



**Powerware**

**Powerware® 9390  
Integrated Distribution Cabinet  
Installation and Operation Manual**

For use with Powerware 9390 100–160 kVA UPS Models

**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**

**CONSIGNES DE SÉCURITÉ IMPORTANTES  
CONSERVER CES INSTRUCTIONS  
CE MANUEL CONTIENT DES CONSIGNES DE SÉCURITÉ IMPORTANTES**

Powerware is a registered trademark of Eaton Electrical Inc.

©Copyright 2005–2007 Eaton Corporation, Raleigh, NC, USA. All rights reserved. No part of this document may be reproduced in any way without the express written approval of Eaton Corporation.

# Table of Contents

<b>1</b>	<b>Introduction</b>	<b>1-1</b>
1.1	Configurations	1-1
1.2	Using This Manual	1-3
1.3	Conventions Used in This Manual	1-4
1.4	Safety Warnings	1-5
1.5	For More Information	1-6
1.6	Getting Help	1-6
<b>Section I – Installation</b>		
<b>2</b>	<b>IDC Installation Plan and Unpacking</b>	<b>2-1</b>
2.1	Creating an Installation Plan	2-1
2.2	Preparing the Site	2-1
2.2.1	Environmental Considerations	2-2
2.2.2	Preparing for Wiring the IDC	2-2
2.3	Inspecting and Unpacking the IDC	2-2
<b>3</b>	<b>Installing the IDC</b>	<b>3-1</b>
3.1	Preliminary Installation Information	3-1
3.2	Unloading the Powerware 9390 IDC-160 from the Pallet	3-1
3.3	IDC Cabinet Installation	3-5
3.3.1	Line-up-and-Match IDC Installation	3-5
3.3.1.1	Installing IDC Line-up-and-Match Power Wiring	3-10
3.3.1.2	Installing Line-up-and-Match P1 and P2 Interface Connections	3-12
3.3.2	Standalone IDC Installation	3-13
3.3.2.1	Installing IDC Standalone Power Wiring	3-14
3.3.2.2	Installing Standalone P1 and P2 Interface Connections	3-16
3.4	Initial Startup	3-17
3.5	Completing the Installation Checklist	3-17
<b>Section II – Operation</b>		
<b>4</b>	<b>Understanding IDC Operation</b>	<b>4-1</b>
4.1	UPS Mode	4-1
4.2	Maintenance Bypass Mode	4-1

<b>5</b>	<b>IDC Features, Options, Controls, and Operation</b>	<b>5-1</b>
5.1	IDC Standard Features	5-1
5.1.1	Maintenance Bypass and Maintenance Isolation Switches	5-1
5.1.2	Output Transformer	5-1
5.1.3	Customer Interface	5-1
5.1.4	Installation Features	5-1
5.1.5	Expansion	5-2
5.2	Options	5-2
5.2.1	Bypass Input Breaker (BIB)	5-2
5.2.2	Rectifier Input Breaker (RIB)	5-2
5.2.3	Distribution Panel	5-2
5.2.4	Distribution Breakers	5-2
5.2.5	Lug Output	5-2
5.2.6	Remote Emergency Power-off	5-2
5.3	Symbols	5-3
5.4	IDC Controls	5-3
5.5	IDC Operation	5-7
5.5.1	Using the UPS when an IDC is Installed	5-7
5.5.2	Transferring the UPS to Maintenance Bypass	5-7
5.5.3	Transferring the UPS from Maintenance Bypass	5-9
5.5.4	Using the Remote Emergency Power-off Switch	5-10
<b>6</b>	<b>Maintaining the IDC</b>	<b>6-1</b>
6.1	Important Safety Instructions	6-1
6.2	Performing Preventive Maintenance	6-1
6.2.1	DAILY Maintenance	6-1
6.2.2	PERIODIC Maintenance	6-2
6.2.3	ANNUAL Maintenance	6-2
6.3	Short Circuits	6-2
6.4	Maintenance Training	6-2
<b>7</b>	<b>Product Specifications</b>	<b>7-1</b>
7.1	Model Number	7-1
7.2	IDC Input	7-1
7.3	IDC Output	7-1
7.4	Environmental Specifications	7-1
	<b>Installation Information</b>	<b>A-1</b>
	<b>Warranty</b>	<b>W-1</b>

## List of Figures

Figure 1-1. Powerware 9390 160 kVA IDC Cabinet .....	1-2
Figure 2-1. Powerware 9390 160 kVA IDC as Shipped on Pallet .....	2-3
Figure 3-1. Removing Front Shipping Bracket on the Powerware 9390 160 kVA IDC .....	3-3
Figure 3-2. Removing Rear Shipping Bracket on the Powerware 9390 160 kVA IDC .....	3-4
Figure 3-3. UPS with Integral IDC .....	3-5
Figure 3-4. IDC Knockout Plug and Hanger Bracket Locations .....	3-7
Figure 3-5. UPS to IDC Joining Brackets .....	3-9
Figure 3-6. UPS with Standalone IDC .....	3-13
Figure 4-1. Path of Current Through the IDC in UPS Mode .....	4-2
Figure 4-2. Path of Current Through the IDC in Maintenance Bypass Mode .....	4-3
Figure 5-1. Powerware 9390 160 kVA IDC Controls – with Distribution Panel Option .....	5-4
Figure 5-2. Powerware 9390 160 kVA IDC Controls – with Distribution Breaker Option .....	5-5
Figure 5-3. Powerware 9390 160 kVA IDC Controls – with No Distribution .....	5-6
Figure 5-4. Powerware 9390 160 kVA IDC Controls - Interlock Operation .....	5-11

**This page intentionally left blank.**

# Chapter 1 | Introduction

The Powerware® 9390 Integrated Distribution Cabinet (IDC) is designed for use with the Powerware 9390 family of three-phase uninterruptible power systems (UPSs). The IDC provides the following custom configurable features, enabling adaptation and expansion without costly electrical rework:

- ▶ Power distribution options distribute power to servers or racks via distribution panelboards, or distribute power to larger loads via distribution circuit breakers.
- ▶ Maintenance Bypass (MBP) and Maintenance Isolation (MIS) breakers enable power to completely bypass the UPS power module. The UPS module can then be serviced or replaced in complete safety, without interrupting power to critical systems.
- ▶ An optional Bypass Input Breaker (BIB) and Rectifier Input Breaker (RIB) provide a single wiring point input to the UPS and a convenient method for removing power from the UPS, when using the maintenance bypass to supply the load.
- ▶ Voltage transformation allows changes to output voltage levels. For example, 480 Vac output from the UPS can be converted to 208/120 Vac output to serve single-phase loads.

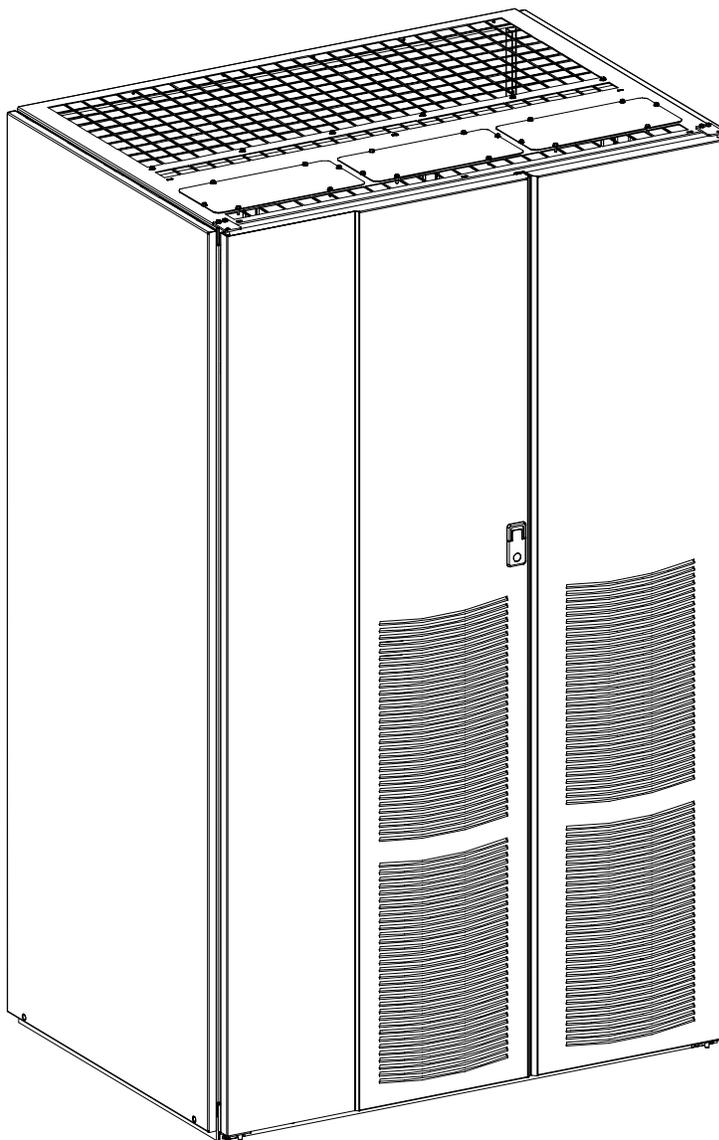
The IDC is housed in a single, free-standing cabinet, with safety shields behind the doors for hazardous voltage protection. The cabinet matches the UPS cabinet in style and color, and can be installed in *line-up-and-match* or *standalone* configurations. Figure 1-1 shows the Powerware 9390 IDC.

## 1.1 Configurations

The following IDC configurations are possible:

- ▶ 480/208V transformer, with MBP and MIS breakers, and:
  - no distribution – output terminal block provided
  - one or two 225A distribution panels
  - one to six 100-250A adjustable distribution breakers
  - one 225A distribution panel and one to three 100-250A adjustable distribution breakers
- ▶ 480/208V transformer, with MBP, MIS, and BIB breakers, and:
  - no distribution – output terminal block provided
  - one or two 225A distribution panels
  - one to six 100-250A adjustable distribution breakers
  - one 225A distribution panel and one to three 100-250A adjustable distribution breakers

- ▶ 480/208V transformer, with MBP, MIS, BIB, and RIB breakers, and:
  - no distribution – output terminal block provided
  - one or two 225A distribution panels
  - one to six 100-250A adjustable distribution breakers
  - one 225A distribution panel and one to three 100-250A adjustable distribution breakers



**Figure 1-1. Powerware 9390 160 kVA IDC Cabinet**

## 1.2 Using This Manual

This manual describes how to install and operate the Powerware 9390 IDC. Read and understand the procedures described in this manual to ensure trouble-free installation and operation.

The information in this manual is divided into the sections and chapters listed. At a minimum, Chapters 1 through 3 and Chapter 5 should be examined.

- ▶ **Chapter 1, “Introduction”** – provides a brief description of the IDC, a description of the content of each chapter, text conventions used in the manual, safety warnings, and reference information.

### Section I, Installation

- ▶ **Chapter 2, “IDC Installation Plan and Unpacking”** – explains how to prepare the site for the installation of the IDC. It discusses equipment environmental requirements, inspecting, and unpacking cabinets.
- ▶ **Chapter 3, “Installing the IDC”** – describes how to install and wire the IDC.

### Section II, Operation

- ▶ **Chapter 4, “Understanding IDC Operation”** – provides information on how an IDC works.
- ▶ **Chapter 5, “IDC Features, Controls, and Operation”** – describes the standard and optional IDC features, the IDC controls, and how to use the IDC.
- ▶ **Chapter 6, “Maintaining the IDC”** – contains maintenance instructions for the IDC.
- ▶ **Chapter 7, “Product Specifications”** – provides specifications for the IDC.
- ▶ **Appendix A, “Installation Information”** – contains important information on wiring requirements and recommendations, and important diagrams of the cabinets’ mechanical details and electrical access.
- ▶ **Warranty** – provides the Powerware warranty for this product.

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

## 1.3 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.
- ▶ *Italic type* highlights notes and new terms where they are defined.
- ▶ `Screen type` represents information that appears on the screen or LCD.

Icon	Description
	Information notes call attention to important features or instructions.

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

The term *line-up-and-match* refers to cabinets that are physically attached to the UPS, and the wiring between them is internal. The term *standalone* refers to cabinets that are not physically attached to the UPS, and are wired with external contractor-supplied wiring.

## 1.4 Safety Warnings

### IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

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

#### 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



- ▶ The UPS system 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 this IDC 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



- ▶ Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
- ▶ Keep the IDC doors 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.
- ▶ Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.

## 1.5 For More Information

Refer to the ***Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual*** 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.powerware.com](http://www.powerware.com) 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 Eaton Help Desk for Powerware products at:

United States	<b>1-800-843-9433 or 1-919-870-3028</b>
In Canada	<b>1-800-461-9166 ext 260</b>
All other countries	<b>Call your local service representative</b>

# **Section I** | **Installation**

**This page intentionally left blank.**

## Chapter 2 | IDC Installation Plan and Unpacking

Use the following basic sequence of steps to install the Integrated Distribution Cabinet (IDC).

1. Create an installation plan for the IDC (Chapter 2).
2. Prepare your site for the IDC (Chapter 2).
3. Inspect and unpack the IDC (Chapter 2).
4. Unload and install the IDC and wire the system (Chapter 3).
5. Complete the Installation Checklist (Chapter 3).
6. Have authorized service personnel perform preliminary operational checks and startup.



---

**NOTE** *Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms as specified on page W-1 become void. This service is offered as part of the sales contract for the UPS system. Contact service in advance (usually a two week notice is required) to reserve a preferred startup date.*

---

### 2.1 Creating an Installation Plan

Before installing the IDC, 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 IDC to operate at peak efficiency, the installation site should meet the environmental parameters outlined in this manual. If the IDC 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 Drawing 164201560-2 on page A-4 and size requirements specified on Drawing 164201560-9 starting on page A-27.

The IDC uses natural convection cooling to regulate internal component temperature. Air inlets are in the bottom and front of the cabinet and outlets are in the top (see Drawing 164201560-9 starting on page A-27). Clearance must be allowed in front and above each IDC, and the front and bottom of the cabinet must be free of any obstructions for proper air circulation. See Drawing 164201560-2 on page A-4 for clearances.

## 2.2.1 Environmental Considerations

The life of the IDC is adversely affected if the installation does not meet the following guidelines:

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

Failure to follow guidelines may void your warranty.

## 2.2.2 Preparing for Wiring the IDC



---

**NOTE** *A minimum of two separate feeds with upstream feeder breakers, or one feed with two upstream feeder breakers, must be provided. One for the UPS and one for the IDC bypass input. DO NOT use one feed or a single feeder breaker to supply both the UPS and IDC.*

---

Power and control wiring for a line-up-and-match IDC are supplied with the cabinet.

Wiring requirements for an IDC installed separate from the UPS cabinet, including the minimum AWG size of external wiring, can be found on Drawing 164201560-5 starting on page A-10. The input power wiring connections for this equipment are rated at 90°C. If wire is run in an ambient temperature greater than 40°C, higher temperature wire and/or larger size wire may be necessary. IDC control wiring requirements can be found on Drawing 164201560-8 starting on page A-23 and should be connected at the IDC interface terminal block located inside the IDC.

## 2.3 Inspecting and Unpacking the IDC

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

### CAUTION



The IDC is heavy (see Table A on page A-4). If unpacking instructions are not closely followed, the cabinet may tip and cause serious injury.

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

### CAUTION

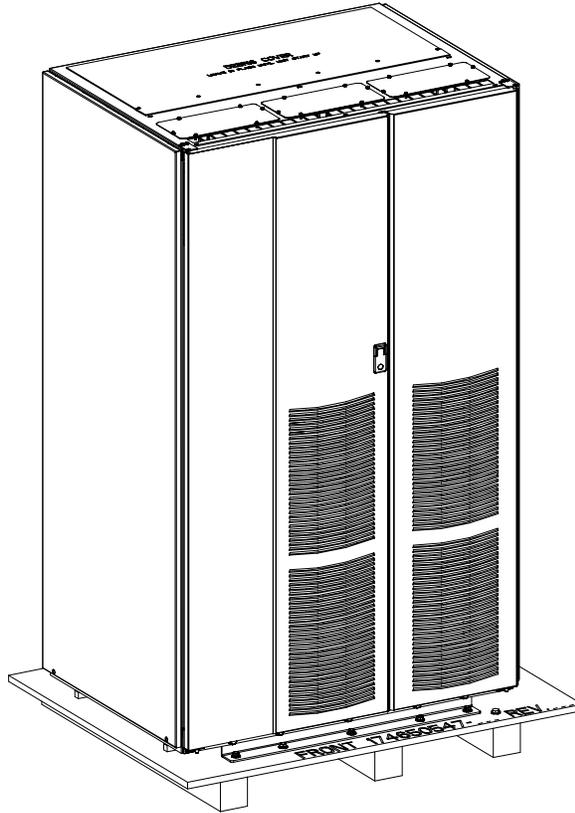


Do not install a damaged cabinet. Report any damage to the carrier and contact your Eaton service representative immediately.

2. Use a forklift or pallet jack to move the packaged cabinet to the installation site, or as close as possible, before unpacking. Insert the forklift or pallet jack's forks between the pallet supports on the bottom of the unit.



**NOTE** Verify that the forklift or pallet jack is rated to handle the weight of the cabinet (see Table A on page A-4 for cabinet weight).



**Figure 2-1. Powerware 9390 IDC as Shipped on Pallet**



### CAUTION

Do not tilt the IDC more than 10° from vertical or the cabinet may tip over.

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



**NOTE** The IDC is shipped with a debris shield covering the ventilation grill on top of the unit. Do not remove the debris shield until installation is complete.

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 IDC properly may void your warranty.

**This page intentionally left blank.**

## Chapter 3 | Installing the IDC

### 3.1 Preliminary Installation Information



#### WARNING

Installation should be performed only by qualified personnel.

Refer to the following while installing the IDC:

- ▶ Appendix A for installation drawings and additional installation notes.
- ▶ Dimensions are in millimeters and inches.
- ▶ Do not tilt the cabinets more than  $\pm 10^\circ$  during installation.
- ▶ The conduit landing plates are to be removed to add conduit landing holes, or remove knockouts, as required. Plate material is 16 gauge steel (1.5 mm/0.060" thick).
- ▶ The cabinets must be installed on a level floor suitable for computer or electronic equipment.
- ▶ See Table A on page A-4 for equipment weight and point loading.
- ▶ Details about control wiring are provided in each procedure. Drawing 164201560-8 and Table J and NO TAG, starting on page A-23, identify the control wiring terminations.
- ▶ Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet installation, wiring information, and conduit and terminal locations.

### 3.2 Unloading the Powerware 9390 from the Pallet

The IDC is bolted to a wooden pallet supported by wood skids. To remove the pallet, perform the following procedure:



#### WARNING

The IDC is heavy. See Table A on page A-4 for weight of cabinets. If unloading instructions are not closely followed, the cabinet may cause serious injury.



#### CAUTION

Do not tilt cabinets more than  $10^\circ$  from vertical.

1. If not already accomplished, use a forklift or pallet jack to move the cabinet to the installation area, or as close as possible, before unloading from the pallet. Insert the forklift jacks between the skids on the bottom of the unit.



---

**NOTE** *Verify that the forklift or pallet jack is rated to handle the weight of the cabinet (see Table A on page A-4 for cabinet weight).*

---

2. Unfasten the front door latch and swing the doors open (see Figure 3-1).
3. Remove the doors. 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 the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
5. Remove five bolts securing the front shipping bracket to the cabinet and five bolts securing the bracket to the pallet (see Figure 3-1). Remove the front shipping bracket. If installing the cabinet permanently, retain the shipping bracket and securing hardware for later use.
6. Remove five bolts securing the rear shipping bracket to the cabinet and five bolts securing the bracket to the pallet (see Figure 3-2). Remove the front shipping bracket. If installing the cabinet permanently, retain the shipping bracket and securing hardware for later use.
7. Remove the front skid bolt (Figure 3-1) and the rear skid bolt (Figure 3-2) securing the removable skid, and remove the skid.



---

**NOTE** *In the following step the pallet will tilt and act as a ramp when the cabinet is rolled beyond the center of the pallet. Be sure to restrain the cabinet as it continues to roll down the pallet/ramp.*

---

### WARNING



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

---

8. Slowly roll the cabinet toward the right side of the pallet. Once the pallet tilts, continue rolling the cabinet down the pallet until the cabinet is clear of the pallet.
9. Discard or recycle the pallet and unused shipping brackets in a responsible manner.
10. Roll the cabinet to its final installation location.
11. Proceed to paragraph 3.3.

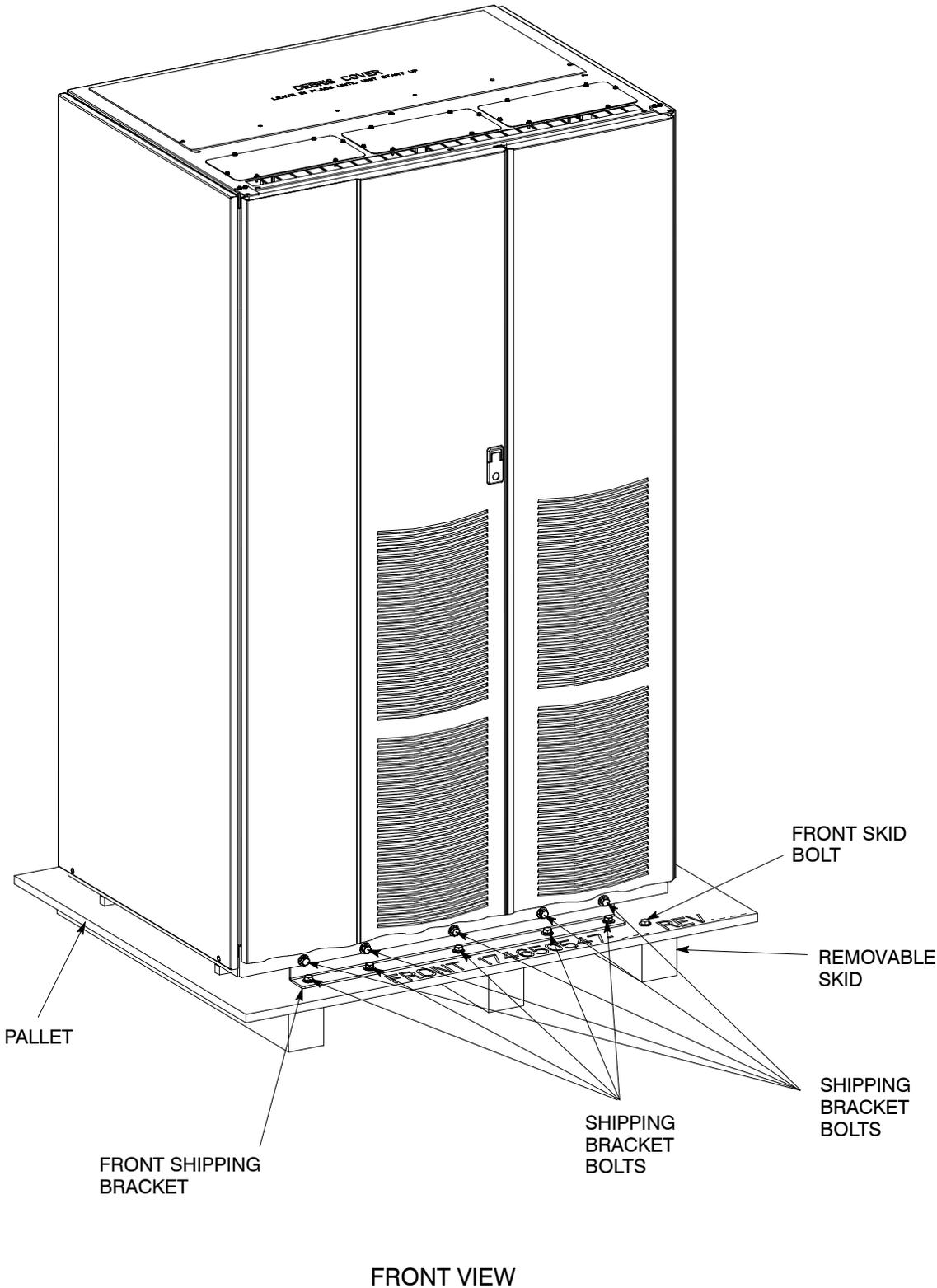


Figure 3-1. Removing Front Shipping Bracket on the Powerware 9390 IDC

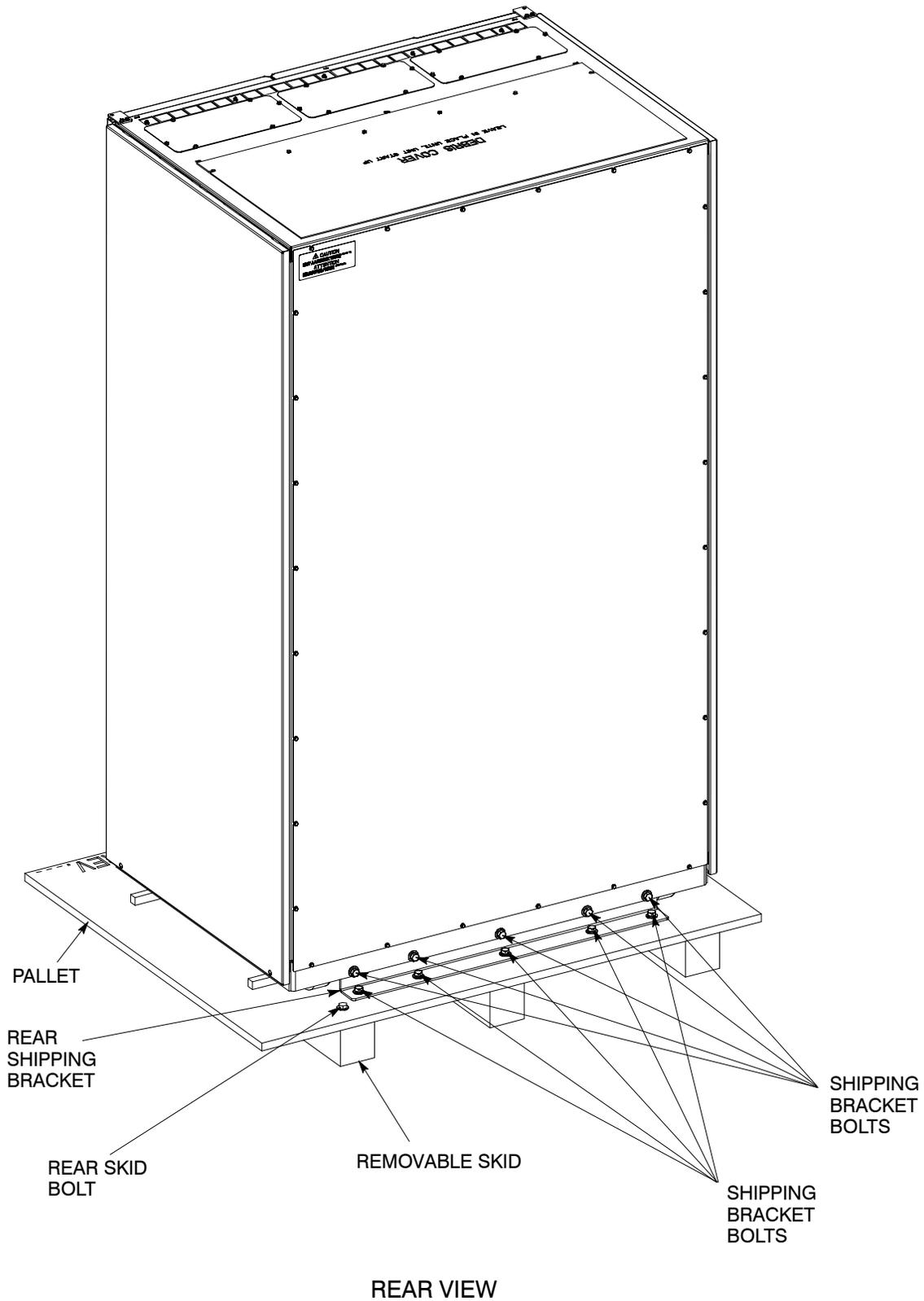


Figure 3-2. Removing Rear Shipping Bracket on the Powerware 9390 IDC

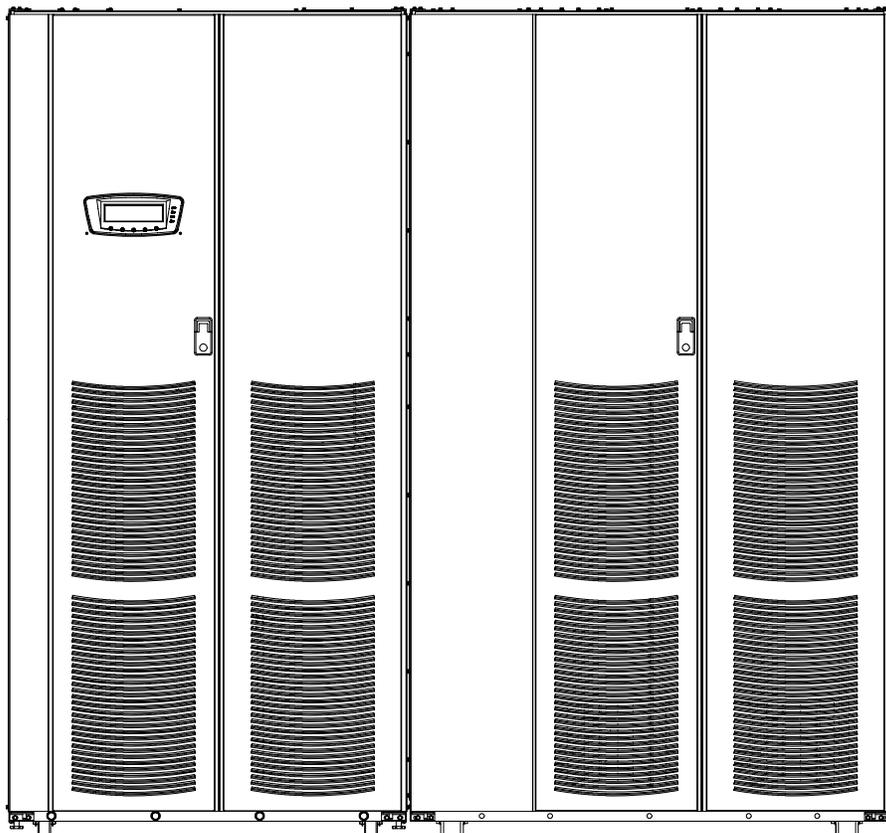
## 3.3 IDC Cabinet Installation

The method used to install the IDC depends on the type of installation being undertaken. The IDC can be installed as a *line-up-and-match* or *standalone* system. The term *line-up-and-match* refers to cabinets that are physically attached to the UPS, and the wiring between them is internal. The term *standalone* refers to cabinets that are not physically attached to the UPS, and are wired with external contractor-supplied wiring.

- ▶ To install a *line-up-and-match* IDC, proceed to paragraph 3.3.1.
- ▶ To install a *standalone* IDC, proceed to paragraph 3.3.2.

### 3.3.1 Line-up-and-Match IDC Installation

Use this procedure to install the IDC adjacent to the Powerware 9390 UPS cabinet (see Figure 3-3). The recommended location is to the right of the UPS cabinet. This procedure assumes the IDC is located to the right of the UPS cabinet.



**Figure 3-3. UPS with Integral IDC**

1. Verify that the UPS is properly installed and secured. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for installation instructions.
2. Roll the IDC to an area near the right-hand side of the UPS.

3. If not already open, unfasten the front door latch and swing the doors open.
4. If not already removed, remove the doors. 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.
5. Remove the screws securing the inside distribution panel doors, and swing the doors open.
6. Remove the screws securing the top internal safety shield panel, and remove the panel to gain access to the top inside of the cabinet.
7. Remove the field kit from the bottom right hand corner of the cabinet and retain for later use.
8. If necessary, remove the cosmetic cover and hanger brackets from the right-hand side of the UPS. Save the cover, screws, and brackets for later use.
9. If necessary, remove the cosmetic cover and hanger brackets from the left-hand side of the IDC. Save the cover, screws, and brackets for later use.
10. Remove the knockouts, as required, on the bottom right side of the UPS cabinet inside panel. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for the location of the knockout plug.
11. Remove the knockouts on the bottom left side of the IDC inside panel (see Figure 3-4).
12. Install the nylon grommets from the field kit around the holes left after removing the knockouts.
13. Push the IDC toward the UPS cabinet until the doors are flush with each other.
14. If not already installed, mount the hanger brackets to the top right side of the IDC using M4 screws (see Figure 3-4).
15. If not already installed, hang the side panel on the hanger brackets and align with the front and rear of the IDC.
16. If not already secured, secure the side panel at the bottom using M4 hex-head screws previously removed.
17. If permanently mounting the IDC, proceed to Step 20; otherwise, proceed to Step 18.
18. Secure the IDC in position by lowering the leveling feet until the cabinet is not resting on the casters. Verify the cabinet is level and matches the height of the installed UPS cabinet.
19. Proceed to step 22.

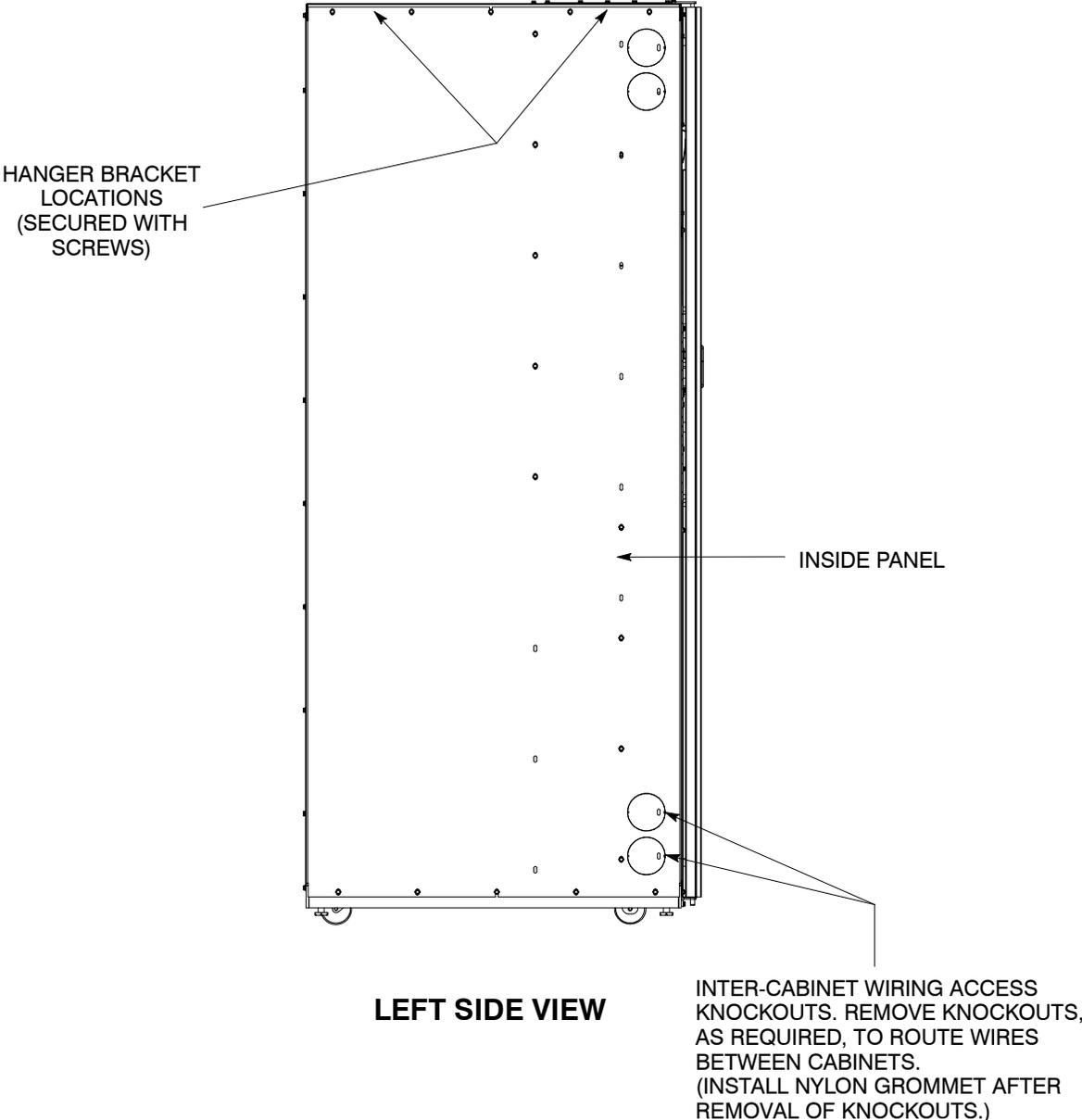


Figure 3-4. IDC Knockout Plug and Hanger Bracket Locations

20. Using the retained hardware, reinstall the shipping brackets previously removed to the front and rear of the IDC with the angle facing outward (see Figure 3-1 and Figure 3-2).
21. Secure the cabinet to the floor with contractor-supplied hardware.



---

**NOTE** *Two cabinet joining brackets are provided in the field kit for securing each cabinet at the top and bottom. A small flat bracket joins the top of the cabinets and a larger flat bracket joins the cabinets at the bottom. The small flat bracket is attached to the cabinet tops first.*

---

22. Remove the right-hand screw from the top right-hand door hinge of the UPS cabinet and the left-hand screw from the top left door hinge of the IDC.
23. Locate the small flat bracket from the field kit. Align the holes in the small flat bracket over the door hinge screw holes. Replace the screws in the hinges, securing the bracket to the cabinets (see Figure 3-5).
24. Locate the large flat bracket from the field kit. Place one end of the bracket over the bolt on the bottom side of the lower right-hand hinge on the UPS cabinet and the other end over the bolt on the bottom side of the lower left-hand hinge on the IDC cabinet (see Figure 3-5).
25. Secure the bracket to the hinges with hardware from the field kit.
26. Proceed to paragraph 3.3.1.1.

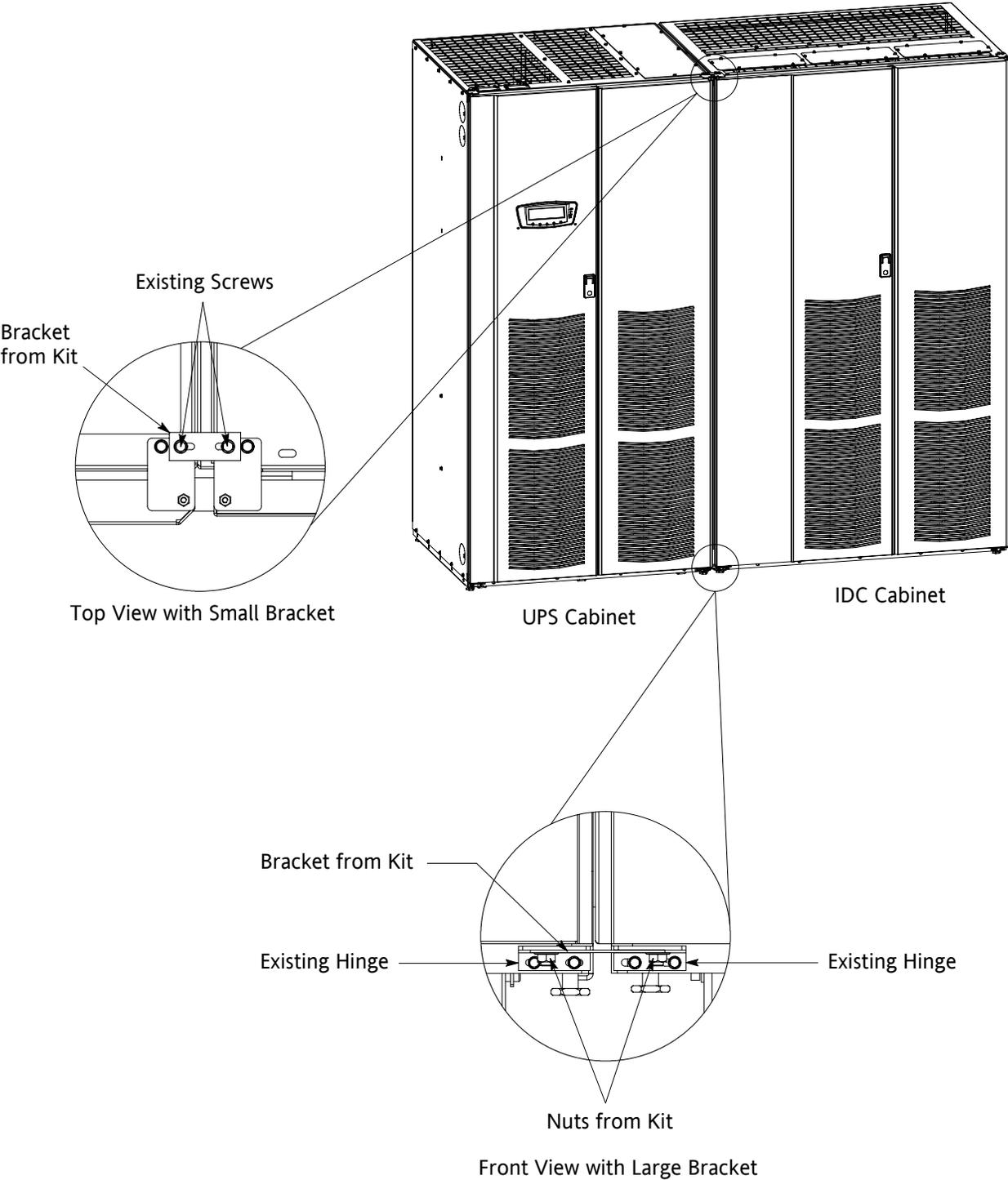


Figure 3-5. UPS to IDC Joining Brackets

### 3.3.1.1 Installing IDC Line-up-and-Match Power Wiring



**NOTE** *The IDC is shipped with a debris shield covering the ventilation grill on top of the unit. Do not remove the debris shield until installation is complete. However, remove the shield before operating the IDC. Once the debris shield is removed, do not place objects on the ventilation grill.*

**NOTE** *Remove the IDC cabinet top or bottom conduit landing plate to drill or punch conduit holes, or remove knockouts (see Drawing 164201560-6 on page A-15).*

**NOTE** *Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet wiring information, and conduit and terminal locations.*

1. Verify the UPS system is turned off and all power sources are removed. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual 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 doors. 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 open, remove the screws securing the inside distribution panel doors, and swing the doors open.
5. If not already removed, remove the screws securing the top internal safety shield panel and remove the panel to gain access to the terminals.
6. An IDC-to-UPS output wiring harness is supplied inside the IDC. Route this harness through the knockouts in the side of the cabinets to the UPS output terminals. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations and termination requirements. See Drawing 164201560-7, starting on page A-17, for IDC wiring access information.
7. Connect phase A, B, and C power wiring to the UPS output terminals.



**NOTE** *If a BIB is not installed, a minimum of two separate feeds with upstream feeder breakers must be provided. One for the UPS and one for the IDC bypass input. Do not use one feed for both UPS and IDC.*

8. Route the bypass input cables to the IDC terminal block. See Drawing 164201560-7, starting on page A-17, for IDC wiring access information and terminal locations.
9. Connect phase A, B, and C bypass input power wiring from the source to the bypass terminals on the IDC.
10. If wiring an IDC with a BIB or RIB, proceed to Step 11; otherwise, proceed to Step 13.

- 11.** IDC-to-UPS rectifier and bypass wiring harnesses are supplied inside the IDC. Route the harnesses through the knockouts in the side of the cabinets to the UPS rectifier and bypass terminals. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations and termination requirements. See Drawing 164201560-7, starting on page A-17, for IDC wiring access information.
- 12.** Connect phase A, B, and C power wiring to the UPS input terminals.
- 13.** If wiring an IDC with a Distribution Panel, proceed to Step 14; if wiring an IDC with Distribution Breakers or an Output Terminal Block, proceed to Step 18.
- 14.** Install customer-supplied branch circuit breakers (Cutler-Hammer type CH) into the Distribution Panel.
- 15.** Wire the branch circuits according to the branch circuit breaker manufacturers ratings and instructions, and national and local electrical codes (output is prewired to the panelboard).
- 16.** Verify the Distribution Panel Input breakers (CB10 and CB20) are set to 225A (Letter G on the breakers). Use the dial on each breaker to adjust as necessary.
- 17.** Proceed to Step 20.
- 18.** Connect phase A, B, and C, and Neutral power wiring from Distribution breakers or Terminals and Neutral Terminals to the critical load.
- 19.** If installed, use the dial on each breaker to adjust Distribution breaker (CB11, CB12, CB13, CB21, CB22, and CB23) current ratings as required to protect the wiring to the load. See Table G on page A-14 for the correct breaker continuous current adjustment letter.
- 20.** Verify the settings of the installed MBP, MIS, BIB, and RIB match the values listed in Table H. Use the dial on each breaker to adjust as necessary.
- 21.** After wiring the UPS system to the facility power and critical load, be sure to ground the system according to local and/or national electrical wiring codes.
- 22.** If wiring interface connections, proceed to paragraph 3.3.1.2; otherwise, proceed to Step 23.
- 23.** When all wiring is complete, reinstall the safety shield panels removed in previous steps.
- 24.** Close the inside distribution panel doors, and secure with screws.
- 25.** Reinstall the doors removed in previous steps and secure with the retained hardware.
- 26.** Close the door and secure the latch.

### 3.3.1.2 Installing Line-up-and-Match P1 Interface Connections



---

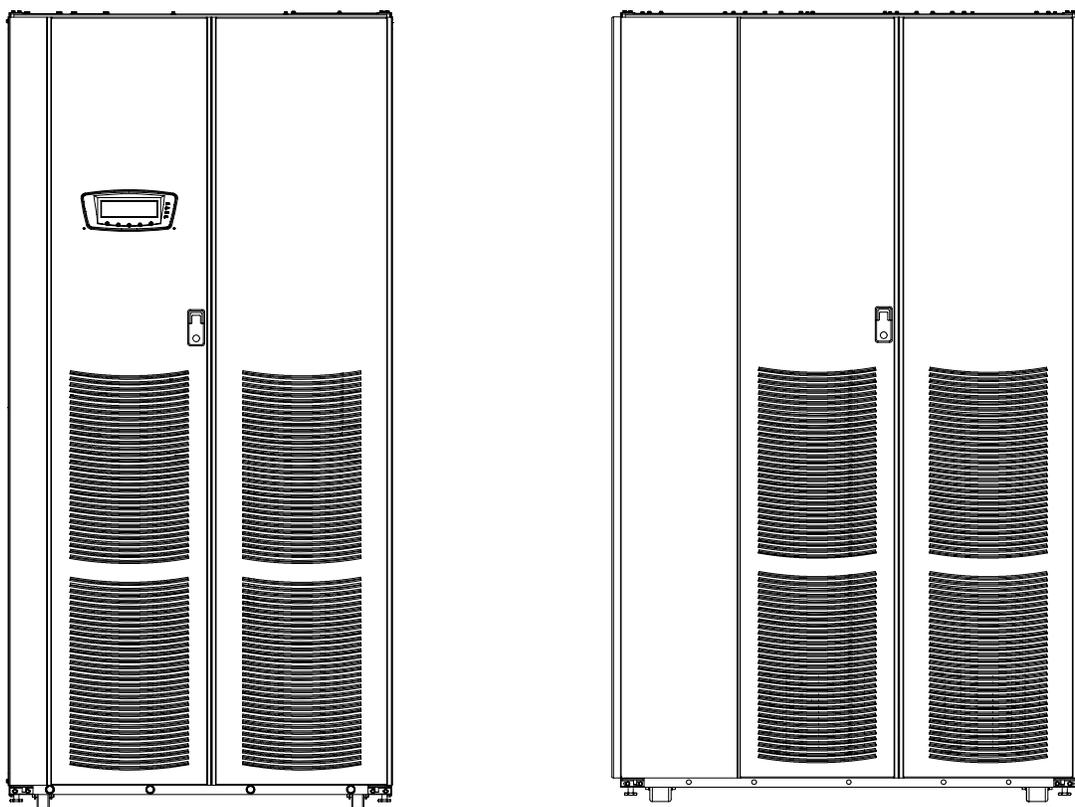
**NOTE** *When installing control wiring (such as for shunt trip or aux contacts) to the IDC interface terminals, conduit must be installed between the the UPS cabinet or device and the IDC, if wiring can not be run through line-up-and-match cabinets. Install the control wiring in separate conduit from the power wiring.*

---

1. Verify the UPS system is turned off and all power sources are removed. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual 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 doors. 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 open, remove the screws securing the inside distribution panel doors, and swing the doors open.
5. If not already removed, remove the screws securing the top internal safety shield panel, and remove the panel to gain access to the terminals.
6. Route and connect the Maintenance Bypass switch wiring from the IDC to the UPS cabinet. See Appendix A and refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations.
7. To install the REPO IDC Maintenance Bypass switch shunt trip, remove the IDC top or bottom conduit landing plate to drill or punch conduit holes (see Drawing 164201560-6 on page A-15).
8. Reinstall the conduit landing plate and install the conduit.
9. To locate the appropriate terminals, and for wiring and termination requirements, see Drawing 164201560-8, starting on page A-23 and the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations.
10. Route and connect the wiring.
11. When all wiring is complete, reinstall the safety shield panels removed in previous steps.
12. Close the inside distribution panel doors, and secure with screws.
13. Reinstall the doors removed in previous steps and secure with the retained hardware.
14. Close the door and secure the latch.

### 3.3.2 Standalone IDC Installation

Use this procedure to install a separately located IDC (see Figure 3-6).



**Figure 3-6. UPS with Standalone IDC**

1. Verify that the UPS is properly installed and secured. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for installation instructions.
2. Roll the IDC to the area where the IDC is to be installed.
3. If not already open, unfasten the front door latch and swing the doors open.
4. If not already removed, remove the doors. 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.
5. Remove the screws securing the inside distribution panel doors, and swing the doors open.
6. Remove the screws securing the internal safety shield panels, and remove the panels to gain access to the inside of the cabinet.
7. If permanently mounting the IDC, proceed to Step 10; otherwise, proceed to Step 8.
8. Secure the IDC in position by lowering the leveling feet, until the cabinet is not resting on the casters and the cabinet is level.

9. Proceed to paragraph 3.3.2.1.
10. Using the retained hardware, reinstall the shipping brackets previously removed to the front and rear of the IDC with the angle facing outward (see Figure 3-1 and Figure 3-2).
11. Secure the cabinet to the floor with contractor-supplied hardware.
12. Proceed to paragraph 3.3.2.1.

### 3.3.2.1 Installing IDC Standalone Power Wiring



---

**NOTE** *The IDC is shipped with a debris shield covering the ventilation grill on top of the unit. Do not remove the debris shield until installation is complete. However, remove the shield before operating the IDC. Once the debris shield is removed, do not place objects on the ventilation grill.*

**NOTE** *Remove the IDC cabinet top or bottom conduit landing plate to drill or punch conduit holes, or remove knockouts (see Drawing 164201560-6 on page A-15).*

**NOTE** *Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet wiring information, and conduit and terminal locations.*

---

1. Verify the UPS system is turned off and all power sources are removed. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual 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 doors. 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 open, remove the screws securing the inside distribution panel doors, and swing the doors open.
5. If not already removed, remove the screws securing the top internal safety shield panel, and remove the panel to gain access to the terminals.
6. Route the UPS output cables from the UPS to the IDC terminal block. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations and termination requirements. See Drawing 164201560-7, starting on page A-17, for IDC wiring access information and terminal locations.
7. Connect phase A, B, and C output power wiring at the UPS and the IDC terminals.



---

**NOTE** *If a BIB is not installed, a minimum of two separate feeds with upstream feeder breakers must be provided. One for the UPS and one for the IDC bypass input. Do not use one feed for both UPS and IDC.*

---

- 8.** Route the bypass input cables to the IDC terminal block. See Drawing 164201560-7, starting on page A-17, for IDC wiring access information and terminal locations.
- 9.** Connect phase A, B, and C bypass input power wiring from the source to the bypass terminals on the IDC.
- 10.** If wiring an IDC with a BIB or RIB, proceed to Step 11; otherwise, proceed to Step 13.
- 11.** Route the UPS rectifier and bypass input cables from the UPS to the IDC terminal blocks. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations and termination requirements. See Drawing 164201560-7, starting on page A-17, for IDC wiring access information and terminal locations.
- 12.** Connect phase A, B, and C input power wiring at the UPS and IDC terminals.
- 13.** If wiring an IDC with a Distribution Panel, proceed to Step 14; if wiring an IDC with Distribution Breakers or an Output Terminal Block, proceed to Step 18.
- 14.** Install the customer supplied branch circuit breakers (Cutler-Hammer type CH) into the Distribution Panel.
- 15.** Wire the branch circuits according to the branch circuit breaker manufacturers ratings and instructions, and national and local electrical codes (output is prewired to the panelboard).
- 16.** Verify the Distribution Panel Input breakers (CB10 and CB20) are set to 225A (Letter G on the breakers). Use the dial on each breaker to adjust as necessary.
- 17.** Proceed to Step 20.
- 18.** Connect phase A, B, and C, and Neutral power wiring from Output Breakers or Terminals and Neutral Terminals to the critical load.
- 19.** If installed, use the dial on each breaker to adjust Distribution breaker (CB11, CB12, CB13, CB21, CB22, and CB23) current ratings as required to protect the wiring to the load. See Table G on page A-14 for the correct breaker continuous current adjustment letter.
- 20.** Verify the settings of the installed MBP, MIS, BIB, and RIB match the values listed in Table H. Use the dial on each breaker to adjust as necessary.
- 21.** After wiring the UPS system to the facility power and critical load, be sure to ground the system according to local and/or national electrical wiring codes.
- 22.** If wiring interface connections, proceed to paragraph 3.3.2.2; otherwise, proceed to Step 23.
- 23.** When all wiring is complete, reinstall the safety shield panels removed in previous steps.

24. Close the inside distribution panel doors, and secure with screws.
25. Reinstall the doors removed in previous steps and secure with the retained hardware.
26. Close the doors and secure the latch.

### 3.3.2.2 Installing Standalone P1 Interface Connections



---

**NOTE** *When installing control wiring (such as for shunt trip or aux contacts) to the IDC interface terminals, conduit must be installed between the the UPS cabinet or device and the IDC. Install the control wiring in separate conduit from the power wiring.*

---

1. Verify the UPS system is turned off and all power sources are removed. Refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual 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 doors. 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 open, remove the screws securing the inside distribution panel doors, and swing the doors open.
5. If not already removed, remove the screws securing the top internal safety shield panel, and remove the panel to gain access to the terminals.
6. Route and connect the Maintenance Bypass switch wiring from the IDC to the UPS cabinet. See Appendix A and refer to the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations.
7. To install the REPO IDC Maintenance Bypass switch shunt trip, remove the IDC top or bottom conduit landing plate to drill or punch conduit holes (see Drawing 164201560-6 on page A-15).
8. Reinstall the conduit landing plate and install the conduit.
9. To locate the appropriate terminals, and for wiring and termination requirements, see Drawing 164201560-8, starting on page A-23 and the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual for UPS cabinet terminal locations.
10. Route and connect the wiring.
11. When all wiring is complete, reinstall the safety shield panels removed in previous steps.
12. Close the inside distribution panel doors, and secure with screws.

13. Reinstall the doors removed in previous steps and secure with the retained hardware.
14. Close the door and secure the latch.

## 3.4 Initial Startup

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms as specified on page W-1 become void. This service is offered as part of the sales contract for the UPS system. Contact service in advance (usually a two week notice is required) to reserve a preferred startup date.

## 3.5 Completing the Installation Checklist

The final step in installing the IDC is completing the following 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.

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



---

**NOTE** *The Installation Checklist MUST be completed prior to starting the UPS system for the first time.*

---

## Installation Checklist

- All packing materials and restraints have been removed from each cabinet.
- Each cabinet in the UPS system is placed in its installed location.
- Shipping brackets are installed on the cabinet and bolted to the floor for permanent installations.
- All conduits and cables are properly routed to the IDC.
- All power cables are properly sized and terminated.
- Distribution Panel branch circuit breakers are installed and wired to load. (OPTIONAL)
- If installed, Distribution Panel Input breaker current settings are correct.
- MBP, MIS, BIB, and RIB current settings are correct.
- If installed, Distribution breaker current settings are correct.
- IDC input breaker shunt trip signal wiring is connected from the IDC to the REPO. (OPTIONAL)
- IDC maintenance bypass aux contact signal wiring is connected from the IDC to the UPS.
- A ground conductor is properly installed.
- Air conditioning equipment is installed and operating correctly.
- The area around the installed UPS system is clean and dust-free. (It is recommended that the UPS and IDC be installed on a level floor suitable for computer or electronic equipment.)
- Adequate workspace exists around the IDC and other cabinets.
- Adequate lighting is provided around all UPS system equipment.
- A 120 Vac service outlet is located within 25 feet of the UPS and IDC equipment.
- The REPO device is mounted in its installed location and its wiring terminated inside the UPS and IDC cabinet. The REPO switch must be a latching-type switch with a dedicated circuit. (OPTIONAL)
- Normally-closed EPO contact (pins 1 and 2 on TB1) is jumpered if not used.
- Transformer overtemperature warning sensor is connected to the UPS building alarm. (OPTIONAL)
- Transformer overtemperature shutdown sensor is connected to the REPO. (OPTIONAL)
- The debris shield covering the IDC cabinet ventilation grill is removed.
- Startup and operational checks are performed by an authorized Eaton Customer Service Engineer.



**This page intentionally left blank.**

# **Section II** | **Operation**

**This page intentionally left blank.**

## Chapter 4 | Understanding IDC Operation

### 4.1 UPS Mode

When the Maintenance Bypass Switch (MBP) is open and the Maintenance Isolation Switch (MIS) is closed, conditioned and protected power from the UPS is routed through the MIS to the IDC 480/208V transformer.

Power from the transformer is routed to one or two 42-pole Distribution Panels through a Panelboard Input breaker. Power is then distributed to the critical loads through customer-provided branch circuit breakers. If Distribution Panels are not installed, power is distributed through either one to six optional Distribution Breakers or through output lugs.

If the optional Bypass Input Breaker (BIB) and Rectifier Input Breaker (RIB) are installed, the UPS rectifier is supplied power through the RIB and the UPS bypass is supplied power through the BIB, for a dual feed system. In a single feed system, the RIB is not installed in the IDC. Power is supplied to the UPS through the BIB only and the UPS rectifier and bypass input terminal jumpered together.

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

### 4.2 Maintenance Bypass Mode

A Maintenance Bypass switch 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 MBP is closed, the load is wrapped around the UPS while power is still supplied to the load by the UPS through the MIS. The MIS is then 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. If the optional BIB and RIB are installed, the BIB and RIB are opened to remove power from the UPS. Otherwise, external upstream breakers are used to remove power. The UPS now 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 the IDC when operating in Maintenance Bypass mode.

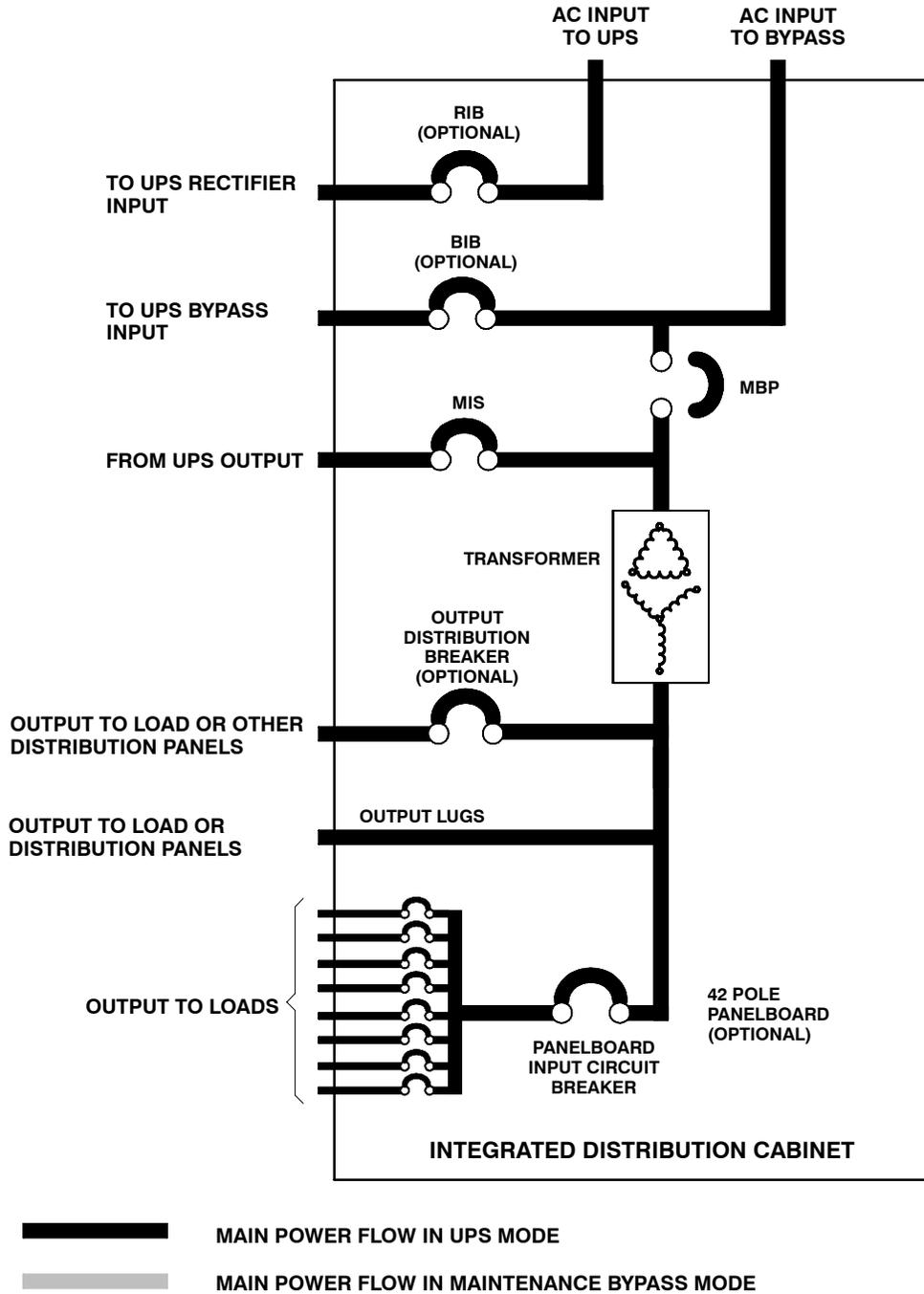


Figure 4-1. Path of Current Through the IDC in UPS Mode

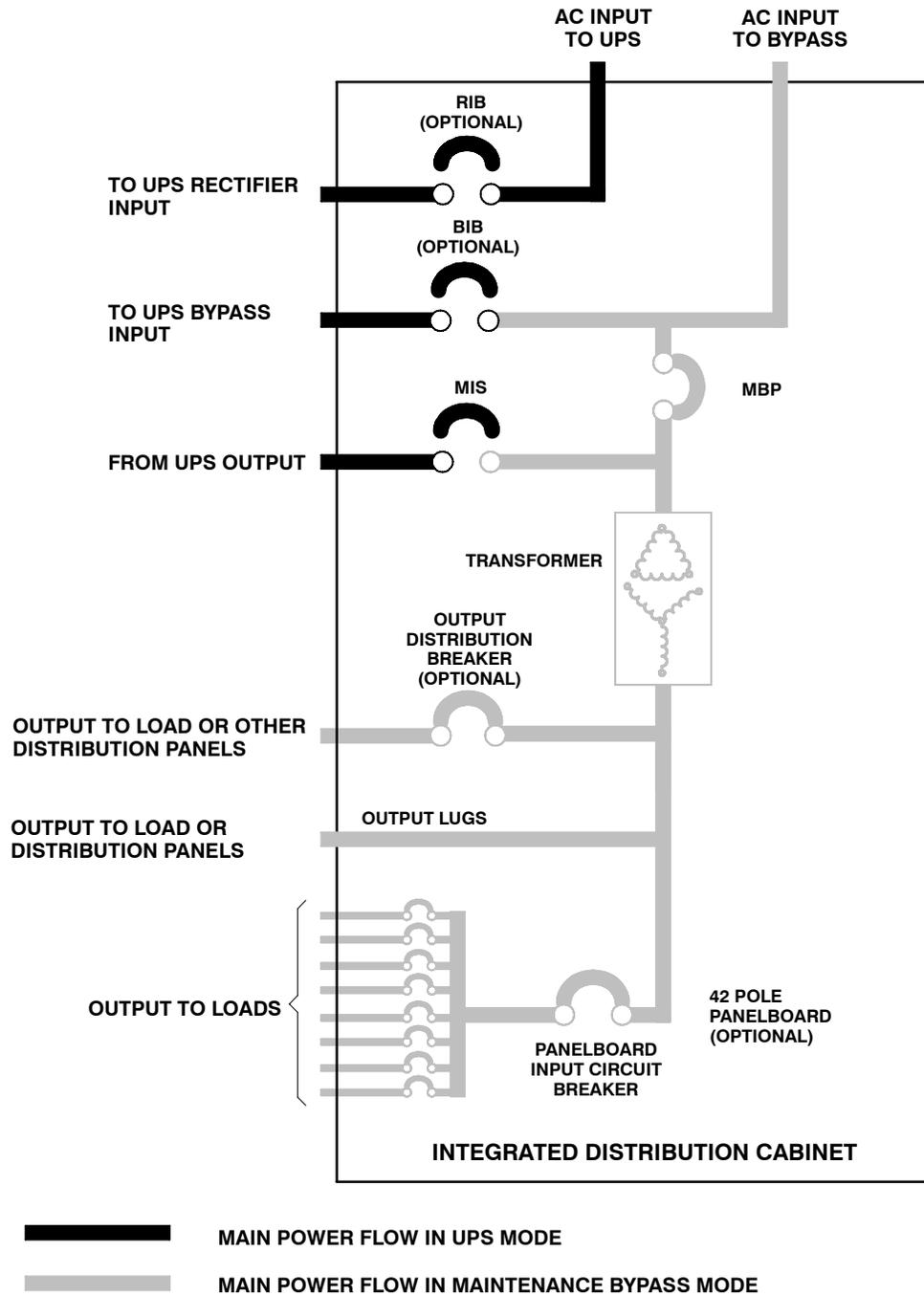


Figure 4-2. Path of Current Through the IDC in Maintenance Bypass Mode

**This page intentionally left blank.**

## Chapter 5 | IDC Features, Options, Controls, and Operation

### 5.1 IDC Standard Features

The IDC has many standard features that provide cost-effective and consistently reliable power distribution.

#### 5.1.1 Maintenance Bypass and Maintenance Isolation Switches

A Maintenance Bypass switch, in combination with the Maintenance Isolation switch, can be used to completely isolate the UPS during service. The UPS can be serviced or replaced without interrupting power to critical systems.

#### 5.1.2 Output Transformer

A 480/208 Vac output transformer provides a 208 Vac output from the 480 Vac UPS output for applications that require 208 Vac, and for use with the distribution panels supplying 208/120 Vac to the critical load.

#### 5.1.3 Customer Interface

- ▶ Maintenance Bypass Switch Monitoring – the IDC can use one UPS building alarm input to detect when the Maintenance Bypass switch is closed and the system is on bypass.
- ▶ Transformer Overtemperature Monitoring – the IDC can use one building alarm input on the UPS to monitor a transformer sensor and send a warning alarm to the UPS in the event the temperature of the transformer reaches 180° C.

#### CAUTION



All power to the critical load is lost when transformer overtemperature shutdown is activated. Install this feature with caution.

- ▶ Transformer Shutdown Monitoring – a shutdown sensor is provided to shut down the UPS in the event that the transformer is overloaded and the temperature of the transformer reaches 210° C. UPS Shutdown is an optional feature and is connected at the customer's request.

#### 5.1.4 Installation Features

The IDC can be installed in *line-up-and-match* or *standalone* configurations. The cabinet can be permanently bolted to the floor or left standing on leveling feet. Power and control wiring can be routed through the top or bottom of the cabinet with connections made to easily accessible terminals. Line-up-and-match cabinets are wired through the side panels of the units.

### 5.1.5 Expansion

The IDC supports custom configurations and scalability to adapt to changing and future power and distribution needs. See paragraph 5.2 for available options.

## 5.2 Options

Contact your sales representative for information about any of these available options:

### 5.2.1 Bypass Input Breaker (BIB)

An optional Bypass Input Breaker, for single feed and dual feed systems, is available to provide a single point of input power control to the UPS, and to easily remove power from the UPS for servicing.

### 5.2.2 Rectifier Input Breaker (RIB)

An optional Rectifier Input Breaker, for dual feed systems, is available to provide a single point of rectifier input power control to the UPS, and to easily remove power from the UPS for servicing.

### 5.2.3 Distribution Panel

An optional output Distribution Panel is available to distribute the output power from the UPS to the critical load. The IDC contains up to two 42-circuit breaker switches (Cutler-Hammer type CH), that can be assigned with flexibility to meet facility needs. The Distribution Panel is enclosed behind the hinged doors on the front of the IDC.

### 5.2.4 Distribution Breakers

Up to six optional output Distribution Breakers are available to distribute the output power from the UPS to larger critical loads. The Distribution Breakers can be adjusted for 100, 125, 150, 160, 175, 200, 225, and 250 Amp current ratings.<sup>4</sup> The Distribution Breakers are enclosed behind the hinged doors on the front of the IDC.

### 5.2.5 Lug Output

Optional output lugs are available to distribute the output power from the UPS directly to the facility distribution panels or to a large critical load.

### 5.2.6 Remote Emergency Power-off

A REMOTE EMERGENCY POWER-OFF pushbutton is a required option to provide shunt tripping of the Maintenance Bypass switch in situations where you must instantaneously control the output to the critical load. An external 120 Vac source is required to operate the shunt trip.

## 5.3 Symbols

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

- 
**ON** - Indicates the circuit breaker is in the “On” position.
- 
**OFF** - Indicates the circuit breaker is in the “Off” position.
- 
**PHASE** - The word “phase.”
- 
**RISK OF ELECTRIC SHOCK** - Indicates that a risk of electric shock is present and the associated warning should be observed.
- 
**CAUTION: REFER TO OPERATOR'S MANUAL** - Refer to your operator's manual for additional information, such as important operating and maintenance instructions.

## 5.4 IDC Controls

Figure 5-1 through Figure 5-3 identify and show the location of the controls on the Powerware 9390 160 kVA IDC. The descriptions provide a brief overview of the IDC controls, and standard and optional features.




---

**NOTE** *Read the operation sections of this manual and the Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual, and have thorough knowledge of UPS operation before attempting to operate any of the IDC controls.*

---

The IDC can contain the following controls:

- ▶ Maintenance Bypass Switch CB1 (Standard)
- ▶ Maintenance Isolation Switch CB2 (Standard)
- ▶ Bypass Input Breaker CB3 (Optional)
- ▶ Rectifier Input Breaker CB4 (Optional)
- ▶ Distribution Panels PB1 and PB2 with Panel Input Breakers (Optional)
- ▶ Distribution Breakers CB11, CB12, CB13 – Right Side and CB21, CB22, CB23 – Left Side (Optional)

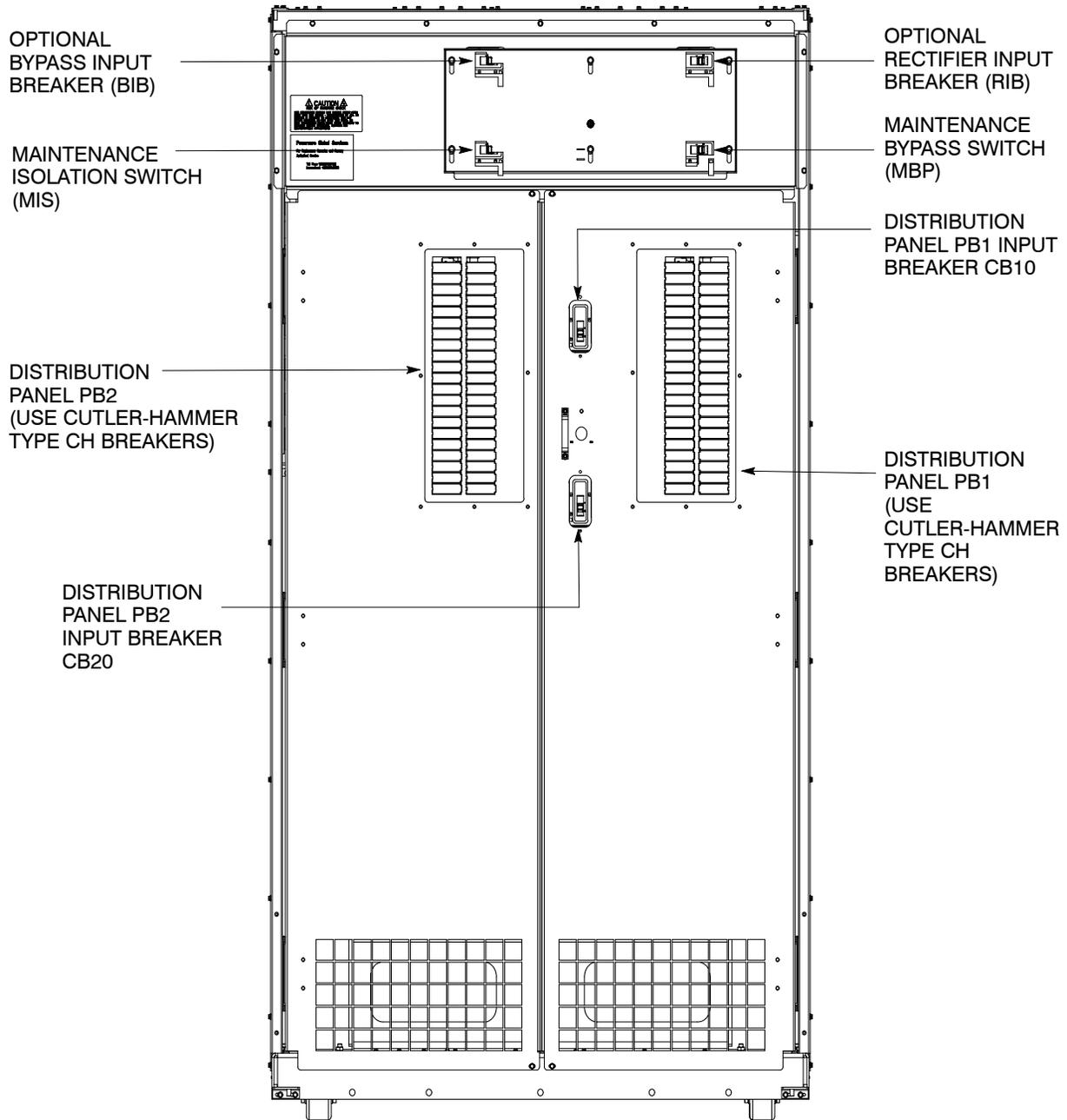


Figure 5-1. Powerware 9390 IDC Controls – with Distribution Panel Option

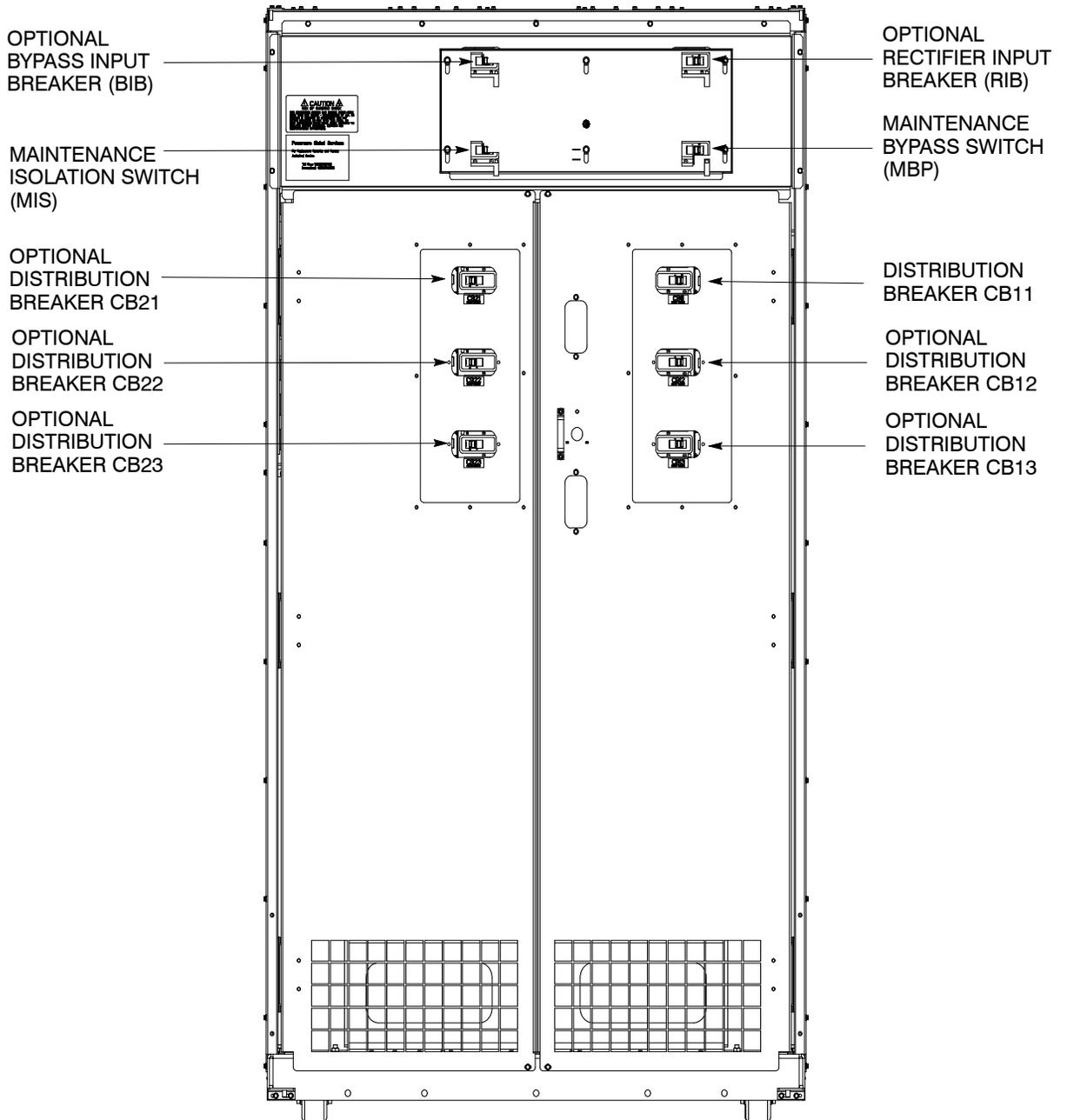


Figure 5-2. Powerware 9390 IDC Controls – with Distribution Breaker Option

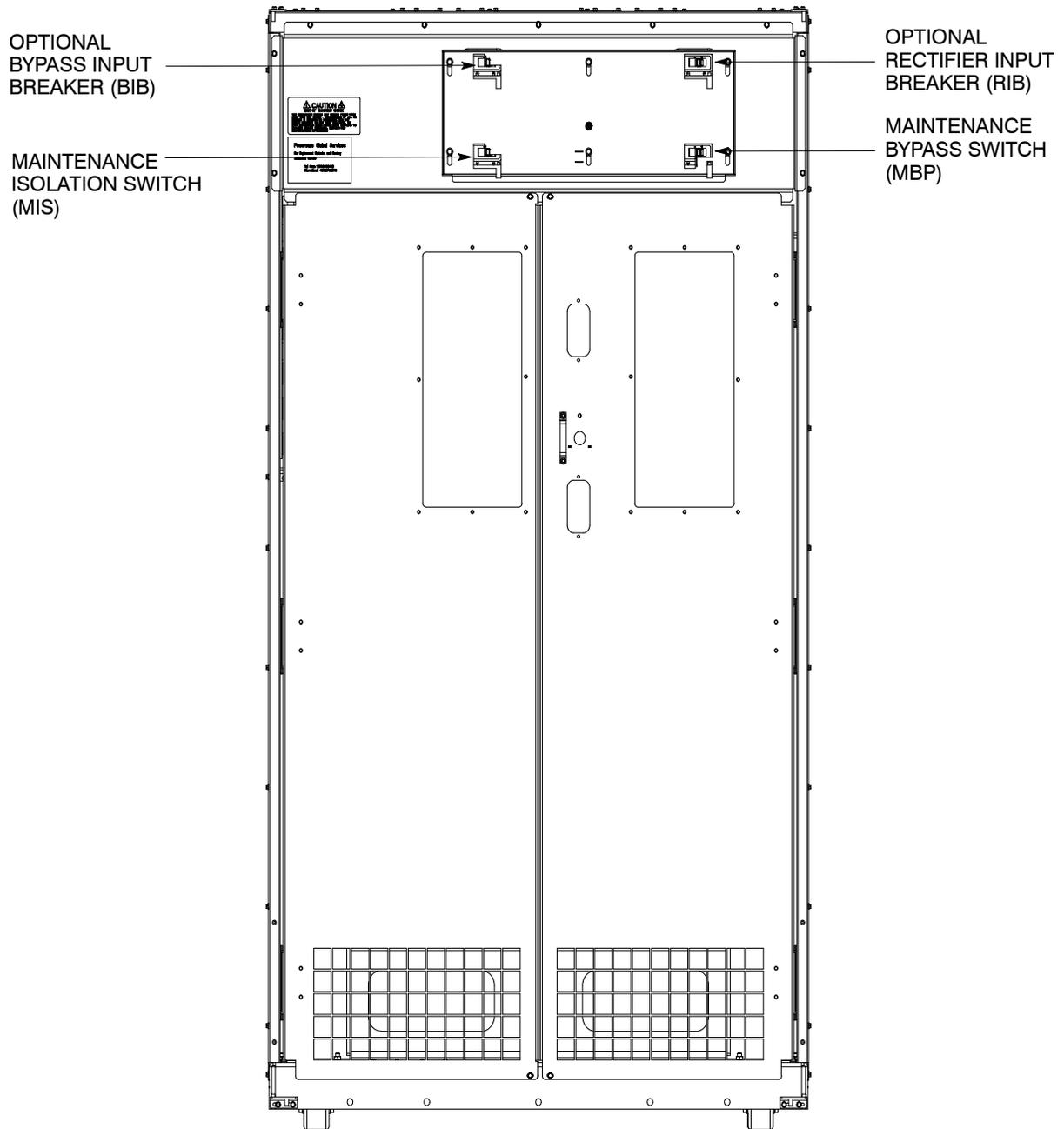


Figure 5-3. Powerware 9390 IDC Controls – with No Distribution

## 5.5 IDC Operation

### 5.5.1 Using the UPS when an IDC is Installed



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

1. Unfasten the front door latch and swing the doors open.
2. Verify that the IDC circuit breakers and switches are set as follows:

IDC Maintenance Bypass Switch CB1 (MBP)	OPEN
IDC Maintenance Isolation Switch CB2 (MIS)	CLOSED
IDC Bypass Input Breaker CB3 (BIB) (if installed)	CLOSED
IDC Rectifier Input Breaker CB4 (RIB) (if installed)	CLOSED
IDC Distribution Panel Input Breakers or Distribution Breakers (if installed)	OPEN
Distribution Panel Branch Breakers (if installed)	OPEN

3. Start the UPS in Normal mode according to the instructions in the Operation chapter of the *Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual*.
4. Close the IDC Distribution Panel Input Breakers (if installed) or the Distribution Breakers (if installed).
5. Close the Distribution Panel Branch Breakers (if installed).

### 5.5.2 Transferring the UPS to 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.

#### CAUTION



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

1. Press the **CONTROLS** button on the main menu bar. The System Controls screen appears.
2. Press the **BYPASS** button on the System Controls menu bar.

The UPS transfers to Bypass mode and the critical load is immediately supplied by the bypass source. If the bypass source is not available, the power processor remains on and an alarm sounds.

3. The UPS is now operating in Bypass mode and the **BYPASS** status indicator is illuminated.
4. Press the **→** button on the System Controls screen to display System Controls Screen 2.
5. Press the **PM OFF** button on the System Controls menu bar.

The power module (PM) status indicates SHUTDOWN. The input and output contactors open, the battery breaker or disconnect is tripped, and the power module is turned off. The bypass source supplies the critical load.



## WARNING

Power is present inside the UPS cabinets.

6. Close the MBP.
7. Completely loosen the interlock knob by hand (see Figure 5-4).
8. Slide the interlock plate up until the standoff aligns with the Bypass arrow (see Figure 5-4).
9. Retighten the interlock knob.
10. Open the MIS.
11. Open the BIB and RIB if installed.

### 5.5.3 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.

---

**CAUTION**

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

---

1. Close the BIB and RIB if installed.
2. Verify that the UPS is operating and is in Bypass mode. Refer to the *Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual*.
3. Close the MIS.
4. Completely loosen the interlock knob by hand (see Figure 5-4).
5. Slide the interlock plate up until the standoff aligns with the Bypass arrow (see Figure 5-4).
6. Retighten the interlock knob.
7. Open the MBP.
8. Transfer the UPS to Normal mode.

## 5.5.4 Using the Remote Emergency Power-off Switch

An Emergency Power-Off is initiated by the **Remote Emergency Power-off (REPO)** pushbutton switch. In an emergency, you can use this switch to control the IDC and UPS output. The REPO switch opens the IDC Maintenance Bypass switch if closed, de-energizes the critical load, and powers down the UPS immediately, without asking for verification.

The UPS, including Bypass, remains off until restarted.

To use the REPO switch:

### CAUTION



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



**NOTE** *The following instructions are general instructions for activating a REPO switch. Refer to the operating instructions provided with the switch for specific instructions.*

1. Press the REPO pushbutton switch.

The IDC Maintenance Bypass switch is tripped, the UPS input, output, and bypass backfeed contactors open, the battery breaker or disconnect is tripped, and the Power Module is turned off immediately, without asking for verification.

### CAUTION



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

2. To restart the UPS after using the REPO pushbutton, reset the REPO switch and then follow the procedures in the Operation chapter of the *Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual*.



**This page intentionally left blank.**

## Chapter 6 | Maintaining the IDC

The components inside the Integrated Distribution Cabinet (IDC) 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.

### 6.1 Important Safety Instructions

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



#### WARNING

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

### 6.2 Performing Preventive Maintenance

The IDC requires very little preventive maintenance. However, the system should be inspected periodically to verify that the unit is operating normally.

#### 6.2.1 DAILY Maintenance

Perform the following steps daily:

1. Check the area surrounding the IDC. Verify the area is not cluttered, allowing free access to the unit.
2. Verify the air intakes (vents on front and bottom of cabinet) and exhaust opening (on top of the IDC) are not blocked.
3. Verify the operating environment is within the parameters specified in Chapter 7, “Product Specifications” and Drawing 164201560-2 on page A-4.
4. Record the check results and any corrective actions in a suitable log.

## 6.2.2 PERIODIC Maintenance

Periodic inspections of the IDC 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.

## 6.2.3 ANNUAL Maintenance

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

## 6.3 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 in accordance with the manufacturer's recommendations.

## 6.4 Maintenance Training

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

## Chapter 7 | Product Specifications

### 7.1 Model Number

The IDC is housed in a free-standing cabinet with safety shields behind the doors.

System	Model	Frequency
Powerware 9390	160 kVA	60 Hz
Powerware 9390	120 kVA	60 Hz

### 7.2 IDC Input

Operating Input Voltage (Nominal +10/–15%)	480 Vac nominal (60 Hz)
Operating Input Frequency Range	±5 Hz
Operating Input Current	See Appendix A, Table D

### 7.3 IDC Output

Operating Output Voltage (Nominal +10/–15%)	208 Vac nominal (60 Hz)
Operating Output Frequency Range	±5 Hz
Output Current	See Appendix A, Table D

### 7.4 Environmental Specifications

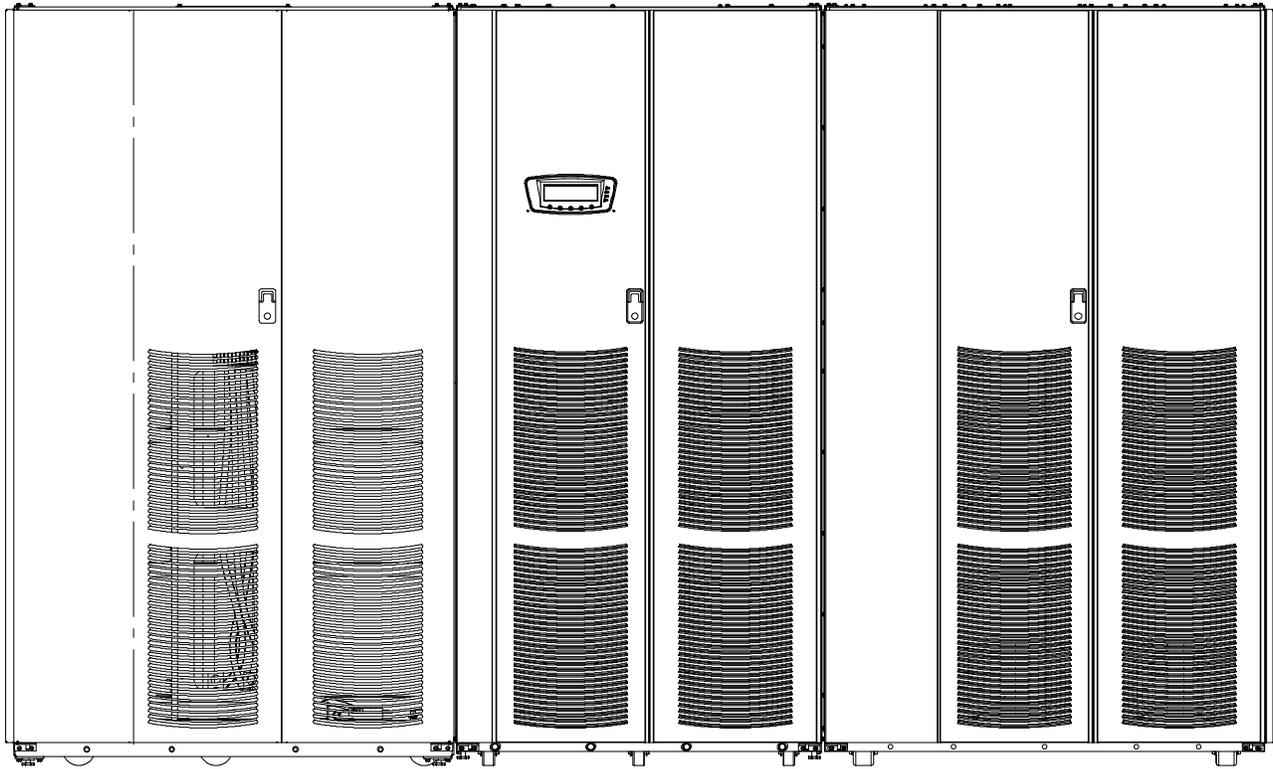
Operating Temperature	0 to 40°C (32–104°F) without derating. The recommended operating temperature is 25°C (77°F).
Operating Altitude	Maximum 1500m (5000 ft) at 40°C without derating
Storage Temperature	–25 to +60°C
Relative Humidity (operating and storage)	5% to 95% maximum noncondensing
Acoustical Noise	N/A
EMI Suppression	N/A
Electrostatic Discharge (ESD) Immunity	N/A

**This page intentionally left blank.**

## Appendix A | Installation Information

The information in this appendix will help during the planning and installation of the Integrated Distribution Cabinet (IDC). This appendix contains the following drawings:

- ▶ 164201560-1 Typical Powerware 9390 UPS System with Integrated Distribution Cabinet
- ▶ 164201560-2 Physical Features and Requirements
- ▶ 164201560-3 IDC Online Drawings
- ▶ 164201560-4 IDC Distribution Panel Schematic
- ▶ 164201560-5 Power Wiring Installation Notes
- ▶ 164201560-6 Conduit and Wire Entry Locations
- ▶ 164201560-7 IDC Power Terminal Locations
- ▶ 164201560-8 Interface and Control Wiring Installation Notes and Terminal Locations
- ▶ 164201560-9 IDC Dimensions



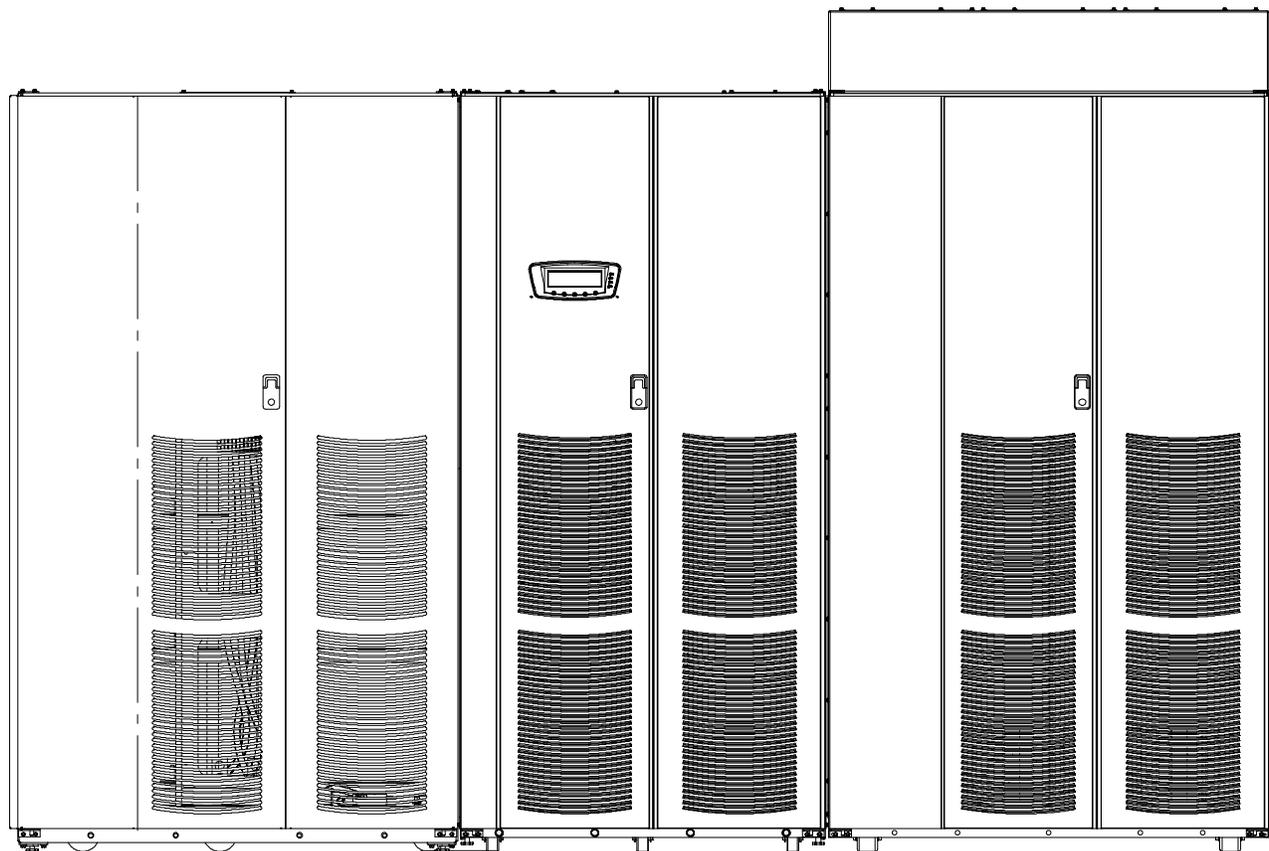
**BATTERY CABINET**

**UPS CABINET**

**IDC**

**IDC WITHOUT TOP ENTRY OPTION**

<b>DESCRIPTION:</b> TYPICAL POWERWARE 9390 UPS SYSTEM WITH INTEGRATED DISTRIBUTION CABINET	
<b>DRAWING NO:</b> 164201560-1	<b>SHEET:</b> 1 of 2
<b>REVISION:</b> A	<b>DATE:</b> 071504



**BATTERY CABINET**

**UPS CABINET**

**IDC**

**IDC WITH TOP ENTRY OPTION**

<i>DESCRIPTION:</i> <b>TYPICAL POWERWARE 9390 UPS SYSTEM WITH INTEGRATED DISTRIBUTION CABINET</b>	
<i>DRAWING NO:</i> 164201560-1	<i>SHEET:</i> 2 of 2
<i>REVISION:</i> A	<i>DATE:</i> 071504

1. The IDC equipment operating environment must meet the weight requirements shown in Table A and size requirements shown on Drawing 164201560–9.
2. The IDC cabinet is palletted separately for shipping.
3. Do not tilt cabinets more than  $\pm 10^\circ$  during handling.
4. Dimensions are in millimeters (inches).

<b>Table A. Equipment Weight</b>			
<i>Component/Model</i>	<i>Weight kg (lb)</i>		
	<i>Shipping</i>	<i>Installed</i>	<i>Point Loading</i>
Powerware 9390 IDC Cabinet with Transformer and Maintenance Bypass Breakers	1021 (2250)	991 (2185)	4 at 247.8 (546.3)
<b>NOTES:</b> <ol style="list-style-type: none"> <li>1. For IDC with Distribution Panels, add 11.3 kg (25 lb) for each panel.</li> <li>2. For IDC with Distribution Breakers, add 6.8 kg (15 lb) for each breaker.</li> <li>3. For IDC with Output Lugs, add 2.3 kg (5 lb).</li> <li>4. For IDC with a BIB, add 6.8 kg (15 lb).</li> <li>5. For IDC with a BIB and RIB, add 13.6 kg (30 lb).</li> </ol>			

5. The clearances required around the IDC cabinet are shown in Table B.

<b>Table B. IDC Cabinet Clearances</b>	
From Top of Cabinet	Minimum clearance over the IDC cabinet is 457.2 mm (18 in.) for ventilation
From Front of Cabinet	36 inches working space
From Back of Cabinet	None Required
From Right Side of Cabinet	None Required
From Left Side of Cabinet	None Required

<i>DESCRIPTION:</i> <b>PHYSICAL FEATURES AND REQUIREMENTS</b>	
<i>DRAWING NO.:</i> 164201560–2	<i>SHEET:</i> 1 of 2
<i>REVISION:</i> A	<i>DATE:</i> 071504

6. The basic environmental requirements for operation of the IDC are:

**Ambient Temperature Range:** 0–40°C (32–104°F)

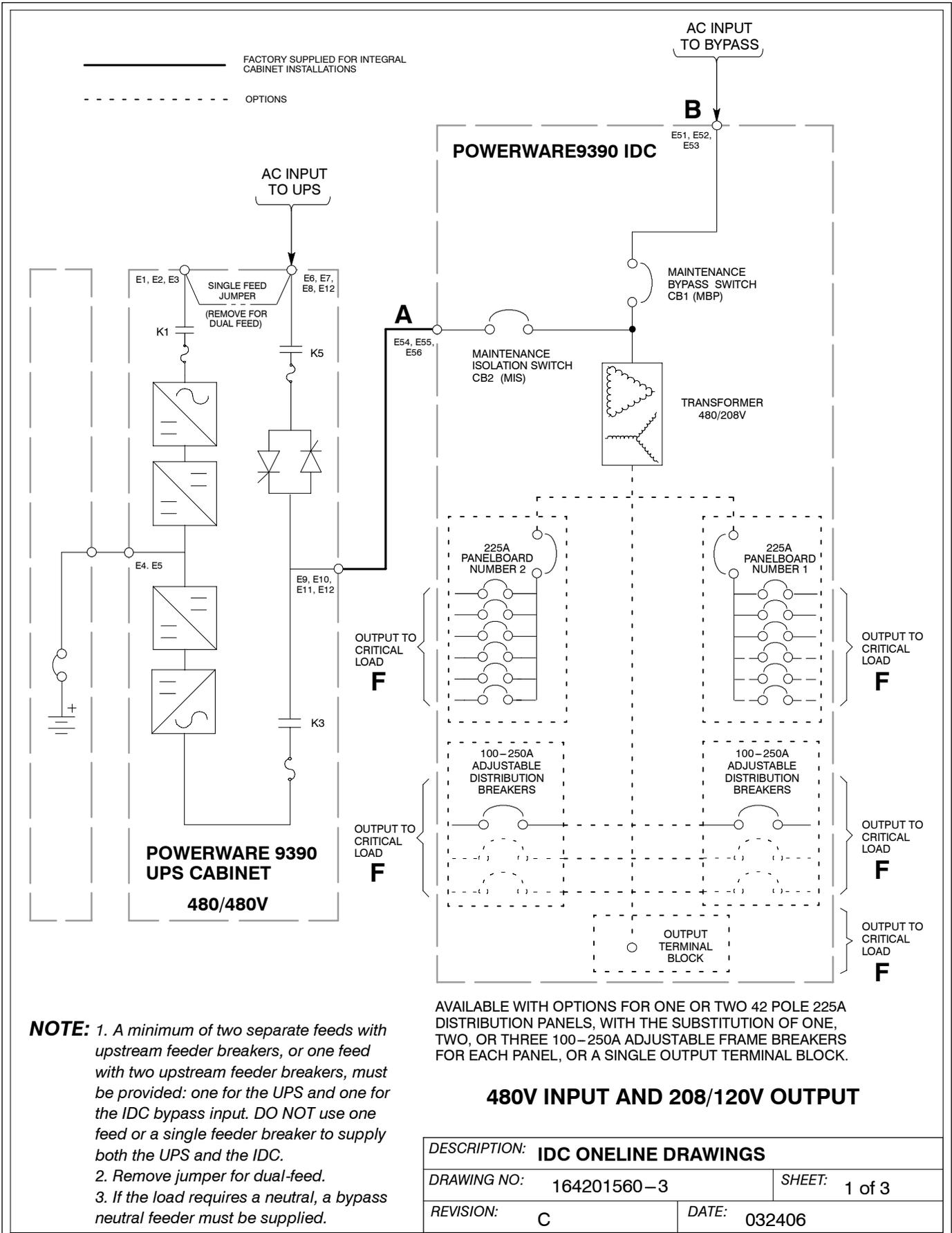
**Recommended Operating Range:** 20–25°C (68–77°F)

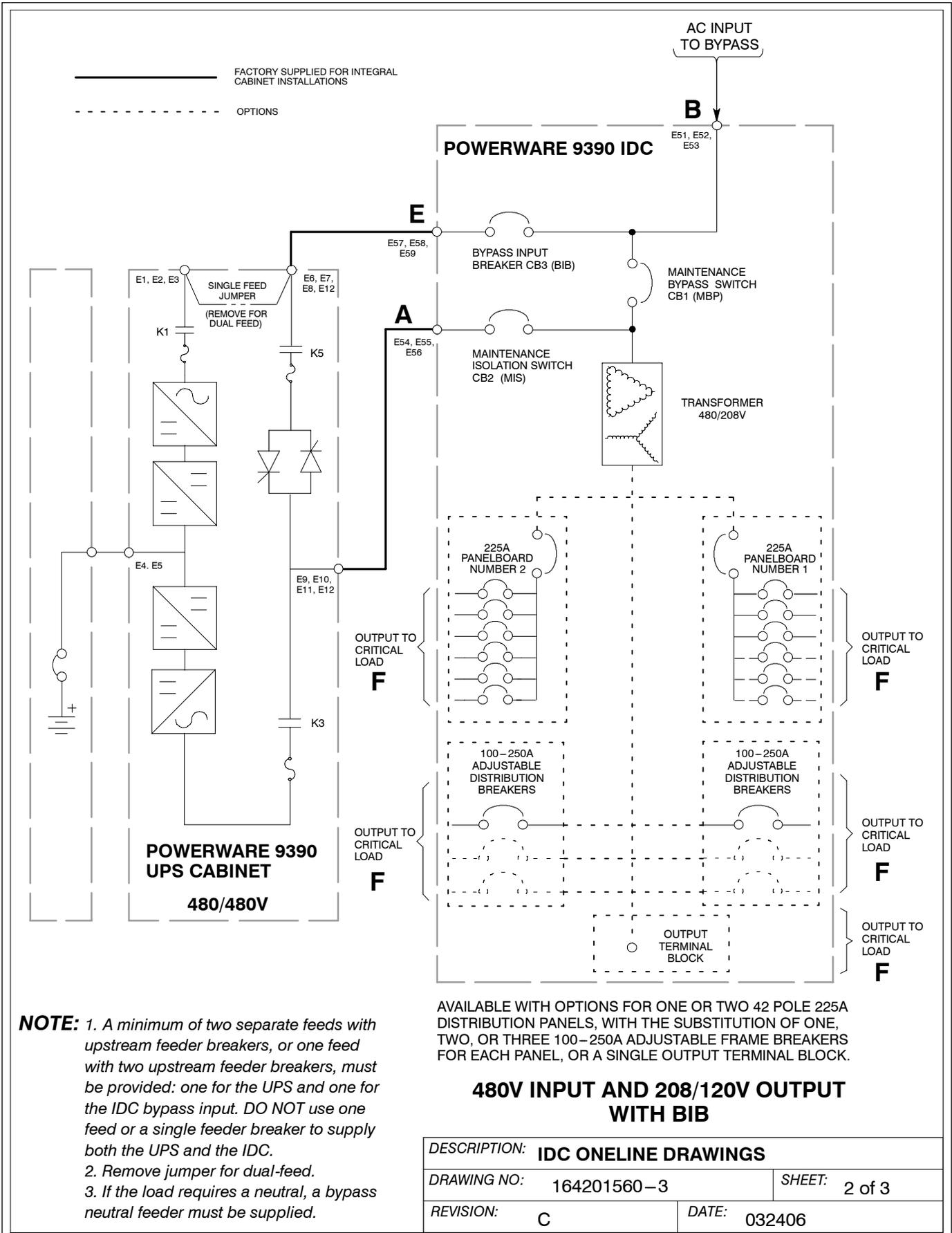
**Maximum Relative Humidity:** 95%, noncondensing

The IDC ventilation requirements are shown in Table C.

<b>Table C. Air Conditioning or Ventilation Requirements During Full Load Operation</b>		
<i>Component/Model</i>	<i>Input/Output Voltage</i>	Heat Rejection BTU/hr × 1000/hr (kg–cal/hr)
160 kVA with Transformer	480/208	14.8 (3.6)
120 kVA with Transformer	480/208	11.1 (2.7)

<i>DESCRIPTION:</i> <b>PHYSICAL FEATURES AND REQUIREMENTS</b>	
<i>DRAWING NO.:</i> 164201560–2	<i>SHEET:</i> 2 of 2
<i>REVISION:</i> A	<i>DATE:</i> 113004



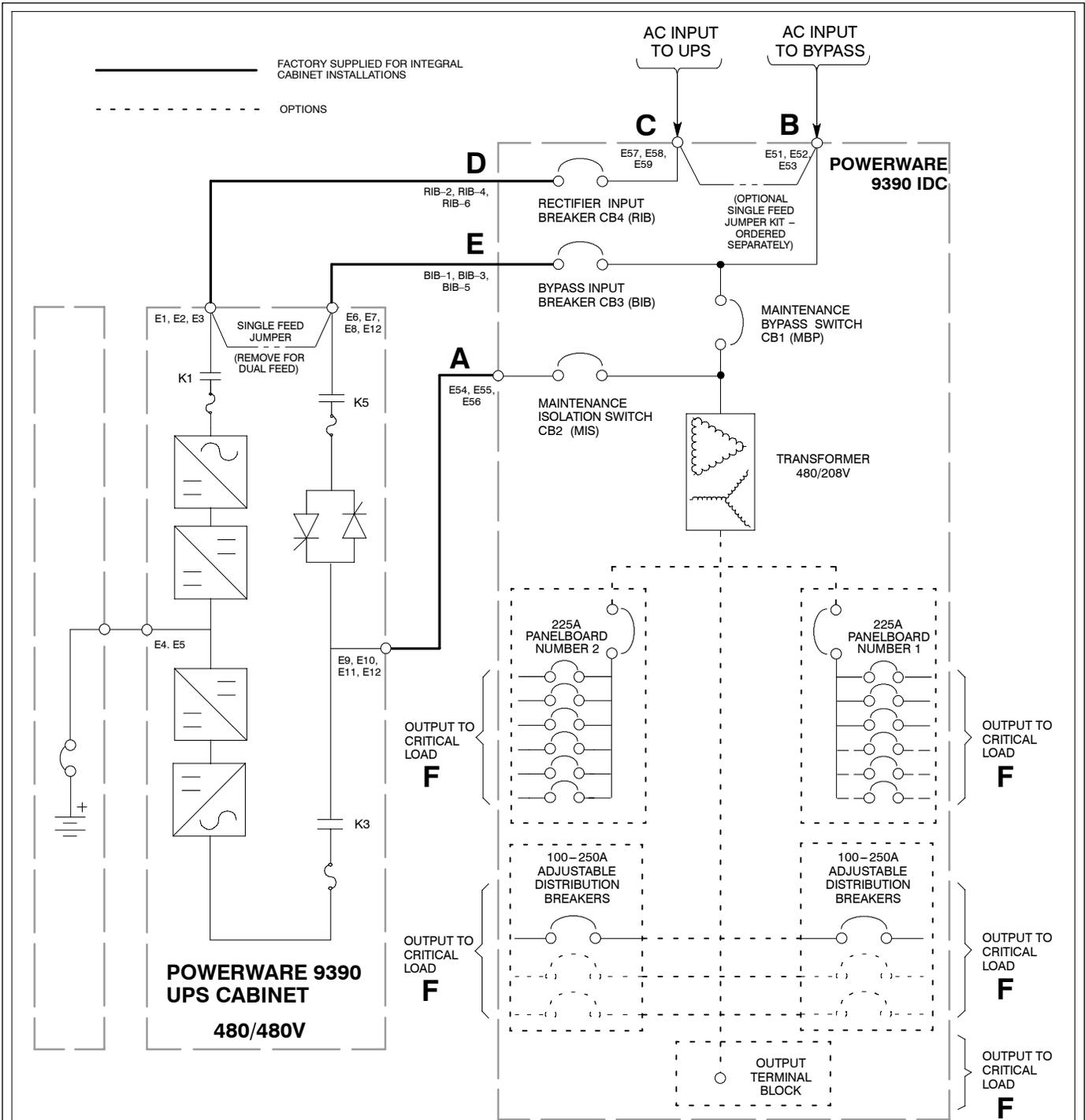


**NOTE:** 1. A minimum of two separate feeds with upstream feeder breakers, or one feed with two upstream feeder breakers, must be provided: one for the UPS and one for the IDC bypass input. DO NOT use one feed or a single feeder breaker to supply both the UPS and the IDC.  
 2. Remove jumper for dual-feed.  
 3. If the load requires a neutral, a bypass neutral feeder must be supplied.

AVAILABLE WITH OPTIONS FOR ONE OR TWO 42 POLE 225A DISTRIBUTION PANELS, WITH THE SUBSTITUTION OF ONE, TWO, OR THREE 100-250A ADJUSTABLE FRAME BREAKERS FOR EACH PANEL, OR A SINGLE OUTPUT TERMINAL BLOCK.

**480V INPUT AND 208/120V OUTPUT WITH BIB**

DESCRIPTION: <b>IDC ONELINE DRAWINGS</b>	
DRAWING NO: 164201560-3	SHEET: 2 of 3
REVISION: C	DATE: 032406

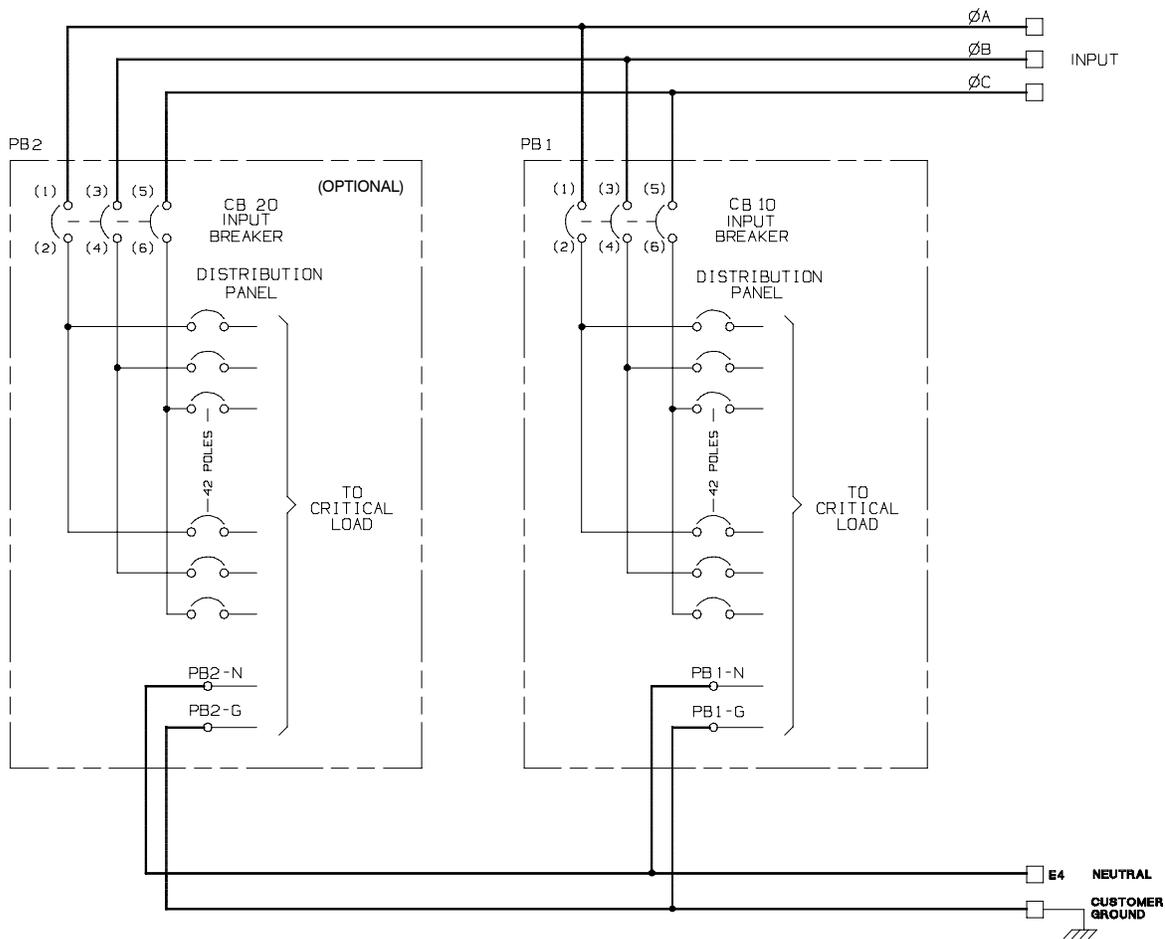


**NOTE:** 1. A minimum of two separate feeds with upstream feeder breakers, or one feed with two upstream feeder breakers, must be provided: one for the UPS and one for the IDC bypass input. DO NOT use one feed or a single feeder breaker to supply both the UPS and the IDC.  
 2. Remove jumper for dual-feed.  
 3. If the load requires a neutral, a bypass neutral feeder must be supplied.

AVAILABLE WITH OPTIONS FOR ONE OR TWO 42 POLE 225A DISTRIBUTION PANELS, WITH THE SUBSTITUTION OF ONE, TWO, OR THREE 100-250A ADJUSTABLE FRAME BREAKERS FOR EACH PANEL, OR A SINGLE OUTPUT TERMINAL BLOCK.

**480V INPUT AND 208/120V OUTPUT WITH BIB AND RIB**

DESCRIPTION: <b>IDC ONELINE DRAWINGS</b>	
DRAWING NO: 164201560-3	SHEET: 3 of 3
REVISION: C	DATE: 032406



**NOTE:** Branch circuit breakers for PB1 and PB2 provided by customer.

DESCRIPTION: <b>IDC DISTRIBUTION PANEL SCHEMATIC</b>	
DRAWING NO: 164201560-4	SHEET: 1 of 1
REVISION: A	DATE: 113004

**Table D. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9390 IDC**

		<b>Units</b>	<b>Rating 60 Hz</b>
<b>Basic Unit Rating</b>		UPS KVA	100/120/160
IDC Input and IDC Bypass Input		VOLTS	480
IDC Output		VOLTS	208
<b>AC Input from UPS</b> (Standalone Installation) (3) Phases, (1) Ground  Minimum Conductor Size Number per Phase	<b>A</b>	AMPS	120/144/192
		AWG or kcmil (each)	For contractor-supplied wiring, refer to the <i>Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual</i> for wire size. Wiring for Line-up-and-match installation is factory-supplied.
<b>AC Input to Maintenance Bypass</b> (Line-up-and-Match or Standalone Installation) (single-feed without BIB or RIB, or dual-feed with BIB and RIB) (3) Phases, (1) Neutral—if required, (1) Ground  Minimum Conductor Size Number per Phase	<b>B</b>	AMPS	120/144/192
		AWG or kcmil (each)	1/0 (2)
<b>AC Input to Maintenance Bypass</b> (Line-up-and-Match or Standalone Installation) (single-feed with BIB, or single-feed with BIB and RIB) (3) Phases, (1) Neutral—if required, (1) Ground  Minimum Conductor Size Number per Phase	<b>B</b>	AMPS	130/160/210
		AWG or kcmil (each)	1/0 (2)
<b>AC Input to Optional RIB</b> (Line-up-and-Match or Standalone Installation) (3) Phases, (1) Neutral—if required, (1) Ground  Minimum Conductor Size Number per Phase	<b>C</b>	AMPS	130/160/210
		AWG or kcmil (each)	1/0 (2)
<b>AC Output from Optional RIB to UPS</b> (Standalone Installation) (3) Phases, (1) Neutral—if required, (1) Ground  Minimum Conductor Size Number per Phase	<b>D</b>	AMPS	130/160/210
		AWG or kcmil (each)	For contractor-supplied wiring, refer to the <i>Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual</i> for wire size. Wiring for Line-up-and-match installation is factory-supplied.
<b>AC Output from Optional BIB to UPS</b> (Standalone Installation) (3) Phases, (1) Neutral—if required, (1) Ground  Minimum Conductor Size Number per Phase	<b>E</b>	AMPS	120/144/192
		AWG or kcmil (each)	For contractor-supplied wiring, refer to the <i>Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual</i> for wire size. Wiring for Line-up-and-match installation is factory-supplied.
<b>AC Output from Distribution Breaker to Critical Load</b> (3) Phases, (1) Neutral—if required, (1) Ground	<b>F</b>	Wire branch circuits in accordance with branch circuit breaker manufacturers ratings, and national and local electrical codes.	
<b>AC Output from Output Terminal Block to Critical Load</b> (3) Phases, (1) Neutral—if required, (1) Ground	<b>F</b>	Wire output in accordance with national and local electrical codes. Refer to the <i>Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual</i> for output current rating and wire size.	
<b>AC Output from Distribution Panel Breakers to Critical Load</b>	<b>F</b>	Wire branch circuits in accordance with branch circuit breaker manufacturers ratings and instructions, and national and local electrical codes (output is prewired to the panelboard).	

**NOTE:** Callout letters **A, B, C, D, E** and **F** map to drawing 164201560–3.

<b>DESCRIPTION: POWER WIRING INSTALLATION NOTES</b>		
<b>DRAWING NO:</b>	164201560–5	<b>SHEET:</b> 1 of 4
<b>REVISION:</b>	C	<b>DATE:</b> 032406

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

1. Refer to national and local electrical codes for acceptable external wiring practices.
2. Material and labor for external wiring requirements are to be provided by designated personnel.
3. For external input wiring, use 90°C copper wire. See the appropriate column in Table D. Wire sizes are based on using the specified breakers.
4. Wire ampacities are chosen from Table 310–16 of the NEC. Input wire is 90°C specification.
5. If a BIB is not installed, a minimum of two separate feeds with upstream feeder breakers must be provided. One for the for the UPS and one for the IDC bypass input. Do not use one feed for both UPS and IDC.
6. The IDC cabinet is shipped with a debris shield covering the ventilation grill on top of the unit. Do not remove the debris shield until installation is complete. However, remove the shield before operating the IDC. Once the debris shield is removed, do not place objects on the ventilation grill.
7. Optional 225A Distribution Panel uses Cutler-Hammer type CH breakers to be provided by the customer.
8. Refer to Section I of this manual for installation instructions.
9. Refer to the *Powerware 9390 UPS (100–160 kVA) Installation and Operation Manual* for UPS cabinet conduit and terminal locations.
10. Terminals are UL and CSA rated at 90°C. Refer to Table E for power cable terminations. Drawing 164201560–7 shows the location of the power cable terminals inside the UPS cabinet.
11. Per NEC article 300-20(a), 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.

DESCRIPTION: <b>POWER WIRING INSTALLATION NOTES</b>	
DRAWING NO: 164201560–5	SHEET: 2 of 4
REVISION: B	DATE: 123004

<b>Table E. IDC Power Cable Terminations 480V/208V</b>						
<i>Terminal Function</i>	<i>Terminal</i>	<i>Function</i>	<i>Size of Pressure Termination</i>	<i>Tightening Torque Nm (lb in)</i>	<i>Type Screw</i>	
<b>AC Input from UPS</b>	E54	Phase A	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E55	Phase B	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E56	Phase C	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
<b>AC Input to Maintenance Bypass</b>	E51	Phase A	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E52	Phase B	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E53	Phase C	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
<b>AC Input to Optional RIB</b>	E57	Phase A	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E58	Phase B	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E59	Phase C	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
<b>AC Output from Optional RIB (CB4) to UPS</b>	RIB–2	Phase A	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	RIB–4	Phase B	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	RIB–6	Phase C	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
<b>AC Output from Optional BIB to UPS (without RIB)</b>	E57	Phase A	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E58	Phase B	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
	E59	Phase C	2 – #6–250 kcmil	42.4 (375)	5/16 in. Hex	
<b>AC Output from Optional BIB (CB3) to UPS (with RIB)</b>	BIB–1	Phase A	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	BIB–3	Phase B	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	BIB–5	Phase C	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
<b>Ground</b>	E8	Ground	2 – #14–1/0	5.6 (50)	Slotted	
<b>Ground</b>	E9	Ground	2 – #14–1/0	5.6 (50)	Slotted	
<b>AC Output from Distribution Breaker to Critical Load</b>	CBxx–2	Phase A	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	CBxx–4	Phase B	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	CBxx–6	Phase C	1 – #4–350 kcmil	20.3 (180)	3/16 in. Hex	
	E10, E20	Neutral	4 ea. – #4–300 kcmil	31 (275)	5/16 Hex	
	E18, E19, E28, E29	Ground	2 ea. – #14–1/0	5.6 (50)	Slotted	
<b>AC Output from Output Terminal Block to Critical Load</b>	E11	Phase A	2 – #6–500 kcmil	56.5 (500)	1/2 in. Hex	
	E12	Phase B	2 – #6–500 kcmil	56.5 (500)	1/2 in. Hex	
	E13	Phase C	2 – #6–500 kcmil	56.5 (500)	1/2 in. Hex	
	<b>Neutral</b>	E10	Neutral	4 – #6–500 kcmil	56.5 (500)	1/2 in. Hex
	<b>Ground</b>	E19	Ground	2 – #14–1/0	5.6 (50)	Slotted
<b>AC Output from Distribution Panel Breakers to Critical Load</b>	Wire branch circuits in accordance with branch circuit breaker manufacturers ratings and instructions (output is prewired to the panelboard)					
	<b>Neutral</b>	PB1–N PB2–N	Neutral	42 – #4–#14	#4–#6: 4.0 (35) #8: 2.8 (25) #10–#14: 2.3 (20)	Slotted
	<b>Ground</b>	E18, E19, E28, E29	Ground	42 – #4–#14	#4–#6: 4.0 (35) #8: 2.8 (25) #10–#14: 2.3 (20)	Slotted

<b>DESCRIPTION: POWER WIRING INSTALLATION NOTES</b>	
<b>DRAWING NO:</b> 164201560–5	<b>SHEET:</b> 3 of 4
<b>REVISION:</b> B	<b>DATE:</b> 123004

- 12. External bypass input overcurrent protection is not provided by this product, but is required by codes. Refer to Table D for wiring requirements.
- 13. Table F lists the maximum rating for bypass input circuit breakers.

<b>Table F. Maximum Bypass Input Circuit Breaker Ratings</b>		
<i>IDC Model</i>	<i>Input Voltage Rating</i>	
		480V
160 kVA	80% Rated	300
	100% Rated	250
120 kVA	80% Rated	225
	100% Rated	175

**CAUTION**



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

<i>DESCRIPTION:</i> <b>POWER WIRING INSTALLATION NOTES</b>		
<i>DRAWING NO:</i>	164201560-5	<i>SHEET:</i> 4 of 4
<i>REVISION:</i>	A	<i>DATE:</i> 113004

14. The continuous current (I<sub>r</sub>) value for the corresponding lettered adjustment setting marked on the the MIS, Distribution Panel Input breakers (CB10 and CB20), and Distribution breakers (CB11, CB12, CB13, CB21, CB22, and CB23), are listed in Table G.

<i>Breaker Setting</i>	<i>Continuous Current (I<sub>r</sub>)</i>	<i>Breaker Setting</i>	<i>Continuous Current (I<sub>r</sub>)</i>
A	100	E	175
B	125	F	200
C	150	G	225
D	160	H	250

15. Verify the settings of the installed MBP, BIB, and RIB (if adjustable) match the values listed in Table H. Use the dial on each breaker to adjust as necessary.

<i>UPS Model</i>	<i>Continuous Current (I<sub>r</sub>)</i>	<i>Breaker Setting</i>
Powerware 9390–100	150A	C
Powerware 9390–120	175A	E
Powerware 9390–160	250A	H

16. Verify the settings of the installed MIS matches the values listed in Table I. Use the dial on the breaker to adjust as necessary.

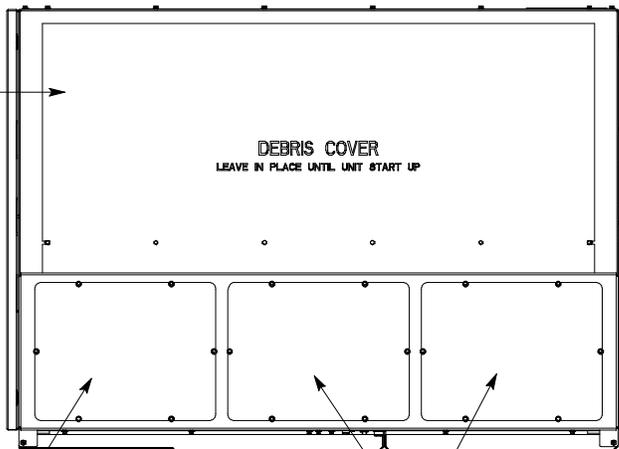
<i>UPS Model</i>	<i>Continuous Current (I<sub>r</sub>)</i>	<i>Breaker Setting</i>
Powerware 9390–100	150A	C
Powerware 9390–120	175A	E
Powerware 9390–160	250A	H

17. If installed, verify the Distribution Panel Input breakers (CB10 and CB20) are set to 225A (Letter G on the breakers). Use the dial on each breaker to adjust as necessary.
18. If installed, use the dial on each breaker to adjust Distribution breaker (CB11, CB12, CB13, CB21, CB22, and CB23) current ratings as required to protect the wiring to the load. See Table G for the correct breaker continuous current adjustment letter.

<i>DESCRIPTION:</i> <b>POWER WIRING INSTALLATION NOTES</b>	
<i>DRAWING NO:</i> 164201560–5	<i>SHEET:</i> 5 of 4
<i>REVISION:</i> B	<i>DATE:</i> 123004

REMOVE DEBRIS SHIELD COVERING EXHAUST GRILL BEFORE OPERATING SYSTEM.

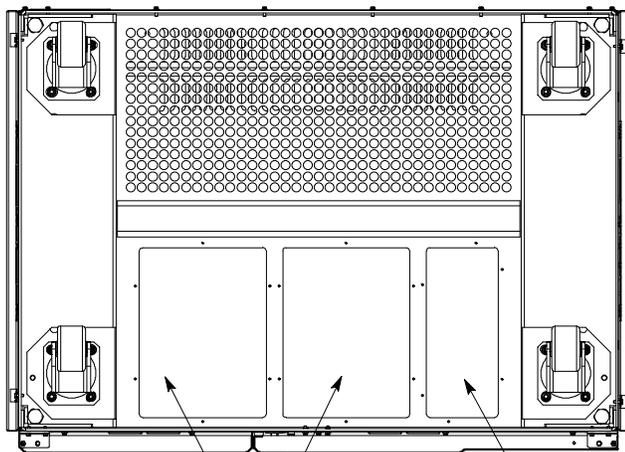
**TOP VIEW**  
(WITH TOP ENTRY OPTION)



DEBRIS COVER  
LEAVE IN PLACE UNTIL UNIT START UP

TOP ENTRY CONDUIT LANDING PLATE FOR AC INPUT AND INTERFACE CONNECTIONS. (REMOVE PANEL TO DRILL OR PUNCH CONDUIT HOLES.)

TOP ENTRY CONDUIT LANDING PLATE FOR AC OUTPUT. MAY BE INTERCHANGED WITH BOTTOM PREPUNCHED OUTPUT PLATES. (REMOVE PANEL TO TO DRILL OR PUNCH CONDUIT HOLES, OR REMOVE KNOCKOUTS.)

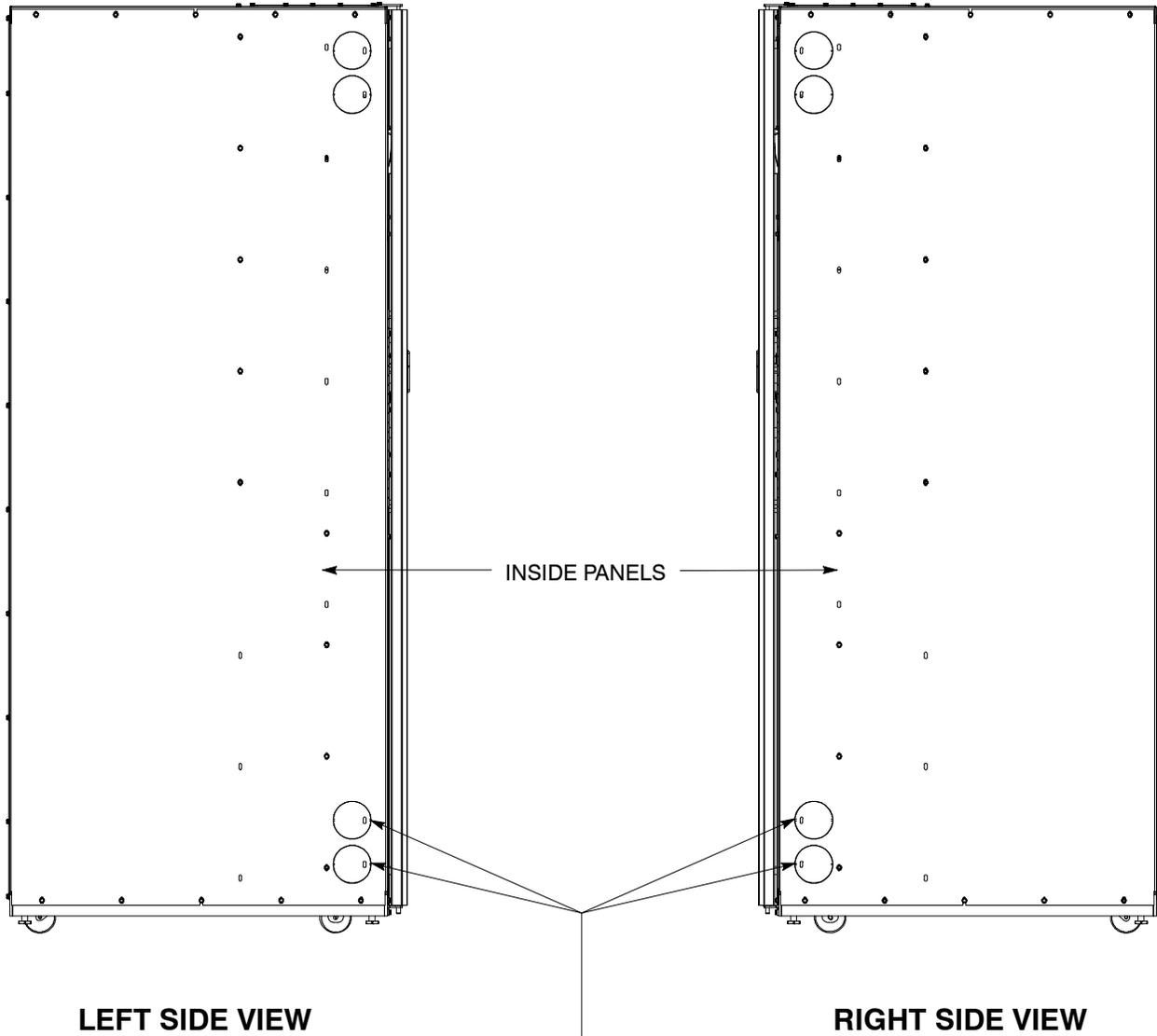


**BOTTOM VIEW**

BOTTOM ENTRY CONDUIT LANDING PLATE FOR AC OUTPUT. BOTTOM ENTRY OUTPUT PLATES ARE PRE-PUNCHED WHEN DISTRIBUTION PANELS ARE ORDERED, AND MAY BE INTERCHANGED WITH TOP OUTPUT PLATES. (REMOVE PANEL TO TO DRILL OR PUNCH CONDUIT HOLES, OR REMOVE KNOCKOUTS.)

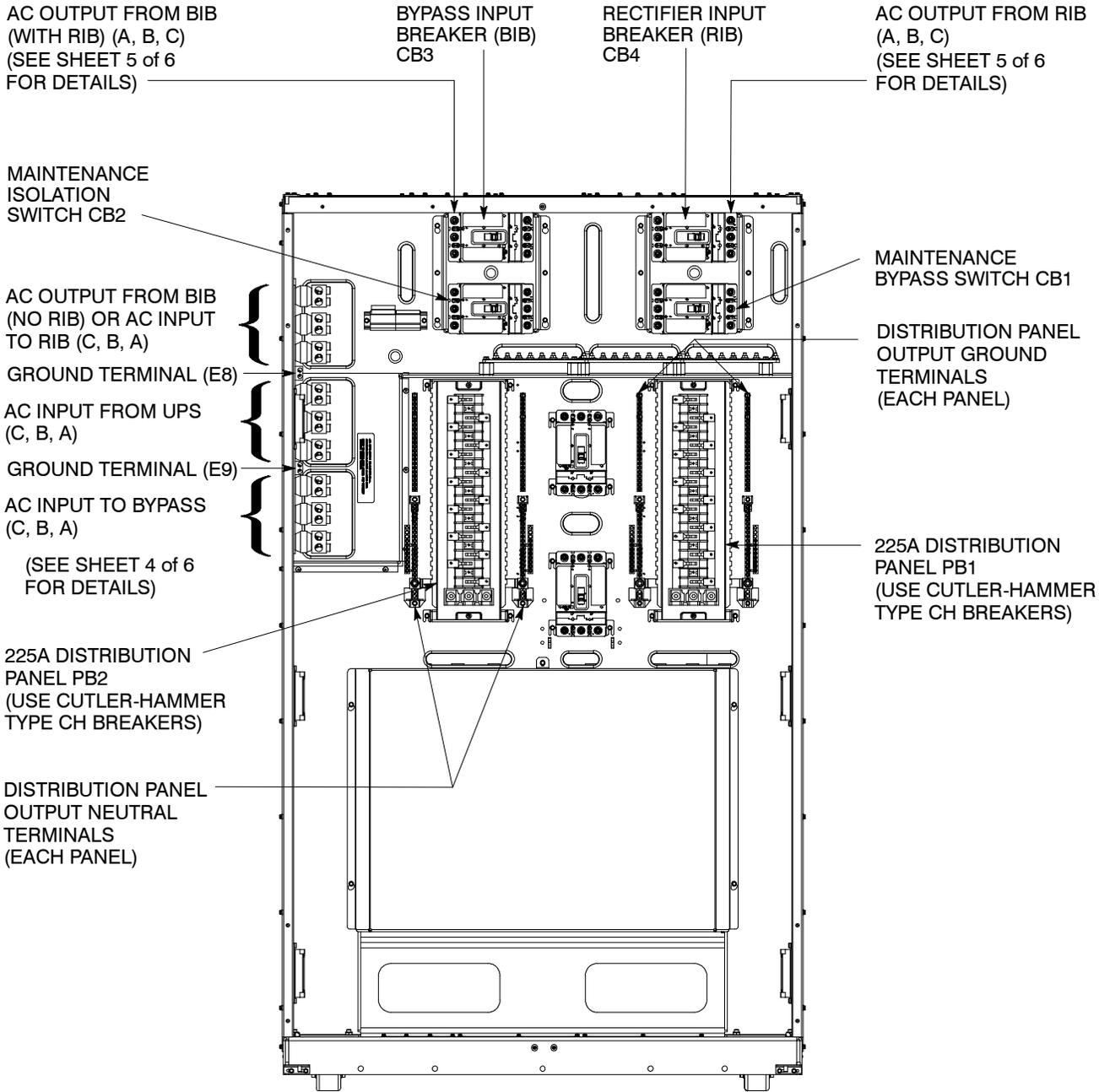
BOTTOM ENTRY CONDUIT LANDING PLATE FOR AC INPUT AND INTERFACE CONNECTIONS. (REMOVE PANEL TO DRILL OR PUNCH CONDUIT HOLES.)

DESCRIPTION: <b>CONDUIT AND WIRE ENTRY LOCATIONS</b>	
DRAWING NO: 164201560-6	SHEET: 1 of 2
REVISION: B	DATE: 123004



INTER-CABINET WIRING ACCESS KNOCKOUTS.  
 REMOVE KNOCKOUTS, AS REQUIRED, TO  
 ROUTE WIRES BETWEEN CABINETS. (INSTALL  
 NYLON GROMMET AFTER REMOVAL OF  
 KNOCKOUTS.)

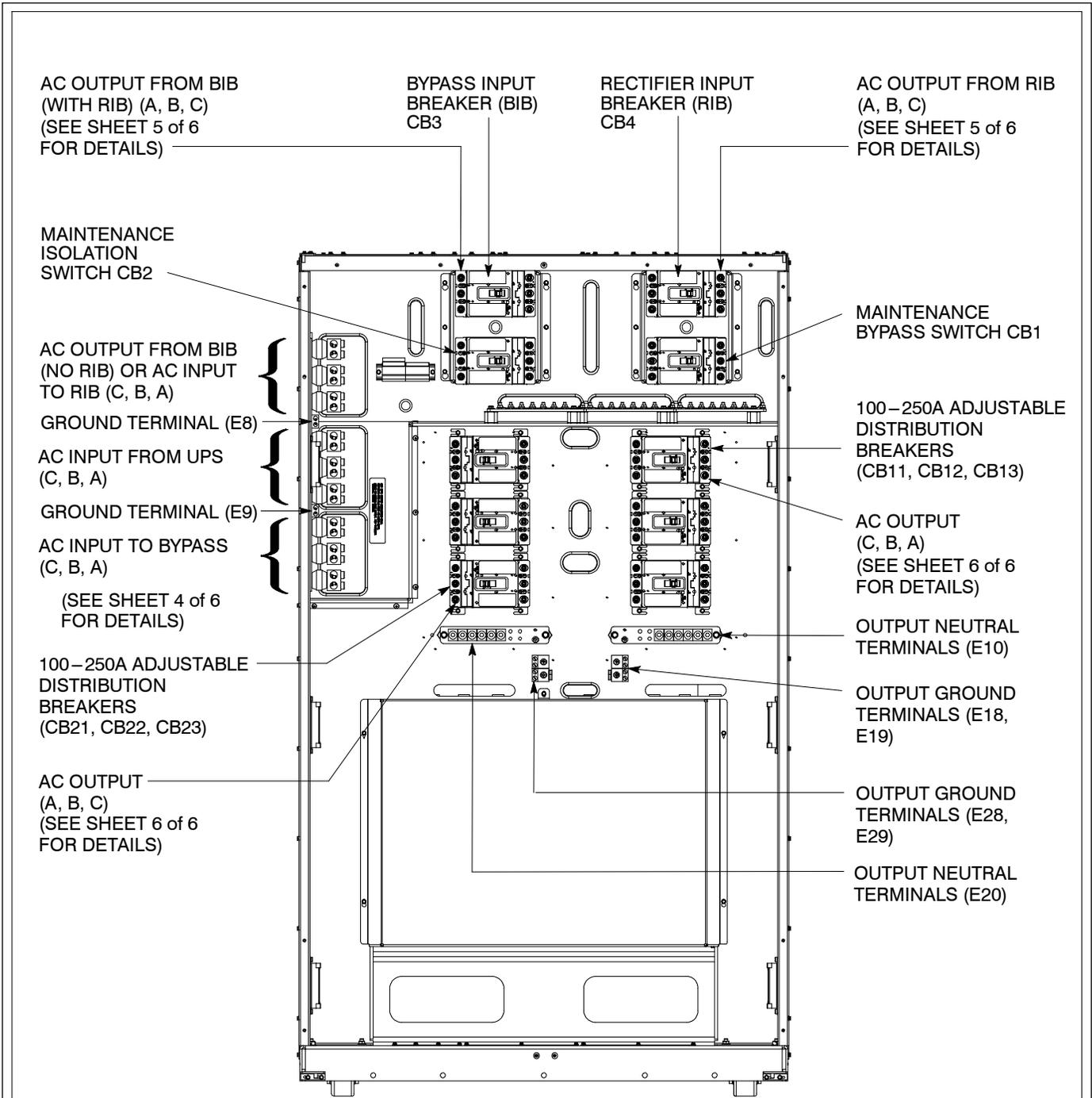
<i>DESCRIPTION:</i> <b>CONDUIT AND WIRE ENTRY LOCATIONS</b>	
<i>DRAWING NO:</i> 164201560-6	<i>SHEET:</i> 2 of 2
<i>REVISION:</i> B	<i>DATE:</i> 123004



**208V/120V OUTPUT DISTRIBUTION PANEL OPTION IDC  
WITH OR WITHOUT BIB AND RIB OPTIONS**

**NOTE:** Metal shields covering wiring terminals must be removed or opened to gain access to terminals.

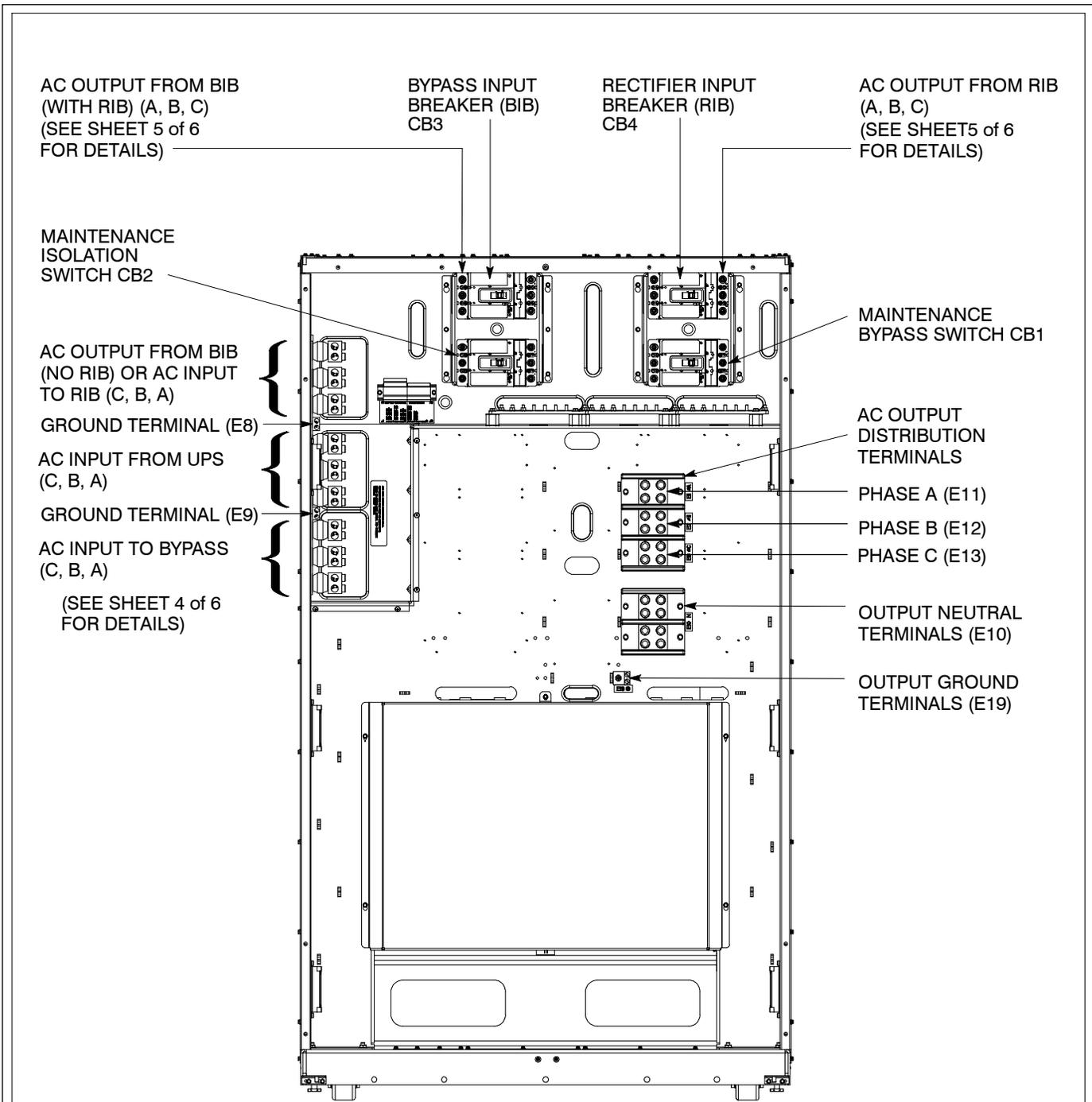
DESCRIPTION:	<b>IDC POWER TERMINAL LOCATIONS</b>		
DRAWING NO:	164201560-7	SHEET:	1 of 6
REVISION:	B	DATE:	123004



**208V OUTPUT DISTRIBUTION BREAKER OPTION IDC  
WITH OR WITHOUT BIB AND RIB OPTIONS**

**NOTE:** Metal shields covering wiring terminals must be removed or opened to gain access to terminals.

DESCRIPTION: <b>IDC POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201560-7	SHEET: 2 of 6
REVISION: B	DATE: 123004

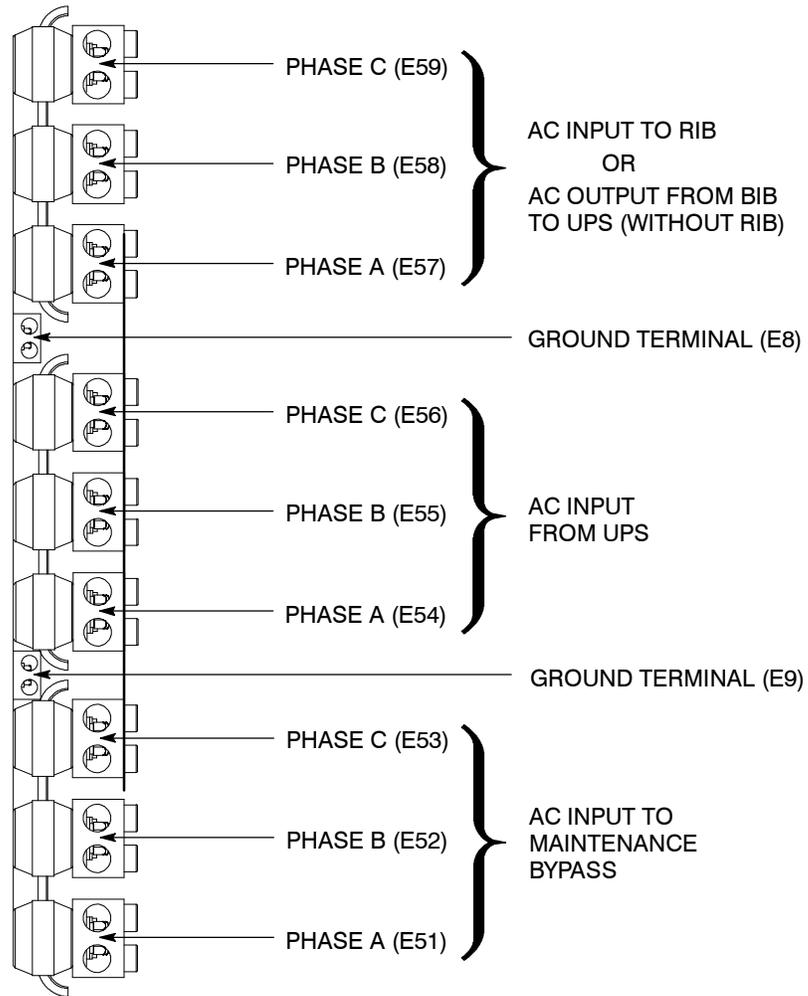


**208V OUTPUT TERMINAL BLOCK OPTION IDC  
WITH OR WITHOUT BIB AND RIB OPTIONS**

**NOTE:** Metal shields covering wiring terminals must be removed or opened to gain access to terminals.

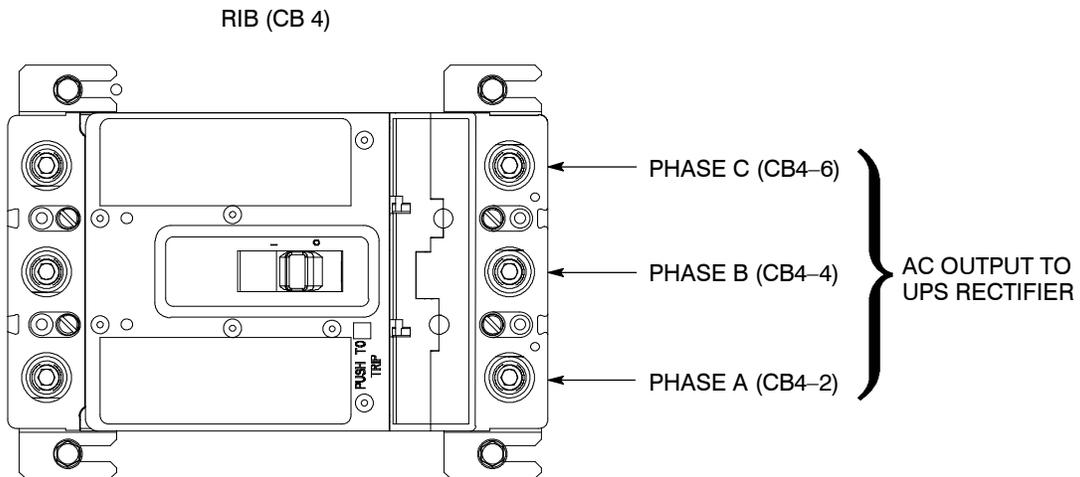
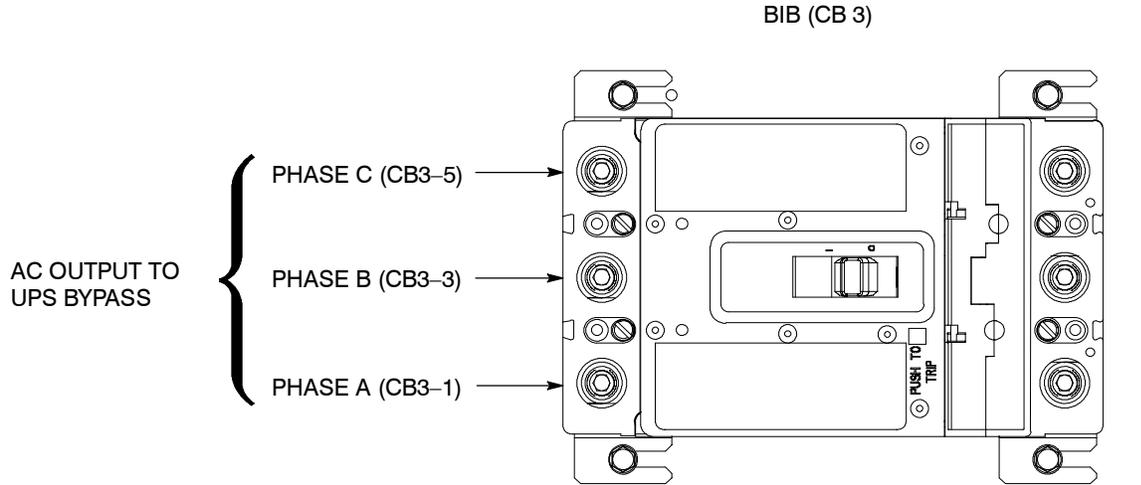
DESCRIPTION: <b>IDC POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201560-7	SHEET: 3 of 6
REVISION: B	DATE: 123004

## MAINTENANCE BYPASS INPUT TERMINAL DETAIL



<b>DESCRIPTION:</b> IDC POWER TERMINAL LOCATIONS	
<b>DRAWING NO:</b> 164201560-7	<b>SHEET:</b> 4 of 6
<b>REVISION:</b> B	<b>DATE:</b> 123004

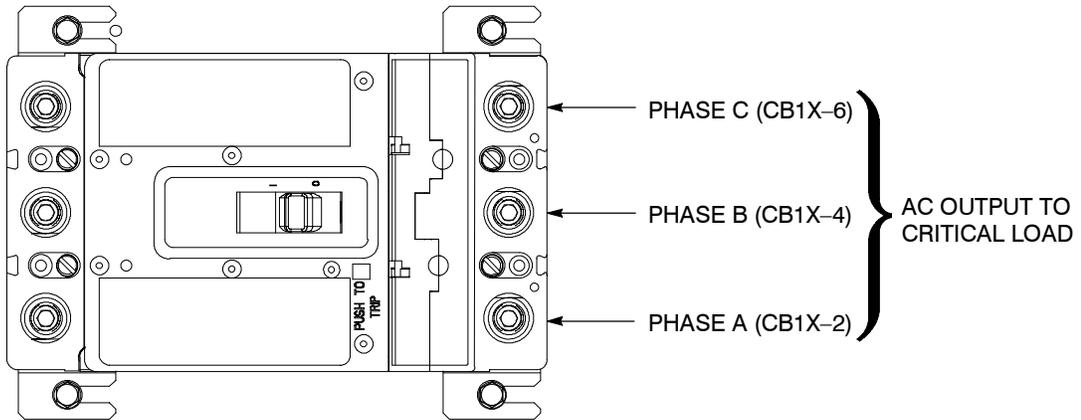
### BIB AND RIB TERMINAL DETAIL



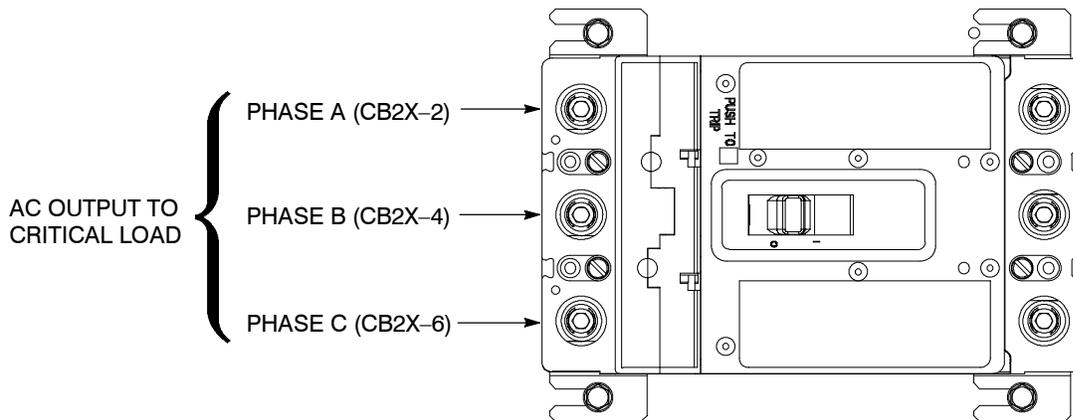
DESCRIPTION: <b>IDC POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201560-7	SHEET: 5 of 6
REVISION: A	DATE: 113004

## OUTPUT BREAKER TERMINAL DETAIL

RIGHT SIDE BREAKERS (CB 11, CB12, CB13)



LEFT SIDE BREAKERS (CB 21, CB22, CB23)



### 208V OUTPUT

DESCRIPTION: <b>IDC POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201560-7	SHEET: 6 of 6
REVISION: B	DATE: 123004

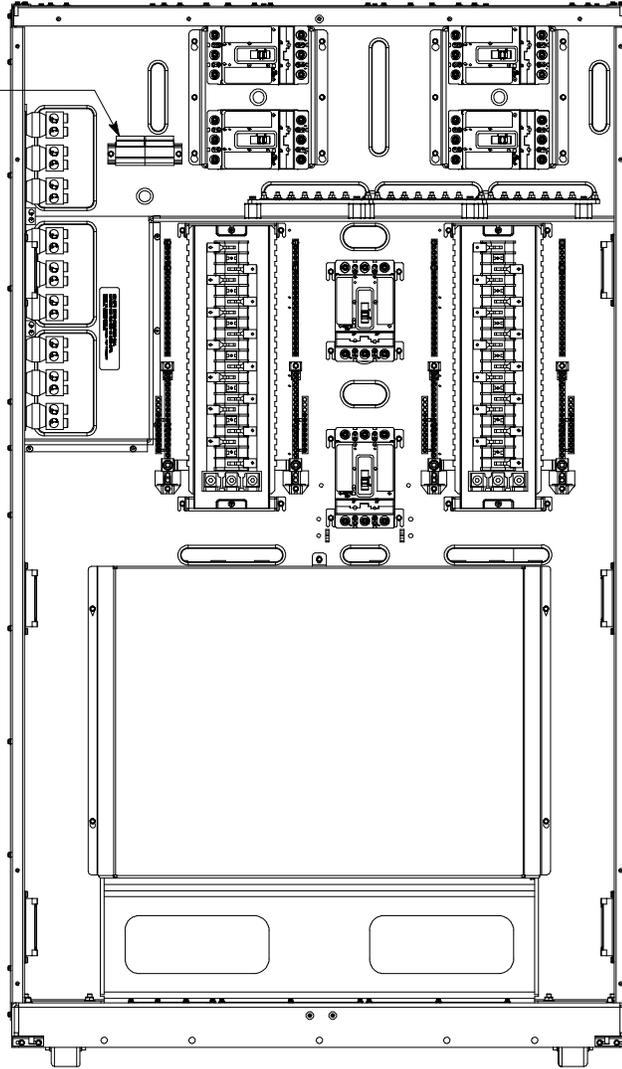
1. Use Class 1 wiring methods (as defined by the NEC) for control wiring. The wire should be rated at 600 volts, 1A minimum and 12 AWG maximum. Use twisted-pair wires for each input and common. All control wiring is customer provided.
2. Shunt Trip wiring should be a minimum of 18 AWG.
3. An external 120 Vac source is required to operate the the shunt trip on the IDC Input Breaker.
4. The REPO feature opens IDC MBP circuit breaker CB1, all contactors in the UPS cabinet, if wired, and isolates power from your critical load. Local electrical codes may also require tripping upstream protective devices to the UPS.
5. The REPO switch is provided by the customer. The REPO switch must be a latching-type switch with a dedicated circuit.
6. When installing control wiring (such as for shunt trip or aux contacts) to the IDC interface terminals, conduit must be installed between the the UPS cabinet or device and the IDC. Install the control wiring in separate conduit from the power wiring.
7. Regardless of assignment, alarms display as Building Alarm 1 and Building Alarm 2 on the UPS Control Panel Display Screen.
8. Refer to Table J, the following sheets of this drawing, and to Chapter 3 for customer interface and control wiring.

<b>Table J. P1 Terminals</b>			
IDC Terminal P1	Name	UPS Terminal	Description
1	MBP Aux Contact NO	TB1-9	Contacts used to indicate whether IDC is in Maintenance Bypass position. Contacts are closed when switch is Bypass position.
2	MBP Aux Contact Return	TB1-10	
3	MBP Aux Contact NC	N/A	Not Used
4	Not Used		
5	MBP Shunt Trip	N/A	When activated by a REPO switch, opens CB1 and removes all power from the critical load.
6	MBP Shunt Trip Return		
7	Not Used		
8	MIS Aux Contact NO	N/A	Not Used
9	MIS Aux Contact Com		
10	MIS Aux Contact NC		

<b>DESCRIPTION:</b> INTERFACE AND CONTROL WIRING INSTALLATION NOTES AND TERMINAL LOCATIONS	
<b>DRAWING NO:</b> 164201560-8	<b>SHEET:</b> 1 of 4
<b>REVISION:</b> D	<b>DATE:</b> 011207

## TERMINAL LOCATIONS

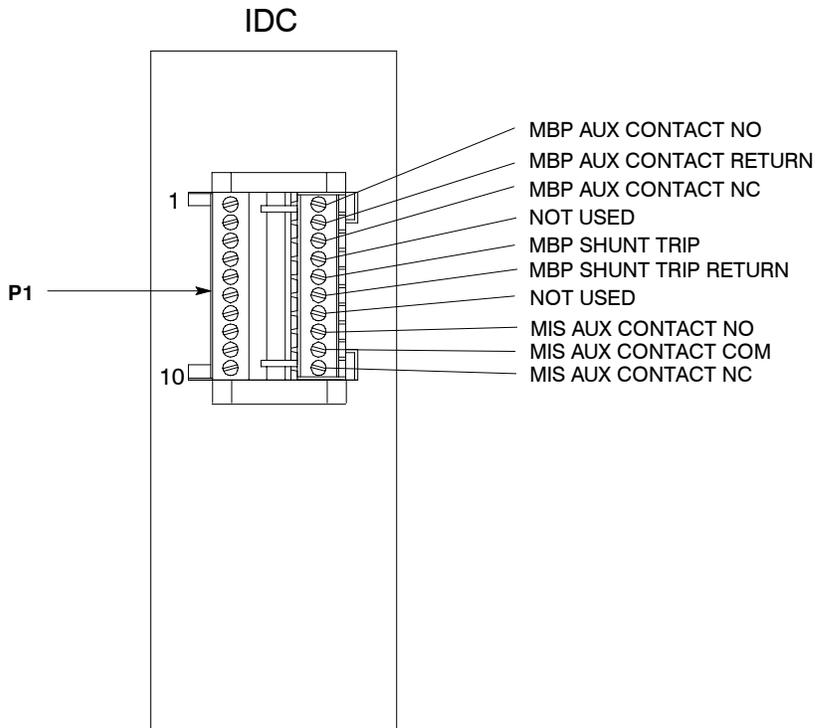
TERMINAL PLUG P1



**NOTE:** Metal shields covering wiring terminals must be removed or opened to gain access to terminals.

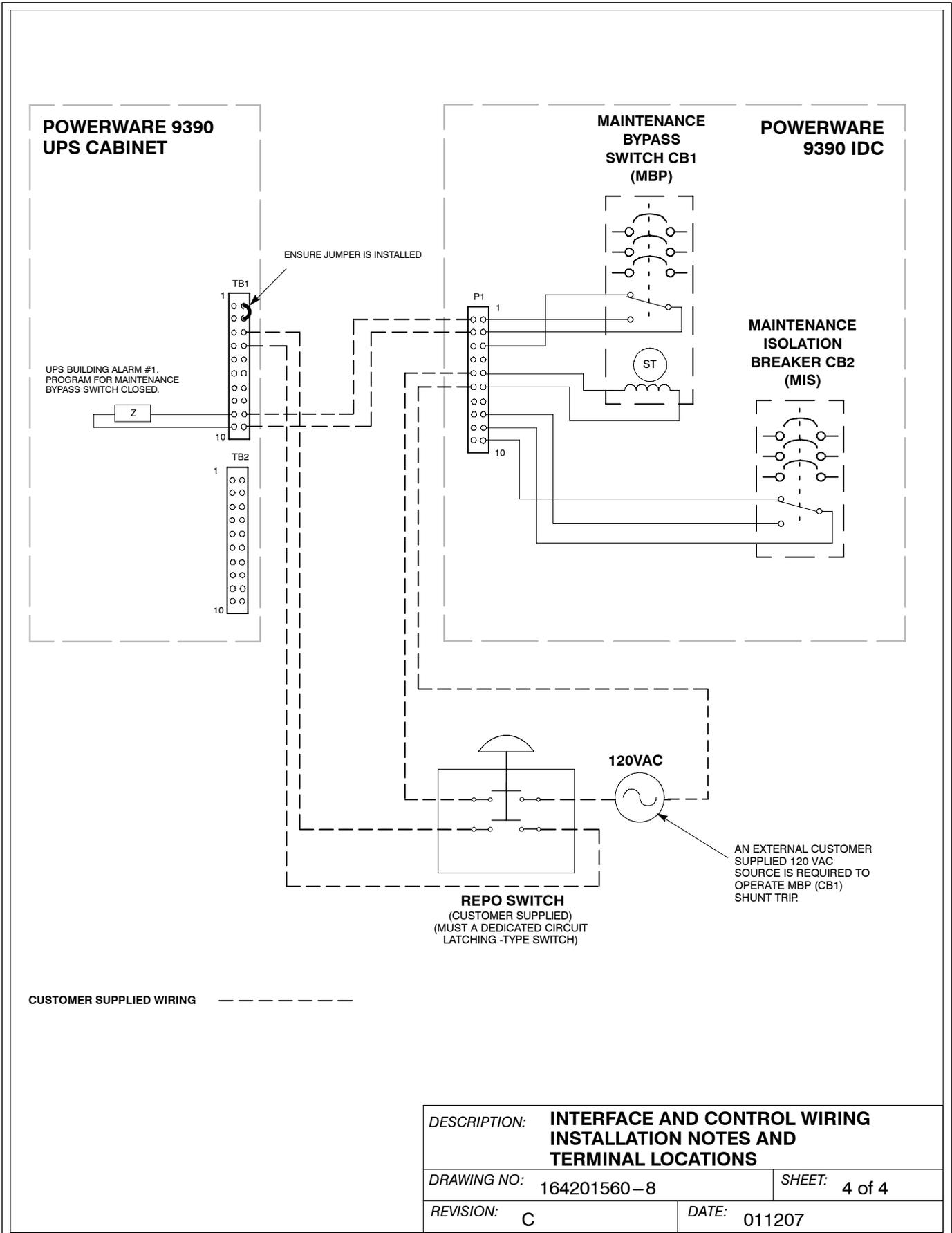
DESCRIPTION:	<b>INTERFACE AND CONTROL WIRING INSTALLATION NOTES AND TERMINAL LOCATIONS</b>	
DRAWING NO:	164201560-8	SHEET: 2 of 4
REVISION:	C	DATE: 011207

## TERMINALS

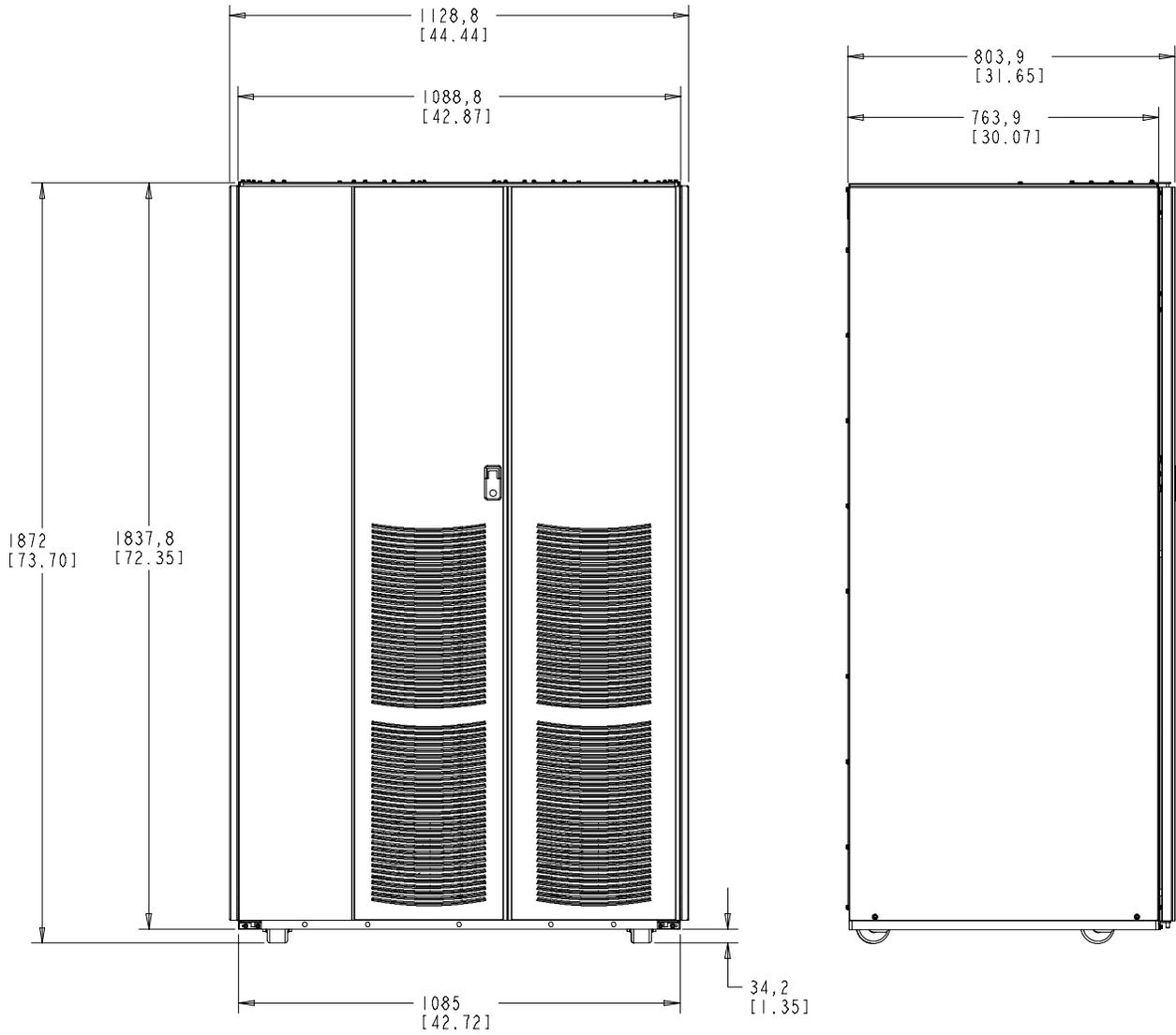


**NOTE:** Regardless of assignment, alarms display as Building Alarm 1 and Building Alarm 2, on the UPS Control Panel Display Screen. Use twisted-pair wires for each alarm input and common.

DESCRIPTION:	<b>INTERFACE AND CONTROL WIRING INSTALLATION NOTES AND TERMINAL LOCATIONS</b>	
DRAWING NO:	164201560-8	SHEET: 3 of 4
REVISION:	B	DATE: 011207



DESCRIPTION:	<b>INTERFACE AND CONTROL WIRING INSTALLATION NOTES AND TERMINAL LOCATIONS</b>	
DRAWING NO:	164201560-8	SHEET: 4 of 4
REVISION:	C	DATE: 011207



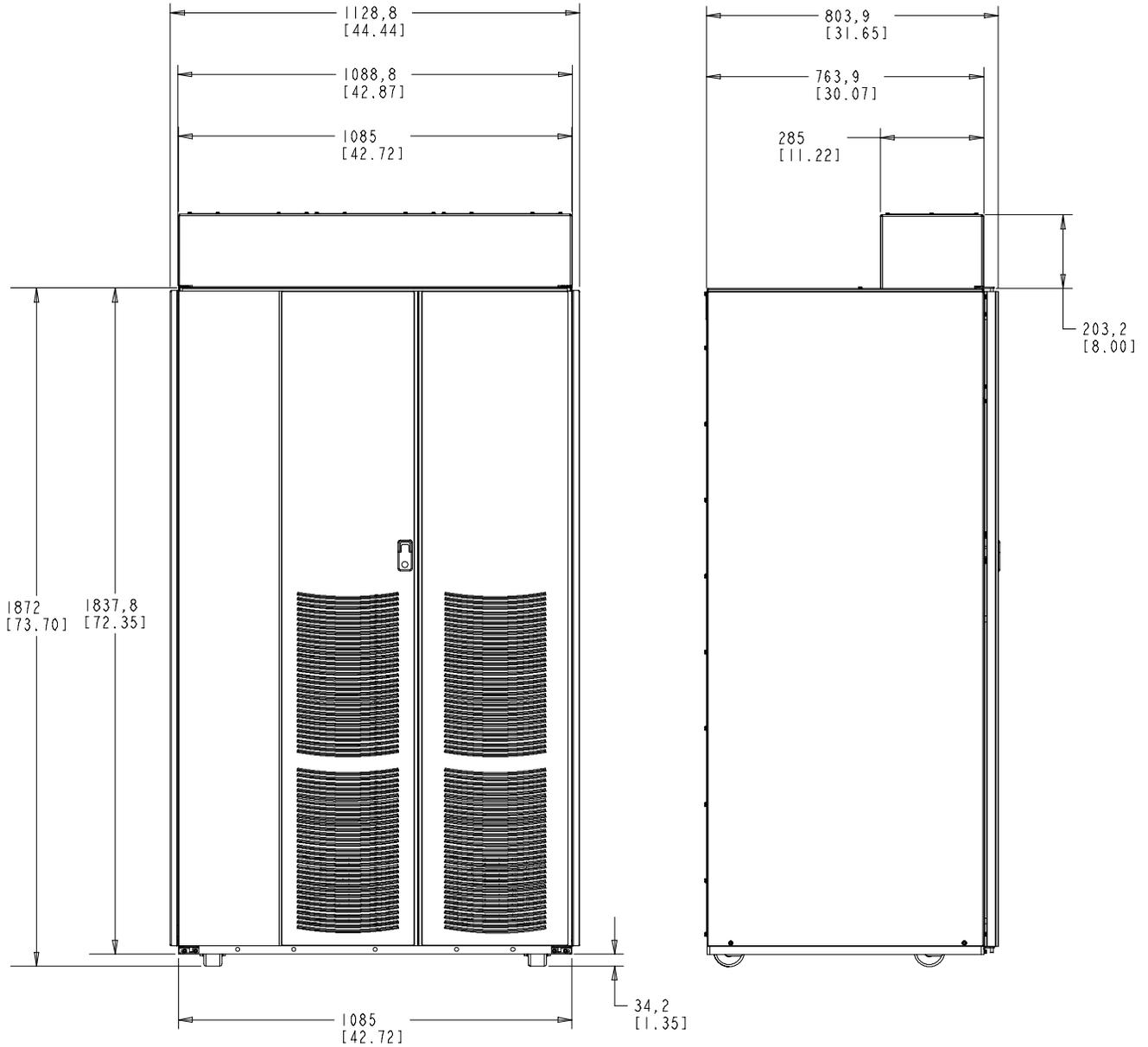
**FRONT VIEW**

**RIGHT SIDE VIEW**

**IDC WITHOUT TOP ENTRY OPTION**

Dimensions are in millimeters [inches]

<b>DESCRIPTION:</b> IDC DIMENSIONS	
<b>DRAWING NO:</b> 164201560-9	<b>SHEET:</b> 1 of 6
<b>REVISION:</b> A	<b>DATE:</b> 113004



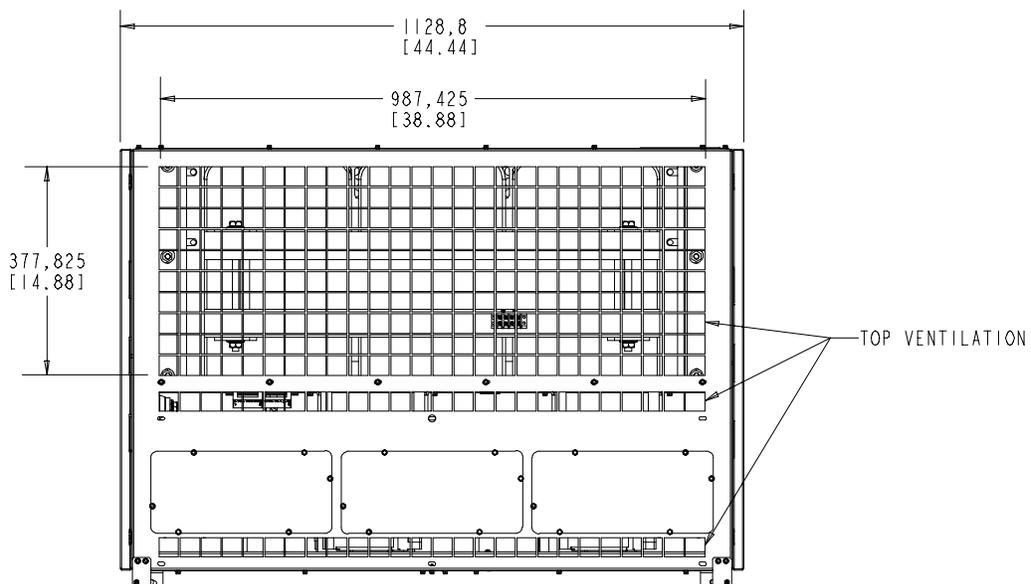
**FRONT VIEW**

**RIGHT SIDE VIEW**

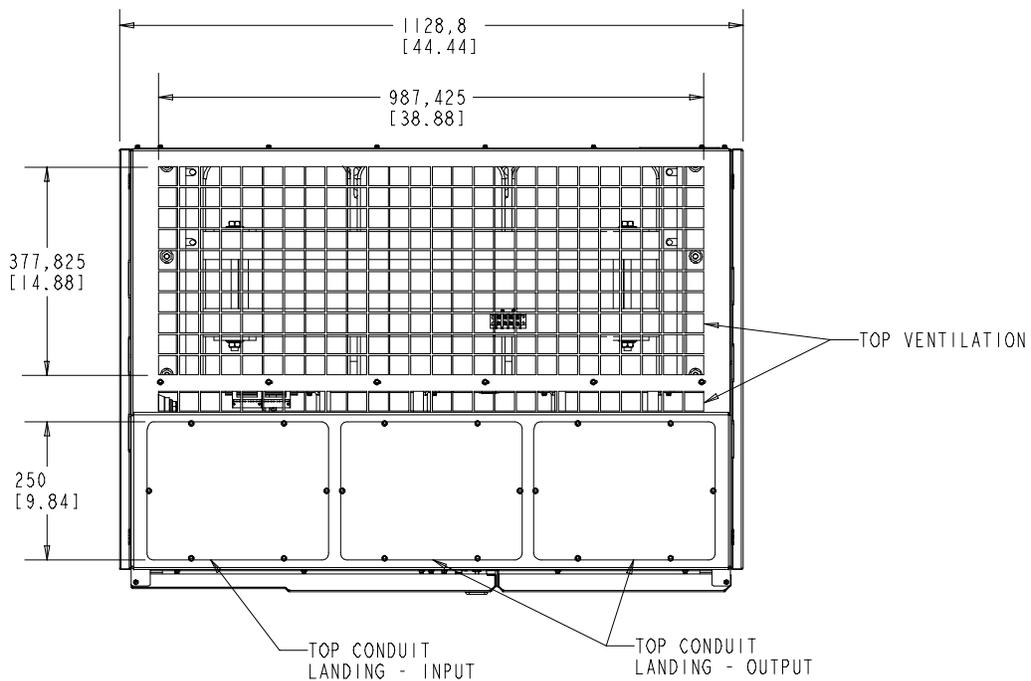
**IDC WITH TOP ENTRY OPTION**

Dimensions are in millimeters [inches]

<b>DESCRIPTION:</b> IDC DIMENSIONS	
<b>DRAWING NO:</b> 164201560-9	<b>SHEET:</b> 2 of 6
<b>REVISION:</b> A	<b>DATE:</b> 113004



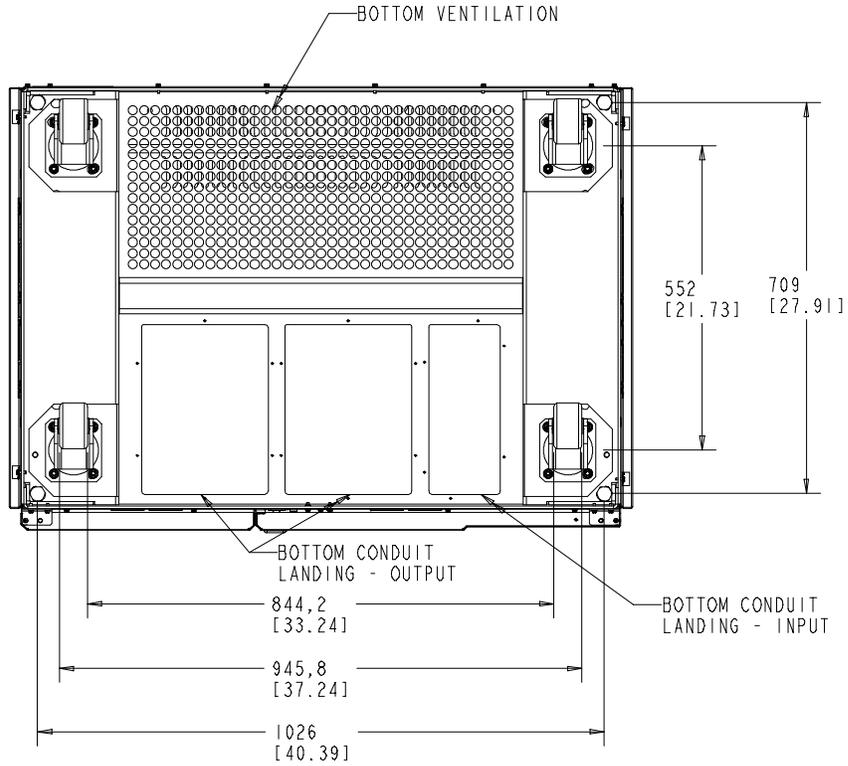
**TOP VIEW**  
(WITHOUT TOP ENTRY OPTION)



**TOP VIEW**  
(WITH TOP ENTRY OPTION)

Dimensions are in millimeters [inches]

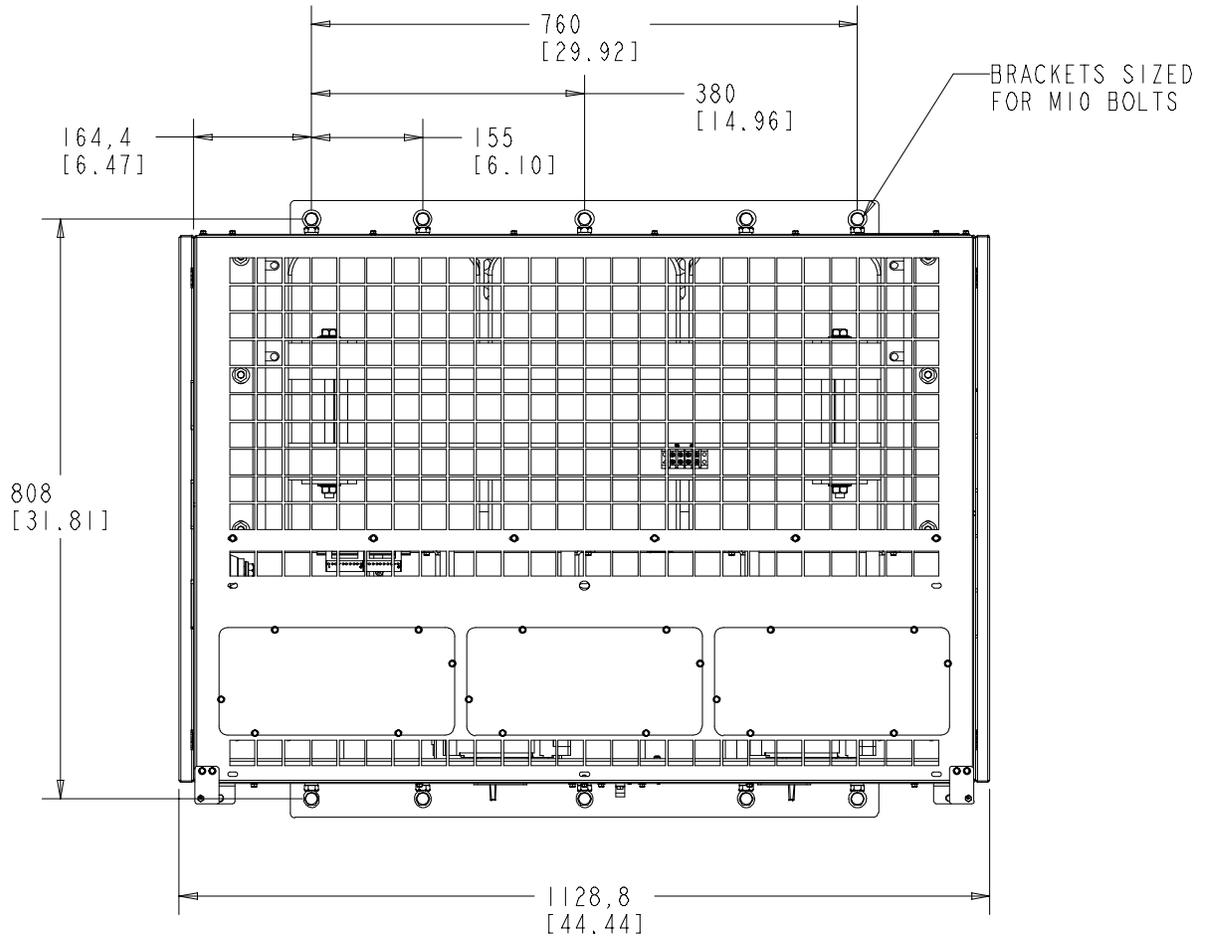
DESCRIPTION: <b>IDC DIMENSIONS</b>	
DRAWING NO: 164201560-9	SHEET: 3 of 6
REVISION: A	DATE: 113004



**BOTTOM VIEW**

Dimensions are in millimeters [inches]

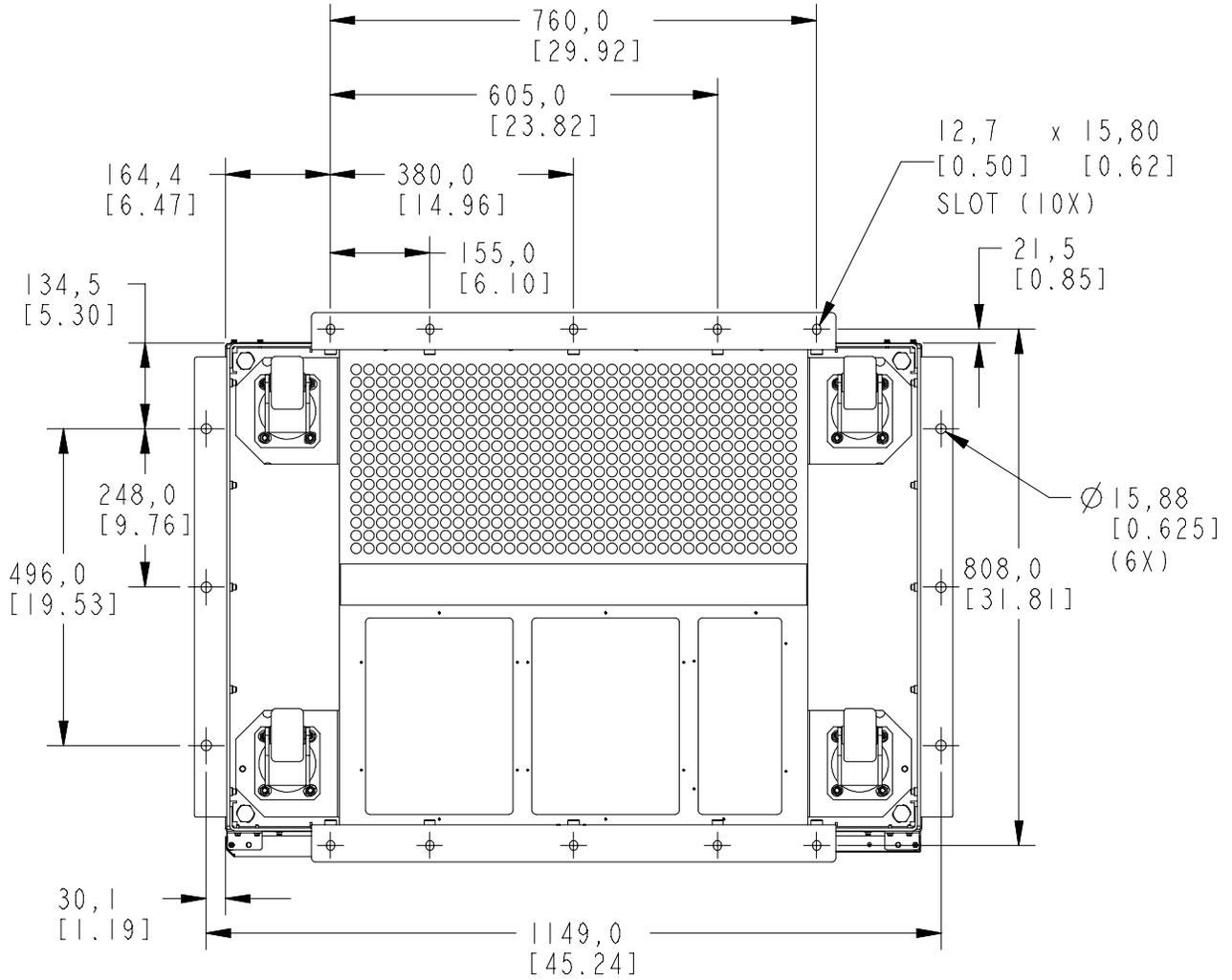
DESCRIPTION: <b>IDC DIMENSIONS</b>	
DRAWING NO: 164201560-9	SHEET: 4 of 6
REVISION: A	DATE: 113004



OPTIONAL FLOOR MOUNTING  
(SEEN FROM TOP OF UNIT)

Dimensions are in millimeters [inches]

DESCRIPTION: <b>IDC DIMENSIONS</b>		
DRAWING NO:	164201560-9	SHEET: 5 of 6
REVISION:	A	DATE: 113004



FRONT

160 IDC SEISMIC MOUNTING

Dimensions are in millimeters [inches]

DESCRIPTION: <b>IDC DIMENSIONS</b>	
DRAWING NO: 164201560-9	SHEET: 6 of 6
REVISION: A	DATE: 113004

# Warranty

## LIMITED FACTORY WARRANTY FOR THREE-PHASE POWERWARE® PRODUCTS

**WARRANTOR:** The warrantor for the limited warranties set forth herein is Eaton Electrical Inc., a Delaware Corporation (“Eaton”).

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

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

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

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

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

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

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

**END-USER’S OBLIGATIONS:** In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way, follow the Product’s 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 to it (including interest charges, if any). During such time as Eaton has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Eaton shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

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

**OBTAINING WARRANTY SERVICE:** In the USA, call the Eaton Customer Reliability Center 7x24 at 800-843-9433. Outside of the USA, call your local Eaton sales or service representative, or call the Eaton Customer Reliability Center in the USA at 919-870-3028. For comments or questions about this Limited Factory Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.

**This page intentionally left blank.**





164201560 C