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IMPORTANT SAFETY INSTRUCTIONS

Instructions Importantes Concernant La Sécurité

SAVE THESE INSTRUCTIONS

Conserver Ces Instructions

This manual contains important instructions for your Uninterruptible Power Supply (UPS) system. You should follow these instructions during the installation and maintenance of the UPS, options, accessories, and batteries.

Cette notice contient des instructions importantes concernant la sécurité.

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

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Introduction

Powerware 9330 UPS true double conversion online power protection can be utilized to prevent loss of valuable electronic information, minimize equipment downtime, and/or minimize the adverse effect on equipment production due to unexpected power problems.

The Powerware UPS System continually monitors incoming electrical power and removes the surges, spikes, sags, and other irregularities that are inherent in commercial utility power. Working with your building's electrical system, the UPS System supplies clean, consistent power that your sensitive electronic equipment requires for reliable operation. During brownouts, blackouts, and other power interruptions, internal and optional external battery strings provide emergency power to safeguard your operation.

The UPS system is housed in free-standing cabinets. The cabinet sections line up and match in style and color, and have safety shields behind the front panels for hazardous voltage protection. The following illustrations depict a typical Powerware 9330 (10 kVA-20 kVA) UPS System and a typical Powerware 9330 (25 kVA-40 kVA) UPS System



Typical Powerware 9330 (10 kVA – 20 kVA) UPS System



Typical Powerware 9330 (25 kVA-40 kVA) UPS System

System Configurations

These UPS system configurations are possible:

- Single Module UPS with integral battery
- Single Module UPS with integral battery and optional options cabinet
- Single Module UPS with integral battery and optional battery cabinet
- Single Module UPS with integral battery, optional battery cabinet, and optional options cabinet
- Single Module UPS with remote battery
- Single Module UPS with remote battery and optional options cabinet

- Parallel System with one to four UPS modules with remote battery and optional options cabinet
- Parallel System with one to four UPS modules and integral battery
- Parallel System with one to four UPS modules, integral battery, and optional battery cabinet
- Parallel System with one to four UPS modules and remote battery

You can enhance any of these system configurations by adding an optional accessories, such as a *Remote Emergency Power Off (EPO)* control, a *Remote Monitor Panel (RMP)*, and X-Slot[™] communications connectivity features.

Using This Manual

Your UPS functions automatically and requires very little attention during normal operation. However, you should read and understand the procedures described in this manual to ensure trouble-free operation. In particular, you should be thoroughly familiar with the Remote Emergency Power Off procedure described in Chapter 10 of this manual.

The information in this manual is divided into the sections and chapters listed. The system you are installing dictates which parts of this manual you should read. Everyone should read, at a minimum, the Introduction, Chapters 1, 2, 8, 9, and 10.

Introduction

The Introduction provides a brief description of the UPS system, a description of the content of each chapter, safety, text conventions used in the manual and reference information.

Section I

- Chapter 1 Getting Started tells you how to prepare your site for the installation of your UPS system. It discusses equipment environmental requirements, inspecting, and unpacking cabinets.
- Chapter 2 Installing the UPS System describes how to install the UPS cabinets and optional equipment.
- **Chapter 3 Installing Batteries –** provides battery safety, installation and connection information.
- Chapter 4 Installing a Remote EPO Control contains information for installing the optional *Remote Emergency Power Off (EPO)* control.
- Chapter 5 Installing a Remote Monitor Panel contains information for installing the optional *Remote Monitor Panel (RMP)*.
- Chapter 6 Installing an Industrial Relay Card contains information for installing the optional *Industrial Relay Card (IRC)*.

Section II

• Chapter 7 – Understanding UPS Operation – provides information on understanding UPS operation.

- Chapter 8 Operational Controls and Features describes the standard and optional operational features and controls of the UPS system.
- Chapter 9 Using the Control Panel describes the controls and indicators found on the Control Panel and shows the various information screens displayed on the LCD screen.
- Chapter 10 UPS Operating Instructions contains startup and shutdown procedures for the UPS system.
- Chapter 11 Using Features and Options contains descriptions and instructions for the UPS system features and options.
- Chapter 12 Responding to System Events lists all the alarm messages and notices that occur during operation of the UPS system.
- Chapter 13 Communications describes the communications features of the UPS system.
- Chapter 14 Maintaining the UPS System contains maintenance instructions for the UPS system.
- Chapter 15 Product Specifications provides detailed specifications for the UPS system.
- Appendix A Customer Information contains important information on wiring requirements and recommendations, and important diagrams of the cabinet's mechanical details and electrical access.
- Warranty provides the Powerware warranty for this product.

Read through each procedure before you begin. Perform only those procedures that apply to the UPS system you are installing or operating.

Conventions Used in This Manual

The text in this manual uses these 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.
- Rectangular boxes containing bold type are warnings or cautions that pertain to the UPS system or its electrical connections.

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 modules, battery strings and options or accessories installed.

Safety Considerations

The UPS cabinet is designed for industrial or computer room applications, and contain safety shields behind the doors. However, the UPS system is a sophisticated power system and should be handled with appropriate care, following these guidelines:

- Keep surroundings clean and free from excess moisture.
- Do not operate the UPS system close to gas or electric heat sources.
- The system is not intended for outdoor use.
- The operating environment should be maintained within the parameters stated in this manual.
- Keep the cabinet doors closed and locked to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.
- The UPS system contains its own power source. Lethal voltages are present even when the UPS is disconnected from utility power.

WARNING:

Only AUTHORIZED SERVICE PERSONNEL should perform maintenance on or service the UPS system.

If service or routine maintenance is required:

- Ensure all power is disconnected before performing installation or service.
- Ensure the area around the UPS system is clean and uncluttered.
- Battery maintenance or battery replacement should be performed only by authorized service personnel.
- Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.

For More Information

This manual describes how to install and operate the UPS modules. For more information about the installation and operation of a Parallel System, refer to the following:

164201363 Powerware[®] 9330 Parallel Cabinet Installation and Operation Manual

The Installation section, provides installation instructions for the Parallel cabinet. Site preparation, planning for installation, and wiring and safety information are supplied. Detailed illustrations of the cabinet, including dimensional and connection point drawings are provided.

The Operation section, explains the functions of the Parallel System; ; provides procedures for operating the Parallel System, and information about maintenance and responding to system events.

Contact your local Powerware Field Service office for information on how to obtain copies of this manual.

Getting Help

If you need to schedule initial startup, need regional locations and telephone numbers, have a question about any of the information in this manual, or have a question this manual does not answer, please call Powerware at:

United States	1-800-843-9433
Canada	1-800-461-9166
Outside the U.S.	Call your local representative

Section I

Installation

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1.1 Installing the UPS

The cabinet sections of the *UPS* are shipped on separate pallets. Use a forklift or pallet jack, rated to handle the weight of the cabinets (refer to Drawing 164201300–3 in Appendix A for cabinet weights), to move the packaged cabinet sections to the installation site, or as close as possible to the site, before unloading from the pallet.

This is the basic sequence of the installation steps:

- 1. Create an installation plan for the UPS system (Chapter 1).
- 2. Prepare your site for the UPS system (Chapter 1).
- 3. Inspect, unpack, and unload the UPS cabinet sections (Chapter 1).
- 4. Wire the system (Chapter 2).
- 5. Install features, accessories, and/or options, as applicable (Chapter 3).
- 6. Complete the Installation Checklist (Chapter 2).
- **7.** Have authorized service personnel perform preliminary operational checks and startup.
- **NOTE:** Startup and operational checks should be performed only by authorized service personnel. This service is usually offered as part of the sales contract for your UPS. Contact service in advance (usually a two week notice is required) to reserve a preferred startup date.

1.1.1 Creating an Installation Plan

Before beginning to install the UPS system, 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.

1.1.2 Preparing Your Site

For your UPS system to operate at peak efficiency, your installation site should meet the environmental parameters outlined in this manual. If you intend to operate the system at an altitude higher than 1500 meters (5000 feet), contact your local sales or service office for important information about high altitude operation. The operating environment must meet the weight, airflow, size and clearance, requirements specified in Appendix A.

The basic environmental requirements for operation of the UPS system 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 UPS cabinets use forced air cooling to regulate internal component temperature. Air inlets are in the front of the cabinet, and outlets are in the rear of the cabinet. You must allow clearance in front of and behind each cabinet for proper air circulation. Refer to Drawing 164201300–3 of Appendix A for clearance requirements.

1.1.3 Environment Considerations

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

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

Failure to follow guidelines may invalidate UPS warranty.

1.1.4 Preparing for Wiring the UPS System

For external wiring requirements, including the minimum AWG size of external wiring, refer to Tables A through F in Appendix A for the Powerware 9330 (10 kVA-20 kVA) UPS or Tables G through M in Appendix A for the Powerware 9330 (25 kVA-40 kVA) UPS. The power wiring connections for this equipment are rated at 90°C. Control wiring for EPO and optional accessories (such as building alarms, and monitoring interface) should be connected at the customer interface panels and terminal blocks located inside the UPS using class 1 wiring methods.

1.1.5 Inspecting and Unpacking Each Cabinet

The first task in preparing for installation is inspecting and unpacking the UPS sections. The UPS and accessory cabinets are shipped bolted to wooden pallets, as shown in Figures 1-1 or 1-2, and protected with outer protective packaging material.



Figure 1-1. Powerware 9330 (10 kVA-20 kVA) UPS Cabinet as Shipped on Pallet



Figure 1-2. Powerware 9330 (25 kVA-40 kVA) UPS Cabinet as Shipped on Pallet

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



2. Use a forklift or other material handling equipment to move the cabinet to a convenient unpacking area. Insert the forklift jacks between the pallet supports on the bottom of the unit.

CAUTION: Do not tilt cabinets more than 10 degrees from vertical.

- **3.** Set each pallet on a firm, level surface, allowing a minimum clearance of 3 m (10 ft) on each side for removing the cabinets from the pallets.
- 4. Remove the protective covering from the cabinets.
- **5.** Remove the packing material, and discard or recycle them in a responsible manner.
- 6. After removing the protective covering, 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 the Powerware, Inc. Customer Service Department immediately to determine the extent of the damage and its impact upon further installation.
- **NOTE:** While awaiting installation, protect the unpacked UPS cabinets from moisture, dust, and other harmful contaminants. Failure to store and protect the UPS properly may invalidate the warranty.

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Installing the UPS System

2.1 Preliminary Installation Information

WARNING: Installation should be performed only by qualified personnel.

Refer to the following while installing the UPS system:

- Refer to Appendix A of this manual for installation drawings and additional installation notes.
- Dimensions in this manual 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 as required. Plate material is 16 gauge steel (0.060 in. thick).
- The cabinets must be installed on a level floor suitable for computer or electronic equipment.
- If perforated floor tiles are required for ventilation, place them in front of the UPS. Refer to Table AA in Appendix A for equipment weight and point loading.
- Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4-wire" source).
- Details about control wiring are provided in each procedure for connecting options and features. Drawing 164201300–2 and Tables X and Y in Appendix A identify the control wiring terminations.

2.2 UPS Cabinet Installation

To install an UPS cabinet, perform the procedures in the following paragraphs.

2.2.1 Unloading the Powerware 9330 (10 kVA–20 kVA) UPS Cabinet from the Pallet

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

WARNING:

The UPS cabinet is heavy. Refer to Drawing 164201300-3 in Appendix A 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 degrees from vertical.

- 1. Use a forklift or other material handling equipment to move the cabinet to the installation area. Insert the forklift jacks between the skids on the bottom of the unit.
- 2. Remove left front solid panel, and right front vented panel from UPS cabinet. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2–1).
- **3.** If the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
- **4.** Remove three bolts, (1) in Figure 2–2, securing the rear shipping bracket (3) to the cabinet and three bolts (2) securing the bracket to the pallet. Remove the rear shipping bracket. If installing cabinet permanently, retain shipping brackets and securing hardware for later use.
- **5.** Remove three bolts, (1) in Figure 2–1, securing front shipping bracket (3) to the pallet. Do not remove bolts (2) securing the bracket to the cabinet.
- **6.** Remove three bolts, (4) in Figure 2–2, securing removable skid (5) and remove skid.
- **NOTE:** In the following step the pallet will tilt and act as a ramp once the cabinet is rolled beyond the the center of the pallet. Make 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.

7. 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.



FRONT VIEW

Figure 2–1. Removing Front Shipping Bracket (Powerware 9330 (10 kVA–20 kVA))





Figure 2–2. Removing Rear Shipping Bracket (Powerware 9330 (10 kVA–20 kVA))

- **8.** Remove three bolts, (2) in Figure 2–1, securing front shipping bracket to the cabinet.
- **9.** If installing cabinet permanently, retain shipping brackets and hardware; otherwise, discard or recycle the pallet and brackets in a responsible manner.
- **10.** Roll cabinet to final installation location.
- **11.** If permanently mounting the system, proceed to step 16; otherwise, proceed to step 12.
- **12.** Secure the UPS cabinet in position by lowering the leveling feet, until cabinet is not resting on the casters and the cabinet is level.
- **13.** If installing Battery and Options cabinets, proceed to step 14; otherwise, proceed to paragraph 2.2.4.
- **14.** If installing an Options cabinet with Distribution Housing, proceed to paragraph 2.2.2; otherwise, proceed to step 15.
- **15.** Install Battery cabinets and Options cabinet without Distribution Housing, by repeating steps 1 through 10 for remaining cabinets and then proceed to paragraph 2.3 for Battery cabinet installation and paragraph 2.4 for Options cabinet installation.
- **16.** Using retained hardware, reinstall shipping brackets previously removed to front and rear of UPS cabinet with the angle facing outward (see Figures 2-1 and 2-2).
- **17.** If installing Battery and Options cabinets, proceed to step 18; otherwise, secure cabinet to floor with contractor supplied hardware and proceed to paragraph 2.2.4.
- **18.** If installing an Options cabinet with Distribution Housing, proceed to paragraph 2.2.2; otherwise, proceed to step 19.
- **19.** Install Battery cabinets and Options cabinet without Distribution Housing, by repeating steps 1 through 10 for remaining cabinets and then proceed to paragraph 2.3 for Battery cabinet installation and paragraph 2.4 for Options cabinet installation.

2.2.2 Unloading the Powerware 9330 (10 kVA–20 kVA) Options Cabinet with Optional Distribution Housing from the Pallet

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

WARNING:

The options cabinet is heavy. Refer to Drawing 164201300-3 in Appendix A 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 degrees from vertical.

1. Use a forklift or other material handling equipment to move the cabinet to the installation area. Insert the forklift jacks between the skids on the bottom of the unit.

- 2. Remove front vented panel from Options cabinet. The Front panel is secured with magnetic latches and is removed by pulling the panel straight forward to disengage magnetic latches (see Figure 2–3).
- **3.** If the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
- **4.** Loosen screws securing Distribution Housing to Options cabinet. Lift Distribution Housing up and remove from Options cabinet.
- **5.** Remove three bolts, (1) in Figure 2–4, securing the rear shipping bracket (3) to the cabinet and three bolts (2) securing the bracket to the pallet. Remove the rear shipping bracket. If installing cabinet permanently, retain shipping brackets and securing hardware for later use.
- **6.** Remove three bolts, (1) in Figure 2–3, securing front shipping bracket (3) to the pallet. Do not remove bolts (2) securing the bracket to the cabinet.
- **7.** Remove three bolts, (4) in Figure 2–4, securing removable skid (5) and remove skid.
- **NOTE:** In the following step the pallet will tilt and act as a ramp once the cabinet is rolled beyond the the center of the pallet. Make 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 three bolts, (2) in Figure 2–3, securing front shipping bracket to the cabinet.
- **10.** If installing cabinet permanently, retain shipping brackets and hardware; otherwise, discard or recycle the pallet and brackets in a responsible manner.
- **11.** Reinstall Distribution Housing over screws on rear of Options cabinet. Tighten screws to secure Distribution Housing to Options cabinet.
- **12.** Roll cabinet to final installation location.
- **13.** If permanently mounting the system, proceed to step 16; otherwise, proceed to step 14.
- **14.** Secure the Options cabinet in position by lowering the leveling feet, until cabinet is not resting on the casters and the cabinet is level.





Figure 2–3. Removing Options Cabinet Front Shipping Bracket (Powerware 9330 (10 kVA–20 kVA))



REAR VIEW

Figure 2–4. Removing Options Cabinet Rear Shipping Bracket (Powerware 9330 (10 kVA–20 kVA))

- **15.** If installing Battery cabinets, proceed to paragraph 2.3 for Battery cabinet installation and then proceed to paragraph 2.4 for Options cabinet installation; otherwise, proceed to paragraph 2.4.
- 16. Using retained hardware, reinstall shipping brackets previously removed to front and rear of Options cabinet with the angle facing outward (see Figures 2–3 and 2–4).
- **17.** Secure Options cabinet to floor with contractor supplied hardware.
- **18.** If installing Battery cabinets, proceed to paragraph 2.3 for Battery cabinet installation and then proceed to paragraph 2.4 for Options cabinet installation; otherwise, proceed to paragraph 2.4.

2.2.3 Unloading the Powerware 9330 (25 kVA-40 kVA) UPS Cabinet from the Pallet

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

WARNING:

The UPS cabinet is heavy. Refer to Drawing 164201300-3 in Appendix A 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 degrees from vertical.

- 1. Use a forklift or other material handling equipment to move the cabinet to the installation area. Insert the forklift jacks between the skids on the bottom of the unit.
- **2.** Remove left front solid panel, and front vented panels from UPS cabinet. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2–5).
- **3.** If the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
- **4.** Remove four bolts, (1) in Figure 2–6, securing the rear shipping bracket (3) to the cabinet and four bolts (2) securing the bracket to the pallet. Remove the rear shipping bracket. If installing cabinet permanently, retain shipping brackets and securing hardware for later use.
- **5.** Remove four bolts, (1) in Figure 2–5, securing front shipping bracket (3) to the pallet. Do not remove bolts (2) securing the bracket to the cabinet.
- **6.** Remove four bolts, (4) in Figure 2–6, securing removable skid (5) and remove skid.



Figure 2-5. Removing Front Shipping Bracket (Powerware 9330 (25 kVA-40 kVA))


REAR VIEW

Figure 2–6. Removing Rear Shipping Bracket (Powerware 9330 (25 kVA–40 kVA))

NOTE: In the following step the pallet will tilt and act as a ramp once the cabinet is rolled beyond the the center of the pallet. Make 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.

- **7.** 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.
- **8.** Remove four bolts, (2) in Figure 2–5, securing front shipping bracket to the cabinet.
- **9.** If installing cabinet permanently, retain shipping brackets and hardware; otherwise, discard or recycle the pallet and brackets in a responsible manner.
- **10.** Roll cabinet to final installation location.
- **11.** If permanently mounting the system, proceed to step 15; otherwise, proceed to step 12.
- **12.** Secure the UPS cabinet in position by lowering the leveling feet, until cabinet is not resting on the casters and the cabinet is level.
- **13.** If installing Battery and Options cabinets, proceed to step 14; otherwise, proceed to paragraph 2.2.4.
- **14.** Install Battery and Options cabinets, by repeating steps 1 through 10 for remaining cabinets and then proceed to paragraph 2.3 for Battery cabinet installation and paragraph 2.4 for Options cabinet installation.
- **15.** Using retained hardware, reinstall shipping brackets previously removed to front and rear of UPS cabinet with the angle facing outward (see Figures 2–5 and 2–6).
- **16.** If installing Battery and Options cabinets, proceed to step 17; otherwise, secure cabinet to floor with contractor supplied hardware and proceed to paragraph 2.2.4.
- **17.** Install Battery cabinets and Options cabinet, by repeating steps 1 through 10 for remaining cabinets and then proceed to paragraph 2.3 for Battery cabinet installation and paragraph 2.4 for Options cabinet installation.

2.2.4 Installing UPS External and Optional Remote Battery Power Wiring

- If not already removed, remove left front solid panel and right front vented panel from the Powerware 9330 (10 kVA-20 kVA) UPS cabinet or left front solid panel and front vented panels from the Powerware 9330 (25 kVA-40 kVA) UPS cabinet. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2-1 or 2-5).
- **2.** Remove screws securing internal safety shield panels and remove panels to gain access to input and output terminals.
- **NOTE:** Remove UPS cabinet input, output, and remote battery input conduit landing plate to punch conduit holes.
- **3.** If wiring an optional remote battery system, proceed to step 4; otherwise proceed to step 6.

CAUTION:

When sizing battery system, do not exceed internal battery charger capabilities. Refer to Chapter 15 *"Specifications"*, for maximum battery charger currents.

- **4.** Route battery cables from the remote battery system to UPS Remote Battery Terminal Block. Refer to Appendix A of this manual for wiring access information.
- **5.** Connect positive, negative, and ground DC power wiring from external battery system to the Remote Battery Terminal Block and ground terminals in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information.
- **6.** Route input and output cables through wireway to the UPS terminal blocks. Refer to Appendix A of this manual for wiring access information.
- **7.** If wiring a single feed system, proceed to step 8; if wiring a dual feed system, proceed to step 10.

CAUTION:

Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4 wire" source).

- 8. Connect phase A, B, C, and Neutral input power wiring from source to the Bypass Input Terminal Block and Neutral Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for single feed systems.
- 9. Proceed to step 17.
- **10.** If wiring a 10 kVA-20 kVA UPS dual feed system, proceed to step 11; if wiring a 25 kVA-40 kVA UPS dual feed system, proceed to step 14.
- **11.** Disconnect single feed jumpers from phase A, B, and C terminals on Input Breaker CB1 and Bypass Input Terminal Block. Remove jumpers from cabinet.

- **12.** Connect phase A, B, and C rectifier input power wiring from source to the rectifier input terminals on Input Breaker CB1 in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- 13. Proceed to step 16.
- **14.** Disconnect single feed jumpers from phase A, B, and C terminals on Rectifier Input Terminal Block and Bypass Input Terminal Block. Remove jumpers from cabinet.
- **15.** Connect phase A, B, and C rectifier input power wiring from source to the Rectifier Input Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.

CAUTION:

Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4 wire" source).

- **16.** Connect phase A, B, C, and Neutral bypass input power wiring from source to the Bypass Input Terminal Block and Neutral Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- **NOTE:** If connecting the UPS to a Parallel Cabinet, refer to Powerware 9330 Parallel Cabinet Installation and Operation manual referenced in the Introduction to this manual.
- **17.** Connect phase A, B, and C, and Neutral power wiring from Output Terminal Block and Neutral Terminal Block to the critical load. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information.
- **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, connect battery strings in accordance with instructions contained in paragraph 3.4.1 of Chapter 3.
- **20.** Secure the UPS by reinstalling safety shield panels, front vented panels, and left front solid panel.

2.2.5 Installing Customer Connections

NOTE: If installing connections (building alarms, relay outputs, or external CAN for a Parallel System) to the Communications Server Board (CSB), you must install conduit between each device and the UPS cabinet for wiring these options. Refer to Appendix A for the location of the interface points within the UPS cabinet.

To prepare the UPS for wiring to Customer Connections:

- 1. Be sure the UPS system is turned off and all power sources are removed. (See the operation section of this manual for shutdown instructions.)
- **2.** Remove Customer Interface conduit landing plate from the UPS cabinet. Drill or punch conduit holes for interface wiring.
- **3.** To gain access to the Communications Server Board (CSB), remove top panel from the UPS by removing screws at the back and front of the top panel.
- **4.** Locate building alarm, relay, or CAN terminals on the CSB by referring to drawings 164201300–2 and 164201300–8.
- 5. Refer to Appendix A of this manual for wiring and termination requirements.
- 6. Reinstall Customer Interface conduit landing plate.
- 7. Install conduit and wiring.
- **8.** When wiring is complete, secure UPS by reinstalling all panels removed in previous steps.

2.2.6 Prepare for Installing Accessories

NOTE: If installing accessories, such as the Remote Emergency Power Off (REPO)switch, you must install conduit between the device and the UPS cabinet for wiring the option.

To prepare the UPS for wiring to Accessories:

- **1.** Be sure the UPS system is turned off and all power sources are removed. (See the operation section of this manual for shutdown instructions.)
- 2. If installing a Remote Monitor Panel (RMP) or an Industrial Relay Card (IRC), proceed to Chapter 5 or Chapter 6, respectively; otherwise proceed to step 3.
- **3.** Remove Customer Interface conduit landing plate from the UPS cabinet. Drill or punch conduit holes for interface wiring.
- **4.** To gain access to the Communications Server Board (CSB), remove top panel from the UPS by removing screws at the back and front of the top panel.
- **5.** Locate REPO terminals on the CSB by referring to drawings 164201300-2 and 164201300-8.
- 6. Reinstall Customer Interface conduit landing plate.
- 7. Refer to Chapter 4 for installation instructions.
- **8.** When wiring is complete, secure UPS by reinstalling all panels removed in previous steps.

2.3 Battery Cabinet Installation

To install optional battery cabinets, perform the procedures in the following paragraphs.

2.3.1 Unloading the Battery Cabinet from the Pallet

To remove the Battery cabinet from the pallet, refer to paragraph 2.2.1.

2.3.2 Joining the Battery Cabinet to the UPS Cabinet

To join battery cabinets to the UPS, perform the following steps. Refer to Figure 2–7 for non-permanent installation or Figure 2–8 for permanent installation of the Powerware 9330 (10 kVA–20 kVA) UPS and Figure 2–9 for non-permanent installation or Figure 2–10 for permanent installation of the Powerware 9330 (25 kVA–40 kVA) UPS.

- 1. Roll the Battery cabinet to a spot near the right side of the UPS.
- 2. Remove left front solid panel, and right front vented panel from the Powerware 9330 (10 kVA-20 kVA) UPS cabinet or left front solid panel and front vented panels from Powerware 9330 (25 kVA-40 kVA) UPS cabinet. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2-1 or 2-5).
- **3.** Remove front vented panel from Battery cabinet. The front panel is secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches.
- 4. Remove right side outside panel from UPS cabinet. Retain hardware.
- 5. Remove right side panel from Battery cabinet. Retain hardware.
- **6.** Install side panel removed from the Battery cabinet to the right side of the UPS cabinet. Secure with screws removed from UPS cabinet.
- **7.** Find the battery cable with 2-pole connector in the Battery cabinet. Route this connector into the UPS cabinet and mate with the matching connector in the UPS (see Figures 2–7, 2–8, 2–9, or 2–10).
- 8. Push the Battery cabinet against the right side of the UPS cabinet.
- **9.** If permanently mounting the system, proceed to step 16; otherwise, proceed to step 10.
- **10.** Secure the Battery cabinet in position by lowering the leveling feet, until cabinet is not resting on the casters and the cabinet is level.
- Secure the front of Battery cabinet to the front of the UPS cabinet by sliding the angle grounding/mounting bracket, from installation kit, behind the base of the Battery and UPS cabinets with the bottom angle facing outward (see Figures 2–7 or 2–9). Use hardware provided in the kit to secure the bracket.
- **12.** Remove the top side panel mounting screw (tie/grounding bracket location in Figures 2–7 or 2–9) from both the Battery and UPS cabinets.
- **13.** Secure the back of Battery cabinet to the back of the UPS cabinet with the tie/grounding bracket. Secure the bracket with the side panel mounting screws.



Figure 2–7. Battery Cabinet Installation – Powerware 9330 (10 kVA–20 kVA) (Non–Permanent Mounting)



Figure 2–8. Battery Cabinet Installation – Powerware 9330 (10 kVA–20 kVA) (Permanent Mounting)



Figure 2–9. Battery Cabinet Installation – Powerware 9330 (25 kVA–40 kVA) (Non–Permanent Mounting)



Figure 2–10. Battery Cabinet Installation – Powerware 9330 (25 kVA–40 kVA) (Permanent Mounting)

- **14.** Install side panel removed from the UPS cabinet to the right side of the Battery cabinet. Secure with screws removed from Battery cabinet.
- **15.** When all wiring is complete, proceed to Chapter 3 and connect battery strings in accordance with instructions contained in paragraph 3.4.2.
- 16. Using retained hardware, reinstall shipping brackets previously removed, to front and rear of Battery cabinet with the angle facing outward.(see Figures 2–8 or 2–10).
- **17.** Secure the front of Battery cabinet to the front of the UPS cabinet with the long flat grounding/mounting bracket from the installation kit (see Figures 2-8 or 2-10). Use hardware provided in the kit to secure the bracket.
- **18.** Remove the top side panel mounting screw (tie/grounding bracket location in Figure 2–8) from both the Battery and UPS cabinets.
- **19.** Secure the back of Battery cabinet to the back of the UPS cabinet with the tie/grounding bracket. Secure the bracket with the side panel mounting screws.
- **20.** Install side panel removed from the UPS cabinet to the right side of the Battery cabinet. Secure with screws removed from Battery cabinet.
- **21.** Secure cabinets to floor with contractor supplied hardware.
- **22.** When all wiring is complete, proceed to Chapter 3 and connect battery strings in accordance with instructions contained in paragraph 3.4.2.

2.3.3 Joining Additional Battery Cabinets

To join additional battery cabinets, perform the following steps. Refer to Figure 2–7 for non-permanent installation or Figure 2–8 for permanent installation of the Powerware 9330 (10 kVA–20 kVA) UPS and Figure 2–9 for non-permanent installation or Figure 2–10 for permanent installation of the Powerware 9330 (25 kVA–40 kVA) UPS.

- **1.** Roll the Battery cabinet to a spot near the right side of the previously installed Battery cabinet.
- Remove front vented panels from the Battery cabinets. The front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2–1).
- **3.** Remove right side outside panel from previously installed Battery cabinet. Retain hardware.
- 4. Remove right side panel from new Battery cabinet. Retain hardware.
- **5.** Install side panel removed from the new Battery cabinet to the right side of the previously installed Battery cabinet. Secure with screws removed from Battery cabinet.
- **6.** Find the battery cable with 2-pole connector in the new Battery cabinet. Route this connector into the previously installed Battery cabinet and mate with the matching connector in the cabinet (see Figures 2–7, 2–8, 2–9, or 2–10).
- **7.** Push the new Battery cabinet against the right side of the previously installed Battery cabinet.

- **8.** If permanently mounting the system, proceed to step 15; otherwise, proceed to step 9.
- **9.** Secure the new Battery cabinet in position by lowering the leveling feet, until cabinet is not resting on the casters and the cabinet is level.
- **10.** Secure the front of Battery cabinets by sliding the angle grounding/mounting bracket, from installation kit, behind the base of the Battery cabinets with the bottom angle facing outward (see Figures 2–7 or 2–9). Use hardware provided in the kit to secure the bracket.
- **11.** Remove the top side panel mounting screw (tie/grounding bracket location in Figures 2–7 or 2–9) from both the Battery cabinets.
- **12.** Secure the back of Battery cabinets with the tie/grounding bracket. Secure the bracket with the side panel mounting screws.
- **13.** Install side panel removed from the previously installed Battery cabinet to the right side of the new Battery cabinet. Secure with screws removed from Battery cabinet.
- **14.** When all wiring is complete, proceed to Chapter 3 and connect battery strings in accordance with instructions contained in paragraph 3.4.2.
- **15.** Using retained hardware, reinstall shipping brackets previously removed to front and rear of new Battery cabinet with the angle facing outward.(see Figures 2–8 or 2–10).
- **16.** Secure the front of Battery cabinets with the long flat grounding/mounting bracket from the installation kit (see Figures 2–8 or 2–10). Use hardware provided in the kit to secure the bracket.
- **17.** Remove the top side panel mounting screw (tie/grounding bracket location in Figures 2–8 or 2–10) from both the Battery cabinets.
- **18.** Secure the back of Battery cabinets with the tie/grounding bracket. Secure the bracket with the side panel mounting screws.
- **19.** Install side panel removed from the previously installed Battery cabinet to the right side of the new Battery cabinet. Secure with screws removed from Battery cabinet.
- 20. Secure cabinets to floor with contractor supplied hardware.
- **21.** When all wiring is complete, proceed to Chapter 3 and connect battery strings in accordance with instructions contained in paragraph 3.4.2.
- **22.** Repeat steps 1 through 21 to join additional Battery cabinets.

2.4.1 Unloading the Options Cabinet from the Pallet

To remove the Options cabinet from the pallet, refer to paragraph 2.2.1 for Options cabinet without Distribution Housing or paragraph 2.2.2 for Options cabinet with Distribution Housing.

2.4.2 Joining the Options Cabinet to the UPS Cabinet

To join the Options cabinets to the UPS, perform the following steps. Refer to Figure 2–11 for non-permanent installation or Figure 2–12 for permanent installation of the Powerware 9330 (10 kVA–20 kVA) UPS and Figure 2–13 for non-permanent installation or Figure 2–14 for permanent installation of the Powerware 9330 (25 kVA–40 kVA) UPS.

- **NOTE:** The cables used in step 8 are coiled outside the Options cabinet and are attached at the factory to the input and output terminals of the Options cabinet.
- 1. Roll the Options cabinet to a spot near the left side of the UPS.
- 2. Remove left front solid panel, and right front vented panel from the Powerware 9330 (10 kVA-20 kVA) UPS cabinet or left front solid panel and front vented panels from Powerware 9330 (25 kVA-40 kVA) UPS cabinet. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2-1 or 2-5).
- **3.** Remove screws securing UPS cabinet internal safety shield panel and remove panel to gain access to wireway.
- **4.** Remove front vented panel from Options cabinet. The front panel is secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches.
- 5. Remove left side outside panel from UPS cabinet. Retain hardware.
- 6. Remove left side panel from Options cabinet. Retain hardware.
- **7.** Install side panel removed from the Options cabinet to the left side of the UPS cabinet. Secure with screws removed from UPS cabinet.
- **8.** Route the input and output cables from the Options cabinet through cutout in UPS cabinet side to the UPS wireway.
- 9. Push the Options cabinet against the left side of the UPS cabinet.
- **10.** If permanently mounting the system, proceed to step 16; otherwise, proceed to step 11.
- **11.** Secure the Options cabinet in position by lowering the leveling feet, until cabinet is not resting on the casters and the cabinet is level.
- 12. Secure the front of Options cabinet to the front of the UPS cabinet by sliding the angle grounding/mounting bracket, from installation kit, behind the base of the Options and UPS cabinets with the bottom angle facing outward (see Figure 2–11 or 2–13). Use hardware provided in the kit to secure the bracket.



Figure 2–11. Options Cabinet Installation – Powerware 9330 (10 kVA–20 kVA) (Non–Permanent Mounting)



Figure 2–12. Options Cabinet Installation – Powerware 9330 (10 kVA–20 kVA) (Permanent Mounting)



Figure 2–13. Options Cabinet Installation – Powerware 9330 (25 kVA–40 kVA) (Non–Permanent Mounting)



Figure 2–14. Options Cabinet Installation – Powerware 9330 (25 kVA–40 kVA) (Permanent Mounting)

- **13.** Remove the top side panel mounting screw (tie/grounding bracket location in Figures 2–11 or 2–13) from both the Option and UPS cabinets.
- **14.** Secure the back of Options cabinet to the back of the UPS cabinet with the tie/grounding bracket. Secure the bracket with the side panel mounting screws.
- **15.** Proceed to paragraph 2.4.3.
- **16.** Using retained hardware, reinstall shipping brackets previously removed to front and rear of Options cabinet with the angle facing outward.(see Figures 2-12 or 2-14).
- **17.** Secure the front of Options cabinet to the front of the UPS cabinet with the long flat grounding/mounting bracket from the installation kit (see Figures 2-12). Use hardware provided in the kit to secure the bracket.
- **18.** Remove the top side panel mounting screw (tie/grounding bracket location in Figure 2-12 or 2-14) from both the Option and UPS cabinets.
- **19.** Secure the back of Options cabinet to the back of the UPS cabinet with the tie/grounding bracket. Secure the bracket with the side panel mounting screws.
- 20. Secure cabinets to floor with contractor supplied hardware.
- **21.** Proceed to paragraph 2.4.3.

2.4.3 Installing Options Cabinet Internal and UPS Optional Remote Battery Power Wiring

- If not already removed, remove left front solid panel and right front vented panel from the Powerware 9330 (10 kVA-20 kVA) UPS cabinet or left front solid panel and front vented panels from the Powerware 9330 (25 kVA-40 kVA) UPS cabinet. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches (see Figure 2-1 or 2-5).
- **2.** Remove screws securing internal safety shield panels and remove panels to gain access to input and output terminals.
- **NOTE:** Remove UPS cabinet input, output, and remote battery input conduit landing plate to punch conduit holes.
- **3.** If wiring an optional remote battery system, proceed to step 4; otherwise proceed to step 6.

CAUTION:

When sizing battery system, do not exceed internal battery charger capabilities. Refer to Chapter 15 *"Specifications"*, for maximum battery charger currents.

4. Route battery cables from the remote battery system to UPS Remote Battery Terminal Block. Refer to Appendix A of this manual for wiring access information.

- **5.** Connect positive, negative, and ground DC power wiring from external battery system to the Remote Battery Terminal Block and ground terminals in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information.
- **6.** Route input and output cables from Options cabinet through wireway to UPS terminal blocks. Refer to Appendix A of this manual for wiring access information.
- **7.** If wiring a single feed system, proceed to step 8; if wiring a dual feed system, proceed to step 10.
- 8. Connect phase A, B, C, and Neutral input power wiring from the Options cabinet to the Bypass Input Terminal Block and Neutral Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for single feed systems.
- 9. Proceed to step 17.
- **10.** If wiring a 10 kVA-20 kVA UPS dual feed system, proceed to step 11; if wiring a 25 kVA-40 kVA UPS dual feed system, proceed to step 14.
- **11.** Disconnect single feed jumpers from phase A, B, and C terminals on Input Breaker CB1 and Bypass Input Terminal Block. Remove jumpers from cabinet.
- 12. Connect phase A, B, and C rectifier input power wiring from the Options cabinet to the rectifier input terminals on Input Breaker CB1 in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- **13.** Proceed to step 16.
- **14.** Disconnect single feed jumpers from phase A, B, and C terminals on Rectifier Input Terminal Block and Bypass Input Terminal Block. Remove jumpers from cabinet.
- **15.** Connect phase A, B, and C rectifier input power wiring from the Options cabinet to the Rectifier Input Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- **16.** Connect phase A, B, C, and Neutral bypass input power wiring from the Options cabinet to the Bypass Input Terminal Block and Neutral Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- **17.** Connect phase A, B, and C, and Neutral output power wiring from the Options cabinet to Output Terminal Block and Neutral Terminal Block in the UPS cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information.
- **18.** Secure the UPS by reinstalling safety shield panels, front vented panels, and front solid panel.

2.4.4 Installing Options Cabinet External Power Wiring

- **NOTE:** Remove Options cabinet input and output conduit landing plate to punch conduit holes.
- **1.** Route input and output cables to input/output terminal block. Refer to Appendix A of this manual for wiring access information.
- **2.** If optional Power Distribution Module (PDM) is installed in the Options cabinet, proceed to step 10; otherwise, proceed to step 3.
- **3.** If wiring a single feed system, proceed to step 4; if wiring a dual feed system, proceed to step 6.

CAUTION:

Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4 wire" source). If the Options cabinet contains an isolation transformer in the bypass feed, the source neutral is not required.

- **4.** Connect phase A, B, C, and Neutral mains and bypass input power wiring from source to the bypass input terminals in the Options cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for single feed systems.
- **5.** Proceed to step 8.
- 6. Connect phase A, B, and C mains input power wiring from source to the mains input terminals in the Options cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.

CAUTION:

Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4 wire" source). If the Options cabinet contains an isolation transformer in the bypass feed, the source neutral is not required.

- **7.** Connect phase A, B, C, and Neutral bypass input power wiring from source to the bypass input terminals in the Options cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- **8.** Connect phase A, B, and C and Neutral output power wiring from output terminals to critical load. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information.
- 9. Proceed to step 25.
- **10.** If wiring a single feed system, proceed to step 11; if wiring a dual feed system, proceed to step 13.

Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4 wire" source). If the Options cabinet contains an isolation transformer in the bypass feed, the source neutral is not required.

- **11.** Connect phase A, B, C, and Neutral mains and bypass input power wiring from source to the bypass input terminals in the Options cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for single feed systems.
- **12.** Proceed to step 16.
- **13.** Connect phase A, B, and C mains input power wiring from source to the mains input terminals in the Options cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.

CAUTION:

Proper UPS operation requires a Bypass Input Neutral connection. This neutral is required to be the common conductor between all bypass source phases (e.g., "wye" or "4 wire" source). If the Options cabinet contains an isolation transformer in the bypass feed, the source neutral is not required.

- **14.** Connect phase A, B, C, and Neutral bypass input power wiring from source to the bypass input terminals in the Options cabinet. Refer to Appendix A of this manual for wiring and termination requirements and wiring access information. Note wiring connections for dual feed systems.
- **15.** If the optional Distribution Housing is installed, proceed to step 19; otherwise, proceed to step 16.
- **16.** Install Square-D Type QO or QOB breakers into PDM panelboard. Refer to Appendix A of this manual for access information.
- **NOTE:** Remove Options cabinet PDM conduit landing plate to punch conduit holes.
- **17.** Wire branch circuits in accordance with branch circuit breaker manufacturers instructions (output from the UPS or Options cabinet is prewired to the PDM). Refer to Appendix A of this manual wiring access information.
- **18.** Proceed to step 25.
- **19.** If output breakers and power distribution cabling and receptacles are not installed, proceed to step 20; otherwise, proceed to step 25.
- **20.** Remove Distribution Housing rear cover.
- **21.** Open top cover on the Options cabinet by sliding the Options cabinet top cover latches toward the rear of the cabinet and lifting the cover. Secure cover in the upright position using latching slide bar.
- **22.** Install Square-D Type QO or QOB breakers into PDM panelboard. Refer to Appendix A of this manual for access information.

- **23.** Install output receptacle power cables through Distribution Housing conduit landing plate to branch circuit breaker.
- **NOTE:** Installation of the output receptacle power cables shall be in accordance with Article 356 of the NEC.
- **24.** Wire branch circuits in accordance with branch circuit breaker manufacturers instructions (output from the Options cabinet is prewired to the PDM). Refer to Appendix A of this manual wiring access information.
- **25.** After wiring the Options cabinet to the facility power and critical load, be sure to ground the system according to local and/or national electrical wiring codes.
- **26.** When all wiring is complete, connect battery strings in accordance with instructions contained in paragraphs 3.4.1 and 3.4.2 of Chapter 3.
- **27.** Secure the UPS by reinstalling safety shield panels, front vented panels, and front solid panel.
- **28.** Install side panel removed from the UPS cabinet to the left side of the Options cabinet.
- **29.** Secure the Options cabinet by reinstalling front vented panel.

2.5 Initial Startup

Startup and operational checks should be performed only by authorized service personnel. Contact service in advance (usually a two week notice is required) to reserve a preferred startup date.

2.6 Completing the Installation Checklist

The final step in installing your UPS system 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. You should make a copy of the Installation Checklist before filling it out, and retain the original.

After your installation is complete, a service representative will be able to verify the operation of your UPS system and commission it to support your 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 be sure you have completed all applicable equipment installation.

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

2.6.1 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.
A cabinet grounding/mounting kit is installed between any cabinets that are bolted together.
All conduits, and cables are properly routed to the UPS and auxiliary cabinets.
All power cables are properly sized and terminated.
The bypass source of the supply is a four wire wye configuration. If using dual feed, the rectifier source is a three wire connection from a wye configuration.
A neutral connection is present at the Bypass Input Neutral Terminal. This neutral is required for proper UPS operation, regardless of UPS configuration or type of connected load. Failure to connect a neutral to this point will void the warranty. See Appendix A of this manual for more details.
All telephone and network connections have been completed.
A ground conductor is properly installed.
Internal battery cabinet connections have been completed (plugs, etc.).
Air conditioning equipment is installed and operating correctly.
The area around the installed UPS system is clean and dust-free. (It is recommended that the UPS be installed on a level floor suitable for computer or electronic equipment.)
Adequate workspace exists around the UPS and other cabinets.
Adequate lighting is provided around all UPS equipment.
A 120V service outlet is located within 25 feet of the UPS equipment.
The Remote Emergency Power Off (EPO) device is mounted in its installed location and its wiring terminated inside the UPS cabinet.
Summary alarms and/or building alarms are wired appropriately. (OPTIONAL)
Startup and operational checks performed by authorized service personnel.

Notes	



3.1 Important Safety Instructions

This chapter describes installing the UPS batteries.

The installation of batteries should be performed or supervised by personnel knowledgeable of batteries and their associated precautions. Keep unauthorized personnel away from batteries.

Observe these precautions when working on or around batteries:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- Determine if the battery is inadvertently grounded. If it is, remove the source of the ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock is reduced if such grounds are removed during installation and maintenance.
- When replacing batteries, use the same number and type.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

WARNING:

Do not dispose of battery or batteries in a fire. The battery may explode.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes, and may be toxic.

A battery can cause electrical shock, burn from high short-circuit current, or fire. Take proper precautions when working with batteries.

ATTENTION:

Une batterie peut prêsenter un risque de choc êlectrique, de brulure, ou d'incendie. Suivre les précautions qui s'imposent.

- Pour le remplacement, utiliser le même nombre et modéle des batteries.
- L'élimination des batteries est règlementée. Consulter les codes locaux à cet effet.

3.2 Battery Type

The following battery types are supplied in the UPS Cabinets and external Battery Cabinets. When purchasing UPS Cabinets or external Battery Cabinets without batteries, only the following types are recommended. Use of any other battery type inside Powerware cabinets will void the product warranty. When replacing batteries use the same manufactuer and part number originally supplied with the unit to ensure correct harness fit and terminal landing.

Battery Manufacturer	CSB Battery Technologies, Inc.	C&D Technologies, Inc.	Sterling
Battery Model	HR12120WFR	UPS12-100FR	HA28-106FR
Battery Quantity 10 kVA-20 kVA 25 kVA-40 kVA	24 48	24 48	24 48

3.3 Battery Installation

3.3.1 Installing Internal Batteries in the UPS Cabinet

If the UPS cabinet was ordered without batteries, install the batteries in accordance with the following procedure.

WARNING:

LETHAL VOLTAGE WILL BE PRESENT WHEN PERFORMING THE STEPS IN THIS SECTION.

- **1.** Ensure that battery breaker CB2 is in the OFF position. If not, set breaker to OFF position.
- Remove left front solid panel and right front vented panel from Powerware 9330 (10 kVA-20 kVA) UPS or left front solid panel and front vented panels from Powerware 9330 (25 kVA-40 kVA) UPS. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches.
- **3.** Remove screws securing internal safety shield panels and remove panels to gain access to battery trays.
- **4.** Remove battery trays, containing wiring and nylon straps, from the UPS cabinet.
- **5.** Select batteries in a accordance with paragraph 3.2. Use batteries of the same age, type, and manufacturer, in each string, so UPS performance is not affected.
- **6.** Install four batteries per tray and electrically interconnect the batteries in accordance with Figure 3–1 or 3–2.
- 7. Secure batteries to tray using nylon straps.
- 8. Reinstall battery trays into the UPS cabinet.
- 9. Connect battery strings in accordance with paragraph 3.4.1.





Figure 3–1. Battery Schematic – Powerware 9330 (10 kVA–20 kVA) UPS and Battery Cabinet



288VDC BATTERY CABINET

Figure 3-2. Battery Schematic - Powerware 9330 (25 kVA-40 kVA) UPS

3.3.2 Installing Internal Batteries in the Battery Cabinet

If the battery cabinet was ordered without batteries, install the batteries in accordance with the following procedure.

WARNING: LETHAL VOLTAGE WILL BE PRESENT WHEN PERFORMING THE STEPS IN THIS SECTION.

- Ensure that battery breaker is in the OFF position. If not, set breaker to OFF position.
- **2.** Remove front vented panel from battery cabinet. The front panel is secured with magnetic latches and is removed by pulling panel straight forward to disengage magnetic latches.
- **3.** Remove screws securing internal safety shield panel and remove panel to gain access to battery trays.
- **4.** Remove battery trays, containing wiring and nylon straps, from the UPS cabinet.
- **5.** Select batteries in a accordance with paragraph 3.2. Use batteries of the same age, type, and manufacturer, in each string, so UPS performance is not affected.
- **6.** Install four batteries per tray and electrically interconnect the batteries in accordance with Figure 3–1.
- 7. Secure batteries to tray using nylon straps.
- 8. Reinstall battery trays into the UPS cabinet.
- 9. Connect battery strings in accordance with paragraph 3.4.2.

3.4 Connecting Batteries

3.4.1 Electrically Connecting Integral Battery Strings

The UPS cabinet is shipped with each internal battery connection string electrically disconnected. Connect the battery strings in accordance with the following procedure:

WARNING: LETHAL VOLTAGE WILL BE PRESENT WHEN PERFORMING THE STEPS IN THIS SECTION.

- **1.** Ensure that battery breaker CB2 is in the OFF position. If not, set breaker to OFF position.
- Remove left front solid panel and right front vented panel from Powerware 9330 (10 kVA-20 kVA) UPS or left front solid panel and front vented panels from Powerware 9330 (25 kVA-40 kVA) UPS. Front panels are secured with magnetic latches and are removed by pulling panels straight forward to disengage magnetic latches.

- **3.** Remove screws securing internal safety shield panels and remove panels to gain access to batteries.
- **4.** Connect the string of battery trays together by mating the loose red connector from each tray to the fixed black connector mounted on the front edge of the tray above it (see Figures 3–1 and 3–3 or 3–2 and 3–3).
- **5.** Connect the pigtail battery connectors at the top battery trays as shown in Figure 3–3.
- **6.** Secure the UPS by reinstalling safety shield panels, front vented panels, and left front solid panel.

3.4.2 Electrically Connecting Battery Cabinet Battery Strings

The battery cabinets are shipped with each internal battery connection string electrically disconnected. Connect the battery strings in accordance with the following procedure:

WARNING: LETHAL VOLTAGE WILL BE PRESENT WHEN PERFORMING THE STEPS IN THIS SECTION.

- 1. Ensure that battery breaker is in the OFF position. If not, set breaker to OFF position.
- **2.** Remove the front vented panel from battery cabinet. The front panel is secured with magnetic latches and is removed by pulling panel straight forward to disengage magnetic latches.
- **3.** Remove screws securing internal safety shield panel and remove panel to gain access to batteries.
- **4.** Connect the string of battery trays together by mating the loose red connector from each tray to the fixed black connector mounted on the front edge of the tray above it (see Figure 3–3).
- **5.** Connect the pigtail battery connectors at the top battery trays as shown in Figure 3–3.
- **6.** Secure the Battery Cabinet by reinstalling safety shield panel, and front vented panel.
- **7.** If you are installing more than one battery cabinet, perform Steps 1 through 6 for each cabinet.



Figure 3-3. Battery String Connection

3.5 Installing and Connecting Remote Battery System

Install and connect remote Battery System as follows:

CAUTION:

When sizing battery system, do not exceed internal battery charger capabilities. Refer to Chapter 15 *"Specifications"*, for maximum battery charger currents.

- **1.** Install battery system in accordance with battery and rack manufactures instructions.
- 2. Install DC disconnect device between battery system and UPS Cabinet.
- **3.** Connect battery system to UPS cabinets (refer to Paragraph 2.2.4 or 2.4.3).

Installing a Remote Emergency Power Off (EPO) Control



4.1 Installation Procedures



Figure 4–1. Remote EPO Control

4.2 To install a Remote EPO:

NOTE: Before installing a Remote EPO, be sure you have prepared the UPS according to the instructions in Chapter 2.

To install a Remote EPO control:

- 1. Remove cover (see Figure 4–2) from Remote EPO switch enclosure bottom.
- **NOTE:** If mounting to a hollow wall, secure the enclosure bottom to a wood or metal stud within the wall. Do not use hollow wall anchors.
- Securely mount the Remote EPO switch enclosure bottom. Recommended locations include operator's consoles or by exit doors. Refer to Appendix A, Drawing 164201300-18, for enclosure dimensions and wiring knockouts.



Figure 4–2. Remote EPO Control (inside view of cover and bottom of enclosure)

- **3.** Mount cover to Remote EPO switch enclosure bottom, as shown in Figure 4–2, for easier wiring.
- **NOTE:** A separate conduit is required for each UPS connected to the Remote EPO switch.
- **4.** Install wiring from the Remote EPO switch using ½-in. conduit through the Customer Interface conduit landing plate on the rear of the UPS cabinet. Refer to Appendix A, Drawing 164201300–8, for conduit landing area and terminal board location, and Drawing 164201300–2 for terminal wiring assignments.
- **5.** Connect the Remote EPO wiring as shown in Tables 4-1 and 4-2 and Figure 4-2.
- **6.** If you are installing multiple Remote EPO stations, wire additional stations in series with the first Remote EPO.

Table 4–1. Remote EPO Wire Terminations				
From Remote EPO Switch(s)	<i>To Communications Server</i> Board TB5 in UPS Cabinet	Remarks		
TB1 Use any open Terminal	TB5-3	Twisted wires (2)		
TB2 Use any open Terminal	TB5-4	14–18 gauge		



- **7.** If required, install ½-in. conduit and wiring from the Remote EPO switch to trip circuitry of upstream protective devices. A separate contact block, with the appropriate normally open or normally closed contacts, must be used for this function. Remote EPO switch wiring must be in accordance with UL Class 1 requirements.
- **8.** When wiring is complete, remove cover from Remote EPO switch enclosure bottom. Turn cover over and secure to enclosure bottom.
- **9.** Secure the UPS by reversing all steps taken to prepare it for Remote EPO installation.

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5.1 Installation Procedures

As an option, a Remote Monitor Panel (RMP) can be installed to monitor the operation of the UPS system from virtually any location within your facility, up to 500 feet from the UPS. You can surface-mount an RMP on a desktop or secure it to a wall. Figure 5–1 shows an RMP. Drawing 164201300–19 in Appendix A shows the enclosure dimensions and cable exit openings.



Figure 5–1. Remote Monitor Panel (RMP)

5.2 To install an RMP:

- **NOTE:** If mounting to a hollow wall, secure the enclosure bottom to a wood or metal stud within the wall. Do not use hollow wall anchors. The RMP also has provisions to be mounted to a single or double gang wall electrical box.
- **1.** Be sure the UPS system is turned off and all power sources are removed. (See the operation section of this manual for shutdown instructions.)
- **2.** If wall mounting, securely mount the RMP. If desk mounting, install provided bumpers to the bottom of the RMP enclosure.
- **3.** Install the Industrial Relay Card (IRC) into an open X-Slot on the rear panel of the UPS Cabinet. Remove X-Slot cover panel to gain access to the X-Slot.
- **4.** If wall mounting, proceed to step 5; if desk mounting, proceed to step 6.
- Install wiring from the RMP to the UPS using ½-in. conduit through the cable exit openings in the IRC (see Figure 5–2) and the RMP (refer to Drawing 164201300–19 in Appendix A). Proceed to step 7.
- Install wiring from the RMP to the UPS using cable listed in Table 5–1 and provided strain relief bushings in the cable exit openings in the IRC (see Figure 5–2) and the RMP (refer to Drawing 164201300–19 in Appendix A).
- **7.** Connect wiring between the RMP and the UPS IRC plug-in terminal blocks using terminations shown in Table 5–1. See Figures 5–2 and 5–3 for plug-in terminal block locations.

Table 5–1. RMP Wire Terminations			
From RMP	To UPS IRC	Remarks	
J1-1	J11	Use Belden 8690 060 or equivalent Cable	
J1-3	J1-3		
J1-4	J1-4		
J1-5	J1-5		
J1-6	J1-6		

8. To check the operation of the RMP, ensure that the UPS system is supplying the load via the inverter or bypass. If the indicators on the RMP show the appropriate status, then it is operating correctly.

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



Figure 5–2. Industrial Relay Card



CONDUIT AND WIRING SUPPLIED BY THE CUSTOMER. THE MAXIMUM DISTANCE BETWEEN THE REMOTE MONITOR AND THE UPS IS NOT TO EXCEED 500 FEET.



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6.1 Installation Procedures

-As an option, an *Industrial Relay Card (IRC)* can be installed to indicate the operating status of the UPS system using the customer's monitoring equipment and to connect an optional Remote Monitor Panel. The IRC uses normally open or normally closed dry relay contacts to indicate the UPS status as listed in Table 6-1. Figure 6-1 shows an IRC.



Figure 6–1. Industrial Relay Card (IRC)

6.2 To install an IRC:

- **1.** Be sure the UPS system is turned off and all power sources are removed. (See the operation section of this manual for shutdown instructions.)
- **2.** Install the IRC into an open X-Slot on the rear panel of the UPS Cabinet. Remove X-Slot cover panel to gain access to the X-Slot.
- **3.** Install wiring from the IRC to the monitoring equipment using $\frac{1}{2}$ -in. conduit through the cable exit opening in the IRC (see Figure 6–1).
- **4.** Connect wiring between the the IRC and the monitoring equipment using terminations shown in Table 6–1. See Figure 6–1 for plug-in terminal block locations.

Table 6–1. IRC Wire Terminations			
IRC Terminal	Function	Remarks	
J2-1	NC		
J2-2	СОМ	Normal Mode	
J2-3	NO		
J2-4	NC		
J2-5	СОМ	Bypass Mode	
J2-6	NO		
J2-7	NC		
J2-8	СОМ	Battery Mode	
J2-9	NO		
J2-10	NC		
J2-11	СОМ	Alarm Mode	
J2-12	NO		
Maximum contact rating: 250 VAC, 30 VDC @ 5A Wire Range: 16-24 AWG			

5. To check the operation of the IRC, ensure that the UPS system is supplying the load via the inverter or bypass. If the indicators on the customer's monitoring equipment show the appropriate status, then it is operating correctly.

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

Section II

Operation

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7.1 Looking Inside the UPS System

The Powerware 9330 is a continuous duty, solid-state, transformerless (at 208/220 VAC), three phase, true online system that provide conditioned and uninterruptible AC power to the UPS systems output. The UPS supports process control, data processing, telecommunications/PBX, research, and non-patient medical equipment. The Powerware 9330 maintains power to the critical loads during commercial electrical power brownout, blackout, overvoltage, undervoltage, and out-of-tolerance frequency conditions.

The basic system consists of a rectifier, battery charger, DC booster, inverter, monitoring/operation control panel, integrated communications server, and microprocessor controlled (DSP) logic.

In this manual, the power required by your equipment is called the *critical load*. The UPS supplies the critical load with conditioned power that is synchronized with your utility power. Figure 7–1 shows the main elements of the UPS.



Figure 7-1. Main Elements of the UPS System

If utility power is interrupted or falls outside the parameters specified in Chapter 15, "Product Specifications," the UPS uses a *backup battery supply* to maintain power to the critical load for a specified period of time or until the utility power returns. For extended power outages, the UPS allows you to either transfer to an alternative power system (such as a generator) or shut down your critical load in an orderly manner.

The emergency bypass consist of a continuous duty static switch, and backfeed protection contactor (K5). The backfeed protection contactor is located in series with the static switch. For manual transfers to bypass, the static switch is also used. The static switch is armed and ready during both types of transfers.

A wraparound Maintenance Bypass switch provides a means of isolating the UPS Power Processing Unit (PPU) for servicing, while still suppling power to the critical load.

The operation of the UPS system is described in greater detail in the following paragraphs.

7.2 UPS Modes

The UPS system functions automatically to supply AC electrical power to the critical load. There are four standard operation modes:

- In Normal mode, the critical load is supplied by the inverter, which derives its power from rectified utility AC power. In this mode, the battery charger also provides charging current for the battery, if needed.
- In Battery mode, the battery provides DC power, which maintains inverter operation. The battery supports the critical load.
- In Bypass and High Efficiency mode, the critical load is directly supported by utility power.
- In Maintenance Bypass mode, the critical load is directly supported by utility power, but the UPS can be shut down for maintenance. This is accomplished by the operator moving the Maintenance Bypass Switch to Bypass.

The UPS continually monitors itself and the incoming utility power, and automatically switches between these modes as required, with no operator intervention, except for the Maintenance Bypass mode. The sophisticated detection and switching logic inside the UPS ensures that operating mode changes are automatic and transparent to the critical load. The UPS switches operating modes in response to these *system events*:

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

System events, alarm horns, and indicator lights are described in Chapter 12, "Responding to System Events."

The following descriptions provide the differences in UPS operating modes.

7.2.1 Normal Mode

Figure 7-2 shows the path of electrical power through the UPS system when the UPS is operating in Normal mode.



Figure 7–2. Path of Current Through the UPS in Normal Mode

During normal UPS operation, power for the system is derived from a utility input source through the input breaker CB1 and contactor K1. "Normal" appears on the front panel and indicates the incoming power is within voltage and frequency acceptance windows. Three phase AC input power is converted to DC using a full–wave, six–pulse, solid–state rectifier block which supplies unregulated DC voltage to a boost converter which in turn supplies a higher and regulated DC voltage to the inverter. The battery is not charged directly from the unregulated rectifier. Instead, a separate battery charger is used to maintain the proper charge level on the battery during normal operation.

The battery charger derives its input from the unregulated DC output of the rectifier and provides regulated DC voltage and charge current to the battery. The battery charge condition is monitored by the UPS and reported by status indicators located on the LCD monitor panel. The battery is always connected to the UPS and ready to support the inverter should the utility input become unavailable.

The DC boost converter derives power from the unregulated DC rectifier and produces an elevated and stable DC voltage and current source for the inverter. The boost converter also establishes the systems output neutral for supporting single phase AC loads from any phase of the inverter output. The output neutral of the system is connected with the required neutral supplied at the utility bypass input and should never be bonded to ground at the modules output.

The inverter produces a three phase AC output to a customers load without the use of a transformer. The inverter derives power from the boost converters regulated DC and utilizes IGBT devices and pulse—width modulation (PWM) to produce a regulated and filtered AC output. The AC output of the inverter is delivered to the system output through the output contactor (K3).

If the utility AC power is interrupted or is out of specification, the UPS automatically switches to Battery mode to support the critical load with no interruption. When utility power returns, the UPS returns to Normal mode.

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

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

7.2.2 Bypass Mode

The UPS automatically switches to Bypass mode if it detects an overload, load fault, or internal failure. The bypass source supplies the commercial AC power to the load directly.

Figure 7–3 shows the path of electrical power through the UPS system when operating in Bypass mode.



Figure 7–3. Path of Current Through the UPS in Bypass Mode

In Bypass mode, the output of the system is provided with three phase AC power directly from the system input. While in this mode, the output of the system is not protected from voltage or frequency fluctuations or power outages from the source. Some power line filtering and spike protection is provided to the load but no active power conditioning or battery support is available to the output of the system in the Bypass mode of operation.

The internal bypass is comprised of a solid state silicon controlled rectifier (SCR) static switch (SSW), and a back feed protection contactor (K5). The static switch is rated as a continuous duty device that is used anytime the boost converter and inverter is unable to support the applied load. The static switch is wired in series with the back feed protection contactor and together they are wired in parallel with

the inverter rectifier. The static switch being an electronically controlled device can be turned on immediately to pickup the load from the inverter while the inverter output contactor K3 opens to isolates the inverter. The back feed protection contactor is normally always closed ready to support the static switch unless the bypass input source becomes unavailable.

During an outage, transfers to bypass are prohibited and for the safety of those who may be working on the power lines upstream from the UPS, the back feed protection contactor is opened, preventing system output voltage from bleeding across the static switch snubber components to the bypass input source.

If the inverter is unable to support the load on the output of the system, to ensure the load remains energized, the UPS will transfer the load to the internal bypass. The output of the system will be transferred automatically to the internal bypass if any of the following abnormal conditions occur on the output of the system: If the output of the system exceeds acceptable voltage tolerances; System is overloaded; Inverter failure. The transfer is initiated by turning on the static switch and opening the output contactor K3. This kind of transfer is normally referred to as a Make–Before–Break transfer. The transfer should take place in less than 4 mS (quarter cycle) to ensure loads on the systems output are not interrupted. The static switch remains on until either the inverter is able to support the system output or the unit is placed into a maintenance position where repairs can be made.

If the UPS initiates its own transfer to bypass for any reason other than operator intervention, the UPS will attempt to restart the inverter (if not running already) and attempt a retransfer back on line to support the output of the system. Three attempts will be made within ten minutes to bring the inverter back on—line automatically before the UPS will lock out any further attempts. After three attempts have been made, the UPS will remain in bypass and an alarm condition will be enunciated. The UPS can also be transferred to bypass using the front panel controls.

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

7.2.3 **High Efficiency Mode**

When the UPS is operating in High Efficiency mode, the bypass source supplies the commercial AC power to the load directly.

Figure 7-4 shows the path of electrical power through the UPS system when operating in High Efficiency mode.



HIGH EFFICIENCY MODE

Figure 7–4. Path of Current Through the UPS in High Efficiency Mode

In High Efficiency mode, the output of the system is provided with three phase AC power directly from the system bypass input. Some power line filtering and spike protection is provided to the load but no active power conditioning or battery support is available to the output of the system in the High Efficiency mode of operation. However if the bypass source falls outside of a predetermined voltage or frequency window, the system forward transfers and the inverter assumes the load. The transfer takes place in less than 4 ms (quarter cycle), to ensure loads being fed by the system output are not interrupted.

The internal bypass is comprised of a solid state silicon controlled rectifier (SCR) static switch (SSW), and a back feed protection contactor (K5). The static switch is rated as a continuous duty device. The static switch is wired in series with the back feed protection contactor and together they are wired in parallel with the inverter.

In the High Efficiency mode, the static switch is turned on to supply the majority of the load current directly to the load while the Inverter remains on line, ready to assume suppling the load.

High Efficiency mode is a normal operating mode, and not an alarm condition. While the UPS is in High Efficiency mode, the **NORMAL** light on the front display will illuminate.

7.2.4 Battery Mode

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

Figure 7–5 shows the path of electrical power through the UPS system when operating in Battery mode.



Figure 7-5. Path of Current Through the UPS in Battery Mode

During a utility power failure, the rectifier no longer has an AC utility source in which to supply the DC output current required to support the battery charger and boost converter. The input contactor (K1) is opened, the battery charger is turned off, and battery SCR (Q10) and battery contactor (K2) both receive signals to turn on enable to supply battery power to the system. Because the battery SCR is an electronic device, it supplies momentary battery power to the system during the time it takes the contacts of K2 to close. Energy stored in the battery is supplied instantaneously to the boost converter so that the inverter and customers load can be supported without interruption. If the bypass is common with the rectifier input, the Feed Back Protection contactor (K5) will also open. The opening of contactors K1 and K5 prevent static system voltages from bleeding backwards through the static switch and rectifier snubber components and re—entering the input source.

While in battery mode, the UPS will enunciate an audible horn, light a visual indicator lamp on the front panel (System Normal, On Battery), and make an entry into the alarm event history. As the battery discharges, the boost converter and inverter constantly makes minute adjustments enable to maintain a steady output. The UPS will remain in this operating mode until the input power to the rectifier is again within the specified voltage or frequency acceptance windows.

If the input power fails to return or is not within the acceptance windows required for normal operation, the battery will continue discharging until a DC voltage level is reached where the inverter output can no longer support the connected loads. When this occurs, the unit will issue another set of audible and visual alarms indicating SHUTDOWN IMMINENT. Unless the rectifier has a valid input soon, the output will only be supported for 2 minutes before the output of the system shuts down. If the bypass source is available, the system will transfer to Bypass instead of shuting down.

If at any time during the battery discharge the input power becomes available again, contactors K1 and K5 are closed and the rectifier will begin to supply DC current to the boost converter and inverter. The battery contactor K2 is opened while the battery charger is turned back on to begin recharging the battery. At this point, the unit returns to normal operation. Depending on the amount of load on the system and the duration of the battery discharge, battery current limit alarms may be seen for a short time due to the current required to recharge the battery.

The systems total operating time on battery will depend on many factors. Some factors that affect battery support times are battery type and capacity, number of parallel strings, environmental temperatures, age of the battery, and fluctuations in load demand during the discharge. The greater the load, the less support time the battery will have. Decrease the load, and the battery support time will generally increase.

7.2.5 Test and Maintenance Bypass Modes

An internal maintenance switch is used to safely supply utility power to the system output during periods of maintenance or repairs. Before this switch is used, the UPS should be transferred to bypass and the Power Processing Unit (PPU) should be turned off. This switch has three positions: UPS (normal), TEST, BYPASS. The bypass source supplies the commercial AC power to the load directly.

While on internal bypass, when a user rotates the maintenance switch from the UPS position to the TEST position, the load is wrapped around the UPS, while power is still supplied to the internal bypass. The static switch remains energized to support the load should the user rotate the switch back to the UPS (normal) position. When the maintenance switch is rotated back to the UPS position from the TEST position, the load is switched back to the internal bypass. If the maintenance switch is rotated to BYPASS instead of to UPS from the TEST position, the load remains wrapped around the UPS and power is removed from the entire upper half of the unit allowing service work to be completed on the unit safely.

Figure 7–6 shows the path of electrical power through the UPS system when operating in Test mode and Figure 7–7 shows the path of electrical power through the UPS system when operating in Maintenance Bypass mode.

The critical load is not protected while the UPS is in Test or



Figure 7–6. Path of Current Through the UPS in Test Mode

CAUTION:

Maintenance Bypass modes.



Figure 7–7. Path of Current Through the UPS in Maintenance Bypass Mode

7.3 Functional Description

The UPS is a true online unit with a series power train. An uncontrolled rectifier feeds a boost converter, which in turn powers the inverter. The bypass utilizes a static switch and a maintenance bypass switch is internal to the unit. The unit input is 3–wire in (plus ground) at the rectifier and 4–wire in (plus ground) at the bypass, and 4 wire output. The unit does not incorporate any galvanic isolation, input to output. The battery string comprises 144 cells (288 volts nominal) and is charged via a buck or boost converter powered from the raw DC IN from the input rectifier.

7.3.1 Input Rectifier

The Input Rectifier is a full wave bridge uncontrolled rectifier, which produces an unregulated DC IN Bus. The raw DC at this point will be approximately 290 VDC. A precharge system precharges the DC IN Bus prior to the input contactor being closed.

A Boost Converter converts the raw DC IN to a regulated DC Link of approximately 400 volts DC. It is operated in current mode and controlled using a variable frequency modulation technique at approximately 18-20 kHz. An artificial neutral is generated by the Neutral Regulator (Buck/Boost configuration in current mode control), which balances the center point to 1/2 the DC Link (+/- 200 Volts).

7.3.3 Inverter and Filter

The Inverter is a traditional (current mode controlled) hard-switched IGBT 3-phase topology. The IGBTs are modulated by a variable frequency, current-mode control technique at approximately 18–20 kHz. An output filter filters out the high frequency switching components (line to neutral).

7.3.4 Battery and Battery Charger

The Battery is comprised of a string of 144 cells, made up of twenty-four 12 volt Battery blocks. The Battery Charger is configured as a simple Buck or Boost current mode controlled converter (mode auto selected based on I out), powered by the raw DC IN, which regulates the battery charge voltage/current. The unit utilizes Advanced Battery Management (ABM) technology, which essentially isolates the Battery from the electrical environment, except for periodic charging or reserve mode operation, extending its life.

7.3.5 Bypass

The Bypass has a continuously rated SCR switch in the Bypass circuit and a contactor in the Inverter leg. In normal mode, the Contactor connects the Inverter to the output. A backfeed contactor is also provided.

7.3.6 Maintenance Bypass

A user accessible shrouded 4-wire Mechanical Maintenance Bypass switch is provided.

7.3.7 External Batteries

External Batteries connect in parallel to the Internal Battery via an internal breaker. The internal charger charges the Batteries in parallel or in conjunction with an optional external charger This Page Intentionally Left Blank.



8.1 General

The UPS system should function automatically and require very little attention during normal operation. The controls and indicators identified in this section are used during startup, to monitor normal operation and during abnormal events.

Figure 8–1 identifies and shows the location of the controls and indicators on the Powerware 9330 (10 kVA–20 kVA) UPS and Figure 8–2 identifies and shows the location of the controls and indicators on the Powerware 9330 (25 kVA–40 kVA) UPS. The descriptions provide a brief overview of the UPS controls, and standard and optional features.

NOTE: Read the Operation section of this manual and have thorough knowledge of UPS operation before attempting to operate any of the UPS controls or optional components.

8.2 UPS Operational Controls

The UPS has many standard features that provide cost-effective and consistently reliable power protection:

8.2.1 Control Panel

The *Control Panel* on the front of the UPS contains an LCD screen to display the current status of the UPS system. You can view a statistical history and log of system events and display a real-time graphic representation of power flowing through the system components. Backlit status indicators show the operating mode of the UPS and alert you to system events. Soft keys provide navigation through the information and control screens. The **LOAD OFF** pushbutton is located at the top right of the control panel. Below the **LOAD OFF** pushbutton is the System Control pushbutton, which provides access to the power control functions of the UPS. The Control Panel is described in detail in Chapter 9, "Using the Control Panel".



Figure 8-1. Powerware 9330 (10 kVA-20 kVA) UPS Controls and Indicators



Figure 8-2. Powerware 9330 (25 kVA-40 kVA) UPS Controls and Indicators

8.2.2 UPS Circuit Breakers

The UPS can contain as many as 10 circuit breakers, depending on the system options. The UPS circuit breakers are described in detail in Chapter 10, "UPS Operating Instructions."

UPS Cabinet

CB1 controls the input to the UPS rectifier, while CB2 controls the battery input to the UPS inverter. CB1 and CB2 are manually controlled.

Optional Battery Cabinet

A local battery circuit breaker controls the output of each battery cabinet, providing the ability to service each battery string individually.

Optional Options Cabinet

Input, output, and bypass circuit breakers control the flow of current to and from the installed transformers.

8.2.3 Smart LOAD OFF

A smart **LOAD OFF** pushbutton is provided for situations where you must quickly control the UPS output. The pushbutton is located on the front of the UPS for quick access, but provides a safety feature to prevent inadvertent load dumps. The **LOAD OFF** pushbutton is described in detail in Chapter 10, "UPS Operating Instructions."

8.2.4 Maintenance Bypass Switch

An internal Maintenance Bypass switch is provided to completely isolate the main power processing unit of the UPS during service. The **Maintenance Bypass Switch** is described in detail in Chapter 10, "UPS Operating Instructions."

8.2.5 Cold Start Switch

A Cold Start switch is provided to start the UPS in Battery Mode when no commercial power is available. The **Cold Start Switch** is described in detail in Chapter 9, "UPS Operating Instructions."

8.3 UPS Standard Features

The UPS has many standard features that provide cost-effective and consistently reliable power protection:

8.3.1 Customer Interface

Computer Interface

One serial communications port is standard on all units, and is electrically isolated from the UPS. You can use this port to link the UPS to the features described in Chapter 13, Communications".

Building Alarm Monitoring

You can connect your facility's alarm system contacts to four (4) inputs in the UPS. The UPS uses these inputs to monitor your building alarms in addition to the UPS status. This feature is described further in Chapter 11, "Using Features and Options."

Summary Alarm Contacts

Alarm contacts are provided for connection to equipment at your facility, such as a light, an audible alarm, or a computer terminal. The equipment you connect to these contacts alerts you to an UPS alarm. This feature is described further in Chapter 11, "Using Features and Options."

8.3.2 Advanced Battery Management

A three stage charging system increases battery service life by optimizing recharge time, and protects batteries from damage due to high current charging and inverter ripple currents. Charging at high currents can overheat and damage batteries.

8.3.3 High Efficiency Mode

A High Efficiency Mode is available that allows the UPS to operate in an offline bypass mode. In this mode, the UPS is operating on bypass, with the power processing unit in standby, ready to automatically transfer to normal mode if a commercial electrical power brownout, blackout, overvoltage, undervoltage, or out-of-tolerance frequency condition occurs.

8.3.4 Customer Convenience Outlet

An uninterruptible 120VAC, 0.2 amp, fuse-protected convenience outlet is provided to supply power to the optional modern. It is located on the Customer Interface Panel.

8.3.5 Installation Features

Power wiring can be routed through the rear and bottom of each cabinet with connections made to easily accessible terminal blocks. External sensing and monitoring control wire must be installed in accordance with Class 1 wiring methods. Class 1 wiring can be routed through the top of each cabinet.

Communications option cards are quickly installed through the rear panel. X–Slot cards are hot pluggable.

8.3.6 Auto Restart

An Auto Restart function can be enabled to automatically restart the UPS after a power outage. To have the Auto Restart function enabled, contact a Powerware service representative.

8.4 Options and Accessories

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

8.4.1 Remote EMERGENCY POWER OFF

A **REMOTE EMERGENCY POWER OFF** pushbutton is a required option to provide for situations where you must instantaneously control the UPS output. The operation of the **REMOTE EMERGENCY POWER OFF** pushbutton is described in detail in Chapter 10, "UPS Operating Instructions."

8.4.2 Remote Monitor Panel

An optional *Remote Monitor Panel (RMP)* contains backlit status indicators and a local horn, allowing the monitoring of the operational status and alarm condition of the UPS from virtually any location within the facility. You can install multiple RMPs at remote locations to increase your monitoring capabilities. This option is described further in Chapter 11, "Using Features."

8.4.3 Industrial Relay Card

An optional *Industrial Relay Card (IRC)* uses relay contact closures to indicate the operating status and alarm condition of the UPS system. This interface allows the monitoring of the operational status of the UPS equipment using the customer's monitoring equipment. This option is described further in Chapter 11, "Using Features."

8.4.4 Options Cabinet

Input Isolation Transformer

An optional 208/208, 480/208, or 600/208 VAC *input isolation transformer* provides an isolated input to the UPS rectifier for applications that require a DC link that is not ground referenced or for applications requiring an input of 480 or 600 VAC. The transformer is contained in the separate options cabinet.

Bypass Input Isolation Transformer (Dual Input)

An optional 208/208, 480/208, or 600/208 VAC *bypass input isolation transformer* provides an isolated input to the UPS bypass for applications that require an isolated bypass and an independently derived neutral, or for applications requiring an input of 480 or 600 VAC. The transformer is contained in the separate options cabinet.

Output Isolation Transformer

An optional 208/208 or 208/480 VAC *output isolation transformer* provides an isolated output to the critical load or for applications that require 480 VAC. The transformer is contained in the separate options cabinet.

Input Auto Transformer

An optional 480/208 or 600/208 VAC *input auto transformer* provides an input to the UPS rectifier for applications requiring an input of 480 or 600 VAC. The transformer is contained in the separate options cabinet.

Bypass Input Auto Transformer (Dual Input)

An optional 480/208 or 600/208 VAC *bypass input auto transformer* provides an input to the UPS bypass for applications requiring an input of 480 or 600 VAC. The transformer is contained in the separate options cabinet.

Output Auto Transformer

An optional 208/480 VAC *output auto transformer* provides an output to the critical load for applications that require 480 VAC. The transformer is contained in the separate options cabinet.

Maintenance Bypass Switch

An internal Maintenance Bypass switch is provided to completely isolate the UPS during service. The **Maintenance Bypass Switch** is described in detail in Chapter 10, "UPS Operating Instructions."

Power Distribution Module

An optional output *Power Distribution Module* (PDM) is available to distribute the output power from the UPS to your critical load. The PDM contains up to 42 circuit breaker switches (Square-D Type QO or QOB) that can be assigned with flexibility to meet facility needs. The PDM is enclosed below the hinged top of the Options Cabinet.

8.4.5 Battery Cabinets

System protection can be enhanced by equipping the UPS system with one to five battery cabinets containing sealed lead-acid, maintenance-free batteries, in addition to the internal batteries. The battery cabinets are designed for line up and match installation and utilize quick disconnect cables for easy installation. The cabinets use 24 batteries. Refer to Chapter 3, "Installing and Conecting Batteries", for recommended battery types.

8.4.6 Parallel Cabinet

The Parallel Cabinet allows the creation of a system that allows two to four UPMs to operate in parallel capacity or redundancy to provide more capacity than a single UPM and as backup for each other.

8.4.7 Communications

Modem

An optional modem is available for use with the Remote Notification feature. See Chapter 13, "Communications" for additional information.

X-Slot [™] Communication Bay

Up to four optional X-Slot cards can be installed in the UPS module at any time. The X-Slot cards support several protocols such as SNMP, HTTP, AS-400, and Modbus[®]. See Chapter 13, "Communications" for additional information.

8.5 Safety Considerations

The UPS enclosure is designed for industrial or computer room applications, and contain safety shields. However, the system is sophisticated and should be handled with appropriate care, following these guidelines:

- Keep surroundings clean and free from excess moisture.
- Do not operate the system close to gas or electric heat sources.
- The system is not intended for outdoor use.
- The system operating environment should be maintained within the parameters stated in this manual.
- Keep the system doors closed to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.
- The system contains its own power source. Lethal voltages are present even when the system is disconnected from utility power.

WARNING:

Only AUTHORIZED SERVICE PERSONNEL should perform service or maintenance on the UPS.

If service or routine maintenance is required:

- Ensure all power is disconnected before performing installation or service.
- Ensure the area around the UPS is clean and uncluttered.
- Battery cabinet maintenance or battery replacement should be performed only by authorized service personnel.
- Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.
- Always conform to the more detailed safety precautions described in "Important Safety Instructions" section of Chapter 14.

8.6 Symbols, Controls, and Indicators

These symbols may appear on your UPS system or on labels inside the UPS. They are accepted by most international safety agents. Everyone in your organization who works with your system should understand the meaning of these symbols:

ON The principal power switch is in the "On" position.



OFF The principal power switch is in the "Off" position.



PHASE The word "phase."



CAUTION: REFER TO MANUAL Stop and refer to the Operator's Manual for more information.



RISK OF ELECTRIC SHOCK

There is a risk of electric shock present, and you should observe associated warnings. The UPS contains high voltages.

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Using the Control Panel



9.1 Description

This chapter describes the UPS Control Panel, including controls and indicators, and how to monitor UPS operation. The Control Panel is located on the front of the UPS (see Figure 9-1).



Figure 9–1. UPS Control Panel

The Control Panel contains the red **LOAD OFF** pushbutton switch (1), a dedicated system control pushbutton switch (2), an audible Alarm Off (horn off) pushbutton switch (3), a flat Liquid Crystal Display (LCD) screen (4), a horizontal row of pushbutton switches (5), and a vertical column of backlit status indicators, (6). The following sections describe using the UPS Control Panel to monitor the UPS. Refer to Chapter 10 *UPS Operating Instructions* for use of the operational controls.

9.2 Using the LCD Screen and Pushbuttons

The LCD screen on the Control Panel provides an operator interface with the UPS system. Figure 9–2 identifies the display areas discussed in the following sections.



Figure 9–2. Parts of the LCD Screen

A The UPS status area automatically scrolls between the current date and time, active alarms, active notices, and load percent and battery run time for the UPS. Shown is a typical alarm message. (For more information about alarms and notices, refer to Chapter 12, "Responding to System Events.")





D Softkey pushbutton switches. Function changes depending on the screen displayed. Use to select menu screens or scroll through available screens. Designated function is indicated on the LCD screen above the respective pushbutton.

To select the System Control screen or turn off the Alarm, depress the respective pushbutton to the right of the LCD screen.

You can use the LCD screen and the pushbuttons beneath or to the right of it to:

- Control UPS operation (see paragraph 9.4)
- Set UPS parameters (see paragraph 9.3.5 and 9.3.6)
- Monitor UPS operation (see paragraph 9.3.3 and 9.3.4)
- Look at a log of UPS events (alarms, notices, and commands) (see paragraph 9.3.2).

After approximately one hour, the display screen dims. To restore the screen, press any pushbutton once.

9.3 Using the Main Menu

The UPS *main menu* allows you to display data in the information area to help you monitor and control UPS operation. The following menus and options are available:

- **EVENTS** Displays the list of Active System Events and a historical log of system events.
- **METERS** Displays performance meters for the system or critical load.
- **CONTROLS** Displays the System Controls screen.
- SETUP Allows you to set the display contrast, set the date and time for the time stamp, configure the UPS serial communication ports and view the firmware version numbers.
- Returns to Main Menu and displays a real-time graphic representation of the UPS operating status.

9.3.1 Mimic Screen

Figure 9–3 shows the LCD screen as it appears when you first start the UPS. To select the mimic screen from the Events, Meters, Setup or System Controls screens, select the \clubsuit pushbutton from the current display menu.

The Mimic screen shows the internal components of the UPS cabinet and a real-time graphical representation of the operating status of the system.



Figure 9–3. Mimic Screen

9.3.2 System Event Screens

Select **EVENTS** from the Main menu to display the Event Simple History Log. The Event Simple History Log lists the most recent events in the following groups:

User and service status. User instruction. User alarm. Check UPS. Schedule service. UPS shutdown. Service alarm.

The end of the log (the most recent events) appears when you display the screen, and you must scroll upward to view older event listings. Figure 9–4 shows the Event Simple History Log screen.

To scroll through the events, select the \uparrow or \downarrow pushbuttons from the display menu.



Figure 9–4. Event Simple History Log Screen
Select **SHOW ALL** from the History screen menu to display the Event History (All) Log. The Event History (All) Log lists up to the 500 system events in chronological order, with the most recent event listed last (once 500 is reached, the earliest event is overwritten). The end of the log (the most recent events) appears when you display the screen, and you must scroll upward to view older event listings. Figure 9–5 shows the Event History (All) Log screen.

To scroll through the events, select the ↑ or ↓ pushbuttons from the display menu. To return to the Simple History screen, select **SIMPLE** from the History (All) menu.



Figure 9–5. Event History (All) Log Screen

Select **EVENTS** from the Simple History or History (All) screen menu to display a listing of all system events that are currently active. The most recent system event is listed first. As events clear, they are removed from the Active System Events listing. Figure 9–6 shows the Active System Events screen.

To scroll through the events, select the \uparrow or \downarrow pushbuttons from the display menu. To return to the History screen, select **HISTORY** from the Active Events menu.



9.3.3 Unit Meter Screens

The Unit Meter screens show the UPS readings for a single unit.

Select **METERS** from the Main menu to display the Unit Meter screens. Figures 9–7 through 9–11 show the Unit Meter screens.

To scroll through the meter screens, select the \leftarrow or \rightarrow pushbuttons from the display menu. The current UPS readings are displayed in the information area of the screen.

The Input screen shows the phase-to-phase voltage, phase current, and frequency, of the incoming utility, followed by the KVA, KW, and power factor measurements.



Figure 9–7. Input Meter Screen



The Output screen shows the phase-to-neutral voltage, phase current, and frequency, being supplied by the UPS, followed by the KVA, KW, and power factor measurements.

Figure 9–8. Output Meter Screen

The Bypass screen shows the phase-to-neutral voltage, and frequency of the bypass source.



Figure 9–9. Bypass Meter Screen

The Battery screen displays the battery voltage (Vdc), the battery current (Idc), battery life, and the minutes of battery time remaining. When battery life decreases to less than 20 %, Check Battery is displayed.



Figure 9–10. Battery Meter Screen

The Output Current Screen displays a real-time bar graph of the output current of the UPS. The graph shows the current for each phase.



Figure 9–11. Output Current (Load) Meter Screen

9.3.4 System Meter Screens

The System Meter screens show the UPS system readings when multiple UPS units are used.

Select **SYSTEM** from the screen menu to display the System Meter screens. Figures 9-12 through 9-14 show the System Meter screens.

To scroll through the meter screens, select the \blacklozenge or \Rightarrow pushbuttons from the display menu. The current UPS System readings are displayed in the information area of the screen. To return to the Unit Meter screen, select **UNIT** from the screen menu.

The Input screen shows the phase-to-phase voltage, phase current, and frequency, of the incoming utility, followed by the KVA, KW, and power factor measurements.



Figure 9–12. System Input Meter Screen





Figure 9–13. System Output Meter Screen

The Bypass screen shows the phase-to-neutral voltage, and frequency of the bypass source.



9.3.5 Setup Menu Level 0 Screens

Select **SETUP** from the Main menu to display the System Setup Level 0 Screen. This screen can be used to set the screen contrast, show the firmware versions installed, identify the unit type, and enter a password to access Level 1 functions (refer to paragraph 9.3.6). No password is necessary to access Level 0 functions. Figure 9–15 shows the System Setup Level 0 menu screen.

Use the \uparrow or \downarrow pushbuttons to highlight the setup function desired, then choose the function using the **SELECT** pushbutton.



Figure 9–15. Setup Menu Level 0 Screen

Select **CONTRAST** from the System Setup Level 0 menu to display the Contrast Adjust screen. Figure 9–16 shows the Contrast Adjust screen.

Use the \leftarrow or \rightarrow pushbuttons to adjust the contrast for the LCD screen. To return to the System Setup menu screen, select the \leftarrow pushbutton.



Select **VERSIONS** from the System Setup Level 0 menu to display the Versions screen. The Versions screen provides the firmware version numbers installed on the UPS. Figure 9–17 shows the Versions screen. To return to the System Setup menu screen, select the **T** pushbutton.



Figure 9–17. Versions Screen

Select **UNIT TYPE** from the System Setup Level 0 menu to display the Unit Type screen. The Unit Type screen provides the model, CTO, and serial numbers of the UPS unit. Figure 9–18 shows the Unit Type screen. To return to the System Setup menu screen, select the **4** pushbutton.



Figure 9–18. Unit Type Screen

9.3.6 Setup Menu Level 1 Screens

A password is required to access the Level 1 functions. To enter the password, select **ENTER PASSWORD** from the System Setup Level 0 menu to display the Enter Password screen. Figure 9-19 shows the Enter Password screen.

Use the \blacklozenge or \blacklozenge pushbuttons to select the password character position. Use the \blacklozenge or \blacklozenge pushbuttons to change the password character. Once the password is entered, select the **ENTER** pushbutton. The System Setup Level 1 menu screen is displayed. The default password is L1.



Figure 9–19. Enter Password Screen

The System Setup Level 1 screen can be used to set the UPS date and time, the serial ports, change the Level 1 password, and logout of Level 1. In addition, the Level 0 functions are available. The Level 1 screen will timeout after 60 minutes, or can be logged out at any time by selecting the **LOG OUT** pushbutton from the menu screen. Figure 9–20 shows the System Setup Level 1 menu screen.

Use the \uparrow or \checkmark pushbuttons to highlight the setup function desired, then choose the function using the **SELECT** pushbutton.



Figure 9–20. Setup Menu Level 1 Screen

Select **CHANGE PASSWORD** from the System Setup Level 1 menu to display the Change Password screen. The Change Password screen allows the System Setup Level 1 password to be changed. Figure 9–21 shows the Change Password screen.

Use the ← or → pushbuttons to select the password character position. Use the ↑ or ↓ pushbuttons to change the password character. Once the new password is entered, select the ← pushbutton. The Change Password Save screen is displayed.



The Change Password Save screen allows the new password to be saved, aborted or to retry another password. Figure 9–22 shows the Change Password Save screen.

Use the \blacklozenge or \blacklozenge pushbuttons to select the action to be performed, then choose the action using the **SELECT** pushbutton.



Select **DATE &TIME** from the System Setup Level 1 menu to display the Date & Time screen. The Date & Time screen allows the internal date & time stamp of the UPS to be set. The stamp is used for logging events in the Event History Log. Figure 9-23 shows the Date & Time screen.

Use the \blacklozenge or \blacklozenge pushbuttons to highlight the setting to be changed. Use the \blacklozenge or \blacklozenge pushbuttons to make the change. When finished making changes, use the \blacklozenge or \blacklozenge pushbuttons to highlight SAVE and the \blacklozenge or \blacklozenge pushbuttons to select YES To complete the save function and return to the Setup Menu screen, select the \blacklozenge pushbutton.



Select **SERIAL PORTS** from the System Setup Level 1 menu to display the Serial Port screen. The Serial Port screen allow you to specify settings for the serial communication ports on the UPS. Figure 9–24 shows the Serial Ports screen. For detailed information about configuring the serial ports, refer to Chapter 13, "*Communications.*"

Use the \blacklozenge or \blacklozenge pushbuttons to highlight the setting to be changed. Use the \blacklozenge or \blacklozenge pushbuttons to make the change. When finished making changes, use the \blacklozenge or \blacklozenge pushbuttons to highlight SAVE and the \blacklozenge or \blacklozenge pushbuttons to select YES To complete the save function and return to the Setup Menu screen, select the \blacklozenge pushbutton.



Figure 9–24. Port Setup Screen

9.4 System Controls Screen

Select **CONTROLS** from the Main menu screen or use the SYSTEM CONTROL pushbutton on the right side of the control panel to display the System Controls screen. Normal operation, transfer to bypass, charger control, and PPU startup and shutdown are controlled from this screen. The PPU pushbutton switch, on the System Controls screen, toggles the PPU On and Off. In addition, the screen displays the current status of the UPS and indicates whether the UPS is in Maintenance Bypass or Bypass, and the state of the Power Processing Unit (PPU). Figures 9–25 and 9–26 show the System Controls screens. For detailed information about using the System Controls, refer to Chapter 10, *"UPS Operating Instructions"*.

NOTE: High Efficiency Mode control option only appears if it has been set by a Customer Service Engineer.



Figure 9–25. System Controls Screen in Normal Mode



Figure 9–26. System Controls Screen in High Efficiency Mode

9.4.1 Charger Controls Screen

Select **CHARGER** from the System Controls screen to display the Charger Controls screen. Use the controls on this screen to turn the battery charger on and off. Figure 9–27 shows the Charger Controls screen.

NOTE: Depending on the configuration set, the battery charger is automatically set to ON after an outage. The charger must then be set to OFF manually.



Figure 9–27. Charger Controls Screen

9.5 Unit Shutdown Screen

The Unit Shutdown screen appears when the LOAD OFF pushbutton is pressed. This screen allows the LOAD OFF process to be aborted if the LOAD OFF pushbutton was pressed accidentally. Figure 9–28 shows the Unit Shutdown screen. For detailed information about using the LOAD OFF and Shutdown screen, refer to Chapter 10, *"UPS Operating Instructions"*.



Figure 9–28. Shutdown Screen

9.6 Reading the Status Indicators

The five symbols on the left side of the control panel are *status indicators*. They are backlit by colored light emitting diode (LED) lamps, and they work in conjunction with the alarm horn to let you know the operating status of the UPS.



For more information about audible horns, refer to the "System Event Horns" section of Chapter 12.

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UPS Operating Instructions



10.1 Operation

The following procedures provide instructions for operating the UPS system. Refer to Chapters 8 and 9 of this manual for a description of the UPS controls and control panel functions.

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

10.2 Starting the UPS in Normal Mode

To start the UPS system, perform the following procedure:

1. Ensure the UPS circuit breakers and switches are set as follows:

UPS Input Breaker (CB1)	OPEN
UPS Battery Breaker (CB2)	OPEN
UPS Maintenance Bypass Switch	UPS
Options Cabinet Maintenance Bypass Switch (if installed)	UPS

- 2. Close the UPS input feeder circuit breaker.
- 3. If UPS is dual feed, close UPS Bypass input feeder circuit breaker.
- **4.** If Options cabinet is installed, close Options cabinet Input, Bypass, and Output circuit breakers.
- 5. Observe UPS monitor screen becoming active as an indication of logic power.
- 6. Press the System Control pushbutton. The System Control screen appears.
- **7.** On the System Control screen, the PPU status should indicate SHUTDOWN, after approximately 20 seconds
- 8. On the UPS, close Input breaker CB1.
- **9.** On the UPS, close Battery breaker CB2.
- **NOTE:** If Auto Restart is enabled, UPS will automatically start in approximately one minute.
- **10.** If installed, close the Battery breakers on Battery cabinets.

11. Select **NORMAL** or **HI-EFF** from the System Control menu.

Normal Mode Requested appears on the screen. The critical load is immediately supplied by the bypass source, in Bypass mode, until the inverter turns on and the UPS transfers to Normal mode. The status indicator on the UPS Control Panel indicates the UPS is in Bypass mode.

12. Observe the following messages appear sequentially on the PPU status line:

WAITING FOR INPUT DC STARTING INVERTER STARTING SYNCING ONLINE

The rectifier and inverter turn on. When the inverter reaches full voltage, UPS output contactor K3 closes and the static switch turns off supplying power to the critical load in Normal mode. It takes less than 1 minute for the UPS to achieve Normal mode.

13. The UPS is now operating in the Normal mode and the **NORMAL** status indicator is illuminated.

10.3 Starting the UPS in Bypass Mode

If the Inverter Output of the UPS is not available and the critical load needs to be energized, perform the following procedure:

1. Ensure the UPS circuit breakers and switches are set as follows:

UPS Input Breaker (CB1)	OPEN
UPS Battery Breaker (CB2)	OPEN
UPS Maintenance Bypass Switch	UPS
Options Cabinet Maintenance Bypass Switch (if installed)	UPS

- 2. Close the UPS input feeder circuit breaker.
- 3. If UPS is dual feed, close UPS Bypass input feeder circuit breaker.
- **4.** If Options cabinet is installed, close Options cabinet Input, Bypass, and Output circuit breakers.
- 5. Observe UPS monitor screen becoming active as an indication of logic power.
- 6. Press the System Control pushbutton. The System Control screen appears.
- **7.** On the System Control screen, the PPU status should indicate SHUTDOWN, after approximately 20 seconds
- Select BYPASS from the System Control menu.
 Bypass Mode Requested appears on the screen.
 The critical load is immediately supplied by the bypass source, in Bypass mode.
- **9.** The UPS is now operating in the bypass mode and the **BYPASS** status indicator is illuminated.

10.4 Starting the Power Processing Unit

To start the Power Processing Unit (PPU) without transferring the critical load to normal, perform the following procedure:

1. Ensure the UPS circuit breakers and switches are set as follows:

UPS Input Breaker (CB1)	OPEN
UPS Battery Breaker (CB2)	OPEN
UPS Maintenance Bypass Switch	UPS
Options Cabinet Maintenance Bypass Switch (if installed)	UPS

- 2. Close the UPS input feeder circuit breaker.
- 3. If UPS is dual feed, close UPS Bypass input feeder circuit breaker.
- **4.** If Options cabinet is installed, close Options cabinet Input, Bypass, and Output circuit breakers.
- 5. Observe UPS monitor screen becoming active as an indication of logic power.
- 6. Press the System Control pushbutton. The System Control screen appears.
- **7.** On the System Control screen, the PPU status should indicate SHUTDOWN, after approximately 20 seconds
- 8. On the UPS, close Input breaker CB1.
- 9. On the UPS, close Battery breaker CB2.
- 10. If installed, close the Battery breakers on Battery cabinets.
- 11. Select PPU ON from the System Control menu.

PPU ON Mode Requested appears on the screen. The critical load is immediately supplied by the bypass source, in Bypass mode. The status indicator on the UPS Control Panel indicates the UPS is in Bypass mode.

12. Observe the following messages appear sequentially on the PPU status line:

WAITING FOR INPUT DC STARTING INVERTER STARTING SYNCING READY

The rectifier and inverter turn on. When the inverter reaches full voltage, the UPS is ready to transfer to the Normal mode and supply the critical load.

13. The UPS is now operating in the Bypass mode and the **BYPASS** status indicator is illuminated.

10.5 Cold Starting the UPS

To start the UPS system when commercial power is not available, perform the following procedure:

- **NOTE:** Output to the load will be limited to the available energy in the battery supply when the UPS is operated in this mode. In order to continue suppling and protecting the load, the Bypass and/or Rectifier sources should be made available as soon as possible. To ensure that the UPS automatically begins using the Bypass and/or Rectifier sources when commercial power returns, set circuit breakers as instructed in steps 2 through 5.
- 1. Ensure the UPS circuit breakers and switches are set as follows:

UPS Input Breaker (CB1)	OPEN
UPS Battery Breaker (CB2)	OPEN
UPS Maintenance Bypass Switch	UPS
Options Cabinet Maintenance Bypass Switch (if installed)	UPS

- 2. Close the UPS input feeder circuit breaker.
- 3. If UPS is dual feed, close UPS Bypass input feeder circuit breaker.
- **4.** If Options cabinet is installed, close Options cabinet Input, Bypass, and Output circuit breakers.
- 5. On the UPS, close Input breaker CB1.
- 6. On the UPS, close Battery breaker CB2.
- 7. If installed, close the Battery breakers on Battery cabinets.
- **8.** Press and hold Cold Start pushbutton switch while DC Link ramps up and precharges system. Continue to hold pushbutton switch until contactor K2 closes.
- **9.** Observe UPS monitor screen becoming active as an indication of logic power. The LCD screen will illuminate and show a graphical representation of the system.
- **10.** Press the System Control pushbutton. The System Control screen appears.
- **11.** On the System Control screen, the PPU status should indicate SHUTDOWN, after approximately 20 seconds
- **NOTE:** If no operation is selected in step 12, system will shut down after one minute.
- 12. Select NORMAL or HI-EFF from the System Control menu.

Normal Mode Requested appears on the screen. The status indicator on the UPS Control Panel indicates the UPS is in Normal–Battery mode. **13.** Observe the following messages appear sequentially on the PPU status line:

WAITING FOR INPUT DC STARTING INVERTER STARTING SYNCING ONLINE

The inverter turns on. When the inverter reaches full voltage, UPS output contactor K3 closes supplying power to the critical load in Normal mode. It takes less than 1 minute for the UPS to achieve Normal mode.

14. The UPS is now operating in the Battery mode and the **BATTERY** status indicator is illuminated.

10.6 Transfer from Normal to Bypass Mode

To transfer the critical load to bypass mode, perform the following procedure:

WARNING:

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

- 1. Press the System Control pushbutton. The System Control screen appears.
- 2. Select BYPASS from the System Control menu.

Bypass Mode Requested appears on the screen. The UPS switches 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 the bypass mode and the **BYPASS** status indicator is illuminated.

The PPU status indicates READY. System is now on bypass and UPS power processor remains on.

WARNING:

Power is present inside the UPS and Options cabinets.

10.7 Transfer from Bypass to Normal Mode

To transfer the critical load to normal mode, perform the following procedure:

- 1. Press the System Control pushbutton. The System Control screen appears.
- 2. Select NORMAL or HI-EFF from the System Control menu.

Normal Mode Requested appears on the screen. The UPS switches to Normal mode. If the power processor is not available, the system remains on bypass and an alarm sounds.

3. The UPS is now operating in the Normal mode and the **NORMAL** status indicator is illuminated.

The PPU status indicates ONLINE.

10.8 Transfer from Normal to High Efficiency Mode

To transfer the UPS from normal mode to high efficiency mode, perform the following procedure:

NOTE: High Efficiency Mode control option only appears if it has been set by a Customer Service Engineer.

- **1.** Press the System Control pushbutton. The System Control screen appears.
- 2. Select HI-EFF from the System Control menu.

Hi-Eff Mode Requested appears on the screen. The UPS switches to High Efficiency mode. If bypass is not available, the system remains in normal mode.

3. The UPS is now operating in the High Efficiency mode and the **NORMAL** status indicator is illuminated.

The PPU status indicates HI-EFF.

10.9 Transfer from High Efficiency to Normal Mode

To transfer the UPS from high efficiency mode to normal mode, perform the following procedure:

NOTE: High Efficiency Mode control option only appears if it has been set by a Customer Service Engineer.

- 1. Press the System Control pushbutton. The System Control screen appears.
- 2. Select NORMAL from the System Control menu.

Normal Mode Requested appears on the screen. The UPS switches to Normal mode. If the power processor is not available, the system remains on bypass and an alarm sounds.

3. The UPS is now operating in the Normal mode and the **NORMAL** status indicator is illuminated.

The PPU status indicates ONLINE.

10.10Transfer from Normal to Bypass Mode with UPS Shutdown

- 1. Transfer critical load to bypass by performing procedure in paragraph 10.6.
- 2. Press the System Control pushbutton. The System Control screen appears.
- **3.** Toggle **PPU OFF** from the System Control menu.

The PPU status indicates SHUTDOWN. The input, output, and battery contactors open and the PPU is turned off. The bypass source supplies the critical load.

WARNING:

Power is present inside the UPS and Options cabinets.

10.11 UPS and Critical Load Shutdown

To perform maintenance or service on the critical load, shut down power to the load by performing the following procedure:

- 1. Turn off all equipment that is being powered by the UPS.
- Perform LOAD OFF procedure contained in paragraph 10.15.1 The input, output, battery and bypass backfeed contactors open and the PPU is turned off.
- 3. On the UPS, open Input circuit breaker CB1.
- 4. On the UPS, open Battery circuit breaker CB2.
- 5. If installed, open the Battery breakers on Battery cabinets.
- **6.** If Options cabinet is installed, open Options cabinet Input, Bypass, and Output circuit breakers.

WARNING:

Power is present inside the Options cabinet, until the upstream input feeder circuit breaker is opened. Power is present inside the UPS cabinet due to internal batteries.

7. Open the UPS input and bypass (if dual feed) feeder circuit breakers.

10.12UPS Maintenance Bypass Transfer

To transfer the critical load to Maintenance Bypass, perform the following procedure:

- 1. Transfer critical load to bypass by performing procedure in paragraph 10.6.
- 2. Manually set the UPS Maintenance Bypass Switch to **BYPASS**, by turning slowly through the **TEST** position to **BYPASS**.

The input, output, battery and bypass backfeed contactors open and the PPU is turned off. The maintenance bypass source supplies the critical load.

WARNING:

Power is present inside the UPS and Options cabinets.

10.13 Options Cabinet Maintenance Bypass Transfer

To transfer the critical load to Maintenance Bypass, perform the following procedure:

- 1. Transfer critical load to bypass by performing procedure in paragraph 10.6.
- 2. Manually set the Options Cabinet Maintenance Bypass Switch to **BYPASS**, by turning slowly through the **TEST** position to **BYPASS**.

The input, output, battery and bypass backfeed contactors open and the PPU is turned off. The maintenance bypass source supplies the critical load.

WARNING:

Power is present inside the UPS and Options cabinets.

10.14 Using the Power Distribution Module

If the UPS system contains the optional Power Distribution Module, access to the PDM circuit breakers can be gained by performing the following procedure.

- 1. Slide the Options cabinet top cover latches to the rear of the cabinet.
- 2. Lift and secure cover in the upright position using latching slide bar.

10.15 Using the LOAD OFF Pushbutton

An UPS Load Off is initiated by the red **LOAD OFF** pushbutton on the UPS Control Panel. This pushbutton can be pressed to control the UPS output. The UPS **LOAD OFF** pushbutton de-energizes the critical load and powers down the UPS.

The UPS (including Bypass) remains off until restarted.

10.15.1To Use the LOAD OFF Pushbutton

1. Press the LOAD OFF pushbutton.

The Unit Shutdown screen appears, providing a choice to proceed with the shutdown or to abort the shutdown.

WARNING:

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

2. To shut down the UPS, select YES from the Unit Shutdown menu, and hold for two seconds . To abort the shutdown, select NO.

When YES is selected and held for two seconds, the input, output, battery and bypass backfeed contactors open and the PPU is turned off.

CAUTION:

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

3. To restart the UPS after pressing the **LOAD OFF** pushbutton, follow the procedure, in paragraphs 10.2 or 10.3.

10.16Using the REMOTE EMERGENCY POWER OFF Switch

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

The UPS, including Bypass, remains off until restarted.

10.16.1To Use the REPO Switch

WARNING:

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

- **NOTE:** The following instructions are for the Powerware supplied REPO switch. If a customer supplied REPO switch is used it may not activate in the same manner. If this is the case, refer to the operating instructions provided with the switch.
- 1. Press the REPO pushbutton switch.

The input, output, battery and bypass backfeed contactors open and the PPU is turned off immediately, without asking for verification.

CAUTION:

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

2. To restart the UPS after using the REPO pushbutton, reset the REPO switch by rotating the switch and then follow the procedure, in paragraphs 10.2 or 10.3.

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Using Features



11.1 General

The many standard features of your UPS system provide consistent, economical, and dependable power protection. In addition, you can add available options to enhance the performance of your system. This chapter provides descriptions of the features and options introduced earlier in this manual, but not covered in other chapters. Refer to drawings 164201300–2 and 164201300–8 in Appendix A for location of the customer interface panel and terminals and for terminal wiring information.

11.2 Building Alarm Monitoring

This standard feature lets you connect the UPS to your building alarms, such as smoke detectors or overtemperature alarms. The customer interface terminals for external connections are located inside the UPS.

Regardless of how you assign the building alarms, they display as Building Alarm 1, Building Alarm 2, Building Alarm 3, etc., on the LCD screen of the Monitor Panel. You should use twisted pair wires for each alarm input and common.

11.3 General Purpose Relay Contacts

Two general purpose relay contacts are provided as a standard feature on the UPS. The alarm contacts (one notice and one alarm) are located inside the UPS on the customer interface terminal board.

You can specify that each contact be either normally closed (NC) or normally open (NO). If the state of the contact changes from the state you specify as normal, an signal is issued. You can connect these contacts to equipment at your facility (such as a light or an alarm bell) to let you know when an alarm is active on the UPS. This feature is useful if the UPS is located in a remote area where the UPS alarm horn may not be heard immediately.

CAUTION:

Contacts should not be operated in excess of 120 VAC @ 5A maximum.

11.4 Optional Remote Monitor Panel

As an option, you can install a Remote Monitor Panel (RMP) to monitor the operation of the UPS system from virtually any location within your facility, up to 500 feet from the UPS. The RMP contains backlit status indicators and a local horn. You can surface-mount an RMP on a desktop, secure to a wall, or place in another convenient location. Figure 11-1 shows an RMP.



Figure 11–1. Remote Monitor Panel

The RMP contains a local horn and the following backlit status indicators:

NORMAL

The UPS is energized (either with utility power or battery backup) and is supplying conditioned power to the critical load.

BYPASS

The bypass source is supplying the critical load. Usually this means that the UPS is not energized. The load is not protected in Bypass mode, and a horn sounds after 30 seconds.

ALARM

The UPS system is issuing an alarm. Conditions that affect the current UPS mode are indicated by the alarm lamps and horn on the UPS.

BATTERY

The UPS battery backup is supplying the critical load. The utility power is either interrupted or out of specification. The NORMAL indicator is also lit. After 30 seconds of run time, the alarm indicator will illuminate and a horn sound.











11.5 Optional Industrial Relay Card

An optional *Industrial Relay Card (IRC)* uses relay contact closures to indicate the operating status and alarm condition of the UPS system. This interface allows the monitoring of the operational status of the UPS equipment using the customer's monitoring equipment. Normally Open or Normally Closed contacts as needed are available for connection to the customer's equipment. Figure 11–2 shows an IRC.



Figure 11-2. Industrial Relay Card

The IRC can provide these signals:

- NORMAL MODE Indicates the UPS is energized and suppling power to the critical load
- **BYPASS MODE** The bypass source is supplying the critical load. Usually this means that the UPS is not energized. The load is not protected in Bypass mode.
- **BATTERY MODE** The UPS battery backup is supplying the critical load. The utility power is either interrupted or out of specification.
- ALARM MODE The UPS system is issuing an alarm that affect the current UPS mode

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Responding to System Events



12.1 General

When the UPS system is running in Normal mode, it continually monitors itself and the incoming utility power. In Battery or Bypass modes, the UPS may issue alarms to let you know exactly what event caused the change from Normal mode. System events on the UPS can be indicated by horns, lights, messages, or all three.

Select **Events** from the System Event menu on the LCD screen to look at the Active System Events screen. This screen shows any currently active alarms, notices, or commands. (For more information on using the Events screen, refer to paragraph 9.3.2 "System Events Screens of Chapter 9.)

12.2 System Event Horns

The system event horn beeps according to the type of event it is signifying:

- **Horn 1** The Horn cycles on for 1 second at a one second rate. It is normally used for all Alarm conditions.
- Horn 2 The Horn sounds for 3 second every three seconds. It is normally used for all Notice conditions.
- **Horn 3** The Horn sounds for 5 second every five seconds. It is normally used to prompt the User for action.

12.3 System Event Lights

The status indicators on the UPS Control Panel work in conjunction with the event horn to let you know when the UPS system is operating in any mode other than Normal. Only the Normal indicator is visible during normal UPS system operation. The others light to indicate alarms or events. When an alarm occurs, you should first check these indicators to see what type of event has taken place. (For descriptions of the status indicators, refer to paragraph 9.6 "Reading the Status Indicators" of Chapter 9.)

12.4 System Event Messages

When a system event occurs, a message appears on the LCD screen in the UPS Status area. This message is also is written to the Active Events log and may be added to the Events History Log. The messages are divided into four categories: Alarms, Notices, Status, and Commands. The following tables contain the events displayed on the LCD System Events screen of the Control panel.

ALARMS					
Message	Horn	Phone	Relay	Log	Indication
Battery Over Voltage	1	No	1	HA	Service Required
Battery Over Voltage OK	Off	No	1	HA	Condition Cleared
Battery Time is Low	1	No	1	HA	User Action Required
Battery Time is Low OK	Off	No	1	HA	Condition Cleared
Battery Under Voltage	1	No	1	HA	Shutdown Imminent
Battery Under Voltage OK	Off	No	1	HA	Condition Cleared
Bypass Calibration Required	1	No	1	HA	Service Required
Bypass Calibration Required OK	Off	No	1	HA	Condition Cleared
Bypass Control Failure	1	4	1	А	Service Required
Bypass Overheating Shutdown	1	No	1	HA	User Action Required
Bypass Overheating Shutdown OK	Off	No	1	HA	Condition Cleared
Bypass Overheating Warning	1	No	1	HA	Shutdown Imminent
Bypass Overheating Warning OK	Off	No	1	HA	Condition Cleared
Bypass Phase Rotation	1	No	1	HA	User Action Required
Bypass Phase Rotation OK	Off	No	1	HA	Condition Cleared
Bypass Setup Required	1	No	1	HA	Service Required
Bypass Setup Required OK	Off	No	1	HA	Condition Cleared
Calibrate DC AutoBalance	1	4	1	HA	Service Required
Calibrate DC AutoBalance OK	Off	No	1	HA	Condition Cleared
Charger Failure	1	4	1	HA	Service Required
Charger Failure OK	Off	No	1	HA	Condition Cleared
Check Battery	1	No	1	HA	User Action Required
Check Battery OK	Off	No	1	HA	Condition Cleared
Check Boost	1	4	1	HA	Service Required
Check Boost OK	Off	No	1	HA	Condition Cleared
Check CSB Setup	1	No	1	HA	Service Required
Check CSB Setup OK	Off	No	1	HA	Condition Cleared
Check Inverter	1	No	1	HA	Service Required
Check Inverter OK	Off	No	1	HA	Condition Cleared
ALARMS					
------------------------------------	------	-------	-------	-----	-------------------
Message	Horn	Phone	Relay	Log	Indication
Check Inverter	1	4	1	HA	Service Required
Check Inverter OK	Off	No	1	HA	Condition Cleared
Check K1	1	No	1	HA	Service Required
Check K1 OK	Off	No	1	HA	Condition Cleared
Check K2	1	4	1	HA	Service Required
Check K2 OK	Off	No	1	HA	Condition Cleared
Check K3	1	4	1	HA	Service Required
Check K3 OK	Off	No	1	HA	Condition Cleared
Check K5	1	4	1	HA	Service Required
Check K5 OK	Off	No	1	HA	Condition Cleared
Check Neutral Regulator	1	4	1	HA	Service Required
Check Neutral Regulator OK	Off	No	1	HA	Condition Cleared
Check Pullchain	1	4	1	HA	Service Required
Check Pullchain OK	Off	No	1	HA	Condition Cleared
DC IN Over Voltage	1	No	1	HA	Service Required
DC IN Over Voltage OK	Off	No	1	HA	Condition Cleared
DC IN Power Supply Failure	1	No	1	HA	Service Required
DC IN Power Supply Failure OK	Off	No	1	HA	Condition Cleared
DC IN Under Voltage	1	No	1	HA	Service Required
DC IN Under Voltage OK	Off	No	1	HA	Condition Cleared
DC Link Unbalance Failure	1	No	1	HA	Service Required
DC Link Unbalance Failure OK	Off	No	1	HA	Condition Cleared
DC Link Voltage Sensing Failure	1	4	1	HA	Service Required
DC Link Voltage Sensing Failure OK	Off	No	1	HA	Condition Cleared
Display Not Responding	1	No	1	HA	Service Required
Display Not Responding OK	Off	No	1	HA	Condition Cleared
DSP Setup Required	1	No	1	А	Service Required
Fan Failed 1	1	4	1	HA	Service Required
Fan Failed 1 OK	Off	No	1	HA	Condition Cleared
Fan Failed 2	1	4	1	HA	Service Required
Fan Failed 2 OK	Off	No	1	HA	Condition Cleared
Fast DC Link Under Voltage	1	No	1	HA	Service Required
Fast DC Link Under Voltage OK	Off	No	1	HA	Condition Cleared
Gate Driver Failed 1	1	4	1	HA	Service Required
Gate Driver Failed 1 OK	Off	No	1	HA	Condition Cleared
Heat Sink Thermistor Failure	1	4	1	HA	Service Required
Heat Sink Thermistor Failure OK	Off	No	1	HA	Condition Cleared

ALARMS					
Message	Horn	Phone	Relay	Log	Indication
Input Failure	1	4	1	HA	Service Required
Input Failure OK	Off	No	1	HA	Condition Cleared
Input Phase Rotation	1	No	1	HA	User Action Required
Input Phase Rotation OK	Off	No	1	HA	Condition Cleared
Inverter DC Link OV	1	No	1	HA	Service Required
Inverter DC Link OV OK	Off	No	1	HA	Condition Cleared
Inverter DC Link UV	1	No	1	HA	Service Required
Inverter DC Link UV OK	Off	No	1	HA	Condition Cleared
Inverter Not Responding	2	No	1	HA	Service Required
Inverter Not Responding OK	Off	No	1	HA	Condition Cleared
Inverter Overheating Shutdown	1	No	1	HA	User Action Required
Inverter Overheating Shutdown OK	Off	No	1	HA	Condition Cleared
Inverter Overheating Warning	1	No	1	HA	Shutdown Imminent
Inverter Overheating Warning OK	Off	No	1	HA	Condition Cleared
Inverter Overload	1	No	1	HA	User Action Required
Inverter Setup Required	1	No	1	А	Service Required
Inverter Tripped	1	No	1	Α	User Action Required
Inverter Voltage Failure	1	4	1	HA	Service Required
Inverter Voltage Failure OK	Off	No	1	HA	Condition Cleared
Load Over 100%	1	No	1	HA	Shutdown Imminent
Load Over 100% OK	Off	No	1	HA	Condition Cleared
Load Over 125%	1	No	1	HA	Shutdown Imminent
Load Over 125% OK	Off	No	1	HA	Condition Cleared
MCU Calibration Required	1	No	1	HA	Service Required
MCU Calibration Required OK	Off	No	1	HA	Condition Cleared
MCU Setup Required	1	No	1	HA	Service Required
MCU Setup Required OK	Off	No	1	HA	Condition Cleared
MCU Not Responding	1	No	1	HA	Service Required
MCU Not Responding OK	Off	No	1	HA	Condition Cleared
Not Enough UPMs	1	No	1	HA	User Action Required
Not Enough UPMs OK	Off	No	1	HA	Condition Cleared
Output Overload 100%	1	No	1	HA	User Action Required
Output Overload 100% OK	Off	No	1	HA	Condition Cleared
Output Overload 125%	1	No	1	HA	User Action Required
Output Overload 125% OK	Off	Off No 1 HA Condition Cle		Condition Cleared	
Output Phase Rotation	1	No	1	HA	User Action Required
Output Phase Rotation OK	Off	No	1	HA	Condition Cleared
Parallel Setup Error	1	4	1	А	Service Required
Parallel Setup Error OK	Off	No	1	Α	Condition Cleared

ALARMS					
Message	Horn	Phone	Relay	Log	Indication
Power Board Sensing Failed 1	1	4	1	HA	Service Required
Power Board Sensing Failed 1 OK	Off	No	1	HA	Condition Cleared
Rectifier Configuration Failure	1	No	1	HA	User Action Required
Rectifier Configuration Failure OK	Off	No	1	HA	Condition Cleared
Rectifier Over Voltage	1	No	1	HA	Service Required
Rectifier Over Voltage OK	Off	No	1	HA	Condition Cleared
Rectifier Under Voltage	1	No	1	HA	Service Required
Rectifier Under Voltage OK	Off	No	1	HA	Condition Cleared
SBM Bypass Failed	1	4	1	HA	Service Required
SBM Bypass Failed OK	Off	No	1	HA	Condition Cleared
Scheduled UPS Off Active	1	No	1	HA	User Action Required
Scheduled UPS Off Inactive	1	No	1	HA	User Action Required
Scheduled UPS Off/On Active	1	No	1	HA	User Action Required
Scheduled UPS Off/On Inactive	1	No	1	HA	User Action Required
Scheduled UPS On Active	1	No	1	HA	User Action Required
Scheduled UPS On Inactive	1	No	1	HA	User Action Required
Selective Trip	1	No	1	Α	Service Required
Selective Trip OK	Off	No	1	Α	Condition Cleared
Shutdown Imminent	1	No	1	HA	User Action Required
Shutdown Imminent Clear	Off	No	1	HA	Condition Cleared
UPS Tripped	1	4	1	Α	User Action Required
Warning: Battery Time is Low	1	No	1	HA	User Action Required
Warning: Battery Time is Low OK	Off	No	1	HA	Condition Cleared

Table Key To Log Column

HA – Event recorded in History and Active Logs.

A – Event recorded in Active Log only.

NOTICES					
Message	Horn	Phone	Relay	Log	Indication
ABS: Battery DCUV	1	No	2	HA	Information Only
ABS: Battery DCUV OK	OFF	No	2	HA	Condition Cleared
Battery Current Limit	2	No	2	HA	Information Only
Battery Current Limit OK	Off	No	2	HA	Condition Cleared
Battery Not Present	2	No	2	HA	Information Only
Battery Not Present Clear	Off	No	2	HA	Condition Cleared
Battery Voltage Low	2	No	2	HA	Information Only
Battery Voltage Low OK	Off	No	2	HA	Condition Cleared
Building Alarm 1	1	1	2	HA	Information Only
Building Alarm 1 Clear	Off	No	2	HA	Condition Cleared
Building Alarm 2	2	2	2	HA	Information Only
Building Alarm 2 Clear	Off	No	2	HA	Condition Cleared
Building Alarm 3	3	No	2	HA	Information Only
Building Alarm 3 Clear	Off	3	2	HA	Condition Cleared
Building Alarm 4	3	No	2	HA	Information Only
Building Alarm 4 Clear	Off	4	2	HA	Condition Cleared
Bypass is Not Available	2	No	2	А	Protection Level
Bypass Over Frequency	2	No	2	HA	Information Only
Bypass Over Frequency OK	Off	No	2	HA	Condition Cleared
Bypass Under Frequency	2	No	2	HA	Information Only
Bypass Under Frequency OK	Off	No	2	HA	Condition Cleared
Bypass Over Voltage	2	No	2	HA	Information Only
Bypass Over Voltage OK	Off	No	2	HA	Condition Cleared
Bypass Under Voltage	2	No	2	HA	Information Only
Bypass Under Voltage Ok	Off	No	2	HA	Condition Cleared
Call Connected	2	No	2	HA	Information Only
Call Connected Clear	Off	No	2	HA	Condition Cleared
Call Phone # 1	2	No	2	HA	Information Only
Call Phone # 1 Clear	Off	No	2	HA	Condition Cleared
Call Phone # 2	2	No	2	HA	Information Only
Call Phone # 2 Clear	Off	No	2	HA	Condition Cleared
Call Phone # 3	2	No	2	HA	Information Only
Call Phone # 3 Clear	Off	No	2	HA	Condition Cleared
Call Phone # 4	2	No	2	HA	Information Only
Call Phone # 4 Clear	Off	No	2	HA	Condition Cleared
Calling Unsuccessful	3	No	2	А	Information Only
Calling Phone #1	2	No	2	HA	Information Only
Calling Phone #1 OK	Off	No	2	HA	Condition Cleared

NOTICES					
Message	Horn	Phone	Relay	Log	Indication
Calling Phone #2	2	No	2	HA	Information Only
Calling Phone #2 OK	Off	No	2	HA	Condition Cleared
Calling Phone #3	2	No	2	HA	Information Only
Calling Phone #3 OK	Off	No	2	HA	Condition Cleared
Calling Phone #4	2	No	2	HA	Information Only
Calling Phone #4 OK	Off	No	2	HA	Condition Cleared
Check EPO Reset	2	No	2	Α	User Instruction
Check Modem	2	No	2	А	User Instruction
Close Battery	3	No	2	HA	User Instruction
Close Battery OK	Off	No	2	HA	Condition Cleared
Discharging Battery	2	No	2	HA	Information Only
Discharging Battery OK	Off	No	2	HA	Condition Cleared
Emergency Transfer To Bypass	2	No	2	А	Protection Level
Input Over Frequency	2	No	2	HA	Information Only
Input Over Frequency OK	Off	No	2	HA	Condition Cleared
Input Under Frequency	2	No	2	HA	Information Only
Input Under Frequency OK	Off	No	2	HA	Condition Cleared
Input Over Voltage	2	No	2	HA	Information Only
Input Over Voltage OK	Off	No	2	HA	Condition Cleared
Input Under Voltage	2	No	2	HA	Information Only
Input Under Voltage OK	Off	No	2	HA	Condition Cleared
Inverter Initializing	No	No	2	А	Information Only
Maintenance Bypass Off	2	No	2	HA	Protection Level
Maintenance Bypass On	2	No	2	HA	Protection Level
Output Over Frequency	2	No	2	HA	Information Only
Output Over Frequency OK	Off	No	2	HA	Condition Cleared
Not Enough UPMS	1	No	2	Α	Information Only
Not Enough UPMS OK	Off	No	2	А	Condition Cleared
Output Under Frequency	2	No	2	HA	Information Only
Output Under Frequency OK	Off	No	2	HA	Condition Cleared
Output Over Voltage	2	No	2	HA	Information Only
Output Over Voltage OK	Off	No	2	HA	Condition Cleared
Output Under Voltage	2	No	2	HA	Information Only
Output Under Voltage OK	Off	No	2	HA	Condition Cleared
Phone #1 Failed	3	No	2	Α	Information Only
Phone #2 Failed	3	No	2	Α	Information Only
Phone #3 Failed	3	No	2	А	Information Only
Phone #4 Failed	3	No	2	А	Information Only
SBM IO 1 Not Reporting	1	No	2	А	Information Only
SBM IO Not Reporting OK	Off	No	2	А	Condition Cleared

NOTICES					
Message	Horn	Phone	Relay	Log	Indication
SBM IO 2 Not Reporting	1	No	2	Α	Information Only
SBM IO Not Reporting OK	Off	No	2	Α	Condition Cleared
UPM 1 Not Reporting	1	No	2	Α	Information Only
UPM 1 Not Reporting OK	Off	No	2	Α	Condition Cleared
UPM 2 Not Reporting	1	No	2	Α	Information Only
UPM 2 Not Reporting OK	Off	No	2	Α	Condition Cleared
UPM 3 Not Reporting	1	No	2	Α	Information Only
UPM 3 Not Reporting OK	Off	No	2	Α	Condition Cleared
UPM 4 Not Reporting	1	No	2	Α	Information Only
UPM 4 Not Reporting OK	Off	No	2	Α	Condition Cleared
UPS MOB Open	1	No	2	Α	Service Status
UPS MOB Open OK	Off	No	2	Α	Condition Cleared

System Not Redundant

Table Key To Log Column

- HA Event recorded in History and Active Logs.
- A Event recorded in Active Log only.

STATUS					
Message	Horn	Phone	Relay	Log	Indication
Alarm Lamp	No	No	1	No	Service Status
Auto Mode	No	No	No	Α	User Status
Bypass is Available	No	No	No	Α	User Status
Charger On	No	No	No	HA	Service Status
Charger Off	No	No	No	HA	Service Status
CSB Power Supply on	No	No	No	Α	Service Status
Hi–Eff Mode	No	No	No	No	User Status
Inverter On	No	No	No	HA	Service Status
Inverter Off	No	No	No	HA	Service Status
Inverter Under Voltage	1	No	No	HA	Service Status
Inverter Under Voltage OK	Off	No	No	HA	Service Status
K1 (Input) Closed	No	No	No	HA	Service Status
K1 (Input) Open	No	No	No	HA	Service Status
K2 (Battery) Closed	No	No	No	HA	Service Status
K2 (Battery) Open	No	No	No	HA	Service Status
K3 (Inverter) Closed	No	No	No	HA	Service Status
K3 (Inverter) Open	No	No	No	HA	Service Status
K5 (Backfeed) Closed	No	No	No	HA	Service Status
K5 (Backfeed) Open	No	No	No	HA	Service Status
Modem OK	No	No	No	Α	User Status
Notice Lamp	No	No	2	No	Service Status
On Battery	No	No	No	Α	User Status
On Bypass	No	No	No	Α	User Status
PPU Shutdown	No	No	No	Α	User Status
SBM Bypass	No	No	No	Α	User Status
Unit Normal	No	No	No	Α	User Status
UPS Power Supply	No	No	No	HA	Service Status
UPS Power Supply OK	No	No	No	HA	Service Status

Table Key To Log Column

HA – Event recorded in History and Active Logs.

A - Event recorded in Active Log only.

COMMANDS					
Message	Horn	Phone	Relay	Log	Indication
Bypass Mode	No	No	No	Α	
Hi–Eff On	No	No	No	Α	
Hi-Eff Off	No	No	No	Α	
Load Off	No	No	No	Α	
Normal Mode	No	No	No	Α	
PPU On	No	No	No	Α	
PPU Off	No	No	No	Α	

Table Key To Log Column

HA – Event recorded in History and Active Logs.

A - Event recorded in Active Log only.

Communications



13.1 Description

This chapter describes the communications features of the Powerware[®] 9330 10 kVA-20 kVA and 25 kVA-40 kVA UPS and provides information about connecting hardware, and using terminal mode.

13.2 Standard Serial Port

The UPS is designed to accept a wide variety of Data Communication Equipment (DCE) such as terminals, printers, and computers to the serial port.

The the rear of the UPS contains one DB–9 Serial Communications Port. The port provides an interface to a remote computer, printer, or modem. The the rear of the UPS also contains a 120 VAC, .2A convenience outlet for powering a modem used for remote notification. Refer to Appendix A for location of the Customer Interface Panel on the UPS.

The cable you use for connection depend on the equipment you are connecting to the UPS. The Cable should be no longer than 16m (50 ft). The connector for the Serial Communications Port in the UPS is female, so the cable connecting to the UPS should be male. Figure 13–1 shows the pin assignments for Serial Port, and Table 13–1 describes them.

For connection and set up of a Modem, please contact Powerware. See "Getting Help" in the "Introduction" of this manual for contact information.



SERIAL PORT (DB-9)



	Table 13–1. Pin Assignments for Serial Port (DB–9)						
Pin #	Symbol	Description	Comments				
2	TXD	Transmit Data	Input to UPS				
3	RXD	Receive Data	Output from UPS				
4	DSR	Data Set Ready					
5	RTN	Return					
6	DTR	Data Terminal Ready					
7	CTS	Clear to Send					
8	RTS	Ready to Send					

13.3 Configuring the Serial Port

Table 13–2 lists the default configuration settings for the serial communications port.

Table 13–2. Serial Communications Port						
Baud	Data Bits	Stop Bit	Parity	Handshaking		
9600	8	1	No	Disabled		

The serial port is pre-configured and can not be changed.

13.4 X-Slot Cards

The Powerware 9330 contains a factory-installed X-Slot communication bay (refer to Appendix A, Drawings 164201300-8 or 164201300-9 for bay location), and is compatible with the following optional cards (see Figure 13-2):

- Modbus Card provides direct integration of UPS information (meters and status) to a building management system (BMS) using the Modbus RTU protocol.
- ConnectUPS[®]-X Web/SNMP Card provides remote monitoring through a Web browser interface, e-mail, and a network management system (NMS) using SNMP; connects to a twisted-pair Ethernet (10/100BaseT) network.
- Modem Card provides "out-of-band" remote notification and monitoring using modem communication directly to cell phones and pagers.
- Relay Interface Card (AS-400) provides a voltage-free "true relay" interface for IBM AS/400 computers, other relay connected computers, and industrial applications.

- Multi-Server Card connects up to three servers for monitoring and graceful shutdown, supports load segment control, and has RS-232 signals for low battery and AC failure.
- ConnectUPS SNMP Card has Ethernet, modem, and SNMP capabilities.
- Single-Port Card connects to the Powerware Expansion Chassis to enable multiple communication options.

For installation and set up of an X-Slot card, please contact Powerware. See "Getting Help" in the "Introduction" of this manual for contact information. Refer to the manual supplied with the X-Slot card for user instructions.



Figure 13–2. Optional X-Slot Cards

13.5 Remote Notification

Remote Notification provides the user with the option of receiving alarms and notices at a remote location. Remote Notification operates through a standard computer modem. Using the Terminal mode, the user calls the UPS to perform basic monitoring. In the event of a UPS alarm or notice, the user is notified at the remote location. The UPS calls, through the modem, to the user's computer or pager and leaves a message.

Remote Notification is an extension of the Terminal mode with the additional support algorithms necessary to control an external modem. Connection to the UPS is made when a user calls the UPS on the phone. The user has exactly the same capabilities as if using a terminal connected directly to the UPS RS–232 port. Remote Notification differs from the basic Terminal mode with the addition of Call Answer, Call Out, and Housekeeping functions. The Call Answer function allows the user to call into the UPS from a remote location and enter Terminal mode. The Call Out function allows the UPS to be configured to call either a remote computer or numeric paging service over the phone line. Call Out allows the UPS to call a remote computer and leave a one-line descriptive message of the alarm or notice condition. Numeric paging support allows the UPS to call a paging service and send numeric messages. The Housekeeping function maintains the link between the UPS and modem.

For connection and set up of a Modem, or to enable Remote Notify and Call Home features within the UPS, please contact Powerware. See "Getting Help" in the "Introduction" of this manual for contact information.

13.6 Remote Notification Features

Remote Notification provides the UPS with the capability to utilize a standard off-the-shelf PC modem as a telephone interface. The features provided by this option are as follows:

- Call out to a remote terminal or pager based on programmable events and alarms.
- Four separate, programmable notification groups (phone numbers).
- Automatic answering (user configurable) for access to the Terminal mode of the UPS.
- Remote and local ability to clear Call Out alarms and events.
- Error detection and correction for misconfigured and disconnected modems.

13.7 Terminal Mode

In Terminal Mode, the user can request the following:

NOTE: The brackets ([]) in the following bullets indicate standard keyboard characters.

To use a key combination, hold down the Escape key and press the indicated letter key.

- Display UPS Control Panel by pressing and holding [ESC], then press [V].
- Display Event History by pressing and holding [ESC], then press [H].
- Display Node Bits Setup by pressing and holding [ESC], then press [N].
- Display any new event by pressing and holding [ESC], then press [L].

13.7.1 Display UPS Control Panel

When this function is invoked, a facsimile of the UPS Control Panel is displayed on the terminal screen. All controls are functional and will control the UPS remotely. The only exception is the Load Off control which requires the operator to press and hold the local control for two seconds to shutdown the UPS.

To remotely control the UPS or view UPS information, use the escape key legend to control the function normally controlled by the Control Panel softkeys. Refer to Chapter 9 "Using the Control Panel" for instructions on navigating the control panel.

Figures 13–3 through 13–18 show typical screens using this function.



Figure 13-3. Main Screen - UPS Normal Mimic



Figure 13-4. Main Screen – UPS On Battery Mimic



Figure 13-5. Main Screen - UPS On Bypass Mimic

🖓 UPS COM1 - HyperT	erminal			_ 8 ×
<u>File E</u> dit <u>V</u> iew <u>C</u> all <u>T</u>	ransfer <u>H</u> elp			
02881	e e			
				A
				_
	S ys	tem Contr	ols	
Normal *	Maintenance By	mass : OF	F	
Battery	Bypass	: 0F	·F	
Notice	110	- 00	IIIe	
Alarm	PPU OFF BYPASS	PPU ON	NORMAL «	
Horn	KEY 1 KEY 2	KEY 3	KEY 4 KEY 5	
	70 <i>04 - 1</i> 770 4			
	ESC1 = KEY 1 $ESC2 = KEY 2$		ESC5 = REY 5 ESC6 = KEY 6(Load Off)	
	ESC3 = KEY 3 $ESC4 = KEY 4$		ESC7 = KEY 7(Controls) ESC8 = KEY 8(Horn Silence)	、
	ESCU = REFRESH		ESCQ = QUIT	
		[
Connected 0:22:44	ANSI 9600 8-N-1	SCROLL	CAPS NUM Capture Print echo	

Figure 13–6. System Controls

Image: Second	erminal ransfer <u>H</u> elp	< 6 -] _] <u>- </u>
Normal * Battery Bypass Notice Alarm Horn	Un This Will Rem Ar Hold YES For 2 YES KEY 1 KEY 2	nit Shutdown Hove Power To The Load? Ye You Sure? Seconds To Power Down NO KEY 3 KEY 4 KEY 5
	ESC1 = KEY 1 ESC2 = KEY 2 ESC3 = KEY 3 ESC4 = KEY 4 ESCU = REFRESH	ESC5 = KEY 5 ESC6 = KEY 6{Load Off} ESC7 = KEY 7{Controls} ESC8 = KEY 8{Horn Silence} ESC9 = QUIT
Connected 0:22:02	ANSI 9600 8-N-1	SCROLL CAPS NUM Capture Print echo

Figure 13–7. Load Off

Image: Book of the second s	erminal ansfer <u>H</u> elp					_ 6 ×
Normal * Battery Bypass Notice Alarn Horn	STATUS STATUS STATUS STATUS I of 4 KEY 1	Hi: K2 (Battel On Battel K2 (Battel Charger 89 08/30 KEY 2	story ery> Clo ry on /2000 Events KEY 3	sed n 07:11: KEY 4	26.366 кеу [«] 5	
	ES C1 = ES C2 = ES C3 = ES C4 = ES CU =	KEY 1 KEY 2 KEY 3 KEY 4 REFRESH		ESC5 = ESC6 = ESC7 = ESC8 = ESC8 =	KEY 5 KEY 6(Load Off) KEY 7(Controls) KEY 8(Horn Silence) QUIT	
Connected 0:11:45	ANSI	9600 8-N-1	ISCBOLL.	CAPS	NUM Capture Print echo	

Figure 13–8. Events – History

Hard COM1 - HyperT File Edit View Call T	erminal ransfer Help					_ 8 ×
						<u> </u>
		Ac	stive Even	nts		
Normal * Battery Bypass Notice Alarm Horn _	KEY 1	KEY [▲] 2	History KEY 3	KEY 4	кеү ^{«5}	
	ES C1 = ES C2 = ES C3 = ES C4 = ES C4 =	KEY 1 KEY 2 KEY 3 KEY 4 REFRESH		ESC5 = ESC6 = ESC7 = ESC8 = ESC9 =	- KEY 5 - KEY 6(Load Off) - KEY 7(Controls) - KEY 8(Horn Silence) - QUIT	
			-			
Connected 0:12:24	ANSI	9600 8-N-1	SCROLL	CAPS	NUM Capture Print echo	

Figure 13–9. Events – Active

ab	Vbc	INE Vca	UT kua	kW	PF
a	ть	Ic	Freq		
KEY 1	KEY ² 2	: KEY	з кі	EY 4	KEY 5
SC1 = SC2 = SC3 = SC4 = SCU =	KEY 1 KEY 2 KEY 3 KEY 4 REFRESH	i.	E E E E E	SC5 = SC6 = SC7 = SC8 = SC9 =	KEY 5 KEY 6(Load Off) KEY 7(Controls) KEY 8(Horn Silence) QUIT
	ab a KEY 1 SC1 = SC2 = SC3 = SC4 = SC4 = SC4 =	ab Ubc a Ib KEY 1 KEY 2 SC1 = KEY 1 SC2 = KEY 2 SC3 = KEY 3 SC4 = KEY 4 SCU = REFRESH	INE ab Ubc Uca a Ib Ic KEY 1 KEY 2 KEY SC1 = KEY 1 SC2 = KEY 2 SC3 = KEY 3 SC4 = KEY 4 SCU = REFRESH	ab Ubc Uca kUA a Ib Ic Freq KEY 1 KEY 2 KEY 3 KI SC1 = KEY 1 ES SC2 = KEY 2 EE SC3 = KEY 3 ES SC4 = KEY 4 ES SCU = REFRESH ES	ab Ubc Uca KUA kW a Ib Ic Freq KEY 1 KEY 2 KEY 3 KEY 4 SC1 = KEY 1 ESC5 = SC2 = KEY 2 ESC6 = SC3 = KEY 3 ESC6 = SC4 = KEY 4 ESC8 = SCU = REFRESH ESC9 =

Figure 13–10. Input Meter

UPS COM1 - Hyper	Terminal				_ 8
e <u>E</u> dit <u>V</u> iew <u>C</u> all <u>(</u>	<u>I</u> ransfer <u>H</u> elp				
16 93 0	ിരിതി				
			OUTPUT		
	Ua	Vb Vc	kŪA	kW PF	
lormal * latteru	Ia	Ib Ic	Frea		
ypass	200	(775) (775)			
lotice Larm					
1	770 4	VT1 4	VEI 0 V		
lorn	KEY 1	KEY Z	KEY 3 KI	EY 4 KEY 5	
	-		1		
	ESG1 = ESC2 =	KEY 1 KEY 2	E	865 = KEY 5 866 = KEY 6(Lo.	ad Off)
	ESC3 =	KEY 3	E	SC7 = KEY 7(Co	ntrols)
	ESC4 = ESCU =	KEY 4 REFRESH	E	SC8 = KEY SCHO: SC0 = OIIIT	rn Silence)
			2.		
					Þ
nected 0:13:00	ANSI	9600 8-N-1	SCROLL	CAPS NUM Captu	re Print echo

Figure 13–11. Output Meter



Figure 13-12. Bypass Meter

🍓 Tech Center - HyperTer	minal		_ 🗆 X
$\underline{F}ile \underline{E}dit \underline{V}iew \underline{C}all \underline{T}rans$	ifer <u>H</u> elp		
DF 83 -DE			
Normal * Battery Bypass Notice * Alarm Horn	Output I A 125% 100% 75% 50% 25% 0% 0% KEY 1 KEY 2	B C - KEY 3 KEY 4 KEY 5	
	ESC1 = KEY 1 ESC2 = KEY 2 ESC3 = KEY 3 ESC4 = KEY 4 ESCU = REFRESH	ESC5 = KEY 5 ESC6 = KEY 6(Load Off) ESC7 = KEY 7(Controls) ESC8 = KEY 8(Horn Silence) ESCQ = QUIT	,
Connected 0:01:40	to detect 19200 8-N-1	SCROLL CAPS NUM Capture Print echo	

Figure 13-13. Output Current (Load) Meter



Figure 13–14. Setup

🖓 UPS COM1 - HyperTe	erminal						_ & ×
<u>File Edit View Call Tr</u>	ansfer <u>H</u> elp						
DR 93 D	8 @						
			<u></u>				
		Cor	ntrast Ad	just			
Normal *							
Battery			6.8-/				
Notice							
Alarm			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	101010000000 ►		«	
Horn _	KEY 1	KEY 2	КЕЧ З	KEY 4	KEY	5	
	70.04			50.05		-	
	ESC1 = ESC2 =	KEY 1 KEY 2		ESC5 = ESC6 =	= KEY = KEY	5 6(Load Off)	
	ESC3 = FSC4 =	KEY 3 Key 4		ESC7 = FSC8 =	= KEY = KEY	7(Controls) 8(Hown Sile	000)
	ESCU =	REFRESH		ESCQ =	QUII		11007
			[
Connected 0:19:11	ANSI	9600 8-N-1	SCROLL	CAPS	NUM	Capture Print	echo

Figure 13–15. Contrast Adjust

Hard COM1 - HyperT File Edit View Call I	erminal ransfer <u>H</u> elp					_ 8 ×
02 93 0	88					
						4
Normal *		D	ate & Tim	e		
Battery Bypass Notice	Day Man	DT MONTH 30 Aug	YEAR HOU 2000 07	R MINUTE 21	SAUE No	
Horn	KEY 1	KEY 2	кеў з	KEY 4	KEY ^{°C} 5	
	ES C1 = ES C2 = ES C3 = ES C4 = ES C4 =	KEY 1 KEY 2 KEY 3 KEY 4 REFRESH		ESC5 = ESC6 = ESC7 = ESC8 = ESC9 =	KEY 5 KEY 6(Load Off) KEY 7(Controls) KEY 8(Horn Silence) QUIT	
Connected 0:19:47	ANSI	9600 8-N-1	SCROLL	CAPS	NUM Capture Print echo	

Figure 13–16. Date and Time Setup

UPS COM1 - HyperTe	ierminal	_ 8 ×
ncial and in	19188 <u>1</u> 69	
		
Naura 1 w	Serial Ports	
Battery	PORT BAUD PARITY DATA STOP SAVE	
Bypass Notice	30311 9600 None 8 1 NO	
Alarm	↓ ▶ ▲ ▼ «	
Horn _	KEY 1 KEY 2 KEY 3 KEY 4 KEY 5	
	ESC1 = KEY 1 $ESC5 = KEY 5$	
	ESC2 = KEY 2 ESC6 = KEY 6(Load Off) ESC3 = KEY 3 ESC2 = KEY 2(Controls)	
	ESC4 = KEY 4 ESC8 = KEY 8(Horn Silence)	
	ESCO - KEIKESH ESCQ - QUII	
Connected 0:20:39	ANSI 9000 9.0.1 ISCROLL ICARS NUM Conture. Print echo.	_ <u> </u>

Figure 13–17. Serial Port Setup

UPS COM1 - HyperT le Edit View Call 1	Terminal _ 🗗
) 6 8 8 • 0	18) 앱
	Versions
Normal * Battery Bypass Notice Alarm	Inverter 0.97 Machine Control 1.00 Comm Server 1.00 Display 1.00
lorn	KEY 1 KEY 2 KEY 3 KEY 4 KEY 5
	ESC1 = KEY 1ESC5 = KEY 5ESC2 = KEY 2ESC6 = KEY 6 <load off="">ESC3 = KEY 3ESC7 = KEY 7<controls>ESC4 = KEY 4ESC8 = KEY 8<(Horn Silence)</controls></load>

Figure 13–18. Versions

13.7.2 Event History Log

This key sequence prints the entire Event History Log of the UPS at the time the data is requested. The printout begins with the oldest alarm entry in the queue and ends with the most recent. Any alarms that occur while the Event History Log is printing are included in chronological order.

The Event History Log lists up to 500 system events in chronological order with the most recent event listed last. Figure 13–19 shows a sample Event History Log printout.

In this mode, system events are continually logged through the serial port to the device connected to the port.

The printed log entries contain a time and date stamp and the alarm text message. Terminal mode uses this format for printing alarm entries:

MM DD Y	үүүү нн	:MM:SS.hh	KYWD MESSAGE	****	<cr> <lf></lf></cr>
S	Symbol	Description			
N	ИМ	Month (2 dig	gits)		
Y	YYY	Year (4 digits	s)		
D	D	Day (2 digits	3)		
Н	IH	Hour (2 digit	ts)		
Ν	/M	Minute (2 di	gits)		
S	S	Second (2 d	ligits)		
h	ıh	Hundredths	of Second (2 digits)		
K	YWD	Keyword (Al	ARM, NOTICE, COMI	MAND, or STA	ATUS)
*	****	System Diag	gnostic Information		
<	<cr></cr>	Carriage Re	turn Character (ASCII	13)	
<	<lf></lf>	Line Feed (A	ASCII 10)		

An alarm message is prefixed by the word "CLEAR" whenever an alarm is entered into the Event History Log with a cleared status.

If a port is operating in Terminal mode and is connected to a computer, you can use key combinations at any time to print selected information:

Esc+H Prints the entire log with a firmware version header

To use a key combination, hold down the Esc key and press the letter key.

Inverter Version 0.97 Machine Control Version 0.99 0.98 Comm Server Version **Display Version** 0.96 08/11/2000 14:13:03.000 STATUS: CSB Power Supply On 08/11/2000 14:13:03.043 NOTICE: Inverter Initializing 08/11/2000 14:13:05.721 STATUS: UPS Power Supply OK 08/11/2000 14:13:05.728 NOTICE: Input Under Voltage 08/11/2000 14:13:05.729 NOTICE: Output Under Voltage 08/11/2000 14:13:05.729 NOTICE: Bypass Under Voltage 08/11/2000 14:13:05.749 ALARM: Rectifier Under Voltage 08/11/2000 14:13:10.459 ALARM: Battery Under Voltage 08/11/2000 14:13:12.954 NOTICE: Battery Voltage Low 08/11/2000 14:13:13.165 NOTICE: Battery Not Present 08/11/2000 14:13:34.710 STATUS: PPU Shutdown 08/11/2000 14:13:57.773 NOTICE: Check Modem 08/11/2000 14:14:33.520 ALARM: Inverter Tripped 08/11/2000 14:14:33.520 ALARM: Check Inverter 08/11/2000 14:27:09.000 STATUS: CSB Power Supply On 08/11/2000 14:27:09.043 NOTICE: Inverter Initializing 08/11/2000 14:27:11.725 STATUS: UPS Power Supply OK 08/11/2000 14:27:11.733 NOTICE: Input Under Voltage 08/11/2000 14:27:11.733 NOTICE: Output Under Voltage 08/11/2000 14:27:11.733 NOTICE: Bypass Under Voltage 08/11/2000 14:27:11.754 ALARM: Rectifier Under Voltage 08/11/2000 14:27:16.464 ALARM: Battery Under Voltage 08/11/2000 14:27:18.954 NOTICE: Battery Voltage Low 08/11/2000 14:27:19.169 NOTICE: Battery Not Present 08/11/2000 14:27:40.714 STATUS: PPU Shutdown 08/11/2000 14:28:04.023 NOTICE: Check Modem 08/12/2000 14:15:09.000 STATUS: CSB Power Supply On 08/12/2000 14:15:09.043 NOTICE: Inverter Initializing 08/12/2000 14:15:11.725 STATUS: UPS Power Supply OK 08/12/2000 14:15:11.733 NOTICE: Input Under Voltage 08/12/2000 14:15:11.733 NOTICE: Output Under Voltage 08/12/2000 14:15:11.754 ALARM: Rectifier Under Voltage 08/12/2000 14:15:11.833 NOTICE: Maintenance Bypass On 08/12/2000 14:15:16.463 ALARM: Battery Under Voltage 08/12/2000 14:15:18.954 NOTICE: Battery Voltage Low 08/12/2000 14:15:19.169 NOTICE: Battery Not Present 08/12/2000 14:15:40.714 STATUS: PPU Shutdown 08/12/2000 14:16:04.023 NOTICE: Check Modem 08/12/2000 14:16:22.925 CMD: Bypass Mode Command 08/12/2000 14:16:23.443 STATUS: K5 (Backfeed) Closed 08/12/2000 14:16:23.586 STATUS: On Bypass 08/12/2000 14:16:24.860 NOTICE: Output Under Voltage OK 08/12/2000 14:17:20.900 NOTICE: Input Under Voltage OK 08/12/2000 14:17:23.606 ALARM: Rectifier Under Voltage OK 08/12/2000 14:17:25.557 ALARM: Battery Under Voltage OK 08/12/2000 14:19:01.899 CMD: PPU On Command 08/12/2000 14:19:04.089 STATUS: K1 (Input) Closed

Figure 13–19. Event History Log

Maintaining the UPS System



14.1 General

The components inside the UPS cabinet are secured to a sturdy metal frame. All repairable parts and assemblies are located for easy removal, with very little disassembly. This design allows authorized service personnel to perform routine maintenance and servicing quickly.

You must schedule periodic performance checks of your UPS system to keep it running properly. Regular routine checks of operation and system parameters will enable your system to function efficiently for many trouble-free years.

14.2 Important Safety Instructions

Remember that your UPS system is designed to supply power **EVEN WHEN DISCONNECTED FROM THE UTILITY POWER**. The UPS module interiors are unsafe until the DC power source is disconnected and the electrolytic capacitors are discharged. After disconnecting the utility power and the DC power, authorized service personnel should wait at least 5 minutes for capacitor bleedoff before attempting internal access to the UPS module.

WARNING:

Servicing and maintenance should be performed by qualified service personnel only.

WARNING:

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.

Since each battery string is an energy source in itself, opening the Battery Circuit Breaker does not de-energize the voltage within the battery string. **DO NOT ATTEMPT TO ACCESS ANY INTERNAL AREA OF THE BATTERY STRING YOURSELF. VOLTAGES ARE ALWAYS PRESENT IN THE BATTERY STRING.** If you suspect that a battery string needs service, you should contact your local field service office.

If the string requires service, refer to the battery manufacturer's operating manual for instructions on battery maintenance, or contact your local field service office.

Observe these precautions when working on or around batteries:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.
- Wear rubber gloves and boots.
- Do not lay tools or metal parts on top of batteries or battery cabinets.
- Disconnect the charging source prior to connecting or disconnecting terminals.
- Determine if the battery is inadvertently grounded. If it is, remove the source of the ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if such grounds are removed during installation and maintenance.
- When replacing batteries, use the same number of sealed, lead-acid batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.

WARNING:

HAZARDOUS WASTE. Do not incinerate or dispose of batteries indiscriminately. Observe local and national codes.

WARNING:

Do not dispose of battery or batteries in a fire. The battery may explode.

Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes, and may be toxic.

A battery can cause electrical shock, burn from high short-circuit current, or fire. Observe proper precautions.

ATTENTION:

Une batterie peut prêsenter un risque de choc êlectrique, de brulure, ou d'incendie. Suivre les précautions qui s'imposent.

- Pour le remplacement, utiliser le même nombre et modéle des batteries.
- L'élimination des batteries est règlementée. Consulter les codes locaux à cet effet.

14.3 Performing Preventive Maintenance

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

Perform the following checks DAILY:

- 1. Check the area surrounding the UPS system. Ensure the area is not cluttered, allowing free access to the unit.
- **2.** Ensure the air intakes (vents on the front) and exhaust opening (on rear of the UPS cabinet) are not blocked.
- **3.** Ensure there is at least 12 inches of clearance behind the unit for proper air circulation.
- **4.** Ensure the operating environment is within the parameters specified in Chapter 15, "Product Specifications."
- **5.** Ensure the UPS is in Normal mode (Normal status indicator is illuminated). If an alarm lamp is illuminated or the Normal status indicators are not illuminated, contact Customer Support.

Perform the following checks MONTHLY:

- 1. Monitor system parameters as described in Chapter 9, "Using the Control Panel."
- 2. The UPS cooling air intake filter on the Powerware 9330 (10 kVA-20kVA) is located behind the removable front panel. The UPS cooling air intake filters on the Powerware 9330 (25 kVA-40kVA) are located behind both removable front panels. Check the air filters and replace as necessary. The filter size is 12 in. x 12 in. x 1 in. To remove filter:
 - a. Remove front panel.
 - **b.** Press up on retaining clip at top of filter and remove filter.
 - c. Install new filter.
 - d. Reinstall front panel.
- 3. Record the results of your checks and any corrective actions in a suitable log.

ANNUAL maintenance:

Annual preventive maintenance should be performed only by authorized service personnel familiar with maintenance and servicing of the UPS system. Contact your nearest field service office for more information about service offerings.

BATTERY maintenance:

Contact your nearest field service office for battery maintenance. Battery replacement and maintenance should be performed only by authorized service personnel.

14.4 Maintenance Training

A basic training course, available from Powerware, 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 Powerware Training Coordinator in Raleigh, North Carolina, or call Powerware field service at **1–800–843–9433**.

Product Specifications



15.1 Model Numbers

The UPS systems are housed in freestanding, cabinets with safety shields behind the front panels. The UPS systems are available in 50/60 Hz with various output power ratings. Smaller models within a system may be upgraded in the field to larger models:

System	Models	Nominal Frequency	
Powerware 9330-20	10, 15, 20 kVA	50/60 Hz	
Powerware 9330-40	25, 30, 35, 40 kVA	50/60 Hz	
The following sections de	etail the input, output, environ	mental, and battery specifications for	r
the UPS.		2 .	

15.2 UPS System Input

Operating Input Voltage (Nominal +10/–15%)	600 VAC for operation from 510 VAC to 660 VAC (50/60 Hz) 480 VAC for operation from 408 VAC to 528 VAC (50/60 Hz) 208 VAC for operation from 177 VAC to 229 VAC (50/60 Hz) 220 VAC for operation from 187 VAC to 242 VAC (50/60 Hz)
Operating Input Frequency Range	\pm 3 Hz of nominal (50 Hz or 60 Hz)
Operating Input Current	Refer to Appendix A, Tables A through F, for 10, 15, and 20 kVA Models and Tables G through M, for 25, 30, 35, and 40 kVA Models. <u>Reduced for Generator:</u> Adjustable
Battery Charge Current	<u>Battery Charge:</u> Up to 7 Amperes for 10, 15, and 20 kVA models Up to 14 Amperes for 25, 30, 35, and 40 kVA models
Input Current Harmonic Content	10% THD at full load (with input filter option installed) 30% THD at full load (without input filter option installed)
Power Factor	Minimum 0.96
Line Surges	6 kV OC, 3 kA SC per ANSI 62.41 and IEC 801-4
Battery Voltage	288 VDC nominal (144 cells @2V/cell)

15.3 UPS System Output

DC Filtering	Ripple voltage less than 0.5% peak to peak
UPS Output Capacity	100% rated current at 0.7 power factor
Output Voltage Regulation	1% (10% to 100% load)
Output Voltage Adjustment (Nominal +/–5%)	480 VAC nominal, adjustable from 456 VAC to 504 VAC (50/60 Hz) 208 VAC nominal, adjustable from 198 VAC to 218 VAC (50/60 Hz) 220 VAC nominal, adjustable from 209 VAC to 231 VAC (50/60 Hz)
Output Current	Refer to Appendix A, Tables A through F, for 10, 15, and 20 kVA Models and Tables G through M, for 25, 30, 35, and 40 kVA Models.
Output Voltage Harmonic Content	3% max THD, 2% max single (linear load)
Output Voltage Balance	3% for 100% maximum load imbalance (linear load)
Output Voltage Phase Displacement	3° for 100% maximum load imbalance (linear load)
Output Transients	\pm 5% for 100% load step or removal
Frequency Regulation	±0.01 Hz free running
Synchronous to Bypass	Bypass within voltage limits of $+10\%$, -15% of output setting; bypass within ± 0.5 Hz Bypass within voltage limits of $+15\%$, -15% of output setting; bypass within ± 0.5 Hz for 220 VAC input and 208 VAC output
Frequency Slew Rate	1 Hz per second maximum (adjustable)
Overload Capability	101–125% for 10 minutes 126–150% for 1 minute
Maximum Output Capability	300% peak for 10 cycles without bypass

15.4 Environmental Specifications

Operating Temperature	0 to 40°C without derating. The recommended operating temperature is 25°C.
Operating Altitude	Maximum 1500m (5000 ft) at 40°C without derating
Storage Temperature	-20 to +70°C (prolonged storage above 40°C will cause rapid battery self-discharge)
Relative Humidity (operating and storage)	95% maximum, noncondensing
Acoustical Noise	60 dBA at a 1m distance (Typical)
EMI Suppression	Meets FCC Regulation 47, Part 15, for class A devices
Electrostatic Discharge (ESD) Immunity	Meets IEC 801–2 specifications. Withstands up to 25 kV pulse without damage and with no disturbance or adverse effect to the critical load.

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Appendix A – Customer Information

The information in this appendix will help you plan for and install your UPS system. This appendix contains the following drawings:

•	164201300-1	Power Wiring Installation Notes
•	164201300-2	Customer Interface Wiring Installation Notes
•	164201300-3	Physical Features and Requirements
•	164201300-4	Typical UPS System
•	164201300-5	UPS System Configurations
•	164201300-6	Oneline Drawing of UPS Cabinet
•	164201300-7	Options Cabinet Schematics
•	164201300-8	Location of UPS Cabinet Terminals Powerware 9330 (10 kVA-20 kVA)
•	164201300-9	Location of UPS Cabinet Terminals Powerware 9330 (25 kVA-40 kVA)
•	164201300-10	Location of Options Cabinet Terminals Powerware 9330 (10 kVA–20 kVA)
•	164201300-11	Location of Options Cabinet Terminals Powerware 9330 (25 kVA-40 kVA)
•	164201300-12	Location of Battery Cabinet Terminals Powerware 9330 (10 kVA-20 kVA) Powerware 9330 (25 kVA-40 kVA)
•	164201300-13	UPS Cabinet Dimensions Powerware 9330 (10 kVA–20 kVA)
•	164201300-14	UPS Cabinet Dimensions Powerware 9330 (25 kVA-40 kVA)
•	164201300-15	Options Cabinet Dimensions Powerware 9330 (10 kVA–20 kVA)
•	164201300-16	Options Cabinet Dimensions Powerware 9330 (25 kVA–40 kVA)
•	164201300-17	Battery Cabinet Dimensions Powerware 9330 (10 kVA–20 kVA) Powerware 9330 (25 kVA–40 kVA)
•	164201300-18	Remote Emergency Power Off Dimensions
•	164201300-19	Remote Monitor Panel Dimensions

	Powerware 9330 (Without Options C)—20/10 Cabinet)		
	Ratings	Units	Rating !	50/60 Hz
Basic un i 0.7 laggin	i t ratings at g PF load	KVA KW	10 7	10 7
		INPUT/OUTPUT VOLTAGE	208	220
AC	AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd	Amps*	28	27
INPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	8 (1)	8 (1)
	*(Maximum amps includes full load current plus battery recharge current)			
AC	AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd	Amps	27.8	26.3
INPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	8 (1)	8 (1)
	DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd	VDC (Nominal) Amps	288 26	288 26
INPUT	Minimum conductor size (number per pole) (See note 8)	AWG or kcmil(ea)	8 (1)	8 (1)
AC	AC Output to Critical Load	Amps	27.8	26.3
OUTPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	8 (1)	8 (1)

Read and understand the following notes while planning your installation:

- 1. Refer to national and local electrical codes for acceptable external wiring practices.
- 2. The bypass feed into this equipment utilizes four wires. The rectifier feed into this equipment utilizes three wires. However, the phases must be symmetrical about ground (i.e., from a Wye source) for proper equipment operation. Failure to follow these instructions will void the product warranty.
- **3.** Material and labor for external wiring requirements are to be provided by designated personnel.
- **4.** For external wiring, use 90°C copper wire. See the appropriate column in Tables A through M.
- 5. Wire ampacities are chosen from Table 310–16 of the NEC.
- 6. A bypass neutral feeder must be supplied.
- 7. Refer to Section I of this manual for installation Instructions.
- **8.** UPS systems not using an external battery source are supplied with internal batteries prewired to the UPS at the factory. External Line-up and Match Battery cabinets are provided with with quick disconnect cables for connection to the UPS. No external wiring is required for Line-up and Match battery cabinets. All products can be connected to an external battery source through the DC connections terminal block. An external DC ground is established through the grounding terminal in the bottom of the cabinet.

	DESCRIPTION:	POWER WIR	NG INS	TALL	ATION	NOTES
map to drawing #164201300-6	DRAWING NO:	164201300-	1		SHEET:	1 of 17
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	Ratings	Units	Rating	50/60 Hz
Basic un 0.7 laggir	it ratings at ng PF load	KVA KW	15 10.5	15 10.5
		INPUT/OUTPUT VOLTAGE	208	220
AC	AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd	Amps*	40	38
INPUT	Minimum conductor size (number per \emptyset)	AWG or kcmil(ea)	8 (1)	8 (1)
	*(Maximum amps includes full load current plus battery recharge current)			
AC	AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd	Amps	41.6	39.4
INPUT	Minimum conductor size (number per \emptyset)	AWG or kcmil(ea)	6 (1)	6 (1)
DC	DC Input from External Battery Source to UP	VDC (Nominal)	288	288
INPUT	Minimum conductor size (number per pole) (See	e note 8) AWG or kcmil(ea)	39 8 (1)	8 (1)
10	AC Output to Critical Load	Amps	41.6	39.4
OUTPUT	Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per 0)	AWG or kcmil(ea)	6 (1)	6 (1)
Basic un	it ratings at	KVA	20	20
0.7 laggir	ng PF load	KW	14	14
		INPUT/OUTPUT		
		VOLTAGE	208	220
AC	AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd	VOLTAGE Amps*	208 52	220 49
AC INPUT	AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus	VOLTAGE Amps* AWG or kcmil(ea)	208 52 6 (1)	220 49 6 (1)
AC INPUT	AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) * (Maximum amps includes full load current plus battery recharge current)	VOLTAGE Amps* AWG or kcmil(ea)	208 52 6 (1)	220 49 6 (1)
AC INPUT	 AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3Ø, (1) Neutral, (1) gnd 	AWG or kcmil(ea) Amps AWG or kcmil(ea) Amps	208 52 6 (1) 55.5	220 49 6 (1) 52.5
AC INPUT AC INPUT	 AC Input to UPS Rectifier (0.95min.PF) 3∅, 1 gnd Minimum conductor size (number per ∅) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3∅, (1) Neutral, (1) gnd Minimum conductor size (number per ∅) 	VOLTAGE Amps* AWG or kcmil(ea) Amps AWG or kcmil(ea)	208 52 6 (1) 55.5 4 (1)	220 49 6 (1) 52.5 4 (1)
AC INPUT AC INPUT DC	 AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) DC Input from External Battery Source to UP (1) positive, (1) negative, (1) gnd 	VOLTAGE Amps* AWG or kcmil(ea) AMG or kcmil(ea) AWG or kcmil(ea) VDC (Nominal) Amps	208 52 6 (1) 55.5 4 (1) 288 52	220 49 6 (1) 52.5 4 (1) 288 52
AC INPUT AC INPUT DC INPUT	 AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) DC Input from External Battery Source to UP (1) positive, (1) negative, (1) gnd Minimum conductor size (number per pole) (See 	AWG or kcmil(ea) AWG or kcmil(ea)	208 52 6 (1) 55.5 4 (1) 288 52 6 (1)	220 49 6 (1) 52.5 4 (1) 288 52 6 (1)
AC INPUT AC INPUT DC INPUT AC	 AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) DC Input from External Battery Source to UP (1) positive, (1) negative, (1) gnd Minimum conductor size (number per pole) (See AC Output to Critical Load Full Load Current 3Ø, (1) Neutral, (1) gnd 	VOLTAGE Amps* AWG or kcmil(ea) AWG or kcmil(ea) AWG or kcmil(ea) VDC (Nominal) Amps AMG or kcmil(ea) Amps AWG or kcmil(ea) Amps Amps Amps	208 52 6 (1) 55.5 4 (1) 288 52 6 (1) 55.5	220 49 6 (1) 52.5 4 (1) 288 52 6 (1) 52.5

				Ratings	50/60 Hz		
Basic u	nit ratings at			Vol	tage		Conducto
0.7 lagg	ing PF load	Series/ Model	kVA/KW	Input	Output	Current (Amps)	Minimum Size
		20/10	10/7	208	208	27.8	8
		20/10	10/7	480	208	12	14
		20/10	10/7	600	208	9.6	14
	AC Input to UPS Rectifier	20/15	15/10.5	208	208	41.6	6
	Transformer	20/15	15/10.5	480	208	18	12
	30, 1 gnd	20/15	15/10.5	600	208	14.4	12
		20/20	20/14	208	208	55.5	4
		20/20	20/14	480	208	24	10
	V	20/20	20/14	600	208	19.2	12
		20/10	10/7	208	208	27.8	8
		20/10	10/7	480	208	12	14
		20/10	10/7	600	208	96	14
	AC Input to UPS Bypass	20/15	15/10.5	208	208	41.6	6
AC	Transformer	20/15	15/10.5	480	208	18	12
INPUT	Full Load Current	20/15	15/10.5	600	208	14.4	12
	op, i noului, i gilu	20/20	20/14	208	208	55.5	4
		20/20	20/14	480	208	24	10
	U	20/20	20/14	600	208	19.2	12

DESCRIPTION:	POWER WIRI	NG INS	STALL	ATION	NOTES
DRAWING NO:	164201300-	-1		SHEET:	3 of 17
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	Table E. Pov	Ratings & E / erware 9 Options Cabi	xternal Wiri 330 (10 net OUTPU	ing Require kVA—20 T Transforn	ments for kVA) ner		
				Ratings	50/60 Hz		
Basic uni	t ratings at		1	Volt	age	Output	Conducto
0.7 laggin	g PF load	Series/ Model	kVA/KW	Input	Output	Current (Amps)	Minimum Size
		20/10	9.5/6.65	208/220	208	26.4	10
	AC Output from	20/10	9.5/6.65	208/220	480	11.4	14
	Output Transformer	20/15	14.25/10	208/220	208	39.6	8
001901	(0.95min.PF)	20/15	14.25/10	208/220	480	17	12
	30, 1 Neutral, 1 gnd	20/20	19/13.3	208/220	208	52.7	6
	U	20/20	19/13.3	208/220	480	22.8	10

Table F. Ratings & External Wiring Requirements for Powerware 9330 (10 kVA-20 kVA)

Options Cabinet OUTPUT Without Output Transformer

				Ratings	50/60 Hz		
Basic uni	t ratings at			Volt	age	Output	Conductor
0.7 laggin	g PF load	Series/ Model	kVA/KW	Input	Output	Current (Amps)	Minimum Size
AC	AC Output from Output	20/10	10/7	208/220	208/220	27.8	8
OUTPUT	to Critical Load	20/15	15/10.5	208/220	208/220	41.6	6
	30, 1 Neutral, 1 gnd	20/20	20/14	208/220	208/220	55.5	4

NOTE: Callout letter A B O and D	DESCRIPTION:	POWER WIR	ING INS	STALL	ATION	NOTES
map to drawing #164201300-6	DRAWING NO:	164201300-	1		SHEET:	4 of 17
	REVISION:		DATE:	0415	503	

	Ratings	Units	Rating	50/60 Hz
Basic uni 0.7 laggin	t ratings at g PF load	KVA KW	25 17.5	25 17.5
		INPUT/OUTPUT VOLTAGE	208	220
AC	AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd	Amps*	70	66.5
INPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	3 (1)	3 (1)
	*(Maximum amps includes full load current plus battery recharge current)			
AC	AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd	Amps	69.4	65.6
INPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	4 (1)	4 (1)
	DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd	VDC (Nominal) Amps	288 64	288 64
INPUT	Minimum conductor size (number per pole) (See note 8)	AWG or kcmil(ea)	4 (1)	4 (1)
AC	AC Output to Critical Load	Amps	69.4	65.6
OUTPUT	Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per Ø)	AWG or kcmil(ea)	4 (1)	4 (1)
	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options	ernal Wiring Requireme 30–40/30 Cabinet)	ents for	
	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options <i>Ratings</i>	ernal Wiring Requireme 30–40/30 Cabinet) <i>Units</i>	ents for Rating s	50/60 Hz
Basic uni	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options <i>Ratings</i> t ratings at a PE lead	ernal Wiring Requireme 30–40/30 Cabinet) Units KVA	ents for Rating s	50/60 Hz
Basic uni 0.7 laggin	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options <i>Ratings</i> t ratings at g PF load	ernal Wiring Requireme 30–40/30 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE	ents for <i>Rating</i> 9 30 21 208	50/60 Hz 30 21 220
Basic uni 0.7 laggin AC	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30. 1 and	ernal Wiring Requireme 30-40/30 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps*	Rating 30 21 208 80	50/60 Hz 30 21 220 77
Basic uni 0.7 laggin AC INPUT	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per Ø)	ernal Wiring Requireme 30-40/30 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea)	Rating 30 21 208 80 3 (1)	50/60 Hz 30 21 220 77 3 (1)
Basic uni 0.7 laggin AC INPUT	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus battery recharge current)	ernal Wiring Requireme 30-40/30 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea)	ents for Rating 8 30 21 208 80 3 (1)	50/60 Hz 30 21 220 77 3 (1)
Basic uni 0.7 laggin AC INPUT	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per 0) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd	ernal Wiring Requireme 30-40/30 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) Amps	Rating 30 21 208 80 3 (1) 83	50/60 Hz 30 21 220 77 3 (1) 78.7
Basic uni 0.7 laggin AC INPUT AC INPUT	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø)	Amps AWG or kcmil(ea)	Rating 30 21 208 80 3 (1) 83 2 (1)	50/60 Hz 30 21 220 77 3 (1) 78.7 2 (1)
Basic uni 0.7 laggin AC INPUT AC INPUT	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd	AWG or kcmil(ea) AWG or kcmil(ea) VDC (Nominal) Amps	Rating 30 21 208 80 3 (1) 83 2 (1) 288 78	50/60 Hz 30 21 220 77 3 (1) 78.7 2 (1) 288 78
Basic uni 0.7 laggin AC INPUT AC INPUT DC INPUT	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per Ø) * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd Minimum conductor size (number per pole) (See note 8)	AWG or kcmil(ea) AWG or kcmil(ea) VDC (Nominal) AWG or kcmil(ea)	Rating 30 21 208 80 3 (1) 83 2 (1) 288 78 3 (1)	50/60 Hz 30 21 220 77 3 (1) 78.7 2 (1) 288 78 3 (1)
AC INPUT AC INPUT DC INPUT AC	Table H. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings t ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per 0) * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per 0) DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd Minimum conductor size (number per pole) (See note 8) AC Output to Critical Load Full Load Current 30, (1) Neutral. (1) and	ernal Wiring Requireme 30-40/30 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) VDC (Nominal) Amps AWG or kcmil(ea) VDC (Nominal) Amps AWG or kcmil(ea)	Rating 30 21 208 80 3 (1) 83 2 (1) 288 78 3 (1) 83	50/60 Hz 30 21 220 77 3 (1) 78.7 2 (1) 288 78 3 (1) 78.7

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	Ratings	Units	Rating	50/60 Hz
Basic un i 0.7 laggin	it ratings at g PF load	KVA KW	35 24.5	35 24.5
		INPUT/OUTPUT VOLTAGE	208	220
AC	AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd	Amps*	92	87.5
INPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	2 (1)	2 (1)
	*(Maximum amps includes full load current plus battery recharge current)			
AC	AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd	Amps	97	92
INPUT	Minimum conductor size (number per Ø)	AWG or kcmil(ea)	1 (1)	1 (1)
DC	DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd	VDC (Nominal) Amps	288 91	288 91
INPUT	Minimum conductor size (number per pole) (See note 8)	AWG or kcmil(ea)	2 (1)	2 (1)
AC	AC Output to Critical Load	Amps	97	92
OUTPUT	Minimum conductor size (number per \emptyset)	AWG or kcmil(ea)	1 (1)	1 (1)
	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options)	ernal Wiring Requireme 30—40/40 Cabinet)	ents for	
	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options <i>Ratings</i>	ernal Wiring Requireme 30–40/40 Cabinet) Units	ents for Rating	50/60 Hz
Basic uni	Table J. INPUT/OUTPUT Ratings & Ext Powerware 93 (Without Options <i>Ratings</i> it ratings at	ernal Wiring Requireme 30–40/40 Cabinet) Units KVA	ents for Rating = 40	50/60 Hz
Basic un 0.7 laggin	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options Ratings it ratings at g PF load	ernal Wiring Requireme 30–40/40 Cabinet) Units KVA KW	Rating 40	50/60 Hz 40 28
Basic un 0.7 laggin	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options Ratings it ratings at g PF load	ernal Wiring Requireme 30–40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE	Rating 40 28 208	50/60 Hz 40 28 220
Basic un 0.7 laggin AC	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options Ratings Ratings It ratings at ag PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps*	Rating 40 28 208 100	50/60 Hz 40 28 220 98
Basic un 0.7 laggin AC INPUT	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings It ratings at log PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per 0)	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea)	Rating 40 28 208 100 1 (1)	50/60 Hz 40 28 220 98 1 (1)
Basic un 0.7 laggin AC INPUT	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings it ratings at og PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per 0) *(Maximum amps includes full load current plus battery recharge current)	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea)	Rating 40 28 208 100 1 (1)	50/60 Hz 40 28 220 98 1 (1)
Basic un 0.7 laggin AC INPUT	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings it ratings at g PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per 0) * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd	ernal Wiring Requireme 30-40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) Amps	Rating 40 28 208 100 1 (1) 111	50/60 Hz 40 28 220 98 1 (1) 105
Basic uni 0.7 laggin AC INPUT AC INPUT	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings Ratings It ratings at 10 PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per Ø) *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per Ø)	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) AWG or kcmil(ea)	Rating 40 28 208 100 1 (1) 111 1/0 (1)	50/60 Hz 40 28 220 98 1 (1) 105 1/0 (1)
Basic uni 0.7 laggin AC INPUT AC INPUT	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings It ratings at ag PF load AC Input to UPS Rectifier (0.95min.PF) 3Ø, 1 gnd Minimum conductor size (number per Ø) * * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 3Ø, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) C DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) AWG or kcmil(ea) VDC (Nominal) Amps	Rating 40 28 208 100 1 (1) 111 1/0 (1) 288 100	50/60 Hz 40 28 220 98 1 (1) 105 1/0 (1) 288 100
Basic uni 0.7 laggin AC INPUT AC INPUT DC INPUT	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings Ratings It ratings at og PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per Ø) A *(Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) B DC Input from External Battery Source to UPS (1) positive, (1) negative, (1) gnd Minimum conductor size (number per pole) (See note 8)	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) VDC (Nominal) AWG or kcmil(ea)	Rating 40 28 208 100 1 (1) 111 1/0 (1) 288 100 1 (1)	50/60 Hz 40 28 220 98 1 (1) 105 1/0 (1) 288 100 1 (1)
Basic uni 0.7 laggin AC INPUT AC INPUT DC INPUT AC	Table J. INPUT/OUTPUT Ratings & Ext Powerware 933 (Without Options) Ratings Ratings It ratings at ng PF load AC Input to UPS Rectifier (0.95min.PF) 30, 1 gnd Minimum conductor size (number per Ø) * (Maximum amps includes full load current plus battery recharge current) AC Input to Module Bypass (UPS Bypass) Full Load Current 30, (1) Neutral, (1) gnd Minimum conductor size (number per Ø) Conput from External Battery Source to UPS (1) positive, (1) negative, (1) gnd Minimum conductor size (number per pole) (See note 8) AC Output to Critical Load Full Load Current 30, (1) Neutral (1) gnd	ernal Wiring Requireme 30 – 40/40 Cabinet) Units KVA KW INPUT/OUTPUT VOLTAGE Amps* AWG or kcmil(ea) VDC (Nominal) Amps AWG or kcmil(ea) Amps	Rating 40 28 208 100 1 (1) 111 1/0 (1) 288 100 1 (1) 288 100 1 (1)	50/60 Hz 40 28 220 98 1 (1) 105 1/0 (1) 288 100 1 (1) 105

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Basic un				Ratings	50/60 Hz		
~ - '	nit ratings at			Vo	tage	Input	Conducto
0.7 laggii	ng PF load	Series/ Model	kVA/KW	Input	Output	Current (Amps)	Minimum Size
		40/25	25/17.5	208	208	69.4	4
		40/25	25/17.5	480	208	30	8
		40/25	25/17.5	600	208	24	10
		40/30	30/21	208	208	83	2
	AC Input to LIPS Postifior	40/30	30/21	480	208	36	8
AC	Transformer	40/30	30/21	600	208	28.8	10
INPUT	(0.95min.PF)	40/35	35/24.5	208	208	97	1
	30, i gna	40/35	35/24.5	480	208	42	6
		40/35	35/24.5	600	208	33.6	8
	Δ	40/40	40/28	208	208	111	1/0
	A	40/40	40/28	480	208	48	6
		40/40	40/28	600	208	38.5	8
							1
		40/25	25/17.5	208	208	69.4	4
		40/25	25/17.5	480	208	30	8
	AC Input to UPS Bypass Transformer	40/25	25/17.5	600	208	24	10
		40/30	30/21	208	208	83	2
		40/30	30/21	480	208	36	8
AC		40/30	30/21	600	208	28.8	10
INPUT	Full Load Current 30. 1 Neutral. 1 and	40/35	35/24.5	208	208	97	1
		40/35	35/24.5	480	208	42	6
		40/35	35/24.5	600	208	33.6	8
	ß	40/40	40/28	208	208	111	1/0
	•	40/40	40/28	480	208	48	6
		40/40	40/28	600	208	33.5	8

	Table L. Ratings & External Wiring Requirements for Powerware 9330 (25 kVA-40 kVA) Options Cabinet OUTPUT Transformer								
				Ratings	50/60 Hz				
Basic unit ratings at 0.7 lagging PF load				Volt	age	Output	Conducto		
		Series/ Model	kVA/KW	Input	Output	Current (Amps)	Minimum Size		
		40/25	23.8/16.6	208/220	208	66	4		
		40/25	23.8/16.6	208/220	480	28.6	10		
	AC Output from	40/30	28.5/20	208/220	208	79	3		
AC	Output Transformer	40/30	28.5/20	208/220	480	34.3	8		
OUIPUI	to Critical Load (0.95min.PF)	40/35	33.2/23.3	208/220	208	92.4	2		
	30, 1 Neutral, 1 gnd	40/35	33.2/23.3	208/220	480	40	8		
	l f	40/40	38/26.6	208/220	208	105.5	1		
		40/40	38/26.6	208/220	480	45.7	6		

	Table M. Ratings & External Wiring Requirements for Powerware 9330 (25 kVA–40 kVA) Options Cabinet OUTPUT Without Output Transformer								
		Ratings 50/60 Hz							
Basic uni	t ratings at			Voltage		Output	Conductor		
0.7 laggin	g PF load	Series/ Model	kVA/KW	Input	Output	Current (Amps)	Minimum Size		
		40/25	25/17.5	208/220	208/220	69.4	4		
	to Critical Load	40/30	30/21	208/220	208/220	83	2		
001901	(0.95min.PF)	40/35	35/24.5	208/220	208/220	97	1		
	3Ø, 1 Neutral, 1 gnd		40/28	208/220	208/220	111	1/0		

NOTE: Callout letter () , () , () , and ()	DESCRIPTION:	POWER WIR	ING INS	TALL	ATION	NOTES
map to drawing #164201300-6	DRAWING NO:	164201300-	1		SHEET:	8 of 17
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9. Terminals are UL and CSA rated at 90°C. Refer to Tables N through Q for power cable terminations, and Tables R through U for conduit requirements. Drawings 164201300–8 through 164201300–12 show the location of the power cable terminals inside the UPS, Options, and Battery Cabinets.

Table N. UPS C	abinet Pow	er Cable Te	erminations Powerwa	re 9330 (10 kVA–2	0 kVA)
Terminal Function	Terminal	Function	Size of Pressure Termination	Tightening Torque N-M (Ib-in.)	Type Screw
AC Input to UPS	E6	Phase A	1 - #14-2/0	13.5 (120)	3/16 in. Hex
Rectifier and Bypass	E7	Phase B	1 - #14-2/0	13.5 (120)	3/16 in. Hex
(Single input)	E8	Phase C	1 - #14-2/0	13.5 (120)	3/16 in. Hex
	E12	Neutral	1 - #8-2/0	13.5 (120)	3/16 in. Hex
AC Input to UPS	E1	Phase A	1 – #14–#3	2.5 (22)	Phillips
Rectifier (CB1)	E2	Phase B	1 – #14–#3	2.5 (22)	Phillips
	E3	Phase C	1 – #14–#3	2.5 (22)	Phillips
AC Input To Bypass	E6	Phase A	1 - #14-2/0	13.5 (120)	3/16 in. Hex
(Dual Input)	E7	Phase B	1 - #14-2/0	13.5 (120)	3/16 in. Hex
	E8	Phase C	1 - #14-2/0	13.5 (120)	3/16 in. Hex
	E12	Neutral	1 – #8–2/0	13.5 (120)	3/16 in. Hex
Single Feed Jumper	_	Phase A	N/A	6 (50)	1/4-20 Stud
on Bypass Input		Phase B	N/A	6 (50)	1/4-20 Stud
		Phase C	N/A	6 (50)	1/4–20 Stud
AC Output to Critical	E9	Phase A	1 - #8-2/0	13 (110)	3/16 in. Hex
Load	E10	Phase B	1 - #8-2/0	13 (110)	3/16 in. Hex
	E11	Phase C	1 - #8-2/0	13 (110)	3/16 in. Hex
	E12	Neutral	1 - #8-2/0	13 (110)	3/16 in. Hex
DC Input from Battery to UPS	N/A	Battery (+)	Red Battery Connector	N/A	N/A
	N/A	Battery (-)	Black Battery Connector	N/A	N/A
External Battery	E4	Positive	1 - #8-2/0	13 (110)	3/16 in. Hex
Input to UPS	E5	Negative	1 - #8-2/0	13 (110)	3/16 in. Hex
Customer Ground	Ground	Ground	2 - #14-1/0	5.6 (50)	Slotted

NOTE: Customer ground, size 1/0, can be run in any conduit listed in Tables R and S.	DESCRIPTION:	POWER WIR	ING INS	TALL	ATION	NOTES
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Terminal Function	Terminal	Function	Size of Pressure Termination	Tightening Torque N-M (lb-in.)	Type Screw
AC Input to UPS	E6	Phase A	1 - #14-2/0	13.5 (120)	3/16 in. He
Rectifier and Bypass	E7	Phase B	1 - #14-2/0	13.5 (120)	3/16 in. He
(Single input)	E8	Phase C	1 - #14-2/0	13.5 (120)	3/16 in. He
	E12	Neutral	1 – #6–350 kcmil	31 (275)	5/16 in. He
AC Input to UPS	E1	Phase A	1 - #8-2/0	13 (110)	3/16 in. He
Rectifier	E2	Phase B	1 - #8-2/0	13 (110)	3/16 in. He
	E3	Phase C	1 - #8-2/0	13 (110)	3/16 in. He
AC Input To Bypass	E6	Phase A	1 - #14-2/0	13.5 (120)	3/16 in. He
(Dual Input)	E7	Phase B	1 - #14-2/0	13.5 (120)	3/16 in. He
	E8	Phase C	1 - #14-2/0	13.5 (120)	3/16 in. He
	E12	Neutral	1 – #6–350 kcmil	31 (275)	5/16 in. He
Single Feed Jumper		Phase A	N/A	6 (50)	1/4-20 Stu
on Bypass Input		Phase B	N/A	6 (50)	1/4-20 Stu
Ierminal Block		Phase C	N/A	6 (50)	1/4–20 Stu
AC Output to Critical	E9	Phase A	1 - #8-2/0	13 (110)	3/16 in. He
Load	E10	Phase B	1 - #8-2/0	13 (110)	3/16 in. He
	E11	Phase C	1 - #8-2/0	13 (110)	3/16 in. He
	E12	Neutral	1 – #6–350 kcmil	31 (275)	5/16 in. He
DC Input from Battery to UPS	N/A	Battery (+)	Red Battery Connector	N/A	N/A
	N/A	Battery (-)	Black Battery Connector	N/A	N/A
External Battery	E4	Positive	1 - #8-2/0	13 (110)	3/16 in. He
Input to UPS	E5	Negative	1 - #8-2/0	13 (110)	3/16 in. He
Customer Ground	Ground	Ground	2 - #14-1/0	5.6 (50)	Slotted

 NOTE: Customer ground, size 1/0, can be run in any conduit listed in Tables T and U.
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Terminal Function	Terminal	Function	Size of Pressure Termination	Tightening Torque N-M (lb-in.)	Type Screw	
AC Input to UPS	L1	Phase A	1 #14#2	#2 - 5.6 (50)		
(TB1)	L2	Phase B	1 - #14-#2	7 #4-#6 - 5.0 (45) #8 - 4 5 (40)	Slotted	
	L3	Phase C	1 - #14-#2	#10-#14 - 4.0 (35)		
AC Input To UPS Bypass Transformer	L1	Phase A	1 – #14–#2			
(TB1)	L2	Phase B	1 – #14–#2	#2 – 5.6 (50) #4–#6 – 5.0 (45)	Slotted	
	L3	Phase C	1 – #14–#2	#8 – 4.5 (40) #10–#14 – 4.0 (35)		
	N	Neutral	1 – #14–#2			
AC Output from	X1	Phase A	1 - #14-2/0	2.5-2.9(22-26)	3/16 in. He>	
to Critical Load	X2	Phase B	1 - #14-2/0	2.5-2.9(22-26)	3/16 in. He	
(ТВ1)	ХЗ	Phase C	1 - #14-2/0	2.5-2.9(22-26)	3/16 in. He	
	N	Neutral	3 - #14-2/0	2.5-2.9(22-26)	3/16 in. He	
Customer Ground	Ground	Ground	2 - #14-1/0	5.6 (50)	Slotted	

Table Q. Optic	ons Cabine	t Power Ca	ble Terminations Pov	verware 93	30 (25 kVA–40 kVA))
Terminal Function	Terminal	Function	Size of Pressure Termination	Vendor	Tightening Torque N-M (Ib-in.)	Type Screw
AC Input to UPS	L1	Phase A	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
Rectifier Transformer	L2	Phase B	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
(TB1)	L3	Phase C	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
AC Input To UPS Bypass Transformer (TB1)	L1	Phase A	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
	L2	Phase B	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
	LI3	Phase C	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
	N	Neutral	1 - #4-4/0	Entrelec	3.2-3.7(28-33)	6 mm Allen
AC Output from	X1	Phase A	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
to Critical Load	X2	Phase B	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
(TB1)	X3	Phase C	1 - #14-1/0	Entrelec	2.5-2.9(22-26)	Slotted
	Ν	Neutral	1 - #4-4/0	Entrelec	4-6(35-52)	6 mm Allen
Customer Ground	Ground	Ground	2 - #14-1/0	N/A	5.6 (50)	Slotted

d, size 1/0, can	DESCRIPTION:	DESCRIPTION: POWER WIRING INSTALLATION NOT				
nduit listed in	DRAWING NO:	164201300	-1		SHEET: 11 of 17	
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NOTE: Customer ground, size 1/ be run in any conduit liste Tables R through U.

- **10.** 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.
- 11. Conduit is sized to accommodate one neutral conductor the same size as the phase conductor and one #8 AWG ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, check the size of the conduit needed to accommodate the extra wire or size and use that conduit size in place of the conduit size listed in table R. All 9330 products can accommodate a double size neutral.
- **12.** Conduit sizes were chosen from NEC Table C1, type letters RHH, RHW, RHW-2, TW, THW, THHW, THW-2.

Table R. Po	Table R. Power Cable Conduit Requirements Powerware 9330 (10 kVA – 15 kVA)								
Powerware System	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size (inches)	Number of Conduits				
		AC Input to UPS (A, B, C, Gnd)	4	1/2	1				
9330-20/10	208/220 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	3/4	1				
		Output (A, B, C, Neut, Gnd)	5	3/4	1				
		AC Input to UPS (A, B, C, Gnd)	4	1/2	1				
9330-20/10	480/600 AC	480/600 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1/2	1			
		Output (A, B, C, Neut, Gnd)	5	1/2	1				
9330-20/10	288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	1/2	1				
	000/000/	AC Input to UPS (A, B, C, Gnd)	4	1/2	1				
9330-20/15	208/220/ 480/600	AC Input to Bypass (A, B, C, Neut, Gnd)	5	3/4	1				
		Output (A, B, C, Neut, Gnd)	5	3/4	1				
9330-20/15	288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	1/2	1				

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Table S	. Power C	Cable Conduit Requirements	Powerware	9330 (20 k)	/A)
Powerware System	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size (inches)	Number of Conduits
		AC Input to UPS (A, B, C, Gnd)	4	1	1
9330-20/20	208/220 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1	1
		Output (A, B, C, Neut, Gnd)	5	1	1
		AC Input to UPS (A, B, C, Gnd)	4	1/2	1
9330-20/20	480 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	3/4	1
		Output (A, B, C, Neut, Gnd)	5	3/4	1
		AC Input to UPS (A, B, C, Gnd)	4	1/2	1
9330-20/20	600 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1/2	1
		Output (A, B, C, Neut, Gnd)	5	1/2	1
9330-20/20	288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	3/4	1

DESCRIPTION:	POWER WIRING INSTALLATION NOTES				
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208/220 AC 480 AC	AC Input to UPS (A, B, C, Gnd) AC Input to Bypass (A, B, C, Neut, Gnd) Output (A, B, C, Neut, Gnd) AC Input to UPS (A, B, C, Gnd) AC Input to Bypass (A, B, C, Neut, Gnd)	4 5 5 4	1-1/4 1-1/4 1-1/4	1
480 AC	AC Input to Bypass (A, B, C, Neut, Gnd) Output (A, B, C, Neut, Gnd) AC Input to UPS (A, B, C, Gnd) AC Input to Bypass (A, B, C, Neut, Gnd)	5 5 4	1-1/4 1-1/4	1
480 AC	Output (A, B, C, Neut, Gnd) AC Input to UPS (A, B, C, Gnd) AC Input to Bypass (A, B, C, Neut, Gnd)	5	1-1/4	1
480 AC	AC Input to UPS (A, B, C, Gnd) AC Input to Bypass (A, B, C, Neut, Gnd)	4	(1
480 AC	AC Input to Bypass	· ·	3/4	1
	(r, b, c, nout, and)	5	3/4	1
	Output (A, B, C, Neut, Gnd)	5	3/4	1
	AC Input to UPS (A, B, C, Gnd)	4	1/2	1
600 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1/2	1
	Output (A, B, C, Neut, Gnd)	N/A	N/A	N/A
288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	1	1
	AC Input to UPS (A, B, C, Gnd)	4	1-1/4	1
208/220 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1-1/2	1
	Output (A, B, C, Neut, Gnd)	5	1-1/2	1
	AC Input to UPS (A, B, C, Gnd)	4	3/4	1
480 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	3/4	1
	Output (A, B, C, Neut, Gnd)	5	3/4	1
	AC Input to UPS (A, B, C, Gnd)	4	1/2	1
600 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1/2	1
	Output (A, B, C, Neut, Gnd)	N/A	N/A	N/A
288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	1	1
	DESCRIPTION:	POWER WIR	ING INSTAL	LATION N
	DRAWING NO:	164201300)—1	SHEET: 14
	DC	DC (Positive, Negative, Gnd) DE (Positive, Negative, Gnd) DESCRIPTION: DESCRIPTION: DRAWING NO: REVISION:	DC (Positive, Negative, Gnd) DESCRIPTION: POWER WIR DRAWING NO: 164201300 REVISION: L	DC (Positive, Negative, Gnd) DESCRIPTION: POWER WIRING INSTAL DRAWING NO: 164201300-1 REVISION: L DATE: 041!

Powerware System	Voltage	Terminal	Number of Wires in Conduit	Minimum Conduit Trade Size (inches)	Number o Conduits
		AC Input to UPS (A, B, C, Gnd)	4	1-1/4	1
9330-40/35	208/220 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	2	1
		Output (A, B, C, Neut, Gnd)	5	2	1
		AC Input to UPS (A, B, C, Gnd)	4	1	1
9330-40/35	480 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1	1
		Output (A, B, C, Neut, Gnd)	5	1	1
		AC Input to UPS (A, B, C, Gnd)	4	3/4	1
9330-40/35	600 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	3/4	1
		Output (A, B, C, Neut, Gnd)	N/A	N/A	N/A
9330-40/35	288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	1	1
		AC Input to UPS (A, B, C, Gnd)	4	1-1/2	1
9330-40/40	208/220 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	2	1
		Output (A, B, C, Neut, Gnd)	5	2	1
		AC Input to UPS (A, B, C, Gnd)	4	3/4	1
9330-40/40	480 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	1	1
		Output (A, B, C, Neut, Gnd)	5	1	1
		AC Input to UPS (A, B, C, Gnd)	4	3/4	1
9330-40/40	600 AC	AC Input to Bypass (A, B, C, Neut, Gnd)	5	3/4	1
		Output (A, B, C, Neut, Gnd)	N/A	N/A	N/A
9330-40/40	288 DC	External Battery DC Source (Positive, Negative, Gnd)	3	1-1/4	1

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- **13.** External overcurrent protection is not provided by this product, but is required by codes. Refer to Tables A through M for wiring requirements. If an output lockable disconnect is required, it is to be supplied by designated personnel.
- **14.** Table V lists the maximum rating for input circuit breakers. When wiring a single feed input, the rating requirements for the input circuit breakers are superceeded by the ratings listed in Table W.

Table V. Maximum Input Circuit Breaker Ratings							
Powonworo Svotom	Input Voltage Rating						
Fowerware System	208/220VAC	480VAC	600VAC	DC			
9330-20/10	35	15	15	35			
9330-20/15	60	25	20	50			
9330-20/20	70	30	25	70			
9330-40/25	90	40	40	80			
9330-40/30	100	50	40	100			
9330-40/35	125	60	40	125			
9330-40/40	125	60	50	125			

CAUTION: To reduce the risk of fire, connect only to a circuit provided with maximum input circuit breaker current ratings from Table V in accordance with the National Electrical code, ANSI/NFPA 70.

15. When the optional Options Cabinet is used, source protection for the AC input should be treated as if you were supplying a 20 kVA three phase transformer for the Powerware 9330 (10 kVA-20 kVA) and a 40 kVA three phase transformer for the Powerware 9330 (25 kVA-40 kVA), to allow for inrush current.

DESCRIPTION:	POWER WIRI	NG IN	STAL	LATIO	NOTES
DRAWING NO:	164201300-1		SHEET:	16 of 17	
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16. Bypass and output overcurrent protection and bypass and output disconnect switches are to be provided by the user. Table W lists the maximum rating for bypass and output circuit breakers satisfying the criteria for both.

Table W. Maximum Bypas	s and Output	Circuit Brea	ker Ratings
Deuropuero Suetom	Ou	tput Voltage Rati	ing
Powerware System	208/220V	480V	600V
9330-20/10	35	15	15
9330-20/15	60	25	20
9330-20/20	70	30	25
9330-40/25	90	40	30
9330-40/30	110	45	40
9330-40/35	125	60	45
9330-40/40	150	60	50

17. Battery voltage is computed at 2 volts per cell as defined by Article 480 of the NEC. Rated battery current is computed at the computed voltage.

DES	CRIPTION	V: POWER WIR	ING IN	STALI		NOTES
DRA	WING NO	^{9:} 16420130	164201300-1		SHEET:	17 of 17
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1. Use Class 1 wiring methods (as defined by the NEC) for control wiring. Install the control wiring in separate conduit from the power wiring. The wire should be rated at 150 volts, 5 amp minimum.

2.	Refer to Tables X, Y, and Z and to Chapters 2, 4, 5 and 6 of this manual for customer
	interface wiring.

	Table X. Custon	ner Interface Inputs and Outputs
Terminal TB2	Name	Description
1	BLDG ALARM 1	Programmable UPS alarm. Activated by a remote dry
2	BLDG ALARM 1 RTN	contact closure.
3	BLDG ALARM 2	Programmable UPS alarm. Activated by a remote dry
4	BLDG ALARM 2 RTN	contact closure.
5	BLDG ALARM 3	Programmable UPS alarm. Activated by a remote dry
6	BLDG ALARM 3 RTN	contact closure.
7	BLDG ALARM 4	Programmable UPS alarm. Activated by a remote dry
8	BLDG ALARM 4 RTN	contact closure.
Terminal TB4		
1	CAN H	
2	CAN L	Parallel CAN Input
3	RTN	
Terminal TB5		
1		Not Used
2		Not Used
3	EXTERNAL EPO	
4	EXTERNAL EPO RTN	Dry contact used to activate remote EPO of UPS.
5		Not Used
6	RTN	
Terminal TB6		
1	RELAY 1 RTN	
2	RELAY 1 NO	General purpose NO and NC relay contacts.
3	RELAY 1 NC	
Terminal TB7		
1	RELAY 2 RTN	
2	RELAY 2 NO	General purpose NO and NC relay contacts.
3	RELAY 2 NC	
X-Slot 4 Terminal		
1	UTIL_FAIL	Input used to indicate utility power failure
2	ON_BYPASS	Input used to indicate On Bypass status of UPS
3	BATTERY_LOW	Contacts used to indicate Battery Low status of UPS
		DESCRIPTION: CUSTOMER INTERFACE WIRING INSTALLATION NOTES
		DRAWING NO: 164201300-2 SHEET: 1
		REVISION: DATE: 051502









3. The Remote EPO feature opens all contactors in the UPS cabinet and isolates power from your critical load. Local electrical codes may also require tripping upstream protective

- **1.** The UPS equipment operating environment must meet the size and weight requirements shown in Table AA, according to your UPS system configuration.
- **2.** In the UPS system, the UPS, Options, and Battery cabinets are palleted separately for shipping.
- **3.** Do not tilt cabinets more than $\pm 10^{\circ}$ during handling.
- 4. Dimensions are in millimeters (inches).

Table AA. Equipment Weight		1			
Component			Weight Kg (lb)		
		Shipping	Installed	Point Loading	
UPS Cabinet with Filter and Batteries Powerware 9330 (10 kVA-20 kVA)	n Filter and Batteries (10 kVA-20 kVA)		435 (958)	6 at 73 (160)	
UPS Cabinet with Filter and Batteries Powerware 9330 (25 kVA-40 kVA)		873 (1925)	838 (1847)	9 at 93 (205)	
Options Cabinet with PDM and no trans Powerware 9330 (10 kVA-20 kVA)	sformer	118 (260)	90 (200)	4 at 23 (50)	
Options Cabinet with PDM and 1 transf Powerware 9330 (10 kVA-20 kVA)	ormer	240 (530)	213 (470)	4 at 53 (118)	
Options Cabinet with PDM and 2 transformers Powerware 9330 (10 kVA-20 kVA)		358 (790)	331 (730)	4 at 83 (183)	
Options Cabinet with PDM and no trans Powerware 9330 (25 kVA-40 kVA)	154 (340)	120 (265)	6 at 20 (44)		
Options Cabinet with PDM and 1 transf Powerware 9330 (25 kVA-40 kVA)	Cabinet with PDM and 1 transformer re 9330 (25 kVA–40 kVA)		437 (965)	6 at 73 (161)	
Options Cabinet with PDM and 2 transf Powerware 9330 (25 kVA-40 kVA)	otions Cabinet with PDM and 2 transformers owerware 9330 (25 kVA–40 kVA)		748 (1650)	6 at 125 (275	
Battery Cabinet		361 (795)	333 (735)	6 at 56 (123)	
Powerware 9330 (10 kVA-20 kVA) 1. For UPS Cabinet without Filter, subtract 25 Kg (55 lb). 2. For UPS Cabinet without Batteries, subtract 227 Kg (499 lb) 3. For Options Cabinet without PDM, subtract 11 Kg (25 lb) 4. For Options Cabinet with Distribution Housing, add 11 Kg (25 lb) Powerware 9330 (25 kVA-40 kVA) 1. For UPS Cabinet without Filter, subtract 41 Kg (90 lb). 2. For UPS Cabinet without Batteries, subtract 453 Kg (998 lb) 3. For Options Cabinet without PDM, subtract 11 Kg (25 lb)					
The clearances required around the U	PS Syste	m are show	n in Table A	B.	
Table AB. System Clearances					
From Front of Cabinet	36 inche	s working sp	ace		
From Back of Cabinet	es air circulation clearance				
		o un onoulun			

DESCRIPTION:	PHYSICAL FEATURES AND REC	UIREM	ENTS
DRAWING NO:	164201300-3	SHEET:	1 of 2

		104201000	
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3 SHEET: 1 of 2 DATE: 013004 6. The basic environmental requirements for operation of the UPS system 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 UPS ventilation requirements are shown in Table AC.

Ratings Input/Output Voltage Heat Rejection* BTU/hr × 1000/hr (Kg-cal/hr) 10 KVA 480/208, 208/220, 220/208, 220/220 2.1 (0.53) 10 KVA 480/208, 600/208 2.7 (0.7) 480/480 3.6 (0.9) 208/208, 208/220, 220/208, 220/220 15 KVA 480/208, 600/208 4.0 (1.1) 480/208, 600/208 4.0 (1.1) 480/208, 600/208 5.3 (1.3) 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 208/208, 208/220, 220/208, 220/220 5.2 (1.3) 208/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 208/208, 208/220, 220/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/208, 600/208 9.3 (2.4) 480/208, 600/208 9.3 (2.1) 40 KVA <th>Tab</th> <th>ntilation Requirements peration A=40 kVA)</th>	Tab	ntilation Requirements peration A=40 kVA)		
10 KVA 208/208, 208/220, 220/208, 220/220 2.1 (0.53) 10 KVA 480/208, 600/208 2.7 (0.7) 480/480 3.6 (0.9) 208/208, 208/220, 220/208, 220/220 3.1 (0.8) 15 KVA 480/208, 600/208 4.0 (1.1) 480/480 5.3 (1.3) 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 480/480 5.3 (1.3) 20 KVA 480/208, 600/208 5.4 (1.4) 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 20 KVA 480/208, 600/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 35 KVA 480/208, 600/208 8.0 (2.0) 480/480 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1)	Ratings	Input/Output Voltage	Heat Rejection* BTU/hr $ imes$ 1000/hr (Kg–cal/hr)	
10 KVA 480/208, 600/208 2.7 (0.7) 480/480 3.6 (0.9) 208/208, 208/220, 220/208, 220/220 3.1 (0.8) 15 KVA 480/208, 600/208 4.0 (1.1) 480/480 5.3 (1.3) 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 480/480 5.3 (1.3) 20 KVA 480/208, 600/208 5.4 (1.4) 480/208, 600/208 5.4 (1.4) 480/208, 600/208 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1)		208/208, 208/220, 220/208, 220/220	2.1 (0.53)	
480/480 3.6 (0.9) 15 KVA 208/208, 208/220, 220/208, 220/220 3.1 (0.8) 480/208, 600/208 4.0 (1.1) 480/480 5.3 (1.3) 20 KVA 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 20 KVA 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 20 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 20 KVA 480/208, 600/208 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 30 KVA 480/208, 600/208 9.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 30 KVA 480/208, 600/208 9.3 (2.4) 480/480 10.5 (3.1) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 480/208, 600/208 10.	10 KVA	480/208, 600/208	2.7 (0.7)	
15 KVA 208/208, 208/220, 220/208, 220/220 3.1 (0.8) 480/208, 600/208 4.0 (1.1) 480/480 5.3 (1.3) 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 20 KVA 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 208/208, 208/220, 220/208, 220/220 5.2 (1.3) 208/208, 208/220, 220/208, 220/220 5.2 (1.3) 208/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7)		480/480	3.6 (0.9)	
15 KVA 480/208, 600/208 4.0 (1.1) 480/480 5.3 (1.3) 20 KVA 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 20 KVA 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 20 KVA 480/208, 208/220, 220/208, 220/220 5.2 (1.3) 20 KVA 480/208, 600/208 6.7 (1.7) 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 10.7 (2.7) 480/480 10.7 (2.7) 480/480 10.7 (2.7) 480/480 10.7 (2.7) 480/480 10.7 (2.7) 480/480 10.7 (2.7)		208/208, 208/220, 220/208, 220/220	3.1 (0.8)	
480/480 5.3 (1.3) 20 KVA 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 20 KVA 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 20 KVA 480/208, 208/220, 220/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 40 KVA 480/208, 600/208 10.7 (2.7)	15 KVA	480/208, 600/208	4.0 (1.1)	
20 KVA 208/208, 208/220, 220/208, 220/220 4.2 (1.1) 20 KVA 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 20 KVA 480/208, 208/220, 220/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 10.7 (2.7) 14.3 (3 6)		480/480	5.3 (1.3)	
20 KVA 480/208, 600/208 5.4 (1.4) 480/480 7.1 (1.8) 208/208, 208/220, 220/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 40 KVA 480/208, 600/208 10.7 (2.7) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 480/208, 600/208 10.7 (2.7)		208/208, 208/220, 220/208, 220/220	4.2 (1.1)	
480/480 7.1 (1.8) 208/208, 208/220, 220/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 30 KVA 480/208, 600/208, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1) 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1)	20 KVA	480/208, 600/208	5.4 (1.4)	
208/208, 208/220, 220/208, 220/220 5.2 (1.3) 25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 30 KVA 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 35 KVA 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 40 KVA 480/208, 600/208 10.7 (2.7) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 10.7 (2.7) 14.3 (3.6)		480/480	7.1 (1.8)	
25 KVA 480/208, 600/208 6.7 (1.7) 480/480 8.9 (2.2) 30 KVA 208/208, 208/220, 220/208, 220/220 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1)		208/208, 208/220, 220/208, 220/220	5.2 (1.3)	
480/480 8.9 (2.2) 208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.1)	25 KVA	480/208, 600/208	6.7 (1.7)	
208/208, 208/220, 220/208, 220/220 6.3 (1.6) 30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 12.5 (3.6)		480/480	8.9 (2.2)	
30 KVA 480/208, 600/208 8.0 (2.0) 480/480 10.7 (2.7) 35 KVA 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)		208/208, 208/220, 220/208, 220/220	6.3 (1.6)	
480/480 10.7 (2.7) 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)	30 KVA	480/208, 600/208	8.0 (2.0)	
35 KVA 208/208, 208/220, 220/208, 220/220 7.3 (1.8) 35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)		480/480	10.7 (2.7)	
35 KVA 480/208, 600/208 9.3 (2.4) 480/480 12.5 (3.1) 40 KVA 208/208, 208/220, 220/208, 220/220 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)		208/208, 208/220, 220/208, 220/220	7.3 (1.8)	
480/480 12.5 (3.1) 40 KVA 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)	35 KVA	480/208, 600/208	9.3 (2.4)	
40 KVA 208/208, 208/220, 220/208, 220/220 8.3 (2.1) 40 KVA 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)		480/480	12.5 (3.1)	
40 KVA 480/208, 600/208 10.7 (2.7) 480/480 14.3 (3.6)		208/208, 208/220, 220/208, 220/220	8.3 (2.1)	
480/480 14.3 (3.6)	40 KVA	480/208, 600/208	10.7 (2.7)	
		480/480	14.3 (3.6)	

DESCRIPTION:	PHYSICAL FEATUR	RES AN	ND REC	UIREM	ENTS
DRAWING NO:	164201300-	-3		SHEET:	2 of 2
REVISION:	L	DATE:	04150	3	





Та	able AD. UPS Sy	stem Config	urations Oneline
Oneline Drawing 164201300-6	Powerware Model	Vin / Vout	System Type
	9330-20/10		
	9330-20/15		
	9330-20/20	208/208	
Sheet 1	9330-40/25	208/220 220/208 220/220	Single Module – Reverse Transfer
	9330-40/30		220/200
	9330-40/35		
	9330-40/40		

Table AE. UPS System Configurations Schematics				
Schematic Drawing 164201300-7	Powerware Model	Vin / Vout	System Type	
	9330-20/10	208/208	Single Module – Reverse Transfer	
Sheet 1	9330-20/15	480/208 600/208	Single or Dual Feed with Input Isolation Transformers. Bypass Switch	
	9330-20/20		and Optional Distribution Panel	
	9330-20/10		Single Module – Reverse Transfer	
Sheet 2	9330-20/15	480/208	Single or Dual Feed with Input Auto Transformers, Bypass Switch and	
	9330-20/20		Optional Distribution Panel	
	9330-20/10	208/208	Single Module – Reverse Transfer	
Sheet 3	9330-20/15	208/220 220/208 220/220	Single or Dual Feed with Bypass	
	9330-20/20		Switch and Optional Distribution Panel	
	9330-20/10		Single Module – Reverse Transfer	
Sheet 4	9330-20/15	208/208	Single or Dual Feed with Output Isolation Transformer, Bypass Switch	
	9330-20/20		and Optional Distribution Panel	
	9330-20/10		Single Module – Reverse Transfer	
Sheet 5	9330-20/15	208/480	Single or Dual Feed with Output Auto	
	9330-20/20		Iransformer and Bypass Switch	
	9330-20/10	208/208 208/480 480/208 480/480 600/208 600/480	Single Module – Reverse Transfer	
Sheet 6	9330-20/15		and Output Isolation Transformers, Bypass Switch and Optional	
	9330-20/20		Distribution Panel	

NOTE 1: A bypass neutral feeder must be	DES
supplied.	אסח
	DNA

NOTE 2: Output Voltage must match Bypass Input Voltage.

DESCRIPTION:	UPS SYSTEM CONFIGURATIONS				
DRAWING NO:	164201300	-5		SHEET:	1 of 3
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Schematic Drawing 164201300-7	Powerware Model	Vin / Vout	System Type
	9330-20/10	480/480	Single Module – Reverse Transfer Single Feed with Input and Output Auto Transformers and Bypass Switc
Sheet 7	9330-20/15 9330-20/20	208 Mains In 480 Bypass In	Single Module – Reverse Transfer Dual Feed with Bypass Input and Output Auto Transformers and
		400 Out	Bypass Switch
	9330-20/10	208/208 208/480	Single Module – Reverse Transfer
Sheet 8	9330-20/15	480/208 480/480	Dual Feed with Input and Output Isolation Transformers, Bypass Switc
	9330-20/20	600/208 600/480	and Optional Distribution Panel
	9330-20/10	480 Mains In	Single Module – Reverse Transfer
Sheet 9	9330-20/15	208 Bypass In	Dual Feed with Mains Input and
	9330-20/20	480 Out	Bypass Switch
	9330-40/25		
0	9330-40/30	208/208	Single or Dual Feed with Input
Sheet 10	9330-40/35	600/208	Isolation Transformers, Bypass Switc
	9330-40/40		
	9330-40/25		Single Module – Reverse Transfer
Shoot 11	9330-40/30	490/209	Single or Dual Feed with Input Auto
Sheet II	9330-40/35	400/200	Transformers, Bypass Switch and
	9330-40/40		
	9330-40/25	208/208	
Shoot12	9330-40/30	208/220	Single Module – Reverse Transfer
Sheetiz	9330-40/35	220/208	Switch and Optional Distribution Pan
	9330-40/40	220/220	
	9330-40/25		Single Module – Reverse Transfer
Shoot 10	9330-40/30	208/208	Single or Dual Feed with Output
Sheet 13	9330-40/35	208/480	Isolation Transformer, Bypass Switch
	9330-40/40	-40/40	
	9330-40/40		and Optional Distribution Panel

NOTE 2: Output Voltage must match Bypass Input Voltage.

DESCRIPTION:	UPS SYSTEM CONFIGURATIONS				
DRAWING NO:	164201300-5		SHEET:	2 of 3	
REVISION: N		DATE:	01300	4	

Table AE	. UPS System (Configuration	s Schematics (Cont'd)
Schematic Drawing 164201300-7	Powerware Model	Vin / Vout	System Type
	9330-40/25		
Cheet 14	9330-40/30	000/400	Single Module – Reverse Transfer
Sheet 14	9330-40/35	208/480	Transformer and Bypass Switch
	9330-40/40		
	9330-40/25	208/208	
	9330-40/30	208/480	Single Module – Reverse Transfer
Sheet 15	9330-40/35	480/480 600/208	Isolation Transformers, Bypass Switch and Optional Distribution Panel
	9330-40/40	600/480	
	9330-40/25	400/400	Single Module – Reverse Transfer
	9330-40/30	480/480	Single Feed with Input and Output Auto Transformers and Bypass Switch
Sheet 16	9330-40/35	208 Mains In 480 Bypass In	Single Module – Reverse Transfer Dual Feed with Bypass Input and
	9330-40/40	480 Out	Bypass Switch
	9330-40/25	208/208	
Sheet 17	9330-40/30	208/480 480/208	Single Module – Reverse Transfer Dual Feed with Input and Output
Sheet II	9330-40/35	480/480	Isolation Transformers, Bypass Switch
	9330-40/40	600/480	
	9330-40/25		Single Medule – Boyeres Transfer
Chaot 19	9330-40/30	480 Mains In	Dual Feed with Mains Input and
Sheet to	9330-40/35	480 Ou	Output Auto Transformers and
	9330-40/40		Bypass Switch
		DESCRIPTION	
E 1: A bypass neutral f	eeder must be	DESCRIFTION.	UPS SYSTEM CONFIGURATION
E 1: A bypass neutral t supplied. F 2: Output Voltage m	ust match Rypass	DRAWING NO:	UPS SYSTEM CONFIGURATION 164201300-5 SHEET:





















































































































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LIMITED FACTORY WARRANTY FOR THREE-PHASE POWERWARE PRODUCTS

Subject to the conditions herein, *Powerware* (*Powerware*[®]) warrants solely, to the original end-user, the electronics (the "Unit"), and *Powerware* built battery cabinets, against defects in material and workmanship for the warranty period of 12 months, from the date of equipment start up, or 18 months from date of shipment, whichever occurs first. Should service be necessary, this warranty covers:

USA only: The *Powerware* 9315, 9320, 9330, 9335, BPIII, and BPIV three-phase UPS products are sold with a standard factory warranty (described below), start up, and extended labor service.

All three-phase UPS installations will have an authorized *Powerware* Service Engineer perform startup or the factory warranty and extended labor service will be void. The included first year extended labor service provides for a complete 12 months of onsite labor for your UPS purchase.

Worldwide: All parts requiring replacement for the Factory Warranty period.

If, in the opinion of *Powerware*, the Unit fails to meet published specifications and the defect is within the terms of this warranty, the Unit will be repaired or replaced at the option of *Powerware* with no charge for replacement parts. Labor required, to make upgrades, repairs or replacement installation, is not included under the terms of this Limited Warranty, except for labor and travel costs required during the first 90 days of this warranty (USA only), provided that startup of the unit onsite, has been performed by *Powerware* (in USA) or its agent (outside of USA). Equipment sold, but not manufactured by *Powerware*, and only the manufacturer of such equipment shall warrant this equipment and is not included as part of this warranty agreement. Equipment repaired or replaced pursuant to this warranty will be warranted for the remaining portion of the original warranty subject to all the terms thereof.

This warranty is not valid unless an authorized *Powerware* Service Engineer (in USA) or Agent (outside USA) performs startup and commissioning. This warranty does not apply to any Unit that has been subject to neglect, accident, abuse, misuse, misapplication, incorrect installation, or that has been subject to repair or alteration, not authorized in writing by *Powerware* personnel or performed by an authorized *Powerware* Service Engineer or Agent. Purchaser shall be invoiced for, and shall pay for, all services not expressly provided for by the terms hereof, including, without limitation, site calls involving an inspection that determines no corrective maintenance is required. THIS WARRANTY IS THE PURCHASER'S (USER'S) SOLE REMEDY AND IS EXPRESSLY IN LIEU OF, AND THERE ARE NOT OTHER, EXPRESSED OR IMPLIED GUARANTEES OR WARRANTIES (INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PURPOSE, WHICH ARE EXPRESSLY DISCLAIMED). In no case will *Powerware's* liability under this Warranty exceed the replacement value of the Unit warranted.

Invensys Powerware's obligation, under said warranty, is expressly conditioned upon receipt by Powerware of all payments due it (including interest charges, if any). During such time as Powerware has not received payment of any amount due it, in accordance with the Contract terms under which the equipment is sold, Powerware shall have no obligation, under said warranty; also during this time, the period of said warranty shall continue to run and the expiration of said warranty shall not be extended upon payment of the overdue amount. These limitations, to said warranty, apply even in the event that the equipment is sold initially by Powerware for resale to an ultimate end-user.

In no event shall *Powerware* 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. *Powerware* shall not be responsible for failure to provide service or parts due to causes beyond *Powerware's* reasonable control. This limited warranty applies only to the original end user of the unit.

This factory warranty will not be in effect if the End-User does not properly store the equipment, including the "trickle charge" of batteries no later than the date indicated on the packaging, before installation and does not cover shipping damages if FOB Factory. Cost for replacement equipment, installation, material freight charges travel expenses and labor of *Powerware* representatives will be borne by the Purchaser (user). Any advice furnished the Purchaser before or after delivery in regard to use or application of *Powerware* equipment is furnished without charge and on the basis that it represents *Powerware*'s best judgment under the circumstances. The use of any such advice by the Purchaser is solely and entirely at its own risk. Any other agreements, such as Service contracts or Sales Concessions are not means to annul this Factory Warranty.

For comment or questions, about this Limited Factory Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, NC 27601, or call (919) 872-3020

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