Eaton® BladeUPS® Maintenance Bypass Cabinet (MBC)

Installation and Operation Manual

For use with Eaton BladeUPS 12 kVA to 60 kVA (N+1) systems
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.

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.

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Special Symbols

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

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

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

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

This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.
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Chapter 1  Introduction

The Eaton® BladeUPS® Maintenance Bypass Cabinet (MBC) is designed for use with the Eaton BladeUPS family of three-phase uninterruptible power systems (UPSs). This configuration supports BladeUPS modules operating in a parallel configuration.

The standard MBC combines a maintenance bypass, a 480V/280V step-down transformer, and power distribution in a single cabinet solution. Custom configurations of the MBC with transformers for different voltages or without a transformer are available upon request. The MBC functionality completely isolates the UPS from utility power for servicing. Utility power is then provided to the load through the MBC instead of the UPS.

The MBC is housed in a single, free-standing cabinet, with safety shields behind the doors for hazardous voltage protection. The cabinet is installed in a standalone configuration. The MBC can be configured in 13 different distribution configurations (see the Appendix A, “Installation Reference Appendices”, section A.4 “Maintenance Bypass Cabinet Distribution Configuration Options”).

Figure 1-1 shows a typical Eaton BladeUPS MBC installation.

Figure 1-1. Eaton Maintenance Bypass Cabinet Installed with a BladeUPS 12 kVA Cabinet
1.1 Maintenance Bypass Cabinet Features

The MBC has many standard features that provide cost-effective and consistently reliable power protection.

1.1.1 Full System Bypass

- While the BladeUPS modules have an internal bypass, the MBC provides full system bypass to allow for testing and maintenance.

- With the MBC, service, testing, and maintenance can be performed on up to a full rack of BladeUPS modules without interrupting power to the critical load.

- The Maintenance Bypass Breaker (MBB) and UPS Output Breaker (UOB) enable power to the critical load and completely bypass the BladeUPS. The BladeUPS can then be serviced or replaced safely, without interrupting power to critical systems.

- The Rectifier Input Breaker (RIB) provides a single wiring point input to the BladeUPS, and a convenient method for removing power from the UPS when using the maintenance bypass to supply the load.

- The System Input Breaker (SIB) is the main system breaker. Opening the breaker removes power from the transformer and isolates the MBC from the 480V input power source.

1.1.2 Power Distribution

- Power is distributed for up to a full rack of BladeUPS modules serving IT equipment.

- Power distribution is provided to servers or racks through a variety of optional distribution choices and a number of different output configurations. For example, the standard configuration option includes two 225A 42-pole panel boards with up to 42 single pole circuit breakers, providing 84 pole positions with the proper kVA rating. See the Appendix drawings A-3 through A-15 for the various output configurations.

- The MBC also provides streamlined top or bottom power cabling through cabling access landing plates.

1.1.3 Transformation

- Voltage transformation allows the MBC to change available site utility voltage to a level that is acceptable for the BladeUPS system.

- The 480 Vac, 3-wire utility input is stepped down through an isolation transformer to 208/120 Vac to provide the appropriate 208V, 4-wire (3P + N) for the BladeUPS modules.

- The transformer also provides electrical isolation for the BladeUPS system and the connected loads.

1.1.4 Safety Features

- There is a mechanical interlock bar between the MBB and UOB to prevent them from being opened at the same time, thereby dropping the load accidently.

- A UPS bypass indicator light on the MBC signals that the BladeUPS system's bypass mode is activated or deactivated.

- The front door panels provide interior safety shields to serve industrial or computer room deployments.

- Control signal input wiring between the MBC and the BladeUPS allows the MBC to initiate a forced bypass of the UPS under specific conditions as a safety precaution.

- A contact is provided for an optional customer-provided remote emergency power-off (REPO) pushbutton that can be installed to provide shunt tripping. Once wired to the MBC and UPS, the MBB, UOB, RIB, and SIB breakers on the MBC can be shunt tripped all at the same time.
1.2 Maintenance Bypass Cabinet Standard Components

The standard MBC is configured with the following primary components:

- Three Cutler-Hammer® breakers rated for 225A (MBB, RIB, and UOB)
- One Cutler-Hammer breaker rated for 125A (SIB)
- Up to two 225A, 42-pole power distribution panels
- One 480V/208V transformer

The descriptions in this section provide a brief overview of the MBC standard components.

![BladeUPS Parallel Rack](image)

Figure 1-2. BladeUPS and MBC block diagram

1.2.1 Maintenance Bypass Breaker and UPS Output Breaker

The MBB, in combination with the UOB and RIB, can be used to completely isolate the UPS during service. The UPS can be serviced or replaced without interrupting power to critical systems. The MBB, RIB, and UOB are located on the front panel of the MBC.

1.2.2 Rectifier Input Breaker

The RIB is available to provide a single point of rectifier input power control to the UPS, and to easily remove input power from the UPS for servicing. The RIB is located on the front panel of the MBC.

1.2.3 System Input Breaker

The SIB is available to provide a single point of 480V input power control to the MBC, and to easily remove power from the MBC transformer. To completely remove power from the MBC, the customer’s feed breaker to the MBC must be turned off. The SIB is located on the rear of the MBC.

1.2.4 Output Distribution Panel or Panels

An output distribution panel distributes the output power from the UPS to the critical load. The MBC can contain up to two 42-circuit breaker panel boards (accepts Cutler-Hammer Bolt-on Type BAB or QBHW circuit breakers), that can be assigned with flexibility to meet facility needs. Distribution panels are located on the front of the MBC. (For configuration option diagrams, see Appendix A, “Installation Reference Appendices”, section A.4.)

1.2.5 Input Isolation Transformer

A 75 kVA 480-208/120V Delta/Wye isolation transformer converts 480 Vac utility input to 208V UPS input for applications that require 208V, and for use with the distribution panels supplying 208/120 Vac to the critical load.
1.2.6 Remote Emergency Power-off Contact

A REPO contact is provided to support optional shunt tripping in situations where you must instantaneously control the output to the critical load. A customer-provided, two-contact REPO shunt trip button (rated for at least 120V) is required to operate the shunt trip, with one normally open (NO) contact and one NO or normally closed (NC) contact.

NOTE The NO contact on the REPO shunt trip button should be wired to the MBC and the other contact should be wired to the UPS. Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for more information.

1.3 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

DANGER

This UPS system 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

- Installation and maintenance should be performed only by qualified personnel.
- The UPS contains its own energy source (batteries). The output terminals may carry live voltage even when the UPS is disconnected from an AC source.
- To reduce the risk of fire or electric shock, install the UPS system 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% max). The system is not intended for outdoor use.
- Ensure all power is disconnected before performing installation or service.
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.
- Replace batteries with the same number and type of batteries as originally installed in the UPS.
- Proper disposal of batteries is required. Refer to local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Keep the UPS and MBC doors on and closed to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.
- Do not operate the UPS system close to gas or electric heat sources.
- The operating environment should be maintained within the parameters stated in this manual.
- Keep surroundings uncluttered, clean, and free from excess moisture.
- Do not use this equipment for other than intended use.
- Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.

CAUTION

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

1.4 Conventions Used in This Manual

This manual uses these type conventions:

- **Bold type** highlights important concepts in discussions, key terms in procedures, Web sites, and menu options.
- **Italic type** highlights notes and new terms where they are defined.
- **Screen type** represents information that appears on the screen or LCD.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
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<tr>
<td><img src="image" alt="NOTE" /></td>
<td>Information notes call attention to important features or instructions.</td>
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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, including the UPS cabinet, the MBC, and options or accessories that have been installed.

The term standalone refers to cabinets that are not physically attached to the UPS, and are wired with external customer-supplied wiring.
1.5 For More Information

Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for the following additional information:

- UPS cabinet, optional components, and accessory installation instructions, including site preparation, planning for installation, and wiring and safety information. Detailed illustrations of cabinets and optional accessories with dimensional and connection point drawings are provided.
- UPS operation, including UPS cabinet controls, functions of the UPS, standard features and optional accessories, procedures for starting and stopping the UPS, and information about maintenance and responding to system events.
- Communication capabilities of the UPS system.

Visit www.eaton.com/powerquality or contact your Eaton service representative for information on how to obtain copies of this manual.

1.6 Getting Help

If help is needed with any of the following:

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

Please call the Help Desk at:

United States: 1-800-843-9433 or 1-919-870-3028
Canada: 1-800-461-9166 ext 260
All other countries: Call your local service representative
Chapter 2  Installation Plan and Preparation

Use the following basic sequence of steps to install the Eaton BladeUPS Maintenance Bypass Cabinet (MBC).

1. Create an installation plan for the MBC (Chapter 2).
2. Prepare your site for the MBC (Chapter 2).
3. Inspect, unpack, and unload the MBC (Chapter 2 and 3).
4. Wire the system (Chapter 3).
5. Complete the installation checklist (Appendix).
6. Have authorized service personnel perform preliminary operational checks and startup.

2.1 Creating an Installation Plan
Before installing the MBC, read and understand how this manual applies to the system being installed. Use the procedures and illustrations in the following chapters to create a logical plan for installing the system.

2.2 Preparing the Site
For the MBC to operate at peak efficiency, the installation site should meet the environmental parameters outlined in this manual. If the MBC is to be operated at an altitude higher than 1500m (5000 ft), contact your Eaton service representative for important information about high altitude operation.

The operating environment must meet the weight, clearance, and environmental requirements specified in size requirements specified in Appendix A.3 “Specifications Diagram”.

**IMPORTANT**
The MBC uses natural convection cooling to regulate internal component temperature. Air inlets are at the bottom of the cabinet and outlets are at the top, both front and back. You must allow clearance in front of and behind each MBC, and the bottom of the cabinet must be free of any obstructions for proper air circulation.

2.2.1 Environmental Considerations
The life of the MBC is adversely affected if the installation does not meet the following guidelines:

1. The system must be installed on a level floor suitable for computer or electronic equipment.
2. The system must be installed in a temperature and humidity controlled indoor area free of conductive contaminants.

Failure to follow guidelines may void your warranty.

2.3 Preparing for Wiring the Maintenance Bypass Cabinet

**IMPORTANT**
One feed breaker is required for the system.

The input power wiring connections for this equipment are rated at 90° C. If the ambient temperature is greater than 40° C, higher temperature wire and/or larger size wire may be necessary.

The MBC control wiring requirements are specified in the Appendix A.2 “Installation and Wiring Diagram” and should be connected at the MBC interface terminal block located inside the MBC.
2.4 Inspecting and Unpacking the Maintenance Bypass Cabinet

The cabinet is shipped bolted to a wooden pallet and protected with outer protective packaging material (see Figure 2-1).

![Figure 2-1. Eaton BladeUPS Maintenance Bypass Cabinet with Shipping Pallet](image)

**WARNING**

The MBC is heavy (544.31 kg/1200 lb). If unpacking instructions are not closely followed, the cabinet may tip and cause serious injury.
CAUTION

- Do not install a damaged cabinet. Report any damage to the carrier and contact your Eaton service representative immediately.
- Do not tilt the MBC more than 10° from vertical or the cabinet may tip over.

NOTE

Verify that the forklift is rated to handle the weight of the cabinet (544.31 kg/1200 lb).

To unpack the cabinet:

1. Carefully inspect the outer packaging for evidence of damage during transit.
2. Use a forklift to move the packaged cabinet to the installation site, or as close as possible, before unpacking. Insert the forklift forks between the skids on the bottom of the unit.
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 covering from the cabinet.
5. Remove the packing material, and discard or recycle in a responsible manner.
6. Inspect the contents for any evidence of physical damage, and compare each item with the Bill of Lading. If damage has occurred or shortages are evident, contact your Eaton service representative immediately to determine the extent of the damage and its impact upon further installation.

NOTE

While waiting for installation, protect the unpacked cabinet from moisture, dust, and other harmful contaminants. Failure to store and protect the MBC properly may void your warranty.
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Chapter 3  Installation

This section describes the Eaton BladeUPS 12 kVA Maintenance Bypass Cabinet (MBC) installation, including:
- Unloading and installing the MBC cabinet
- Connecting power wiring
- Establishing communication and signaling
- Completing the installation checklist

3.1 Unloading and Installing the Cabinet

The MBC is installed as a standalone system. The term standalone refers to cabinets that are not physically attached to the UPS, and are wired with external customer-supplied wiring.

The MBC must first be unloaded from the pallet with a forklift. Then, the cabinet should be moved to the installation site and secured in a stabilized position.

3.1.1 Preliminary Installation Information

**DANGER**

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

**WARNING**

All wiring should be performed by a licensed electrician. Installation should be performed only by qualified personnel.

**WARNING**

The MBC and BladeUPS rack should be completely isolated from all power sources prior to and during installation of wiring and communication cards.

Refer to the following while installing the MBC:

- See the Appendix for installation drawings and additional installation notes.
- Do not tilt the cabinets more than 10° from vertical or the cabinet may tip over.
- 1066.8 mm (42 in.) space is required behind the cabinet.
- Remove the conduit landing plates to add conduit landing holes, or remove knockouts, as required. Plate material is 16 gauge steel (1.5 mm/0.060 in. thick).
- The cabinets must be installed on a level floor suitable for computer or electronic equipment.
- See Appendix A.3 “Specifications Diagram” for equipment weight and point loading.
- Details about control wiring are provided in each procedure. See Appendix A.2 “Installation and Wiring Diagram” to identify the control wiring terminations and top and bottom conduit landing areas.
• Control wiring is 16-22GA 75C copper wire only. Tighten to 7 lb-in, and run intercabinet wiring through conduit.

• After signal input wiring is connected between the MBC and the BladeUPS, the UPS firmware setting must be set to FORCE BYPASS to allow the system to force a maintenance bypass mode.

NOTE Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for UPS cabinet installation, wiring information, conduit and terminal locations, and firmware settings.

3.1.2 Unloading the Cabinet

The MBC is bolted to a wooden pallet supported by wood skids for shipping.

This procedure requires the following tools:

• 3/8-inch nut driver
• ratchet
• 1/2-inch socket
• 6-inch extension (or longer)
• forklift

WARNING

• The MBC is heavy (544.31 kg/1200 lb). If unpacking instructions are not closely followed, the cabinet may tip and cause serious injury.
• Do not install a damaged cabinet. Report any damage to the carrier and contact your Eaton service representative immediately.
• Do not tilt the MBC more than 10° from vertical or the cabinet may tip over.

NOTE Verify that the forklift is rated to handle the weight of the cabinet.

To remove the cabinet from the pallet:

1. If not already moved, move the cabinet to the installation site, or as close as possible, before unloading from the pallet.
   • Insert the forklift forks between the skids on the bottom of the pallet.
   • Move the pallet and cabinet close to the installation site.
2. Locate the vent covers at the bottom of the front and back door (see Figure 3-1). Using a nut driver, remove the two 1/4–20 x 1 1/2-inch hex head screws that secure each vent cover.

3. Remove and retain the vent covers and screws for reinstallation.

Figure 3-1. Removing the Vent Cover on the Front Door
4. Inside the vent cover openings, locate the four 3/8-inch bolts (two in front and two in back) that secure the MBC to the pallet (see Figure 3-2). Using the socket, extension, and ratchet, remove the bolts. Discard the bolts.

![Figure 3-2. Removing the Pallet Bolts](image)

**WARNING**

Do not stand directly in front of the pallet while unloading the cabinet. If unloading instructions are not closely followed, the cabinet may cause serious injury.

3.1.3 Installing the Cabinet

To install the cabinet:

1. Prepare the installation site for securing the cabinet to the floor. See Appendix Figure A-1 for the location of the four anchor bolt locations.

2. Place the forks of the forklift in the specified location to lift the cabinet from the pallet (see Figure 3-3).
3. Set the cabinet down in the installation site.
4. Move the forklift away from the cabinet.
5. Align the cabinet to the floor anchors and secure the MBC in a stabilized position.
6. Reinstall the vent covers at the bottom of the front and back door (see Figure 3-1). Using a nut driver, secure each vent cover with two 1/4–20 x 1 1/2-inch hex head screws.
7. Lift up the front door key latch. Turn it to the right and pull open the front door.
8. Use a screwdriver to pry the hinge pins from each of the three front door hinges. Lift the front door off of the hinges and set the door aside. Retain the front door and the hinge pins for reinstallation.
9. Locate the retaining screws on both the top and bottom inside the distribution panel doors. Remove the four retaining screws that secure each door panel, then remove the door panels. Retain the door panels and retaining screws for reinstallation.
10. Discard or recycle the pallet and shipping material in a responsible manner.

3.2 Connecting Power Wiring

**NOTE** Remove the MBC conduit landing plate (either top or bottom) to drill or punch conduit holes. See Appendix A.2 “Installation and Wiring Diagram” in this manual.

**NOTE** Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for UPS cabinet wiring information, conduit locations, and terminal locations.

To connect the MBC power wiring:
1. Verify that the UPS system is turned off and all power sources are removed. Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for shutdown instructions.

**NOTE** Before connecting wiring to the UPS, ensure the UPS is grounded.

**NOTE** Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for UPS cabinet terminal locations.

2. Connect the ground wire to the cabinet ground lug (see Figure 3-4)

![Diagram of UPS cabinet](image)

**Figure 3-4. MBC with covers removed**
3. Connect phase A, B, C, and N output power wiring from the UOB in the MBC (see Figure 3-4) to the output terminals in the UPS cabinet.

**NOTE** The input phase rotation must be A B C clockwise.

4. Connect phase A, B, C, and N input wiring from the RIB in the MBC (see Figure 3-4) to the input terminals in the UPS cabinet.

5. Install customer-supplied branch circuit breakers (Cutler-Hammer Bolt-on Type BAB or QBHW) into the distribution panel board.

6. Wire branch circuits according to the branch circuit breaker manufacturer’s ratings and instructions, and national and local electrical codes (MBC output is prewired to the panel board).

7. Connect phase A, B, C, and N power wiring from the MBC output breakers or terminals and neutral terminals to the critical load.

8. Connect phase A, B, and C input wiring from the facility power to the SIB in the MBC.

9. Verify system grounding is according to local and/or national electrical wiring codes.

10. If wiring interface connections, proceed to paragraph 3.3; otherwise, continue to the next step.

11. When all wiring is complete, reinstall the safety shields.

12. Close the inside distribution panel doors and secure with the retained screws.

13. Reinstall the front door panels and secure with the retained screws.

### 3.3 BladeUPS and MBC Communication and Signaling

In a parallel BladeUPS system, only one UPS is required to be connected by signal input wiring to the MBC. This UPS transmits bypass instructions to the other UPSs through the pull chain and Powerware Hot Sync CAN Bridge Card communication interface.

**NOTE** The parallel BladeUPS system must be fully interconnected using the pull chain and Powerware Hot Sync CAN Bridge Card communication. Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for more information.

Overview of communication set up between the MBC and the UPS:

- Connect the communication wiring between the MBC and the BladeUPS
- Install the Industrial Relay Card (IRC) in the BladeUPS X-Slot communication bay
- Set the go to bypass wiring between the MBC and the BladeUPS chassis
- Set the IRC for bypass signal output in BladeUPS firmware
- Enable the Force Bypass mode feature in BladeUPS firmware

The IRC must be installed in the UPS and wired to the MBC. The communication signal wiring between the MBC and the BladeUPS IRC allows the UPS status signal inputs to be transmitted to the MBC. The IRC has isolated dry contact (Form-C) relay outputs for UPS status, such as Utility Failure, Low Battery, UPS Alarm/OK, or On Bypass.

After the communication signal wiring is connected directly from the MBC to the BladeUPS chassis, the UPS setting for bypass signal output can be set up using the UPS LCD menu display. When the setting is enabled, the IRC sends the signal to the “UPS on Bypass” LED indicator on the MBC front panel to turn On (green) or Off (not illuminated).
The firmware on the UPS also provides a user setting for the Force Bypass mode feature. This setting is enabled using the LCD menu display on the front panel of the BladeUPS. With this setup, if the UPS is accidently left in service before closing the MBB, the signal wiring between the UPS and the MBC senses this error and immediately forces the UPS to maintenance bypass mode.

---

**CAUTION**

If the IRC is removed from the UPS during operation, there is the possibly that a lethal voltage will be on the exposed connectors on the IRC card. Only properly trained and authorized personnel should perform service on energized IRC card.

---

### 3.3.1 Preliminary Communication Wiring Information

**WARNING**

All wiring should be performed by a licensed electrician. Installation should be performed only by qualified personnel.

---

**IMPORTANT**

In a parallel BladeUPS system that uses the pull chain and Powerware Hot Sync CAN Bridge Card communication, the signal wiring from the MBC is connected to only one UPS. This UPS will transmit bypass instructions to the other UPSs using the pull chain and Powerware Hot Sync CAN Bridge Card communication interface.

---

**CAUTION**

In a UPS connected to utility power, X-Slot cards remain powered on even if the input breaker is off.

---

**NOTE**

Remove the MBC top or bottom conduit landing plate, remove knockouts, or identify the control wiring terminations, see Appendix A.2 “Installation and Wiring Diagram” in this manual.

**NOTE**

Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for guidance on installing the included IRC into the BladeUPS X-Slot Communication Bay.

---

### 3.3.2 Connecting Communication Wiring and Signaling

To set up UPS and MBC communication:

1. Install the IRC (shipped with UPS) in X-Slot Communication Bay 1 (see Figure 3-5).
2. Connect the cables to the appropriate location.

3. Route and tie the cable(s) out of the way.

---

**CAUTION**

In a UPS connected to utility power, X-Slot cards remain powered on even if the input breaker is off.

4. Verify that the UPS system is turned off and all power sources are removed. Refer to the *Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems)* for use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for shutdown instructions.

5. Refer to the Communication chapter in the *Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems)* for use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for detailed instructions on connecting communication wiring, and for guidance on installing the included IRC into the BladeUPS X-Slot Communications Bay.

6. Refer to the Industrial Relay Card User’s Guide and wiring diagram for instruction on setting the card for bypass signal output.

   **NOTE** Note on the diagram that the connections are to J2-5 and J2-6.

7. See Appendix A.2 “Installation and Wiring Diagram” in this manual for wiring termination points.

3.3.3 (Optional) Connecting the Control Wiring for Shunt Trip

---

**IMPORTANT**

When installing Remote Emergency Power-Off (REPO) control wiring for shunt trip to the MBC interface terminals, conduit must be installed between the UPS cabinet or device and the MBC. Install the control wiring in separate conduit from the power wiring.
**IMPORTANT**

Two separate contacts are required for the shunt trip REPO switch. One contact should be normally open (NO) and rated up to 120 Vac (120 Vac is supplied by the MBC). This contact connects to the MBC. The other contact can be either NO or normally closed (NC). This contact connects directly to the REPO connections on the BladeUPS.

1. Verify that the UPS system is turned off and all power sources are removed. Refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for shutdown instructions.
2. If not already open, unfasten the front door latch and swing the doors open.
3. If not already removed, remove the front door panels. Remove the retaining screws located inside each door at the top and bottom hinge pivot points, then lift the door off. Save the retaining screws for reinstallation of the doors.
4. If not already removed, remove the screws securing the top internal safety shield, and remove the shield to gain access to the terminals.
5. To install the shunt trip, remove the MBC top or bottom conduit landing plate to drill or punch conduit holes, remove knockouts (see Appendix A.2 “Installation and Wiring Diagram” in this manual).
6. Reinstall the conduit landing plate and install the conduit.
7. To locate appropriate terminals, and for wiring and termination requirements, see Appendix A.2 “Installation and Wiring Diagram” in this manual, and refer to the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for UPS cabinet terminal locations.
8. Route and connect the wiring.
9. When all wiring is complete, reinstall the safety shields.
10. Close the inside distribution panel doors and secure with the retained screws.
11. Reinstall the front door panels and secure with the retained screws.

### 3.3.4 Setting the Force Bypass Firmware Option

When the signal input wiring between the UPS and MBC is connected, the UPS firmware must be set to allow Force Bypass mode. If the MBB is closed without first manually placing the UPS in bypass mode, this setting causes the signal input to sense this action and immediately force the UPS to maintenance bypass mode.

**IMPORTANT**

This is intended as a precautionary setting and should not be used instead of the instructions to transfer the UPS into maintenance bypass mode.

**NOTE**

For parallel BladeUPS configurations, this setup is only required on the BladeUPS that is connected to the MBC with the signal input wiring. If a single BladeUPS is connected to the MBC, only set up the UPS that connected to the MBC main power inputs and outputs.
1. Ensure the UPS indicator is green, signifying that the UPS is on and operating normally.

2. From the Start screen, press any button to activate the menu options (see Figure 3-6).
   - 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 button to cancel or return to the previous menu.

3. Go to the Settings menu.

4. Select User Settings.

5. Select Signal Inputs.

6. Select signal input 1 or 2.
   - Select 1 or 2 based on which terminal was used to connect the signal input wiring.

7. Select Force Bypass.

8. Press the button to return to the Start screen.

3.4 Starting Up the MBC

Although this unit can be started by any knowledgeable contractor or end user, Eaton offers optional startup and maintenance contracts using factory authorized service personnel.

3.5 Completing the Installation Checklist

The final step in installing the MBC is completing the following installation checklist (see the Appendix A.1, “Installation Checklist”). This checklist ensures that you have completely installed all hardware, cables, and other equipment. Completing all items listed on the checklist will ensure a smooth installation. Make a copy of the installation checklist before filling it out, and retain the original.

If an optional startup service is purchased and the installation is complete, a service representative will be able to verify the UPS system operation and commission it to support the critical load. The service representative cannot perform any installation tasks other than verifying software and operating setup parameters. Service personnel may request a copy of the completed installation checklist to verify that all applicable equipment installations have been completed.

NOTE The installation checklist MUST be completed prior to starting the UPS system for the first time.
Chapter 4  Operation Modes

4.1  Understanding UPS Mode

The BladeUPS supplies conditioned and protected power to the critical load. The BladeUPS is a 208V UPS, but the data center power source may be 480V. An isolation transformer in the Maintenance Bypass Cabinet (MBC) converts the 480V input power to 208V and routes the power to the BladeUPS to be used in conjunction with data center equipment.

While in UPS mode, the Maintenance Bypass Breaker (MBB) is open and both the Rectifier Input Breaker (RIB) and the UPS Output Breaker (UOB) are closed. If the configuration includes power distribution panelboards, the BladeUPS provides power to the critical loads through the MBC UPS Output Breaker (UOB) to the power distribution panelboards. The branch breakers providing power to the critical load are also closed.

Figure 4-1 shows the path of electrical power through an example MBC when operating in UPS mode.

![Diagram of power flow through an MBC in UPS mode](image-url)
4.2 Understanding Maintenance Bypass Mode

An MBB is used to safely supply utility power to the critical load during periods of UPS maintenance or repairs. The bypass source supplies the commercial AC power to the load directly.

When the MBB is first closed, the load is wrapped around the UPS while power is still supplied to the load by the UPS through the UOB. When the MBB closes, the UPS is signaled to go to maintenance bypass mode. The UPS is still powering the load, but it is in maintenance bypass mode. Then, the UOB and RIB are opened, isolating the UPS from the Bypass power source. The UPS can be safely shut down and power removed from the UPS without interrupting power to the critical load. Once isolated, the UPS can be serviced or replaced safely.

The critical load is not protected while the UPS is in Maintenance Bypass mode.

Figure 4-2 shows the path of electrical power through an example MBC when operating in Maintenance Bypass mode.

![Diagram of Electrical Power Flow]

Figure 4-2. Path of Current in Maintenance Bypass Mode Example
Chapter 5  Maintenance

The components inside the Eaton BladeUPS Maintenance Bypass Cabinet (MBC) are secured to a sturdy metal frame. All repairable parts and assemblies are located for easy removal, with very little disassembly. This design allows authorized service personnel to perform routine maintenance and servicing quickly.

5.1 Important Safety Instructions

Remember that the UPS system is designed to supply power **EVEN WHEN DISCONNECTED FROM THE UTILITY POWER**. The MBC interior is unsafe until the UPS is shut down (inverter output and bypass) and utility power to the MBC is disconnected.

**DANGER**

The 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**

- Servicing and maintenance should be performed by qualified service personnel only.
- LETHAL VOLTAGE PRESENT. DO NOT operate with the cabinet doors open or protective panels removed. Do not make any assumptions about the electrical state of any cabinet in the UPS system.
- See “Safety Warnings” on page 1-4.

5.2 Performing Preventive Maintenance

The MBC requires very little preventive maintenance. However, inspect the MBC periodically to verify that the unit is operating normally.

5.2.1 Daily Maintenance

Perform the following steps daily:

1. Check the area surrounding the MBC. Verify that the area is not cluttered, allowing free access to the unit.
2. Verify that the air intake and exhaust openings are not blocked.
3. Verify that the operating environment is within the parameters specified in Chapter 7, “Product Specifications” and Appendix A.3 “Specifications Diagram”.
4. Record the results of your checks and any corrective actions in a suitable log.

5.2.2 Periodic Maintenance

Periodic inspections of the MBC should be made to determine if components, wiring, and connections exhibit evidence of overheating. Particular attention should be given to bolted connections. Maintenance procedures should specify that the bolted connections be retorqued to values listed on labels posted on the equipment.

Refer to the distribution panel manufacturer’s circuit breaker application and maintenance literature for recommended maintenance practices and procedures.

5.2.3 Annual Maintenance

Annual preventive maintenance, if required, should be performed only by authorized service personnel familiar with maintenance and servicing of the UPS system and the MBC. Contact your Eaton service representative for more information about service offerings.
5.3 Investigating Short Circuits

Short circuits are not considered normal phenomena in UPS applications. Tripping of protective devices due to low impedance short circuits should be thoroughly investigated for damage to conductors, insulation, and the protective devices according to the manufacturer’s recommendations.

5.4 Scheduling Maintenance Training

A basic training course, available from Eaton, gives you a competent working knowledge of the UPS system and MBC operation. The class also teaches you how to perform first level corrective maintenance. For more information about training and other services, contact the Help Desk (see page 1-6).
Chapter 6 Controls and Operation

This chapter describes the Eaton BladeUPS Maintenance Bypass Cabinet (MBC) controls and instructions for operating the UPS system.

6.1 Locating Maintenance Bypass Cabinet Controls

Figure 6-1 identifies and shows the location of the controls on the MBC. The MBC contains the following controls:

- Maintenance Bypass Breaker (MBB)
- UPS Output Breaker (UOB)
- Rectifier Input Breaker (RIB)
- Distribution panels with panel input breakers

Figure 6-1. Maintenance Bypass Cabinet Controls
6.2 Operating the UPS with a Maintenance Bypass Cabinet

1. Verify that the UPS is Off. For additional information, refer to the Operation chapter in the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems.

2. Ensure that the circuit breakers on the MBC are set as shown in Table 6-1.

<table>
<thead>
<tr>
<th>Table 6-1. Settings for Circuit Breakers</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIB</td>
</tr>
<tr>
<td>MBB</td>
</tr>
<tr>
<td>RIB</td>
</tr>
<tr>
<td>UOB</td>
</tr>
<tr>
<td>MBC Distribution Panel Main Breakers</td>
</tr>
<tr>
<td>NOTE</td>
</tr>
</tbody>
</table>

3. Close any upstream breakers to ensure the MBC has input power to the line side of the SIB.

4. Close the SIB on the MBC.

5. Close the RIB on the MBC.

<table>
<thead>
<tr>
<th>NOTE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

6. Start the UPS in Normal mode (online) according to the instructions in the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems.

7. Close the MBC Distribution Panel Main Breakers (load breakers).

8. Turn on the protected equipment (loads).
6.3 Transferring the UPS to Maintenance Bypass

**WARNING**
When the UPS is in Bypass mode, power is present inside the UPS cabinet.

**CAUTION**
- Only trained personnel familiar with the operation of this equipment should transfer loads. Failure to follow this transfer sequence may cause loss of power to loads or overload protection devices to activate.
- In Bypass mode, the critical load is not protected from commercial power interruptions and abnormalities.

**NOTE**
After the interlock maintenance bar is set, the MBB and UOB can only be tripped off at the same time by a fault or Remote Emergency Power-off (REPO) switch.

1. Put the UPS in Bypass mode. Refer to the Operation chapter in the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems to confirm the following detailed instructions on placing the UPS in Bypass mode:
   - Press the CONTROLS pushbutton on the main menu bar. The System Controls screen appears.
   - Press the BYPASS pushbutton on the System Controls menu bar.
   - The UPS transfers to Bypass mode and the critical load is immediately supplied by the (internal) bypass source.
   - The UPS is now operating in Bypass mode and the BYPASS status indicator is illuminated.

**IMPORTANT**
When the UPS is in Bypass mode, the UPS IN BYPASS indicator light on the MBC is illuminated.

2. Close the MBB on the MBC.
3. Loosen the MBC maintenance interlock bar knobs by hand.
4. Slide the interlock bar until the standoff aligns with the BYPASS arrow.
5. Retighten the interlock bar knobs by hand.

**IMPORTANT**
Failure to close the MBB prior to opening the UOB will interrupt power to the load.

6. Open the UOB on the MBC. The UPS critical load is now directly supplied by utility power.
7. Shut down the BladeUPS modules.
8. Open the RIB on the MBC.

**NOTE**
Opening the RIB and UOB on the MBC completely removes power to the UPS.
9. Ensure that the MBC circuit breakers are set as shown in Table 6-2. and Figure 6-2.

### Table 6-2. Normal Operation Settings for Circuit Breaker

<table>
<thead>
<tr>
<th>Breaker Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIB</td>
<td>CLOSED</td>
</tr>
<tr>
<td>MBB</td>
<td>OPEN</td>
</tr>
<tr>
<td>RIB</td>
<td>CLOSED</td>
</tr>
<tr>
<td>UOB</td>
<td>CLOSED</td>
</tr>
<tr>
<td>MBC Distribution Panel Main Breakers</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>

**NOTE**  
Closed breaker is UP; Open breaker is DOWN.

![Figure 6-2. Normal Operation](image)

6.4 Transferring the UPS from Maintenance Bypass

**CAUTION**

Only trained personnel familiar with the operation of this equipment should transfer loads. Failure to follow this transfer sequence may cause loss of power to loads or overload protection devices to activate.
1. Close the RIB on the MBC to supply power to the BladeUPS. Verify that the UPS is operating and is in Bypass mode. For additional information, refer to the Operation chapter in the Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems.

**NOTE** When the UPS is in Bypass mode, the UPS IN BYPASS indicator light on the MBC is lit.

**IMPORTANT**

The BladeUPS must be in Bypass mode because, if it is in Standby mode, it will not have any output voltage. In this case, closing the UOB and opening the MBB will cause the critical loads to lose power.

2. Close the UOB on the MBC.

**IMPORTANT**

Failure to close the UOB prior to opening the MBB will interrupt power to the load.

3. Completely loosen the MBC maintenance interlock bar knobs by hand.
4. Slide the interlock bar until the standoff aligns with the NORMAL arrow.
5. Retighten the interlock bar knobs by hand.
6. Open the MBB on the MBC.

**NOTE**

Observe that the indicator light may illuminate during the transition from bypass (MBB closed) to online (MBB opened). When the UPS first comes online (Normal mode), the UPS IN BYPASS indicator light on the Maintenance Bypass Cabinet cabinet is extinguished and does not illuminate.

7. Ensure that the MBC circuit breakers are set as shown in Table 6-3 and Figure 6-3.

Table 6-3. UPS in Maintenance Bypass Settings for Circuit Breakers

<table>
<thead>
<tr>
<th>SIB</th>
<th>CLOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBB</td>
<td>CLOSED</td>
</tr>
<tr>
<td>RIB</td>
<td>OPEN</td>
</tr>
<tr>
<td>UOB</td>
<td>OPEN</td>
</tr>
<tr>
<td>MBC Distribution Panel Main Breakers</td>
<td>CLOSED</td>
</tr>
</tbody>
</table>
8. Transfer the UPS to Normal mode (online). Refer to the Operation chapter in the *Eaton® BladeUPS® User’s Guide (Preassembled and Standard Systems)* for use with Eaton BladeUPS 5.1 kVA to 60 kVA (N+1) systems for detailed instructions on placing the UPS in Normal mode.
Chapter 7  Product Specifications

The following tables detail the model characteristics such as input, output, and environmental specifications for the Eaton BladeUPS Maintenance Bypass Cabinet (MBC). The MBC is a free-standing cabinet with safety shields behind the doors.

### Table 7-1. Model Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>kVA rating</td>
<td>60 kVA</td>
</tr>
<tr>
<td>Fault Current</td>
<td>35 kAIC @ 480 Vac</td>
</tr>
<tr>
<td></td>
<td>50 kAIC @ 240 Vac</td>
</tr>
<tr>
<td>Nominal Current</td>
<td>225A</td>
</tr>
<tr>
<td>Size and Weight</td>
<td>W x D x H: 762 mm x 914.4 mm x 2032 mm (30 in x 36 in x 80 in)</td>
</tr>
<tr>
<td></td>
<td>Weight: 544.310 kg (1200 lb)</td>
</tr>
<tr>
<td>Safety Standards</td>
<td>UL 1778</td>
</tr>
<tr>
<td></td>
<td>CSA C22.2 no. 107.1</td>
</tr>
</tbody>
</table>

### Table 7-2. Input Ratings

| Operating Input Voltage (Nominal +10/-15%)  | 480V Three-phase, three wire plus ground |
| Operating Input Frequency Range            | 60 Hz (±5 Hz)                            |

### Table 7-3. Output Ratings

| Operating Output Voltage (Nominal +10/-15%)  | 280V/120V Three-phase, three wire plus ground |
| Operating Output Frequency Range            | 60 Hz (±5 Hz)                                |

### Table 7-4. Distribution Characteristics

| Panelboards                      | (2) Cutler-Hammer 42-pole 225A panelboards |
| Bussing                           | Silver-plated                              |
| Breakers                          | 225A Cutler-Hammer Series C molded case breakers for UOB, RIB, and MBB |
|                                  | 125A Cutler-Hammer Series C molded case breakers for SIB |

### Table 7-5. Transformer Characteristics

| Energy Efficiency    | TP-1 rated                                   |
| Frequency            | 60 Hz                                        |
| K Factor             | K1                                            |
| Bussing              | Silver-plated                                |
### Table 7-5. Transformer Characteristics

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windings</td>
<td>Aluminium</td>
</tr>
<tr>
<td>Electrostatic Shielding</td>
<td>Yes</td>
</tr>
<tr>
<td>Temperature Rise</td>
<td>150°C</td>
</tr>
</tbody>
</table>

### Table 7-6. Environmental Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
</table>
| Operating Temperature    | 0 to 40°C (32 to 104°F) without derating  
**NOTE:** The recommended operating temperature is 25°C (77°F). |
| Operating Altitude       | Maximum 1500m (5000 ft) at 40°C (104°F) without derating |
| Storage Temperature      | –25 to 60°C (–13 to 140°F) |
| Relative Humidity (Operating and Storage) | 5% to 95% maximum noncondensing |
| Acoustical Noise         | N/A                    |
| EMI Suppression          | N/A                    |
| Electrostatic Discharge (ESD) Immunity | N/A |


Chapter 8  Warranty

Limited Warranty

Eaton® UPS Model: BladeUPS® (Global)

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton Corporation, an Ohio Corporation (“Eaton”).

LIMITED WARRANTY: This limited warranty (this “Warranty”) applies only to the original Purchaser (the “End-User”) of any Eaton BladeUPS Products (individually and collectively, the “Product”) purchased and registered with Eaton and cannot be transferred. This restriction applies even in the event that the Product is initially sold by Eaton for resale to an End-User. This Warranty gives you specific legal rights, and you may also have other rights which vary from State to State (or jurisdiction to jurisdiction).

LIMITED WARRANTY PERIOD: The period covered by this Warranty for the Product is eighteen (18) months from the date of Product shipment.

WHAT THIS LIMITED WARRANTY COVERS: Eaton warrants that the Product and battery (individually and collectively, the “Warranted Items”) are free of defects in material and workmanship. If, in the opinion of Eaton, a Warranted Item is defective and the defect is within the terms of this Warranty, Eaton’s sole obligation will be to repair or replace such defective Warranted Item (including providing service, parts and labor, as applicable), at the option of Eaton.

PROCEDURES FOR REPAIR OR REPLACEMENT OF WARRANTED ITEMS: The Warranted Item will be repaired or replaced at an Eaton site or such other location as determined by Eaton.

If the Warranted Item is to be replaced by Eaton, and the End-User supplies a credit card number or purchase order for the value of the replacement product, Eaton will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Eaton receives notice of the warranty claim. In such case, the End-User must return (at Eaton’s expense) the defective Warranted Item to Eaton in the same packaging as the replacement Warranted Item received by the End-User or as otherwise instructed by Eaton. If Eaton does not receive the defective Warranted Item, Eaton will either charge the End-User’s credit card, or send the End-User an invoice (which the End-User agrees to pay), for the value of the replacement product.

If the Warranted Item is to be replaced by Eaton, but the End-User is unwilling or unable to supply a credit card number or purchase order for the value of the replacement product, Eaton will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Eaton receives the defective product from the End-User.

In any case, Eaton will provide shipping instructions and will pay its designated carrier for all shipping charges for return of defective equipment and replacement of Warranted Items. Any returned Warranted Item or parts that are replaced may be new or re-conditioned. All Warranted Items returned to Eaton and, in any replacement endeavor, all parts removed by Eaton shall become the property of Eaton.

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation, including the charge of batteries no later than the date indicated on the packaging; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) damage caused by fire, flood, lightning, vandalism, acts of God, End-User’s neglect, misuse, misapplication, incorrect connection, or external damage, or that has been subject to repair or alteration by End-User (or a third party) not authorized by Eaton in writing; (d) repair or alteration not performed by an authorized Eaton Customer Service Engineer or Agent; (e) improper testing, operation, maintenance, adjustment, or modification of any kind not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent; or (f) use of the Product under other than normal operating conditions or in a manner inconsistent with the Product’s labels or instructions.
This Warranty is not valid if the Product’s serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof.

Eaton shall not be responsible for any charges for testing, checking, removal, or installation of Warranted Items.

**EATON DOES NOT WARRANT EQUIPMENT NOT MANUFACTURED BY EATON. IF PERMITTED BY THE APPLICABLE MANUFACTURER, EATON SHALL PASS THROUGH SUCH MANUFACTURER’S WARRANTIES TO END-USER.**

**EATON DOES NOT WARRANT SOFTWARE, INCLUDING SOFTWARE EMBEDDED IN PRODUCTS, THAT IS NOT CREATED BY EATON. WITHOUT LIMITING THE FOREGOING, EATON SPECIFICALLY DOES NOT WARRANT SOFTWARE (SUCH AS LINUX) THAT WAS CREATED USING AN “OPEN SOURCE” MODEL OR IS DISTRIBUTED PURSUANT TO AN OPEN SOURCE LICENSE.**

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**LIMITATION OF LIABILITY:** The remedies of the End-User set forth herein are exclusive and are the sole remedies for any failure of Eaton to comply with its obligations hereunder. In no event shall Eaton be liable for any indirect, incidental, special, or consequential damages of any kind or type whatsoever, resulting from, or in connection with, any claim or cause of action, whether brought in contract or in tort (including negligence or strict liability). Some States or jurisdictions do not allow the exclusion of limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. Eaton shall not be responsible for failure to provide service or parts due to causes beyond Eaton’s reasonable control. In no case will Eaton’s liability under this Warranty exceed the replacement value of the Warranted Items.

**END-USER’S OBLIGATIONS:** In order to receive the benefits of this Warranty, the End-User must register the product warranty (via mail or online at www.eaton.com/powerquality “Register a Product”); use the Product in a normal way; follow the Product’s operation and maintenance manual; and protect against further damage to the Product if there is a covered defect.

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

**COSTS NOT RELATED TO WARRANTY:** The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses, or labor of Eaton representatives outside the terms of this Warranty will be borne by the End-User.
OBTAINING WARRANTY SERVICE: In the United States, call the Customer Reliability Center 7x24 at 800-356-5737. Outside of the United States, contact your local Eaton product sales or service representative. For comments or questions about this Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.
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Appendix A  Installation Reference Appendices

The information in this appendix will help during the planning and installation of the Eaton BladeUPS 12 kVA Maintenance Bypass Cabinet. This appendices included in this section are listed in Table A-1

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<td>“Installation Checklist”</td>
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<td>Appendix A-2</td>
<td>“Installation and Wiring Diagram”</td>
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<td>Appendix A-3</td>
<td>“Specifications Diagram”</td>
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<td>Appendix A-4</td>
<td>“Maintenance Bypass Cabinet Distribution Configuration Options”</td>
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A.1 Installation Checklist

- All packing materials and restraints have been removed from each cabinet.
- Adequate workspace exists around the MBC and other cabinets.
- Adequate lighting is provided around all UPS system equipment.
- Air conditioning equipment is installed and operating correctly.
- Each cabinet in the UPS system is placed in its final installation location. The UPS and MBC must be installed on a level floor suitable for computer or electronic equipment.
- The MBC cabinet is bolted to the floor for permanent installations.
- All conduits and cables are properly routed to the MBC.
- All power cables are properly sized and terminated.
- A ground conductor is properly installed.
- MBC maintenance bypass aux contact signal wiring is connected from the MBC to the UPS.
- The area around the UPS and MBC system is clean and dust-free.
- OPTIONAL – Distribution panel branch circuit breakers are installed and wired to the load.
- OPTIONAL – If MBC remote emergency power-off (REPO) switch is installed:
  - The REPO device is mounted in its installed location and its wiring is terminated in the UPS and MBC. The REPO switch must be a latching-type switch with two sets dedicated contacts.
  - MBC remote emergency power-off (REPO) signal wiring is connected from the MBC to the REPO button.
  - Ensure that SEPARATE contact was used to wire the REPO to the UPS.
A.2 Installation and Wiring Diagram

Figure A-1. PTE06056BAS4200 Installation and Wiring Diagram
A.4 Maintenance Bypass Cabinet Distribution Configuration Options

There are 13 distinct Maintenance Bypass Cabinet (MBC) distribution configurations. Table A-2 lists and describes the configuration options and identifies the figure diagram corresponding to that configuration.

**NOTE** Subfeed breaker trip ratings must be specified at time of order. Maximum 225A trip.

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Figure A-3. Configuration 1 (PTE06056BAS4200)
Figure A-4. Configuration 2 (PTE06056BAS4100)
Figure A-5. Configuration 3 (PTE06056BAS41LL)
Figure A-6. Configuration 4 (PTE06056BAS412A)
Figure A-7. Configuration 5 (PTE96056BAS413A)
Figure A-8. Configuration 6 (PTE06056BAS414A)
Figure A-9. Configuration 7 (PTE06056BAS40LL)
Figure A-10. Configuration 8 (PTE06056BAS402A)
Figure A-11. Configuration 9 (PTE06056BAS403A)
Figure A-12. Configuration 10 (PTE06056BAS404A)
Figure A-13. Configuration 11 (PTE06056BAS42LL)
Figure A-14. Configuration 12 (PTE06056BAS405A)
Figure A-15. Configuration 13 (PTE06056BAS406A)