



**Powerware**

**Powerware® 9390 Integrated Accessory Cabinet  
IAC-D Configuration  
Installation and Operation Manual**

For use with 40–80 kVA and 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 2005–2006 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>IAC-D 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 IAC-D	2-2
2.3	Inspecting and Unpacking the IAC-D	2-2
<b>3</b>	<b>Installing the IAC-D</b>	<b>3-1</b>
3.1	Preliminary Installation Information	3-1
3.2	Unloading the Powerware 9390 IAC-D from the Pallet	3-1
3.3	IAC-D Cabinet Installation	3-5
3.3.1	Line-up-and-Match IAC-D Installation	3-5
3.3.2	Standalone IAC-D Installation	3-10
3.3.3	Installing IAC-D Power Wiring	3-12
3.4	Initial Startup	3-14
3.5	Completing the Installation Checklist	3-14
<b>Section II – Operation</b>		
<b>4</b>	<b>Understanding IAC-D Operation</b>	<b>4-1</b>
4.1	Distribution Panelboard Configuration	4-1
4.2	Distribution Breaker Configuration	4-1
4.3	Distribution Panelboard and Distribution Breaker Configuration	4-1

<b>5</b>	<b>IAC-D Features, Options, Controls, and Operation</b>	<b>5-1</b>
5.1	IAC-D Standard Features	5-1
5.1.1	Installation Features	5-1
5.1.2	Expansion	5-1
5.2	Options	5-1
5.2.1	Distribution Panel	5-1
5.2.2	Distribution Breakers	5-1
5.3	Symbols	5-2
5.4	IAC-D Controls	5-2
5.5	IAC-D Operation	5-5
<b>6</b>	<b>Maintaining the IAC-D</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	IAC-D Input	7-1
7.3	IAC-D Output	7-1
7.4	Environmental Specifications	7-1
<b>Appendix A – Installation Information</b>		<b>A-1</b>
<b>Warranty</b>		<b>W-1</b>

## List of Figures

Figure 1-1. Powerware 9390 IAC-D Cabinet .....	1-2
Figure 2-1. Powerware 9390 IAC-D as Shipped on Pallet .....	2-3
Figure 3-1. Removing Front Shipping Bracket on the Powerware 9390 IAC-D .....	3-3
Figure 3-2. Removing Rear Shipping Bracket on the Powerware 9390 IAC-D .....	3-4
Figure 3-3. 80 kVA UPS with Line-up-and-Match IAC-D .....	3-5
Figure 3-4. 160 kVA UPS with Line-up-and-Match IAC-D .....	3-6
Figure 3-5. 80 kVA UPS to IAC-D Joining Brackets .....	3-8
Figure 3-6. 160 kVA UPS to IAC-D Joining Brackets .....	3-9
Figure 3-7. 80 kVA UPS with Standalone IAC-D .....	3-10
Figure 3-8. 160 kVA UPS with Standalone IAC-D .....	3-11
Figure 4-1. Path of Current Through the IAC-D with Distribution Panelboards .....	4-2
Figure 4-2. Path of Current Through the IAC-D with Distribution Breakers .....	4-3
Figure 4-3. Path of Current Through the IAC-D with Distribution Panelboard and Breakers .....	4-4
Figure 5-1. Powerware 9390 IAC-D Controls – with Distribution Panel Option .....	5-3
Figure 5-2. Powerware 9390 IAC-D Controls – with Distribution Breaker Option .....	5-4

**This page intentionally left blank.**

# Chapter 1 | Introduction

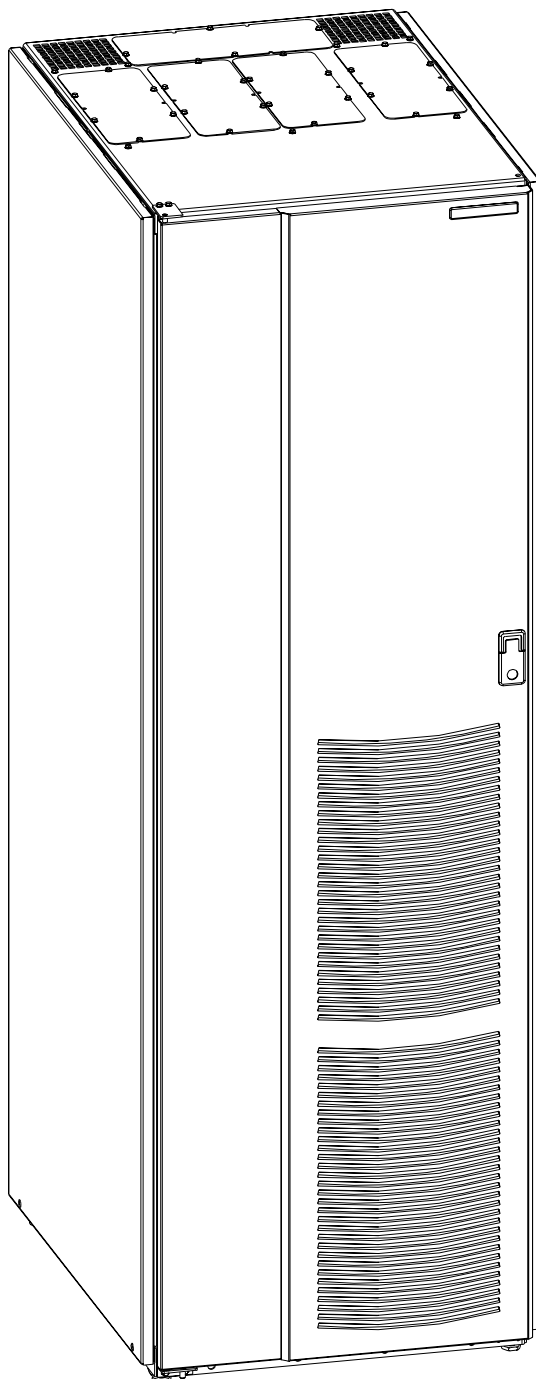
The Powerware® 9390 Integrated Accessory Cabinet-Distribution (IAC-D) is designed for use with the Powerware 9390 three-phase Uninterruptible Power Systems. The IAC-D provides power distribution options for servers, racks, and other equipment via distribution panelboards, or distributes power to larger loads via distribution circuit breakers. The distribution options are custom configurable, enabling adaptation and expansion without costly electrical rework.

The IAC-D 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 IAC-D.

## 1.1 Configurations

The following IAC-D configurations are possible:

- ▶ One or two 225A distribution panels (208V only)
- ▶ One to six 40-100A adjustable distribution breakers (208V or 480V)
- ▶ One to six 100-250A adjustable distribution breakers (208V or 480V)
- ▶ One 225A distribution panel and one to three 100-250A adjustable distribution breakers (208V only)
- ▶ One 225A distribution panel and one to three 40-100A adjustable distribution breakers (208V only)



**Figure 1-1. Powerware 9390 IAC-D Cabinet**



## 1.2 Using This Manual

This manual describes how to install and operate the Powerware 9390 IAC-D. 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 IAC-D, a description of the content of each chapter, text conventions used in the manual, safety warnings, and reference information.

### Section I, Installation

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

### Section II, Operation


- ▶ **Chapter 4, “Understanding IAC-D Operation”** – provides information on how an IAC-D works.
- ▶ **Chapter 5, “IAC-D Features, Controls, and Operation”** – describes the standard and optional IAC-D features, the IAC-D controls, and how to use the IAC-D.
- ▶ **Chapter 6, “Maintaining the IAC-D”** – contains maintenance instructions for the IAC-D.
- ▶ **Chapter 7, “Product Specifications”** – provides specifications for the IAC-D.
- ▶ **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 IAC-D 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 IAC-D, 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 IAC-D. Please read all instructions before operating the equipment and save this manual for future reference.

The IAC-D 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 IAC-D 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 IAC-D 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 (40–80 kVA) Installation and Operation Manual** or 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 these manuals.

## 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:

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

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

**This page intentionally left blank.**

## Chapter 2 | IAC-D Installation Plan and Unpacking

Use the following basic sequence of steps to install the Integrated Accessory Cabinet-Distribution (IAC-D).

1. Create an installation plan for the IAC-D (Chapter 2).
2. Prepare your site for the IAC-D (Chapter 2).
3. Inspect and unpack the IAC-D (Chapter 2).
4. Unload and install the IAC-D 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 IAC-D, 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 IAC-D to operate at peak efficiency, the installation site should meet the environmental parameters outlined in this manual. If the IAC-D 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 164201591-2 on page A-4 and size requirements specified on Drawing 164201591-9 starting on page A-27.

The IAC-D uses natural convection cooling to regulate internal component temperature. Air inlets are in the front of the cabinet and outlets are in the top (see Drawing 164201591-9 starting on page A-27). Clearance must be allowed in front and above each IAC-D, and the front of the cabinet must be free of any obstructions for proper air circulation. See Drawing 164201591-2 on page A-4 for clearances.

## 2.2.1 Environmental Considerations

The life of the IAC-D 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 IAC-D

Preassembled power wiring harnesses for a line-up-and-match IAC-D are optional and must be ordered separately.

Wiring requirements for an IAC-D installed separate from the UPS cabinet, including the minimum AWG size of external wiring, can be found on Drawing 164201591-6 starting on page A-16. 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.

## 2.3 Inspecting and Unpacking the IAC-D

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

### CAUTION



The IAC-D 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



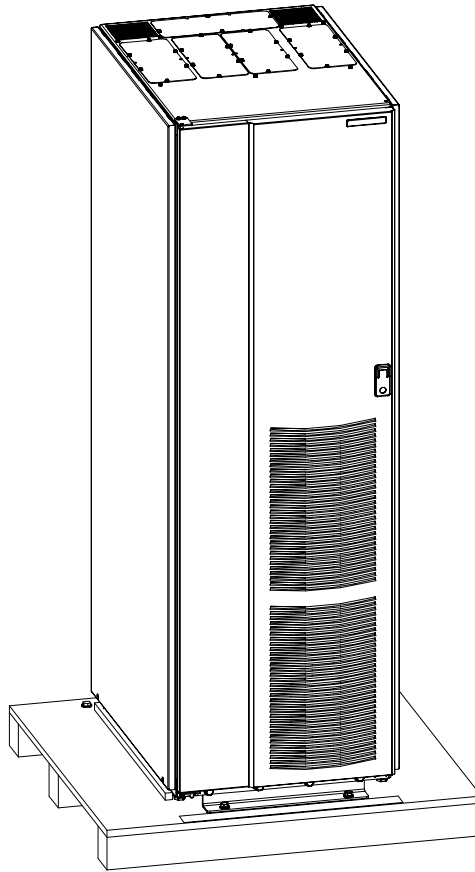
Do not install a damaged cabinet. Report any damage to the carrier and contact your Eaton service representative immediately.

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 IAC-D as Shipped on Pallet**



### CAUTION

Do not tilt the IAC-D 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.
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 IAC-D properly may void your warranty.*

**This page intentionally left blank.**

## Chapter 3 | Installing the IAC-D

### 3.1 Preliminary Installation Information



#### WARNING

Installation should be performed only by qualified personnel.

Refer to the following while installing the IAC-D:

- ▶ 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.
- ▶ Refer to the applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, for UPS cabinet installation, wiring information, and conduit and terminal locations.

### 3.2 Unloading the Powerware 9390 IAC-D from the Pallet

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



#### WARNING

The IAC-D 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 door open (see Figure 3-1).
3. Remove the door. Remove the retaining screws located inside the door at the top and bottom hinge pivot points, then lift the door off. Save the retaining screws for reinstallation of the door.
4. If the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
5. Remove the two bolts securing the front shipping bracket to the pallet (see Figure 3-1). Do not remove the four bolts securing the bracket to the cabinet.
6. Remove the four bolts securing the rear shipping bracket to the cabinet and the two bolts securing the bracket to the pallet (see Figure 3-2). Remove the rear shipping bracket. If installing the cabinet permanently, retain the shipping bracket and securing hardware for later use.
7. Remove the three rear skid bolts securing the removable skid and remove the skid (see Figure 3-2).



---

**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. The front shipping bracket will act as a brake to assist restraining the cabinet.*

---

### WARNING



Do not stand directly behind 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 rear of the pallet. Once the pallet tilts, continue rolling the cabinet down the pallet until the cabinet is clear of the pallet.
9. Remove the four bolts securing the front shipping bracket to the cabinet (see Figure 3-1). Remove the front shipping bracket. If installing the cabinet permanently, retain the shipping bracket and securing hardware for later use.
10. Discard or recycle the pallet and unused shipping brackets in a responsible manner.
11. Roll the cabinet to its final installation location.
12. Proceed to paragraph 3.3.

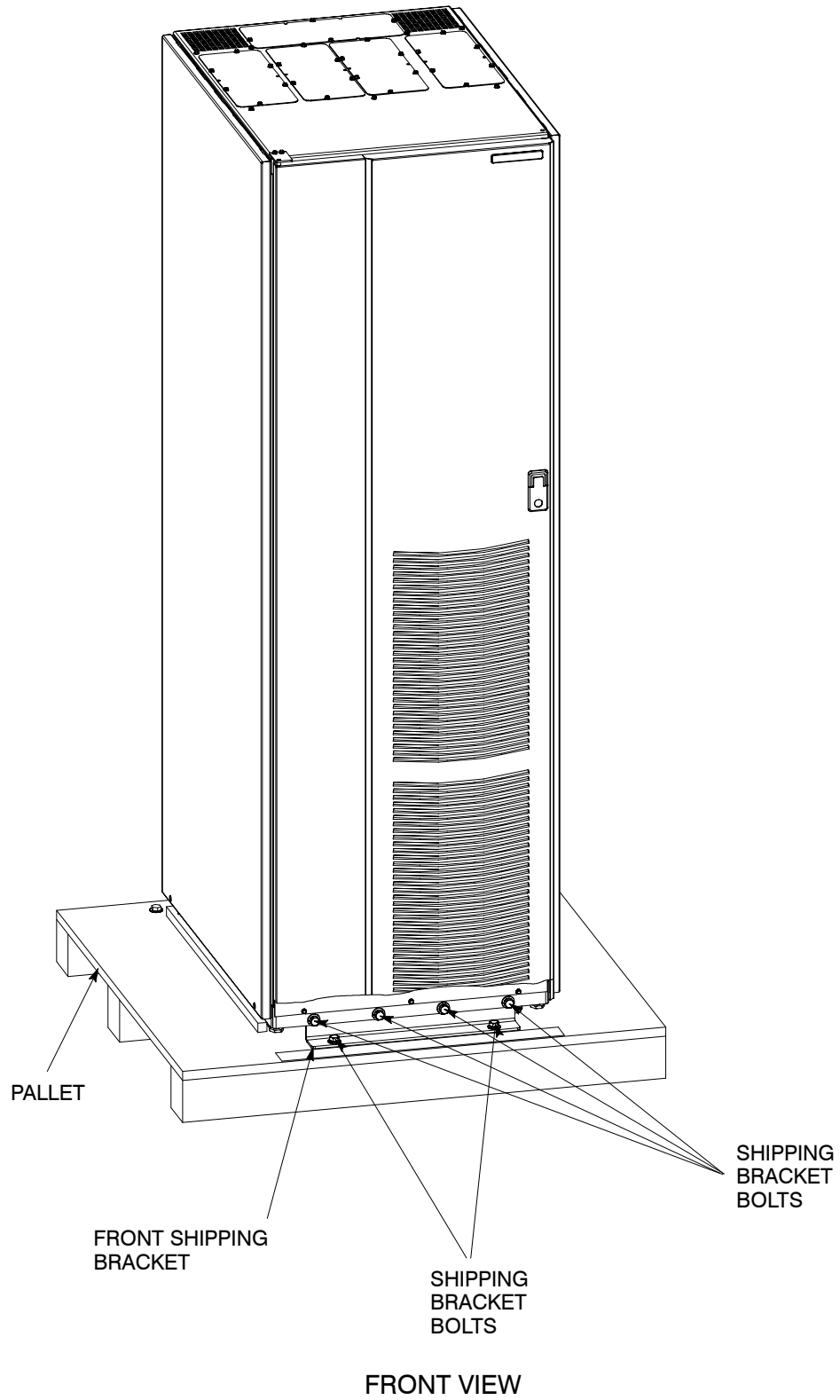


Figure 3-1. Removing Front Shipping Bracket on the Powerware 9390 IAC-D

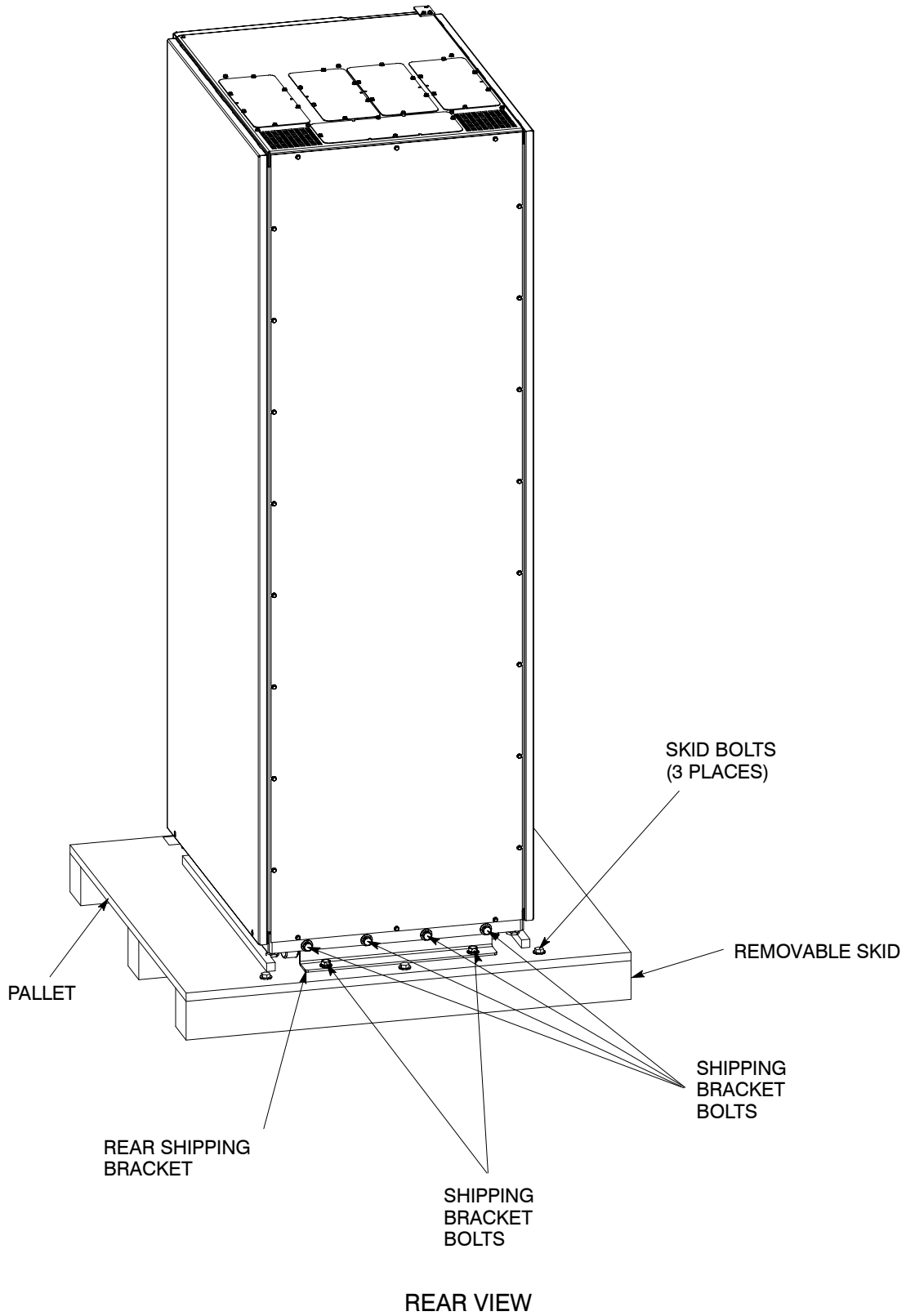


Figure 3-2. Removing Rear Shipping Bracket on the Powerware 9390 IAC-D

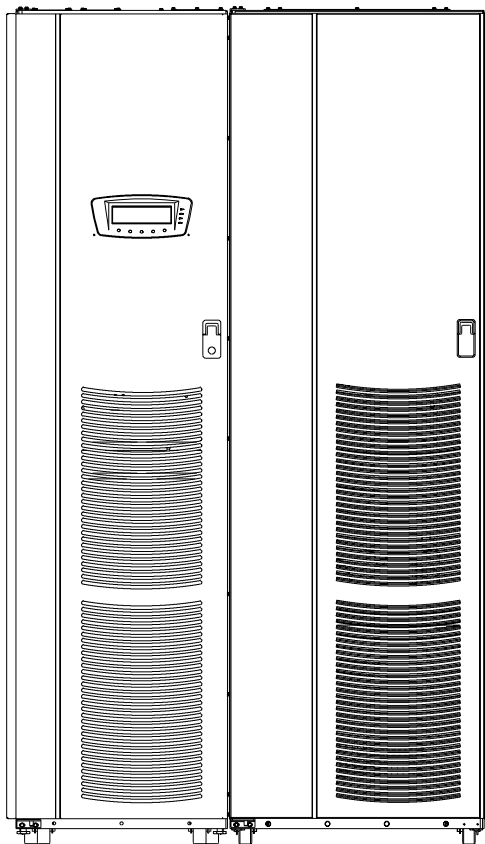
### 3.3 IAC-D Cabinet Installation

The method used to install the IAC-D depends on the type of installation being undertaken. The IAC-D 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* IAC-D, proceed to paragraph 3.3.1.
- ▶ To install a *standalone* IAC-D, proceed to paragraph 3.3.2.

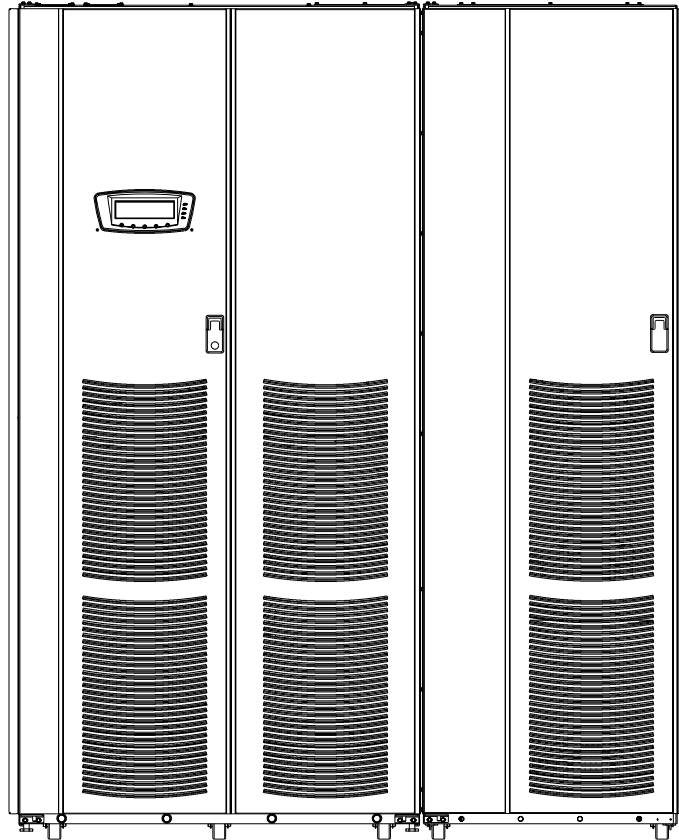
#### 3.3.1 Line-up-and-Match IAC-D Installation

Use this procedure to install the IAC-D adjacent to the Powerware 9390 UPS cabinet (see Figure 3-3 or Figure 3-4). The recommended location is to the right of the UPS cabinet. This procedure assumes the IAC-D is located to the right of the UPS cabinet.



**Figure 3-3. 80 kVA UPS with Line-up-and-Match IAC-D**

1. Verify that the UPS is properly installed and secured. Refer to the applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, for installation instructions.
2. Roll the IAC-D to an area near the right-hand side of the UPS.



**Figure 3-4. 160 kVA UPS with Line-up-and-Match IAC-D**

3. If not already open, unfasten the front door latch and swing the door open.
4. If not already removed, remove the door. Remove the retaining screws located inside the door at the top and bottom hinge pivot points, then lift the door off. Save the retaining screws for reinstallation of the door.
5. Remove the screws securing the top internal safety shield panel covering the input terminal compartment and remove the panel to gain access to the optional field kit (see Drawing 164201591-8, sheet 4 of 6).
6. Remove the optional field kit from the bottom of the cabinet and retain for later use.
7. 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.
8. If necessary, remove the cosmetic cover and hanger brackets from the left-hand side of the IAC-D. Save the cover, screws, and brackets for later use.
9. Remove the screws securing the inside distribution panel door, and swing the door open.
10. Remove the knockouts, as required, on the bottom right side of the UPS cabinet inside panel. Refer to the applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, for the location of the knockout plug.



11. Remove the knockouts on the bottom left side of the IAC-D inside panel (see Drawing 164201591-7, sheet 2 of 2).
12. Install the nylon grommets from the field kit around the holes left after removing the knockouts.
13. Push the IAC-D 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 IAC-D using M4 screws (see Drawing 164201591-7, sheet 2 of 2).
15. If not already installed, hang the side panel on the hanger brackets and align with the front and rear of the IAC-D.
16. If not already secured, secure the side panel at the bottom using M4 hex-head screws previously removed.
17. If permanently mounting the IAC-D, proceed to Step 20; otherwise, proceed to Step 18.
18. Secure the IAC-D 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.
20. Using the retained hardware, reinstall the shipping brackets previously removed to the front and rear of the IAC-D with the angle facing outward (see Figure 3-1 and Figure 3-2).
21. Secure the cabinet to the floor with contractor-supplied hardware.
22. If installing an 80 kVA UPS with an IAC-D, proceed to Step 23; if installing a 160 kVA UPS with an IAC-D, proceed to Step 29.
23. Remove the left-hand screw from the top door hinge on the IAC-D.

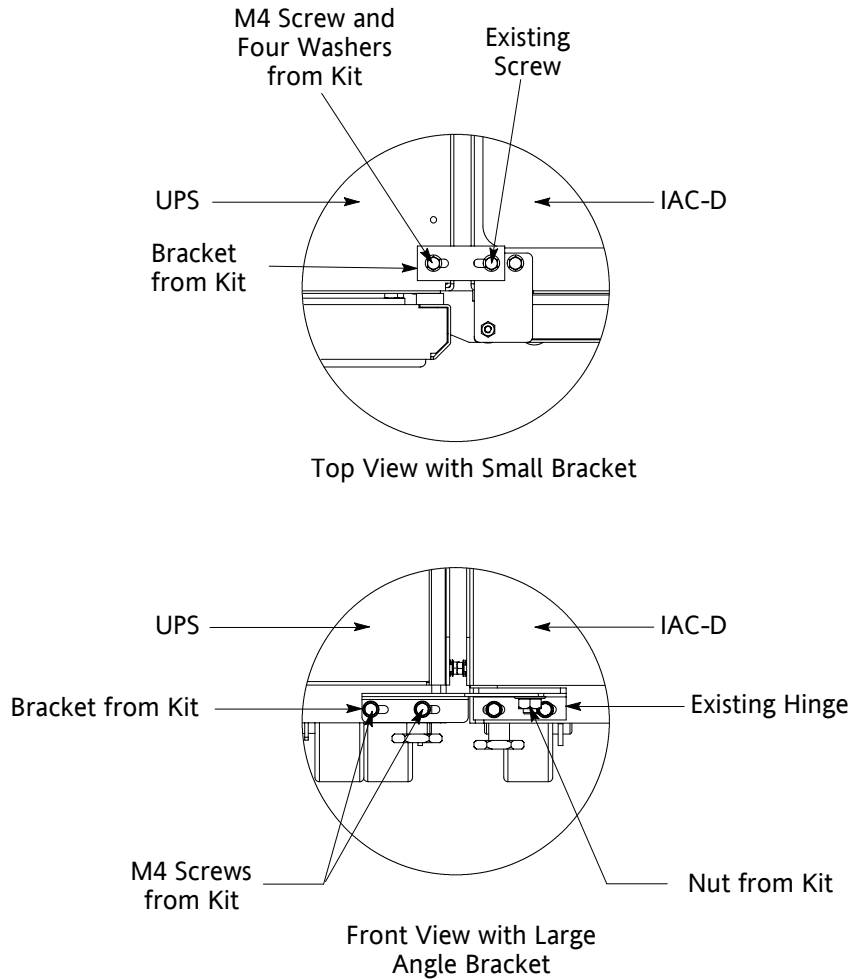


---

**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 angle bracket joins the cabinets at the bottom. The small flat bracket is attached to the cabinet tops first.*

---

24. Locate the small flat bracket, four washers, and M4 screw from the field kit. Align the holes in the small flat bracket over the hole in the top of the UPS and the door hinge screw hole on the IAC-D. Use the four washers between the bracket and the top of the UPS to match the thickness of the hinge on the IAC-D. Secure the bracket to the UPS using the M4 screw, and to the hinge on the IAC-D using the screw removed in Step 23 (see Figure 3-5).



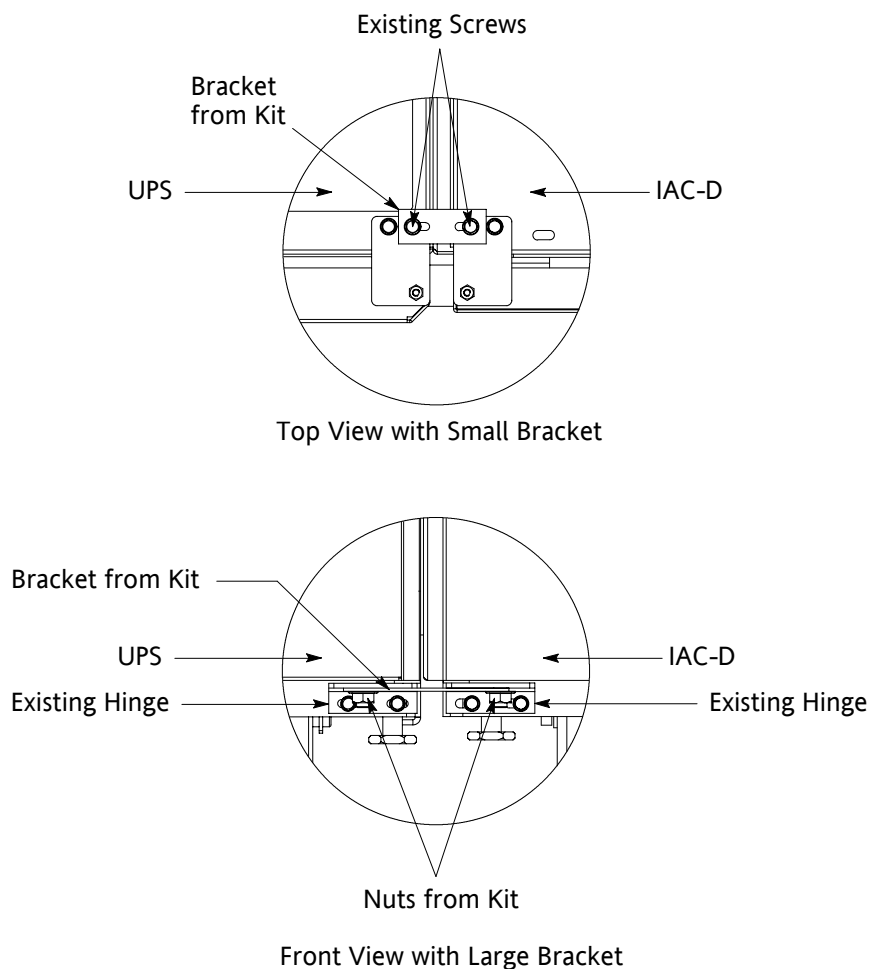
**Figure 3-5. 80 kVA UPS to IAC-D Joining Brackets**

25. Locate the large angle bracket, M4 screws, and large nut from the field kit. Place one end of the bracket over the bolt on the bottom side of the lower hinge on the IAC-D, and loosely secure the bracket to the hinge with the large nut (see Figure 3-5).
26. Align the holes in the other end of the bracket with the holes in the bottom right-hand side of the UPS (see Figure 3-5). Secure the bracket with M4 screws from the field kit.
27. Secure the large nut on the IAC-D hinge.
28. Proceed to paragraph 3.3.3.
29. 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 IAC-D.



**NOTE** Two cabinet joining brackets are provided in the optional 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.

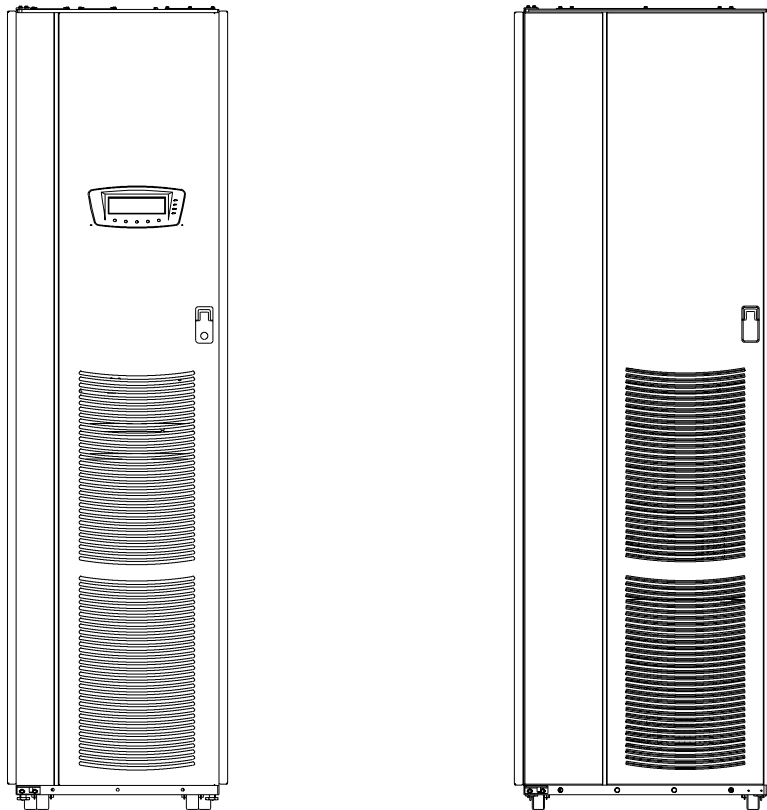
30. Locate the small flat bracket from the field kit. Align the holes in the small flat bracket over the door hinge screw holes. Replace the screws in the hinges, securing the bracket to the cabinets (see Figure 3-6).
31. Locate the large flat bracket from the field kit. Place one end of the bracket 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 hinge on the IAC-D (see Figure 3-6).
32. Secure the bracket to the hinges with the large nuts from the field kit.
33. Proceed to paragraph 3.3.3.



**Figure 3-6. 160 kVA UPS to IAC-D Joining Brackets**

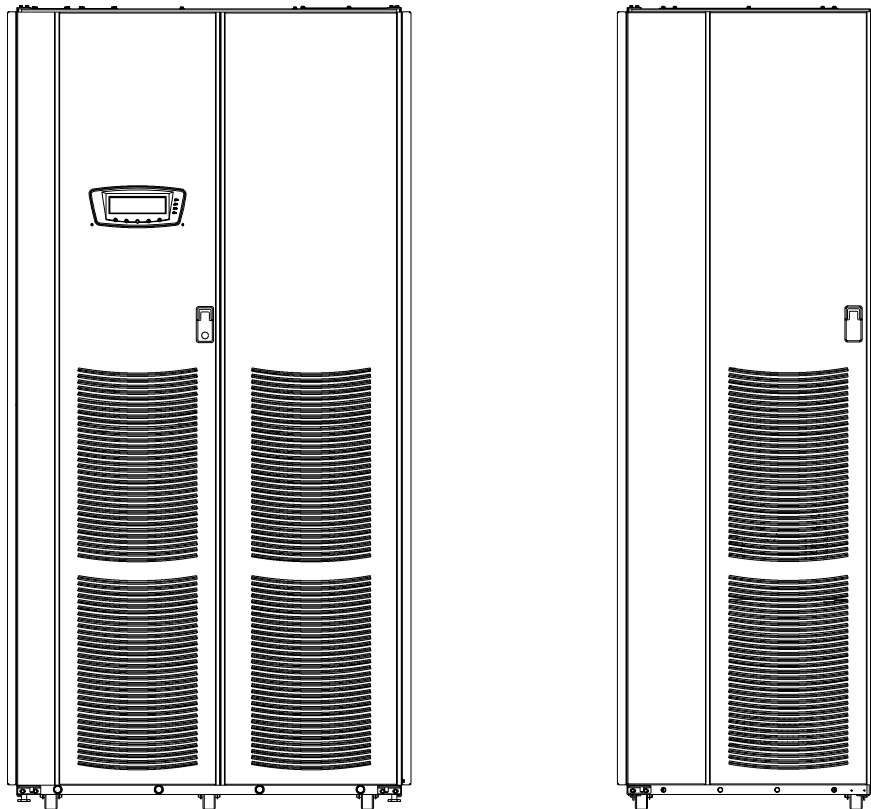
### 3.3.2 Standalone IAC-D Installation

Use this procedure to install a separately located IAC-D (see Figure 3-7 and Figure 3-8).



**Figure 3-7. 80 kVA UPS with Standalone IAC-D**

1. Verify that the UPS is properly installed and secured. Refer to the applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, for installation instructions.
2. Roll the IAC-D to the installation area.
3. If not already open, unfasten the front door latch and swing the door open.
4. If not already removed, remove the door. Remove the retaining screws located inside the door at the top and bottom hinge pivot points, then lift the door off. Save the retaining screws for reinstallation of the door.
5. If permanently mounting the IAC-D, proceed to Step 8; otherwise, proceed to Step 6.



**Figure 3-8. 160 kVA UPS with Standalone IAC-D**

6. Secure the IAC-D in position by lowering the leveling feet until the cabinet is not resting on the casters and the cabinet is level.
7. Proceed to paragraph 3.3.3.
8. Using the retained hardware, reinstall the shipping brackets previously removed to the front and rear of the IAC-D with the angle facing outward (see Figure 3-1 and Figure 3-2).
9. Secure the cabinet to the floor with contractor-supplied hardware.
10. Proceed to paragraph 3.3.3.

### 3.3.3 Installing IAC-D Power Wiring



---

**NOTE** Remove the IAC-D cabinet top or bottom conduit landing plate to drill or punch conduit holes, or remove knockouts (see Drawing 164201591-7 on page A-19).

**NOTE** Refer to the applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, 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 applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, for shutdown instructions.
2. If not already open, unfasten the front door latch and swing the door open.
3. If not already removed, remove the door. Remove the retaining screws located inside the door at the top and bottom hinge pivot points, then lift the door off. Save the retaining screws for reinstallation of the door.
4. If not already removed, remove the screws securing the top internal safety shield panel covering the input terminal compartment and remove the panel (see Drawing 164201591-8, sheet 4 of 6).
5. Remove the screws securing the Lexan internal safety shield covering the input terminals and remove the shield (see Drawing 164201591-8, sheet 4 of 6).
6. Remove the screws securing the bottom front internal safety shield panel covering the input terminal compartment and remove the panel to gain access to the terminals (see Drawing 164201591-8, sheet 4 of 6).
7. If not already open, remove the screws securing the inside distribution panel door, and swing the door open.



---

**NOTE** If ordered, use the IAC-D input wiring harness when installing line-up-and-match wiring.

---

8. Route the IAC-D input cables from the UPS, another IAC-D, IAC-B, or IDC to the IAC-D input terminals. If installing line-up-and-match wiring, route cables through the knockouts in the side of the cabinets. Refer to the applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5, for UPS cabinet terminal locations and termination requirements. See Drawing 164201591-8, starting on page A-21, for IAC-D wiring access information and terminal locations.
9. Connect phase A, B, and C, and, if required, Neutral power wiring between the UPS, another IAC-D, IAC-B, or IDC output and IAC-D input terminals.
10. If not already open, remove the screws securing the inside distribution panel door, and swing the door open.
11. If wiring an IAC-D with a Distribution Panel, proceed to Step 12; if wiring an IAC-D with Distribution Breakers or an Output Terminal Block, proceed to Step 16.

12. Install customer-supplied branch circuit breakers (Cutler-Hammer bolt-on type BAB or QBHW breakers for bolt-on panels, or plug-on type HQP or QPHW breakers for plug-on panels) into the Distribution Panel. See Drawing 164201591-8, starting on page A-21, for IAC-D wiring access information and terminal locations.




---

**NOTE** *When wiring branch circuits, begin adding conduits at the back of the center conduit landing plate to simplify future circuit additions.*

---

13. Wire the branch circuits according to the branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard).
14. 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.
15. Proceed to Step 18.




---

**NOTE** *When wiring branch circuits, begin adding conduits at the back of the center conduit landing plate to simplify future circuit additions.*

---

16. Connect phase A, B, and C, and Neutral power wiring from Distribution breakers and Neutral Terminals to the critical load. See Drawing 164201591-8, starting on page A-21, for IAC-D wiring access information and terminal locations.
17. 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 F or Table G on page A-18 for the correct breaker continuous current adjustment letter.
18. 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.
19. When all wiring is complete, close the inside distribution panel door, and secure with screws.
20. Reinstall the safety shield covers and panels removed in previous steps.
21. Reinstall the door removed in previous steps and secure with the retained hardware.
22. 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 IAC-D 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 IAC-D.
- 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.
- If installed, Distribution breaker current settings are correct.
- 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. (The UPS and IAC-D must be installed on a level floor suitable for computer or electronic equipment.)
- Adequate workspace exists around the IAC-D and other cabinets.
- Adequate lighting is provided around all UPS system equipment.
- A 120V service outlet is located within 25 feet of the UPS and IAC-D equipment.
- Startup and operational checks are performed by an authorized Powerware Customer Service Engineer.



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

**This page intentionally left blank.**

## Chapter 4 | Understanding IAC-D Operation

### 4.1 Distribution Panelboard Configuration

Power from the UPS 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.

Figure 4-1 shows the path of electrical power through the IAC-D with Distribution Panelboards.

### 4.2 Distribution Breaker Configuration

Power from the UPS is routed to one to six Distribution Breakers. Power is then distributed to the critical loads through the Distribution Breakers.

Figure 4-2 shows the path of electrical power through the IAC-D with Distribution Breakers.

### 4.3 Distribution Panelboard and Distribution Breaker Configuration

Power from the UPS is routed to one 42-pole Distribution Panel through a Panelboard Input breaker and to one to three Distribution Breakers. Power is then distributed to the critical loads through customer-provided branch circuit breakers or the Distribution Breakers.

Figure 4-3 shows the path of electrical power through the IAC-D with a Distribution Panelboard and Distribution Breakers.

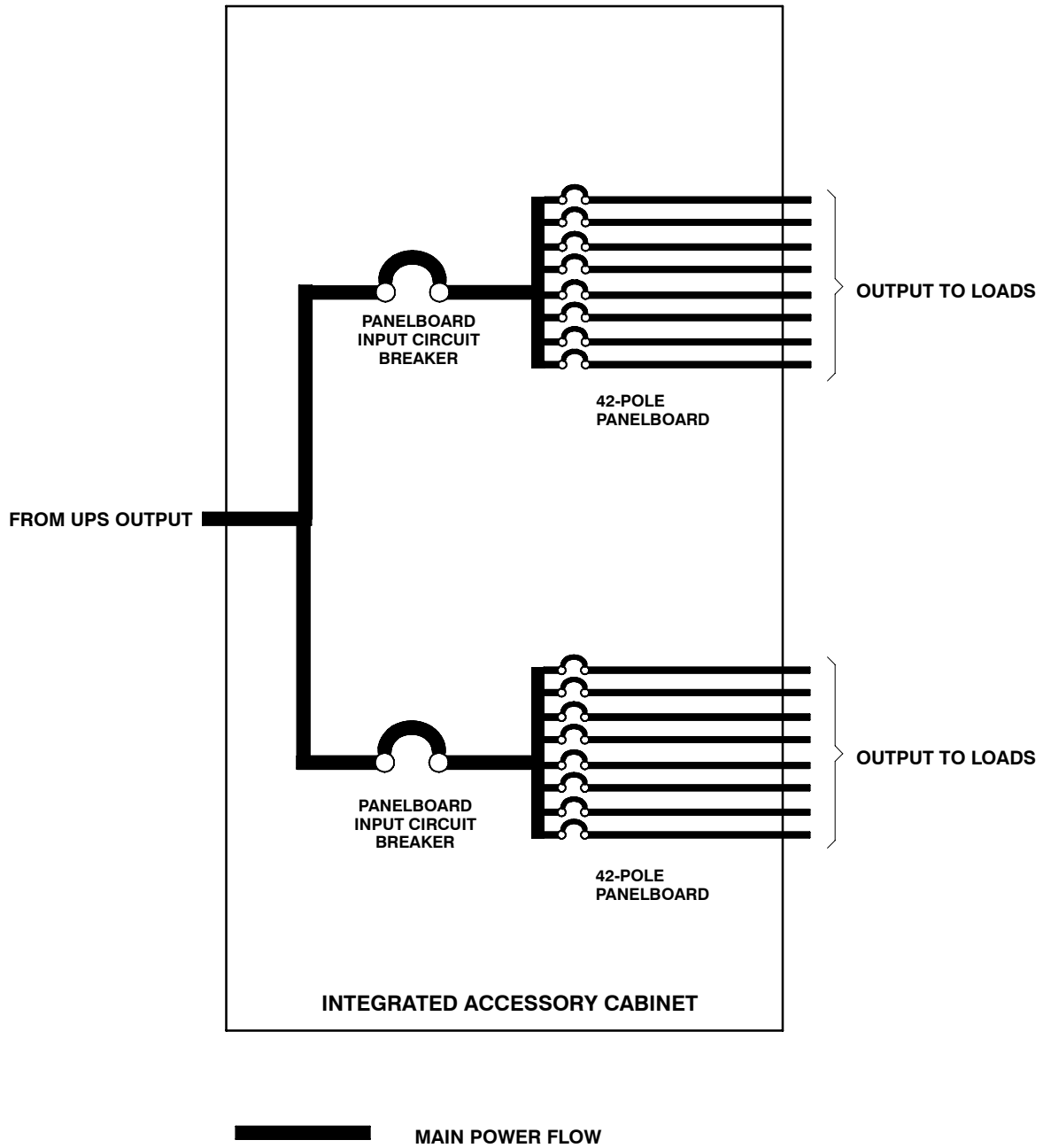
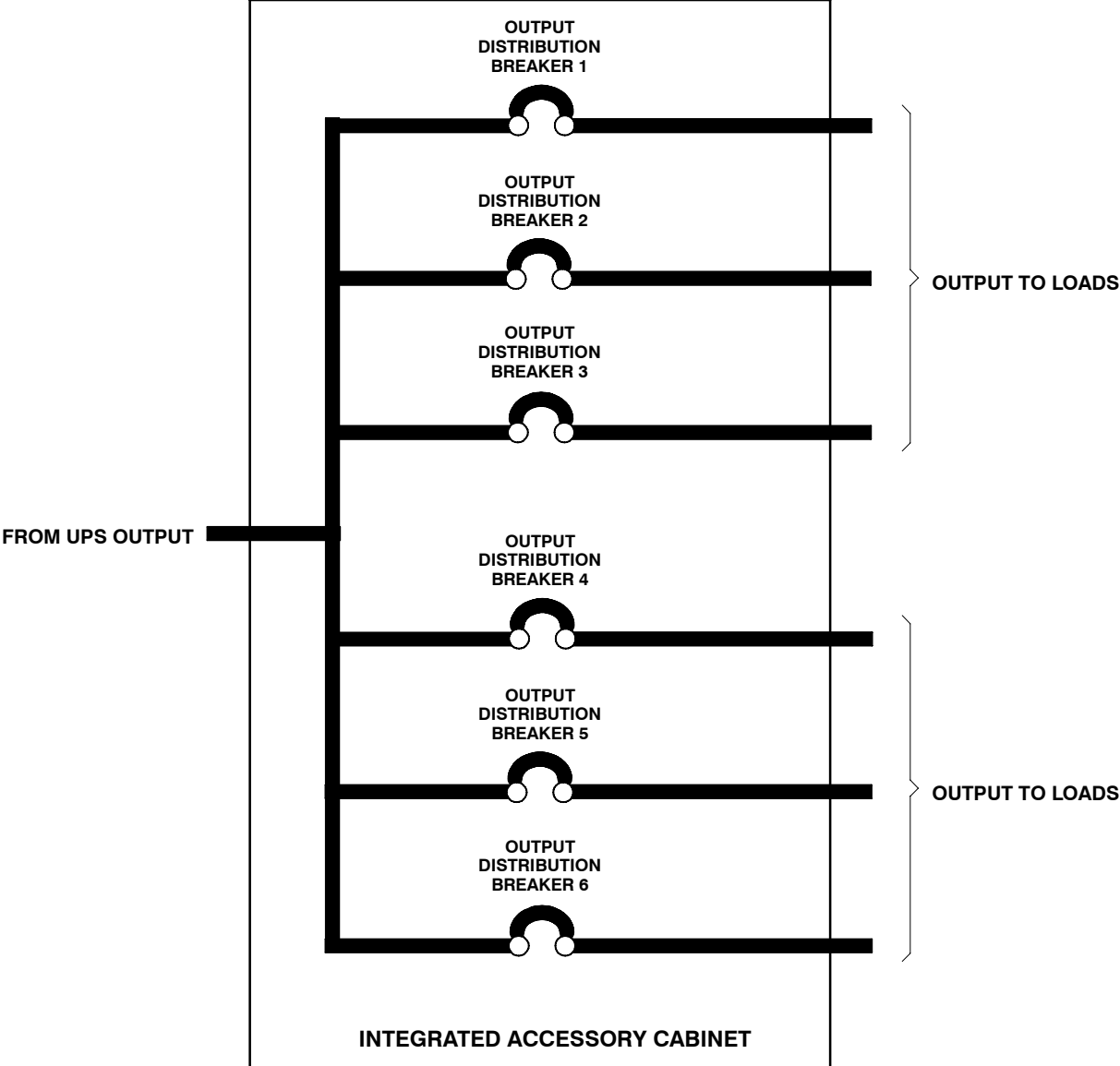


Figure 4-1. Path of Current Through the IAC-D with Distribution Panelboards



— MAIN POWER FLOW

Figure 4-2. Path of Current Through the IAC-D with Distribution Breakers

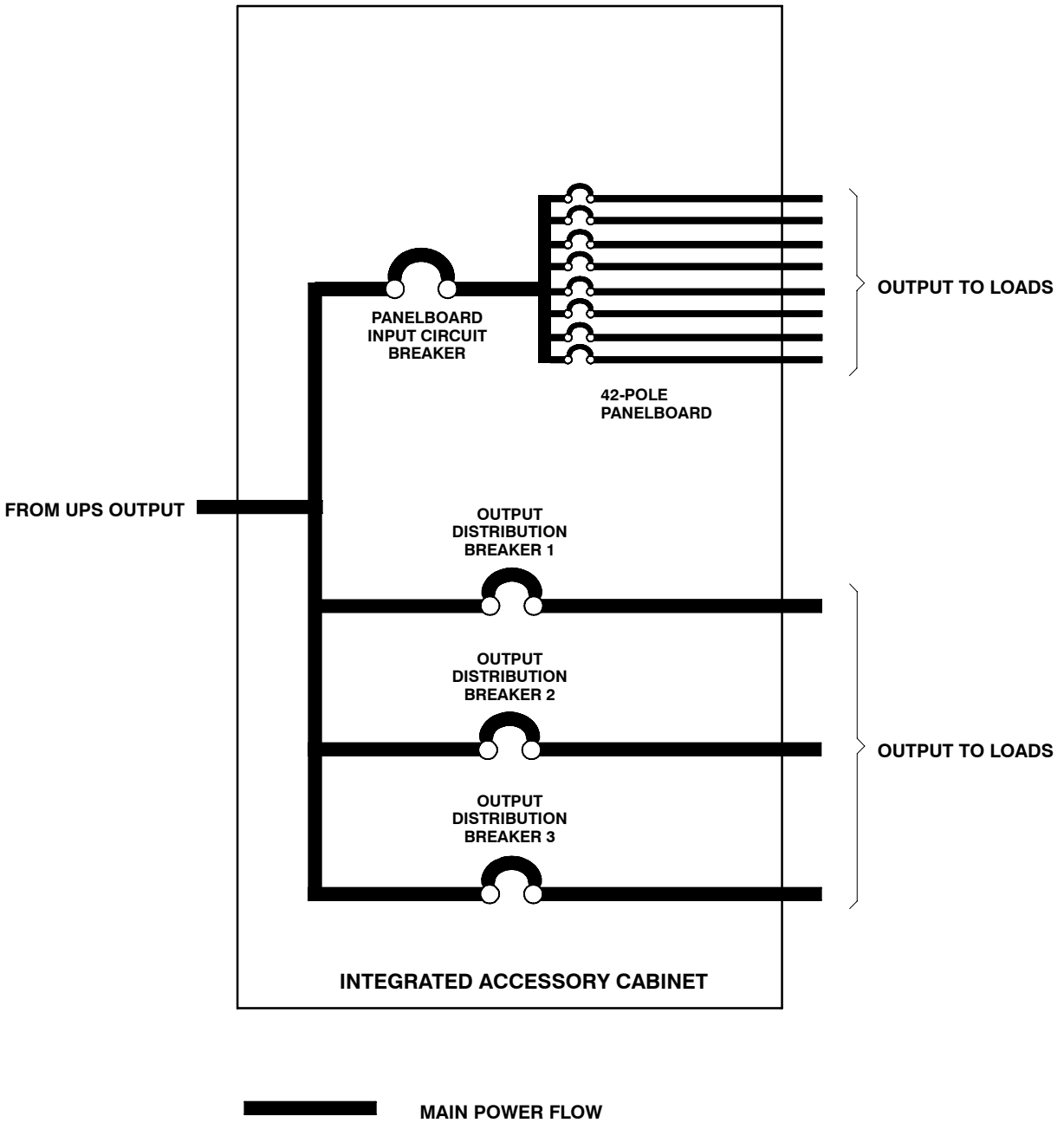


Figure 4-3. Path of Current Through the IAC-D with Distribution Panelboard and Breakers



## Chapter 5 | IAC-D Features, Options, Controls, and Operation

### 5.1 IAC-D Standard Features

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

#### 5.1.1 Installation Features

The IAC-D 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.

#### 5.1.2 Expansion

The IAC-D 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 Distribution Panel






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

#### 5.2.2 Distribution Breakers

Up to six optional output Distribution Breakers are available to distribute the output power from the UPS to larger critical loads. The breakers are adjustable and are available in low current and high current ranges. The low current Distribution Breakers can be adjusted for 40A, 45A, 50A, 63A, 70A, 80A, 90A, and 100A current ratings. The high current Distribution Breakers can be adjusted for 100A, 125A, 150A, 160A, 175A, 200A, 225A, and 250A current ratings. The Distribution Breakers are enclosed behind the hinged doors on the front of the IAC-D.

## 5.3 Symbols

The following are examples of symbols used on the IAC-D 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 IAC-D Controls

Figure 5-1 and Figure 5-2 identify and show the location of the controls on the Powerware 9390 IAC-D. The descriptions provide a brief overview of the IAC-D controls, and standard and optional features.



---

**NOTE** *Read the operation sections of this manual and the applicable Powerware 9390 UPS Installation and Operation Manual, listed in paragraph 1.5, and have thorough knowledge of UPS operation before attempting to operate any of the IAC-D controls.*

---

The IAC-D can contain the following controls:

- ▶ Distribution Panels PB1 and PB2 with Panel Input Breakers
- ▶ Distribution Breakers CB11, CB12, CB13 – Top and CB21, CB22, CB23 – Bottom

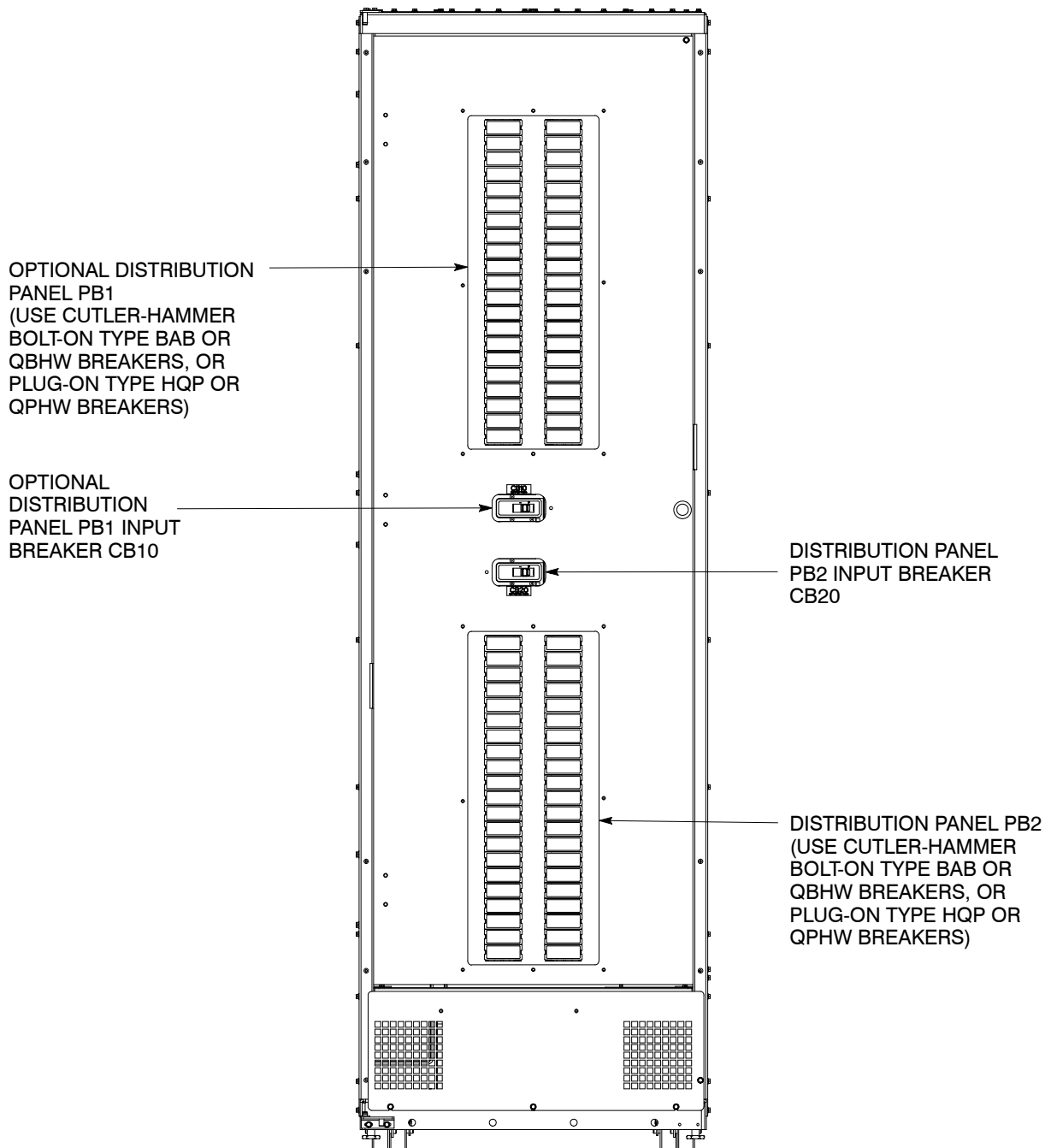


Figure 5-1. Powerware 9390 IAC-D Controls – with Distribution Panel Option

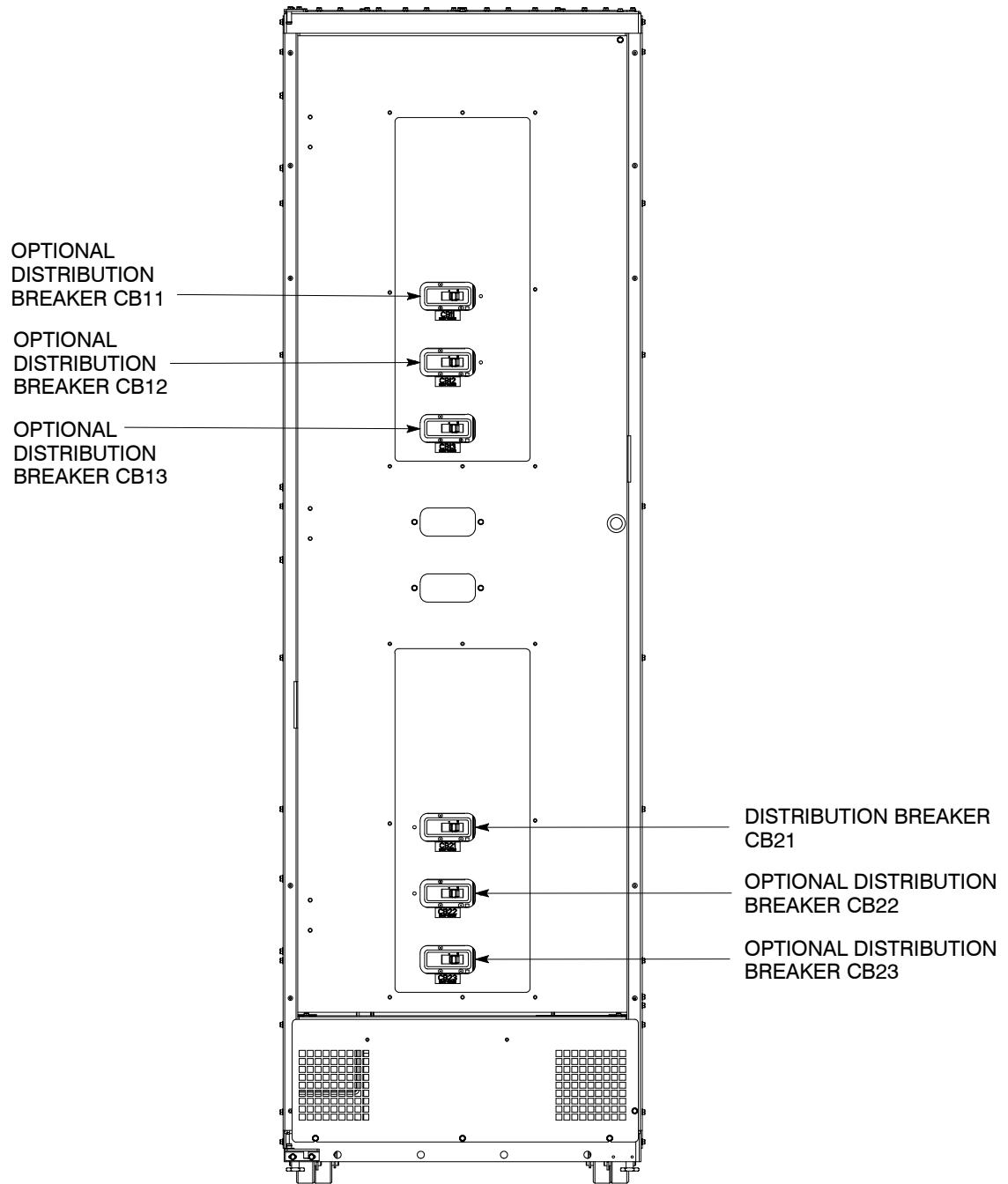


Figure 5-2. Powerware 9390 IAC-D Controls – with Distribution Breaker Option

## 5.5 IAC-D Operation



**NOTE** *Before starting the UPS with the IAC-D, 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 door open.
2. Verify that the IAC-D circuit breakers and switches are set as follows:

IAC-D 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 applicable Powerware 9390 Installation and Operation manual, listed in paragraph 1.5.
4. Close the IAC-D Distribution Panel Input Breakers (if installed) or the Distribution Breakers (if installed).
5. Close the Distribution Panel Branch Breakers (if installed).
6. Close the front door and secure the latch.

**This page intentionally left blank.**

## Chapter 6 | Maintaining the IAC-D

The components inside the Integrated Accessory Cabinet-Distribution (IAC-D) 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 IAC-D interior is unsafe until the UPS is shut down (inverter output and bypass).



#### 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 IAC-D 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 IAC-D. Verify the area is not cluttered, allowing free access to the unit.
2. Verify the air intakes (vents on front of cabinet) and exhaust opening (on top of the IAC-D) are not blocked.
3. Verify the operating environment is within the parameters specified in Chapter 7, “Product Specifications” and Drawing 164201591-2 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 IAC-D 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 system 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 IAC-D is housed in a free-standing cabinet with safety shields behind the doors.

System	Model	Frequency
Powerware 9390	IAC-D	50/60 Hz

### 7.2 IAC-D Input

Operating Input Voltage (Nominal +10/-15%)	208 Vac nominal (50/60 Hz) 480 Vac nominal (50/60 Hz)
Operating Input Frequency Range	±5 Hz
Operating Input Current	See Appendix A, Table D

### 7.3 IAC-D Output

Operating Output Voltage (Nominal +10/-15%)	208 Vac nominal (50/60 Hz) 480 Vac nominal (50/60 Hz)
Operating Output Frequency Range	±5 Hz
Output Current	See Appendix A, Table D

### 7.4 Environmental Specifications

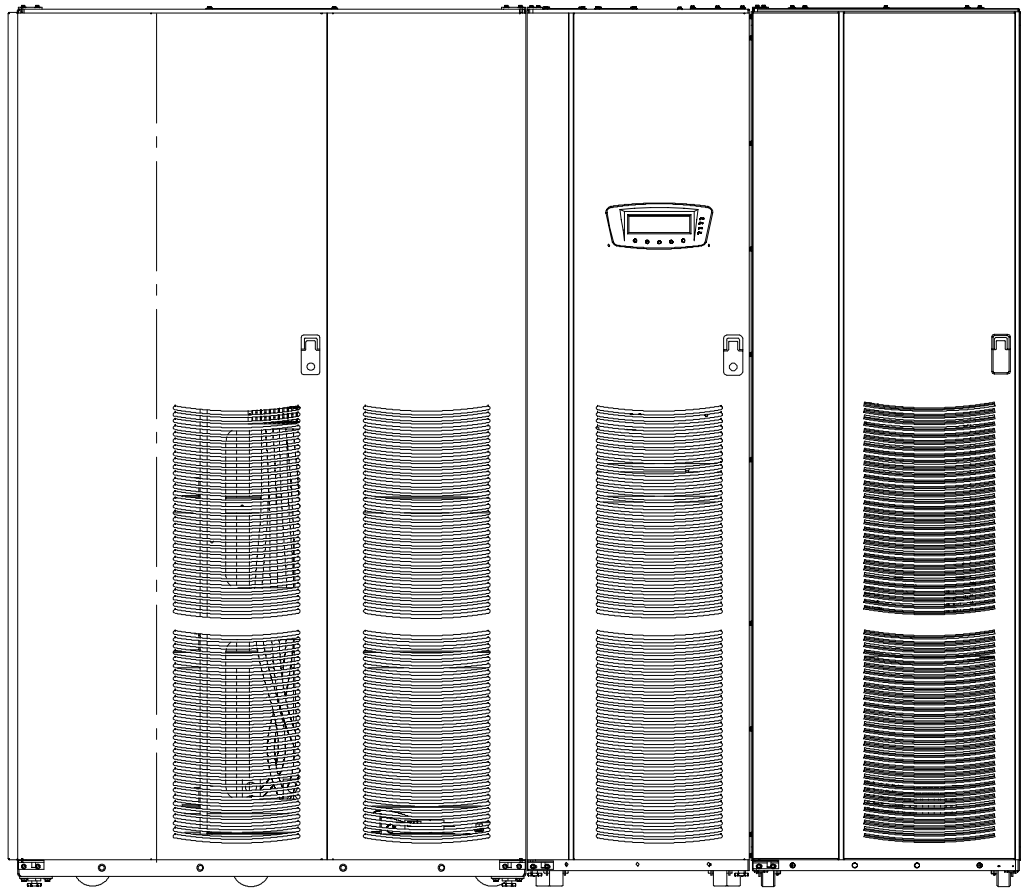
Operating Temperature	0 to 40°C (32–104°F) without derating. The recommended operating temperature is 25°C (77°F).
Operating Altitude	Maximum 1500m (5000 ft) at 40°C without derating
Storage Temperature	-25 to +60°C
Relative Humidity (operating and storage)	5% to 95% maximum noncondensing
Acoustical 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 Accessory Cabinet-Distribution (IAC-D). This appendix contains the following drawings:

- ▶ 164201591-1 Typical Powerware 9390 UPS System with IAC-D
- ▶ 164201591-2 Physical Features and Requirements
- ▶ 164201591-3 IAC-D Oneline Drawings
- ▶ 164201591-5 IAC-D Distribution Panel Schematic
- ▶ 164201591-6 Power Wiring Installation Notes
- ▶ 164201591-7 Conduit and Wire Entry Locations
- ▶ 164201591-8 IAC-D Power Terminal Locations
- ▶ 164201591-9 IAC-D Dimensions

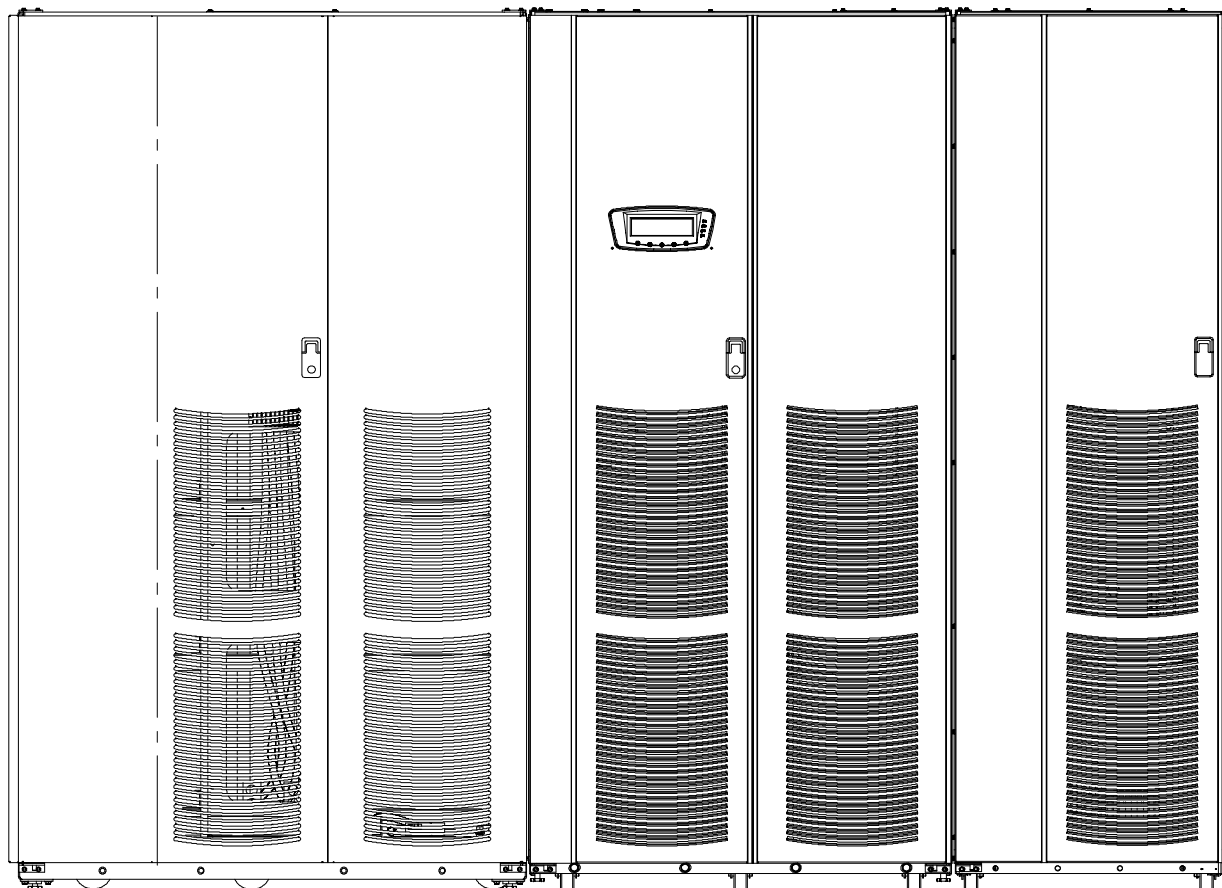


**BATTERY CABINET**

**40 kVA OR  
80 kVA  
UPS CABINET**

**IAC-D**

<b>DESCRIPTION:</b> TYPICAL POWERWARE 9390 UPS SYSTEM WITH IAC-D	
<b>DRAWING NO:</b> 164201591-1	<b>SHEET:</b> 1 of 2
<b>REVISION:</b> A	<b>DATE:</b> 051505



**BATTERY CABINET**

**120 kVA OR  
160 kVA  
UPS CABINET**

**IAC-D**

<b>DESCRIPTION: TYPICAL POWERWARE 9390 UPS SYSTEM WITH IAC-D</b>		
<b>DRAWING NO:</b> 164201591-1	<b>SHEET:</b> 2 of 2	
<b>REVISION:</b> A	<b>DATE:</b> 051505	

1. The IAC–D equipment operating environment must meet the weight requirements shown in Table A and size requirements shown on Drawing 164201591–9.
2. The IAC–D 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 IAC–D (cabinet only)	210.9 (465)	188.2 (415)	4 at 47.1 (103.8)
<b>NOTES:</b> 1. For IAC–D with Distribution Panels, add 11.3 kg (25 lb) for each panel. 2. For IAC–D with Distribution Breakers, add 6.8 kg (15 lb) for each breaker. 3. For IAC–D with Cometic Covers, add 27.2 kg (60 lb).			

5. The clearances required around the IAC–D cabinet are shown in Table B.

<b>Table B. IAC–D Cabinet Clearances</b>	
From Top of Cabinet	Minimum clearance over the IAC–D 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> 164201591–2	<i>SHEET:</i> 1 of 2
<i>REVISION:</i> A	<i>DATE:</i> 051505

6. The basic environmental requirements for operation of the IAC–D are:

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

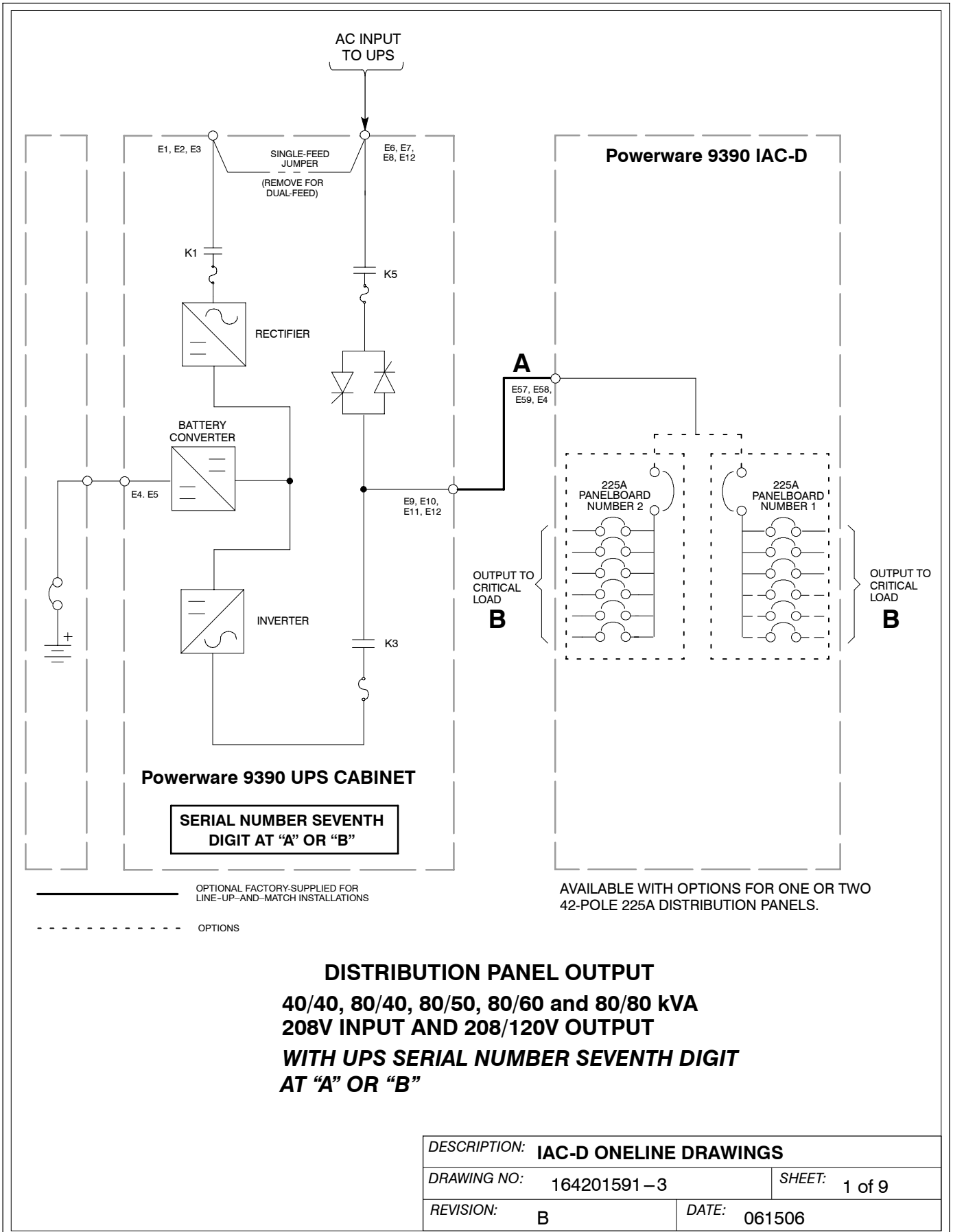
**Recommended Operating Range:** 20–25°C (68–77°F)

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

The IAC–D 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)
Powerware 9390 IAC–D	N/A	N/A

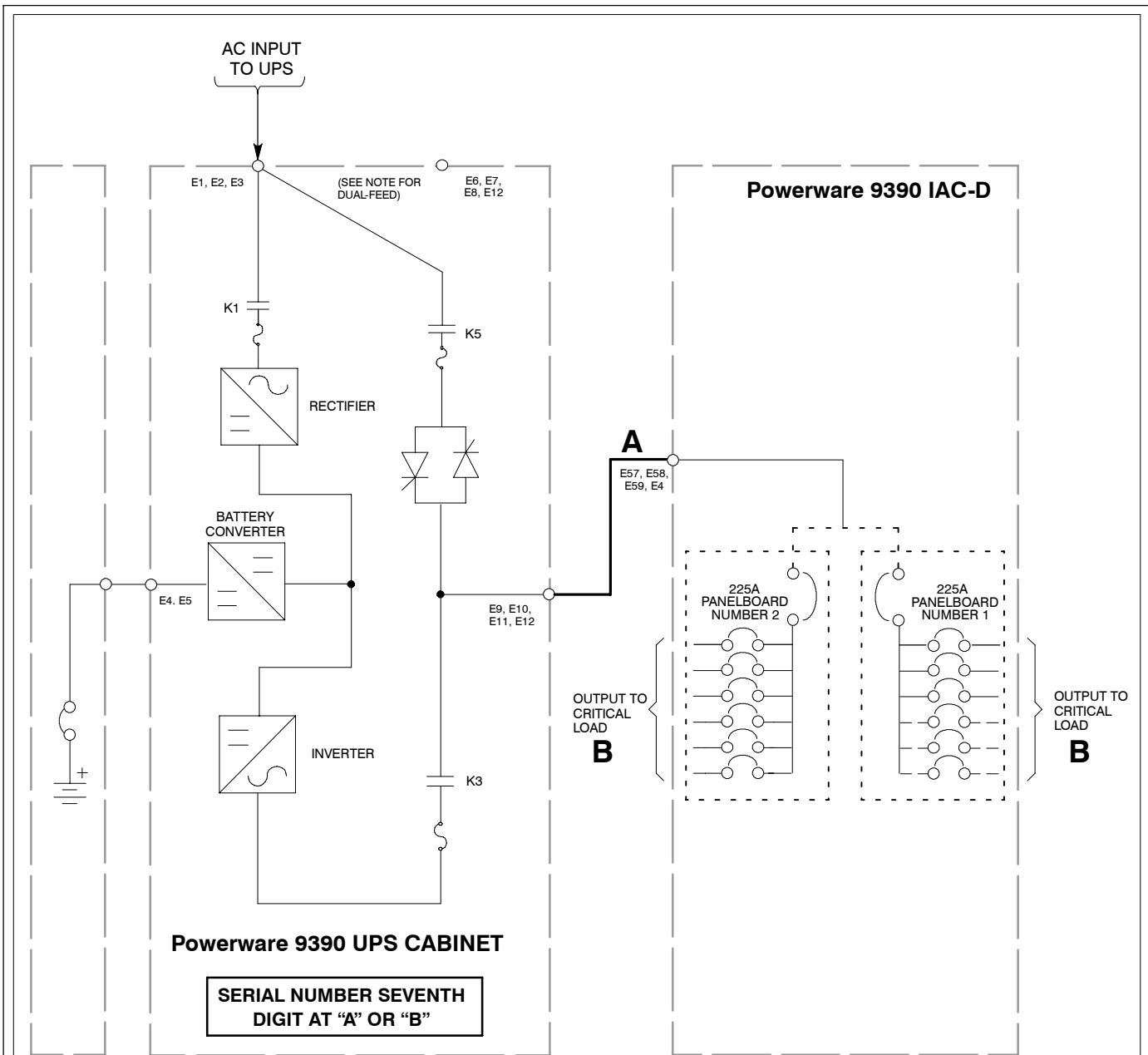
<i>DESCRIPTION:</i> <b>PHYSICAL FEATURES AND REQUIREMENTS</b>		
<i>DRAWING NO.:</i>	164201591–2	<i>SHEET:</i> 2 of 2
<i>REVISION:</i>	A	<i>DATE:</i> 051505



**DISTRIBUTION PANEL OUTPUT**  
**40/40, 80/40, 80/50, 80/60 and 80/80 kVA**  
**208V INPUT AND 208/120V OUTPUT**  
**WITH UPS SERIAL NUMBER SEVENTH DIGIT**  
**AT "A" OR "B"**

DESCRIPTION: <b>IAC-D ONELINE DRAWINGS</b>	
DRAWING NO: 164201591-3	SHEET: 1 of 9
REVISION: B	DATE: 061506





OPTIONAL FACTORY-SUPPLIED FOR LINE-UP-AND-MATCH INSTALLATIONS

----- OPTIONS

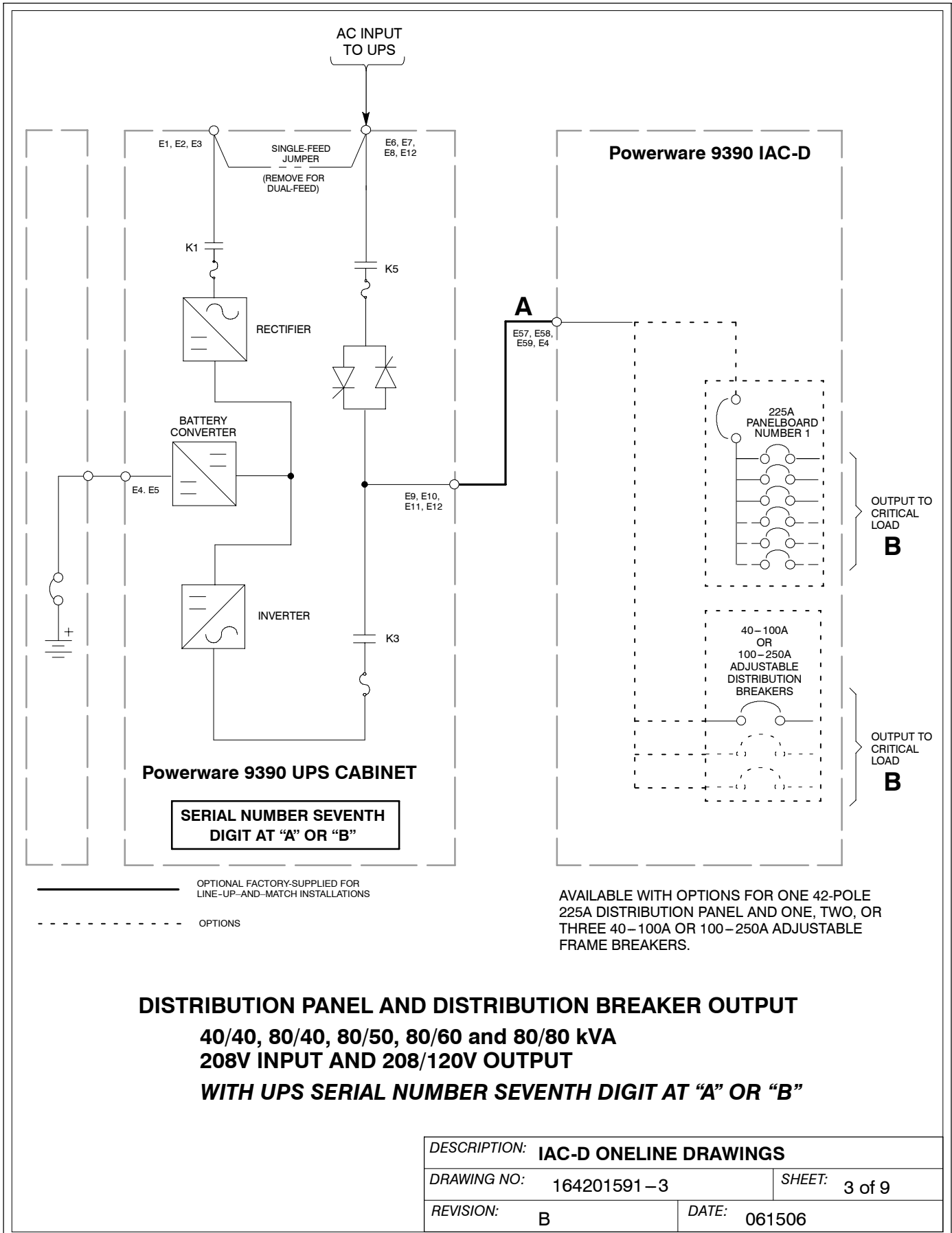
AVAILABLE WITH OPTIONS FOR ONE OR TWO 42-POLE 225A DISTRIBUTION PANELS.

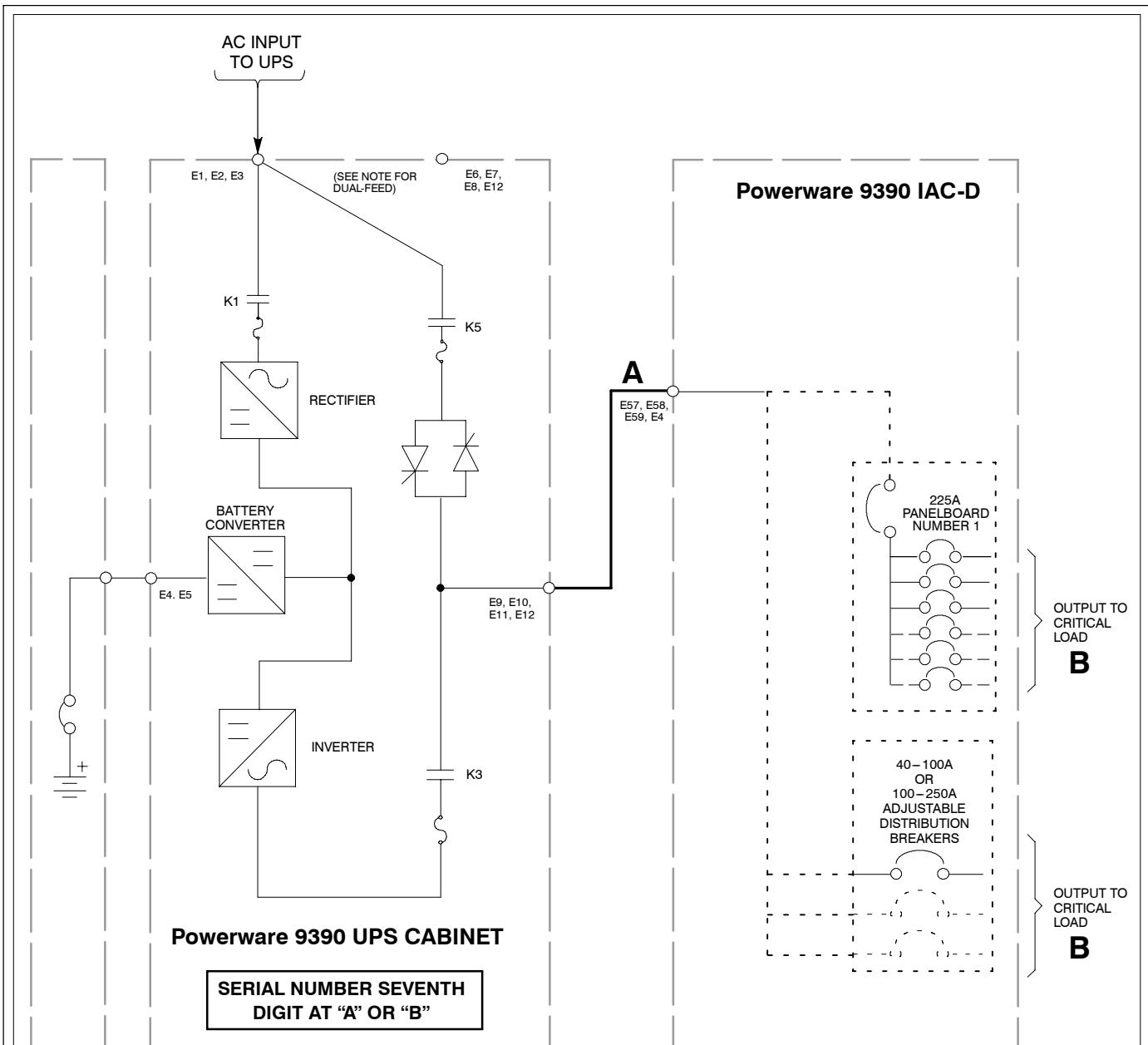
**DISTRIBUTION PANEL OUTPUT**

**120/100, 120/120 kVA, 160/100, 160/120, AND 160/160 kVA  
208V INPUT AND 208/120V OUTPUT  
WITH UPS SERIAL NUMBER SEVENTH DIGIT AT "A" OR "B"**

**NOTE:** Move bypass contactor wires to bypass terminals for dual-feed.

DESCRIPTION: <b>IAC-D ONELINE DRAWINGS</b>	
DRAWING NO: 164201591-4	SHEET: 2 of 9
REVISION: B	DATE: 061506





OPTIONAL FACTORY-SUPPLIED FOR LINE-UP-AND-MATCH INSTALLATIONS

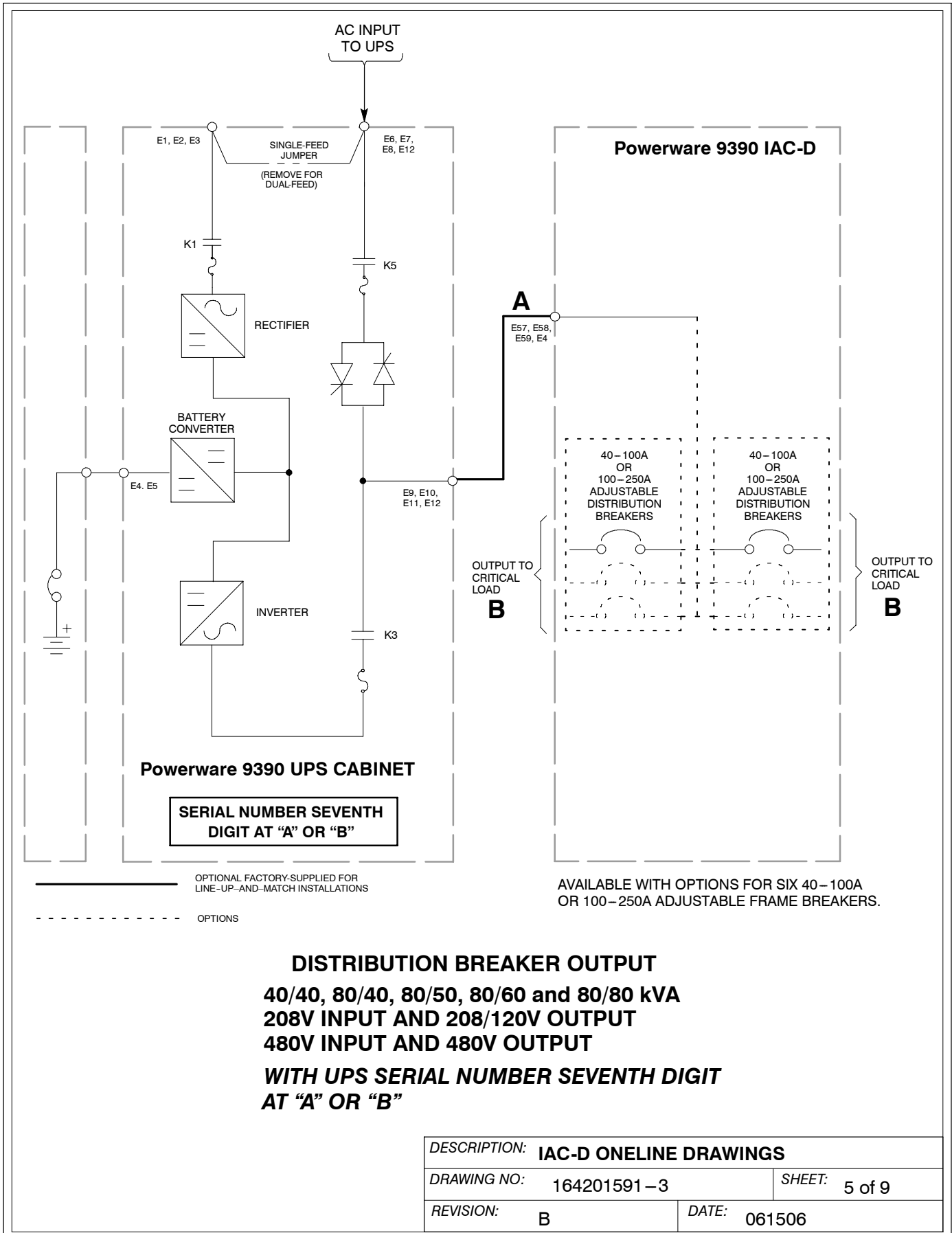
OPTIONS

AVAILABLE WITH OPTIONS FOR ONE 42-POLE 225A DISTRIBUTION PANEL AND ONE, TWO, OR THREE 40-100A OR 100-250A ADJUSTABLE FRAME BREAKERS.

**DISTRIBUTION PANEL AND DISTRIBUTION BREAKER OUTPUT**  
**120/100, 120/120 kVA, 160/100, 160/120, AND 160/160 kVA**  
**208V INPUT AND 208/120V OUTPUT**  
**WITH UPS SERIAL NUMBER SEVENTH DIGIT AT "A" OR "B"**

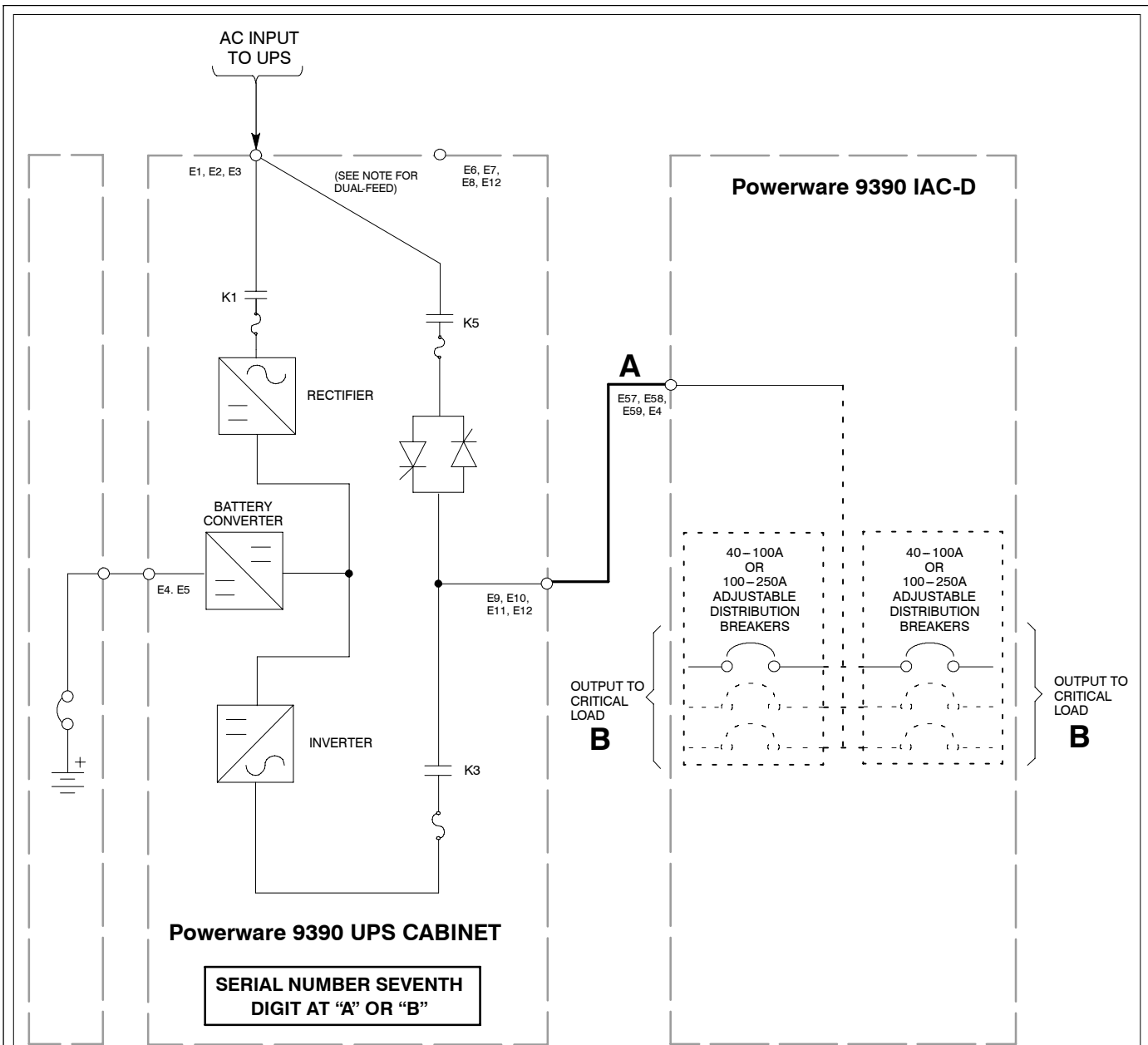
**NOTE:** Move bypass contactor wires to bypass terminals for dual-feed.

DESCRIPTION: <b>IAC-D ONELINE DRAWINGS</b>	
DRAWING NO: 164201591-3	SHEET: 4 of 9
REVISION: B	DATE: 061506



**DISTRIBUTION BREAKER OUTPUT**  
**40/40, 80/40, 80/50, 80/60 and 80/80 kVA**  
**208V INPUT AND 208/120V OUTPUT**  
**480V INPUT AND 480V OUTPUT**  
**WITH UPS SERIAL NUMBER SEVENTH DIGIT**  
**AT "A" OR "B"**

DESCRIPTION: <b>IAC-D ONELINE DRAWINGS</b>	
DRAWING NO: 164201591-3	SHEET: 5 of 9
REVISION: B	DATE: 061506



**Powerware 9390 UPS CABINET**

**SERIAL NUMBER SEVENTH  
DIGIT AT "A" OR "B"**

**Powerware 9390 IAC-D**

40-100A  
OR  
100-250A  
ADJUSTABLE  
DISTRIBUTION  
BREAKERS

OUTPUT TO  
CRITICAL  
LOAD  
**B**

OUTPUT TO  
CRITICAL  
LOAD  
**B**

OPTIONAL FACTORY-SUPPLIED FOR  
LINE-UP-AND-MATCH INSTALLATIONS

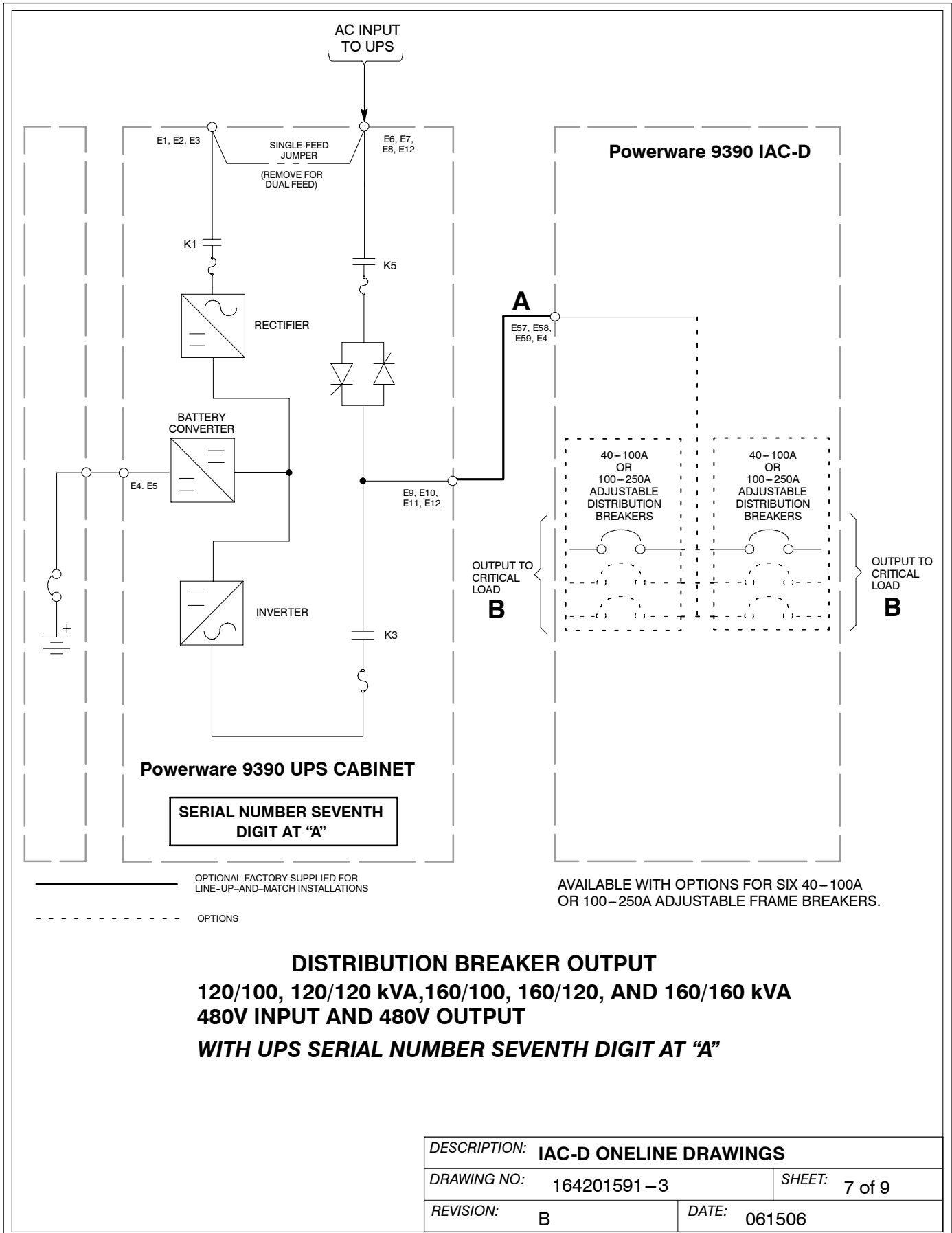
OPTIONS

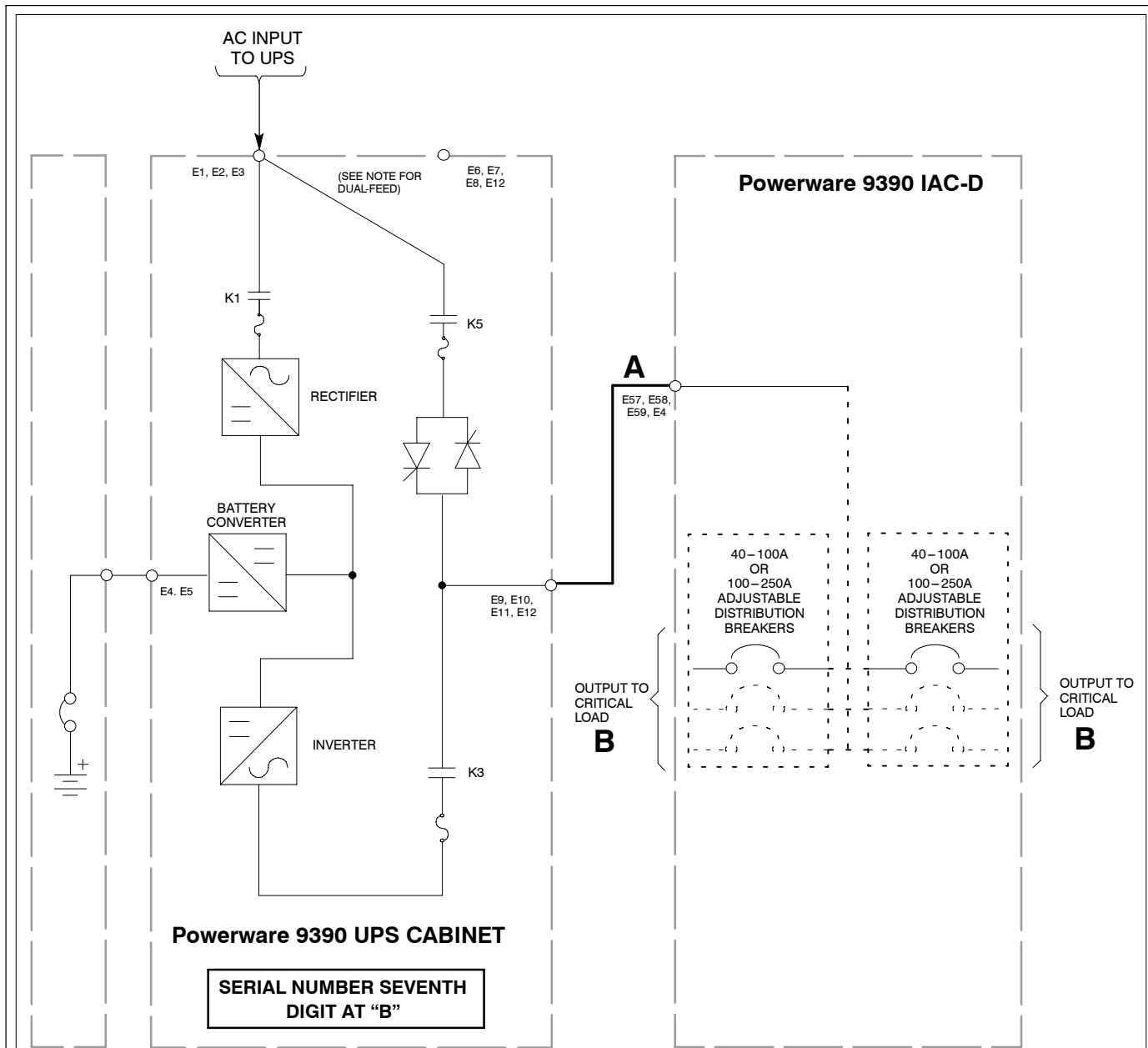
AVAILABLE WITH OPTIONS FOR SIX 40-100A  
OR 100-250A ADJUSTABLE FRAME BREAKERS.

**DISTRIBUTION BREAKER OUTPUT**  
**120/100, 120/120 kVA, 160/100, 160/120, AND 160/160 kVA**  
**208V INPUT AND 208/120V OUTPUT**  
**WITH UPS SERIAL NUMBER SEVENTH DIGIT AT "A" OR "B"**

**NOTE:** Move bypass contactor wires to bypass terminals for dual-feed.

DESCRIPTION: <b>IAC-D ONELINE DRAWINGS</b>	
DRAWING NO: 164201591-3	SHEET: 6 of 9
REVISION: B	DATE: 061506





**Powerware 9390 UPS CABINET**

**SERIAL NUMBER SEVENTH DIGIT AT "B"**

**Powerware 9390 IAC-D**

OPTIONAL FACTORY-SUPPLIED FOR LINE-UP-AND-MATCH INSTALLATIONS

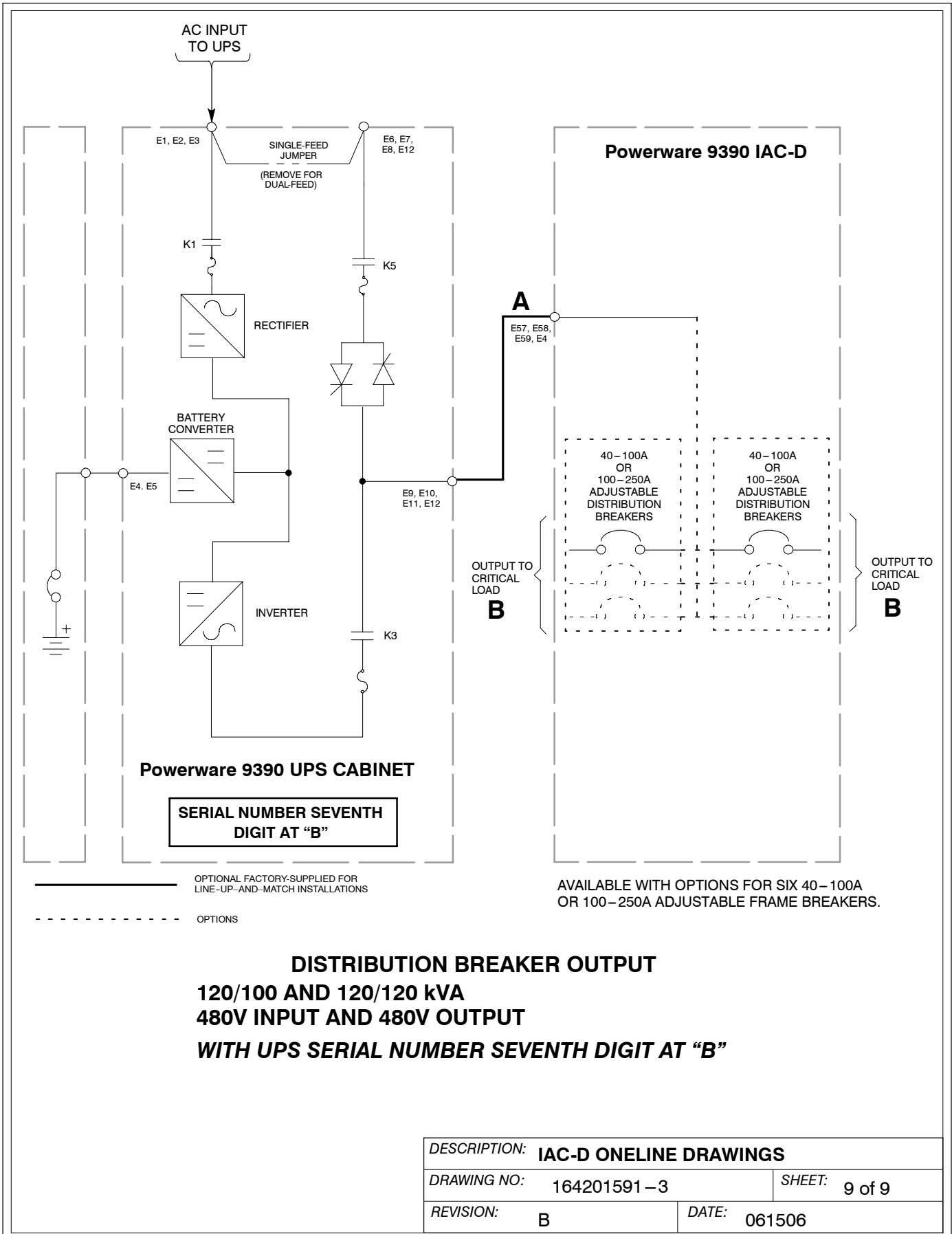
AVAILABLE WITH OPTIONS FOR SIX 40-100A OR 100-250A ADJUSTABLE FRAME BREAKERS.

----- OPTIONS

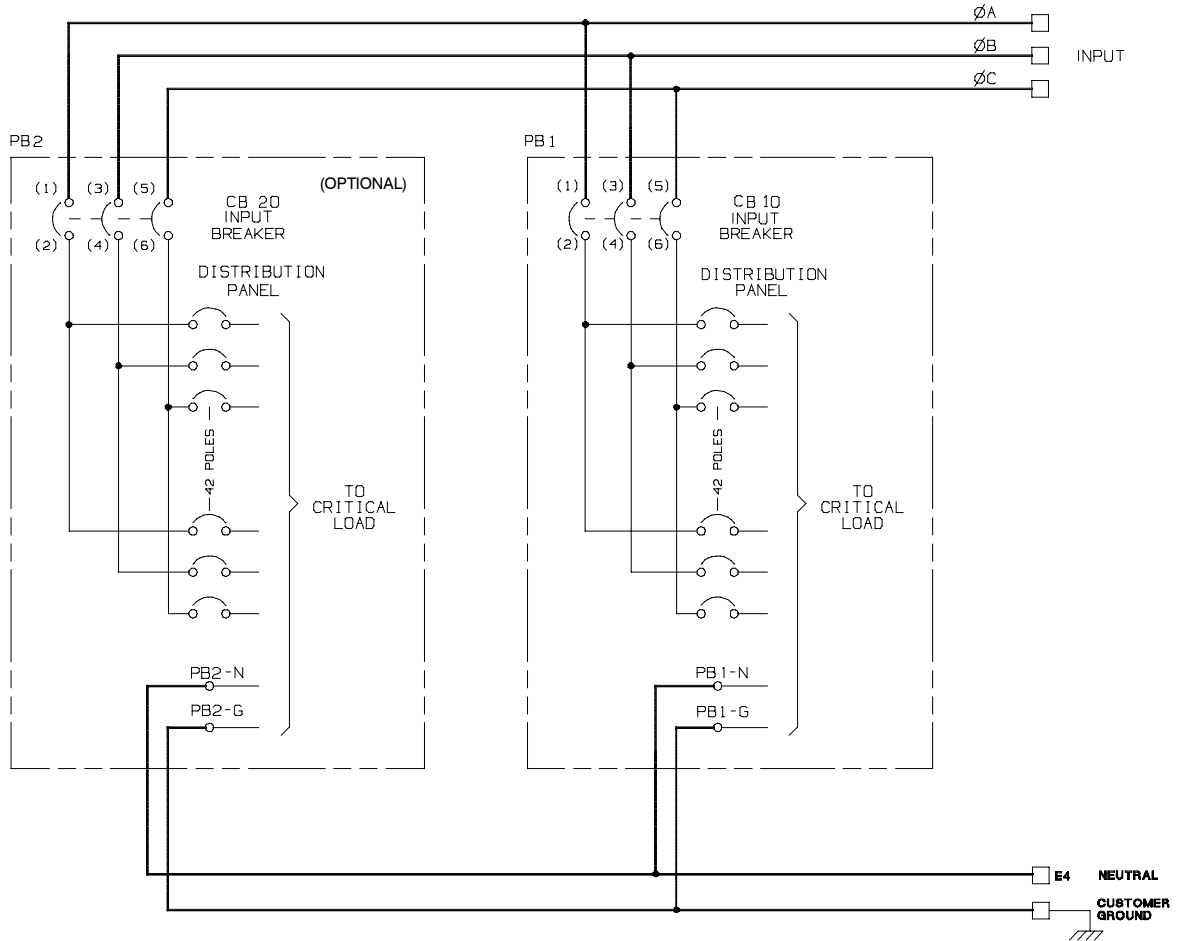
**DISTRIBUTION BREAKER OUTPUT**  
**160/100, 160/120, AND 160/160 kVA**  
**480V INPUT AND 480V OUTPUT**  
**WITH UPS SERIAL NUMBER SEVENTH DIGIT AT "B"**

**NOTE:** Move bypass contactor wires to bypass terminals for dual-feed.

DESCRIPTION: <b>IAC-D ONELINE DRAWINGS</b>	
DRAWING NO: 164201591-3	SHEET: 8 of 9
REVISION: B	DATE: 061506







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

DESCRIPTION: <b>IAC-D DISTRIBUTION PANEL SCHEMATIC</b>	
DRAWING NO: 164201591-5	SHEET: 1 of 1
REVISION: A	DATE: 051505

Table D. INPUT/OUTPUT Ratings & External Wiring Requirements for Powerware 9390 IAC-D		
	Units	Rating 50/60 Hz
<b>AC Input from UPS</b> (Standalone Installation) (3) Phases, (1) Ground  Minimum Conductor Size Number per Phase	A AMPS	Maximum input ratings are to be in accordance with the rating label on the IAC-D and not to exceed 500A. The total combined load is not to exceed the UPS output rating.
	A AWG or kcmil (each)	For contractor-supplied wiring, refer to the applicable Powerware 9390 UPS Installation and Operation manual, listed in paragraph 1.5. Wiring should be sized in accordance with the rating label on the IAC-D. Factory supplied wiring for line-up-and-match installation is available as an option.
<b>AC Output from Distribution Breaker to Critical Load</b> (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the IAC-D and not to exceed 500A. The total combined load is not to exceed the UPS output rating.
<b>AC Output from Distribution Panel Breakers to Critical Load</b>	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the IAC-D and not to exceed 500A. The total combined load is not to exceed the UPS output rating.

**NOTE:** Callout letters **A** and **B** map to drawing 164201591-3.

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. Optional 225A Distribution Panels use Cutler-Hammer bolt-on type BAB or QBHW breakers for bolt-on panels, or plug-on type HQP or QPHW breakers for plug-on panels. Breakers to be provided by the customer.
6. Refer to Section I of this manual for installation instructions.
7. Refer to the applicable Powerware 9390 UPS Installation and Operation manual, listed in paragraph 1.5, for UPS cabinet wiring requirements, and conduit and terminal locations.
8. When Distribution Panel Boards or a combination of Panel Board and Distribution Breakers are installed, input and output to the IAC-D must be 208V. If only Distribution Breakers are installed, input and output to the IAC-D can be either 208V or 480V.

DESCRIPTION: <b>POWER WIRING INSTALLATION NOTES</b>	
DRAWING NO: 164201591-6	SHEET: 1 of 3
REVISION: A	DATE: 051505

- 9. 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.
- 10. Conduit is to be sized to accommodate one neutral conductor the same size as the phase conductor and one ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, size the conduit to accommodate the extra wire or size. All Powerware 9390 products can accommodate a double-sized neutral.
- 11. Terminals are UL and CSA rated at 90°C. Refer to Table E for power cable terminations. Drawing 164201591–8 shows the location of the power cable terminals inside the UPS cabinet.

<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>	E57	Phase A	2 – #2–600 kcmil	56.5 (500)	1/2 in. Hex
	E58	Phase B	2 – #2–600 kcmil	56.5 (500)	1/2 in. Hex
	E59	Phase C	2 – #2–600 kcmil	56.5 (500)	1/2 in. Hex
	E4	Neutral	4 – #2–600 kcmil	56.5 (500)	1/2 in. Hex
	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	6 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 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)				
	PB1–N PB2–N	Neutral	42 – #4–#14 or 3 x #10–#14	#4–#6: 4.0 (35) #8: 2.8 (25) #10–#14: 2.3 (20)	Slotted
	E18, E19, E28, E29	Ground	42 – #4–#14 or 2 x #12–#14	#4–#6: 4.0 (35) #8: 2.8 (25) #10–#14: 2.3 (20)	Slotted

<i>DESCRIPTION:</i> <b>POWER WIRING INSTALLATION NOTES</b>	
<i>DRAWING NO:</i> 164201591–6	<i>SHEET:</i> 2 of 3
<i>REVISION:</i> A	<i>DATE:</i> 051505

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

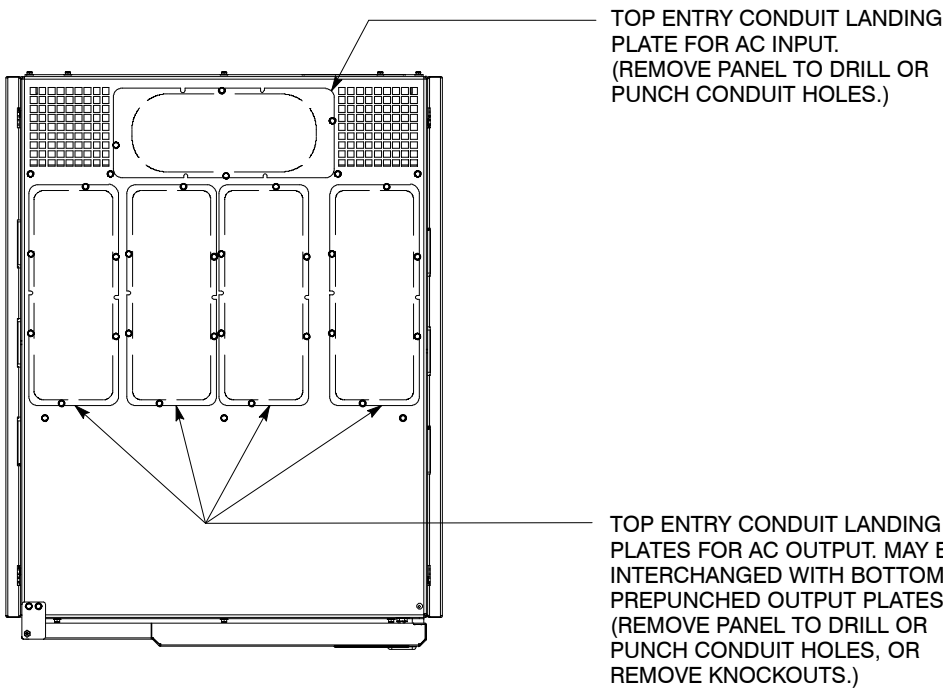
<i>Breaker Setting</i>	<i>Continuous Current (I<sub>r</sub>)</i>	<i>Breaker Setting</i>	<i>Continuous Current (I<sub>r</sub>)</i>
A	40	E	70
B	45	F	80
C	50	G	90
D	63	H	100

<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

13. 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.
14. 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.

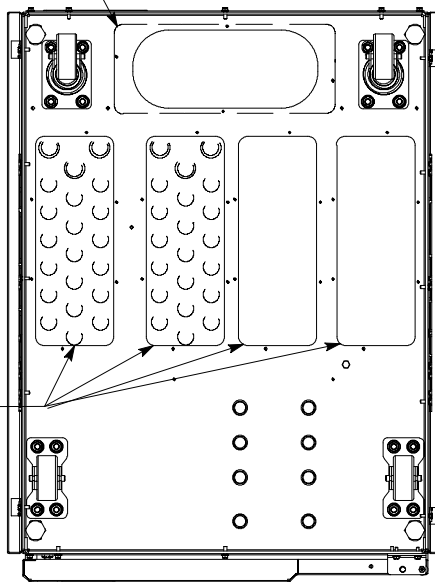
<i>DESCRIPTION:</i> <b>POWER WIRING INSTALLATION NOTES</b>	
<i>DRAWING NO:</i> 164201591-6	<i>SHEET:</i> 3 of 3
<i>REVISION:</i> A	<i>DATE:</i> 051505

**TOP VIEW**

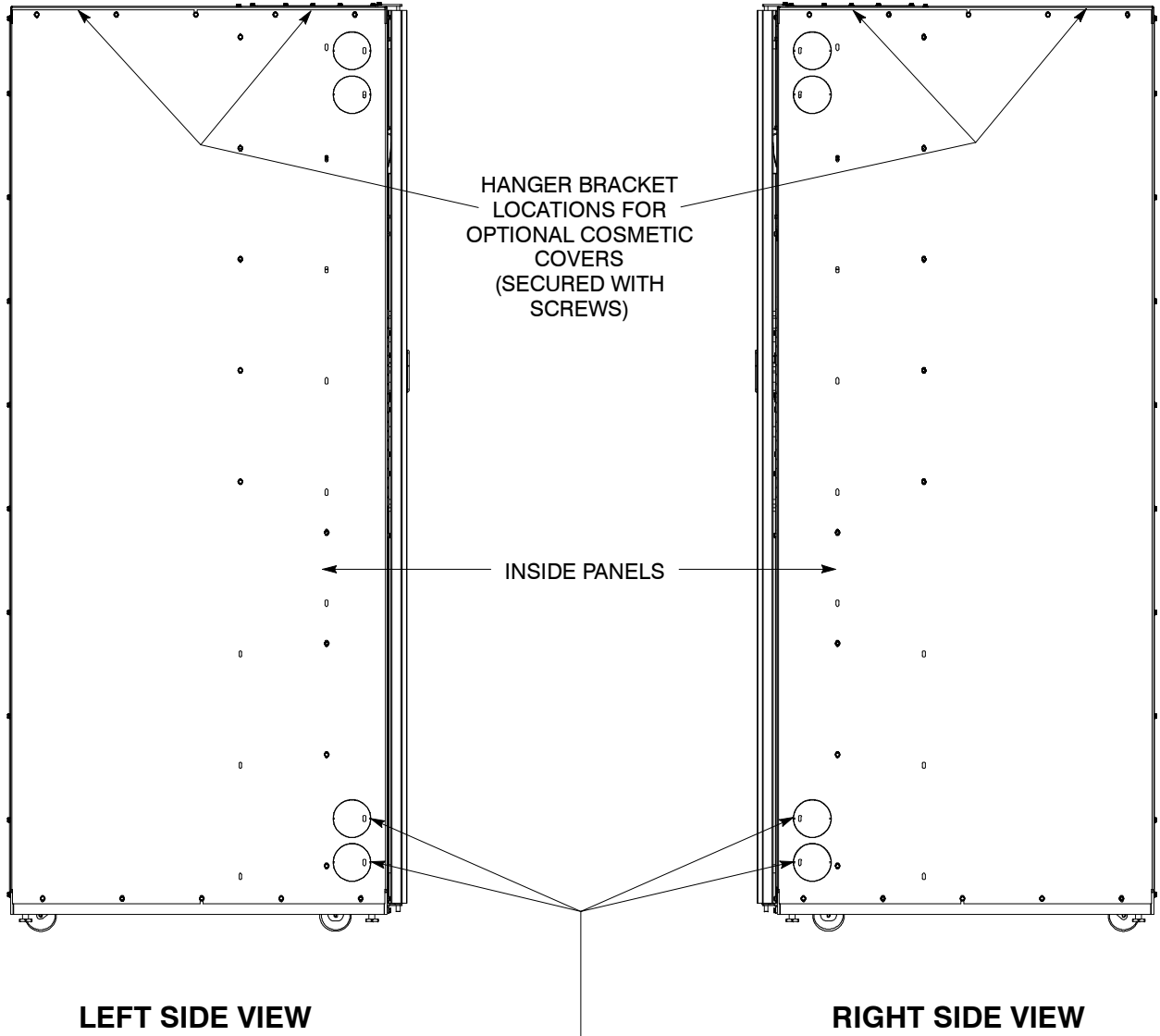


**BOTTOM ENTRY CONDUIT LANDING PLATE FOR AC INPUT. (REMOVE PANEL TO DRILL OR PUNCH CONDUIT HOLES.)**

**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 DRILL OR PUNCH CONDUIT HOLES, OR REMOVE KNOCKOUTS.)**

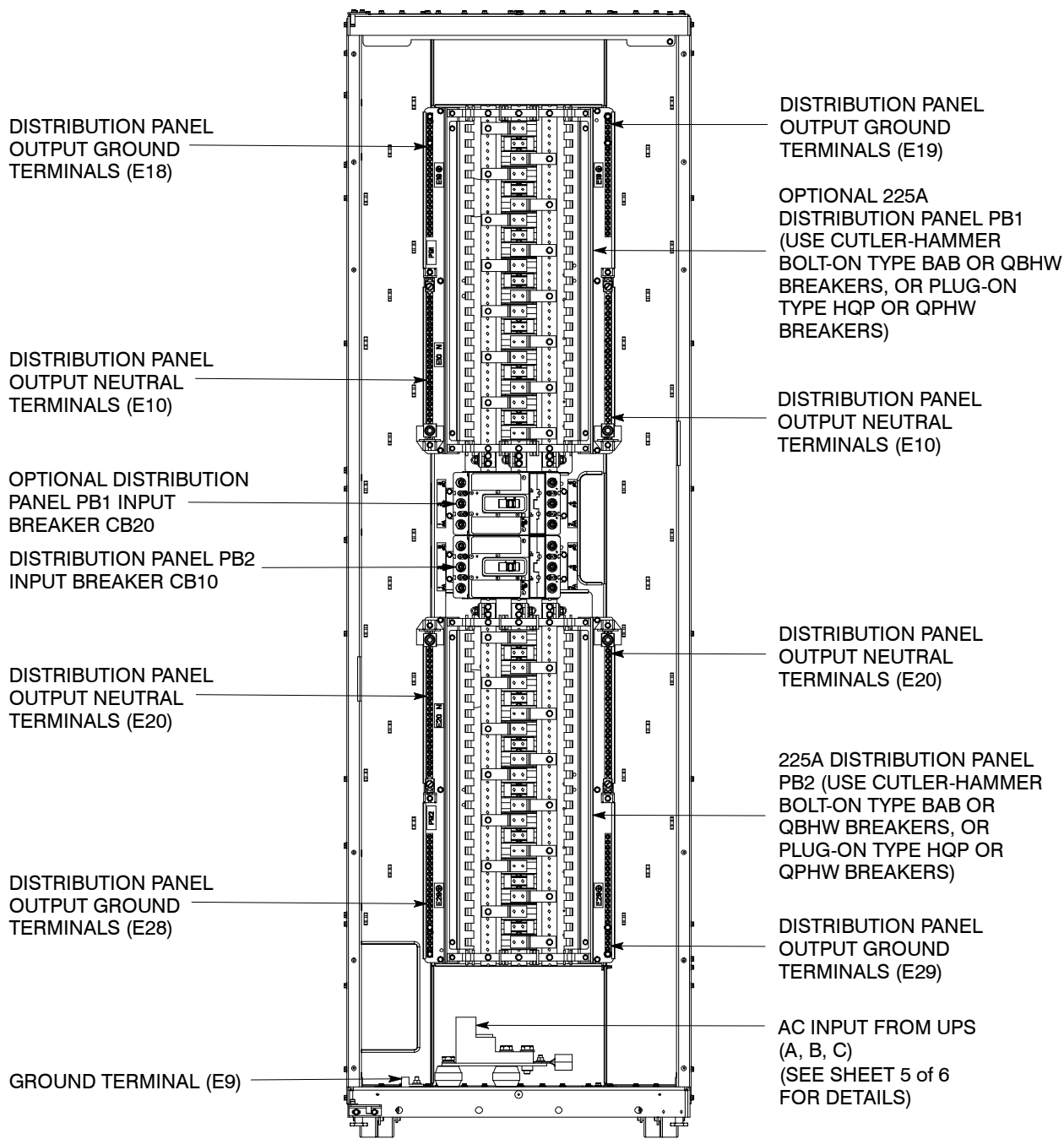


<b>DESCRIPTION:</b> CONDUIT AND WIRE ENTRY LOCATIONS		
<b>DRAWING NO:</b> 164201591-7	<b>SHEET:</b> 1 of 2	
<b>REVISION:</b> A	<b>DATE:</b> 051505	



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

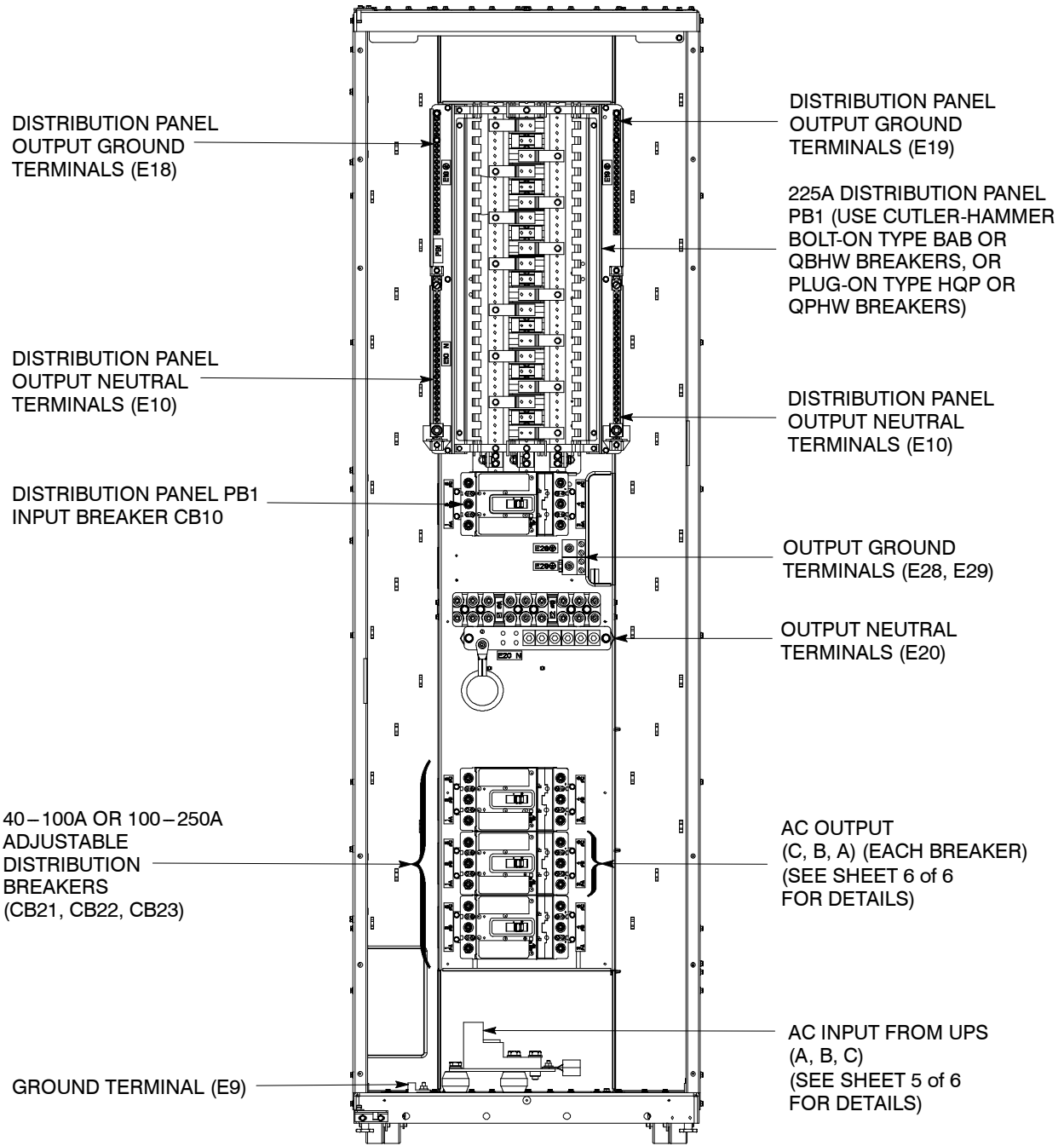
DESCRIPTION: <b>CONDUIT AND WIRE ENTRY LOCATIONS</b>	
DRAWING NO: 164201591-7	SHEET: 2 of 2
REVISION: A	DATE: 051505



**208V/120V OUTPUT DISTRIBUTION PANEL OPTION IAC-D**

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

DESCRIPTION:	<b>IAC-D POWER TERMINAL LOCATIONS</b>		
DRAWING NO:	164201591-8	SHEET:	1 of 6
REVISION:	A	DATE:	051505

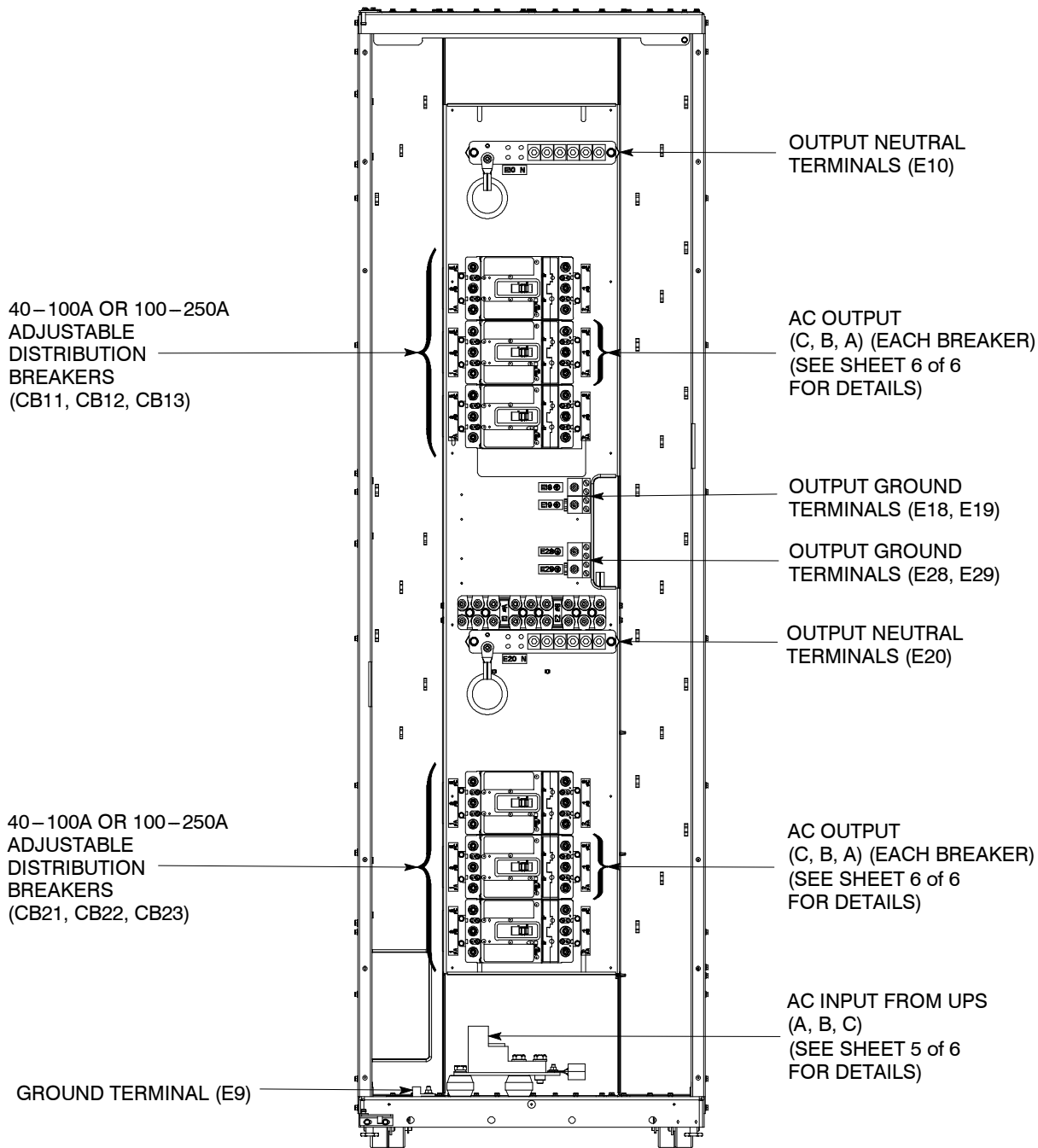


**208V/120V OUTPUT DISTRIBUTION PANEL AND  
208V DISTRIBUTION BREAKER OPTION IAC-D**

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

DESCRIPTION:	<b>IAC-D POWER TERMINAL LOCATIONS</b>	
DRAWING NO:	164201591-8	SHEET: 2 of 6
REVISION:	A	DATE: 051505



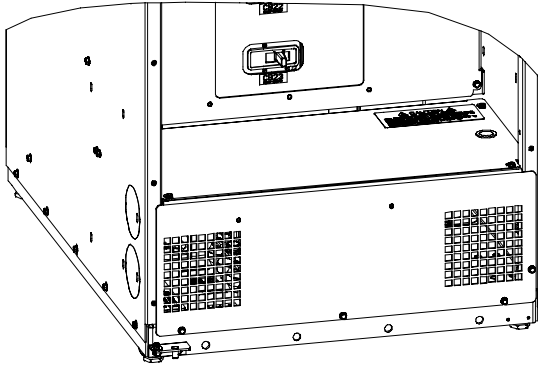


**208V OR 480V OUTPUT DISTRIBUTION BREAKER OPTION IAC-D**

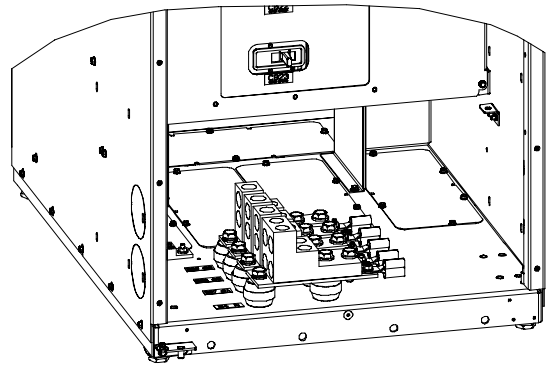
**NOTE:** Metal shields covering wiring terminals must be removed or opened to gain access to terminals.

DESCRIPTION: <b>IAC-D POWER TERMINAL LOCATIONS</b>		
DRAWING NO:	164201591-8	SHEET: 3 of 6
REVISION:	A	DATE: 051505

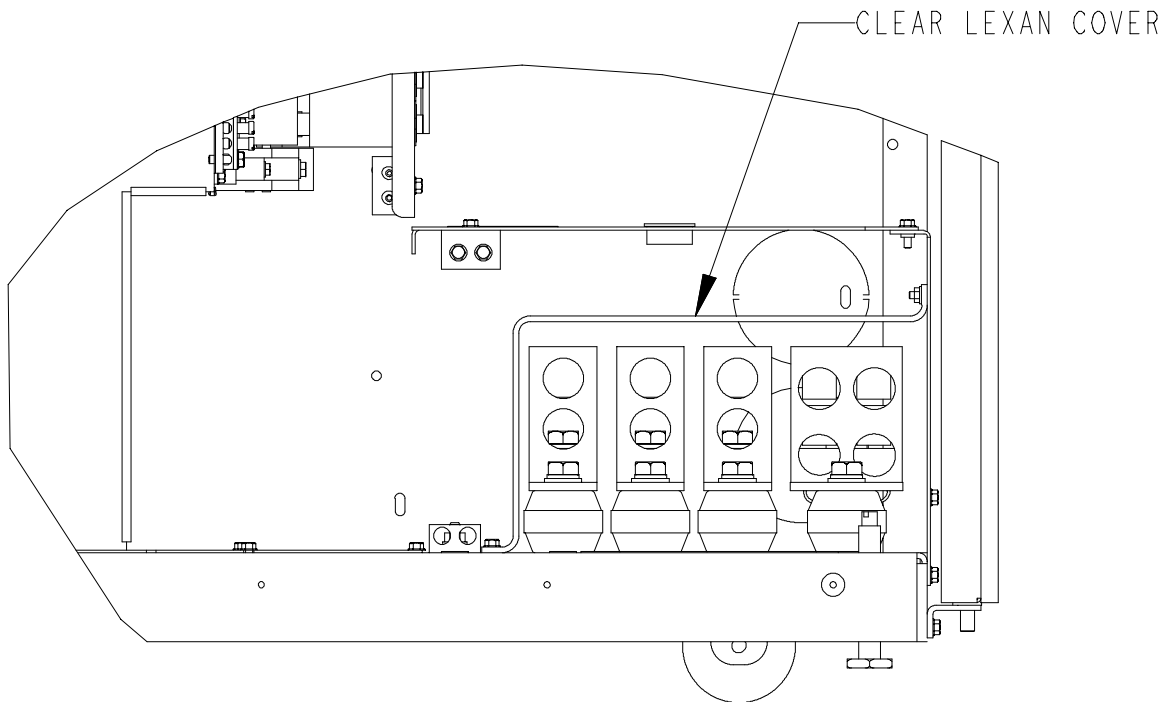
## INPUT TERMINAL COMPARTMENT



COVERS IN PLACE



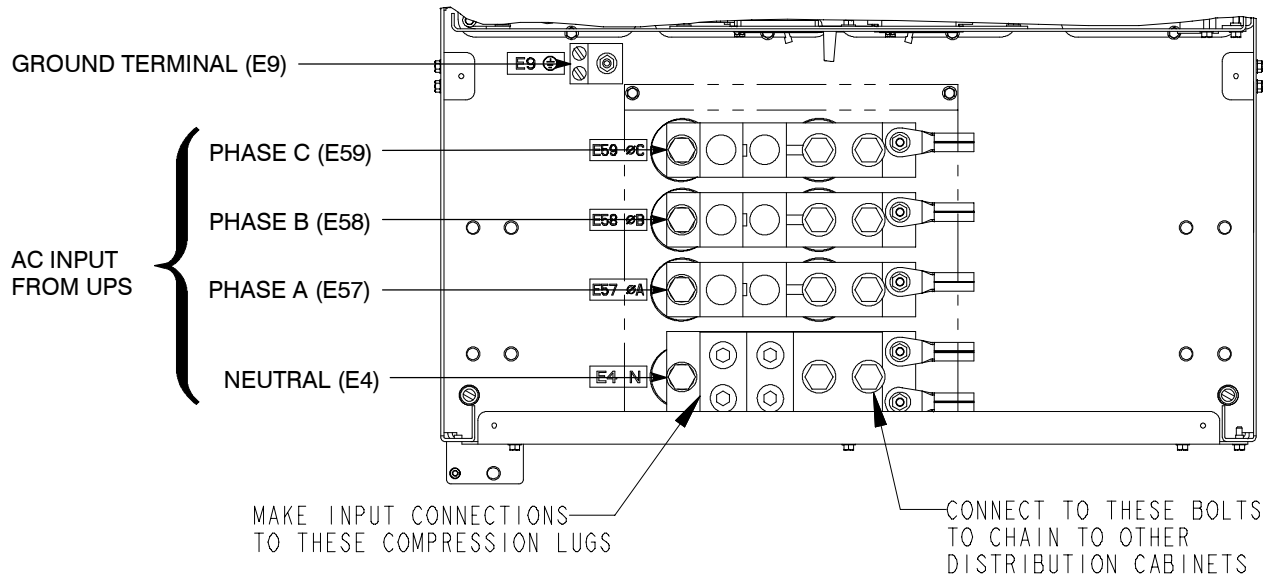
COVERS REMOVED



LEFT SIDE VIEW

DESCRIPTION: <b>IAC-D POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201591-8	SHEET: 4 of 6
REVISION: A	DATE: 051505

## INPUT TERMINAL DETAIL

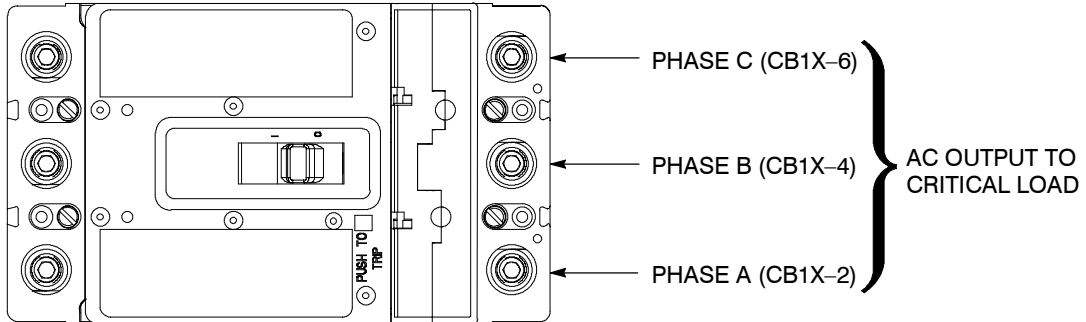


**WIRING COMPARTMENT**  
TOP VIEW,  
TOP INPUT COVER REMOVED

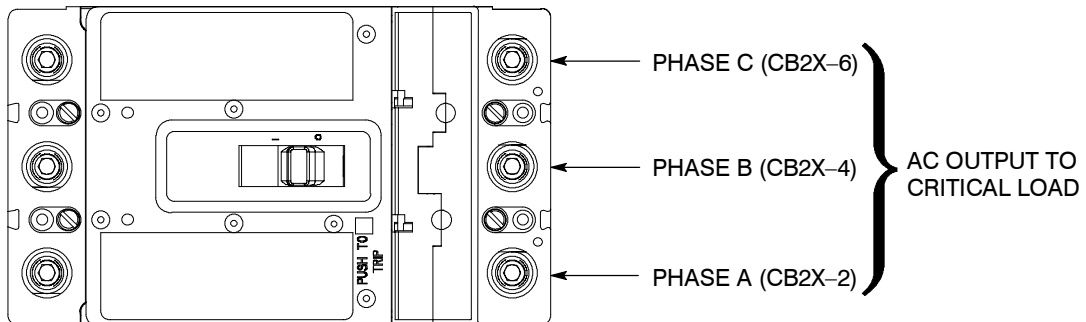
DESCRIPTION: <b>IAC-D POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201591-8	SHEET: 5 of 6
REVISION: A	DATE: 051505

## OUTPUT BREAKER TERMINAL DETAIL

TOP BREAKERS (CB 11, CB12, CB13)

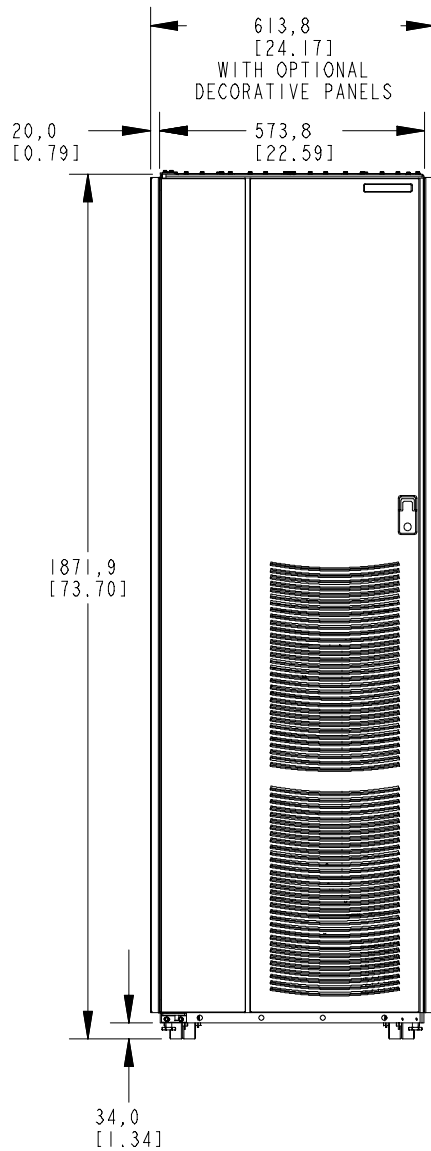


BOTTOM BREAKERS (CB 21, CB22, CB23)

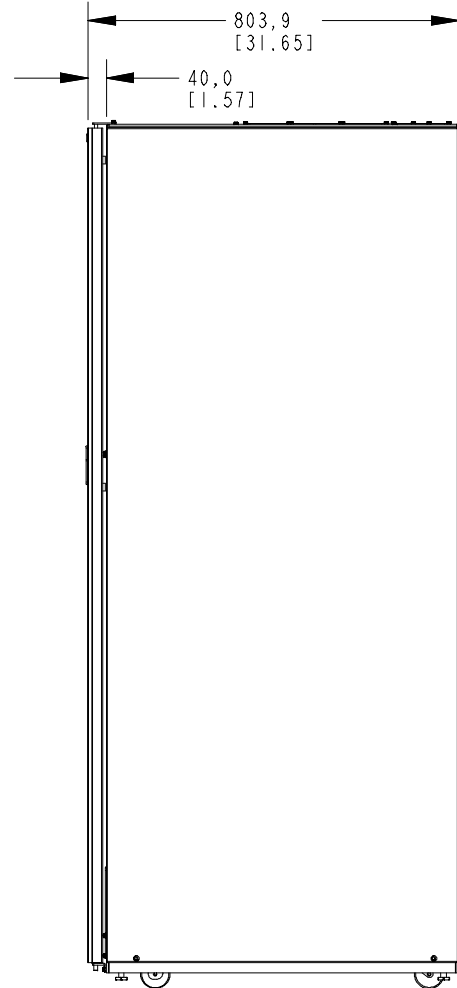


### 208V OR 480V OUTPUT

DESCRIPTION: <b>IAC-D POWER TERMINAL LOCATIONS</b>	
DRAWING NO: 164201591-8	SHEET: 6 of 6
REVISION: A	DATE: 051505



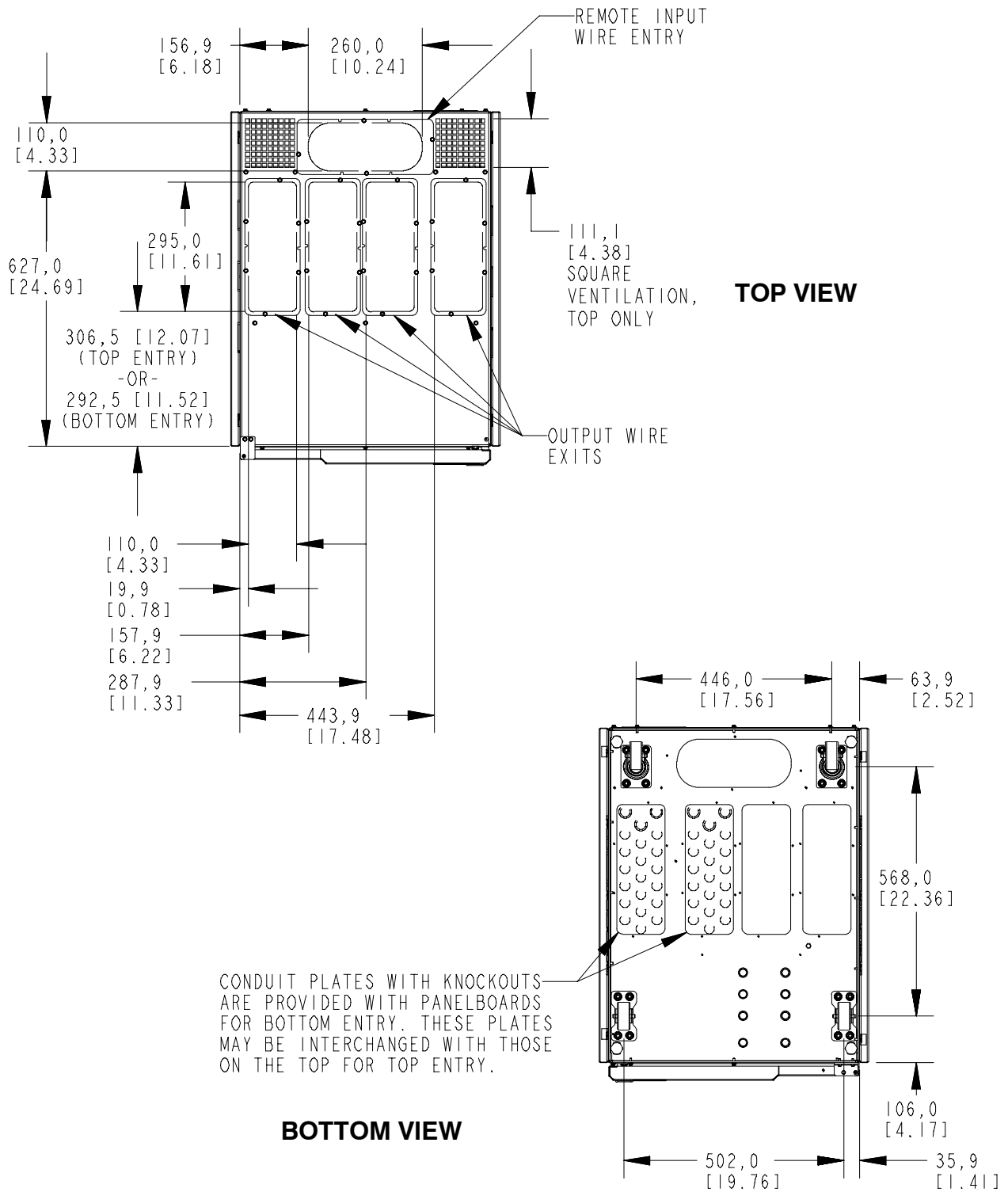
**FRONT VIEW**



**RIGHT SIDE VIEW**

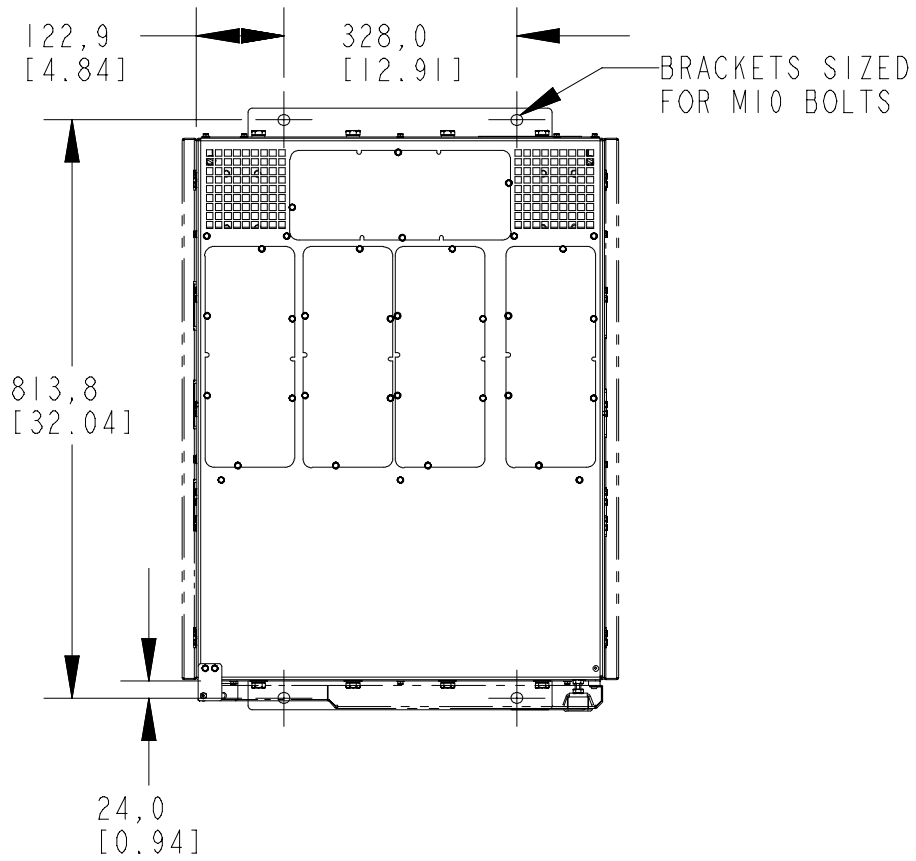
Dimensions are in millimeters [inches]

DESCRIPTION: <b>IAC-D DIMENSIONS</b>	
DRAWING NO: 164201591-9	SHEET: 1 of 3
REVISION: A	DATE: 051505



Dimensions are in millimeters [inches]

DESCRIPTION: <b>IAC-D DIMENSIONS</b>	
DRAWING NO: 164201591-9	SHEET: 2 of 3
REVISION: A	DATE: 051505



**TOP VIEW**  
(OPTIONAL FLOOR  
MOUNTING SHOWN)

Dimensions are in millimeters [inches]

DESCRIPTION: <b>IAC-D DIMENSIONS</b>		
DRAWING NO:	164201591-9	SHEET: 3 of 3
REVISION:	A	DATE: 051505

**This Page Intentionally Left Blank.**



# 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.**





164201591 B