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

600 kVA, 600 kW

Installation and Operation Manual

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

EATON
Powering Business Worldwide
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.

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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Chapter 1  Introduction

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

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

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

The UPS is available as a single unit or an optional multiple unit distributed bypass system (see paragraph 1.4.5). The UPS is housed in a free-standing cabinet.

Four 9395P-600 UPS systems are available:

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

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

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

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

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

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

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

Figure 1-1. Single UPM and Two UPM Configurations
1.2 Single UPM Plus 1 and Two UPM Plus 1 Configurations

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

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

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

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

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

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

---

**NOTE** Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms 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 color touchscreen to control the operation of the UPS and to display the status of the UPS system. See Chapter 7, “UPS Operating Instructions” for additional information.

1.3.3 **Customer Interface**

- **Building Alarm Monitoring.** Up to five inputs in the UPS are available to connect the facility’s alarm system contacts. Some system configurations may limit the number of inputs available. The UPS uses these inputs to monitor the building alarms in addition to the UPS status. See Chapter 8, “Communication” for additional information.

- **Alarm Contact.** One alarm contact is provided for connection to equipment at the facility, such as a light, an audible alarm, or a computer terminal. The equipment connected to this contact alerts you to a UPS alarm. See Chapter 8, “Communication” for additional information.

- **X-Slot Communication Bays.** Four communication bays are standard equipment. One to four optional X-Slots inline (for generic slot name; ie: Avaya’s alarm adapter) connectivity cards can be installed in the UPS module at any time. X-Slot cards are quickly installed at the front of the UPS and are hot-pluggable. See Chapter 8, “Communication” for additional information.

1.3.4 **Advanced Battery Management**

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

1.3.5 **Power Management Software**

Intelligent Power Management and Intelligent Power Protector software are available through Eaton support. See Chapter 8, “Communication” for additional information.

1.4 **Options and Accessories**

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

1.4.1 **Integrated Battery Cabinets**

Battery backup protection can be provided by equipping the UPS system with 9395P-600 battery cabinets containing sealed lead-acid, maintenance-free batteries. The cabinets are designed for standalone installation and may be installed adjacent to the UPS or in a separate location. The recommended installation location for adjacent battery cabinets is on the right side of the UPS cabinet to allow for future expansion using an external module.

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

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

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

1.4.3 Sync Control

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

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

1.4.4 Single-Feed Kit

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

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

1.4.5 Distributed Bypass System

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

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

A distributed bypass UPS system can be installed to provide a capacity and/or redundant system. This load sharing system provides more capacity than a single UPS, and can provide backup, depending on the load and configuration. In addition, when one UPS 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 9395P-600 UPS can be configured by an authorized Eaton Customer Service Engineer for inherent redundancy. When configured, the UPS automatically becomes redundant if the load is at or below the capacity of the UPMs minus the capacity of one UPM. Under normal conditions the UPMs in the UPS share the load equally. If one or more UPMs becomes unavailable and the load is at or below the capacity of remaining UPMs, the remaining UPMs supply the load instead of transferring to bypass.

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

1.4.9 Energy Saver and High Alert Modes

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.

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 then 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, “Installing Options and Accessories” for additional information. Basic System Configurations The following basic UPS system configurations are possible:

- **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 9395P-600.

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

This manual describes how to install and operate the 9395P-600 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.

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<td><img src="image" alt="Information notes icon" /></td>
<td>Information notes call attention to important features or instructions.</td>
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[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 or contact an Eaton service representative for information on how to obtain copies of these manuals.
1.10 Getting Help

If help is needed with any of the following:

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

Please call the Customer Reliability Center at:

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

E-ESSDocumentation@eaton.com
Chapter 2    Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

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

⚠️ 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, 600 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, 600 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.
ATTENTION!

- L’installation et l’entretien doivent être effectués par du personnel qualifié en matière d’onduleurs et de batteries, il doit connaître les précautions qui s’imposent. Le personnel non autorisé doit être tenu à l’écart de l’équipement. Il est important de prendre connaissance des avertissements, des mises en garde et des avis avant de procéder à l’installation ou à l’entretien de l’équipement. NE PAS DÉBRANCHER les batteries lorsque l’onduleur est en mode Batterie.

- Ne jamais jeter les batteries au feu. L’exposition aux flammes risque de les faire exploser.

- Déconnecter la source d’alimentation avant de brancher ou débrancher les bornes.

- Vérifier que la batterie n’est pas, par inadvertance, reliée à la terre. Si c’est le cas, couper la source de mise à la terre. Les contacts avec une batterie reliée à la terre peuvent provoquer des risques de décharge électrique. Ces risques sont atténués si la mise à la terre est annulée avant le début des travaux sur les batteries.

- L’élimination appropriée des batteries est requise. Se reporter aux codes locaux pour connaître les exigences liées à l’élimination

- Ne pas jeter les batteries au feu. Les batteries peuvent exploser lorsqu’elles sont exposées à des flammes.

- Garder les portes de l’onduleur fermées et les panneaux avant en place pour garantir une circulation adéquate de l’air de refroidissement et pour protéger le personnel des tensions dangereuses dans l’unité.

- Ne pas installer ni faire fonctionner l’onduleur près d’une source de chaleur au gaz ou à l’électricité.

- Le milieu de fonctionnement doit toujours correspondre aux paramètres établis dans ce manuel.

- Maintenir les lieux rangés, propres et exempts d’une humidité excessive.

- Respecter les étiquettes DANGER, MISE EN GARDE et AVERTISSEMENT se trouvant à l’intérieur et à l’extérieur de l’équipement.

CAUTION

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

- Lift and move the cabinet using only the front or rear forklift slots.

- Verify that the forklift forks are in a horizontal position before inserting them into the forklift slots.

- DO NOT angle fork tips upward.

- Insert the forks all the way through the base. DO NOT insert forks partially into the base to move the cabinet.

- Forks may be partially inserted into the front or rear forklift slots for minor positioning if the forks are kept in a horizontal position with no upward angling.

- DO NOT use the forklift slots on the end of the cabinet to move the cabinet.

- End forklift slots may be used for minor positioning if the forks are kept in a horizontal position with no upward angling.

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

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

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

Si ces instructions ne sont pas suivies, des dommages au câblage et à son canal surviendront.
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 cabinet (Chapter 3).
4. Unload and install the UPS cabinet, 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.

**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 (a minimum two-week notice is required) to reserve a preferred startup date.

3.1  Creating an Installation Plan

Before installing the UPS system, read and understand how this manual applies to the system being installed. Use the procedures and illustrations in paragraph 3.2 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-600 UPS meets the following operating restrictions:

The environmental requirements specified below are for the air at the intake ports of the 9395P-600, 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.

Do not expose the UPS for overly aggressive environments, such as salt mist or corrosive gases. High relative humidity accelerates the effects of contaminants. The UPS should be installed in a G1 environment (based on ANSI/ISA S-71.04 classifications). If the UPS is used in a more aggressive environment, it can cause reduced product life and possibly early failure. If the installation location does not meet the recommended environment, contact Eaton service representative for further information.

3.2.2 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 3-9. 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).
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 3-1. UPS Cabinet Maximum Weights

<table>
<thead>
<tr>
<th>Model</th>
<th>Section</th>
<th>Maximum Weight kg (lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/600</td>
<td>ISBM (CSS)</td>
<td>1497 (3300)</td>
</tr>
<tr>
<td>Eaton 9395P-600/550</td>
<td>+ 2 UPMs</td>
<td>1444 (3184)</td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td></td>
<td>496 (1094)</td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td></td>
<td>471 (1037)</td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td>ISBM (CSS)</td>
<td>905 (1995)</td>
</tr>
<tr>
<td>Eaton 9395P-600/275</td>
<td>+ 1 UPM</td>
<td>855 (1886)</td>
</tr>
<tr>
<td>Eaton 9395P-600/250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/200</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**: CSS = Continuous Static Switch

**NOTE**: Table 3-3 describes power ratings of each model.

The basic environmental requirements for operation of the UPS are:

- 40°C (32–104°F) at elevations up to 1000m without derating
- For 300 kW and 600 kW: 0 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 or contact an Eaton service representative for information on how to obtain copies.

The UPS 480V ventilation requirements are shown in Table 3-3.
Table 3-3. 480V Air Conditioning and Ventilation Requirements During Full Load Operation

<table>
<thead>
<tr>
<th>Model</th>
<th>Rating</th>
<th>Input/Output Voltage</th>
<th>Heat Rejection kW (1000 BTU/hr)</th>
<th>Ventilation Required for Cooling Air Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/600</td>
<td>600 kVA</td>
<td>480/480</td>
<td>23.1 (78.7)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>600 kVA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/550</td>
<td>550 kVA</td>
<td>480/480</td>
<td>21.1 (72.2)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>550 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/500</td>
<td>500 kVA</td>
<td>480/480</td>
<td>18.7 (63.8)</td>
<td>Approximately 2124 liter/sec (4500 CFM)</td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>500 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td>450 kVA</td>
<td>480/480</td>
<td>15.8 (54.1)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>450 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td>400 kVA</td>
<td>480/480</td>
<td>14.1 (48.1)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>400 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td>300 kVA</td>
<td>480/480</td>
<td>11.5 (39.4)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>300 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/275</td>
<td>275 kVA</td>
<td>480/480</td>
<td>10.6 (36.1)</td>
<td>Approximately 1180 liter/sec (2500 CFM)</td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>275 kW</td>
<td></td>
<td></td>
<td>With field installed FI-UPM:</td>
</tr>
<tr>
<td>Eaton 9395P-600/250</td>
<td>250 kVA</td>
<td>480/480</td>
<td>9.3 (31.9)</td>
<td>Approximately 2124 liter/sec (4500 CFM)</td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>250 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/225</td>
<td>225 kVA</td>
<td>480/480</td>
<td>7.9 (27.0)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>225 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/200</td>
<td>200 kVA</td>
<td>480/480</td>
<td>7.0 (24.0)</td>
<td></td>
</tr>
<tr>
<td>(CSS or IOM)</td>
<td>200 kW</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE CSS = Continuous Static Switch; IOM = Input Output Module
The UPS 415V/400V/380V ventilation requirements are shown in Table 3-4.

### Table 3-4. 415V/400V/380V Air Conditioning and Ventilation Requirements During Full Load Operation

<table>
<thead>
<tr>
<th>Model</th>
<th>Rating</th>
<th>Input/Output Voltage</th>
<th>Heat Rejection kW (1000 BTU/hr)</th>
<th>Ventilation Required for Cooling Air Exhaust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/550 (CSS or IOM)</td>
<td>550 kVA</td>
<td>415/415</td>
<td>22.7 (77.42)</td>
<td>Approximately 3050 liter/sec (6500 CFM)</td>
</tr>
<tr>
<td>Eaton 9395P-600/500 (CSS or IOM)</td>
<td>500 kVA</td>
<td>415/415</td>
<td>20.6 (70.38)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/450 (CSS or IOM)</td>
<td>450 kVA</td>
<td>415/415</td>
<td>18.6 (63.35)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/400 (CSS or IOM)</td>
<td>400 kVA</td>
<td>415/415</td>
<td>16.5 (56.31)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/300 (CSS or IOM)</td>
<td>300 kVA</td>
<td>415/415</td>
<td>12.4 (42.23)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/275 (CSS or IOM)</td>
<td>275 kVA</td>
<td>415/415</td>
<td>11.3 (38.71)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/250 (CSS or IOM)</td>
<td>250 kVA</td>
<td>415/415</td>
<td>10.3 (35.19)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/225 (CSS or IOM)</td>
<td>225 kVA</td>
<td>415/415</td>
<td>9.3 (31.67)</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/200 (CSS or IOM)</td>
<td>200 kVA</td>
<td>415/415</td>
<td>8.2 (28.15)</td>
<td></td>
</tr>
</tbody>
</table>

Approximately 1700 liter/sec (3600 CFM)  
With field installed FI-UPM:  
Approximately 3050 liter/sec (6500 CFM)

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

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

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

Figure 3-9 provides side view illustrations of dimensions and center of gravity measurements for all configurations.
Dimensions are in millimeters [inches].

**Figure 3-1. Single UPM Configuration Dimensions**
Figure 3-2. Single UPM Center of Gravity Dimensions

Dimensions are in millimeters [inches].
Dimensions are in millimeters [inches].

**Figure 3-3. Single UPM and 1 FI-UPM Configuration Dimensions**
Figure 3-4. Single UPM and 1 FI-UPM Center of Gravity Dimensions

Dimensions are in millimeters [inches].
Dimensions are in millimeters [inches].

**Figure 3-5. Two UPM Configuration Dimensions**
Dimensions are in millimeters [inches].

Figure 3-6. Two UPM Center of Gravity Dimensions
Dimensions are in millimeters [inches].

Figure 3-7. Two UPM Plus 1 FI-UPM Configuration Dimensions
### Figure 3-8. Two UPM and 1 FI-UPM Center of Gravity Dimensions

Dimensions are in millimeters [inches].
Figure 3-9. Side View Dimensions and Center of Gravity Measurements

Dimensions are in millimeters [inches].

NOT INTENDED FOR PERMANENT MOUNTING
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 3-5 through Table 3-12 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-600 480V unit is designed for operation on a grounded-wye source of supply. There is no additional connection point for a neutral conductor. The output of this UPS will not directly support phase to neutral loads.
- The ISBM and UPM sections are shipped with debris shields covering the ventilation grills on top of the sections. Do not remove the debris shields until installation is complete. However, remove the shields before operating the UPS. Once the debris shields are removed, do not place objects on the ventilation grills.
- In a common battery system, all UPMs are powered from one common battery source. In a separate battery system, each UPM is powered from separate battery sources.
- UPSs in distributed bypass and parallel systems must use a separate battery system for each UPS.
- On a UPS configured as an Input Output Module (IOM), requirements for bypass input wiring, termination, conduit, and bypass breaker are not applicable.

If the power rating listed on the nameplate of the installed UPS is not found in the following tables, wire the UPS using the fully rated specifications. Otherwise, calculate the required wire, conduit, and breaker sizes using the following guidelines in addition to those already listed in paragraph 3.2.3:

- Select wire size according to the UPS nameplate.
- Do not use wire larger than the largest size listed in Table 3-5 through Table 3-12.
- Use terminal recommendations from Table 3-5 through Table 3-12.
- Size and number of conduits must not exceed those listed in Table 3-17 and Table 3-20.
- Select overcurrent protection input, battery, and output breakers according to the UPS nameplate rated for either 80% or 100%.
- Follow all applicable NEC and local codes.

Wire sizes listed are for copper wiring only.
### UPS Installation Plan and Unpacking

#### Table 3-5. 480V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

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

**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 6-15 on page 6-20.

**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 3-6. 480V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
<td>600</td>
</tr>
<tr>
<td>Input and Output Voltage</td>
<td>Volts</td>
<td>480/480</td>
<td>480/480</td>
<td>480/480</td>
<td>480/480</td>
<td>480/480</td>
</tr>
<tr>
<td>AC Input to UPS Rectifier (0.98 Minimum pF)</td>
<td>A</td>
<td>Amps</td>
<td>594</td>
<td>668</td>
<td>742</td>
<td>817</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
</tr>
<tr>
<td>AC Input to UPS Bypass</td>
<td>B</td>
<td>Amps</td>
<td>481</td>
<td>541</td>
<td>601</td>
<td>662</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
</tr>
<tr>
<td>DC Input from Battery Disconnect to UPS UPM</td>
<td>C</td>
<td>Amps per UPM</td>
<td>603</td>
<td>603</td>
<td>603</td>
<td>603</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>500 (3)</td>
<td>500 (3)</td>
<td>500 (3)</td>
<td>500 (3)</td>
<td>500 (3)</td>
</tr>
<tr>
<td>AC Output to Critical Load</td>
<td>D</td>
<td>Amps</td>
<td>481</td>
<td>541</td>
<td>601</td>
<td>662</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
<td>350 (3)</td>
</tr>
</tbody>
</table>

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 6-15 on page 6-20.

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 3-7. 415V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>Input and Output Voltage</td>
<td>Volts</td>
<td>415/415</td>
<td>415/415</td>
<td>415/415</td>
<td>415/415</td>
<td>415/415</td>
</tr>
<tr>
<td>AC Input to UPS Rectifier (0.98 Minimum pF)</td>
<td>A</td>
<td>Amps</td>
<td>514</td>
<td>685</td>
<td>770</td>
<td>856</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWG or kcmil (each)</td>
<td>500 (2)</td>
<td>500 (3)</td>
<td>500 (3)</td>
<td>500 (4)</td>
</tr>
<tr>
<td>AC Input to UPS Bypass (Five Wire)</td>
<td>B</td>
<td>Amps</td>
<td>417</td>
<td>556</td>
<td>626</td>
<td>696</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWG or kcmil (each)</td>
<td>350 (2)</td>
<td>300 (3)</td>
<td>350 (3)</td>
<td>500 (3)</td>
</tr>
<tr>
<td>DC Input from Battery Disconnect to UPS</td>
<td>C</td>
<td>Total Amps</td>
<td>658</td>
<td>877</td>
<td>987</td>
<td>1096</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWG or kcmil (each)</td>
<td>500 (2)</td>
<td>500 (3)</td>
<td>500 (3)</td>
<td>500 (4)</td>
</tr>
<tr>
<td>AC Output to Critical Load (Five Wire)</td>
<td>D</td>
<td>Amps</td>
<td>417</td>
<td>556</td>
<td>626</td>
<td>696</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AWG or kcmil (each)</td>
<td>350 (2)</td>
<td>300 (3)</td>
<td>350 (3)</td>
<td>500 (3)</td>
</tr>
</tbody>
</table>

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 6-15 on page 6-20.

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 3-8. 415V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td><strong>Input and Output Voltage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Volts</td>
<td>415/415</td>
<td>415/415</td>
<td>415/415</td>
<td>415/415</td>
<td>415/415</td>
</tr>
<tr>
<td><strong>AC Input to UPS Rectifier (0.98 Minimum pF)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full load current plus battery recharge current (3) Phases, (1) Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Conductor Size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AC Input to UPS Bypass (Five Wire)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Load Current (3) Phases, (1) Neutral (1) Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Conductor Size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC Input from Battery Disconnect to UPS UPM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Positive, (1) Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Conductor Size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Pole (1) Positive, (1) Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AC Output to Critical Load (Five Wire)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Load Current (3) Phases, (1) Neutral (1) Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Conductor Size</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Pole</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 6-15 on page 6-20.

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

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

**Battery Cable Routing Requirements**

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

**Raceway applications:**
- Positive and negative battery cables must be run side by side in the raceway in an alternating pattern (+ - + - + - + -).
- There must be a ground cable running in the raceway with the battery cables.
NOTE V 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 6-15 on page 6-20.

NOTE V 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 3-9. 400V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
</tbody>
</table>

**Input and Output Voltage**

<table>
<thead>
<tr>
<th>Volts 400/400</th>
<th>Volts 400/400</th>
<th>Volts 400/400</th>
<th>Volts 400/400</th>
</tr>
</thead>
</table>

**AC Input to UPS Rectifier (0.98 Minimum pF)**

| Full load current plus battery recharge current | Amps | 533 | 710 | 799 | 888 | 960 |
| (3) Phases, (1) Ground | AWG or kcmil (each) | 500 | 500 | 500 | 500 | 500 |

**AC Input to UPS Bypass (Five Wire)**

| Full Load Current | Amps | 433 | 577 | 650 | 722 | 794 |
| (3) Phases, (1) Neutral, (1) Ground | AWG or kcmil (each) | 350 | 300 | 500 | 500 | 500 |

**DC Input from Battery Disconnect to UPS**

<table>
<thead>
<tr>
<th>Total Amps</th>
<th>658</th>
<th>877</th>
<th>987</th>
<th>1096</th>
<th>1206</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC Input from Battery Disconnect to UPS</td>
<td>Total Amps</td>
<td>658</td>
<td>877</td>
<td>987</td>
<td>1096</td>
</tr>
<tr>
<td>(1) Positive, (1) Negative</td>
<td>AWG or kcmil (each)</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Number per Pole</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

**AC Output to Critical Load**

<table>
<thead>
<tr>
<th>Total Amps</th>
<th>658</th>
<th>877</th>
<th>987</th>
<th>1096</th>
<th>1206</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC Output to Critical Load</td>
<td>Total Amps</td>
<td>658</td>
<td>877</td>
<td>987</td>
<td>1096</td>
</tr>
<tr>
<td>Full Load Current</td>
<td>Amps</td>
<td>433</td>
<td>577</td>
<td>650</td>
<td>722</td>
</tr>
<tr>
<td>(3) Phases, (1) Neutral, (1) Ground</td>
<td>AWG or kcmil (each)</td>
<td>350</td>
<td>300</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Number per Pole</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
NOTE V 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 6-15 on page 6-20.

NOTE V 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.

Table 3-10. 400V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>kW</td>
<td></td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>Input and Output Voltage</td>
<td>Volts</td>
<td></td>
<td></td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td>AC Input to UPS Rectifier (0.98 Minimum pF)</td>
<td>A</td>
<td>amps</td>
<td>538</td>
<td>710</td>
<td>799</td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td>kWm or kcmil</td>
<td>500 (2)</td>
<td>500 (3)</td>
<td>500 (3)</td>
<td>500 (4)</td>
</tr>
<tr>
<td>AC Input to UPS Bypass (Five Wire)</td>
<td>B</td>
<td>amps</td>
<td>433</td>
<td>577</td>
<td>650</td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td>kWm or kcmil</td>
<td>350 (2)</td>
<td>300 (3)</td>
<td>350 (3)</td>
<td>500 (3)</td>
</tr>
<tr>
<td>DC Input from Battery Disconnect to UPS UPM</td>
<td>C</td>
<td>amps per UPM</td>
<td>603</td>
<td>603</td>
<td>603</td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td>kWm or kcmil</td>
<td>500 (2)</td>
<td>500 (2)</td>
<td>500 (2)</td>
<td>500 (2)</td>
</tr>
<tr>
<td>AC Output to Critical Load (Five Wire)</td>
<td>D</td>
<td>amps</td>
<td>433</td>
<td>577</td>
<td>650</td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td>kWm or kcmil</td>
<td>350 (2)</td>
<td>300 (3)</td>
<td>500 (3)</td>
<td>500 (3)</td>
</tr>
</tbody>
</table>

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 3-11. 380V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Common Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
</tr>
<tr>
<td><strong>Input and Output Voltage</strong></td>
<td>Volts</td>
<td>380/380</td>
<td>380/380</td>
<td>380/380</td>
<td>380/380</td>
</tr>
<tr>
<td><strong>AC Input to UPS Rectifier (0.98 Minimum pF)</strong></td>
<td>Amps</td>
<td>545</td>
<td>727</td>
<td>800</td>
<td>909</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>300</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3)</td>
<td>(3)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td><strong>AC Input to UPS Bypass (Five Wire)</strong></td>
<td>Amps</td>
<td>456</td>
<td>608</td>
<td>684</td>
<td>760</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>400</td>
<td>350</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(3)</td>
<td>(3)</td>
</tr>
<tr>
<td><strong>DC Input from Battery Disconnect to UPS</strong></td>
<td>Total Amps</td>
<td>658</td>
<td>877</td>
<td>987</td>
<td>1096</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>500</td>
<td>500</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td><strong>AC Output to Critical Load (Five Wire)</strong></td>
<td>Amps</td>
<td>456</td>
<td>608</td>
<td>684</td>
<td>760</td>
</tr>
<tr>
<td></td>
<td>AWG or kcmil (each)</td>
<td>400</td>
<td>350</td>
<td>500</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2)</td>
<td>(3)</td>
<td>(3)</td>
<td>(3)</td>
</tr>
</tbody>
</table>

**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 6-15 on page 6-20.

**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 3-12. 380V Input/Output Ratings and External Wiring Requirements for the One/Two/Three UPM Separate Battery

<table>
<thead>
<tr>
<th>Basic Unit Rating</th>
<th>Units</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
<th>Rating 50/60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kVA</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td></td>
<td>kW</td>
<td>300</td>
<td>400</td>
<td>450</td>
<td>500</td>
<td>550</td>
</tr>
<tr>
<td>Input and Output Voltage</td>
<td>Volts</td>
<td>380/380</td>
<td>380/380</td>
<td>380/380</td>
<td>380/380</td>
<td>380/380</td>
</tr>
<tr>
<td><strong>AC Input to UPS Rectifier (0.98 Minimum pF)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full load current plus battery recharge current (3) Phases, (1) Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AC Input to UPS Bypass (Five Wire)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Load Current (3) Phases, (1) Neutral (1) Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>DC Input from Battery Disconnect to UPS UPM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1) Positive, (1) Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Pole (1) Positive, (1) Negative</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AC Output to Critical Load (Five Wire)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Load Current (3) Phases, (1) Neutral (1) Ground</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Conductor Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number per Pole</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE V 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 6-15 on page 6-20.

**NOTE V** Bypass wiring data is not applicable to IOM configurations.

**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.

---

**Battery Conductor Sizing:** Eaton strongly recommends using the specified DC conductor size and quantity shown above for optimum system performance and battery run time.
For a UPS with common rectifier input terminals, E1 through E12 are 2-hole bus bar mountings for standard NEMA 2-hole barrel lugs. The power wiring connections for this equipment are rated at 90°C. See Table 3-13 for external power cable terminations, Table 3-14 and Table 3-15 for supplied external wiring terminal hardware, and Table 3-16 for recommended installation parts and tools not supplied by Eaton.

The torque values listed in Table 3-13 are the maximum allowable. Tightening further will risk breaking or twisting the stud.

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

Table 3-13. UPS External Power Cable Terminations for the One/Two/Three UPM

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

NOTE Customer ground, sized in accordance with NEC Table 250.122, can be run in any conduit listed in Table 3-17 or Table 3-18. NOTE Bypass terminations are not applicable to IOM configurations.
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 3-14 and Table 3-15 for supplied terminal hardware, Table 3-16 for recommended installation parts and tools not supplied by Eaton, and Table 3-17 through Table 3-20 for power cable conduit sizes.

### Table 3-14. Supplied Intercabinet Wiring Terminal Hardware Kit

<table>
<thead>
<tr>
<th>Part</th>
<th>Size</th>
<th>Quantity</th>
<th>Terminals Used On</th>
<th>Eaton Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat Washer</td>
<td>M8</td>
<td>36</td>
<td>UPM AC Input, UPM Battery Input, UPM AC Output</td>
<td>180500036-080</td>
</tr>
<tr>
<td>Conical Washer</td>
<td>M8</td>
<td>36</td>
<td>UPM AC Input, UPM Battery Input, UPM AC Output</td>
<td>180500037-080</td>
</tr>
<tr>
<td>Nut</td>
<td>M8</td>
<td>36</td>
<td>UPM AC Input, UPM Battery Input, UPM AC Output</td>
<td>180200001-05</td>
</tr>
</tbody>
</table>

### Table 3-15. Supplied External Wiring Terminal Hardware Kit

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

**NOTE** Bypass terminations are not applicable to IOM configurations.

### Table 3-16. Recommended Installation Parts and Tools (Not Supplied by Eaton)

<table>
<thead>
<tr>
<th>Part</th>
<th>Size</th>
<th>Quantity</th>
<th>Manufacturer</th>
<th>Part Number</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Barrel 2-Hole Lug</td>
<td>As required</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54862BE</td>
<td>Copper wire only</td>
</tr>
<tr>
<td></td>
<td>2/0 AWG</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54864BE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3/0 AWG</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54866BE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4/0 AWG</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54868BE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 MCM</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54970BE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>300 MCM</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54972BE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>350 MCM</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54974BE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>400 MCM</td>
<td></td>
<td>Thomas &amp; Betts</td>
<td>54976BE</td>
<td></td>
</tr>
<tr>
<td>Manual Hydraulic Crimp Tool</td>
<td>14 Ton</td>
<td>1</td>
<td>Thomas &amp; Betts</td>
<td>TBM14M</td>
<td></td>
</tr>
<tr>
<td>Die Set</td>
<td>N/A</td>
<td>1</td>
<td>Thomas &amp; Betts</td>
<td>15506</td>
<td></td>
</tr>
</tbody>
</table>
Conduit sizes were chosen from NEC Table 4, Electrical Metallic Tubing (EMT). See Table 3-17 through Table 3-20 for 480V, 415V, 400V and 380V conduit requirements.

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

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

Conduit sizes listed are for copper wiring only.

**Table 3-17. 480V Power Cable Conduit Requirements**

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

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

**Battery Conductor Routing** Refer to the notes at the bottom of Table 3-5 Input/Output Ratings and External Wiring Requirements.
### Table 3-18. 415V Power Cable Conduit Requirements

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

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

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

**Battery Cable Routing** Refer to the notes at the bottom of Table 3-5 Input/Output Ratings and External Wiring Requirements.
Table 3-19. 400V Power Cable Conduit Requirements

<table>
<thead>
<tr>
<th>UPS Model</th>
<th>Voltage</th>
<th>Terminal</th>
<th>Number of Wires</th>
<th>Minimum Conduit Trade Size</th>
<th>Number of Conduits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/550</td>
<td>400 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/500</td>
<td>400 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td>400 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td>400 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td>400 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output (A, B, C, Ground)</td>
<td>5</td>
<td>2.5</td>
<td>2</td>
</tr>
<tr>
<td>DC (same for all ratings)</td>
<td></td>
<td>Battery (Positive, Negative, Ground)</td>
<td></td>
<td>See Note 1</td>
<td></td>
</tr>
</tbody>
</table>

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

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

**Battery Cable Routing:** Refer to the notes at the bottom of Table 3-5 Input/Output Ratings and External Wiring Requirements.
### Table 3-20. 380V Power Cable Conduit Requirements

<table>
<thead>
<tr>
<th>UPS Model</th>
<th>Voltage</th>
<th>Terminal Description</th>
<th>Number of Wires in Conduit</th>
<th>Minimum Conduit Trade Size</th>
<th>Number of Conduits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/550</td>
<td>380 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output  (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Eaton 9395P-600/500</td>
<td>380 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output  (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td>380 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output  (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td>380 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output  (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td>380 Vac</td>
<td>AC Input to UPS Rectifier (A, B, C, Ground)</td>
<td>4</td>
<td>2.5</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AC Input to Bypass and Output  (A, B, C, Ground)</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

- **DC** (same for all ratings)
- **Battery** (Positive, Negative, Ground)

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

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

**Battery Cable Routing**: Refer to the notes at the bottom of Table 3-5 Input/Output Ratings and External Wiring Requirements.
Table 3-21 lists the recommended rating for 480V, 415V, 400V, and 380V input circuit breakers with 100% and 80% breaker ratings for rectifier input.

Table 3-21. Recommended Input Circuit Breaker Ratings (100% and 80%)

<table>
<thead>
<tr>
<th>UPS Model Output kW/kVA</th>
<th>100%</th>
<th>1000A</th>
<th>N/A</th>
<th>N/A</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/600</td>
<td>80</td>
<td>1200A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Eaton 9395P-600/550</td>
<td>100</td>
<td>1000A</td>
<td>1000A</td>
<td>1000A</td>
<td>1000A</td>
</tr>
<tr>
<td>Eaton 9395P-600/500</td>
<td>80</td>
<td>1000A</td>
<td>1200A</td>
<td>1200A</td>
<td>1200A</td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td>100</td>
<td>700A</td>
<td>800A</td>
<td>800A</td>
<td>800A</td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td>80</td>
<td>1000A</td>
<td>1000A</td>
<td>1000A</td>
<td>1000A</td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td>100</td>
<td>500A</td>
<td>600A</td>
<td>600A</td>
<td>600A</td>
</tr>
<tr>
<td>Eaton 9395P-600/275</td>
<td>80</td>
<td>600A</td>
<td>700A</td>
<td>700A</td>
<td>700A</td>
</tr>
<tr>
<td>Eaton 9395P-600/250</td>
<td>100</td>
<td>450A</td>
<td>500A</td>
<td>500A</td>
<td>500A</td>
</tr>
<tr>
<td>Eaton 9395P-600/225</td>
<td>80</td>
<td>600A</td>
<td>600A</td>
<td>600A</td>
<td>600A</td>
</tr>
<tr>
<td>Eaton 9395P-600/200</td>
<td>100</td>
<td>350A</td>
<td>350A</td>
<td>400A</td>
<td>400A</td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>450A</td>
<td>500A</td>
<td>500A</td>
<td>500A</td>
</tr>
</tbody>
</table>

CAUTION

To reduce the risk of fire, connect only to a circuit provided with maximum input circuit breaker current ratings from Table 3-21 in accordance with the NEC, ANSI/NFPA 70.

ATTENTION!

Pour réduire le risque d’incendie, ne brancher qu’à un circuit avec le courant nominal maximal du disjoncteur d’entrée indiqué dans le tableau 3-21 (Table 3-21) 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 3-5 to Table 3-12. 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 3-22 lists the recommended rating for 480V, 415V, 400V, and 380V bypass, output, and MOB circuit breakers with 100% and 80% breaker rating. Bypass breakers are not applicable for IOM configurations.
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 3-23 and Table 3-24 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 3-23. Recommended DC Input Battery Disconnect Ratings 100% – Common Battery

<table>
<thead>
<tr>
<th>UPS Model</th>
<th>All Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/600</td>
<td>1600A</td>
</tr>
<tr>
<td>Eaton 9395P-600/550</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/500</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td>1200A</td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/275</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/250</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/225</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/200</td>
<td></td>
</tr>
<tr>
<td>See Note</td>
<td></td>
</tr>
</tbody>
</table>

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

### Table 3-24. Recommended DC Input Battery Disconnect Ratings 100% – Separate Battery

<table>
<thead>
<tr>
<th>UPS Model</th>
<th>All Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/600</td>
<td>800A</td>
</tr>
<tr>
<td>Eaton 9395P-600/300</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/550</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/500</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/450</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/400</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/275</td>
<td>700A</td>
</tr>
<tr>
<td>Eaton 9395P-600/250</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/225</td>
<td></td>
</tr>
<tr>
<td>Eaton 9395P-600/200</td>
<td></td>
</tr>
<tr>
<td>See Note</td>
<td></td>
</tr>
</tbody>
</table>

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

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

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 3-5 to Table 3-12.
- The 9395P-600 480V unit is designed for operation on a ground wire source of supply. There is no additional connection point for a neutral conductor. The output of this UPS will not directly support phase to neutral loads.
- MOBs with dual auxiliary contacts are to be provided by the customer. Table 3-22 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.

---

### ATTENTION!

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

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

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

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

### CAUTION

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

---

### ATTENTION!

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

---

### NOTE

For the following step, verify that the forklift or pallet jack is rated to handle the weight of the cabinet (see Table 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 forklift 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.

ATTENTION!

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

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

NOTE The ISBM and UPM sections are shipped with debris shields covering the ventilation grills on top of the sections (see Figure 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 3-10. Two UPM Configuration as Shipped on Pallet
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Chapter 4  Installation

4.1  Preliminary Installation Information

**WARNING**
Installation should be performed only by qualified personnel.

**WARNING**
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 10° 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° 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.

ATTENTION!

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

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

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

Si ces instructions ne sont pas suivies, des dommages au câblage et à son canal surviendront.
To remove the pallet and mechanically install the UPS:

1. If not already accomplished, use a forklift or pallet jack to move the ISBM and UPM sections to the installation area, or as close as possible, before unloading from the pallets. If possible, move each section using the pallet. Insert the forklift or pallet jack forks from the right side of the pallet (facing the cabinet), between the supports on the bottom of the pallet. If the sections must be moved using the section front or rear fork lift slots, see the caution statements at the beginning of this procedure.

2. Remove the three bolts securing the left side shipping bracket to the cabinet and three bolts securing the bracket to the pallet (see Figure 4-1). Remove the left side shipping bracket.

---

**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).

---

![Figure 4-1. Removing the ISBM Section Left Side Shipping Bracket](image-url)
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](image)

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. Repeat Steps 2 through 6 for the remaining cabinet.

8. 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

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 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 4-3 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 washer, or large terminal.

**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 2 UPM Section Debris Shields](image)

Ventilation Grill Debris Shields
Remove shields before operating system
Figure 4-5. ISBM and UPM Section Conduit and Wire Entry Locations

Top Entry Conduit Landing for AC Input and Output, and DC Input
(Remove panel to drill or punch conduit holes.)

Interface Entry Conduit Landings for TB1 through TB3 Wiring and X-Slot Connections
(Remove panels to drill or punch conduit holes.)

Bottom Entry Conduit Landing for AC Input and Output, and DC Input
(Remove panel to drill or punch conduit holes.)
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 3-15), 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 3-15), 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 3-15), 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 3-15), 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.

**ATTENTION!**


To install wiring to connections:

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 3-15), 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.


5. Using hardware from the external wiring terminal hardware kit (see Table 3-13), 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.

---

**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.
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 4-8 for wiring access.
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

<table>
<thead>
<tr>
<th>Terminal TB1</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>REPO NC</td>
<td>Input: Normally-closed dry contact used to activate UPS EPO from a remote switch.</td>
</tr>
<tr>
<td>2</td>
<td>REPO Return</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>REPO NO</td>
<td>Input: Normally-open dry contact used to activate UPS EPO from a remote switch.</td>
</tr>
<tr>
<td>4</td>
<td>REPO Return</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Battery Aux</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Battery Aux Common</td>
<td>Input: Normally-open contact used to indicate when UPS battery breaker is open or closed</td>
</tr>
<tr>
<td>7</td>
<td>48 Vdc Battery Shunt Trip +</td>
<td>Output: Contacts used to open battery breaker or disconnect.</td>
</tr>
<tr>
<td>8</td>
<td>48 Vdc Battery Shunt Trip –</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Output Contactor K3 NC Aux</td>
<td>Output: Normally-closed contact opens when output contactor closes.</td>
</tr>
<tr>
<td>10</td>
<td>Output Contactor K3 NC Aux Common</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Terminal TB3</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Building Alarm 1</td>
<td>Input: Programmable UPS alarm, activated by a remote dry contact closure.</td>
</tr>
<tr>
<td>2</td>
<td>Building Alarm 1 Return</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Building Alarm 2</td>
<td>Input: Programmable UPS alarm, activated by a remote dry contact closure.</td>
</tr>
<tr>
<td>4</td>
<td>Building Alarm 2 Return</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Building Alarm 3 Default: Charger Off</td>
<td>Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for charger off.</td>
</tr>
<tr>
<td>6</td>
<td>Building Alarm 3 Return</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Building Alarm 4 Default: On Generator</td>
<td>Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for on generator.</td>
</tr>
<tr>
<td>8</td>
<td>Building Alarm 4 Return</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Building Alarm 5 Return</td>
<td></td>
</tr>
</tbody>
</table>

NOTE “Return” indicates connection to electronics circuit ground. “Common” indicates connection to common side of isolated relay contact.
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 4-9 through Figure 4-14.

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

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

7. Reinstall the interface entry plate and install the conduit.

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

8. Route the shunt trip (optional) and battery aux wiring from the battery disconnects to the UPS cabinet. See Figure 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

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 4-9 and 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.

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.

3. Unfasten the front door latch and swing the door open (see Figure 4-1).

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 4-16. Remote EPO Switch Dimensions

Dimensions are in millimeters [inches].
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

<table>
<thead>
<tr>
<th>From REPO Station(s) Switch Contact Block (Either Block)</th>
<th>To Customer Interface Terminal Board TB1 in UPS Cabinet</th>
<th>Wire Size</th>
<th>Tightening Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 NO TB1-3</td>
<td>Twisted Wires (2) 14–22 AWG</td>
<td></td>
<td>7 lb in</td>
</tr>
<tr>
<td>4 NO TB1-4</td>
<td>(0.75–4.0 mm²)</td>
<td></td>
<td>(0.8 Nm)</td>
</tr>
</tbody>
</table>

Figure 4-17. REPO Switch

Contact Block (Back View, Faceplate Removed)
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.
Figure 4-19. Normally-Closed REPO Switch Wiring

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.

**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.
Distributed Bypass Installation Checklist

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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.

![Hot Sync CAN Bridge Card](image)

**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.
Table 5-1. Hot Sync CAN Bridge Card Interface Connections

<table>
<thead>
<tr>
<th>J3 Terminal</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alarm</td>
<td>Programmable UPS alarm. Activated by a remote dry contact closure.</td>
</tr>
<tr>
<td>2</td>
<td>Alarm Return</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Alarm Relay NC</td>
<td>Alarm Relay NC Normally-closed contact opens when UPS is on bypass.</td>
</tr>
<tr>
<td>4</td>
<td>Alarm Relay Com</td>
<td>Bypass contact return.</td>
</tr>
<tr>
<td>5</td>
<td>Alarm Relay NO</td>
<td>Normally-open contact closes when UPS is on bypass.</td>
</tr>
<tr>
<td>6</td>
<td>TX</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>TX</td>
<td>RMP II, RIM II, and SCM II connections.</td>
</tr>
<tr>
<td>8</td>
<td>CAN L</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Can H</td>
<td>CAN input for parallel operation.</td>
</tr>
<tr>
<td>10</td>
<td>Shield</td>
<td></td>
</tr>
</tbody>
</table>
5.2 Installing Distributed Bypass Control Wiring

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 on page 4-15). 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 4-1 through Figure 4-9.

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.

12. Reinstall the top internal safety shield panel and secure with the retained hardware.

13. Close the door and secure the latch.

**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.

**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.
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 MOBs

Table 5-2. CAN Bridge Card Wiring Terminations

<table>
<thead>
<tr>
<th>From UPS 1 CAN Bridge Card</th>
<th>To UPS 2 CAN Bridge Card</th>
<th>To UPS 3 CAN Bridge Card (If Installed)</th>
<th>To UPS 4 CAN Bridge Card (If Installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3–9 (H)</td>
<td>J3–9 (H)</td>
<td>J3–9 (H)</td>
<td>J3–9 (H)</td>
</tr>
<tr>
<td>J3–10 (Shield)</td>
<td>J3–10 (Shield)</td>
<td>J3–10 (Shield)</td>
<td>J3–10 (Shield)</td>
</tr>
</tbody>
</table>
**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**

<table>
<thead>
<tr>
<th>From UPS 1</th>
<th>To UPS 2</th>
<th>To UPS 3 (If Installed)</th>
<th>To UPS 4 (If Installed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB2–1 (Pull Chain)</td>
<td>TB2–1 (Pull Chain)</td>
<td>TB2–1 (Pull Chain)</td>
<td>TB2–1 (Pull Chain)</td>
</tr>
<tr>
<td>TB2–2 (Pull Chain Common)</td>
<td>TB2–2 (Pull Chain Common)</td>
<td>TB2–2 (Pull Chain Common)</td>
<td>TB2–2 (Pull Chain Common)</td>
</tr>
</tbody>
</table>
Figure 5-6. Distributed Bypass Pull-Chain Wiring with MOBs

NOTE  NC and NO designations on MOB AUX contacts are defined with breaker in OFF (open) position.
NOTE  If MOB contacts have pigtail leads, use the same wire gauge to connect to UPS and use the correct crimp connections for the wire gauge.
NOTE  External CAN connections between UPS cabinets require shielded twisted pair wire.
NOTE  Use twisted pair wiring between the UPS and MOB AUX contacts.
NOTE  Always confirm contact operation prior to wiring.
### Table 5-4. Pull-Chain Wiring Terminations with MOBs

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS 1 CAN Bridge Card J3–1 (Alarm)</td>
<td>MOB 1 Aux 1 NC</td>
<td>MOB Open Alarm</td>
</tr>
<tr>
<td>UPS 1 CAN Bridge Card J3–2 (Alarm Return)</td>
<td>MOB 1 Aux 1 Com</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 1 TB2–1 (Pull Chain)</td>
<td>MOB 1 Aux 2 NO</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 1 TB2–2 (Pull Chain Common)</td>
<td>UPS 2 TB2–2 (Pull Chain Common)</td>
<td>Pull Chain Common</td>
</tr>
<tr>
<td>UPS 2 CAN Bridge Card J3–1 (Alarm)</td>
<td>MOB 2 Aux 1 NC</td>
<td>MOB Open Alarm</td>
</tr>
<tr>
<td>UPS 2 CAN Bridge Card J3–2 (Alarm Return)</td>
<td>MOB 2 Aux 1 Com</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 2 TB2–1 (Pull Chain)</td>
<td>MOB 2 Aux 2 NO</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 2 TB2–2 (Pull Chain Common)</td>
<td>UPS 3 TB2–2 (Pull Chain Common)</td>
<td>Pull Chain Common</td>
</tr>
<tr>
<td>UPS 3 CAN Bridge Card J3–1 (Alarm)</td>
<td>MOB 3 Aux 1 NC</td>
<td>MOB Open Alarm</td>
</tr>
<tr>
<td>UPS 3 CAN Bridge Card J3–2 (Alarm Return)</td>
<td>MOB 3 Aux 1 Com</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 3 TB2–1 (Pull Chain)</td>
<td>MOB 3 Aux 2 NO</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 3 TB2–2 (Pull Chain Common)</td>
<td>UPS 4 TB2–2 (Pull Chain Common)</td>
<td>Pull Chain Common</td>
</tr>
<tr>
<td>UPS 4 CAN Bridge Card J3–1 (Alarm)</td>
<td>MOB 4 Aux 1 NC</td>
<td>MOB Open Alarm</td>
</tr>
<tr>
<td>UPS 4 CAN Bridge Card J3–2 (Alarm Return)</td>
<td>MOB 4 Aux 1 Com</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>UPS 4 TB2–1 (Pull Chain)</td>
<td>MOB 4 Aux 2 NO</td>
<td>Pull Chain</td>
</tr>
<tr>
<td>MOB 1 Aux 2 Com</td>
<td>MOB 2 Aux 2 Com</td>
<td>Pull Chain Common</td>
</tr>
<tr>
<td>MOB 2 Aux 2 Com</td>
<td>MOB 3 Aux 2 Com</td>
<td>Pull Chain Common</td>
</tr>
<tr>
<td>MOB 3 Aux 2 Com</td>
<td>MOB 4 Aux 2 Com</td>
<td>Pull Chain Common</td>
</tr>
</tbody>
</table>

**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

![Diagram of Terminal Locations](image-url)

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

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

<table>
<thead>
<tr>
<th>From UPS CAN Card</th>
<th>To RMP II, RIM II, or SCM II</th>
<th>Tightening Torque Nm (lb in)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>J3–6 (TX)</td>
<td>TB1–5 (RDX*)</td>
<td>0.9 (8)</td>
<td>Use twisted pair</td>
</tr>
<tr>
<td>J3–7 (TX)</td>
<td>TB1–4 (RDX)</td>
<td>0.9 (8)</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>TB3 Line</td>
<td>0.9 (8)</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>TB3 Neutral</td>
<td>0.9 (8)</td>
<td></td>
</tr>
<tr>
<td>N/A</td>
<td>Ground Terminal</td>
<td>2.7 (24) Maximum</td>
<td></td>
</tr>
</tbody>
</table>

**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.
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.

3. Securely mount the RIM II at the desired location. See Figure 5-13 for mounting hole locations.

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.

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.

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

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

**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.

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

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

- 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.
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.
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.

**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.
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.
Flush Mount using #10 Pan Head Screws. (Mount with vent holes facing up.)

Surface Mount using #10 Pan Head Screws for Hanging. (Mount with vent holes facing up.)

Dimensions are in millimeters [inches].

Figure 5-12. Remote Monitor Panel II Dimensions
Knockouts Provided on Five Surfaces

Flush Mount using #10 Pan Head Screws. (Mount with vent holes facing up.)

Surface Mount using #10 Pan Head Screws for Hanging. (Mount with vent holes facing up.)

Dimensions are in millimeters [inches].

**Figure 5-13. Relay Interface Module II Dimensions**
Figure 5-14. Supervisory Contact Module II Dimensions

Knockouts Provided on Five Surfaces

Dimensions are in millimeters [inches].

- Surface Mount using #10 Pan Head Screws for Hanging. (Mount with vent holes facing up.)
- Flush Mount using #10 Pan Head Screws. (Mount with vent holes facing up.)
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Section II

Operation
Chapter 6  Understanding UPS Operation

6.1 UPS System Overview

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

The basic system consists of a rectifier, battery converter, inverter, monitoring/operation control panel, integrated communication server, and digital signal processor (DSP) logic. Figure 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.

![Figure 6-1. Main Elements of the UPS System](image)

**NOTE** On a UPS configured as an Input Output Module (IOM), the bypass input, static switch, and backfeed protection contactor (K5) are not present.
The emergency bypass consists of a continuous static switch, and a backfeed protection contactor K5. The bypass breaker (if installed) is located in parallel with the static switch. The backfeed protection contactor is located in series with the static switch. The static switch is armed and ready during normal operation.

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

6.2 Single UPS

A single UPS operates independently to support an applied load from the inverter, providing conditioned and uninterruptible AC power to the critical load from the output of the module. During an outage, the inverter continues to operate, supporting power to the load from the battery supply. If the unit requires service, applied loads are transferred to the internal bypass 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 9395P-600 UPS supports a critical load in five different modes of operation:

- 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.

**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.

**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.

**NOTE** Bypass mode is not available on a UPS configured as an IOM.
6.2.3 Energy Saver System (ESS) Mode

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

When the UPS is operating in ESS mode, 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

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

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

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

VMMS limits the maximum power available from a UPM when in VMMS mode. The default setting is 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.

**ATTENTION!**

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

The static switch, being an electronically-controlled device, can be turned on immediately to pick up the load from the inverter while 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.
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.

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

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

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

#### Table 6-1. Oneline Configurations

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<td>Eaton 9395P-600/400</td>
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<td>Simplified Dual-Feed UPS with Maintenance Bypass Panel</td>
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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 the applicable voltage in Tables 3-5, 3-7, 3-9, 3-11.
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 the applicable voltage in Tables 3-6, 3-8, 3-10, 3-12.
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 the applicable voltage in Tables 3-5, 3-7, 3-9, 3-11.
![Diagram of UPS operation](image)

**NOTE** Callout letters **A**, **B**, **C**, and **D** map to the applicable voltage in Tables 3-6, 3-8, 3-10, 3-12.

**Figure 6-9. Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch**
NOTE Callout letters A, B, C, and D map to the applicable voltage in Tables 3-5, 3-7, 3-9, 3-11.

Figure 6-10. Two UPM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM
Figure 6-11. Two UPM, Common Rectifier Feed, Separate Battery, Dual-Feed Configuration, Continuous Static Switch, FI-UPM

NOTE: Callout letters A, B, C, and D map to the applicable voltage in Tables 3-6, 3-8, 3-10, 3-12.
Figure 6-12. Two UPM, Common Rectifier Feed, Common Battery, IOM Configuration

NOTE: Callout letters A, B, C, and D map to the applicable voltage in Tables 3-5, 3-7, 3-9, 3-11.
NOTE Callout letters A, C, and D map to the applicable voltage in Tables 3-6, 3-8, 3-10, 3-12.

Figure 6-13. Two UPM, Common Rectifier Feed, Separate Battery, IOM Configuration
Figure 6-14. Three UPM Common Rectifier Feed, Common Battery, IOM Configuration

NOTE Callout letters A, B, C, and D map to the applicable voltage in Tables 3-5, 3-7, 3-9, 3-11.
Figure 6-15. Three UPM Common Rectifier Feed, Separate Battery, IOM Configuration

NOTE Callout letters A, B, C, and D map to the applicable voltage in Tables 3-6, 3-8, 3-10, 3-12.
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 6-16. Simplified Dual-Feed UPS with Maintenance Bypass Panel
6.4 Multiple UPS Distributed Bypass System

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

The output of the system is normally supplied by Uninterruptible Power Modules (UPMs) contained in each UPS. Multiple UPMs are connected with their outputs in parallel (tied together) to provide a load level greater than the rating of one UPM, 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 9395P-600 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.

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 6-17. Path of Current through the UPSs in Online Mode - Distributed Bypass](image-url)
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 6-18 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 6-18. Path of Current through the UPSs in Bypass Mode - Distributed Bypass](image-url)
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 6-19 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.
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 Oneline Configurations

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

Table 6-2. Multiple UPS Distributed Bypass System Oneline Configurations

<table>
<thead>
<tr>
<th>Oneline Drawing</th>
<th>UPS Model</th>
<th>System Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 6-20 on page 28</td>
<td>Eaton 9395P-600/600, Eaton 9395P-600/550, Eaton 9395P-600/500, Eaton 9395P-600/450, Eaton 9395P-600/400, Eaton 9395P-600/300, Eaton 9395P-600/275, Eaton 9395P-600/250, Eaton 9395P-600/225, Eaton 9395P-600/200</td>
<td>Multiple UPS – Distributed Bypass, Continuous Static Switch, 1+1 and 2+0 Configurations</td>
</tr>
<tr>
<td>Figure 6-21 on page 29</td>
<td>Eaton 9395P-600/600, Eaton 9395P-600/550, Eaton 9395P-600/500, Eaton 9395P-600/450, Eaton 9395P-600/400, Eaton 9395P-600/300, Eaton 9395P-600/275, Eaton 9395P-600/250, Eaton 9395P-600/225, Eaton 9395P-600/200</td>
<td>Multiple UPS – Distributed Bypass, Continuous Static Switch, 2+1 and 3+0 Configurations</td>
</tr>
<tr>
<td>Figure 6-22 on page 30</td>
<td>Eaton 9395P-600/600, Eaton 9395P-600/550, Eaton 9395P-600/500, Eaton 9395P-600/450, Eaton 9395P-600/400, Eaton 9395P-600/300, Eaton 9395P-600/275, Eaton 9395P-600/250, Eaton 9395P-600/225, Eaton 9395P-600/200</td>
<td>Multiple UPS – Distributed Bypass, Continuous Static Switch, 3+1 and 4+0 Configurations</td>
</tr>
</tbody>
</table>
Figure 6-20. Typical Distributed Bypass System - Continuous Static Switch, 1+1 and 2+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.
Figure 6-21. Typical Distributed Bypass System - Continuous Static Switch, 2+1 and 3+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 UPS, but represents each UPS in the distributed bypass system.
Figure 6-22. Typical Distributed Bypass System - 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.
Chapter 7  UPS Operating Instructions

This section describes how to operate the UPS.

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. 600 kW/kVA UPS Controls](image)

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. For a description of the UPS control panel functions, see paragraph 7.3.

7.3 Using the Color Touchscreen Control Panel
The following sections describe the UPS control panel and how to monitor and control UPS operation.

Figure 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**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lit Steady</td>
<td>The UPS is in Online mode, operating normally. The power module is supplying power to the critical load.</td>
</tr>
<tr>
<td>Green</td>
<td>Lit Steady</td>
<td>The UPS is in Battery mode. Because Battery mode is a normal condition of the UPS, the Online indicator also remains illuminated.</td>
</tr>
<tr>
<td>Yellow</td>
<td>Lit Steady</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>Lit Steady</td>
<td>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.</td>
</tr>
<tr>
<td>Red</td>
<td>Lit Flashing</td>
<td>There is a new UPS alarm condition. The indicator flashes until acknowledged by pressing anywhere on the control panel once.</td>
</tr>
</tbody>
</table>

### 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**

<table>
<thead>
<tr>
<th>Level</th>
<th>Name</th>
<th>Passcode</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>USER</td>
<td>NONE</td>
<td>USER</td>
</tr>
<tr>
<td>1</td>
<td>CONTROL</td>
<td>1111</td>
<td>USER + CONTROL</td>
</tr>
<tr>
<td>2</td>
<td>CONFIGURATION</td>
<td>0101</td>
<td>USER + CONTROL + CONFIGURATION</td>
</tr>
<tr>
<td>3</td>
<td>SERVICE</td>
<td>Service Only</td>
<td>USER + CONTROL + CONFIGURATION + SERVICE</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Menu Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOME</td>
<td>Displays the system status both graphically and within the info bar.</td>
</tr>
<tr>
<td>METERS</td>
<td>Displays performance meters for the system or critical load.</td>
</tr>
<tr>
<td>CONTROLS</td>
<td>Allows access to various system performance control screens.</td>
</tr>
<tr>
<td>POWER MAPS</td>
<td>Allows operator to observe system power flow.</td>
</tr>
<tr>
<td>LOGS</td>
<td>Allows access to system information logs.</td>
</tr>
<tr>
<td>STATISTICS</td>
<td>Allows access to see system specific operation values.</td>
</tr>
<tr>
<td>SETTINGS</td>
<td>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.</td>
</tr>
</tbody>
</table>

NOTE

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

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](image)

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)](image)
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.
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.

![Input Meters Screen](image)

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

![Bypass Meters Screen](image)
The Output Meters Screen shown in Figure 7-15 displays values pertaining to the system output.

![Output Meters Screen](image)

### Figure 7-15. Output Meters Screen

<table>
<thead>
<tr>
<th>Phase</th>
<th>Output Load KVA</th>
<th>Available KVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>46.0kVA</td>
<td>220.0kVA</td>
</tr>
<tr>
<td>B</td>
<td>45.7kVA</td>
<td>229.9kVA</td>
</tr>
<tr>
<td>C</td>
<td>50.3kVA</td>
<td>224.1kVA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>141.4kVA</strong></td>
<td><strong>683.8kVA</strong></td>
</tr>
</tbody>
</table>
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.

![Image of Input Meters Detail Screen]

**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.

![Image of Select Source Screen]

**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 7-20 shows the Battery Log Detail screen.

Figure 7-21 shows the 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](image)

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](image)
### 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.

![System Status Screen](image)

**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.

![Module Controls Screen](image)

**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.

![Configuration Options Screen](image)

**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.

![Energy Advantage Architecture (EAA) Screen](image)

**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.

![Statistics Basic Screen](image)

**Figure 7-35. Statistics Basic Screen**

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Online</th>
<th>On Bypass</th>
<th>On Battery</th>
</tr>
</thead>
<tbody>
<tr>
<td>This Month</td>
<td>0.4 Hours</td>
<td>15.3 Hours</td>
<td>0.2 Hours</td>
</tr>
<tr>
<td>Last Month</td>
<td>0.0 Hours</td>
<td>0.0 Hours</td>
<td>0.0 Hours</td>
</tr>
<tr>
<td>Since Reset</td>
<td>0.4 Hours</td>
<td>15.3 Hours</td>
<td>0.2 Hours</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Online ESS</th>
<th>Online VMMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>This Month</td>
<td>74.0 Hours</td>
<td>0.0 Hours</td>
</tr>
<tr>
<td>Last Month</td>
<td>0.0 Hours</td>
<td>0.0 Hours</td>
</tr>
<tr>
<td>Since Reset</td>
<td>74.0 Hours</td>
<td>0.0 Hours</td>
</tr>
</tbody>
</table>

**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](image)

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](image)
7.3.20 System Overview Screen

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

![System Overview Screen](image)

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.

---

**ATTENTION!**

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

---

**NOTE**

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

---

To use the 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.
ATTENTION!

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

2. To deactivate the REPO switch in preparation for restarting the UPS, insert the supplied key and rotate clockwise until the red pushbutton releases (see Figure 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
7.5 **Multiple UPS Distributed Bypass Operation**

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

### 7.5.1 Starting the Distributed Bypass System in Online Mode

To start the distributed bypass system:

1. Unfasten the front door latches and swing the doors open on all of the UPSs.
2. If the UPSs contain input breakers (CB1), verify that all input breakers are open.
3. Close all Module Output Breakers (MOBs).
4. Close all UPS input feeder circuit breakers.
5. Close all UPS Bypass input feeder circuit breakers.
6. If the UPSs contain input breakers (CB1), close all input breakers.
7. Close the doors and secure the latches.
8. Observe the UPS control panel displays becoming active, indicating logic power.
9. On any UPS, 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).
10. On the System Status screen, verify the UPS status is OK and the UPM status is **OFFLINE**.
11. Close all battery breakers.
12. Verify no alarms are active on the Events Log screen.
13. On the System Status screen, select the UPS Controls command.
14. Press the CONTROLS pushbutton on the System Status menu bar. The UPS Control Command screen is displayed.
15. 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 from all UPSs, until the inverter turns on and the UPSs transfer to Online mode. The status indicator on the UPS control panel indicates the UPS is in Bypass mode. If Auto Bypass is not enabled, the UPS outputs remain off until the UPSs turn on the inverter and close the inverter output contactors.
16. The UPS START UP screen is displayed.
   - 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.
17. To activate, enable, or disable any of the UPS operational modes, follow the online screen prompts.

---

**NOTE**

- A Field Installed UPM (FI-UPM) is always designated as UPM 4.
- To obtain any system information, follow the on screen prompts to get to the proper screen. The operator cannot inadvertently cause a system dump or disconnect unless they override a warning pop-up. Value or information screens DO NOT affect system operation.
7.5.2 Starting the Distributed Bypass System in Bypass Mode

If the inverter output of the distributed bypass system is not available and the critical load needs to be energized, start the distributed bypass system in bypass mode.

---

**CAUTION**

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

---

To start in bypass mode:

1. Unfasten the front door latches and swing the doors open on all of the UPSs.
2. If the UPSs contain input breakers (CB1), verify that all input breakers are open.
3. Close all Module Output Breakers (MOBs).
4. Close all UPS Bypass input feeder circuit breakers.
5. Close the doors and secure the latches.
6. Observe the UPS control panel displays becoming active, indicating logic power.
7. On any UPS, 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).
8. On the System Status screen, verify the UPS status is *OK* and the UPM status is *OFFLINE*.
9. Verify no alarms are active on the Events Log screen.
10. On the System Status screen, select the UPS Controls command.
11. Press the CONTROLS pushbutton on the System Status menu bar. The UPS Control Command screen is displayed.
12. On the UPS Control Command screen, select the Go To Bypass command.
13. Select YES when prompted to confirm the command.

The critical load is immediately supplied by the bypass source in Bypass mode.

The BYPASS status indicator is illuminated. The Bypass status indicates **ON**. The UPM status indicates **ON**.

---

7.5.3 Starting a Single UPM

To start a single UPM:

1. Unfasten the front door latch and swing the door open.
2. If the UPS contains input breaker CB1, verify that input breaker CB1 is open.
3. Close the UPS input feeder circuit breaker for only the UPS containing the UPM to be started.
4. Close the UPS Bypass input feeder circuit breaker for only the UPS containing the UPM to be started.
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 becoming active, indicating logic power.
8. Press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.
9. On the System Status screen, the UPS status should indicate SHUTDOWN and the UPM status should indicate OFFLINE.
10. Verify no alarms are active.
11. On the System Status screen, select the UPM command.

12. Press the CONTROLS pushbutton on the UPS Control Command menu bar. The UPM Control Command screen is displayed.

13. On the UPM Control Command screen, select UPM ON.

14. Press the SELECT pushbutton on the UPM Command menu bar.

15. Verify the following messages display sequentially on the UPM status line:
   
   DC STARTING, CHARGER OFF
   INVERTER STARTING
   INVERTER SYNCING
   READY

   The U0PM rectifier and inverter turn on.

16. To transfer the UPM to Online mode, press the CONTROLS pushbutton on the UPS Control Command menu bar. The UPM Control Command screen is displayed.

17. On the UPM Control Command screen, select UPM GO TO ONLINE.

18. Press the SELECT pushbutton on the UPM Command menu bar.

   The UPM transfers to Online mode. The UPM status indicates ONLINE.

**7.5.4 Single UPM Shutdown**

To shut down a single UPM:

1. Press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.

2. On the System Status screen, select the UPM Command.

3. Press the CONTROLS pushbutton on the UPS Control Command menu bar. The UPM Control Command screen is displayed.

4. On the UPM Control Command screen, select UPM OFF.

5. Press the SELECT pushbutton on the UPM Command menu bar.

   The UPM status indicates READY. The input, output, and battery contactors open, and the power module remains on. The remaining UPMs supply the critical load.

6. To turn off the power module, press the CONTROLS pushbutton on the UPS Control Command menu bar. The UPM Control Command screen is displayed.

7. On the UPM Control Command screen, select UPM OFF.

8. Press the SELECT pushbutton on the UPM Command menu bar.

   The UPM status indicates SHUTDOWN. The power module is turned off. The remaining UPMs continue to supply the critical load.

   Logic power remains on.

**7.5.5 Single UPM Restart**

To restart a single UPM from a shutdown state:

1. Press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.

2. On the System Status screen, select the UPM command.

3. Press the CONTROLS pushbutton on the System Status Command menu bar. The UPM Control Command screen is displayed.
4. On the UPM Control Command screen, select UPM ON.
5. Press the SELECT pushbutton on the UPM Command menu bar.
6. Verify the following messages display sequentially on the UPM status line:
   DC STARTING, CHARGER OFF
   INVERTER STARTING
   INVERTER SYNCING
   READY
   The UPM rectifier and inverter turn on.
7. To transfer the UPM to Online mode, press the CONTROLS pushbutton on the UPS Control Command menu bar. The UPM Control Command screen is displayed.
8. On the UPM Control Command screen, select UPM GO TO ONLINE.
9. Press the SELECT pushbutton on the UPM Command menu bar.
   The UPM transfers to Online mode. The UPM status indicates ONLINE.

7.5.6 Single UPS Shutdown using Load Off

To shut down a single UPS:

1. Open the MOB for the UPS being shut down.
2. On the UPS to shut down, press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.
3. On the System Status screen, select the BYPASS command.
4. Press the CONTROLS pushbutton on the System Status menu bar. The Bypass Control Command screen is displayed.
5. On the Bypass Control Command screen, select GO TO BYPASS.
6. Press the SELECT pushbutton on the Bypass Command menu bar.
   The UPS being shut down transfers to Bypass mode.
   The BYPASS status indicator is illuminated. The Bypass status indicates ON. The UPM status indicates READY. The power module remains on.
7. Perform the LOAD OFF procedure in paragraph 7.5.11 or paragraph 7.5.12 on the UPS being shut down.
   The input, output, battery, and bypass backfeed contactors open, and the power module is turned off on the UPS being shut down.
   Logic power remains on.
8. Verify the battery breaker or disconnect for the UPS being shut down is open. If not, open the breaker.

NOTE If the UPS contains an input breaker (CB1), DO NOT open the breaker unless no input feeder breaker is installed.
9. Open the input and bypass feeder circuit breakers for the UPS being shut down.  
The UPS is now completely shut down.  
External Communications Failure alarm is active on remaining online UPSs. This is an expected event and will clear upon UPS restart.

7.5.7 Single UPS Shutdown using UPM Shutdown

To shut down a single UPS:

1. Open the MOB for the UPS being shut down.
2. On the UPS being shut down, press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.
3. On the System Status screen, select the BYPASS command.
4. Press the CONTROLS pushbutton on the System Status menu bar. The Bypass Control Command screen is displayed.
5. On the Bypass Control Command screen, select GO TO BYPASS.
6. Press the SELECT pushbutton on the Bypass Command menu bar.
   The UPS being shut down transfer to Bypass mode.
   The BYPASS status indicator is illuminated. The Bypass status indicates ON. The UPM status indicates READY. The power module remains on.
7. On the System Status screen, select the UPM command.
8. Press the CONTROLS pushbutton on the System Status Command menu bar. The UPM 1 Control Command screen is displayed.
9. On the UPM 1 Control Command screen, select UPM OFF.
10. Press the SELECT pushbutton on the UPM 1 Command menu bar.
    The UPM status indicates SHUTDOWN. The input, output, and battery contactors open, and the power module is turned off.
    Logic power remains on.
11. If there are other UPMs in the UPS, they should be shut down in sequence. Repeat Steps 7 through 10 until all other UPMs are shut down.
12. Perform the LOAD OFF procedure in paragraph 7.5.11 or paragraph 7.5.12 on the UPS being shut down.
    The input, output, battery, and bypass backfeed contactors open, and the power module is turned off on the UPS being shut down.
    Logic power remains on.
13. Verify the battery breaker or disconnect for the UPS being shut down is open. If not, open the breaker.

To shut down a single UPS, MOBs with dual auxiliary contacts must be installed and connected.
14. Open the input and bypass feeder circuit breakers for the UPS being shut down.
   The UPS is now completely shut down.
   External Communications Failure alarm is active on remaining online UPSs. This is an expected event and will clear upon UPS restart.

7.5.8 Single UPS Restart
To restart a single UPS from a shutdown state:
1. Close the MOB for the UPS being restarted.
2. Close UPS input and bypass feeder circuit breakers for the UPS being restarted.
3. Unfasten the front door latch and swing the door open on the UPS being restarted.
4. If input breaker (CB1) is installed on the UPS being restarted and is open, close the breaker.
5. Close the door and secure the latch.
6. On the UPS being restarted, observe the UPS control panel display becoming active, indicating logic
7. On the UPS being restarted, press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.
8. On the System Status screen, verify the UPS status is SHUTDOWN and the UPM status is SHUTDOWN.
9. Close the battery breaker for the UPS being restarted.
10. Verify no alarms are active on UPS being restarted.
11. Verify the External Communications Failure alarm has cleared and no other alarms are active on the online UPSs.
12. On the System Status screen, select the UPS command.
13. Press the CONTROLS pushbutton on the System Status menu bar. The UPS Control Command screen is displayed.
14. On the UPS Control Command screen, select GO TO ONLINE.
15. Press the SELECT pushbutton on the UPS Command menu bar.
16. Verify the following messages display sequentially on the UPS status line:

   NOTE If the UPS is starting on a bus with other online paralleled UPSs, the UPS will not go to bypass during startup. The UPS will start, sync to the other UPSs online, and go online.
DC STARTING, CHARGER OFF
INVERTER STARTING
INVERTER SYNCING
ONLINE, CHARGER ON

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

Once the inverter reaches full voltage, the UPS output contactor (K3) closes. Power is now supplied to the critical load in Online mode along with the other UPSs online. It takes approximately one minute for the UPS to achieve Online mode.

The Online status indicator is illuminated. The UPS status indicates ONLINE. The UPM status indicates ONLINE, CHARGER ON.

7.5.9 UPS and Critical Load Shutdown

To perform maintenance or service on the critical load, shut down UPS power to the load.

To shut down the UPS and the critical load:

1. Turn off all equipment that is being powered by the distributed bypass system.
2. Perform the LOAD OFF procedure in paragraph 7.5.11 or paragraph 7.5.12 on the UPS being shut down.
   The input, output, battery, and bypass backfeed contactors open, and the power module turns off.
   Logic power remains on.

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

3. If the UPSs contain input breakers (CB1), open all UPS input breakers.
4. Open the input and bypass feeder circuit breakers on all UPSs.

7.5.10 Charger Control

To turn on the battery charger:

1. Press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.
2. On the System Status screen, select the CHARGER command.
3. Press the CONTROLS pushbutton on the System Status menu bar. The Charger Control Command screen is displayed.
4. On the Charger Control Command screen, select CHARGER ON.
5. Press the SELECT pushbutton on the Charger Command menu bar.

To turn off the battery charger:

1. Press the CONTROLS pushbutton on the main menu bar. The System Status screen is displayed.
2. On the System Status screen, select the CHARGER command.
3. Press the CONTROLS pushbutton on the System Status menu bar. The Charger Control Command screen is displayed.
4. On the Charger Control Command screen, select CHARGER OFF.
5. Press the SELECT pushbutton on the Charger Command menu bar.
7.5.11 Using the UPS LOAD OFF Pushbutton

A UPS Load Off is initiated by either a command or a pushbutton. It controls the UPSs’ outputs by powering down the UPS and de-energizing the critical load. The UPSs (including Bypass) remain off until restarted.

This procedure initiates a UPS Load Off using the LOAD OFF pushbutton.

To use the LOAD OFF pushbutton:

1. Press the LOAD OFF pushbutton on the UPS to shut down.

   The Load Off screen is displayed, providing a choice to proceed or abort the shutdown.

   **CAUTION**

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

2. To shut down the UPS, press the LOAD OFF pushbutton from the Load Off menu bar, and hold for three seconds. To abort the shutdown, press CANCEL. When LOAD OFF pushbutton is pressed and held for three seconds, the input, output, battery, and bypass backfeed contactors open, and the power module is turned off on the UPS.

3. If another UPS is to be shut down, proceed to that UPS and repeat Steps 1 and 2.

   **CAUTION**

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

4. Restart the UPS after pressing the LOAD OFF pushbutton by following the procedure in paragraph 7.5.1 or 7.5.2.

   **WARNING**

   Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.
7.5.12 Using the UPS LOAD OFF Command

A UPS Load Off is initiated by either a command or a pushbutton. It controls the UPSs’ outputs by powering down the UPS and de-energizing the critical load. The UPSs (including Bypass) remain off until restarted.

This procedure initiates a UPS Load Off using the LOAD OFF command.

### NOTE

The UPS LOAD OFF controls each UPS independently and does not shut down the whole distributed bypass system unless all UPSs have been transferred to bypass. To immediately shut down the whole system, use the REPO switch (see paragraph 7.5.13).

---

### CAUTION

All power to the critical load is lost when a LOAD OFF command is issued in the following step. You should use this feature only when you want to de-energize the critical load.

To use the LOAD OFF command:

1. Press the CONTROLS pushbutton on the main menu bar of the UPS to be shut down. The System Status screen is displayed.

2. On the System Status screen, select either the UPS or the BYPASS command.

3. Press the CONTROLS pushbutton on the System Status menu bar. The UPS or Bypass Control Command screen is displayed.

4. On the Control Command screen, select LOAD OFF.

5. Press the SELECT pushbutton on the Command menu bar.

   The Load Off screen is displayed, providing a choice to proceed or abort the shutdown.

6. To shut down the UPS, press LOAD OFF from the Load Off menu bar, and hold for three seconds. To abort the shutdown, press CANCEL.

   When LOAD OFF is selected and held for three seconds, the input, output, battery, and bypass backfeed contactors open, and the power module is turned off on the UPS.

7. If another UPS is to be shut down, proceed to that UPS and repeat Steps 1 through 6.

---

### CAUTION

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

8. Restart the UPS by following the procedure in paragraph 7.5.1 or 7.5.2.

### WARNING

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.
7.5.13 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 UPSs immediately, without asking for verification.

The UPS, including Bypass, remains off until restarted.

**CAUTION**

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

**NOTE**

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

To use the REPO pushbutton switch:

1. Firmly push the red pushbutton until it locks into place. The switch latches into the activated state.
   
   The input, output, and bypass backfeed contactors open, the battery breaker or disconnect is tripped, and the power module is turned off immediately, without asking for verification on all UPSs.

**CAUTION**

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

2. To deactivate the REPO pushbutton switch in preparation for restarting the UPS, insert the supplied key and rotate clockwise until the red pushbutton releases. To remove the key, rotate the key back to the vertical position.

3. Restart the UPSs by following the procedure in paragraph 7.5.1 or 7.5.2.

**WARNING**

Power is present inside the UPS cabinet until the upstream input feeder circuit breaker is opened.
Chapter 8  Communication

This chapter describes the communication features of the Eaton Power Xpert 9395P-600 UPS system and provides information about connecting hardware. For terminal wiring information, see paragraph 3.2.4 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 9395P-600 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

PredictPulse Remote Monitoring and Management Service is a subscription monitoring and management service that collects and analyzes data from connected power infrastructure devices, providing Eaton with the insight needed to make recommendations and take action on your behalf. It is also powered by CA Technologies, bringing together the best in hardware and software. PredictPulse Service is included at no charge during the first year of 9395P-600 UPS operation (warranty period) along with the required connectivity parts. Beyond that, it may be purchased with Eaton Support Agreements or as a standalone subscription after the initial warranty expires. PredictPulse may also be subscribed to for free as part of a 90-day trial period. PredictPulse availability and first year bundled offers may vary by market. For more information, visit www.eaton.com/predictpulse.

8.2.1 PredictPulse Features

PredictPulse provides proactive monitoring, an online dashboard, mobile app with alarm status information and a monthly report detailing the ongoing health of your 9395P-600 UPS. Features include:

- Proactive monitoring that automatically analyzes the status of the 9395P-600 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 9395P-600 UPS system.

- Easy self-installation in minutes from a wizard installer or directly from the PowerXpert Gateway UPS card. PredictPulse uses standard Eaton connectivity hardware, requiring no special software (devices only need to be connected to a network).

- Ability to give an unlimited number of coworkers access to the real-time data and reports found in PredictPulse’s online dashboard and mobile app. This allows you to collaborate and Eaton to notify the most appropriate person responsible for a specific site or device.

- Real-time access to key performance information, alarms and trended health data about your 9395P-600 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 9395P-600 UPS system, based on the prior month’s data.

- A foundation based on CA Technologies’ leading Data Center Infrastructure Management (DCIM) software application. This enables powerful reporting, analytics, security and compatibility with hundreds of power infrastructure devices.

8.2.2 Installing PredictPulse

A quick start guide and self-installation wizard tool are available at www.eaton.com/predictpulse. The latest updates, installation tips and information on connecting PredictPulse are also available at that link. For installation support or questions about PredictPulse, contact predictpulsesupport@eaton.com.
PredictPulse relies on a Power Xpert Gateway UPS card installed with the UPS to send one-way outbound SMTP e-mails to Eaton, as well as an environmental monitoring probe (EMP) for battery temperature/humidity monitoring. PredictPulse is secure as Eaton never communicates through your firewall—it only listens for health data and alarm data—and uses industry-standard security protocols. By using a common e-mail transport mechanism, you do not have to open your network to proprietary or potentially unsecure protocols and transports. The PXGX connectivity card gathers information directly from the UPS and any external sensors that are attached, and transmits that data every 15 minutes (or 96 times per day), enabling real-time monitoring and advanced virtual preventive maintenance.

8.3 Power Management Software

Eaton’s software solutions, based on Web2.0 technology, include two applications: Intelligent Power Manager® for UPS management and monitoring, and Intelligent Power Protector®, which allows graceful shutdown of operating systems.

Eaton’s Software gives you all the tools you need to monitor and manage power devices on your network, even in a virtualized environment. This innovative software solution combines the most critical applications in ensuring system uptime and data integrity: not only power monitoring and management, but also graceful shutdown during an extended power outage.

Because it can manage redundant power systems, it is an ideal solution for the most critical IT environments with stringent requirements for power availability and reliability. Yet it is easy to use – the software scales flexibly from a simple single-computer, single-UPS configuration, to the most sophisticated highavailability environments.

The software’s mass configuration capabilities make installation and maintenance easy, which minimizes the effort required and benefits the bottom line. Eaton’s cost effective Intelligent Power Software manages up to ten devices at no charge, with licences for up to 100 devices – or even an unlimited number – also available.

Contact your Eaton Sales representative for additional information.

8.4 Building Alarm Monitoring

This standard feature lets you connect the UPS to your building alarms, such as smoke detectors or over-temperature alarms. The customer interface terminals for external connections are located inside the UPS. You should use twisted-pair wires for each alarm input and common.

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

8.5 General Purpose Relay Contact

One general purpose relay contact is provided as a standard feature on the UPS. The alarm contact is located inside the UPS on the customer interface terminal board.

You can use a normally-closed or normally-open contact. If the state of the contact changes from the state you specify as normal, a signal is issued. You can connect this contact to equipment at your facility (such as a light or an alarm bell) to let you know when an alarm is active on the UPS. This feature is useful if the UPS is located in a remote area where the UPS horn may not be heard immediately.

**CAUTION**

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

**ATTENTION!**

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

**Table 8-1. RMP II Status Indicators**

<table>
<thead>
<tr>
<th><strong>SYSTEM NORMAL</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The UPS is energized (either with utility power or battery backup) and is supplying conditioned power to the critical load.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>NO REDUNDANCY</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>This indicator applies only to parallel systems when one cabinet is not functioning.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ON GENERATOR</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The UPS input and bypass are being supplied by the power from the generator instead of from the utility power.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ON BYPASS</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>UPS ALARM</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The UPS system is issuing an alarm. Conditions that affect the current UPS mode are indicated by the indicators and horn on the UPS.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>ON BATTERY</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>BYPASS UNAVAILABLE</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The UPS system is in Online mode, but a bypass source is not within specification. A horn sounds after 30 seconds.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>SHUTDOWN IMMINENT</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>
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](image)

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

<table>
<thead>
<tr>
<th>Status</th>
<th>J1 through J4</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS AVAILABLE</td>
<td>Pins 1 and 12</td>
<td>Contacts are closed when the UPS is operating in Online mode or ready to supply the load.</td>
</tr>
<tr>
<td>UPS OFFLINE</td>
<td>Pins 3 and 13</td>
<td>Contacts are open when the UPS is offline. Contacts are closed when the UPS is operating in Online mode.</td>
</tr>
<tr>
<td>BATTERY WEAK</td>
<td>Pins 5 and 14</td>
<td>Contacts are closed when approximately two minutes of battery time is remaining before the critical load is lost.</td>
</tr>
<tr>
<td>UTILITY FAILURE</td>
<td>Pins 6 and 15</td>
<td>Contacts are closed when Utility Failure is detected.</td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Indication</th>
<th>TB2 Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSTEM NORMAL</td>
<td>TB2-1 through TB2-3</td>
</tr>
<tr>
<td>NO REDUNDANCY</td>
<td>TB2-4 through TB2-6</td>
</tr>
<tr>
<td>ON GENERATOR</td>
<td>TB2-7 through TB2-9</td>
</tr>
<tr>
<td>BYPASS NOT AVAILABLE</td>
<td>TB2-10 through TB2-12</td>
</tr>
<tr>
<td>ON BATTERY</td>
<td>TB2-13 through TB2-15</td>
</tr>
<tr>
<td>UPS ALARM</td>
<td>TB2-16 through TB2-18</td>
</tr>
<tr>
<td>ON BYPASS</td>
<td>TB2-19 through TB2-21</td>
</tr>
<tr>
<td>SHUTDOWN IMMINENT</td>
<td>TB2-22 through TB2-24</td>
</tr>
</tbody>
</table>
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Chapter 9  UPS Maintenance

The components inside the UPS cabinet are secured to a sturdy metal frame. All repairable parts and assemblies are located for easy removal, with very little disassembly. This design allows authorized service personnel to perform routine maintenance and servicing quickly.

You must schedule periodic performance checks of your UPS system to keep it running properly. Regular routine checks of operation and system parameters enable your system to function efficiently for many trouble-free years.

9.1  Important Safety Instructions

Remember that your UPS system is designed to supply power EVEN WHEN DISCONNECTED FROM THE UTILITY POWER. The UPS module interiors are unsafe until the DC power source is disconnected and the electrolytic capacitors are discharged. After disconnecting the utility power and the DC power, authorized service personnel should wait at least five minutes for capacitor bleedoff before attempting internal access to the UPS module.

WARNING

- Servicing and maintenance should be performed by qualified service personnel only.
- LETHAL VOLTAGE PRESENT. This unit should not be operated with the cabinet doors open or protective panels removed. Do not make any assumptions about the electrical state of any cabinet in the UPS system.

AVERTISSEMENT!

- L'installation et l'entretien ne doivent être effectués que par du personnel qualifié.
- PRÉSENCE DE TENSIONS MORTELLES. Ne pas faire fonctionner cette unité lorsque les portes de l’armoire sont ouvertes ou si les panneaux de protection ne sont pas en place. Ne jamais faire de suppositions au sujet de l’état électrique des armoires du système d’onduleur.

Because each battery string is an energy source in itself, opening the battery circuit breaker does not de-energize the voltage within the battery string. DO NOT ATTEMPT TO ACCESS ANY INTERNAL AREA OF THE BATTERY STRING YOURSELF. VOLTAGES ARE ALWAYS PRESENT IN THE BATTERY STRING. If you suspect that a battery string needs service, contact an .

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 Chapter 7, “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**

<table>
<thead>
<tr>
<th>Filter Location</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom Left ISBM Section Air Filters (Continuous Static Switch)</td>
<td>12” x 20” x 0.25”</td>
</tr>
<tr>
<td>Bottom Right ISBM Section Air Filters (Continuous Static Switch)</td>
<td>12” x 20” x 0.25”</td>
</tr>
<tr>
<td>Middle Right ISBM Section Air Filter (Continuous Static Switch)</td>
<td>20” x 6.3” x 0.25”</td>
</tr>
<tr>
<td>FI-UPM Section Air Filters</td>
<td>20” x 44” x 0.25”</td>
</tr>
</tbody>
</table>

   **CAUTION**

Verify washed filters are thoroughly dry before reinstalling.

   **ATTENTION!**

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

To remove and replace the filters:

1. 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.

2. 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.
3. If the UPS is a continuous static switch configuration, unfasten the front door latch and swing the door open.

4. Pull the foam filters over the screw heads on the cabinet mounted studs and remove the filters from the cabinet.

5. Push the washed or new foam filters over the screw heads on the cabinet mounted studs until seated against the cabinet.

6. Reinstall the UPM section front panels removed in Step a. and secure with the retained hardware.

7. Reinstall the ISBM section front panel removed in Step b. and secure with the retained hardware.

8. If opened, close the front door and secure the latch.

---

**Figure 9-1. ISBM and UPM Section Air Filter Locations - Continuous Static Switch**
9. 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.

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.

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

- **CAUTION**
  Verify washed filter is thoroughly dry before reinstalling.

- **ATTENTION!**
  Vérifier que les filtres sont bien secs avant de les réinstaller.

  c. Push the washed or new foam filter over the screw heads on the cabinet mounted studs until seated against the cabinet.

  d. Reinstall the FI-UPM front panel removed in Step a and secure with the retained hardware.
10. Record maintenance results and any corrective actions in a suitable log.

9.2.3 PERIODIC Maintenance

Periodic inspections of the UPS should be made to determine if components, wiring, and connections exhibit evidence of overheating. Particular attention should be given to bolted connections. Maintenance procedures should specify that the bolted connections be retorqued to values listed in this manual.

9.2.4 ANNUAL Maintenance

Annual preventive maintenance should be performed only by authorized service personnel familiar with maintenance and servicing of the UPS system. Contact an Eaton service representative for more information about service offerings.

9.2.5 BATTERY Maintenance

Contact an Eaton service representative for battery maintenance. Battery replacement and maintenance should be performed only by authorized service personnel.

9.3 Installing Batteries

**NOTE** There is no manual DC disconnect device within the UPS.

Install batteries in accordance with the battery and battery 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 brulure, 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.
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).
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.

<table>
<thead>
<tr>
<th>Models</th>
<th>Power Rating</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaton 9395P-600/600 (one, two, or three UPM)</td>
<td>600 kVA, 600 kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/550 (one, two, or three UPM)</td>
<td>600 kVA, 550 kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/500 (one, two, or three UPM)</td>
<td>600 kVA, 500 kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/450 (one, two, or three UPM)</td>
<td>600 kVA, 450 kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/400 (one, two, or three UPM)</td>
<td>600 kVA, 400 kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/300 (one, two, or three UPM)</td>
<td>600 kVA, 300 kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/275 (one, two, or three UPM)</td>
<td>600 kVA, 275kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/250 (one, two, or three UPM)</td>
<td>600 kVA, 250kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-600/225 (one, two, or three UPM)</td>
<td>600 kVA, 225kVA</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Eaton 9395P-275/200 (one, two, or three UPM)</td>
<td>600 kVA, 200 kVA</td>
<td>50/60 Hz</td>
</tr>
</tbody>
</table>

10.2  Specifications

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

10.2.1  UPS Input

<table>
<thead>
<tr>
<th>Operating Input Voltage</th>
<th>480 Vac, 415 Vac, 400 Vac, 380 Vac</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Input Frequency Range</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Operating Input Current</td>
<td>See Table 3-5 or Table 3-6 for 480V One/Two/Three UPM models</td>
</tr>
<tr>
<td></td>
<td>See Table 3-7 or Table 3-8 for 415V One/Two/Three UPM models</td>
</tr>
<tr>
<td></td>
<td>See Table 3-9 or Table 3-10 for 400V One/Two/Three UPM models</td>
</tr>
<tr>
<td></td>
<td>See Table 3-11 or Table 3-12 for 380V One/Two/Three UPM models.</td>
</tr>
<tr>
<td></td>
<td>Reduced for Generator Adjustable</td>
</tr>
<tr>
<td>Input Current Harmonic Content</td>
<td>3% THD at full load</td>
</tr>
<tr>
<td>Power Factor</td>
<td>Minimum 0.99 at full load</td>
</tr>
<tr>
<td>Line Surges</td>
<td>6 kV OC, 3 kA SC per ANSI 62.41 and IEC 801-4</td>
</tr>
<tr>
<td>Battery Voltage</td>
<td>480 Vdc</td>
</tr>
<tr>
<td>Battery Charging Capacity</td>
<td>Configurable per UPM at nominal line voltage: Up to 120A</td>
</tr>
<tr>
<td>Battery Shunt Trip</td>
<td>48 Vdc</td>
</tr>
</tbody>
</table>
### 10.2.2 UPS Output

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UPS Output Capacity</strong></td>
<td>100% rated current</td>
</tr>
<tr>
<td><strong>Output Voltage Regulation</strong></td>
<td>±1.5% (10% to 100% load)</td>
</tr>
<tr>
<td><strong>Output Voltage (Nominal +/-3%)</strong></td>
<td>480 Vac nominal, adjustable from 466 Vac to 494 Vac</td>
</tr>
<tr>
<td><strong>Output Voltage Harmonic Content</strong></td>
<td>1% maximum THD (linear load)</td>
</tr>
<tr>
<td><strong>Output Voltage Harmonic Content</strong></td>
<td>5% maximum THD (nonlinear load)</td>
</tr>
<tr>
<td><strong>Output Current</strong></td>
<td>See Table 3-5 or Table 3-6 for 480V One/Two/Three UPM models</td>
</tr>
<tr>
<td><strong>Output Current</strong></td>
<td>See Table 3-7 or Table 3-8 for 415V One/Two/Three UPM models</td>
</tr>
<tr>
<td><strong>Output Current</strong></td>
<td>See Table 3-9 or Table 3-10 for 400V One/Two/Three UPM models</td>
</tr>
<tr>
<td><strong>Output Current</strong></td>
<td>See Table 3-11 or Table 3-12 for 380V One/Two/Three UPM models.</td>
</tr>
<tr>
<td><strong>Output Voltage Balance</strong></td>
<td>2.5% for 100% maximum load imbalance (linear load)</td>
</tr>
<tr>
<td><strong>Output Voltage Phase Displacement</strong></td>
<td>±4° for 100% maximum load imbalance (linear load)</td>
</tr>
<tr>
<td><strong>Output Transients</strong></td>
<td>Meets Class 1 IEC 62040-3 (10% to 100% load)</td>
</tr>
<tr>
<td><strong>Frequency Regulation</strong></td>
<td>±0.1 Hz free running</td>
</tr>
<tr>
<td><strong>Synchronous to Bypass</strong></td>
<td>+10% to -10%</td>
</tr>
<tr>
<td><strong>Frequency Slew Rate</strong></td>
<td>.7 Hz per second maximum</td>
</tr>
<tr>
<td><strong>Load Compatibility</strong></td>
<td>0.9 pf Leading</td>
</tr>
<tr>
<td><strong>Load Compatibility</strong></td>
<td>0.7 pf Lagging</td>
</tr>
<tr>
<td><strong>Overload Capability</strong></td>
<td>110% for 10 minutes</td>
</tr>
<tr>
<td><strong>Overload Capability</strong></td>
<td>125% for 120 seconds</td>
</tr>
<tr>
<td><strong>Overload Capability</strong></td>
<td>150% for 15 seconds</td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
<td>The 125% and 150% overloads are based on the non-derated hardware capability of the UPS.</td>
</tr>
</tbody>
</table>

### 10.2.3 UPS Environmental

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating Temperature</strong></td>
<td>All ratings except 600 kW, 300 kW: 0 to 40°C (32 to 104°F) at elevation up to 1000m without derating. For 600 kW, 300 kW: 0 to 35°C at elevation up to 1000m without derating. The recommended operating temperature is 25°C (77°F).</td>
</tr>
<tr>
<td><strong>Operating Altitude</strong></td>
<td>Maximum 1000 m (3300 ft) at 40°C without derating</td>
</tr>
<tr>
<td><strong>Storage Temperature</strong></td>
<td>-25 to +60°C excluding batteries (prolonged storage above 40°C causes rapid battery self-discharge)</td>
</tr>
<tr>
<td><strong>Relative Humidity (operating and storage)</strong></td>
<td>5% to 95% maximum noncondensing</td>
</tr>
<tr>
<td><strong>Agency Markings</strong></td>
<td>83 dB at a 1m distance, A weighted for three UPM UPS</td>
</tr>
<tr>
<td><strong>Agency Markings</strong></td>
<td>81 dB at a 1m distance, A weighted for two UPM UPS</td>
</tr>
<tr>
<td><strong>Agency Markings</strong></td>
<td>78 dB at a 1m distance, A weighted for one UPM UPS</td>
</tr>
<tr>
<td><strong>EMI Emissions and Immunity</strong></td>
<td>Meets IEC 62040-2, category C3</td>
</tr>
<tr>
<td><strong>Electrostatic Discharge (ESD) Immunity</strong></td>
<td>Meets IEC 801-2 specifications. Withstands up to 25 kV pulse without damage and with no disturbance or adverse effect to the critical load.</td>
</tr>
</tbody>
</table>
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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