



**Eaton® Power Xpert® 9395 High Performance (9395P) UPS  
300 kVA, 300 kW  
Installation and Operation Manual**

For use with Single UPM (200–300 kVA) and Plus 1 (200–300 kVA) UPS Models



*Powering Business Worldwide*





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## **IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS**

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

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## **CONSIGNES DE SÉCURITÉ IMPORTANTES CONSERVER CES INSTRUCTIONS**

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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 des batteries et de l'onduleur. 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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### **WARNING**



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This is a product for restricted sales distribution to informed partners (EN/IEC 62040-2). Installation restrictions or additional measures may be needed to prevent electromagnetic disturbances.

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### **AVERTISSEMENT**



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Les ventes et la distribution de ce produit sont limitées aux partenaires avisés (EN/CEI 62040-2). Des restrictions en matière d'installation ou des mesures supplémentaires sont parfois nécessaires pour éviter les perturbations électromagnétiques.

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# Chapter 1

## Introduction

The Eaton® Power Xpert® 9395P 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 Eaton 9395P 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 Eaton 9395P 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.

Power Xpert 9395P 300 kW/kVA UPS systems are available in a Single UPM (uninterruptible power module) configuration and Plus 1 configurations (see Figure 1-1).

### 1.1 Single UPM Configuration

The Single UPM Power Xpert 9395P UPS 300 kW/kVA 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 300 kVA
- a UPM section with one factory installed UPM

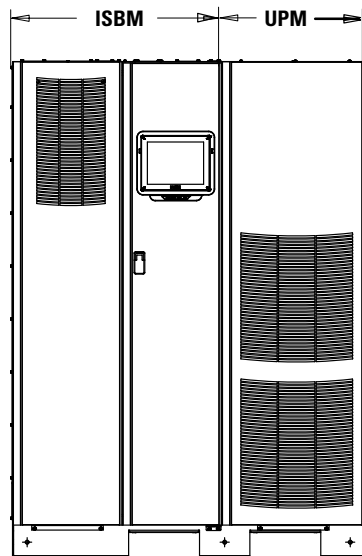
The ISBM section and the UPM section are shipped as a joined unit on the same pallet (see Figure 1-1).

### 1.2 Plus 1 Configuration

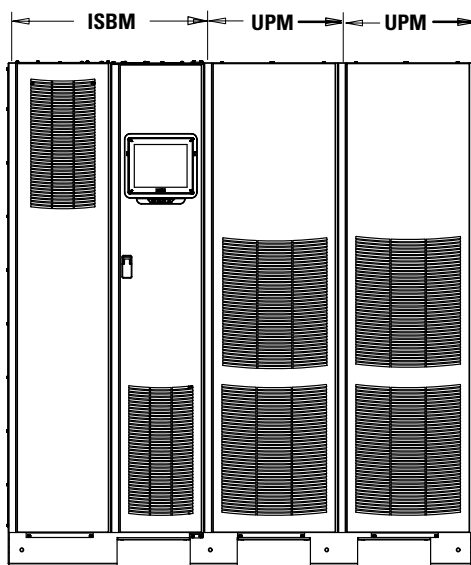
The Plus 1 Power Xpert 9395P UPS 300 kW/kVA configuration provides N+1 redundancy for the basic configuration (see paragraph 1.4.2 and Figure 1-1):

- an ISBM section and a UPM section, with two UPMs
- an ISBM section and a UPM section, with one factory installed UPM and a field installed UPM (FI-UPM)

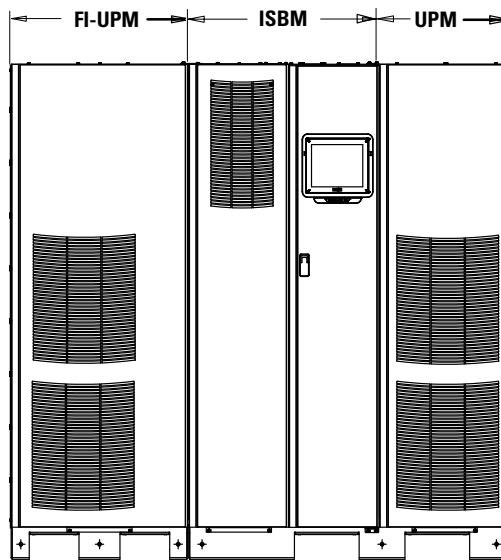
The ISBM section and the UPM sections are shipped as a joined unit on the same pallet. The FI-UPM is not supplied as standard, but is available as an option. The FI-UPM is shipped separately and can be added to the existing configuration later.



**SINGLE UPM**  
300 kVA/kW UPS with 1 UPM



**TWO UPM**  
400-600 kVA/kW UPS with 2 UPMs



**PLUS 1**  
300 kVA/kW UPS with 1 UPM + 1 FI-UPM

**Figure 1-1. Single UPM and Plus 1 Configurations**



**NOTE** Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified on page W-1 become void. 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 10-inch 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-Slotslot 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 Eaton 9395P 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.

### 1.4.2 Field Installed UPM

A Field Installed UPM (FI-UPM) provides redundancy for the Eaton 9395P. 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. Each UPM is rated for a maximum of 300 kVA.

Refer to 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 PowerXpert 9395P.

### 1.4.3 Sync Control

An optional Eaton 9395P Sync Control maintains the critical load outputs of two separate single module Eaton 9395P 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 PowerXpert 9395P.

### 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).




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

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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 Eaton 9395P 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




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

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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 II, SCM II, RIM II, or X-Slot communication cards. See Chapter 5, "Options" for additional information.



- **Remote Monitor Panel II (RMP II)** – An optional RMP II contains backlit 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, such as 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 UPS (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 PowerXpert 9395P.

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 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.*

## 1.6 Using This Manual

This manual describes how to install and operate the Eaton 9395P 300 kVA, 300 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 7.4.2).


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® Power Xpert® 9395/9395P Integrated Battery Cabinet (Models 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® Power Xpert® 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® Power Xpert® 9395P UPS 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](http://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 technical question this manual does not answer

Please call the Eaton 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 for manual comments, suggestions, or to report a technical error in this manual.

**E-ESSDocumentation@eaton.com**

### 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.

#### DANGER



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.

#### DANGER!



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**.

#### WARNING



- 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 UPS or 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 UPS and battery systems, and required precautions. Keep unauthorized personnel away from equipment. Consider all warnings, cautions, and notes before installing or servicing equipment. *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 with 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.

### MISE EN GARDE!



- 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.

### MISE EN GARDE!



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.

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# **Section I**

# **Installation**



## 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 sections (Chapter 3).
4. Unload and install the UPS sections, and wire the system (Chapter 4).
5. Install features, accessories, or options, as applicable (Chapter 5).
6. Complete the Installation Checklist (Chapter 4).
7. Have authorized service personnel perform preliminary operational checks and start up the system.



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**NOTE** *Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified on page W-1 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.*

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### 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 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 (3300 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 Environmental 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.

- 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.

Observe caution 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.

### 3.2.2 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 maximum weight requirements shown in Table 3-1 and the size requirements shown in Figure 3-1 through Figure 3-3. Dimensions are in millimeters (inches).

Table 3-1 includes the weights of the heaviest cabinet configuration. Actual weights may be less due to the installed configuration. Weights are in kilograms (pounds).

**Table 3-1. UPS Cabinet Maximum Weights**

Model	Section	Maximum Weight kg (lb)				
		Shipping	Installed			
Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250	ISBM (CSS) + 1 UPM	1100 (2420)	966 (2125)			
Eaton 9395P-300/225 Eaton 9395P-300/200				FI-UPM	496 (1094)	471 (1037)
Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200						

NOTE CSS = Continuous Static Switch; Table 3-3 describes power ratings of each model.

The UPS cabinet uses 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 3-2. Dimensions are in millimeters (inches).

**Table 3-2. UPS Cabinet Clearances**

<b>From Top of Cabinet</b>	457.2 mm (18") minimum clearance for ventilation
<b>From Front of Cabinet</b>	914.4 mm (36") working space
<b>From Back of Cabinet</b>	None Required
<b>From Right Side of Cabinet</b>	152.4 mm (6") working space
<b>From Left Side of Cabinet</b>	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: 0 to 35°C at elevations up to 1000m without derating.
- Recommended Operating Range: 20–25°C (68–77°F)
- Maximum Relative Humidity: 95%, non-condensing



**NOTE** Eaton battery cabinets are located in the same room as the UPS, the battery cabinet environmental requirements supersede 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](http://www.eaton.com/powerquality) or contact an Eaton service representative for information on how to obtain copies.

The UPS ventilation requirements are shown in Table 3-3.

**Table 3-3. Air Conditioning or Ventilation Requirements During Full Load Operation**

Model	Rating	Input/Output Voltage	Heat Rejection kW (1000 BTU/hr)	Ventilation Required for Cooling Air Exhaust
Eaton 9395P-300/300 (CSS or IOM)	300 kVA 300 kW	480/480	11.5.(39.4)	Approximately 1180 liter/sec (2500 CFM)  With field installed UPM: Approximately 2124 liter/sec (4500 CFM)
Eaton 9395P-300/275 (CSS or IOM)	275 kVA 275 kW	480/480	10.6 (36.1)	
Eaton 9395P-300/250 (CSS or IOM)	250 kVA 250 kW	480/480	9.3 (31.9)	
Eaton 9395P-300/225 (CSS or IOM)	225 kVA 225 kW	480/480	7.9 (27.0)	
Eaton 9395P-300/200 (CSS or IOM)	200 kVA 200 kW	480/480	7.0 (24.0)	

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

The following figures show the dimensions of the Eaton 9395P 300 kVA/kW UPS and UPM configurations:

- SINGLE UPM: 300 kVA/kW UPS ISBM with 1 Factory Installed UPM (see Figure 3-1)
- TWO UPM: 300 kVA/kW UPS ISBM with 2 Factory Installed UPMs (see Figure 3-2)
- PLUS 1: 300 kVA/kW UPS ISBM with 1 Factory Installed UPM + 1 FI-UPM (see Figure 3-3)

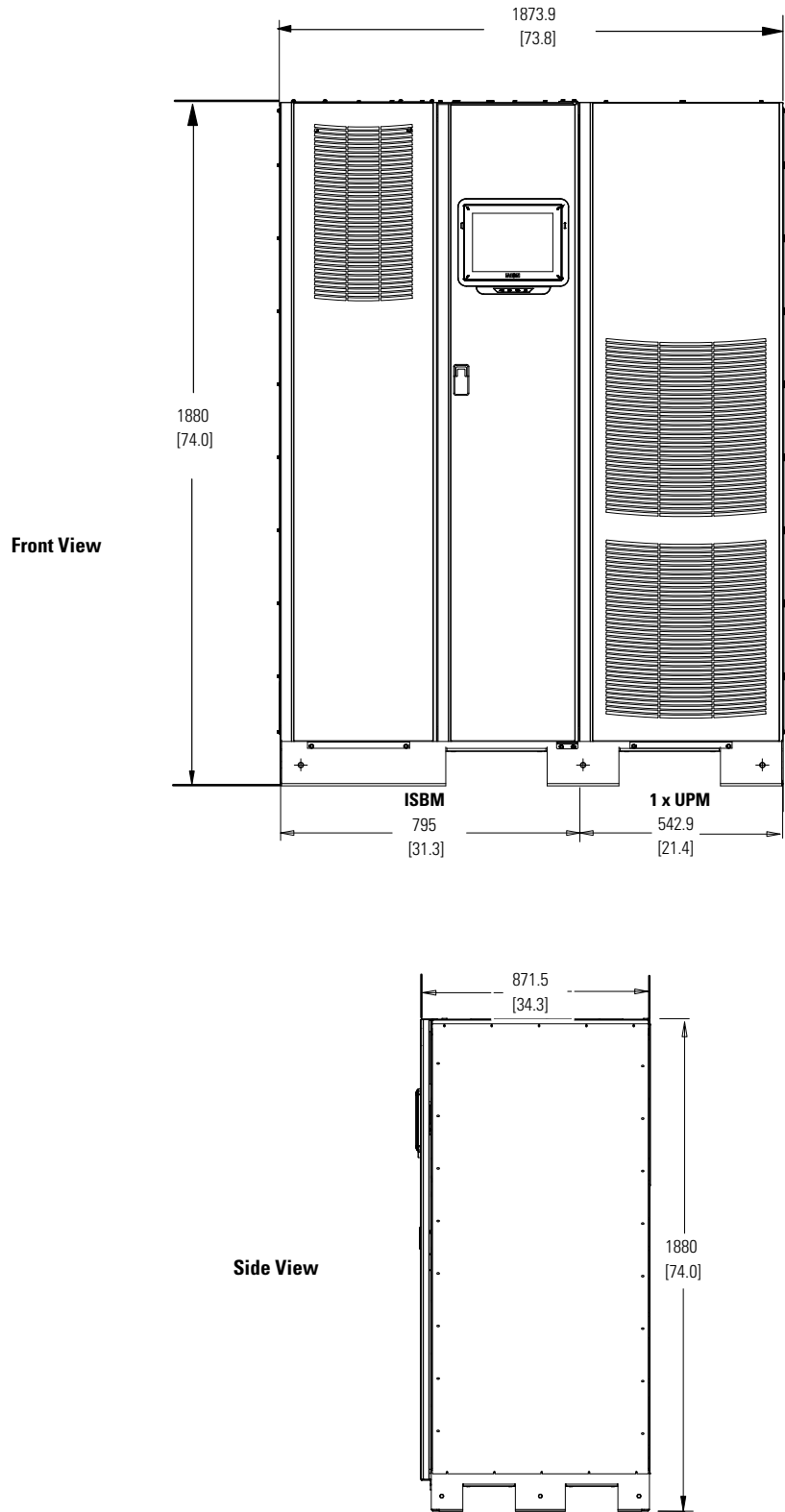
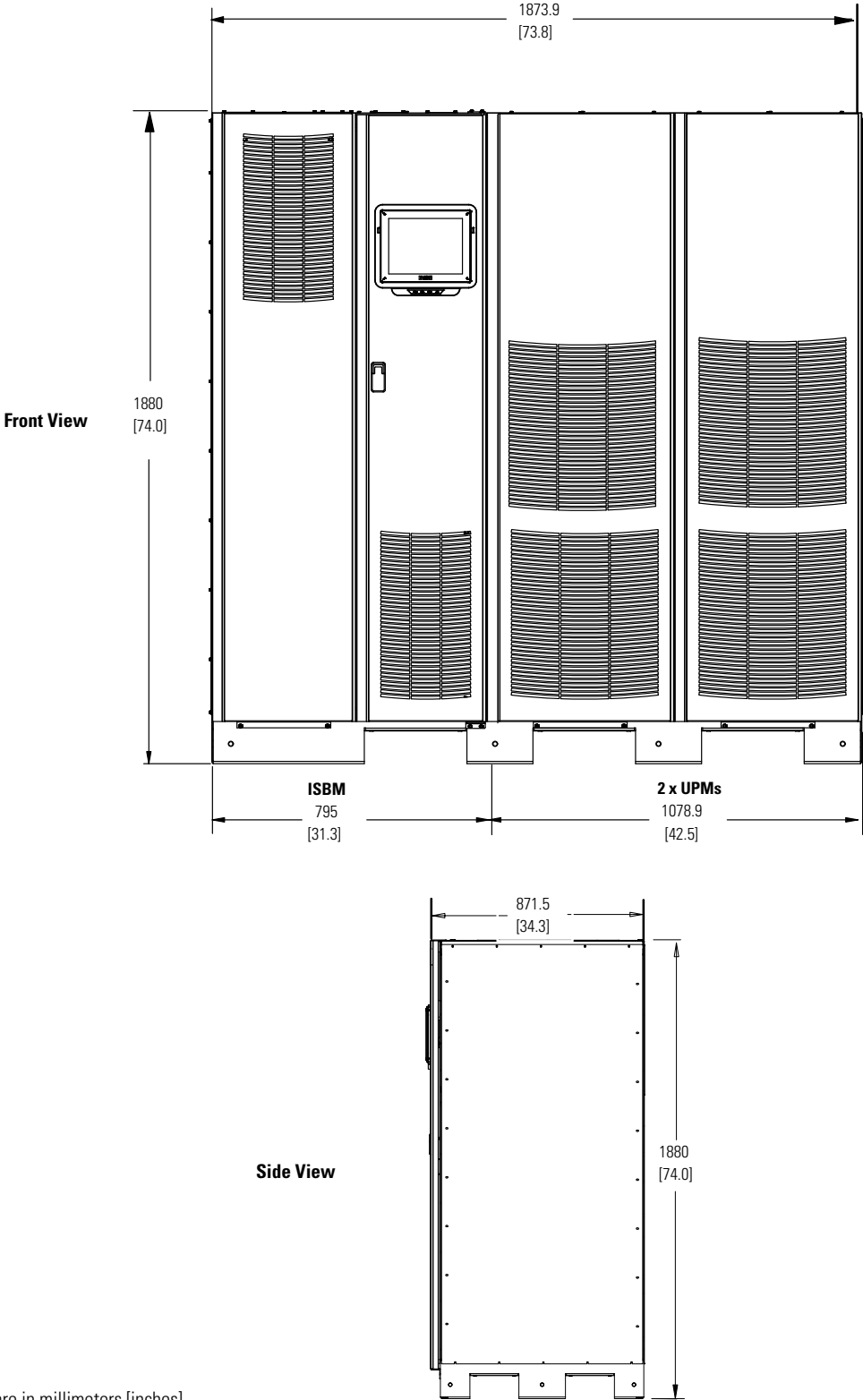
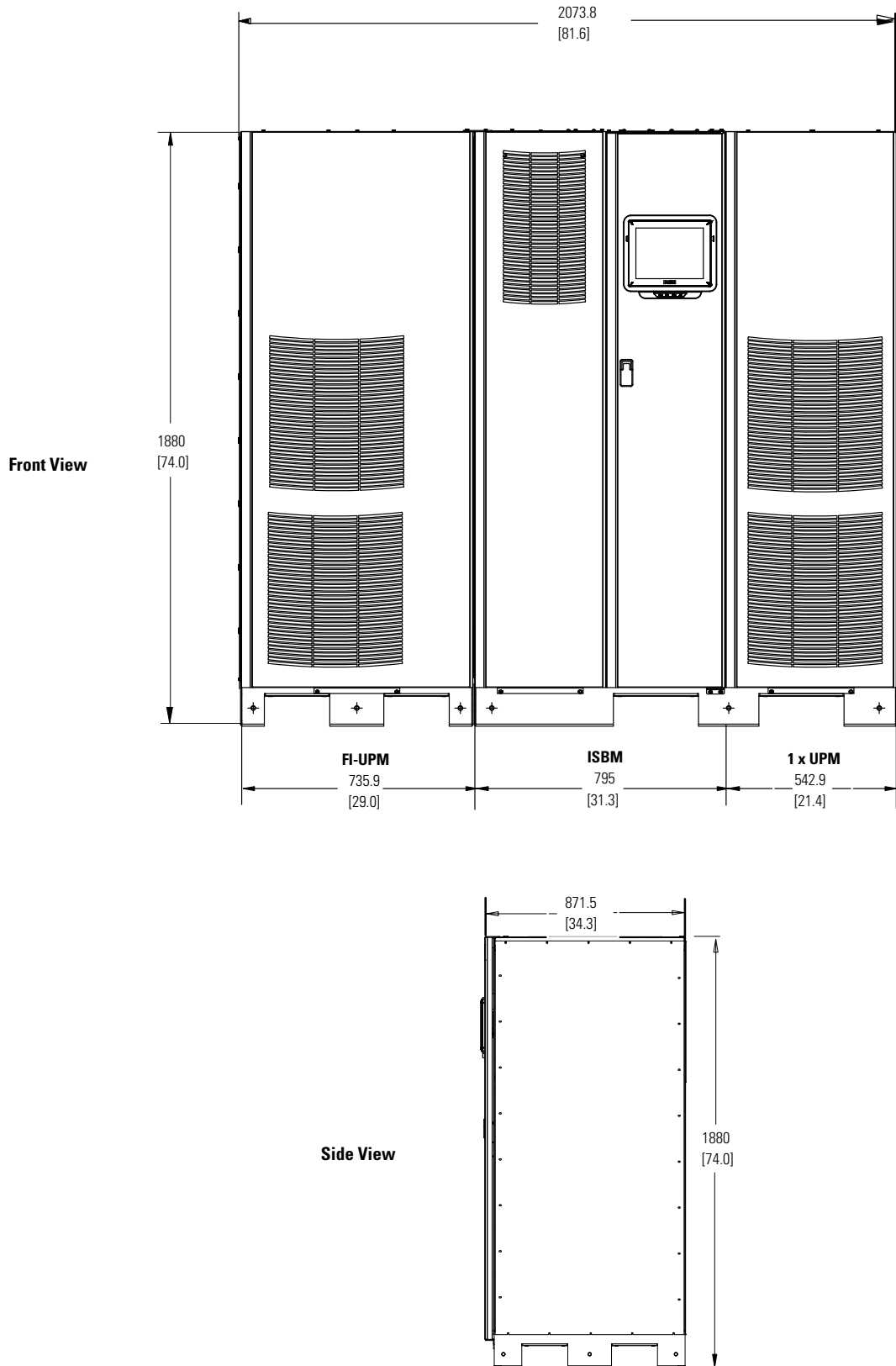


Figure 3-1. ISBM with 1 UPM (Single UPM Configuration) Dimensions



Dimensions are in millimeters [inches].

**Figure 3-2. ISBM with Two UPMs (Two UPM Configuration) Dimensions**



**Figure 3-3. ISBM with 1 UPM + 1 FI-UPM (Plus 1 Configuration) Dimensions**



### 3.2.3 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.
- For external wiring, use 75°C copper or aluminum wire. Wire sizes listed in Table 3-4 through Table 3-5 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 310.15(b) (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 and rectifier feeds into this equipment use three wires. The phases must be symmetrical about ground (from a Wye source) for proper equipment operation.
- The Eaton 9395P 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 3.2.3:

- Select wire size according to the UPS nameplate.
- Do not use wire larger than the largest size listed in Table 3-4 through Table 3-5.
- Use terminal recommendations from Table 3-6 through Table 3-9.
- Size and number of conduits must not exceed those listed in Table 3-10.

- 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.

For single UPM external wiring requirements, including the minimum AWG size of external wiring, see Table 3-4 for installations using a common battery system or Table 3-5 for installations using a separate battery system. Wire sizes listed are for copper wiring only.

**Table 3-4. Input/Output Ratings and External Wiring Requirements for the Single UPM Eaton 9395P-300/200, Eaton 9395P-300/225, Eaton 9395P-300/250, Eaton 9395P-300/275 and Eaton 9395P-300/300 – Common Battery**

Basic Unit Rating	Units	Rating 50/60 Hz	Rating 50/60 Hz	Rating 50/60 Hz	Rating 50/60 Hz	Rating 50/60 Hz
		kVA	200	225	250	275
	kW	200	225	250	275	300
<b>Input and Output Voltage</b>	Volts	480/480	480/480	480/480	480/480	480/480
<b>AC Input to UPS Rectifier (0.98 Minimum pF)</b> Full load current plus battery recharge current (3) Phases, (1) Ground	Amps	297	334	371	408	445
Minimum Conductor Size Number per Phase	AWG or kcmil (each)	2/0 (2)	2/0 (3)	2/0 (3)	2/0 (3)	2/0 (3)
<b>AC Input to UPS Bypass</b> Full Load Current (3) Phases, (1) Ground	Amps	241	271	301	331	361
Minimum Conductor Size Number per Phase	AWG or kcmil (each)	2/0 (2)	2/0 (2)	2/0 (3)	2/0 (3)	2/0 (3)
<b>DC Input from Battery Disconnect to Each UPS UPM</b> (1) Positive, (1) Negative	Total Amps	439	493	548	603	658
Minimum Conductor Size Number per Pole	AWG or kcmil (each)	500 (3)	500 (3)	500 (3)	500 (3)	500 (3)
<b>AC Output to Critical Load</b> Full Load Current (3) Phases, (1) Ground	Amps	241	271	301	331	361
Minimum Conductor Size Number per Phase	AWG or kcmil (each)	2/0 (2)	2/0 (2)	2/0 (3)	2/0 (3)	2/0 (3)

NOTE Callout letters **A, B, C,** and **D** map to common battery systems. Callout letters **A, C,** and **D** map to separate battery systems . See Figure 6-5 on page 6-10 through Figure 6-14 on page 6-19.

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.

**Table 3-5. Input/Output Ratings and External Wiring Requirements for the Single UPM Eaton 9395P-300/200, Eaton 9395P-300/225, Eaton 9395P-300/250, Eaton 9395P-300/275 and Eaton 9395P-300/300 – Separate Battery**

	Units	Rating 50/60 Hz	Rating 50/60 Hz	Rating 50/60 Hz	Rating 50/60 Hz	Rating 50/60 Hz
<b>Basic Unit Rating</b>	kVA	200	225	250	275	275
	kW	200	225	250	275	275
<b>Input and Output Voltage</b>	Volts	480/480	480/480	480/480	480/480	480/480
<b>AC Input to UPS Rectifier (0.98 Minimum pF)</b> Full load current plus battery recharge current (3) Phases, (1) Ground	Amps	297	334	371	408	445
	<b>A</b> Minimum Conductor Size Number per Phase	AWG or kcmil (each)	2/0 (2)	2/0 (3)	2/0 (3)	2/0 (3)
<b>AC Input to UPS Bypass</b> Full Load Current (3) Phases, (1) Ground	Amps	241	271	301	331	361
	<b>B</b> Minimum Conductor Size Number per Phase	AWG or kcmil (each)	2/0 (2)	2/0 (2)	2/0 (3)	2/0 (3)
<b>DC Input from Each Battery Disconnect to Each UPS UPM</b> (1) Positive, (1) Negative	Amps per UPM	603	603	603	603	603
	<b>C</b> Minimum Conductor Size Number per Pole (1) Positive, (1) Negative	AWG or kcmil (each)	500 (3)	500 (3)	500 (3)	500 (3)
<b>AC Output to Critical Load</b> Full Load Current (3) Phases, (1) Ground	Amps	241	271	301	331	361
	<b>D</b> Minimum Conductor Size Number per Phase	AWG or kcmil (each)	2/0 (2)	2/0 (2)	2/0 (3)	2/0 (3)

NOTE Callout letters **A, B, C,** and **D** map to common battery systems. Callout letters **A, C,** and **D** map to separate battery systems. See Figure 6-5 on page 6-10 through Figure 6-14 on page 6-19.

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.

Terminals E1A through E5A and E9A through E11A are stud type terminals. The intercabinet power wiring connections for this equipment are rated at 90°C. See Table 3-7 for supplied intercabinet wiring terminal hardware.

The torque values listed are the maximum allowable. Tightening further will risk breaking or twisting the stud.

**Table 3-6. UPS External Power Cable Terminations for the Single UPM Eaton 9395P-300/200 , Eaton 9395P-300/225, Eaton 9395P-300/250, Eaton 9395P-300/275 and Eaton 9395P-300/300**

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	76 (56)	M12
	E5	Battery (-)	8 – 2 bolt mounting	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
Input and Output Neutral	E12	Neutral	8 – 2 bolt mounting	22 (16)	M10
Customer Ground	Ground	Ground	7 – 1 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 3-10.

NOTE Bypass terminations are not applicable to IOM configurations.

**Table 3-7. 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 Output	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 3-8 for supplied terminal hardware, and Table 3-9 for recommended installation parts and tools not supplied by Eaton.

**Table 3-8. Supplied External Wiring Terminal Hardware Kit**

Part	Size	Quantity	Terminals Used On	Eaton Part Number
Bolt, Grade 5	M10 x 30 mm	12	Ground and Neutral	180190078-088
Bolt, Grade 5	M12 x 45 mm	26	Rectifier Input, Bypass Input, Battery Input, and Output	180190078-113
Flat Washer	M10	12	Ground and Neutral	180500036-100
Flat Washer	M12	52	Rectifier Input, Bypass Input, Battery Input, and Output	180500036-120
Conical Washer	M10	12	Ground and Neutral	180500037-100
Conical Washer	M12	26	Rectifier Input, Bypass Input, Battery Input, and Output	180500037-120
Nut	M12	26	Rectifier Input, Bypass Input, Battery Input, and Output	180200001-07

NOTE Bypass terminations are not applicable to IOM configurations.

**Table 3-9. 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 3-10 for 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 3-10. Power Cable Conduit Requirements**

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size	Number of Conduits
Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2	3
		AC Input to Bypass and Output (A, B, C, Ground)	4	2	3
	DC (Common Battery)	Battery (Positive, Negative, Ground)	7	4	1
Eaton 9395P-300/225	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2	3
		AC Input to Bypass and Output (A, B, C, Ground)	4	2	2
	DC (Common Battery)	Battery (Positive, Negative, Ground)	7	4	1
Eaton 9395P-300/200	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	2	2
		AC Input to Bypass and Output (A, B, C, Ground)	4	2	2
	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 1 Bypass conduit data is not applicable to IOM configurations.

**Battery Cable Routing:** Refer to the notes at the bottom of Table 3-4 Input/Output Ratings and External Wiring Requirements.

External overcurrent protection and disconnect are not provided by this product, but are required by codes. Refer to Table 3-4 and Table 3-5 for wiring requirements. If an output lockable disconnect is required, it is to be supplied by the customer.

Table 3-11 lists the recommended rating for input circuit breakers.

**Table 3-11. Recommended Input Circuit Breaker Ratings**

UPS Model	Input Rating	
	Load Rating	480V
Eaton 9395P-300/300 Eaton 9395P-300/275	100% Rated	450A
Eaton 9395P-300/250	100% Rated	400A
Eaton 9395P-300/225	100% Rated	350A
Eaton 9395P-300/200	100% Rated	300A

**CAUTION**

To reduce the risk of fire, connect only to a circuit provided with maximum input circuit breaker current ratings from Table 3-11 in accordance with the NEC, ANSI/NFPA 70.

**MISE EN GARDE!**

Pour réduire le risque d'incendie, ne brancher qu'à un circuit avec le courant nominal maximal du disjoncteur d'entrée indiqué dans le tableau 3-14 (Table 3-11,) 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 3-4 and Table 3-5. 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 3-12 lists the recommended rating for bypass, output, and MOB circuit breakers. Bypass breakers are not applicable for IOM configurations.

**Table 3-12. Recommended Bypass, Output, and MOB Circuit Breaker Ratings**

UPS Model	Bypass, Output, and MOB Rating	
	Load Rating	480V
Eaton 9395P-300/300 Eaton 9395P-300/275	100% Rated	400A
Eaton 9395P-300/250	100% Rated	350A
Eaton 9395P-300/225 Eaton 9395P-300/200	100% Rated	300A

NOTE 1 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 3-13 and Table 3-14 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 3-13. Recommended DC Input Battery Disconnect Ratings – Common Battery**

UPS Model	Battery Disconnect Rating	
	Breaker Load Rating	480V
Eaton 9395P-300/300	100% Rated	800A
Eaton 9395P-300/275 Eaton 9395P-300/250	100% Rated	700A
Eaton 9395P-300/225 Eaton 9395P-300/200	100% Rated	600A

**Table 3-14. Recommended DC Input Battery Disconnect Ratings – Separate Battery**

UPS Model	Battery Disconnect Rating	
	Breaker Load Rating	480V
Eaton 9395P-300/300	100% Rated	800A
Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	100% Rated	700A

### 3.2.4 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.



**AVERTISSEMENT!**

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** On all 9395P 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.

*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.*

### 3.2.5 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 3-4 and Table 3-5.
- The Eaton 9395P 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 3-12 lists the recommended rating for the MOBs.

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.

### 3.3 Inspecting and Unpacking the UPS Cabinets

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 sections are heavy (see Table 3-1). 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 Table 3-1). 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 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.

### MISE EN GARDE!



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.

### MISE EN GARDE!



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 3-1 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 cabinets more than 10° from vertical or the cabinets may tip over.

### MISE EN GARDE!



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.

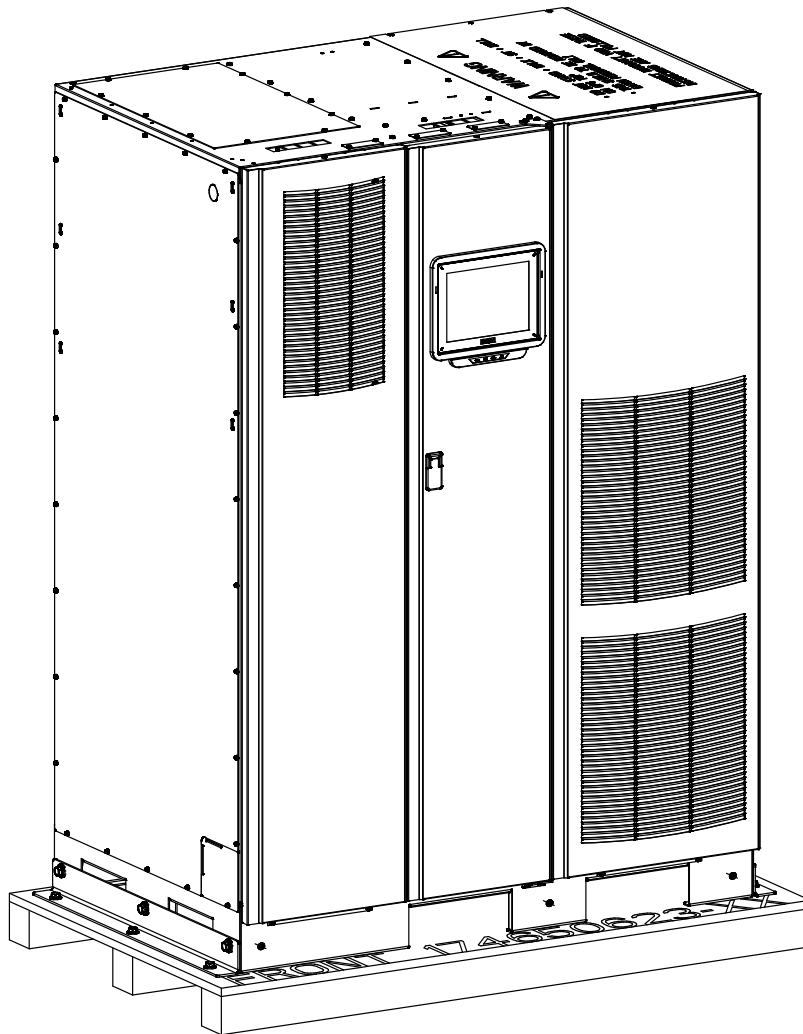


**NOTE** The ISBM and UPM sections are shipped with debris shields covering the ventilation grills on top of the sections (see Figure 4-4). Do not remove the debris shields until installation is complete.

4. Remove the protective covering from the cabinets.
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 cabinets from moisture, dust, and other harmful contaminants. Failure to store and protect the UPS properly may void your warranty.



**Figure 3-4. Single UPM Configuration as Shipped on Pallet (ISBM and UPM)**

### 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 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 cabinets with a UPM or UPMs are joined and bolted to a wooden pallet supported by wood skids. They are referred to as the UPS.



#### WARNING

The ISBM with UPM or UPMs section is heavy (see Table 3-1). 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 3-1). 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  $10^\circ$  from vertical.
- Lift the cabinets only with a forklift or damage may occur.

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

- Lift and move the UPS 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.

### MISE EN GARDE!



- 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 3-1 for cabinet weight).



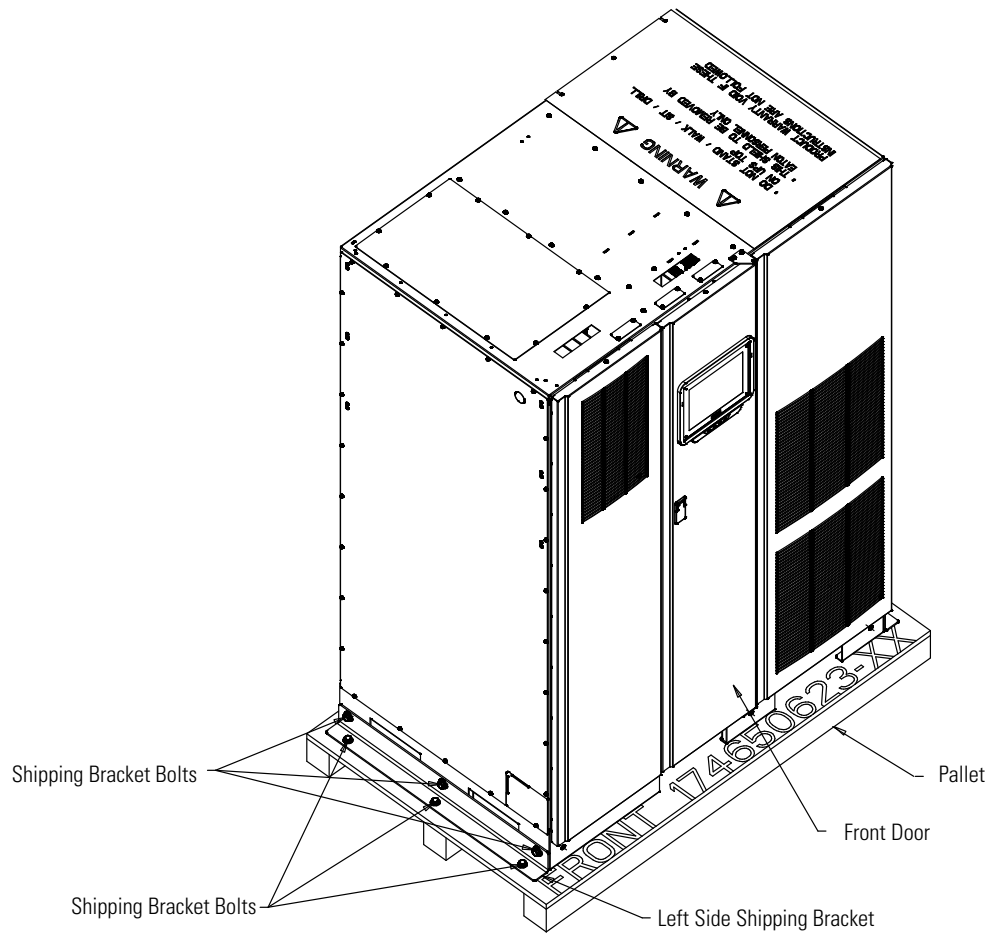
**NOTE** If an FI-UPM is ordered later, use the Eaton Power Xpert® 9395P UPS Field Installed UPM Mechanical Installation Manual (P-164000503) for installation instructions. The FI-UPM is always installed on the side opposite the factory-installed UPMs. See Figure 1-1 .

To remove the pallet and mechanically install the UPS:

1. If not already accomplished, use a forklift or pallet jack to move the UPS to the installation area, or as close as possible, before unloading from the pallet. Use a forklift or pallet jack to install the UPS.

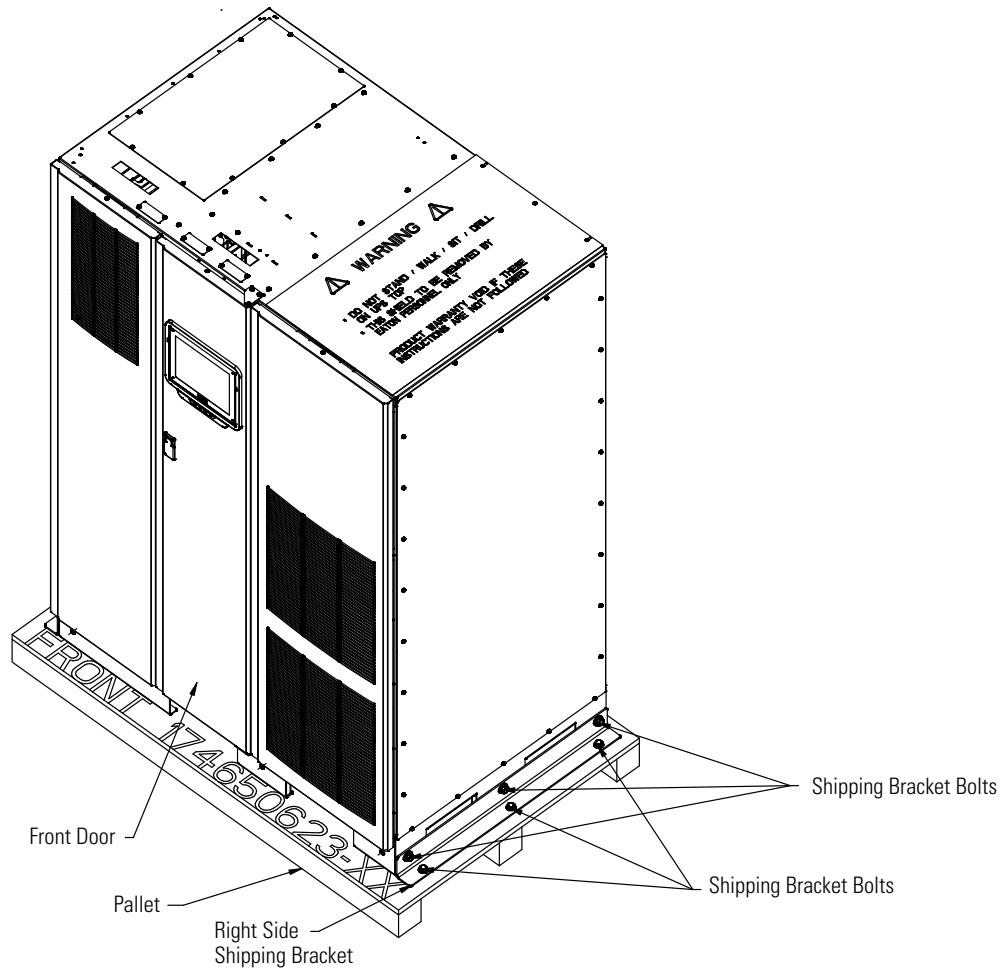
Insert the forklift or pallet jack forks from the right side of the pallet (facing the cabinet), between the supports on the bottom of the pallet. If the sections must be moved using the cabinet front or rear fork lift slots, see the caution statements at the beginning of this procedure.

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 4-1). Remove the left side shipping bracket.



**Figure 4-1. 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 4-2). Remove the right side shipping bracket.



**Figure 4-2. Removing the ISBM Section Right Side Shipping Bracket**

4. Using a forklift (see the caution statement at the beginning of this procedure), raise the cabinet until the cabinet bottom clears the pallet by approximately 3 mm (1/8").
5. Pull the pallet from under the cabinet. Discard or recycle the pallet and shipping brackets in a responsible manner.
6. Carefully lower the cabinet until the cabinet base contacts the floor.
7. If installing an FI-UPM, go to the next section. If installing a battery system, go to paragraph 4.4. Otherwise, go to paragraph 4.5 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)*. After the FI-UPM is installed, proceed to paragraph 4.4 in this document if installing a battery system; otherwise, proceed to paragraph 4.5 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 if installing a distributed bypass tie cabinet; otherwise, proceed to paragraph 4.6 to complete the wiring of the UPS.

### 4.5 Distributed Bypass Tie Cabinet Installation



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**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 only 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.*

---

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 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 4-4). 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.

**NOTE** Remove the ISBM section top or bottom conduit landing plate to drill or punch conduit holes (see Figure 4-5).

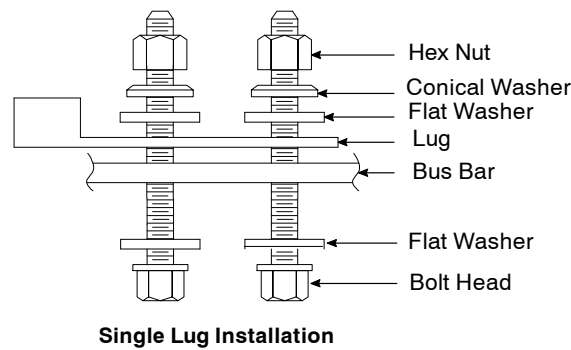
Use the procedures in the following paragraphs to connect the external and battery power wiring.

### 4.6.1 2-Hole Barrel Lug Terminations for Bus Bar Installation

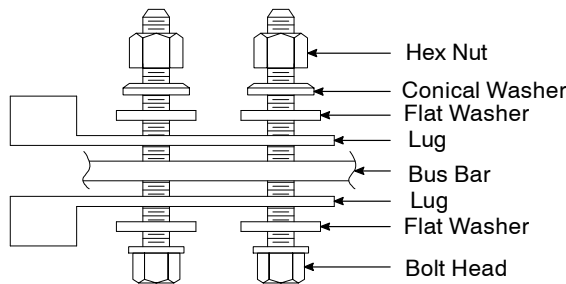
Paragraphs 4.6.2 and 4.6.3 require connecting input, output, and battery power wiring using 2-hole barrel lugs. See Figure 4-15 for the hardware sequence when installing the lugs to the bus bars. Tighten the nut to the torque value listed in Table 3-7.



**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 surface such as a bus bar, flat washer, or large terminal.



Single Lug Installation



Double Lug Installation

Figure 4-3. 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 4-2). 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 4-5 through Figure 4-8 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.

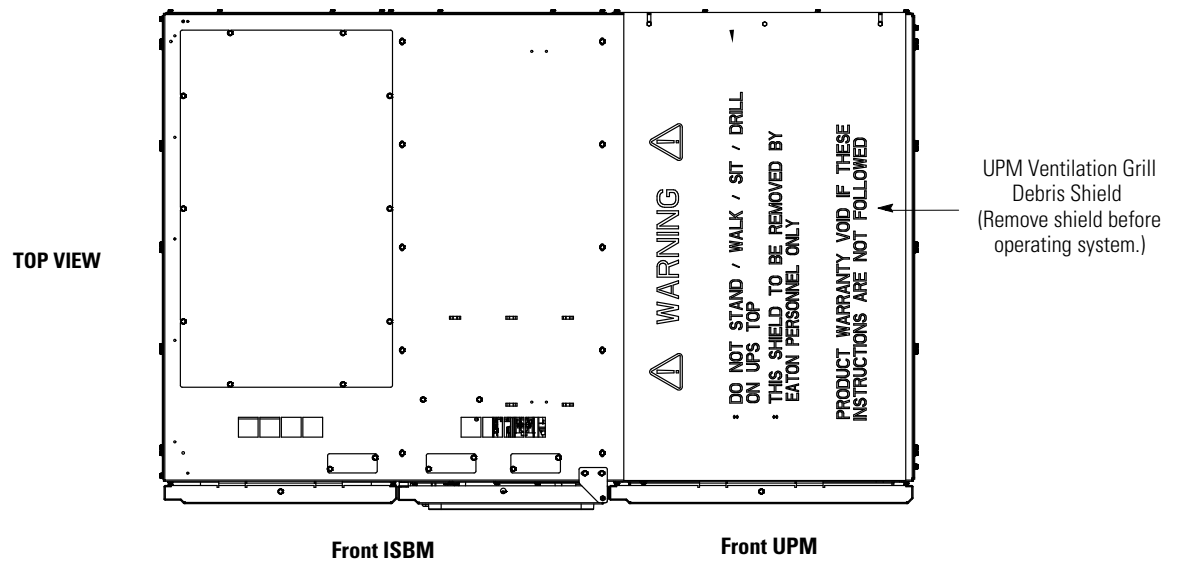


Figure 4-4. ISBM and UPM Section Debris Shields

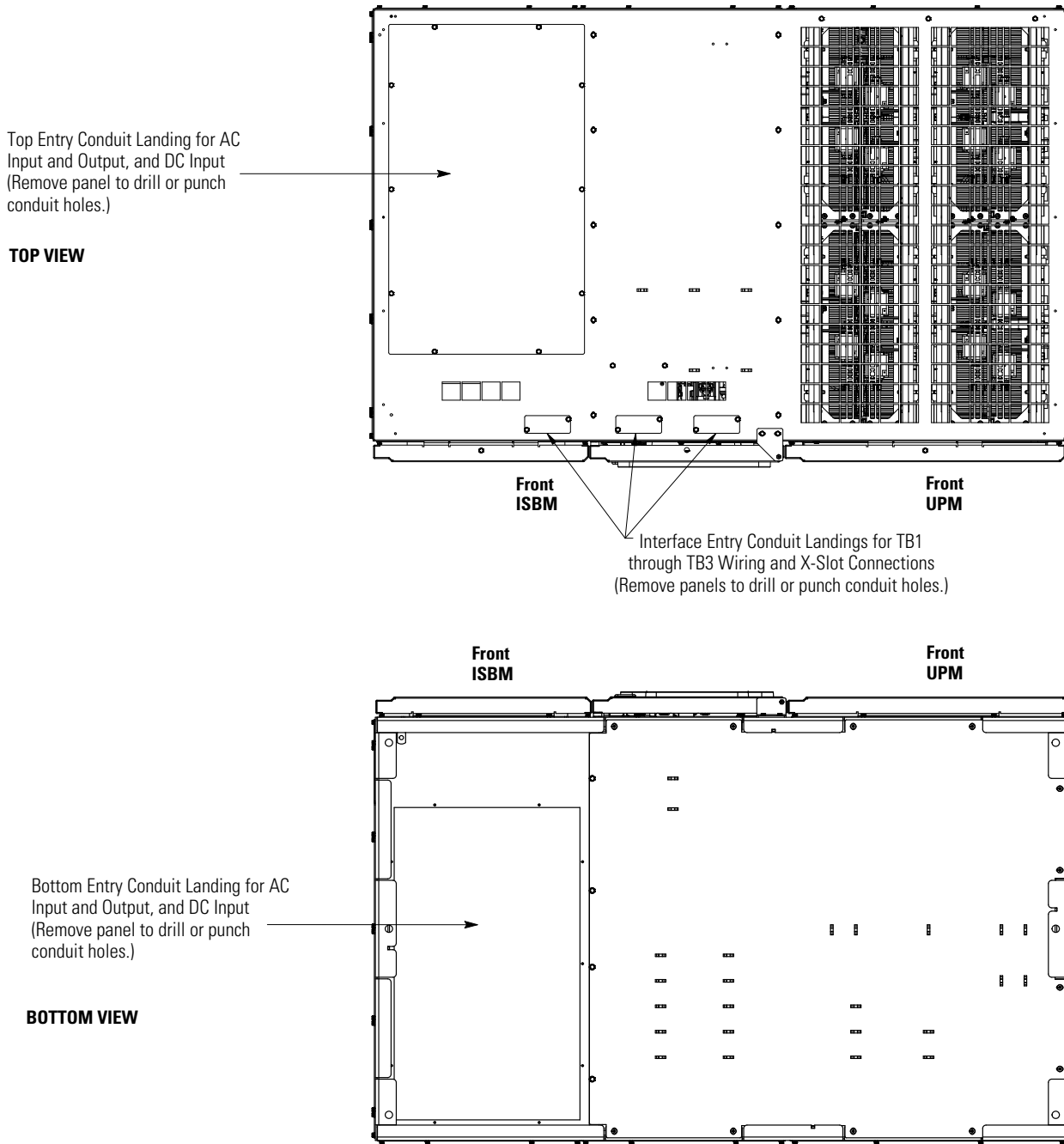


Figure 4-5. ISBM and UPM Section Conduit and Wire Entry Locations

- 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 3-8), 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 3.2.3 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 3-8), 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 3.2.3 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 3-8), 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 3.2.3 for wiring and termination requirements.
- 10.** Proceed to paragraph 4.6.3.
- 11.** Using hardware from the external wiring terminal hardware kit (see Table 3-8), connect phase A, B, and C power wiring from output terminals to the critical load. See paragraph 3.2.3 for wiring and termination requirements.
- 12.** Proceed to paragraph 4.6.3.

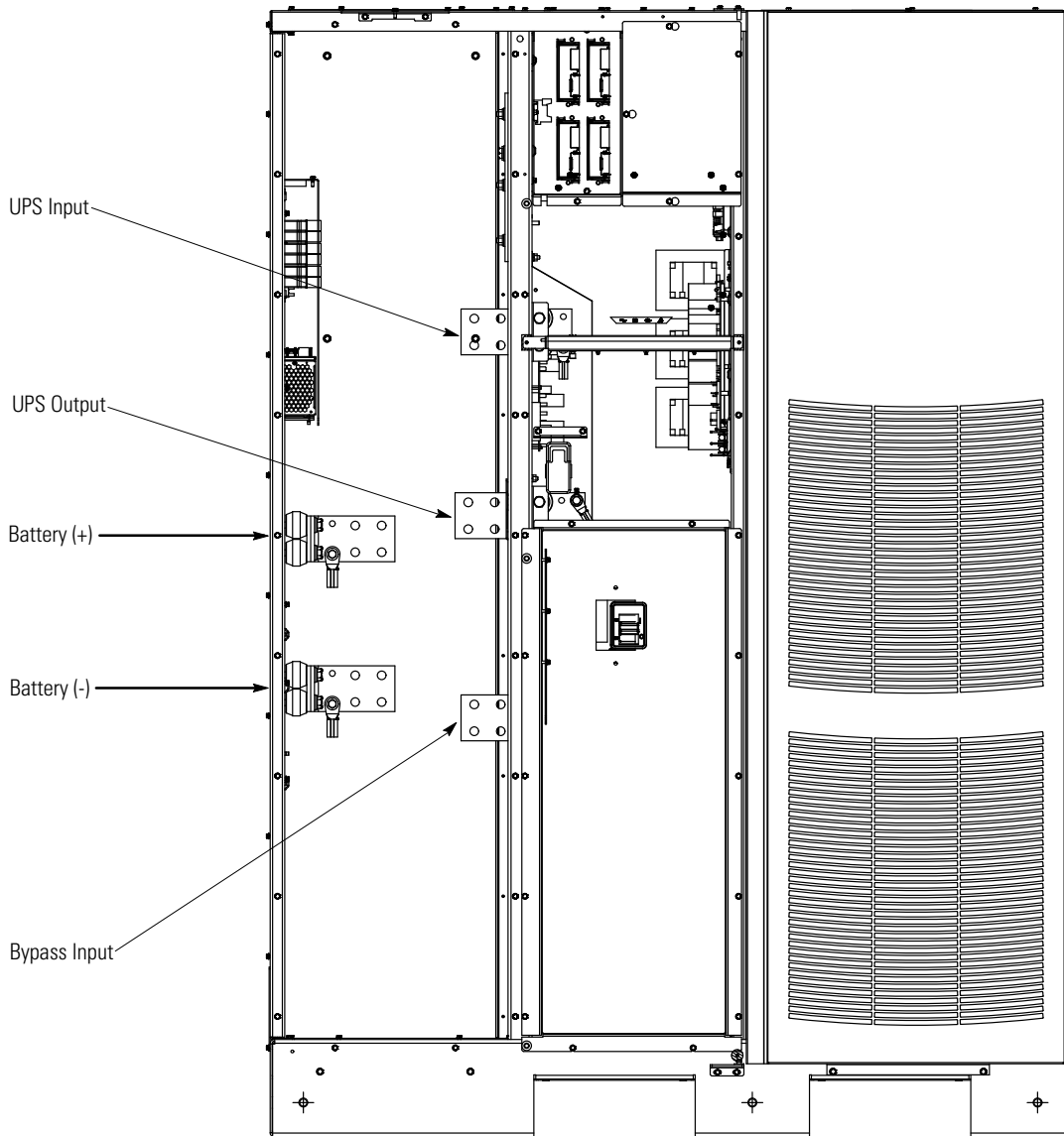


Figure 4-6. ISBM Section Power Terminal Locations

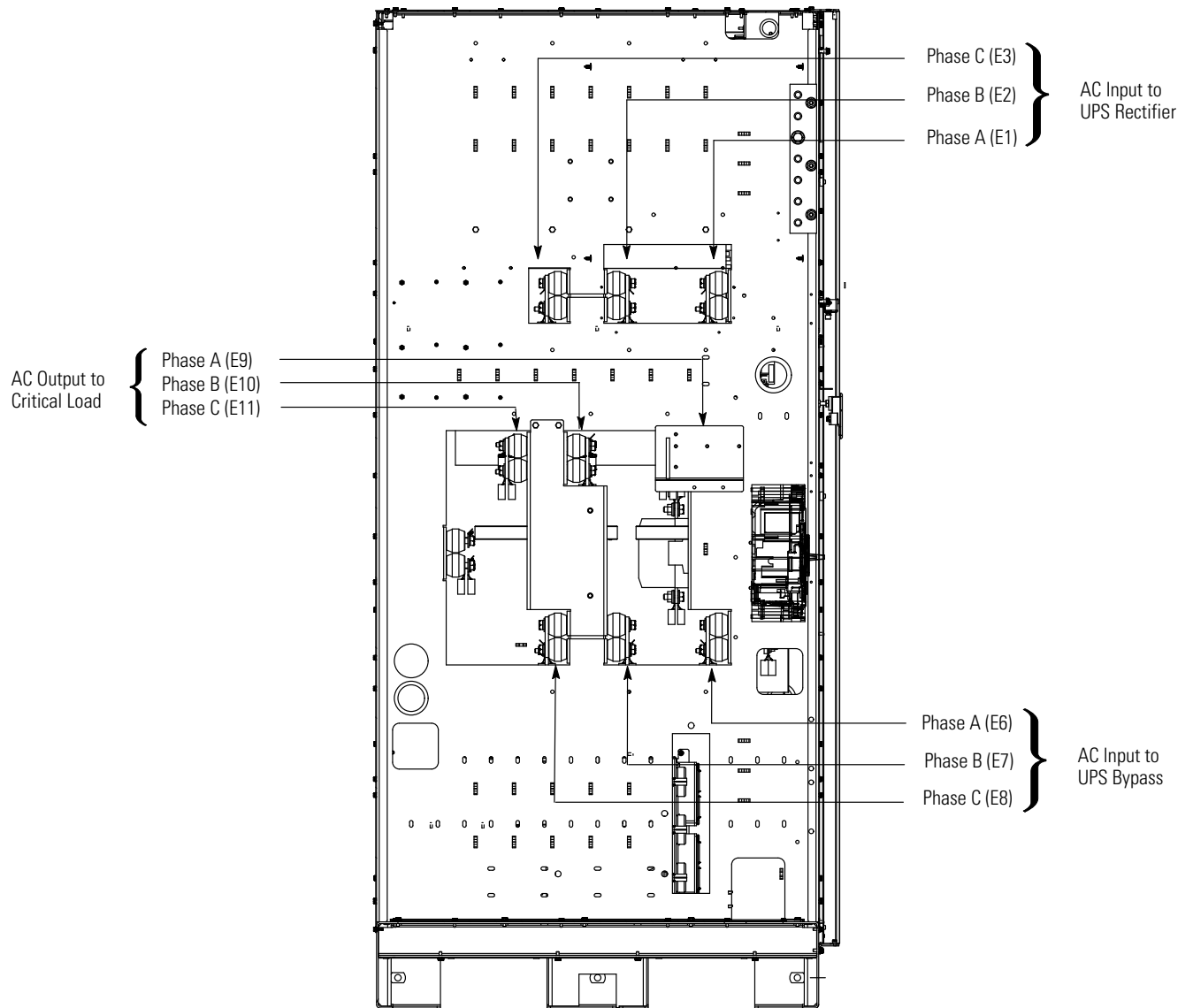


Figure 4-7. ISBM Section Power Terminal Detail – Section AA

### 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.

#### MISE EN GARDE!



Lors de l'évaluation du système de batterie, ne pas dépasser les capacités internes du chargeur de batteries. Se reporter au chapitre 10 sur les notices techniques pour connaître les tensions maximales du chargeur de batteries.

To install wiring to connections:



#### **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 4-5 through Figure 4-8 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 3-8), 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 4-8 as needed. See paragraph 3.2.3 for wiring and termination requirements.
4. Proceed to Step 6.
5. Using hardware from the external wiring terminal hardware kit (see Table 3-8), 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 3.2.3 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; 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, Step 2. Secure with the retained hardware.
9. Reinstall the left front panel removed in paragraph 4.6.2, Step 1 and secure with the retained hardware.



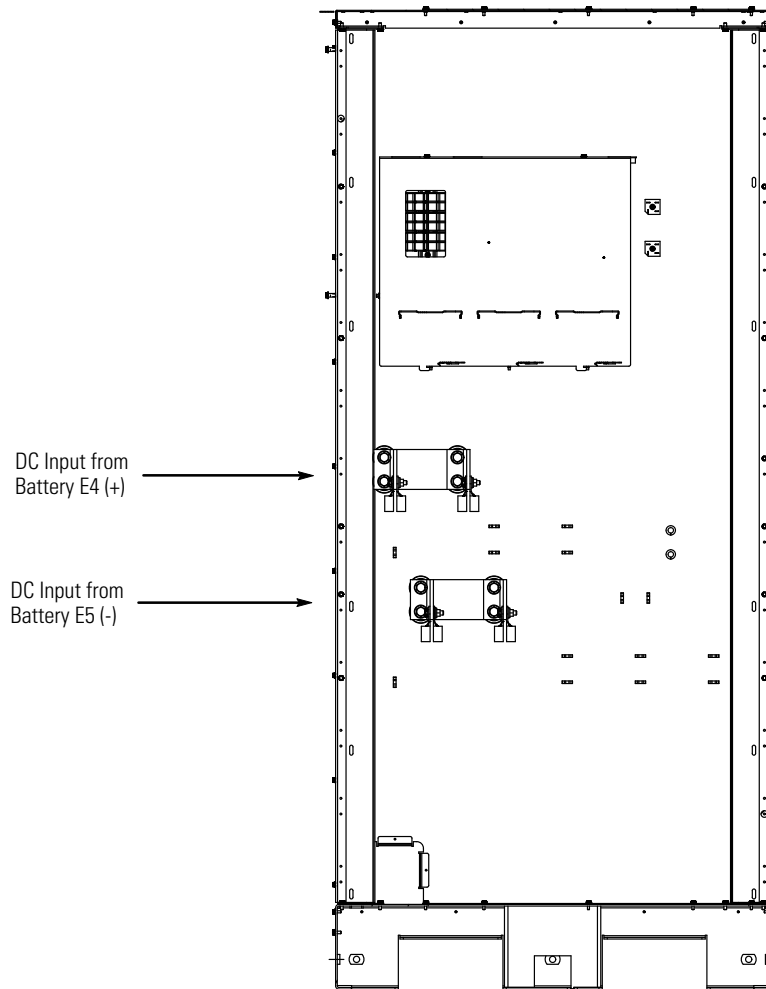


Figure 4-8. ISBM Section Power Terminal Detail BB – Common Battery

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

**NOTE** 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 4-1).
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 4-9).
5. Remove the interface entry conduit landing plates to drill or punch holes (see Figure 4-5).
6. Reinstall the interface entry plates and install the conduit.

#### WARNING



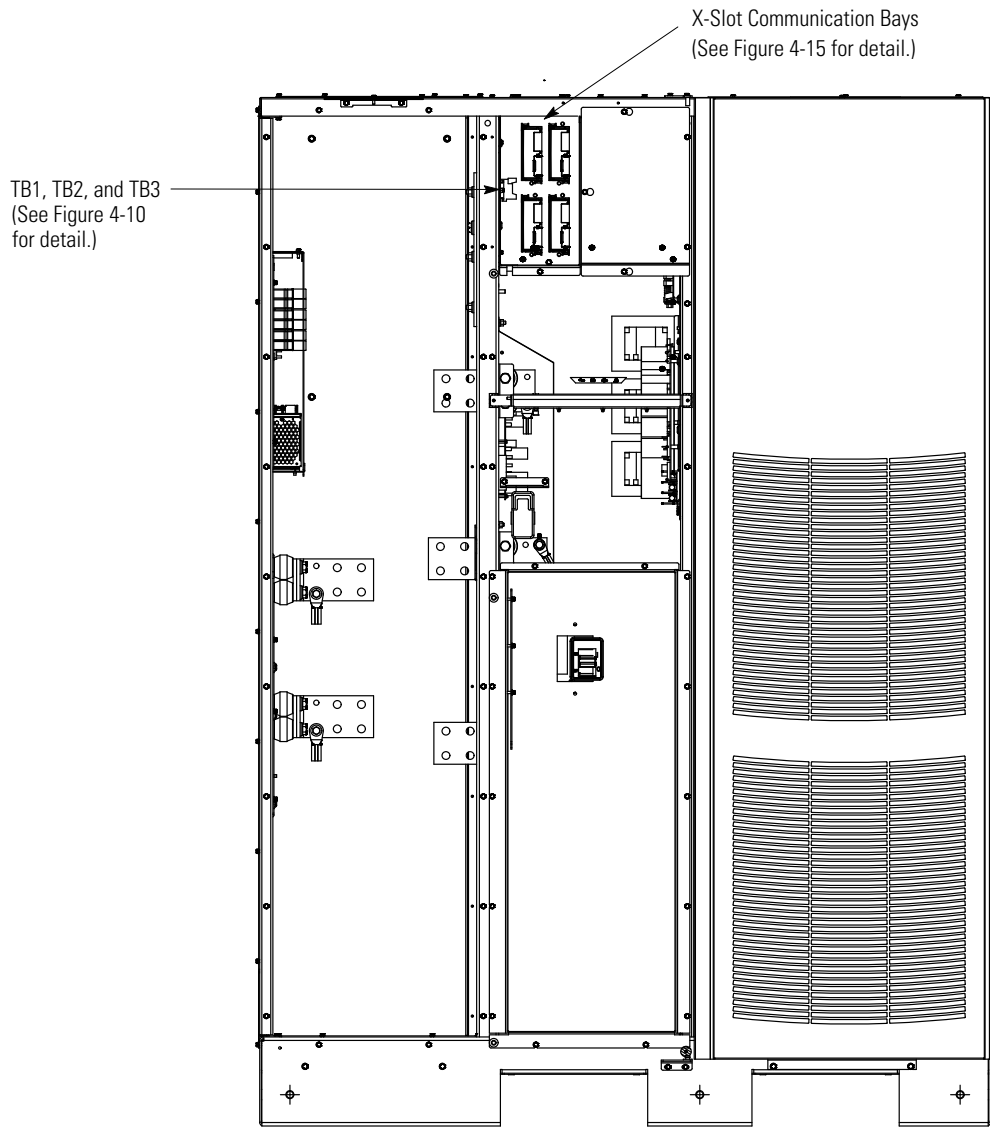
Do not directly connect relay contacts to the mains related circuits. Reinforced insulation to the mains is required.

#### 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 3.2.4, Table 4-1, and Figure 4-5 through Figure 4-6.
8. Route and connect the wiring.
9. If wiring TB1 battery interface connections, proceed to paragraph 4.7.2; if wiring the X-Slot connections only, proceed to paragraph 4.7.3; 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 4-9. ISBM Section Interface Terminal Locations**

**Table 4-1. 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	

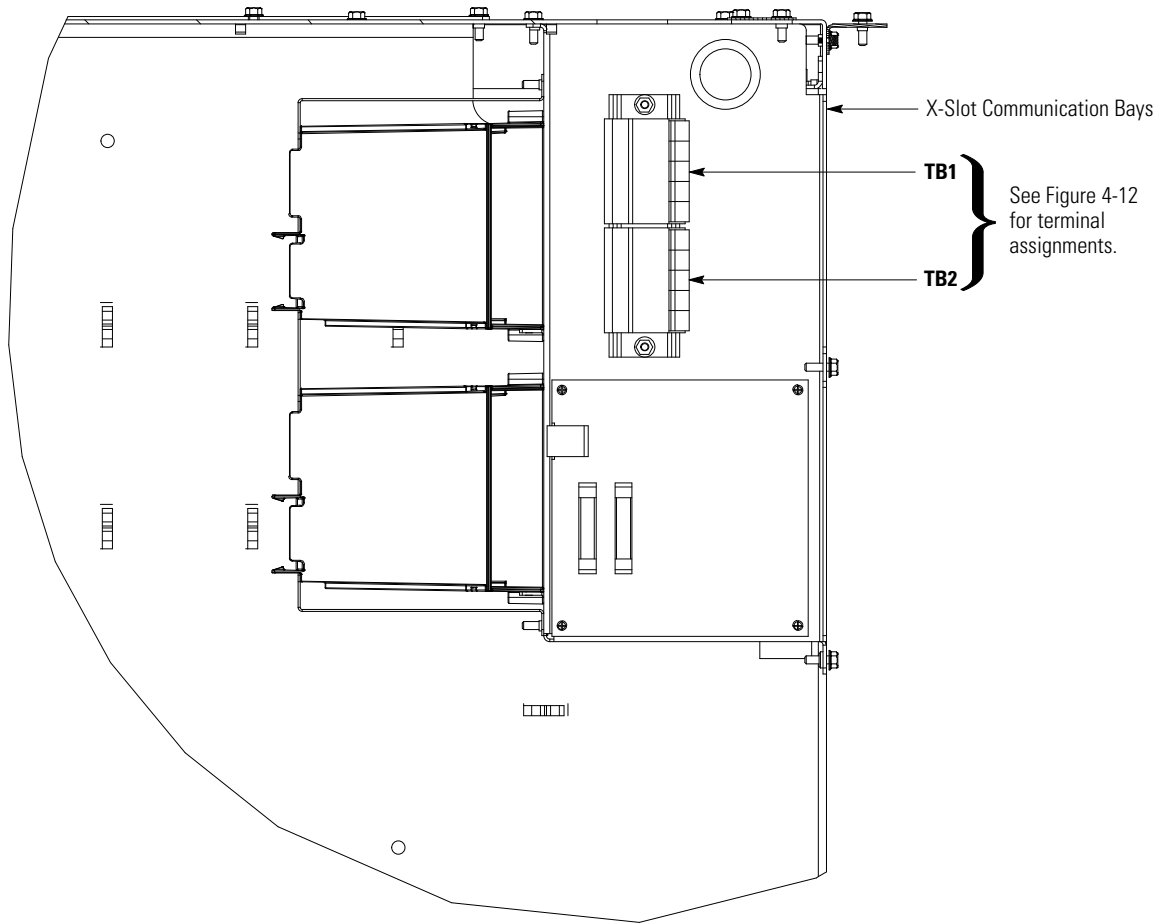
  

Terminal TB2	Name	Description
1	Pull Chain	Output: Backup control for parallel operation.
2	Pull Chain Common	
3	Alarm Relay NC	Output: General purpose normally-closed (NC) relay contact.
4	Alarm Relay Common	
5	Alarm Relay NO	Output: General purpose normally-open (NO) relay contact.
6	Alarm Relay Common	
7	Not Used	
8	Not Used	
9	Not Used	
10	Not Used	

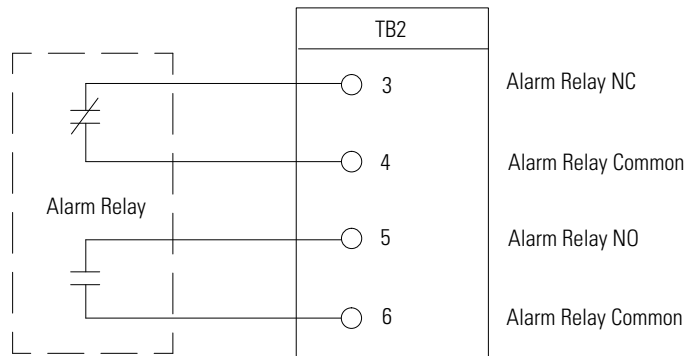
  

Terminal TB3	Name	Description
1	Building Alarm 1	Input: Programmable UPS alarm, activated by a remote dry contact closure.
2	Building Alarm 1 Return	
3	Building Alarm 2	Input: Programmable UPS alarm, activated by a remote dry contact closure.
4	Building Alarm 2 Return	
5	Building Alarm 3 Default: Charger 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.
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.

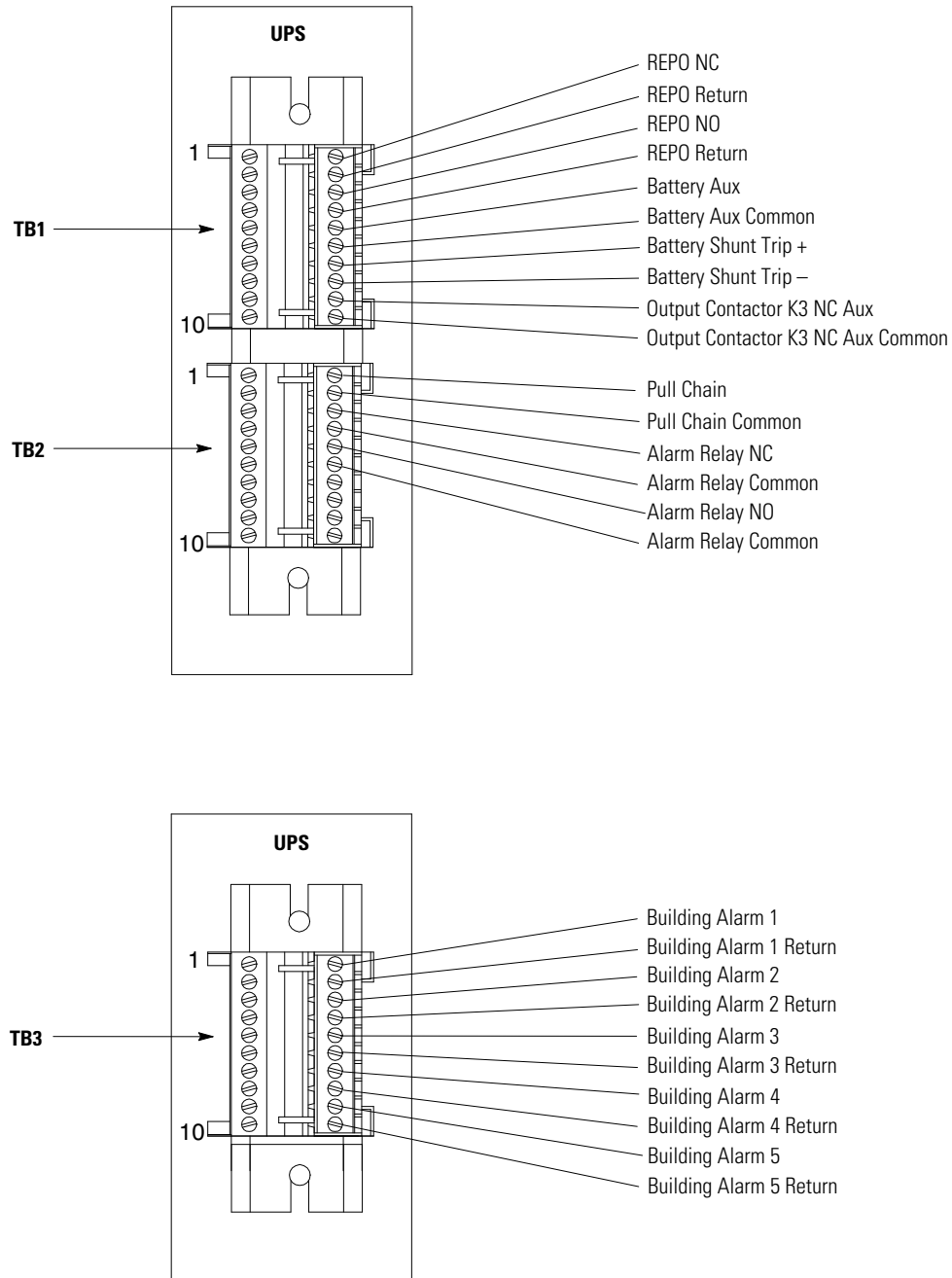


**Figure 4-10. Interface Terminal Detail**



- 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 4-11. Typical Alarm Relay Connection**



**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.

**Figure 4-12. Terminal Blocks TB1, TB2, and TB3 Connector Assignments**

## 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 4-1).
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 3.2.3, Table 4-1, and Figure 4-14.




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**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.

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6. Remove the left interface entry conduit landing plate to drill or punch holes (see Figure 4-5).
7. Reinstall the interface entry plate and install the conduit.

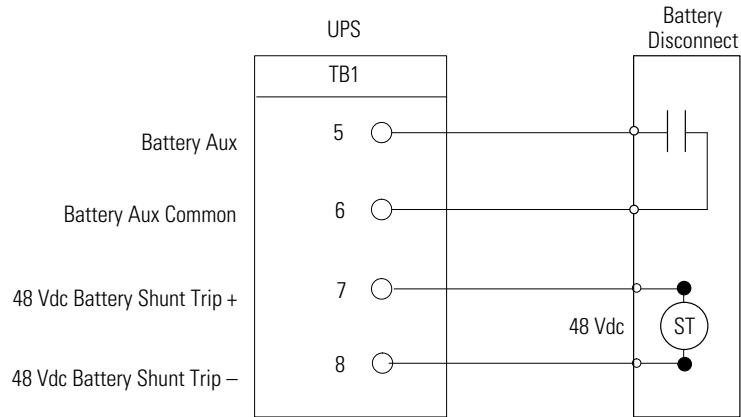



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**NOTE** The 9395P system can trip a maximum of six battery cabinets total. This applies to both the 1085 standard and High Rate series batteries. If more than six battery cabinets in total are needed in a separate UPM battery configuration, DO NOT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

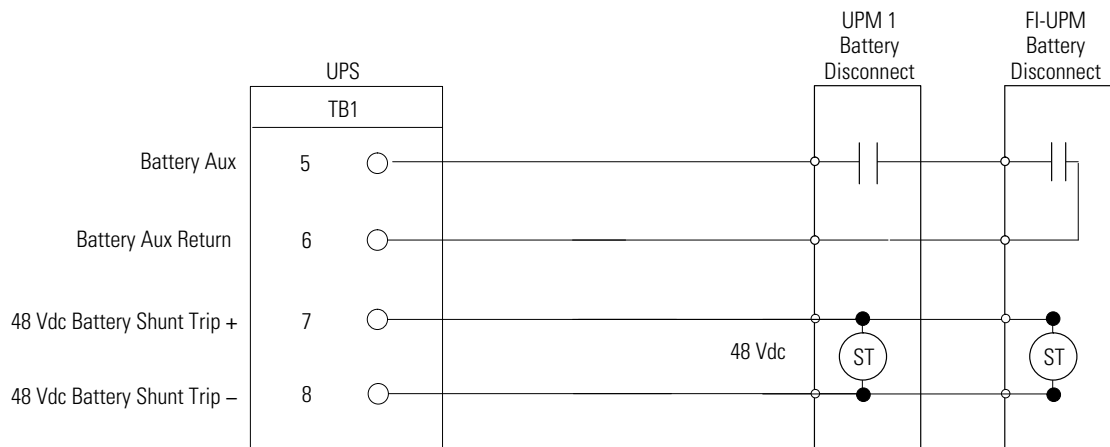
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8. Route the shunt trip (optional) and battery aux wiring from the battery disconnects to the UPS cabinet. See Figure 4-5 and Figure 4-6 for UPS wiring access information and terminal locations.
9. Connect the wiring to the TB1 terminals.
10. Reinstall 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; otherwise, proceed to Step 13.
13. Close the door and secure the latch.



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

**Figure 4-13. Typical Battery Interface Connection – Common Battery System**



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

**Figure 4-14. Typical Battery Interface Connection – Separate Battery System**



### 4.7.3 X-Slot Connections



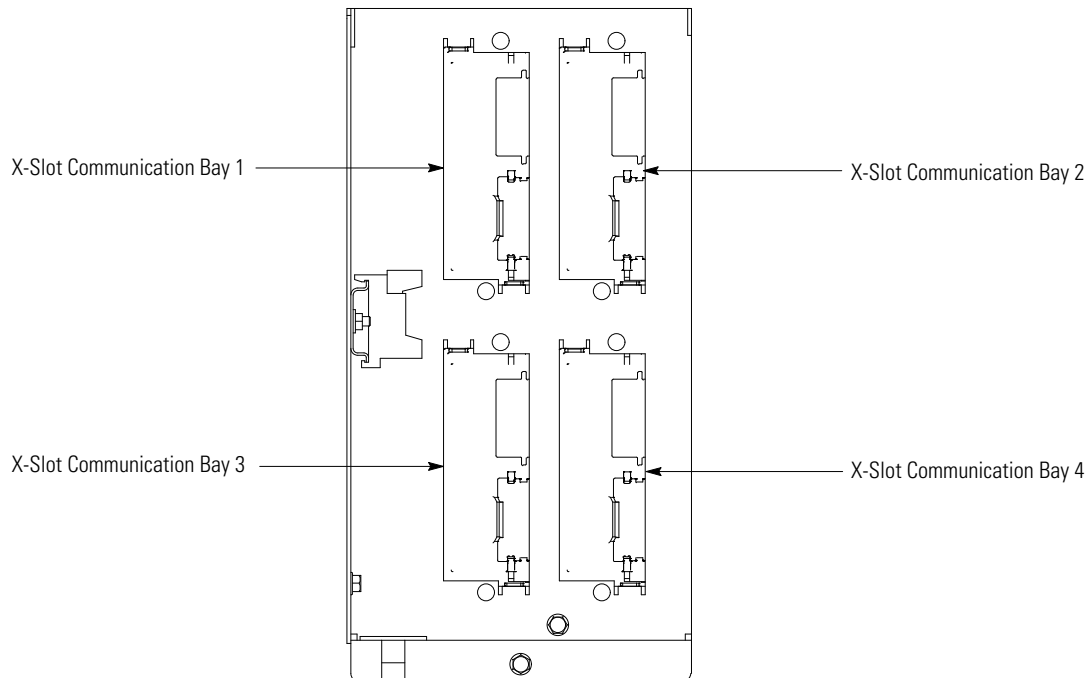
**NOTE** LAN drops for use with X-Slot cards must be provided by the customer.

**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 page 1-10).

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 4-1).
3. Remove the right interface entry conduit landing plate to drill or punch holes (see Figure 4-5).
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 4-15 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 4-15. 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 4-17 shows a REPO switch.



**NOTE** Before installing a REPO switch, verify that the UPS was installed according to the instructions in paragraphs 4.2 through 4.7.

**NOTE** When installing the REPO switch, you must install conduit between the device and the UPS cabinet for wiring the switch.

**NOTE** Remove the UPS cabinet interface entry conduit landing plates to drill or punch holes (see Figure 4-5).

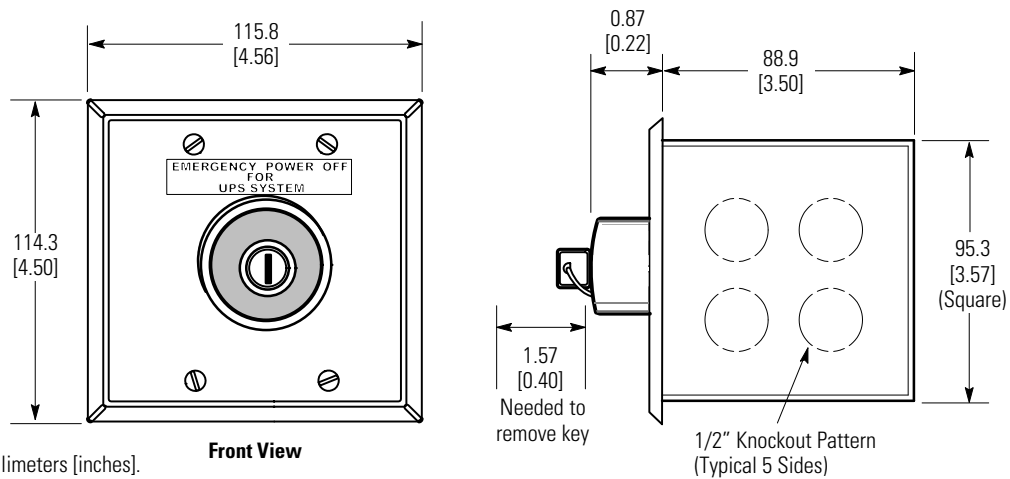
**NOTE** The REPO switch must be a normally-open or normally-closed latching-type switch not tied into any other circuits.

**NOTE** 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** The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.

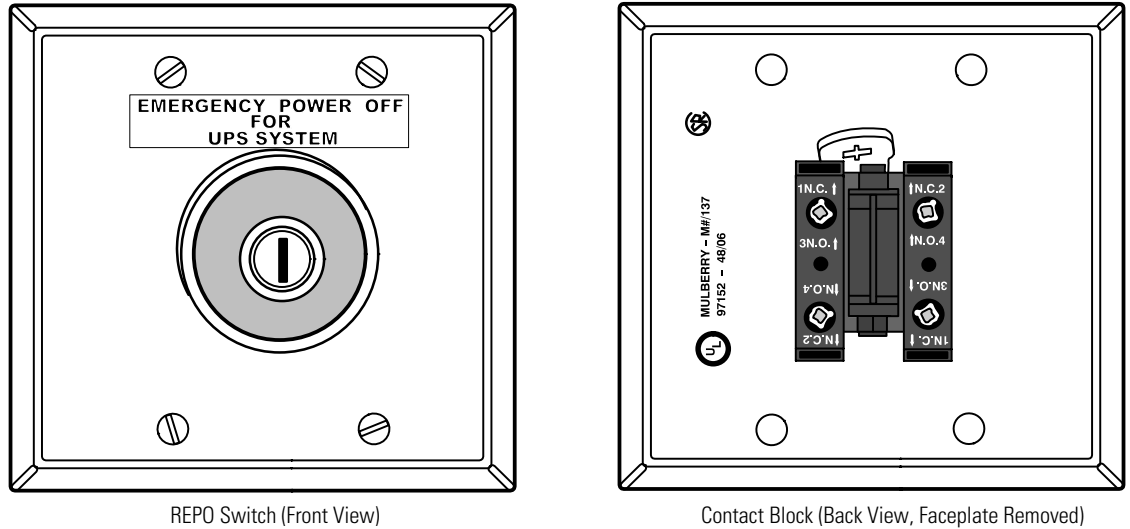
To Install a REPO switch:

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 4-16 for enclosure dimensions and wiring knockouts.



**Figure 4-16. Remote EPO Switch Dimensions**

3. Unfasten the front door latch and swing the door open.
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.

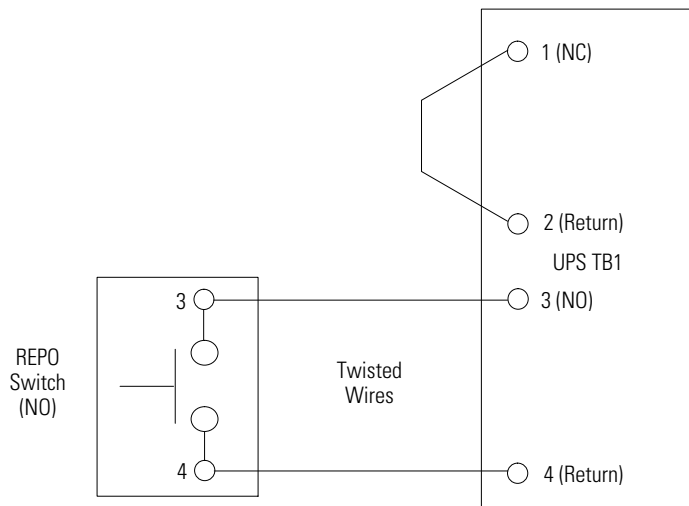


**Figure 4-17. REPO Switch**

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 4-9).
6. Remove the left interface entry conduit landing plate to drill or punch holes (see Figure 4-5).
7. Reinstall the interface entry plate and install conduit.
8. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph 3.2.3, Table 4-1, and Figure 4-12.
9. Route and connect the wiring as shown in Table 4-2 and Figure 4-18.
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 4-2. 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 <sup>2</sup> )	7 lb in (0.8 Nm)
4 NO	TB1-4		



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

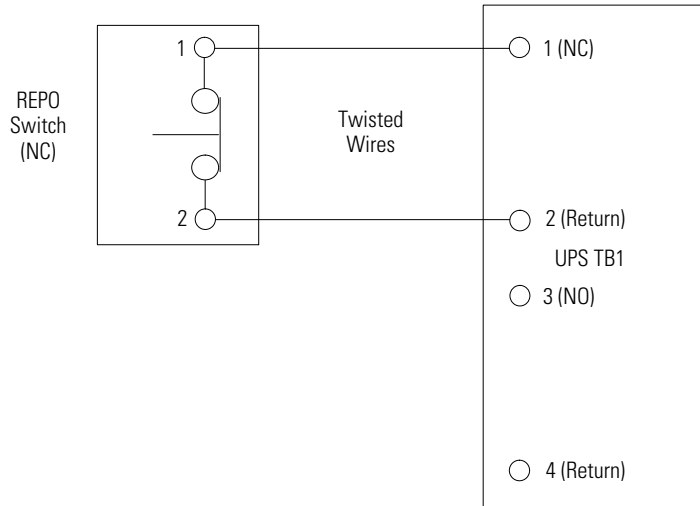
**NOTE** The REPO switch must be a latching-type switch not tied to any other circuits.

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

**Figure 4-18. Normally-Open REPO Switch Wiring**

- 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 4-17). 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 4-19 shows the wiring connections if the normally-closed REPO contacts are used and Figure 4-20 shows alternative methods of connecting a REPO switch if using another manufacturer's switch.

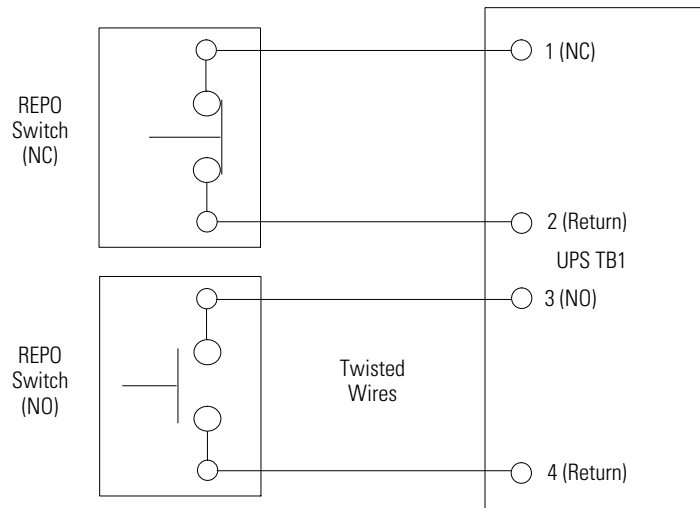


**NOTE** REPO switch rating is 24 Vdc, 1A minimum.

**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 4-19. 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 4-20. Normally-Closed and Normally-Open REPO Switch Wiring**

## 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 specified on page W-1 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.

## 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.



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**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 the ISBM and UPM sections.
- 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 drops are installed.
- All 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 is mounted in its installed location and its wiring is terminated inside the UPS. (OPTIONAL)
- Accessories are mounted in installed locations and wiring is terminated inside the UPS cabinet. (OPTIONAL)
- The debris shields covering the UPS cabinet ventilation grills are 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.



## 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 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 75°C copper wire.
- 120 Vac for the RMP II, RIM II, or SCM II should be provided from the critical bus by facility planners or the customer.

Install wiring from the Hot Sync CAN Bridge Card in accordance with the following instructions:

- Hot Sync CAN Bridge card (see paragraph 5.1)
- Parallel system wiring (see paragraph 5.2)
- RMP II (see paragraph 5.3)
- RIM II (see paragraph 5.4)
- SCM II (see paragraph 5.5)

## 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 5-1, 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 II, a Relay Interface Module II, or a Supervisory Contact Module II to the UPS.

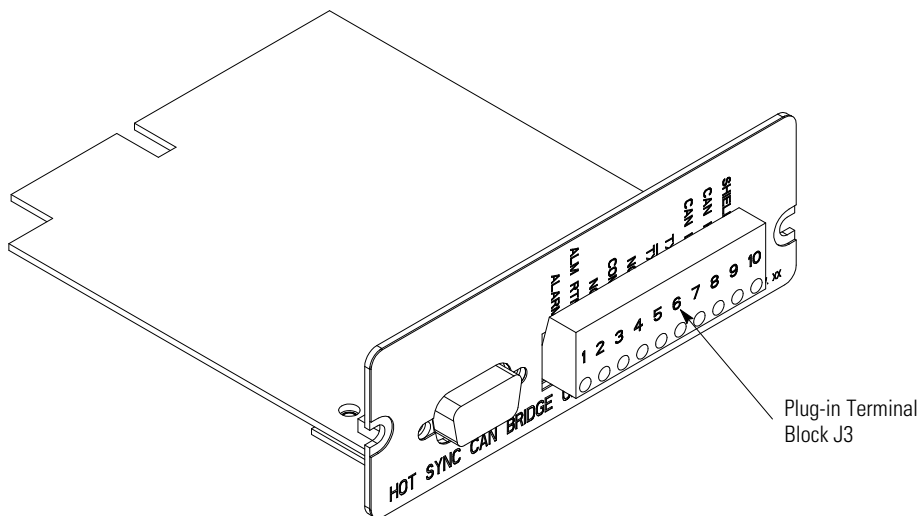


Figure 5-1. Hot Sync CAN Bridge Card



**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 4-1).
3. Install the Hot Sync CAN Bridge Card into an open X-Slot communication bay on the front of the UPS. See Figure 4-9 and Figure 4-15 for X-Slot communication bay locations.

To locate the appropriate terminals on the Hot Sync CAN Bridge Card, see Figure 5-2 and Table 5-1.

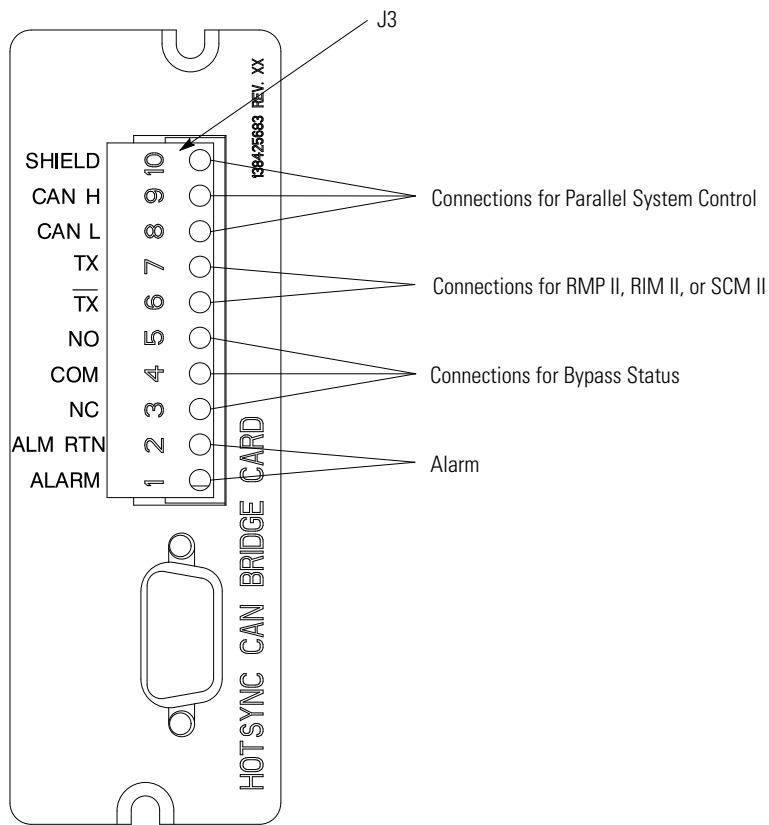


Figure 5-2. Hot Sync CAN Bridge Card Connections

Table 5-1. 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	TX	RMP II, 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** 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** 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.
3. Terminal block TB3 is accessible on the left side of the X-Slot communication bay (see Figure 4-9). 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 4-5).
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 3.2.4, Table 4-1, and Figure 4-9 through Figure 4-12.
7. Route and install CAN wiring between the UPS cabinets. See Figure 5-2 and Table 5-1 for the Hot Sync CAN Bridge Card terminal location and Figure 5-3, Figure 5-4, and Table 5-2 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 5-5 and Table 5-3 for wiring information.
10. Proceed to Step 12.
11. Route and install distributed bypass system pull-chain wiring between the UPS cabinets and customer-supplied tie cabinet MOBs. See Figure 5-6 and Table 5-4 for wiring information.

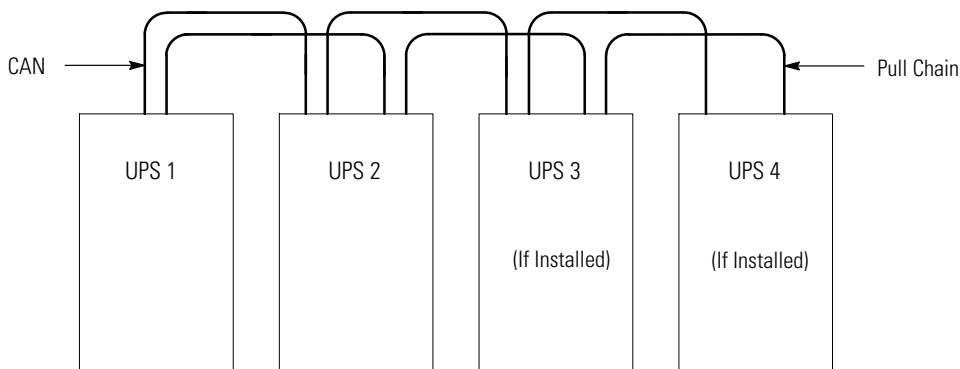



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**NOTE** Setup of the Hot Sync CAN Bridge Card for parallel operation must be performed by an authorized Eaton Customer Service Engineer. Contact an Eaton service representative to schedule a date.

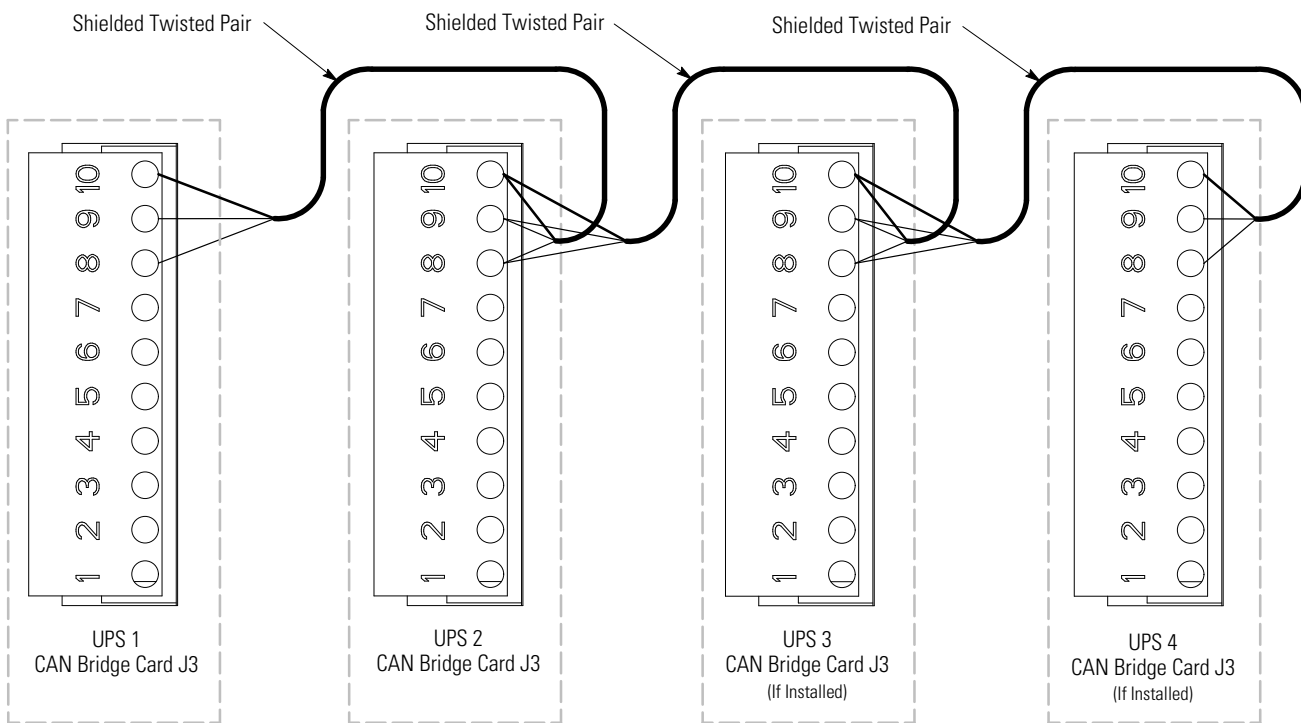
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12. Reinstall the top internal safety shield panel and secure with the retained hardware.
13. Close the door and secure the latch.



**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 5-3. Distributed Bypass System CAN and Pull-Chain Simplified Interface Wiring**

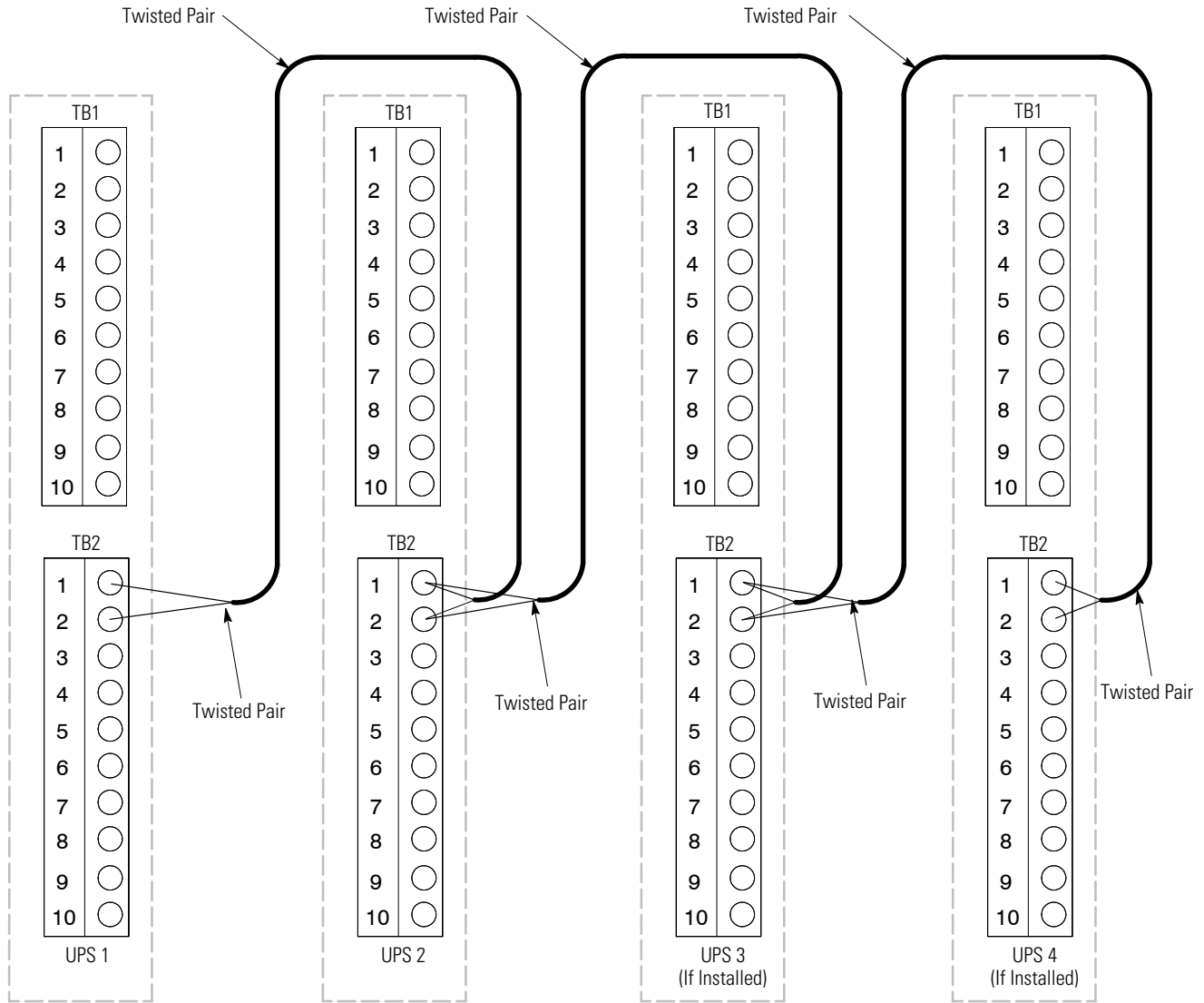


**NOTE** External CAN connections between UPSs require shielded twisted pair wire.

**Figure 5-4. Distributed Bypass System UPS CAN Wiring without MOB**

**Table 5-2. CAN Bridge Card Wiring Terminations**

From UPS 1 CAN Bridge Card	To 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)
J3-9 (H)	J3-9 (H)	J3-9 (H)	J3-9 (H)
J3-10 (Shield)	J3-10 (Shield)	J3-10 (Shield)	J3-10 (Shield)

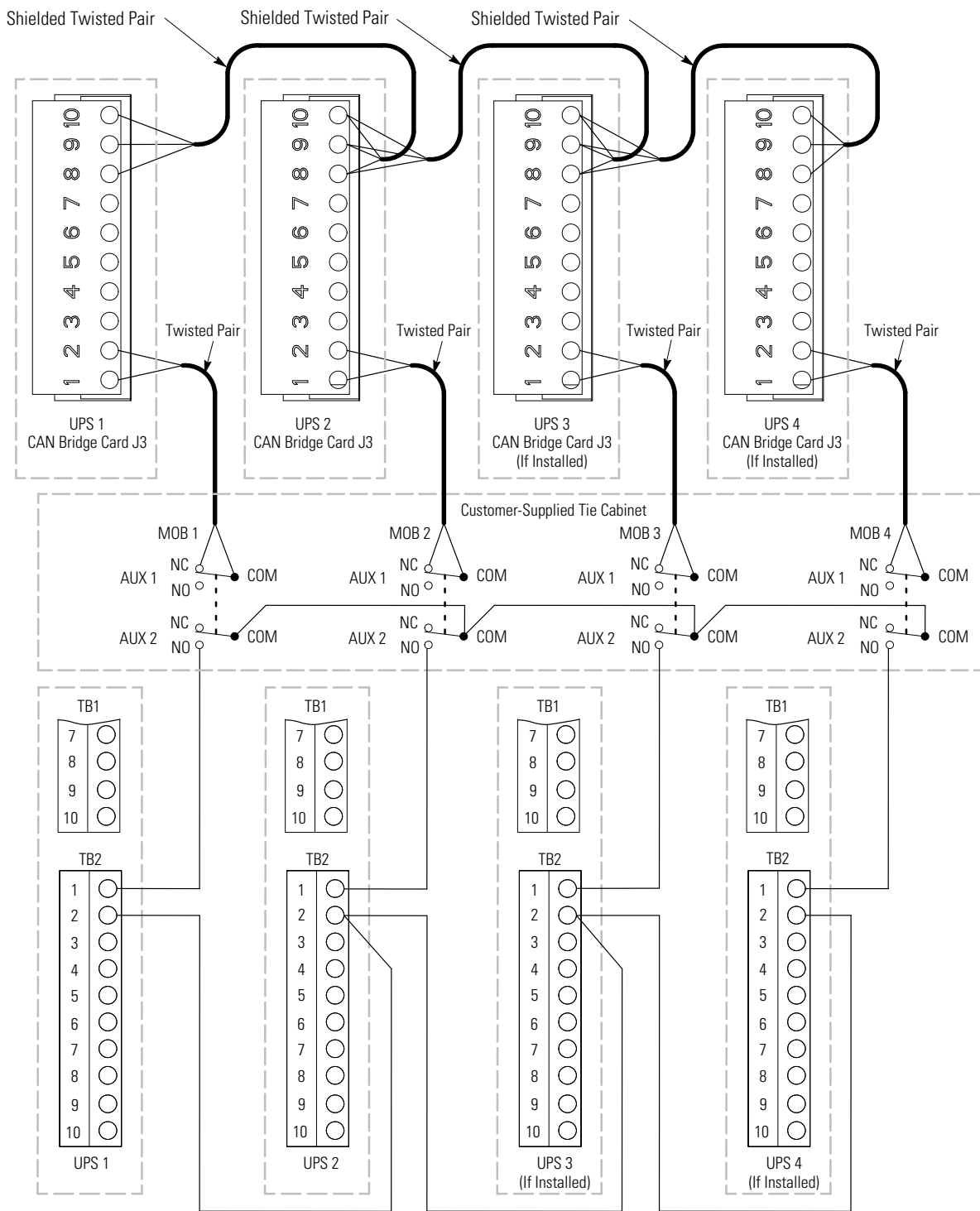


**NOTE** Use twisted pair wiring between the UPS and MOB AUX contacts.

**Figure 5-5. Distributed Bypass Pull-Chain Wiring without MOBs**

**Table 5-3. 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)



**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 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.

**Figure 5-6. Distributed Bypass Pull-Chain Wiring with MOB**

**Table 5-4. 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 1 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 II

To install RMP 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.




---

**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 II at the desired location. See Figure 5-12 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 ISBM cabinet top right interface conduit landing plate to drill or punch conduit holes (see Figure 4-5).
5. Reinstall the conduit landing plate.
6. Install conduit between the UPS and RMP II. See Figure 5-12 for RMP II knockout hole location.
7. Install wiring between the UPS and RMP II. See Figure 5-2 and Table 5-1 for the Hot Sync CAN Bridge Card terminal location and wiring information, and Figure 5-7, Figure 5-8, and Table 5-5 for the RMP II terminal location and wiring information.




---

**NOTE** *120 Vac for the RMP 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 RMP II. See Figure 5-7, Figure 5-8, and Table 5-5 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.

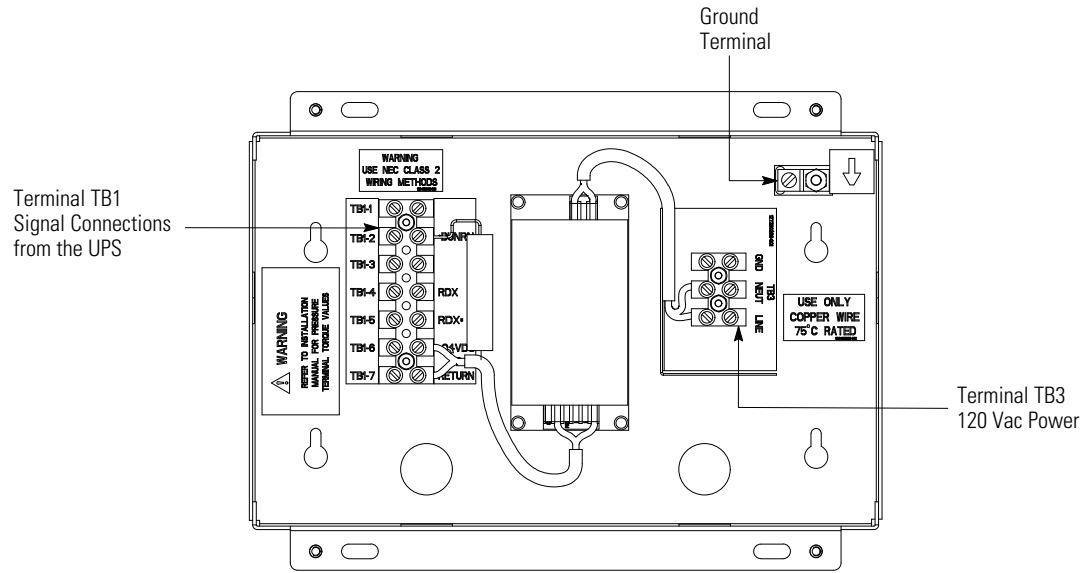


Figure 5-7. Remote Monitor Panel II and Relay Interface Module II Terminal Locations

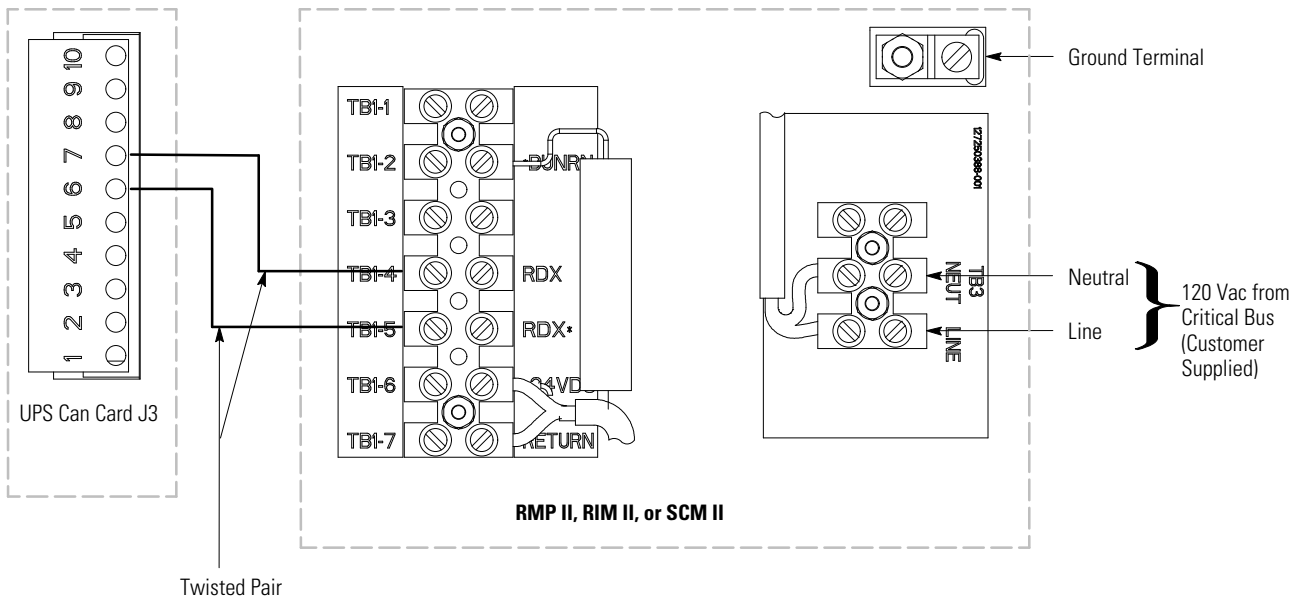


Figure 5-8. Remote Monitor Panel II, Relay Interface Module II, or Supervisory Contact Module II Wiring

Table 5-5. RMP II, RIM II, or SCM II Wiring Terminations

From UPS CAN Card	To RMP II, RIM II, or SCM II	Tightening Torque Nm (lb in)	Remarks
J3-6 (TX)	TB1-5 (RDX*)	0.9 (8)	Use twisted pair
J3-7 (TX)	TB1-4 (RDX)	0.9 (8)	
N/A	TB3 Line	0.9 (8)	
N/A	TB3 Neutral	0.9 (8)	
N/A	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 II, ensure that the UPS is supplying the load via inverter or bypass. If the indicators on the RMP II show the appropriate status, then it is operating correctly.

If the communication link between the UPS and the RMP II is not present, the RMP II 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 II 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 II 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.




---

**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 5-13 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 ISBM cabinet top right interface conduit landing plate to drill or punch conduit holes (see Figure 4-5).
5. Reinstall the conduit landing plate.
6. Install conduit between the UPS and RIM II. See Figure 5-13 for RIM II knockout hole location.
7. Install wiring between the UPS and RIM II. See Figure 5-2 and Table 5-1 for the Hot Sync CAN Bridge Card terminal location and wiring information, and Figure 5-7, Figure 5-8, and Table 5-5 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 5-7, Figure 5-8, and Table 5-5 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.



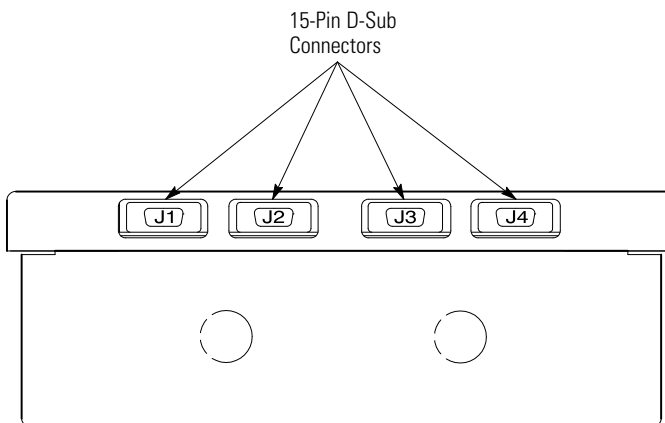
**NOTE** Setup of the Hot Sync CAN Bridge Card must be performed by an authorized Eaton Customer Service Engineer. Contact an Eaton service representative to schedule a date.

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 5-6 and Figure 5-9).

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

**Table 5-6. J1 through J4 Interface Connectors**

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



**Figure 5-9. 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.



**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 5-14 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 ISBM cabinet top right interface conduit landing plate to drill or punch conduit holes (see Figure 4-5).
5. Reinstall the conduit landing plate.
6. Install conduit between the UPS and SCM II. See Figure 5-14 for SCM II knockout hole location.
7. Install wiring between the UPS and SCM II. See Figure 5-2 and Table 5-1 for the Hot Sync CAN Bridge Card terminal location and wiring information, and Figure 5-10, Figure 5-8, and Table 5-5 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 5-10, Figure 5-8, and Table 5-5 for the terminal location and wiring information.

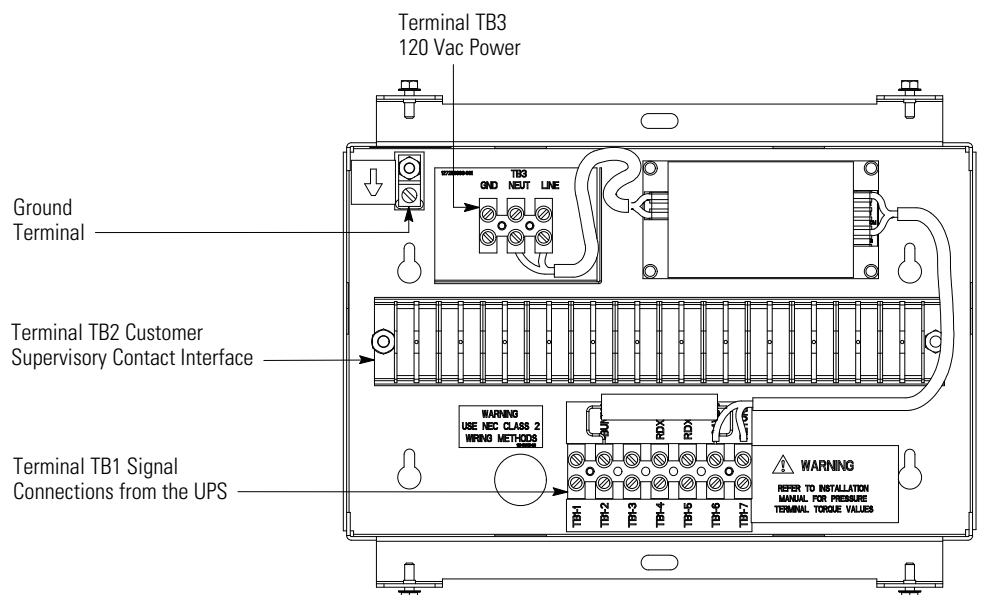
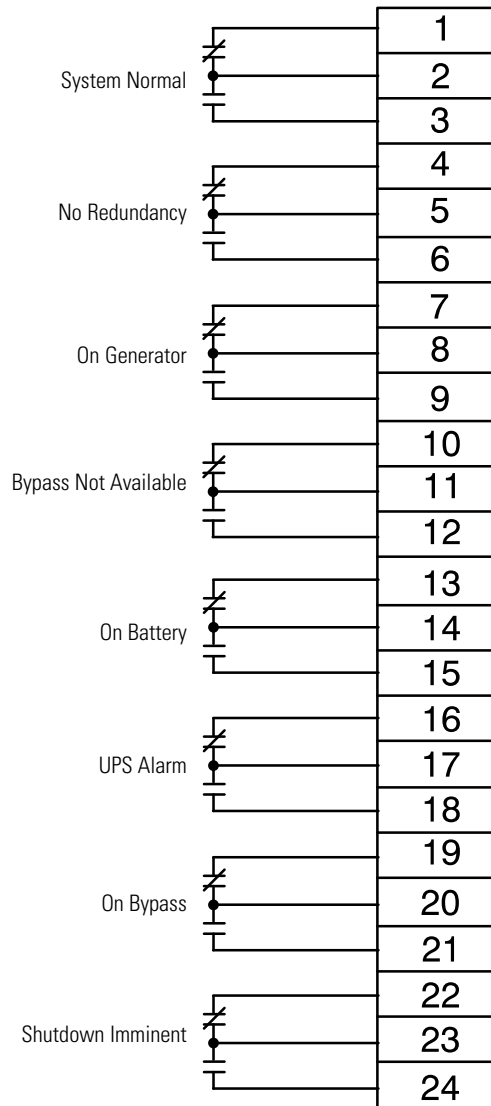


Figure 5-10. Supervisory Contact Module II Terminal Location



**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 5-10 for terminal block location and Figure 5-11 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 5-11. 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 5-12 through Figure 5-14 show the dimensions of the RMP II, the RIM II, and the SCM II.

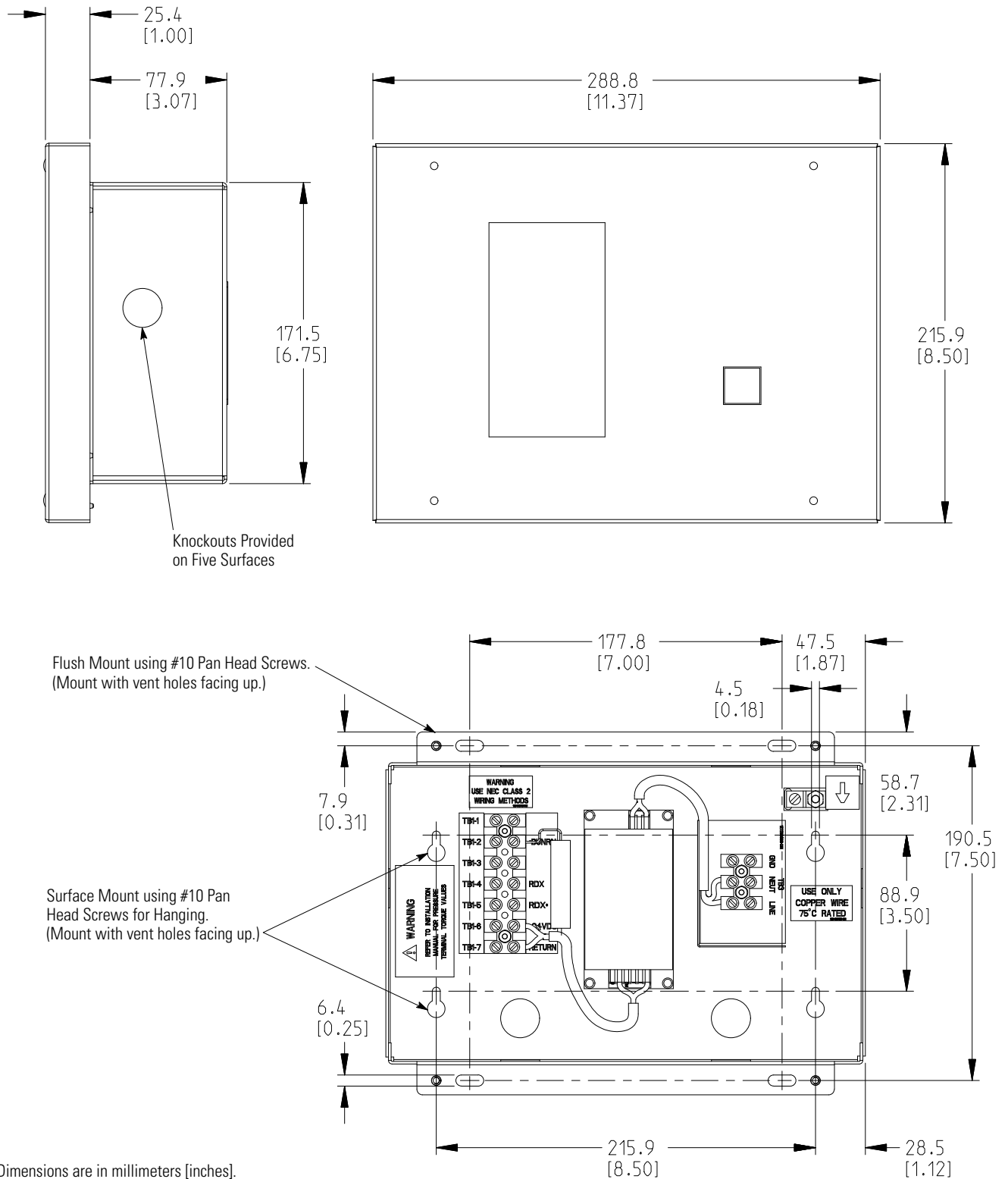


Figure 5-12. Remote Monitor Panel II Dimensions

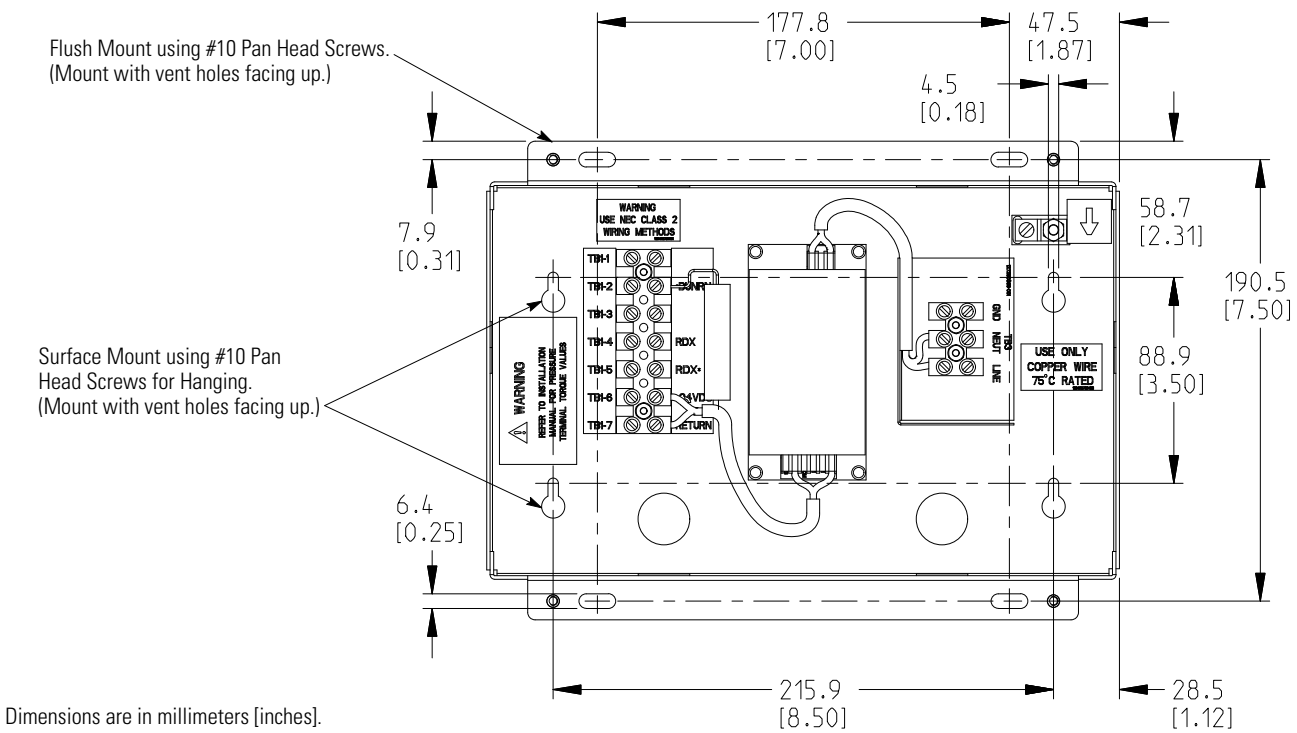
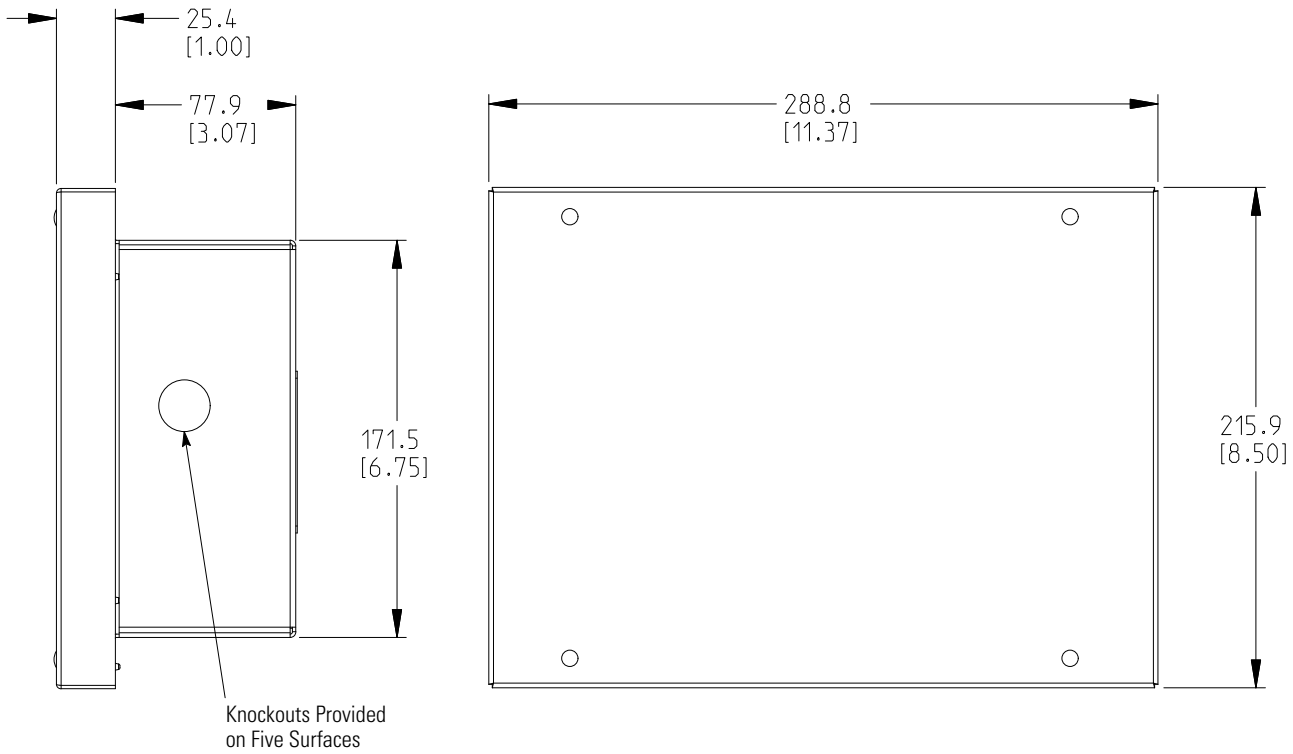


Figure 5-13. Relay Interface Module II Dimensions



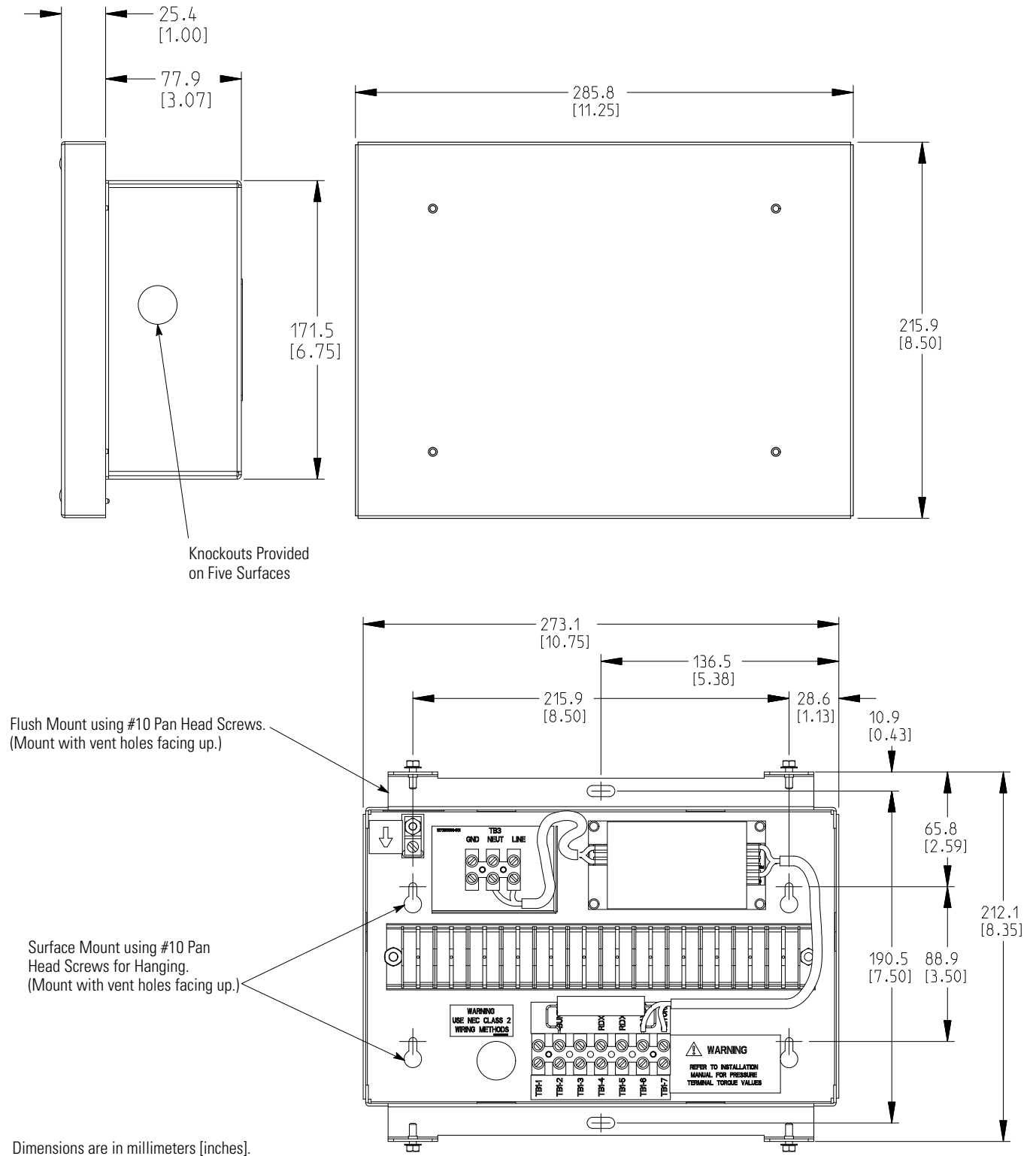


Figure 5-14. Supervisory Contact Module II Dimensions

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# **Section II**

## **Operation**



## Chapter 6

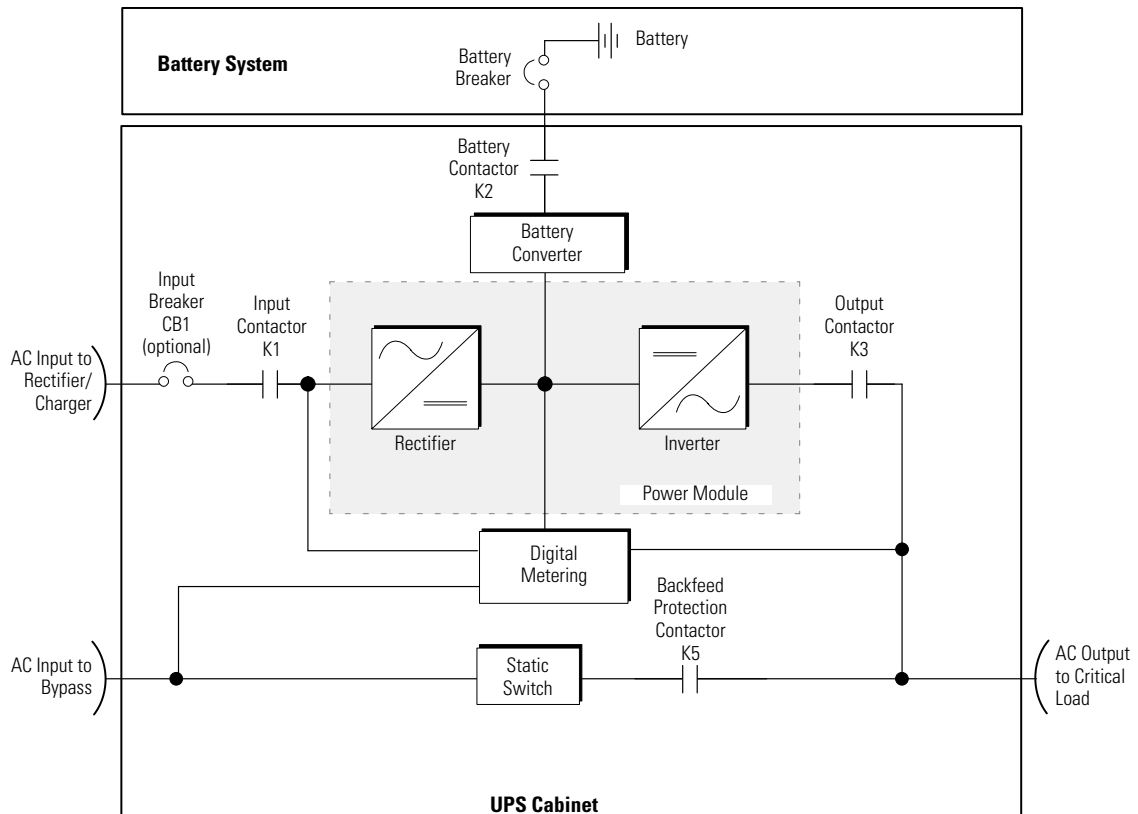
# Understanding UPS Operation

### 6.1 UPS System Overview

The Eaton 9395P 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 6-1 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 system allows you to either transfer to an alternative power system (such as a generator) or shut down your critical load in an orderly manner.



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

**Figure 6-1. Main Elements of the UPS System**

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 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 UPS supports a critical load in five different modes of operation:




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

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- 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 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.
- In Variable Module Management System 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 five UPS operating modes, using block diagrams to show the power flow during each mode of operation.

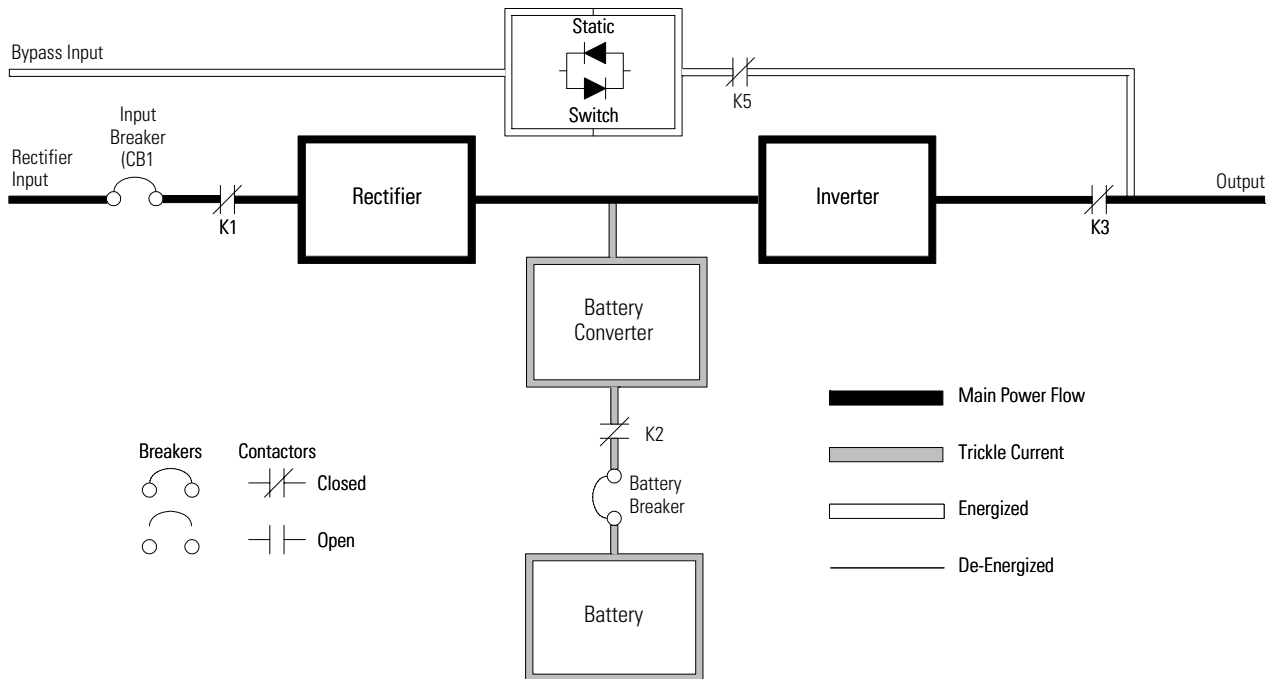
### 6.2.2 Online Mode

Figure 6-2 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 a 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.



**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.

**Figure 6-2. Path of Current Through the UPS in Online Mode**

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 Normal 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 Normal 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 (ESS) Mode




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

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When the UPS is operating in ESS mode, commercial AC power is supplied directly to the critical load through the continuous static switch. Power line filtering and spike protection for the load are provided by the input and output filter networks, and the UPS actively monitors the critical bus for power disturbances. When in this mode, the input and output contactors are 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




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

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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 55% 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 Normal mode to Bypass mode manually. The bypass source supplies the commercial AC power to the load directly. Figure 6-3 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 SCR continuous static switch, and a backfeed protection contactor K5. The static switch is used instantaneously anytime the inverter is unable to support the applied load. The continuous static switch is wired in series with the backfeed protection contactor, and together they are wired in parallel with the rectifier and inverter.



#### CAUTION

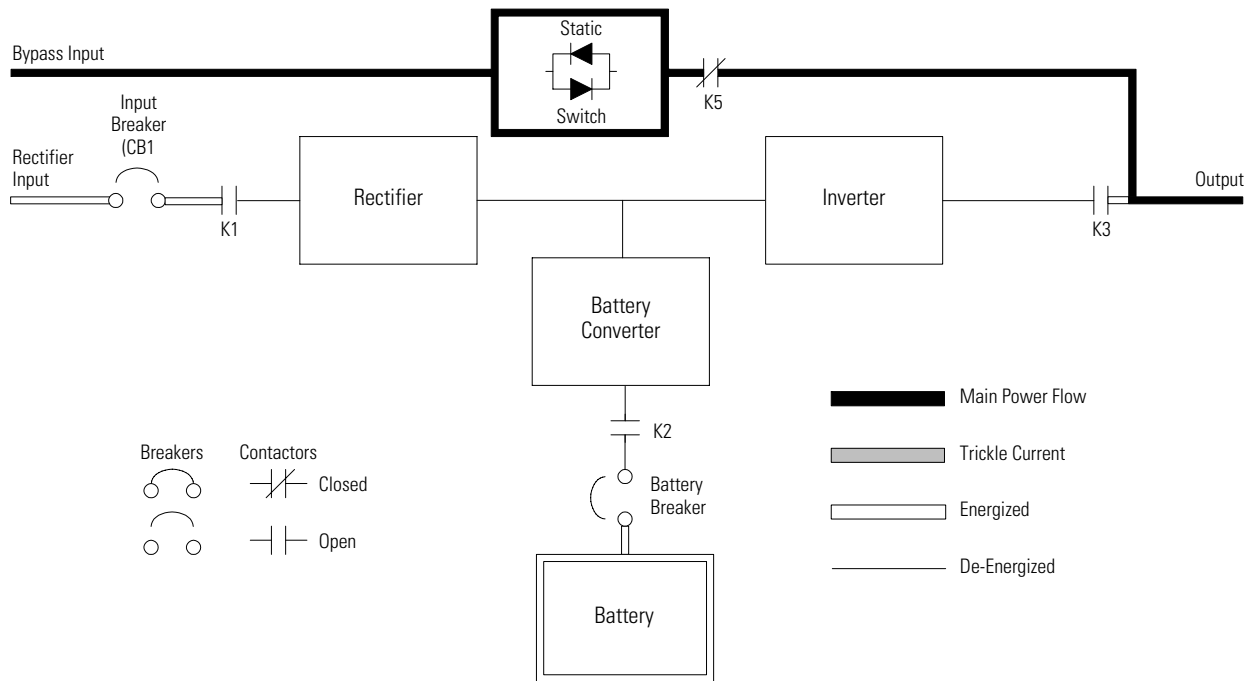
The critical load is not protected from voltage or frequency fluctuations or power outages while the UPS is in Bypass mode.



#### MISE EN GARDE!

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 inverter output contactor K3 opens to isolate the inverter. The backfeed protection contactor is normally closed, ready to support the static switch unless the bypass input source becomes unavailable.



**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.

**Figure 6-3. Path of Current Through the UPS in Bypass Mode**

If the UPS transfers to Bypass mode from Normal mode due to any reason other than operator intervention, the UPS automatically attempts to transfer back to Normal 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

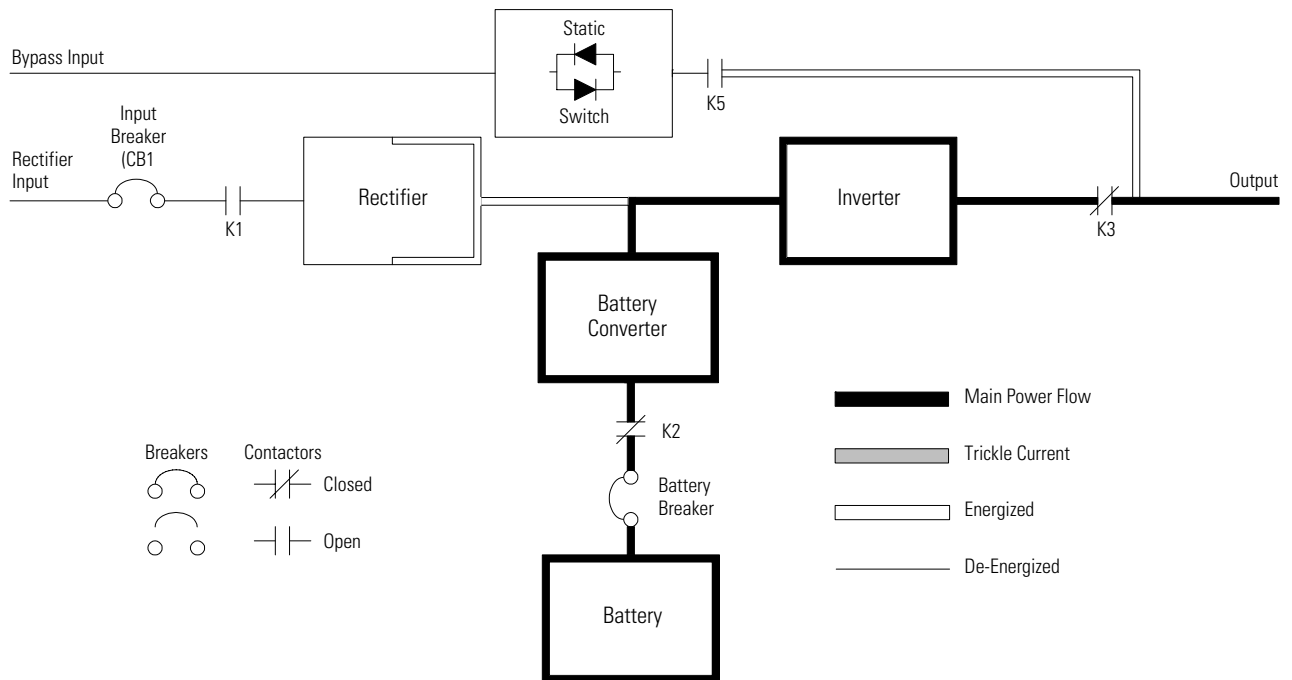
The UPS automatically transfers to Battery mode if a utility power outage occurs, or if the utility power does not conform to specified parameters. In Battery mode, the battery provides emergency DC power that the inverter converts to AC power.

Figure 6-4 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 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 battery continues discharging until a DC voltage level is reached where the inverter output can no longer support the shared loads. 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 Normal 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.



**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.

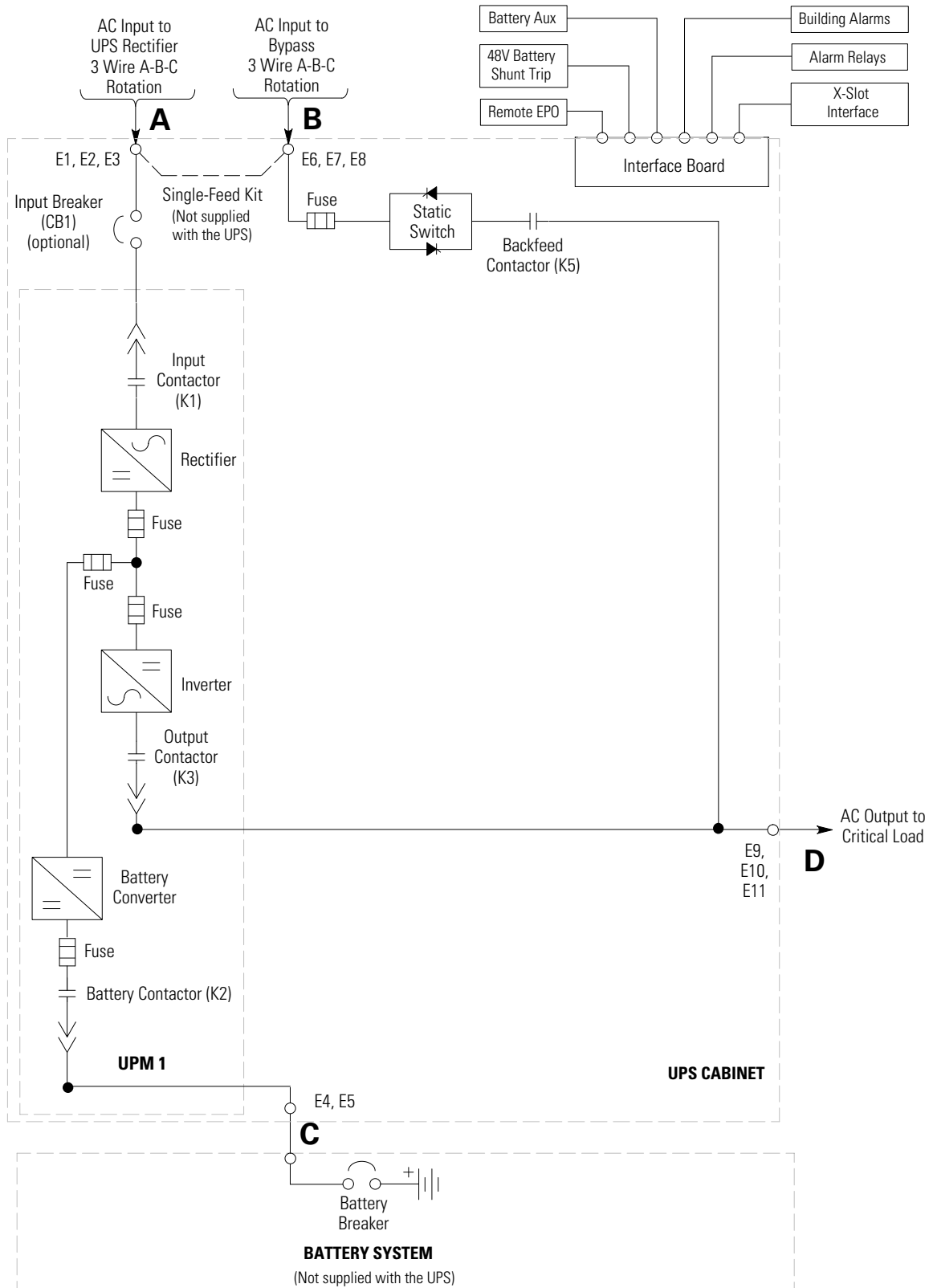
**Figure 6-4. Path of Current Through the UPS in Battery Mode**

### 6.3 Single UPS Unit System Online Configurations

The system online drawings in this section show the simplified internal structure of the UPS, battery supply, and basic maintenance bypass.

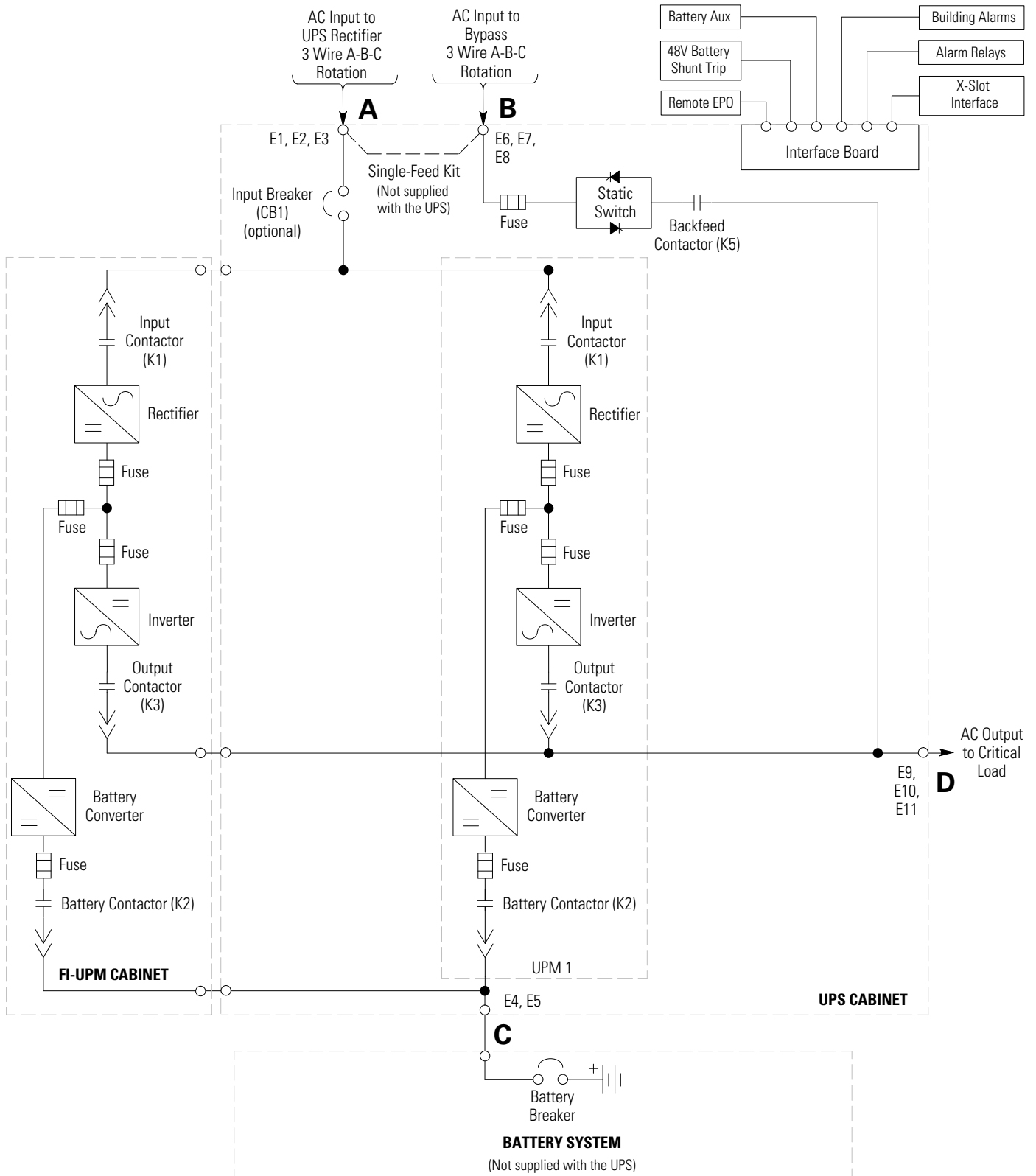
Online Drawing	UPS Model	Voltage		System Type
		Input	Output	
Figure 6-5 on page 6-10	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – One UPM, Rectifier Feed, Battery System, Dual-Feed Configuration, Continuous Static Switch
Figure 6-6 on page 6-11	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch with Field-installed Redundant UPM
Figure 6-7 on page 6-12	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch with Field-installed Redundant UPM
Figure 6-8 on page 6-13	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch
Figure 6-9 on page 6-14	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch
Figure 6-10 on page 6-15	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Battery System, IOM Configuration
Figure 6-11 on page 6-16	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Common Battery, IOM Configuration with Field-installed Redundant UPM
Figure 6-12 on page 6-17	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – One UPM, Common Rectifier Feed, Separate Battery, IOM Configuration with Field-installed Redundant UPM
Figure 6-13 on page 6-18	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Common Battery, IOM Configuration

Online Drawing	UPS Model	Voltage		System Type
		Input	Output	
Figure 6-14 on page 6-19	Eaton 9395P-300/300	480	480	Single Reverse Transfer UPS – Two UPM, Common Rectifier Feed, Separate Battery, IOM Configuration
	Eaton 9395P-300/275			
	Eaton 9395P-300/250			
	Eaton 9395P-300/225			
	Eaton 9395P-300/200			
Figure 6-15 on page 6-20	Eaton 9395P-300/300	480	480	Simplified Dual-Feed UPS with Maintenance Bypass Panel with Factory-installed Redundant UPM
	Eaton 9395P-300/275			
	Eaton 9395P-300/250			
	Eaton 9395P-300/225			
	Eaton 9395P-300/200			



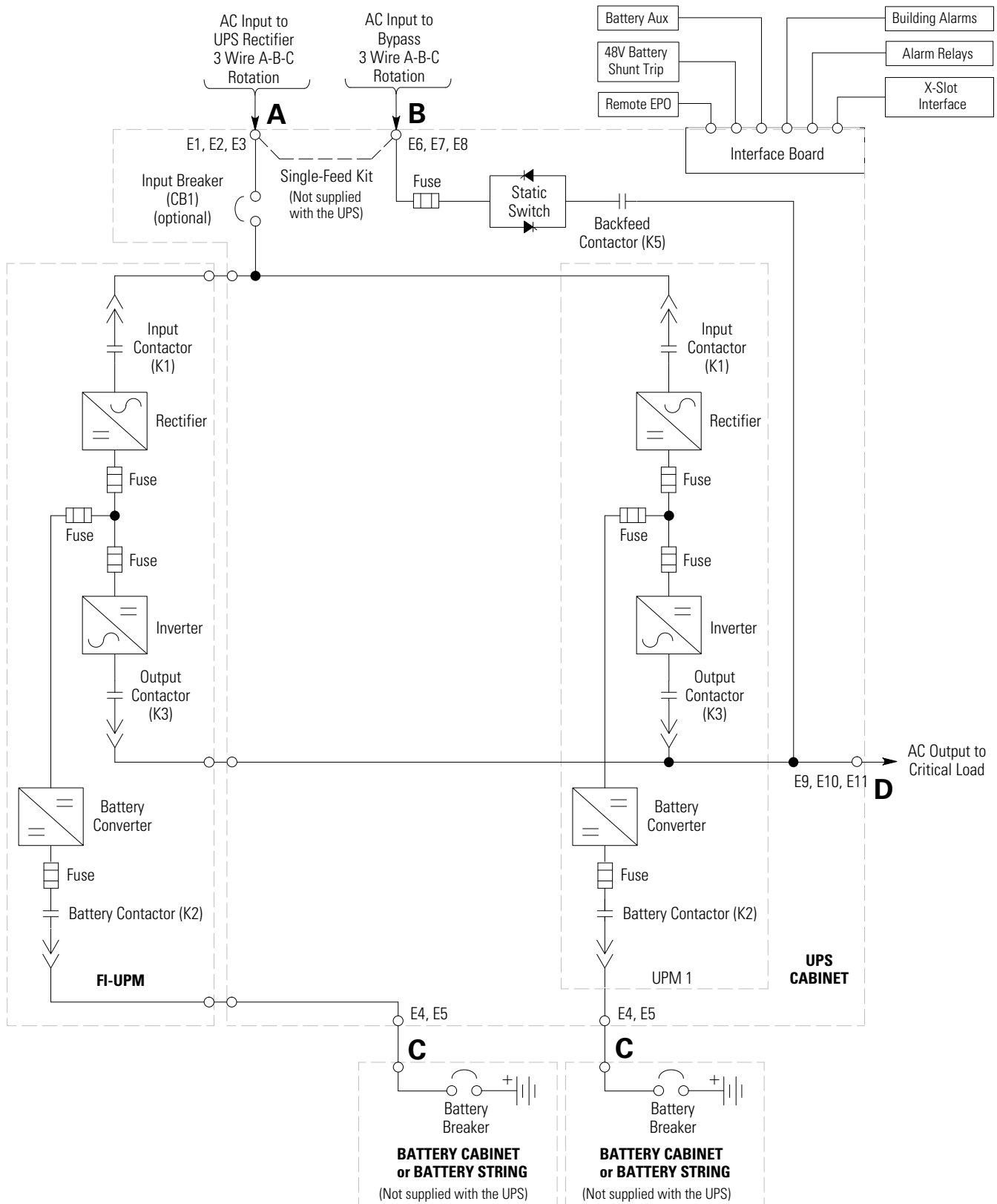
**NOTE** Callout letters **A**, **B**, **C**, and **D** map to Table 3-4 on page 3-8.

**Figure 6-5. One UPM, Rectifier Feed, Battery System, Dual-Feed Configuration, Continuous Static Switch**



**NOTE** Callout letters **A**, **B**, **C**, and **D** map to Table 3-4 on page 3-8.

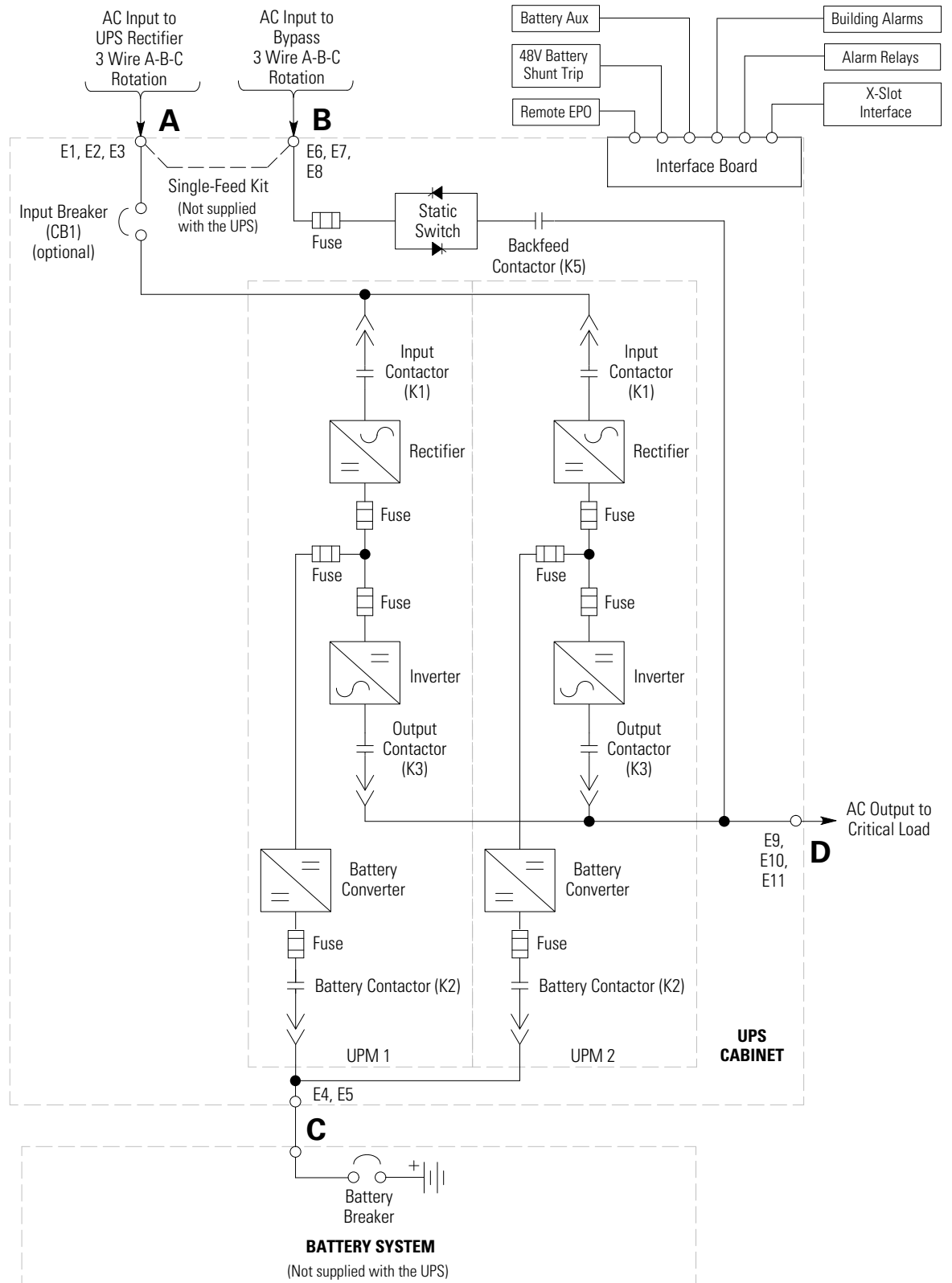
**Figure 6-6. One UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM**



**NOTE** Callout letters **A**, **B**, **C**, and **D** map to Table 3-5 on page 3-9.

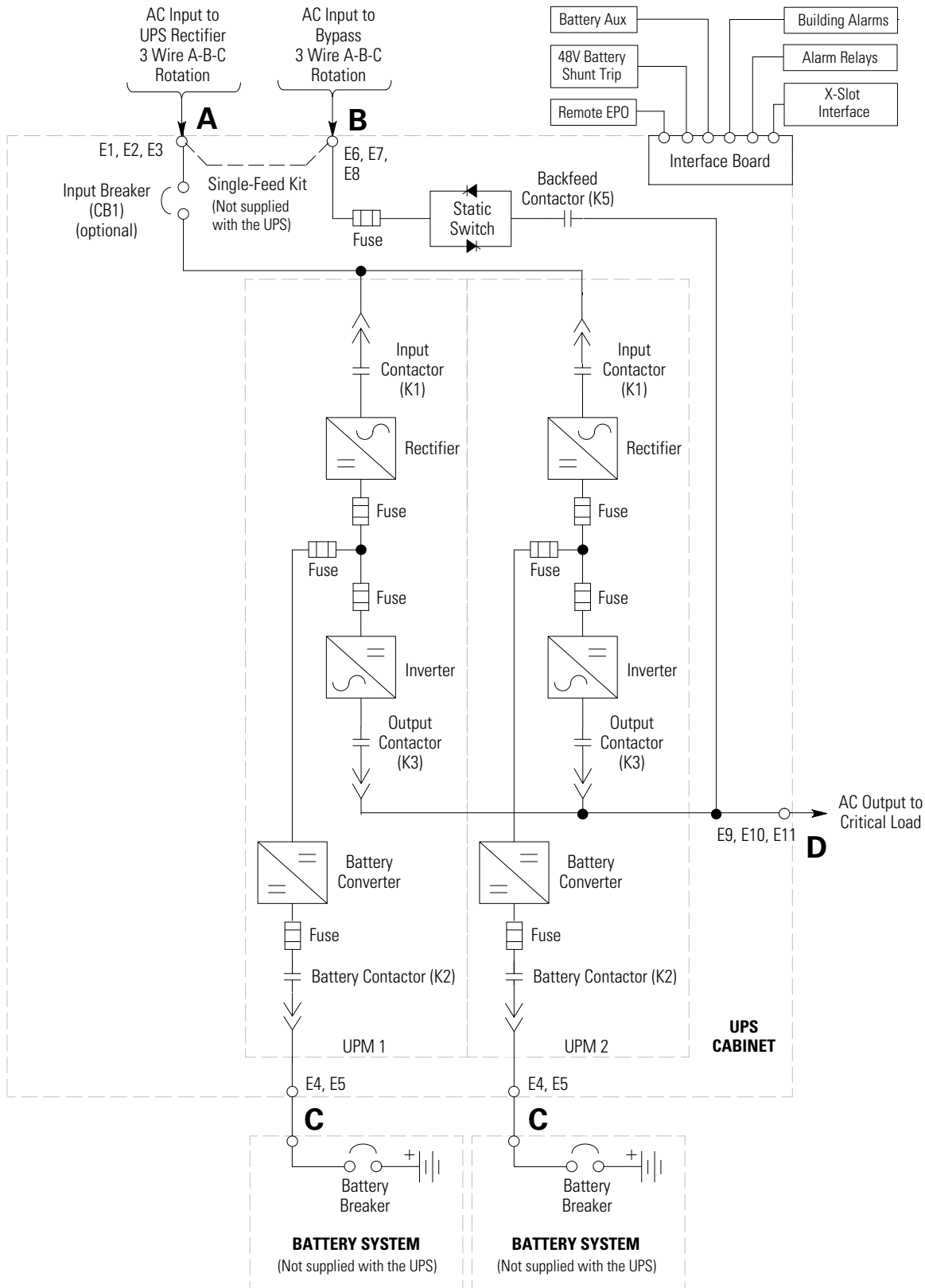
**Figure 6-7. One UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM**





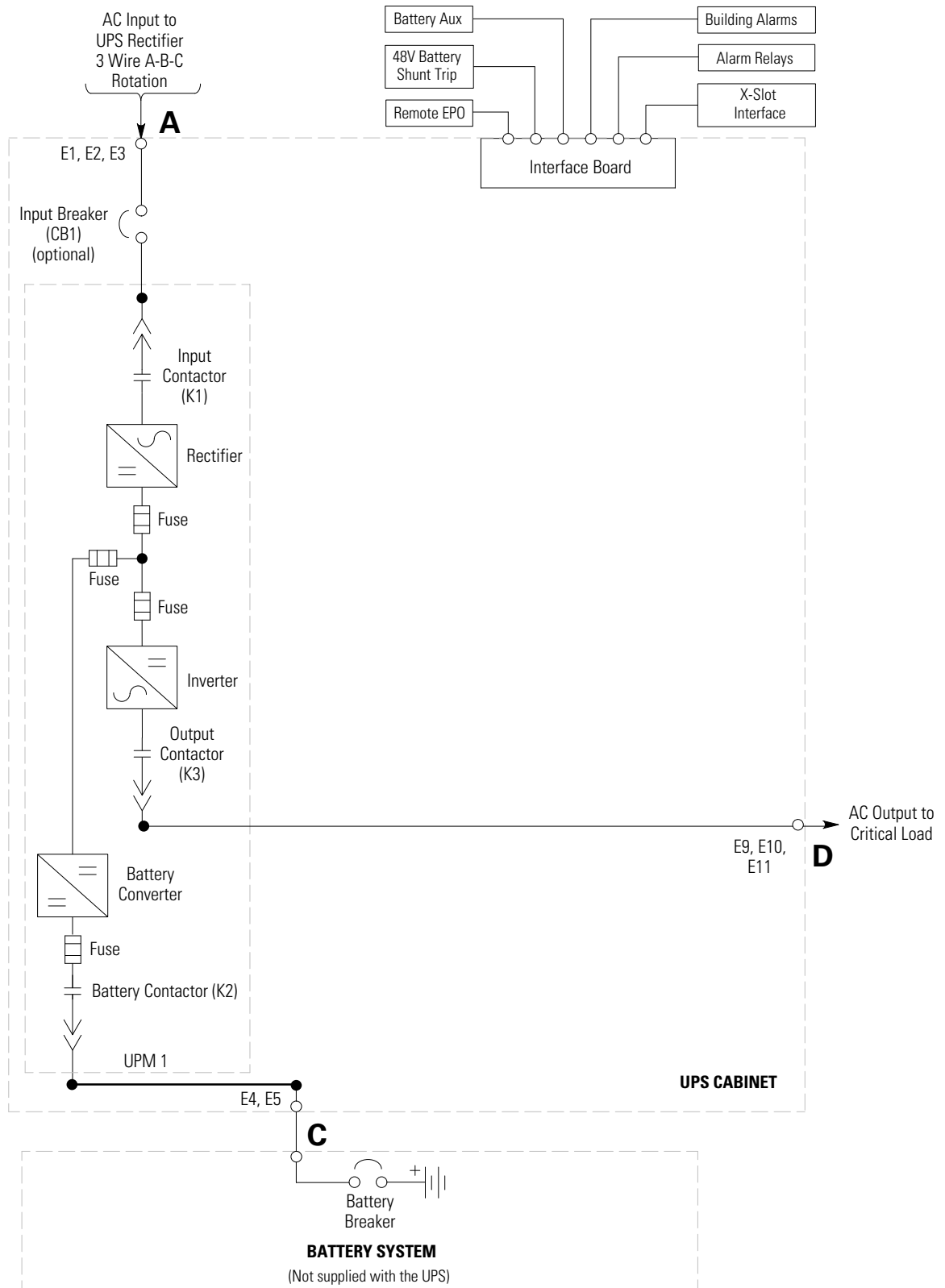
**NOTE** Callout letters **A**, **B**, **C**, and **D** map to Table 3-4 on page 3-8.

**Figure 6-8. Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch**



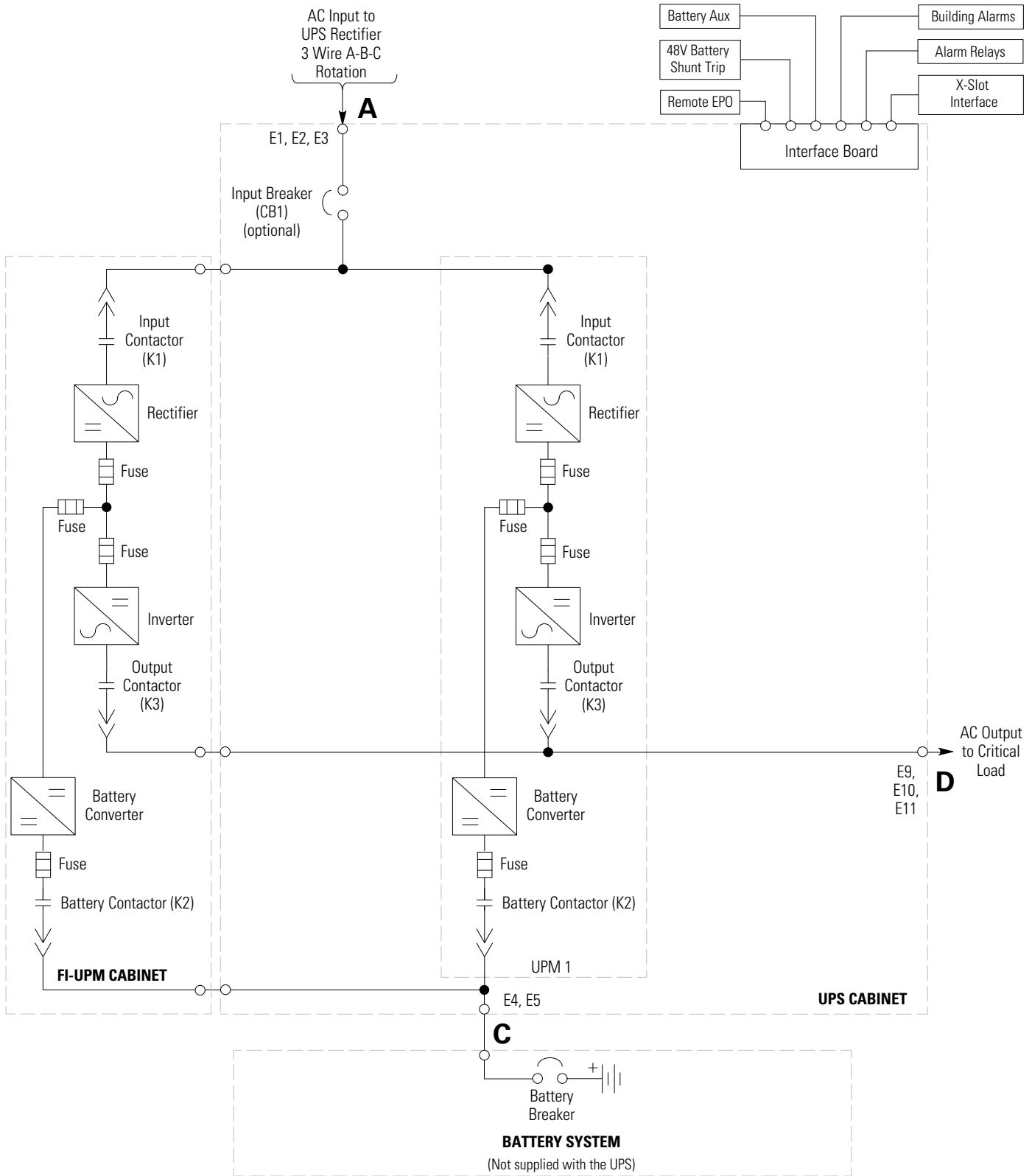
**NOTE** Callout letters **A**, **B**, **C**, and **D** map to Table 3-5 on page 3-9.

**Figure 6-9. Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch**



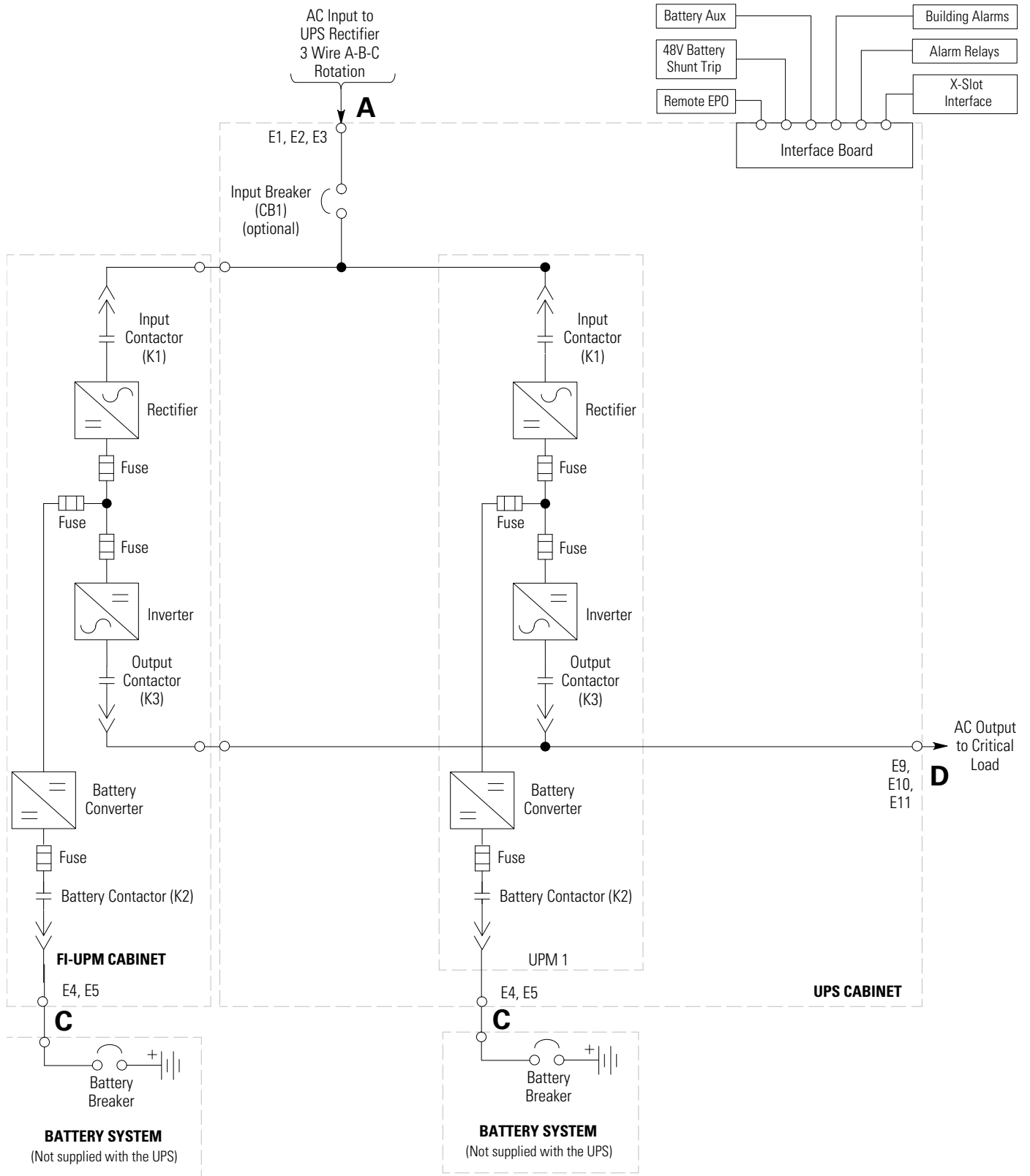
**NOTE** Callout letters **A**, **C**, and **D** map to Table 3-4 on page 3-8.

**Figure 6-10. One UPM, Rectifier Feed, Battery System, IOM Configuration**



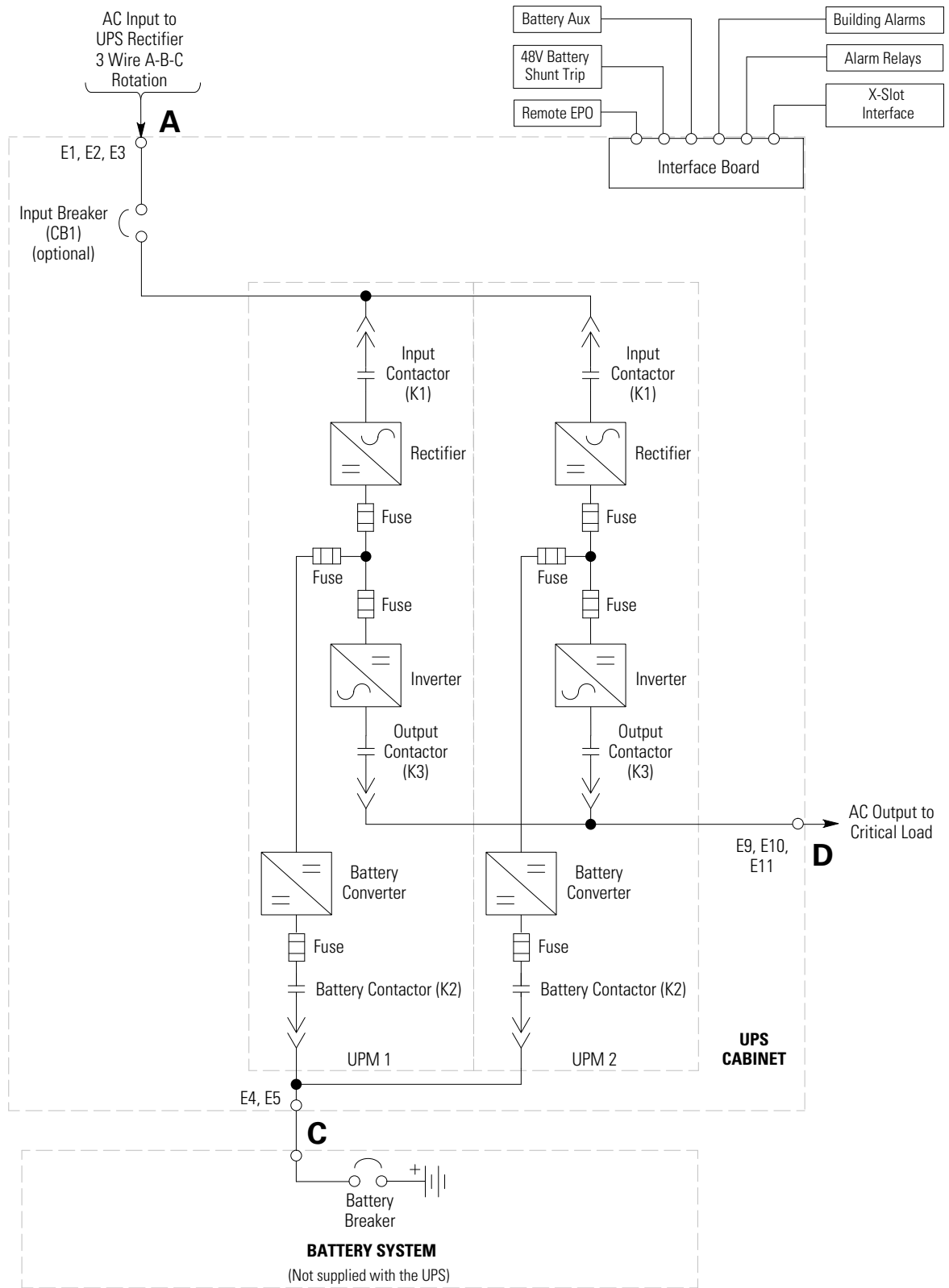
DTE Callout letters **A**, **B**, **C**, and **D** map to Table 3-4 on page 3-8.

**Figure 6-11. One UPM, Common Rectifier Feed, Common Battery, IOM Configuration, FI-UPM**



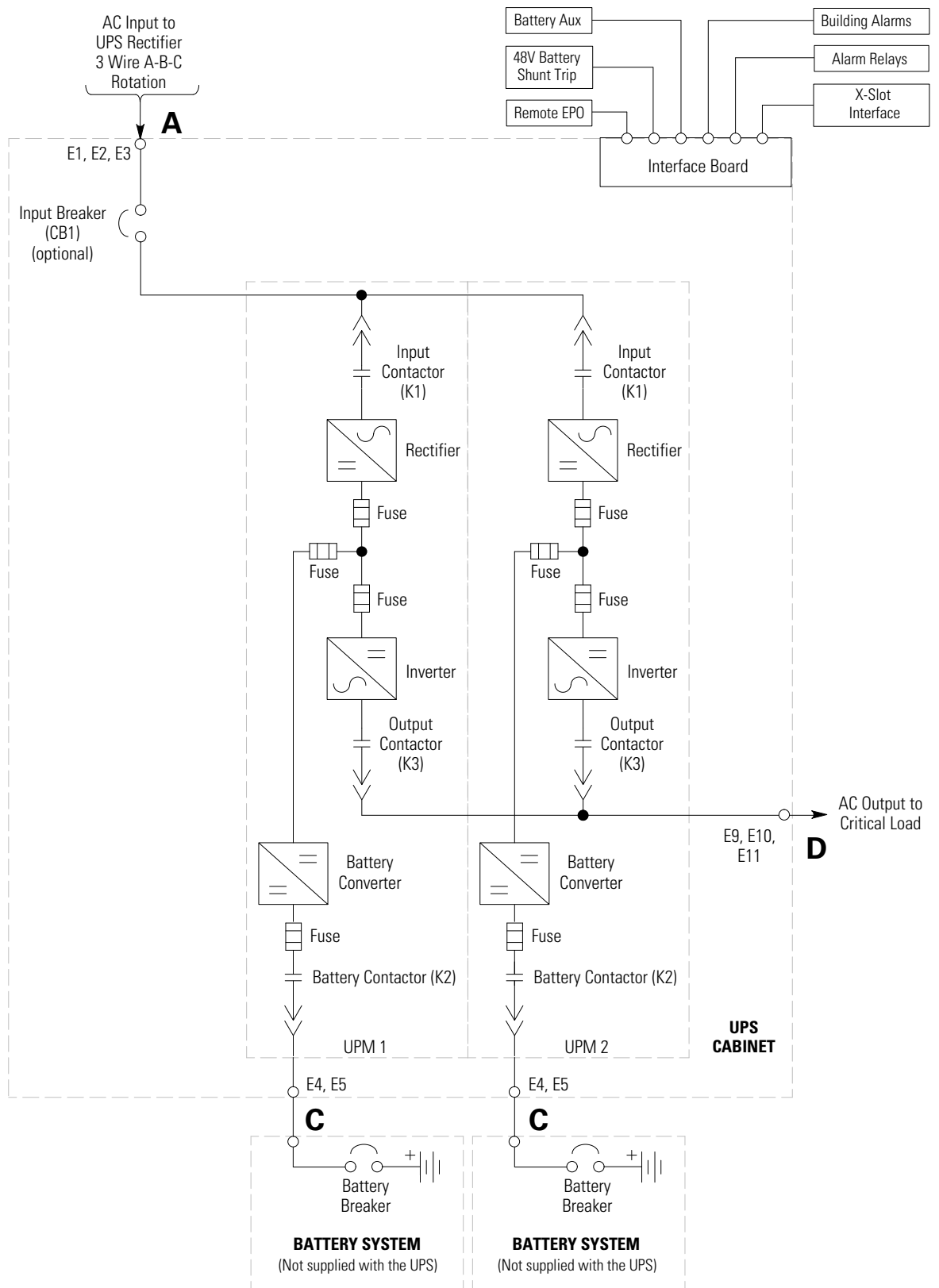
**NOTE** Callout letters **A**, **C**, and **D** map to Table 3-5 on page 3-9.

**Figure 6-12. One UPM, Common Rectifier Feed, Separate Battery, IOM Configuration, FI-UPM**



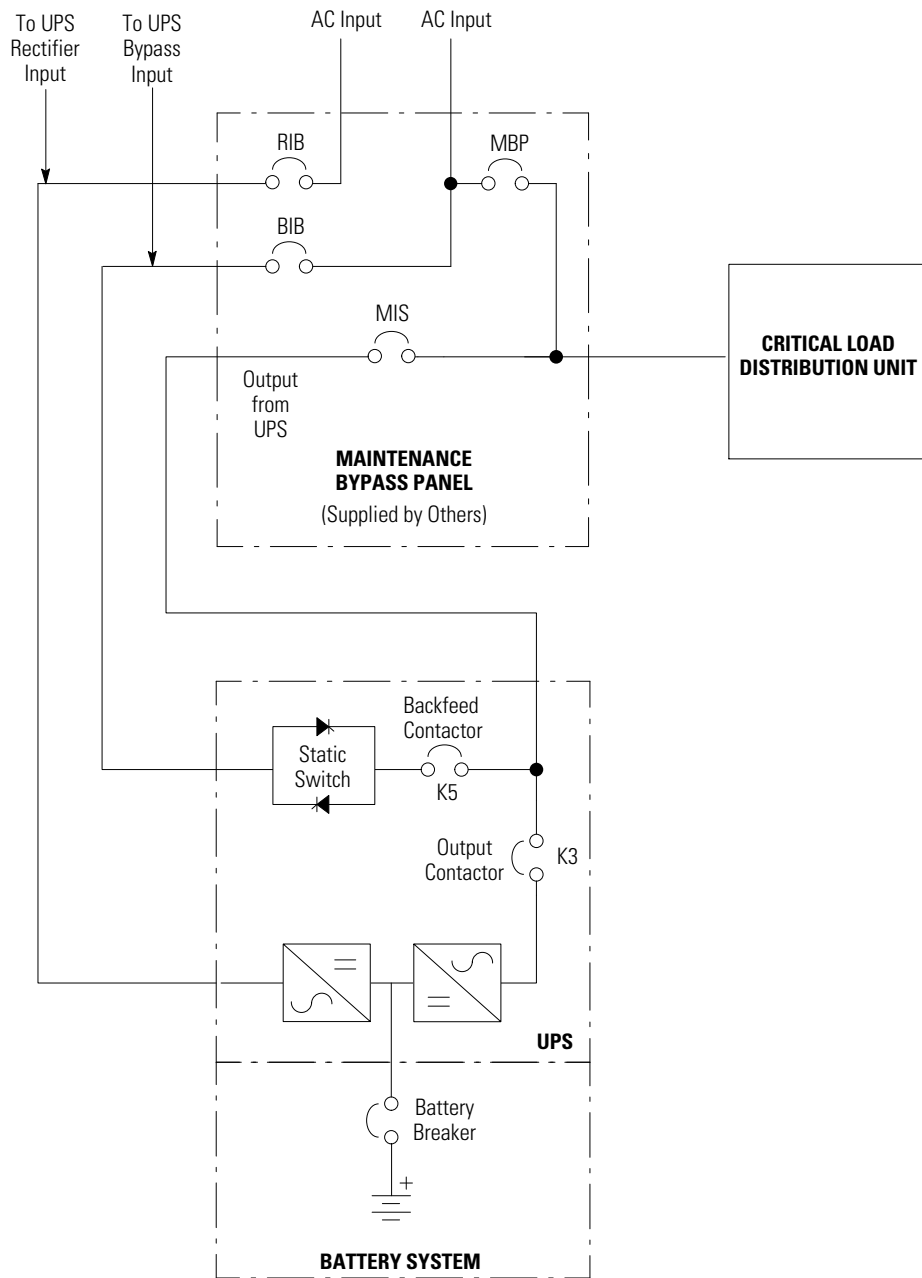
**NOTE** Callout letters **A**, **C**, and **D** map to Table 3-4 on page 3-8.

**Figure 6-13. Two UPM, Common Rectifier Feed, Common Battery, IOM Configuration**



**NOTE** Callout letters **A**, **C**, and **D** map to Table 3-5 on page 3-9.

**Figure 6-14. Two UPM, Common Rectifier Feed, Separate Battery, IOM Configuration**



- 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.

**Figure 6-15. Simplified Dual-Feed UPS with Maintenance Bypass Panel**



## 6.4 Multiple UPS Distributed Bypass System

Distributed bypass parallel operation extends the normal operation of Eaton 9395P 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, for redundancy, or both. 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 UPS parallel system supports a critical load in five different modes of operation. The standard operation modes are:

- In Normal 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 UPS system (see paragraph 6.2.3).
- 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).

- 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.

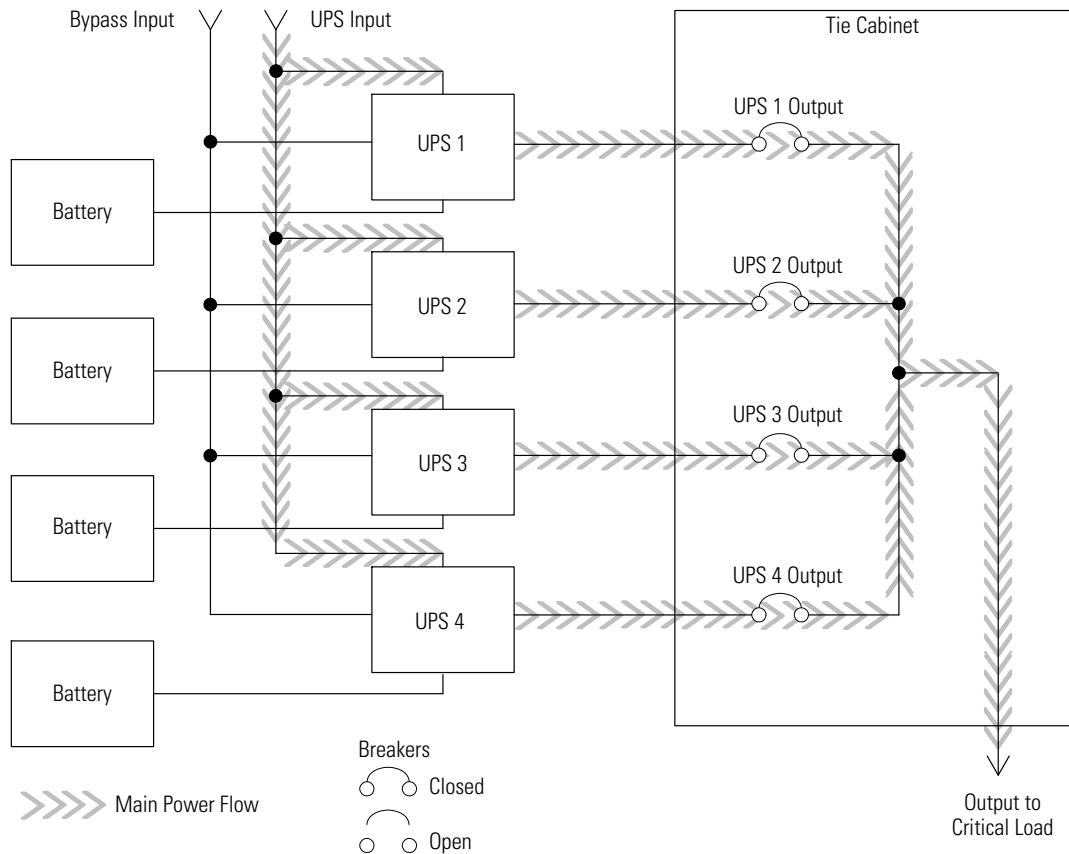
#### 6.4.2 Online Mode – Distributed Bypass

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 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 6-16 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 Normal mode.

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



**Figure 6-16. Path of Current through the UPSs in Online Mode – Distributed Bypass**

### 6.4.3 Bypass Mode – Distributed Bypass

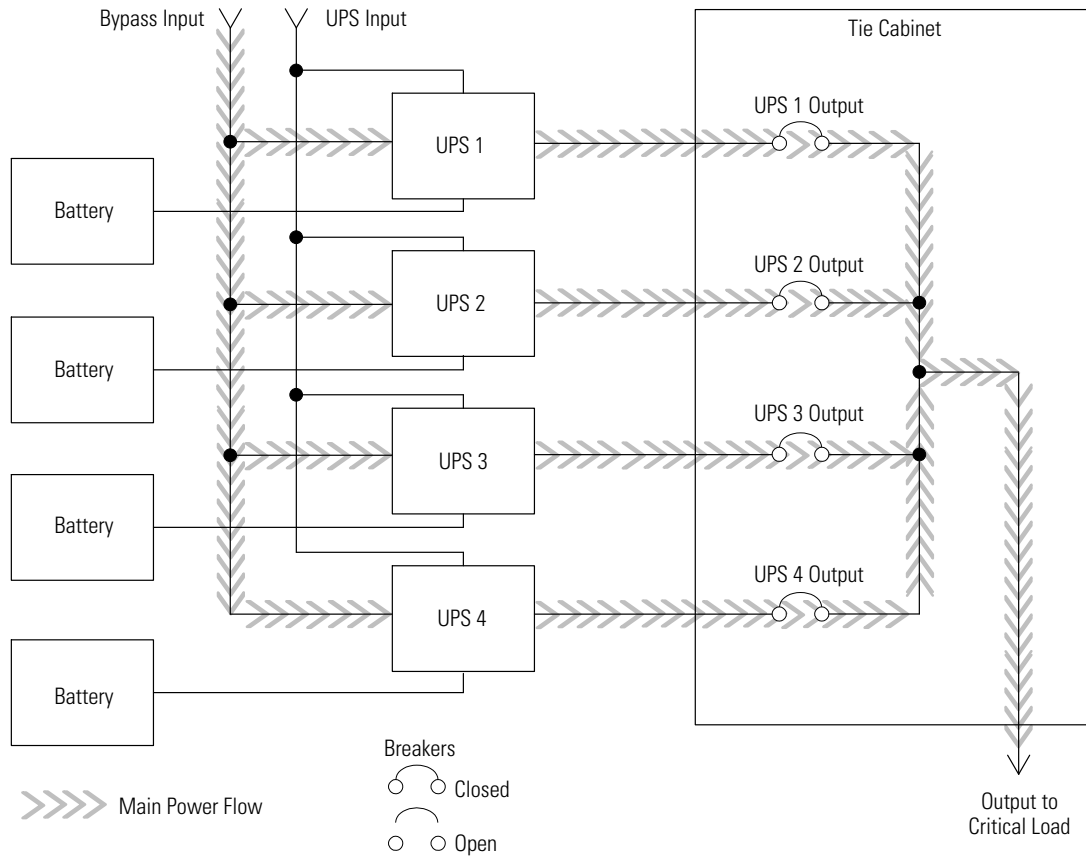
In Bypass mode, the output of the system is provided with three-phase AC power directly from the bypass input. While in this mode, the output of the system is not protected from fluctuations, spikes, or power outages from the source. No battery support is available to the output of the system in the 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 6-17 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 6-17. Path of Current through the UPSs in Bypass Mode – Distributed Bypass**

The distributed bypass system can be transferred from Normal 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 Normal mode due to an output voltage deviation, the distributed bypass system automatically attempts to return to Normal 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 Normal 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.

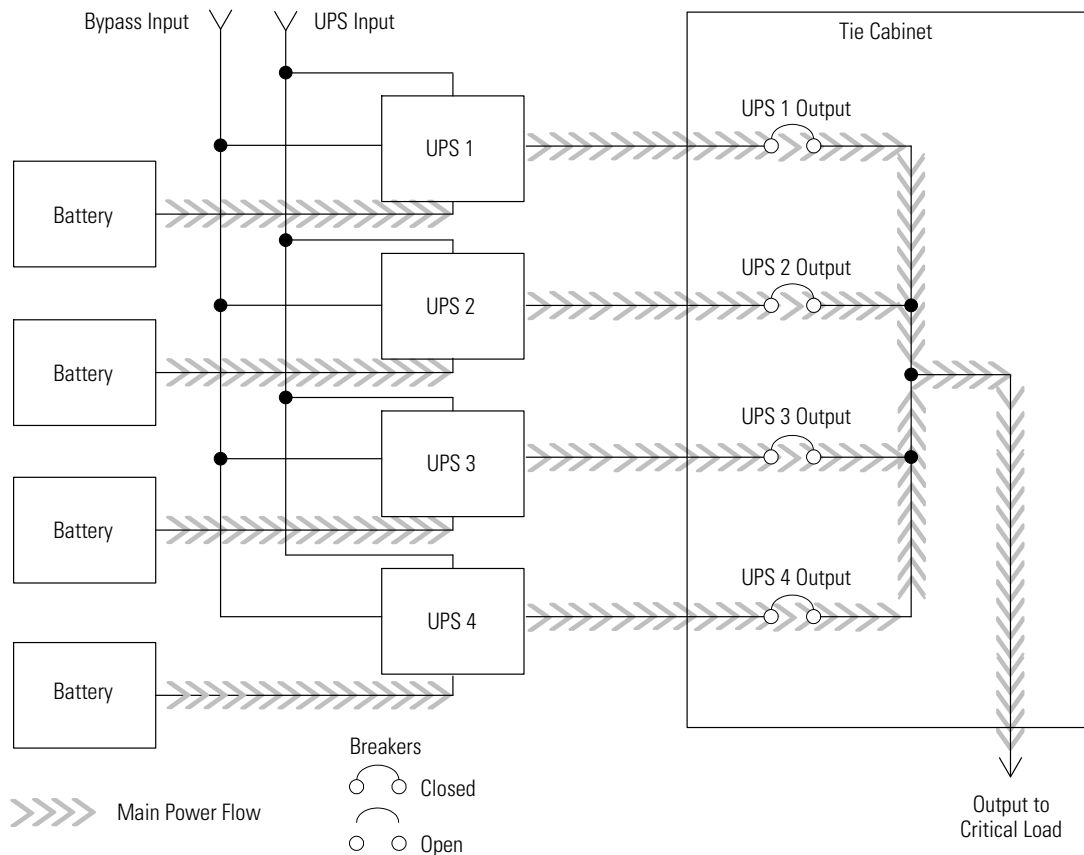
### 6.4.4 Battery Mode – Distributed Bypass

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 6-18 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 a visual indicator lamp 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.



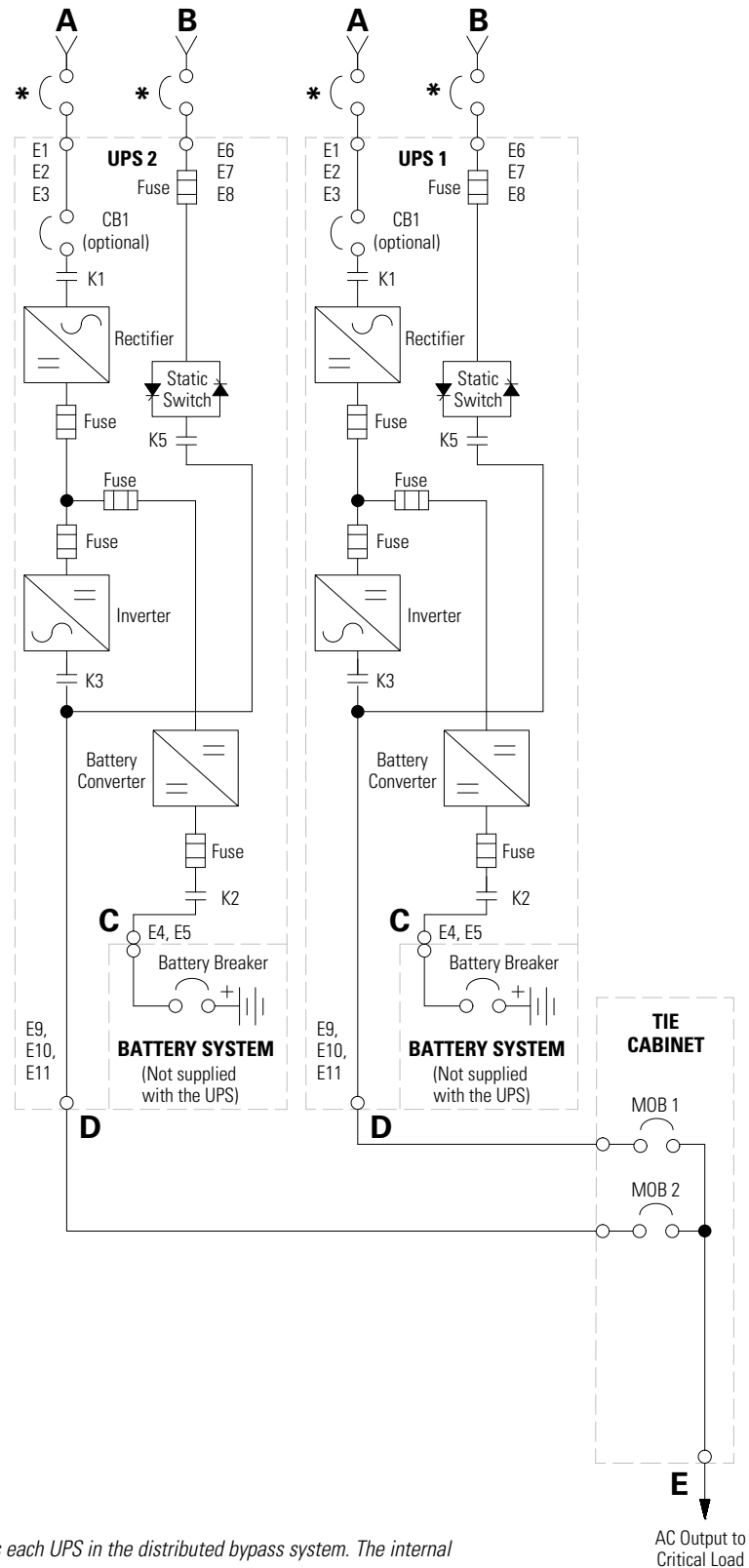
**Figure 6-18. Path of Current through the UPSs in Battery Mode – Distributed Bypass**

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 Normal 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 online drawings in this section show the simplified internal structure of the UPS, battery supply, and basic maintenance bypass in a multiple UPS configuration. These onlines do not show each UPM in the UPSs, but represent each UPS in the distributed bypass system. The internal structure of each UPS is shown in Figure 6-5.

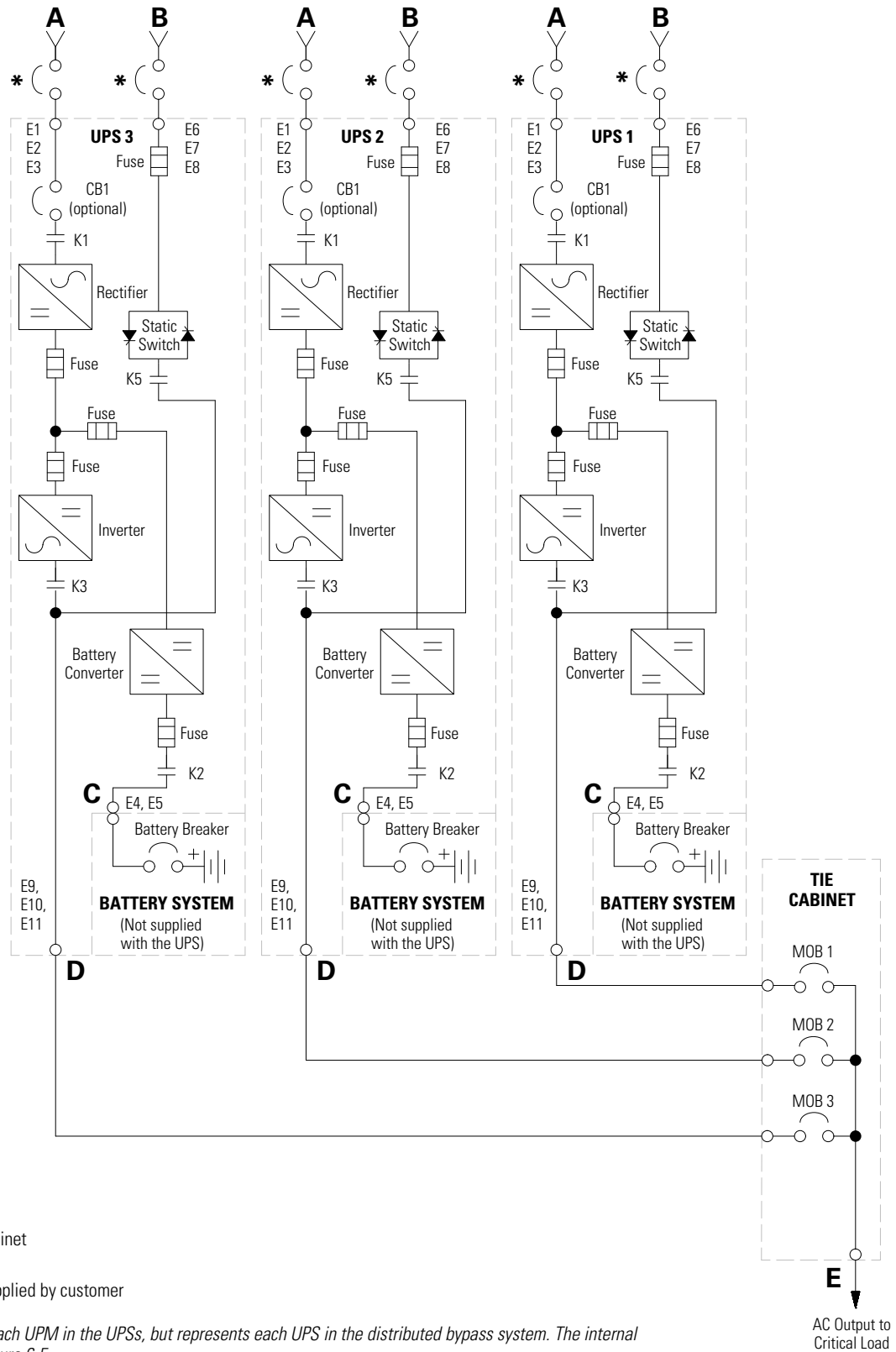
Online Drawing	UPS Model	Voltage		System Type
		Input	Output	
Figure 6-19 on page 6-27	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Multiple UPS – Distributed Bypass, Continuous Static Switch, 1+1 and 2+0 Configurations
Figure 6-20 on page 6-28	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Multiple UPS – Distributed Bypass, Continuous Static Switch, 2+1 and 3+0 Configurations
Figure 6-21 on page 6-29	Eaton 9395P-300/300 Eaton 9395P-300/275 Eaton 9395P-300/250 Eaton 9395P-300/225 Eaton 9395P-300/200	480	480	Multiple UPS – Distributed Bypass, Continuous Static Switch, 3+1 and 4+0 Configurations



- A** – AC Input to UPS Rectifier
- B** – AC Input to Bypass
- C** – DC Input from Battery
- D** – UPS AC Output to Tie Cabinet
- E** – Output to Critical Load
- \*** – Overcurrent Protection supplied by customer

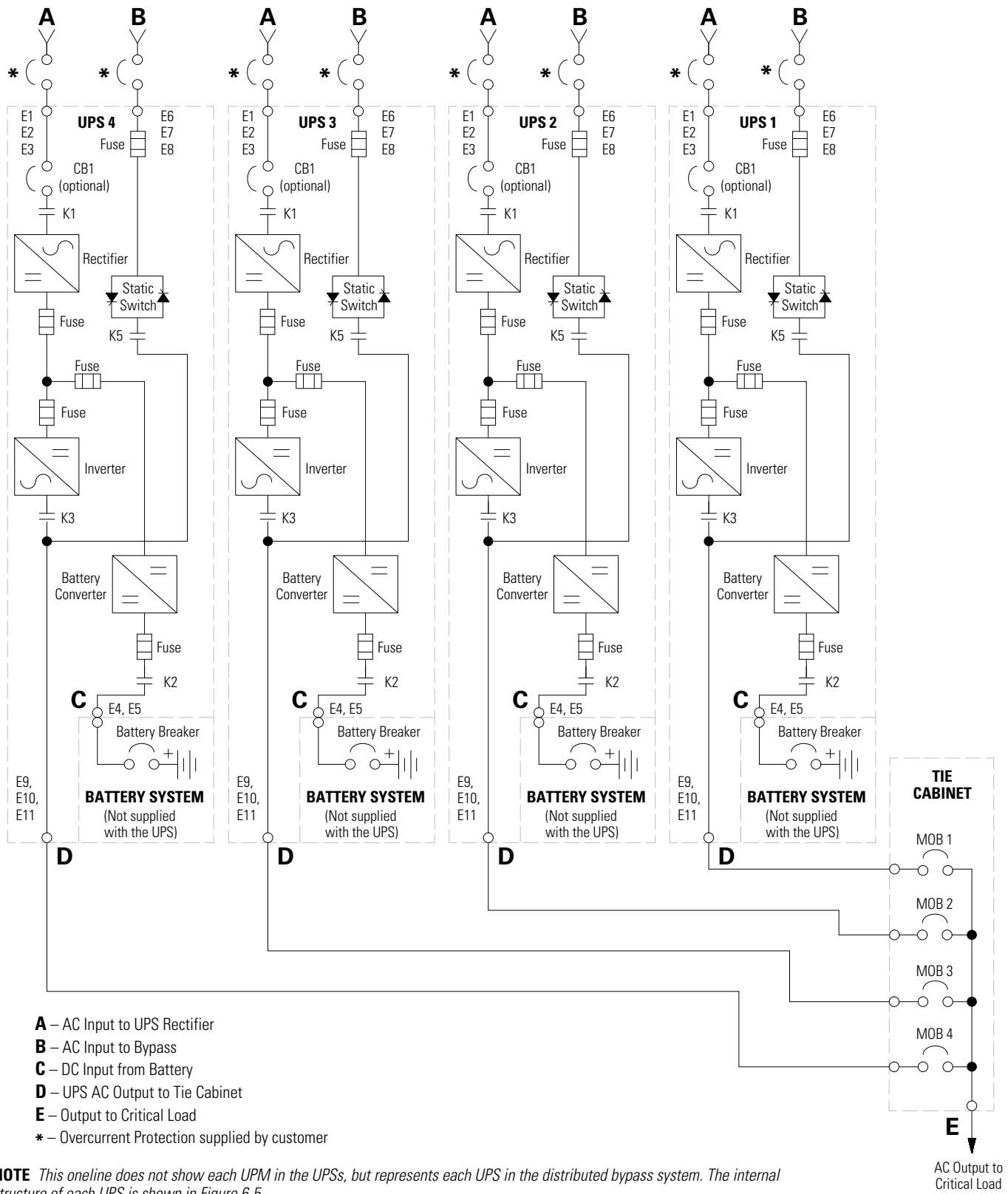
**NOTE** This oneline does not show each UPM in the UPSs, but represents each UPS in the distributed bypass system. The internal structure of each UPS is shown in Figure 6-5.

**Figure 6-19. Typical Distributed Bypass System – Continuous Static Switch, 1+1 and 2+0 Configurations**



**Figure 6-20. Typical Distributed Bypass System – Continuous Static Switch, 2+1 and 3+0 Configurations**





**Figure 6-21. Typical Distributed Bypass System – Continuous Static Switch, 3+1 and 4+0 Configurations**

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This section describes how to operate the UPS using the color touchscreen control.



**NOTE** 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** Read this section of the manual and have thorough knowledge of UPS operation before attempting to operate any of the controls.

**NOTE** 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 7-1 Identifies the touchscreen control panel and the location of the CB1 circuit breaker (optional).

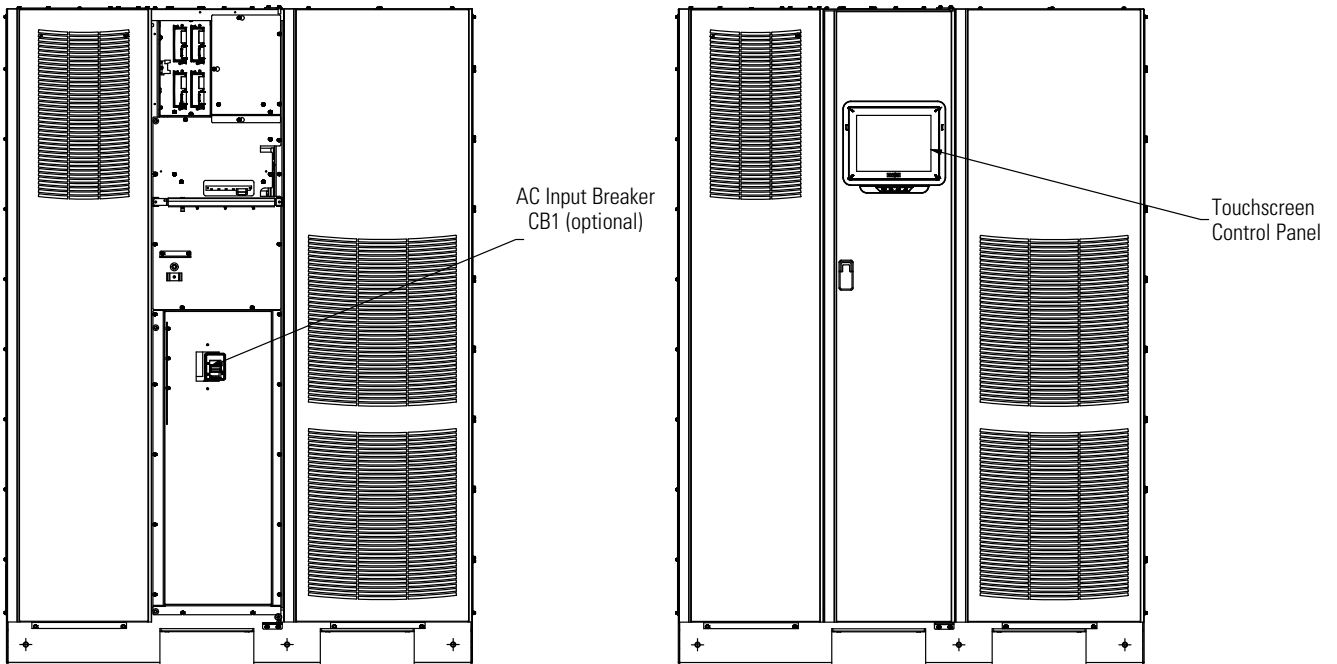


Figure 7-1. 300 kW/kVA UPS Controls

### 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.

### 7.1.2 Circuit Breakers

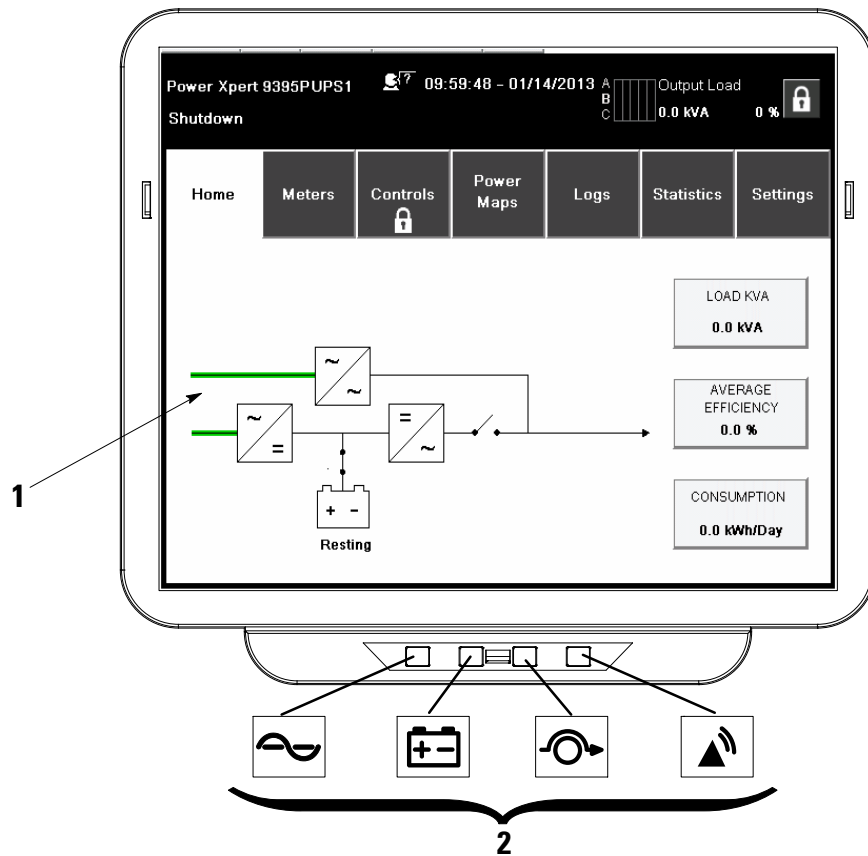
Optional circuit breaker (CB1) is used to control the AC input to the UPS rectifier.

## 7.2 Color Touchscreen Control Panel

This section describes how the various screens are used to control and monitor UPS operation. Figure 7-1 shows the location of the color touchscreen control panel on the front door of the UPS. Descriptions of the control panel functions follow.

## 7.3 Using the Color Touchscreen Control Panel

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



(Symbols enlarged to show detail)

**Figure 7-2. UPS Color Touchscreen Control Panel (Typical)**

The color touchscreen control panel consists of:

- 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 7-2.

When the unit powers up, the screen displays as shown in Figure 7-2. When power is applied to the system, the display advances to the Sign In screen shown in Figure 7-3

### 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 7-1.

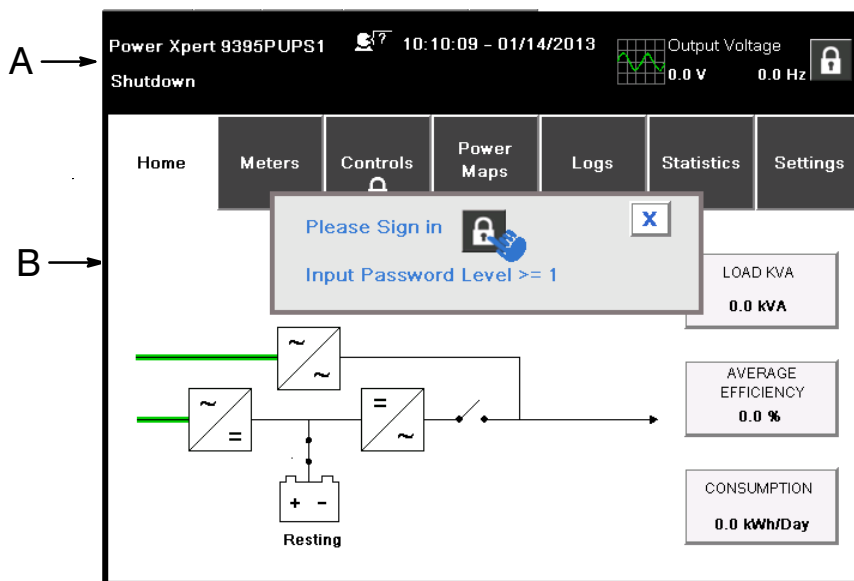
**Table 7-1. Status Indicators**

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 Online 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 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.
	Lit Flashing	There is a new UPS alarm condition. The indicator flashes until acknowledged by pressing anywhere on the control panel once.

### 7.3.2 Using the Touch Screen

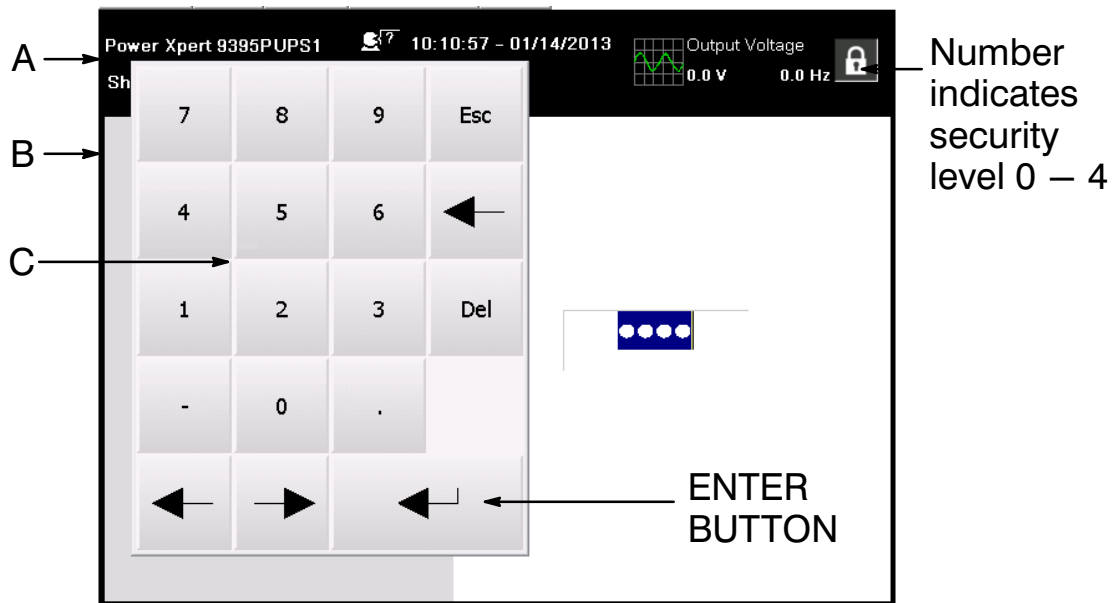
The touch screen control panel provides an operator interface with the UPS system. Figure 7-3 identifies the display areas discussed in the following sections.

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 7-4).



**Figure 7-3. 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 7.3.12.
- 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 7-2 Security Levels and Functions.



**Figure 7-4. Sign In or Password Request Screen**

**Table 7-2. Security Levels and Functions**

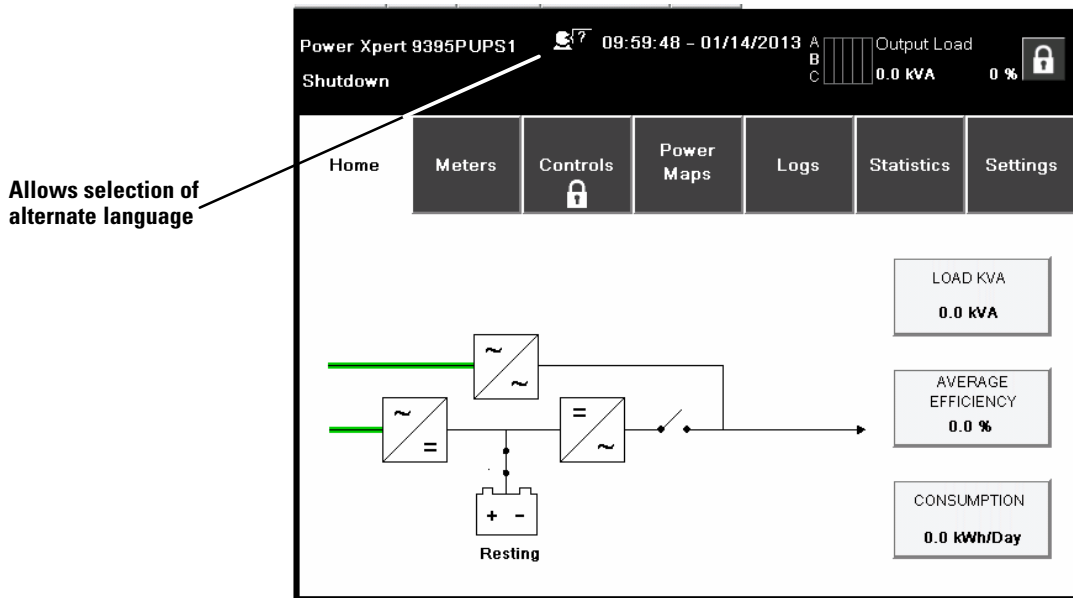
Level	Name	Passcode	Description
0	USER	NONE	USER
1	CONTROL	1111	USER + CONTROL
2	CONFIGURATION	0101	USER + CONTROL + CONFIGURATION
3	SERVICE	Service Only	USER + CONTROL + CONFIGURATION + SERVICE

### 7.3.3 Using the Main Menu Buttons

The UPS menu bar shown in Figure 7-5 allows you to display data in the information area to help you monitor and control UPS operation. Table 7-3 shows the basic menu structure.

**Table 7-3. 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.
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 7-5. 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 7-6 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.

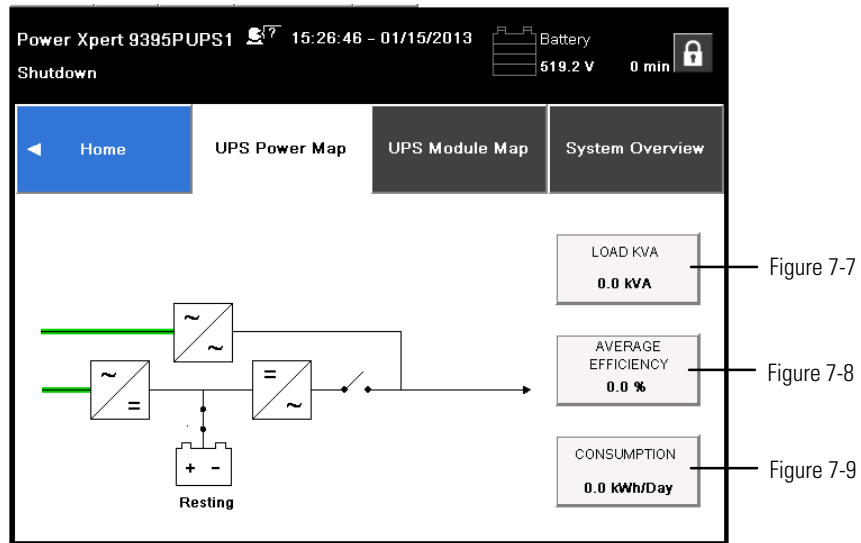


Figure 7-6. Main Menu and Power Maps Screen (Online Mode)

Touching the LOAD kVA button displays the Output kVA screen shown in Figure 7-7

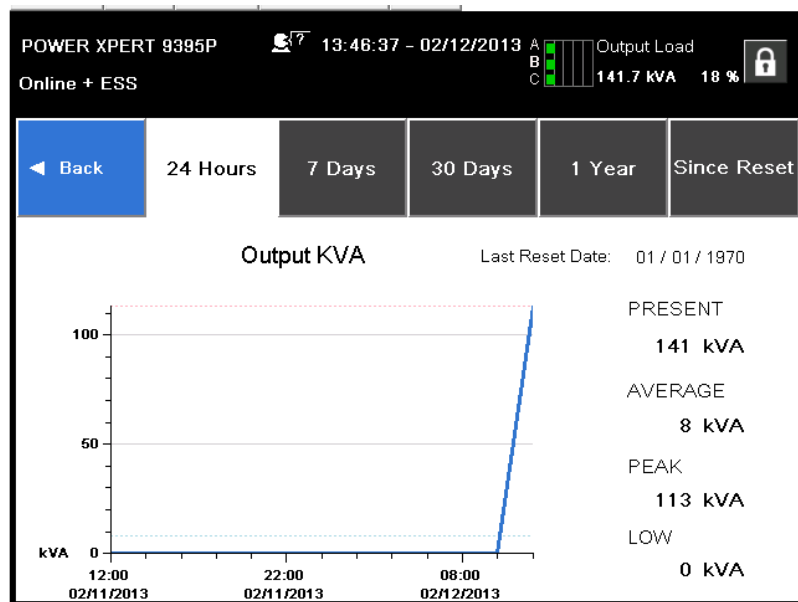


Figure 7-7. Output kVA Screen from Home Screen



Touching the AVERAGE EFFICIENCY button displays the system efficiency screen shown in Figure 7-8.

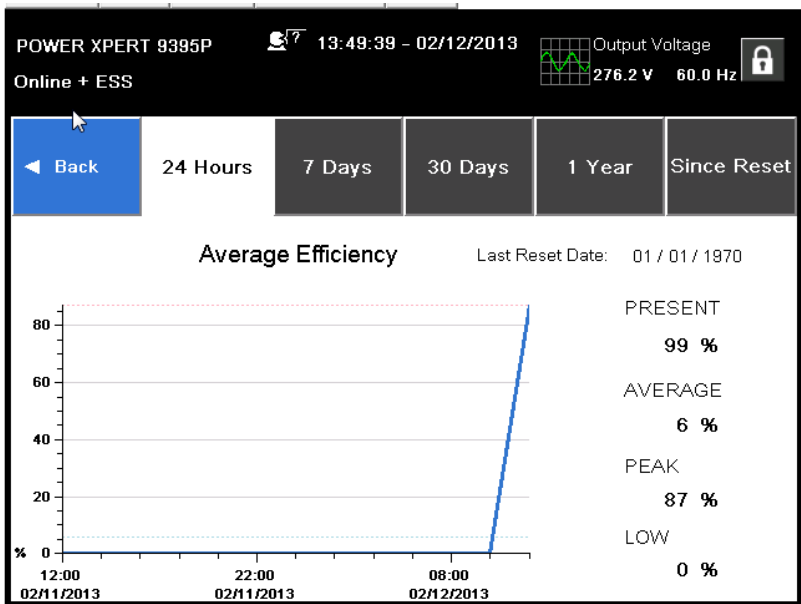


Figure 7-8. Average Efficiency Screen from Home Screen

Touching the CONSUMPTION button displays the screen shown in Figure 7-9.

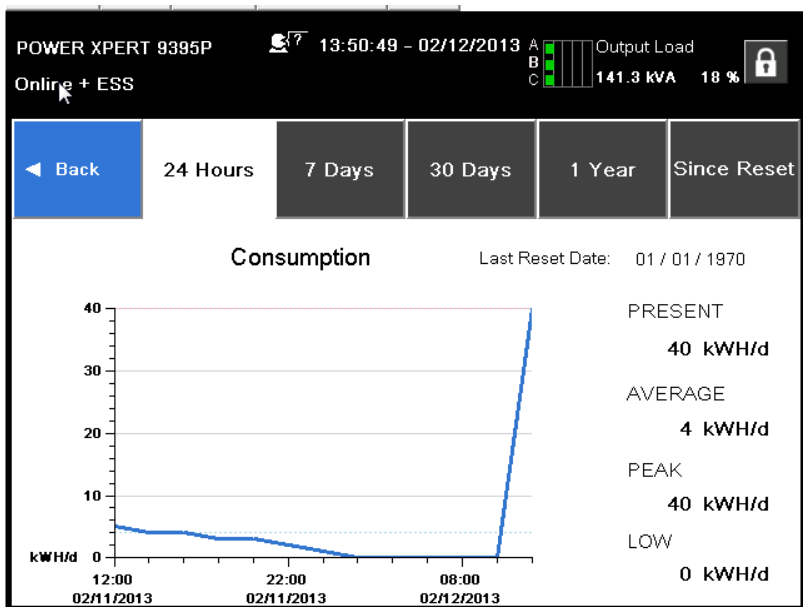


Figure 7-9. Consumption Screen from Home Screen

### 7.3.5 Power Maps Screen (Bypass Mode)

Figure 7-10 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

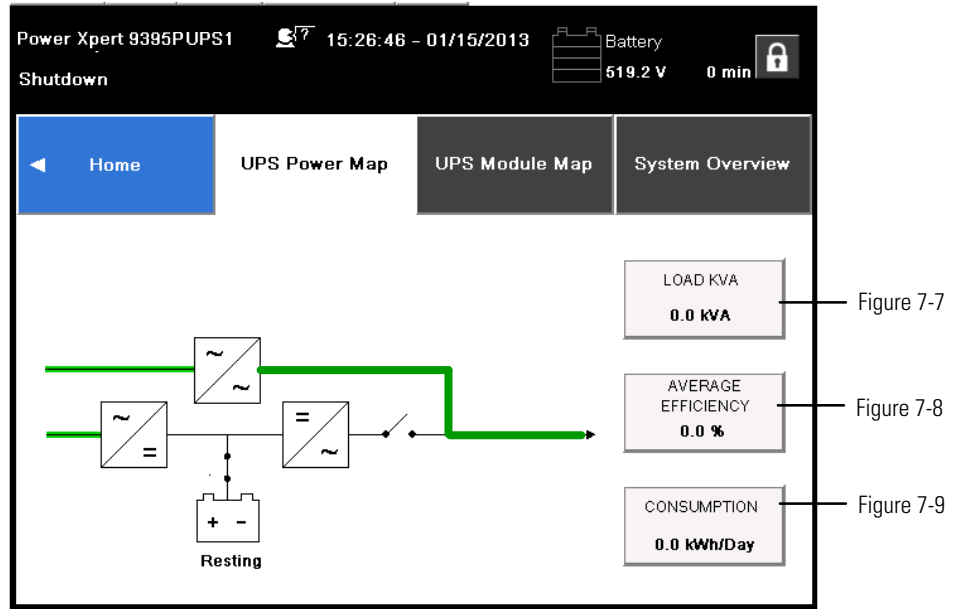


Figure 7-10. Bypass Screen

### 7.3.6 Command Confirmation Pop-Up

Figure 7-11 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.

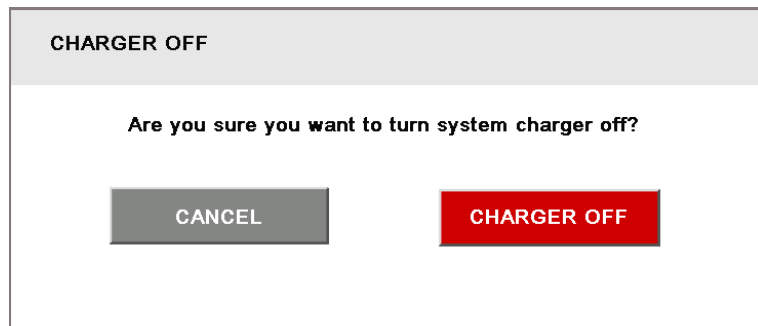


Figure 7-11. Typical Command Confirmation Screen (Charger Off)

### 7.3.7 Meters Summary Screen

Figure 7-12 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.

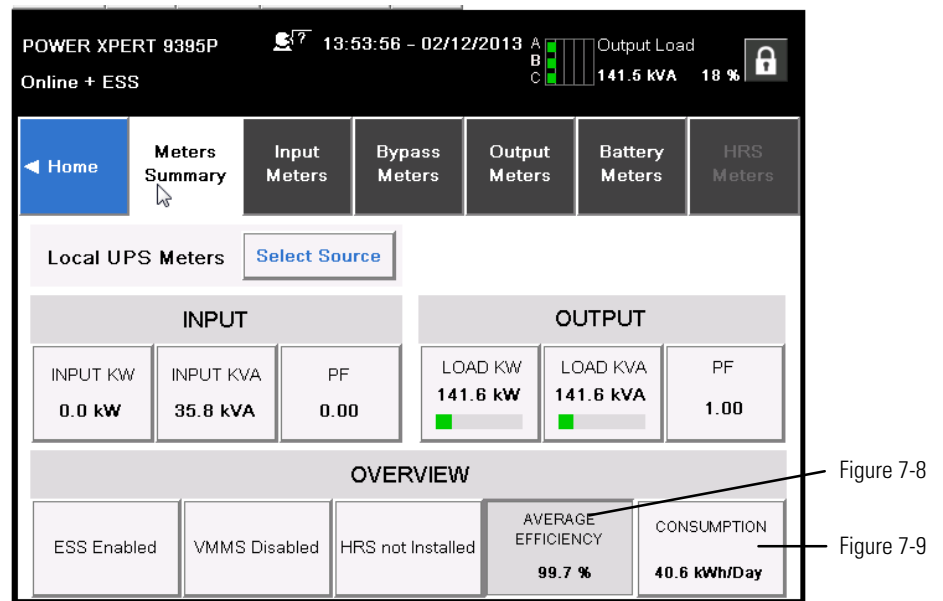


Figure 7-12. Meters Summary Screen

### 7.3.8 Input Meters Screen

Figure 7-13 shows the Input Meters screen. This screen displays the individual phase and total power values of the system.

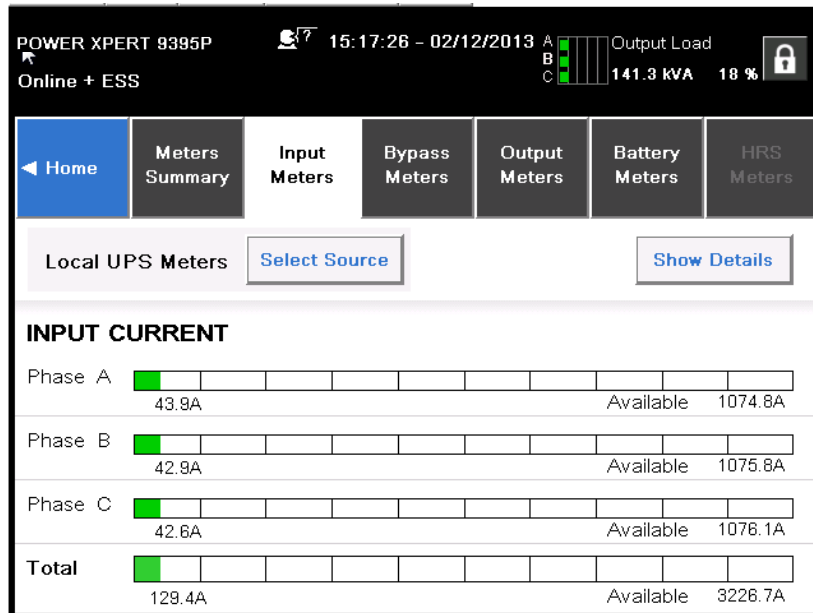


Figure 7-13. Input Meters Screen

The Bypass Meters Screen shown in Figure 7-14 displays values pertaining to the Bypass conditions.

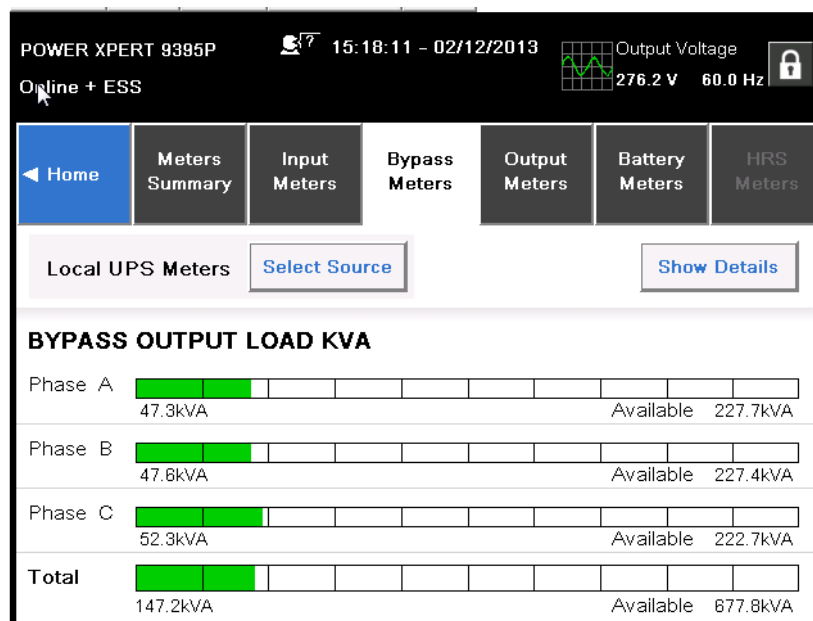


Figure 7-14. Bypass Meters Screen

The Output Meters Screen shown in Figure 7-15 displays values pertaining to the system output.

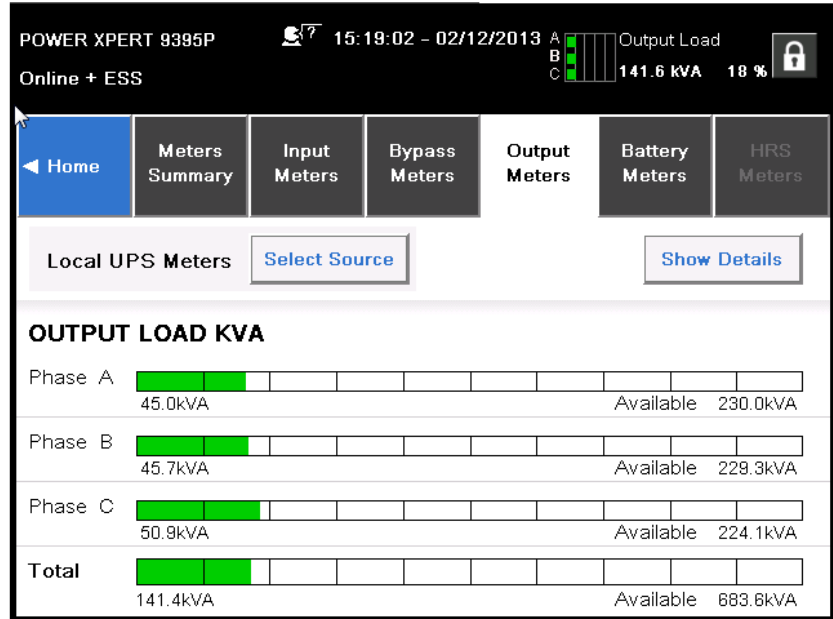


Figure 7-15. Output Meters Screen

### 7.3.9 Input Meters Detail Screen

Figure 7-16 shows the Input Meters detail screen. This screen displays the individual values of the system in additional detail.

The Bypass, Output, and Battery meters screens display similar values relevant to their monitoring of the system.

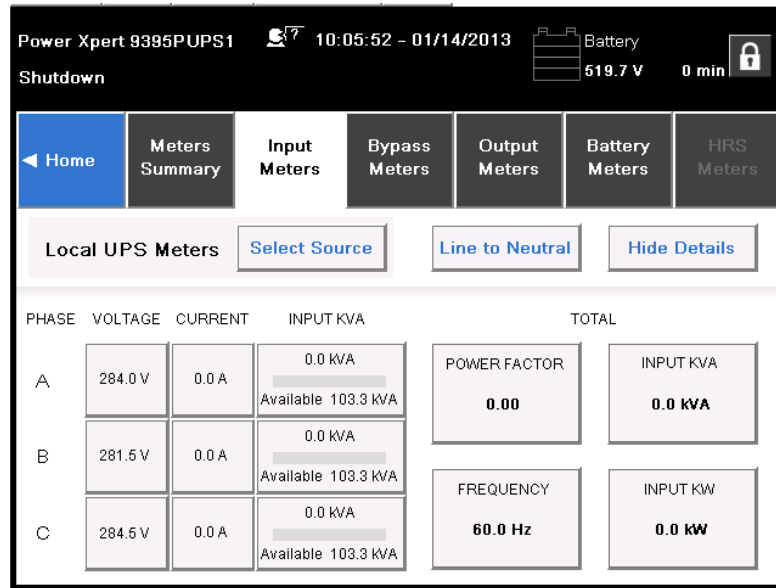


Figure 7-16. Input Meters Detail Screen

The Select Source screen shown in Figure 7-17 allows the operator to choose the individual source for system readings.

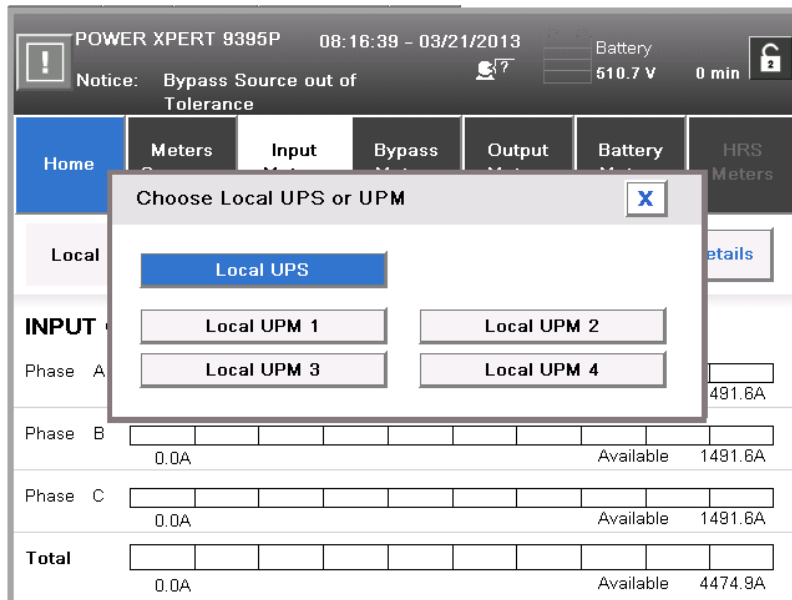


Figure 7-17. Select Source Screen

### 7.3.10 Battery Meters Screens

Figure 7-18 shows the Battery Meters basic screen.

Figure 7-19 shows the Battery Log access screen.

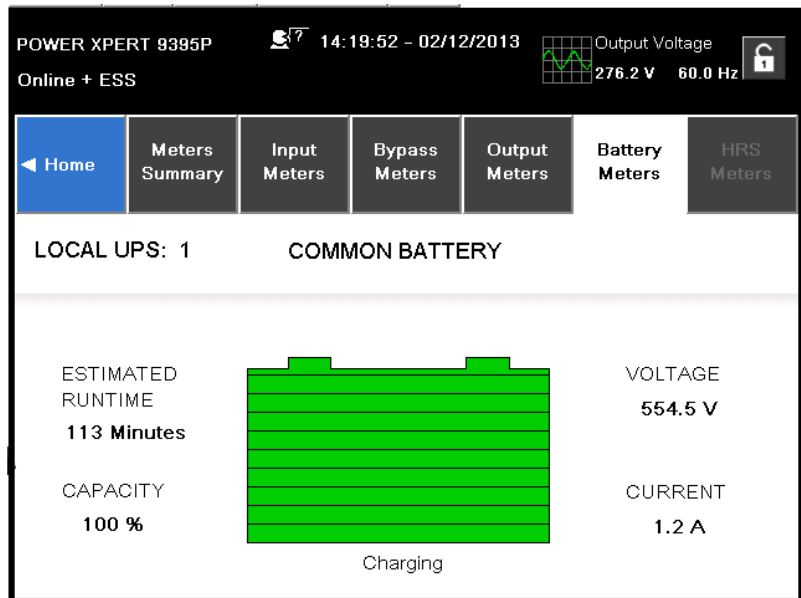


Figure 7-18. Battery Meters Screen

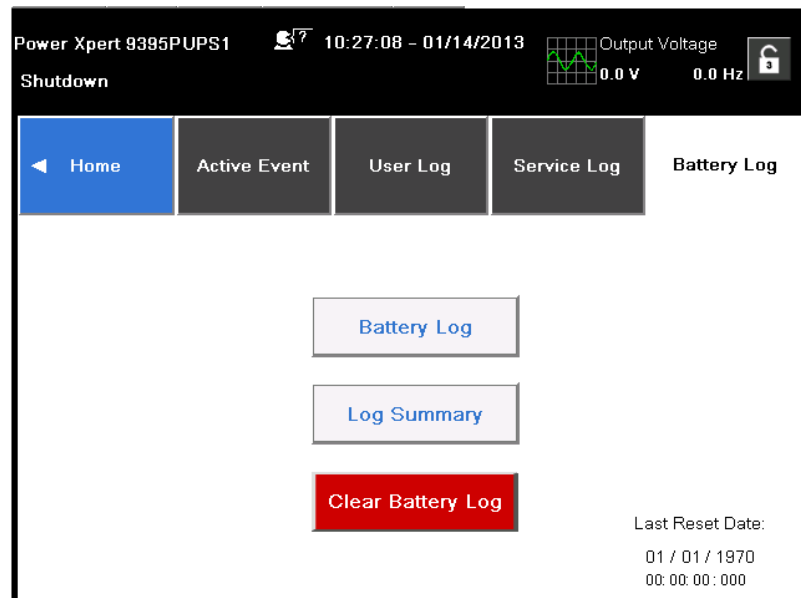


Figure 7-19. Battery Log Screen

Figure 7-20 shows the Battery Log Detail screen.

Figure 7-21 shows the Battery Log Summary screen.

Date	Time on Battery	Load on Battery	End Voltage	Source
01 / 08 / 2013 16:11:09:496	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
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 7-20. Battery Log Detail

Source	<1 min	1-4 min	>4 min	Average Time	Total Time
UPM1	2	1	0	0 Min 35 Sec	1 Min 48 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

Figure 7-21. Battery Log Summary Screen



### 7.3.11 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. See Figure 7-22.

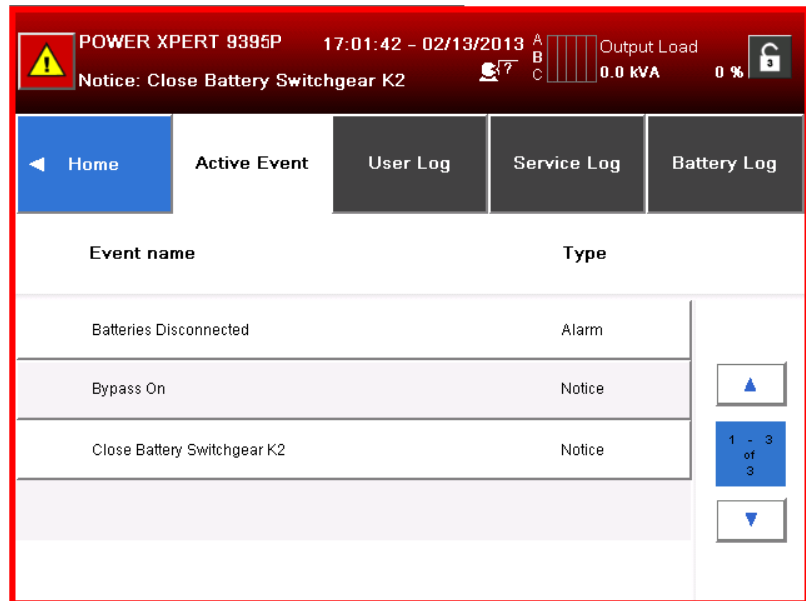


Figure 7-22. System Events Screen

### 7.3.12 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.
- **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 7-23.

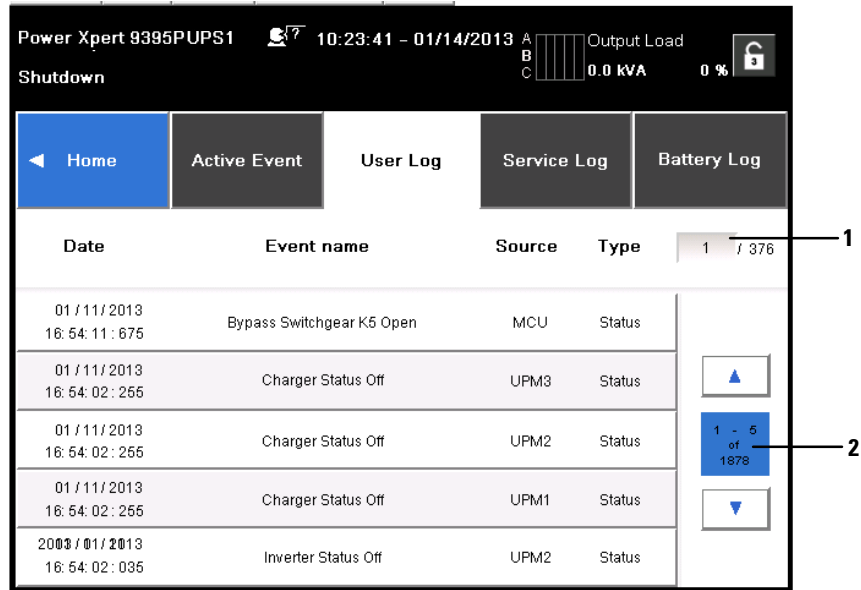


Figure 7-23. User Log Screen

Selecting an event opens the Event Detail screen shown in Figure 7-24. This screen details the specifics of the event for the user to see.

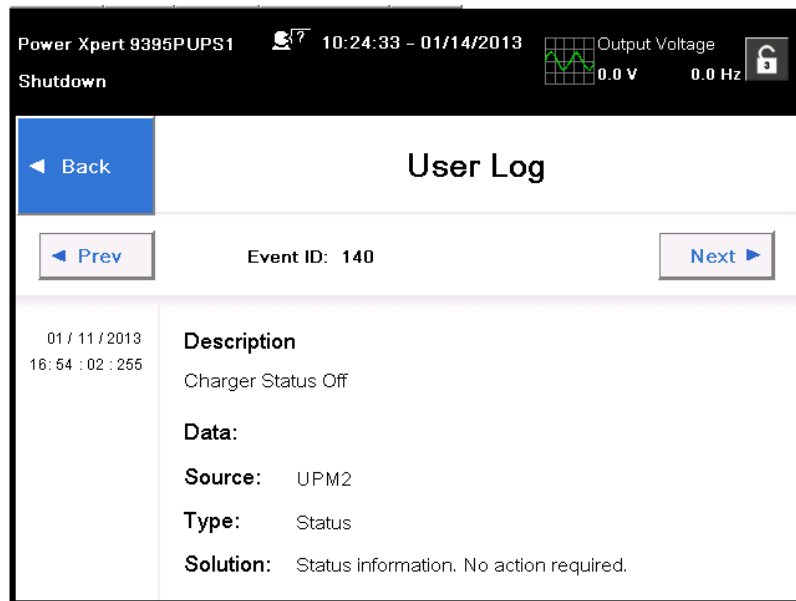


Figure 7-24. User Log Detail Screen

### 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 7-25 shows the System Status screen.

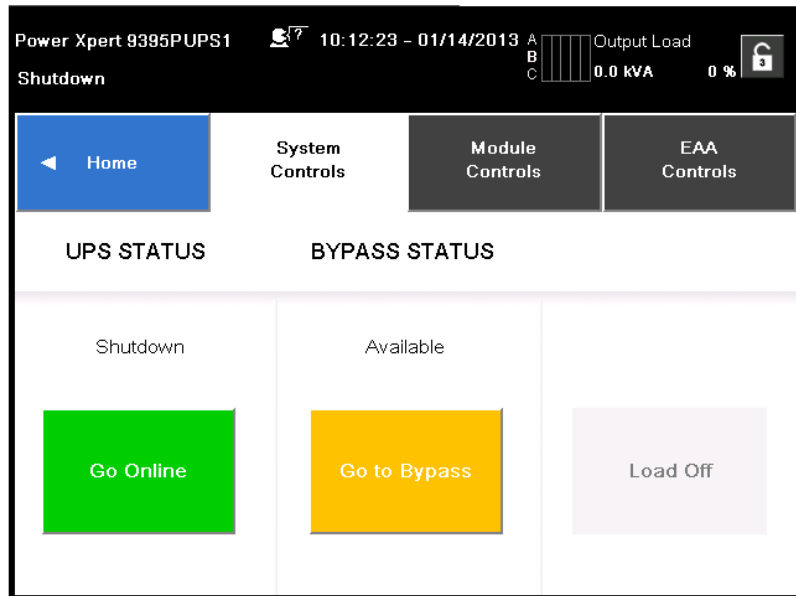


Figure 7-25. System Status Screen

Figure 7-26 shows the Module Controls screen. This screen allows control of the individual modules within the system. It also gives their values and status.

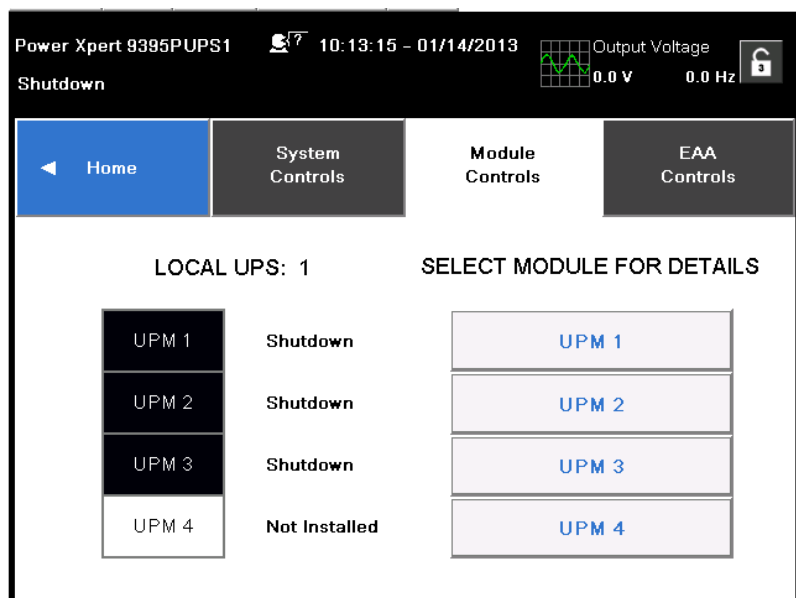
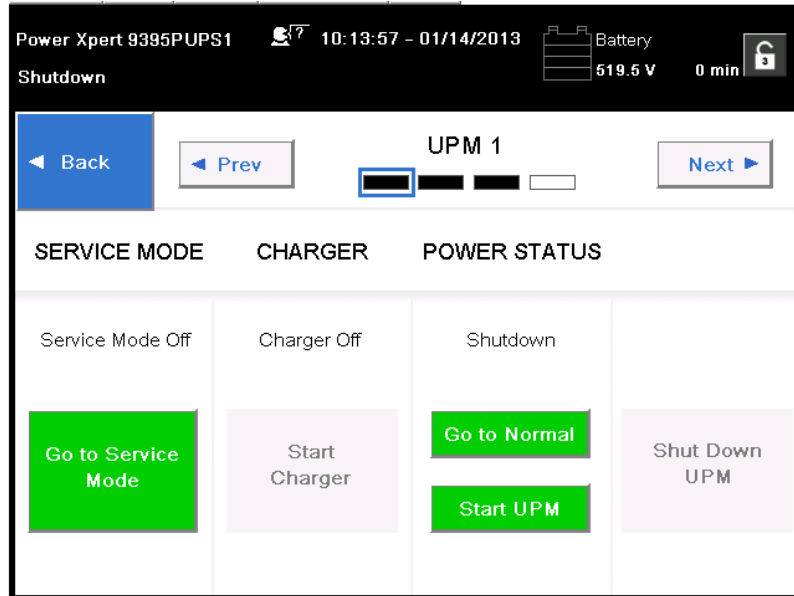


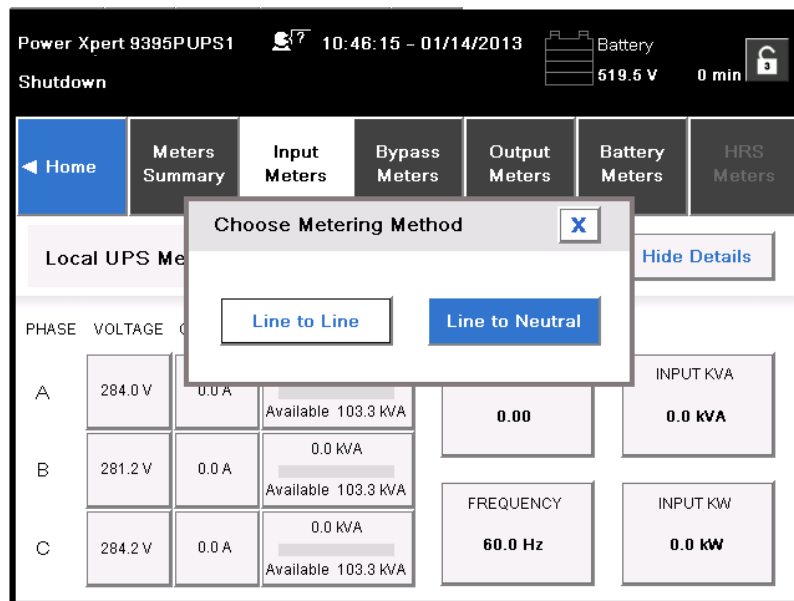
Figure 7-26. Module Controls Screen

Figure 7-27 shows the Module Control Detail screen. By selecting any of the modules shown on the previous screen (Figure 7-26), 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.



**Figure 7-27. Module Control Detail Screen**

The Metering Method screen allows the operator to select line-to-line or line-to-neutral monitoring values. See Figure 7-28 or Figure 7-29.



**Figure 7-28. Online Mode Metering Method Option Screen**

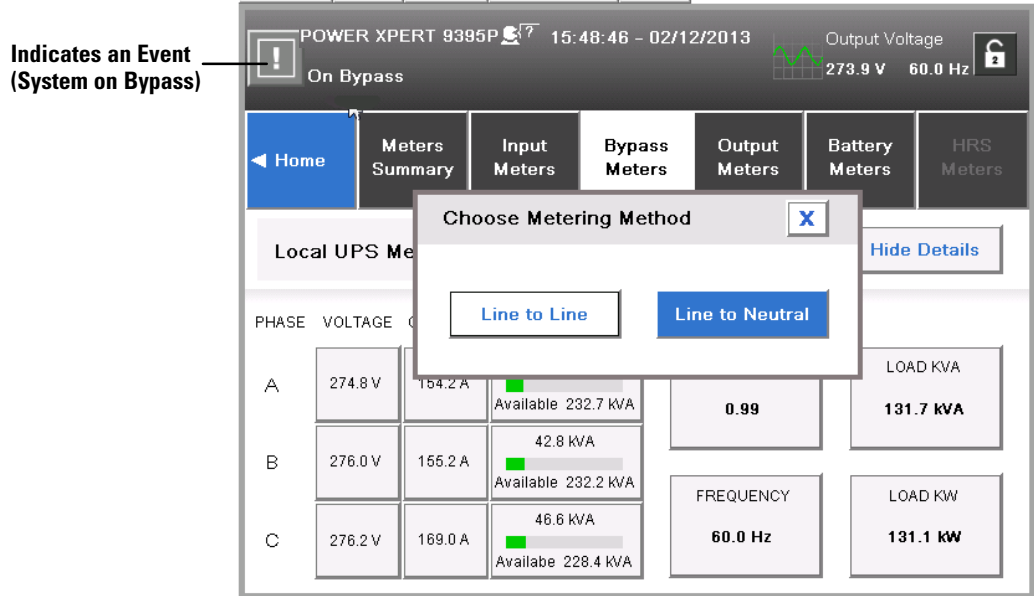


Figure 7-29. Bypass Mode Metering Method Option Screen

### 7.3.14 Settings Screen

The screen shown in Figure 7-30 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.

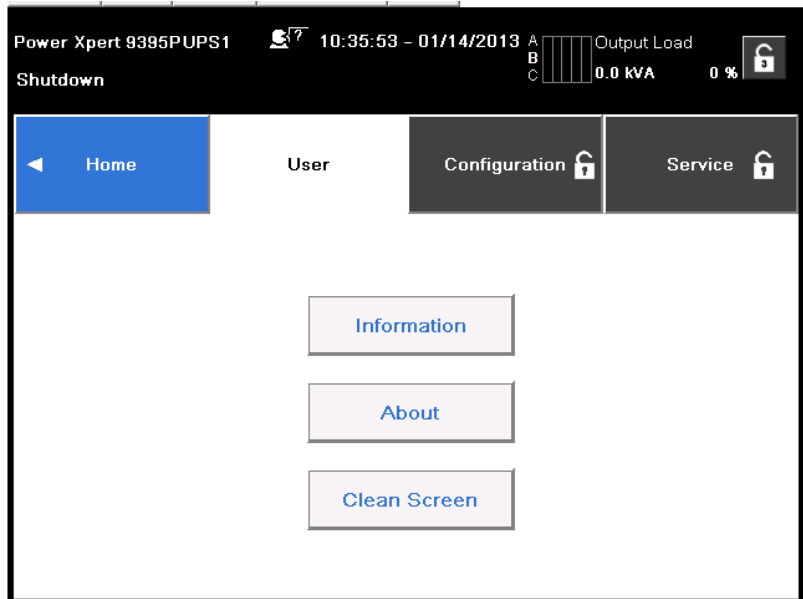


Figure 7-30. Settings Screen

### 7.3.15 Configuration Options Screen

The screen shown in Figure 7-31 allows the operator to affect changes to various system values.

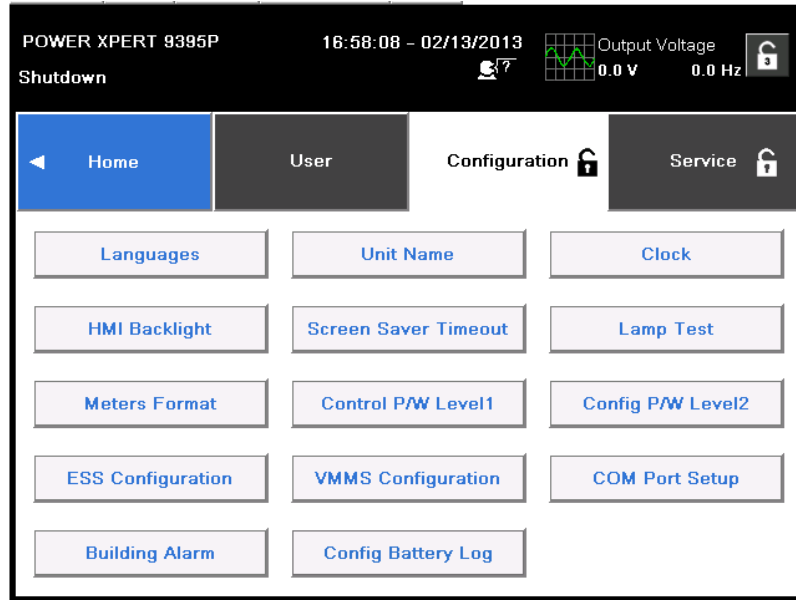


Figure 7-31. Configuration Options Screen

### 7.3.16 Energy Advantage Architecture (EAA) Screen

This screen shown in Figure 7-32 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.

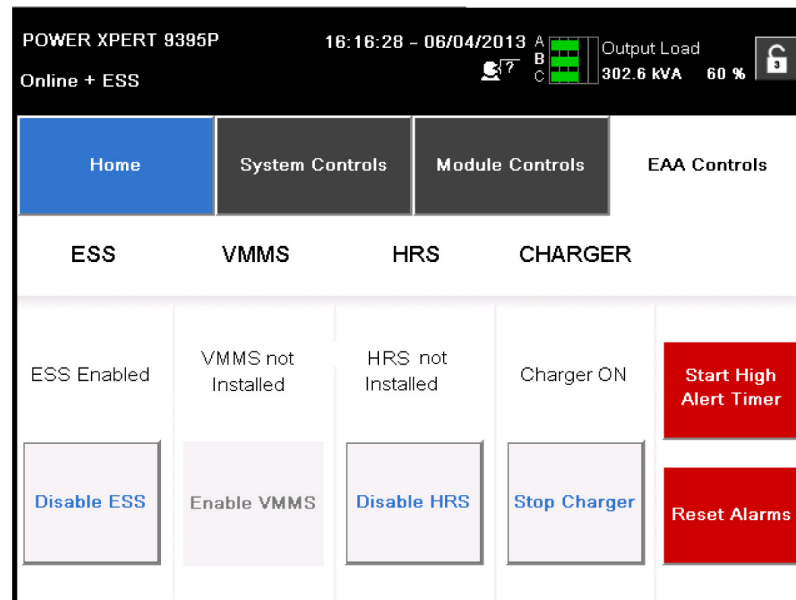
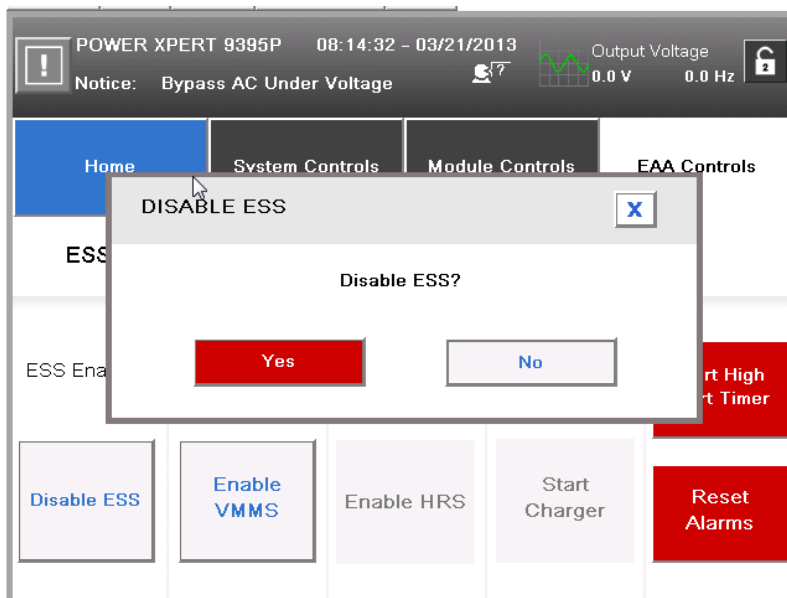
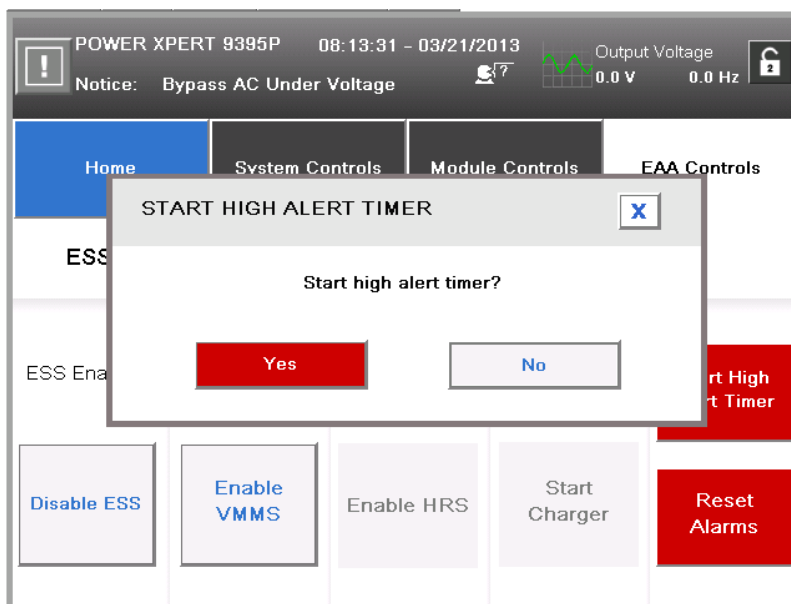


Figure 7-32. Energy Advantage Architecture (EAA) Screen



**Figure 7-33. Disable ESS Screen**

This screen shown in Figure 7-33 asks the operator to verify disabling the ESS mode running at that time.



**Figure 7-34. High Alert Timer Screen**

This screen shown in Figure 7-34 asks the operator if they want to start the High Alert mode timer.

### 7.3.17 Statistics Basic Screen

The screen shown in Figure 7-35 allows the operator to query the system for various operational statistics such as shown in Figure 7-36.

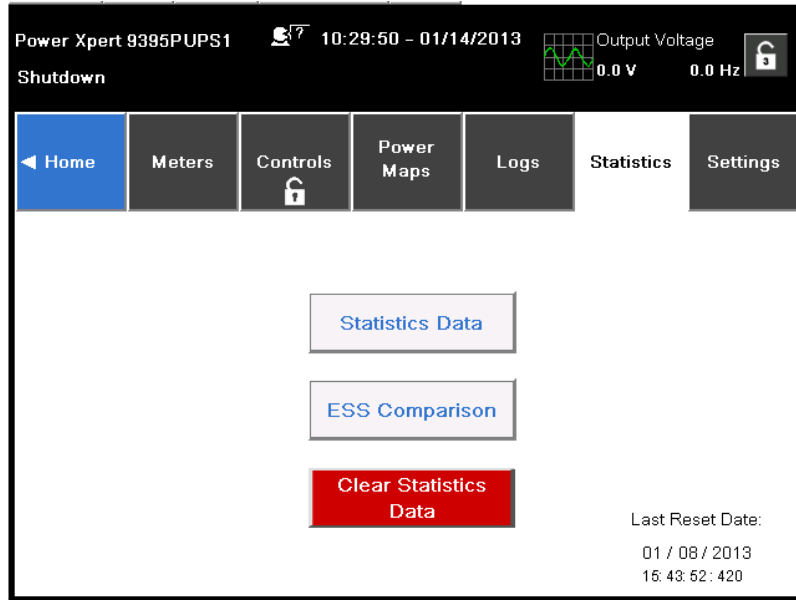


Figure 7-35. Statistics Basic Screen

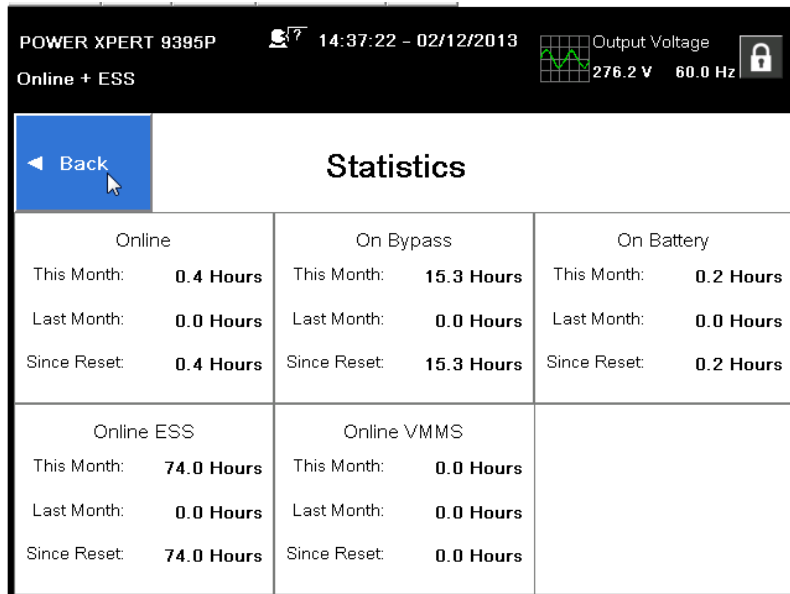


Figure 7-36. Statistics Data Detail Screen



### 7.3.18 ESS Comparison Screen

The screen shown Figure 7-37 allows the operator to visually obtain EAA mode efficiency values.

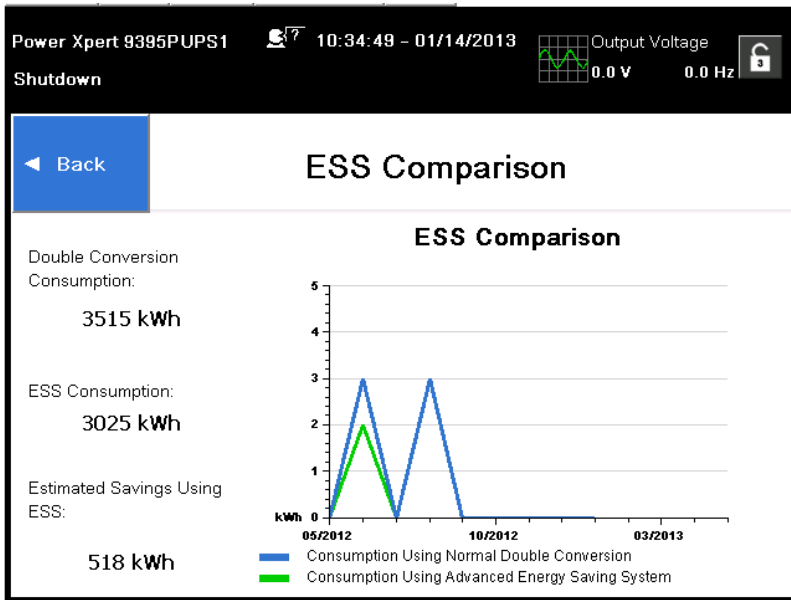


Figure 7-37. ESS Comparison Screen

### 7.3.19 UPS Module Map Screen

The screen shown Figure 7-38 allows the operator to control the individual UPMs.

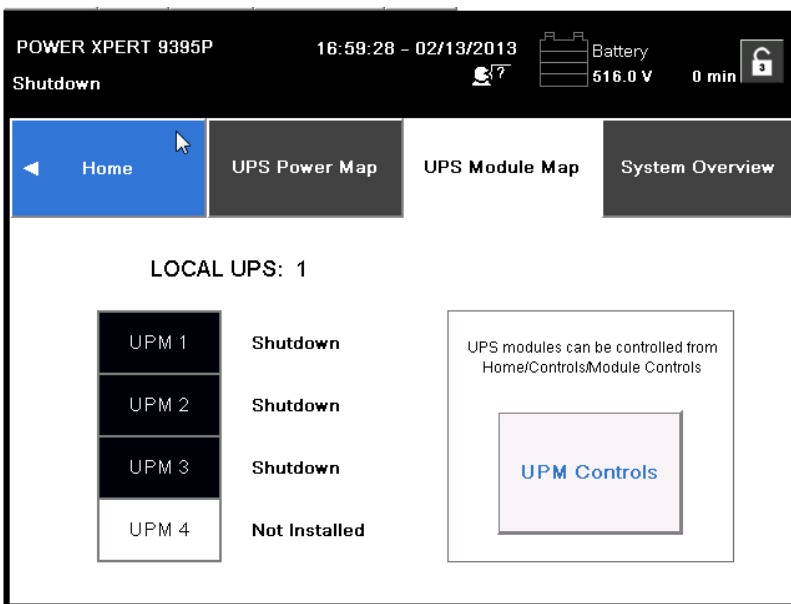
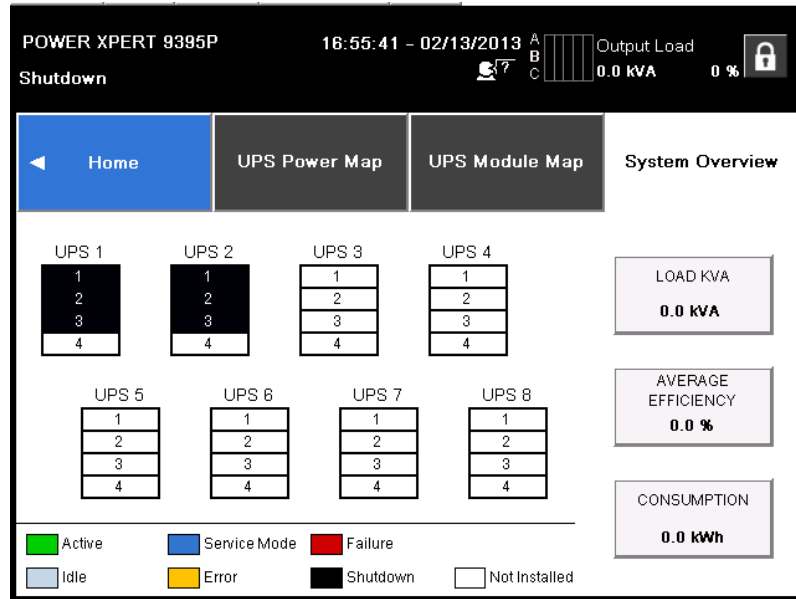


Figure 7-38. UPS Module Map Screen

### 7.3.20 System Overview Screen

The screen shown Figure 7-39 displays values for all UPS and UPM parameters.



**Figure 7-39. System Overview Screen**

## 7.4 UPS Operation using the Color Touchscreen Control Panel



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

**NOTE** 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.

**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.

### 7.4.1 Starting the UPS in Online Mode

To start the UPS system:

1. Unfasten the front door latch and swing the door open (refer to 9395P UPS Operation and Installation manual supplied with system).
2. If the UPS contains input breaker CB1, 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. If the UPS contains input breaker CB1, close input breaker CB1.
6. Close the door and secure the latch.
7. Observe the UPS control panel display becoming active, indicating logic power.
8. Press the **LOCK** icon on the main screen. The Sign In screen is displayed. Use operator password to log in (factory default password is **0101**).
9. On the System screen, verify the UPS status is **OK** and the UPM status is **OFFLINE**.
10. Close the battery breaker.
11. Verify no alarms are active on the **EVENTS LOG** screen.
12. On the System Status screen, select the **UPS CONTROLS** command.
13. On the UPS Control Command screen, select **GO ONLINE**.

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.

**14. The UPS START UP 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 **ONLINE, CHARGING** on the MIMIC Screen.

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 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.

**MISE EN GARDE!**

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 REPO switch:

1. Firmly push the red pushbutton until it locks into place. The switch latches into the activated state (see Figure 7-40).

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.

### MISE EN GARDE!



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 7-40). 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.

### 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.

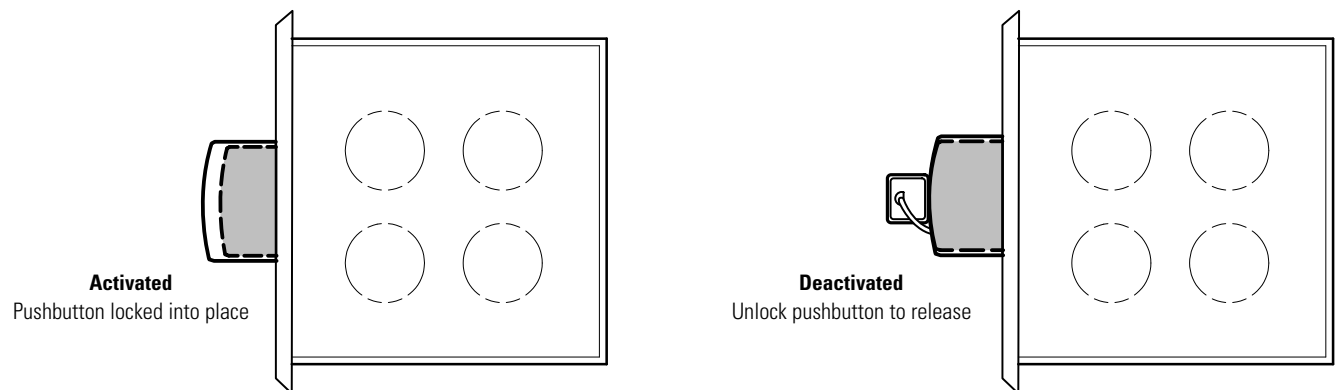


Figure 7-40. REPO Operation

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## Chapter 8

## Communication

This chapter describes the communication features of the Eaton 9395P UPS system and provides information about connecting hardware. For terminal wiring information, see paragraph 3.2.4 and paragraph 4.7. For location of the customer interface panels and terminals, see Figure 4-5 and Figure 4-9 through Figure 4-12.

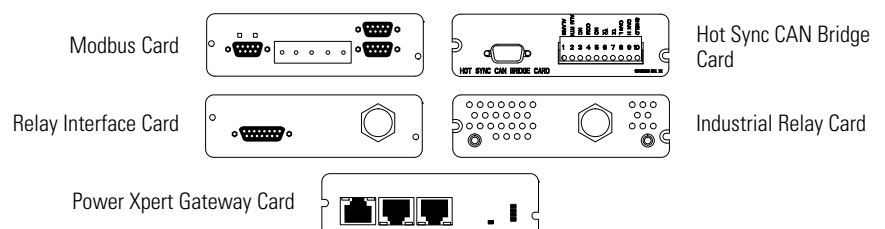
### 8.1 X-Slot Cards

The Eaton 9395P UPS system has four standard, factory-installed X-Slot communication bays. See Figure 4-9 on page 4-15 for bay locations. The UPS is compatible with the following X-Slot cards (see Figure 8-1):

- 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 page 1-10). Refer to the manual supplied with the X-Slot card for user instructions.



**Figure 8-1. Optional X-Slot Cards**

## 8.2 PredictPulse

The Eaton 9395P UPS supports Eaton's 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 Eaton 9395P 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](http://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 Power Xpert 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](http://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](mailto: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 Web-2.0 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 Intelligent Power Software gives you all the tools you need to monitor and manage power devices on your network, even in a virtualised 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 overtemperature 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.



### CAUTION

Contacts should not be operated in excess of 30 Vac @ 5A maximum.



### MISE EN GARDE!

Ne pas faire fonctionner les contacts à plus de 30 VCA à 5 A maximum.

## 8.6 Remote Monitor Panel II

As an option, an RMP II 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 II contains backlit status indicators and a local horn. The RMP II can be flush-mounted or surface-mounted on a desktop, or secured to a wall. Figure 8-2 shows an RMP II.

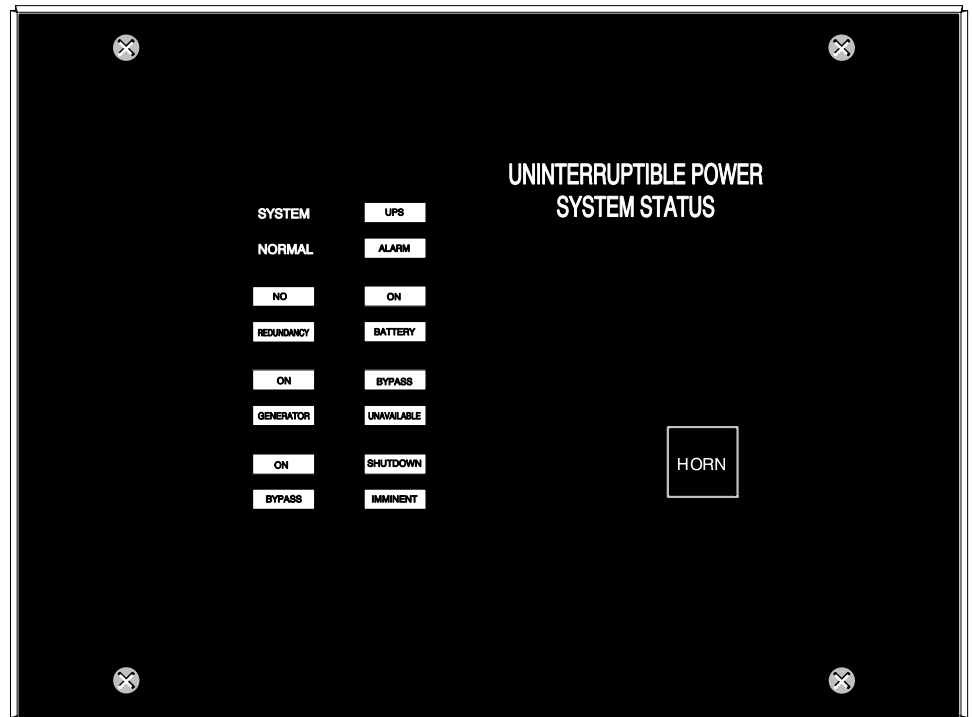


Figure 8-2. Remote Monitor Panel II

The RMP II contains a local horn and the backlit status indicators listed in Table 8-1.

**Table 8-1. RMP II 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**

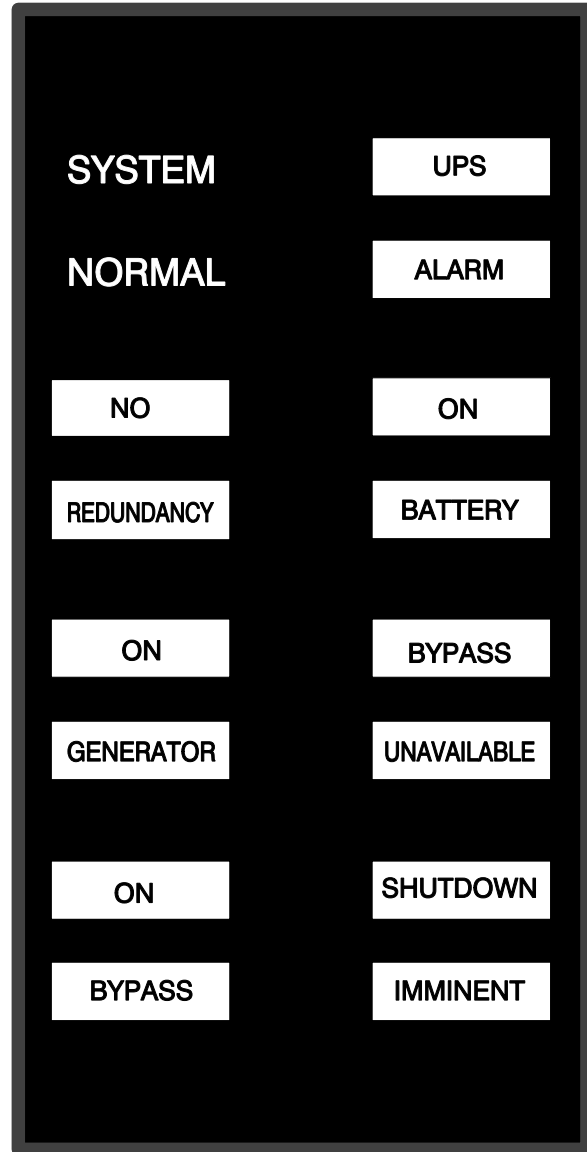
The UPS battery backup is supplying the critical load. The utility power is either interrupted or out of specification. The SYSTEM NORMAL indicator is also illuminated.

**BYPASS UNAVAILABLE**

The UPS system is in Online mode, but a bypass source is not within specification. A horn sounds after 30 seconds.

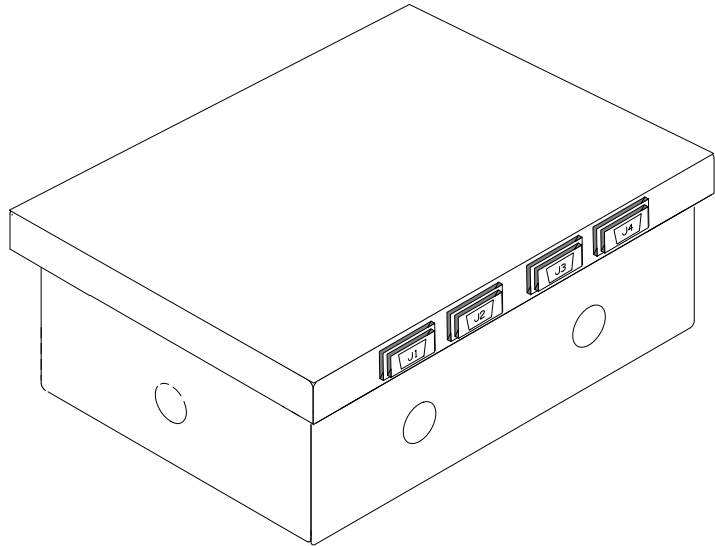
**SHUTDOWN IMMINENT**

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 8-3 shows the RIM II with its four 15-pin connectors labeled J1 through J4.



**Figure 8-3. Relay Interface Module II**

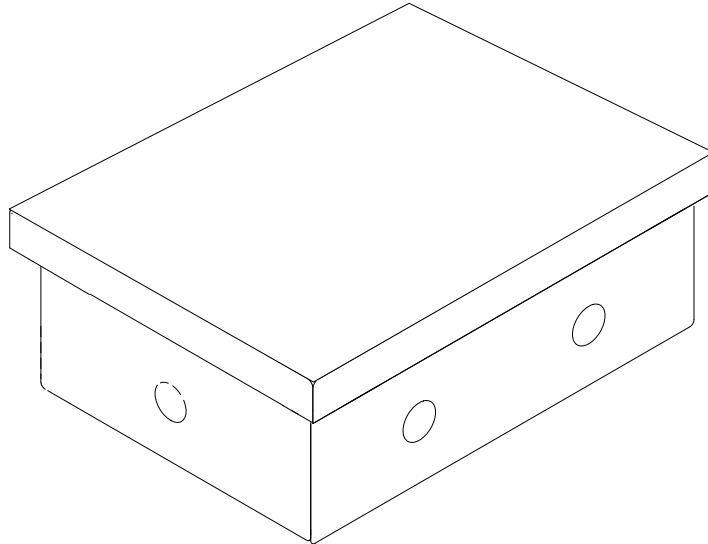
The RIM II can provide the status and alarm signals shown in Table 8-2.

**Table 8-2. Customer Interface Connectors**

Status	J1 through J4	Description
<b>UPS AVAILABLE</b>	Pins 1 and 12	Contacts are closed when the UPS is operating in Online mode or ready to supply the load.
<b>UPS OFFLINE</b>	Pins 3 and 13	Contacts are open when the UPS is offline. Contacts are closed when the UPS is operating in Online mode.
<b>BATTERY WEAK</b>	Pins 5 and 14	Contacts are closed when approximately two minutes of battery time is remaining before the critical load is lost.
<b>UTILITY FAILURE</b>	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 8-4 shows the SCM II.



**Figure 8-4. Supervisory Contact Module II**

The SCM II provides signals for the indications shown in Table 8-3.

**Table 8-3. SCM II Status Indicators and Connections**

Indication	TB2 Connections
<b>SYSTEM NORMAL</b>	TB2-1 through TB2-3
<b>NO REDUNDANCY</b>	TB2-4 through TB2-6
<b>ON GENERATOR</b>	TB2-7 through TB2-9
<b>BYPASS NOT AVAILABLE</b>	TB2-10 through TB2-12
<b>ON BATTERY</b>	TB2-13 through TB2-15
<b>UPS ALARM</b>	TB2-16 through TB2-18
<b>ON BYPASS</b>	TB2-19 through TB2-21
<b>SHUTDOWN IMMINENT</b>	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 bleed-off 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.
- 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 or panels) and the exhaust openings (on top of the UPM section) are not blocked.
3. Ensure the operating environment is within the parameters specified in paragraph 3.2.2 and Chapter 10, "Product Specifications."
4. Ensure the UPS is in Normal mode (Normal status indicator is illuminated). If an alarm lamp is illuminated or the Normal 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 9-1 and Figure 9-2 for filter locations, and Table 9-1 for filter sizes. Contact an Eaton service representative for replacement filters. To remove and replace the filters:

**Table 9-1. UPS Filter Sizes**

Filter Location	Size
Bottom Left ISBM Section Air Filters (Continuous Static Switch)	12" × 20" × 0.25"
Bottom Right ISBM Section Air Filters (Continuous Static Switch)	12" × 20" × 0.25"
Middle Right ISBM Section Air Filter (Continuous Static Switch)	20" × 6.3" × 0.25"
FI-UPM Section Air Filters	20" × 44" × 0.25"



### CAUTION

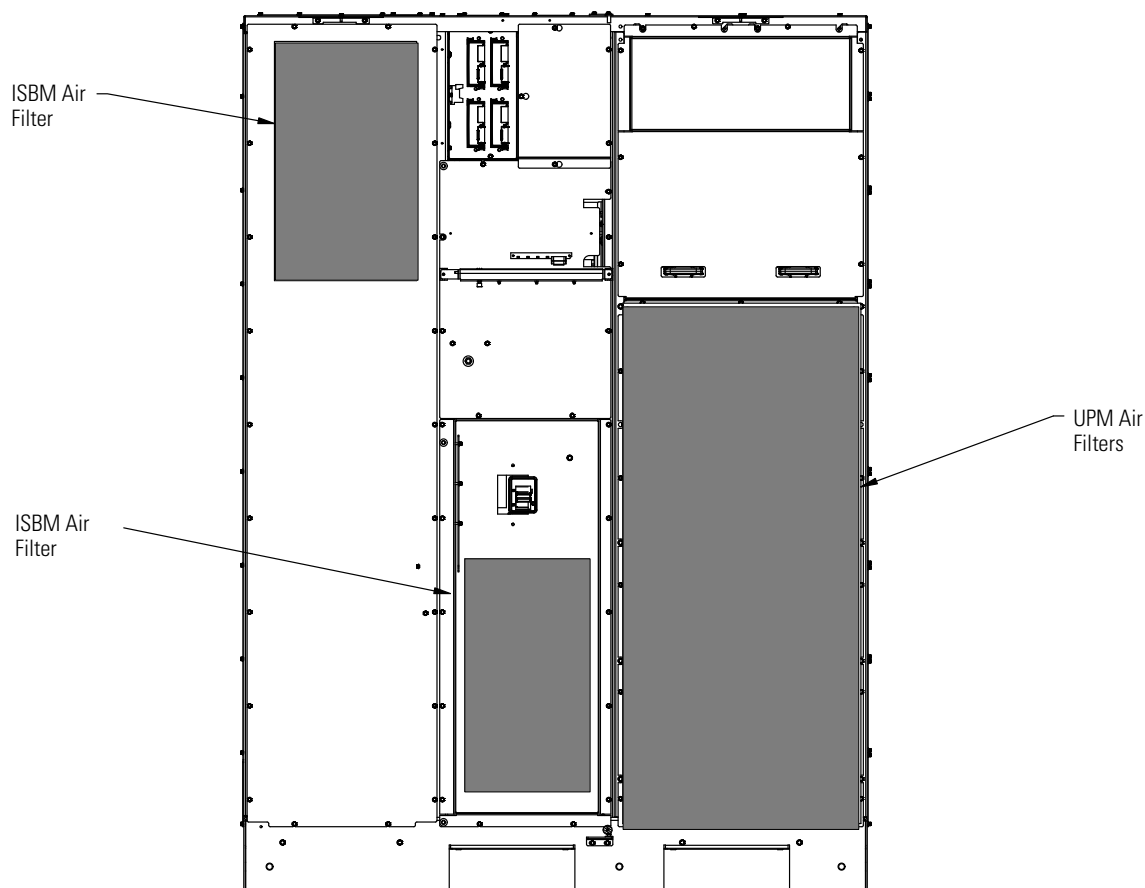
Verify washed filters are thoroughly dry before reinstalling.



**MISE EN GARDE!**

Vérifier que les filtres sont bien secs avant de les réinstaller.

- a.** Remove one top screw and two bottom screws securing each UPM section front panel. Lift the 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 each ISBM section front panel. 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.
- 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 9-1. ISBM and UPM Section Air Filter Locations – Continuous Static Switch**

3. If the UPS configuration included an FI-UPM model, check the FI-UPM air filter (located behind the front panel) and wash or replace as necessary. See Figure 9-2 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)*). 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.

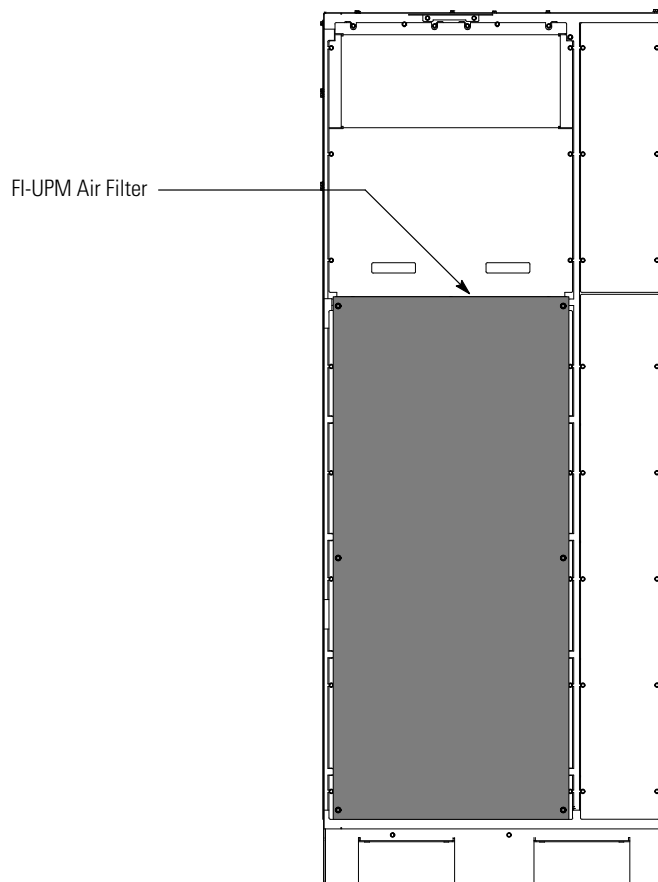


### MISE EN GARDE!

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 a and secure with the retained hardware.

4. Record maintenance results and any corrective actions in a suitable log.



**Figure 9-2. FI-UPM Air Filter Location**

### **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 system 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.



#### CAUTION

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



#### MISE EN GARDE!

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.



#### CAUTION

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



#### MISE EN GARDE!

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, 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 Eaton Help Desk (see page 1-10).

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## Chapter 10

## Product Specifications

### 10.1 Model Numbers

The UPS is housed in one or two free-standing cabinets 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-300/300 (one or two UPM)	300 kVA, 300 kW	50/60 Hz
Eaton 9395P-300/275 (one or two UPM)	275 kVA, 275 kW	50/60 Hz
Eaton 9395P-300/250 (one or two UPM)	250 kVA, 250 kW	50/60 Hz
Eaton 9395P-300/225 (one or two UPM)	225 kVA, 225 kW	50/60 Hz
Eaton 9395P-300/200 (one or two UPM)	200 kVA, 200 kW	50/60 Hz

### 10.2 Specifications

The following sections detail the input, output, environmental, and battery specifications for the UPS.

#### 10.2.1 UPS Input

<b>Operating Input Voltage</b>	480 Vac
<b>Operating Input Frequency Range</b>	50/60 Hz
<b>Operating Input Current</b>	See Table 3-4 or Table 3-5 Reduced for Generator Adjustable
<b>Input Current Harmonic Content</b>	3% THD at full load
<b>Power Factor</b>	Minimum 0.99 at full load
<b>Line Surges</b>	6 kV OC, 3 kA SC per ANSI 62.41 and IEC 801-4
<b>Battery Voltage</b>	480 Vdc
<b>Battery Charging Capacity</b>	Configurable per UPM at nominal line voltage: Up to 120A with less than 85% load Up to 80A with 100% load
<b>Battery Shunt Trip</b>	48 Vdc

### 10.2.2 UPS Output

<b>UPS Output Capacity</b>	100% rated current
<b>Output Voltage Regulation</b>	± 1.5% (10% to 100% load)
<b>Output Voltage Adjustment (Nominal +/-3%)</b>	480 Vac nominal, adjustable from 466 Vac to 494 Vac
<b>Output Voltage Harmonic Content</b>	1% maximum THD (linear load) 5% maximum THD (nonlinear load)
<b>Output Current</b>	See Table 3-4 or Table 3-5
<b>Output Voltage Balance</b>	2.5% for 100% maximum load imbalance (linear load)
<b>Output Voltage Phase Displacement</b>	± 4° for 100% maximum load imbalance (linear load)
<b>Output Transients</b>	Meets Class 1 IEC 62040-3 (10% to 100% load)
<b>Frequency Regulation</b>	± 0.1 Hz free running
<b>Synchronous to Bypass</b>	+10% to -10%
<b>Frequency Slew Rate</b>	.7 Hz per second maximum
<b>Load Compatibility</b>	0.9 pF Leading 0.7 pF Lagging
<b>Overload Capability (kW)</b>	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

<b>Operating Temperature</b>	All ratings except 300 kW: 0 to 40°C (32 to 104°F) at elevation up to 1000m without derating. For 300kW: 0 to 35°C at elevation up to 1000m without derating. The recommended operating temperature is 25°C (77°F).
<b>Operating Altitude</b>	Maximum 1000m (3300 ft) at 40°C without derating
<b>Storage Temperature</b>	-25 to +60°C, excluding batteries (prolonged storage above 40°C causes rapid battery self-discharge)
<b>Relative Humidity (Operating and Storage)</b>	5% to 95% maximum noncondensing
<b>Acoustical Noise</b>	78 dB at a 1m distance, A weighted for one UPM UPS 81 dB at a 1m distance, A weighted for two UPM UPS
<b>EMI Suppression</b>	Meets IEC 62040-2, category C3
<b>Electrostatic Discharge (ESD) Immunity</b>	Meets IEC 801-2 specifications. Withstands up to 25 kV pulse without damage and with no disturbance or adverse effect to the critical load.



# Warranty

## LIMITED FACTORY WARRANTY FOR THREE-PHASE EATON UPS PRODUCTS

**WARRANTOR:** The warrantor for the limited warranties set forth herein is Eaton ("Eaton").

**LIMITED WARRANTY:** This limited warranty (this "Warranty") applies only to the original End-user (the "End-user") of the Eaton three-phase UPS Products (the "Product") and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Eaton for resale to an End-user.

**LIMITED WARRANTY PERIOD:** The period covered by this Warranty for Product installed [and currently located] in the fifty (50) United States and the District of Columbia is twelve (12) months from the date of Product startup or eighteen (18) months from date of Product shipment, whichever occurs first, for parts coverage and 90 days from the date of Product startup for labor coverage. The period covered by this Warranty for Product installed [and currently located] outside of the fifty (50) United States and the District of Columbia is twelve (12) months from the date of Product startup or eighteen (18) months from date of Product shipment, whichever occurs first, for parts coverage.

**WHAT THIS LIMITED WARRANTY COVERS:** The warrantor warrants that the Eaton three-phase UPS electronics, Eaton-built accessories, and Eaton-built battery cabinets, (individually and collectively, the "Warranted Items") are free from defects in material and workmanship. If, in the opinion of Eaton, a Warranted Item is defective and the defect is within the terms of this Warranty, Eaton's sole obligation will be to repair or replace such defective item (including by providing service, parts and labor, as applicable), at the option of Eaton. The Warranted Item will be repaired or replaced onsite at the End-user's location or such other location as determined by Eaton. Any parts that are replaced may be new or reconditioned. All parts replaced by Eaton shall become the property of Eaton.

**WHAT THIS LIMITED WARRANTY DOES NOT COVER:** This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation, including the "trickle charge" of batteries no later than the date indicated on the packaging; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, fire, flood, lightning, vandalism, acts of God, Customer's neglect, abuse, misuse, misapplication, incorrect installation; (d) repair or alteration, not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent; or (e) improper testing, operation, maintenance, adjustment or any modification of any kind not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent.

This Warranty is not valid: (a) unless an authorized Eaton Customer Service Engineer (in USA) or Agent (outside of USA) performs startup and commissioning of the Product; (b) if the Product is moved to a new location by someone other than an authorized Eaton Customer Service Engineer (in USA) or Agent (outside of USA); or (c) if the Product's serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof. Labor warranty is not provided for Product located outside of the fifty (50) United States or the District of Columbia. Any equipment, parts or materials included in the Product and not manufactured by Eaton are warranted solely by the manufacturer of such equipment, parts or materials and are not included as part of this warranty. Batteries are not warranted by Eaton.

**THIS WARRANTY IS THE END-USER'S SOLE REMEDY AND IS EXPRESSLY IN LIEU OF, AND THERE ARE NO OTHER EXPRESSED OR IMPLIED GUARANTEES OR WARRANTIES (INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE, WHICH ARE EXPRESSLY DISCLAIMED).**

**LIMITATION OF LIABILITY:** In no event shall Eaton be liable for any indirect, incidental, special or consequential damages of any kind or type whatsoever, or based on any claim or cause of action, however denominated. Eaton shall not be responsible for failure to provide service or parts due to causes beyond Eaton's reasonable control. In no case will Eaton's liability under this Warranty exceed the replacement value of the Warranted Items.

**END-USER'S OBLIGATIONS:** In order to receive the benefits of this Warranty, the End-user must use the Product in a normal way; follow the Product's operators and maintenance manual; and protect against further damage to the Product if there is a covered defect.

**OTHER LIMITATIONS:** Eaton's obligations under this Warranty are expressly conditioned upon receipt by Eaton of all payments due to it (including interest charges, if any). During such time as Eaton has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Eaton shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

**COSTS NOT RELATED TO WARRANTY:** The End-user shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses or labor of Eaton representatives outside the terms of this Warranty will be borne by the End-user.

**OBTAINING WARRANTY SERVICE:** In the USA, call the Customer Reliability Center 7x24 at 800.843.9433. Outside of the USA, contact your local Eaton product sales or service representative for units purchased from those countries, or call the Customer Reliability Center in the USA at 919.845.3633 for units purchased in the USA that were shipped overseas. For comments or questions about this Warranty, write to the Customer Quality Representative, 8609 Six Forks Road, Raleigh, North Carolina 27615 USA.

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