



G90 Online UPS

1000VA, 2000VA, 3000VA Models

User & Installation Manual

Table of Contents

Introduction.....	7
Product Description.....	7
Double Conversion Online Technology.....	7
Diagnostic Tests.....	8
System Configuration.....	8
Communication Connections.....	10
Emergency Power Off (EPO) Port.....	11
Hardware Installation Guide.....	12
Safety Information.....	12
Storage and Transportation.....	12
Environment.....	13
UPS Installation.....	13
Connecting the UPS Internal Batteries.....	13
Connecting Extended Battery Packs (EBPs).....	15
Rack-mount Installation.....	17
Tower Installation.....	19
UPS Input Connection.....	21
UPS Output Connection.....	21
Starting the UPS.....	21
Operations.....	23
Front Panel Control Functions.....	23
Indicator Descriptions.....	23
Button Descriptions.....	24
Working Status of Indicators.....	24
Display Functions.....	25
Parameters Inquiring.....	27
User Settings.....	29
Operating Mode Description.....	33

Startup Operation.....	34
Shutdown Operation.....	34
UPS Self-Test/Mute Test Operation.....	35
Configuring Battery Settings.....	35
Using UPS with Generator.....	35
Communication.....	36
Installing Communication Options and Control Terminals.....	36
Troubleshooting.....	39
Fault Codes.....	40
UPS Maintenance.....	40
UPS and Battery Care.....	40
Storing the UPS and Batteries.....	41
Maintenance.....	41
Replacing Batteries (QUALIFIED SERVICE PERSONNEL ONLY).....	41
Replacing Battery Trays in UPS and EBPs.....	42
Specifications.....	45
Shipping List.....	46
Obtaining Service.....	47
Xtreme Power Conversion Limited Warranty.....	48
Appendix A: G90-EBP1, G90-EBP2 User Guide.....	49
Introduction.....	49
Installation.....	49
Operation.....	51
Maintenance.....	51
Testing New Batteries.....	53
Recycling the Used Battery.....	53
Specifications.....	54

Thank you for selecting this uninterruptible power supply (UPS). It provides you with protection for connected equipment. **Please read this manual** before installing the G90 Series UPS models G90-1000, G90-2000, or G90-3000 as it provides important information that should be followed during installation and maintenance of the UPS and batteries, allowing you to correctly set up your system for the maximum safety and performance. Included is information on customer support and service, if it is required. If you experience a problem with the UPS, please refer to the Troubleshooting section in this manual to correct the problem. If the problem is not corrected, please collect information so that the Technical Support personnel can more effectively assist you.

Important Safety Instructions: (Save These Instructions)

CAUTION! (UPS having Internal Batteries): Risk of electrical shock – Hazardous live parts inside this unit are energized from the battery supply even when the input AC power is disconnected.

CAUTION! (No User serviceable Parts): Risk of electrical shock, do not remove cover. No user serviceable parts inside. Refer servicing to qualified service personnel.

CAUTION! (Non-isolated Battery supply): Risk of electric shock, battery circuit is not isolated from AC input, hazardous voltage may exist between battery terminals and ground. Test before touching.

WARNING! (Fuses): To reduce the risk of fire, replace only with the same type and size of fuse.

WARNING! Unit intended for installation in a controlled environment.

CAUTION! Do not dispose of batteries in a fire, the battery may explode.

CAUTION! Do not open or mutilate the battery, released electrolyte is harmful to the skin and eyes.

CAUTION! A battery can present a risk of electric shock and high short circuit current. The following precaution should be observed when working on batteries:

- Remove watches, rings or other metal objects.
- Use tools with insulated handles.

To reduce the risk of electric shock, disconnect the UPS from the main supply before installing a computer interface signal cable. Reconnect the power cord only after signaling interconnections have been made.

Servicing of batteries should be performed or supervised by personnel with knowledge of batteries and the required precautions. Keep unauthorized personnel away from batteries.

These UPS units are extremely heavy. Caution should be taken in moving and positioning equipment.

The instructions contained within this safety manual are deemed important and should be closely followed at all times during installation and follow-up maintenance of the UPS and batteries.

**CAUTION**

The unit has a dangerous amount of voltage. If the UPS indicator is on, the unit's outlets may have a dangerous amount of voltage even when not plugged into the wall outlet because the battery may continue to supply power.

Care should be taken to undertake installation indoors, free from electrically-conductive particles which are under temperature and humidity control, in order to reduce the risk of electric shock.

It is best to disconnect the device using the power supply cord. Ensure that the equipment is placed in a position near the outlet where easily accessible.

Except for replacing the batteries, all servicing on this equipment must be carried out by qualified service personnel.

Before conducting any maintenance, repair, or shipment, first ensure that everything is turned off completely and disconnected.

For additional safety instructions, please use the Safety Manual as a reference.

Special Symbols

The following symbols used on the UPS warn you of precautions:



RISK OF ELECTRIC SHOCK - Please observe the warning that a risk of electric shock is present



CAUTION: REFER TO OPERATOR'S MANUAL - Refer to the operator's manual for additional information, such as important operating and maintenance instructions.



SAFE GROUNDING TERMINAL - Indicates primary safe ground



LOAD ON/OFF – Pressing the button turns on/off the output receptacles and the indicator light.



RJ45 RECEPTACLE – The receptacle provides network interface connections and telephone or telecommunications equipment should not be plugged into it.



Please do not discard of the UPS or the UPS batteries as the UPS may have valve-regulated lead-acid batteries. Please recycle batteries appropriately.

Introduction

The information provided in this manual covers single phase 1000 – 3000 VA uninterruptible power system, their basic functions, operating procedures, options available and emergency situations. It also includes information on how to ship, store, handle, and install the equipment. Only detailed requirements of the UPS units are described herein, and installation must be carried out in accordance with this manual. Electrical installation must also carefully follow local legislation and regulations. Only qualified personnel should conduct these installations as failure to acknowledge electrical hazards could prove to be fatal.

Product Description

Many different kinds of sensitive electrical equipment can be protected by an Uninterruptible Power Supply (UPS) including computers, workstations, process control systems, telecommunications systems, sales terminals, other critical instrumentation, etc. The purpose of the UPS is to protect these systems from poor quality utility power, complete loss of power, or other associated problems.

Electrical interference exists in many forms, causing problems in AC power, from lightning, power company accidents and radio transmission motors, air conditioners, and vending machines. Protection of sensitive electrical equipment is vital to protect against power outages, low or high voltage conditions, slow voltage fluctuations, frequency variations, differential and common-mode noise, transients, etc.

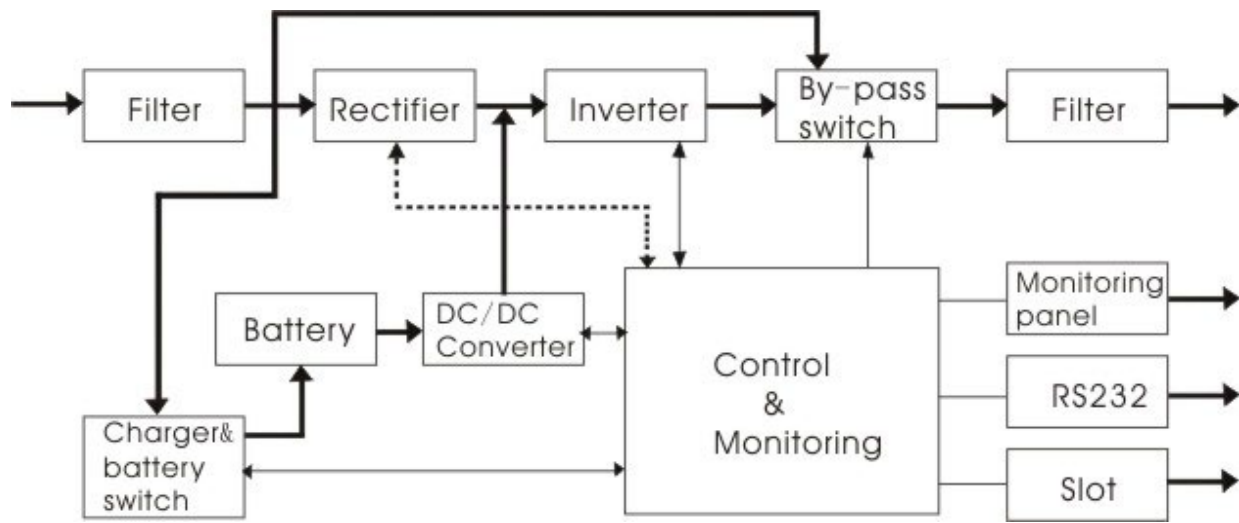
To prevent power line problems from reaching critical systems causing damage to software, hardware, and equipment malfunctions, the UPS maintains constant voltage, isolating critical load output and cleaning the utility AC power.

Double Conversion Online Technology

A double conversion on-line technology UPS provides completely isolated, clean, uninterrupted single-phase power to your critical systems, while maintaining the batteries for their maximum potential. In the event that the power failure lasts longer than the UPS backup time, the UPS will shut down avoiding battery damage. When the input AC voltage returns, the UPS will automatically return online to recharge the batteries.

As shown in block diagram:

- An input filter reduces transients on the incoming utility.
- To maintain full battery charge, the AC input power is rectified and regulated in the rectifier feeding power to the battery converter and inverter.
- DC power is converted to AC in the inverter, passing it on to the load.
- Power is maintained from the battery during a power failure.
- The converter increases voltage appropriately for the inverter.



Block Diagram

Diagnostic Tests

When the UPS is started, a diagnostic test is automatically executed, checking the electronics and batteries, reporting any problems on the LCD display.

System Configuration

The UPS device and the internal batteries make up the system. Depending on the site and load requirements of the installation, certain additional options are available for the solution.

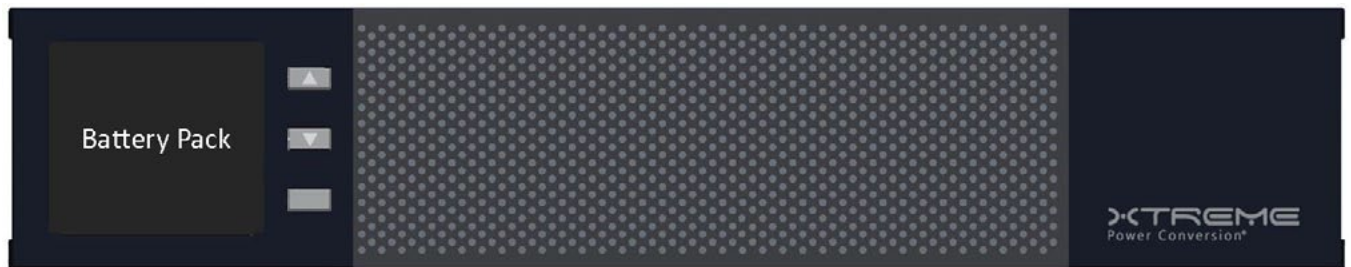
Planning a UPS system, the following should be taken into consideration:

- The total demand of the protected system shall dictate the output power rating (VA). Allow a margin for future expansion or calculation inaccuracies from measured power requirements.
- Backup time required will indicate the battery size needed. If the load is less than the UPS nominal power rating, then actual backup time is longer.
- The following options are available:
 - o Connectivity Options
 - ◆ SNMP/WEB card
 - ◆ Dry contact card
 - o Extended Battery Packs
 - ◆ G90-EBP1 for use with the G90-1000
 - ◆ G90-EBP2 for use with the G90-2000 and G90-3000

See the Specification section of this manual for additional model information.



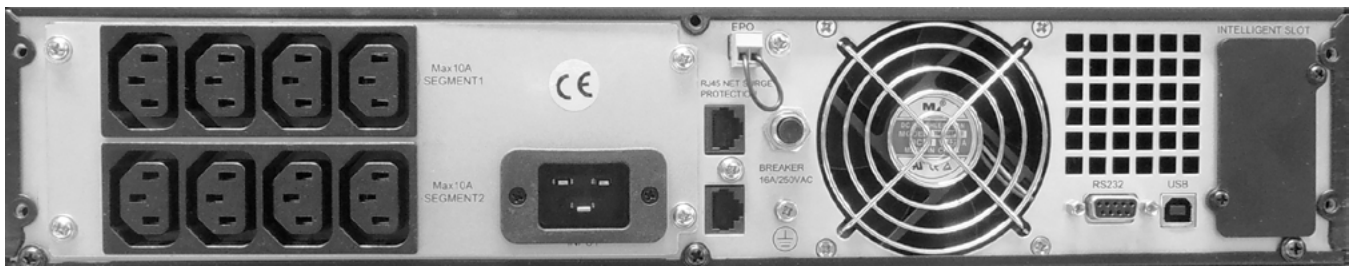
UPS FRONT VIEW



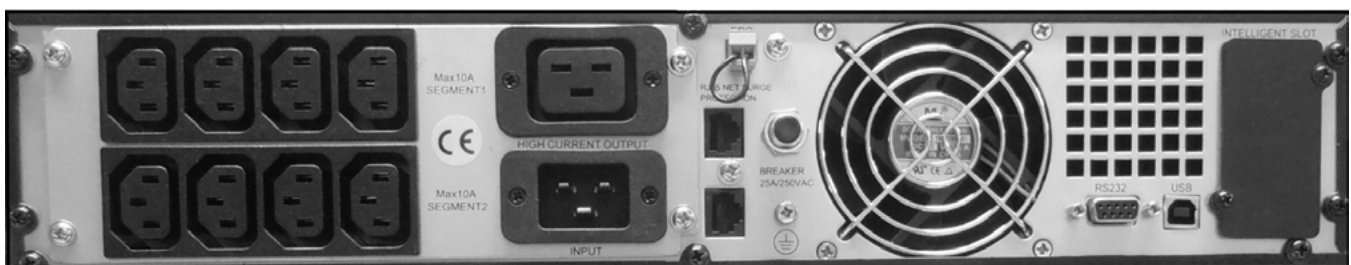
EBP FRONT VIEW



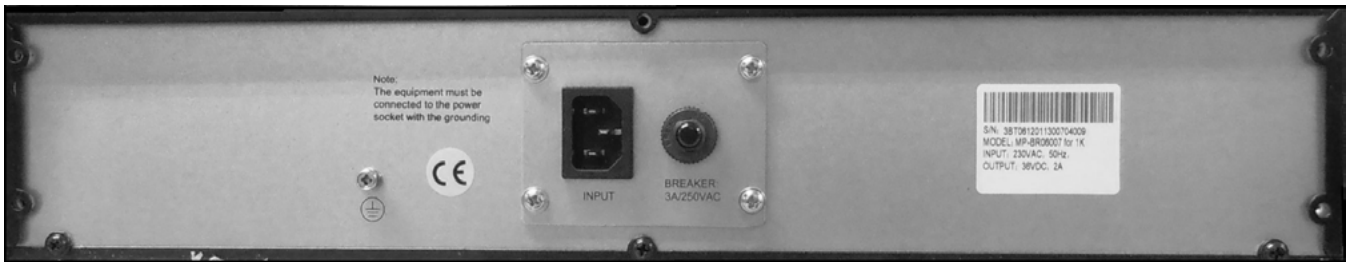
G90-1000 REAR VIEW DIAGRAM



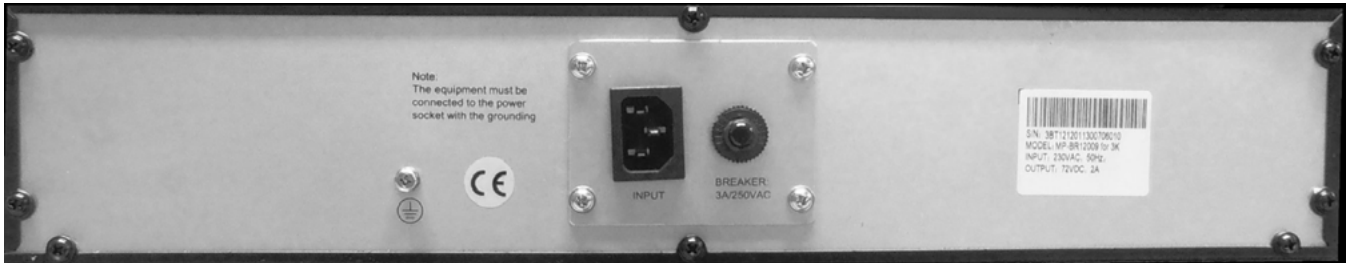
G90-2000 REAR VIEW DIAGRAM



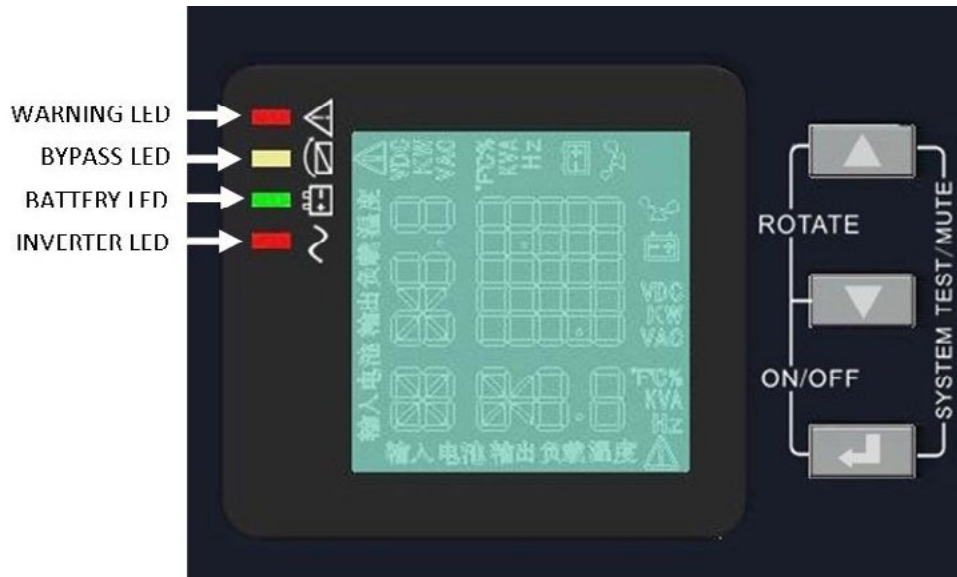
G90-3000 REAR VIEW DIAGRAM



G90-EBP1 BATTERY PACK REAR VIEW DIAGRAM



G90-EBP2 BATTERY PACK REAR VIEW DIAGRAM



FRONT PANEL

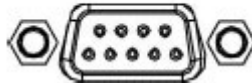
Communication Connections

To allow for unattended UPS shutdown/start-up and status monitoring, connect one end of the communication cable to the USB/RS232 port and the other to the communications port on your PC or server. With the monitoring software installed, the UPS can be scheduled for shutdown/start-up and monitoring of the UPS status through the PC or server.

USB port



RS-232 port



Intelligent slot



RS232 Communications

The RS-232 interface uses a 9-pin female D-sub connector. Information provided includes data about utility, load and the UPS. The interface port pins and their functions are identified in the following table:



PIN #	FUNCTIONS
1,4,6,7,8,9	Reserved
2	UPS transmit
3	UPS receive
5	Ground

SNMP Communications Option

The UPS provides an intelligent slot for internal or external network card. This special intelligent network card can be compatible with popular software and hardware found on the web and in operating systems. It can support operating systems such as HP Open View, IBM Netview, SUN Netmanager, etc. This enables the UPS to provide instant UPS and power information over the network. Please contact your reseller for additional details.

Emergency Power Off (EPO) Port

A customer supplied switch located remotely can be used to close the EPO connection and allows the UPS output receptacles to be switched off. Since the EPO shuts down the equipment immediately, orderly shutdown procedures are not followed by any power management software. The UPS will have to be manually restarted in order to regain power to the outlets on the UPS.

Keep Pin 1 and Pin 2 closed for UPS normal operation. To activate EPO function, cut the wire between Pin 1 and Pin 2.



Warning: The EPO circuit is an IEC 60950 safety extra low voltage (SELV) circuit. This circuit must be separated from any hazardous voltage circuits by reinforced insulation.



Caution: The EPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The EPO switch must have a minimum rating of 24VDC and 20mA, and be a dedicated latching-type switch, not tied to another circuit. The EPO signal must remain active for at least 250ms for proper operation. To ensure the UPS stops supplying power to the load during any mode of operation, the input power must be disconnected from the UPS when the emergency power off function is activated.

Note: For Europe, the emergency switch requirements are detailed in Harmonized document HD-384-48 S1, "Electrical Installation of the Buildings, Part 4: Protection for Safety Chapter 46: Isolation and Switching".

Hardware Installation Guide

Inspect the UPS upon receipt. The packaging is recyclable; keep it for reuse or dispose of properly.

Safety Information

Information presented here is vital to all personnel. Please read all Safety information.

Storage and Transportation

Please handle the UPS and associated equipment with extreme caution since a high amount of energy is contained in the batteries. Always keep the unit in an upright position as marked on the packaging, and never drop the unit.

Please adhere to the following instructions if the UPS is not installed immediately:

- Store the equipment as is in its original packing and shipping carton.
- Do not store in temperatures outside the range of -15°C to +25°C
- Ensure that the equipment is fully protected from wet or damp areas and from moist air.

In order to maintain the batteries, the UPS should be recharged every 6 months for at least 8 hours.

If flammable substances such as gases or fumes are present, or if the room is airtight, a hazardous situation may exist in which no electrical equipment should be operated.

The instructions in this manual explain how to install the UPS safely. Not acknowledging such electrical hazards may be fatal – keep this manual for future reference.



WARNING!

It is strongly recommended that the UPS cabinet not be opened as components have very high voltage and touching those components may be fatal. Only a qualified technician or authorized agent may service the unit.

The UPS unit's output receptacles carry live voltage even when not connected to an input voltage source. The UPS has its own internal energy source.

Environment

Ensure that all environmental concerns and requirements are met according to specifications listed in this document, otherwise the safety of installation personnel cannot be guaranteed, and the unit may malfunction.

Ensure that you remember the following when locating the UPS system and battery options:

- Avoid extremes of temperature and humidity. Maximum battery life can be attained with a recommended temperature range of +15°C to +25°C.
- Provide protection for the equipment from moisture.
- Space and ventilation requirements must be met. Ensure there is 100mm behind and 50mm on the sides of the UPS for proper ventilation.
- Ensure that the front of the UPS remains clear for user operation.

UPS Installation

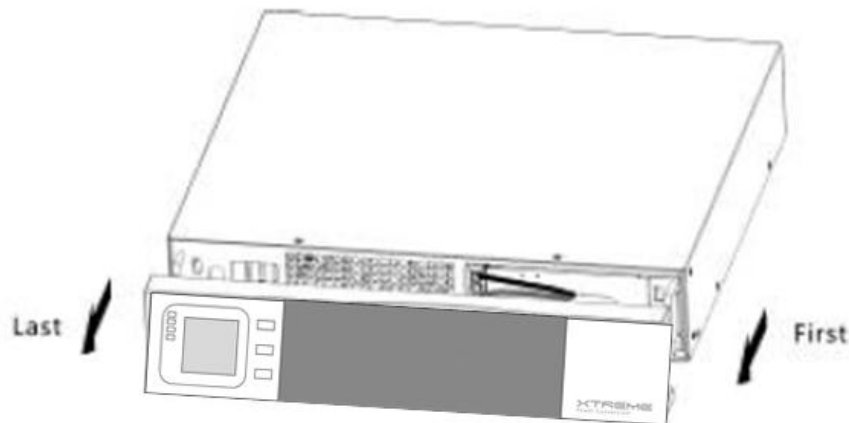
Installation and wiring must be performed in accordance with the local electrical laws and regulations, and performed by appropriate personnel.

For safety considerations, the UPS is shipped from the factory without connecting the battery wires. Before installing the UPS, please follow these steps for connection of the battery wires.

Connecting the UPS Internal Batteries

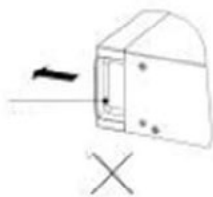
Step 1

Remove the front cover of the UPS by holding in the cover side with the LCD display, then un-snap the other side of the front panel from the UPS. The front panel should now easily be removed from the LCD side.

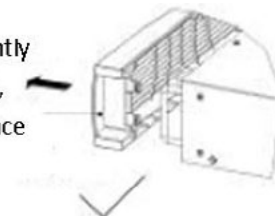


Note: A ribbon cable connects the LCD to the cover of the UPS. Do not pull on the cable or disconnect it.

Do not try to remove the front panel by pulling on the metal handle—the metal handle is connected to the UPS frame



Remove the front panel by gently pulling on the front panel only, leaving the metal handle in place

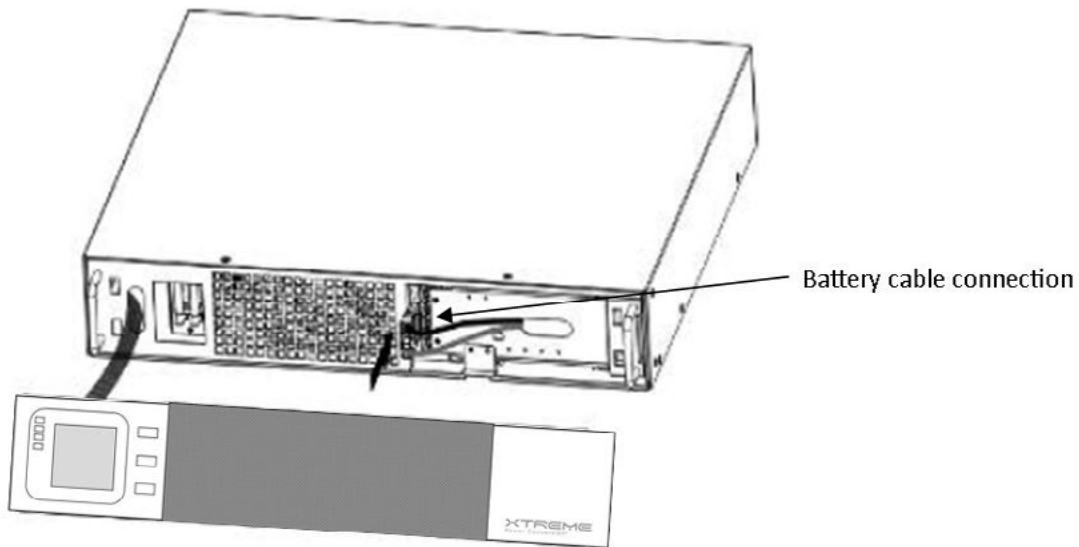


Step 2

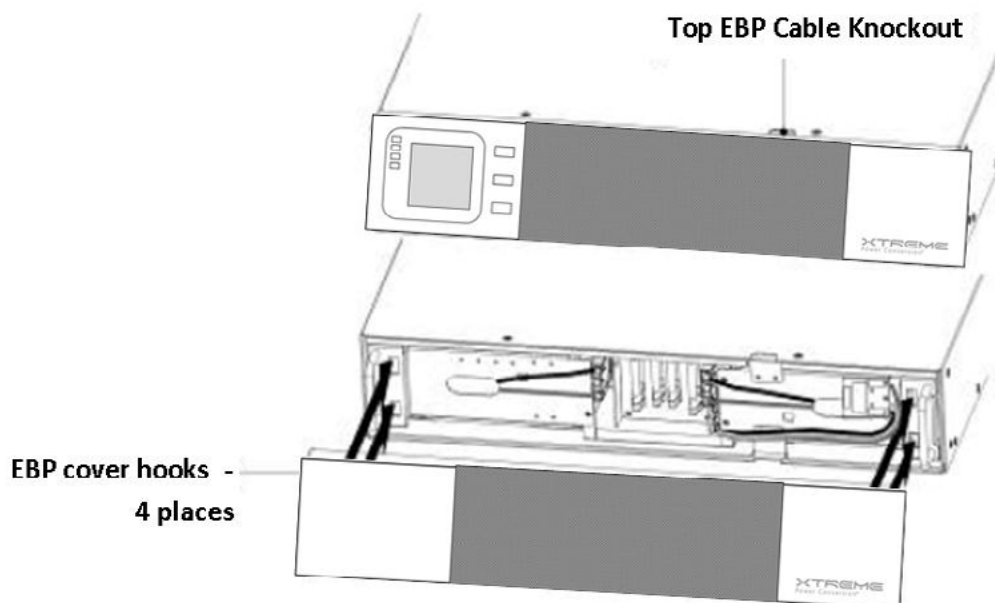
Caution: A small amount of arcing may occur when connecting the internal batteries. This is normal and will not harm personnel. Connect the cables quickly and firmly.

Connect the internal battery connector - connect red to red, pressing the connector tightly together to ensure proper connectivity.

If installing an Extended Battery Pack (EBP) see the section titled **Connecting EPBs** before continuing with the UPS installation

**Step 3**

Replace the UPS front cover, verifying that the ribbon cable is protected, and if EPBs are installed, that the EBP cable is routed through the knockout on the bottom of the cover.



Attach the UPS front cover by reversing the process in Step 1 – installing the LCD side first and then gently snapping the other side into the ports on the UPS.

Step 4

If you are installing power management software, connect your computer to one of the communication ports or optional connectivity card, using appropriate cable.

Step 5

If your rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not supplied) to the ground bonding screw on the rear of the UPS as shown in the example below.



Step 6

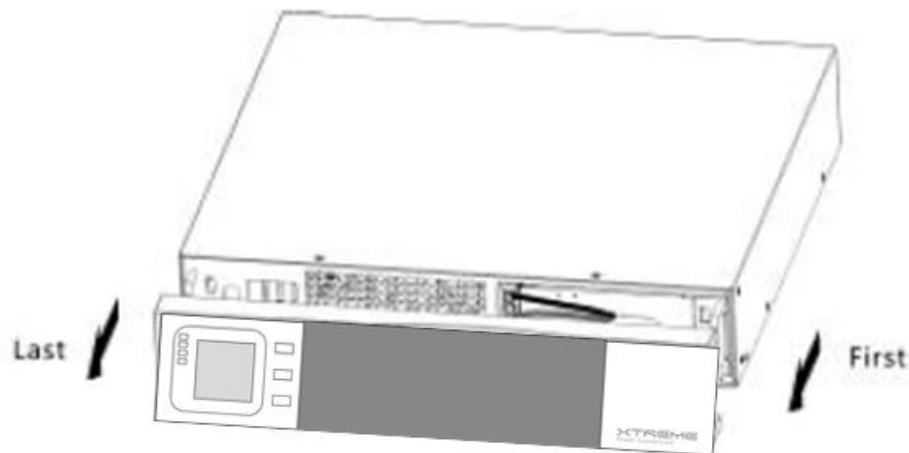
If an emergency power off (disconnect) switch is required by local codes, see “Remote Emergency Power off (REPO)” section to install the REPO switch before powering on the UPS.

Continue to “UPS Internal Startup”.

Connecting Extended Battery Packs (EBPs)

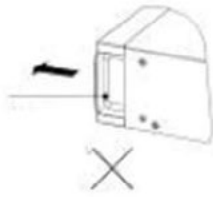
Step 1

Remove the front cover of the UPS and each EBP by holding in the cover side with the LCD display, then un-snap the other side of the front panel from the UPS. The front panel should now easily be removed from the LCD side.

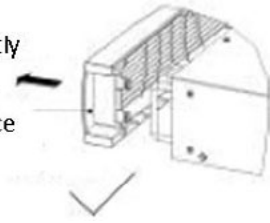


Note: a ribbon cable connects the LCD to the cover of the UPS. Do not pull on the cable or disconnect it.

Do not try to remove the front panel by pulling on the metal handle—the metal handle is connected to the UPS frame

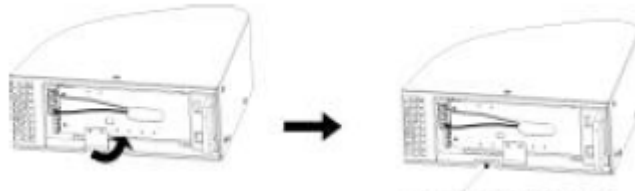


Remove the front panel by gently pulling on the front panel only, leaving the metal handle in place

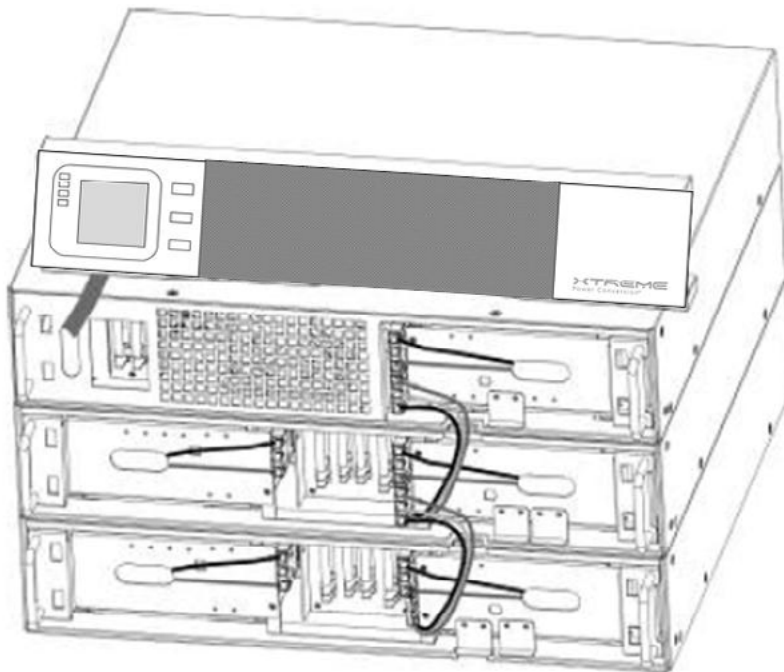


Step 2

On the bottom of the UPS front cover, remove the EBP Cable Knockout as shown in the diagram below.



For the bottom EBP, remove the EBP Cable Knockout on the top of the EBP front cover. If you are installing more than one EBP, for each additional EBP, remove the EBP Cable Knockout on the top and bottom of the EBP front cover.



Step 3

Caution: A small amount of arcing may occur when connecting the internal batteries. This is normal and will not harm personnel. Connect the cables quickly and firmly.

Connect the EBP cables into the battery connector(s) - connecting **black to black** – press the connectors tightly together to ensure proper connection.

To connect the second EBP, unclip the EBP connector on the first EBP and pull gently to extend the wiring to the EBP connector on the second EBP. Repeat for any additional EBPs.

Verify that the EBP connections are tight and there are adequate bend radiuses and strain relief exists for each cable.

Step 4

Replace the front covers on the UPS and EBPs, verifying the EBP cables are routed through the EBP cover knock-outs. Clip the left side of each EBP in place first before connecting the right side. Repeat for each EBP. This is the same installation procedure as used for the UPS earlier.

Assure that the wires connected between the UPS and EBP are installed behind the front covers and not accessible to the user.

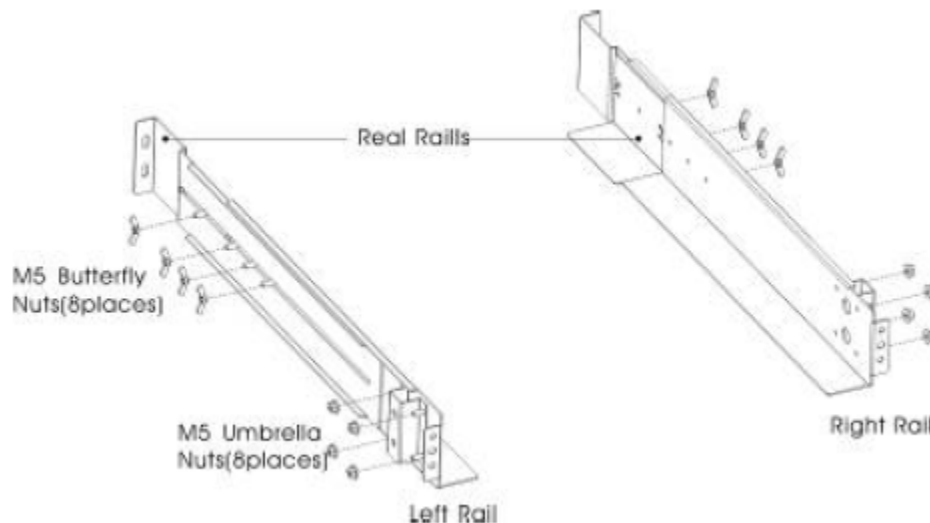
Rack-mount Installation

Caution: The UPS and EBPs are heavy. Removing the units from its carton requires a minimum of two people. If installing optional EBPs, make sure to install the EBPs directly below the UPS so that all wiring between the cabinets is installed behind the front covers and inaccessible to users.

Note: Rail Kits are required for each individual UPS and EBP to be installed.

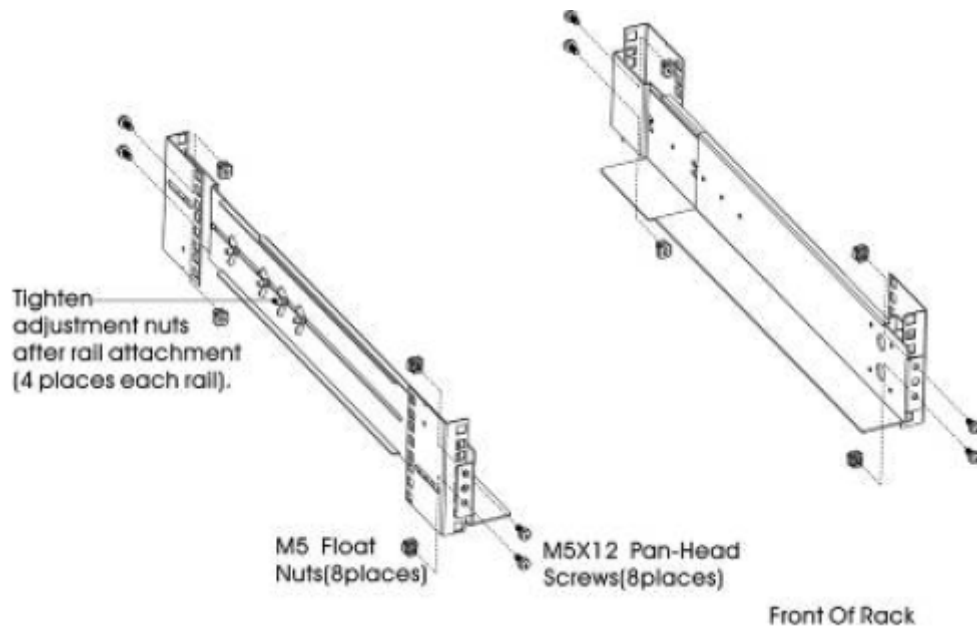
Step 1

Assemble the left and right rails to the rear rails as shown in the diagram below. Do not tighten the screws yet. Adjust each rail size for the depth of the rack.



Step 2

Select the proper size in the rack for positioning the UPS. The rail occupies four positions on the front and rear of the rack.



Tighten four M5 Umbrella Nuts in the side of rail assembly

Fix one rail assembly to the front of the rack with one M5 x 12 pan-head screw and one M5 cage nut. Use two M5 cage nuts and two M5 x 12 pan-head screws to fix the rail assembly to the rear of the rack.

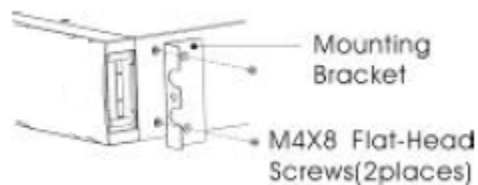
Tighten all screws and nuts.

Repeat steps for the other rail assemblies.

Step 3

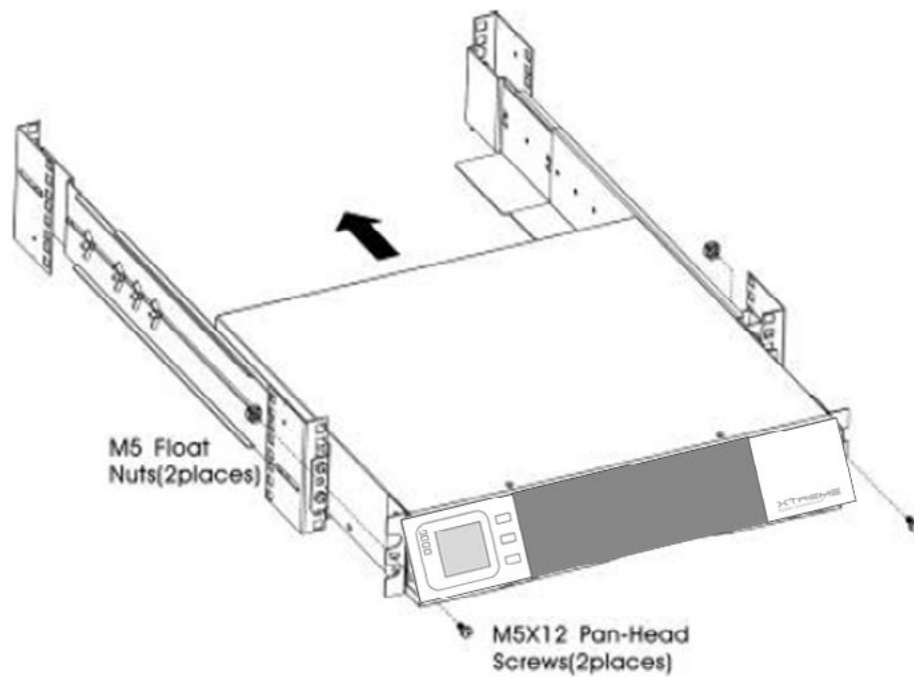
Place the UPS or EBP on a flat, stable surface with the front of the UPS or EBP facing you.

Align the mounting brackets with the screw holes on each side of the UPS or EBP and fix with supplied M4 x 8 flat-head screws.



Slide the UPS or EBP into the rack.

Secure the front of the UPS to the rack using one M5 x 12 pan-head screw and one M5 cage nut on each side. Install the bottom screw on each side through the bottom holes of the mounting bracket and the bottom hole of the rail.

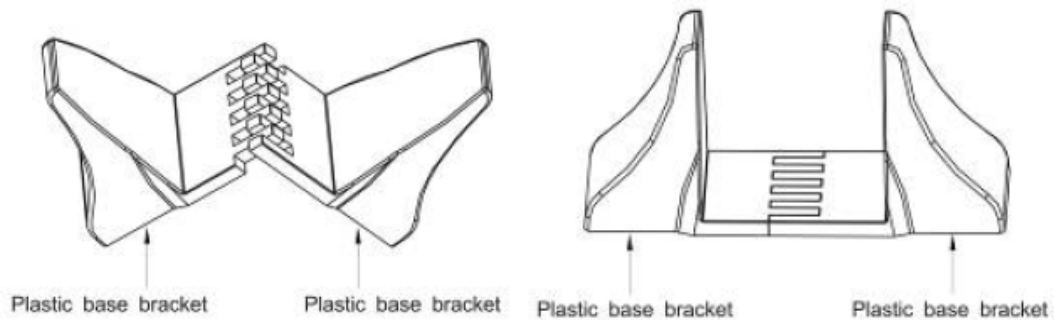


Repeat for all additional UPS or EBP for the installation.

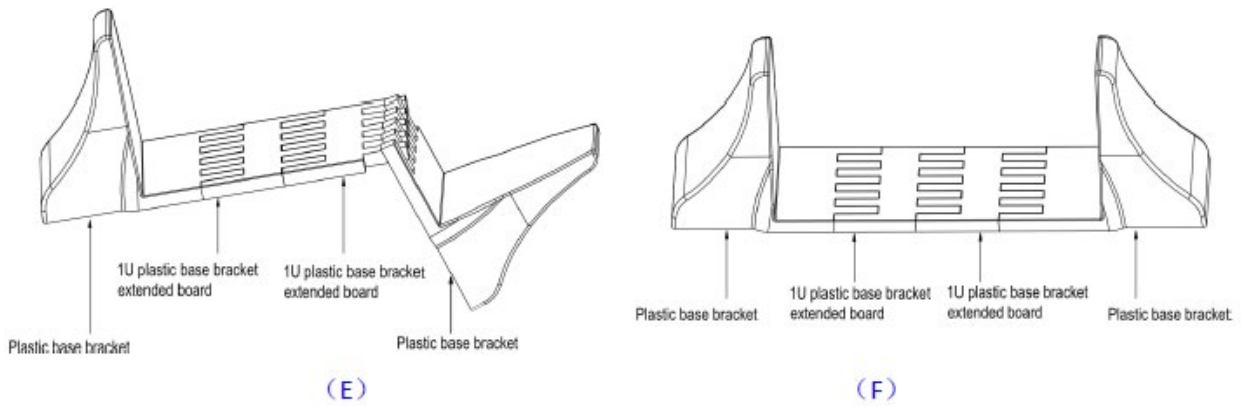
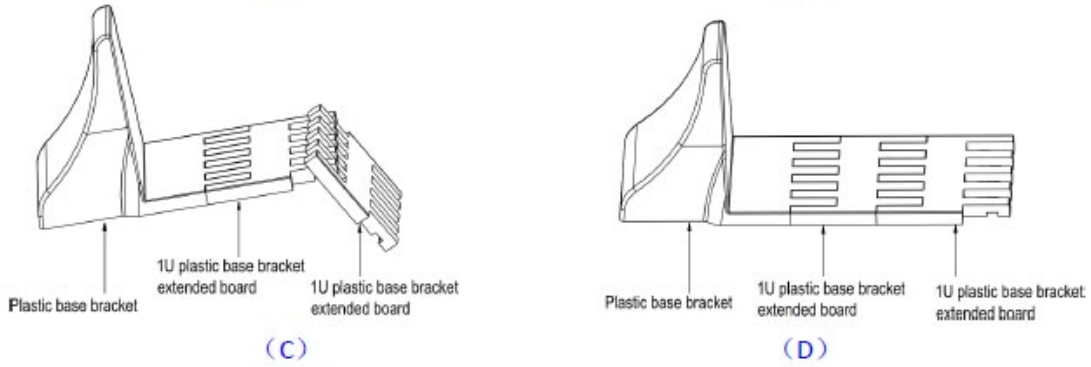
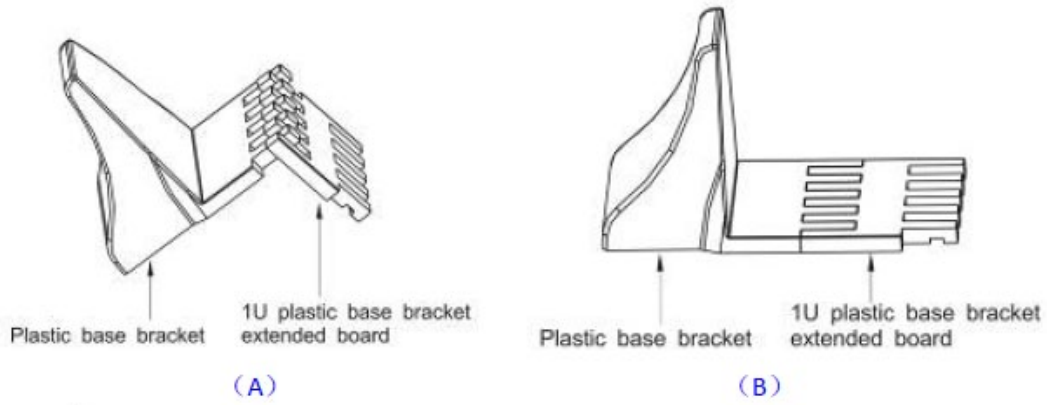
Tower Installation

Step 1

Two plastic base brackets intercross and flatten to make a single unit tower bracket.

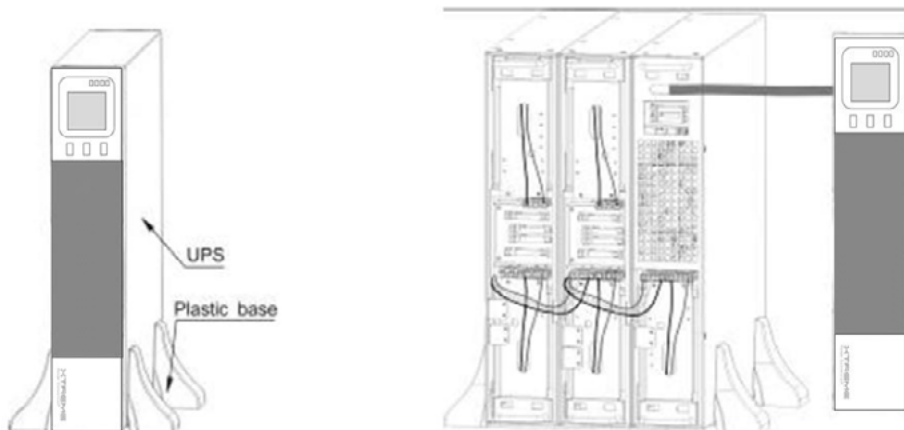


If an EBP is to be placed in the tower configuration with the UPS, extension boards are added in the middle to make the tower bracket larger as shown below.



Step 2

Install the UPS and associated EBPs into the tower brackets as shown below.



UPS Input Connection

Connect the UPS to an approved electrical input source consistent with the input power cord connection provided with the UPS. Do not replace the power cord or use a substitute. Avoid using extension cords when connecting AC input to any UPS.

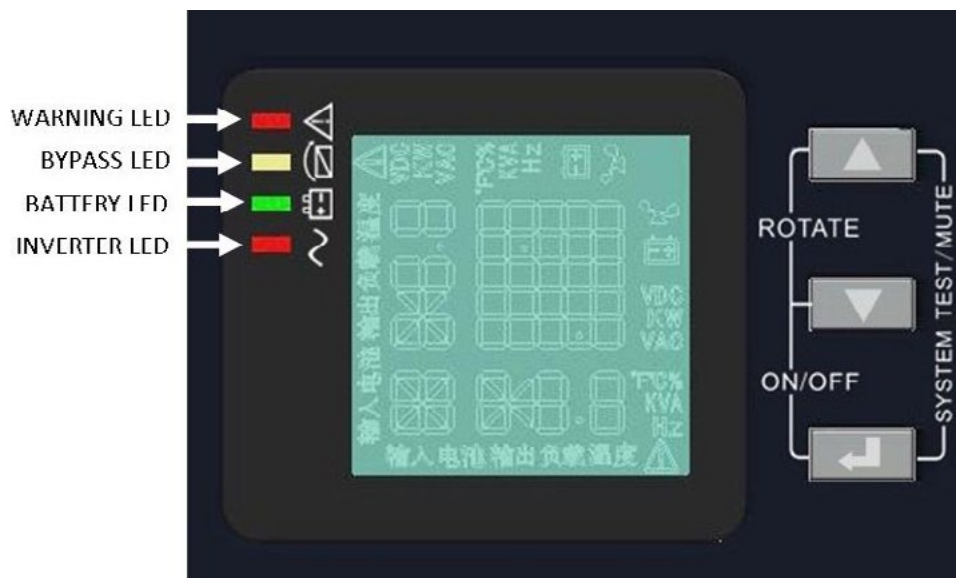
UPS Output Connection


There are two types of output on the G90 models - programmable outlets and general outlets. Please connect non-critical devices to the programmable outlets and critical devices to the general outlets. During power failure, you may extend the backup time to critical devices by setting shorter backup time for non-critical devices. Programmable outlets can also be used to re-cycle the power to remote devices if required to re-start a server due to lock-up issues.


Starting the UPS

Note: Verify that the total equipment ratings do not exceed the UPS capacity to prevent an overload alarm.

1. If optional EBPs are installed, verify that the EBPs are connected to the UPS.
2. Plug the equipment to be protected into the UPS, but do not turn on the protected equipment.
3. Make any necessary provisions for cord retention and strain relief.
4. Plug the detachable UPS power cord into the input connector on the UPS rear cover.
5. Plug the UPS power cord into a power outlet. The UPS front cover display illuminates.
6. The UPS will do a self-test when power on. After the self-test is completed, the charger will charge the batteries. If the output display on the LCD is "0" there is no output. If you need the UPS output from the utility without starting the UPS when plugged into the utility, then the bPS option needs to be set to "ON" - see instructions for the bPS in this manual.
7. Press the combination of start buttons on the UPS front cover for at least ½ second. The UPS will start and the LEDs will turn on and off sequentially.



8. Check the UPS front panel display for active alarms or notices. Resolve any active alarms before continuing. See "Troubleshooting" section in this manual for additional information on resolving alarm conditions. If the  LED is illuminated, do not proceed until all alarms are clear. Check the UPS status from the front panel to view active alarms. Correct the alarms and reset if necessary.

9. Verify that the  LED is illuminated solid, indicating that the UPS is operating normally and any loads are powered.
10. If optional EBPs are installed, see “Configuring Battery Settings” section in this manual to set the number of installed EBPs.
11. To change any other factory-set defaults, see “User Settings” section in this manual.

Note: At initial startup, the UPS sets system frequency according to the input line frequency (input frequency auto-sensing is enabled by default).

Note: At initial startup, please set the output voltage needed before startup of the UPS. After the subsequent startup, the UPS will output the setting voltage.

12. If you installed an optional EPO, test the EPO function: Activate the external EPO switch. Verify the status change on the UPS front panel display. Deactivate the external EPO switch and restart the UPS.

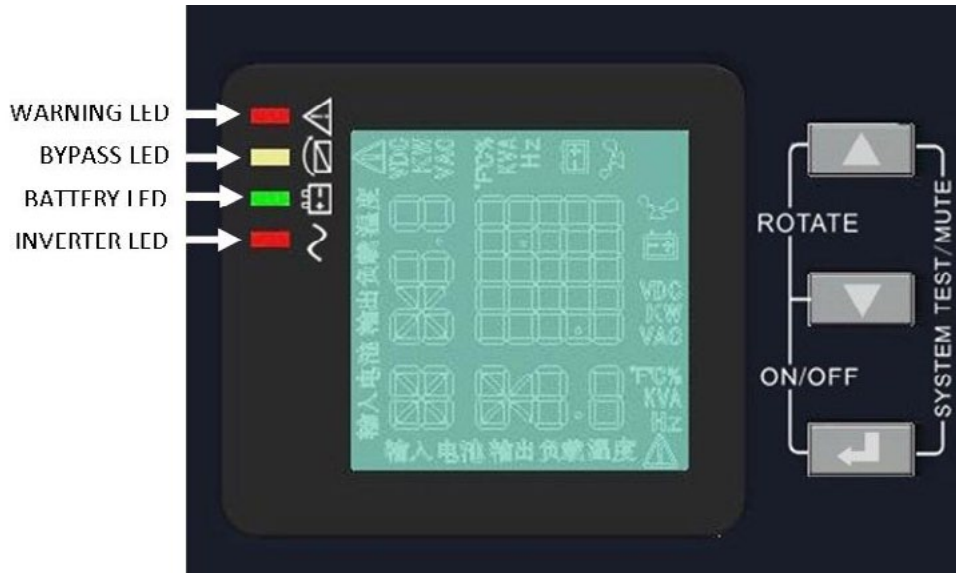
Note: The internal batteries charge to 80% capacity in less than 5 hours. However, it is recommended that the batteries should be charged for 48 hours after installation or long-term storage. If optional EBPs are installed, see the recharge times listed in this manual.

Operations

This section contains information on how to use the UPS, including the front panel operation, operating modes, UPS startup and shutdown, transferring the UPS between modes, and configuring bypass settings, load segments, and battery settings.

Front Panel Control Functions










The UPS has a three-button segmental LCD with backlighting. It provides useful information about the UPS, load status, measurements, and settings.



Indicator Descriptions

Indicator	Description
 Red	ON The UPS has an active alarm
 Yellow	ON The UPS is in Bypass Mode The UPS is operating normally on bypass during High Efficiency operation
 Yellow	ON The UPS is in Battery Mode
 Green	ON The UPS is operating normally
<p>Note: When power on or during startup, these indicators will turn on and off sequentially. Note: In different operation modes these indicators will indicate differently. See Operating Modes Table for additional information.</p>	

Button Descriptions

Button	Description
Startup combination  + 	Press and hold these buttons for more than ½ second to turn on the UPS or to turn off the UPS
Rotating combination  + 	Press and hold these buttons for more than 2 seconds to rotate the LCD for rack or tower configuration
Battery test/mute combination  + 	Press and hold these buttons for more than 1 second in Line Mode or ECO Mode: UPS runs self-test function Press and hold these buttons for more than 1 second in Battery Mode: UPS runs mute function
Scroll  OR 	Non-function Setting Mode: Press and hold this button for more than ½ second (less than 2 seconds): indicates the items of the LCD item section in order Press and hold this button for more than 2 seconds: orderly displays a looping sequential view of the items every 2 seconds, when press and hold the button for some time again, display will turn to output status Function Setting Mode: Press and hold the button for more than 1 second (less than 2 seconds): affirm the Set Option, Press and hold the button for more than 2 seconds to exit from this function setting interface
Setting entry 	Non-function Setting Mode: Press and hold the key for more than 2 seconds: Function setting interface Function Setting Mode: Press and hold this button for more than ½ second (less than 2 seconds): Affirms the set option, Press and hold the button for more than 2 seconds, exit from the function setting interface

Working Status of Indicators





No.	Working Status	Indication				Warning	Remarks
		Nor	Bat	Bps	Fau		
1	Line Mode						
	Normal voltage	●				None	
	High/low voltage protection, turn to battery mode	●	●		★	Once every 4 seconds	
2	Battery Mode						
	Normal voltage	●	●		★	Once every 4 seconds	
	Battery voltage abnormal warning	●	★		★	Once per second	
3	Bypass Mode						
	Main AC normal voltage in Bypass Mode			●	★	Once every 2 minutes	Eliminate after start the UPS

	Main AC high voltage warning in Bypass Mode				★	Once every 4 seconds	
	Main AC low voltage warning in Bypass Mode				★	Once every 4 seconds	
4	Battery disconnect warning						
	Bypass Mode			●	★	Once every 4 seconds	Check to determine if the battery switch is closed
	Inverting Mode	●			★	Once every 4 seconds	Check to determine if the battery switch is closed
	Power up or start					6 times	Check to determine if battery is connected properly
5	Output overload protection						
	Overload warning in Line Mode	●			★	2 per second	Remove uncritical loads
	Overload in Line Mode protection			●	●	Long beeps	Remove uncritical loads
	Overload warning in Battery Mode	●	●		★	2 per second	Remove uncritical loads
	Overload in Battery Mode protection	●	●		●	Long beeps	Remove uncritical loads
6	Overload warning in Bypass Mode			●	★	Once every 2 seconds	Remove uncritical loads
7	Fan fault (fan icon flashing)	▲	▲	▲	★	Once every 2 seconds	Check if the fan is blocked by an object
8	Fault Mode				●	Long beeps	If display fault code and icon lights, contact dealer, distributor or manufacturer for additional support




● = indicator lights for a long time; ★ = indicator flashes; ▲ = status of indicator depends on other conditions




Display Functions



As the default or after 5 minutes of inactivity, the LCD displays the output parameters. The backlit LCD automatically dims after 5 minutes of inactivity. Press any button to restore the screen. LCD display comprises numerical value section, capacity graphics section, fan-status graphics section, and charger-status graphics section. See the table below for details.

Section	Description	Graphic
Numerical value section	Display the corresponding numerical value of inquiring items (output, load, temperature, input, battery), for example, the graphic shows the output voltage is 230V, the output frequency is 50Hz	
Capacity graphics section	Display the capacity of the battery and load. Every pane represents 20% capacity. As the graphic shows, the capacity of the battery is 80-100% (5 panes), the load reaches 40-60% (3 panes). When the UPS is overloaded, the icon will flash, when the battery is weak or disconnected, the icon will also flash.	
Fan-status graphics section	Display if the fan works normally. When the fan works normally, it will show the dynamic fan blades rotating; when the fan works abnormally, the icon will keep flashing with the warning.	
Charger-status graphics section	Displays the status of the charger. When charger works normally, the corresponding icon will vary dynamically and orderly, when the charger works abnormally, the icon will keep flashing. When the UPS is in Battery Mode, the number of icons of the charger-state section will vary according to the chargeable capacity of the battery.	

Parameters Inquiring










Press and hold the scroll button  or  for more than ½ second (less than 2 seconds) to inquire about items. The inquired items include input, battery, output, load, temperature. Press and hold the scroll button  for more than 2 seconds, LCD begins to display the items circularly and orderly which transfer to another every 2 seconds. Press and hold the button for some time again to return to output status.











Item	Description	Graphic
Output	Display the output voltage and output frequency of the UPS. As shown in the graphic, the output voltage is 230V and the output frequency is 50Hz	
Load	Display the numerical value of the active power (WATT) and apparent power (VA) of the load. As shown in the graphic, the WATT of the load is 100W, the VA is 100VA (when the load is disconnected it is normal for a small numerical value to show).	
Temperature	Display the temperature of the inverter in the UPS. As shown in the graphic, the temperature of the inverter is 37°C.	
Input	Display the voltage and frequency of the input. As shown in the graphic, the input voltage is 210V, the input frequency is 49.8Hz.	

















<p>Battery</p>	<p>Display the voltage and capacity of the battery. As shown in the graphic, the battery voltage is 38V, the capacity of the battery is 100% (the capacity of the battery is an estimate based upon the battery voltage).</p>	 <p>The LCD display shows a battery icon at the top left, a battery level indicator with 10 bars, and a battery symbol with a plus sign at the top right. The main display area shows '38.0 VDC' and '100%' below it. A battery icon is also shown at the bottom left of the display area.</p>
<p>Battery remaining time</p>	<p>Display the battery remaining time when under battery mode. The number is from 0 to 999 minutes. As shown in the graphic, there are 686 minutes of battery time remaining.</p>	 <p>The LCD display shows a battery icon at the top left, a battery level indicator with 10 bars, and a battery symbol with a plus sign at the top right. The main display area shows '686' and 'm' below it. A battery icon is also shown at the bottom left of the display area.</p>
















User Settings

The UPS has setting functions. The user settings can be done under any of the UPS working modes. The setting will take effect under certain conditions. The table below describes the User Settings.

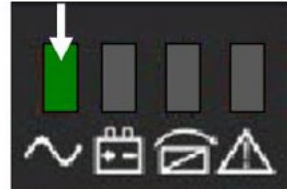



Setting Function (serial number)	Setting Procedure	Graphic
1 - ECO function setting	<ol style="list-style-type: none"> 1. Enter the setting interface. Press and hold the Function Setting button  for more than 2 seconds, the letters "ECO" flash. 2. Enter the ECO setting interface. Press and hold the Function Setting button  for more than ½ second (less than 2 seconds), the letters "ECO" will stop flashing. The "ON" (or OFF) below the ECO will flash. Press and hold the scroll button  for more than ½ second (less than 2 seconds) to determine whether the ECO function is enabled or disabled. 3. Confirm the ECO selecting interface. After selecting ON or OFF, press and hold the function setting button  for more than ½ second (less than 2 seconds). Now the ECO setting function is completed and the "ON" or "OFF" below the "ECO" will light without flashing. 4. If "OFF" is chosen go to step 7, otherwise go to step 5. 5. Set the ECO tolerance range. Briefly press the scroll button  or  for more than ½ second (less than 2 seconds) to select the voltage range in percentage +5%,+10%,+15%,+25%(default), then briefly press the function setting button  for more than ½ second (less than 2 seconds) to confirm selection. 6. Then set the minus range in a similar manner. 7. After the minus range is confirmed, press the function setting button  for more than 2 seconds to exit setting menu. 	

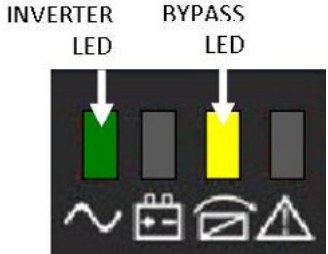


<p>2 - Bypass function setting</p>	<ol style="list-style-type: none"> 1. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "bPS" flashing. 2. Enter the BPS setting interface. Press and hold the function setting button  for more than ½ second (less than 2 seconds). At this time the "bPS" will stop flashing. The "ON" (or OFF) below the bPS will flash. Press and hold the scroll key  for more than ½ second (less than 2 seconds) to determine whether the BPS function is enabled or disabled. 3. Confirm the BPS selecting interface. After selecting ON or OFF, press and hold the function setting button  for more than ½ second (less than 2 seconds). Now the BPS setting function is completed and the "ON" of "OFF" below the "bPS" will light without flashing. 4. If "OFF" is chosen go to step 7, otherwise go to step 5. 5. Set the BPS tolerance range. Briefly press the scroll button  or  for more than ½ second (less than 2 seconds) to select the voltage range in percentage +5%,+10%,+15%,+25%(default), then briefly press the function setting button  for more than ½ second (less than 2 seconds) to confirm selection. 6. Then set the minus range in a similar manner. 7. After the minus range is confirmed, press the function setting button  for more than 2 seconds to exit setting menu. 	 <p>The image shows a square LCD display with a black background and white text. On the left side, there are four small icons: a triangle, a square, a circle, and a sine wave. The main display area shows the text 'bPS' on the top line, 'ON' on the second line, and '2 +15' on the third line. The 'ON' text is flashing.</p>
------------------------------------	---	--

<p>3 - Output voltage setting</p>	<ol style="list-style-type: none"> 1. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "OPU" flashing. 2. Enter the BPS setting interface. Press and hold the function setting button  for more than ½ second (less than 2 seconds). At this time the "OPU" will stop flashing. Briefly press the scroll button  or  for more than ½ second (less than 2 seconds) to select the output voltage as 208V, 220V (default), 230V, 240V, then briefly press the function setting button  for more than ½ second (less than 2 seconds) to confirm selection. 3. Press the function setting button  for more than 2 seconds to exit setting menu. 	 <p>The LCD display shows the text "OPU" on the top line and "3 230V" on the bottom line. On the left side of the display, there are four icons: a battery level indicator, a warning triangle, a square with a diagonal line, and a sine wave.</p>
<p>4 - Battery string number and type setting</p>	<ol style="list-style-type: none"> 1. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "bAt" flashing. 2. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "bAt" flashing. Press and hold the scroll button  to select the numerical value in accordance with connected battery strings. 3. Confirm the battery string settings by press and hold the function setting button  for more than ½ second (less than 2 seconds). Now the battery strings setting is confirmed and the battery type value below will flash 4. Set the battery type in the same way. 5. Press the function setting button  for more than 2 seconds to exit setting menu. 	 <p>The LCD display shows the text "bAt" on the top line, "3" on the middle line, and "4 7Ah" on the bottom line. On the left side of the display, there are four icons: a battery level indicator, a warning triangle, a square with a diagonal line, and a sine wave.</p>

5 - Load segment setting	<ol style="list-style-type: none"> 1. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "Seg 1" flashing. 2. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "Seg 1" flashing. Press and hold the scroll button  to select the battery voltage of 10.5V (default), 11.0V, or 11.5V. 3. Confirm the power shedding shielding battery voltage settings by press and hold the function setting button  for more than ½ second (less than 2 seconds). Now the load shielding battery voltage setting is confirmed. 4. Press the function setting button  for more than 2 seconds to exit setting menu. 	
6 - EPO Input Polarity setting	<ol style="list-style-type: none"> 1. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "EPO" flashing. 2. Enter the setting interface. Press and hold the function setting button  for more than 2 seconds stepping through using the scroll button  until reaching the "EPO" flashing. Select the EPO input polarity, "+P" (open circuit execute EPO function) or "-P" (short circuit execute EPO). 3. Confirm the EPO input polarity settings by press and hold the function setting button  for more than ½ second (less than 2 seconds). Now EPO input polarity setting is confirmed. 4. Press the function setting button  for more than 2 seconds to exit setting menu. 	

Operating Mode Description

Mode	Description	Indicator
Line Mode	<p>The Inverter green LED is on.</p> <p>When input AC utility is providing stable input power, the UPS will work in Line Mode, charging the battery and protecting the load.</p>	<p>INVERTER LED</p> 
Battery Mode	<p>Both the Inverter green LED and Battery yellow LED are on, the buzzer beeps once every 4 seconds. The Warning red LED is on when beeping.</p> <p>When the utility power is down or unstable, the UPS will go to Battery Mode immediately. If the utility power returns, the UPS will transfer back to Line Mode.</p> <p>If the Battery low alarm activates, the indicator of  flashes. If the Battery voltage reaches the low limit, the UPS will turn off to protect the Battery. The UPS will auto-restart when the input utility power returns.</p> <p>Note: The backup time of Battery Mode is subject to the load connected and the EBPs installed. Battery remaining time displayed on the LCD may not be completely accurate.</p>	<p>INVERTER LED BATTERY LED WARNING LED</p> 
Bypass Mode	<p>Bypass yellow LED is on, the buzzer beeps once every 2 minutes. The warning red LED is on when beeping, the LCD displays the load and battery capacity.</p> <p>Bypass tolerance can be set by the LCD.</p> <p>Under the conditions listed below, the UPS will transfer to Bypass Mode:</p> <ul style="list-style-type: none"> • BPS "ON" set by user through LCD and the UPS is turned "OFF" • BPS "ON" set by user through LCD and the UPS is plugged into utility but is not turned "ON" • Overload on Line Mode or ECO Mode <p>Note: When in Bypass Mode the load is not protected.</p>	<p>BYPASS LED WARNING LED</p> 

ECO Mode	<p>Both the Inverter green LED and the Bypass yellow LED are on.</p> <p>When ECO is enabled and the utility is within range, the UPS will operate in ECO Mode. If the utility is out of ECO range but still in Line Mode range, the UPS will transfer to Line Mode.</p> <p>Utility tolerance of ECO Mode can be set.</p>	
Fault Mode	<p>When the UPS has a fault condition, the Warning red LED is on and the buzzer beeps. The UPS will turn to Fault Mode. The UPS disconnects the output and the LCD displays fault codes. Press the Mute Button to silent the buzzer temporarily. Press the OFF Button to shut down the UPS .</p> <p>Note: Information on Fault Codes can be found in the Fault Code table in this manual.</p>	
Standby Mode	<p>When the UPS is plugged into utility power and is not turned on, the UPS will work in Standby Mode to charge the battery. No LED indicator displays are on in this mode.</p>	

Startup Operation

Startup UPS in Line Mode

1. Once the utility power is connected to the UPS, the UPS will charge the battery. The LCD shows that the output voltage is 0, which means the UPS has no output. If it is desired to have Bypass output, set the BPS to "ON" by LCD setting menu.
2. Press and hold the ON Button for more than ½ second to start the UPS. The UPS will start the inverter.
3. Once started, the UPS will perform a self-test function with the LEDs cycling on and off. When the self-test is complete, the UPS will appear in Line Mode with the corresponding LED illuminated.

Startup UPS in Battery Mode

1. When utility input power is not available, press and hold the ON Button for more than ½ second to start the UPS in Battery Mode.
2. After finishing the self-test, the UPS will operate in Battery Mode as long as power is available from the batteries.

Shutdown Operation

Shutdown UPS in Line Mode

1. Press and hold the OFF Button for more than ½ second to turn off the UPS and Inverter.
2. After the UPS has shutdown, the LEDs go out and there is no output power. If output power is needed set BPS "ON" on the LCD setting menu.

Shutdown UPS in Battery Mode

Press and hold the OFF Button for more than ½ second to turn off the UPS.

When turning off the UPS, it will perform a self-test first, with the LEDs cycling on and off, exiting automatically when the test is finished.

UPS Self-Test/Mute Test Operation

When the UPS is in Line Mode, press and hold the Self-test/Mute Button for more than 1 second, the LEDs will cycle on and off. The UPS comes to Self-test Mode and tests its status. It will exit automatically after finishing testing, and the LED indication will return to previous status.

When the UPS is in Battery Mode, press and hold the Self-test/Mute Button for more than 1 second, the buzzer stops beeping. If you press and hold the Self-test/Mute Button for 1 more second, it will restart the audible alarm.

Configuring Battery Settings

Set the UPS for the number of EBPs installed.

To ensure maximum battery runtime, configure the UPS for the correct number of EBPs per the table below. Use the up and down scroll buttons to select the number of battery strings according to your UPS configuration.

UPS & EBP Units	Number of Battery Strings
UPS only (internal batteries)	1 (default)
UPS + 1 EBP	3
UPS + 2 EBP	5
UPS + 3 EBP	7
UPS + 4 EBP	9
Note: The UPS contains 1 battery string; each EBP contains 2 battery strings.	

Using UPS with Generator

Caution:

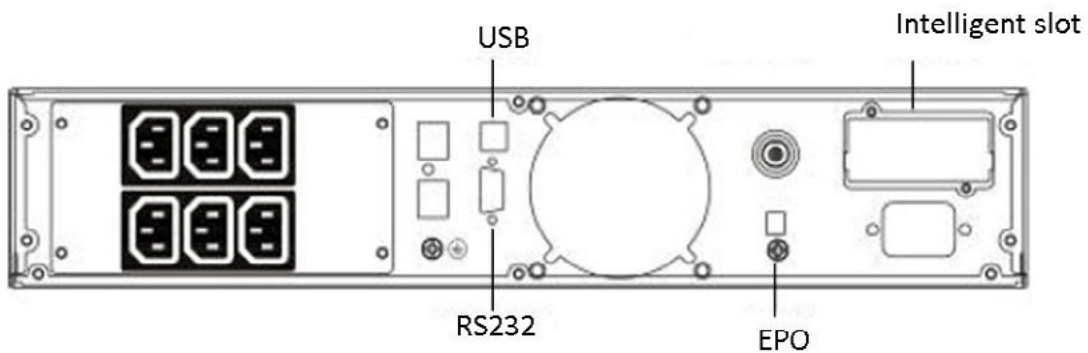
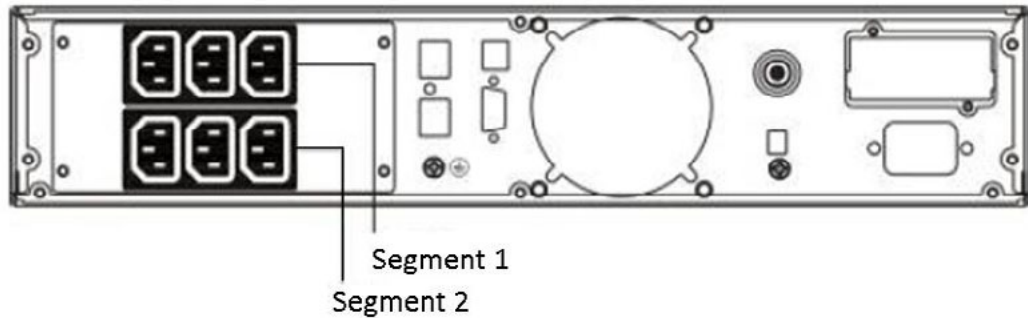
The following process must be performed if the UPS is connected with a generator:

1. Turn on the generator. After it is running stably, connect output power of the generator to the UPS input power, and then turn on the UPS. After the UPS is turned on, connect the loads one at a time.
2. It is recommended that the generator capacity is 2x the UPS rated capacity.
3. It is not recommended the use of ECO Mode when the quality of the input AC utility (generator) is not stable.

Communication

This section describes:

- Communication ports (RS-232 and USB)
- Connectivity cards
- Emergency Power Off (EPO)
- Load Segments
- UPSilon2000 Power Management Software



Installing Communication Options and Control Terminals

To install the communication options and control terminals:

1. Install the appropriate connectivity card and/or necessary cable(s) and connect the cables to the appropriate location.
2. Route and tie the cable(s) properly.
3. Continue to “Operation” section in this manual to startup UPS.

Communication Options

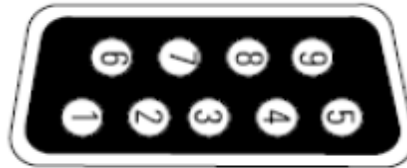
The UPS has serial communication capabilities through the USB and RS232 communication ports or through a connectivity card in the available communication bay. The UPS supports two serial communication devices according to the following table.

Independent	Multiplexed	
Communication Bay	USB	RS232
Any connectivity card	Available	Not in use
Any connectivity card	Not in use	Available
Note: The communication speed of the RS232 port is fixed at 2400 bps		

RS232 and USB Communication Ports

To establish communication between the UPS and a computer, connect the computer to one of the UPS communication ports using an appropriate communication cable (not supplied).

When the communication cable is installed, power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment. The cable pins and functions for the RS232 communication port are shown below.



Pin Number	Function Definition	Direction from the UPS
1, 4, 6, 7, 8, 9	No use	---
2	R x D (transmit to external device)	Out
3	T x D (receive from external device)	In
5	GND (signal common)	---

Connectivity Cards

Connectivity Cards allow the UPS to communicate in a variety of networking environments and with different types of devices. The UPS has one available communication bay for the following connectivity cards.

- Web/SNMP Card has SNMP and HTTP capabilities as well as monitoring through a Web browser interface, connecting to a twisted-pair Ethernet (10/100BaseT) network. In addition, an Environmental Monitoring Probe can be attached to obtain humidity, temperature, smoke alarm, and security information.
- Relay Interface Card has isolated dry contact relay outputs for UPS status including utility failure, low battery, UPS alarm/OK, or On bypass.

Note: Before installing the connectivity card, please remove the cover from the Intelligent Card Slot.

Emergency Power Off (EPO)

EPO is used to shut down the UPS from a distance. This feature can be used for shutting down the load and the UPS by thermal relay, for instance, in the event of room over-temperature. When EPO is activated the UPS shuts down the output and all power converters immediately. The UPS remains in alarm fault status.

Warning: The EPO circuit is an IEC 60950 safety extra low voltage (SELV) circuit. This circuit must be separated from any hazardous voltage circuits by reinforced insulation.

Caution: The EPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The EPO switch must have a minimum rating of 24VDC and 20mA, and be a dedicated latching-type switch, not tied to another circuit. The EPO signal must remain active for at least 250ms for proper operation. To ensure the UPS stops supplying power to the load during any mode of operation, the input power must be disconnected from the UPS when the emergency power off function is activated.

Note: For Europe, the emergency switch requirements are detailed in Harmonized document HD-384-48 S1, "Electrical Installation of the Buildings, Part 4: Protection for Safety Chapter 46: Isolation and Switching".

EPO Connections		
EPO L1	4-0.32 mm ² (12-22 AWG)	0.82 mm ² (18 AWG)
EPO L2		



Note: Leave the EPO connector installed into the EPO port of the UPS even if the EPO function is not required.

The EPO polarity can be set. See the “EPO Input Polarity” setting under “User Settings” in this manual.

Note: Depending on user configuration, the pins must be shorted or opened to keep the UPS running. To restart the UPS, reconnect (re-open) the EPO connector pins and turn on the UPS manually. Maximum resistance in the shortened loop is 10 ohm.

Note: Always test the EPO function before applying your critical load to avoid accidental load loss.

Load Segments

Load segments are sets of receptacles that can be controlled by power management software or through the display, providing for an orderly shutdown and startup of equipment. For example, during a power outage, critical equipment can be kept running while other equipment is turned off. This feature allows saving of battery power for critical loads.

Each UPS has two load segments:

- Load Segment 1: The power shedding battery voltage of this segment can be set by the LCD
- Load Segment 2: This power segment operates on full UPS function at all times



UPSILON2000 Power Management Software

Each UPS ships with UPSilon2000 Power Management Software. To begin installation of UPSilon2000 software, see the instructions accompanying the Software Suite CD.

Note: Install UPSilon2000 power management software with the serial number attached on the cover of the CD. When running the monitoring software, choose appropriate communications port.

If using RS232, choose COM1/2 and Megatec protocol.

If using USB, choose Megatec USB.

UPSilon2000 software provides up-to-date graphics of UPS power and system data and power flow. It also gives you a complete record of critical power events, and it notifies user of important UPS or power information. If there is a power outage and the UPS battery power becomes low, UPSilon2000 software can automatically shut down the computer system to protect the data before the UPS shutdown occurs.

Troubleshooting

The following messages are the information that users would find on the UPS when problems are experienced. The user can judge if the fault is caused by external factors and determine how to deal with the problem by using this information.

If the Fault LED is on, it indicates that the UPS had detected some faults. The buzzer beeps to indicate that the UPS needs to be checked - if beeping continues it indicates that there is something wrong with the UPS requiring service. Please contact the service department for assistance.

Fault	Cause	Solution
The "INPUT" letters on LCD display section flashing	The input utility is not connected or is out of range	Re-connect the input power cable and check to be sure input power is available
Battery capacity indicator flashing	Battery low voltage or battery disconnected	Check UPS battery, connect battery securely, if battery is damaged, replace
Utility normal but UPS has no input	UPS input breaker open circuit	Press the breaker for reset
Short backup time	Battery not fully charged	Keep UPS connected with utility power for more than 8 hours to recharge battery
	UPS overload	Check loads connected and remove some non-critical loads
	Battery aged	When replacing the battery, please contact dealer or distributor to get the correct battery and/or assistance

UPS does not startup after pressing the ON Button	Did not press the correct combination of buttons for "ON"	Press the 2 buttons at the same time
	UPS has not battery connected or battery voltage is too low and too many loads connected	Connect UPS battery securely. If battery voltage is low, turn the UPS OFF and remove some loads, then start the UPS again.
	Fault occurs inside UPS	Contact dealer or distributor for assistance
The icon of charger status on LCD display flashes and buzzer beeps once per second	Charger does not work normally or battery aged	Contact dealer or distributor for assistance

Fault Codes

Fault Cause	Fault Code
Bus Fault	00 - 19
Inverter Fault	20 - 39
Over Heat	40 - 44
Output Short Circuit	45 - 49
Overload	50 - 54
Output Relay Fault	55 - 59
Input NTC Fault	60 - 64
Auxiliary Power Fault	65 - 69
Input Fuse Fault	70 - 74
Others	99

UPS Maintenance

This section explains how to:

- Care for the UPS and batteries
- Replace Extended Battery Packs (EBPs)
- Test new batteries
- Recycle used batteries or UPS

UPS and Battery Care

For the best preventative maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the UPS with a vacuum cleaner. For full battery life, keep the UPS and EBPs at an ambient temperature of 25°C (77°F).

Note: The batteries in the UPS are rated for a 3-5 year service life. The length of service life varies depending upon the frequency of usage and ambient temperature. Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every 5 years to keep units running at peak efficiency.

Storing the UPS and Batteries

If the UPS or EBPs are stored for a long period, recharge the battery every 6 months by connecting the UPS or EPBs to utility power. The internal batteries charge to 80% capacity in less than 5 hours. It is recommended for the batteries to charge for 48 hours after long-term storage.

Check the battery recharge date on the shipping carton label. If the date is expired and the batteries were never recharged, do not use the UPS. Contact the service representative.

Maintenance



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



Even after the unit is disconnected from the mains, components inside the UPS system are still connected to the battery packs which are potentially dangerous.



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



Only persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.



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



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



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



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



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



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



Do not disassemble the UPS system.

The UPS contains no user-serviceable parts.

Replacing Batteries (QUALIFIED SERVICE PERSONNEL ONLY)

CAUTION! Read and follow the IMPORTANT SAFETY INSTRUCTIONS before servicing the battery. Service the battery under the supervision of Qualified Service Personnel knowledgeable of batteries and their precautions.

CAUTION! Use only the specified type of battery. See your dealer for replacement batteries.

CAUTION! The battery may present risk of electrical shock. Do not dispose of batteries in a fire as it may explode. Follow all local ordinances regarding proper disposal of batteries.

CAUTION! Do not open or mutilate the batteries. Released electrolyte is harmful to skin and eyes and may be toxic.

CAUTION! The battery can present a high risk of short circuit current and electrical shock. The short circuit current capability of the battery is sufficient to burn wire or tools very rapidly, producing molten metal. Observe these precautions when replacing the battery:

1. Remove all watches, rings or other metal objects.
2. Only use tools with insulated handles.
3. Do not lay tools or metal parts on top of battery or any terminals.
4. Wear protective eye wear (goggles), rubber gloves, and boots.
5. Disconnect the charging source before connecting or disconnecting the battery terminals.
6. Determine if the battery is inadvertently grounded. If inadvertently grounded, remove the source of the ground. Contact with a grounded battery can result in electrical shock! The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance (applicable to a UPS and a remote battery supply not having a grounded circuit).

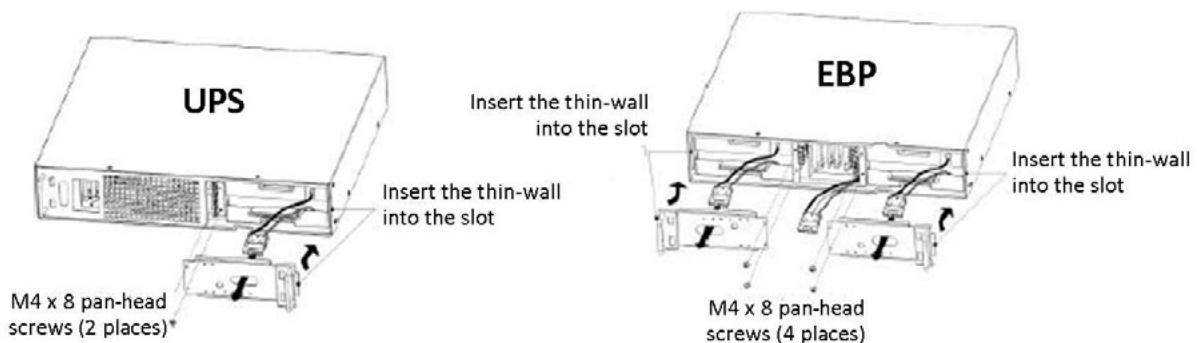
Note: DO NOT DISCONNECT the batteries while the UPS is in Battery Mode.

The EBPs can be replaced when the UPS is ON, but be aware that if the utility fails at that time, the load of the UPS may NOT be protected.

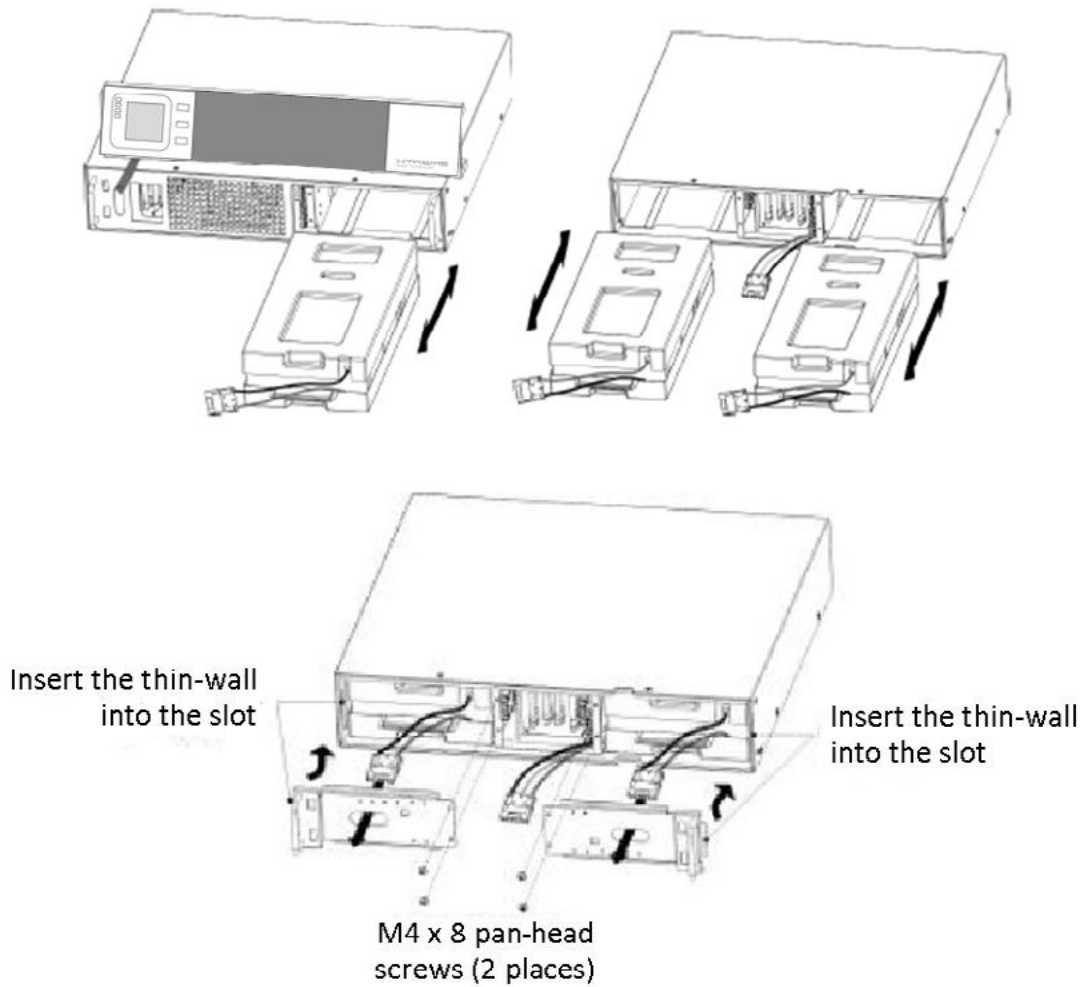
Replacing Battery Trays in UPS and EBPs

If the batteries fail and need to be replaced following these steps.

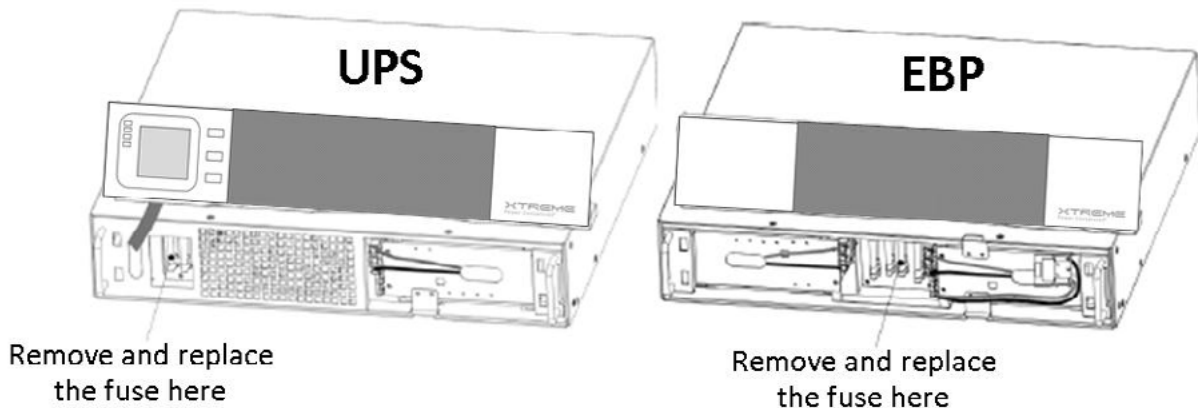
1. Remove the front cover of the UPS and/or EBPs.
2. Remove the connection cables between the EBP and the UPS. Remove the screw on the baffle of the EBP as shown in figures below, then remove the baffle from the left or right.



3. Grasp the handle in front of the battery tray, pull the battery tray out of the UPS or EBP carefully.
4. Hold the middle of the new battery tray and insert it into the slot in the UPS or EBP. Once installed, make sure it is completely inserted into the chassis.



5. If the fuse is blown, replace before reassembling the UPS or EBP.



Testing New Batteries

To test new batteries:

1. Plug the UPS into a power outlet for 48 hours to completely charge the batteries.
2. Start up the UPS by pressing the startup combination buttons.
3. Press the Battery Test combination buttons to activate the battery test. The UPS starts a battery test if
 - the batteries are fully charged

- the UPS is in Line Mode with no active alarms
- the bypass voltage is acceptable

During the battery test, the UPS transfers to Battery Mode and discharges the batteries for 10 seconds. The LED indicators on the front panel stop cycling when the test is completed.

Recycling the Used Battery or UPS

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

⚠ Warning: Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to local codes for disposal requirements.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to skin and eyes. It may be toxic.

⚠ Caution: Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information contact your local recycling/reuse or hazardous waste center.

⚠ Caution: Do not discard electrical waste or electronic equipment (WEEE) in the trash. For more information contact your local recycling/reuse or hazardous waste center.

Specifications

MODEL NUMBER		G90-1000	G90-2000	G90-3000
INPUT	Capacity	1000VA (900W)	2000VA (1800W)	3000VA (2700W)
	Voltage	160–290VAC		
	Frequency	50/60Hz auto sensing		
	Detachable AC power cord	6 ft, IEC C14 to IEC C13	6 ft, IEC C20 to IEC C19	
OUTPUT	Voltage	200/208/220/230/240VAC		
	Waveform	Pure sine wave		
	Frequency	50/60Hz auto sensing (line mode); 50/60 ± 0.02Hz (battery mode)		
	Power factor	0.9		
	Voltage regulation	± 2%		
	Crest factor	3:1		
	Outlets	(6) IEC C13	(8) IEC C13	(1) IEC C19 + (8) IEC C13
	Overload protection	150% for 30 sec; > 150% for 300 ms		
	Efficiency	98% ECO mode, ≥ 92% online mode		
	BATTERY	UPS battery quantity and size	(3) 12V 9AH/36VDC	(6) 12V 9AH/72VDC
UPS/EBP charge current		1A (3 stage charger)		
EBP battery quantity and size		(6) 12V 9AH/36VDC	(12) 12V 9AH/72VDC	
PHYSICAL	UPS dimensions (W x D x H)	440 x 430 x 86.5 mm (17.3 x 16.9 x 3.4 in)	440 x 690 x 86.5 mm (17.3 x 27.2 x 3.4 in)	
	UPS weight	16.2 kg (35.7 lbs)	28.1 kg (61.9 lbs)	29.2 kg (64.4 lbs)
	EBP dimensions (W x D x H)	440 x 430 x 86.5 mm (17.3 x 16.9 x 3.4 in)	440 x 690 x 86.5 mm (17.3 x 27.2 x 3.4 in)	
	EBP weight	24.0 kg (52.9 lbs)	46.0 kg (101.4 lbs)	
	ENVIRONMENT	Temperature	0–40°C (32–104°F)	
Humidity		0–95% non-condensing		
Altitude		3500 m (11,500 ft) above sea level		
APPROVALS	CE, EN 61000, IEC/EN 62040			
WARRANTY	2 years electronics, 2 years battery			
COMMUNICATIONS INTERFACE	RS-232, USB, Web/SNMP (optional)			
INCLUDED IN BOX	User manual, rack mount brackets, tower pedestals, power cord, software CD, USB & SNMP cables			
AVAILABLE OPTIONS	Bypass distribution module (XBDM), power distribution module (XPDU), rail kit			

Battery Estimated Runtimes

	UPS	+ (1) EBP	+ (2) EBP	+ (3) EBP	+ (4) EBP
Backup time*	Half/full	Half/full	Half/full	Half/full	Half/full
G90-1000 (0.8 PF load)	21/9	87/35	167/68	259/96	358/148
G90-1000 (0.9 PF load)	18/8	75/31	144/59	222/91	307/125
G90-2000 (0.8 PF load)	21/9	87/35	167/68	259/96	358/148
G90-2000 (0.9 PF load)	18/8	75/31	144/59	222/91	307/125
G90-3000 (0.8 PF load)	12/6	52/21	99/41	154/63	212/87
G90-3000 (0.9 PF load)	11/4	44/18	86/35	132/55	183/75

*Runtimes are shown in minutes and will vary based on battery age and site conditions

Shipping List

1. User Manual
2. Rack mount brackets
3. Tower stands
4. Power cord
5. Software CD
6. USB cable
7. RS232 cable

Obtaining Service

If the UPS requires Service:

1. Use the TROUBLESHOOTING section in this manual to eliminate obvious causes.
2. Verify there are no circuit breakers tripped.
3. Call your dealer for assistance. If you cannot reach your dealer, or if they cannot resolve the problem, call Xtreme Power Conversion Corp Technical Support at 800.582.4524. Technical support inquiries can also be made at support@xpcc.com. Please have the following information available BEFORE calling the Technical Support Department:
 - Your name and address.
 - The serial number of the unit.
 - Where and when the unit was purchased.
 - All of the model information about your UPS.
 - Any information on the failure, including LED's that may or may not be illuminated.
 - A description of the protected equipment, including model numbers if possible.
 - A technician will ask you for the above information and, if possible, help solve your problem over the phone. In the event that the unit requires factory service, the technician will issue you a Return Material Authorization number (RMA).

If you are returning the UPS to Xtreme Power for service, please follow these procedures:

1. Pack the UPS in its original packaging. If the original packaging is no longer available, ask the Technical Support Technician about obtaining a replacement set of packaging material. It is important to pack the UPS properly in order to avoid damage in transit. Never use Styrofoam beads for a packing material.
2. Include a letter with your name, address, daytime phone number, RMA number, a copy of your original sales receipt, and a brief description of the problem.
3. Mark the RMA number on the outside of all packages. Xtreme Power cannot accept any package without the RMA number marked on the outside of the boxes.
4. Return the UPS by insured, prepaid carrier to the address provided by the Technician.
5. Refer to the Warranty statements in this manual for additional details on what is covered.

Xtreme Power Conversion Limited Warranty

Xtreme Power Conversion (XPC) Corporation warrants Xtreme Power Conversion equipment, when properly applied and operated within specified conditions, against faulty materials or workmanship (excluding batteries) for a period of **two years for G90-Series products** from the date of purchase. XPC Corporation warrants **internal batteries for a period of two years** from the date of purchase. For warranty units, an (RMA) must be requested for all claims. XPC will honor warranties at the sole discretion of XPC Corporation after units have been evaluated.

If equipment provided by XPC Corporation is found to be **Dead-on-Arrival (DOA)**, the customer must request and received a **Return Material Authorization (RMA)** number. DOA equipment is defined as equipment that does not properly function according to user documentation when initially received and connected in conjunction with proper procedures as shown in the user documentation or via support provided by XPC Corporation personnel or authorized agents.

This warranty shall be void if (a) the equipment is repaired or modified by anyone other than XPC Corporation or a XPC Corporation approved third party; (b) the equipment is damaged by the customer, is improperly used or stored, is subjected to an adverse operating environment, or is operated outside the limits of its electrical specifications; or (c) the equipment has been used or stored in a manner contrary to the equipment's operating manual, intended use or other written instructions. Any technical advice furnished by XPC Corporation or a XPC Corporation authorized representative before or after delivery with regard to the use or application of Xtreme Power Conversion equipment is furnished on the basis that it represents XPC Corporations best judgment under the situation and circumstances, but it is used at the recipient's sole risk.

EXCEPT AS STATED ABOVE, XPC Corporation DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS STATED ABOVE, IN NO EVENT WILL XPC Corporation BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF Xtreme Power Conversion EQUIPMENT, including but not limited to, any costs, lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, cost of substitutes, or claims by third parties. Purchaser's sole and exclusive remedy for breach of any warranty, expressed or implied, concerning Xtreme Power Conversion equipment, and the only obligation of XPC Corporation under this warranty, shall be the repair or replacement of defective equipment, components, or parts; or, at XPC Corporations sole discretion, refund of the purchase price or substitution of an equivalent replacement product.

Appendix A: G90-EBP1, G90-EBP2 User Guide

Introduction

The extended battery pack can be added to UPS to extend the available battery time. Up to four EBPs can be installed with the UPS.

Battery Estimated Runtimes

	UPS	+ (1) EBP	+ (2) EBP	+ (3) EBP	+ (4) EBP
Backup time*	Half/full	Half/full	Half/full	Half/full	Half/full
G90-1000 (0.8 PF load)	21/9	87/35	167/68	259/96	358/148
G90-1000 (0.9 PF load)	18/8	75/31	144/59	222/91	307/125
G90-2000 (0.8 PF load)	21/9	87/35	167/68	259/96	358/148
G90-2000 (0.9 PF load)	18/8	75/31	144/59	222/91	307/125
G90-3000 (0.8 PF load)	12/6	52/21	99/41	154/63	212/87
G90-3000 (0.9 PF load)	11/4	44/18	86/35	132/55	183/75

*Runtimes are shown in minutes and will vary based on battery age and site conditions

Important Safety Instructions: (Save These Instructions)

This manual contains important instruction that you should follow during installation and maintenance of the EBP. Please read all instructions before operating the equipment and save this manual for future reference.

CAUTION: Batteries can prevent a risk of electrical shock or burn from high short circuit current. Observe proper precautions. Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries

CAUTION: Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

CAUTION: Never dispose of batteries in a fire. Batteries may explode when exposed to flame.

Installation

Inspecting the equipment

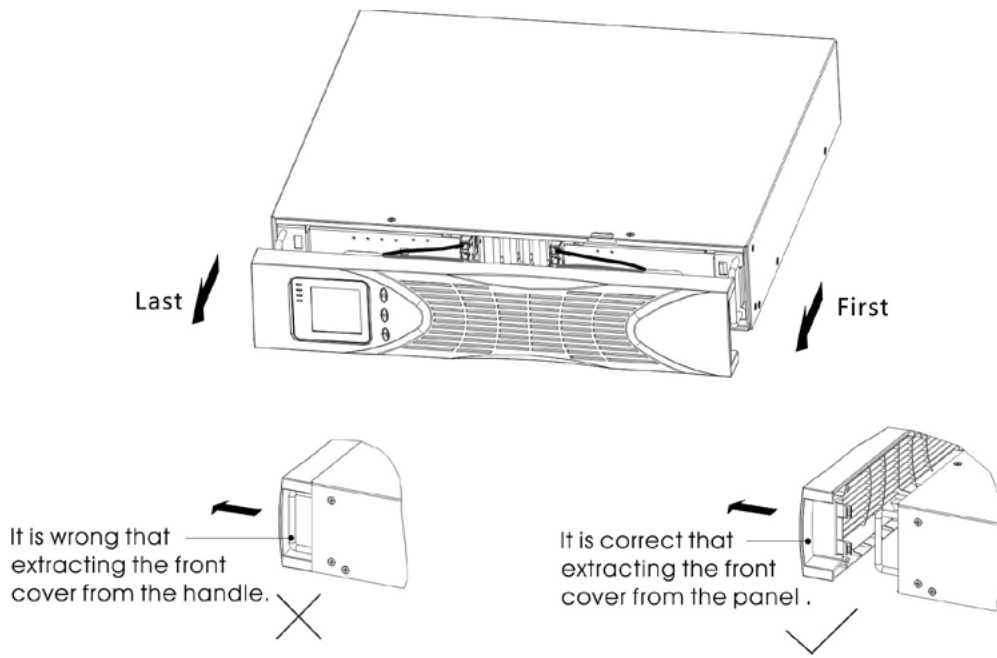
If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase to file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

Note: Check the battery recharge date on the shipping carton label. If the date has passed and the batteries were never charged, do not use the EBP. Contact your service representative.

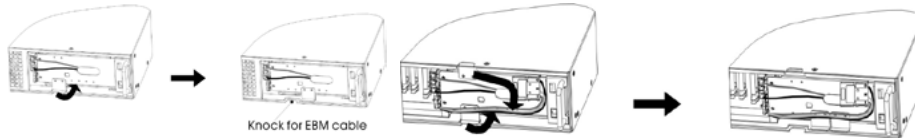
To install the optional EBPs for a UPS:

1. Remove the front cover of each EBP. Press the panel side with LCD display, hold the other side and quickly extract it, then extract the other side with display.

Note: A ribbon cable connects the LCD control panel to the UPS. Do not pull on the cable or disconnect it.



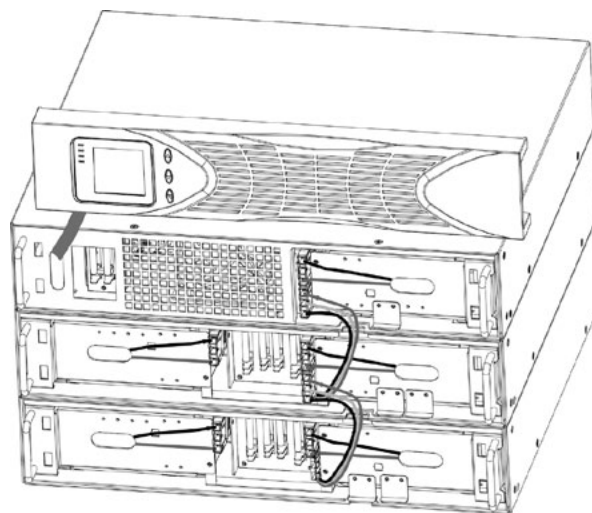
2. On the bottom of the UPS front cover, remove the EBP cable knockout



3. Plug the EBP cable(s) into the battery connector(s). A small amount of arcing may occur when connecting an EBP to the UPS. This is normal and will not harm personnel. Insert the EBP cable into the UPS battery connector quickly and firmly. Up to four EBPS may be connected to the UPS. Connect red to red, black to black, and yellow to yellow. Press the two parts tightly together to ensure a proper connection.

To connect a second EBP, unclip the EBP connector on the first EBP and pull gently to extend the wiring to the EBP connector on the second EBP. Repeat for any additional EBPs.

4. Verify that the EBP connections are tight and that adequate bend radius and strain relief exist for each cable.



5. Replace the EBP front cover.

To replace the cover, verify that the EBP cables are routed through the EBP cover knockouts, cover connects with the cover hook near the left side of the EBP cabinet. Repeat for each additional EBP.

Put the front panel side with display to the panel port, put another side to the other two ports, then press it until the panel and the chassis are combined tightly.

6. Verify that all wiring connecting the UPS and EBP(s) is installed behind the front covers and is inaccessible to users.
7. Return to Step 1 to continue the EBP installation

Operation

Configuring Battery Settings

Set the UPS for the number of EBPs installed. To ensure maximum battery runtime, configure the UPS for the correct number of EBPs, refer to Specifications section for the appropriate setting of battery numbers and type. Use the up and down buttons to select the number of battery strings according to your UPS configuration:

Battery Number Configuration

All UPS and EBP Cabinets	Number of Battery Strings
UPS only (internal batteries)	1 (default)
UPS + 1EBP	3
UPS + 2EBPs	5
UPS + 3EBPs	7
UPS + 4EBPs	9
Note: The UPS contains one battery string; each EBP contains two battery strings.	

Maintenance

Replacing Batteries

NOTE: DO NOT DISCONNECT the batteries while the UPS is in Battery mode. The EBP can be replaced when UPS is ON, but be aware that if the utility fails at that time, the load of the UPS may NOT be protected. If you prefer to remove input power to change the batteries.

WARNING! Servicing should be performed by qualified personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.

WARNING! Batteries can present a risk of electrical shock or burn from high short circuit current. Observe the following precautions:

- Remove watches, rings, or other metal objects
- Use tools with insulated handles
- Do not lay tools or metal parts on top of batteries
- Wear rubber gloves and boots

WARNING! When replacing batteries, replace with the same type and number of batteries or battery packs. Contact your service representative to orders new batteries.

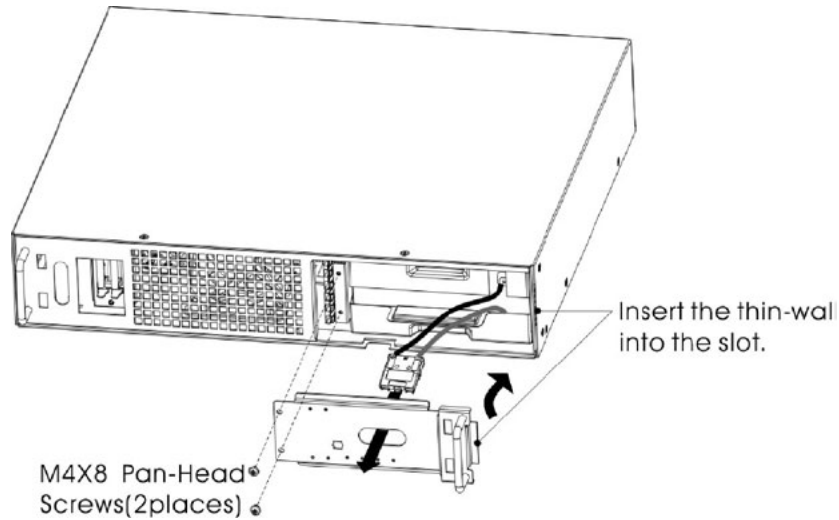
WARNING! Proper disposal of batteries is required. Refer to your codes for disposal requirements.

WARNING! Never dispose of batteries in a fire. Batteries may explode when exposed to flame.

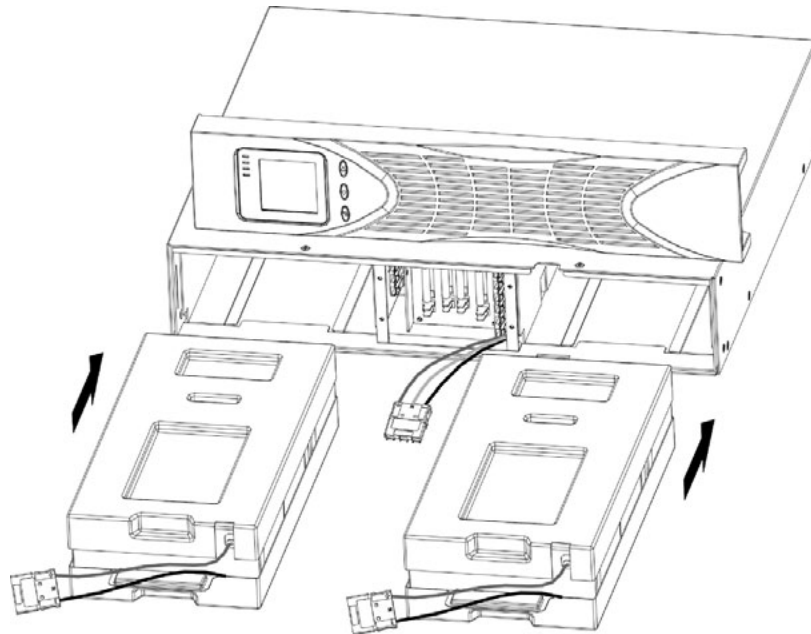
Replacing EBPs

CAUTION! The EBP is heavy. Lifting the cabinet requires a minimum of two people.

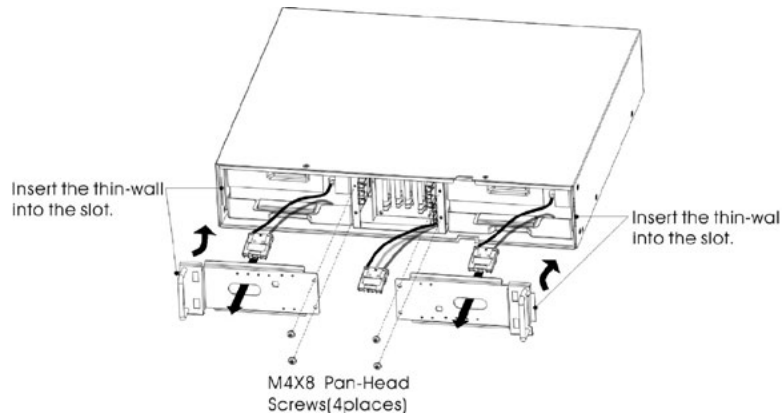
1. If the battery fault, the following steps are provided for modular unit to replace the new battery pack.
2. Remove the front panel of the battery box.
3. Remove the connection cables between battery box and UPS. Release the screw of the baffle of the battery pack as the figure below shows, then remove the baffle from the left.



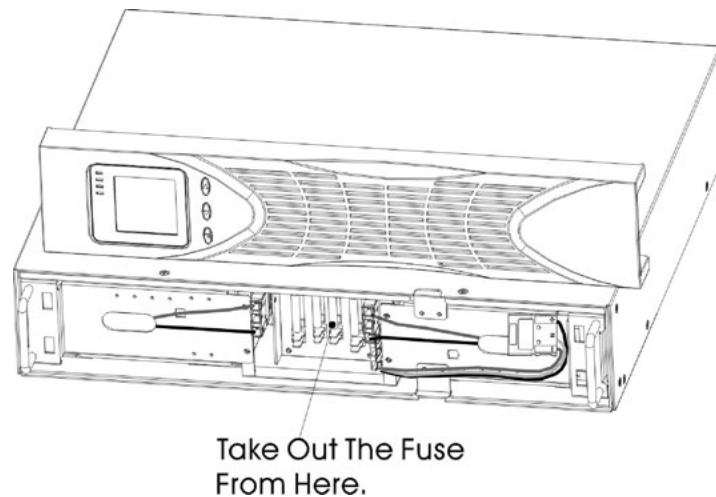
4. Grasp the handle in front of the battery pack, take out of it and hold it, then remove the battery pack.



5. Hold the middle of the new battery pack, insert it. Make sure that the whole battery pack is in position.



6. If the fuse melting, replace it from the front.



Testing New Batteries

To test new batteries:

1. Plug the UPS into a power outlet for 48 hours to charge the batteries.
2. Start up the UPS by pressing the start up combination button.
3. Press the battery test combination button to activate the battery test.

The UPS starts a battery test if the batteries are fully charged, the UPS is in Normal mode with no active alarms, and the bypass voltage is acceptable. During the battery test, the UPS transfers to Battery mode and discharges the batteries for 10 seconds. The LED indicators of the front panel stop cycling when the test is completed.

Recycling the Used Battery

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

WARNING! Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

WARNING! Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

CAUTION! Do not discard the battery pack or the batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

CAUTION! Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Specifications

Internal Batteries	EBPs
Tower Configuration	1K -EBP: 36 Vdc (2 x 3 ,12V, 7 Ah) 2K -EBP: 72 Vdc (2 x 6 ,12V, 7 Ah) 3K -EBP: 72 Vdc (2 x 6 ,12V, 9 Ah)
Fuses	30A/250 Vdc fuses per EBP
Type	Sealed, maintenance-free, valve-regulated, lead-acid, with minimum 3 year float service life at 25°C (77°F)
Monitoring	Advanced monitoring for earlier failure detection and warning
Recharge Time (to 90%)	Internal batteries: 3 hours 1 EBP: 9 hours; 2 EBPs : 15 hours; 3 EBPs: 21 hours; 4 EBPs: 27 hours