figure above as an example; if you tap the curve '2018-12-28 16:00', the data bar that shows the corresponding piece of data will appear below the chart and show the kWh statistics '4 kWh' of the UPS main input from 16:00 ~ 17:00 of that date.

Tap the icon (◀▶) on either side of the data bar, and you can view the statistics of the previous/ next hour.

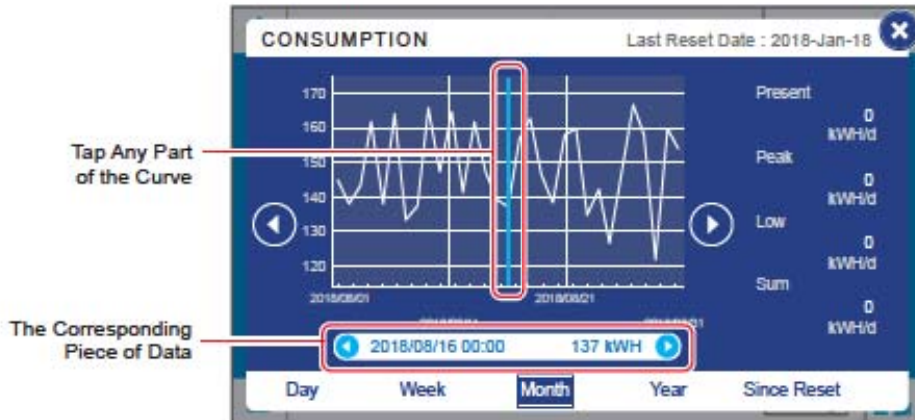
- (2) At the moment of viewing, if it is still within the hour (the minimum unit), the window shows the current statistics and will keep updating.

For example, if you view the kWh statistics at 16:30 (still within the minimum unit of the hour 16:00 ~ 17:00), the statistics of the curve shown on the chart is from 16:00 ~ 16:30, and will keep updating.

- C. Tap the kWh statistics sheet tab (**Month**), and you can view the monthly kWh statistics of the UPS main input by day, as shown in the figure below.



- On the X-axis
 - (1) Minimum unit: one day (a piece of data); interval: 10 days.
 - (2) Interval marks: 1st/ 11th/ 21st/ (31st) day of the month.
 - (3) Pieces of data from the 1st day to the last day of the month (the total number of the days depends on the calendar) are shown in the curve chart.
- Tap the icon (◀▶) on either side of the chart to view the statistics of the previous/ next month.
- Tap any part of the curve, and the corresponding piece of data will appear below the chart, as shown in the figure below.



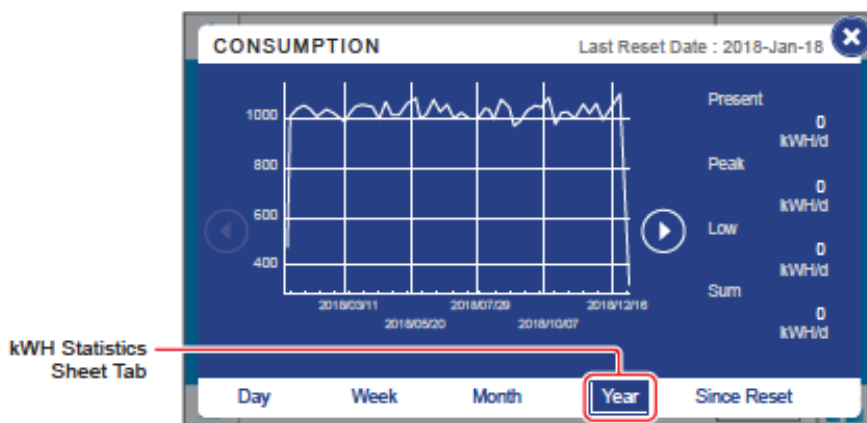
- (1) Take the figure above as an example; if you tap the curve '2018-08-16', the data bar that shows the corresponding piece of data will appear below the chart and show the kWh statistics '137 kWh' of the UPS main input of the day.

Tap the icon (⏪ ⏩) on either side of the data bar, and you can view the statistics of the previous/ next day.

- (2) At the moment of viewing, if it is still within the day (the minimum unit), the window shows the current statistics and will keep updating.

For example, if you view the kWh statistics on 2018-08-16 at 23:30 (still within the minimum unit of the day 2018-08-16), the statistics of the curve shown on the chart is from 00:00 ~ 23:30, and will keep updating.

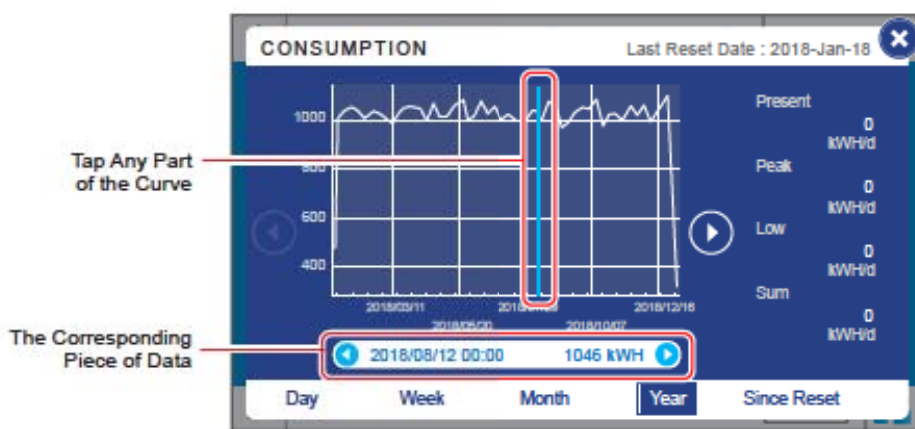
- D. Tap the kWh statistics sheet tab (**Year**), and you can view the yearly kWh statistics of the UPS main input by week, as shown in the figure below.



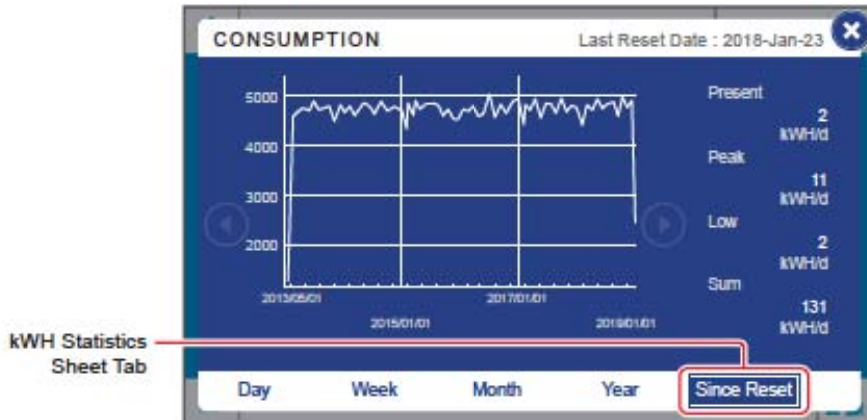
- On the X-axis

- (1) Minimum unit: one week (a piece of data); interval: 10 weeks.

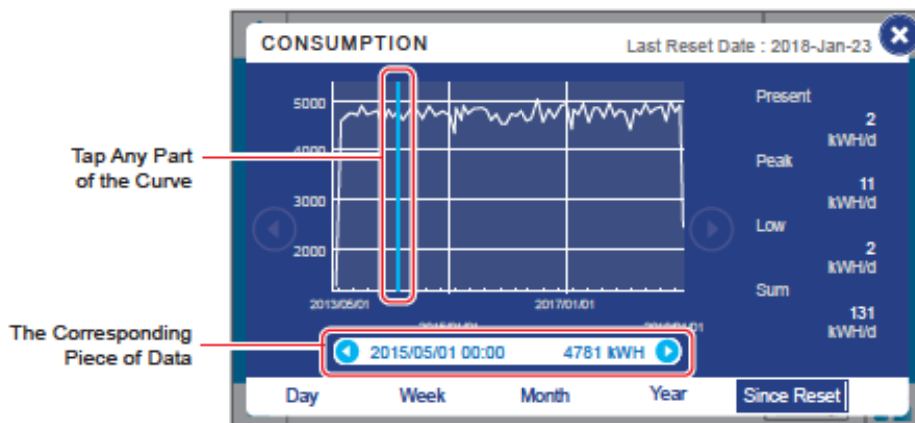
- (2) Interval marks: (starting from Sunday) 1st week/ 11st week/ 21st week/ 31st week/ 41st week/ 51st week of the year.
 - (3) Pieces of data from the 1st Sunday to the last Sunday of the year (the total number of the weeks depends on the calendar) are shown in the curve chart.
- Tap the icon (◀ ▶) on either side of the chart to view the statistics of the previous/ next year.
 - Tap any part of the curve, and the corresponding piece of data will appear below the chart, as shown in the figure below.



- (1) Take the figure above as an example; if you tap the curve '2018-08-12', the data bar that shows the corresponding piece of data will appear below the chart and show the kWH statistics '1046 kWH' of the UPS main input of the week.
- Tap the icon (◀ ▶) on either side of the data bar, and you can view the statistics of the previous/ next week.
- (2) At the moment of viewing, if it is still within the week (the minimum unit), the window shows the current statistics and will keep updating.
- For example, if you view the kWH statistics on 2018-08-23 at 06:00 (still within the minimum unit of the week 2018-08-19 Sun. ~ 2018-08-25 Sat.), the statistics of the curve shown on the chart is from 2018-08-19 Sun. 00:00 ~ 2018-08-23 Thurs. 06:00, and will keep updating.
- E. Tap the kWH statistics sheet tab (**Since Reset**), and you can view the kWH statistics of the UPS main input power since Last Reset Date (the last date when 'Clear Kilowatt Hour' was executed) by month, as shown in the figure below.



- On the X-axis
 - (1) Minimum unit: one month (a piece of data); interval: 2 years.
 - (2) Interval marks: Last Reset Date/ January of every two years (and so on).
 - (3) Pieces of data lasting for 10 years since Last Reset Date are shown in the curve chart. The system can save and show the statistics for up to 20 years.
- Tap the icon (◀ ▶) on either side of the chart to view the statistics of the previous/ next 10 years.
- Tap any part of the curve, and the corresponding piece of data will appear below the chart, as shown in the figure below.



- (1) Take the figure above as an example; if you tap the curve '2015-May', the data bar that shows the corresponding piece of data will appear below the chart and show the kWh statistics '4781 kWh' of the UPS main input of the month.

Tap the icon (◀ ▶) on either side of the data bar, and you can view the statistics of the previous/ next month.



- (2) At the moment of viewing, if it is still within the month (the minimum unit), the window shows the current statistics and will keep updating.

For example, if you view the kWh statistics on 2018-05-23 at 06:00 (still within the minimum unit of the month 2018-05-01 ~ 2018-05-31), the statistics of the curve shown on the chart is from 2018-05-01 00:00 ~ 2018-05-23 06:00, and will keep updating.

7.8.2 Bypass Input

Path: Main Menu  → Measurement → Bypass Input



After entering the **Bypass Input** screen (shown in the figure below), you can view the readings of **Line Voltage**, **Frequency** and **Temperature**.

UPS-1.1 > Measurement > Bypass Input		EVENT LOG 	
Line Voltage(V)	501.1	498.3	501.1
Frequency(Hz)	60.0		
Temperature(°C)	21		
2019-Mar-01		09:30	Standby 

7.8.3 Inverter Output

Path: Main Menu  → Measurement → Inverter Output

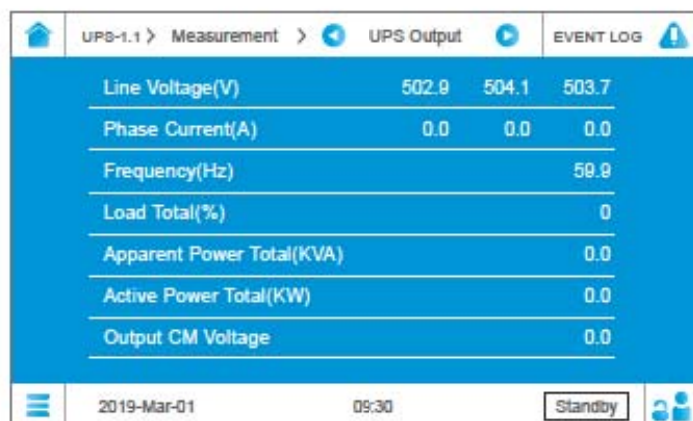
After entering the **Inverter Output** screen (shown in the figure below), you can view each power module's **Line Voltage** and **Phase Current**.

UPS-1.1 > Measurement > Inverter Output		EVENT LOG 		
01	Line Voltage(V)	480.8	480.0	480.1
	Phase Current(A)	0.0	0.0	0.0
02	Line Voltage(V)	479.3	480.1	480.1
	Phase Current(A)	0.0	0.0	0.0
03	Line Voltage(V)	479.2	480.1	480.1
	Phase Current(A)	0.0	0.0	0.0
2019-Mar-01		09:30	Standby 	

7.8.4 UPS Output

Path: Main Menu  → Measurement → UPS Output


After entering the **UPS Output** screen (shown in the figure below), you can view the readings of **Line Voltage**, **Phase Current**, **Frequency**, **Load Total**, **Apparent Power Total**, **Active Power Total** and **Output CM Voltage**.



UPS-1.1 > Measurement > UPS Output		EVENT LOG
Line Voltage(V)	502.9 504.1 503.7	
Phase Current(A)	0.0 0.0 0.0	
Frequency(Hz)	59.9	
Load Total(%)	0	
Apparent Power Total(KVA)	0.0	
Active Power Total(KW)	0.0	
Output CM Voltage	0.0	

2019-Mar-01 09:30 Standby

7.8.5 Battery Status

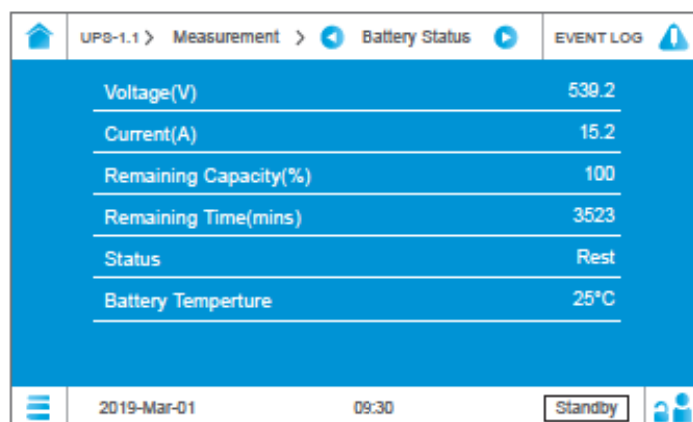
Path: Main Menu  → Measurement → Battery Status

After entering the **Battery Status** screen (shown in the figure below), you can view the readings of **Voltage**, **Current**, **Remaining Capacity^{*1}**, **Remaining Time^{*1}**, **Status** and **Battery Temperature**.



NOTE:

^{*1} means that the **Administrator password** is needed. For password information, please refer to **7.5 Password Entry**.



UPS-1.1 > Measurement > Battery Status		EVENT LOG
Voltage(V)	539.2	
Current(A)	15.2	
Remaining Capacity(%)	100	
Remaining Time(mins)	3523	
Status	Rest	
Battery Temperature	25°C	

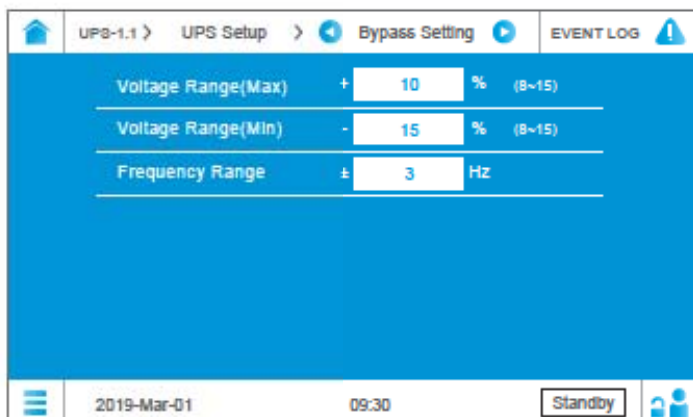
2019-Mar-01 09:30 Standby

7.9 UPS Settings

7.9.1 Bypass Setting

Path: Main Menu  → UPS Setup → Bypass Setting

After entering the **Bypass Setting** screen (shown in the figure below), you can set up **Voltage Range (Max.)**, **Voltage Range (Min.)** and **Frequency Range** of the bypass. If any value is out of range, the system will issue an alarm.



Item	Description
Voltage Range (Max.)	Set up the bypass maximum voltage.
Voltage Range (Min.)	Set up the bypass minimum voltage.
Frequency Range	Set up the bypass frequency range.

7.9.2 Mode Setting

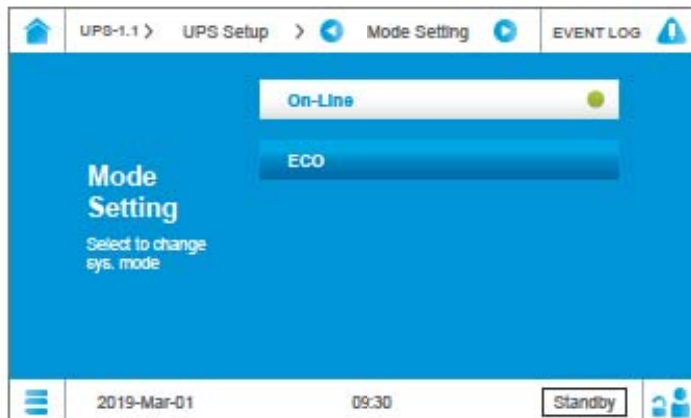
Path: Main Menu  → UPS Setup → Mode Setting

After entering the **Mode Setting** screen*¹ (shown in the figure below), you can set up the UPS system mode, of which there are two options: **On-Line Mode** and **ECO Mode**. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



NOTE:

*¹ means that the **Administrator** password is needed. For password information, please refer to *7.5 Password Entry*.



Item	Description
On-Line Mode	Set up the UPS in On-Line mode. In On-Line mode, it is the inverter to supply power to the connected loads.
ECO Mode	Set up the UPS in ECO mode. In ECO mode, it is the bypass to supply power to the connected loads. It is suggested that you set the UPS in ECO mode only when there is stable main AC power. Otherwise, power supply quality will be compromised.

7.9.3 Output Setting

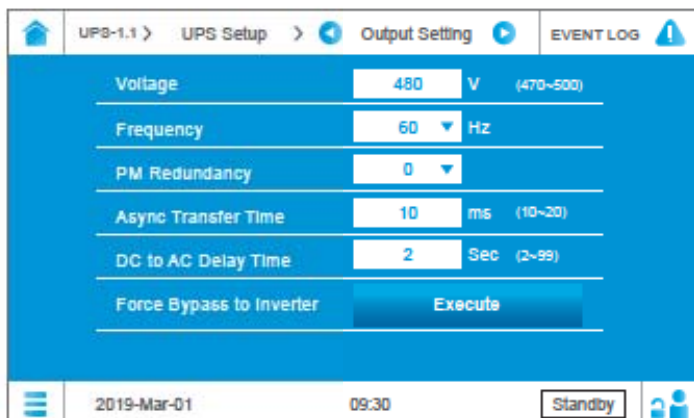
Path: Main Menu  → UPS Setup → Output Setting

After entering the Output Setting screen^{*1} (shown in the figure below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



NOTE:

^{*1} means that the Administrator password is needed. For password information, please refer to *7.5 Password Entry*.



Item	Description
Voltage	Set up the output voltage.
Frequency	Set up the output frequency as 50Hz (default) or 60Hz. The system will automatically select the output frequency in accordance with the bypass power.
Power Module Redundancy	Set up how many power modules that need to be preserved for redundancy.
Asynchronous Transfer Time	When it is impossible for the inverter to reach synchronous phase lock with the bypass, the output will be terminated during conversion process according to this setup time.
DC to AC Delay Time	Set up how much delay time the UPS needs to transfer from Battery Mode to On-Line Mode.
Force Bypass to Inverter	Manually force the UPS to switch from bypass to inverter when the inverter keeps staying in the soft-start status and is unable to transfer to On-Line mode successfully.

7.9.4 Battery Setting

Path: Main Menu  → UPS Setup → Battery Setting

After entering the Battery Setting screen^{*1} (shown in the figure below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



NOTE:

^{*1} means that the Administrator password is needed. For password information, please refer to 7.5 Password Entry.

UPS-1.1 > UPS Setup > Battery Setting

Battery Type: Lead-acid

Battery Rating Voltage: 480 V (456-504)

Battery Capacity: 125 AH (40-200)

Battery Strings: 2

Battery Cut Off Voltage: 420 V (380-441)

Installation Date: 2019-Mar-01

Next Replacement Date: 2021-Mar-01

2019-Mar-01 09:30 Standby

UPS-1.1 > UPS Setup > Battery Setting

Battery Charging Protection (IP DRY 2): Disable

Battery Fault Alarm (IP DRY 1): Disable

Battery Test Fall Voltage: 0 V (400-520)

Battery Test Duration: 0 Min (1-360)

Auto Battery Test Interval: None

Baseline Build for Aging Reference

2019-Mar-01 09:30 Standby



UPS-1.1 > UPS Setup > Battery Setting

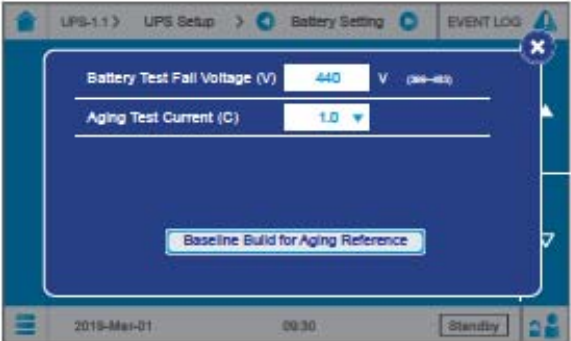
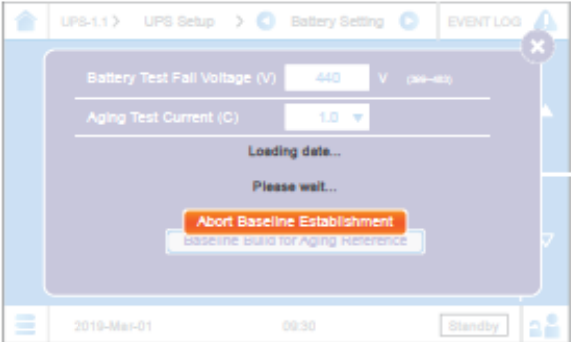
Battery Test Fall Voltage (V): 440 V (399-483)

Aging Test Current (C): 1.0

Baseline Build for Aging Reference

2019-Mar-01 09:30 Standby

Item	Description
Battery Type	Set up the battery type.  NOTE: <ol style="list-style-type: none"> 1. If you use lead-acid batteries, please set up the battery type as Lead-acid. 2. If you use lithium-ion batteries, please set up the battery type as LFPO.
Battery Rating Voltage	Set up the battery rating voltage.
Battery Capacity	Set up the battery capacity.
Battery Strings	Set up how many battery strings that are used on site.
Battery Cut Off Voltage	Set up the battery low voltage. In battery mode, when the battery low voltage is reached, the battery power will cut off, the UPS will shut down, and the connected loads won't be protected.
Installation Date	Record the battery installation date.
Next Replacement Date	Set up the battery replacement date.
Battery Charging Protection (IP DRY 2)	Enable input dry contacts 2 to let the UPS have battery charging protection function. Please refer to 4.1.8 Output/ Input Dry Contacts .
Battery Fault Alarm (IP Dry 1)	Enable input dry contacts 1 to let the UPS trigger the battery fault alarm. Please refer to 4.1.8 Output/ Input Dry Contacts .
Battery Test Fail Voltage	Set up the battery test fail voltage. When the battery voltage is under the test fail voltage, it means battery failure.
Battery Test Duration	Set up how long the battery test should last.
Auto Battery Test Interval	Set up the battery test interval.
Baseline Built For Aging Reference	Establish the battery discharging curve as the benchmark and reference for battery aging test. It is suggested that you establish the reference right after initial installation of batteries. Please refer to below for more information. <ol style="list-style-type: none"> 1. If you cannot tap the Baseline Build for Aging Reference on the LCD, it means that all of the following conditions are not matched for you to establish the baseline. The conditions include that: <ol style="list-style-type: none"> a. The UPS is in On-Line mode or ECO mode. b. Main input is normal. c. The battery status icon  illuminates green.

Item	Description
<p>Baseline Built For Aging Reference (Continued)</p>	<p>d. The batteries are in the floating charge status.</p> <p>e. Battery voltage is \geq charging voltage setup value minus 20V.</p> <p>f. Charging current is $<$ 10A.</p> <p>2. If you can tap the Baseline Build for Aging Reference on the LCD, the following screen will appear to ask you to set up Battery Test Fail Voltage and Aging Test Current.</p>  <p>(1) After you set up the Battery Test Fail Voltage and Aging Test Current, tap the Baseline Build for Aging Reference and the following screen will pop up to ask if you want to abort baseline establishment.</p>  <p>(2) Click the Abort Baseline Establishment and the following screen will pop up to ask if you would like to stop the baseline establishment?</p>

Item	Description
<p>Baseline Built For Aging Reference (Continued)</p>	<div data-bbox="669 266 1236 602" style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> </div> <p>(3) If you select 'NO', the test will continue.</p> <p>(4) When the test is successful, the battery discharging curve (baseline) will appear as follows.</p> <div data-bbox="669 755 1236 1091" style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> </div> <p>When the test is failed, the following screen will pop up. Click 'YES' to go back to the original screen and contact service personnel for failure reasons.</p> <div data-bbox="669 1251 1236 1588" style="border: 1px solid black; padding: 10px;"> </div>
<p>Aging Test Current</p>	<p>Set up the battery aging test current.</p>

7.9.5 Charge Setting

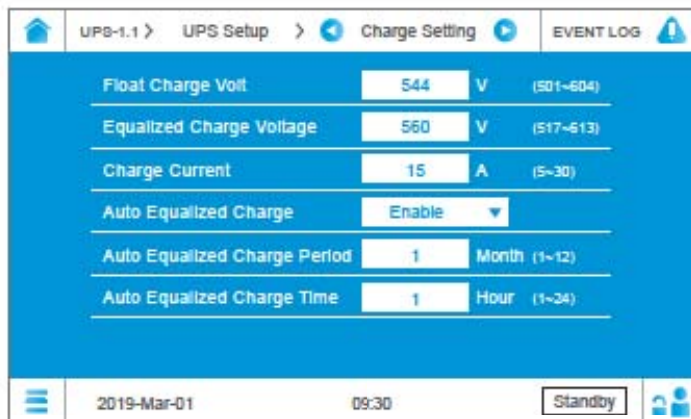
Path: Main Menu  → UPS Setup → Charge Setting

In the **Charge Setting** screen^{*1} (shown in the figure below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



NOTE:

^{*1} means that the **Administrator** password is needed. For password information, please refer to **7.5 Password Entry**.



Item	Value	Unit	Range
Float Charge Volt	544	V	(501~604)
Equalized Charge Voltage	560	V	(517~613)
Charge Current	15	A	(5~30)
Auto Equalized Charge	Enable		
Auto Equalized Charge Period	1	Month	(1~12)
Auto Equalized Charge Time	1	Hour	(1~24)

Item	Description
Float Charge Voltage	Set up the float charge voltage.
Equalized Charge Voltage	Set up the equalized charge voltage.
Charge Current	Set up the charge current.
Auto Equalized Charge	Enable or disable the auto-equalized charge.
Auto Equalized Charge Period	Set up the auto-equalized charge period.
Auto Equalized Charge Time	Set up the duration of auto-equalized charge time.

7.9.6 Parallel Setting

Path: Main Menu  → UPS Setup → Parallel Setting

After entering the **Parallel Setting** screen^{*1} (shown in the figure below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.

**NOTE:**

*1 means that the Administrator password is needed. For password information, please refer to *7.5 Password Entry*.


The screenshot shows the 'Parallel Setting' menu. At the top, there is a navigation bar with a home icon, 'UPS-1.1 >', 'UPS Setup >', 'Parallel Setting', and 'EVENT LOG' with a warning icon. The main area has three settings, each with a dropdown menu:

- Parallel Group ID: 0
- Parallel ID: 0
- Common Battery: Enable

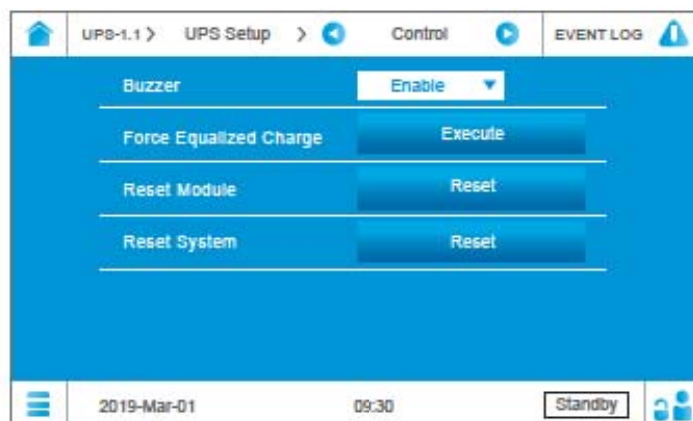
At the bottom, there is a status bar with a menu icon, the date '2019-Mar-01', the time '09:30', a 'Standby' button, and a user icon.





Item	Description
Parallel Group ID	<p>The UPSs in parallel connection must be assigned the same parallel group ID No. in order to let the outputs of the parallel UPSs be put in parallel connection and let the loads be evenly distributed among the parallel units.</p> <p>If the parallel UPSs have different parallel group ID No., their output signals might be synchronized but their outputs cannot be connected in parallel.</p>
Parallel ID	<p>The UPSs that need to be paralleled must be assigned the same parallel group ID No. and different parallel ID No. in order to let the parallel function work.</p>
Common Battery	<p>If the parallel UPSs that have the same parallel group ID No. need to share common batteries, please select 'Enable' for the 'Common Battery' setup item. Otherwise, the function of battery abnormality detection will fail. For more information about common battery, please refer to <i>3.4 Common Battery (Only for Parallel UPSs Connecting to the Same External Battery Cabinet(s))</i>.</p>

7.9.7 Control

Path: Main Menu  → UPS Setup → Control

After entering the Control screen (shown in the figure below), you can set up the following items.

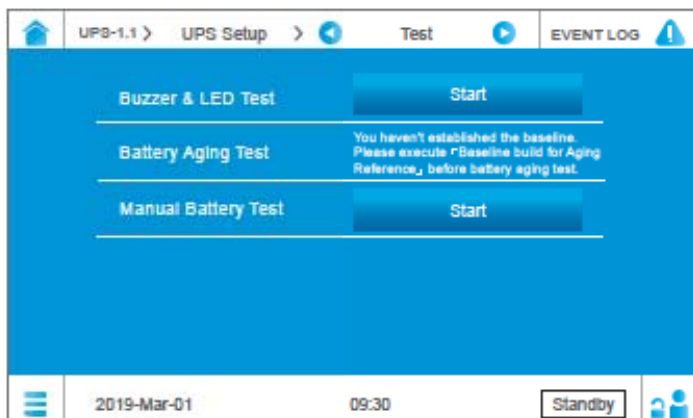







Item	Description
Buzzer	Enable or disable the buzzer.
Force Equalized Charge	Manually force the UPS to run in auto equalized charge mode to charge the batteries.
Reset Module	Reset the power modules or not. In bypass mode, when you tap the ON/ OFF Button  to start up the UPS but the UPS does not respond, please select 'Reset' to reset the power modules. After the power modules are reset, please tap the ON/ OFF Button  to start up the UPS.
Reset System	Reset the system or not. In bypass mode, when you tap the ON/ OFF Button  to start up the UPS but the UPS does not respond, please select 'Reset' to reset the system. After the system is reset, please tap the ON/ OFF Button  to start up the UPS.

7.9.8 Test

Path: Main Menu  → UPS Setup → Test

In the Test screen (shown in the figure below), you can set up the following items.



Item	Description
Buzzer & LED Test	Start the buzzer & LED test.
Battery Aging Test	<p>Start the battery aging test. There are three situations as follows.</p> <ol style="list-style-type: none"> If the following screen appears, it means that you haven't established the baseline. Please refer to 7.9.4 Battery Setting to establish the baseline.  <ol style="list-style-type: none"> If the following screen appears,  <p>it means that you cannot start the battery aging test because all of the following conditions are not matched for you to execute the battery aging test. The conditions include that:</p> <ol style="list-style-type: none"> The battery status icon  illuminates green. The batteries are in the floating charge status. Battery voltage is \geq charging voltage setup value minus 20V. Charging current is $<$ 10A. <ol style="list-style-type: none"> If the following screen appears, it means that you can start the battery aging test.  <p>(1) Once you tap the , the following screen will pop up to ask if you want to abort aging test.</p>

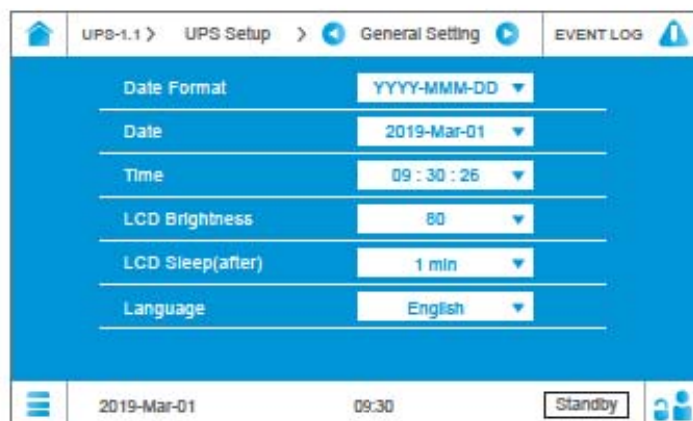
Item	Description
<p style="text-align: center;">Battery Aging Test (Continued)</p>	<div data-bbox="573 262 1140 604" data-label="Image"> </div> <p data-bbox="532 624 1221 685">(2) Click the Abort Aging Test and the following screen will appear to ask if you would like to stop the battery aging test?</p> <div data-bbox="573 703 1140 1045" data-label="Image"> </div> <p data-bbox="532 1060 991 1089">(3) If you select 'NO', the test will continue.</p> <p data-bbox="532 1103 1221 1203">(4) Condition A: When the test is successful, the battery discharging curve will appear as follows.</p> <div data-bbox="573 1221 1140 1562" data-label="Figure"> </div> <p data-bbox="573 1578 1221 1705">Except the baseline line (the yellow one), there are at maximum three battery discharging curves. The newest one will replace the oldest one. Please refer to the figure below.</p>

Item	Description
<p data-bbox="252 672 480 739">Battery Aging Test (Continued)</p>	<div data-bbox="598 266 1163 602"> <p>The screenshot shows a line graph titled 'Battery Discharging History'. The y-axis is 'Voltage (V)' ranging from 440 to 520. The x-axis is 'Time (Min)' with markers at 28.4 and 30.3. Three data series are plotted: 2019/02/01 15:49:55 (red), 2017/06/16 14:35:28 (blue), and 2017/06/16 14:33:25 (green). A yellow 'Baseline' is also shown. A horizontal line at approximately 445V is labeled 'End of Testing Voltage'. The status bar at the bottom shows '2019-Mar-01 09:30' and a 'Standby' button.</p> </div> <p data-bbox="600 624 740 653">Condition B:</p> <p data-bbox="600 664 1245 761">When the test is failed, the following screen will pop up. Click 'YES' to go back to the original screen and contact service personnel for failure reasons.</p> <div data-bbox="598 784 1163 1124"> <p>The screenshot shows a blue screen with a white exclamation mark icon and the text 'Aging Test Fail.' Below the text is a white button with the text 'Yes'. The status bar at the bottom shows '2019-Mar-01 09:30' and a 'Standby' button.</p> </div>
<p data-bbox="244 1184 485 1213">Manual Battery Test</p>	<p data-bbox="518 1184 842 1213">Start the manual battery test.</p>

7.9.9 General Setting


Path: Main Menu  → UPS Setup → General Setting

After entering the **General Setting** screen (shown in the figure below), you can set up the following items.



Item	Description
Date Format	Select the date format.
Date	Set up the date.
Time	Set up the time.
LCD Brightness	Adjust the LCD display brightness (default: 80).
LCD Sleep (after)	Set up the LCD backlight sleep time (default: 1 minute).
Language	Set up the display language (default: English).

7.9.10 Advanced Setting

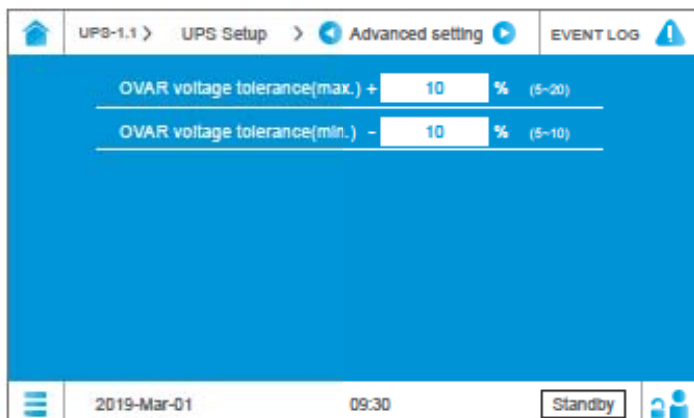
Path: Main Menu  → UPS Setup → Advanced Setting

After entering the **Advanced Setting** screen^{*1} (shown in the figure below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



NOTE:

^{*1} means that the **Administrator** password is needed. For password information, please refer to *7.5 Password Entry*.

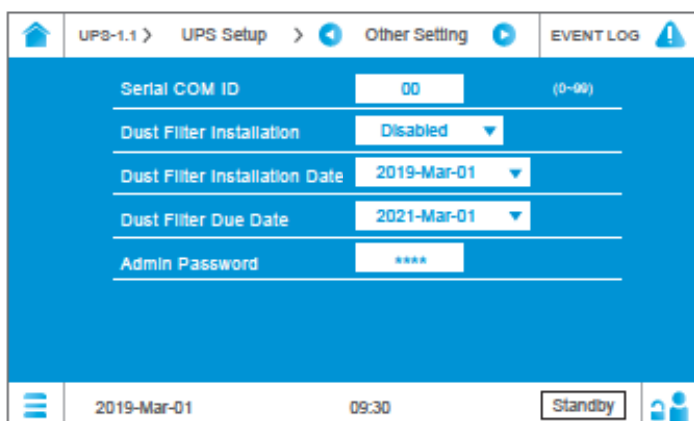




Item	Description
OVER Voltage Tolerance (Max)	Set up the upper limit 480v+ (5% ~ 20%). Default: +10%.
OVER Voltage Tolerance (Min)	Set up the lower limit 480v- (5% ~ 20%). Default: -10%.

7.9.11 Other Setting

Path: Main Menu  → UPS Setup → Other Setting

After entering the Other SETTING screen (shown in the figure below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



Item	Description
Serial COM ID	Check the UPS's serial COM ID No.
Dust Filter Installation ^{*1}	If you have installed any dust filter, please select 'Enable'; if not, please select 'Disable'.
Dust Filter Installation Date ^{*1}	Set up the dust filter installation date.
Dust Filter Due Date ^{*1}	Set up the dust filter due date.  NOTE: When the date is due, the yellow warning icon  will automatically appear in the upper right corner of the LCD, and the alarm message ' DUST FILTER REPLACEMENT ' will also appear.
Admin Password ^{*1}	Set up the Administrator password (4 digits).





NOTE:


^{*1} means that the Administrator password is needed. For password information, please refer to *7.5 Password Entry*.






7.10 System Maintenance

7.10.1 Alarm Warning

Path 1: No. 

Path 2: Main Menu  → Maintenance → Warning

When there is a warning, the buzzer icon  will appear and the buzzer will make an alarm sound. Tap the warning icon No.  to enter the **WARNING** screen.

After entering the **WARNING** screen (shown in the figure below), you can use the     icons to view the warning logs or use the function key  to enter a specific page No. to check the warning logs. The system can store at maximum 200 warning logs. The greater the event number is, the newer the event is.

The **WARNING** screen also displays relevant solutions. For warning solutions, please refer to *10. Troubleshooting*.






No.	Log	Solution
1	TOUCH PANEL COMMUNICATION LOSS	

2019-Mar-01 09:30 Standby

7.10.2 Historical Event

Path: Main Menu  → Maintenance → Historical Event

The Historical Event screen shown below provides each historical event's No., start date, time, code (red: serious; orange: minor; green: normal), location, and log description.

You can use the icons     to check the historical event logs or use the function key  to enter a specific page No. to view the historical event logs.

The system can save up to 10000 historical event logs. The greater the event number is, the newer the event is. When the total number of historical event logs exceeds the storage capacity (up to 10000 entries), the oldest 500 historical event logs will be overwritten.

To clear the historical event logs, please refer to [7.10.6 Clear](#).

No.	Start date	Code	Location	Log
1238	2019-02-23 13:34:46.440	250B-01	System	Display Communication Loss
1237	2019-02-23 13:34:43.390	2501-00	System	Display Communication OK
1236	2019-02-23 13:34:40.420	250B-01	System	Display Communication Loss
1235	2019-02-23 13:34:37.390	2501-00	System	Display Communication OK
1234	2019-02-23 13:34:34.460	250B-01	System	Display Communication Loss
1233	2019-02-23 13:34:31.450	5006-01	System	Load on ECO Mode

2019-Mar-01 09:30 Standby

No.	Start date	Code	Location	Log
302	2019-02-22 19:51:58.400	2508-01	System	INT CAN Bus Communication Loss
301	2019-02-22 19:51:10.800	2501-00	System	Mains Input Switch OFF
300	2019-02-22 19:51:58.800	1003-01	System	Battery Disconnected
299	2019-02-22 19:51:58.400	2508-01	System	INT CAN Bus Communication Loss
298	2019-02-22 19:51:10.400	0141-01	System	Mains Input Switch OFF
297	2019-02-22 19:51:10.610	0105-01	System	Mains Input Line to Line ST Vo...

2019-Mar-01 09:30 Standby

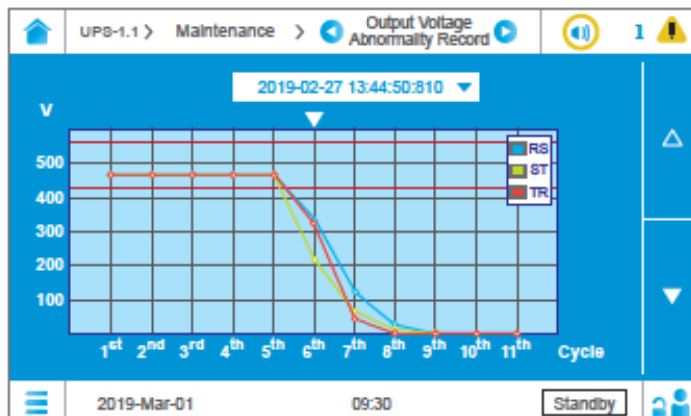
7.10.3 Output Voltage Abnormality Record

Path: Main Menu → Maintenance → Output Voltage Abnormality Record

After entering the Output Voltage Abnormality Record screen (shown in the figure below), you can view the output voltage's RMS value (Root Mean Square Value). When the UPS's output voltage exceeds the Over Voltage Tolerance (Max) or Over Voltage Tolerance (Min), the system will record the previous 5 cycles, the current cycle and the next 5 cycles' data per time (which means that each record includes 11-cycles' data every time), and can save up to the latest ten records. For information about the Over Voltage Tolerance (Max) and Over Voltage Tolerance (Min), please refer to *7.9.10 Advanced Setting*.

Please tap the icon shown in the figure below to select a specific date's output voltage abnormality record and use the icons and to check its graph and statistic accordingly. In the graph,

- means R-S line voltage;
- means S-T line voltage;
- means T-R line voltage.



	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th
RS	500.3	500.0	500.1	500.2	500.3	319.9	213.7	208.7	202.8	196.6	190.3
ST	501.6	501.6	501.6	501.4	501.5	412.0	432.0	420.6	408.8	396.6	384.6
TR	503.5	503.6	503.5	503.4	503.4	638.5	636.9	619.9	602.4	584.2	565.5

Unit : V

2019-Mar-01 09:30 Standby

7.10.4 Statistics

Path: Main Menu → Maintenance → Statistics

After entering the **Statistics** screen (shown in the figure below), you can view the following statistics.

Amount of Battery Mode Transition	3 times
Amount of Bypass Mode Transition	251 times
Operation time	0 Years 5 Dates 0 Hours

2019-Mar-01 09:30 Standby


Item	Description
Amount of Battery Mode Transition	Means how many times that the UPS runs in battery mode.
Amount of Bypass Mode Transition	Means how many times that the UPS runs in bypass mode.
Operation Time	Means how long the UPS has operated.

To clear the statistics, please refer to [7.10.6 Clear](#).

7.10.5 Battery Discharging History

Path: Main Menu  → Maintenance → Battery Discharging History

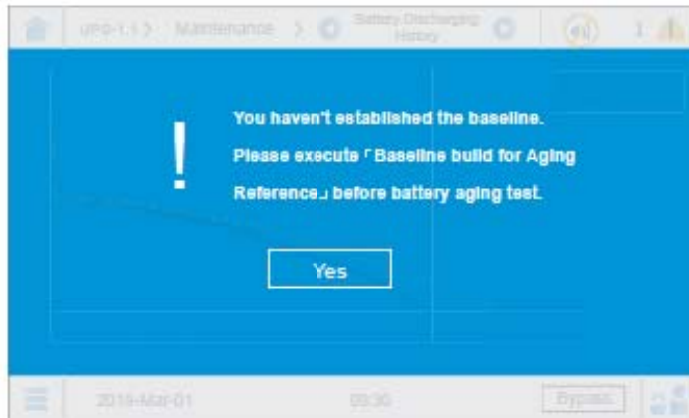
Scenario 1:

After you follow the Path mentioned above to enter the **Battery Discharging History** screen*¹ and you see the figure shown below, it means that you haven't established the baseline. Please tap the **Main Menu Icon**  and go to **UPS Setup → Battery Setting → Baseline Built for Aging Reference** to set up the baseline. For more information, please refer to **7.9.4 Battery Setting**.

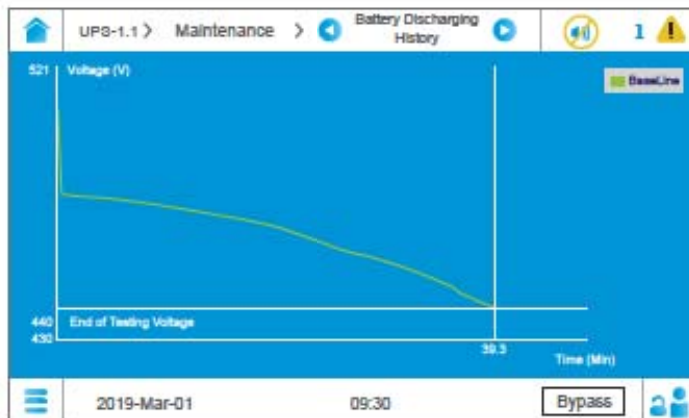


NOTE:

*¹ means that the **Administrator** password is needed. For password information, please refer to **7.5 Password Entry**.



After setting the baseline, you can view the battery discharging history record as shown in the figure below.

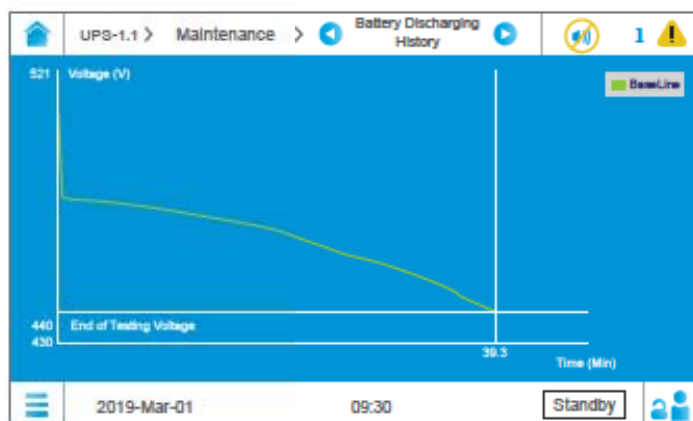



Scenario 2:

If you have already set up the baseline (please refer to **7.9.4 Battery Setting**) and followed the Path mentioned above to enter the **Battery Discharging History** screen^{*1}, you can view the **Battery Discharging History** record as follows.

**NOTE:**

^{*1} means that the **Administrator** password is needed. For password information, please refer to **7.5 Password Entry**.

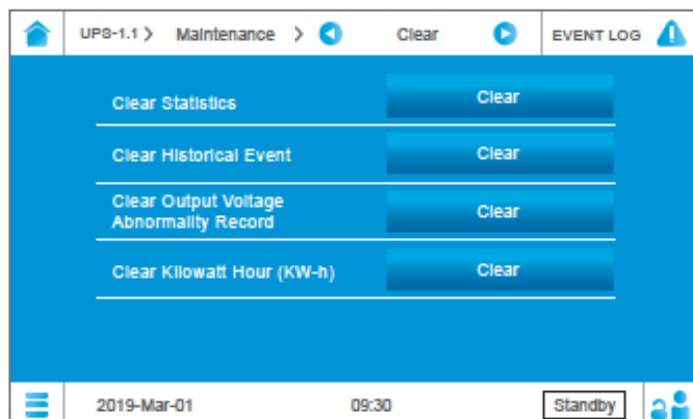
**7.10.6 Clear**

Path: Main Menu  → Maintenance → Clear

After entering the **Clear** screen^{*1} (shown in the figure below), you can clear the records of (1) statistics, (2) historical event, (3) output voltage abnormality and (4) kilowatt hour (kWh).

**NOTE:**

^{*1} means that the **Administrator** password is needed. For password information, please refer to **7.5 Password Entry**.



Item	Description
Clear Statistics	After you select 'Clear' and confirm clearance of statistics, all records of the statistics will be cleared.
Clear Historical Event	After you select 'Clear' and confirm clearance of historical event logs, all historical event logs will be cleared.
Clear Output Voltage Abnormality Record	After you select 'Clear' and confirm clearance of output voltage abnormality records, all the output voltage abnormality records will be cleared.
Clear Kilowatt Hour (kWh)	After you select 'Clear' and confirm clearance of kilowatt hour records, the kilowatt hour statistics will be cleared.



NOTE:

The records of (1) statistics, (2) historical event, (3) output voltage abnormality and (4) kilowatt hour (kWh) provide important information for system analysis and maintenance. Do not clear any of them without the consent of qualified service personnel.

7.10.7 Advanced Diagnosis






Path: Main Menu  → Maintenance → Advanced Diagnosis

After entering the **Advanced Diagnosis** screen^{*1} (shown in the figure below), you can check the readings of each power module's DC BUS Voltage, PM A/D, PM D/D, Charge Voltage and Charge Current.



NOTE:

^{*1} means that the **Administrator** password is needed. For password information, please refer to **7.5 Password Entry**.

UPS-1.1 > Maintenance > Advanced Diagnosis			EVENT LOG 
01	DC BUS Voltage	779.7 V	 
	PM A/D	On	
	PM D/D	Off	
	Charge Voltage	540.0 V	
	Charge Current	0.0 A	
	2019-Mar-01	09:30	Standby 

7.10.8 Version

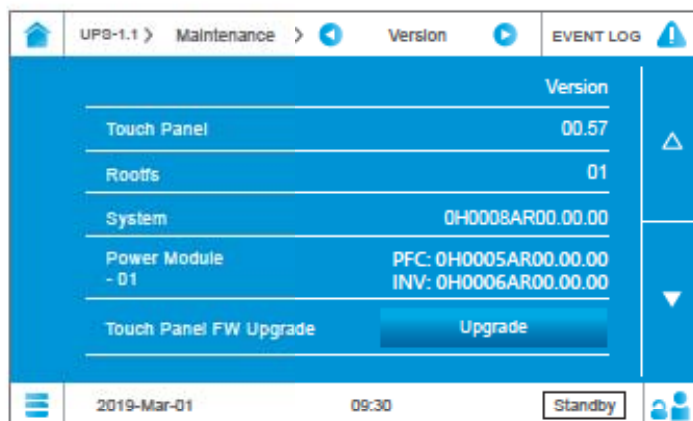


NOTE:

To operate the UPS in parallel mode, please make sure the version of each following item is the same for each parallel unit.

Path: Main Menu  → Maintenance → Version

After entering the **Version** screen (shown in the figure below), you can check relevant items' version No. and upgrade the touch panel's firmware version. For detailed information, please refer to the table below.




Item	Description
Touch Panel	Check the touch panel's version No.
Rootfs	Check the root file system's version No.
System	Check the system's version No.
Power Module #	Check a specific power module's version No.
Touch Panel FW Upgrade ^{*1}	Upgrade the touch panel's firmware version.



NOTE:

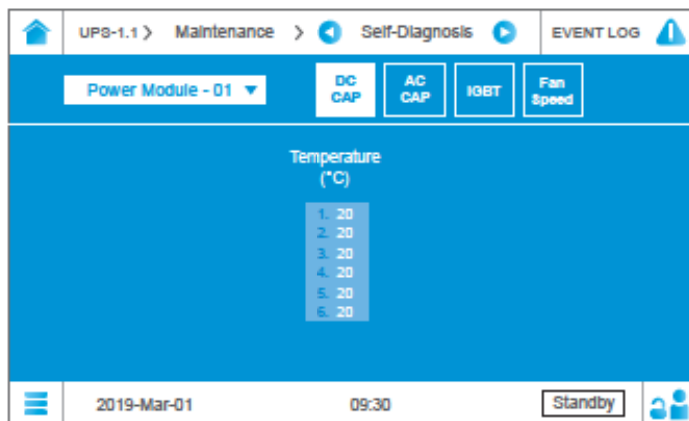
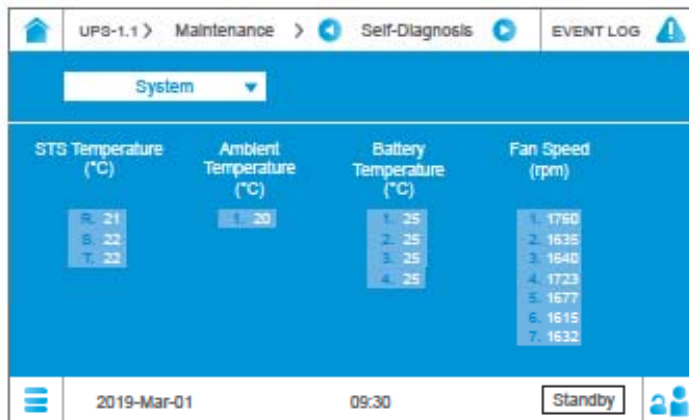
^{*1} means that the Administrator password is needed. For password information, please refer to *7.5 Password Entry*.

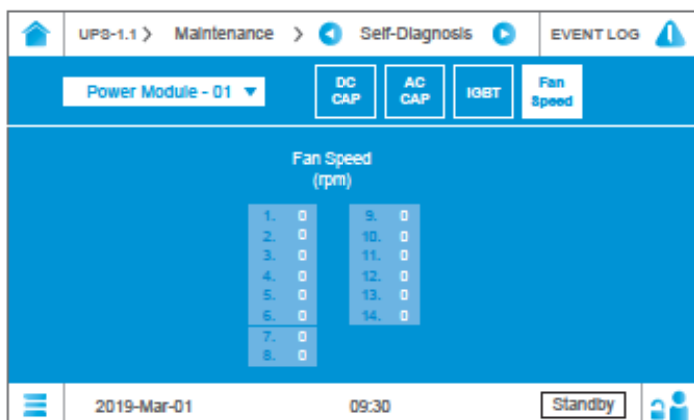
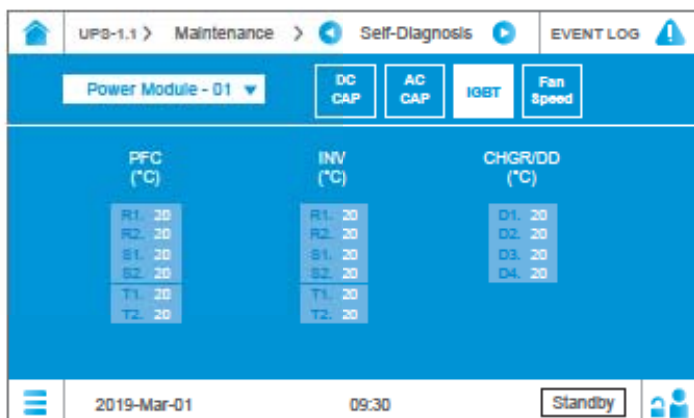
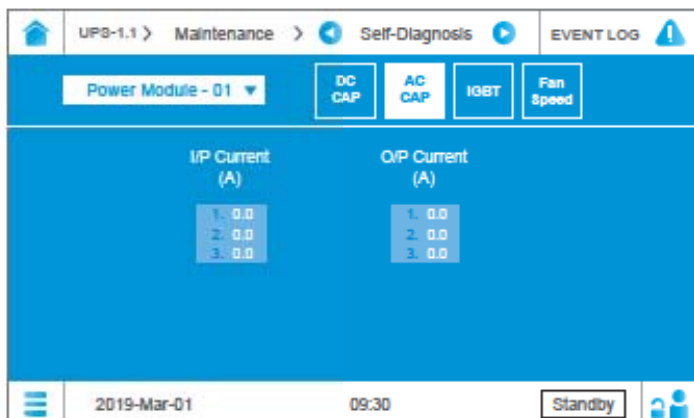
7.10.9 Self-Diagnosis

Path: Main Menu  → Maintenance → Self-Diagnosis

After entering the **Self-Diagnosis** screen (shown in the figures below), you can check:

1. The system's STS temperature, ambient temperature, battery temperature and fan speed.
2. A specific power module's:
 - (1) DC CAP's temperature
 - (2) AC CAP's input and output current
 - (3) IGBT's PFC, INV, and CHGR/ DD temperature
 - (4) Fan speed





7.10.10 IP Setting

Path: Main Menu  → Maintenance → IP Setting

After entering the IP Setting screen^{*1} (shown in the figures below), you can set up the following items. These settings must be carried out by qualified service personnel. Please contact Delta customer service for assistance.



NOTE:

^{*1} means that the Administrator password is needed. For password information, please refer to *7.5 Password Entry*.

UPS-1.1 > Maintenance > IP Setting		EVENT LOG
DHCP Client	Enable	▲ ▼
IP Address	192.166.2.103	
Subnet Mask	255.255.255.0	
Gateway IP	10.0.10.252	
DNS 1 IP	170.11.18.250	
DNS 2 IP	171.13.11.125	
Search Domain		
2019-Mar-01 09:30		Standby

UPS-1.1 > Maintenance > IP Setting		EVENT LOG
IP Address	192.166.2.103	▲ ▼
Subnet Mask	255.255.255.0	
Gateway IP	10.0.10.252	
DNS 1 IP	170.11.18.250	
DNS 2 IP	171.13.11.125	
Search Domain		
Host Name	DELTA	
2019-Mar-01 09:30		Standby

Item	Description
DHCP Client	Enable or disable the DHCP client.
IP Address	Set up the IP address.
Subnet Mask	Set up the subnet mask.
Gateway IP	Set up the gateway IP address.
DNS 1 IP	Set up the DNS server 1 IP address.
DNS 2 IP	Set up the DNS server 2 IP address.
Search Domain	Set up the search domain.
Host Name	Set up the host name.



Optional Accessories

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

No.	Item	Function
1	SNMP Card	Monitors the status of the UPS via internet.
2	Relay I/O Card	Increases the quantity of dry contacts.
3	MODBUS Card	Lets the UPS have MODBUS communication function.
4	EnviroProbe 1000/ EnviroProbe 1100/ EnviroProbe 1200	Monitors temperature, humidity and other connected monitoring devices in a room environment. The EnviroProbe 1000/ 1100/ 1200 should work with either an SNMP card or an EMS2000.
5	EnviroStation	Monitors and controls environmental conditions through peripheral devices to ensure that your equipment is protected from critical conditions such as high temperature, humidity, water leakage, danger status, etc.
6	Battery Cabinet Temperature Sensor Cable	Detects the temperature of an external battery cabinet connected to the UPS.



NOTE:

1. For details of installation and operation of the accessories 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 purchase any accessories mentioned above, please contact your local dealer or customer service.



Maintenance

- **UPS**

1. UPS Cleaning:

Regularly clean the UPS, especially the slits, openings and filters, 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, and clean and replace the filters regularly to prevent any object from blocking or covering these areas.

2. UPS Regular Inspection:

- a. Monthly check the filters, and regularly clean and replace them.
- b. Regularly check the UPS every half year and inspect:
 - 1) Whether the UPS, LED indicators, and alarm function are operating normally.
 - 2) Whether the UPS works in bypass mode (normally, the UPS works 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.

- **Batteries**

The DPM series UPS uses the lead-acid batteries or the lithium-ion batteries. The battery life depends on the environment 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 life.

1. Keep usage temperature between 15°C ~ 25°C (59°F ~ 77°F).
2. When the UPS needs to be stored for an extended period of time, the lead-acid batteries must be recharged once every three months and the charging time must not be less than 24 hours each time. As for the lithium-ion batteries, please contact your battery supplier for the charging frequency and charging duration.

- **Fans**

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



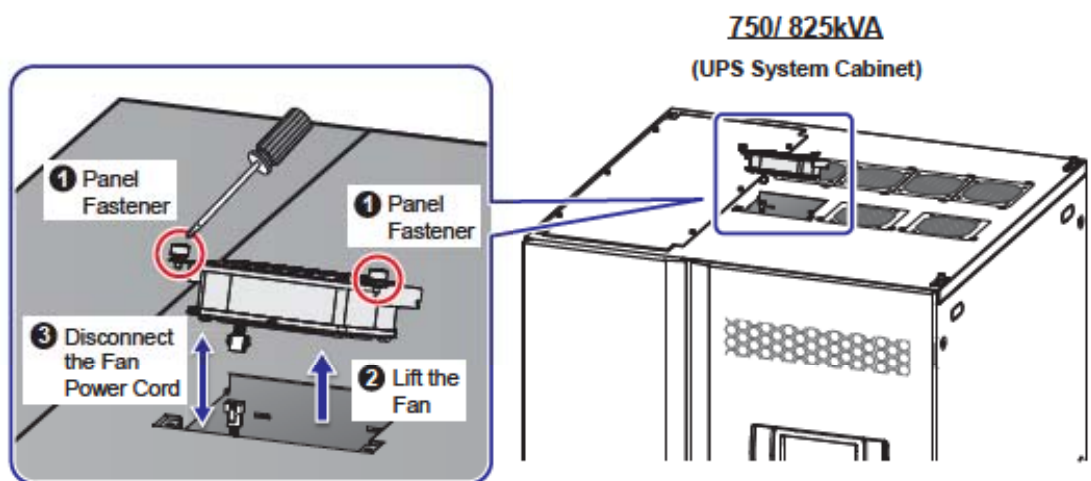
NOTE:

1. Please ask your local dealer or customer service for more maintenance information. Do not perform maintenance if you are not trained for it.
2. The fan replacement procedures for the UPS system cabinet and power modules are the same.

3. For 500/ 550kVA UPS and 750/ 825kVA UPS, their external views of UPS system cabinets are the same, except that their total number of fans located on the top are different. In this chapter, only the illustration of 750/ 825kVA UPS system cabinet is taken for example.

The fan replacement procedures are as follows.

- ① Use a Phillips screwdriver to counterclockwise unscrew the fan cover's two panel fasteners (①).
- ② Lift the fan (②) and disconnect the fan power cord (③). After that, you can remove the fan from the UPS.
- ③ To install a new fan, please follow the above steps in reverse order.



(Figure 9-1: Fan Replacement)

- 7" Color Touch Panel LCD



NOTE:

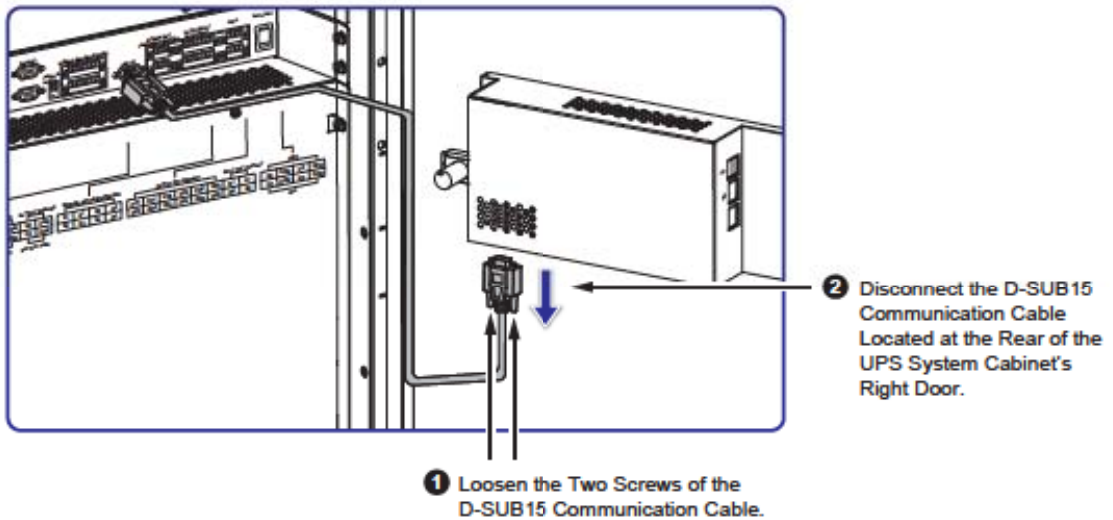
Please ask your local dealer or customer service for more maintenance information. Do not perform maintenance if you are not trained for it.

The LCD replacement procedures are as follows.

- 1 Open the UPS system cabinet's two front doors and find the D-SUB15 communication cable located at the rear of the UPS system cabinet's right door. Loosen the D-SUB15 communication cable's two screws (1) to disconnect the cable (2).

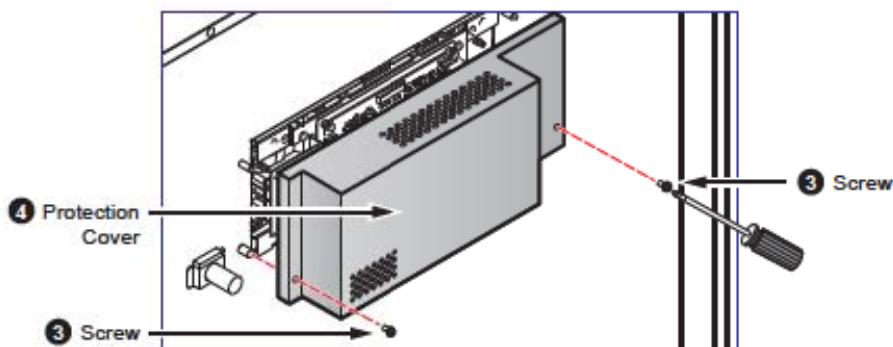
750/ 825kVA

(UPS System Cabinet with Two Front Doors Open)



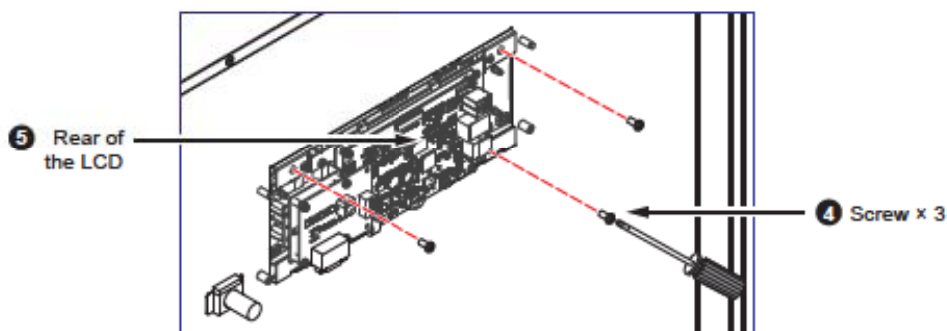
(Figure 9-2: Disconnect the D-SUB15 Communication Cable Located at the Rear of UPS System Cabinet's Right Door)

- 2 Use a Phillips screwdriver to remove the two screws (3) from the protection cover (4) located at the rear of the UPS system cabinet's right door and remove the protection cover (4).

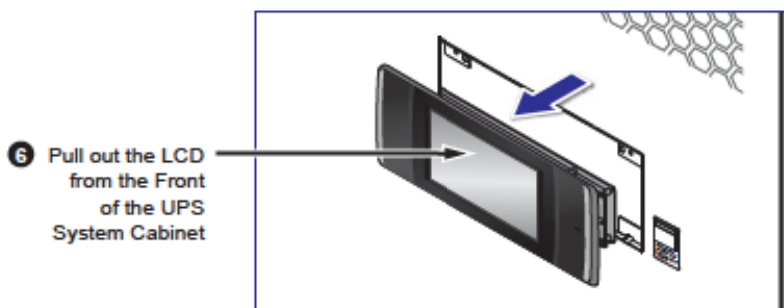


(Figure 9-3: Remove the Protection Cover Located at the Rear of the UPS System Cabinet's Right Door)

- 3 Use a Phillips screwdriver to remove the three screws (4) from the rear of the LCD (5). After that, you can pull out the LCD (6) from the front of the UPS system cabinet.



(Figure 9-4: Remove the Three Screws from the Rear of the LCD)



(Figure 9-5: Pull Out the LCD from the Front of the UPS System Cabinet)

- 4 To install a new LCD, please follow the above steps in reverse order.

- **Dust Filters**



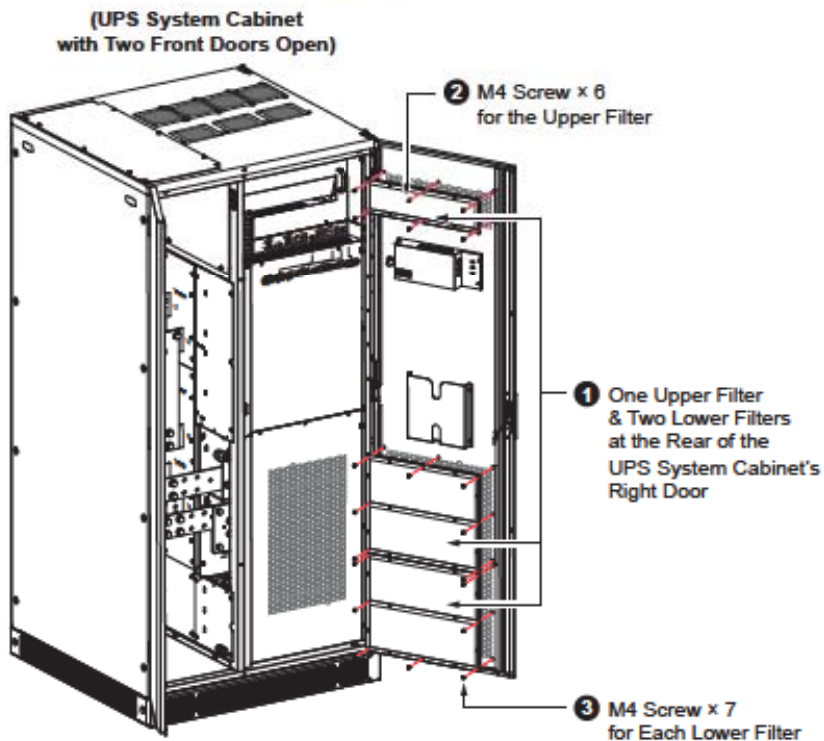
NOTE:

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

A. UPS System Cabinet's Dust Filter Replacement Procedures

- 1 There are one upper filter and two lower filters (1) at the rear of the UPS system cabinet's right door; the filters are located behind the ventilation areas. The upper filter is fixed with six M4 screws (2) and each of the lower filters is fixed with seven M4 screws (3). For replacement, loosen the screws to remove the old filter(s) and use the screws that you just removed to fix the new one(s).

750/ 825kVA

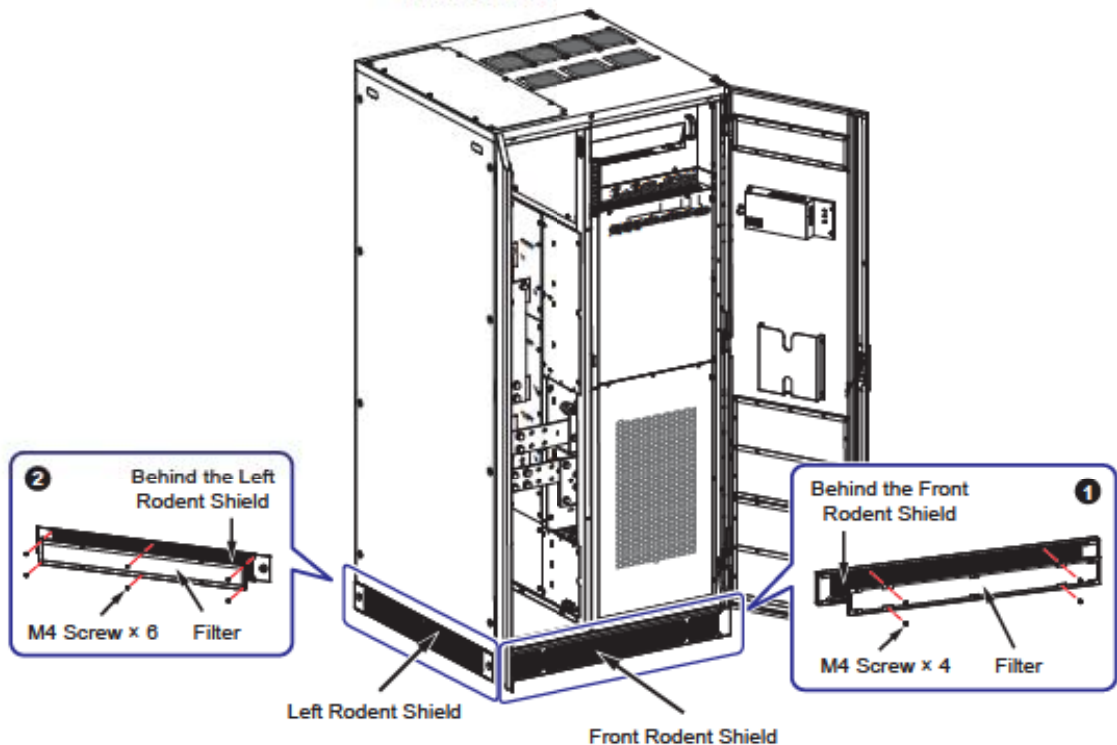


(Figure 9-6: Dust Filters Located at the Rear of the UPS System Cabinet's Right Door)

- 2 There are two filters located respectively behind the UPS system cabinet's front and left rodent shields as shown in *Figure 9-7*. The filter located behind the UPS system cabinet's front rodent shield is fixed with four M4 screws (1). The filter located behind the UPS system cabinet's left rodent shield is fixed with six M4 screws (2). For replacement, loosen the screws to remove the old filter(s) and use the screws that you just removed to fix the new one(s).

750/ 825kVA

(UPS System Cabinet
with Two Front Doors Open)



(Figure 9-7: Dust Filters Located behind the UPS System Cabinet's Front & Left Rodent Shields)

B. Power Module's Dust Filter Replacement Procedures



NOTE:

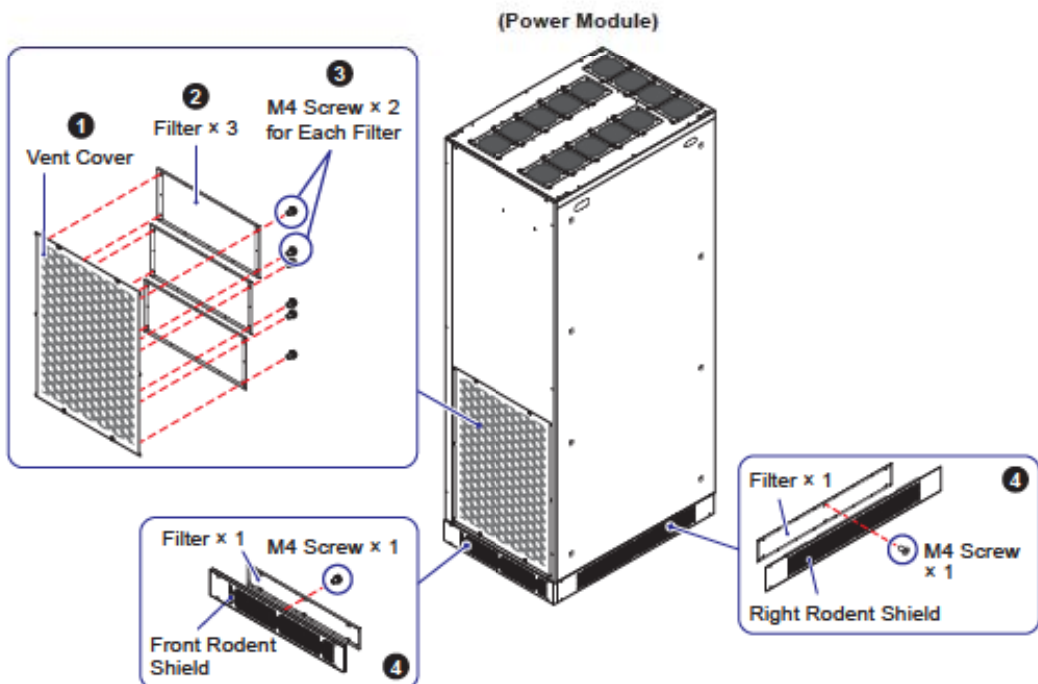
1. Please ask your local dealer or customer service for more maintenance information. Do not perform maintenance if you are not trained for it.
2. For 500/ 550kVA UPS and 750/ 825kVA UPS, each power module's structure, exterior and dimensions are the same. Only their total number of the power modules are different. In this section, only one power module is taken as an example.

- 1 Remove the vent cover (1) located on the front of the power module, and you will see three filters (2). Each filter is fixed with two M4 screws (3). For replacement, loosen the screws to remove the old filter(s) and use the screws that you just removed to fix the new one(s).
- 2 There are two filters located respectively behind the power module's front and right*¹ rodent shields as shown in *Figure 9-8*. Each filter is fixed with one M4 screw (4). For replacement, loosen the screw(s) to remove the old filter(s) and use the screw(s) that you just removed to fix the new one(s).



NOTE:

*¹: Only the right-end-side power module has a right rodent shield.



(Figure 9-8: Dust Filters Located behind the Power Module's Vent Cover and Front & Right Rodent Shields)



Troubleshooting

When you see the following alarm messages appear on the LCD, please follow the solutions shown below. If you see other alarm messages that are not listed in the table below, please contact Delta service personnel for assistance. Do not perform troubleshooting if you are not trained for it.

No.	Alarm Message	Possible Cause	Solution
1	MAINS INPUT VOLT OR FREQ NOK	<ol style="list-style-type: none"> The input breaker is turned off. The main AC source's voltage or frequency is abnormal. 	<ol style="list-style-type: none"> Please check if the input breaker is turned off or not. If yes, please turn it on. Please check if the main AC source's voltage or frequency is abnormal or not. If yes, please wait for the main AC source to be restored. If the alarm message still exists after the solutions mentioned above have been executed, please contact service personnel.
2	MAINS INPUT VOLT PHASE SEQ NOK	The wiring is incorrect.	Please check the wiring and phase sequence of the main AC source, and contact service personnel for assistance.
3	MAINS INPUT BREAKER OFF	The input breaker is turned off.	<ol style="list-style-type: none"> Please check if the input breaker is turned off or not. If yes, please turn it on. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
4	BYPASS INPUT VOLT OR FREQ NOK	<ol style="list-style-type: none"> The bypass breaker is turned off. The bypass AC source's voltage is abnormal. 	<ol style="list-style-type: none"> Please check if the bypass breaker is turned off or not. If yes, please turn it on. Please check if the bypass AC source's voltage is abnormal or not. If yes, please wait for the bypass AC source to be restored. If the alarm message still exists after the solutions mentioned above have been executed, please contact service personnel.
5	BYPASS INPUT VOLT PHASE SEQ NOK	The wiring is incorrect.	Please check the wiring and phase sequence of the bypass AC source, and contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
6	BYPASS VOLT OUT ECO RANGE	The bypass AC source's voltage or frequency exceeds the range suitable for ECO mode.	Please check the bypass AC source's voltage and frequency. If there is any abnormality, please wait for the bypass AC source to be restored.
7	BYPASS BREAKER OFF	For single input application, the input breaker is turned off.	<ol style="list-style-type: none"> 1. Please check if the input breaker is turned off or not. If yes, please turn it on. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
		For dual input application, the bypass breaker is turned off.	<ol style="list-style-type: none"> 1. Please check if the bypass breaker is turned off or not. If yes, please turn it on. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
8	BYPASS STS FAULT	Heat dissipation is poor or components are damaged.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or air inlets. If yes, remove the foreign matter. 2. Decrease some loads. 3. If the alarm message still exists after the solutions mentioned above have been executed, please contact service personnel.
9	BYPASS STS FUSE OPEN	The bypass static switch or its drive circuit is abnormal.	Please contact service personnel for assistance.
10	Battery End of Discharge Imminent	The bypass STS fuse is blown.	Please contact service personnel for assistance.
11	BYPASS OVER CURRENT	The connected loads exceed the rated value.	Please decrease the loads.
12	BYPASS MAGNETIC CONTACTOR AUX POWER FAULT	The bypass magnetic contactor's auxiliary power is abnormal.	Please contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
13	BYPASS MAGNETIC CONTACTOR FAULT	The bypass magnetic contactor is abnormal.	Please contact service personnel for assistance.
14	BATTERY LOW WARNING	The battery voltage is lower than the alarm value.	If there is no bypass power feeding to the system, please shut down the connected loads in accordance with normal procedures as soon as possible.
15	BATTERY END OF DISCHARGE	The battery voltage is lower than the setup value of Battery Cut Off Voltage.	If there is no bypass power feeding to the system, please shut down the connected loads in accordance with normal procedures as soon as possible.
16	BATTERY OVER CHARGED	The charger is abnormal.	Please contact service personnel for assistance.
17	BATTERY ABSENT	<ol style="list-style-type: none"> 1. The batteries are not connected. 2. The external battery cabinet's breaker is turned off. 	<ol style="list-style-type: none"> 1. Please check if the batteries are properly connected. 2. Please check if the external battery cabinet's breaker is turned off or not. If yes, please turn it on. 3. If the alarm message still exists after the solutions mentioned above have been executed, please contact service personnel.
18	BATTERY EXPIRED	<ol style="list-style-type: none"> 1. The battery replacement date is due. 2. The system date is wrongly set. 	<ol style="list-style-type: none"> 1. Please check if the battery replacement date is due or not. If yes, please contact service personnel for assistance. 2. Please check the setting of the system date. If there is any error, please correct it.
19	BATTERY REVERSED	The battery wiring is wrong.	Check the battery wiring. If there is any error or abnormality, please contact service personnel for assistance.
20	BATTERY TEST FAULT	The battery wiring is wrong or battery abnormalities exist.	Check the batteries. If wrong battery wiring or battery abnormalities exist, please contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
21	BATTERY BREAKER OFF	The external battery cabinet's breaker is turned off.	<ol style="list-style-type: none"> 1. Please check if the external battery cabinet's breaker is turned off or not. If yes, please turn it on. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
22	BATTERY OVER HEAT	The battery temperature is too high or the batteries are abnormal.	<ol style="list-style-type: none"> 1. Improve ventilation to reduce the battery temperature. 2. Check if the batteries are abnormal or not. If yes, please contact service personnel for assistance.
23	BATTERY FUSE OPEN	The battery fuse is blown.	Please contact service personnel for assistance.
24	OUTPUT OVERLOAD WARNING	The connected loads exceed the rated value.	Please decrease the loads.
25	OUTPUT OVERLOAD SHUTDOWN	The connected loads exceed the rated value for a long time.	<ol style="list-style-type: none"> 1. After overload shutdown, the connected loads will be supplied by the bypass. Please decrease the loads to let the system re-start automatically. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
26	OUTPUT COMMON MODE VOLT TOO HIGH	The output's common mode voltage is too high.	Please contact service personnel for assistance.
27	OUTPUT BREAKER OFF	The output breaker is turned off.	<ol style="list-style-type: none"> 1. Please check if the output breaker is turned off or not. If yes, please turn it on. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
28	INV OUTPUT ABNORMAL	The total output voltage of the UPS's inverter is abnormal.	Please contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
29	EXT PARALLEL SETTINGS INCOMPATIBLE	There are conflicts between the parallel UPS units' output settings.	Check if the output settings among the parallel UPS units are correct or not, and contact service personnel for assistance.
30	EXT PARALLEL COMMUNICATION LOSS	The parallel cable is loose or the circuit board is abnormal.	Check if the parallel cable is firmly connected or not, and contact service personnel for assistance.
31	REDUNDANCY LOSS	The connected loads exceed the redundancy setting.	<ol style="list-style-type: none"> 1. Please reduce the loads. 2. Please reset the power module redundancy setting. Please refer to 7.9.3 Output Setting.
32	EXT PARALLEL UNIT Incompatible	There are conflicts between the parallel UPS units' output settings.	Check if the output settings among the parallel UPS units are correct or not, and contact service personnel for assistance.
33	EXT CAN COM LOSS	The parallel cable is loose or the circuit board is abnormal.	Check if the parallel cable is firmly connected or not, and contact service personnel for assistance.
34	INT CAN COM LOSS	The internal cable is loose or the circuit board is abnormal.	Please contact service personnel for assistance.
35	INT SCI COM LOSS	The internal cable is loose or the circuit board is abnormal.	Please contact service personnel for assistance.
36	TOUCH PANEL COMMUNICATION LOSS	The touch panel's cable is loose or the touch panel is abnormal.	Please contact service personnel for assistance.
37	SYSTEM AUX POWER FAULT	The circuit board is abnormal.	Please contact service personnel for assistance.
38	SYSTEM FAN FAULT	The fan components of the UPS system cabinet are damaged.	Please contact service personnel for assistance.
39	SYSTEM FAN POWER OVER HEAT WARNING	The foreign matter blocks the fans or the circuit board is abnormal.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
40	PARALLEL IO NOT READY	The parallel cable is loose or the circuit board is abnormal.	Please contact service personnel for assistance.
41	EXT PARALLEL UPS ABNORMAL ABSENT	The parallel cable is removed.	Check if the parallel cable is firmly connected or not, and contact service personnel for assistance.
42	BREAKER NOT INSTALLED	The input, bypass, manual bypass or output breaker is not installed or its auxiliary contact is removed.	Please contact service personnel for assistance.
43	EMERGENCY POWER OFF	The EPO button is pressed.	<ol style="list-style-type: none"> 1. Please confirm if the EPO button is pressed or not. If yes, restart the UPS in accordance with the On-Line mode start-up procedures after the relevant abnormalities are eliminated. 2. If the alarm message still exists, please contact service personnel for assistance.
44	DUST FILTER REPLACEMENT	The filter replacement date is due.	Please contact service personnel for assistance.
45	INHIBIT ECO TRANSFER	In ECO mode, due to the unstable bypass voltage and frequency, the UPS transfers between On-Line mode and ECO mode for too many times within a short period of time.	<ol style="list-style-type: none"> 1. Please check if the bypass voltage and frequency are within the normal range for the UPS to run in ECO mode. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
46	OVER AUTO RECOVER LIMIT	Overload shutdown and auto recovery happen too many times within a short period of time.	<ol style="list-style-type: none"> 1. Please check if the load capacity is beyond the range for the UPS to run normally. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.

No.	Alarm Message	Possible Cause	Solution
47	ON MANUAL BYPASS	The manual bypass breaker is turned on.	<ol style="list-style-type: none"> 1. Please confirm if the manual bypass breaker is turned on or not. If yes, restart the UPS in accordance with the On-Line mode start-up procedures after the relevant abnormalities are eliminated. 2. If the alarm message still exists, please contact service personnel for assistance.
48	PWR MODULE QUANTITY NOT MATCHED	Power module quantity is not matched.	Please contact service personnel for assistance.
49	PWR MODULE #n INCOMPATIBLE	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
50	PWR MODULE #n FRAM PARAMETER UNCALIBRATED	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
51	PWR MODULE #n COMMUNICATION LOSS	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
52	PWR MODULE #n SOFT START FAIL	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
53	PWR MODULE #n PFC OVER HEAT WARNING	Heat dissipation is poor or components are damaged.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.
54	PWR MODULE #n PFC OVER HEAT SHUTDOWN	Heat dissipation is poor or components are damaged.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.
55	PWR MODULE #n PFC FUSE OPEN SHUTDOWN	The PFC of the power module #n is abnormal.	Please contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
56	PWR MODULE #n PFC IGBT SHORT SHUTDOWN	The IGBT of the power module #n is abnormal.	Please contact service personnel for assistance.
57	PWR MODULE #n PFC I/P CURRENT UNBALANCE	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
58	PWR MODULE #n SUPERVISOR FAULT	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
59	PWR MODULE #n DC BUS NOK	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
60	PWR MODULE #n IP/MC FAULT	The input magnetic contactor of the power module #n is abnormal.	Please contact service personnel for assistance.
61	PWR MODULE #n OVER AUTO RECOVER LIMIT	The power module #n activates its own protection mechanism when abnormalities occur and re-starts automatically for more than 3 times.	Please contact service personnel for assistance.
62	PWR MODULE #n MAINS INPUT VOLT PHASE SEQ NOK	The phase sequence of the power module #n is abnormal.	<ol style="list-style-type: none"> 1. Please check if the phase sequence of the power module #n is correct. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
63	PWR MODULE #n OP/MC FAULT	The output magnetic contactor of the power module #n is abnormal.	Please contact service personnel for assistance.
64	PWR MODULE #n INV OVER HEAT WARNING	The fans of the power module #n are abnormal.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
65	PWR MODULE #n INV OVER HEAT SHUTDOWN	The fans of the power module #n are abnormal.	1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.
66	PWR MODULE #n INV FUSE OPEN SHUTDOWN	The inverter of the power module #n is abnormal.	Please contact service personnel for assistance.
67	PWR MODULE #n INV IGBT SHORT SHUTDOWN	The IGBT of the power module #n is abnormal.	Please contact service personnel for assistance.
68	PWR MODULE #n INV LOAD SHARING UNBALANCE	The connected loads are abnormal or the inverter of the power module #n is damaged.	Please contact service personnel for assistance.
69	PWR MODULE #n INVERTER OUTPUT ABNORMAL	The inverter output voltage of the power module #n is abnormal.	Please contact service personnel for assistance.
70	PWR MODULE #n INV OVER CURRENT SHUTDOWN	The inverter output current of the power module #n is too high.	Please contact service personnel for assistance.
71	PWR MODULE #n INV STS FAULT SHUTDOWN	The inverter static switch or its drive circuit is abnormal.	Please contact service personnel for assistance.
72	PWR MODULE #n GENERAL FAULT	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
73	PWR MODULE #n PARALLEL I/O FAULT	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
74	PWR MODULE #n CHARGER FAULT	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
75	PWR MODULE #n BATTERY FUSE OPEN	The battery fuse of the power module #n is abnormal.	Please contact service personnel for assistance.

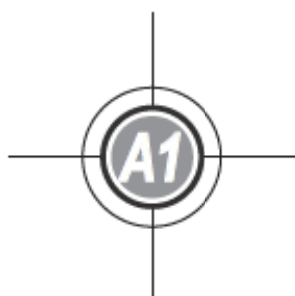
No.	Alarm Message	Possible Cause	Solution
76	PWR MODULE #n DC/DC OVER HEAT WARNING	The fans of the power module #n are abnormal.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.
77	PWR MODULE #n BAT/MC FAULT	The battery magnetic contactor of the power module #n is abnormal.	Please contact service personnel for assistance.
78	PWR MODULE #n BAT ABNORMAL - REVERSE	The battery wiring is wrong.	Check the battery wiring. If there is any error or abnormality, please contact service personnel for assistance.
79	PWR MODULE #n BAT ABNORMAL - UNDER VOLTAGE	<ol style="list-style-type: none"> 1. The batteries are not connected. 2. The external battery cabinet's breaker is turned off. 	<ol style="list-style-type: none"> 1. Please check if the batteries are properly connected. 2. Please check if the external battery cabinet's breaker is turned off or not. If yes, please turn it on. 3. If the alarm message still exists after the solutions mentioned above have been executed, please contact service personnel.
80	PWR MODULE #n FAN FAULT	The fan components of the power module #n are damaged.	Please contact service personnel for assistance.
81	PWR MODULE #n IP AC CAP FAULT	The CAP components of the power module #n are damaged or aging.	Please contact service personnel for assistance.
82	PWR MODULE #n OP AC CAP FAULT	The CAP components of the power module #n are damaged or aging.	Please contact service personnel for assistance.
83	PWR MODULE #n FAN AUX PWR FAULT	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
84	PWR MODULE #n FAN AUX PWR OVER HEAT WARNING	The fans of the power module #n are abnormal.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
85	PWR MODULE #n AUX POWER FAULT	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.
86	PWR MODULE #n DC BUS CAP OVER HEAT WARNING	The CAP components of the power module #n are overheated.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.
87	PWR MODULE #n DC/DC OVER HEAT SHUTDOWN	The fans of the power module #n are abnormal.	<ol style="list-style-type: none"> 1. Check if any foreign matter blocks the fans or not. If yes, remove the foreign matter. 2. Contact service personnel for assistance.
88	PWR MODULE #n DC/DC IGBT SHORT SHUTDOWN	The IGBT of the power module #n is abnormal.	Please contact service personnel for assistance.
89	PWR MODULE #n MAINS INPUT VOLT NOK	The input voltage of the power module #n is abnormal.	<ol style="list-style-type: none"> 1. Please check if the input voltage of the power module #n is within the normal range. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
90	PWR MODULE #n OP/STS FAULT	The output static switch of the power module #n is abnormal.	Please contact service personnel for assistance.
91	PWR MODULE #n OUTPUT VOLT PHASE SEQ NOK	The phase sequence of the power module #n is abnormal.	<ol style="list-style-type: none"> 1. Please check if the phase sequence of the power module #n is correct. 2. If the alarm message still exists after the solution mentioned above has been executed, please contact service personnel.
92	PWR MODULE #n PFC I/P CURRENT WITH DC OFFSET	The circuit board of the power module #n is abnormal.	Please contact service personnel for assistance.

No.	Alarm Message	Possible Cause	Solution
93	PWR MODULE #n AMBIENT THERMAL SENEOR NOT INSTALLED	<ol style="list-style-type: none"> 1. The sensor cable of the power module #n is loose. 2. The circuit board of the power module #n is abnormal. 	Please contact service personnel for assistance.
94	PWR MODULE #n DC CAP THERMAL SENEOR NOT INSTALLED	<ol style="list-style-type: none"> 1. The sensor cable of the power module #n is loose. 2. The circuit board of the power module #n is abnormal. 	Please contact service personnel for assistance.
95	PWR MODULE #n PFC IGBT THERMAL SENEOR NOT INSTALLED	<ol style="list-style-type: none"> 1. The sensor cable of the power module #n is loose. 2. The circuit board of the power module #n is abnormal. 	Please contact service personnel for assistance.
96	PWR MODULE #n INV IGBT THERMAL SENEOR NOT INSTALLED	<ol style="list-style-type: none"> 1. The sensor cable of the power module #n is loose. 2. The circuit board of the power module #n is abnormal. 	Please contact service personnel for assistance.
97	PWR MODULE #n PFC DC/DC THERMAL SENEOR NOT INSTALLED	<ol style="list-style-type: none"> 1. The sensor cable of the power module #n is loose. 2. The circuit board of the power module #n is abnormal. 	Please contact service personnel for assistance.

**NOTE:**

If the alarm still exists after the above possible causes are eliminated, please contact your dealer or customer service.



Technical Specifications

Model		DPM-500K	DPM-550K	DPM-750K	DPM-825K
UPS Capacity		500kW/ 500kVA	500kW/ 550kVA	750kW/ 750kVA	750kW/ 825kVA
Input	Nominal Voltage	480 Vac (3Φ3W)			
	Voltage Range	408 ~ 552 Vac (full load) ; 360 ~ 408 Vac (70% load)			
	Frequency	50/60 Hz (± 5 Hz)			
Output	Nominal Voltage	480 Vac (3Φ3W)			
	Voltage Harmonic Distortion	< 2 % (linear load)			
	Frequency	50/60 Hz			
	Overload Capability	101% ~ ≤ 125% : 10 minutes ; 126% ~ ≤ 150% : 1 minute ; > 150% : 1 second			
Display		7" Color Touch Panel (multi-language supported) & Tri-color LED Indicator			
Interface	Standard	Smart slot × 1, RS-232 port × 2, USB port × 4, Parallel port × 2, External breaker detection dry contact × 4, External battery temperature detection dry contact × 4, Output dry contact × 6, Input dry contact × 2, REPO × 1, EPO × 1, SNMP card × 1			
Efficiency	Online Mode	Up to 96%			
	ECO Mode	Up to 99%			
Battery	Nominal Voltage	480 Vdc			
	Charge Voltage _ Float Charge	544V (±2 Vdc)			
	Charge Voltage _ Boost Charge	576V (±2 Vdc)			
	Charge Current	140A		210A	

Model		DPM-500K	DPM-550K	DPM-750K	DPM-825K
UPS Capacity		500kW/ 500kVA	500kW/ 550kVA	750kW/ 750kVA	750kW/ 825kVA
Environment	Operating Altitude	1000 meters (without derating) 3280 ft (without derating)			
	Operating Temperature	0 ~ 40°C 32 ~ 104°F			
	Relative Humidity	< 95% (non-condensing)			
Environment	Audible Noise	< 70 dBA *1		< 73 dBA *1	
	IP Degree of Protection	IP 20			
Physical-UPS System Cabinet	Dimensions (W x D x H)	900 × 875 × 1900 mm 35.4 × 34.4 × 74.8 inch		900 × 875 × 1900 mm 35.4 × 34.4 × 74.8 inch	
	Weight	310 kg 683.4 lbs		367 kg 809.1 lbs	
Physical-Power Modules	Dimensions (W x D x H)	1230 × 875 × 1900 mm 48.4 × 34.4 × 74.8 inch		1845 × 875 × 1900 mm 72.6 × 34.4 × 74.8 inch	
	Weight	1184 kg 2610.3 lbs		1776 Kg 3915.4 lbs	

**NOTE:**

- *1: At a distance of 1 meter (3.28ft) in front of the UPS.
- Please refer to the rating label for the safety rating.
- All specifications are subject to change without prior notification.

The logo features a central circle containing the text "A2". This circle is surrounded by a larger, thin-lined circle. Four thin lines extend from the center of the circles to the top, bottom, left, and right edges of the page.

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.

No. 501327380000

Version : V 0.0

Release Date : 2019_07_15



5013273800