

Eaton® 9395XC UPS

1200kW/1200kVA, 1350kW/1350kVA or 1500kW/1500kVA
Installation and Operation Manual



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Revision 17

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

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

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Table of Contents

1 Introduction	1
1.1 UPS Standard Features	3
1.1.1 Installation Features	3
1.1.2 Control Panel	3
1.1.3 Customer Interface	4
1.1.4 Advanced Battery Management	4
1.1.5 Power Management Software	4
1.2 Options and Accessories	4
1.2.1 Integrated Battery Cabinets	4
1.2.2 Sync Control	4
1.2.3 Single-Feed Kit	4
1.2.4 Distributed Bypass System	4
1.2.5 Continuous Static Switch	5
1.2.6 Monitoring and Communication	5
1.3 Battery System	5
1.4 Using This Manual	5
1.5 Conventions Used in This Manual	5
1.6 Symbols, Controls, and Indicators	6
1.7 For More Information	6
1.8 Getting Help	6
1.9 Warranty	7
2 Safety Warnings	8
2.1 Safety Labels	11
3 UPS Installation Plan and Unpacking	15
3.1 Creating an Installation Plan	15
3.2 Preparing the Site	15
3.2.1 General Storage Requirements for UPS Equipment	15
3.2.2 Environmental and Installation Considerations	16
3.2.3 Installation Considerations	16
3.2.4 UPS System Power Wiring Preparation	28
3.2.5 UPS System Interface Wiring Preparation	40
3.2.6 Distributed Bypass Power Wiring Preparation	42
3.3 Inspecting and Unpacking the UPS Cabinets	42
4 UPS System Installation	47
4.1 Preliminary Installation Information	47
4.2 Unloading the UPS Cabinet from the Pallet	47
4.3 Installing and Connecting the UPS Sections	53
4.3.1 Preparing the UPS Sections	53

4.3.2 Electrically Connecting the UPS Sections	56
4.3.3 Mechanically Joining the UPS Sections	58
4.4 Battery System Installation	61
4.5 Distributed Bypass Tie Cabinet Installation	61
4.6 Installing UPS External and Battery Power Wiring	61
4.6.1 External Power Wiring Installation	62
4.6.2 Battery Power Wiring	65
4.7 Installing Interface Connections	68
4.7.1 TB1, TB2, and TB3 Connections (Other than TB1 Battery Interface Connections)	68
4.7.2 TB1 Battery Interface Connections	73
4.7.3 Minislot Connections	74
4.8 Installing a REPO Switch	75
4.9 Installing Options, Accessories, and Distributed Bypass Control Wiring	79
4.10 Initial Startup	79
4.11 Completing the Installation Checklist	79
5 Installing Options and Accessories	82
5.1 Installing Distributed Bypass Control Wiring	83
6 Understanding UPS Operation	89
6.1 UPS System Overview	89
6.2 Single UPS	89
6.2.1 Modes	90
6.2.2 Online Mode	90
6.2.3 Energy Saver System (ESS) Mode	91
6.2.4 Bypass Mode	92
6.2.5 Battery Mode	93
6.3 Single UPS System Online Configurations	94
6.4 Multiple UPS Distributed Bypass System	97
6.4.1 Multiple UPS Parallel System Modes	97
6.4.2 Online Mode Distributed Bypass	97
6.4.3 Bypass Mode – Distributed Bypass	98
6.4.4 Battery Mode Distributed Bypass	99
6.5 Multiple UPS Distributed Bypass System Online Configurations	101
7 UPS Operating Instructions	105
7.1 UPS Controls	105
7.1.1 Control Panel	106
7.2 Touchscreen Control Panel	106
7.3 Using the Touchscreen Control Panel	106
7.3.1 Touch Screen Controls	108
7.3.2 Using the Navigation Menu Buttons	110
7.3.3 Timeline Screen	112

Table of Contents

7.3.4 Meters Screen	116
7.3.5 Controls Screen.....	119
7.3.6 Settings Screen.....	122
7.4 UPS Operation using the Color Touchscreen Control Panel.....	124
7.4.1 Starting the UPS in Online Mode.....	124
7.4.2 Using the Remote Emergency Power-off Switch.....	125
7.5 Multiple UPS Distributed Bypass Operation	126
7.5.1 Starting the Distributed Bypass System in Online Mode.....	126
7.5.2 Starting the Distributed Bypass System in Bypass Mode.....	127
7.5.3 Single UPS Shutdown using Load Off	127
7.5.4 Single UPS Restart in a Parallel System (TBD).....	128
7.5.5 UPS and Critical Load Shutdown	129
7.5.6 Charger Control	129
7.5.7 Using the UPS LOAD OFF Command.....	130
7.5.8 Using the Remote Emergency Power-off Switch.....	131
8 Communication	133
8.1 Minislot Cards.....	133
8.2 PredictPulse	134
8.2.1 PredictPulse Features.....	134
8.2.2 Installing PredictPulse.....	135
8.3 Power Management Software.....	135
8.4 Building Alarm Monitoring	135
8.5 General Purpose Relay Contact	135
9 UPS Maintenance.....	137
9.1 Important Safety Instructions	137
9.2 Performing Preventive Maintenance.....	138
9.2.1 DAILY Maintenance	138
9.2.2 MONTHLY Maintenance	138
9.2.3 PERIODIC Maintenance.....	141
9.2.4 ANNUAL Maintenance.....	141
9.2.5 BATTERY Maintenance.....	141
9.3 Installing Batteries	141
9.3.1 Recycling the Used Battery or UPS.....	141
9.4 Maintenance Training	142
10 Product Specifications.....	143
10.1 Model Numbers	143
10.2 Specifications.....	143
10.2.1 UPS Input.....	143
10.2.2 UPS Output	144
10.2.3 UPS Environmental	144

List of Figures

Figure 1.	Eaton 9395XC UPS (LD).....	2
Figure 2.	Eaton 9395XC UPS (HD).....	3
Figure 3.	Deadfront Warning - UPS, PDU, RPP.....	11
Figure 4.	Deadfront Caution - UPS, PDU, RPP.....	12
Figure 5.	Deadfront Warning - Batt Cabinets, Internal UPS Batt.....	12
Figure 6.	Deadfront Warning - Unstable Batt Cabinets, Internal UPS Batt.....	12
Figure 7.	Caution - Replaceable Fuse.....	13
Figure 8.	Field Wiring - Compartment.....	13
Figure 9.	Deadfront Warning - Battery Communicator Module.....	13
Figure 10.	Deadfront Caution - Battery Communicator Module.....	14
Figure 11.	Deadfront Caution - Capacitor.....	14
Figure 12.	Deadfront Warning - Service.....	14
Figure 13.	UPS Cabinet Dimensions – HD (Front View).....	19
Figure 14.	UPS Cabinet Dimensions – LD (Front View).....	20
Figure 15.	Cabinet Dimensions (Right Side View).....	21
Figure 16.	ISBM/PM Section Dimensions – (Front View).....	22
Figure 17.	ISBM/PM Section Dimensions – (Top View).....	23
Figure 18.	UPS Bottom View.....	23
Figure 19.	I/O Section Dimensions – HD (Front View).....	24
Figure 20.	I/O Section Dimensions – (Top View).....	25
Figure 21.	UPS Center of Gravity – HD (Front View).....	26
Figure 22.	UPS Center of Gravity – LD (Front View).....	27
Figure 23.	Remote EPO Switch Dimensions.....	28
Figure 24.	UPS Cabinet as Shipped on Pallet (ISBM/PM Section).....	45
Figure 25.	UPS Cabinet as Shipped on Pallet (I/O Section).....	46
Figure 26.	Removing the ISBM/PM Section Left Side Shipping Bracket.....	49
Figure 27.	Removing the ISBM/PM Section Right Side Shipping Bracket.....	50
Figure 28.	Removing the I/O Section Left Side Shipping Bracket.....	51
Figure 29.	Removing the I/O Section Right Side Shipping Bracket.....	52
Figure 30.	UPS Forklift Locations.....	53
Figure 31.	I/O and ISBM/PM Electrical Access.....	55
Figure 32.	Section Bottom Entry Landing Conduit Plate.....	56
Figure 33.	UPS Intercabinet Power Terminal Locations.....	57
Figure 34.	I/O to ISBM/PM Section Joining.....	59
Figure 35.	I/O Section to ISBM /PM Section Joining Strap.....	60
Figure 36.	I/O and ISBM/PM in Position.....	61
Figure 37.	ISBM and ISBM/PM Section Debris Shields.....	62
Figure 38.	ISBM and ISBM/PM Section Conduit and Wire Entry Locations.....	63
Figure 39.	I/O Section Power Terminal Locations.....	64

List of Figures

Figure 40.	I/O Section Power Terminal Detail AA.....	65
Figure 41.	UPS Power Terminal Detail BB.....	67
Figure 42.	ISBM Section Interface Terminal Locations.....	69
Figure 43.	Minislot Wire Entry.....	70
Figure 44.	Typical Alarm Relay Connection.....	72
Figure 45.	Terminal Blocks TB1, TB2, and TB3 Connector Assignments.....	73
Figure 46.	Typical Battery Interface Connection.....	74
Figure 47.	Minislot Communication Bays.....	75
Figure 48.	REPO Switch.....	76
Figure 49.	Normally-Open REPO Switch Wiring.....	77
Figure 50.	Normally Closed REPO Switch Wiring.....	78
Figure 51.	Normally Closed and Normally Open REPO Switch Wiring.....	78
Figure 52.	External Interface Terminals Detail.....	83
Figure 53.	Distributed Bypass System CAN Interface Wiring.....	86
Figure 54.	Distributed Bypass Pull-Chain Wiring with MOBs.....	88
Figure 55.	Main Elements of the UPS System.....	89
Figure 56.	Path of Current Through the UPS in Online Mode.....	91
Figure 57.	Path of Current Through the UPS in Bypass Mode.....	92
Figure 58.	Path of Current Through the UPS in Battery Mode.....	93
Figure 59.	One PM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration.....	95
Figure 60.	Simplified Dual-Feed UPS with Maintenance Bypass Panel.....	96
Figure 61.	Path of Current through the UPSs in Online Mode – Distributed Bypass.....	98
Figure 62.	Path of Current through the UPSs in Bypass Mode – Distributed Bypass.....	99
Figure 63.	Path of Current through the UPSs in Battery Mode – Distributed Bypass.....	100
Figure 64.	Typical Distributed Bypass System - Continuous Static Switch, 1+1 and 2+0 Configurations.....	102
Figure 65.	Typical Distributed Bypass System -Continuous Static Switch, 2+1 and 3+0 Configurations.....	103
Figure 66.	Typical Distributed Bypass System -Continuous Static Switch, 3+1 and 4+0 Configurations.....	104
Figure 67.	UPS Controls.....	105
Figure 68.	UPS Control Panel (Typical).....	106
Figure 69.	Tap to Unlock screen.....	107
Figure 70.	Sign In or Password Request Screen.....	107
Figure 71.	Padlock Icon.....	108
Figure 72.	UPS Touchscreen Control Panel (Typical).....	108
Figure 73.	Parts of the Touch Screen.....	109
Figure 74.	Overview Screen.....	111
Figure 75.	Alarm Message.....	112
Figure 76.	Timeline Screen — Active Events.....	112
Figure 77.	Timeline Screen — No Events.....	113
Figure 78.	Timeline — Filter Events.....	114
Figure 79.	Timeline — Event Sort.....	114
Figure 80.	Timeline — Clear Alarms/Logs/Status.....	115

Figure 81.	Timeline Search	115
Figure 82.	Timeline Table	116
Figure 83.	Event Detail	116
Figure 84.	Meters Summary Screen	117
Figure 85.	Input Meters Screen	117
Figure 86.	Bypass Meters Screen	118
Figure 87.	Output Meters Screen	118
Figure 88.	Battery Meters Screen	119
Figure 89.	Battery Meters Screen — Battery Control.....	119
Figure 90.	Control Screen Status	120
Figure 91.	System Control Screen — Bypass	120
Figure 92.	System Control Screen — Online	120
Figure 93.	Command Confirmation Screen Example	121
Figure 94.	This UPS Control Screen.....	121
Figure 95.	ESS Controls Screen	122
Figure 96.	ABM Controls Screen	122
Figure 97.	Settings Screen	123
Figure 98.	REPO Operation	126
Figure 99.	Charger Control	130
Figure 100.	REPO Operation	132
Figure 101.	Optional Minislot Cards	133
Figure 102.	ISBM/PM Section Air Filter Locations	139
Figure 103.	ISBM/PM Section Air Filter Replacement	140

List of Tables

Table 1.	Storage Area Contaminants	16
Table 2.	UPS Cabinet Maximum Weights	17
Table 3.	UPS Cabinet Clearances	17
Table 4.	480V Air Conditioning and Ventilation Requirements During Full Load Operation	18
Table 5.	480V Input/Output Ratings and External Wiring Requirements	30
Table 6.	UPS Internal Power Cable Terminations	31
Table 7.	Supplied Inter-cabinet Wiring Terminal Hardware Kit	32
Table 8.	External Power Cable Terminations	33
Table 9.	Supplied External Power Wiring Terminal and Cabinet to Cabinet Hardware Kit	33
Table 10.	Recommended Installation Parts and Tools (Not Supplied by Eaton)	35
Table 11.	480V Power Cable Conduit Recommendations	36
Table 12.	Recommended Input Circuit Breaker Ratings (100% and 80% Load Rating)	38
Table 13.	Recommended Output Circuit Breaker Ratings (100% and 80% Load Rating)	39
Table 14.	Recommended Bypass, Output, and MOB Circuit Breaker Ratings (100% and 80% Load Rating)	40
Table 15.	Recommended DC Input Battery Disconnect Ratings	40
Table 16.	Supplied Interface Wire Connectors	42
Table 17.	TB1, TB2, and TB3 Interface Connections	71
Table 18.	REPO Wire Terminations	77
Table 19.	External Interface Terminal Connections	83
Table 20.	External Parallel CAN Connections-Wire Size	85
Table 21.	CAN Wire Terminations	85
Table 22.	External Pull Chain with MOB Connections-Wire Size	86
Table 23.	Pull-Chain Wiring Terminations with MOB	87
Table 24.	Online Configurations	94
Table 25.	Multiple UPS Distributed Bypass System Online Configurations	101
Table 26.	Security Levels and Functions	107
Table 27.	Parts of the Touchscreen	109
Table 28.	Navigation Menu Map	110
Table 29.	Touchscreen Icons	111
Table 30.	Settings Security Levels Access	123
Table 31.	IRC-MS Default Triggers	134
Table 32.	UPS Filter Sizes	138



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Chapter 1 Introduction

The Eaton® Power Xpert® 9395XC 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 Power Xpert 9395XC contains a section configured as an integrated system bypass module (ISBM) and power module (PM) rated for a maximum of 1500 kVA.

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

The Eaton 9395XC UPS 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 housed in a free-standing cabinet, divided into two sections to facilitate shipping:

- Integrated System Bypass Module (ISBM) and Power Module (PM)
- Input/Output Module (I/O)

Three configurations of the 9395XC UPS are included in this manual:

- 9395XC Low Density (LD)
- 9395XC Low Density (LD) with K5 Backfeed Contactor
- 9395XC High Density (HD)

**NOTE**

Access and connections to the LD and HD UPS are identical. Differences in dimensions or specifications are identified where applicable.

The UPS sections match in style and color and have dead front panels behind the door and front panels for hazardous voltage protection.

The Eaton 9395XC UPS configurations are shown in [Figure 1](#) and [Figure 2](#).

**NOTE**

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified in section [1.9 Warranty](#) 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.

Figure 1. Eaton 9395XC UPS (LD)

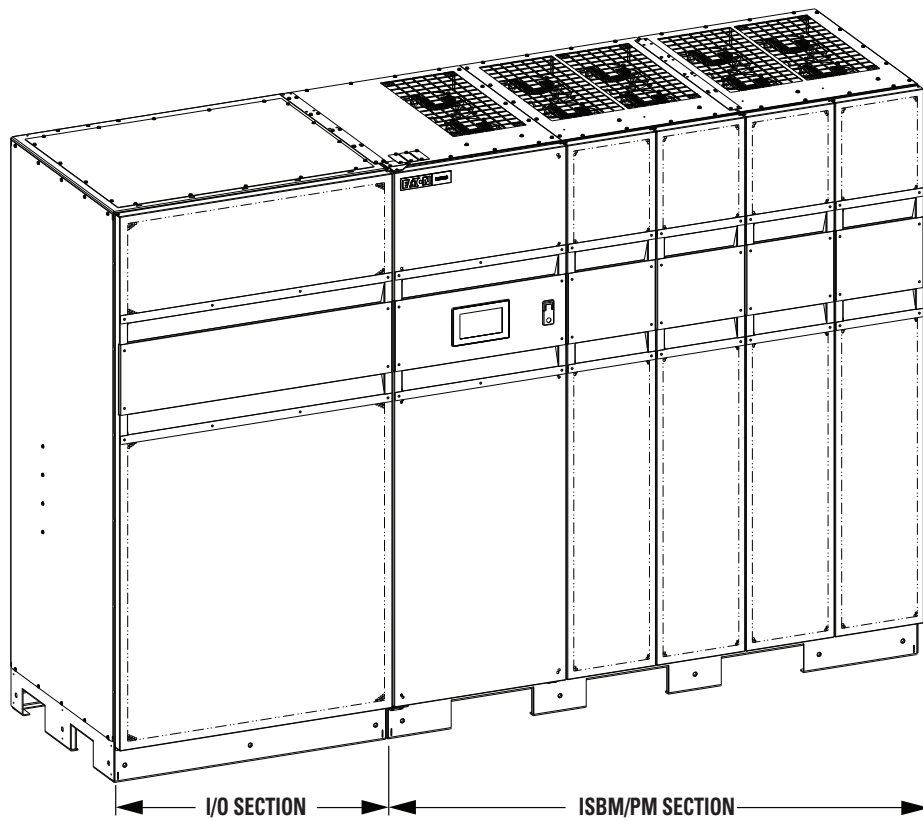
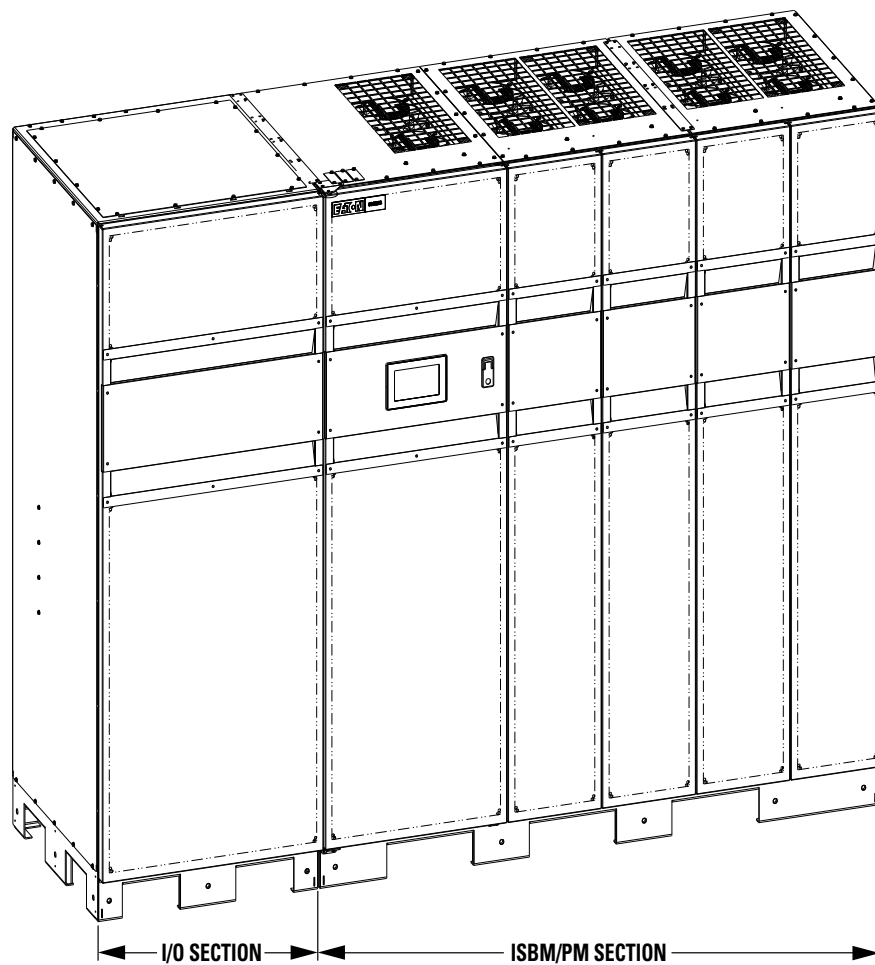


Figure 2. Eaton 9395XC UPS (HD)



1.1 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.

1.1.1 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 I/O cabinet with connections made to easily accessible terminals. Control wiring is routed between the cabinets and must be installed in accordance with Class 1 wiring methods.

1.1.2 Control Panel

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

1.1.3 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.
- **Minislot® Communication Bays.** Four communication bays are standard equipment. One to four optional Minislot® connectivity cards can be installed in the UPS module at any time. Minislot cards are quickly installed at the front of the UPS and are hot-pluggable. See [Chapter 8 Communication](#) for additional information.

1.1.4 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.

1.1.5 Power Management Software

Eaton's Intelligent Power® Software solution, based on Web 2.0 technology, includes two applications: Intelligent Power® Manager™ for UPS management and monitoring, and Intelligent Power® Protector™, which allows graceful shutdown of operating systems. See [Chapter 8 Communication](#) for additional information.

1.2 Options and Accessories

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

1.2.1 Integrated Battery Cabinets

Battery backup protection can be provided by equipping the UPS system with Eaton 9395XC 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.

1.2.2 Sync Control

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

1.2.3 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.

1.2.4 Distributed Bypass System

A distributed bypass UPS system with four UPSs 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.

The tie cabinet is provided by the customer and must contain Module Output Breakers (MOBs) with dual auxiliary contacts for control of the system.

1.2.5 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.

1.2.6 Monitoring and Communication

- **Minislot Cards** – Optional Minislot cards support several protocols, such as SNMP, SMTP, HTTP, Modbus®, and TCP/IP. See Chapter 7 Communication, for additional information on monitoring and communication features.
- **PredictPulse™ Remote Monitoring and Management Service**– PredictPulse is a subscription monitoring and management service from Eaton that collects and analyzes data from connected power infrastructure devices, providing us with the insight needed to make recommendations and take action on your behalf. It's also powered by CA Technologies, bringing together the best in hardware and software. Like a second set of eyes on your power infrastructure, PredictPulse provides 24/7 remote monitoring of alarms and system performance (load, temperature/humidity, battery health, energy savings and service level) to reduce downtime risk and expedite repairs. PredictPulse also shares real-time status and trend information via an online dashboard and smartphone mobile app (Apple and Android), giving subscribers insights about past and current performance, a list of all active alarms, and asset management data (i.e., battery date codes, last and next scheduled service dates, firmware versions). The service notifies customers of critical alarms, supports remote diagnostics, and facilitates smart dispatch of technicians. PredictPulse requires an Eaton® Industrial Gateway Card connectivity card in a Minislot 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.

1.3 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 or lithium-ion batteries. An external battery disconnect switch must be used.

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

See the battery related documents located in the system manual for battery cabinet specifics.

1.4 Using This Manual

This manual describes how to install and operate the Eaton 9395XC 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 Using the Remote Emergency Power-off Switch](#) and [7.4.2 Using the Remote Emergency Power-off Switch](#)).


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

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

1.5 Conventions Used in This Manual

This manual uses these type conventions:

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

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

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

1.6 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.

1.7 For More Information

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

1.8 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 Eaton Help Desk at:

United States: **1-800-843-9433**

Canada: **1-800-461-9166 ext 260**

All other countries: **Call your local service representative**

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

E-ESSDocumentation@eaton.com

1.9 Warranty

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

UPS Product Warranty

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

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

Chapter 2 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

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

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



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



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



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

**AVERTISSEMENT!**

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

CAUTION

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

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



ATTENTION!

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

CAUTION

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

- Lift and move the cabinet using only the front or rear forklift slots.
- Verify that the forklift forks are in a horizontal position before inserting them into the forklift slots. DO NOT angle fork tips upward.
- 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.

2.1 Safety Labels

Safety labels are attached to the UPS in areas that pose specific risks or hazards.

⚠ WARNING

Make sure that you read safety labels carefully before accessing components or performing maintenance. Death or injury may result.

Figure 3. Deadfront Warning - UPS, PDU, RPP

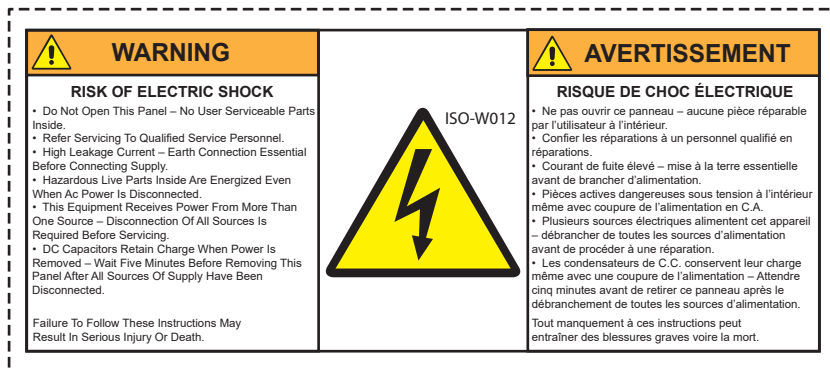


Figure 4. Deadfront Caution - UPS, PDU, RPP

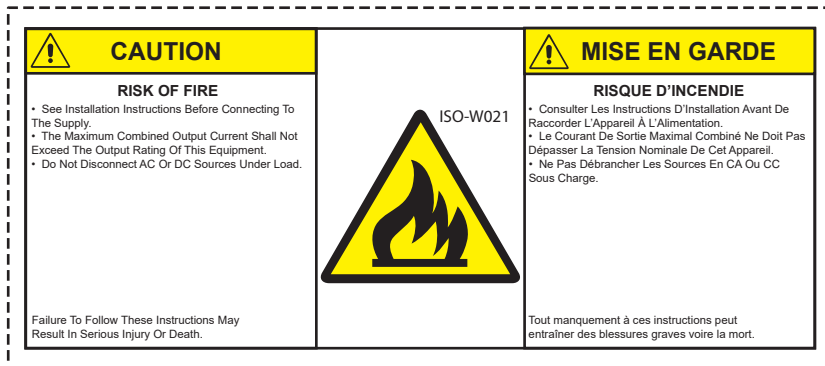


Figure 5. Deadfront Warning - Batt Cabinets, Internal UPS Batt

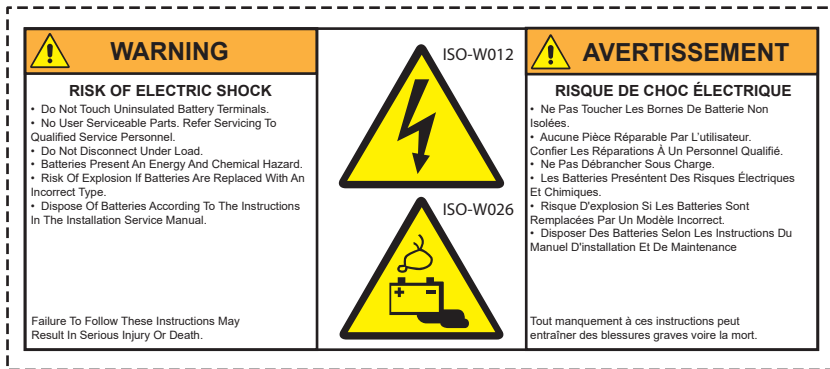


Figure 6. Deadfront Warning - Unstable Batt Cabinets, Internal UPS Batt

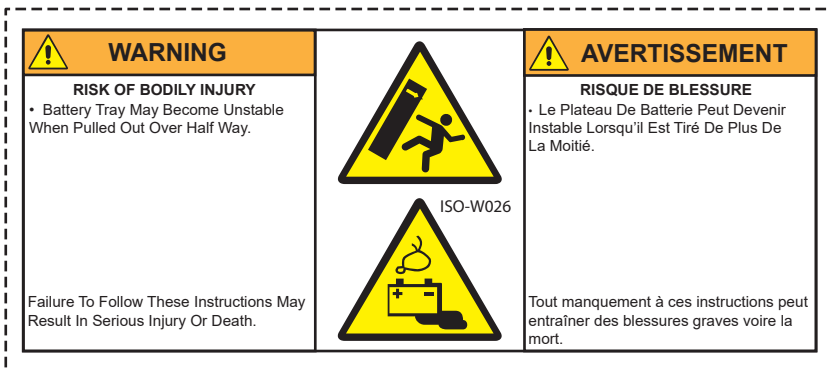


Figure 7. Caution - Replaceable Fuse





 CAUTION	 ISO-W012	 MISE EN GARDE
<p>RISK OF FIRE OR ELECTRIC SHOCK Only Replace Fuses With The Same Type And Rating.</p> <p>Failure To Follow These Instructions May Result In Serious Injury Or Death.</p>	 ISO-W012	<p>RISQUE D'INCENDIE OU DE CHOC ÉLECTRIQUE Remplacer Les Fusibles Uniquement Par Des Fusibles De Même Type Et Calibre.</p> <p>Tout manquement à ces instructions peut entraîner des blessures graves voire la mort.</p>

Figure 8. Field Wiring - Compartment



NOTICE	 ISO-W001	AVIS
<ul style="list-style-type: none"> • For Use In A Controlled Environment – Refer To Manual For Environmental Conditions. • Use Copper Conductors Only. • Refer To The Installation Manual For Pressure Terminal Torque Values. • Suitable For Computer Room Applications. 	 ISO-M002	<ul style="list-style-type: none"> • À Utiliser Au Sein D'un Environnement Contrôlé – Consulter Le Manuel Pour Connaître Les Conditions Environnementales. • Utiliser Uniquement Des Conducteurs En Cuivre. • Consulter Le Manuel D'installation Pour Connaître Les Valeurs De Couple Des Bornes À Pression. • Convient Aux Applications De Salle Informatique.

Figure 9. Deadfront Warning - Battery Communicator Module




 WARNING	 ISO-W012	 AVERTISSEMENT
<p>RISK OF ELECTRIC SHOCK</p> <ul style="list-style-type: none"> • Do Not Open This Panel – No User Serviceable Parts Inside. • Refer Servicing To Qualified Service Personnel. • High Leakage Current – Earth Connection Essential Before Connecting Supply. • Hazardous Live Parts Inside Are Energized Even When AC Power Is Disconnected. <p>Failure To Follow These Instructions May Result In Serious Injury Or Death.</p>		<p>RISQUE DE CHOC ÉLECTRIQUE</p> <ul style="list-style-type: none"> • Ne pas ouvrir ce panneau – aucune pièce réparable par l'utilisateur à l'intérieur. • Confier les réparations à un personnel qualifié en réparations. • Courant de fuite élevé – mise à la terre essentielle avant de brancher d'alimentation. • Pièces actives dangereuses sous tension à l'intérieur même avec coupure de l'alimentation en C.A. <p>Tout manquement à ces instructions peut entraîner des blessures graves voire la mort.</p>

Figure 10. Deadfront Caution - Battery Communicator Module

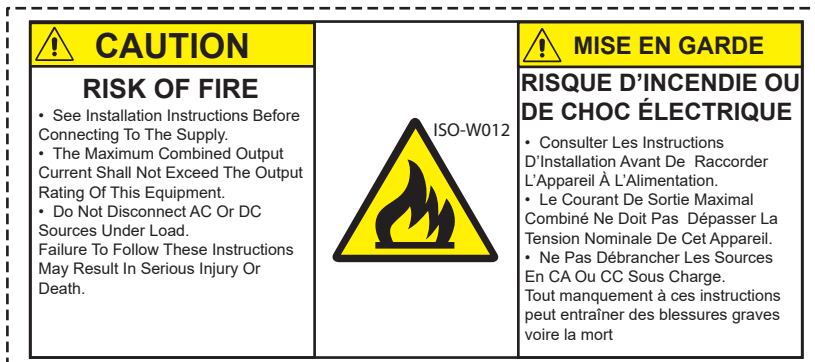


Figure 11. Deadfront Caution - Capacitor

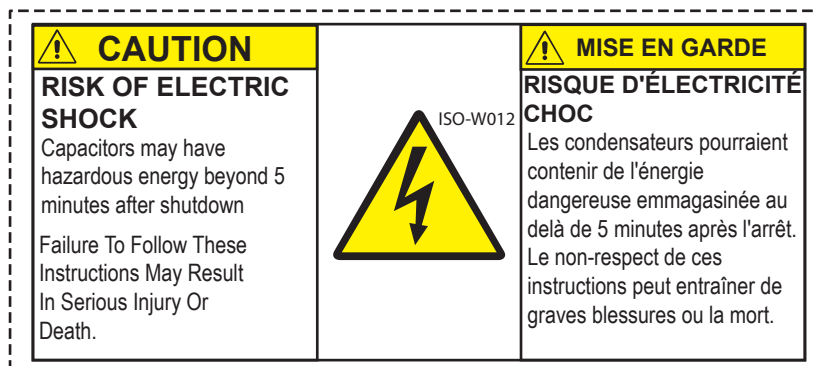
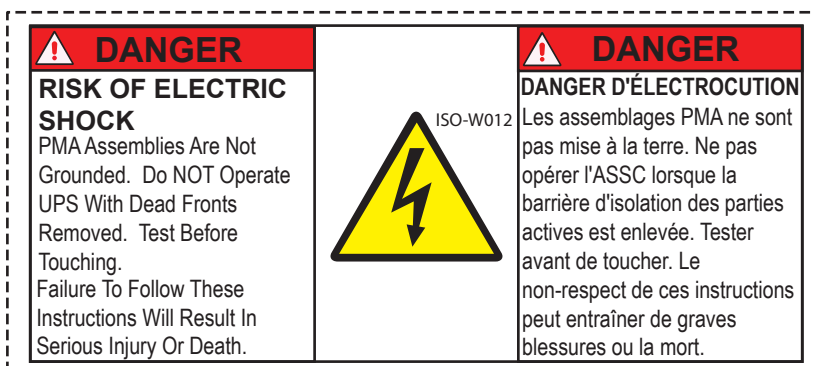


Figure 12. Deadfront Warning - Service



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



NOTE

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified on [1.9 Warranty](#) become void. This service is offered as part of the sales contract for the UPS. Contact an Eaton service representative in advance (usually a two-week notice is required) to reserve a preferred startup date.

3.1 Creating an Installation Plan

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

3.2 Preparing the Site

For the UPS system to operate at peak efficiency, the installation site should meet the environmental parameters outlined in this manual. If the UPS is to be operated at an altitude higher than 1000 m (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 General Storage Requirements for UPS Equipment

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

Table 1. Storage Area Contaminants

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

3.2.2 Environmental and Installation Considerations

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

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

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

Restriction Always maintain a non-condensing environment

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

Cautions regarding UPS operating environmental conditions:

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

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

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

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

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

3.2.3 Installation Considerations

The UPS system installation must meet the following guidelines:

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

- The system must be installed in a temperature and humidity controlled indoor area free of conductive contaminants.
- The cabinet can be installed in *line-up-and-match* or *standalone* configurations.

Failure to follow guidelines may void your warranty.

The UPS equipment operating environment must meet the maximum weight requirements shown in [Table 2](#) and the size requirements shown in [Figure 13](#) through [Figure 20](#). Dimensions are in millimeters (inches).

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

Table 2. UPS Cabinet Maximum Weights

Model	Section	Maximum Weight kg (lb)	
		Shipping	Installed
Eaton 9395XC-1500/1500 HD	UPS (Total)	2110.4 (4653.40)	1981.5 (4369.2)
	ISBM/PM	1663.7 (3668.5)	1602.5 (3533.5)
	I/O	446.7 (985.0)	379.0 (835.7)
Eaton 9395XC-1500/1500 LD	UPS (Total)	2205.0 (4862.0)	2076.1 (4577.8)
	ISBM/PM	1663.7 (3668.5)	1602.5 (3533.5)
	I/O	541.3 (1193.6)	473.6 (1044.4)

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](#). Dimensions are in millimeters (inches).

Table 3. UPS Cabinet Clearances

From Top of Cabinet	457.2 mm (18") minimum clearance for ventilation
From Front of Cabinet	914.4 mm (36") working space
From Back of Cabinet	None Required
From Right Side of Cabinet	None Required
From Left Side of Cabinet	None Required

The basic environmental requirements for operation of the UPS are:

- Recommended Operating Range: 20–25° C (68–77° F)
- Maximum Relative Humidity: 95%, non-condensing



NOTE

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

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

Model	Rating	Input/Output Voltage	Heat Rejection KW (kBTU/HR)	Ventilation Required for Cooling Air Exhaust
Eaton 9395XC	1000 kW 1000 kVA	480/480	41.23 [140.692]	Approximately 4250 liter/sec (9000 CFM)
	1050 kW 1050 kVA	480/480	43.29 [147.727]	
	1100 kW 1100 kVA	480/480	45.36 [154.761]	
	1200 kW 1200 kVA	480/480	49.48 [168.831]	
	1300 kW 1300 kVA	480/480	53.60 [168.831]	
	1350 kW 1350 kVA	480/480	55.66 [189.934]	
	1400 kW 1400 kVA	480/480	57.73 [196.969]	
	1500 kW 1500 kVA	480/480	61.85 [211.038]	

Figure 13. UPS Cabinet Dimensions – HD (Front View)

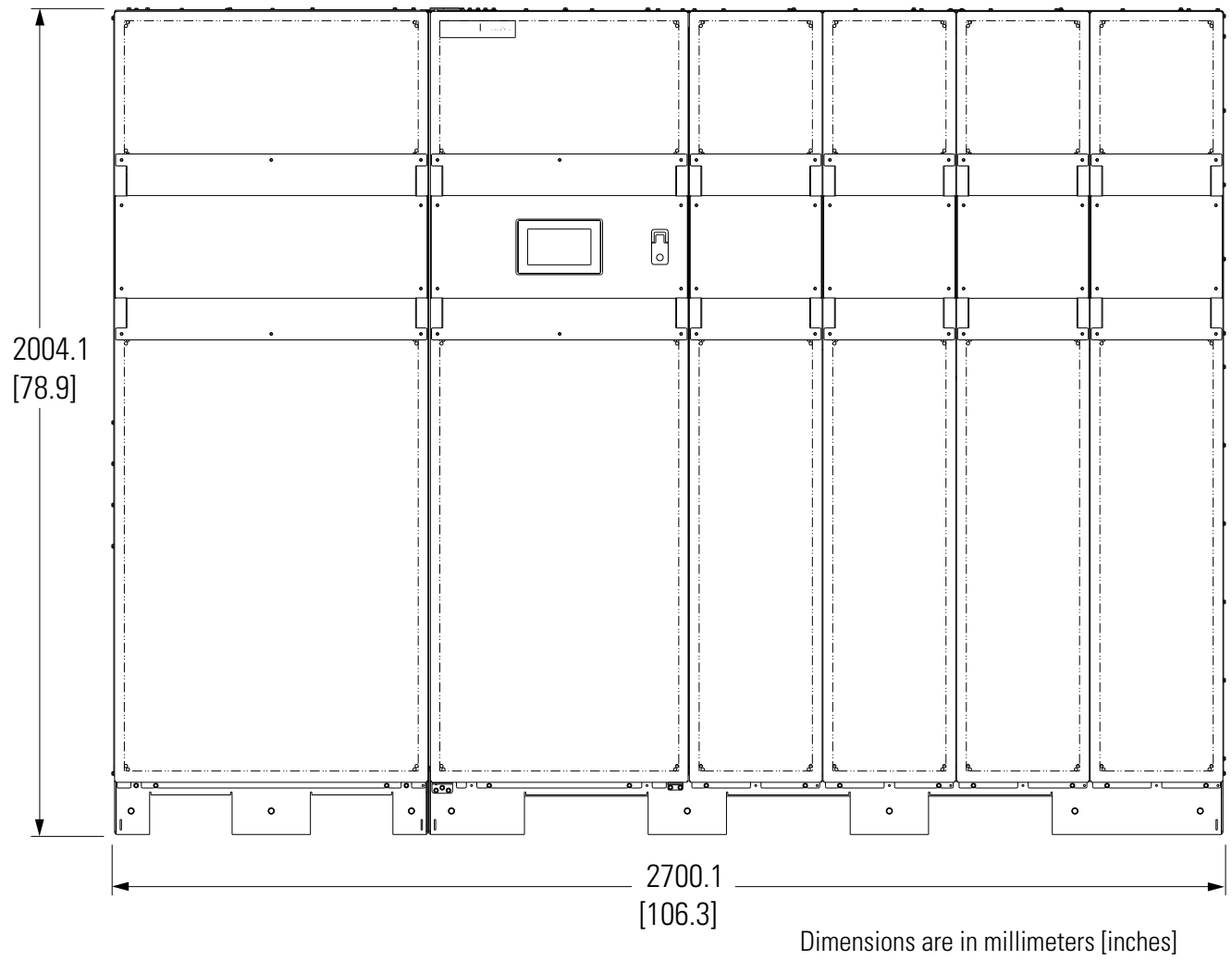


Figure 14. UPS Cabinet Dimensions – LD (Front View)

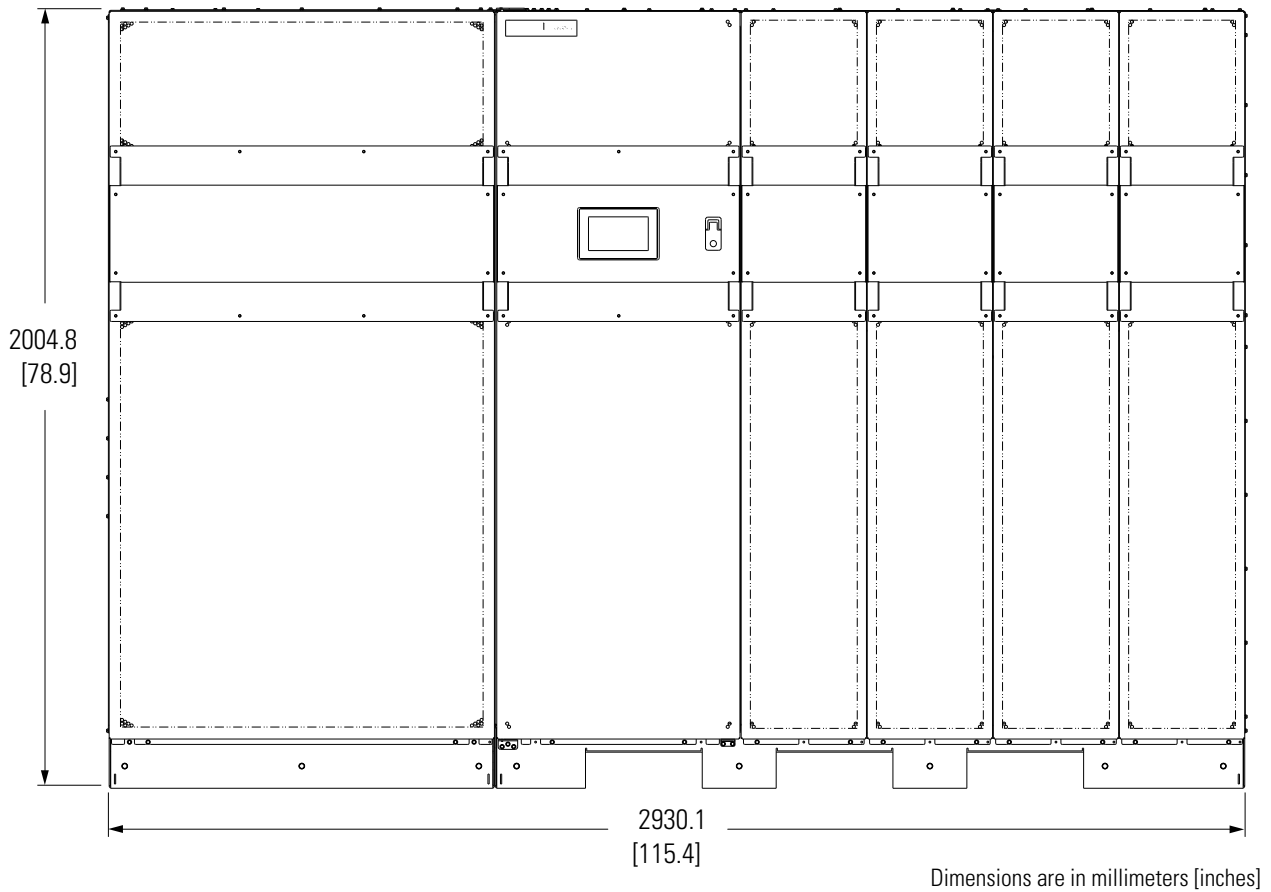
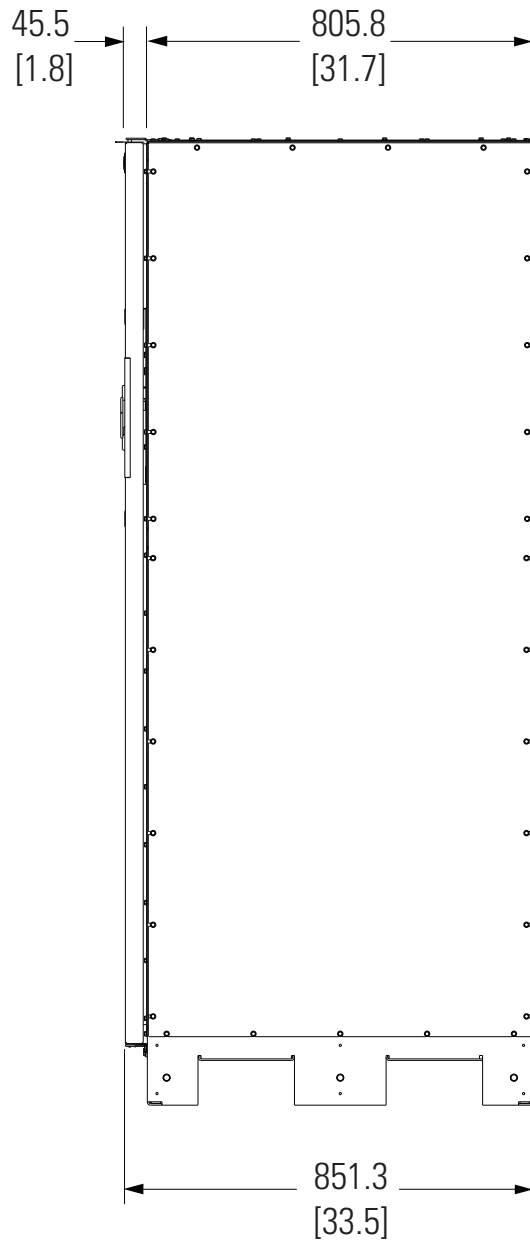
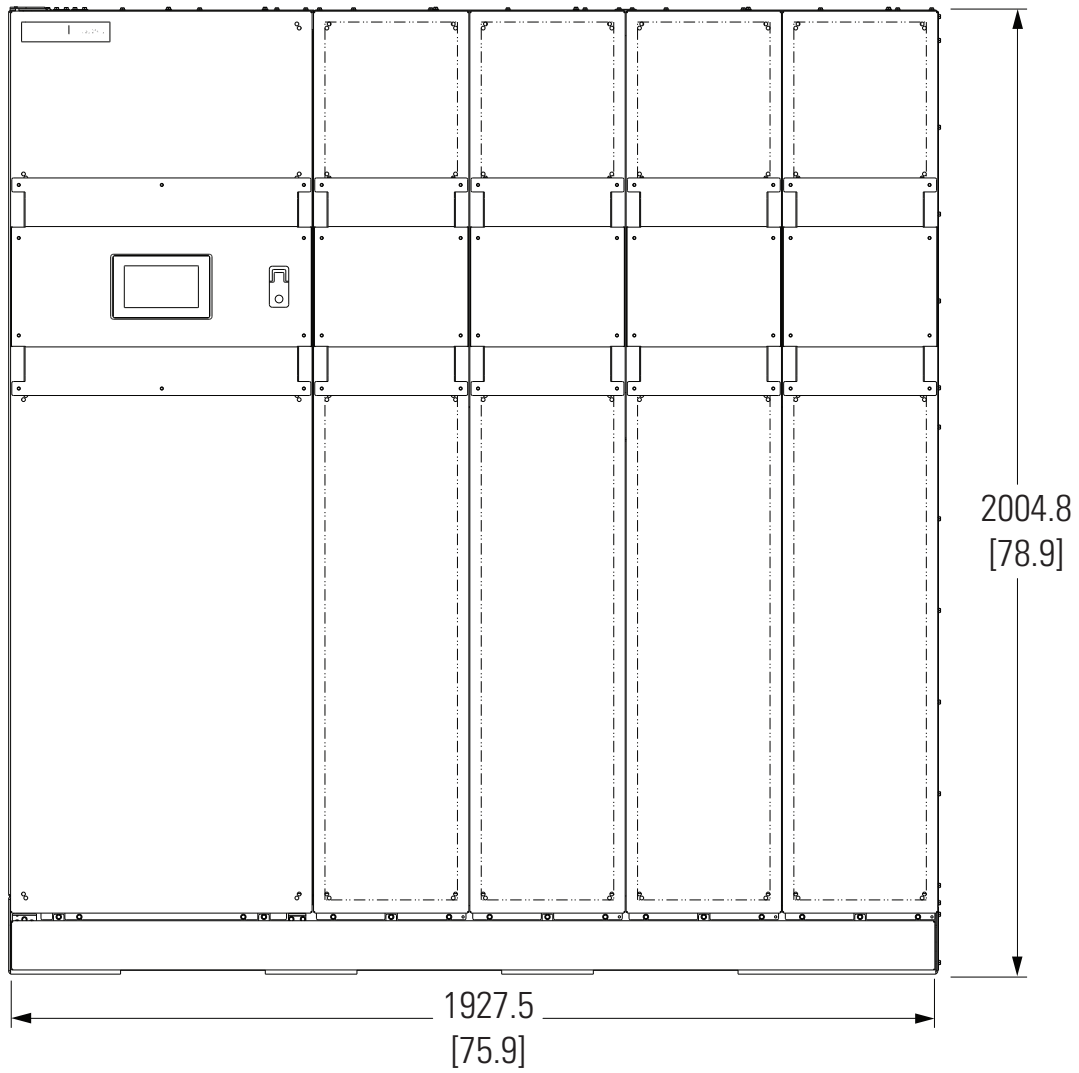


Figure 15. Cabinet Dimensions (Right Side View)



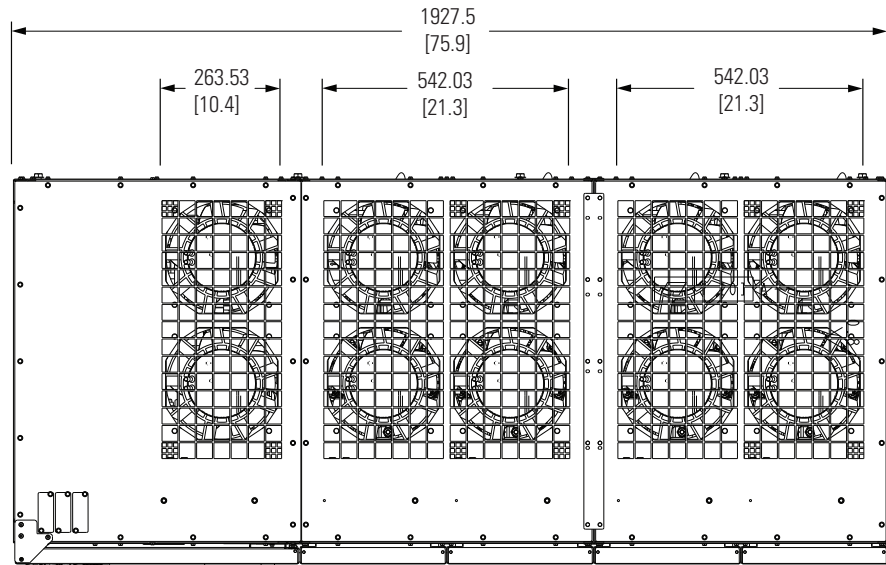
Dimensions are in millimeters [inches]

Figure 16. ISBM/PM Section Dimensions – (Front View)



Dimensions are in millimeters [inches]

Figure 17. ISBM/PM Section Dimensions – (Top View)



Dimensions are in millimeters [inches]

Figure 18. UPS Bottom View

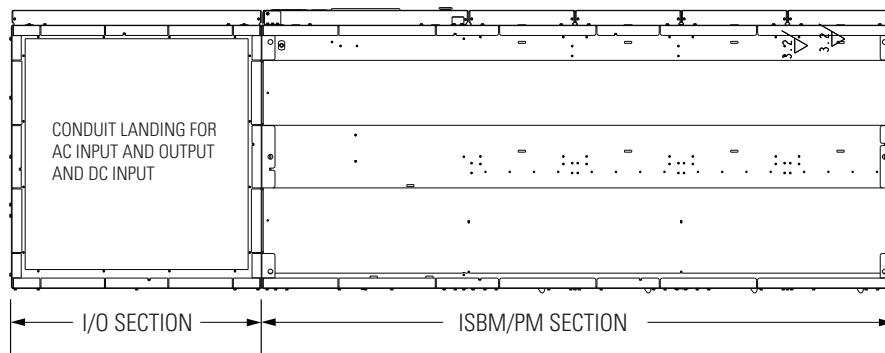


Figure 19. I/O Section Dimensions – HD (Front View)

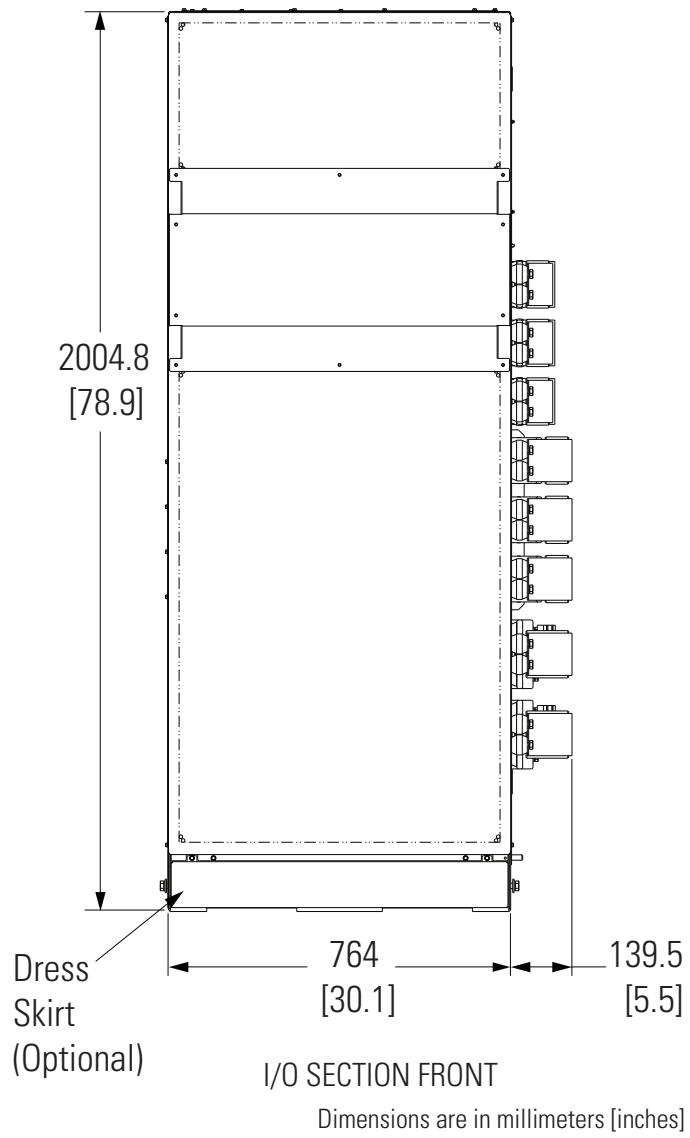
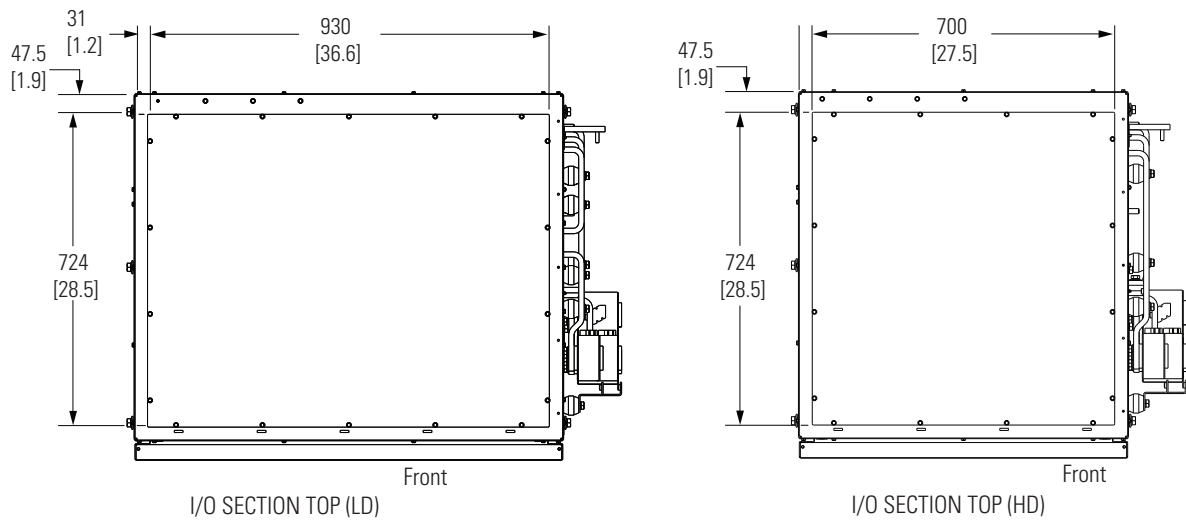
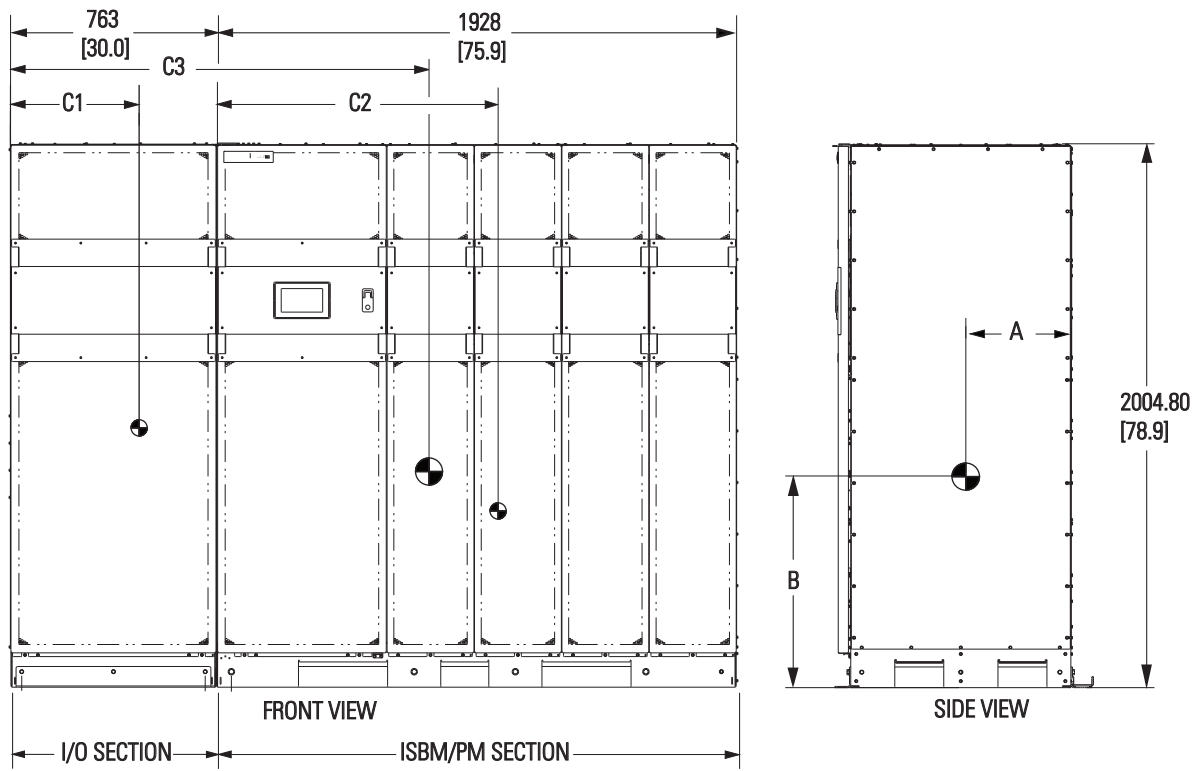


Figure 20. I/O Section Dimensions – (Top View)



Dimensions are in millimeters [inches]

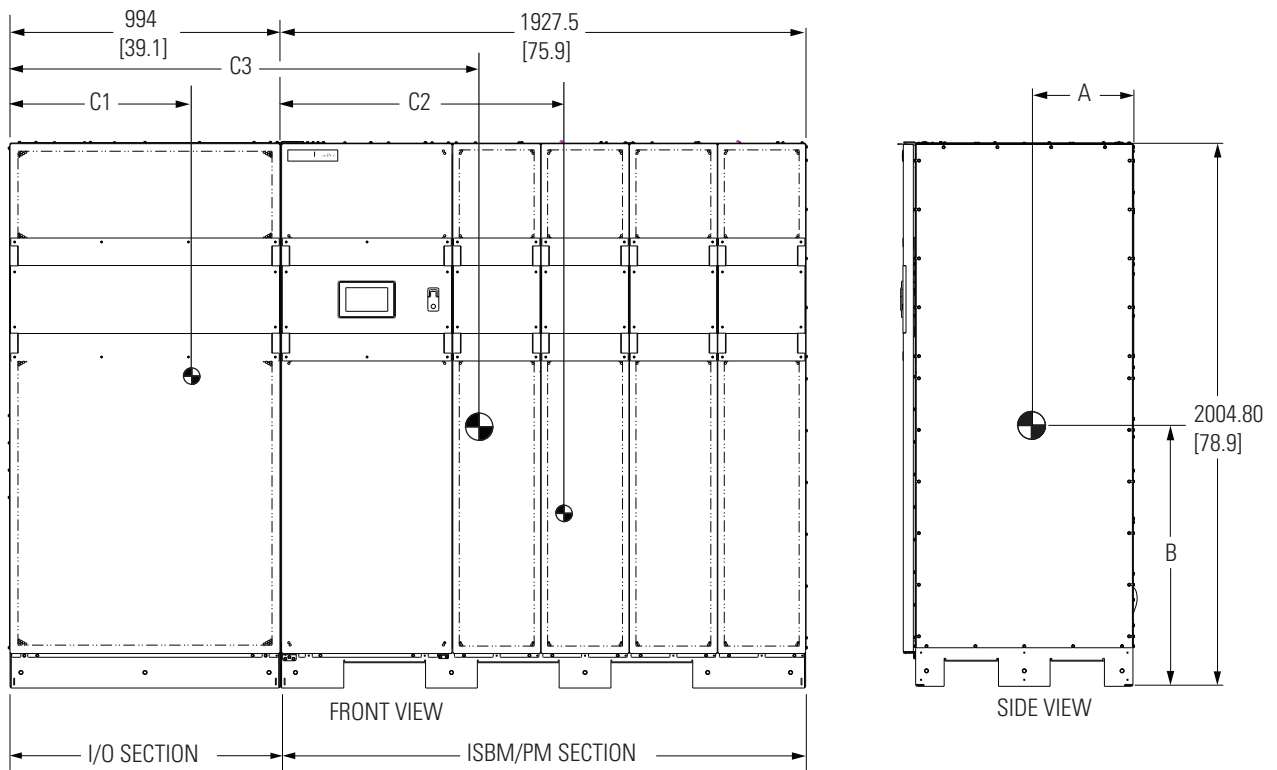
Figure 21. UPS Center of Gravity – HD (Front View)



Dimensions are in millimeters [inches]

CENTER OF GRAVITY	DIMENSIONS MM [IN]				
	A	B	C1	C2	C3
UPS	383.3 [15.1]	780.2 [30.7]	xxx	xxx	1551.6 [61.1]
HD I/O CABINET	338.6 [13.3]	940.7 [37.0]	477.1 [18.8]	xxx	xxx
ISBM/PM CABINET	393.8 [15.5]	742.3 [29.2]	xxx	1043.7 [41.1]	xxx

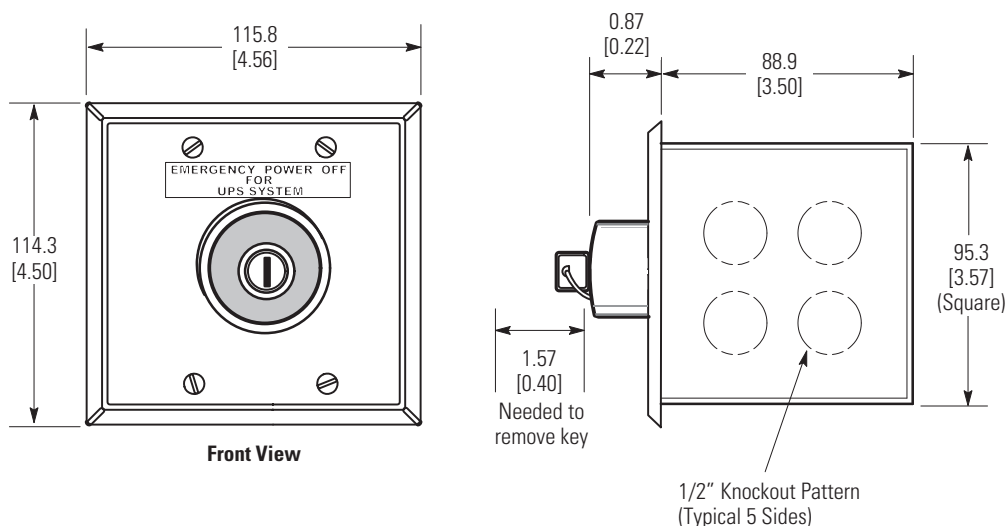
Figure 22. UPS Center of Gravity – LD (Front View)



Dimensions are in millimeters [inches]

CENTER OF GRAVITY	DIMENSIONS MM [IN]				
	A	B	C1	C2	C3
UPS	378.3 [14.9]	796.2 [31.3]	xxx	xxx	1724.1 [67.9]
LD I/O CABINET	325.5 [12.8]	978.6 [38.5]	669.8 [26.4]	xxx	xxx
ISBM/PM CABINET	393.8 [15.5]	742.3 [29.2]	xxx	1043.7 [41.1]	xxx

Figure 23. Remote EPO Switch Dimensions



Dimensions are in millimeters [inches].

3.2.4 UPS System Power Wiring Preparation

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

- Refer to national and local electrical codes for acceptable external wiring practices.
- To allow for future kVA upgrades, consider installing a derated UPS using wiring and external overcurrent protection breakers sized for a fully rated UPS.
- For external wiring, use 75°C copper wire. Wire sizes listed in [Table 5](#) are for copper wiring only. If wire is run in an ambient temperature greater than 40°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 and 40°C ambient correction factors.
- 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 9395XC 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 I/O Cabinet and ISBM/PM 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.

- UPSs or each UPS in distributed bypass and parallel systems must use a separate battery system for each UPS.

The Eaton 9395XC UPS provides backfeed detection and protection through a +48V DC Shunt Trip Interface of the bypass input breaker. An optional I/O Cabinet is also available with an integrated backfeed contactor.

The AC output and output ground wiring to the critical load should be sized the same as the UPS bypass and bypass ground wiring if recommended output breaker listed in [Table 14](#) is not installed in the system.

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

[3.2.4 UPS System Power Wiring Preparation:](#)

- Select wire size according to the UPS nameplate.
- Do not use wire larger than the largest size listed in [Table 5](#).
- Use terminal recommendations from [Table 11](#).
- Size and number of conduits must not exceed those listed in [Table 11](#).
- Select overcurrent protection input, battery, and output breakers according to the UPS nameplate rated for either 80% or 100%.
- Follow all applicable NEC and local codes.

For UPS external wiring requirements, including the minimum AWG size of external wiring, see [Table 5](#) for recommended installations using a common battery system. Wire sizes listed are for copper wiring only.

Table 5. 480V Input/Output Ratings and External Wiring Requirements

Basic Unit Rating	Units		Rating 50/60 Hz							
	kVA	kW	1000	1050	1100	1200	1300	1350	1400	1500
Input and Output Voltage	Volts	480/480	480/480	480/480	480/480	480/480	480/480	480/480	480/480	480/480
AC Input to UPS Rectifier (0.99 Minimum pF) Full load current plus battery recharge current (3) Phases, (1) Ground Minimum Conductor Size Number per Phase	A	Amps	1505	1563	1642	1786	1950	2009	2122	2232
		AWG or kcmil (each)	500 (6)	500 (6)	500 (8)	500 (8)	500 (8)	500 (9)	500 (9)	500 (9)
AC Input to UPS Bypass Full Load Current (3) Phases, (1) Ground Minimum Conductor Size Number per Phase	B	Amps	1203	1263	1323	1443	1564	1624	1684	1804
		AWG or kcmil (each)	500 (5)	500 (5)	500 (6)	500 (6)	500 (6)	400 (8)	500 (8)	500 (8)
DC Input from Battery Disconnect to UPS (1) Positive, (1) Negative Minimum Conductor Size Number per Phase (1) Positive, (1) Negative	C	Total Amps	2214	2325	2436	2657	2879	2989	3100	3322
		AWG or kcmil (each)	500 (8)	500 (8)	500 (8)	500 (9)	500 (9)	300 (12)	500 (12)	500 (12)
AC Output to Critical Load Full Load Current (3) Phases, (1) Ground Minimum Conductor Size Number per Pole	D	Amps	1203	1263	1323	1443	1564	1624	1684	1804
		AWG or kcmil (each)	500 (5)	500 (5)	500 (6)	500 (6)	500 (6)	500 (8)	500 (8)	500 (8)

NOTE Callout letters **A**, **B**, **C**, and **D** map to [Figure 59](#).

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.

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

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

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

Terminals E1A through E5A and E9A through E11A are bolted-type terminals. The inter-cabinet power wiring connections for this equipment are rated at 90°C. See [Table 6](#) for Internal power cable terminations, [Table 7](#) for supplied inter-cabinet wiring terminal hardware. [Table 8](#) for external power cable terminations and [Table 9](#) for supplied external wiring terminal hardware.

The torque values listed in [Table 6](#) for the M8 bolts are the maximum allowable. Tightening further will risk breaking or twisting the bolt.

[Figure 39](#) through [Figure 41](#) show the location of the power cable terminals inside the UPS.

Table 6. UPS Internal Power Cable Terminations

Terminal Function	Terminal	Function	Bus Landing	Tightening Torque Nm (lb ft)	Bolt
AC Input to UPM Section	E1A	Phase A	4 – stud mounting	14.2 (10.4)	M8
	E2A	Phase B	4 – stud mounting	14.2 (10.4)	M8
	E2A	Phase C	4 – stud mounting	14.2 (10.4)	M8
AC Input from ISBM	E9A	Phase A	4 – stud mounting	14.2 (10.4)	M8
	E10A	Phase B	4 – stud mounting	14.2 (10.4)	M8
	E11A	Phase C	4 – stud mounting	14.2 (10.4)	M8
	E12A	Neutral	4 – stud mounting	14.2 (10.4)	M8
DC Input to ISBM	E4A	Positive	6 – stud mounting (2 per ISBM)	14.2 (10.4)	M8
	E5A	Negative	6 – stud mounting (2 per ISBM)	14.2 (10.4)	M8
AC Input to ISBM	E1A	Phase A	3-Nut Mounting	13.5 (10)	M8
	E2A	Phase B	3-Nut Mounting	13.5 (10)	M8
	E3A	Phase C	3-Nut Mounting	13.5 (10)	M8
DC Input to ISBM	E4A	Positive	4-Stud Mounting	40 (29.5)	M10
	E5A	Negative	4-Stud Mounting	40 (29.5)	M10
		Positive	2-Stud Mounting	22 (16.3)	M8
		Negative	2-Stud Mounting	22 (16.3)	M8
Bypass Input to ISBM	E6A	Phase A	4-Stud Mounting	40 (29.5)	M10
	E7A	Phase B	4-Stud Mounting	40 (29.5)	M10
	E8A	Phase C	4-Stud Mounting	40 (29.5)	M10
		Phase A	2-Stud Mounting	22 (16.3)	M8
		Phase B	2-Stud Mounting	22 (16.3)	M8
		Phase C	2-Stud Mounting	22 (16.3)	M8
AC Output to ISBM	E9A	Phase A	4-Stud Mounting	40 (29.5)	M10

Table 6. UPS Internal Power Cable Terminations (Continued)

Terminal Function	Terminal	Function	Bus Landing	Tightening Torque Nm (lb ft)	Bolt
	E10A	Phase B	4-Stud Mounting	40 (29.5)	M10
	E11A	Phase C	4-Stud Mounting	40 (29.5)	M10
		Phase A	2-Stud Mounting	22 (16.3)	M8
		Phase B	2-Stud Mounting	22 (16.3)	M8
		Phase C	2-Stud Mounting	22 (16.3)	M8

Table 7. Supplied Inter-cabinet Wiring Terminal Hardware Kit

Part	Size	Quantity	Terminals Used On	Eaton Part Number
Flat Washer	M8	40	Bypass Input, I/O AC Input to ISBM, Battery Input, I/O AC Output, Mounting to Brackets	180500036-080
Flat Washer	M10	34	Bypass Input, I/O Battery Input,	180220042-06
Split Lock	M10	40	Bypass Input, UPM Battery Input, UPM AC Output I/O Battery Input,	180240035-06
Hex Bolt	M8 x 40mm	25	Bypass Input, Battery Input, AC Output, Mounting to Brackets	180190078-072
Hex Bolt	M10 x 25mm	40	Bypass Input, AC Input, I/O Battery Input, AC Output	180190078-087
Hex Nut	M8	9	I/O AC Input to ISBM	180200001-05
Conical Washer	M8	34	I/O AC Input to ISBM, Bypass Input, AC Output, Mounting to Brackets	180500037-080

For a UPS with common rectifier input terminals, E1 through E11 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 8](#) for external power cable terminations, [Table 9](#) for supplied external wiring terminal hardware, and [Table 10](#) for recommended installation parts and tools not supplied by Eaton Corporation.

[Figure 39](#) through [Figure 41](#) show the location of the power cable terminals inside the UPS.

Table 8. External Power Cable Terminations

Terminal Function	Terminal	Function	Bus Landings (using both sides of bus)	Tightening Torque Nm (lb ft)	Bolt Size
AC Input to UPS Rectifier	E1	Phase A	9 – 2 bolt mounting	76 (56)	M12
	E2	Phase B	9 – 2 bolt mounting	76 (56)	M12
	E2	Phase C	9 – 2 bolt mounting	76 (56)	M12
AC Input to Bypass	E6	Phase A	9 – 2 bolt mounting	76 (56)	M12
	E7	Phase B	9 – 2 bolt mounting	76 (56)	M12
	E8	Phase C	9 – 2 bolt mounting	76 (56)	M12
AC Output to Critical Load	E9	Phase A	8 – 2 bolt mounting	76 (56)	M12
	E10	Phase B	8 – 2 bolt mounting	76 (56)	M12
	E11	Phase C	8 – 2 bolt mounting	76 (56)	M12
DC Input from Battery or Battery Disconnect to UPS	E4	Battery (+)	12 – 2 bolt mounting	76 (56)	M12
	E5	Battery (-)	12 – 2 bolt mounting	76 (56)	M12

NOTE Customer ground, sized in accordance with NEC Table 250.122, can be run in any conduit listed in [Table 11](#).

Table 9. Supplied External Power Wiring Terminal and Cabinet to Cabinet Hardware Kit

Part	Size	Quantity	Eaton Part Number
Hex Bolt	M12 x 35 mm (GRD BUS)	30	180190078-110
Hex Bolt	M12 x 50 mm	122	180190078-115
Nut	M12	122	180500036-120
Flat Washer	M12	274	180500037-120
Conical Washer	M12	152	180500037-120
Cabinets Connecting Hardware			
Part	Size	Quantity	Eaton Part Number
Hex Bolt, Locking (cabinet connecting - lower)	M12 x 30 mm	4	180190109-058
Bolt, Hex–Head, (cabinet connecting - side)	M6 x 20 mm	3	180190078-045
Nut	M6 Serr Flg Hex, Clr ZN	3	180200005-002
Washer, Flat	M6 HD	6	180500036-060
Hex Bolt, Locking (joining strap)	M5 x 12 mm	5	180190118-028
Cabinet to Cabinet System Ground Hardware			
Part	Size	Quantity	Eaton Part Number
Hex Bolt	M8 x 25mm	1	180190078-067

Table 9. Supplied External Power Wiring Terminal and Cabinet to Cabinet Hardware Kit (Continued)

Part	Size	Quantity	Eaton Part Number
Flat Washer	M8	1	180500036-080
Conical Washer	M8	1	180500037-080

Table 10. Recommended Installation Parts and Tools (Not Supplied by Eaton)

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

Conduit sizes were chosen from NEC Table 4, Electrical Metallic Tubing (EMT). See [Table 11](#) for conduit requirements.

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

Conduit is sized to accommodate one ground conductor sized in accordance with NEC Table 250.122.

Conduit sizes listed are for copper wiring only.

Table 11. 480V Power Cable Conduit Recommendations

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size in.	Number of Conduits
Eaton 9395XC-1000/1000	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	6
		AC Output (A, B, C, Ground)	4	3	5
		AC Bypass (A, B, C, Ground)	4	3	5
	DC (Common Battery)	Battery (Positive, Negative, Ground)	3	2.5	8
Eaton 9395XC-1050/1050	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	6
		AC Output (A, B, C, Ground)	4	3	5
		AC Bypass (A, B, C, Ground)	4	3	5
	DC (Common Battery)	Battery (Positive, Negative, Ground)	3	2.5	8
Eaton 9395XC-1100/1100	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	8
		AC Output (A, B, C, Ground)	4	3	6
		AC Bypass (A, B, C, Ground)	4	3	6
	DC (Common Battery)	Battery (Positive, Negative, Ground)	3	2.5	8
Eaton 9395XC-1200/1200	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	8
		AC Output (A, B, C, Ground)	4	3	6
		AC Bypass (A, B, C, Ground)	4	3	6
	DC (Common Battery)	Battery (Positive, Negative, Ground)	3	2.5	9
Eaton 9395XC-1300/1300	480 Vac	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	8
		AC Output (A, B, C, Ground)	4	3	6

Table 11. 480V Power Cable Conduit Recommendations (Continued)

UPS Model	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size in.	Number of Conduits
Eaton 9395XC-1350/1350	480 Vac	AC Bypass (A, B, C, Ground)	4	3	6
		Battery (Positive, Negative, Ground)	3	2.5	9
	DC (Common Battery)	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	9
		AC Output (A, B, C, Ground)	4	3	8
Eaton 9395XC-1400/1400	480 Vac	AC Bypass (A, B, C, Ground)	4	3	8
		Battery (Positive, Negative, Ground)	3	2	12
	DC (Common Battery)	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	9
		AC Output (A, B, C, Ground)	4	3	8
Eaton 9395XC-1500/1500	480 Vac	AC Bypass (A, B, C, Ground)	4	3	8
		Battery (Positive, Negative, Ground)	3	2.5	12
	DC (Common Battery)	AC Input to UPS Rectifier (A, B, C, Ground)	4	3	9
		AC Output (A, B, C, Ground)	4	3	8

Battery Conductor Routing: Refer to the notes at the bottom of [Table 5](#) Input/Output Ratings and External Wiring Requirements. External overcurrent protection and disconnect are not provided by this product, but are required by codes.

If an output lockable disconnect is required, it is to be supplied by the customer.

[Table 12](#) lists the recommended rating for input circuit breakers with breaker ratings for rectifier input.

Table 12. Recommended Input Circuit Breaker Ratings (100% and 80% Load Rating)

UPS Model	Input Rating	
	%	480V
Eaton 9395XC-1000/1000	80	2000A
	100	1600A
Eaton 9395XC-1050/1050	80	2000A
	100	1600A
Eaton 9395XC-1100/1100	80	2500A
	100	2000A
Eaton 9395XC-1200/1200	80	2500A
	100	2000A
Eaton 9395XC-1300/1300	80	2500A
	100	2000A
Eaton 9395XC-1350/1350	80	3000A
	100	2500A
Eaton 9395XC-1400/1400	80	3000A
	100	2500A
Eaton 9395XC-1500/1500*	80	2500A
	100	2000A
Eaton 9395XC-1500/1500**	80	2500A
	100	3000A

*- Indicates product will operate at full load with reduction in performance as shown below:

Firmware Derating for 2000A Input Limit

- Limits available capacity to 4%
 - Includes \leq 4% low line input voltage
 - Includes 4% battery charging capacity
 - Includes 5 mins overload at 110%
- Alternatively: Full capabilities at max 88% load

** - Indicates without reduction in performance.

[Table 13](#) lists the recommended rating for output circuit breakers.

Table 13. Recommended Output Circuit Breaker Ratings (100% and 80% Load Rating)

UPS Model	Output Rating	
	%	480V
Eaton 9395XC-1000/1000	80	1600A
	100	1600A
Eaton 9395XC-1050/1050	80	1600A
	100	1600A
Eaton 9395XC-1100/1100	80	2000A
	100	1600A
Eaton 9395XC-1200/1200	80	2000A
	100	1600A
Eaton 9395XC-1300/1300	80	2000A
	100	1600A
Eaton 9395XC-1350/1350	80	2500A
	100	2000A
Eaton 9395XC-1400/1400	80	2500A
	100	2000A
Eaton 9395XC-1500/1500	80	2500A
	100	2000A

CAUTION

To reduce the risk of fire, connect only to a circuit provided with maximum input circuit breaker current ratings from [Table 12](#) in accordance with the NEC, ANSI/NFPA 70.

ATTENTION!

Pour réduire le risque d'incendie, ne brancher qu'à un circuit avec le courant nominal maximal du disjoncteur d'entrée indique dans le tableau ([Table 12](#)) 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 5](#). The recommended line-to-line load unbalance is 50% or less.

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

[Table 14](#) lists the recommended rating for bypass, output, and MOB circuit breakers with breaker ratings.

Table 14. Recommended Bypass, Output, and MOB Circuit Breaker Ratings (100% and 80% Load Rating)

UPS Model	Input Rating	
	%	480V
Eaton 9395XC-1000/1000	80	1600A
	100	1600A
Eaton 9395XC-1050/1050	80	1600A
	100	1600A
Eaton 9395XC-1100/1100	80	2000A
	100	1600A
Eaton 9395XC-1200/1200	80	2000A
	100	1600A
Eaton 9395XC-1300/1300	80	2000A
	100	1600A
Eaton 9395XC-1350/1350	80	2500A
	100	2000A
Eaton 9395XC-1400/1400	80	2500A
	100	2000A
Eaton 9395XC-1500/1500	80	2500A
	100	2000A

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 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 15](#) 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 15. Recommended DC Input Battery Disconnect Ratings

UPS Model	Input Rating for Each UPM	
	%	480V
Eaton 9395XC	80	5000A
	100	4000A

3.2.5 UPS System Interface Wiring Preparation

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




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

**ATTENTION!**

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

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

- Use Class 1 wiring methods (as defined by the NEC) for interface wiring from 30V to 600V. The wire should be rated at 600V, 1A minimum and 12 AWG maximum.
- Use Class 2 wiring methods (as defined by the NEC) for interface wiring up to 30V. The wire should be rated at 24V, 1A minimum. When Class 2 circuit wiring must be mixed with Class 1 wiring, use Class 1 wire and wiring methods.
- Use shielded twisted-pair wires for each input and return or common.
- All interface wiring and conduit is to be provided by the customer.
- When installing external interface wiring (for example, building alarm, relay output, battery breaker trip, and Minislot) 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 Minislot terminals, route the wiring from the interface entry conduit landing panels through the internal opening in the Minislot 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 Minislot 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 UVR signal for the battery disconnect device is provided. Breaker should be used and closed in normal operation. If a Lead acid cabinet it needs a UVR to ensure breaker cannot be closed into a dead bus.
- Battery aux and 48 Vdc UVR 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 on the J89 MCU Board between pins 2 and 4 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.


	<p>NOTE 1 On all 9395XC 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 operation.</p> <p>NOTE 2 HIGH ALERT mode is desired because any loads with a leading power factor will not be seen by the generator. Rectifier operation will be much softer while on generator thereby increasing overall system stability.</p>
---	---

Connectors for the control and interface wiring are supplied in the hardware kit are listed in [Table 16](#).

Table 16. Supplied Interface Wire Connectors

To Terminal	Connector	Quantity
TB1	1757093	1
TB2	1757093	1
TB3	1757093	1
J90	P-154000040	1
J19	P-154000039	1
CN5	P-154000038	1
CN13	P-154000039	1
CN15	P-154000040	1

3.2.6 Distributed Bypass Power Wiring Preparation

	<p>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 grounded wire source connects to the System Switchgear to the point where the Common Load connects to the System Switchgear.</p>
---	---

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.
- The 9395XC 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.
- The tie cabinet must contain Module Output Breakers (MOBs) with dual auxiliary contacts for control of the system.
- Use the applicable wiring for the designated interface terminals:

3.3 Inspecting and Unpacking the UPS Cabinets

The UPS cabinet is divided into two sections palletted separately for shipping. The sections are shipped bolted to wooden pallets (see [Figure 24](#) and [Figure 25](#)) and protected with outer protective packaging material.

⚠ WARNING

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

⚠ AVERTISSEMENT!

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

To prevent damage to the wiring in the I/O section base when lifting or moving the cabinet:

- Lift and move the I/O 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 will occur.

⚠ ATTENTION!

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

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

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

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

⚠ CAUTION

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



ATTENTION!

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



NOTE

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

2. Use a forklift or pallet jack to move the packaged cabinets to the installation site, or as close as possible, before unpacking. If possible, move the cabinets using the pallet. Insert the forklift or pallet jack forks from the right side of the pallet (facing the cabinet), between the supports on the bottom of the pallet (see [Figure 21](#) and [Figure 22](#)) for the UPS cabinet center of gravity measurements). If the cabinets must be moved using the cabinet front or rear fork lift slots, see the caution statement at the beginning of this procedure. See [Figure 30](#) for cabinet forklift locations.
-

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/PM section is shipped with debris shields covering the ventilation grills on top of the section (see [Figure 37](#)). 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 Loading. 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 24. UPS Cabinet as Shipped on Pallet (ISBM/PM Section)

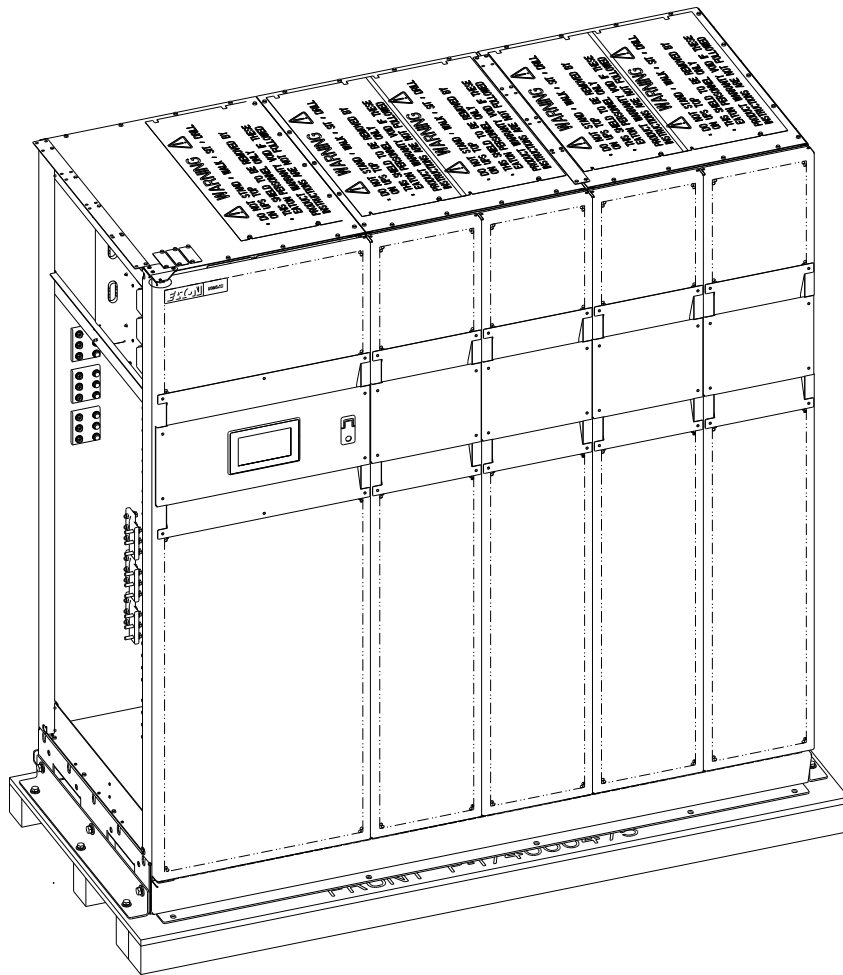
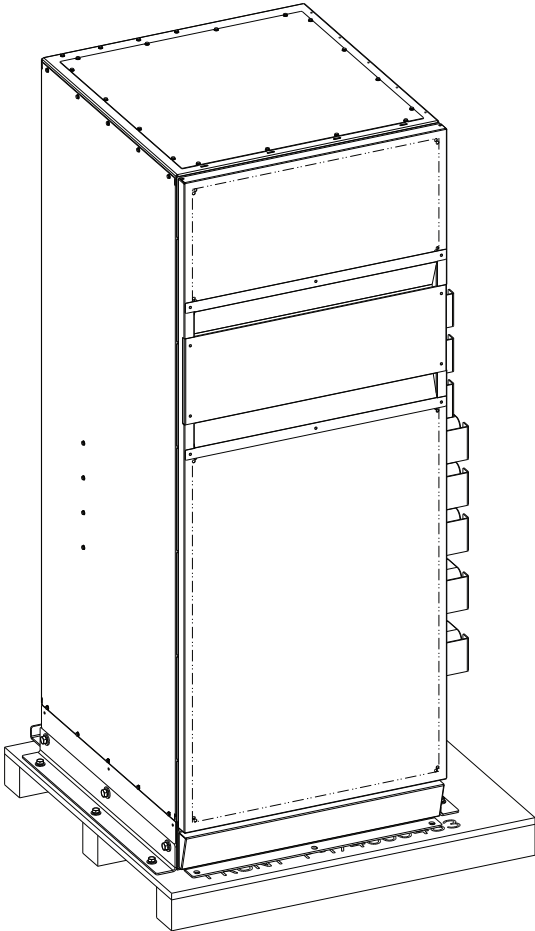


Figure 25. UPS Cabinet as Shipped on Pallet (I/O Section)



Chapter 4 UPS System Installation

4.1 Preliminary Installation Information

WARNING

Installation should be performed only by qualified personnel.

AVERTISSEMENT!

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

Refer to the following while installing the UPS system:

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

4.2 Unloading the UPS Cabinet from the Pallet

The I/O and ISBM/PM sections are bolted to separate wooden pallets supported by wood skids. To remove the pallets:

WARNING

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

AVERTISSEMENT!

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

CAUTION

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

To prevent damage to 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 UPS cabinet will occur.

AVERTISSEMENT!

- 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 la section de l'onduleur lorsque l'armoire est soulevé ou déplacé:

- 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 à l'armoire se produiront.

**NOTE**

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

If installed, remove the optional dress skirts at the bottom of the I/O and ISBM/PM cabinets (see [Figure 26](#) and [Figure 28](#)).

To remove the pallet and mechanically install the UPS:

1. If not already accomplished, use a forklift or pallet jack to move the I/O and ISBM/PM 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 (see [Figure 21](#) and [Figure 22](#) for the I/O and ISBM/PM section center of gravity measurements). If the sections must be moved using the cabinet front or rear fork lift slots, see the caution statements at the beginning of this procedure. See [Figure 30](#) for cabinet fork lift slots locations.

2. Remove the three bolts securing the left side shipping bracket to the ISBM/PM cabinet and three bolts securing the bracket to the pallet (see [Figure 26](#)). Remove the left side shipping bracket.
3. Remove the three bolts securing the right side shipping bracket to the ISBM/PM cabinet and three bolts securing the bracket to the pallet (see [Figure 27](#)). Remove the right side shipping bracket.

Figure 26. Removing the ISBM/PM Section Left Side Shipping Bracket

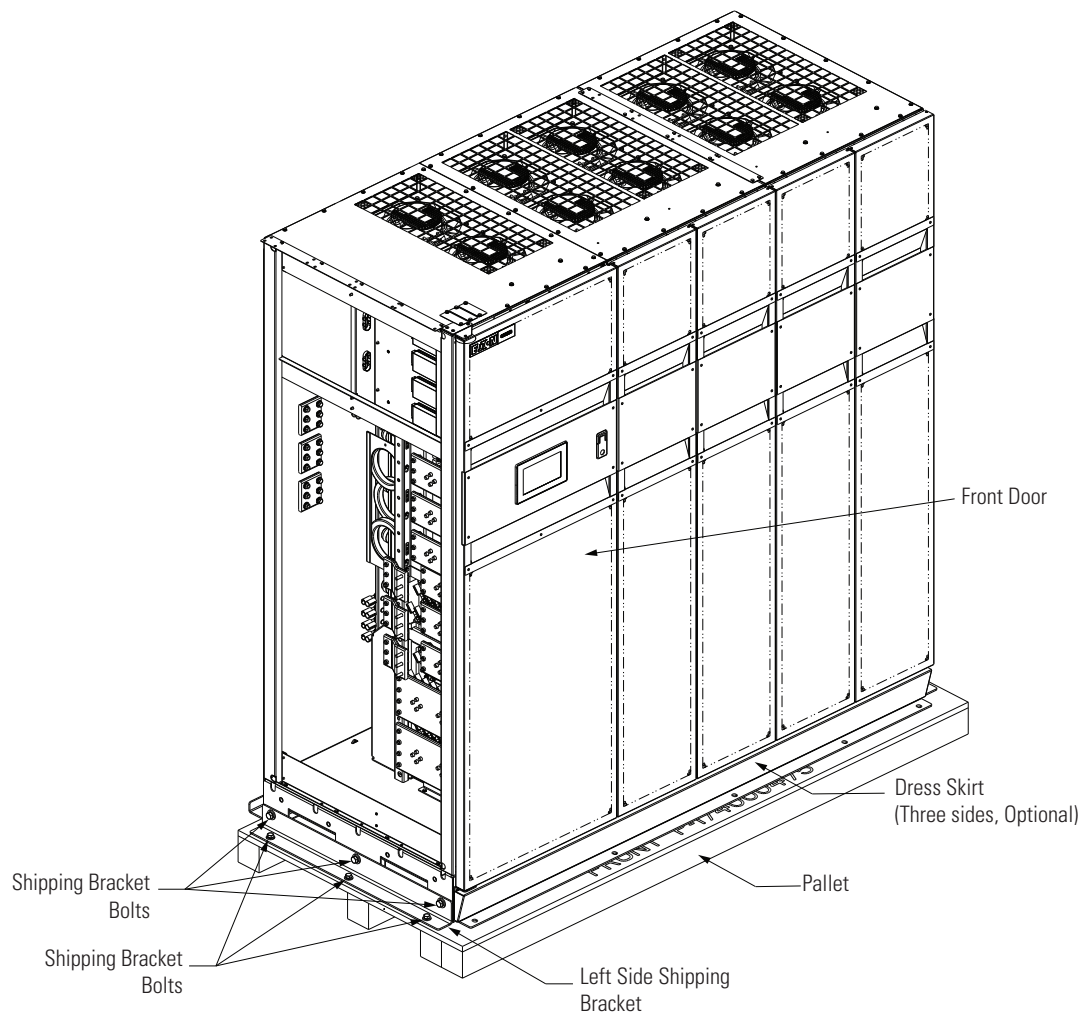
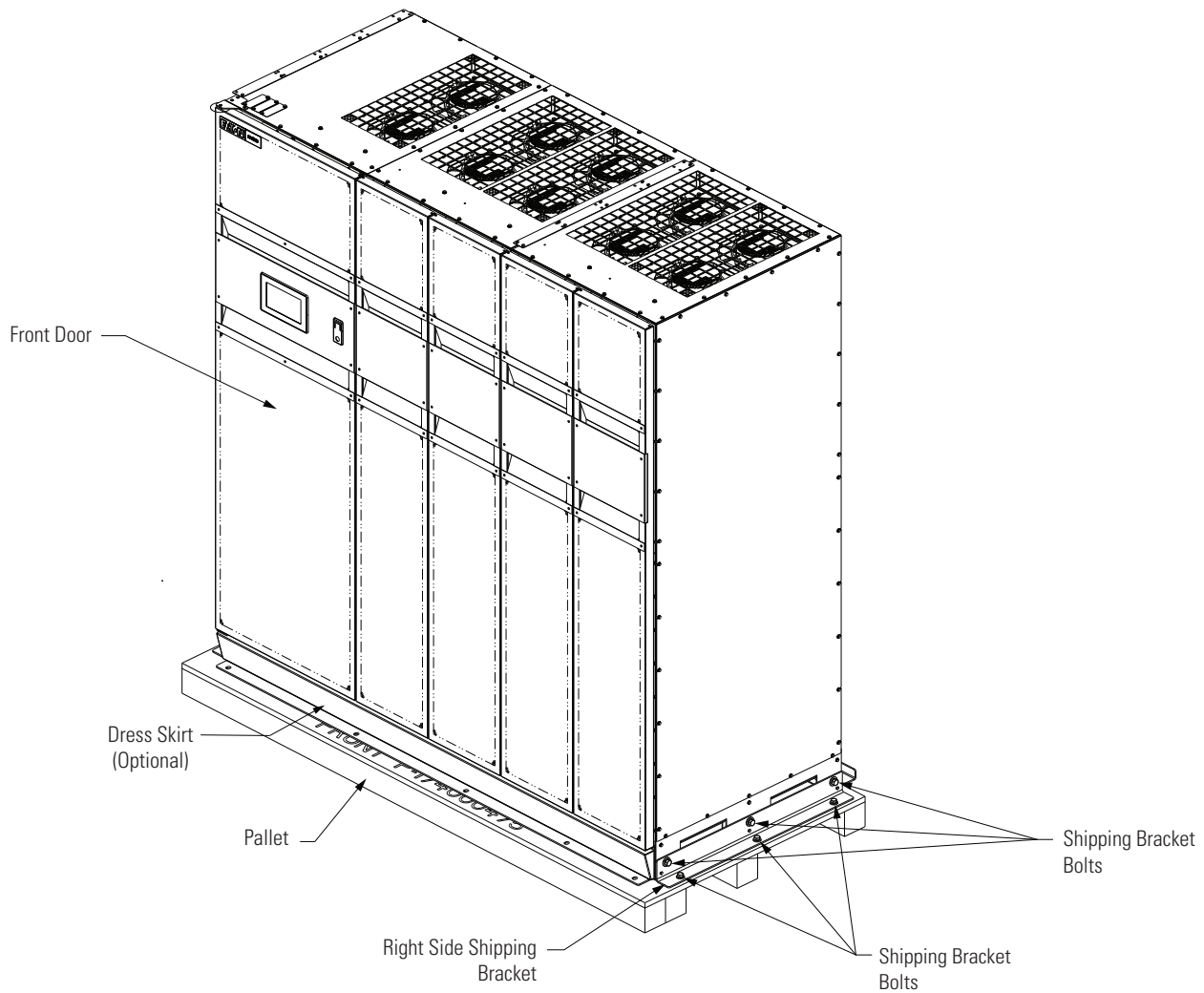


Figure 27. Removing the ISBM/PM Section Right Side Shipping Bracket



4. Using a forklift (see the caution statement at the beginning of this procedure), raise the cabinet until the cabinet bottom clears the pallet by approximately 3 mm (1/8") (see [Figure 30](#)).
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 I/O cabinet (see [Figure 28](#) and [Figure 29](#)).

Figure 28. Removing the I/O Section Left Side Shipping Bracket

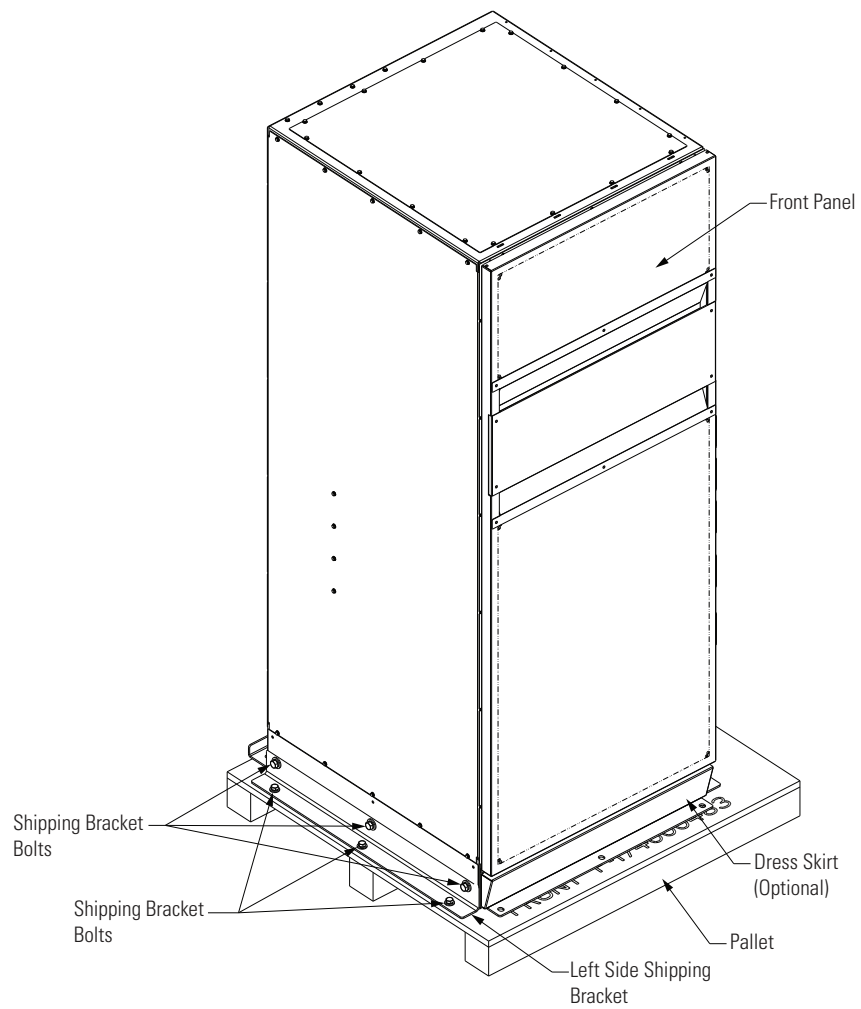


Figure 29. Removing the I/O Section Right Side Shipping Bracket

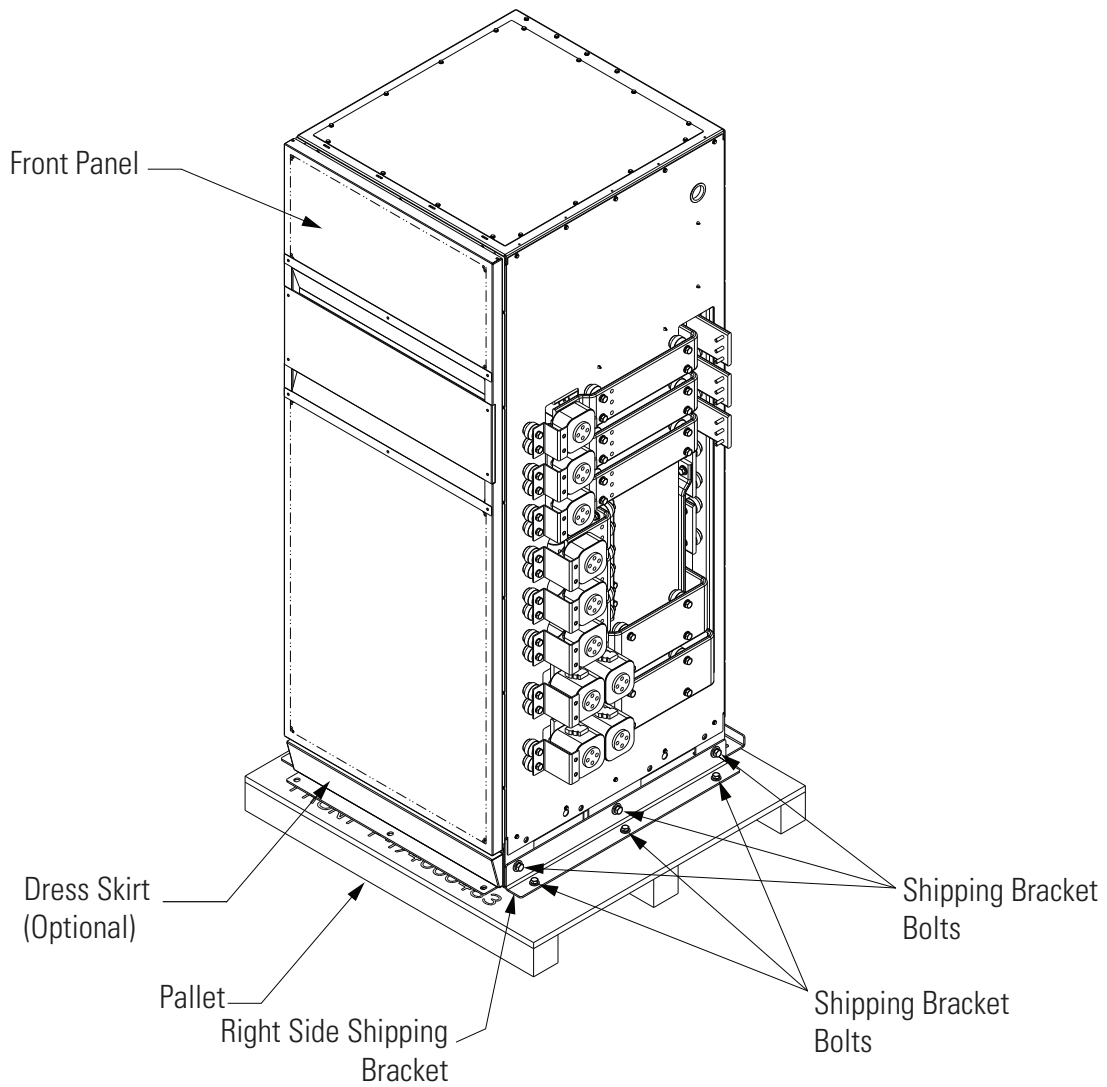
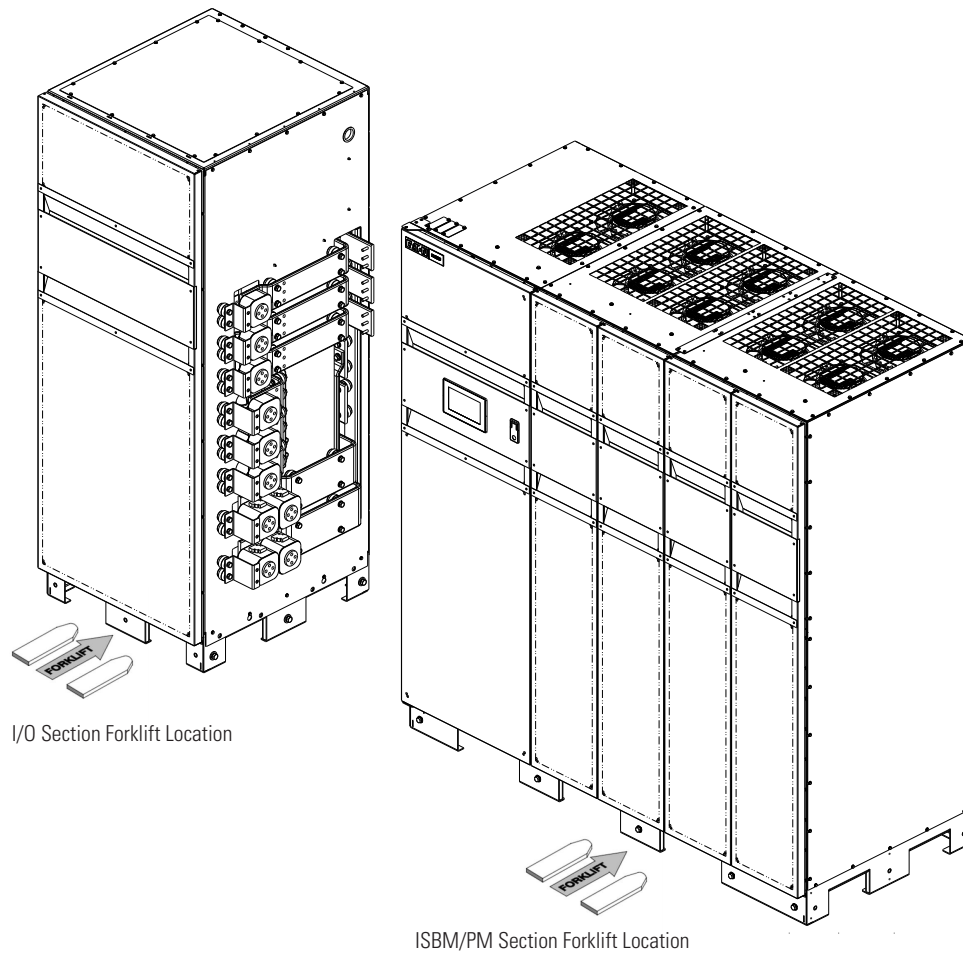


Figure 30. UPS Forklift Locations



8. Proceed to paragraph [4.3 Installing and Connecting the UPS Sections](#).

4.3 Installing and Connecting the UPS Sections

4.3.1 Preparing the UPS Sections



NOTE

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

Position the sections as follows:

CAUTION

Use care during installation to protect components mounted on the right side of the I/O section and the inter-cabinet wiring harnesses attached to the left side ISBM/PM section from damage.



ATTENTION!

Lors de l'installation, prendre soin de protéger les composantes du côté droit du module de contournement de système intégré (I/O) et les faisceaux de câbles reliant les armoires du côté gauche du module d'alimentation universel (ISBM/PM).

1. Using a forklift with the forks in the front forklift slots, move the ISBM/PM section to the final installation location.
2. Using the forklift, move the I/O section next to the ISBM/PM section. Leave enough space to connect the inter-cabinet electrical connections (see [Figure 31](#))



CAUTION

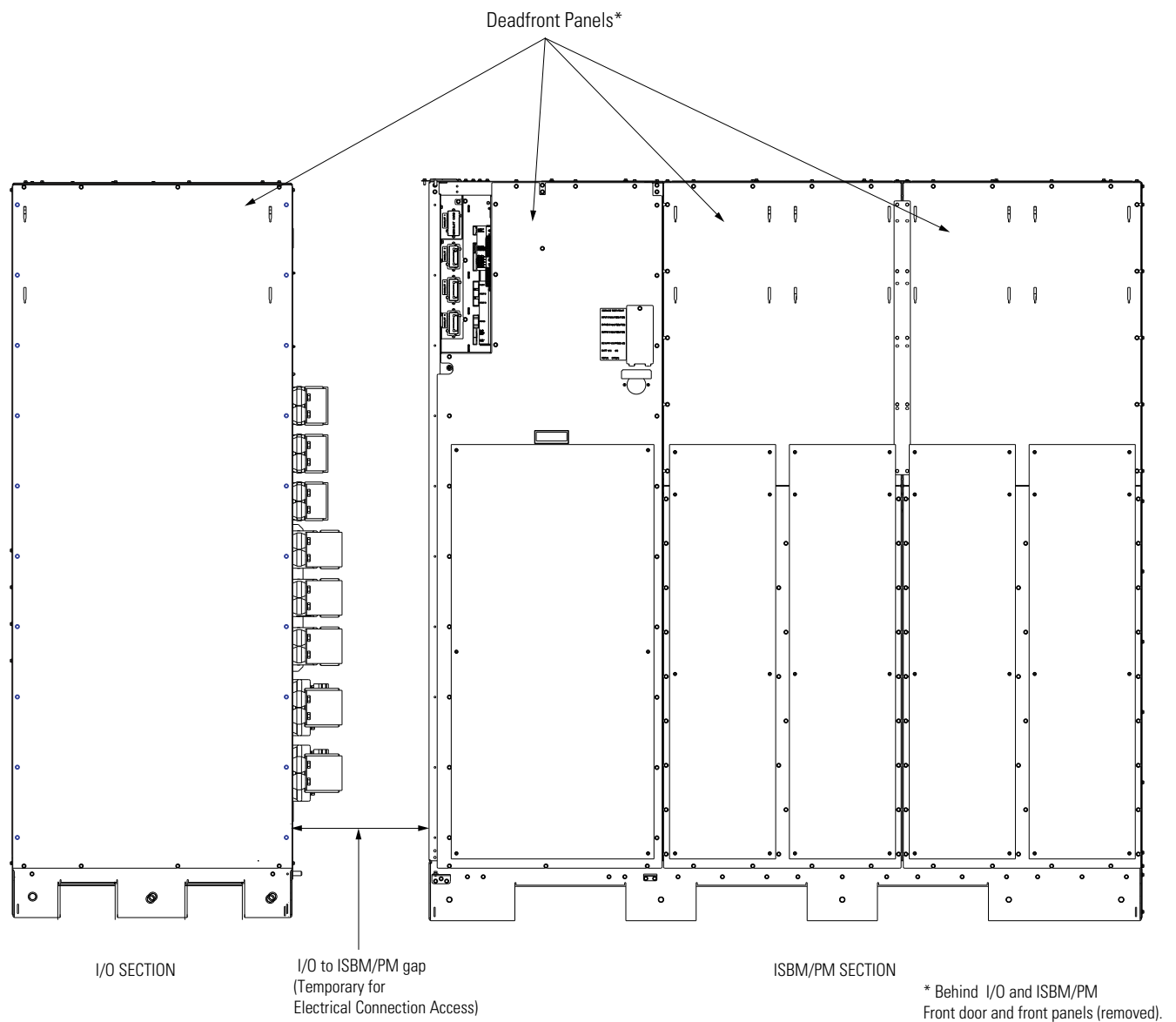
Use care during installation to protect components mounted on the right side of the I/O section and the inter-cabinet wiring harnesses attached to the left side ISBM section from damage.



ATTENTION!

Lors de l'installation, prendre soin de protéger les composantes du côté droit de la section d'entrée/sortie (I/O) et les faisceaux de câbles reliant les armoires du côté gauche du module de contournement de système intégré (ISBM).

Figure 31. I/O and ISBM/PM Electrical Access



3. Unfasten the front door latch and open the ISBM front door open (see [Figure 26](#)).

If required for improved access, remove the door as follows:

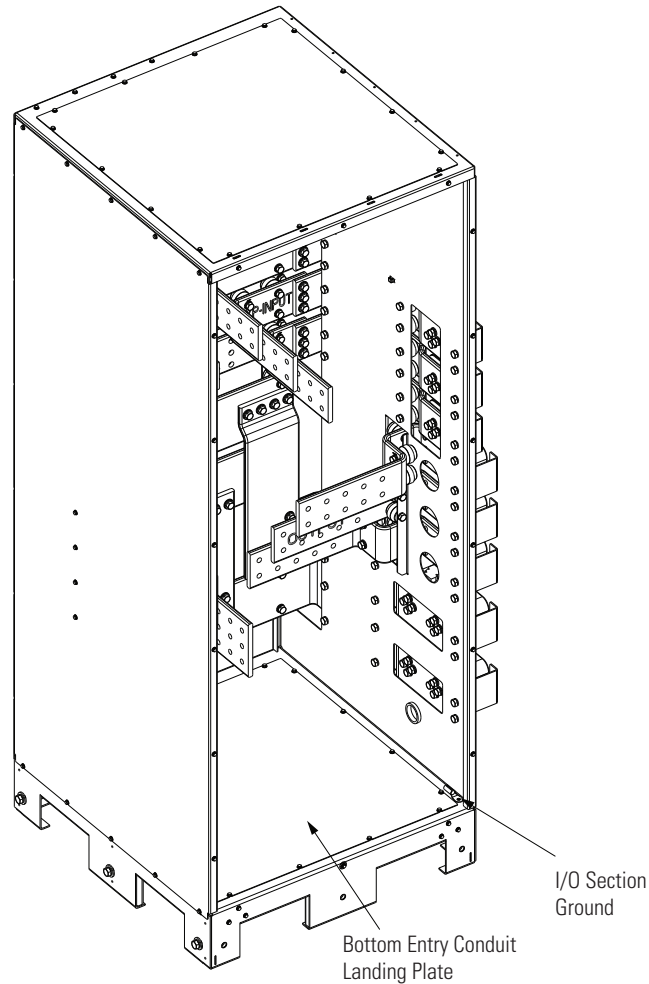
- Disconnect the cable from the HMI control panel and stow carefully in the cabinet.
- Remove the retaining screw located inside the door at the bottom hinge pivot point, then lift the door off.
- Retain the hardware for later use.

4. Remove the deadfront panels from the I/O and ISBM/PM sections (see [Figure 31](#)).
5. Proceed to paragraph [4.3.2 Electrically Connecting the UPS Sections](#)

4.3.2 Electrically Connecting the UPS Sections

1. Remove the I/O bottom entry conduit plate and retain the hardware for later use (see [Figure 32](#)).

Figure 32. Section Bottom Entry Landing Conduit Plate

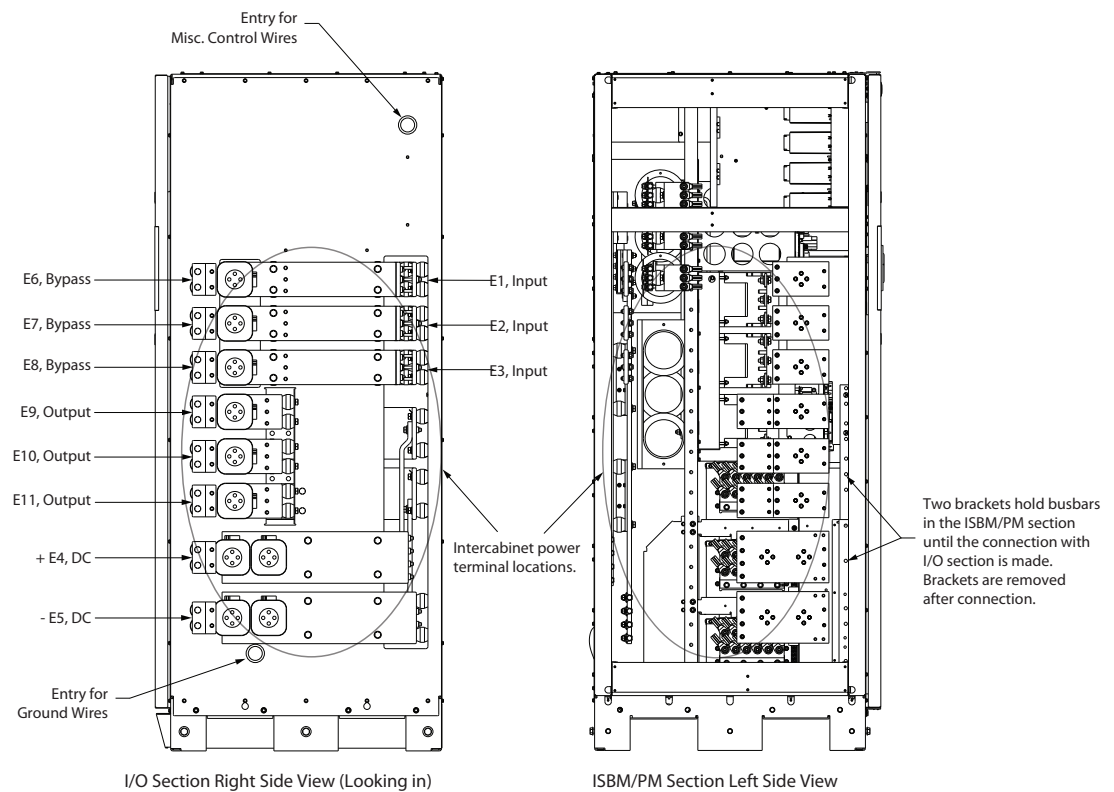


NOTE

AC and DC input inter-cabinet power wiring harnesses are secured in the ISBM/PM to brackets for shipping in the left side of the ISBM section. The shipping brackets can be removed and discarded after releasing the power wiring.

2. Disconnect the power wiring harnesses from the ISBM shipping brackets (see [Figure 33](#)).

Figure 33. UPS Intercabinet Power Terminal Locations



3. Locate the AC and DC input inter-cabinet power wiring harnesses - long cables labeled (color):

AC Input	E1 (A, black)
	E2 (B, red)
	E3 (C, blue)
AC Output	E9 (A, black)
	E10 (B, red)
	E11 (C, blue)
Bypass	E6 (A, black)
	E7 (B, red)
	E8 (C, blue)
DC	E4 (+) (Red)
	E5 (-) (Black)

4. Locate the inter-cabinet wiring terminal hardware kit packed on the bottom right side of the ISBM section.
5. Using hardware from the inter-cabinet wiring terminal hardware kit (see [Table 7](#)), connect phase A, B, and C cable lug connections to the I/O AC Input terminals. Follow the callout details in [Figure 33](#) to connect the correct cable lug to the proper terminals. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.

CAUTION

When connecting the battery cables, verify the cables are connected to the correct terminals.

6. Using hardware from the inter-I/O cabinet wiring terminal hardware kit (see [Table 7](#)), connect the positive and negative cable lug connections to the DC Input to I/O terminals. Follow the callout details in [Figure 33](#) to connect the correct cable lug to the proper terminals. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
7. Using hardware from the inter-cabinet wiring terminal hardware kit (see [Table 7](#)), connect phase A, B, and C cable lug connections to the I/O AC output terminals. Follow the callout details in [Figure 33](#) to connect the correct cable lug to the proper terminals. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
8. Install the remaining hardware (three washers, conical washers, and nuts) onto the I/O AC Input terminals designated for the I/O and secure the hardware (see [3.2.4 UPS System Power Wiring Preparation](#)).
9. When all wiring is complete, reinstall the safety shield panels removed in previous steps.

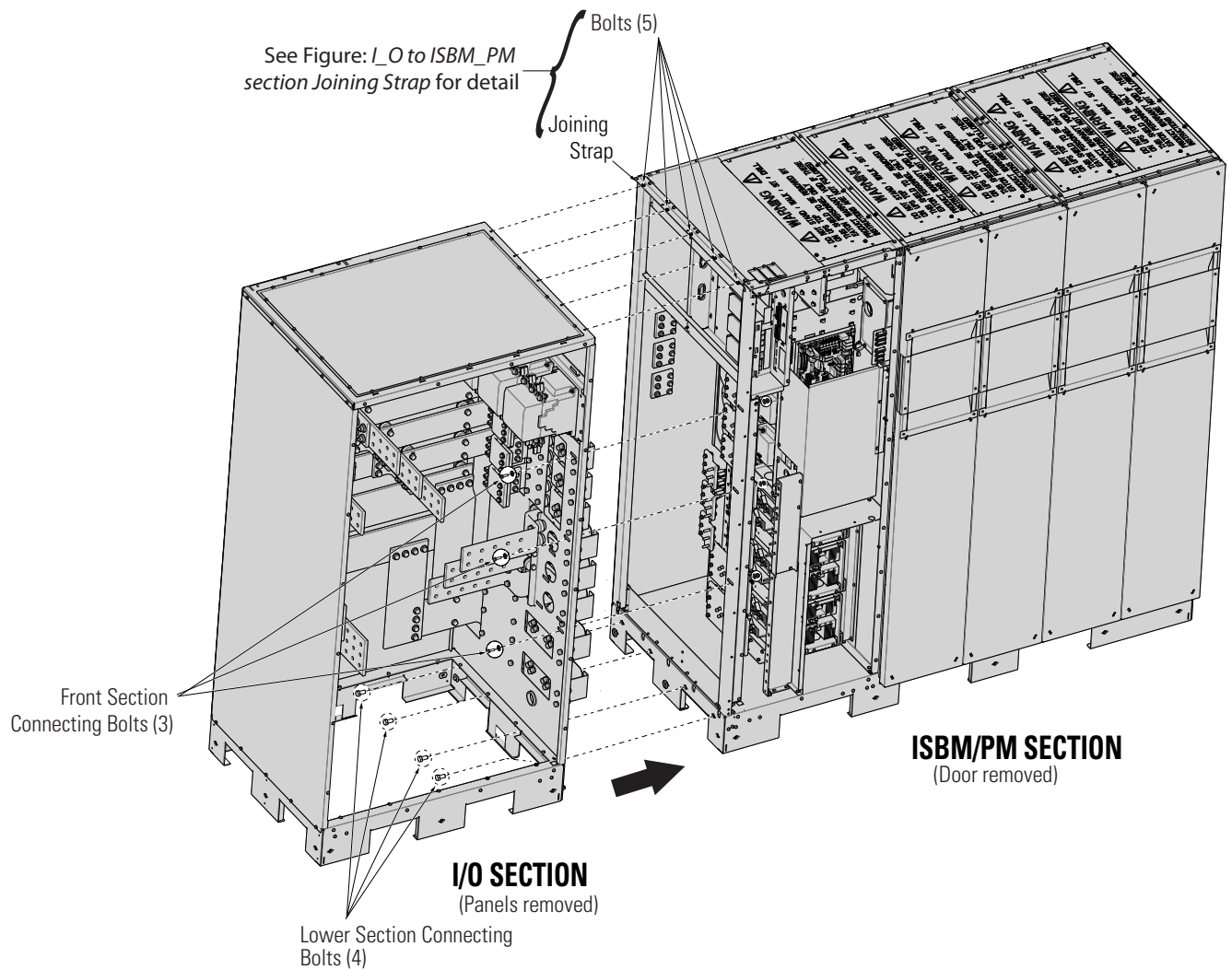
4.3.3 Mechanically Joining the UPS Sections

**NOTE**

Clearance between the I/O and the ISBM/PM sections must be less than 1/2" so that joining brackets can be installed.

1. Using a forklift with the forks in the front forklift slots, position the I/O section right side against the ISBM/PM section left side and the front of the cabinet bases are flush with each other. Make sure to align the connecting bolt holes in the I/O base and the joining strap on the upper ISBM section (see [Figure 34](#)).

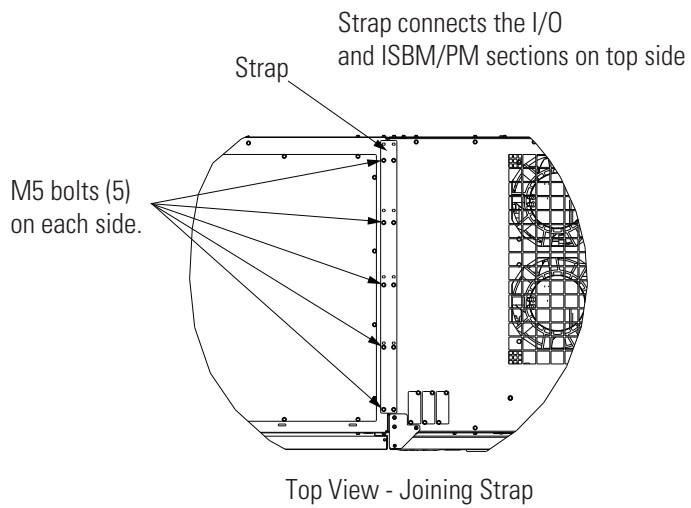
Figure 34. I/O to ISBM/PM Section Joining

**NOTE**

Bolts, nuts and washers are provided in the hardware kit (packed inside a drawstring bag tied to the I/O section) for connecting the I/O and ISBM/PM sections (see [Table 9](#)).

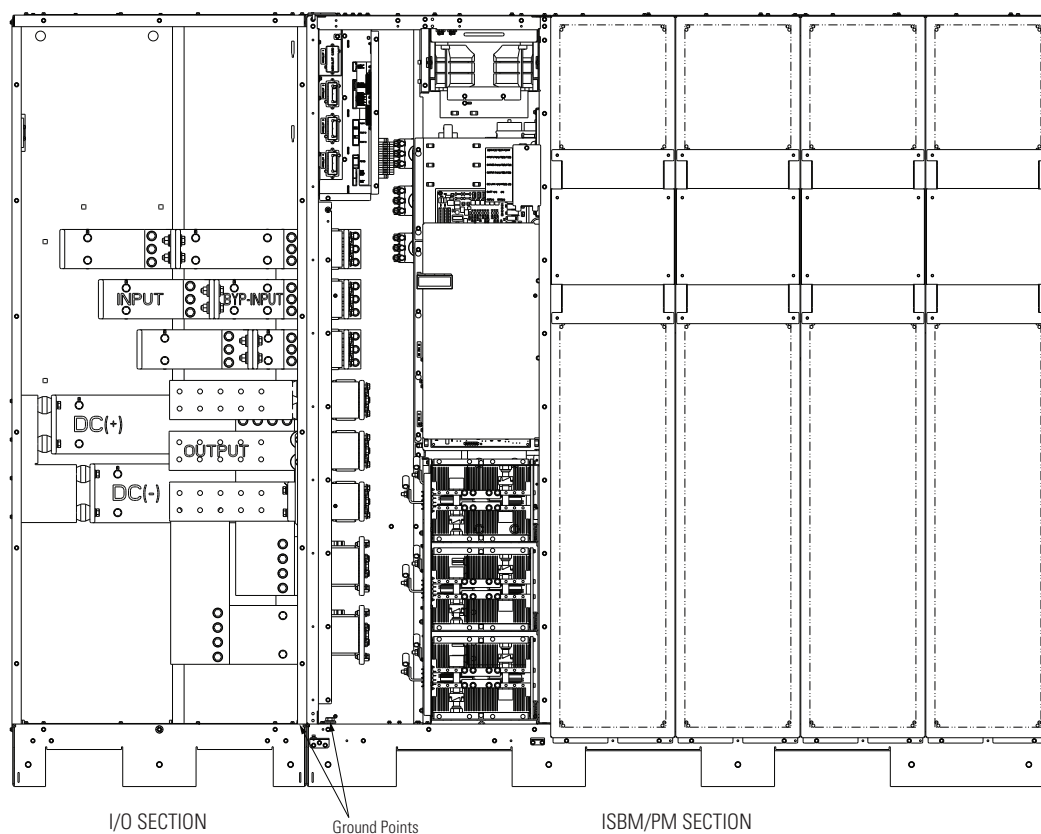
2. Using the parts from the hardware kit connect the I/O and ISBM/PM sections as follows:(see [Figure 34](#)).
 - a. Use the four M12 connecting bolts and secure the lower sections.
 - b. Connect the front of the sections using three M6 bolts with nuts and washers.
 - c. Align the holes on the joining strap between the I/O and ISBM/PM sections. Secure the bracket with five M5 bolts from the hardware kit (see [Figure 35](#)).

Figure 35. I/O Section to ISBM /PM Section Joining Strap



3. Connect the ground cable from the ISBM/PM to the I/O section ground points using the supplied hardware (see [Figure 36](#) and [Table 9](#)). Route the cable through the ground access hole in the I/O section (see [Figure 33](#)).

Figure 36. I/O and ISBM/PM in Position



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 [4.6 Installing UPS External and Battery Power Wiring](#).

4.5 Distributed Bypass Tie Cabinet Installation



NOTE The tie cabinet must contain Module Output Breakers (MOBs) with dual auxiliary contacts for control of the system.

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 [4.8 Installing a REPO Switch](#) to complete the wiring of the UPS.

4.6 Installing UPS External and Battery Power Wiring



NOTE The ISBM/PM section is shipped with debris shields covering the ventilation grills on top of the sections (see [Figure 37](#)). 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.

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

4.6.1 External Power Wiring Installation

To install wiring to connections:

1. If not previously removed, remove the I/O front panel (see [Figure 27](#) and deadfront panel [Figure 31](#)).



NOTE

Depending on customer requirements, external power cables can be routed through either the top or bottom conduit panels.

2. Route the input and output cables through either the top or bottom of the cabinet to the UPS terminals. See [Figure 38](#) through [Figure 41](#) for wiring access information and terminal locations.

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

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

Retain all panel hardware.

Figure 37. ISBM and ISBM/PM Section Debris Shields

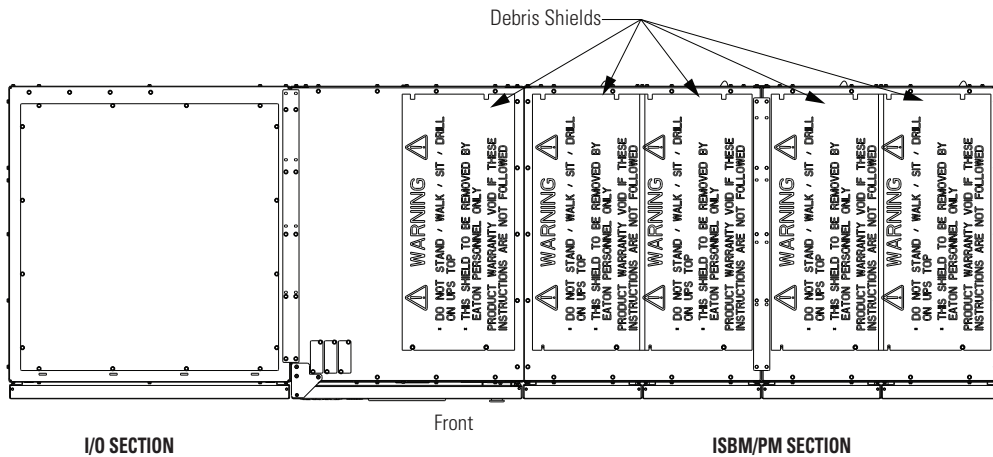
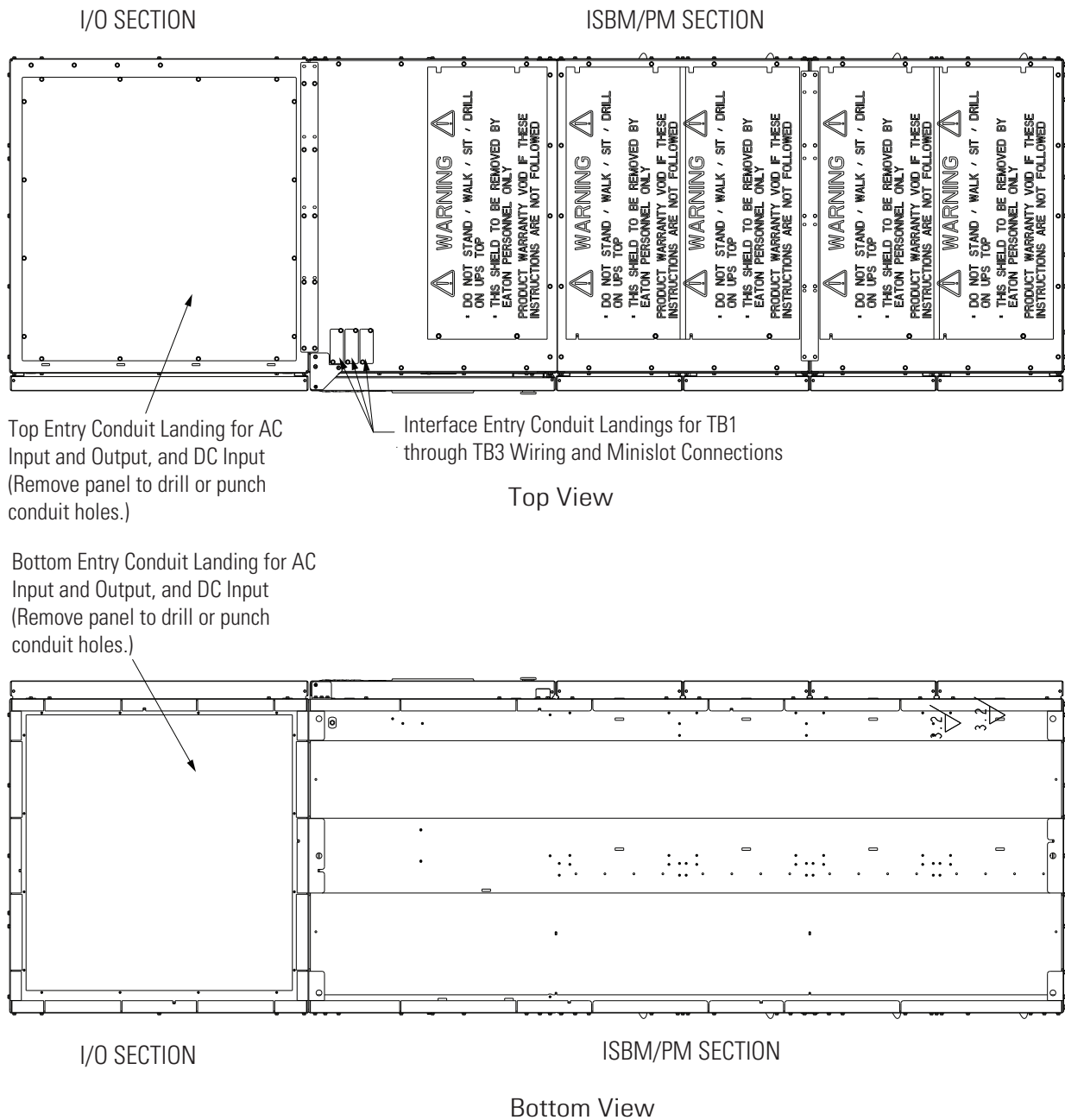


Figure 38. ISBM and ISBM/PM Section Conduit and Wire Entry Locations



3. Locate the external wiring terminal hardware kit packed on the bottom left side of the ISBM section.
4. Using hardware from the external wiring terminal hardware kit (see [Table 9](#)), connect phase A, B, and C rectifier input power wiring from the utility source to the rectifier input terminals (E1, E2, E3) in the I/O section (see [Figure 40](#) and [Figure 41](#). See paragraph [3.2.4 UPS System Power Wiring Preparation](#) UPS System Power Wiring Preparation for wiring and termination requirements.

5. Using hardware from the external wiring terminal hardware kit (see [Table 9](#)), connect phase A, B, and C wiring from the output terminals the UPS unit to the customer-supplied tie cabinet or load distribution panel. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) UPS System Power Wiring Preparation for wiring and termination requirements.
6. Proceed to paragraph [4.6.2 Battery Power Wiring](#).
7. Using hardware from the external wiring terminal hardware kit (see [Table 9](#)), connect phase A, B, and C power wiring from output terminals (E9, E10, E11) to the critical load. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
8. Proceed to paragraph [4.6.2 Battery Power Wiring](#).

Figure 39. I/O Section Power Terminal Locations

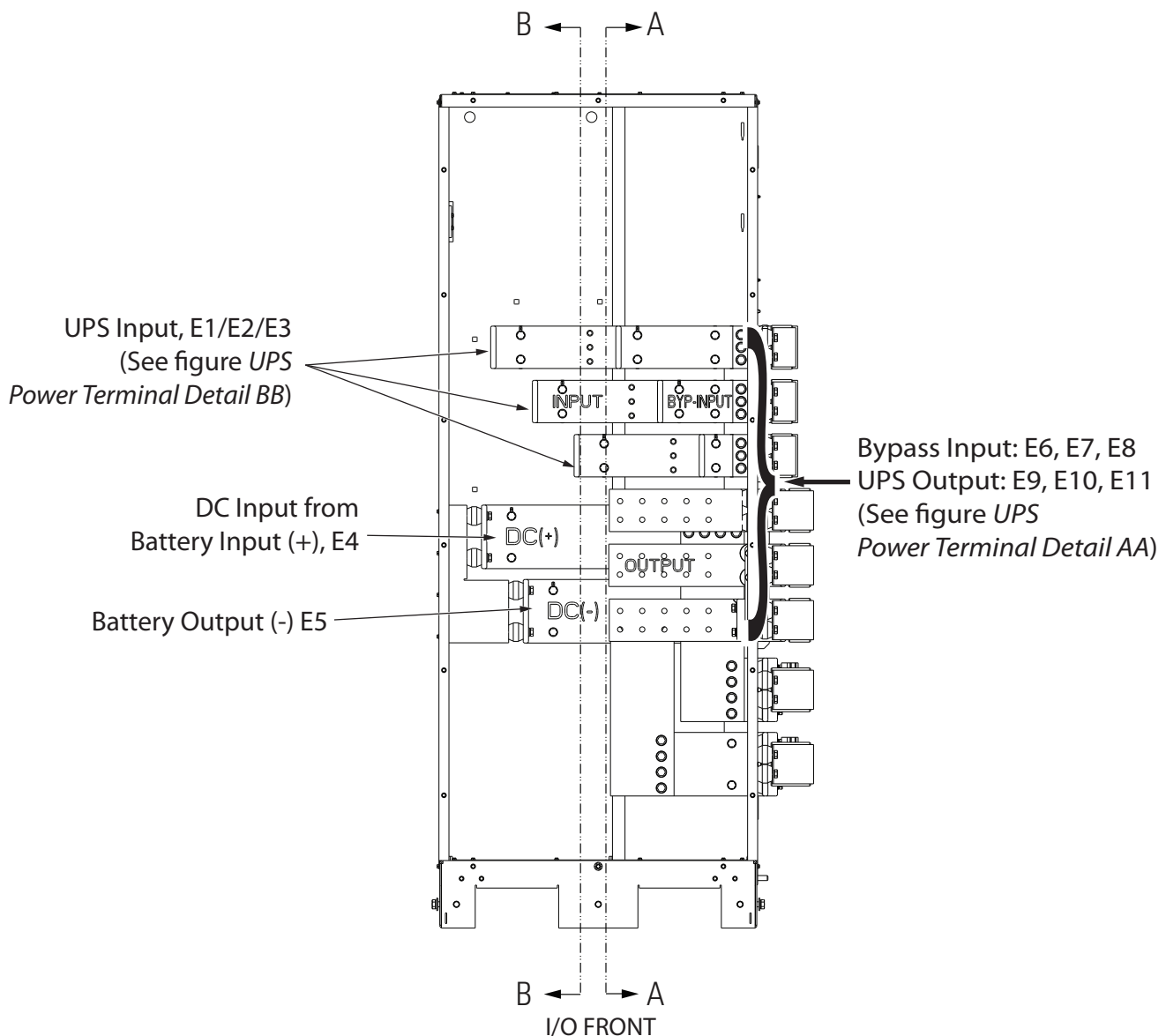
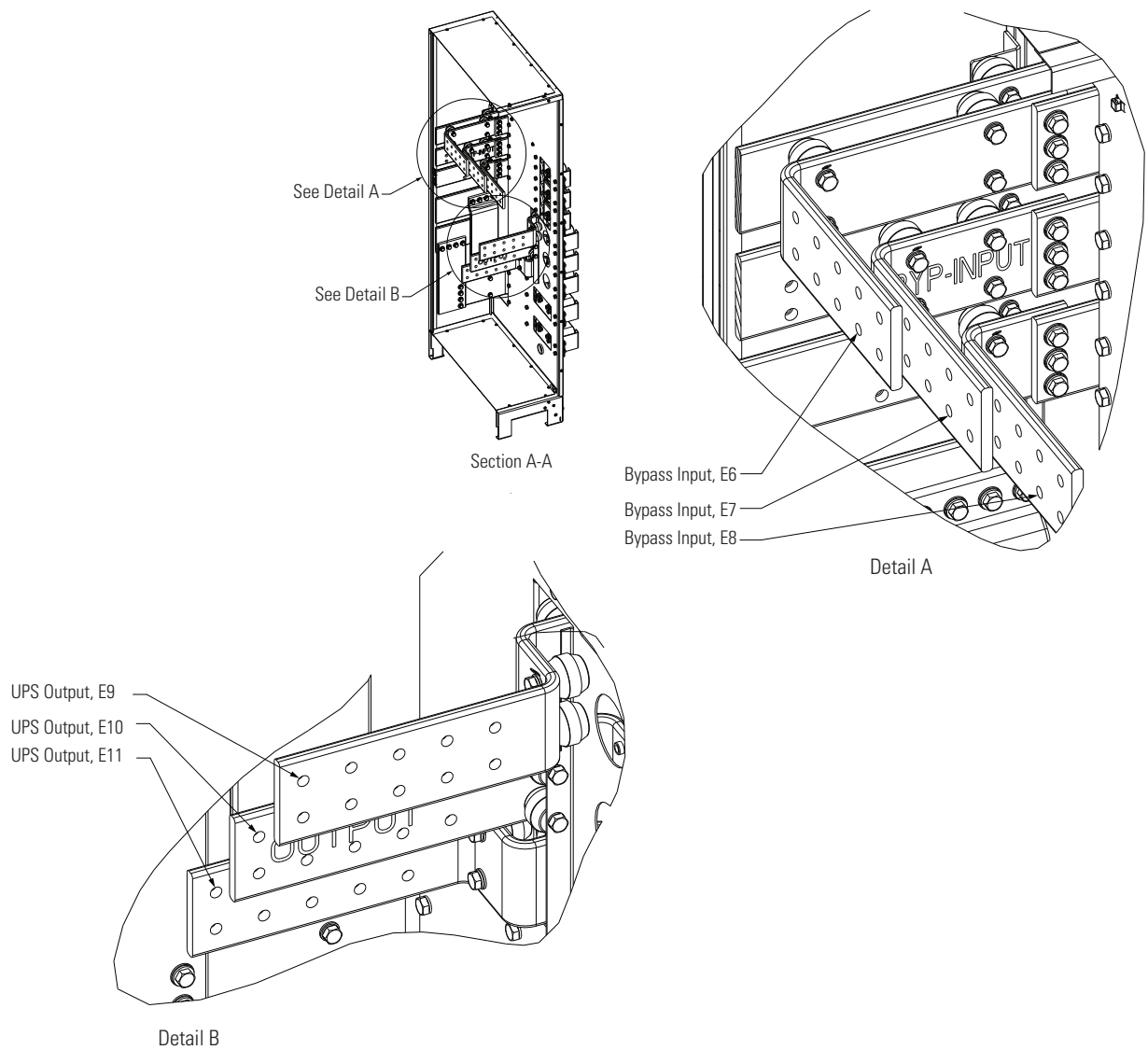


Figure 40. I/O Section Power Terminal Detail AA



4.6.2 Battery Power Wiring

CAUTION

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



ATTENTION!

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

To install wiring to connections:

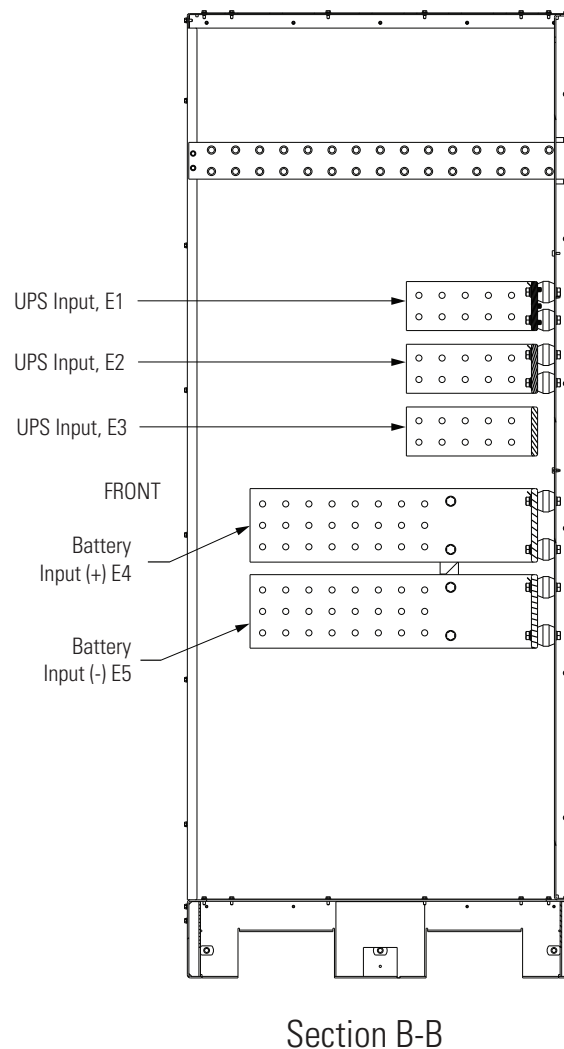
NOTE **Battery Cable Routing Requirements using Conduit:**



- 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.
-

1. Route the battery cables to the I/O section and the battery system or battery disconnect. See [Figure 38](#), [Figure 39](#), and [Figure 41](#) for wiring access information and terminal locations.

Figure 41. UPS Power Terminal Detail BB



2. Using hardware from the external wiring terminal hardware kit (see [Table 9](#)), connect the positive, negative, and ground DC power wiring from the battery systems or disconnects to the ISBM section battery and ground terminals. See paragraph [3.2.4 UPS System Power Wiring Preparation](#) for wiring and termination requirements.
3. 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.
4. When all wiring is complete, reinstall the conduit panel removed in [4.6.1 External Power Wiring Installation](#) Step 2 and secure with the retained hardware.
5. Reinstall the panels removed in paragraph [4.6.1 External Power Wiring Installation](#), Step 1 and secure with the retained hardware.

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, TB2, and TB3 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, the conduit must be installed between each device and the UPS cabinet.



NOTE

Terminal block 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 26](#)).
 3. Terminal block TB3 is accessible on the right side of the Minislot communication bay. To gain access to terminal block TB1, TB2, and the left interface entry conduit landing plates, remove the screws securing the ISBM deadfront panel and remove the panel. Retain the hardware for later use (see [Figure 31](#)).
 4. Remove the interface entry conduit landing plates to drill or punch holes (see [Figure 38](#)).
 5. 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.

6. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.4 UPS System Power Wiring Preparation](#), [Table 16](#), [Table 17](#), and [Figure 31](#) through [Figure 45](#).
7. Route the wiring through the wire entry in the Minislot panel (see [Figure 43](#)).
8. Wire the connectors to the wires to connect the wiring.
9. If wiring TB1 battery interface connections, proceed to paragraph [4.7.2 TB1 Battery Interface Connections](#); if wiring the Minislot connections only, proceed to paragraph [4.7.3 Minislot Connections](#); otherwise, proceed to Step 10.
10. Reinstall the ISBM deadfront panel and secure with the retained hardware.

11. Close the front door and secure the latch.

Figure 42. ISBM Section Interface Terminal Locations.

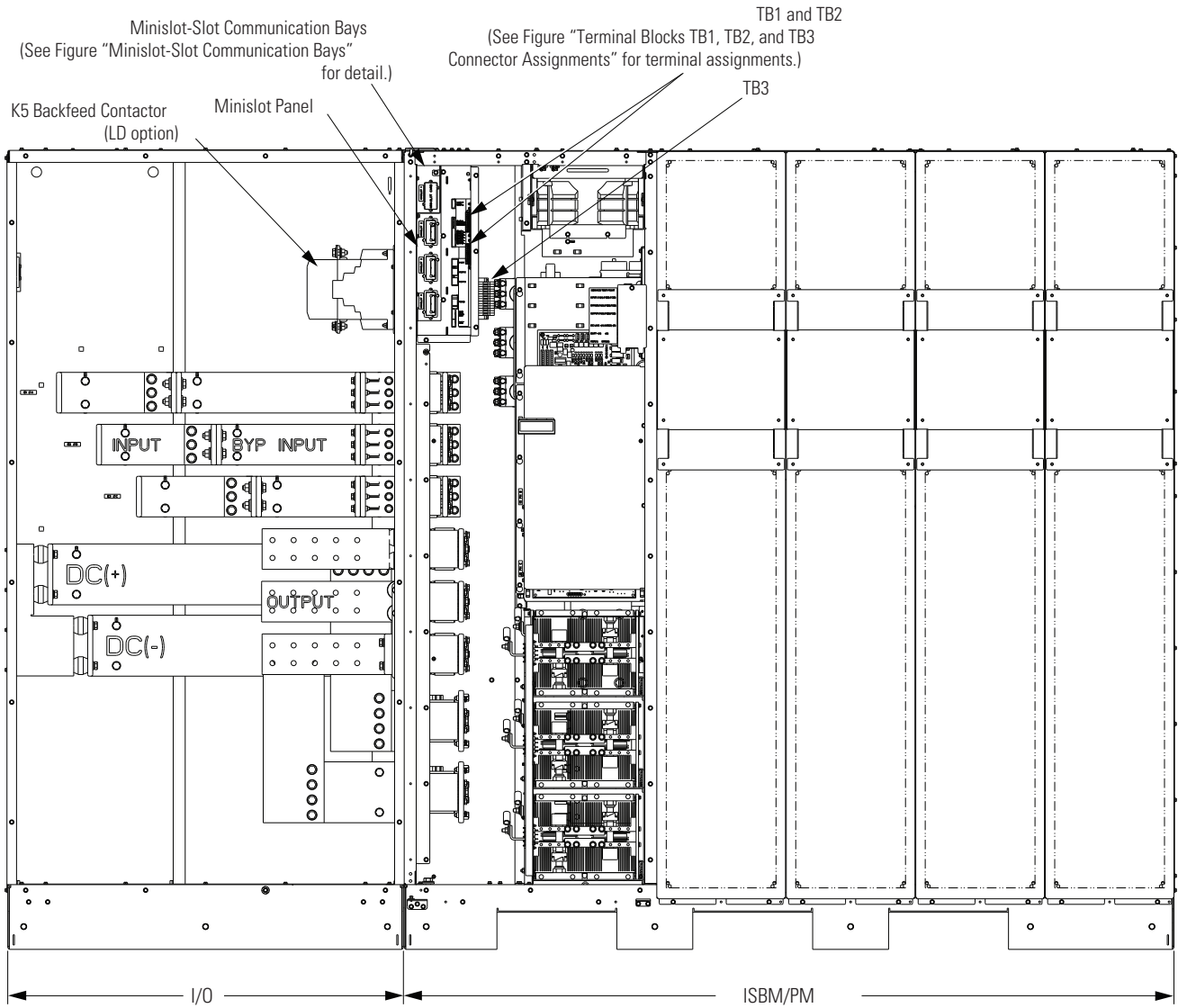


Figure 43. Minislot Wire Entry

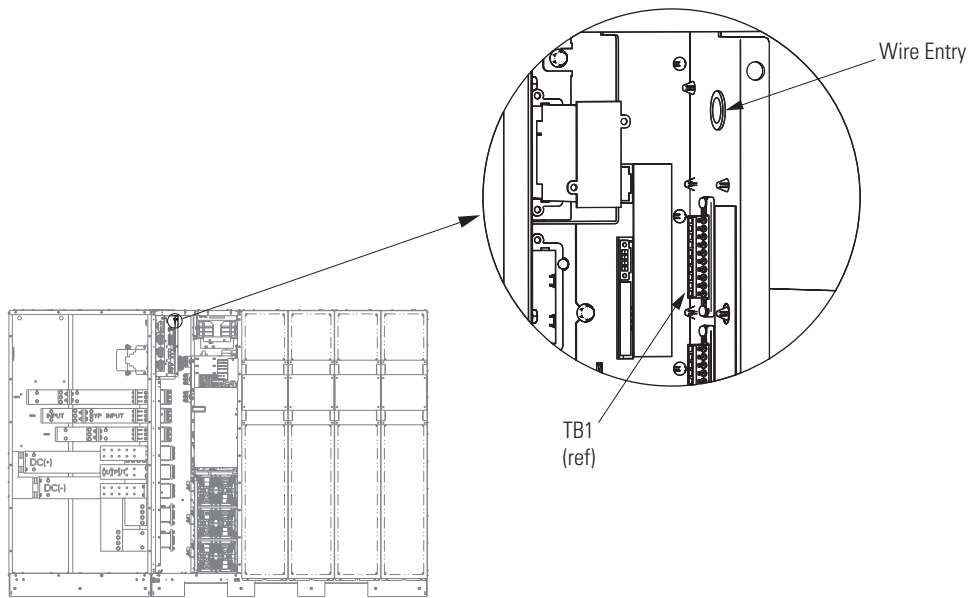
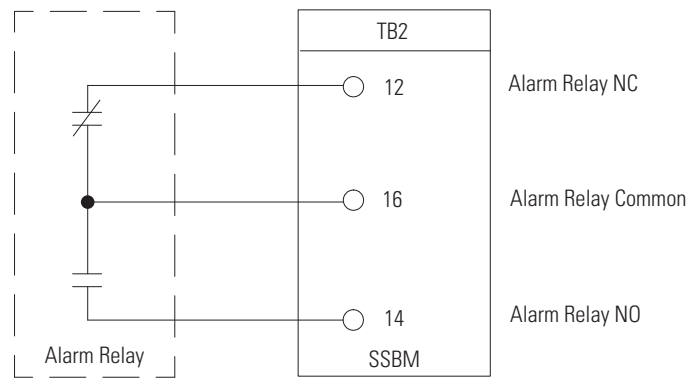


Table 17. TB1, TB2, and TB3 Interface Connections

Terminal TB1	Name	Description
1	BATT DC UVR	Output: Contacts used to allow battery breaker to be closed and tripped.
2	BATT DC UVR RTN	
3	BATT AUX	Input: Normally-open contact used to indicate when UPS battery breaker is open or closed.
4	BATT AUX RTN	
5	Not Used	
6	Not Used	
7	K3/MOB DC UVR	Output: Contacts used to allow MOB to be closed and tripped.
8	K3/MOB DC UVR RTN	
9	K3/MOB AUX	Input: Normally-closed contact opens when MOB is closed.
10	K3/MOB AUX RTN	
Terminal TB2	Name	Description
1	K5 DC Drive	Output: Contacts used to open/close bypass contactor.
2	K5 DC Drive RTN	
3	K5 CONT AUX	Input: Normally-closed contact opens when bypass contactor is closed.
4	K5 CONT AUX RTN	
5	NOT USED	
6	NOT USED	
7	K5 DC ST	Output: Contacts used to open bypass breaker or disconnect.
8	K5 DC ST RTN	
9	K5 AUX	Input: Normally-closed contact opens when bypass breaker is closed.
10	K5 AUX RTN	
Terminal TB3	Name	Description
1	BATT UVR 480V - ØA	Output: 3-Phase Control Power for Lithium-Ion Battery Cabinet.
2	BATT UVR 480V - ØB	
3	BATT UVR 480V - ØC	
4	NOT USED	
5	NOT USED	
6	BYP VOLT ØA	Output: 3-Phase UPS Bypass Voltage to Sync Box for Sync Control.
7	BYP VOLT ØB	
8	BYP VOLT ØC	
9	Out VOLT ØA	Output: 3-Phase UPS Output Voltage to Sync Box for Sync Control.
10	Out VOLT ØB	
11	Out VOLT ØC	
12	BYP VOLT RTRN ØA	Input: 3-Phase Synchronization Source sent from Sync Box for Sync Control.
13	BYP VOLT RTRN ØB	
14	BYP VOLT RTRN ØC	

Figure 44. Typical Alarm Relay Connection



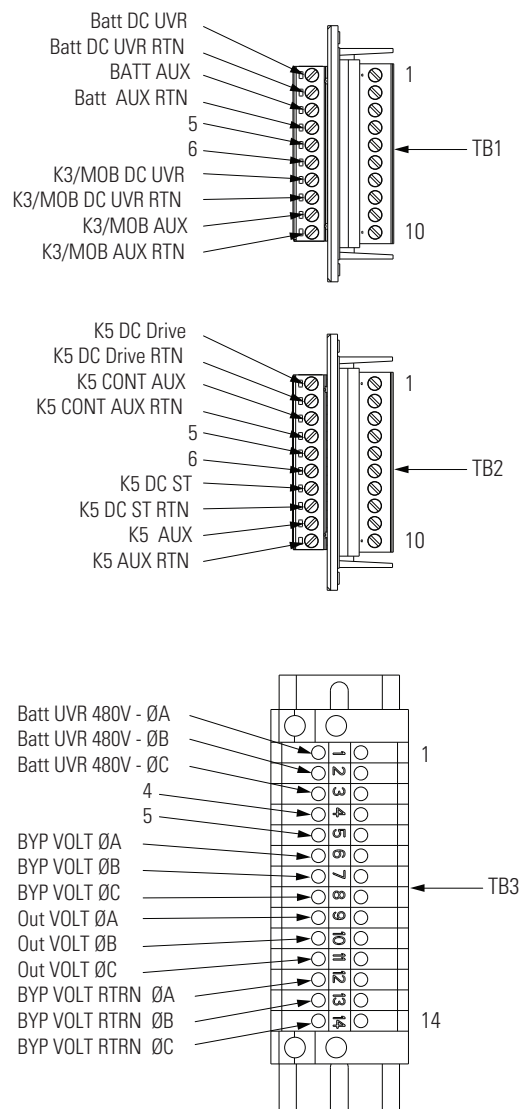
NOTE Alarm relay contacts have a maximum current rating of 5A and a switched voltage rating of 30 Vac and 28 Vdc.

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

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

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

Figure 45. 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 26](#)).
3. To gain access to terminal block TB1 and the interface entry conduit landing plates, remove the ISBM deadfront panel (see [Figure 31](#)).
4. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.4 UPS System Power Wiring Preparation](#), [Table 17](#), and [Figure 42](#) through [Figure 46](#).

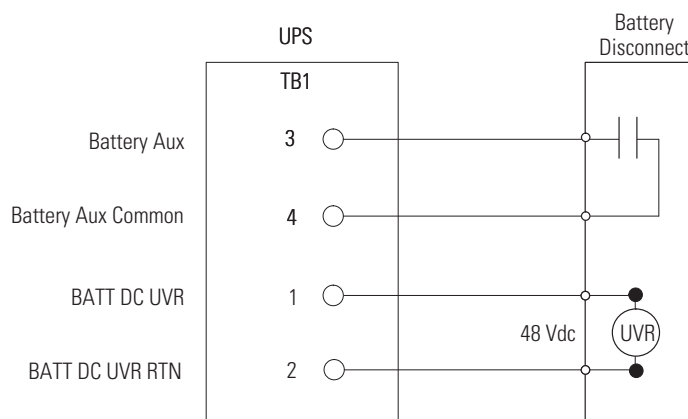
i **NOTE** When installing UVR and battery aux interface wiring to the UPS interface terminals, conduit must be installed between the UPS and battery system.

5. Remove the UPS cabinet interface entry conduit landing plates to drill or punch holes (see [Figure 38](#)).
6. Reinstall the interface entry plates and install the conduit.

i **NOTE** The 9395XC system can trip a maximum of six battery cabinets total. If more than six battery cabinets in total are needed in a separate UPM battery configuration, DO NOT hook up the UVRs.

7. Route the UVR and battery aux wiring from the battery disconnects to the UPS cabinet. See [Figure 38](#) for UPS wiring access information and terminal locations.
8. Connect the wiring to TB1 terminals.
9. Reinstall the deadfront panel.
10. If wiring Minislot connections, proceed to paragraph [4.7.3 Minislot Connections](#); otherwise, proceed to Step 12.
11. Close the door and secure the latch.

Figure 46. Typical Battery Interface Connection



NOTE: Battery aux and DC UVR wiring should be a minimum of 18 AWG.

4.7.3 Minislot Connections

i **NOTE** LAN and telephone drops for use with Minislot cards must be provided by the customer.

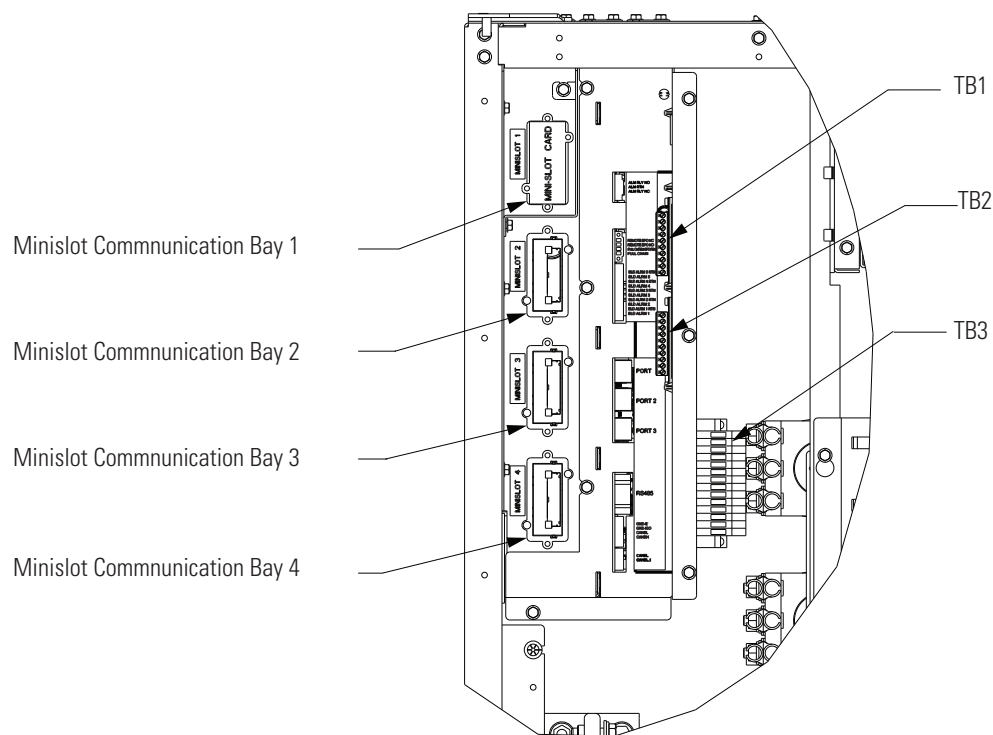
i **NOTE** When installing external wiring to Minislot cards, a conduit must be installed to the UPS cabinet. When installing internal wiring to Minislot terminals, route the wiring through the internal opening in the Minislot communication bay and the interface entry conduit landing plates.

For installation and setup of an Minislot card, contact an Eaton service representative (see [1.8 Getting Help](#)).

To install wiring to connections:

1. If not already installed, install the LAN drops.
2. Unfasten the front door latch and swing the door open (see [Figure 26](#)).
3. Remove a UPS top cabinet interface entry conduit landing plate(s) as required to drill or punch holes (see [Figure 38](#)).
4. Reinstall the interface entry plates and install the conduit.
5. Route and connect the LAN, telephone, and other cables to the appropriate Minislot cards. See [Figure 42](#) and [Figure 47](#) for Minislot communication bay locations.
6. Close the front door and secure the latch.
7. Refer to the manual supplied with the Minislot card for operator instructions.

Figure 47. Minislot 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 48](#) shows a REPO switch.



NOTE

Before installing a REPO switch, verify that the UPS was installed according to the instructions in paragraphs [4.2 Unloading the UPS Cabinet from the Pallet](#) through [4.7 Installing Interface Connections](#).



NOTE

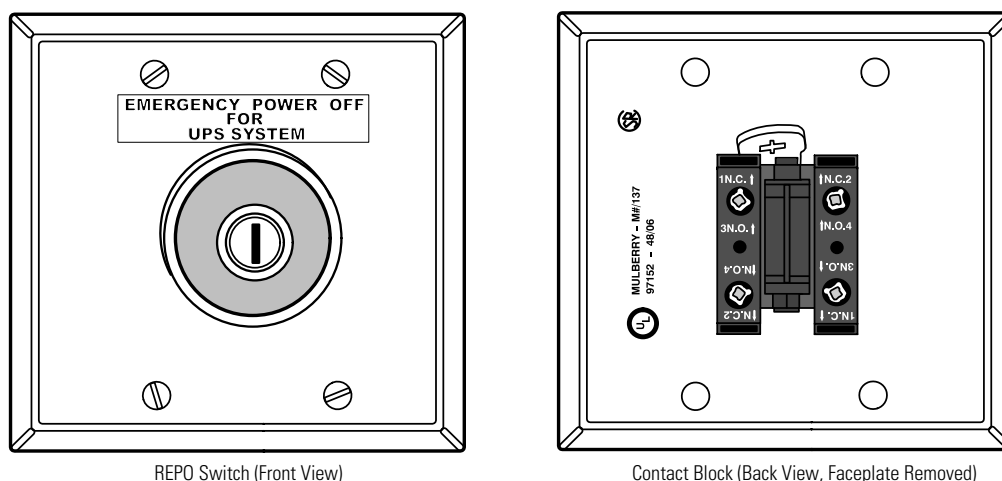
When installing the REPO switch, you must install conduit between the device and the UPS cabinet for wiring the switch.

i	NOTE	Remove the UPS cabinet interface entry conduit landing plates to drill or punch holes (see Figure 38).
i	NOTE	The REPO switch must be a normally-open or normally-closed latching-type switch not tied into any other circuits.
i	NOTE	This procedure is intended to be used for the installation of the Eaton-supplied REPO switch. If installing another manufacturer's switch, use this procedure only as a guide.
i	NOTE	The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.

To Install a REPO switch:

1. Verify the UPS system is turned off and all power sources are removed. See [Chapter 7 UPS Operating Instructions](#) for shutdown instructions.
2. Securely mount the REPO switch. Recommended locations include operator's consoles or near exit doors. See [Figure 23](#) for enclosure dimensions and wiring knockouts.
3. Unfasten the front door latch and swing the door open (see [Figure 26](#)).
4. Remove the front 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 48. REPO Switch

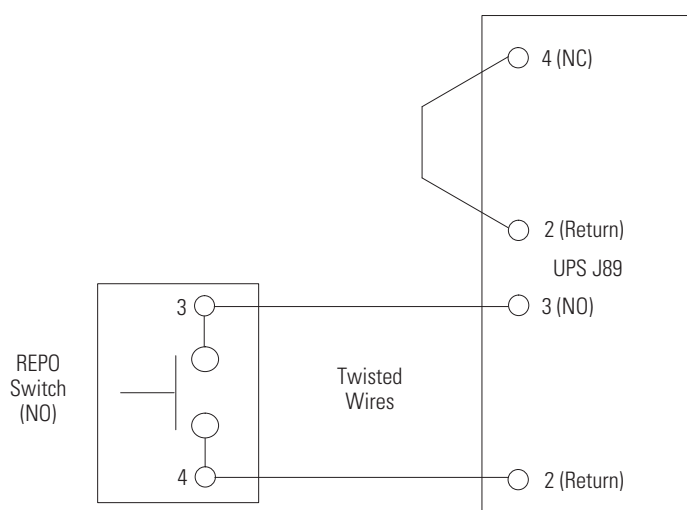


5. To gain access to J89 MCU Board and the interface entry conduit landing plate, remove the screws securing the ISBM deadfront panel and remove the panel. Retain the hardware for later use (see [Figure 42](#)).
6. Remove the right interface entry conduit landing plate to drill or punch holes (see [Figure 38](#)).
7. Reinstall the interface entry plate and install conduit.
8. To locate the appropriate terminals and review the wiring and termination requirements, see paragraph [3.2.4 UPS System Power Wiring Preparation](#), [Table 17](#), and [Figure 42](#) through [Figure 45](#).
9. Route and connect the wiring as shown in [Table 18](#) and [Figure 49](#).

10. If the normally-closed J89 MCU Board jumper (pins 2 to 4) connection in the UPS is not used, connect a jumper wire between pins 1 and 2 on J89 MCU.
11. If you are installing multiple REPO switches, wire additional switches in parallel with the first REPO.

Table 18. REPO Wire Terminations

From REPO Station(s) Switch Contact Block (Either Block)	To Customer Interface Terminal Board J89 in UPS Cabinet	Wire Size	Tightening Torque
3 NO	J89 3	Twisted Wires (2)	7 lb in (0.8 Nm)
4 NO	J89 4	14 22 AWG (0.75 4.0 mm ²)	

Figure 49. Normally-Open REPO Switch Wiring

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

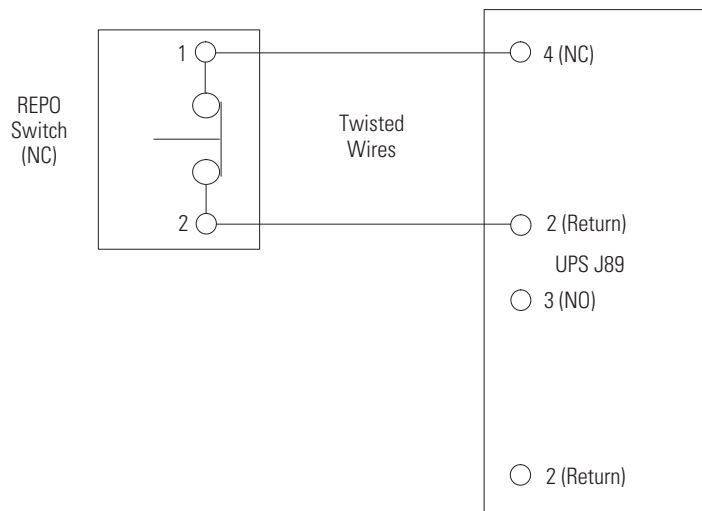
NOTE The REPO switch must be a latching-type switch not tied to any other circuits.

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

12. If required, install wiring from the REPO switch to the trip circuitry of the upstream protective devices. A second contact block is provided on the REPO switch for this function (see [Figure 48](#)). The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.
13. Reinstall the top Interface entry conduit landing 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 50](#) shows the wiring connections if the normally-closed REPO contacts are used and [Figure 51](#) shows alternative methods of connecting a REPO switch if using another manufacturer's switch.

Figure 50. Normally Closed REPO Switch Wiring

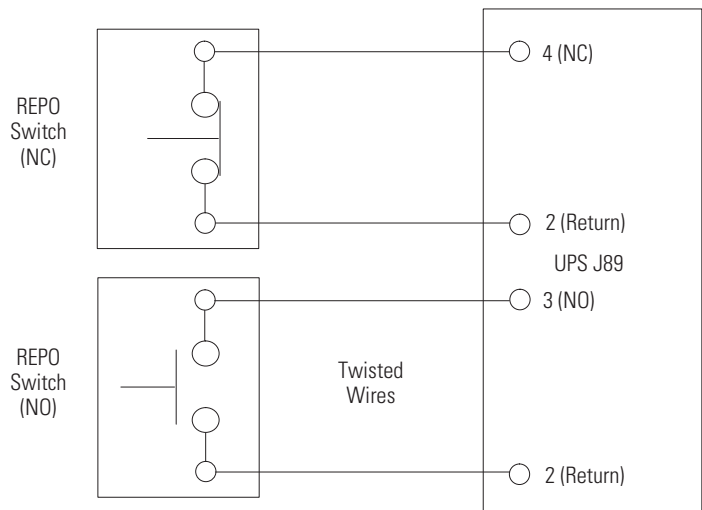


NOTE REPO switch rating is 24 Vdc, 1A minimum.

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

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

Figure 51. Normally Closed and Normally Open REPO Switch Wiring



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

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

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

If removed for UPS transport, reinstall the optional dress skirts at the bottom of the I/O and ISBM/PM cabinets (see [Figure 26](#) and [Figure 28](#)).

4.9 Installing Options, Accessories, and Distributed Bypass Control Wiring

To install options, accessories, and distributed bypass control wiring, see Installing Options and Accessories [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 in [1.9 *Warranty*](#) 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.

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.

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.
- Joining brackets are installed between the I/O and ISBM/PM sections.
- inter-cabinet power wiring is installed between the I/O and ISBM/PM sections.
- inter-cabinet interface wiring is installed between the I/O and ISBM/PM sections
- A cabinet grounding/mounting kit is installed between any cabinets that are bolted together.
- All conduits and cables are properly routed to the UPS and any ancillary cabinets.
- All power cables are properly sized and terminated.
- Neutral conductors are installed or bonded to ground per requirements.
- Battery cables are terminated on E4 (+) and E5 (-).
- Battery aux contact signal wiring is connected from the UPS to the battery disconnect.
- Battery UVR signal wiring is connected from the UPS to the battery disconnect.
- LAN and telephone 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 2 to 4 on J89) is jumpered if not used.
- Alarm relays and building alarms are wired appropriately. (OPTIONAL)
- A remote battery disconnect control is mounted in its installed location and its wiring is terminated inside the UPS and battery cabinet. (OPTIONAL)
- Accessories are mounted in installed locations and wiring is terminated inside the UPS cabinet. (OPTIONAL)
- The debris shield covering the UPS cabinet ventilation grill is removed.
- Startup and operational checks are performed by an authorized Eaton Customer Service Engineer.

Notes

Chapter 5 Installing Options and Accessories

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

- Conduit must be installed between the UPS cabinet and the device for signal wiring. Conduit must be installed between the device and the power source for power wiring. Install the signal wiring in separate conduit from the power wiring.
- Conduit and wiring between the UPS and the device are to be supplied by the customer.
- Maximum distance between the UPS cabinet and the device is not to exceed 150 meters (500 feet).
- Use Class 1 wiring methods (as defined by the NEC) for interface and power wiring from 30 to 600V.
- Use Class 2 wiring methods (as defined by the NEC) for interface and power wiring up to 30V. The wire should be rated at 24V, 1A minimum.
- Signal wiring should be a minimum of 22 AWG and a maximum of 14 AWG. The wire should be shielded twisted pair, rated for 5A maximum. Power wiring should be a minimum of 22 AWG and a maximum of 14 AWG. The wire should be rated for 1A minimum.
- Use only 75°C copper wire.

The procedures in this section describe the installation of Distributed Bypass Control wiring for:

- Controller Area Network (CAN)
- Pull Chain wiring with Module Output Breakers (MOBs).

5.1 Installing Distributed Bypass Control Wiring



NOTE

When installing interface wiring for the CAN and pull chain, conduits must be installed between UPSs.

Interface control terminals are located on the right side of the Minislot communication bay (see [Figure 52](#)).

Figure 52. External Interface Terminals Detail

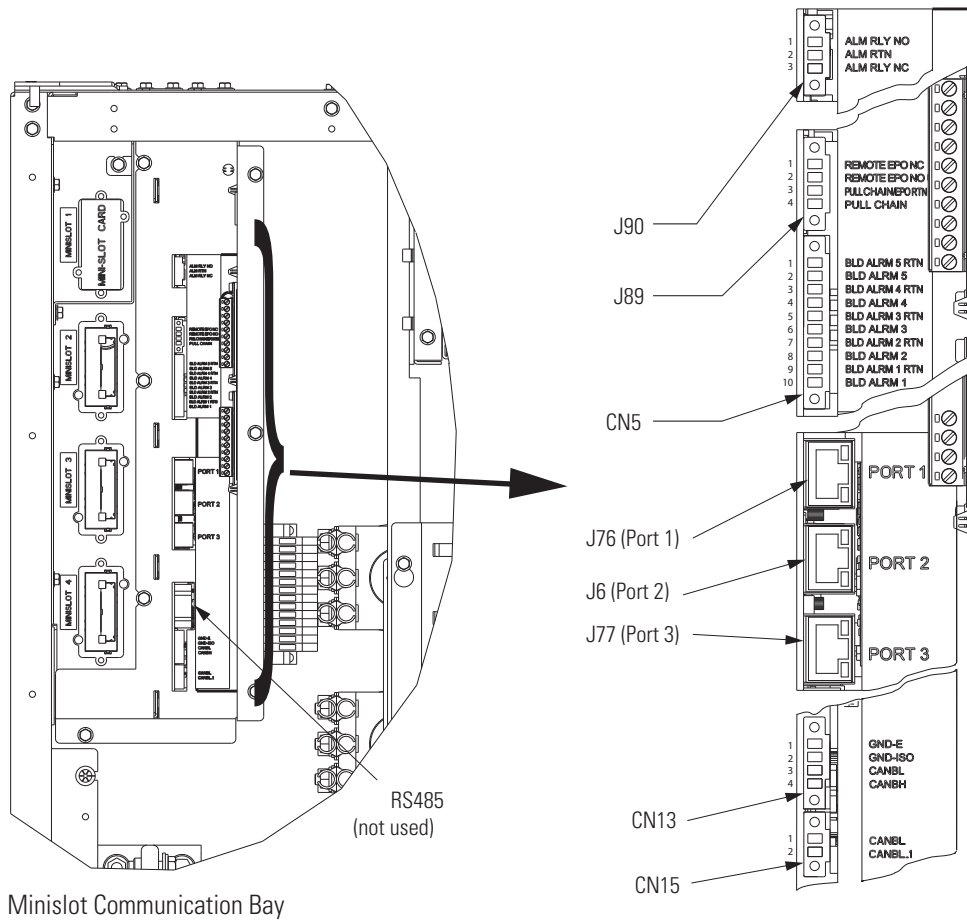


Table 19. External Interface Terminal Connections

Connection to MCU No.	Terminal	Name	Description
J90	1	ALM RLY NO	Output: General purpose normally-open (NO) relay contact.
	2	ALM RTN	Output: ALM RTN is shared for (NC) and (NO) relay contacts.
	3	ALM RLY NC	Output: General purpose normally-closed (NC) relay contact.

Table 19. External Interface Terminal Connections (Continued)

Connection to MCU No.	Terminal	Name	Description
J89	1	REMOTE EPO NC *(REPO NC)	Input: Normally-closed dry contact used to activate UPS EPO from a remote switch
	2	REMOTE EPO NO *(REPO NO)	Input: Normally-open dry contact used to activate UPS EPO from a remote switch.
	3	PULL CHAIN/EPO RTN	Input: Shared RTN for PULL CHAIN and REMOTE EPO functions.
	4	PULL CHAIN	Input: Backup Control for parallel operation.
CN5	1	BLD ALRM 5 RTN (Building Alarm 5 Return)	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for on maintenance bypass.
	2	BLD ALRM 5 (Building Alarm 5)	
	3	BLD ALRM 4 RTN (Building Alarm 4 Return)	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for on generator.
	4	BLD ALRM 4 (Building Alarm 4)	
	5	BLD ALRM 3 RTN (Building Alarm 3 Return)	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for charger off.
	6	BLD ALRM 3 (Building Alarm 3)	
	7	BLD ALRM 2 RTN (Building Alarm 2 Return)	Input: Programmable UPS alarm, activated by a remote dry contact closure.
	8	BLD ALRM 2 (Building Alarm 2)	
	9	BLD ALRM 1 RTN (Building Alarm 1 Return)	Input: Programmable UPS alarm, activated by a remote dry contact closure.
	10	BLD ALRM 1 (Building Alarm 1)	
CN13	1	GND-E (Optional for Shielded Cable) [Earth]	Input/Output: External Parallel CAN connections.
	2	GND-ISO	
	3	CANBL	
	4	CANBH	
CN15	1	CANBL	Input: CAN Termination jumper. Jumper should be populated at first UPS in external parallel system and should be populated at last UPS in external parallel system.
	2	CANBL_1	
Connection to MCU No.	Name	Description	
J76	PORT 1	Input: 10/100M Ethernet Port for BMS (Battery Management System).	
J6	PORT 2	Input: 10/100M Ethernet Port for Service.	
J77	PORT 3	Input: 1G Ethernet Port for PredictPulse.	

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. For each installed UPS:
 - a. If not already opened, open the front door and swing the door open (see [Figure 26](#)).
 - b. Remove an Interface Entry Conduit Landing panel to drill or punch holes (see [Figure 38](#)).
 - c. Reinstall the conduit landing panel and install the conduit.
3. To locate the appropriate terminals and review the wiring and termination requirements, see: [3.2.5 UPS System Interface Wiring Preparation](#), [3.2.6 Distributed Bypass Power Wiring Preparation](#) and [Figure 52](#).
4. Route and install CAN wiring between the UPS cabinets. See [Table 20](#), [Table 21](#) and [Figure 53](#) for wiring information.

Table 20. External Parallel CAN Connections-Wire Size

Terminal	Terminal #	Name	Description	Recommended Wire Size Max/Min [Recommended]
CN13	1	GND-E**	Input/Output: External Parallel CAN connections.	Max Wire = 14AWG / Min Wire = 30AWG [Twisted Wires (3) #18 AWG]
	2	GND-ISO**		
	3	CANBL**		
	4	CANBH		
CN15	1	CANBL	CAN Termination jumper*.	Max Wire = 14AWG / Min Wire = 30AWG [#18AWG Jumper (if used)]
	2	CANBL_1		

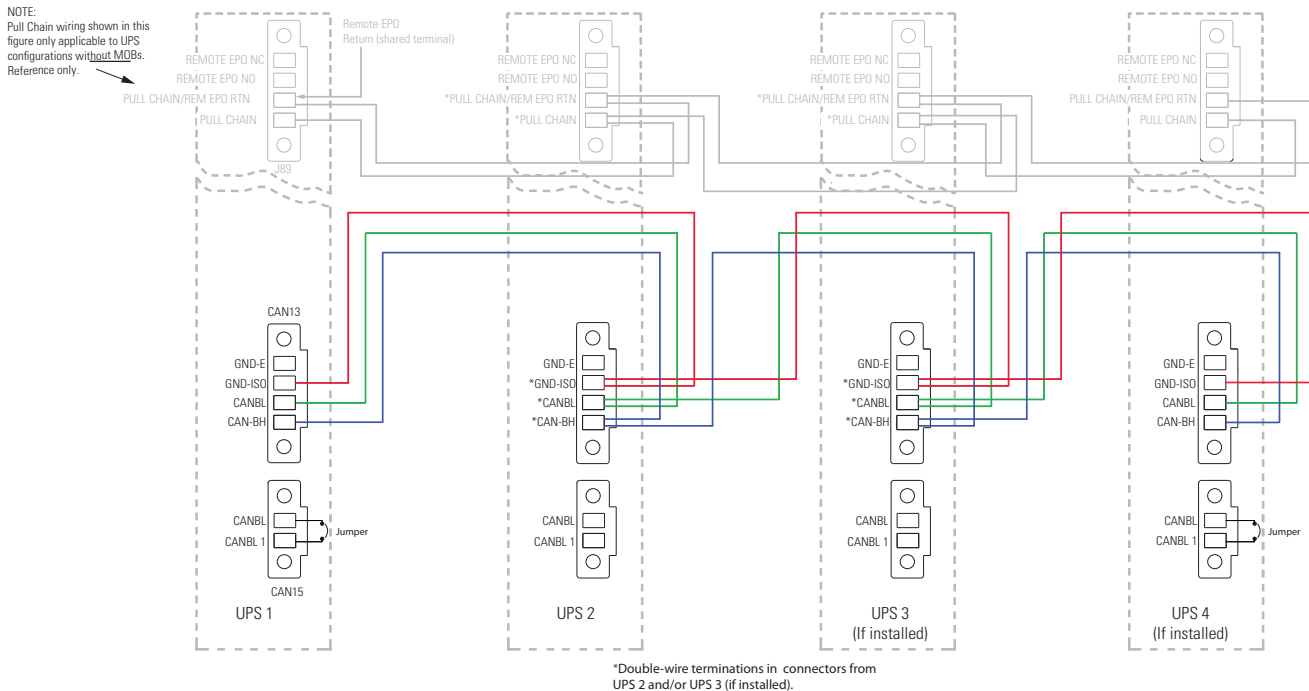
*On first and last installed UPS.

** Shared terminal if the UPS is connected between the first and last UPS

Table 21. CAN Wire Terminations

From UPS 1	To UPS 2	To UPS 3 (If Installed)	To UPS 4 (If Installed)
CN13 (GND-ISO)	CN13 (GND-ISO) (Shared)	CN13 (GND-ISO) (Shared)	CN13 (GND-ISO)
CN13 (CANBL)	CN13 (CANBL) (Shared)	CN13 (CANBL) (Shared)	CN13 (CANBL)
CN13 (CANBH)	CN13 (CANBH) (Shared)	CN13 (CANBH) (Shared)	CN13 (CANBH) (Shared)

Figure 53. Distributed Bypass System CAN Interface Wiring



- NOTE 1** External CAN connections between UPS cabinets require shielded twisted pair wires.
- NOTE 2** Always confirm contact operation prior to wiring.

- Route and install distributed bypass system pull-chain wiring between the UPS cabinets and customer-supplied tie cabinet MOB's. See [Table 22](#), [Table 23](#) and [Figure 54](#) for wiring information.

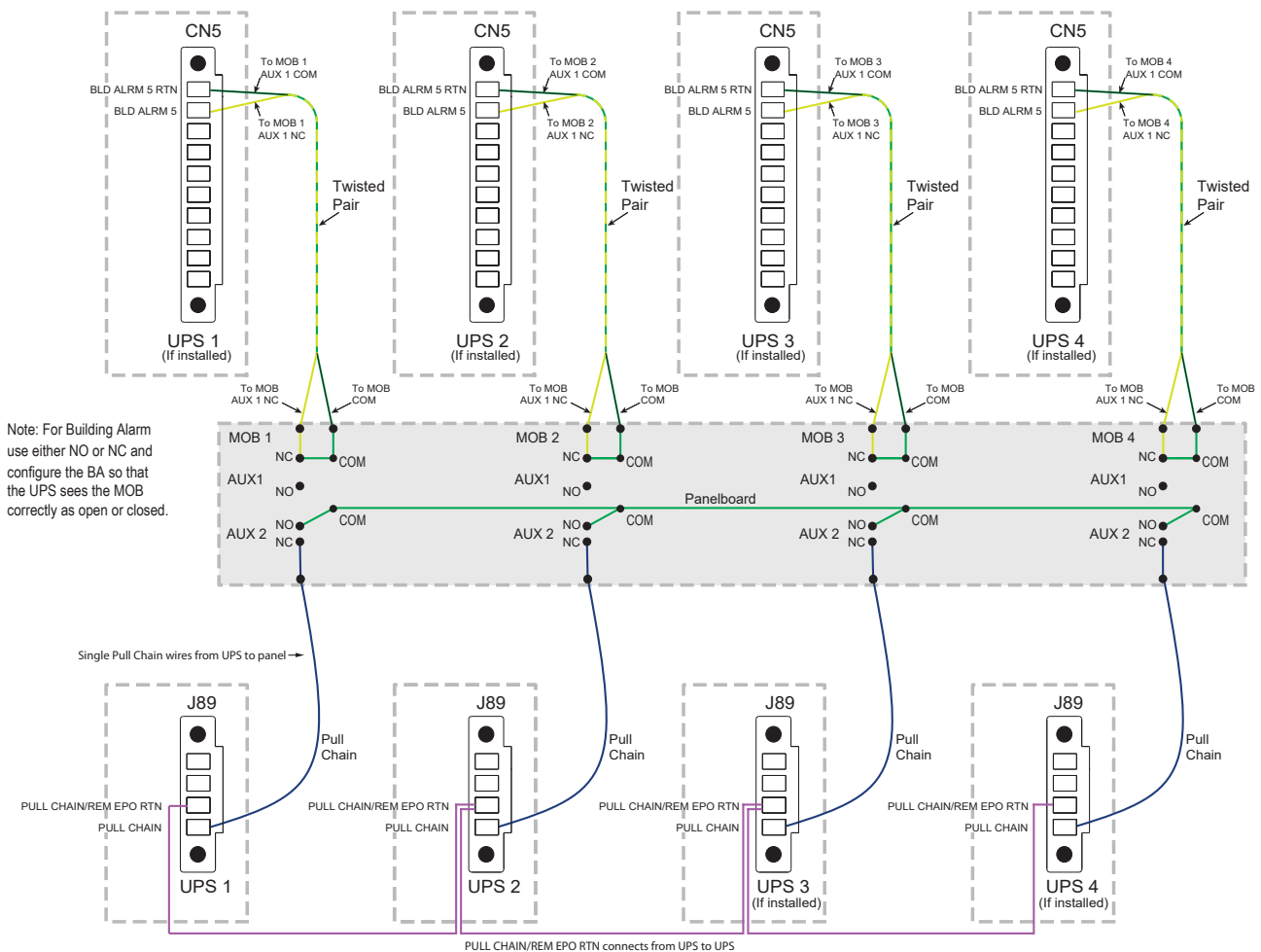
Table 22. External Pull Chain with MOB's Connections-Wire Size

Terminal	Terminal #	Name	Description	Recommended Wire Size Max/Min [Recommended]
J89	3	Pull Chain/ EPO RTN	Shared RTN for PULL CHAIN and REMOTE EPO functions.	Max Wire = 14AWG / Min Wire = 30AWG
	4	Pull Chain	Backup Control for parallel operation.	
ZCN5	1	BLD ALRM 5 RTN	Input: Programmable UPS alarm, activated by a remote dry contact closure. Default function set for on maintenance bypass.	Max Wire = 14AWG / Min Wire = 30AWG [Recommended Wire: Twisted Pair Wires #18AWG (per Building Alarm)]
	2	BLD ALRM 5		

Table 23. Pull-Chain Wiring Terminations with MOBs

From	To	Function
UPS 1 CN5 – BLD ALARM 5 RTN	MOB 1 AUX 1 COM	MOB Open Alarm
UPS 1 CN5 – BLD ALARM 5	MOB 1 AUX 1 NC	
UPS 1 J89 – PULL CHAIN/REM EPO RTN	MOB 1 AUX 2 COM	Pull Chain Common
UPS 1 J89 – PULL CHAIN	MOB 1 AUX 2 NO	Pull Chain
UPS 2 CN5 – BLD ALARM 5 RTN	MOB 2 AUX 1 COM	MOB Open Alarm
UPS 2 CN5 – BLD ALARM 5	MOB 2 AUX 1 NC	
UPS 2 J89 – PULL CHAIN/REM EPO RTN	MOB 2 AUX 2 COM	Pull Chain Common
UPS 2 J89 – PULL CHAIN	MOB 2 AUX 2 NO	Pull Chain
UPS 3 CN5 – BLD ALARM 5 RTN	MOB 3 AUX 1 COM	MOB Open Alarm
UPS 3 CN5 – BLD ALARM 5	MOB 3 AUX 1 NC	
UPS 3 J89 – PULL CHAIN/REM EPO RTN	MOB 3 AUX 2 COM	Pull Chain Common
UPS 3 J89 – PULL CHAIN	MOB 3 AUX 2 NO	Pull Chain
UPS 4 CN5 – BLD ALARM 5 RTN	MOB 4 AUX 1 COM	MOB Open Alarm
UPS 4 CN5 – BLD ALARM 5	MOB 4 AUX 1 NC	
UPS 4 J89 – PULL CHAIN/REM EPO RTN	MOB 4 AUX 2 COM	Pull Chain Common
UPS 4 J89 – PULL CHAIN	MOB 4 AUX 2 NO	Pull Chain

Figure 54. Distributed Bypass Pull-Chain Wiring with MOBs



NOTE 1 External parallel pull chain connections between the UPS and MOB Aux contacts require twisted pair wire.

NOTE 2 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 3 NC and NO designations on MOB AUX contacts are defined with breaker in OFF (open) position.

NOTE 4 Always confirm contact operation prior to wiring.

NOTE 5 Any pair of unused building alarm terminals may be used for the MOB Aux 1 connections.

6. Wire the connectors to the wires and connect to the applicable terminals (see [Table 16](#)).
7. Reinstall all panels previously removed and secure with the retained hardware.
8. Close the UPS front doors and secure the latches.

Chapter 6 Understanding UPS Operation

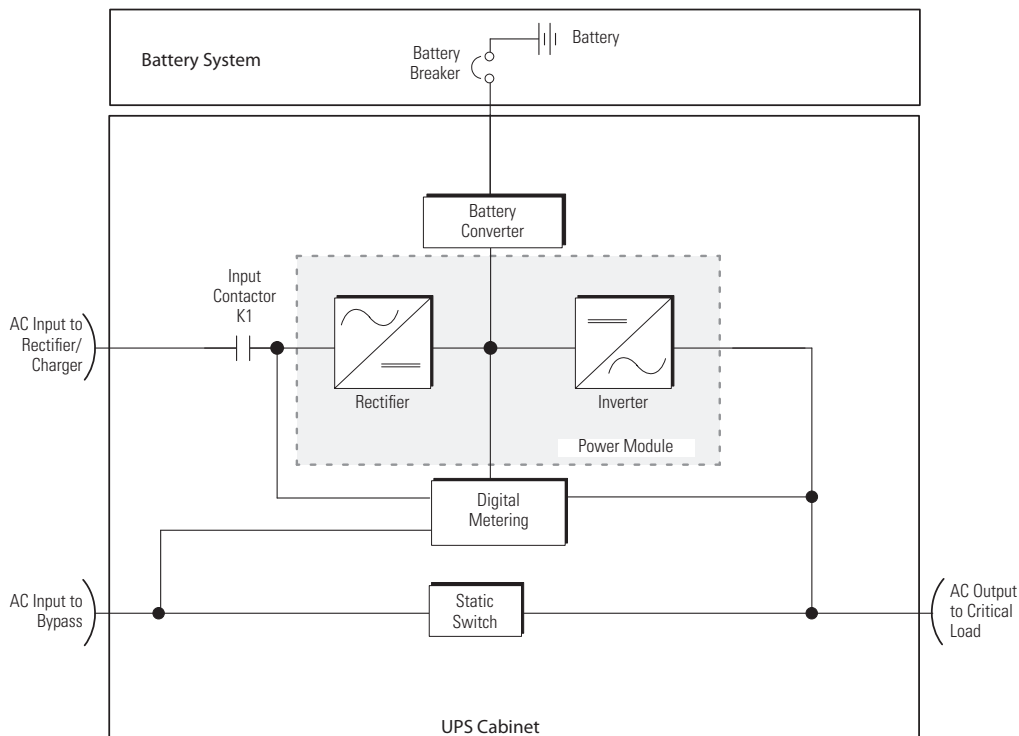
6.1 UPS System Overview

The Eaton Power Xpert 9395XC 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 55](#) 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 55. Main Elements of the UPS System



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

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 9395XC UPS supports a critical load in 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 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

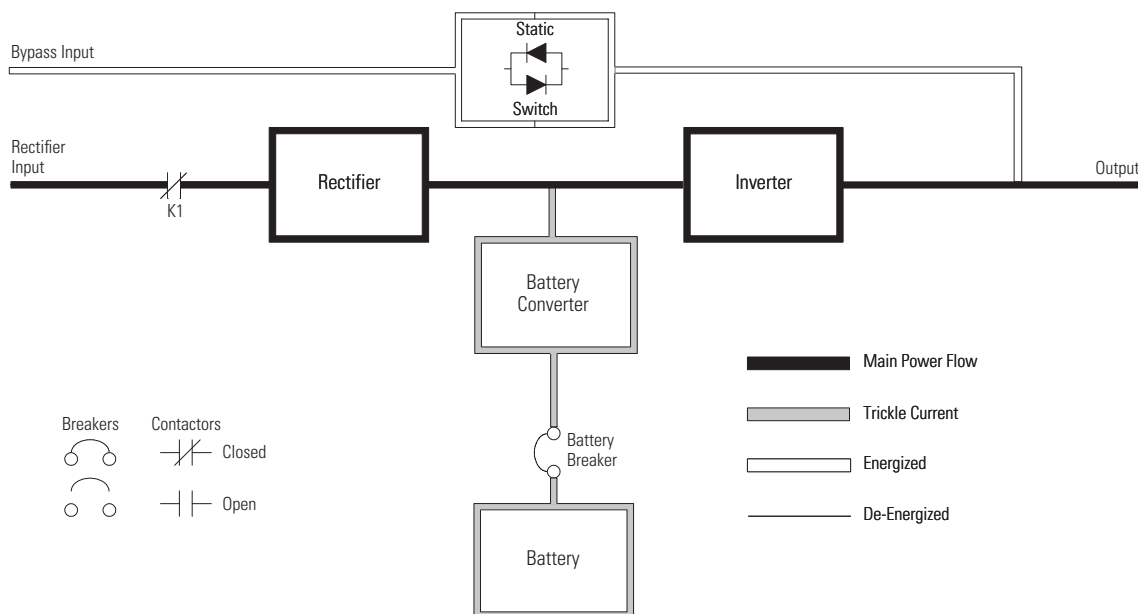
[Figure 56](#) shows the path of electrical power through the UPS system when the UPS is operating in Online mode.

During normal UPS 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 Power Semiconductor or SiC MosFET devices to produce a regulated DC voltage to the inverter. When battery breaker is closed the battery is charged directly from the regulated rectifier output through a buck or boost DC converter, depending on the system voltage and the size of the battery string attached to the unit.

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 Power Semiconductor or SiC MosFET devices and pulse-width modulation (PWM) to produce a regulated and filtered AC output.

Figure 56. 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.

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

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

6.2.3 Energy Saver System (ESS) Mode

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 contactor is closed and the link is maintained through the diode bridge.

If commercial power voltage or frequency disturbances are detected, the system forward transfers to Battery mode for minor disturbances and then to double-conversion mode for more severe disturbances. During a complete power outage, the transfer takes place within 2 ms to ensure loads being fed by the system output are not interrupted. All forward transfers transfer to Battery mode before returning to double-conversion mode.

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

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

6.2.4 Bypass Mode

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 57](#) 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. 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 customer supplied Bypass Breaker with Shunt Trip and together they are wired in parallel with the rectifier and inverter.

CAUTION

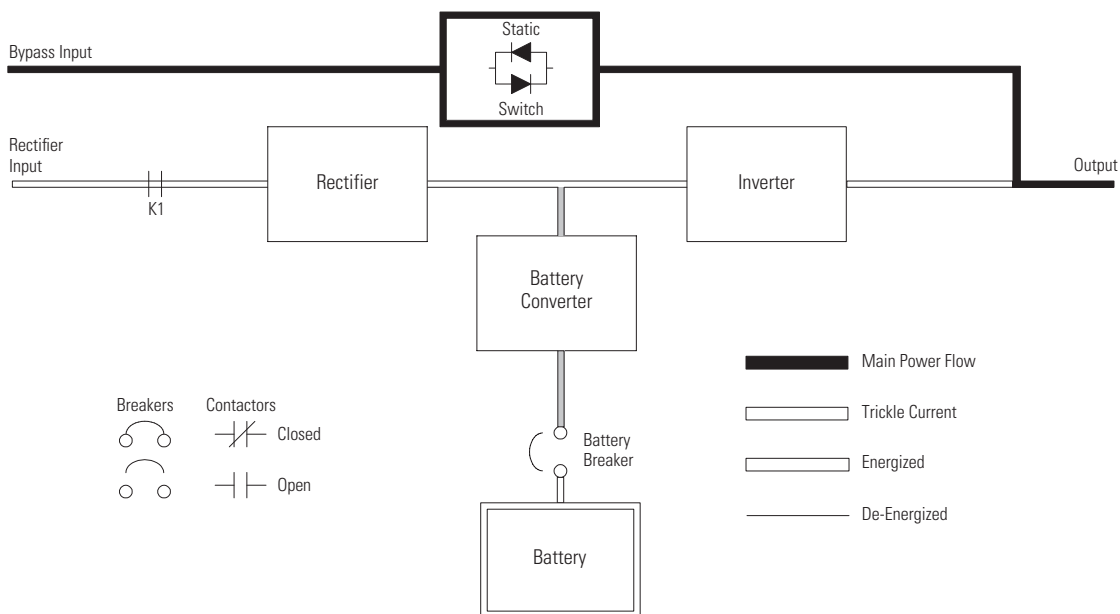
The critical load is not protected from voltage or frequency fluctuations or power outages while the UPS is in Bypass mode.

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 Eaton 9395XC UPS provides backfeed detection and protection through a Shunt Trip mechanism of the bypass input breaker. An optional Bypass Contactor is available in the I/O Cabinet.

Figure 57. Path of Current Through the UPS in Bypass Mode



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

6.2.5 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.

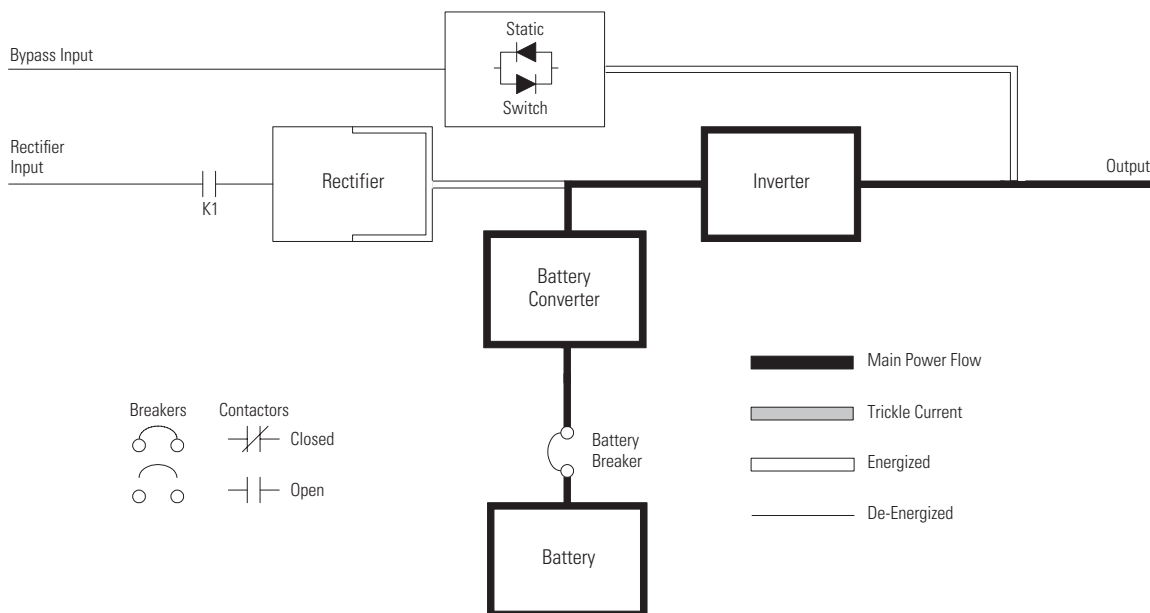
Figure 58 shows the path of electrical power through the UPS system when operating in Battery mode.

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. The opening of contactor K1 prevents system voltages from bleeding backwards through the static switch and rectifier snubber components and re-entering the input source.

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

If at any time during the battery discharge the input power becomes available again, contactor K1 closes 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.

Figure 58. Path of Current Through the UPS in Battery Mode



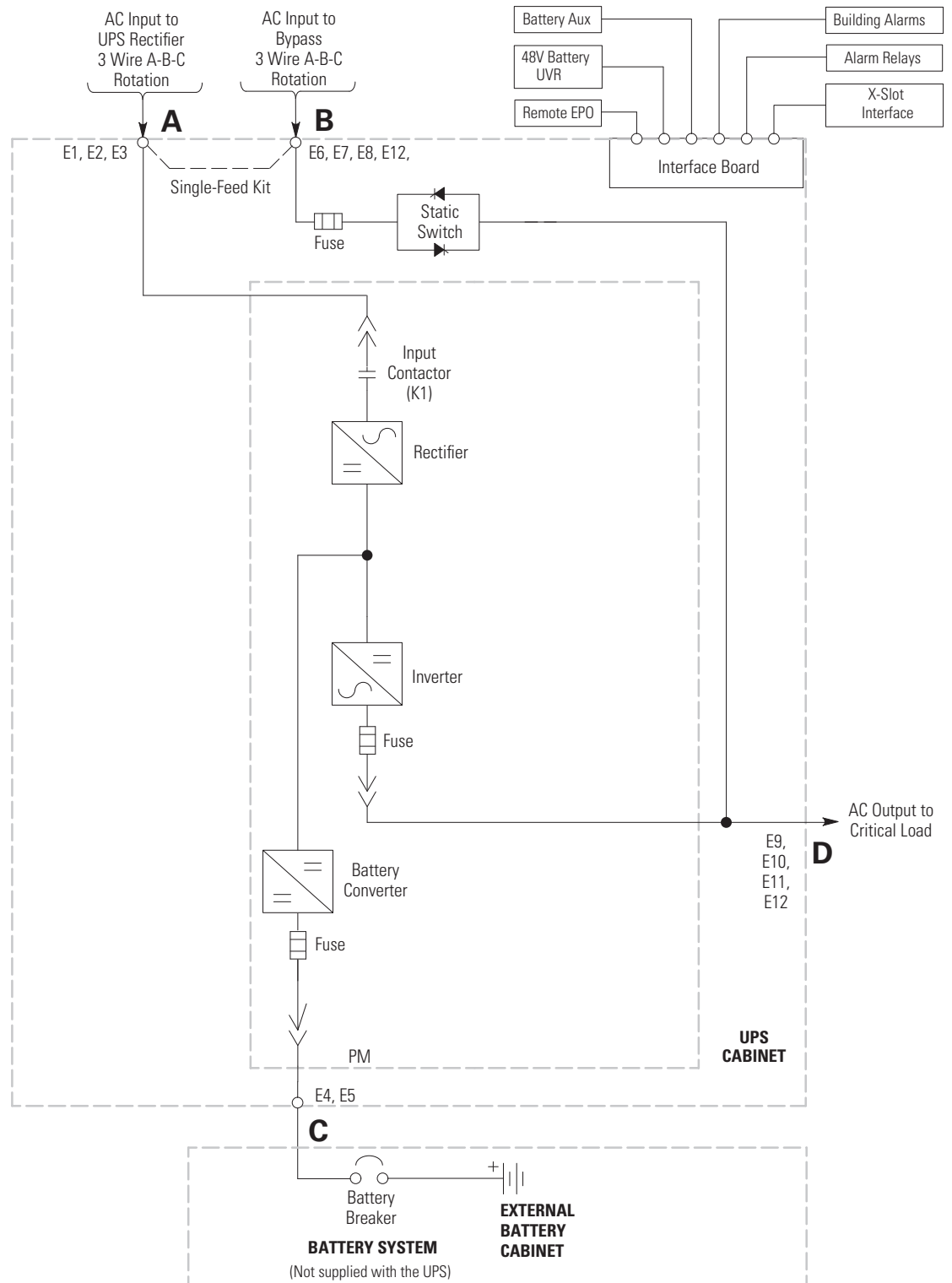
6.3 Single UPS System Online Configurations

The system online drawings in this section show the simplified internal structure of the UPS, battery supply, and basic maintenance bypass. See site specific custom online drawings for further detail.

Table 24. Online Configurations

Online Drawing	UPS Model	System Type
Figure 59	Eaton 9395XC	Single Reverse Transfer UPS – Two PM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration
Figure 60	Eaton 9395XC	Simplified Dual-Feed UPS with Maintenance Bypass Panel

Figure 59. One PM, Common Rectifier Feed, Common Battery, Dual-Feed Configuration

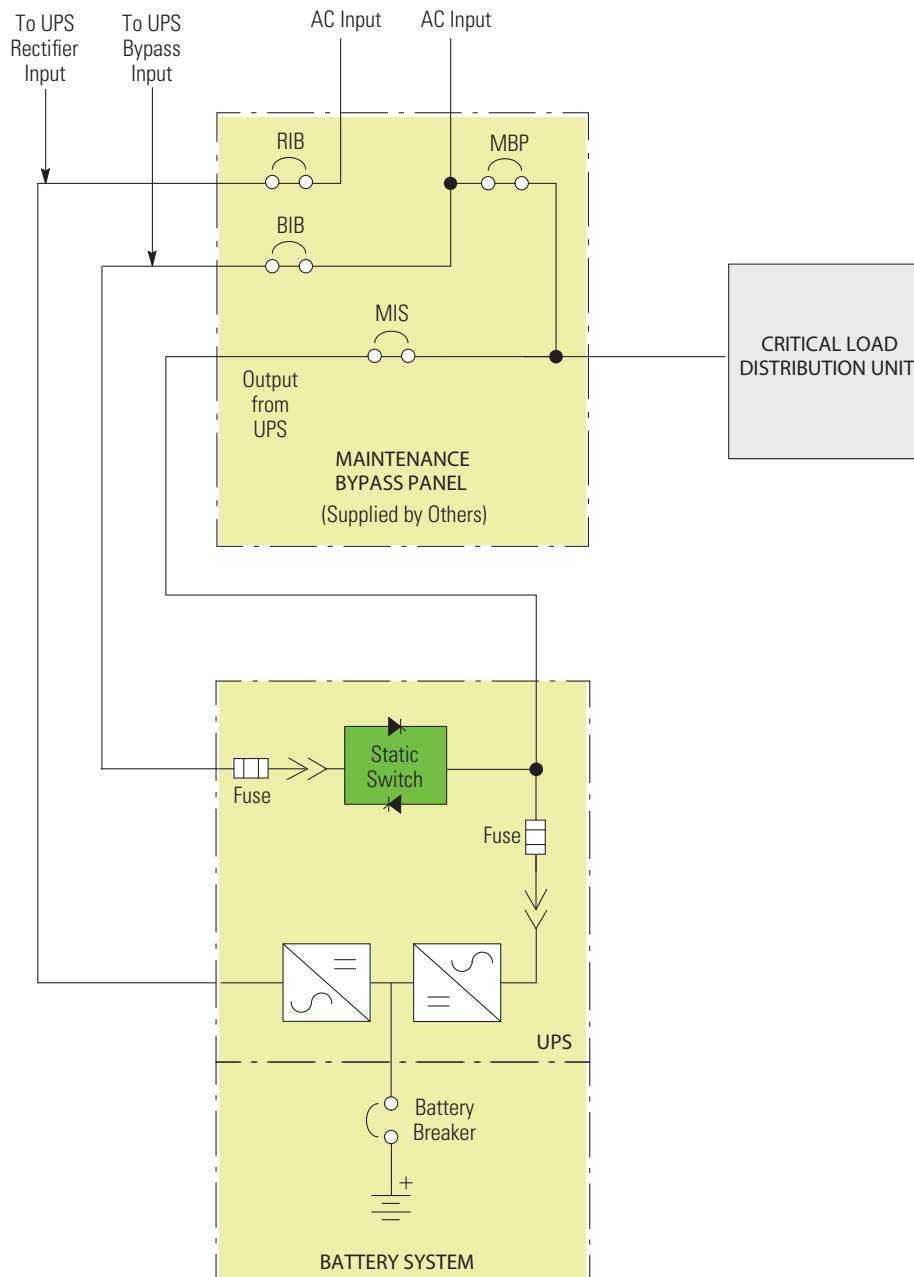


NOTE Callout letters **A**, **B**, **C** and **D** map to the applicable voltage in the Input/Output Ratings and External Wiring Requirements table in Chap. 3.

NOTE AC input to rectifier is not used in single feed configuration. Dashed lines indicate optional features/components

NOTE Backfeed protection is not provided as a part of UPS. Customer supplied bypass input breaker with 48-60 VDC shunt trip is required.

Figure 60. Simplified Dual-Feed UPS with Maintenance Bypass Panel



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

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

6.4 Multiple UPS Distributed Bypass System

Distributed bypass parallel operation extends the normal operation of 9395XC 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.

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.

6.4.1 Multiple UPS Parallel System Modes

Similar to the single UPS system, the 9395XC 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 Energy Saver System \(ESS\) Mode](#)).
- In Bypass mode, the critical load is directly supported by utility power through the bypass circuit in each UPS.
- In Battery mode, the battery provides DC power, which maintains UPM operation. The UPM batteries support the critical load.

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

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

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

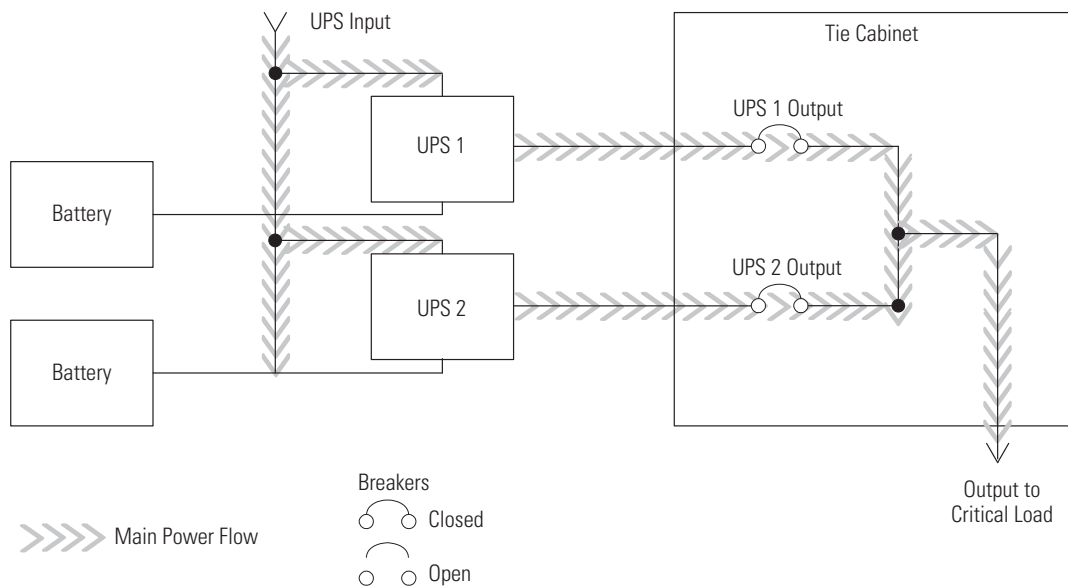
6.4.2 Online Mode Distributed Bypass

In Online mode, utility AC power is supplied to the UPSs. Each UPS then conditions the incoming AC power and provides clean, regulated AC power to tie cabinet or distribution panel for parallel systems up to four modules. The applied load is shared equally among the available UPMs in the system.

[Figure 61](#) shows the path of electrical power through the parallel system when operating in Online mode.

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

Figure 61. Path of Current through the UPSs in Online Mode – Distributed Bypass



6.4.3 Bypass Mode – Distributed Bypass

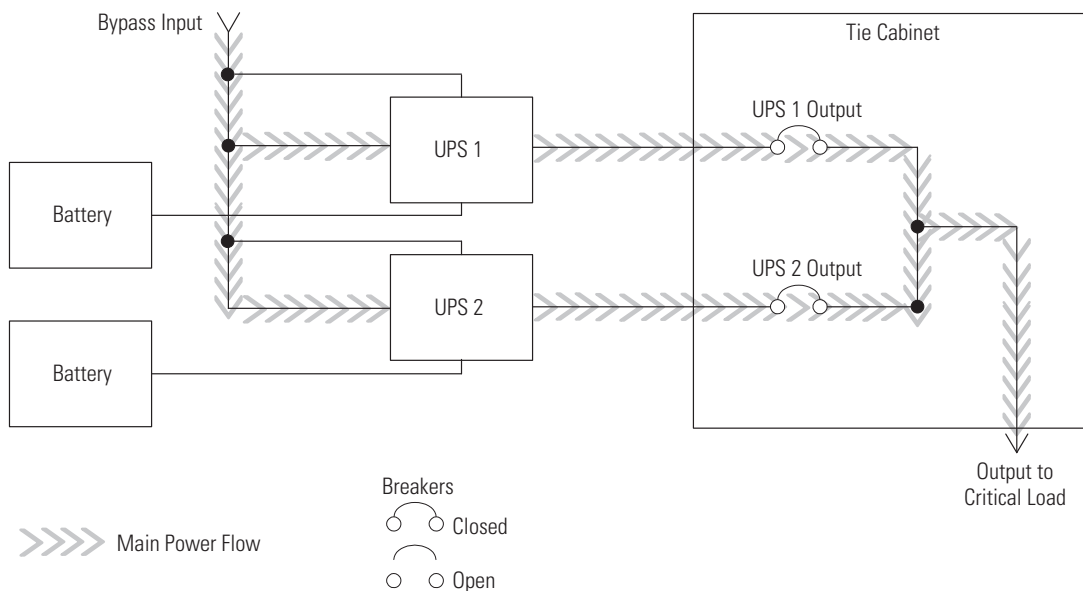
In Bypass mode, the output of the system is provided with three-phase AC power directly from the bypass input. While in this mode, the output of the system is not protected from fluctuations, spikes, or power outages from the source. No battery support is available to the output of the system in the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

The distributed bypass system automatically switches to Bypass mode if it detects a UPS system overload or load fault. If one UPS becomes unavailable, the distributed bypass system dynamically updates the redundancy calculation to determine if the remaining UPSs can support the load. If the load can be supported, the system does not switch to bypass.

[Figure 62](#) 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 62. Path of Current through the UPSs in Bypass Mode – Distributed Bypass



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

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

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

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

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

6.4.4 Battery Mode Distributed Bypass

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

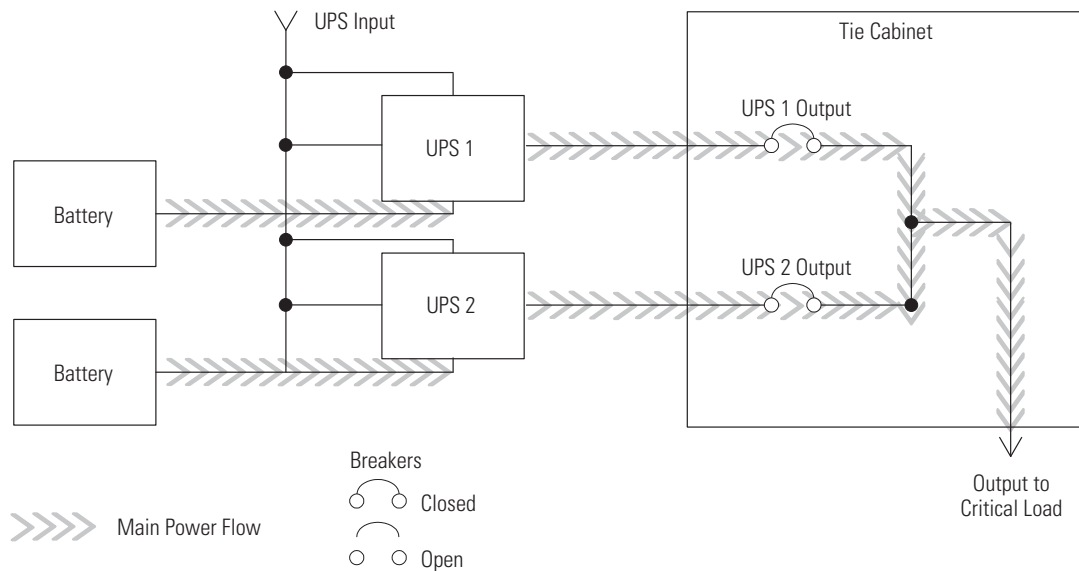
[Figure 63](#) shows the path of electrical power through the distributed bypass system when operating in Battery mode.

While in Battery mode, the UPSs sound an audible horn, illuminate a visual indicator lamp on the front panel (Online and On Battery), and create an entry into the alarm event history. As the battery discharges, the boost converter and inverter constantly make minute adjustments maintaining a steady output. The UPSs remain in

this operating mode until the input power to the rectifier is again within the specified voltage or frequency acceptance windows.

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

Figure 63. Path of Current through the UPSs in Battery Mode – Distributed Bypass



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

6.5 Multiple UPS Distributed Bypass System Online Configurations

The distributed bypass system 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 represent each UPS in the distributed bypass system.

Table 25. Multiple UPS Distributed Bypass System Oneline Configurations

Oneline Drawing	UPS Model	System Type
Figure 64	Eaton 9395XC-1500/1500 Eaton 9395XC-1350/1350 Eaton 9395XC-1200/1200	Multiple UPS – Distributed Bypass, Continuous Static Switch, 1+1 and 2+0 Configurations
Figure 65	Eaton 9395XC-1500/1500 Eaton 9395XC-1350/1350 Eaton 9395XC-1200/1200	Multiple UPS – Distributed Bypass, Continuous Static Switch, 2+1 and 3+0 Configurations
Figure 66	Eaton 9395XC-1500/1500 Eaton 9395XC-1350/1350 Eaton 9395XC-1200/1200	Multiple UPS – Distributed Bypass, Continuous Static Switch, 3+1 and 4+0 Configurations

Figure 64. Typical Distributed Bypass System - Continuous Static Switch, 1+1 and 2+0 Configurations

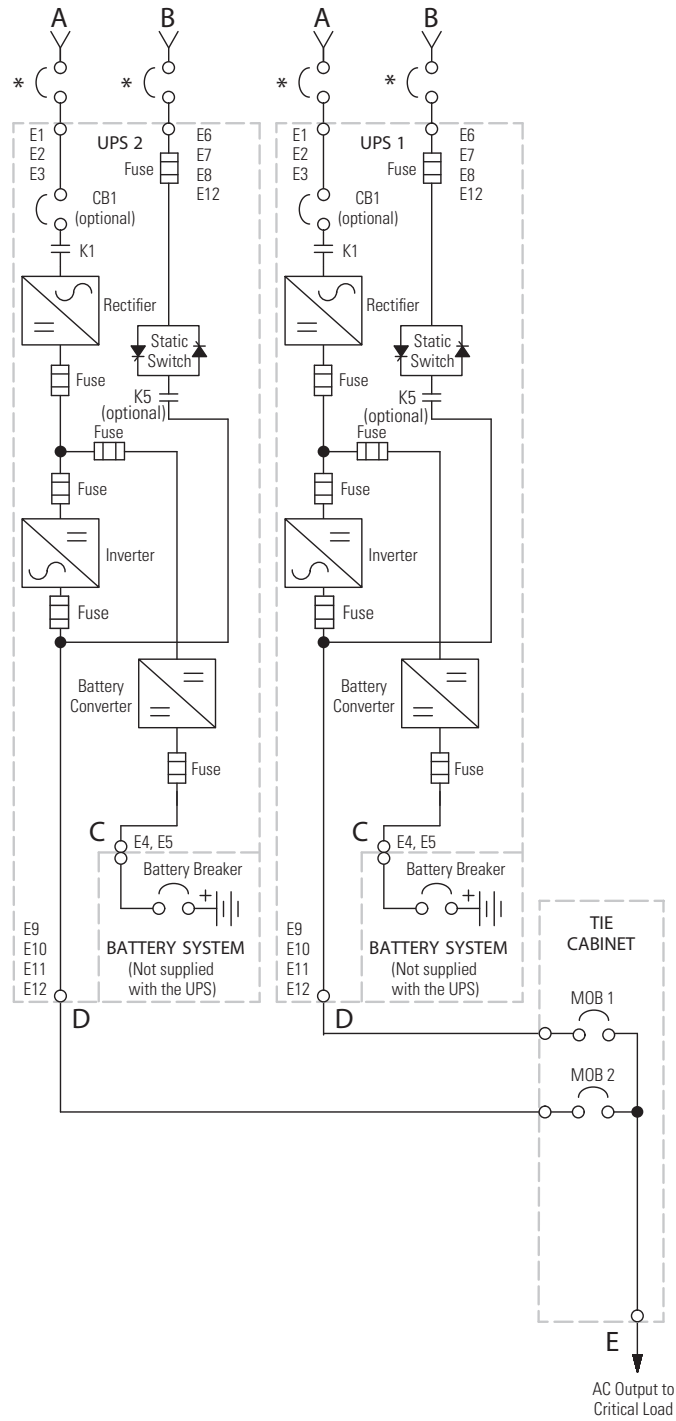


Figure 65. Typical Distributed Bypass System -Continuous Static Switch, 2+1 and 3+0 Configurations

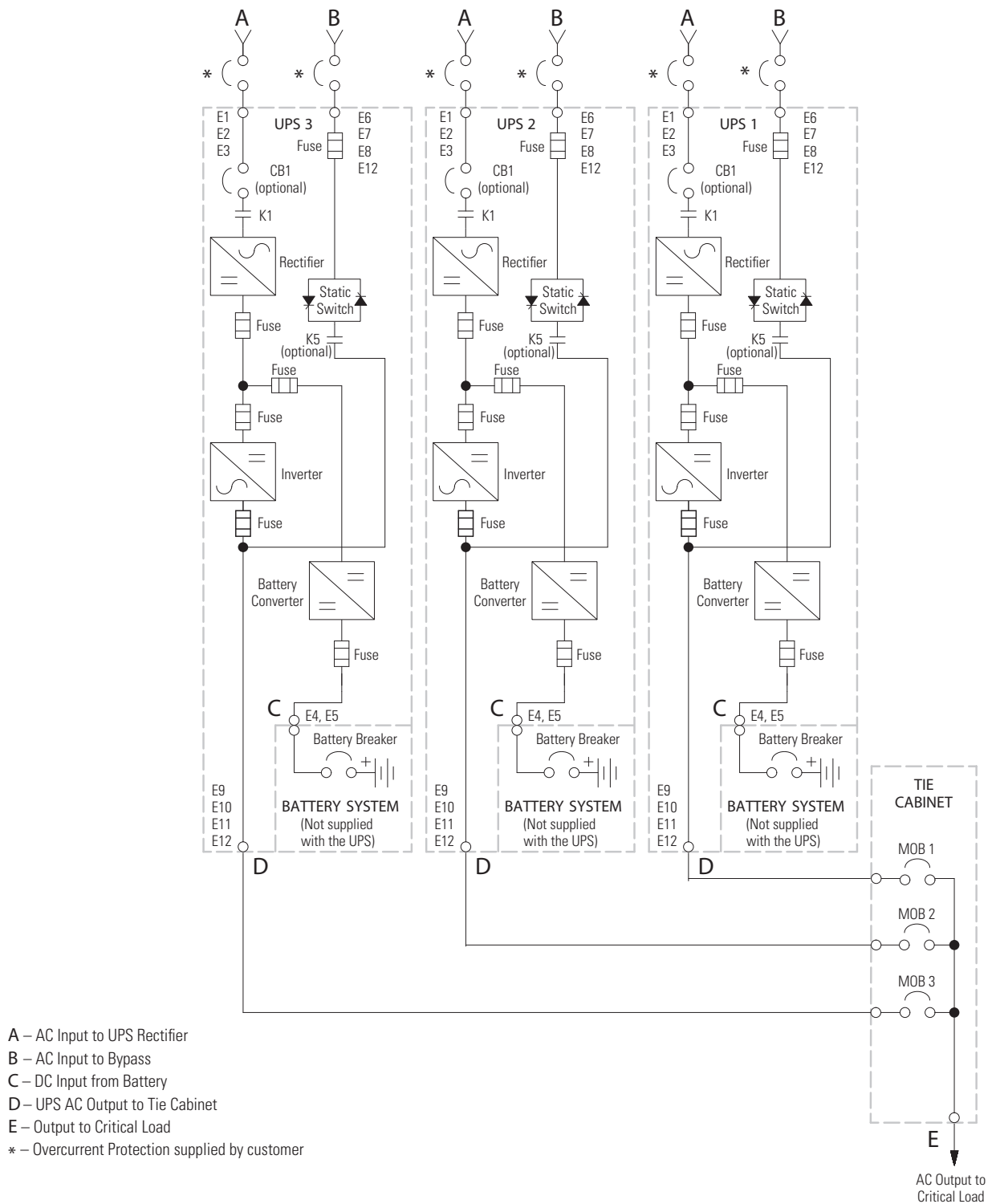
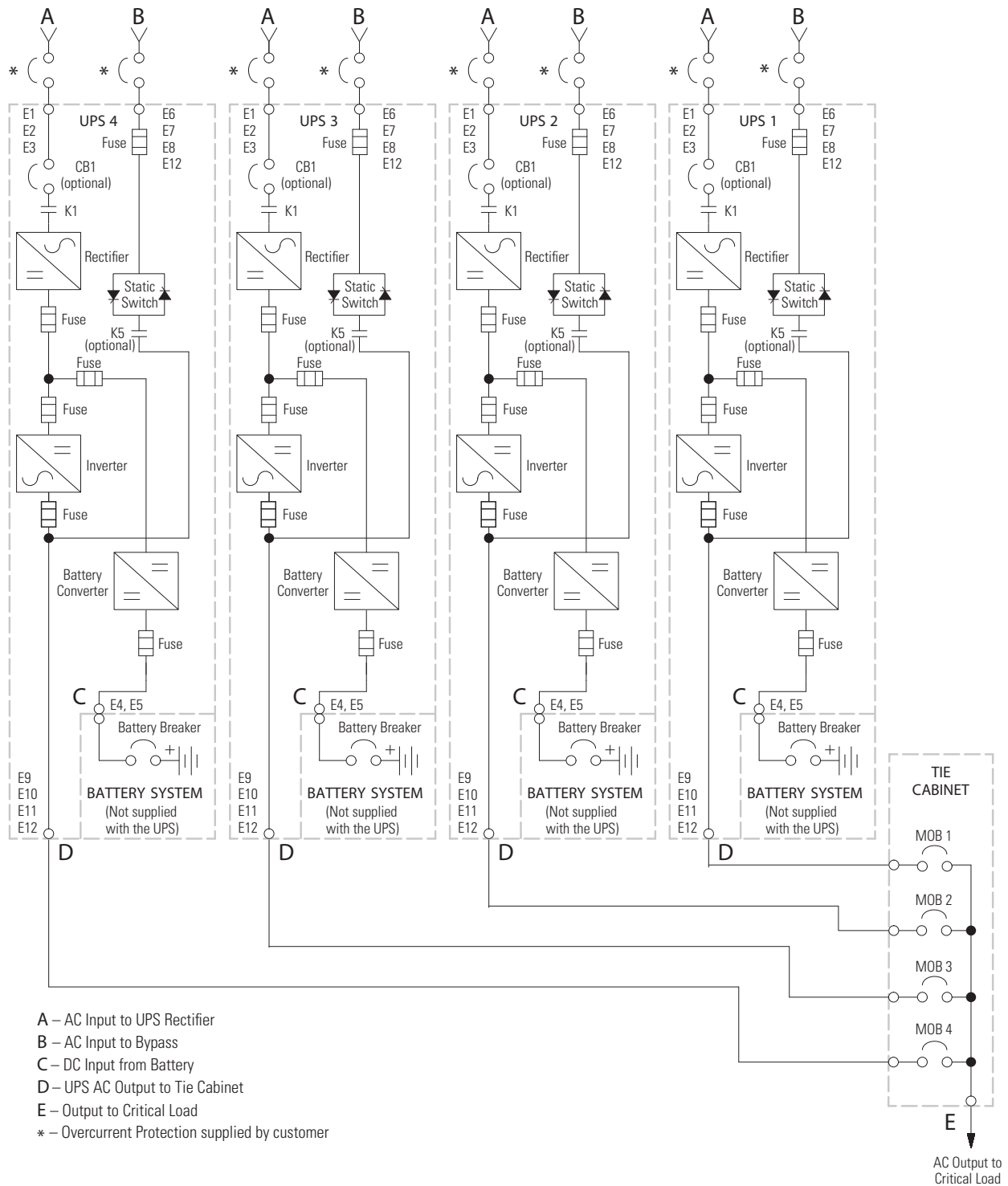



Figure 66. Typical Distributed Bypass System -Continuous Static Switch, 3+1 and 4+0 Configurations



Chapter 7 UPS Operating Instructions

This section describes how to operate the UPS.

NOTE 1 Before starting the UPS, ensure all installation tasks are complete and a preliminary startup has been performed by authorized service personnel. The preliminary startup verifies all electrical interconnections to ensure the installation was successful and the system operates properly.

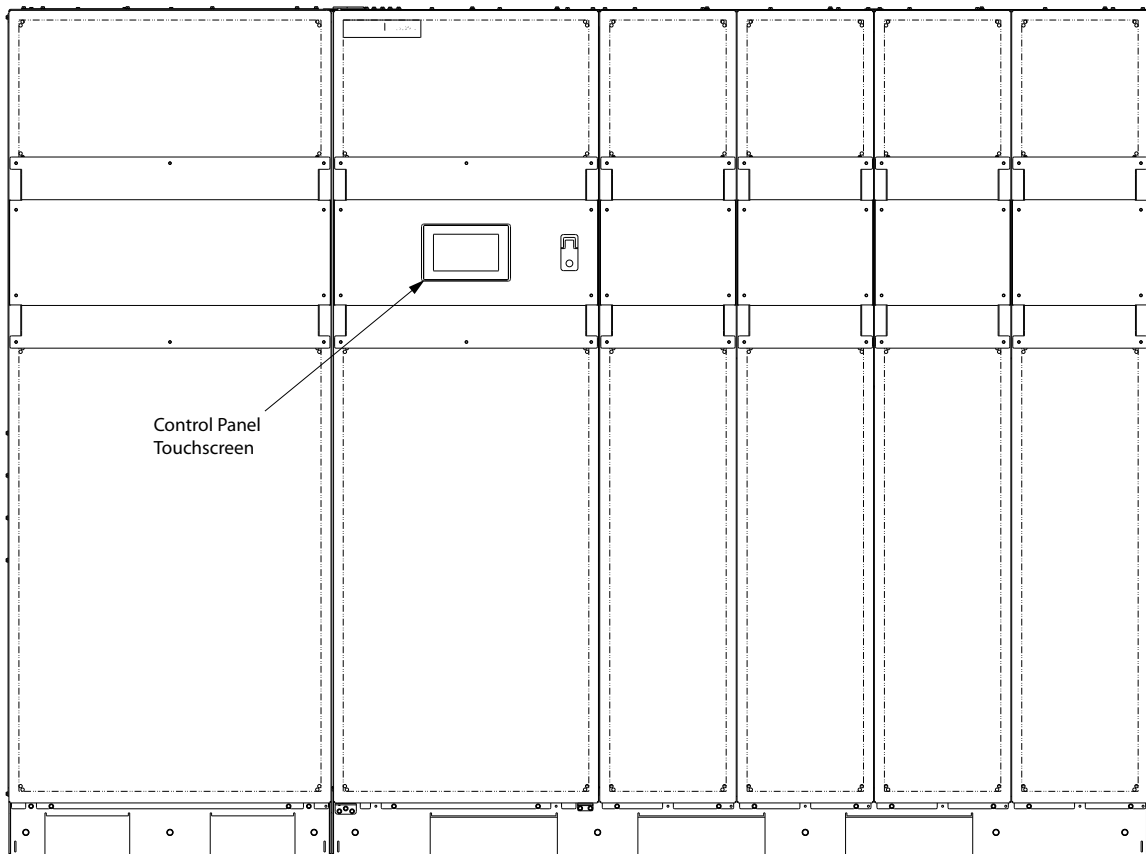
 **NOTE 2** Read this section of the manual and have thorough knowledge of UPS operation before attempting to operate any of the controls.

NOTE 3 The UPS displays two minutes of battery runtime at the initial startup. After a 24-hour charging period, the UPS automatically runs a battery test and the correct battery runtime displays.

7.1 UPS Controls

The controls identified and described in this section are used to control and monitor UPS operation. [Figure 67](#) identifies the location of the touchscreen control panel.

Figure 67. UPS Controls



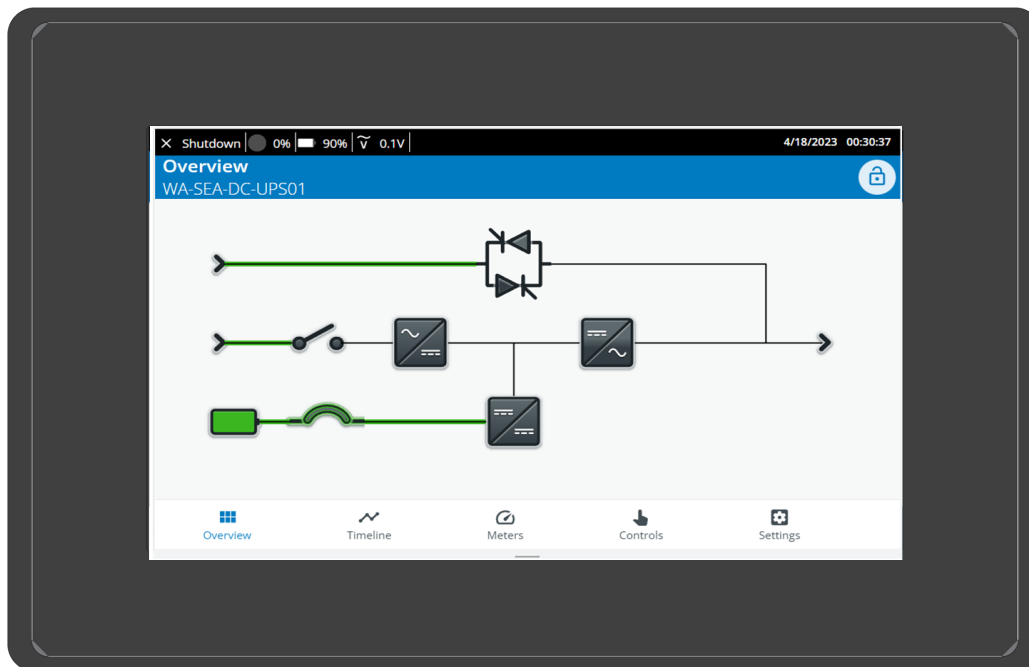
7.1.1 Control Panel

The control panel is used to set up and control the UPS, and to monitor UPS operation. For a description of the UPS control panel functions, see paragraph [7.2 Touchscreen Control Panel](#) Touchscreen Control Panel.

7.2 Touchscreen Control Panel

This section describes how the various screens are used to control and monitor UPS operation. [Figure 68](#) shows the location of the touchscreen control panel on the front door of the UPS. Descriptions of the control panel functions follow. For a description of the UPS control panel functions, see paragraph [7.3 Using the Touchscreen Control Panel](#).

Figure 68. UPS Control Panel (Typical)

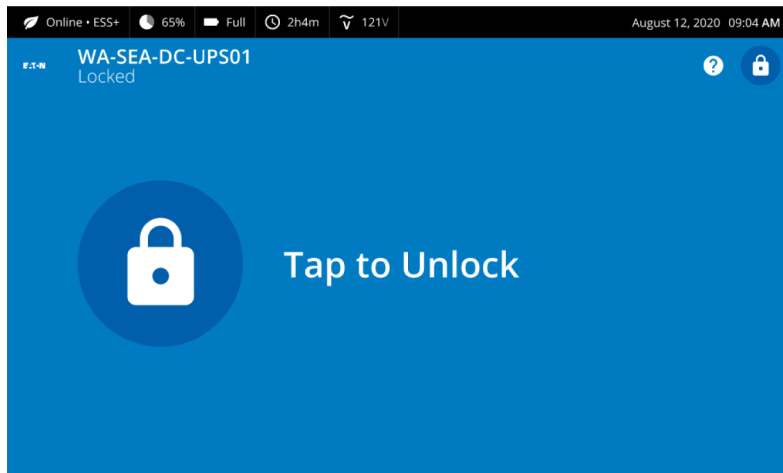


7.3 Using the Touchscreen Control Panel

The following sections describe the UPS control panel and how to monitor and control UPS operation. The color touchscreen control panel consists of a color liquid crystal touch screen display

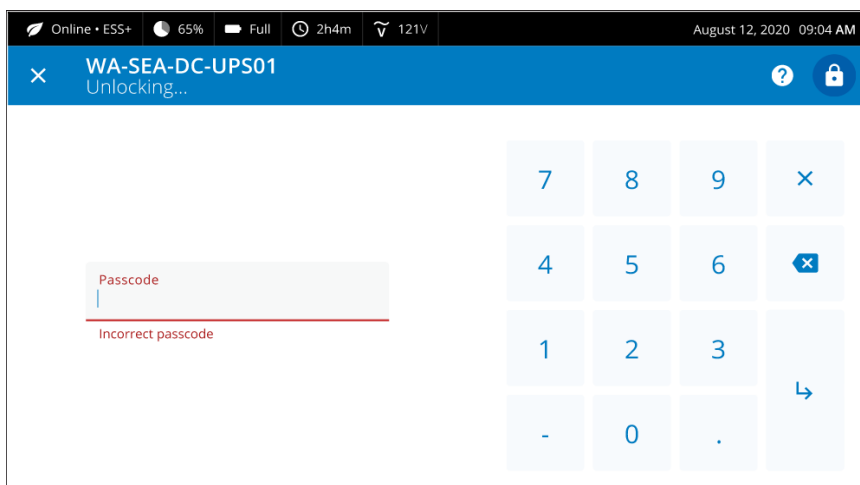
When power is supplied to the UPS, the control panel touchscreen boots and the Eaton logo appears. If the user is not logged in a *Tap to Unlock* screen appears (see [Figure 69](#))

Figure 69. Tap to Unlock screen



Touch the padlock to open the unlock level password request screen (see [Figure 70](#)).

Figure 70. Sign In or Password Request Screen



The user can login depending on the security level of access permitted (see [Table 26](#)).

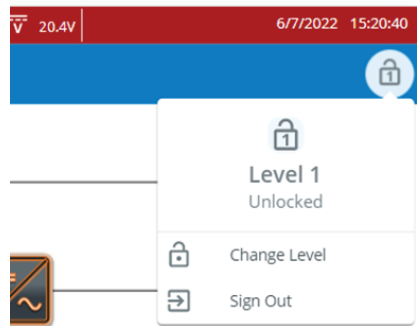
Table 26. Security Levels and Functions

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

The number in an unlocked padlock icon shows the current accessed security level . Click on the icon to change the security level or sign out (see [Figure 71](#)).

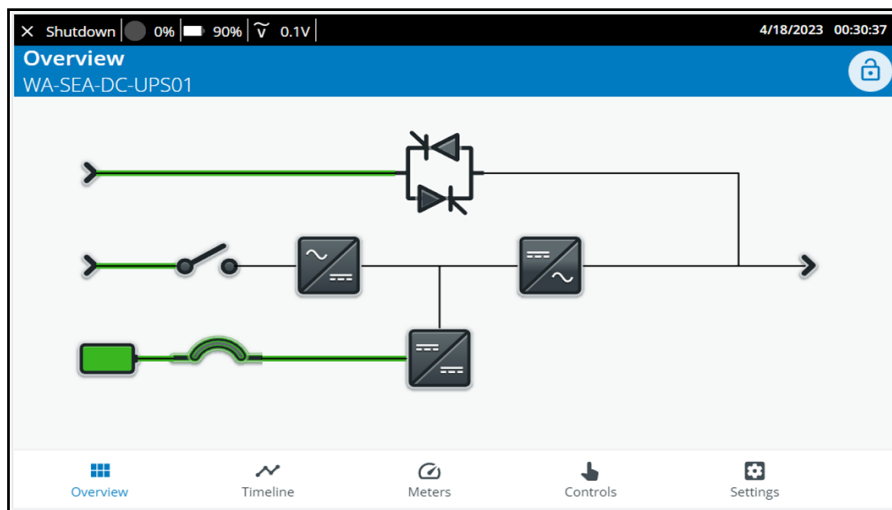
Figure 70. Sign In or Password Request Screen (Continued)

Figure 71. Padlock Icon



After login, the **Overview Screen** appears and displays the system status similar to the one shown in [Figure 72](#).

Figure 72. UPS Touchscreen Control Panel (Typical)



NOTE The touch screen will time out if it has been inactive for 15 minutes.

7.3.1 Touch Screen Controls

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

Figure 73. Parts of the Touch Screen

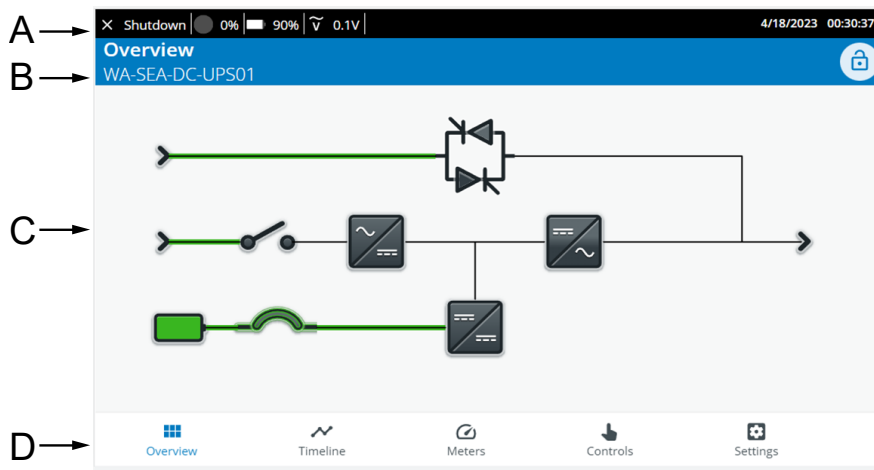
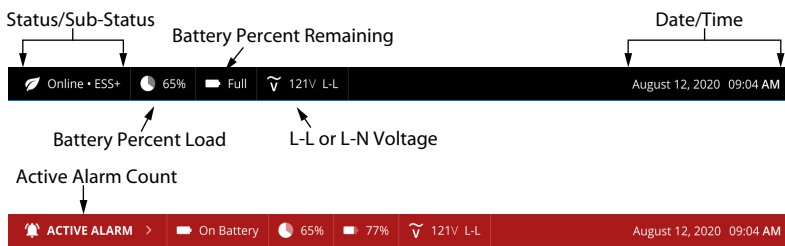


Table 27. Parts of the Touchscreen

- A** The *Status* bar automatically displays the UPS status, current time and date, active alarms, active notices, and load percent and battery run time for the UPS. The status bar is shown on multiple screens. When the header is required for a screen, the header provides the following information: The active alarms count (when applicable), status/sub status, battery percent load, battery percent remaining and whether voltage is L-L(Line to Line) or L-N (Line to Neutral). The Status bar will appear red when there are active alarms. For more information about alarms and notices, see paragraph [7.3 Using the Touchscreen Control Panel](#).



- B** *Header Bar* identifies the screen selected and level indicator (padlock icon). 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 [Figure 70](#) and [Table 26](#) for Security Levels and Functions). The Timeline header bar also provides clear alarms/logs, sort, filter and search functions (see [7.3.3 Timeline Screen](#)).

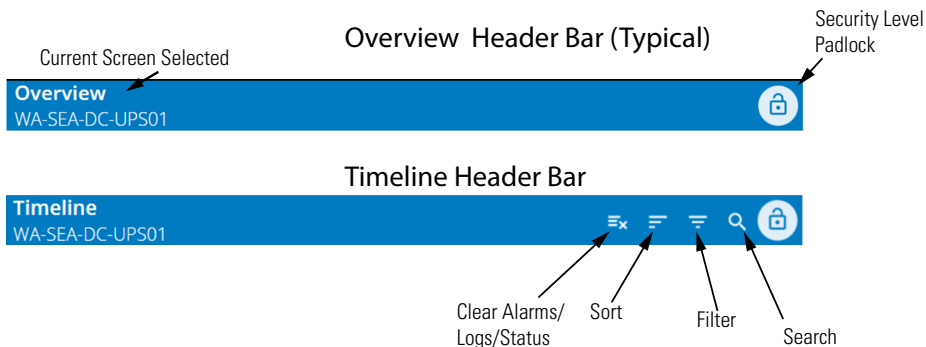
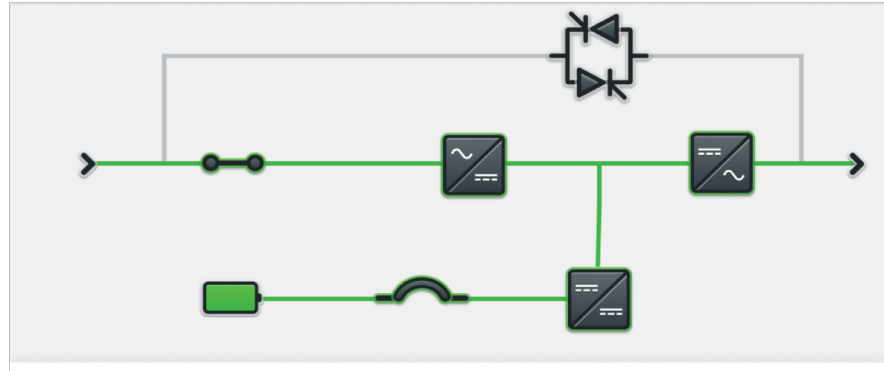


Table 27. Parts of the Touchscreen (Continued)

- C** The *Power Flow* diagram. The overview screen on-line diagram is an illustration of the UPS power flow. The Rectifier (AC/DC), Inverter (DC/AC), Battery and static switch (AC/AC) components are shown as a picture. The Maintenance bypass, Inverter contactor and output contactor are shown as breakers. The lines are shown connecting the power devices.



- D** The *Navigation Menu* allows selection of system information, control, events screens and other display functions by touching the menu buttons. (See [Table 28](#)).



NOTE You can also access screen selections from the menu drop-down on the Header Bar.

Touching an area on the screen that requires a password shows a locked padlock icon with the required security level number. (see [Table 26](#)).


7.3.2 Using the Navigation Menu Buttons

The Overview Screen menu bar shown in [Figure 74](#) allows you to display data in the information area to help you monitor and control UPS operation. [Table 28](#) shows the basic menu structure.

Table 28. Navigation Menu Map

Menu Option	Icon	Description
Overview	 Overview	Displays the power map of the UPS with colors indicating the power flow (online, ESS or bypass mode). Also displays data pertaining to system load and efficiency
Timeline	 Timeline	Displays the list of active system events and a historical log of system events. Historical logs include a detailed time stamped list of over 300 events. Events include detailed information including the description, source, type and solution.
Meters	 Meters	Displays performance meters for the system or critical load. When selected, the front display shows individual screens of input parameters, output parameters or bypass parameters, including; voltage, current and frequency in a graphical format. In addition, the battery display shows runtime remaining. In a parallel system, meters for the local UPS and the other UPS in the system can be viewed.
Controls	 Controls	Allows selection of operating mode, normal, bypass, charger on/off and power module on/off. The EAA controls screen can be used to enable and disable installed Energy Advantage Architecture options.

Table 28. Navigation Menu Map (Continued)

Menu Option	Icon	Description
Settings		Allows configuration of the unit including meters format, ESS configuration, backlight adjustments, display contrast, date and time information, serial communication port configuration and display of firmware revision numbers.

Touch an icon on the Navigation Menu to open the applicable screen.

Figure 74. Overview Screen

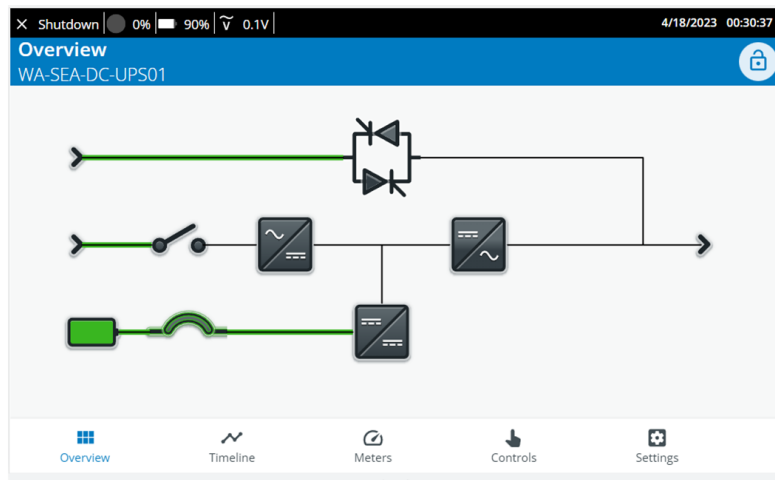











Table 29. Touchscreen Icons

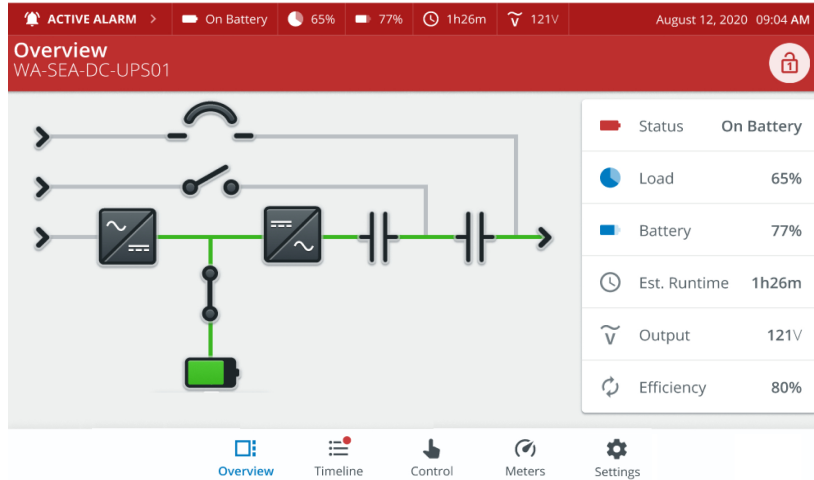
Component	Icon
Static Switch	
Rectifier	
DC Converter	
Inverter	
Battery	
DC Breaker	
Contactor	

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

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

If an alarm occurs it will be displayed with a red banner in the header bar with a graphical representation and system status readings.

Figure 75. Alarm Message



7.3.3 Timeline 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 and messages. Selecting the Timeline button on the navigation menu shows the Timeline screen. Active events labeled Active on the events screen. (See [Figure 76](#)).

The Timeline Screen shows events and alarms that have occurred over a specified period.

Figure 76. Timeline Screen — Active Events

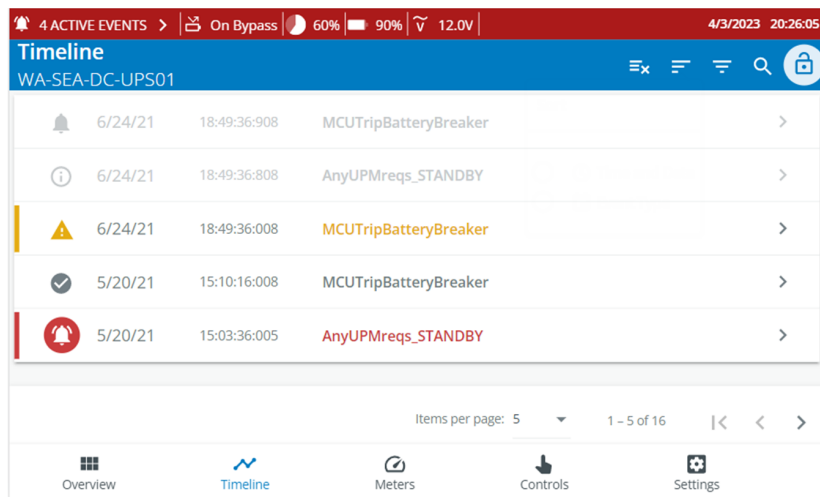


Figure 76. Timeline Screen — Active Events (Continued)

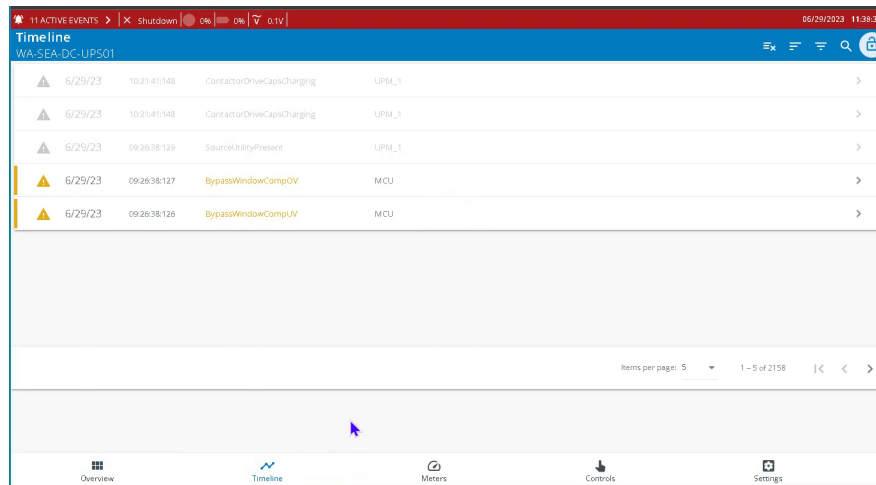
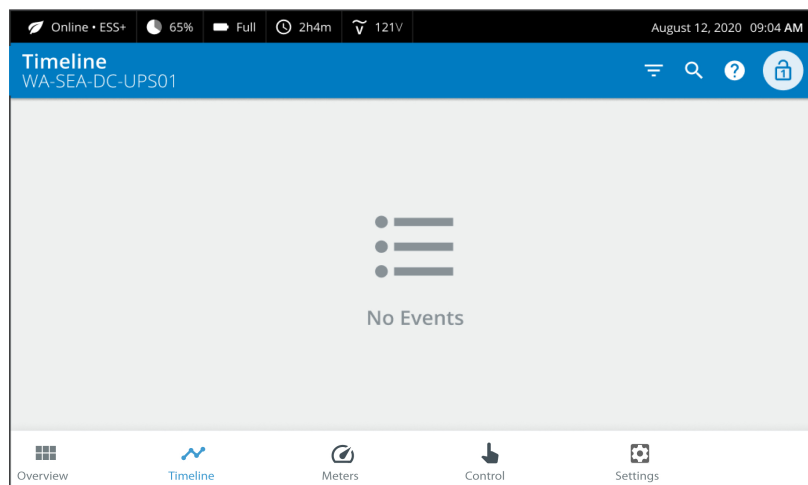


Figure 77. Timeline Screen — No Events




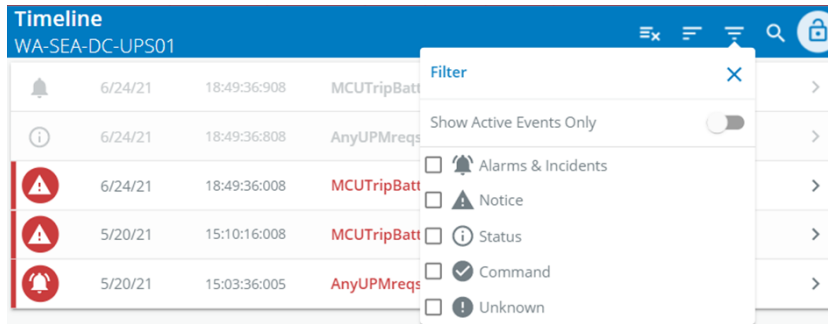
Tap the filter icon  to filter the events by type and status.

Figure 78. Timeline — Filter Events




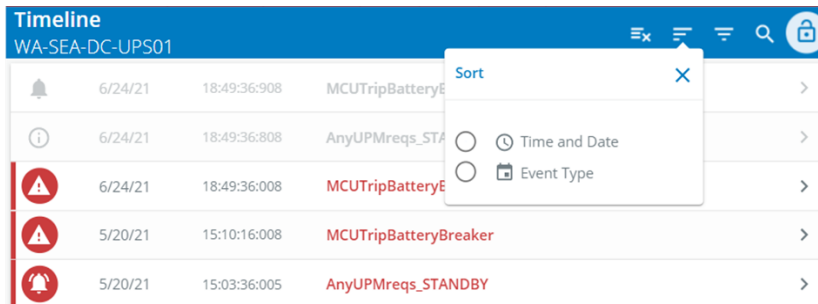
Tap the sort icon  to sort the event by time/date and type.

Figure 79. Timeline — Event Sort




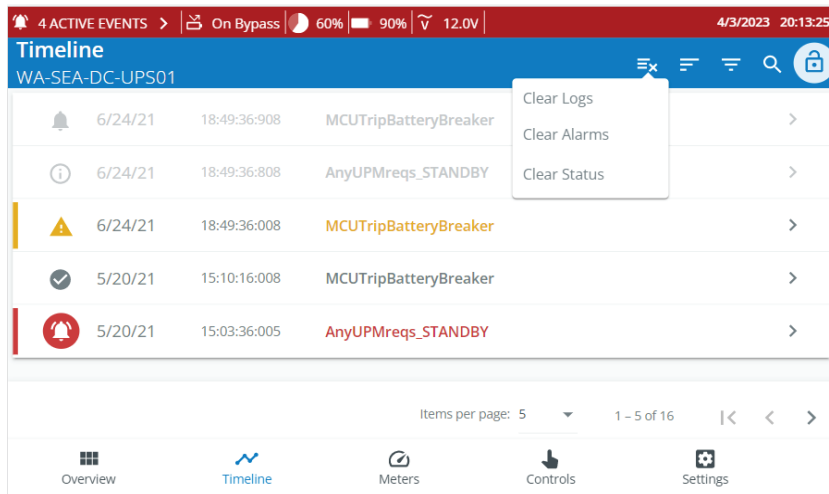
Tap the Clear icon  to clear alarms, logs or status items from the Timeline list.

Figure 80. Timeline — Clear Alarms/Logs/Status




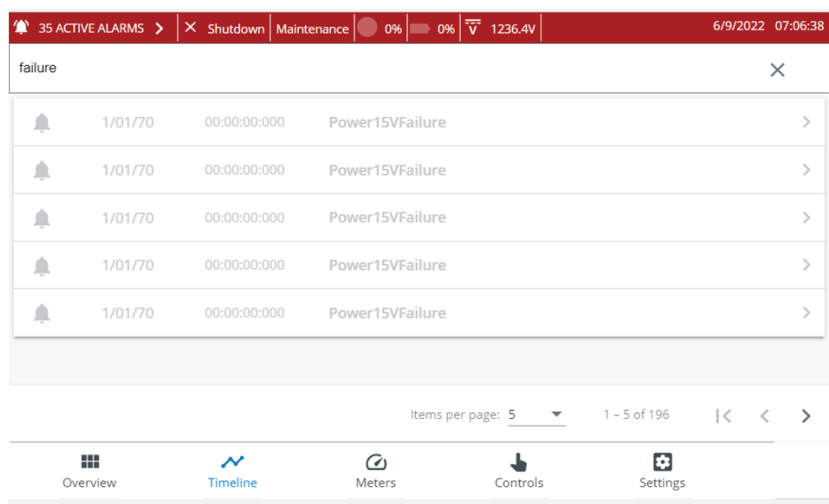
When the search icon  is selected, an inline text field is opened. You can filter out alarms by searching for any keyword which on matching with alarm description will be displayed in table. All other alarms which don't contain the keyword will be not shown.

Figure 81. Timeline Search



Timeline Table

The Timeline table displays events in three columns on the main screen.

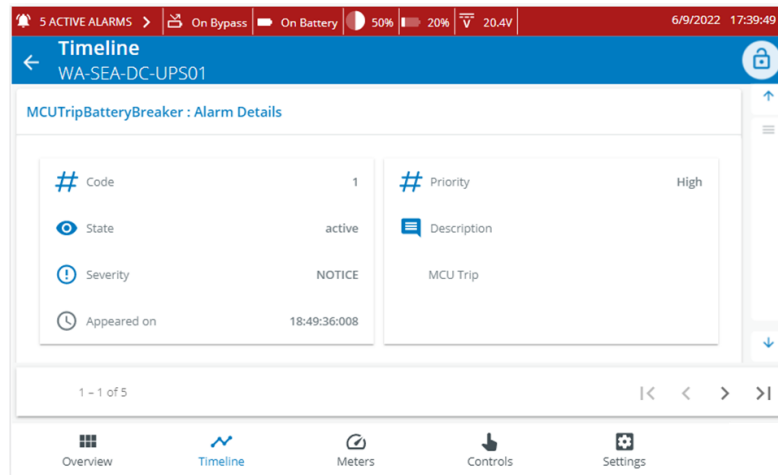
- **Alarm Type:** Alarm/Status/Notice/Command/Unknown
- **Date & Time:** Date & Time when alarm was logged into system
- **Event:** Describe Event title in short detail.

Figure 82. Timeline Table

	6/24/21	18:49:36:908	MCUTripBatteryBreaker	>
	6/24/21	18:49:36:808	AnyUPMreqs_STANDBY	>
	6/24/21	18:49:36:008	MCUTripBatteryBreaker	>
	5/20/21	15:10:16:008	MCUTripBatteryBreaker	>
	5/20/21	15:03:36:005	AnyUPMreqs_STANDBY	>

Selecting an event opens the Event Detail screen shown in [Figure 83](#). This screen details the specifics of the event.

Figure 83. Event Detail



7.3.4 Meters Screen

When Meters is selected from the navigation menu the Meters Summary Screen appears. The meters screen includes six sub screens:

- Meters Summary
- Input Meters
- Bypass Meters
- Output Meters
- Battery Meters
- Battery Control

[Figure 84](#) shows the Meters Summary screen. This screen allows selection of the various metering readout functions of Input, Bypass, Output and Battery status. Details for each meter screen can be selected by touching the item in the header bar or column name on the Summary Screen.

Figure 84. Meters Summary Screen

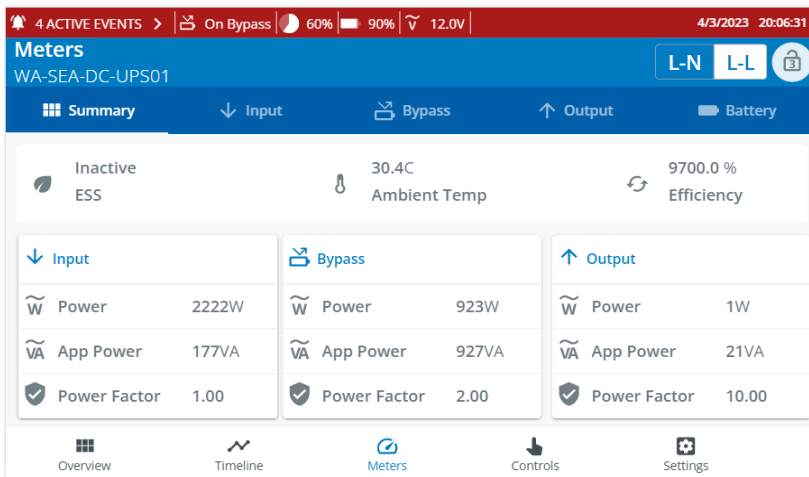
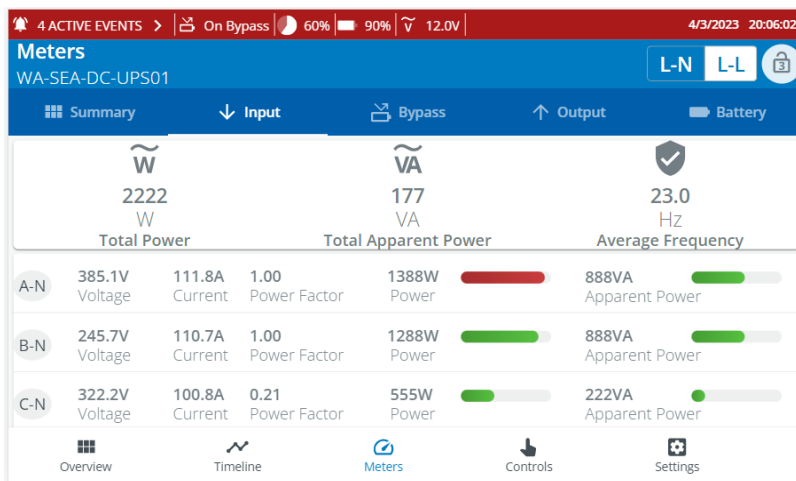


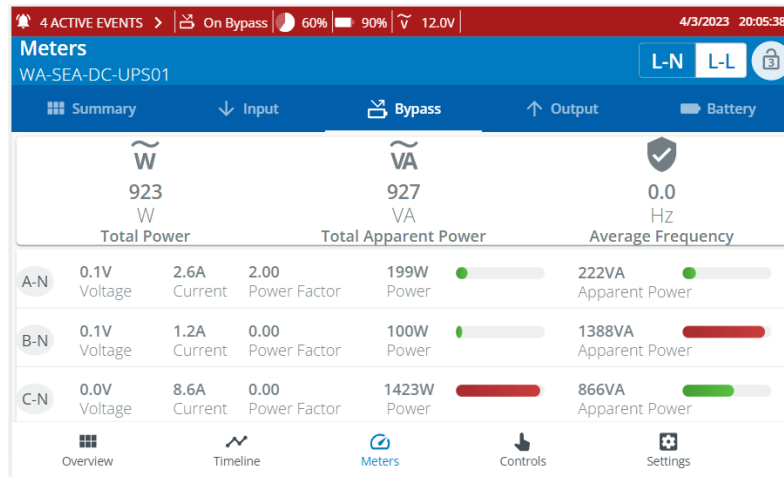
Figure 85 shows the Input Meters screen. This screen displays the individual phase and total power values of the system. Selecting a value shown opens a details screen

Figure 85. Input Meters Screen



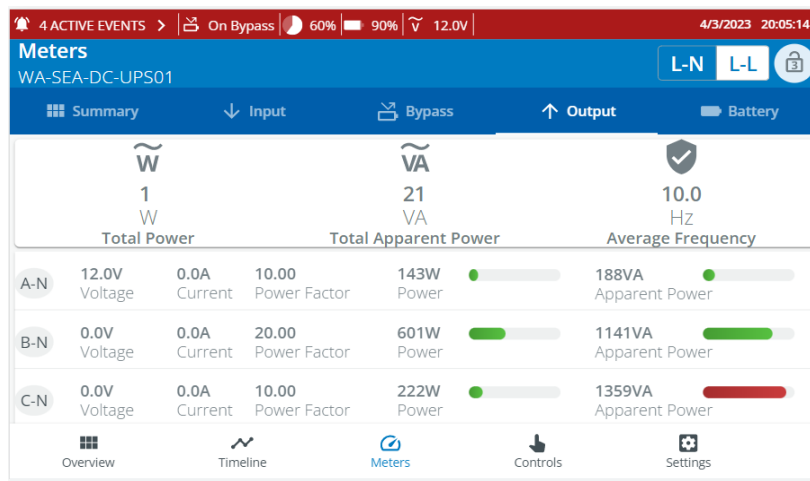
The Bypass Meters Screen shown in Figure 86 displays values pertaining to the Bypass conditions.

Figure 86. Bypass Meters Screen



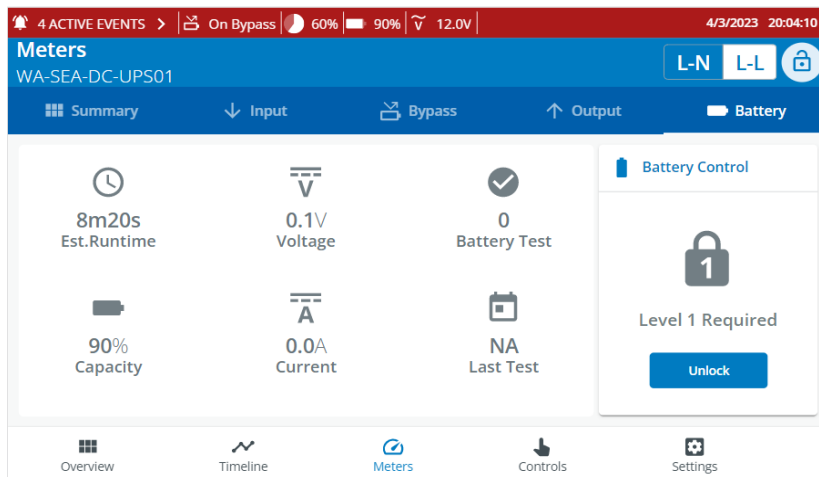
The Output Meters Screen shown in [Figure 87](#) displays values for the system output.

Figure 87. Output Meters Screen



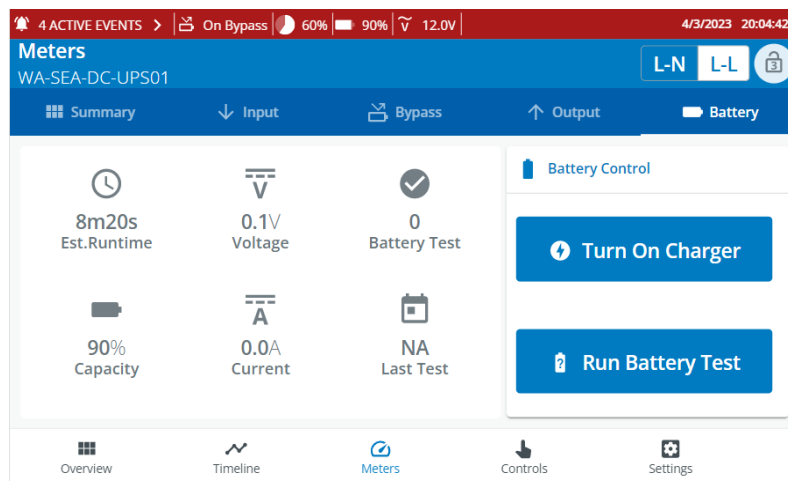
Selecting Battery on the Meters screen [Figure 88](#) shows the Battery Meters screen.

Figure 88. Battery Meters Screen



Turn on Charger and *Run Battery Test* are available in the Battery Control section of the meters screen if the user has the correct security level access (Level 3).

Figure 89. Battery Meters Screen — Battery Control



7.3.5 Controls Screen

The Controls button on the navigation menu accesses the Controls screen. Online operation, transfer to bypass 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 UPS.

When Controls button is selected, an unlock screen may appear if the user is not logged in to the correct security level (see [Table 26](#)). When the correct security code is entered, the Controls screen appears.

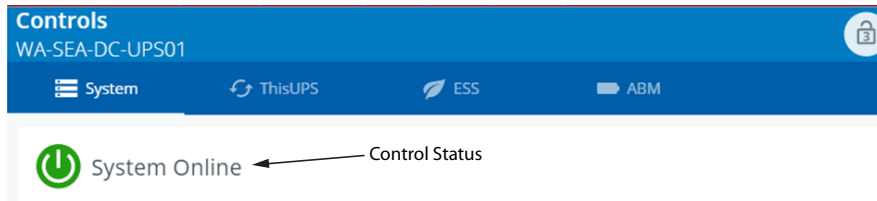
The Controls screen shows system status and includes four sub screens:

- System
- This UPS

- ESS
- ABM

The status for each control screen is shown below the Header Bar

Figure 90. Control Screen Status



[Figure 92](#) shows the System Control screen.

Figure 91. System Control Screen — Bypass

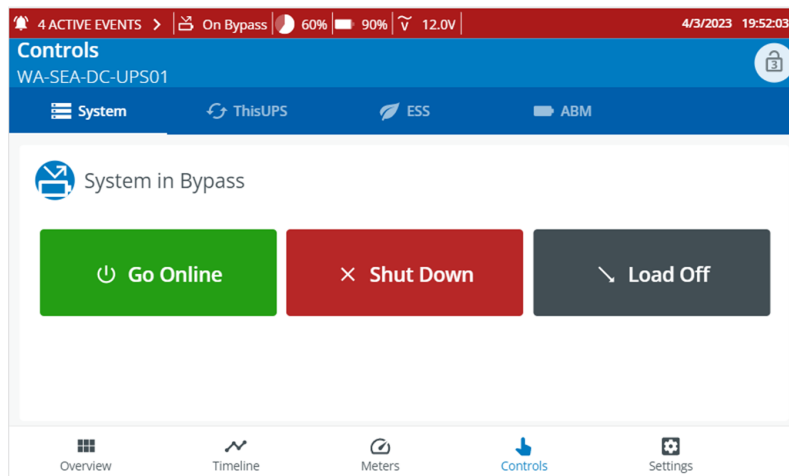
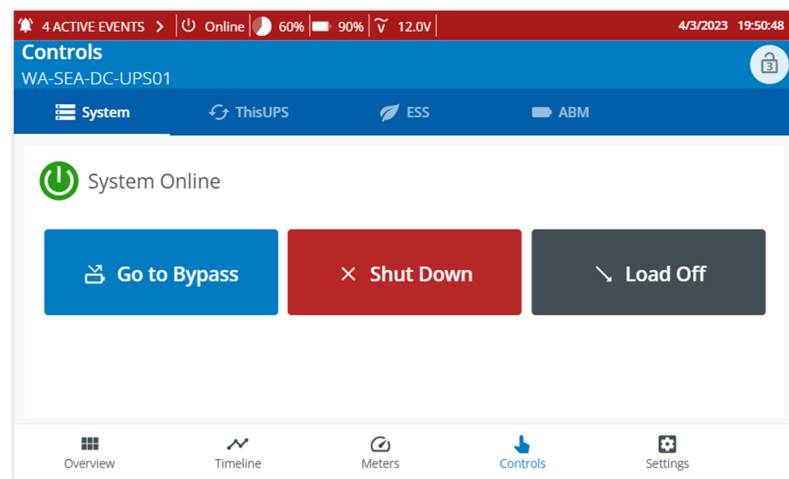
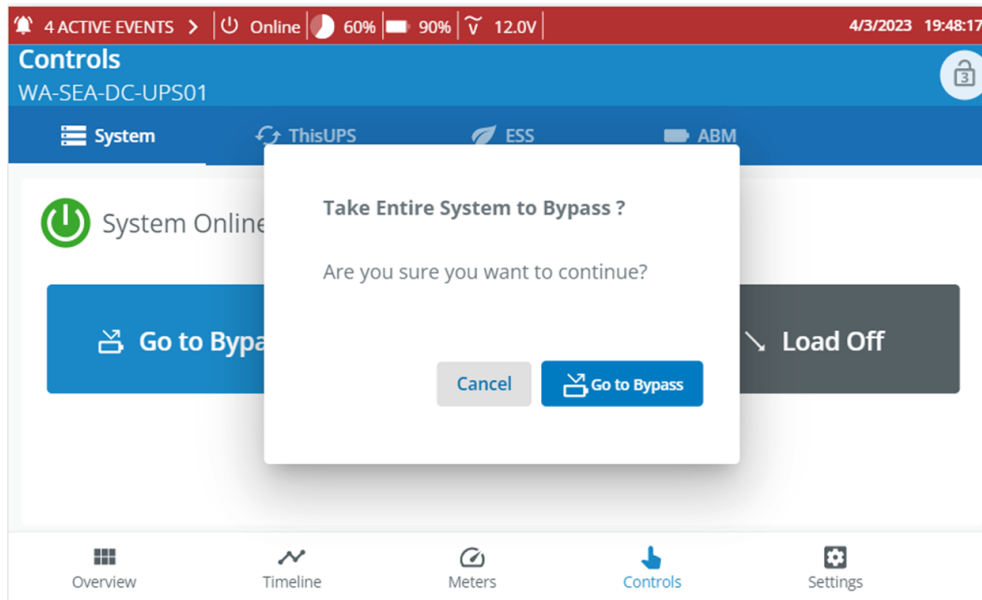


Figure 92. System Control Screen — Online



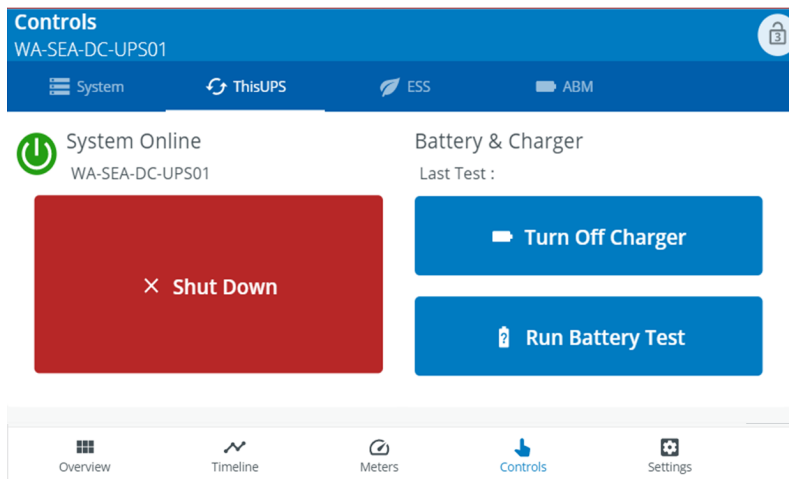
Selecting an operation will bring up a confirmation screen (see [Figure 93](#)).

Figure 93. Command Confirmation Screen Example



Selecting **This UPS** from the Control menu displays Control for Go Online, Shutdown UPS, Turn on/off Charger and Run Battery Test.

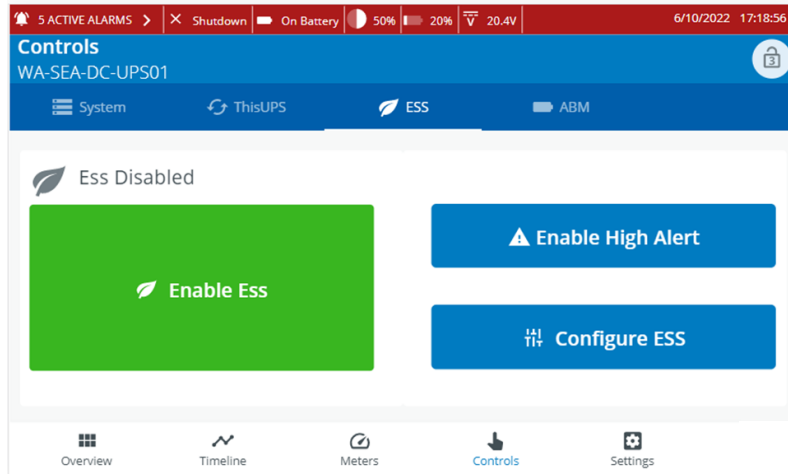
Figure 94. This UPS Control Screen



The **ESS Controls** shows the ESS (Energy Saver System) status and contains two sections to control the ESS:

- ESS Commands — Enable/Disable ESS
- ESS Action Buttons — Enable High Alert and Configure ESS (link to ESS in Settings)

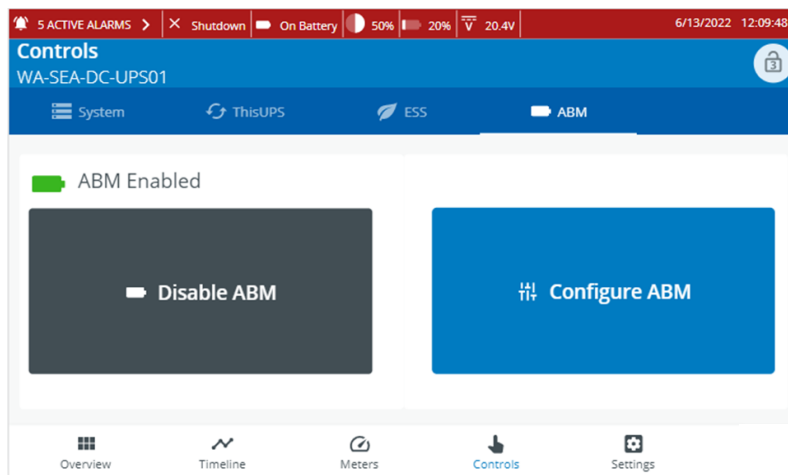
Figure 95. ESS Controls Screen



The **ABM Controls** contains two sections to control the ABM:

- ABM Commands — Enable/Disable ABM
- ABM Action Buttons — Configure ABM (link to ABM in Settings)

Figure 96. ABM Controls Screen

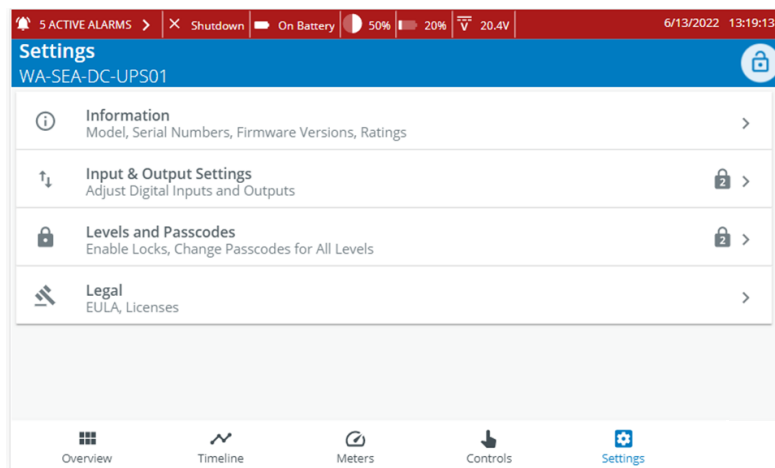


7.3.6 Settings Screen

The Settings screen includes four sub screens . Information, Input & Output Settings, Levels & Passcodes and Legal Settings screen. Each settings screen is associated with some level of access , its denoted by number padlock icon indicating level of user required to access a particular setting. If there is no lock icon against a setting its accessible for default user and above.

The Settings screen shown in [Figure 97](#) gives the operator access through sub-menus to basic system information such as serial number, installed firmware version, etc. Advanced settings are available to configure system parameters and will require password login to higher security levels (see [Table 26](#)).

Figure 97. Settings Screen



The Setting screen allows changes or configuration of various UPS settings depending on security level.

Table 30. Settings Security Levels Access

Setting	Security Level	Value
Information	1	Model, Serial Numbers, Firmware Versions, Ratings
Unit Name	2	Change the Name and Number of this Unit
Localization	2	Change Language, Units, Date Format
Clock and Time Preferences	2	Update Time and Date Format
Network	3	Ethernet Settings, DHCP, Web Access
Input & Output Settings	3	Adjust Digital Inputs and Outputs
Electrical Settings	3	Input, Output, Bypass, Power Settings
Bypass Settings	2	Update Bypass Limits
Parallel Settings	3	Adjust Parallel System Settings
Alarm Settings	3	Alarm, Notice, and Event Settings, Nodebit Configuration, Test
Generator and Walk-In	3	Walk-in and Generator Current Limits
Auto Restart	3	Behavior when Source returns
Minimum Required kVA	2	Change the Minimum Required kVA
Battery	3	Battery Health, Discharge, Run Battery Tests and View Previous Results
Reminders	3	Service, Warranty Reminders
Display	2	Adjust Backlight Brightness, Adjust Idle Timeout, Test Lamp
Levels and Passcodes	2	Enable Locks, Change Passcodes for all levels
Legal	1	EULA, Terms and Conditions, Licenses

Table 30. Settings Security Levels Access (Continued)

Setting	Security Level	Value
Reset Statistics	2	Clear all statistics
Clear Alarms	2	Description of what clear alarm does (level 2 required)
Reset Settings	3	Reset All Settings to Default

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

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. Close the UPS input feeder circuit breaker.
2. Close the UPS Bypass input feeder circuit breaker.
3. Observe the UPS control panel display becoming active, indicating logic power.
4. Press the **Padlock** icon on any screen. The **Sign In** screen is displayed (see [Figure 70](#)). Use operator password to log in (factory default password is **0101**) (see [Figure 73](#)).
5. Select the Overview screen, and verify the UPS status.
6. Select the Control button (see [Figure 74](#)).
7. On the **Control** screen, select Go Online (see [Figure 92](#)). Select "Go Online" when prompted.
8. From the **Timeline** screen menu, select *Alarms and Incidents* and verify no alarms are active on the screen (see [Figure 78](#)).

The UPS start up sequence begins.

- 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. Bypass only comes on after DC Link is pre-charged. The status 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

CAUTION

Every battery cabinet must have a UVR-type DC circuit breaker with an auxiliary contact. Failure to use this type of circuit breaker may cause severe damage to the UPS and create a personnel hazard. Note that all battery cabinets provided by the UPS manufacturer have this circuit breaker as a standard feature.



NOTE

Do not close battery breaker until pre-charge is complete (i.e. Bypass Mode or Online Mode has been achieved).



NOTE

If "Batteries Disconnected" and/or "Battery Breaker Open" alarms are present, close the battery breaker.

- The rectifier and inverter turn on. The inverter continues to ramp up to full voltage.
 - When the inverter reaches full voltage, the static switch turns off (if auto bypass enabled). Power is now supplied to the critical load in Online mode. It takes approximately three minutes for the UPS to achieve Online mode.
 - The UPS status indicates **Online** on the UPS Status area section of the screen. The UPM status indicates **Active** on the **Overview** Screen (see [Figure 74](#)).
9. Close the battery breaker. The message “*Request close external battery breaker?*” appears.
- 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 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.

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 pushbutton switch:

1. Firmly push the red pushbutton until it locks into place (see [Figure 98](#)). The switch latches into the activated state.

The battery breaker or disconnect is tripped and the power module is turned off immediately without asking for verification on all UPSs.

CAUTION

Do not attempt to restart the system after the Load Off 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 (see [Figure 98](#)). To remove the key, rotate the key back to the vertical position.
3. Open systems MOBs.

- Restart the UPSs by following the procedure in paragraph [7.4 UPS Operation using the Color Touchscreen Control Panel.](#)

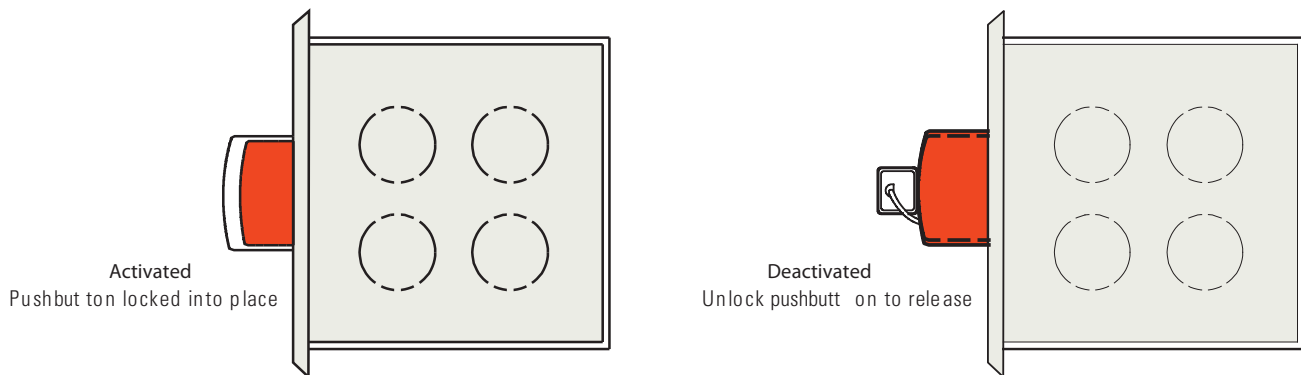
WARNING

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 98. REPO Operation



7.5 Multiple UPS Distributed Bypass Operation

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

NOTE  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

CAUTION

Do not attempt to close battery breakers until the UPS is online.

7.5.1 Starting the Distributed Bypass System in Online Mode

To start the distributed bypass system:

- Close all Module Output Breakers (MOBs).
- Close all UPS input feeder circuit breakers.
- Close all UPS Bypass input feeder circuit breakers.
- Observe the UPS control panel displays becoming active, indicating logic power.

5. Press the **Padlock** icon on any screen. The **Sign In** screen is displayed (see [Figure 70](#)). Use operator password to log in (factory default password is **0101**) (see [Table 26](#)).
6. Select the Overview screen, and verify the UPS status.
7. On the **Control** screen, select Go Online (see [Figure 92](#)). Select “Go Online” when prompted.
8. From the Timeline screen, verify no alarms are active on the **Active Event** screen (see [Figure 76](#)). The UPS start up sequence begins.
 - If Auto Bypass is enabled (factory default), the critical load is immediately supplied after pre-charge 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.
 - The rectifier and inverter turn on. The inverter continues to ramp up to full voltage.
 - When the inverter reaches full voltage, 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 UPS status indicates **Online** on the header section of the screen. The UPM status indicates **Active** on the Overview Screen (see [Figure 74](#)).
9. Close all battery breakers.
10. To activate, enable, or disable any of the UPS operational modes, follow the online screen prompts.

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. Close all Module Output Breakers (MOBs).
2. Close all UPS Bypass input feeder circuit breakers.
3. Observe the UPS control panel displays becoming active, indicating logic power.
4. Press the **Padlock** icon on any screen. The **Sign In** screen is displayed. Use operator password to log in (factory default password is **0101**) (see [Figure 70](#) and [Table 26](#)).
5. Select the Overview screen, and verify the UPS status.
6. Return to the **Home** screen and select the **Control** (see [Figure 74](#)).
7. On the **Control** screen, select **Go To Bypass** (see [Figure 92](#)). Select “Go to Bypass” when prompted.
8. From the Home screen menu, select **Timeline** and verify no alarms are active on the **Active Event** screen (see [Figure 76](#)). The UPS start up sequence begins.

The critical load is immediately supplied after pre-charge by the bypass source in Bypass mode.

7.5.3 Single UPS Shutdown using Load Off



NOTE

To shut down a single UPS, MOBs with dual auxiliary contacts must be installed and connected.

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 tab on the Home menu bar. The **System Controls** screen is displayed.
3. Select the LOAD OFF command.



NOTE

Load Off will turn off only the UPS being shut down. The remaining UPSs will remain online supplying power to the critical load.

4. Perform the LOAD OFF procedure in paragraph [7.5.7 Using the UPS LOAD OFF Command](#) on the UPS being shut down. The input contactor opens and the power module is turned off on the UPS being shut down. Logic power remains on.
5. Verify the battery breaker or disconnect for the UPS being shut down is open. If not, open the breaker.
6. 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.

7.5.4 Single UPS Restart in a Parallel System (TBD)

To restart a single UPS from a shutdown state:

1. Do not close the MOB for the UPS being restarted.
2. Close UPS input and bypass feeder circuit breakers for the UPS being restarted.
3. On the UPS being restarted, observe the UPS control panel display becoming active, indicating logic power.
4. On the UPS being restarted, press the **Overview** button on the navigation menu. The **Power Maps** screen is displayed (see [Figure 73](#)).
5. On the UPS **Power Maps** screen, verify the UPS status is SHUTDOWN.
6. Verify no alarms are active on UPS being restarted.
7. Verify the External Communications Failure alarm has cleared and no other alarms are active on the online UPSs.
8. On the **Controls** screen, select Go Online (see [Figure 92](#)). Select “Go Online” when prompted.

If Auto Bypass is enabled (factory default), the critical load is immediately supplied after pre-charge 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.

9. Press the SELECT pushbutton on the UPS Command menu bar.



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.

10. Verify the following messages display sequentially on the UPS status line:

```
DC STARTING, BYPASS
ONLINE
```

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

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.

11. Close the battery breaker for the UPS being restarted.
12. Select the UPS to Bypass
13. Place the other units in Bypass
14. Close the MOB.
15. Place all units to Online.

7.5.5 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 on the UPS being shut down.

The input contactor opens 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.

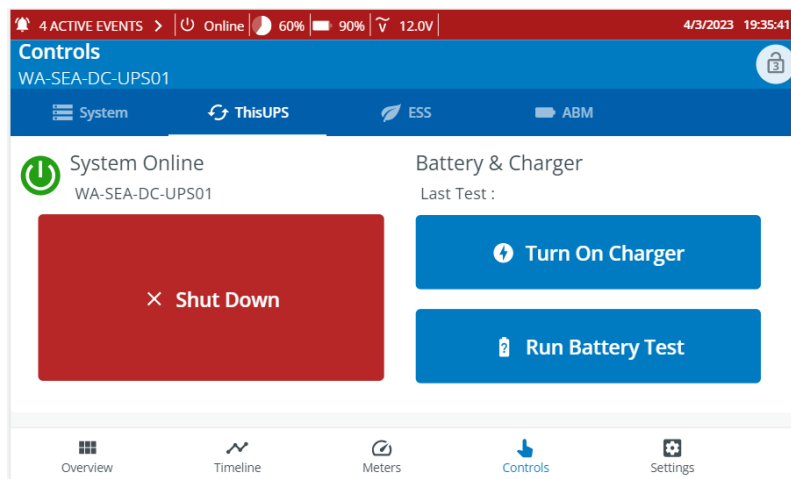
3. Open systems MOBs.
4. Open the input and bypass feeder circuit breakers on all UPSs.

7.5.6 Charger Control

To turn on the battery charger:

1. Press the **Control** button on the menu bar. The Controls screen is displayed (see [Figure 92](#)).
2. Select **This UPS** from the Control screen (see [Figure 99](#)).

Figure 99. Charger Control



3. Press the **Turn on Charger** button to start the UPM charger.
4. Use the Prev and Next buttons to select the UPMs as applicable and repeat step 3. to start their chargers.


To turn off the battery charger:

1. Press the **Controls** button on the menu bar. The Controls screen is displayed (see [Figure 92](#)).
2. Select **This UPS** from the Control screen (see [Figure 99](#)).
3. Press the **Turn off Charger** button to turn off the UPM.
4. Use the Prev and Next buttons to select the UPMs as applicable and repeat step 3. to turn off their chargers.

7.5.7 Using the UPS LOAD OFF Command

A UPS Load Off is initiated by selecting the command on the Controls screen. 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 selection.

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).

⚠ 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** on the navigation menu of the UPS to be shut down. The **System** screen is displayed (see [Figure 92](#)).
2. On the **Controls** screen, select LOAD OFF.

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

When LOAD OFF is selected the input contactor opens 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 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.

4. Restart the UPS by following the procedure in paragraph Restart the UPSs by following the procedure in paragraph [7.4.1 Starting the UPS in Online Mode](#) or [7.5.2 Starting the Distributed Bypass System in Bypass Mode](#).
-

⚠ WARNING

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

7.5.8 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 (see [Figure 100](#)). The switch latches into the activated state.

The battery breaker or disconnect is tripped and the power module is turned off immediately without asking for verification on all UPSs.

⚠ CAUTION

Do not attempt to restart the system after the Load Off 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 (see [Figure 98](#)). To remove the key, rotate the key back to the vertical position.
3. Open systems MOBs.

- Restart the UPSs by following the procedure in paragraph [7.4.1 Starting the UPS in Online Mode](#) or [7.5.2 Starting the Distributed Bypass System in Bypass Mode](#).

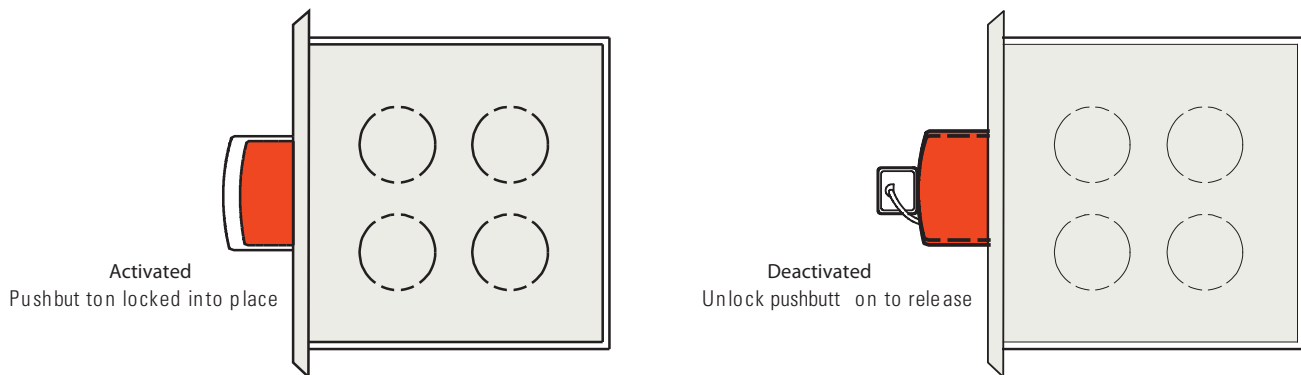
WARNING

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

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 100. REPO Operation



Chapter 8 Communication

This chapter describes the communication features of the Eaton 9395XC UPS system and provides information about connecting hardware. For terminal wiring information, see paragraph [3.2.5 UPS System Interface Wiring Preparation](#) and paragraph [4.7 Installing Interface Connections](#). For location of the customer interface panels and terminals, see [Figure 37](#) and [Figure 42](#) through [Figure 45](#).

8.1 Minislot Cards

The Eaton 9395XC UPS has four standard, factory-installed Minislot communication bays.



NOTE

Minislots support three Industrial Gateway Cards (maximum) and one Industrial Relay Card.

The UPS is compatible with the following minislot cards:(see [Figure 101](#)):

- The Eaton Industrial Gateway Card (INGW-M2) provides Web-enabled, real-time monitoring of Eaton 9395XC uninterruptible power systems (UPSs) through standard Web pages, Power Xpert software, Intelligent Power Manager (IPM), Intelligent Power Protector (IPP), or third-party software. As an integral part of the Eaton Power Xpert Architecture®, Industrial Gateway the card provides a central point to connect UPSs to the Ethernet network.

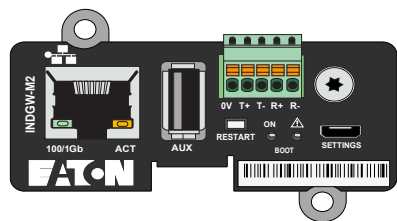
Network managers can view critical downstream device information, such as status, power, energy, and power quality data with an easy-to-use interface.

- Industrial Relay Card-Minislot (IRC-MS) – can be used to indicate the operating status of the UPS system using the customer's monitoring equipment. The Industrial Relay Card uses five isolated normally-open or normally-closed dry relay contacts to indicate the UPS status. Normal, Bypass, Battery, and Alarm modes can be monitored. See [Table 31](#) for default triggers. The contact ratings and wire range are listed in the IRC-MS installation guide. One input can be activated by a switch or dry contact. The voltage source is provided by the card, no external voltage source is needed.

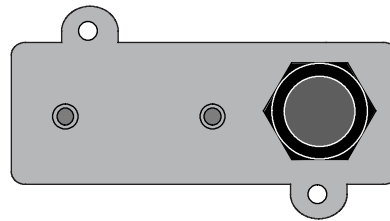
For installation and setup of a Minislot card, contact an Eaton service representative (see paragraph [1.8 Getting Help](#)). Refer to the manual supplied with the Minislot card and associated wiring isolation bracket for installation instructions.

External wiring from the IRC-MS card should be routed through the upper Interface Entry Conduit Landings panels (see [Figure 38](#)).

Figure 101. Optional Minislot Cards



Industrial Gateway Card



Industrial Relay
(IRC-MS) Card

Table 31. IRC-MS Default Triggers

Relay	Trigger
K1	UPS supporting the load
K2	UPS on Battery
K3	Summary alarm
K4	UPS on bypass
K5	UPS battery low

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 9395XC UPS operation (warranty period) along with the required connectivity parts. Beyond that, it may be purchased with Eaton Support Agreements or as a standalone subscription after the initial warranty expires. PredictPulse may also be subscribed to for free as part of a 90-day trial period. PredictPulse availability and first year bundled offers may vary by market. For more information, visit www.eaton.com/predictpulse.

8.2.1 PredictPulse Features

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

- Proactive monitoring that automatically analyzes the status of the Eaton 9395XC UPS 96 times every day (every 15 minutes). All health data gathered from the unit, current and historical, is analyzed at the Customer Reliability Center (CRC). Algorithms and sophisticated analytics software is constantly scanning your UPS's data for potential failures. Anomalies are escalated to a Software and Monitoring analyst or Technical Support specialist. Critical events are remotely diagnosed to expedite repairs, including smart dispatch of field technicians with probable cause and likely parts (avoiding return visits due to lack of required parts). Through this service, the CRC can take pre-emptive, corrective action to ensure the highest level of availability of your Eaton 9395XC UPS system.
- Easy self-installation in minutes from a wizard installer or directly from the PowerXpert Gateway UPS card. PredictPulse uses standard Eaton connectivity hardware, requiring no special software (devices only need to be connected to a network).
- Ability to give an unlimited number of coworkers access to the real-time data and reports found in PredictPulse's online dashboard and mobile app. This allows you to collaborate and Eaton to notify the most appropriate person responsible for a specific site or device.
- Real-time access to key performance information, alarms and trended health data about your Eaton 9395XC UPS via the PredictPulse online dashboard. Depending on the model, the dashboard aggregates all subscribed devices and provides detailed information about voltages, loads, energy savings, service levels, external factors such as temperature and humidity, attached batteries, and system availability. All of these factors contribute to the Relative Performance Index (RPI) score that allows you to compare your unit's health relative to Eaton's optimum UPS operating levels.
- Real-time alarm events for all subscribed devices via the PredictPulse mobile app (Apple and Android). You can track all alarms by device. As critical alarms occur, Eaton will acknowledge them so you know when Eaton has diagnosed the alarm (and pending notification of resolution).

- A monthly summary report that delivers key performance information, alarms and trended health data about your Eaton 9395XC 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 Native 9395XC 1G Ethernet Port or 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 Industrial Gateway 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 Intelligent Power Software gives you all the tools you need to monitor and manage power devices on your network, even in a virtualized environment. This innovative software solution combines the most critical applications in ensuring system uptime and data integrity: not only power monitoring and management, but also graceful shutdown during an extended power outage.

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

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

Contact your Eaton Sales representative for additional information.

8.4 Building Alarm Monitoring

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

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

8.5 General Purpose Relay Contact

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

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

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.



NOTE

If contact ratings are required that can be operated above the rated voltage and current available with the UPS general purpose relay contacts, an IRC-MS card should be used and separation of Class 1 and Class 2 wiring is observed.

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 all power sources (AC and DC) are 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.
- Failure to follow these instructions could result in severe injury or death.

⚠ 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.
- Le non-respect de ces instructions peut entraîner des blessures graves ou la mort.

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

If the string requires service, refer to the battery manufacturer's operating manual for instructions on battery maintenance or contact an Eaton service representative.

Observe these precautions when working on or around batteries:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect the charging source prior to connecting or disconnecting terminals.

- Determine if the battery is inadvertently grounded. If it is, remove the source of the ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock is reduced if such grounds are removed during installation and maintenance.
- When replacing batteries, use the same number of sealed, lead-acid batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic

9.2 Performing Preventive Maintenance

The UPS system requires very little preventive maintenance. However, the system should be inspected periodically to verify that the units are operating normally and that the batteries are in good condition.

9.2.1 DAILY Maintenance

Perform the following steps daily:

1. Check the area surrounding the UPS system. Ensure the area is not cluttered, allowing free access to the unit.
2. Ensure the air intakes (vents on the front door or panels) and the exhaust openings (on top of the ISBM/PM section) are not blocked.
3. Ensure the operating environment is within the parameters specified in paragraph [3.2.2 Environmental and Installation Considerations](#) and [Chapter 10 Product Specifications](#).
4. Ensure the UPS is in Normal mode (Normal status indicator is illuminated). If an alarm lamp is illuminated or the Normal status indicator is not illuminated, contact an Eaton service representative.

9.2.2 MONTHLY Maintenance

Perform the following steps monthly:

1. Monitor system parameters as described in paragraph [7.3 Using the Touchscreen Control Panel](#).
2. Check the UPS air filters (located behind the front panels or door) and wash or replace as necessary. See [Figure 102](#) and [Figure 103](#) for filter locations, and [Table 32](#) for filter sizes. Contact an Eaton service representative for replacement filters.

To remove and replace the filters:

Table 32. UPS Filter Sizes

Filter Location	Size	Part Number
ISBM Section Air Filter	44" X 21.6" X 0.5"	P-151000055
PM Section Air Filters	44" X 11.3" X 0.5"	P-151000054



Verify washed filters are thoroughly dry before reinstalling.



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

- a. Remove the bottom screws securing each PM section front panel (see [Figure 103](#)). Lift the panel straight up to remove it from the panel hanger bracket at the top of the cabinet.
- b. On the inside of the PM front panels remove the screws securing the filters and retain the hardware (see [Figure 103](#)).
- c. Install the washed or new PM section filters with the retained hardware.
- d. Reinstall the PM section front panels removed in Step a. and secure with the retained hardware.
- e. Open the ISBM front door (see [Figure 102](#)).
- f. Remove the screws securing the filters and retain the hardware (see [Figure 103](#)).
- g. Install the washed or new ISBM section filter with the retained hardware.
- h. Reinstall the PM section front panels removed in Step a. and secure with the retained hardware.
- i. Close the ISBM front door and secure the latch.

Figure 102. ISBM/PM Section Air Filter Locations

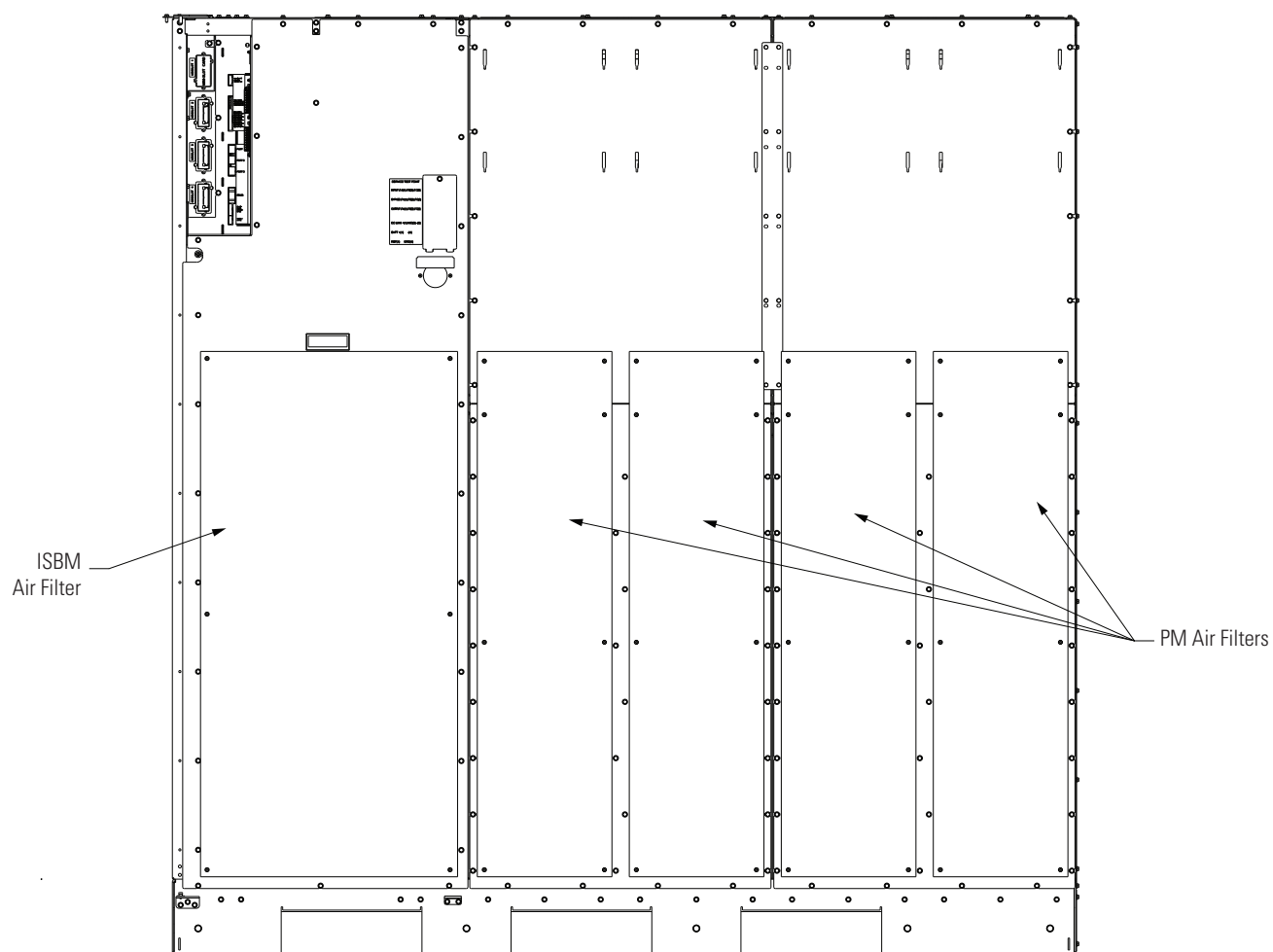
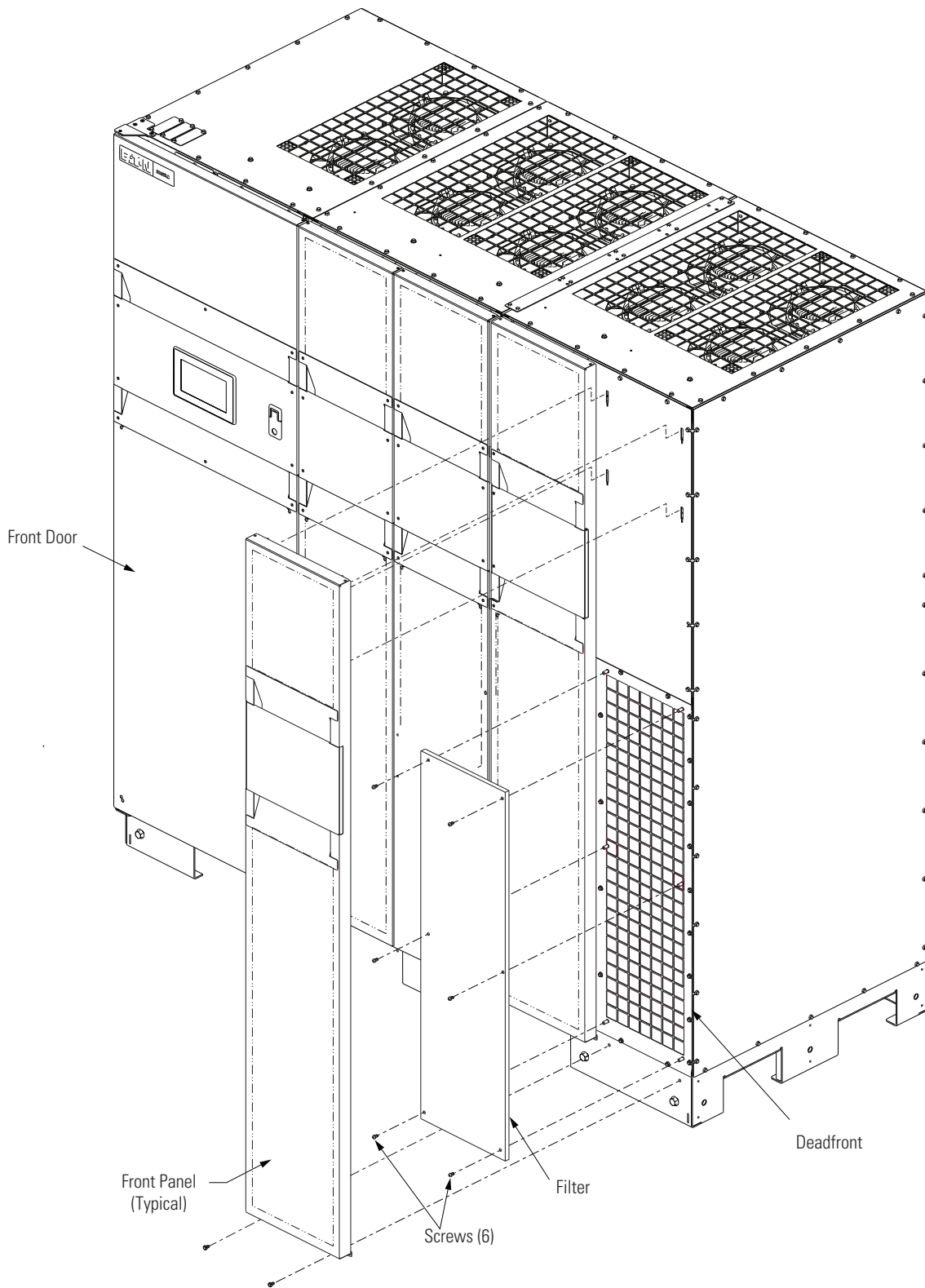


Figure 103. ISBM/PM Section Air Filter Replacement



- 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.

9.3.1 Recycling the Used Battery or UPS

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

WARNING

- Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
 - Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
 - A battery can cause electrical shock, burn from high short-circuit current, or fire. Observe proper precautions.
-



AVERTISSEMENT!

- Une batterie peut présenter un risque de choc électrique, de brûlure, ou d'incendie. Suivre les précautions qui s'imposent.
 - Pour le remplacement, utiliser le même nombre et modèle des batteries.
 - L'élimination des batteries est réglementée. Consulter les codes locaux à cet effet.
-



CAUTION

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



ATTENTION!

Ne pas jeter l'onduleur ou ses batteries aux ordures. Ce produit contient des batteries au plomb scellées, il est important de l'éliminer convenablement. Pour plus de renseignements, communiquer avec le centre régional de récupération/réutilisation ou d'élimination des déchets dangereux.



CAUTION

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



ATTENTION!

Ne pas éliminer les déchets d'équipements électriques et électroniques (DEEE) aux ordures. Pour connaître la méthode d'élimination appropriée, communiquer avec le centre régional de récupération/réutilisation ou d'élimination des déchets dangereux.

9.4 Maintenance Training

A basic training course, available from Eaton Corporation, gives you a competent working knowledge of the UPS system operation and teaches you how to perform first level corrective maintenance. For more information about training and other services, contact the Help Desk (see [1.8 Getting Help](#)).

Chapter 10 Product Specifications

10.1 Model Numbers

The UPS is housed in 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.

Model	Power Rating	Frequency
Eaton 9395XC-1000/1000	1000 kW, 1000 kVA	50/60 Hz
Eaton 9395XC-1050/1050	1050 kW, 1050 kVA	50/60 Hz
Eaton 9395XC-1100/1100	1100 kW, 1100 kVA	50/60 Hz
Eaton 9395XC-1200/1200	1200 kW, 1200 kVA	50/60 Hz
Eaton 9395XC-1300/1300	1300 kW, 1300 kVA	50/60 Hz
Eaton 9395XC-1350/1350	1350 kW, 1350 kVA	50/60 Hz
Eaton 9395XC-1400/1400	1400 kW, 1400 kVA	50/60 Hz
Eaton 9395XC-1500/1500	1500 kW, 1500 kVA	50/60 Hz

10.2 Specifications

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

10.2.1 UPS Input

Operating Input Voltage	480 Vac
Operating Input Frequency Range	50/60 Hz
Operating Input Current	See Table 5 Reduced for Generator Adjustable
Input Current Harmonic Content	<3% THD at full load
Power Factor	Minimum 0.99 at full load
Line Surges	6 kV OC, 3 kA SC per ANSI 62.41 and IEC 801-4
Battery Voltage	480 Vdc
Battery Charging Capacity	Up to 480A with less than 85% load Up to 80A with 100% load The rectifier provides an additional 15% power for charging batteries while the UPS is powering rated load at nominal line. Charging up to 520A for 1500kW model.
Battery UVR	48 Vdc
Battery Overload	110% OL at 480V fixed DC Steady State up to overload timer. No overload below 480V. 100% load at 420V fixed DC Steady State. Operates to System Current of 4000A UPS shall transfer to Bypass mode if available or shutdown after the overload timer expires

10.2.2 UPS Output

Output Voltage Regulation	±1.0% (10% to 100% load)
Output Voltage (Nominal +/-3%)	480 Vac nominal, adjustable from 466 Vac to 494 Vac
Output Voltage Harmonic Content	1% maximum THD (linear load) 5% maximum THD (nonlinear load)
Output Current	See Table 5
Output Voltage Balance	2.5% for 100% maximum load imbalance (linear load)
Output Voltage Phase Displacement	±4° for 100% maximum load imbalance (linear load)
Output Transients	Meets Class 1 IEC 62040-3 (10% to 100% load)
Frequency Regulation	±0.1 Hz free running
Synchronous to Bypass	+10% to -10%
Frequency Slew Rate	.7 Hz per second maximum
Load Compatibility	0.7 pF Leading 0.7 pF Lagging
Overload Capability (kVA or kW)	105% - 110% for 10 minutes 111% - 125% for 120 seconds 126% - 150% for 10 seconds >150% for 300 milliseconds

NOTE The 125% and 150% overloads are based on the non-derated hardware capability of the UPS.

10.2.3 UPS Environmental

Operating Temperature	0 to 40°C (32 to 104°F) at elevation up to 1000m without derating. The recommended operating temperature is 25°C (77°F).
Operating Altitude	Maximum 1000 m (3300 ft) at 40°C without derating
Storage Temperature	-20 to +50°C excluding batteries (prolonged storage above 40°C causes rapid battery self-discharge)
Relative Humidity (operating and storage)	5% to 95% maximum non-condensing.
Acoustical Noise	82dB at a 1m distance A weighted for one UPS 100% Load.
EMI Emissions and Immunity	Meets IEC 62040-2, category C3.
Electrostatic Discharge (ESD) Immunity	IEC61000-4-2 Level 3 - 4kV contact/ 8kV air discharge.



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