

Eaton 93PX 400V 15–20kVA UPS

User and Installation Guide



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. The output cable should be less than ten meters in length.



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

Unique Identifier: EATON, 93PX

Responsible Party:

EATON
10000 Woodward Ave
Woodridge, IL 60517 USA
773-869-1111
www.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.

Innovation, Science and Economic Development Canada Notice

This Class A digital device apparatus complies with Canadian ICES-003. **CAN-ICES-003A/NMB-003A.**

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 User and Installation Guide for additional information, such as important operating and maintenance instructions.



This symbol indicates that you should 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.



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.

Battery Warning Instructions

- Risk of electric shock. All repairs and service should be performed by **AUTHORIZED SERVICE PERSONNEL ONLY**. There are **NO USER-SERVICEABLE PARTS** inside the UPS.
- **CAUTION:** Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- Defective batteries can attain temperatures that surpass the burn limits for surfaces that can be touched.
- Remove watches, rings, and other metal objects from the hands before servicing equipment.
- Wear rubber gloves and boots.
- Use tools with insulated handles.
- The system must be properly grounded at all times.
- The battery may consist of multiple parallel strings. Make sure that you disconnect all strings before installation.
- The battery supplied with the system contains small amounts of toxic materials. To avoid accidents, observe the following directives:
 - 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 and burning). The short-circuit current may be very high.
- Precautions must be taken for all handling. A battery can present a risk of electric shock and high short circuit current. The following precautions should be observed when working on batteries:
 - Do not lay tools or metal parts on top of batteries.
 - Disconnect the charging source prior to connecting or disconnecting battery terminals.
 - Remove battery grounds during installation and maintenance to reduce the likelihood of shock.

- Determine whether the battery is inadvertently grounded. If inadvertently grounded, remove the source from the 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 that do not have a grounded supply circuit).

Product Safety

- This UPS carries lethal voltages. All repairs and service must be done by AUTHORIZED SERVICE PERSONNEL ONLY. There are no NO USER-SERVICEABLE PARTS inside the UPS.
- High leakage current. Make sure that there is a ground connection before connecting supply.
- To connect the UPS, instructions and operations described in the User and Installation Guide must be followed in the indicated order.
- Before starting any installation or service work, ensure all AC and DC power sources are disconnected, as power can come from multiple sources. Also, verify system grounding and protective earth continuity. In parallel systems, output terminals may still be energized even if the UPS is turned off.
- The UPS operates with mains, battery or bypass power. It contains components that carry high currents and voltage. A properly installed enclosure is earthed and IP20 rated against electric shock and unwanted objects. The UPS is a sophisticated power system and only qualified personnel are allowed to install and service it.
- The UPS is powered by its own energy source (batteries). The output terminals may be energized even if the UPS is disconnected from an AC source.
- 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.
- Ensure that the system is free of any contaminants, the surrounding area is free of debris, and there are no foreign substances within the system.
- For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.
- Do not allow any liquids to enter the UPS. Do not place beverages or any other liquid-containing vessels on or near the unit.
- This unit is intended for installation in a controlled environment (temperature-controlled, indoor area free of conductive contaminants). Avoid installing the UPS in locations with standing or running water or excessive humidity.
- Never install the system near liquids or in an excessively damp environment. This equipment should only be used in a dry, indoor environment.
- Never let a foreign body penetrate the system.
- Do not plug the UPS input into its own output.
- Never block the ventilation grates of the system.
- Never expose the system to direct sunlight or to a heat source.
- Store the system in a dry place before installing. If storage is required, store the system in a dry location.
- Unplug the UPS prior to cleaning, and do not use liquid or spray detergent on it.
- The admissible storage temperature range is -25°C to +55°C without batteries, 0°C to 40°C with batteries.
- The system is not for use in a computer room AS DEFINED IN the standard for the Protection of Information Technology Equipment, ANSI/NFPA.

- To reduce the risk of overheating the UPS, do not cover the unit's cooling vents and avoid exposing the UPS to direct sunlight or installing the unit near heat-emitting appliances such as space heaters or furnaces.
- Ensure that the UPS is connected only to the appropriate electrical supply system (e.g., TN, IT). Connecting to an incompatible system may result in equipment damage or safety hazards.
- Ensure that the load equipment is connected only to the appropriate electrical supply system (e.g., TN, IT). Connecting to an incompatible system may result in equipment damage or safety hazards.
- Ensure that the energy storage device is connected only to the appropriate electrical supply system (e.g., TN, IT). Connecting to an incompatible system may result in equipment damage or safety hazards.
- This device is intended to be supplied from the building wiring. It applies to both plug-connected and permanently connected equipment and is classified under Overvoltage Category: OVC II.
- The operating conditions for this electrical equipment fall under Pollution Degree 2 according to IEC 664 (3.7.3).

Special Precautions

- The unit is heavy. Wear safety shoes and use a vacuum lifter if possible when handling the system.
- All handling operations 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, and avoids possibly irreversible damage.

Table of Contents

1 Overview	1
1.1 Introduction	1
1.2 Dimensions	2
1.3 Physical Features	7
2 UPS System Installation	12
2.1 Unpacking the Equipment	12
2.2 Package Contents	14
2.3 System Mechanical Installation	19
2.4 Electrical Installation	24
2.4.1 Breaker and Wire Sizes	24
2.4.2 MBP20KIU Installation	25
2.4.3 MBP20KIUHW Electrical Installation	28
2.4.4 MBP20KIUPARA Electrical Installation	31
2.4.5 EBM Installation	35
3 Operation.....	42
3.1 Control Panel Functions	42
3.2 Control Panel Menu Structure	43
3.2.1 Initial Settings Screens	44
3.2.2 Main Screen	46
3.2.3 Main Menu Screen.....	47
3.2.4 Meters Screen	47
3.2.5 History Screen	48
3.2.6 System Control Screen	50
3.2.7 Settings Menu	51
3.2.8 External Battery Settings	54
3.2.9 UPS Information Screen	55
3.2.10 UPS Maintenance Screen	55
3.3 Operating Modes	56
3.3.1 Line mode	56
3.3.2 HE (High Efficiency) mode	56
3.3.3 Energy Saver System (ESS) mode	56
3.3.4 Power-on mode.....	56
3.3.5 Bypass mode	56
3.3.6 Battery mode	56
3.3.7 Battery Test mode	56
3.3.8 CVCF (Constant Voltage/Constant Frequency) mode	57
3.3.9 Fault mode	57
3.3.10 Shutdown mode	57
3.3.11 Automatic Restart	57

3.3.12 Short Fault Clearance Function	57
3.3.13 Overload Warning	57
3.3.14 Battery Deep Discharge Protection	57
3.3.15 Sleep Mode	58
3.3.16 Advanced Battery Management	58
4 UPS Startup	59
4.1 Normal Mode Startup	59
4.2 Maintenance Bypass Startup	61
4.3 UPS Cold Start	62
4.4 UPS Bypass and Shutdown	63
5 Communication	64
5.1 Power Management Software	64
5.2 Communication Cards	64
5.3 Communication Ports	67
5.4 Emergency Power-Off (EPO)	67
5.5 Relay Contact Port	68
6 UPS Maintenance and Troubleshooting	69
6.1 Battery Replacement	69
6.2 Storage	70
6.3 Recycling Used Equipment	70
6.4 Troubleshooting	70
6.5 Service and Support	75
7 Specifications	76
7.1 Product Specifications	76

Chapter 1 Overview

1.1 Introduction

The Eaton 93PX uninterruptible power system (UPS) delivers an innovative plug-and-play rack mounted three-phase UPS solution that aligns with the growing trend of distributed IT and Edge installations. The Eaton 93PX protects sensitive electronic equipment from the most common power problems, including power failures, sags, surges, brownouts, line noise, high voltage spikes, frequency variations, switching transients, and harmonic distortion. Power outages can occur unexpectedly, and power quality may be erratic. These issues have the potential to corrupt critical data, destroy sessions, and damage hardware resulting in hours of lost productivity and costly repairs. The Eaton 93PX UPS can effectively eliminate the effects of power disturbances and safeguard the integrity of your equipment.

The Eaton 93PX UPS unique benefits include:

- True online double-conversion technology with high power density, utility frequency independence, and generator compatibility.
- Selectable High-Efficiency mode of operation.
- Standard communication options: one RS232 communication port, one USB communication port, one dry-in port, and a dry-out port.
- Optional connectivity cards with enhanced communication capabilities.
- User-friendly installation.

The 93PX UPS system is available in 15 kW and 20 kW standard and parallel bundles. The components that comprise a bundle are as follows:

- **93PX UPS Power Module-** A 15 or 20 kVA single or parallel UPS module that operates on 380/400/415 V wye input and output, designed for high-efficiency power protection. (See [Figure 6](#)).
- **93PX External Battery Module (93PX2EBM480U)-** Two extended battery modules that extend battery runtimes during power outages. (See [Figure 7](#)).



NOTE

There must be a minimum of one 93PX2EBM480U (which consists of two extended battery modules) for every power module present in the system. Each 93PX UPS Power Module can support up to four 93PX2EBM480U units (four pairs or eight modules total).

- **93PX Maintenance Bypass Module-** Available in three different configurations: hardwired, parallel, and corded versions, to allow for the uninterrupted flow of power during UPS maintenance or repair without having to power down the entire network. (See [Figure 8](#), [Figure 9](#), and [Figure 10](#)).
- **Network Connectivity Card-**Each 93PX UPS bundle can be customized to include a Gigabit Network Card (Network-M3) or an Industrial Gateway Card (INDGW-M3) to enable you to remotely monitor and manage your power quality equipment. From outlet-by-outlet energy consumption reports to temperature and humidity readings, these connectivity devices give you full control of your IT environment from off-site locations. This high level of awareness and control helps boost both business continuity and profitability.

1.2 Dimensions

Figure 1. 93PX15KIPMB / 93PX20KIPMB

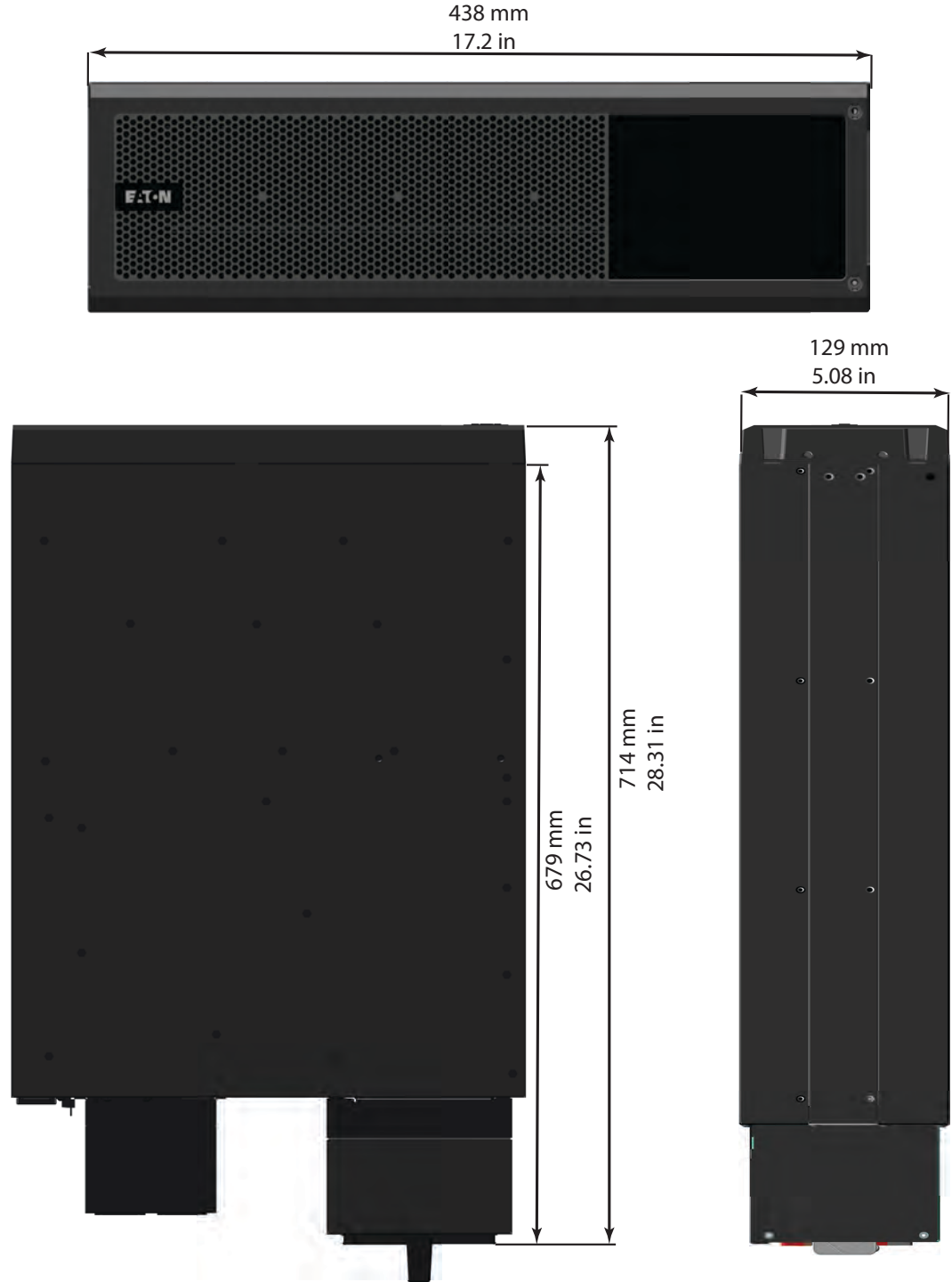


Figure 2. 93PX2EBM480U

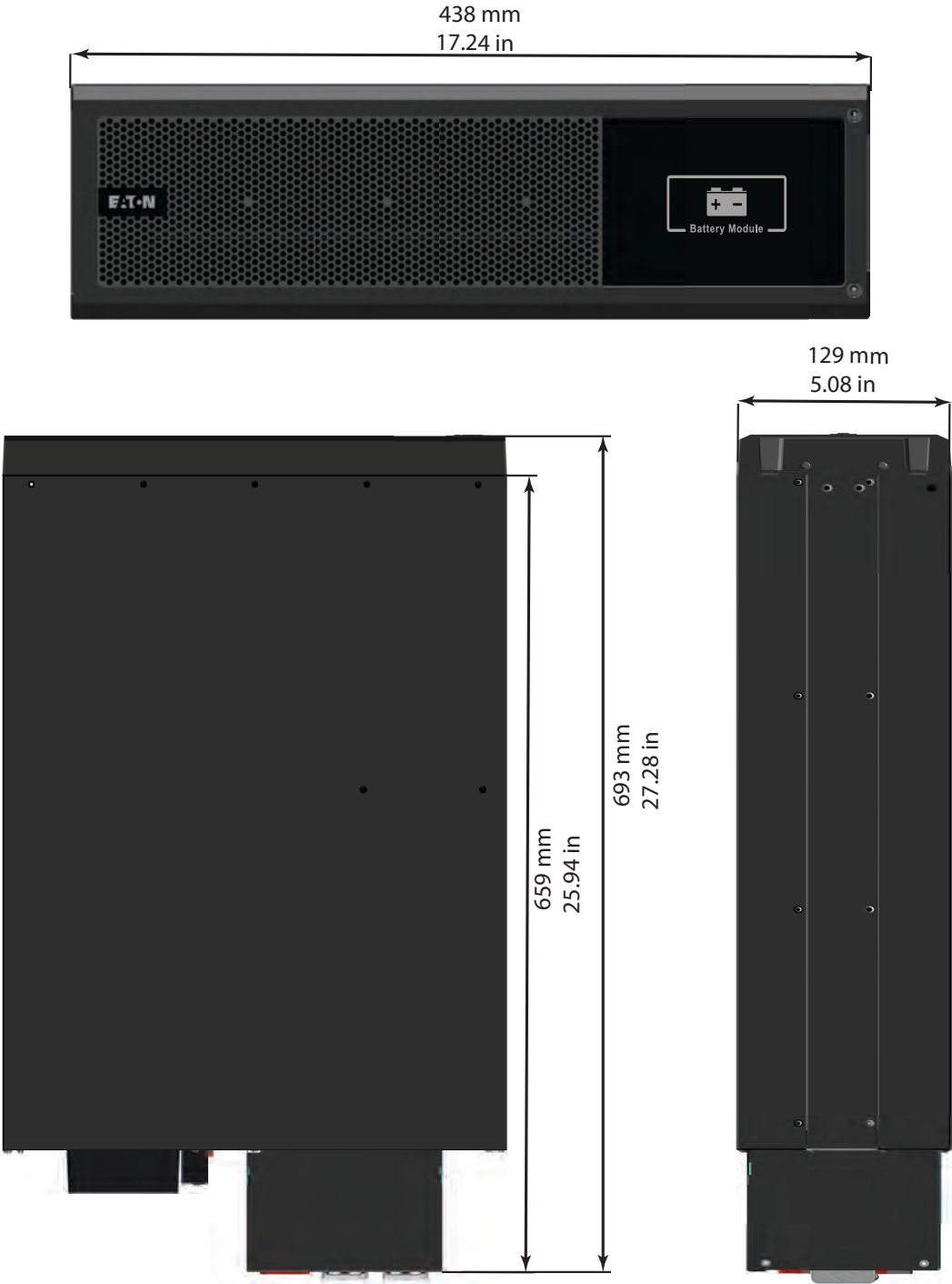


Figure 3. MBP20KIU

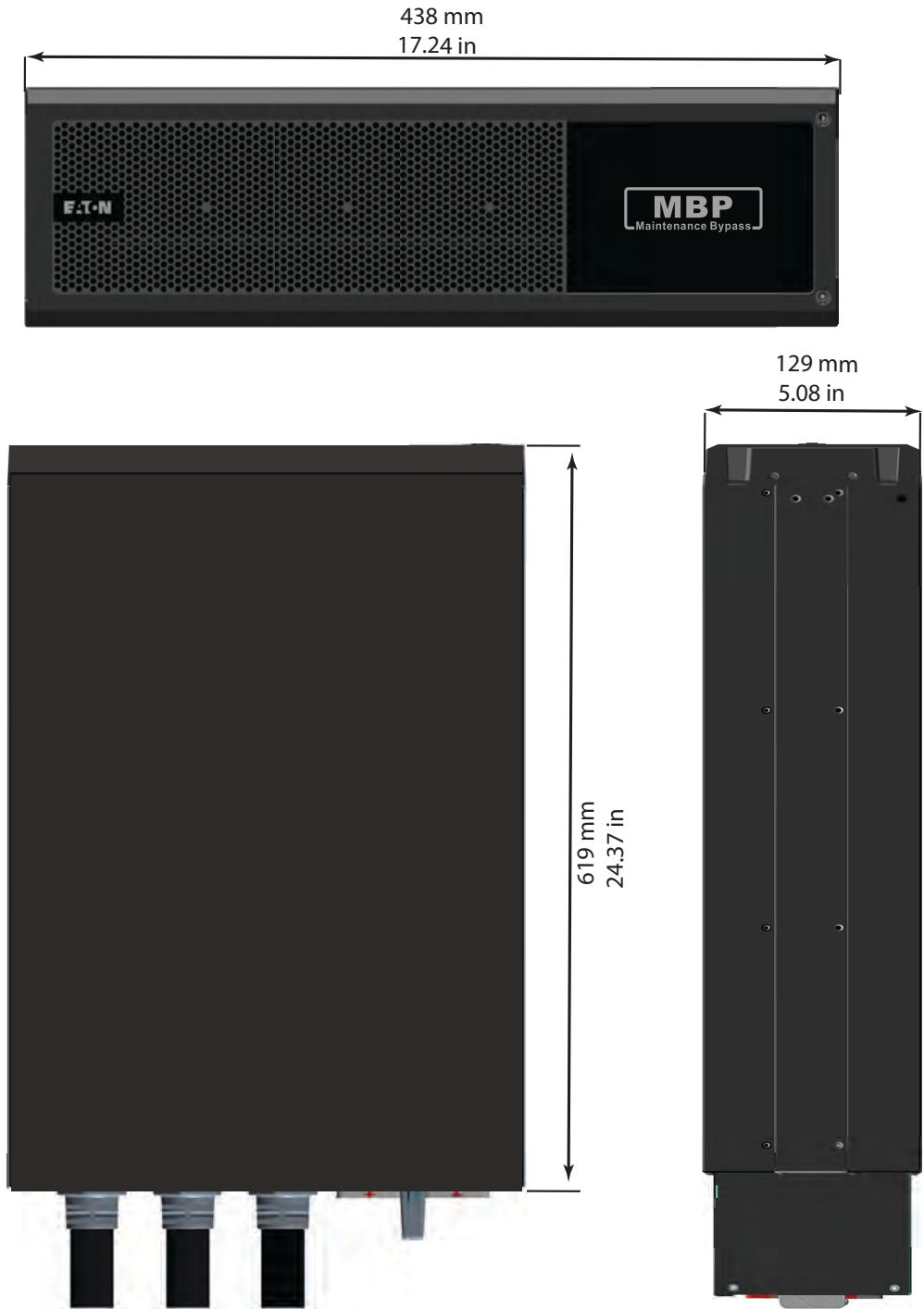


Figure 4. MBP20KIUHW

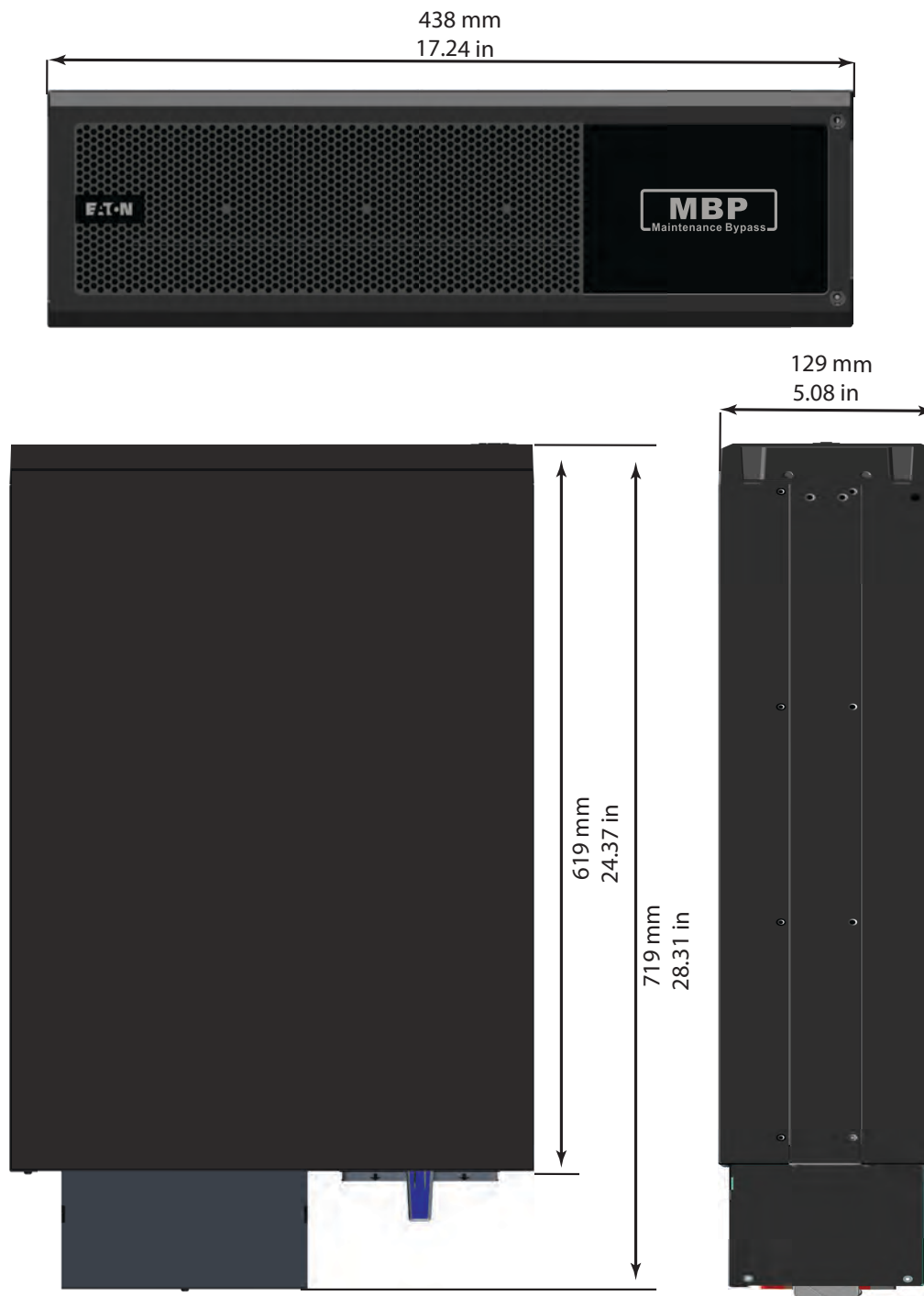
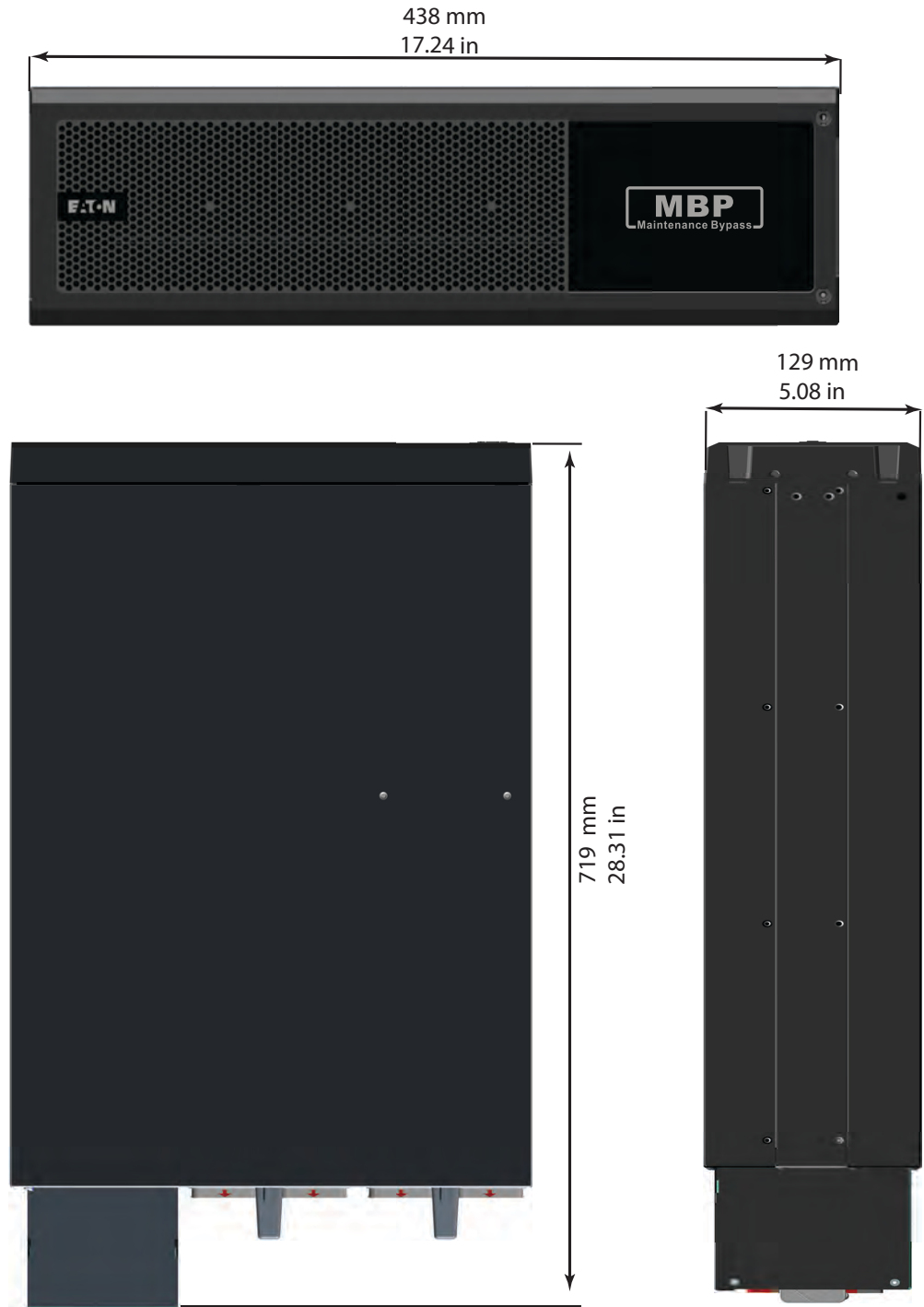


Figure 5. MBP20KIUPARA



1.3 Physical Features

Figure 6. 93PX15KIPMB/93PX20KIPMB

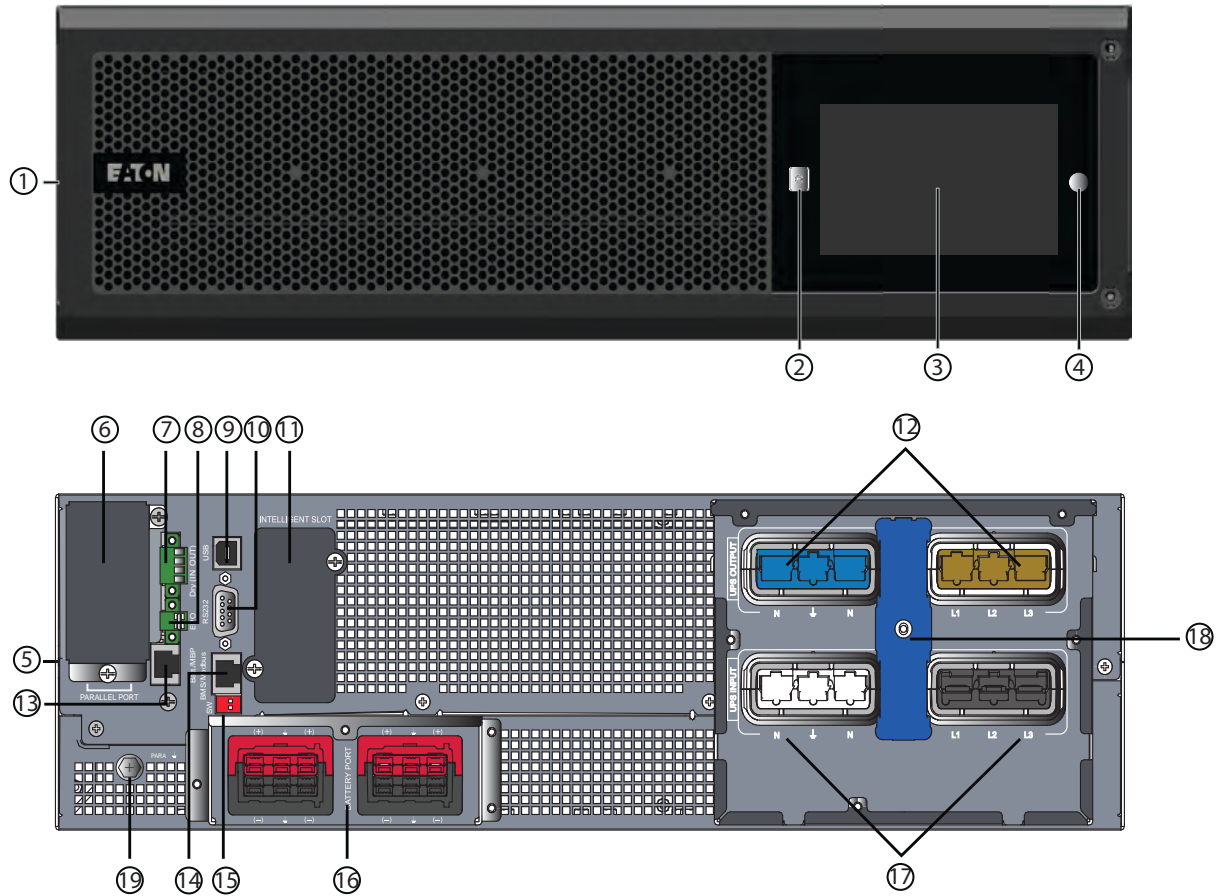
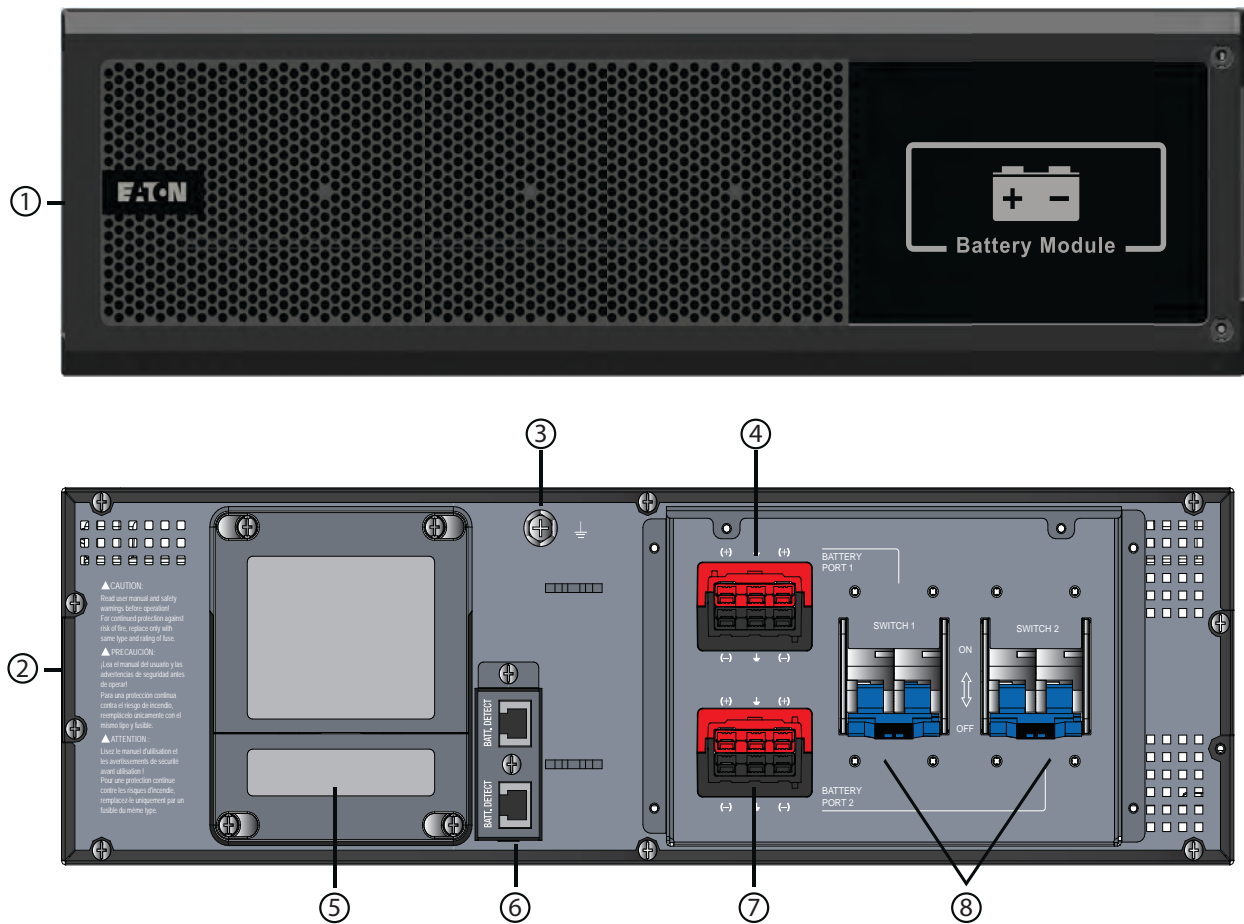
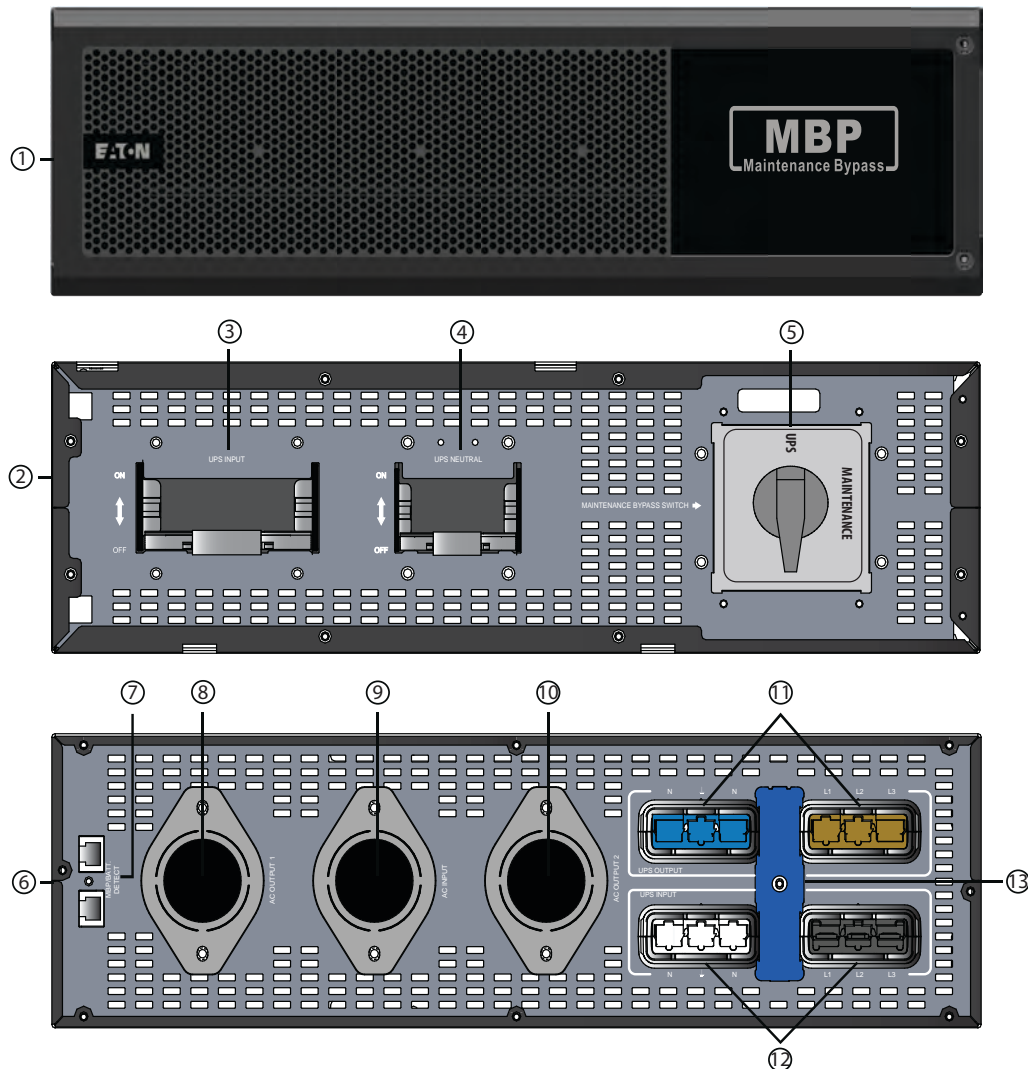


Table 1. UPS Physical Features

① UPS front bezel	⑥ Parallel port	⑪ Intelligent card slot	⑯ Battery terminal ports (EBM1/EBM2)
② ON/OFF power button	⑦ Dry contact relay port	⑫ UPS output connectors (L1 +L2+L3+N+N+G)	⑰ UPS input connectors (L1+L2 +L3+N+N+G)
③ Touch screen HMI	⑧ Remote Emergency Power Off (EPO) contact	⑬ RJ45 EBM/MBP detection port (for future use)	⑱ Cable retention bracket
④ LED indicator	⑨ USB communication port	⑭ RJ45 MODBUS/BMS detection port	⑲ Parallel cable grounding screw
⑤ UPS rear panel	⑩ RS232 communication port	⑮ Dip Switch	

Figure 7. 93PX2EBM480U**Table 2. 93PX2EBM480U Physical Features**

① External battery module front bezel	⑤ Fuse box
② External battery module back panel	⑥ RJ45 port (detects External Battery Module)
③ M6*12 grounding screw	⑦ Battery connection port #2
④ Battery connection port #1	⑧ Battery port breakers #1 and #2

Figure 8. MBP20KIU**Table 3. MBP20KIU Physical Features**

① MBP front bezel	⑧ IEC-309 60 MBP AC output #1 (L1+L2+L3+N+G)
② MBP with front bezel removed	⑨ IEC-309 60 MBP AC input (L1+L2+L3+N+G)
③ UPS input breaker	⑩ IEC-309 60 MBP AC output #2 (L1+L2+L3+N+G)
④ Neutral breaker	⑪ UPS output connector (L1+L2+L3+N+G)
⑤ Maintenance bypass switch	⑫ UPS input connector (L1+L2+L3+N+G)
⑥ MBP back panel	⑬ Cable retention bracket
⑦ RJ45 port (Detect EBM / MBP)	

Figure 9. MBP20KIUHW

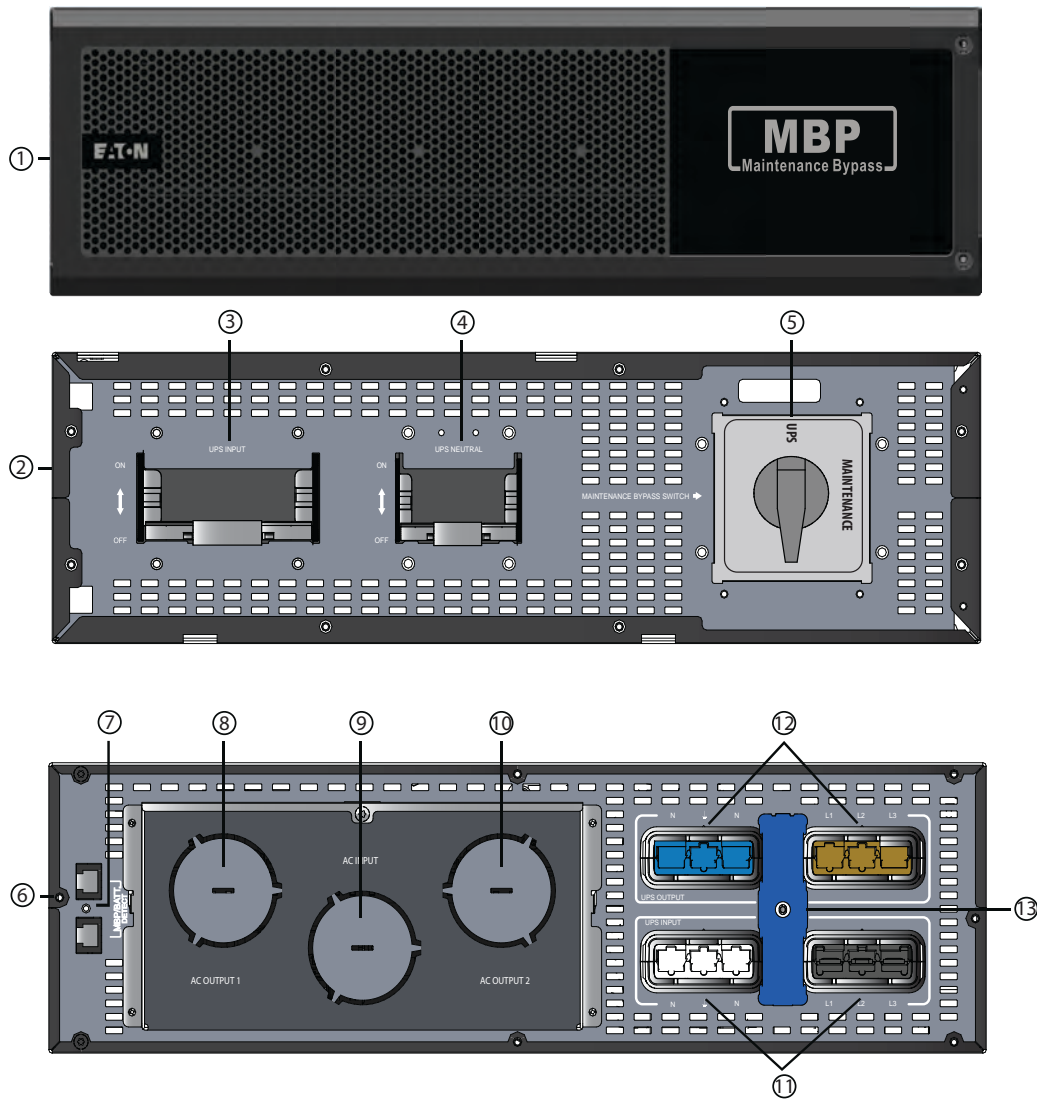
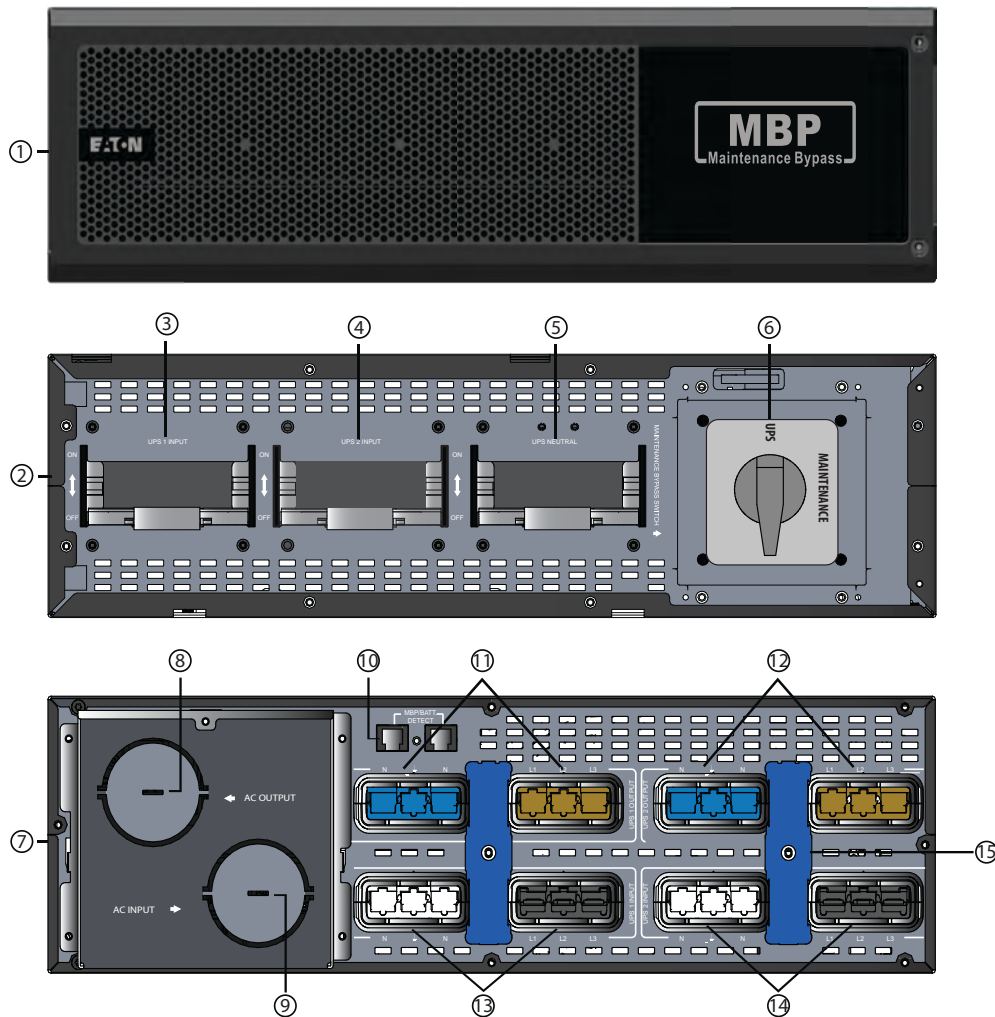


Table 4. MBP20KIUHW Physical Features

① MBP front bezel	⑧ MBP AC output #1 (L1+L2+L3+N+N+G)
② MBP with front bezel removed	⑨ MBP AC input (L1+L2+L3+N+N+G)
③ UPS input breaker	⑩ MBP AC output #2 (L1+L2+L3+N+N+G)
④ Neutral breaker	⑪ UPS input connectors (L1+L2+L3+N+N+G)
⑤ Maintenance bypass switch	⑫ UPS output connectors (L1+L2+L3+N+N+G)
⑥ MBP back panel	⑬ Cable retention bracket
⑦ RJ45 port (Detect EBM / MBP)	

Figure 10. MBP20KIUPARA**Table 5. MBP20KIUPARA Physical Features**

① MBP front bezel	⑨ MBP AC input (L1+L2+L3+N+N+G)
② MBP with front bezel removed	⑩ RJ45 port (Detect EBM / MBP)
③ UPS #1 input breaker	⑪ UPS #1 output connectors (L1+L2+L3+N+N+G)
④ UPS #2 input breaker	⑫ UPS #2 output connectors (L1+L2+L3+N+N+G)
⑤ UPS neutral breaker	⑬ UPS #1 input connectors (L1+L2+L3+N+N+G)
⑥ Maintenance bypass switch	⑭ UPS #2 input connectors (L1+L2+L3+N+N+G)
⑦ MBP back panel	⑮ Cable retention bracket
⑧ MBP AC output (L1+L2+L3+N+N+G)	

Chapter 2 UPS System Installation

2.1 Unpacking the Equipment

The Eaton 93PX UPS System can be easily installed in a temperature-controlled indoor environment free from contaminants.

Remove the equipment from its packaging and inspect it for damage that may have occurred during shipping. If any damage is discovered, re-pack the equipment and contact your **Local Distributor** or **Eaton Support**.



IMPORTANT

It's crucial to note that batteries are perishable goods. To ensure warranty validation, reliability, and safety, they must be **installed and operational by the recharge date specified on the battery packaging**. If the UPS will not be operational by the recharge date, it's imperative to contact Eaton (Tech support 1-800-356-5737, option 2, option 4) without delay.

CAUTION

- Unpacking in a low-temperature environment may cause condensation to occur in and on the equipment. Do not install the equipment until the inside and outside of the equipment are absolutely dry (hazard of electric shock).
 - The equipment is heavy, and removing it from their cartons requires at least two people.
 - To protect the product, leave the components packaged until they are ready to install.
-
- Follow these guidelines when unpacking the cabinet and accessories:
 - Cut the pallet straps and remove the large cardboard outer sleeve. Have two people lift the sleeve for easier removal.
 - Use care when moving and opening the cartons.
 - Discard or recycle the packaging responsibly, or store it for future use.
 - Follow these guidelines when locating the equipment after unpacking:
 - Place the equipment in a protected area that has adequate airflow and is free of humidity, flammable gas, and corrosion.
 - Avoid placing the equipment on its side.
 - Verify that the air vents on the front and rear are not blocked.
 - Allow 1m (3 ft) of floor space in the front and rear of the rack for safety and access for maintenance.

Figure 11. Unpacking the UPS and MBP Modules

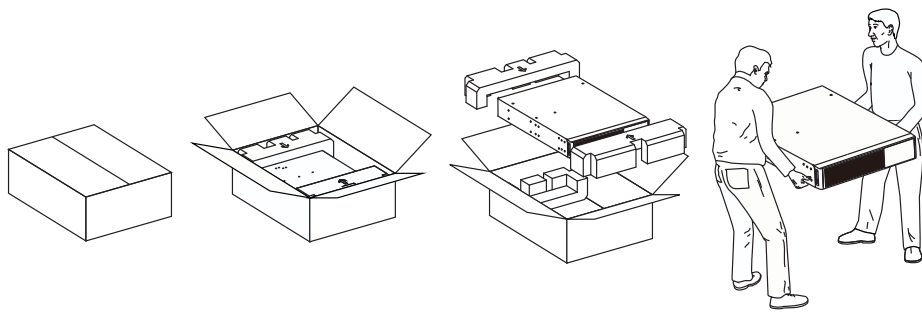
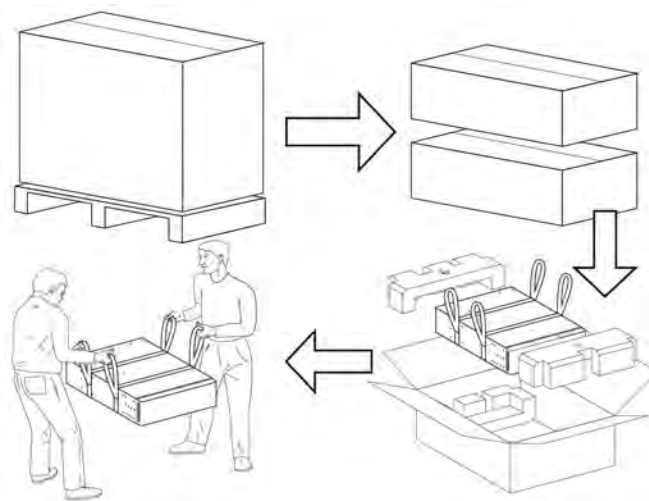


Figure 12. Unpacking the Extended Battery Module



2.2 Package Contents

Figure 13. 93PX15KIPMB / 93PX20KIPMB Package Contents

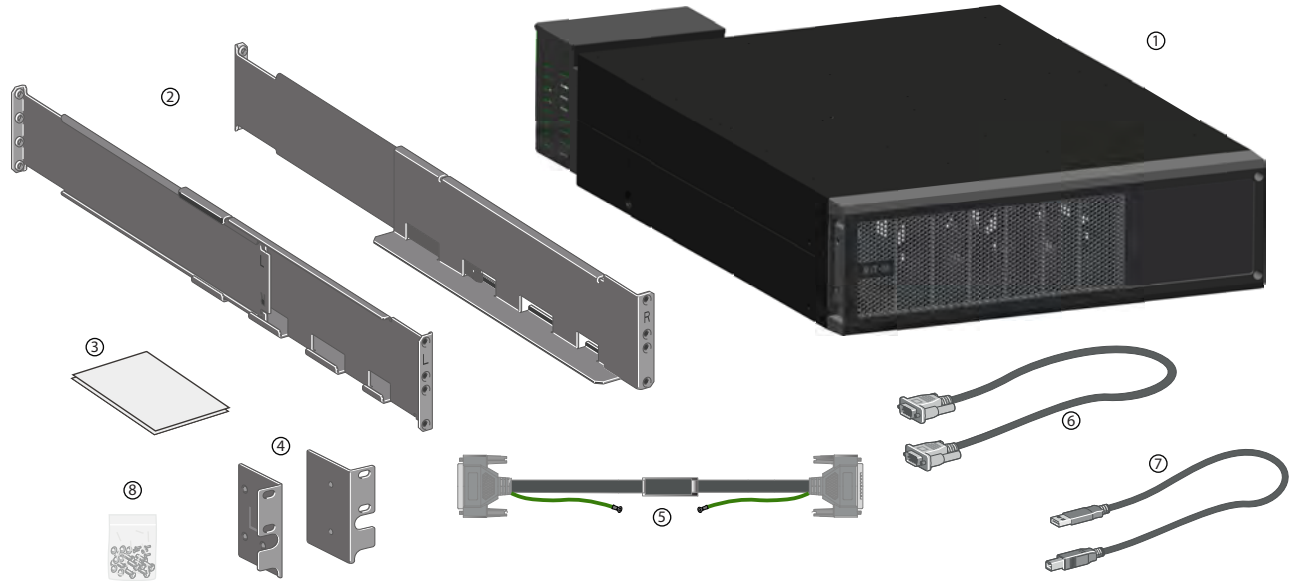


Table 6. UPS Package Contents

① 93PX UPS	⑤ UPS parallel cable
② Rail kit	⑥ RS232 cable
③ Quick start guide	⑦ USB cable
④ Mounting ears	⑧ Mounting hardware

Figure 14. 93PX2EBM480U Package Contents

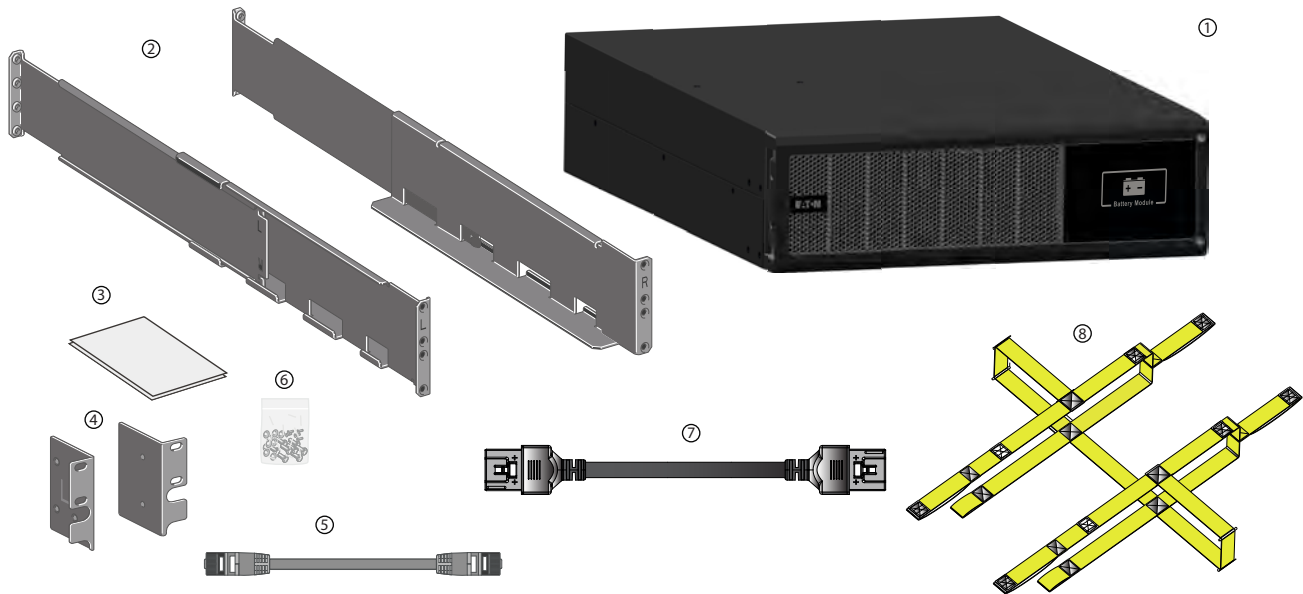
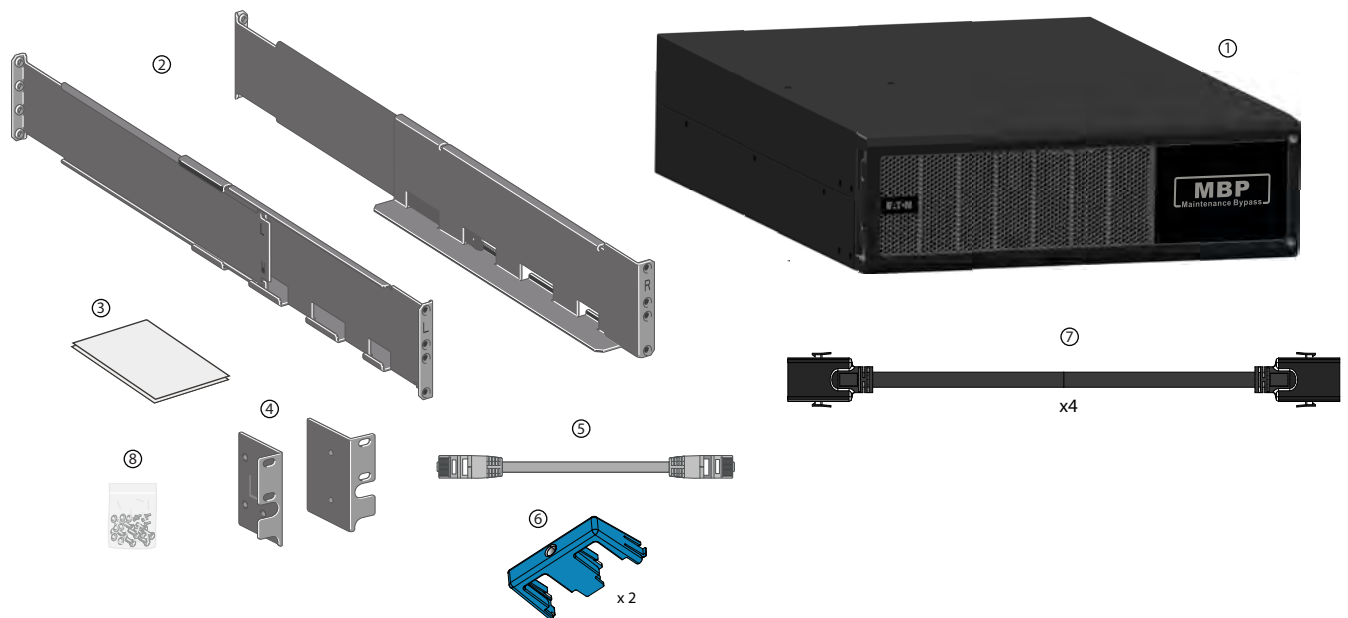


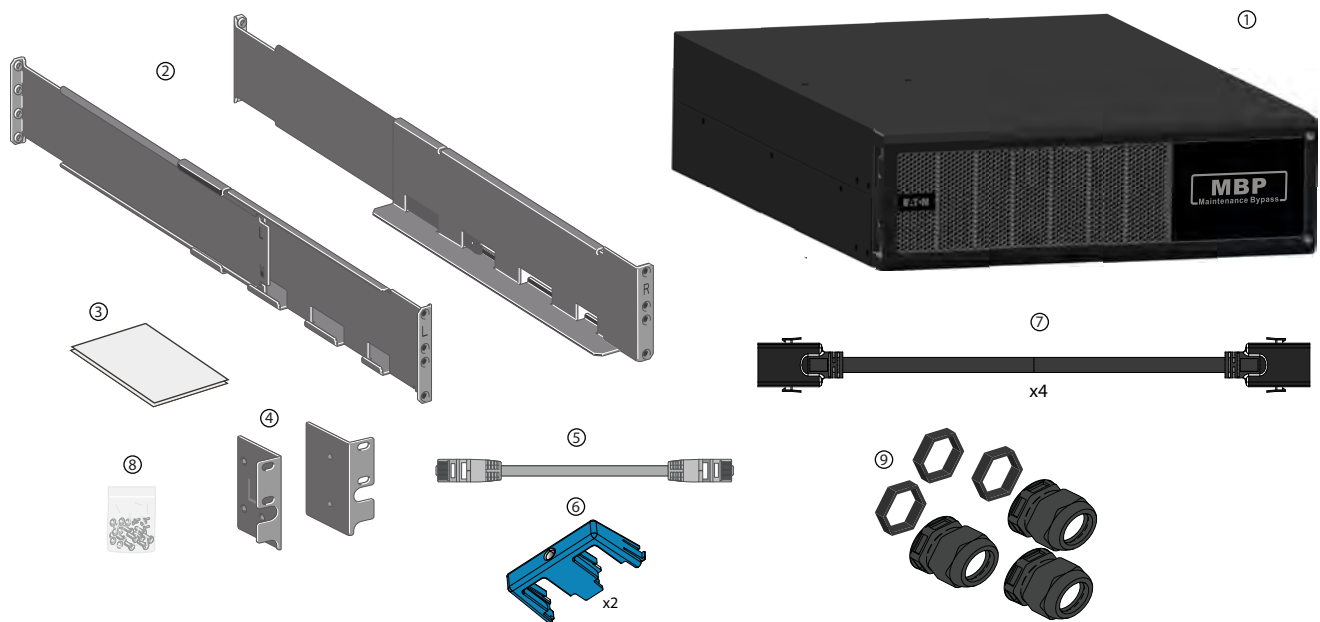
Table 7. EBM Package Contents

① 93PX External Battery Module	⑤ EBM detection cable
② Rail kit	⑥ Mounting hardware
③ Quick start guide	⑦ EBM cable
④ Mounting ears	⑧ EBM lifting strap

Figure 15. MBP20KIU Package Contents

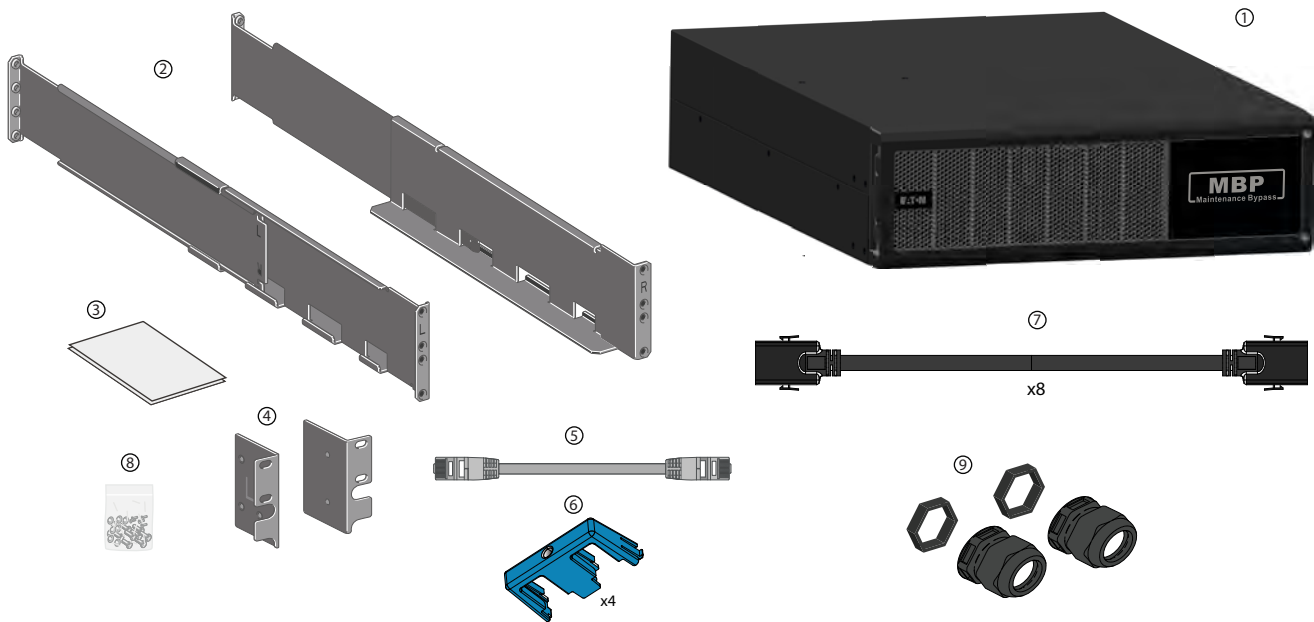
① 93PX MBP	⑤ MBP detection cable
② Rail kit	⑥ Quantity cable retention brackets (2)
③ Quick start guide	⑦ UPS to MBP quick connection cables (4)
④ Mounting ears	⑧ Mounting hardware

Figure 16. MBP20KIUHW Package Contents



① 93PX MBP	⑥ Cable retention brackets (2)
② Rail kit	⑦ UPS to MBP quick connection cables (4)
③ Quick start guide	⑧ Mounting hardware
④ Mounting ears	⑨ Cable glands
⑤ MBP detection cable	

Figure 17. MBP20KIUPARA



① 93PX MBP	⑥ Cable retention brackets (4)
② Rail kit	⑦ UPS to MBP quick connection cables (8)
③ Quick start guide	⑧ Mounting hardware
④ Mounting ears	⑨ Cable glands
⑤ MBP detection cable	

2.3 System Mechanical Installation

Rail Kit Installation

The Eaton 93PX series supports installation in a rack mount orientation only.

- NOTE 1** Make sure that the airflow is sufficient and keep a free space of at least 500 mm around the front and rear panels of each of the UPS system modules.
- NOTE 2** For the screw types and tightening torques used during the mechanical installation of the UPS, EBM, and MBP modules, refer to [Table 8](#).

Table 8. Mechanical installation screw types and tightening torques

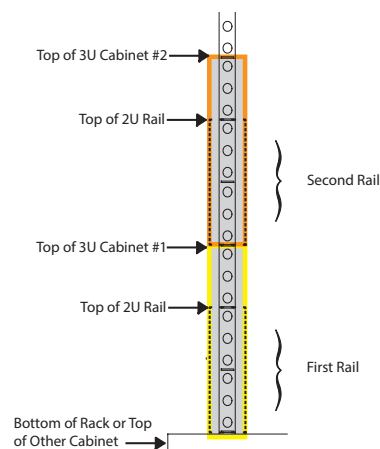
Screw type	Tightening torque
M3	0.8 Nm (7 lb in)
M4	1.6 Nm (14 lb in)
M5	3.0 Nm (27 lb in)
M6	5.0 Nm (44 lb in)

- NOTE** Mounting rails are required for each component of the UPS system.

The 93PX system is suitable for installation in a 19-inch standard IT equipment rack enclosure. It is recommended that the minimum depth of the enclosure is 800 mm.

The UPS, Extended Battery Modules, and Maintenance Bypass Module are all 3U in rack height, be sure to plan enough space for each system component.

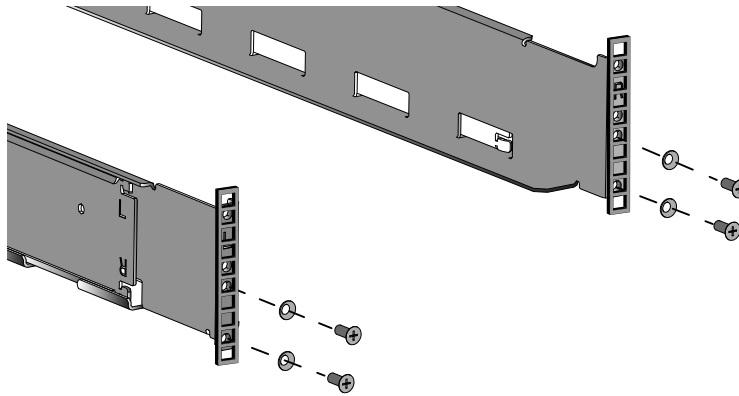
Figure 18. Cabinet and Rail Kit Spacing Example



To install the rail kits into the rack enclosure:

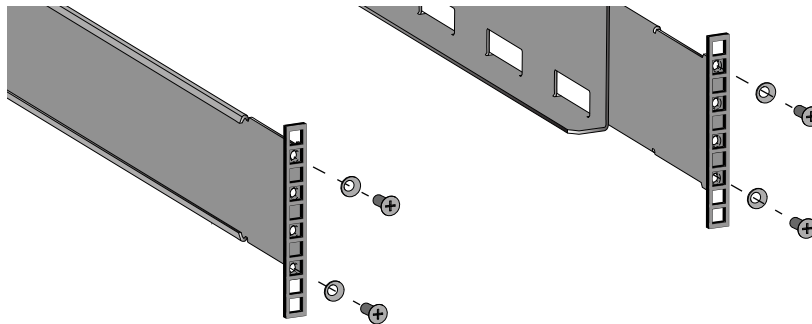
1. Verify that the hole patterns on the mounting rails align with the hole pattern on the rack enclosure.
2. Attach the front of each mounting rail to the rack enclosure using four M6 screws and washers and finger-tighten only. See [Figure 19](#).

Figure 19. Attaching the Front Rails



3. Adjust the size of each mounting rail for the depth of the rack enclosure. The depth of each mounting rail is 650–1050 mm.
4. Attach the rear of each mounting rail to the equipment rack enclosure with four M6 screws and washers, and finger-tighten only. See [Figure 20](#).

Figure 20. Securing the Rear Rails



5. Tighten the screws on the front and rear of each mounting rail. See [Table 8](#).
6. Attach the rack ears to each of the 93PX system components with eight M4 flat head-screws. See [Table 8](#).

NOTE NOTE: There are optional installation positions for the rack ears to meet different depth requirements.

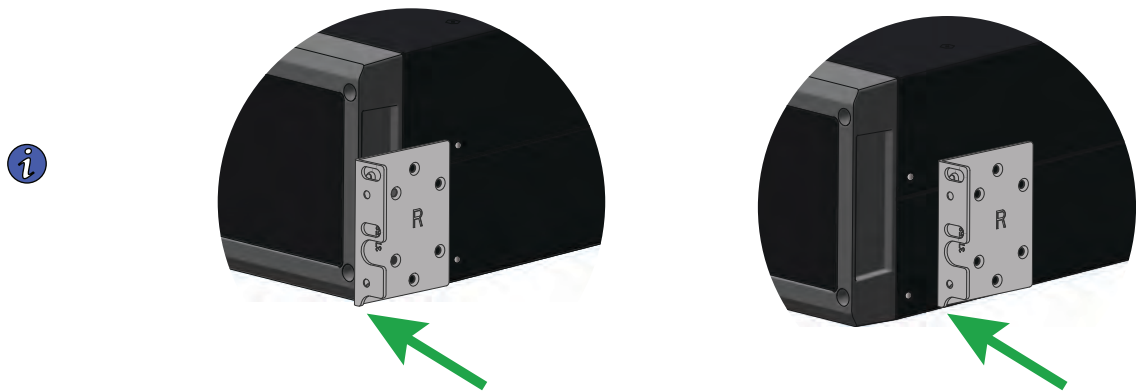


Figure 21. Rack Ear Installation



7. If you are installing an MBP20KIUHW or the MBP20KIUPARA, remove the AC terminal wiring box from the back the unit. Set the box and the screws aside in a safe place.

Figure 22. MBP20KIUHW AC Terminal Wiring Box Removal

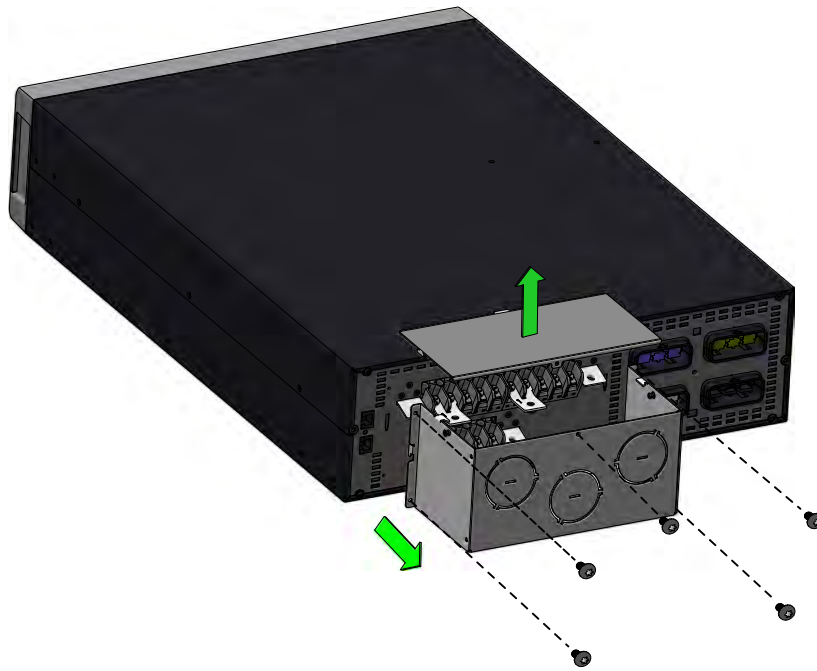
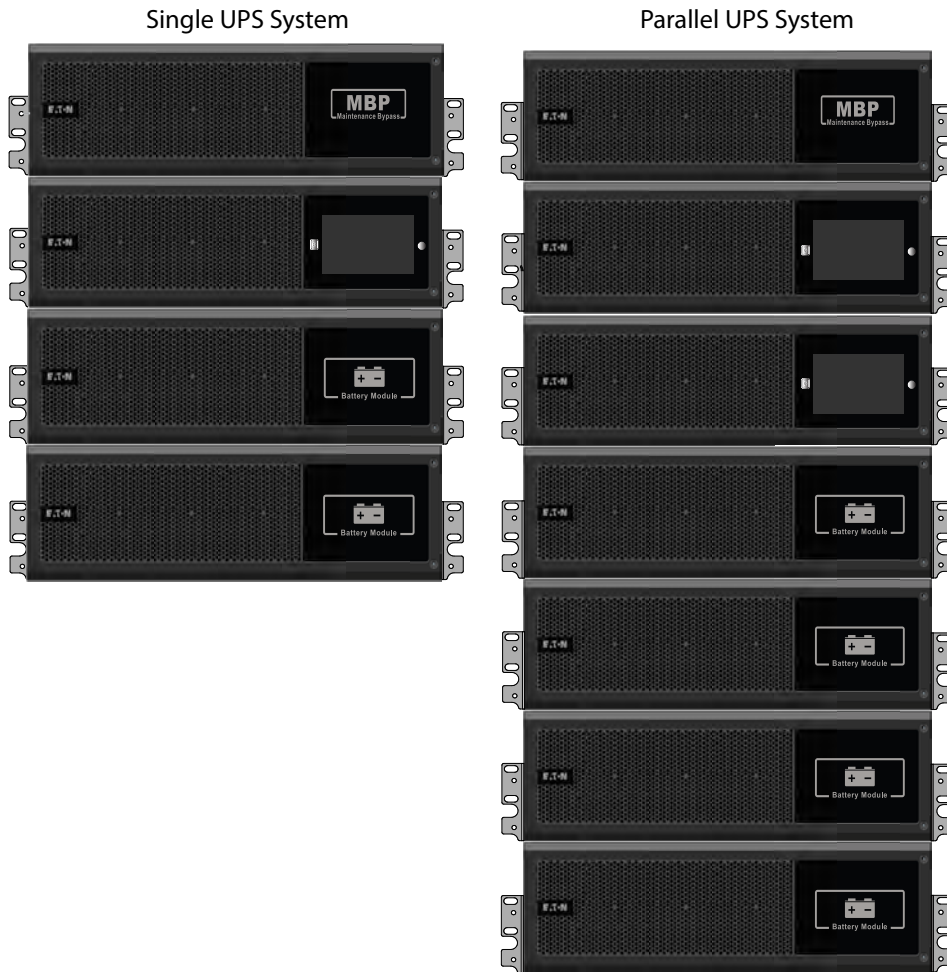


Figure 23. MBP20KIUPARA AC Terminal Wiring Box Removal



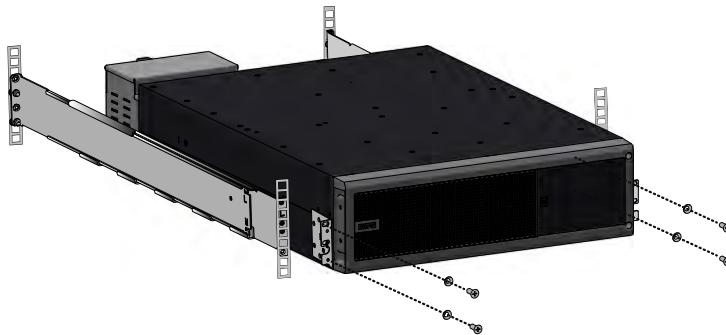
8. Install the 93PX system components in the following order for both single and parallel systems [Figure 24](#).

Figure 24. Single 93PX System Rack Installation



9. Secure each system module to the rack enclosure using four M5 screws and washers. See [Figure 24](#).

Figure 25. Secure Each Unit to the Equipment Rack



2.4 Electrical Installation

⚠ CAUTION

To reduce the risk of fire, connect only to a circuit provided with 60 or 100 amperes branch circuit overcurrent protection in accordance with the National Electrical Code ANSI/NFPA70. See [Table 9](#) and [Table 10](#).

2.4.1 Breaker and Wire Sizes

Recommended Breaker Sizes

Table 9. 93PX system recommended input circuit breaker current specifications for CE

MBP Model	Input configuration	Breaker current (A)
MBP20KIUHW	3-phase input	60
MBP20KIUPARA	3-phase input	100

Table 10. 93PX system recommended input circuit breaker current specifications for UL

MBP Model	Input configuration	Breaker current (A)	Standard
MBP20KIUHW	3-phase input	60	UL 489
MBP20KIUPARA	3-phase input	100	UL 489

Table 11. MBP wiring for CE (cross-section of conductor, unit: mm²)

MBP Model	Input/ Output Configura- tion	Input			Output		
		L1–L3 wires	N wire	Ground wire	L1–L3 wires	N wire	Ground wire
MBP20KIUHW	3–3	10 mm ²	10 mm ²	10 mm ²	10 mm ²	10 mm ²	10 mm ²
MBP20KIUPARA	3–3	25 mm ²	25 mm ²	25 mm ²	16 mm ²	16 mm ²	16 mm ²

Table 12. MBP for UL (AWG) wire sizes

MBP Model	Input/ Output Configura- tion	Input Copper Wire Size			Output Copper Wire Size		
		L1–L3 wires	N wire	Ground wire	L1–L3 wires	N wire	Ground wire
MBP20KIUHW	3–3	6 AWG	6 AWG	6 AWG	8 AWG	8 AWG	8 AWG
MBP20KIUPARA	3–3	3 AWG	3 AWG	3 AWG	4 AWG	4 AWG	4 AWG



NOTE

For input supply connections, use wires suitable for at least 90°C copper or equivalent.

Table 13. Tightening torques

Wiring Connection	Tightening Torque	
	[lb-in]	[Nm]
Bypass, Input and Output Terminals	18 lb in	2.0 Nm
Grounding Screw	104 lb in	11.76 Nm

Table 14. Ring terminal by conductor cross section

Conductor cross-section (mm²)	Ring terminal type
6 (8 AWG)	DRTB16
10 (6 AWG)	DRTB16
16 (4 AWG)	DRTB35
25 (2 AWG)	DRTB35

2.4.2 MBP20KIU Installation



NOTE

Avoid making unauthorized changes to the UPS, MBP and EBM's as this could damage your equipment and will void the UPS warranty.

Table 15. Input Plug Specifications

Maintenance Bypass Model	Input Plug	Rated Voltage	Rated Input / Output Current (A)	Nominal Cord Length from Rear Panel [IN]	Line Cord Bend Radius MM [IN]	Depth of Cord Bend from Rear Panel MM [IN]
	IEC309-60 (5 WIRE) 3Phase 200–415V IP67 Input Connector	380/400/415	40/30.4	3.05m [120 in]	140mm (5.51in)	100mm (3.94in)

MBP20KIU

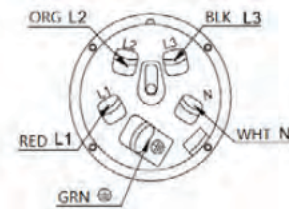
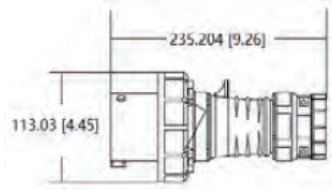


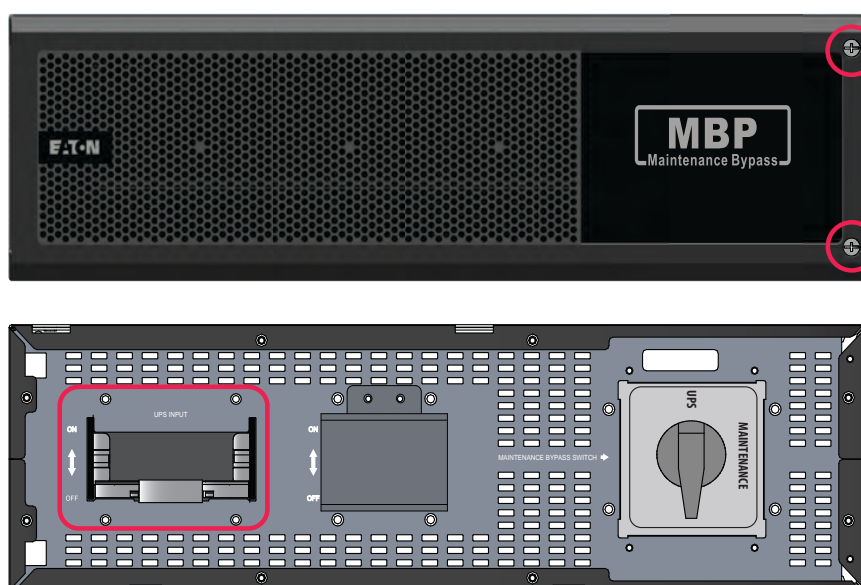
Table 16. Output Connector Specifications

Maintenance Bypass Model	Output Connectors	Rated Voltage	Rated Input / Output Current (A)	Nominal Cord Length from Rear Panel [IN]	Line Cord Bend Radius MM [IN]	Depth of Cord Bend from Rear Panel MM [IN]
	IEC309-60 (5 WIRE) 3Phase 200–415V IP67 Output Connector	380/400/415	40/30.4	0.6m [24 in] 0.6m [24 in]	75mm (2.95 in)	75mm (2.95 in)

MBP20KIU

To install the MBP20KIU:

1. Switch off utility power to the distribution point where the UPS will be connected. Make absolutely sure that the power is disconnected.
2. Loosen the two screws and remove the MBP front cover. Ensure the UPS input circuit breaker is in the OFF (O) position.

Figure 26. MBP20KIU Cover Removal

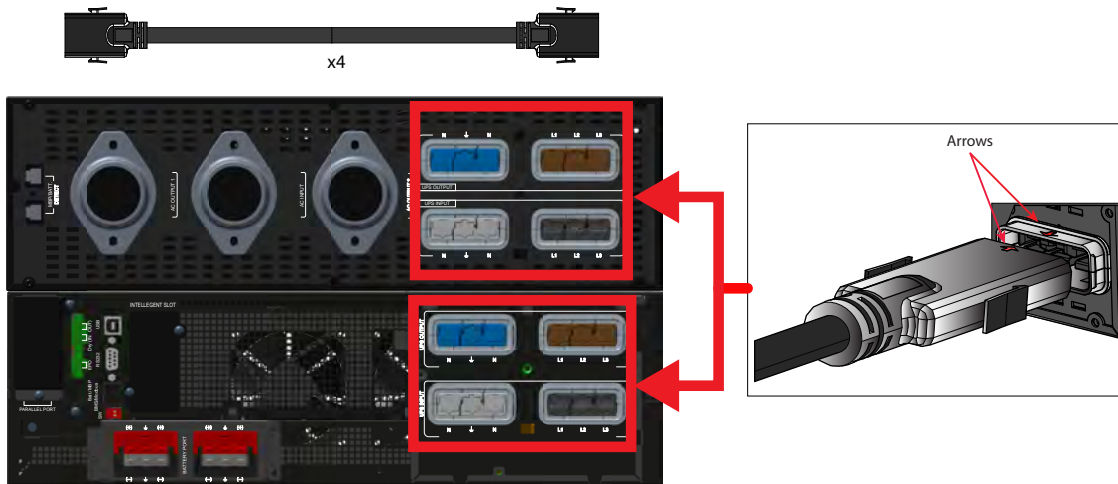
3. If the equipment rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not included) to the ground bonding screw on the chassis of the MBP.
4. Connect the four quick connection cables to their corresponding connectors on both the MBP and the UPS.



NOTE

Each quick connection cable features colored pins (black, white, blue, brown) to assist with installation. To ensure proper cable orientation, align the arrow on each cable with the arrow on the corresponding connector of the UPS and the MBP. (See [Figure 27](#)).

Figure 27. MBP20KIU to UPS Connections



5. Install the blue cable retention bracket over the cable connectors on both the UPS and the MBP.

Figure 28. Cable Retention Bracket Installation



6. If an emergency power-off (disconnect) switch is required by local codes, install the REPO switch before powering on the UPS.
7. Proceed to [2.4.5 EBM Installation](#).

2.4.3 MBP20KIUHW Electrical Installation

Read and understand the following safety information while planning and performing the installation:

WARNING

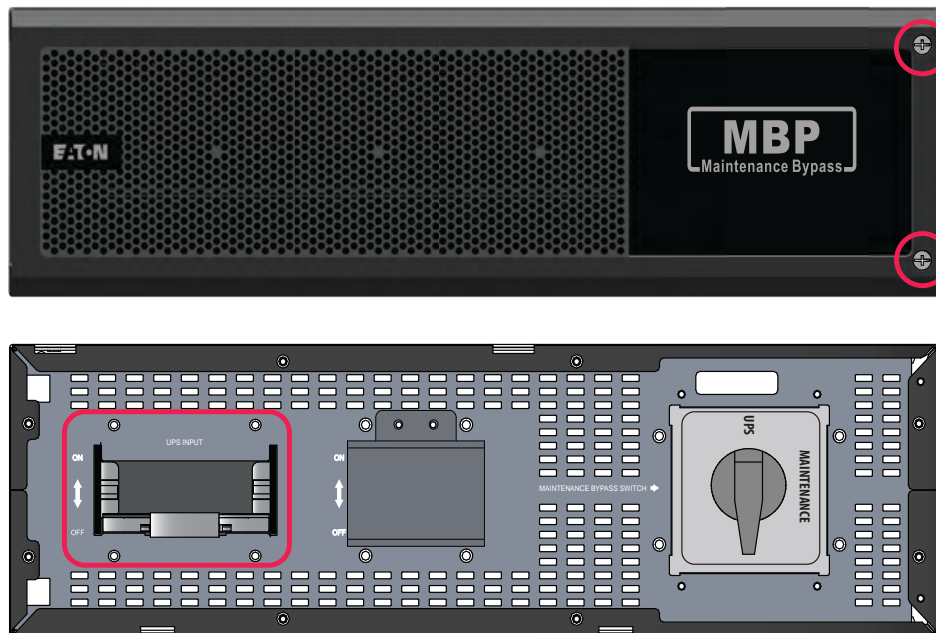
- As a result of the connected loads, high leakage current is possible. Connection to earth ground is required for safety and proper product operation. Do not check UPS operation by any action that includes removal of the earth (ground) connection with loads attached.
 - Risk of electrical shock. Only qualified service personnel (such as a licensed electrician) should perform the electrical installation in this section.
 - Refer to national and local electrical codes for acceptable external wiring practices.
 - Wire sizes listed in [2.4.1 Breaker and Wire Sizes](#) and are for copper wiring only. If wire is run in an ambient temperature greater than 40°C, larger size wire may be necessary. Wire sizes are based on using the specified breakers.
 - Recommended wire sizes are based on NFPA National Electrical Code® (NEC®) 70 Table 310.15(B)(16) 90°C ampacity with 40°C ambient correction factors.
 - Input neutral must be wired for proper operation. Failure to connect an input neutral will void the warranty.
 - The Eaton 93PX UPS is a single-feed UPS only.
-

To hardwire the MBP20KIUHW:

1. Verify that the electrical connections to the installation site have been properly installed.
2. A wall-mounted, user-supplied, readily accessible disconnection device must be incorporated in the input wiring. External overcurrent protection and disconnect are not provided by this product, but are required by local codes.

Compare the input circuit breaker, wire and ring terminal ratings to those found in [2.4.1 Breaker and Wire Sizes](#).
3. Switch off utility power to the distribution point where the UPS will be connected. Be absolutely sure there is no power.
4. Loosen the two screws and remove the MBP front cover. Ensure the UPS input circuit breaker is in the OFF (O) position.

Figure 29. MBP20IUHW Cover Removal



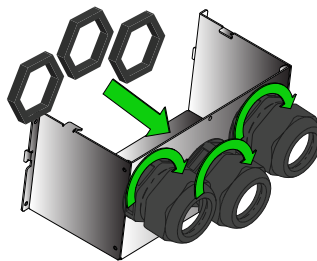
5. Determine your equipment's grounding requirements according to your local electrical code.
6. Detach the knockouts from the AC terminal wiring box and install the cable glands included in the MBP accessory kit.



NOTE

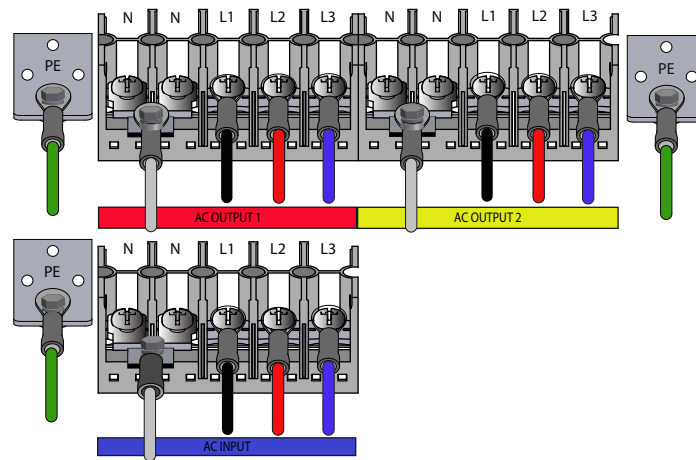
The AC terminal wiring box input and output knockout hole sizes are two inches in diameter.

Figure 30. Cable Gland Installation



7. Connect phase A, B, C, and Neutral input power wiring from the utility source to the input and neutral terminals. For a detailed view, see [Figure 31](#).
8. Connect phase A, B, C, output power wiring from the output terminals and the neutral terminals to the critical load. For a detailed view, see [Figure 31](#).

Figure 31. MBP20KIUHW Terminal Block



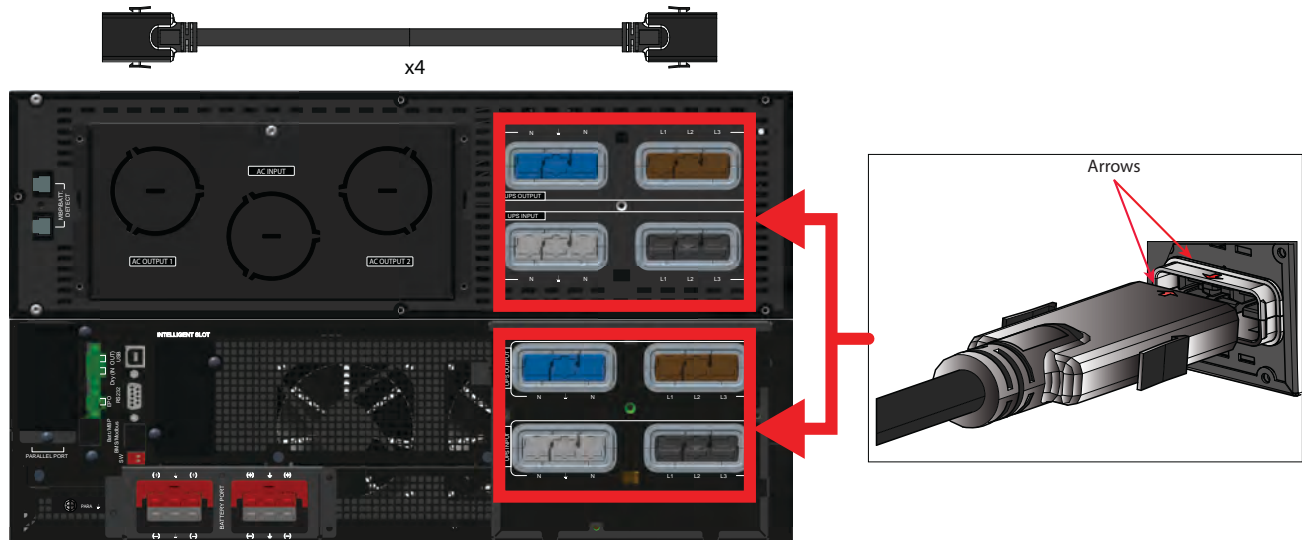
9. Install the MBP AC terminal wiring box and cover using the appropriate hardware.
10. Connect the UPS to the MBP using the four quick connection cables provided with the MBP.



NOTE

Each quick connection cable features colored pins (black, white, blue, brown) to assist with installation. To ensure proper cable orientation, align the arrow on each cable with the arrow on the corresponding connector of the UPS and the MBP. (See [Figure 32](#)).

Figure 32. MBP20KIUHW UPS Cable Installation



11. Proceed to [2.4.5 EBM Installation](#).

2.4.4 MBP20KIUPARA Electrical Installation

Read and understand the following safety information while planning and performing the installation:

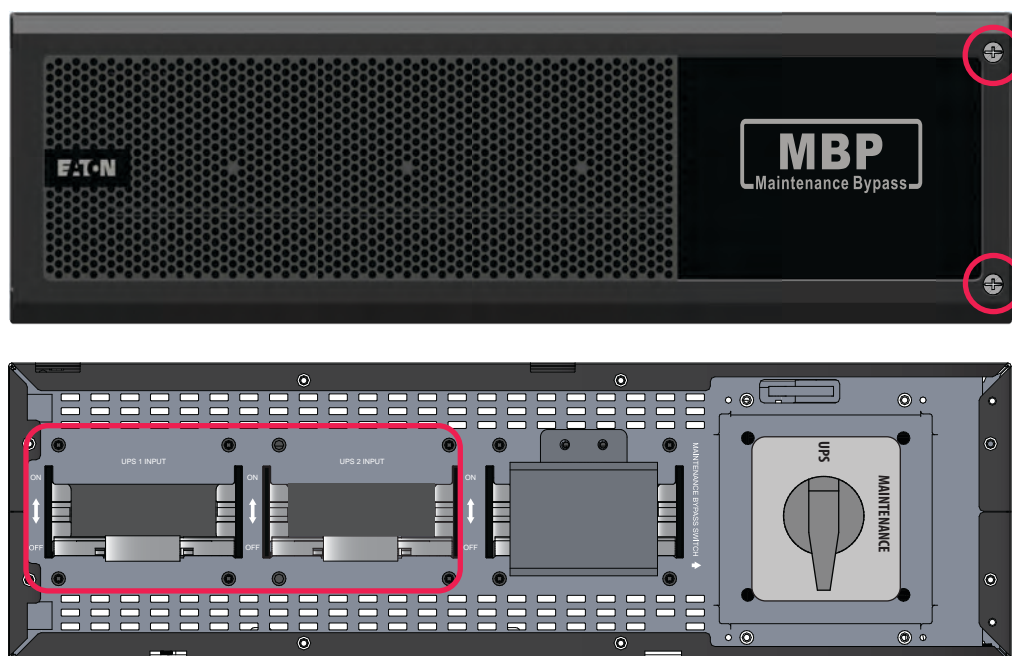
⚠ WARNING

- Only connect two of same size kW UPS modules in a parallel configuration. Be sure to check the nameplate rating of each of the UPS units prior to installation.
- As a result of the connected loads, high leakage current is possible. Connection to earth ground is required for safety and proper product operation. Do not check UPS operation by any action that includes removal of the earth (ground) connection with loads attached.
- Risk of electrical shock. Only qualified service personnel (such as a licensed electrician) should perform the electrical installation in this section.
- Refer to national and local electrical codes for acceptable external wiring practices.
- Wire sizes listed in [2.4.1 Breaker and Wire Sizes](#) are for copper wiring only. If wire is run in an ambient temperature greater than 40°C, larger size wire may be necessary. Wire sizes are based on using the specified breakers.
- Recommended wire sizes are based on NFPA National Electrical Code® (NEC®) 70 Table 310.15(B)(16) 90° C ampacity with 40°C ambient correction factors.
- Input neutral must be wired for proper operation. Failure to connect an input neutral will void the warranty.
- The Eaton 93PX UPS is a single-feed UPS only.

To hardwire the MBP20KIUPARA:

1. Verify that the electrical connections to the installation site are properly installed.
2. A wall-mounted, user-supplied, readily accessible disconnection device must be incorporated in the input wiring.

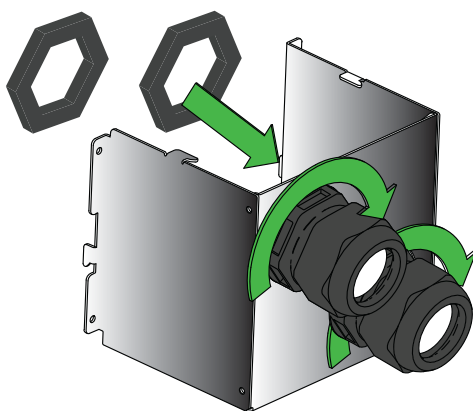
Compare the input circuit breaker, wire and ring terminal ratings to those found in [2.4.1 Breaker and Wire Sizes](#).
3. Switch off utility power to the distribution point where the UPS will be connected. Be absolutely sure there is no power.
4. Loosen the two screws and remove the MBP front cover. Ensure the UPS input circuit breakers are in the OFF (O) position.

Figure 33. MBP20KIUPARA Cover Removal

5. Determine your equipment's grounding requirements according to your local electrical code.
6. Detach the knockouts from the AC terminal wiring box and install the cable glands included in the MBP accessory kit.

**NOTE**

The AC terminal wiring box input and output knockout hole sizes are two inches in diameter.

Figure 34. MBP20KIUPARA Cable Gland Installation

7. Connect phase A, B, C, and Neutral input power wiring from the utility source to the input and neutral terminals. For a detailed view, see [Figure 35](#).

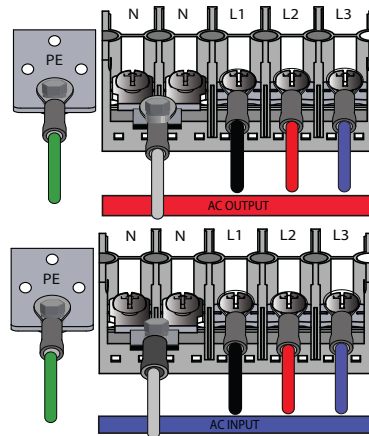


NOTE

Input neutral must be wired for proper operation.

8. Connect phase A, B, C, output power wiring from the output terminals and the neutral terminals to the critical load. For a detailed view, see [Figure 35](#).

Figure 35. MBP20KIUPARA Terminal Block



9. Replace the MBP AC terminal wiring box and cover.
10. Remove the UPS Parallel port cover and connect the parallel cables to each UPS, and secure the ground cables to the chassis of each UPS. See [Figure 36](#).

Figure 36. Connecting the Parallel Cable



11. Install the parallel cable lock on each of the UPS parallel ports to prevent accidental disconnection of the cables which could cause a failure in the system. The parallel cable lock is located in the UPS accessory kit.

Figure 37. Parallel Cable Lock Installation



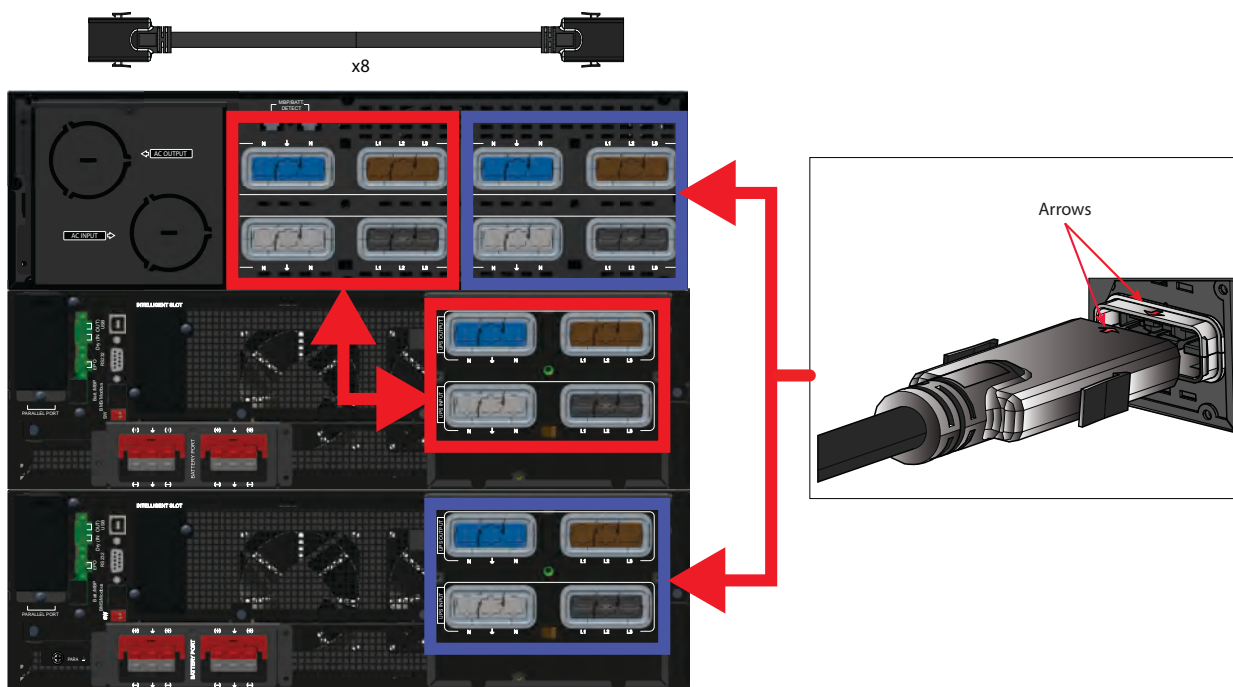
12. Connect each UPS to the MBP by using the eight connection cables provided in the MBP accessory kit. Match the cable pin color to the connection points and insert the cables until they lock into place.



NOTE

Each quick connection cable features colored pins (black, white, blue, brown) to assist with installation. To ensure proper cable orientation, align the arrow on each cable with the arrow on the corresponding connector of the UPS and the MBP. (See [Figure 38](#)).

Figure 38. MBP20KIUPARA UPS Cable Installation



13. Proceed to [2.4.5 EBM Installation](#).

2.4.5 EBM Installation



IMPORTANT

It's crucial to note that batteries are perishable goods. To ensure warranty validation, reliability, and safety, they must be **installed and operational by the recharge date specified on the battery packaging**. If the UPS will not be operational by the recharge date, it's imperative to contact Eaton (Technical support 1-800-356-5737, option 2, option 4) without delay.

WARNING

- Before connecting an external battery cabinet to the UPS cabinet or to another external battery cabinet, verify that all AC input power is removed from the UPS and open the input service circuit breaker. Observe all electrical safety precautions.
- Only qualified service personnel (such as a licensed electrician) should perform the battery cabinet installation. Risk of electrical shock.
- When extending the EBM's to another rack, ensure that the EBM grounding terminals are grounded.
- The EBM is heavy and requires more than two people to install.
- Remove watches, rings, and other metal objects from your hands.
- Wear rubber gloves and safety shoes.

NOTE 1 Each 93PX EBM contains two battery modules, each with a height of 3U. Therefore, a 6U installation space is required.



NOTE 2 Eaton provides extended-length main battery and battery detection cables for installing batteries across multiple equipment racks.

NOTE 3 The detection cable that connects the MBP to the UPS is included in the MBP accessory kit.

NOTE 4 Up to four EBM's (eight battery modules) may be connected to each UPS.

1. Verify that all battery circuit breakers on all UPSs are in the OFF position.
2. Plug the EBM detection cable(s) into the battery detection connection locations as shown in [Figure 42](#), [Figure 43](#) and [Figure 44](#).

Figure 39. EBM Detection Port



3. Align the guide pins of each of the main battery cables with the battery connectors on the UPS and EBM, and then install them. Verify that the EBM connections are tight and that there is adequate bend radius and strain relief for each cable.

**NOTE**

The main battery cable has different guide pin orientations on each end. Be sure to match the correct pin orientation to each of the connectors on the EBM and UPS. See [Figure 40](#) and [Figure 41](#).

Figure 40. Main UPS EBM Battery Cable Installation

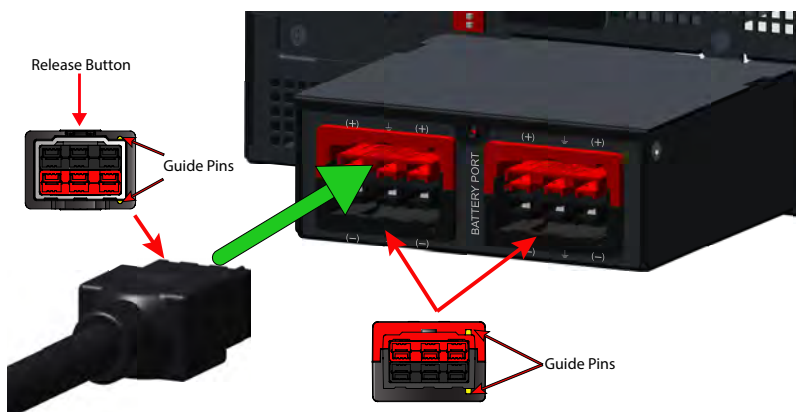
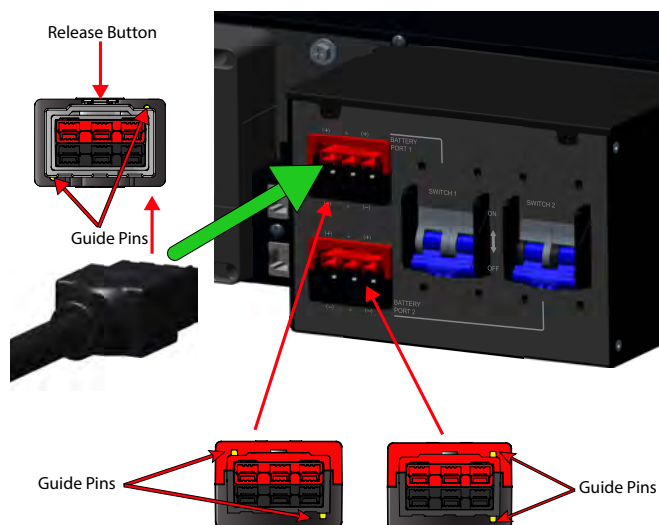


Figure 41. Main EBM Battery Cable Installation



See [Figure 45](#) and [Figure 46](#) for installing the cables in a single or parallel system.

**NOTE**

To remove a battery cable, press and hold the release button on the top of each battery cable connector, then gently remove it from the UPS or EBM.

4. Proceed to [4.1 Normal Mode Startup](#).

Figure 42. MBP20KIU EBM Detection Cable Installation

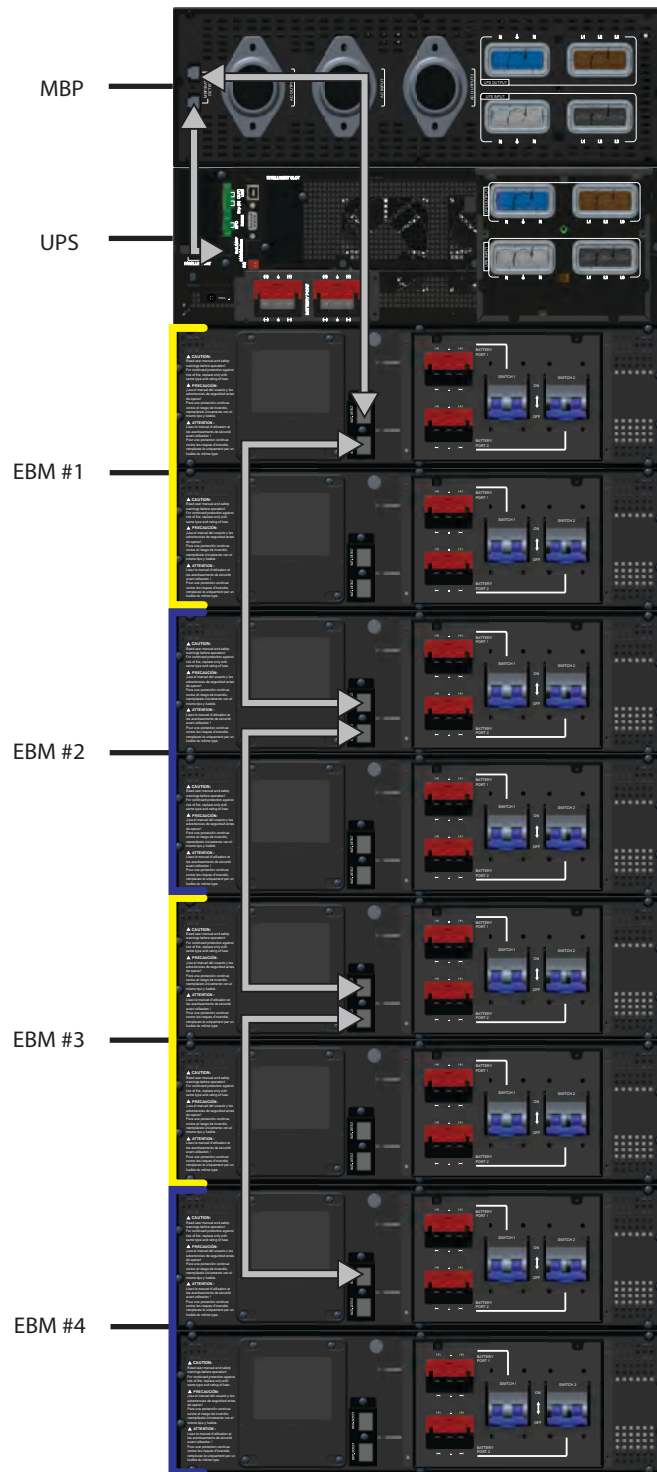


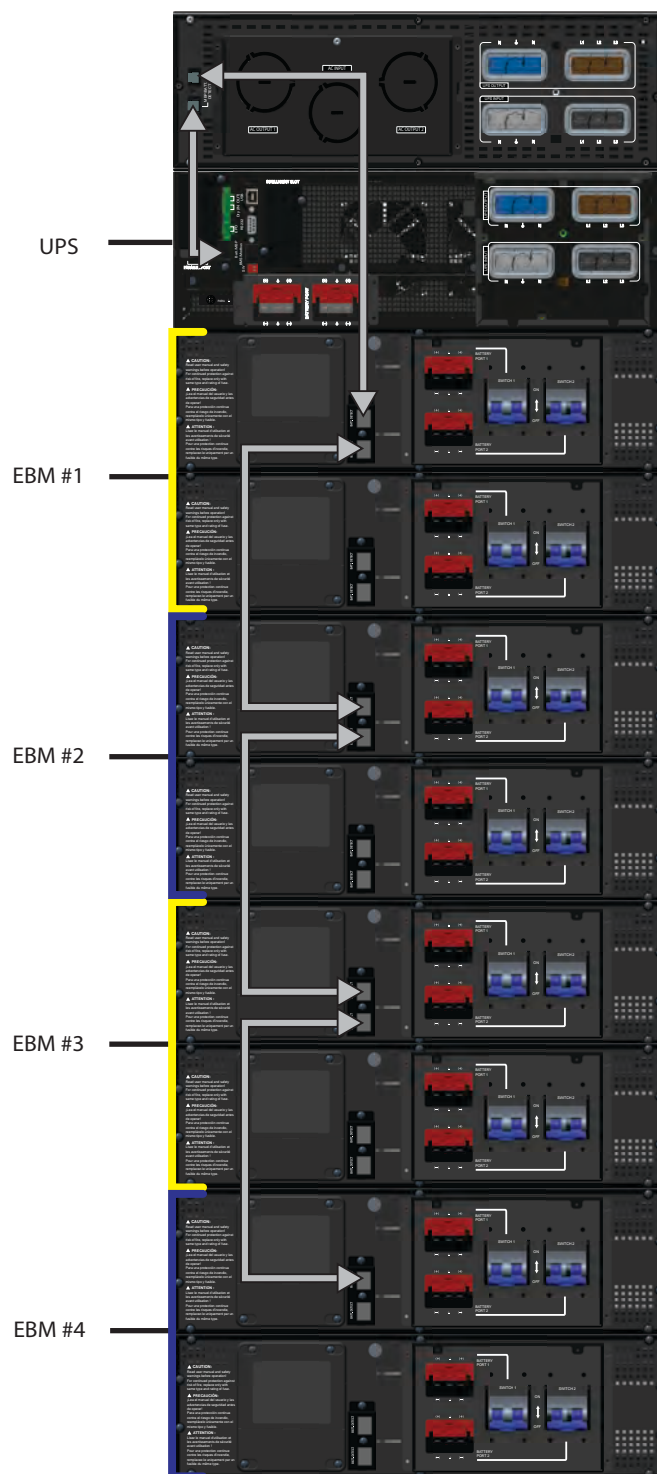
Figure 43. MBP20KIUHW EBM Detection Cable Installation

Figure 44. MBP20KIUPARA EBM Detection Cable Installation

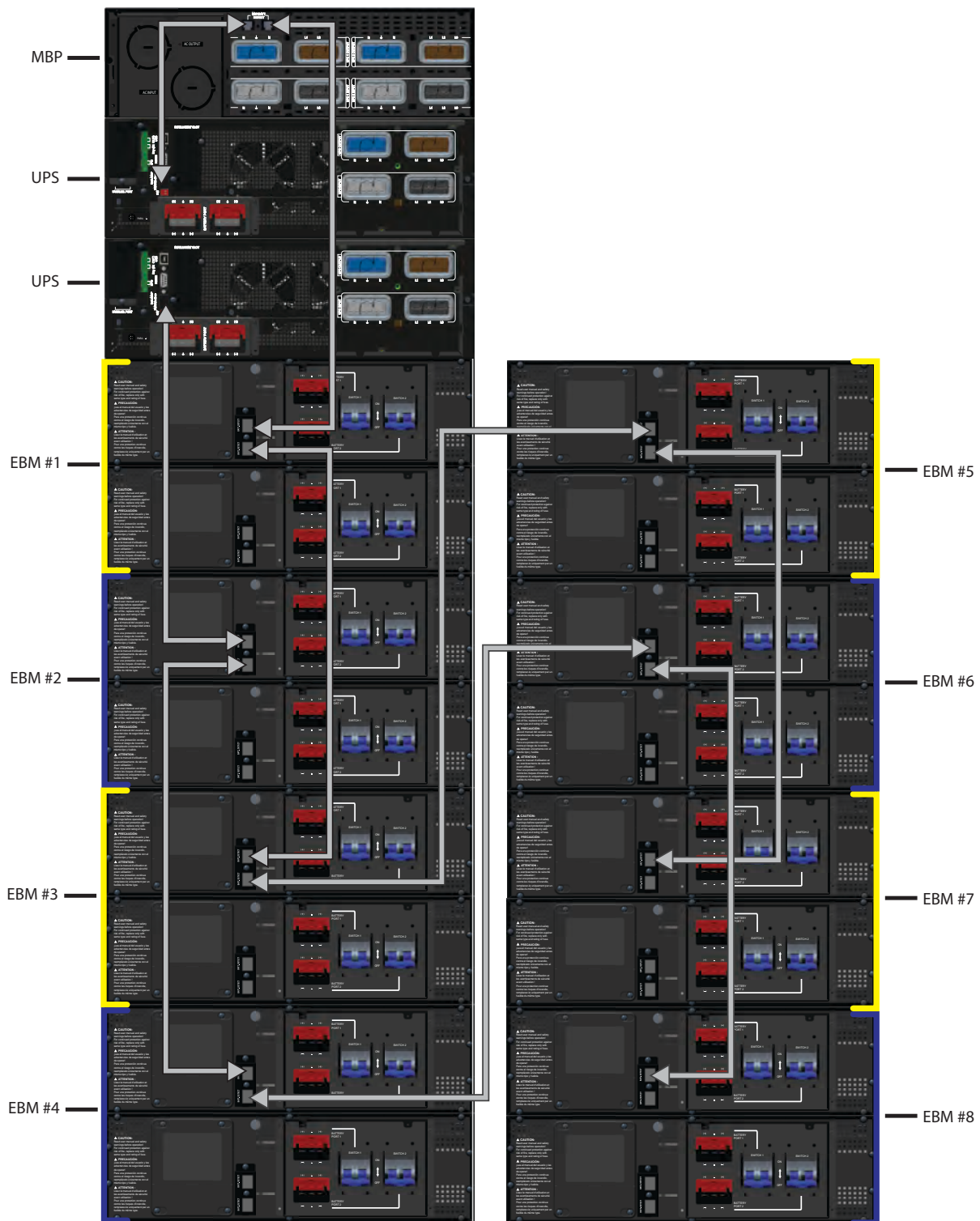


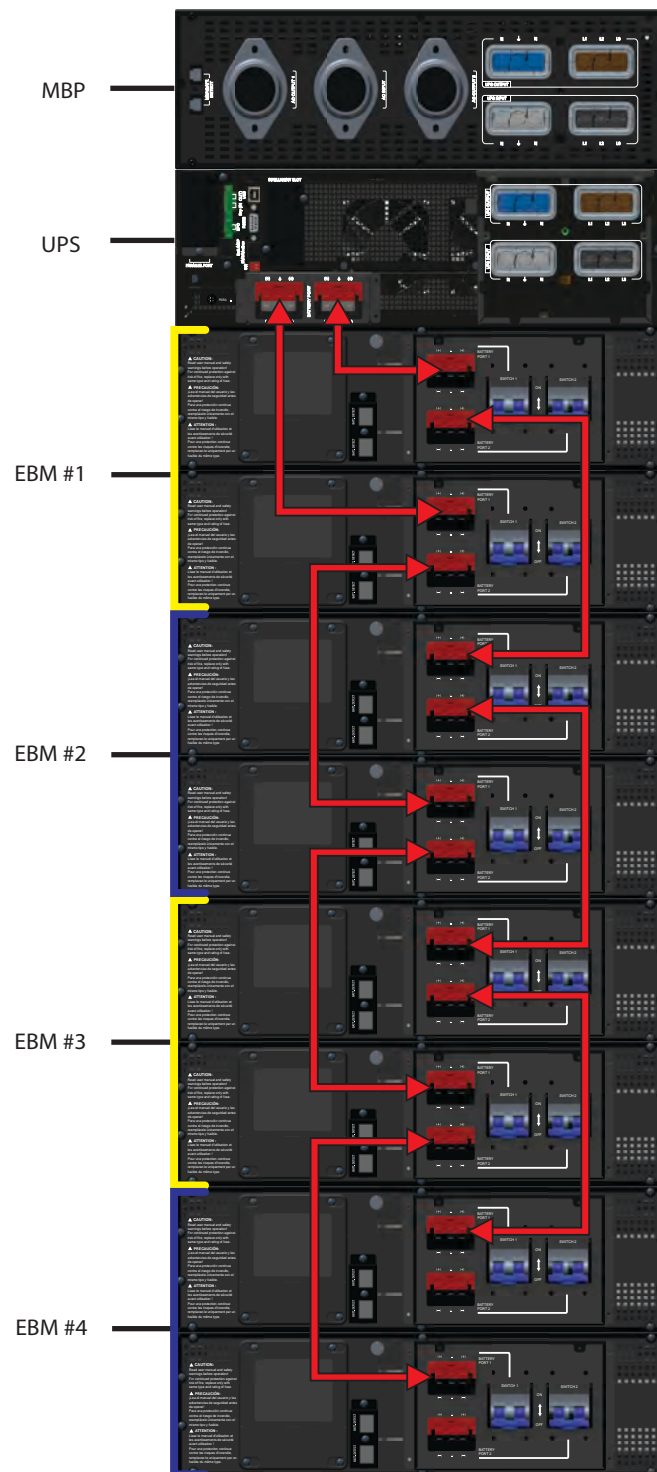
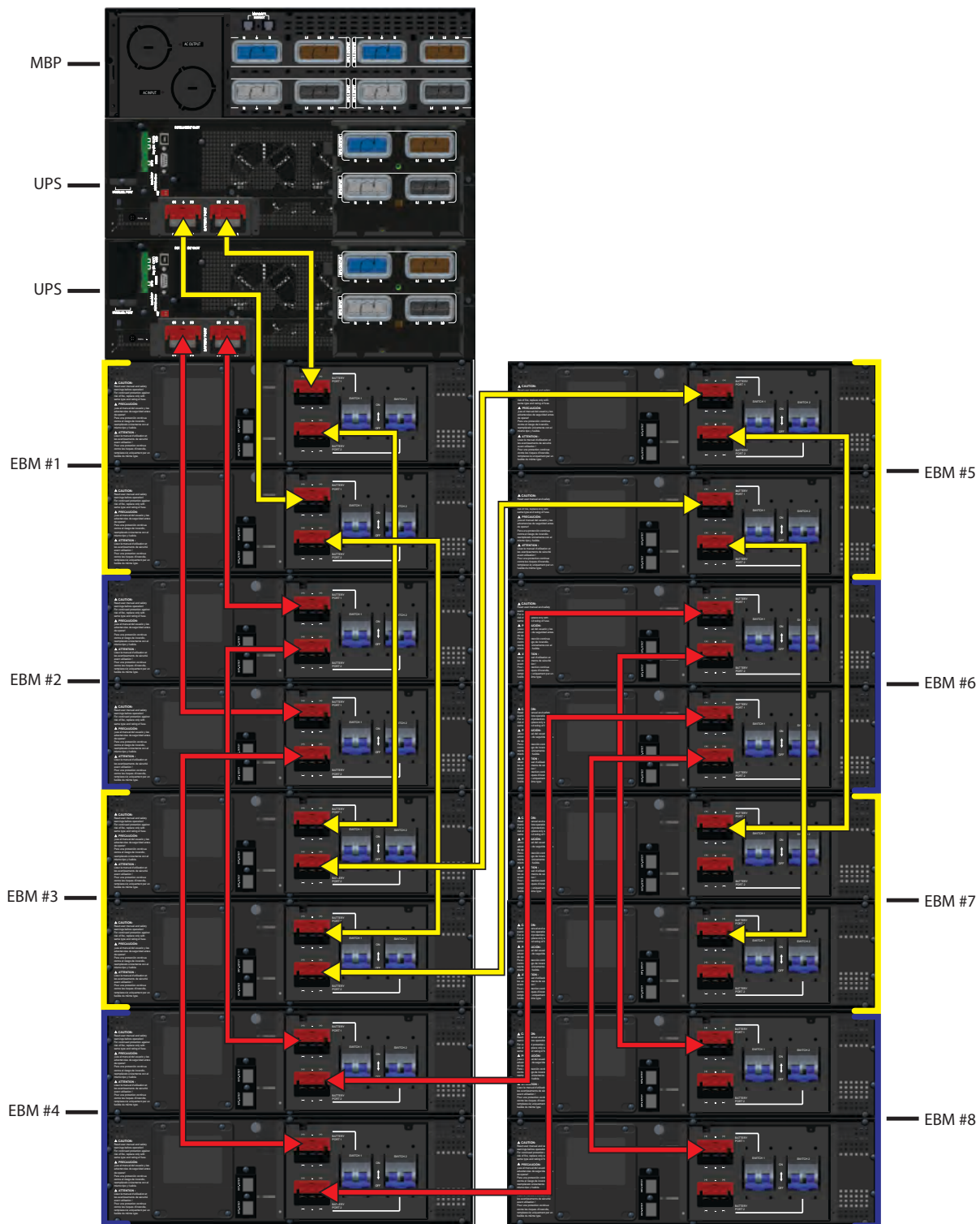
Figure 45. Single UPS System Battery Cable Wiring

Figure 46. Parallel UPS System Battery Cable Wiring



Chapter 3 Operation

3.1 Control Panel Functions

The UPS is equipped with a 4.3-inch 65K true color touch screen control panel with a graphical menu, and touch operation. The control panel provides UPS function and control settings.

Figure 47. Control Panel



① Power button	② Touch screen	③ LED indicator
----------------	----------------	-----------------

Table 17. Status Indicator Lights







LED indicator	Status	Description
	Steady red	The UPS is in Fault mode.
	Flashing red	There is an active alarm in the UPS.
	Steady yellow	The UPS is in Battery mode.
	Flashing yellow	The UPS is in Bypass mode with output.
	Steady green	The UPS is in Line mode or High Efficiency mode.
	Light off	The UPS has no output. It is in Power-on mode, Shutdown mode, or Bypass mode without output.

Table 18. Power Button Functionality


Power Button	Function	Description
	Power on	Press the power button to start the UPS.
	Power off	When the UPS is operating, press the power button to open the shutdown window.
	Clear fault	When the UPS is in Fault mode, press the power button to open the clear fault window.

Table 19. Buzzer Functionality

Buzzer	Description
No beep sound	The UPS is operating correctly. Check the UPS mode of operation.
One beep	Power-on sound.
Beep once every two minutes	The UPS is operating in Bypass mode.
Beep once every ten seconds	The UPS is operating in Battery mode.
Beep once every second	The UPS is operating in Battery mode and the battery is low, or a warning is active.
Continuous beep	There is an active fault on the system.

3.2 Control Panel Menu Structure

Figure 48. Menu Structure



3.2.1 Initial Settings Screens

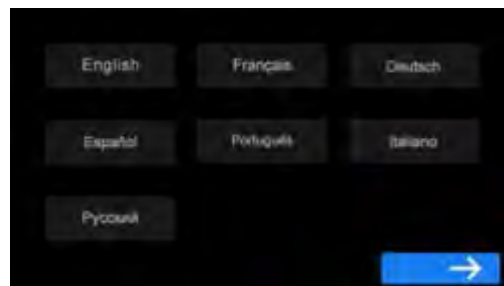
During initial startup, the LCD displays a start-up screen animation and then you will be prompted to enter the initial UPS settings.

Figure 49. Initial Start Screen Animation



Select the user interface language. English is used as the default. Press the right arrow button to advance the menu when finished.

Figure 50. Select Language



Set and confirm a six digit user password in order to access the Settings, Control and History menus.

Figure 51. Set the User Password

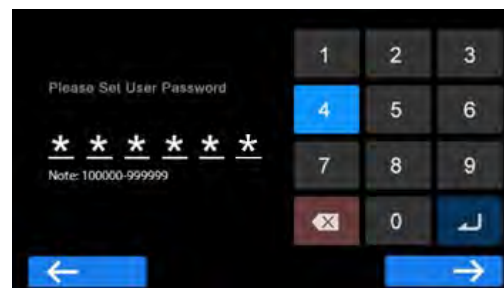
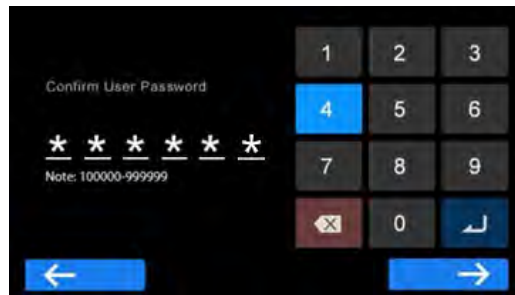


Figure 52. Confirm User Password



NOTE

Menu password protection is enabled by default. If you enter the password incorrectly three consecutive times within five minutes, the LCD will switch back to the main page, and the menus will be locked for five minutes. To reset the password, contact Eaton Support. If password protection is not needed, you can turn it off in Settings menu.


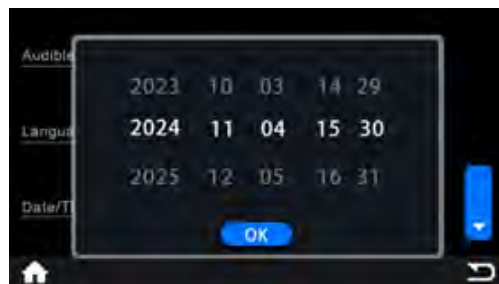
Press the  next to modify the date and time setting. The date and time setting are entered in the following format **YYYY-MM-DD hh:mm:ss**. Press OK when finished.

Figure 53. Setting the Date, Time and Output Voltage



3.2.2 Main Screen






The Main screen shows information about the UPS status and operation.

Figure 54. Main Screen



Table 20. Main Screen Options

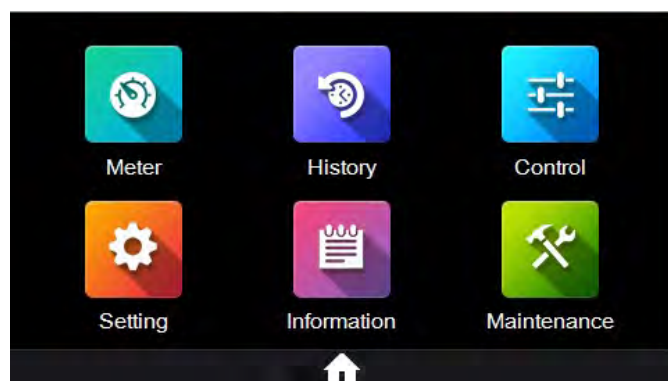
Number	Name	Description
1	Alarms and faults	Alarms and faults are displayed in the status bar. The status bar is blank when there are no alarms or faults to display.
2	Input information	There are three input status displays for bypass, line, and battery. The highlighted color represents the current input state.
3	System status	The system status is indicated as follows: <ul style="list-style-type: none"> Blue: the UPS operates correctly. Orange: There is an active alarm. Red: There is a failure in the system.
4	Menu	Tap this icon to go to the menu page.
5	UPS number	The number of this UPS in the parallel system.
6	Battery status	Displays battery information.
7	Output information	Displays output information.
8	Time	Displays the UPS system time. If it does not match the actual time, modify it in Settings → General → Date/Time.

Other Screen Control Buttons	
	Exits back to the Main Settings screen
	Displays the Home screen
	Scrolls to next setting
	Scrolls to previous setting
	Brings up more options on any setting.

3.2.3 Main Menu Screen

The Main Menu screen provides access to all of the UPS settings and information. Tap an icon to access a specific menu.

Figure 55. Main Menu Screen

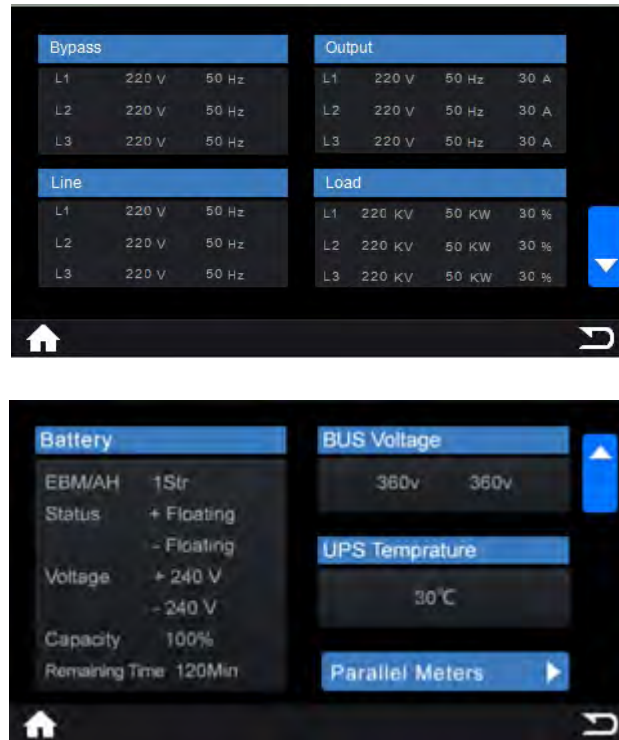


3.2.4 Meters Screen

Selecting the Meters screen displays a real-time metering snapshot of the UPS operating parameters.

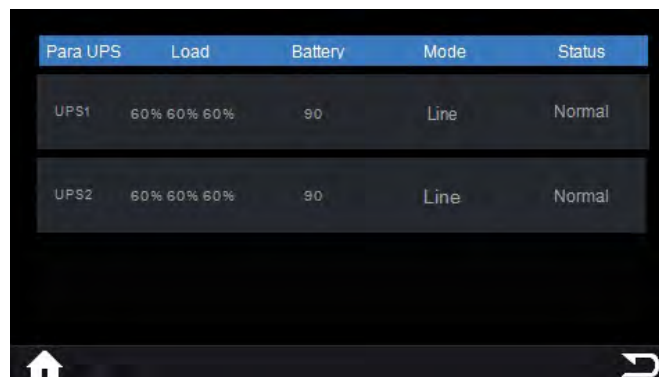
Tap the blue and white flip page icon on the right side of the screen to change the view between the Bypass, Output, Line, and Load real-time parameters, or Battery, BUS Voltage, UPS temperature and Parallel Meters parameters.

Figure 56. Measurements Screen



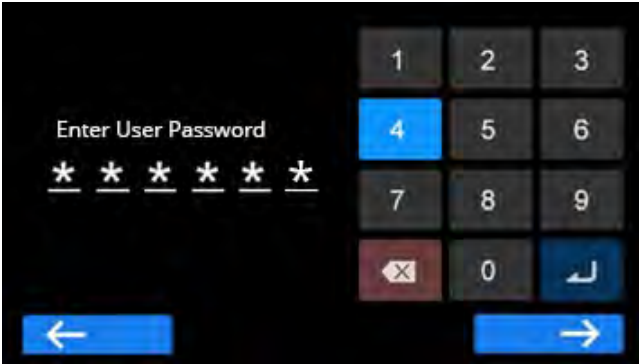
Tap on the arrow icon next to the Parallel Meters parameter to view the status of all UPS units in a parallel system.

Figure 57. Parallel Meters Screen



3.2.5 History Screen

Tap the History icon on the menu page to view the History page and enter the User password to access the History menu.



The event or alarm list can be sorted according to the time of the event’s occurrence. The icon's color indicates the severity level: red for a fault and blue for an event. The maximum number of log records kept is 100 for both lists combined.

Figure 58. Fault Log






Fault			
Type	ID#	List	Date
1 	#8888	Battery Runout	2024-11-04 15:30
2 	#8888	Battery Runout	2024-11-04 15:30
3 	#8888	Battery Runout	2024-11-04 15:30
4 	#8888	Battery Runout	2024-11-04 15:30
5 	#8888	Battery Runout	2024-11-04 15:30

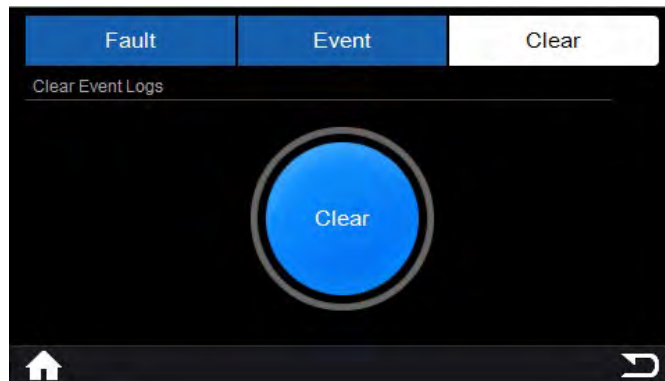
Figure 59. Event Log

Event			
Type	ID#	List	Date
1 	#8888	Battery Runout	2024-11-04 15:30
2 	#8888	Battery Runout	2024-11-04 15:30
3 	#8888	Battery Runout	2024-11-04 15:30
4 	#8888	Battery Runout	2024-11-04 15:30
5 	#8888	Battery Runout	2024-11-04 15:30

To clear the records, select Clear.



Use the Clear function carefully. The logs are permanently deleted and cannot be retrieved once the Clear function has been selected.

Figure 60. Clear Function

3.2.6 System Control Screen

Enter your password when prompted and the Control screen will open.


NOTE

In a parallel system, there are six different types of control functions. In a single system, there are four control functions.

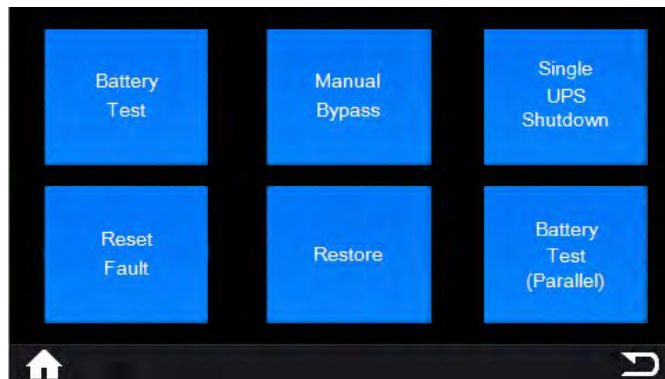
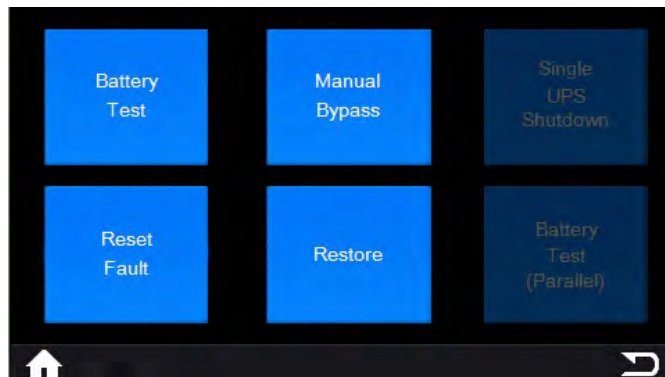
Figure 61. Parallel System Control Screen**Figure 62. Single System Control Screen**

Table 21. Control Screen Functions

Control Function	Description
Battery Test	Manually force a battery test when conditions permit in a single system.
Manual Bypass	Manually force the UPS to enter or exit Bypass mode when conditions permit.
Single UPS Shutdown	Shut down a single UPS in a parallel system.
Reset Fault	When the UPS is in Fault mode and there are alarms, cancel the fault and stop the alarm.
Restore Fault	All settings of the control UPS are restored to the default factory settings. This function can only be executed in Bypass mode.
Battery test (Parallel)	Manually force a battery test when conditions permit in a parallel system.

3.2.7 Settings Menu

From the Main Menu page, select the Settings option to access the Settings page.

Figure 63. Settings Menu**Table 22. Settings Menu Options**

		Setting Options on the display	Default
General	Audible alarms	[enabled] [disabled] Enable or disable the UPS buzzer if an alarm occurs.	[enabled]
	Language	[English] [French] [German] [Spanish], [Portuguese] [Italian] [Russian] Menus, status, notices and alarms, UPS fault, Event Log data and settings are in all supported languages.	[English]
	Date/Time	[Year: Month:Day] [Hour: Min:Sec]	

Table 22. Settings Menu Options (Continued)


		Setting Options on the display	Default
	LCD brightness	10~100 Modify LCD screen brightness and contrast to be adapted to room light conditions.	100
	LCD saving mode	[enabled] [disabled] LCD enters screen saver mode after 5 minutes of no activity.	[enabled]
Input	Bypass voltage low limit	xxx V (≥ 110 V) Bypass operation is disabled if the measured bypass voltage level is below the Bypass Voltage Limit Setting.	176V
	Bypass voltage high limit	xxx V (≤ 276 V) Bypass operation is disabled if the measured bypass voltage level is above the Bypass Voltage Limit Setting.	264V
	Bypass frequency range	[5 %, 10 %] Bypass operation is disabled if the measured bypass frequency is outside the nominal frequency range.	10%
	HE voltage low limit	xxx V (≥ 110 V) Minimum input operating voltage set point in High Efficiency mode	207 V
	HE voltage high limit	xxx V (≤ 276 V) Maximum input operating voltage set point in High Efficiency mode.	253 V
	HE frequency range	[5%, 10%] Percentage setting for the operating frequency range in High Efficiency mode.	5%
Output	UPS mode	[Line Mode] [HE Mode] [CVCF Mode] (See 3.3 Operating Modes)	[Line Mode]
	Output voltage	[220V] [230V] [240V]	[230V]
	Output frequency	[Auto Detection] [50Hz] [60Hz],	[Auto Detection]
	ESS function	[disabled][enabled] (See 3.3.3 Energy Saver System (ESS) mode)	[disabled]
	Auto bypass	[disabled][enabled] Defines whether the output is powered from Bypass in Standby mode.	[enabled]
	Auto restart	[disabled][enabled] (See 3.3.11 Automatic Restart)	[enabled]
	Clear SC fault	[disabled][enabled] (See 3.3.12 Short Fault Clearance Function)	[disabled]
	Overload prealarm	50%~105% (See 3.3.13 Overload Warning)	105%



Table 22. Settings Menu Options (Continued)

		Setting Options on the display	Default
Battery	DC start	[disabled] [enabled]	[enabled]
	Battery auto test	[Every ABM cycle] [Disable] (See 3.3.7 Battery Test mode)	[Every ABM cycle]
	Deep discharge protection	[disabled] [enabled] (See 3.3.14 Battery Deep Discharge Protection)	[enabled]
	Sleep mode	[disabled] [enabled] (See 3.3.15 Sleep Mode)	[disabled]
	Low batt warning	0%~100% The alarm triggers when the set percentage of battery capacity is reached during back-up time.	0%
	Low remaining time warning	0~59940s When in battery mode, if the battery remaining time level is below this threshold, the buzzer beeps.	180
	Restart batt level	0~100% If enabled, the UPS will automatically restart only when the specified battery charge level percentage is reached.	0%
	Charge current	[1-8A] Sets the UPS charging current and can be adjusted in 1A increments.	[8A]
	Battery charge Mode	[ABM Cycling] [Constant charge]	[ABM Cycling]
	External battery setting	[Auto Detection] [Manual EBM Set] [Manual AH Set] [No Battery] (See 3.2.8 External Battery Settings)	[Auto Detection]
Dry Contact	Dry in	[No Function] [Start UPS] [Remote Shutdown] [Maintenance Bypass]	[No Function]
	Dry out	[Load Powered] [On Bat] [Low Bat] [No Battery] [Bypass] [UPS OK]	[Load Powered]
	Modbus address	1~255	1
Password	Control menu password	[disabled][enabled] Enables or disables the Control Menu password.	[enabled]
	Setting menu password	[disabled][enabled] Enables or disables the Settings Menu password.	[enabled]
	Change password	[Old Password][New Password][Confirm New Password] Enter the old password and the new password. If the old password is correct, the new password will become active immediately.	100000-999999 (only 6 digit PIN)

3.2.8 External Battery Settings

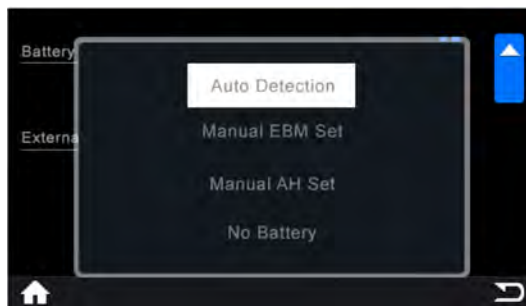
There are several ways to configure the UPS to recognize the external battery strings.

Press the  button on the Main Screen to activate the menu options, then select *Settings*, enter the password required to access the menu (if enabled), select *Battery* to access the *Battery Settings* menu.

Press the  button to access the *External Battery Settings*. To modify the External Battery Setting option, press the  button.

Select the method with which you would like to have the UPS detect the external battery strings. See [Figure 64](#).

Figure 64. Battery Settings Menu



NOTE

If automatic EBM detection is enabled, any manual EBM / Ah settings will be overridden by automatic detection. If Automatic EBM detection is enabled while the unit is powered on, a complete UPS restart may be required for the change to take effect.

- **Auto Detection (Default Setting)** - battery strings are detected automatically via connection of the RJ45 battery detection cable to the battery detection ports on the EBM and the UPS.
- **Manual EBM Set** -allows for setting the number of battery strings manually.
- **Manual Ah Set** - sets the amp hour rating for the quantity of Eaton external battery modules attached to the UPS. See [Table 23](#) for the recommended settings for the EBM Ah ratings.
- **No Battery-** configures the UPS to run with no external battery modules without reporting an open-battery alarm.

Table 23. EBM Setting and Amp Hour Rating

EBM String Number	Battery Number/Ah	Total Ah	LCD Setting Recharge Current	Charge Current Setting [A]
1	1 x 2 x 20 /9 Ah	9	4	1.8
2	2 x 2 x 20 /9 Ah	18	4	3.6
3	3 x 2 x 20 /9 Ah	27	6	5.4
4	4 x 2 x 20 /9 Ah	36	8	7.2
1 string = 2 EBM Modules				

3.2.9 UPS Information Screen

The Identification screen shows the product type and installed accessories.

Figure 65. UPS Information Screen



Figure 66. UPS Information Screen



Table 24. Communication Card Information

Setting Item	Description
UPS Model Number	Displays the model number of the UPS.
Serial Number	Displays the serial number of the UPS.
UPS FW Version	Displays the firmware version of the UPS.
LCD Firmware / JHD_APP Version	Displays the LCD firmware version.
COM Card FW Version	The value of these settings will be populated by the network management card.
COM Card IPv4	
COM Card IPv6	
COM Card MAC	

3.2.10 UPS Maintenance Screen

The Maintenance screen is reserved for service personnel only.

3.3 Operating Modes

3.3.1 Line mode

The critical load is supplied by the inverter, which derives its power from utility AC power. The UPS load is protected, and the batteries are charged according to a selected charging scheme.

The UPS can be switched to Line mode through the system control settings. See [3.2.6 System Control Screen](#).

The UPS transfers automatically to Line mode after an automatic restart.

3.3.2 HE (High Efficiency) mode

The critical load is supported securely by utility power through the static bypass switch with double conversion available on-demand with typically less than a 10 ms transition time, should any abnormal condition be detected in the utility.

The UPS can be transferred to HE mode through the system control settings. See [3.2.6 System Control Screen](#).

3.3.3 Energy Saver System (ESS) mode

The critical load is securely supported by utility power through the static bypass switch, with double conversion available on demand and typically less than a 2 ms transition time should any abnormal condition be detected in the utility. Operating the UPS in ESS mode increases system efficiency up to 99%, allowing significant savings in energy losses without compromising system reliability.

ESS mode is a function of HE mode and is automatically turned on and off.

3.3.4 Power-on mode

The UPS starts up in Power-on mode when it is connected to a power supply.

3.3.5 Bypass mode

- **Standby mode without output:** Critical load is supplied directly by utility power through the bypass. The inverter is off and the UPS load is not protected. The batteries are charged according to a selected charging scheme.
- **Bypass mode with bypass output:** Pressing the UPS power button in Line mode, Battery mode, Battery test mode, or HE mode transfers the UPS to Bypass mode. Clearing a UPS fault by selecting Reset fault transfers the UPS to Bypass mode.

3.3.6 Battery mode


Critical load is supplied by the inverter, which derives its power from a DC power source and converts it into AC power.

The UPS transfers to Battery mode when utility power is interrupted in Line mode, HE mode, or Battery test mode.

3.3.7 Battery Test mode

The Battery Test mode is used to perform a battery discharge test, which can be executed either manually or automatically in Online or High Efficiency mode. The critical load is supplied by the inverter, which derives its power from a DC power source even if utility AC power is available.

There are two different charging modes available: ABM mode and Constant Charge mode. In ABM mode the automatic battery test is run after the conclusion of every ABM cycle. In Constant Charge mode the battery test is scheduled every week, day or month(s). See [Table 22](#).

To run a battery test manually, from the Main Screen press the  button and then press the Control Menu icon and enter the password.

To run a test in a parallel system, select '*Battery Test (Parallel)*' and then Test to begin or schedule a battery test. Any UPS in the system that receives the '*Battery Test (Parallel)*' command from the LCD control menu will force all of the UPS units in the system to perform the battery test simultaneously if allowed. Each UPS will conduct the battery test for ten seconds. After the battery test is finished, each UPS will individually transfer to line power.

For a single UPS, select '*Battery Test*' from the Control Menu. See [Figure 62](#) and [Figure 63](#).

3.3.8 CVCF (Constant Voltage/Constant Frequency) mode

Critical load is supplied by the inverter, which derives its power from utility AC power. The UPS load is protected. The batteries are charged according to a selected charging scheme. Output frequency is constant (50 Hz or 60 Hz), and the unit does not synchronize the output frequency with the input frequency.

3.3.9 Fault mode

The UPS transfers to Fault mode if it detects a failure in the system. This action is intended to prevent damage to the equipment and to ensure the safety of individuals.

3.3.10 Shutdown mode

The unit saves the user settings and log information and then shuts down all power supplies.

The UPS transfers to Shutdown mode if utility power is interrupted in Standby mode or if the UPS detects a failure in the system.

3.3.11 Automatic Restart

If the battery is exhausted when utility power is restored, the UPS enters Bypass mode and begins charging the battery. When the automatic restart function is enabled and the battery reaches the specified restart power level, the UPS automatically restarts.

If the restart battery is set to 0% when the utility power is restored, the UPS automatically restarts. Automatic restart can be enabled or disabled in the Settings Menu. See [Table 22](#).

3.3.12 Short Fault Clearance Function

If the Short fault clearance function is disabled during an output short circuit, the UPS enters Fault mode after 200 ms. The output is powered off until the short fault is confirmed.

If the Short fault clearance function is enabled, after 200 ms, the UPS keeps the rated current output for ten seconds. If the short fault is cleared within ten seconds, the UPS automatically returns to a normal operating mode, otherwise it enters Fault mode.

3.3.13 Overload Warning

The UPS sounds an alarm after exceeding 105% of the rated power. However, if there are special requirements, this value can be reset. When the UPS load exceeds the set limit, it sounds an alarm to remind the user to confirm whether there is abnormal power in the system. The overload warning can be configured in the Settings Menu.. See [Table 22](#).

3.3.14 Battery Deep Discharge Protection

When the battery deep discharge protection is disabled, the low voltage warning point is set at 10.5 V per battery, and the discharge end point is set at 9.6 V per battery. When this function is enabled, the UPS will automatically calculate the actual discharge power and the actual EBM number of the battery (or the actual Ah number). Flexible adjustment of low voltage warning points and discharge end points helps achieve deep battery discharge protection.

Deep discharge protection is enabled by default. This setting is recommended to avoid damaging the battery. The warranty is void if deep discharge protection is disabled.

3.3.15 Sleep Mode

When Sleep mode is enabled and the utility power is off in Bypass mode, the UPS does not shut down immediately; it remains in Sleep mode for 60 minutes. During this time, communication, display, and other functions operate normally. When the UPS is used in an unattended or remote control scenario, it is recommended to enable this mode to allow remote operation without manual power-on.

3.3.16 Advanced Battery Management

The Advanced Battery Management (ABM) technology uses sophisticated sensing circuitry and a three stage charging technique that extends the useful service life of UPS batteries while optimizing the battery recharge time. The UPS also protects batteries from damage caused by high current charging and inverter ripple currents. Charging at high currents can overheat and damage batteries.

In the charge mode, the batteries are recharged. Charging lasts only as long as it takes to bring the battery system up to a predetermined float level. Once this level is reached, the UPS battery charger enters the float stage and the charger operates in the constant voltage mode.

The Rest mode begins at the end of the Float Charge mode; that is, after 48 hours of float charging (user adjustable). In the Rest mode, the battery charger is completely turned off. The battery system receives no charge current during this rest period of approximately 28 days (user-adjustable). During the Rest mode, the open circuit battery voltage is monitored constantly, and battery charging is resumed when necessary.

Chapter 4 UPS Startup

4.1 Normal Mode Startup



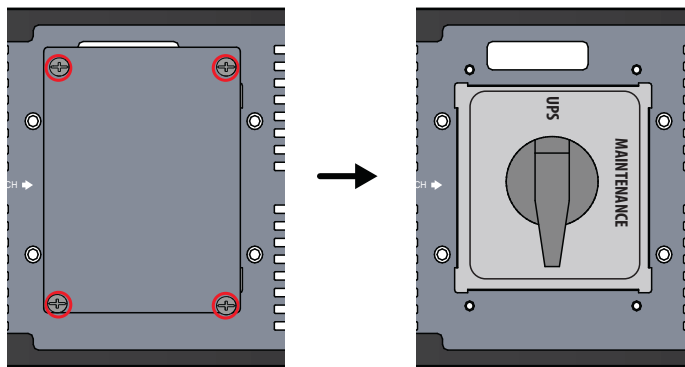
IMPORTANT

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

To start the UPS:

1. Install the UPS and MBP according to [2.4 Electrical Installation](#).
2. Ensure that the EBMs are connected to the UPS and that the battery breakers are switched to the ON position. See [2.4.5 EBM Installation](#).
3. Remove the MBP front bezel by loosening the two cover screws. See [Figure 26](#), [Figure 29](#) and [Figure 33](#).
4. Locate and remove the maintenance bypass switch cover (see [Figure 68](#) and [Figure 69](#)) on the front of the MBP.

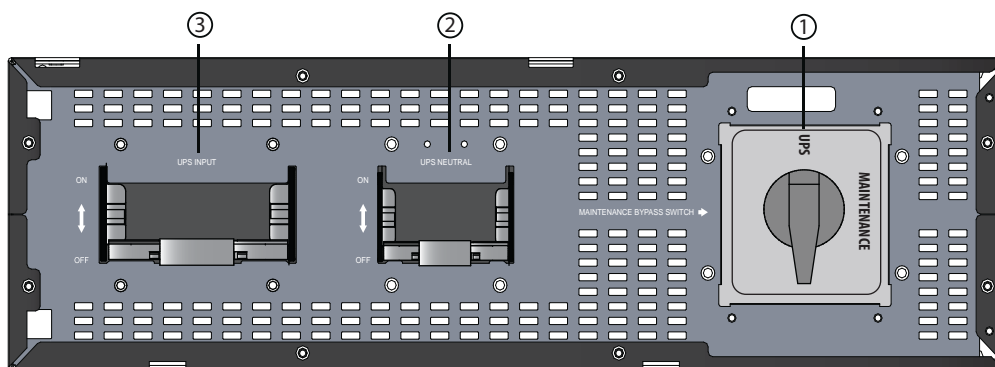
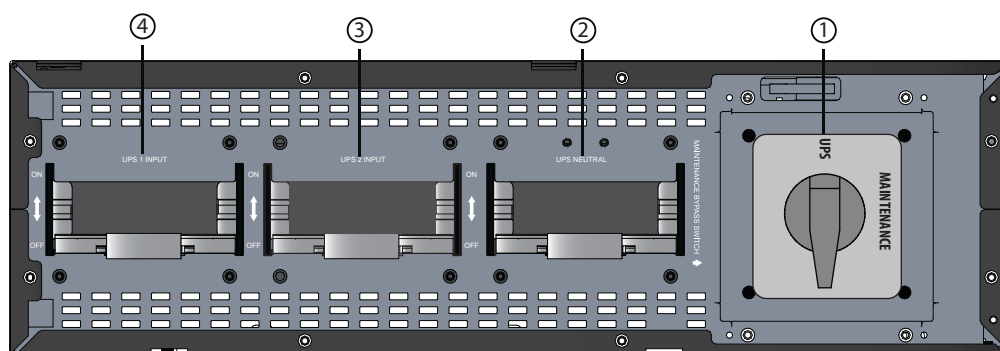
Figure 67. Maintenance Bypass Switch Cover Removal



5. Verify that the maintenance bypass switch is in the UPS position.
6. Remove the UPS Neutral breaker cover and verify it is in the ON position. See [Figure 68](#) and [Figure 69](#).

WARNING

The MBP neutral breaker must be switched to the ON position **prior** to applying power to the MBP to prevent damage to the load equipment.

Figure 68. Front of MBP20KIU / MBP20KIUHW**Figure 69. Front of MBP20KIUPARA Front Panel**

7. Install the maintenance bypass switch cover and the neutral breaker cover.
8. Set the upstream input circuit breaker (not provided) to the "I" position (On) to switch on the utility power to the MBP.
9. Switch each of the UPS input breaker(s) to the ON position. The UPS fans will begin to rotate, the LCD will display the Eaton startup animation screen and enter the Initial Settings Screens. (See [3.2.1 Initial Settings Screens](#)).

**NOTE**

By default, Auto Bypass is enabled. As a result, the UPS transfers automatically to Bypass mode, and the system status displayed on the main page is Bypass mode.

10. After setting the initial power on settings, verify there are no alarms on the UPS screen, then press and hold the power button for approximately one second. The buzzer will beep and the UPS transfers to line mode after three seconds. The load is powered by the UPS and the LCD displays a charging sign indicating that the battery is charging. See [Figure 54](#).

**NOTE**

If turning on a parallel system, press and hold the power button on one of the UPS units for approximately one second. Both units will start up in Line mode at the same time.

**NOTE**

If the utility power is abnormal, the UPS transfers to Battery mode. If the battery is not connected, the UPS will still start up and an alarm is triggered due to a disconnected battery.

WARNING

Do not turn the UPS maintenance bypass switch while the UPS is in battery mode. This can damage your equipment and will void the UPS warranty.

4.2 Maintenance Bypass Startup

CAUTION

- Only trained personnel familiar with the operation of this equipment should transfer loads. Failure to follow this transfer sequence may cause loss of power to loads or overload protection devices to activate.
 - In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.
-

IMPORTANT

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

To start the UPS:

1. Install the UPS and MBP according to [2.4 Electrical Installation](#).
 2. Ensure that the EBMs are connected to the UPS and that the battery breakers are switched to the ON position. See [2.4.5 EBM Installation](#).
 3. Remove the MBP front bezel by loosening the two cover screws. See [Figure 26](#), [Figure 29](#) and [Figure 33](#).
 4. Locate and remove the maintenance bypass switch cover (see [Figure 68](#) and [Figure 69](#)) on the front of the MBP.
 5. Verify that the bypass switch is in the maintenance position.
 6. Remove the UPS neutral breaker cover. See [Figure 68](#) and [Figure 69](#).
-

WARNING

The MBP neutral breaker must be switched to the ON position **prior** to applying power to the MBP to prevent damage to the load equipment.

7. Set the upstream input circuit breaker (not provided) to the "I" position (ON) to switch on the utility power to the MBP.
 8. Switch each of the UPS input breaker(s) to the ON position (See [Figure 68](#) and [Figure 69](#)). The UPS fans will begin to rotate, the LCD will display the Eaton startup animation screen and display the Initial Settings Screens. (See [3.2.1 Initial Settings Screens](#)).
-



NOTE

By default, Auto Bypass is enabled. As a result, the UPS transfers automatically to internal Bypass mode.

9. After setting the initial power on settings, verify that there are no alarms on the UPS screen.
10. Move or turn the switch the maintenance switch to UPS.
11. Install the maintenance bypass switch cover and the neutral breaker cover.

12. Press and hold the power button for approximately one second. The buzzer will beep and the UPS will transfer to line mode after three seconds. The load is powered by the UPS and the LCD displays a charging sign indicating that the battery is charging. See [Figure 54](#).

**NOTE**

If turning on a parallel system, press and hold the power button on one of the UPS units for approximately one second. Both units will start up in Line mode at the same time.

**NOTE**

If the utility power is abnormal, the UPS transfers to Battery mode. If the battery is not connected, the UPS will still start up and an alarm will trigger due to a disconnected battery.

WARNING

Do not turn the UPS maintenance bypass switch while the UPS is in battery mode. This could damage the load equipment and will void the UPS warranty.

4.3 UPS Cold Start

A UPS cold start is the process of starting a UPS (Uninterruptible Power Supply) directly on battery power without any input from the main AC power source. This procedure is typically used to determine whether if the UPS can function properly when there is no utility power available.

To start the UPS on battery power:

1. Verify that the UPS and MBP have been installed and connected according to [2.4 Electrical Installation](#).
2. Verify that the EBM's are connected to the UPS and that the battery breakers are in the ON position. See [2.4.5 EBM Installation](#).
3. Set the upstream input circuit breaker (not provided) to the "O" position (OFF) to switch off the utility power to the MBP.
4. Locate and remove the maintenance bypass switch cover (see [Figure 68](#) and [Figure 69](#)) on the front of the MBP.
5. If the load equipment is to be supported in battery mode, ensure that the MBP bypass switch is in the UPS position.

**IMPORTANT**

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

6. Press the power button for approximately one second. The fan starts to rotate and the LCD displays the start-up animation screen and enters the main page. Standby mode is displayed. The UPS enters Battery mode after a few seconds.
7. The UPS will operate in battery mode and the buzzer will beep once every ten seconds.
8. Press the power button for approximately one second to turn the UPS off.

4.4 UPS Bypass and Shutdown

⚠ CAUTION

- Only trained personnel familiar with the operation of this equipment should transfer loads. Failure to follow this transfer sequence may cause loss of power to loads or overload protection devices to activate.
 - In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.
-

To shut down the UPS:

1. Verify that there are no active alarms on the front panel of the UPS.
 2. Press the Menu icon on the Main display page. See [Figure 54](#).
 3. Select the Control Menu icon and enter the user password. See [Figure 55](#).
 4. Select the Manual Bypass option and then press Confirm. The UPS will switch to internal bypass. The LED to the right of the HMI will turn yellow and the UPS will emit one beep every two minutes.
-



NOTE

For parallel systems: when one unit is commanded to enter bypass mode, both units will change modes at the same time.

5. Loosen the two screws on the front of the MBP that hold the front bezel in place and remove the bezel. See [Figure 26](#), [Figure 29](#) and [Figure 33](#).
 6. Locate the maintenance bypass switch cover. Remove the four screws that hold the cover in place. Then remove the cover. See [Figure 67](#).
-



NOTE

When the bypass switch is removed, the status LED on the display will turn red. This is normal operation. The UPS will still be in internal bypass mode.

7. Move or Turn switch the bypass switch to the Maintenance position.
 8. Install the bypass switch cover and secure it with four screws.
 9. Switch the UPS Input breaker(s) to the OFF position. See [Figure 68](#) and [Figure 69](#).
 10. The UPS will enter the Shutdown mode, the LCD will turn off and the fans will stop rotating.
-

⚠ CAUTION

The load equipment will still be energized and is being supported from utility even though the UPS is shut down.

Chapter 5 Communication

5.1 Power Management Software

Eaton Intelligent Power Protector (IPP)

Eaton® Intelligent Power® Protector (IPP) is protection software that gracefully shuts down local computers and servers powered by a UPS in the event of a power outage. IPP acquires information through local or network communication using:

- **Local Communication:** UPS USB or RS-232 communication ports
- **Network Communication:** Web/SNMP Cards, such as Network Management Cards (NMCs),

IPP provides the following:

- Graceful shutdown of local computers through network or local connectivity.
- Allows Eaton Intelligent Power Manager (IPM) to provide centralized management and supervision of Eaton IPP applications running on virtualized servers other than VMware vCenter (such as Microsoft® Hyper-V™ Hypervisor or Citrix® Xen®).
- Allows Eaton IPM to provide advanced management features (mass configuration and mass upload) with Eaton Network Management Cards.

Intelligent Power Manager (IPM)

- Ideal for monitoring and managing multiple power and environmental devices, Intelligent Power Manager software delivers a global view across the network from any PC with an internet browser.
- Exceptionally versatile, the software is compatible with any device supporting a network interface, including other manufacturers' UPSs, environmental sensors, PDUs, shutdown applications, and more.
- Intelligent Power Manager also offers the ability to organize a management table by groups, centralize alarms, and maintain event logs for preventive maintenance of the entire installed equipment base.

5.2 Communication Cards

Connectivity cards allow the UPS to communicate in a variety of networking environments and with different types of devices. The 9PX models have one available communication bay for the following connectivity cards:

Figure 70. Gigabit Network Card (Network-M3)



Network-M3 card: The Gigabit Network Card provides a Gigabit Ethernet connection and enables secure UPS monitoring over HTTPS web browser interface, 10/100/1000 Mb/s, auto neg., HTTP 1.1, Log on events SNMP V1, SNMP V3, NTP, SMTP, DHCP, and email alarms. In addition, up to three Environmental Monitoring Probes can be attached to obtain humidity, temperature, smoke alarm, and security information.

Figure 71. Industrial Gateway Card (INDGW-M2 / INDGW-M3)



INDGW-M2 / INDGW-M3 card: The Industrial Gateway Card (INDGW-M2 / INDGW-M3) provides Modbus RTU and Modbus TCP communication support and the same secure UPS monitoring, management, and sensor capability as the Gigabit Network card.

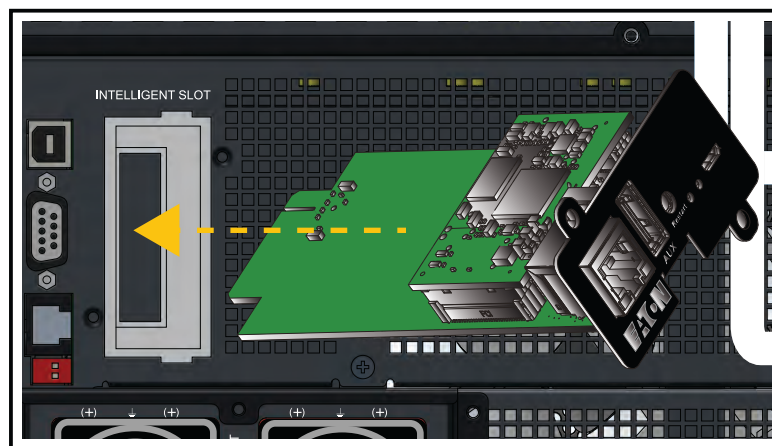
Figure 72. EMPDT1H1C2 Environmental Monitoring Probe (EMP) Gen 2



EMPD1H1C2: The EMPDT1H1C2 Environmental Monitoring Probe (EMP) Gen 2 enables you to collect temperature and humidity readings in rack enclosures and monitor environmental data remotely using SNMP or a web browser. It features one temperature, one humidity and two dry-contact status data points.

To install the communication cards:

Figure 73. Communications Card Installation



1. Remove the intelligent slot cover, which is secured by two screws. See [Figure 6](#) for the intelligent slot location.
2. Insert the communication card into the slot.



NOTE

It is not necessary to shut down the UPS before installing a communication card.

5.3 Communication Ports

Connecting to the RS232 or USB Communication Port

The UPS has USB and RS232 communication ports for use with Eaton IPP or IPM management software. Use the communication cables included in the UPS accessory kit for communication port connections.

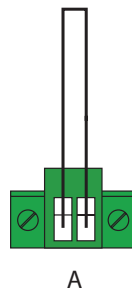
The default parameters for RS232 port communication are: 2400, 8, 1, 0 (baud rate 2400, 8 data bits, 1 stop bit, no parity).

If the USB and RS232 are to be connected at the same time, connect the USB before connecting the RS232.

5.4 Emergency Power-Off (EPO)

A normally closed contact used to shut down the UPS remotely when the contact is opened. This feature can be used for shutting down the load and the UPS by thermal relay, for instance, in an increase in temperature past the threshold. When EPO is activated, the UPS shuts down the output and all of its power converters immediately. As a result, the UPS performs an emergency shutdown, the red warning LED light turns on, and the UPS transfers to Fault mode. The EPO circuit is an IEC 60950 safety extra low voltage (SELV). This circuit must be separated from any hazardous voltage circuits by reinforced insulation.

Figure 74. Emergency Power Off (EPO)



A = Normally closed

- 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 27 Vdc and 20 mA and be a dedicated latching type switch not tied into any other circuit. For proper operation, the EPO signal must remain active for at least 250 ms.
- 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.

Leave the EPO connector installed in the EPO port on the UPS even if the EPO function is not utilized.

Testing the Emergency Power Off Function

1. Verify that the UPS is shut down and that the mains electrical input is disconnected from the UPS.
2. Remove the EPO connector from the UPS by loosening the screws.
3. Plug the EPO connector into the back of the UPS and tighten the screws.
4. Connect and restart the UPS according to the previously-described procedures.
5. Activate the external remote shutdown contact to test the function. Always test the EPO function before applying your critical load to avoid an accidental load loss.

5.5 Relay Contact Port

The input relay contact is an input interface connected to an external switch. After setting the dry contact input function, it can perform operations such as powering on and off.

The output relay contact is normally closed. It can indicate different UPS operating conditions, such as a UPS overload, Battery mode, low battery voltage, disconnected battery, and bypass output.



IMPORTANT

The dry input contacts can be configured as normally open or normally closed.

The relay signal input contacts can be set as:

1. Disabled (Default)
2. Start the UPS - turns the UPS on when the input signal is active (UPS must be in Bypass mode).
3. Remote Shutdown - turns the UPS off when the input signal is active.
4. Maintain Bypass - the UPS transfers to Maintain Bypass when the signal is active.

The relay signal output contacts can be set as:

1. Loaded powered (Default) - active when the UPS load is powered.
2. Run on Battery Mode - changes state when the UPS is on battery power.
3. Battery Voltage Low - activates when the UPS battery is low.
4. Battery disconnected - activates when the UPS external battery is disconnected.
5. Bypass Output - activates when the load is supplied by internal bypass.
6. UPS Normal - activates when the UPS operation is normal.

Chapter 6 UPS Maintenance and Troubleshooting

6.1 Battery Replacement

⚠ DANGER

Risk of electric shock. All repairs and service should be performed by QUALIFIED SERVICE PERSONNEL ONLY. There are NO USER-SERVICEABLE PARTS inside the UPS. The UPS is to be disconnected from the AC mains before the battery is replaced.

⚠ WARNING

Replace the EBM with an Eaton-supplied battery module ONLY! Ensure the UPS has been powered off and safely isolated from AC input power before replacing the battery. Although the UPS may be disconnected from the utility power, a hazardous voltage may still be present through the UPS battery. Use tools with insulated handles.

The battery in the EBM is rated for a 3–5 year service life. The length of service life varies, depending on the frequency of use and ambient temperature. Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every five years to keep your UPS running at peak efficiency.

The unit is heavy. Wear safety shoes and use a vacuum lifter for handling operations.

All handling operations will require at least two people (removal, lifting, installation in rack system).

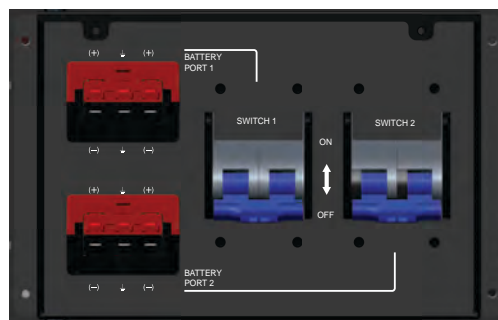
⚠ CAUTION

- Safely secure the battery cables out of the way when removing and installing the battery so that they do not get damaged during the battery replacement process. Use properly insulated tools when removing and installing the battery.
- Check the battery recharge date on the shipping carton label. If the expiration date has passed, and the batteries were never recharged, do not use the UPS. Contact Eaton support.

To replace an extended battery module:

1. Shut down the UPS system (see [4.4 UPS Bypass and Shutdown](#)).
2. Switch the breakers on the back of each EBM to the OFF position.

Figure 75. EBM Breakers



3. Disconnect the main battery cable(s) and detection cable(s) from each EBM. See [2.4.5 EBM Installation](#).
4. Replace the EBM(s). See [6.3 Recycling Used Equipment](#) for proper disposal.
5. Install the supplied mounting brackets onto the new EBM(s) and install into the rack enclosure. See [2.3 System Mechanical Installation](#).
6. Connect the main battery cable(s) and detection cable(s) to each EBM. Verify that all the wiring is tight and that adequate bend radius and strain relief exist for each cable.. See [2.4.5 EBM Installation](#).
7. Proceed to [4.1 Normal Mode Startup](#).

6.2 Storage

The ideal ambient temperature range is –13°F to 140°F (–25°C to 60°C). It is recommended to charge the UPS batteries for at least eight hours, then store the UPS covered and upright in a cool, dry location. Remove any accessories and disconnect any cables connected to the UPS EBM's to avoid unnecessary draining of the battery.

Extended Storage

During extended storage in environments where the ambient temperature is 5°F to 104°F (–15°C to 40°C), charge the UPS EBM's every six months.

During extended storage in environments where the ambient temperature is 104°F to 140°F (40°C to 60°C), charge the UPS battery every three months.

6.3 Recycling Used Equipment

Contact your local recycling or hazardous waste center for information regarding the proper the disposal of used equipment.



This symbol indicates that you should 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.



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 for more information.

6.4 Troubleshooting

The Eaton 93PX UPS system has an audible alarm feature to alert you of potential power problems. When activated, the alarm sounds at different intervals according to a particular condition. Use the table below to determine and resolve UPS alarms and conditions.

Table 25. Alarms and Faults

Alarm number	Alarm name	Possible cause	Solution
00E	Parallel line loss	The parallel connection is not operating correctly.	Make sure that the parallel connection is operating correctly.
00F	Parallel inconsistent	The parallel setting is inconsistent.	Examine the parallel setting. If the UPS still alarms, Contact Eaton support.

Table 25. Alarms and Faults (Continued)

Alarm number	Alarm name	Possible cause	Solution
004	Ambient temperature high	The ambient temperature is high.	Examine whether the ambient temperature exceeds 50 °C. If the ambient temperature is within the acceptable limits, but the UPS still alarms, Contact Eaton support.
007	Internal fan fault	The fan is not operating correctly.	Contact Eaton support.
01B	Para. Male Cable Lost	The male cable connection is lost.	Examine the male cable connection of the parallel line.
01C	Para. Female Cable Lost	The female cable connection is lost.	Examine the female cable connection of the parallel line.
08B	Output Volt Unbalance	The output is unbalanced.	Contact Eaton support.
010	Main SPS fault	The internal power supply of the UPS is not operating correctly.	Contact Eaton support.
012	Bat In Different	The battery connection is different in the parallel mode.	Examine the battery connection.
017	Auxiliary SPS fault	The internal power supply of the UPS is not operating correctly.	Contact Eaton support.
018	Line In Different	The AC input is different in the parallel mode.	Examine the AC input.
019	Bypass In Different	The bypass connection is different in the parallel mode.	Examine the bypass connection.
10A	Line Volt Unbalance	The line voltage is unbalanced.	Contact Eaton support.
20D	Byp Wire Config Fail	Detection of bypass phase wiring is not compatible with the UPS setting.	Contact Eaton support.
20E	Bypass Fan Fault	The fan is not operating correctly.	Contact Eaton support.
20F	Byp Volt Unbalance	The bypass voltage is unbalanced.	Contact Eaton support.
63F	Positive battery is not connected	The battery is not connected.	Examine the battery and the battery cable. If the battery is damaged, it must be replaced immediately by qualified service personnel.

Table 25. Alarms and Faults (Continued)

Alarm number	Alarm name	Possible cause	Solution
70C	Inverter voltage low	The inverter voltage is low.	Stop the UPS, remove all loads, and make sure that the load is not defective or short-circuited. Press the button to clear the alarm and restart. If this fails, Contact Eaton support.
70D	Inverter voltage high	The inverter voltage is high.	
80D	Working mode fault	There is a working mode setting error.	Contact Eaton support.
80E	Power Overload Prealarm	There is an active power overload pre-alarm.	Reduce load power.
81F	L1 Overload Prealarm	There is an active L1 overload pre-alarm (R Phase).	Reduce L1 phase load power.
100	Bus soft start failed	Bus boost failure	Contact Eaton support.
106	Line Volt Loss	There is no line voltage.	Contact Eaton support.
107	Input Line Reversed	The Input L/N line is reversed.	Make sure that the input connection operates correctly.
		There is no ground connection.	Make sure that there is a ground connection.
120	N line loss	The N line is not connected.	Make sure that the N line connection operates correctly.
123	Line Wire Wrong	The AC phase number is incorrect. 1- or 2-phase loss on the 3-phase AC input.	Examine the AC input phase number and the AC cable connection.
124	Line Rotation Wrong	There is a phase rotation fault on the 3-phase input UPS, which could cause a failure in the UPS at transfer.	Examine the AC cable connection.
203	Bypass temperature high	Internal over temperature	Contact Eaton support.
207	Byp Device Fault	Bypass internal failure (relay stick, backfeed)	Contact Eaton support.
208	Bypass overload fault	The load exceeds the rated value.	Redistribute the load, remove the non-critical load, and make sure that the load is not defective.
211	Byp Wire Wrong	The bypass phase number is incorrect. 1- or 2-phase loss on the 3-phase bypass input.	Examine the bypass phase number and connection.

Table 25. Alarms and Faults (Continued)

Alarm number	Alarm name	Possible cause	Solution
212	Byp Rotation Wrong	There is a bypass phase rotation fault on the 3-phase output UPS, which could cause a failure in the UPS at transfer.	Examine the bypass cable connection.
300	Positive Bus high	Positive bus voltage is high.	Contact Eaton support.
301	Negative Bus high	Negative bus voltage is high.	Contact Eaton support.
302	Positive Bus low	Positive bus voltage is low.	Contact Eaton support.
303	Negative Bus low	Negative bus voltage is low.	Contact Eaton support.
304	Bus imbalance	Bus imbalance	Contact Eaton support.
308	Bus short	Bus short	Contact Eaton support.
501	Charger temperature high	Internal over temperature	Contact Eaton support.
607	Bad Battery	The battery does not operate correctly. The battery needs to be replaced or is defective (ABM).	Contact Eaton support.
640	Positive battery number incorrect	The number of batteries is incorrect.	Contact Eaton support.
641	Positive battery low voltage	Battery voltage is low.	Examine the battery. If the battery is damaged, it must be replaced immediately by qualified service personnel.
642	Negative battery is not connected	The battery is not connected.	Examine the battery and the battery cable. If the battery is damaged, it must be replaced immediately by qualified service personnel.
643	Negative battery number incorrect	The number of batteries is incorrect.	Contact Eaton support.
644	Negative battery low voltage	Battery voltage is low.	Examine the battery. If the battery is damaged, it must be replaced immediately by qualified service personnel.
645	Positive charger fault	The UPS charger is not operating correctly.	Contact Eaton support.

Table 25. Alarms and Faults (Continued)

Alarm number	Alarm name	Possible cause	Solution
646	Positive battery overcharge	Battery voltage is high.	Examine the battery and the charger. If the battery is damaged, it must be replaced immediately by qualified service personnel.
647	Negative charger fault	The UPS charger is not operating correctly.	Contact Eaton support.
648	Negative battery overcharge	Battery voltage is high.	Examine the battery and the charger. If the battery is damaged, it must be replaced immediately by qualified service personnel.
704	Inverter soft start fault	Inverter startup fault	Contact Eaton support.
705	Inverter overload fault	The load exceeds the rated value	Redistribute the load, remove the non-critical load, and make sure that the load is not defective.
706	Internal heat sink temperature high	Internal over temperature	Contact Eaton support.
805	Output short	Output short	Stop the UPS, remove all loads, and make sure that the load is not defective or short-circuited. Press the button to clear the alarm and restart. If this fails, Contact Eaton support.
806	Emergency shutdown	Emergency shutdown	Examine the EPO terminal status.
810	Power Overload	Power overload >105 %	Reduce load power.
811	Negative power	N/A	Contact Eaton support.
820	L2 Overload Prealarm	There is an active L2 overload pre-alarm (S Phase).	Reduce L2 phase load power.
821	L3 Overload Prealarm	There is an active L3 overload pre-alarm (T Phase).	Reduce L3 phase load power.
822	L1 Output short	Output short	Stop the UPS, remove all loads, and make sure that the load is not defective or short-circuited. Press the button to clear the alarm and restart. If this fails, Contact Eaton support.
823	L2 Output short		
824	L3 Output short		
825	LCD FW Version Incompatible	The LCD FW version is incompatible.	Contact Eaton support.
900	Maintenance Bypass	The UPS is operating in Maintenance Bypass mode and the loads unprotected.	N/A

6.5 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 7 Specifications

7.1 Product Specifications

This chapter provides the following specifications:

- Model list
- Weights and dimensions
- Electrical input and output
- Environmental and safety
- Battery

Table 26. Model List

UPS Model Numbers	
93PX15KIPMB	Eaton 93PX 15 kW Power Module
93PX20KIPMB	Eaton 93PX 20 kW Power Module
Extended Battery Module Model Number	
93PX2EBM480U	240V Eaton 93PX extended battery modules (2)
Maintenance Bypass Panel Model Numbers	
MBP20KIU	Standalone MBP (20kW)
MBP20KIUHW	Standalone MBP (20kW) Hardwired
MBP20KIUPARA	Parallel MBP (2x20kW)

Table 27. Weights and Dimensions

Model	Dimensions (W x H x D) [mm/in]	Net Weight
93PX15KIPMB	438 x 129 x 714 (17.24" X 5.08" X 28.07")	57.1 lbs (25.9 kg)
93PX20KIPMB		
93PX2EBM480U	438 x 129 x 693 (17.24" X 5.08" X 27.28")	137.8 lbs (62.5 kg) for 3U EBM Combined weight 275.6 lbs for (125 kg) x2 3U EBM
MBP20KIU	438 x 129 x 619 (17.24" X 5.08" X 24.37")	59.5 lbs (27 kg)
MBP20KIUHW	438 x 129 x 719 (17.24" X 5.08" X 28.31")	38.2 lbs (17.4 kg)
MBP20KIUPARA	438 x 129 x 719 (17.24" X 5.08" X 28.31")	49.4 lbs (22.4 kg)

Table 28. Electrical Input

	93PX15KIPMB			93PX20KIPMB	
Number of Input Phases	Three-phase 3:3				
Nominal Input Voltage P-P	380/400/415V				
Nominal Input Voltage P-N	220V/230V/240V				
Input Frequency	50Hz/60Hz				
Nominal Input Frequency Range	40Hz to 70Hz				
Frequency Line Loss Comeback	Frequency low loss +0.5Hz Frequency high loss −0.5Hz				
Input Power Factor	>0.995				
Input Voltage Surge Rating	L-N 15K/20K-405J LN-G 15K/20K-445J				
Input THDI		50Hz		60Hz	
	Voltage	Resistive Load	RCD Load	Resistive Load	RCD Load
	220V	<3%	<5%	<4%	<5%
	230V				<5.5%
	240V				<6%
Bypass Input Voltage Range	176–264 P-N 308–457 P-P				
Rated Input Current	93PX15K 32A	93PX20K 40A	MBP20KI 40A	MBP20KIUHW 40A	MBP20KIUPARA 80A

Table 29. Electrical Output

Model	93PX15KIPMB	93PX20KIPMB
Nominal Output Voltage P-N	220V/230V/240V Default 230V	
Output Voltage Variation	±1%	
Nominal Output Frequency	45–55 Hz auto-detection (Line mode 50 Hz) 54–66 Hz auto-detection (Line mode 60 Hz)	
Output Frequency Variation	±0.1	
Output short circuit current	76.6A rms/180ms, the max peak value is 110A	
Output Overload Input Voltage >200V (Line Mode)	105–125%: unit will alarm and the load transfers to Bypass mode after ten minutes 125–150%: unit will alarm and the load transfers to Bypass mode after one minute >150%: unit will alarm the and load transfers to Bypass mode after 0.5 seconds	

Table 29. Electrical Output (Continued)

Model	93PX15KIPMB	93PX20KIPMB
Output Overload Input Voltage <200V (Line Mode)	105–125%: unit will alarm and the load transfers to Bypass mode after one minutes 125–150%: unit will alarm and the load transfers to Bypass mode after thirty seconds >150%: unit will alarm the and load transfers to Bypass mode after 0.5 seconds	
Output Overload Input Voltage range: <176V (Line Mode)	105–125%: unit will alarm and the load transfers to Bypass mode after thirty seconds >125%: unit will alarm and the load transfers to Bypass mode after 0.5 seconds	
Output Overload (Battery Mode)	105–125%: unit will alarm and shutdown in one minute 125–150%: unit will alarm and shutdown in thirty seconds >150%: unit will alarm and shutdown in 0.5 seconds	
Voltage Waveform	Standard mode and Battery mode: Sine wave;	
Output Mode	Three-phase 3:3	
Output N-G Voltage	<7V	

Table 30. Environmental and Safety

Model	93PX15KIPMB		93PX20KIPMB	
Surge Suppression	IEC/EN 61000-4-5			
Safety Conformance	UL 1778 5 th edition; EN/IEC 62040-1			
Agency Markings	TUV CB/NOM/CE/cULus			
EMC	FCC: CLASS A CE: Category C2 EN 62040-2			
Operating Temperature	0°C to 40°C (32°F to 104°F)			
Storage Temperature	–25°C to 60°C (–13°F to 140°F) UPS –15°C to 40°C (5°F to 104°F) EBM			
Relative Humidity	Operating: 0–95% non-condensing			
Operating Altitude	<1000m no derating (load derates at 1 % for every 100m above 1000m) 2000m max			
Heat Dissipation	93PX15KIPMB Model		93PX20KIPMB Model	
	50% Load	100% Load	50%	100%
	2144 BTU/H On Line Mode 2490 BTU/H Battery Mode	2149 BTU/H On Line Mode 2429 BTU/H Battery Mode	2784 BTU/H On Line Mode 3201 BTU/H Battery Mode	3044 BTU/H On Line Mode 3486 BTU/H Battery Mode
Audible Noise	65dB max			
Leakage Current	<7 mA			
Communication	DB-9 / USB			

Table 31. Battery

	+1 EBM	+2 EBMs	+3 EBMs	+4 EBMs
Configuration	(40) 12V, 9 Ah	(80) 12V, 9 Ah	(120) 12V, 9 Ah	(160) 12V, 9 Ah
Type	Sealed, maintenance-free, lead-acid batteries.			
Charging (in minutes)	180 minutes recharge To 90%			

Table 32. UPS Battery Runtimes (in Minutes)

Bat Type	EBM quantity	Load	Back Up time (20K)	Back Up time (15k)
Sealed Lead Battery	1 EBM	100%	2.5	3.5
		75%	3.5	6.5
		50%	9.5	14.5
		25%	25	38
	2 EBM	100%	8.5	13.5
		75%	13.5	21.5
		50%	25	39
		25%	65.5	103.5
	3 EBM	100%	17	26
		75%	26	40.5
		50%	42.5	68
		25%	98.5	132
	4 EBM	100%	25	39.5
		75%	39.5	61.5
		50%	67	105
		25%	133	199.5
One EBM = Two Battery Modules				
NOTE Battery times are approximate and vary depending on the load configuration and battery charge				



DSD-93PX2406 01