POWERWARE® 9315

Uninterruptible Power Supply

300 kVA - 500 kVA

Installation Manual

164201118 Rev. F

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.

WARNING:
This is a product for restricted sales distribution to informed partners. Installation restrictions or additional measures may be needed to prevent disturbances.

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1 Introduction

This manual describes how to install your Powerware® 9315 Uninterruptible Power Supply (UPS) system. It contains instructions for installing the UPS and each optional component and accessory. The information you will use depends on the system you purchased.

Each component of your UPS system is housed in a free-standing cabinet. The cabinets line up and match in style and color, and have safety shields behind the doors for hazardous voltage protection. Figure 1–1 shows a typical UPS system that includes at least one of each component.

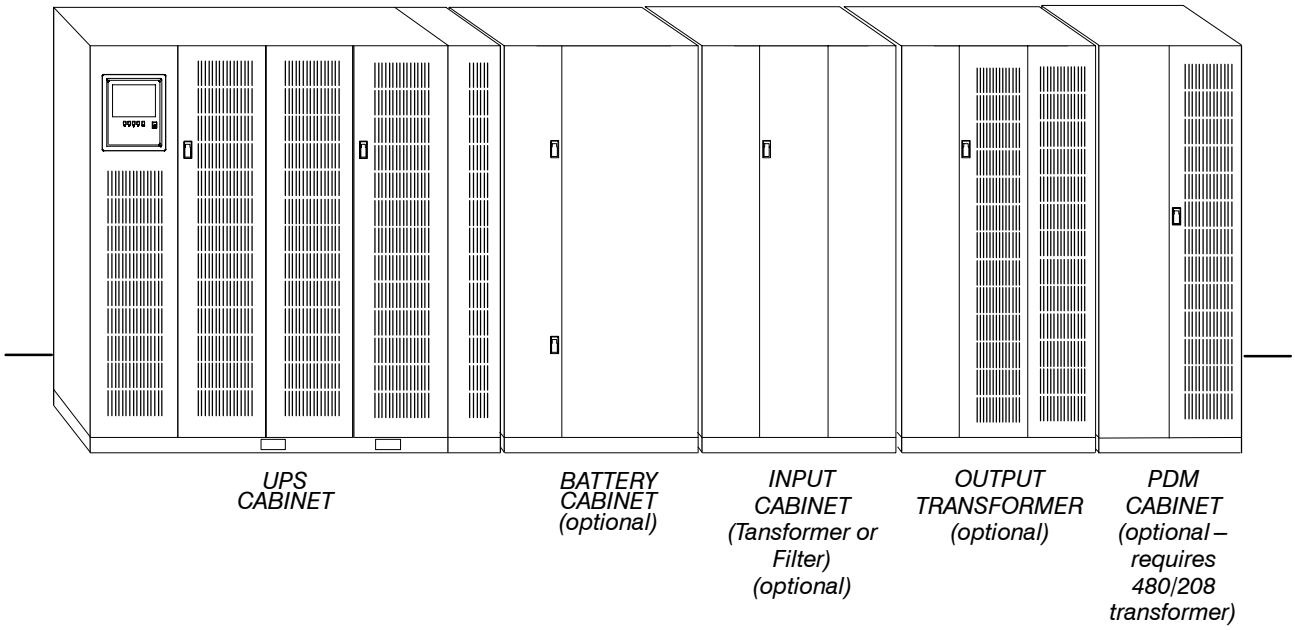

Figure 1–1. Typical UPS System

These basic UPS system configurations are possible:

- The UPS and one or more battery cabinets
- The UPS, battery cabinet(s), and a Power Distribution Module (PDM)
- The UPS, battery cabinet(s), and an input cabinet (transformer or filter)

- The UPS, battery cabinet(s), PDM, and an input cabinet (transformer or filter)
- The UPS, battery cabinet(s), an input cabinet (transformer or filter) and an output transformer cabinet
- The UPS, battery cabinet(s), PDM, an input cabinet (transformer or filter) and an output transformer cabinet .

You can enhance any of these system configurations by adding optional accessories, such as a *Remote Monitor Panel (RMP)*, *Relay Interface Module (RIM)*, Supervisory Contact Module (SCM), or *Remote Emergency Power Off (EPO)* control.

Using This Manual

The system you are installing dictates which parts of this manual you should read. Everyone should read Chapters 1 through 3:

- Chapter 1 discusses installation considerations for your entire UPS system.
- Chapter 2 tells you how to prepare your site for the installation of your UPS system. It discusses equipment environmental requirements, inspecting, and unpacking cabinets.
- Chapter 3 describes how to install the UPS cabinet.
- Chapter 4 contains safety instructions and general notes for installation of the UPS manufacturer's optional battery cabinets.
- Chapter 5 contains information for installing optional input and output transformer cabinets.
- Chapter 6 contains information for installing the optional Power Distribution Module (PDM).
- Chapter 7 discusses installing the optional Remote Emergency Power Off (EPO) control.
- Chapter 8 contains information for installing the optional remote battery disconnect.
- Chapter 9 contains information for installing the optional Remote Monitor Panel (RMP).
- Chapter 10 contains information for installing the optional Relay Interface Module (RIM).
- Chapter 11 contains information for installing the optional Supervisory Contact Module (SCM).
- Appendix A contains important information for planning and installing your UPS system, including illustrations of cabinets and optional accessories.

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

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 cabinet plus any options or accessories you have installed.

For More Information

This manual describes how to install your UPS system. For more information about the operation and communications capabilities of the UPS system, refer to the following:

164201119 ***Powerware® 9315 (300 kVA–500 kVA) UPS Operation***

Describes the UPS cabinet Control Panel and Monitor Panel, and explains the functions of the UPS; discusses the standard features of the UPS and optional accessories; provides procedures for starting and stopping the UPS, and information about maintenance and responding to system events.

Also described are the RS–485 and RS–232 serial communications capabilities of the UPS system; discusses the two communications ports on the Customer Interface Panel inside the UPS and how to connect optional remote accessories to your UPS system; provides information about enabling, disabling, and customizing building alarms.

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

Getting Help

If you have a question about any of the information in this manual, or if you have a question this manual does not answer, please call Powerware Corporation Field Service:

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

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2 Getting Started

Each cabinet of your UPS system is shipped on a separate pallet. Use a forklift or pallet jack to move the packaged cabinets to the installation site, or as close as possible to the site, before you unload them from the pallets.

This is the basic sequence of the installation steps:

1. Prepare your site for the UPS cabinet (Chapter 2).
2. Inspect, unpack, and unload the UPS cabinets (Chapter 2).
3. Create an installation plan for the UPS and optional cabinets (Chapter 3).
4. Wire the cabinets together (Chapters 4–11, as applicable).
5. Install features, accessories, and/or options (Chapters 4–11, as applicable).
6. Complete the Installation Checklist (Chapter 3).
7. Have authorized service personnel perform preliminary checks and startup.

After wiring the UPS system to the facility power and critical load(s), be sure to ground the system according to local and/or national electrical wiring codes, using your own cabling and conduit.

Install batteries in accordance with all applicable codes and regulations, including the National Electrical Code (NEC), Article 480.

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 system.*

Preparing Your Site

For your UPS system to operate at peak efficiency, your installation site should meet the environmental parameters outlined in the operator's manual for the UPS. If you intend to operate the UPS 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 size and weight requirements shown in Table K of 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%

The UPS and input transformer cabinets use forced air cooling to regulate internal component temperature. The battery and optional component cabinets use convection cooling to regulate internal component temperature. Air inlets are in the front of the cabinet, and outlets are in the top. You must allow clearance in front of and above each cabinet for proper air circulation.

Environment Considerations

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

1. The UPS system must be installed on a sealed concrete pad on a sealed concrete floor.
2. The UPS system must be installed in a temperature-controlled indoor area free of conductive contaminants.

Preparing for Wiring the UPS System

For external wiring requirements, including the minimum AWG size of external wiring, see Tables A through E in Appendix A. The power wiring connections for this equipment are rated at 90˚C. If wire is run in an ambient temperature greater than 30˚C, higher temperature and/or larger size wire may be necessary. Wiring for optional accessories (such as a Remote Monitor Panel (RMP) or Relay Interface Module (RIM)) should be installed through the knockout in the bottom of the UPS cabinet. The top entry connection requires installation of ½-in. flexible conduit within the UPS. Bottom entry connection requires no additional routing of conduit within the UPS.

Inspecting and Unpacking Each Cabinet

The first task in preparing for installation is inspecting and unpacking each cabinet. Cabinets arrive covered with protective packaging material as shown in Figure 2–1.

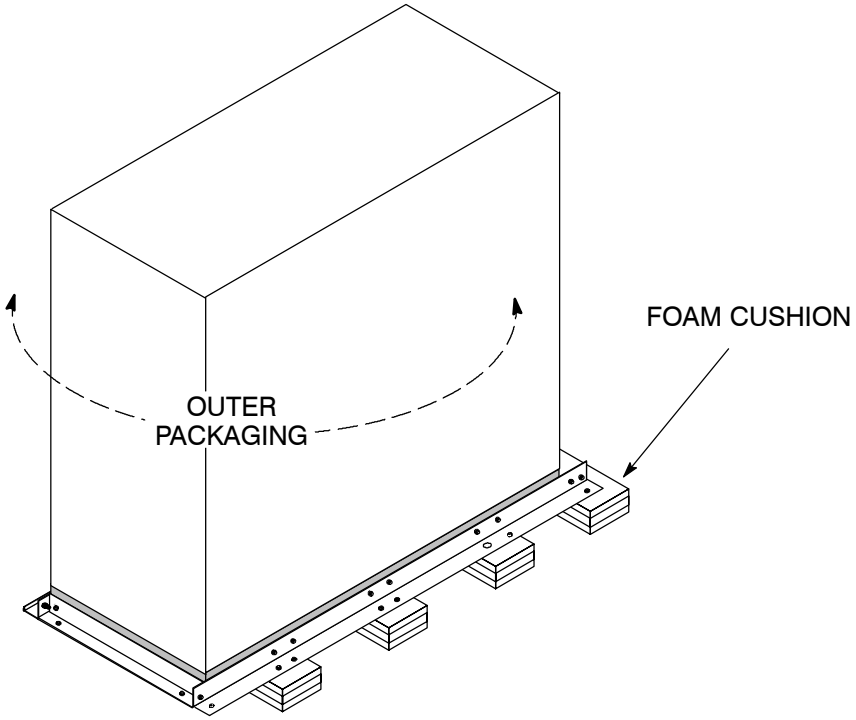

Figure 2–1. Cabinet as Shipped, with Outer Packaging–Rear View

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

CAUTION:
Do not install a damaged cabinet. Report any damage to the carrier and contact your local sales or service office immediately.

2. Use a forklift or other material handling equipment to move the cabinet to a convenient unpacking area. Insert the forklift jacks between the foam cushions 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 4.6m (15 ft) on each side for removing the cabinets from the pallets.
4. Cut the steel bands around each cabinet.
5. Remove the protective cardboard covering from the cabinets, cutting where indicated, using a knife blade no longer than 25 mm (1 in.).
6. Remove the plastic bag and foam packing material, and discard or recycle them in a responsible manner.

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3 Installing the UPS

WARNING:
Installation should be performed by qualified personnel.

Refer to the following while installing the UPS:

- Dimensions in this manual are in millimeters and inches.
- Do not tilt the UPS or other cabinets more than ±10˚ during installation.
- Cooling exhaust airflow is approximately 1420 L/S (3000 CFM).
- The conduit landing plates are to be removed to add conduit landing holes as required. Plate material is 16 gauge steel (0.06 in. thick).
- Terminals E1–E15 are UL and CSA rated at 90˚C. A hex key tool is required to attach wires to the terminals.
- The Remote Emergency Power Off (EPO) feature opens all breakers and contactors in the UPS cabinet and isolates power from your critical load. Local electrical codes may also require tripping upstream protective devices to the UPS.
- UPS cabinet must be installed on a level, sealed concrete pad or floor.
- If perforated floor tiles are required for ventilation, place them in front of the UPS. Refer to Table K in Appendix A for equipment weight.
- Details about control wiring are provided in each procedure for connecting options and features. Table N in Appendix A identifies the control wiring terminations.

Installing the UPS Cabinet

Refer to Figure 3−1 when installing the UPS cabinet. The UPS cabinet is bolted to a sheet metal pallet consisting of four supports secured to foam cushions. The foam cushions act as shock absorbers for the cabinet during shipment and movement to the installed location.

WARNING:
UPS cabinets are extremely heavy. If unloading instructions are not closely followed, the cabinet may tip and cause serious injury.

NOTE: *UPS cabinet base is equipped with forklift slots to accommodate lifting and moving the equipment. The forklift slots are located on all four sides of the cabinet base to meet individual needs. The wireway section on the right side of the UPS cabinet (as seen from the front) must be removed to gain access to the right side fork lift slots.* See Figure 3−1.

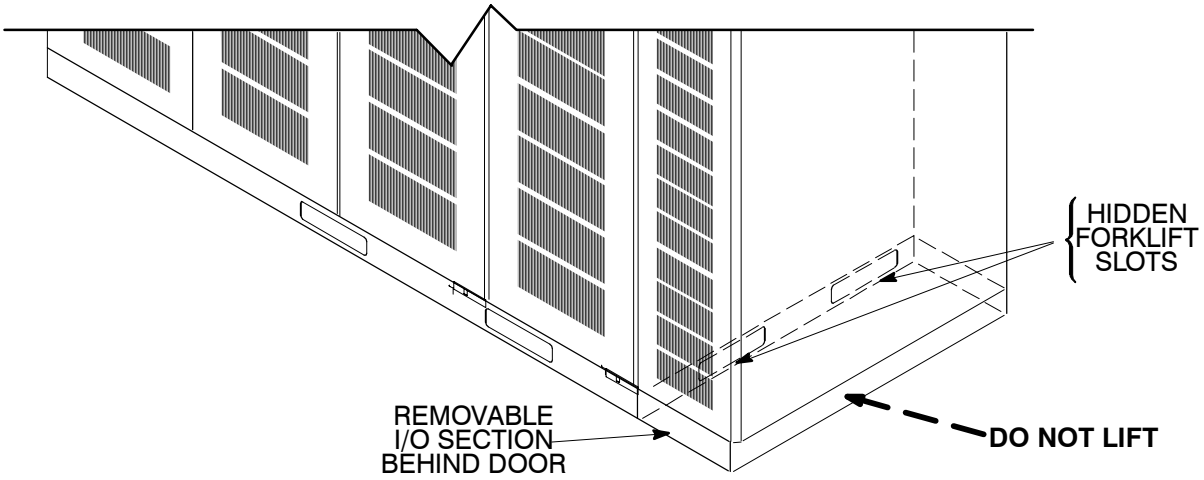


Figure 3−1. Removable I/O Section

1. Move UPS to final installed location using forklift jacks between foam cushions on the bottom of the unit.
2. Remove hardware labeled “1”, “2”, and “3” in Figure 3−2, holding the front, rear and side supports to the cabinet base.
3. Remove the front, rear and side supports from the cabinet base and foam cushions. Discard or recycle the hardware and support brackets in a responsible manner.

CAUTION:
Lift only at forklift openings or cabinet damage may occur.

4. Insert the forklift jacks in the forklift slots and raise the UPS cabinet until the cabinet bottom clears the foam cushions by approximately 3 mm (1/8 in.).

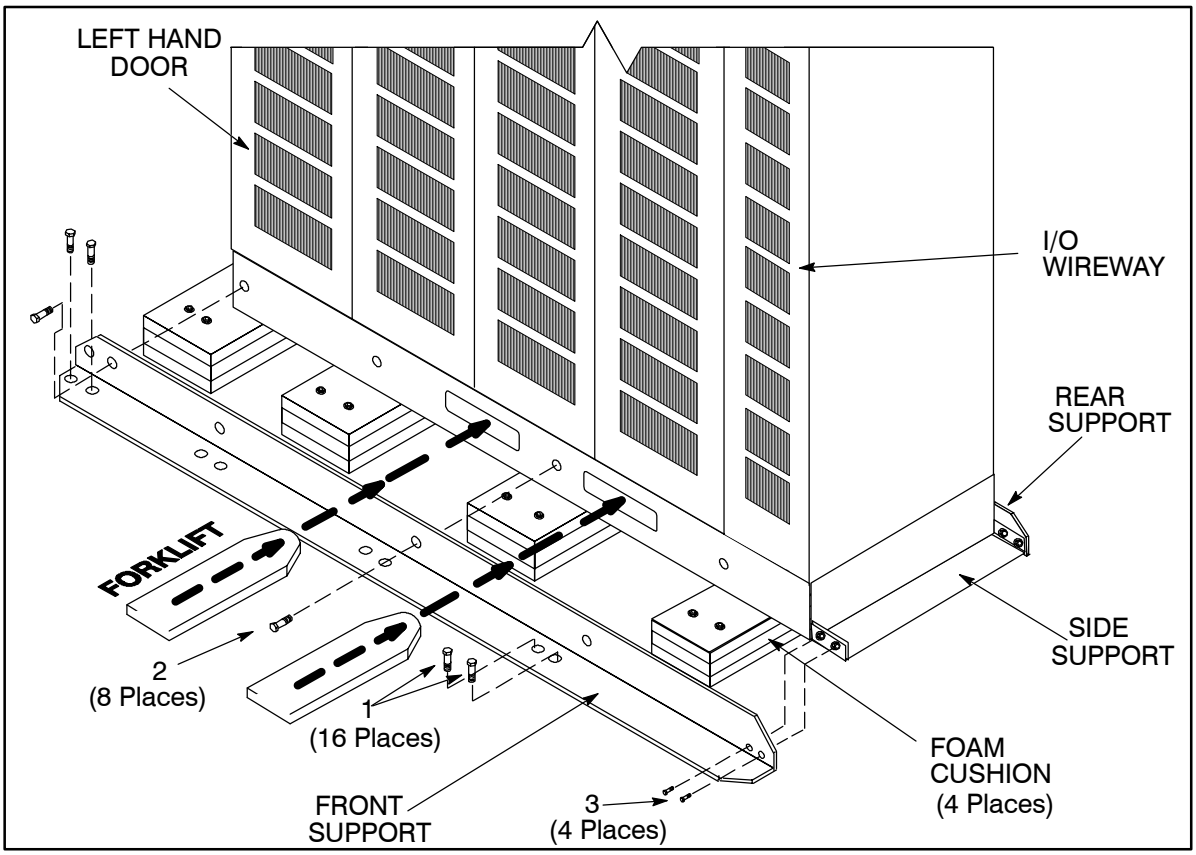


Figure 3–2. Removing Front and Rear Supports

5. Pull the foam cushions from under the UPS cabinet. Discard or recycle them in a responsible manner.
6. Carefully lower the cabinet until the UPS cabinet base contacts the floor.
7. Repeat steps 1 through 6 for each cabinet you are preparing to install.

Prepare for Installing Optional Cabinets or Accessories

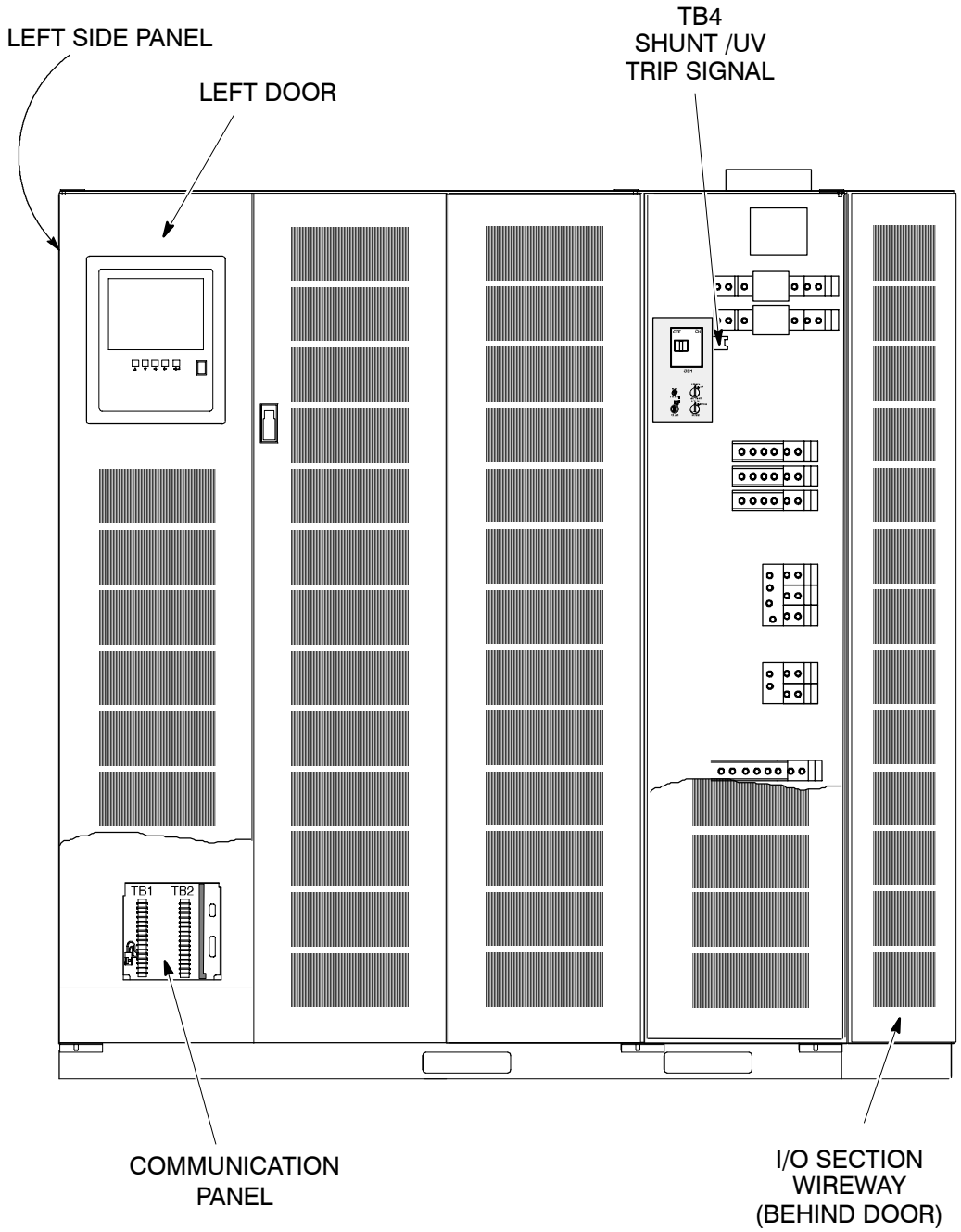
If you are installing optional cabinets or accessories, such as a Power Distribution Module (PDM) cabinet, an input transformer, an output transformer or a Remote Monitor Panel (RMP), you must install conduit between each device and the UPS cabinet for wiring these options. Refer to Figure 3−3 for the locations of the interface points within the UPS cabinet. Also, refer to *Powerware 9315 Series 685 and 1085 Auxiliary Battery Cabinets Installation* Manual, 164200300, for information on installing battery cabinets.

To prepare the UPS for wiring to an Input Transformer, Output Transformer, Maintenance Bypass Cabinet (MBC), Power Distribution Module (PDM), or all:

1. Be sure the UPS is turned off and all power sources are removed. (See the operator's manual for instructions.)
2. Open the doors of the UPS.
3. Remove stationary right side door and set it aside for later reuse.
4. Remove the air filters and set aside for later reuse.
5. Remove the lower metal access panel. Set the access panel and hardware aside for later reuse.

To prepare the UPS for wiring to an RMP, RIM, SCM, or Remote EPO:

1. Be sure the UPS is turned off and all power sources are removed. (See the operator's manual for instructions.)
2. Open the doors of the UPS.
3. Remove the air filters and set aside for later reuse.
4. Remove the lower metal access panel. Set the access panel and hardware aside for later reuse.



NOTE: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

Figure 3–3. Preparing the UPS for Installation

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 before starting the UPS system for the first time.*

Installation Checklist

- ☐ All packing materials and restraints have been removed from each cabinet.
- ☐ Each cabinet in the UPS system is placed in its installed location.
- ☐ A ground bond is installed between any cabinets that are bolted together.
- ☐ All switchboards, conduits, and cables are properly routed to the UPS and auxiliary cabinets.
- ☐ All power cables are properly terminated.
- ☐ A ground conductor is properly installed.
- ☐ If neutral connection is used, no other N–G bonds exist downstream from the UPS.
- ☐ Battery cables and harness are terminated on E4 and E5.
- ☐ Internal battery cabinet connections have been completed (bus bars, plugs, etc.).
- ☐ Shunt trip signal wiring is connected from UPS to battery breaker(s).
- ☐ 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 sealed concrete pad on a sealed concrete floor.)
- ☐ 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.
- ☐ Each Remote Monitor Panel (RMP) is mounted in its installed location. (OPTIONAL)
- ☐ The control wiring for each RMP is terminated inside the UPS cabinet. (OPTIONAL)
- ☐ The Remote Emergency Power Off (EPO) device is mounted in its installed location and its wiring terminated inside the UPS cabinet. (OPTIONAL)
- ☐ Summary alarms and/or building alarms are wired appropriately. (OPTIONAL)
- ☐ A Relay Interface Module (RIM) is mounted in its installed location and its wiring is terminated inside the UPS cabinet. (OPTIONAL)
- ☐ A remote battery disconnect control is mounted in its installed location and its wiring is terminated inside the UPS and battery cabinet. (OPTIONAL)

Notes

4 Installing Battery Cabinets

This chapter describes installing the UPS manufacturer's battery cabinets. If you are installing battery cabinets and remote disconnects provided by Powerware Corporation, refer to the *Powerware Series 9315 685 and 1085 Auxiliary Battery Cabinets Installation* Manual, 164200300, for instructions.

One Model is Available

- Series 1085 (1085 mm wide cabinet)

Important Safety Instructions

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

Observe these precautions when working on or around battery cabinets:

- 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 is 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:
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.

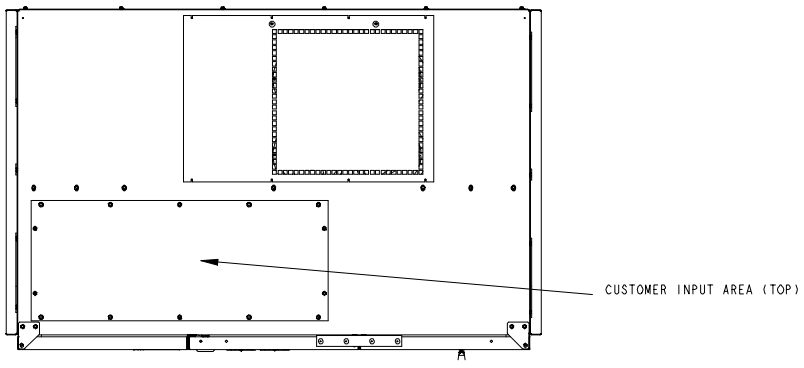
- Pour le remplacement, utiliser le même nombre et modéle des batteries.
- L'élimination des batteries est règlementée. Consulter les codes locaux à cet effet.

General Notes About Installing Battery Cabinets and Remote Disconnects

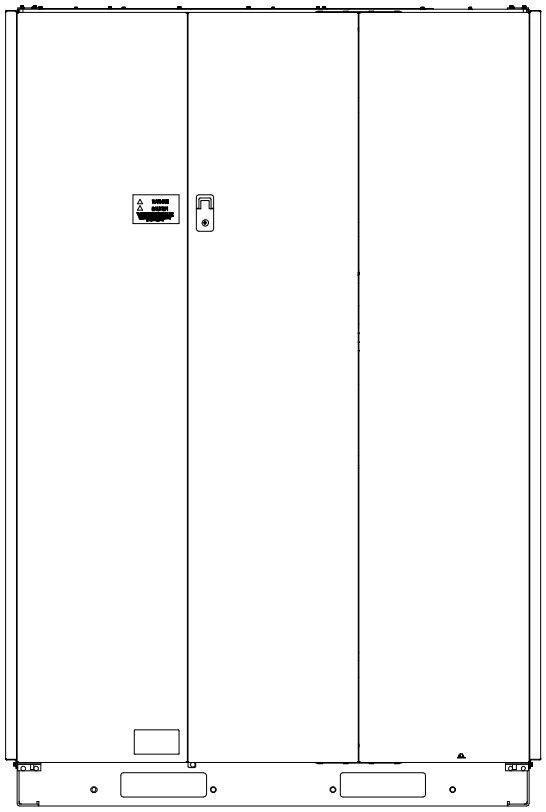
1. There is no DC disconnect device within the UPS.
2. The DC input to the UPS is protected by internal fuses F21, F22.
3. The UPS DC disconnect trip signal from TB4, points 1 and 2 (shunt trip) or TB4, points 1 and 3 (UV trip) must be connected to the DC source disconnect device(s).
4. If you are installing battery cabinets not provided by Powerware Corporation, refer to the battery cabinet manufacturer's operating manual for instructions on battery cabinet installation and maintenance.

5 Installing Input and Output Transformers and Input Filter

Before installing optional input and output transformers, and input filter, be sure you have prepared the UPS according to the instructions in Chapter 3. The input and output transformer, and input filter cabinets arrive as shown in Figures 5−1 through 5−4. See Appendix A for cabinet dimensions.

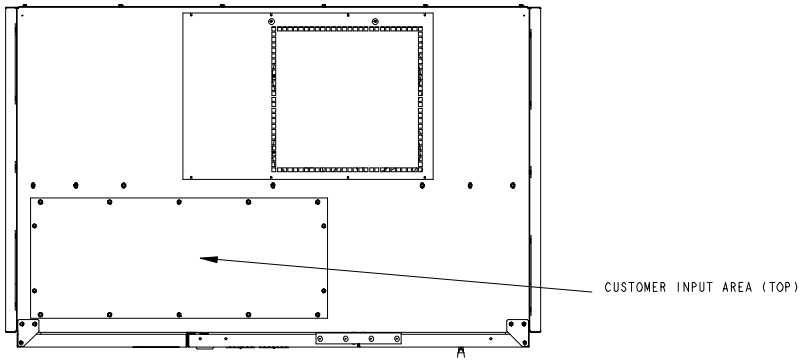


TOP VIEW

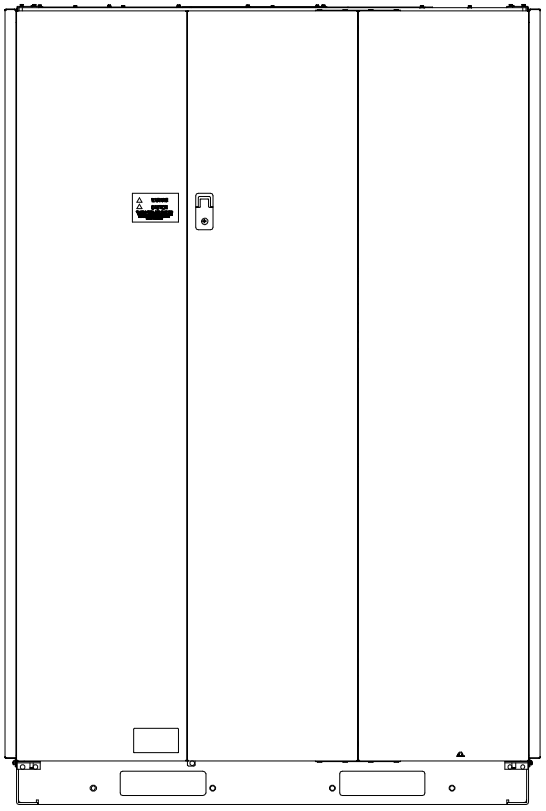


FRONT VIEW

Figure 5−1. Input Transformer Cabinet (480/480 and 600/480)

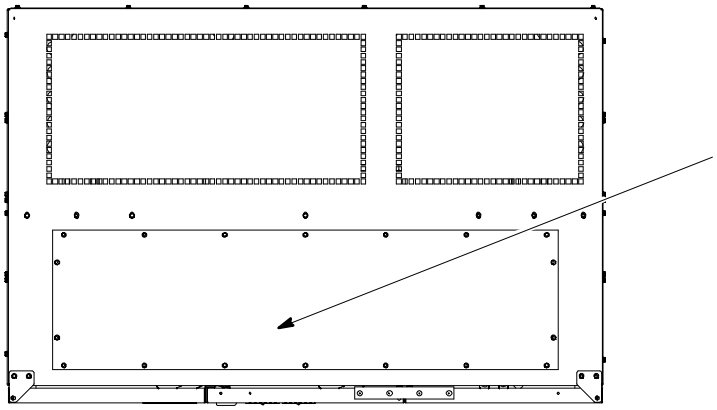


TOP VIEW



FRONT VIEW

Figure 5–2. 5% Input Filter Cabinet (480/480)



TOP VIEW

FRONT VIEW

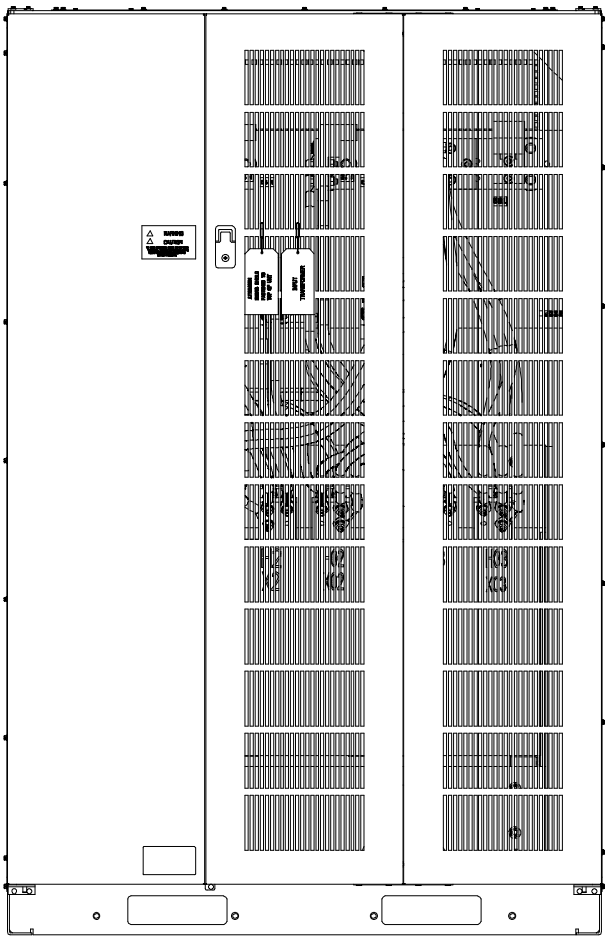


Figure 5−3. Input Transformer Cabinet (208/480)

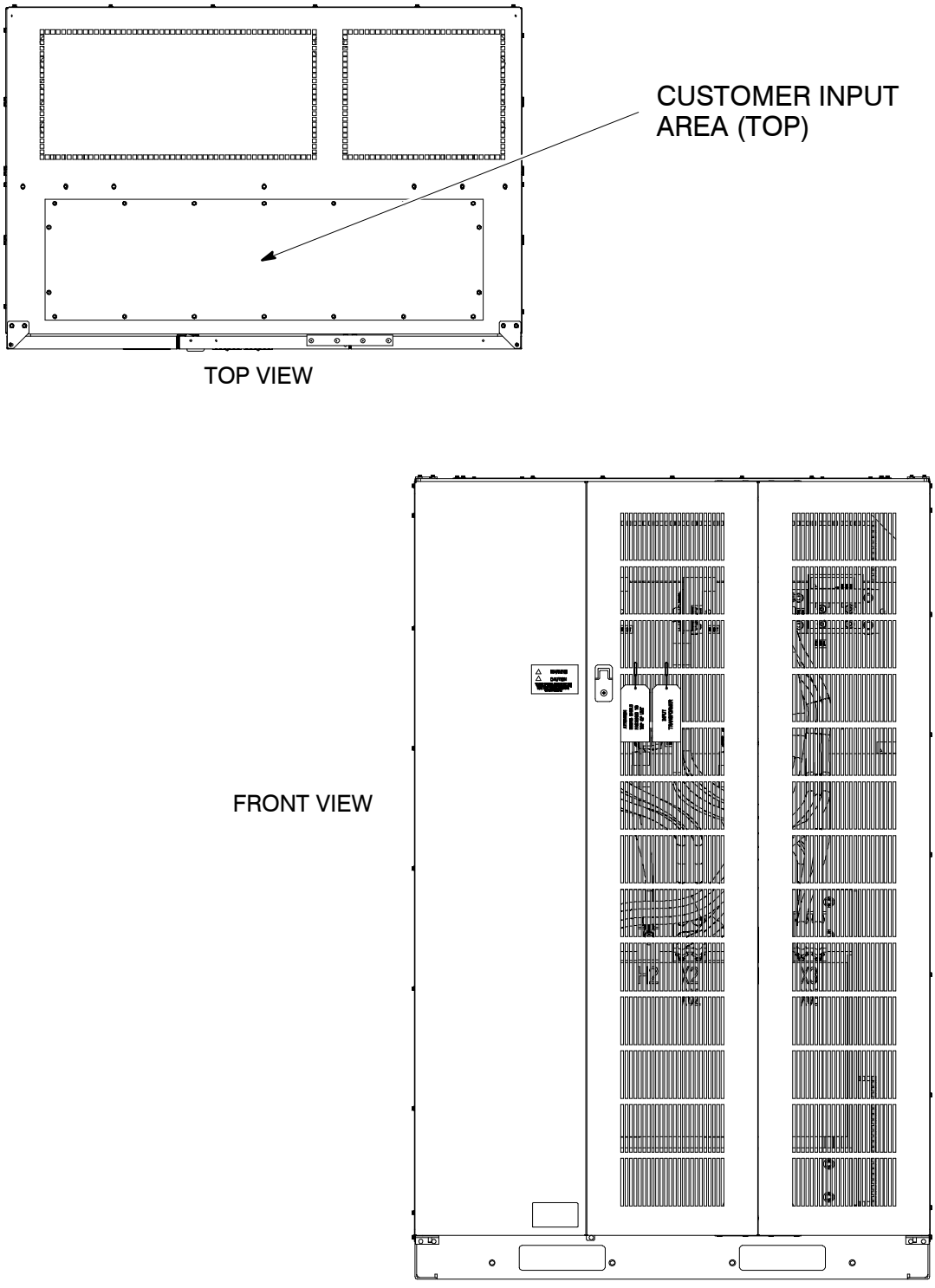


Figure 5–4. Output Transformer Cabinet (480/208)

To prepare the input and output transformer and input filter cabinets for wiring to the UPS:

1. Install the UPS into final operating position.
2. Install the cabinets into final operating position and secure.
3. Attach a ground conductor from the cabinets to closest ground bus.

To wire the input transformer or input filter cabinet (single feed):

NOTE: *Refer to drawing 164201118−1, Tables B, D, E, and F, in Appendix A for wiring information.*

1. Install wiring from utility to input cabinet using conduit through cable entry panel in the top of cabinet.
2. Install wiring from input cabinet to UPS cabinet using conduit through the cable entry panels in the top of the UPS.
3. Connect the cables as shown in Table A. Refer to Figures 5−5, 5−6, or 5−7 for location of connection points within the cabinets.

Table A. Input Transformer and Input Filter Connection Points (Single Feed)

Connection Point in Transformer or Input Filter Cabinet			*Connection point in UPS*
Phase	*Input*	*Output*	
∅ A	E23	E26	E1
∅ B	E24	E27	E2
∅ C	E25	E28	E3
Neutral	E22	E29	E12

4. Close the UPS cabinet and the input cabinet doors.

To wire the input transformer cabinets or input filter cabinet (dual feed):

NOTE: *Refer to drawing 164201118−1, Tables B, D, E, and F, in Appendix A for wiring information.*

1. Install wiring from utility to input cabinets using conduit through cable entry panel in the top of cabinets.
2. Install wiring from input cabinets to UPS cabinet using conduit through the cable entry panels in the top of the UPS.
3. Connect the cables as shown in Table B and C. Refer to Figures 5−5, 5−6, or 5−7 for location of connection points within the cabinets.
4. Close the rectifier input transformer cabinet doors and the bypass input transformer cabinet doors.

Table B. Rectifier Input Transformer and Input Filter Connection Points (Dual Feed)			
Connection Point in Transformer or Input Filter Cabinet			*Connection point in UPS*
Phase	*Input*	*Output*	
∅ A	E23	E26	E1
∅ B	E24	E27	E2
∅ C	E25	E28	E3
Neutral	E22	E29	E12

Table C. Bypass Input Transformer Connection Points (Dual Feed)			
Connection Point in Transformer Cabinet			*Connection point in UPS*
Phase	*Input*	*Output*	
∅ A	E23	E26	E6
∅ B	E24	E27	E7
∅ C	E25	E28	E8
Neutral	E22	E29	E12

To wire the output transformer cabinet:

NOTE: *Refer to drawing 164201118–1, Tables B, D, E, and F, in Appendix A for wiring information.*

1. Install wiring from UPS cabinet to transformer cabinet using conduit through cable entry panel in the top of cabinet.
2. Install wiring from input transformer cabinet to UPS cabinet using conduit through the cable entry panels in the top of the UPS.
3. Connect the cables as shown in Table D. Refer to Figure 5–8 for location of connection points within the transformer cabinets.

Table D. Output Transformer Connection Points			
Connection Point in Transformer Cabinet			*Connection point in UPS*
Phase	*Input*	*Output*	
∅ A	E23	E26	E9
∅ B	E24	E27	E10
∅ C	E25	E28	E11
Neutral	E29	E29	E12

4. Close the UPS cabinet doors and the output transformer cabinet door.

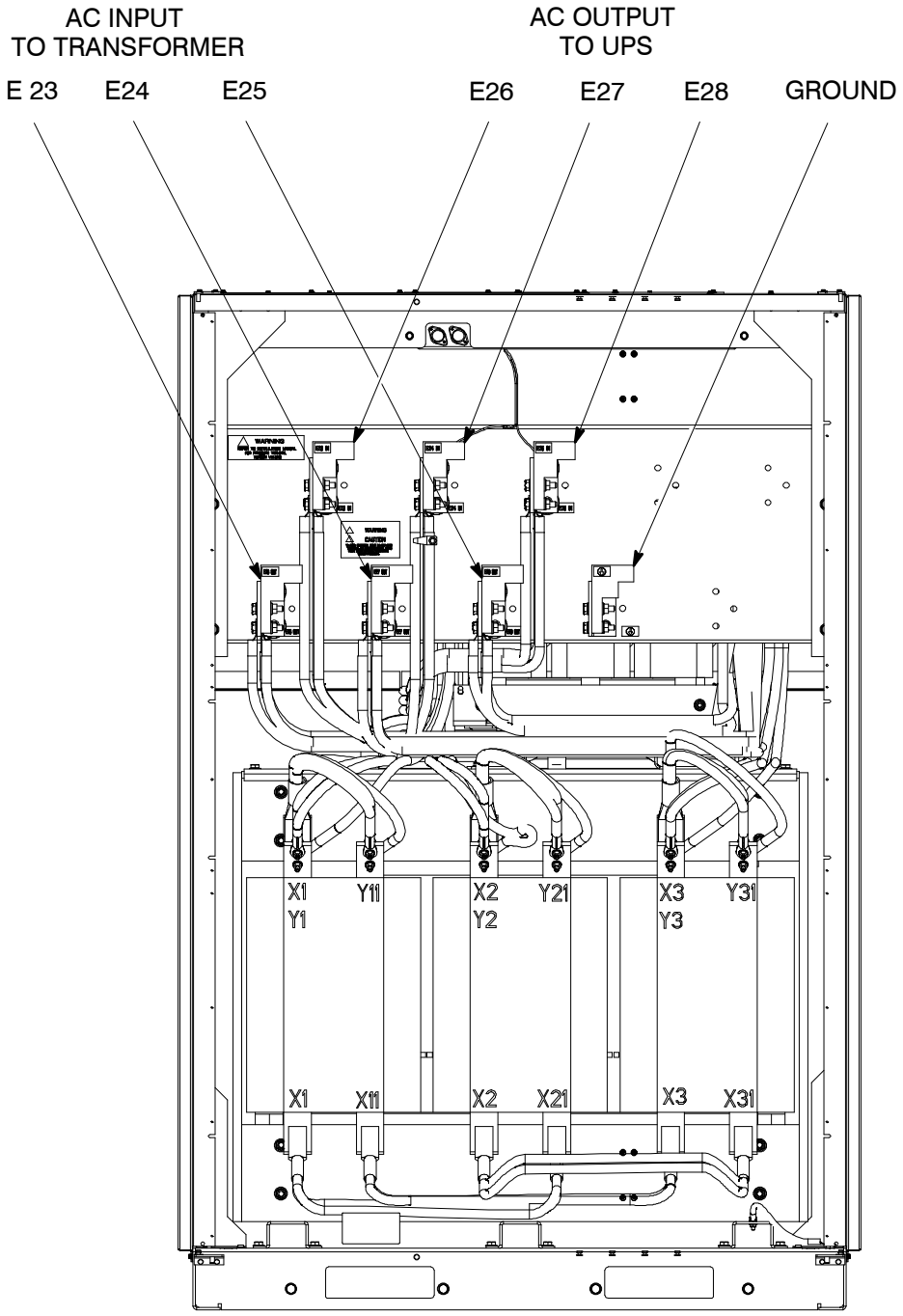


Figure 5–5. Installing a 480/480 VAC or 600/480 VAC Input Transformer Cabinet

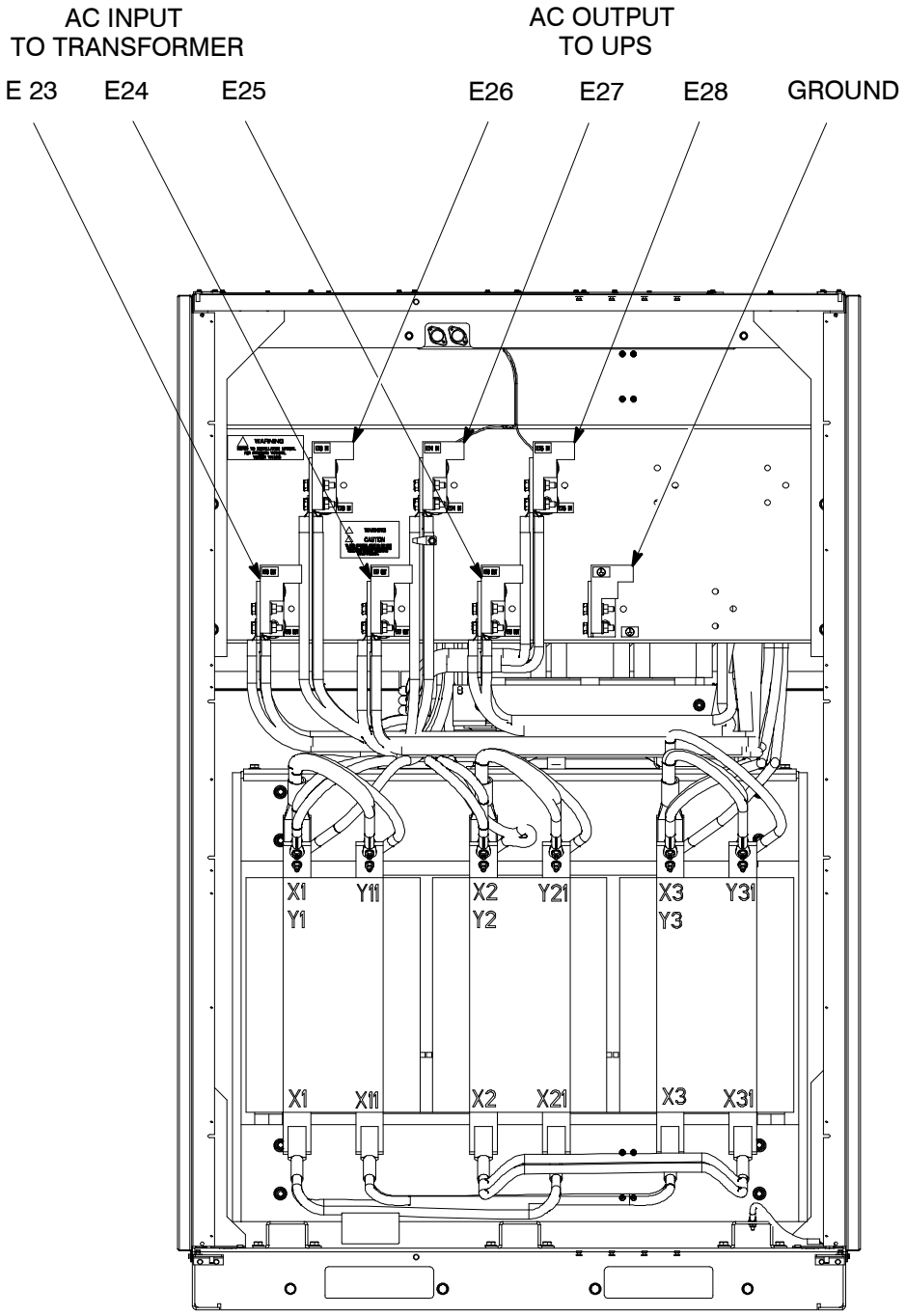


Figure 5–6. Installing an 480/480 VAC Input Filter Cabinet

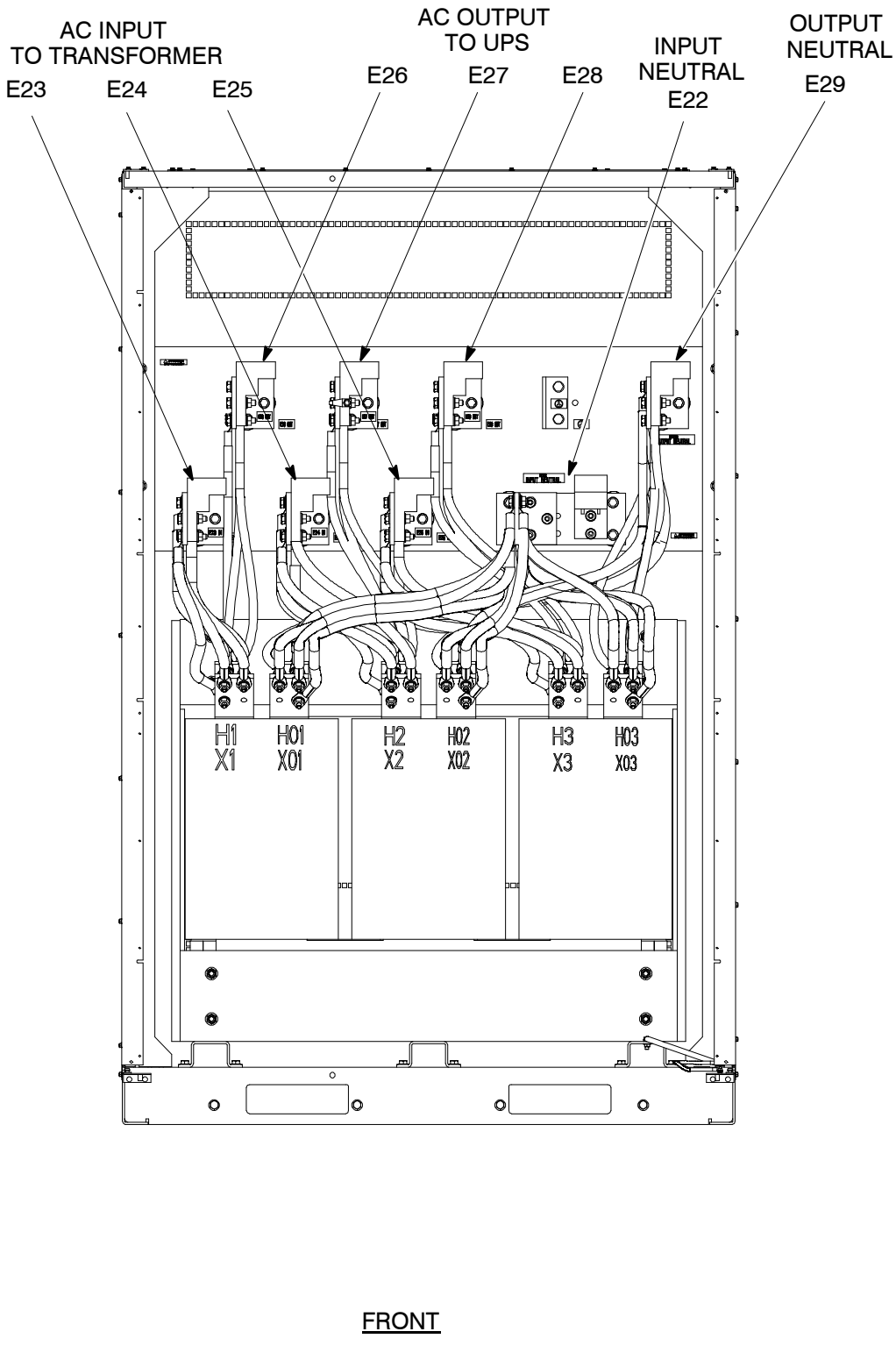


Figure 5–7. Installing a 208/480 VAC Input Transformer Cabinet

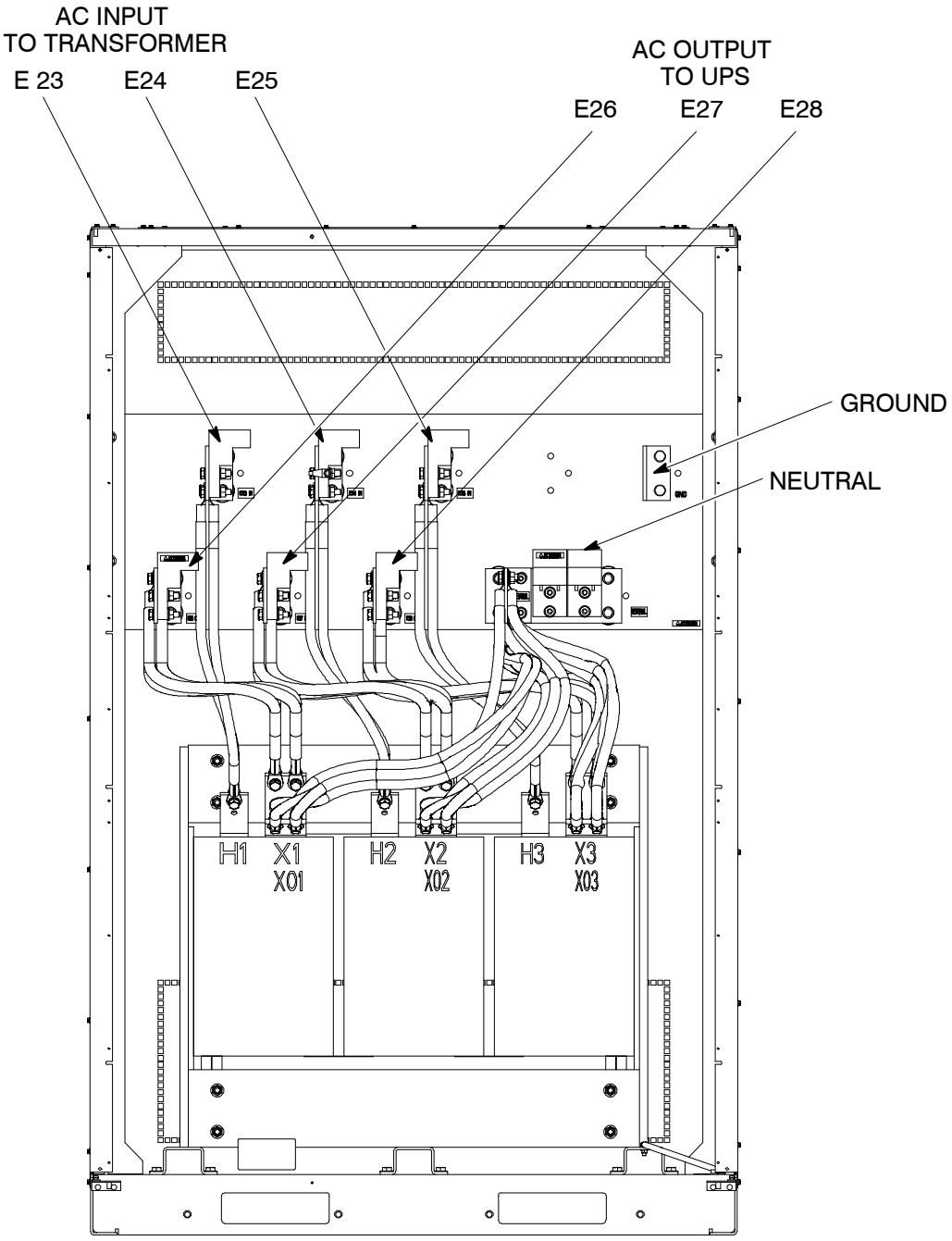


Figure 5–8. Installing a 480/208 VAC Output Transformer Cabinet

6 Installing a Power Distribution Module

The PDM cabinet has one or two interface panels, each containing 42 poles for breaker switches you can assign to meet the needs of your facility. Each panel is controlled by one 225 amp feeder breaker. The PDM cabinet arrives as shown in Figure 6−1 and Drawing 164201118−8 in Appendix A. Before installing the PDM, be sure you have prepared the UPS according to the instructions in Chapter 3. Refer to Powerware Power Distribution Module Installation and Operation Manual 164201061 for PDM installation and operation.

NOTE: *This option requires a 480 to 208 VAC transformer.*

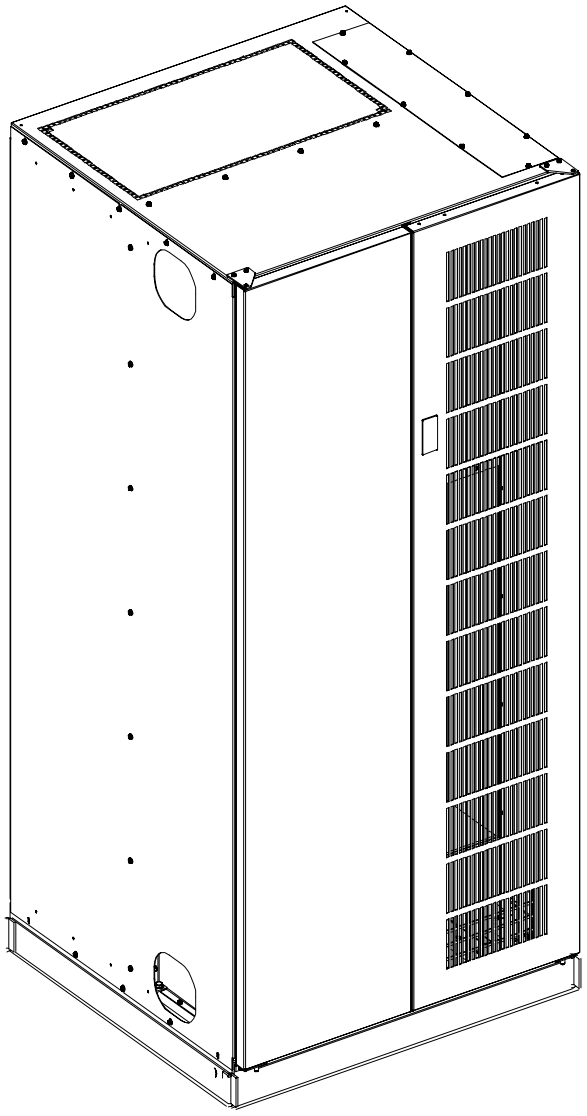


Figure 6−1. Typical PDM Cabinet

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7 Installing a Remote EPO Control

The Remote EPO control arrives as shown in Figure 7–1. See Drawing 164201118–9 in Appendix A for enclosure dimensions, side views, and knockout patterns.

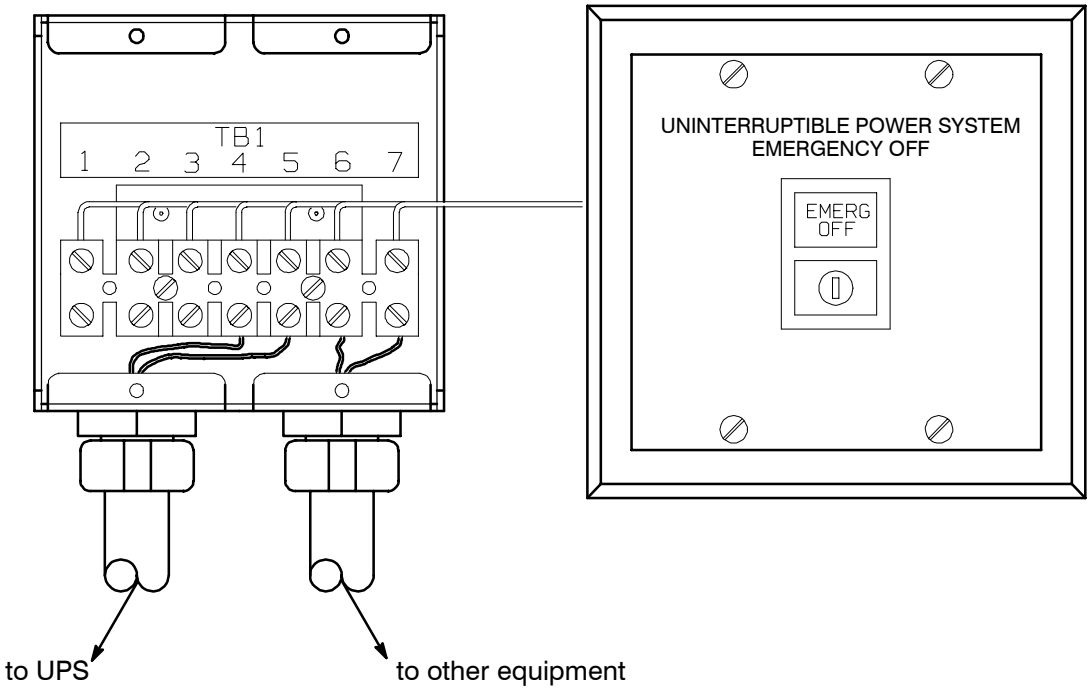


Figure 7–1. Remote EPO Control

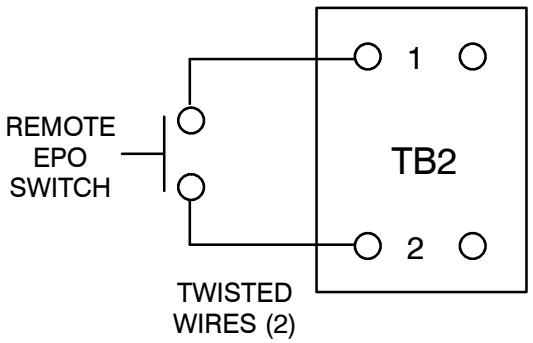
To install a Remote EPO control:

1. Securely mount the Remote EPO station. Recommended locations include operator's consoles or exit doors.
2. Install wiring from the Remote EPO station using ½-in. conduit through the cable entry panels in either the top or bottom of the UPS.
3. Connect the Remote EPO wiring as shown in Tables E and F:

Table E. Remote EPO Wire Terminations

From Remote EPO Station(s)	*To Communications Panel in UPS*	*Remarks*
TB1–4	TB2–1	Twisted wires (2) 14–18 gauge
TB1–5	TB2–2	

Table F. Remote EPO



Remote EPO switch rating is 24 VDC.
1 Amp minimum if supplied by user.

NOTE: This switch must be a dedicated switch not tied into any other circuits.

4. If you are installing multiple Remote EPO stations, wire additional stations in parallel with the first Remote EPO.
5. If required, install ½-in. conduit and wiring from the Remote EPO station to trip circuitry of upstream protective devices. A normally open contact is provided, as shown in Table F. Remote EPO switch wiring must be in accordance with UL Class II requirements.
6. Secure the UPS by reversing all steps taken to prepare it for Remote EPO installation.

8 Installing a Remote Battery Disconnect

The remote battery disconnect is crated separately for shipping. The enclosure is designed to be wall-mounted on a surface that can support the weight and bolt pattern. You can install a remote battery disconnect anywhere between the remote DC supply and the UPS, according to national and local codes. Figure 8–1 shows a typical remote battery disconnect enclosure.

The breaker switch on the remote battery disconnect should be set to the ON position for normal UPS operation when DC power is available at the UPS. When service personnel are performing maintenance on the UPS or battery cabinet, the switch should be set to the OFF position.

Installation Notes:

You should read and understand these general notes before beginning installation:

- There is no DC disconnect device within the UPS.
- The DC input to the UPS is only protected by internal fuses F21 and F22.
- The UPS DC disconnect trip signal from TB4, points 1 and 2 (shunt trip) or TB4, points 1 and 3 (UV trip) must be connected to the DC source disconnect device(s).
- Refer to Appendix A, drawing 164201118–13, for battery switch dimensions.

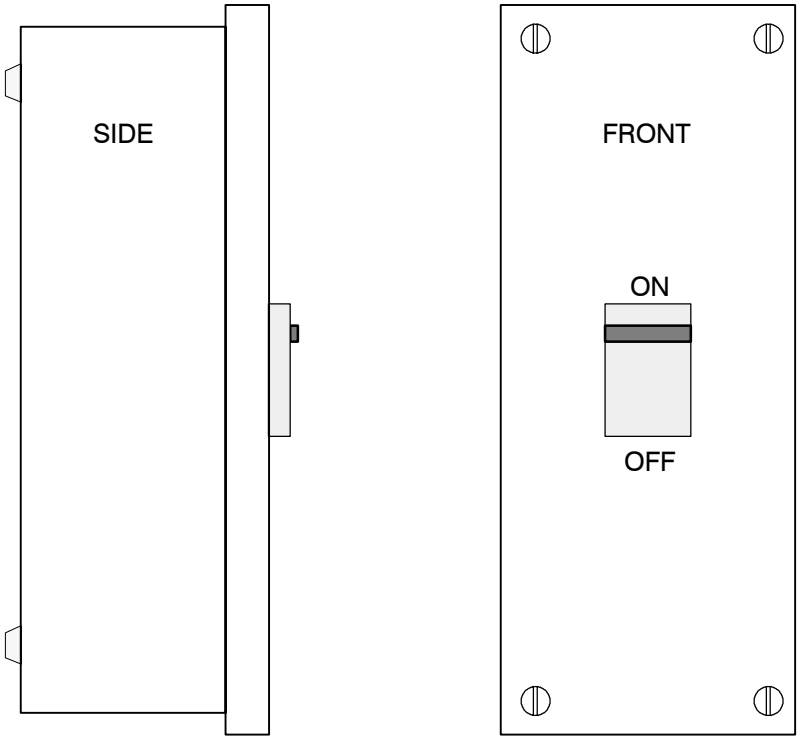


Figure 8–1. Remote Battery Disconnect Enclosure

- Refer to Appendix A, Table C of drawing 164201118−1, for specific ratings and wiring requirements.
- The material and labor for external wiring requirements is to be supplied by others.
- The knockout pattern for the K1200 breaker is determined by others at the time of installation.
- Power cables and control wiring must be installed in separate conduit.
- The ground conductor is to be sized per NEC Article 250 and local electrical code requirements.
- The maximum current listed is at the minimum DC operating voltage.
- Nominal voltages listed in this chapter are for a lead-acid battery plant rated per NEC at 2.00 VDC per cell.
- Battery cabinets must be installed in accordance with all applicable codes and regulations, including the National Electrical Code (NEC), Article 480.
- The UPS to battery cable should be sized for a total maximum voltage drop of 1% nominal DC link voltage at maximum current.
- Table G in this chapter details the power cable terminations.
- The remote battery disconnect weighs approximately 34 kg (75 lb). It has an ampere interrupting capacity (AIC) of 22,000 at 500 VDC.
- Tightening Torque: 28.7−31.1 N-M (255−275 lb-in.)
  Internal Drive Hex Size: 5/16 in.

Table G. Remote Battery Disconnect Power Terminations		
Terminal	*Size of Pressure Termination*	*Terminal Function*
E4 (+)	See Appendix A, Table D	UPS Battery Input (+)
E5(–)	See Appendix A, Table D	UPS Battery Input (–)
Breaker (+)	(3) 3/0–500 kcmil	Battery Disconnect (+)
Breaker (–)	(3) 3/0–500 kcmil	Battery Disconnect (–)
Breaker (jumper)	(3) 3/0–500 kcmil	Battery Disconnect (jumper)
Series 1085 Battery Cabinet (+)	(1) 3/0–250 kcmil [Breaker]	Stand-alone battery cabinet (+)
Series 1085 Battery Cabinet (–)	(1) 3/0–250 kcmil [Breaker]	Stand-alone battery cabinet (–)

Table H. Remote Battery Disconnect Circuit Breaker Ratings		
UPS Model	*Circuit Breaker Rating*	*DC Voltage*
Powerware 9315 300	800	480
Powerware 9315 300	900	420
Powerware 9315 400	1200	420
Powerware 9315 400	1000	480
Powerware 9315 500	1200	480

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9 Installing a Remote Monitor Panel

As an option, you can install Remote Monitor Panels (RMPs) to monitor the operation of the UPS system from virtually any location within your facility, up to 500 feet from the UPS. You can flush-mount or surface-mount an RMP on a desktop or on a wall, wherever you have a serial interface line. A maximum of two monitoring accessories (RMPs, RIMs, or SCMs) can be installed. See Table I for the number of accessories permitted. Figure 9–1 shows an RMP. Drawing 164201118–10 in Appendix A shows the enclosure dimensions and knockout patterns.

Table I. Optional Monitoring Accessories

Number and Type of Accessories Permitted		
Remote Monitor Panel	Relay Interface Panel	Supervisory Contact Module
2	—	—
—	2	—
—	—	2
1	1	—
1	—	1
—	1	1

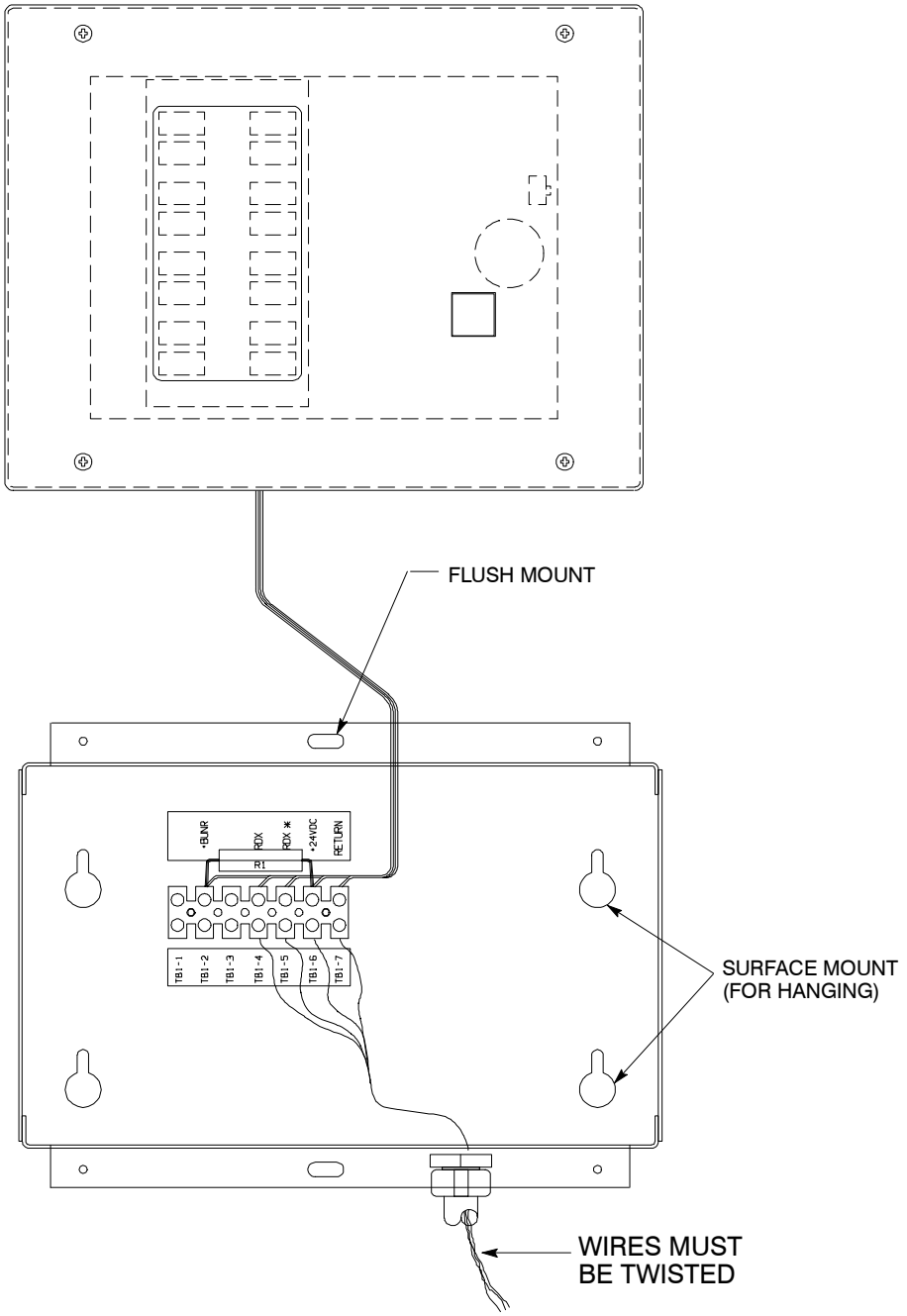

Figure 9–1. Remote Monitor Panel (RMP)

Before installing an RMP, be sure you have prepared the UPS according to the instructions in Chapter 3.

To install an RMP:

1. Securely mount the RMP(s).
2. Install wiring from the RMP using ½-in. conduit through the cable entry panels in either the top or bottom of the UPS cabinet.

   The top entry connection requires installation of ½-in. flexible conduit within the UPS. Bottom entry connection requires no additional routing of conduit within the UPS.
3. In the spare parts kit, locate the RMP adapter cable assembly (see Figure 9−2).
   Mate the DE−9 connector on the back of the terminal block into the DE−9 connector on the Communications Panel of the UPS (see Figure 9−3). Use two screws from the spare parts kit to secure the terminal block bracket to the Communications Panel.

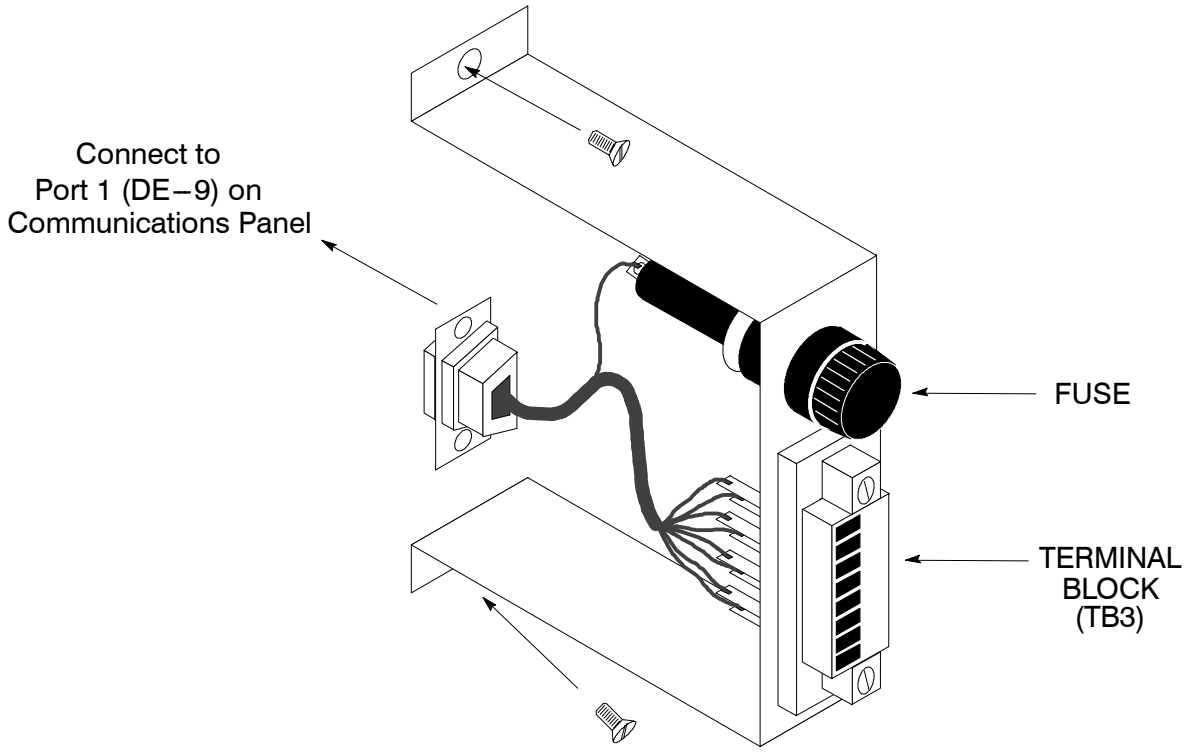

Figure 9−2. Terminal Block Bracket

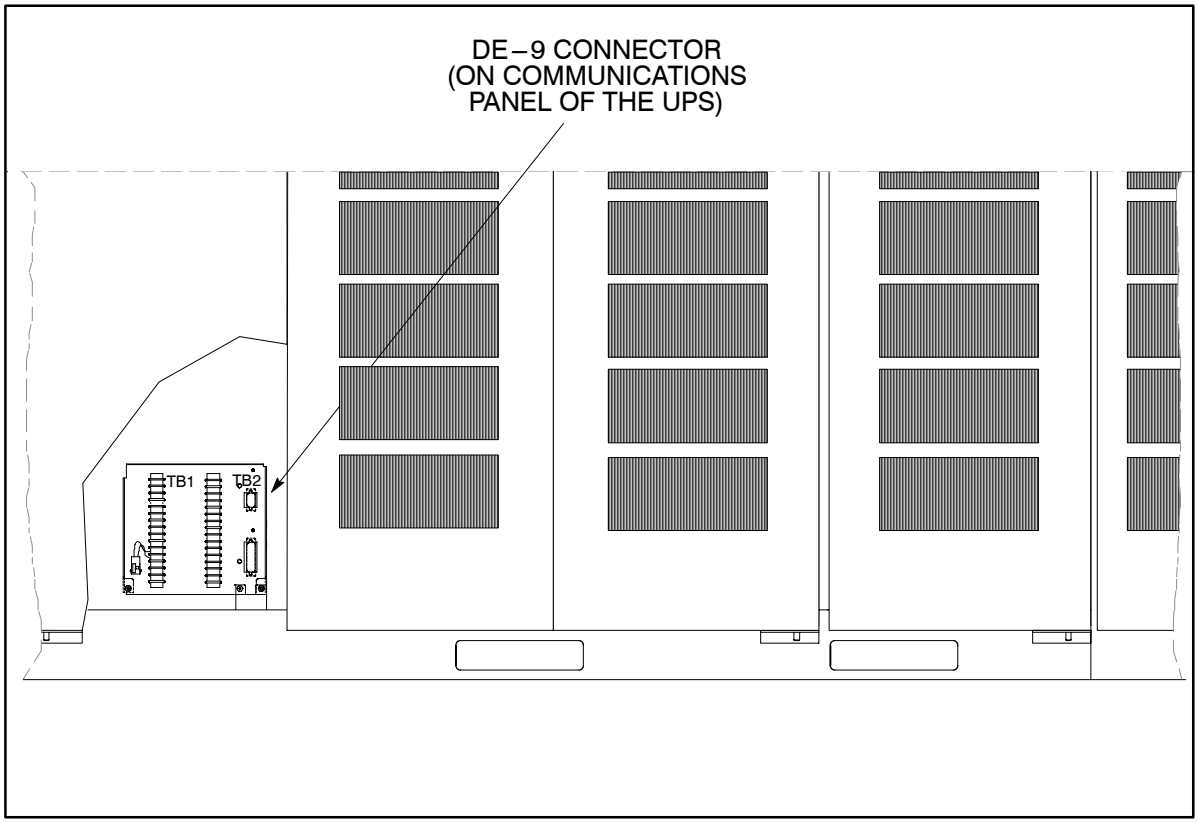

Figure 9–3. Wiring an RMP to the UPS

4. Connect RMP wiring to the terminal block using terminations shown in Table J.

Table J. RMP Wire Terminations

From RMP A	*To UPS*	*Remarks*
TB1–4	TB3–1	TWISTED WIRES (4) 1–2 TURNS PER 3 INCHES
TB1–5	TB3–2	
TB1–6	TB3–3	
TB1–7	TB3–4	
From RMP B (if used)	*To UPS*	*Remarks*
TB1–4	TB3–5	TWISTED WIRES (4) 1–2 TURNS PER 3 INCHES
TB1–5	TB3–6	
TB1–6	TB3–7	
TB1–7	TB3–8	

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

   If the communications link between the UPS and the RMP is not present, the RMP will self-test (all indicators flash and the horn beeps at one-second intervals). If this occurs, check all harness connectors and the fuse for proper seating. If all connections are secure but the RMP continues to self-test, replace the fuse with the spare included in the hardware kit. If this does not correct the problem, contact your local field service office for verification that the RMP is working correctly.

6. To test the indicator lamps, press the horn silence button and hold it for 3 seconds. All lamps should light, and the horn will sound continuously until you release the button.

7. Repeat steps 1, 2, and 4 through 6 for each RMP you are installing.

8. If you are installing an RIM or SCM in addition to an RMP, proceed to Chapter 9 or 10, respectively; otherwise, secure the UPS cabinet by reversing the steps contained in procedure “To Prepare the UPS for Wiring to an RMP, RIM, SCM, or Remote EPO” of Chapter 3.

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10 Installing a Relay Interface Module

The optional Relay Interface Module (RIM) uses relay contact closures to indicate the operating status and alarm condition of the UPS system. The module uses an RS422 serial interface line and may support up to eight critical loads. A maximum of two monitoring accessories (RMPs, RIMs, or SCMs) can be installed. Refer to Chapter 9, Table I for the number of accessories permitted. Figure 10−1 shows the RIM with its four 15-pin connectors labeled J1 through J4. Drawing 164201118−11 in Appendix A outlines the enclosure dimensions.

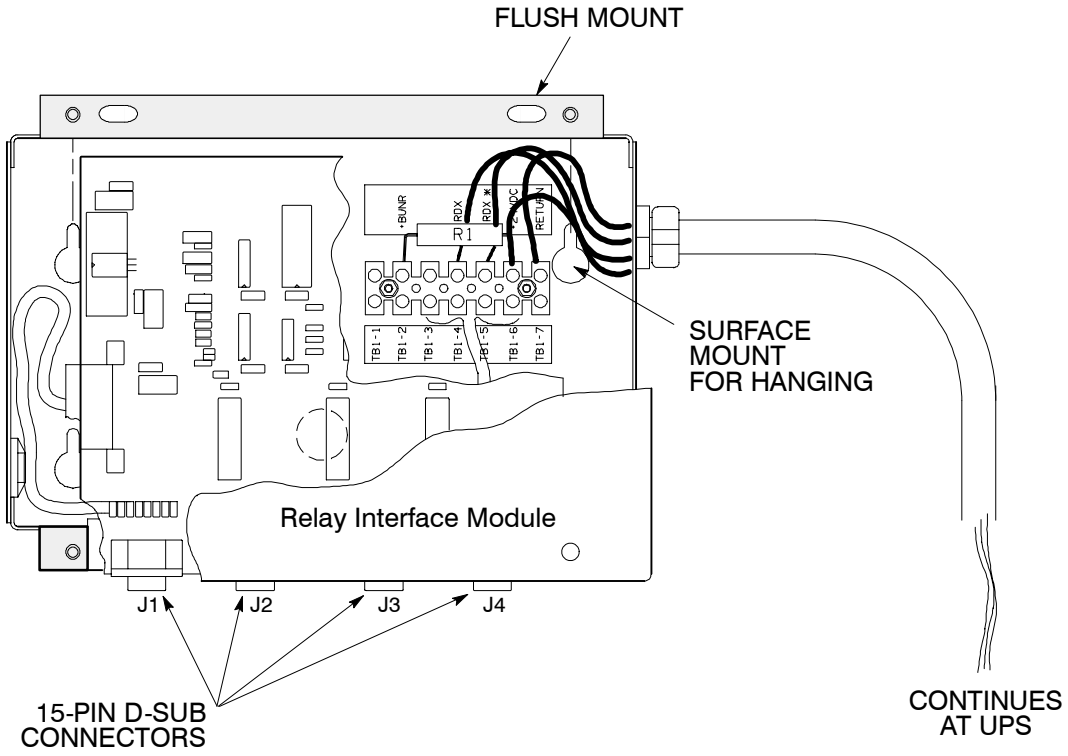

Figure 10−1. Relay Interface Module

To install an RIM:

1. Securely mount the RIM.
2. Install wiring from the RIM using ½-in. conduit through the conduit entry plate in either the top or bottom of the UPS cabinet.

   The top entry connection requires installation of ½-in. flexible conduit within the UPS. Bottom entry requires no additional routing of conduit within the UPS.

3. If not already installed, locate the RMP adapter cable assembly (see Figure 10−2) in the spare parts kit. Mate the DE−9 connector on the back of the terminal block into the DE−9 connector on the Communications Panel of the UPS (see Figure 10−3). Use two screws from the spare parts kit to secure the terminal block bracket to the Communications Panel.

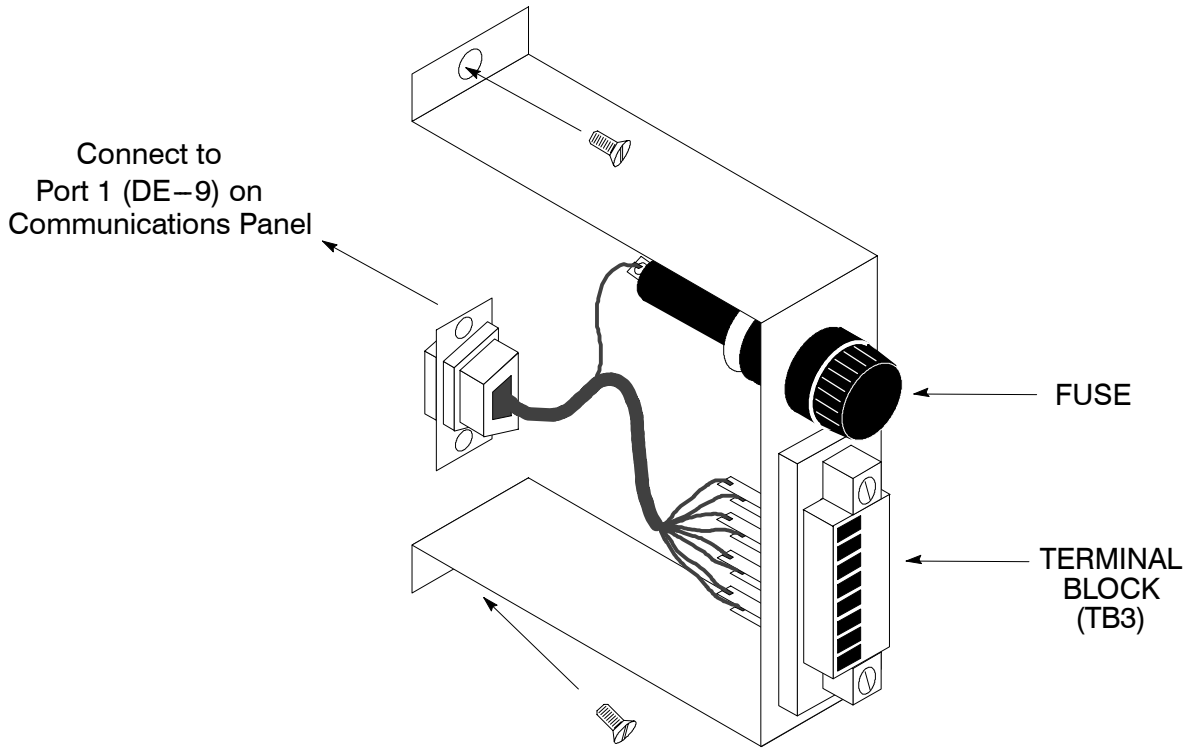

Figure 10−2. Terminal Block Bracket

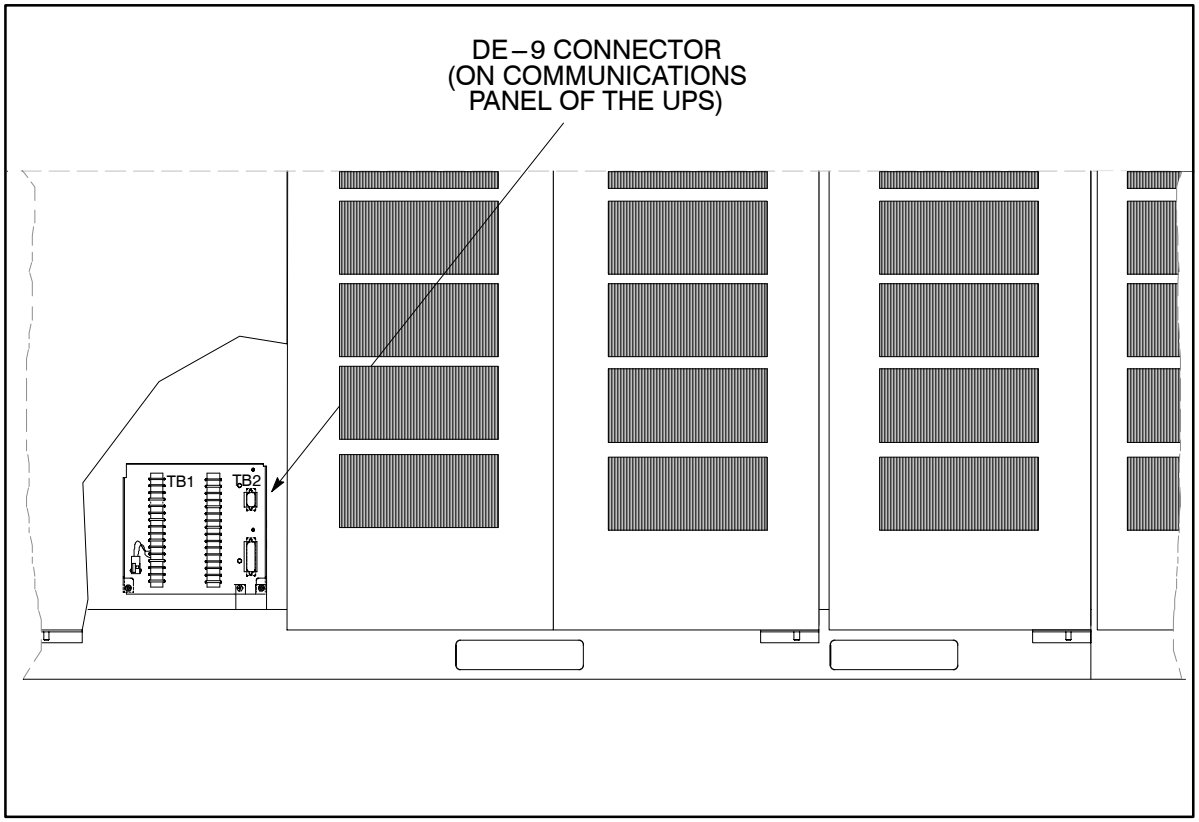

Figure 10−3. Wiring an RIM to the UPS

4. Connect RIM wiring to the terminal block using the terminations shown in Table K.
5. Contact your local field service office for verification and testing of the RIM and its connections prior to making connections with J1–J4.

   You can order interface cables separately for connecting to the 15-Pin D-Sub Connectors.

6. Repeat steps 1 through 5 for each RIM you are installing.
7. If you are installing an RMP or SCM in addition to an RIM, proceed to Chapter 8 or 10, respectively; otherwise, secure the UPS cabinet by reversing the steps contained in procedure “To Prepare the UPS for Wiring to an RMP, RIM, SCM, or Remote EPO” of Chapter 3.

Table K. RIM Wire Terminations

From RIM A	*To UPS*	*Remarks*
TB1–4	TB3–1	TWISTED WIRES (4) 1–2 TURNS PER 3 INCHES
TB1–5	TB3–2	
TB1–6	TB3–3	
TB1–7	TB3–4	
From RIM B (if used)	*To UPS*	*Remarks*
TB1–4	TB3–5	TWISTED WIRES (4) 1–2 TURNS PER 3 INCHES
TB1–5	TB3–6	
TB1–6	TB3–7	
TB1–7	TB3–8	

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11 Installing a Supervisory Contact Module

The optional Supervisory Contact Module (SCM) as shown in Figure11−1 provides contacts for monitoring UPS status. A maximum of two monitoring accessories (RMPs, RIMs, or SCMs) can be installed. Refer to Chapter 9, Table I for the number of accessories permitted. See Drawing 164201118−12 in Appendix A for enclosure dimensions, side views, and knockout patterns.

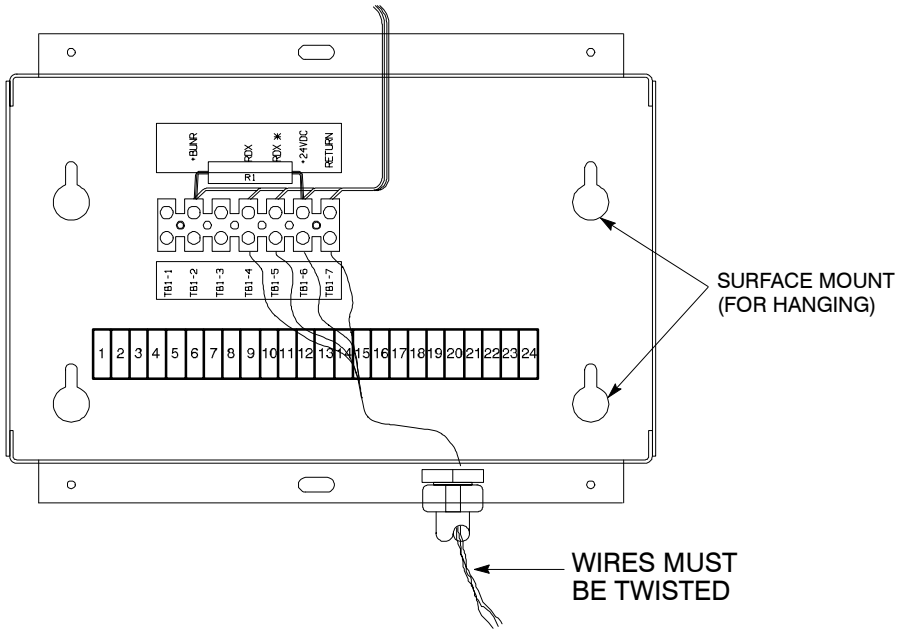


Figure 11−1. Supervisory Contact Module

To install a Supervisory Contact Module:

1. Securely mount the SCM.
2. Install wiring from the SCM using ½-in. conduit through the conduit entry plate in either the top or bottom of the UPS cabinet.

   The top entry connection requires installation of ½-in. flexible conduit within the UPS. Bottom entry connection requires no additional routing of conduit within the UPS.
3. If not already installed, locate the RMP adapter cable assembly (see Figure 11−2) in the spare parts kit. Mate the DE−9 connector on the back of the terminal block into the DE−9 connector on the Communications Panel of the UPS (see Figure 11−3). Use two screws from the spare parts kit to secure the terminal block bracket to the Communications Panel.

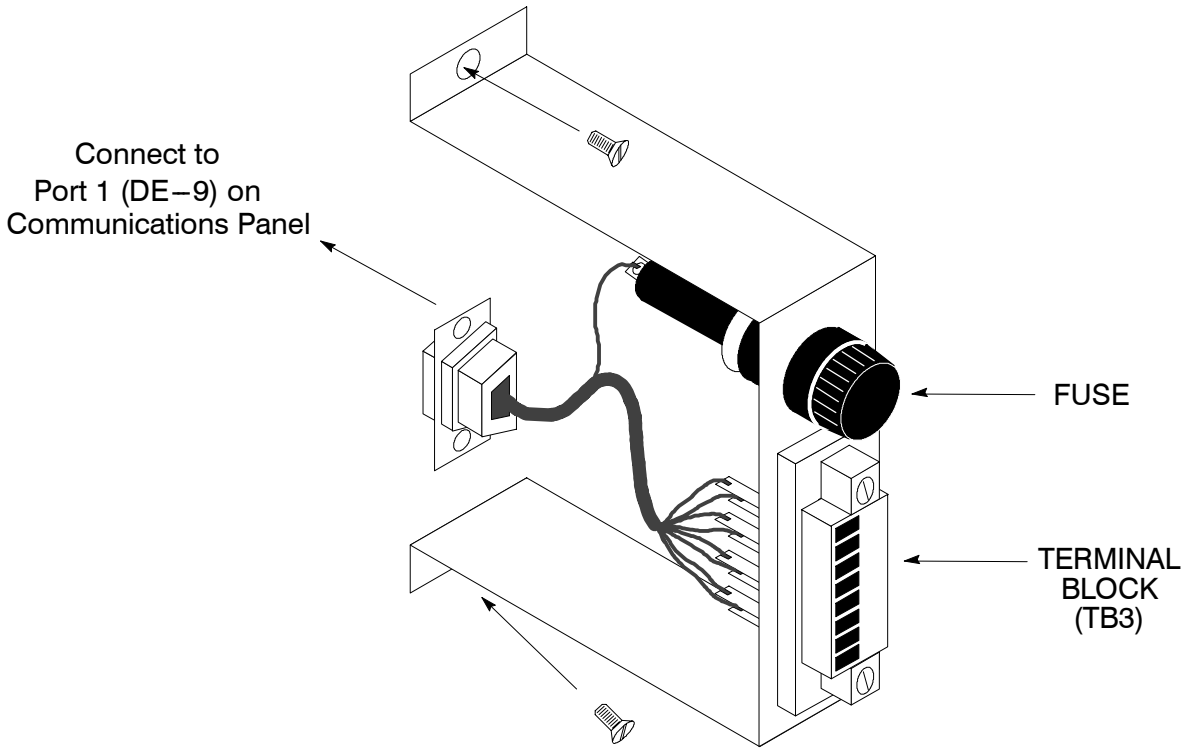


Figure 11−2. Terminal Block Bracket

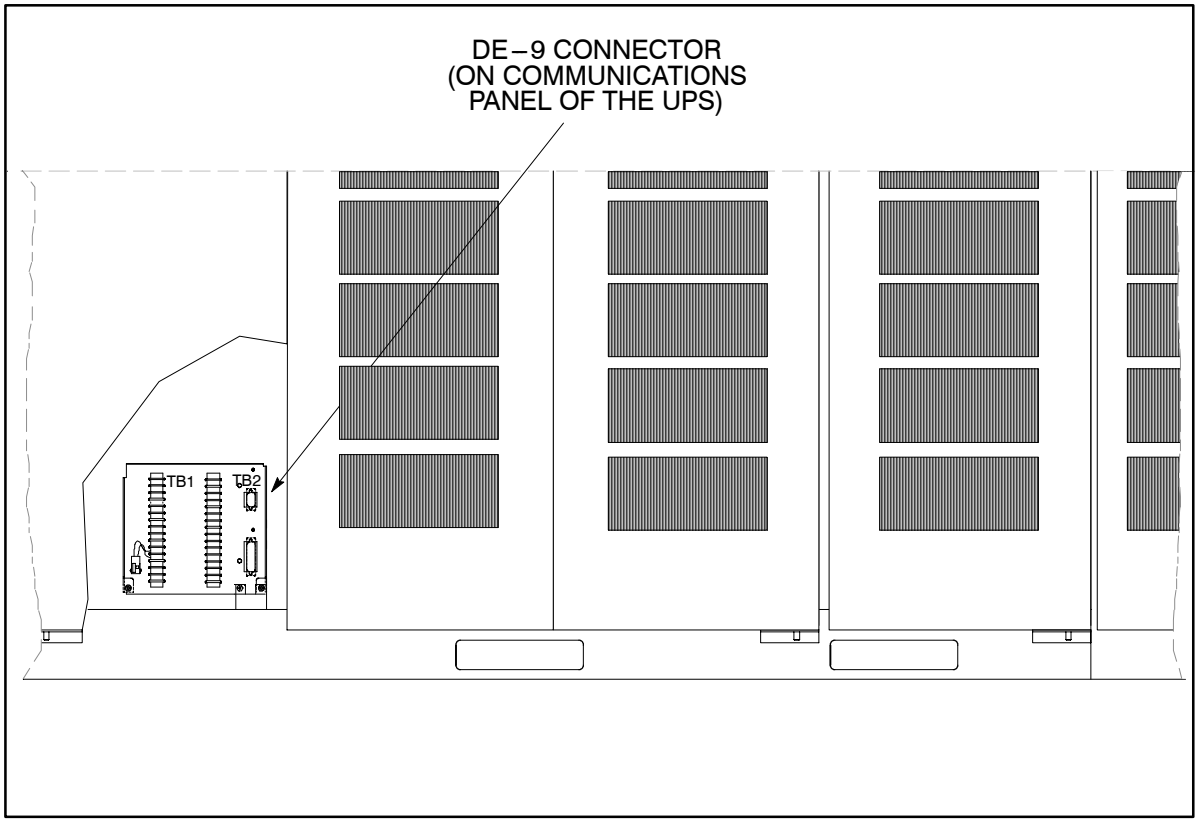
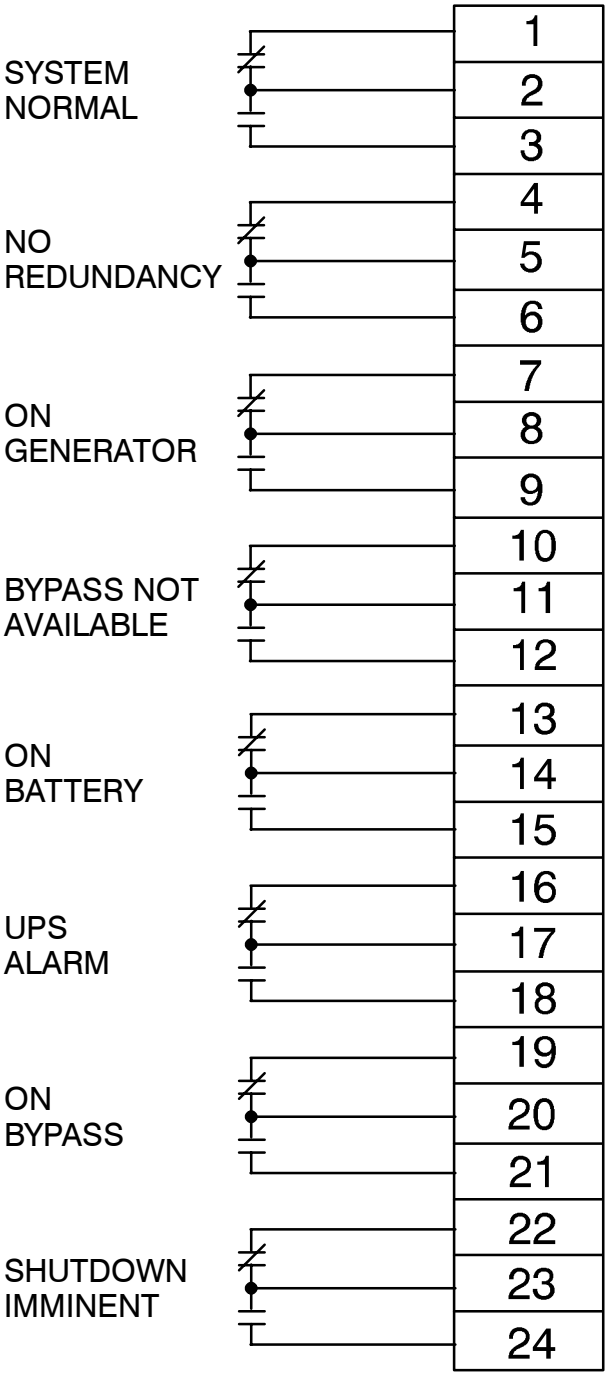


Figure 11−3. Wiring an SCM to the UPS

4. Connect the SCM wiring to the terminal block using the terminations shown in Table L.
5. Contact your local field service office for verification and testing of the SCM and its connections prior to making connections to terminal strip shown in Figure 11–4.
6. Repeat steps 1 through 5 for each SCM you are installing.
7. If you are installing an RMP or RIM in addition to an SCM, proceed to Chapter 8 or 9, respectively; otherwise, secure the UPS cabinet by reversing the steps contained in procedure “To Prepare the UPS for Wiring to an RMP, RIM, SCM, or Remote EPO” of Chapter 3.

Table L. Supervisory Contact Module Wire Terminations

From SCM A	*To UPS*	*Remarks*
TB1–4	TB3–1	TWISTED WIRES (4) 1–2 TURNS PER 3 INCHES
TB1–5	TB3–2	
TB1–6	TB3–3	
TB1–7	TB3–4	
From SCM B (if used)	*To UPS*	*Remarks*
TB1–4	TB3–5	TWISTED WIRES (4) 1–2 TURNS PER 3 INCHES
TB1–5	TB3–6	
TB1–6	TB3–7	
TB1–7	TB3–8	



Note: *Supervisory contacts are rated at 2.0 amps at 28 Vdc or 120 Vac and 0.15 amp at 115 Vdc.*

Supervisory contacts require external power supply. Internal 24 Vdc is not capable of supplying contact current.

Figure 11–4. Supervisory Contact Module TB2

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:

- 164201118–1 Installation Notes
- 164201118–2 Typical UPS System
- 164201118–3 UPS System Oneline Configurations
- 164201118–4 Oneline Drawing of UPS System
- 164201118–5 Location of UPS Power Terminals
- 164201118–6 UPS Cabinet
- 164201118–7 Transformer Cabinets
- 164201118–8 Power Distribution Module
- 164201118–9 Remote Emergency Power Off
- 164201118–10 Remote Monitor Panel
- 164201118–11 Relay Interface Module
- 164201118–12 Supervisory Contact Module
- 164201118–13 Battery Disconnect Switch

Table A. INPUT/OUTPUT Ratings & External Wiring Requirements for **Powerware 9315 400**				
Ratings		***Units***	***Rating 50/60 Hz***	
Basic unit rating at 0.8 lagging PF load		KVA KW	300 240	400 320
		INPUT/OUTPUT VOLTAGE	400	400
AC INPUT	**AC Input to UPS Rectifier (0.95min.PF)** *3Ø, 1 gnd* *Minimum conductor size (number per Ø)* Ⓐ *Minimum conductor size (number per Ø* *(Maximum amps includes full load current plus battery recharge current)	With Filter:		
		Amps*	476	635
		AWG or kcmil(ea)	4/0(3)	300(3)
		Without Filter:		
		Amps*	560	747
		AWG or kcmil(ea)	250(3)	400(3)
AC INPUT	**AC Input to Bypass** *Full Load Current 3Ø, (1) Neutral, (1) gnd* *Minimum conductor size (number per Ø)* Ⓑ	Amps	433	577
		AWG or kcmil(ea)	3/0(3)	250(3)
DC INPUT	**DC Input from Battery to UPS** *(1) positive, (1) negative* Ⓒ *Minimum conductor size (number per Ø)*	VDC	420	420
		Amps @ (1.8V/cell)	686	914
		AWG or kcmil(ea)	See Table C	See Table C
AC OUTPUT	**AC Output to Critical Load** *Full Load Current 3Ø, (1) Neutral, (1) gnd* *Minimum conductor size (number per Ø)* Ⓓ	Amps	433	577
		AWG or kcmil(ea)	3/0(3)	250(3)

Read and understand the following notes while planning your installation:

1. Refer to national and local electrical codes for acceptable external wiring practices.
2. Material and labor for external wiring requirements are to be provided by designated personnel.
3. For external wiring, use 90°C copper wire. See the appropriate column in Table A.
4. Wire ampacities are chosen from Table 310–16 of the NEC. Wire is 90°C specification.
5. The neutral conductor is considered to be a current-carrying conductor per note 10 of the Notes to Ampacity Table 310 of the NEC. If a neutral is used, the wire is derated by 80% per Note 8(a) of the Notes to Ampacity Table 310 assuming 4–6 conductors in a raceway. If there is no neutral, it is assumed that there is only 3 current carrying conductors in a raceway (one per phase).

NOTE: Callout letter Ⓐ, Ⓑ, Ⓒ, and Ⓓ map to drawing #164201118–4

DESCRIPTION:	**INSTALLATION NOTES**		
DRAWING NO:	164201118–1	*SHEET:*	1 of 17
REVISION: F		*DATE:*	041500

Table B. INPUT/OUTPUT Ratings & External Wiring Requirements for **Powerware 9315 500**						
Ratings		***Units***	***Rating 60 Hz***			
Basic unit rating at 0.8 lagging PF load		KVA KW	400 320	400 320	500 400	500 400
		INPUT/OUTPUT VOLTAGE	208	480	480	600
AC INPUT	**AC Input to UPS Rectifier or Input Transformer (0.95min.PF)** *3Ø, 1 gnd, 1 Neutral (Input Transformer only)* *Minimum conductor size (number per Ø)*	With Filter:				
		Amps*	1280	560	640	512
		AWG or kcmil(ea)	600(5)	500(2)	300(3)	250(3)
		Without Filter:				
		Amps*	N/A	640	800	640
	Minimum conductor size (number per Ø) (A)	AWG or kcmil(ea)	N/A	300(3)	400(3)	300(3)
	*(Maximum amps includes full load current plus battery recharge current)					
AC INPUT	**AC Input to UPS Rectifier from Input Transformer** *3Ø, 1 gnd* *Minimum conductor size (number per Ø)* (E)	With Filter:				
		Amps	560	560	640	640
		AWG or kcmil(ea)	500(2)	500(2)	300(3)	300(3)
AC INPUT	**AC Input to 5% Filter** *3Ø, 1 Neutral, 1 gnd* *Minimum conductor size (number per Ø)* (A)	With Filter:				
		Amps	N/A	560	640	N/A
		AWG or kcmil(ea)	N/A	500(2)	300(3)	N/A
AC INPUT	**AC Input to UPS Rectifier from 5% *Filter*** *3Ø, 1 gnd* *Minimum conductor size (number per Ø)* (E)	With Filter:				
		Amps	N/A	560	640	N/A
		AWG or kcmil(ea)	N/A	500(2)	300(3)	N/A
AC INPUT	**AC Input to UPS Bypass or Bypass Transformer** *Full Load Current 3Ø, (1) Neutral, (1) gnd* *Minimum conductor size (number per Ø)* (B)	Amps	1280	480	601	480
		AWG or kcmil(ea)	600(5)	250(3)	300(3)	250(3)
AC INPUT	**AC Input to UPS Bypass from Bypass Transformer** *Full Load Current 3Ø, (1) Neutral, (1) gnd* *Minimum conductor size (number per Ø)* (F)	Amps	560	N/A	N/A	640
		AWG or kcmil(ea)	500(2)	N/A	N/A	300(3)
DC INPUT	**DC Input from Battery to UPS** *(1) positive, (1) negative*	VDC	480	480	480	480
		Amps @ (1.8V/cell)	800	800	1000	1000
	Minimum conductor size (number per Ø) (C)	AWG or kcmil(ea)	See Table C	See Table C	See Table C	See Table C
AC OUT-PUT	**AC Output to Output Transformer or Critical Load** *Full Load Current 3Ø, (1) Neutral, (1) gnd* *Minimum conductor size (number per Ø)* (G)	Amps	480	480	601	601
		AWG or kcmil(ea)	250(3)	250(3)	350(3)	350(3)
AC OUT-PUT	**AC Output from Output Transformer to Critical Load** *Full Load Current 3Ø, (1) Neutral, (1) gnd* *Minimum conductor size (number per Ø)* (D)	Amps	1110	N/A	N/A	480
		AWG or kcmil(ea)	600(5)	N/A	N/A	4/0(3)
ISO GND	**Isolated Ground Connection to Grounding Electrode system (Optional)** *Minimum conductor size (number per Ø)* (H)	AWG or kcmil(ea)	1/0 (2)			

NOTE: Callout letter (A), (B), (C), (D), (E), (F), (G), and (H) map to drawing #164201118–4

DESCRIPTION:	**INSTALLATION NOTES**		
DRAWING NO:	164201118–1	*SHEET:*	2 of 17
REVISION: F		*DATE:*	041500

Read and understand the following notes while planning your installation:

1. Refer to national and local electrical codes for acceptable external wiring practices.
2. Material and labor for external wiring requirements are to be provided by designated personnel.
3. For external wiring, use 90°C copper wire. See the appropriate column in Table B.
4. Wire ampacities are chosen from Table 310−16 of the NEC. Wire is 90°C specification.
5. The 208V input isolation tranformer is intended for use with UPS units with input filter option only.
6. The neutral conductor is considered to be a current-carrying conductor per note 10 of the Notes to Ampacity Table 310 of the NEC. If a neutral is used, the wire is derated by 80% per Note 8(a) of the Notes to Ampacity Table 310 assuming 4−6 conductors in a raceway. If there is no neutral, it is assumed that there is only 3 current carrying conductors in a raceway (one per phase).

DESCRIPTION:	**INSTALLATION NOTES**		
DRAWING NO:	164201118−1	*SHEET:*	3 of 17
REVISION: D		*DATE:*	101598

Table C. Battery Cabinet Ratings and External Wiring Requirements								
UPS	*Model*	*Battery Type*	*Cabinet Series*	*Number of Cabinets*	*DC Voltage*	*DC Amps per Cabinet*	*Minimum Conductor Size per Cabinet (AWG or kcmil)*	*Number of Wires per Cabinet*
PWP500	500	J27	1085	4	480	300	4/0	1 pos 1 neg
	500	J31	1085	4	480	300	4/0	
	500	J31	1085	3	480	300	350	
	500	J37	1085	3	480	300	350	
	500	J37	1085	4	480	300	4/0	
	500	J47	1085	3	480	300	350	
	500	J47	1085	4	480	300	4/0	
PWP500	400	J27	1085	3	480	300	250	1 pos 1 neg
	400	J27	1085	4	480	300	3/0	
	400	J31	1085	3	480	300	250	
	400	J31	1085	4	480	300	3/0	
	400	J37	1085	2	480	300	350	
	400	J37	1085	3	480	300	250	
	400	J37	1085	4	480	300	3/0	
	400	J47	1085	2	480	300	350	
	400	J47	1085	3	480	300	250	
	400	J47	1085	4	480	300	3/0	
PWP400	400	J27	1085	3	420	300	4/0	1 pos 1 neg
	400	J31	1085	3	420	300	300	
	400	J31	1085	4	420	300	4/0	
	400	J37	1085	3	420	300	300	
	400	J37	1085	4	420	300	4/0	
	400	J47	1085	3	420	300	300	
	400	J47	1085	4	420	300	4/0	
PWP400	300	J27	1085	3	420	300	4/0	1 pos 1 neg
	300	J27	1085	4	420	300	2/0	
	300	J31	1085	2	420	300	350	
	300	J31	1085	3	420	300	4/0	
	300	J31	1085	4	420	300	2/0	
	300	J37	1085	2	420	300	350	
	300	J37	1085	3	420	300	4/0	
	300	J37	1085	4	420	300	2/0	
	300	J47	1085	2	420	300	350	
	300	J47	1085	3	420	300	4/0	
	300	J47	1085	4	420	300	2/0	

DESCRIPTION:	**INSTALLATION NOTES**		
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1. A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.
2. External overcurrent protection is not provided by this product, but is required by codes. Refer to Tables A through F for wiring requirements. If an output lockable disconnect is required, it is to be supplied by designated personnel.
3. When an input transformer is present, the rectifier and bypass inputs may both be supplied by the same source.
4. Terminals E1 through E12 and E22 through E29 are UL and CSA rated at 90˚C. A hex key tool is required to attach wires to terminals. Refer to Table D and E for power cable terminations and Table F for conduit requirements. Drawing 164201118−5 shows the location of the power cable terminals inside the UPS. Refer to Chapter 5 in this manual for location of the power cable terminals inside the transformer cabinets.

Table D. UPS Cabinet Power Cable Terminations

Terminal Function	*Terminal*	*Function*	*Size of Pressure Termination*	*Tightening Torque N-M (lb-in)*	*Int Hex Size (In.)*
Internal Wiring to UPS Rectifier (CB1 Input)	E1	Phase A	4 – #4/0−500 kcmil	42.4 (375)	3/8
	E2	Phase B	4 – #4/0−500 kcmil	42.4 (375)	3/8
	E3	Phase C	4 – #4/0−500 kcmil	42.2 (375)	3/8
AC Input to Bypass	E6	Phase A	4 – #2−600 kcmil	56.5 (500)	1/2
	E7	Phase B	4 – #2−600 kcmil	56.5 (500)	1/2
	E8	Phase C	4 – #2−600 kcmil	56.5 (500)	1/2
AC Output to Critical Load	E9	Phase A	4 – #2−600 kcmil	56.5 (500)	1/2
	E10	Phase B	4 – #2−600 kcmil	56.5 (500)	1/2
	E11	Phase C	4 – #2−600 kcmil	56.5 (500)	1/2
DC Input from Battery to UPS	E4	Battery (+)	4 – #2−600 kcmil	56.5 (500)	1/2
	E5	Battery (−)	4 – #2−600 kcmil	56.5 (500)	1/2
Neutral, Output	E12	Neutral	12 – #2−600 kcmil	56.5 (500)	1/2
Customer Ground	Ground	Ground	8 – #2−600 kcmil	56.5 (500)	1/2
Isolated Ground (Optional)	Isolated Ground	Grounding Electrode	10 – #14−1/0 AWG	42.4 (275)	Slotted

NOTE: Customer ground, size 2/0, can be run in any conduit listed in Table F.

DESCRIPTION:	**INSTALLATION NOTES**		
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Table E. Transformer and Filter Cabinet Power Cable Terminations					
Terminal Function	*Terminal*	*Function*	*Size of Pressure Termination*	*Tightening Torque N-M (lb-in)*	*Int Hex Size (In.)*
AC Input to Input Isolation Transformer (480/480) (as applicable)	E23	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E24	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E25	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Output from Input Isolation Transformer (480/480) (as applicable)	E26	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E27	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E28	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Input to Input Isolation Transformer (208/480) (as applicable)	E23	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E24	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E25	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
	E22	Neutral	4 – #2–600 kcmil	56.5 (500)	1/2
AC Output from Input Isolation Transformer (208/480) (as applicable)	E26	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E27	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E28	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
	E29	Neutral	4 – #2–600 kcmil	56.5 (500)	1/2
AC Input to Input Isolation Transformer (600/480) (as applicable)	E23	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E24	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E25	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Output from Input Isolation Transformer (600/480) (as applicable)	E26	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E27	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E28	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Input to 5% Input Filter (480/480) (as applicable)	E23	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E24	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E25	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Output from 5% Input Filter (480/480) (as applicable)	E26	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E27	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E28	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Input to Output Auto Transformer (480/208) (as applicable)	E23	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E24	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E25	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
AC Output from Output Auto Transformer (480/208) (as applicable)	E26	Phase A	4 – #2–600 kcmil	56.5 (500)	1/2
	E27	Phase B	4 – #2–600 kcmil	56.5 (500)	1/2
	E28	Phase C	4 – #2–600 kcmil	56.5 (500)	1/2
	E29	Neutral	8 – #2–600 kcmil	56.5 (500)	1/2

NOTE: Customer ground, size 2/0, can be run in any conduit listed in Table F.

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5. Per NEC article 300-20(a), all three phase conductors must be run in the same conduit. If a neutral and/or ground is used, it must be run in the same conduit as the phase conductors.
6. Conduit is sized to accommodate one neutral conductor the same size as the phase conducter (if applicable) and one 2/0 ground conductor.
7. Conduit sizes were chosen from NEC Table C1, type letters RHH, RHW, RHW-2, TW, THW, THHW, THW-2.

Table F. Power Cable Conduit Requirements

Terminal	**9315 500**			**9315 400**		
	Number of Wires in Conduit	*Minimum Conduit Trade Size*	*Number of Conduits*	*Number of Wires in Conduit*	*Minimum Conduit Trade Size*	*Number of Conduits*
UPS Input (A, B, C, Gnd)	4	3 in.	3	4	2.5 in.	3
Input Transformer (480/480) (A, B, C, Gnd)	4	3 in.	3	4	2.5 in.	3
Input Transformer Input Conduit (208/480) (A, B, C, Gnd)	5	3 in.	5	N/A	N/A	N/A
Input Transformer Output Conduit (208/480) (A, B, C, Gnd)	4	3 in.	2	N/A	N/A	N/A
Output Transformer Input Conduit (480/208) (A, B, C, Gnd)	5	2.5 in.	3	N/A	N/A	N/A
Output Transformer Output Conduit (480/208) (A, B, C, Gnd)	5	3 in.	5	N/A	N/A	N/A
Input Transformer Input Conduit (600/480) (A, B, C, Gnd)	4	3 in.	3	N/A	N/A	N/A
Input Transformer Output Conduit (600/480) (A, B, C, Gnd)	4	3 in.	3	N/A	N/A	N/A
5% Input Filter Input Conduit (480/480) (A, B, C, Gnd)	4	3 in.	3	N/A	N/A	N/A

DESCRIPTION:	**INSTALLATION NOTES**		
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Table F. Power Cable Conduit Requirements (Cont'd)						
Terminal	**9315 500**			**9315 400**		
	Number of Wires in Conduit	*Minimum Conduit Trade Size*	*Number of Conduits*	*Number of Wires in Conduit*	*Minimum Conduit Trade Size*	*Number of Conduits*
5% Input Filter Output Conduit (480/480) (A, B, C, Gnd)	4	3 in.	3	N/A	N/A	N/A
Bypass (A, B, C, Gnd)	5	3 in.	3	5	2.5 in.	3
Bypass Input Transformer (Dual Feed) Input Conduit (A, B, C, Gnd)	5	3 in.	5	N/A	N/A	N/A
Bypass Input Transformer (Dual Feed) Output Conduit (A, B, C, Gnd)	4	3 in.	2	N/A	N/A	N/A
Output (A, B, C, Gnd)	5	3 in.	3	5	2.5 in.	3
Battery (+), (–), Gnd	3	2.5 in.	3	3	2.5 in.	3

DESCRIPTION: **INSTALLATION NOTES**		
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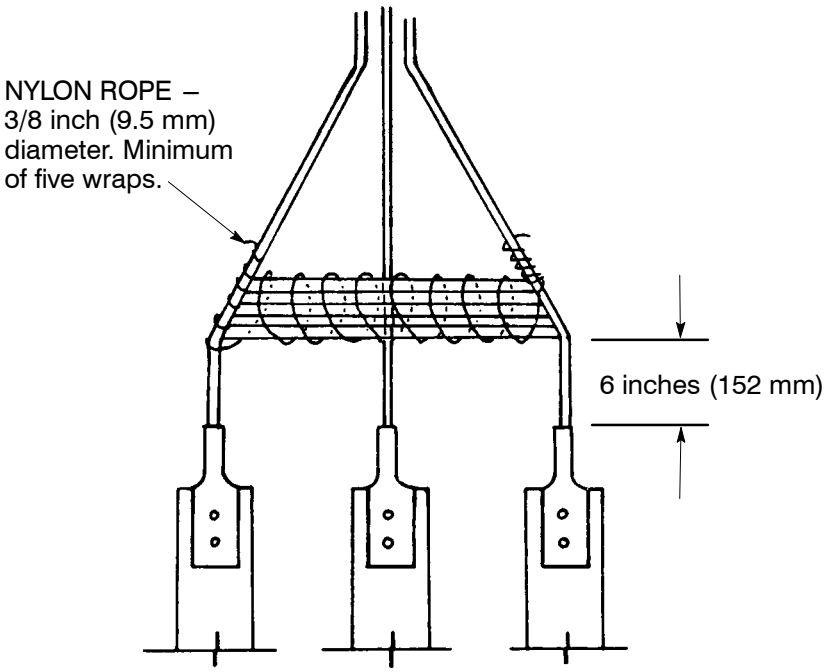
8. When using 65 KAIC or higher rated breakers, secure cables as shown in figure below. Wrap line cables together with nominal 3/8 inch (9.5mm) nylon rope or rope having a minimum tensile strength of 2000 pounds (8896 N). Wrap line cables at 6 inches (152 mm) and 12 inches (305 mm) from the line terminals with five wraps. Wrap each additional 6 inch (152.4 mm) interval with five wraps or 1 inch (25.4 mm) intervals with one wrap

SECUREMENT OF CABLE



DESCRIPTION:	**INSTALLATION NOTES**		
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1. In the UPS system, each battery cabinet, PDM cabinet, and transformer cabinet are crated separately for shipping.
2. Do not tilt cabinets more than ±10° during handling.
3. Dimensions are in millimeters (inches).
4. If perforated floor tiles are required for ventilation, you should place them in front of the UPS. Table G lists the ventilation requirements for full load operation:

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

Ratings	*Input/Output Voltage*	Heat Rejection* BTU/hr × 1000/hr (Kg−cal/hr)
Powerware 9315 400		
300 KVA	400/400	71.7 (18.1)
400 KVA	400/400	95.6 (24.1)
Powerware 9315 500		
400 KVA	208/208	119 (30.0)
400 KVA	480/480	95.6 (24.1)
500 KVA	480/480	119.5 (30.2)

5. Recommended minimum clearance over the UPS module is 304.8 mm (12 in.). Required for cooling air exhaust: approximately 1420 liter/sec (3000 cfm).
6. Battery voltage is computed at 2 volts per cell as defined by Article 480 of the NEC. Rated battery current is computed at 1.8 volts per cell.
7. The battery wiring used between the battery and the UPS should not allow a voltage drop of more than 1% of nominal DC voltage at rated battery current.
8. A battery disconnect switch is recommended, and may be required by NEC or local codes when batteries are remotely located. The battery disconnect switch may be supplied as an accessory, and should be installed between battery and UPS.
9. If the conductors used for DC input from the battery cabinet(s) to the UPS are those provided by the UPS manufacturer, and the UPS and battery cabinet are manufactured by the same supplier, then it is acceptable if they do not meet the noted minimum conductor sizes.

DESCRIPTION: **INSTALLATION NOTES**		
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1. Table H lists the maximum rating for input circuit breakers.

Table H. Maximum Input Circuit Breaker Ratings

Powerware 9315 System	Input Voltage Rating						
	208V	400V		480V		600V	
	With Filter	With Filter	Without Filter	With Filter	Without Filter	With Filter	Without Filter
Powerware Plus 9315, Model 300	N/A	600	800	N/A	N/A	N/A	N/A
Powerware Plus 9315, Model 400	N/A	700	1000	N/A	N/A	N/A	N/A
Powerware Plus 9315, Model 400	1600	N/A	N/A	700	800	600	700
Powerware Plus 9315, Model 500	N/A	N/A	N/A	800	1000	700	800

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

2. Source protection for the optional input transformer should be treated as if you were supplying a three phase transformer, to allow for transformer magnetization inrush current.
3. Source protection for the AC input should be treated as if you were supplying a three phase transformer, to allow for filter inrush current.
4. Source protection for the input to the bypass section should be treated as if you were supplying a 500 kVA three phase transformer, to allow for transformer magnetization inrush current.
5. The input breaker (CB1) has a trip rating of 1000 amps AT and an Amp Interrupting Capability (AIC) of 65,000 in symmetrical RMS amps for the Powerware Plus 400 and 500. See Table I.

Table I. Equivalent Transformer Size for Determining Inrush

Optional Input Transformer	500 kVA

6. The input and bypass three phase feeds should be symmetrical about ground, due to the existence of voltage surge protection devices.
7. The line-to-line unbalanced output capability of the UPS is limited only by the full load per phase current values for AC output to critical load shown in Tables A and B. The recommended line-to-line load unbalance is 50% or less.
8. Output overcurrent protection and output disconnect switch are to be provided by the user. Table J lists the maximum rating for output circuit breakers satisfying the criteria for both.

Table J. Maximum Output Circuit Breaker Ratings

Powerware 9315 System	Output Voltage Rating			
	208V	400V	480V	600V
Powerware Plus 9315, Model 300	N/A	600	N/A	N/A
Powerware Plus 9315, Model 400	N/A	800	N/A	N/A
Powerware Plus 9315, Model 400	1600	N/A	600	400
Powerware Plus 9315, Model 500	N/A	N/A	800	500

DESCRIPTION:	**INSTALLATION NOTES**		
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1. The UPS equipment operating environment must meet the size and weight requirements shown in Table K, according to your UPS system configuration:

Table K. Equipment Weight

Component	*Weight (Kg (lb)*	
	Shipping	*Installed*
UPS Cabinet (Powerware 9315 400) (400/400 System)	2812 (6200)	2767 (6100)
UPS Cabinet (Powerware 9315 500) (480/480 System)	2812 (6200)	2767 (6100)
UPS Input Transformer Cabinet (480/480)	1860(4100)	1814(4000)
UPS Input Transformer Cabinet (208/208)	1860(4100)	1814(4000)
UPS Input Transformer Cabinet (600/600)	1860(4100)	1814(4000)
UPS Output Transformer Cabinet (208/208)	1860(4100)	1814(4000)
UPS 5% Input Filter Cabinet (480/480)	2182(4800)	2136(4700)

2. 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%

DESCRIPTION: **INSTALLATION NOTES**		
DRAWING NO: 164201118–1		*SHEET:* 12 of 17
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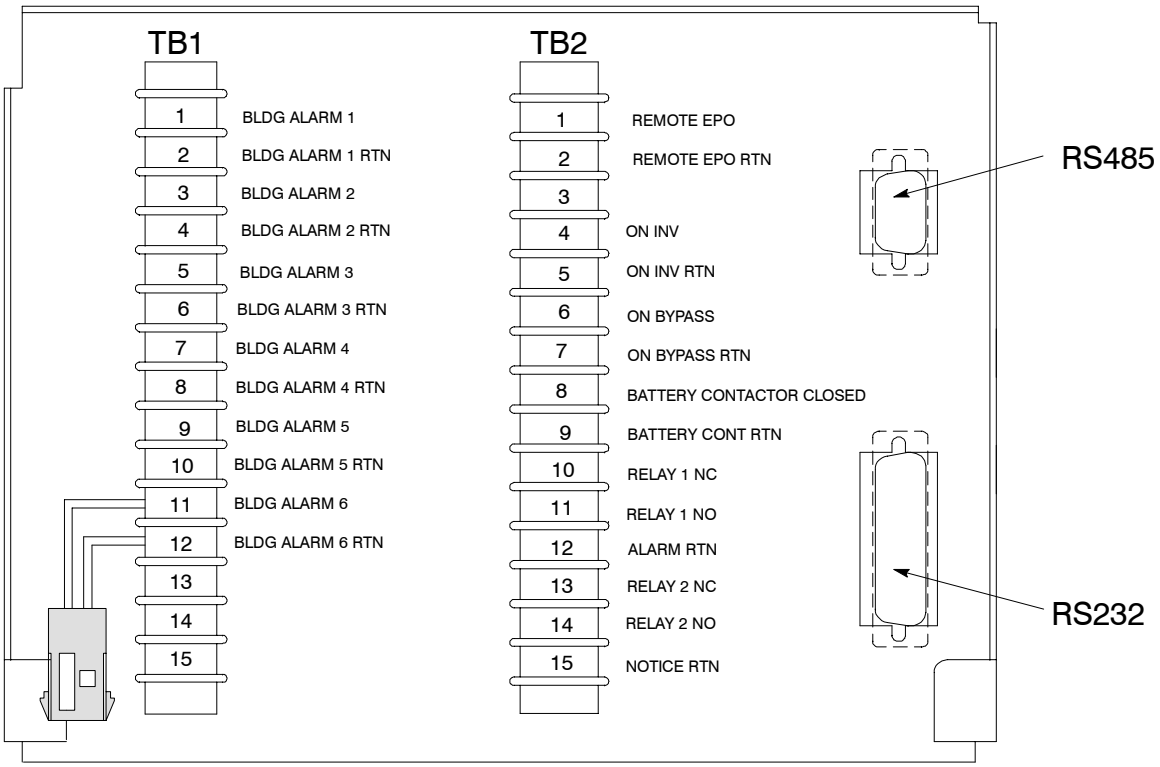
Communications Panel



NOTE: *All building alarm inputs or remote features require an isolated normally open contact or switch (rated at 24 VDC, 20 mA minimum) connected between the alarm input and common terminal as shown. All control wiring and relay and switch contacts are customer provided.*

NOTE: *Regardless of assignment, alarms display as Building Alarm 1, Building Alarm 2, etc., on Monitor Panel. Use twisted pair wires for each alarm input and common.*

DESCRIPTION:	**INSTALLATION NOTES**		
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Table L. Communications Panel Inputs and Outputs		
TB1 Pin #	Name	Description
1	BLDG ALARM 1	Programmable UPS alarm. Activated by a remote contact closure.
2	BLDG ALARM 1 RTN	
3	BLDG ALARM 2	Programmable UPS alarm. Activated by a remote contact closure.
4	BLDG ALARM 2 RTN	
5	BLDG ALARM 3	Programmable UPS alarm. Activated by a remote contact closure.
6	BLDG ALARM 3 RTN	
7	BLDG ALARM 4	Programmable UPS alarm. Activated by a remote contact closure.
8	BLDG ALARM 4 RTN	
9	BLDG ALARM 5	Programmable UPS alarm. Activated by a remote contact closure.
10	BLDG ALARM 5 RTN	
11	BLDG ALARM 6	Programmable UPS alarm. Activated by a remote contact closure.
12	BLDG ALARM 6 RTN	

Table M. Communications Panel Inputs and Outputs		
TB2 Pin #	Name	Description
1	REMOTE EPO	Contacts used to activate remote EPO of UPS.
2	REMOTE EPO RTN	
3		
4	ON INV	Contacts used to indicate On Inverter status of UPS.
5	ON INV RTN	
6	ON BYPASS	Contacts used to indicate On Bypass status of UPS.
7	ON BYPASS RTN	
8	BATTERY CONTACTOR CLOSED	Contacts used to indicate UPS Battery Contactor is closed.
9	BATTERY CONT RTN	
10	RELAY 1 NC	General purpose NO and NC relay contacts.
11	RELAY 1 NO	
12	ALARM RTN	
13	RELAY 2 NC	General purpose NO and NC relay contacts.
14	RELAY 2 NO	
15	NOTICE RTN	

DESCRIPTION: **INSTALLATION NOTES**		
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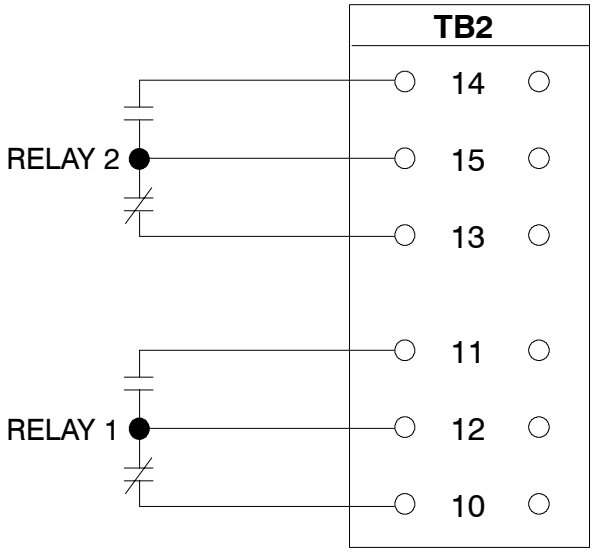
1. Use Class 1 wiring methods (as defined by the NEC) for control wiring. Install the control wiring in separate conduit from the power wiring. The wire should be rated at 24 volts, 1 amp minimum.
2. Refer to Tables N, O, and P, and to applicable chapters for information about installing control wiring for options and accessories.

Table N. Control Wiring Terminations

Terminal	*Description*	*Terminal Function*
TB1	Terminal Block	Building Alarms (optional, up to 6)
		Generator Interface
TB1	Terminal Block	Remote EPO
TB2		"On Inverter" Monitoring
TB2		"On Bypass" Monitoring
		Summary Alarm & Notice Contacts

Table O. Summary Alarm Relay Contacts



CONTACT RATING:		
Maximum Switched Voltage	32 VAC	42 VDC
Maximum Carrying Current	1A	

DESCRIPTION:	**INSTALLATION NOTES**		
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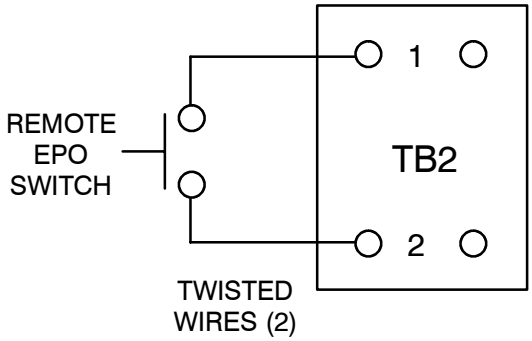
3. The Remote EPO feature opens all breakers and contactors in the UPS cabinet and isolates power from your critical load. Local electrical codes may also require tripping upstream protective devices to the UPS.

Table P. Remote EPO



Remote EPO switch rating is 24 VDC.
1 Amp minimum if supplied by user.

NOTE: This switch must be a dedicated switch not tied into any other circuits.

DESCRIPTION: **INSTALLATION NOTES**		
DRAWING NO: 164201118–1		*SHEET:* 16 of 17
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1. Table Q lists the battery shunt trip and UV trip wiring requirements.

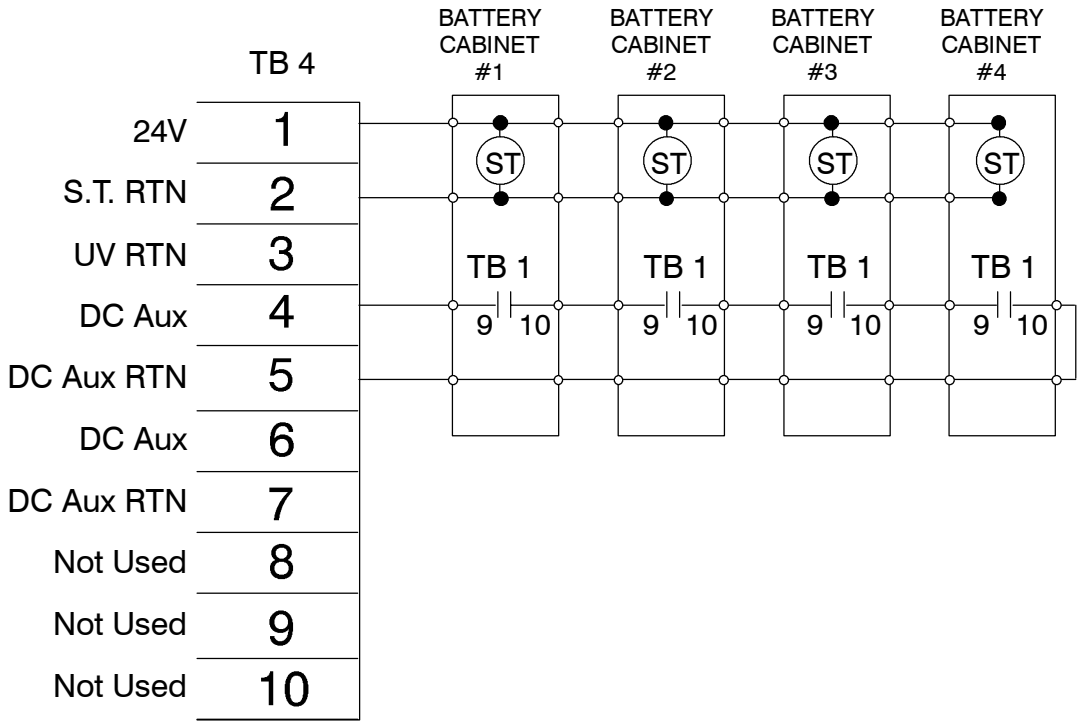
Table Q. Battery Shunt Trip or UV Trip Wiring Requirements		
	ST	UV
TB4 Points	1, 2	1, 3
Output Max Pulse	220 VA instantaneous	40 VA
Wiring	#12–22AWG	#12–22AWG

2. There is no DC disconnect device within the UPS.

3. The DC input to the UPS is protected by internal fuses F21 and F22.

4. The UPS DC disconnect trip signal from TB4, points 1 and 2 (shunt trip) or TB4, points 1 and 3 (UV trip) must be connected to the DC source disconnect device(s).

5. Recommended wire size is 14 AWG.



NOTE: *For other than Powerware battery cabinets that use UV trip coils, connect to TB4 Pin 3 instead of TB4 Pin 2.*

DESCRIPTION:	**INSTALLATION NOTES**		
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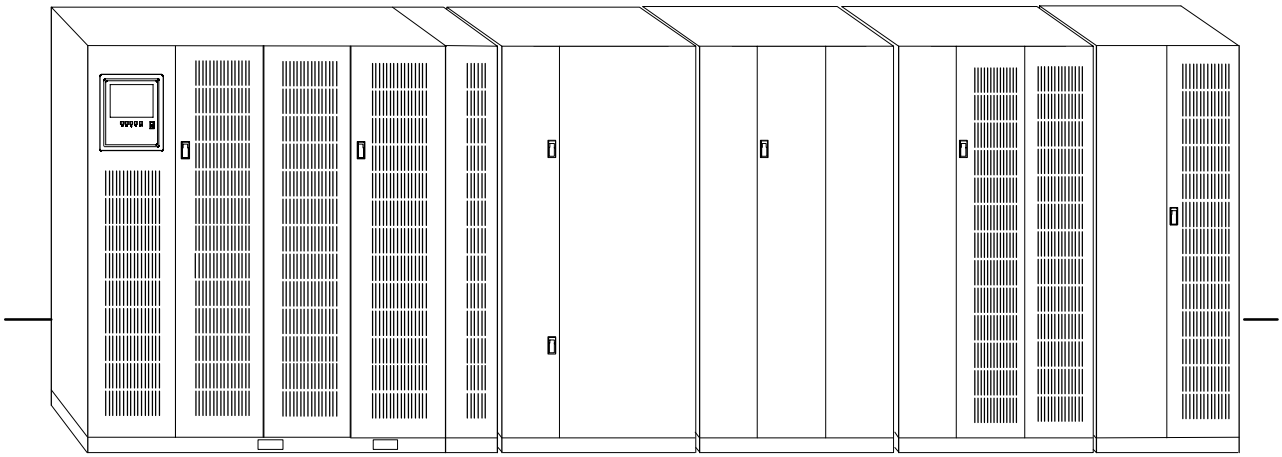

UPS CABINET

BATTERY CABINET (optional)

INPUT CABINET (Tansformer or Filter) (optional)

OUTPUT TRANSFORMER (optional)

PDM CABINET (optional – requires 480/208 transformer)

DESCRIPTION: **TYPICAL UPS SYSTEM**		
DRAWING NO: 164201118–2		*SHEET:* 1 of 1
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Table R. UPS System Oneline Configurations				
Oneline Drawing 164201118–4	Powerware 9315	Vin / Vout	Input Transformer	Output Transformer
Sheet 1	400, 500	480/480	N/A	N/A
	300, 400	400/400	N/A	N/A
Sheet 2	400, 500	480/480	Isolation (Delta in, Delta out)	N/A
Sheet 2	500	600/600	Isolation (Delta in, Delta out)	N/A
Sheet 3	500	480/480	5% Input Filter (Delta in, Delta out)	N/A
Sheet 4	400 (Single Feed)	208/208	Isolation (Wye in, Wye out)	Auto
Sheet 5	400 (Dual Feed)	208/208	Isolation (Wye in, Wye out)	Auto

NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

NOTE 2: Output Voltage must match Bypass Input Voltage.

DESCRIPTION: **UPS SYSTEM ONELINE CONFIGURATIONS**		
DRAWING NO: 164201118–3		*SHEET:* 1 of 1
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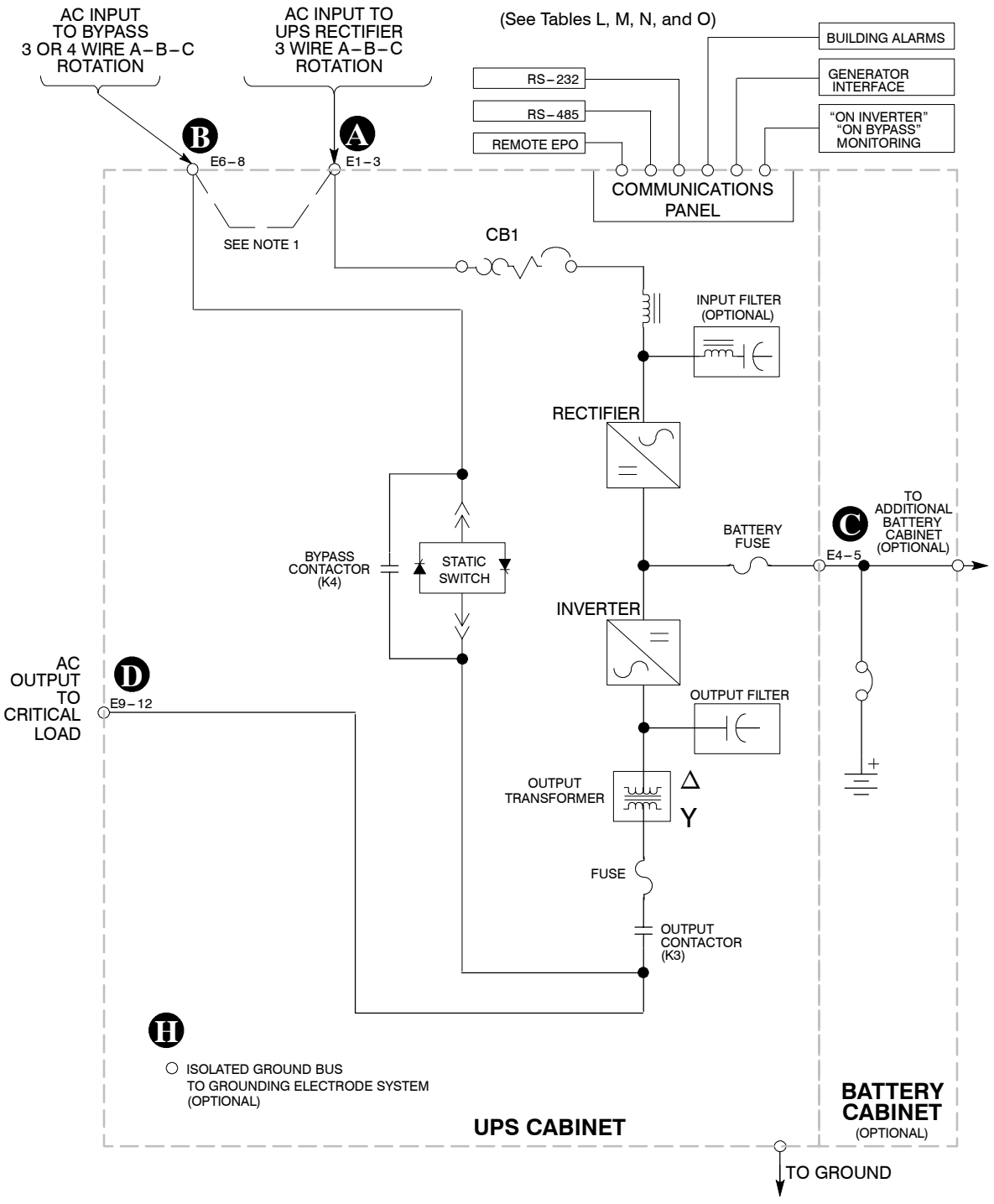
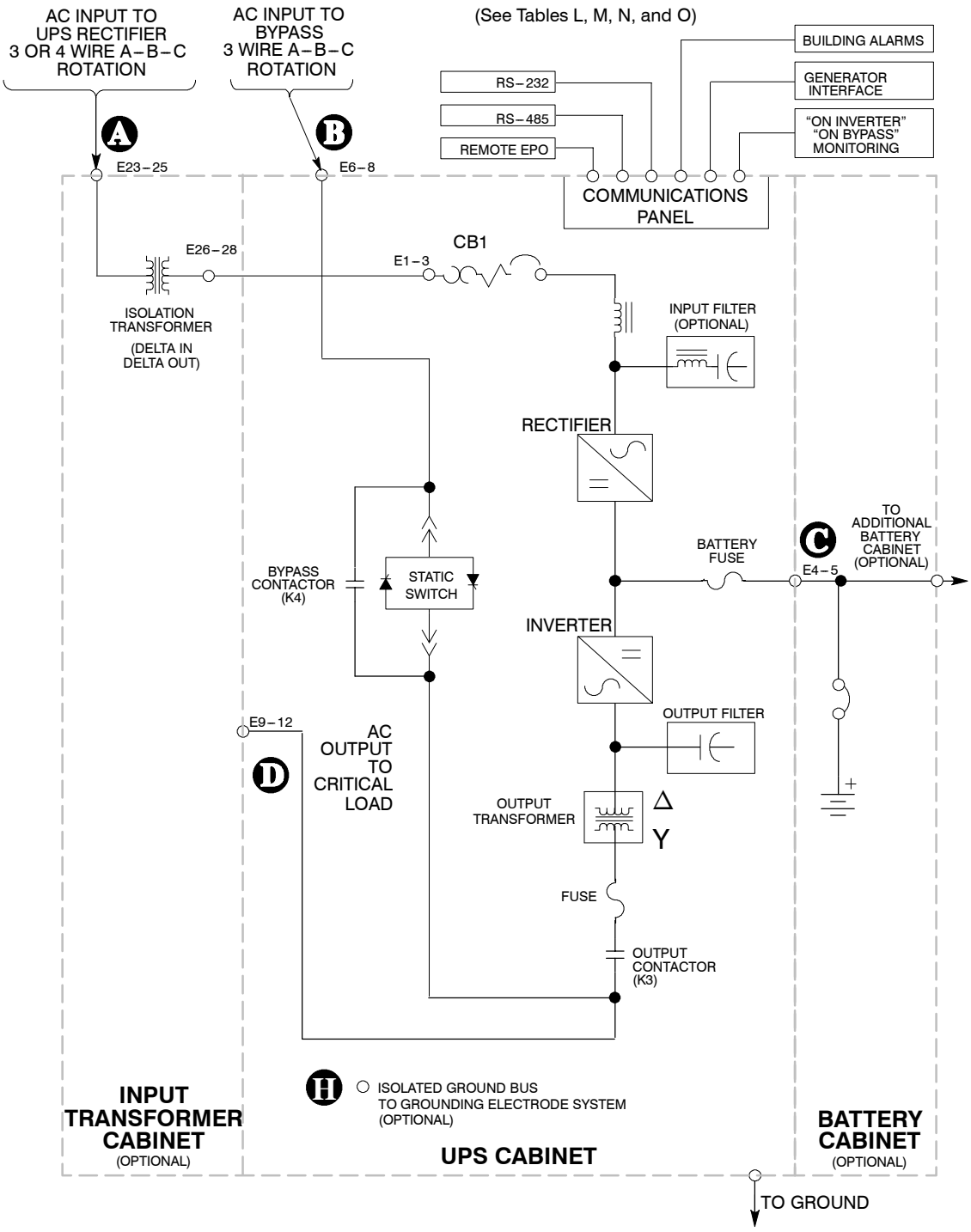


NOTE 1: Optional jumper for single feed. Use terminals E6, E7, and E8 for connection. See Tables A or B, row **B** *for wire rating.*

NOTE 2: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

UPS SYSTEM WITH 480V INPUT, SINGLE OR DUAL FEED

DESCRIPTION:	**ONELINE DRAWINGS OF UPS SYSTEM**		
DRAWING NO:	164201118–4	*SHEET:*	1 of 5
REVISION:	E	*DATE:*	041599

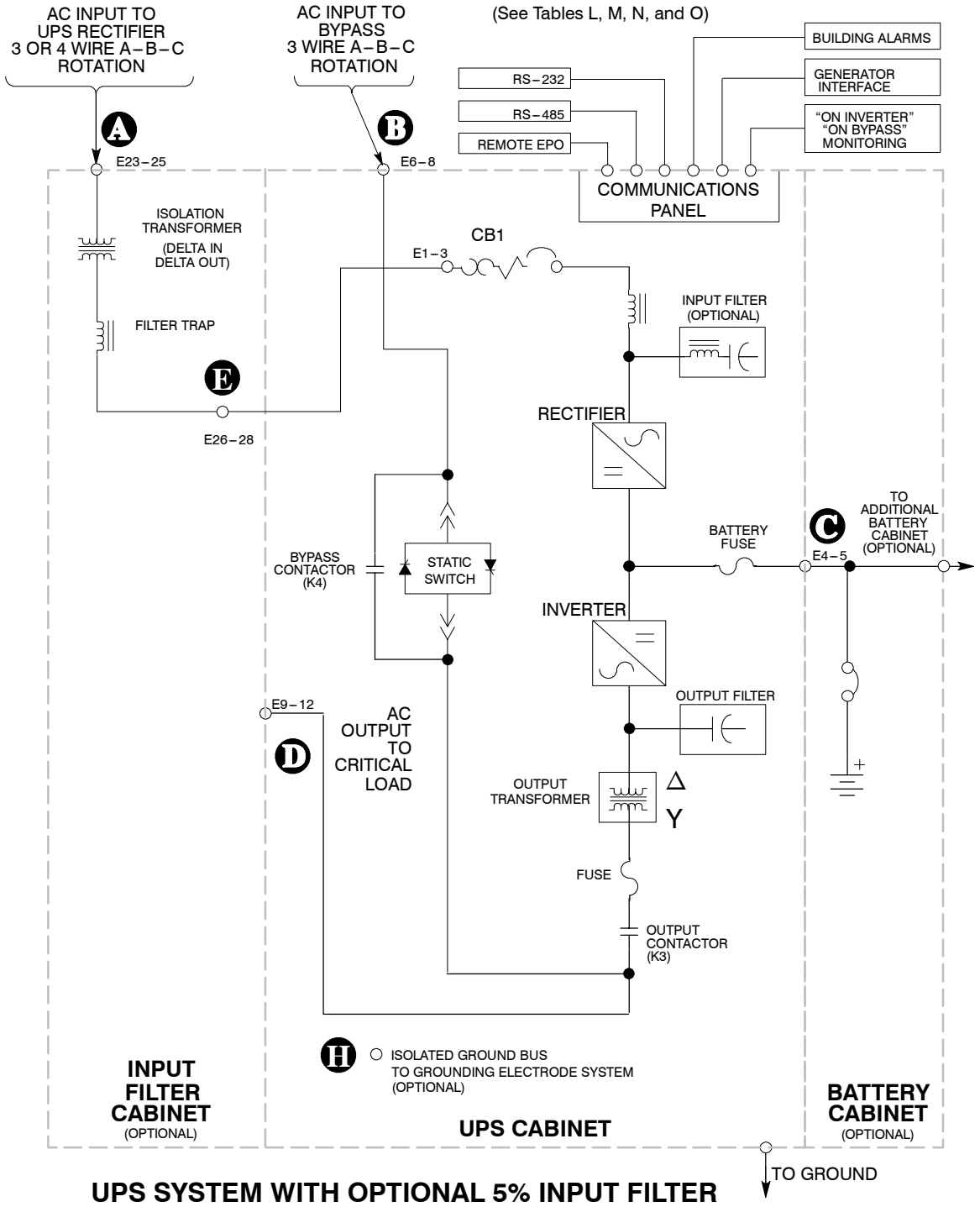


UPS SYSTEM WITH OPTIONAL ISOLATION INPUT TRANSFORMER (480V and 600V INPUT)

NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

NOTE 2: See Figure 164201118–3 to determine when an input transformer is required.

DESCRIPTION:	**ONELINE DRAWINGS OF UPS SYSTEM**		
DRAWING NO:	164201118–4	*SHEET:*	2 of 5
REVISION:	E	*DATE:*	041599

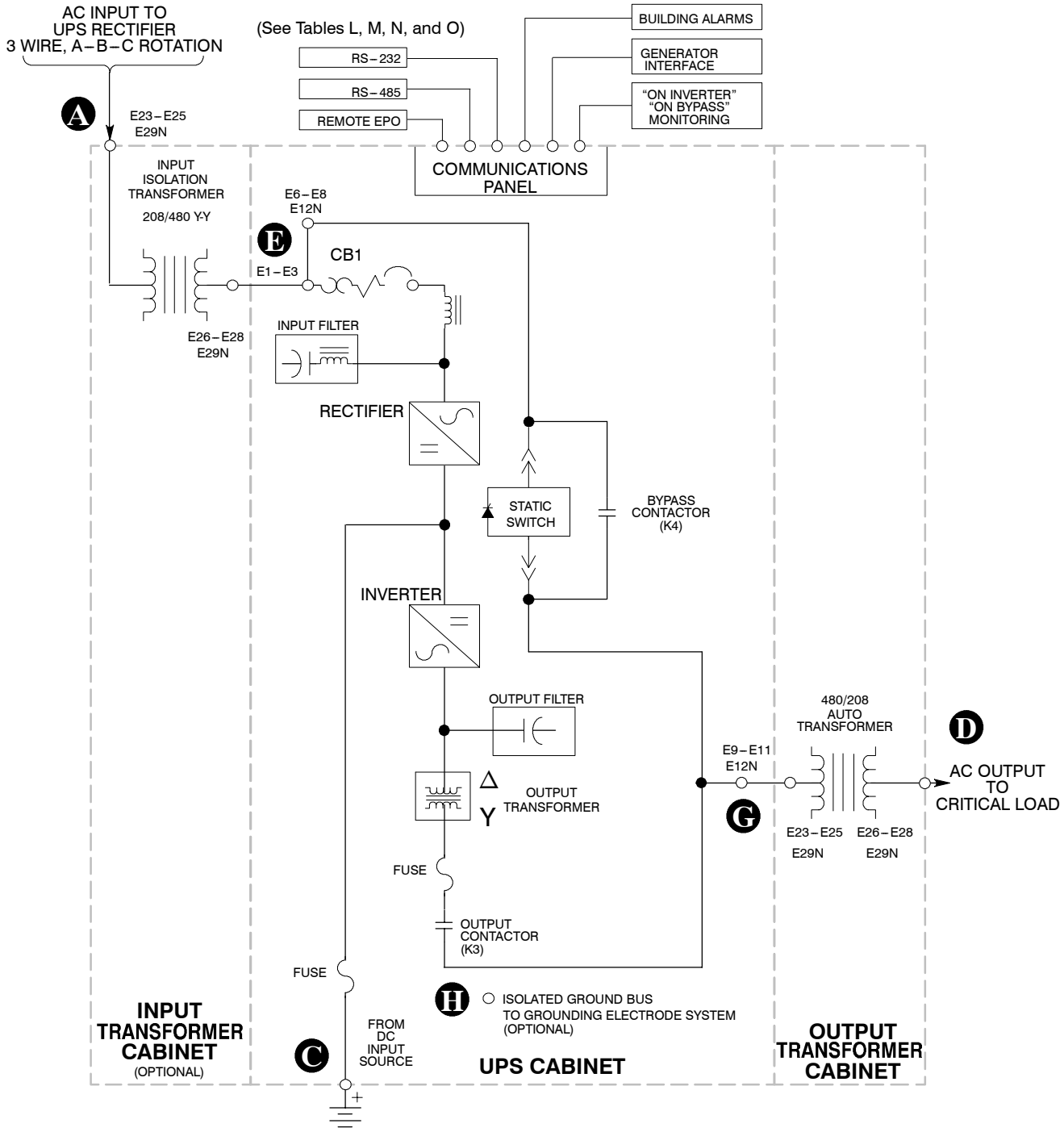


UPS SYSTEM WITH OPTIONAL 5% INPUT FILTER (480V INPUT)

NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

NOTE 2: See Figure 164201118–3 to determine when an input transformer is required.

DESCRIPTION:	**ONELINE DRAWINGS OF UPS SYSTEM**		
DRAWING NO:	164201118–4	*SHEET:*	3 of 5
REVISION:	E	*DATE:*	041599

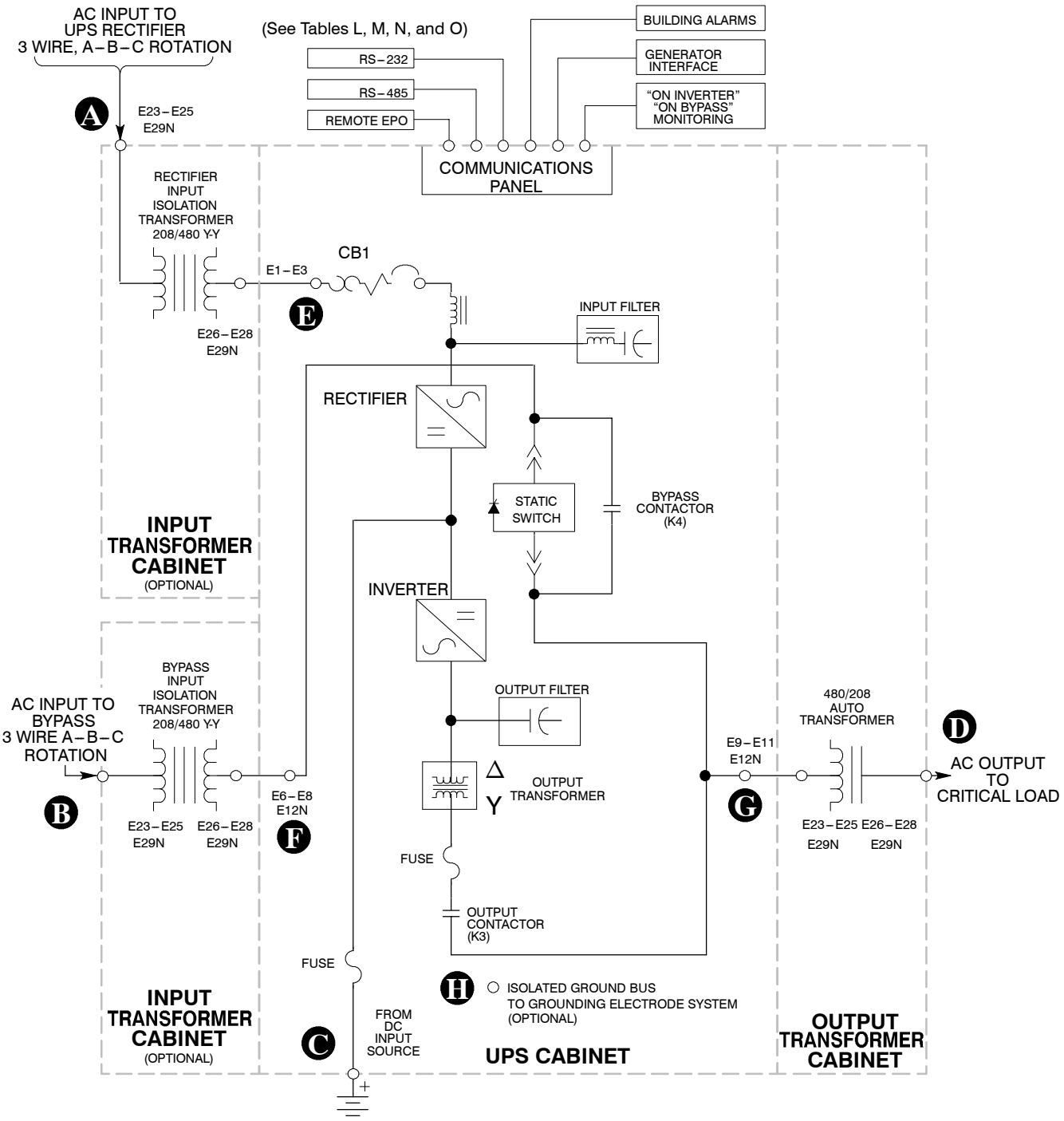


UPS SYSTEM WITH OPTIONAL INPUT ISOLATION TRANSFORMER AND OUTPUT AUTO TRANSFORMER (208V INPUT SINGLE FEED)

NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

NOTE 2: See Figure 164201118–3 to determine when an input transformer is required.

DESCRIPTION:	**ONELINE DRAWINGS OF UPS SYSTEM**		
DRAWING NO:	164201118–4	*SHEET:*	4 of 5
REVISION:	E	*DATE:*	041599

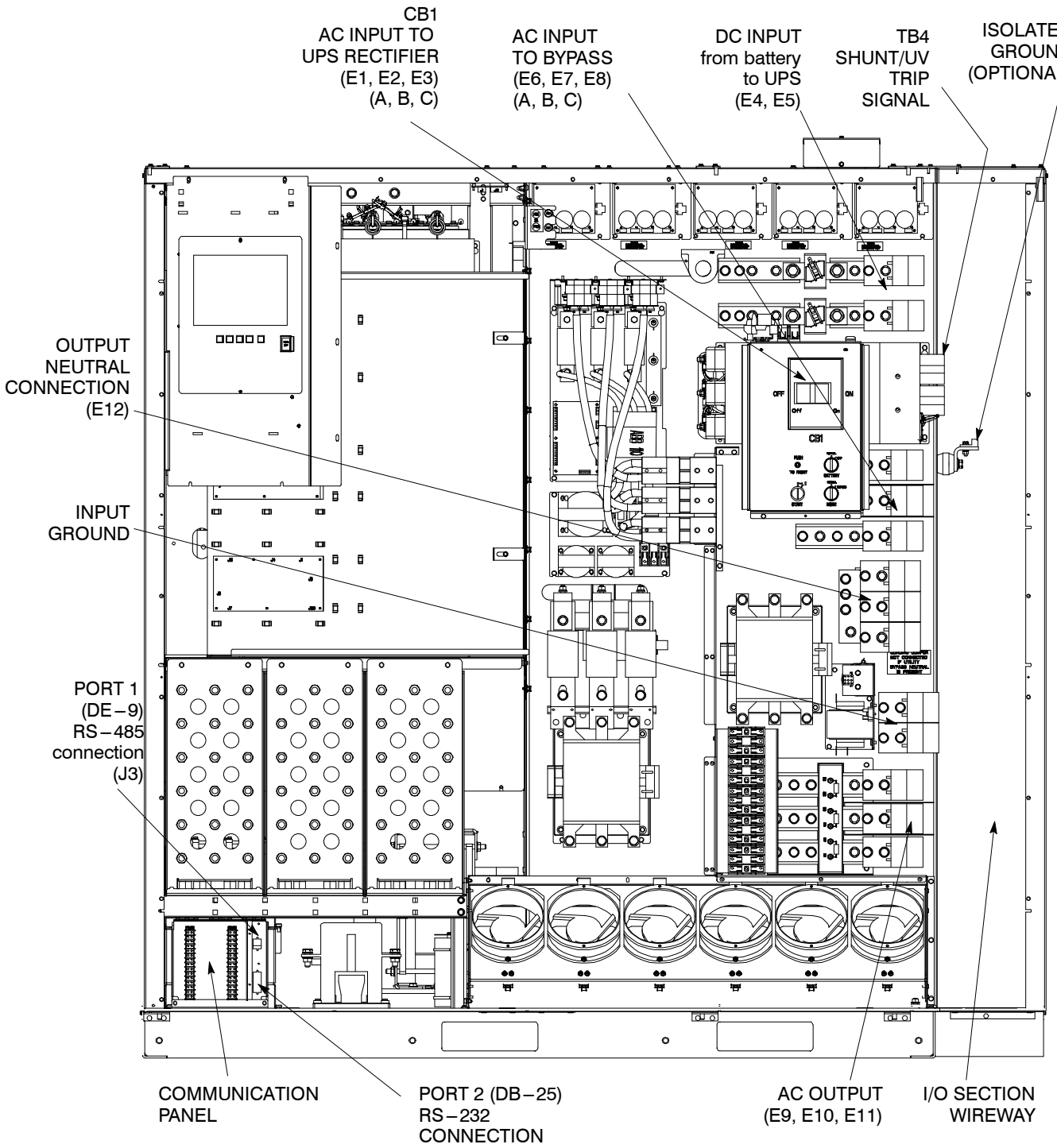


UPS SYSTEM WITH OPTIONAL RECTIFIER AND BYPASS INPUT ISOLATION TRANSFORMER AND OUTPUT AUTO TRANSFORMER (208V INPUT DUAL FEED)

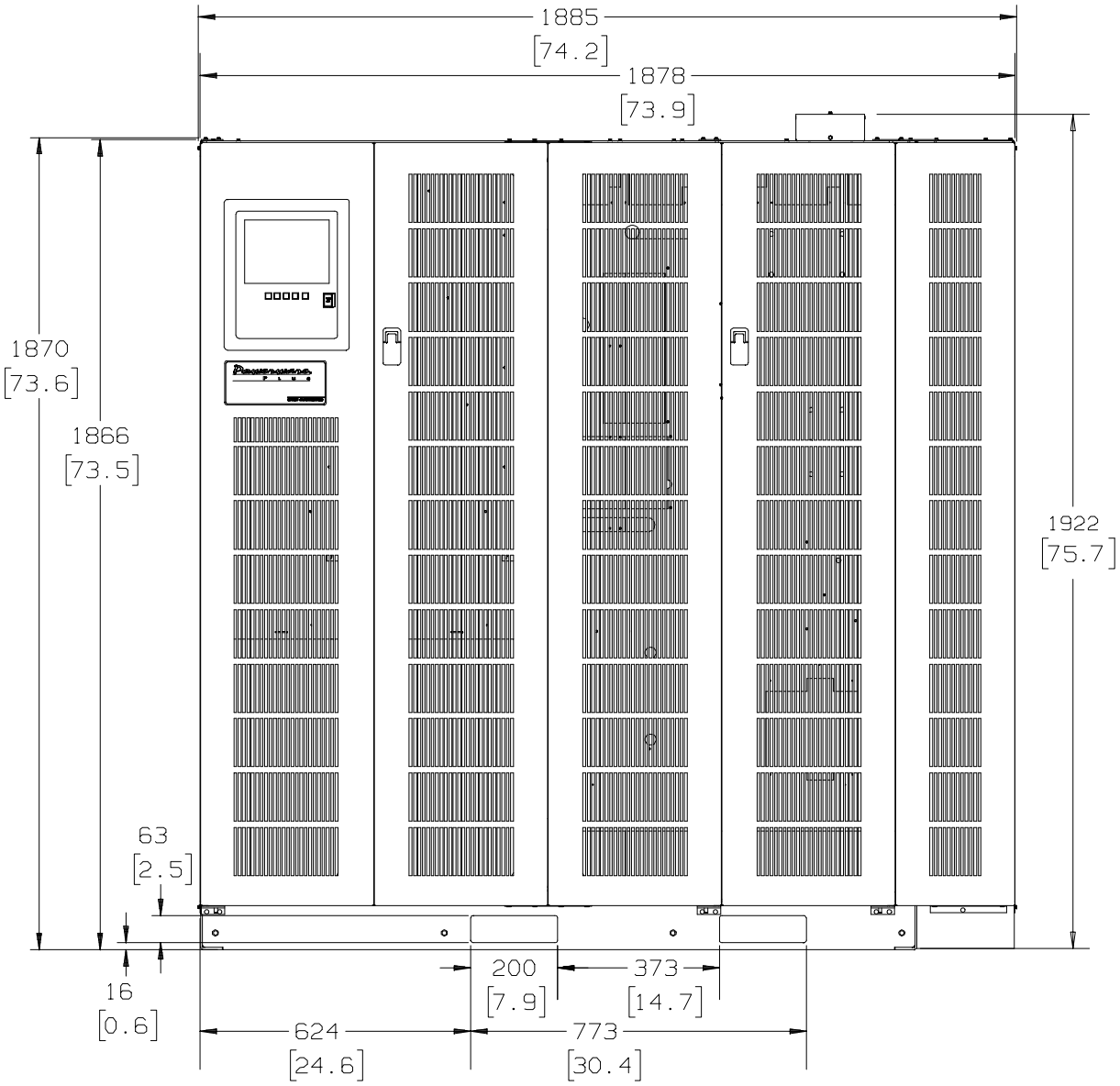
NOTE 1: A bypass neutral feeder must be supplied when the output neutral is used. If no bypass neutral is supplied, the output neutral is to be bonded to ground through a minimum 3/0 copper conducter.

NOTE 2: See Figure 164201118–3 to determine when an input transformer is required.

DESCRIPTION:	**ONELINE DRAWINGS OF UPS SYSTEM**		
DRAWING NO:	164201118–4	*SHEET:*	5 of 5
REVISION:	E	*DATE:*	041599

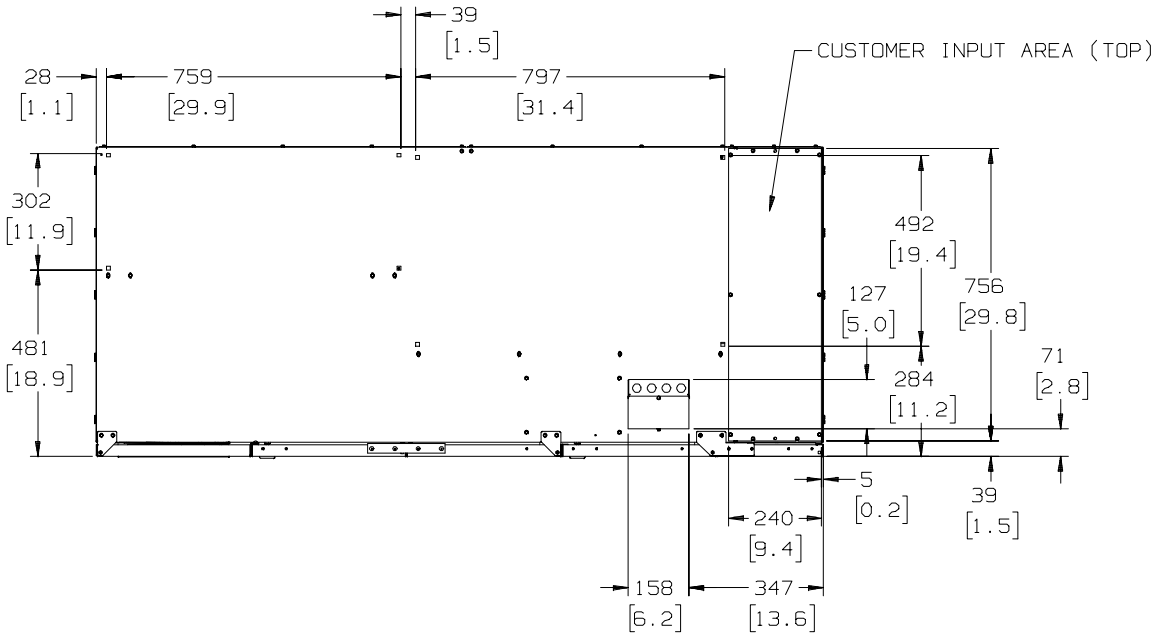


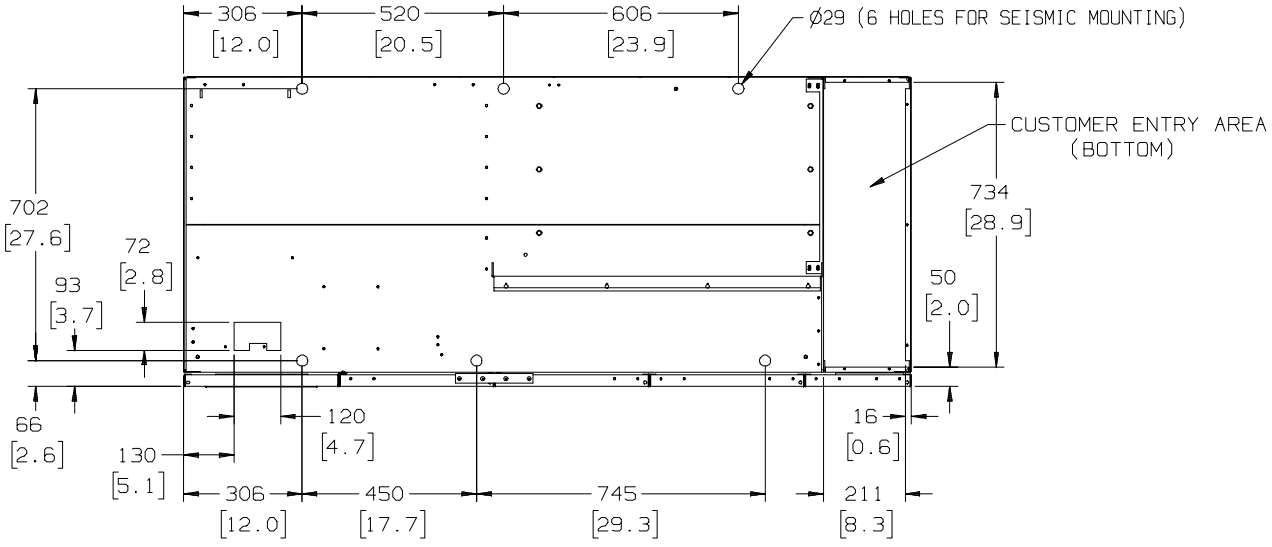
DESCRIPTION:	**LOCATION OF UPS POWER TERMINALS**		
DRAWING NO:	164201118–5	*SHEET:*	1 of 1
REVISION:	E	*DATE:*	051599



DESCRIPTION:	**UPS CABINET**		
DRAWING NO:	164201118–6	*SHEET:*	1 of 2
REVISION: A		*DATE:*	010198

Dimensions are in millimeters (inches)



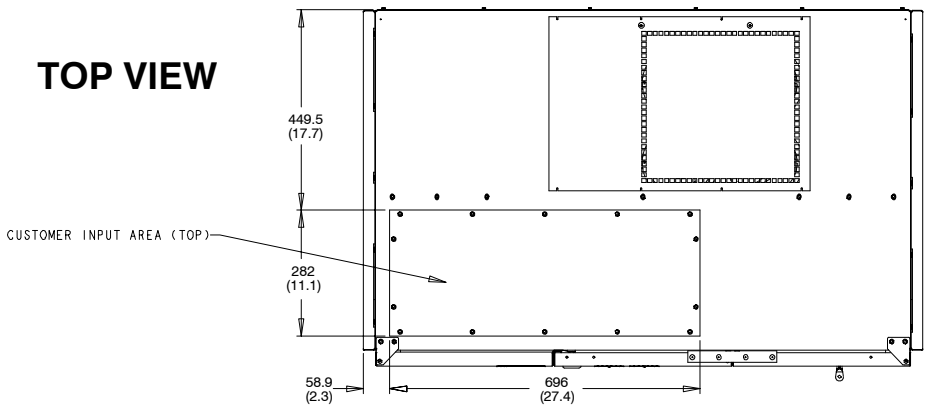


PLAN VIEW SHOWING BOTTOM ENTRY LOCATIONS

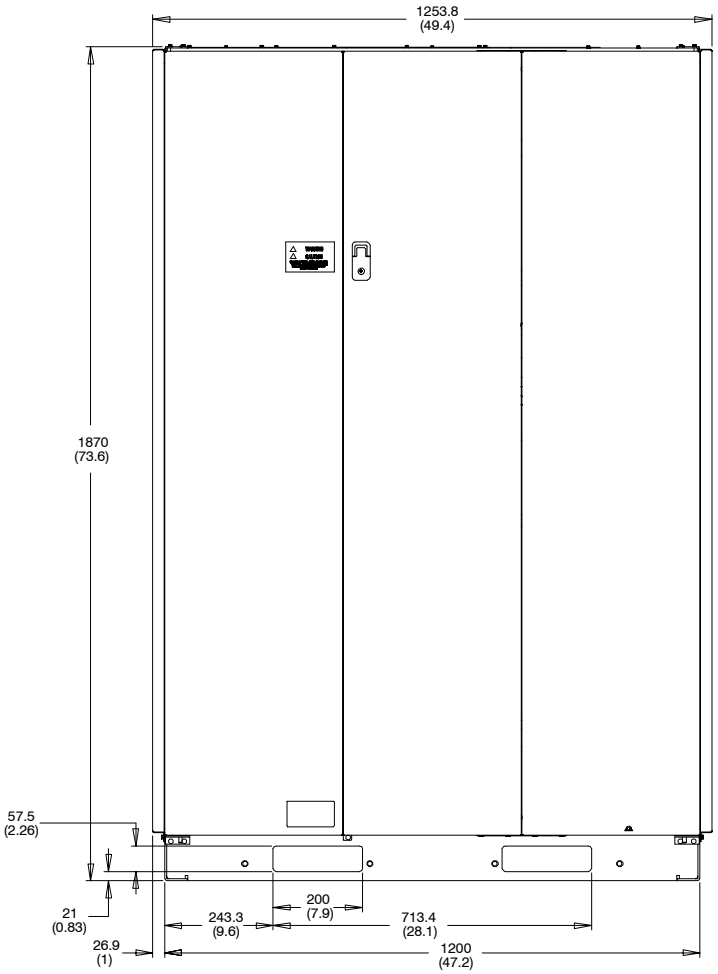
DESCRIPTION:	**UPS CABINET**		
DRAWING NO:	164201118–6	*SHEET:*	2 of 2
REVISION: A		*DATE:*	010198

Dimensions are in millimeters (inches)

TOP VIEW



FRONT VIEW

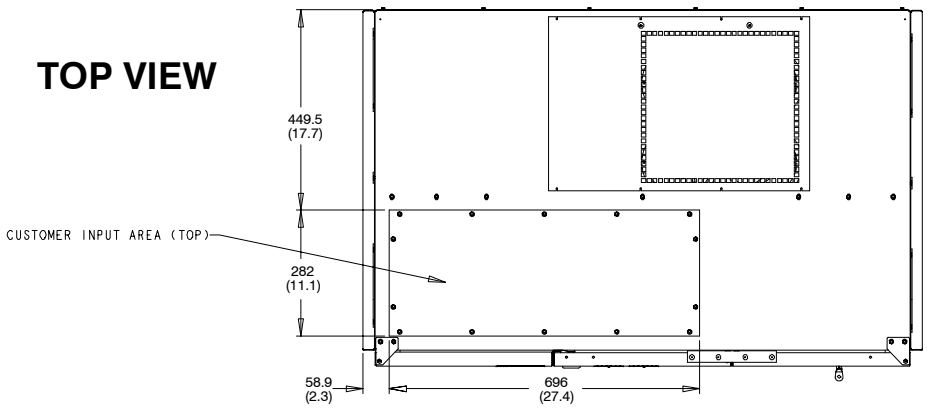


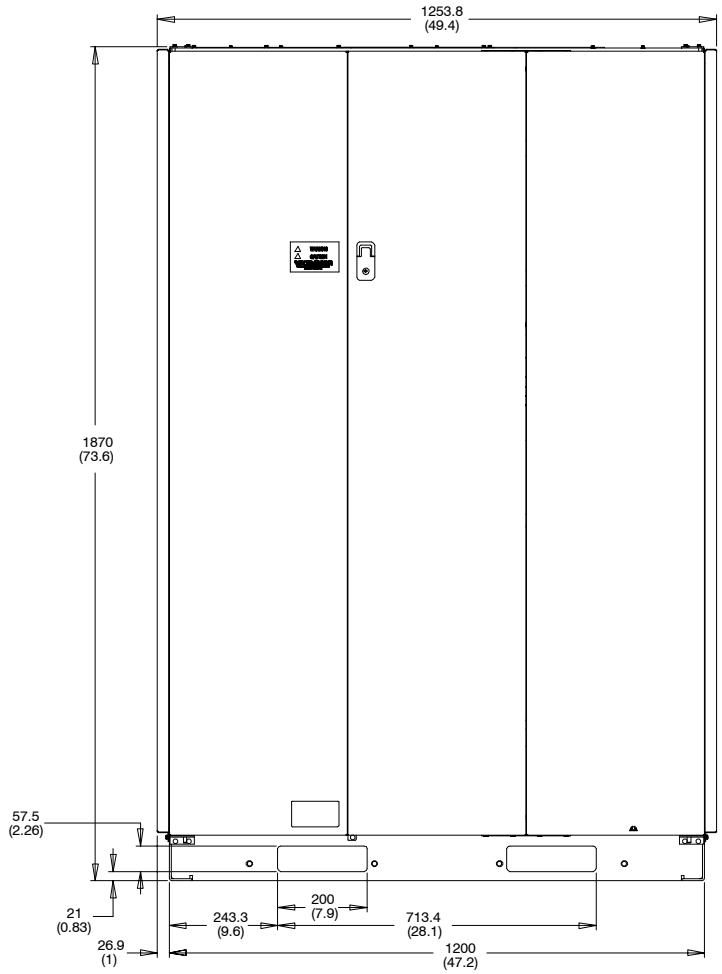
INPUT ISOLATION TRANSFORMER CABINET (480/480 and 600/480)

DESCRIPTION:	**TRANSFORMER CABINETS**		
DRAWING NO:	164201118–7	*SHEET:*	1 of 4
REVISION: D		*DATE:*	101598

Dimensions are in millimeters (inches)

TOP VIEW





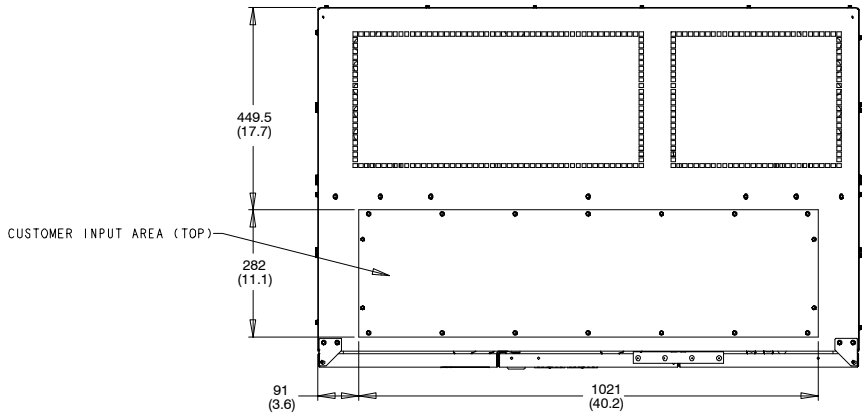
FRONT VIEW

5% INPUT FILTER CABINET (480/480)

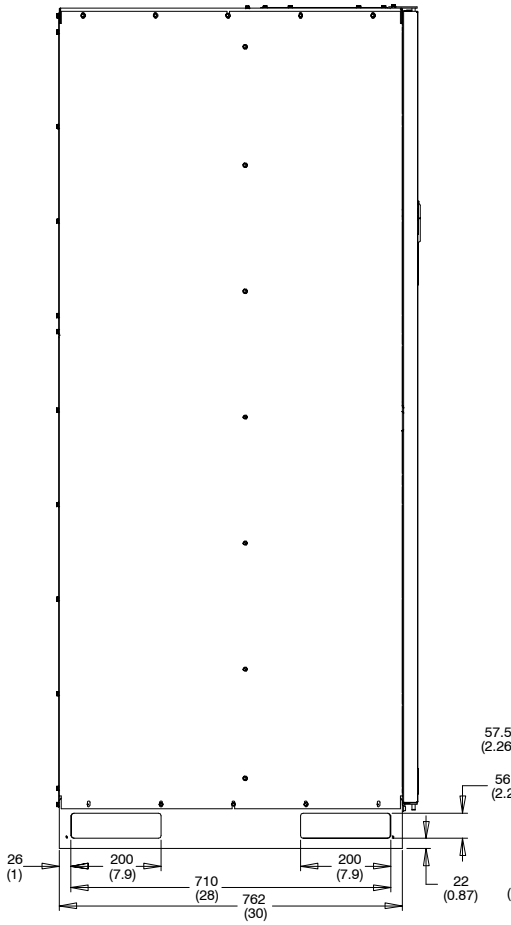
DESCRIPTION:	**TRANSFORMER CABINETS**		
DRAWING NO:	164201118–7	*SHEET:*	2 of 4
REVISION: D		*DATE:* 101598	

Dimensions are in millimeters (inches)

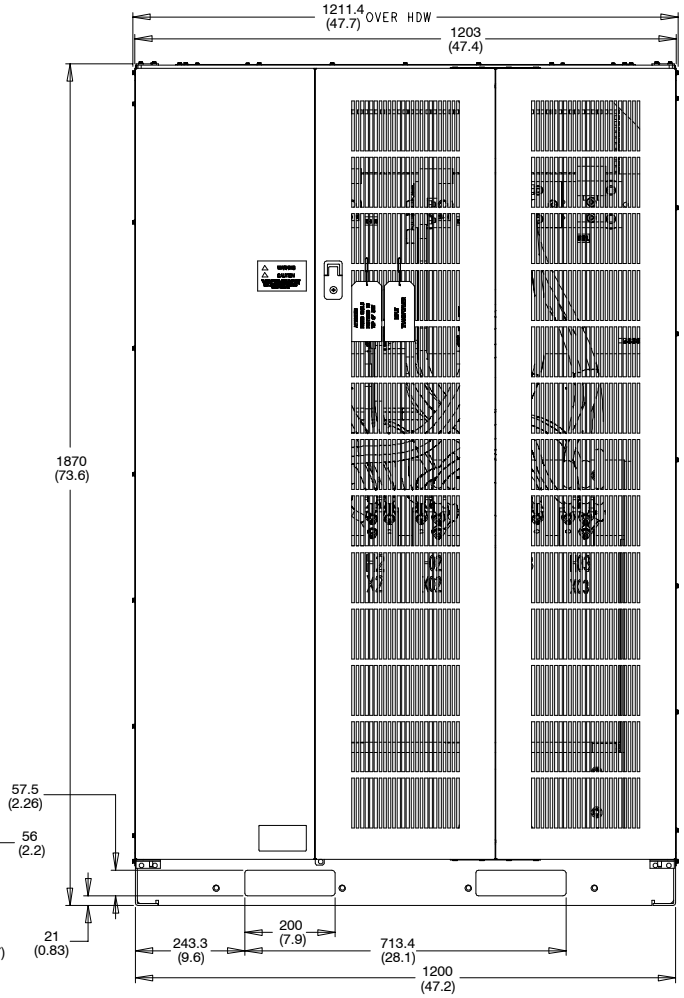
TOP VIEW



SIDE VIEW



FRONT VIEW

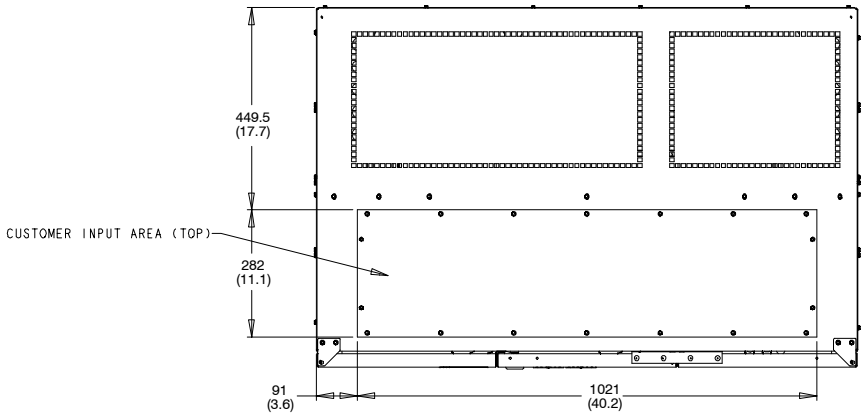


INPUT ISOLATION TRANSFORMER CABINET (208/480)

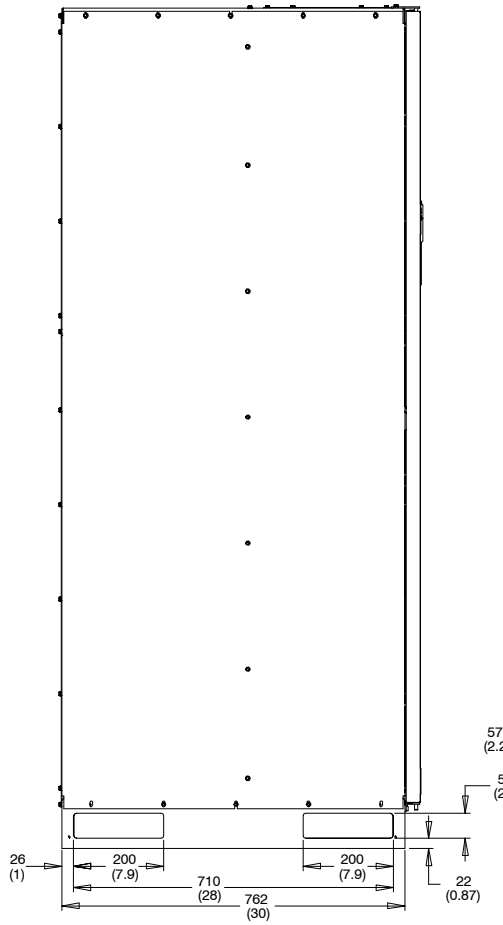
DESCRIPTION:	**TRANSFORMER CABINETS**		
DRAWING NO:	164201118–7	*SHEET:*	3 of 4
REVISION: D		*DATE:*	101598

Dimensions are in millimeters (inches)

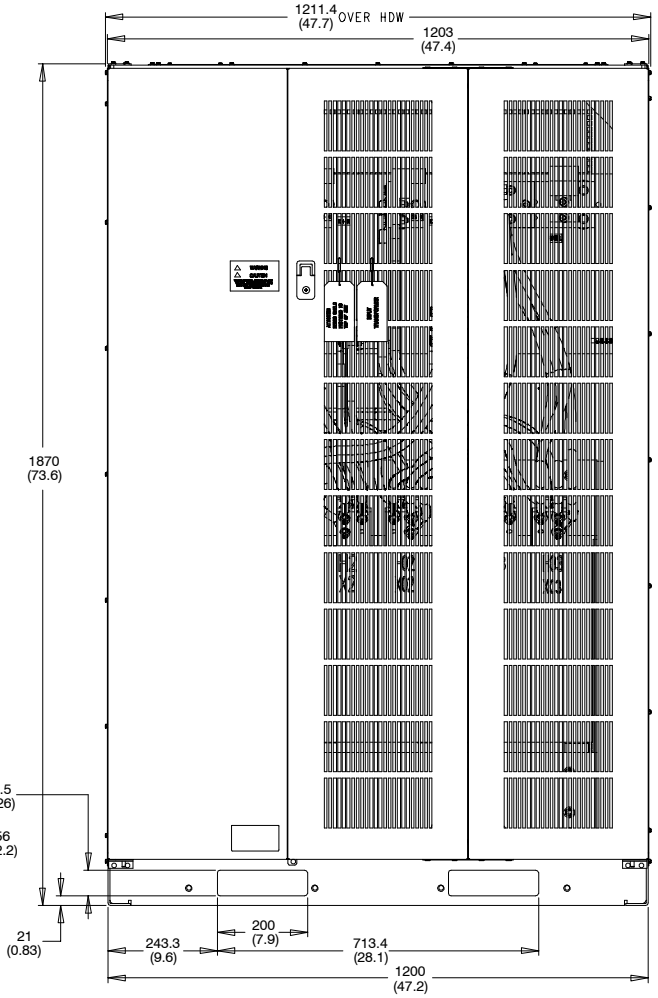
TOP VIEW



SIDE VIEW



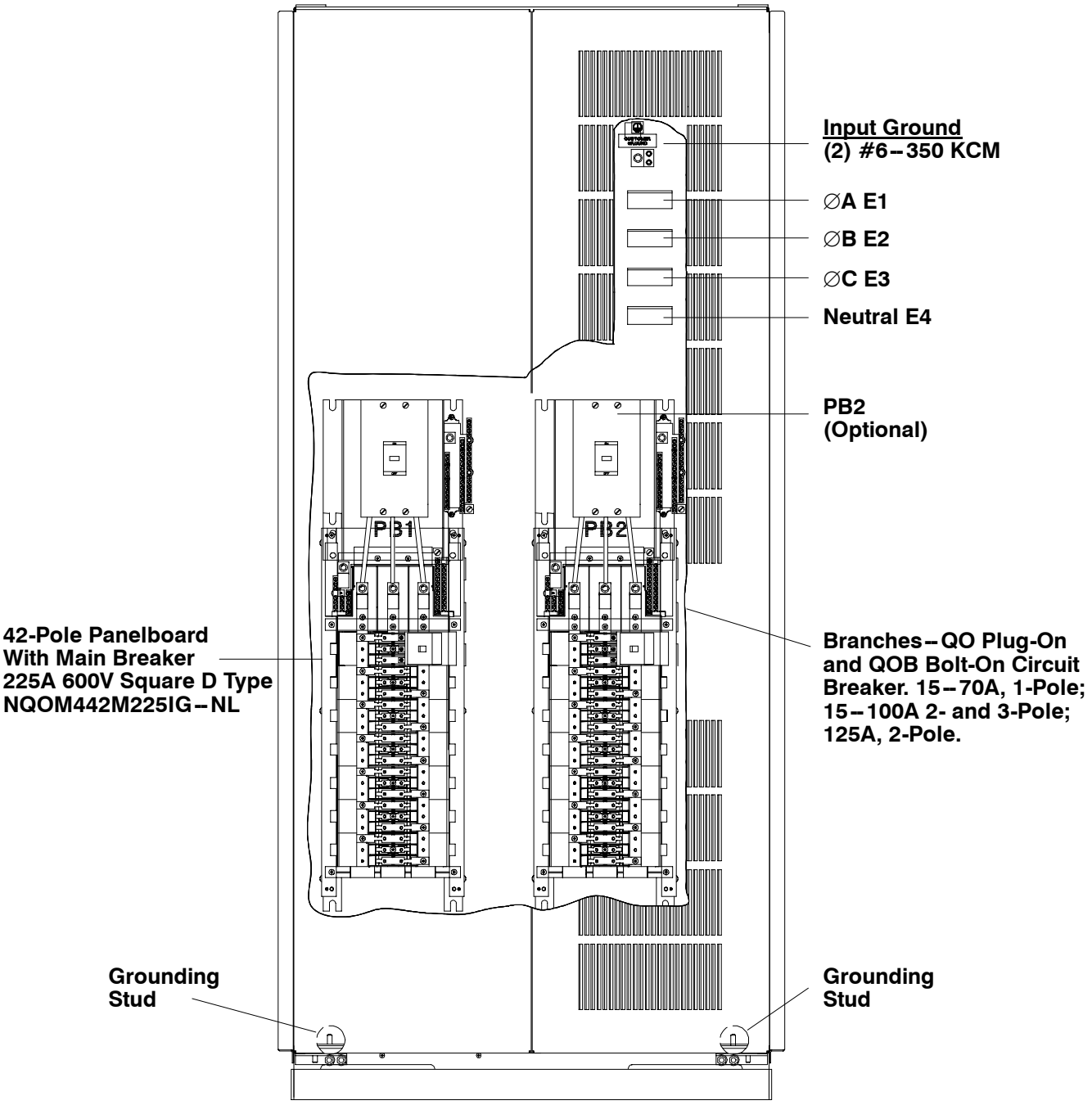
FRONT VIEW



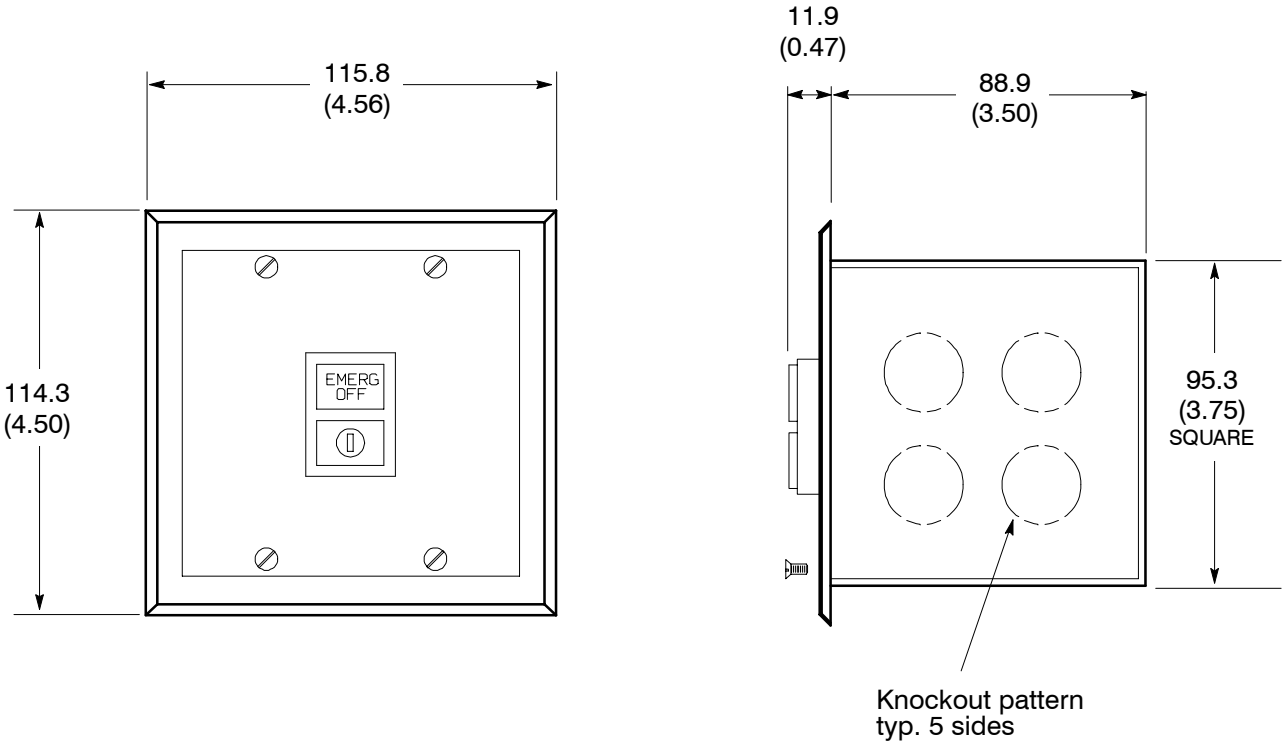
OUTPUT AUTO TRANSFORMER CABINET (480/208)

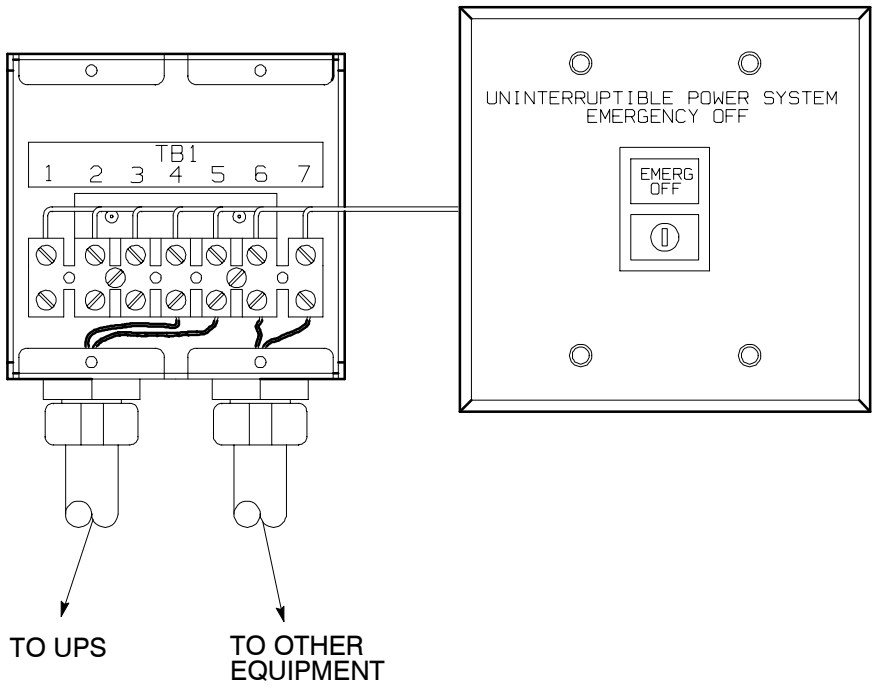
DESCRIPTION:	**TRANSFORMER CABINETS**		
DRAWING NO:	164201118–7	*SHEET:*	4 of 4
REVISION: D		*DATE:*	101598

Dimensions are in millimeters (inches)



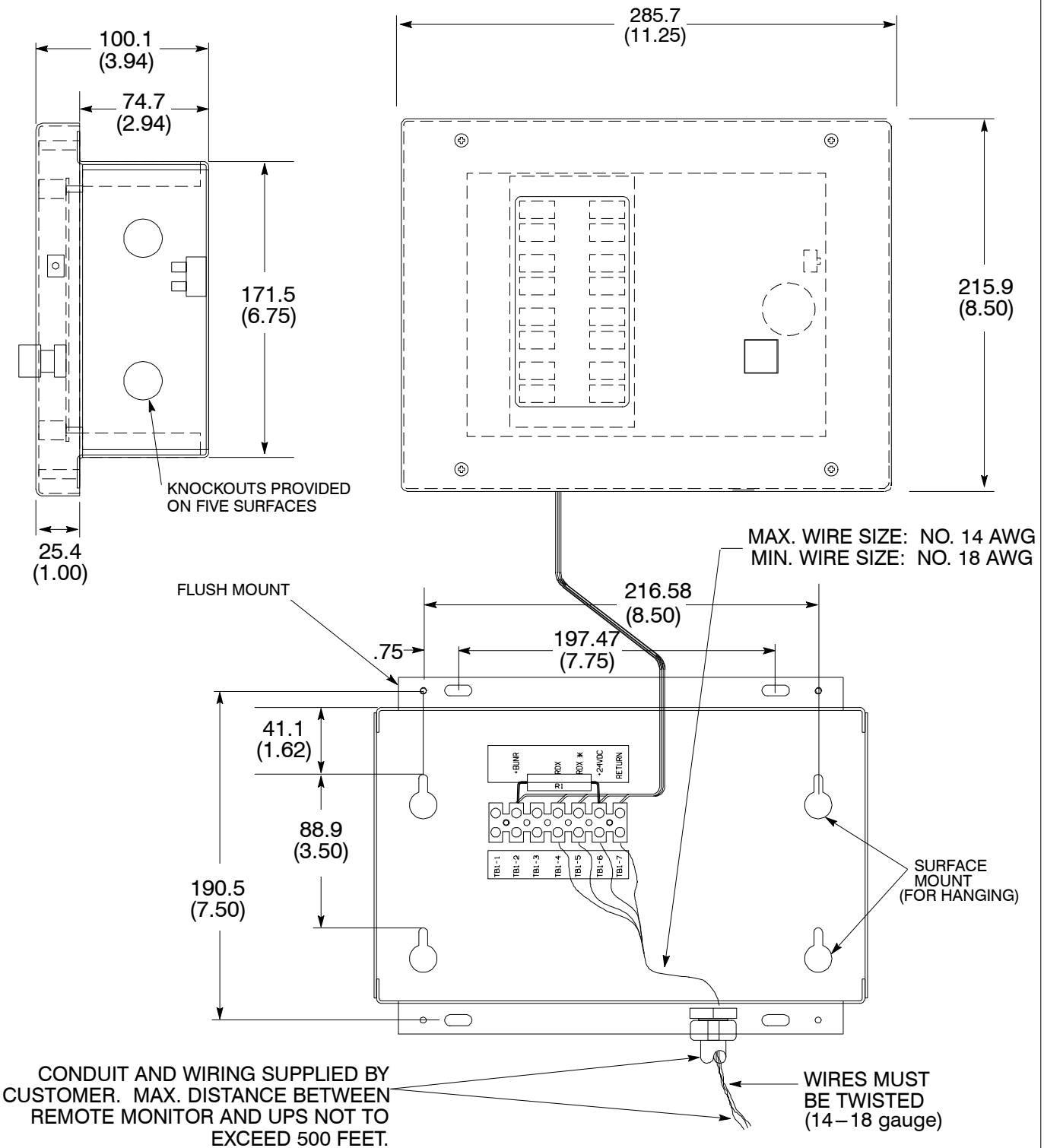
DESCRIPTION:	**POWER DISTRIBUTION MODULE**		
DRAWING NO:	164201118–8	*SHEET:*	1 of 1
REVISION:	A	*DATE:*	010198





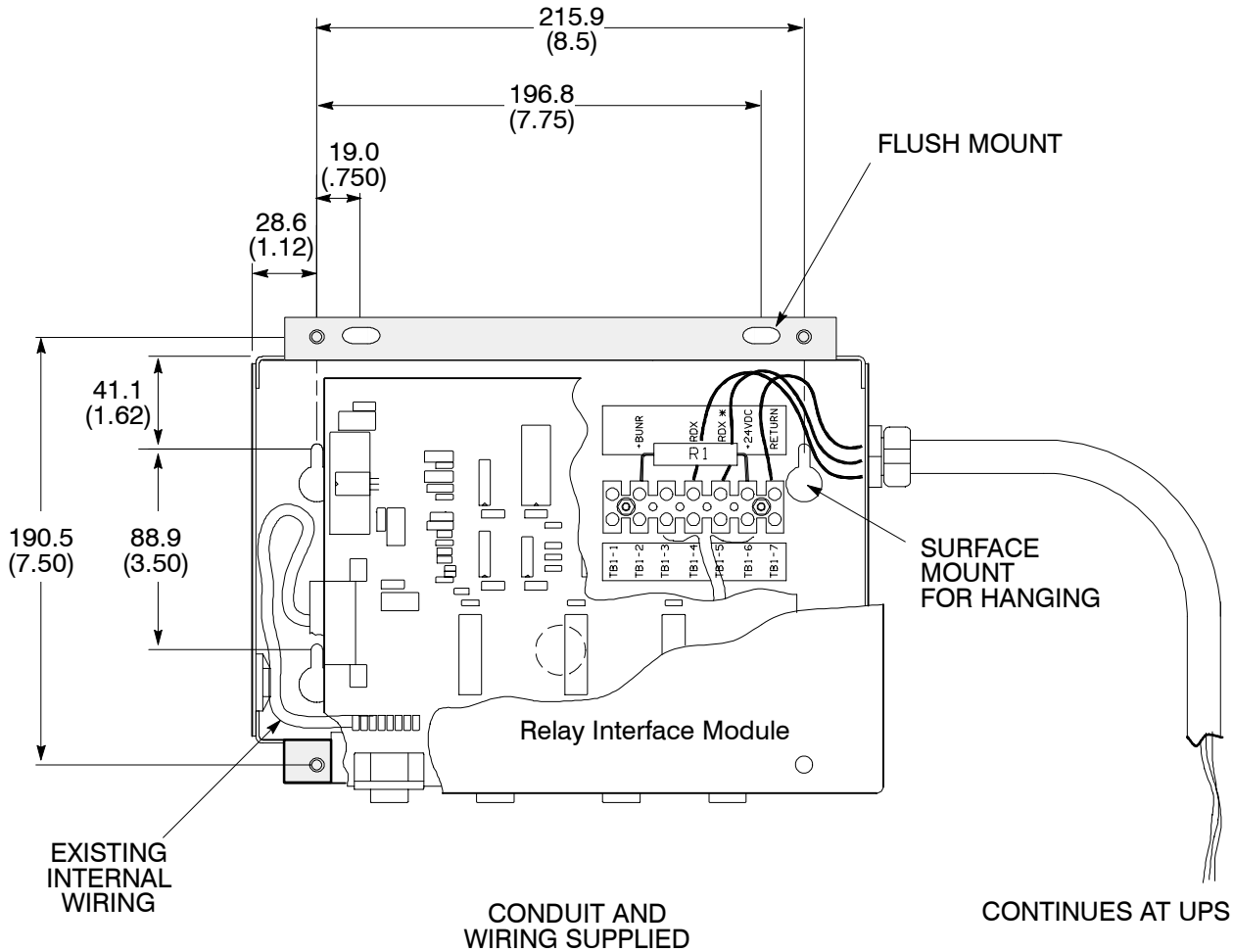
DESCRIPTION:	**REMOTE EMERGENCY POWER OFF**		
DRAWING NO:	164201118–9	*SHEET:*	1 of 1
REVISION: A		*DATE:*	010198

Dimensions are in millimeters (inches)



DESCRIPTION:	**REMOTE MONITOR PANEL**		
DRAWING NO:	164201118–10	*SHEET:*	1 of 1
REVISION: A		*DATE:*	010198

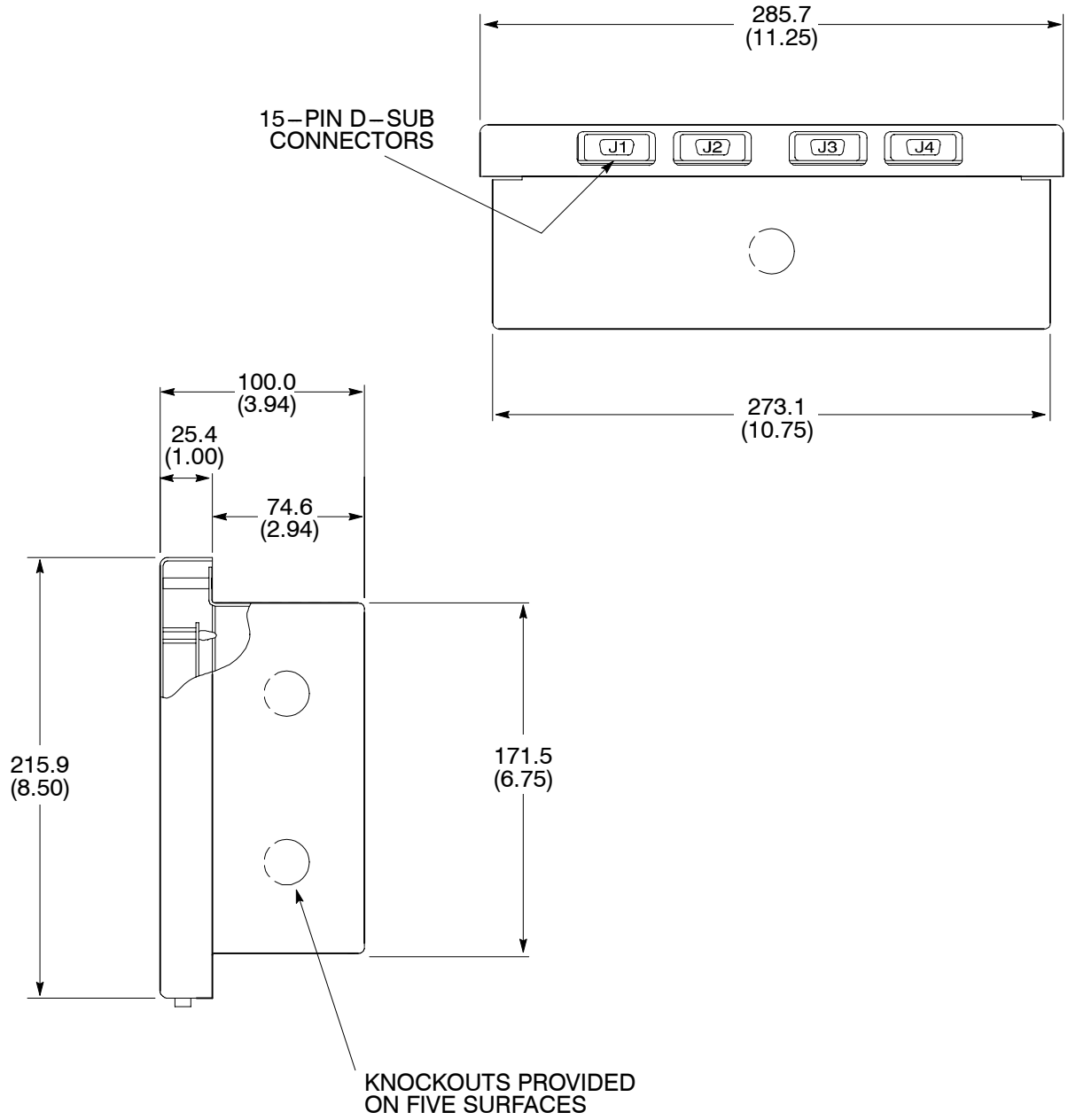
Dimensions are in millimeters (inches)



CONDUIT AND
WIRING SUPPLIED
BY CUSTOMER.
Maximum distance between
RIM and UPS not to exceed
500 feet. Wires must be twisted.
MAX WIRE SIZE NO. 14 AWG.
MIN WIRE SIZE NO. 18 AWG.

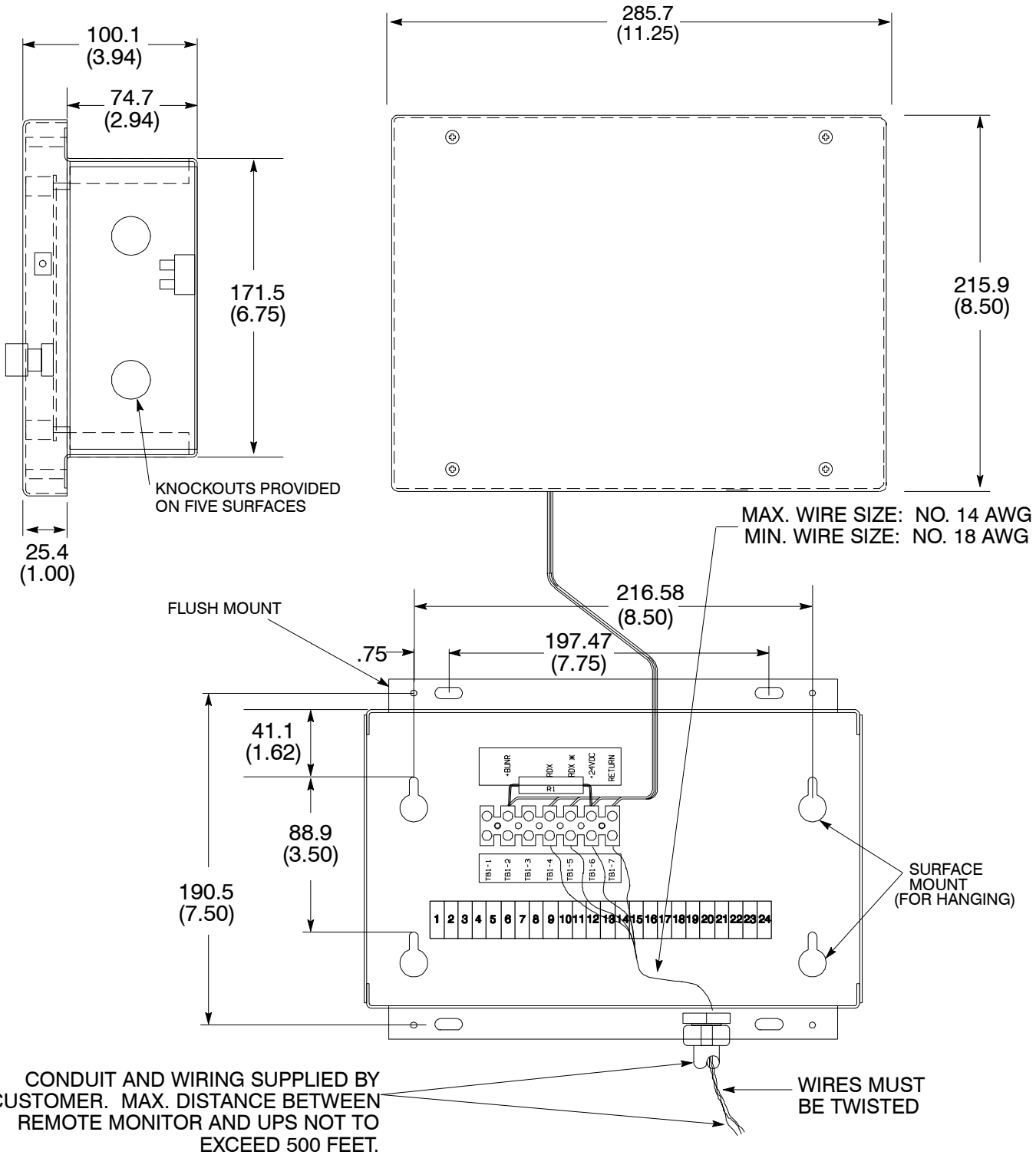
Dimensions are in millimeters (inches)

DESCRIPTION:	**RELAY INTERFACE MODULE**		
DRAWING NO:	164201118–11	*SHEET:*	1 of 2
REVISION:	A	*DATE:*	010198



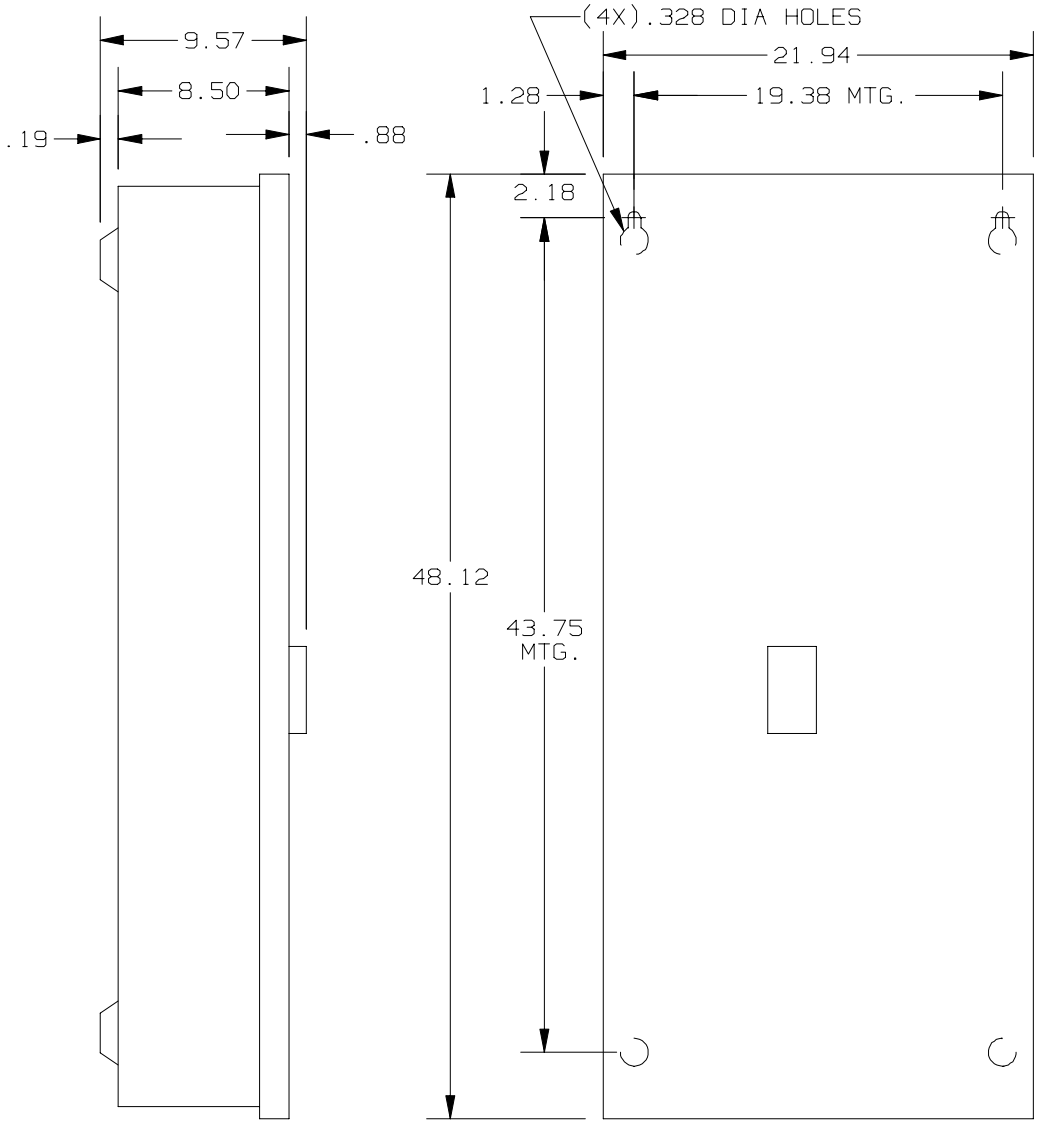
DESCRIPTION:	**RELAY INTERFACE MODULE**		
DRAWING NO:	164201118–11	*SHEET:*	2 of 2
REVISION: A		*DATE:*	010198

Dimensions are in millimeters (inches)



DESCRIPTION:	**SUPERVISORY CONTACT MODULE**		
DRAWING NO:	164201118–12	*SHEET:*	1 of 1
REVISION:	A	*DATE:*	010198

Dimensions are in millimeters (inches)

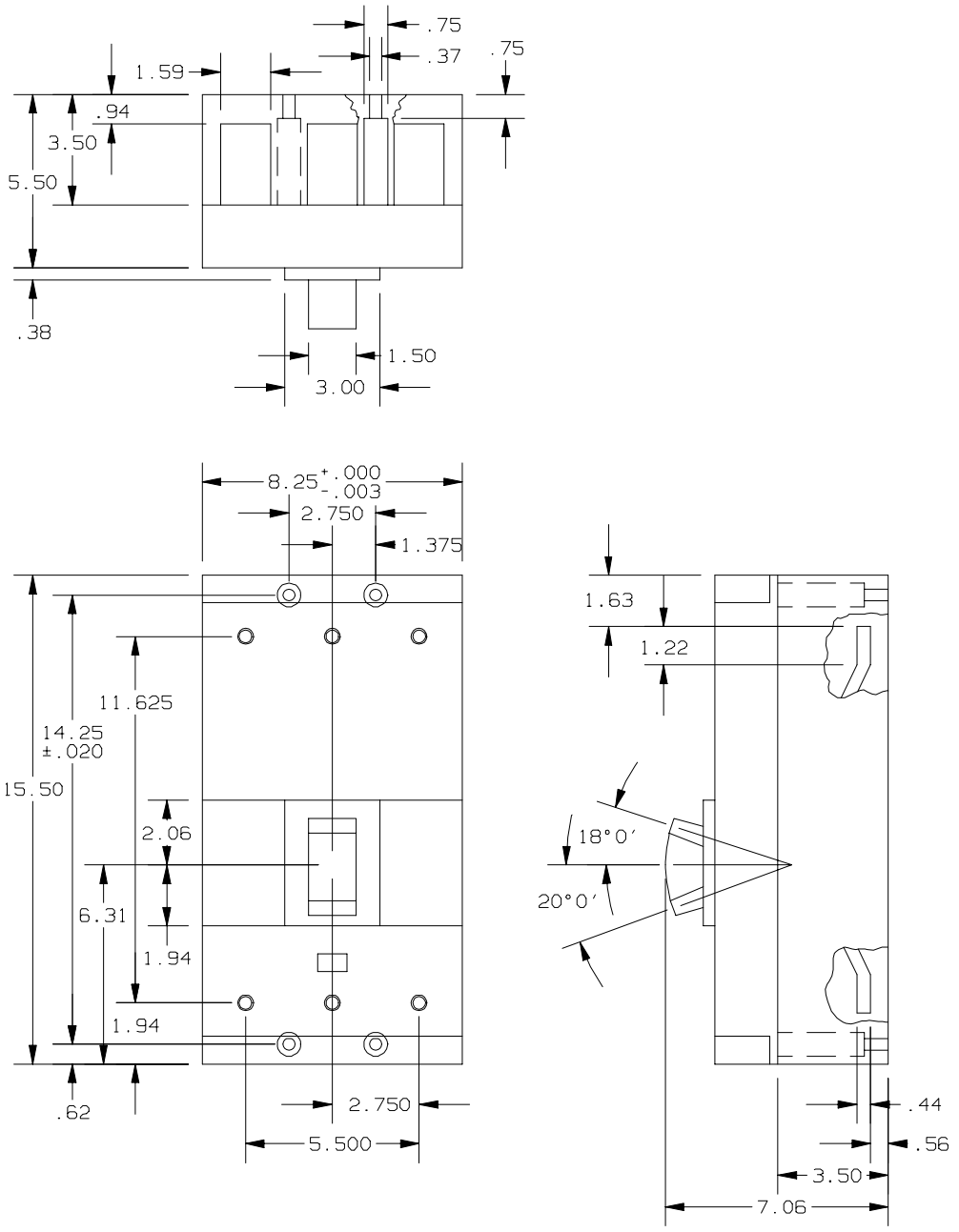


ENCLOSURE FOR K1200 BREAKERS

ENCLOSURE HAS NO KNOCKOUTS.
KNOCKOUTS TO BE DETERMINED AT
TIME OF INSTALLATION.

WEIGHT
75 LBS (34 KG)

DESCRIPTION:	**BATTERY DISCONNECT SWITCH**		
DRAWING NO:	164201118–13	*SHEET:*	1 of 2
REVISION: A		*DATE:*	010198



TYPE K1200 BREAKER OUTLINE

DESCRIPTION:	**BATTERY DISCONNECT SWITCH**		
DRAWING NO:	164201118–13	*SHEET:*	2 of 2
REVISION: A		*DATE:* 010198	