

Eaton® 9355 UPS

20/30 kVA
User's Guide



p/n: 164201626
Revision H0

Class A EMC Statements

FCC Part 15

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ICES-003

This Class A Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

IEC 62040-2

Some configurations are classified under IEC 62040-2 as "C2 UPS for Unrestricted Sales Distribution."



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Chapter 1 Introduction



NOTE

If installing or upgrading a single tray battery configuration go to the Tech Support website under the training tab at www.Eaton.com for installation and upgrade instructions.

The Eaton® 9355 uninterruptible power supply (UPS) is a true online, double-conversion, three-phase system that can be used to prevent loss of valuable electronic information and minimize equipment downtime. It is ideal for protecting essential information technology and electrical engineering infrastructure in corporate, telecom, health care, banking, and industrial applications.

The Eaton 9355 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 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.

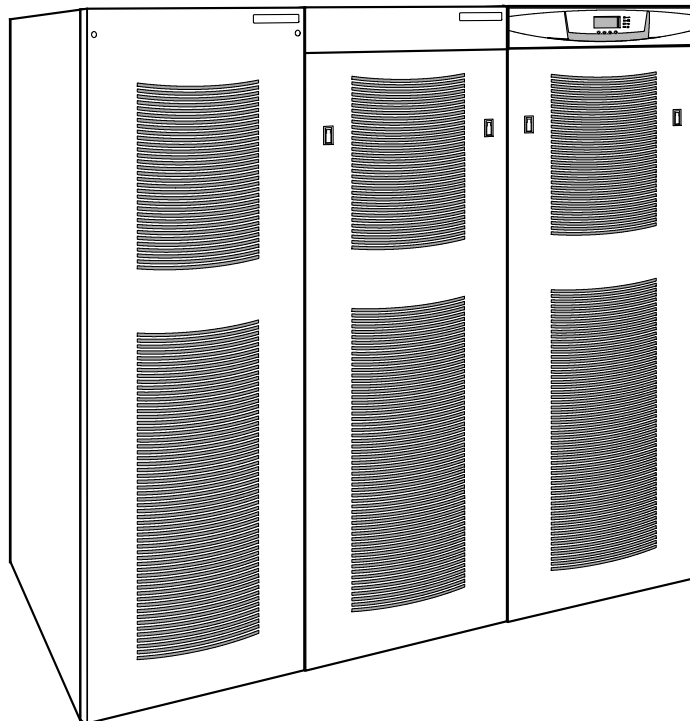
With the Eaton 9355 UPS, you can safely eliminate the effects of electrical line disturbances and guard the integrity of your systems and equipment. [Figure 1](#) shows the Eaton 9355 UPS (20/30 kVA) with an optional Extended Battery Cabinet (EBC) and Options Cabinet.



IMPORTANT

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified on the product's resources page become void. See [Chapter 11 Warranty](#) for details. This service is offered as part of the sales contract for the UPS. Contact an Eaton service representative in advance (a minimum two-week notice is required) to reserve a preferred startup date.

Figure 1. The Eaton 9355 UPS (20/30 kVA) with Optional EBC and Options Cabinet



Providing outstanding performance and reliability, the Eaton 9355 UPS's unique benefits including the following:

- Online UPS design with pure sine wave output. The UPS filters and regulates incoming AC power and provides consistent power to your equipment without draining the battery.
- More wattage in less space with a 0.9 power factor – protecting more equipment and leaving more room for expansion.
- Support for Powerware Hot Sync® paralleling of multiple modules for redundancy or extra capacity.
- Input current total harmonic distortion (THD) of less than five percent, using active input power factor correction.
- ABM® technology that uses advanced battery management to increase battery service life, optimize recharge time, and provide a warning before the end of useful battery life.
- Over two hours of extended runtime with added EBCs.
- Advanced power management with the Software Suite CD for graceful shutdowns and power monitoring.
- Emergency shutdown control through the remote emergency power-off (REPO) port.
- Start-on-battery capability for powering up the UPS even if utility power is not available.
- Standard communication options with a DB-9 serial port, relay output contacts, and programmable signal inputs.
- Optional X-Slot® cards with enhanced communication capabilities for increased power protection and control.

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 Control Panel

The control panel, located on the front of the UPS, has a four-button graphical LCD with backlight. It provides useful information about the UPS itself, load status, events, measurements, and settings.

See [Chapter 7 UPS Operating Instructions](#), for additional information.

1.1.2 Customer Interface

- **Building Alarm Monitoring** – Up to four 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.
- **X-Slot Communication Bays** – Two communication bays are standard equipment. Up to two communication cards can be installed in the UPS at any time.

For additional information on these topics, see [Chapter 6 Communication](#).

1.1.3 Advanced Battery Management

Advanced Battery Management (ABM) technology uses sophisticated sensing circuitry and a three-stage charger. The charger is a high-frequency, IGBT-based power conversion stage that extends the useful service life of UPS batteries by isolating the battery from the electrical environment, except for periodic charging or reserve mode operation. ABM also protects batteries from damage due to high current charging and inverter ripple currents. Charging at high currents can overheat and damage batteries.

ABM extends battery life by keeping the batteries charged and performing periodic battery testing. The battery test checks the batteries by transferring to battery mode. During the test the battery voltage is constantly monitored to determine Battery Health. ABM is intended for VRLA style batteries.

An ABM charging cycle starts with the charger driving the battery voltage at maximum current limit, to a battery charge level of 2.30volts/cell. The time it takes for the voltage to reach the battery charge level is saved as the battery charge time. If the battery charge time exceeds 24 hours, an alarm sounds.

When the battery reaches the float level, the battery is charged at the float level for 48 hours. Due to charger capability, some battery cabinet configurations extend float level to 72 hours. Twenty-four hours into the float period, a series of battery tests are performed to check the battery health. The float level charge continues after a successful test.

After initial startup, the battery run time on the front panel display indicates two minutes. After the 24-hour float charging period and automated battery testing, the actual battery run time is determined and the actual battery run time is displayed.

After the float period is completed, the charger is disconnected and the batteries are allowed to rest for up to 672 hours (28 days) maximum rest time. If the battery voltage falls below the opportunity charge level of 2.1V/cell during the first 240 hours (10 days) of the rest period, an alarm sounds.

An ABM charge cycle is initiated whenever one of these four conditions occurs since the last charge cycle:

- The batteries have rested over the maximum rest time of 672 hours.
- Accumulated discharge time is over a maximum battery discharge time of 20 seconds.
- Battery voltage is under the opportunity charge level of 2.1 volts/cell and the cabinet has been in rest mode for longer than 240 hours.
- A Battery Test command has been initiated.

1.2 Options and Accessories

Contact an Eaton sales representative for information about the following available options for the Eaton 9355 UPS:

1.2.1 Extended Battery Cabinet

Optional EBCs are available with 2 strings or 4 strings, providing up to 2.7 hours of extended runtime.

1.2.2 Options Cabinet

The Options Cabinet is available in five models:

1. Options Cabinet with a maintenance bypass switch that provides wrap-around bypass for UPS maintenance or service without shutting down the load
2. Options Cabinet with both MBS and input isolation transformer that allows operation from a 208V, 480V, or 600V 60-Hz source (input transformer in single-feed systems or bypass transformer in dual-feed systems)
3. Options Cabinet for dual-feed systems that provides the second input from a 208V, 480V, or 600V 60-Hz source
4. Options Cabinet with an output isolation transformer for 480V loads
5. Options Cabinet for single-feed system with MBS, 480V input isolation transformer, and 480V output transformer.

1.2.3 Wall-Mounted Bypass Switch

The optional wall-mounted bypass switch is used to bypass the UPS during maintenance or servicing, providing wrap-around bypass for UPS service without shutting down the load.

1.2.4 Parallel Tie Cabinet

An optional parallel system with up to four UPSs can be installed to provide a parallel capacity and/or redundant system. This load sharing system provides more capacity than a single UPS and can provide backup, depending on the load and configuration. In addition, when one UPS is taken out of service for maintenance or is not operating properly, a redundant UPS continues to supply uninterrupted power to the critical load. A parallel Powerware Hot Sync Controller Area Network (CAN) Bridge Card provides connectivity for system metering and operational mode control. The parallel system consists of two to four UPSs, each with a parallel CAN Bridge Card, and a parallel Tie Cabinet.

1.2.5 Seismic Kit

The optional seismic kit secures the UPS and optional cabinets for Zone 4 seismic installations.

1.2.6 Monitoring and Communication

X-Slot Cards – Optional X-Slot cards support several protocols, such as SNMP, SMTP, HTTP, Modbus®, and TCP/IP. See [Chapter 6 Communication](#), for additional information on monitoring and communication features.

Remote Monitoring Device (RMD) – An optional RMD contains a touch screen status display and a local audible alarm, allowing monitoring of the operational status and alarm condition of the UPS from virtually any location within the facility, up to 300 feet from the UPS.

Refer to the ***Eaton Remote Monitoring Device (RMD) Installation and Operation Manual***, listed in paragraph [1.6 For More Information](#), for additional information.

PredictPulse™ Remote Monitoring and Management Service – PredictPulse is a subscription monitoring and management service from Eaton that collects and analyzes data from connected power infrastructure devices, providing us with the insight needed to make recommendations and take action on your behalf. It's also powered by CA Technologies, bringing together the best in hardware and software. Like a second set of eyes on your power infrastructure, PredictPulse provides 24/7 remote monitoring of alarms and system performance (load, temperature/humidity, battery health, energy savings and service level) to reduce downtime risk and expedite repairs. PredictPulse also shares real-time status and trend information via an online dashboard and smartphone mobile app (Apple and Android), giving subscribers insights about past and current performance, a list of all active alarms, and asset management data (i.e., battery date codes, last and next scheduled service dates, firmware versions). The service notifies customers of critical alarms, supports remote diagnostics, and facilitates smart dispatch of technicians. PredictPulse requires a Power Xpert® Gateway X-Slot (PXGMS) connectivity card in an X-Slot communication bay and an Environmental Monitoring Probe (EMP) for battery temperature/humidity monitoring. See [Chapter 6 Communication](#), for additional information.

1.3 Using This Manual

This manual describes how to install and operate the Eaton 9355 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 or the LOAD OFF procedure, see **Chapter 7 UPS Operating Instructions**.

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, **Chapter 1 Introduction** through **Chapter 4 UPS System Installation** and **Chapter 7 UPS Operating Instructions** should be examined.

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

1.4 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
Note	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, an external battery system, and options or accessories installed.

The term line-up-and-match refers to accessory cabinets that are physically located adjacent to the UPS. The term standalone refers to accessory cabinets that are located separate from the UPS.

Left and right side notations are referenced standing in front of the cabinet.

1.5 Symbols, Controls, and Indicators

The following are examples of symbols used on the product to alert you to important information:



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



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



This symbol indicates that you should not discard the product in the trash. This product 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.



ON - Indicates that the switch is in the ON position.



OFF - Indicates that the switch is in the OFF position.



PHASE - The word "phase."

1.6 For More Information

Refer to the ***Eaton 9355 Tie Cabinet Installation Guide*** for the following additional information:

- Installation instructions, including site preparation, planning for installation, wiring and safety information, and detailed illustrations of cabinets with dimensional and connection point drawings
- Operation, including breakers, standard features and optional accessories, procedures for using the bypass functions, and information about maintenance

Refer to the ***Eaton 9355 Version 2 Tie Cabinet Installation Guide*** for the following additional information:

- Installation instructions, including site preparation, planning for installation, wiring and safety information, and detailed illustrations of cabinets with dimensional and connection point drawings
- Operation, including breakers, standard features and optional accessories, procedures for using the bypass functions, and information about maintenance

Refer to the ***Eaton Remote Monitoring Device (RMD) Installation and Operation Manual*** for additional installation and operating instructions.

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

1.7 Getting Help

If help is needed with any of the following:

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

Please call the Customer Reliability Center at:

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

Please have the following information ready when you call for service:

- Model number
- Serial number
- Firmware version number
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

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

E-ESSDocumentation@eaton.com

1.8 Equipment Registration

Please visit www.eaton.com/pg/register to register your new Eaton UPS / Eaton UPS Accessory.

Model Number:

Serial Number:

Chapter 2 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

 **DANGER**

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

 **WARNING**

- This UPS contains its own energy source (batteries). The UPS output may carry live voltage even when the UPS is not connected to an AC supply.
 - 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).
 - To reduce the risk of fire, connect only to a circuit provided with 125 amperes maximum branch circuit overcurrent protection in accordance with the National Electrical Code, ANSI/NFPA 70.
 - Output overcurrent protection and disconnect switch must be provided by others.
-

 **CAUTION**

- Batteries can present a risk of electrical shock or burn from high short circuit current. Observe proper precautions. Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
 - Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
 - Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
-

2.1 Consignes de Sécurité

CONSIGNES DE SÉCURITÉ IMPORTANTES – CONSERVER CES INSTRUCTIONS

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

 **DANGER!**

Cet onduleur contient des TENSIONS MORTELLES. Toute opération d'entretien et de réparation doit être EXCLUSIVEMENT CONFIEE A UN PERSONNEL QUALIFIE AGRÉÉ. AUCUNE PIÈCE RÉPARABLE PAR L'UTILISATEUR ne se trouve dans l'onduleur.



AVERTISSEMENT!

- Cette onduleur possède sa propre source d'alimentation (batteries). Il est possible que la sortie de l'onduleur soit sous tension même lorsque l'onduleur n'est pas connectée à une alimentation CA.
- Pour réduire les risques d'incendie et de décharge électrique, installer l'onduleur uniquement à l'intérieur, dans un lieu dépourvu de matériaux conducteurs, où la température et l'humidité ambiantes sont contrôlées. La température ambiante ne doit pas dépasser 40 °C. Ne pas utiliser à proximité d'eau ou dans une atmosphère excessivement humide (95 % maximum).
- Afin de réduire les risques d'incendie, n'effectuez le raccordement qu'avec un circuit muni d'une protection de surintensité du circuit de dérivation maximum de 125 ampères conformément au Code Électrique National (National Electrical Code) des États-Unis ANSI/NFPA 70.
- La protection de surintensité de sortie ainsi que le sectionneur doivent être fournis par des tiers.



ATTENTION!

- Les batteries peuvent présenter un risque de choc électrique ou de brûlure provenant d'un courant de court-circuit haute intensité. Observez les précautions appropriées. L'entretien doit être réalisé par du personnel qualifié connaissant bien les batteries et les précautions nécessaires. N'autorisez aucun personnel non qualifié à manipuler les batteries.
 - Une mise au rebut réglementaire des batteries est obligatoire. Consulter les règlements en vigueur dans votre localité.
 - Ne jamais jeter les batteries au feu. L'exposition aux flammes risque de les faire exploser.
-

2.2 Advertencias de Seguridad

INSTRUCCIONES DE SEGURIDAD IMPORTANTES – GUARDE ESTAS INSTRUCCIONES

Este manual contiene instrucciones importantes que debe seguir durante la instalación y el mantenimiento del SIE y de las baterías. Por favor, lea todas las instrucciones antes de poner en funcionamiento el equipo y guarde este manual para referencia en el futuro.



PELIGRO

Este SIE contiene VOLTAJES MORTALES. Todas las reparaciones y el servicio técnico deben ser efectuados SOLAMENTE POR PERSONAL DE SERVICIO TÉCNICO AUTORIZADO. No hay NINGUNA PARTE QUE EL USUARIO PUEDA REPARAR dentro del SIE.

**ADVERTENCIA**

- Este SIE contiene su propia fuente de energía (baterías). La salida del SIE puede transportar voltaje activo aun cuando el SIE no esté conectado con una fuente de CA.
- Para reducir el riesgo de incendio o de choque eléctrico, instale este SIE en un lugar cubierto, con temperatura y humedad controladas, libre de contaminantes conductores. La temperatura ambiente no debe exceder los 40°C. No trabaje cerca del agua o con humedad excesiva (95% máximo).
- Para reducir el riesgo de incendio, realice la conexión únicamente hacia un circuito que cuente con un máximo de 125 amperios de protección contra sobrecorriente de circuito derivado, de acuerdo con el Código Eléctrico Nacional, ANSI/NFPA 70.
- La protección contra sobrecorriente de salida y el conmutador de desconexión debe suministrarse por parte de terceros.

**PRECAUCIÓN**

- Las baterías pueden constituir un riesgo de descarga eléctrica o quemaduras por corriente alta de corto circuito. Adopte las precauciones debidas. Personal calificado de servicio que conozca de baterías y esté al tanto de las precauciones requeridas debe darle servicio al equipo. Mantenga al personal no autorizado alejado de las baterías.
 - Es necesario desechar las baterías de un modo adecuado. Consulte las normas locales para conocer los requisitos pertinentes.
 - Nunca deseche las baterías en el fuego. Las baterías pueden explotar si se las expone a la llama.
-

Safety Warnings

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 cabinet.
4. Unload and install the UPS cabinet, and wire the system.
5. Complete the Installation Checklist.
6. Have authorized service personnel perform preliminary operational checks and start up the system.

The instructions are intended for the chief operator/system supervisor, electrical consultants, and installation electricians. Local regulations and electrical code must be followed during the UPS installation.

3.1 Creating an Installation Plan

Before installing the UPS system, read and understand how this manual applies to the system being installed. Use this chapter's procedures and illustrations and those in **Chapter 4 UPS System Installation** 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. The operating environment must meet the weight, clearance, and environmental requirements specified.

3.2.1 Environmental and 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 operated at an altitude no higher than 1500m (5000 ft) without derating. For additional assistance with high altitude operation, contact an Eaton service representative (see paragraph [1.7 Getting Help](#)).
- The system must be installed in a temperature and humidity controlled indoor area free of conductive contaminants.



CAUTION

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

- The environmental requirements specified below are for the air at the intake ports of the 9355 UPS, and are the maximum, not to exceed, ratings.
 - There shall be at least a 1.8°F (1.0°C) difference between the dry bulb temperature and the wet bulb temperature, at all times, to maintain a non-condensing environment.
 - The maximum rate of temperature change shall be limited to 3°F over 5 minutes (36°F/hour), based on the ASHRAE Standard 90.1-2013.

- 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 the actual temperature.
 - 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 night to 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.

Failure to follow guidelines may void your warranty.

The basic environmental requirements for operation of the UPS are:

- Ambient Temperature Range: 5–40°C (41–104°F)
- Recommended Operating Range: 5–40°C (41–104°F)
- Maximum Relative Humidity: 5–95%, noncondensing

 **CAUTION**

If battery systems are located in the same room as the UPS, the battery manufacturer's environmental requirements should be followed if they are more stringent than the UPS requirements. Operating temperatures above the recommended range will result in decreased battery life and performance, and may reduce or void the battery warranty.

The UPS ventilation requirements are shown in [Table 1](#). To allow for future power upgrades, Eaton recommends using air conditioning or ventilation sized for the fully rated UPS kW frame size installed instead of the derated kW ordered. Sizing the site cooling infrastructure to be capable of cooling the maximum kW frame size will allow a full power rating upgrade without having to modify the infrastructure.

Table 1. Air Conditioning or Ventilation Requirements During Full Load Operation

Model	UPS Rating	Minimum Required Cooling Air Flow
Eaton 9355 UPS	20–30 kVA	363 liter/sec (770 cfm)

When planning the installation, consider the UPS weight for floor loading. The strength of the installation surface must be adequate for point and distributed loadings. The approximate weights are shown in the following table.

Table 2. Standard Model Floor Loadings

Eaton 9355	Maximum Weight	Point Loading
20 kVA UPS	1160 lb (526 kg)	290 lb/in ² (20 kg/cm ²)
30 kVA UPS	1160 lb (526 kg)	290 lb/in ² (20 kg/cm ²)
EBC 36	1160 lb (526 kg)	290 lb/in ² (20 kg/cm ²)

Table 2. Standard Model Floor Loadings (Continued)

Eaton 9355	Maximum Weight	Point Loading
EBC 72	2060 lb (934 kg)	515 lb/in ² (36 kg/cm ²)
Options Cabinet with Single Transformer	535 lb (243 kg)	134 lb/in ² (9.4 kg/cm ²)
Options Cabinet with Dual Transformer	792 lb (360 kg)	198 lb/in ² (13.9 kg/cm ²)
Options Cabinet with MBS only	205 lb (93 kg)	51 lb/in ² (3.6 kg/cm ²)

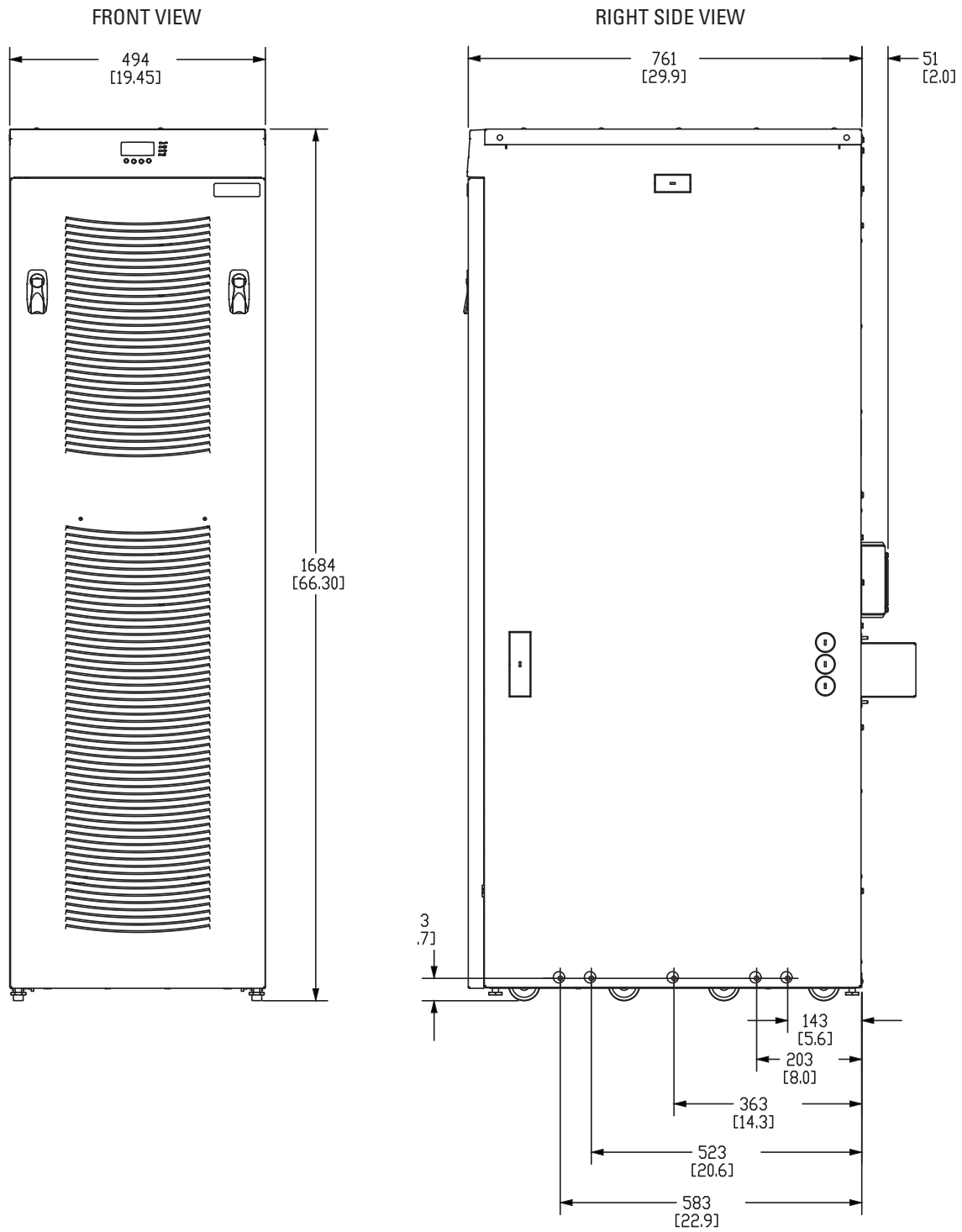
The UPS cabinet uses forced air cooling to regulate internal component temperature. Allow clearance in front of and in back of the cabinet for proper air circulation. The clearances required around the UPS cabinet are shown in the following table.

The following clearances are recommended for the Eaton 9355 UPS:

Table 3. UPS Cabinet Clearances

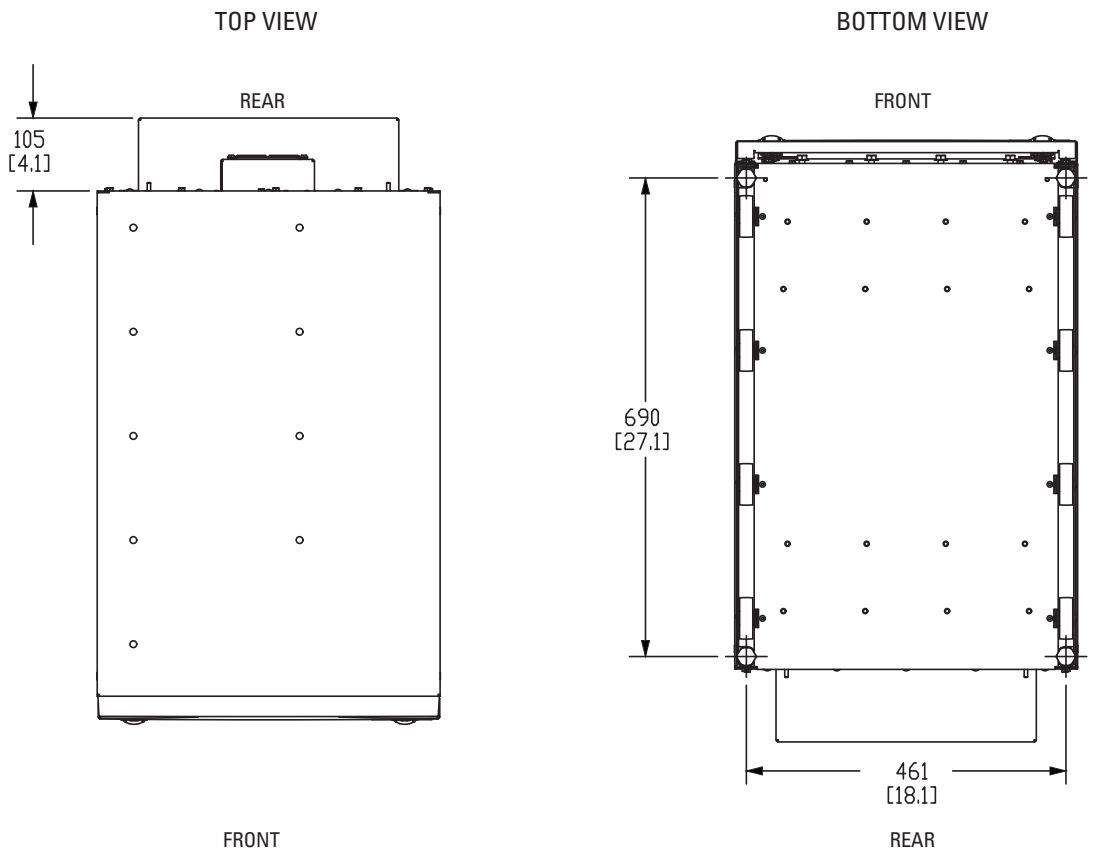
From Front of Cabinet	36" (91.4 cm) working space
From Back of Cabinet	6" (15.2 cm)
From Right of Cabinet	Refer to local codes for right side service access [minimum 36" (91.4 cm)]

Figure 2. UPS Cabinet Dimensions (Front and Right Side Views)



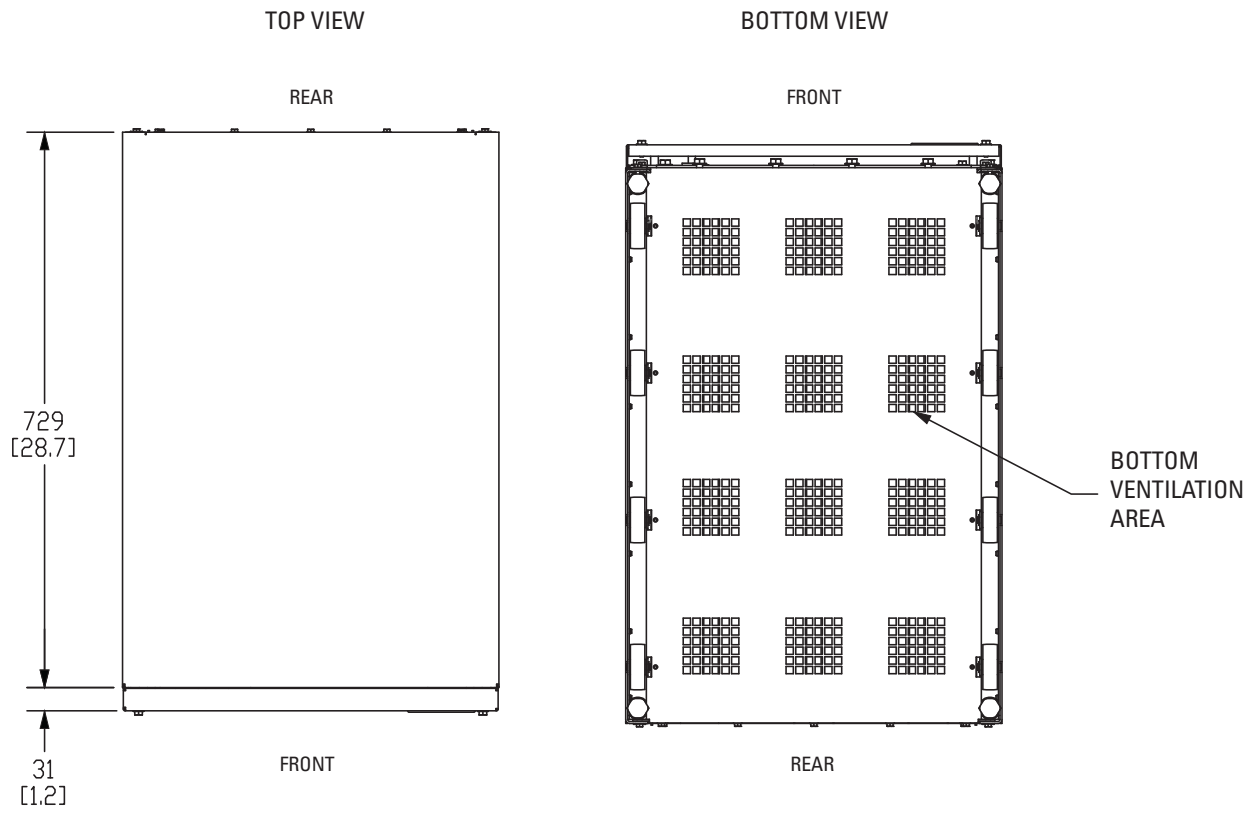
Dimensions are in millimeters [inches]

Figure 3. UPS Cabinet Dimensions (Top and Bottom Views)



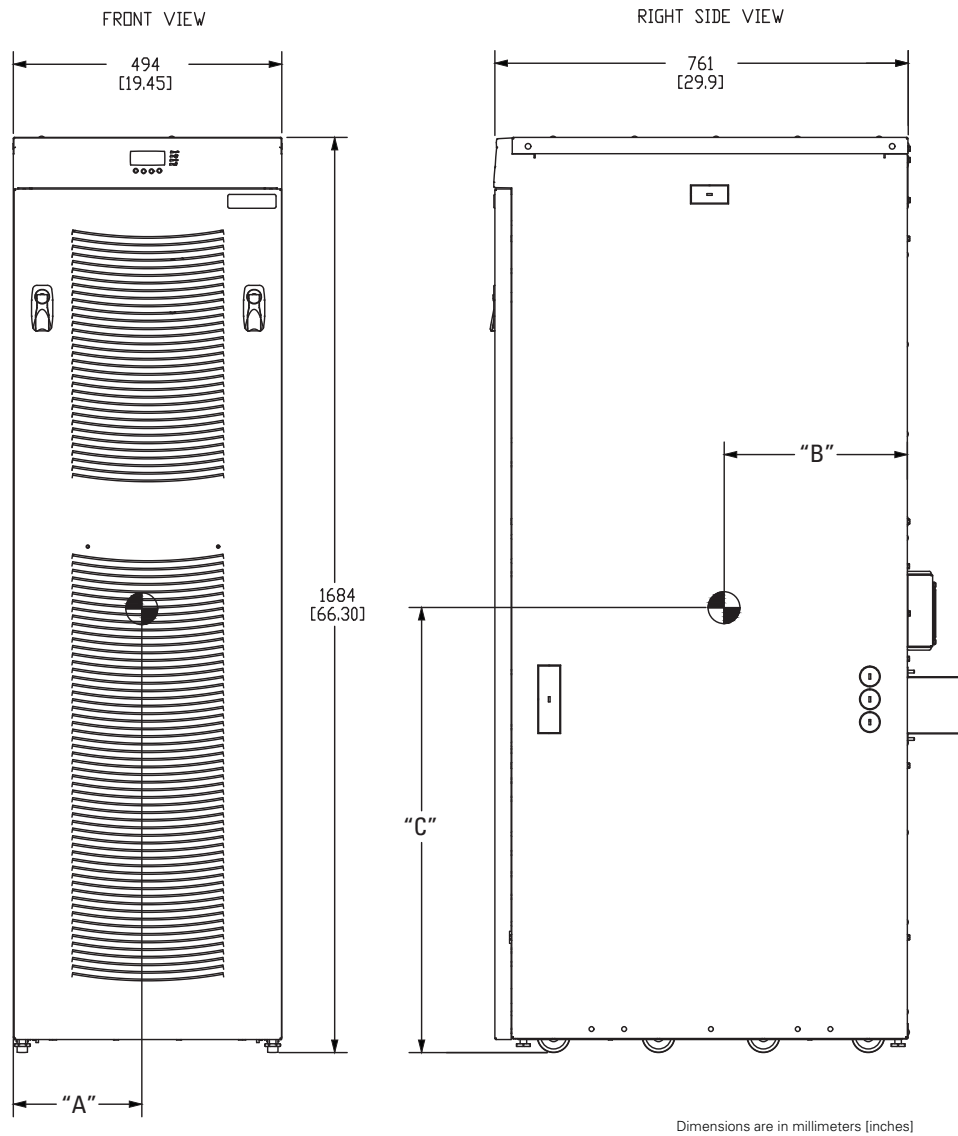
Dimensions are in millimeters [inches]

Figure 4. External Battery Cabinet Dimensions (Top and Bottom Views)



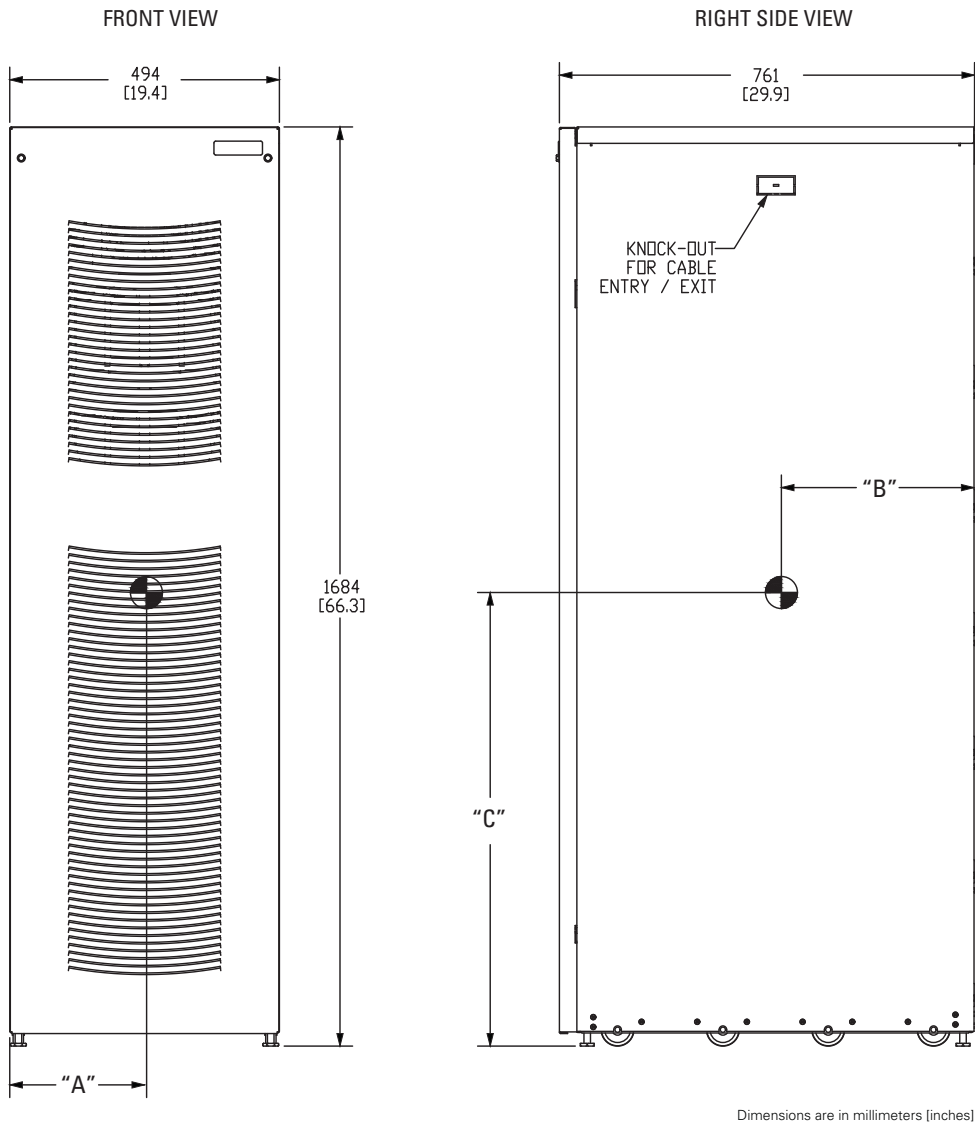
Dimensions are in millimeters [inches]

Figure 5. UPS Cabinet Center of Gravity



Dimensions mm [in] See Figure 5 .				
Weight and Center of Gravity	A mm [inch]	B mm [inch]	C mm [inch]	Weight kg [lb]
Eaton 9355 20–30 kVA UPS	178 [7.0]	475 [18.7]	838 [33.0]	524 [1155]

Figure 6. External Battery Cabinet Center of Gravity



Weight and Center of Gravity	Dimensions mm [in]			Weight kg [lb]
	A mm [inch]	B mm [inch]	C mm [inch]	
Eaton 9355 20–30 kVA External Battery Cabinet (EBC-36)	246 [9.7]	364 [14.3]	473 [18.6]	520 [1146]
Eaton 9355 20–30 kVA External Battery Cabinet (EBC-36)	246 [9.7]	361 [14.2]	734 [28.9]	927 [2043]

3.3 UPS System Power Wiring Preparation

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

 **WARNING**

As a result of the connected loads high leakage current is possible. Connection to earth ground is required for safety and proper product operation. Do not check UPS operation by any action that includes removal of the earth (ground) connection with loads attached.

-
- Refer to national and local electrical codes for acceptable external wiring practices.
 - For external wiring, use 90°C copper wire.

 **IMPORTANT**

This product has been evaluated for use with **copper wire only**. For external wiring, use only 90°C copper wire.

Wire sizes listed in [Table 4](#) is for copper wiring only. If wire is run in an ambient temperature greater than 40°C, larger size wire may be necessary. Wire sizes are based on using the specified breakers.

- Recommended wire sizes are based on NFPA National Electrical Code® (NEC®)70 Table 310.15(B)(16) 90° C ampacity with 40°C ambient correction factors.
- Input neutral must be wired for proper operation. Failure to connect an input neutral will void the warranty. If the optional input transformer is installed, an input neutral is not required.
- The Eaton 9355 UPS is shipped as a single-feed UPS and can be converted to a dual-feed UPS in the field.

 **CAUTION**

DO NOT overtighten the screws; be sure to use the specified tightening torque values shown in [Table 4](#).

Table 4. Terminal Block Wiring

20 kVA System Voltage	Wire Function	Feeder Circuit Breaker Rating	L1, L2, L3, N Wire Size ¹	Ground Wire Size ¹	Tightening Torque	Conduit Size ^{2,3} (Number of Conduits)
208	Input UPS X1	100A	1 AWG	6 AWG	120 lb in (13.5 Nm)	2.00" conduit (1)
220	WYE / 4-wire	100A	1 AWG	6 AWG		
480	Input Options Cabinet	45A	6 AWG	10 AWG	120 lb in (13.5 Nm)	1.00" conduit (1)
600	Delta / 3-Wire	35A	8 AWG	10 AWG		
208	Output UPS X2		1 AWG	6 AWG	120 lb in (13.5 Nm)	2.00" conduit (1)
220	WYE / 4-wire		1 AWG	6 AWG		
480	Output Options Cabinet WYE / 4-Wire		1 AWG	6 AWG		

30 kVA System Voltage	Wire Function	Feeder Circuit Breaker Rating	L1, L2, L3, N Wire Size ¹	Ground Wire Size ¹	Tightening Torque	Conduit Size ^{2,3} (Number of Conduits)
208	Input UPS X1	125A	1/0 AWG	6 AWG	120 lb in (13.5 Nm)	2.00" conduit (1)
220	WYE / 4-wire	125A	1/0 AWG	6 AWG		
480	Input Options Cabinet	60A	6 AWG	10 AWG	120 lb in (13.5 Nm)	1.00" conduit (1)
600	Delta / 3-Wire	50A	6 AWG	10 AWG		

Table 4. Terminal Block Wiring (Continued)

208	Output UPS X2	1/0 AWG	6 AWG		
220	WYE / 4- wire	1/0 AWG	6 AWG		
480	Output Options Cabinet WYE / 4- Wire	1/0 AWG	6 AWG	120 lb in (13.5 Nm)	2.00" conduit (1)

1 Use only 90°C-rated copper wire. Minimum wire size is based on 120/208 full load ratings applied to National Electrical Code® (NEC®) Table 310-104A. Code may require a larger AWG size than shown in this table because of temperature, number of conductors in the conduit, or long service runs. Follow local requirements.

2 Per NEC article 300-20(a) for Ferrous Metal Raceways, all three-phase conductors must be run in the same conduit. Neutral and ground must be run in the same conduit as the phase conductors.

3 Conduit is sized to accommodate one neutral conductor the same size as the phase conductor and one ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, check the size of the conduit needed to accommodate the extra wire or size and use that conduit size in place of the conduit size listed. Conduit sizes were chosen from NEC Table C1, type letters RHH, RHW, RHW-2, TW, THW, THHW, THW-2.

3.4 Inspecting and Unpacking the Equipment

The cabinet is shipped bolted to a metal and wood pallet with outer protective packaging material covering the cabinets.

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.

2. Use a forklift or pallet jack to move the packaged cabinet to the installation site, or as close as possible, before unpacking. If possible, move the cabinet using the pallet. Insert the forklift or pallet jack forks between the supports on the bottom of the pallet.
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.
4. Remove the protective packaging material from the cabinet and recycle in a responsible manner. Retain any parts kits packaged with the cabinet.
5. Inspect the contents for any evidence of physical damage, and compare each item with the Bill of Lading. If damage has occurred or shortages are evident, contact an Eaton service representative immediately to determine the extent of the damage and its impact on further installation.

If any equipment has been damaged during shipment, keep the shipping and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

**NOTE**

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

**NOTE**

Check the battery recharge date on the packaging label. If the date has expired and the batteries were never recharged, do not use the UPS. Contact your service representative.

Chapter 4 UPS System Installation

4.1 Preliminary Installation Information



Installation should be performed only by qualified personnel.

Refer to the following while installing the UPS system:

- Review **Chapter 3 UPS Installation Plan and Unpacking**, for cabinet dimensions, equipment weight, wiring and terminal data, and installation notes.
- Do not tilt the cabinets more than $\pm 10^\circ$ during installation.
- Remove conduit landing plates to add conduit landing holes as required.
- If perforated floor tiles are required for ventilation, place them in front of the UPS.

4.2 Removing and Replacing the Front Doors

To remove and replace the UPS or Options Cabinet front door, see the following section. To remove and replace the Extended Battery Cabinet (EBC) front door, see paragraph [4.2.2 EBC Front Door](#).

4.2.1 UPS or Options Cabinet Front Door

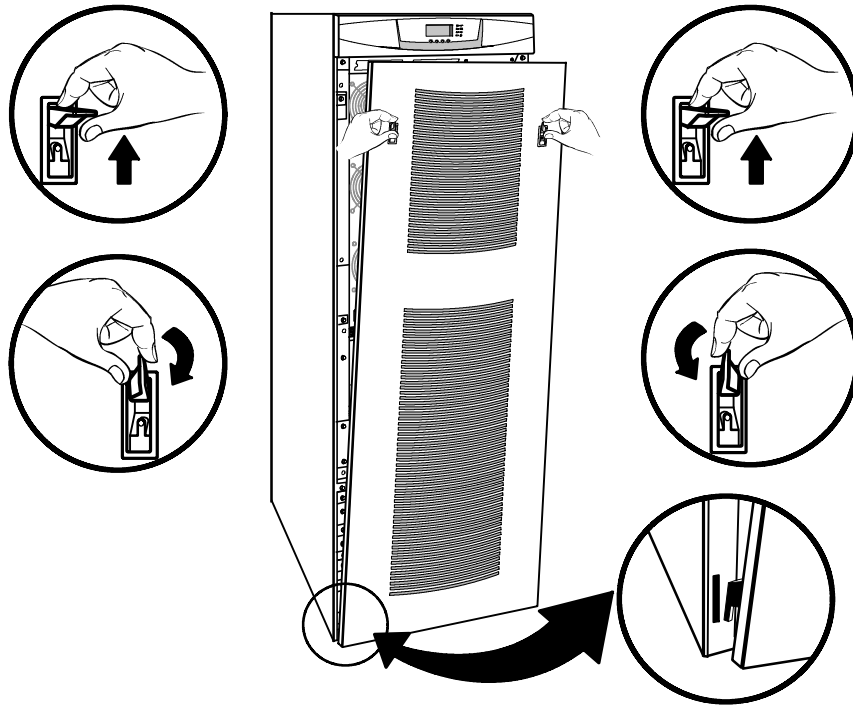
To remove the UPS or Options Cabinet front door:

1. Press and rotate the latches 90° to open the front door (rotate the left latch clockwise and the right latch counter-clockwise). See [Figure 7](#).
2. Lift the door up and off the cabinet.

To replace the door:

1. Insert the door notches into the slots on the bottom of the cabinet.
2. Secure the door latches.

Figure 7. Removing the UPS Front Door



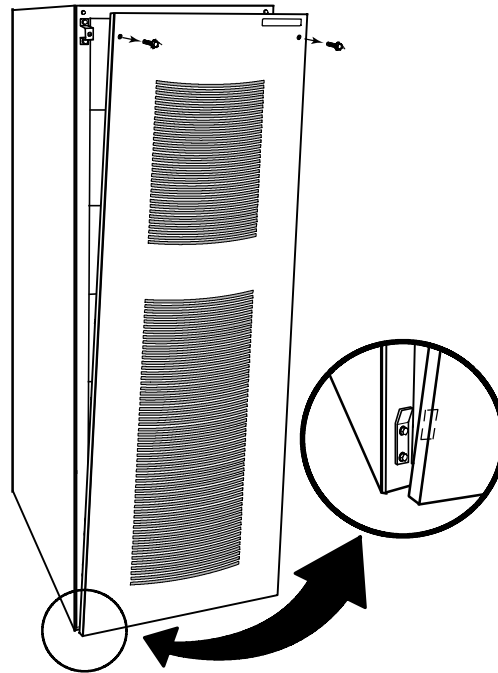
4.2.2 EBC Front Door

To remove the EBC front door:

1. Remove the two M8 hex-head screws from the top corners of the door (see [Figure 8](#)).
2. Lift the door up and off the cabinet.

To replace the door:

1. Place the door on the bottom hooks of the EBC.
2. Replace the two door screws.

Figure 8. Removing the EBC Front Door

4.3 Unloading the UPS Cabinet from the Pallet

The following tools are required for unloading the cabinet(s):

- 15 mm wrench or socket
- 7 mm nut driver or socket
- Adjustable wrench or channel-locks

⚠ CAUTION

The UPS and optional cabinets are heavy (see [Table 2](#)). Unloading the cabinets requires at least two people to safely remove the cabinets from the pallet.

To remove the UPS or optional cabinets from the shipping pallet:

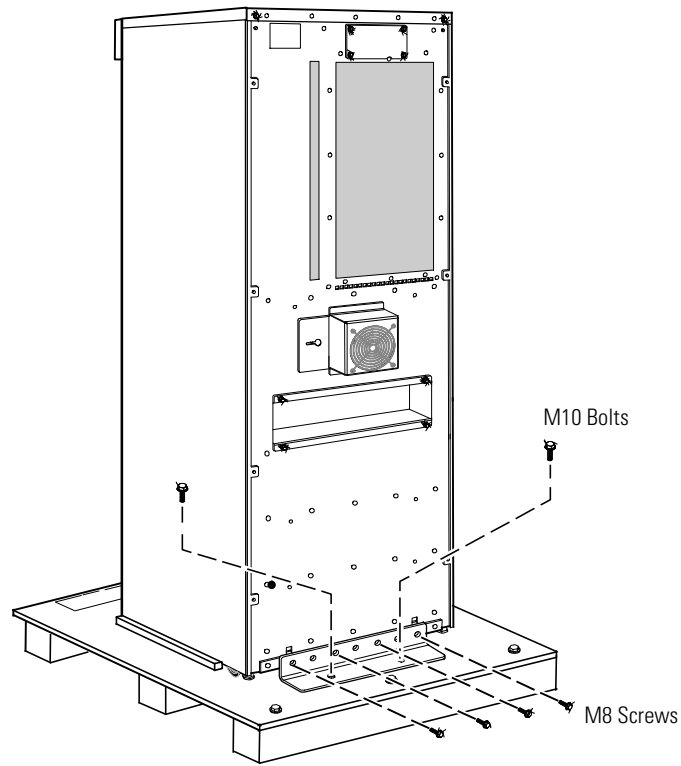
1. Remove the two M10 bolts securing the rear shipping bracket to the pallet (see [Figure 9](#)).
 2. Remove the four M8 screws securing the rear shipping bracket to the cabinet rear panel and remove the bracket. Retain the hardware for later use.
-



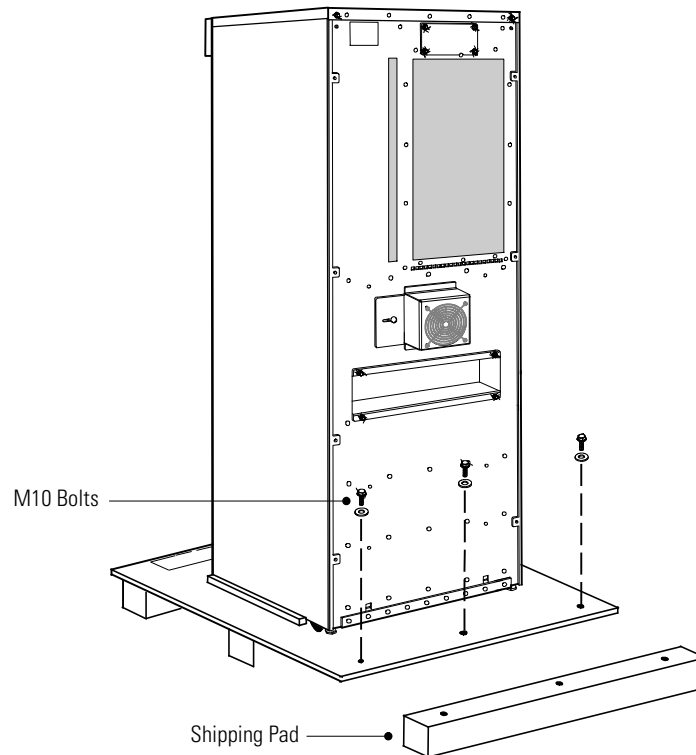
NOTE

Be sure to retain the rear shipping bracket and hardware for later re-assembly if you plan to permanently mount the cabinet.

Figure 9. Removing the Rear Shipping Bracket (UPS Shown)

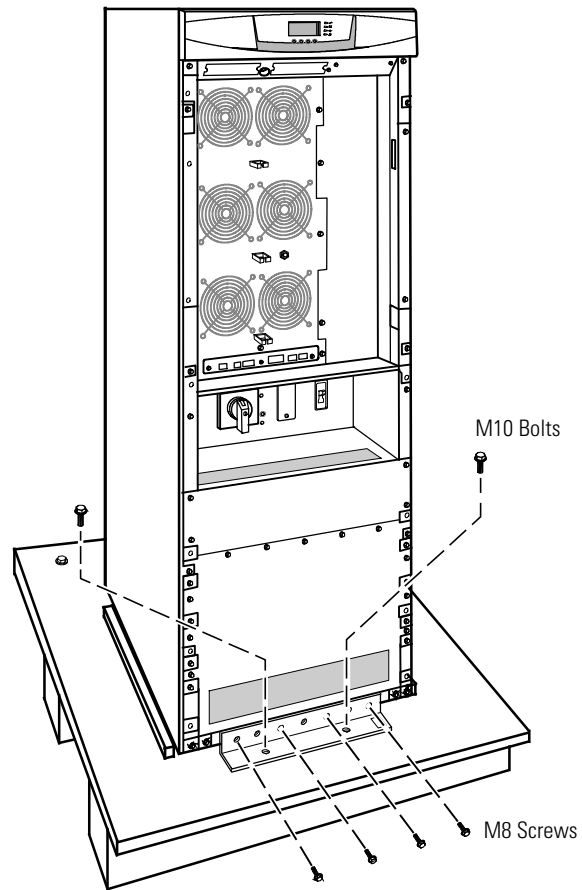


3. Remove the three M10 bolts securing the rear shipping pad to the pallet and remove the shipping pad (see [Figure 10](#)).

Figure 10. Removing the Shipping Pad (UPS Shown)

4. Remove the front door to access the front shipping bracket (see [Figure 7](#)).
5. Remove the four M8 screws securing the front shipping bracket to the cabinet (see [Figure 11](#)).
6. Remove the two M10 bolts securing the front shipping bracket to the pallet and remove the bracket.

Figure 11. Removing the Front Shipping Bracket (UPS Shown)



7. Replace the front door.

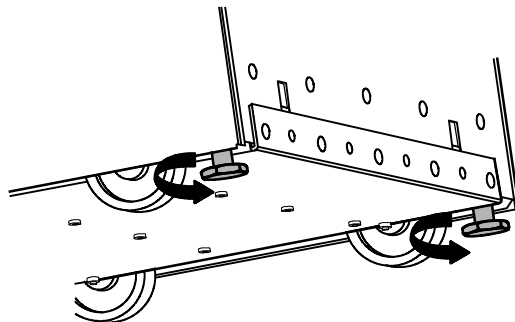


NOTE

Be sure to support the front and back of the cabinet when rolling it off the pallet to prevent tipping or rolling away.

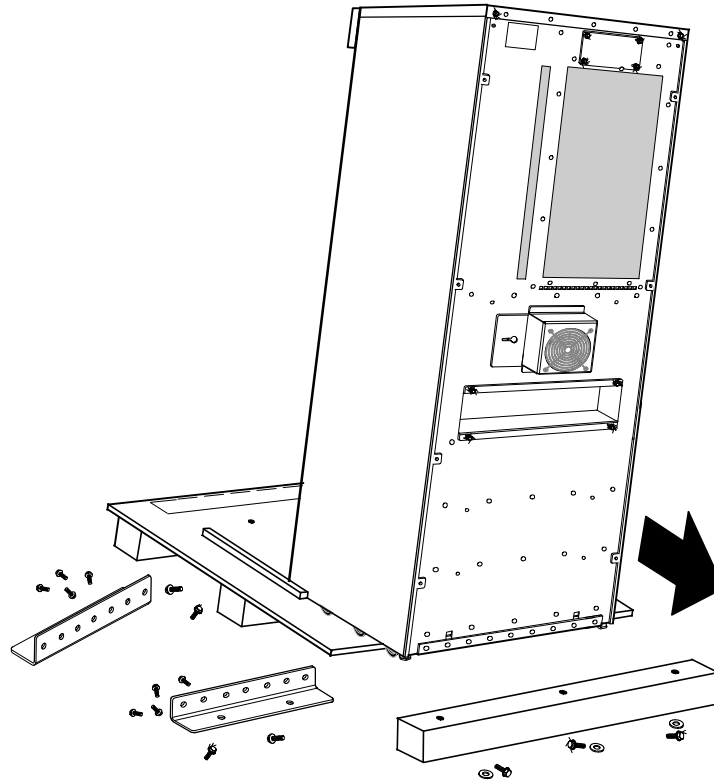
8. Raise the leveling feet so that they do not touch the pallet.

Figure 12. Raising the Leveling Feet

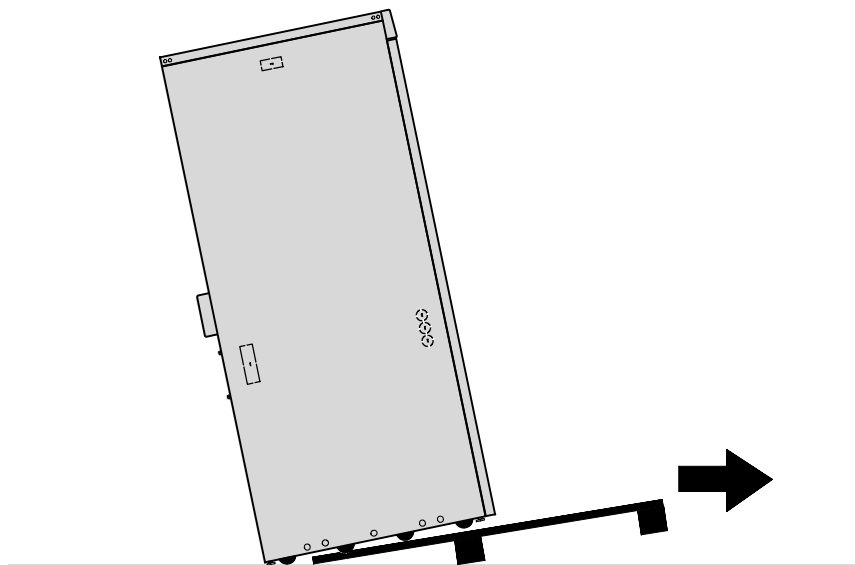


9. Slowly roll the cabinet toward the rear of the pallet. Once the pallet tilts, continue rolling the cabinet down the pallet until the cabinet touches the floor (see [Figure 13](#)).

Figure 13. Unloading the Cabinet (UPS Shown)



10. With the cabinet supported, slowly pull the pallet away from the cabinet (see [Figure 14](#)).

Figure 14. Removing the Pallet (UPS Shown)

11. Roll the cabinet to the desired location.
12. If you are installing more than one cabinet, continue to [4.4 Joining the Cabinets](#); otherwise, continue to paragraph [4.5 Electrical Installation](#).

4.4 Joining the Cabinets

If you are installing additional cabinets to the UPS, join the cabinets before installing the electrical connections between the cabinets.

To join the cabinets:

1. Position the cabinets to the left of the UPS, leaving enough space between cabinets to remove the knockouts.

NOTE 1 Position the Extended Battery Cabinet (EBC) to the far left of the UPS and Options Cabinet (if installed).

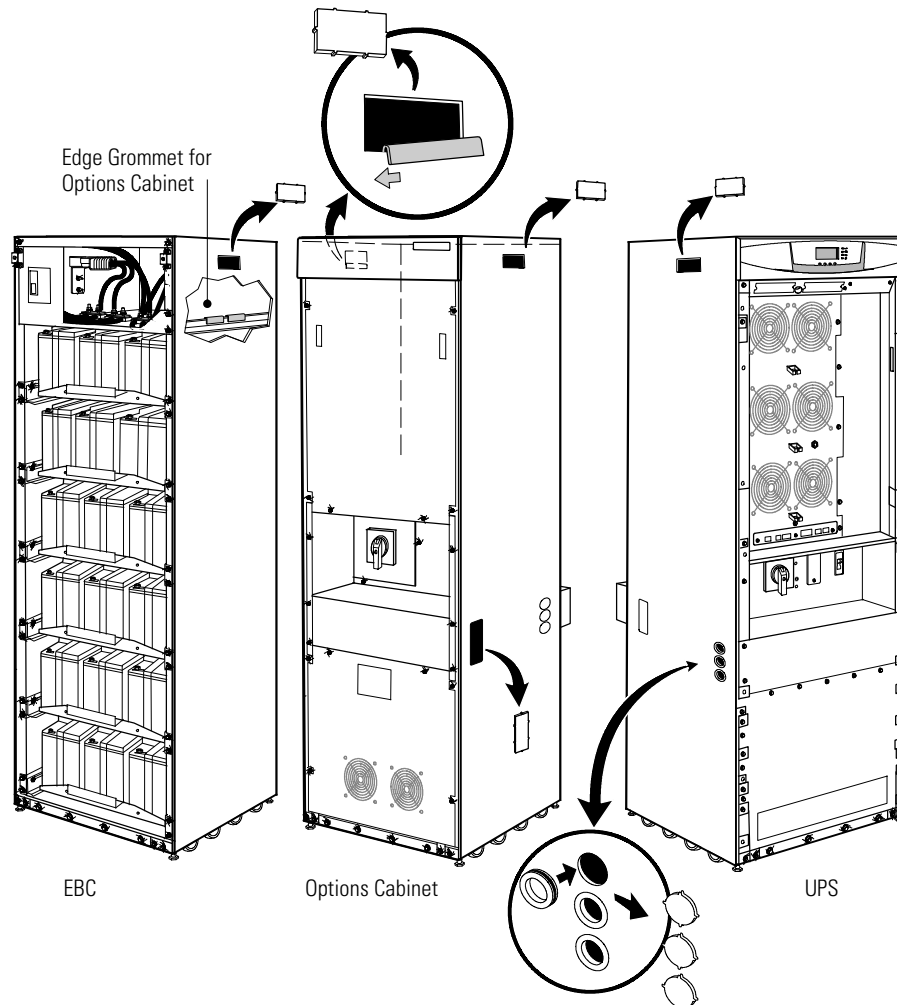
i NOTE 2 A maximum of four EBCs can be installed.

NOTE 3 If you have two Options Cabinets, position the cabinet with the maintenance bypass switch (MBS) closest to the UPS.

2. Remove the front door of all cabinets (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
3. For EBCs only or EBCs and Options Cabinets, continue to [Step 4](#). For Options Cabinets only, proceed to [Step 8](#).
4. Remove the knockout on the top left side of the UPS and the top right side of the EBC (see [Figure 15](#)).
If you are installing more than one EBC, remove both knockouts on the middle cabinet(s).
5. If you are installing an EBC with an Options Cabinet, continue to [Step 6](#); otherwise, proceed to [Step 11](#) to install the ground straps.
6. Remove both knockouts from the top sides of the Options Cabinet (see [Figure 15](#)).

7. Remove one edge grommet from the inside rail of the EBC(s). Install the grommet on the bottom edge of the left knockout of the Options Cabinet (the knockout closest to the UPS does not need an edge grommet).
If you are installing two Options Cabinets, install edge grommets on both knockouts of the second cabinet.
8. Remove the rectangular knockout on the right side of the Options Cabinet.
If you have two Options Cabinets, remove the rectangular knockout on the right side of the second Options Cabinet.
9. Remove the three circular knockouts on the left side of the UPS (see [Figure 15](#)).
If you have two Options Cabinets, remove the three circular knockouts on the left side of the first Options Cabinet.
10. Install three bushings (supplied) in the circular knockouts of the adjacent cabinet.

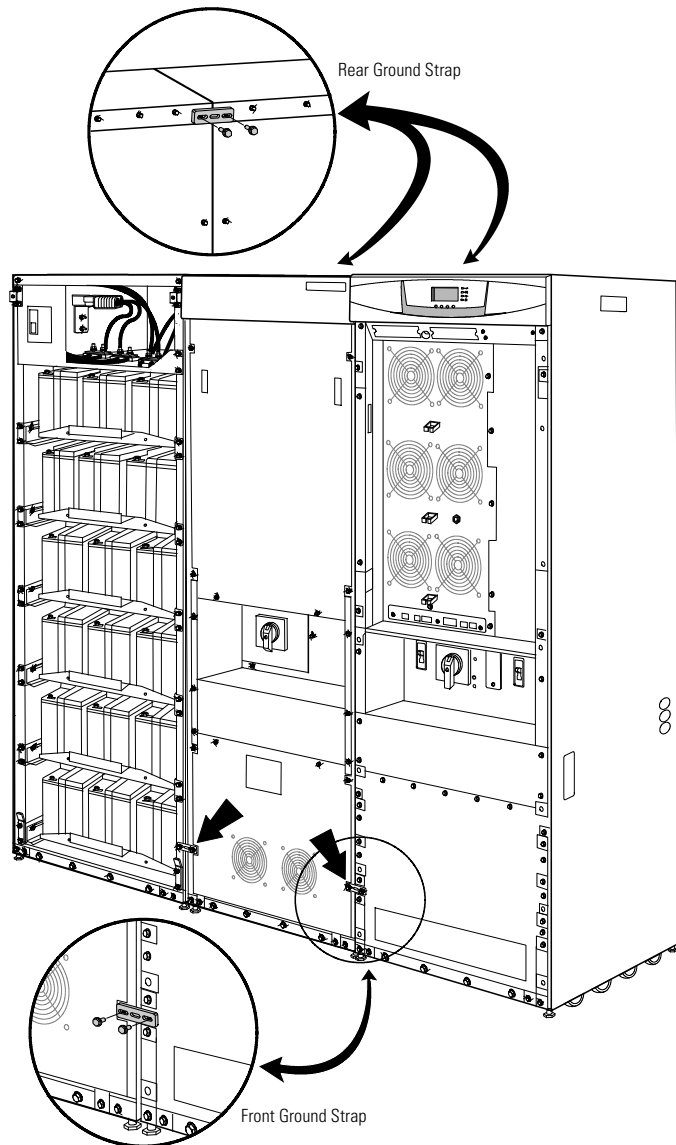
Figure 15. Joining Additional Cabinets (Typical Configuration)



11. Remove the two ground straps from the rear panel of the EBC or Options Cabinet (installed at the top corners).

12. Install one ground strap between the rear panels of the adjacent cabinets as shown in [Figure 16](#).
13. Install the other ground strap between the front panels of the adjacent cabinets as shown in [Figure 16](#).
14. Repeat [Step 11](#) through [Step 13](#) for each cabinet.
15. Replace the front door of all cabinets.
16. Proceed to paragraph [4.5 Electrical Installation](#), to continue the UPS installation.

Figure 16. Ground Strap Installation



4.5 Electrical Installation

The Eaton 9355 has the following power connections:

- 3-phase (L1, L2, and L3), neutral, and ground connection for rectifier/bypass input

- 3-phase (L1, L2, and L3), neutral, and ground connection for load output

The nominal input/output voltages are:

- 120/208 or 127/220 Vac (UPS only or parallel system)
- 208V, 480V, or 600V 60-Hz input is available when using the Options Cabinet with an input isolation transformer
- 480/480 Vac is available when using the Options Cabinet with an output transformer

Output overcurrent protection and disconnect switch must be provided by others.



WARNING

Only qualified service personnel (such as a licensed electrician) should perform the UPS installation. Initial startup must be performed by an authorized Eaton Customer Service Engineer. Risk of electrical shock.

4.5.1 Wiring Preparation

To begin wiring the UPS or Options Cabinet:

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

Compare the circuit breaker ratings to the ones in [Table 4](#).

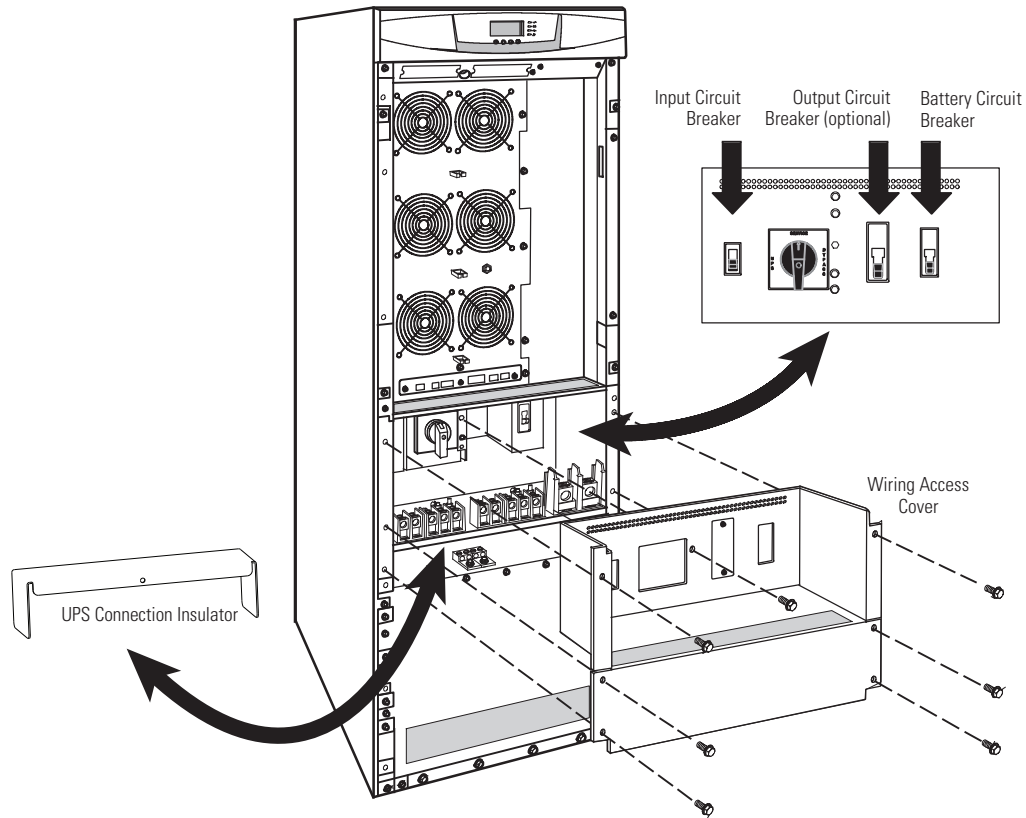


NOTE

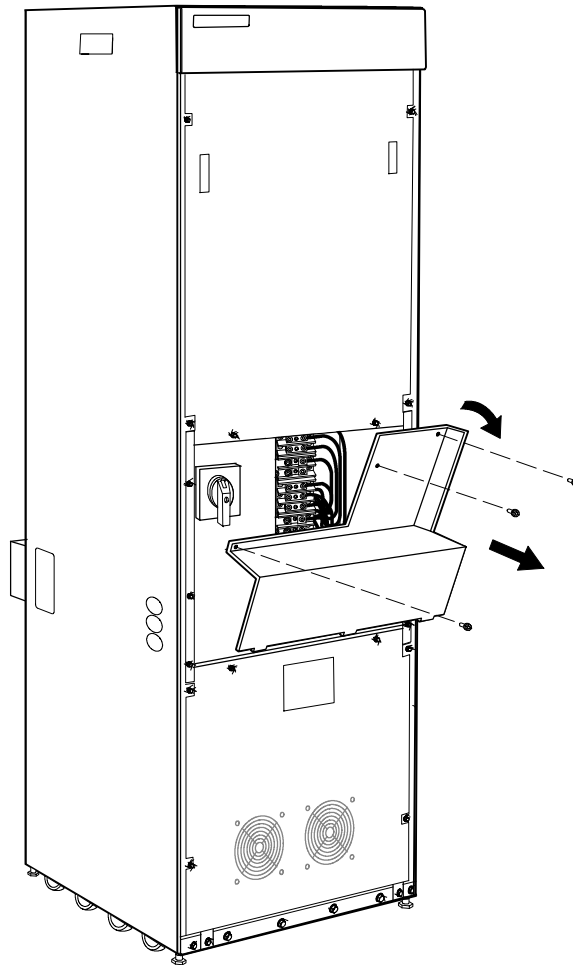
To accommodate the feature of easy system expandability, it is recommended that initial installation of the Eaton 9355 UPS contain wiring to support the maximum capacity of the UPS cabinet.

3. Switch off utility power to the distribution point where the UPS or Options Cabinet will be connected. Be absolutely sure there is no power.
4. Determine your equipment's grounding requirements according to your local electrical code.
5. Remove the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
6. Verify that the UPS input circuit breaker is in the OFF position (see [Figure 17](#)).
7. Verify that the UPS battery circuit breaker is in the OFF position.
8. If you ordered the UPS with the optional output circuit breaker, verify that the output circuit breaker is in the OFF position.
9. Remove the UPS wiring access cover and retain.
10. Remove the UPS connections insulator and retain.

Figure 17. UPS Front View



11. If you have an Options Cabinet, remove the front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
12. Remove the Options Cabinet wiring access cover and retain (see [Figure 18](#)).
13. If you have two Options Cabinets, repeat [Step 11](#) and [Step 12](#) for the second cabinet.

Figure 18. Removing the Options Cabinet Wiring Access Cover

4.6 Wiring Installation

Wire the UPS or Options Cabinet(s) according to one of the following configurations:

- UPS only – see paragraph [4.6.1 UPS Only Wiring](#).
- Up to four UPSs in a parallel capacity and/or redundant system – see paragraph [4.6.2 Parallel UPS Wiring](#).
- UPS with Options Cabinet that has a maintenance bypass switch (MBS) – see paragraph [4.6.3 Options Cabinet with MBS Wiring](#).
- UPS with Options Cabinet that has a dual transformer (input and output) and an MBS – see paragraph [4.6.3 Options Cabinet with MBS Wiring](#).
- UPS with Options Cabinet that has an input transformer only – see paragraph [4.6.4 Options Cabinet with Dual-Feed Wiring](#).
- UPS with Options Cabinet that has an output transformer only – see paragraph [4.6.5 Options Cabinet with Output Transformer Wiring](#).



NOTE

For Standalone EBC installation, separate ground cabling must be installed

4.6.1 UPS Only Wiring

To hardwire the UPS:

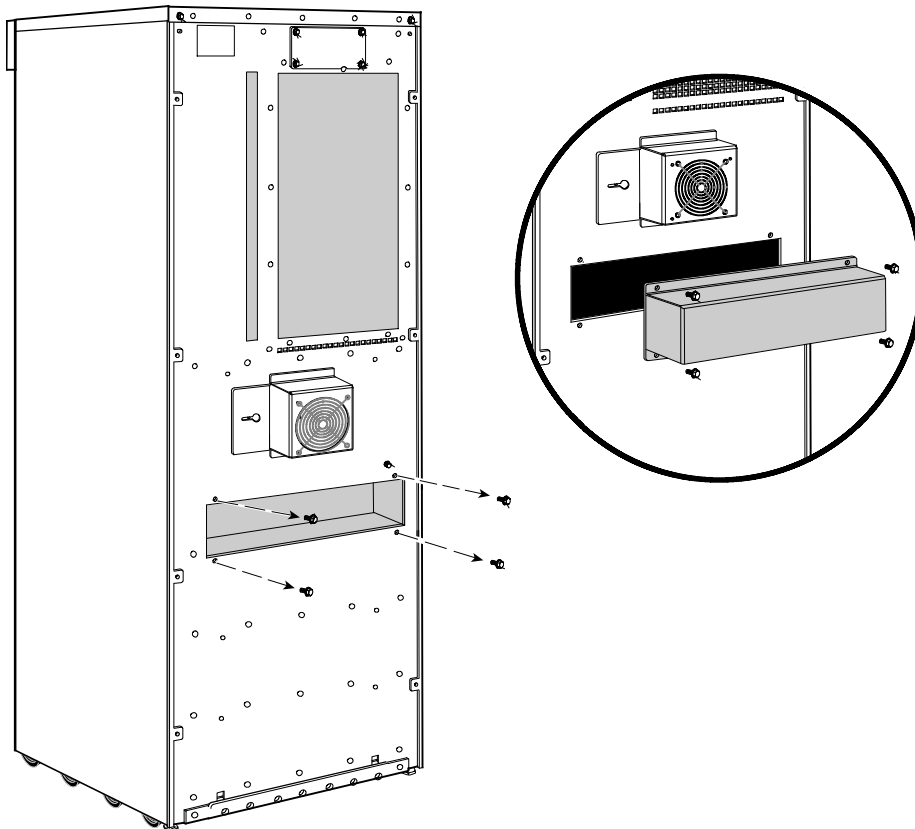
1. Remove the UPS conduit landing box from the rear panel and retain (see [Figure 19](#)).
2. Punch two holes in the conduit landing box for the input and output conduit using a Greenlee® punch or similar device.
3. Route the wiring from the back of the UPS, through the wiring tray, to the front of the UPS.
4. Hardwire the input, output, and ground terminations for the UPS. See [Table 4](#) for wiring specifications.

For a detailed view of the UPS terminal block, see [Figure 28](#).

To review the Eaton 9355 wiring diagrams and schematics, see [Chapter 5 UPS Wiring Diagrams and Schematics](#).

5. If wiring for dual-feed, remove the jumpers between the input terminal block and the input circuit breaker. Wire the second input directly to the input circuit breaker.
6. Reinstall the UPS wiring access cover.
7. Reinstall the UPS conduit landing box in the reversed position (see [Figure 19](#)).
8. Replace the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).

Figure 19. Reversing the UPS Conduit Landing Box



4.6.2 Parallel UPS Wiring

To hardwire the UPS in a parallel capacity and/or redundant system:

1. Remove the UPS conduit landing box from the rear panel and retain (see [Figure 19](#)).
2. Punch two holes in the conduit landing box for the input and output conduit using a Greenlee punch or similar device.
3. Route the wiring from the back of the UPS, through the wiring tray, to the front of the UPS.
4. Hardwire the input terminations for the UPS. See [Table 4](#) for wiring specifications.

For a detailed view of the UPS terminal block, see [Figure 28](#). See [Figure 20](#) or [Figure 21](#) for a parallel wiring diagram.

To review the Eaton 9355 wiring diagrams and schematics, see [Chapter 5 UPS Wiring Diagrams and Schematics](#).

5. Remove any Tie Cabinet covers and install conduit for the Tie Cabinet.
6. Hardwire the output terminations from the UPS to the Tie Cabinet.
7. Hardwire the load to the Tie Cabinet.
8. Wire the maintenance bypass auxiliary contacts below the maintenance bypass switch and terminate to the maintenance bypass wires in the Tie Cabinet.

Figure 20. Parallel Wiring Diagram – Version 1 and Version 2 without Maintenance Isolation Switch (MIS)

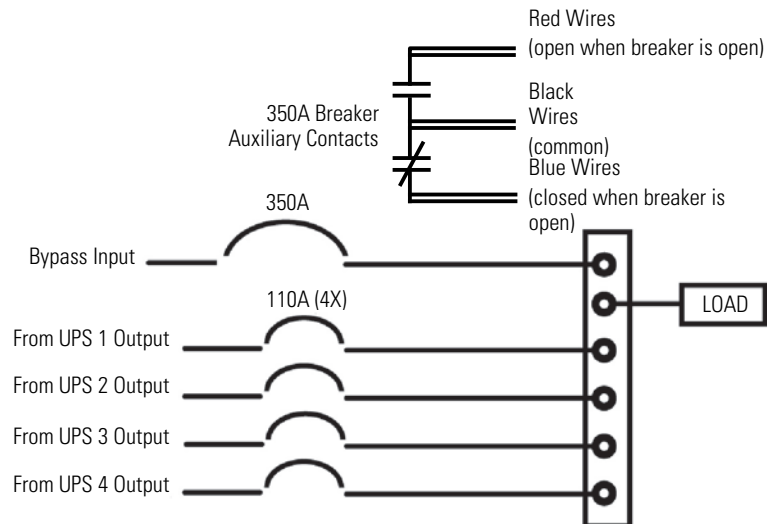
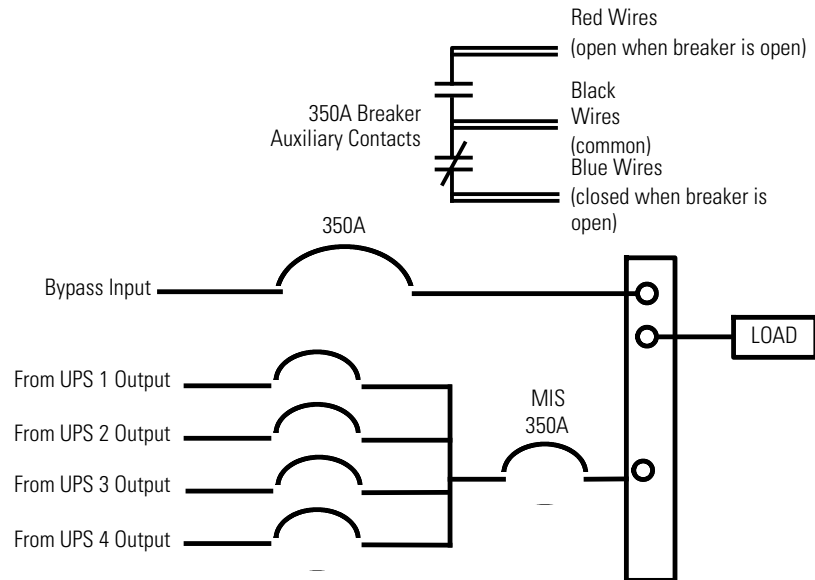


Figure 21. Parallel Wiring Diagram – Version 2 with MIS



9. Wire the AC input to the bypass breaker on the Tie Cabinet (see [Figure 22](#) for Version 1 or [Figure 23](#) for Version 2).
10. Verify the phase rotation for each UPS and the bypass input.
11. Reinstall any covers removed from the Tie Cabinet.
12. Reinstall the UPS wiring access cover.
13. Reinstall the UPS conduit landing box in the reversed position (see [Figure 19](#)).
14. Replace the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).

Figure 22. Bypass AC Input Wiring (Eaton Tie Cabinet Version 1 Shown)

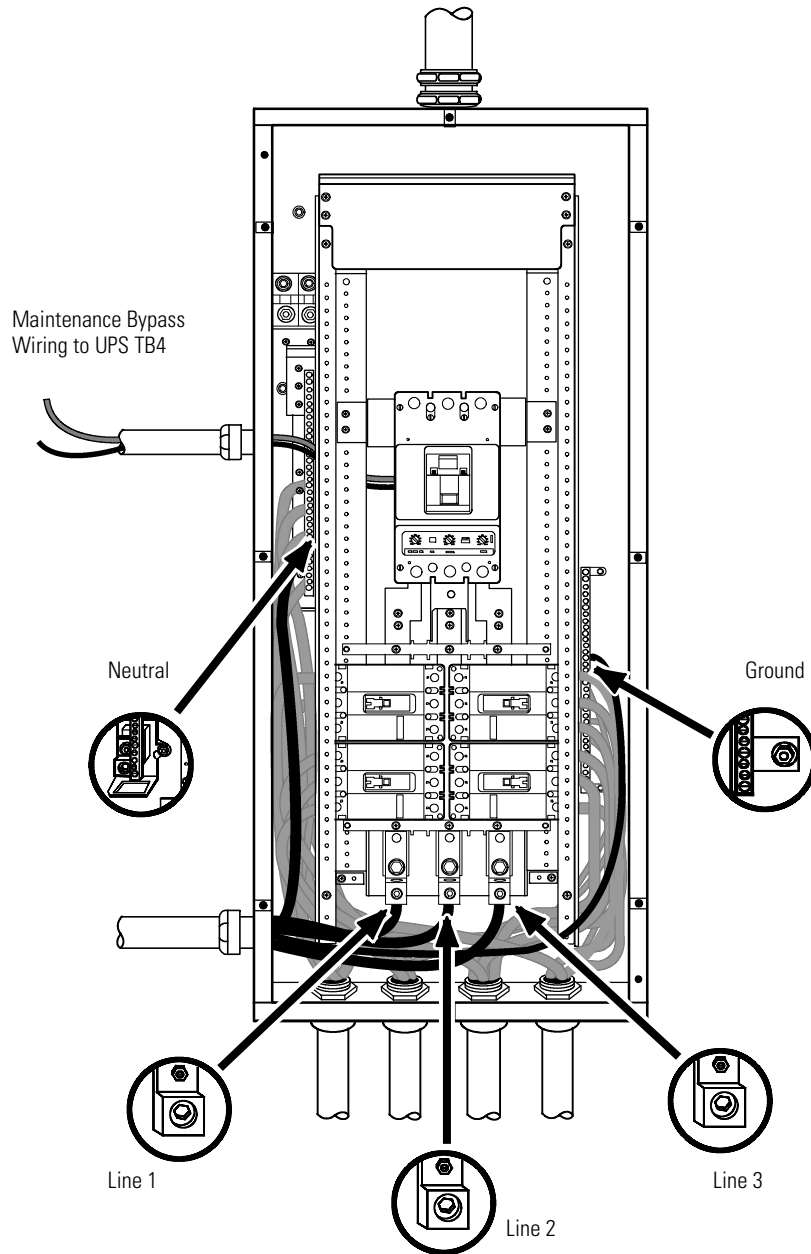
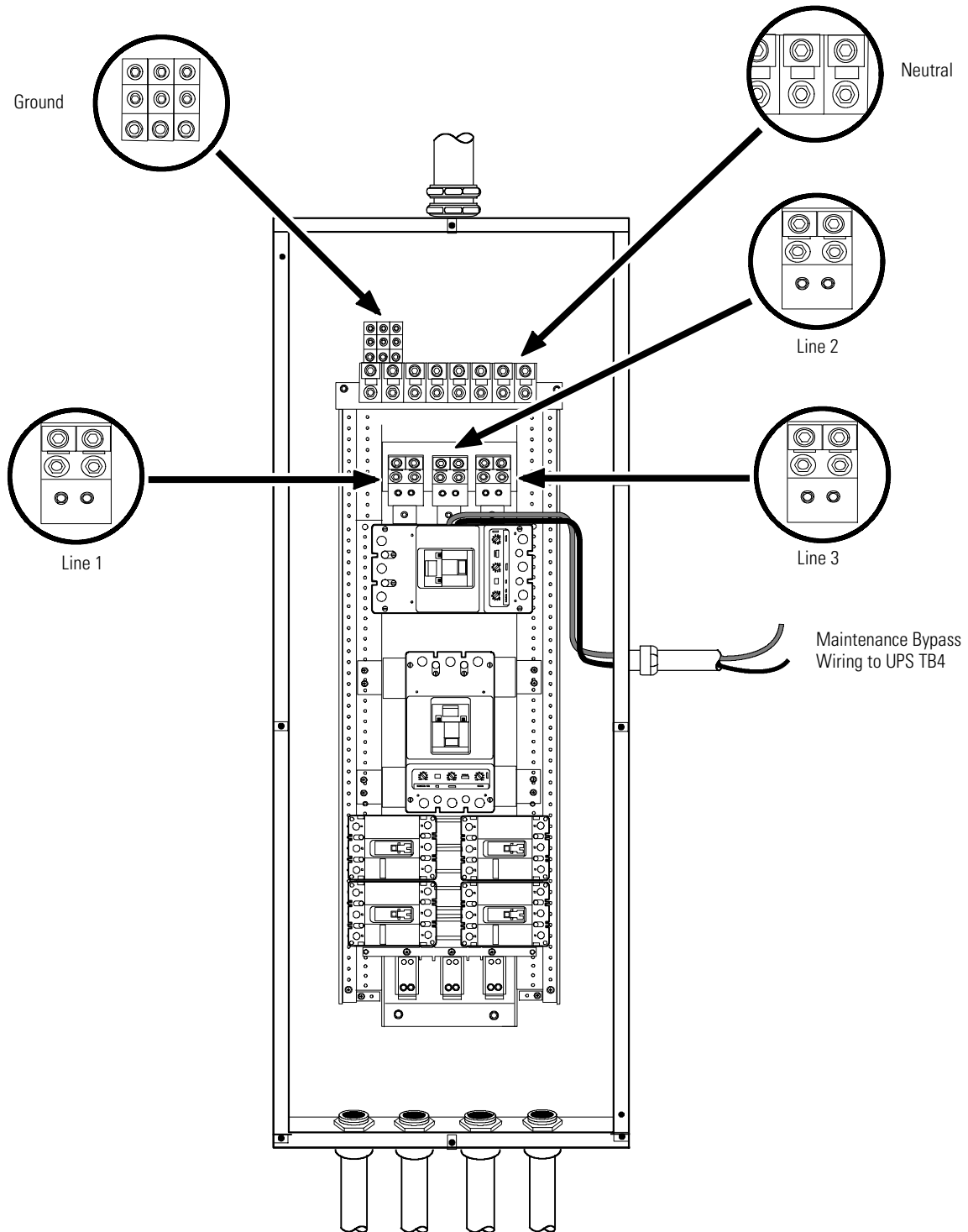


Figure 23. Bypass AC Input Wiring (Eaton Tie Cabinet Version 2 with MIS Shown)



4.6.3 Options Cabinet with MBS Wiring

To hardwire an Options Cabinet with an MBS (with or without an input isolation transformer or input and output transformers):

1. Remove the Options Cabinet conduit landing box from the rear panel and retain (see [Figure 24](#)).
2. Punch two holes in the conduit landing box for the input and output conduit using a Greenlee punch or similar device.
3. Route the wiring from the back of the Options Cabinet, through the wiring tray, to the front of the Options Cabinet.
4. Hardwire the input, output, and ground terminations for the Options Cabinet. See [Table 4](#) for wiring specifications.

For a detailed view of the Options Cabinet terminal block, see [Figure 25](#).

5. Route the factory-installed wiring and ground bonding wire through the knockouts and hardwire to the UPS terminal and ground blocks.

For a detailed view of the UPS terminal block, see [Figure 28](#).

To review the Eaton 9355 wiring diagrams and schematics, see [Chapter 5 UPS Wiring Diagrams and Schematics](#).

6. Route the maintenance bypass auxiliary wiring through the knockouts to the UPS and wire to the contacts below the MBS (see [Figure 25](#)).
7. Reinstall the Options Cabinet wiring access cover.
8. Reinstall the Options Cabinet conduit landing box in the reversed position (see [Figure 24](#)).
9. Replace the Options Cabinet front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
10. Reinstall the UPS wiring access cover.
11. Replace the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).

Figure 24. Reversing the Options Cabinet Conduit Landing Box

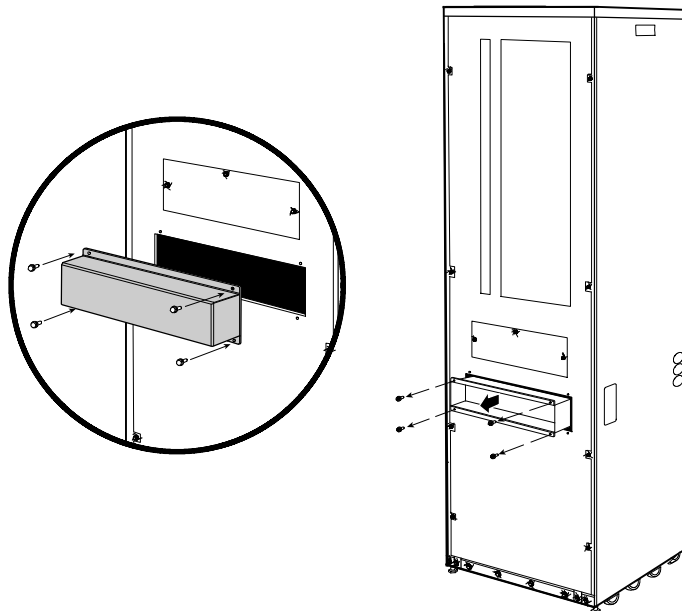
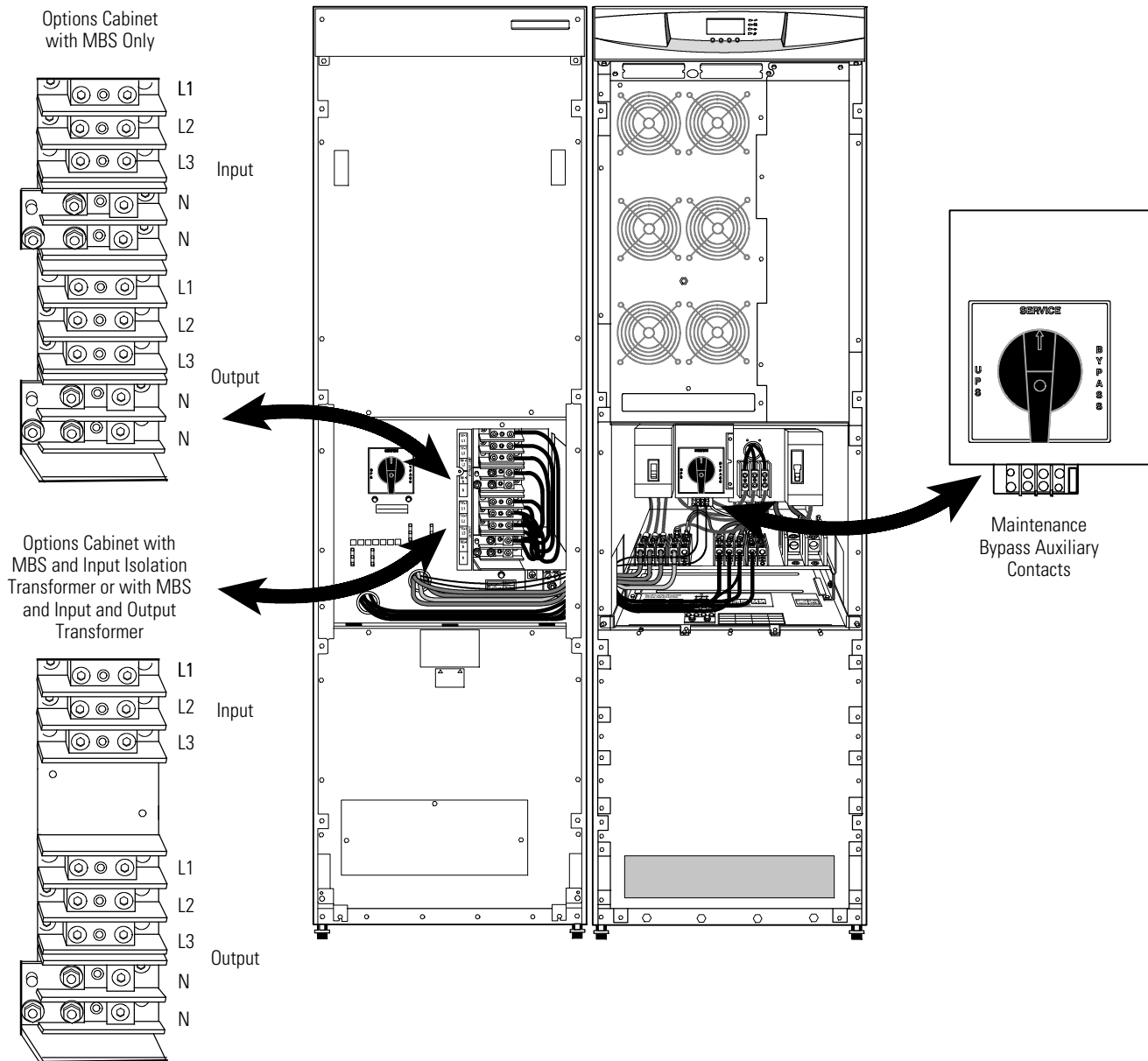


Figure 25. Options Cabinet with MBS Wiring



4.6.4 Options Cabinet with Dual-Feed Wiring

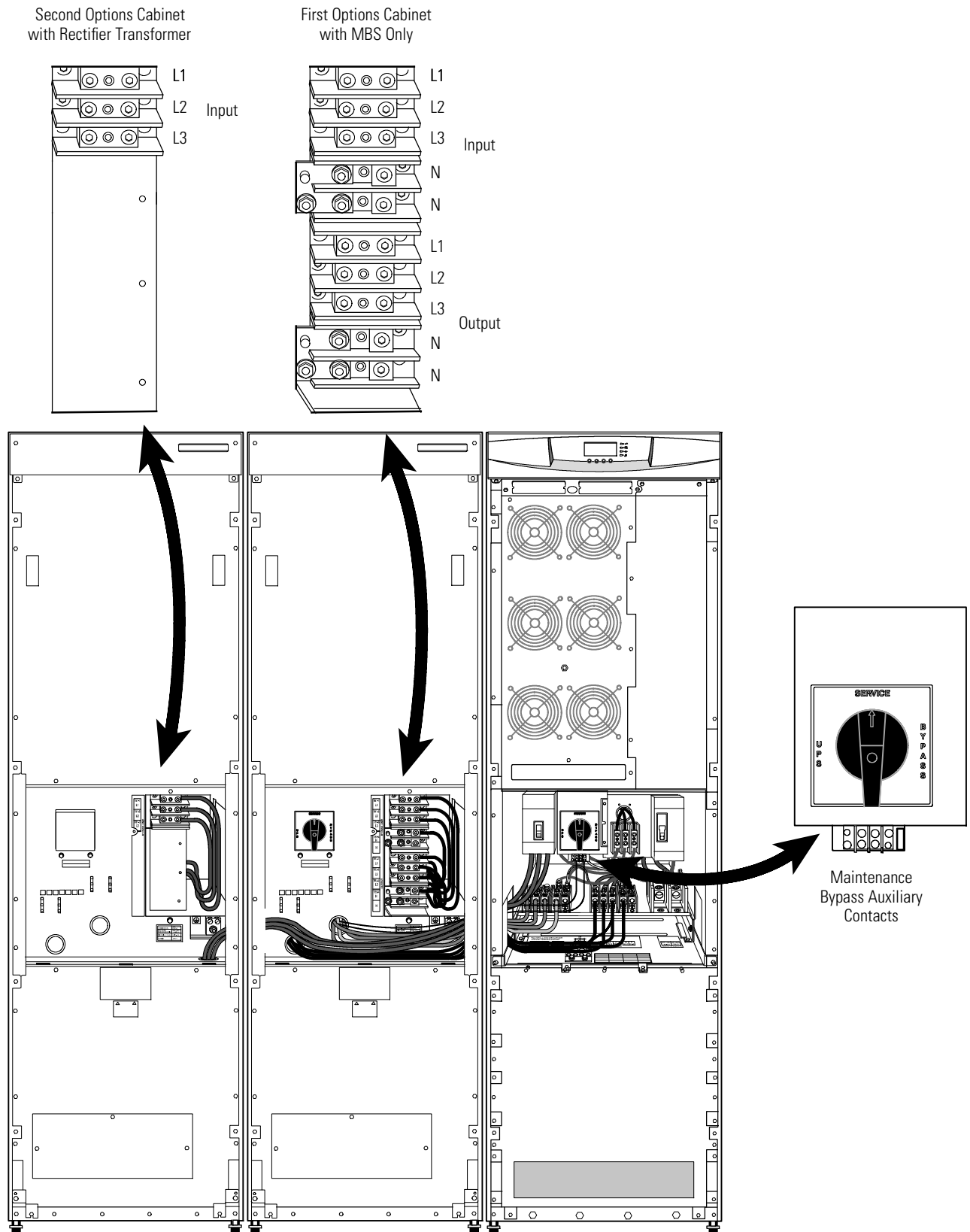
To hardwire the Options Cabinets in a dual-feed system:

1. Remove the Options Cabinet conduit landing box from both Options Cabinet rear panels and retain (see [Figure 19](#)).
2. Punch two holes in the first conduit landing box for the input and output conduit using a Greenlee punch or similar device.

Punch one hole in the second conduit landing box for the second input conduit.

3. Route the wiring from the back of the first Options Cabinet, through the wiring tray, to the front of the Options Cabinet.
Route the wiring from the back of the second Options Cabinet, through the wiring tray, to the front of the Options Cabinet.
4. On the first Options Cabinet, hardwire the input, output, and ground terminations. See [Table 4](#) for wiring specifications.
On the second Options Cabinet, hardwire the second input and ground terminations.
For a detailed view of both Options Cabinet terminal blocks, see [Figure 26](#).
To review the Eaton 9355 wiring diagrams and schematics, see [Chapter 5 UPS Wiring Diagrams and Schematics](#).
5. Remove the jumpers between the UPS input terminal block and the input circuit breaker.
6. On the first Options Cabinet, route the factory-installed wiring through the knockouts and hardwire to the UPS terminal block.
On the second Options Cabinet, route the factory-installed wiring through the knockouts and hardwire to the UPS input circuit breaker.
For a detailed view of the UPS terminal block, see [Figure 28](#).
7. On the first Options Cabinet, route the maintenance bypass auxiliary wiring through the knockouts to the UPS and wire to the contacts below the MBS (see [Figure 26](#)).
8. Reinstall both Options Cabinet wiring access covers.
9. Reinstall both Options Cabinet conduit landing boxes in the reversed position (see [Figure 19](#)).
10. Replace both Options Cabinet front doors (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
11. Reinstall the UPS wiring access cover.
12. Replace the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).

Figure 26. Options Cabinets with Dual-Feed Wiring



4.6.5 Options Cabinet with Output Transformer Wiring

To hardwire the Options Cabinets for 480V loads:

1. Remove the Options Cabinet conduit landing box from both Options Cabinet rear panels and retain (see [Figure 24](#)).
2. Punch one hole in the first conduit landing box for the input conduit using a Greenlee punch or similar device.
Punch one hole in the second conduit landing box for the output conduit.
3. Route the wiring from the back of the first Options Cabinet, through the wiring tray, to the front of the Options Cabinet.
Route the wiring from the back of the second Options Cabinet, through the wiring tray, to the front of the Options Cabinet.
4. On the first Options Cabinet, hardwire the input and ground terminations. See [Table 4](#) for wiring specifications.
On the second Options Cabinet, hardwire the output and ground terminations.
For a detailed view of both Options Cabinet terminal blocks, see [Figure 27](#).
To review the Eaton 9355 wiring diagrams and schematics, see [Chapter 5 UPS Wiring Diagrams and Schematics](#).
5. On the second Options Cabinet, route the factory-installed wiring through the knockouts and hardwire to the output terminal block of the first Options Cabinet.
On the first Options Cabinet, route the factory-installed wiring through the knockouts and hardwire to the UPS terminal block.
For a detailed view of the UPS terminal block, see [Figure 28](#).
6. On the first Options Cabinet, route the maintenance bypass auxiliary wiring through the knockouts to the UPS and wire to the contacts below the MBS (see [Figure 27](#)).
7. Reinstall both Options Cabinet wiring access covers.
8. Reinstall both Options Cabinet conduit landing boxes in the reversed position (see [Figure 24](#)).
9. Replace both Options Cabinet front doors (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
10. Reinstall the UPS wiring access cover.
11. Replace the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).

Figure 27. Options Cabinets with Output Transformer Wiring

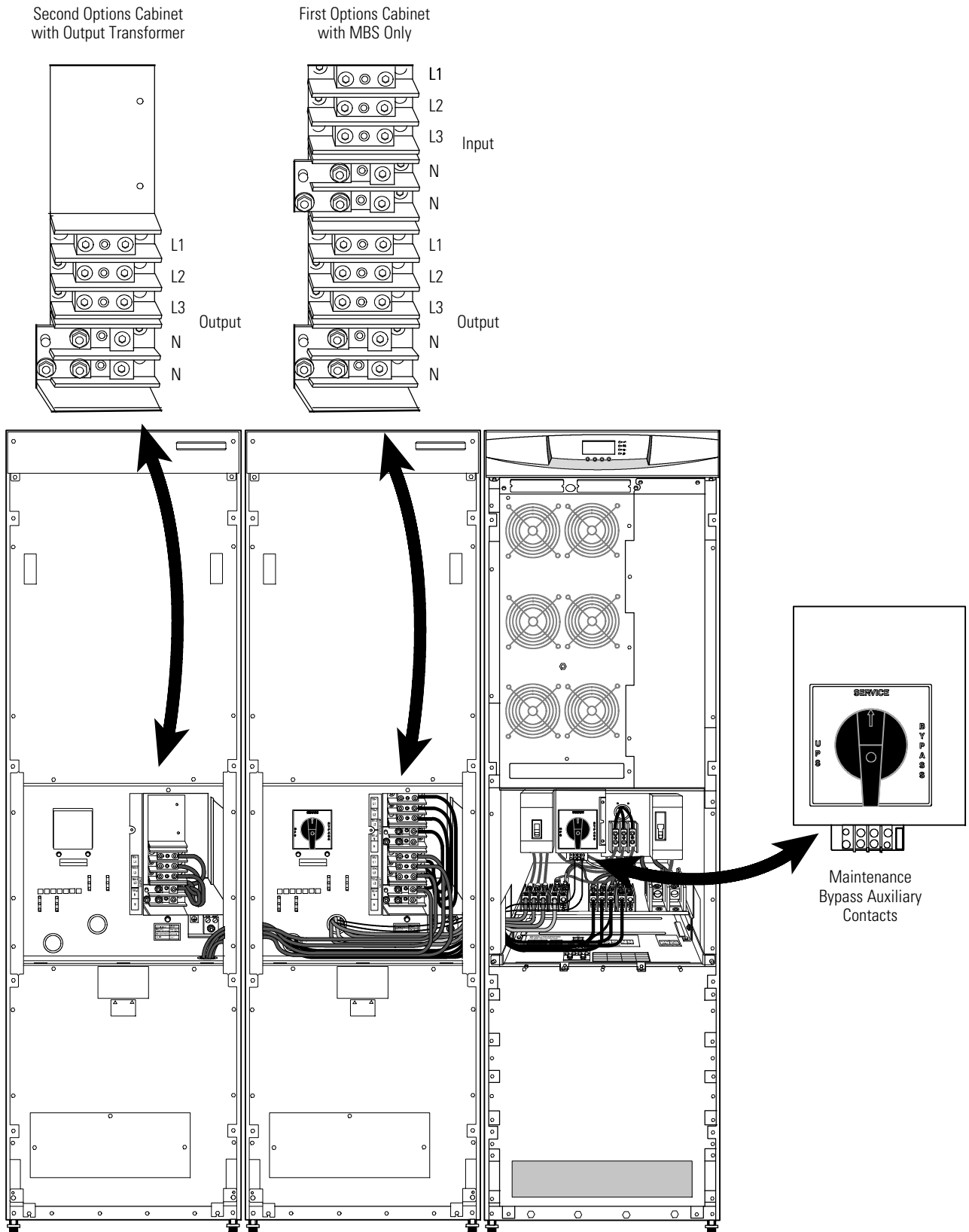
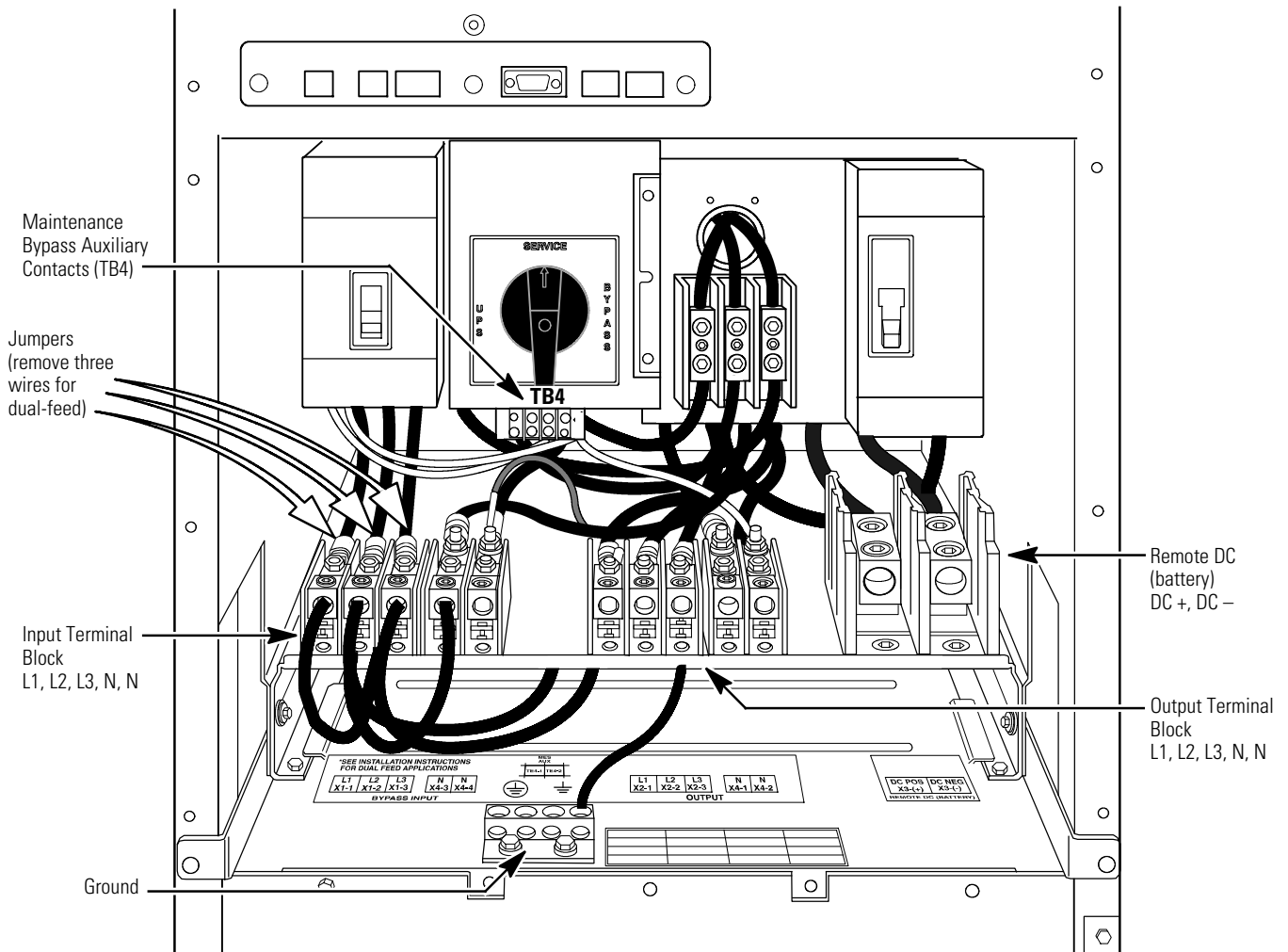


Figure 28. UPS Terminal Block



NOTE 1 Input neutral must be wired for proper operation or the UPS will not start. If you have an Options Cabinet with an input isolation transformer, the input neutral is supplied by the input isolation transformer.

NOTE 2 The Eaton 9355 UPS is shipped as a single-feed UPS and can be converted to a dual-feed UPS in the field.

NOTE 3 DO NOT overtighten the screws; be sure to use the specified tightening torque values shown in [Table 4](#).

NOTE 1 The two input neutral terminals are jumpered together; use either one of these terminals to make the input neutral connection.

NOTE 2 The two output neutral terminals are jumpered together; use either one of these terminals to make the output neutral connection.

4.7 Internal Battery Tray Wiring Connections



NOTE

To reduce electrical safety risks during transportation, the UPS is shipped with the internal battery tray assemblies disconnected.



DANGER

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



WARNING

The UPS is intended to be operated only with batteries installed. When batteries are not installed a stabilizing bracket is required to prevent a tip hazard.



WARNING

Only qualified service personnel (such as a licensed electrician) should perform the UPS installation. Initial startup must be performed by an authorized Eaton Customer Service Engineer. Risk of electrical shock.



CAUTION

- Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
 - 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) Disconnect charging source prior to connecting or disconnecting battery terminals; 5) Wear voltage rated gloves and electrical hazard footwear.
 - When replacing batteries, replace with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
 - Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
 - Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
 - Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be extremely toxic.
 - Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.
 - ELECTRIC ENERGY HAZARD. Do not attempt to alter any battery wiring or connectors. Attempting to alter wiring can cause injury.
-

To access and install the internal battery trays and wiring connections (for both the 9355 UPS and EBCs):

1. Verify that the input, output, and battery circuit breakers are in the OFF position
2. If not already removed, remove the front door of each cabinet.
See paragraph [4.2 Removing and Replacing the Front Doors](#) details on this process.
3. If not already removed, remove the battery panel dead front.

4. Connect the cabinet battery wiring harness to the battery tray wiring, red connector to red connector, black connector to black connector (see [Figure 29](#) and [Figure 30](#)).

Figure 29. Internal Battery Tray Wiring Connections

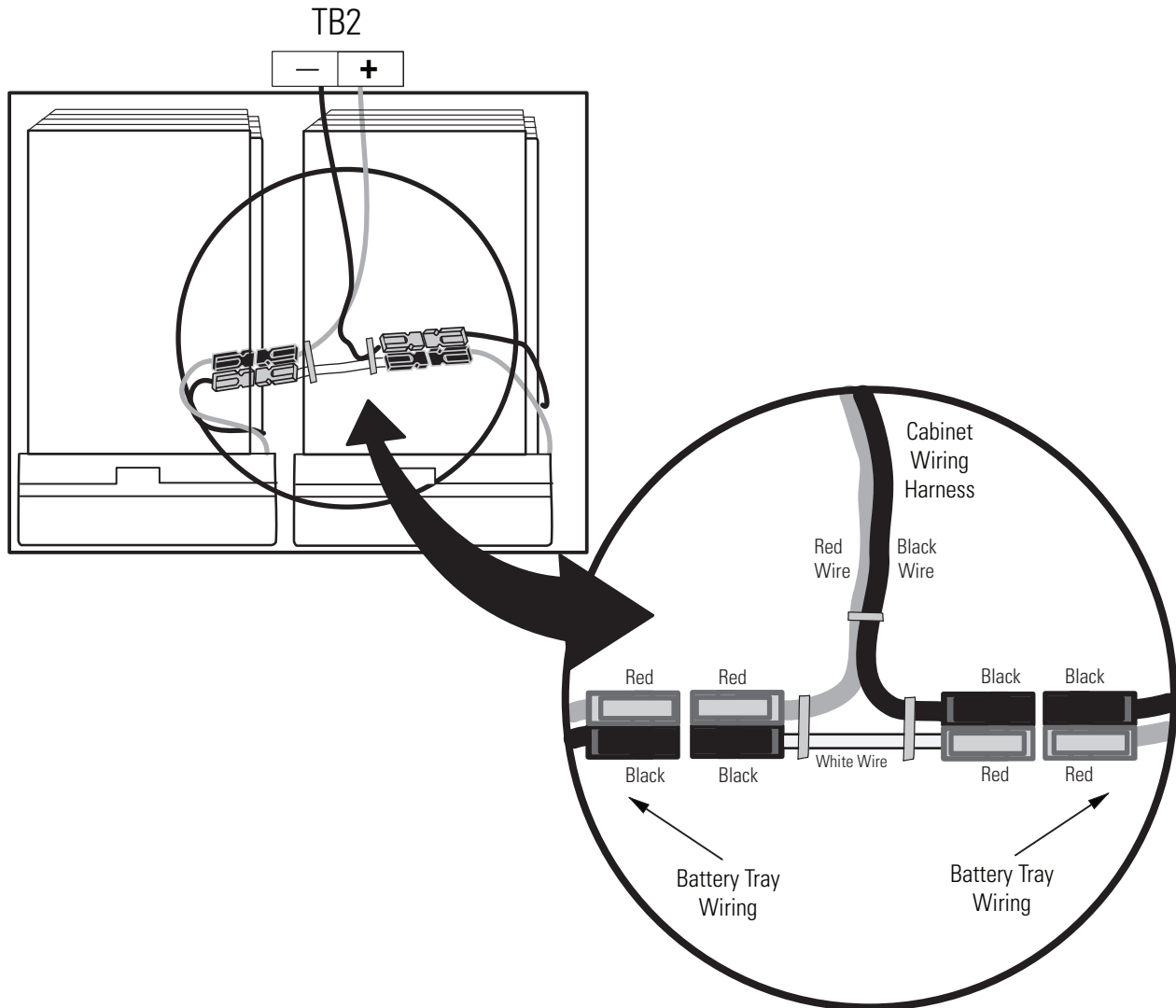
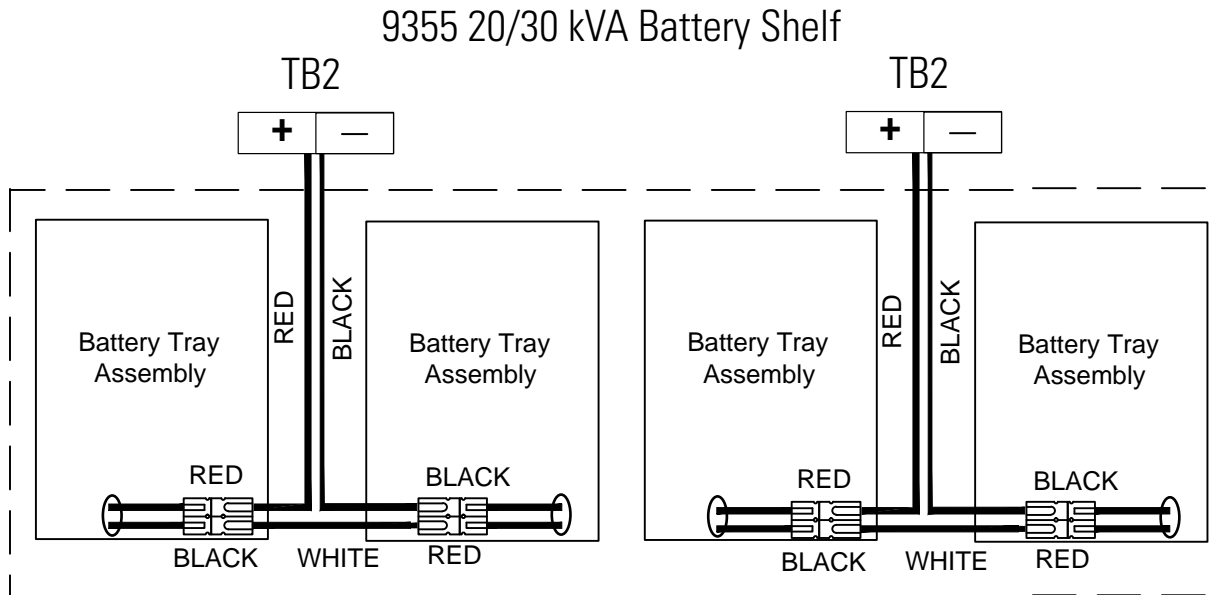


Figure 30. Internal Battery Tray Wiring Diagram

5. Repeat these steps to connect each battery tray to the UPS-Battery wiring harness.
6. Continue to one of the following sections:
 - See paragraph [4.8 Extended Battery Cabinet Installation](#) to install optional EBMs.
 - See [Chapter 6 Communication](#) to install UPS communication options, such as X-Slot cards or remote emergency power-off (REPO).
 - See [Chapter 7 UPS Operating Instructions](#) to start up the UPS.

4.8 Extended Battery Cabinet Installation

To install the optional EBC in a Line-Up-and-Match configuration, see paragraph [4.8.1 Line-Up-and-Match EBC Installation](#), to install the optional EBC in a Standalone configuration, see [4.8.2 Standalone EBC Installation](#).

4.8.1 Line-Up-and-Match EBC Installation



NOTE

A maximum of four Extended Battery Cabinets (EBCs) can be installed.

To install the optional EBC:

1. Remove the UPS front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
If you installed an Options Cabinet, remove the Options Cabinet front door (see paragraph [4.2.1 UPS or Options Cabinet Front Door](#)).
2. Verify that the UPS battery circuit breaker is in the OFF position (see [Figure 31](#)).
3. Remove the EBC front door(s). See paragraph [4.2.2 EBC Front Door](#).
4. Plug the EBC cable into the UPS battery connector (see [Figure 31](#)).

If an Options Cabinet is installed, route the EBC cable through the knockouts and connect to the UPS battery connector.

 **CAUTION**

The EBC cable must not touch the top of the transformer. Leave any EBC cable slack inside the EBC cabinet.

If a dual transformer Options Cabinet is installed, route the EBC cable through the knockout in the left side of the Options Cabinet, placing the cable in the cable hooks at the top of the cabinet (see [Figure 32](#)) and connect to the UPS battery connector.

If additional EBCs are installed, plug the EBC cable into the battery connector on the next EBC. Repeat for each additional EBC.

5. Replace the EBC front door(s).

6. Replace the UPS front door.

If you installed an Options Cabinet, replace the Options Cabinet front door.

7. Continue to one of the following sections:

- To permanently mount the cabinet, see [4.9 Permanent Mounting Installation](#).
- To install UPS communication options, such as X-Slot cards or remote emergency power-off (REPO), see [Chapter 6 Communication](#).
- To start up the UPS, see [Chapter 7 UPS Operating Instructions](#).

**NOTE**

After UPS startup, ensure maximum battery runtime by configuring the UPS for the correct number of EBCs (see paragraph [7.5 Configuring the UPS for EBCs](#)).

Figure 31. Typical EBC Installation

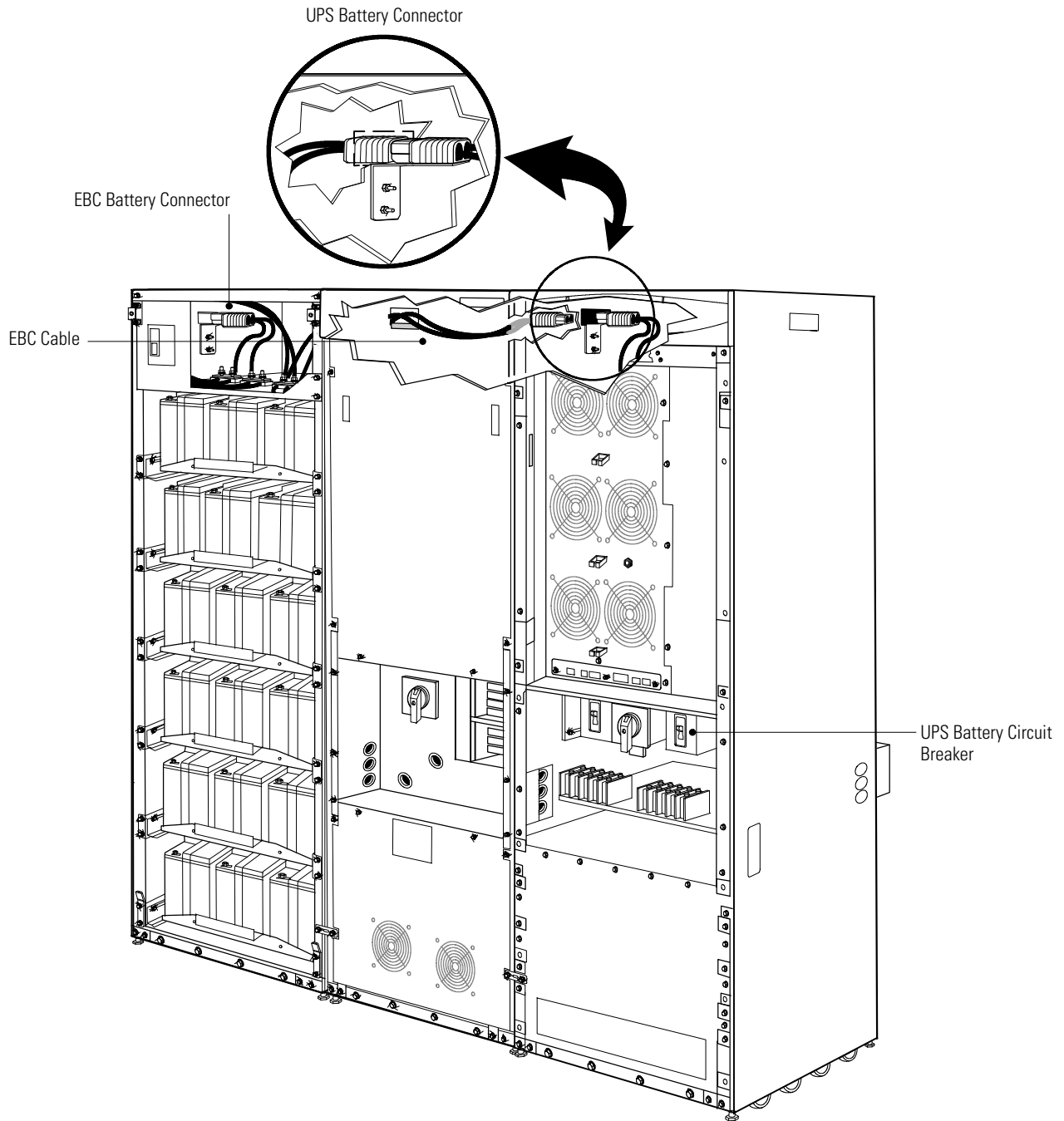
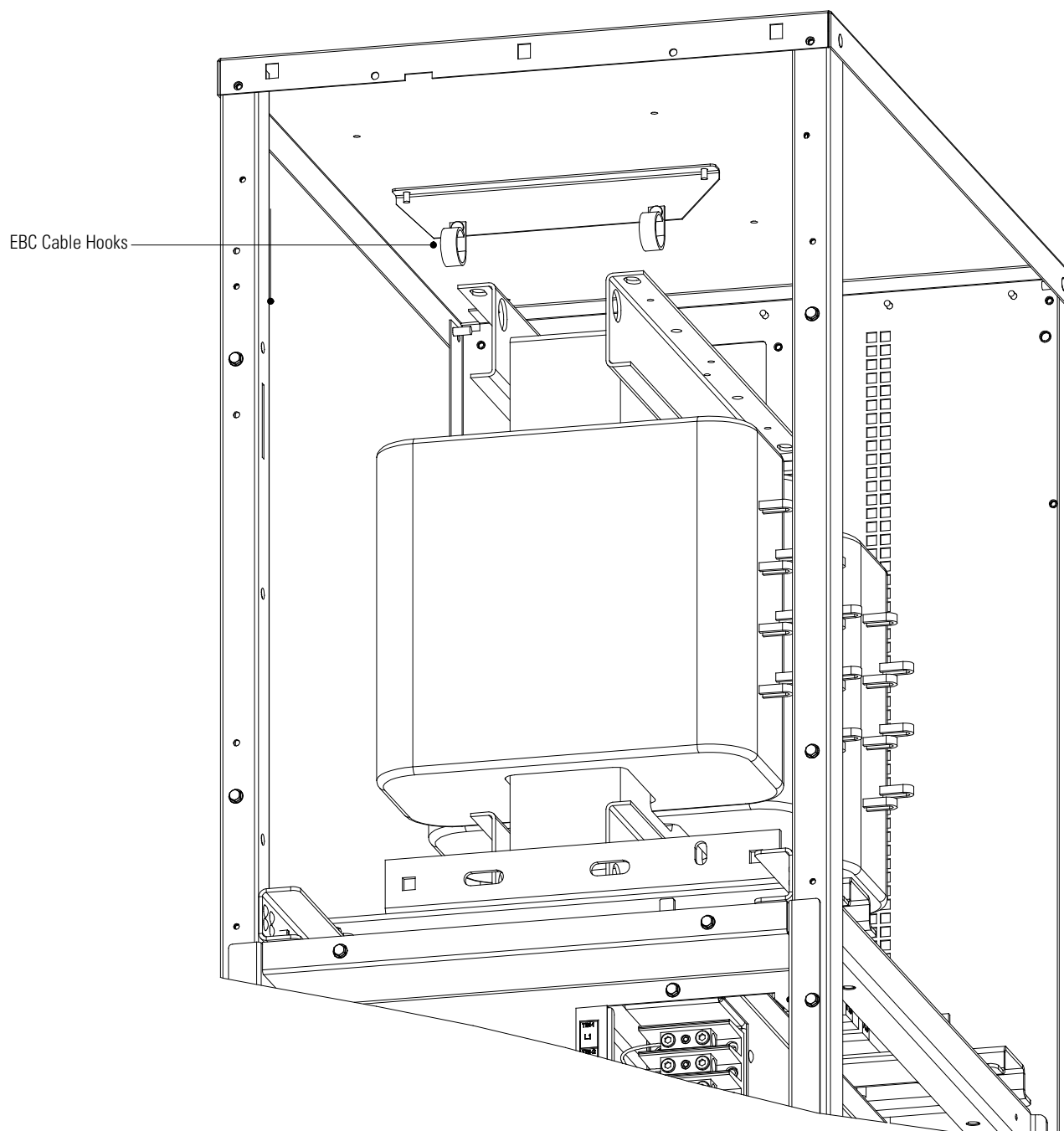


Figure 32. Dual Transformer Options Cabinet EBC Cable Hooks



4.8.2 Standalone EBC Installation

NOTE 1 Standalone EBC installations with three or four EBCs require a customer supplied external tie point and circuit breaker or disconnect between the EBCs and the UPS.

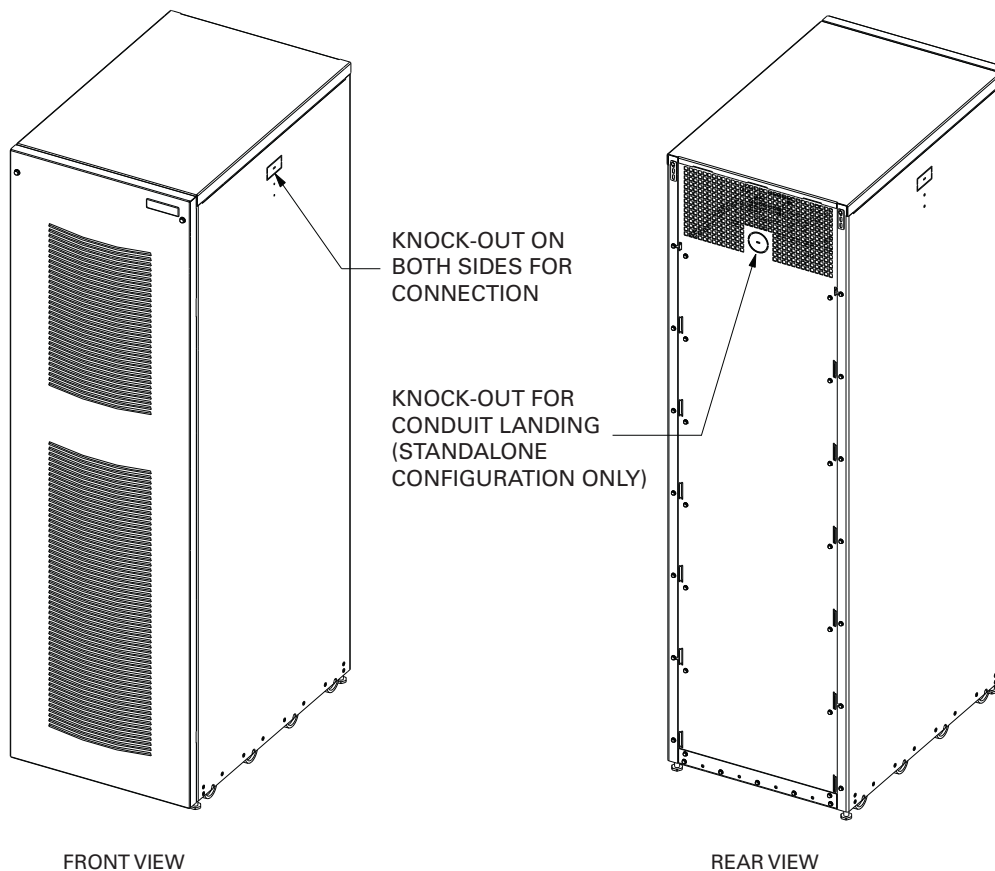
NOTE 2 Up to four EBCs can be installed in a standalone configuration.

i NOTE 3 In multiple EBC installations, individual conduit will be run between each battery cabinet and the UPS or disconnect.

NOTE 4 Remove the EBC conduit landing plates to drill or punch conduit holes, or remove knockouts in the conduit plate.

1. Verify the UPS system is turned off and all power sources are removed.
2. If not already removed, remove the EBC front door(s). See paragraph [4.2.2 EBC Front Door](#).
3. For standalone configuration EBCs only, remove the circular knockout in the rear of the cabinet and install conduit (see [Figure 33](#) for conduit knockout location).

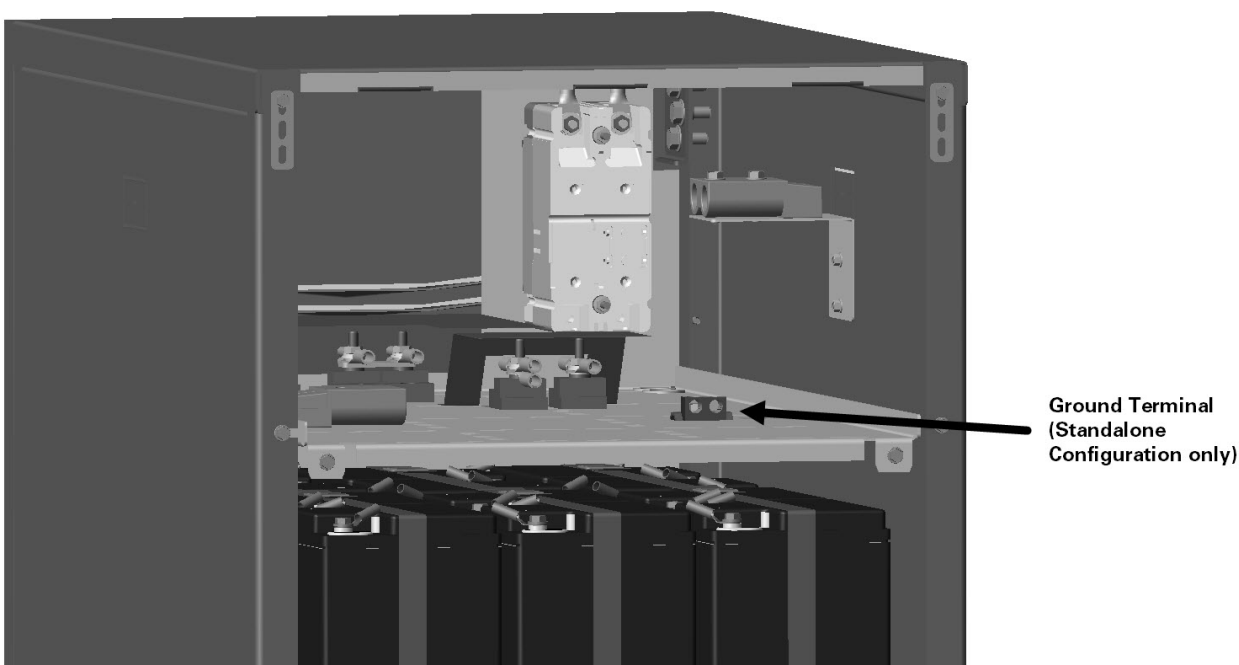
Figure 33. EBC Conduit Knockout Location



4. Route EBC cabling from the UPS to the EBC through the conduit.
5. Route the ground cabling to the EBC through the conduit.

6. Connect ground cabling to the ground terminal in the upper EBC cabinet area (see [Figure 34](#) for ground terminal location).

Figure 34. EBC (Standalone Configuration) Ground Terminal Location



i NOTE Rear view of the EBC upper cabinet view with cabinet door/panel removed for clarity.

7. Plug the EBC cable into the UPS battery connector (see [Figure 31](#)).
If additional EBCs are installed, plug the EBC cable into the battery connector on the next EBC. Repeat for each additional EBC.
8. Replace the EBC front door(s).
9. Replace the UPS front door.
If you installed an Options Cabinet, replace the Options Cabinet front door.
10. Continue to one of the following sections:
 - To permanently mount the cabinet, see [4.9 Permanent Mounting Installation](#).
 - To install UPS communication options, such as X-Slot cards or remote emergency power-off (REPO), see [Chapter 6 Communication](#).
 - To start up the UPS, see [Chapter 7 UPS Operating Instructions](#).

i NOTE After UPS startup, ensure maximum battery runtime by configuring the UPS for the correct number of EBCs (see paragraph [7.5 Configuring the UPS for EBCs](#)).

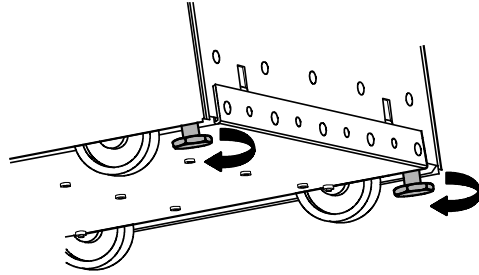
4.9 Permanent Mounting Installation

i NOTE Permanent mounting is optional and uses the rear shipping bracket.

To permanently mount the cabinet(s):

1. Lower the leveling feet to prevent the cabinet from rolling.

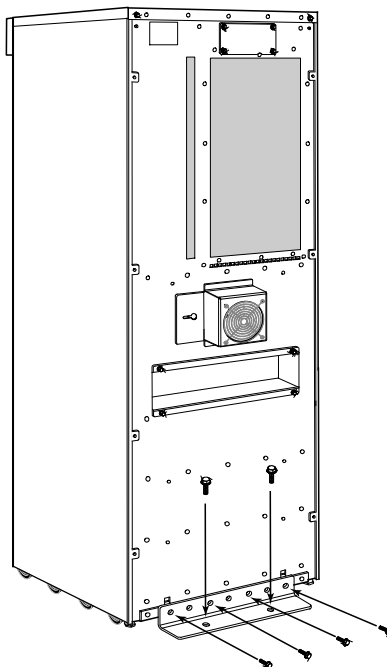
Figure 35. Lowering the Leveling Feet



2. Attach the rear shipping bracket to the bottom of the cabinet rear panel using the retained hardware from the shipping pallet (see [Figure 36](#)).
3. Install customer-provided floor bolts in the holes in the bottom of the bracket to attach the cabinet to the flooring.
4. Continue to one of the following sections:
 - To install UPS communication options, such as X-Slot cards or remote emergency power-off (REPO), see [Chapter 6 Communication](#).
 - To start up the UPS, see [Chapter 7 UPS Operating Instructions](#).

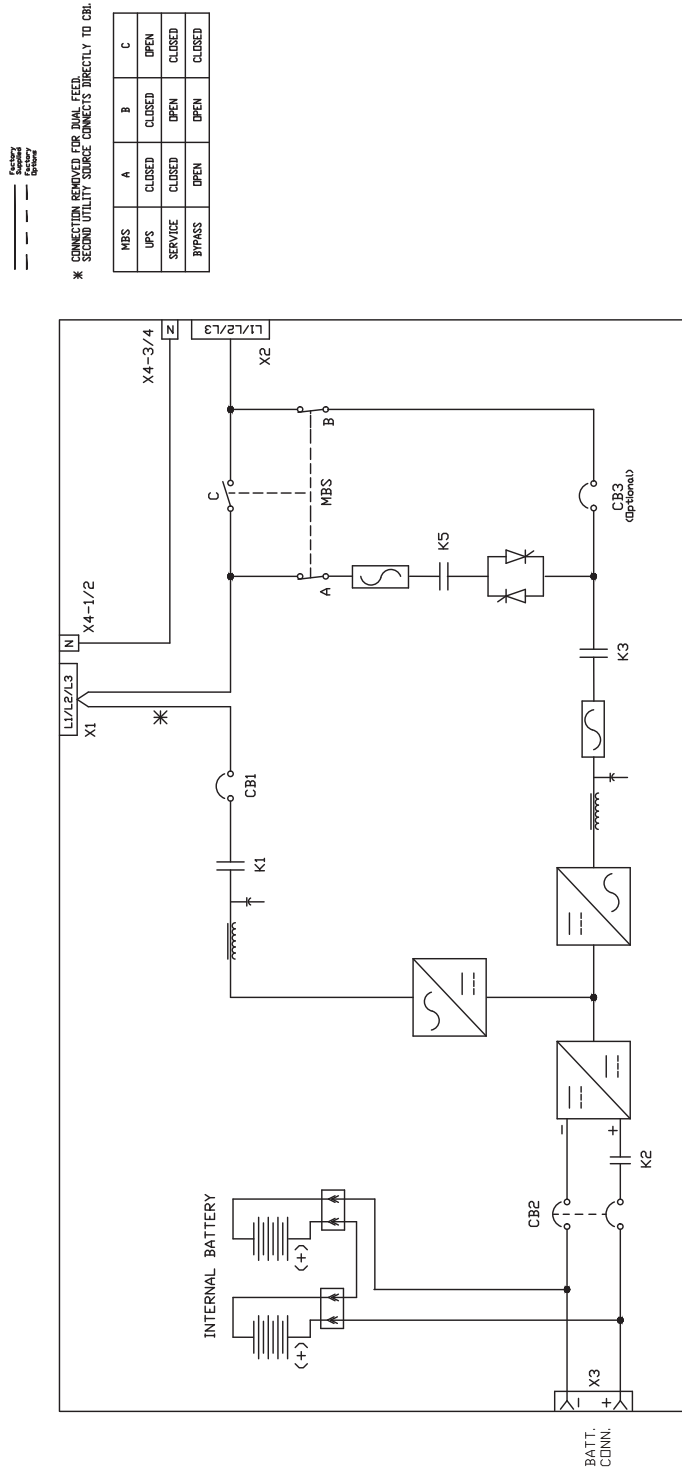
i NOTE After UPS startup, ensure maximum battery runtime by configuring the UPS for the correct number of EBCs (see paragraph [7.5 Configuring the UPS for EBCs](#)).

Figure 36. Permanent Mounting



Chapter 5 UPS Wiring Diagrams and Schematics

Figure 37. UPS Wiring Diagram (Single-Feed, 208V or 220V Input : 208V or 220V Output)

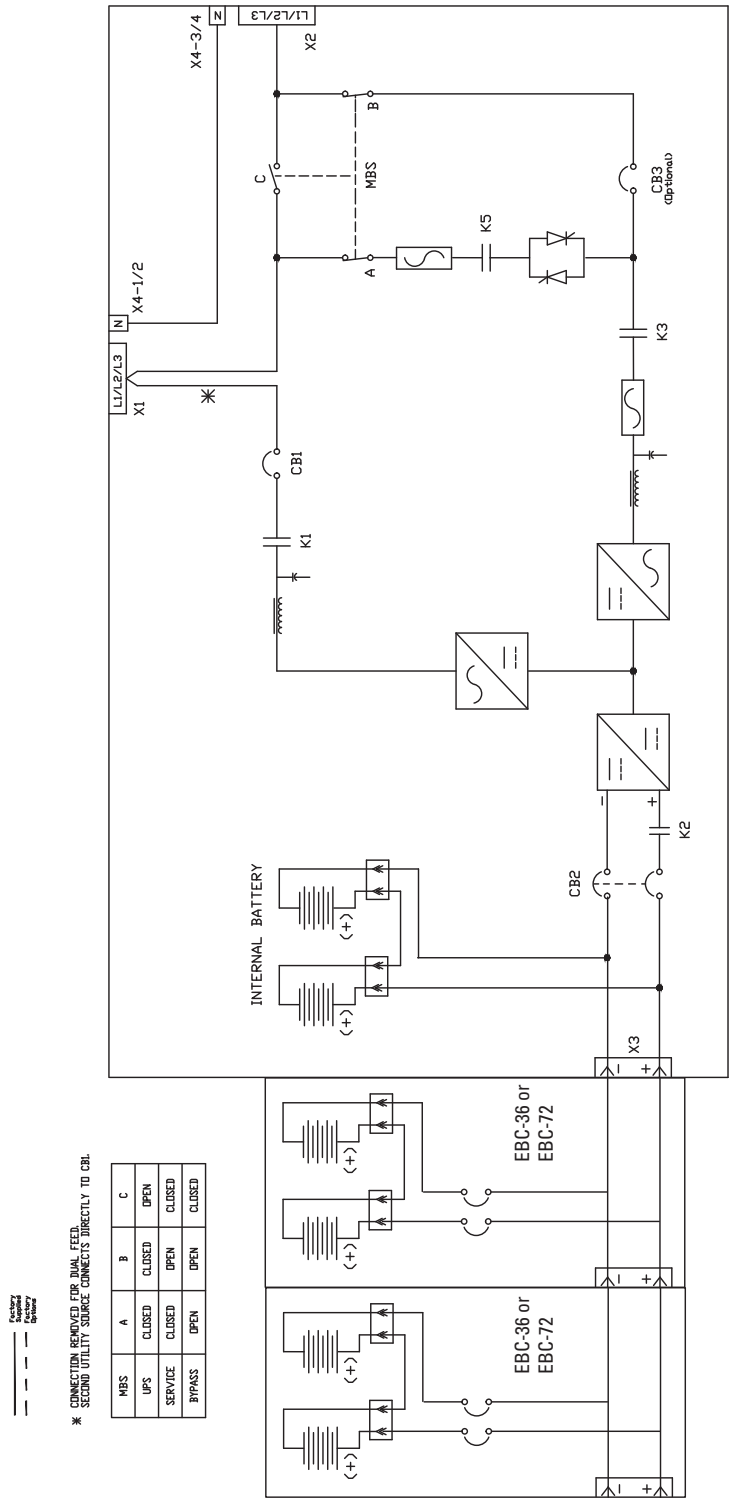


ONE-LINE DIAGRAM FOR 9355 20-30KVA UPS WITH INTERNAL BATTERIES

Notes:

1. Use only 90° C-Rated copper wire, minimum wire size is based on 120/208 full load ratings applied to National Electrical Code®(NEC®) Table 310.15(B)(16). Code may require a larger AWG size than shown in this table because of temperature, number of conductors in the conduit, or long service runs. Follow local requirements.
2. Per NEC article 300-20(A) for ferrous metal raceways, all three-phase conductors must be run in the same conduit. Neutral and ground must be run in the same conduit as the phase conductors.
3. Conduit is sized to accommodate one neutral conductor the same size as the phase conductor and one ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, check the size of the conduit needed to accommodate the extra wire or size and use that conduit size in place of the conduit size listed. Conduit sizes were chosen from NEC table C1, type letters RHH, RHW, RHW-2, TW, THW, THHW, THW-2.

Figure 38. UPS with EBCs Wiring Diagram (Single-Feed, 208V or 220V Input : 208V or 220V Output)



ONE-LINE DIAGRAM FOR 9355 20-30KVA UPS WITH INTERNAL BATTERIES

- Notes:
1. Use only 90° C-Rated copper wire, minimum wire size is based on 120/208 full load ratings applied to Nation Electrical Code®(NEC®) Table 310.15(B)(16). Code may require a larger AWG size than shown in this table because of temperature, number of conductors in the conduit, or long service runs. Follow local requirements.
 2. Per NEC article 300-20(A) for ferrous metal raceways, all three-phase conductors must be run in the same conduit. Neutral and ground must be run in the same conduit as the phase conductors.
 3. Conduit is sized to accommodate one neutral conductor the same size as the phase conductor and one ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, check the size of the conduit needed to accommodate the extra wire or size and use that conduit size in place of the conduit size listed. Conduit sizes were chosen from NEC table C1, type letters RHH, RHW, RHW-2, TW, THW, THHW, THW-2.

Figure 39. UPS and Options Cabinet with MBS Only (Single-Feed, 208V or 220V Input : 208V Output)

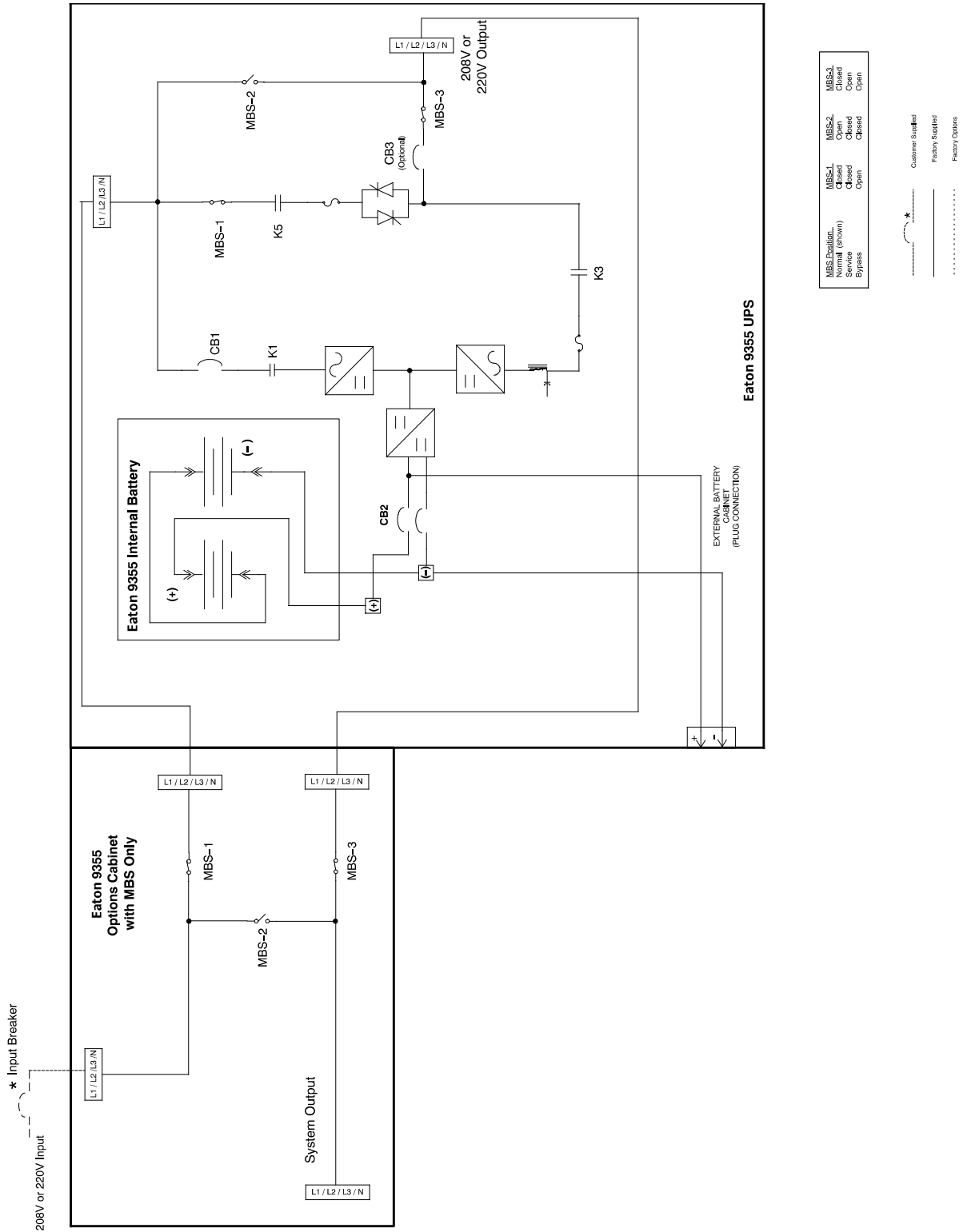


Figure 40. UPS and Options Cabinet with MBS/Input Isolation Transformer Wiring Diagram (Single-Feed, 208V, 480V, or 600V Input : 208V Output)

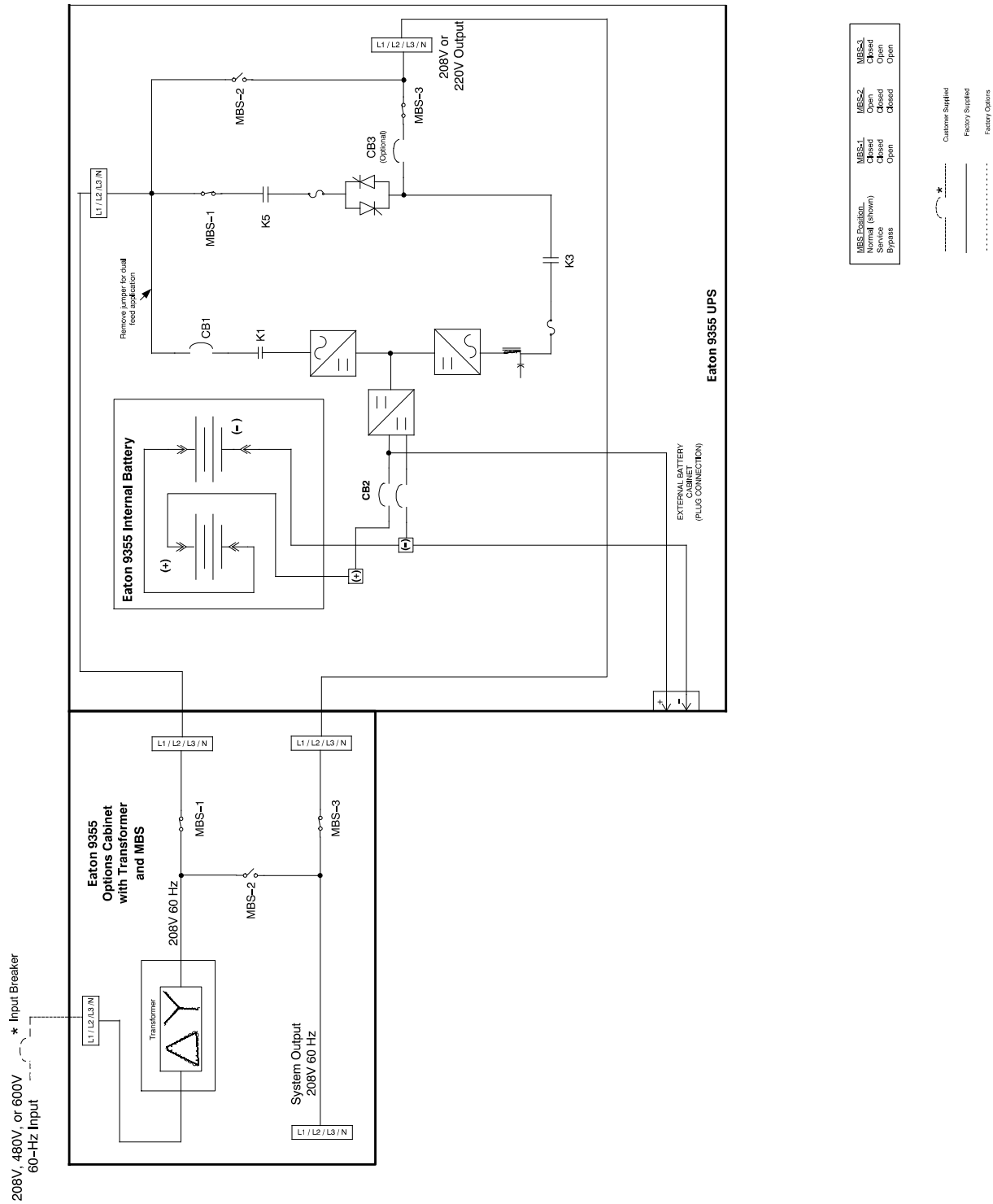
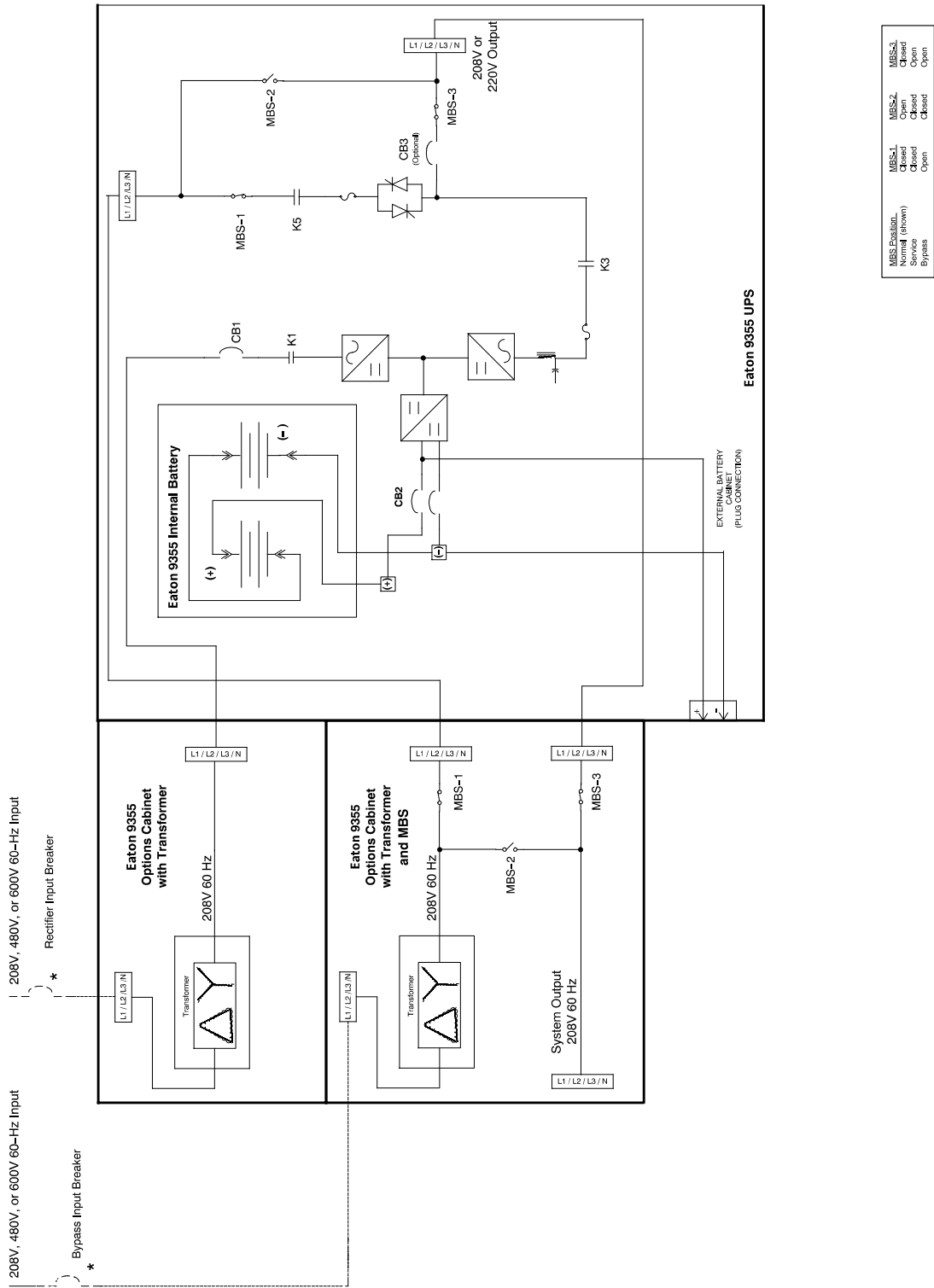


Figure 41. UPS and Dual-Feed Options Cabinets Wiring Diagram (Dual-Feed, 208V, 480V, or 600V Input : 208V Output)



MBS-1	MBS-2	MBS-3
Close	Close	Close
Open	Open	Open
Bypass	Close	Open

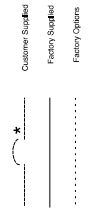


Figure 42. UPS and Dual Options Cabinets with Input and Output Transformers Wiring Diagram (Single-Feed, 480V Input : 480V Output)

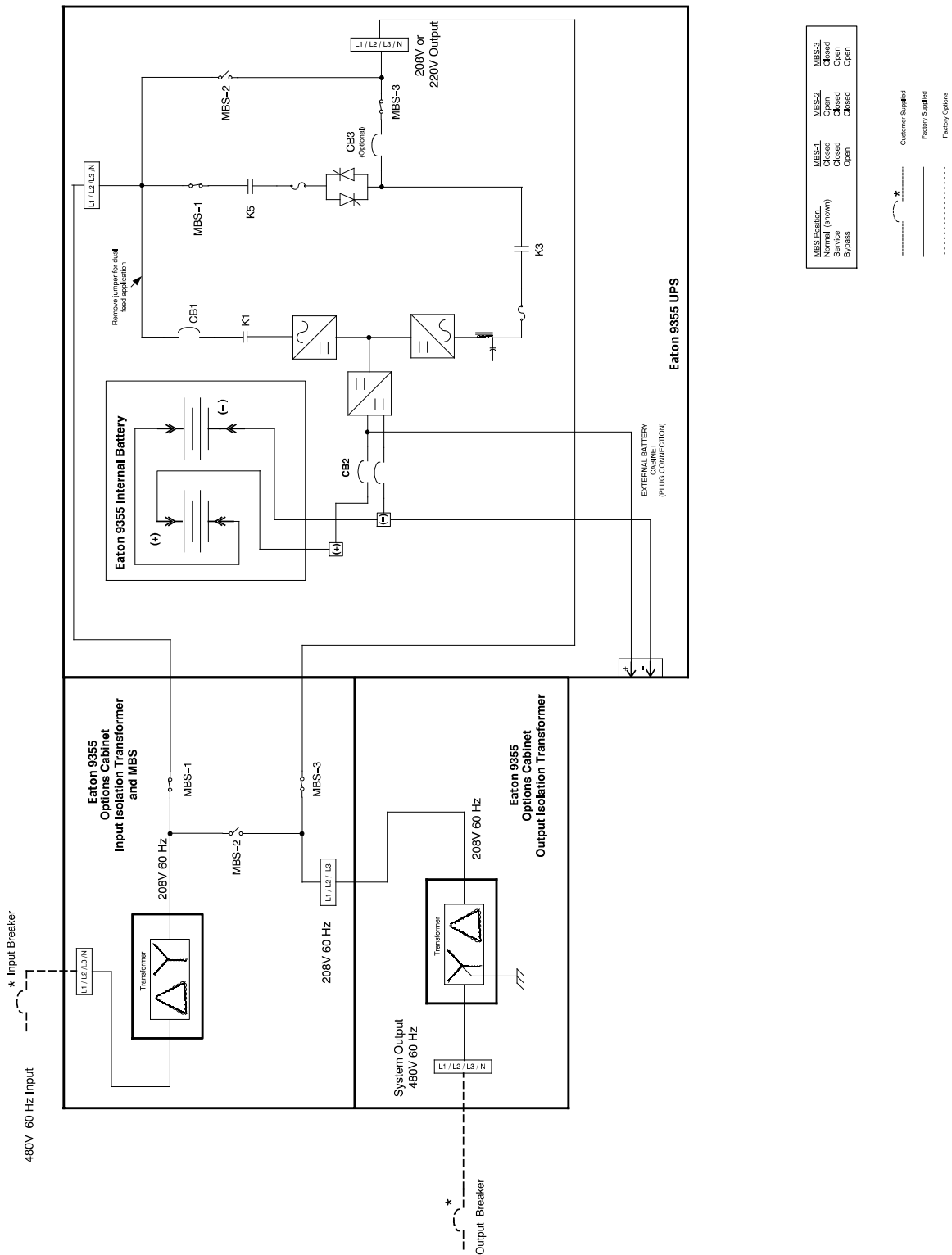


Figure 43. UPS and Single Options Cabinet with Input and Output Transformers Wiring Diagram (Single-Feed, 480V Input : 480V Output)

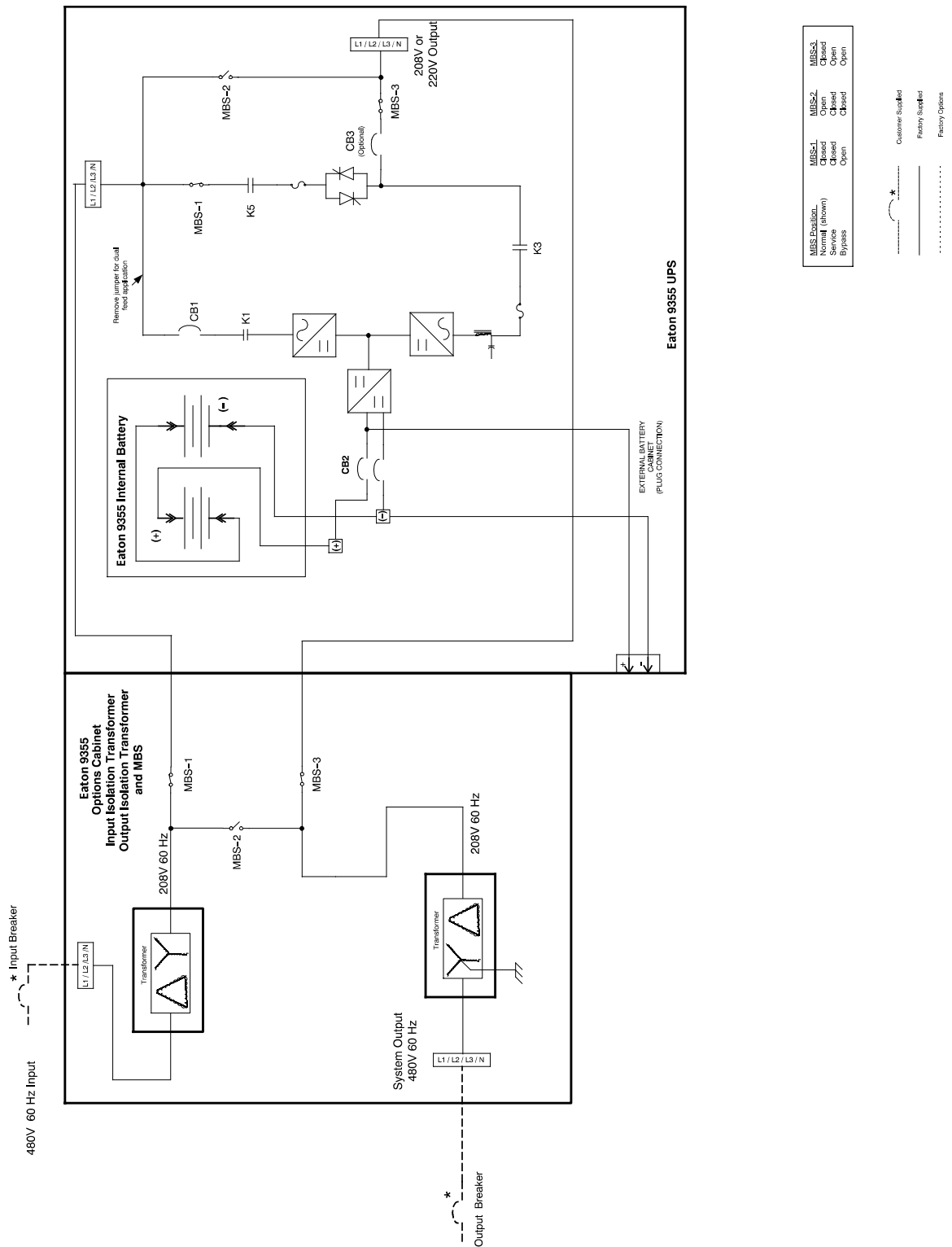
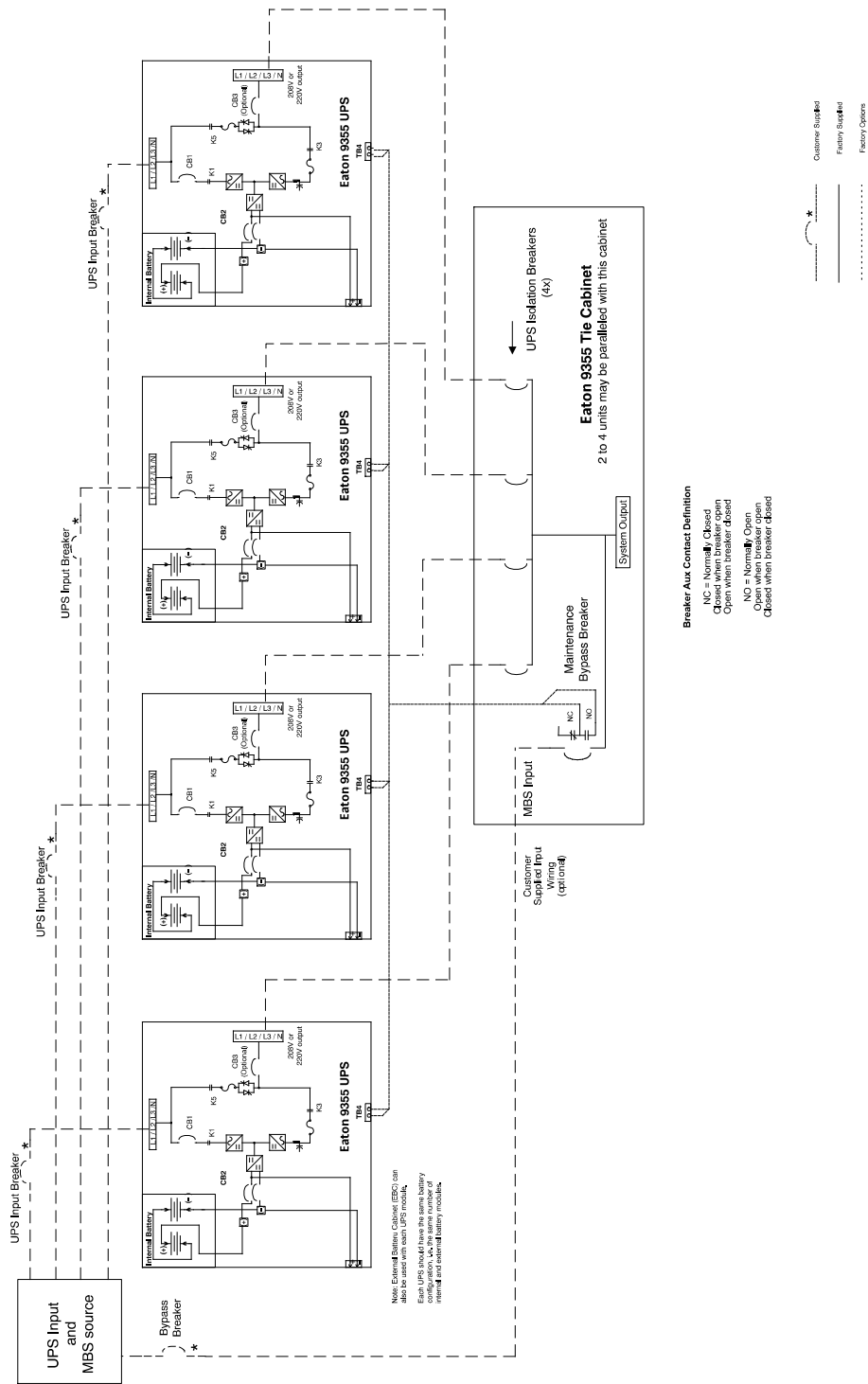


Figure 44. Parallel UPS System with Tie Cabinet Diagram (Single-Feed, 208V or 220V Input : 208V or 220V Output)



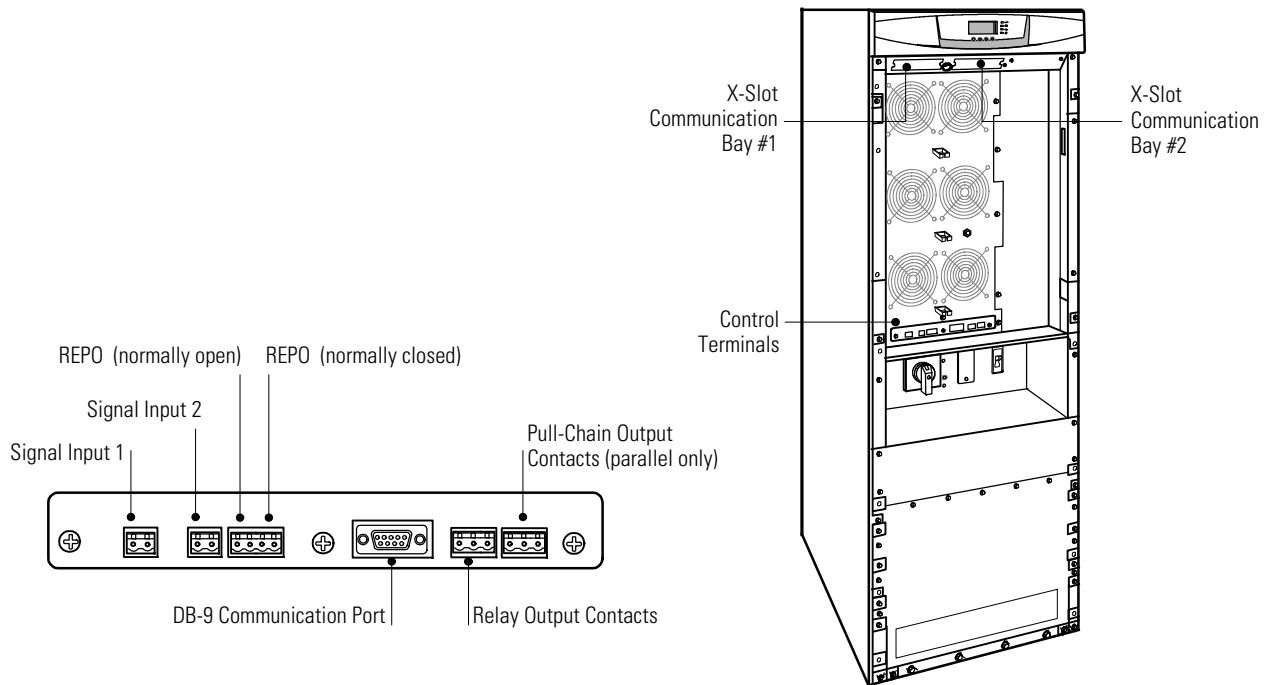
Chapter 6 Communication

This section describes the:

- DB-9 communication port
- X-Slot cards
- Remote Monitor Panel (RMP) and Industrial Relay Card (IRC)
- LanSafe® Power Management Software
- Remote emergency power-off (REPO)
- Relay output contacts
- Programmable signal inputs
- Parallel Communication

[Figure 45](#) shows the location of the communication options and control terminals on the UPS.

Figure 45. Communication Options and Control Terminals



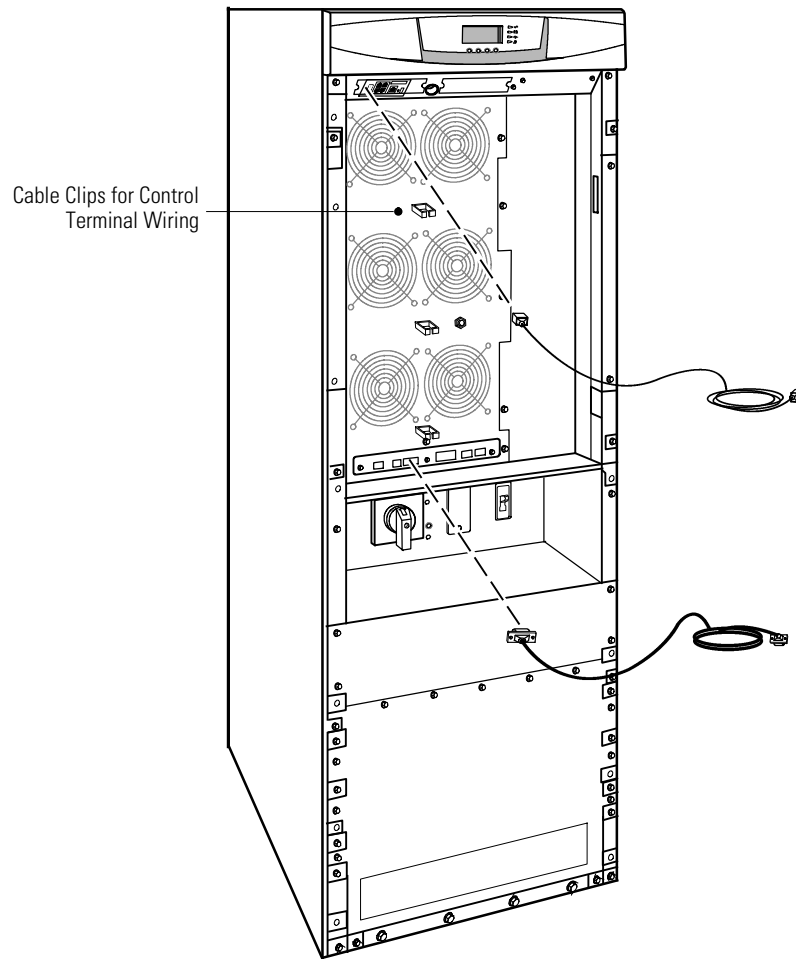
6.1 Installing Communication Options and Control Terminals

NOTE To install a CAN Bridge Card, see paragraph [6.4 Parallel Communication](#).

To access and install the communication options and control terminals:

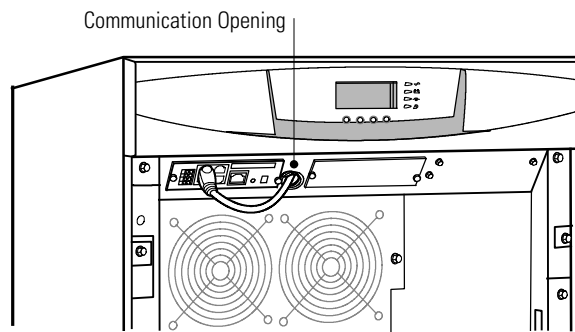
1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Install the appropriate X-Slot card and/or necessary cables into the ports (see [Figure 45](#) and [Figure 46](#)).
3. Route the control terminal cable(s) through the middle of the fan section and secure in the cable clips.

Figure 46. Installing Communication Cables



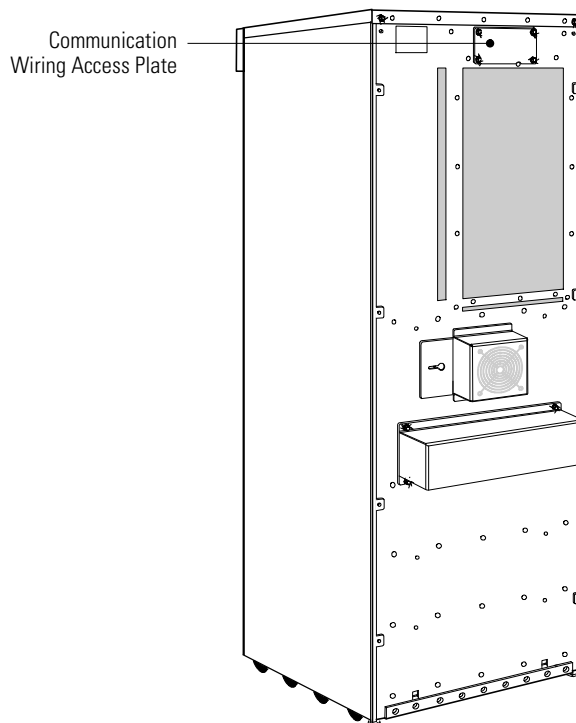
4. Route the cable(s) through the opening between the two X-Slot communication bays.

Figure 47. Routing the Cables



5. Remove the communication wiring access plate from the UPS rear panel and punch a hole in it using a Greenlee punch or similar device (see [Figure 48](#)).

Figure 48. Communication Wiring Access



6. Connect the cables to the appropriate location.
See paragraph [6.2 Communication Options](#) or paragraph [6.3 Control Terminals](#) for detailed information.
7. Reinstall the communication wiring access plate.
8. Replace the UPS front door.
9. Continue to [Chapter 7 UPS Operating Instructions](#) to start up the UPS.

6.2 Communication Options

The Eaton 9355 UPS has serial communication capabilities through the DB-9 communication port or through an X-Slot card in one of the available bays. In addition, the LanSafe Power Management Software can be installed and used to communicate with the UPS via one of the serial communication connections.

The UPS supports two serial communication devices according to the following table:

Independent		Multiplexed
X-Slot 1	X-Slot 2	DB-9 Communication Port
Any X-Slot card	Any X-Slot card except the Eaton Modem Card	Not in use
Any X-Slot card	Eaton Relay Interface Card Powerware Hot Sync CAN Bridge Card	Available
Any X-Slot card	Not in use	Available

NOTE You can configure relays, signal inputs, and the serial port baud rate through the front panel menus (see [Table 11](#)).

6.2.1 DB-9 Communication Port

To establish communication between the UPS and a computer, connect your computer to the UPS communication port using the supplied communication cable.

When the communication cable is installed, power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment.

The cable pins are identified in [Figure 49](#) and the pin functions are described in [Table 5](#). See [Figure 45](#) for the communication port location.

Figure 49. Communication Port

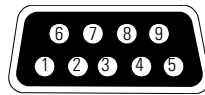


Table 5. Communication Port Pin Assignment

Pin Number	Signal Name	Function	Direction from the UPS
2	TxD	Transmit to external device	Out
3	RxD	Receive from external device	In
5	GND	Signal common (tied to chassis)	—

6.2.2 X-Slot Cards

For information about the Powerware Hot Sync CAN Bridge Card, see paragraph [6.4 Parallel Communication](#).

X-Slot cards allow the UPS to communicate in a variety of networking environments and with different types of devices. The Eaton 9355 UPS has two available communication bays for any X-Slot card, including:

- Power Xpert® Gateway Card - provides a data gateway from the UPS to the Power Xpert Software; provides remote monitoring through a Web browser interface, e-mail, and a network management system using SNMP; connects to a twisted-pair Ethernet (10/100 BaseT) network. Modbus TCP support provides direct integration of the UPS's parameters to a Building Management System (BMS). It has a built-in switching hub that allows a second network device to be connected to the network without the requirement of an additional network drop.
- ConnectUPS™ -X Web/SNMP Card - has SNMP and HTTP capabilities as well as monitoring through a Web browser interface; connects to a twisted-pair Ethernet (10/100 BaseT) network. It has a built-in switching hub that allows three additional network devices to be connected to the network without the requirement of additional network drops. In addition, a Environmental Monitoring Probe can be attached to obtain humidity, temperature, smoke alarm, and security information.
- Relay Interface Card - has isolated dry contact (Form-C) relay outputs for UPS status: Utility failure, Low battery, UPS alarm/OK, or On bypass.
- Modbus® Card - allows you to continuously and reliably monitor the UPSs in your Building Management System (BMS).
- Industrial Relay Card - is used to indicate the operating status of the UPS using the customer's monitoring equipment and to connect an optional RMP. The IRC uses four isolated normally-open or normally-closed

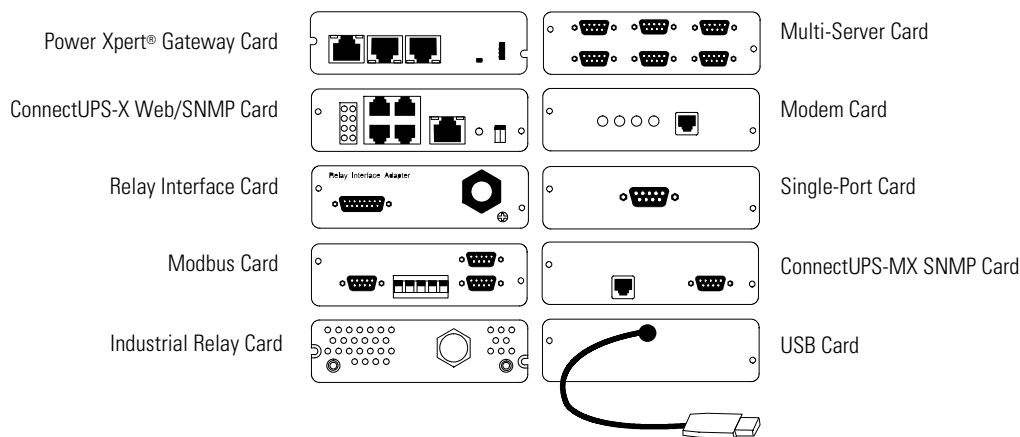
dry relay contacts to indicate the UPS status. Normal, Bypass, Battery, and Alarm mode can be monitored (see paragraph [6.2.4 Industrial Relay Card](#) for more information).

- Multi-Server Card - has six serial communication ports that can communicate simultaneously with other computers using LanSafe Power Management Software (provided on the Software Suite CD).
- Modem Card - provides out-of-band remote notification and monitoring using modem communication directly to cell phones and pagers.
- Single-Port Card - provides serial communication.
- Connect UPS-MX SNMP Card - has Ethernet, modem, and SNMP capabilities.
- USB Card - connects to a USB port on your computer.

NOTE The Eaton 9355 UPS does not detect plug-and-play hardware. Before installing the USB Card, set the UPS baud rate to 1200 through the front panel (see [Table 11](#)).

See [Figure 45](#) for the location of the two X-Slot communication bays.

Figure 50. Optional X-Slot Cards



6.2.3 Remote Monitor Panel

The optional RMP can be installed to monitor the operation of the UPS from virtually any location within your facility, up to 500 ft (152.4m) from the UPS. You can surface-mount an RMP on a desktop or on a wall, wherever you have a serial interface line. [Figure 51](#) shows an RMP. [Figure 52](#) shows the enclosure dimensions and cable exit openings.

Figure 51. Remote Monitor Panel

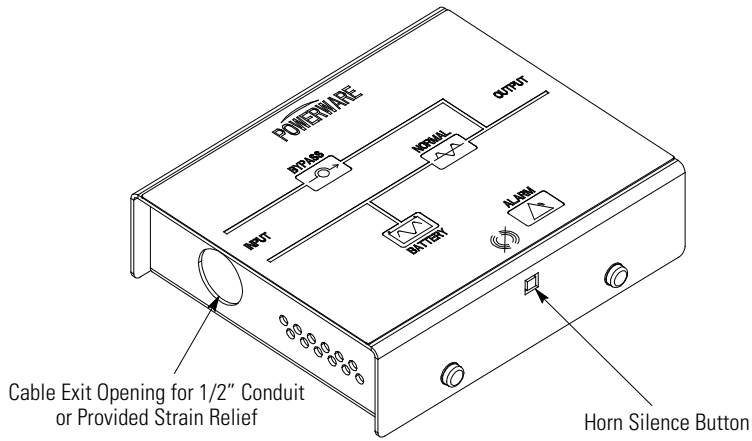
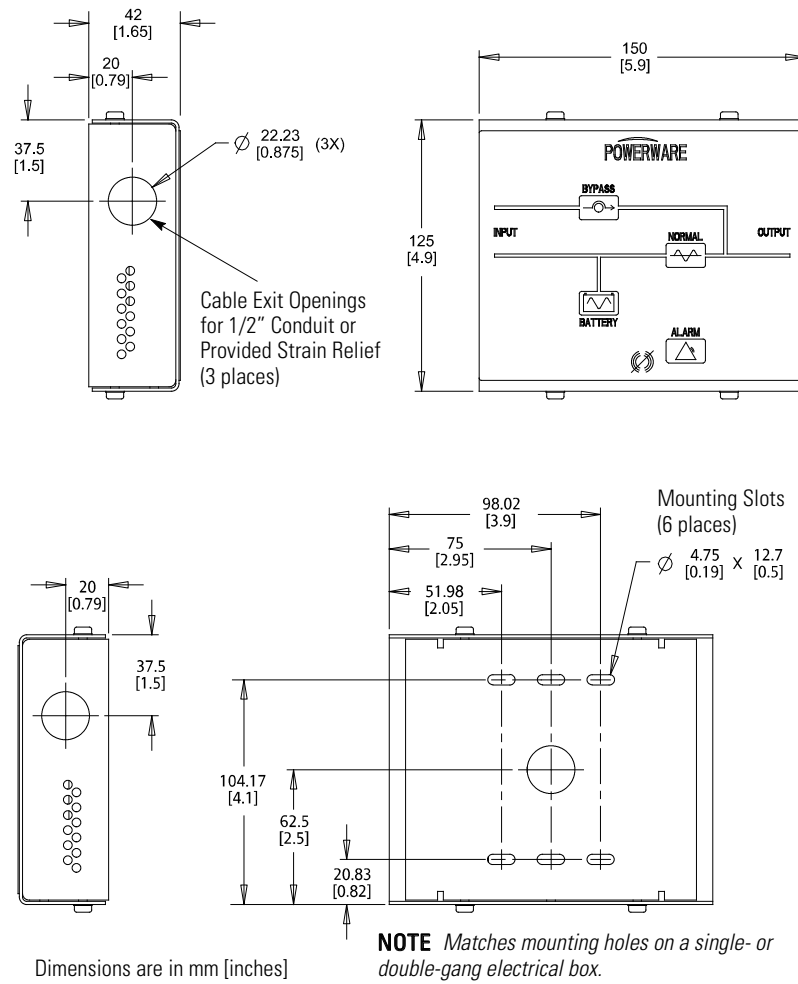


Figure 52. RMP Dimensions



To install an RMP:

NOTE If mounting to a hollow wall, secure the enclosure bottom to a wood or metal stud within the wall. Do not use hollow wall anchors. The RMP can also be mounted to a single- or double-gang electrical box.

1. If wall mounting, securely mount the RMP. Continue to [Step 2](#).
If desk mounting, install the provided bumpers to the bottom of the RMP enclosure. Proceed to [Step 3](#).
2. Install 1/2" conduit from the RMP to the IRC through the cable exit openings (see [Figure 52](#)). Proceed to [Step 4](#).
3. Install wiring from the RMP to the IRC using the cable listed in [Table 6](#) and the provided strain relief bushings in the cable exit openings in the IRC (see [Figure 54](#)) and the RMP.
4. Connect the wiring between the RMP and the IRC plug-in terminal blocks using terminations shown in [Table 6](#). See [Figure 53](#) and [Figure 54](#) for plug-in terminal block locations.

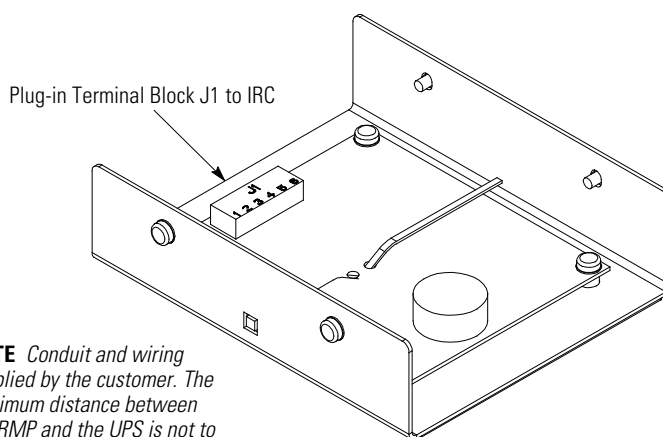
Table 6. RMP Wire Terminations

From RMP Terminal	To IRC Terminal	Remarks
J1-1	J1-1	Use Beldon 8690 060 or equivalent cable
J1-3	J1-3	
J1-4	J1-4	
J1-5	J1-5	
J1-6	J1-6	
J1-6	J1-6	

5. Install the IRC into an open X-Slot communication bay (see [Figure 45](#)).
6. To check the operation of the RMP, ensure that the UPS is supplying the load via the inverter or bypass. If the indicators on the RMP show the appropriate status, then it is operating correctly.

If the RMP is not operating correctly, check the wiring, the fuse on the IRC, and the plug-in terminal blocks for proper seating. If all connections are secure but the RMP still does not operate correctly, replace the fuse. If this does not correct the problem, contact your service representative for verification that the RMP is working correctly.

Figure 53. RMP Top Internal View

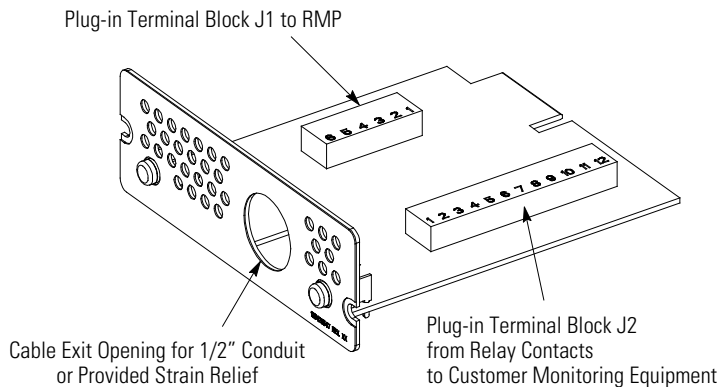


NOTE Conduit and wiring supplied by the customer. The maximum distance between the RMP and the UPS is not to exceed 500 ft (152.4m).

6.2.4 Industrial Relay Card

The IRC uses normally-open or normally-closed dry relay contacts to indicate the UPS status as listed in [Table 7](#). [Figure 54](#) shows an IRC.

Figure 54. Industrial Relay Card



1. Verify that the UPS is turned off and all power sources are removed.
2. Install wiring from the IRC to the monitoring equipment using 1/2" conduit through the cable exit opening in the IRC (see [Figure 54](#)).
3. Connect wiring between the IRC and the monitoring equipment using terminations shown in [Table 7](#). See [Figure 54](#) for plug-in terminal block locations.
4. Install the IRC into an open X-Slot communication bay (see [Figure 45](#)).
5. To check the operation of the IRC, ensure that the UPS is supplying the load via the inverter or bypass. If the indicators on the customer's monitoring equipment show the appropriate status, then it is operating correctly.

If the IRC is not operating correctly, check the wiring, the fuse on the IRC, and the plug-in terminal blocks for proper seating. If all connections are secure but the IRC still does not operate correctly, replace the fuse. If this does not correct the problem, contact your service representative for verification that the IRC is working correctly.

Table 7. IRC Wire Terminations

IRC Terminal	Function	Remarks
J2-1	NC	Normal mode
J2-2	COM	
J2-3	NO	
J2-4	NC	Bypass mode
J2-5	COM	
J2-6	NO	
J2-7	NC	Battery mode
J2-8	COM	
J2-9	NO	

Table 7. IRC Wire Terminations (Continued)

IRC Terminal	Function	Remarks
J2-10	NC	Alarm mode
J2-11	COM	
J2-12	NO	

NOTE Maximum contact rating: 250 Vac, 30 Vdc @ 5A; Wire range: 16–24 AWG

6.2.5 LanSafe Power Management Software

Each Eaton 9355 UPS ships with LanSafe Power Management Software and a communication cable. To begin installing LanSafe software, see the instructions accompanying the Software Suite CD.

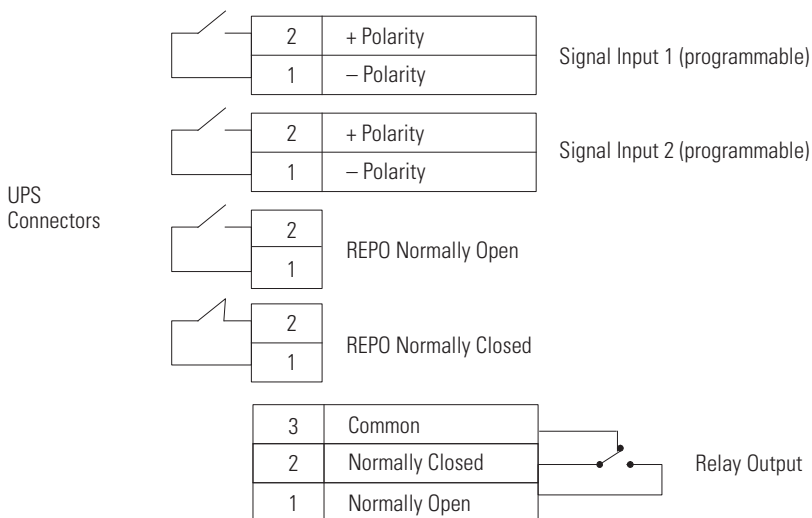
i NOTE Use only the supplied communication cable to connect the UPS to your computer.

LanSafe software provides up-to-date graphics of UPS power and system data and power flow. It also gives you a complete record of critical power events, and it notifies you of important UPS or power information. If there is a power outage and the Eaton 9355 UPS battery power becomes low, LanSafe software can automatically shut down your computer system to protect your data before the UPS shutdown occurs.

6.3 Control Terminals

The cables should be connected to the control terminals with a mating connector. Input and output terminals have a functional isolation from terminal to terminal. They are connected to the UPS chassis through individual 1 MΩ resistors.

Figure 55. External Control Terminal Connections



i NOTE If using a semiconductor switch type, pay attention to the proper polarity. A relay or other mechanical control is preferred.

6.3.1 Remote Emergency Power-off


REPO is used to shut down the UPS from a distance. This feature can be used for shutting down the load and the UPS by thermal relay, for instance in the event of room overtemperature. When REPO is activated, the UPS shuts down all converters, de-energizes all system relays, trips the battery circuit breaker, and fully powers down within 1–2 minutes.


There are two REPO positions that may be used, normally-open or normally-closed.

The pins on the normally-closed REPO connector are connected together. When this connection is open, the logic circuitry completely shuts down the UPS, thus preventing the power from supplying the load.

If the use of normally-closed REPO operation is desired, replace the connector with a normally-closed external switch (see [Figure 45](#)).

If the use of normally-open REPO operation is desired, connect a normally-open external switch (see [Figure 45](#)).

-
- 

NOTE 1 To restart the UPS, reconnect the REPO connector pins and turn on the UPS manually. The pins must be shorted to keep the UPS running. Maximum resistance is 10 ohm.
 - 

NOTE 2 Leave the REPO connector installed in the REPO port on the UPS even if the REPO function is not needed.
-

CAUTION

- The REPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The REPO switch must have a minimum rating of 24 Vdc and 20 mA.
 - To ensure the UPS stops supplying power to the load during any mode of operation, the input power must be disconnected from the UPS when the emergency power-off function is activated.
-

Table 8. REPO Terminal Connections

Wire Function	Terminal Wire Size Rating	Suggested Wire Size
REPO	L1	12–22 AWG
	L2	(4–0.32 mm ²)

6.3.2 Relay Output Contacts

The UPS incorporates a programmable relay output with potential free contacts for remote alarm indications (see [Figure 45](#)). An additional four relay outputs can be obtained with the X-Slot compatible Relay Interface Card.

WARNING

The relay output contacts must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The relay output contacts have a maximum rating of 10A, 250 Vac or 30 Vdc nominal values.

6.3.3 Programmable Signal Inputs

The UPS incorporates two programmable signal inputs (see [Figure 45](#)). Use of non-polar (relay) control input is recommended. The pins must be shorted with maximum resistance of 10 ohm to activate the specific input.

-
- 

NOTE See [Figure 55](#) for the polarity and verify these connections if polarity control is required.
-

The default and programmable settings for the signal inputs are shown in [Table 9](#).

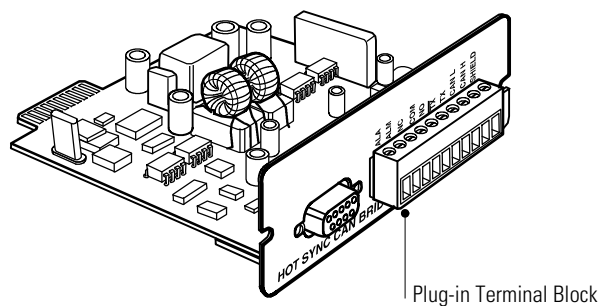
Table 9. Programmable Signal Inputs

Signal	Description
Disable Bypass Operation	If active, the automatic transfer to the static bypass is prevented.
Charger Off	If active, the battery charge function is disabled. In a utility power outage, the discharge of batteries is supported.
Remote ON/OFF	If active, the UPS output turns off regardless of the mode of operation. Auxiliary power, fan, communication, and rectifier/battery charger remain functional. Restart is initiated immediately when this signal is inactive.
Request Bypass	If active, the UPS transfers to bypass if the bypass voltage, frequency, and synchronization are all okay.
Request Normal	If active, the UPS transfers to inverter operation if not prohibited by REPO or an alarm condition.
Force Bypass	If active, the UPS is forced to static bypass operation regardless of the bypass status.
External Battery Breaker Status	If active, the UPS knows that the batteries are disconnected.
Building Alarm 1–6	These alarms can be activated separately or at the same time with other building alarms.
Not in Use	Default
Shutdown	If active, the UPS shuts down immediately.
Delayed Shutdown	If active, the UPS shuts down after a user-configured delay time. Default shutdown delay is 120 seconds. The UPS automatically restarts when the signal changes to inactive.
Normal/Bypass	If active, the UPS transfers to bypass if okay. If inactive, the UPS transfers to the inverter when possible.
On Generator	If active, the UPS knows that input is fed from the generator. Bypass is disabled; the automatic battery test is disabled.
External Transformer Overtemperature	This option is not used.

6.4 Parallel Communication

The Powerware Hot Sync CAN Bridge Card, shown in [Figure 56](#), can be installed to provide connectivity for operational mode control and metering of a parallel system at any UPS in the system.

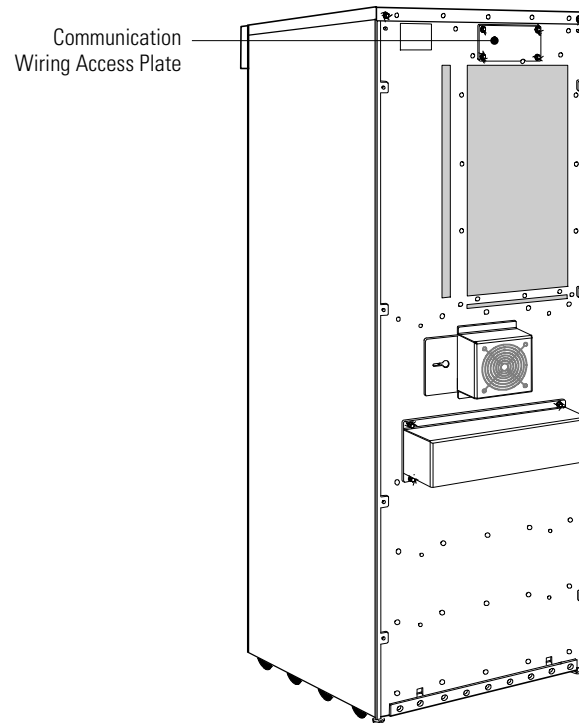
Figure 56. Powerware Hot Sync CAN Bridge Card



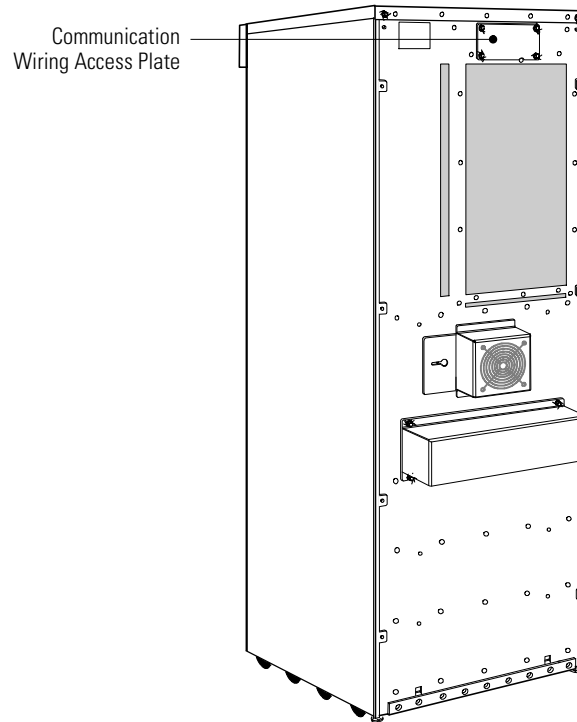
To install the Powerware Hot Sync CAN Bridge Card:

1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Remove the communication wiring access plate from the UPS rear panel and punch a hole in it using a Greenlee punch or similar device (see [Figure 57](#)).
3. Install conduit for the communication wiring.

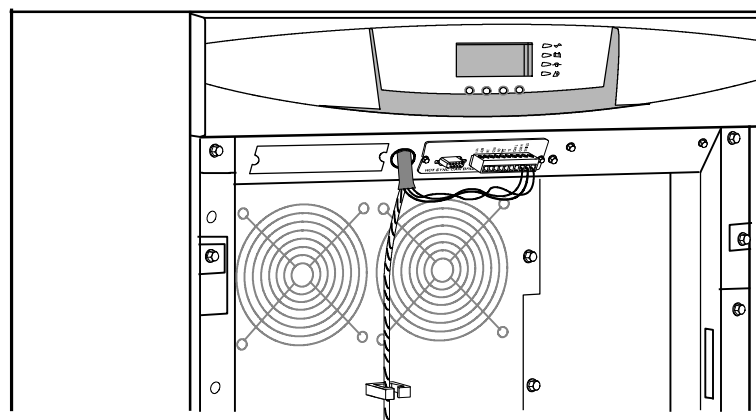
Figure 57. Communication Wiring Access



4. Set the jumper pins on the Powerware Hot Sync CAN Bridge Card according to the parallel configuration (see [Figure 58](#)):
 - If only two UPSs are paralleled, then set both cards to Pins 1 and 2.
 - For three or four paralleled UPSs, set the cards of the first and last UPSs to Pins 1 and 2; set the cards for the middle UPSs to Pins 2 and 3.

Figure 58. Setting the CAN Bridge Card Jumper J7 (Side View)

5. Install the CAN Bridge Card into X-Slot 2 (see [Figure 49](#) and [Figure 46](#)).
6. Strip shielded, four-wire, twisted-pair wire (maximum 18 AWG recommended) for CAN Bridge Card wiring and pull-chain wiring.
7. Repeat [Step 1](#) through [Step 6](#) for each UPS.
8. Route the wiring through the conduit from the communication wiring access plate to the opening between the two X-Slot communication bays on each UPS (see [Figure 59](#)).

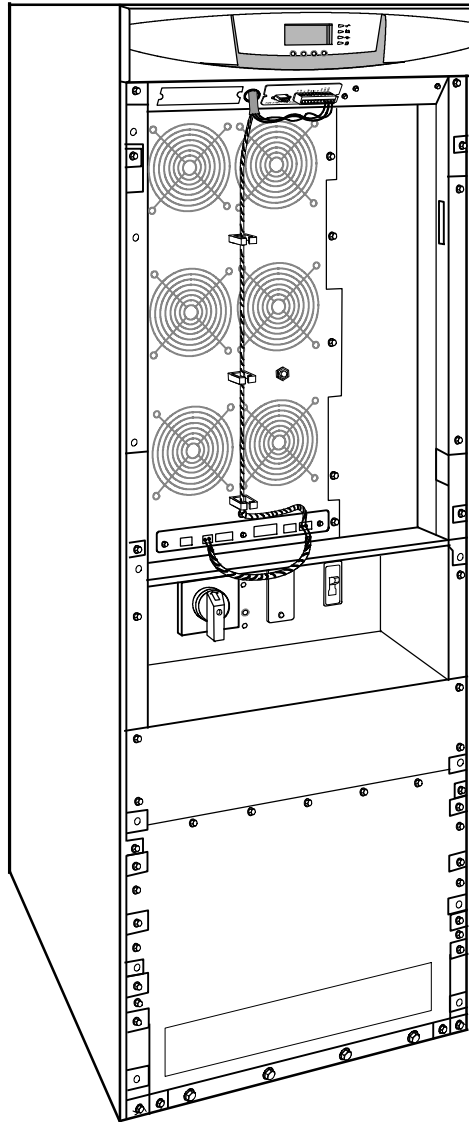
Figure 59. Routing the Cables

9. Install the CAN Bridge Card wiring between each UPS (see [Figure 61](#)).

Use three wires of the four-wire twisted-pair wire. (Reserve two wires for pull-chain wiring in [Step 11](#).) Be sure to check correct polarity for Pins 8 and 9:

- Connect SHIELD Pin 10 on all cards together.
 - Connect CAN H Pin 9 and CAN L Pin 8 (twisted pair) on all cards together.
10. Route the pull-chain wiring through the middle of the fan section and secure in the cable clips for each UPS (see [Figure 60](#)).

Figure 60. Installing Communication Cables



11. Wire the pull-chain wiring to Signal Input 2 on each UPS and daisy chain the wiring to each UPS as shown in [Figure 61](#). Be sure to check correct polarity:

- Connect Pull-Chain Output Contact Pin 1 to Signal Input 2 Pin 1 on each UPS.
- Connect Pull-Chain Output Contact Pin 2 to Signal Input 2 Pin 2 on each UPS.

 **CAUTION**

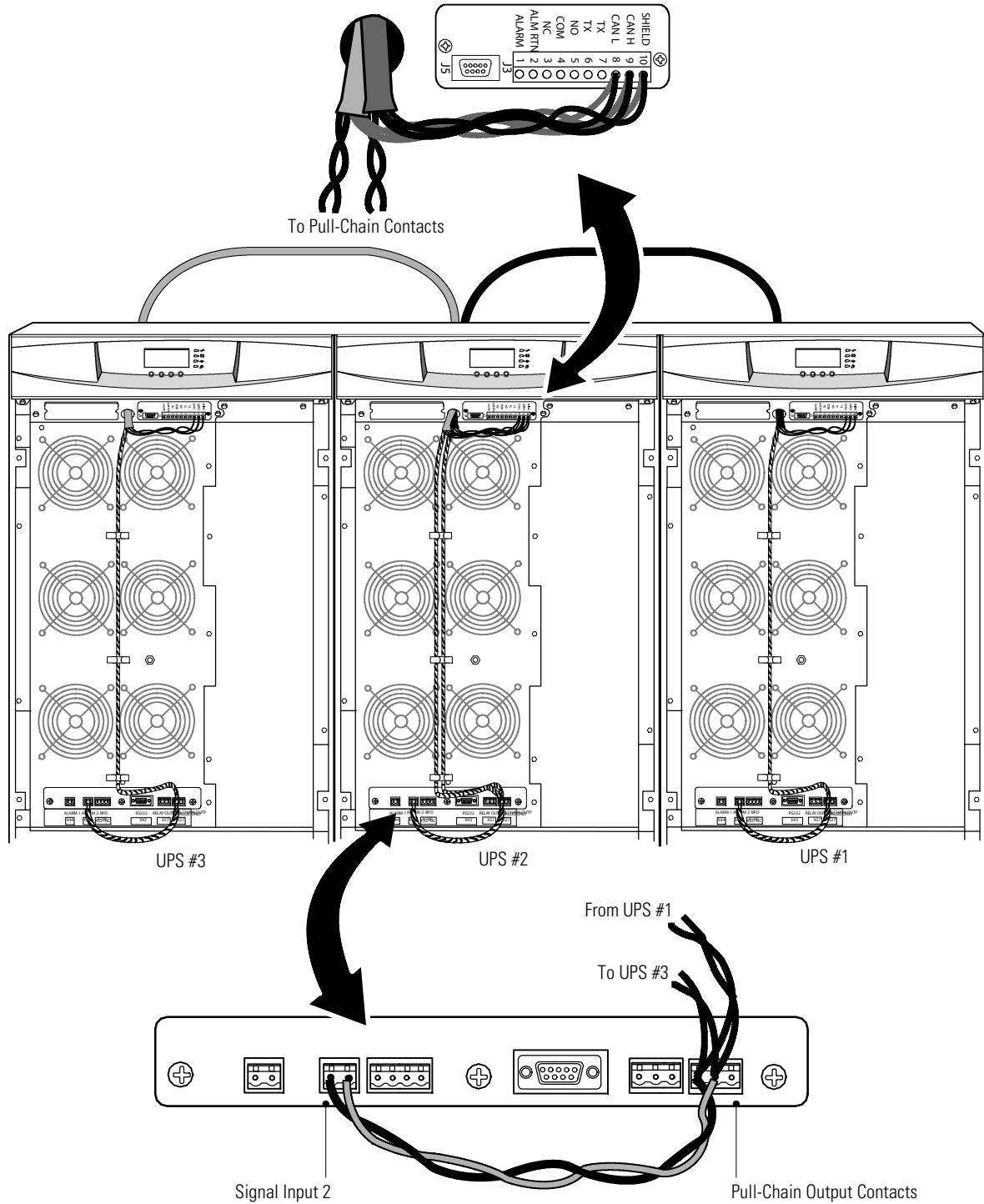
If polarity or wiring is not correct, the parallel system does not operate normally. For example, when shutting down one UPS, the remaining UPS transfers the load to bypass instead of supporting the load. Verify all CAN Bridge Card wiring is correct for proper operation.

**NOTE**

Signal Input 2 can still be used for building alarms; it is automatically rerouted to the CAN Bridge Card.

12. Reinstall the communication wiring access plate on each UPS.
13. Replace the UPS front door on each UPS.

Figure 61. CAN Bridge Card and Pull-Chain Wiring



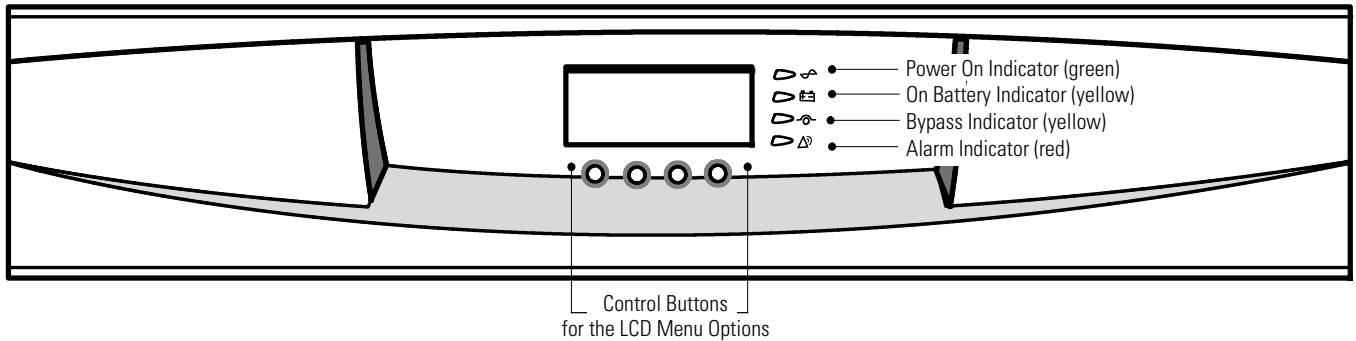
Chapter 7 UPS Operating Instructions

This chapter contains information on how to use the Eaton 9355 UPS, including front panel operation, UPS startup and shutdown, and configuring the UPS for Extended Battery Cabinets (EBCs).





7.1 Control Panel Functions

The UPS has a four-button graphical LCD with backlight. It provides useful information about the UPS itself, load status, events, measurements, and settings (see [Figure 62](#)).

Figure 62. Eaton 9355 UPS Control Panel



The following table shows the indicator status and description:

Indicator	Status	Description
 Green	On	The UPS is operating normally.
	Flashing	A new information message is active.
	Off	The UPS is turned off and will not turn on automatically.
 Yellow	On	The UPS is in Battery mode.
 Yellow	On	The UPS is in Bypass mode.
 Red	On	The UPS has an active alarm.
	Flashing	There is a new UPS alarm condition. See Chapter 9 Troubleshooting for additional information.

7.1.1 Changing the Language

Press and hold the first button on the left for approximately five seconds to select the language menu. This action is possible from any LCD menu screen.

7.1.2 Display Functions

As the default or after 15 minutes of inactivity, the LCD displays the selectable startup screen. The default is the Eaton logo and can be changed to the Mimic screen in the User Settings menu.

The backlit LCD automatically dims after a long period of inactivity. Press any button to restore the screen.

Use the two middle buttons (↑ and ↓) to scroll through the menu structure. Press the → button to enter a submenu. Press the ← button to select an option. Press the **ESC** button to cancel or return to the previous menu.

The following table shows the basic menu structure.

Table 10. Menu Map for Display Functions

Main Menu	Submenu	Display Information or Menu Function
UPS Status		UPS off / System normal / UPS supporting load / UPS on battery / UPS on bypass / Active alarm list / Battery status For parallel systems: System normal / Battery floating UPS in Parallel mode / Parallel Unit Number x / Units on CAN Bus / Units on load
Event Log		Displays up to 127 events and alarms
Measurements	Parallel System (parallel UPSs only)	Voltage [by unit] / Voltage [Parallel total] / Output Voltage: L-N / Output Voltage L-L / Output Current / Output Frequency / Output Power
	Output	L-N and L-L / Current / Frequency / Power (kW/kVA/pf)
	Battery	Voltage / Current / Runtime
	Input	L-N and L-L / Current / Frequency
	Bypass	L-N and L-L / Frequency
Control	Go to Bypass Mode	Transfers the UPS to internal Bypass mode When this command is active, the option changes to Go to Normal Mode.
	Start Battery Test	Initiates a battery test
	Display Test	Four different selectable tests for the front panel functions: the LEDs cycle through, the alarm beep sounds, the backlight turns off and on, and the pixels scroll through to test the LCD.
Settings	User Settings	See Table 11 for detail.
	Service Settings	This screen is password-protected.
Identification		UPS Type / Part Number / Serial Number / Firmware / Display / CAN Bridge
Turn UPS ON/OFF	ON and OFF Options	

7.1.3 User Settings

The following table displays the options that can be changed by the user.


	NOTE	Changes to the output voltage or frequency options should be made before turning on the UPS; otherwise, the changes do not take effect.
---	-------------	---

Table 11. User Settings

Description	Available Settings	Default Setting
Set Date and Time	Set Month Date: mm/dd/yyyy Time: 24:00	01/01/2003 00:00
Display Contrast	Adjust contrast with up/down arrow buttons	Moderate
Change Language	Select Language: <English> Elegir idioma <Español> Choisir la langue <Français>	English
Set Nominal Output Voltage	Output: [120V/208V] [127V/220V]	120V/208V
Relay Config	Relay: [Alarm 1] [X-Slot 1-1/2/3/4] or [X-Slot 2-1/2/3/4] Setup: [Battery Low] [On Battery] [On Bypass] [UPS ok] [custom] [empty]	Alarm 1: empty X-Slots (1 or 2) #1: UPS ok #2: On Bypass #3: Summary Alarm #4: On Battery
Signal Inputs	[empty] [Logic] (see Table 9)	<empty>
Serial Port Config	Port: [X-Slot-1] [X-Slot-2/Serv] Speed: [19200] [9600] [2400] [1200]	19200
Modem Config	Modem Setup	<Not Installed>
	Set Modem Call Events	Event #0 Call modem: no
	Set Modem Init String	ATZ0
	Set Modem Call Command	None
	Set Modem Communication Password	None
Battery Setup	Number of Internal Battery Strings	6
	Internal Battery Capacity [1 through 65535 watts per cell]	34W/cell
	Number of External Battery Strings (see 7.5 Configuring the UPS for EBCs)	0
	External Battery Capacity	120W/cell
	Battery Low Alarm Level [1.750 through 1.950 volts per cell]	1.880 V/cell
	Battery Charging [ABM cycling/constant]	ABM cycling
	Automatic Battery Tests [Enabled/Disabled] Enabled automatically runs the battery test once a month.	Enabled
Full Power Battery Test [Enabled/Disabled]	Enabled	

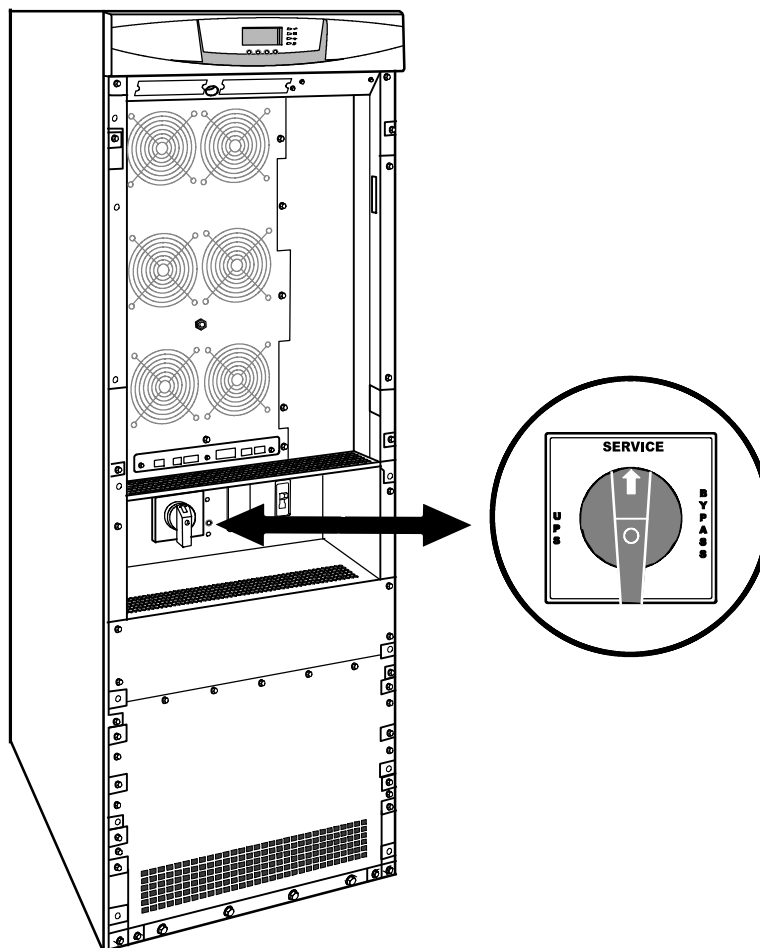
Table 11. User Settings (Continued)

Description	Available Settings	Default Setting
Start Screen	Eaton logo Mimic screen	Eaton logo
User Password	Enabled/Disabled If Enabled is selected, the password is USER.	Disabled
Audible Alarms	Normal Sound/Disabled	Normal Sound
Bypass Voltage High Limit	+1 through +20% (1% increments)	120V +10%
Bypass Voltage Low Limit	-1 through -20% (1% increments)	120V -15%
Nominal Output Frequency	50 Hz or 60 Hz	60 Hz
Synchronization	Enabled/Disabled	Enabled
Synchronization Window	± 0.5 through ± 3.0 Hz (0.1 Hz increments)	± 2.0 Hz
Unsynchronized Transfer to Bypass	Allowed/Not Allowed	Not Allowed
Output Frequency Slew Rate	0.1 through 5 hertz per second (0.1 Hz increments)	0.5 Hz/s
Usage of Bypass	Enabled/Disabled	Enabled
Transfer to Bypass When Overload	After a delay/Immediately	After a delay
Control Commands from X-Slot1	Allowed/Disabled	Allowed
Control Commands from X-Slot2/ Serv	Allowed/Disabled	Allowed
X-Slot Signal Input Activation Delay	0 through 65 seconds	5s
Input Signal Delayed Shutdown Delay	1 through 65535 seconds	120s
Site Wiring Fault Notice	Enabled/Disabled	Enabled
Reset Custom Event Settings	0 through 32	Total: 0/32
Auto Output Configuration	Enabled/Disabled	Enabled for initial startup Disabled after initial startup

7.2 Operating the UPS Maintenance Bypass Switch

The UPS maintenance bypass switch is located behind the UPS front door (see [Figure 63](#)).

The maintenance bypass switch is used to bypass the UPS during maintenance or servicing. The switch provides a wrap-around bypass without shutting down the load. The SERVICE position on the switch allows a service engineer to apply power to the UPS input and verify its operation while the load is powered through bypass.

Figure 63. Maintenance Bypass Switch

7.3 Single UPS Operation

WARNING








Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified on the product's resources page become void. See [Chapter 11 Warranty](#) for details. This service is offered as part of the sales contract for the UPS. Contact an Eaton service representative in advance (a minimum two-week notice is required) to reserve a preferred startup date.

Verify that UPS installation has been carried out correctly and the UPS ground has been connected.

7.3.1 Normal Mode Startup

To start up the UPS when the load is de-energized:

1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Verify that the rotary maintenance bypass switch is in the UPS position (see [Figure 63](#)).
3. Switch ON the utility power where the UPS is connected.
4. Switch the UPS input circuit breaker (CB1) to the ON position.

5. If the optional UPS output circuit breaker (CB3) is installed, switch the breaker to the ON position.
6. Wait for the front panel LCD to illuminate.
The  indicator flashes.
7. Switch the battery circuit breaker (CB2) to the ON position.
The  indicator stops flashing.
8. Press any button on the front panel display to activate the menu options.
9. Press the  button on the front panel display and then press the  button to select the **TURN UPS ON/OFF** menu.
10. Select the **TURN UPS ON** option. Press and hold the  button for three seconds, until the UPS stops beeping.
The UPS precharges for a few minutes and then the  indicator illuminates. The UPS is now powering the load.
If the  indicator is flashing, check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.
11. Replace the UPS front door.

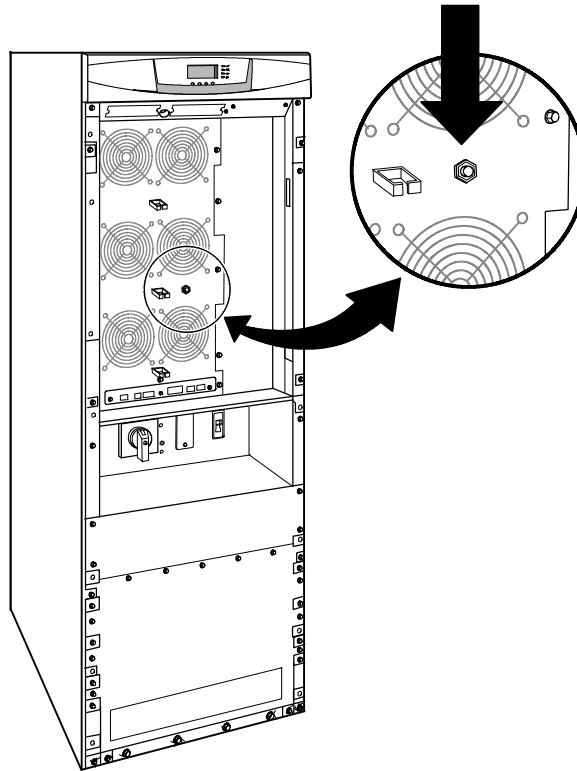
7.3.2 Starting the UPS on Battery

**NOTE**

Before using this feature, the UPS must have been powered by utility power at least once.

To start the UPS on battery:

1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Verify that the maintenance bypass switch is in the UPS position (see [Figure 63](#)).
3. Switch the UPS battery circuit breaker (CB2) to the ON position.
4. Press and hold the red start-on-battery button on the UPS, till logic power is present (~3 seconds) (see [Figure 64](#)).

Figure 64. Start-on-Battery Button

5. Wait for the front panel LCD to illuminate.
6. Press any button on the front panel display to activate the menu options.
7. Within three minutes, press the \uparrow button on the front panel display and then press the \rightarrow button to select the **TURN UPS ON/OFF** menu.
8. Select the **TURN UPS ON** option. Press and hold the \leftarrow button for three seconds, until the UPS stops beeping.

The UPS starts in Battery mode within two minutes and supplies battery power to your equipment.

9. Replace the UPS front door.

7.3.3 Internal Bypass Startup


To start the UPS when the load is powered by the internal bypass:


1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Verify that the maintenance bypass switch is in the SERVICE position (see [Figure 63](#)).
3. Switch ON the utility power where the UPS is connected.
4. Switch the UPS input circuit breaker (CB1) to the ON position.
5. If the optional UPS output circuit breaker (CB3) is installed, switch the breaker to the ON position.
6. Wait for the front panel LCD to illuminate.

The \triangle indicator flashes.



The  indicator flashes.

7. Switch the UPS battery circuit breaker (CB2) to the ON position.

The  indicator stops flashing.


The  indicator continues flashing.

The UPS starts and transfers to Bypass mode. This may take up to 1 minute.

The  indicator flashes while transferring to bypass then extinguishes with the  illuminating to indicate the UPS is operating in Bypass mode. The load is now powered by utility power.

Verify the system is On Manual/Maintenance Bypass by selecting ESC and UPS Status.

8. To switch to Normal mode from internal Bypass mode, rotate the maintenance bypass switch to the UPS position.

The  indicator illuminates to indicate the UPS is operating in UPS mode. The load is now powered by UPS.

9. Replace the UPS front door.

7.3.4 UPS Maintenance Bypass Startup

To start the UPS in maintenance bypass:

1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Verify that the maintenance bypass switch is in the BYPASS position (see [Figure 63](#)).
3. Replace the UPS front door.
4. Switch ON the utility power where the UPS is connected.
The load is now powered by utility power.
5. To transfer the load to the UPS, see paragraph [7.2 Operating the UPS Maintenance Bypass Switch](#).

7.3.5 Single UPS Bypass




7.3.5.1 Transfer the load from the UPS to maintenance bypass



1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Remove the cables and screws for any ConnectUPS Web/SNMP or PXGX card and then remove the x-slot card.




NOTE

Before proceeding ensure that there are no active alarms or notices.



3. Set the system to internal Bypass mode:
 - Using the  button on the front panel display, scroll to the **Control** menu option and press the  button.
 - Press the  button to select the **Go to Bypass Mode** option.

The  indicator illuminates and the  indicator extinguishes, indicating the UPS system is operating in Bypass mode.
4. Turn the maintenance bypass switch to the SERVICE position (see [Figure 63](#)).

The Normal LED  will be flashing.

The UPS is now bypassed, with the load powered by utility power.

5. Command the UPS off.

Press the  button on the front display, scroll to the UPS On/Off menu. Press the  button to turn the UPS off.

Rear fan is running signifying load is being supplied utility power on bypass.

6. Switch the input breaker (CB1), battery breaker (CB2), output breaker (CB3) if equipped and any external batter breakers to the OFF position.

Wait for the unit to shutdown, bleed, and go dark.

7. Turn the maintenance bypass switch to the BYPASS position.
8. Switch all of external battery breakers to the OFF position.

7.3.5.2 Transfer the load from maintenance bypass to the UPS


1. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
2. Turn the maintenance bypass switch to the SERVICE position (see [Figure 63](#)).
3. Switch the input breaker (CB1), battery breaker (CB2), output breaker (CB3) if equipped and any external batter breakers to the ON position.

Wait at least 10 seconds for logic to start up and to activate the internal static bypass. The Bypass LED will be lit and the Normal LED will be flashing.

4. Wait 1.5 to 2 minutes for the internal startup process to complete.



NOTE

Wait until the  indicator illuminates (approximately two minutes) before proceeding to [Step 6](#); otherwise, power to the load may be lost.

5. Confirm that the UPS is secured in Bypass mode.

- On the UPS front control display panel, select the Control Menu and press enter
- “Go to Bypass Mode” will be displayed: press ENTER; the UPS will now stay on internal bypass until commanded to Normal. The indication will be the Bypass LED is lit and the Normal LED will stop flashing and will be off.
- Verify that the six fans in front of the unit and the one fan on the rear are operating before continuing.





6. Turn the maintenance bypass switch to the UPS position.
7. Manually transfer the UPS to Normal, from the Controls menu.

The UPS is now powering the load.

8. Reinstall any ConnectUPS Web/SNMP or PXGX cards, secure with retained hardware and connect cables.
9. Replace the UPS front door.

7.3.6 UPS Shutdown

To shut down the UPS:

1. Press any button on the front panel display to activate the menu options.
2. Press the  button on the front panel display and then press the  button to select the **TURN UPS ON/OFF** menu.
3. Press the  button to select the **TURN UPS OFF** option.
4. Press and hold the  button for three seconds, until the UPS stops beeping.

The UPS stops supplying power to the load.

5. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
6. Switch the UPS input (CB1) and battery (CB2) circuit breakers to the OFF position.
7. If the optional UPS output (CB3) circuit breaker is installed, switch the breaker to the OFF position.
8. Replace the UPS front door.
9. Switch OFF the utility power where the UPS is connected.

7.4 Parallel UPS Operation

Initial startup must be performed by an authorized Eaton Customer Service Engineer. This section describes shutting down and restarting UPSs in a parallel system.

7.4.1 Isolate a Single UPS in a Parallel System



NOTE

Procedure is used to isolate one UPS for service, when ups modules are in parallel supporting the critical load using the Eaton Parallel Panel with Module Output Breaker and Maintenance Bypass Breakers

1. Remove the cables and screws for any ConnectUPS Web/SNMP or PXGX card and then remove the x-slot card.



NOTE

Before proceeding ensure that there are no active alarms or notices.

2. Using each module's display, observe and document the amount of current which each module is providing to the load.



NOTE

Before removing a UPS from the parallel circuit, ensure the total current load can be handled by the remaining UPSs.

3. On the parallel panel, switch the Module Output Breaker (MOB) assigned/connected to the UPS intended to be isolated for service to the OFF position.



NOTE

Confirm no unexpected alarms or changes in the mode of operation occur on the UPSs that will remain online supporting the critical load and confirm that the online modules are now supporting the total parallel system load.

4. Remove the Building Alarm 2 connector (X45) from the UPS(s) that are to remain online supporting the load.
5. On the UPS that has been isolated for service, remove the J3 terminal strip on the CAN Bridge X-Slot card and the Building Alarm 2 connector (X45).



NOTE

A "Check Parallel Board" alarm will latch on the UPS(s) that remain online.

6. On the UPS that has been isolated for service, Press the button on the front panel display and then press the button to select the **TURN UPS ON/OFF** menu.
7. Press the button to select the **TURN UPS OFF** option.
8. Switch the input breaker (CB1), battery breaker (CB2), output breaker (CB3) if equipped and any external batter breakers to the OFF position.

7.4.2 Returning a Single UPS to Normal Operation after Isolation and Service in a Parallel System

1. Switch the UPS input circuit breaker (CB1) to the ON position or begin with the UPS in logic only mode.
2. Bring the unit to the Standby State (logic power only) or AutoStandby if enabled.
3. Switch the MOB on the parallel panel for the UPS being serviced to the ON position.
4. Reconnect the J3 terminal strip on the CAN Bridge X-Slot Card and the Building Alarm 2 connector (X45) on the unit returning to service.



NOTE

The "Check Parallel Board" alarm should clear on the other UPS(s) that are in the parallel circuit.

5. Switch the UPS battery circuit breaker (CB2) to the ON position.
6. On the UPS that has been isolated for service, Press the ↑ button on the front panel display and then press the → button to select the **TURN UPS ON/OFF** menu.
7. Press the ← button to select the **TURN UPS ON** option.



NOTE

Verify that all the UPS(s) in the parallel circuit display the appropriate number of units on the CAN bus.

8. Reconnect the Building Alarm 2 connectors (X45) on the remaining UPS(s).
9. Reinstall any ConnectUPS Web/SNMP or PXGX cards, secure with retained hardware and connect cables.

7.4.3 Parallel System Shutdown


To remove power to the parallel UPS system output:

1. Press any button on the front panel display to activate the menu options.
2. Press the ↑ button on the front panel display and then press the → button to select the **TURN UPS ON/OFF** menu.
3. Press the ↓ button to select the **System Off** option.
4. Press and hold the ← button for three seconds, until the UPS stops beeping.
The UPS removes power to the parallel UPS system output.
5. Press the button until the Eaton logo or Mimic screen appears.


7.4.4 Restarting the Parallel System






To restart the parallel system:


1. Verify that the maintenance isolation breaker (MIS) if present or all of the UPS breakers on the Tie Cabinet are in the OFF position.
2. Switch ON the utility power where the UPSs are connected.
3. Remove the UPS front door (see paragraph [4.2 Removing and Replacing the Front Doors](#)).
4. Switch the UPS input circuit breaker (CB1) to the ON position.
5. If the optional UPS output circuit breaker (CB3) is installed, switch the breaker to the ON position.
6. Wait for the front panel LCD to illuminate.
The indicator flashes.
7. Switch the battery circuit breaker (CB2) to the ON position.

The  indicator stops flashing.

8. If present, switch the maintenance isolation breaker on the Tie Cabinet to the ON position; otherwise, switch all UPS breakers to the ON position.
9. Replace the UPS front door.
10. Verify that no alarms appear on the UPS front panel display.

If the  indicator is flashing, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

11. Press the  button once and then press the  button to select the **TURN UPS ON/OFF** menu.
12. Press the  button to select the **System On** option; press the  button.
13. Press and hold the  button for three seconds, until the UPS stops beeping.

The UPS goes to Bypass mode for five seconds, and then the  indicator illuminates. Each UPS should be in Normal mode.

14. Press the  button until the Eaton logo or Mimic screen appears.









7.5 Configuring the UPS for EBCs





NOTE

Each UPS in a parallel system must have its own EBC and the same number of EBCs to ensure consistent runtimes.

To ensure maximum battery runtime, configure the UPS for the correct number of EBCs:

1. Press any button on the front panel display to activate the menu options.
2. Using the  button, scroll to the Settings menu.
3. Press the  button twice to select the User Settings menu.
4. Using the  button, scroll to the Battery Setup menu and press the  button.
5. Using the  button, scroll to the Number of External Battery Strings option and press the  button.
6. Use the  or  buttons to select the number of strings according to your UPS configuration:

Battery Combinations	Number of Strings
EBC 36	2
1 EBC 72	4
2 EBC 72s	8
3 EBC 72s	12

7. Press the  button to save the setting.
8. Press the  button until the Eaton logo or Mimic screen appears.

Chapter 8 UPS Maintenance

This section explains how to:

- Care for the UPS and batteries
- Recycle used batteries or UPS
- Use the maintenance bypass switch (MBS)
- Use parallel bypass

8.1 UPS and Battery Care

For the best preventive maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.

For full battery life, keep the UPS at an ambient temperature of 77°F (25°C).



NOTE


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

8.1.1 Storing the UPS and Batteries

When storing the UPS and optional cabinets, the following requirements should be met:

- Verify that the battery circuit breaker is in the OFF position.
- Avoid temperature and humidity extremes. To maximize battery life, the recommended storage temperature is 59°F (15°C) to 77°F (25°C).
- If you store the UPS for a long period, recharge the batteries every 10 months by applying utility power. The batteries charge to 80% capacity in approximately 3 hours. However, it is recommended that the batteries charge for 48 hours after long-term storage.
- Check the battery recharge date on the shipping carton label. If the date has expired and the batteries were never recharged, do not use the UPS. Contact your service representative.

8.2 When to Replace Batteries

When the  indicator flashes and the LCD panel displays Battery Failure, the batteries may need replacing. Contact your service representative to order new batteries.

Change the batteries approximately every five years.

8.3 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.
-

 **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.

 **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.

Chapter 9 Troubleshooting

The Eaton 9355 is designed for durable, automatic operation and also alerts you whenever potential operating problems may occur. Usually the alarms shown by the control panel do not mean that the output power is affected. Instead, they are preventive alarms intended to alert the user. Use the following troubleshooting chart to determine the UPS alarm condition.

9.1 Typical Alarms and Conditions

The following table describes typical alarms and conditions; check the Event Log through the control panel for a list of active alarms. If an alarm appears with a service code, please contact the Help Desk (see [1.7 Getting Help](#)).

Alarm or Condition	Possible Cause	Action
On Battery  LED is on. 1 beep every second.	A utility failure has occurred and the UPS is in Battery mode.	The UPS is powering the equipment with battery power. Prepare your equipment for shutdown.
Battery Low  LED is on. Continuous beep for 10 seconds.	The battery is running low.	Five minutes or less of battery power remains (depending on load configuration and battery charge). Save your work and turn off your equipment. When utility power is restored, the UPS restarts automatically, provides power to the load, and charges the battery.
Battery Breaker  LED is on. 1 beep every second.	The UPS does not recognize the internal batteries.	Verify the battery circuit breaker is in the ON position. If the condition persists, contact your service representative.
Overload  LED is on. 1 beep every second.	The power requirements exceed the UPS capacity (greater than 100% of nominal; see Table 15 for specific output overload ranges).	Remove some of the equipment from the UPS. The UPS continues to operate, but may switch to Bypass mode if the load increases. The alarm resets when the condition becomes inactive.
Overtemperature  LED is on. 1 beep every second.	The UPS internal temperature is too high or the fan has failed.	Turn the maintenance bypass switch to the SERVICE position. Otherwise, shut down the UPS. Clear vents and remove any heat sources. Allow the UPS to cool. Ensure the airflow around the UPS is not restricted. If the alarm disappears, turn the maintenance bypass switch back to the UPS position. If the condition persists, contact your service representative.
Battery test failed	The batteries need service.	Contact your service representative.
The UPS does not start.	The main utility breaker is off.	Verify that the main utility breaker is on.
	The input circuit breaker is off.	Verify that the UPS input circuit breaker is on.

Alarm or Condition	Possible Cause	Action
	The remote emergency power-off (REPO) switch is active or the REPO connector is missing.	Reset the REPO switch and restart the UPS. Verify that the REPO connector is present.
Power is not available at the UPS output terminals.	The UPS is in Standby mode.	Supply power to the connected equipment: Press any button on the front panel display to activate the menu options. Press the \uparrow button on the front panel display and then press the \rightarrow button to select the TURN UPS ON/OFF menu. Press the \downarrow button to select the TURN UPS ON option; press the \leftarrow button. Press and hold the \leftarrow button for three seconds, until the UPS stops beeping.
The UPS does not provide the expected backup time.	The batteries need charging or service.	Apply utility power for 48 hours to charge the batteries. If the condition persists, contact your service representative.
	The battery circuit breakers are in the OFF position.	Switch all battery circuit breakers to the ON position.
Check Parallel Board	The UPS is not recognizing another parallel unit.	From the UPS Status menu, select the Units on CAN Bus option and verify that all UPSs appear in the list. If any UPS is missing, verify the Powerware Hot Sync CAN Bridge Card connections and recheck the status from the UPS front panel. If all UPSs appear in the list, check the pull-chain wiring (see paragraph 6.4 Parallel Communication). Set the system to internal Bypass mode (see paragraph 7.3.3 Internal Bypass Startup). If the condition persists, contact your service representative.
Abnormal output voltage at startup	The UPS breaker on the Tie Cabinet was not switched to the ON position properly.	Shut down the UPS where the alarm is indicated. Switch the UPS breaker on the Tie Cabinet to the ON position. Start up the UPS. Select the System On option through the front panel of the UPS that was turned off.
Selective Trip	The Powerware Hot Sync CAN Bridge Card is not wired correctly.	Verify the CAN wiring (see paragraph 6.4 Parallel Communication). Verify the pull-chain wiring (see paragraph 6.4 Parallel Communication). If the condition persists, contact your service representative.

9.2 Silencing the Alarm

Before silencing an alarm, check the alarm condition and perform the applicable action to resolve the condition.

Press any button on the front panel display to silence the alarm. If the alarm status changes, the alarm beeps again, overriding the previous alarm silencing.



NOTE

For any questions or issues, please contact the Help Desk (see [1.7 Getting Help](#)).

Chapter 10 Product Specifications

This section provides the following specifications:

- Model list
- Dimensions and weights
- Environmental and safety specifications
- Technical specifications
- Model specifications
- Battery specifications
- Battery runtimes

Table 12. Model List

UPS	Description	Power Rating
PW9355-20	UPS with internal batteries	20 kVA, 18 kW
PW9355-30	UPS with internal batteries	30 kVA, 27 kW
Extended Battery Cabinet (EBC)	Description	
EBC 36	EBC with 2 strings	
EBC 72	EBC with 4 strings	

Table 13. Dimensions and Weights

Eaton 9355 Cabinet	Dimensions (H x W x D) Including Conduit Landing Box	Weight
UPS	66.3" x 19.4" x 34.1" (168 x 49 x 87 cm)	1160 lb (526 kg)
EBC 36	66.3" x 19.4" x 34.1" (168 x 49 x 76 cm)	1160 lb (526 kg)
EBC 72	66.3" x 19.4" x 34.1" (168 x 49 x 76 cm)	2060 lb (934 kg)
Options Cabinet with Single (Input or Output) Transformer	66.3" x 19.4" x 34.1" (168 x 49 x 87 cm)	535 lb (243 kg)
Options Cabinet with Dual (Input and Output) Transformer	66.3" x 19.4" x 34.1" (168 x 49 x 87 cm)	792 lb (360 kg)
Options Cabinet with Maintenance Bypass Switch (MBS) Only	66.3" x 19.4" x 34.1" (168 x 49 x 87 cm)	205 lb (93 kg)

Table 14. Environmental and Safety Specifications

Operating Temperature	50°F to 104°F (10°C to 40°C) Optimal battery performance: 77°F (25°C)
Transit Temperature	-13°F to 131°F (-25°C to 55°C)
Storage Temperature	32°F to 77°F (0°C to 25°C) Recommended battery storage: 59°F to 77°F (15°C to 25°C)
Ventilation	Front air intake, forced air, six fans, positive pressurization, temperature UPS-monitored

Table 14. Environmental and Safety Specifications (Continued)

Altitude	9,843 ft (3,000m) operating without derating 32,810 ft (10,000m) during transportation
Relative Humidity	0–95% noncondensing
Audible Noise	< 58 dBA at 1 meter depending on load
Surge Suppression	ANSI C62.41 Category B3
Safety Conformance	IEC 62040-1-1, IEC 60950, EN 62040-1-1, UL 1778, NOM-0190SCP8-1993
Agency Markings	UL, cUL, NOM-NYCE
EMC (Class A)	EN 50091-2 Class A

Table 15. Technical Specifications

Technology	Online, double-conversion topology with static bypass switch and 3-position maintenance bypass switch. Frequency independent operation.
Input Voltage Range	75/130–144/249 Vac per phase
Input Power Factor	>0.99
Input Rated Voltage	120/208 or 127/220 Vac three-phase
Isolation Transformer Input Voltage Range	208V, 480V, or 600V \pm 20% 60 Hz only
Input Frequency Range	45–65 Hz
Input Rated Frequency	50/60-Hz selectable, auto configuring
Output Voltage Regulation	\pm 1% static, Phase to Neutral \pm 2% static, Phase to Phase \pm 5% dynamic at 100% resistive load change Response time <1 ms
Output Voltage Distortion	<2% THD linear load <5% THD non linear load
Output Frequency	50/60-Hz selectable or auto configuring
Output Frequency Regulation	Synchronization to line
Output Overload	101–110% for 10 minutes 111–125% for 60 seconds 126–149% for 5 seconds >150% for 300 milliseconds

Table 16. Model Specifications

20 kVA Model							
Output Voltage (Line–Line)	208	208	208	220	480 (with output isolation transform- er)	480 (with output isolation transform- er)	480 (with output isolation transform- er)
Output Voltage (Line–Neutral)	120	120	120	127	277	277	277
Input Voltage	208	480 (with input isolation transformer)	600 (with input isolation transformer)	220	208	480 (with input isolation transform- er)	600 (with input isolation transform- er)
Input Current	70A	30A	24A	70A	70A	30A	24A
Output Current	55A	55A	55A	52A	55A	25A	25A
Output kVA	20	20	20	20	20	20	20
Output kW	18	18	18	18	18	18	18
Efficiency (Minimum)	89%	83%	83%	89%	85%	81%	81%
Heat Rejection [BTU/hr (kg-cal/hr)]	6762 (1704)	10450 (2633)	10450 (2633)	6762 (1704)	11035 (2783)	14723 (3713)	14723 (3713)
30 kVA Model							
Output Voltage (Line–Line)	208	208	208	220	480 (with output isolation transform- er)	480 (with output isolation transform- er)	480 (with output isolation transform- er)
Output Voltage (Line–Neutral)	120	120	120	127	277	277	277
Input Voltage	208	480 (with input isolation transformer)	600 (with input isolation transformer)	220	208	480 (with input isolation transform- er)	600 (with input isolation transform- er)
Input Current	100A	45A	35A	100A	100A	48A	32A
Output Current	83A	83A	83A	79A	83A	37A	37A
Output kVA	30	30	30	30	30	30	30
Output kW	27	27	27	27	27	27	27

Table 16. Model Specifications (Continued)

20 kVA Model							
Efficiency (Minimum)	90%	85%	85%	90%	87%	84%	84%
Heat Rejection [BTU/hr (kg-cal/hr)]	9220 (2323)	13831 (3485)	13831 (3485)	9220 (2323)	13493 (3402)	18104 (4565)	18104 (4565)

Table 17. Battery Specifications

UPS Internal Battery Type	9 Ah sealed, valve-regulated lead acid (VRLA), maintenance-free, minimum 3-year float service life at 77°F (25°C), voltage 216 Vdc (108 cells per string)
EBC Battery Type	Sealed, valve-regulated lead acid (VRLA), maintenance-free, minimum 3-year float service life at 77°F (25°C), 120W/cell
Number of Strings	UPS: 6 strings EBC 36: 2 strings; EBC 72: 4 strings
Battery Replacement	Must be replaced by a qualified service technician
Charger	Service configurable 0.5 –34A per string, with overall maximum of 34A (limited by input current). Default: 3.4A per string
Charging	Internal battery: approximately 3 hours to 80% usable capacity at nominal line voltage after full load discharge External battery: no more than 10x discharge time to 90% usable capacity at nominal line voltage after full load discharge
Start-on-Battery	Allows start of UPS without utility input
Performance	ABM technology increases battery service life, optimizes recharge time, and provides a warning before the end of useful battery life
Protection	EBC output protected by 200A circuit breaker

Table 18. Battery Runtimes (in Minutes) at Full Load, 0.9 pF

Load	UPS Internal Batteries	+(1) EBC 36	+(2) EBC 36	+(3) EBC 36
30 kVA/27 kW	10	31	56	75
20 kVA/18 kW	18	56	82	97
Load	UPS Internal Batteries	+(1) EBC 72	+(2) EBC 72	+(3) EBC 72
30 kVA/27 kW	10	56	89	110
20 kVA/18 kW	18	83	114	162

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Chapter 11 Warranty

For warranty information, please refer to the Resources link on our website, www.eaton.com/9355.

EQUIPMENT REGISTRATION

Please visit www.eaton.com/pg/register to register your new Eaton UPS / Eaton UPS Accessory.

Model Number:

Serial Number:



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