

Eaton® Power Xpert™ 9395 High Performance (9395P-600) UPS

600 kVA, 600 kW Installation and Operation Manual

For use with Single UPM (200–600 kVA), Two UPM (400–600 kVA), and Plus 1 (400–600 kVA) UPS Models

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

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

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Ce manuel comporte des instructions importantes que vous êtes invité à suivre lors de toute procédure d'installation et de maintenance de la UPS. Veuillez consulter entièrement ces instructions avant de faire fonctionner l'équipement et conserver ce manuel afin de pouvoir vous y reporter ultérieurement.

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Chapter 1 Introduction

The Eaton® Power Xpert® 9395P-600 (600 kVA/600 kVA) uninterruptible power supply (UPS) is a true online, continuous-duty, transformerless, double-conversion, solid-state, three-phase system, providing conditioned and uninterruptible AC power to protect the customer's load from power failures.

The 9395P-600 UPS online power protection system is used to prevent loss of valuable electronic information, minimize equipment downtime, and minimize the adverse effect on production equipment due to unexpected power problems.

The 9395P-600 UPS system continually monitors incoming electrical power and removes the surges, spikes, sags, and other irregularities that are inherent in commercial utility power. Working with a building's electrical system, the UPS system supplies clean, consistent power that sensitive electronic equipment requires for reliable operation. During brownouts, blackouts, and other power interruptions, batteries provide emergency power to safeguard operation.

The UPS is available as a single unit or an optional multiple unit distributed bypass system (see paragraph [1.4.5 Distributed Bypass System](#)).

The UPS is housed in a free-standing cabinet.

Four 9395P-600 UPS systems are available:

- two standard UPM configurations with one or two factory installed UPMs (see [Figure 1](#)).
- two optional field upgraded configurations with a field installed UPM (FI-UPM) added to a standard configuration (see [Figure 2](#)).



NOTE

The FI-UPM is not supplied as standard, but is available as an option to provide upgradability to a maximum of 600 kVA. Adding the FI-UPM can also provide N+1 redundancy if the power requirements are less than the single UPM rating. The FI-UPM matches the UPS in style and color.

1.1 Single UPM and Two UPM Configurations

The standard Single UPM 9395P-600 UPS configuration contains two sections:

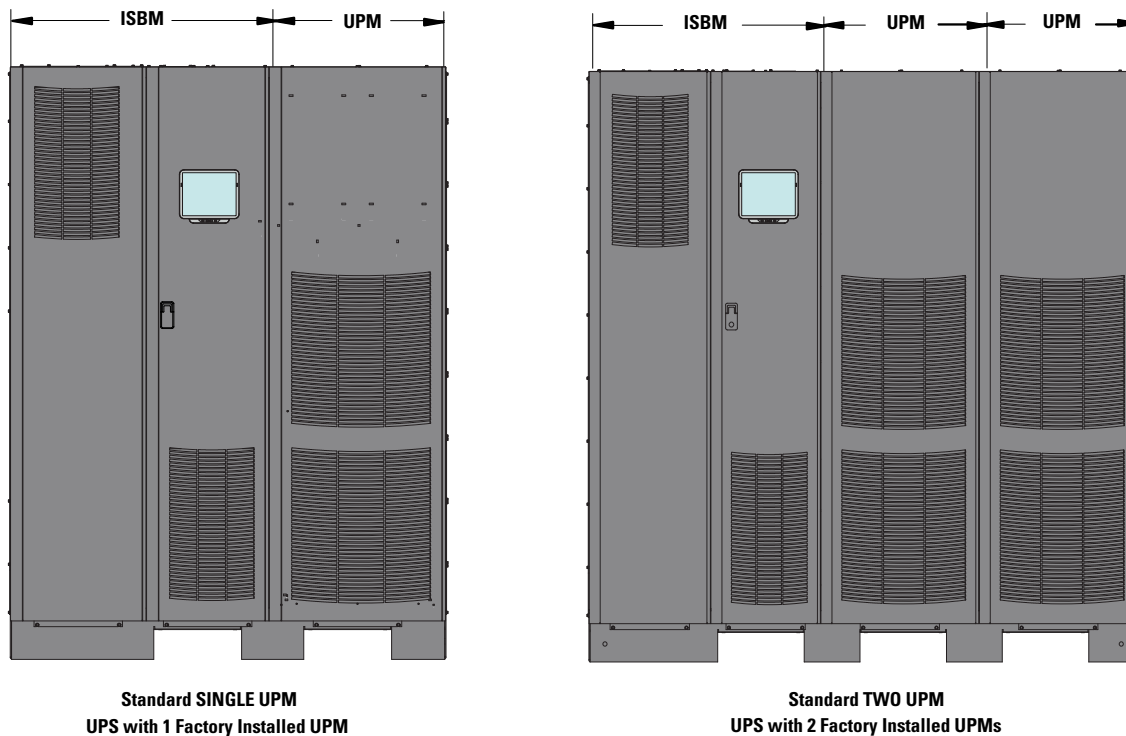
- an ISBM section configured either as an integrated system bypass module (ISBM) or an input output module (IOM) rated for a maximum of 600 kVA
- a UPM section with one factory installed UPM

The standard Two UPM UPS 9395P-600 configuration has two sections:

- an ISBM section configured either as an integrated system bypass module (ISBM) or an input output module (IOM) rated for a maximum of 600 kVA
- a UPM section with two factory installed UPMs

The ISBM section and the UPM section are shipped as a joined unit on the same pallet (see [Figure 1](#)).

Figure 1. Single UPM and Two UPM Configurations



1.2 Single UPM Plus 1 and Two UPM Plus 1 Configurations

The optional Single UPM Plus 1 9395P-600 UPS configuration has three sections:

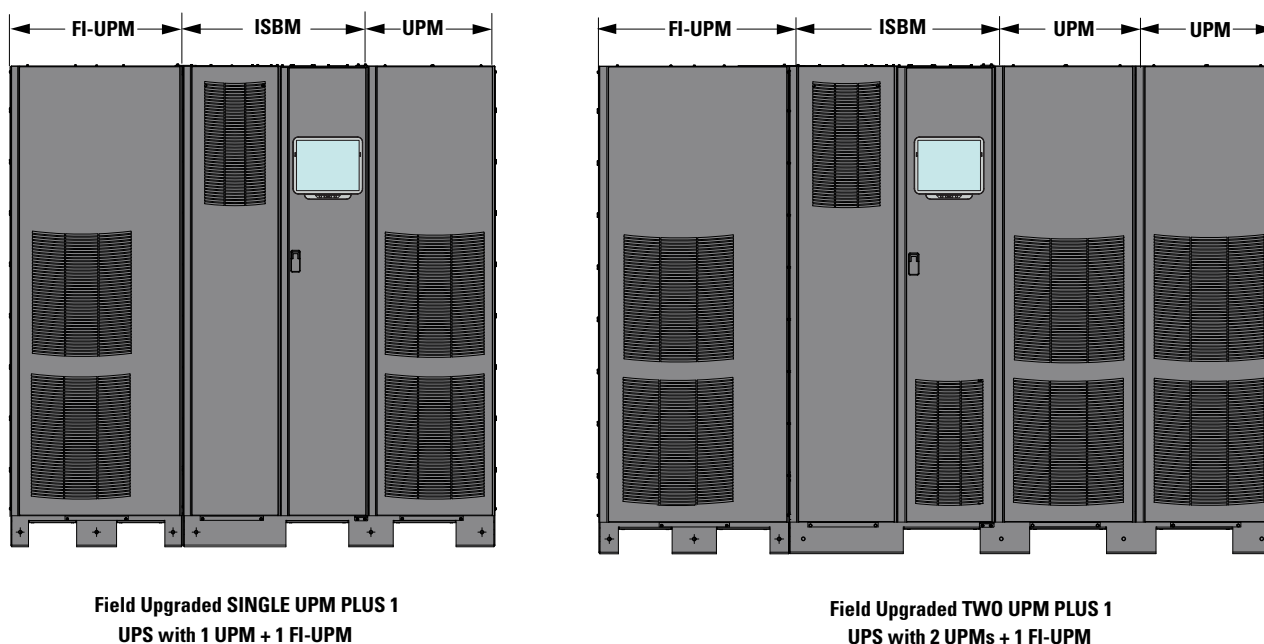
- an ISBM section configured either as an integrated system bypass module (ISBM) or an input output module (IOM) rated for a maximum of 600 kVA
- a UPM section with one factory installed UPM
- one field-installed UPM (FI-UPM), which is field upgraded and provides N+1 redundancy for the basic configuration

The standard Two UPM UPS 9395P-600 configuration has three sections:

- an ISBM section configured either as an integrated system bypass module (ISBM) or an input output module (IOM) rated for a maximum of 900 kVA
- a UPM section with two factory installed UPMs
- one field-installed UPM (FI-UPM), which is field upgraded and provides N+1 redundancy for the basic configuration

The ISBM section and the factory-installed UPM sections are shipped as a joined unit on the same pallet. For Plus 1 field upgrades, the FI-UPM is shipped separately and is added to the standard, existing configuration later (see [Figure 2](#)).

Figure 2. Single UPM Plus 1 and Two UPM Plus 1 Configurations

**NOTE**

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms become void (see Section [1.11 Warranty](#)). This service is offered as part of the sales contract for the UPS system. Contact an Eaton service representative in advance (usually a two-week notice is required) to reserve a preferred startup date.

1.3 UPS Standard Features

The UPS has many standard features that provide cost-effective and consistently reliable power protection. The descriptions in this section provide a brief overview of the UPS standard features.

1.3.1 Installation Features

Each UPS section is shipped separately. The sections are mechanically and electrically joined at the installation site, and can be permanently bolted to the floor.

Power wiring can be routed through the top or bottom of the cabinet with connections made to easily accessible terminals. Control wiring is routed through the top of the cabinet and must be installed in accordance with Class 1 wiring methods.

1.3.2 Control Panel

The control panel, located on the front of the UPS is a color touchscreen to control the operation of the UPS and to display the status of the UPS system. See [Chapter 7 UPS Operating Instructions](#) for additional information.

1.3.3 Customer Interface

- **Building Alarm Monitoring.** Up to five inputs in the UPS are available to connect the facility's alarm system contacts. Some system configurations may limit the number of inputs available. The UPS uses

these inputs to monitor the building alarms in addition to the UPS status. See [Chapter 8 Communication](#) for additional information.

- **Alarm Contact.** One alarm contact is provided for connection to equipment at the facility, such as a light, an audible alarm, or a computer terminal. The equipment connected to this contact alerts you to a UPS alarm. See [Chapter 8 Communication](#) for additional information.
- **X-Slot Communication Bays.** Four communication bays are standard equipment. One to four optional X-Slots inline (for generic slot name; ie: Avaya's alarm adapter) connectivity cards can be installed in the UPS module at any time. X-Slot cards are quickly installed at the front of the UPS and are hot-pluggable. See [Chapter 8 Communication](#) for additional information.

1.3.4 Advanced Battery Management

A three-stage charging system increases battery service life by optimizing recharge time, and protects batteries from damage due to high current charging and inverter ripple currents. Charging at high currents can overheat and damage batteries.

1.3.5 Power Management Software

Intelligent Power Management and Intelligent Power Protector software are available through Eaton support. See [Chapter 8 Communication](#) for additional information.

1.4 Options and Accessories

Contact an Eaton sales representative for information about the following options.

1.4.1 Integrated Battery Cabinets

Battery backup protection can be provided by equipping the UPS system with Power Xpert 9395P-900 battery cabinets containing sealed lead-acid, maintenance-free batteries. The cabinets are designed for standalone installation and may be installed adjacent to the UPS or in a separate location. The recommended installation location for adjacent battery cabinets is on the right side of the UPS cabinet to allow for future expansion using an external module.

Consult the *Eaton® Power Xpert® 9395/9395P Integrated Battery Cabinet (Models 1085 and 1085HR) Installation Manual (P-164000580)* for specifics on battery cabinet usage with the Power Xpert 9395P-600.

1.4.2 Field Installed UPM

A Field Installed UPM (FI-UPM) provides redundancy for the 9395P-600. The FI-UPM may be installed at any time in the future. The module cabinet is installed on the left side of the ISBM section and is wired directly to the UPS. No input or output wiring changes are needed for adding redundancy. Operation remains the same as the original UPS.

Refer to the *Eaton® Power Xpert® 9395P UPS Field Installed UPM Mechanical Installation Manual (P-164000503)* for specifics on the FI-UPM usage with the 9395P-600.

1.4.3 Sync Control

An optional Power Xpert 9395P-600 Sync Control maintains the critical load outputs of two separate single module 9395P-600 UPS systems in synchronization. This option facilitates the uninterrupted transfer of the load from one load bus to another by means of transfer switches. The Sync Control is housed in a wall-mounted panel that can be located between the UPS units for easy wiring.

Refer to the *Eaton® Power Xpert® 9395P Sync Control Installation and Operation Manual (P-164000502)* for specifics on battery cabinet usage with the 9395P-600.

1.4.4 Single-Feed Kit

An optional kit is available for converting the dual-feed rectifier and bypass inputs to a single-feed configuration. The kit consists of jumpers and bus bar extensions for each phase, and the hardware required for installation.

Refer to the *Eaton® Power Xpert® 9395/9395P UPS (1000.1200 kVA) Single.Feed Kit Installation Instructions (P-164000610)* manual for installation instructions.

1.4.5 Distributed Bypass System

There are two types of redundancy: UPS based (based on the number of UPSs) and UPM based (based on the number of UPMs).



NOTE

All UPSs in the distributed bypass system must contain the same number of UPMs. Mixed UPS kVA ratings are not permitted.

A distributed bypass UPS system can be installed to provide a capacity and/or redundant system. This load sharing system provides more capacity than a single UPS, and can provide backup, depending on the load and configuration. In addition, when one UPM is taken out of service for maintenance or is not operating properly, a redundant UPM continues to supply uninterrupted power to the critical load. A Hot Sync Controller Area Network (CAN) Bridge Card provides connectivity and operational mode control.

The tie cabinet is provided by the customer and must contain Module Output Breakers (MOBs) with dual auxiliary contacts for control of the system. Without dual auxiliary MOBs, UPMs are not allowed to go to bypass individually during servicing. All UPMs will go to bypass instead of just the UPM needing service, decreasing critical load protection. With dual auxiliary MOBs, one UPM can be bypassed while the remaining UPMs support the load as long as the remaining UPMs have the capacity to do so.

1.4.6 Input Output Module Configuration

The UPS can be supplied in an Input Output Module (IOM) configuration without the bypass input connections, the static switch, and the backfeed protection contactor. This configuration is primarily used in multiple UPS parallel systems that do not need a bypass for each UPS and use a separate System Bypass Module (SBM) to provide system bypass capabilities.

1.4.7 Continuous Static Switch

A continuous static switch is used to provide transfer of the load from the inverter to the bypass source in the event the inverter become unavailable.

1.4.8 Inherent Redundancy

To deliver greater reliability, the Power Xpert 9395P-600 UPS can be configured by an authorized Eaton Customer Service Engineer for inherent redundancy. When configured, the UPS automatically becomes redundant if the load is at or below the capacity of the UPMs minus the capacity of one UPM. Under normal conditions the UPMs in the UPS share the load equally. If one or more UPMs becomes unavailable and the load is at or below the capacity of remaining UPMs, the remaining UPMs supply the load instead of transferring to bypass.

If the capacity of the UPMs falls below the redundancy level or the load increases above redundancy level, but is still able to maintain the load, a loss of redundancy alarm is sounded. If the load exceeds the capacity of remaining UPMs, the UPS transfers to bypass.

1.4.9 Energy Saver and High Alert Modes



NOTE

Energy Saver System mode requires the UPS to be factory built with a Continuous Static Switch (CSS).



NOTE

The Variable Module Management System and Energy Saver System modes are mutually exclusive.

As a subset of Normal mode, Energy Saver mode maximizes efficiency by eliminating unnecessary power conversion when the commercial power source is within acceptable voltage and frequency limits. In this mode, the UPS is actively monitoring the critical bus and instantly and seamlessly transitions to double-conversion

mode (inverter online) if a commercial electrical power brownout, blackout, overvoltage, undervoltage, or out-of-tolerance frequency condition occurs.

In High Alert mode, the unit transfers from Energy Saver mode to double-conversion mode or if in double-conversion mode remains in double-conversion mode for a default time period of one hour. High Alert mode allows the user to place the unit in double-conversion mode when outside conditions could cause a power disturbance. At the completion of the time period, the unit defaults back to Energy Saver mode. If the High Alert command is received during the time period, the timer will be restarted.

1.4.10 Variable Module Management System and High Alert Modes.



NOTE

Variable Module Management System and Energy Saver modes are mutually exclusive.

Variable Module Management (VMMS) maintains UPM redundancy and achieves higher efficiencies by intelligently controlling the UPM's load level. The efficiency rating for each UPM is highest when loads are greater than 50% of the system rating. Therefore, shifting the load to fewer UPMs can achieve higher efficiencies when the UPS load is lighter.

In VMMS mode, the UPS is actively monitoring the critical bus and UPMs are available to assume load in less than 2 ms to respond to load changes.

The VMMS feature has three configurable modes of operation: Online mode, Online mode with VMMS, and High Alert mode. All modes are selectable from the front panel.

VMMS mode supports both distributed bypass and SBM parallel configurations.

In High Alert mode, all idle UPMs go online for one hour. At the completion of the hour, the UPS defaults back to VMMS mode. If the high alert command is received during the one hour, the one hour timer will be restarted.

1.4.11 Monitoring and Communication

The UPS system can be further enhanced by adding optional accessories such as a Remote Emergency Power-off (REPO) control, RMP III SCM II, RIM II, or X-Slot communication cards. See [Chapter 5 Installing Options and Accessories](#) for additional information.

- **Remote Monitor Panel III (RMP III)** – An optional RMP III contains a 7" display with status indicators and a local horn, allowing monitoring of the operational status and alarm condition of the UPS from virtually any location within the facility.
- **Relay Interface Module II (RIM II)** – An optional RIM II uses relay contact closures to indicate the UPS operating status and alarm condition.
- **Supervisory Contact Module II (SCM II)** – An optional SCM II establishes an interface between the UPS system equipment and the customer's monitor.
- **X-Slot Cards** – Optional X-Slot cards support several protocols, such as SNMP, HTTP, IBM AS/400, and Modbus.
- **PredictPulse™ Remote Monitoring and Management Service** – PredictPulse is a subscription monitoring and management service from Eaton that collects and analyzes data from connected power infrastructure devices, providing us with the insight needed to make recommendations and take action on your behalf. It's also powered by CA Technologies, bringing together the best in hardware and software. Like a second set of eyes on your power infrastructure, PredictPulse provides 24/7 remote monitoring of alarms and system performance (load, temperature/humidity, battery health, energy savings and service level) to reduce downtime risk and expedite repairs. PredictPulse also shares real-time status and trend information via an online dashboard and smartphone mobile app (Apple and Android), giving subscribers insights about past and current performance, a list of all active alarms, and asset management data (i.e., battery date codes, last and next scheduled service dates, firmware versions). The service notifies customers of critical alarms, supports remote diagnostics, and facilitates smart dispatch of technicians.

PredictPulse requires a Power Xpert® Gateway Card (PXGX) connectivity card in an X-Slot communication bay and an Environmental Monitoring Probe (EMP) for battery temperature/humidity monitoring.

See [Chapter 8 Communication](#) for additional information on monitoring and communication features.

1.5 Battery System

Although not provided with the UPS, a battery system is required to provide emergency short-term backup power to safeguard operation during brownouts, blackouts, and other power interruptions. The battery system should be equipped with lead-acid batteries. An external battery disconnect switch must be used.

The UPMs may be powered with either a common or separate battery system. In a common battery system, single and multiple UPMs are powered from one common battery source. In a separate battery system, multiple UPMs are each powered from separate battery sources.

UPSs in distributed bypass and parallel systems must use a separate battery system.

Consult the *Eaton® Power Xpert® 9395/9395P Integrated Battery Cabinet (Models 1085 and 1085HR) Installation Manual (P-164000580)* for specifics on battery cabinet usage with the Power Xpert 9395P models.

A supplemental 48 Vdc shunt trip signal for the battery disconnect device is provided by the UPS, but is not required for normal operation.



NOTE

The Power Xpert 9395P-600 system can trip a maximum of six battery cabinets total. This applies to both the 1085 standard and High Rate series batteries. If more than six battery cabinets in total are needed in a separate UPM battery configuration, DO NOT hook up the shunt trips.

1.6 Using This Manual

This manual describes how to install and operate the Power Xpert 9395P-600 kVA, 900 kW UPS. Read and understand the procedures described in this manual to ensure trouble-free installation and operation. In particular, be thoroughly familiar with the REPO procedure (see paragraph [7.4.18 Using the Remote Emergency Power-off Switch](#)).

The information in this manual is divided into sections and chapters. The system, options, and accessories being installed dictate which parts of this manual should be read. At a minimum, Chapters 1 through 4 and Chapter 7 should be examined.

Read through each procedure before beginning the procedure. Perform only those procedures that apply to the UPS system being installed or operated.

1.7 Conventions Used in This Manual

This manual uses these type conventions:

- **Bold type** highlights important concepts in discussions, key terms in procedures, and menu options, or represents a command or option that you type or enter at a prompt.
- *Italic type* highlights notes and new terms where they are defined.
- `Screen type` represents information that appears on the screen or LCD.

Icon	Description
	Information notes call attention to important features or instructions.
[Keys]	Brackets are used when referring to a specific key, such as [Enter] or [Ctrl].

In this manual, the term *UPS* refers only to the UPS cabinet and its internal elements. The term UPS system refers to the entire power protection system – the UPS cabinet, the battery system, and options or accessories installed.

1.8 Symbols, Controls, and Indicators

The following are examples of symbols used on the UPS or accessories to alert you to important information:



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



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



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.

1.9 For More Information

Refer to the *Eaton 9395/9395P Integrated Battery Cabinet (Model 1085 and 1085HR) Installation Manual (P-164000580)* for the following additional information:

- Integrated Battery Cabinet (IBC) installation instructions, including site preparation, planning for installation, wiring, and safety information.
- Detailed illustrations of the cabinet, including dimension and connection point drawings.

Refer to the *Eaton 9395P Sync Control Installation and Operation Manual (P-164000502)* for the following additional information:

- Installation instructions, including site preparation, planning for installation, and wiring and safety information. Detailed illustrations of the cabinet with dimensional and connection point drawings are provided.
- Operation, including controls, functions of the standard and optional features, procedures for using with the UPS, and information about maintenance.

Refer to the *Eaton 9395P Field Installed UPM Mechanical Installation Manual (P-164000503)* for the following additional information:

- Mechanical installation instructions, including site preparation, planning for mechanical installation, and safety information.
- Detailed illustrations of the cabinet, including dimension and pallet removal drawings.

Visit www.eaton.com/powerquality or contact an Eaton service representative for information on how to obtain copies of these manuals.

1.10 Getting Help

If help is needed with any of the following:

- Scheduling initial startup
- Regional locations and telephone numbers
- A question about any of the information in this manual
- A question this manual does not answer

Please call the Help Desk at:

United States:	1-800-843-9433 or 1-919-870-3028
Canada:	1-800-461-9166 ext 260
All other countries:	Call your local service representative

Please use the following e-mail address for manual comments, suggestions, or to report an error in this manual:

E-ESSDocumentation@eaton.com

1.11 Warranty

To view the UPS warranty please click on the link or copy the address to download from the Eaton website:

[UPS Product Warranty](https://www.eaton.com/content/dam/eaton/products/backup-power-ups-surge-it-power-distribution/backup-power-ups/portfolio/eaton-three-phase-ups-warranty.pdf)

<https://www.eaton.com/content/dam/eaton/products/backup-power-ups-surge-it-power-distribution/backup-power-ups/portfolio/eaton-three-phase-ups-warranty.pdf>

Chapter 2 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries. Read all instructions before operating the equipment and save this manual for future reference.

The UPS is designed for industrial or computer room applications, and contains safety shields behind the door and front panels. However, the UPS is a sophisticated power system and should be handled with appropriate care.



This UPS contains **LETHAL VOLTAGES**. All repairs and service should be performed by **AUTHORIZED SERVICE PERSONNEL ONLY**. There are **NO USER SERVICEABLE PARTS** inside the UPS.



Cet onduleur peut générer des **TENSIONS MORTELLES**. L'installation et l'entretien ne doivent être effectués que par le **PERSONNEL AUTORISÉ**. Ne contient **AUCUNE PIÈCE REMPLAÇABLE**.



- The UPS is powered by its own energy source (batteries). The output terminals may carry live voltage even when the UPS is disconnected from an AC source.
 - To reduce the risk of fire or electric shock, install this UPS in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°F) [35°C 300 kW model]. Do not operate near water or excessive humidity (95% maximum). The system is not intended for outdoor use.
 - Ensure all power is disconnected before performing installation or service.
 - Batteries can present a risk of electrical shock or burn from high short-circuit current. The following precautions should be observed: 1) Remove watches, rings, or other metal objects; 2) Use tools with insulated handles; 3) Do not lay tools or metal parts on top of batteries; 4) Wear rubber gloves and boots.
 - **ELECTRIC ENERGY HAZARD**. Do not attempt to alter any battery wiring or connectors. Attempting to alter wiring can cause injury.
 - 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.
 - Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
-



AVERTISSEMENT!

- L'onduleur est alimenté par sa propre source d'énergie (batteries). Les bornes de sortie peuvent être sous tension, même lorsque l'onduleur est débranché d'une source de courant alternatif
- Pour réduire les risques d'incendie et de décharge électrique, installer l'onduleur à l'intérieur, dans un endroit exempt d'éléments conducteurs et où la température et l'humidité sont régulées. La température ambiante ne doit pas dépasser 40°C (104°F) [35°C modèle 300 kW]. Ne pas faire fonctionner près d'une source d'eau ou dans un endroit très humide (95% maximum). Le système n'est pas conçu pour une utilisation extérieure.
- Toutes les sources d'alimentation doivent être débranchées avant de procéder à l'installation et à l'entretien.
- Les batteries peuvent présenter un risque de décharge électrique ou de brûlure en raison du courant de court-circuit élevé. Les précautions de base suivantes doivent être suivies : 1) retirer les montres, bagues et autres objets métalliques; 2) utiliser des outils munis d'une poignée isolée; 3) ne pas déposer les outils ou des pièces de métal sur les batteries; 4) porter des gants et des bottes en caoutchouc.
- DANGERS ÉLECTRIQUES. Ne pas tenter de modifier le câblage et les connecteurs de l'onduleur ou des batteries. Toute tentative de modification peut provoquer des blessures.
- Les charges raccordées pourraient provoquer un courant de fuite élevé. La mise à la terre est donc obligatoire pour garantir la sécurité et le bon fonctionnement du produit. Lors de la vérification du fonctionnement de l'UPS, ne pas enlever la mise à la terre si des charges y sont raccordées.
- Ne pas ouvrir ni abîmer les batteries. L'électrolyte qu'elles contiennent est dangereux pour la peau et les yeux. Il peut être toxique.

CAUTION

Installation or servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries. Consider all warnings, cautions, and notes before installing or replacing batteries. *DO NOT DISCONNECT the batteries while the UPS is in Battery mode.*

- Replace batteries with the same number and type of batteries as originally installed in the UPS.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- Determine if the battery is inadvertently grounded. If it is, remove the source of the ground. Contacting any part of a grounded battery can cause a risk of electric shock. An electric shock is less likely if you disconnect the grounding connection before you work on the batteries.
- Proper disposal of batteries is required. Refer to local codes for disposal requirements.
- Do not dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Keep the UPS door closed and front panels installed to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.
- Do not install or operate the UPS system close to gas or electric heat sources.
- The operating environment should be maintained within the parameters stated in this manual.
- Keep surroundings uncluttered, clean, and free from excess moisture.
- Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.



ATTENTION!

- L'installation et l'entretien doivent être effectués par du personnel qualifié en matière d'onduleurs et de batteries, il doit connaître les précautions qui s'imposent. Le personnel non autorisé doit être tenu à l'écart de l'équipement. Il est important de prendre connaissance des avertissements, des mises en garde et des avis avant de procéder à l'installation ou à l'entretien de l'équipement. *NE PAS DÉBRANCHER les batteries lorsque l'onduleur est en mode Batterie.*
- Ne jamais jeter les batteries au feu. L'exposition aux flammes risque de les faire exploser.
- Déconnecter la source d'alimentation avant de brancher ou débrancher les bornes.
- Vérifier que la batterie n'est pas, par inadvertance, reliée à la terre. Si c'est le cas, couper la source de mise à la terre. Les contacts avec une batterie reliée à la terre peuvent provoquer des risques de décharge électrique. Ces risques sont atténués si la mise à la terre est annulée avant le début des travaux sur les batteries.
- L'élimination appropriée des batteries est requise. Se reporter aux codes locaux pour connaître les exigences liées à l'élimination
- Ne pas jeter les batteries au feu. Les batteries peuvent exploser lorsqu'elles sont exposées à des flammes.
- Garder les portes de l'onduleur fermées et les panneaux avant en place pour garantir une circulation adéquate de l'air de refroidissement et pour protéger le personnel des tensions dangereuses dans l'unité.
- Ne pas installer ni faire fonctionner l'onduleur près d'une source de chaleur au gaz ou à l'électricité.
- Le milieu de fonctionnement doit toujours correspondre aux paramètres établis dans ce manuel.
- Maintenir les lieux rangés, propres et exempts d'une humidité excessive.
- Respecter les étiquettes DANGER, MISE EN GARDE et AVERTISSEMENT se trouvant à l'intérieur et à l'extérieur de l'équipement.

CAUTION

To prevent damage to the wiring channel and wiring in the UPS cabinet base when lifting or moving the cabinet:

- Lift and move the cabinet using only the front or rear forklift slots.
- Verify that the forklift forks are in a horizontal position before inserting them into the forklift slots.
- DO NOT angle fork tips upward.
- Insert the forks all the way through the base. DO NOT insert forks partially into the base to move the cabinet.
- Forks may be partially inserted into the front or rear forklift slots for minor positioning if the forks are kept in a horizontal position with no upward angling.
- DO NOT use the forklift slots on the end of the cabinet to move the cabinet.
- End forklift slots may be used for minor positioning if the forks are kept in a horizontal position with no upward angling.

If these instructions are not followed, damage to the wiring channel and wiring will occur.



ATTENTION!

Pour éviter d'endommager le câblage et son canal à la base de l'armoire de l'onduleur lorsque l'armoire est soulevée ou déplacée.

- Soulever ou déplacer l'armoire en n'utilisant que les passages de fourche à l'avant ou à l'arrière.
- Vérifier que les fourches du chariot élévateur sont en position horizontale avant de les insérer dans les passages de fourche. NE PAS orienter les pointes de fourche vers le haut.
- Insérer complètement les fourches dans les passages de fourche de la base. NE PAS insérer partiellement les fourches dans les passages pour déplacer l'armoire.
- Il est possible d'insérer partiellement les fourches dans les passages avant et arrière pour les petits déplacements, et ce, si les fourches sont en position horizontale sans pointer vers le haut.
- NE PAS utiliser les passages de fourche à l'extrémité de l'armoire pour la déplacer.
- Les passages de fourche à l'extrémité de l'armoire peuvent servir lors des petits déplacements, et ce, si les fourches sont en position horizontale sans pointer vers le haut.

Si ces instructions ne sont pas suivies, des dommages au câblage et à son canal surviendront.

Chapter 3 UPS Installation Plan and Unpacking

Use the following basic sequence of steps to install the UPS:

1. Create an installation plan for the UPS system (Chapter 3).
2. Prepare your site for the UPS system (Chapter 3).
3. Inspect and unpack the UPS cabinet (Chapter 3).
4. Unload and install the UPS cabinet, and wire the system ([Chapter 4 UPS System Installation](#)).
5. Install features, accessories, or options, as applicable ([Chapter 5 Installing Options and Accessories](#)).
6. Complete the Installation Checklist ([Chapter 4 UPS System Installation](#)).
7. Have authorized service personnel perform preliminary operational checks and start up the system.



NOTE

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified on the Eaton website in section [1.11 Warranty](#) will become void. This service is offered as part of the sales contract for the UPS. Contact an Eaton service representative in advance (usually a two-week notice is required) to reserve a preferred startup date.

3.1 Creating an Installation Plan

Before installing the UPS system, read and understand how this manual applies to the system being installed. Use the procedures and illustrations in paragraph [3.2 Preparing the Site](#) and Chapter 4 to create a logical plan for installing the system.

3.2 Preparing the Site

For the UPS system to operate at peak efficiency, the installation site should meet the environmental parameters outlined in this manual. If the UPS is to be operated at an altitude higher than 1000m (3000 ft), contact an Eaton service representative for important information about high altitude operation. The operating environment must meet the weight, clearance, and environmental requirements specified.

3.2.1 General Storage Requirements for UPS Equipment

- Equipment which cannot be immediately installed and energized should be stored in an indoor, dry, clean, ventilated area, heated environment (i.e. an temperature and humidity controlled environment). The storage area must be protected from rain, water, chemical agents and gases as shown in [Table 1](#).
- Do not store in areas where conditions such as dampness, changes in temperature, dust, dirt, rubble, paint, conductive particulates, or corrosive atmosphere / gases are present.
- Storage temperature: -25 °C to +60 °C (-13 °F to 140 °F).
- Factory installed packaging and wrapping of the equipment should not be removed until equipment is ready to install.
- Equipment should be checked periodically for any signs of deterioration. It is the responsibility of the receiving contractor to ensure protection during storage.
- Equipment should be placed on true and solid level surfaces for storage.
- Have a plan for condensation and environmental mitigation prior to equipment arrival.

Table 1. Storage Area Contaminants

Contaminant	Gas	Gas Concentration in ppbv
Group A	H ₂ S	<3
	SO ₂ SO ₂	<10
	Cl ₂	<1
	NO _x	<50
Group B	HF	<1
	NH ₃	<500
	O ₃	<2

3.2.2 Environmental and Installation Considerations

Make sure that the environment for the 9395P UPS meets the following operating restrictions:

The environmental requirements specified below are for the air at the intake ports of the 9395P, and are the maximum, not to exceed, ratings.

- Use temperature: -0 °C to +40 °C (32 °F to 104 °F).

Restriction Always maintain a non-condensing environment

- There shall be at least a 1.8° F (1.0° C) difference between the dry bulb temperature and the wet bulb temperature, at all times, to maintain a non-condensing environment.
- The maximum rate of temperature change shall be limited to 3° F over 5 minutes (36° F/hour), based on the ASHRAE Standard 90.1-2013.

Cautions regarding UPS operating environmental conditions:

The newer, more energy efficient data center cooling methods (such as air side economization) can create much wider ranges of temperature and Relative Humidity (RH) in the UPS room and/or data center.

There are two aspects of this increased operating environment that can, if ignored, create issues:

- One is the creation of microclimates, which are persistent variations of temperature and/or RH within a single room; for example one side of the room is always cooler than the other side, no matter what the actual temperature is.
- The other aspect is the rate of change of temperature and/or RH, which can occur during transitions within the cooling system. Examples: changing the mixture ratio of inside versus outside air, or external changes in the outside air when going from nighttime into day, and back to night.

When ignored, either one of these aspects can create an undesirable microclimate at the UPS location. If the environment created by this microclimate exceeds the UPS operating specification, the UPS reliability, over time, will be reduced. These same environmental extremes will also create reliability concerns for any servers that are exposed to them.

Do not expose the UPS for overly aggressive environments ANSI/ISA-71.04-2013 classifications). Refer to [Table 1](#) for gas concentration limits. If the UPS is used in a more aggressive environment, it can cause reduced product life and possibly early failure. If the installation location does not meet the recommended environment, contact Eaton service representative for further information.

3.2.3 Installation Considerations

The UPS system installation must meet the following guidelines:

- The system must be installed on a level floor suitable for computer or electronic equipment.

- The system must be installed in a temperature and humidity controlled indoor area free of conductive contaminants.

Failure to follow guidelines may void your warranty.

The UPS equipment operating environment must meet the weight requirements shown in [Table 2](#) and the size requirements shown in [Figure 3](#) through [Figure 11](#). Dimensions are in millimeters (inches).

[Table 2](#) Includes the weights of the heaviest cabinet configuration. Actual weights may be less due to installed configuration. Weights are in kilograms (pounds).

Table 2. UPS Cabinet Maximum Weights

Model	Section	Maximum Weight kg (lb)	
		Shipping	Installed
Eaton 9395P-600/600	ISBM (CSS) + 2 UPMs	1497 (3300)	1444 (3184)
Eaton 9395P-600/550			
Eaton 9395P-600/500			
Eaton 9395P-600/450	FI-UPM	496 (1094)	471 (1037)
Eaton 9395P-600/400			
Eaton 9395P-600/300	ISBM (CSS) + 1 UPM	905 (1995)	855 (1886)
Eaton 9395P-600/275			
Eaton 9395P-600/250			
Eaton 9395P-600/225			
Eaton 9395P-600/200			

NOTE CSS = Continuous Static Switch
NOTE CSS = [Table 4](#) describes power ratings of each model.

The UPS cabinets use forced air cooling to regulate internal component temperature. Air inlets are in the front of the cabinet and outlets are in the top. Allow clearance in front of and above each cabinet for proper air circulation. The clearances required around the UPS cabinet are shown in [Table 3](#). Dimensions are in millimeters (inches).

Table 3. UPS Cabinet Clearances

From Top of Cabinet	457.2 mm (18") minimum clearance for ventilation
From Front of Cabinet	1067mm (42") working space
From Back of Cabinet	None Required
From Right Side of Cabinet	None Required
From Left Side of Cabinet	None Required

The basic environmental requirements for operation of the UPS are:

- 40°C (32–104°F) at elevations up to 1000m without derating
- For 300 kW and 600 kW: 0–35°C (32–95°F) at elevations up to 1000m without derating
- Recommended Operating Range: 20–25°C (68–77°F)
- Maximum Relative Humidity: 95%, non-condensing

CAUTION

If Eaton battery cabinets are located in the same room as the UPS, the battery cabinet environmental requirements supercede the UPS requirements. Operating temperatures above the recommended range will result in decreased battery life and performance, and will reduce or void the battery warranty. Refer to *Eaton's Terms and Conditions of Sale with Battery Replacement Coverage and the Battery Replacement Price Book* for more information. These documents can be found at www.eaton.com/powerquality or contact an Eaton service representative to obtain copies.

The UPS 480V ventilation requirements are shown in [Table 4](#).

Table 4. 480V Air Conditioning and Ventilation Requirements During Full Load Operation

Model	Rating	Input/Output Voltage	Heat Rejection BTU/hr x1000 (kg-cal/hr)	Ventilation Required for Cooling Air Exhaust
Eaton 9395P-600/600 (CSS or IOM)	600 kVA 600 kVA	480/480	78.7 (19.8)	Approximately 2124 liter/sec (4500 CFM) With Field Installed UPM Approximately 1180 liter/sec (2500 CFM)
Eaton 9395P-600/550 (CSS or IOM)	550 kVA 550 kVA	480/480	72.2 (18.2)	
Eaton 9395P-600/500 (CSS or IOM)	500 kVA 500 kVA	480/480	63.8 (16.1)	
Eaton 9395P-600/450 (CSS or IOM)	450 kVA 450 kVA	480/480	54.1 (13.6)	
Eaton 9395P-600/400 (CSS or IOM)	400 kVA 400 kVA	480/480	48.1 (12.1)	
Eaton 9395P-600/300 (CSS or IOM)	300 kVA 300 kVA	480/480	39.4 (9.9)	Approximately 1180 liter/sec (2500 CFM) With Field Installed UPM Approximately 2124 liter/sec (4500 CFM)
Eaton 9395P-600/275 (CSS or IOM)	275 kVA 275 kVA	480/480	36.1 (9.1)	
Eaton 9395P-600/250 (CSS or IOM)	250 kVA 250 kVA	480/480	31.9 (8.0)	
Eaton 9395P-600/225 (CSS or IOM)	225 kVA 225 kVA	480/480	27.0 (6.8)	
Eaton 9395P-600/200 (CSS or IOM)	200 kVA 200 kVA	480/480	24.0 (6.0)	

NOTE CSS = Continuous Static Switch; IOM = Input Output Module

The UPS 415V/400V/380V ventilation requirements are shown in [Table 5](#)

Table 5. 415V/400V/380V Air Conditioning and Ventilation Requirements During Full Load Operation

Model	Rating	Input/Output Voltage	Heat Rejection BTU/hr x1000 (kg-cal/hr)	Ventilation Required for Cooling Air Exhaust
Eaton 9395P-600/550 (CSS or IOM)	550 kVA 550 kVA	415/415 400/400 380/380	77.42 (19.5)	Approximately 3050 liter/sec (6500 CFM)
Eaton 9395P-600/500 (CSS or IOM)	500 kVA 500 kVA	415/415 400/400 380/380	70.38 (17.7)	
Eaton 9395P-600/450 (CSS or IOM)	450 kVA 450 kVA	415/415 400/400 380/380	63.35 (16.0)	
Eaton 9395P-600/400 (CSS or IOM)	400 kVA 400 kVA	415/415 400/400 380/380	56.31 (14.2)	
Eaton 9395P-600/300 (CSS or IOM)	300 kVA 300 kVA	415/415 400/400 380/380	42.23 (10.6)	Approximately 1700 liter/sec (3600 CFM) With Field installed FI-UPM: Approximately 3050 liter/sec (6500 CFM)
Eaton 9395P-600/275 (CSS or IOM)	275 kVA 275 kVA	415/415 400/400 380/380	38.71 (9.8)	
Eaton 9395P-600/250 (CSS or IOM)	250 kVA 250 kVA	415/415 400/400 380/380	35.19 (8.9)	
Eaton 9395P-600/225 (CSS or IOM)	225 kVA 225 kVA	415/415 400/400 380/380	31.67 (8.0)	
Eaton 9395P-600/200 (CSS or IOM)	200 kVA 200 kVA	415/415 400/400 380/380	28.15 (7.1)	

NOTE CSS = Continuous Static Switch; IOM = Input Output Module

Front view illustrations of configuration dimensions and center of gravity measurements are provided for each configuration as follows:

- **Single UPM:** ISBM with 1 Factory Installed UPM (see [Figure 3](#) and [Figure 4](#))
- **Single UPM PLUS 1 UPM:** ISBM with 1 Factory Installed UPM and 1 Field Installed FI-UPM (see [Figure 5](#) and [Figure 6](#))
- **TWO UPM:** ISBM with 2 Factory Installed UPMs (see [Figure 7](#) and [Figure 8](#))
- **TWO UPM PLUS 1 UPM:** ISBM with 2 Factory Installed UPMs and 1 Field Installed FI-UPM (see [Figure 9](#) and [Figure 10](#))

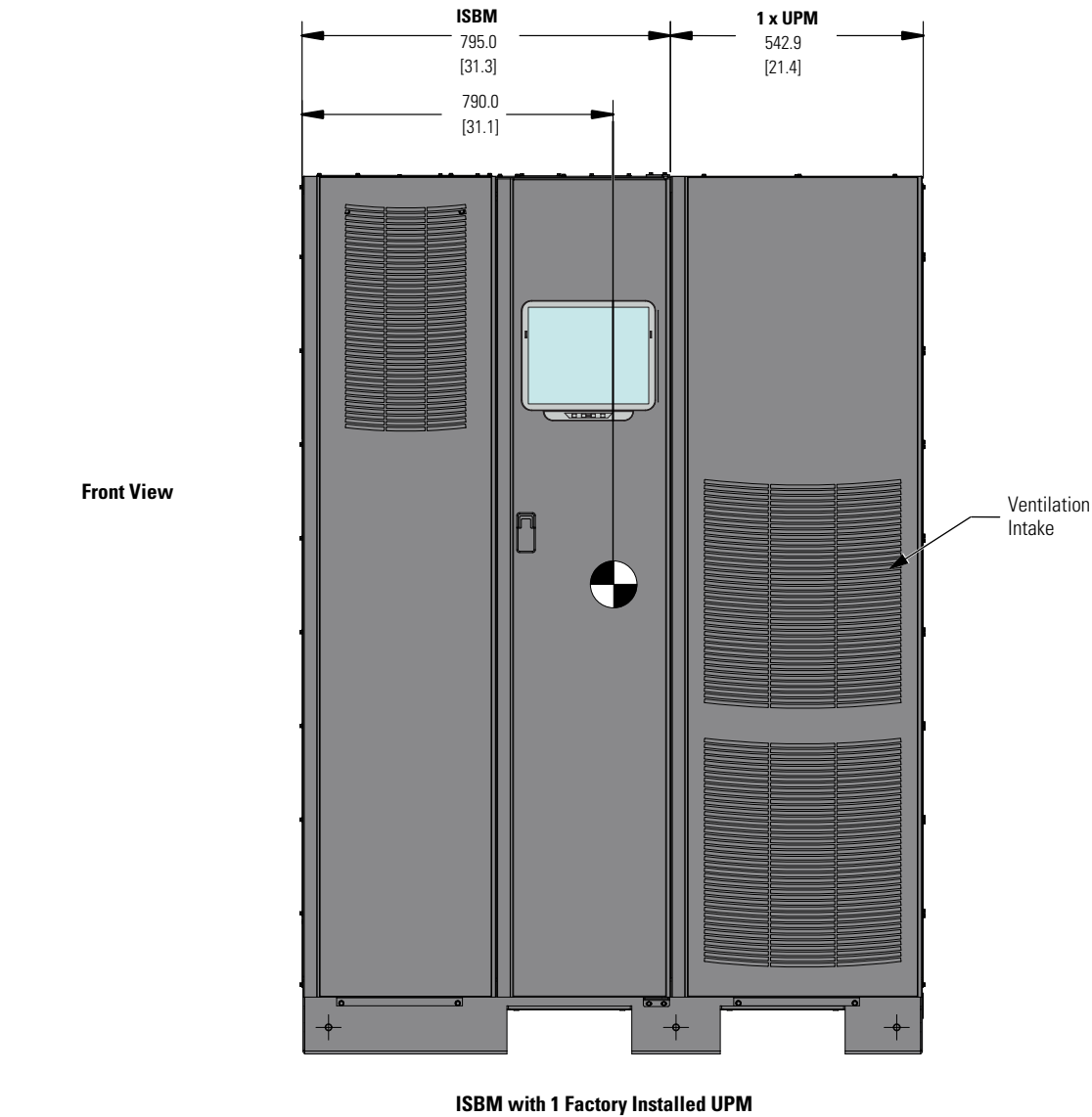
[Figure 11](#) provides side view illustrations of dimensions and center of gravity measurements for all configurations.

Figure 3. Single UPM Configuration Dimensions



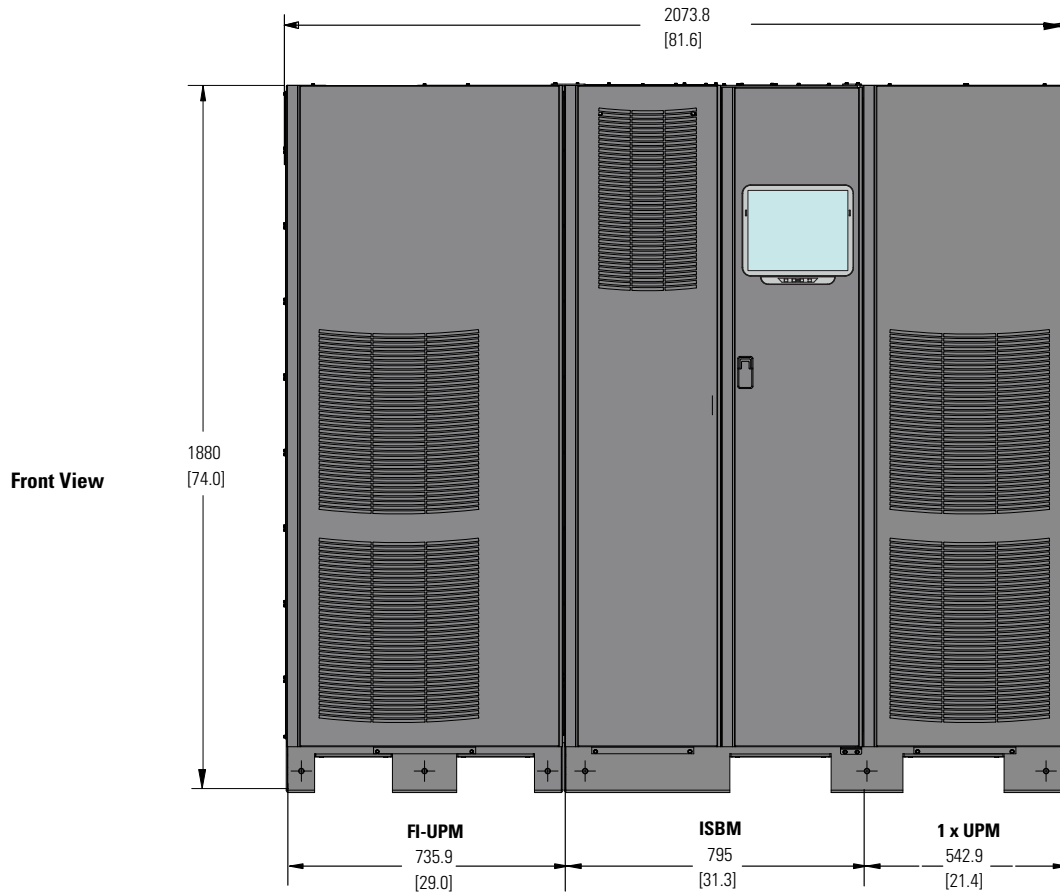
Dimensions are in millimeters [inches].

Figure 4. Single UPM Center of Gravity Dimensions



Dimensions are in millimeters [inches].

Figure 5. Single UPM and 1 FI-UPM Configuration Dimensions



ISBM with 1 Factory Installed UPM and 1 Field-Installed UPM

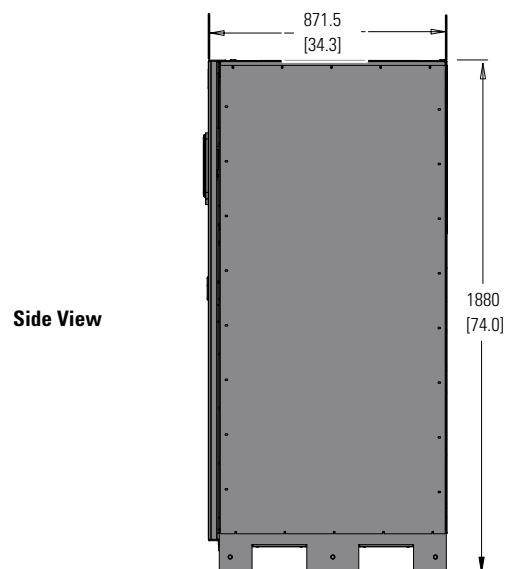
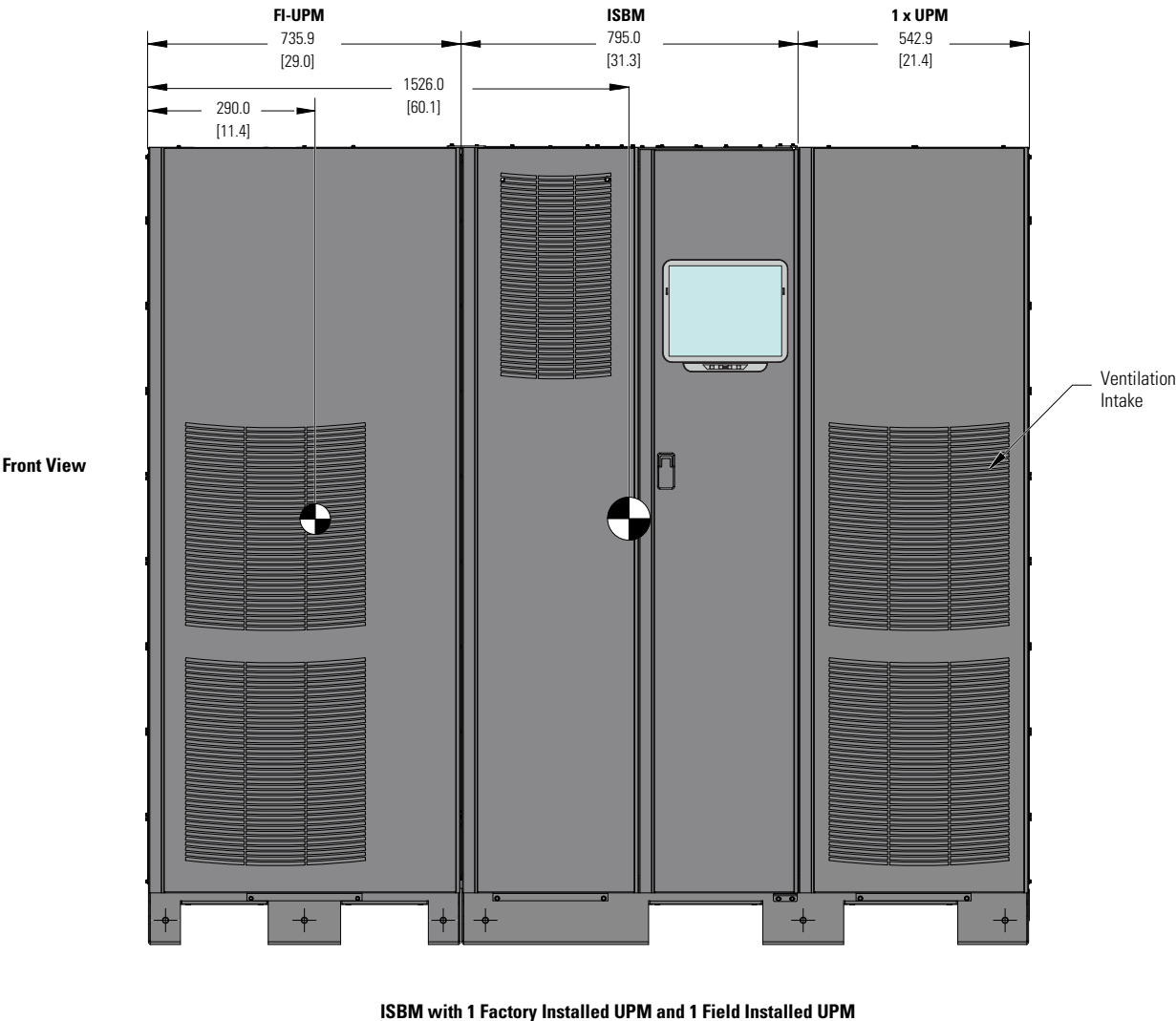


Figure 6. Single UPM and 1 FI-UPM Center of Gravity Dimensions



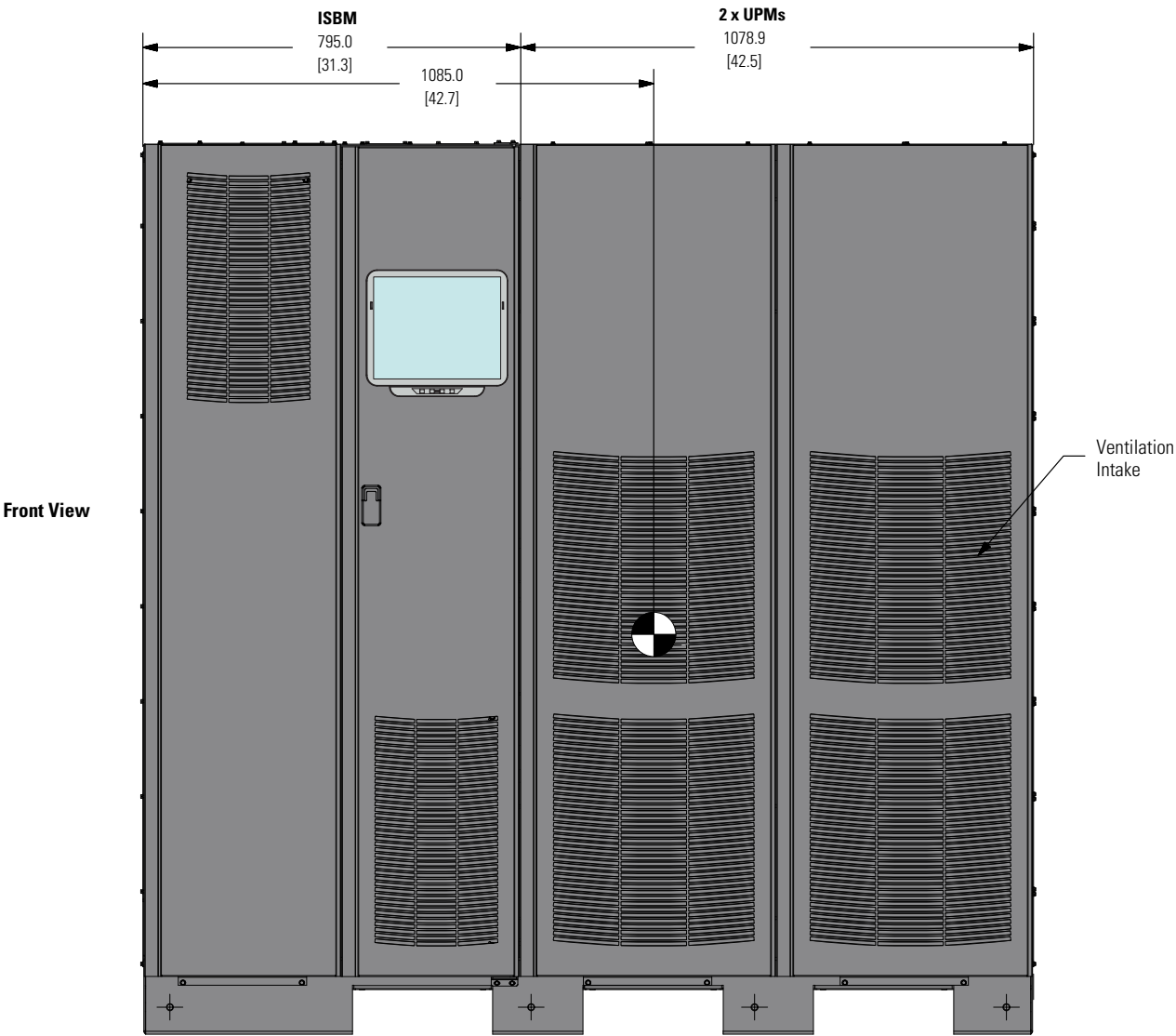
Dimensions are in millimeters [inches].

Figure 7. Two UPM Configuration Dimensions



Dimensions are in millimeters [inches].

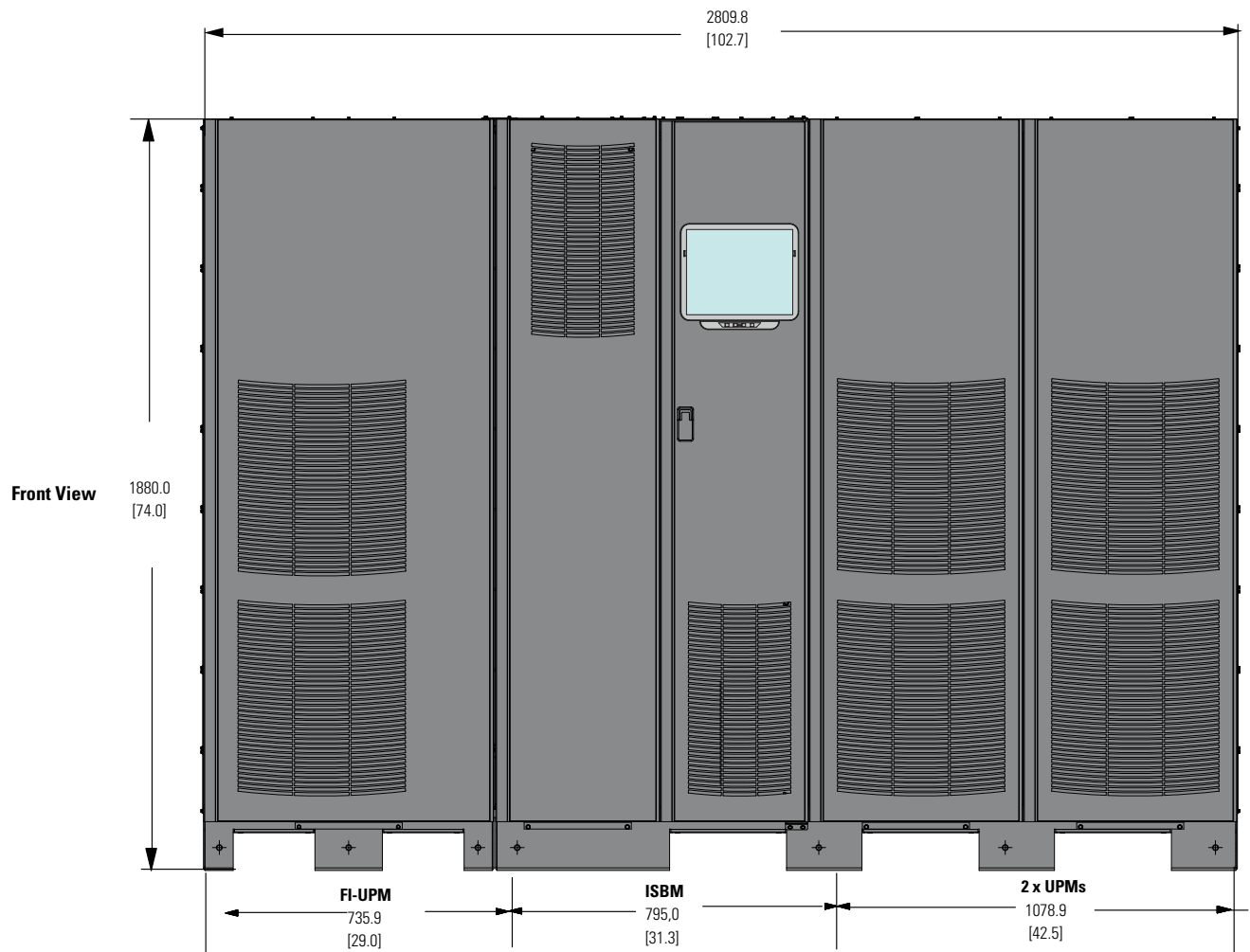
Figure 8. Two UPM Center of Gravity Dimensions



ISBM with 2 Factory Installed UPMs

Dimensions are in millimeters [inches].

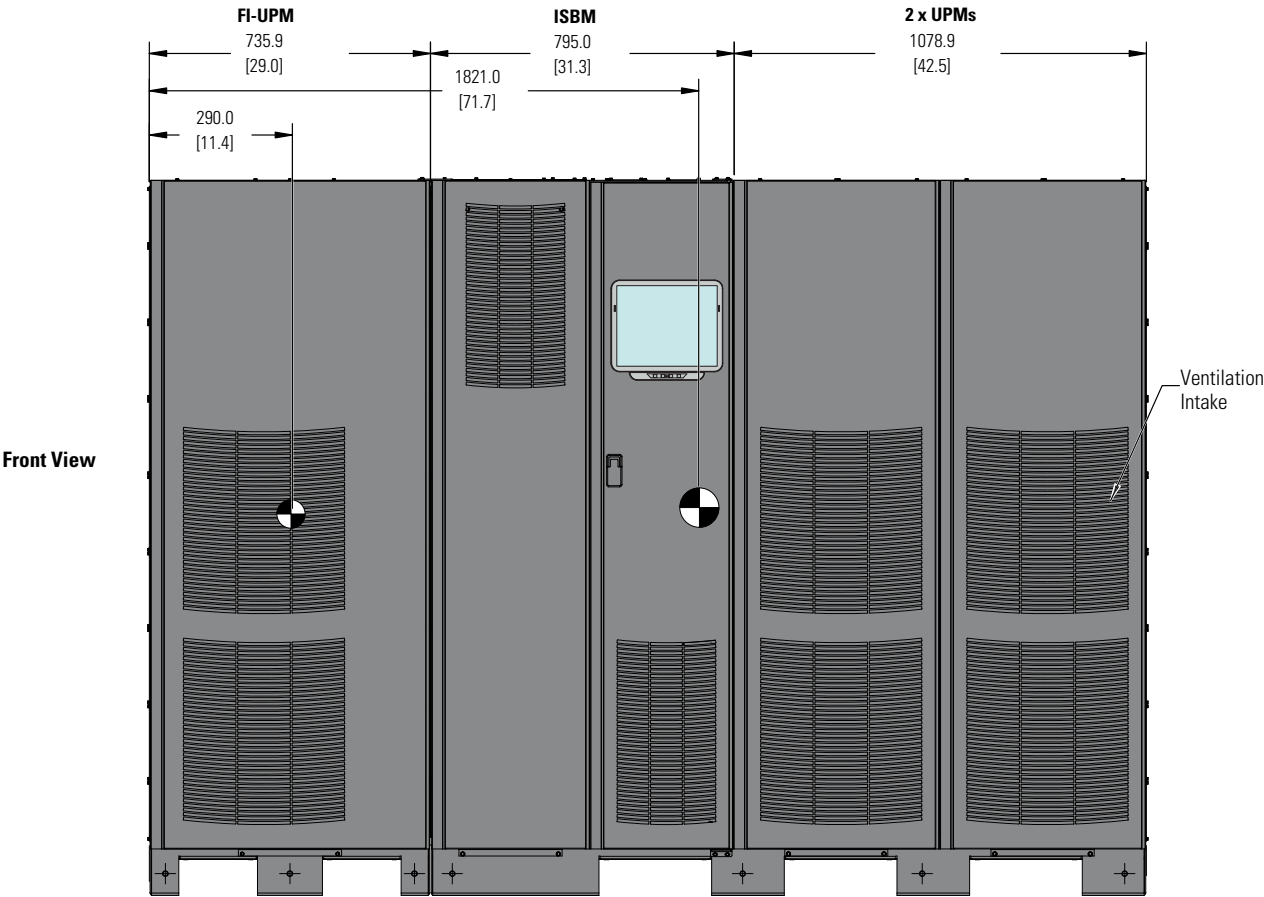
Figure 9. Two UPM Plus 1 FI-UPM Configuration Dimensions



ISBM with 2 Factory Installed UPMs and 1 Field Installed UPM

Dimensions are in millimeters [inches].

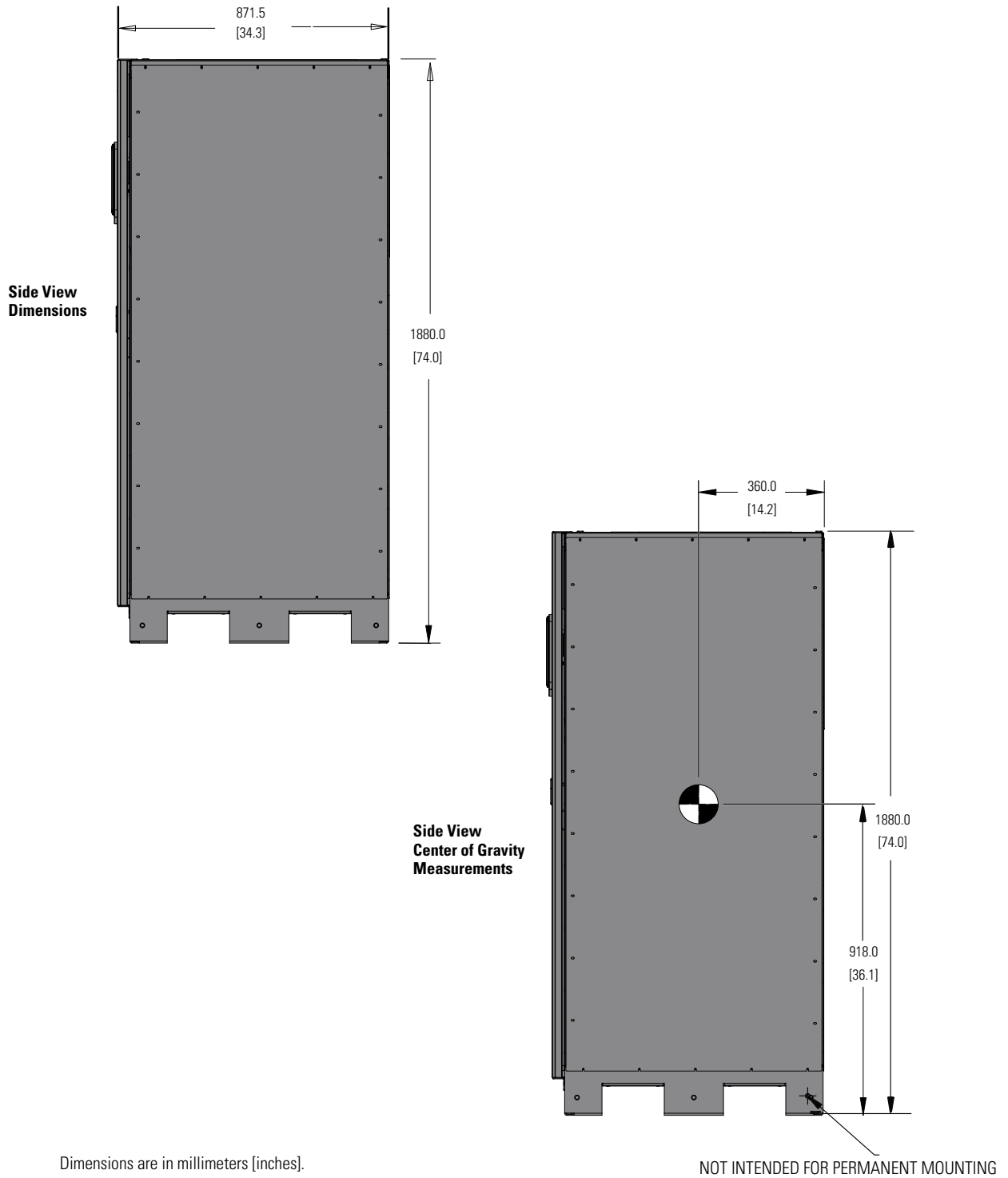
Figure 10. Two UPM and 1 FI-UPM Center of Gravity Dimensions



ISBM with 2 Factory Installed UPMs and 1 Field Installed UPM

Dimensions are in millimeters [inches].

Figure 11. Side View Dimensions and Center of Gravity Measurements



3.2.4 UPS System Power Wiring Preparation

Read and understand the following notes while planning and performing the installation:

- Refer to national and local electrical codes for acceptable external wiring practices.
- To allow for future kVA upgrades, consider installing a derated UPS using wiring and external overcurrent protection breakers sized for a fully rated UPS.
- To allow for a future upgrade, install a three UPM model using conductors and external overcurrent protection breakers sized the same as a fully rated 900 kVA model.
- For external wiring, use 75°C copper or aluminum wire. Wire sizes listed in [Table 8](#) through [Table 11](#) are for copper wiring only. If wire is run in an ambient temperature greater than 30°C, higher temperature wire and/or larger size wire may be necessary. Wire sizes are based on using the specified breakers.
- Wire ampacities are chosen from Table 310-16 of the National Electrical Code® (NEC®). Specification is for copper wire with a 75° C rating.
- Material and labor for external wiring requirements are to be provided by designated personnel.
- If installing a maintenance bypass, a minimum of two separate feeds with upstream feeder breakers, or a single feed with two upstream feeder breakers, must be provided: one for the UPS or rectifier input breaker (RIB) (if installed) and one for the maintenance bypass input. DO NOT use a single feed or a single feeder breaker to supply both the UPS or RIB and the maintenance bypass. If a bypass input breaker (BIB) is installed in the maintenance bypass and a single-feed UPS is being installed, a single feed to the maintenance bypass is acceptable for supplying both the UPS and the bypass.
- The bypass feed into this equipment uses three or four wires. The rectifier feed into this equipment uses three wires. The phases must be symmetrical about ground (from a Wye source) for proper equipment operation.
- The Eaton 9395P-600 480V unit is designed for operation on a grounded-wye source of supply. There is no additional connection point for a neutral conductor. The output of this UPS will not directly support phase to neutral loads.
- The ISBM and UPM sections are shipped with debris shields covering the ventilation grills on top of the sections. Do not remove the debris shields until installation is complete. However, remove the shields before operating the UPS. Once the debris shields are removed, do not place objects on the ventilation grills.
- In a common battery system, all UPMs are powered from one common battery source. In a separate battery system, each UPM is powered from separate battery sources.
- UPSs in distributed bypass and parallel systems must use a separate battery system for each UPS.
- On a UPS configured as an Input Output Module (IOM), requirements for bypass input wiring, termination, conduit, and bypass breaker are not applicable.

If the power rating listed on the nameplate of the installed UPS is not found in the following tables, wire the UPS using the fully rated specifications. Otherwise, calculate the required wire, conduit, and breaker sizes using the following guidelines in addition to those already listed in paragraph

3.2.4 UPS System Power Wiring Preparation:

- Select wire size according to the UPS nameplate.
- Do not use wire larger than the largest size listed in [Table 6](#) through [Table 13](#).
- Use terminal recommendations from [Table 6](#) through [Table 13](#).
- Size and number of conduits must not exceed those listed in [Table 18](#) and [Table 21](#).
- Select overcurrent protection input, battery, and output breakers according to the UPS nameplate rated for either 80% or 100%.

- Follow all applicable NEC and local codes.

Wire sizes listed are for copper wiring only.

Table 6. 480V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

Basic Unit Rating	Units		Rating 50/60 Hz				
	kVA	400	450	500	550	600	
	kW	400	450	500	550	600	
Input and Output Voltage	Volts	480/480	480/480	480/480	480/480	480/480	
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	594	668	742	817	891	
	Minimum Conductor Size	AWG or kcmil	350	350	350	350	350
	Number per Phase	(each)	(3)	(3)	(3)	(4)	(4)
AC Input to UPS Bypass Full Load Current (3) Phases, (1) Ground B	Amps	481	541	601	662	722	
	Minimum Conductor Size	AWG or kcmil	350	350	350	350	350
	Number per Phase	(each)	(3)	(3)	(3)	(3)	(3)
DC Input from Each Battery Cabinet to UPS (1) Positive, (1) Negative C	Total Amps	877	987	1096	1206	1316	
	Minimum Conductor Size	AWG or kcmil	500	500	500	500	500
	Number per Pole	(each)	(6)	(6)	(6)	(6)	(6)

Table 6. 480V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery (Continued)

Basic Unit Rating	Units	Rating 50/60 Hz				
	kVA	400	450	500	550	600
	kW	400	450	500	550	600
Input and Output Voltage	Volts	480/480	480/480	480/480	480/480	480/480
AC Output to Critical Load	D					
Full Load Current (3) Phases, (1) Ground		Amps	481	541	601	662
Minimum Conductor Size Number per Pole		AWG or kcmil (each)	350 (3)	350 (3)	350 (3)	350 (3)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 7. 480V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

Basic Unit Rating	Units	Rating 50/60 Hz				
	kVA	400	450	500	550	600
	kW	400	450	500	550	600
Input and Output Voltage	Volts	480/480	480/480	480/480	480/480	480/480
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	594	668	742	817	891
	Minimum Conductor Size	AWG or kcmil	350	350	350	350
	Number per Phase	(each)	(3)	(3)	(3)	(3)
AC Input to UPS Bypass Full Load Current (3) Phases, (1) Ground B	Amps	481	541	601	662	722
	Minimum Conductor Size	AWG or kcmil	350	350	350	350
	Number per Phase	(each)	(3)	(3)	(3)	(3)
DC Input from Battery Disconnect to Each UPS UPM (1) Positive, (1) Negative C	Amps per UPM	603	603	603	603	603
	Minimum Conductor Size	AWG or kcmil	500	500	500	500
	Number per Pole	(each)	(3)	(3)	(3)	(3)
AC Output to Critical Load Full Load Current (3) Phases, (1) Ground D	Amps	481	541	601	662	722
	Minimum Conductor Size	AWG or kcmil	350	350	350	350
	Number per Pole	(each)	(3)	(3)	(3)	(3)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched*. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 8. 415V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

Basic Unit Rating	Units		Rating 50/60 Hz			
	kVA	300	400	450	500	550
	kW	300	400	450	500	550
Input and Output Voltage	Volts	415/415	415/415	415/415	415/415	415/415
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	514	685	770	856	942
	Minimum Conductor Size Number per Phase	AWG or kcmil (each)	500 (2)	500 (3)	500 (3)	500 (4) (4)
AC Input to UPS Bypass (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground B	Amps	417	556	626	696	765
	Minimum Conductor Size Number per Phase	AWG or kcmil (each)	350 (2)	300 (3)	350 (3)	500 (3) (3)
DC Input from Battery Disconnect to UPS (1) Positive, (1) Negative C	Total Amps	658	877	987	1096	1206
	Minimum Conductor Size Number per Pole	AWG or kcmil (each)	500 (2)	500 (3)	500 (3)	500 (4) (5)
AC Output to Critical Load (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground D	Amps	417	556	626	696	765
	Minimum Conductor Size Number per Pole	AWG or kcmil (each)	350 (2)	300 (3)	350 (3)	500 (3) (3)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 9. 415V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

Basic Unit Rating	Units	Rating 50/60 Hz				
	kVA	300	400	450	500	550
	kW	300	400	450	500	550
Input and Output Voltage	Volts	415/415	415/415	415/415	415/415	415/415
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	514	685	770	856	942
	Minimum Conductor Size	AWG or kcmil	500	500	500	500
	Number per Phase	(each)	(2)	(3)	(3)	(4)
AC Input to UPS Bypass (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground B	Amps	417	556	626	696	765
	Minimum Conductor Size	AWG or kcmil	350	300	350	500
	Number per Phase	(each)	(2)	(3)	(3)	(3)
Input from Battery Disconnect to Each UPS UPM (1) Positive, (1) Negative C	Amps per UPM	603	603	603	603	603
	Minimum Conductor Size	AWG or kcmil	500	500	500	500
	Number per Pole	(each)	(2)	(2)	(2)	(2)
AC Output to Critical Load (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground D	Amps	417	556	626	696	765
	Minimum Conductor Size	AWG or kcmil	350	300	350	500
	Number per Pole	(each)	(2)	(3)	(3)	(3)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 10. 400V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

Basic Unit Rating	Units		Rating 50/60 Hz			
	kVA	300	400	450	500	550
	kW	300	400	450	500	550
Input and Output Voltage	Volts	400/400	400/400	400/400	400/400	400/400
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	533	710	799	888	960
	Minimum Conductor Size Number per Phase	AWG or kcmil (each)	500 (2)	500 (3)	500 (3)	500 (4) (5)
AC Input to UPS Bypass Full Load Current (3) Phases, (1) Neutral (1) Ground B	Amps	433	577	650	722	794
	Minimum Conductor Size Number per Phase	AWG or kcmil (each)	350 (2)	300 (3)	500 (3)	500 (3) (3)
Input from Battery Disconnect to UPS (1) Positive, (1) Negative C	Total Amps	658	877	987	1096	1206
	Minimum Conductor Size Number per Pole	AWG or kcmil (each)	500 (2)	500 (3)	500 (3)	500 (4) (5)
AC Output to Critical Load Full Load Current (3) Phases, (1) Neutral (1) Ground D	Amps	433	577	650	722	794
	Minimum Conductor Size Number per Pole	AWG or kcmil (each)	350 (2)	300 (3)	500 (3)	500 (3) (3)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 11. 400V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

Basic Unit Rating	Units	Rating 50/60 Hz				
	kVA	300	400	450	500	550
	kW	300	400	450	500	550
Input and Output Voltage	Volts	400/400	400/400	400/400	400/400	400/400
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	538	710	799	888	960
	Minimum Conductor Size	AWG or kcmil	500	500	500	500
	Number per Phase	(each)	(2)	(3)	(3)	(4)
AC Input to UPS Bypass (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground B	Amps	433	577	650	722	794
	Minimum Conductor Size	AWG or kcmil	350	300	350	500
	Number per Phase	(each)	(2)	(3)	(3)	(3)
Input from Battery Disconnect to Each UPS UPM (1) Positive, (1) Negative C	Amps per UPM	603	603	603	603	603
	Minimum Conductor Size	AWG or kcmil	500	500	500	500
	Number per Pole	(each)	(2)	(2)	(2)	(2)
AC Output to Critical Load (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground D	Amps	433	577	650	722	794
	Minimum Conductor Size	AWG or kcmil	350	300	350	500
	Number per Pole	(each)	(2)	(3)	(3)	(3)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 12. 380V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

Basic Unit Rating	Units		Rating 50/60 Hz			
	kVA	300	400	450	500	550
	kW	300	400	450	500	550
Input and Output Voltage	Volts	380/380	380/380	380/380	380/380	380/380
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	545	727	800	909	960
	Minimum Conductor Size Number per Phase	AWG or kcmil (each)	300 (3)	500 (3)	500 (3)	500 (4) 500 (4)
AC Input to UPS Bypass (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground B	Amps	456	608	684	760	836
	Minimum Conductor Size Number per Phase	AWG or kcmil (each)	400 (2)	350 (3)	500 (3)	500 (3) 500 (4)
Input from Battery Disconnect to Each UPS (1) Positive, (1) Negative C	Total Amps	658	877	987	1096	1206
	Minimum Conductor Size Number per Pole	AWG or kcmil (each)	500 (2)	500 (3)	500 (3)	500 (4) 500 (5)
AC Output to Critical Load (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground D	Amps	456	608	684	760	836
	Minimum Conductor Size Number per Pole	AWG or kcmil (each)	400 (2)	350 (3)	500 (3)	500 (3) 500 (4)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

Table 13. 380V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

Basic Unit Rating	Units	Rating 50/60 Hz				
	kVA	300	400	450	500	550
	kW	300	400	450	500	550
Input and Output Voltage	Volts	380/380	380/380	380/380	380/380	380/380
AC Input to UPS Rectifier (0.98 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground A	Amps	545	727	800	909	960
	Minimum Conductor Size	AWG or kcmil	300	500	500	500
	Number per Phase	(each)	(3)	(3)	(3)	(4)
AC Input to UPS Bypass (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground B	Amps	456	608	684	760	836
	Minimum Conductor Size	AWG or kcmil	400	350	500	500
	Number per Phase	(each)	(2)	(3)	(3)	(4)
Input from Battery Disconnect to Each UPS UPM (1) Positive, (1) Negative C	Amps per UPM	603	603	603	603	603
	Minimum Conductor Size	AWG or kcmil	500	500	500	500
	Number per Pole	(each)	(2)	(2)	(2)	(2)
AC Output to Critical Load (Five Wire) Full Load Current (3) Phases, (1) Neutral (1) Ground D	Amps	456	608	684	760	836
	Minimum Conductor Size	AWG or kcmil	400	350	500	500
	Number per Pole	(each)	(2)	(3)	(3)	(4)

NOTE: Callout letters **A**, **B**, **C**, and **D** map common battery systems. Callout letters **A**, **C**, and **D** map to separate battery systems. See [Figure 53](#) through [Figure 63](#).

NOTE: Bypass wiring data is not applicable to IOM configurations.

Battery Conductor Sizing: Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.

Battery Cable Routing Requirements

Conduit applications:

* Each conduit must have a Positive, Negative, and Ground conductor.

* There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Raceway applications:

* Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).

* There must be a ground cable running in the raceway with the battery cables.

NOTE If a 4-pole Automatic Transfer Switch (ATS) is used to connect the UPS to a generator or alternative input source, it may interrupt the UPS input neutral during its transition between sources. For the 9395P UPS:

The ATS transition must be open in both directions. The "break" time for the contacts must be at least 50 ms. This allows the UPS to operate properly, *however it is important to evaluate whether the critical load will function properly as its neutral reference is rapidly (50 ms) switched. Note also that if the UPS load is on bypass, an ATS switchover with interruption of the neutral, will interrupt the return current path and cause a loss of all phase-to-neutral loads.*

If an overlapping neutral or make-before-break ATS switch is used, the neutrals must overlap for a minimum of 50 ms during the transition.

For a UPS with common rectifier input terminals, E1 through E12 are 2-hole bus bar mountings for standard NEMA 2-hole barrel lugs. The power wiring connections for this equipment are rated at 90°C. See [Table 14](#) for external power cable terminations, [Table 15](#) and [Table 16](#) for supplied external wiring terminal hardware, and [Table 17](#) for recommended installation parts and tools not supplied by Eaton.

The torque values listed in [Table 14](#) are the maximum allowable. Tightening further will risk breaking or twisting the stud.

For a UPS with separate rectifier input terminals for the UPMs, E1 through E3 are pressure terminations, UL and CSA rated at 90°C.

Table 14. UPS External Power Cable Terminations for the One/Two/Three UPM

Terminal Function	Terminal	Function	Bus Landings (using both sides of bus)	Tightening Torque Nm (lb ft)	Bolt Size
AC Input to UPS Rectifier	E1	Phase A	4 – 2 bolt mounting	76 (56)	M12
	E2	Phase B	4 – 2 bolt mounting	76 (56)	M12
	E3	Phase C	4 – 2 bolt mounting	76 (56)	M12
AC Input to Bypass	E6	Phase A	4 – 2 bolt mounting	76 (56)	M12
	E7	Phase B	4 – 2 bolt mounting	76 (56)	M12
	E8	Phase C	4 – 2 bolt mounting	76 (56)	M12
AC Output to Critical Load	E9	Phase A	4 – 2 bolt mounting	76 (56)	M12
	E10	Phase B	4 – 2 bolt mounting	76 (56)	M12
	E11	Phase C	4 – 2 bolt mounting	76 (56)	M12
DC Input from Battery or Battery Disconnect to UPS – Common Battery	E4	Battery (+)	8 – 2 bolt mounting 12 – 2 bolt mounting (Plus 1)	76 (56)	M12
	E5	Battery (-)	8 – 2 bolt mounting 12 – 2 bolt mounting (Plus 1)	76 (56)	M12
DC Input from Battery or Battery Disconnect to UPS – Separate Battery (UPM 1)	E4	Battery (+)	4 – 2 bolt mounting	76 (56)	M12
	E5	Battery (-)	4 – 2 bolt mounting	76 (56)	M12
DC Input from Battery or Battery Disconnect to UPS – Separate Battery (UPM 2)	E4	Battery (+)	4 – 2 bolt mounting	76 (56)	M12
	E5	Battery (-)	4 – 2 bolt mounting	76 (56)	M12
DC Input from Battery or Battery Disconnect to UPS – Separate Battery (FI-UPM)	E4	Battery (+)	4 – 2 bolt mounting	76 (56)	M12
	E5	Battery (-)	4 – 2 bolt mounting	76 (56)	M12
Input and Output Neutral	E12	Neutral	8 – 2 bolt mounting	22 (16)	M10
Customer Ground	Ground	Ground	7 – 2 bolt mounting	22 (16)	M10

NOTE Customer ground, sized in accordance with NEC Table 250.122, can be run in any conduit listed in [Table 18](#) or [Table 19](#).

NOTE Bypass terminations are not applicable to IOM configurations.

Table 15. Supplied Intercabinet Wiring Terminal Hardware Kit

Part	Size	Quantity	Terminals Used On	Eaton Part Number
Flat Washer	M8	36	UPM AC Input, UPM Battery Input, UPM AC Output	180500036-080
Conical Washer	M8	36	UPM AC Input, UPM Battery Input, UPM AC OutputGround and Neutral	180500037-080
Nut	M8	36	UPM AC Input, UPM Battery Input, UPM AC Output	180200001-05

Terminals E1 through E11 are 2-hole busbar mountings for standard NEMA 2-hole barrel lugs. The power wiring connections for this equipment are rated at 90°C. See [Table 15](#) and [Table 16](#) for supplied terminal hardware, [Table 17](#) for recommended installation parts and tools not supplied by Eaton, and [Table 18](#) through [Table 21](#) for power cable conduit sizes.

Table 16. Supplied External Wiring Terminal Hardware Kit

Part	Size	Quantity	Terminals Used On	Eaton Part Number
Bolt, Grade 5	M12 x 40 mm	30	Ground and Neutral	180190078-112
Bolt, Grade 5	M12 x 50 mm	86	Rectifier Input, Bypass Input, Battery Input, and Output	180190078-115
Flat Washer	M12	202	Rectifier Input, Bypass Input, Battery Input, Output, and Ground	180500036-120
Conical Washer	M12	116	Rectifier Input, Bypass Input, Battery Input, Output, and Ground	180500037-120
Nut	M12	86	Rectifier Input, Bypass Input, Battery Input, Output, and Ground	180200001-07

NOTE Bypass terminations are not applicable to IOM configurations.

Table 17. Recommended Installation Parts and Tools (Not Supplied by Eaton)

Part	Size	Quantity	Manufacturer	Part Number	Notes
Long Barrel 2-Hole Lug	2/0 AWG	As required	Thomas & Betts	54862BE	Copper wire only
	3/0 AWG		Thomas & Betts	54864BE	
	4/0 AWG		Thomas & Betts	54866BE	
	250 MCM		Thomas & Betts	54868BE	
	300 MCM		Thomas & Betts	54870BE	
	350 MCM		Thomas & Betts	54872BE	
	400 MCM		Thomas & Betts	54874BE	
	500 MCM		Thomas & Betts	54876BE	
Manual Hydraulic Crimp Tool	14 Ton	1	Thomas & Betts	TBM14M	
Die Set	N/A	1	Thomas & Betts	15506	

Conduit sizes were chosen from NEC Table 4, Electrical Metallic Tubing (EMT). See [Table 18](#) through [Table 21](#) for 480V, 415V, 400V and 380V conduit requirements.

Per NEC article 300, 3(B)(1), all three-phase conductors must be run in the same conduit.

Conduit is sized to accommodate one neutral conductor the same size as the phase conductor and one ground conductor sized in accordance with NEC Table 250.122.

Conduit sizes listed are for copper wiring only.

Table 18. 480V Power Cable Conduit Requirements

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size	Number of Conduits
Eaton 9395P-600/600 Eaton 9395P-600/550	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2.5	4
		AC Input to Bypass and Output (A, B, C, Ground)	4	2.5	3
	DC (Common Battery)	Battery (Positive, Negative, Ground)	7	4	2
Eaton 9395P-600/500 Eaton 9395P-600/450 Eaton 9395P-600/400	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2.5	3
		AC Input to Bypass and Output (A, B, C, Ground)	4	2.5	3
	DC (Common Battery)	Battery (Positive, Negative, Ground)	7	4	2
Eaton 9395P-600/300 Eaton 9395P-600/275 Eaton 9395P-600/250 Eaton 9395P-600/225 Eaton 9395P-600/200 See Note 1	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2.5	4
		AC Input to Bypass and Output (A, B, C, Ground)	4	2.5	3
	DC (Common Battery)	Battery (Positive, Negative, Ground)	7	4	1
All models	DC (Separate Battery - per UPM)	Battery (Positive, Negative, Ground)	7	4	1

NOTE Bypass conduit data is not applicable to IOM configurations.

Battery Conductor Routing: Refer to the notes at the bottom of [Table 6](#) Input/Output Ratings and External Wiring Requirements.

Table 19. 415V Power Cable Conduit Requirements

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size	Number of Conduits
Eaton 9395P-600/550	415 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	4
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/500	415 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	4
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/450	415 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/400	415 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/300	415 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	2
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	2
DC (same for all ratings)		Battery (Positive, Negative, Ground)	See Note 1		

NOTE 1 Select conduit taking into consideration the DC input wire sizes and terminations listed in appropriate tables, type of battery installation, and requirements from NEC Table 4, Electrical Metallic Tubing (EMT).

NOTE 2 Bypass conduit data is not applicable to IOM configurations.

Battery Conductor Routing: Refer to the notes at the bottom of [Table 6](#) Input/Output Ratings and External Wiring Requirements.

Table 20. 400V Power Cable Conduit Requirements

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size	Number of Conduits
Eaton 9395P-600/550	400 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	5
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/500	400 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	4
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/450	400 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/400	400 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/300	400 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2.5	2
		AC Input to Bypass and Output (A, B, C, Ground)	5	2.5	2
DC (same for all ratings)		Battery (Positive, Negative, Ground)	See Note 1		
NOTE 1 Select conduit taking into consideration .the DC input wire sizes and terminations listed in appropriate tables, type of battery installation, and requirements from NEC Table 4, Electrical Metallic Tubing (EMT).					
NOTE 2 Bypass conduit data is not applicable to IOM configurations.					
Battery Conductor Routing: Refer to the notes at the bottom of Table 6 Input/Output Ratings and External Wiring Requirements.					

Table 21. 380V Power Cable Conduit Requirements

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size	Number of Conduits
Eaton 9395P-600/550	380 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	5
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	4
Eaton 9395P-600/500	380 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	4

Table 21. 380V Power Cable Conduit Requirements (Continued)

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size	Number of Conduits
Eaton 9395P-600/450	380 Vac	AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
		AC Input to UPS Rectifier (A, B, C, Ground)	4	3	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/400	380 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	3
Eaton 9395P-600/300	380 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2.5	3
		AC Input to Bypass and Output (A, B, C, Ground)	5	3	2
DC (same for all ratings)		Battery (Positive, Negative, Ground)	See Note 1		

NOTE 1 Select conduit taking into consideration the DC input wire sizes and terminations listed in appropriate tables, type of battery installation, and requirements from NEC Table 4, Electrical Metallic Tubing (EMT).

NOTE 2 Bypass conduit data is not applicable to IOM configurations.

Battery Conductor Routing: Refer to the notes at the bottom of [Table 6](#) Input/Output Ratings and External Wiring Requirements.

[Table 22](#) lists the recommended rating for 480V, 415V, 400V, and 380V input circuit breakers with 100% and 80% breaker ratings for rectifier input.

Table 22. Recommended Input Circuit Breaker Ratings (100% and 80% Load Rating)

UPS Model Output kW/kVA	Input Rating				
	%	480V	415V	400V	380V
Eaton 9395P-600/600	100	1000A	N/A	N/A	N/A
	80	1200A	N/A	N/A	N/A
Eaton 9395P-600/550	100	1000A	1000A	1000A	1000A
	80	1200A	1200A	1200A	1200A
Eaton 9395P-600/500	100	800A	1000A	1000A	1000A
	80	1000A	1200A	1200A	1200A
Eaton 9395P-600/450	100	700A	800A	800A	800A
	80	1000A	1000A	1000A	1000A
Eaton 9395P-600/400	100	600A	700A	800A	800A

Table 22. Recommended Input Circuit Breaker Ratings (100% and 80% Load Rating) (Continued)

UPS Model Output kW/kVA	Input Rating				
	%	480V	415V	400V	380V
Eaton 9395P-600/300	80	800A	1000A	1000A	1000A
	100	500A	600A	600A	600A
	80	600A	700A	700A	700A
Eaton 9395P-600/275	100	450A	500A	500A	500A
	80	600A	600A	600A	600A
Eaton 9395P-600/250	100	400A	450A	450A	450A
	80	500A	600A	600A	600A
Eaton 9395P-600/225	100	350A	400A	400A	400A
	80	450A	500A	500A	500A
Eaton 9395P-600/200	100	300A	350A	400A	400A
	80	400A	450A	500A	500A

CAUTION

To reduce the risk of fire, connect only to a circuit provided with maximum input circuit breaker current ratings from [Table 22](#) in accordance with the NEC, ANSI/NFPA 70.

**ATTENTION!**

Pour réduire le risque d'incendie, ne brancher qu'à un circuit avec le courant nominal maximal du disjoncteur d'entrée indique dans le tableau ([Table 22](#)) conformément à la norme ANSI/ NFPA 70 du NEC.

The line-to-line unbalanced output capability of the UPS is limited only by the full load per phase current values for AC output to critical load shown in [Table 6](#) to [Table 13](#). The recommended line-to-line load unbalance is 50% or less.

Bypass and output overcurrent protection and bypass and output disconnect switches are to be provided by the customer. Module Output Breakers (MOBs) are to be provided by the customer.

[Table 23](#) lists the recommended rating for 480V, 415V, 400V, and 380V bypass, output, and MOB circuit breakers with 100% and 80% breaker rating. Bypass breakers are not applicable for IOM configurations.

Table 23. Recommended Bypass, Output, and MOB Circuit Breaker Ratings (100% and 80%)

UPS Model Output kW/kVA	Input Rating				
	%	480V	415V	400V	380V
Eaton 9395P-600/600	100	800A	N/A	N/A	N/A
	80	1000A	N/A	N/A	N/A
Eaton 9395P-600/550	100	700A	800A	800A	1000A
	80	1000A	1000A	1000A	1200A
Eaton 9395P-600/500	100	700A	700A	800A	800A
	80	800A	800A	1000A	1000A
Eaton 9395P-600/450	100	600A	700A	700A	700A
	80	700A	800A	1000A	1000A
Eaton 9395P-600/400	100	500A	600A	600A	700A
	80	600A	700A	800A	800A
Eaton 9395P-600/300	100	400A	450A	450A	450A
	80	500A	600A	600A	600A
Eaton 9395P-600/275	100	350A	400A	400A	450A
	80	450A	500A	500A	600A
Eaton 9395P-600/250	100	350A	350A	400A	400A
	80	400A	450A	500A	500A
Eaton 9395P-600/225	100	300A	350A	350A	350A
	80	350A	400A	450A	450A
Eaton 9395P-600/200	100	300A	300A	300A	350A
	80	350A	350A	400A	400A

NOTE Bypass breakers are not required for IOM configurations.

There is no manual DC disconnect device within the UPS.

A battery disconnect switch is required for battery systems and may also be required by NEC or local codes. The battery disconnect switch should be installed between the battery and the UPS.

Battery voltage is computed at 2 volts per cell as defined by Article 480 of the NEC. Rated battery current is computed at 2 volts per cell.

The battery wiring used between the battery and the UPS should not allow a voltage drop of more than 1 % of nominal DC voltage at rated battery current.

External DC input overcurrent protection and disconnect switch is to be provided by the customer. [Table 24](#) and [Table 25](#) list the maximum ratings for continuous-duty rated circuit breakers satisfying the criteria for both. Recommended disconnect size is based on a maximum full load discharge time less than 3 hours. For longer discharge times a larger disconnect may be required.

Table 24. Recommended DC Input Battery Disconnect Ratings 100% – Common Battery

UPS Model	All Ratings
Eaton 9395P-600/600 Eaton 9395P-600/550 Eaton 9395P-600/500	1600A
Eaton 9395P-600/450 Eaton 9395P-600/400	1200A
Eaton 9395P-600/300 Eaton 9395P-600/275 Eaton 9395P-600/250 Eaton 9395P-600/225 Eaton 9395P-600/200 See Note	1600A

NOTE Bypass conduit data is not applicable to IOM configurations.

Table 25. Recommended DC Input Battery Disconnect Ratings 100% – Separate Battery

UPS Model	All Ratings
Eaton 9395P-600/600 Eaton 9395P-600/300	800A
Eaton 9395P-600/550 Eaton 9395P-600/500 Eaton 9395P-600/450 Eaton 9395P-600/400 Eaton 9395P-600/275 Eaton 9395P-600/250 Eaton 9395P-600/225 Eaton 9395P-600/200 See Note	700A

NOTE Bypass conduit data is not applicable to IOM configurations.

3.2.5 UPS System Interface Wiring Preparation

Control wiring for features and options should be connected at the customer interface terminal blocks located inside the UPS.

WARNING

Do not directly connect relay contacts to the mains related circuits. Reinforced insulation to the mains is required.



ATTENTION!

Ne pas directement brancher les contacts de relais aux circuits du réseau. Une isolation renforcée des réseaux est nécessaire.

Read and understand the following notes while planning and performing the installation:

- Use Class 1 wiring methods (as defined by the NEC) for interface wiring from 30V to 600V. The wire should be rated at 600V, 1A minimum and 12 AWG maximum.
- Use Class 2 wiring methods (as defined by the NEC) for interface wiring up to 30V. The wire should be rated at 24V, 1A minimum. When Class 2 circuit wiring must be mixed with Class 1 wiring, use Class 1 wire and wiring methods.
- Use shielded twisted-pair wires for each input and return or common.
- All interface wiring and conduit is to be provided by the customer.
- When installing external interface wiring (for example, building alarm, relay output, battery breaker trip, and X-Slot) to the UPS interface terminals, conduit must be installed between each device and the UPS cabinet.
- Install the interface wiring in separate conduit from the power wiring.
- When installing internal interface wiring to X-Slot terminals, route the wiring through the internal opening in the X-Slot communication bay.
- All building alarm inputs or remote features require an isolated normally-open contact or switch (rated at 24 Vdc, 20 mA minimum) connected between the alarm input and common terminal. All control wiring and relay and switch contacts are customer-supplied and may need to use Class 1 wiring, see above.
- The building alarms can be programmed to display the alarm functional name.
- LAN drops for use with X-Slot connectivity cards must be provided by the customer and may need to use Class 1 wiring, see above.
- The UPS battery aux signal wiring from the UPS must be connected to the battery disconnect device.
- A supplemental 48 Vdc shunt trip signal for the battery disconnect device is provided, but is not required for normal operation.
- Battery aux and 48 Vdc shunt trip wiring should be a minimum of 18 AWG.
- The REPO feature opens all contactors in the UPS cabinet and isolates power from your critical load. Local electrical codes may also require tripping upstream protective devices to the UPS.
- The REPO switch must be a latching-type switch not tied to any other circuits.
- A jumper wire must be connected between pins 1 and 2 on TB1, if the normally-closed REPO contact is not used.
- REPO wiring should be a minimum of 22 AWG and a maximum of 14 AWG.
- The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.
- The maximum distance between the REPO and the UPS cannot exceed 150 meters (500 feet).
- Alarm relay contacts have a maximum current rating of 5A and a switched voltage rating of 30 Vac and 28 Vdc.
- Alarm relay wiring should be a minimum of 22 AWG.



NOTE 1 On all 9395P–600 models that will be fed by a site generator at any time it is recommended to have an “*On Generator*” sensing input connected and proven functional. This allows the UPS to optimize its operation with the generator. This function includes reduced input current and battery current limits, slower walk-in to ease the load step on the generator initially, and HIGH ALERT mode for ESS and VMMS operation.

NOTE 2 HIGH ALERT mode is desired because any loads with a leading power factor will not be seen by the generator. Rectifier operation will be much softer while on generator thereby increasing overall system stability

3.2.6 Distributed Bypass Power Wiring Preparation


NOTE

For full-rated operation of a Distributed Bypass System when in Bypass or ESS mode, the line frequency impedance of all conduction paths must be equal when assessed from the point where the Bypass Power Source connects to the System Switchgear to the point where the Common Load connects to the System Switchgear.

Read and understand the following notes while planning and performing the installation:

- All distributed bypass UPS rectifier inputs must come from one source and all bypass input feeds must come from one source.
- All UPSs in the distributed bypass system must contain the same number of UPMs. Mixed UPS kVA ratings are not permitted.
- Distributed bypass UPS input wiring size requirements and output wiring size requirements from the UPSs to the tie cabinet or distribution panel are the same as listed in [Table 6](#) to [Table 13](#).
- The 99395P-600 480V unit is designed for operation on a ground wire source of supply. There is no additional connection point for a neutral conductor. The output of this UPS will not directly support phase to neutral loads.
- MOBs with dual auxiliary contacts are to be provided by the customer. [Table 23](#) lists the recommended rating for the MOBs.
- The tie cabinet must contain Module Output Breakers (MOBs) with dual auxiliary contacts for control of the system. Without dual auxiliary MOBs, UPMs are not allowed to go to bypass individually during servicing. All UPMs will go to bypass instead of the just the UPM needing service, decreasing critical load protection. With dual auxiliary MOBs, one UPM can be bypassed while the remaining UPMs support the load as long as the remaining UPMs have the capacity to do so.

3.3 Inspecting and Unpacking the UPS Cabinet

The UPS cabinet is palletted separately for shipping. The cabinet is shipped bolted to a wooden pallet and protected with outer protective packaging material.

WARNING

The UPS cabinet is heavy (see [Table 2](#)). If unpacking and unloading instructions are not closely followed, the cabinet may tip and cause serious injury.



AVERTISSEMENT!

Les sections de l'onduleur sont lourdes (voir le [Table 2](#)). Suivre attentivement les instructions de déchargement et de déballage pour éviter de renverser les armoires, ce qui pourrait causer de graves blessures.

CAUTION

To prevent damage to the wiring channel and wiring in the UPS cabinet base when lifting or moving the cabinet:

- Lift and move the cabinet using only the front or rear forklift slots.
- Verify that the forklift forks are in a horizontal position before inserting them into the forklift slots. DO NOT angle fork tips upward.
- Insert the forks all the way through the base. DO NOT insert forks partially into the base to move the cabinet.
- Forks may be partially inserted into the front or rear forklift slots for minor positioning if the forks are kept in a horizontal position with no upward angling.
- DO NOT use the forklift slots on the end of the cabinet to move the cabinet.
- End forklift slots may be used for minor positioning if the forks are kept in a horizontal position with no upward angling.

If these instructions are not followed, damage to the wiring channel and wiring will occur.

**ATTENTION!**

Pour éviter d'endommager le câblage et son canal à la base de l'armoire de l'onduleur lorsque l'armoire est soulevée ou déplacée: Soulever ou déplacer l'armoire en n'utilisant que les passages de fourche à l'avant ou à l'arrière.

- Vérifier que les fourches du chariot élévateur sont en position horizontale avant de les insérer dans les passages de fourche. NE PAS orienter les pointes de fourche vers le haut.
- Insérer complètement les fourches dans les passages de fourche de la base. NE PAS insérer partiellement les fourches dans les passages pour déplacer l'armoire.
- Il est possible d'insérer partiellement les fourches dans les passages avant et arrière pour les petits déplacements, et ce, si les fourches sont en position horizontale sans pointer vers le haut.
- NE PAS utiliser les passages de fourche à l'extrémité de l'armoire pour la déplacer.
- Les passages de fourche à l'extrémité de l'armoire peuvent servir lors des petits déplacements, et ce, si les fourches sont en position horizontale sans pointer vers le haut.

Si ces instructions ne sont pas suivies, des dommages au câblage et à son canal surviendront.

1. Carefully inspect the outer packaging for evidence of damage during transit.

CAUTION

Do not install a damaged cabinet. Report any damage to the carrier and contact an Eaton service representative immediately.

**ATTENTION!**

Ne pas installer une armoire endommagée. Signaler les dommages au transporteur et communiquer avec un représentant du service Eaton immédiatement.

**NOTE**

For the following step, verify that the forklift or pallet jack is rated to handle the weight of the cabinet (see [Table 2](#) for cabinet weight).

2. Use a forklift or pallet jack to move the packaged cabinets to the installation site, or as close as possible, before unpacking. If possible, move the cabinets using the pallet. Insert the forklift or pallet jack forks from the right side of the pallet (facing the cabinet), between the supports on the bottom of the pallet. If the cabinets must be moved using the cabinet front or rear fork lift slots, see the caution statement at the beginning of this procedure.

⚠ CAUTION

Do not tilt the UPS cabinet more than 10° from vertical or the cabinet may tip over.

⚠ ATTENTION!

Ne pas incliner les armoires d'onduleur à plus de 10 degrés de la verticale puisqu'elles pourraient se renverser.

3. Set the pallet on a firm, level surface, allowing a minimum clearance of 3m (10 ft) on each side for removing the cabinet from the pallet.

**NOTE**

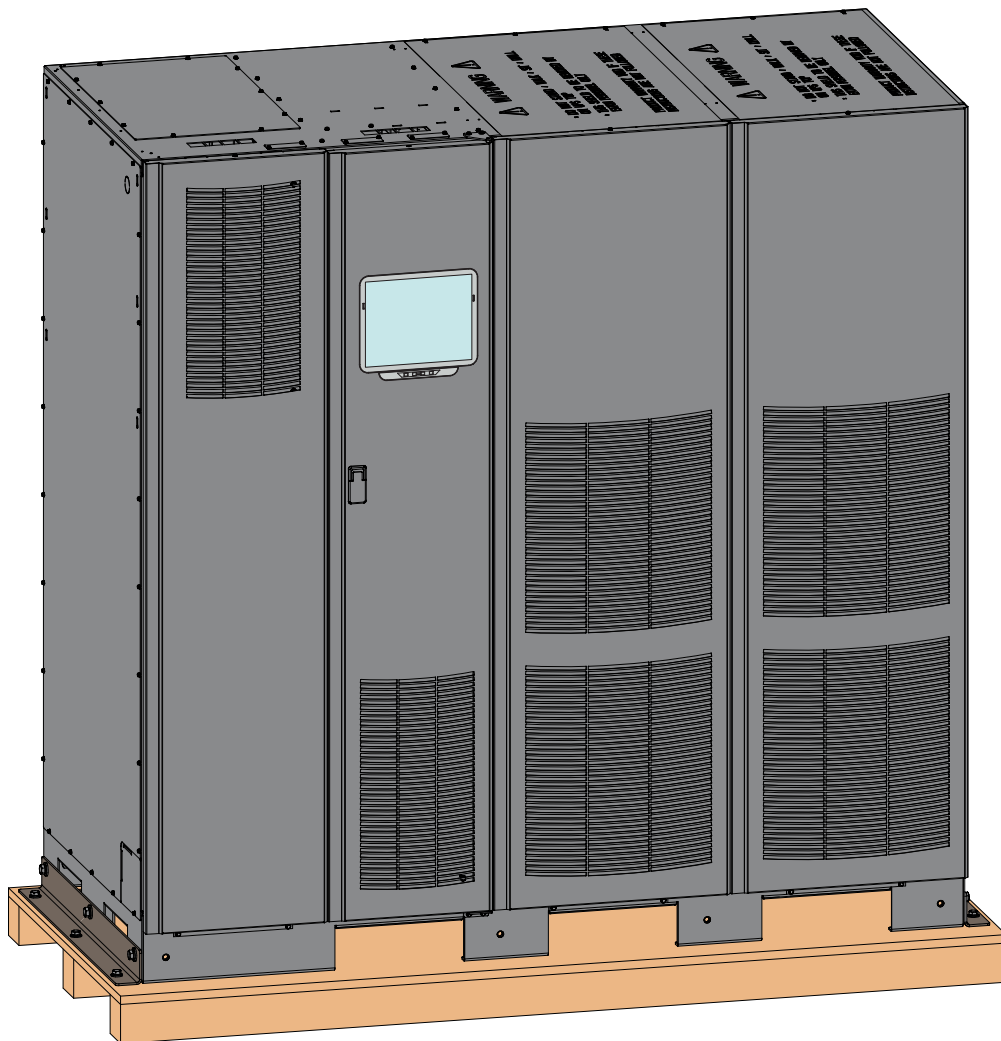
The ISBM and UPM sections are shipped with debris shields covering the ventilation grills on top of the sections (see [Figure 16](#)). Do not remove the debris shields until installation is complete.

4. Remove the protective covering from the cabinet.
5. Remove the packing material, and discard or recycle in a responsible manner.
6. Inspect the contents for any evidence of physical damage, and compare each item with the Bill of Lading. If damage has occurred or shortages are evident, contact an Eaton service representative immediately to determine the extent of the damage and its impact on further installation.

**NOTE**

While waiting for installation, protect the unpacked cabinet from moisture, dust, and other harmful contaminants. Failure to store and protect the UPS properly may void your warranty.

Figure 12. Two UPM Configuration as Shipped on Pallet



Chapter 4 UPS System Installation

4.1 Preliminary Installation Information

WARNING

Installation should be performed only by qualified personnel.



AVERTISSEMENT!

L'installation ne doit être effectuée que par du personnel qualifié.

Refer to the following while installing the UPS system:

- [Chapter 3 UPS Installation Plan and Unpacking](#) for cabinet dimensions, equipment weight, wiring and terminal data, and installation notes.
- Do not tilt the cabinets more than $\pm 10^\circ$ during installation.
- Remove the conduit landing plates to add conduit landing holes as required. Plate material is 16 gauge steel (1.5 mm/0.06" thick).
- If perforated floor tiles are required for ventilation, place them in front of the UPS.

4.2 Unloading the ISBM with UPM Section from the Pallet

The ISBM and UPM sections are bolted to separate wooden pallets supported by wood skids. To remove the pallets:

WARNING

If unpacking and unloading instructions are not closely followed, the cabinets may tip and cause serious injury. The ISBM with UPM or UPMs section is heavy (see [Table 2](#)). If unpacking and unloading instructions are not closely followed, the cabinets may tip and cause serious injury.



AVERTISSEMENT!

Les sections de l'onduleur sont lourdes (voir le tableau [Table 2](#)). Suivre attentivement les instructions de déchargement et de déballage pour éviter de renverser les armoires, ce qui pourrait causer de graves blessures.

CAUTION

- Do not tilt cabinets more than 10° from vertical.
- Lift the cabinets only with a forklift or damage may occur.

To prevent damage to the wiring channel and wiring in the UPM section base when lifting or moving the cabinet:

- Lift and move the UPM section using only the front or rear forklift slots.
- Verify that the forklift forks are in a horizontal position before inserting them into the forklift slots. DO NOT angle fork tips upward.
- Insert the forks all the way through the base. DO NOT insert forks partially into the base to move the cabinet.
- Forks may be partially inserted into the front or rear forklift slots for minor positioning if the forks are kept in a horizontal position with no upward angling.
- DO NOT use the forklift slots on the end of the cabinet to move the cabinet.
- End forklift slots may be used for minor positioning if the forks are kept in a horizontal position with no upward angling.

If these instructions are not followed, damage to the wiring channel and wiring will occur.

ATTENTION!

- Ne pas incliner les armoires à plus de 10 degrés de la verticale.
- Ne soulever les armoires qu'à l'aide d'un chariot élévateur pour éviter de les endommager.

Pour éviter d'endommager le câblage et son canal à la base de la section de l'onduleur lorsque l'armoire est soulevée ou déplacée:

- Soulever ou déplacer la section de l'onduleur en n'utilisant que les passages de fourche à l'avant ou à l'arrière.
- Vérifier que les fourches du chariot élévateur sont en position horizontale avant de les insérer dans les passages de fourche. NE PAS orienter les pointes de fourche vers le haut.
- Insérer complètement les fourches dans les passages de fourche de la base. NE PAS insérer partiellement les fourches dans les passages pour déplacer l'armoire. Il est possible d'insérer partiellement les fourches dans les passages avant et arrière pour les petits déplacements, et ce, si les fourches sont en position horizontale sans pointer vers le haut.
- NE PAS utiliser les passages de fourche à l'extrémité de l'armoire pour la déplacer.
- Les passages de fourche à l'extrémité de l'armoire peuvent servir lors des petits déplacements, et ce, si les fourches sont en position horizontale sans pointer vers le haut.

Si ces instructions ne sont pas suivies, des dommages au câblage et à son canal surviendront.

**NOTE**

For the following steps, verify that the forklift or pallet jack is rated to handle the weight of the cabinet (see [Table 2](#) for cabinet weight).

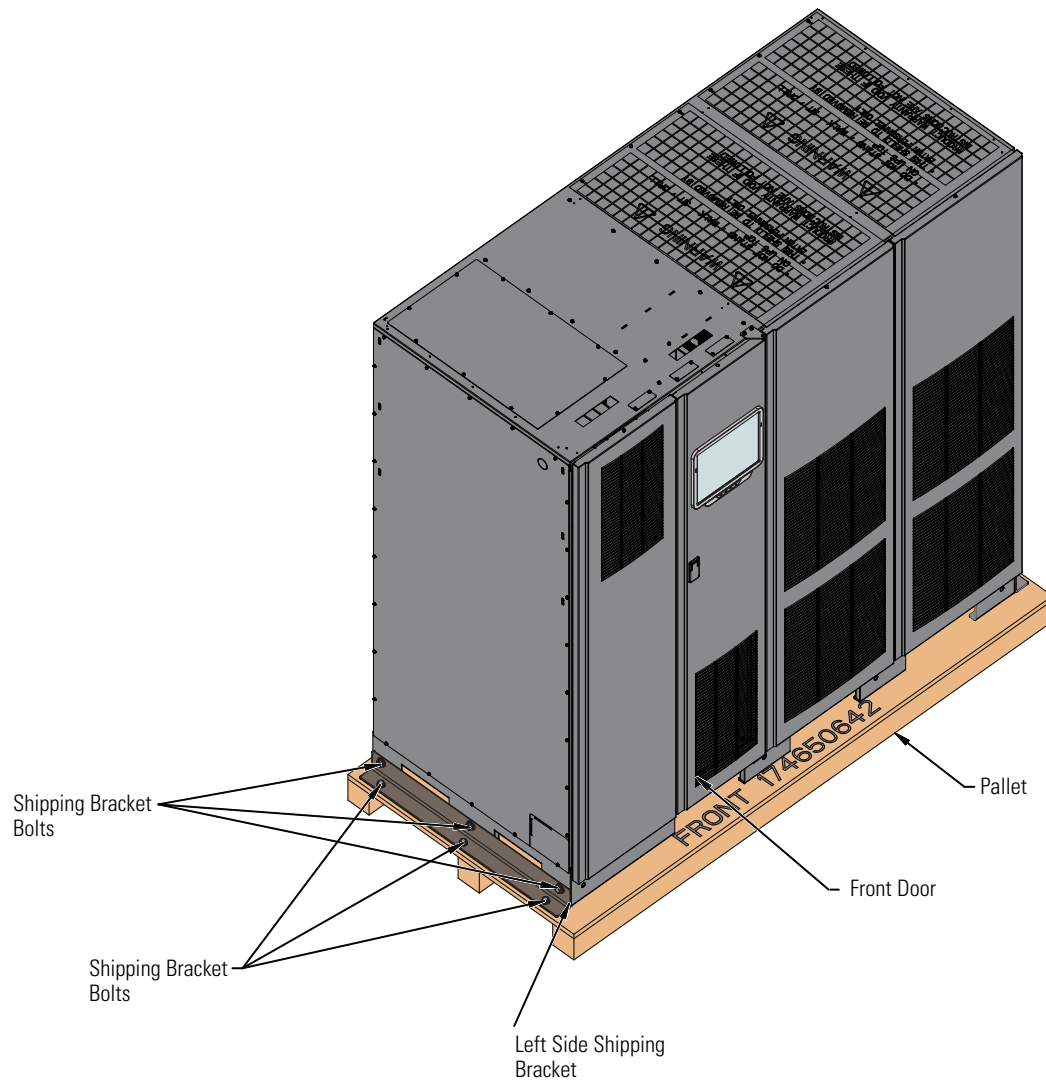
To remove the pallet and mechanically install the UPS:

1. If not already accomplished, use a forklift or pallet jack to move the ISBM and UPM sections to the installation area, or as close as possible, before unloading from the pallets. If possible, move each section

using the pallet. Insert the forklift or pallet jack forks from the right side of the pallet (facing the cabinet), between the supports on the bottom of the pallet. If the sections must be moved using the section front or rear fork lift slots, see the caution statements at the beginning of this procedure.

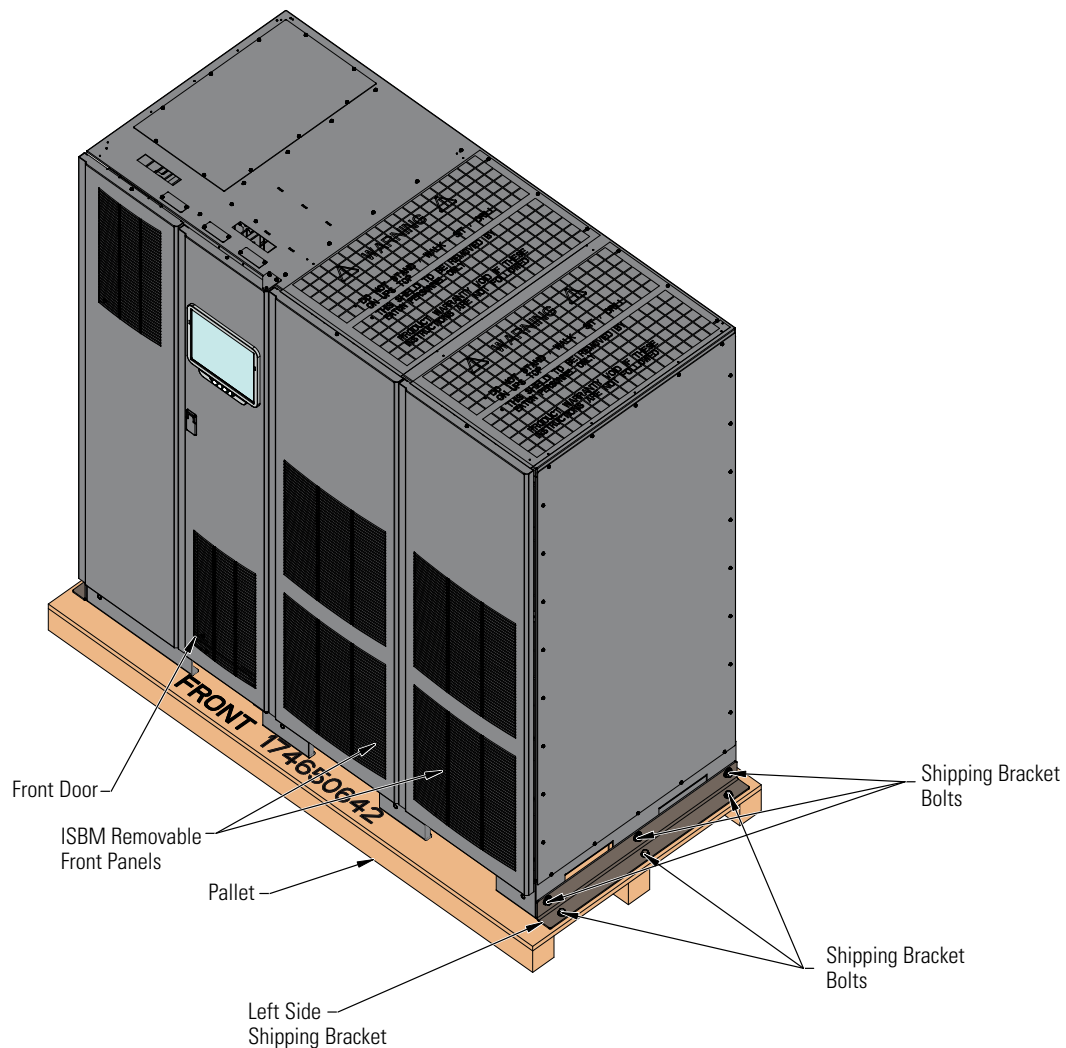
2. Remove the three bolts securing the left side shipping bracket to the cabinet and three bolts securing the bracket to the pallet (see [Figure 13](#)) . Remove the left side shipping bracket.

Figure 13. Removing the ISBM Section Left Side Shipping Bracket



3. Remove the three bolts securing the right side shipping bracket to the cabinet and three bolts securing the bracket to the pallet (see [Figure 14](#)) . Remove the right side shipping bracket.

Figure 14. Removing the ISBM Section Right Side Shipping Bracket



4. Using a forklift (see the caution statement at the beginning of this procedure), raise the UPS cabinet section until the cabinet bottom clears the pallet by approximately 3 mm (1/8").
5. Pull the pallet from under the UPS cabinet. Discard or recycle the pallet in a responsible manner.
6. Carefully lower the UPS cabinet until the cabinet base contacts the floor.
7. Repeat Steps 2 through 6 for the remaining cabinet.
8. Proceed to paragraph [4.4 Battery System Installation](#). Otherwise, go to paragraph [4.5 Distributed Bypass Tie Cabinet Installation](#) to complete the wiring of the UPS.

4.3 Field Installed UPM Installation

If installing a Plus 1 configuration with an FI-UPM, install the FI-UPM using the instructions in the *Eaton® Power Xpert® 9395P UPS Field Installed UPM Mechanical Installation Manual* (P-164000503) listed in

paragraph [1.9 For More Information](#) for more info. After the FI-UPM is installed, proceed to paragraph [4.4 Battery System Installation](#) in this document if installing a battery system; otherwise, proceed to paragraph [4.5 Distributed Bypass Tie Cabinet Installation](#) in this document to complete the wiring of the UPS.

4.4 Battery System Installation

If installing a battery system, install the customer-supplied battery system according to the battery and battery system manufacturer's instructions and all applicable codes and regulations, including the NEC, Article 480. After the battery system is installed, proceed to paragraph [4.5 Distributed Bypass Tie Cabinet Installation](#) if installing a distributed bypass tie cabinet; otherwise, proceed to paragraph [4.6 Installing UPS External and Battery Power Wiring](#) to complete the wiring of the UPS.

4.5 Distributed Bypass Tie Cabinet Installation

	NOTE The tie cabinet must contain Module Output Breakers (MOBs) with dual auxiliary contacts for control of the system. Without dual auxiliary MOBs, UPMs are not allowed to go to bypass individually during servicing. All UPMs will go to bypass instead of the just the UPM needing service, decreasing critical load protection. With dual auxiliary MOBs, one UPM can be bypassed while the remaining UPMs support the load as long as the remaining UPMs have the capacity to do so.
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If installing a distributed bypass system, install the customer-supplied tie cabinet or distribution panel according to the tie cabinet or distribution panel manufacturer's instructions and all applicable codes and regulations, including the NEC, Article 480. After the tie cabinet is installed, proceed to paragraph [4.6 Installing UPS External and Battery Power Wiring](#) to complete the wiring of the UPS.

4.6 Installing UPS External and Battery Power Wiring

	NOTE The ISBM and UPM sections are shipped with debris shields covering the ventilation grills on top of the sections (see Figure 16). Do not remove the debris shields until installation is complete. However, remove the shields before operating the UPS. Once the debris shields are removed, do not place objects on the ventilation grills.
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	NOTE Remove the ISBM section top or bottom conduit landing plate to drill or punch conduit holes (see Figure 17).
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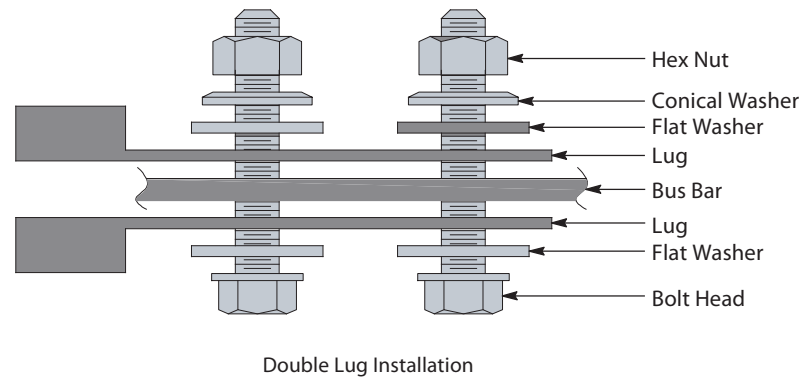
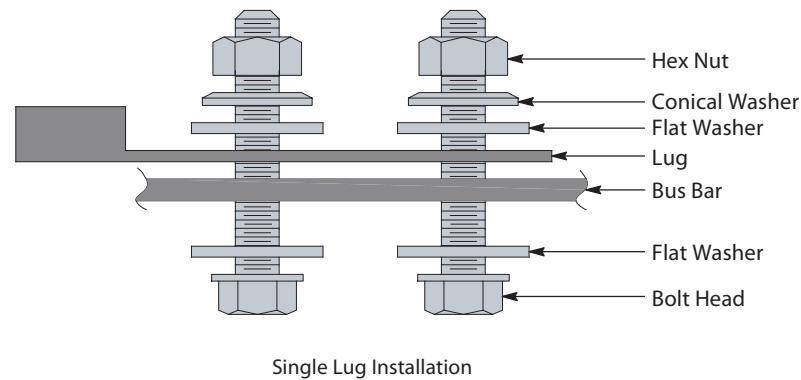
Use the procedures in the following paragraphs to connect the external and battery power wiring.

4.6.1 2-Hole Barrel Lug Terminations for Bus Bar Installation

Paragraphs [4.6.2 External Power Wiring Installation](#) and [4.6.3 Battery Power Wiring](#) require connecting input, output, and battery power wiring using 2-hole barrel lugs. See [Figure 15](#) for the hardware sequence when installing the lugs to the bus bars. Tighten the nut to the torque value listed in [Table 14](#).

	NOTE Conical washers are special purpose washers that look similar to flat washers, except for a slight conical shape. When installing conical washers, the top of the dome should be next to the nut and the base of the washer should be against a flat washer, or large terminal.
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Figure 15. Typical Bus Bar Barrel Lug Mounting – Hardware Assembly Sequence



4.6.2 External Power Wiring Installation

To install wiring to connections:

1. Remove one top screw and two bottom screws securing each ISBM section left and right front panel (see [Figure 14](#)). Lift the panels straight up to remove them from the panel hanger brackets at the top of the cabinet.
2. Remove the screws securing the top and bottom internal safety shield panels and remove the panels to gain access to the input, output, and battery terminals. Retain the hardware for later use.
3. Route the input and output cables through either the top or bottom of the cabinet to the UPS terminals. See [Figure 17](#) through [Figure 20](#) for wiring access information and terminal locations.

Top Access Wiring. Remove the top conduit plate from the top of the ISBM section. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the top conduit plate prior to mounting on the ISBM section. Install the conduit plate and install all conduit runs into the plate. Pull wiring through conduit into the ISBM section wiring area.

Bottom Access Wiring. Remove the bottom conduit plate from the inside bottom of the ISBM section. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the bottom conduit plate prior to mounting on the ISBM section. Install the conduit plate and install all conduit runs into the plate. Pull wiring through conduit into the ISBM section wiring area.

Figure 16. ISBM and 2 UPM Section Debris Shields

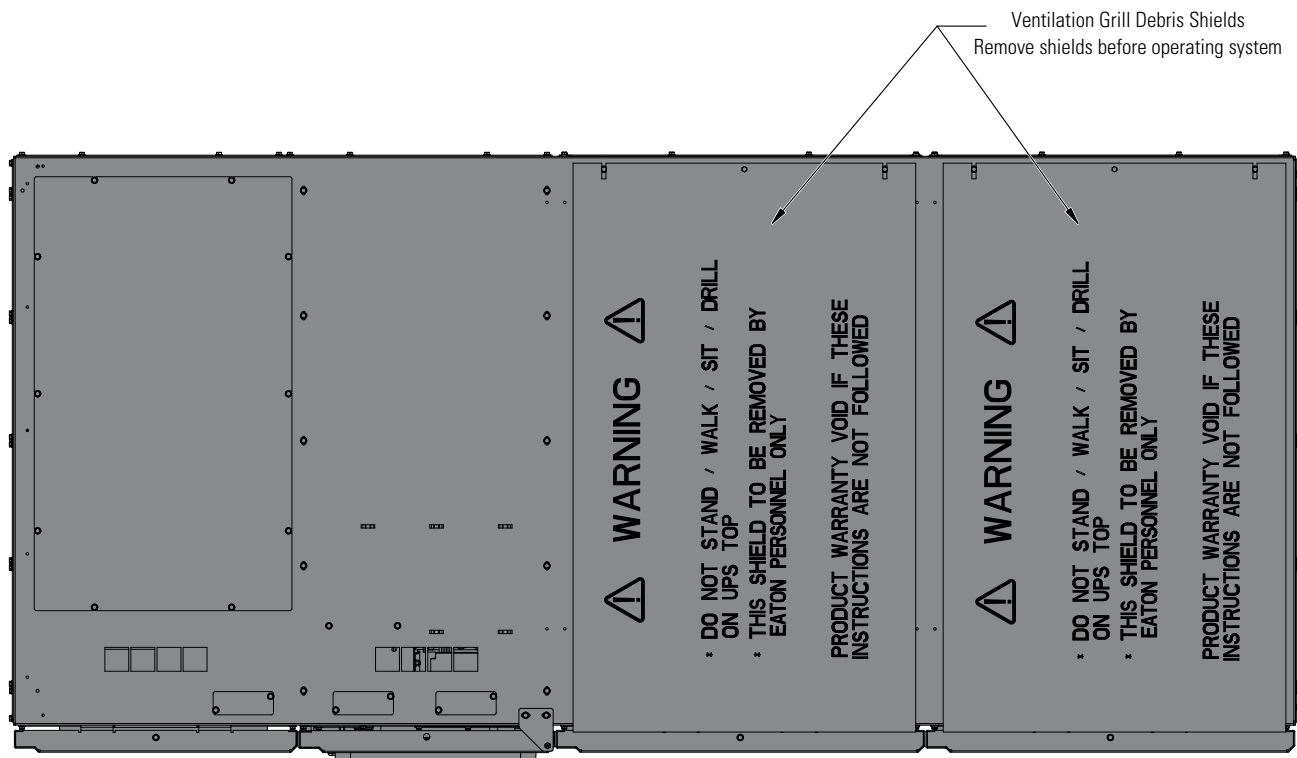
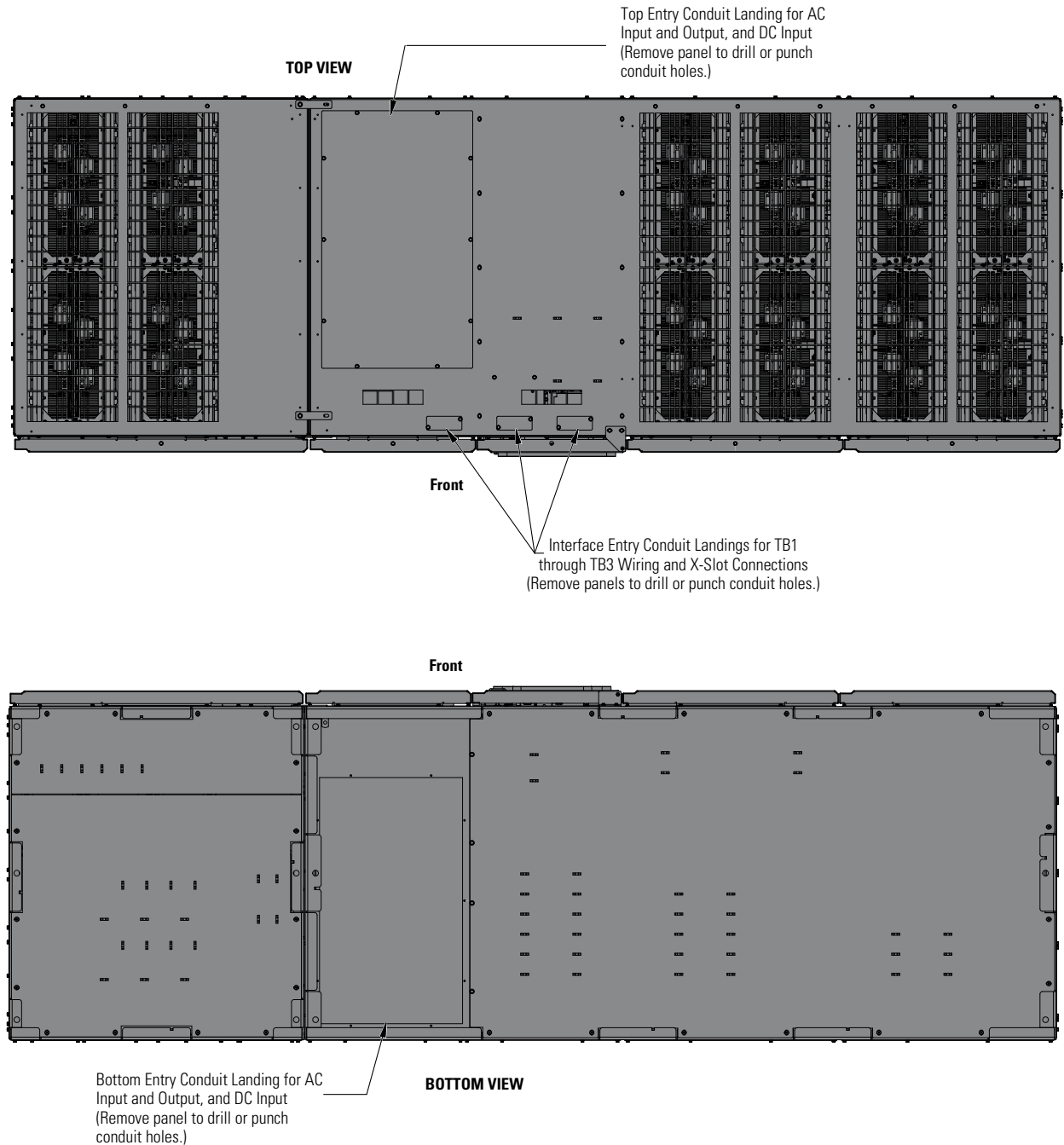


Figure 17. ISBM and UPM Section Conduit and Wire Entry Locations



4. Locate the external wiring terminal hardware kit packed on the bottom left side of the ISBM section.

5. Using hardware from the external wiring terminal hardware kit (see [Table 16](#)), connect phase A, B, and C rectifier input power wiring from the utility source to the rectifier input terminals in the ISBM section. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
6. If installing a UPS configured as an Input Output Module (IOM), proceed to Step 8; otherwise, proceed to Step 7.
7. Using hardware from the external wiring terminal hardware kit (see [Table 16](#)), connect phase A, B, and C bypass input power wiring from the utility source to the bypass input terminals in the ISBM section. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
8. If wiring a distributed bypass system, proceed to Step 9; otherwise, proceed to Step 11.
9. Using hardware from the external wiring terminal hardware kit (see [Table 16](#)), connect phase A, B, and C wiring from the output terminals of each UPS unit to the customer-supplied tie cabinet or load distribution panel. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
10. Proceed to paragraph [4.6.3 Battery Power Wiring](#).
11. Using hardware from the external wiring terminal hardware kit (see [Table 16](#)), connect phase A, B, and C power wiring from output terminals to the critical load. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
12. Proceed to paragraph [4.6.3 Battery Power Wiring](#).

Figure 18. ISBM Section Power Terminal Locations

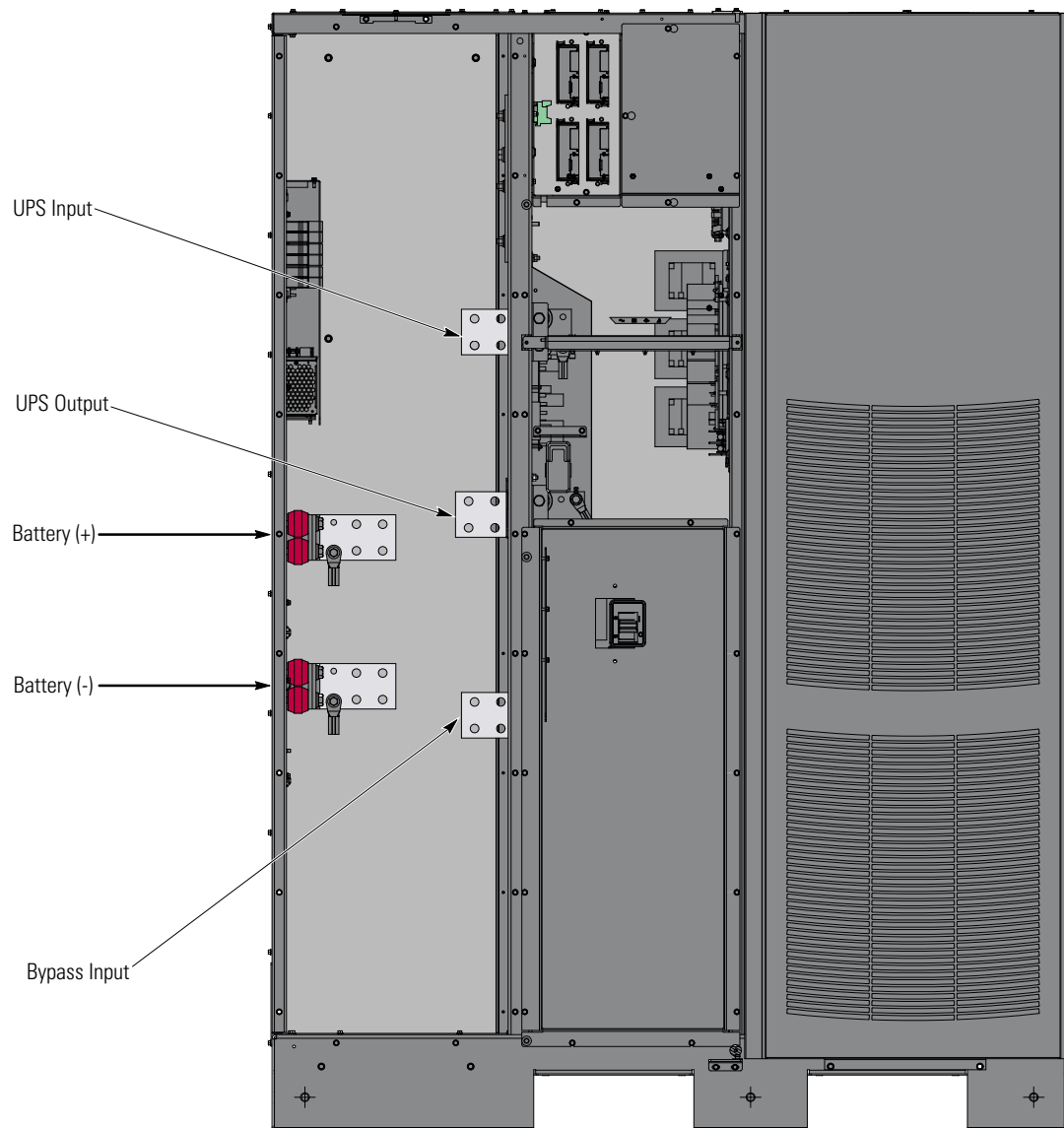
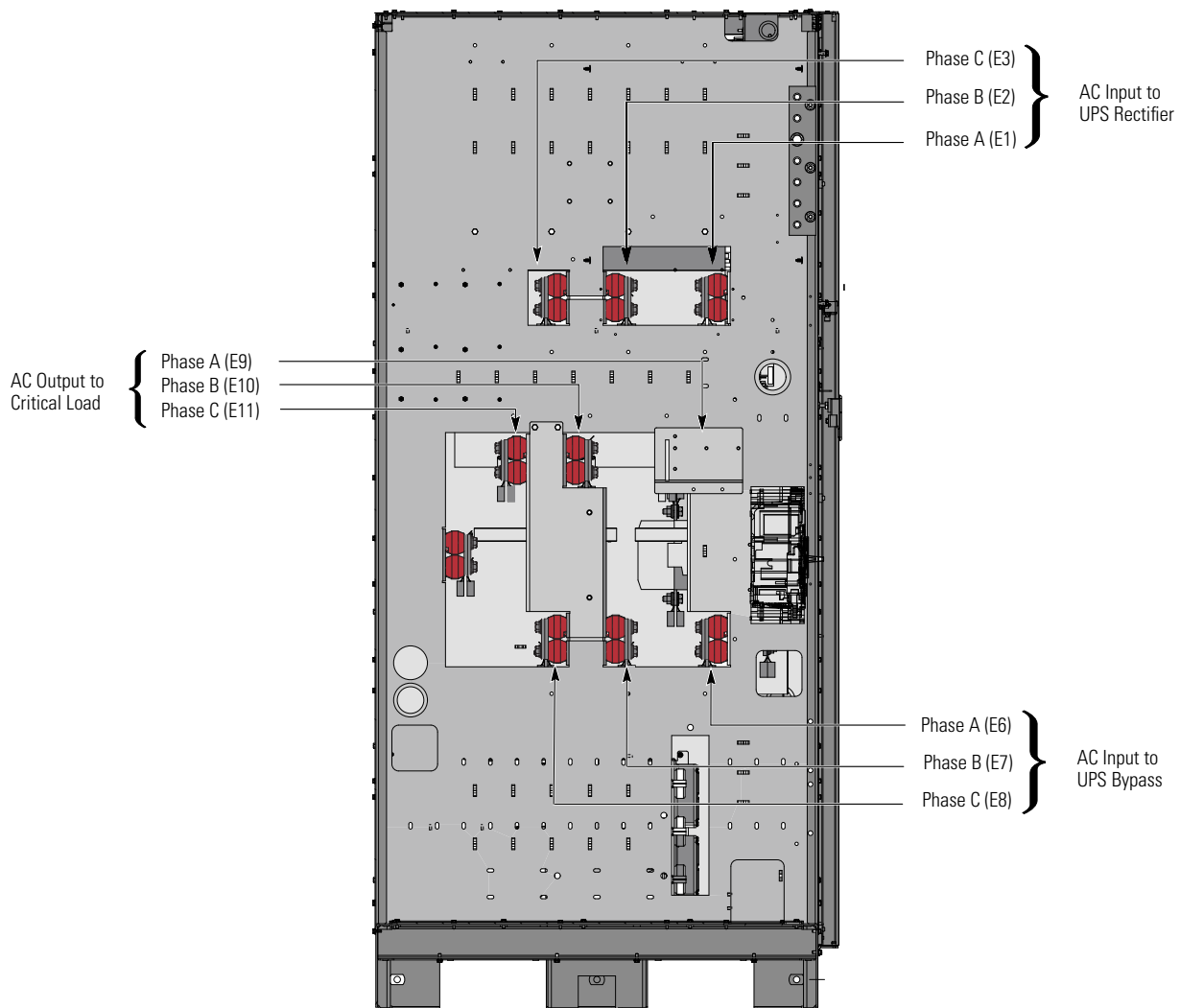


Figure 19. ISBM Section Power Terminal Detail – Section AA (380V, 400V, 415V, and 480V Models)



4.6.3 Battery Power Wiring

CAUTION

When sizing the battery system, do not exceed the internal battery charger capabilities. See [Chapter 10 Product Specifications](#) for maximum battery charger currents



ATTENTION!

Lors de l'évaluation du système de batterie, ne pas dépasser les capacités internes du chargeur de batteries. Se reporter au chapitre 10 [Chapter 10 Product Specifications](#) sur les notices techniques pour connaître les tensions maximales du chargeur de batteries. Ne pas installer une armoire endommagée. Signaler les dommages au transporteur et communiquer avec un représentant du service Eaton immédiatement.

To install wiring to connections:



NOTE

An installed FI-UPM is always designated as UPM 4.



NOTE

Battery Cable Routing Requirements using Conduit:

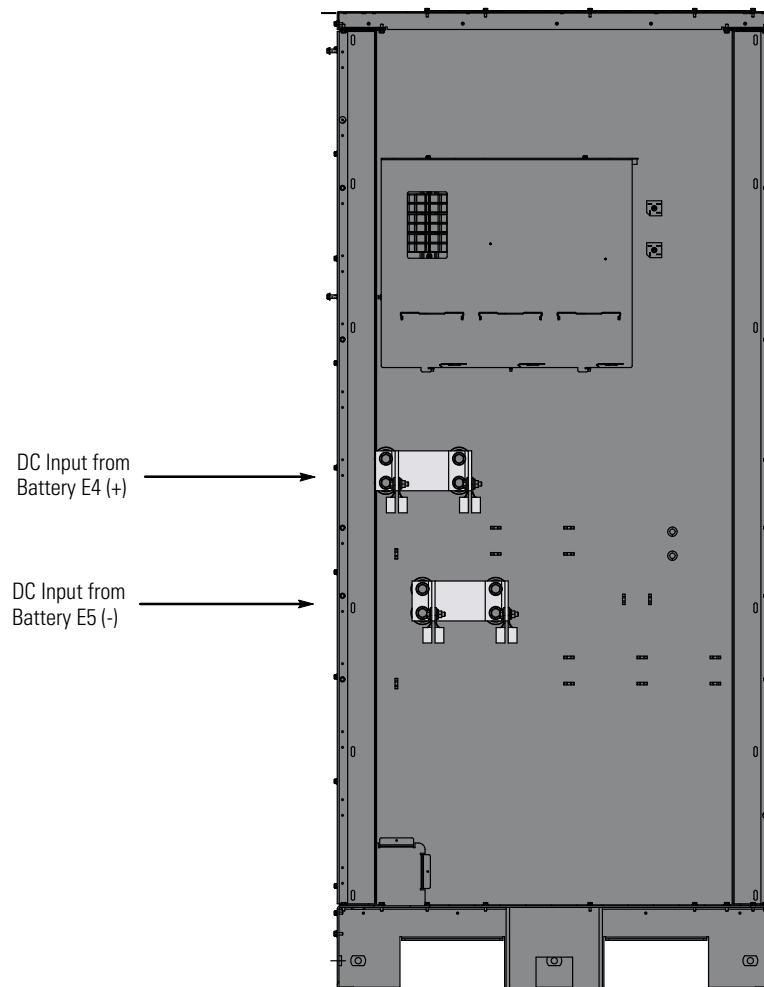
- * Each conduit must have a Positive, Negative, and Ground conductor
- * There must be an equal number of positive and negative conductors in a single conduit. Only one ground conductor is required in each conduit.

Battery Cable Routing Requirements using Raceway:

- * Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + -).
- * There must be a ground cable running in the raceway with the battery cables.

1. Route the battery cables between the ISBM section and the battery system or battery disconnect. See [Figure 17](#) through [Figure 20](#) for wiring access information and terminal locations.
2. If wiring the UPS for a common battery, proceed to Step 3; if wiring for a separate battery, proceed to Step 5.
3. Using hardware from the external wiring terminal hardware kit (see [Table 16](#)), connect the positive, negative, and ground DC power wiring from the battery system or disconnect to the ISBM section battery and ground terminals. Use both sets of terminals shown in [Figure 20](#) as needed. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
4. Proceed to Step 6.
5. Using hardware from the external wiring terminal hardware kit (see [Table 16](#)), connect the positive, negative, and ground DC power wiring from the battery systems or disconnects to the ISBM section battery and ground terminals. Use one set of terminals for each UPM. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
6. After wiring the UPS system to the facility power and critical load, be sure to ground the system according to local and/or national electrical wiring codes.
7. If wiring interface connections, proceed to paragraph [4.7 Installing Interface Connections](#); otherwise, proceed to Step 8.
8. When all wiring is complete, reinstall the top and bottom safety shield panels removed in paragraph [4.6.2 External Power Wiring Installation](#), Step 2. Secure with the retained hardware.
9. Reinstall the left front panel removed in paragraph [4.6.2 External Power Wiring Installation](#), Step 1 and secure with the retained hardware.

Figure 20. UPS Power Terminal Detail BB – Common Battery



4.7 Installing Interface Connections

⚠ WARNING

Hazardous voltages are present near the user interface terminal area if the UPS is not totally disconnected.



AVERTISSEMENT!

Des tensions dangereuses sont présentes près de l'enceinte du terminal de l'interface utilisateur si l'onduleur n'est pas totalement débranché.

Use the procedures in the following paragraphs to connect the TB1, TB1 Battery, TB2, and TB3 interface connections.

4.7.1 TB1, TB2, and TB3 Connections (Other than TB1 Battery Interface Connections)



NOTE 1 When installing interface wiring for TB1, TB2, and TB3 connections, conduit must be installed between each device and the UPS cabinet.

NOTE 2 Interface wiring must be installed from the top of the UPS cabinet.

To install wiring to connections:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. If not already opened, unfasten the front door latch and swing the door open (see [Figure 13](#)).
3. If not already removed, remove the door. Remove the retaining screw located inside the door at the bottom hinge pivot point, then lift the door off. Retain the hardware for later use.
4. Terminal block TB3 is accessible on the left side of the X-Slot communication bay. To gain access to terminal block TB1, TB2, and the left interface entry conduit landing plates, remove the screws securing the top internal safety shield panel and remove the panel. Retain the hardware for later use (see [Figure 21](#)).
5. Remove the interface entry conduit landing plates to drill or punch holes (see [Figure 17](#)).
6. Reinstall the interface entry plates and install the conduit.

⚠ WARNING

Do not directly connect relay contacts to the mains related circuits. Reinforced insulation to the mains is required.



AVERTISSEMENT!

Ne pas directement brancher les contacts de relais aux circuits du réseau. Une isolation renforcée des réseaux est nécessaire.

7. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.5 UPS System Interface Wiring Preparation](#), [Table 26](#), and [Figure 17](#) through [Figure 20](#) for wiring access.
8. Route and connect the wiring.
9. If wiring TB1 battery interface connections, proceed to paragraph [4.7.2 TB1 Battery Interface Connections](#); if wiring the X-Slot connections only, proceed to paragraph [4.7.3 X-Slot Connections](#); otherwise, proceed to Step 10.
10. Reinstall the top internal safety shield panel and secure with the retained hardware.
11. Reinstall the front door removed in Step 3 and secure with the retained hardware.
12. Close the door and secure the latch.

Figure 21. ISBM Section Interface Terminal Locations



Table 26. TB1, TB2, and TB3 Interface Connections

Terminal TB1	Name	Description
1	REPO NC	Input: Normally-closed dry contact used to activate UPS EPO from a remote switch.
2	REPO Return	
3	REPO NO	Input: Normally-open dry contact used to activate UPS EPO from a remote switch.
4	REPO Return	
5	Battery Aux	Input: Normally-open contact used to indicate when UPS battery breaker is open or closed.
6	Battery Aux Common	
7	48 Vdc Battery Shunt Trip +	Output: Contacts used to open battery breaker or disconnect.
8	48 Vdc Battery Shunt Trip –	
9	Output Contactor K3 NC Aux	Output: Normally-closed contact opens when output contactor closes.
10	Output Contactor K3 NC Aux Common	
Terminal TB2	Name	Description
1	Pull Chain	Output: Backup control for parallel operation.
2	Pull Chain Common	
3	Alarm Relay NC	Output: General purpose normally-closed (NC) relay contact.
4	Alarm Relay Common	
5	Alarm Relay NO	Output: General purpose normally-open (NO) relay contact.
6	Alarm Relay Common	
7	Not Used	
8	Not Used	
9	Not Used	
10	Not Used	
Terminal TB3	Name	Description
1	Building Alarm 1	Input: Programmable UPS alarm, activated by a remote dry contact closure.
2	Building Alarm 1 Return	
3	Building Alarm 2	Input: Programmable UPS alarm, activated by a remote dry contact closure.
4	Building Alarm 2 Return	
5	Building Alarm 3 Default: Charger Off	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for charger off.
6	Building Alarm 3 Return	
7	Building Alarm 4 Default: On Generator	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for on generator.

Table 26. TB1, TB2, and TB3 Interface Connections (Continued)

Terminal TB3	Name	Description
8	Building Alarm 4 Return	
9	Building Alarm 5 Default: Maintenance Bypass	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for maintenance bypass.
10	Building Alarm 5 Return	

NOTE "Return" indicates connection to electronics circuit ground. "Common" indicates connection to common side of isolated relay contact.

Figure 22. Interface Terminal Detail

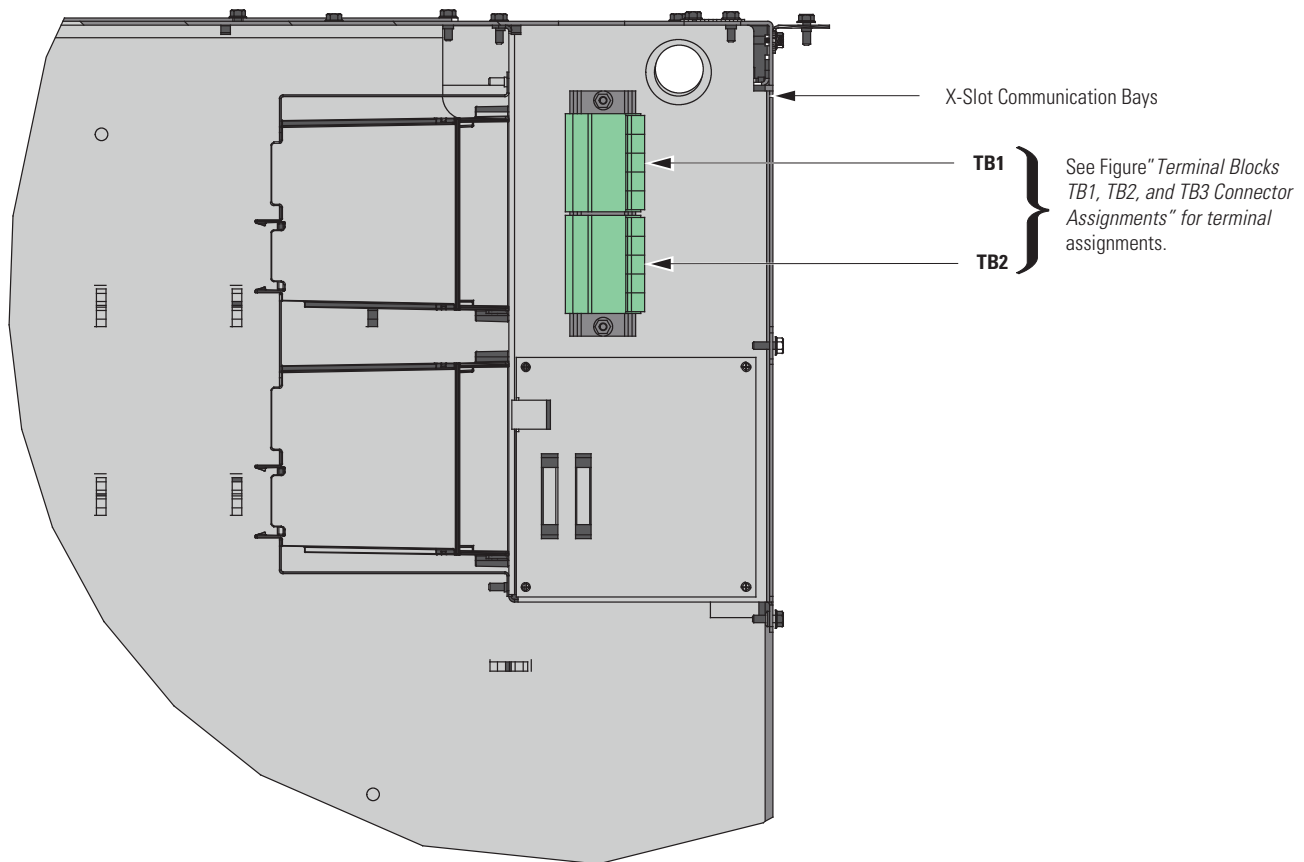
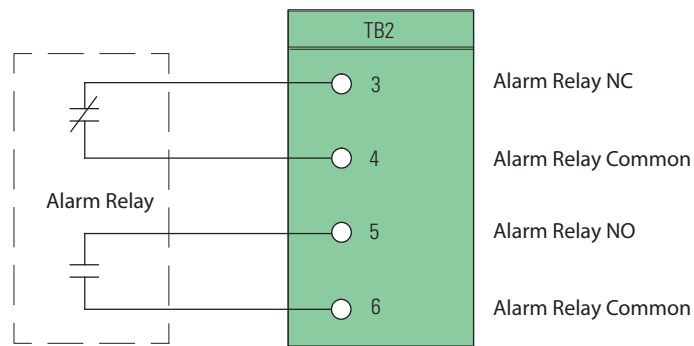


Figure 23. Typical Alarm Relay Connection



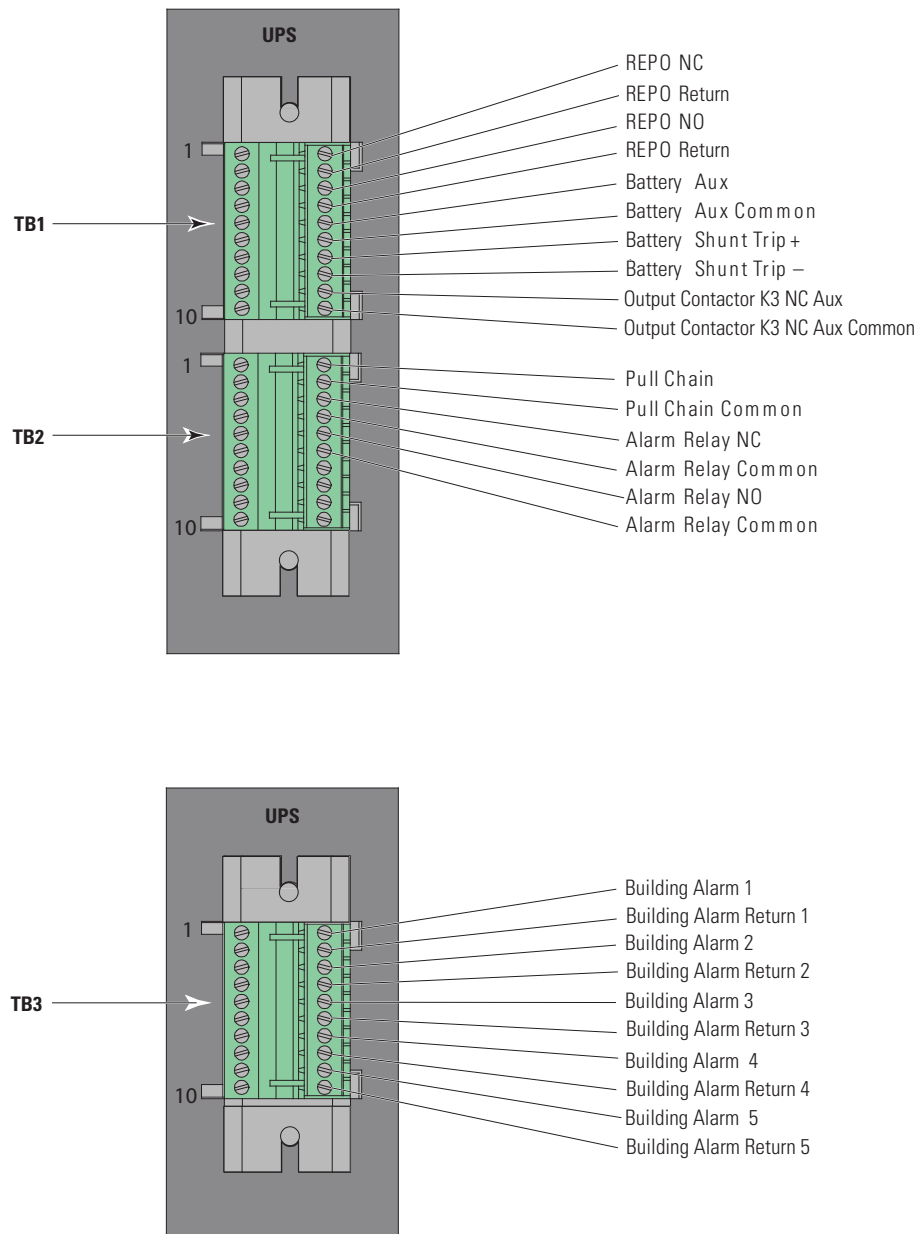
NOTE Alarm relay contacts have a maximum current rating of 5A and a switched voltage rating of 30 Vac and 28 Vdc.

NOTE Alarm relay normally-open and normally-closed return terminals are separated on the terminal board but are electrically in common.

NOTE Do not directly connect relay contacts to the mains related circuits. Reinforced insulation to the mains is required.

NOTE Alarm relay wiring should be a minimum of 22 AWG.

Figure 24. Terminal Blocks TB1, TB2, and TB3 Connector Assignments



NOTE All building alarm inputs require an isolated normally-open or normally-closed contact or switch (rated at 24 Vdc, 20 mA minimum) connected between the alarm input and common terminal as shown. Building alarm inputs can be programmed for use with either normally-open or normally-closed contacts. All control wiring and relay and switch contacts are customer-supplied.

NOTE The building alarms can be programmed to display the alarm functional name.

NOTE A jumper wire must be connected between pins 1 and 2 on TB1, if the normally-closed REPO contact is not used.

4.7.2 TB1 Battery Interface Connections

To install wiring to connections:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Unfasten the front door latch and swing the door open (see [Figure 13](#)).
3. Remove the door. Remove the retaining screw located inside the door at the bottom hinge pivot point, then lift the door off. Retain the hardware for later use.
4. To gain access to terminal block TB1 and the interface entry conduit landing plate, remove the screws securing the top internal safety shield panel and remove the panel. Retain the hardware for later use.
5. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.4 UPS System Power Wiring Preparation](#), [Table 26](#), and [Figure 21](#) through [Figure 25](#).



NOTE

When installing shunt trip and battery aux interface wiring to the UPS interface terminals, conduit must be installed between the UPS and battery system.

6. Remove the left interface entry conduit landing plate to drill or punch holes (see [Figure 17](#)).
7. Reinstall the interface entry plate and install the conduit.

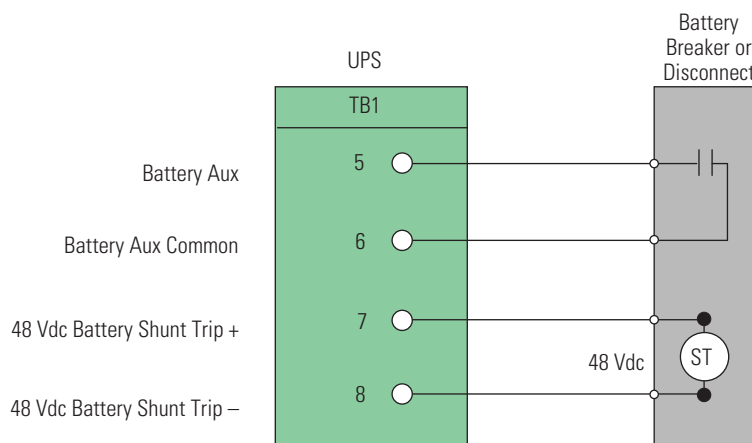


NOTE

The 9395P system can trip a maximum of six battery cabinets total. This applies to both the 1085 standard and High Rate series batteries. If more than six battery cabinets in total are needed in a separate UPM battery configuration, DO NOT hook up the shunt trips.

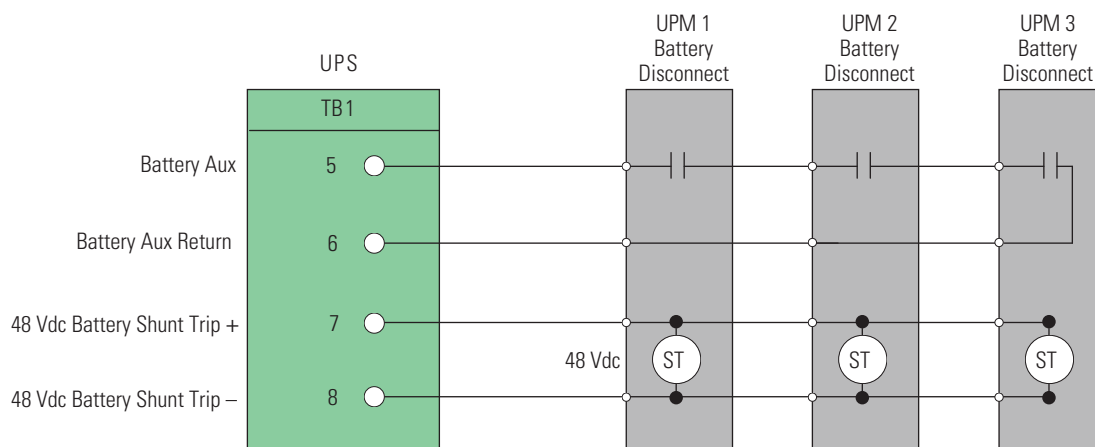
8. Route the shunt trip (optional) and battery aux wiring from the battery disconnects to the UPS cabinet. See [Figure 17](#) and [Figure 18](#) for UPS wiring access information and terminal locations.
9. Connect the wiring to the TB1 terminals.
10. Reinstall the top internal safety shield panel and secure with the retained hardware.
11. Reinstall the front door removed in Step 3 and secure with the retained hardware.
12. If wiring X-Slot connections, proceed to paragraph [4.7.3 X-Slot Connections](#); otherwise, proceed to Step 13.
13. Close the door and secure the latch.

Figure 25. Typical Battery Interface Connection – Common Battery System



NOTE Battery Aux and DC Shunt Trip wiring should be a minimum of 18 AWG.

Figure 26. Typical Battery Interface Connection – Separate Battery System



NOTE Battery aux and DC shunt trip wiring should be a minimum of 18 AWG.

4.7.3 X-Slot Connections



NOTE LAN and telephone drops for use with X-Slot cards must be provided by the customer.

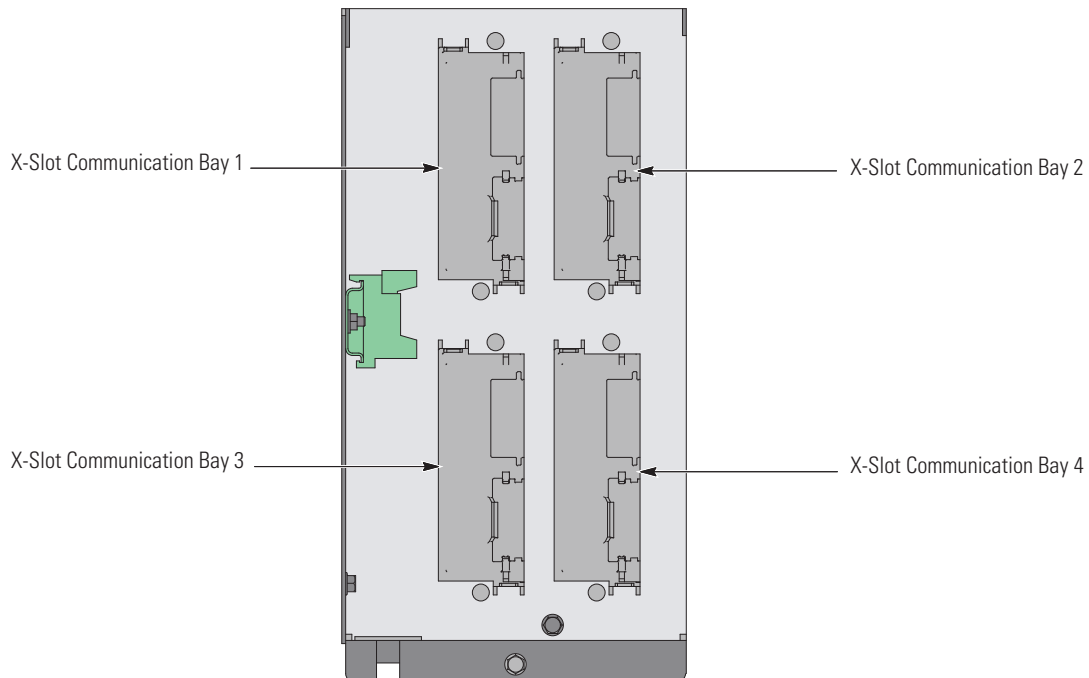


NOTE When installing external wiring to X-Slot cards, conduit must be installed to the UPS cabinet. When installing internal wiring to X-Slot terminals, route the wiring through the internal opening in the X-Slot communication bay.

For installation and setup of an X-Slot card, contact an Eaton service representative (see paragraph [1.10 Getting Help](#)). To install wiring to connections:

1. If not already installed, install the LAN drops.
2. Unfasten the front door latch and swing the door open (see [Figure 13](#)).
3. Remove the right interface entry conduit landing plate to drill or punch holes (see [Figure 17](#)).
4. Reinstall the interface entry plate and install the conduit.
5. Route and install the LAN and other cables to the appropriate X-Slot cards. See [Figure 21](#) and [Figure 26](#) for X-Slot communication bay locations.
6. Close the door and secure the latch.
7. Refer to the manual supplied with the X-Slot card for operator instructions.

Figure 27. X-Slot Communication Bays



4.8 Installing a REPO Switch

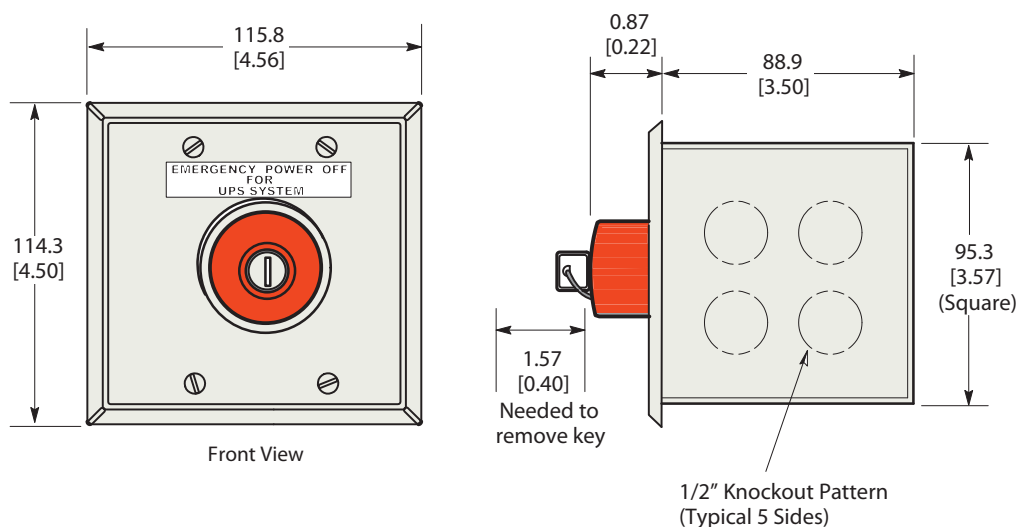
A latching-type Remote Emergency Power-off (REPO) switch can be used in an emergency to shut down the UPS and remove power to the critical load from a location away from where the UPS is installed. [Figure 29](#) shows a REPO switch.

-
- NOTE 1** Before installing a REPO switch, verify that the UPS was installed according to the instructions in paragraphs [4.2 Unloading the ISBM with UPM Section from the Pallet](#) through [4.7 Installing Interface Connections](#).
- NOTE 2** When installing the REPO switch, you must install conduit between the device and the UPS cabinet for wiring the switch.
- NOTE 3** Remove the UPS cabinet interface entry conduit landing plates to drill or punch holes (see [4.5 Distributed Bypass Tie Cabinet Installation](#)).
- NOTE 4** The REPO switch must be a normally-open or normally-closed latching-type switch not tied into any other circuits.
- NOTE 5** This procedure is intended to be used for the installation of the Eaton-supplied REPO switch. If installing another manufacturer's switch, use this procedure only as a guide.
- NOTE 6** The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.
-

To Install a REPO switch:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Securely mount the REPO switch. Recommended locations include operator's consoles or near exit doors. See [Figure 27](#) for enclosure dimensions and wiring knockouts.

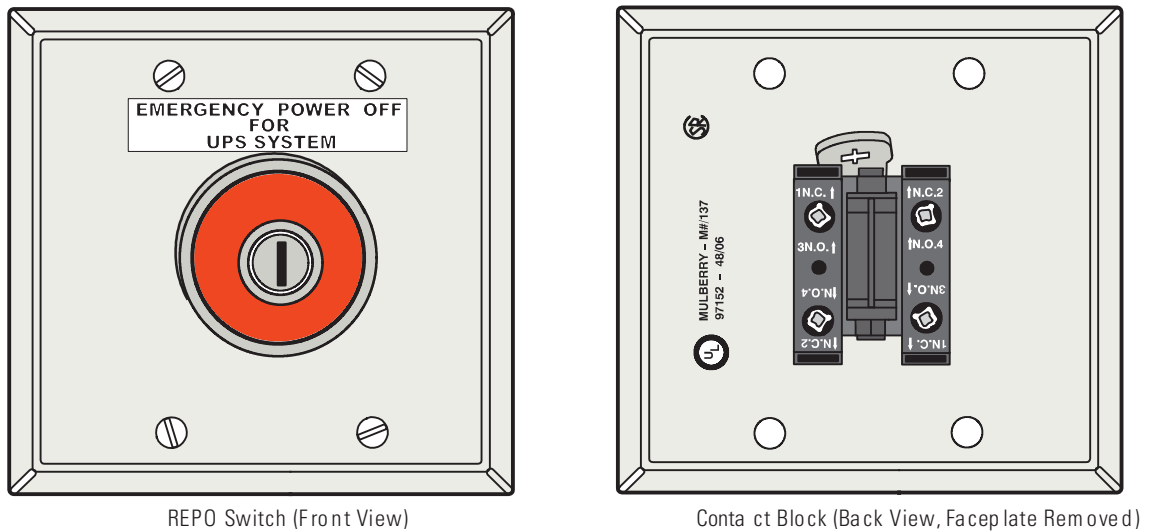
Figure 28. Remote EPO Switch Dimensions



Dimensions are in millimeters [inches].

3. Unfasten the front door latch and swing the door open (see [Figure 13](#)).
4. Remove the door. Remove the retaining screw located inside the door at the bottom hinge pivot point, then lift the door off. Retain the hardware for later use.

Figure 29. REPO Switch

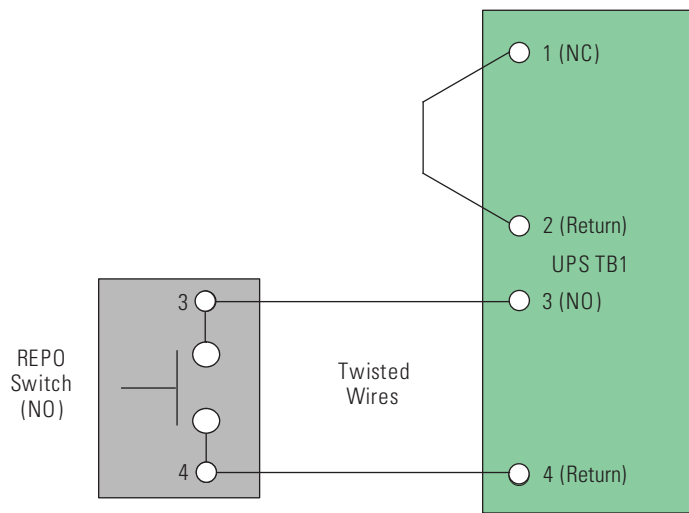


5. To gain access to terminal block TB1 and the interface entry conduit landing plate, remove the screws securing the top internal safety shield panel and remove the panel. Retain the hardware for later use (see [Figure 21](#)).
6. Remove the left interface entry conduit landing plate to drill or punch holes (see [Figure 17](#)).
7. Reinstall the interface entry plate and install conduit.
8. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.4 UPS System Power Wiring Preparation](#), [Table 26](#), and [Figure 23](#).
9. Route and connect the wiring as shown in [Table 27](#) and [Figure 30](#).
10. If the normally-closed REPO TB1 connection in the UPS is not used, connect a jumper wire between pins 1 and 2 on TB1.
11. If you are installing multiple REPO switches, wire additional switches in parallel with the first REPO.

Table 27. REPO Wire Terminations

From REPO Station(s) Switch Contact Block (Either Block)	To Customer Interface Terminal Board TB1 in UPS Cabinet	Wire Size	Tightening Torque
3 NO	TB1 3	Twisted Wires (2) 14 22 AWG (0.75 4.0 mm ²)	7 lb in (0.8 Nm)
4 NO	TB1 4		

Figure 30. Normally-Open REPO Switch Wiring



NOTE REPO switch rating is 24 Vdc, 1A minimum.

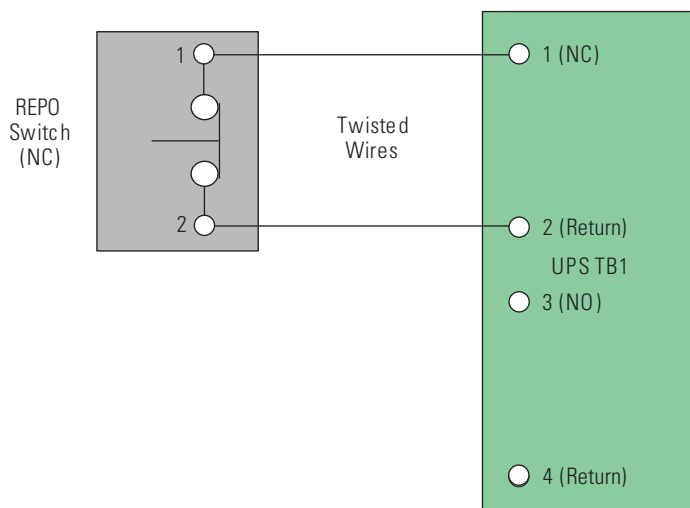
NOTE The REPO switch must be a latching-type switch not tied to any other circuits.

NOTE REPO normally-open and normally-closed return terminals are separated on the terminal board but are electrically in common.

12. If required, install wiring from the REPO switch to the trip circuitry of the upstream protective devices. A second contact block is provided on the REPO switch for this function (see [Figure 29](#)). The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.
13. Reinstall the top internal safety shield panel and secure with the retained hardware.
14. Reinstall the front door removed in Step 4 and secure with the retained hardware.
15. Close the door and secure the latch.

[Figure 31](#) shows the wiring connections if the normally-closed REPO contacts are used and [Figure 32](#) shows alternative methods of connecting a REPO switch if using another manufacturer's switch.

Figure 31. Normally Closed REPO Switch Wiring

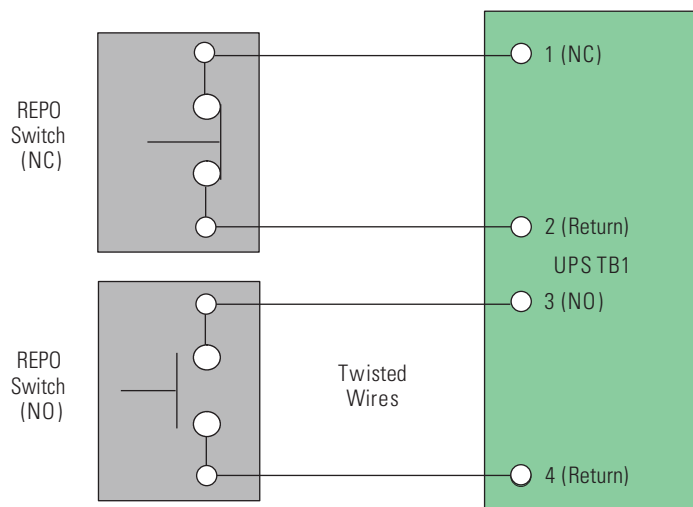


NOTE REPO switch rating is 24 Vdc, 1A minimum.

NOTE The REPO switch must be a latching-type switch not tied to any other circuits.

NOTE REPO normally-open and normally-closed return terminals are separated on the terminal board but are electrically in common.

Figure 32. Normally Closed and Normally Open REPO Switch Wiring



NOTE REPO switch rating is 24 Vdc, 1A minimum.

NOTE The REPO switch must be a latching-type switch not tied to any other circuits.

NOTE REPO normally-open and normally-closed return terminals are separated on the terminal board but are electrically in common.

4.9 Installing Options, Accessories, and Distributed Bypass Control Wiring

To install options, accessories, and distributed bypass control wiring, see [Chapter 5 Installing Options and Accessories](#).

4.10 Initial Startup

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms become void (see Section [1.11 Warranty](#)). This service is offered as part of the sales contract for the UPS system. Contact an Eaton service representative in advance (usually a two-week notice is required) to reserve a preferred startup date.

4.11 Completing the Installation Checklist

The final step in installing the UPS system is completing the following Installation Checklist.

This checklist ensures that you have completely installed all hardware, cables, and other equipment. Complete all items listed on the checklist to ensure a smooth installation. Make a copy of the Installation Checklist before filling it out, and retain the original.

After the installation is complete, an Eaton Customer Service Engineer must verify the operation of the UPS system and commission it to support the critical load. The service representative cannot perform any installation tasks other than verifying software and operating setup parameters. Service personnel may request a copy of the completed Installation Checklist to verify all applicable equipment installations have been completed.



NOTE

The Installation Checklist **MUST** be completed prior to starting the UPS system for the first time.

Installation Checklist

- ☐ All packing materials and restraints have been removed from each cabinet.
- ☐ Each cabinet in the UPS system is placed in its installed location.
- ☐ A cabinet grounding/mounting kit is installed between any cabinets that are bolted together.
- ☐ All conduits and cables are properly routed to the UPS and any ancillary cabinets.
- ☐ All power cables are properly sized and terminated.
- ☐ Battery cables are terminated on E4 (+) and E5 (–).
- ☐ Battery aux contact signal wiring is connected from the UPS to the battery disconnect.
- ☐ Battery shunt trip signal wiring is connected from the UPS to the battery disconnect. (OPTIONAL)
- ☐ LAN and telephone drops are installed.
- ☐ All telephone and LAN connections have been completed.
- ☐ A ground conductor is properly installed.
- ☐ Air conditioning equipment is installed and operating correctly.
- ☐ The area around the installed UPS system is clean and dust-free. (It is recommended that the UPS be installed on a level floor suitable for computer or electronic equipment.)
- ☐ Adequate workspace exists around the UPS and other cabinets.
- ☐ Adequate lighting is provided around all UPS equipment.
- ☐ A 120 Vac service outlet is located within 7.5 meters (25 feet) of the UPS equipment.
- ☐ The REPO device is mounted in its installed location and its wiring is terminated inside the UPS cabinet.
- ☐ The normally-closed (NC) Emergency Power-off contact (pins 1 and 2 on TB1) is jumpered if not used.
- ☐ Alarm relays and building alarms are wired appropriately. (OPTIONAL)
- ☐ A remote battery disconnect control is mounted in its installed location and its wiring is terminated inside the UPS and battery cabinet. (OPTIONAL)

- ☐ Accessories are mounted in installed locations and wiring is terminated inside the UPS cabinet. (OPTIONAL)
- ☐ The debris shield covering the UPS cabinet ventilation grill is removed.
- ☐ Startup and operational checks are performed by an authorized Eaton Customer Service Engineer.

Distributed Bypass Installation Checklist

- ☐ Each cabinet in the distributed bypass system is placed in its installed location.
- ☐ All conduits and cables are properly routed to the UPS cabinets and to the tie cabinet or distribution panel.
- ☐ All power cables are properly sized and terminated.
- ☐ A ground conductor is properly installed.
- ☐ Controller Area Network (CAN) wiring between the UPS cabinets is properly installed.
- ☐ Pull-chain wiring between the UPS cabinets is properly installed.
- ☐ Adequate workspace exists around the UPS cabinets, the tie cabinet, and other cabinets.
- ☐ Startup and operational checks are performed by an authorized Eaton Customer Service Engineer.

Notes

[illegible]

Chapter 5 Installing Options and Accessories

Read and understand the following notes while planning and performing the wiring installation:

- Conduit must be installed between the UPS cabinet and the device for signal wiring. Conduit must be installed between the device and the power source for power wiring. Install the signal wiring in separate conduit from the power wiring.
- Conduit and wiring between the UPS and the device are to be supplied by the customer.
- Maximum distance between the UPS cabinet and the device is not to exceed 150 meters (500 feet).
- Use Class 1 wiring methods (as defined by the NEC) for interface and power wiring from 30 to 600V.
- Use Class 2 wiring methods (as defined by the NEC) for interface and power wiring up to 30V. The wire should be rated at 24V, 1A minimum.
- Signal wiring should be a minimum of 22 AWG and a maximum of 14 AWG. The wire should be shielded twisted pair, rated for 5A maximum. Power wiring should be a minimum of 22 AWG and a maximum of 14 AWG. The wire should be rated for 1A minimum.
- Use only 60°C copper wire.
- 120 Vac for the RMP III, RIM II, or SCM II should be provided from the critical bus by facility planners or the customer.

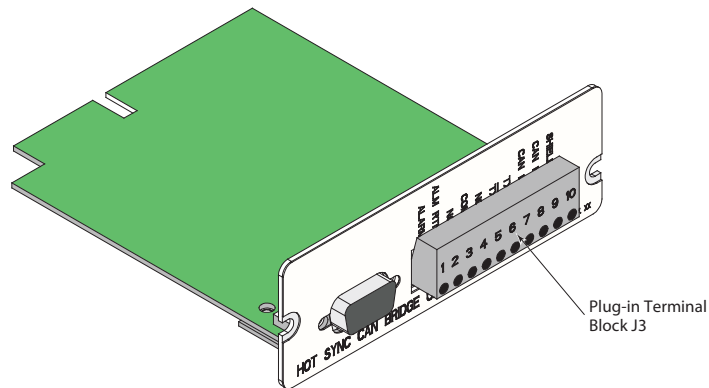
Install wiring the optional accessories in accordance with the following paragraphs:

- Hot Sync CAN Bridge card (see paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#))
- Distributed Bypass Control Wiring (see paragraph [5.2 Installing Distributed Bypass Control Wiring](#))
- RMP III (see paragraph [5.3 Installing an Optional Remote Monitor Panel III](#))
- RIM II (see paragraph [5.4 Installing an Optional Relay Interface Module II](#))
- SCM II (see paragraph [5.5 Installing an Optional Supervisory Contact Module II](#))

5.1 Installing an Optional Hot Sync CAN Bridge Card

As an option, a Hot Sync Controller Area Network (CAN) Bridge Card, shown in [Figure 33](#), can be installed to provide connectivity for operational mode control of a parallel system. In addition, this card can be used to connect optional system monitoring devices, such as a Remote Monitor Panel III, a Relay Interface Module II, or a Supervisory Contact Module II to the UPS.

Figure 33. Hot Sync CAN Bridge Card.



NOTE

Only one Hot Sync CAN Bridge Card can be installed in the UPS. Multiple CAN cards are not supported and will cause system conflicts.

To install the card:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Unfasten the front door latch and swing the door open (see [Figure 13](#)).
3. Install the Hot Sync CAN Bridge Card into an open X-Slot communication bay on the front of the UPS. See [Figure 21](#) and [Figure 26](#) for X-Slot communication bay locations.

To locate the appropriate terminals on the Hot Sync CAN Bridge Card, see [Figure 34](#) and [Table 28](#).

Figure 34. Hot Sync CAN Bridge Card Connections

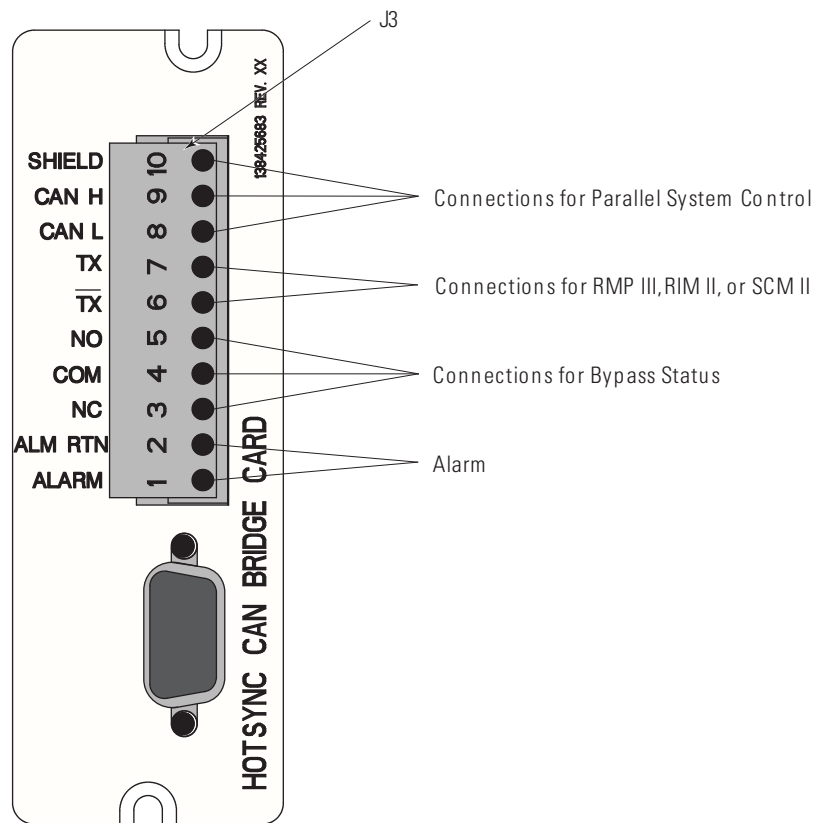


Table 28. Hot Sync CAN Bridge Card Interface Connections

J3 Terminal	Name	Description
1	Alarm	Programmable UPS alarm. Activated by a remote dry contact closure.
2	Alarm Return	
3	Alarm Relay NC	Normally closed contact opens when UPS is on bypass.
4	Alarm Relay Com	Bypass contact return.
5	Alarm Relay NO	Normally open contact closes when UPS is on bypass.
6	$\overline{\text{TX}}$	RMP III, RIM II, and SCM II connections.
7	TX	
8	CAN L	CAN Input for parallel operation.
9	Can H	
10	Shield	

5.2 Installing Distributed Bypass Control Wiring



NOTE 1 When installing external wiring to the Hot Sync CAN Bridge Card, conduit must be installed to the UPS cabinet. When installing internal wiring to the Hot Sync CAN Bridge Card terminals, route the wiring through the internal opening in the X-Slot communication bay.

NOTE 2 When installing interface wiring for the pull chain, conduit must be installed between UPSs.

To install distributed bypass control wiring:

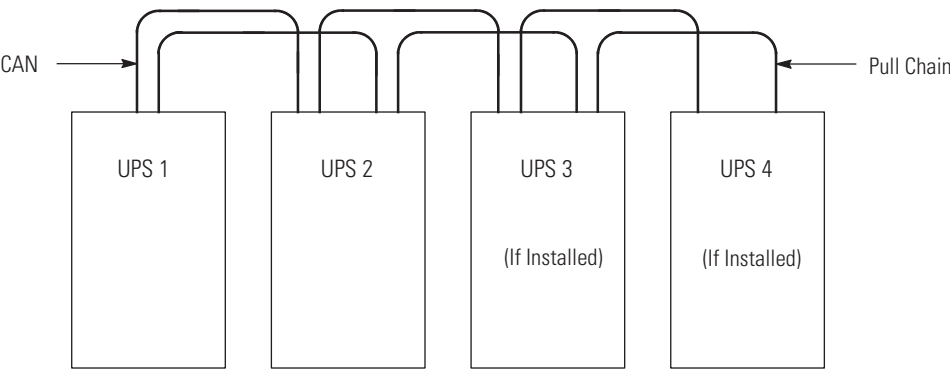
1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Perform the procedure listed in paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#).
3. Terminal block TB3 is accessible on the left side of the X-Slot communication bay (see [Figure 24](#)). To gain access to terminal block TB1, TB2, and the left interface entry conduit landing plates, remove the screws securing the top internal safety shield panel and remove the panel. Retain the hardware for later use.
4. Remove the interface entry conduit landing plates to drill or punch holes (see [Figure 17](#)).
5. Reinstall the interface entry plates and install the conduit.
6. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.5 UPS System Interface Wiring Preparation](#), [Table 26](#), and [Figure 21](#) through [Figure 24](#).
7. Route and install CAN wiring between the UPS cabinets. See [Figure 34](#) and [Table 28](#) for the Hot Sync CAN Bridge Card terminal location and [Figure 35](#), [Figure 36](#), and [Table 29](#) for wiring information.
8. If a tie cabinet with Module Output Breakers (MOBs) is being wired, proceed to Step 11; otherwise, proceed to Step 9.
9. Route and install distributed bypass system pull-chain wiring between the UPS cabinets. See [Figure 37](#) and [Table 30](#) for wiring information.
10. Proceed to Step 12.
11. Route and install distributed bypass system pull-chain wiring between the UPS cabinets and tie cabinet MOBs. See [Figure 38](#) and [Table 31](#) for wiring information.



NOTE Setup of the Hot Sync CAN Bridge Card for parallel operation must be performed by an authorized Eaton Customer Service Engineer. Contact an Eaton service representative to schedule a date.

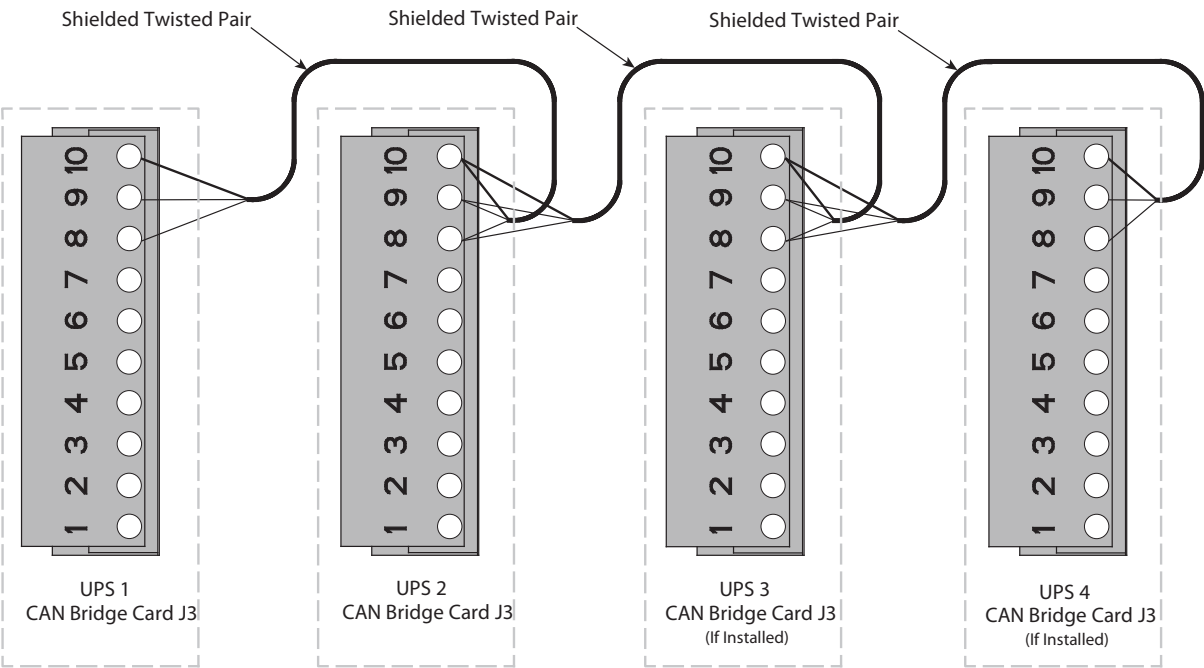
12. Reinstall the small top internal safety shield panel and secure with the cabinet mounted screws.
13. Close the front door and secure the latch.

Figure 35. Distributed Bypass System CAN and Pull-Chain Simplified Interface Wiring



NOTE This drawing is for distributed bypass wiring purposes and is not a floor layout plan. UPSs can be placed in any physical order.

Figure 36. Distributed Bypass System UPS CAN Wiring without MOBs



NOTE External CAN connections between UPSs require shielded twisted-pair wire.

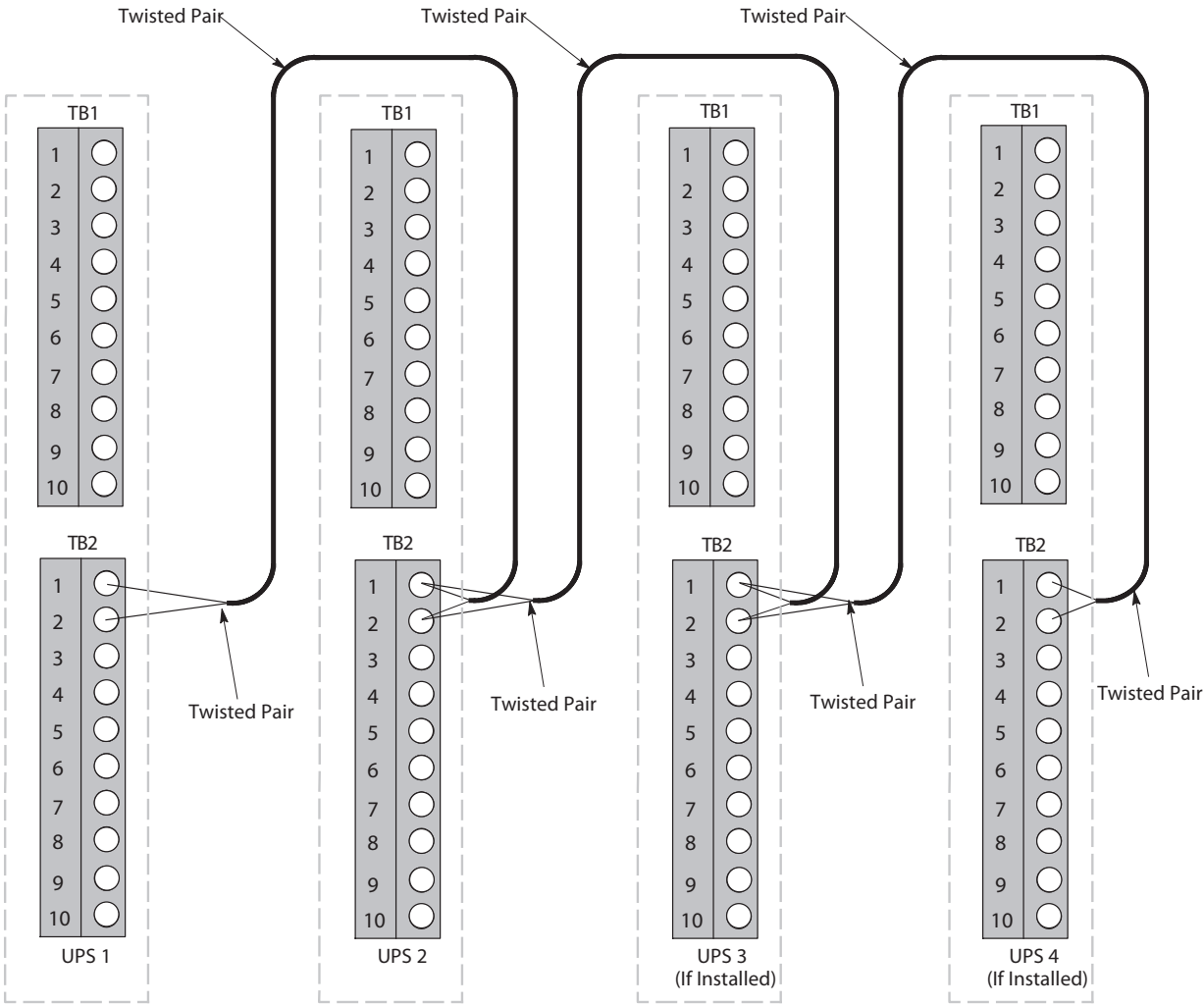
Table 29. CAN Bridge Card Wiring Terminations

From UPS 1 CAN Bridge Card	From UPS 2 CAN Bridge Card	To UPS 3 CAN Bridge Card (If Installed)	To UPS 4 CAN Bridge Card (If Installed)
J3 8 (L)	J3 8 (L)	J3 8 (L)	J3 8 (L)

Table 29. CAN Bridge Card Wiring Terminations (Continued)

J3 9 (H)	J3 9 (H)	J3 9 (H)	J3 9 (H)
J3 10 (Shield)	J3 10 (Shield)	J3 10 (Shield)	J3 10 (Shield)

Figure 37. Distributed Bypass Pull-Chain Wiring without MOBs

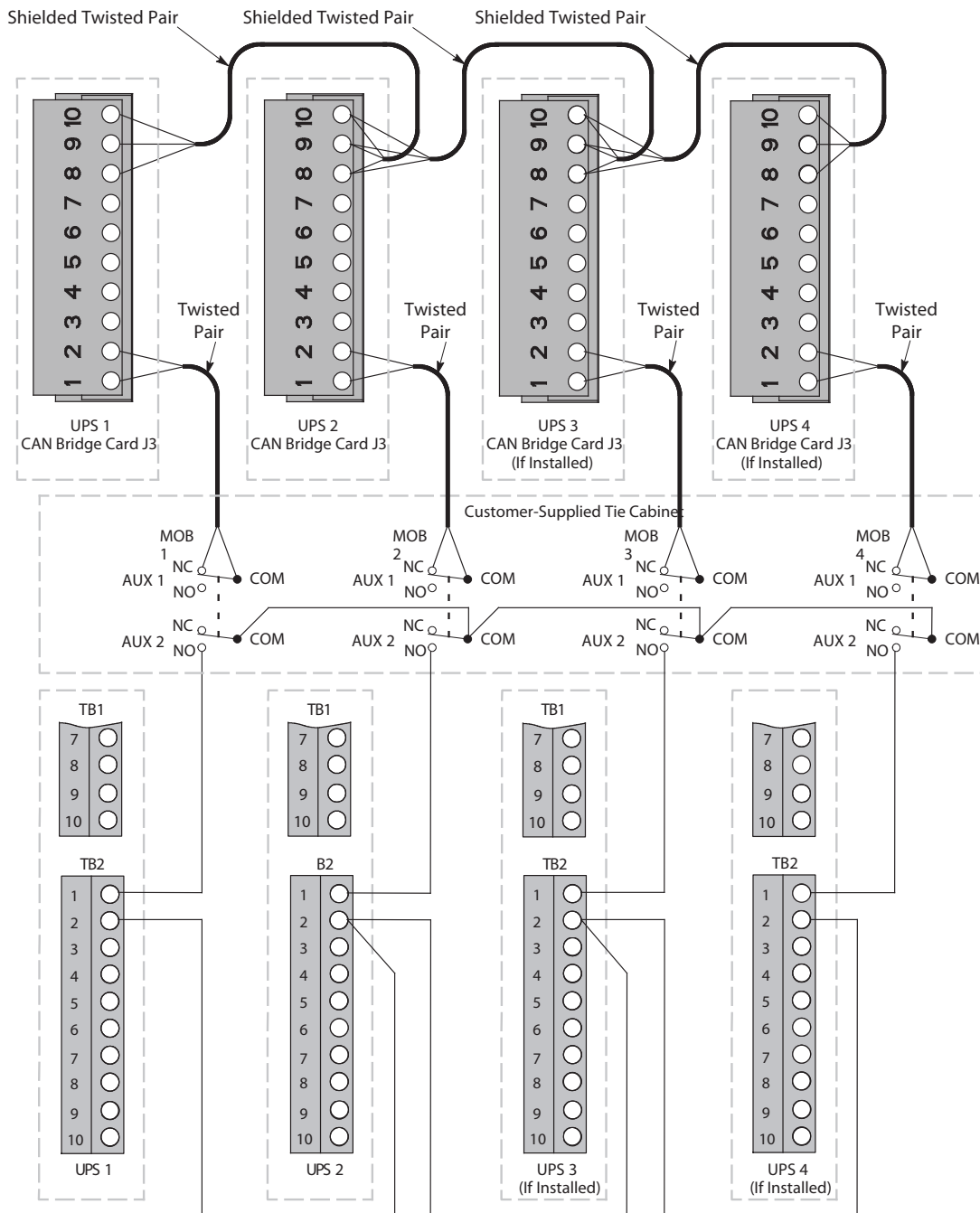


NOTE Use twisted-pair wiring between the UPS and MOB AUX contacts.

Table 30. Pull-Chain Wiring Terminations

From UPS 1	To UPS 2	To UPS 3 (If Installed)	To UPS 4 (If Installed)
TB2-1 (Pull Chain)	TB2-1 (Pull Chain)	TB2-1 (Pull Chain)	TB2-1 (Pull Chain)
TB2-2 (Pull Chain Common)	TB2-2 (Pull Chain Common)	TB2-2 (Pull Chain Common)	TB2-2 (Pull Chain Common)

Figure 38. Distributed Bypass Pull-Chain Wiring with MOBs



NOTE NC and NO designations on MOB AUX contacts are defined with breaker in OFF (open) position.

NOTE If MOB contacts have pigtail leads, use the same wire gauge to connect to the UPS and use the correct crimp connections for the wire gauge.

NOTE External CAN connections between UPS cabinets require shielded twisted-pair wire.

NOTE Use twisted-pair wiring between the UPS and MOB AUX contacts.

NOTE Always confirm contact operation prior to wiring.

Table 31. Pull-Chain Wiring Terminations with MOBs

From	To	Function
UPS 1 CAN Bridge Card J3-1 (Alarm)	MOB 1 Aux 1 NC	MOB Open Alarm
UPS 1 CAN Bridge Card J3-2 (Alarm Return)	MOB 1 Aux 1 Com	
UPS 1 TB2-1 (Pull Chain)	MOB 1 Aux 2 NO	Pull Chain
UPS 2 TB2-2 (Pull Chain Common)	UPS 2 TB2-2 (Pull Chain Common)	Pull Chain Common
UPS 2 CAN Bridge Card J3-1 (Alarm)	MOB 2 Aux 1 NC	MOB Open Alarm
UPS 2 CAN Bridge Card J3-2 (Alarm Return)	MOB 2 Aux 1 Com	
UPS 2 TB2-1 (Pull Chain)	MOB 2 Aux 2 NO	Pull Chain
UPS 2 TB2-2 (Pull Chain Common)	UPS 3 TB2-2 (Pull Chain Common)	Pull Chain Common
UPS 3 CAN Bridge Card J3-1 (Alarm)	MOB 3 Aux 1 NC	MOB Open Alarm
UPS 3 CAN Bridge Card J3-2 (Alarm Return)	MOB 3 Aux 1 Com	
UPS 3 TB2-1 (Pull Chain)	MOB 3 Aux 2 NO	Pull Chain
UPS 3 TB2-2 (Pull Chain Common)	UPS 4 TB2-2 (Pull Chain Common)	Pull Chain Common
UPS 4 CAN Bridge Card J3-1 (Alarm)	MOB 4 Aux 1 NC	MOB Open Alarm
UPS 4 CAN Bridge Card J3-2 (Alarm Return)	MOB 4 Aux 1 Com	
UPS 4 TB2-1 (Pull Chain)	MOB 4 Aux 2 NO	Pull Chain
MOB 1 Aux 2 Com	MOB 2 Aux 2 Com	Pull Chain MOB Common
MOB 2 Aux 2 Com	MOB 3 Aux 2 Com	
MOB 3 Aux 2 Com	MOB 4 Aux 2 Com	

5.3 Installing an Optional Remote Monitor Panel III

To install RMP III wiring:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Perform the procedure listed in paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#).



NOTE

If mounting to a hollow wall, secure the enclosure to a wood or metal stud within the wall. Do not use hollow wall anchors.

3. Securely mount the RMP III at the desired location. See [Figure 46](#) for mounting hole locations.



NOTE

When installing signal wiring for CAN card J3 terminals, conduit must be installed between the device and the UPS cabinet.

4. Remove the UPS cabinet top interface conduit landing plates to drill or punch conduit holes (see [Figure 17](#)).
5. Reinstall the conduit landing plate.
6. Install conduit between the UPS and RMP III. See [Figure 46](#) for RMP III knockout hole location.
7. Install wiring between the UPS and RMP III. See [Figure 34](#) and [Table 28](#) for the Hot Sync CAN Bridge Card terminal location and wiring information, and [Figure 39](#), [Figure 40](#), and [Table 32](#) for the RMP III terminal location and wiring information.

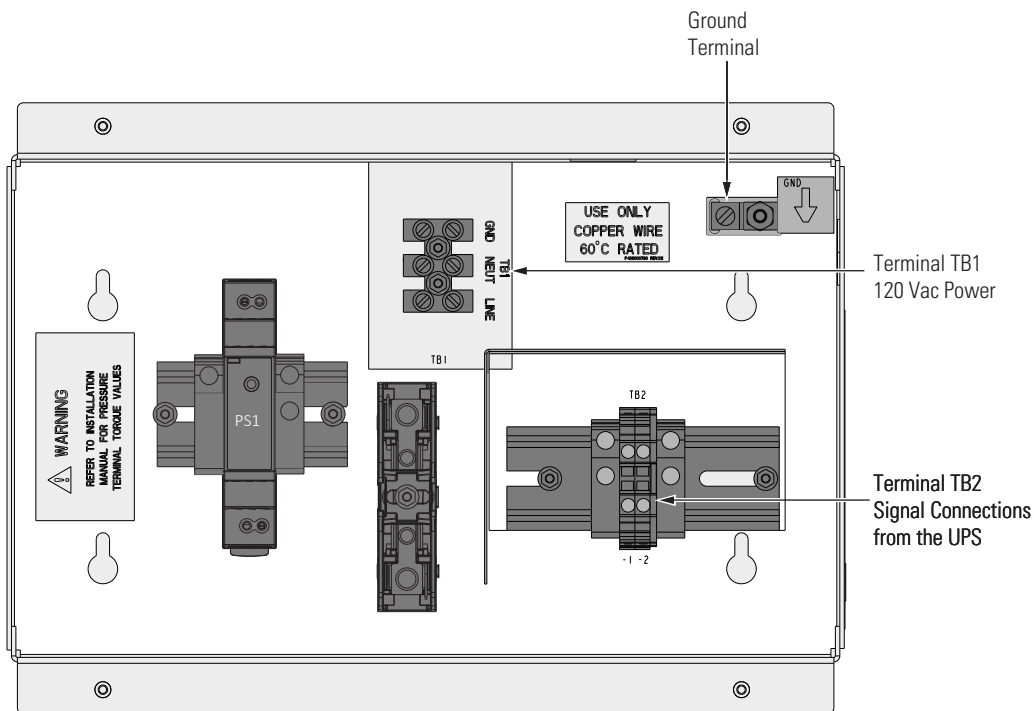


NOTE

120 Vac for the RMP III should be supplied by facility planners or the customer.

8. Install 120 Vac power wiring from the critical bus to the RMP III. See [Figure 39](#), [Figure 40](#), and [Table 32](#) for the terminal location and wiring information.
9. Close the front door and secure the latch.
10. Restart the UPS. See [Chapter 7 UPS Operating Instructions](#) for startup instructions.

Figure 39. Remote Monitor Panel III Terminal Locations



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Figure 40. Remote Monitor Panel III Wiring

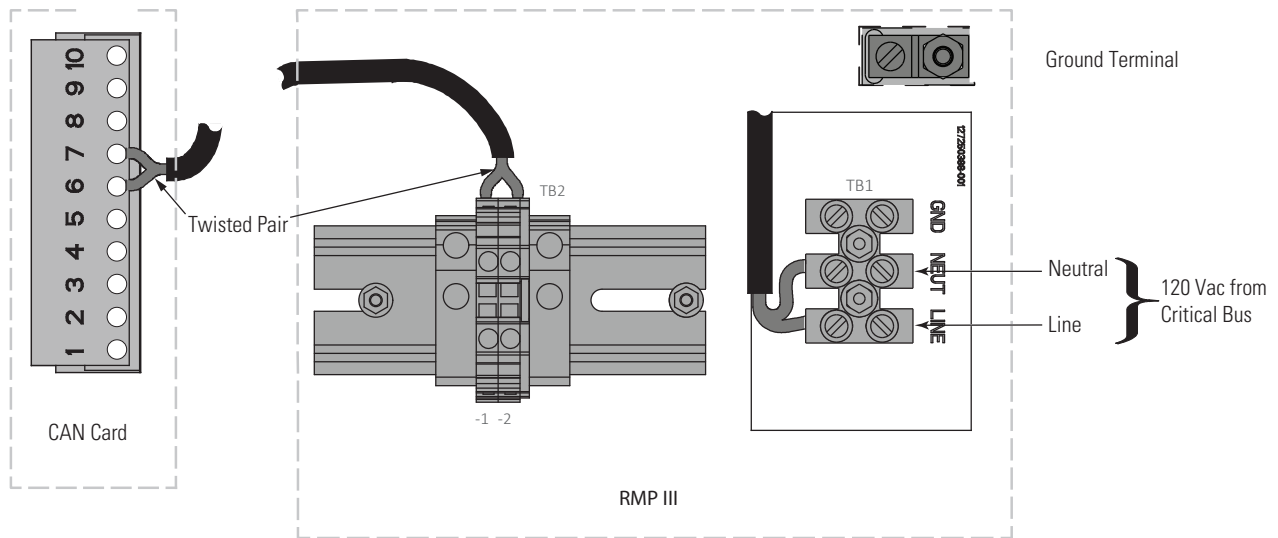


Table 32. RMP III, RIM II, or SCM II Wiring Terminations

From UPS CAN Card	To RIM II, or SCM II	or	To RMP III	Tightening Torque Nm (lb in)	Remarks
J3-6 ($\overline{\text{TX}}$)	TB1-5 (RDX*)		TB2-2	0.9 (8)	Use twisted pair
J3-7 (TX)	TB1-4 (RDX)		TB2-1	0.9 (8)	
N/A	TB3 Line		TB1 Line	0.9 (8)	
N/A	TB3 Neutral		TB1 Neutral	0.9 (8)	
N/A	Ground Terminal		Ground Terminal	2.7 (24) Maximum	

**NOTE**

Setup of the Hot Sync CAN Bridge Card must be performed by an authorized Eaton Customer Service Engineer. Contact an Eaton service representative to schedule a date.

11. To check the operation of the RMP III, ensure that the UPS is supplying the load via inverter or bypass. If the indicators on the RMP III show the appropriate status, then it is operating correctly.

If the communication link between the UPS and the RMP III is not present, the RMP III performs a self-test (all indicators flash and the horn beeps at one-second intervals). If the self-test occurs, check all harness connectors and the fuse for proper seating. If all connections are secure but the RMP III continues to self-test, replace the fuse with the spare included in the hardware kit. If a fuse replacement does not correct the problem, contact an Eaton service representative for verification that the RMP III is working correctly.

12. To test the indicator lamps, press and hold the horn silence pushbutton for three seconds. All lamps should illuminate, and the horn sounds continuously until you release the pushbutton.

5.4 Installing an Optional Relay Interface Module II

To install RIM II wiring:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Perform the procedure listed in paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#).



NOTE

If mounting to a hollow wall, secure the enclosure to a wood or metal stud within the wall. Do not use hollow wall anchors.

3. Securely mount the RIM II at the desired location. See [Figure 47](#) for mounting hole locations.



NOTE

When installing signal wiring for CAN card J3 terminals, conduit must be installed between the device and the UPS cabinet.

4. Remove the UPS cabinet top interface conduit landing plates to drill or punch conduit holes (see [Figure 27](#)).
5. Reinstall the conduit landing plate.
6. Install conduit between the UPS and RIM II. See [Figure 47](#) for RIM II knockout hole location.
7. Install wiring between the UPS and RIM II. See [Figure 34](#) and [Table 28](#) for the Hot Sync CAN Bridge Card terminal location and wiring information, and [Figure 39](#), [Figure 40](#), and [Table 32](#) for the RIM II terminal location and wiring information.



NOTE

120 Vac for the RIM II should be supplied from the critical bus by facility planners or the customer.

8. Install 120 Vac power wiring from the critical bus to the RIM II. See [Figure 39](#), [Figure 40](#), and [Table 32](#) for the terminal location and wiring information.

Figure 41. Relay Interface Module II Terminal Locations

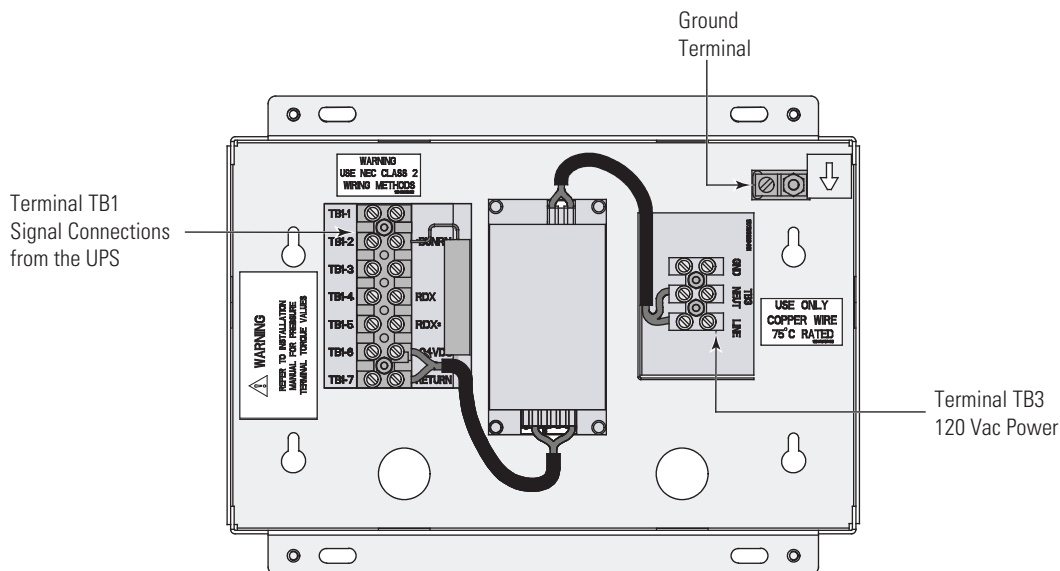
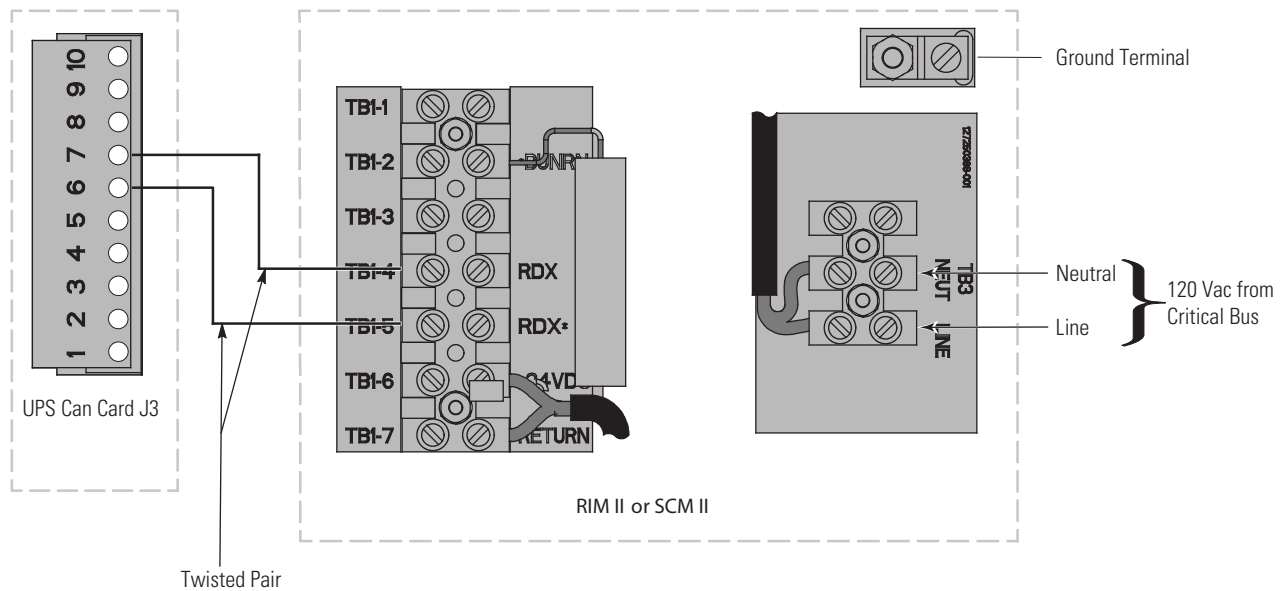


Figure 42. Relay Interface Module II or Supervisory Contact Module II Wiring



9. Close the front door and secure the latch.
10. Restart the UPS. See [Chapter 7 UPS Operating Instructions](#) for startup instructions.

**NOTE**

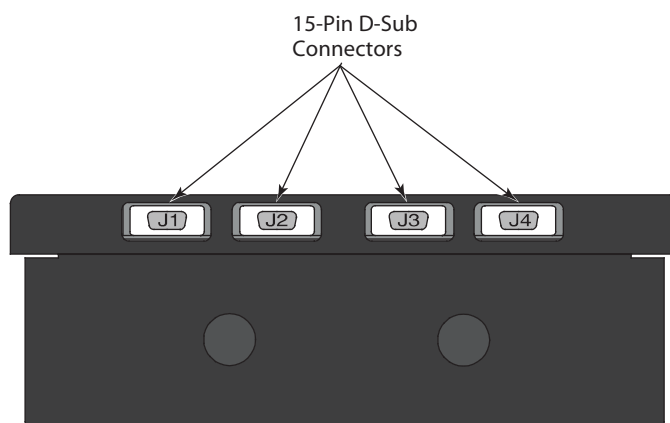
Setup of the Hot Sync CAN Bridge Card must be performed by an authorized Eaton Customer Service Engineer. Contact an Eaton service representative to schedule a date.

11. Contact an Eaton service representative for verification and testing of the RIM II and its connections prior to making connections with J1 through J4 (see [Table 33](#) and [Figure 43](#)).

You can order interface cables separately for connecting to the 15-Pin D-Sub Connectors.

Table 33. J1 through J4 Interface Connectors

Status	J1 through J4	Description
UPS AVAILABLE	Pins 1 and 12	Contacts are closed when the UPS is operating in Online mode or ready to supply the load.
UPS OFFLINE	Pins 3 and 13	Contacts are open when the UPS is offline. Contacts are closed when the UPS is operating in Online mode.
BATTERY WEAK	Pins 5 and 14	Contacts are closed when approximately two minutes of battery time remains before the critical load is lost.
UTILITY FAILURE	Pins 6 and 15	Contacts are closed when Utility Failure is detected.

Figure 43. J1, J2, J3, and J4 15-Pin D-Sub Connectors

5.5 Installing an Optional Supervisory Contact Module II

To install SCM II wiring:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Perform the procedure listed in paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#).



NOTE

If mounting to a hollow wall, secure the enclosure to a wood or metal stud within the wall. Do not use hollow wall anchors

3. Securely mount the SCM II at the desired location. See [Figure 48](#) for mounting hole locations.



NOTE

When installing signal wiring for CAN card J3 terminals, conduit must be installed between the device and the UPS cabinet.

4. Remove the UPS cabinet top interface conduit landing plates to drill or punch conduit holes (see [Figure 27](#)).
5. Reinstall the conduit landing plate.
6. Install conduit between the UPS and SCM II. See [Figure 48](#) for SCM II knockout hole location.

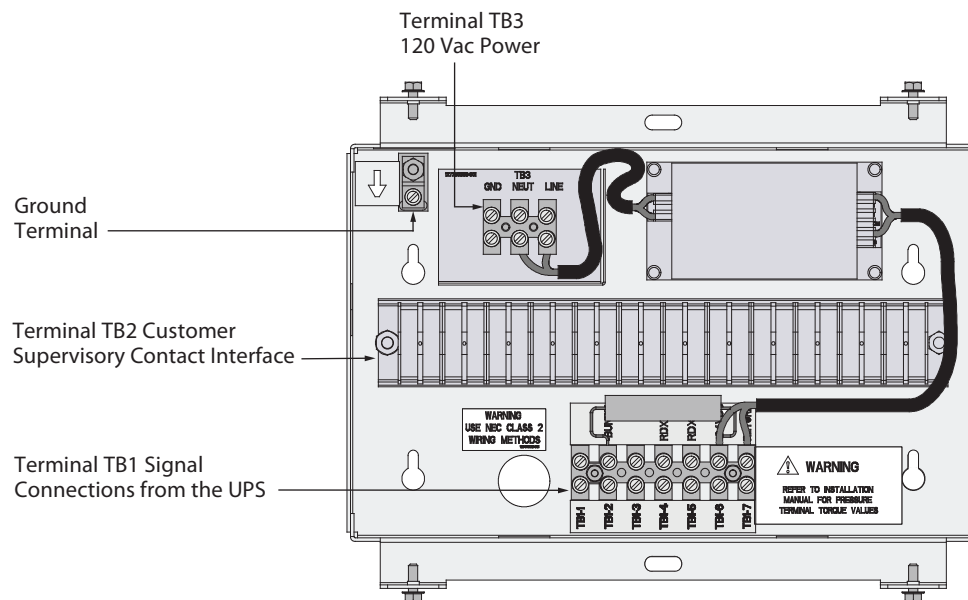
7. Install wiring between the UPS and SCM II. See [Figure 34](#) and [Table 28](#) for the Hot Sync CAN Bridge Card terminal location and wiring information, and [Figure 44](#), [Figure 40](#), and [Table 32](#) for the SCM II terminal location and wiring information.

**NOTE**

120 Vac for the SCM II should be supplied from the critical bus by facility planners or the customer.

8. Install 120 Vac power wiring from the critical bus to the SCM II. See [Figure 44](#), [Figure 40](#), and [Table 32](#) for the terminal location and wiring information.

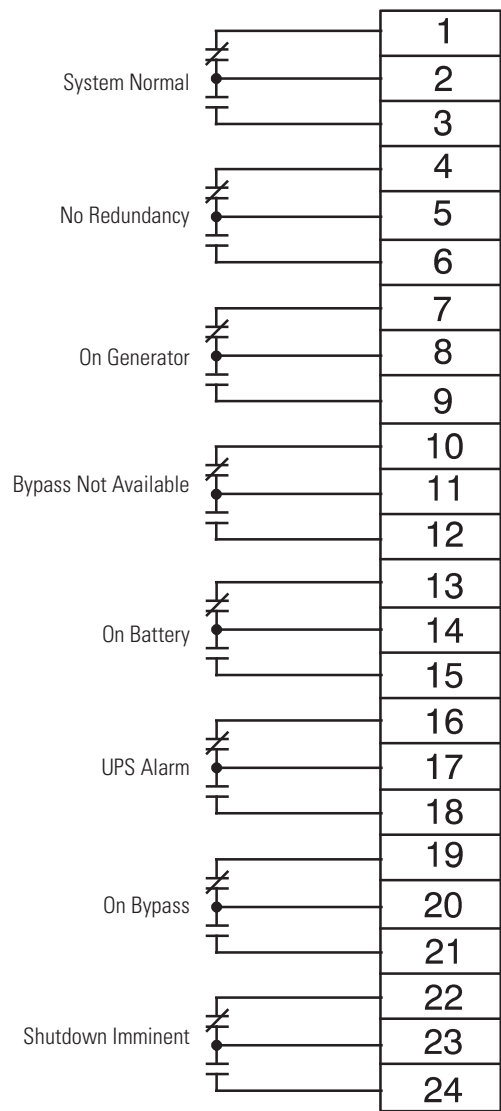
Figure 44. Supervisory Contact Module II Terminal Location.

**NOTE**

Setup of the Hot Sync CAN Bridge Card must be performed by an authorized Eaton Customer Service Engineer. Contact an Eaton service representative to schedule a date.

9. Install wiring between the SCM II terminal block TB2 and the monitoring equipment. See [Figure 44](#) for terminal block location and [Figure 45](#) for terminal assignments.
10. Close the front door and secure the latch.
11. Restart the UPS. See [Chapter 7 UPS Operating Instructions](#) for startup instructions.

Figure 45. Supervisory Contact Module II TB2



NOTE Supervisory contacts are rated at 2.0A at 28 Vdc or 120 Vac and 0.15A at 115 Vdc.

NOTE Supervisory contacts require an external power supply. Internal 24 Vdc is not capable of supplying contact current.

5.6 Accessory Mounting Dimensions

Figure 46 through Figure 48 show the dimensions of the RMP III, the RIM II, and the SCM II.

Figure 46. Remote Monitor Panel III Dimensions

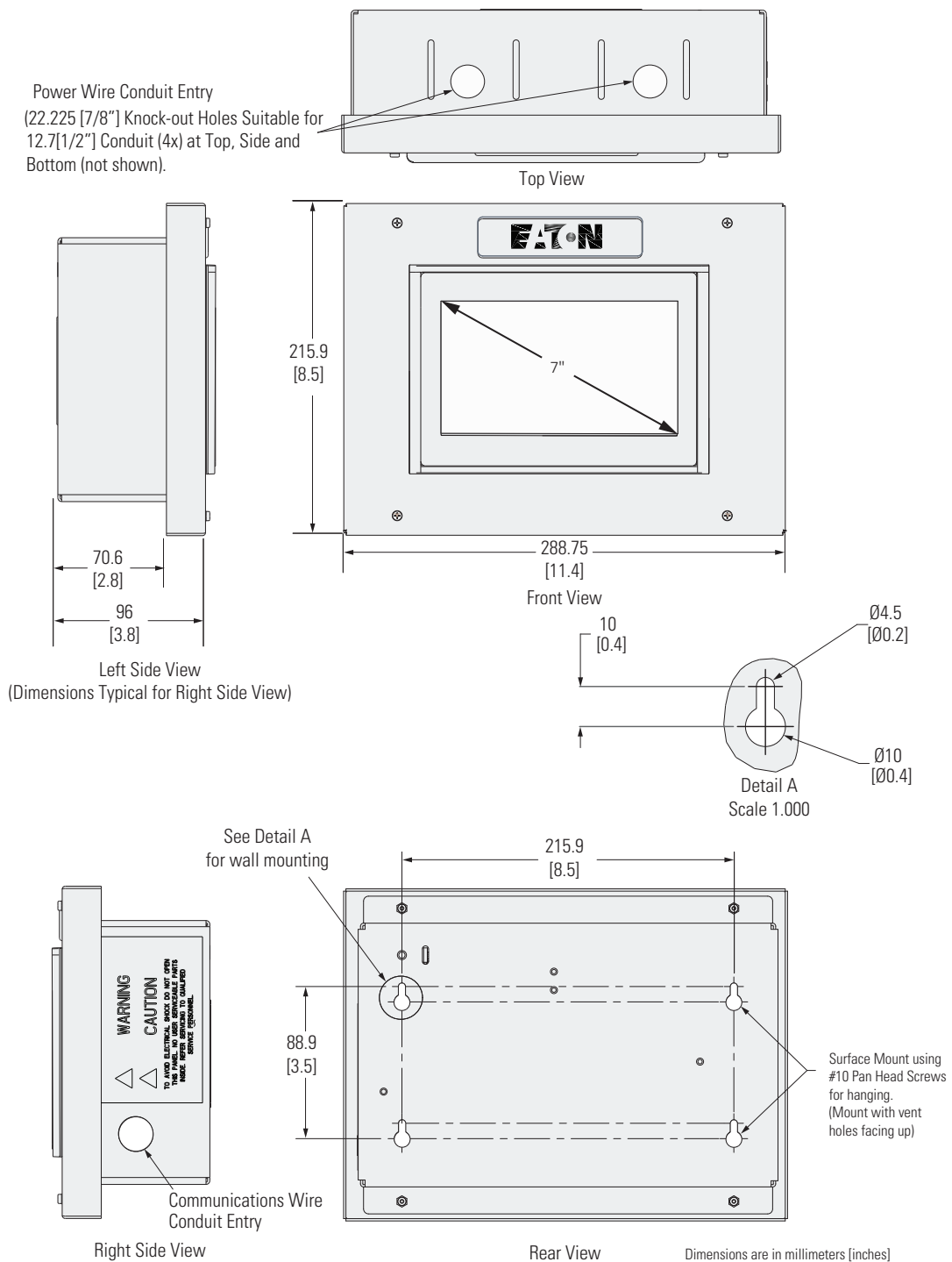


Figure 47. Relay Interface Module II Dimensions

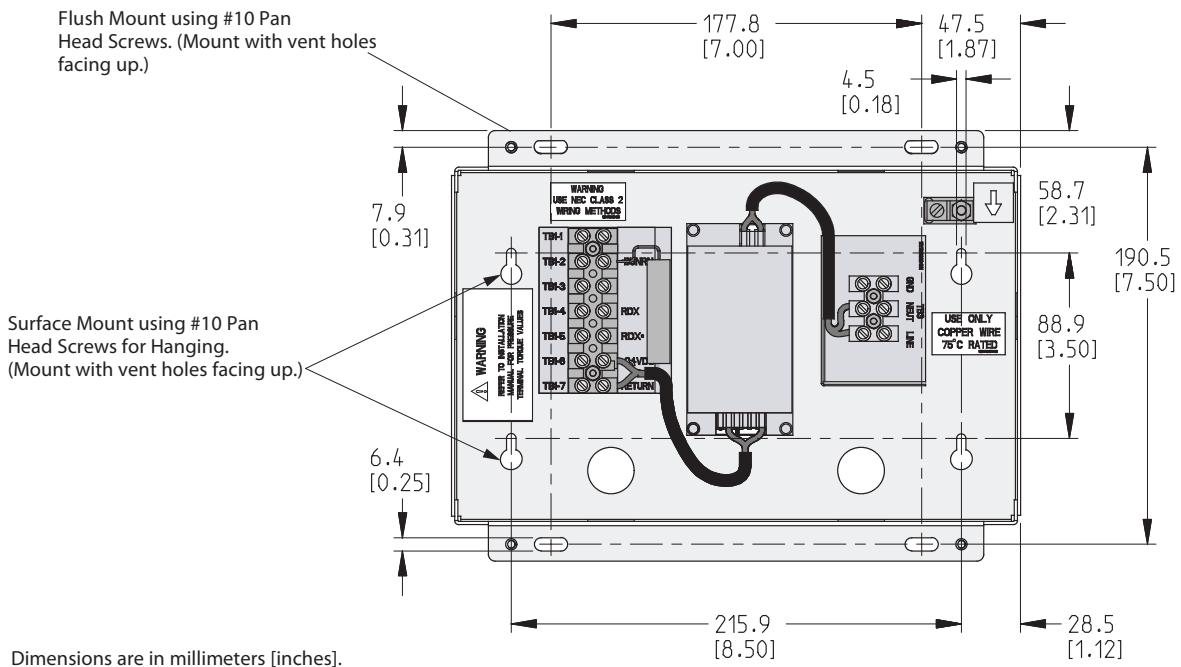
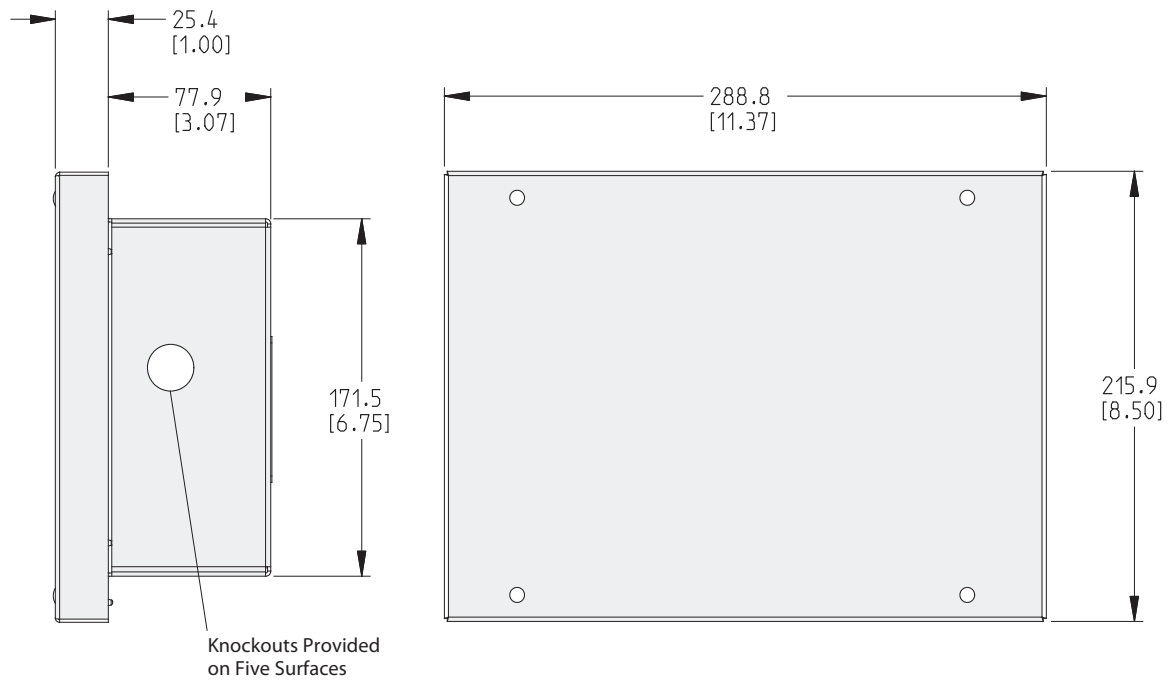
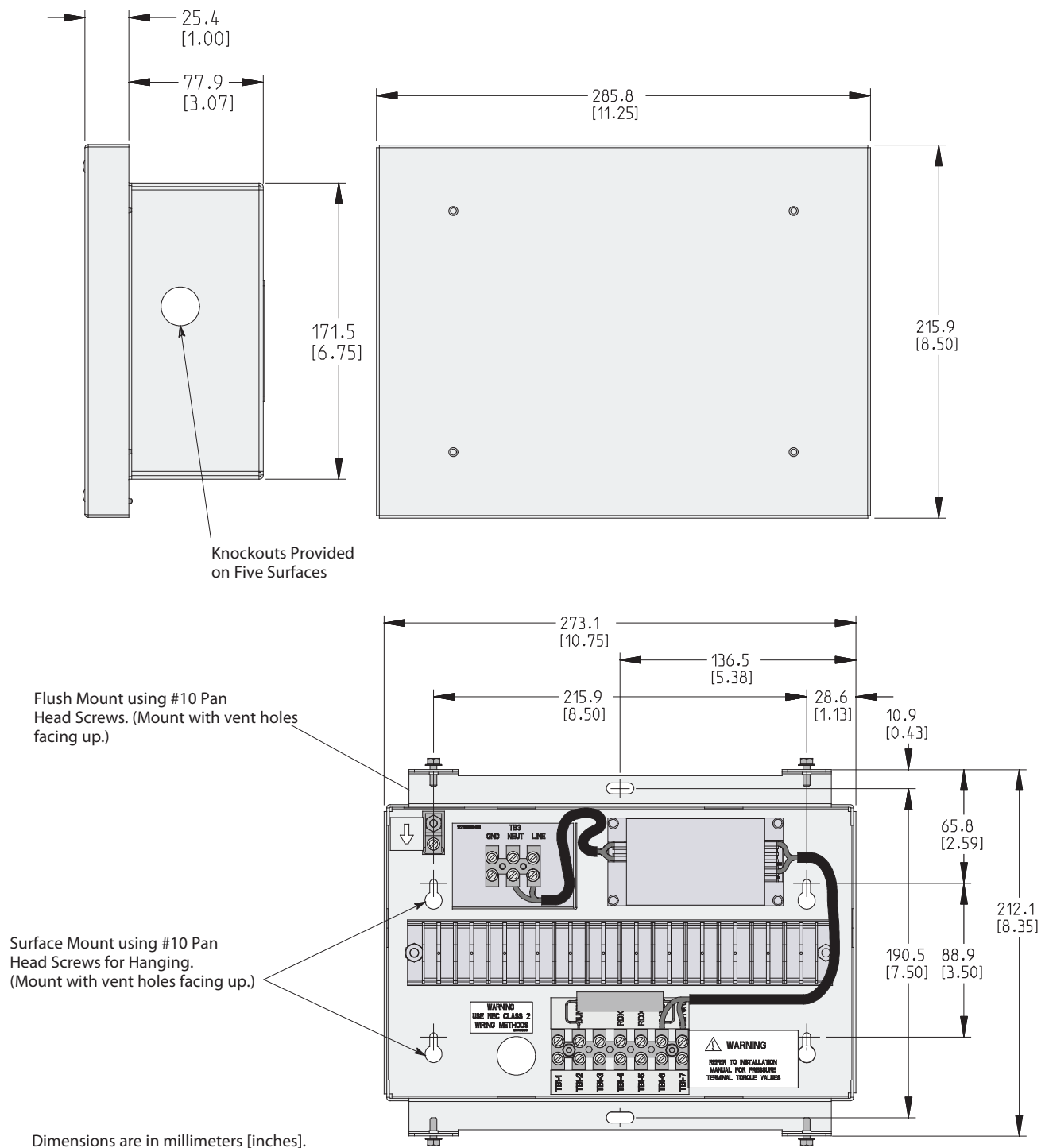


Figure 48. Supervisory Contact Module II Dimensions



Chapter 6 Understanding UPS Operation

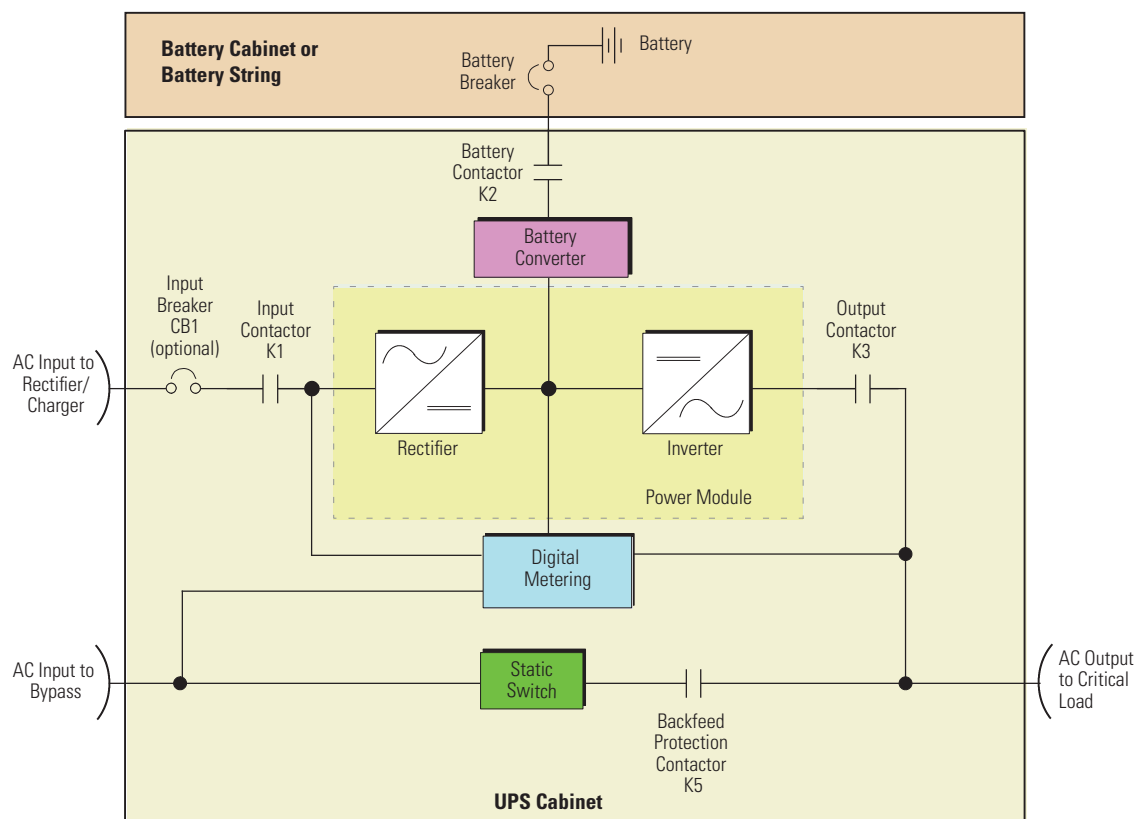
6.1 UPS System Overview

The Eaton 9395P-600 UPS is a continuous-duty, solid-state, transformerless (at 480 Vac), three-phase, true online system that provides conditioned and uninterruptible AC power to the UPS system's output and critical load.

The basic system consists of a rectifier, battery converter, inverter, monitoring/operation control panel, integrated communication server, and digital signal processor (DSP) logic. [Figure 49](#) shows the main elements of the UPS system.

If utility power is interrupted or falls outside the parameters specified in [Chapter 10 Product Specifications](#) the UPS uses a *backup battery supply* to maintain power to the critical load for a specified period of time or until the utility power returns. For extended power outages, the UPS allows you to either transfer to an alternative power system (such as a generator) or shut down your critical load in an orderly manner.

Figure 49. Main Elements of the UPS System



NOTE On a UPS configured as an Input Output Module (IOM), the bypass input, static switch, and backfeed protection contactor (K5) are not present.

The emergency bypass consists of a continuous static switch, and a backfeed protection contactor K5. The bypass breaker (if installed) is located in parallel with the static switch. The backfeed protection contactor is located in series with the static switch. The static switch is armed and ready during normal operation.

On a UPS configured as an Input Output Module (IOM), bypass circuitry is not installed. This configuration is primarily used in multiple UPS parallel systems that do not need a bypass for each UPS and use a separate System Bypass Module (SBM) to provide system bypass capabilities.

6.2 Single UPS

A single UPS operates independently to support an applied load from the inverter, providing conditioned and uninterruptible AC power to the critical load from the output of the module. During an outage, the inverter continues to operate, supporting power to the load from the battery supply. If the unit requires service, applied loads are transferred to the internal bypass, continuous-duty static switch either automatically or manually. With the exception of a battery cabinet, no other cabinets or equipment are required for the single UPS to successfully support its applied loads.

6.2.1 Modes

The Eaton 9395P-600 UPS supports a critical load in five different modes of operation:



NOTE

The Variable Module Management System and Energy Saver System modes are mutually exclusive.

- In Online mode, the critical load is supplied by the inverter, which derives its power from rectified utility AC power. In this mode, the battery charger also provides charging current for the battery, if needed.
- In Energy Saver System (ESS) mode, commercial AC power is supplied directly to the critical load through the continuous static switch and transfers automatically to Online mode if an abnormal condition is detected.
- In Variable Module Management System (VMMS) mode, the UPS operates as a traditional double-conversion UPS, but selectively shifts the load to fewer UPMs to increase the efficiency of the UPS.
- In Bypass mode, the critical load is directly supported by utility power.
- In Battery mode, the battery provides DC power, which maintains inverter operation. The battery supports the critical load.

The following paragraphs describe the differences in the UPS operating modes, using block diagrams to show the power flow during each mode of operation.

6.2.2 Online Mode

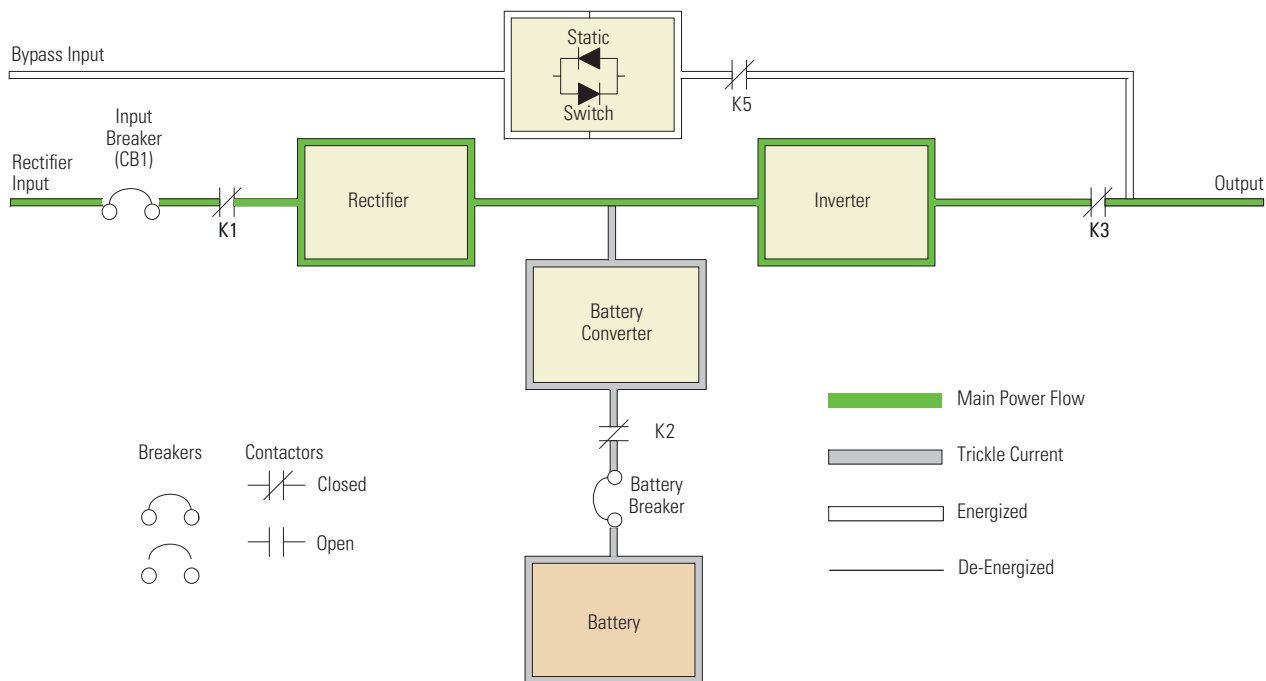
[Figure 50](#) shows the path of electrical power through the UPS system when the UPS is operating in Online mode.

During normal UPS system operation, power for the system is derived from a utility input source through the rectifier input contactor K1. The front panel displays "Online" indicating the incoming power is within voltage and frequency acceptance windows. Three-phase AC input power is converted to DC using IGBT devices to produce a regulated DC voltage to the inverter. When contactor K2 is closed the battery is charged directly from the regulated rectifier output through a buck DC converter.

The battery converter derives its input from the regulated DC output of the rectifier and provides either a boosted or bucked regulated DC voltage charge current to the battery. The battery is always connected to the UPS and ready to support the inverter should the utility input become unavailable.

The inverter produces a three-phase AC output to a customer's load without the use of a transformer. The inverter derives regulated DC from the rectifier and uses IGBT devices and pulse-width modulation (PWM) to produce a regulated and filtered AC output. The AC output of the inverter is delivered to the system output through the output contactor K3.

Figure 50. Path of Current Through the UPS in Online Mode



NOTE On a UPS configured as an IOM, the bypass input, static switch, bypass breaker (CB4), and K5 are not present.

NOTE On a UPS configured with a Continuous Static Switch (CSS), bypass breaker (CB4) is not present.

If the utility AC power is interrupted or is out of specification, the UPS automatically switches to Battery mode to support the critical load without interruption. When utility power returns, the UPS returns to Online mode.



NOTE Bypass mode is not available on a UPS configured as an IOM.

If the UPS becomes overloaded or unavailable, the UPS switches to Bypass mode. The UPS automatically returns to Online mode when the overload condition is cleared and system operation is restored within specified limits.

If the UPS suffers an internal failure, it switches automatically to Bypass mode and remains in that mode until the failure is corrected and the UPS is back in service.

6.2.3 Energy Saver System Mode



NOTE VMMS and ESS modes are mutually exclusive. If ESS mode is enabled, VMMS mode is disabled.

When the UPS is operating in ESS mode, the bypass source supplies the commercial AC power to the load directly through the static switch. Some power line filtering and spike protection is provided to the load but no active power conditioning or battery support is available. All power converters are off and are in the ready state (in case a forward transfer is needed). During this mode, the output contactor is closed and the link is maintained through the diode bridge.

If commercial power voltage or frequency disturbances are detected, the system forward transfers to Battery mode for minor disturbances and then to double-conversion mode for more severe disturbances. During a

complete power outage, the transfer takes place within 2 ms to ensure loads being fed by the system output are not interrupted. All forward transfers transfer to Battery mode before returning to double-conversion mode.

In High Alert mode the unit transfers from ESS mode to double-conversion mode or if in double-conversion mode remains in double-conversion mode for a default time period of one hour (customer configurable). At the completion of the time period, the unit defaults back to ESS mode. If the High Alert command is received during the time period, the timer will be restarted.

ESS mode is a normal operating mode, and not an alarm condition. While the UPS is in this mode, the **ONLINE** light on the front display will illuminate.

6.2.4 Variable Module Management System



NOTE

VMMS and ESS modes are mutually exclusive. If VMMS mode is enabled, ESS mode is disabled.

In VMMS mode, the UPS operates as a traditional double-conversion UPS. However, the UPS will selectively shift the load to fewer UPMs based on the required load in order to force the remaining UPMs to carry a higher load. The efficiency rating for each UPM is highest when loads are greater than 50% of the system rating. Therefore, with multiple UPMs, a UPS can achieve higher efficiencies for lighter loads.

When a UPM is placed into VMMS mode, the UPM will stop gating the inverter and rectifier and keep the output contactor closed in order to maintain voltage match and phase lock to the critical bus. In this mode the UPS actively monitors the critical bus, keeping the UPM input contactors closed in order to keep the DC link primed (through the rectifier diodes) and also to allow the UPM to immediately return to active mode in the event of a disturbance or load step on the critical bus.

VMMS limits the maximum power available from a UPM when in VMMS mode. The default setting is 80% of the UPM full power rating. If the limit is exceeded, additional UPMs take on the increased load. The VMMS redundancy setting sets the number of redundant UPMs that the customer requires. Both the VMMS UPM load limit and UPM redundancy are customer configurable.

VMMS's UPM automatic scheduling rotates the idle UPMs every month with the ABM cycle. This allows the UPMs to have equal load-share time and also conducts a periodic UPM readiness test. The automatic ABM scheduler selects the next UPM in turn after each charge-to-float transition. If ABM is disabled, the scheduler selects the next UPM after conducting the automatic battery test. If ABM and automatic battery tests are disabled, the scheduler selects the next UPM at the beginning of each month.

In High Alert mode, the UPS defaults to double-conversion Online mode and all UPMs go active for one hour (customer configurable). At the completion of the hour, the UPS defaults back to VMMS mode. If the High Alert command is received during the one hour, the one hour timer will be restarted.

6.2.5 Bypass Mode



NOTE

Bypass mode is not available on a UPS configured as an IOM.

The UPS automatically switches to Bypass mode if it detects an overload, load fault, or internal failure. The UPS can also be transferred from Online mode to Bypass mode manually. The bypass source supplies the commercial AC power to the load directly. [Figure 51](#) shows the path of electrical power through the UPS system when operating in Bypass mode.

In Bypass mode, the output of the system is provided with three-phase AC power directly from the system input. While in this mode, the output of the system is not protected from voltage or frequency fluctuations or power outages from the source. Some power line filtering and spike protection is provided to the load but no active power conditioning or battery support is available to the output of the system in the Bypass mode of operation.

The internal bypass is comprised of a solid-state, silicon-controlled rectifier (SCR) static switch (SSW) and a backfeed protection contactor K5. The static switch is rated as a continuous-duty device that is used anytime

the inverter is unable to support the applied load. The static switch is wired in series with the backfeed protection contactor, and together they are wired in parallel with the rectifier and inverter.

CAUTION

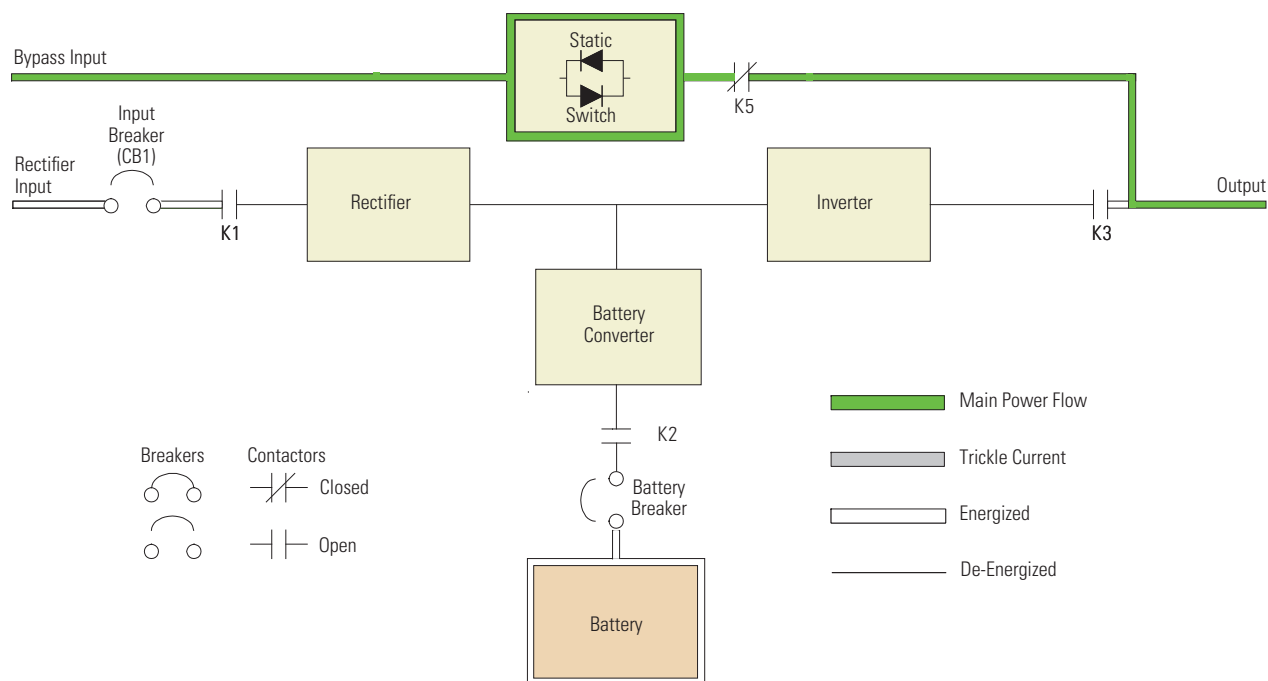
The critical load is not protected from voltage or frequency fluctuations or power outages while the UPS is in Bypass mode.

ATTENTION!

Les charges critiques ne sont pas protégées des fluctuations de tension ou de fréquence ni des pannes de courant lorsque l'onduleur est en mode Contournement.

The static switch, being an electronically-controlled device, can be turned on immediately to pick up the load from the inverter while the inverter output contactor K3 opens to isolate the inverter. The backfeed protection contactor is normally always closed, ready to support the static switch unless the bypass input source becomes unavailable.

Figure 51. Path of Current Through the UPS in Bypass Mode



NOTE On a UPS configured as an IOM, the bypass input, static switch, bypass breaker (CB4), and K5 are not present.

NOTE On a UPS configured with a Continuous Static Switch (CSS), bypass breaker (CB4) is not present.

If the UPS transfers to Bypass mode from Online mode due to any reason other than operator intervention, the UPS automatically attempts to transfer back to Online mode (up to three times within a ten minute period). The fourth transfer locks the critical load to the bypass source and requires operator intervention to transfer.

6.2.6 Battery Mode

The UPS automatically transfers to Battery mode if a utility power outage occurs, or if the utility power does not conform to specified parameters. In Battery mode, the battery provides emergency DC power that the inverter converts to AC power.

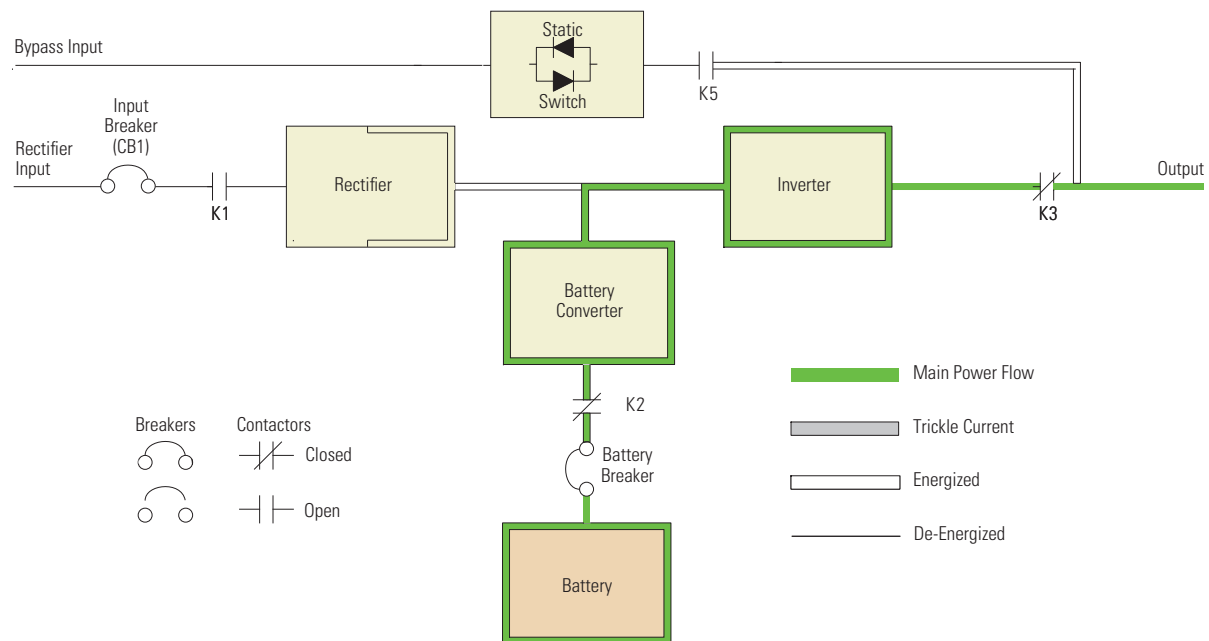
[Figure 52](#) shows the path of electrical power through the UPS system when operating in Battery mode.

During a utility power failure, the rectifier no longer has an AC utility source from which to supply the DC output current required to support the inverter. The input contactor K1 opens and the battery instantaneously supplies energy to the battery converter. The converter either bucks or boosts the voltage so that the inverter can support the customer's load without interruption. If bypass is common with the rectifier input, the backfeed protection contactor K5 also opens. The opening of contactors K1 and K5 prevent system voltages from bleeding backwards through the static switch and rectifier snubber components and re-entering the input source.

If the input power fails to return or is not within the acceptance windows required for normal operation, the battery continues discharging until a DC voltage level is reached where the inverter output can no longer support the connected loads. When this event occurs, the UPS issues another set of audible and visual alarms indicating SHUTDOWN IMMINENT. Unless the rectifier has a valid AC input soon, the output can be supported for only two minutes before the output of the system shuts down. If the bypass source is available, the UPS transfers to bypass instead of shutting down.

If at any time during the battery discharge the input power becomes available again, contactors K1 and K5 close and the rectifier begins to supply DC current to the converter and inverter. At this point, the unit returns to Online mode. Depending on the total load and the duration of the battery discharge, battery current limit alarms may be seen for a short time due to the current required to recharge the battery.

Figure 52. Path of Current Through the UPS in Battery Mode



NOTE On a UPS configured as an IOM, the bypass input, static switch, bypass breaker (CB4), and K5 are not present.

NOTE On a UPS configured with a Continuous Static Switch (CSS), bypass breaker (CB4) is not present.

6.3 Single UPS System Online Configurations

The system oneline drawings in this section show the simplified internal structure of the UPS, battery supply, and basic maintenance bypass. The following voltages apply: 380V, 400V, 415V, 480V and 600V.

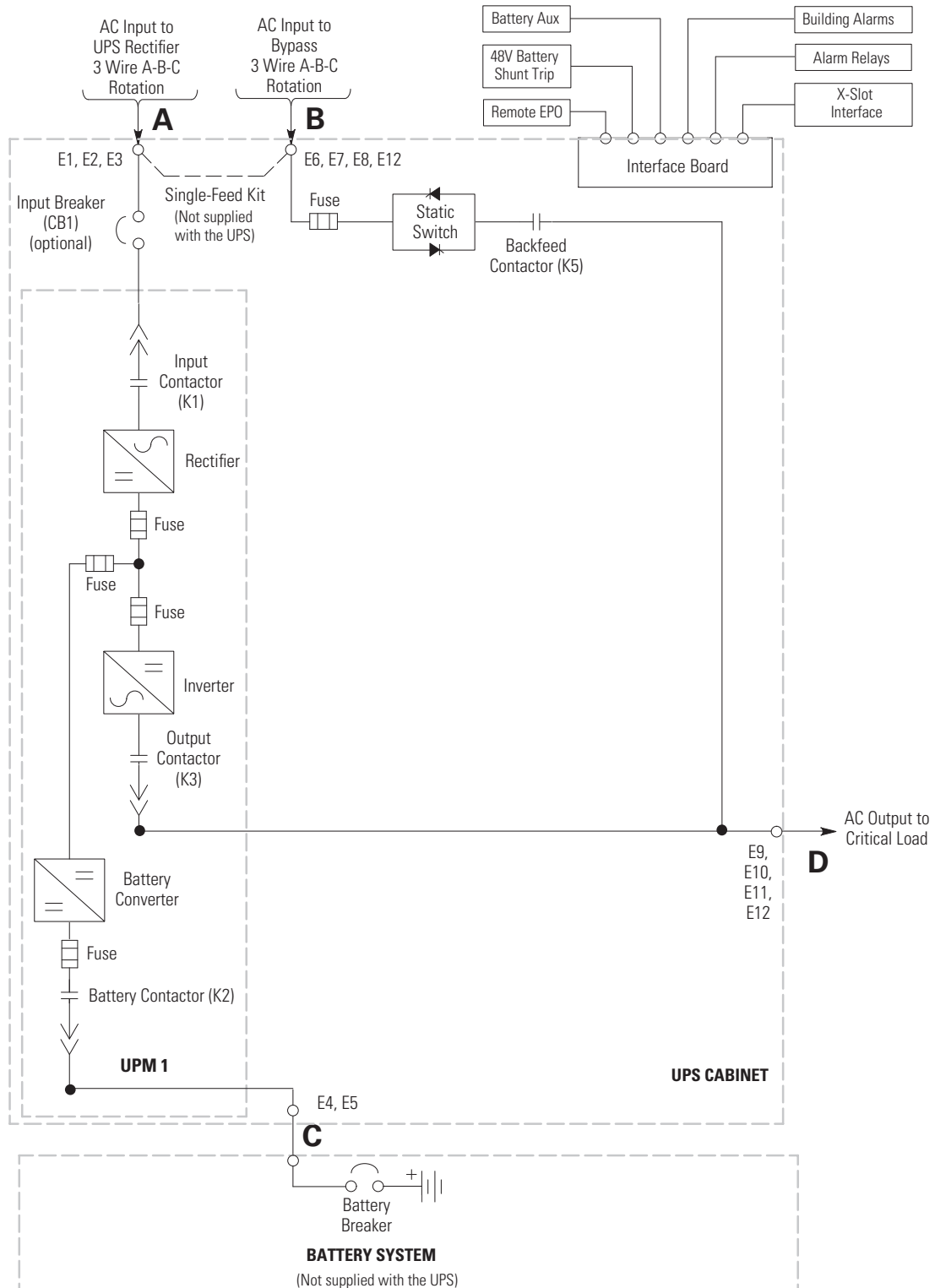
Table 34. Oneline Configurations

Oneline Drawing	UPS Model	System Type
Figure 53	Eaton 9395P-600/300	Single Reverse Transfer UPS – One UPM, Rectifier Feed, Battery System, Dual-Feed Configuration, Continuous Static Switch
	Eaton 9395P-600/275	
	Eaton 9395P-600/250	
	Eaton 9395P-600/225	
	Eaton 9395P-600/200	
Figure 54	Eaton 9395P-600/300	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM
	Eaton 9395P-600/275	
	Eaton 9395P-600/250	
	Eaton 9395P-600/225	
	Eaton 9395P-600/200	
Figure 55	Eaton 9395P-600/600	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 56	Eaton 9395P-600/600	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 57	Eaton 9395P-600/600	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 58	Eaton 9395P-600/600	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 59	Eaton 9395P-600/600	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 60	Eaton 9395P-600/600	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Common Battery, IOM Configuration
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	

Table 34. Oneline Configurations (Continued)

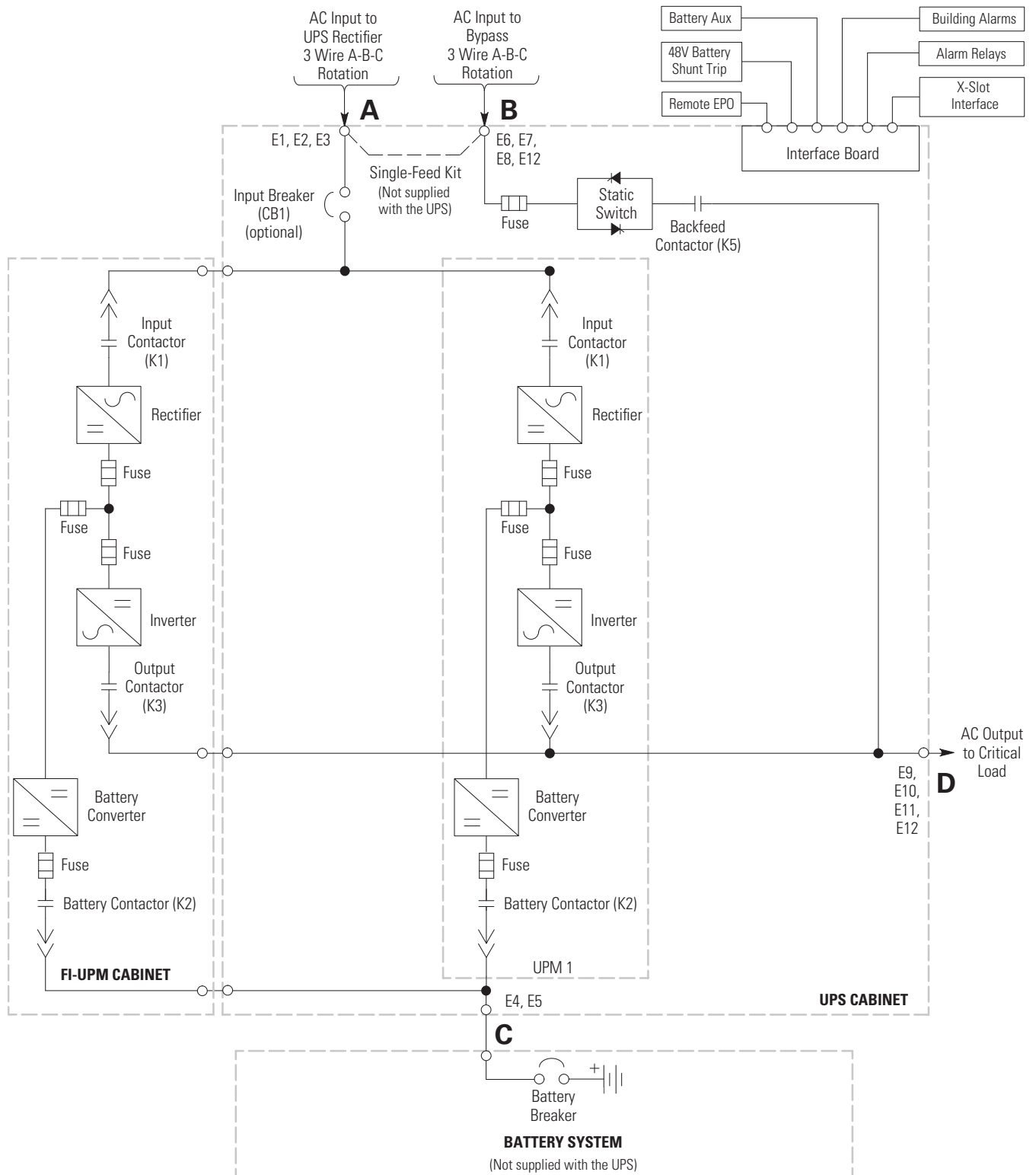
Online Drawing	UPS Model	System Type
Figure 61	Eaton 9395P-600/600	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Separate Battery, IOM Configuration
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 62	Eaton 9395P-600/600	Single Reverse Transfer UPS – Three UPM Common Rectifier Feed, Common Battery, IOM Configuration
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 63	Eaton 9395P-600/600	Single Reverse Transfer UPS – Three UPM Common Rectifier Feed, Separate Battery, IOM Configuration
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
Figure 64	Eaton 9395P-600/600	Simplified Dual-Feed UPS with Maintenance Bypass Panel
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
	Eaton 9395P-600/300	
	Eaton 9395P-600/275	
	Eaton 9395P-600/250	
	Eaton 9395P-600/225	
	Eaton 9395P-600/200	

Figure 53. One UPM, Rectifier Feed, Battery System, Dual-Feed Configuration, Continuous Static Switch



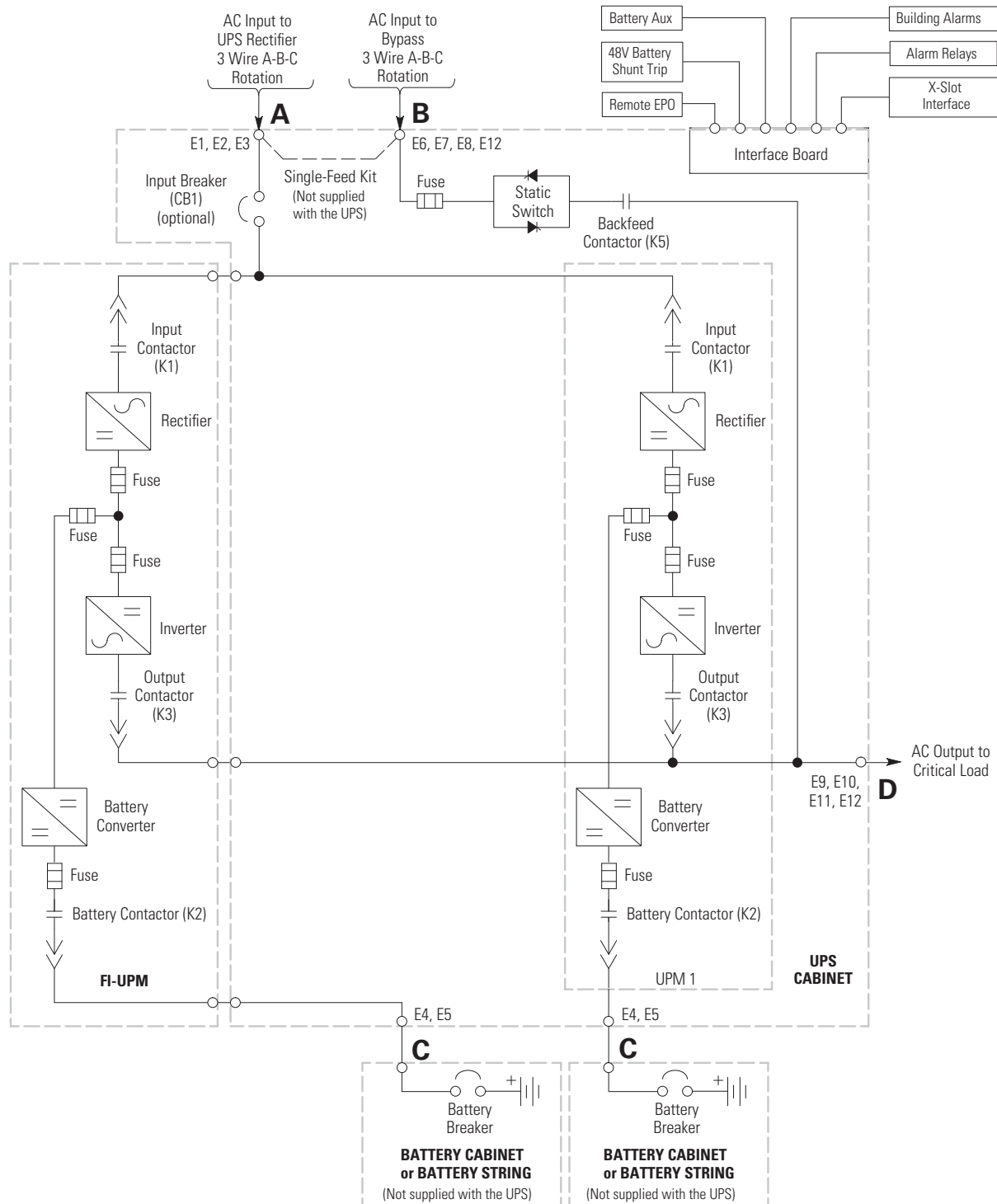
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 54. One UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM



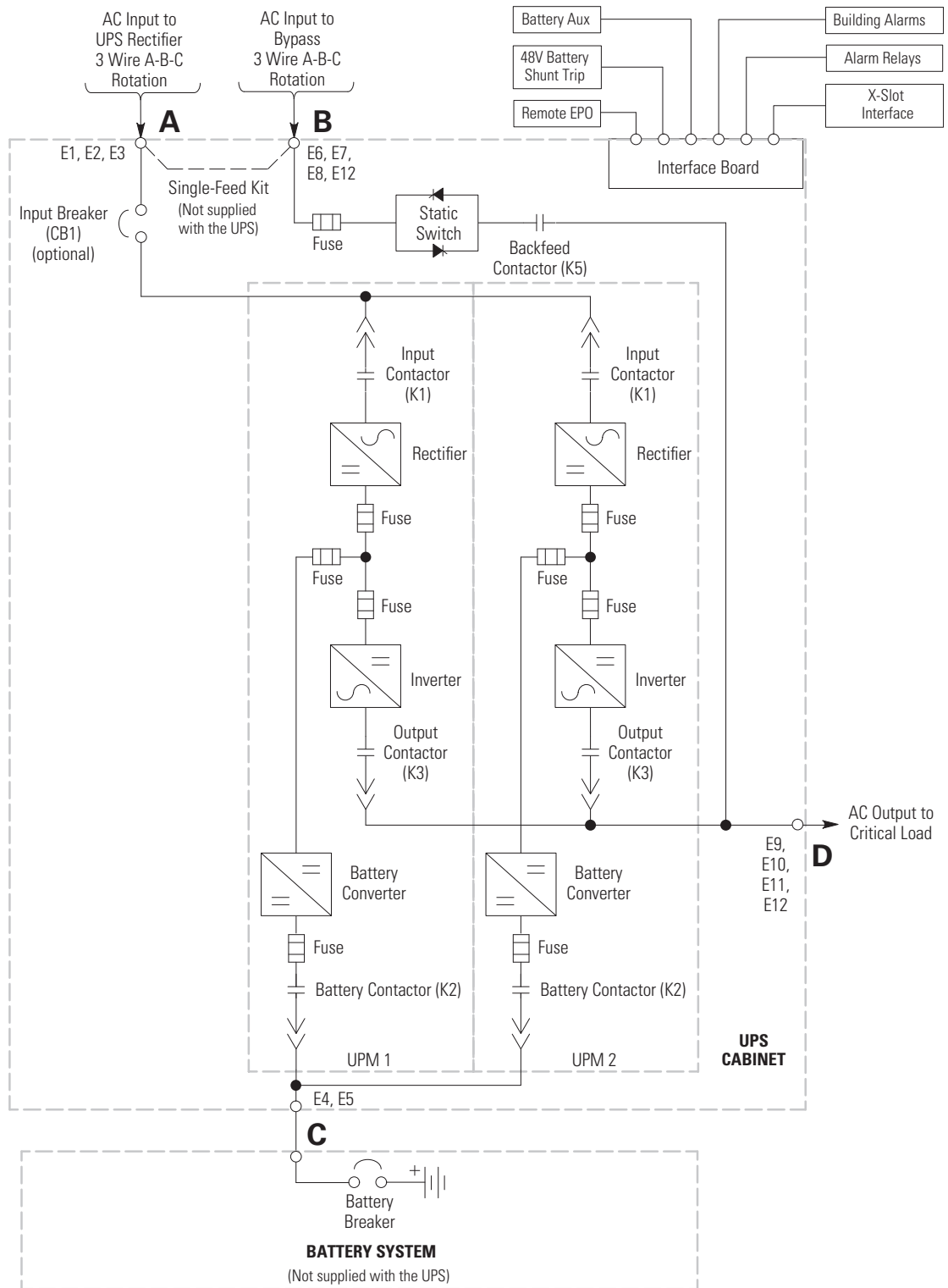
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 55. One UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM



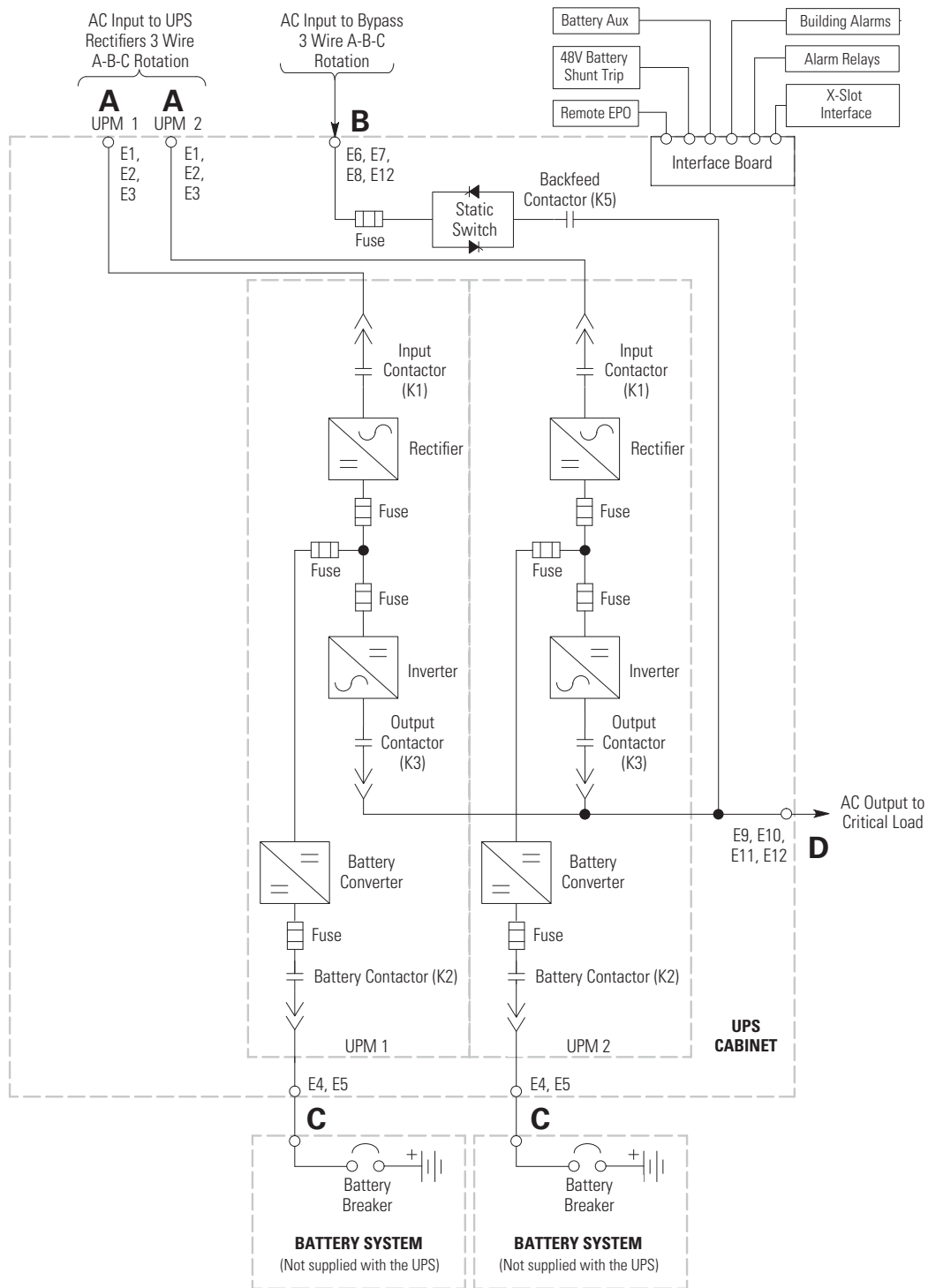
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 56. Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch



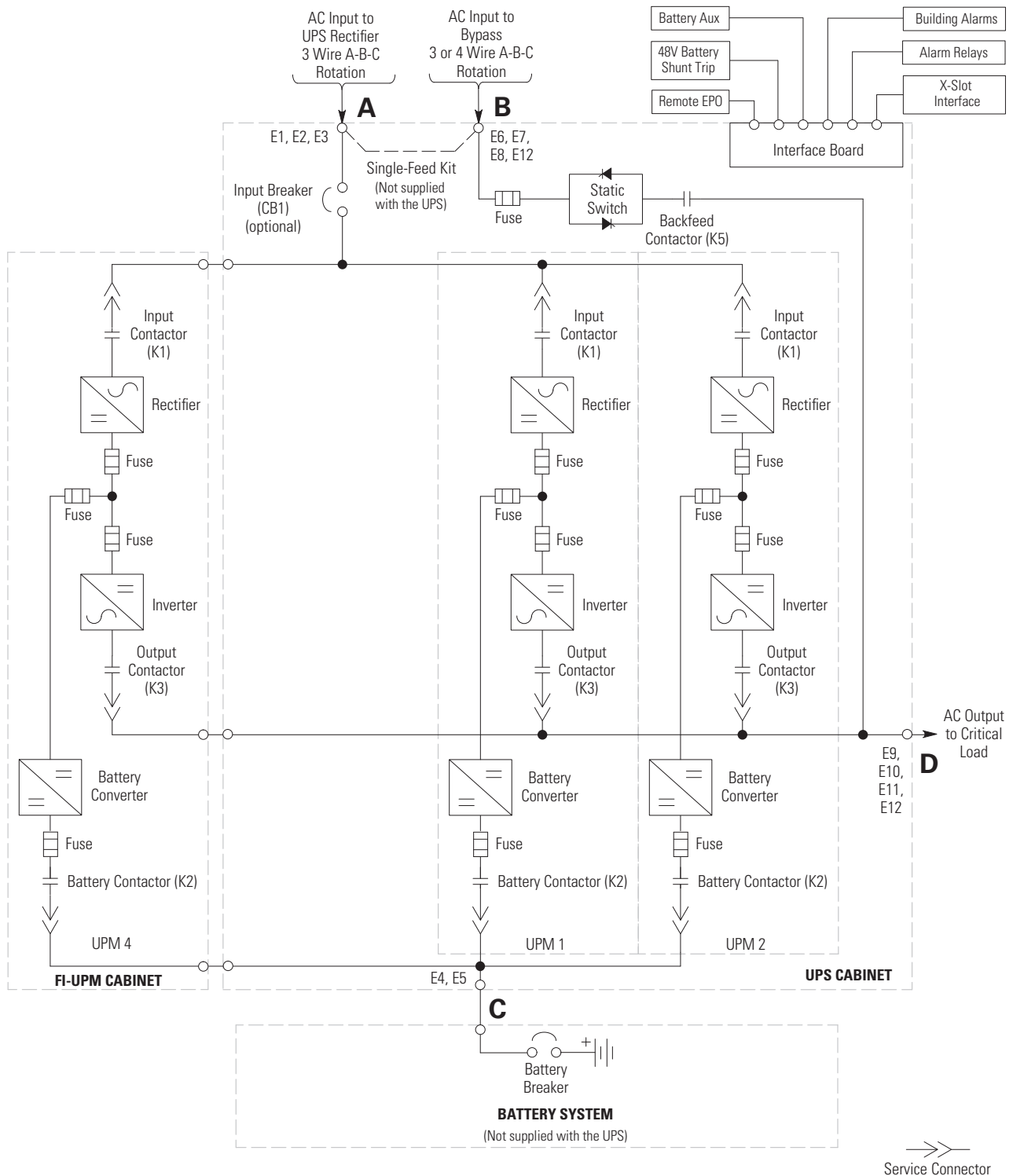
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 57. Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch



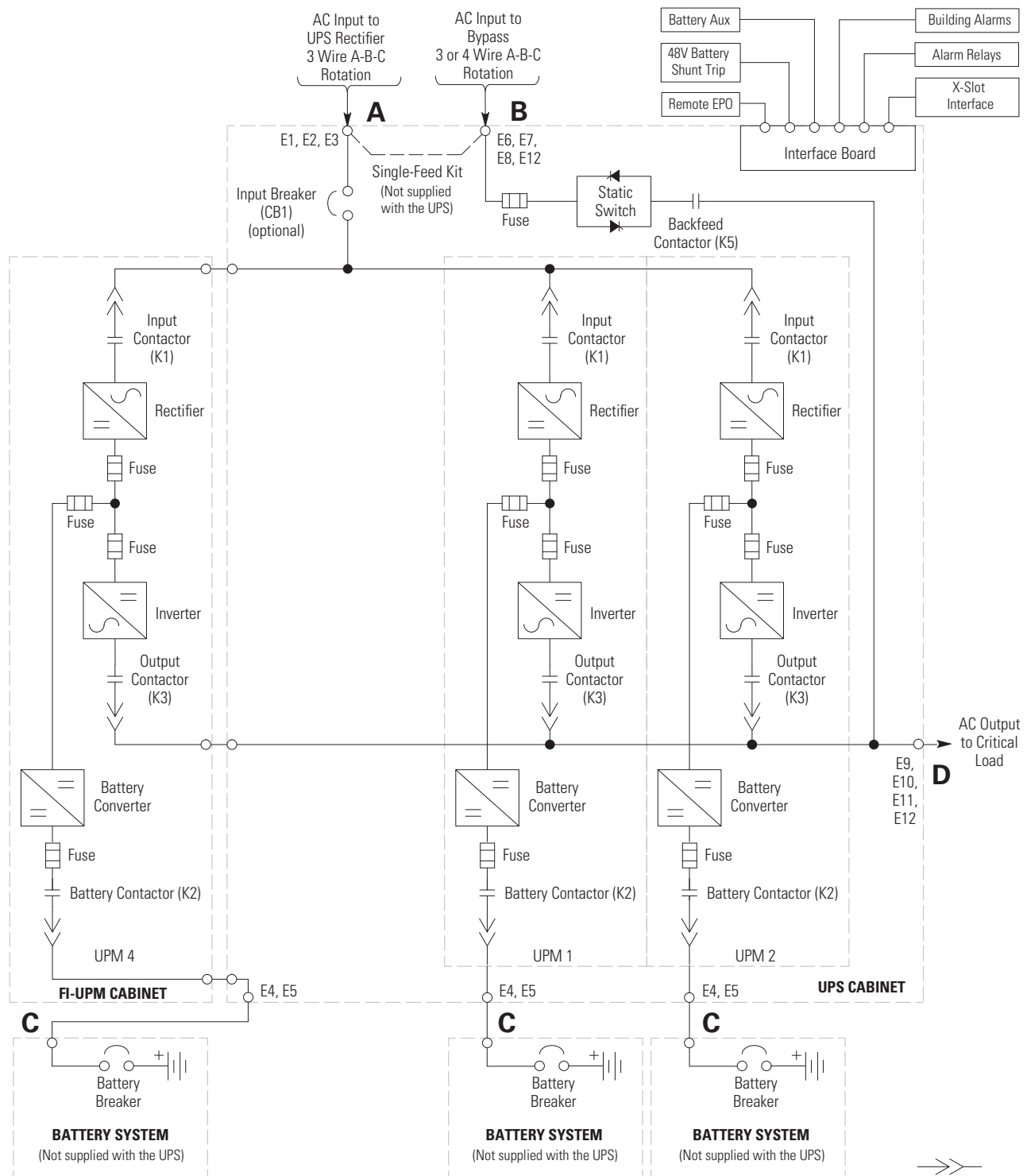
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 58. Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM



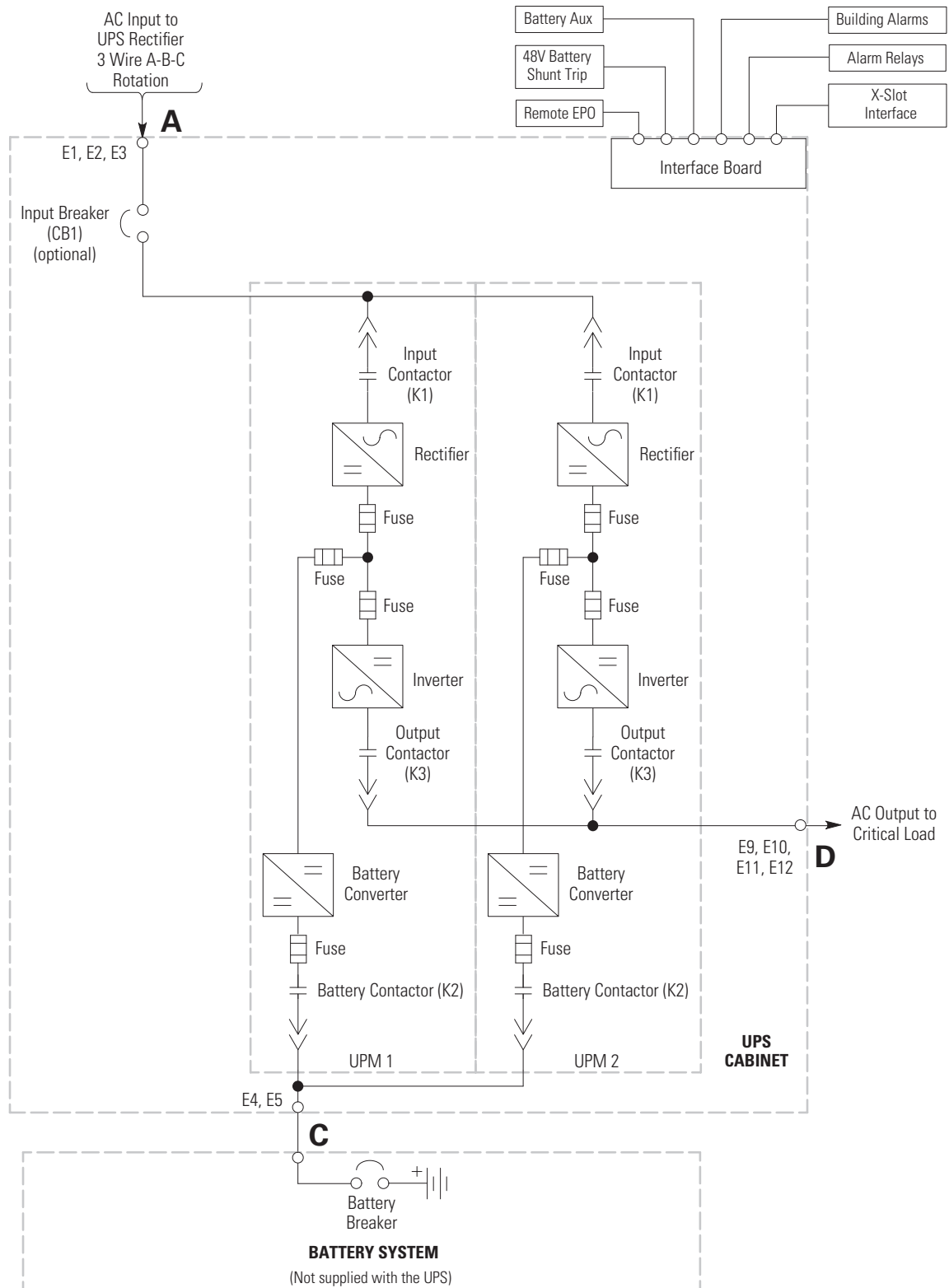
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 59. Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM



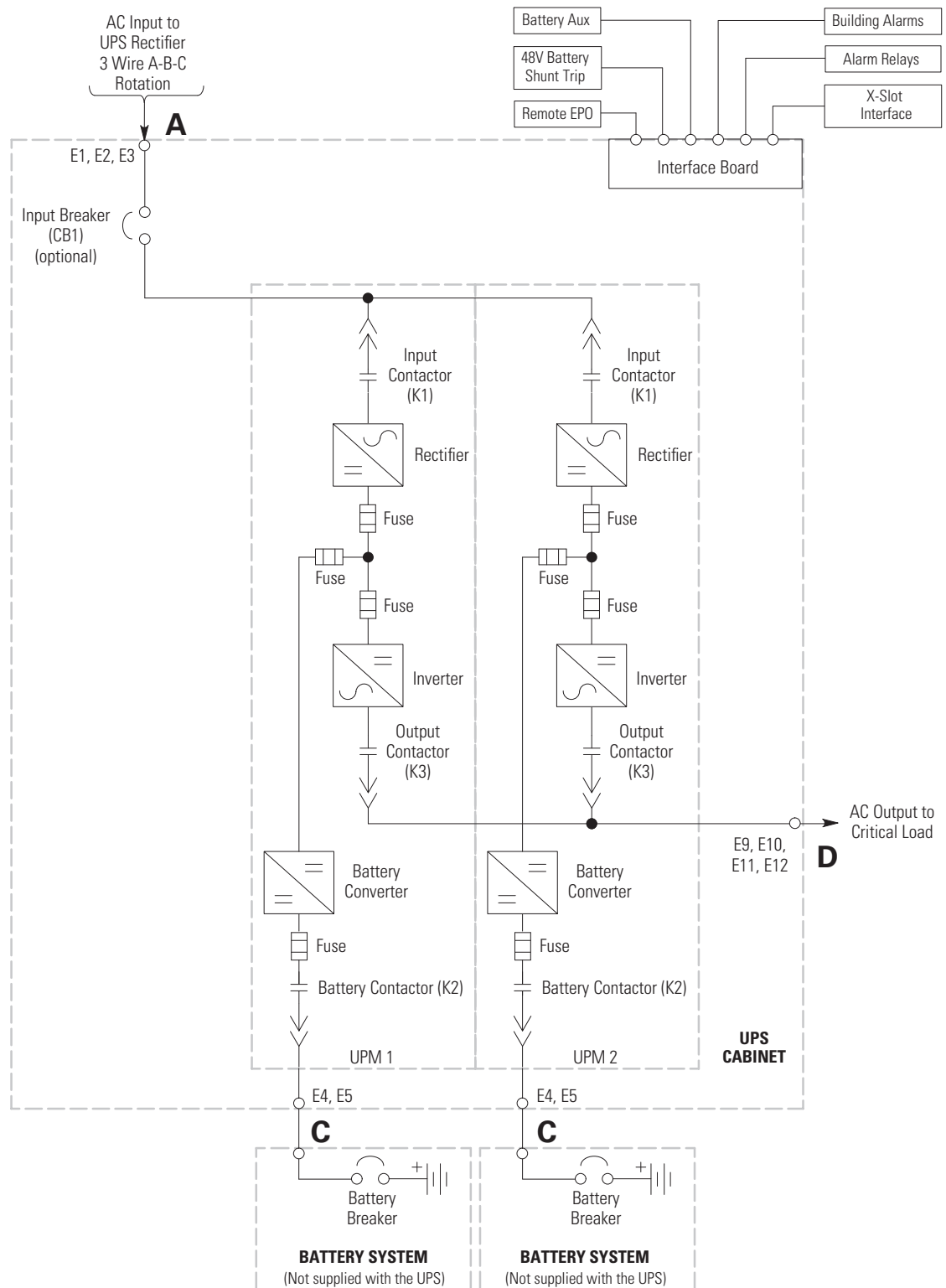
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 60. Two UPM, Common Rectifier Feed, Common Battery, IOM Configuration



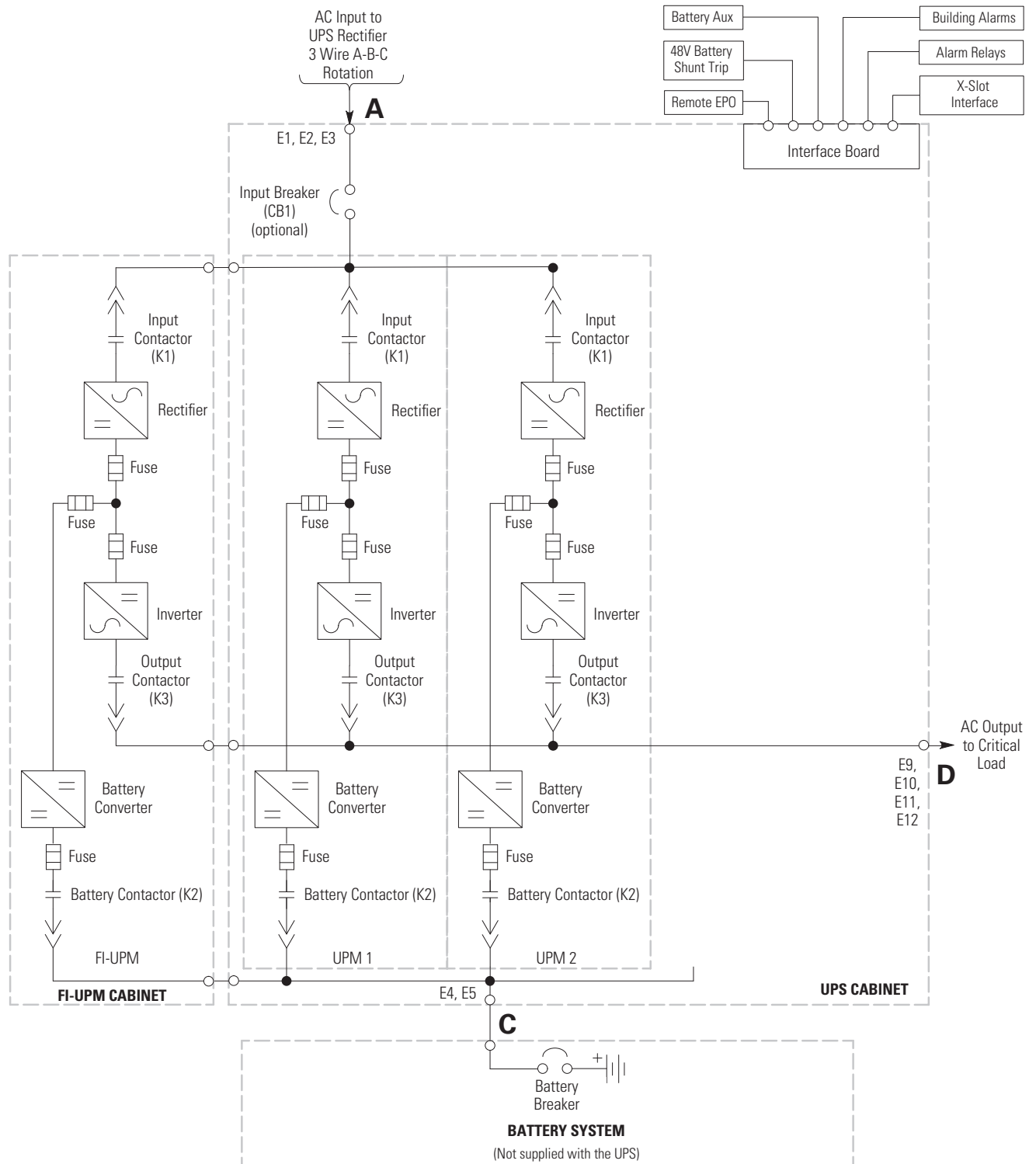
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 61. Two UPM, Common Rectifier Feed, Separate Battery, IOM Configuration



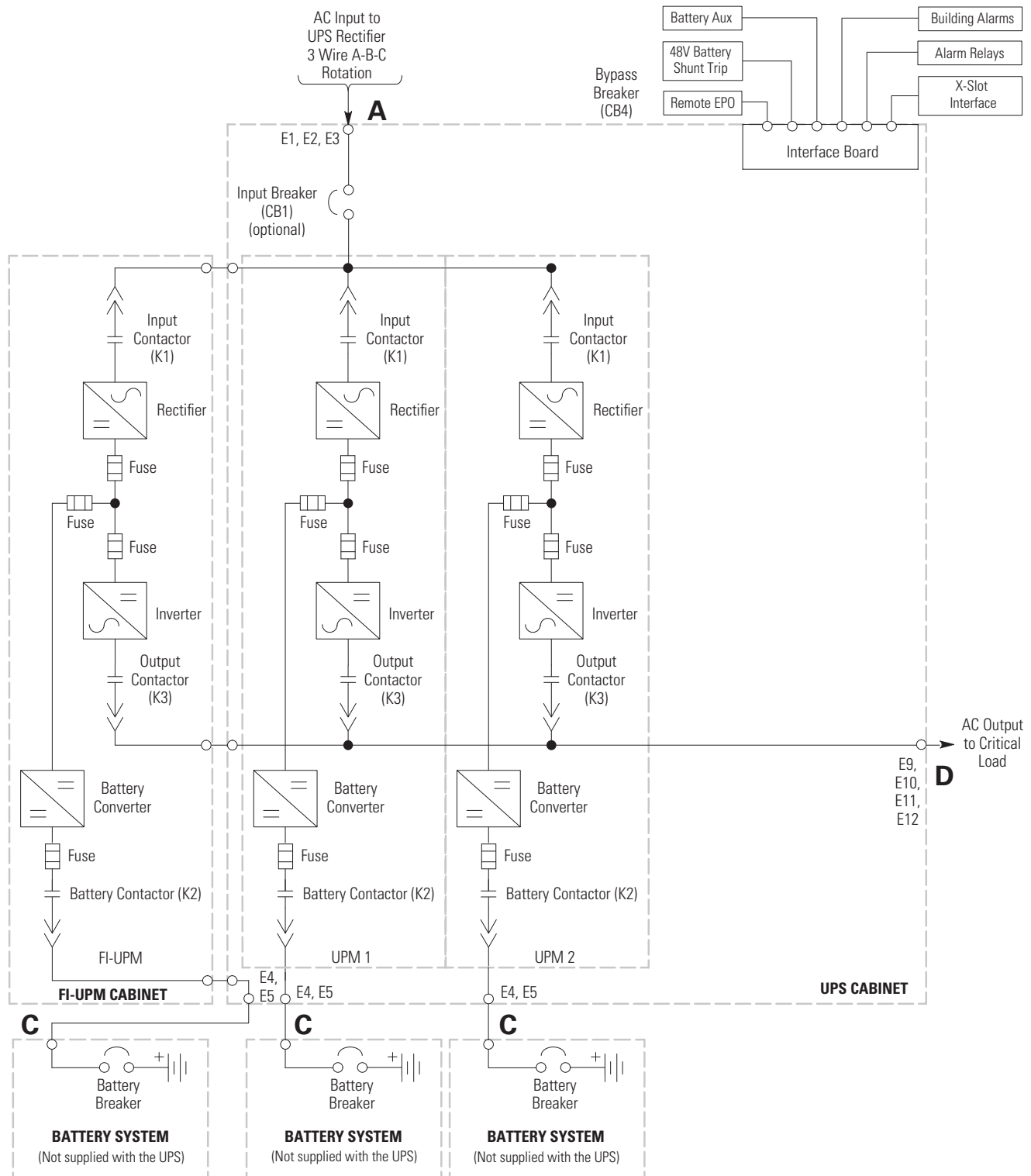
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 62. Three UPM Common Rectifier Feed, Common Battery, IOM Configuration



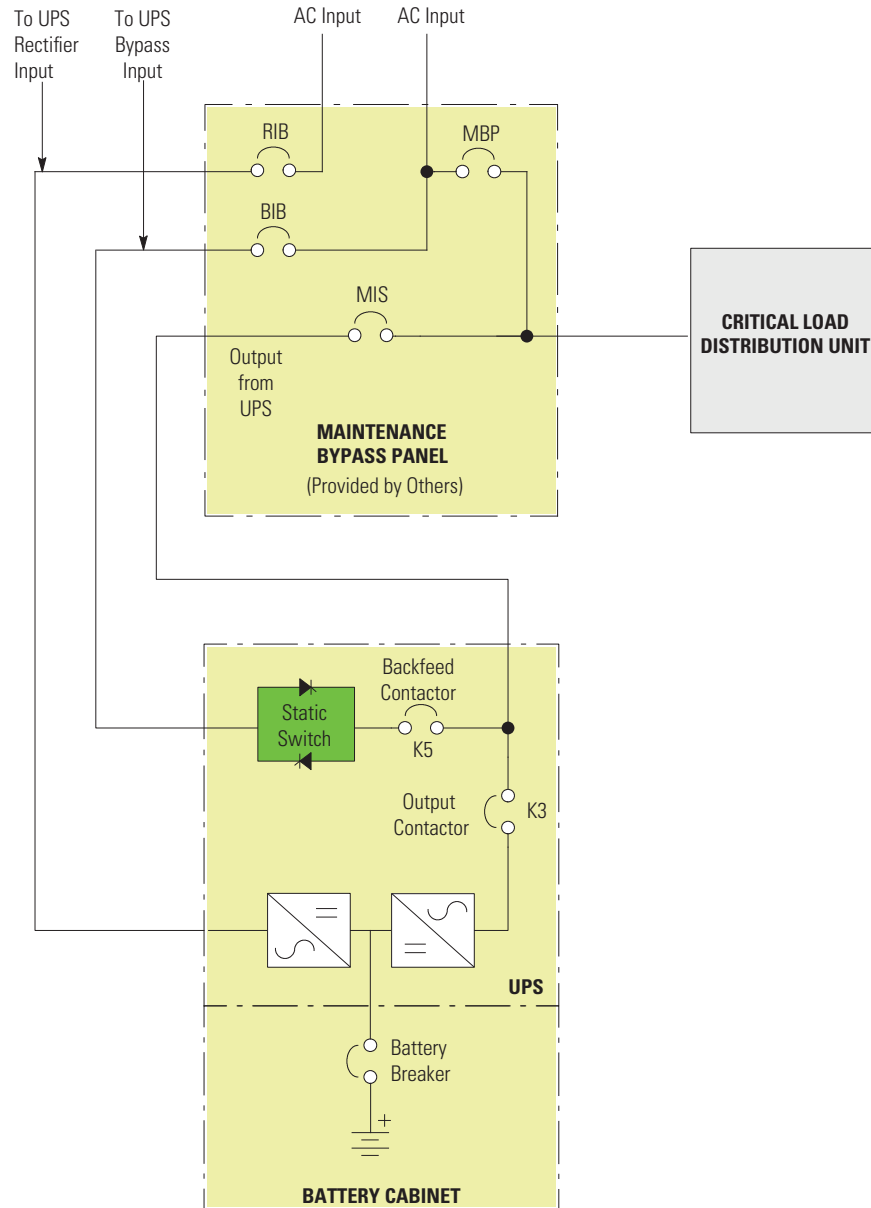
NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 63. Three UPM Common Rectifier Feed, Separate Battery, IOM Configuration



NOTE Callout letters **A**, **B**, **C**, and **D** map to the applicable Input/Output Ratings and External Wiring Requirements Table in Chapter 3.

Figure 64. Simplified Dual-Feed UPS with Maintenance Bypass Panel



RIB: Rectifier Input Breaker
 BIB: Bypass Input Breaker
 MIS: Maintenance Isolation Breaker
 MBP: Maintenance Bypass Breaker

NOTE If installing a maintenance bypass, a minimum of two separate feeds with upstream feeder breakers, or a single feed with two upstream feeder breakers, must be provided: one for the UPS or rectifier input breaker (RIB) (if installed) and one for the maintenance bypass input. DO NOT use a single feed or a single feeder breaker to supply both the UPS or RIB and the maintenance bypass. If a bypass input breaker (BIB) is installed in the maintenance bypass and a single-feed UPS is being installed, a single feed to the maintenance bypass is acceptable for supplying both the UPS and the bypass.

6.4 Multiple UPS Distributed Bypass System

Distributed bypass parallel operation extends the normal operation of Eaton 9395P-600 UPSs by offering increased capacity and/or redundant capability. The parallel system continues to maintain power to the critical loads during commercial electrical power brownout, blackout, overvoltage, undervoltage, and out-of-tolerance frequency conditions.

The output of the system is normally supplied by Uninterruptible Power Modules (UPMs) contained in each UPS. Multiple UPMs are connected with their outputs in parallel (tied together) to provide a load level greater than the rating of one UPM and/or for redundancy. The paralleled UPMs supply the output load with protected power as long as the load does not exceed the combined rating of the paralleled UPMs.

The power system is redundant as long as one of the UPMs can be disconnected from the output bus and the remaining UPMs can continue to supply power to the load without exceeding their ratings.

When the load is being supplied by the UPMs, the system output bus is continuously monitored for an overvoltage or undervoltage condition. If an out of limits condition is detected, the paralleled UPMs transfer the load to bypass using the UPS static switches.

Communication is required between the UPSs for system metering and mode control. System level communication and control are accomplished using a Controller Area Network (CAN). A single building alarm in each UPS, connected to the other UPSs in parallel and tied to the bypass contactor auxiliary contacts in each UPS, are used for a secondary communication path. This arrangement ensures bypass control even if the CAN bus is lost.

The system is paralleled for redundancy (1+1) in a system where two UPMs are paralleled together and the load is less than the supporting capability of one of the UPMs. The system is paralleled for capacity (2+0) if both UPMs in a system are required to support the load.

A parallel capacity system can also be redundant (2+1), as long as there is always one or more UPMs online than required to support the load.

6.4.1 Multiple UPS Parallel System Modes

Similar to the single UPS system, the Eaton 9395P-600 UPS parallel system supports a critical load in five different modes of operation. The standard operation modes are:

- In Online mode, the paralleled UPMs supply the critical load with clean, filtered power. Each UPM battery charger also provides charging current for the battery if needed.
- In Energy Saver mode, commercial AC power is supplied directly to the critical load through the continuous static switch and transfers automatically to Online mode if an abnormal condition is detected. The Energy Saver mode requires a UPS with a continuous static switch. Energy Saver mode in a parallel system operates the same as it does in a single (see paragraph [6.2.3 Energy Saver System Mode](#)).
- In Variable Module Management mode, the UPS operates as a traditional double-conversion UPS, but selectively shifts the load to fewer UPMs to increase the efficiency of the UPS. In a parallel system each UPS will require at least one UPM to be in double-conversion mode at all times; otherwise, Variable Module Management mode operates the same as it does in a single UPS system (see paragraph [6.2.4 Variable Module Management System](#)).
- In Bypass mode, the critical load is directly supported by utility power through the bypass circuit in each UPS.
- In Battery mode, the battery provides DC power, which maintains UPM operation. The UPM batteries support the critical load.

The UPSs continually monitor themselves and the incoming utility power and automatically switch between these modes as required, without operator intervention, except when manually switching to Bypass mode. The sophisticated detection and switching logic inside the UPSs ensures that operating mode changes are automatic and transparent to the critical load, while internal monitoring systems indicate the current mode of operation. The UPSs switch operating modes in response to these system events:

- A *command* is an intervention that is externally initiated by an operator or by some site action. A command causes the UPSs to switch operating modes; it usually does not require any further action.
- A *notice* is a minor system event that may or may not require attention.
- An *alarm* is a system event that requires immediate intervention.

The following paragraphs describe the differences in the parallel system operating modes, using block diagrams to show the power flow during each mode of operation.

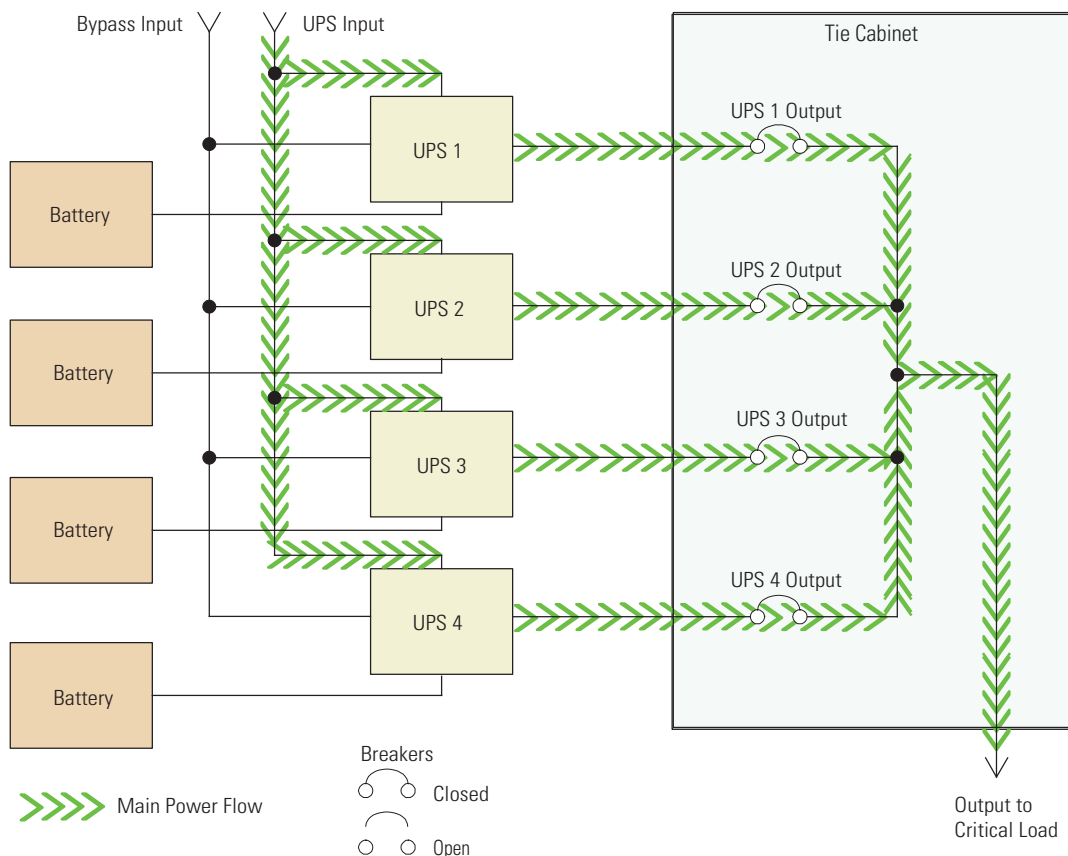
6.4.2 Online Mode – Distributed Bypass

In Online mode, utility AC power is supplied to the UPSs. Each UPS then conditions the incoming AC power and provides clean, regulated AC power to the tie cabinet or distribution panel for parallel systems up to four modules. The applied load is shared equally among the available UPMs in the system. Figure [Figure 65](#) shows the path of electrical power through the parallel system when operating in Online mode.

If the utility AC power is interrupted or is out of specification, the UPSs automatically switch to Battery mode to support the critical load without interruption. When utility power returns, the UPSs return to Online mode.

If the UPSs become overloaded or unavailable, the distributed bypass system switches to Bypass mode. The distributed bypass system automatically returns to Online mode when the overload condition is cleared and system operation is restored within specified limits.

Figure 65. Path of Current through the UPSs in Online Mode – Distributed Bypass



6.4.3 Bypass Mode – Distributed Bypass

In Bypass mode, the output of the system is provided with three-phase AC power directly from the bypass input. While in this mode, the output of the system is not protected from fluctuations, spikes, or power outages from the source. No battery support is available to the output of the system in the Bypass mode of operation.

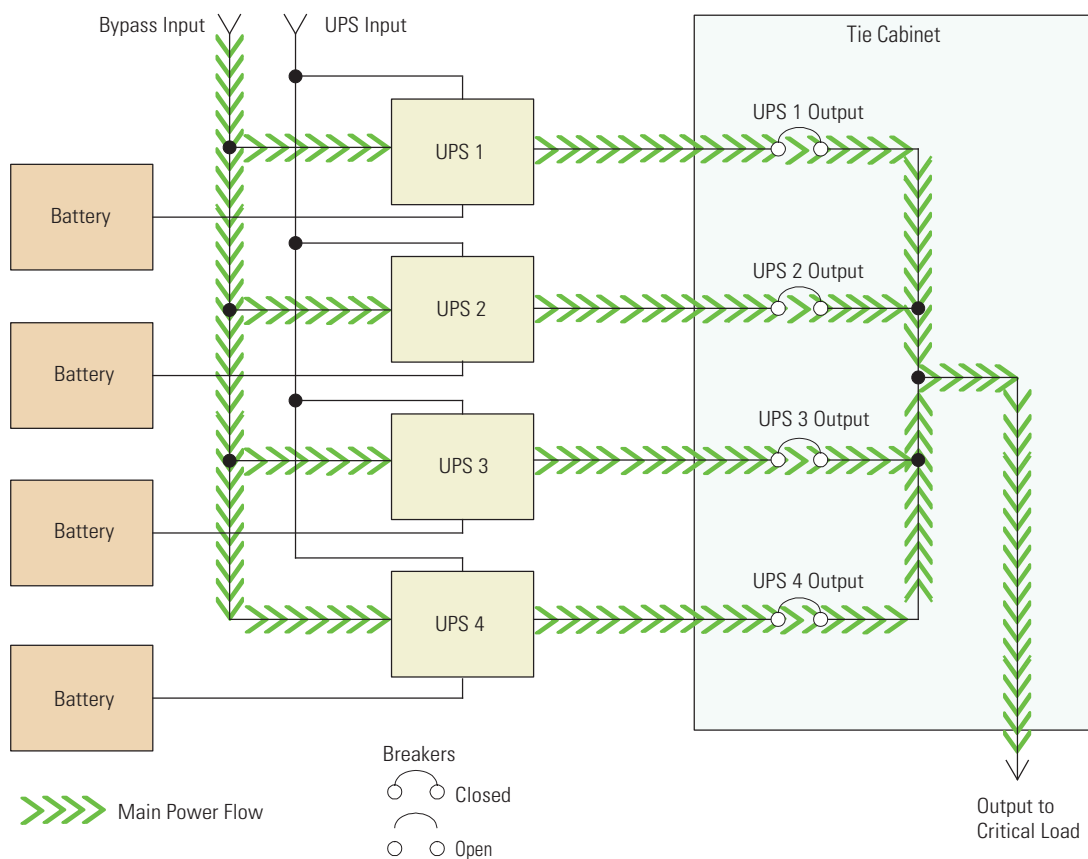
The distributed bypass system automatically switches to Bypass mode if it detects a UPS system overload or load fault.

If one UPS becomes unavailable, the distributed bypass system dynamically updates the redundancy calculation to determine if the remaining UPSs can support the load. If the load can be supported, the system does not switch to bypass.

[Figure 66](#) shows the path of electrical power through the parallel system when operating in Bypass mode.

In a distributed bypass system, each UPS operates similar to a single UPS, but in parallel with each other. The bypass source for the load is derived from the bypass input of one, two, three, or four UPSs, depending on the system configuration, through the internal static switches. If a module is taken offline, the other modules remain online to support the load. If more modules than can support the load must be taken offline, the load must be transferred to maintenance bypass or shut down.

Figure 66. Path of Current through the UPSs in Bypass Mode – Distributed Bypass



The distributed bypass system can be transferred from Online mode to Bypass mode manually. However, the distributed bypass system automatically switches to Bypass mode whenever the UPSs can no longer supply the critical load. If the distributed bypass system transfers to Bypass mode from Online mode due to an output voltage deviation, the distributed bypass system automatically attempts to return to Online mode (up to three times within a 10-minute period). After three transfer attempts or an overload, the system locks the critical load to the bypass source and requires operator intervention to transfer.

Bypass mode is a normal operating mode, not an alarm condition. However, if the distributed bypass system is unable to return to Online mode following an automatic transfer to Bypass mode, an alarm condition is recorded.

Bypass may also be used when the UPSs or UPMs in the system must be shut down to perform routine maintenance or repairs.

In the Parallel Redundant (N+1) arrangement, the bypass circuitry in each UPS operates to support the applied loads on bypass. If the UPSs are online and one UPS trips offline, the remaining UPSs do not go to bypass as long as they have the capacity to support the load.

In the Parallel Capacity (N+0) arrangement, if one UPS trips offline and goes to bypass, the remaining UPSs also go to bypass.

6.4.4 Battery Mode – Distributed Bypass

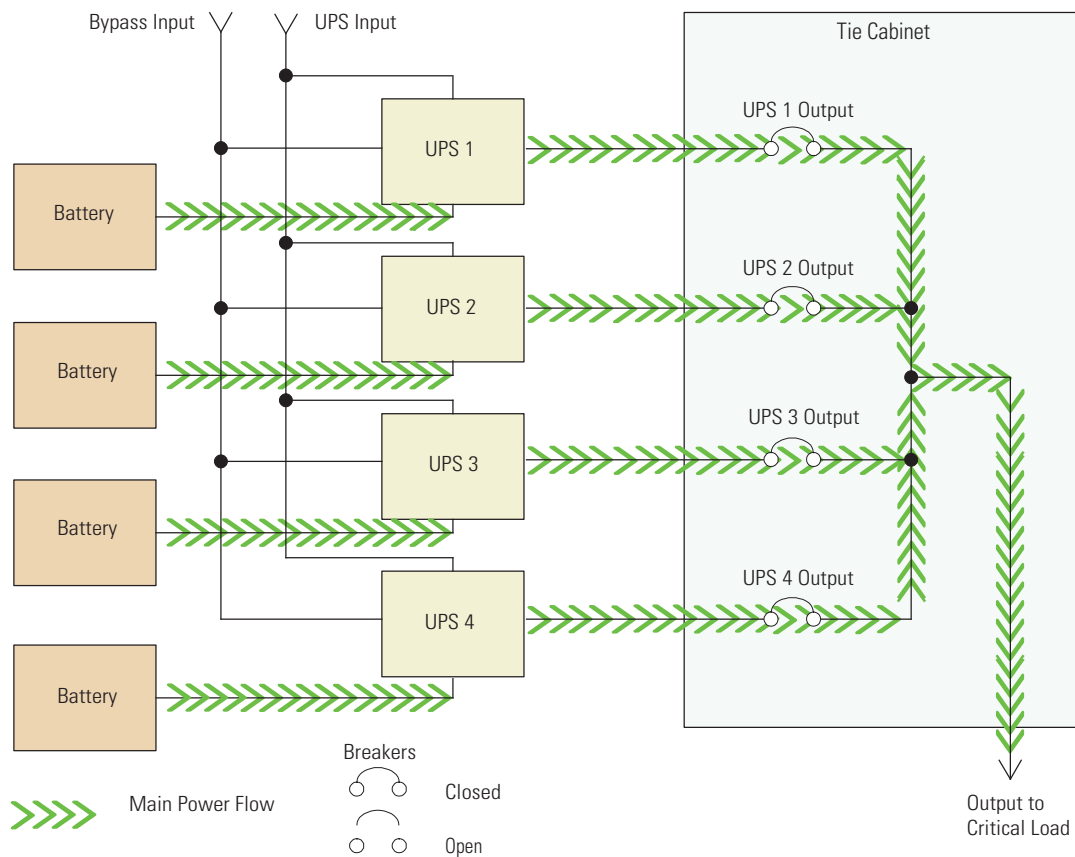
The UPSs transfer to Battery mode automatically if a utility power outage occurs, or if the utility power does not conform to specified parameters. In Battery mode, the battery provides emergency DC power that the inverter converts to AC power.

[Figure 67](#) shows the path of electrical power through the distributed bypass system when operating in Battery mode.

While in Battery mode, the UPSs sound an audible horn, illuminate visual indicator lamps on the front panel (Online and On Battery), and create an entry into the alarm event history. As the battery discharges, the boost converter and inverter constantly make minute adjustments maintaining a steady output. The UPSs remain in this operating mode until the input power to the rectifier is again within the specified voltage or frequency acceptance windows.

If the input power fails to return or is not within the acceptance windows required for normal operation, the battery continues discharging until a DC voltage level is reached where the inverter output can no longer support the shared loads. When this event occurs, each UPS issues another set of audible and visual alarms that indicate a two-minute SHUTDOWN IMMINENT warning. Unless the system has a valid AC input soon, redundant UPMs begin shutting down until there are no longer enough UPMs online to support the connected load. When this event occurs, the system shuts down. If the bypass source is available, the system transfers to bypass instead of shutting down.

Figure 67. Path of Current through the UPSs in Battery Mode – Distributed Bypass



If at any time during the battery discharge the input power becomes available again, the rectifier begins to supply DC current to the inverter. At this point, the UPS returns to Online mode. If at any time during the battery discharge the AC input power becomes available again, each rectifier turns on, assumes the inverter load from the batteries, and begins recharging the batteries. Depending on the total load and the duration of the battery discharge, battery and rectifier input current limit alarms may be seen for a short time due to the current required to recharge the batteries.

6.5 Multiple UPS Distributed Bypass System Online Configurations

The distributed bypass system oneline drawings in this section show the simplified internal structure of the UPS, battery supply, and basic maintenance bypass in a multiple UPS configuration. These onelines do not show each UPM in the UPSs, but represent each UPS in the distributed bypass system. The following voltages apply: 380V, 400V, 415V, 480V and 600V.

Oneline Drawing	UPS Model	System Type
Figure 68	Eaton 9395P-600/600	Multiple UPS – Distributed Bypass 1+1 and 2+0 Configurations
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
	Eaton 9395P-600/300	
	Eaton 9395P-600/275	
	Eaton 9395P-600/250	
	Eaton 9395P-600/225	
	Eaton 9395P-600/200	
Figure 69	Eaton 9395P-600/600	Multiple UPS – Distributed Bypass 2+1 and 3+0 Configurations
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
	Eaton 9395P-600/300	
	Eaton 9395P-600/275	
	Eaton 9395P-600/250	
	Eaton 9395P-600/225	
	Eaton 9395P-600/200	
Figure 70	Eaton 9395P-600/600	Multiple UPS – Distributed Bypass 3+1 and 4+0 Configurations
	Eaton 9395P-600/550	
	Eaton 9395P-600/500	
	Eaton 9395P-600/450	
	Eaton 9395P-600/400	
	Eaton 9395P-600/300	
	Eaton 9395P-600/275	
	Eaton 9395P-600/250	
	Eaton 9395P-600/225	
	Eaton 9395P-600/200	

Figure 68. Typical Distributed Bypass System (1+1 and 2+0 Configurations)

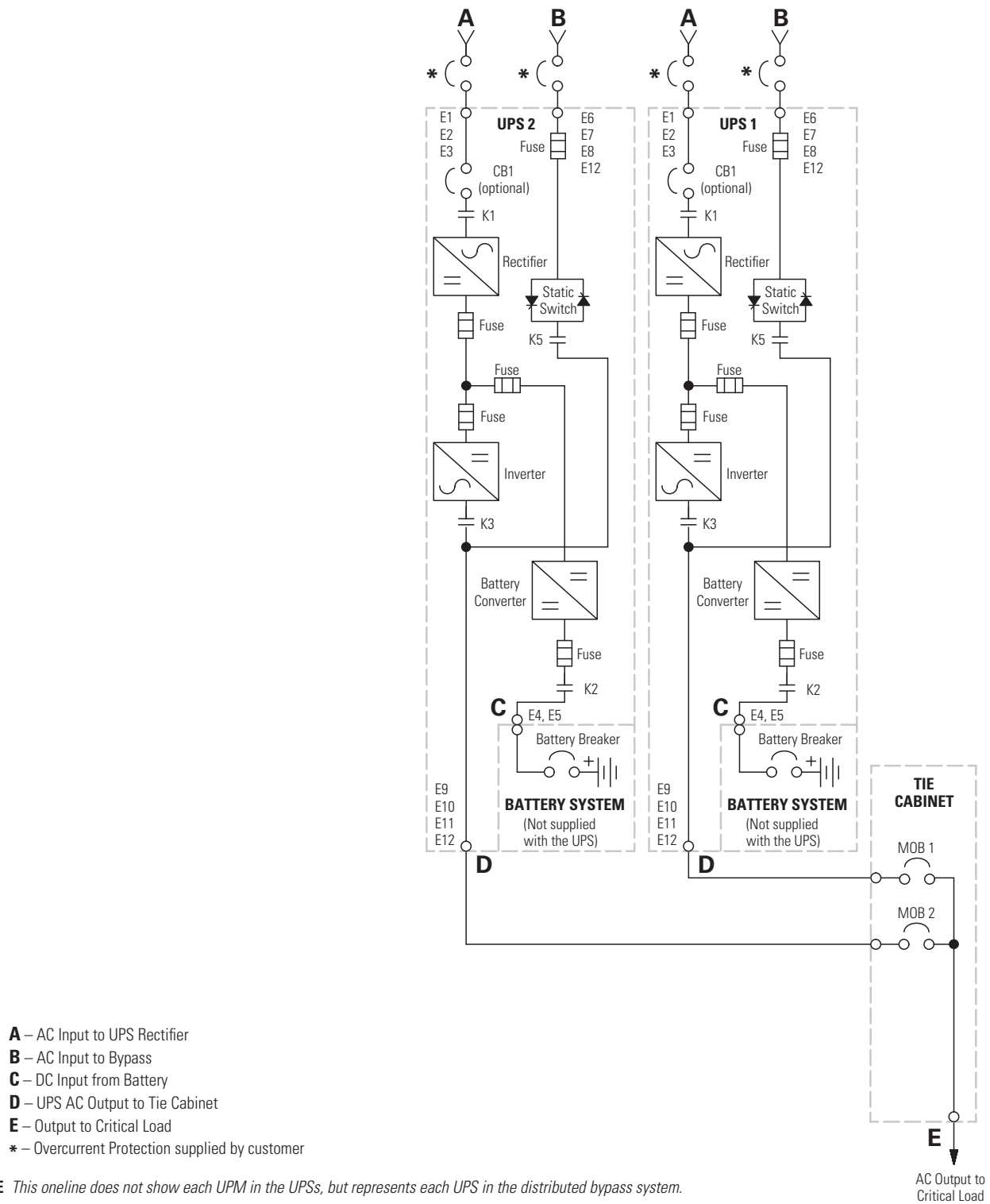


Figure 69. Typical Distributed Bypass System (2+1 and 3+0 Configurations)

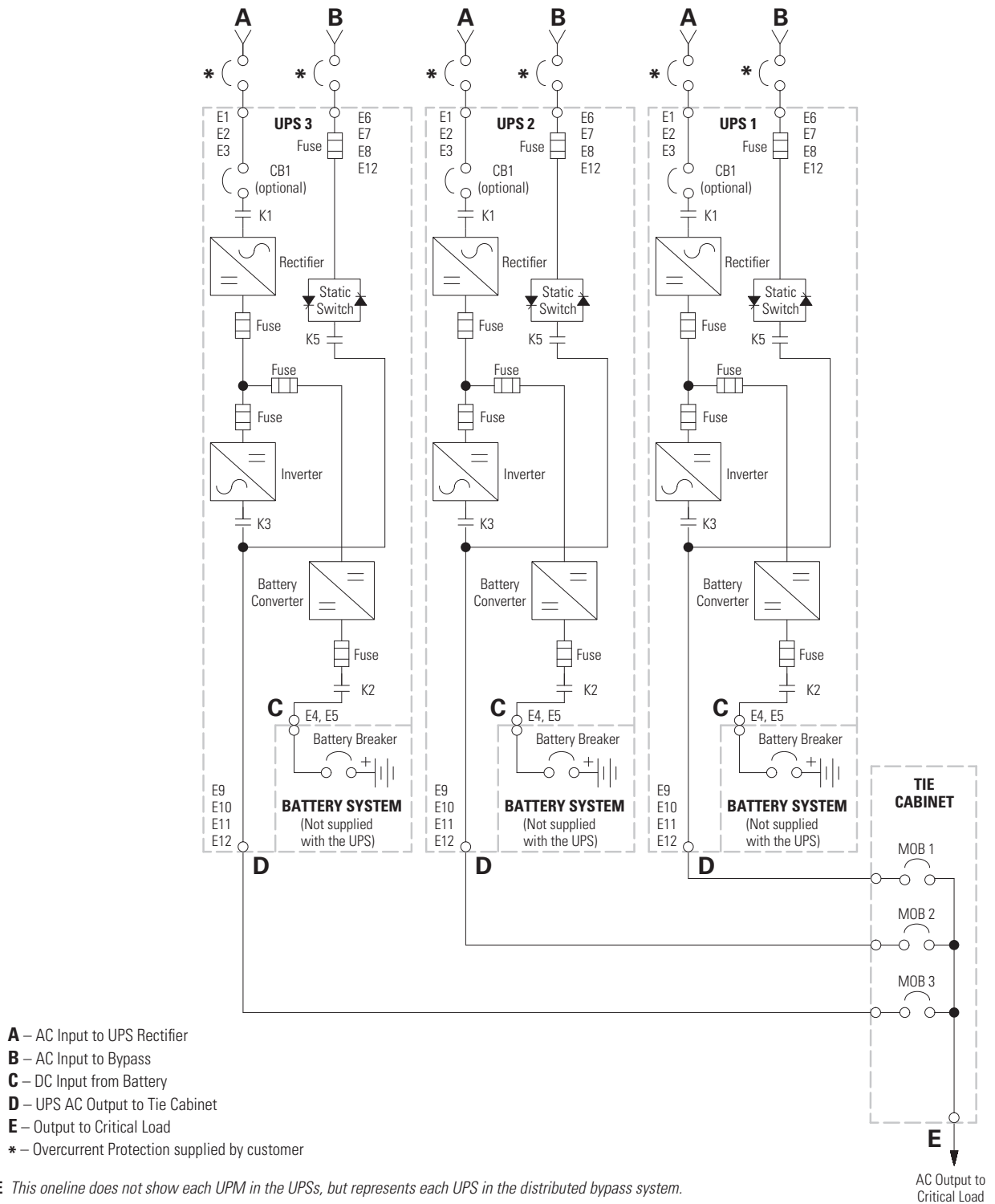
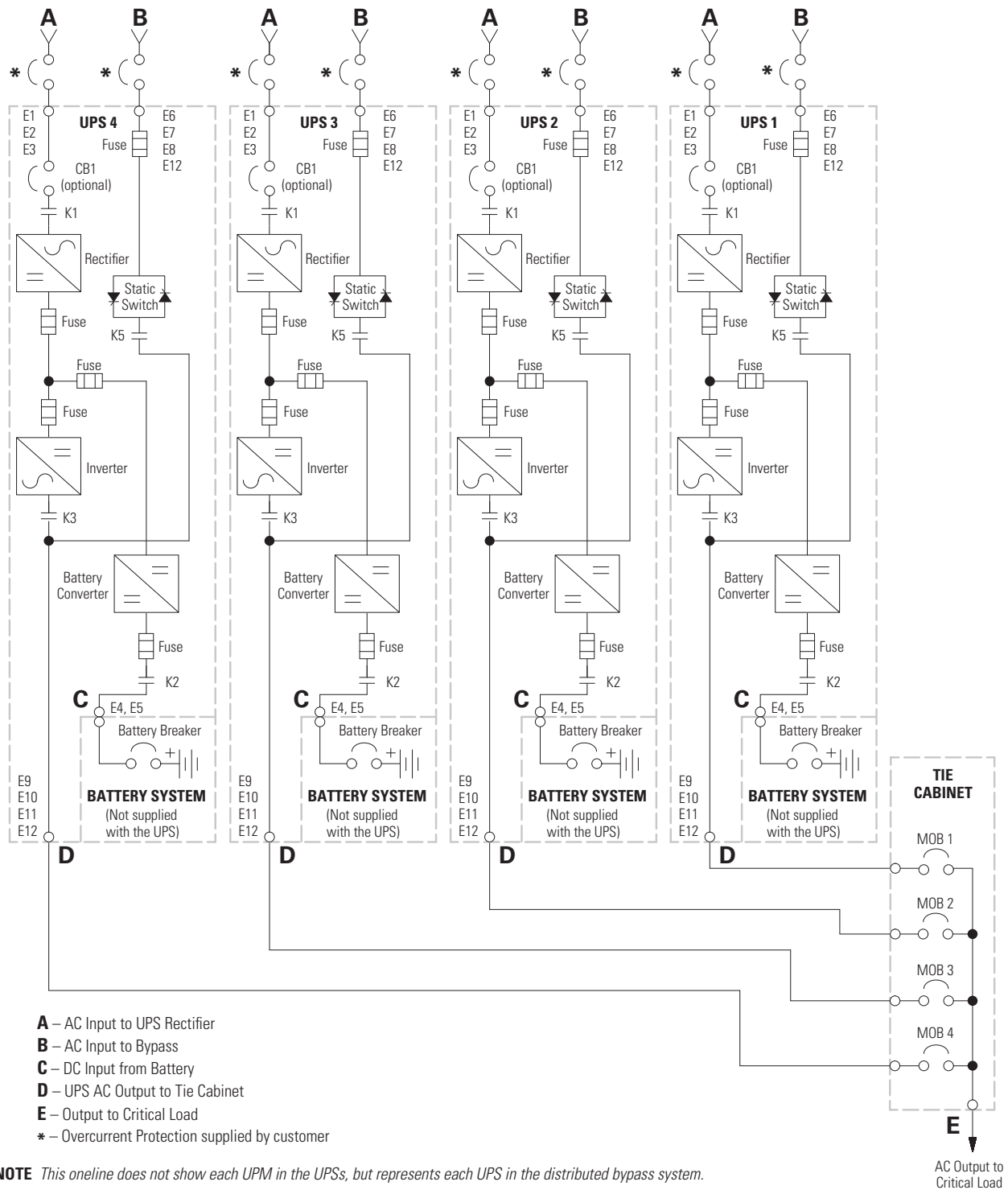


Figure 70. Typical Distributed Bypass System (3+1 and 4+0 Configurations)



Chapter 7 UPS Operating Instructions

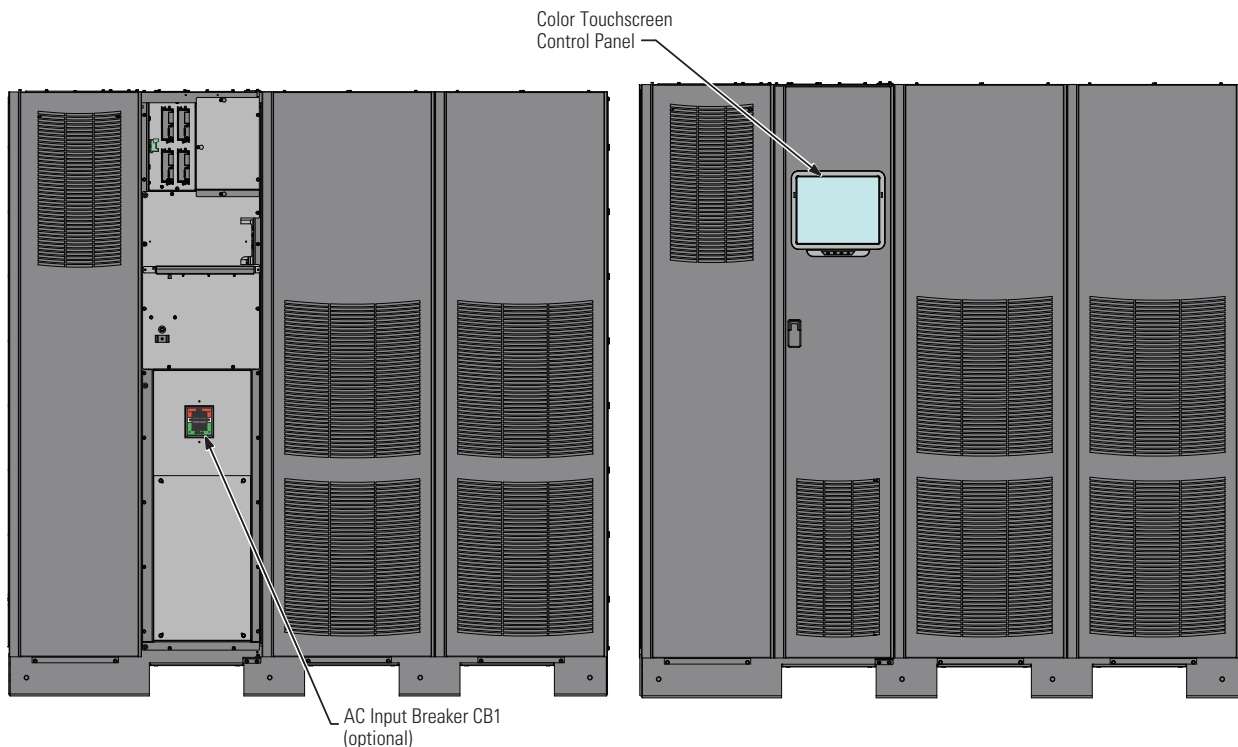
This section describes how to operate the UPS.

-
- NOTE 1** Before starting the UPS, ensure all installation tasks are complete and a preliminary startup has been performed by authorized service personnel. The preliminary startup verifies all electrical interconnections to ensure the installation was successful and the system operates properly.
-  **NOTE 2** Read this section of the manual and have thorough knowledge of UPS operation before attempting to operate any of the controls.
- NOTE 3** The UPS displays two minutes of battery runtime at the initial startup. After a 24-hour charging period, the UPS automatically runs a battery test and the correct battery runtime displays.
-

7.1 UPS Controls and Indicators

The controls and indicators identified and described in this section are used to control and monitor UPS operation. [Figure 71](#) identifies the touchscreen control panel and the location of the CB1 circuit breaker (optional).

Figure 71. 600 kW/kVA UPS Controls



7.1.1 Control Panel

The control panel is used to set up and control the UPS, and to monitor UPS operation. For a description of the UPS control panel functions, see paragraph [7.3 Using the Color Touchscreen Control Panel](#).

7.1.2 Circuit Breakers

Optional circuit breaker (CB1) is used to control the AC input to the UPS rectifier.

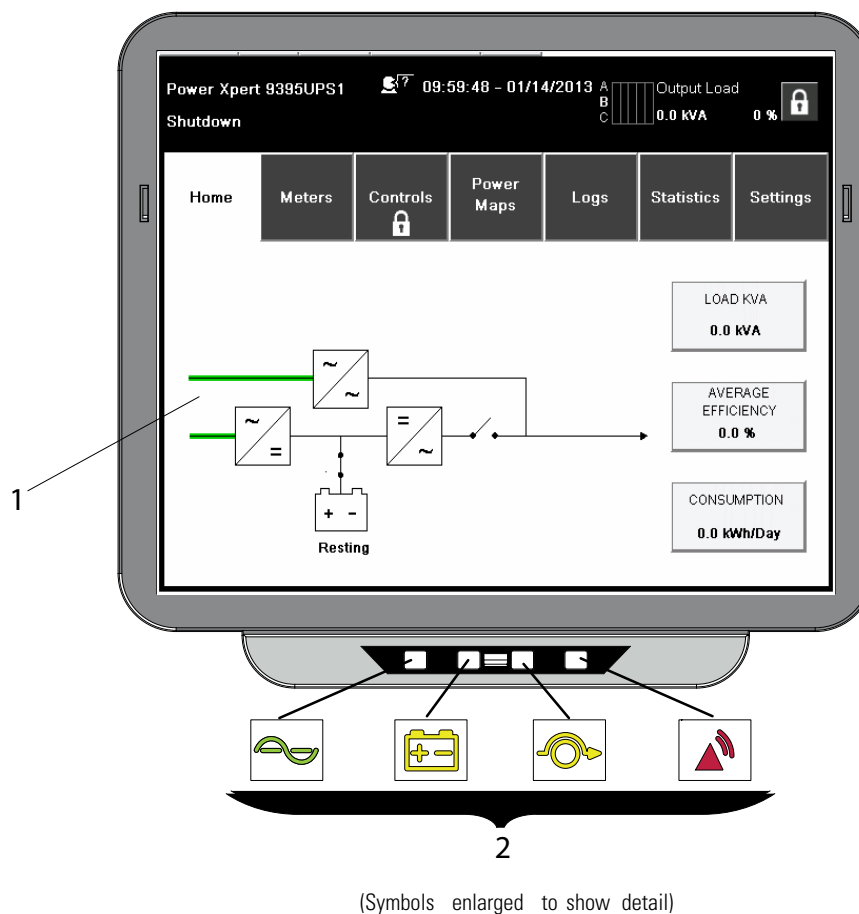
7.2 Color Touchscreen Control Panel

This section describes how the various screens are used to control and monitor UPS operation. [Figure 71](#) shows the location of the color touchscreen control panel on the front door of the UPS. Descriptions of the control panel functions follow. For a description of the UPS control panel functions, see paragraph [7.3 Using the Color Touchscreen Control Panel](#).

7.3 Using the Color Touchscreen Control Panel

The following sections describe the UPS control panel and how to monitor and control UPS operation.

Figure 72. UPS Color Touchscreen Control Panel (Typical)



- A color liquid crystal touch screen display (1)

- A horizontal row of LED indicators (2)

Before system power up, the panel displays a system status screen similar to the one shown in [Figure 72](#).

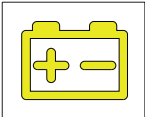
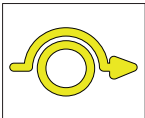
When the unit powers up, the screen displays as shown in [Figure 72](#).

When power is applied to the system, the display advances to the Sign In screen shown in [Figure 73](#).

7.3.1 Status Indicators

The symbols on the bottom of the control panel are status indicators. These colored light emitting diode (LED) lamps work with the alarm horn to let you know the operating status of the UPS. See [Table 35](#).

Table 35. Status Indicators

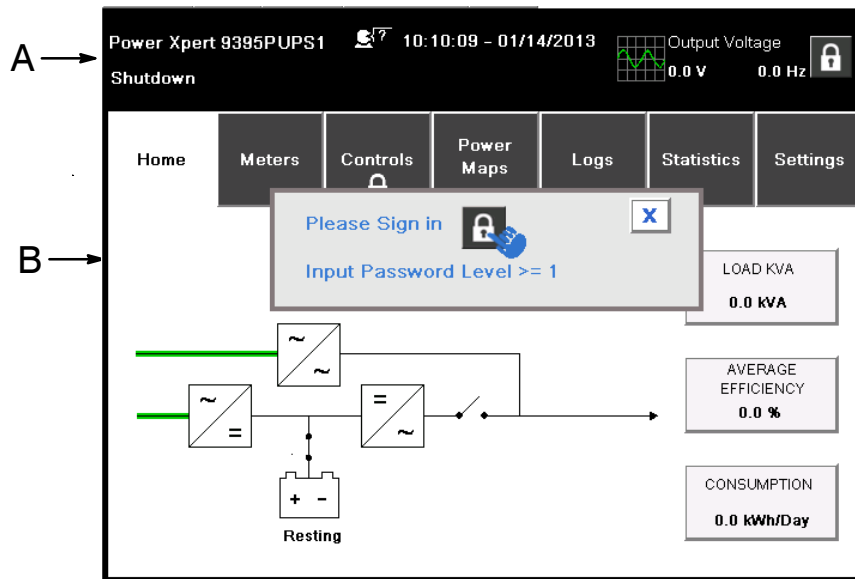
Indicator	Status	Description
 Green	Lit Steady	The UPS is in Online mode, operating normally. The power module is supplying power to the critical load.
 Yellow	Lit Steady	The UPS is in Battery mode. Because Battery mode is a normal condition of the UPS, the Normal indicator also remains illuminated.
 Yellow	Lit Steady	The UPS is in Bypass mode. The critical load is supported by the bypass source. The Online indicator is not illuminated when the system is in Bypass mode.
 Red	Lit Steady Lit Flashing	The UPS has an active alarm and requires immediate attention. The screen shows the highest priority active alarms. All alarms are accompanied by an audible horn. To silence the horn, press any control panel pushbutton once. The Alarm indicator may be illuminated along with other indicators. There is a new UPS alarm condition. The indicator flashes until acknowledged by pressing any control panel pushbutton once.

7.3.2 Using the Touch Screen

The touch screen control panel provides an operator interface with the UPS system. [Figure 73](#) identifies the display areas discussed in the following sections.

Touching anywhere on the screen brings up the Sign In Request pop-up. Touch the X in the upper right corner of the pop-up, then touch the padlock symbol in the upper right corner to obtain the password request pop-up (see [Figure 74](#)).

Figure 73. Parts of the Touch Screen



- A** The *UPS status* area automatically displays the Eaton model number, current time and date, active alarms, active notices, and load percent and battery run time for the UPS. If the Eaton Environmental Monitoring Probe is installed, the temperature and humidity sensed by the probe will also be displayed. The small head symbol between the system model and time allows the operator select a different language from an imbedded list.

The top line of the display blinks while scrolling when the system needs attention. Some notices and alarms may be accompanied by an audible horn. To silence the horn, touch anywhere on the control panel once. For more information about alarms and notices, see paragraph [7.3.11 User Log](#).

- B** The *information area* contains data about UPS status and operations.
- C** After touching the padlock in the upper right corner, the numerical keypad appears to allow entry of the system access pass code for operation. See [Table 36](#) Security Levels and Functions.

Figure 74. Sign In or Password Request Screen

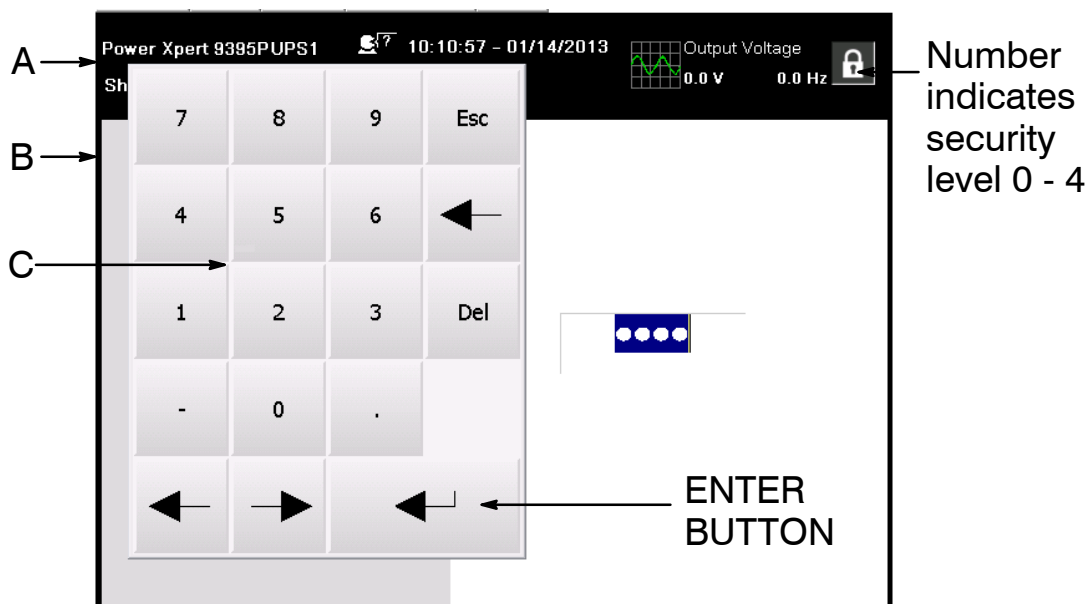


Table 36. Security Levels and Functions

Level	Name	Passcode	Description
0	USER	NONE	USER
1	CONTROL	1111	USER + CONTROL
2	CONFIGURATION	0101	USER + CONTROL + CONFIGURATION
3	SERVICE	Service Only	USER + CONTROL + CONFIGURATION + SERVICE

7.3.3 Using the Main Menu Buttons

The UPS menu bar shown in [Figure 75](#) allows you to display data in the information area to help you monitor and control UPS operation. [Table 37](#) shows the basic menu structure.

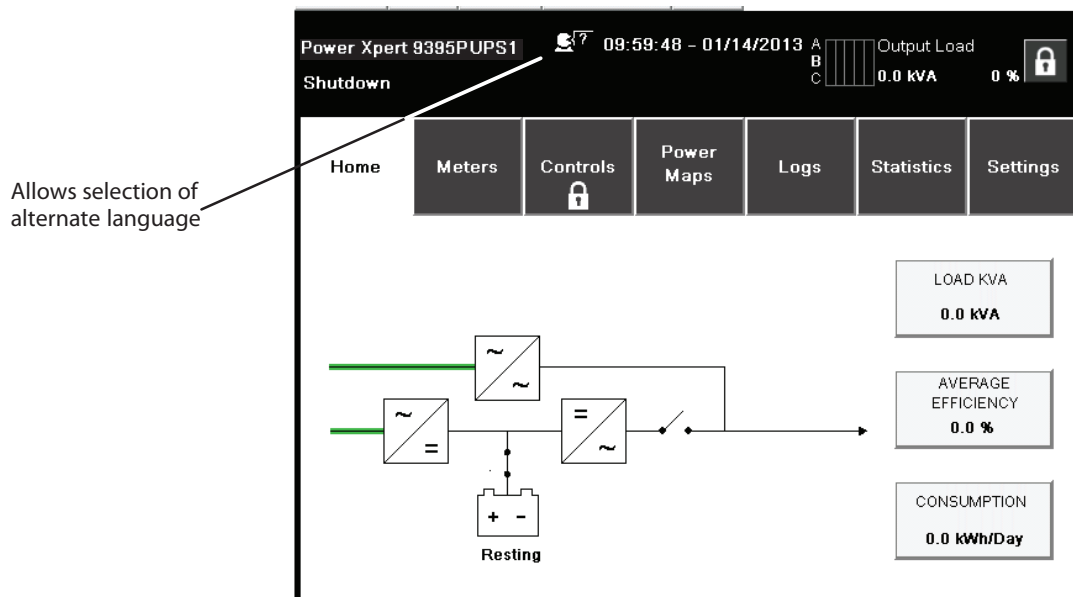
Table 37. Display Function Menu Map

Menu Option	Description
HOME	Displays the system status both graphically and within the info bar.
METERS	Displays performance meters for the system or critical load.
CONTROLS	Allows access to various system performance control screens.
POWER MAPS	Allows operator to observe system power flow.
LOGS	Allows access to system information logs.

Table 37. Display Function Menu Map (Continued)

Menu Option	Description
STATISTICS	Allows access to see system specific operation values.
SETTINGS	Allows access to various screen controlled variables for system operation. Level 0, 1 and 2 are for user/operator. Level 3 is used only by service personnel.

Figure 75. Home Screen

**NOTE**

On all screens, Black lines indicate NO power flow, Green lines indicate ACTIVE power flow, Yellow lines indicates an out-of-tolerance condition.

**NOTE**

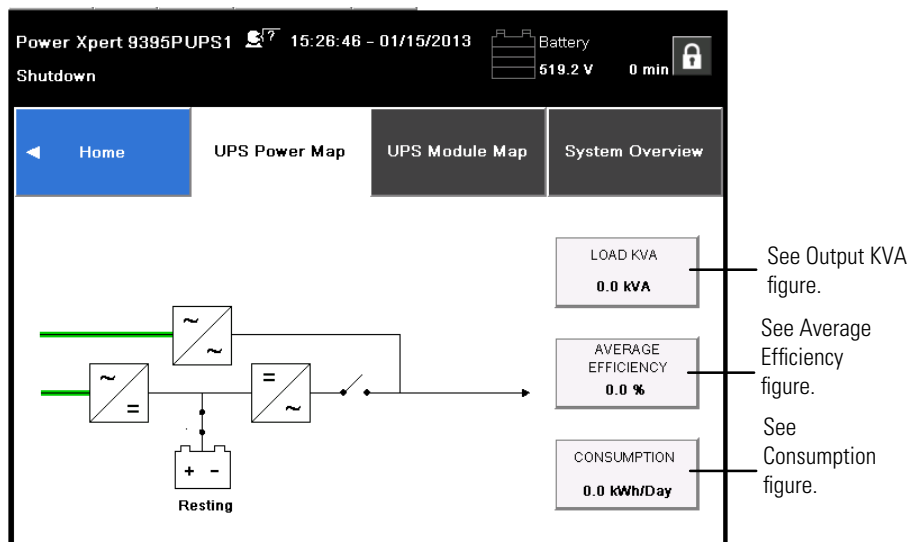
Screens shown are representative examples of system operation. The screen data will vary based on system activity at the time of observation.

7.3.4 Power Maps Screen (Online Mode)

Figure 76 shows the Main Menu and Power Maps screen. The Power Maps screen displays immediately after entering the access code.

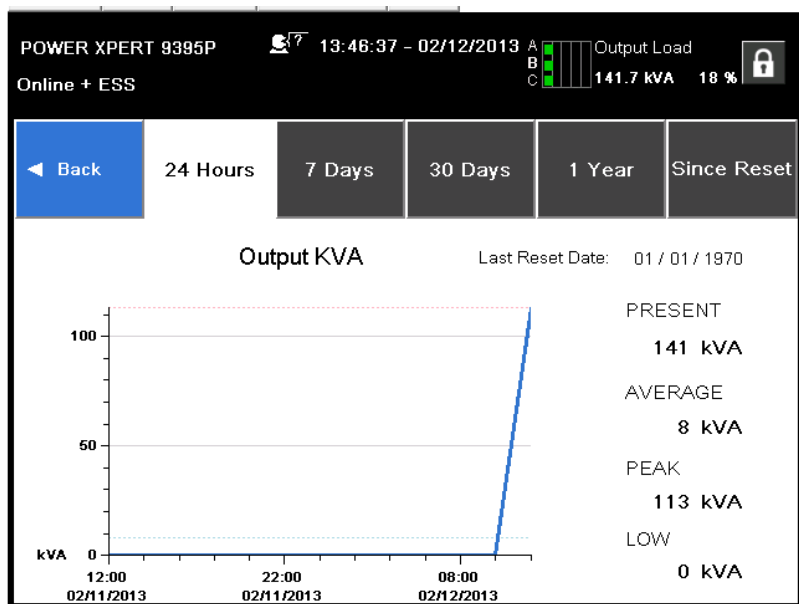
The Power Maps screen shows a real-time graphical representation of the operating status.

Figure 76. Main Menu and Power Maps Screen (Online Mode)



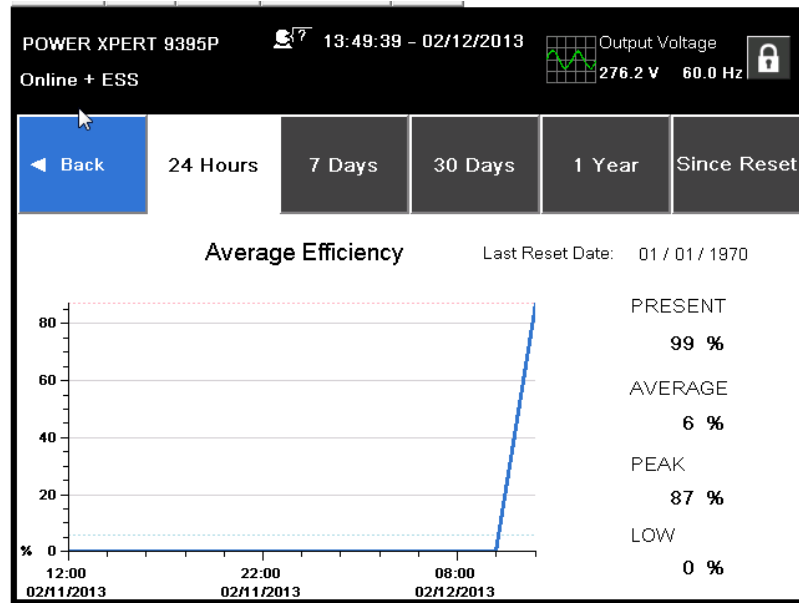
Touching the LOAD kVA button displays the Output kVA screen shown in [Figure 77](#).

Figure 77. Output kVA Screen from Home Screen



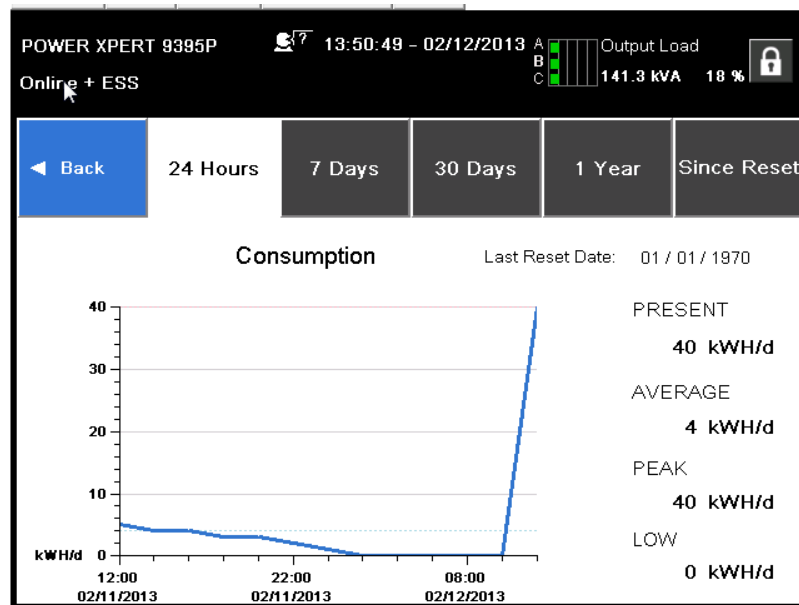
Touching the AVERAGE EFFICIENCY button displays the system efficiency screen shown in [Figure 78](#).

Figure 78. Average Efficiency Screen from Home Screen



Touching the CONSUMPTION button displays the screen shown in [Figure 79](#).

Figure 79. Consumption Screen from Home Screen



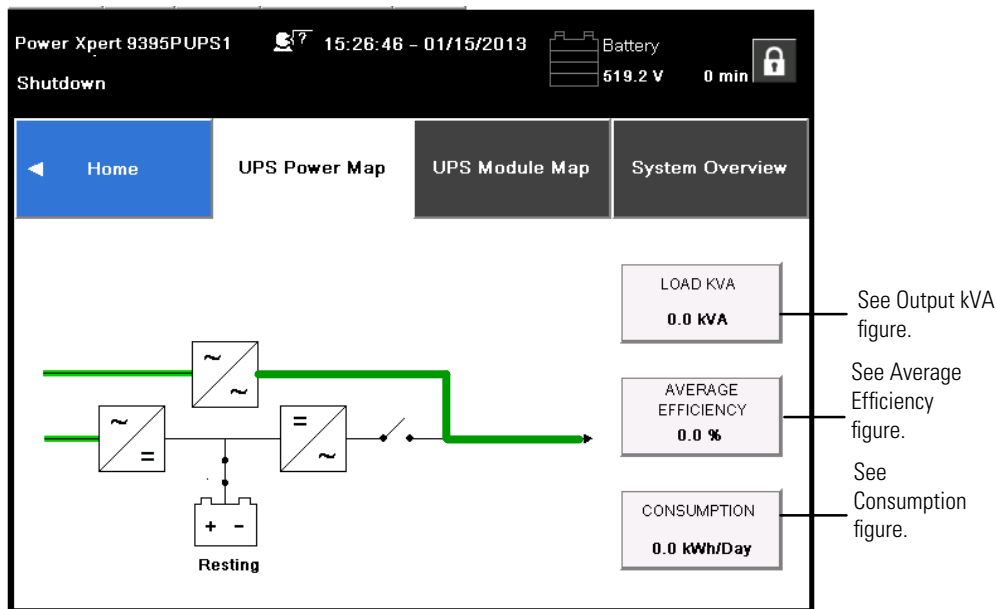
7.3.5 Power Maps Screen (Bypass Mode)

[Figure 80](#) shows the Bypass screen. The Bypass screen displays only when the system is in Bypass mode.

The Bypass screen shows a real-time graphical representation of the operating status.

Touching any of the buttons on the right side of the screen takes the user directly to that information screen.

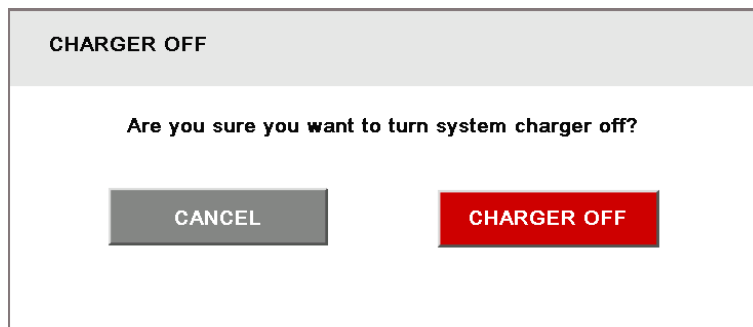
Figure 80. Bypass Screen



7.3.6 Command Confirmation Pop-Up

[Figure 81](#) is an example of a command request confirmation pop-up screen. This type of pop-up allows the user to confirm that the requested command is valid.

Figure 81. Typical Command Confirmation Screen (Charger Off)



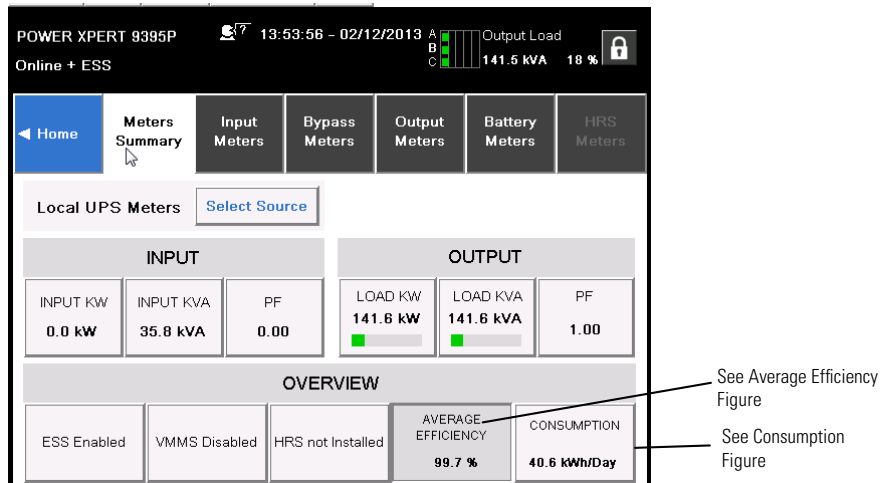
7.3.7 Meters Summary Screen

[Figure 82](#) shows the Meters Summary screen. This screen allows selection of the various metering readout functions of Input, Output and overall System status.

The three left items in the OVERVIEW section of the screen are not active buttons but are status detail panels. They show individual conditions of the UPS at that time.

The two items at the far right of the OVERVIEW section are active buttons. They can be selected to show a profile of efficiency or consumption over various time periods of 24 hours, 7 days, 30 days, or 1 year. This is true of all the meters screens listed in the top section.

Figure 82. Meters Summary Screen

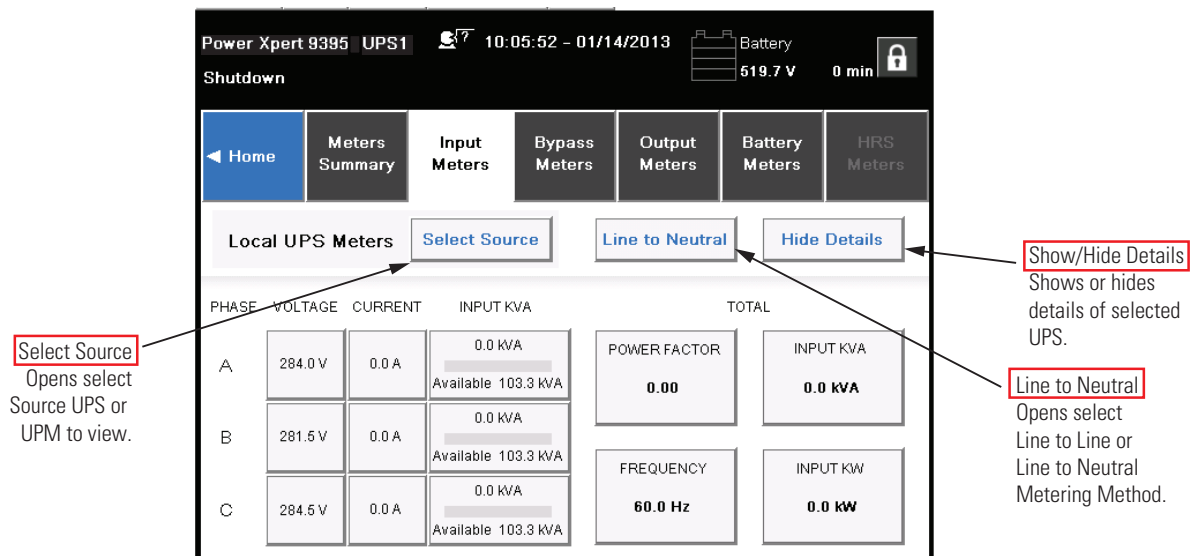


7.3.8 Input, Bypass and Output Meters Screens

Meters for UPS Input, Bypass and Output can be selected for detailed status and operation.

Meters Selection Buttons on the Input, Bypass and Output screens allow selection of the source UPS, Metering mode (Line to Line/Line to Neutral) and UPS details. See [Figure 83](#).

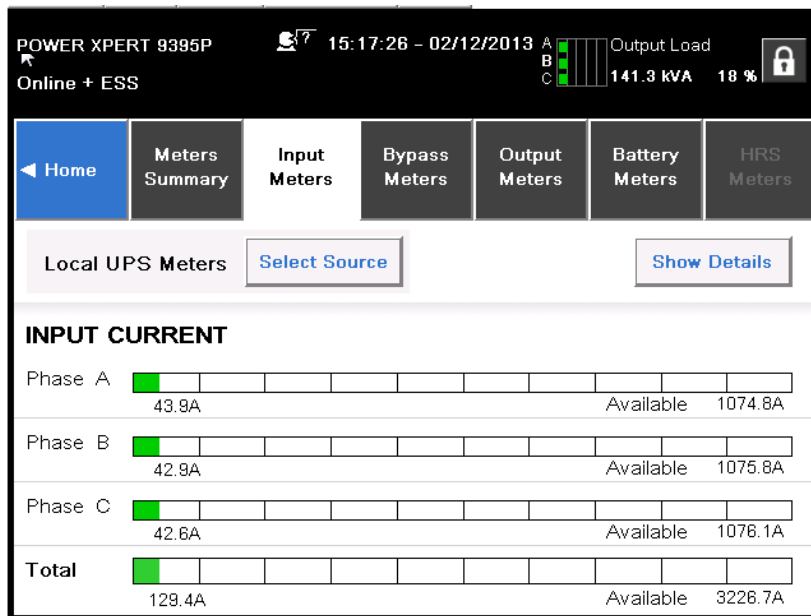
Figure 83. Meters Selection Buttons (Typical)



Input Meters Screen

Figure 84 shows the Input Meters screen. This screen displays the individual phase and total power values of the system.

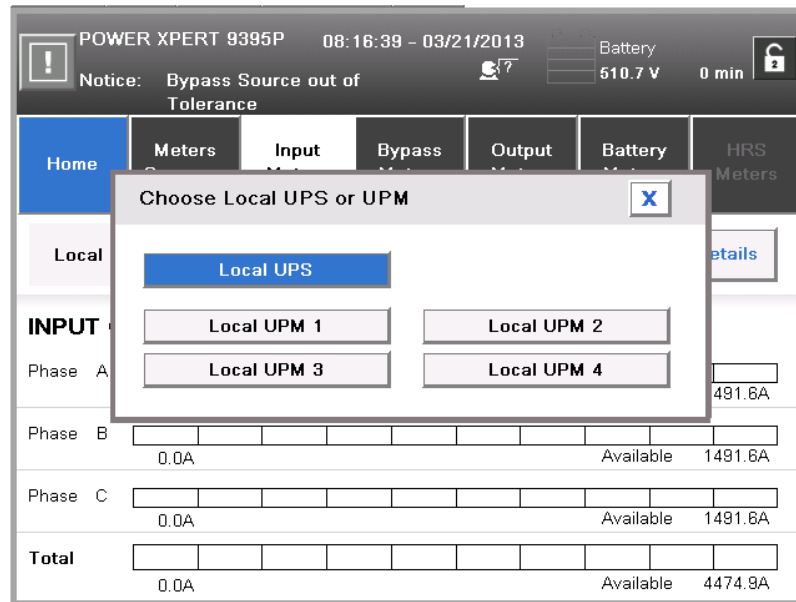
Figure 84. Input Meters Screen



Select Source Screen

The Select Source screen and allows the operator to choose the individual source for system readings (see [Figure 85](#)).

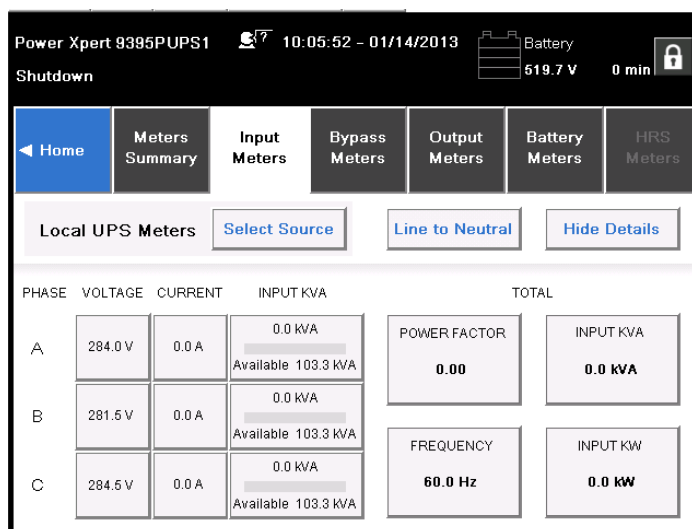
Figure 85. Select Source Screen



Input Meters Detail Screen

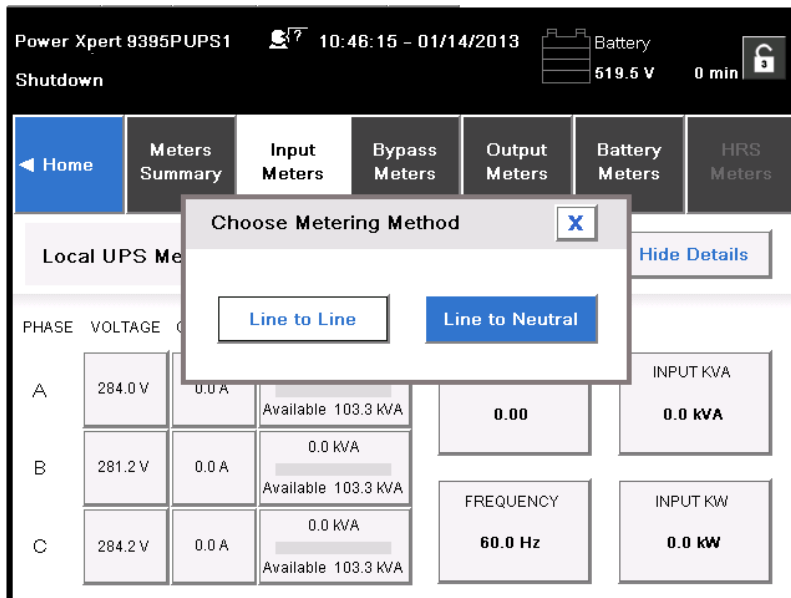
Show Details button shows the Input Meters detail screen (see [Figure 86](#)). This screen displays the individual values of the system in additional detail.

Figure 86. Input Meters Detail Screen



The Line to Neutral Button on the Input Meters Detail screen opens the Metering Method Option screen. The operator can select line-to-line or line-to-neutral monitoring values. See [Figure 87](#).

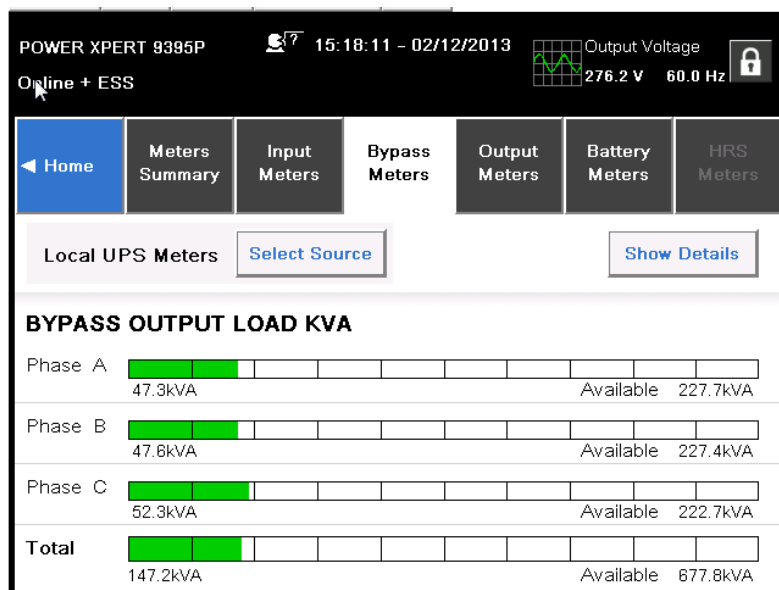
Figure 87. Online Mode Metering Method Option Screen



Bypass Meters Screen

The Bypass Meters Screen shown in [Figure 88](#) displays values pertaining to the Bypass conditions.

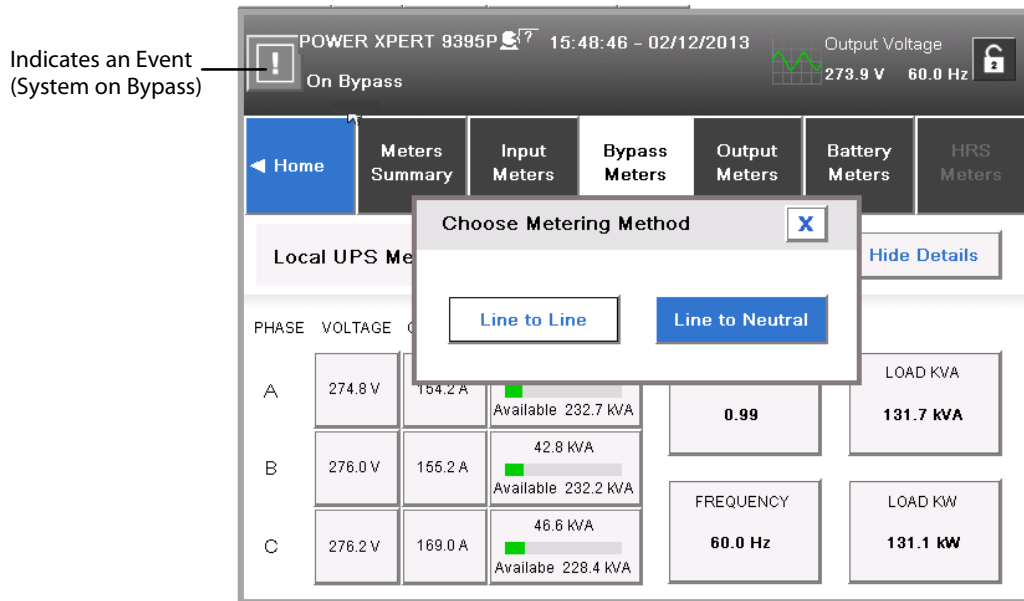
Figure 88. Bypass Meters Screen



Bypass Mode Metering Method Option Screen

The Show Details button on the Bypass Mode Metering Method Option Screens allows the operator to select the metering method for either line-to-line or line-to-neutral monitoring values. See [Figure 89](#)

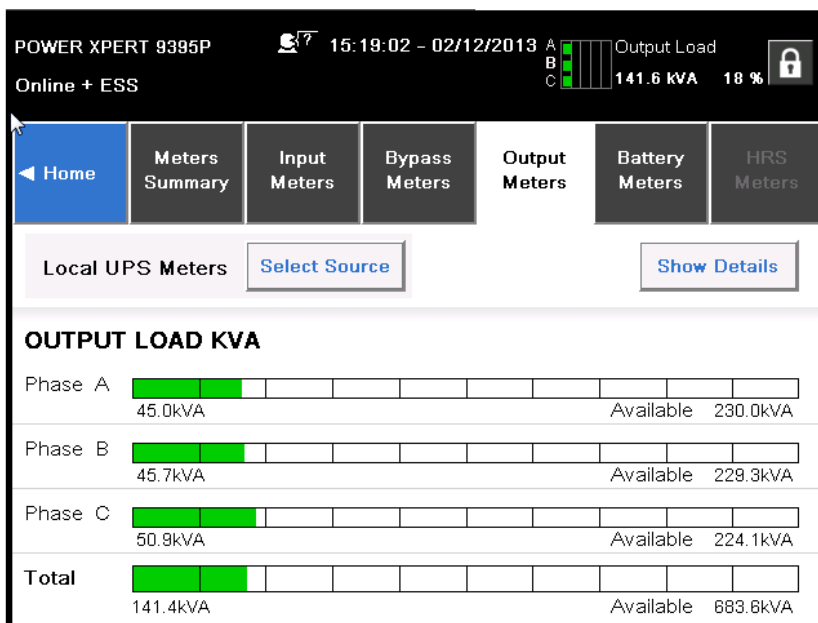
Figure 89. Bypass Mode Metering Method Option Screen



Output Meters Screen

The Output Meters Screen shown in [Figure 90](#) displays values pertaining to the system output.

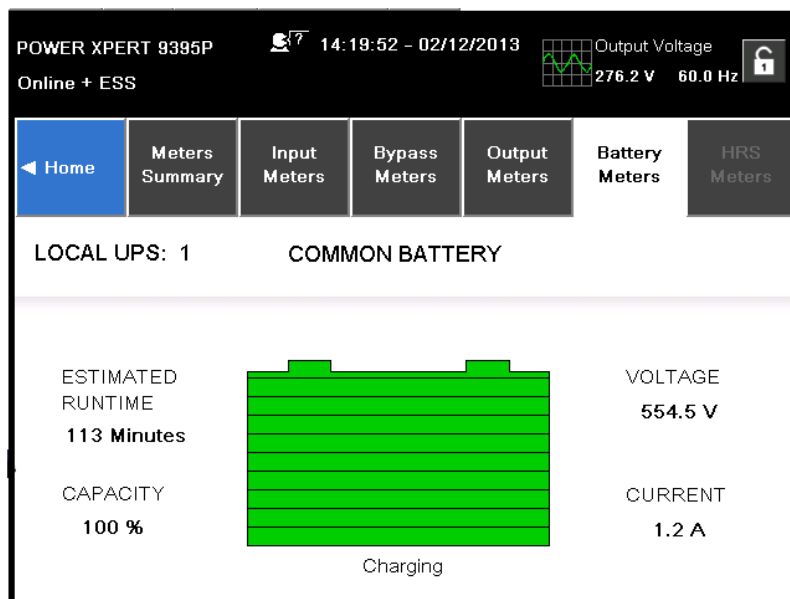
Figure 90. Output Meters Screen



7.3.9 Battery Meters Screen

[Figure 91](#) shows the Battery Meters basic screen.

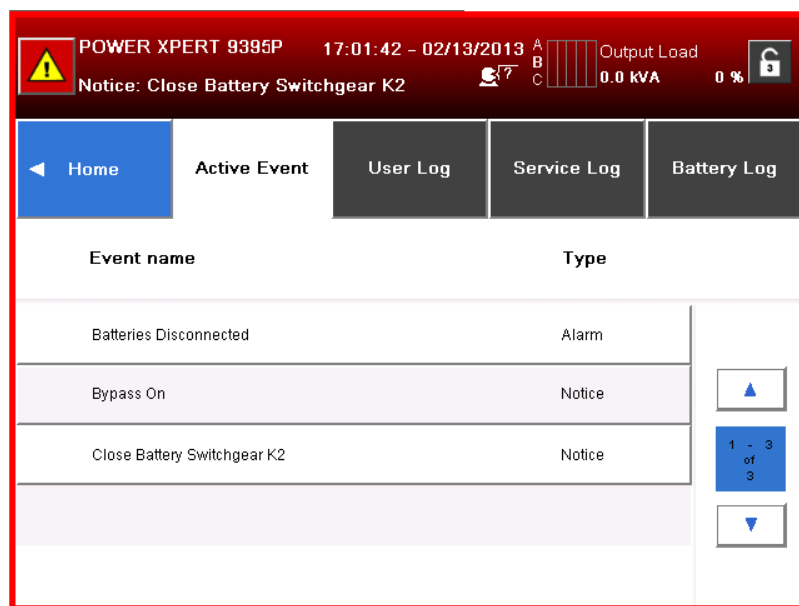
Figure 91. Battery Meters Screen



7.3.10 System Events Main Screen

When the UPS system is running in Online mode, it continually monitors itself and the incoming utility power. In Battery or Bypass modes, the UPS may issue alarms to display exactly what event caused the change from Online mode. System events on the UPS can be indicated by horns, lights, messages, or all three. The System Events screen can be accessed from the Home screen with the **LOGS** button. See [Figure 92](#).

Figure 92. System Events Screen



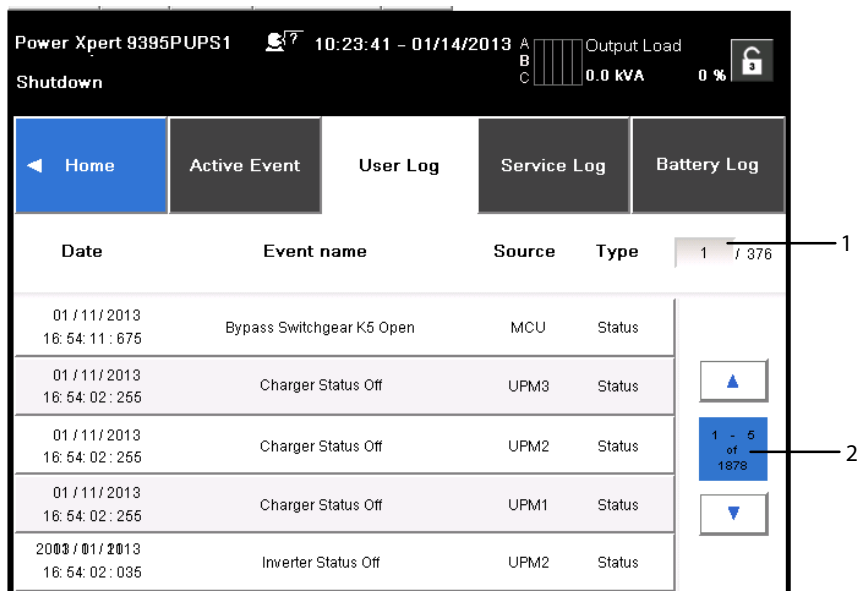
7.3.11 User Log

Select **LOGS** from the menu bar on the main menu screen to look at the active events screen. This screen shows any currently active alarms, notices, or commands.

- **System Event Horns** – The system event horn beeps to alert an operator that an event needing attention is taking place. The horn cycles at a half-second rate.
- **System Event Indicators** – The status indicators on the UPS control panel work with the event horn to let the operator know when the UPS is operating in any mode other than normal. Only the ON indicator is visible during normal UPS system operation. The other indicators illuminate to indicate alarms or events. When an alarm occurs, first check these indicators to see what type of event has taken place. For descriptions of the status indicators, see paragraph [7.3.1 Status Indicators](#).
- **System Event Messages** – When a system event occurs, a message appears on the LCD in the UPS status area. This message is also written to the Active Events Log and may be added to the History Log. The messages are divided into four categories: alarms, notices, status, and commands.

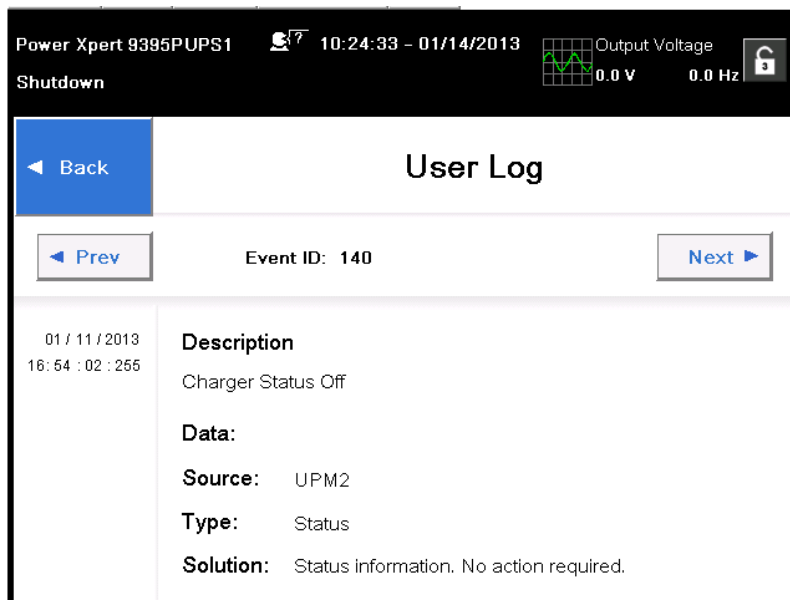
The user log window (1) allows the operator to enter any number up to the number shown to the right of the box. Each window shows five events. The operator can also use the UP/DOWN arrows above and below the blue field (2) showing the number of events in the log. See [Figure 93](#).

Figure 93. User Log Screen



Selecting an event opens the Event Detail screen shown in [Figure 94](#). This screen details the specifics of the event for the user to see.

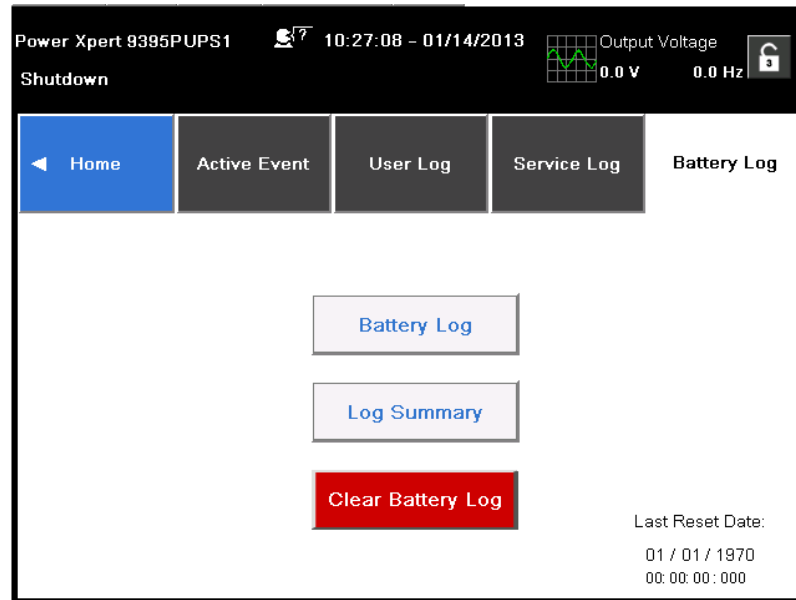
Figure 94. User Log Detail Screen



7.3.12 Battery Log Screen

[Figure 95](#) shows the Battery Log access screen.

Figure 95. Battery Log Screen



[Figure 96](#) shows the Battery Log Detail screen.

Figure 96. Battery Log Detail

The screenshot shows the 'Battery Log' detail screen. At the top, it displays 'Power Xpert 9395PUPS1', a clock icon, the time '10:27:46 - 01/14/2013', a battery icon, 'Battery 519.7 V', '0 min', and a lock icon. Below this is a 'Shutdown' status. A navigation bar contains a 'Back' button and the title 'Battery Log'. The main area is a table with the following data:

Date	Time on Battery	Load on Battery	End Voltage	Source	
01 / 08 / 2013 16:11:09:495	0 Min 15 Sec	84.6 kW	142.9 V	UPM3	
01 / 08 / 2013 16:11:11:485	0 Min 13 Sec	76.3 kW	143.6 V	UPM1	▲
01 / 08 / 2013 15:51:57:355	0 Min 24 Sec	94.1 kW	89.1 V	UPM3	1 - 5 of 8
01 / 08 / 2013 15:51:57:355	0 Min 24 Sec	93.7 kW	89.4 V	UPM2	
01 / 08 / 2013 15:51:57:355	0 Min 24 Sec	93.6 kW	89.4 V	UPM1	▼

[Figure 97](#) shows the Battery Log Summary screen.

Figure 97. Battery Log Summary Screen

Source	<1 min	1-4 min	>4 min	Average Time	Total Time
UPM1	2	1	0	0 Min 35 Sec	1 Min 46 Sec
UPM2	1	1	0	0 Min 56 Sec	1 Min 53 Sec
UPM3	2	1	0	0 Min 37 Sec	1 Min 51 Sec

7.3.13 System Status Screen and Controls

Press the SYSTEM CONTROLS pushbutton on the main menu bar to display the System Status screen. Online operation, transfer to bypass, UPM start up and shutdown, and LOAD OFF commands are controlled through this screen. In addition, the screen displays the current status of the UPS, indicates whether the UPS is in Maintenance Bypass or Bypass, and displays the state of the UPM. [Figure 98](#) shows the System Status screen.

Figure 98. System Status Screen

Power Xpert 9395PUPS1
10:12:23 - 01/14/2013
Output Load
0.0 kVA 0 %

System Controls
Module Controls
EAA Controls

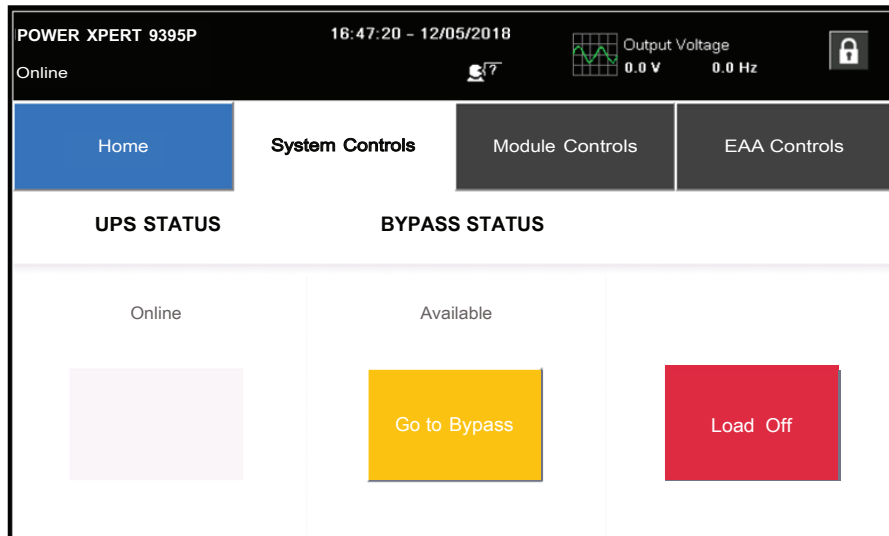
UPS STATUS
BYPASS STATUS

Shutdown
Available

Go Online
Go to Bypass
Load Off

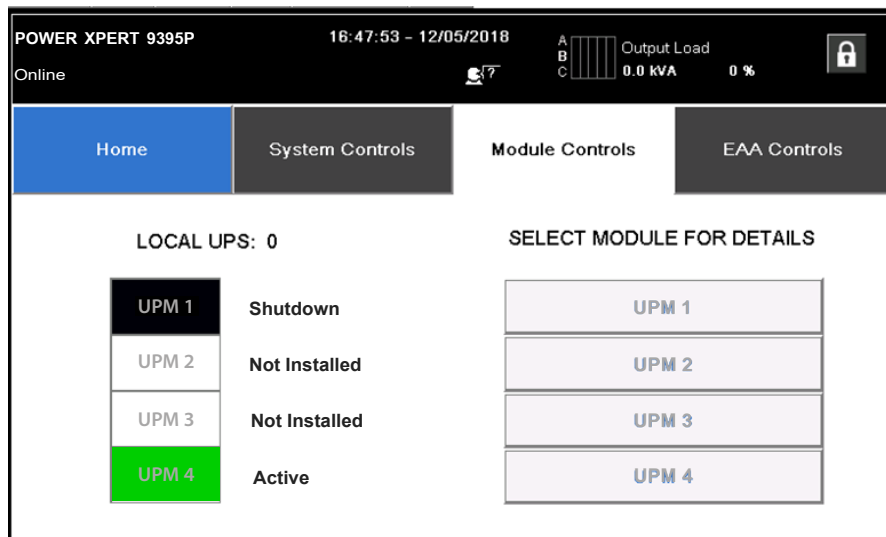
The Load Off button on the System Status screen controls the UPS output by powering down the UPS and de-energizing the critical load (see [Figure 99](#))

Figure 99. Load Off Button



[Figure 100](#) shows the Module Controls screen. This screen allows control of the individual modules within the system. It also gives their values and status.

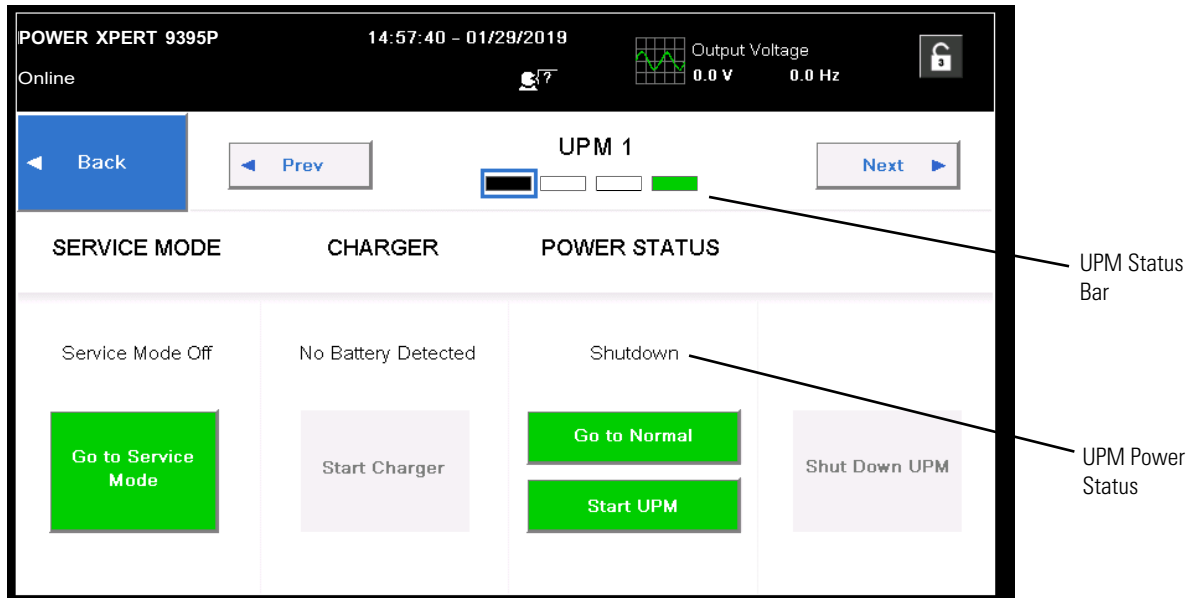
Figure 100. Module Controls Screen



[Figure 101](#) shows the Module Control Detail screen. By selecting any of the modules shown on the previous screen ([Figure 100](#)), the user can observe full details of an individual module. It also allows the user to move through various modules and modes while within this screen. The color of the UPM button indicates status:

- Green – Active
- Gray – Idle
- Black – Shutdown

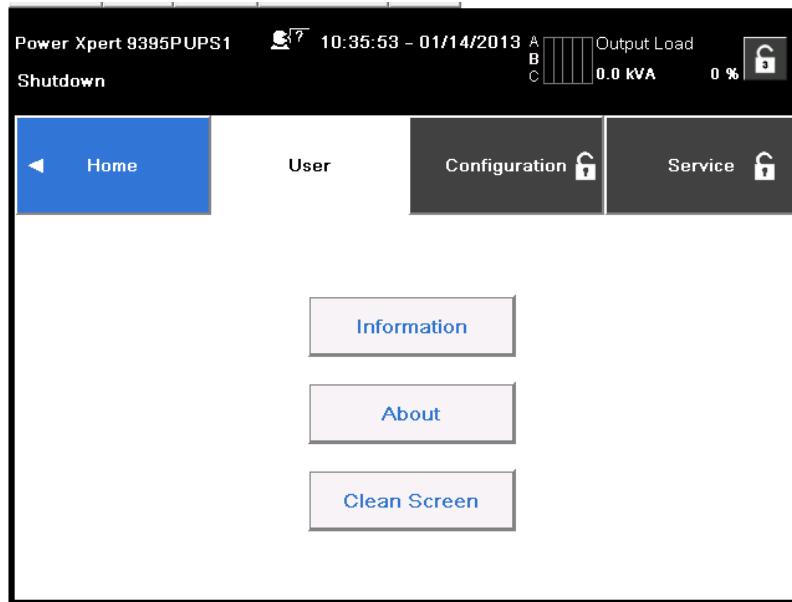
Figure 101. Module Control Detail Screen



7.3.14 Settings Screen

The screen shown in [Figure 102](#) gives the operator access to basic system information such as serial number, installed firmware version, etc. Touching the CLEAN SCREEN button disables the screen for 30 seconds to allow the user to safely clean the screen without affecting operation.

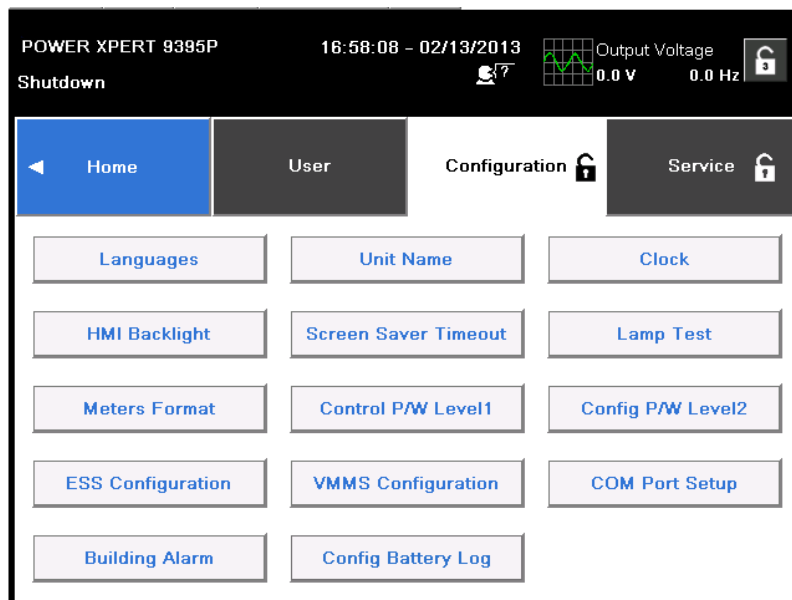
Figure 102. Settings Screen



7.3.15 Configuration Options Screen

The screen shown in [Figure 103](#) allows the operator to affect changes to various system values.

Figure 103. Configuration Options Screen

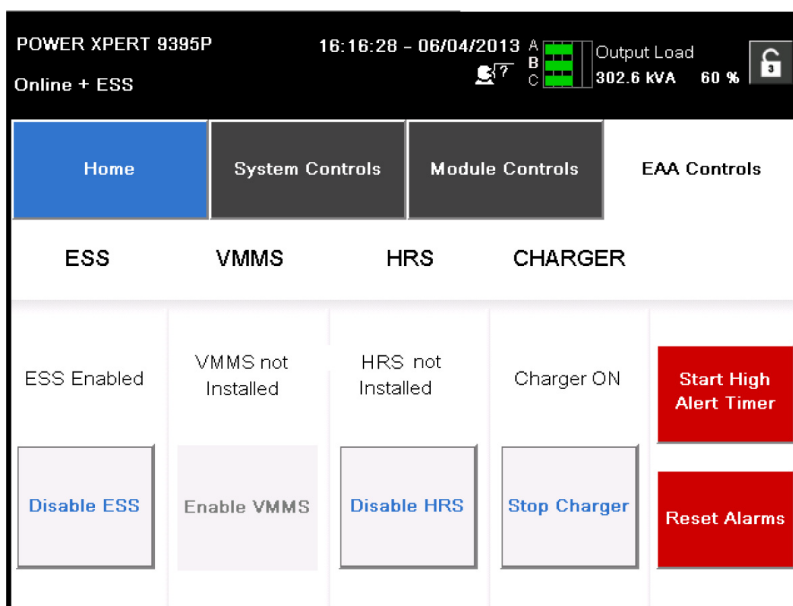


7.3.16 Energy Advantage Architecture (EAA) Screen

This screen shown in [Figure 104](#) allows the operator to activate the various energy saving and power efficiency modes of the system.

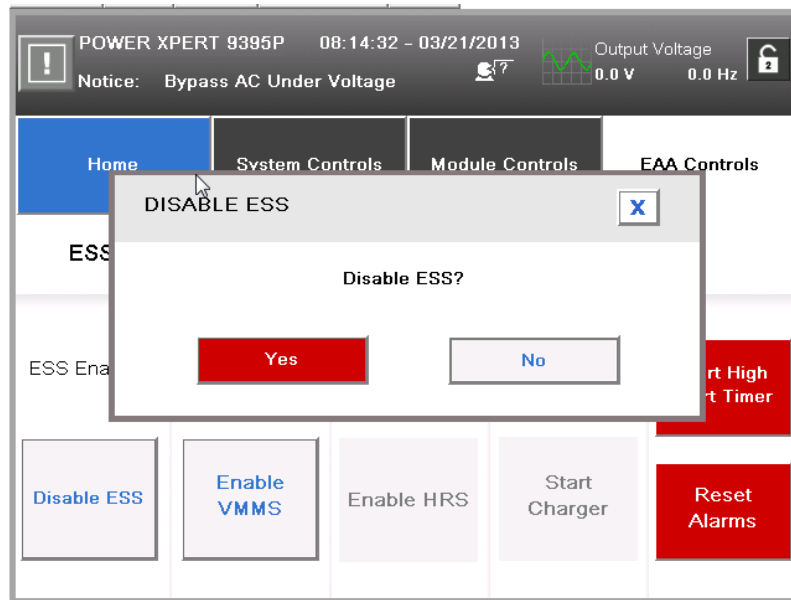
The various Energy Advantage Architecture operations are described in the UPS Installation and Operation manual for your system.

Figure 104. Energy Advantage Architecture (EAA) Screen



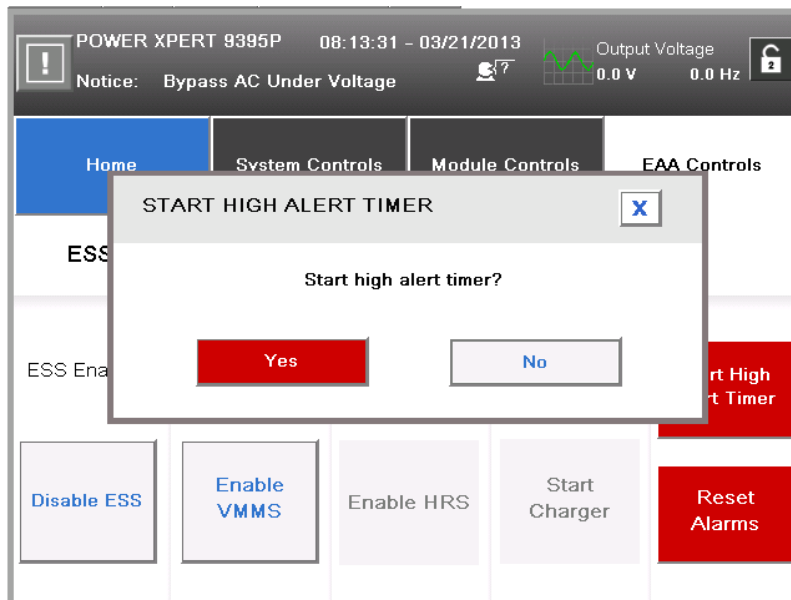
This screen shown in [Figure 105](#) asks the operator to verify disabling the ESS mode running at that time.

Figure 105. Disable ESS Screen



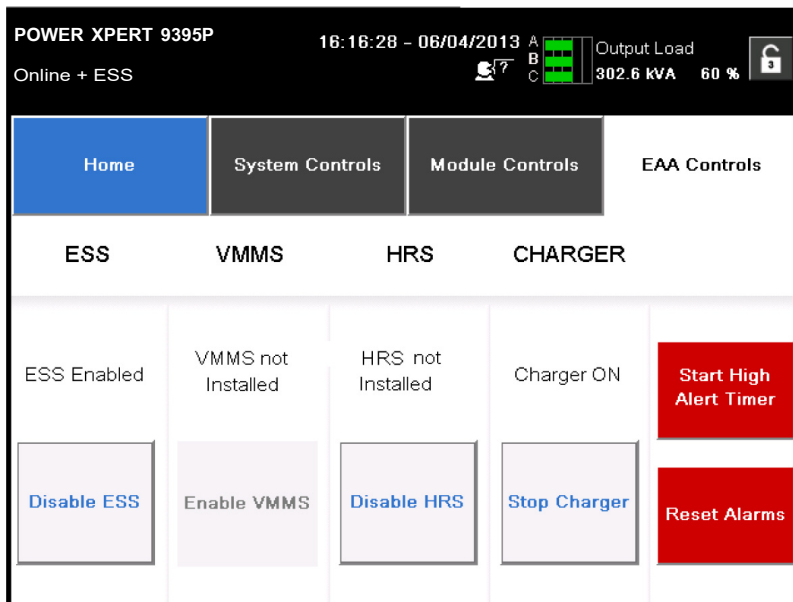
This screen shown in [Figure 106](#) asks the operator if they want to start the High Alert mode timer.

Figure 106. High Alert Timer Screen



The **Reset Alarms** button on the EAA Controls screen allows the user to reset alarms after an alarm has been activated.

Figure 107. Reset Alarms



7.3.17 Statistics Basic Screen

The screen shown in [Figure 108](#) allows the operator to query the system for various operational statistics such as shown in [Figure 109](#).

Figure 108. Statistics Basic Screen

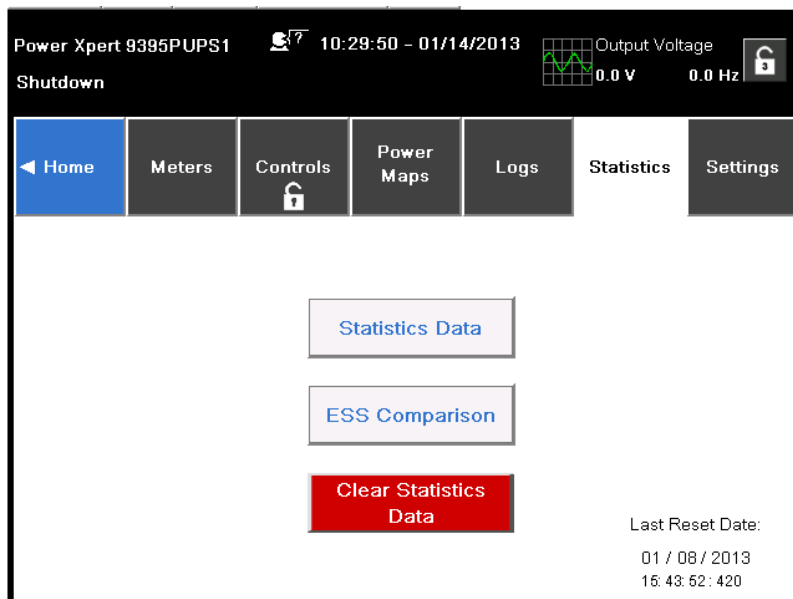
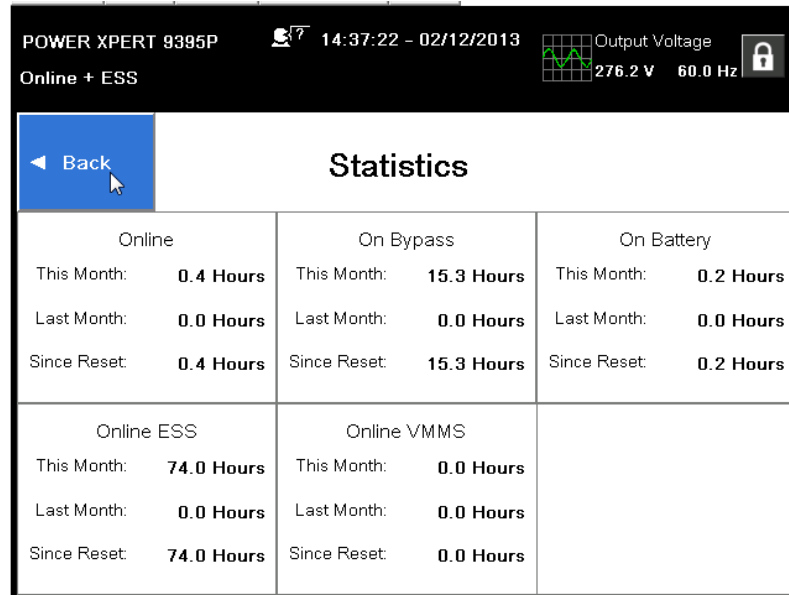


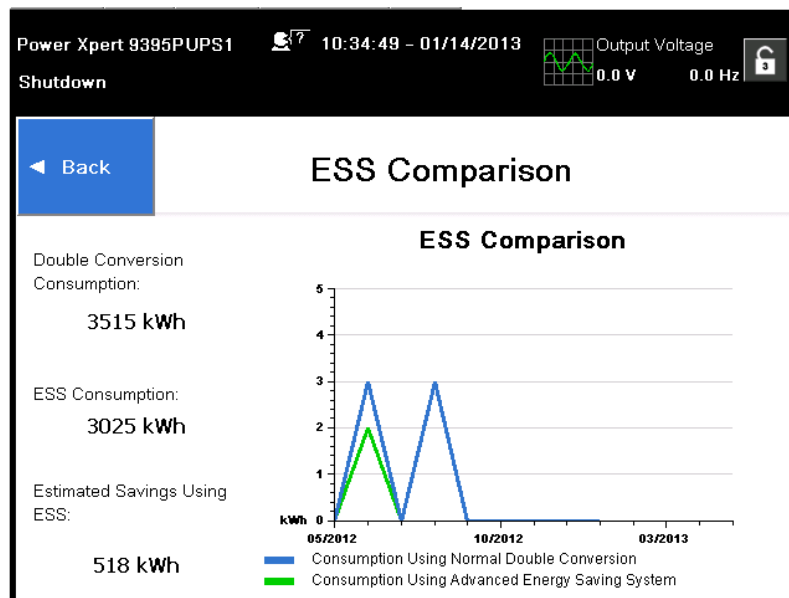
Figure 109. Statistics Data Detail Screen



7.3.18 ESS Comparison Screen

The screen shown [Figure 110](#) allows the operator to visually obtain EAA mode efficiency values.

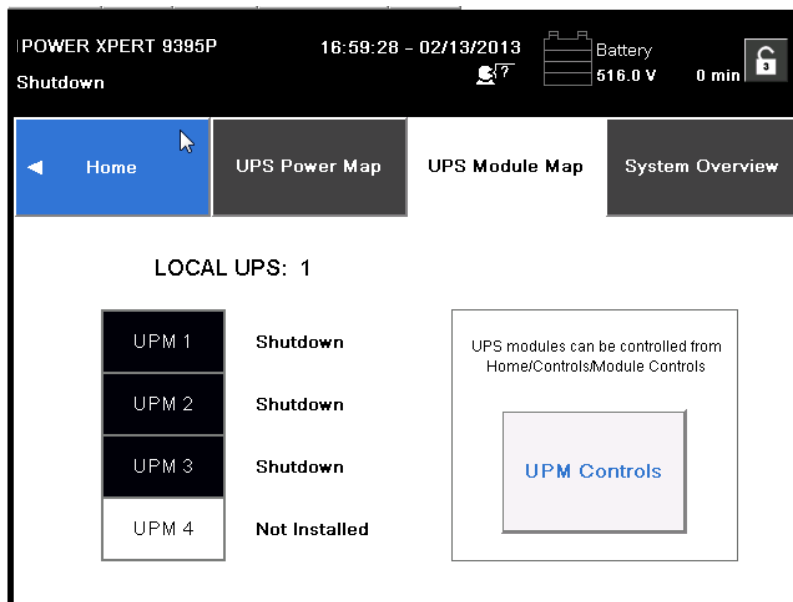
Figure 110. ESS Comparison Screen



7.3.19 UPS Module Map Screen

The screen shown [Figure 111](#) allows the operator to control the individual UPMs.

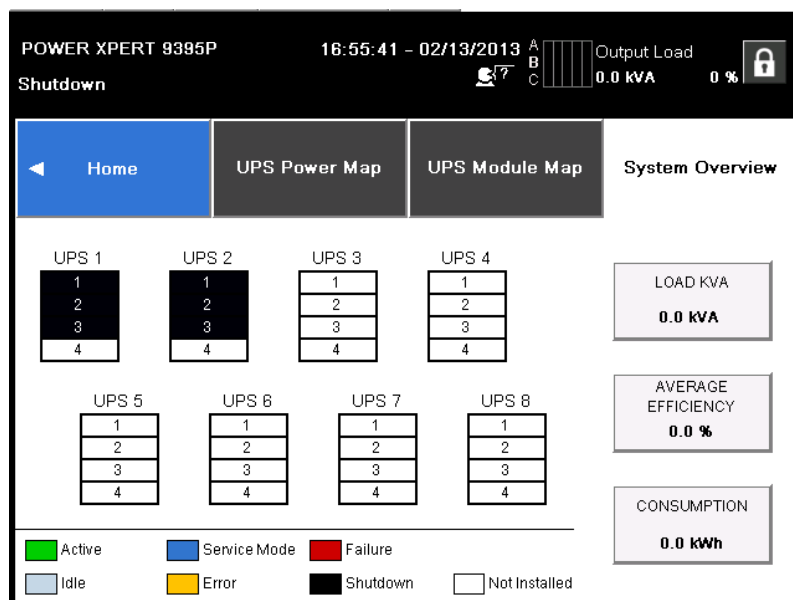
Figure 111. UPS Module Map Screen



7.3.20 System Overview Screen

The screen shown [Figure 112](#) displays values for all UPS and UPM parameters.

Figure 112. System Overview Screen



7.4 Single UPS Operation

The paragraphs in this section provide operating instructions for a UPS system containing only one UPS.

**NOTE**

If the touch screen fails to respond, open the front door and depress the RESET button located on the bottom of the screen mounting assembly. The screen will reboot but NOT affect system status or operation.

**NOTE**

Some UPS operations may require a security level sign-in. If a sign-in request screen appears, see [Figure 74](#) for details.

**NOTE**

A Field Installed UPM (FI-UPM) is always designated as UPM 4.

7.4.1 Starting the UPS in Online Mode

To start the UPS system:

WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

1. Unfasten the front door latch and swing the door open (see [Figure 14](#)).

**NOTE**

*Only perform steps 2 and 5 if the UPS has an input breaker CB1 (see [Figure 71](#)).

2. *Verify that input breaker CB1 is open.
3. Close the UPS input feeder circuit breaker.
4. Close the UPS Bypass input feeder circuit breaker.
5. *Close input breaker CB1.
6. Close the battery breaker.
7. Close the door and secure the latch.
8. Observe the UPS control panel display becoming active, indicating logic power.
9. Make sure you are logged in for user access (see [Figure 74](#)).
10. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
11. Select **Go Online**. Select **Yes** on the confirmation screen.
If Auto Bypass is enabled (factory default), the critical load is immediately supplied by the bypass source in Bypass mode, until the inverter turns on and the UPS transfers to Online mode. The status indicator on the UPS control panel indicates the UPS is in Bypass mode. If Auto Bypass is not enabled, the UPS output remains off until the UPS transfers to Online mode.
12. The **Going Online** screen appears.

The rectifier and inverter turn on. The inverter continues to ramp up to full voltage.

When the inverter reaches full voltage, the UPS output contactor K3 closes and the static switch turns off. Power is now supplied to the critical load in Online mode. It takes approximately one minute for the UPS to achieve Online mode.

The Online status indicator is illuminated. The UPS status indicates *Online* on the header section of the screen. The UPM status indicates *Active, Charger ON* on the UPM **Module Control Detail** screen (see [Figure 101](#)).

To activate or enable/disable any of the UPS operational modes, follow the online screen prompts.

To obtain any system information, follow the on screen prompts to get to the proper screen. The operator cannot inadvertently cause a system dump or disconnect unless they override a warning pop-up. Value or information screens DO NOT affect system operation.

7.4.2 Enable Energy Saver System Mode

To enable Energy Saver System mode:

NOTE 1 The Energy Saver System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive.

NOTE 3 The UPS can transfer to ESS only if the UPS was online. ESS can be enabled in any mode, including Shutdown

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)). (AA)
4. On the EAA screen, select **Enable ESS**.
5. Select **Yes** on the confirmation screen.

The UPS transfers to Energy Saver System mode.

The Online status indicator is illuminated and **Online + ESS** displays in the UPS status area. If the battery is not charging, the power module fans are off.

7.4.3 Disable Energy Saver System Mode

To disable Energy Saver System mode:

NOTE 1 The Energy Saver System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Disable ESS** the **Disable ESS?** confirmation screen appears (see [Figure 105](#)).
5. Select **Yes** on the confirmation screen.

The UPS transfers to Battery mode and then to Online mode if it was in Online+ESS mode.

The Online status indicator is illuminated. The UPS status indicates **Online**. The UPM status indicates **Active**.

7.4.4 Start Energy Saver System High Alert Mode



NOTE 1 The High Alert mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.

NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive.

To start ESS High Alert mode:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).

The UPS status indicates **Online + ESS**.

3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Start High Alert Timer** the **Start high alert timer?** confirmation screen appears (see [Figure 106](#)).
5. Select **Yes** on the confirmation screen.

The UPS starts High Alert mode with the UPMs online supplying the critical load. After one hour the UPS transfers back to Energy Saver System mode.

The Online status indicator is illuminated. The UPS status indicates **Online**. The UPM status indicates **Active**. The power module is on.

7.4.5 Enable Variable Module Management System Mode

To enable Variable Module Management System mode:



NOTE 1 The Variable Module Management System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.

NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Energy Saver System mode is enabled, the Variable Module Management System mode commands will not be displayed.

NOTE 3 The UPS can transfer to VMMS only if the UPS was online. VMMS can be enabled in any mode, including Shutdown.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Enable VMMS**. The **Enable VMMS?** confirmation screen appears.
5. Select **Yes** on the confirmation screen.

The UPS transfers to Variable Module Management System mode. In approximately twenty seconds the UPS calculates the required number of UPMs needed to support the load.

The Online status indicator is illuminated and **Online + VMMS** displays in the UPM status area.

7.4.6 Disable Variable Module Management System Mode

To disable Variable Module Management System mode:

NOTE 1 The Variable Module Management System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Energy Saver System mode is enabled, the Variable Module Management System mode commands will not be displayed.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Disable VMMS**. The **Disable VMMS?** confirmation screen appears.
5. Select **Yes** on the confirmation screen.

The UPS transfers to Battery mode and then to Online mode in approximately ten seconds.

The Online status indicator is illuminated. The UPS status indicates *Online*.

7.4.7 Start Variable Module Management System High Alert Mode

NOTE 1 The High Alert mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive.

To start VMMS High Alert mode:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
The UPS status indicates *Online + VMMS*.
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Start High Alert Timer**. The **Start high alert timer?** confirmation screen appears (see [Figure 106](#)).
5. Select **Yes** on the confirmation screen.

The UPS starts High Alert mode with the UPMs online supplying the critical load. After one hour the UPS transfers to Variable Module Management System mode.

The Online status indicator is illuminated. The UPS status indicates *Online*. The UPM status indicates *Active*. The power module is on.

7.4.8 Starting the UPS in Bypass Mode

If the inverter output of the UPS is not available and the critical load needs to be energized:



If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

CAUTION

In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.

1. Unfasten the front door latch and swing the door open (see [Figure 14](#)).

**NOTE**

*Only perform steps 2 and 5 if the UPS has an input breaker CB1 (see [Figure 71](#)).

2. *Verify that input breaker CB1 is open.
3. Close the UPS input feeder circuit breaker.
4. Close the UPS Bypass input feeder circuit breaker.

**NOTE**

If only bypass mode is required, CB1 is not required. The UPS will go to bypass with CB1 open.

5. *Close input breaker CB1.
6. Close the door and secure the latch.
7. Observe the UPS control panel becoming active, indicating logic power.
8. Make sure you are logged in for user access (see [Figure 74](#)).
9. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
10. On the System Status screen, verify the UPS status is **Shutdown** and the UPM status is **Idle** (see [Figure 100](#)).
11. On the System Status screen, select the **Go to Bypass** button. Select **Yes** on the confirmation screen. The critical load is immediately supplied by the bypass source, in Bypass mode. The Bypass status indicator is illuminated. The Bypass status indicates **On Bypass**. The UPM status indicates **Shutdown**.

7.4.9 Starting the UPMs

**NOTE**

This procedure applies to any installed UPM.

To start the power module without transferring the critical load to Online mode:

WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

1. Unfasten the front door latch and swing the door open (see [Figure 14](#)).

**NOTE**

*Only perform steps 2 and 5 if the UPS has an input breaker CB1 (see [Figure 71](#)).

2. *Verify that input breaker CB1 is open.
3. Close the UPS input feeder circuit breaker.
4. Close the UPS Bypass input feeder circuit breaker.

5. *Close input breaker CB1.
6. Close the door and secure the latch.
7. Observe the UPS control panel becoming active, indicating logic power.
8. Make sure you are logged in for user access (see [Figure 74](#)).
9. Verify no alarms are active.
10. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
11. On the System Status screen, check that the UPS status indicates **Shutdown**.
12. On the System Status screen, select the **Module Controls** button. The Module Controls screen is displayed (see [Figure 100](#)). The UPM(s) to start show **Shutdown** (black box).
13. Select the UPM to be started in the left column. The **Module Controls Detail** screen for the UPM appears (see [Figure 101](#)).
14. Press the **Start UPM** button in the Power Status section.
15. Select **Yes** on the confirmation screen.
Verify the following:
 - A message that the selected UPM is starting appears
 - The UPM rectifier and inverter turn on.
 - UPM Power Status line shows **idle**.
 - The UPM status bar shows in a gray color (Idle)
16. Repeat the procedures from step 13 to step 15 to start the other UPMs if required.

**NOTE**

To transfer to Online mode after starting individual UPMs, follow the procedure in paragraph [7.4.12 Transfer from Bypass to Online Mode](#).

7.4.10 Starting a Single UPM to Online Mode

To start a single UPM:

⚠ WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

**NOTE**

UPM 1 is used in this procedure. Use the same procedure to start any UPM as applicable.

1. Unfasten the front door latch and swing the door open (see [Figure 14](#)).

**NOTE**

*Only perform steps 2 and 5 if the UPS has an input breaker CB1 (see [Figure 71](#)).

2. *Verify that input breaker CB1 is open.
3. Close the UPS input feeder circuit breaker.
4. Close the UPS Bypass input feeder circuit breaker.
5. *Close input breaker CB1.

6. Close the door and secure the latch.
7. Close the battery breaker.
8. Observe the UPS control panel becoming active, indicating logic power.
9. Make sure you are logged in for user access (see [Figure 74](#)).
10. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
11. On the System Status screen, the UPS status should indicate **Shutdown** and the UPM status should indicate **Shutdown**.
12. Verify no alarms are active.
13. On the System Status screen, select the **Module Controls** button. The Module Controls screen is displayed (see [Figure 100](#)).
14. Select the detail button of the UPM to start. The **Module Controls Detail** screen for the selected UPM appears (see [Figure 101](#)).
15. Press the **Go to Normal** button in the Power Status section. Select **Yes** on the confirmation screen.
Verify the following:
 - The message **UPM 1 IS STARTING** appears.
 - The UPM 1 rectifier and inverter turn on.
 - UPM 1 Power Status line shows **idle**.
 - The UPM 1 status bar shows in a gray color (Idle).
16. To transfer the UPM to Online mode, select the **Go to Normal** button under the Power Status section.
 - The UPM 1 Power Status shows **Active**
 - The UPM 1 status bar shows in a green color (Active)

If UPM 4 (FI-UPM) is installed and the Inherent Redundancy option is enabled, a loss of redundancy alarm will be issued. Silence the alarm

7.4.11 Transfer from Online to Bypass Mode

To transfer the critical load to Bypass mode:

⚠ CAUTION

In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select the **Go to Bypass** button. Select **Yes** on the confirmation screen.
The UPS transfers to Bypass mode and the critical load is immediately supplied by the bypass source. If the bypass source is not available, the power module remains on and an alarm sounds.
The Bypass status indicator is illuminated. The Bypass status indicates **On Bypass**. The UPM status indicates **Idle**. The power module remains on.



Power is present inside the UPS cabinet.

7.4.12 Transfer from Bypass to Online Mode

To transfer the critical load to Online mode:

1. If not already closed, close the battery breaker.
2. Make sure you are logged in for user access (see [Figure 74](#)).
3. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
4. On the System Status screen, select **Go to Online**.
5. Select **Yes** when the confirmation screen appears.

The UPS transfers to Online mode. If the power module is not available, the system remains on bypass and an alarm sounds while the UPMs start.

The **ONLINE** status indicator is illuminated. The UPS status indicates *Online*. The UPM status indicates *Active* on the applicable **Module Control Detail** screen (see [Figure 101](#)).

7.4.13 Transfer from Online to Bypass Mode and Shut Down UPMs

To transfer the critical load to Bypass mode and shut down the UPMs:

1. Transfer the critical load to bypass by performing the procedure in paragraph (see [7.4.11 Transfer from Online to Bypass Mode](#)).
2. Shutdown the UPMs by performing the procedure in paragraph [7.4.14 Single UPM Shutdown](#).

7.4.14 Single UPM Shutdown

To shut down a single UPM:



NOTE

Depending on the system configuration, the last online UPM in a system may not shut down or the UPS may transfer to BP.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. Select **Module Controls**. The Module Controls screen is displayed (see (kk)).
4. On the Module Controls screen, select the applicable UPM details button. The UPM **Module Controls Detail** screen appears (see [Figure 101](#)).
5. On the UPM Module Control Detail screen, select **Shutdown UPM**. Select **Yes** on the confirmation screen.
6. Verify the following:

UPM "x" IS SHUTTING DOWN message appears

The UPM POWER STATUS shows *Idle* on the **Module Control Detail** screen, (see [Figure 101](#)).

The UPM status bar shows in a gray color (Idle).



NOTE

The shutdown UPM button must be pressed twice to fully shutdown the UPM.

7. Repeat step 4.
8. Verify the following:
 - UPM "x" IS SHUTTING DOWN message appears
 - The UPM POWER STATUS shows `Shutdown` on the Module Control Detail screen, (see [Figure 101](#)).
 - The UPM status bar shows in a black color (Shutdown)
 - The UPM rectifier and inverter turn off.
 - Logic power remains on.
9. Repeat the procedures in this section to shut down any other UPMs as applicable.

7.4.15 Single UPM Restart

To restart a single UPM from a shutdown state refer to the procedures in [7.4.10 Starting a Single UPM to Online Mode](#)

7.4.16 Charger Control

To turn the battery charger on:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **Module Controls**. The Module Controls screen is displayed (see [Figure 100](#)).
4. Select the Module Controls Detail screen for the applicable UPM to start the charger (see [Figure 101](#)).
5. Select **Start Charger**. The charger status shows `Charger On`.

To turn the battery charger off:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select the **Module Controls** button. The Module Controls screen is displayed (see [Figure 100](#)).
4. Select the Module Controls Detail screen for the applicable UPM to start the charger (see [Figure 101](#)).
5. Select **Stop Charger**. The charger status shows `Charger Off`.

7.4.17 Using the UPS Load Off Button / UPS and Critical Load Shutdown

A UPS Load Off is initiated by the **Load Off** button on the **System Status Screen**. The UPS Load Off controls the UPS output by powering down the UPS and de-energizing the critical load.

The UPS (including Bypass) remains off until restarted.

To use the **Load Off** button:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).

⚠ CAUTION

All power to the critical load is lost when the Load Off is selected in the following step. You should use this feature only when you want to de-energize the critical load.

3. Press the **Load Off** button.

The **Shut Down?** confirmation screen is displayed, providing a choice to proceed or abort the shutdown. Select **Yes** to continue or **No** to cancel.

When Load Off is selected, the input, output, battery, and bypass backfeed contactors open, and the power module is turned off.

⚠ CAUTION

Do not attempt to restart the system after Load Off until the cause of the shutdown has been identified and cleared.

4. To restart the UPS after pressing the **Load Off** button, follow the procedure in paragraph [7.4.1 Starting the UPS in Online Mode](#) or [7.4.8 Starting the UPS in Bypass Mode](#).

⚠ WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.

The UPS status is **Shutdown**.

7.4.18 Using the Remote Emergency Power-off Switch

A UPS emergency power-off is initiated by the **REPO** pushbutton switch. In an emergency, you can use this switch to control the UPS output. The REPO switch de-energizes the critical load and powers down the UPS immediately, without asking for verification.

The UPS, including Bypass, remains off until restarted.

⚠ CAUTION

All power to the critical load is lost when the REPO switch is activated in the following step. You should use this feature only when you want to de-energize the critical load.

⚠ ATTENTION!

L'alimentation de la charge critique est complètement coupée lorsque le circuit d'arrêt d'urgence à distance est déclenché à l'étape suivante. N'utiliser cette fonction que pour mettre la charge critique hors tension.

**NOTE**

The following instructions are for the Eaton-supplied REPO switch. If a customer-supplied REPO switch is used, it may not activate in the same manner; refer to the operating instructions provided with the switch.

To use the Eaton REPO switch:

1. Firmly push the red pushbutton until it locks into place. The switch latches into the activated state (see [Figure 114](#)).

The input, output, and bypass backfeed contactors open, the battery breaker or disconnect is tripped, and the power module is turned off immediately, without asking for verification.

⚠ CAUTION

Do not attempt to restart the system after the REPO until the cause of the shutdown has been identified and cleared.

⚠ ATTENTION!

Ne pas tenter de redémarrer le système après le déclenchement du circuit d'arrêt d'urgence à distance avant d'avoir déterminé la raison du déclenchement.

2. To deactivate the REPO switch in preparation for restarting the UPS, insert the supplied key and rotate clockwise until the red pushbutton releases (see [Figure 114](#)). To remove the key, rotate the key back to the vertical position.
 3. Restart the UPS by following the procedure in paragraph [7.4.1 Starting the UPS in Online Mode](#) or [7.4.8 Starting the UPS in Bypass Mode](#).
-

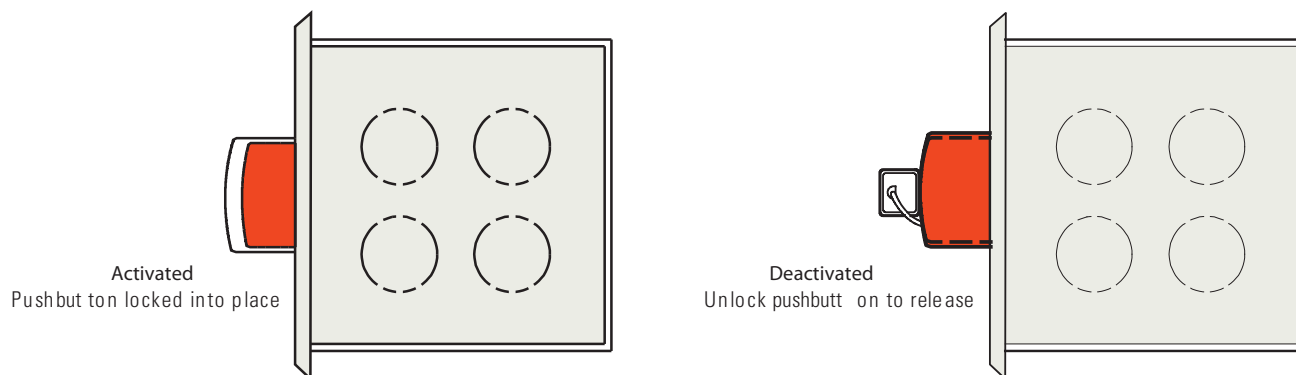
⚠ WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.

⚠ AVERTISSEMENT!

L'intérieur de l'armoire de l'onduleur est alimenté jusqu'à ce que le disjoncteur du circuit d'alimentation en amont soit activé.

Figure 113. REPO Operation



7.5 Multiple UPS Distributed Bypass Operation

This section provides operating instructions for a UPS system containing multiple UPSs in a Distributed Bypass System configuration.



NOTE

A Field Installed UPM (FI-UPM) is always designated as UPM 4.

**NOTE**

To obtain any system information, follow the on screen prompts to get to the proper screen. The operator cannot inadvertently cause a system dump or disconnect unless they override a warning pop-up. Value or information screens DO NOT affect system operation.

7.5.1 Starting the Distributed Bypass System in Online Mode

To start the distributed bypass system:

WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

1. Unfasten the front door latches and swing the doors open on all of the UPSs (see [Figure 14](#)).
2. If the UPSs contain input breakers (CB1), verify that all input breakers are open (see [Figure 71](#)).
3. Close all Module Output Breakers (MOBs).
4. Close all UPS input feeder circuit breakers.
5. Close all UPS Bypass input feeder circuit breakers.
6. Close all battery breakers.
7. If the UPSs contain input breakers (CB1), close all input breakers.
8. Close the doors and secure the latches.
9. Observe the UPS control panel displays becoming active, indicating logic power.
10. Make sure you are logged in for user access (see [Figure 74](#)).
11. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
12. On the System Status screen, verify the UPS status is SHUTDOWN and the UPM status is SHUTDOWN.
13. Verify no alarms are active on the Events Log screen.
14. On the System Status screen, select the **Go Online**.

If Auto Bypass is enabled (factory default), the critical load is immediately supplied by the bypass source in Bypass mode from all UPSs, until the inverter turns on and the UPSs transfer to Online mode. The status indicator on the UPS control panel indicates the UPS is in Bypass mode. If Auto Bypass is not enabled, the UPS outputs remain off until the UPSs turn on the inverter and close the inverter output contactors.

15. Verify the following:

The rectifier and inverter turn on. The inverter continues to ramp to full voltage.

Once the inverter reaches full voltage, all UPS output contactors (K3) close and the bypass circuits open. Power is now supplied to the critical load in Online mode from all UPSs. It takes approximately one minute for the UPSs to achieve Online mode.

The Online status indicator is illuminated. The UPS status indicates **Online**. The UPM status indicates **Active, Charger ON**.

16. To activate, enable, or disable any of the UPS operational modes, follow the online screen prompts.

7.5.2 Enable Energy Saver System Mode

To enable Energy Saver System mode:

NOTE 1 The Energy Saver System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Variable Module Management System mode is enabled, the Energy Saver System mode commands will not be displayed.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Enable ESS**.
5. Select **Yes** on the confirmation screen.

The UPS transfers to Energy Saver System mode.

The Online status indicator is illuminated and **Online + ESS** displays in the UPS status area. If the battery is not charging, the power module is off.

7.5.3 Disable Energy Saver System Mode

To disable Energy Saver System mode:

NOTE 1 The Energy Saver System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Variable Module Management System mode is enabled, the Energy Saver System mode commands will not be displayed.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Disable ESS** the **Disable ESS?** confirmation screen appears (see [Figure 105](#)).
5. Select **Yes** on the confirmation screen.

The UPS transfers to Battery mode and then to Online mode.

The Online status indicator is illuminated. The UPS status indicates **Online**. The UPM status indicates **Active**.

7.5.4 Start Energy Saver System High Alert Mode

NOTE 1 The High Alert mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive.

To start ESS High Alert mode:

1. Make sure you are logged in for user access (see [Figure 74](#)).

2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).

The UPS status indicates **Online + ESS**.

3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Start High Alert Timer** the **Start high alert timer?** confirmation screen appears (see [Figure 106](#)).
5. Select **Yes** on the confirmation screen.

The UPS starts High Alert mode with the UPMs online supplying the critical load. After one hour the UPS transfers to Energy Saver System mode.

The Online status indicator is illuminated. The UPS status indicates **Online**. The UPM status indicates **Active**. The power module is on.

7.5.5 Enable Variable Module Management System Mode

To enable Variable Module Management System mode:

NOTE 1 The Variable Module Management System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Energy Saver System mode is enabled, the Variable Module Management System mode commands will not be displayed.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Start High Alert Timer**. The **Start high alert timer?** confirmation screen appears (see [Figure 106](#)).
5. Select **Yes** on the confirmation screen.

The UPS transfers to Variable Module Management System mode. In approximately twenty seconds the UPS calculates the required number of UPMs needed to support the load.

The Online status indicator is illuminated. The UPS status indicates **ONLINE + VMMS** displays in the UPM status area.

7.5.6 Disable Variable Module Management System Mode

To disable Variable Module Management System mode:

NOTE 1 The Variable Module Management System mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Energy Saver System mode is enabled, the Variable Module Management System mode commands will not be displayed.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).

4. On the EAA screen, select **Disable VMMS**. The **Disable VMMS?** confirmation screen appears.
5. Select **Yes** on the confirmation screen.

The UPS transfers to Battery mode and then to Online mode in approximately ten seconds.

The Online status indicator is illuminated. The UPS status indicates *Online*.

7.5.7 Start Variable Module Management System High Alert Mode

⚠ WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

To start High Alert mode:

NOTE 1 The High Alert mode commands are displayed only if enabled at the factory or by an Eaton Customer Service Engineer.



NOTE 2 The Variable Module Management System and Energy Saver System modes are mutually exclusive. If the Energy Saver System mode is enabled, the Variable Module Management System mode commands will not be displayed.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **EAA Controls**. The EAA screen is displayed (see [Figure 104](#)).
4. On the EAA screen, select **Start High Alert Timer** the **Start high alert timer?** confirmation screen appears (see [Figure 106](#)).
5. Select **Yes** on the confirmation screen.

The UPS starts High Alert mode with the UPMs online supplying the critical load. After one hour the UPS transfers to Variable Module Management System mode.

The Online status indicator is illuminated. The UPS status indicates *Online + High Alert Timer*. The UPM status indicates *Active*. The power module is on.

7.5.8 Starting the Distributed Bypass System in Bypass Mode

⚠ WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

If the inverter output of the distributed bypass system is not available and the critical load needs to be energized:

⚠ WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

CAUTION

In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.

1. Unfasten the front door latches and swing the doors open on all of the UPSs (see [Figure 14](#)).
2. If the UPSs contain input breakers (CB1), verify that all input breakers are open (see [Figure 71](#)).

**NOTE**

*Only perform steps 3 and 7 if the UPSs have an input breaker CB1.

3. *Verify that the input breakers CB1 are open.
4. Close all MOBs.
5. Close all UPS Bypass input feeder circuit breakers.
6. Close the doors and secure the latches.
7. *Close all input breakers (CB1).
8. Observe the UPS control panel displays becoming active, indicating logic power.
9. Make sure you are logged in for user access (see [Figure 74](#)).
10. On any UPS, press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
11. On the System Status screen, verify the UPS status is **SHUTDOWN** and the UPM status is **Idle**.
12. On the System Status screen, select the **Go to Bypass** button. The **Go to bypass?** confirmation screen appears.
13. Select **Yes** on the confirmation screen.

The critical load is immediately supplied by the bypass source in Bypass mode from all UPSs.

The Bypass status indicator is illuminated. The Bypass status indicates **On Bypass**. The UPM status indicates **Shutdown**.

7.5.9 Starting the UPS UPMs

To start the power modules without transferring the critical load to Online mode:

WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

1. Unfasten the front door latches and swing the doors open on all of the UPSs (see [Figure 14](#)).

**NOTE**

*Only perform steps 2 and 5 if the UPSs have input breakers CB1 (see [Figure 71](#)).

2. *Verify that the input breakers CB1 are open.
3. Close all UPS input feeder circuit breakers.
4. Close all UPS Bypass input feeder circuit breakers.
5. *Close the CB1 input breakers.
6. Close the doors and secure the latches.

7. Observe the UPS control panel becoming active, indicating logic power.
8. Make sure you are logged in for user access (see [Figure 74](#)).
9. Verify no alarms are active.
10. On any UPS, press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
11. On the System Status screen, check that the UPS status indicates **Shutdown**.
12. On the System Status screen, select the **Module Controls** button. The Module Controls screen is displayed (see [Figure 100](#)). The UPM(s) to start show **Shutdown** (black box).
13. Select the UPM to be started in the left column. The **Module Controls Detail** screen for the UPM appears (see [Figure 101](#)).
14. Press the **Start UPM** button in the Power Status section.
15. Select **Yes** on the confirmation screen.
Verify the following:
 - A message that the selected UPM is starting appears
 - The UPM rectifier and inverter turn on.
 - UPM Power Status line shows **idle**.
 - The UPM status bar shows in a gray color (Idle)
16. Repeat the procedures from step 13 to step 15 to start the other UPMs if required.

**NOTE**

To transfer to Online mode after starting individual UPMs, follow the procedure in paragraph [7.5.12 Transfer from Bypass to Online Mode](#).

7.5.10 Starting a Single UPM

To start a single UPM:

⚠ WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

**NOTE**

UPM 1 is used in this procedure. Use the same procedure to start any UPM as applicable.

1. Unfasten the front door latch and swing the door open (see [Figure 14](#)).

**NOTE**

*Only perform steps 2 and 5 if the UPS has an input breaker CB1 (see [Figure 71](#)).

2. *Verify that input breaker CB1 is open.
3. Close the UPS input feeder circuit breaker.
4. Close the UPS Bypass input feeder circuit breaker.
5. *Close input breaker CB1.
6. Close the door and secure the latch.

7. Observe the UPS control panel becoming active, indicating logic power.
8. Make sure you are logged in for user access (see [Figure 74](#)).
9. Verify no alarms are active.
10. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
11. On the System Status screen, verify the UPS status is **Shutdown**.
12. On the System Status screen, select the **Module Controls** button. The Module Controls screen is displayed (see [Figure 100](#)). The UPM(s) to start show **Shutdown** (black box).
13. Select the UPM to be started in the left column (black box). The **Module Controls Detail** screen for the UPM appears (see [Figure 101](#)).
14. Press the **Start UPM** button in the Power Status section.
15. Select **Yes** on the confirmation screen.
Verify the following message is displayed:
 - UPM 1 IS STARTING
 - The UPM 1 rectifier and inverter turn on.
 - UPM Power Status line shows **idle**.
 - The UPM status bar shows in a gray color (Idle)
16. Repeat the procedures from step 13 to step 15 to start the other UPMs if required.

7.5.11 Transfer from Online to Bypass Mode

To transfer the critical load to Bypass mode:

CAUTION

In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. On any UPS, press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select the **Go to Bypass** command.
4. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
5. On the System Status screen, select **Go to Bypass**. Select **Yes** on the confirmation screen.

All of the UPSs transfer to Bypass mode and the critical load is immediately supplied by the bypass source. If the bypass source is not available, the power module remains on and an alarm sounds.

The **BYPASS** status indicator is illuminated. The Bypass status indicates **ON**. The UPM status indicates **Idle**. The power module remains on.

WARNING

Power is present inside the UPS cabinet.

7.5.12 Transfer from Bypass to Online Mode

To transfer the critical load to Online mode:

1. If not already closed, close the battery breaker.
2. Make sure you are logged in for user access (see [Figure 74](#)).
3. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
4. On the System Status screen, select **Go to Online**.
5. Select **Yes** when the confirmation screen appears.

All of the UPSs transfer to Online mode. If the power module is not available, the system remains on bypass and an alarm sounds.

The Online status indicator is illuminated. The UPS status indicates *Online*. The UPM status indicates *Active* on the [Figure 100](#).

7.5.13 Transfer from Online to Bypass Mode and Shut Down UPMs

To transfer the critical load to Bypass mode and shut down all UPMs:

1. Transfer the critical load to bypass by performing the procedure in paragraph [7.5.11 Transfer from Online to Bypass Mode](#).
2. Shutdown the UPMs by performing the procedure in paragraph [7.5.14 Single UPM Shutdown](#)

7.5.14 Single UPM Shutdown

To shut down a single UPM:



NOTE

Depending on the system configuration, the last online UPM in a system may not shut down or the UPS may transfer to BP.

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. Select **Module Controls**. The Module Controls screen is displayed (see [Figure 100](#)).
4. On the Module Controls screen, select the applicable UPM details button. The UPM **Module Controls Detail** screen appears (see [Figure 101](#)).
5. On the UPM Module Control Detail screen, select **Shutdown UPM**. Select **Yes** on the confirmation screen.
6. Verify the following:
 - UPM "x" IS SHUTTING DOWN message appears
 - The UPM POWER STATUS shows *Idle* on the Module Control Detail screen, (see [Figure 101](#)).
 - The UPM status bar shows in a gray color (*Idle*).



NOTE

The shutdown UPM button must be pressed twice to fully shutdown the UPM.

7. Repeat step 4.
8. Verify the following:
 - UPM "x" IS SHUTTING DOWN message appears

The UPM POWER STATUS shows **Shutdown** on the Module Control Detail screen, (see [Figure 101](#)).

The UPM status bar shows in a black color (Shutdown)

The UPM rectifier and inverter turn off.

Logic power remains on.

9. Repeat the procedures in this section to shut down any other UPMs as applicable.

7.5.15 Single UPM Restart

To restart a single UPM from a shutdown state refer to start procedures in [7.4.10 Starting a Single UPM to Online Mode](#)

7.5.16 Single UPS Shutdown Using Load Off



NOTE

To shut down a single UPS, MOBs with dual auxiliary contacts must be installed and connected according to the procedure in paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#).

To shut down a single UPS:

1. Open the MOB for the UPS being shut down.
2. Make sure you are logged in for user access (see [Figure 74](#)).
3. On the UPS to shut down, press the **Controls** button on the **Home** screen (see [Figure 75](#) (1q)). The **System Status** screen is displayed (see [Figure 98](#)).
4. On the System Status screen, select the **Load Off** button.
5. Select **Go To Bypass**.

The UPS being shut down transfers to Bypass mode.

The Bypass status indicator is illuminated. The Bypass status indicates **On Bypass**. The UPM status indicates **Idle**. The power module remains on.



NOTE

Load Off will turn off only the UPS being shut down. The remaining UPSs will remain online supplying power to the critical load.

6. Perform the Load Off procedure in paragraph [7.5.21 Using the UPS Load Off Button / UPS and Critical Load Shutdown](#) on the UPS being shut down.
The input, output, battery, and bypass backfeed contactors open, and the power module is turned off on the UPS being shut down.
Logic power remains on.
7. Verify the battery breaker or disconnect for the UPS being shut down is open. If not, open the breaker.

⚠ WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.



NOTE

If the UPS contains an input breaker (CB1), DO NOT open the breaker unless no input feeder breaker is installed.

8. Open the input and bypass feeder circuit breakers for the UPS being shut down.
The UPS is now completely shut down.

External Communications Failure alarm is active on remaining online UPSs. This is an expected event and will clear upon UPS restart.

7.5.17 Single UPS Shutdown Using UPM Shutdown



NOTE

To shut down a single UPS, MOBs with dual auxiliary contacts must be installed and connected according to the procedure in paragraph [5.1 Installing an Optional Hot Sync CAN Bridge Card](#).

To shut down a single UPS:

1. Open the MOB for the UPS being shut down.
2. Make sure you are logged in for user access (see [Figure 74](#)).
3. On the UPS to shut down, press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
4. On the System Status screen, select the **Go to Bypass** button. The **Go to bypass?** confirmation screen appears.

Select **Yes** on the confirmation screen.

The UPS being shut down transfers to Bypass mode.

The Bypass status indicator is illuminated and **Bypass On** displays in the UPS status area. If the battery is not charging, the power module is off.

On the Modules Control screen, select the UPM to shutdown. The applicable UPM **Module Control Detail** screen is appears (see [Figure 101](#)).

5. On the UPM Module Control Detail screen, select **Shut Down UPM**. The **Shutdown UPM?** confirmation screen appears.
6. Select **Yes** on the confirmation screen.
7. Verify the following:
 - UPM "x" IS SHUTTING DOWN message appears
 - The UPM POWER STATUS shows **Idle** on the Module Control Detail screen, (see [Figure 101](#)).
 - The UPM status bar shows in a gray color (Idle).



NOTE

The shutdown UPM button must be pressed twice to fully shutdown the UPM.

8. Repeat step 4.
9. Verify the following:
 - UPM "x" IS SHUTTING DOWN message appears
 - The UPM POWER STATUS shows **Shutdown** on the Module Control Detail screen, (see [Figure 101](#)).
 - The UPM status bar shows in a black color (Shutdown)
 - The UPM rectifier and inverter turn off.
 - Logic power remains on.
10. Verify the battery breaker or disconnect for the UPS being shut down is open. If not, open the breaker.

⚠ WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.

**NOTE**

If the UPS contains an input breaker (CB1), DO NOT open the breaker unless no input feeder breaker is installed.

11. Open the input and bypass feeder circuit breakers for the UPS being shut down.

The UPS is now completely shut down.

External Communications Failure alarm is active on remaining online UPSs. This is an expected event and will clear upon UPS restart.

7.5.18 Single UPS Restart

To restart a single UPS from a shutdown state:

⚠ WARNING

If required to close a circuit breaker inside a UPS, use appropriate personal protective equipment. Injury to personnel may occur from electrical shock.

1. Close the MOB for the UPS being restarted.
2. Close UPS input and bypass feeder circuit breakers for the UPS being restarted.
3. Unfasten the front door latch and swing the door open on the UPS being restarted (see [Figure 14](#)).
4. If input breaker (CB1) is installed on the UPS being restarted and is open, close the breaker (see [Figure 71](#)).
5. Close the door and secure the latch.
6. On the UPS being restarted, observe the UPS control panel display becoming active, indicating logic power.
7. Make sure you are logged in for user access (see [Figure 74](#)).
8. On the UPS being restarted, press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
9. On the System Status screen, verify that the UPS STATUS is **Shutdown** and the UPM status is **Shutdown** on the Module Controls screen.
10. Close the battery breaker for the UPS being restarted.
11. Verify no alarms are active on UPS being restarted.
12. Verify the External Communications Failure alarm has cleared and no other alarms are active on the online UPSs.
13. On the System Status screen, select **Go Online**. The **Go Online?** confirmation screen appears.
Select **Yes** on the confirmation screen.

**NOTE**

If the UPS is starting on a bus with other online paralleled UPSs, the UPS will not go to bypass during startup. The UPS will start, sync to the other UPSs online, and go online.

The **Going Online** message appears.

The rectifier and inverter turn on. The inverter continues to ramp to full voltage.

Once the inverter reaches full voltage, the UPS output contactor (K3) closes. Power is now supplied to the critical load in Online mode along with the other UPSs online. It takes approximately one minute for the UPS to achieve Online mode.

The Online status indicator is illuminated. The UPS status indicates *Online*. The UPM status indicates *Active*.

7.5.19 UPS and Critical Load Shutdown

To perform maintenance or service on the critical load, shut down power to the load:

1. Turn off all equipment that is being powered by the distributed bypass system.
2. Transfer the UPSs to bypass by performing the procedure in paragraph [7.5.11 Transfer from Online to Bypass Mode](#).
3. Perform the Load Off procedure in paragraph [7.5.12 Transfer from Bypass to Online Mode](#).

The input, output, battery, and bypass backfeed contactors open, and the power module is turned off.

⚠ WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.

4. If the UPSs contain input breakers (CB1), open all UPS input breakers.
5. Open the input and bypass feeder circuit breakers on all UPSs.

7.5.20 Charger Control

To turn the battery charger on:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. On the System Status screen, select **Module Controls**. The Module Controls screen is displayed (see [Figure 100](#)).
4. Select the Module Controls Detail screen for the applicable UPM to start the charger (see [Figure 101](#)).
5. Select **Start Charger**. The charger status shows *Charger On*.

To turn the battery charger off:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).
3. Select the Module Controls Detail screen for the applicable UPM charger stop (see [Figure 101](#)).
4. Select **Stop Charger**. The charger status shows *Charger Off*.

7.5.21 Using the UPS Load Off Button / UPS and Critical Load Shutdown

A UPS Load Off is initiated by the **Load Off** button on the **System Status Screen**. The UPS Load Off controls the UPS output by powering down the UPS and de-energizing the critical load.

The UPS (including Bypass) remains off until restarted.

**NOTE**

The UPS Load Off controls each UPS independently and does not shut down the whole distributed bypass system unless all UPSs have been transferred to bypass. To immediately shut down the whole system, use the REPO switch (see paragraph [7.5.21 Using the UPS Load Off Button / UPS and Critical Load Shutdown](#)).

To use the **Load Off** button:

1. Make sure you are logged in for user access (see [Figure 74](#)).
2. Press the **Controls** button on the **Home** screen (see [Figure 75](#)). The **System Status** screen is displayed (see [Figure 98](#)).

CAUTION

All power to the critical load is lost when the Load Off is selected in the following step. You should use this feature only when you want to de-energize the critical load.

3. Press the **Load Off** button.

The **Shut Down?** confirmation screen is displayed, providing a choice to proceed or abort the shutdown. Select **Yes** to continue or **No** to cancel.

When Load Off is selected, the input, output, battery, and bypass backfeed contactors open, and the power module is turned off.

4. If another UPS is to be shut down, proceed to that UPS and repeat Steps 1 and 2.

CAUTION

Do not attempt to restart the system after Load Off until the cause of the shutdown has been identified and cleared.

5. To restart the UPS after pressing the **Load Off** button, follow the procedure in paragraph [7.5.1 Starting the Distributed Bypass System in Online Mode](#) or [7.5.8 Starting the Distributed Bypass System in Bypass Mode](#).

WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.

The UPS status is **Shutdown**.

7.5.22 Using the Remote Emergency Power-off Switch

**NOTE**

This procedure applies to the Eaton REPO switch installed in [4.8 Installing a REPO Switch](#). Refer to the applicable manufacturer's instructions if other REPO switch type installed.

A UPS emergency power-off is initiated by the **REPO** pushbutton switch. In an emergency, you can use this switch to control the UPS output. The REPO switch de-energizes the critical load and powers down the UPSs immediately, without asking for verification.

The UPS, including Bypass, remains off until restarted.

⚠ CAUTION

All power to the critical load is lost when the REPO switch is activated in the following step. You should use this feature only when you want to de-energize the critical load.



NOTE

The following instructions are for the Eaton-supplied REPO switch. If a customer-supplied REPO switch is used, it may not activate in the same manner; refer to the operating instructions provided with the switch.

To use the REPO pushbutton switch:

1. Firmly push the red pushbutton until it locks into place. The switch latches into the activated state (see [Figure 113](#)).

The input, output, and bypass backfeed contactors open, the battery breaker or disconnect is tripped, and the power module is turned off immediately, without asking for verification on all UPSs.

⚠ CAUTION

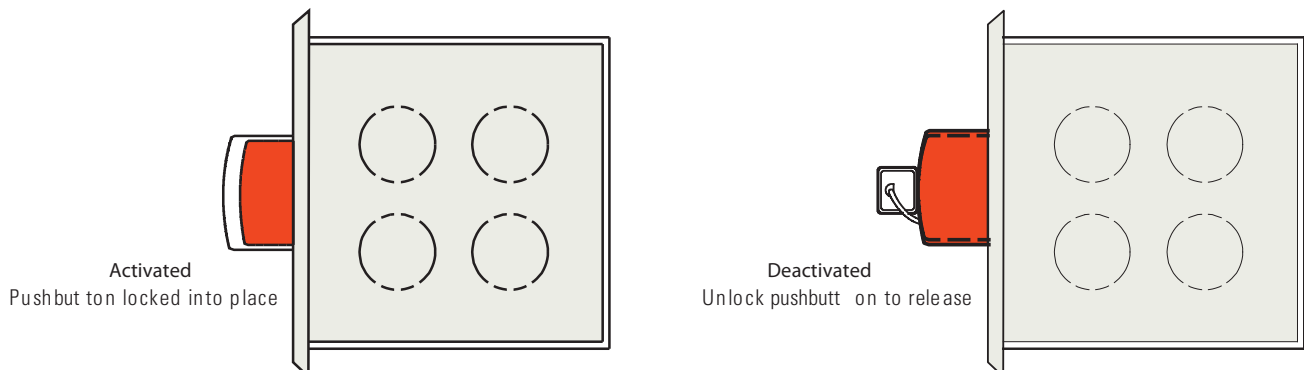
Do not attempt to restart the system after the REPO until the cause of the shutdown has been identified and cleared.

2. To deactivate the REPO switch in preparation for restarting the UPS, insert the supplied key and rotate clockwise until the red pushbutton releases (see [Figure 113](#)). To remove the key, rotate the key back to the vertical position.
3. Restart the UPSs by following the procedure in paragraph [7.5.1 Starting the Distributed Bypass System in Online Mode](#) or [7.5.8 Starting the Distributed Bypass System in Bypass Mode](#).

⚠ WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.

Figure 114. REPO Operation



Chapter 8 Communication

This chapter describes the communication features of the Eaton Power Xpert 9395P-600 UPS system and provides information about connecting hardware. For terminal wiring information, see paragraph [3.2.5 UPS System Interface Wiring Preparation](#) and paragraph [4.7 Installing Interface Connections](#). For location of the customer interface panels and terminals, see [Figure 17](#) and [Figure 20](#) through [Figure 23](#).

8.1 X-Slot Cards

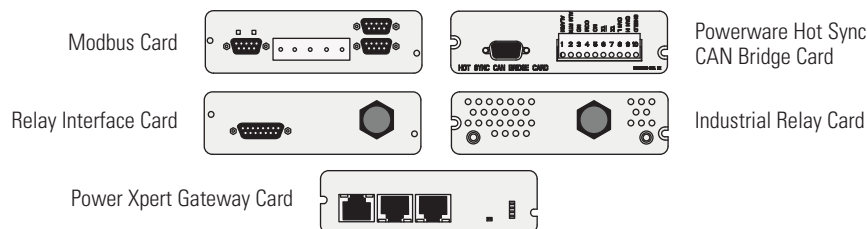
The 9395P-600 UPS system has four standard, factory-installed X-Slot communication bays. See [Figure 20](#) for bay locations. The UPS is compatible with the following X-Slot cards (see [Figure 115](#)):

- Power Xpert® Gateway Card - provides a data gateway from the UPS to the Power Xpert software; provides remote monitoring through a Web browser interface, e-mail, and a network management system using SNMP; connects to a twisted-pair Ethernet (10/100BaseT) network. Modbus TCP support provides direct integration of the UPS parameters to a Building Management System (BMS). It has a built-in switching hub that allows one additional network device to be connected to the network without the requirement of an additional network drop.
- Modbus Card - provides direct integration of UPS information (meters and status) to a Building Management System (BMS) using the Modbus RTU protocol.
- Relay Interface Card (AS/400) - has isolated dry contact (Form-C) relay outputs for UPS status: Utility failure, Low battery, UPS alarm/OK, or On bypass when interfacing with IBM AS/400 computers, other relay connected computers, and industrial applications.
- Industrial Relay Card (IRC) - indicates the operating status of the UPS system using the customer's monitoring equipment. The IRC uses four isolated normally-open or normally-closed dry relay contacts to indicate the UPS status. Online, Bypass, Battery, and Alarm modes can be monitored.
- Hot Sync CAN Bridge Card - provides connectivity for operational mode control and metering of a parallel system at any UPM in the system. In addition, this card can be used to connect optional system monitoring devices, such as a Remote Monitor Panel II (RMP II), a Relay Interface Module II (RIM II), or a Supervisory Contact Module II (SCM II) to the UPS.

LAN drops for use with X-Slot connectivity cards must be provided by facility planners or the customer.

For installation and setup of an X-Slot card, contact an Eaton service representative (see section [1.10 Getting Help](#)). Refer to the manual supplied with the X-Slot card for user instructions.

Figure 115. Optional X-Slot Cards



8.2 PredictPulse

PredictPulse Remote Monitoring and Management Service is a subscription monitoring and management service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf. It is also powered by CA Technologies, bringing together the best in hardware and software. PredictPulse Service is included at no charge during the first year of 9395P-600 UPS operation (warranty period) along with the required connectivity parts. Beyond that, it may be purchased with Eaton Support Agreements or as a standalone subscription after the initial warranty expires. PredictPulse may also be subscribed to for free as part of a 90-day trial period. PredictPulse availability and first year bundled offers may vary by market. For more information, visit www.eaton.com/predictpulse.

8.2.1 PredictPulse Features

PredictPulse provides proactive monitoring, an online dashboard, mobile app with alarm status information and a monthly report detailing the ongoing health of your Eaton 9395P UPS. Features include:

- Proactive monitoring that automatically analyzes the status of the Eaton 9395P UPS 96 times every day (every 15 minutes). All health data gathered from the unit, current and historical, is analyzed at the Customer Reliability Center (CRC). Algorithms and sophisticated analytics software is constantly scanning your UPS's data for potential failures. Anomalies are escalated to a Software and Monitoring analyst or Technical Support specialist. Critical events are remotely diagnosed to expedite repairs, including smart dispatch of field technicians with probable cause and likely parts (avoiding return visits due to lack of required parts). Through this service, the CRC can take pre-emptive, corrective action to ensure the highest level of availability of your Eaton 9395P UPS system.
- Easy self-installation in minutes from a wizard installer or directly from the PowerXpert Gateway UPS card. PredictPulse uses standard Eaton connectivity hardware, requiring no special software (devices only need to be connected to a network).
- Ability to give an unlimited number of coworkers access to the real-time data and reports found in PredictPulse's online dashboard and mobile app. This allows you to collaborate and Eaton to notify the most appropriate person responsible for a specific site or device.
- Real-time access to key performance information, alarms and trended health data about your Eaton 9395P UPS via the PredictPulse online dashboard. Depending on the model, the dashboard aggregates all subscribed devices and provides detailed information about voltages, loads, energy savings, service levels, external factors such as temperature and humidity, attached batteries, and system availability. All of these factors contribute to the Relative Performance Index (RPI) score that allows you to compare your unit's health relative to Eaton's optimum UPS operating levels.
- Real-time alarm events for all subscribed devices via the PredictPulse mobile app (Apple and Android). You can track all alarms by device. As critical alarms occur, Eaton will acknowledge them so you know when Eaton has diagnosed the alarm (and pending notification of resolution).
- A monthly summary report that delivers key performance information, alarms and trended health data about your Eaton 9395P UPS system, based on the prior month's data.
- A foundation based on CA Technologies' leading Data Center Infrastructure Management (DCIM) software application. This enables powerful reporting, analytics, security and compatibility with hundreds of power infrastructure devices.

8.2.2 Installing PredictPulse

A quick start guide and self-installation wizard tool are available at www.eaton.com/predictpulse. The latest updates, installation tips and information on connecting PredictPulse are also available at that link. For installation support or questions about PredictPulse, contact predictpulsesupport@eaton.com.

PredictPulse relies on a Power Xpert Gateway UPS card installed with the UPS to send one-way outbound SMTP e-mails to Eaton, as well as an environmental monitoring probe (EMP) for battery temperature/humidity monitoring. PredictPulse is secure as Eaton never communicates through your firewall—it only listens for

health data and alarm data—and uses industry-standard security protocols. By using a common e-mail transport mechanism, you do not have to open your network to proprietary or potentially unsecure protocols and transports. The PXGX connectivity card gathers information directly from the UPS and any external sensors that are attached, and transmits that data every 15 minutes (or 96 times per day), enabling real-time monitoring and advanced virtual preventive maintenance.

8.3 Power Management Software

Eaton's software solutions, based on Web2.0 technology, include two applications: Eaton LanSafe Power Management Software for UPS management and monitoring, and Eaton LanSafe software, which allows graceful shutdown of operating systems.

Eaton's Software gives you all the tools you need to monitor and manage power devices on your network, even in a virtualized environment. This innovative software solution combines the most critical applications in ensuring system uptime and data integrity: not only power monitoring and management, but also graceful shutdown during an extended power outage.

Because it can manage redundant power systems, it is an ideal solution for the most critical IT environments with stringent requirements for power availability and reliability. Yet it is easy to use – the software scales flexibly from a simple single-computer, single-UPS configuration, to the most sophisticated high availability environments.

The software's mass configuration capabilities make installation and maintenance easy, which minimizes the effort required and benefits the bottom line. Eaton's cost effective Intelligent Power Software manages up to ten devices at no charge, with licences for up to 100 devices – or even an unlimited number – also available.

Contact your Eaton Sales representative for additional information.

8.4 Building Alarm Monitoring

This standard feature lets you connect the UPS to your building alarms, such as smoke detectors or over-temperature alarms. The customer interface terminals for external connections are located inside the UPS. You should use twisted-pair wires for each alarm input and common.

The building alarms can be programmed to display the alarm functional name.

8.5 General Purpose Relay Contact

One general purpose relay contact is provided as a standard feature on the UPS. The alarm contact is located inside the UPS on the customer interface terminal board.

You can use a normally-closed or normally-open contact. If the state of the contact changes from the state you specify as normal, a signal is issued. You can connect this contact to equipment at your facility (such as a light or an alarm bell) to let you know when an alarm is active on the UPS. This feature is useful if the UPS is located in a remote area where the UPS horn may not be heard immediately.



Contacts should not be operated in excess of 30 Vac @ 5A maximum.

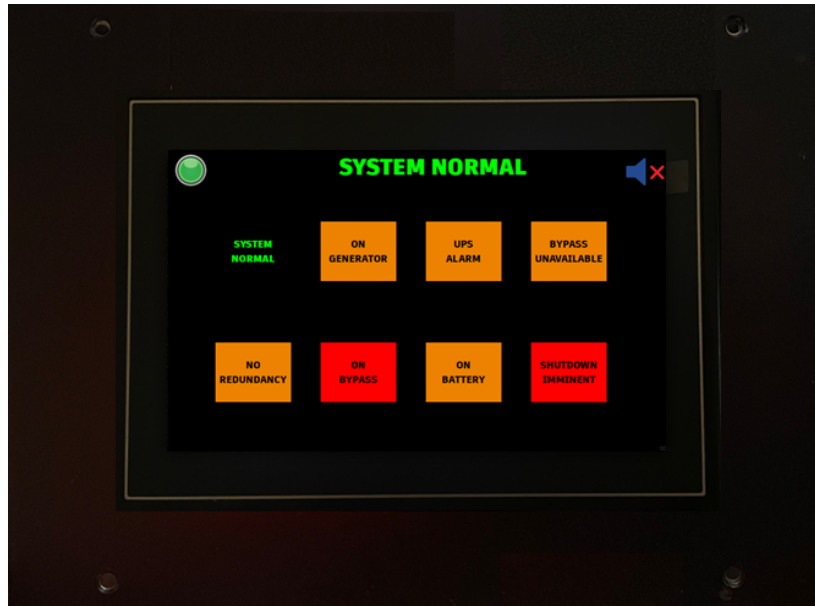


Ne pas faire fonctionner les contacts à plus de 30 VCA à 5 A maximum.

8.6 Remote Monitor Panel III

As an option, an RMP III can be installed to monitor the operation of the UPS system from virtually any location within the facility, up to 150m (500 ft) from the UPS. The RMP III contains backlit status indicators and a local horn. The RMP III is to be surface-mounted on a desktop, or secured to a wall. [Figure 116](#) shows an RMP III.

Figure 116. Remote Monitor Panel III



The RMP III contains a local horn and the backlit status indicators listed in [Table 38](#).

Table 38. RMP III Status Indicators**SYSTEM NORMAL**

The UPS is energized (either with utility power or battery backup) and is supplying conditioned power to the critical load.

NO REDUNDANCY

This indicator applies only to parallel systems when one cabinet is not functioning.

ON GENERATOR

The UPS input and bypass are being supplied by the power from the generator instead of from the utility power.

ON BYPASS

The bypass source is supplying the critical load. Usually this means that the UPS is not energized. The load is not protected in Bypass mode, and a horn sounds after 30 seconds.

UPS ALARM

The UPS system is issuing an alarm. Conditions that affect the current UPS mode are indicated by the indicators and horn on the UPS.

ON BATTERY

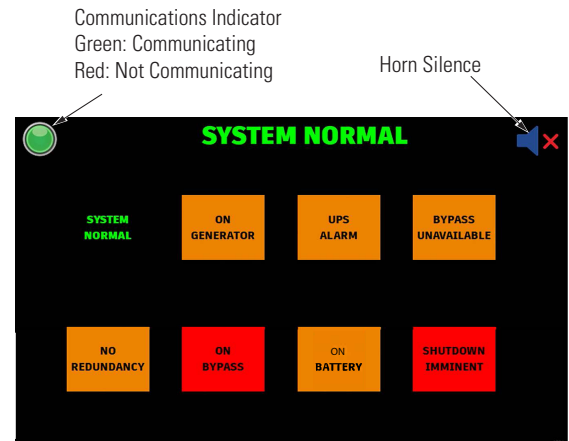
The UPS battery backup is supplying the critical load. The utility power is either interrupted or out of specification. The SYSTEM NORMAL indicator is also illuminated.

BYPASS UNAVAILABLE

The UPS system is in Online mode, but a bypass source is not within specification. A horn sounds after 30 seconds.

SHUTDOWN IMMINENT

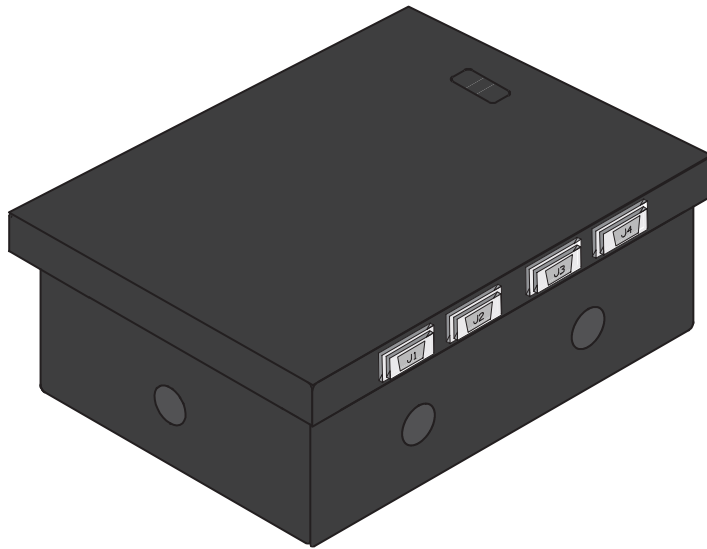
The UPS is preparing to shut down because the UPS is in Battery mode and the DC voltage is approaching its low limit. This indicator is accompanied by a horn.



8.7 Relay Interface Module II

An optional RIM II uses relay contact closures to indicate the operating status and alarm condition of the UPS system. The module uses a serial interface line and may support up to eight critical loads. The RIM II can be flush-mounted or surface-mounted on a desktop, or secured to a wall. [Figure 117](#) shows the RIM II with its four 15-pin connectors labeled J1 through J4.

Figure 117. Relay Interface Module II



The RIM II can provide the status and alarm signals shown in [Table 39](#).

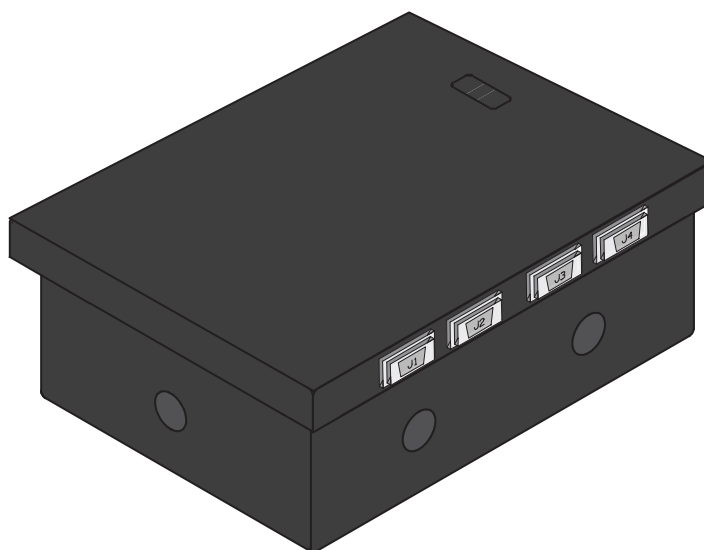
Table 39. Customer Interface Connectors

Status	J1 through J4	Description
UPS AVAILABLE	Pins 1 and 12	Contacts are closed when the UPS is operating in Online mode or ready to supply the load.
UPS OFFLINE	Pins 3 and 13	Contacts are open when the UPS is offline. Contacts are closed when the UPS is operating in Online mode.
BATTERY WEAK	Pins 5 and 14	Contacts are closed when approximately two minutes of battery time is remaining before the critical load is lost.
UTILITY FAILURE	Pins 6 and 15	Contacts are closed when Utility Failure is detected.

8.8 Supervisory Contact Module II

An optional SCM II establishes an interface between the UPS system and the customer's monitor. This interface allows the customer to monitor operational status of the UPS system equipment. The SCM II can be flush-mounted or surface-mounted on a desktop, or secured to a wall. [Figure 118](#) shows the SCM II.

Figure 118. Supervisory Contact Module II



The SCM II provides signals for the indications shown in [Table 40](#).

Table 40. SCM II Status Indicators and Connections

Indication	TB2 Connections
SYSTEM NORMAL	TB2-1 through TB2-3
NO REDUNDANCY	TB2-4 through TB2-6
ON GENERATOR	TB2-7 through TB2-9
BYPASS NOT AVAILABLE	TB2-10 through TB2-12
ON BATTERY	TB2-13 through TB2-15
UPS ALARM	TB2-16 through TB2-18
ON BYPASS	TB2-19 through TB2-21
SHUTDOWN IMMINENT	TB2-22 through TB2-24

Chapter 9 UPS Maintenance

The components inside the UPS cabinet are secured to a sturdy metal frame. All repairable parts and assemblies are located for easy removal, with very little disassembly. This design allows authorized service personnel to perform routine maintenance and servicing quickly.

You must schedule periodic performance checks of your UPS system to keep it running properly. Regular routine checks of operation and system parameters enable your system to function efficiently for many trouble-free years.

9.1 Important Safety Instructions

Remember that your UPS system is designed to supply power **EVEN WHEN DISCONNECTED FROM THE UTILITY POWER**. The UPS module interiors are unsafe until the DC power source is disconnected and the electrolytic capacitors are discharged. After disconnecting the utility power and the DC power, authorized service personnel should wait at least five minutes for capacitor bleedoff before attempting internal access to the UPS module.

WARNING

- Servicing and maintenance should be performed by qualified service personnel only.
- **LETHAL VOLTAGE PRESENT.** This unit should not be operated with the cabinet doors open or protective panels removed. Do not make any assumptions about the electrical state of any cabinet in the UPS system.



AVERTISSEMENT!

- L'installation et l'entretien ne doivent être effectués que par du personnel qualifié.
- **PRÉSENCE DE TENSIONS MORTELLES.** Ne pas faire fonctionner cette unité lorsque les portes de l'armoire sont ouvertes ou si les panneaux de protection ne sont pas en place. Ne jamais faire de suppositions au sujet de l'état électrique des armoires du système d'onduleur.

Because each battery string is an energy source in itself, opening the battery circuit breaker does not de-energize the voltage within the battery string. **DO NOT ATTEMPT TO ACCESS ANY INTERNAL AREA OF THE BATTERY STRING YOURSELF. VOLTAGES ARE ALWAYS PRESENT IN THE BATTERY STRING.** If you suspect that a battery string needs service, contact an Eaton service representative.

If the string requires service, refer to the battery manufacturer's operating manual for instructions on battery maintenance or contact an Eaton service representative.

Observe these precautions when working on or around batteries:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries or battery cabinets.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- Determine if the battery is inadvertently grounded. If it is, remove the source of the ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock is reduced if such grounds are removed during installation and maintenance.

- When replacing batteries, use the same number of sealed, lead–acid batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

9.2 Performing Preventive Maintenance

The UPS system requires very little preventive maintenance. However, the system should be inspected periodically to verify that the units are operating normally and that the batteries are in good condition.

9.2.1 DAILY Maintenance

Perform the following steps daily:

1. Check the area surrounding the UPS system. Ensure the area is not cluttered, allowing free access to the unit.
2. Ensure the air intakes (vents on the front door and panel) and the exhaust opening (on top of the UPS cabinet) are not blocked.
3. Ensure the operating environment is within the parameters specified in paragraph [3.2.3 Installation Considerations](#) and [Chapter 10 Product Specifications](#).
4. Ensure the UPS is in Online mode (Online status indicator is illuminated). If an alarm lamp is illuminated or the Online status indicator is not illuminated, contact an Eaton service representative.

9.2.2 MONTHLY Maintenance

Perform the following steps monthly:

1. Monitor system parameters as described in paragraph [7.3 Using the Color Touchscreen Control Panel](#).
2. Check the UPS air filters (located behind the front panels or door) and wash or replace as necessary. See [Figure 119](#) to [Figure 120](#) for filter locations, and [Table 41](#) for filter sizes. Contact an Eaton service representative for replacement filters. To remove the filters:

Table 41. UPS Filter Sizes

Filter Location	Size
Bottom Left ISBM Section Air Filters (Continuous Static Switch only)	12" x 20" x 0.25"
Bottom Right ISBM Section Air Filters (Continuous Static Switch only)	12" x 20" x 0.25"
Middle Right ISBM Section Air Filter (Continuous Static Switch only)	20" x 6.3" x 0.25"
FI-UPM Section Air Filters	20" x 44" x 0.25"



Verify washed filters are thoroughly dry before reinstalling.



ATTENTION!

Vérifier que les filtres sont bien secs avant de les réinstaller.

To remove and replace the filters:

- a. Remove one top screw and two bottom screws securing each UPM front panel (see [Figure 13](#)). Lift each panel straight up to remove it from the panel hanger bracket at the top of the cabinet.
- b. Remove one top screw and two bottom screws securing the ISBM left front panel (see [Figure 13](#)). Lift the panel straight up to remove it from the panel hanger bracket at the top of the cabinet.
- c. If the UPS is a continuous static switch configuration, unfasten the front door latch and swing the door open (see [Figure 13](#)).
- d. Pull the foam filters over the screw heads on the cabinet mounted studs and remove the filters from the cabinet.
- e. Push the washed or new foam filters over the screw heads on the cabinet mounted studs until seated against the cabinet.
- f. Reinstall the UPM section front panels removed in Step a and secure with the retained hardware.
- g. Reinstall the ISBM section front panel removed in Step b and secure with the retained hardware.
- h. If opened, close the front door and secure the latch.

Figure 119. ISBM Section Air Filter Locations – Continuous Static Switch

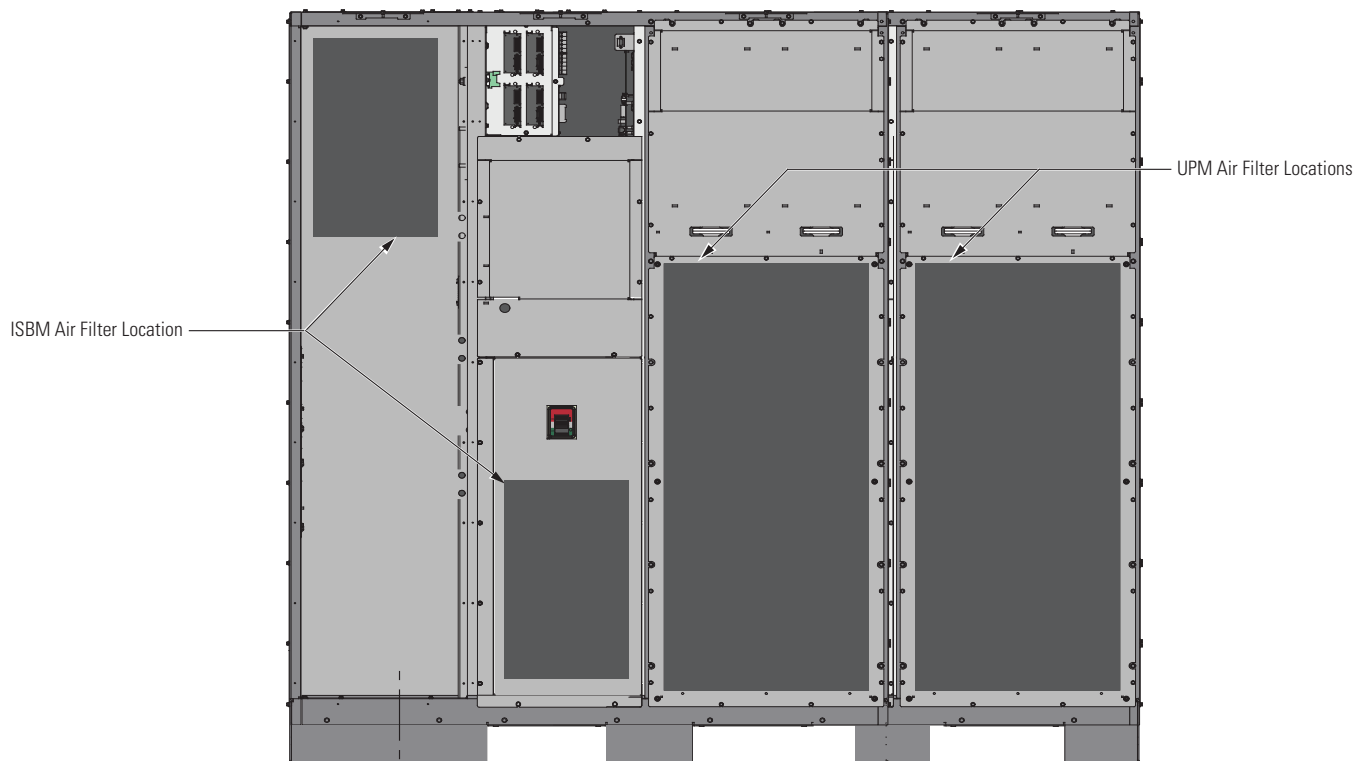
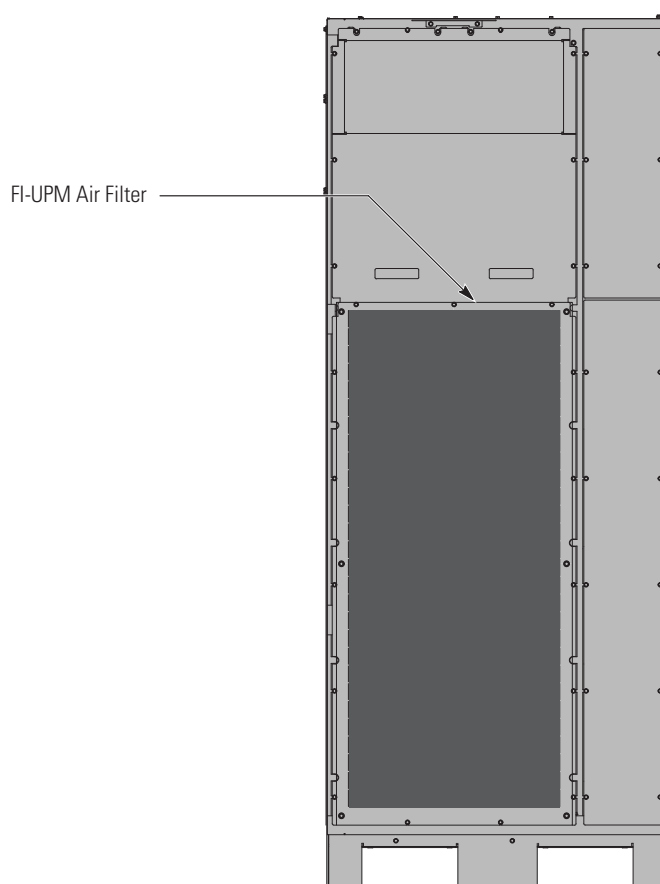


Figure 120. FI-UPM Air Filter Location



3. If the UPS is a four UPM model, check the Field Installed UPM (FI-UPM) air filter (located behind the front panel) and wash or replace as necessary. See [Figure 120](#) for the filter location. The FI-UPM filter size is 20" x 44" x 0.25". Contact an Eaton service representative for a replacement filter. To remove the filter:
 - a. Remove one top screw and two bottom screws securing the FI-UPM front panel (refer to the *Eaton® Power Xpert® 9395P UPS Field Installed UPM Mechanical Installation Manual (P-164000503)*), listed in para [1.9 For More Information](#)). Lift the panel straight up to remove it from the panel hanger bracket at the top of the cabinet.
 - b. Pull the foam filter over the screw heads on the cabinet mounted studs and remove the filter from the cabinet.

CAUTION

Verify washed filter is thoroughly dry before reinstalling.

ATTENTION!

Vérifier que les filtres sont bien secs avant de les réinstaller.

- c. Push the washed or new foam filter over the screw heads on the cabinet mounted studs until seated against the cabinet.
 - d. Reinstall the FI-UPM front panel removed in Step c and secure with the retained hardware.
4. Record maintenance results and any corrective actions in a suitable log.

9.2.3 PERIODIC Maintenance

Periodic inspections of the UPS should be made to determine if components, wiring, and connections exhibit evidence of overheating. Particular attention should be given to bolted connections. Maintenance procedures should specify that the bolted connections be retorqued to values listed in this manual.

9.2.4 ANNUAL Maintenance

Annual preventive maintenance should be performed only by authorized service personnel familiar with maintenance and servicing of the UPS system. Contact an Eaton service representative for more information about service offerings.

9.2.5 BATTERY Maintenance

Contact an Eaton service representative for battery maintenance. Battery replacement and maintenance should be performed only by authorized service personnel.

9.3 Installing Batteries



NOTE

There is no manual DC disconnect device within the UPS.

Install batteries in accordance with the battery and battery cabinet or battery rack manufacturer's instructions.

9.4 Recycling the Used Battery or UPS

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

WARNING

- Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- A battery can cause electrical shock, burn from high short-circuit current, or fire. Observe proper precautions.



AVERTISSEMENT!

- Une batterie peut présenter un risque de choc électrique, de brûlure, ou d'incendie. Suivre les précautions qui s'imposent.
 - Pour le remplacement, utiliser le même nombre et modèle des batteries.
 - L'élimination des batteries est réglementée. Consulter les codes locaux à cet effet.
-

**NO DISPOSAL**

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

**ATTENTION!**

Ne pas jeter l'onduleur ou ses batteries aux ordures. Ce produit contient des batteries au plomb scellées, il est important de l'éliminer convenablement. Pour plus de renseignements, communiquer avec le centre régional de récupération/réutilisation ou d'élimination des déchets dangereux.

**NO DISPOSAL**

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

**ATTENTION!**

Ne pas éliminer les déchets d'équipements électriques et électroniques (DEEE) aux ordures. Pour connaître la méthode d'élimination appropriée, communiquer avec le centre régional de récupération/réutilisation ou d'élimination des déchets dangereux.

9.5 Maintenance Training

A basic training course, available from Eaton Corporation, gives you a competent working knowledge of the UPS system operation and teaches you how to perform first level corrective maintenance. For more information about training and other services, contact the Help Desk (see para. [1.10 Getting Help](#)).

Chapter 10 Product Specifications

10.1 Model Numbers

The UPS is housed in a free-standing cabinet with safety shields behind the door and front panels. The UPS is available in 50 or 60 Hz with various output power ratings.

Models	Power Rating	Frequency
Eaton 9395P-600/600 (one, two, or three UPM)	600 kVA, 600 kVA	50/60 Hz
Eaton 9395P-600/550 (one, two, or three UPM)	600 kVA, 550 kVA	50/60 Hz
Eaton 9395P-600/500 (one, two, or three UPM)	600 kVA, 500 kVA	50/60 Hz
Eaton 9395P-600/450 (one, two, or three UPM)	600 kVA, 450 kVA	50/60 Hz
Eaton 9395P-600/400 (one, two, or three UPM)	600 kVA, 400 kVA	50/60 Hz
Eaton 9395P-600/300 (one, two, or three UPM)	600 kVA, 250 kVA	50/60 Hz
Eaton 9395P-600/275 (one, two, or three UPM)	600 kVA, 275 kVA	50/60 Hz
Eaton 9395P-600/250 (one, two, or three UPM)	600 kVA, 600 kVA	50/60 Hz
Eaton 9395P-600/225 (one, two, or three UPM)	600 kVA, 225 kVA	50/60 Hz
Eaton 9395P-275/200 (one, two, or three UPM)	600 kVA, 200 kVA	50/60 Hz

10.2 Specifications

The following sections detail the input, output, battery, and environmental specifications for the UPS.

10.2.1 UPS Input

Operating Input Voltage	480 Vac, 415 Vac, 400 Vac, 380 Vac
Operating Input Frequency Range	50/60 Hz
Operating Input Current	See Table 6 or Table 7 for 480V One/Two/Three UPM models See Table 8 or Table 9 for 415V One/Two/Three UPM models See Table 10 or Table 11 for 400V One/Two/Three UPM models See Table 12 or Table 13 for 380V One/Two/Three UPM models. Reduced for Generator Adjustable
Input Current Harmonic Content	3% THD at full load
Power Factor	Minimum 0.99 at full load
Line Surges	6 kV OC, 3 kA SC per ANSI 62.41 and IEC 801 4
Battery Voltage	480 Vdc
Battery Charging Capacity	Configurable per UPM at nominal line voltage: Up to 120A
Battery Shunt Trip	48 Vdc

10.2.2 UPS Output

Output Voltage Regulation	±1.5% (10% to 100% load)
Output Voltage Harmonic Content	1.5% maximum THD (linear load) 5% maximum THD (nonlinear load)
Output Current	See Table 6 or Table 7 for 480V One/Two/Three UPM models See Table 8 or Table 9 for 415V One/Two/Three UPM models See Table 10 or Table 11 for 400V One/Two/Three UPM models See Table 12 or Table 13 for 380V One/Two/Three UPM models.
Output Voltage Balance	2.5% for 100% maximum load imbalance (linear load)
Output Voltage Phase Displacement	±4° for 100% maximum load imbalance (linear load)
Output Transients	Meets Class 1 IEC 62040-3 (10% to 100% load)
Frequency Regulation	±0.1 Hz free running
Synchronous to Bypass	+10% to -10%
Frequency Slew Rate	.7 Hz per second maximum
Load Compatibility	0.9 pF Leading 0.8 pF Lagging
Overload Capability	110% for 10 minutes 125% for 120 seconds 150% for 15 seconds


NOTE

The 125% and 150% overloads are based on the non-derated hardware capability of the UPS.

10.2.3 UPS Environmental

Operating Temperature	All ratings except 600 kW, 300 kW: 0 to 40°C (32 to 104°F) without derating. For 600 kW, 300 kW: 0 to 35°C at elevation up to 1000m without derating. The recommended operating temperature is 25°C (77°F).
Operating Altitude	Maximum 1000 m (3000 ft) at 40°C without derating
Storage Temperature	–25 to +60°C, excluding batteries (prolonged storage above 40°C causes rapid battery self discharge)
Relative Humidity (Operating and Storage)	5% to 95% maximum non-condensing
Acoustical Noise	83 dB at a 1m distance, A weighted for three UPM UPS 81 dB at a 1m distance, A weighted for two UPM UPS 78 dB at a 1m distance, A weighted for one UPM UPS
EMI Suppression	Meets IEC 62040-2, category C3
Electrostatic Discharge (ESD) Immunity	Meets IEC 801-2 specifications. Withstands up to 25 kV pulse without damage and with no disturbance or adverse effect to the critical load.



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