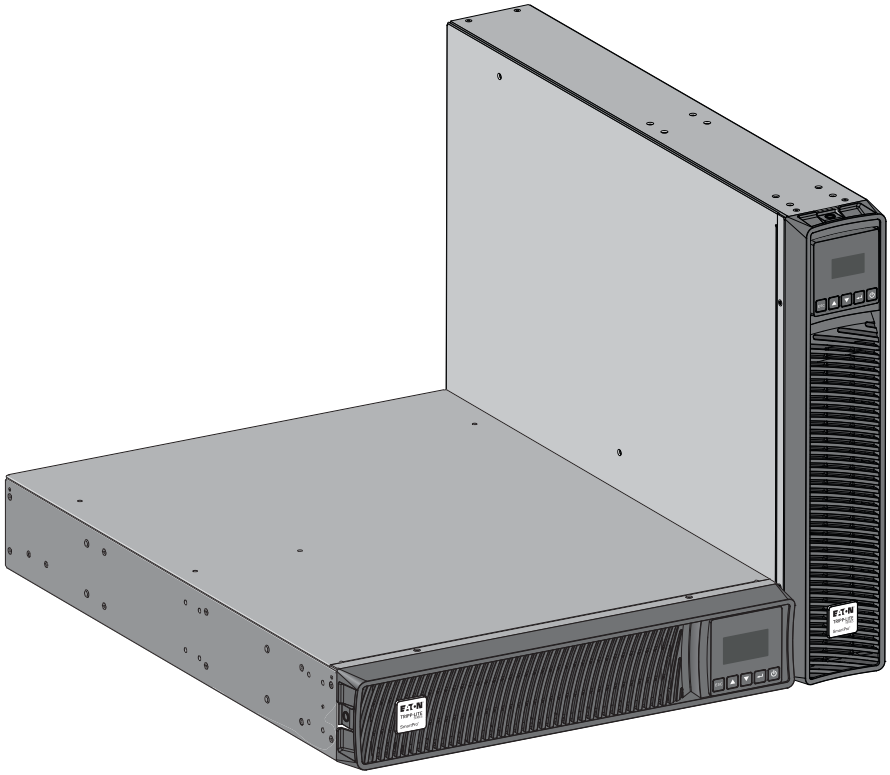
Eaton Tripp Lite Series SmartPro TAA

Advanced User Guide



SMART1500RXLTAA
SMART2200RXLTAA
SMART3000RXLTAA
BP48VRXLTAA
BP72VRXLTAA

Powering Business Worldwide

p/n: 614-09404
Revision 01

Safety Instructions

SAVE THESE INSTRUCTIONS. This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

⚠WARNING

This is a category C2 UPS product. In a residential environment, this product may cause radio interference, in which case the user may be required to take additional measures.

Suppliers Declaration of Conformity

Responsible Party:

EATON
10000 Woodward Ave
Woodridge, IL 60517 USA
773–869–1111

tripplite.eaton.com

FCC Compliance Statement:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. this device must accept any interference received, including interference that may cause undesired operation.

Special Symbols

The following are examples of symbols used on the product to alert you to important information:

RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.

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

Information, advice, help.

Read the documentation provided.

Disconnect input plug.

Before maintenance, first shut down the UPS then disconnect the AC power source, internal and external batteries then discharge capacitors by pressing the ON button and wait 5 minutes.

This equipment should only be used in a dry indoor environment.

Operating range of temperature.

Operating range of humidity.

The UPS and their batteries must be kept in a ventilated place.

Safety of Persons

- The system has its own power source (the battery). Consequently, the power outlets may be energized ven if the systems is disconnected from the AC power source. Dangerous voltage levels are resent within the system. It should be opened exclusively by qualified service personnel.
- The system must be properly grounded at all times.
- The battery supplied with the system contains small amounts of toxic materials. To avoid accidents, the directives listed below must be observed:
  - Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
  - When replacing batteries, replace with the same type and number of batteries or battery packs.
  - Do not dispose of batteries in a fire. The batteries may explode.

  - Batteries constitute a danger (electrical shock, burns). The short-circuit current may be very high.
  - UPS employing batteries with min. V-2 case are intended for use in computer room as defined in the standard for the Protection of Information Technology Equipment, ANSI/NFPA 75.
  - UPS employing batteries with HB case are intended not for use in a computer room as defined in the standard for the Protection of Information Technology Equipment, ANSI/NFPA 75.
- Precautions must be taken for all handling:
  - Wear rubber gloves and boots.
  - Do not lay tools or metal parts on top of batteries.
  - Disconnect charging source prior to connecting or disconnecting battery terminals.
  - Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

Product Safety

- To connect the UPS, instructions and operation described in the manual must be followed in the indicated order.
- CAUTION - To reduce the risk of fire, the unit connects only to a circuit provided with 20 or 30 amperes maximum branch circuit overcurrent protection in accordance with the National Electric Code, ANSI/NFPA 70 (US installations only).
- Check that the indications on the rating plate correspond to your AC powered system and to the actual electrical consumption of all the equipment to be connected to the system.
- For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible
- Never install the system near liquids or in an excessively damp environment.
- Never let a foreign body penetrate inside the system.
- Never block the ventilation grates of the system.
- Never expose the system to direct sunlight or source of heat.
- If the system must be stored prior to installation, storage must be in a dry place.
- The admissible storage temperature range is -25ºC to +55ºC without batteries, 0°C to 40°C with batteries.
- This UPS can be used in IT/TT/TN power system. This UPS complies with the IP20 protection type. Protective class I.
- Output short-circuit current max RMS & delay time: 90A/80ms; The max peak value: 140A.
- For 3K LV models, the upstream circuit breaker of UPS for installation must committee the disconnection time in 0.4s according to requirement of IEC 60364-4-41:2005 Table 41.1.
- The system is not for use in a computer room AS DEFINED IN the standard for the Protection of Information Technology Equipment, ANSI/NFPA 75 (US installations only).
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Special Precautions

- The unit is heavy: wear safety shoes and use vacuum lifter preferentially for handling operations.

- All handling operations will require at least two people (unpacking, lifting, installation in rack system).
- Before and after the installation, if the UPS remains de-energized for a long period, the UPS must be energized for a period of 24 hours, at least once every 6 months (for a normal storage temperature less than 25°C). This charges the battery, thus avoiding possible irreversible damage.
- During the replacement of the Battery Module, it is imperative to use the same type and number of element as the original Battery Module provided with the UPS to maintain an identical level of performance and safety. If there are any questions, don't hesitate to contact your local Eaton representative. For potential safety issue on defective UPS : DISCONNECT INTERNAL BATTERY for storage and transportation.
- All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER SERVICEABLE PARTS inside the UPS.

Table of Contents

Chapter 1 Introduction

1.1 Introduction

Thank you for selecting an Eaton® Tripp Lite Series SmartPro TAA product to protect your electrical equipment.

The Eaton® Tripp Lite Series SmartPro TAA range has been designed with the utmost care. We recommend that you take the time to read this advanced user guide to take full advantage of the many features of your UPS (Uninterruptible Power System).

Before installing your Eaton® Tripp Lite Series SmartPro TAA, please read the information and safety instructions provided.

Follow the instructions in the quick start guide and if necessary, refer to this advance user guide.

To discover the entire range of Eaton Tripp Lite Series products, we invite you to visit our web site at tripplite.eaton.com or contact your Eaton Tripp Lite Series local representative.

1.2 Environmental protection

Eaton® Tripp Lite Series has implemented an environmental-protection policy. Products are developed according to an eco-design approach.

Substances

This product does not contain CFC and HCFC. This product does not contain asbestos. This product is compliant with regulations on the restriction of the use of substances in electrical and electronic equipment.

Packaging

To improve waste treatment and facilitate recycling, separate the various packing components.

- The cardboard we use comprises over 50% of recycled cardboard.
- Plastic bags are made of polyethylene.
- Packing materials are recyclable and bear the appropriate identification symbol.

Table 1.

Materials	Abbreviations	Number in the symbols
Polyethylene terephthalate	PET	01
High-density polyethylene	HDPE	02
Polyvinyl chloride	PVC	03
Low-density polyethylene	LDPE	04
Polypropylene	PP	05
Polystyrene	PS	06

Follow all local regulations for the disposal of packing materials.

End of life

Eaton will process products at the end of their service life in compliance with local regulations. Eaton® Tripp Lite Series SmartPro TAA works with companies in charge of collecting and eliminating our products at the end of their service life.

Product

The product is made up of recyclable materials. Dismantling and destruction must take place in compliance with all local regulations concerning waste. At the end of its service life, the product must be transported to a processing center for electrical and electronic waste. tripplite.eaton.com/support/recycling-program

Battery

The product contains lead-acid batteries that must be processed according to applicable local regulations concerning batteries. The battery may be removed to comply with regulations and in view of correct disposal.

1.3 Benefits

The Eaton Tripp Lite Series SmartPro TAA uninterruptible power system (UPS) protects your sensitive electronic equipment from the most common power problems, including power outages, voltage sags, impulsive transients, line noise, and long-term under and over voltage conditions, frequency variations, switching transients, and harmonic distortion.

Power outages can occur when you least expect it and power quality can be erratic. These power problems have the potential to corrupt critical data, destroy unsaved work sessions, and damage hardware - causing hours of lost productivity and expensive repairs.

With the Eaton Tripp Lite Series SmartPro TAA, you can safely eliminate the effects of power disturbances and guard the integrity of your equipment. Providing outstanding performance and reliability, the Eaton Tripp Lite Series SmartPro TAA's unique benefits include:

- Standard communication options: one RS-232 communication port, one USB communication port, relay output contacts.
- Optional connectivity cards with enhanced communication capabilities.
- Extended runtime with up to four Extended Battery Modules (EBMs) per UPS.
- Remote on/off (ROO) and remote power off (RPO).
- Backed by worldwide agency approvals.

1.4 Special Precautions

- The unit is heavy: wear safety shoes and use vacuum lifter preferentially for handling operations.
- All handling operations will require at least two people (unpacking, lifting, installation in rack system).
- Before and after the installation, if the UPS remains de-energized for a long period, the UPS must be energized for a period of 24 hours, at least once every 6 months (for a normal storage temperature less than 25°C). This charges the battery, thus avoiding possible irreversible damage.
- During the replacement of the Battery Module, it is imperative to use the same type and number of element as the original Battery Module provided with the UPS to maintain an identical level of performance and safety. If there are any questions, don't hesitate to contact your local EATON representative.
- All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER-SERVICEABLE PARTS inside the UPS.
- For potential safety issue on defective UPS : DISCONNECT INTERNAL BATTERY for storage and transportation.

Chapter 2 Presentation

2.1 Standard installation

Table 2. Installation Formats

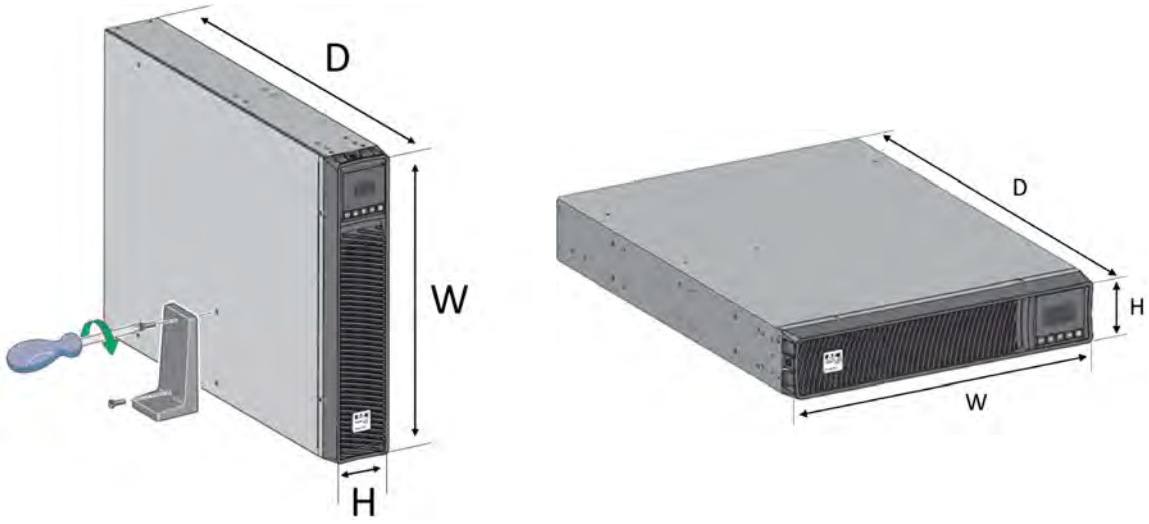


Table 3. Weights and Dimensions

Description (UPS)	Weights (lb / kg)	Dimensions (inch / mm) D x W x H
SMART1500RXLTAA	50.7 / 23.0	17.6 x 17.2 x 3.4 / 448 x 438 x 85.5
SMART2200RXLTAA	65.3 / 29.6	23.7 x 17.2 x 3.4 / 603 x 438 x 85.5
SMART3000RXLTAA	74.5 / 33.8	23.7 x 17.2 x 3.4 / 603 x 438 x 85.5
Description (EBM)	**Weights (lb / kg)**	**Dimensions (inch / mm) D x W x H**
BP48VRXLTAA	61.3 / 27.8	17.6 x 17.2 x 3.4 / 448 x 438 x 85.5
BP72VRXLTAA	89.1 / 40.4	23.7 x 17.2 x 3.4 / 603 x 438 x 85.5

2.2 Optional accessories

Table 4. Optional Accessories

Part number	Description
BP48VRXLTAA BP72VRXLTAA	Extended Battery Module
WEBCARDLXE	UPS Web Management Accessory Card SNMP Remote Monitoring HTML5

2.3 Rear Panels

Figure 1. SMART1500RXLTAA

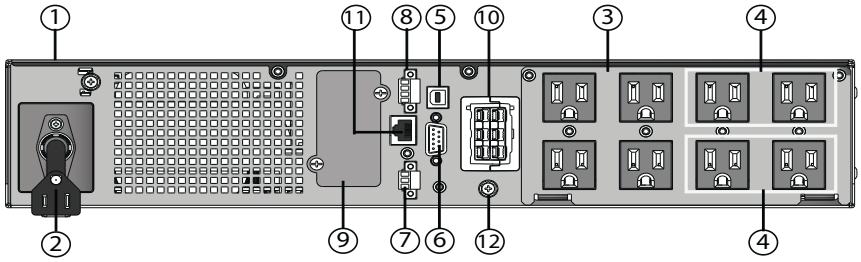


Figure 2. SMART2200RXLTAA

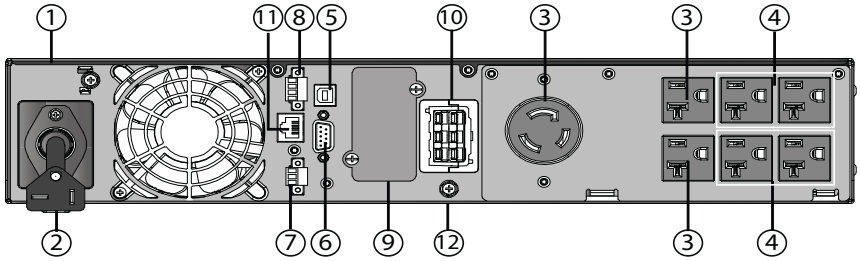


Figure 3. SMART3000RXLTAA

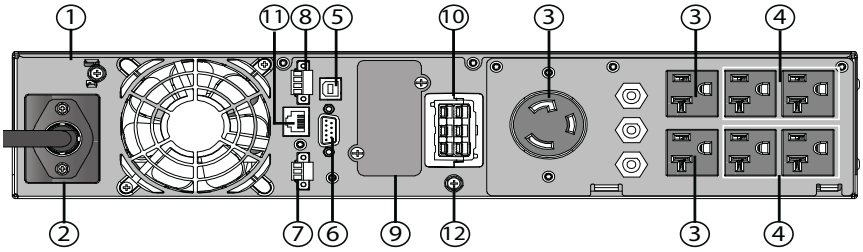


Table 5. Back Panel Options

① UPS	⑦ Relay output contact
② Input AC power source	⑧ Connector for ROO (Remote ON/OFF) control and RPO (Remote Power Off)
③ Primary group (critical equipment)	⑨ Slot for optional communication card
④ Outlet group (programmable outlets)	⑩ Connector for additional battery module
⑤ USB communication ports	⑪ Connector for automatic recognition of an additional battery module
⑥ RS232 communication port	⑫ Ground screw

Figure 4. BP48VRXLTAA / BP72VRXLTAA

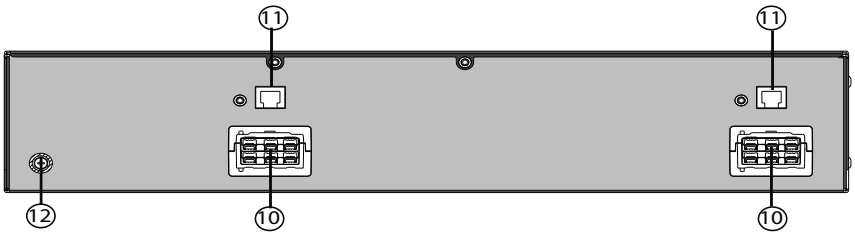


Table 6. Battery Pack Back Panel Options

⑩ Connector for additional battery module	⑪ Connector for automatic recognition of an additional battery module	⑫ Ground screw

Chapter 3 Installation

3.1 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 and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage. For pluggable equipment, the socket outlet shall be installed near the equipment and shall be easily accessible.

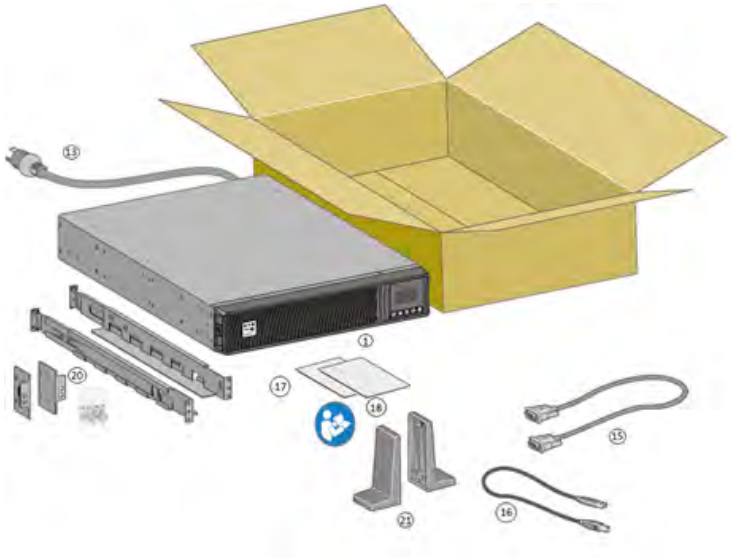
To file a claim for shipping damage or concealed damage:

1. File with the carrier within 15 days of receipt of the equipment;
2. Send a copy of the damage claim within 15 days to your service representative.

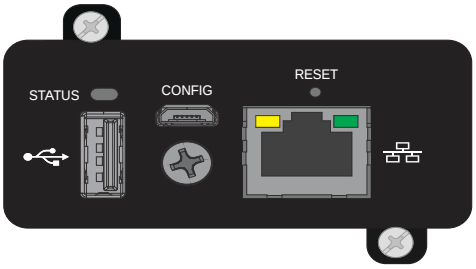
IMPORTANT

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

Table 7. Package content



Verify that the following additional items are included with the UPS:
1. UPS
13. Connection cable to AC power source
15. RS232 communication cable
16. USB communication cable
17. Safety instructions
18. Quick start
20. Rack kit for 19-inch 4-post enclosures
21. Two supports for tower position (tower feet)
WEBCARDLXE (optional)

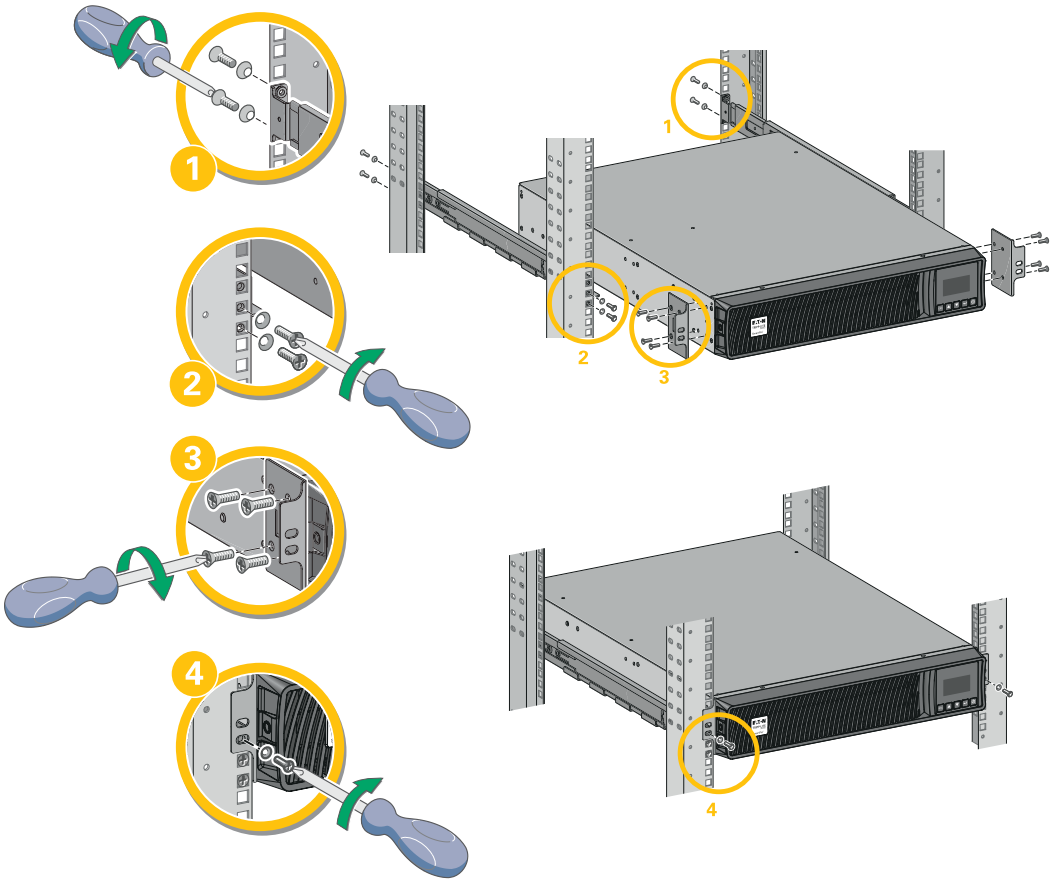


3.2 Recommended Positions

Installation in rack position

Follow steps 1 to 4 for module mounting on the rails.

Figure 5. Rack Installation Steps



NOTE The rails and necessary hardware are supplied by Eaton.

Installation in tower position

If you ordered other UPS accessories, refer to specific user manuals to check the tower installation with the UPS.

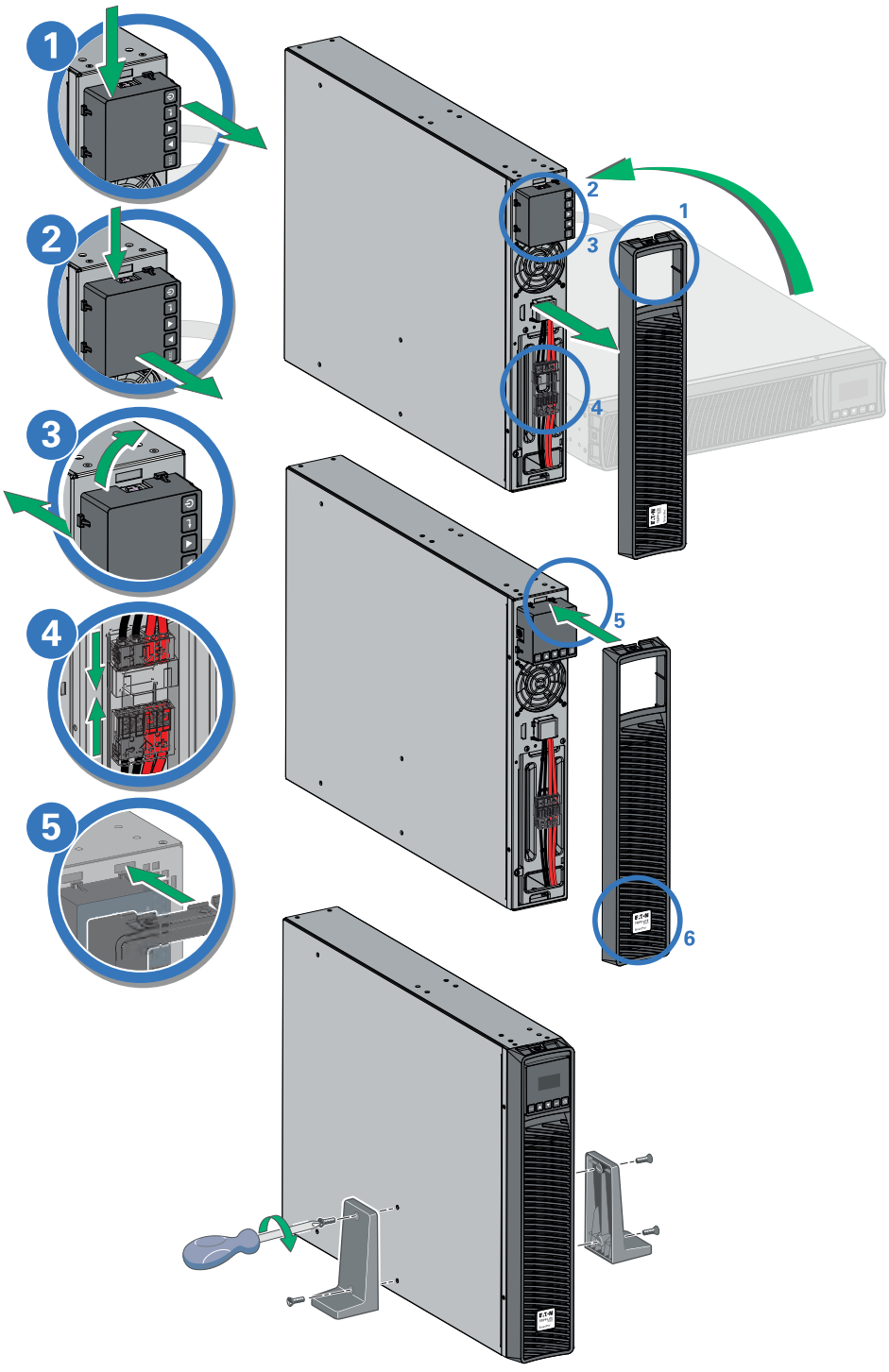
To install the UPS:

Place the UPS on a flat, stable surface in its final location. Always keep 6" or 150 mm of free space behind the UPS rear panel for ventilation.

If installing additional EBM, place them next to the UPS in their final location.

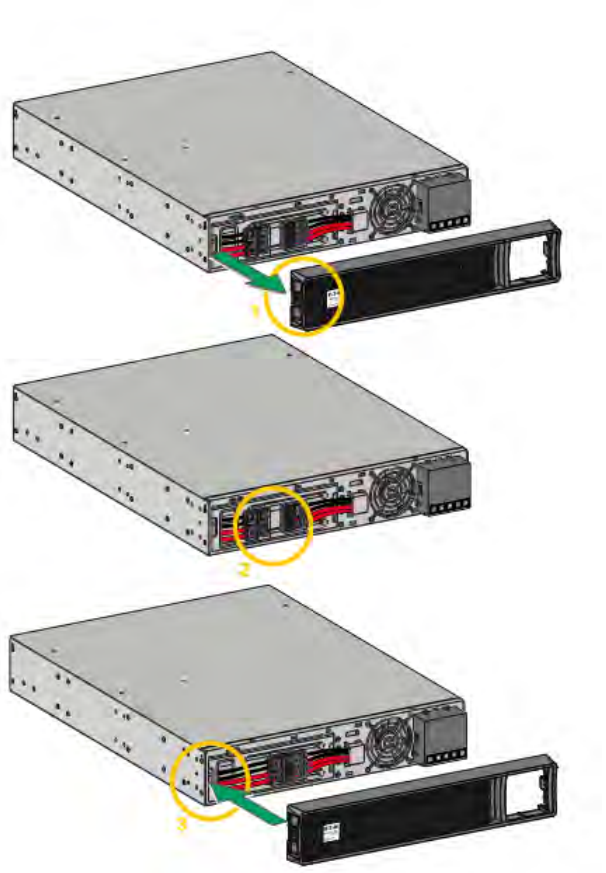
Follow steps 1 to 5 to adjust the orientation of the LCD panel and of the logo.

Figure 6. Tower Installation Steps



3.3 Connecting the Internal Battery

Figure 7. Internal Battery Connection



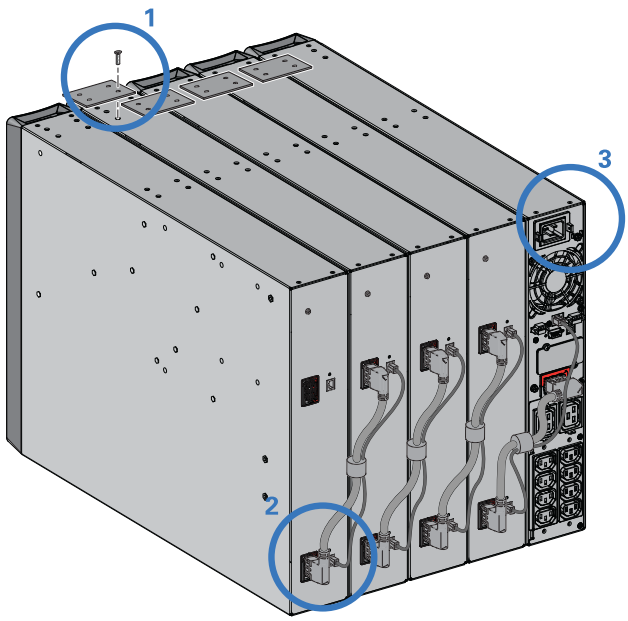
⚠WARNING

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.

1. Remove the front panel by pressing on both sides of the panel.
2. Connect the two battery connectors together.
3. Replace the front panel.

3.4 EBM Connection

Figure 8. Tower Battery Connections



WARNING

A small amount of arcing may occur when connecting an EBM to the UPS. This is normal and will not harm personnel. Insert the EBM cable into the UPS battery connector quickly and firmly.

1. Attach the UPS and the EBMs to each other using the supplied mounting plate. Up to 4 EBMs may be connected to the UPS.
2. Connect the EBMs power cable and the attached battery detection cable as shown in the picture.
3. Verify that the EBM connections are tight and that adequate bend radius and strain relief exist for each cable.

WARNING

A small amount of arcing may occur when connecting an EBM to the UPS. This is normal and will not harm personnel. Insert the EBM cable into the UPS battery connector quickly and firmly.

CAUTION

To increase stability, it is preferable to place the EBM below the UPS.

Figure 9. Rack EBM Installation and Connection

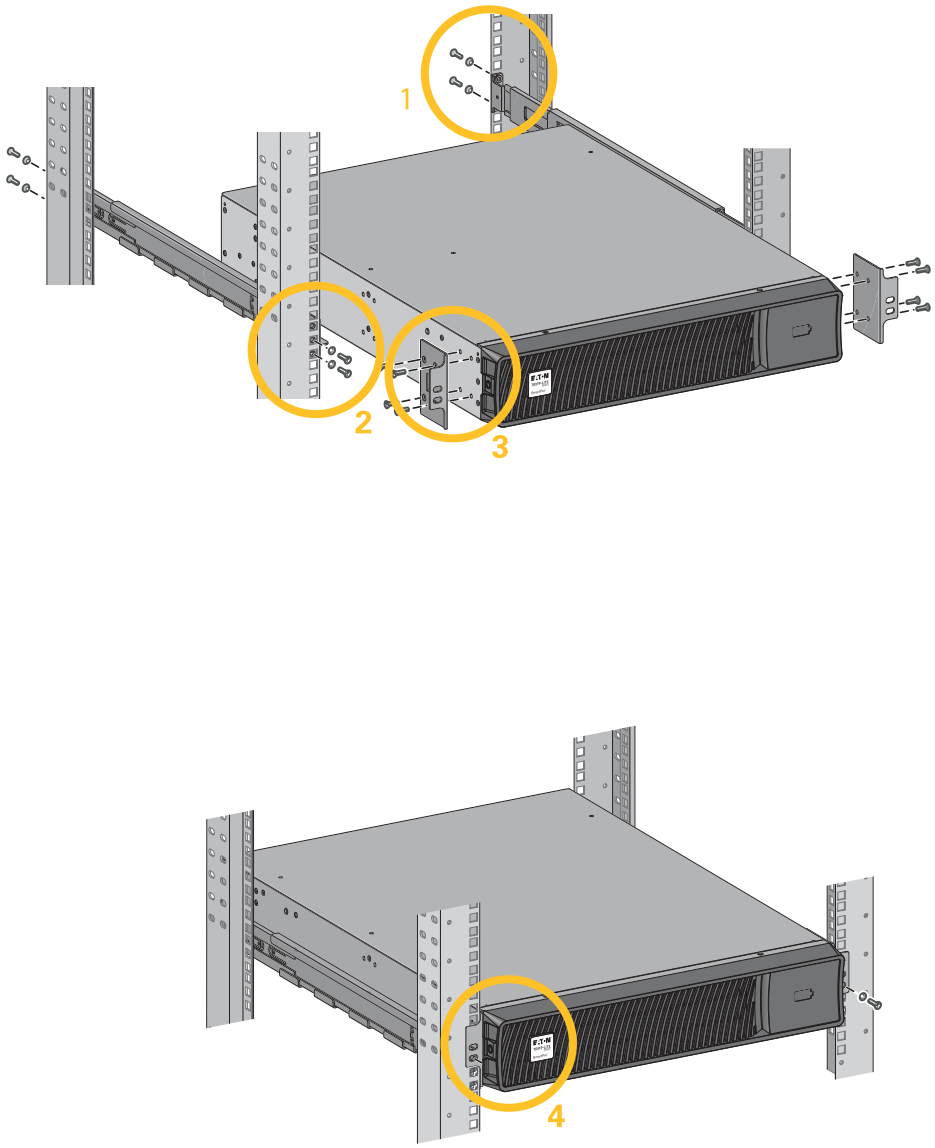
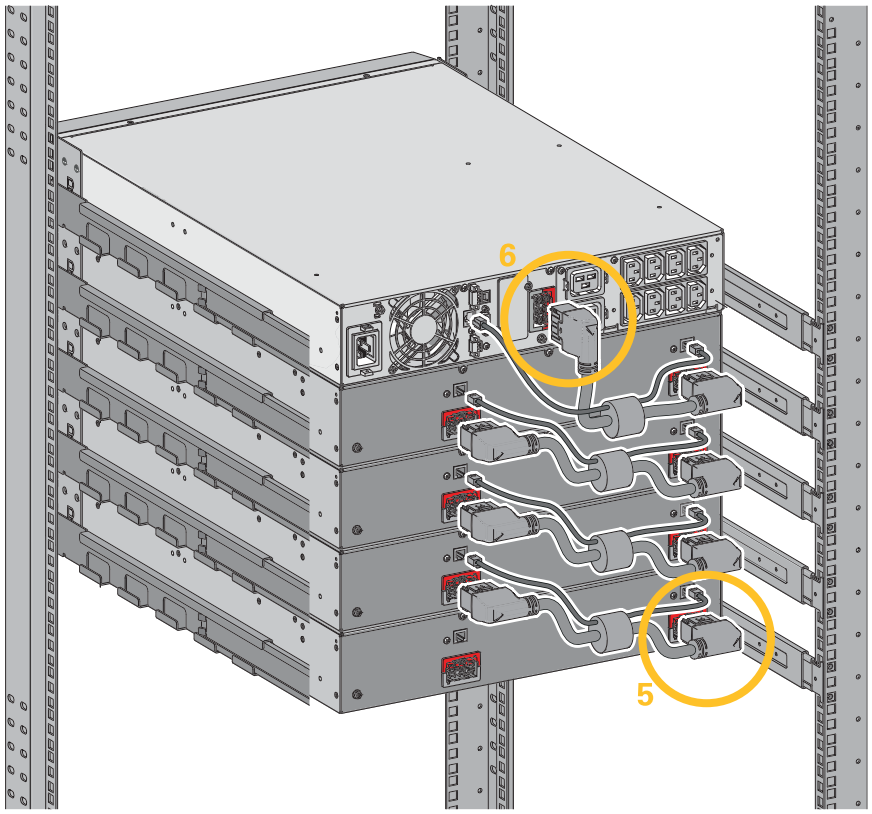


Figure 9. Rack EBM Installation and Connection (Continued)



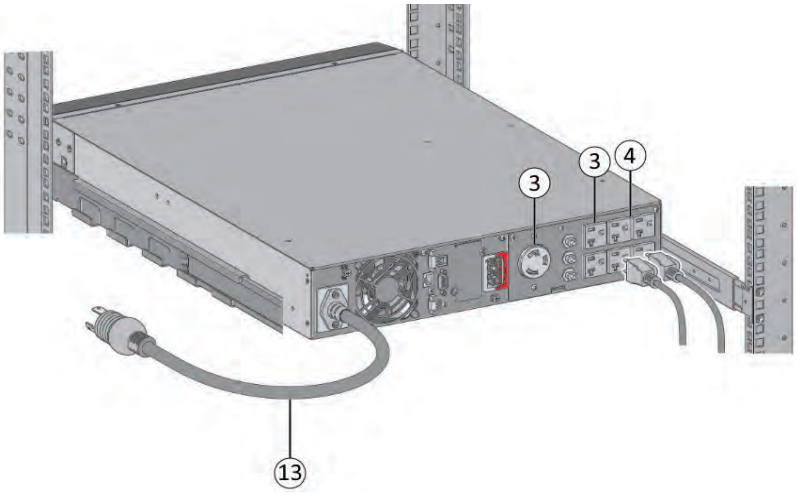
1. Fix the rail on the back of the rack.
2. Fix the rail on the front of the rack using the two holes at the bottom.
3. Fix the ears plate to the UPS.
4. Place the UPS on the rails and fix the ears plate to the top hole of the rail.
5. Connect the EBM power cable as shown in the picture.
6. Connect the RJ45 battery detection cable of the first EBM between the EBM and the UPS connector "Batt detection" (11). For any additional EBM, connect the battery detection cable to the previous EBM.

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

3.5 UPS Connection

⚠CAUTION

Check that the indications on the name plate located on the back of the UPS correspond to the AC-power source and the true electrical consumption of the total load.



1. Connect the UPS input cable (13) to the AC power source.
2. Connect the loads to the UPS. It is preferable to connect the priority loads to the outlets marked (3) and the non-priority loads to the outlets Group1, Group2 (4) that can be programmed.programmed.

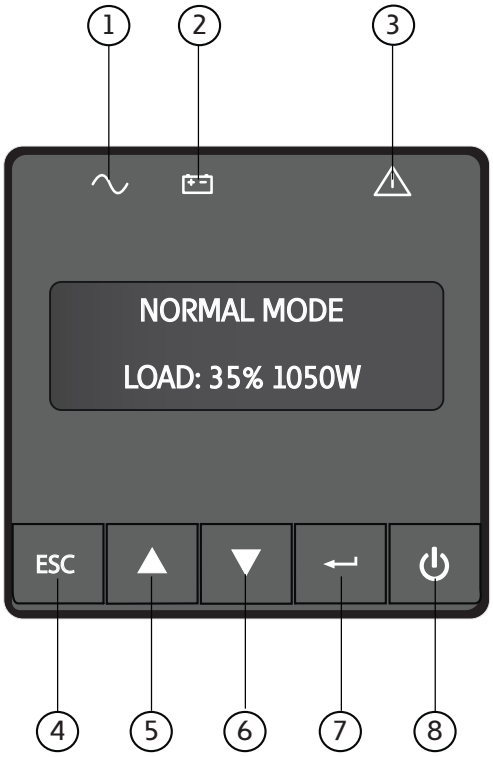
   For the SmartPro2200 / 3000 models, connect any high- power devices or matching Power Distribution Unit (PDU) to the L5-20R or L5-30R outlet.
3. To program shutdown and startup of the Group1 and Group2 outlets in order to extend battery runtime and perform scheduled shutdowns, please see the XREF "In/Out settings" section.

Chapter 4 Interfaces and Communication

4.1 Control panel

The screen provides useful information about the UPS itself, load status, events, measurements and settings.

Figure 10. Control Panel Details



① Power ON indicator (green)	⑤ Up
② Power ON indicator (green)	⑥ Down
③ Alarm Indicator (red)	⑦ Enter
④ Escape	⑧ On/Off button

The following table shows the indicator status and description :

Table 8. LED Indicator Details

Indicator	Status	Description
Green	On	The UPS is "On" and the load is protected.
Orange	On	The UPS is in battery mode and the load is protected.

Table 8. LED Indicator Details (Continued)

	Flashing	The battery voltage is below the warning level.
⚠ Red	On	The UPS has an active alarm or fault. See troubleshooting page for additional information.

4.2 LCD Description

The LCD screen has 2 lines, each line may show 16 characters maximum. The first line shows UPS mode, which may be standby mode, normal mode, battery mode, backup end mode or fault mode. The second line shows measures. The backlight LCD automatically dims after 5 minutes of inactivity. Press any button to restore the screen.

⚠CAUTION

If fault or alarm appears, the first line of LCD will cycle between fault/alarm message and UPS mode, see 7.1 *Troubleshooting* for additional information.

Figure 11. LCD Screen — Example

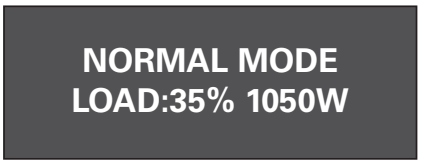


Table 9. LCD Screen – Display Details

Screen	Battery area display	Bottom row values
1st Screen (home / default *screen*): Load percentage and Watt.	UPS MODE LOAD: xxx% xxxxW	The LOAD data screen specifies the amount of power that connected equipment is currently using in terms of percentage and Watt. Load %, 0 decimal. Load W , 0 decimals.
2nd Screen: Load percentage and VA.	UPS MODE LOAD: xxx% xxxxVA	The OUTPUT LOAD LEVEL screen indicates the load percentage and VA output load level. Load % , 0 decimals. Load VA , 0 decimals.
3rd Screen: Output load power factor	UPS MODE LOAD PF: x. xx	The OUTPUT LOAD POWER FACTOR screen indicates the power factor of connected equipment. 2 decimal.

Table 9. LCD Screen – Display Details (Continued)

4th Screen: Input voltage and frequency	UPS MODE IN: xxxV xx. xHZ	The INPUT VOLTAGE & FREQUENCY screen displays current data. Input voltage: 0 decimal. Input frequency HZ,1 decimal.
5th Screen: Output voltage and frequency	UPS MODE OUT: xxxV xx. xHZ	The OUTPUT VOLTAGE & FREQUENCY screen displays current data. Output voltage: 0 decimal. Output frequency HZ,1 decimal.
6th Screen: Battery voltage and charge percentage	UPS MODE BAT: xx. xV xxx%	The BATTERY voltage screen tracks the charge level of your connected battery bank in terms of voltage and charge percentage. Battery voltage:1 decimal. Charge percentage:0 decimal.
7th Screen: Remaining battery runtime	UPS MODE RUNTIME: xxxMIN	The RUNTIME remaining screen tracks the approximate minutes of runtime available under the current loading and battery pack configuration. The runtime value will automatically re-calculate as connected equipment power consumption changes. 0 decimal.
8th Screen: External battery quantity	UPS MODE EBM: x	The EBM screen display external battery quantity. This screen is only for long time model. 0 decimal.
9th Screen: Remaining watts of UPS	UPS MODE REMAIN W: x. xxKW	The REMAIN WATTS screen tracks the remaining capacity of the UPS in kilowatt 2 decimals.
10th Screen: Demand energy	UPS MODE DEMAND E: x. xxKWH	The DEMAND ENERGY screen offers continuous data on the KWh(kilowatt-hour) that connected equipment has consumed in the last one-hour period. 2 decimals.

The following table describes the status information provided by the UPS :

Table 10. System Operational Status Details

Operation status	Possible cause	Action
Standby mode	The UPS is OFF, waiting for start-up command from user	Equipment is not power until button ⏻ is pressed during start up and the green "normal mode" LED indicator is illuminated.

Table 10. System Operational Status Details (Continued)

Normal mode	The UPS is operating normally.	The UPS is powering and protecting the equipment.
Battery Mode One beep every 10 seconds	A utility failure has occurred and the UPS is in Battery mode.	The UPS is powering the equipment with battery power. Prepare your equipment for shutdown.
End of backup time 1 beep every 3 seconds	The UPS is in Battery mode and the battery is running low.	This warning is approximate, and the actual time to shutdown may vary significantly. Depending on the UPS Load, the "Battery Low" warning may occur before the battery reaches 20% capacity remaining.
Fault Mode	Some fault has happened to the UPS. Action may be needed.	See 7.1 *Troubleshooting* for additional information.

4.3 Display Functions

Press the Enter ( ) button to activate the menu options. Use the two middle buttons (☐ and ☐) to scroll through the menu structure. Press the Enter (☐) button to select an option. Press the (**ESC**) button to cancel or return to the previous menu.

Table 11. Menu Map for Display Functions

Main menu	Submenu	Display information or Menu function
CONTROL	BATTERY TEST	Starts a manual battery test(possible if load>10% and battery >80%).
	RESET FAULT ST	Reset fault state.
	CLEAR EVENT LOG	Clears the faults and events stored.
	RESET KWH USED	Reset the power used.
	FACTORY SETT	Restore factory settings.
LOCAL SETTING	LANGUAGE	Sets product general parameters, see 4.4 *User Settings*
	AUDIBLE ALARM	Sets input and output parameters, see 4.4 *User Settings*
IN/OUT SETTING	OUTPUT VOLTAGE	Select output voltage through this submenu.
	INPUT THRESHOLD	Input threshold can be set to normal or extended through this menu.
	SENSITIVITY	Sensitivity can be set to high or low through this menu.
	OVRLOAD PREALARM	Overload pre-alarm can be set through this menu.
ON/OFF SETTING	COLD START	Cold start can be enabled or disabled through this menu.
	AUTO RESTART	Auto restart can be enabled or disabled through this menu.
	AUTO START	Auto start can be enabled or disabled through this menu.
	SLEEP MODE	Sleep mode can be enabled or disabled through this menu.

Table 11. Menu Map for Display Functions (Continued)

Main menu	Submenu	Display information or Menu function
	SITE WIRING FLT	Site wiring fault can be enabled or disabled through this menu.
BATTERY SETTING	AUTO BAT TEST	Auto battery test period can be set through this menu.
	RESTART LEVEL	Restart battery level can be set through this menu.
	BAT LOW LEVEL	Battery low percentage can be set through this menu.
	BAT LOW TIME	Battery low remaining time can be set through this menu.
COM SETTING	REMOTE ON/OFF	Select input signal function for REMOTE ON/OFF.
	REMOTE PWR OFF	Select input signal function for REMOTE PWR OFF.
	INPUT DB9-4	Select input signal function for INPUT DB9-4.
	OUTPUT RELAY	Select output signal function for OUTPUT RELAY.
	OUTPUT DB9-1	Select output signal function for OUTPUT DB9-1.
	OUTPUT DB9-7	Select output signal function for OUTPUT DB9-7.
	OUTPUT DB9-8	Select output signal function for OUTPUT DB9-8.
EVENT LOG		Event log has utmost 50 items to show what happened.
IDENTIFICATION		This menu shows IDENTIFICATION information.

4.4 User Settings

The following table displays the options that can be changed by the user.

Table 12. User Settings

	Submenu	Available settings	Default settings
LOCAL SETTING	LANGUAGE	ENGLISH FRANCAIS ESPANOL	ENGLISH
	AUDIBLE ALARM	ENABLED DISABLED ON BAT ALWAYS DISABLED	ENABLED
IN/OUT SETTING	OUTPUT VOLTAGE	[200 V] [208 V] [220 V] [230 V] [240 V]	[208 V]
	INPUT THRESHOLD	NORMAL EXTENDED	NORMAL
	SENSITIVITY	HIGH LOW	HIGH
	OVRLOAD PREALARM	[50%-105%, step is 5%.	105%
ON/OFF SETTING	COLD START	ENABLED DISABLED	ENABLED
	AUTO RESTART	ENABLED DISABLED	ENABLED
	AUTO START	ENABLED DISABLED	DISABLED
	SLEEP MODE	ENABLED DISABLED	ENABLED

Table 12. User Settings (Continued)

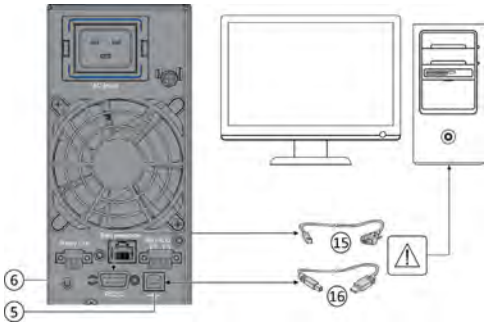
	Submenu	Available settings	Default settings
	SITE WIRING FLT	ENABLED DISABLED	DISABLED
BATTERY SETTING	AUTO BAT TEST	NO TEST MONTHLY	MONTHLY
	RESTART LEVEL	0%-100%, step is 5%.	0%
	BAT LOW LEVEL	0%-100%, step is 10%.	0%
	BAT LOW TIME	0MIN-60MIN, step is 3MIN	3MIN
COM SETTING	REMOTE ON/OFF	NO ROO RPO BLD.ALARM SHUTDOWN CMD	NO
	REMOTE PWR OFF	NO ROO RPO BLD.ALARM SHUTDOWN CMD	NO
	INPUT DB9-4	NO ROO RPO BLD.ALARM SHUTDOWN CMD	NO
	OUTPUT RELAY	ON BATTERY LOW BATTERY BATTERY FAULT UPS OK LOAD PROTECTED LOAD POWERED GENERAL ALARM OVRLOAD PREALARM BAT DISCONN	BATTERY FAULT
	OUTPUT DB9-1	ON BATTERY LOW BATTERY BATTERY FAULT UPS OK LOAD PROTECTED LOAD POWERED GENERAL ALARM OVRLOAD PREALARM BAT DISCONN	LOW BATTERY

Table 12. User Settings (Continued)

	Submenu	Available settings	Default settings
	OUTPUT DB9-7	ON BATTERY LOW BATTERY BATTERY FAULT UPS OK LOAD PROTECTED LOAD POWERED GENERAL ALARM OVRLOAD PREALARM BAT DISCONN	UPS OK
	OUTPUT DB9-8	ON BATTERY LOW BATTERY BATTERY FAULT UPS OK LOAD PROTECTED LOAD POWERED GENERAL ALARM OVRLOAD PREALARM BAT DISCONN	ON BATTERY

4.5 Communication Ports

Table 13. RS232/USB Communication Port Connection Steps

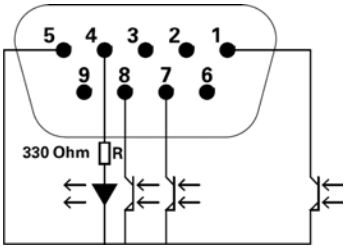


1. Connect the RS232 (15) or USB (16) communication cable to the serial or USB port on the computer equipment.
2. Connect the other end of the communication cable (15) or (16) to the USB (5) or RS232 (6) communication port on the UPS.

The UPS can now communicate with Eaton Tripp Lite Series power management software.

You can improve the remote monitoring and power management of the UPS by adding a communication card compatible with the SmartPro product, see paragraph 4.6 *UPS Remote Control Functions*.

Table 14. RS232 Communication Port Contact Details



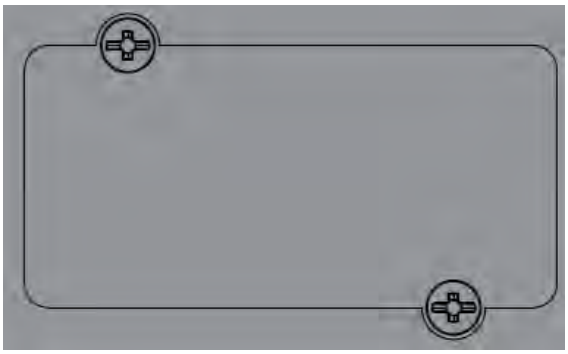
Contact characteristics (optocoupler)

- Voltage: 48 V DC max
- Current: 25 mA max
- Power: 1.2 W

Pin	Signal	Direction	Function
1	Bat low	Output	Low Battery Output
2	TxD	Output	Transmit to external device
3	RxD	Input	Receive from external device
4	I/P SIG	Input	-
5	GNDS	-	Signal Common tied to chassis
6	PNP	Input	Plug and Play
7	UPS OK	Output	UPS OK
8	BAT mode	Output	UPS on battery mode
9	+5V	Output	Power supply for external signal or options

Table 15. Communication Card Installation Steps

Installation of the communication cards



Accessory Slot: Remove the small cover panel from this slot to install optional accessories to remotely monitor and control your UPS. Refer to your accessory's manual for installation instructions. Contact tripplite.eaton.com for more information, including a list of available SNMP, network management and connectivity products.

NOTE Select models include a pre installed network management card. For these models, refer to the management card accessory user manual included with your UPS for connection, configuration and complete operating instructions.

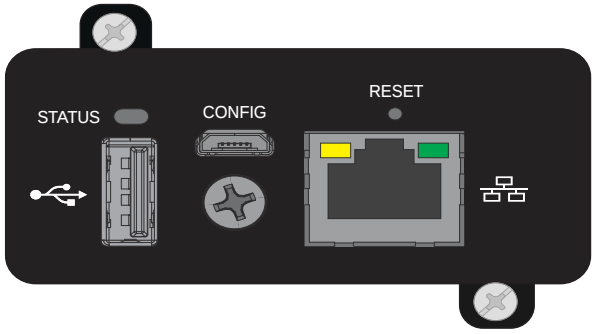
4.6 UPS Remote Control Functions

Connectivity cards

Connectivity cards allow the UPS to communicate in a variety of networking environments and with different types of devices. The SmartPro models have one available communication bay for the following connectivity card:

• **Network card** (**WEBCARDLXE**) : Operate any compatible UPS system or PDU as a managed device on your network. Monitor and control the device using an SNMP network management platform, web browser, SSH or Telnet.

Figure 12. Network Card



Programmable signal inputs

The SmartPro incorporates several programmable signal inputs: one Remote Power Off (RPO) input terminal, one Remote On/Off (ROO) input terminal, one RS-232 input (pin-4).

Signal inputs can be configured (see Settings > Comm settings > Signal Input) to have one of the following functions:

Table 16. Programmable Signal Input Details

Function	Description
No	No function. (Please choose a function if you want to use input signal.)
RPO	Remote Power off (RPO) is used to shutdown the UPS remotely.
ROO	Remote On/Off allows remote action of a button or other interface to switch On/ Off the UPS. (Cold start is prohibited while using the ROO function.)
Building alarm	Active input generates an alarm "building alarm".
Shutdown commands	Active input turns UPS output (or outlet groups) off after a user defined shutdown delay but keeps on charging batteries according to a selected charging scheme; inactive input does not abort shutdown countdown. Depending on the "Restart" parameter (see Settings > Comm Settings > Shutdown commands) the unit may startup automatically.

⚠WARNING

Signal inputs have no function by default; please choose a function through the LCD (Settings > Com settings > Input signals).

See the following two examples of system configuration with the RPO terminal used as RPO function and the ROO terminal use as ROO function:

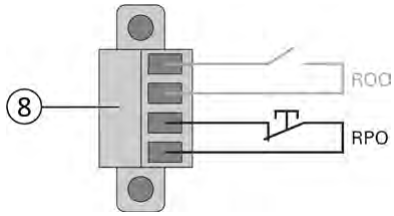
Remote Power Off (RPO)

RPO is used to shutdown the UPS remotely when the contact is open. This feature can be used for shutting down the load and the UPS by thermal relay, for example, in the event of room over temperature. When RPO is activated, the UPS turns 25 off the output and shuts down all power converters immediately (except for logic power). The UPS remains "ON" to alarm the fault.

The RPO circuit is a safety extra low voltage (SELV) circuit. This circuit must be separated from any hazardous voltage circuits by reinforced insulation.

- The RPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The RPO switch must be a dedicated latching-type switch not tied into any other circuit. The RPO signal must remain active for at least 250 ms 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 Remote Power Off function is activated.

Table 17. RPO Connections Detail

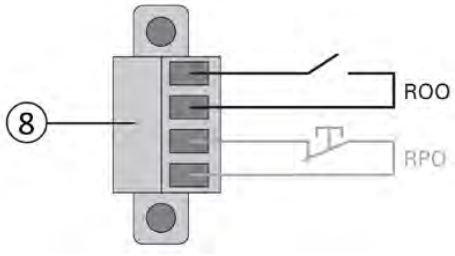


RPO	Comments
Connector type	Terminal, 14 AWG Maximum wires
Terminal rating	60 V DC/30 V AC 20 mA max

Remote On/Off (ROO)

- Remote On/Off allows remote action of button to switch On/Off the UPS.
- When contact changes from open to closed, the UPS is switched-on (or stays On).
- When contact changes from closed to open, the UPS is switched-off (or stays Off).
- On/Off control via button has priority over the remote control.

The ROO function is only active after the first use of the "Remote OFF" function.

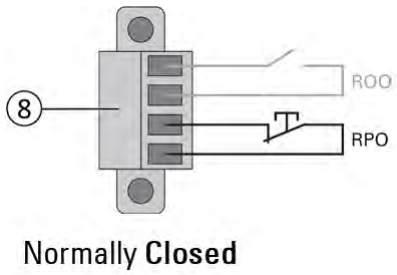


ROO	Comments
Connector type	Terminal, 14 AWG Maximum wires
Terminal rating	60 V DC/30 V AC 20 mA max

Remote control connection and test

1. Check the UPS is shut down and the electrical supply network disconnected.

2. Remove RPO connector from the UPS by removing the screws.
3. Connect a normally closed volt-free contact between the two pins of connector.



Contact open: shut down of UPS.
To return to normal operation, deactivate the external remote shut down contact and restart the UPS from the front panel.

4. Plug the RPO connector into the back of the UPS and fix the screws.
5. Connect and restart the UPS according to the previously described procedures.
6. Activate the external remote shut down contact to test the function

Always test the RPO function before applying your critical load to avoid accidental load loss.

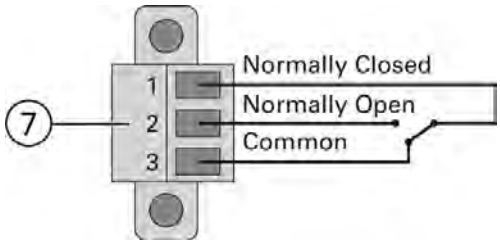
Programmable signal outputs

The SmartPro incorporates several programmable signal outputs: one relay output and two optocoupler outputs (DB9 pins 1 and 8). Signal outputs can be configured (see Settings > Comm settings > Output Signals) to report the following information:

Table 18. Programmable Signal Outputs Details

Signal	Default Assignment	Description
On battery (On Bat)	DB9-Pin 8	UPS is in battery mode
Low battery (Low Bat)	DB9-Pin 1	UPS is in battery mode and has reached the low battery alarm threshold
Battery fault	(1) Relay output	Battery fault
UPS OK	DB9-Pin 7	Load is powered with no alarm (from inverter or bypass)
Load protected	-	UPS is on inverter, with no alarm and ready to go to battery
Load powered	-	Load is powered(from inverter or bypass)
General alarm	-	Choose events that will trigger this alarm trough the LCD (Settings > Comm settings > General alarm). For more information on possible events please look at User settings
OVLD pre-alarm	-	Overload pre-alarm
Bat disconn	-	Battery is disconnected

Figure 13. Relay Output Details



4.7 Power Alert Software

Use with Tripp Lite's PowerAlert Software and included cables to enable your computer to automatically save open files and shut down equipment during a blackout. Also use PowerAlert Software to monitor a wide variety of AC line power and UPS operating conditions. Consult your PowerAlert Software manual or contact Tripp Lite Customer Support for more information.

4.8 Cybersecurity

Eaton is committed to minimizing the Cybersecurity risk in its products and employs cybersecurity best practices and the latest cybersecurity technologies in its products and solutions, making them more secure, reliable and competitive for our customers. Eaton also offers Cybersecurity Best Practices whitepapers to its customers, referenced at www.eaton.com/cybersecurity.

Chapter 5 Operation

5.1 Start-up and normal operation

⚠CAUTION

Check that the indications on the name plate located on the back of the UPS meets to the AC power source and the true electrical consumption of the total load.

Battery charge

The UPS charges the battery as soon as it is connected to the AC outlet, whether the ON/OFF button is pressed or not. It is recommended that the UPS be permanently connected to the AC power supply to ensure the best possible autonomy.

To start the UPS:

1. Verify that the UPS power cord is plugged in.
2. The UPS front panel display illuminates.
3. Press the ⏻ button on the UPS front panel for at least two seconds.
4. Check the UPS front panel display for active alarms or notices. Resolve any active alarms before continuing; if the ⚠ indicator is on, do not proceed until all alarms are clear (see 7.1 *Troubleshooting*). Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
5. Verify that the ∿ indicator illuminates solid, indicating that the UPS is operating normally and any loads are powered and protected. The UPS should be in Normal mode.

5.2 Starting the UPS on battery

Before using this feature, the UPS must have been powered by utility power with output enabled at least once.

Battery start can be disabled. See the "Cold start" setting in .

To start the UPS on battery:

1. When the UPS is disconnected from the AC power source, press the ⏻ button on the UPS front panel.

   The UPS transfers from Standby mode to Battery mode. The 🔋 indicator illuminates solid.

   The UPS supplies power to your equipment.
2. Check the UPS front panel display for active alarms or notices besides the "Battery mode" and related notifications that indicates missing utility power. Resolve any active alarms before continuing. See 7.1 *Troubleshooting*.

   Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

5.3 UPS shutdown

To shut down the UPS:

Press the ⏻ button on the front panel for three seconds.

The UPS starts to beep and shows a status of "SHUTTING DOWN...". The UPS then transfers to Standby mode.

5.4 Operating modes

The Eaton® Tripp Lite Series SmartPro TAA front panel indicates the UPS status through the UPS indicators located above the LCD screen.

Normal mode 

When the green sinewave symbol is illuminated, the UPS is providing protected AC power output. The UPS monitors and charges the batteries as needed and provides power protection to your equipment.

Battery mode 

When the UPS is operating during a power outage, the alarm beeps once every ten seconds and the indicator illuminates solid. The necessary energy is provided by the battery.

When the utility power returns, the UPS transfers to Normal mode operation while the battery recharges. If battery capacity becomes low while in Battery mode, the audible alarm beeps once every three seconds.

This warning is approximate, and the actual time to shutdown may vary significantly; gracefully shutdown all applications on connected equipment due to imminent UPS shutdown.

When utility power is restored after the UPS shuts down, the UPS automatically restarts.

Low-battery warning

- The  indicator illuminates solid.
- The audio alarm beeps every three seconds.

The remaining battery power is low. Shut down all applications on the connected equipment because automatic UPS shutdown is imminent.

End of battery backup time

- LCD displays "BACKUP END MODE".
- All the LEDs go OFF.
- The audible alarm stops.

5.5 Return of AC input power

Following an outage, the UPS restarts automatically when AC input power returns (unless the restart function has been disabled) and the load is supplied again.

5.6 Configuring Battery Settings

Automatic battery test

Automatic battery tests are done every month.

During the test, the UPS transfers to Battery mode and discharges the batteries for 10 seconds under load. Battery mode is not displayed and battery low alarm does not activate during a battery test.

The battery test may be postponed due to bad conditions, or failed if battery is not ok.

Low battery warning

During discharge, the low battery alarm is activated if the remaining runtime goes below 3 minutes or less than the setting capacity threshold (0% by default).

This threshold can be modified.

External battery setting

The number of Extended Battery Module is automatically detected.

Deep discharge protection

This setting is recommended to avoid damaging the battery. Warranty is void if deep discharge protection is disabled.

5.7 Retrieving the event and fault log

To retrieve the event and fault log through the display:

1. Press any button to activate the menu options, then select event log.
2. Scroll through the listed events and faults.

Chapter 6 UPS Maintenance

6.1 Equipment Care

For the best preventive maintenance, keep the area around the equipment clean and dust free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.

For full battery life, keep the equipment at an ambient temperature of 25 °C (77 °F).

The batteries are rated for a 3-5 year service life. The length of service life varies, depending on the frequency of usage and ambient temperature (life divided by 2 each 10 °C above 25 °C).

If the UPS requires any type of transportation, verify that the UPS is turned off.

Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every 4 years to keep units running at peak performance.

Batteries runtime will be reduced at low temperature (below 10 °C).

6.2 Storing the Equipment

If you store the equipment for a long period, recharge the battery every 6 months by connecting the UPS to utility power. The internal batteries charge to 90% capacity in less than 3 hours. However, Eaton recommends that the batteries charge for 48 hours after long-term storage.

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

6.3 When to Replace Batteries

Eaton Tripp Lite Series UPS batteries have an expected life span of 3-5 years.

After 4 years of operation you should take proactive steps to ensure you replace your batteries for optimal operation and reliability.

Contact your service representative to order new batteries.

Battery recommended replacement reference can be accessed through the LCD.

6.4 Replacing Batteries

⚠CAUTION

DO NOT DISCONNECT the batteries while the UPS is in Battery mode.

For battery replacement, follow Eaton Tripp Lite Series instructions provided on tripplite.eaton.com.

Batteries can be replaced easily without turning off the UPS or disconnecting the load.

Consider all warnings, cautions, and notes before replacing batteries.

- Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions.

  Keep unauthorized personnel away from batteries.

- Batteries can present a risk of electrical shock or burn from high short circuit current.

  Observe the following precautions:

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

3. Do not lay tools or metal parts on top of batteries.
4. Wear rubber gloves and boots.

- When replacing batteries, replace with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be extremely toxic.
- Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).
- ELECTRIC ENERGY HAZARD. Do not attempt to alter any battery wiring or connectors. Attempting to alter wiring can cause injury.
- Disconnect charging source prior to connecting or disconnecting battery terminals.

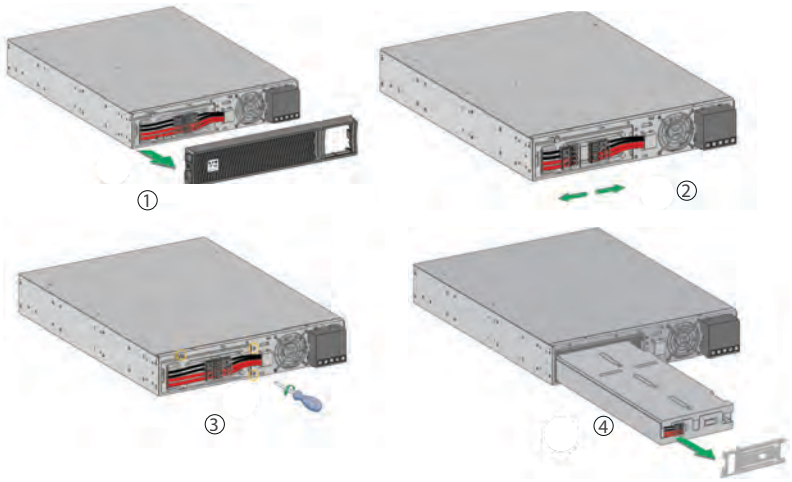
Replacing the Internal Battery

The internal battery is heavy. Use caution when handling the heavy batteries. See Figure 14 .

NOTE A Phillips head screwdriver is needed to perform this procedure.

1. Pull off the front panel by pressing the tabs on both sides.
2. Disconnect the battery pack by separating the connectors (never pull on the wires).
3. Remove the metal protection cover in front of the battery (three screws).
4. Pull the plastic tab to remove the battery pack and replace it.

Figure 14. Battery Replacement



⚠WARNING

Take care not to reverse the polarity + (red) and - (black) when connecting the batteries as this will destroy the device.

Testing New Batteries

To test new batteries:

1. Charge the batteries for 48 hours.
2. Press any button to activate the menu options.
3. Select "CONTROL" then Start 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 front panel displays "BAT TESTING".

6.5 Recycling the Used Equipment

Contact your local recycling or hazardous waste center for information on proper disposal of the used equipment. www.eaton.com/recycling

RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.

This symbol indicates that you should not discard the product in the trash. This product must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Chapter 7 Troubleshooting

7.1 Troubleshooting

The Eaton Tripp Lite Series SmartPro is designed for reliable, autonomous operation while providing you with notifications and alerts whenever a potential operational or performance issue occurs. is designed for durable, automatic operation and alerts you whenever potential operating problem may occur.

Usually the alarms shown by the control panel do not mean that the output power is affected. Instead, they are preventive alarms intended to alert the user.

- Events are silent status information that are recorded into the Event log. Example = "AC NOT PRESENT".
- Alarms are recorded into the Event log and displayed on the LCD status screen. Some alarms may be announced by a beep every 3 seconds. Example = "BATTERY LOW".
- Faults are announced by a continuous beep and red LED, recorded into the EVENT log and displayed on the LCD with a specific message box or Fault code. Example = "OVER LOAD!" or "FAULT #007".

Use the following troubleshooting chart to determine the UPS alarm condition.

7.1.1 Typical Alarms and Faults

To check the Event log or Fault log:

1. Press any button on the front panel display to activate the menu options.

2. Press the ▼ button to select Event log.

3. Scroll through the listed events or faults.

The following table describes typical conditions:

Table 19. Alarm Conditions

Conditions	Possible cause	Action
Battery mode  LED is On. 1 beep every 10 seconds	A utility failure has occurred and the UPS is in battery mode.	The UPS is powering the equipment with battery power. Prepare your equipment for shutdown.
Battery low  LED is On. 1 beep every 3 seconds	The UPS is in Battery mode and the battery is running low.	This warning is approximate, and the actual time to shutdown may vary significantly. Depending on the UPS load and number of Extended Battery Modules (EBMs), the "BATTERY LOW" warning may occur before the remaining time reaches 3 minutes by default.
No battery  LED is On Beep continuous	The batteries are disconnected.	Verify that all batteries are properly connected. If the condition persists, contact your service representative.
Battery fault	The battery test is failed due to bad or disconnected batteries.	Verify that all batteries are properly connected. If the condition persists, contact your service representative.

Table 19. Alarm Conditions (Continued)

Conditions	Possible cause	Action
 LED is On. Beep continuous		
The UPS does not provide the expected backup time.	The batteries need charging or service.	Apply utility power for 48 hours to charge the batteries. If the condition persists, contact your service representative.
Power Overload  LED is On	Power requirements exceed the UPS capacity (greater than 100% of nominal; see for specific output overload ranges).	Remove some of the equipment from the UPS. The UPS continues to operate, but may shut down if the load increases. The alarm resets when the condition becomes inactive.
UPS overtemperature  LED is On 1 beep every 3 seconds	The UPS internal temperature is too high or a fan has failed. At the warning level, the UPS generates the alarm but remains in the current operating state. If the temperature rises another 10°C, the UPS shuts down.	Clear vents and remove any heat sources. Allow the UPS to cool. Ensure the airflow around the UPS is not restricted. Restart the UPS. If the condition continues to persist, contact your service representative.
The UPS does not start	The input source is not connected correctly.	Check the input and battery connections.
	The Remote Power Off (RPO) switch is active or the RPO connector is missing.	If the UPS Status menu displays the "Remote Power Off" notice, deactivate the RPO input.

7.1.2 Alarm or Fault Codes

Table 20. Alarm Codes

Alarm Code	Message	Description
#004	UPS TEMP. ALARM	Ambient or NTC temperature is high
#110	BUILDING ALARM	Building alarm
#604	BATTERY LOW	Battery level is below Remaining Capacity Limit threshold or Run Time to Empty is below Remaining Time Limit threshold.
#802	IMMINENT SHUTOFF	Shut down imminent
#806	EMERGENCY OFF	Emergency stop was proceed
#808	OVLD PREALARM	The load percent is > the overload level setting (default 105%)

Table 21. Alarm Fault Codes

Fault Code	Message	Description
#007	FAN FAULT	Ventilator fault
#60D	NO BATTERY	Battery not present
#607	BATTERY FAULT	Battery need replacement OR is faulty
#004	UPS TEMP. FAULT	UPS internal temperature is high, over fault point
#808	POWER OVERLOAD	Overload counter time reach, transfer to Fault mode
#805	OUTPUT SHORTED	Short circuit on output
#107	INPUT BAD WIRING	Site wiring fault that can come of Phase neutral inversion on single phase UPS
#809	INDU OVERLOAD	Inductive overload occurred, transfer to Fault mode
#80A	CAPA OVERLOAD	Capacitive overload occurred, transfer to Fault mode
#804	IMBALANCE LOAD	Load is unbalance
#002	INTERNAL FAULT	UPS Internal fault: Main relay abnormal
#002	SAFETY FAULT	Safety relay is failure
#002	NTC ABNORMAL	NTC abnormal
#105	AVR TOO HOT	AVR is abnormal
#500	CHARGER FAULT	Charger internal failure
#502	MAX CHARGER VOLT	The charger voltage is >2.5VPC
#503	MIN CHARGER VOLT	The charger voltage is <1.5VPC

7.1.3 Silencing the Alarm

Press the ESC (Escape) button on the front panel display to silence the alarm. Check the alarm condition and perform the applicable action to resolve the condition. If the alarm status changes, the alarm beeps again, overriding the previous alarm silencing.

7.1.3.1 Service and Support

If you have any questions or problems with the UPS, call your **Local Distributor** or **Eaton Support** at one of the following telephone numbers and ask for a UPS technical representative.

United States:	**1–800–356–5737**
Canada:	**1–800–461–9166 ext 260**
All other countries:	**Call your local service representative**

Please have the following information ready when you call Eaton Support:

- Model number
- Serial number
- Version number (if available)
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from Eaton Support or your local distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, and freight prepaid for all warrantied units.

NOTE For critical applications, immediate replacement may be available. Call **Eaton Support** for the dealer or distributor nearest you.

Chapter 8 Specifications

8.1 UPS Model List

Figure 15. SmartPro 1500– 3000 Models

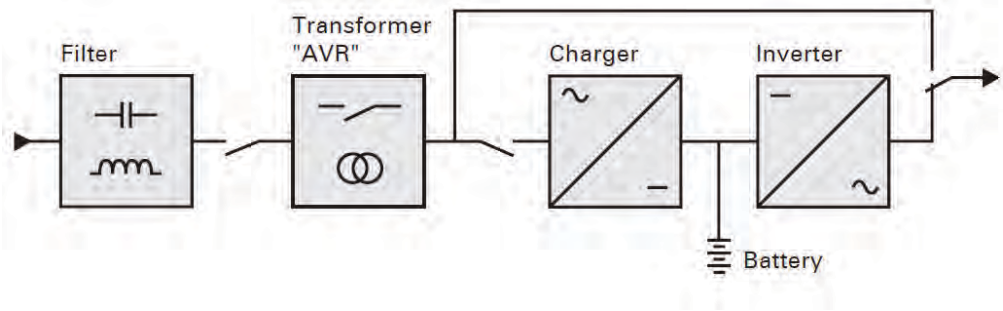


Table 22. Model List

Model	Power rating	Configuration
SMART1500RXLTAA	1440W/1440VA	Rack / Tower
SMART2200RXLTAA	1950W/1950VA	Rack / Tower
SMART3000RXLTAA	3000W/3000VA	Rack / Tower

8.2 Extended Battery Module Model List

Table 23. Extended Battery Module List

Model	Configuration	Battery voltage	Use with
BP48VRXLTAA	Rack / Tower	48Vdc	SMART1500RXLTAA
BP72VRXLTAA	Rack / Tower	72Vdc	SMART2200RXLTAA SMART3000RXLTAA

8.3 Weights and Dimensions

Table 24. Weights and Dimensions

Description (UPS)	Weights (lb / kg)	Dimensions (inch / mm) D x W x H
SMART1500RXLTAA	50.7 / 23.0	17.6 x 17.2 x 3.4 / 448 x 438 x 85.5
SMART2200RXLTAA	65.3 / 29.6	23.7 x 17.2 x 3.4 / 603 x 438 x 85.5
SMART3000RXLTAA	74.5 / 33.8	23.7 x 17.2 x 3.4 / 603 x 438 x 85.5
Description (EBM)	**Weights (lb / kg)**	**Dimensions (inch / mm) D x W x H**
BP48VRXLTAA	61.3 / 27.8	17.6 x 17.2 x 3.4 / 448 x 438 x 85.5
BP72VRXLTAA	89.1 / 40.4	23.7 x 17.2 x 3.4 / 603 x 438 x 85.5

8.4 Electrical Input

Table 25. Electrical Input

Default frequency	60Hz
Nominal frequency	50/60Hz
Frequency range	47-70Hz

Model	Default input (Voltage/ Current)	Input nominal voltages	Input voltage window
SMART1500RXLTAA	120V/12A	100-125V	80-151V adjustable to 70-153V
SMART2200RXLTAA	120V/16A		
SMART3000RXLTAA	120V/24A		

8.5 Electrical Input Connections

Table 26. Electrical Input Connections

Model	Input connection	Input cable
SMART1500RXLTAA	Fixed	NEMA 5-15P
SMART2200RXLTAA		NEMA 5-20P
SMART3000RXLTAA		NEMA L5-30P

8.6 Electrical Output

Table 27. Electrical Output

All models	Normal mode	Battery mode	
Voltage regulation	Boost : Vin*1.15 Buck : Vin*0.87	(-10% ,6%)	
Efficiency	>96%	1500-2200 > 82% 3000 > 85%	
Frequency regulation		+/-0.1 Hz	
Nominal output	100/110/120/125V		
Frequency	Follows input frequency	50/60Hz	
Output overload	[105%,120%] 30min [120%,150%] 5min >150% 10s	[105% ~110%] 10s - Output short-circuit current max RMS & delay time: 114.5A/100ms; The max peak value: 202A	
Short circuit current limitation in battery mode		**Model**	**Current limitation**
		SMART1500RXLTAA	56A
		SMART2200RXLTAA	66A

Table 27. Electrical Output (Continued)

All models	Normal mode	Battery mode	
		SMART3000RXLTAA	90A
Transfer time	Utility Outage: 1-4ms for normal mode, >5ms for sensitive mode Utility abnormal: <10ms for normal mode ,<25ms for sensitive mode		

8.7 Electrical Output Connection

Table 28. Electrical Output Connections

Model	Output connection
SMART1500RXLTAA	(4) 5-15R Primary (2) 5-15R Group1 (2) 5-15R Group2
SMART2200RXLTAA	(2) 5-20R + (1) L5-20R Primary (2) 5-20R Group 1 (2) 5-20R Group 2
SMART3000RXLTAA	(2) 5-20R + (1) L5-30R Primary (2) 5-20R Group 1 (2) 5-20R Group 2

8.8 Battery

Table 29. Battery Specifications

	Internal batteries	EBM
Specifications	SMART1500RXLTAA: 48Vdc - 4 x 12V, 9Ah SMART2200RXLTAA: 72Vdc - 6 x 12V, 7Ah (9Ah max) SMART3000RXLTAA: 72Vdc - 6 x 12V, 9Ah	BP48VRXLTAA: 48Vdc - 2 x 4 x 12V, 2 x 9Ah BP72VRXLTAA: 72Vdc - 2 x 6 x 12V, 2 x 9Ah
Type	Sealed, maintenance-free, valve-regulated, lead-acid, with minimum 3-5 year float service life at 25°C (77°F).	
Monitoring	Advanced monitoring for earlier failure detection and warning	
EBM battery cable length	2U EBM cable length：350mm/13.78in	

8.9 Environmental and Safety

Table 30. Environmental and Safety Specifications

Standards	IEC/EN 62040-1:2008+A1:2013 EN IEC 62040-2: 2018 IEC 62040-2: 2016 FCC CFR Title 47, Part 15, Subpart B IEC/EN 62040-3 IEC 62040-1:2017 UL1778 5th edition CSA 22.2
EMC (Emissions)	EN IEC 62040-2: 2018 C2 EN 62040-2: 2006 C2 IEC 62040-2: 2016 C2 EN 55011:Class A CISPR11 Class A CISPR32 Class A FCC part 15 Class A
Agency markings	CE, cTUVus, FCC, Energy star NOM
Operating temperature	0 to 40 °C (32 to 104 °F)
Storage temperature	-15 to 50°C (5 to 122 °F)
Relative humidity	20 to 90 % (without condensation)
Operating altitude	Up to 3,000 meters (9,843 ft) above sea level, no derating for 40°c (104°F) room temperature
Transit altitude	Up to 10,000 meters (32,808 ft) above sea level
Audible noise	Line mode:<40dB Buck/boost mode:<45 dB Batt. Mode: <45dB, 50dB for 3K

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