

The power behind competitiveness

Delta UPS - Ultron Family

EH Series, Three Phase
10/15/20 kVA

User Manual

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.

Copyright © 2013 by Delta Electronics Inc. All Rights Reserved. All rights of this User Manual (“Manual”), including but not limited to the contents, information, and figures are solely owned and reserved by Delta Electronics Inc. (“Delta”). The Manual can only be applied to the operation or the use of this product. Any disposition, duplication, dissemination, reproduction, modification, translation, extraction, or usage of this Manual in whole or in part is prohibited without the prior written permission of Delta. Given that Delta will continuously improve and develop the product, changes may be made to the information in this Manual at any time without obligation to notify any person of such revision or changes. Delta will make all possible efforts to secure the accuracy and the integrity of this Manual. Delta disclaims any kinds or forms of warranty, guarantee, or undertaking, either expressly or implicitly, including but not limited to the completeness, faultlessness, accuracy, non-infringement, merchantability or fitness for a particular purpose of the Manual.

Table of Contents

Chapter 1 : Important Safety Instructions	1
1.1 Placement Warnings	1
1.2 Connection Warnings	1
1.3 Usage Warnings	1
1.4 Storage Warnings	2
1.5 Glossary of Symbols	3
1.6 Standard Compliance	4
Chapter 2 : Introduction	5
2.1 Product Introduction	5
2.2 Package Inspection	5
2.3 Functions and Features	7
Chapter 3 : Appearance and Mechanism	9
3.1 Appearance and Dimensions	9
3.2 Front Panel	10
3.3 Rear Panel	11
Chapter 4 : Operation Modes	14
Chapter 5 : Communication Interfaces	16
Chapter 6 : Installation and Wiring	19
6.1 Precautions Prior to Installation and Wiring	19
6.2 Installation Environment	19
6.3 UPS Transportation & Handling	20
6.4 Installation	20
6.5 Wiring	24
6.5.1 Precautions Prior to Wiring	24
6.5.2 Single Input/ Dual Input Modification	26
6.5.3 Single Unit Wiring	28

6.5.4	Parallel Units Wiring -----	32
6.6	Precautions for Connecting with the External Battery Cabinet-----	34
Chapter 7	: Operation -----	38
7.1	Connection of the UPS with the Utility AC Power -----	38
7.2	UPS Start-up with AC Input -----	38
7.3	UPS Turn-off -----	40
7.4	LCD Display in Different Operation Modes-----	41
7.5	Firmware Version Look-up-----	42
Chapter 8	: Optional Accessories -----	43
Chapter 9	: Maintenance -----	44
Chapter 10	: Troubleshooting -----	45
Appendix 1	: Technical Specifications -----	47
Appendix 2	: Warranty -----	49

Chapter 1 : Important Safety Instructions

1.1 Placement Warnings

- 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 (at least 50cm) for proper ventilation.

1.2 Connection Warnings

- The UPS must be well grounded due to a possible risk of current leakage.
- The installation of upstream and downstream protective devices is highly recommended when the UPS is connected to the mains and the load. For relevant information, please refer to **6.5.1 Precautions Prior to Wiring**.
- If the UPS is supplied by a source whose neutral is grounded, the protective device installed as UPS input protection must be a 3-pole type. If the UPS is supplied by a source whose neutral is not grounded, the protective device installed as UPS input protection must be a 4-pole type.
- The protective devices connecting to the UPS must be installed near the UPS and must be easily accessible for operation.

1.3 Usage Warnings

- This is a class-A product. In a domestic environment, this product may cause radio interference, in which case, the user is required to take adequate measures.
- The UPS can be used to power computers and associated peripheral devices, such as monitors, modems, cartridge tape drives, external hard drives, etc.
- The UPS cannot share common batteries.
- If the UPS needs to be connected to a motor load, it must be confirmed by qualified 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 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.

- In a low temperature environment (below 0°C), you must allow the UPS to adjust to room temperature for at least one hour to avoid moisture condensing inside the UPS before usage.
- Do not put beverage containers on the UPS, battery cabinet, cabinet or any other accessory associated with the UPS.
- The risk of dangerous high voltage is possible when the batteries are still connected to the UPS even though the UPS is disconnected from the mains. Do not forget to pull out the battery cable to completely cut off the battery source.
- Do not open or mutilate the battery or batteries. The released electrolyte is harmful to the skin and eyes and may be toxic.
- Do not dispose of the battery or batteries in a fire. The batteries may explode.
- All maintenance services must be performed by qualified service personnel. Forbid opening or removing the cover of the UPS to avoid high voltage electric shock.
- You must contact qualified service personnel if either of the following events occur:
 1. Liquid is poured or splashed on the UPS.
 2. The UPS does not run normally after this User Manual is carefully observed.



NOTE:



If you use the UPS in an area that generates or incurs dust, you should install a dust filter in the UPS to ensure normal product life and function.

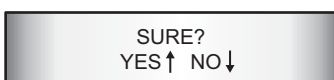
1.4 Storage Warnings

- **Prior to Installation**











If the UPS needs to be stored prior to installation, it should be placed in a dry area. The allowable storage temperature is between -15°C and +50°C.

- **After Usage**

Press the **OFF** key () for three seconds, release it after you hear one beep and the LCD shows the following screen. If you want to turn off the UPS, please press the **UP** key (). Make sure the UPS is shutdown, disconnect the UPS from the utility power, remove all equipment from the UPS, and store the UPS in a dry and well-ventilated area, at a temperature between -15°C and +50°C. Idle batteries must be recharged fully approximately every three months if the UPS needs to be stored for an extended period of time. The charging time must not be less than 24 hours each time.



1.5 Glossary of Symbols

No.	Symbol	Description
1		ON key
2		OFF key
3		Function key (moves up/ down; increases/ decreases number)
4	 NORMAL	Online mode LED indicator
5	 BATTERY	Battery mode LED indicator
6	 BYPASS	Bypass mode LED indicator
7	 FAULT	Fault LED indicator
8	 EPO	EPO key
9	R	R phase of main input
10	S	S phase of main input
11	T	T phase of main input
12	N	Input neutral line/ Output neutral line
13	L	Bypass input L/ Output L
14		For UPS grounding
15		For critical load grounding/ For external battery cabinet grounding
16	+	Positive battery terminal
17	—	Negative battery terminal

1.6 Standard Compliance

This product meets the following safety standards and electromagnetic compatibility (EMC) inspection standards:

- CE
- IEC62040-1
- GB7260.2-2009/ IEC62040-2 C2
- GB17626-2/ IEC61000-4-2 (ESD) Level 4
- GB17626-3/ IEC61000-4-3 (Radiated field) Level 3
- GB17626-4/ IEC61000-4-4 (EFT) Level 4
- GB17626-5/ IEC61000-4-5 (Surge) Level 4

Chapter 2 : Introduction

2.1 Product Introduction

The EH series uninterruptible power system (hereinafter referred to as UPS) is an online uninterruptible power supply device with three-phase four-line input and single-phase output, which can provide a reliable and stable sine wave power supply for your electronic devices. This device applies the latest design of DSP digital control technology and highest quality assembly, with an output power factor up to 0.8. The efficiency of the entire device can reach 91% in online mode and 96% in ECO mode. With its outstanding features, the UPS not only provides safe, reliable and uninterrupted power to your sensitive electronic equipment at all times, but also produces greater electric power efficiency at less cost. This EH series UPS provides three different rated power levels, 10kVA, 15kVA and 20kVA, for your selection.

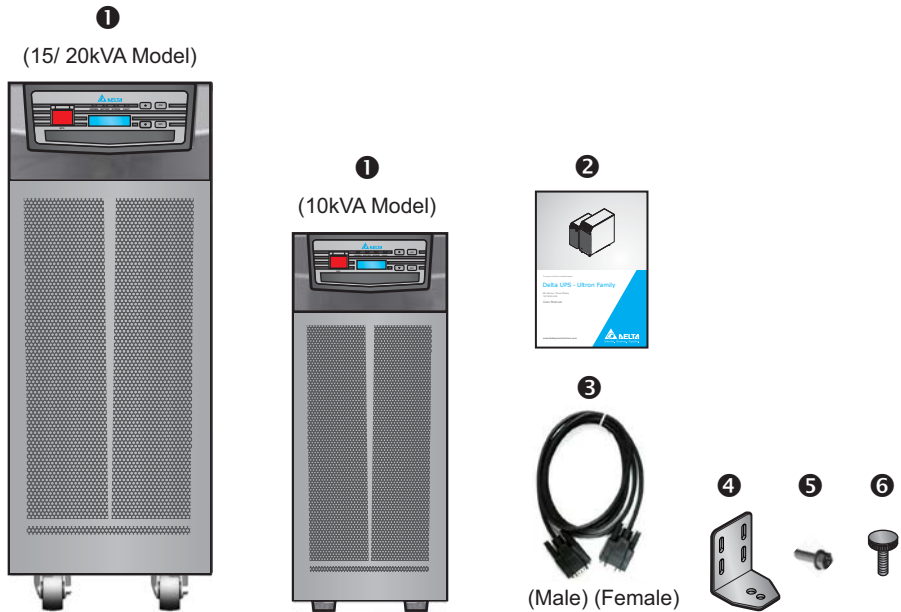
2.2 Package Inspection

- **External**

During the transportation of the UPS, unexpected conditions may occur. Hence, we recommend that you should inspect whether the external packing is damaged after receiving the UPS. If any damage has occurred, please contact your supplier immediately.

- **Internal**

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



• **10kVA UPS:**

No.	Item	Quantity
1	UPS	1 pc
2	User Manual	1 pc
3	RS232 Cable	1 pc
4	Balance Support	4 pcs
5	Screw	8 pcs

• **15/ 20kVA UPS:**

No.	Item	Quantity
1	UPS	1 pc
2	User Manual	1 pc
3	RS232 Cable	1 pc
6	Bolt	4 pcs



NOTE: The balance supports of the 15/ 20kVA UPS have been locked on the pallet when leaving the factory.

4. If any damage or shortage is found, please contact your supplier immediately.
5. If return or replacement is required, carefully repack the UPS and all the accessories using the original packing material that came with the unit.

2.3 Functions and Features

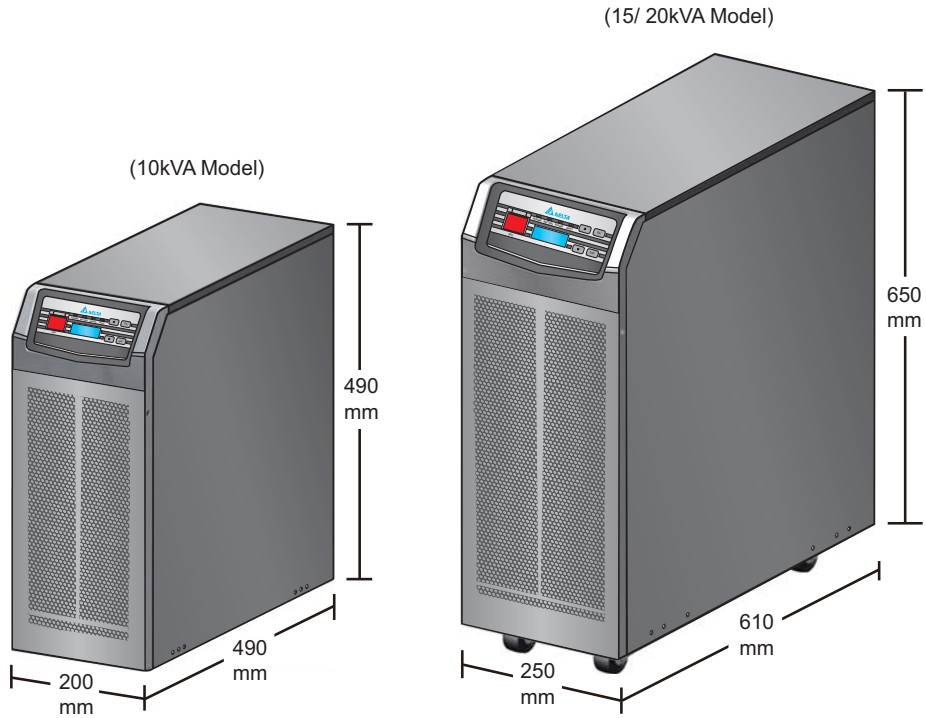
The EH series UPS is designed for systems with medium power. It provides clean power supply for data systems, communication systems, computer network systems, medical treatment systems, monitoring systems and factory equipment, etc.

- The EH series UPS utilizes all digital high frequency modulation technology, which decreases the volume, improves the reliability and prolongs the service life of the device.
- With a wide input range power supply, it can reduce the discharge probability of the batteries and prolong battery life.
- It is possible to set the automatic discharge time of the batteries to prolong battery life.
- By detecting the input frequency, the device can set the output frequency to 50Hz or 60Hz automatically.
- It can perform “3+1” parallel redundancy, which improves the reliability of the system.
- It is convenient for operators to set the parameters (output voltage, charging current, output frequency and password setting, etc.) on the LCD panel.
- The operating conditions, such as load, input and output voltage, input and output frequency, battery voltage, of the device are available on LCD so that management personnel can see them accurately and clearly.
- It can set the output voltage on LCD as: 220/ 230/ 240Vac.
- The CPU can record up to 200 entries of abnormal information of the UPS at most, which is helpful in fault diagnosis for the UPS and in the improvement of the maintenance efficiency.
- No-battery start-up: In case the external battery cabinet is not connected, the device can still start up normally with normal AC.
- REPO port: Under emergency status, use a user-supplied remote control switch to disconnect the output immediately so as to prevent any danger.
- Built-in RS232 port allows monitoring and management of the UPS via the UPSentry 2012 software (<http://www.deltapowersolutions.com/en/mcis/software-center.php>).
- Attaches optional accessories like SNMP and Mini SNMP cards for network communication. Other optional accessories include Mini Relay I/O, Mini USB, Mini ModBus and Mini TVSS cards for dry contact, USB communication, ModBus communication and surge protection.
- In order to improve the efficiency further, the UPS can be set to operate in ECO mode. In case of any abnormal conditions, the UPS will transfer to online mode automatically.
- It can automatically detect and show whether fans are operating normally.

- The fans are provided with an automatic speed regulation function. With multi-stage control over the fan speed, it can improve the reliability and the efficiency of the system, reduce the noise and prolong the service life of the fans.
- **About Charging**
 1. Provides boost charge, float charge and four-level charge current. The charging mode is set according to the actual charging current so as to keep the batteries at full charging capacity and prolong the battery life (float charge voltage: 272Vdc; boost charge voltage: 280Vdc).
 2. Charge voltage automatic compensation function: The charge voltage can be compensated automatically according to the temperature so as to prolong the battery life.

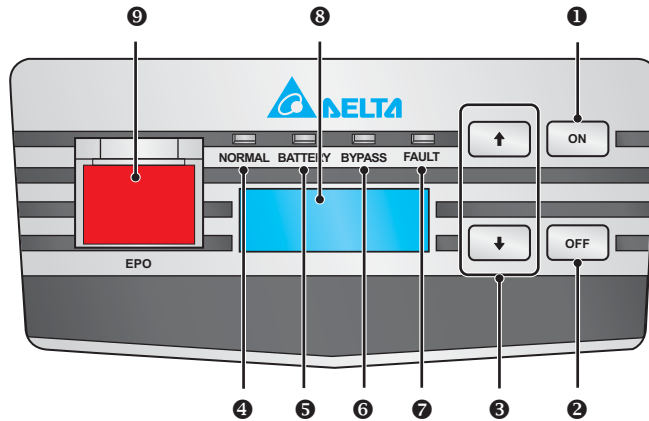
Chapter 3 : Appearance and Mechanism

3.1 Appearance and Dimensions






(Figure 3-1: Appearance and Dimensions)

3.2 Front Panel

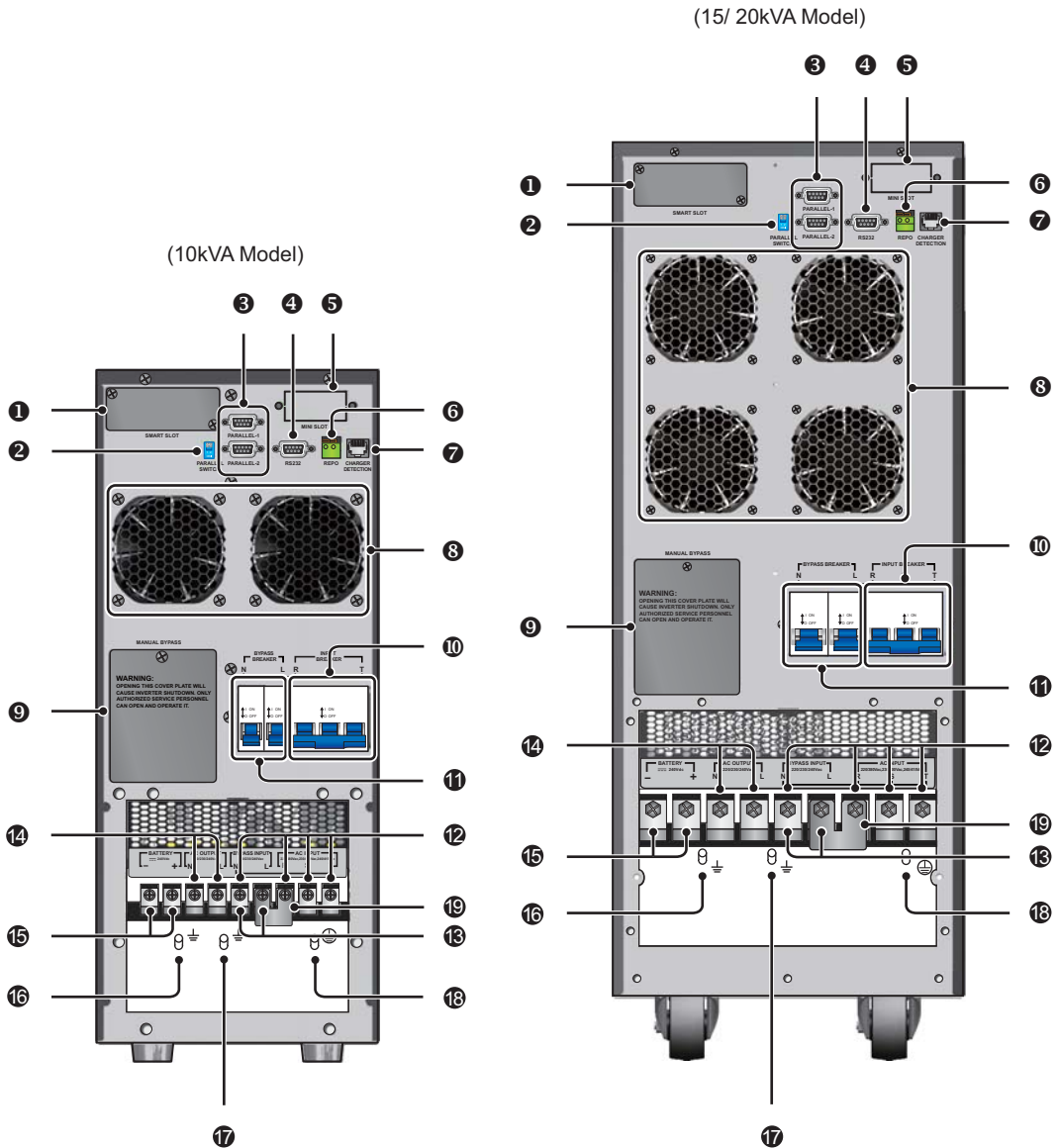


(Figure 3-2: Front Panel)



No.	Item	Description
①	ON Key	<ol style="list-style-type: none"> ON key: Press this key for 3-5 seconds, and after hearing a beep, release it to start up the UPS. In setting mode, this key functions as a confirmation key. In online mode, press this key for 3 seconds to execute a 10-second battery test. In battery mode, press this key to turn off the buzzer (which is limited to buzzing once every 10 seconds).
②	OFF Key	<p>Press this key for over 3 seconds, release it after you hear one beep and the LCD shows the following screen. To turn off the UPS, please press the UP key ().</p> <div style="text-align: center; border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>SURE? YES ↑ NO ↓</p> </div>
③	 /  Function Keys	<ol style="list-style-type: none"> Up for increasing number/ down for decreasing number. Set the output frequency, voltage and operating mode and control and adjust the LCD parameters. Press these two function keys simultaneously and you will enter into setting mode.
④	Online Mode LED Indicator	This indicates that the UPS is operating in online mode.
⑤	Battery Mode LED Indicator	This indicates that the UPS is operating in battery mode and the external batteries are discharging.
⑥	Bypass Mode LED Indicator	This indicates that the UPS is operating in bypass mode.


No.	Item	Description
7	Fault LED Indicator	This indicates that the UPS has abnormalities.
8	LCD Display	This displays the operating status of the UPS and the relevant monitoring data.
9	EPO Key	When an emergency event occurs, press the EPO key for over 1 second to shut down the rectifier, inverter and output of the UPS immediately.

3.3 Rear Panel




(Figure 3-3: Rear Panel)

No.	Item	Description
①	SMART Slot	Accepts SNMP/ Relay I/O/ ModBus card. For detailed information, please refer to Chapter 5 : Communication Interfaces .
②	Parallel Switch	Controls parallel port's status (ON or OFF). For detailed information, please refer to Chapter 5 : Communication Interfaces .
③	Parallel Ports	For UPS parallel usage. For detailed information, please refer to Chapter 5 : Communication Interfaces .
④	RS232 Port	Connects to a computer. For detailed information, please refer to Chapter 5 : Communication Interfaces .
⑤	MINI Slot	Accepts Mini SNMP/ Mini Relay I/O/ Mini USB/ Mini ModBus/ Mini TVSS card. For detailed information, please refer to Chapter 5 : Communication Interfaces .
⑥	REPO Port	When an emergency event occurs, it can disconnect the UPS power supply rapidly and shut down the UPS immediately. For detailed information, please refer to Chapter 5 : Communication Interfaces .
⑦	Charger Detection Port	Connects to a charger box and detects the charger status. Please refer to Chapter 5 : Communication Interfaces .
⑧	Fans	Cool and ventilate the UPS.
⑨	Manual Bypass Switch	For maintenance only! Only authorized service personnel can open the cover plate of the manual bypass switch and operate it. Please note that opening this cover plate will cause inverter shutdown.
⑩	Input Breaker	Controls the UPS's main input switch and for safety protection.
⑪	Bypass Breaker	Controls the UPS's bypass power switch and for safety protection.
⑫	AC Input Terminal Block	Connects the main AC source.
⑬	Bypass Input Terminal Block	Connects the bypass AC source.
⑭	AC Output Terminal Block	Connects the critical loads.
⑮	Battery Terminal Block	Connects an external battery cabinet.
⑯		For external battery cabinet grounding.
⑰		For critical load grounding.

No.	Item	Description
18		For UPS grounding.
19	Concave Copper Terminal Block	If the concave copper terminal block is not removed, the UPS will run in single input (default setting); if the concave copper terminal block is removed, the UPS will run in dual input.

Chapter 4 : Operation Modes



- **Online Mode**

The critical load is supplied by the inverter, which derives its power from the utility AC power, and the UPS charges the batteries as needed and provides power protection to the equipment. During on-line mode, the NORMAL LED indicator () illuminates (green).


- **Standby Mode**

When the input voltage and frequency of the utility AC power are within the normal range, the UPS runs in standby mode and charges the batteries.

- **ECO Mode**


You can manually set the UPS to ECO mode. In ECO mode, when the utility input voltage is within the range of rating voltage $\pm 10\%$, the load is supplied by the utility power and the BYPASS LED indicator () illuminates (yellow); if out of the range, the load is supplied by the inverter and the NORMAL LED indicator () illuminates (green).

- **Battery Mode**


When the UPS is operating during a power outage, the batteries provide DC power, which maintains inverter operation to support the critical load. During battery mode, the BATTERY LED indicator () illuminates (yellow). The battery status is as follows.

Battery Capacity	Buzzer	LCD Display
Full/ Mid	The alarm beeps once every 10 seconds. (ON for 0.1 second and OFF for 9.9 seconds)	BATTERY CAPACITY 00V/ 000%
Low	The alarm beeps once every 0.5 second. (ON for 0.1 second and OFF for 0.4 second)	BATTERY CAPACITY 00V/ 000%
Under	Long beep	SHUT DOWN DUE TO DEPLETED BATTERY

- **Bypass Mode**

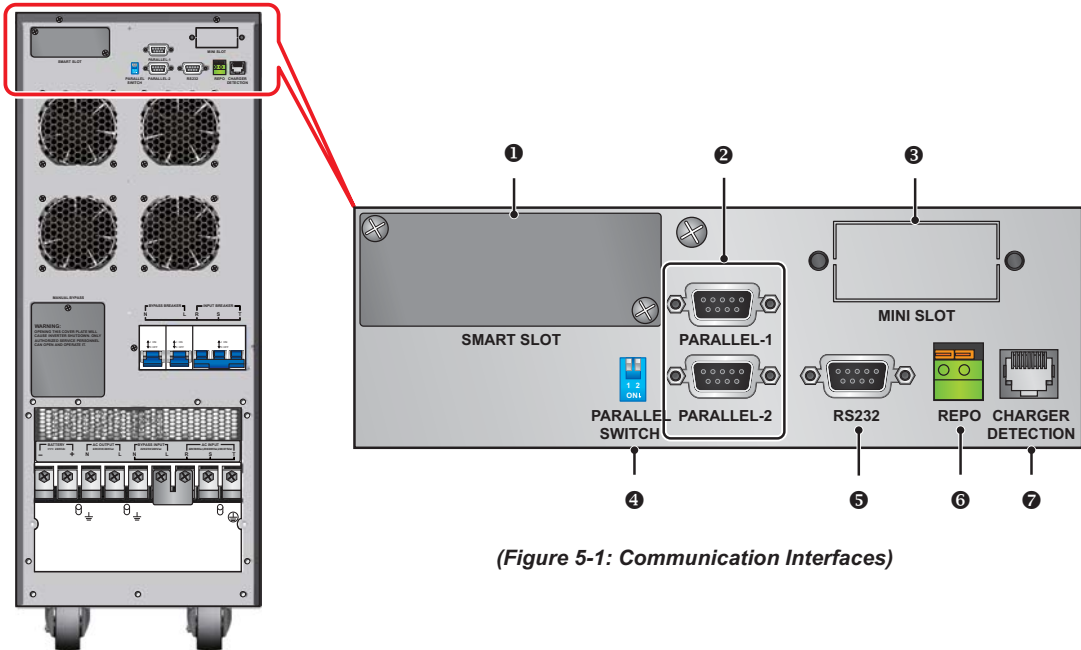
The critical load is directly supplied by the utility power and the batteries are charged. During bypass mode, the BYPASS LED indicator () illuminates (yellow).

- **Converter Mode**

When the UPS is manually set in converter mode, the output frequency can be set as 50Hz or 60Hz. After the output frequency is set up, the system will automatically disable the bypass function. Please note that once the inverter shuts down, there is no bypass output. During converter mode, the NORMAL LED indicator () illuminates (green).

Chapter 5 : Communication Interfaces

For the position and functions of the communication interfaces, please refer to the following description.



(Figure 5-1: Communication Interfaces)



NOTE:

1. The UPS can still operate normally without making the connections below.
2. The communication interfaces can be used simultaneously and will not influence their respective functions.

1 SMART Slot

Install an SNMP card in this SMART slot to remotely control and monitor the UPS status via a network. You can also insert the Relay I/O or ModBus card in this slot to let the UPS have dry contact and ModBus communication functions respectively.

2 Parallel Ports

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

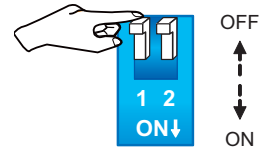
3 MINI Slot

This MINI slot is for mini-size cards. You can install the Mini SNMP, Mini Relay I/O, Mini USB, Mini ModBus, or Mini TVSS card in this slot to give the system network communication, dry contact, USB communication, ModBus communication, and surge protection functions respectively.

4 Parallel Switch

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

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.



(Figure 5-2: Parallel Switch)

5 RS232 Port

The RS232 port is built into the UPS rear panel to provide communication between the UPS and a computer. It also provides dry contact functions to output the UPS status. You can use the Delta UPSentry 2012 software (<http://www.deltapowersolutions.com/en/mcis/software-center.php>) to check and monitor the UPS status via a computer. Detailed information is as follows:

1. Monitor the load level, battery status, battery voltage, UPS operation mode, input voltage, input frequency, output voltage, and unit inside temperature.

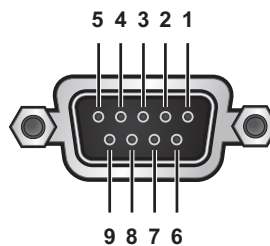
2. Set shut-down delay time.

3. Enable/ disable beep.

4. Remote shut-down.

5. Pin Assignment:

- 1) PIN 2: TXD <Transmitting Data>
- 2) PIN 3: RXD <Receiving Data>
- 3) PIN 5: GND <Signal Ground>



(Figure 5-3: RS232 Port)

6. Hardware

- 1) Baud Rate: 2400bps
- 2) Data Length: 8bit
- 3) Stop Bit: 1bit
- 4) Parity: None

7. Dry contact information:

Status	Pin	Pin 8 & Pin 5	Pin 1 & Pin 5
On-line Mode		Open	Open
Battery Mode		Close	N/ A
Low Battery Warning		Close	Close



NOTE: Other pins are reserved and cannot be used.

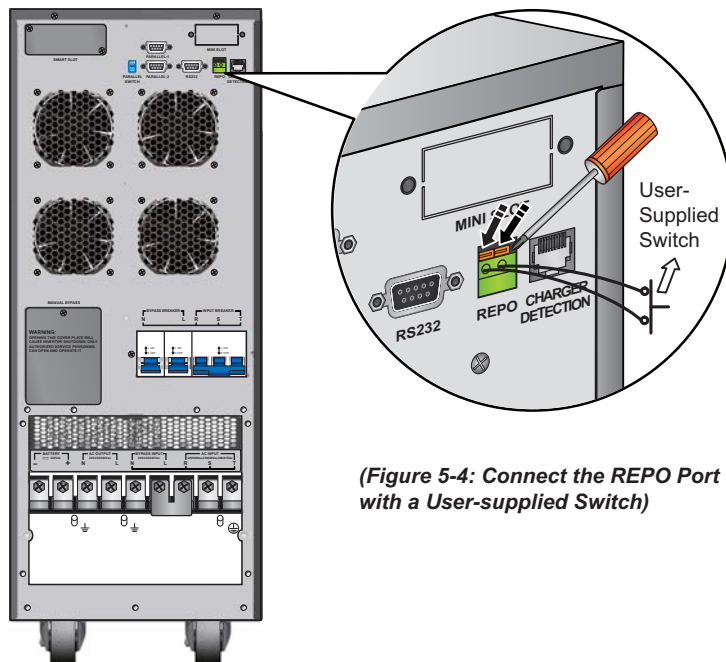
6 REPO Port

The REPO port is for remote emergency shutdown. When an emergency event occurs, it can disconnect the UPS power supply rapidly and shut down the UPS immediately. This interface is normally open. Please connect it with a user-supplied remote control switch.



NOTE:

Use a screwdriver to push the area shown by the two black arrows (as shown in *Figure 5-4*) to open the REPO port, and connect the port to a user-supplied switch.



(Figure 5-4: Connect the REPO Port with a User-supplied Switch)

7 Charger Detection Port

The charger detection port is used to connect with an external charger box. Via this port, the UPS can detect the operating status of the external charger box and control its switch.

Chapter 6 : Installation and Wiring

6.1 Precautions Prior to Installation and Wiring

As the installation environment varies with each user, please read this user manual carefully before installation and wiring. All installation, wiring, maintenance and operation must be performed by qualified professional personnel. If independent manipulation is needed, it should be carried out under on-site supervision and guidance from qualified professional personnel. If any machine or tool is used to handle the device, please confirm whether it has sufficient supporting capacity first. For the weight of the UPS, please refer to **Appendix 1 : Technical Specifications**.

6.2 Installation Environment

- EH series UPS can be used indoors only, and must not be placed outdoors.
- Make sure that transportation routes (e.g. corridor, door gate, elevator, etc.) and installation area can accommodate and bear the weight of the UPS, external battery cabinets and forklifts. For the weight of the UPS, please refer to **Appendix 1 : Technical Specifications**.
- The installation place must be kept clean and tidy at all times.
- Ensure that the installation area is big enough for maintenance and ventilation. Since the fans of the UPS ventilate from front to rear, and it is recommended that you place the external battery cabinet next to the UPS, we suggest that you:
 1. Keep a distance of 50cm from the front of the UPS and the external battery cabinet for maintenance and ventilation.
 2. Keep a distance of 50cm from the back of the UPS and the external battery cabinet for maintenance and ventilation.
 3. Keep a distance of at least 50cm from the both sides of the UPS and the external battery cabinet for maintenance and ventilation.
- Keep the installation area's temperature around 25°C and humidity within 90%. The highest operating altitude is 3000 meters above sea level.

**WARNING:**

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

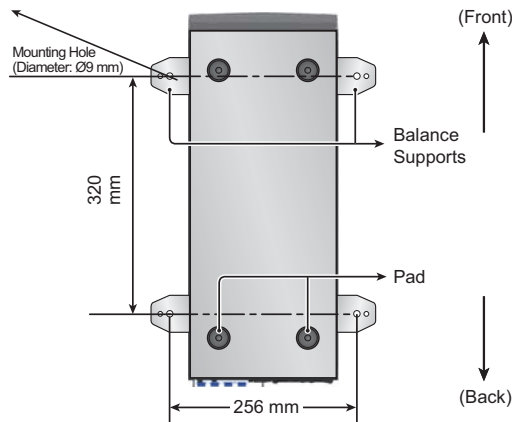
6.3 UPS Transportation & Handling

- No casters are mounted at the bottom of the 10kVA UPS. Please use sufficient labour (at least 2 persons) or handling machines and tools to carry out transportation.
- There are 4 casters at the bottom of the 15/ 20kVA UPS. Please pay attention to the movement of the casters to avoid accidents when you remove the UPS from its pallet. The casters are designed to move on level ground. Do not move the UPS on an uneven surface. This might cause damage to the casters or tip the UPS which could damage the unit. If you need to move the UPS over a long distance, please use appropriate equipment like a forklift. Do not use the UPS casters to move the unit over a long distance.

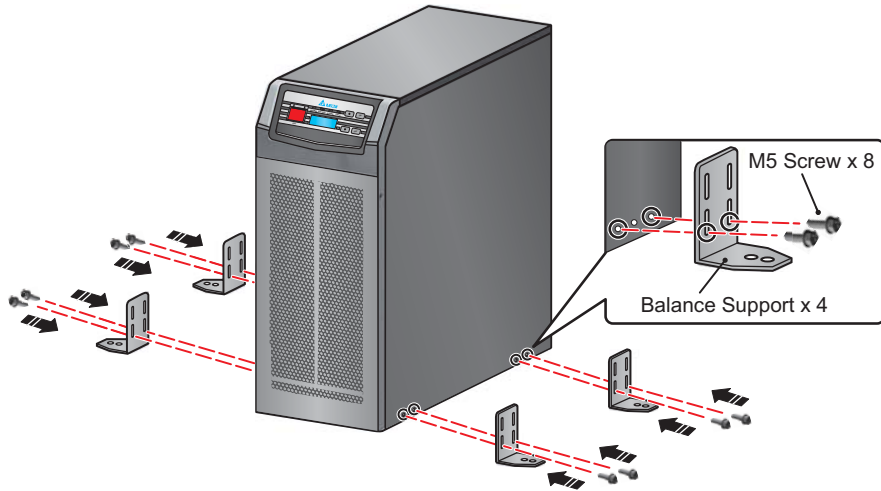
6.4 Installation

- **10kVA UPS**

Before installation, please refer to **Figure 6-1: 10kVA UPS Mounting Hole Diagram**. Please lock the balance supports and screws provided in the accessory kit on both sides of the UPS to complete the installation of the UPS. Please note that the screws must be locked in the lower position of each balance support's lower row of screw holes. Please refer to **Figure 6-2**.



(Figure 6-1: 10kVA UPS Mounting Hole Diagram)



(Figure 6-2: 10kVA UPS Balance Support Installation)

• 15/ 20kVA UPS

There are two installation methods for the 15/ 20kVA UPS, which are shown as below.

1. Installation Method 1:

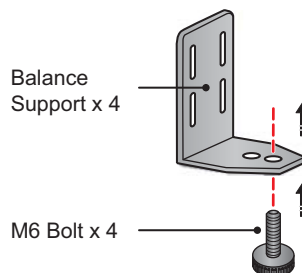
- 1 At delivery, the balance supports have been mounted on both sides of the 15/ 20kVA UPS. To facilitate installation, please remove the balance supports and their screws first.



WARNING:

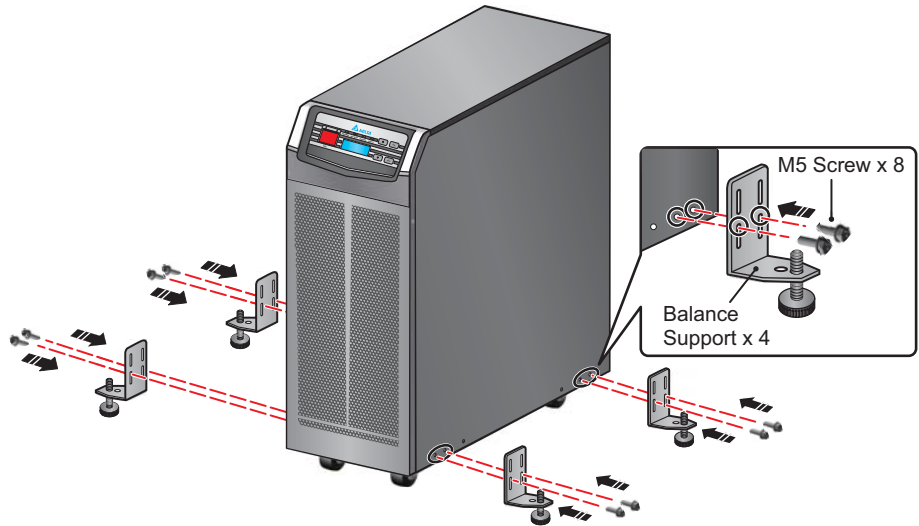
There are 4 casters at the bottom of the 15/ 20kVA UPS. When taking apart the balance supports from the UPS, please pay attention to the movement of the casters to avoid accidents.

- 2 Install each bolt (provided in the accessory kit) into each balance support's outer screw hole. Please refer to **Figure 6-3**.



(Figure 6-3: 15/ 20kVA UPS Bolt Installation)

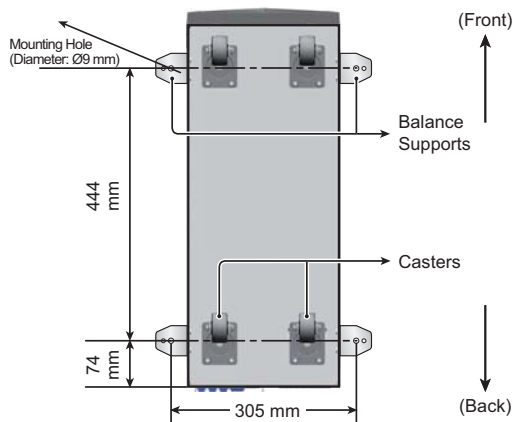
- 3 Follow **Figure 6-4** to mount the balance supports on both sides of the UPS. Please note that the screws must be locked in the upper position of each balance support's lower row of screw holes. Please refer to **Figure 6-4**.



(Figure 6-4: 15/ 20kVA UPS Balance Support Installation)

2. Installation Method 2:

- 1 This installation method requires drilling holes on your ground. Please refer to **Figure 6-5** for 15/ 20kVA UPS mounting hold diagram.



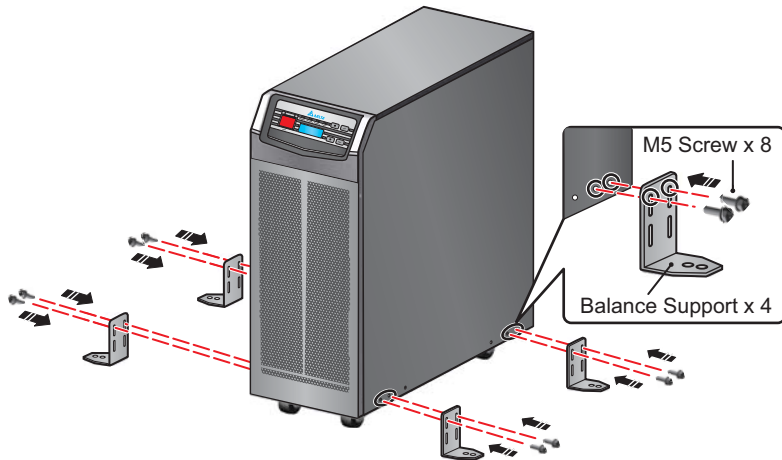
(Figure 6-5: 15/ 20kVA UPS Mounting Hole Diagram)

- 2 At delivery, the balance supports have been mounted on both sides of the 15/ 20kVA UPS. To facilitate installation, please remove the balance supports and their screws first.

**WARNING:**

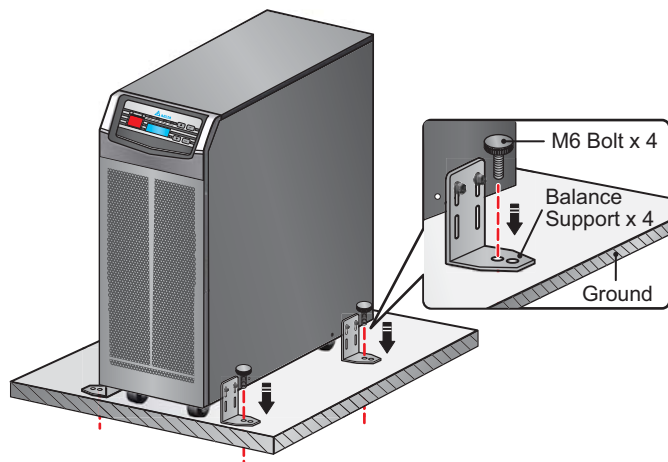
There are 4 casters at the bottom of the 15/ 20kVA UPS. When taking apart the balance supports from the UPS, please pay attention to the movement of the casters to avoid accidents.

- 3 Follow **Figure 6-6** to mount the balance supports on both sides of the UPS. Please note that the screws must be locked in the upper position of each balance support's upper row of screw holes.



(Figure 6-6: 15/ 20kVA UPS Balance Support Installation)

- 4 Use each bolt (provided in the accessory kit) to interlock each balance support's inner screw hole and your ground's mounting hole. Please refer to **Figure 6-7**. For mounting hole information, please refer to **Figure 6-5**.



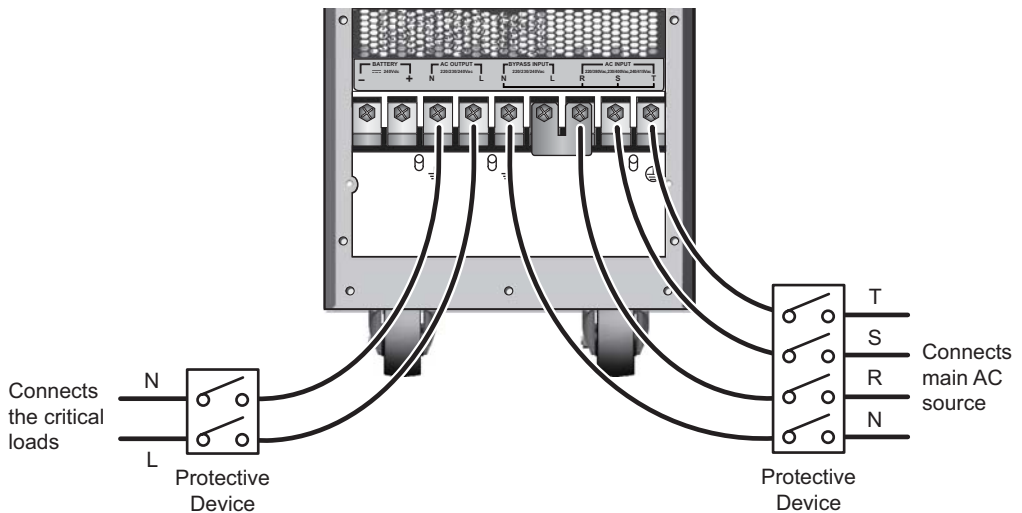
(Figure 6-7: 15/ 20kVA UPS Bolt Installation)

6.5 Wiring

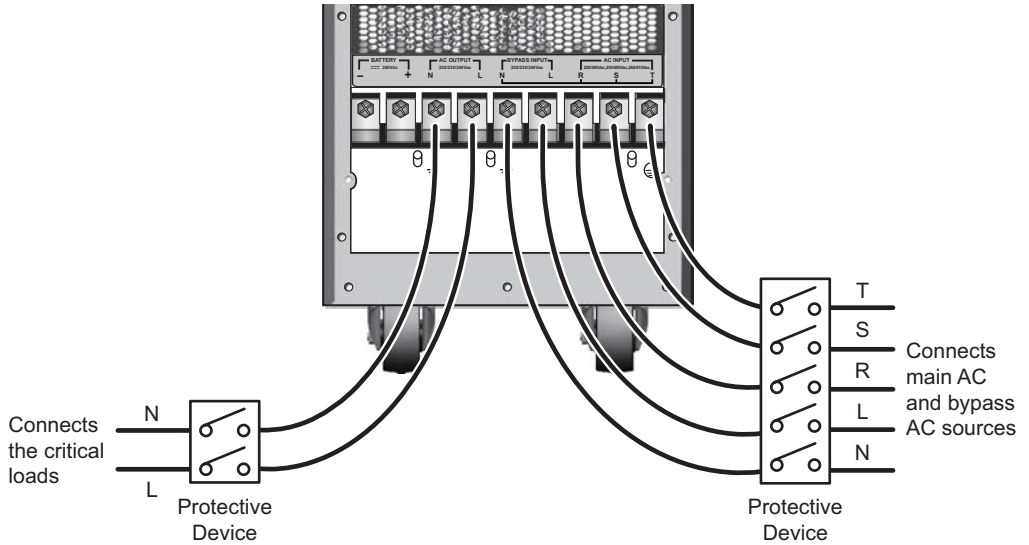
6.5.1 Precautions Prior to Wiring

- The wiring must be performed by qualified professional personnel. If independent manipulation is needed, it must be carried out under on-site supervision and guidance of qualified professional personnel.
- Before wiring or making any electrical connection, make sure the power supplied to the input and output of the UPS is completely cut off.
- When connecting the UPS to the utility AC power and the load, it is highly recommended that you install the protective devices. The protective devices must use approved components that meet safety certifications. Please refer to the table below and **Figure 6-8/ 6-9**.

UPS	Protective Device	Recommended Manufacturer
10kVA	D Curve-80A circuit breaker D Curve-63A circuit breaker	I/P Nader (NDM1-125D 80/ 4) O/P Nader (NDM1-125D 63/ 2)
15kVA	D Curve-80A circuit breaker	I/P Nader (NDM1-125D 80/ 4) O/P Nader (NDM1-125D 80/ 2)
20kVA	D Curve-100A circuit breaker	I/P Nader (NDM1-125D 100/ 4) O/P Nader (NDM1-125D 100/ 2)



(Figure 6-8: Single Input Protective Device Installation Diagram)



(Figure 6-9: Dual Input Protective Device Installation Diagram)

- Confirm the diameter identification of each wiring connected with the input, output and external battery cabinet, and confirm whether the diameter size, polarity and phase position are correct. For the specifications of input/ output cables and circuit breakers, please refer to **Table 6-1**.







Table 6-1: Specifications of Input/ Output cables and Circuit Breakers

Capacity (kVA)	10kVA	15kVA	20kVA
Input Cable	12AWG/ 2.5mm ²	10AWG/ 4mm ²	8AWG/ 6mm ²
Bypass Input Cable	6AWG/ 10mm ²	4AWG/ 16mm ²	2AWG/ 25mm ²
Output Cable	6AWG/ 10mm ²	4AWG/ 16mm ²	2AWG/ 25mm ²
Battery Cable	8AWG/ 6mm ²	6AWG/ 10mm ²	4AWG/ 16mm ²
Input Breaker	32A (3-pole × 1)	40A (3-pole × 1)	50A (3-pole × 1)
Bypass Breaker	63A (1-pole × 2)	80A (1-pole × 2)	100A (1-pole × 2)



NOTE:

1. In accordance with National Electrical Codes (NEC), please install a suitable conduit and bushing.
2. Please refer to national and local electrical codes for acceptable non-fuse breakers and cable size.
3. Cables with PVC material and with temperature resistance up to 105°C are suggested.
4. Make sure that the input/ output cables are locked tightly with the tightening torque of 150±5Kgf.cm.

- The EH series UPS is 3-phase in & 1-phase out. For single input configuration, please consider the status of bypass circuit. The current flowing through Phase R is output current. Therefore, please make wiring for Phases R and N according to the diameters of the output cables.
- When connecting with the external battery cabinet, please confirm the polarity, and do not reverse the polarity.
- The grounding cable of the external battery cabinet must be connected to the () terminal of the battery terminal block.
- At delivery, the UPS default setting is single input. If there is an intention to change the UPS into dual input or hot standby redundancy configuration, please contact qualified service personnel to connect the bypass terminal block with another power supply. Please note whether the electric potential of the neutral line (N) of the bypass power supply is the same as that of the neutral line (N) of the main power supply. If they do not share a common neutral line system, add an isolation transformer to the bypass power supply.
- The input of the UPS must be a Y-connection, and the neutral line (N) must be actually connected for fear of any UPS fault. When wiring, the neutral line (N) of the UPS should not be connected with the ground terminal ().
- If there is a floating voltage between the input power's neutral (N) and the ground (), and you require that the V_{NG} of the UPS should be zero, we suggest that you install an isolation transformer in front of the input side of the UPS, and connect the UPS neutral (N) with the ground ().
- The utility AC power must be three phases (R/ S/ T) and meet the related power specified on the UPS's rating label. When connecting the utility input power to the UPS, make sure it is in positive phase sequence.
- Connect the external battery cabinet's grounding terminal to the grounding terminal () of the UPS's battery terminal block. Do not connect the grounding terminal of the external battery cabinet to any other grounding system.
- The ground terminal () of the UPS must be grounded.



WARNING:

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

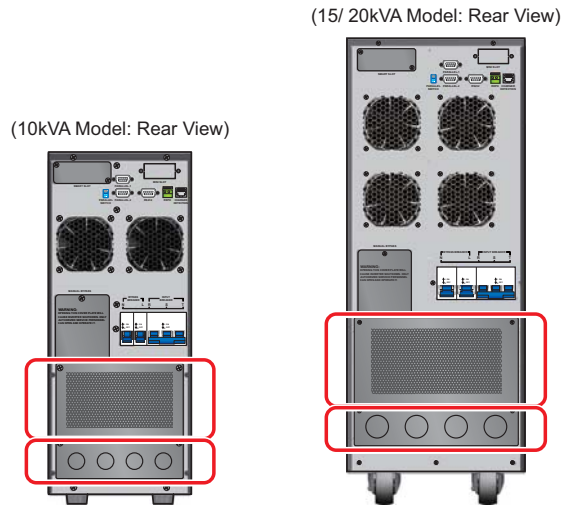
6.5.2 Single Input/ Dual Input Modification



WARNING:

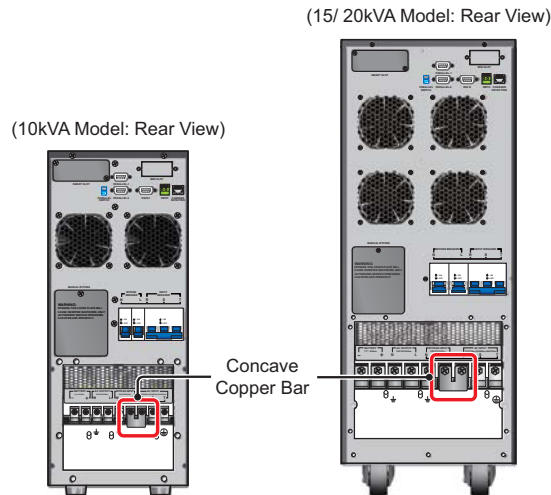
Only authorized Delta engineers or service personnel can modify single input/ dual input setup.

- 1 At delivery, the UPS is set as single input. If it is intended to change the UPS into dual input, please remove the cover plates shown in the figure below.



(Figure 6-10: Position of Cover Plates)

- 2 After removing the cover plates, please use a socket wrench to remove the concave copper bar locating between the Bypass Terminal Block's L terminal and the AC Input Terminal Block's R terminal to modify the UPS into dual input.



(Figure 6-11: Position of Concave Copper Bar)



NOTE:

If you want to modify the UPS from dual input into single input, please use the socket wrench to reinstall the concave copper bar and replace the cover plates.

6.5.3 Single Unit Wiring

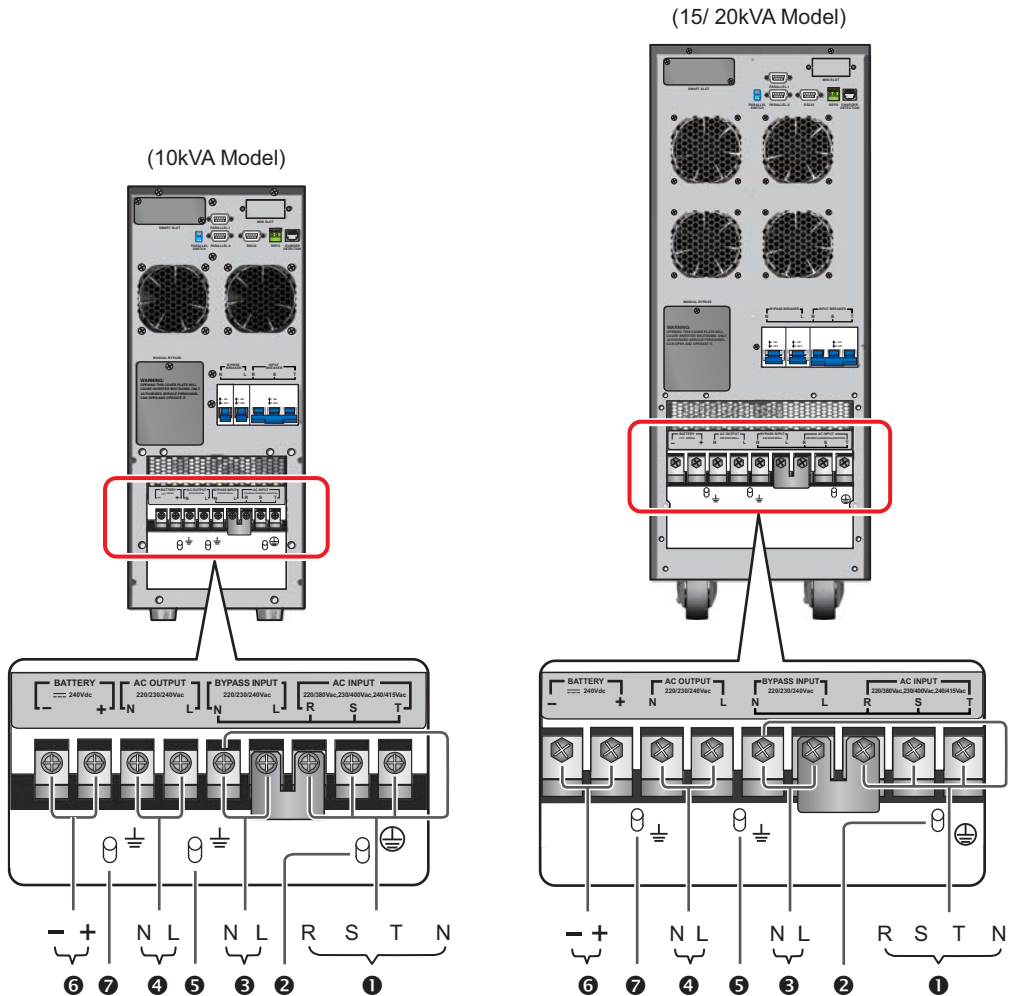


NOTE: Prior to wiring, please read **6.5.1 Precautions Prior to Wiring** first.

- **Single Input (Single Unit)**




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

- 1 Remove the cover plates shown in **Figure 6-10** and you will see the wiring terminal block shown in **Figure 6-12**.

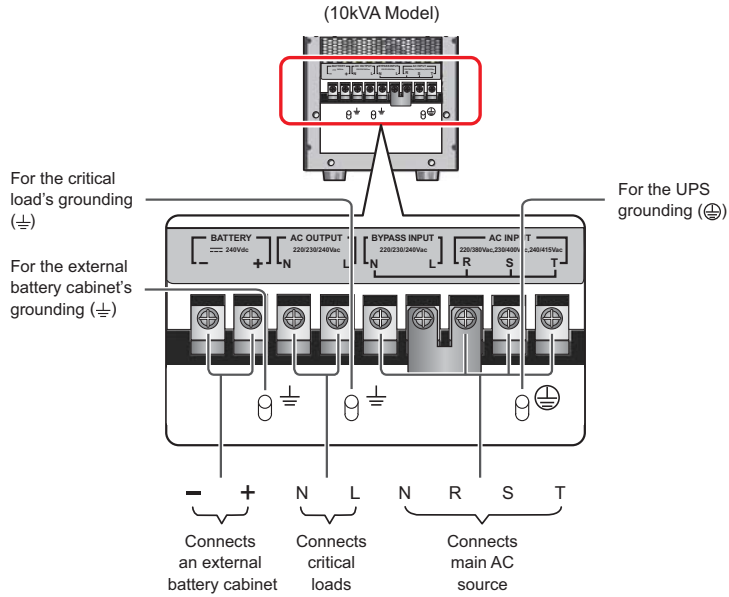


(Figure 6-12: Wiring Terminal Block)

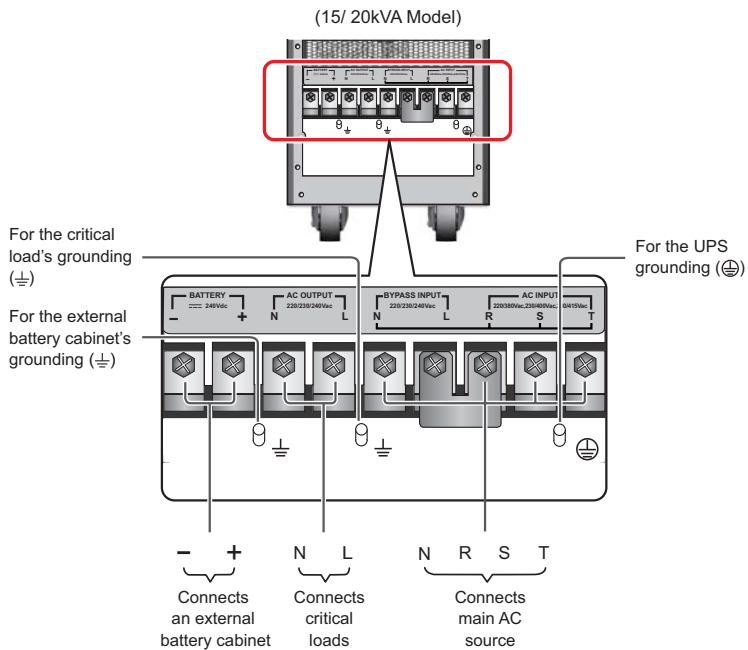
- 2 Please ensure you understand the functions of the wiring terminal block shown in **Figure 6-12**.

No.	Item	Function	Description
1	AC Input Terminal Block	Connects the main AC source	Includes three-phase terminals, R, S & T.
2		For the UPS grounding	Includes one grounding terminal.
3	Bypass Input Terminal Block	Connects the bypass AC source	Includes two terminals, L & N.
4	AC Output Terminal Block	Connects the critical loads	Includes two terminals, L & N.
5		For the critical loads' grounding	Includes one grounding terminal.
6	Battery Terminal Block	Connects an external battery cabinet	Includes two terminals, positive (+) & negative (-).
7		For the external battery cabinet's grounding	Includes one grounding terminal

- 3 The UPS rating voltage is 220/ 380Vac, 230/ 400Vac or 240/ 415Vac.
- 4 The battery rating voltage is +240Vdc.
- 5 Confirm the input breaker and the bypass breaker are in the **OFF** position.
- 6 According to the capacity and the model of your UPS, select proper input and output cables (please refer to **Table 6-1**).
- 7 Connect the main AC source/ output/ external battery cabinet cables to the wiring terminal block (please refer to **Figures 6-13/ 6-14**).
- 8 Ground the UPS.



(Figure 6-13: 10kVA UPS Single Unit Single Input Wiring Diagram)



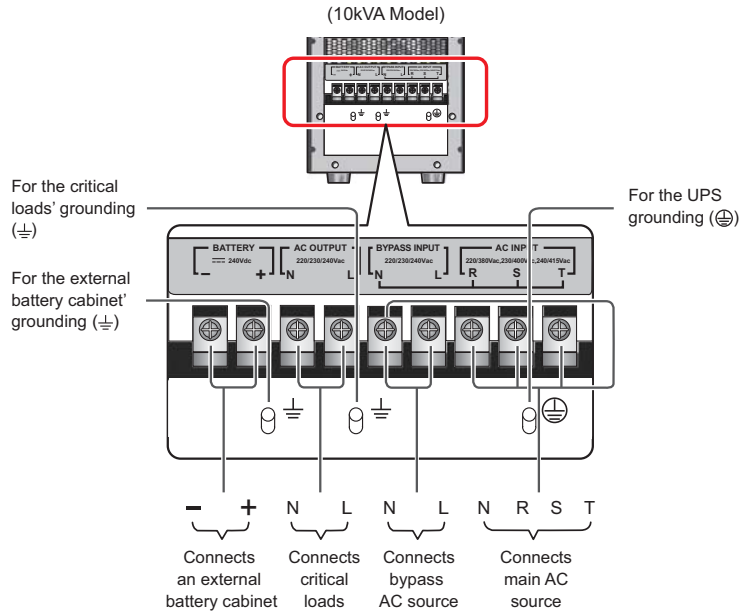
(Figure 6-14: 15/ 20kVA UPS Single Unit Single Input Wiring Diagram)

- **Dual Input (Single Unit)**

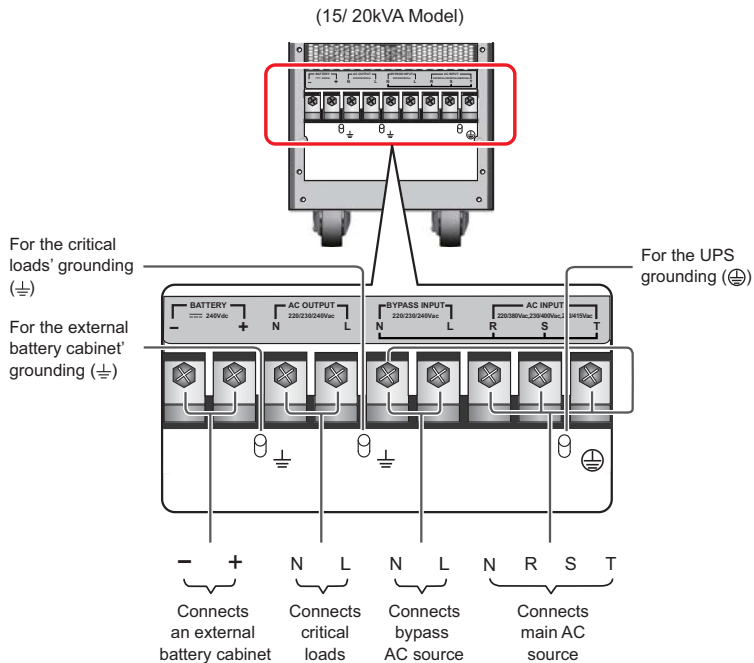
When there are two AC power sources, single unit wiring procedures are as follows.

- 1 Follow **6.5.2 Single Input/ Dual Input Modification** to modify the UPS into dual input.

- 2 Please follow **Pages 28~29**: steps 1 ~ 6 stated in section **Single Input (Single Unit)**.
- 3 Connect the main AC source/ bypass AC source/ output/ external battery cabinet cables to the wiring terminal block (please refer to **Figures 6-15/ 6-16**).
- 4 Ground the UPS.



(Figure 6-15: 10kVA UPS Single Unit Dual Input Wiring Diagram)



(Figure 6-16: 15/ 20kVA UPS Single Unit Dual Input Wiring Diagram)

6.5.4 Parallel Units Wiring



NOTE: Prior to wiring, please read **6.5.1 Precautions Prior to Wiring** first.

- **Single Input (Parallel Units)**

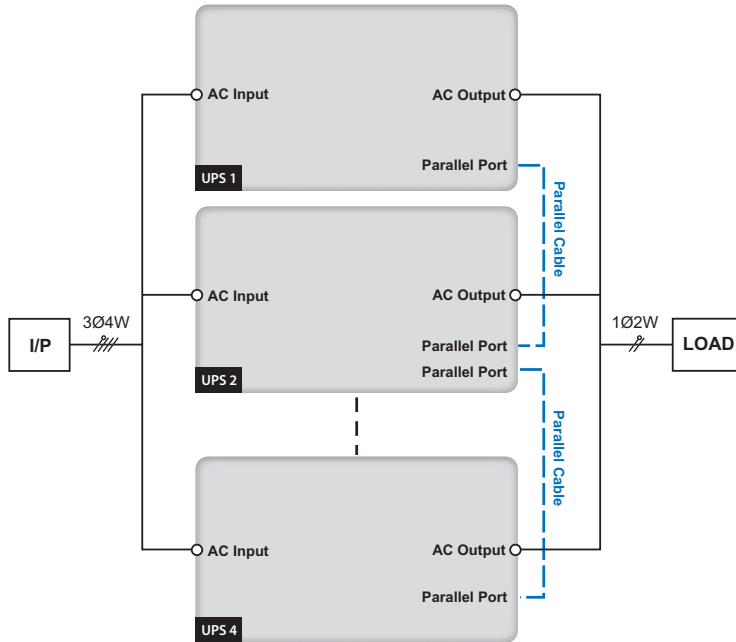
When there is only one AC power source, parallel units' wiring procedures are as follows.

- 1 Please follow **Pages 28~29**: steps 1 ~ 6 stated in section **Single Input (Single Unit)**.
- 2 Connect the main AC source/ output/ external battery cabinet cables to the wiring terminal block (please refer to **Figures 6-13/ 6-14/ 6-17**).
- 3 Use the provided parallel cable to connect the parallel ports on the parallel units. Please see **Figure 5-1** for parallel port location.
- 4 Please refer to **Chapter 5 : Communication Interfaces** to set the parallel switch in **ON** or **OFF** position.
- 5 Ground the parallel UPSs.



WARNING:

1. When UPSs are paralleled, the length of each unit's input cables plus output cables must be equal. This ensures that the parallel UPSs can equally share the equipment loads in bypass mode.
2. Only UPSs with the same capacity, voltage and frequency can be paralleled; otherwise, parallel functions will fail.
3. Before parallel startup, qualified service personnel should set ID (0, 1, 2 or 3) through LCD. Otherwise, UPSs can not be started. If the symbol '!' appears after an ID number, it indicates there is a conflict between ID numbers.



(Figure 6-17: Parallel Units Single Input Wiring Diagram)

• Dual Input (Parallel Units)

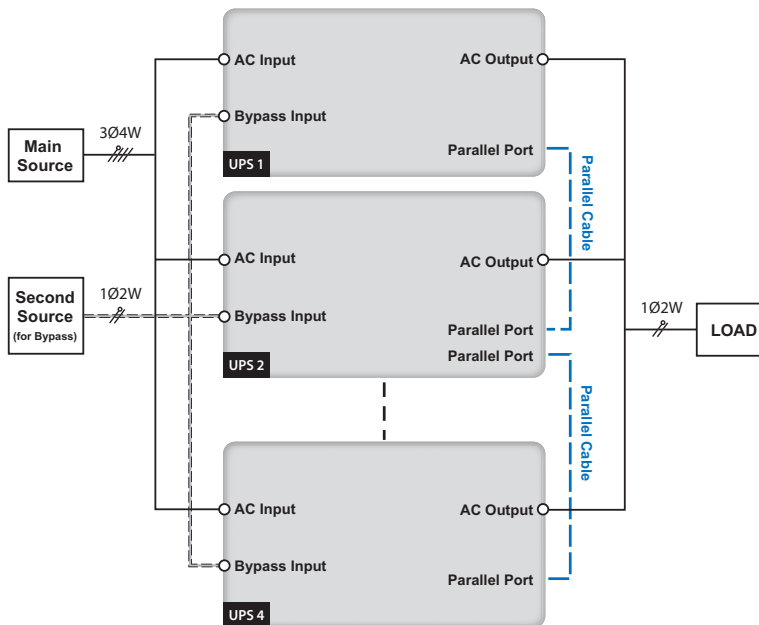
When there are two AC power sources, parallel units' wiring procedures are as follows.

- 1 Follow **6.5.2 Single Input/ Dual Input Modification** to modify the UPS into dual input.
- 2 Please follow **Pages 28~29**: steps 1 ~ 6 stated in section **Single Input (Single Unit)**.
- 3 Connect the main AC source/ bypass AC source/ output/ external battery cabinet cables to the wiring terminal block (please refer to **Figures 6-15/ 6-16/ 6-18**).
- 4 Use the provided parallel cable to connect the parallel ports on the parallel units. Please see **Figure 5-1** for parallel port location.
- 5 Please refer to **Chapter 5 : Communication Interfaces** to set the parallel switch in **ON** or **OFF** position.
- 6 Ground the parallel UPSs.



WARNING:

1. When UPSs are paralleled, the length of each unit's input cables (bypass AC source) plus output cables must be the same. This ensures that the parallel UPSs can equally share the equipment loads in bypass mode.
2. Only UPSs with the same capacity, voltage and frequency can be paralleled; otherwise, parallel functions will fail.
3. Before parallel startup, qualified service personnel should set ID (0, 1, 2 or 3) through LCD. Otherwise, UPSs can not be started. If the symbol '!' appears after an ID number, it indicates there is a conflict between ID numbers.



(Figure 6-18: Parallel Units Duals Input Wiring Diagram)

6.6 Precautions for Connecting with the External Battery Cabinet



WARNING:

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

• Battery

1. Charge Voltage
 - 1) Float voltage: $272\pm 2\text{Vdc}$ (default)
 - 2) Boost voltage: $280\pm 2\text{Vdc}$ (default)

2. Charge Current
 - 1) Minimum: 1.5A
 - 2) Maximum: 4A
 - 3) Default: 4A
3. Low Battery Shutdown: 210Vdc (default: 210Vdc)
4. The Number of Batteries: 12V x 20 pcs (in series connection)

**NOTE:**

1. The settings for charge current range for 10kVA/ 15kVA/ 20kVA UPS are shown in the table below.

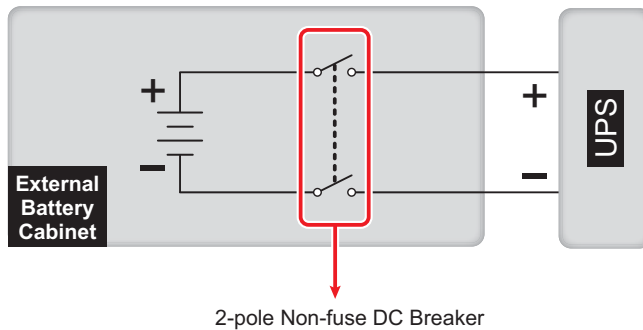
10kVA/ 15kVA/ 20kVA UPS	Level 1	Level 2	Level 3	Level 4
Total Battery Capacity	9~17Ah	13~20Ah	20~30Ah	27~40Ah
Charge Current	1.5A	2A	3A	4A

2. If you need to modify the charge current default setting and low battery shutdown default setting, please contact your local dealer or service personnel.
- Only use the same type of batteries from the same supplier. Never use old, new and different Ah batteries at the same time.
 - The number of batteries must meet UPS requirements.
 - Do not connect the batteries in reverse.
 - Use the voltage meter to measure whether the total voltage, after the external battery cabinet connection, is around 12.5Vdc × the total number of batteries.
 - To extend battery backup time, you can connect several external battery cabinets to the UPS.
 - When connecting an external battery cabinet to the UPS, it is compulsory to install an appropriate non-fuse DC breaker or a fuse switch. The fuse switch shall have a contact separation of at least 3mm. When short-circuit occurs, the breaker's trip current or the melting current of the fuse switch must be 5~6 times of the rating current. The non-fuse DC breaker and the fuse switch must use approved components that meet safety certifications.
 - Please follow **Table 6-2** to select appropriate fuse switches for different rating-power UPSs.

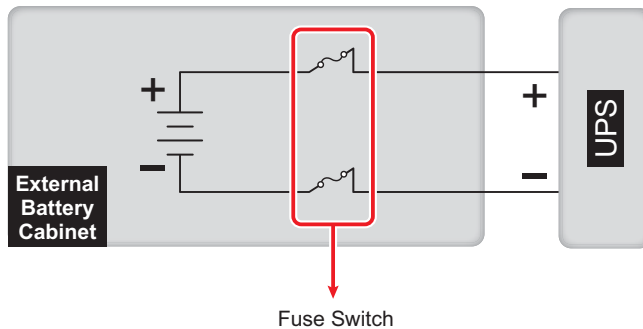
Table 6-2: External Battery Cabinet Configuration Data

Rating Power (kVA)	Circuit Breaker Rating Current (A)	Battery Cable (mm ²)	Fuse Switch Rating Current (A)
10	63	10	50
15	100	16	80
20	100	25	100

- The breaker must be a 2-pole non-fuse DC breaker with characteristics of 1-pole 250Vdc and 2-pole 500Vdc. Please follow **Figure 6-19** or **Figure 6-20** to install a 2-pole non-fuse DC breaker or a fuse switch between the UPS and the external battery cabinet.



(Figure 6-19: 2-pole Non-fuse DC Breaker Installation)



(Figure 6-20: Fuse Switch Installation)

- The UPS cannot share common batteries.



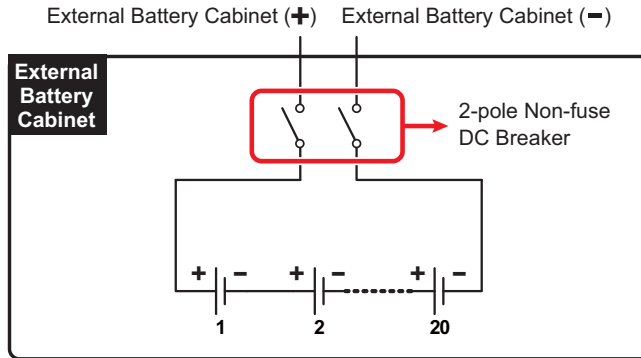
WARNING:

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

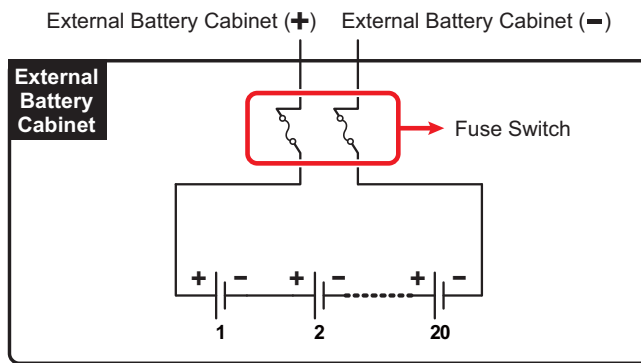


NOTE:

An external battery cabinet shall include 20 batteries. You should use two cables to connect an external battery cabinet with the '+' and '-' terminals marked on the UPS. When connecting an external battery cabinet with the UPS, you must install an appropriate non-fuse 2-pole DC breaker or a fuse switch (please refer to **Table 6-2**). Do not use an AC breaker. The closer the breaker/ the fuse switch is to the batteries, the better. Please refer to **Figure 6-21** or **Figure 6-22**.



(Figure 6-21: External Battery Cabinet Installation I)



(Figure 6-22: External Battery Cabinet Installation II)

• External Battery Cabinet Alarm

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

No.	External Battery Cabinet Status	Alarm
1	Battery Test Fail	Sounds once every 2 seconds
2	Battery Low Warning	Sounds once every 0.5 second
3	Battery Low Shutdown	Long beep (5 seconds)
4	Battery Over Charge	Sounds once every 2 seconds
5	Battery Missing	Sounds once every 2 seconds

Chapter 7 : Operation




NOTE:

The information displayed in all LCD pictures of this manual is only for reference, and the real display status depends on actual conditions.

7.1 Connection of the UPS with the Utility AC Power

- Switch the bypass N breaker, bypass L breaker and input breaker to **ON** position successively. For the position of breakers, please refer to **3.3 Rear Panel**. After the UPS is connected with the utility AC power, the following conditions will occur.
 1. The fans come on.
 2. The LCD will first show the message below.


ONLINE UPS
V00

3. Then, the LCD will display that the UPS is now in 'BYPASS MODE'. At this time, the bypass LED indicator () will illuminate (yellow).

BYPASS MODE
00.00KW / 000%

7.2 UPS Start-up with AC Input

- **UPS Start-up with AC Input**

First complete **7.1 Connection of the UPS with the Utility AC Power**. Press the **ON** key () for 3~5 seconds, and after hearing a beep sound, release it to start up the UPS. The system starts and performs self-diagnosis automatically. At this time, the LCD automatically shows the following screens sequentially.

DIAGNOSIS MODE
FREQ OUT=50Hz

- ❶ The UPS will detect the input frequency automatically to determine the output frequency (default value: 50Hz).

DIAGNOSIS MODE
RECTIFIER OK

- ❷ The UPS will check the rectifier automatically. If it is normal, the LCD will display RECTIFIER OK.

DIAGNOSIS MODE
DC BUS OK

- ❸ The UPS will check the DC BUS voltage automatically. If it is normal, the LCD will display DC BUS OK.

DIAGNOSIS MODE
INVERTER TEST

④ The UPS will test the inverter automatically.

DIAGNOSIS MODE
INVERTER OK

⑤ If the inverter is normal, the LCD will display INVERTER OK.




NOTE: When the LCD displays each screen (①~⑤), the bypass LED indicator (BYPASS) will illuminate (yellow).

ONLINE MODE
00.00KW / 000%


⑥ When the LCD displays that the UPS is in 'ONLINE MODE', and the NORMAL LED indicator (NORMAL) illuminates (green), it means that the startup is completed.

• UPS Start-up with Battery Power

Press the **ON** key () for 3~5 seconds, and after hearing a beep sound, release it to start up the UPS.

1. When you begin to press the **ON** key (), the LCD shows the following screen.

ON-LINE 20KVA
FW VER:00

2. Press the **ON** key () for 3~5 seconds, and after hearing a beep sound, release it. The system starts and performs self-diagnosis automatically. At this time, the LCD automatically shows the following screens sequentially.

DIAGNOSIS MODE
FREQ OUT=50Hz

① Because there is no input frequency, the UPS will select the default value of 50Hz as the output frequency automatically.

DIAGNOSIS MODE
RECTIFIER OK

② The UPS will check the rectifier automatically. If it is normal, the LCD will display RECTIFIER OK.

DIAGNOSIS MODE
BATTERY OK

③ The UPS will check the battery automatically. If it is normal, the LCD will display BATTERY OK.

DIAGNOSIS MODE
DC BUS OK

④ The UPS will check the DC BUS voltage automatically. If it is normal, the LCD will display DC BUS OK.

DIAGNOSIS MODE
INVERTER TEST

⑤ The UPS will test the inverter automatically.


DIAGNOSIS MODE
INVERTER OK

- ⑥ If the inverter is normal, the LCD will display INVERTER OK.






NOTE: When the LCD displays each screen (①~⑥) on the left side automatically, no indicator will illuminate.



BATTERY CAPACITY
000V / 000%

- ⑦ When the LCD displays the battery capacity automatically, and the battery LED indicator () illuminates (yellow), it means that the startup is completed.

7.3 UPS Turn-off

- In online mode, press the **OFF** key () for 3 seconds, release it after you hear one beep and the LCD shows the following screen. Press the **UP** key () to turn off the UPS, the inverter will shutdown and the system will transfer to bypass mode. At this time, the bypass LED indicator () illuminates (yellow) and the LCD shows 'BYPASS MODE'.

SURE?
YES↑ NO↓

- In battery mode, press the **OFF** key () for 3 seconds, release it after you hear one beep and the LCD shows the 1st screen as follows. Press the **UP** key () to turn off the UPS. At this moment, the inverter shuts down, the LCD shows the 2nd screen as follows, and then the UPS shuts down.

SURE?
YES↑ NO↓

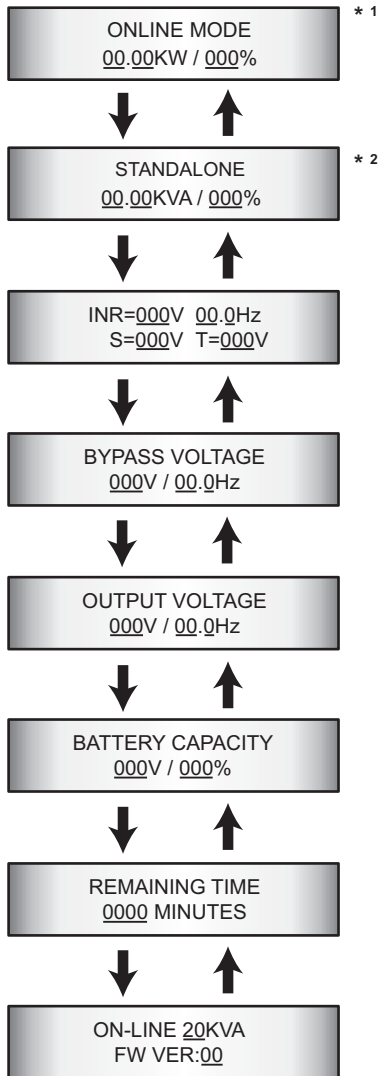
UPS OFF WAITING
BUS=000V-000V



WARNING:

You can remove the UPS only after the above screen is off, the fans stop running, the utility AC power is shut off and the batteries are removed.

7.4 LCD Display in Different Operation Modes



NOTE:

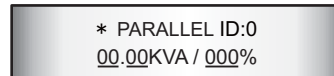
- *1 In different operation modes, the LCD will display different information.
- *2

Single Mode





Indicates that the UPS is in single mode.

Parallel Mode





Indicates that the UPS is in parallel mode. ID (0~3) indicates the UPS's ID number. The UPS is a master machine if the symbol '*' appears before its ID. Otherwise, the UPS is a slave machine.

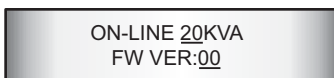
- Please use the function keys  /  on the front panel to switch between screens.
- The LCD is provided with the multi-language selection function. If there is an intention to modify the factory setting, please contact your local dealer or service personnel.

- **LCD Display Message**

LCD Message	Meaning
ONLINE MODE	Indicates that the UPS is in online mode.
STANDBY MODE	Indicates that the UPS is in standby mode.
ECO MODE	Indicates that the UPS is in ECO mode.
BATTERY MODE	Indicates that the UPS is in battery mode.
BYPASS MODE	Indicates that the UPS is in bypass mode.
CONVERTER MODE	Indicates that the UPS is in converter mode.
SINGLE MODE	Indicates that the UPS is in single mode.
PARALLEL ID: 0	Indicates that the UPS is in parallel mode. The message also shows the UPS's ID. If the symbol '' appears, it means this is the MASTER UPS; if not, it means this is the SLAVE UPS.
INPUT VOLTAGE	Indicates the input voltage.
BYPASS VOLTAGE	Indicates the bypass voltage.
OUTPUT VOLTAGE	Indicates the output voltage.
BATTERY CAPACITY	Indicates the battery capacity.
REMAINING TIME	Indicates the remaining battery time.
ONLINE <u>X</u> KVA	Indicates the UPS's power rating and firmware version.

7.5 Firmware Version Look-up

- Check the firmware version of the UPS with the function keys  /  on the front panel.



- When units are in parallel, each UPS detects whether each firmware version is the same. If not, the UPS won't turn on and the alarm message below appears. If the message below appears, please contact your local dealer to upgrade the firmware.



Chapter 8 : Optional Accessories

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

No.	Item	Function
1	Charger Board (4A)	Increase the UPS charge current.
2	External Charger Box	Increase the UPS charge current.
3	External Charger Board (4A)	Increase the UPS charge current.
4	Dust Filter	Prevents dust from entering into the UPS to ensure UPS reliability and to prolong product life.
5	EnviroProbe	Monitors temperature, humidity and other conditions in a room environment. Please note that the EnviroProbe should work with either an SNMP card or an EMS2000.
6	SNMP Card (IPv4 or IPv6)	Monitors and controls the status of the UPS via internet.
7	Relay I/O Card	Increases the quantity of dry contacts.
8	ModBus Card	Lets the UPS have ModBus communication function.
9	Mini TVSS Card	Lets the UPS have surge protection function.
10	Mini USB Card	Lets the UPS have USB communication function.
11	Mini SNMP Card	Monitors and controls the status of the UPS via internet.
12	Mini Relay I/O Card	Increases the quantity of dry contacts.
13	Mini ModBus Card	Lets the UPS have ModBus communication function.



REFERENCE:

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

Chapter 9 : Maintenance

- **UPS**

1. UPS Cleaning:

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

2. UPS Regular Inspection:

Regularly check the UPS every half year and inspect:

- 1) Whether the UPS, LEDs, and alarm function are operating normally.
- 2) Whether the UPS works in bypass mode (normally, the UPS will work in normal mode). If yes, check if any error, overload, internal fault, etc. occurs.
- 3) Whether battery voltage is normal. If the battery voltage is too high or too low, find the root cause.

- **Battery**

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

1. Keep usage temperature between 15°C~25°C.
2. When the UPS needs to be stored for an extended period of time, the batteries must be recharged once every three months and the charging time must not be less than 24 hours each time.

- **Fan**

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



NOTE:

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

Chapter 10 : Troubleshooting

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

No.	Alarm	Possible Cause	Solution
1	BUS OVP FAIL	1. Output has abnormalities. 2. The UPS has an internal fault.	Contact service personnel.
2	+DC BUS HIGH	1. Output has abnormalities. 2. The UPS has an internal fault.	Contact service personnel.
3	+DC BUS LOW	1. Output has abnormalities. 2. The UPS has an internal fault.	Contact service personnel.
4	-DC BUS HIGH	1. Output has abnormalities. 2. The UPS has an internal fault.	Contact service personnel.
5	-DC BUS LOW	1. Output has abnormalities. 2. The UPS has an internal fault.	Contact service personnel.
6	OUTPUT SHORT	Output has short circuit issue	Contact service personnel.
7	INVERTER FAIL	Inverter is damaged.	Contact service personnel.
8	OVER TEMPERATURE	The UPS temperature is too high.	1. Choose a well-ventilated area. 2. Decrease some loads. 3. Check if fans run normally.
9	INV SCR OPEN	Inverter SCR has no driver signal.	Contact service personnel.
10	INV SCR SHORT	1. Inverter SCR has no driver signal. 2. Input SCR is damaged.	Contact service personnel.
11	I/P SCR SHORT	1. Input SCR has no driver signal. 2. Input SCR is damaged.	Contact service personnel.
12	OVERLOAD	The UPS is overloaded.	Remove some unnecessary loads to let total load capacity below 95%.

No.	Alarm	Possible Cause	Solution
13	FAN FAIL	Fans are damaged or stuck.	Contact service personnel.
14	AUXILIARY POWER FAIL	Charge voltage/ battery voltage is abnormal.	Contact service personnel.
15	RECTIFIER FAIL	1. Rectifier SCR has no driver signal. 2. Rectifier has short circuit issue.	Contact service personnel.
16	O/P FUSE BROKEN	Output fuse is broken.	Contact service personnel.
17	NTC OPEN FAIL	1. NTC is not connected well. 2. NTC line is broken.	Contact service personnel.
18	LOW TEMP PROTECT	Ambient temperature is below -15°C.	Check the ambient temperature.
19	BYPASS SCR FAIL	1. Bypass SCR has no driver signal. 2. Bypass SCR has short circuit issue.	Contact service personnel.
20	PARALLEL FAIL	Parallel cable is not well connected.	Check if the parallel cable is well connected or not.
21	CHARGER FAIL	Charge voltage is abnormal.	Contact service personnel.
22	NO BATTERY	1. Failure to connect with batteries. 2. Battery cable is not well connected.	Check if the battery cable is well connected or not.



NOTE:

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

Appendix 1 : Technical Specifications

Model		EH-10K	EH-15K	EH-20K
Power Rating		10kVA/8KW	15kVA/12KW	20kVA/16KW
Waveform		Sine Wave		
Input	Nominal Voltage	220/380 Vac; 230/400 Vac; 240/415 Vac		
	Voltage Range	208 ~ 304 Vac (50% ~ 100% load); 305 ~ 477 Vac (100% load)		
	Frequency	50/ 60 Hz		
	Frequency Range	45 ~ 65 Hz		
	Input Current	18A	25A	32A
	Power Factor	> 0.95 (full load)		
Output	Voltage	220/230/240 Vac		
	Power Factor	0.8		
	Voltage Regulation	± 2%		
	Voltage Harmonic Distortion	< 3% (linear load)		
	Overload Capability	< 105%: continuous; 105% ~ 110%: 10 minutes; 111% ~ 125%: 5 minute; 126% ~ 150%: 30 seconds		
	Output Frequency	50/60 Hz ± 0.1 Hz		
	Cress Factor	3:1		
Efficiency	Online Mode	91%		
	ECO Mode	96%		
Battery	Type	Sealed lead-acid battery		
	Battery Voltage	240 Vdc		
	Charge Current	4A (an optional charger board (4A) can be added)		
	Charge Voltage	Float charge 272 ± 2 Vdc Boost charge 280 Vdc		
Audible Noise		< 55 dBA	< 60 dBA	< 60 dBA
LED & LCD		LED indicators and Multi-language LCD display		
Communication Interfaces		SMART Slot x 1, MINI Slot x 1, Parallel Port x 2, RS232 Port x 1, REPO Port x 1, Charger Detection Port x 1		
Manual Bypass Switch		Yes		

Model		EH-10K	EH-15K	EH-20K
Physical	Dimensions (W x D x H)	200 x 490 x 490 mm	250 x 610 x 650 mm	250 x 610 x 650 mm
	Weight	26 Kg	45 Kg	45 Kg
Environment	Operating Temperature	0 ~ 40°C		
	Ambient Storage Temperature	-15 ~ 50°C		
	Relative Humidity	5% ~ 95% (non-condensing)		



NOTE:

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

Appendix 2 : Warranty

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

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

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

**WARNING:**

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



5012329400