

Eaton® Three-Phase Power Distribution Unit (PDU)

150kVA

Installation and Operation Manual

Includes all 50-150 kVA Models



Powering Business Worldwide

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IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

CONSIGNES DE SÉCURITÉ IMPORTANTES CONSERVER CES INSTRUCTIONS

Ce manuel comporte des instructions importantes que vous êtes invité à suivre lors de toute procédure d'installation et de maintenance de la PDU. Veuillez consulter entièrement ces instructions avant de faire fonctionner l'équipement et conserver ce manuel afin de pouvoir vous y reporter ultérieurement.

Class A EMC Statements

FCC Part 15



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Chapter 1 Introduction

The Eaton® 150 kVA Three-Phase Power Distribution Unit (Eaton 150 kVA PDU) is designed for use with all three-phase uninterruptible power systems (UPSs) and three-phase power sources. The PDU provides power distribution, voltage transformation, metering, status monitoring, and load profiling with easy adaptation and expansion without costly electrical rework.

The PDU is housed in a single, free standing cabinet, with safety shields behind the doors for hazardous voltage protection. Figure 1-1 through Figure 1-4 show the Eaton 150 kVA Three-Phase Power Distribution Unit.

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

1.1 PDU Standard Features

The PDU has the following standard features that provide cost effective and consistently reliable power distribution.

1.1.1 Control Panel

The control panel, located on the front of the PDU, contains an LCD panel and pushbutton switches to control the operation and to display the status of the PDU.

See Chapter 6, “PDU Operating Instructions,” for additional information.

1.1.2 Power Monitoring

The PDU provides the following monitoring features:

- PDU status and event log recording
- PDU metering for the following:
 - Input voltages – phase to phase
 - Output voltages – phase to phase and phase to neutral
 - Output current
 - kVA, kW, frequency, ground current, and power factor
 - Percent loading per phase
- Load profiling
 - Minimum and maximum voltage, current, frequency, and kilowatt
 - Highest reading on a monthly basis

See Chapter 6, “PDU Operating Instructions,” for additional information.

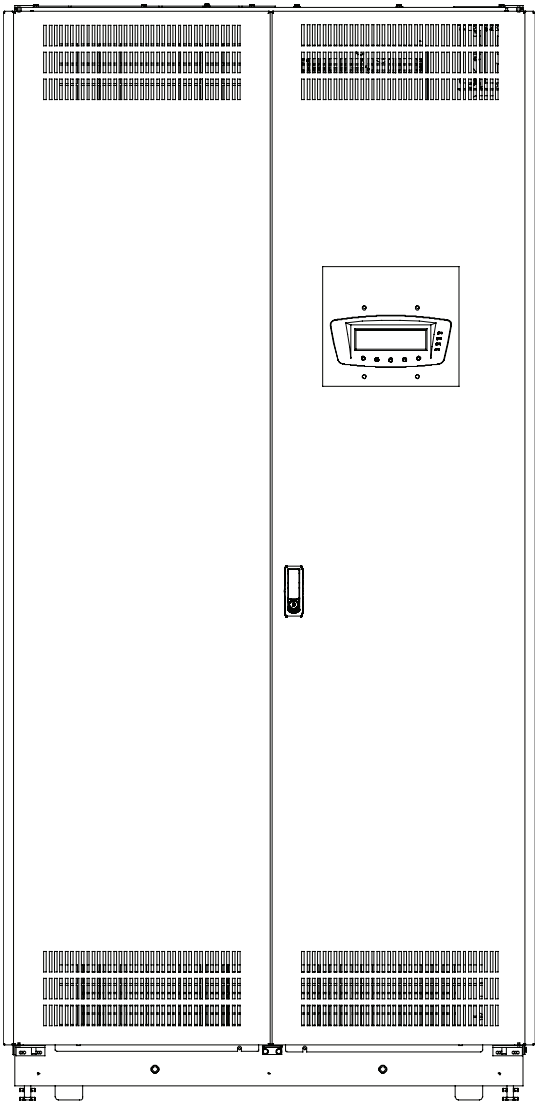


Figure 1-1. Eaton 150 kVA Three-Phase PDU Cabinet



Figure 1-2. Eaton 150 kVA Three-Phase PDU Cabinet with Left and Right Front-Facing Sidecars

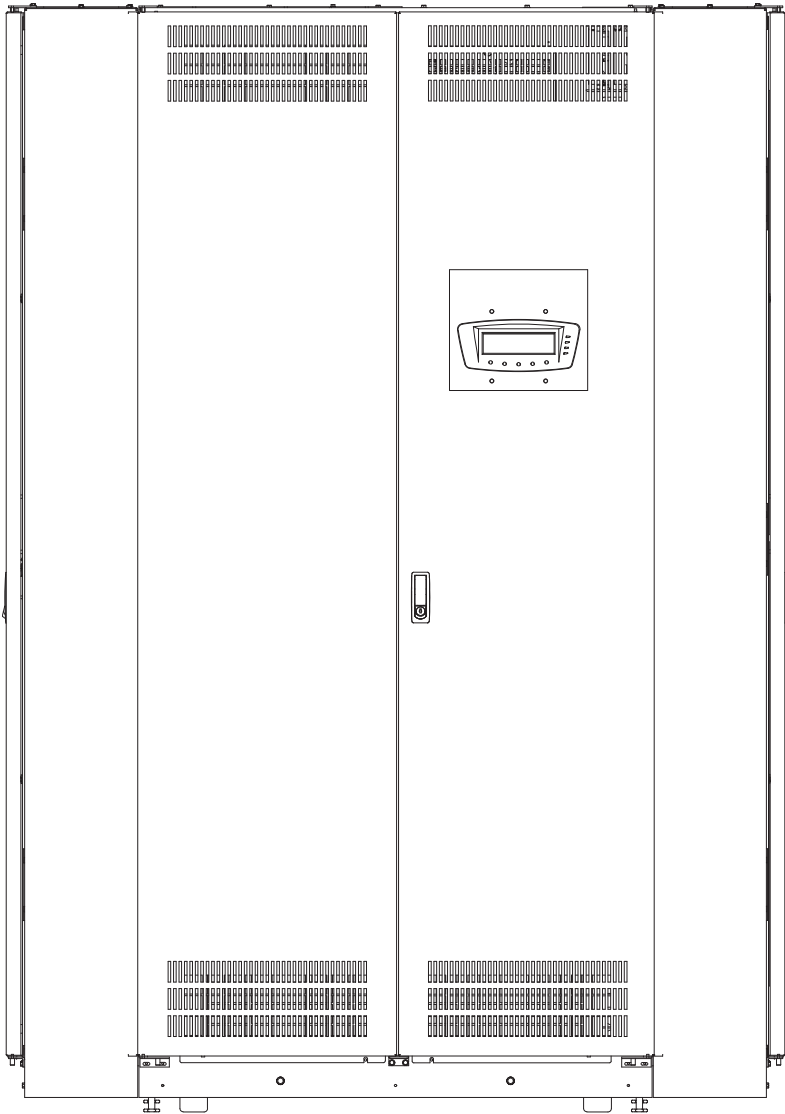


Figure 1-3. Eaton 150 kVA Three-Phase PDU Cabinet with Left and Right Side-Facing Sidecars

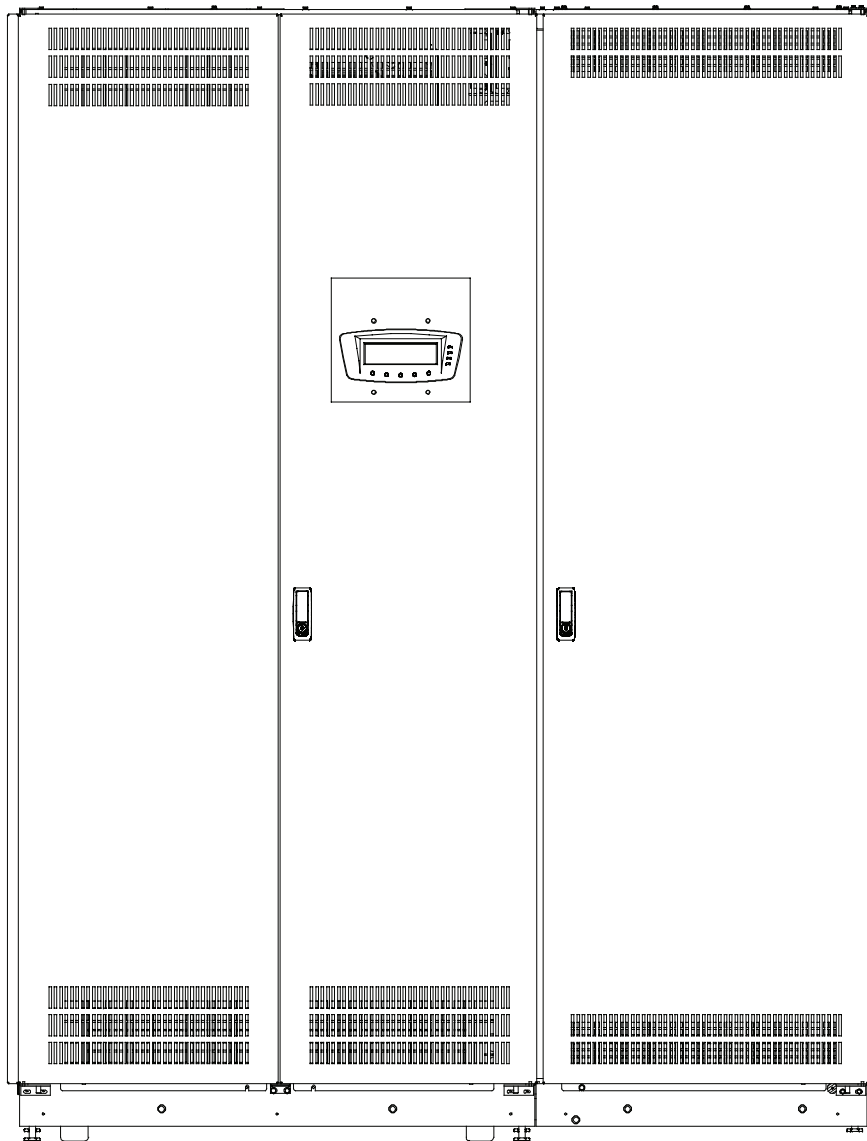


Figure 1-4. Eaton 150 kVA Three-Phase PDU Cabinet with Dual-Input Sidecar

1.1.3 Manual Restart

If Manual Restart is enabled, the main input breaker will trip when input power to the PDU is lost. Opening the main input breaker on power failure prevents the possibility of a power surge when power is restored in systems with multiple PDUs and sensitive loads. When power returns, each PDU can be restarted individually, preventing or minimizing any power fluctuations.

See Chapter 6, “PDU Operating Instructions,” for additional information.

1.1.4 Output Transformer and Transformer Monitoring

The PDU has the following transformer and transformer monitoring features.

- **Output Transformer** – An output transformer provides 208 Vac output from a 208 Vac, 380 Vac, 400 Vac, 415 Vac, 480 Vac, or 600 Vac input for use with the distribution panels supplying 208/120 Vac to the load.
- **Transformer Overtemperature Monitoring** – An overtemperature sensor is provided to monitor the PDU transformer and issue a warning alarm if the temperature of the transformer reaches 180°C. This feature is disabled by default and can be enabled or disabled by an Eaton Customer Service Engineer.
- **Transformer Shutdown Monitoring** – A shutdown sensor is provided to shut down the PDU if the temperature of the transformer reaches 200°C. This feature is disabled by default and can be enabled or disabled by an Eaton Customer Service Engineer.

1.1.5 Customer Interface

The PDU has the following customer interface features.

- **Building Alarm Monitoring** – Two inputs are available to connect to the facility's building alarm system, such as smoke detectors or overtemperature alarms. The building alarms can be programmed to display the alarm functional name using the front panel LCD. The PDU uses these inputs to monitor the building alarms in addition to the PDU status.
- **Alarm Contact** – One general-purpose form c, normally-closed or normally-open relay contact is provided on the PDU. This contact can be connected to equipment at the facility such as a light, an audible alarm, or a computer terminal to signal when an alarm occurs.
- **X-Slot® Communication** – Two communication bays are standard equipment. One or two optional X-Slot cards can be installed in the PDU at any time. See Chapter 7, “Communication,” for additional information.

1.1.6 Fault Monitoring

The following conditions can initiate a PDU shutdown and trip the PDU main input breaker CB1. These features can be enabled, disabled, or configured by an Eaton Customer Service Engineer.

- **Overload Shutdown** – An overload beyond a pre-set level is detected. This level can be set at 100%, 110%, or 125% of maximum rated output, or at a customer-specified level.
- **Over or Under Voltage Shutdown** – An over or under voltage beyond pre-set levels is detected. This level can be set at $\pm 2.5\%$ of the nominal voltage detected for a period greater than 5 seconds.
- **Over or Under Frequency Shutdown** – An over or under frequency beyond pre-set levels is detected. This level can be set at $\pm 15\%$ of the nominal frequency detected for a period greater than 5 seconds.
- **Phase Rotation Shutdown** – A phase wiring error is detected.
- **Phase Loss Shutdown** – A phase loss is detected on both the input and the output.
- **Ground and Neutral Overcurrent Shutdown** – A ground or neutral overcurrent is detected beyond a pre-set value.

1.1.7 Installation Features

Cabinets can be permanently bolted to the floor or left standing on leveling feet.

Power and control wiring can be routed through the top or bottom of the cabinet with connections made to easily accessible terminals.

Optional X-Slot connectivity cards are quickly installed at the front of the unit and are hot-pluggable.

1.1.8 Expansion

The PDU supports custom configurations and scalability to adapt to changing and future power and distribution needs. See paragraph 1.2 for available options.

1.2 Options

The following options are available to enhance the performance of your system. Contact an Eaton sales representative for information about any of these available options.

1.2.1 Front Only Service Access

Optional main PDU cabinet that requires front only access for transformer tap adjustment or for terminal inspection. Optional infrared (IR) inspection ports are available to IR temperature measuring equipment. No side or rear clearance is required for any service related tasks. To accomplish front only service access, no distribution breakers are contained in the main PDU cabinet. Front-facing or side-facing sidecars are required for distribution panel boards or subfeed breakers.

1.2.2 Front Only Service Access Infrared Inspection Port

Optional IR inspection ports are available with the front only service access option for easy transformer tap and phase tie point terminal inspection using IR temperature measuring equipment.

1.2.3 Distribution Panels

Optional output distribution panels distribute the output power from the output transformer to the load. The main cabinet of the PDU can be equipped with up to two distribution panels rated at 225A, 400A, or 800A. The distribution panels are behind the hinged doors on the front of the PDU.

1.2.4 Branch and Subfeed Breakers

Optional branch and subfeed output circuit breakers distribute the output power from the AC source to the loads or remote power panels. Each 225A and 400A distribution panel can hold up to the equivalent of 42 single-pole branch circuit breakers (either Eaton bolt-on type BAB or QBHW, or plug-on type HQP or QPHW) that can be configured to meet facility needs. For larger loads of up to 225A, up to four 3-pole F-frame breakers can be installed on a 800A distribution panel in the PDU. Up to two additional non-monitored sub-feed breakers of up to 225A may be added to the PDU.

1.2.5 Subfeed Shunt Trip and Auxiliary Contacts

Optional shunt trip terminals can be used to easily connect subfeed breaker shunt trips to emergency off devices. Auxiliary contact connections are also provided to allow monitoring of the breaker open or closed status.

1.2.6 Square D Distribution Panels

Optional 225A and 400A Square D® type distribution panels using bolt-on type QOB breakers are available for installations needing to limit breaker resources to a single type. These panels are available for use in both the main cabinet and the sidecars.

1.2.7 Surge Protective Device

An optional Surge Protective Device (SPD) module provides protection for sensitive electronic equipment from damaging transients, surges, and electrical line noise.

See Chapter 6, “PDU Operating Instructions,” for SPD status display indicators.

1.2.8 Lightning Arrestor

An optional Lightning Arrestor provides protection for equipment from damaging from lightning surges.

1.2.9 Sidecars

Optional front-facing or side-facing sidecars installed on the left, right, or both sides of the main PDU provide additional branch circuit capacity and flexibility to meet facility needs. Each sidecar is capable of holding up to two 225A or 400A 42-pole panelboards using Eaton bolt-on type BAB or QBHW or plug-on type HQP or QPHW breakers, or one 800A panelboard with up to four F-Frame 3-pole subfeed breakers. The distribution panels are enclosed behind the hinged door on the sidecar. Sidecar availability and placement may vary when the dual input option selected.

1.2.10 Dual Input Breaker Sidecar

The Dual Input option allows you to switch the utility source that feeds the PDU without dropping critical loads (Make-Before-Break transition). The Dual Input uses a key interlock system to minimize the chances of an unintentional load drop due to human error. A basic model with single key interlocks and a premier model with double key interlocks are available. The sidecar is mounted on the right side of the main PDU and is front facing.

1.2.11 Crimp Lug Input

Standard customer input connections to PDU the are made directly to the main input breaker and are secured by the mechanical lugs on the breaker terminal. The crimp lug input option can be ordered to ease installation by allowing the electrician to crimp the power cables prior to connecting them to the pre-mounted assembly that feeds the main input breaker. Crimp lugs are available for both single and dual input PDUs.

1.2.12 Floorstand

An optional floorstand can support the PDU when installed in facilities with raised floors that will not support the weight of the PDU directly.

1.2.13 Floor Mounting Brackets

Optional front and rear floor mounting brackets are available to permanently secure the PDU to the facility floor.

1.2.14 Branch Circuit Monitoring

The Eaton Energy Management System (EMS) Premium metering (EMS Premium metering) is designed to provide branch circuit monitoring (BCM) features for Eaton PDUs (available in both the 60A or 100A option). The unique benefits include the following:

- For 225A or 400A 42-pole panelboards, BCM is available to monitor full load at 60A or 100A per branch circuit breaker. For 225A or 400A 42-pole Square D distribution panelboards, BCM is available to monitor full load at 60A per branch circuit breaker only.
- For 800A panelboards, BCMS is available to monitor full load at 225A per F-frame subfeed breaker.
- Monitors voltage and current for branch and subfeed breakers.
- Eaton EMS is designed to measure and store the energy parameter for each of the outputs delivered to the customer's load.

1.2.15 Remote Emergency Power-off

A Remote Emergency Power-off (REPO) option provides tripping of the main input breaker in situations where immediate shutdown of the PDU output to the load is needed from a remote location. This switch must be a normally-open or normally-closed latching type switch not tied into any other circuits. The factory default configuration is set up for use with a normally-open switch. To use a normally-closed switch, the configuration must be changed during setup by an Eaton Customer Service Engineer. This option utilizes a building alarm contact.

See Chapter 6, "PDU Operating Instructions," for REPO operation.

1.2.16 Optional X-Slot Cards

The optional X-Slot cards support several protocols, such as SNMP and Modbus®. See Chapter 7, "Communication," for additional information.

1.2.17 See-through Door

Optional see-through doors can allow instant visual inspection of the state of branch circuit breakers without having to open the front doors.

1.2.18 Air Skirt

An air skirt is available as an accessory kit for the PDU. An air skirt can be installed at the bottom of the PDU to prevent the loss of air flow caused by the gap between the bottom of the cabinet and the raised floor. Use air skirts only when the PDU is installed on a raised floor where the raised floor acts as a plenum and provides adequate air flow to the PDU. Inadequate air flow will cause the PDU to overheat.

1.3 Configurations

The following PDU configurations are possible for an output range of 50-150 kVA with K13 and K20 transformers:

- 208V/380V/400V/415V/480V/600V Input and 208V Output with transformer and:
 - one or two 225A or 400A 42-pole distribution panels
 - one or two 800A distribution panels for up to four "F" frame 3-pole subfeed breakers each
 - one to two unmonitored "F" frame 3-pole subfeed breakers
 - up to two front-facing or side-facing sidecars with one or two 225A or 400A 42-pole distribution panels, or one 800A distribution panel with up to four "F" frame 3-pole subfeed breakers

Other configurations may be available. Please contact an Eaton sales representative.

1.4 Using This Manual

This manual describes how to install and operate the Eaton 150 kVA PDU. Read and understand the procedures described in this manual to help ensure trouble-free installation and operation. In particular, be thoroughly familiar with the REPO procedure (see paragraph 6.7).

The information in this manual is divided into sections and chapters. The system, options, and accessories being installed dictate which parts of this manual should be read. At a minimum, Chapters 1 through 3 and Chapter 6 should be examined.

Referenced paragraphs A.1 through A.10, Figure A-1 through Figure A-68, and Table A through Table W can be found in Appendix A "Installation Reference," at the back of this manual.

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

1.5 Conventions Used in This Manual

This manual uses these type conventions:

- **Bold type** highlights important concepts in discussions, key terms in procedures, and menu options, or represents a command or option that you type or enter at a prompt.
- *Italic type* highlights notes and new terms where they are defined.
- `Screen type` represents information that appears on the screen or LCD.

Icon	Description
NOTE	Information notes call attention to important features or instructions.
[Keys]	Brackets are used when referring to a specific key, such as [Enter] or [Ctrl].

1.6 Symbols

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



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



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



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

1.7 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

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

DANGER

The PDU contains LETHAL VOLTAGES. All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER SERVICEABLE PARTS inside the PDU with the exception of adding and wiring branch circuit breakers.

WARNING

- To reduce the risk of fire or electric shock, install this PDU in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°F). Do not operate near water or excessive humidity (95% maximum). The system is not intended for outdoor use.
 - Ensure all power is disconnected before performing installation or service.
 - As a result of the connected loads high leakage current is possible. Connection to earth ground is required for safety and proper product operation.
 - Locate the PDU on concrete or other non-combustible surface only.
-

CAUTION

- Keep the PDU doors closed to ensure proper cooling airflow and to protect personnel from dangerous voltages inside the unit.
 - Do not operate the PDU close to gas or electric heat sources.
 - The operating environment should be maintained within the parameters stated in this manual.
 - Keep surroundings uncluttered, clean, and free from excess moisture.
 - Use leveling feet only for distributing the weight of the cabinet equally. Using the leveling feet to raise the cabinet may result in serious injury to personnel or damage to the cabinet.
 - Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.
-

1.8 For More Information

Refer to the *Eaton Energy Management System (EMS) Branch Circuit Management System (BCMS) Interface User's Guide* for EMS Premium metering information, as well as the following:

- Branch circuit monitoring configuration instructions, including branch circuit parameter setup and alarm setup.
- Branch circuit monitoring operation, including using the PDU LCD and menu map.
- Branch circuit monitoring troubleshooting, including alarms and conditions, and service and support.

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

1.9 Getting Help

If help is needed with any of the following:

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

Please call the Eaton Corporation Help Desk at:

United States:	1-800-843-9433
Canada:	1-800-461-9166 ext 260
All other countries:	Call your local service representative

Please use the following e-mail for manual comments, suggestions, or to report a technical error.

E-ESSDocumentation@Eaton.com

Section 1

Installation

Chapter 2 PDU Installation Plan and Unpacking

Use the following basic sequence of steps to install the Power Distribution Unit (PDU).

1. Create an installation plan for the PDU (Chapter 2).
2. Prepare your site for the PDU (Chapter 2).
3. Inspect and unpack the PDU (Chapter 2).
4. Unload and install the PDU and wire the system (Chapter 3).
5. Install features, accessories, or options, as applicable (Chapters 4 and 7).
6. Complete the Installation Checklist (Chapter 3).
7. Have authorized service personnel perform preliminary operational checks and startup.



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

NOTE 2 Referenced paragraph A.1, Figure A-5 through Figure A-18, and Table A and Table C and Table D can be found in Appendix A “Installation Reference” at the back of this manual.

2.1 Creating an Installation Plan

Before installing the PDU, read and understand how this manual applies to the system being installed. Use the procedures and illustrations in the following chapters to create a logical plan for installing the system.

2.2 Preparing the Site

For the PDU to operate at peak efficiency, the installation site should meet the environmental parameters outlined in this manual. If the PDU is to be operated at an altitude higher than 1500m (5000 ft), contact an Eaton service representative for important information about high-altitude operation. The operating environment must meet the weight, clearance, and environmental requirements specified in paragraph A.1 and size requirements specified in Figure A-5 through Figure A-18.

The PDU takes in air at the bottom of the front door, at the bottom of the rear, but the main air intake is through perforated metal used in the floor under the transformer. The air exits through the top of the front door, top of the rear panel, and through perforated metal used on the top surface of PDU. (see Figure A-5 through Figure A-18). Provide clearance free of any obstructions in front of and above the PDU for proper air circulation. See Table C and Table D for clearances.

2.2.1 Environmental Considerations

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

- The system must be installed on a level concrete or non-combustible floor suitable for computer or electronic equipment or on the floorstands available from Eaton. Floorstands must be installed on a level concrete or non-combustible floor suitable for computer or electronic equipment.
- The system must be installed in a temperature and humidity controlled indoor area free of conductive contaminants.

Failure to follow guidelines may void your warranty.

2.2.2 Preparing for Wiring the PDU

 **WARNING**

As a result of the connected loads high leakage current is possible. Connection to earth ground is required for safety and proper product operation.

 **CAUTION**

Cable insulation with 90°C or better is required for the incoming 3-phase cables connecting to the input main circuit breaker. Failure to meet this requirement may lead to catastrophic system failure.

Wiring requirements for the PDU, including the minimum AWG size of external wiring, can be found in Table G through Table L. The input power wiring connections for this equipment are rated at 90°C. If wire is run in an ambient temperature greater than 40°C, higher temperature wire and/or larger size wire may be necessary.

2.3 Inspecting and Unpacking the PDU

Use the applicable procedure from the following list for the PDU model being installed:

- For PDU models with PDU main cabinet, PDU main cabinet and one or two side facing sidecars bolted to a standard pallet, or PDU main cabinet and one front facing sidecar, proceed to paragraph 2.3.1.
- For PDU models with PDU main cabinet and two front facing sidecars bolted to a lifting tube pallet, proceed to paragraph 2.3.2.

2.3.1 Standard Pallet Unpacking Procedure

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

 **CAUTION**

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

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

 **CAUTION**

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

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



NOTE

Verify that the forklift or pallet jack is rated to handle the weight of the cabinet (see Table A for cabinet weight).

CAUTION

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

3. Set the pallet on a firm, level surface, allowing a minimum clearance of 3m (10 ft) on each side for removing the cabinet from the pallet.
4. Remove the protective covering from the cabinet.
5. Remove the packing material, and discard or recycle in a responsible manner.
6. Inspect the contents for any evidence of physical damage, and compare each item with the Bill of Lading. If damage has occurred or shortages are evident, contact an Eaton service representative immediately to determine the extent of the damage and its impact upon further installation.

**NOTE**

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

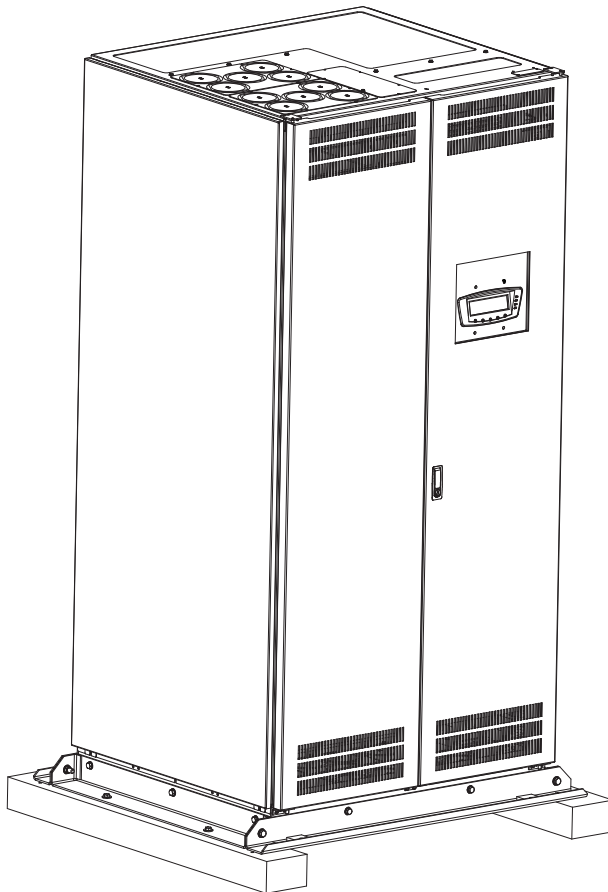


Figure 2-1. Eaton 150 kVA Three-Phase PDU as Shipped on Pallet

2.3.2 Lifting Tube Pallet Unpacking Procedure

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

 **CAUTION**

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

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

 **CAUTION**

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

2. Use a forklift to move the packaged cabinet to the installation site, or as close as possible, before unpacking. Insert the forklift forks into the lifting tubes on the right side of the cabinet (see Figure 2-2).



NOTE Verify that the forklift is rated to handle the weight of the cabinet (see Table A for cabinet weight).

 **CAUTION**

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

3. Set the pallet on a firm, level surface, allowing a minimum clearance of 3m (10 ft) on each side for removing the cabinet from the pallet.
4. Remove the protective covering from the cabinet.
5. Remove the packing material, and discard or recycle in a responsible manner.
6. Inspect the contents for any evidence of physical damage, and compare each item with the Bill of Lading. If damage has occurred or shortages are evident, contact an Eaton service representative immediately to determine the extent of the damage and its impact upon further installation.



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

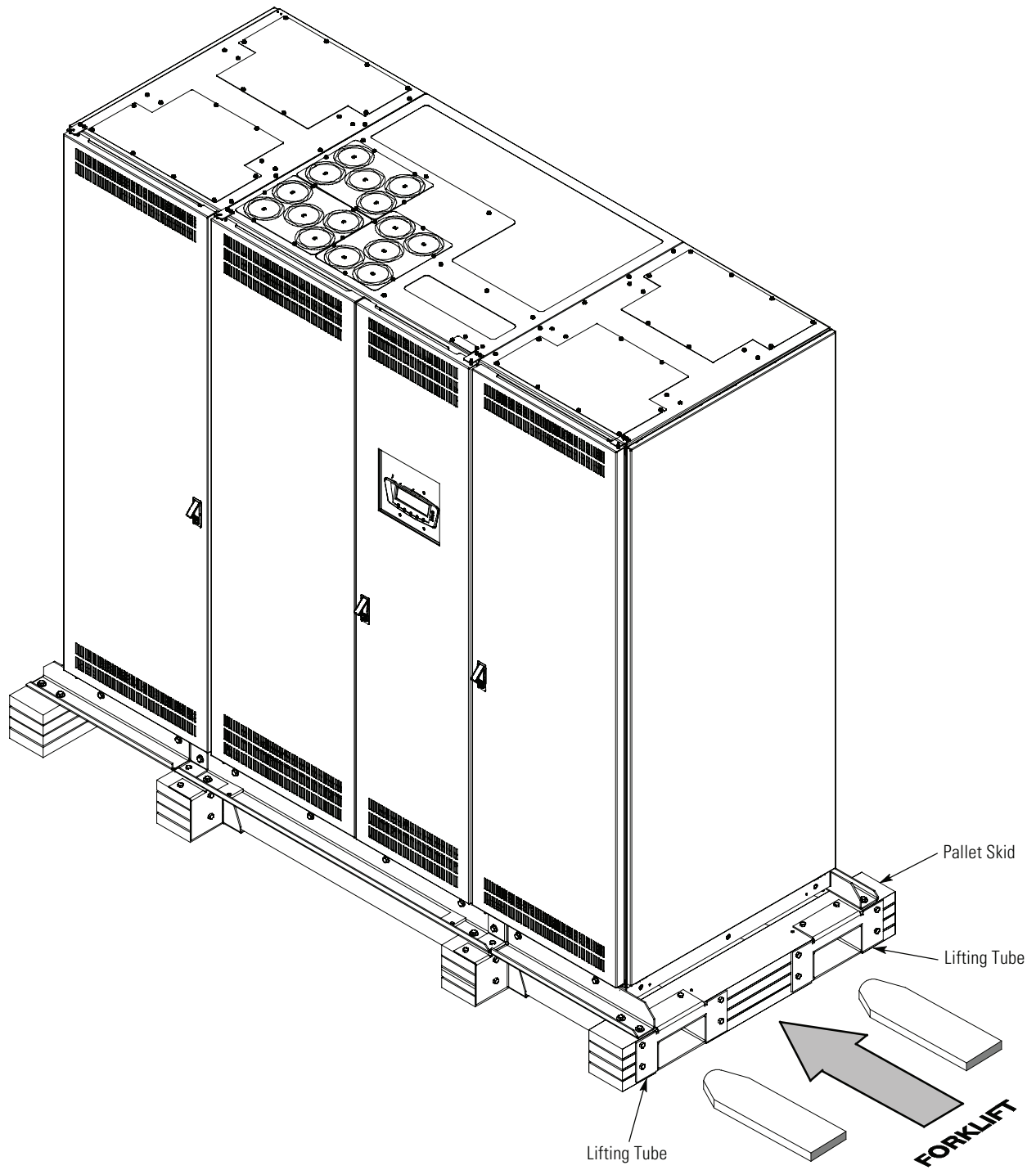


Figure 2-2. Eaton 150 kVA Three-Phase PDU with Two Front-Facing Sidecars as Shipped on Lifting Tube Pallet

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Chapter 3 Installing the PDU

Use the following procedures to install the Power Distribution Unit (PDU).



NOTE Referenced paragraphs A.1 through A.10, Figure A-1 through Figure A-68, and Table A through Table W can be found in Appendix A “Installation Reference,” at the back of this manual.

3.1 Preliminary Installation Information



WARNING

Installation should be performed only by qualified personnel.

Refer to the following while installing the PDU:

- Appendix A contains installation drawings and additional installation notes.
- Dimensions are in millimeters and inches.
- Do not tilt the cabinets more than $\pm 10^\circ$ during installation.
- Remove the conduit landing plates to add conduit landing holes or remove knockouts, as required. Plate material is 16 gauge steel (1.5 mm/0.060" thick).
- Install the cabinets on a level concrete or non-combustible floor suitable for computer or electronic equipment.
- If installing with a UPS, refer to the applicable UPS Installation and Operation manual for UPS cabinet wiring requirements and conduit and terminal locations.
- See Table A for equipment weight and point loading.

3.2 Unloading the PDU from the Pallet

Use the applicable procedure from the following list for the PDU model being installed:

- For PDU models with PDU main cabinet, PDU main cabinet and one or two side facing sidecars, or PDU main cabinet and one front facing sidecar bolted to a standard pallet, proceed to paragraph 3.2.1.
- For PDU models with PDU main cabinet and two front facing sidecars bolted to a lifting tube pallet, proceed to paragraph 3.2.2.

3.2.1 Standard Pallet Unloading Procedure

The PDU cabinet is bolted to a pallet consisting of four angle metal supports secured to two four-inch by six-inch wood supports.



WARNING

- The PDU is heavy (see Table A). If unloading instructions are not closely followed, the cabinet may cause serious injury.
 - Do not install a damaged cabinet. Report any damage to the carrier and contact an Eaton service representative immediately.
 - Do not tilt the PDU more than 10° from vertical or the cabinet may tip over.
-

**NOTE**

Verify that the forklift is rated to handle the weight of the cabinet (see Table A for cabinet weight).

1. If not already moved, use a forklift to move the cabinet to the installation site, or as close as possible, before unloading from the pallet. Insert the forklift jacks between the skids on the bottom of the unit.
2. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
3. Loosen the screws securing the inside distribution panel doors, and swing the doors open.
4. If the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
5. Locate the field kit (packed inside of the cabinet). Locate the four 1/2" jacking bolts and install them in the threaded holes in the front and rear supports as shown in Figure 3-1. Place a floor protector underneath each jacking bolt, and screw the bolts down against them.

The floor protectors protect the floor from being marred by the jacking bolts.

6. Close the inside distribution panel doors and secure with screws.
7. Close the outside doors and secure the latch.
8. Loosen, but do not remove, the hardware holding the 4 x 6 supports to the front and rear supports (see Figure 3-1).
9. Turn each jacking bolt consecutively, two full turns, until the 4 x 6 supports clear the floor by approximately 3 mm (1/8").

 **WARNING**

RISK OF INSTABILITY. Turning the jacking bolts unevenly may cause the cabinet to become unbalanced. To prevent tipping the cabinet, raise and lower the jacking bolts evenly.

 **CAUTION**

CABINET MAY TIP. Raise the PDU cabinet no more than 3 mm (1/8") above the floor (just enough to allow removal of the 4 x 6 supports).

10. **For PDUs installed on an optional floorstand only.** Unscrew and remove the leveling feet from the bottom of the PDU. Discard or recycle them in a responsible manner. (There should be sufficient clearance to remove the leveling feet. If not, turn the jacking bolts to provide additional clearance.)

 **WARNING**

RISK OF INSTABILITY. Turning the jacking bolts unevenly may cause the cabinet to become unbalanced. To prevent tipping the cabinet, raise and lower the jacking bolts evenly.

11. Remove the hardware loosened in Step 8 . Pull the 4 x 6 supports out from under the PDU cabinet. Discard or recycle them in a responsible manner.

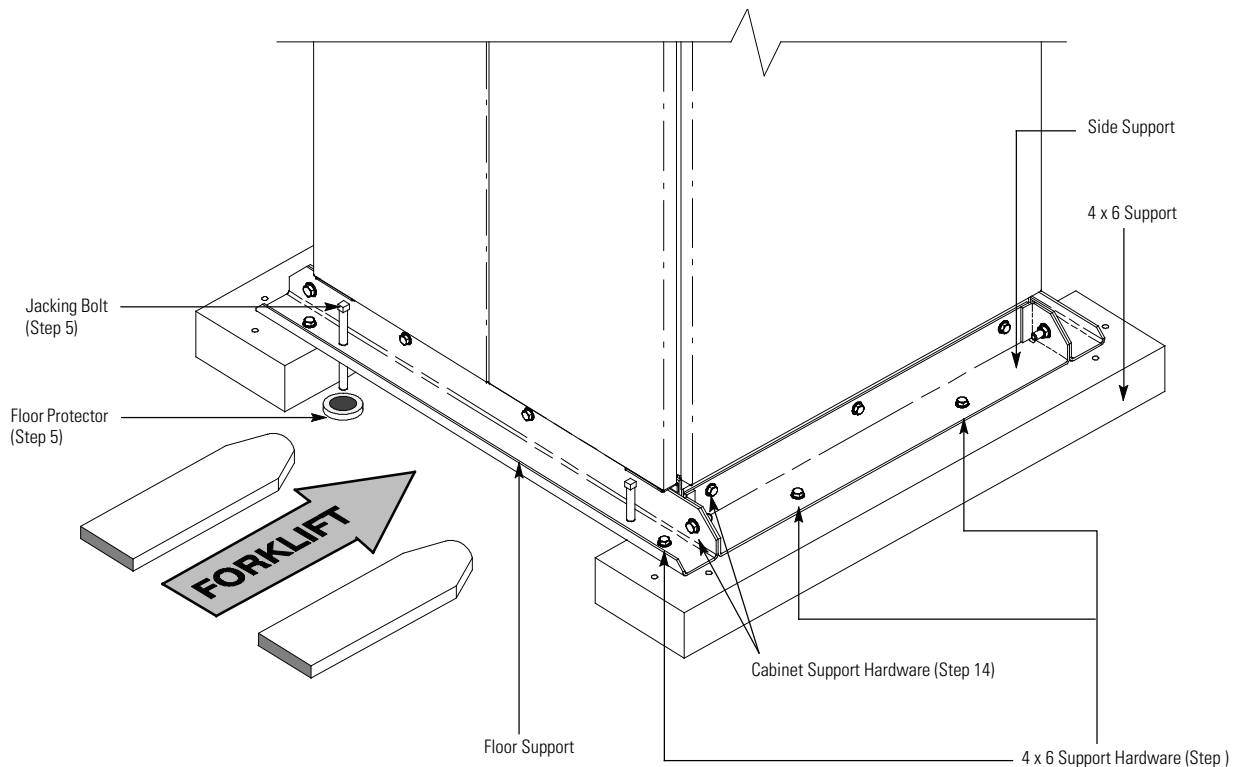


Figure 3-1. Removing Shipping Supports

CAUTION

CABINET MAY FALL. Do not loosen the hardware attaching the side or front supports to the cabinet base, or the front and side supports to each other, at this time. The cabinet must be lowered by the jacking bolts before the supports can be removed.

12. Carefully and evenly **lower the cabinet by turning each jacking bolt consecutively two full turns (maximum)** until the casters contact the floor and the cabinet is no longer supported by the jacking bolts.
 13. After the PDU cabinet is resting on the floor, remove the jacking bolts and discard or recycle them in a responsible manner.
 14. Remove the hardware holding the front, rear, and side supports to the cabinet base. Discard or recycle the hardware and support brackets in a responsible manner.
 15. Roll the cabinet to the installation location.
 16. If the PDU is being installed onto a floorstand, proceed to paragraph 3.3; otherwise, proceed to Step 17.
 17. If permanently mounting the PDU, proceed to Step 20; otherwise, continue to Step 18.
 18. Secure the PDU in position by lowering the leveling feet until the cabinet is locked in place.
-

CAUTION

Use the leveling feet only to lock the cabinet in place. Using the leveling feet to raise the cabinet may result in serious injury to personnel or damage to the cabinet.

19. Proceed to Step 21.
20. Install the optional front and rear floor mounting brackets (see Figure A-63) according to the instructions provided with the floor mounting bracket kit.
21. If the optional air skirt is being installed, proceed to paragraph 3.4; otherwise, proceed to paragraph 3.5.

3.2.2 Lifting Tube Pallet Unloading Procedure

The PDU cabinet is bolted to a pallet consisting of six angle metal supports (three front and three rear) secured to four wood pallet skids and two lifting tubes.

WARNING

- The PDU is heavy (see Table A). If unloading instructions are not closely followed, the cabinet may cause serious injury.
 - Do not install a damaged cabinet. Report any damage to the carrier and contact an Eaton service representative immediately.
 - Do not tilt the PDU more than 10° from vertical or the cabinet may tip over.
-

NOTE 1 Verify that the forklift is rated to handle the weight of the cabinet (see Table A for cabinet weight).



NOTE 2 Leave adequate space on the right side of the cabinet to remove the lifting tubes. After lifting tubes have been removed, cabinet can be moved into final position using the casters on the cabinet.

1. If not already moved, use a forklift to move the cabinet to the installation site, or as close as possible, before unloading from the pallet. Insert the forklift forks into the lifting tubes on the right side of the cabinet (see Figure 3-2).
2. Remove the bolts (six per lifting tube) securing the lifting tubes to the right side pallet skid (see Figure 3-3 and Figure 3-4).
3. Slide each lifting tube out from under the pallet skids and PDU (see Figure 3-3). Recycle the lifting tubes and hardware in a responsible manner.
4. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
5. Loosen the screws securing the inside distribution panel doors, and swing the doors open.
6. If the leveling feet are not fully retracted, turn the leveling feet until they are retracted.
7. Locate the field kit (packed inside of the cabinet). Locate the four 1/2" jacking bolts and install them in the threaded holes in the front and rear supports as shown in Figure 3-5 and Figure 3-6. Place a floor protector underneath each jacking bolt, and screw the bolts down against them.
The floor protectors protect the floor from being marred by the jacking bolts.
8. Close the inside distribution panel doors and secure with screws.
9. Close the outside doors and secure the latch.
10. Loosen, but do not remove, the skid mounting bolts holding the pallet skids to the front and rear supports (see Figure 3-5).

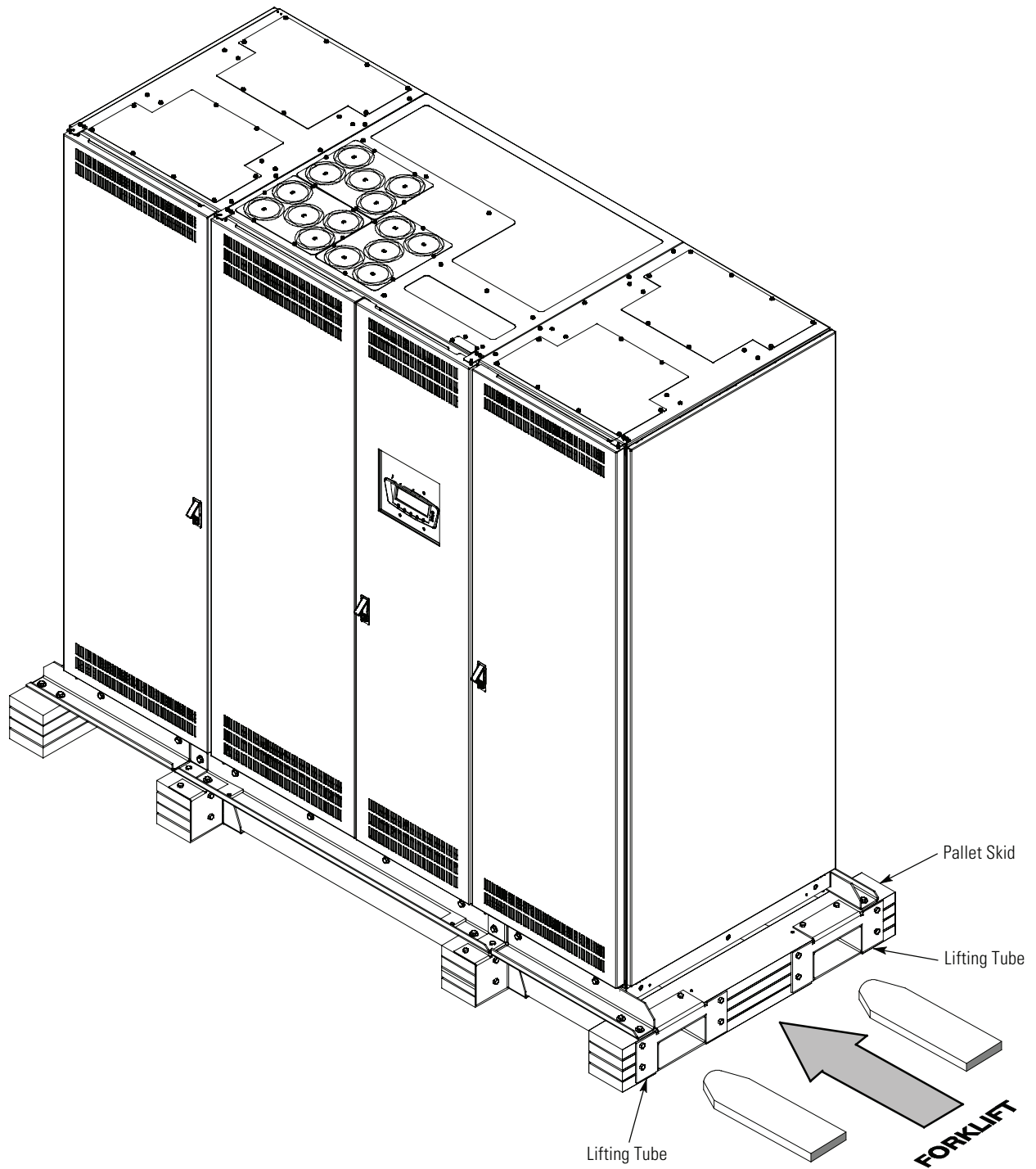


Figure 3-2. Lifting the PDU Using the Lifting Tubes

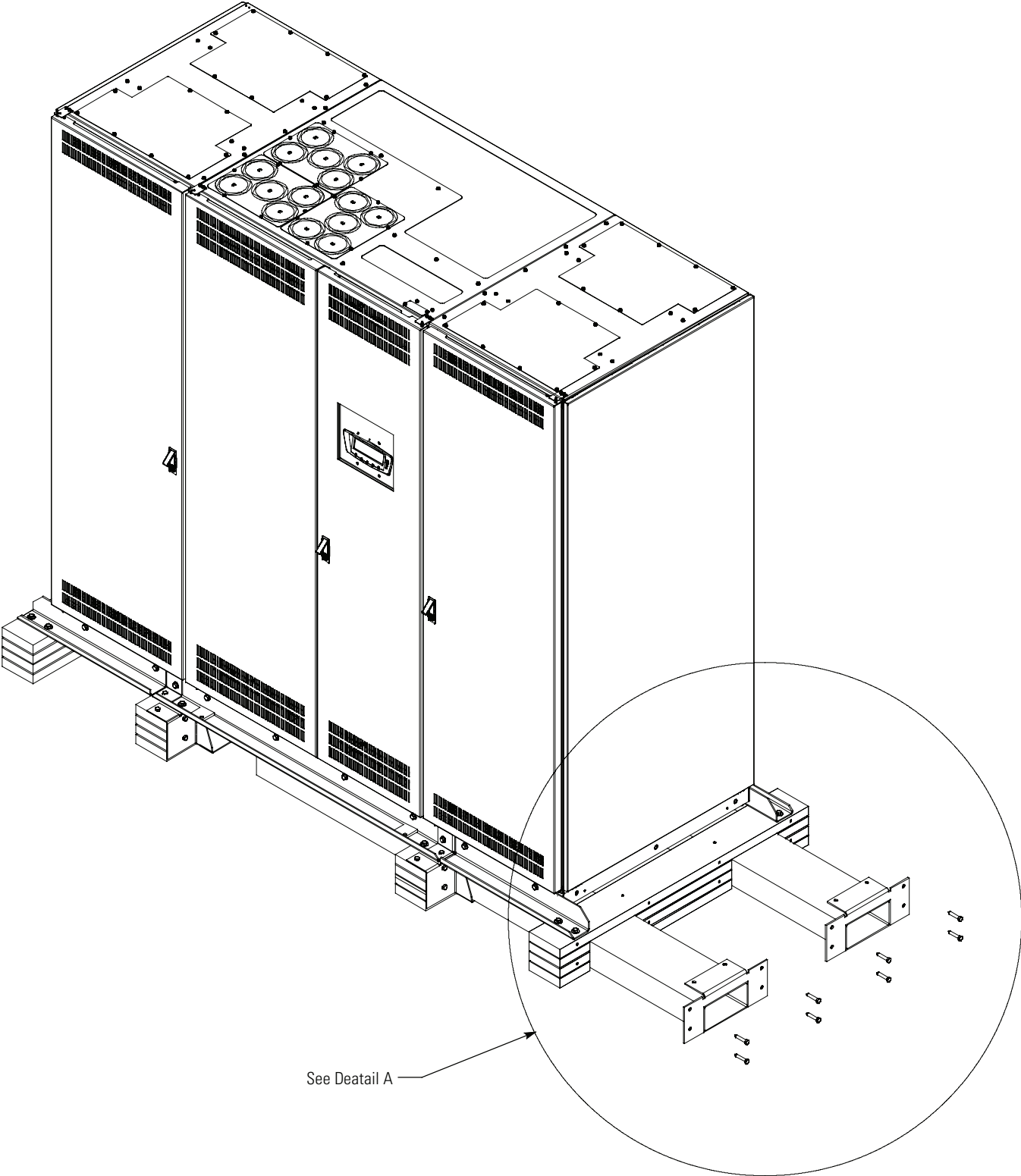


Figure 3-3. Removing the Lifting Tubes

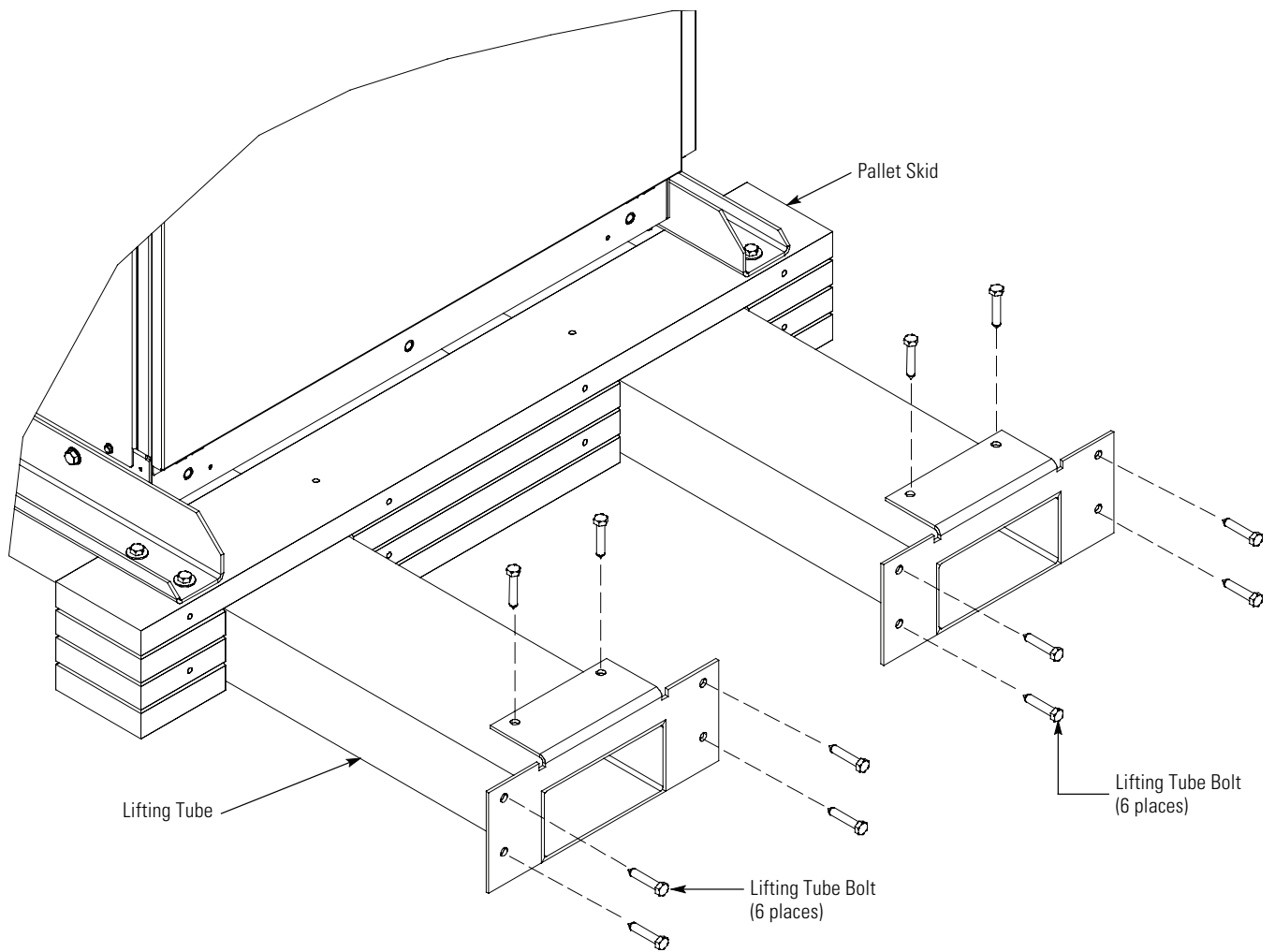


Figure 3-4. Removing the Lifting Tubes – Detail A

Installing the PDU

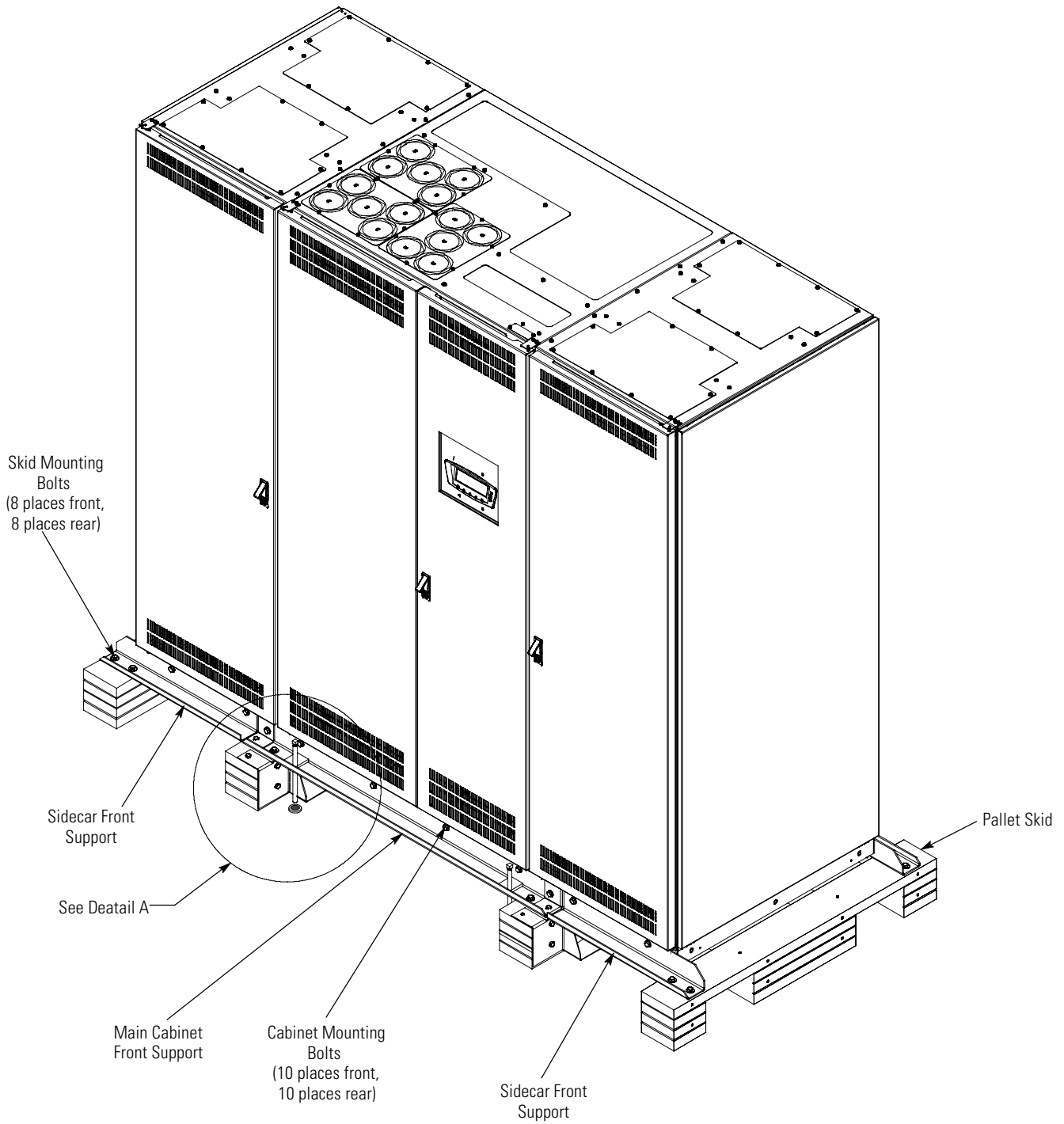


Figure 3-5. Removing Shipping Supports from Lifting Tube Pallet

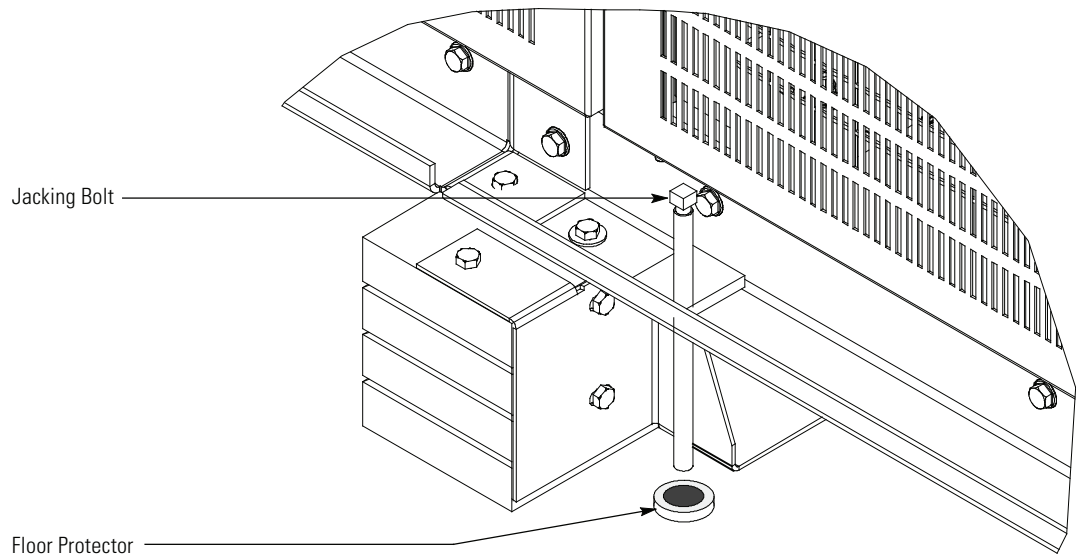


Figure 3-6. Removing Shipping Supports – Detail A

⚠ WARNING

RISK OF INSTABILITY. Turning the jacking bolts unevenly may cause the cabinet to become unbalanced. To prevent tipping the cabinet, raise and lower the jacking bolts evenly.

⚠ CAUTION

CABINET MAY TIP. Raise the PDU cabinet no more than 3 mm (1/8") above the floor (just enough to allow the removal of the pallet skids).

11. Turn each jacking bolt consecutively, two full turns, until the pallet skids clear the floor by approximately 3 mm (1/8").
-

⚠ WARNING

RISK OF INSTABILITY. Turning the jacking bolts unevenly may cause the cabinet to become unbalanced. To prevent tipping the cabinet, raise and lower the jacking bolts evenly.

12. **For PDUs installed on an optional floorstand.** Unscrew and remove the leveling feet from the bottom of the PDU. Recycle the leveling feet in a responsible manner. (There should be sufficient clearance to remove the leveling feet. If not, turn the jacking bolts to provide additional clearance.)
 13. Remove the hardware loosened in Step 10. Pull the four pallet skids out from under the front and rear supports and PDU cabinet. Recycle the pallet skids and hardware in a responsible manner.
-

⚠ CAUTION

CABINET MAY FALL. Do not loosen the hardware attaching the front supports to the cabinet base. The cabinet must be lowered by the jacking bolts before the supports can be removed.

14. Carefully and evenly **lower the cabinet by turning each jacking bolt consecutively two full turns (maximum)** until the casters contact the floor and the cabinet is no longer supported by the jacking bolts.

15. After the PDU cabinet is resting on the floor, remove the jacking bolts and recycle them in a responsible manner.
16. Remove the cabinet mounting bolts holding the front and rear supports to the cabinet base. Remove the sidecar supports first, then the main cabinet supports (see Figure 3-5). Recycle the hardware and support brackets in a responsible manner.
17. Roll the cabinet to the installation location.
18. If the PDU is being installed onto a floorstand, proceed to paragraph 3.3; otherwise, proceed to Step 19.
19. If permanently mounting the PDU, proceed to Step 22; otherwise, continue to Step 20.
20. Secure the PDU in position by lowering the leveling feet until the cabinet is locked in place.

 **CAUTION**

Use the leveling feet only to lock the cabinet in place. Using the leveling feet to raise the cabinet may result in serious injury to personnel or damage to the cabinet.

21. Proceed to Step 23.
22. Install the optional front and rear floor mounting brackets (see Figure A-63) according to the instructions provided with the floor mounting bracket kit.
23. If the optional air skirt is being installed, proceed to paragraph 3.4; otherwise, proceed to paragraph 3.5.

3.3 Installing the Optional Floorstand

Optional floorstands are used for raised floor installations. The floorstand is used when raised floors cannot bear the weight of the PDU. See paragraph A.9 for floorstand installation diagram.

To install the optional floorstand:

1. Position the floorstand at the installation location. The front span of the floorstand should be oriented to correspond to the front of the PDU when mounted. (See Figure A-66 to identify the front and back of the floorstand.)
2. Adjust the floorstand leveling feet.

Ensure that the floorstand top mounting surface is at the correct level (relative to the raised floor) to install the PDU at the appropriate height.

Ensure that the floorstand top mounting plane is level.
3. Anchor the floorstand base to the floor adhering to the appropriate local codes.
4. Roll the PDU into position at the front or rear of the floorstand.
5. Continue to roll the PDU onto the floorstand.

Align the PDU leveling feet mounting holes with the mounting holes on the floorstand top mounting surface.

 **WARNING**

- The PDU is heavy (see Table A). Follow all standard local safety practices when moving the cabinet. Failing to do so may cause serious injury.
 - Do not tilt the PDU more than 10° from vertical or the cabinet may tip over.
-

6. Size the steel spacers needed to mount the PDU to the floorstand. Ensure that the spacer sizing allows the PDU to be level when mounted see Figure A-66).

7. Install the steel spacers between the floorstand and the PDU.
8. Position the PDU casters, ensuring that they rest on permanent surfaces and do not block access to any conduit plates.

**NOTE**

The casters may or may not rest solidly on the floorstand. When the PDU is installed on the floorstand, the casters carry some of the weight load, but the PDU weight load is primarily supported by the customer-provided steel bushings.

9. Ensure the PDU is level.
10. Secure the PDU to the floorstand adhering to the appropriate local codes.
11. If the optional air skirt is being installed, proceed to paragraph 3.4; otherwise, proceed to paragraph 3.5.

3.4 Installing the Optional Air Skirt

CAUTION

Use air skirts only when the PDU is installed on a raised floor where the raised floor acts as a plenum and provides adequate air flow to the PDU. The side skirts are to keep forced air from escaping, but will block air if installed on a concrete or similar non-raised flat floor. Inadequate air flow will cause the PDU to overheat.

The optional air skirt can be installed on PDU configurations with or without sidecars. Custom air skirt installation kits are available for each configuration.

The installation process is the same for either left- or right-mounted Side-Mount or Front-Mount sidecars. See paragraph A.10 for a typical air skirt installation and air skirt footprint diagrams.

To install the optional air skirt:

1. Position the air skirt sections that correspond to each side around the base of the PDU configuration.
2. Starting at the front of the PDU, align the first section with the three base mounting holes. Use a 15 mm socket to secure the air skirt bracket over the base with the M10 screws (provided).
3. Moving counter-clockwise, install the remaining air skirt sections around the base of the Main Unit PDU and any sidecars mounted to the Main PDU. Align the sections with the base mounting holes, and then secure them with M10 screws.

See Figure A-67 and Figure A-68 for air skirt bracket installation.

4. Proceed to paragraph 3.5.

3.5 Installing PDU Power Wiring



NOTE 1 The PDU is shipped debris shields covering the ventilation grills on top of the cabinet (see paragraph A.4). Do not remove the debris shields until installation is complete. However, remove the shields before operating the PDU. Once the debris shields are removed, do not place objects on the ventilation grills.

NOTE 2 Remove the PDU cabinet top or bottom conduit landing plate to drill or punch conduit holes or remove knockouts (see paragraph A.4).

 **WARNING**

As a result of the connected loads high leakage current is possible. Connection to earth ground is required for safety and proper product operation.

 **CAUTION**

DO NOT overtighten the terminal lugs to prevent stripping the threads. Tighten lugs to the torque values specified in Table N through Table U.

1. Verify that all power sources are removed.
2. If not already open, open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
3. Loosen the screws securing the inside distribution panel doors and swing the doors open.
4. Loosen the screws securing the inside terminal cover plates and remove the plates.
5. If installing a PDU with the optional dual input sidecar, proceed to Step 6; otherwise, proceed to Step 9.
6. If not already open, open the dual input sidecar front door by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the door open.
7. Loosen the screws securing the inside door and swing the door open.
8. Loosen the screws securing the inside terminal cover plate and remove the plate.
9. To review the wiring and termination requirements, see paragraph A.3.
10. If installing a PDU with optional dual input sidecar, proceed to Step 11; otherwise, proceed to Step 17.
11. If installing a PDU with the optional crimp lug dual input sidecar, proceed to Step 12; otherwise, proceed to Step 15.
12. Remove the screws securing the crimp lug terminal covers and remove the covers.
13. Route the PDU input cables from the AC sources through either the top or bottom of the dual input sidecar cabinet to the CB1 and CB2 crimp input terminals. See paragraph A.5 for wiring access and terminal locations. See paragraph A.4 for location of conduit landing and wire entry plates.

Top Access Wiring – Remove the top conduit plate from the top of the dual input sidecar. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the top conduit plate prior to mounting on the dual input sidecar. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

Bottom Access Wiring – Remove the bottom conduit plate from the inside bottom of the dual input sidecar. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the bottom conduit plate prior to mounting on the dual input sidecar. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

14. Proceed to Step 22.
15. Route the PDU input cables from the AC sources through either the top or bottom of the dual input sidecar cabinet to the input terminals on main input breakers CB1 and CB2. See paragraph A.5 for wiring access and terminal locations. See paragraph A.4 for conduit landing plate locations.

Top Access Wiring – Remove the top conduit plate from the top of the dual input sidecar. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the top conduit plate prior to mounting on the dual input sidecar. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

Bottom Access Wiring – Remove the bottom conduit plate from the inside bottom of the dual input sidecar. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the bottom conduit plate prior to mounting on the dual input sidecar. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.
16. Proceed to Step 22.
17. If installing a PDU with the optional single crimp lugs, proceed to Step 18; otherwise, proceed to Step 21.
18. Remove the screws securing the crimp lug terminal cover and remove the cover.
19. Route the PDU input cables from the AC sources through either the top or bottom of the cabinet to the CB1 crimp input terminals. See paragraph A.5 for wiring access and terminal locations. See paragraph A.4 for conduit landing plate locations.

Top Access Wiring – Remove the top conduit plate from the top of the dual input sidecar. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the top conduit plate prior to mounting on the dual input sidecar. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

Bottom Access Wiring – Remove the bottom conduit plate from the inside bottom of the dual input sidecar. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the bottom conduit plate prior to mounting on the dual input sidecar. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.
20. Proceed to Step 22.
21. Route the PDU input cables from the AC source through either the top or bottom of the cabinet to the PDU input terminals on the main input breaker CB1. See paragraph A.5 for wiring access and terminal locations. See paragraph A.4 for conduit landing plate locations.

Top Access Wiring – Remove the top conduit plate from the top of the PDU. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the top conduit plate prior to mounting on the PDU. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

Bottom Access Wiring – Remove the bottom conduit plate from the inside bottom of the PDU. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the bottom conduit plate prior to mounting on the PDU. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.
22. Connect phase A, B, and C, power wiring between the AC source and the PDU main input breaker terminals. See Table N through Table U on for termination requirements.
23. Ground the PDU according to local and/or national electrical wiring codes by routing and connecting the ground wire to the input ground lug. See paragraph A.5 for PDU terminal locations.
24. If wiring a PDU with only subfeed breakers, proceed to Step 28; if wiring a PDU with distribution panels, proceed to Step 25.

25. Install customer-supplied branch circuit breakers into the distribution panel (see Figure A-29). Use Cutler-Hammer bolt-on type BAB or QBHW breakers for bolt-on panels, or plug-on type HQP or QPHW breakers for plug-on panels. If Square D panelboards are installed, use Square D bolt-on type QOB breakers.

NOTE 1 When wiring branch circuits, begin adding conduits at the back of the center conduit landing plate to simplify future circuit additions.



NOTE 2 When wiring a PDU with branch circuit monitoring, use THHN wire for branch circuit output distribution. Using THHN wire will facilitate routing the wire through the branch CTs to the branch breakers.

NOTE 3 When installing or replacing branch breakers, use only hand tools and follow torque specifications. See Table 3-1. Failure to follow torque specifications may result in damage to bus bar or branch breaker.

Table 3-1. Branch Breaker Wire Torques

Connecting Wire Torques								Bus Bar Connections	
Neutral & Ground Bar				Other Terminals				Bolt Size	Torque Nm (lb in)
Small Opening		Large Opening		Screwdriver		Socket Head		#10	3.4 Nm (30 lb in)
Wire Size	Torque Nm (lb in)	Wire Size	Torque Nm (lb in)	Wire Size	Torque Nm (lb in)	Across Flats	Torque Nm (lb in)	1/4"	7.4 Nm (65 lb in)
2.1 3.3 mm ² (14 12 AWG)	2.3 Nm (20 lb in)*	2.1 5.3 mm ² (14 10 AWG)	4.0 Nm (35 lb in)**	0.8 5.3 mm ² (18 10 AWG)	4.0 Nm (35 lb in)	1/8"	5.1 Nm (45 lb in)	–	Torque Nm (lb ft)
5.3 mm ² (10 AWG)	2.3 Nm (20 lb in)	8.4 mm ² (8 AWG)	4.5 Nm (40 lb in)	8.4 mm ² (8 AWG)	4.5 Nm (40 lb in)	5/32"	11.3 Nm (100 lb in)	5/16"	14.6 Nm (10.8 lb ft)
8.4 mm ² (8 AWG)	2.8 Nm (25 lb in)	18.0 13.3 mm ² (4 6 AWG)	5.1 Nm (45 lb in)	13.3 18.0 mm ² (6 4 AWG)	5.1 Nm (45 lb in)	3/16"	13.6 Nm (120 lb in)	3/8"	27.1 Nm (20 lb ft)
13.3 mm ² (6 AWG)	4.0 Nm (35 lb in)	26.7 53.4 mm ² (3 1/0 AWG)	5.6 Nm (50 lb in)	33.6 67.3 mm ² (2 2/0 AWG)	5.6 Nm (50 lb in)	7/32"	16.9 Nm (150 lb in)	1/2"	67.8 Nm (50 lb ft)
*Max 2 wires						1/4"	22.6 Nm (200 lb in)		
** Max 3 wires						5/16"	31.1 Nm (275 lb in)		
NOTE: Use 50 lb in for 3-#10 conductors.						3/8"	42.4 Nm (375 lb in)		
						1/2"	56.5 Nm (500 lb in)		
						9/16"	67.8 Nm (600 lb in)		

26. Route output cables to the branch circuit breakers and wire the branch circuits according to the branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (input is prewired to the panelboard). See Table W for termination requirements.

If the optional Eaton Energy Management System (EMS) Premium metering branch circuit monitoring (BCM) is installed, route branch wiring through the current transformer (CT) opposite the breaker terminal to the breaker lug (see Figure 3-7). Use care when bending and routing the wires through the CTs.

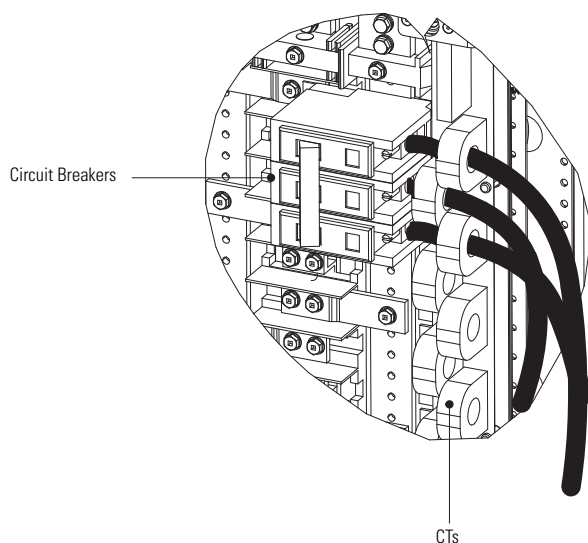


Figure 3-7. BCM CT Wiring

27. If wiring a PDU with subfeed breakers, proceed to Step 28; otherwise, proceed to Step 29.

NOTE 1 When wiring subfeed breakers, begin adding conduits at the back of the center conduit landing plate to simplify future circuit additions.

i **NOTE 2** When wiring a PDU with branch circuit monitoring, use THHN wire for branch circuit output distribution. Using THHN wire will facilitate routing the wire through the branch CTs to the branch breakers.

28. Route output cables from subfeed breakers to the critical load and connect phase A, B, and C, and Neutral power wiring to the subfeed breakers and neutral terminals. See paragraph A.5 for wiring access and terminal locations. See Table U for termination requirements.

If the optional EMS Premium metering BCM is installed, verify the location of the subfeed CTs. If the CTs are mounted on the input side of the breaker, proceed to Step 29; if the CTs are mounted on the output side of the breaker, route branch wiring through the CTs opposite the breaker terminal to the breaker lug.

29. If wiring a PDU with sidecars, proceed to Step 30; otherwise, proceed to Step 35.
30. If not already open, open the sidecar front door by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the door open.
31. Loosen the screws securing the inside distribution panel doors and swing the doors open.
32. Loosen the screws securing the inside terminal cover plates and remove the plates.
33. Install customer-supplied branch circuit breakers into the sidecar distribution panel (see Figure A-41 through Figure A-46). Use Cutler-Hammer bolt-on type BAB or QBHW breakers for bolt-on panels, or plug-on type HQP or QPHW breakers for plug-on panels. If Square D panelboards are installed, use Square D bolt-on type QOB breakers.

NOTE 1 When wiring branch circuits, begin adding conduits at the back of the center conduit landing plate to simplify future circuit additions.

i **NOTE 2** When wiring a PDU with branch circuit monitoring, use THHN wire for branch circuit output distribution. Using THHN wire will facilitate routing the wire through the branch CTs to the branch breakers.

34. Route output cables to the branch circuit breakers and wire the branch circuits according to the branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (input is prewired to the panelboard).

If the optional EMS Premium metering BCM is installed, route branch wiring through the CT opposite the breaker terminal to the breaker lug (see Figure 3-7). Use care when bending and routing the wires through the CTs.

35. Reinstall all inside terminal cover plates removed in previous steps.
36. Close the inside doors and secure with screws.
37. If wiring interface connections, proceed to paragraph 3.6; otherwise, proceed to Step 38.
38. Close the outside doors and secure the latch.

3.6 Installing TB1, TB2, Shunt Trip, and Auxiliary Contact Interface Connections



NOTE When installing control wiring (such as building alarms, alarm contacts, shunt trips, and auxiliary contacts) to the PDU interface terminals, conduit must be installed between the device and the PDU. Install the control wiring in separate conduit from the power wiring.



CAUTION

Alarm relay contacts should not be operated in excess of 30 Vac @ 5A maximum.

1. Verify that the PDU is turned off and all power sources are removed. See Chapter 6, "PDU Operating Instructions," for shutdown instructions.
2. If not already open, open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
3. Loosen the screw securing the inside interface access panel and remove the panel (see Figure 6-2).
4. To review the wiring and termination requirements, see paragraphs A.6 and A.7.
5. Route the PDU interface wiring through either the top or bottom of the cabinet to the PDU interface terminals. See paragraph A.6 for wiring access and terminal locations. See paragraph A.4 for conduit landing plate locations.

Top Access Wiring – Remove the top conduit plate from the top of the PDU. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the top conduit plate prior to mounting on the PDU. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

Bottom Access Wiring – Remove the bottom conduit plate from the inside bottom of the PDU. Identify all conduit requirements and mark their location. Drill and punch all conduit holes in the bottom conduit plate prior to mounting on the PDU. Install the conduit plate and install all conduit runs into the plate. Pull the wiring through the conduit into the wiring area.

6. Route and connect the wiring.
7. Reinstall the interface access panel and tighten screw.
8. Close the outside doors and secure the latch.

3.7 Initial Startup

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

3.8 Completing the Installation Checklist

The final step in installing the PDU is to complete the following Installation Checklist. This checklist ensures that you have completely installed all hardware, cables, and other equipment. Completing all items listed on the checklist will ensure a smooth installation. Make a copy of the Installation Checklist before filling it out, and retain the original.

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

**NOTE**

The Installation Checklist **MUST** be completed prior to starting the PDU for the first time.

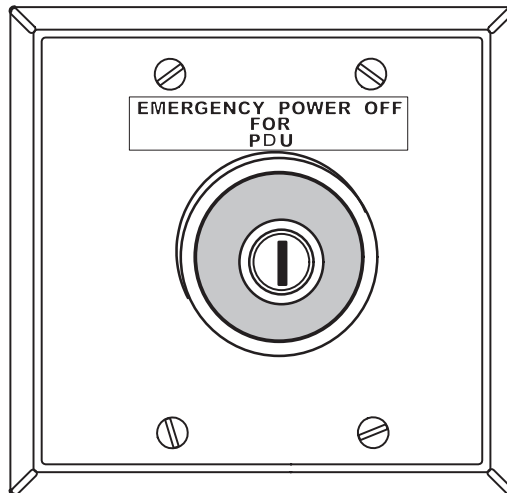
Installation Checklist

- All packing materials and restraints have been removed from each cabinet.
- The PDU is placed in its installed location.
- The PDU cabinet is secured in position with leveling feet lowered until the cabinet is not resting on the casters and the cabinet is level.
- The PDU cabinet is installed and secured to the floorstand. (Optional)
- All conduits and cables are properly routed to the PDU.
- All power cables are properly sized and terminated.
- Distribution panel branch circuit breakers are installed and wired to load. (Optional)
- A ground conductor is properly installed.
- Alarm relays and building alarms are wired appropriately. (Optional)
- Shunt Trip and Auxiliary connections are wired appropriately. (Optional)
- LAN drop is installed. (Optional)
- All LAN connections have been completed.
- The PDU air skirts are installed. (Optional)
- The floor mounting brackets are correctly installed and secured to the floor. (Optional) (Cannot be used with optional floorstand).
- Any debris shields covering the PDU cabinet ventilation grills are removed.
- Air conditioning equipment is installed and operating correctly.
- The area around the installed PDU is clean and dust free. (The PDU must be installed on a level concrete or non-combustible floor suitable for computer or electronic equipment.)
- Adequate workspace exists around the PDU and other cabinets.
- Adequate lighting is provided around the PDU.
- A 120V service outlet is located within 7.5m (25 ft) of the PDU.
- Startup and operational checks are performed by an authorized Eaton Customer Service Engineer.

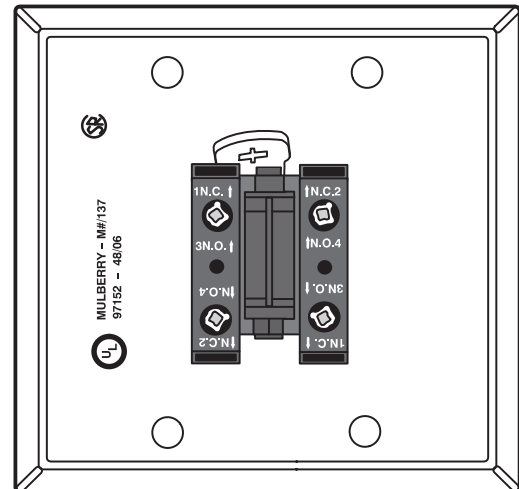
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Chapter 4 Installing a Remote Emergency Power-off Switch

A latching-type Remote Emergency Power-off (REPO) switch can be used in an emergency to shut down the UPS and remove power to the critical load from a location away from where the PDU is installed. Figure shows an Eaton REPO switch.



REPO Switch (front view)



Contact Block (back view, faceplate removed)

Eaton REPO Switch

-
- NOTE 1** Before installing a REPO switch, verify that the PDU was installed according to the instructions in Chapter 3, “Installing the PDU”.
- NOTE 2** When installing the REPO switch, you must install conduit between the device and the PDU cabinet for wiring the switch.
- NOTE 3** The REPO switch must be a normally-open or normally-closed latching type switch not tied into any other circuits. The factory default configuration is set up for use with a normally-open switch. To use a normally-closed switch, the configuration must be changed during setup by an Eaton Customer Service Engineer.
- NOTE 4** This procedure is intended to be used for the installation of the Eaton REPO switch. If installing another manufacturer's switch, use this procedure only as a guide.
- NOTE 5** The REPO switch wiring must be in accordance with National Electric Code® (NEC®) Article 725 Class 2 requirements.
-

To install a REPO station:

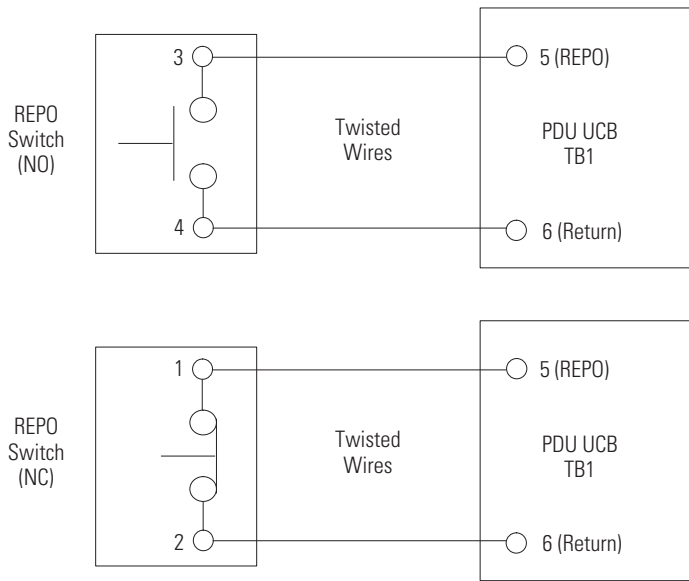
1. Verify the PDU is turned off and all power sources are removed. See Chapter 6, “PDU Operating Instructions” for shutdown instructions.
2. Securely mount the REPO station. Recommended locations include operator's consoles or near exit doors. See Figure A-62 for enclosure dimensions and wiring knockouts.
3. If not already open, open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
4. Loosen the screw securing the inside interface access panel and remove the panel (see Figure 6-2).

Installing a Remote Emergency Power-off Switch

5. Remove the PDU cabinet interface entry conduit landing plates to drill or punch holes (see paragraph A.4).
6. Reinstall the interface entry plates and install conduit.
7. To locate the appropriate terminals and review the wiring and termination requirements, see Figure 4-1 and paragraphs A.6 and A.7.
8. Route and connect the wiring as shown in Table 4-1 and Figure 4-1.

Table 4-1. REPO Wire Terminations

From REPO Station(s) Switch Contact Block (either block)	To Customer Interface Terminal Board TB1 on the PDU Universal Control Board (UCB)	Wire Size	Tightening Torque
3 NO	TB1 5	Twisted Wires (2) 14–22 AWG (0.75–4.0 mm ²)	7 lb in (0.8 Nm)
4 NO	TB1 6		



NOTE REPO switch rating is 24 Vdc, 1A minimum.

NOTE The REPO switch must be a normally-open or normally-closed latching-type switch not tied into any other circuits. The factory default configuration is set up for use with a normally-open switch. To use a normally-closed switch, the configuration must be changed during setup by an Eaton Customer Service Engineer.

NOTE The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.

Figure 4-1. REPO Switch Wiring

9. If you are installing multiple normally-open REPO switches, wire additional switches in parallel with the first REPO switch. If you are installing multiple normally-closed REPO switches, wire additional switches in series with the first REPO switch.
10. If required, install ½" conduit and wiring from the second contact block in the REPO station to trip circuitry of other equipment, such as upstream protective devices, facility monitoring devices, or alarms. Using the contact block that was not used for the UPS EPO wiring will help maintain isolation between the control systems.

A normally open (NO) contact and a normally closed (NC) contact are provided, and the two are electrically isolated. If single-pole, double-throw action is desired, one side of the NO contact can be jumpered to one side of the NC contact to form the common connection point. REPO switch wiring must be according to UL Class I requirements.

11. When all wiring is complete, reinstall the interface access panel and tighten screw.
12. Close the outside doors and secure the latch.

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Section 2

Operation

Chapter 5 Understanding PDU Operation

The Power Distribution Unit (PDU) consists of a main input breaker, an isolation output transformer, a monitoring/operation control panel, an integrated communication server, and a distribution panel or subfeed breaker system.

5.1 Distribution Panelboard and Subfeed Breaker Power Routing

Power from the AC source is routed through the main input breaker and the isolation output transformer to the distribution tie bus. From the distribution tie bus, power is directed to panelboards and subfeed breakers as detailed in paragraph . Power is then distributed to the critical loads through customer-provided branch circuit breakers or the subfeed breakers.

Figure 5-1 and Figure 5-2 show examples of the path of electrical power through the PDU with a 225A or 400A distribution panelboard, an 800A distribution panelboard, and two unmonitored subfeed breakers for single and dual input sources.

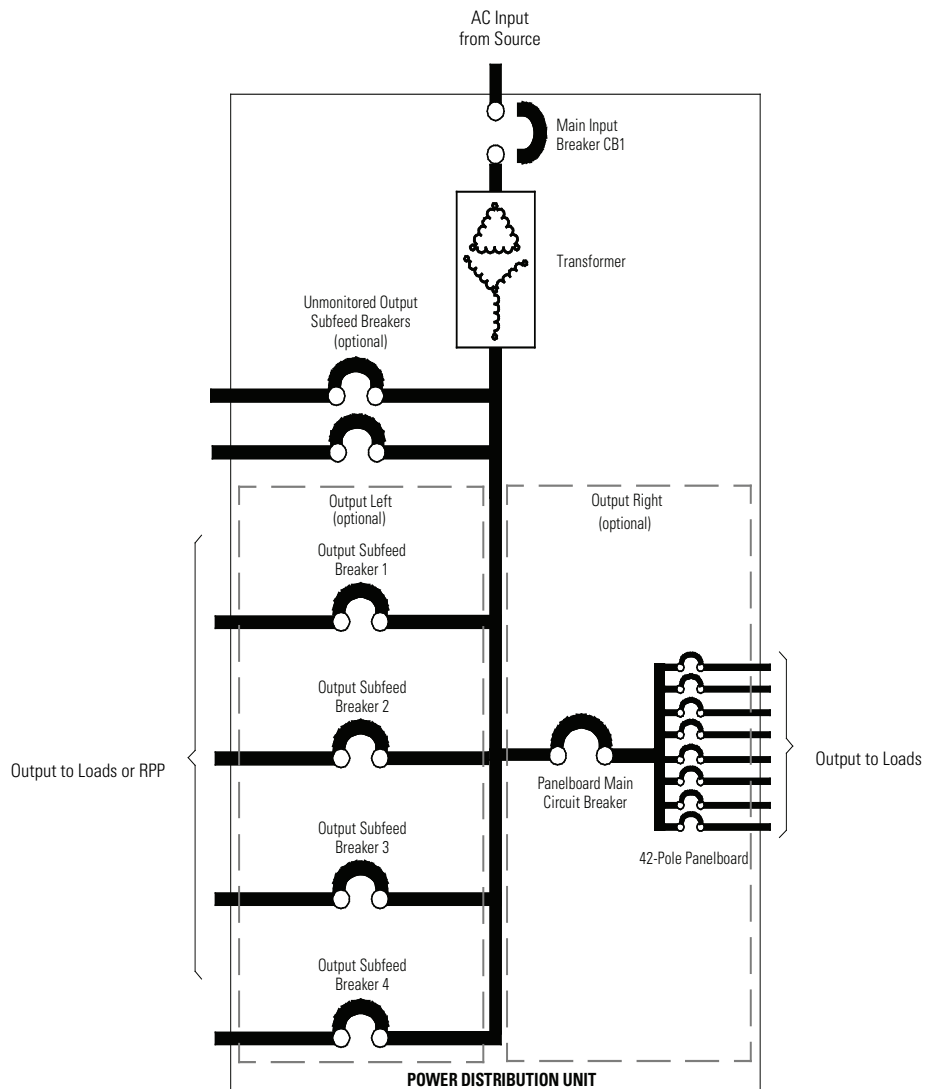


Figure 5-1. Current Path Through the Standard Service PDU with Distribution Panelboard and Subfeed Breakers (Single Source)

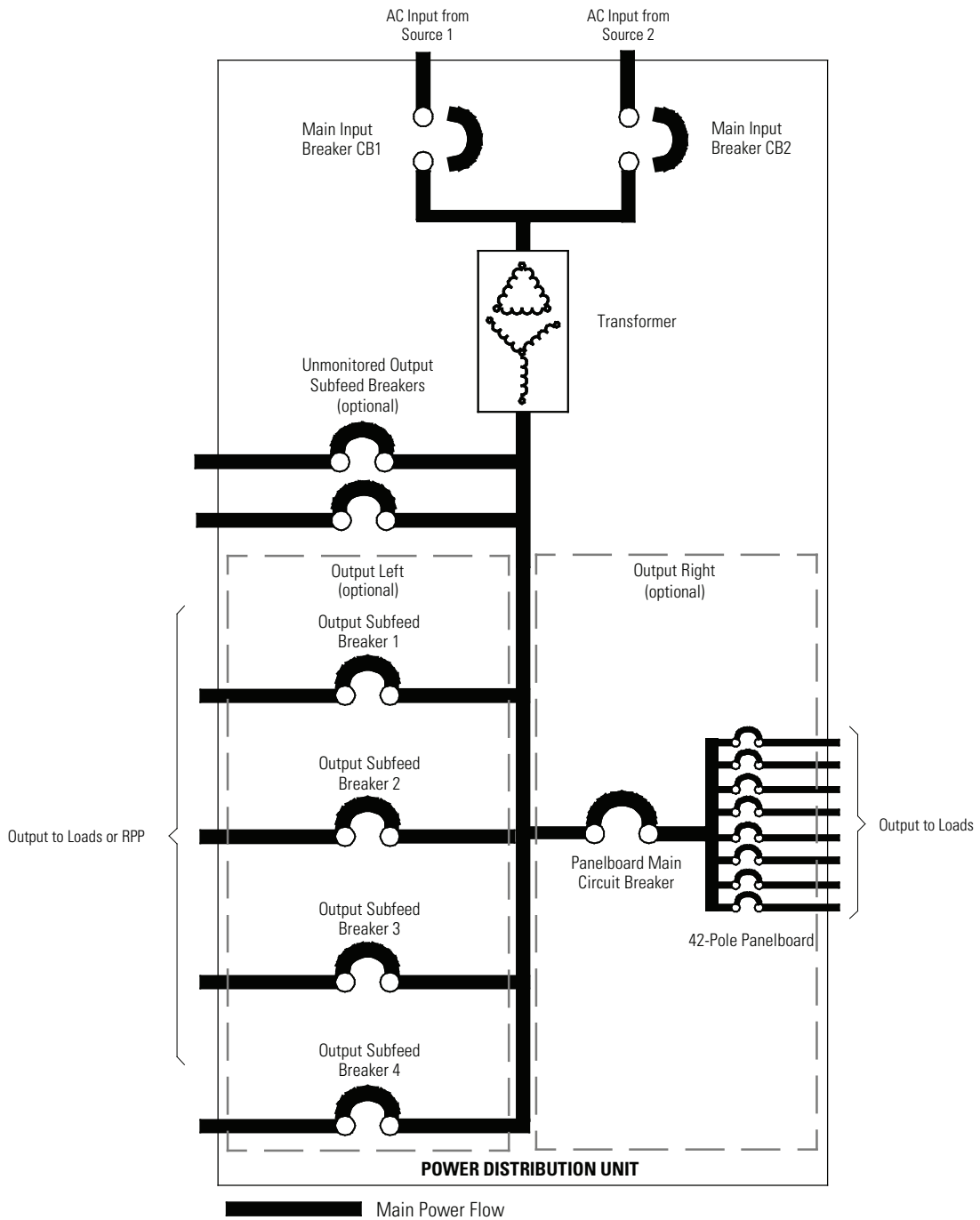


Figure 5-2. Current Path Through the Standard Service PDU with Distribution Panelboard and Subfeed Breakers (Dual Source)

Chapter 6 PDU Operating Instructions

This section describes how to operate the PDU.

-
- NOTE 1** Before starting the PDU, ensure all installation tasks are complete and a preliminary startup has been performed by an Eaton Customer Service Engineer. The preliminary startup verifies all electrical interconnections to ensure the installation was successful and the PDU operates properly.
- NOTE 2** Read this section of the manual and have thorough knowledge of PDU operation before attempting to operate any of the controls.
-

6.1 PDU Controls, Breakers, and Displays

Figure 6-1 through Figure 6-10 identify and show the location of the controls, breakers and displays on the PDU and optional sidecars. The descriptions provide a brief overview of the PDU controls with standard and optional features.

-
- NOTE** Read the operation sections of this manual and have thorough knowledge of PDU operation before attempting to operate any of the PDU controls.
-

The PDU can contain the following controls, breakers, and displays:

- Main input breaker CB1 (and CB2 if Dual Input Sidecar is installed)
- Surge Protective Device (SPD) status display (if non-EMS-monitored SPD is installed)
- Control panel
- PDU right and left distribution panels with panel input breakers
- Up to eight PDU subfeed breakers depending on PDU configuration
- Sidecar top and bottom distribution panels with panel input breakers
- Sidecar subfeed breakers

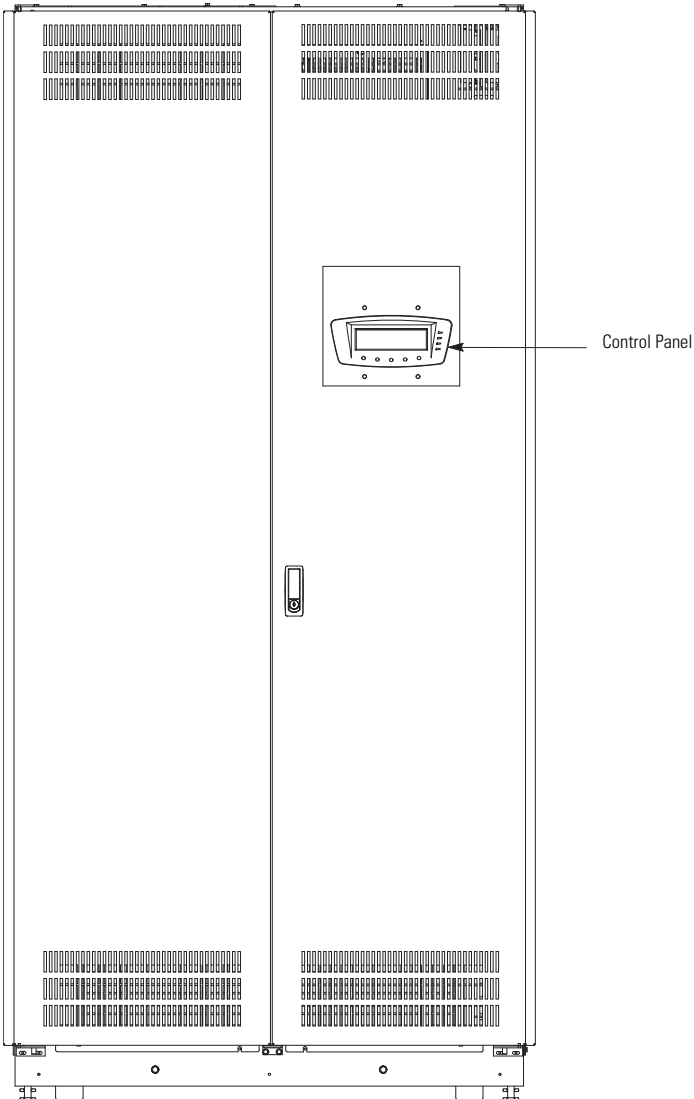
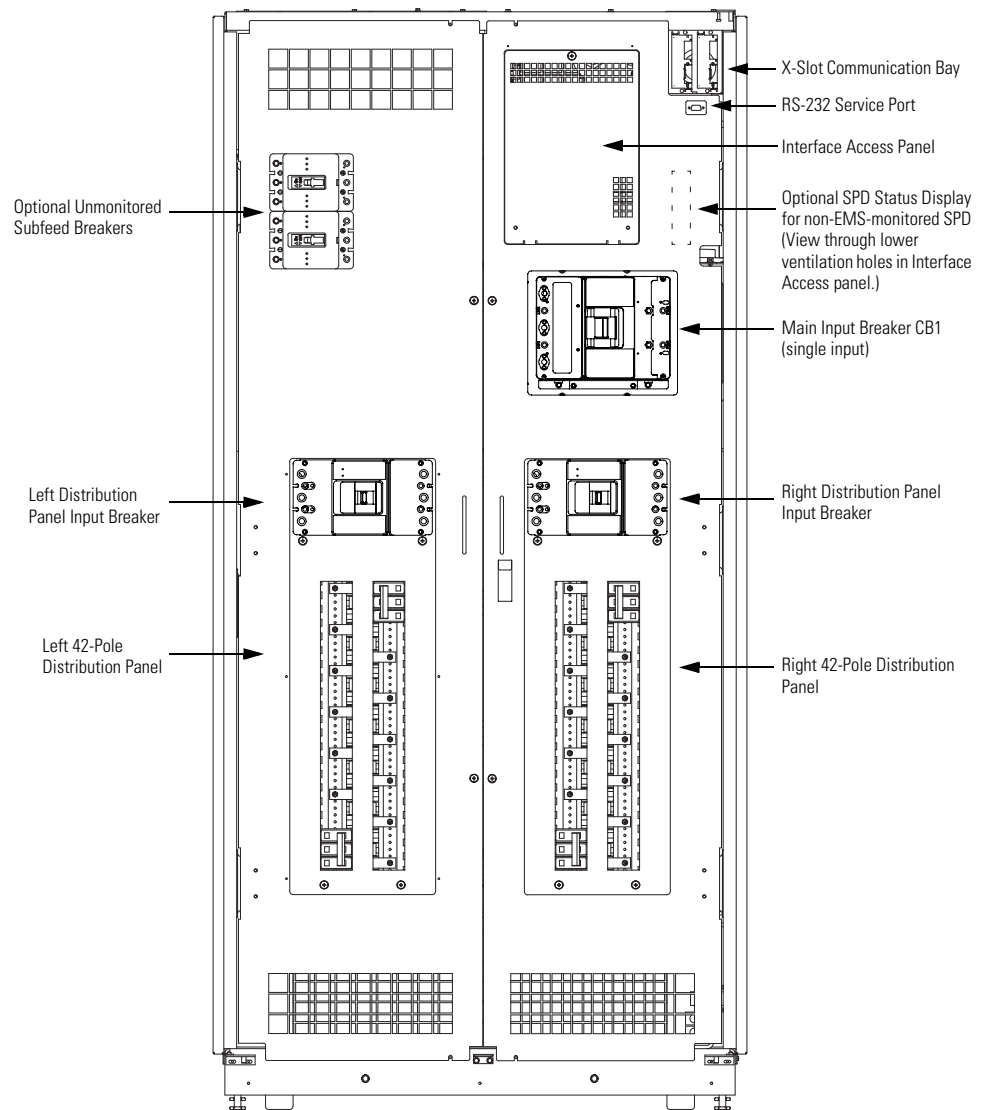
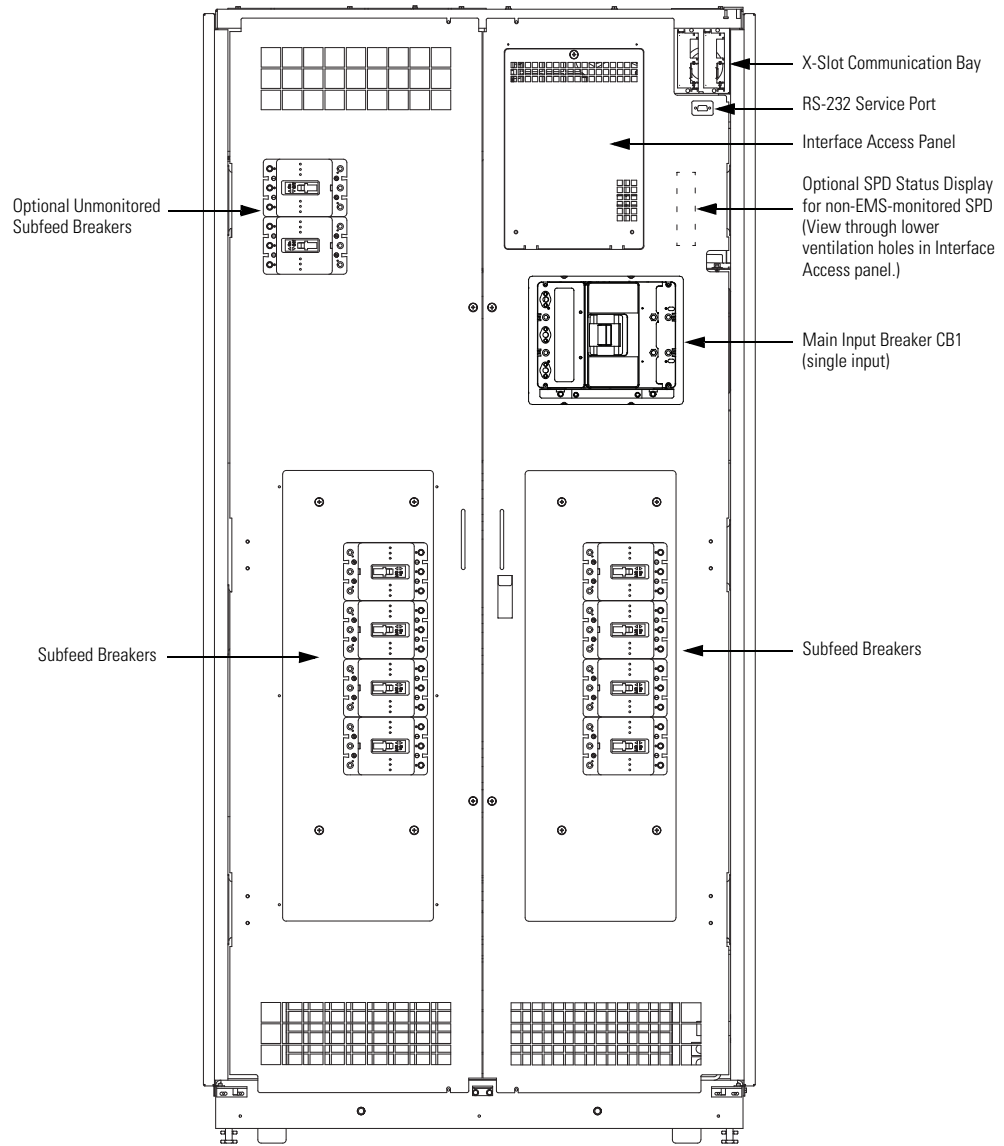


Figure 6-1. PDU Controls – Doors Closed



NOTE The PDU is shown with both left and right distribution panels. However, the installed configuration may contain only a left or right distribution panel.

Figure 6-2. Standard Service PDU Breakers and SPD Display – Doors Removed with Distribution Panels



NOTE The PDU is shown with eight subfeed breakers. However, the installed configuration may contain one to eight subfeed breakers.

Figure 6-3. Standard Service PDU Breakers and SPD Display – Doors Removed with Subfeed Breakers

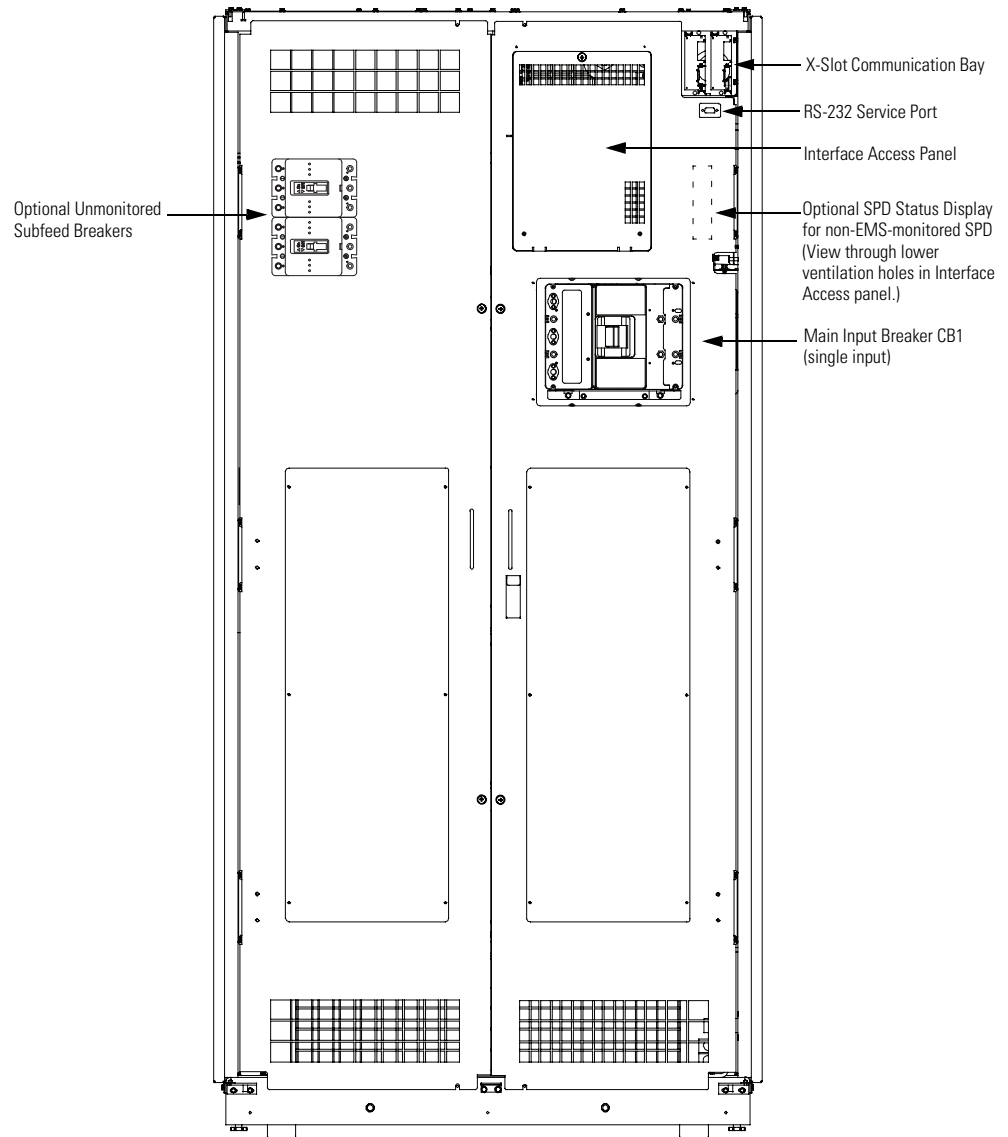


Figure 6-4. PDU Breakers and SPD Display – Front Only Service Access with Doors Removed

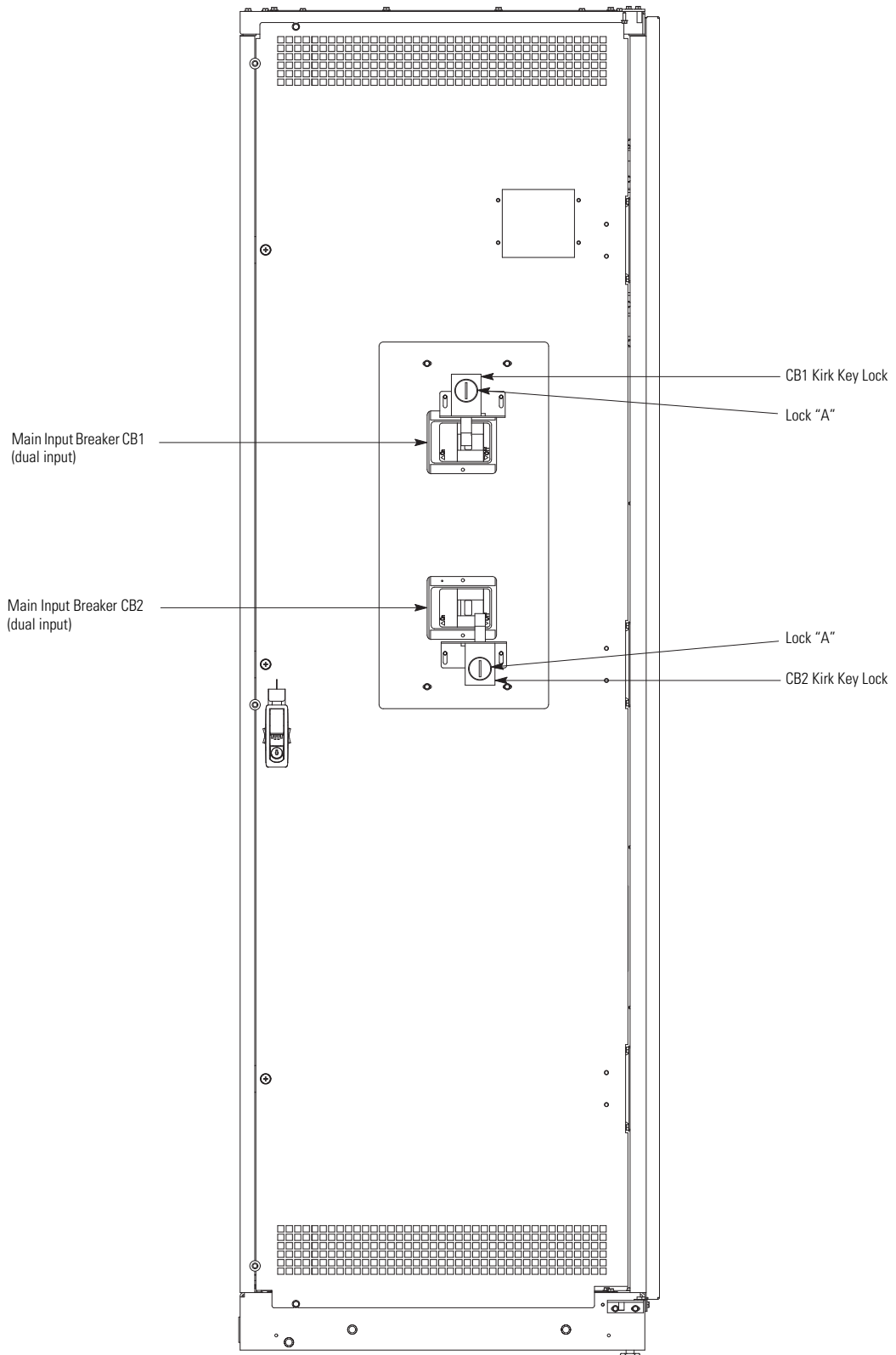


Figure 6-5. Basic Dual Input Sidecar Controls and Breakers – Doors Removed with Input Breakers

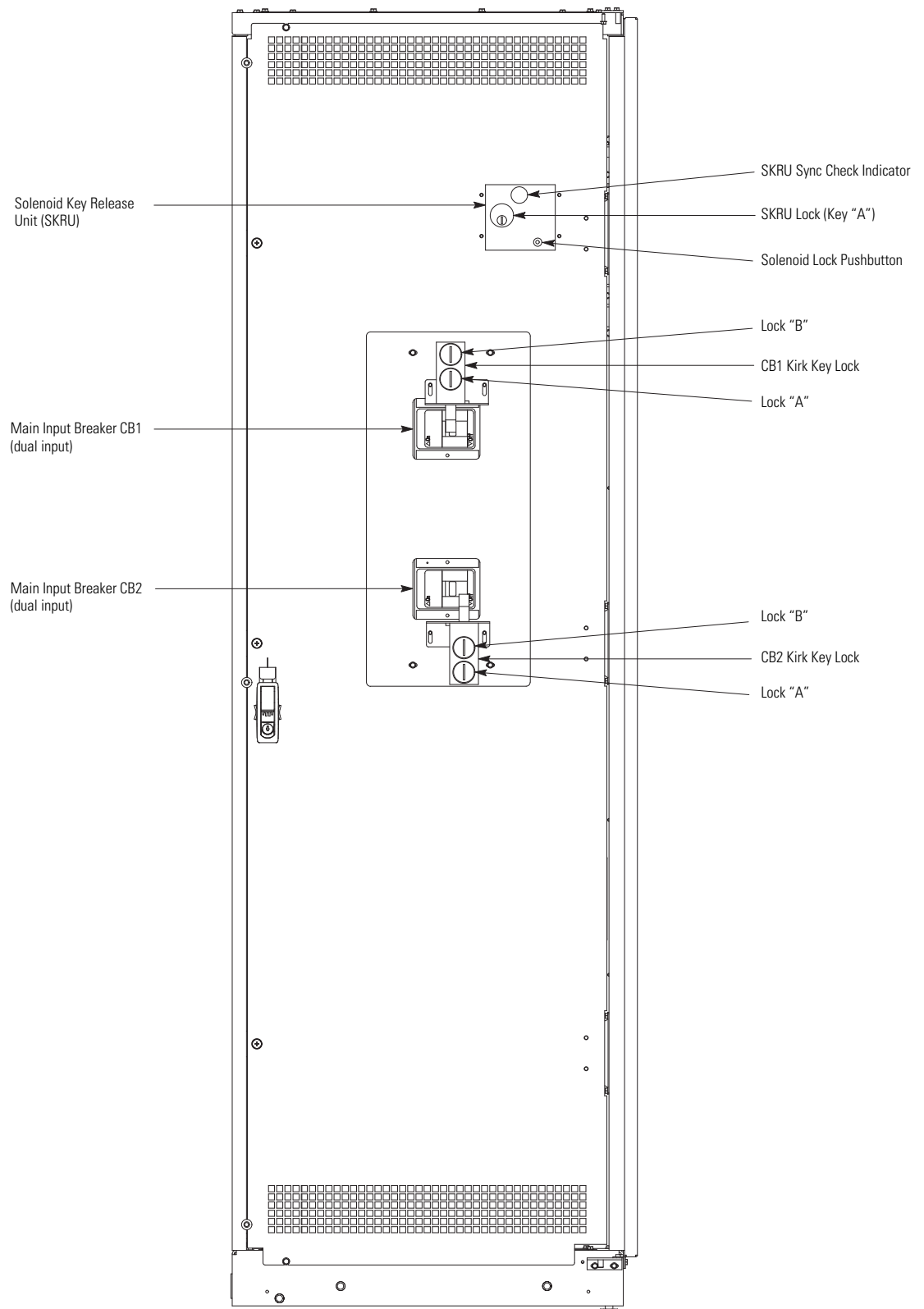
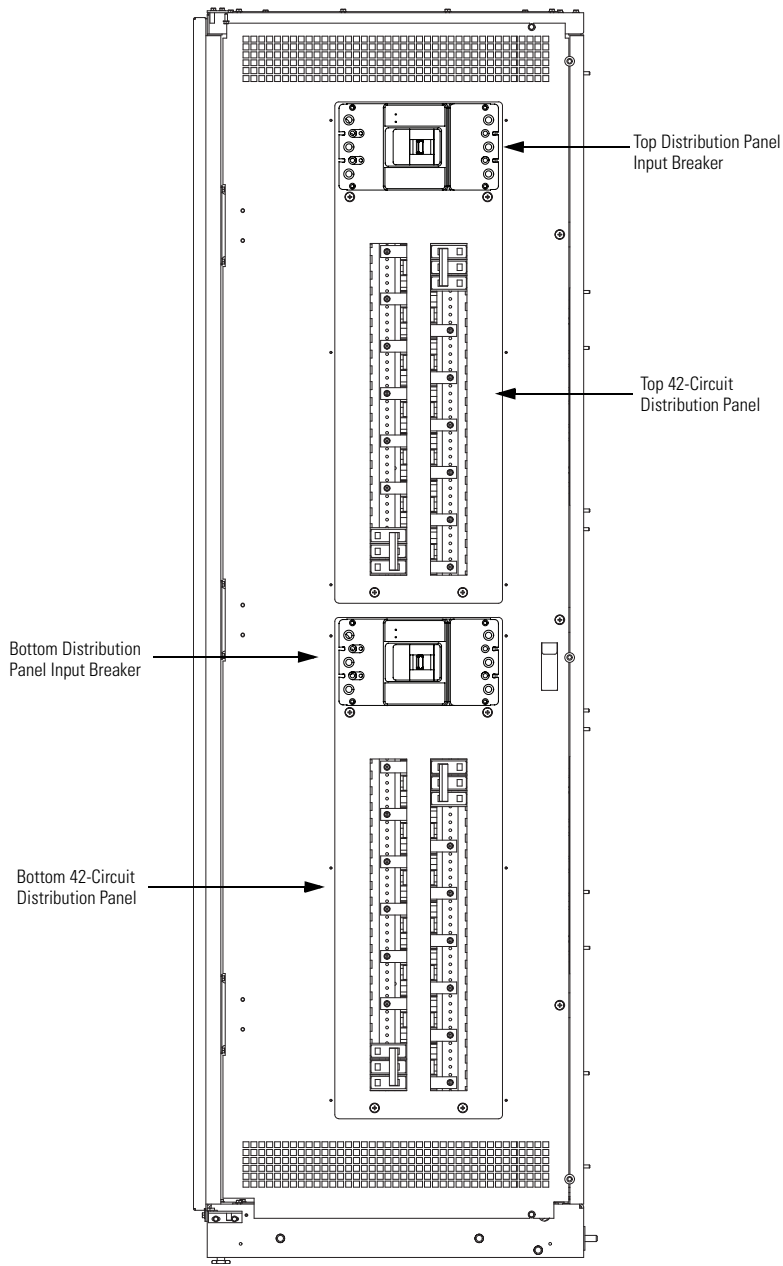


Figure 6-6. Premier Dual Input Sidecar Controls and Breakers – Doors Removed with Input Breakers



NOTE The sidecar is shown with both top and bottom distribution panels. However, the installed configuration may contain only a top or bottom distribution panel.

Figure 6-7. Front-Facing Sidecar Breakers – Doors Removed showing Distribution Panels

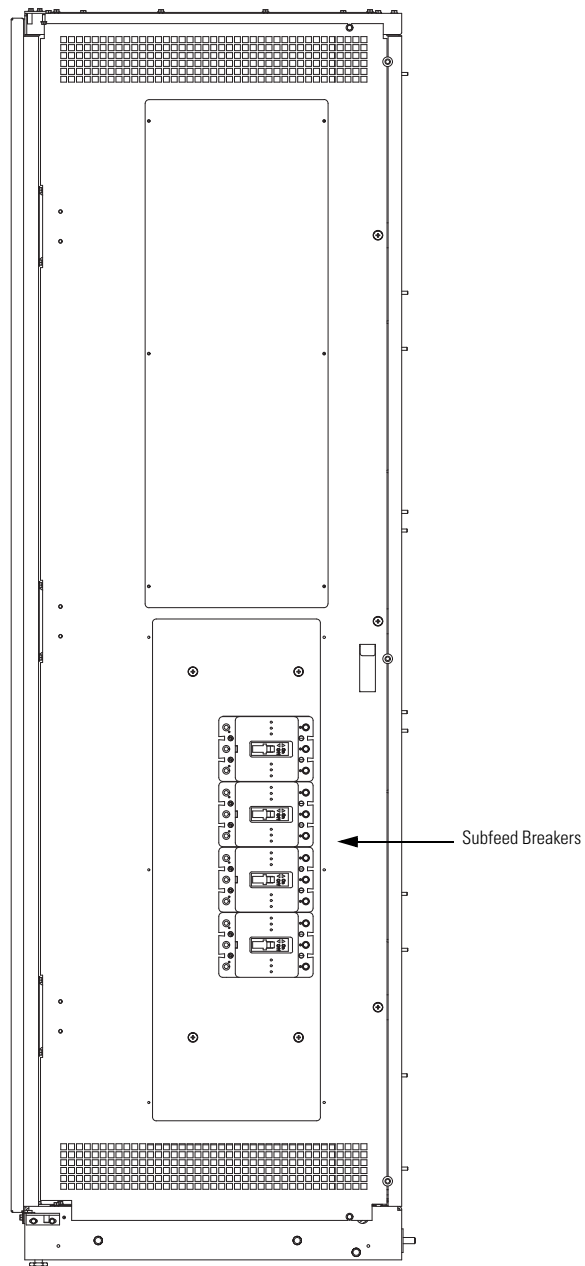
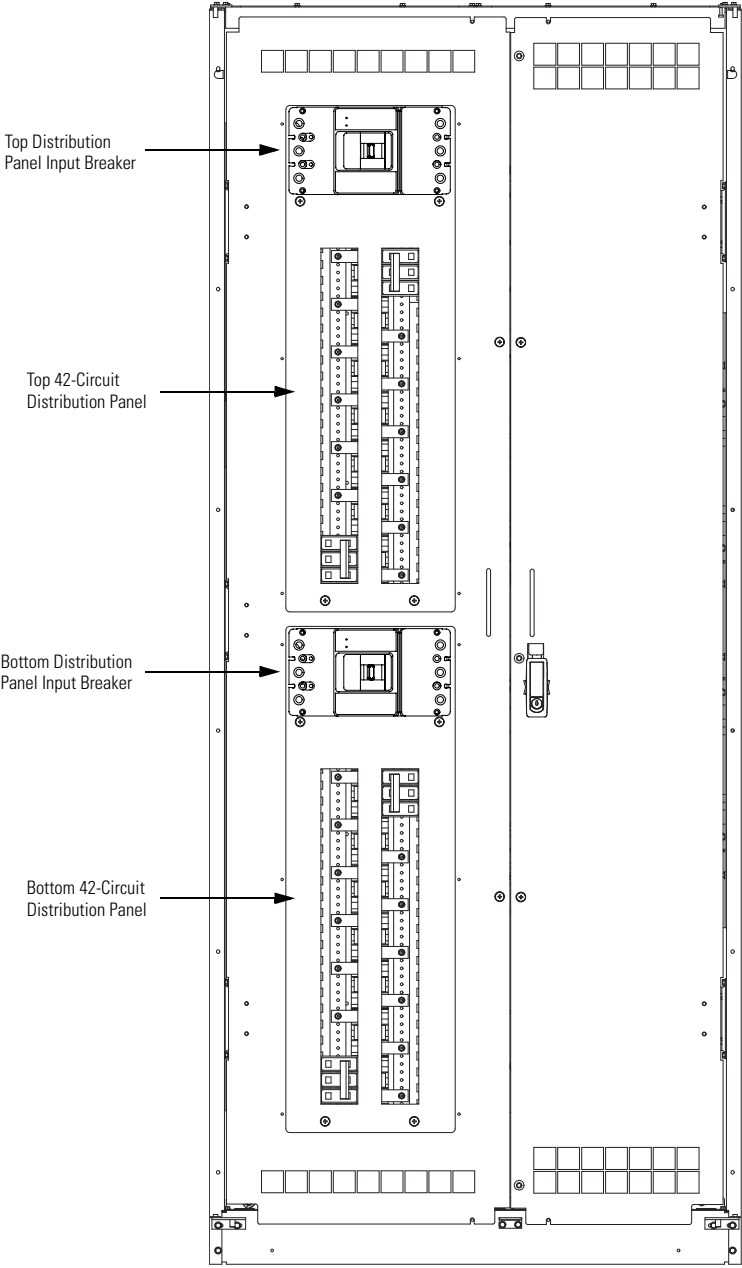


Figure 6-8. Front-Facing Sidecar Breakers – Doors Removed showing Subfeed Breakers



NOTE The sidecar is shown with both top and bottom distribution panels. However, the installed configuration may contain only a top or bottom distribution panel.

Figure 6-9. Side-Facing Sidecar Breakers – Doors Removed showing Distribution Panels

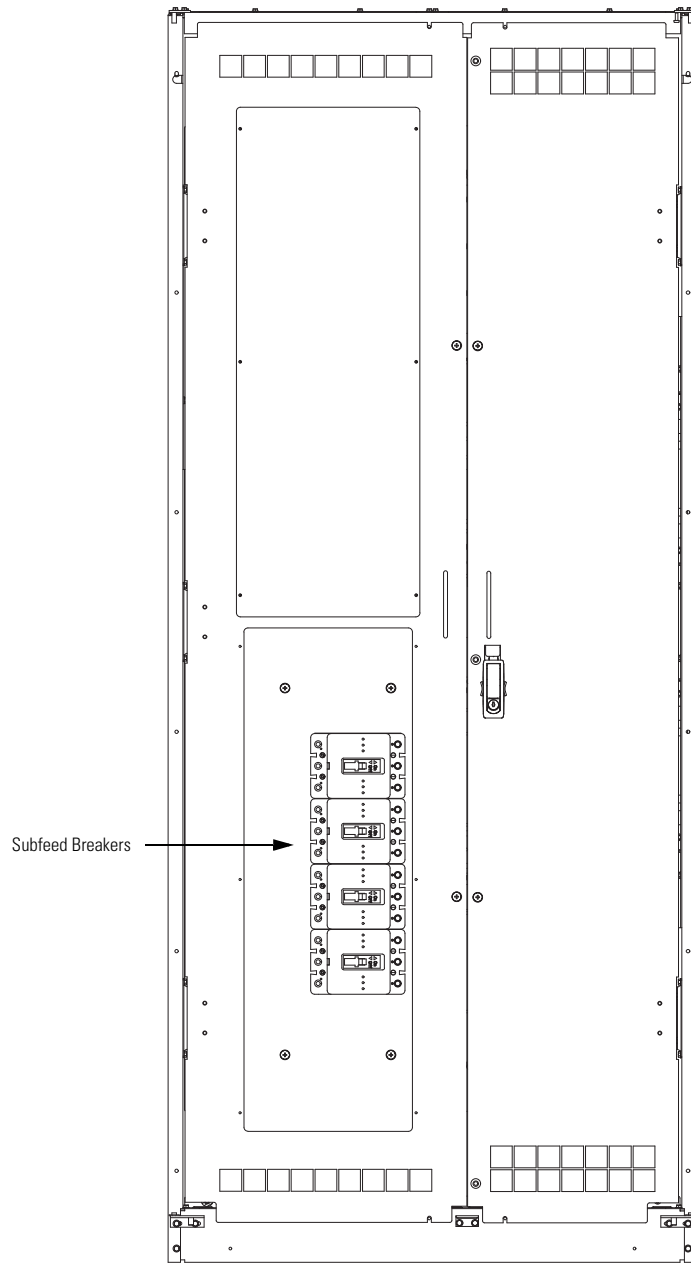


Figure 6-10. Side-Facing Sidecar Breakers – Doors Removed showing Subfeed Breakers

6.2 Using the Control Panel

The following paragraphs describe the PDU control panel, including controls and indicators, and how to monitor and control the PDU. The control panel (see Figure 6-11) is located on the front door of the PDU.

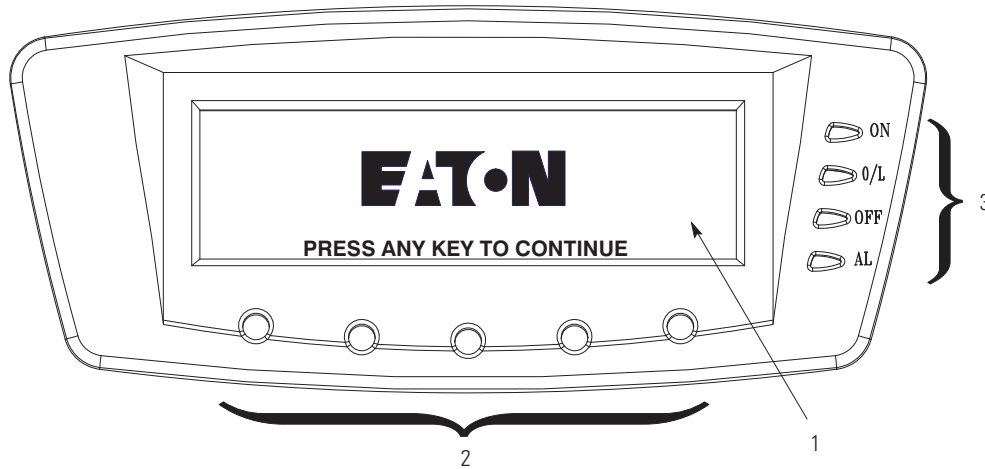


Figure 6-11. PDU Control Panel

The control panel consists of:

- A liquid crystal display (LCD) **(1)**
- A horizontal row of pushbuttons **(2)**
- A vertical column of status indicators **(3)**

The following paragraphs describe how to use the PDU control panel to monitor the PDU. For specific procedures, see paragraph 6.4.





When the unit powers up, the screen displays the Eaton logo as shown in Figure 6-11. To advance to the main menu and mimic screen, press any control panel pushbutton once.

6.2.1 Status Indicators

The four symbols on the right side of the control panel are status indicators. They are colored light emitting diode (LED) lamps, and they work with the alarm horn to let you know the operating status of the PDU.

Table 6-1 describes the status indicators.

Table 6-1. Status Indicators

Indicator	Status	Description
 ON Green	On	The PDU output is energized.
 O/L Yellow	On	One or more phases are in overload; or there is an alarm or warning for neutral overload, ground overload, main panel breaker overload, or panel breaker overload; or there is a transformer overload.
 OFF Yellow	Off	The PDU main input breaker is open.
 AL Red	Flashing or On	The PDU has an active alarm and requires immediate attention. All alarms are accompanied by an audible horn. The Alarm indicator may be illuminated along with other indicators. To acknowledge the alarm and silence the horn, press any control panel pushbutton once. The alarm indicator then returns to steady illumination. The LCD shows the highest priority active alarms.

6.2.2 System Events

When the PDU is operating, it continually monitors itself and the incoming utility power. System events on the PDU can be indicated by horns, lights, messages, or all three.

Select **EVENTS** from the menu bar on the main menu screen to look at the active events screen. This screen shows any currently active alarms, notices, or commands. For more information on using the events screen, see paragraph 6.2.7.

- **System Event Horns** The system event horn beeps to alert an operator that an event needing attention is taking place. The horn cycles at a half-second rate.
- **System Event Indicators** The status indicators on the PDU control panel work with the event horn to let the operator know when the PDU is operating in any mode other than normal. Only the ON indicator is visible during normal PDU operation. The other indicators illuminate to indicate alarms or events. When an alarm occurs, first check these indicators to see what type of event has taken place. For descriptions of the status indicators, see paragraph 6.2.1.
- **System Event Messages** When a system event occurs, a message appears on the LCD in the PDU status area. This message is also written to the Active Events Log and may be added to the History Log. The messages are divided into four categories: alarms, notices, status, and commands.

6.2.3 Using the LCD and Pushbuttons

The LCD on the control panel provides an operator interface with the PDU. Figure 6-12 identifies the display areas.

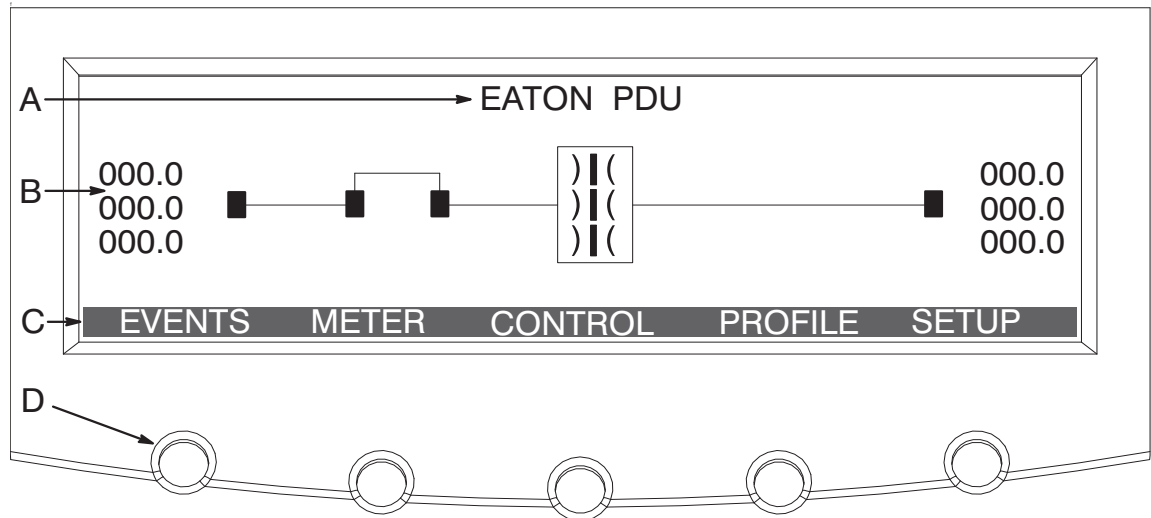


Figure 6-12. Parts of the LCD

- A** The *PDU status* area alternately displays the Eaton PDU name, the current date and time, and any current alarm messages.
- B** The *information area* contains data about PDU status and operations.
- C** The *menu bar* lists the available screens. To select a screen, press the pushbutton under the screen.
- D** Each *navigation pushbutton* function depends on the screen displayed. Use the *pushbuttons* to select menu screens or scroll through available screens. The LCD options above the pushbuttons indicate each pushbutton's function.

You can use the LCD and the pushbuttons to:

- Look at a log of PDU events (alarms, notices, and commands)
- Monitor PDU operation
- Set PDU parameters
- Control PDU operation

See paragraph 6.2.7 for detailed menu operation.

After approximately 15 minutes (default delay), the display screen darkens. To restore the screen, press any pushbutton once. The timeout delay is programmable. Contact an Eaton service representative for programming.

6.2.4 Display and Metering Screens

The Eaton Energy Management System (EMS) provides System Level and Premium metering display and metering configurations for the PDU:




- System Level metering includes system level input and output meters, Active Events and History Logs, setup menu, mimic screen, Profile Log, and two X-Slot communication bays.
- Premium metering has all the features of System Level metering and includes branch circuit or subfeed breaker level monitoring.

System Level metering is the standard configuration for the PDU; Premium metering is optional.

6.2.5 Using the Menu

The PDU main menu bar allows you to display data in the information area to help you monitor and control PDU operation. Table 6-2 shows the basic menu structure.

Table 6-2. Display Function Menu Map

Menu Option	Description
EVENTS	Displays the list of Active System Events and a historical log of system events.
METER	Displays performance meters for the system or critical load.
CONTROL	Displays the Control screen to turn the PDU load off.
PROFILE	Displays load profile data for the most recent 24 months. Profile data includes highest and lowest input and output currents, frequencies, power levels, power factors, AC undervoltage, and Total Harmonic Distortion (THD).
SETUP	Allows the entry of a password, viewing the firmware version numbers, setting the display contrast, changing the password, setting the date and time, clearing the history screen, clearing the load profile screen, setting up the building alarms, displaying the unit type, configuring the THD, and changing the unit name. Available functions depend on the setup level authorized.
	Returns to main menu and mimic screen from the Events, Meter, Control, Profile, or Setup screens. Returns to the main System Setup Level screen from a setup submenu.
	Up or down arrows scroll through screens and lists or highlight settings.
	Left or right arrows select or adjust settings displayed on the screen.

6.2.6 Mimic Screen

Figure 6-13 shows the main menu and mimic screen. To select the mimic screen from the Events, Meters, Profile, or Setup screens, press the ← pushbutton on the current menu bar.

The mimic screen shows the internal components of the PDU and a real time graphical representation of the operating status of the system.

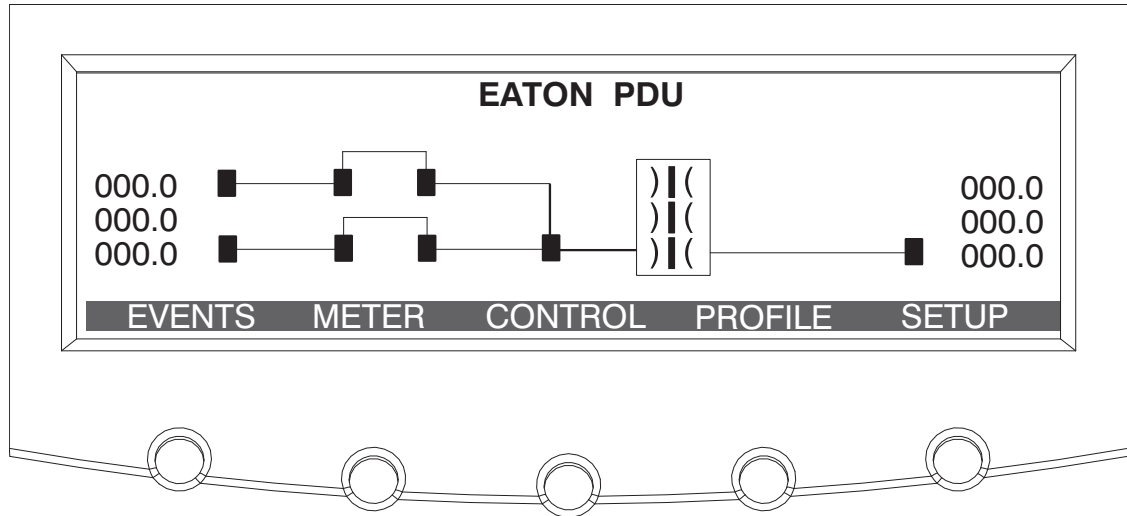


Figure 6-13. Main Menu and Mimic Screen with Dual Input Breaker

6.2.7 Display Menu Operation

Table 6-3 describes the menu functions and how to use them.

Table 6-3. Display Menu Operation

Function	Subfunction	Operation
Events		Press the EVENTS pushbutton on the main menu to display a listing of all system events that are currently active. The most recent event is listed first. As events clear, they are removed from the Active System Events listing. To scroll through the events, press the up or down arrow pushbuttons on the menu bar.
History		Press the HISTORY pushbutton on the Active Events menu bar to display the History Log. The History Log lists up to 127 system events in chronological order, with the most recent event listed last (once 127 is reached, the earliest event is overwritten). The end of the log (the most recent events) is displayed first; scroll upward to view older event listings. To scroll through the events, press the up or down arrow pushbuttons on the menu bar. To return to the Active Events screen, press the EVENTS pushbutton on the menu bar.
Meters		The Meter screens show the PDU input and output meter readings. Press the METER pushbutton on the main menu bar to display the Meter screens. To switch between the Output and Input screens, press the INPUT or OUTPUT pushbutton on the menu bar. To scroll through the meter screens, press the up or down arrow pushbuttons on the menu bar. The current PDU readings are displayed in the information area of the screen.
	Output RMS (phase-to-phase)	The screen shows the total output voltage, output current (each phase), and frequency being supplied by the PDU, as well as kVA, kW, neutral and ground currents, and power factor measurements.
	Output RMS (phase-to-neutral)	The screen shows the total output voltage, output current (each phase), and frequency being supplied by the PDU, as well as kVA, kW, neutral and ground currents, and power factor measurements.
	Output %	The screen shows the ratio of present output voltage compared to nominal output voltage rating of the PDU in %, as well as kVA and output current.
	Output THD	The screen displays the ratio of the distortion present on the output in the form of harmonics and noise compared to fundamental pure sine wave (utility frequency), as well as output current. This value is displayed in tenth percent and does not require calibration.
	Output Crest	The screen displays the ratio of peak to RMS output current in %.
	Output kWh	The screen shows the total power being supplied by the PDU.
	Input RMS (phase-to-phase)	The screen shows the total input voltage and frequency being supplied to the PDU. If optional input CTs are installed, input current (each phase), kVA, kW, and power factor measurements are displayed.
	Input RMS (phase-to-neutral)	The screen shows the total input voltage and frequency being supplied to the PDU. If optional input CTs are installed, input current (each phase), kVA, kW, and power factor measurements are displayed.
	Input %	The screen shows the ratio of present input voltage compared to nominal input voltage rating of the PDU in %. If optional input CTs are installed, input current (each phase) is displayed.
	Input THD	The screen displays the ratio of the distortion present on the input in the form of harmonics and noise compared to fundamental pure sine wave (utility frequency). This value is displayed in tenth percent and does not require calibration. If optional input CTs are installed, input current (each phase) is displayed.
	Input Crest	If optional input CTs are installed, the screen displays the ratio of peak to RMS input current in %.
	Input kWh	If optional input CTs are installed, the screen shows the total power being supplied to the PDU.
	BCM	If the optional Energy Management System branch circuit monitoring (BCM) is installed, press the PANEL pushbutton to display the BCM meter screens. Refer to the <i>Eaton Energy Management System (EMS) Branch Circuit Management System (BCMS) Interface User's Guide</i> . If BCM is not installed, an option unavailable message will be displayed.
Control		Use this selection to manually shunt trip input breakers. Press the CONTROL pushbutton on the main menu bar to display the Control screen. Press the ALLOFF pushbutton to display the Enter Password screen. Use the left or right arrow pushbuttons to select the password character position. Use the up or down arrow pushbuttons to change the password character. Once the password is entered, press the DONE pushbutton. Press the ALLOFF pushbutton and hold for three seconds to turn off the load. The default password is L1.

Table 6-3. Display Menu Operation (Continued)

Function	Subfunction	Operation
Profile		Press the PROFILE pushbutton on the main menu bar to display the Load Profile screen. If the unit has been powered on for less than one minute, the Initializing Load Profile screen will be displayed counting down to zero. After completing initialization, the Load Profile screen will be displayed. During normal operation, the Load Profile screen will be displayed without delay. The screen shows the highest and lowest currents, frequencies, power level, and THD. Data is compared every 5 ms. Scroll the display to observe the statistics for the current month and past 23 months. Use the left or right arrow pushbuttons to select the month to view. To scroll through the profile screen, press the up or down arrow pushbuttons on the menu bar. The recorded PDU readings are displayed in the information area of the screen.
System Setup Level 0		This screen can be used to set the screen contrast, show the firmware versions installed, and enter a password to access Level 1 functions. No password is necessary to access Level 0 functions.
	Function Selection	Press the SETUP pushbutton on the main menu bar to display the System Setup Level 0 Screen. Use the up or down arrow pushbuttons to highlight the setup function screen desired, then press the SELECT pushbutton to display the function screen.
	Contrast Adjust	Select CONTRAST from the System Setup Level 0 menu to display the Contrast Adjust screen. Use the left or right arrow pushbuttons to adjust the contrast for the LCD. When the contrast adjustment is complete, press the SAVE pushbutton. Once the setting is saved, the System Setup screen displays. To return to the System Setup screen without saving the setting, press the return arrow pushbutton.
	Versions	The Versions screen provides the firmware version numbers installed on the PDU. Select VERSIONS from the System Setup Level 0 menu to display the Versions screen. To scroll through the firmware types, press the up or down arrow pushbuttons on the menu bar. To return to the System Setup screen, press the return arrow pushbutton.
System Setup Level 1		The System Setup Level 1 screen can be used to change the Level 1 password, set the PDU date and time, clear the History Log, clear the Profile Log, set up the modem, set up the building alarms, and log out of Level 1. In addition, all of the Level 0 functions are available. A password is required to access the Level 1 functions.
	Enter Password	If not already in a system setup menu, press the SETUP pushbutton on the main menu bar to display the System Setup Level 0 Screen. Select ENTER PASSWORD from the System Setup Level 0 menu to display the Enter Password screen. Use the left or right arrow pushbuttons to select the password character position. Use the up or down arrow pushbuttons to change the password character. Once the password is entered, press the DONE pushbutton. The System Setup Level 1 menu screen is displayed. The default password is L1.
	Function Selection	Use the up or down arrow pushbuttons to highlight the setup function screen desired, then press the SELECT pushbutton to display the function screen. The Level 1 screen times out after 60 minutes or can be logged out at any time by selecting the LOG OUT function from the menu screen. When logged out the screen returns to the Level 0 screen.
	Change Access Level Password (change password)	The Change Access Level Password (change password) screen allows the System Setup Level 1 password to be changed. Select CHANGE PASSWORD from the System Setup Level 1 menu to display the Change Access Level Password (change password) screen. Use the left or right arrow pushbuttons to select the password character position. Use the up or down arrow pushbuttons to change the password character. Once the new password is entered, press the DONE pushbutton. The Change Access Level Password (change password save) screen is displayed.
		Change Access Level Password (change password save)
		The Change Access Level Password (change password save) screen lets the user save the new password, retry another password, or abort the password change. Press SAVE , RETRY , or ABORT . <ul style="list-style-type: none"> • If SAVE or ABORT is pressed, the action is completed, and the System Setup screen displays. • If RETRY is pressed, the Change Access Level Password (change password) screen is redisplayed.

Table 6-3. Display Menu Operation (Continued)

Function	Subfunction	Operation
System Setup Level 1 (continued)	Set Date and Time MM/DD/YYYY	The Set Date and Time MM/DD/YYYY screen allows the internal date and time of the PDU to be set in the month/day/year format. The date and time information is used for display on the screen and for logging events in the Event and History Logs. Use the left or right arrow pushbuttons to highlight the setting to be changed. Use the up or down arrow pushbuttons to make the change. When finished making changes, use the left or right arrow pushbuttons to highlight SAVE and the up or down arrow pushbuttons to select YES. To complete the save function and return to the System Setup screen, select the return arrow pushbutton.
	Clear History	The Clear History screen allows the History Log to be cleared. Select CLEAR HISTORY from the System Setup Level 1 menu to display the Clear History screen. Use the CLEAR pushbutton to clear the log. To return to the System Setup screen without clearing the log, press the CANCEL pushbutton.
	Clear Load Profile	The Clear Load Profile screen allows the Profile Log to be cleared. Select CLEAR LOAD PROFILE from the System Setup Level 1 menu to display the Clear Load Profile screen. Use the CLEAR pushbutton to clear the log. To return to the System Setup screen without clearing the log, press the CANCEL pushbutton.
Building Alarm Setup	The Building Alarm Setup screen is used to change the building alarm names and the action that occurs when a building alarm is received. Select BUILDING ALARM SETUP from the System Setup Level 1 menu to display the Building Alarm Setup screen. Use the up or down arrow pushbuttons to highlight the building alarm to set up, then press the SELECT pushbutton to display the Setup screen.	
Building Alarm Setup	Setup	<p>The Setup screen Name String selection allows the building alarm name to be changed. The Setup screen Settings selection sets the action that occurs when a building alarm is received. the load can be turned off or remain on. Use the up or down arrow pushbuttons to highlight the setup function screen desired, then press the SELECT pushbutton to display the screen.</p> <p>Building Alarm Name</p> <p>The Building Alarm Name screen allows the building alarm name to be changed. Select NAME STRING from building alarm Setup screen to display the Building Alarm Name screen. Use the left or right arrow pushbuttons to select the name character position. Use the up or down arrow pushbuttons to change the name character. Once the new name is entered, press the DONE pushbutton. The Building Alarm Name (save) screen is displayed.</p> <p>Building Alarm Name (save)</p> <p>The Building Alarm Name Save screen lets the user save the new building alarm name, retry another name, or abort the name change. Press SAVE, RETRY, or ABORT.</p> <ul style="list-style-type: none"> • If SAVE or ABORT is pressed, the action is completed, and the System Setup screen displays. • If RETRY is pressed, the Building Alarm Name screen is redisplayed.
THD Alarm Level		Use this screen to set the voltage and current Total Harmonic Distortion, and enable or disable this feature. Select THD SETTING to configure the THD alarm level. The default selection is 5.0. Select ENABLED/DISABLED to enable or disable alarms for THD. The alarm feature is disabled by default.

Table 6-3. Display Menu Operation (Continued)

Function	Subfunction	Operation
System Setup Level 2		The System Setup Level 2 screen can be used to change the Level 2 password, set the PDU unit type, the PDU unit name, and log out of Level 2. In addition, all of the Level 0 and Level 1 functions are available. A password is required to access the Level 2 functions.
	Enter Password	If not already in a system setup menu (Level 0 or 1), press the SETUP pushbutton on the main menu bar to display the System Setup Level 0 Screen. Select ENTER PASSWORD from the System Setup Level 0 or 1 menu to display the Enter Password screen. Use the left or right arrow pushbuttons to select the password character position. Use the up or down arrow pushbuttons to change the password character. Once the password is entered, press the DONE pushbutton. The System Setup Level 2 menu screen is displayed. The default password is SUP.
	Function Selection	Use the up or down arrow pushbuttons to highlight the setup function screen desired, then press the SELECT pushbutton to display the function screen. The Level 2 screen times out after 60 minutes or can be logged out at any time by selecting the LOG OUT function from the menu screen. When logged out the screen returns to the Level 0 screen.
	Change Access Level Password (change password)	<p>The Change Access Level Password (change password) screen allows the System Setup Level 2 password to be changed. Select CHANGE PASSWORD from the System Setup Level 2 menu to display the Change Access Level Password (change password) screen. Use the left or right arrow pushbuttons to select the password character position. Use the up or down arrow pushbuttons to change the password character. Once the new password is entered, press the DONE pushbutton. The Change Access Level Password (change password save) screen is displayed.</p> <p>Change Access Level Password (change password save)</p> <p>The Change Access Level Password (change password save) screen lets the user save the new password, retry another password, or abort the password change. Press SAVE, RETRY, or ABORT.</p> <ul style="list-style-type: none"> • If SAVE or ABORT is pressed, the action is completed, and the System Setup screen displays. • If RETRY is pressed, the Change Access Level Password (change password) screen is redisplayed.
	Reset All Lower Level Passwords	<p>This selection resets the Level 1 password to the default setting. Press RESET or CANCEL.</p> <ul style="list-style-type: none"> • If RESET is pressed, the action is completed, and the System Setup screen displays. • If CANCEL is pressed, the System Setup screen is redisplayed.
	Unit Type	The Unit Type screen provides the model, CTO, and serial number of the PDU. Select UNIT TYPE from the System Setup Level 2 menu to display the Unit Type screen. To return to the System Setup screen, press the return arrow pushbutton.
	Unit Name	The Unit Name screen allows the unit name to be changed. Select UNIT NAME from the System Setup Level 2 menu to display the Unit Name screen. Use the left or right arrow pushbuttons to select the name character position. Use the up or down arrow pushbuttons to change the name character. Once the new name is entered, press the DONE pushbutton. The Unit Name (save) screen is displayed.
	Unit Name (save)	<p>The Unit Name (save) screen lets the user save the new name, retry another name, or abort the name change. Press SAVE, RETRY, or ABORT.</p> <ul style="list-style-type: none"> • If SAVE or ABORT is pressed, the action is completed, and the System Setup screen displays. • If RETRY is pressed, the Unit Name screen is redisplayed.

6.3 Surge Protective Device Status Indicators (Non-EMS Monitored SPD)

The optional Surge Protection Device (SPD) is equipped with eight indicators to provide the working status of the SPD (see Figure 6-14). For the location of the SPD, see Figure A-29. For specification details, see paragraph 9.5.



Figure 6-14. Status Indicators Display for Non-EMS monitored SPD

6.4 Single Input PDU Operating Instructions

6.4.1 Starting the Single Input PDU

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU circuit breakers and switches are set as follows:

PDU Main Input Breaker CB1	OPEN
PDU Distribution Panel Input Breakers or Subfeed Breakers (if installed)	OPEN
Distribution Panel Branch Breakers (if installed)	OPEN



NOTE If the PDU is supplied by a UPS, it is recommended that the UPS be placed in bypass mode before starting the PDU because of the possibility of high inrush current creating a UPS overload condition.

3. Apply AC source power to the PDU Main Input Breaker CB1.
4. Verify that the PDU control panel display becomes active after approximately 30 seconds, indicating logic power.
5. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are illuminated and the horn is sounding.
6. Press any key to silence the audible alarm.
7. Set the date and time.
8. Verify the input frequency and input voltage displayed are within the expected range and no alarm is associated with the input.
9. Verify that the PDU control panel output current meters read zero (lines 1, 2, and 3 only). If the meters do not read zero, wait until the meters zero out before continuing to Step 10.
10. Close PDU main input breaker CB1.

11. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are extinguished.
12. Verify that the **ON** status indicator on the PDU control panel is illuminated.
13. Close the PDU distribution panel input breakers (if installed) or the subfeed breakers (if installed).
14. Close the distribution panel branch breakers (if installed).
15. Close the outside doors and secure the latch.

6.4.2 Restarting the Single Input PDU

To restart the PDU after an unscheduled shutdown (main input breaker shunt trip or REPO) or if manual restart is enabled (main input breaker will trip when input power to the PDU is lost):

CAUTION

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

1. If shutdown occurred because of a REPO trip, follow the REPO resetting procedure in paragraph 6.7.
2. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
3. Reset the main input breaker CB1 to the OFF position.



NOTE If the PDU is supplied by a UPS, it is recommended that the UPS be placed in bypass mode before starting the PDU because of the possibility of high inrush current creating an UPS overload condition.

4. Close the PDU main input breaker CB1.
5. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are extinguished.
6. Verify that the **ON** status indicator on the PDU control panel is illuminated.
7. Close the outside doors and secure the latch.

6.4.3 Single Input Shutdown

To shut down the PDU:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Shut down the load equipment according to the manufacturer's recommended shutdown sequence. Load equipment may be turned off at the equipment or at the circuit breakers on the PDU.
3. Turn off all the panelboard main input circuit breakers or subfeed breakers.
4. Open main input breaker CB1 or use the control panel.
5. To remove power from the PDU completely, turn off utility power to the PDU.
6. Close the outside doors and secure the latch.

6.5 Basic (Single Key) Dual Input PDU Operating Instructions

6.5.1 Starting the Basic Dual Input PDU

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU circuit breakers and switches are set as follows:

PDU Main Input Breaker CB1	OPEN
PDU Main Input Breaker CB2	OPEN
PDU Distribution Panel Input Breakers or Subfeed Breakers (if installed)	OPEN
Distribution Panel Branch Breakers (if installed)	OPEN



NOTE To start the PDU using CB2, transfer CB1 to CB2 using procedure in paragraph 6.5.4.

3. Verify that the interlocks are set as follows:

PDU Main Input Breaker CB1	Bolt in retracted position. Key "A" held captive.
PDU Main Input Breaker CB2	Bolt in extended position. Key "A" removed.



NOTE If the PDU is supplied by a UPS, it is recommended that the UPS be placed in bypass mode before starting the PDU because of the possibility of high inrush current creating a UPS overload condition.

4. Apply AC source power to the PDU Main Input Breaker CB1 or CB2.
5. Verify that the PDU control panel display becomes active after approximately 30 seconds, indicating logic power.
6. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are illuminated and the horn is sounding.
7. Press any key to silence the audible alarm.
8. Set the date and time.
9. Verify the input frequency and input voltage displayed are within the expected range and no alarm is associated with the input.
10. Verify that the PDU control panel output current meters read zero (lines 1, 2, and 3 only). If the meters do not read zero, wait until the meters zero out before continuing to Step 11.
11. Close the PDU main input breaker CB1 or CB2 and turn key "A" to extend bolt and lock CB1 or CB2 in the closed position.
12. Remove key "A" from the interlock on CB1 or CB2 and insert the key into the key "A" interlock on CB1 or CB2. Turn key "A" to retract bolt. Key "A" is held captive.
13. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are extinguished.
14. Verify that the **ON** status indicator on the PDU control panel is illuminated.
15. Close the PDU distribution panel input breakers (if installed) or the subfeed breakers (if installed).
16. Close the distribution panel branch breakers (if installed).
17. Close the outside doors and secure the latch.


6.5.2 Restarting the Basic Dual Input PDU

To restart the PDU after an unscheduled shutdown (main input breaker shunt trip or REPO) or if manual restart is enabled (main input breaker will trip when input power to the PDU is lost):

 **CAUTION**

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

1. If shutdown occurred because of a REPO trip, follow the REPO resetting procedure in paragraph 6.7.
2. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
3. Reset the main input breaker CB1 (or CB2 if the PDU was powered through CB2 prior to the unscheduled shutdown), to the OFF position.

 **NOTE** If the PDU is supplied by a UPS, it is recommended that the UPS be placed in bypass mode before starting the PDU because of the possibility of high inrush current creating a UPS overload condition.

4. Close the PDU main input breaker CB1 (or CB2 if the PDU was powered through CB2 prior to the unscheduled shutdown).
5. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are extinguished.
6. Verify that the **ON** status indicator on the PDU control panel is illuminated.
7. Close the outside doors and secure the latch.

6.5.3 Basic Dual Input Shutdown

To shut down the PDU:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Shut down the load equipment according to the manufacturer's recommended shutdown sequence.
Load equipment may be turned off at the equipment or at the circuit breakers on the PDU.
3. Turn off all the panelboard main input circuit breakers or subfeed breakers.
4. Open the upstream feeder breaker for main input breaker CB1 (or CB2 if the PDU was powered through CB2). The EPO pushbutton may also be used.
5. If not already accomplished, turn off utility power to the PDU to remove power from the PDU completely.
6. Close the outside doors and secure the latch.

6.5.4 Basic Dual Input PDU CB1 to CB2 Transition

 **CAUTION**

Do not attempt the transition sequence if the two power sources are not synchronized.

To switch the current path of the PDU from CB1 to CB2:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU main input breakers are set as follows:

PDU Main Input Breaker CB1	CLOSED
PDU Main Input Breaker CB2	OPEN

3. Verify that the interlocks are set as follows:

PDU Main Input Breaker CB1	Bolt in extended position. Key "A" removed.
PDU Main Input Breaker CB2	Bolt in retracted position. Key "A" held captive.

4. Ensure that the two power sources are synchronized.

 **CAUTION**

Do not continue the transition sequence if the two power sources are not synchronized.

5. Close main input breaker CB2 and turn key "A" to extend bolt and lock CB2 in the closed position.
6. Remove key "A" from the interlock on CB2 and insert the key into the key "A" interlock on CB1. Turn key "A" to retract bolt. Key "A" is held captive.
7. Open the main input breaker CB1.
8. Close the outside doors and secure the latch.

6.5.5 Basic Dual Input PDU CB2 to CB1 Transition

 **CAUTION**

Do not attempt the transition sequence if the two power sources are not synchronized.

To switch the current path of the PDU from CB2 to CB1:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU main input breakers are set as follows:

PDU Main Input Breaker CB1	OPEN
PDU Main Input Breaker CB2	CLOSED

3. Verify that the interlocks are set as follows:

PDU Main Input Breaker CB1	Bolt in retracted position. Key "A" held captive.
PDU Main Input Breaker CB2	Bolt in extended position. Key "A" removed.

4. Ensure that the two power sources are synchronized.

 **CAUTION**

Do not continue the transition sequence if the two power sources are not synchronized.

5. Close main input breaker CB1 and turn key "A" to extend bolt and lock CB1 in the closed position.
6. Remove key "A" from the interlock on CB1 and insert the key into the key "A" interlock on CB2. Turn key "A" to retract bolt. Key "A" is held captive.
7. Open the main input breaker CB2.
8. Close the outside doors and secure the latch.

6.6 Premier (Dual Key) Dual Input PDU Operating Instructions

6.6.1 Starting the Premier Dual Input PDU

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU circuit breakers and switches are set as follows:

PDU Main Input Breaker CB1	OPEN
PDU Main Input Breaker CB2	OPEN
PDU Distribution Panel Input Breakers or Subfeed Breakers (if installed)	OPEN
Distribution Panel Branch Breakers (if installed)	OPEN



NOTE To start the PDU using CB2, transfer CB1 to CB2 using the procedure in paragraph 6.6.4.

3. Verify that the interlocks are set as follows:

Interlock on Main Input Breaker CB1	Bolt in retracted position. Only key "A" held captive.
Interlock on Main Input Breaker CB2	Bolt in extended position. Only key "B" held captive.
Solenoid Key Release Unit (SKRU)	SKRU indicator off. Key "A" held captive.



NOTE If the PDU is supplied by a UPS, it is recommended that the UPS be placed in bypass mode before starting the PDU because of the possibility of high inrush current creating a UPS overload condition.

4. Apply AC source power to the PDU Main Input Breaker CB1 or CB2.
5. Verify that the PDU control panel display becomes active after approximately 30 seconds, indicating logic power.
6. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are illuminated and the horn is sounding.
7. Press any key to silence the audible alarm.
8. Set the date and time.
9. Verify the input frequency and input voltage displayed are within the expected range and no alarm is associated with the input.

10. Verify that the PDU control panel output current meters read zero (lines 1, 2, and 3 only). If the meters do not read zero, wait until the meters zero out before continuing to Step 11.
11. Close the PDU main input breaker CB1 or CB2.
12. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are extinguished.
13. Verify that the **ON** status indicator on the PDU control panel is illuminated.
14. Close the PDU distribution panel input breakers (if installed) or the subfeed breakers (if installed).
15. Close the distribution panel branch breakers (if installed).
16. Close the outside doors and secure the latch.

6.6.2 Restarting the Premier Dual Input PDU

To restart the PDU after an unscheduled shutdown (main input breaker shunt trip or REPO) or if manual restart is enabled (main input breaker will trip when input power to the PDU is lost):

CAUTION

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

1. If shutdown occurred because of a REPO trip, follow the REPO resetting procedure in paragraph 6.7.
2. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
3. Reset the main input breaker CB1 (or CB2 if the PDU was powered through CB2 prior to the unscheduled shutdown), to the OFF position.



NOTE If the PDU is supplied by a UPS, it is recommended that the UPS be placed in bypass mode before starting the PDU because of the possibility of high inrush current creating a UPS overload condition.

4. Close the PDU main input breaker CB1 (or CB2 if the PDU was powered through CB2 prior to the unscheduled shutdown).
5. Verify that the **OFF** and **ALARM** status indicators on the PDU control panel are extinguished.
6. Verify that the **ON** status indicator on the PDU control panel is illuminated.
7. Close the outside doors and secure the latch.

6.6.3 Premier Dual Input Shutdown

To shut down the PDU:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Shut down the load equipment according to the manufacturer's recommended shutdown sequence. Load equipment may be turned off at the equipment or at the circuit breakers on the PDU.
3. Turn off all the panelboard main input circuit breakers or subfeed breakers.
4. Open main input breaker CB1 (or CB2 if the PDU was powered through CB2), or use the control panel.
5. To remove power from the PDU completely, turn off utility power to the PDU.
6. Close the outside doors and secure the latch.

6.6.4 Premier Dual Input PDU CB1 to CB2 Transition



Do not attempt the transition sequence if the two power sources are not synchronized.

To switch the current path of the PDU from CB1 to CB2:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU main input breakers are set as follows:

PDU Main Input Breaker CB1	CLOSED
PDU Main Input Breaker CB2	OPEN

3. Verify that the interlocks are set as follows:

PDU Main Input Breaker CB1	Bolt in retracted position. Only key "A" held captive.
PDU Main Input Breaker CB2	Bolt in extended position. Only key "B" held captive.
Solenoid Key Release Unit (SKRU)	SKRU indicator off. Key "A" held captive.

4. Apply AC source power to PDU main input breaker CB2.
5. Verify SKRU indicator is on.
6. On SKRU, depress key release pushbutton and turn key "A." Remove key from SKRU and release pushbutton.
7. Insert key "A" into the key "A" interlock on CB2. Turn key to retract bolt and unlock breaker. Key "A" is held captive and key "B" is removable.



Do not continue the transition sequence if the SKRU indicator does not stay on. The SKRU indicator stays on if both power sources are synchronized and ready to be tied together.

8. Ensure that the two power sources are synchronized.
9. Close main input breaker CB2.
10. Open main input breaker CB1.
11. Remove key "B" from the interlock on CB2 and insert the key into the key "B" interlock on CB1. Turn key "B" to extend bolt and lock breaker open. Key "B" is held captive and key "A" is removable.
12. Remove key "A" from the interlock on CB1 and insert the key into the SKRU key "A" lock. Turn key "A" to lock. Key "A" is held captive.
13. Close the outside doors and secure the latch.

6.6.5 Premier Dual Input PDU CB2 to CB1 Transition

 **CAUTION**

Do not attempt the transition sequence if the two power sources are not synchronized.

To switch the current path of the PDU from CB2 to CB1:

1. Open the front doors by pressing the key insert to release the handle, turn the handle in either direction to unfasten the door latch and swing the doors open.
2. Verify that the PDU main input breakers are set as follows:

PDU Main Input Breaker CB1	OPEN
PDU Main Input Breaker CB2	CLOSED

3. Verify that the interlocks are set as follows:

PDU Main Input Breaker CB1	Bolt in extended position. Only key "B" held captive.
PDU Main Input Breaker CB2	Bolt in retracted position. Only key "A" held captive.
Solenoid Key Release Unit (SKRU)	SKRU indicator off. Key "A" held captive.

4. Apply AC source power to PDU main input breaker CB1.
5. Verify SKRU indicator is on.
6. On SKRU, depress key release pushbutton and turn key "A". Remove key from SKRU and release pushbutton.
7. Insert key "A" into the key "A" interlock on CB1. Turn key to retract bolt and unlock breaker. Key "A" is held captive and key "B" is removable.

 **CAUTION**

Do not continue the transition sequence if the SKRU indicator does not stay on. The SKRU indicator stays on if both power sources are synchronized and ready to be tied together.

8. Ensure that the two power sources are synchronized.
9. Close main input breaker CB1.
10. Open main input breaker CB2.
11. Remove key "B" from the interlock on CB1 and insert the key into the key "B" interlock on CB2. Turn key "B" to extend bolt and lock breaker open. Key "B" is held captive and key "A" is removable.
12. Remove key "A" from the interlock on CB2 and insert the key into the SKRU key "A" lock. Turn key "A" to lock. Key "A" is held captive.
13. Close the outside doors and secure the latch.

6.7 Using the Remote Emergency Power-off Switch

A PDU emergency power-off can be initiated by the **REPO** pushbutton switch. In an emergency, you can use this switch to control the PDU output. The **REPO** pushbutton switch de-energizes the critical load without asking for verification.

The PDU remains off until restarted.

⚠ CAUTION

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



NOTE The following instructions are for the Eaton-supplied REPO pushbutton switch. A customer-supplied REPO pushbutton switch may not activate in the same manner; refer to the operating instructions provided with the switch.

To activate the **REPO** pushbutton switch:

1. Firmly push the red pushbutton until it locks into place. The switch latches into the activated state (see Figure 6-15).

The PDU main input breaker trips, and the PDU turns off immediately, without asking for verification. If an upstream feeder breaker is connected to the **REPO** pushbutton switch, the feeder breaker also trips.

⚠ WARNING

Power is present inside the PDU cabinet until the upstream input feeder circuit breaker is opened.

⚠ CAUTION

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

2. To restart the PDU after activating the **REPO** pushbutton switch, deactivate the **REPO** pushbutton switch by inserting the supplied key and rotating clockwise until the red pushbutton releases (see Figure 6-15). To remove the key, rotate the key back to the vertical position and follow the procedure in paragraphs 6.4.2, 6.5.2, or 6.6.2.

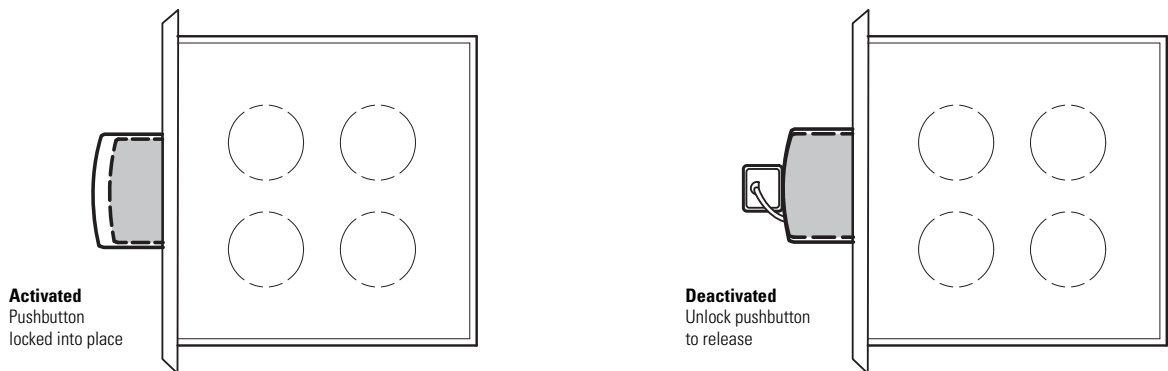


Figure 6-15. REPO Operation

Chapter 7 Communication

This chapter describes the communication features of the Eaton 150 kVA PDU and provides information about connecting hardware and using Terminal mode.

7.1 X-Slot Cards

The PDU has two factory installed X-Slot communication bays. See Figure 6-2 for bay locations. The PDU is compatible with the following X-Slot cards (see Figure 7-1):

- Modbus Card - provides direct integration of the Eaton 150 kVA PDU's parameters (meters and status) to a Building Management System (BMS) using the Modbus RTU protocol.



NOTE

Either the Power Xpert® Gateway Card or the Power Xpert Gateway PXGX PDP Card can be used.

- Power Xpert Gateway Card - provides remote monitoring through a Web browser interface, e-mail, and a network management system using SNMP; connects to a twisted-pair Ethernet (10/100BaseT) network. Modbus TCP support provides direct integration of the PDU's parameters to a Building Management System (BMS). It has a built-in switching hub that allows one additional network device to be connected to the network without the requirement of an additional network drop.
- Eaton Power Xpert Gateway PXGX PDP Card – provides Web-enabled, real-time monitoring of Eaton power distribution products (PDPs) through standard Web pages, Power Xpert Software, or third-party software. An integral part of the Eaton Power Xpert Architecture, which provides end-to-end PowerChain Management® solutions, the PXGX PDP Card provides a central point to connect PDPs to the Ethernet network. Modbus TCP support provides direct integration of the PDU's parameters to a Building Management System (BMS). It has a built-in switching hub that allows one additional network device to be connected to the network without the requirement of an additional network drop.

LAN drops for use with X-Slot connectivity cards must be provided by facility planners or the customer.

For installation and setup of all other X-Slot cards, please contact an Eaton service representative (see page 1-12). Refer to the manual supplied with the X-Slot card for user instructions.

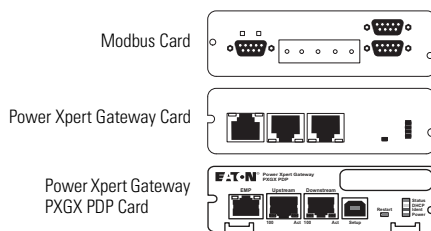


Figure 7-1. Optional X-Slot Cards

7.2 Terminal Mode



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.

Terminal mode requires a computer with a serial (RS-232) port connected to the RS-232 port on the PDU. The computer can use HyperTerminal[®] set to emulate ANSI.

In Terminal mode, the following can be requested:

- **[Esc] [V]** displays the screens as shown on the PDU LCD.
- **[Esc] [P]** displays the Profile Log.
- **[Esc] [H]** displays the History Log.
- **[Esc] [A]** displays any new event.

7.2.1 PDU LCD Screens

To display the PDU LCD screens on a local computer, press **[Esc] [V]**. In this mode, keyboard keys 1, 2, 3, 4, and 5 are substituted for the five pushbuttons on the PDU LCD screen. The various screens are invoked using the same procedure described in Chapter 6, "PDU Operating Instructions."

7.2.2 Profile Log

If a computer operating in terminal mode is connected to the RS-232 port on the PDU, press **[Esc] [P]** to print the entire Profile Log. The printout begins with the oldest monthly entries in the queue and ends with the most recent. Statistics for the current month and past 23 months are displayed.

7.2.3 Event History Log

If a computer operating in terminal mode is connected to the RS-232 port on the PDU, press **[Esc] [H]** to print the entire History Log with a firmware version header. The printout begins with the oldest alarm entry in the queue and ends with the most recent. Any alarms that occur while the History Log is printing are included in chronological order.

The History Log lists up to 127 system events in chronological order with the most recent event listed last. Figure 7-2 shows a sample 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 the following format for printing alarm entries:

MM DD YYYY HH:MM:SS.hhh KYWD MESSAGE <CR> <LF>

Where	Equals
MM	Month (2 digits)
DD	Day (2 digits)
YYYY	Year (4 digits)
HH	Hour (2 digits)
MM	Minute (2 digits)
SS	Second (2 digits)
hhh	Hundredths of Second (3 digits)
KYWD	Keyword (ALARM, NOTICE, COMMAND, or STATUS)
Message	System Diagnostic Information
<CR>	Carriage Return Character (ASCII 13)
<LF>	Line Feed (ASCII 10)

An alarm that clears is prefixed by the word "CLEAR" in the history log.

04/14/2006 04:31:17.310 ALARM: Output Phase Loss 1
 04/14/2006 04:31:17.310 ALARM: Output Phase Loss 2
 04/14/2006 04:31:17.310 ALARM: Output Phase Loss 3
 04/14/2006 04:32:16.595 STATUS: Control Power Status On
 04/14/2006 04:32:16.635 NOTICE: Output AC Under Voltage
 04/14/2006 04:32:16.635 NOTICE: Input AC Under Voltage
 04/14/2006 04:32:16.905 STATUS: Input Switchgear Open
 04/14/2006 04:32:17.710 ALARM: Input Phase Loss 1
 04/14/2006 04:32:17.710 ALARM: Input Phase Loss 2
 04/14/2006 04:32:17.710 ALARM: Input Phase Loss 3
 04/14/2006 04:33:16.995 STATUS: Control Power Status On
 04/14/2006 04:33:17.035 NOTICE: Output AC Under Voltage
 04/16/2006 08:05:36.015 ALARM: Building Alarm 2
 04/16/2006 08:05:36.335 ALARM: Building Alarm 2 Ok
 04/16/2006 08:05:36.035 ALARM: Remote Emergency Power Off
 04/16/2006 08:04:32.475 NOTICE: Output Under Or Over Frequency
 04/16/2006 22:34:00.530 NOTICE: Output AC Under Voltage
 04/16/2006 22:34:00.530 NOTICE: Input AC Under Voltage
 04/16/2006 22:34:00.570 ALARM: Output Phase Loss
 04/16/2006 22:34:00.790 STATUS: Input Switchgear Open
 04/16/2006 22:34:01.620 ALARM: Input Phase Loss 1
 04/16/2006 22:34:01.620 ALARM: Input Phase Loss 2
 04/16/2006 22:34:01.620 ALARM: Input Phase Loss 3
 04/16/2006 22:34:01.620 ALARM: Output Phase Loss 1
 04/16/2006 22:34:01.620 ALARM: Output Phase Loss 2
 04/16/2006 22:34:01.620 ALARM: Output Phase Loss 3
 04/16/2006 22:35:00.875 STATUS: Control Power Status On
 04/17/2006 13:35:01.225 ALARM: Input Phase Loss 1
 04/17/2006 13:35:01.225 ALARM: Input Phase Loss 2
 04/17/2006 13:35:01.225 ALARM: Input Phase Loss 3
 04/17/2006 13:35:00.095 STATUS: Control Power Status On
 04/17/2006 13:35:00.125 ALARM: Output Phase Loss
 04/17/2006 13:35:00.135 NOTICE: Output AC Under Voltage
 04/17/2006 13:35:00.135 NOTICE: Input AC Under Voltage
 04/17/2006 13:35:01.225 ALARM: Input Phase Loss 1
 04/17/2006 13:35:01.225 ALARM: Input Phase Loss 2
 04/17/2006 13:35:01.225 ALARM: Input Phase Loss 3
 04/17/2006 13:35:01.225 ALARM: Output Phase Loss 1
 04/17/2006 13:35:01.225 ALARM: Output Phase Loss 2
 04/17/2006 13:35:01.225 ALARM: Output Phase Loss 3
 04/18/2006 08:05:36.015 ALARM: Building Alarm 1
 04/18/2006 08:05:36.335 ALARM: Building Alarm 1 Ok
 04/18/2006 08:04:32.475 NOTICE: Output Under Or Over Frequency
 04/18/2006 08:04:29.690 ALARM: Remote Emergency Power Off
 04/18/2006 07:36:01.225 ALARM: Input Phase Loss 1
 04/18/2006 07:36:01.225 ALARM: Input Phase Loss 2
 04/18/2006 07:36:01.225 ALARM: Input Phase Loss 3
 04/18/2006 08:05:32.565 STATUS: Control Power Status On

Figure 7-2. Sample History Log

7.3 Modbus Register Mapping

7.3.1 Read Input Status

Modbus Function Code 02
Input registers start at 10000.

Register	Name	Value	Format	Unit
11	System normal	1	BOOL	Status
16	PDU Off	0	BOOL	Status
NOTE Registers 1-16 are mutually exclusive.				
150	Input AC over voltage	0	BOOL	Status
151	Input AC under voltage	0	BOOL	Status
152	Input under or over frequency	0	BOOL	Status
153	Output AC over voltage	0	BOOL	Status
154	Output AC under voltage	0	BOOL	Status
155	Output under or over frequency	0	BOOL	Status
156	Remote emergency power off	0	BOOL	Status
162	Building Alarm 2	0	BOOL	Status
163	Building Alarm 1	0	BOOL	Status
169	Output overload	0	BOOL	Status
241	Emergency shutdown command	0	BOOL	Status
303	Greater than 106% overload on phase A	0	BOOL	Status
304	Greater than 106% overload on phase B	0	BOOL	Status
305	Greater than 106% overload on phase C	0	BOOL	Status
306	Greater than 125% overload on phase A	0	BOOL	Status
307	Greater than 125% overload on phase B	0	BOOL	Status
308	Greater than 125% overload on phase C	0	BOOL	Status
309	Greater than 150% overload on phase A	0	BOOL	Status
310	Greater than 150% overload on phase B	0	BOOL	Status
311	Greater than 150% overload on phase C	0	BOOL	Status
338	Site wiring fault	0	BOOL	Status
345	Transformer Overtemperature	0	BOOL	Status
361	Input breaker failed	0	BOOL	Status

7.3.2 Read Input Registers

Modbus Function Code 04
Input registers start at 30000.

Register	Meter Name	Value	Scale	Unit
4	INPUT VOLTS AB	4875	/10	Volts
5	INPUT VOLTS BC	4915	/10	Volts
6	INPUT VOLTS CA	4895	/10	Volts
19	INPUT CURRENT PHASE A	0	/10	Amps
20	INPUT CURRENT PHASE B	0	/10	Amps
21	INPUT CURRENT PHASE C	0	/10	Amps
22	OUTPUT TRUE POWER	51	/10	kW
23	INPUT TRUE POWER	0	/10	kW
24	OUTPUT APPARENT POWER	51	/10	kVA
25	INPUT APPARENT POWER	0	/10	kVA
26	OUTPUT POWER FACTOR	100	/100	--
27	INPUT POWER FACTOR	0	/100	--
28	OUTPUT FREQUENCY	600	/10	Hz
29	INPUT FREQUENCY	600	/10	Hz
57	INPUT VOLTS PHASE A	2828	/10	Volts
58	INPUT VOLTS PHASE B	2835	/10	Volts
59	INPUT VOLTS PHASE C	2840	/10	Volts
66	LOAD CURRENT PHASE A	138	/10	Amps
67	LOAD CURRENT PHASE B	138	/10	Amps
68	LOAD CURRENT PHASE C	140	/10	Amps
69	LOAD CURRENT PHASE A BAR CHART	2266	/10	Amps
70	LOAD CURRENT PHASE B BAR CHART	2266	/10	Amps
71	LOAD CURRENT PHASE C BAR CHART	2266	/10	Amps
79	OUTPUT VOLTS A	1230	/10	Volts
80	OUTPUT VOLTS B	1223	/10	Volts
81	OUTPUT VOLTS C	1227	/10	Volts
82	NEUTRAL CURRENT	10	/10	Amps

Chapter 8 PDU Maintenance

The components inside the Power Distribution Unit (PDU) 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.

8.1 Important Safety Instructions

The PDU interior is unsafe until AC source power is removed.

 **WARNING**

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

8.2 Performing Preventive Maintenance

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

8.2.1 DAILY Maintenance

Perform the following steps daily:

1. Check the area surrounding the PDU. Verify the area is not cluttered, allowing free access to the unit.
2. Verify the air intakes (vents at top and bottom of front and rear, panel on top) and exhaust opening (on top of the cabinet) are not blocked.
3. Verify the operating environment is within the parameters specified in Chapter 9, “Product Specifications” and paragraph A.1 in Appendix A.
4. Record the check results and any corrective actions in a suitable log.

8.2.2 PERIODIC Maintenance

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

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

8.2.3 ANNUAL Maintenance

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

8.3 Short Circuits

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

8.4 Optional Front Only Service Access Infrared Inspection Ports

Front only service access PDU models that have the optional infrared (IR) Inspection ports allow transformer tap and phase tie point terminal inspection using infrared (IR) temperature measuring equipment. Figure 8-1 shows the port locations and Figure 8-2 shows what areas are visible for measurement.

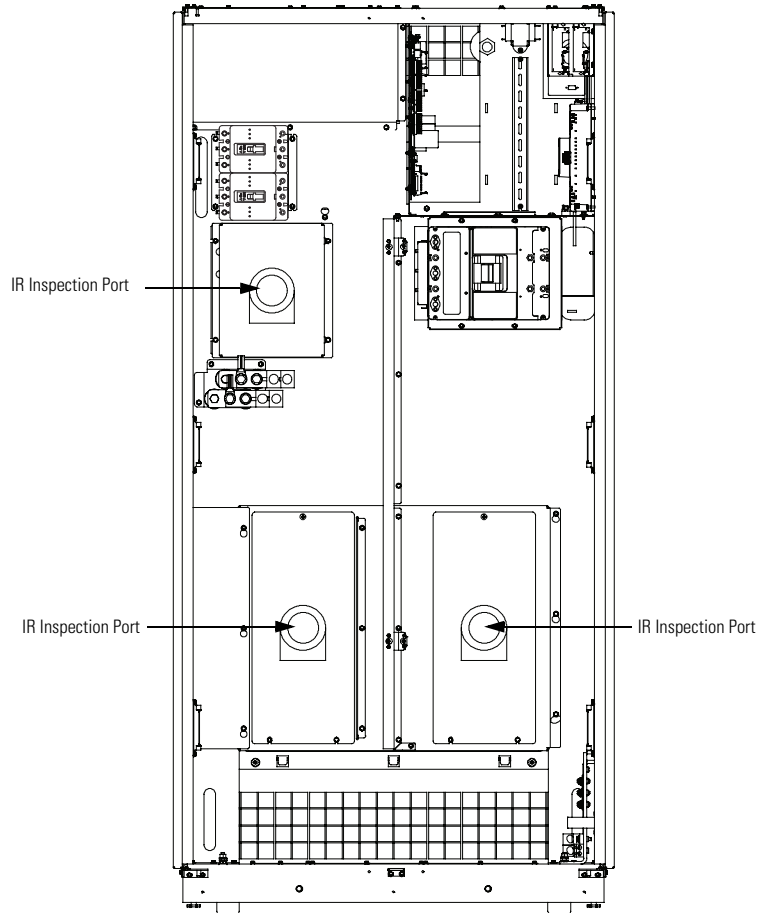
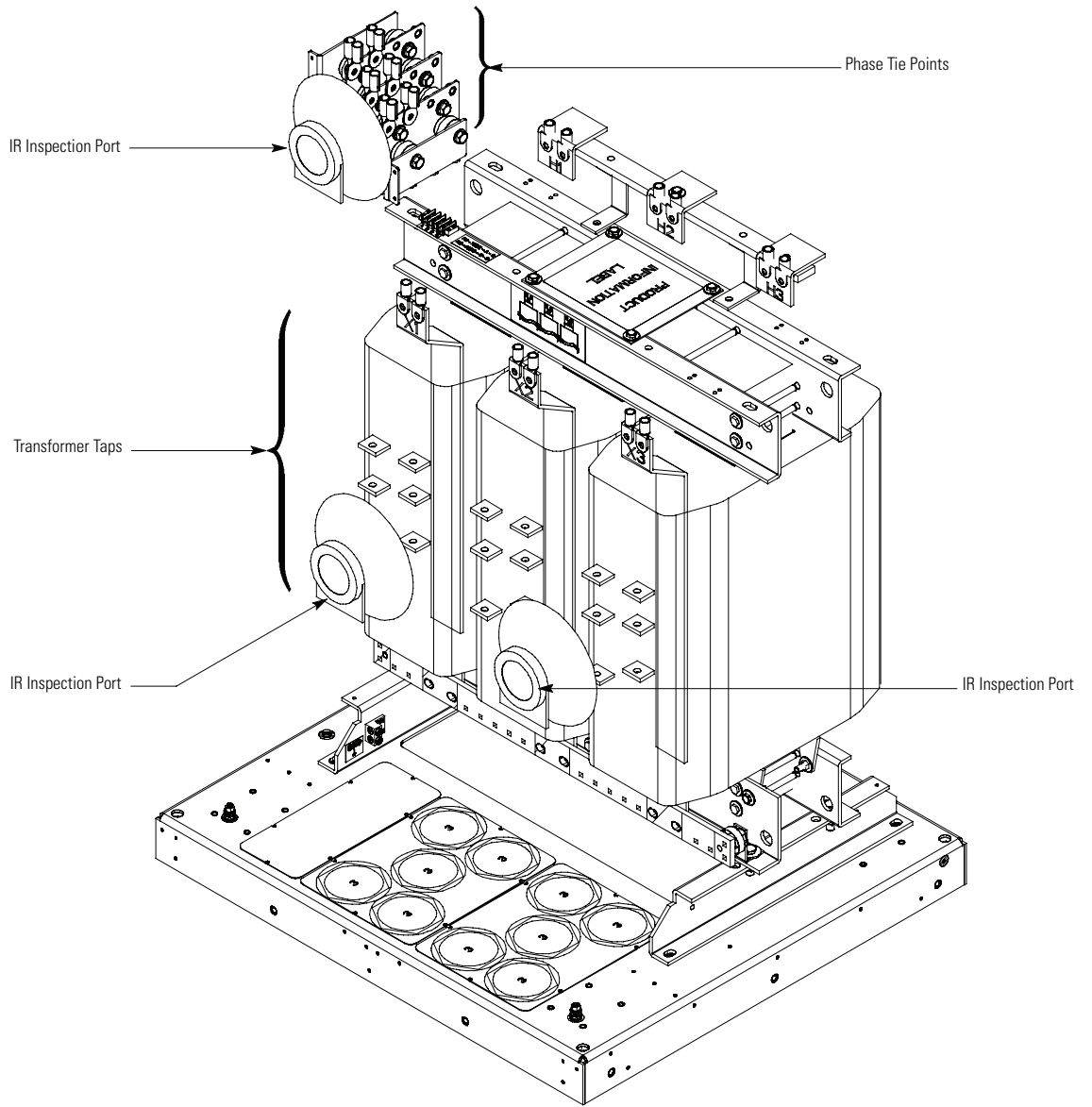


Figure 8-1. Infrared (IR) Inspection Port Locations – Front Only Service Access PDU



NOTE Frame Parts Removed for Clarity.

Figure 8-2. Transformer Tap and Phase Tie Point Terminal Visibility – Front Only Service Access PDU

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Chapter 9 Product Specifications

9.1 Model Number

The Power Distribution Unit (PDU) is housed in a free-standing cabinet with safety shields behind the doors.

Model	Power Rating	Frequency
Eaton 150 kVA Three-Phase Power Distribution Unit	50-150 kVA	60 Hz

9.2 PDU Input

Operating Input Voltage Range	208 Vac nominal (60 Hz) 400 Vac nominal (60 Hz) 480 Vac nominal (60 Hz) 600 Vac nominal (60 Hz)
Input Wiring: 3W + G Operating Frequency Range	60 Hz \pm 5 Hz
Operating Input Current	See Appendix A, Table G through Table L.

9.3 PDU Output

Operating Output Voltage	208/120 Vac nominal
Output Wiring: 4W + G Operating Output Frequency Range	60 Hz \pm 5 Hz
Output Current	See Appendix A, Table G through Table L.

9.4 Environmental Specifications

Operating Temperature	0 to 40°C (32 to 104°F) without derating. The recommended operating temperature is 25°C (77°F).
Operating Altitude	Maximum 1500m (5000 ft) at 40°C without derating
Storage Temperature	-25°C to 60°C (-13°F to 140°F)
Relative Humidity (operating and storage)	10% to 95% maximum noncondensing
Acoustical Noise	Meets or exceeds ANSI C89 standard for transformers
EMI Suppression	Meets FCC Regulation 47, Part 15, for class A devices
Electrostatic Discharge (ESD) – Air Discharge Dielectric Strength	Meets IEC 801-2 specifications. Withstands up to 25 kV pulse without damage and with no disturbance or adverse effect to the critical load.
Agency Marking	US Domestic/Canadian: UL/CSA 60950-1-Ed2

9.5 Optional Surge Protective Devices

Platform	Thermally protected, MOV surge suppressor
Capacity	100 kA/phase (non-EMS monitored) 100 kA/phase (EMS monitored) 200 kA/phase (EMS monitored)
Indicators	Dual-colored indicator lights for each phase protected; audible alarm with silence button (non-EMS monitored)
Noise Attenuation	EMI/RFI filtering, up to 50 dB noise attenuation from 10 kHz to 100 MHz
Safety Conformance	UL 1449 3rd Ed; UL 1283 (Type 2 only)
Relay Contact	Form C relay contact (EMS monitored)

Chapter 10 Warranty

Limited Factory Warranty

Three Phase Eaton Power Distribution Unit (PDU) and Static Switch (STS) Products

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

LIMITED WARRANTY: This limited warranty (this "Warranty") applies only to the original end-user (the "End-User") of the Eaton Three-Phase PDU and STS Products (the "Product") and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Eaton for resale to an End-User. **This warranty is not valid unless a separately purchased Startup service is purchased.**

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

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

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, fire, flood, lightning, vandalism, acts of God, Customer's neglect, abuse, misuse, misapplication, incorrect installation; (d) repair or alteration not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent; or (e) improper testing, operation, maintenance, adjustment, or any modification of any kind not authorized in writing by Eaton personnel or performed by an authorized Eaton Customer Service Engineer or Agent.

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

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

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

END-USER'S OBLIGATIONS: In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way, follow the Product's user's guide, and protect against further damage to the Product if there is a covered defect.

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

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

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

Appendix A Installation Reference

The information in this appendix will help you plan for and install the Eaton 150 kVA Three-Phase Power Distribution Unit (Eaton 150 kVA PDU). This appendix contains the following information:

- Physical features and requirements, including dimensions
- Oneline drawings and distribution panel schematic
- Power wiring installation notes
- Location of conduit and wire entry landing plates
- Location of power terminals
- Interface wiring notes, including terminal locations
- Optional Remote Emergency Power-off (REPO)
- Optional floorstand
- Optional air skirt

A.1 Power Distribution Unit Physical Features and Requirements

1. The Power Distribution Unit (PDU) is palletted for shipping.
2. Do not tilt the PDU cabinet more than 10° from vertical or the cabinet may tip over.
3. Dimensions are in millimeters [inches].
4. The PDU equipment operating environment for the installed PDU configuration must meet the weight requirements shown in Table A or Table B and size requirements shown in Figure A-5 through Figure A-18

Table A. Equipment Weight – Standard Service Access PDUs

Component	Rating kVA	Maximum Weight kg (lb)		
		Shipping	Installed	Point Loading
PDU	150	1299 (2864)	1262 (2782)	4 at 316 (696)
PDU with single front-facing sidecar	150	1569 (3460)	1515 (3339)	4 at 379 (835)
PDU with single side-facing sidecar	150	1491 (3286)	1439 (3194)	4 at 360 (799)
PDU with dual front-facing sidecar	150	1840 (4056)	1767 (3896)	4 at 442 (974)
PDU with dual side-facing sidecar	150	1682 (3708)	1636 (3606)	4 at 409 (902)
PDU with single front-facing sidecar and single side-facing sidecar	150	1761 (3882)	1701 (3751)	4 at 425 (938)
PDU with dual input sidecar	150	1508 (3324)	1453 (3203)	4 at 363 (801)
PDU with dual input sidecar and single front-facing sidecar	150	1778 (3920)	1706 (3760)	4 at 427 (940)
PDU with dual input sidecar and single side-facing sidecar	150	1699 (3746)	1640 (3615)	4 at 410 (904)

Table B. Equipment Weight – Front Service Access PDUs

Component	Rating kVA	Maximum Weight kg (lb)		
		Shipping	Installed	Point Loading
PDU	150	1207 (2662)	1170 (2580)	4 at 293 (645)
PDU with single front-facing sidecar	150	1478 (3258)	1423 (3137)	4 at 356 (784)
PDU with single side-facing sidecar	150	1399 (3084)	1357 (2992)	4 at 339 (748)
PDU with dual front-facing sidecar	150	1748 (3854)	1676 (3694)	4 at 419 924)
PDU with dual side-facing sidecar	150	1590 (3506)	1544 (3404)	4 at 386 (851)
PDU with single front-facing sidecar and single side-facing sidecar	150	1669 (3680)	1610 (3549)	4 at 403 (887)
PDU with dual input sidecar	N/A	N/A	N/A	N/A
PDU with dual input sidecar and single front-facing sidecar	150	1686 (3718)	1614 (3558)	4 at 404 (890)
PDU with dual input sidecar and single side-facing sidecar	150	1608 (3554)	1548 (3413)	4 at 387 (853)

5. The recommended clearances around the PDU cabinet are shown in Table C and Table D. Side clearances are based on the assumption that the doors do not need to be opened beyond 90° and can be removed if additional service clearance is needed.

Table C. Clearances for Standard PDU Front/Rear Access Cabinet

PDU Configuration	Top	Front	Rear	Left or Right Side (with side car)	Left or Right Side (no side car)
Side access on both sides, no sidecars			4" ventilation	N/A	42" for working space
No side access, no side cars	18" for ventilation	42" working space	42" working space	N/A	None required
With side facing side car (either side)			42" working space	42" working space for side car	None required
With front facing side car (either side)			42" working space	None required	None required

Table D. Clearances for PDU Front Access Only Cabinet

PDU Configuration	Top	Front	Rear	Left or Right Side (with side car)	Left or Right Side (no side car)
With side facing side car (either side)	18" for ventilation	42" working space	4" ventilation	42" working space for sidecar	None Required
With front facing side car (either side)				None required	

6. The basic environmental requirements for PDU operation are:
- Ambient Temperature Range: 0–40°C (32–104°F)
 - Recommended Operating Range: 20–25°C (68–77°F)
 - Maximum Relative Humidity: 95%, non-condensing

The PDU cooling requirements are shown in Table E.

Table E. PDU Cooling Requirements During Full Load Operation

Rating		Voltage		Heat Rejection		
kVA	K-factor	Input	Output	Watts	BTU/hr	Kg-cal/hr
50	13	208	208/120	1413	4821	1215
		400	208/120	1370	4676	1178
		480	208/120	1420	4846	1221
		600	208/120	1392	4750	1197
	20	208	208/120	1406	4798	1209
		400	208/120	1392	4748	1196
		480	208/120	1412	4818	1214
		600	208/120	1374	4688	1181
75	13	208	208/120	1542	5203	1326
		400	208/120	1670	5697	1436
		480	208/120	1759	6002	1512
		600	208/120	1542	5263	1326
	20	208	208/120	1564	5335	1344
		400	208/120	1702	5806	1463
		480	208/120	1662	5672	1429
		600	208/120	1564	5335	1344
100	13	208	208/120	2420	8258	2081
		400	208/120	2420	8258	2081
		480	208/120	2451	8363	2107
		600	208/120	2399	8185	2063
	20	208	208/120	2161	7374	1858
		400	208/120	1993	6800	1714
		480	208/120	1660	5664	1427
		600	208/120	1876	6401	1613
125	13	208	208/120	2721	9284	2340
		400	208/120	2912	9935	2504
		480	208/120	2762	9425	2375
		600	208/120	2525	8616	2171
	20	208	208/120	2882	9833	2478
		400	208/120	2568	8762	2208
		480	208/120	2726	9302	2344
		600	208/120	2612	8911	2246
150	13	208	208/120	3297	11250	2835
		400	208/120	3155	10764	2712
		480	208/120	3296	11248	2834
		600	208/120	3213	10962	2762
	20	208	208/120	4480	15288	3853
		400	208/120	3425	11685	2945
		480	208/120	3311	11297	2847
		600	208/120	3182	10858	2736

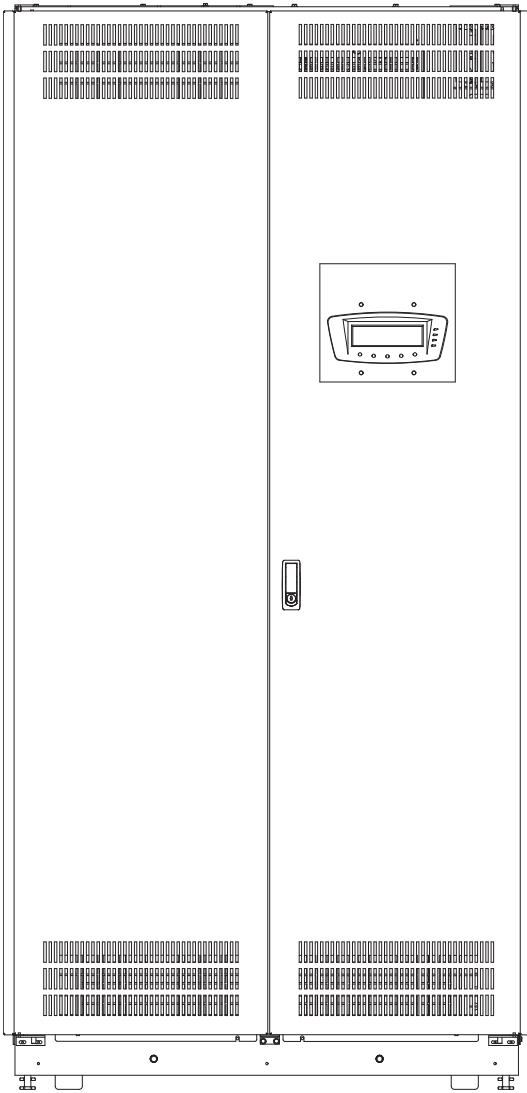


Figure A-1. Eaton 150 kVA PDU

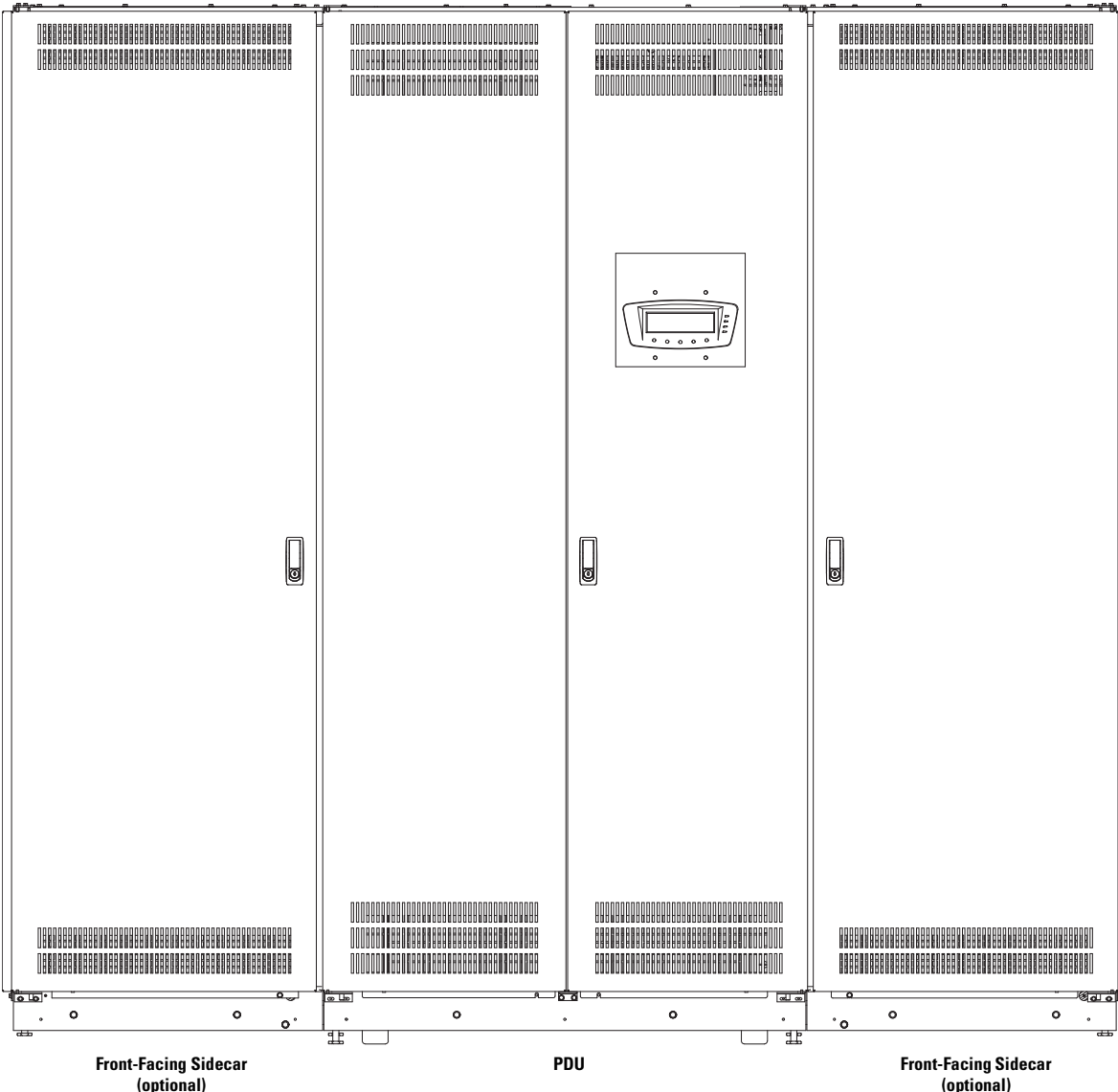


Figure A-2. Eaton 150 kVA PDU with Front-Facing Sidecars

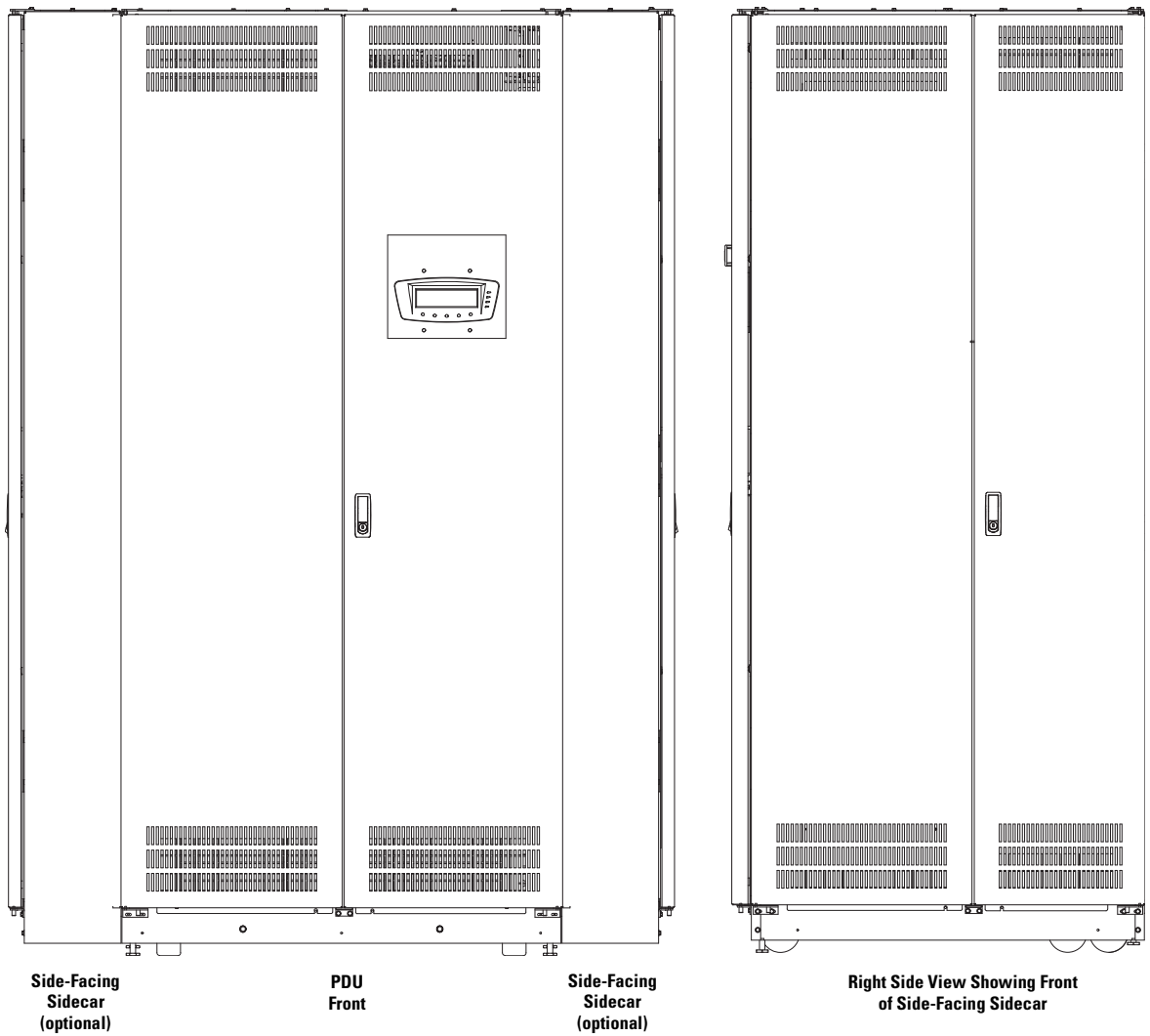


Figure A-3. Eaton 150 kVA PDU with Side-Facing Sidecars

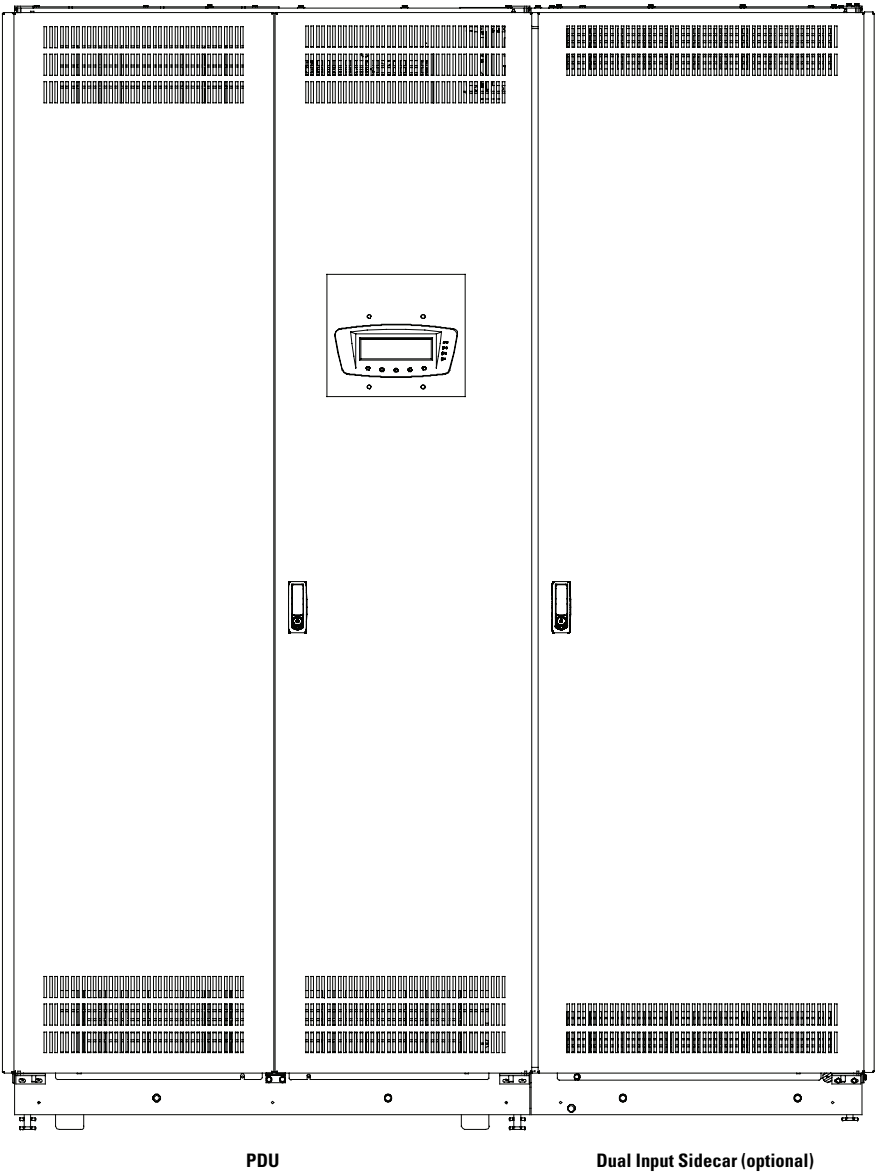
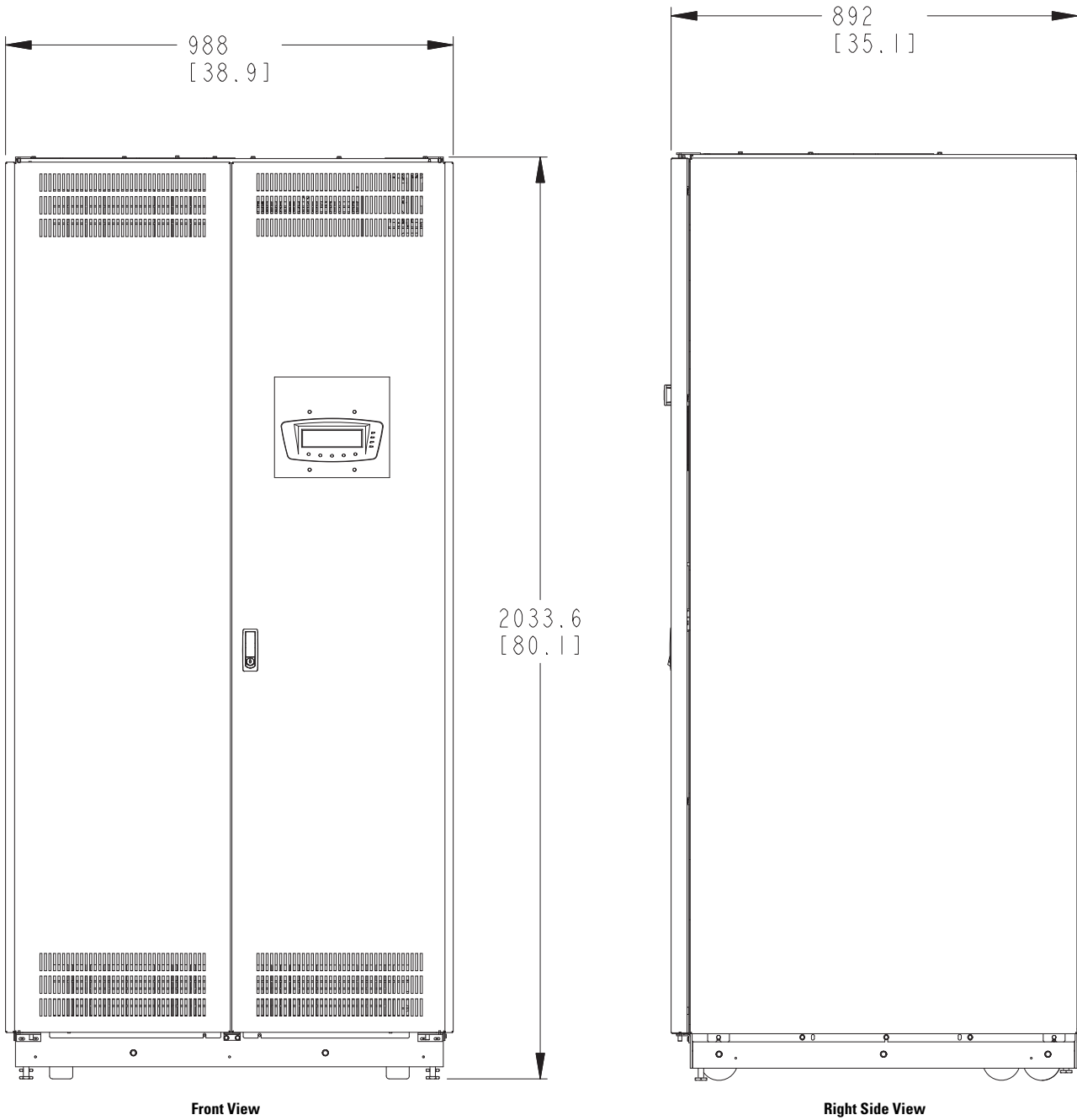
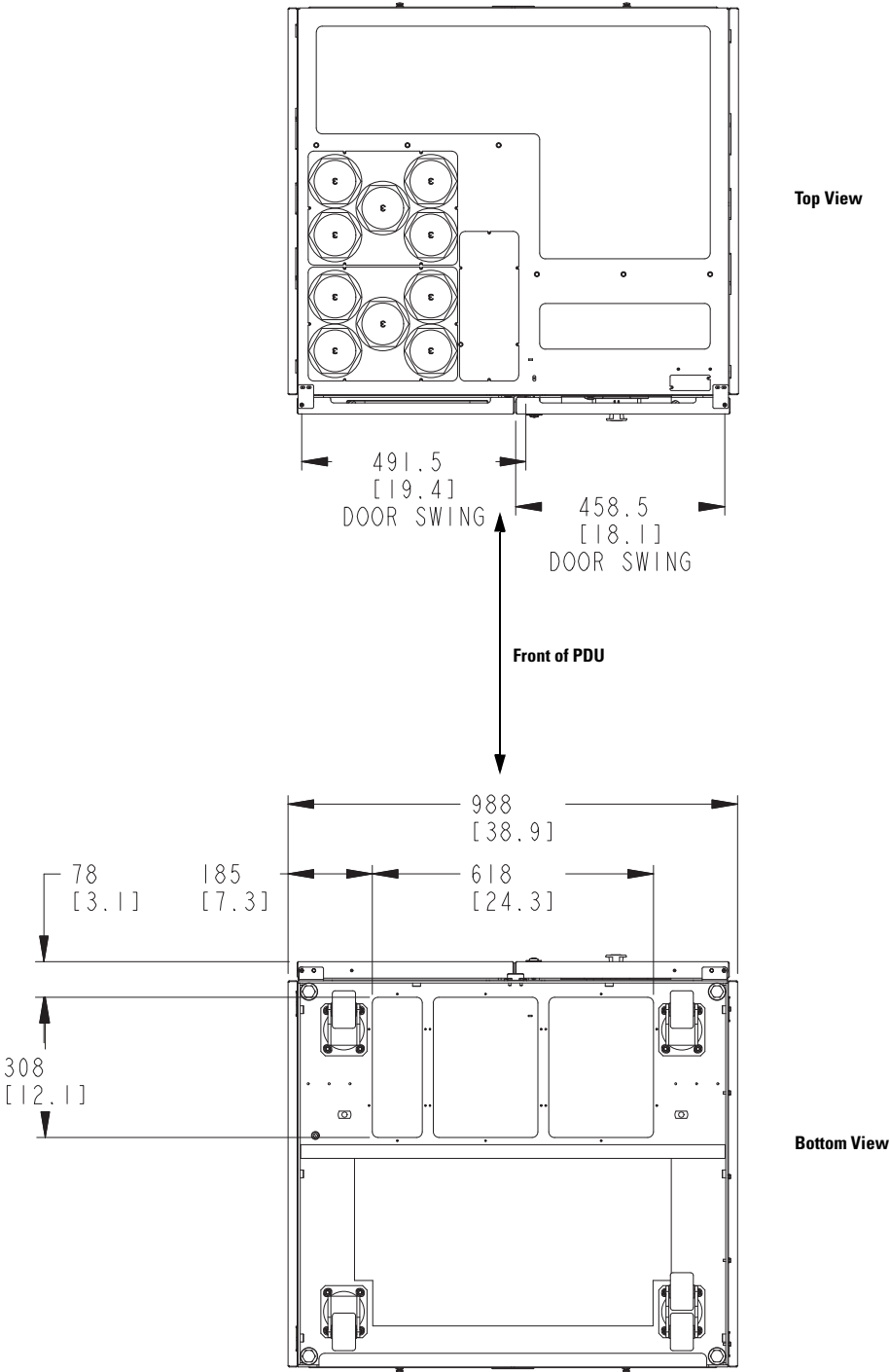


Figure A-4. Eaton 150 kVA PDU with Dual Input Sidecar



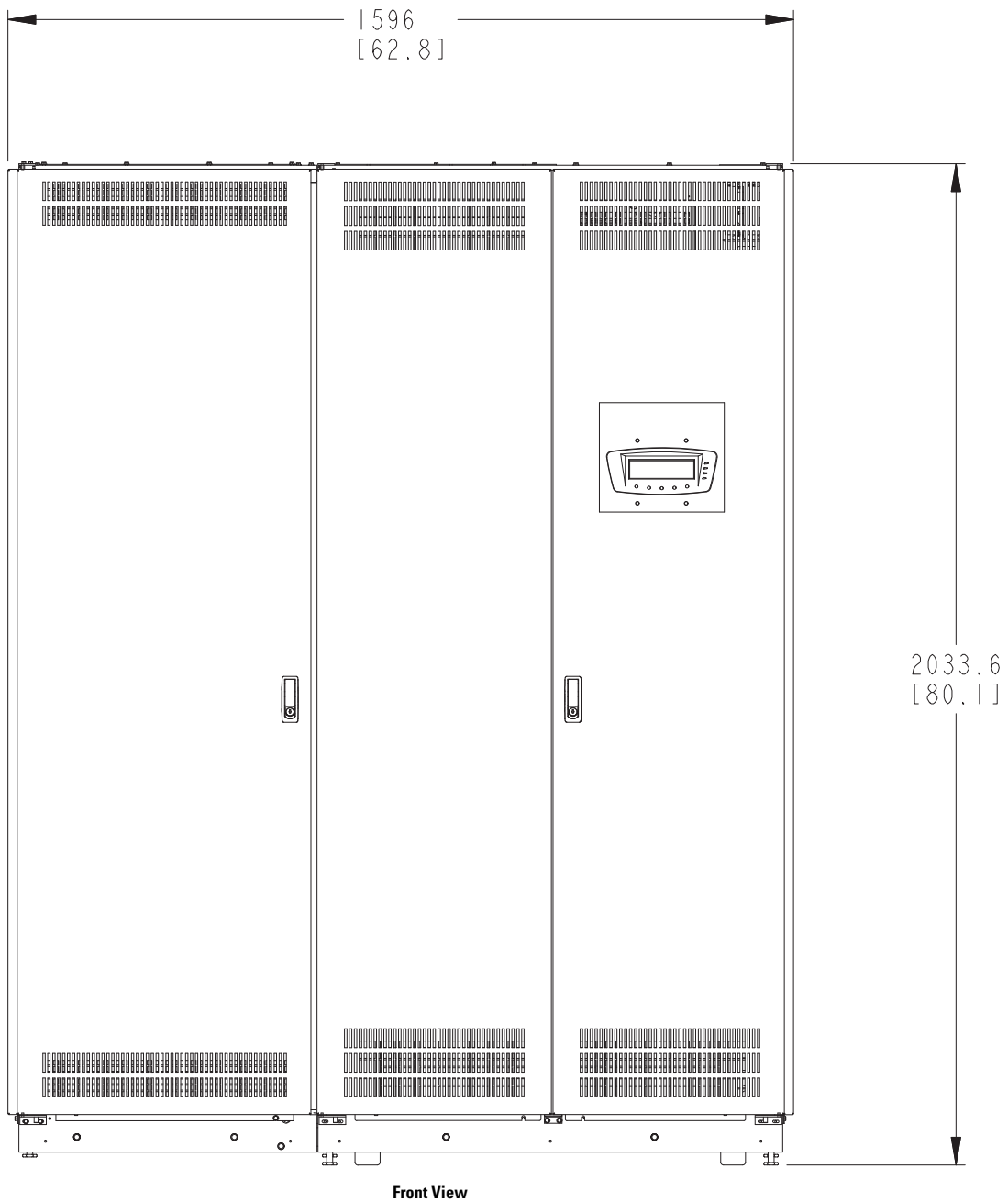
Dimensions are in millimeters (Inches).

Figure A-5. PDU Dimensions – Front and Right Side View



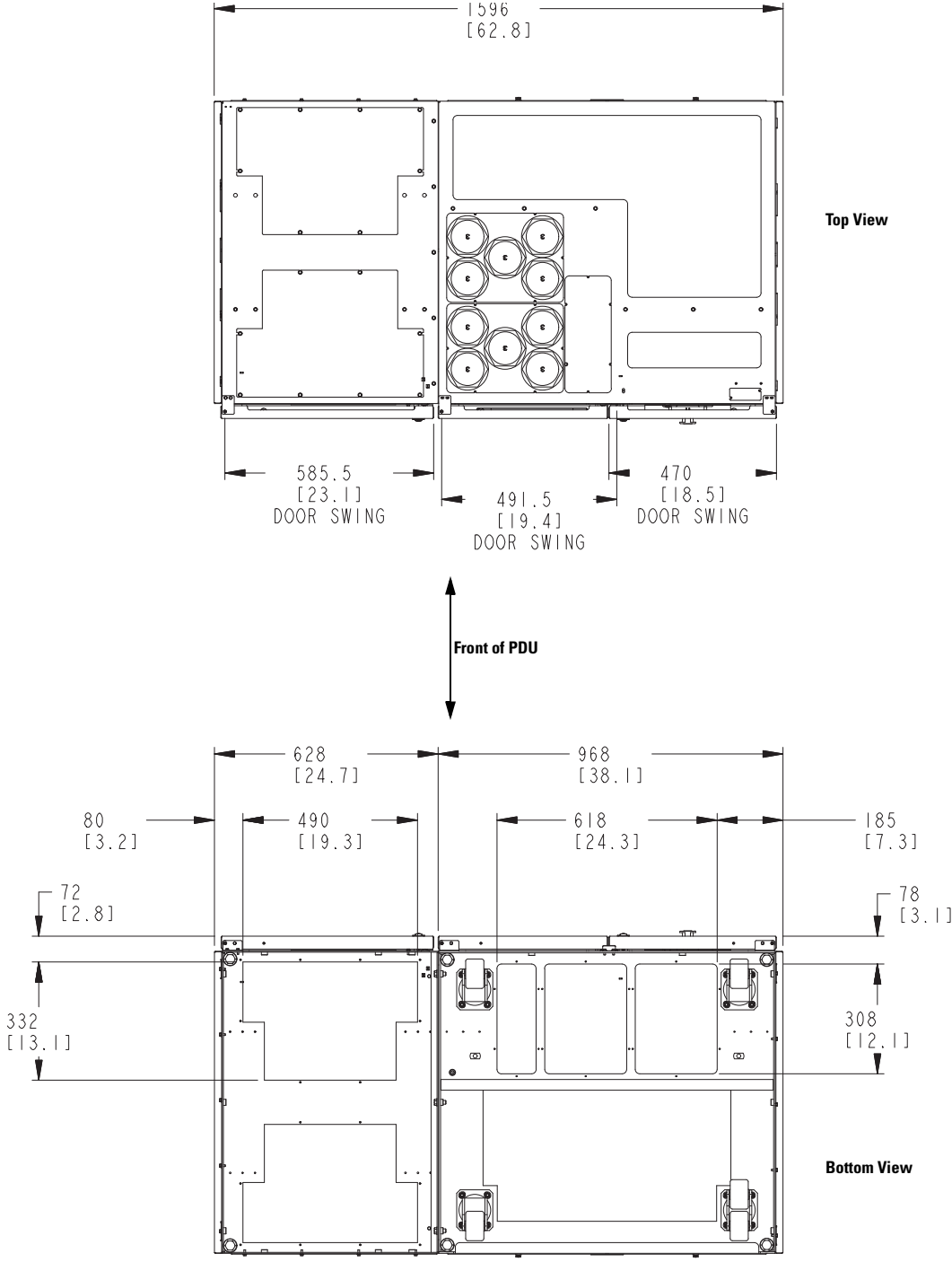
Dimensions are in millimeters (Inches).

Figure A-6. PDU Dimensions – Top and Bottom View



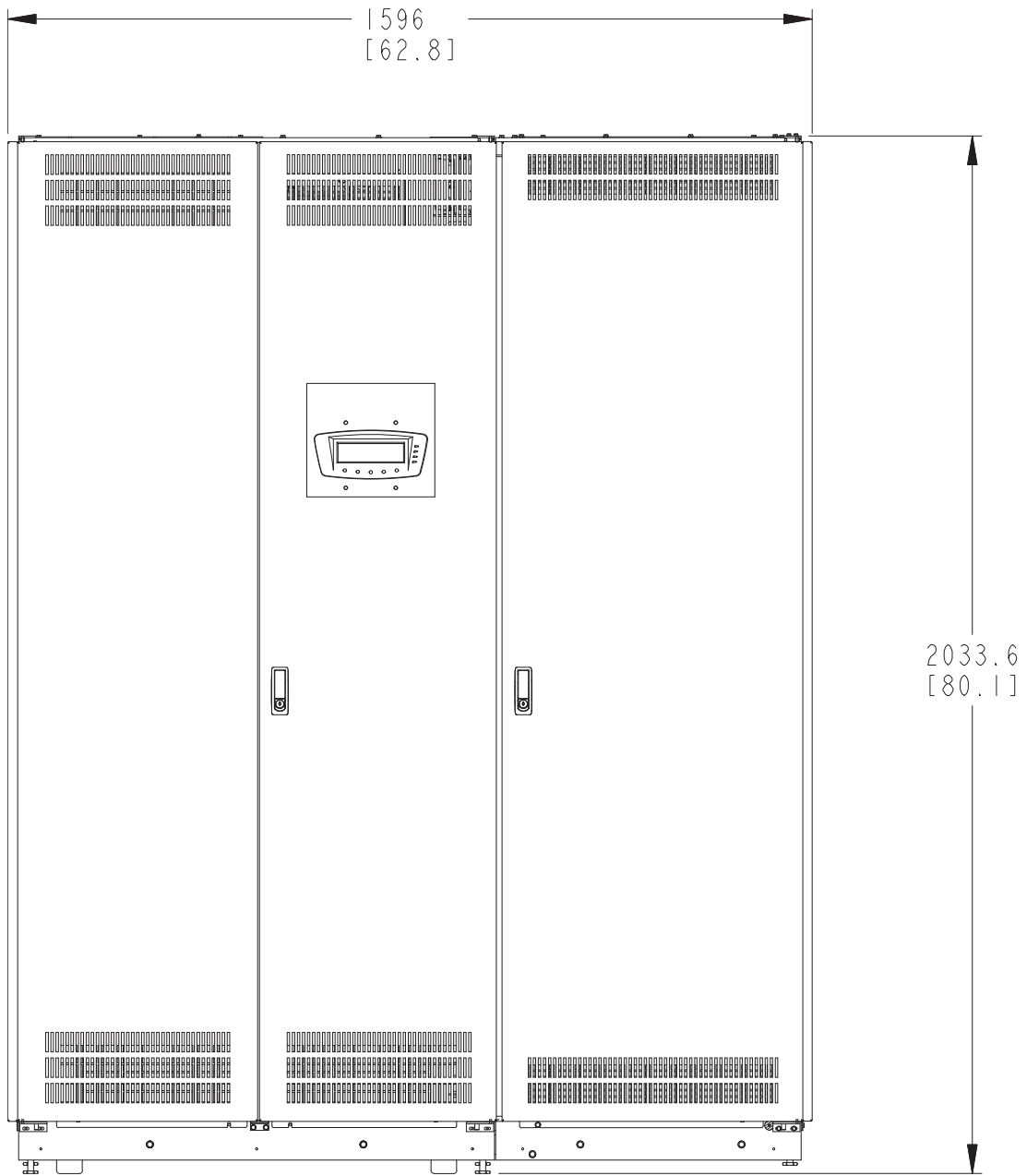
Dimensions are in millimeters (Inches).

Figure A-7. PDU Dimensions – Front View with Left Front-Facing Sidecar



Dimensions are in millimeters (Inches).

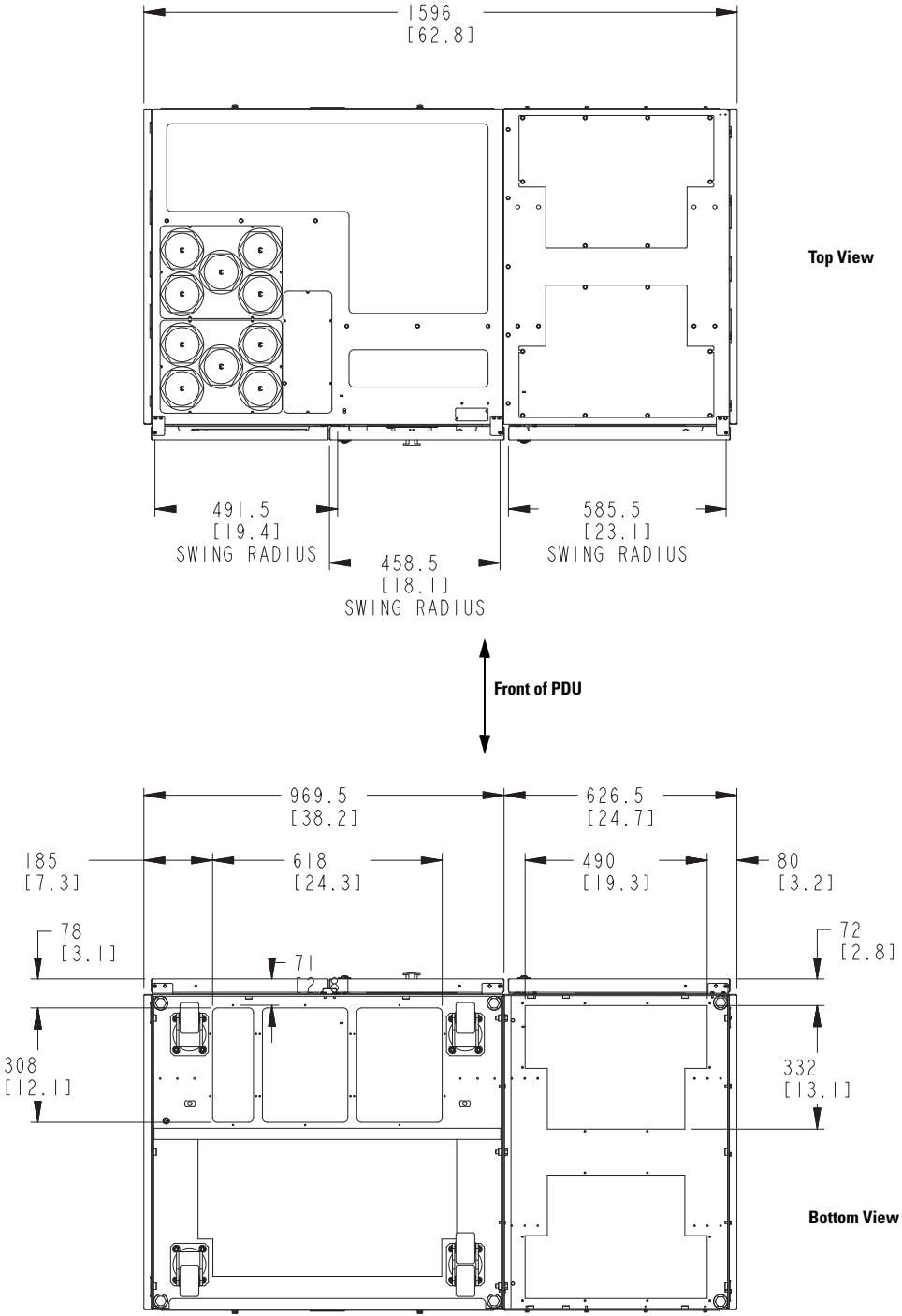
Figure A-8. PDU Dimensions – Top and Bottom View with Left Front-Facing Sidecar



Front View

Dimensions are in millimeters (Inches).

Figure A-9. PDU Dimensions – Front View with Right Front-Facing Sidecar or Dual Input Sidecar



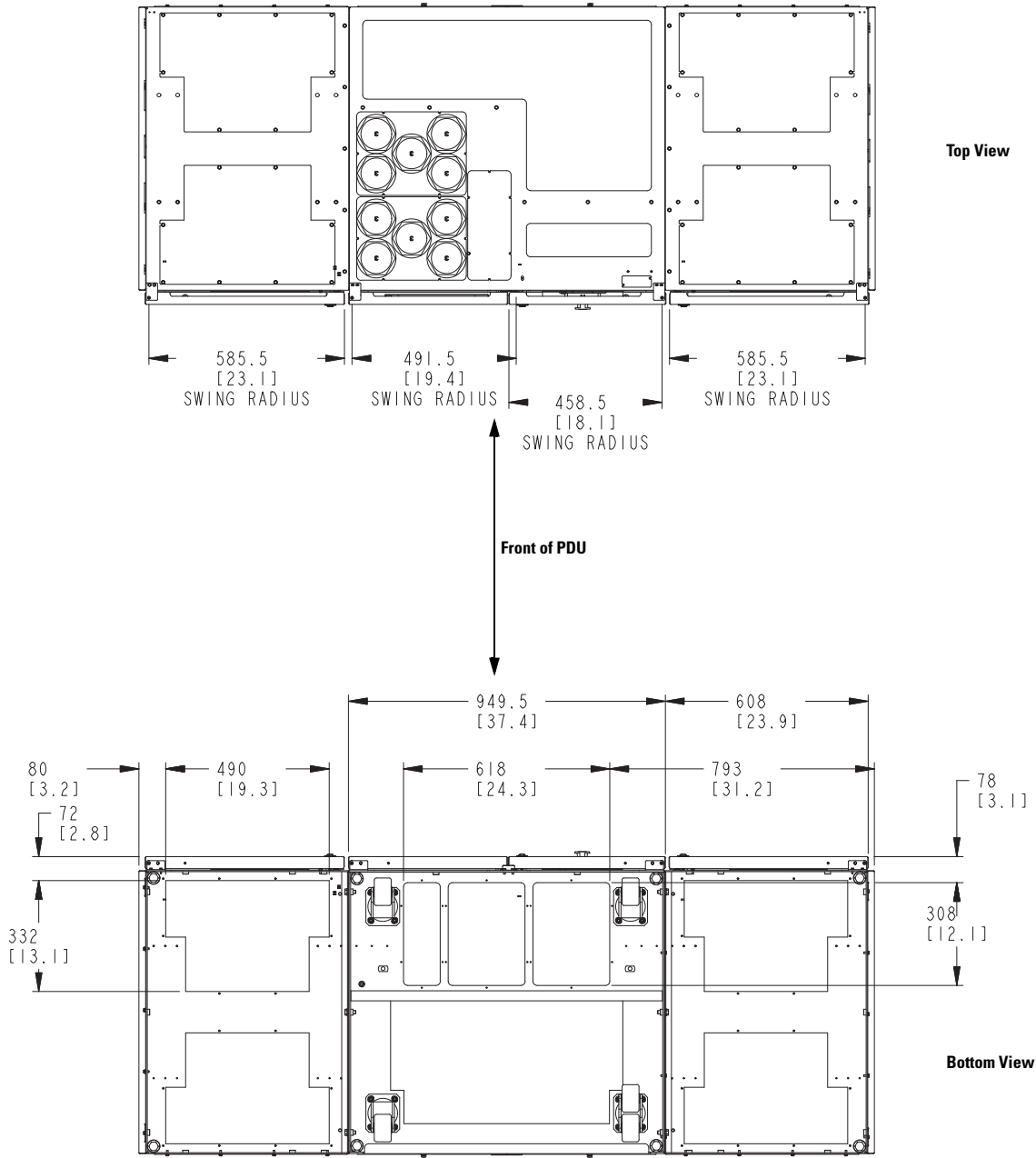
Dimensions are in millimeters (Inches).

Figure A-10. PDU Dimensions – Top and Bottom View with Right Front-Facing Sidecar or Dual Input Sidecar



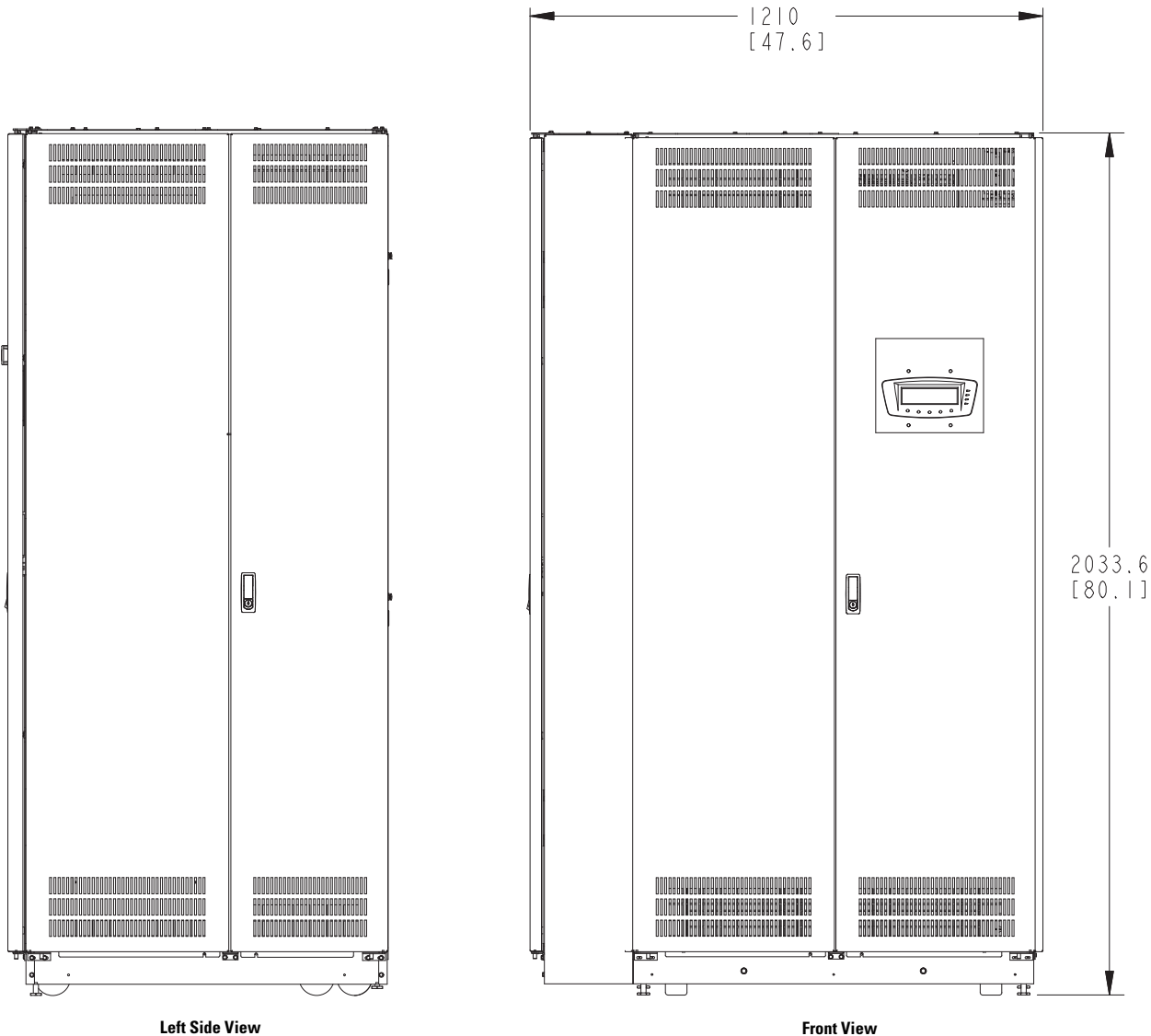
Dimensions are in millimeters (Inches).

Figure A-11. PDU Dimensions – Front View with Left and Right Front-Facing Sidecars



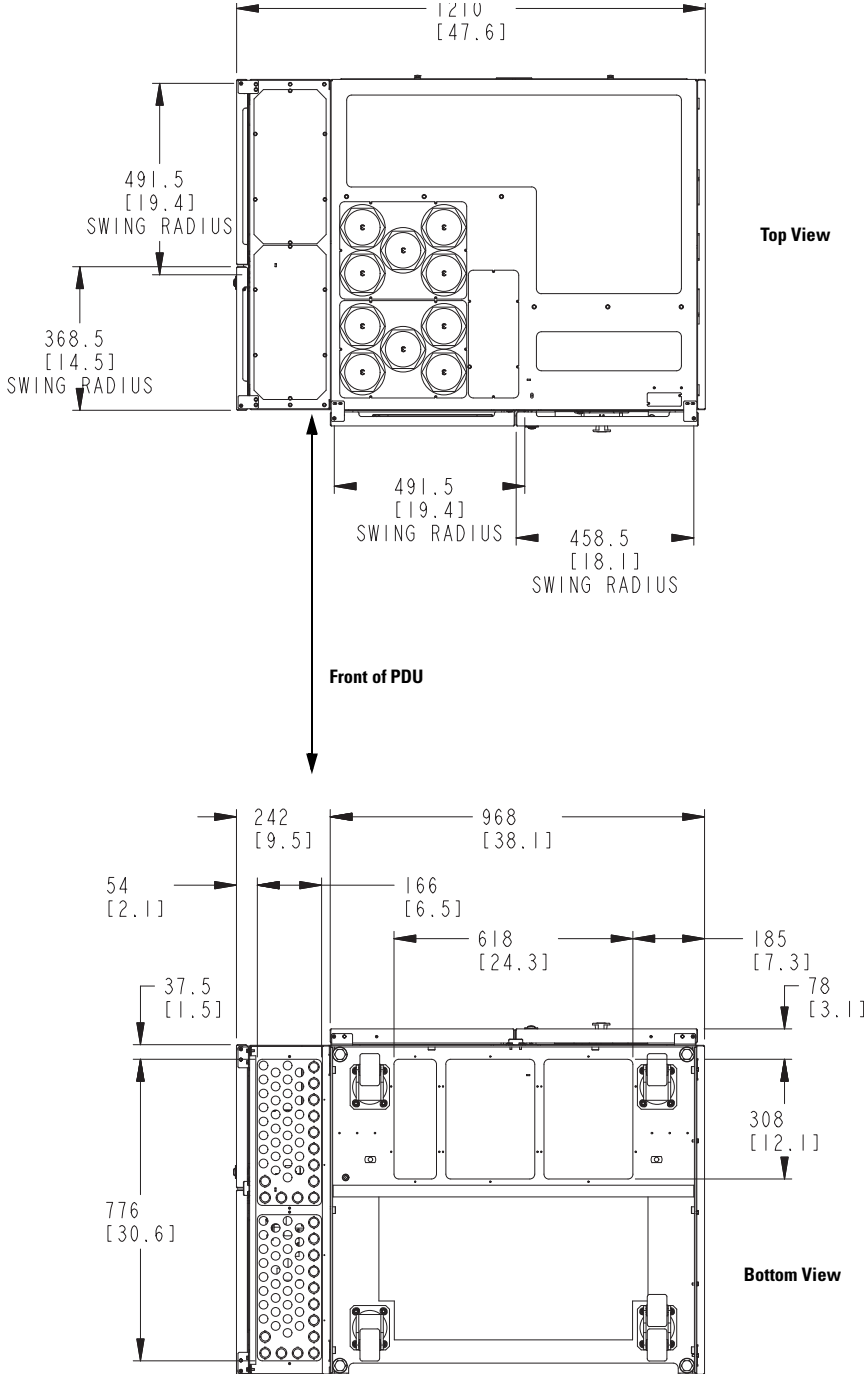
Dimensions are in millimeters (Inches).

Figure A-12. PDU Dimensions – Top and Bottom View with Left and Right Front-Facing Sidecar



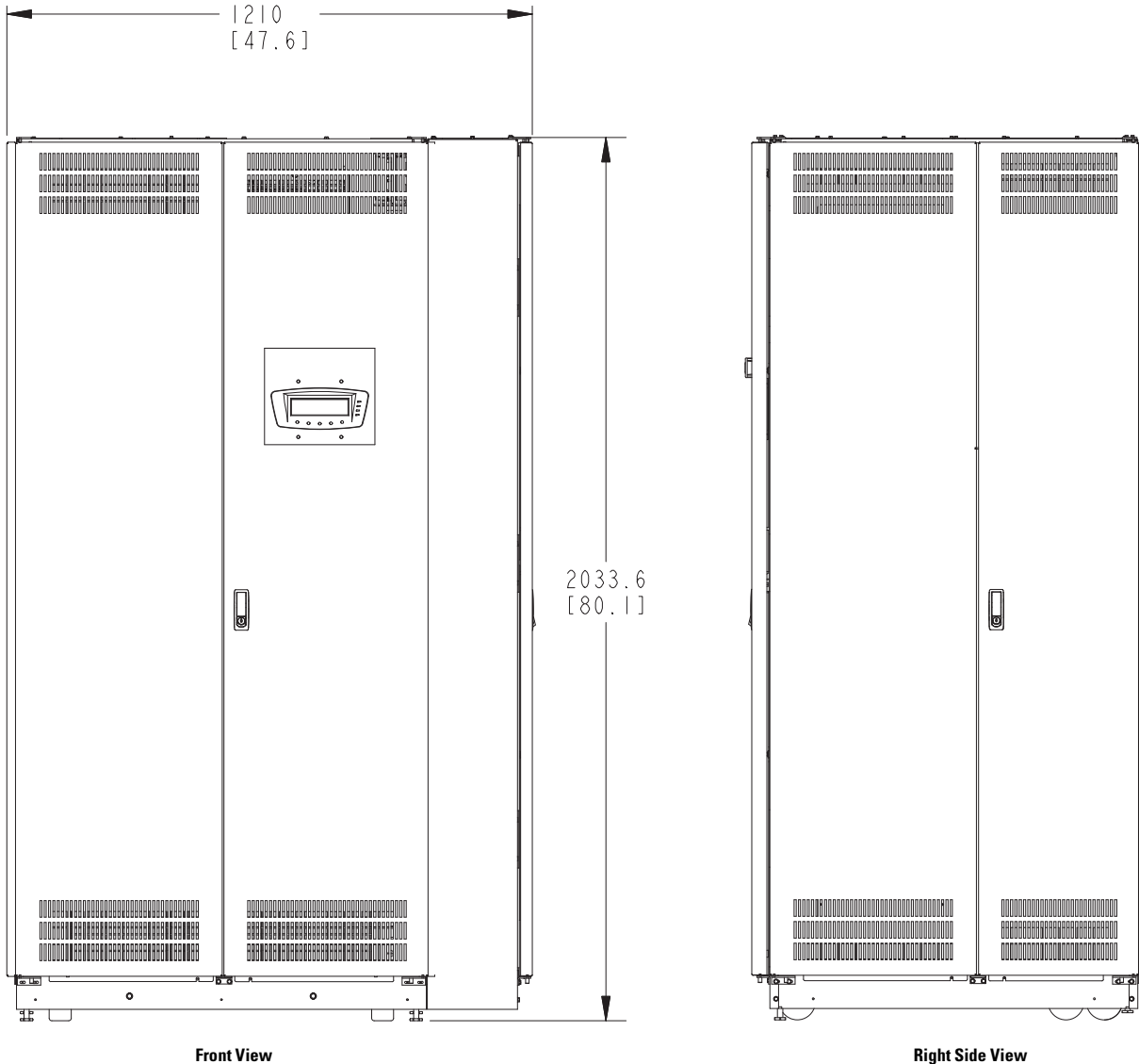
Dimensions are in millimeters (Inches).

Figure A-13. PDU Dimensions – Front View with Left Side-Facing Sidecar



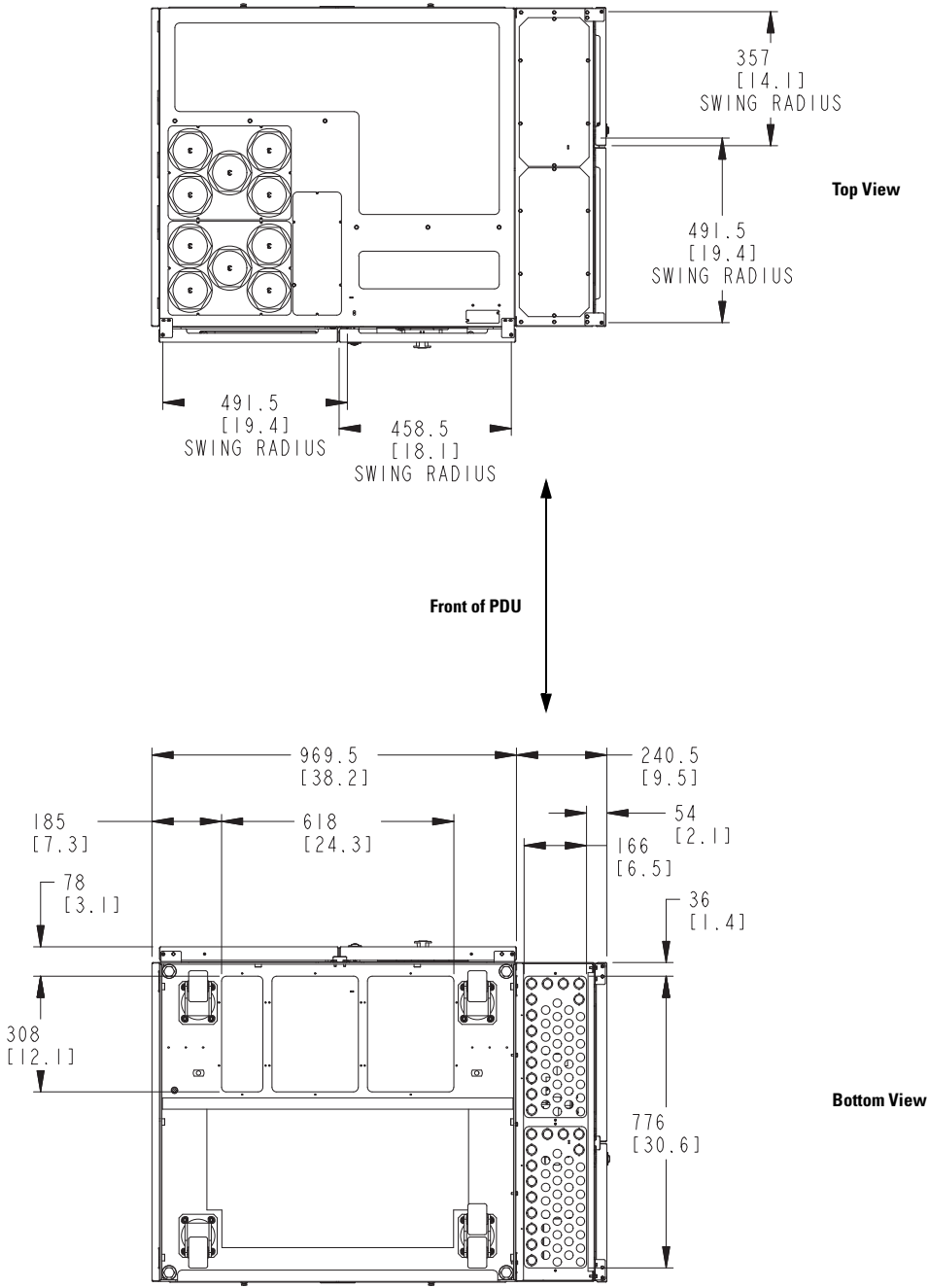
Dimensions are in millimeters (Inches).

Figure A-14. PDU Dimensions – Top and Bottom View with Left Side-Facing Sidecar

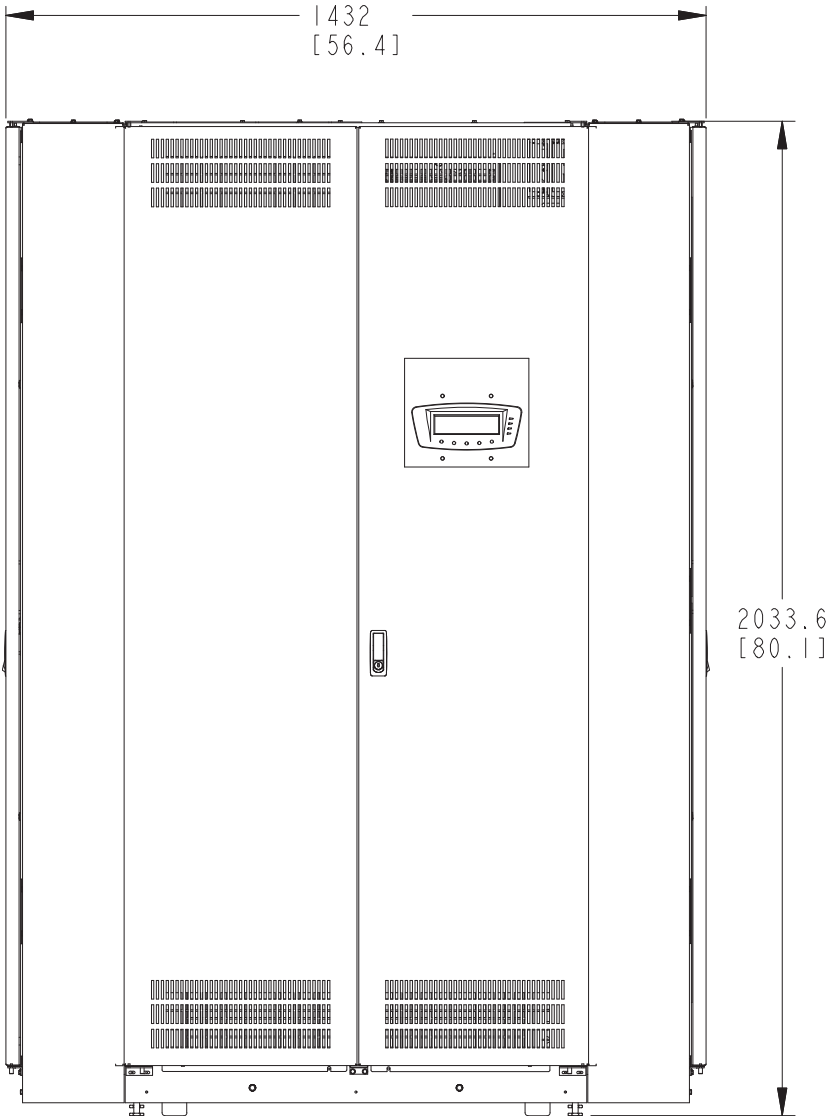


Dimensions are in millimeters (Inches).

Figure A-15. PDU Dimensions – Front View with Right Side-Facing Sidocar



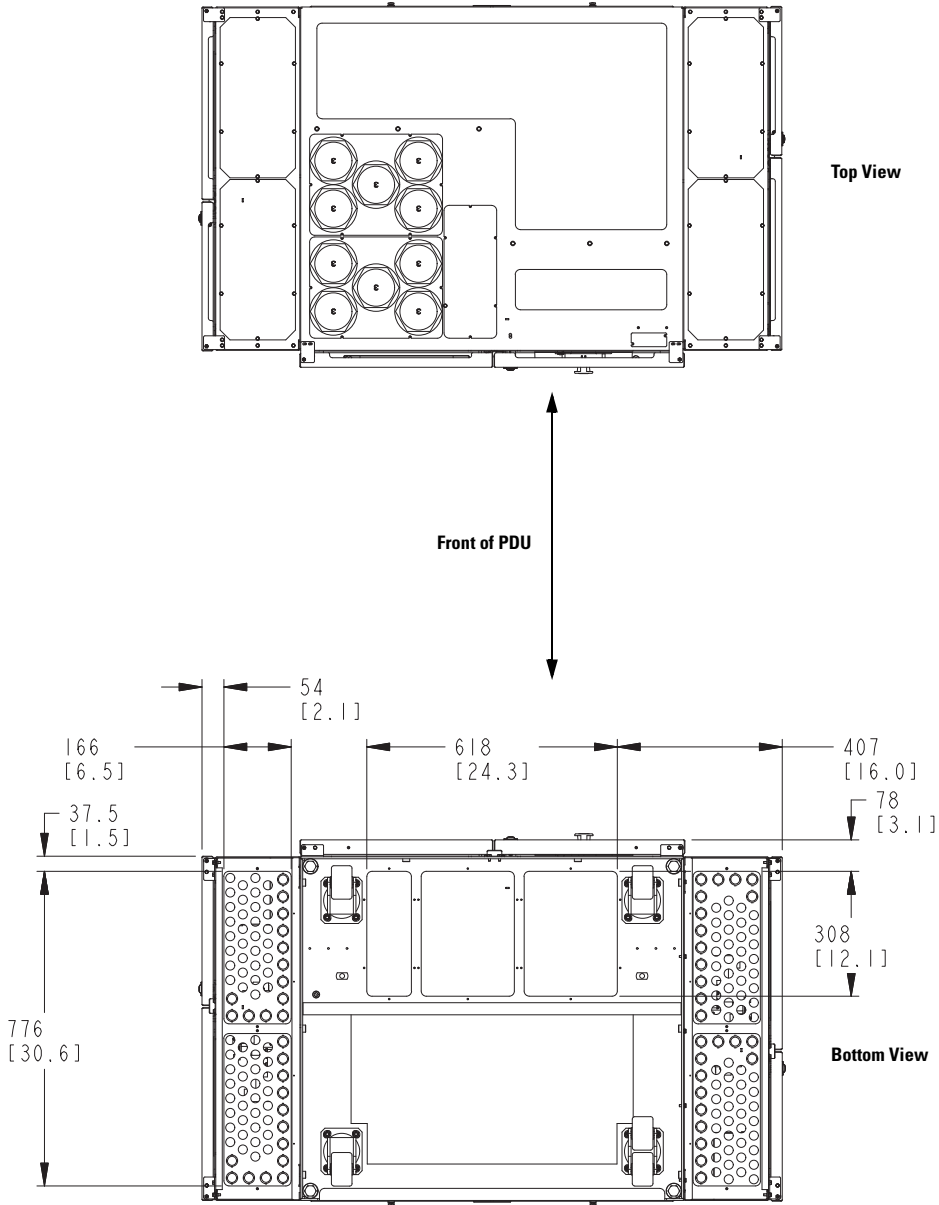
Dimensions are in millimeters (Inches).
Figure A-16. PDU Dimensions – Top and Bottom View with Right Side-Facing Sidecar



Front View

Dimensions are in millimeters (Inches).

Figure A-17. PDU Dimensions – Front View with Left and Right Side-Facing Sidecars



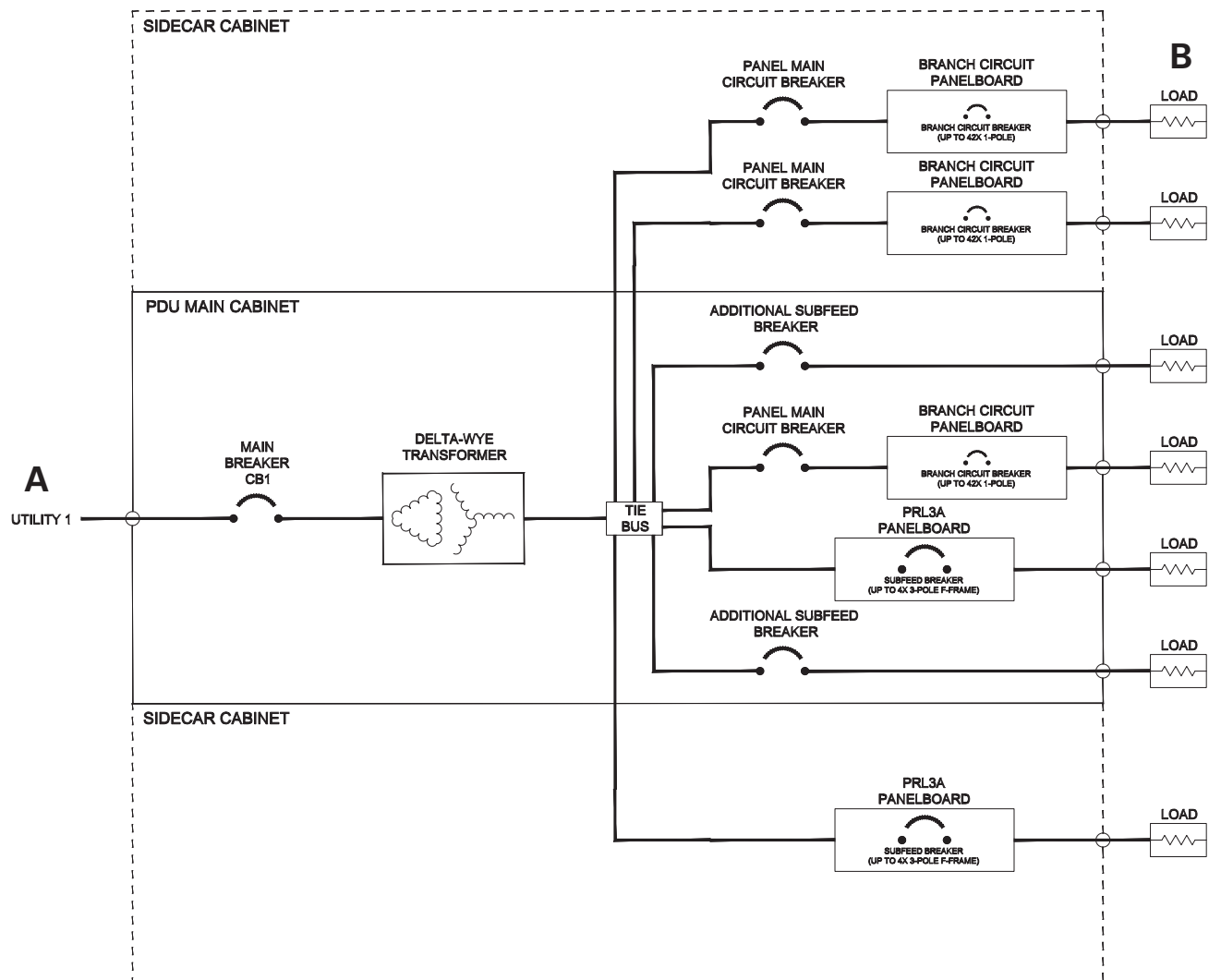
Dimensions are in millimeters (Inches).

Figure A-18. PDU Dimensions – Top and Bottom View with Left and Right Side-Facing Sidecars

A.2 Oneline Drawings and Schematic

Table F. Eaton 150 kVA PDU Oneline Configurations

Oneline Drawing or Schematic	Rating	Vin	Vout	System Type
Figure A-19	50-150 kVA	208	208/120	PDU with single input and two sidecars
		380		
		400		
		415		
		480		
		600		
Figure A-20	50-150 kVA	208	208/120	PDU with dual input sidecar and breaker sidecar
		380		
		400		
		415		
		480		
		600		
Figure A-21	50-150 kVA	208	208/120	PDU with Dual Sidecars and Single Input - Front Access Only
		380		
		400		
		415		
		480		
		600		
Figure A-22	50-150 kVA	208	208/120	PDU with Single Sidecar and Dual Input - Front Access Only
		380		
		400		
		415		
		480		
		600		
Figure A-23	50-150 kVA	208	208/120	Distribution panel schematic
		380		
		400		
		415		
		480		
		600		



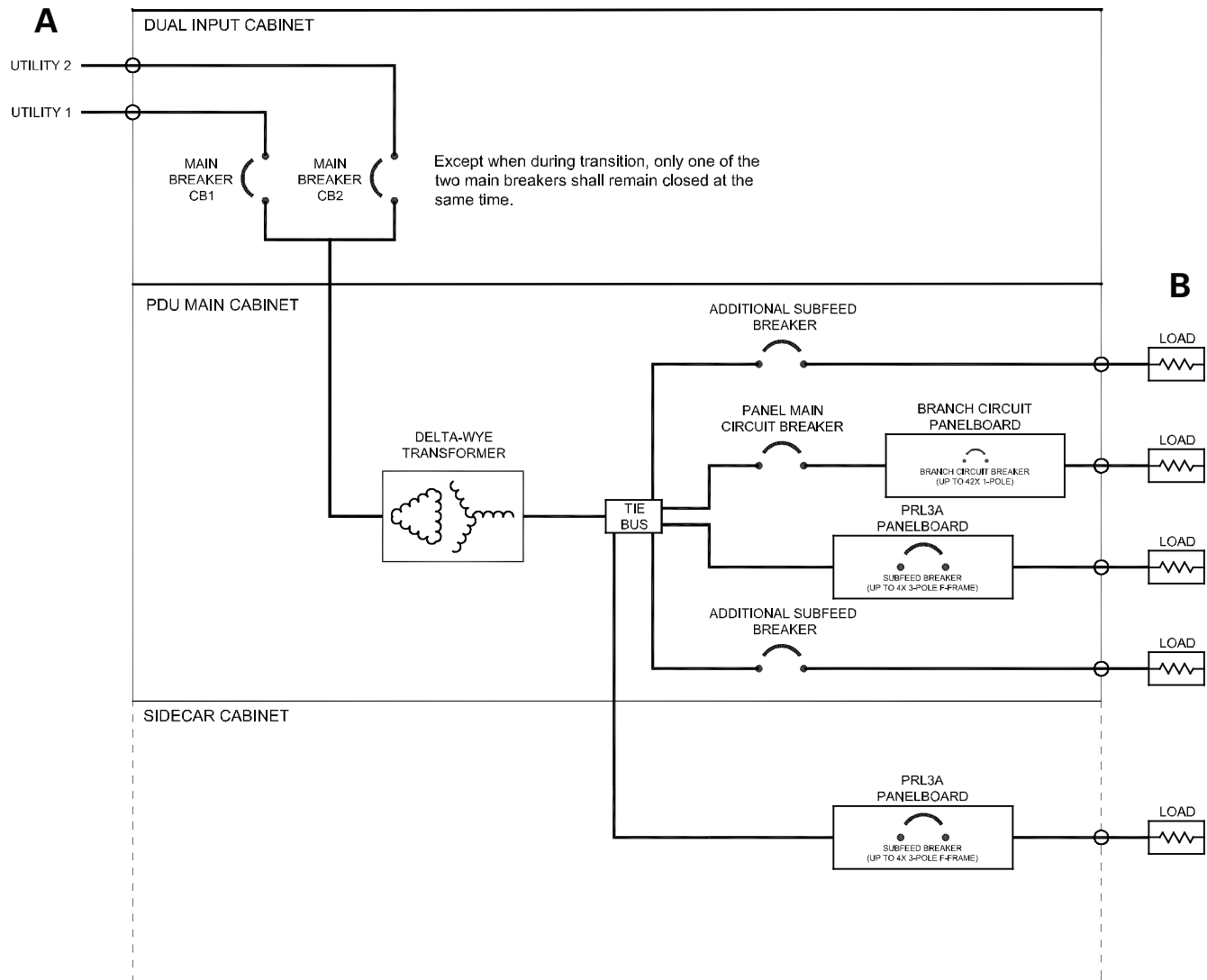
NOTE The main cabinet of the PDU is configurable for up to two branch circuit panelboards, up to two PRL3a panelboards, one branch circuit panelboard and one PRL3a panelboard.

NOTE In addition to distribution through panelboard, up to two 3-pole F-frame unmonitored subfeed breakers can be installed in the main cabinet.

NOTE Up to two sidecars can be added for single input PDU. Each sidecar is capable of mounting up to two branch circuit panelboards or one PRL3a panelboard.

Callout letters **A** and **B** map to Table G through Table L.

Figure A-19. Single Input PDU with Two Sidecars



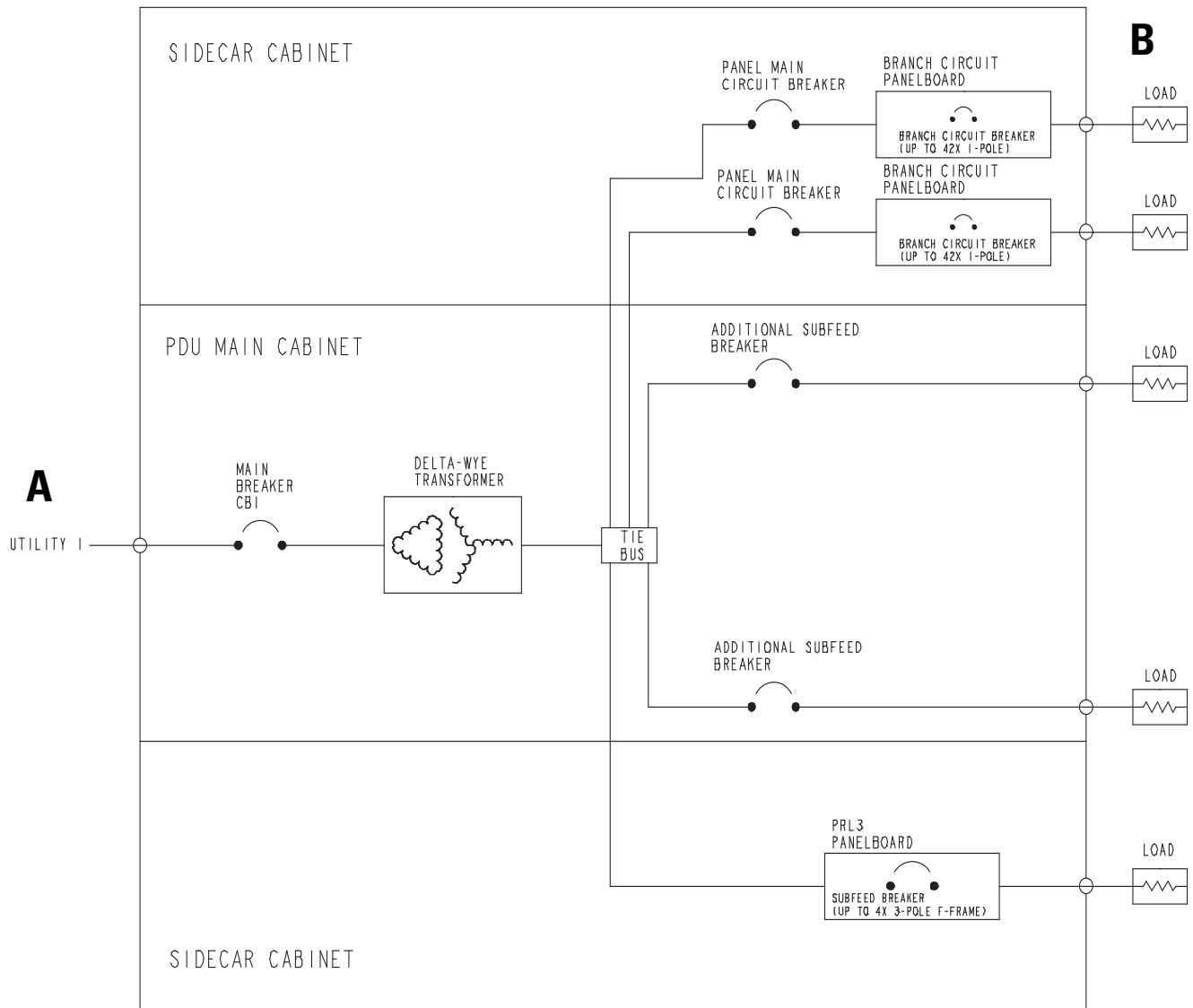
NOTE The main cabinet of the PDU is configurable for up to two branch circuit panelboards, up to two PRL3a panelboards, or one branch circuit panelboard and one PRL3a panelboard.

NOTE In addition to distribution through panelboard, up to two 3-pole F-frame unmonitored subfeed breakers can be installed in the main cabinet.

NOTE Only one left sidecar can be added for the additional power distribution for dual input PDU. The sidecar is capable of mounting up to two branch circuit panelboards or one PRL3a panelboard.

Callout letters **A** and **B** map to Table G through Table L.

Figure A-20. PDU with Dual Input Sidecar and Breaker Sidecar



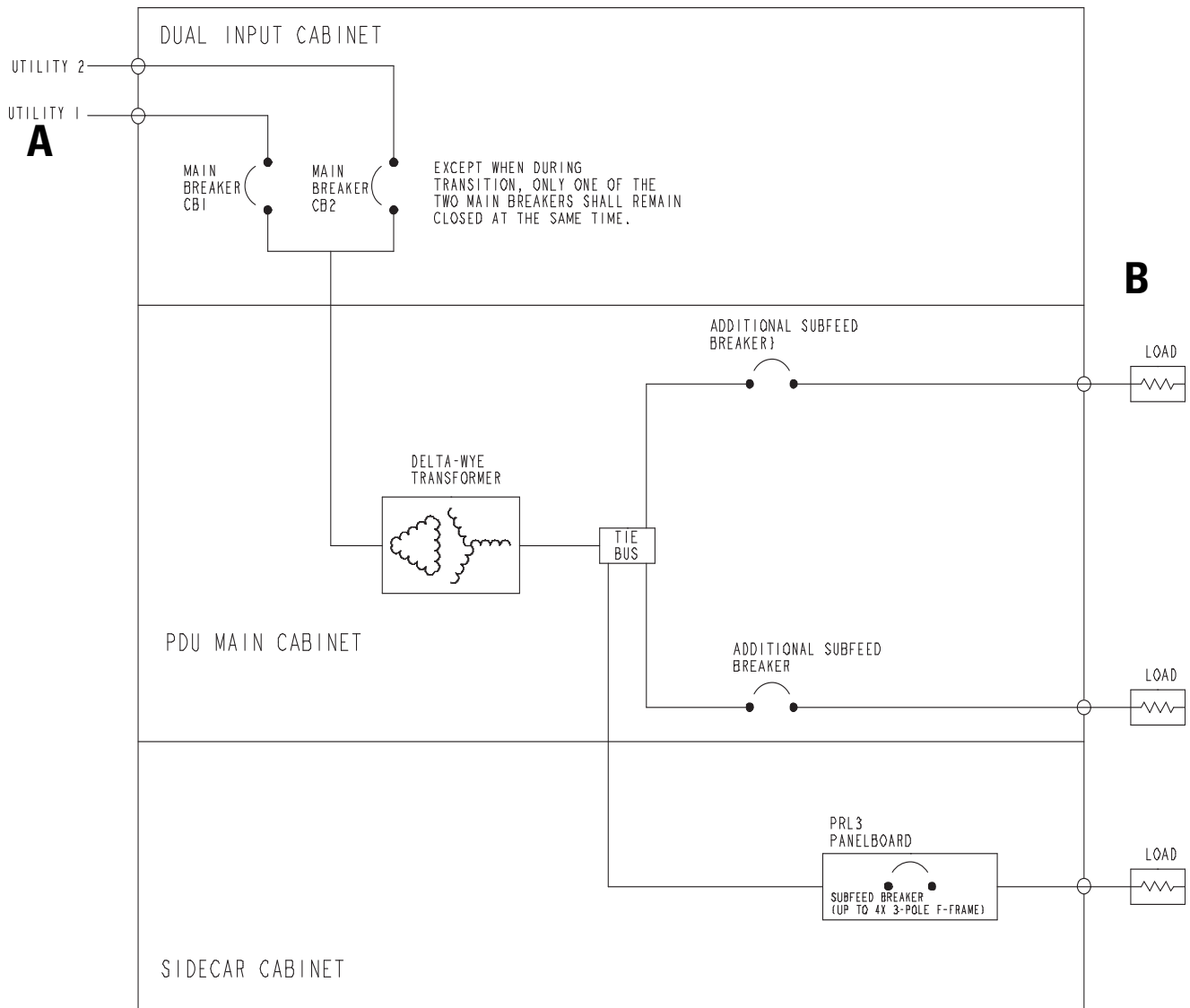
NOTE The main cabinet of the PDU is NOT configurable for internal panelboards.

NOTE Up to two 3-pole F-frame un-monitored sub-feed breakers can be installed in the main cabinet.

NOTE Up to two sidecars can be added to the single input PDU. Each sidecar is capable of mounting up to two branch circuit panelboards or one PRL3A panelboard.

Callout letters **A** and **B** map to Table G through Table L.

Figure A-21. PDU with Dual Sidecars and Single Input - Front Access Only



NOTE The main cabinet of the PDU is NOT configurable for internal panelboards.

NOTE Up to two 3-pole F-frame un-monitored sub-feed breakers can be installed in the main cabinet.

NOTE Only one left sidecar can be added for the additional power distribution for a dual input PDU. The sidecar is capable of mounting up to two branch circuit panelboards or one PRL3 panelboard.

Callout letters **A** and **B** map to Table G through Table L.

Figure A-22. PDU with Single Sidecar and Dual Input - Front Access Only

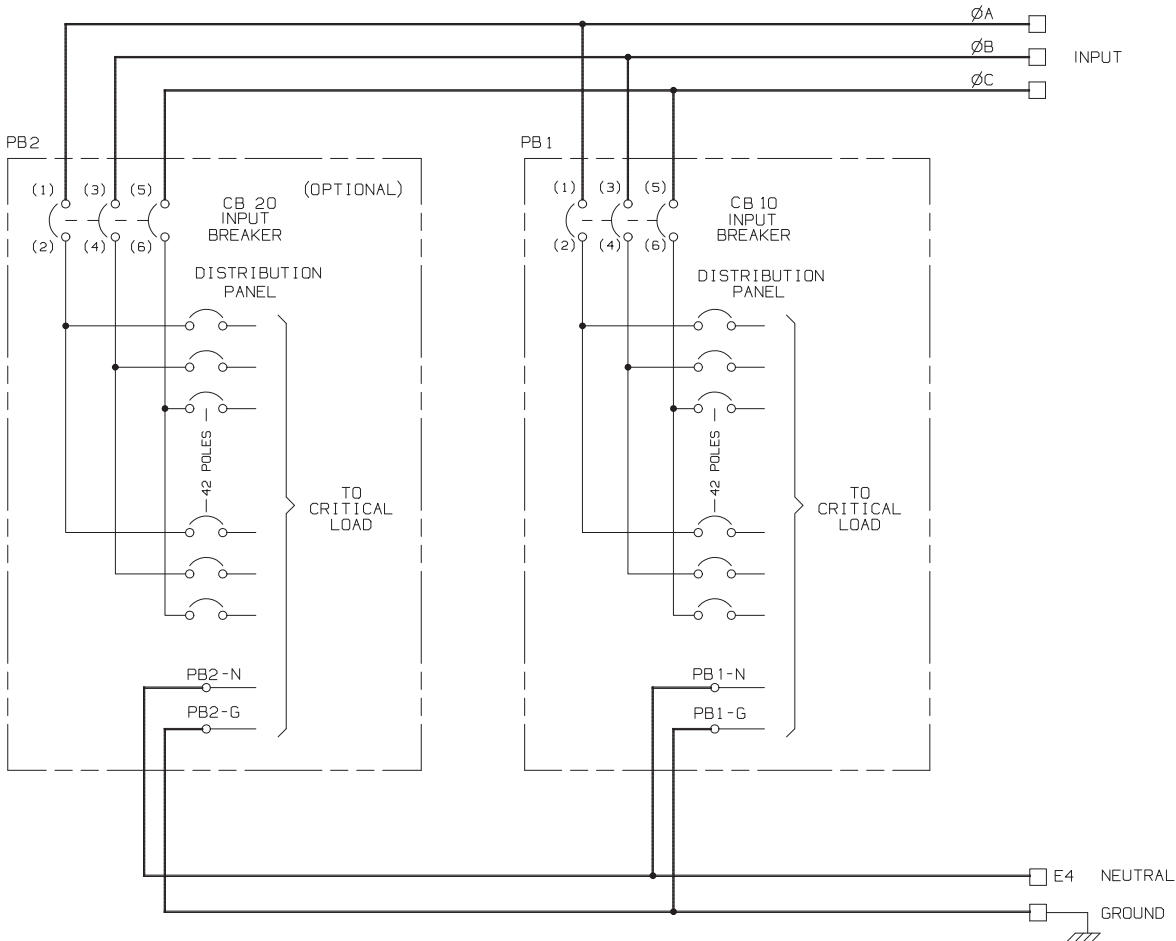


Figure A-23. PDU Distribution Panel Schematic

A.3 Power Wiring Installation Notes

Read and understand the following notes while planning your installation:

 **WARNING**

As a result of the connected loads high leakage current is possible. Connection to earth ground is required for safety and proper product operation.

1. Wire ampacities are chosen from Table 310-16 of the National Electrical Code® (NEC). Wire is 90°C specification.

 **CAUTION**

Cable insulation with 90°C or better is required for the incoming 3-phase cables connecting to the input main circuit breaker. Failure to meet this requirement may lead to catastrophic system failure.

2. For external wiring, use 90°C copper wire. See the appropriate column in Table G through Table O.
3. Refer to national and local electrical codes for acceptable external wiring practices.
4. Material and labor for external wiring requirements are to be provided by designated personnel.
5. When wiring a PDU with branch circuit monitoring, use THHN wire for branch circuit output distribution. Using THHN wire will facilitate routing the wire through the branch CTs to the branch breakers.
6. Output neutrals are rated for up to 200%.
7. 100% rated adjustable subfeed breakers must be wired for maximum rated current.
8. The PDU cabinet is shipped with a debris shield covering the ventilation grill on top of the unit. Do not remove the debris shield until installation is complete. However, remove the shield before operating the PDU. Once the debris shield is removed, do not place objects on the ventilation grill.
9. Optional 225A distribution panels use Eaton bolt-on type BAB or QBHW breakers for bolt-on panels, or plug-on type HQP or QPHW breakers for plug-on panels. Breakers to be provided by the customer.
10. Optional 225A and 400A Square D NQ type distribution panels use bolt-on type QOB breakers. These panels are available for use in both the main cabinet and the sidecars. Breakers to be provided by the customer.
11. Refer to section 1 of this manual for installation instructions.
12. If installing with a UPS, refer to the applicable UPS Installation and Operation manual for UPS cabinet wiring requirements, and conduit and terminal locations.
13. 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.
14. Conduit is to be sized to accommodate one neutral conductor the same size as the phase conductor and one ground conductor. If two neutral conductors or an oversized neutral conductor are to be installed, size the conduit to accommodate the extra wire or size. All PDU products can accommodate a double-sized neutral.

Table G. Input/Output Ratings and External Wiring Requirements for the Eaton 150 kVA PDU (208V)

Basic Unit Rating	Units		Rating 60 Hz			
	kVA	50	75	100	125	150
Input/Output Voltage	Volts	208/208	208/208	208/208	208/208	208/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	142	212	283	353	424
Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)	2/0 [67] 1	2/0 [67] 2	2/0 [67] 2	4/0 [107] 2	300 [151] 2
Minimum Conductor Size (Ground) Number per Phase	— AWG or kcmil [CSA – mm ²] (each)	#6 [13] 1	#4 [21] 1	#3 [27] 1	#2 [34] 1	#1 [34] 1
AC Output	— Maximum Amps	139	209	278	347	416
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, power cable termination sizes listed in Table U, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating. Wire 100% rated adjustable subfeed breakers for maximum rated current.				
AC Output from Distribution Panel Breakers to the Critical Load	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating.				
NOTE Callout letters A and B map to Figure A-19 through Figure A-22.						

Table H. Input/Output Ratings and External Wiring Requirements for the Eaton 150 kVA PDU (380V)

Basic Unit Rating	Units		Rating 60 Hz			
	kVA	50	75	100	125	150
Input/Output Voltage	Volts	380/208	380/208	380/208	380/208	380/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	78	116	155	193	232
Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)	#3 [27] 1	1/0 [54] 1	3/0 [85] 1	2/0 [67] 2	2/0 [67] 2
Minimum Conductor Size (Ground) Number per Phase	— AWG or kcmil [CSA – mm ²] (each)	#8 [8] 1	#6 [13] 1	#6 [13] 1	#4 [21] 1	#4 [21] 1
AC Output	— Maximum Amps	139	208	278	347	416
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, power cable termination sizes listed in Table U, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating. Wire 100% rated adjustable subfeed breakers for maximum rated current.				
AC Output from Distribution Panel Breakers to the Critical Load	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating.				
NOTE Callout letters A and B map to Figure A-19 through Figure A-22.						

Table I. Input/Output Ratings and External Wiring Requirements for the Eaton 150 kVA PDU (400V)

Basic Unit Rating	Units		Rating 60 Hz			
	kVA	50	75	100	125	150
Input/Output Voltage	Volts	400/208	400/208	400/208	400/208	400/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	74	110	147	184	220
Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)	#3 [27] 1	1/0 [54] 1	3/0 [85] 1	2/0 [67] 1	2/0 [67] 2
Minimum Conductor Size (Ground) Number per Phase	— AWG or kcmil [CSA – mm ²] (each)	#8 [8] 1	#6 [13] 1	#6 [13] 1	#4 [21] 1	#4 [21] 1
AC Output	— Maximum Amps	139	208	278	347	416
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, power cable termination sizes listed in Table U, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating. Wire 100% rated adjustable subfeed breakers for maximum rated current.				
AC Output from Distribution Panel Breakers to the Critical Load	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating.				
NOTE Callout letters A and B map to Figure A-19 through Figure A-22.						

Table J. Input/Output Ratings and External Wiring Requirements for the Eaton 150 kVA PDU (415V)

Basic Unit Rating	Units		Rating 60 Hz			
	kVA	50	75	100	125	150
Input/Output Voltage	Volts	415/208	415/208	415/208	415/208	415/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	71	106	142	177	212
Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)	#3 [27] 1	#1 [43] 1	2/0 [67] 1	4/0 [107] 1	2/0 [67] 2
Minimum Conductor Size (Ground) Number per Phase	— AWG or kcmil [CSA – mm ²] (each)	#8 [8] 1	#6 [13] 1	#6 [13] 1	#4 [21] 1	#4 [21] 1
AC Output	— Maximum Amps	139	208	278	347	416
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, power cable termination sizes listed in Table U, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating. Wire 100% rated adjustable subfeed breakers for maximum rated current.				
AC Output from Distribution Panel Breakers to the Critical Load	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating.				
NOTE Callout letters A and B map to Figure A-19 through Figure A-22.						

Table K. Input/Output Ratings and External Wiring Requirements for the Eaton 150 kVA PDU (480V)

Basic Unit Rating	Units		Rating 60 Hz			
	kVA	50	75	100	125	150
Input/Output Voltage	Volts	480/208	480/208	480/208	480/208	480/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	61	92	122	153	184
Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)	#4 [21] 1	#2 [34] 1	1/0 [54] 1	3/0 [85] 1	2/0 [67] 2
Minimum Conductor Size (Ground) Number per Phase	— AWG or kcmil [CSA – mm ²] (each)	#8 [8] 1	#6 [13] 1	#6 [13] 1	#6 [13] 1	#4 [21] 1
AC Output	— Maximum Amps	139	208	278	347	416
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, power cable termination sizes listed in Table U, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating. Wire 100% rated adjustable subfeed breakers for maximum rated current.				
AC Output from Distribution Panel Breakers to the Critical Load	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating.				
NOTE Callout letters A and B map to Figure A-19 through Figure A-22.						

Table L. Input/Output Ratings and External Wiring Requirements for the Eaton 150 kVA PDU (600V)

Basic Unit Rating	Units		Rating 60 Hz			
	kVA	50	75	100	125	150
Input/Output Voltage	Volts	600/208	600/208	600/208	600/208	600/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	49	74	98	122	147
Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)	#6 [13] 1	#3 [27] 1	#1 [43] 1	1/0 [54] 1	3/0 [85] 1
Minimum Conductor Size (Ground) Number per Phase	— AWG or kcmil [CSA – mm ²] (each)	#8 [8] 1	#8 [8] 1	#6 [13] 1	#6 [13] 1	#6 [13] 1
AC Output	— Maximum Amps	139	208	278	347	416
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings, power cable termination sizes listed in Table U, and national and local electrical codes. Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating. Wire 100% rated adjustable subfeed breakers for maximum rated current.				
AC Output from Distribution Panel Breakers to the Critical Load	B	Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions, and national and local electrical codes (output is prewired to the panelboard). Maximum output ratings are to be in accordance with the rating label on the PDU. The total combined load is not to exceed the maximum output rating.				
NOTE Callout letters A and B map to Figure A-19 through Figure A-22.						

15. See Table M for PDU input circuit breaker ratings.

Table M. PDU Input Circuit Breaker Ratings

Input Voltage	kVA Rating	FLA	Main Breaker Size	kAIC Rating		
				Standard	High	Ultra High
208	50	139	200A	65	100	200
	75	209	300A	65	100	200
	100	278	400A	65	100	200
	125	347	450A	65	100	200
	150	417	600A	65	100	200
380	50	76	100A	35	65	100
	75	114	150A	35	65	100
	100	152	200A	35	65	100
	125	190	250A	35	65	100
	150	228	300A	35	65	100
400	50	73	100A	35	65	100
	75	109	150A	35	65	100
	100	145	200A	35	65	100
	125	181	250A	35	65	100
	150	217	300A	35	65	100
415	50	70	90A	35	65	100
	75	105	150A	35	65	100
	100	140	200A	35	65	100
	125	174	225A	35	65	100
	150	209	300A	35	65	100
480	50	61	80A	35	65	100
	75	91	125A	35	65	100
	100	121	175A	35	65	100
	125	151	200A	35	65	100
	150	181	250A	35	65	100
600	50	49	70A	18	25	35
	75	73	100A	18	25	35
	100	97	125A	18	25	35
	125	121	175A	18	25	35
	150	145	200A	18	25	35

16. Terminals are UL and CSA rated at 75°C. See Table N through Table R for input power cable terminations. Paragraph A.5 shows the location of the input power cable terminals inside the PDU cabinet.
17. DO NOT overtighten the terminal lugs to prevent stripping the threads. Tighten lugs to the torque values in Table N through Table R.

Table N. Eaton 150 kVA PDU Input Power Cable Terminations (208V)

Terminal Function	Rating (kVA)	Main Breaker Rating	Frame Size	Terminal	Function	Number and Size of Pressure Termination	Tightening Torque Nm (lb in)	Type and Size Screw
AC Input to Main Breaker CB1 (and CB2, if installed)	50	200A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	75	300A	K	A (Black)	Phase A	2 – 2/0–250 kcmil	31 (275)	5/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	100	400A	K	A (Black)	Phase A	2 – 2/0–250 kcmil	31 (275)	5/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	125	450A	L	A (Black)	Phase A	2 – 3/0–350 kcmil	31 (275)	5/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
150	600A	L	A (Black)	Phase A	2 – 250–350 kcmil	31 (275)	5/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
Customer Ground	All	All		G (Green)	Ground	2 – #14–1/0	5.6 (50)	5/16" Hex

Table O. Eaton 150 kVA PDU Input Power Cable Terminations (380V and 400V)

Terminal Function	Rating (kVA)	Main Breaker Rating	Frame Size	Terminal	Function	Number and Size of Pressure Termination	Tightening Torque Nm (lb in)	Type and Size Screw
AC Input to Main Breaker CB1 (and CB2, if installed)	50	100A	F	A (Black)	Phase A	1 – #14–1/0	#14–10: 4 (35)	Slotted
				B (Red)	Phase B		#8: 4.5 (40)	
				C (Blue)	Phase C		#6–#4: 5.1 (45)	
							#3–1/0: 5.6 (50)	
	75	150A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	100	200A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	125	250A	K	A (Black)	Phase A	2 – 2/0–250 kcmil	31 (275)	5/16" Hex
				B (Red)	Phase B			
C (Blue)				Phase C				
150	300A	K	A (Black)	Phase A	2 – 2/0–250 kcmil	31 (275)	5/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
Customer Ground	All	All		G (Green)	Ground	2 – #14 – 1/0	5.6 (50)	5/16" Hex

Table P. Eaton 150 kVA PDU Input Power Cable Terminations (415V)

Terminal Function	Rating (kVA)	Main Breaker Rating	Frame Size	Terminal	Function	Number and Size of Pressure Termination	Tightening Torque Nm (lb in)	Type and Size Screw
AC Input to Main Breaker CB1 (and CB2, if installed)	50	90A	F	A (Black)	Phase A	1 – #14 – 1/0	#14–10: 4 (35)	Slotted
				B (Red)	Phase B		#8: 4.5 (40)	
				C (Blue)	Phase C		#6–#4: 5.1 (45)	
	75	150A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
C (Blue)				Phase C				
100	200A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
125	250A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
150	300A	F	A (Black)	Phase A	2 – 2/0–250 kcmil	31 (275)	5/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
Customer Ground	All	All		G (Green)	Ground	2 – #14 – 1/0	5.6 (50)	5/16" Hex

Table Q. Eaton 150 kVA PDU Input Power Cable Terminations (480V)

Terminal Function	Rating (kVA)	Main Breaker Rating	Frame Size	Terminal	Function	Number and Size of Pressure Termination	Tightening Torque Nm (lb in)	Type and Size Screw
AC Input to Main Breaker CB1 (and CB2, if installed)	50	80A	F	A (Black)	Phase A	1 – #14–1/0	#14–10: 4 (35)	Slotted
				B (Red)	Phase B		#8: 4.5 (40)	
				C (Blue)	Phase C		#6–#4: 5.1 (45)	
	75	125A	K	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
C (Blue)				Phase C				
100	150A	K	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
125	200A	L	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
150	225A	L	A (Black)	Phase A	2 – 2/0–250 kcmil	31 (275)	5/16" Hex	
			B (Red)	Phase B				
			C (Blue)	Phase C				
Customer Ground	All	All		G (Green)	Ground	2 – #14 – 1/0	5.6 (50)	5/16" Hex

Table R. Eaton 150 kVA PDU Input Power Cable Terminations (600V)

Terminal Function	Rating (kVA)	Main Breaker Rating	Frame Size	Terminal	Function	Size of Pressure Termination	Tightening Torque Nm (lb in)	Type and Size Screw
AC Input to Main Breaker CB1 (and CB2, if installed)	50	60A	F	A (Black)	Phase A	1 – #14–1/0	#14–10: 4 (35)	Slotted
				B (Red)	Phase B		#8: 4. 5 (40)	
				C (Blue)	Phase C		#6–#4: 5.1 (45) #3–1/0: 5.6 (50)	
	75	100A	F	A (Black)	Phase A	1 – #14–1/0	#14–10: 4 (35)	Slotted
				B (Red)	Phase B		#8: 4.5 (40)	
				C (Blue)	Phase C		#6–#4: 5.1 (45) #3–1/0: 5.6 (50)	
	100	125A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	125	150A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	150	200A	F	A (Black)	Phase A	1 – #4–4/0	13.5 (120)	3/16" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
Customer Ground	All	All		G (Green)	Ground	2 – #14–1/0	5.6 (50)	5/16" Hex

18. For a PDU with Dual Input crimp lug terminals see Table S for output power cable terminations. A through C and Ground are 2-hole stud mountings for standard NEMA 2-hole long barrel lugs. The power wiring connections for this equipment are rated at 75°C. Paragraph A.5 shows the location of the output power cable terminals inside the PDU cabinet. See Table T for recommended installation parts and tools not supplied by Eaton Corporation.
19. DO NOT overtighten the terminal lugs to prevent stripping the threads. Tighten lugs to the torque values in Table S.

Table S. Eaton 150 kVA PDU Dual Input Crimp Lug Input Power Cable Terminations

Terminal Function	Terminal	Function	Bus Landing	Tightening Torque Nm (lb in)	Stud Size
AC Input to Main Breakers CB1 and CB2 Compression Lug Input Option	A (Black)	Phase A	1 – 2 stud mounting	76 (56)	M12
	B (Red)	Phase B			
	C (Blue)	Phase C			
Customer Ground	Ground	Ground	1 – 2 stud mounting	76 (56)	M12

Table T. Recommended (or Equivalent) Installation Parts and Tools (Not Supplied by Eaton)

Part	Size	Quantity	Manufacturer	Part Number	Notes
Long Barrel 2-Hole Lug	#8 AWG	As required	Thomas & Betts	54850BE	Copper wire only
	#6 AWG		Thomas & Betts	54852BE	
	#4 AWG		Thomas & Betts	54854BE	
	#3 and #2 AWG		Thomas & Betts	54856BE	
	#1 AWG		Thomas & Betts	54858BE	
	1/0 AWG		Thomas & Betts	54860BE	
	2/0 AWG		Thomas & Betts	54862BE	
	3/0 AWG		Thomas & Betts	54864BE	
	4/0 AWG		Thomas & Betts	54866BE	
	250 MCM		Thomas & Betts	54868BE	
	300 MCM		Thomas & Betts	54870BE	
	350 MCM		Thomas & Betts	54872BE	
	400 MCM		Thomas & Betts	54874BE	
500 MCM	Thomas & Betts	54876BE			
Manual Hydraulic Crimp Tool	14 Ton	1	Thomas & Betts	TBM14M	
Die Set	N/A	1	Thomas & Betts	15506	
NOTE Equivalent parts are acceptable.					

20. Terminals are UL and CSA rated at 75°C. See Table U for output power cable terminations. Paragraph A.5 shows the location of output power cable terminals inside of the PDU cabinet.

21. DO NOT overtighten the terminal lugs to prevent stripping the threads. Tighten lugs to the torque values in Table U and Table V.

Table U. Eaton 150 kVA PDU Output Power Cable Terminations

Terminal Function	Breaker Rating	Terminal	Function	Size of Pressure Termination	Tightening Torque Nm (lb in)	Type and Size Screw	
AC Output from Subfeed Breakers to Critical Load	(F-Frame) <=100A	A	Phase A	1 - #14 – 1/0	Varies based on wire size. See Table V below.	Slotted screw	
		B	Phase B				
		C	Phase C				
	(F-Frame) >100A	A	Phase A	1 - #4 – 4/0	13.6 (120)	3/16" Hex	
		B	Phase B				
		C	Phase C				
	(K-Frame)	A	Phase A	2 - 2/0 – 250 kcmil or 1 - 2/0 – 500 kcmil	31.0 (275) and 42.0 (375) or 42.0 (375)	5/16" Hex or 3/8" Hex	
		B	Phase B				
		C	Phase C				
	(L-Frame)	A	Phase A	2 - 3/0 – 350 kcmil	31 (275)	5/16" Hex	
		B	Phase B				
		C	Phase C				
ALL		N	Neutral	#2 – 600 kcmil	42.0 (375)	1/2" Hex	
ALL		G	Ground	#14 – 1/0	Varies based on wire size. See Table V below.	Slotted	
Wire branch circuits in accordance with branch circuit breaker manufacturer's ratings and instructions and national and local electrical codes (output is prewired to the panelboard).							
AC Output from Distribution Panel Breakers to Critical Load	N/A	N	Neutral	84 – #4–#14 or 2 x #12–#14	#4–#6: #8: #10–#14:	4.0 (35) 2.8 (25) 2.3 (20)	Slotted
				N/A	G	Ground	

Table V. Tightening Torque for F-Frame Breaker and Ground Lug using Slotted Screws

AWG Wire Range	Metric Wire Range	Torque Value Lb.-in. (Nm)
#14 – #10	2.5 – 6	35 (3.96)
#8	10	40 (4.52)
#6 – #4	16 – 25	45 (5.09)
#3 – 1/0	35 – 95	50 (5.65)
NOTE	PRL3 uses same ground and neutral lugs.	
NOTE	Lug is a 2-hole lug and employs two different size bores each with a different compression screw.	

A.4 Location of Conduit Landing and Wire Entry Plates

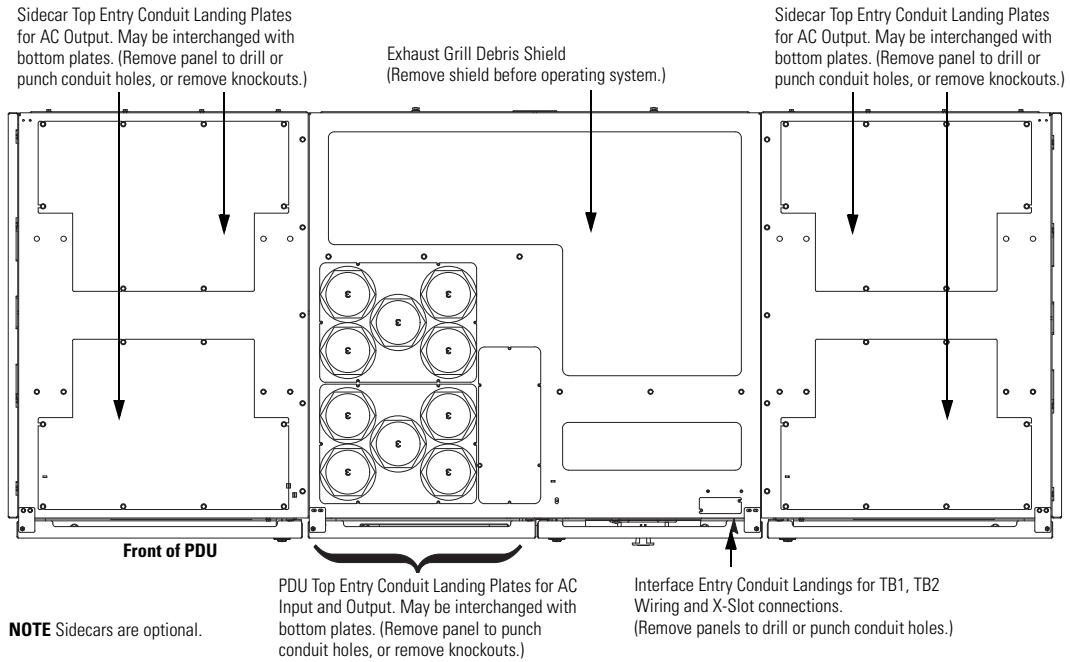


Figure A-24. PDU Conduit Landing Plate Locations – Top View of PDU with Front-Facing Sidecars

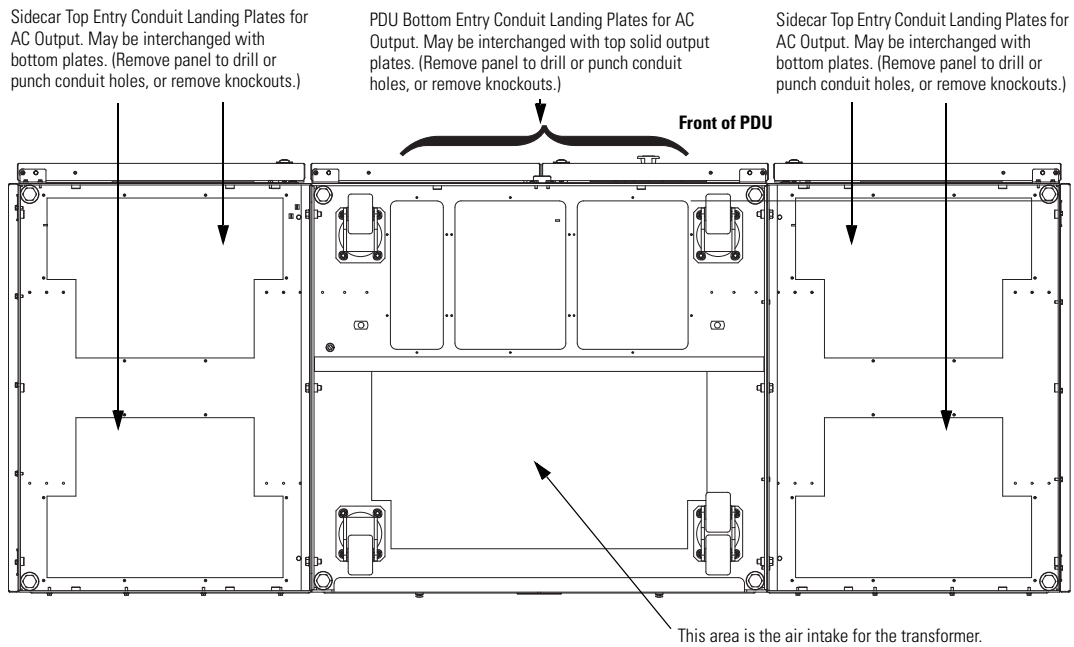


Figure A-25. PDU Conduit Landing Plate Locations – Bottom View of PDU with Front-Facing Sidecars

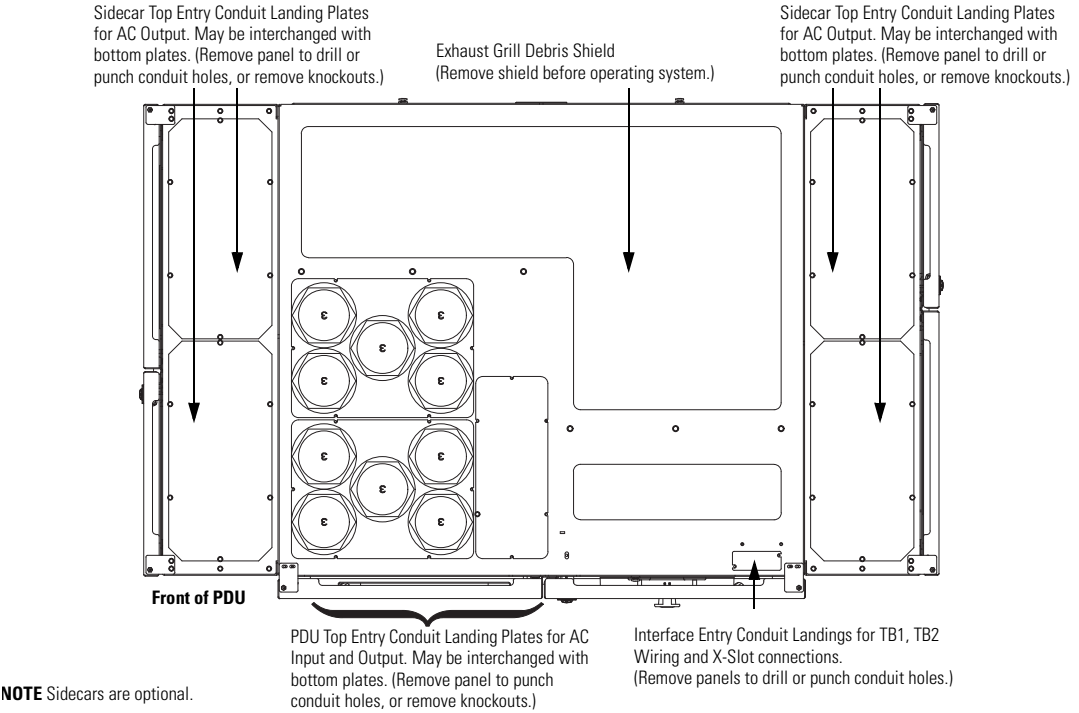


Figure A-26. PDU Conduit Landing Plate Locations – Top View of PDU with Side-Facing Sidecars

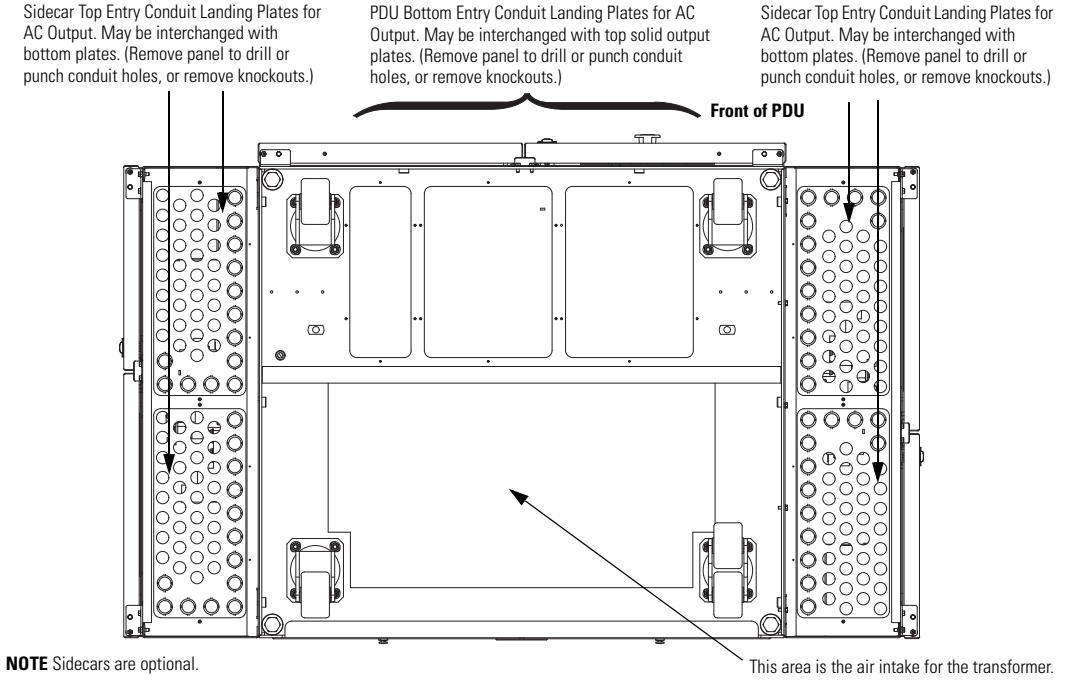


Figure A-27. PDU Conduit Landing Plate Locations – Bottom View of PDU with Side-Facing Sidecars

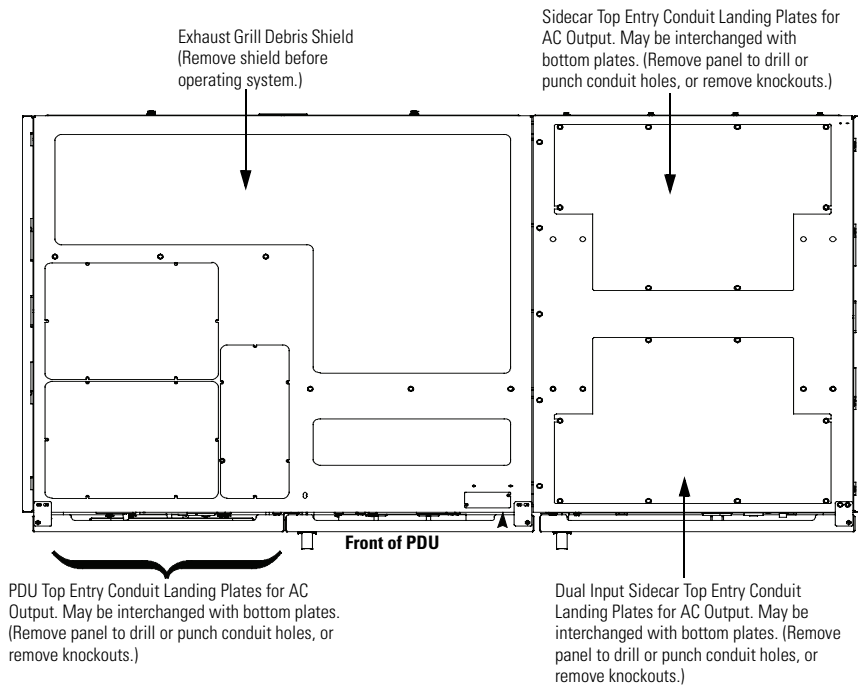


Figure A-28. PDU Conduit Landing Plate Locations – Top View of PDU with Dual Input Sidecar

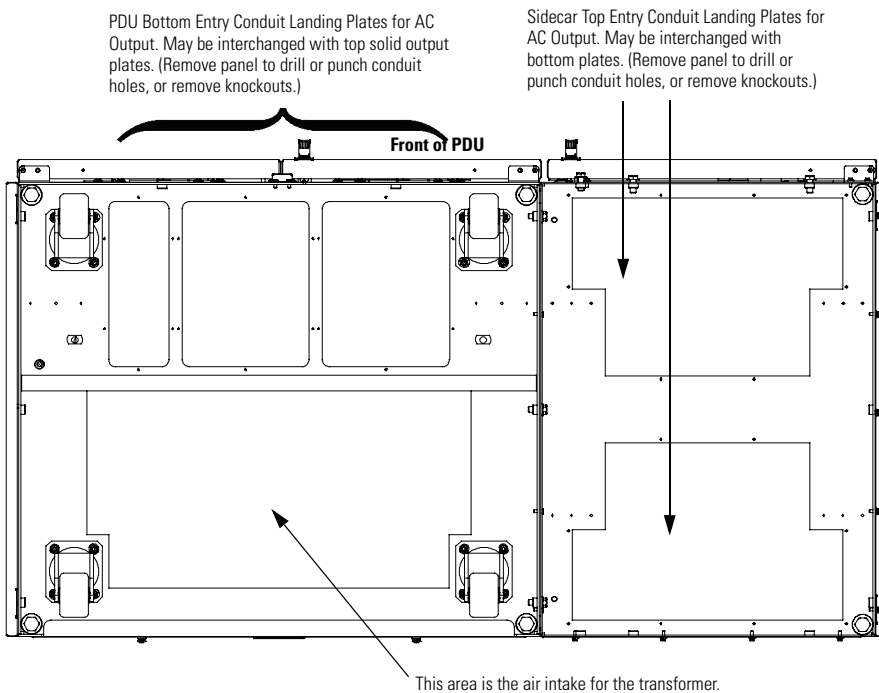
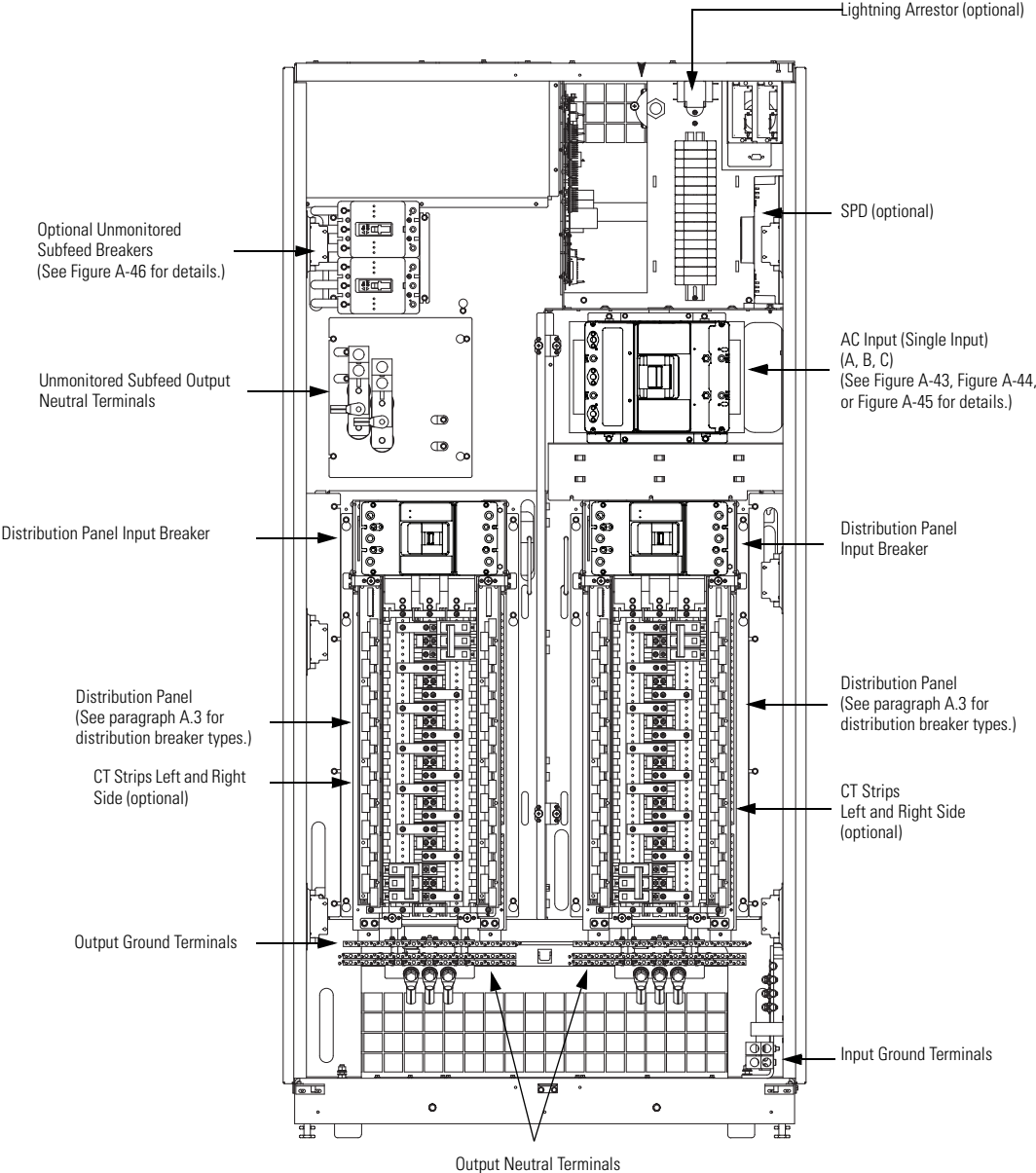


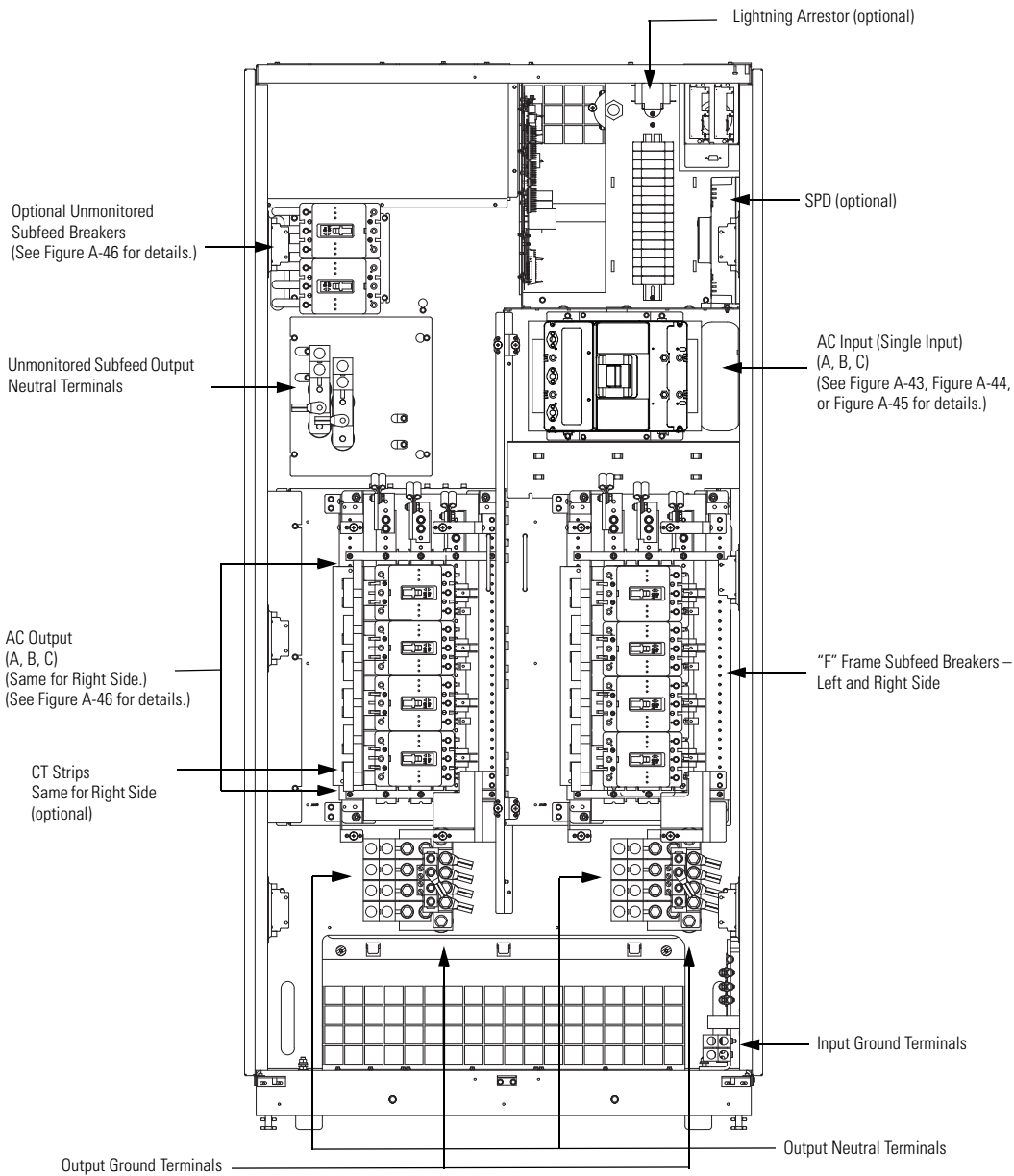
Figure A-29. PDU Conduit Landing Plate Locations – Bottom View of PDU with Dual Input Sidecar

A.5 Location of Power Terminals



NOTE The PDU is shown with both left and right distribution panels. However, the installed configuration may contain only a left or right distribution panel.

Figure A-30. Power Terminal Locations – PDU with Two Output Distribution Panels



NOTE The PDU is shown with eight subfeed breakers. However, the installed configuration may contain one to eight subfeed breakers.

Figure A-31. Power Terminal Locations – PDU with Left and Right "F" Frame Subfeed Breakers

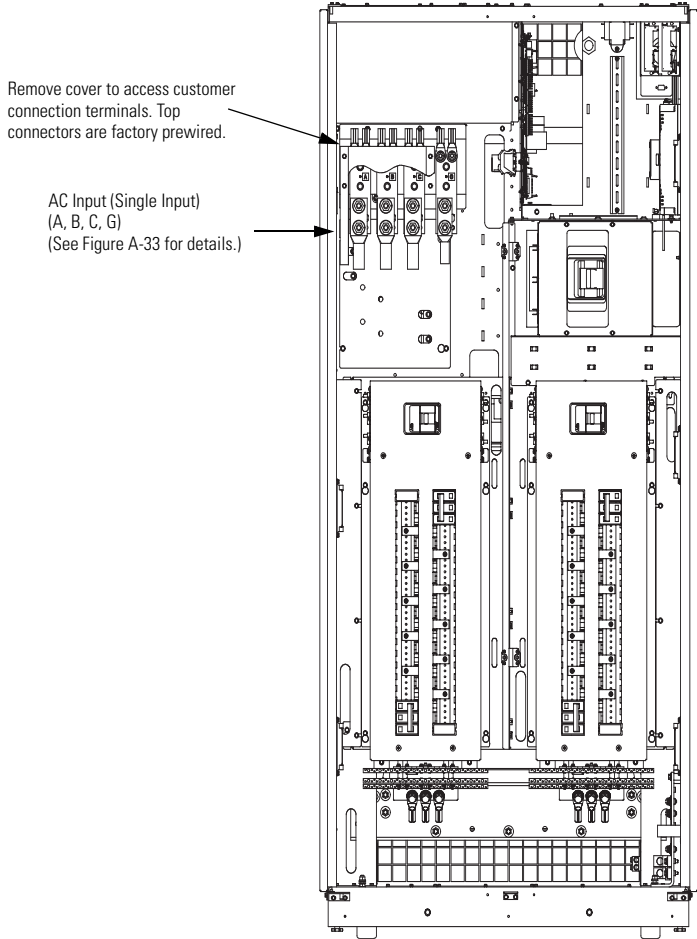


Figure A-32. Power Terminal Locations – Single Input Crimp Lugs

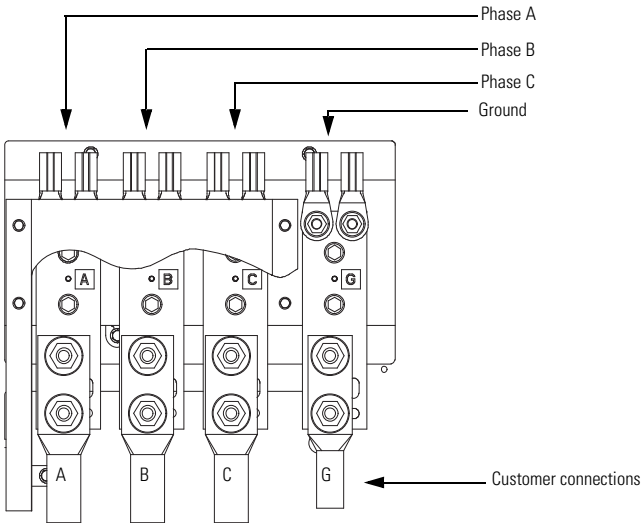


Figure A-33. Power Terminal Locations – Single Input Crimp Lug Detail (Customer Connections)

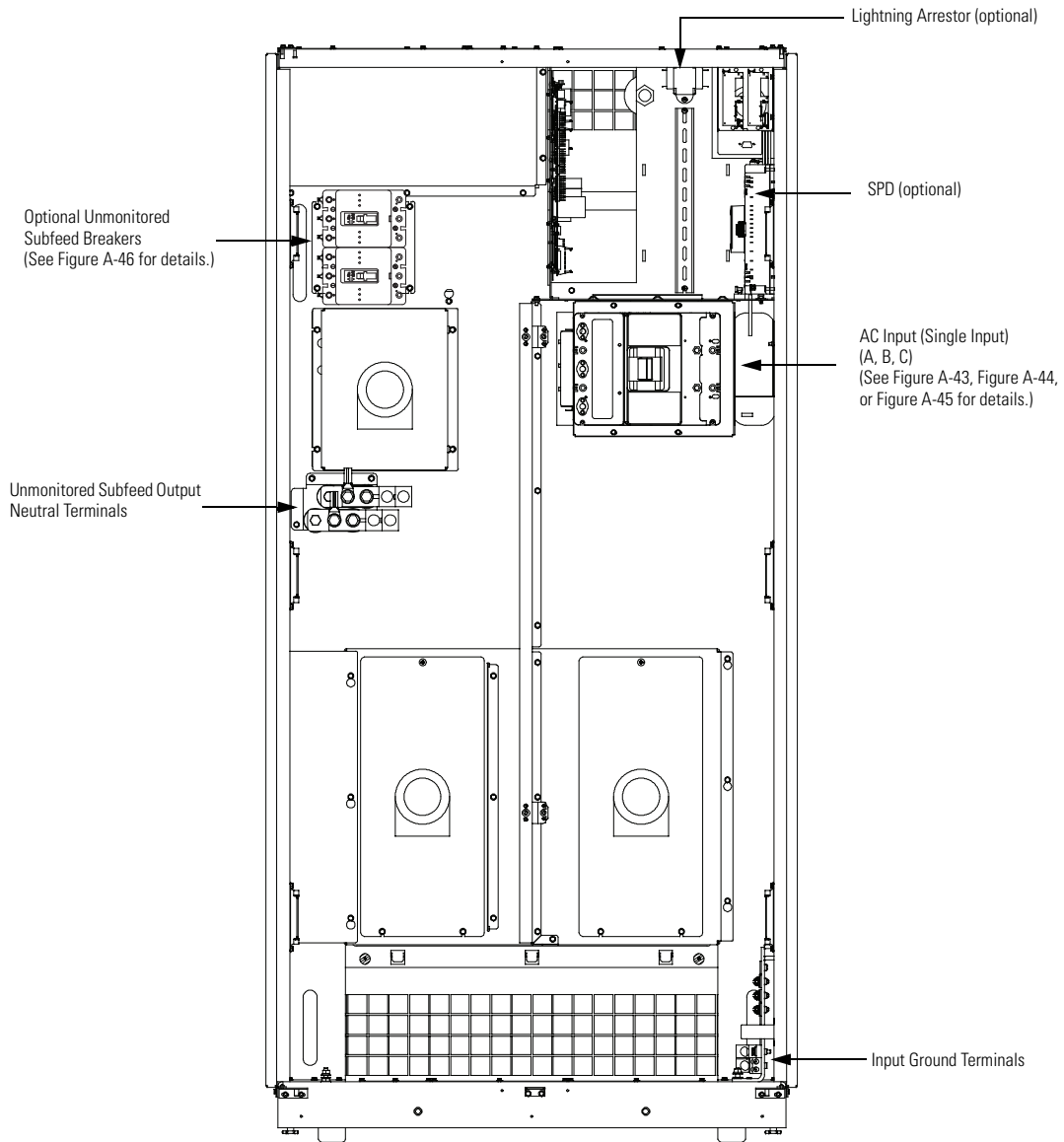


Figure A-34. Power Terminal Locations – Front Only Service Access PDU

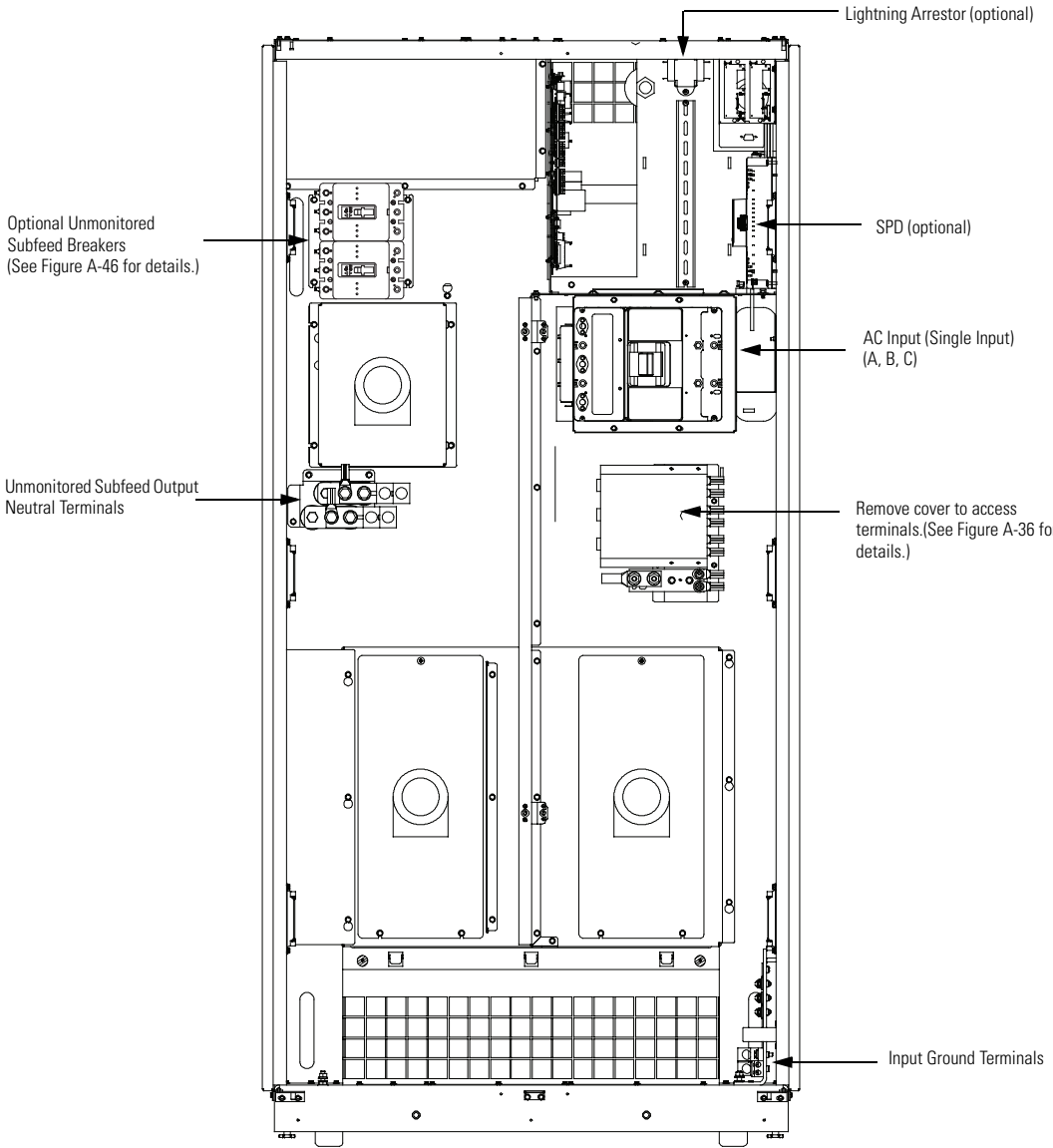


Figure A-35. Power Terminal Locations – Front Only Service Access with Single Input Crimp Lugs

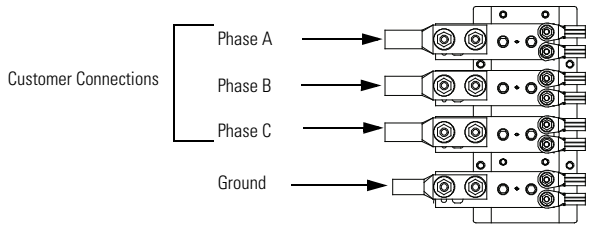


Figure A-36. Power Terminal Locations – Front Only Service Access with Single Input Crimp Lug Detail (Cover Removed)

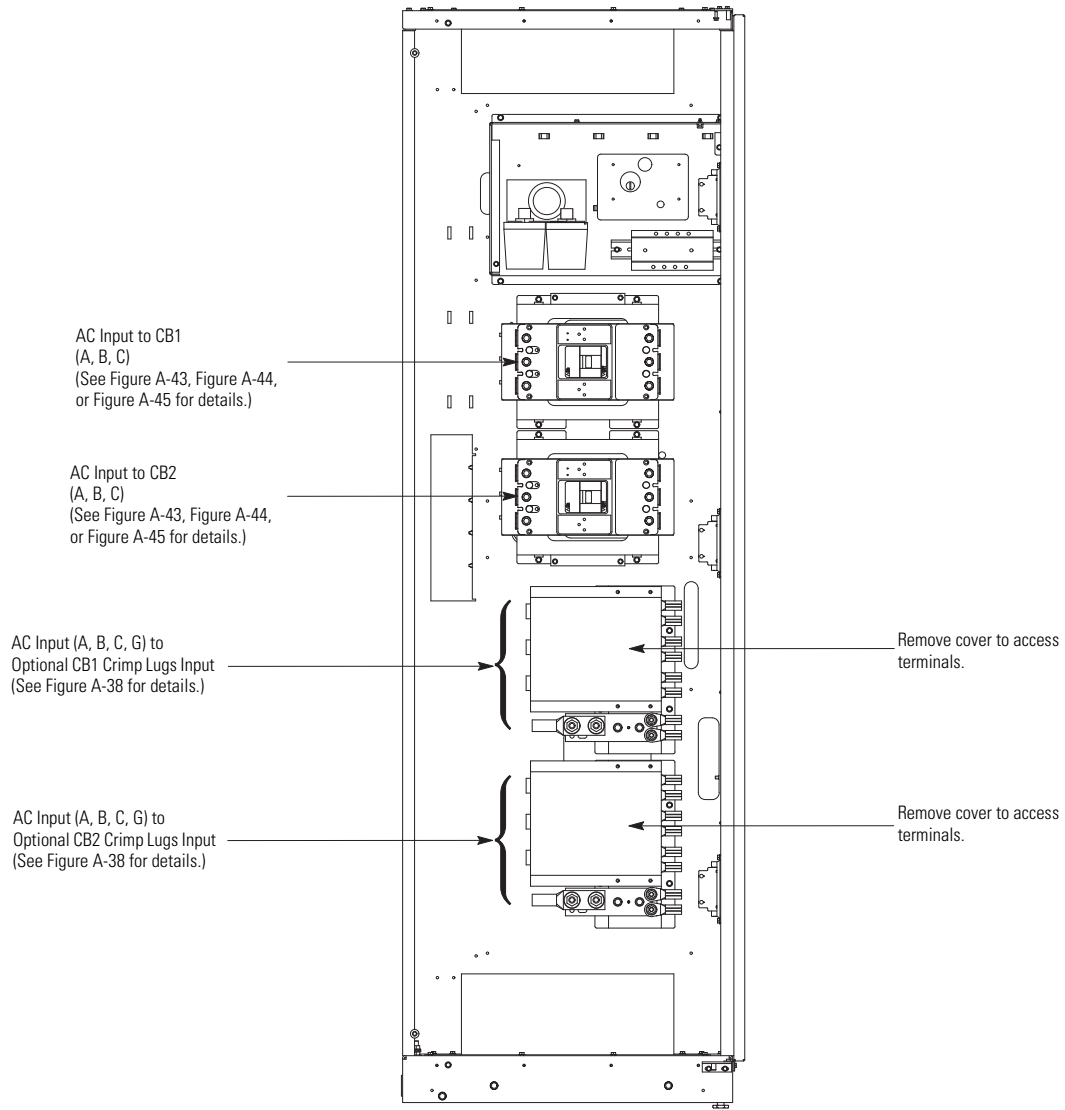


Figure A-37. Power Terminal Locations – Dual Input Sidecar

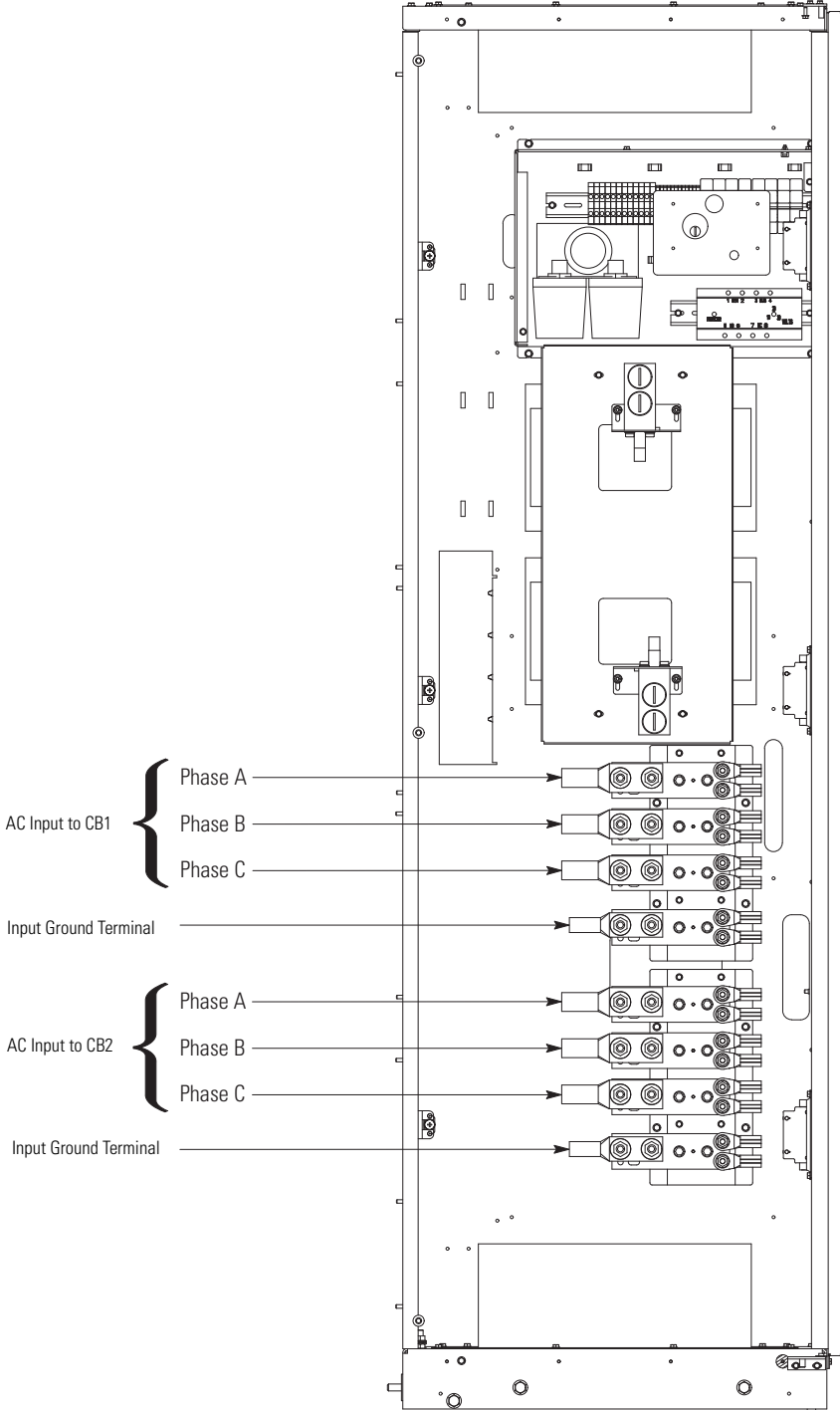
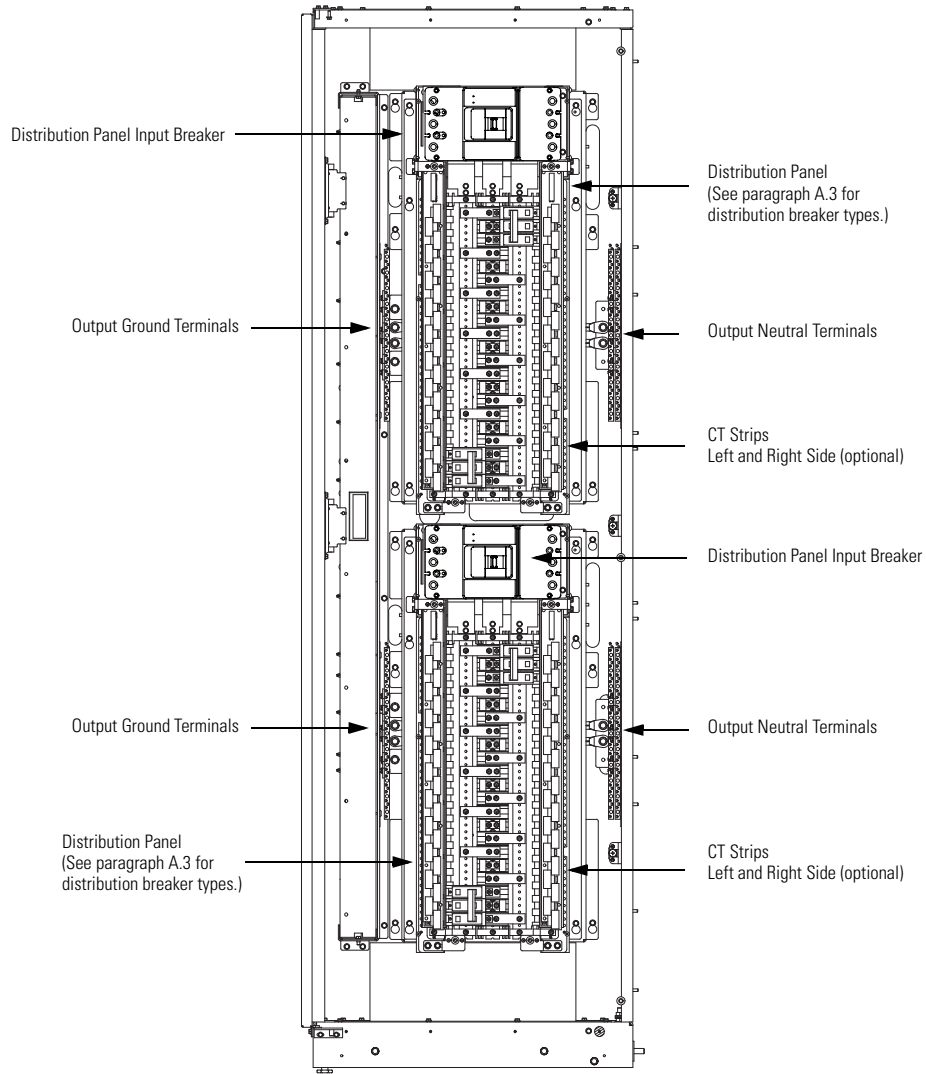
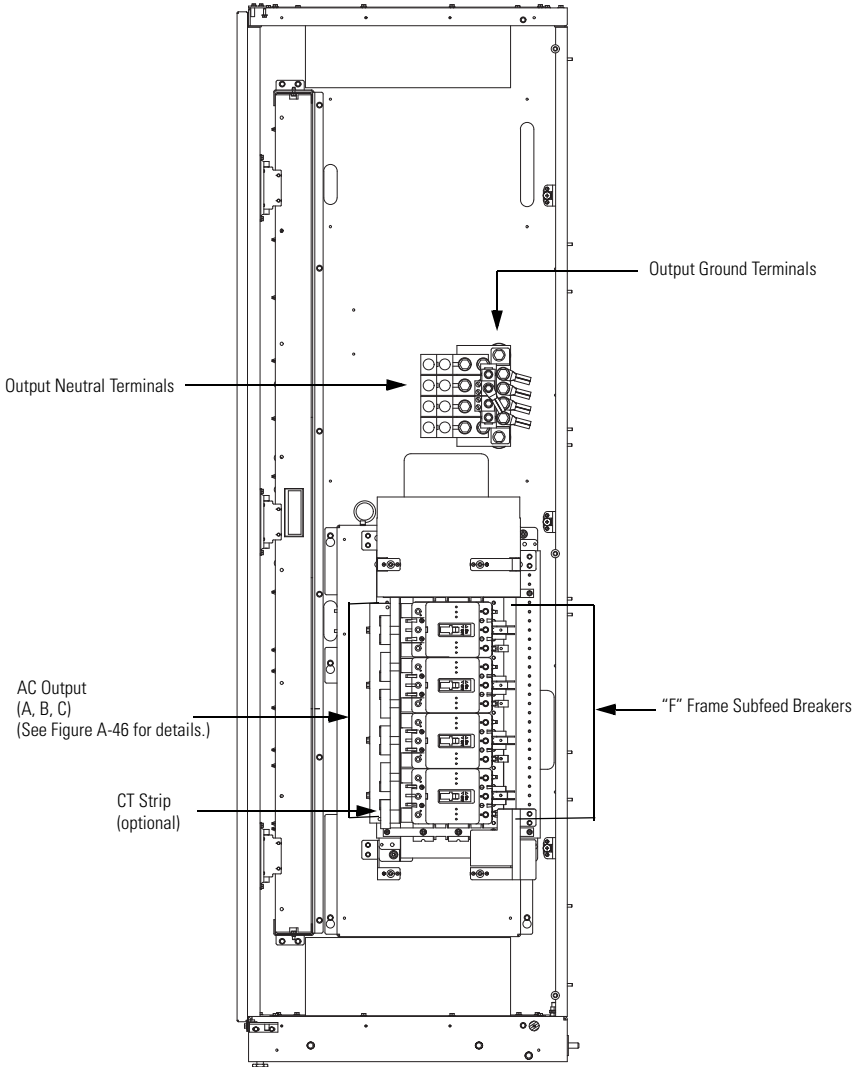


Figure A-38. Power Terminal Locations – Dual Input Crimp Lug Detail



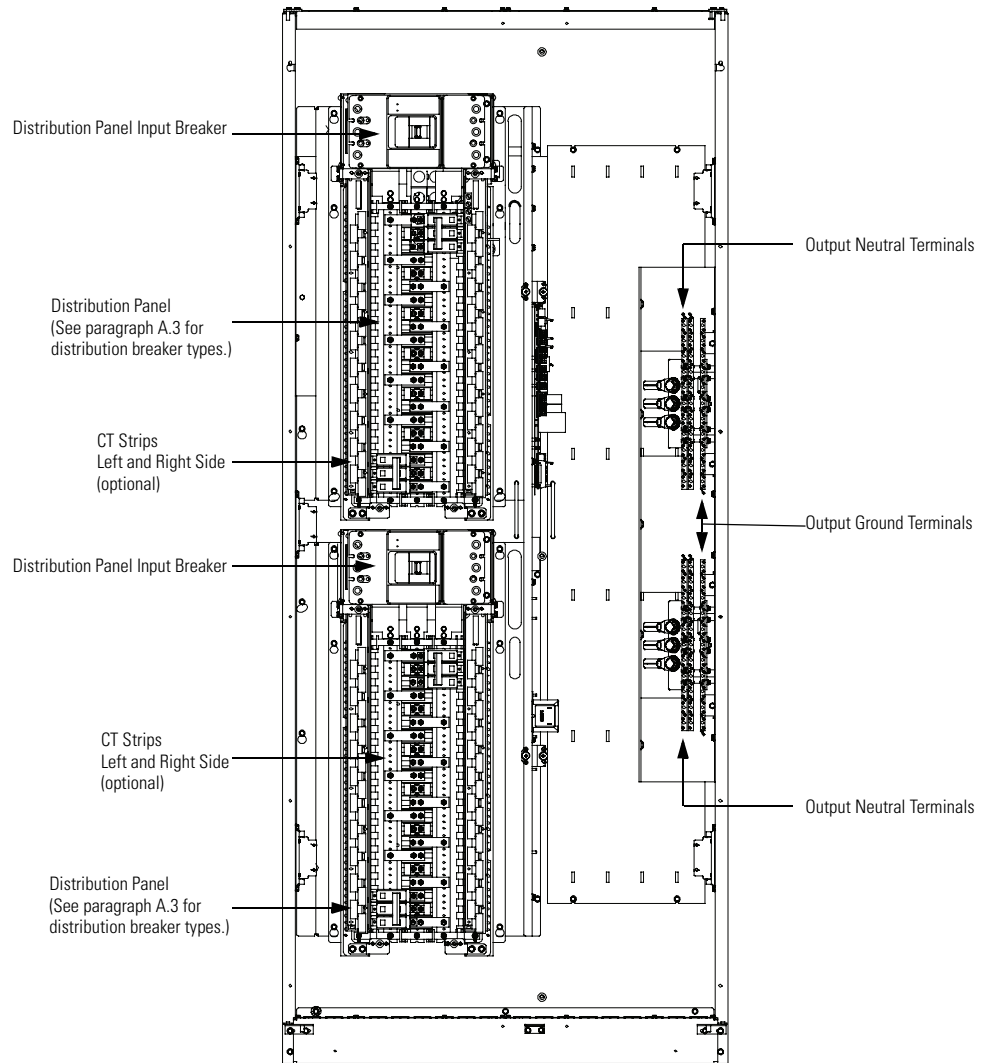
NOTE The sidecar is shown with both top and bottom distribution panels. However, the installed configuration may contain only a top or bottom distribution panel.

Figure A-39. Power Terminal Locations – Left or Right Front-Facing Sidecar with Two Output Distribution Panels



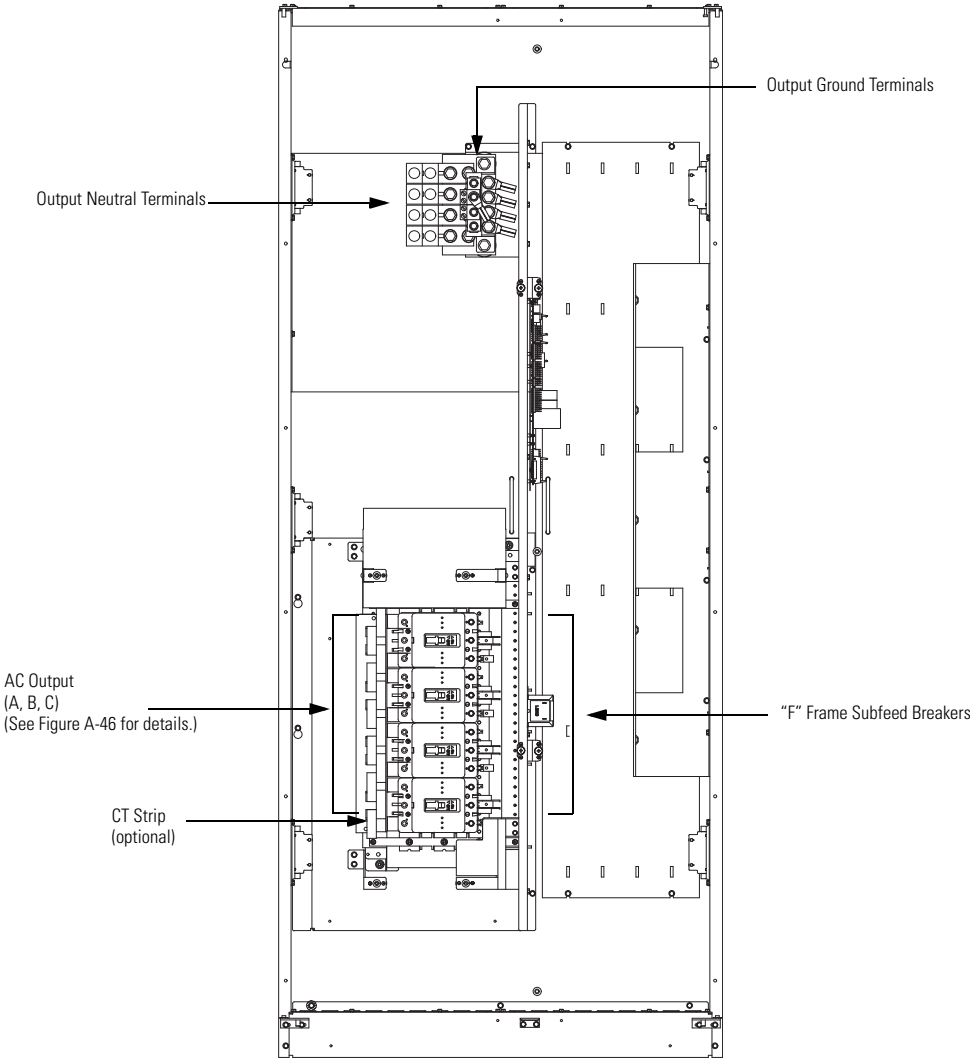
NOTE The PDU is shown with four subfeed breakers. However, the installed configuration may contain one to four subfeed breakers.

Figure A-40. Power Terminal Locations – Left or Right Front-Facing Sidecar with Subfeed Breakers



NOTE The sidecar is shown with both top and bottom distribution panels. However, the installed configuration may contain only a top or bottom distribution panel.

Figure A-41. Power Terminal Locations – Left or Right Side-Facing Sidecar with Two Output Distribution Panels



NOTE The PDU is shown with four subfeed breakers. However, the installed configuration may contain one to four subfeed breakers.

Figure A-42. Power Terminal Locations – Left or Right Side-Facing Sidecar with Subfeed Breakers

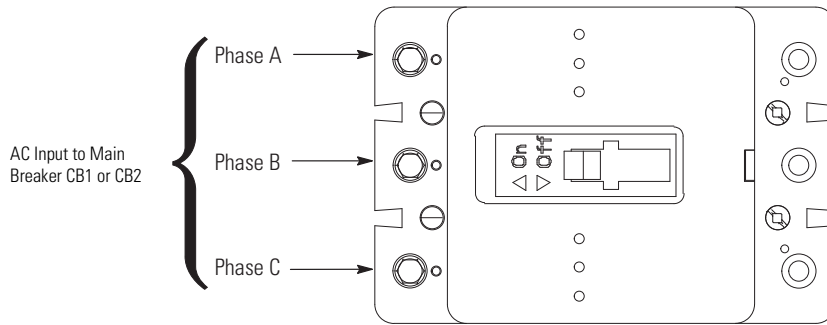


Figure A-43. Power Terminal Locations – “F” Frame PDU Input Main Breaker CB1 or CB2 Terminal Detail

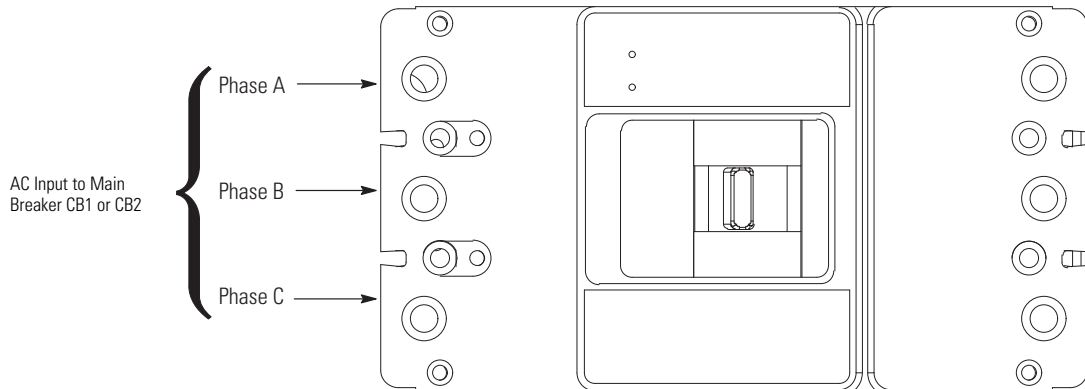


Figure A-44. Power Terminal Locations – “K” Frame PDU Input Main Breaker CB1 or CB2 Terminal Detail

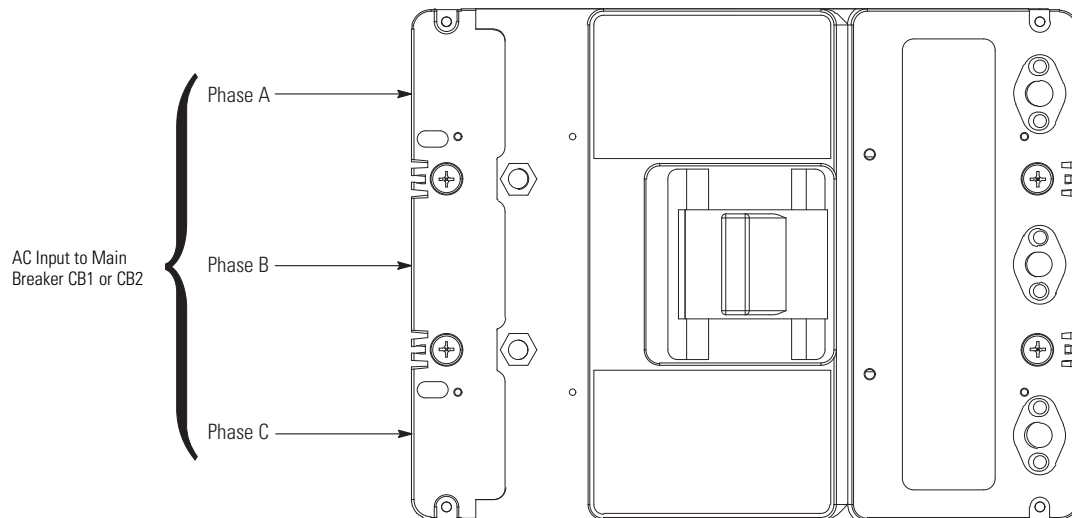


Figure A-45. Power Terminal Locations – “L” Frame PDU Input Main Breaker CB1 or CB2 Terminal Detail

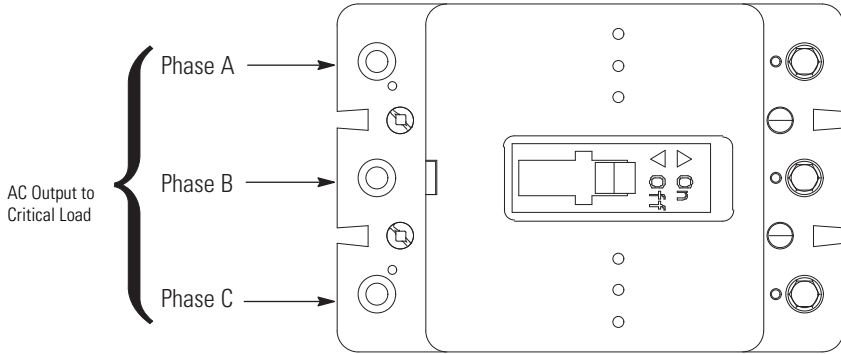


Figure A-46. Power Terminal Locations – “F” Frame Output Subfeed Breaker Terminal Detail

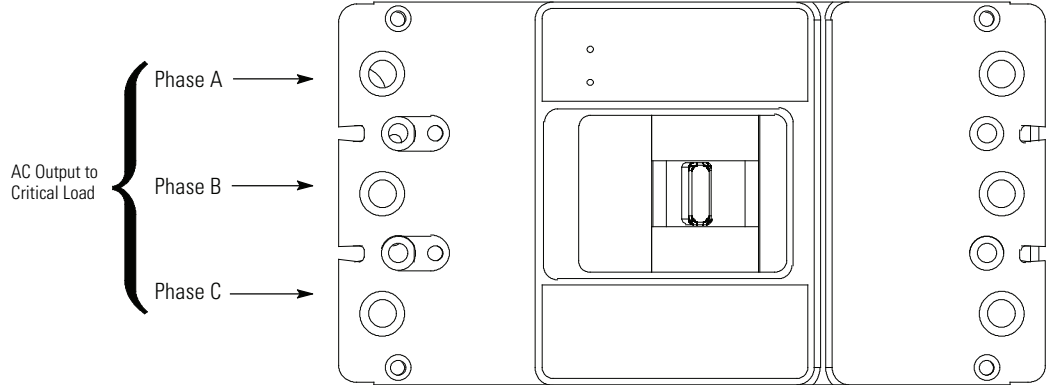


Figure A-47. Power Terminal Locations – “K” Frame Output Subfeed Breaker Terminal Detail

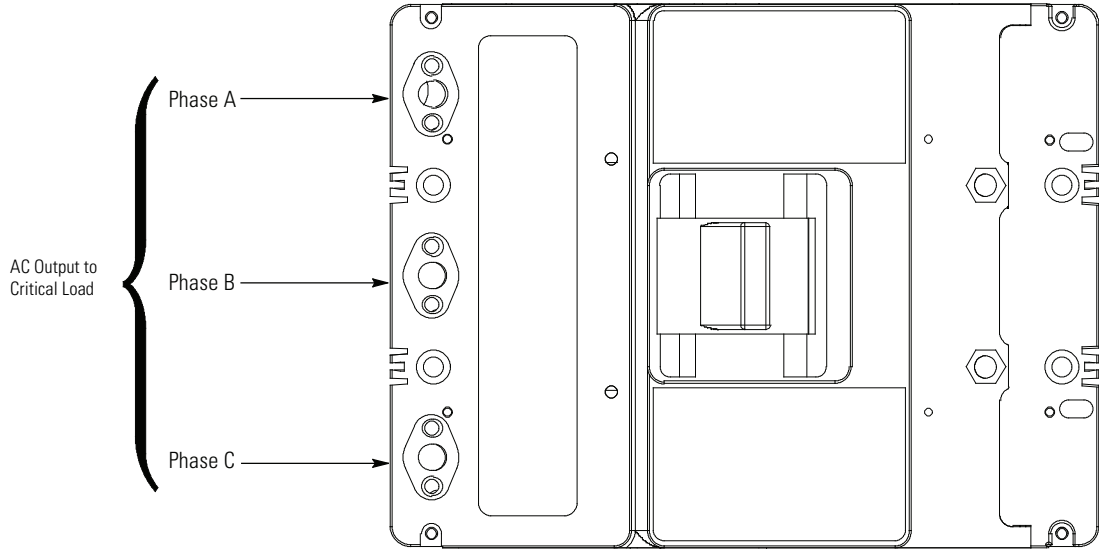


Figure A-48. Power Terminal Locations – “L” Frame Output Subfeed Breaker Terminal Detail

A.6 Interface Wiring Notes

Control wiring for features and options should be connected at the customer interface terminal blocks located inside the PDU.

 **WARNING**

Do not directly connect relay contacts to the mains related circuits. Reinforced insulation to the mains is required.

 **WARNING**

Alarm relay contacts should not be operated in excess of 30 Vac @ 5A maximum.

1. Use Class 1 wiring methods (as defined by the NEC) for interface wiring up to 30V. The wire should be rated at 24V, 1A minimum.
2. Use Class 2 wiring methods (as defined by the NEC) for interface wiring from 30 to 600V. The wire should be rated at 600 volts, 1A minimum and 12 AWG maximum.
3. Use twisted-pair wires for each input and return or common.
4. All interface wiring and conduit is to be provided by the customer.
5. When installing external interface wiring (for example, building alarm, relay output, and X-Slot) to the PDU interface terminals, conduit must be installed between each device and the PDU cabinet.
6. Install the interface wiring in separate conduit from the power wiring.
7. All building alarm inputs require an isolated normally-open or normally-closed contact or switch (rated at 24 Vdc, 20 mA minimum) connected between the alarm input and common terminal. Building alarm inputs can be programmed for use with either normally-open or normally-closed contacts. All relay and switch contacts are customer-supplied.
8. The building alarms can be programmed to display the alarm functional name using the front panel LCD.
9. Alarm relay contacts have a maximum current rating of 5A and a switched voltage rating of 30 Vac and 28 Vdc.
10. Alarm relay wiring should be a minimum of 22 AWG.
11. See Table W, Figure A-49 through Figure A-59, and Chapters 3 and 7 for interface wiring.
12. LAN drops for use with X-Slot connectivity cards must be provided by facility planners or the customer.

Table W. UCB TB1 and TB2 Interface Connections

TB1 Terminal	Name	Description
1	Building Alarm 1	Input: Programmable PDU alarm, activated by a remote dry contact closure. Building alarm inputs can be programmed for use with either normally-open or normally-closed contacts.
2	Building Alarm 1 Return	
3	Building Alarm 2	Input: Programmable PDU alarm, activated by a remote dry contact closure. Building alarm inputs can be programmed for use with either normally-open or normally-closed contacts.
4	Building Alarm 2 Return	
5	REPO	Input: normally-open or normally-closed dry contact used to activate PDU EPO from a remote switch. The factory default configuration is set up for use with a normally-open switch. To use a normally-closed switch, the configuration must be changed during setup by an Eaton Customer Service Engineer.
6	REPO Return	
NOTE "Return" indicates connection to electronics circuit ground. "Common" indicates connection to common side of isolated relay contact.		

Table W. UCB TB1 and TB2 Interface Connections

TB1 Terminal	Name	Description
7	Local EPO	NOT USED
8	Local EPO Return	
TB2 Terminal	Name	Description
1	Alarm Relay Common	Output: General purpose normally-open (NO) and normally-closed (NC) relay
2	Alarm Relay NO	contacts. Set by default to signal when a panelboard or subfeed breaker
3	Alarm Relay NC	overload occurs.
NOTE "Return" indicates connection to electronics circuit ground. "Common" indicates connection to common side of isolated relay contact.		

Table X. PDU Aux & Shunt Trip Wiring Terminal Block Terminations

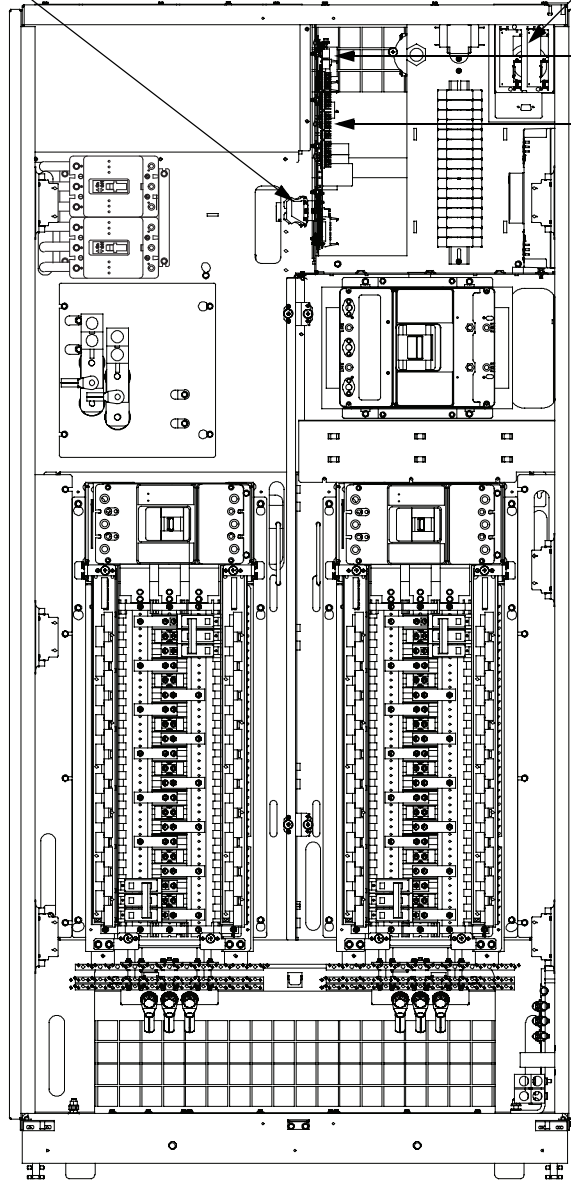
Terminal Function	Rating	Size of Pressure Termination	Tightening Torque Nm (lb in)	Type Screw	Comment
Shunt Trip or Auxiliary Contacts	600V, 20A	#26-#12	0.4 (3.5) - 0.8 (7.1)	Slotted	Use twisted-pair wires for each input and return or common. Strip wire insulation back 10 millimeters to wire terminal blocks.

Optional Aux and Shunt Trip Terminal Blocks for Unmonitored Subfeed Breakers. See Figure A-52 for details.

X-Slot Communication Bay

Terminals TB1 and TB2
(See Figure A-58 for details.)

UCB



NOTE The PDU is shown with both left and right distribution panels. However, the locations of the interface terminals are the same for all configurations.

Figure A-49. PDU Interface Terminal Locations for Unmonitored Subfeed Breaker Monitoring

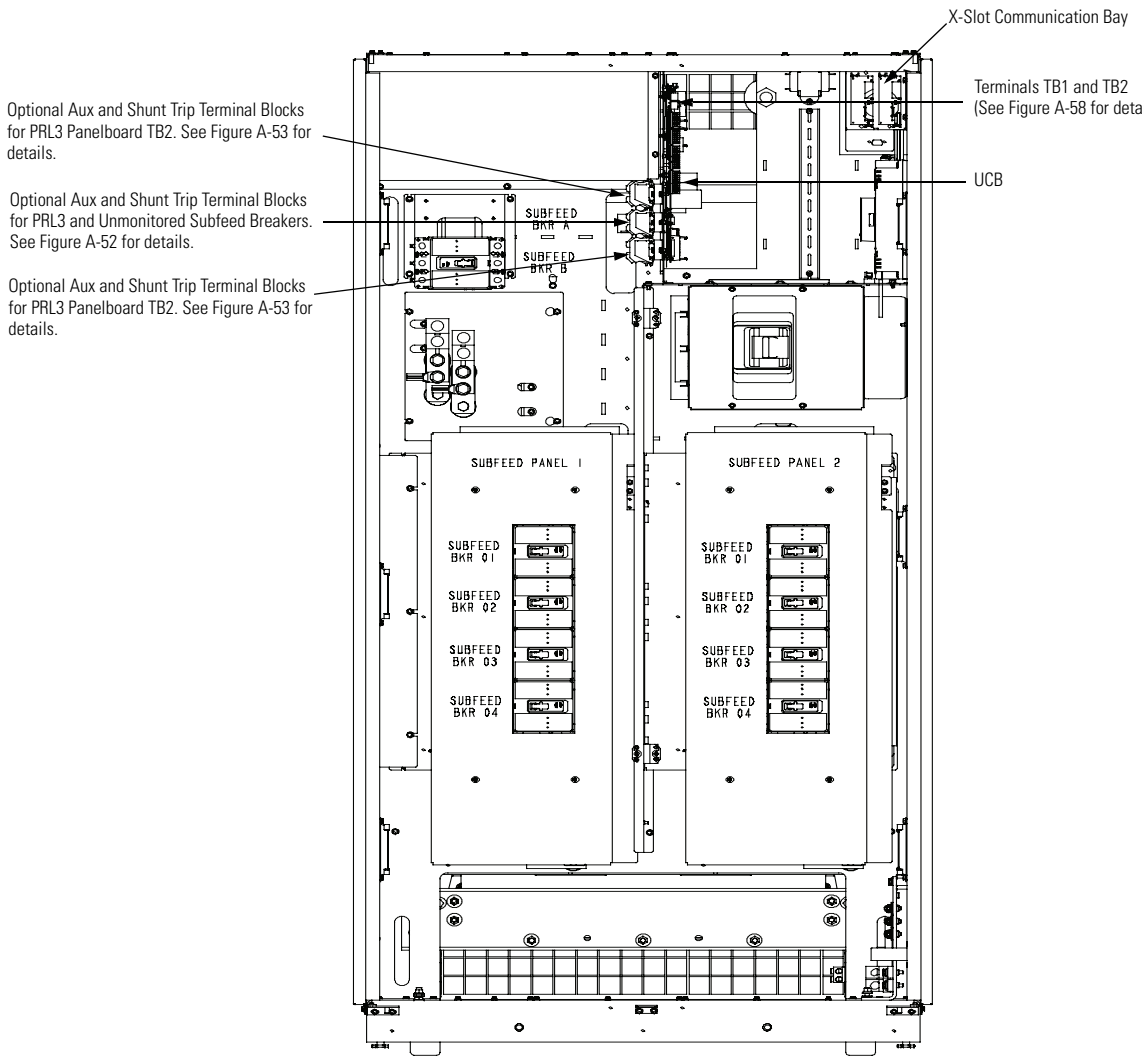


Figure A-50. PDU Interface Terminal Locations for Two PRL3 and Subfeed Breaker Monitoring

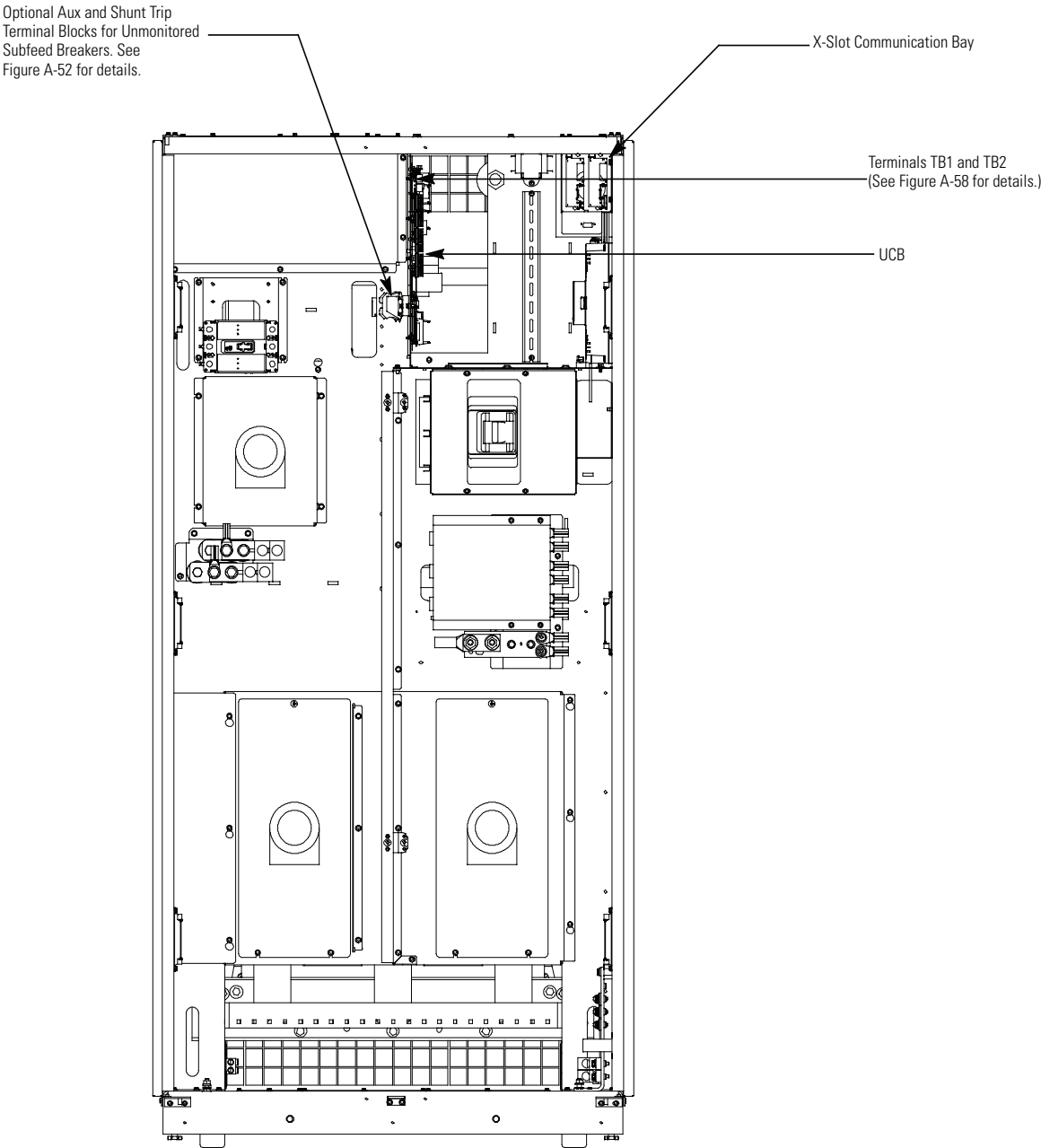


Figure A-51. PDU Interface Terminal Location for No Panelboards

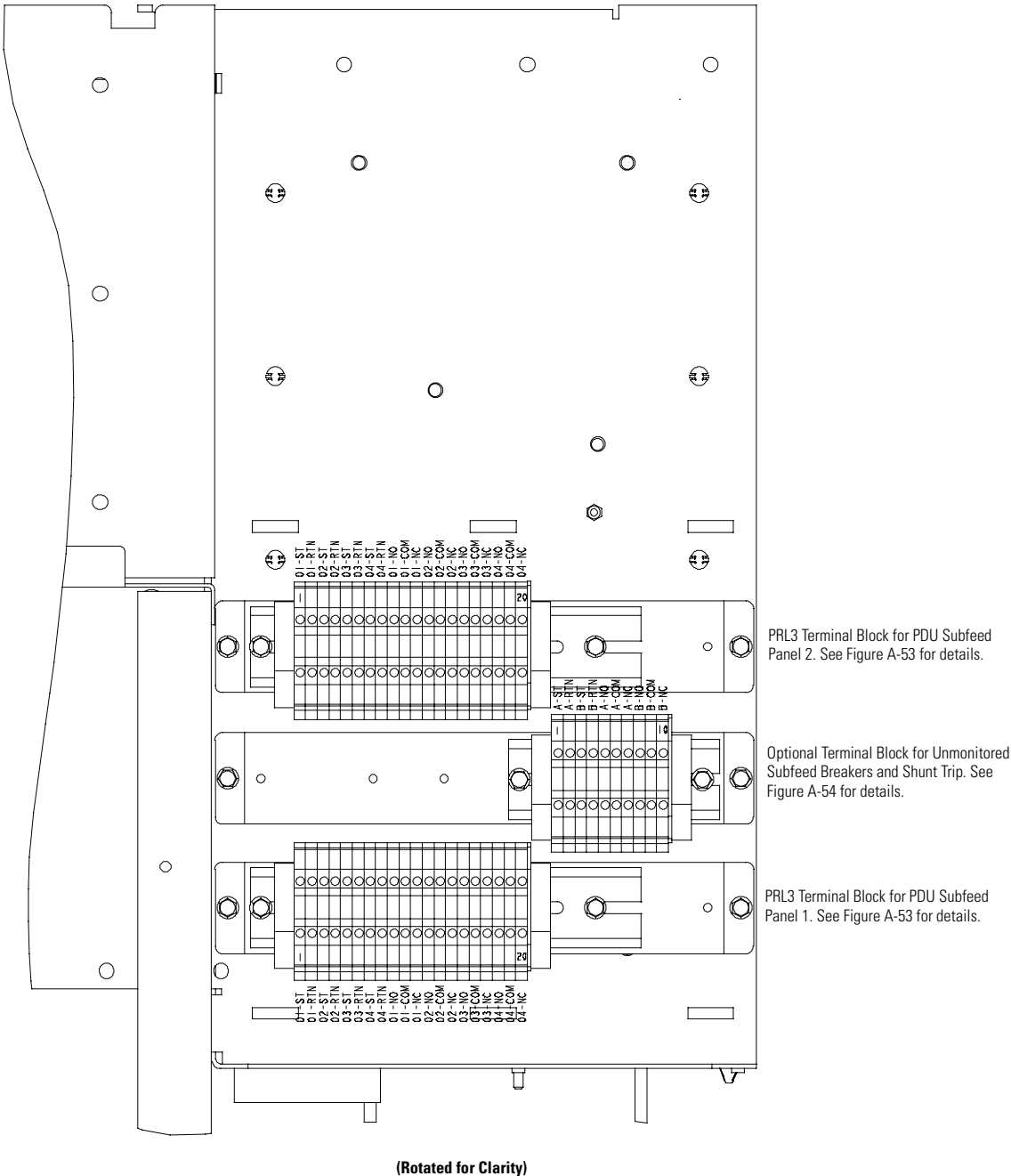
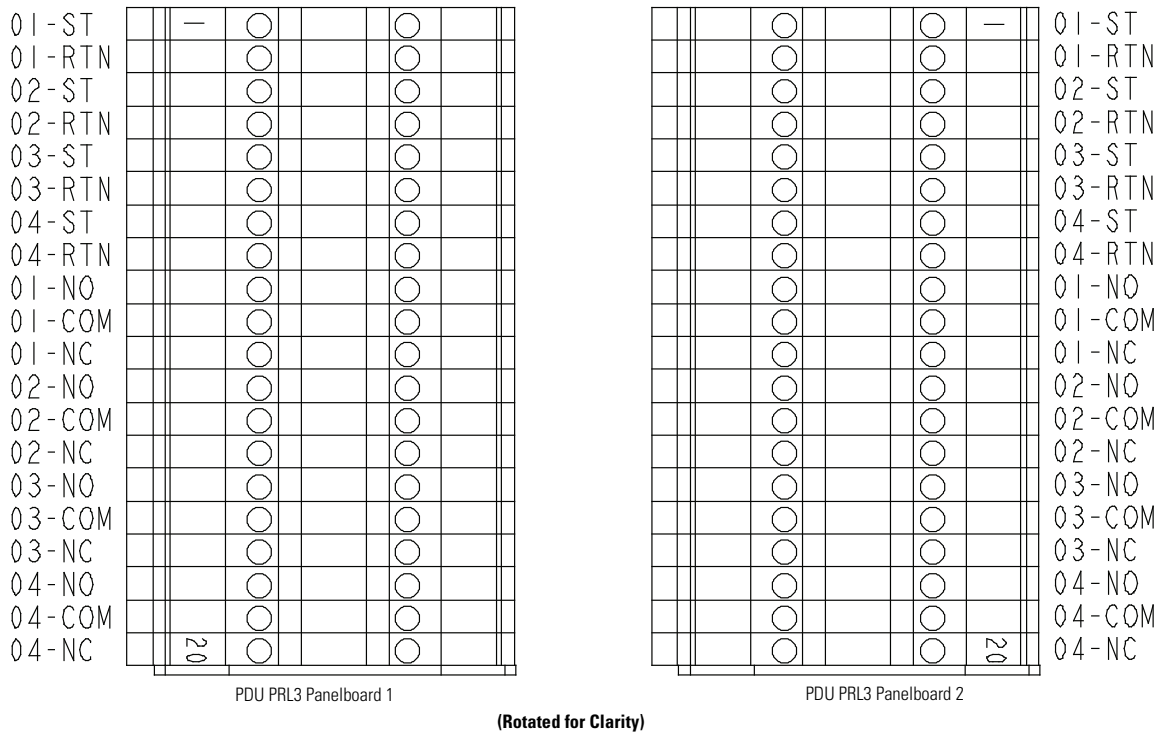
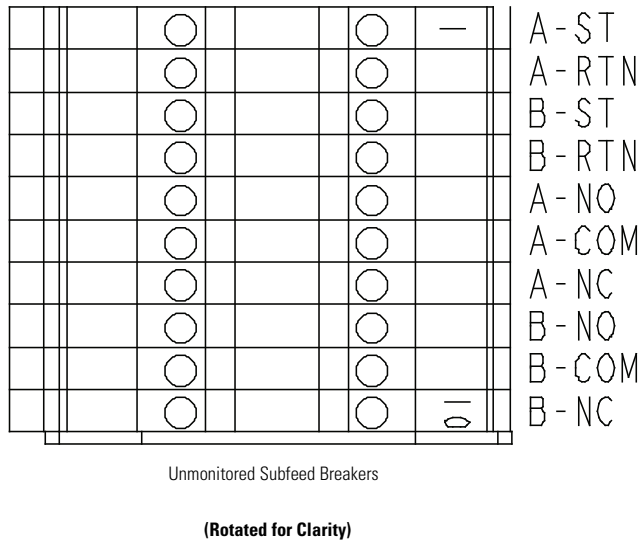


Figure A-52. Terminal Blocks for PRL3 and Optional Unmonitored Subfeed Breaker Monitoring



NOTE Numbers in terminal designation indicate PRL3 panelboard breaker number as shown in Figure A-50.

Figure A-53. PRL3 Terminal Block Detail



NOTE First letter in terminal designation indicates unmonitored subfeed breaker letter as shown in Figure A-50.

Figure A-54. Unmonitored Subfeed Breaker Terminal Block Detail

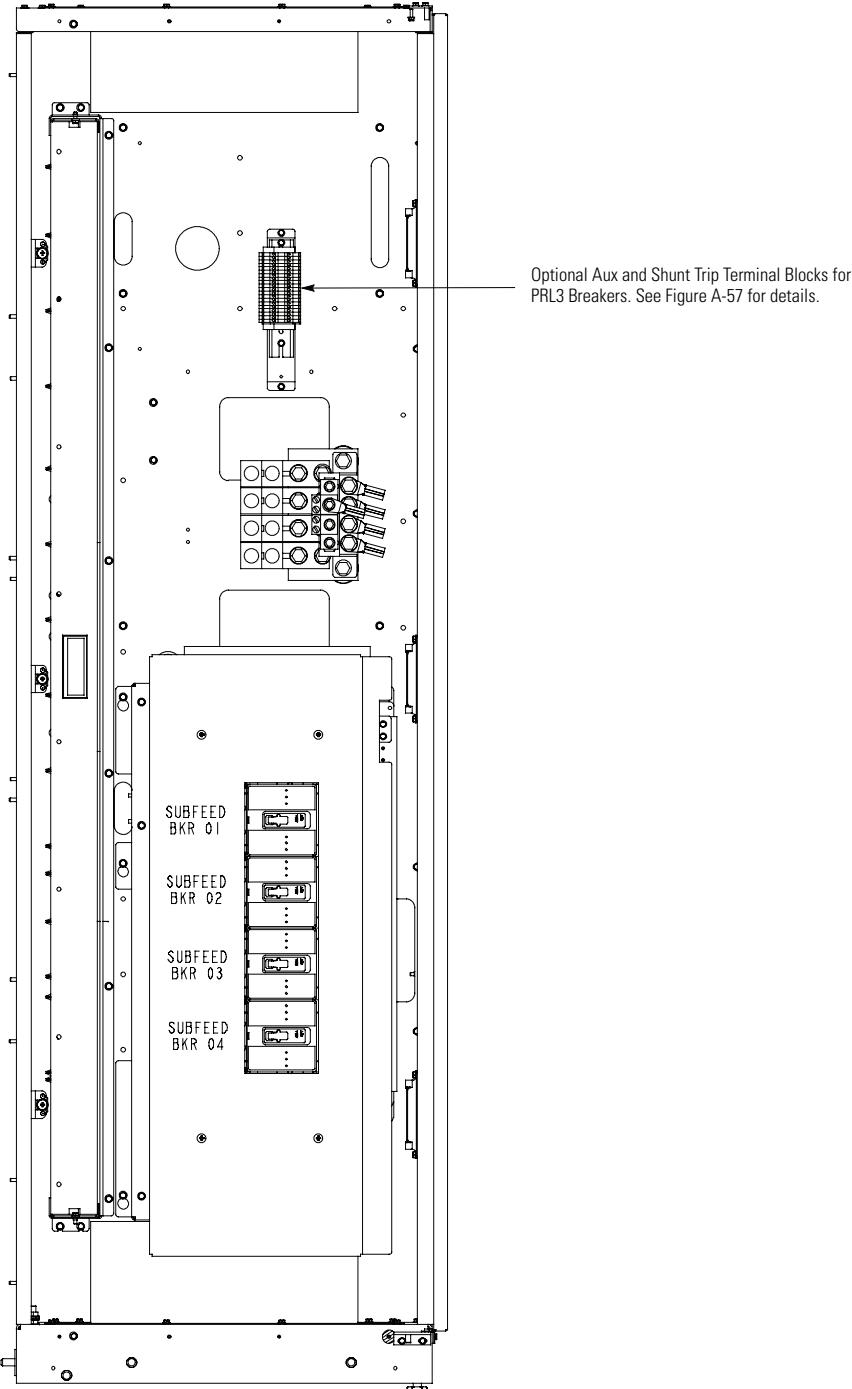


Figure A-55. Front Facing Sidecar Interface Terminal Location

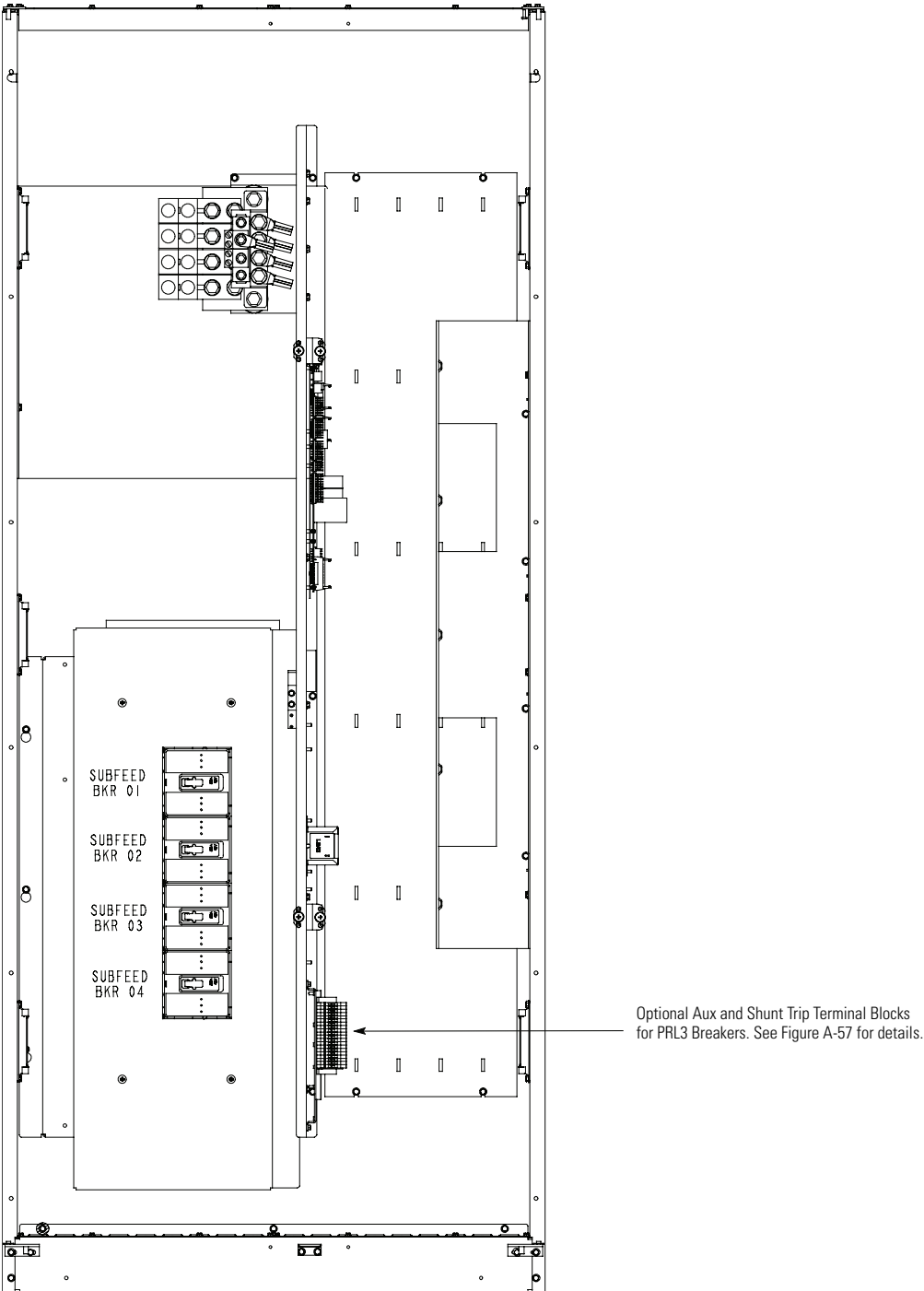
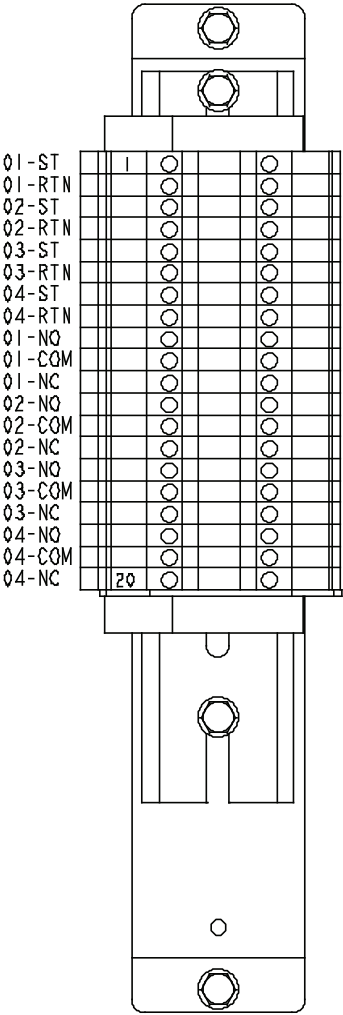
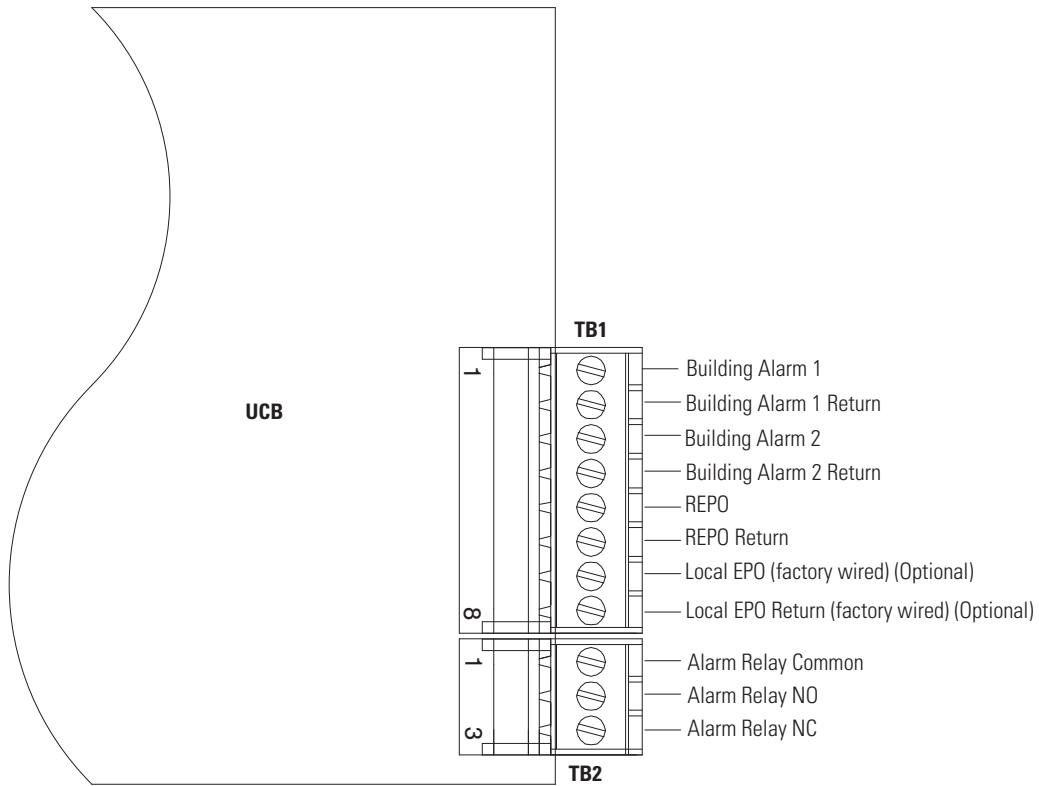


Figure A-56. Side Facing Sidecar Interface Terminal Location



NOTE Numbers in terminal designation indicate PRL3 panelboard breaker number as shown in Figure A-55 or Figure A-56.

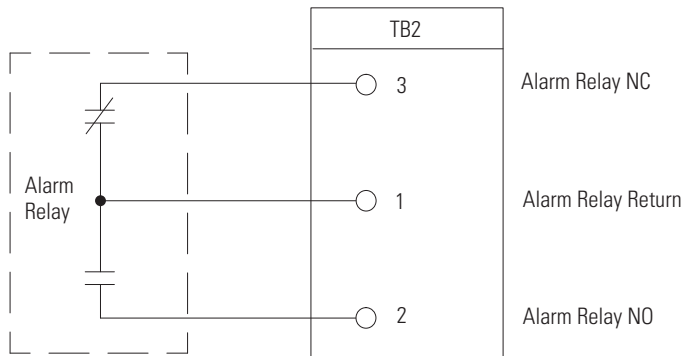
Figure A-57. Terminal Block for Front and Side Mounted Sidecar PRL3 Aux and Shunt Trip Option



NOTE All building alarm inputs require an isolated normally-open or normally-closed contact or switch (rated at 24 Vdc, 20 mA minimum) connected between the alarm input and common terminal as shown. Building alarm inputs can be programmed for use with either normally-open or normally-closed contacts. All control wiring and relay and switch contacts are customer-supplied.

NOTE The building alarms can be programmed to display the alarm functional name using the front panel LCD controls.

Figure A-58. PDU Interface Terminal Detail



NOTE Alarm relay contacts have a maximum current rating of 5A and a switched voltage rating of 30 Vac and 28 Vdc.

NOTE Alarm relay wiring should be a minimum of 22 AWG.

NOTE Do not directly connect relay contacts to the mains related circuits. Reinforced insulation to the mains is required.

NOTE Relay is shown in de-energized state. By default, the relay changes state when a panelboard or subfeed breaker overload occurs.

Figure A-59. Typical Alarm Relay Connection

A.7 Optional Remote Emergency Power-off (REPO)

The REPO feature opens the PDU main input breaker CB1 (or CB2 if installed) and isolates power from the critical load. Local electrical codes may also require tripping upstream protective devices to the PDU.

1. This switch must be a normally-open or normally-closed latching-type switch not tied into any other circuits. The factory default configuration is set up for use with a normally-open switch. To use a normally-closed switch, the configuration must be changed during setup by an Eaton Customer Service Engineer.
2. The REPO switch rating is 24 Vdc, 1A minimum.
3. REPO wiring should be a minimum of 22 AWG and a maximum of 14 AWG.
4. The REPO switch wiring must be in accordance with NEC Article 725 Class 2 requirements.
5. The maximum distance between the REPO and the PDU cannot exceed 150m (500 ft).
6. See Table W, Figure A-60 or Figure A-61, and Chapter 4 for REPO interface wiring.
7. See Figure A-62 for the optional Eaton REPO switch.

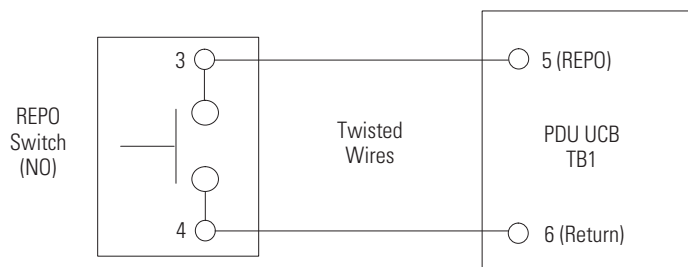


Figure A-60. REPO Wiring – Normally Open Switch

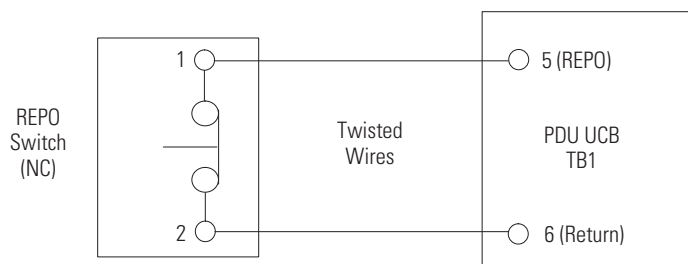
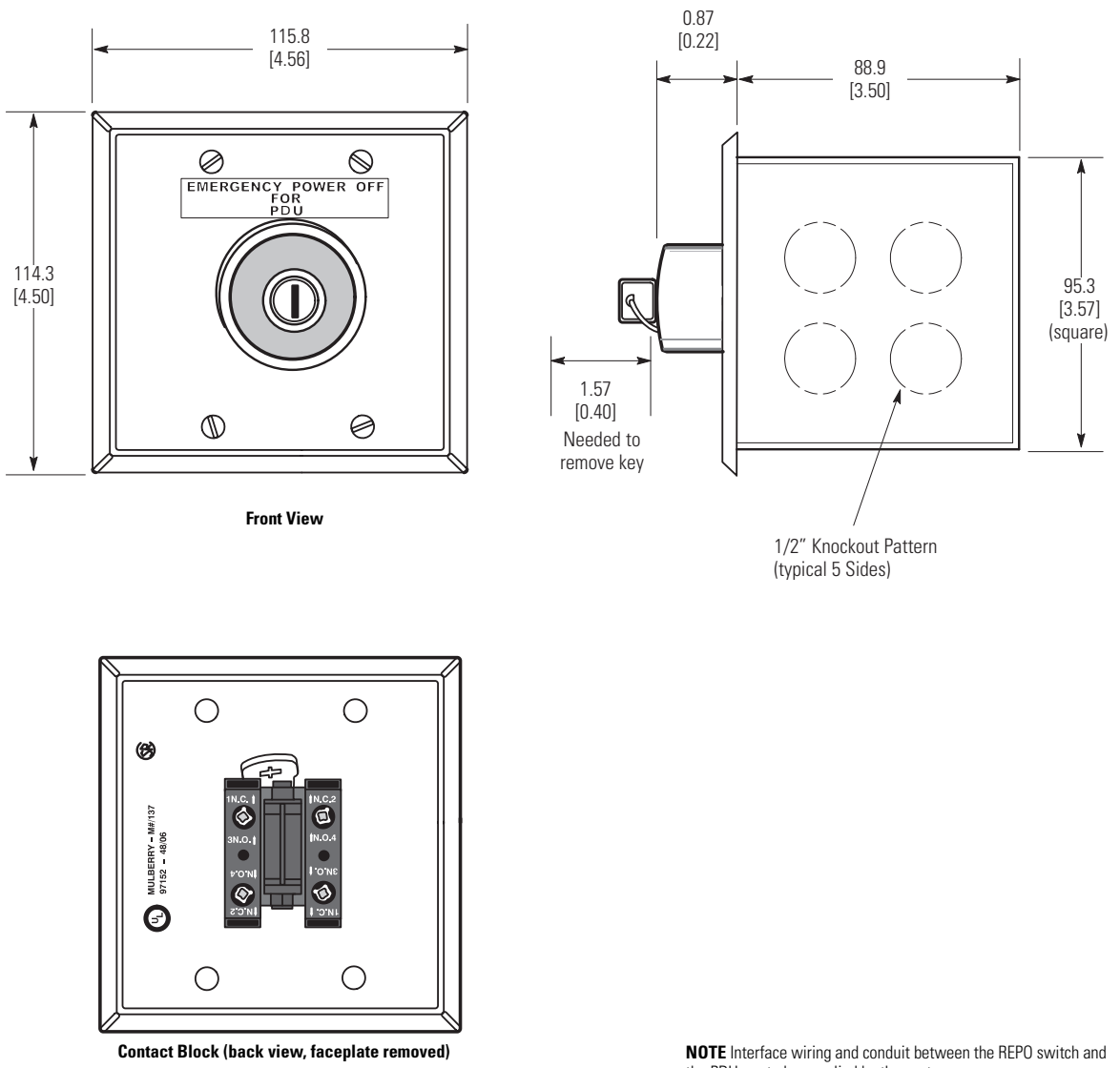


Figure A-61. REPO Wiring – Normally Closed Switch



NOTE Interface wiring and conduit between the REPO switch and the PDU are to be supplied by the customer.

Dimensions are in millimeters (inches).

Figure A-62. Optional Eaton REPO Switch

A.8 Optional Floor Mounting Brackets

Front and rear floor mounting brackets can be installed to permanently secure the PDU to the facility floor. The floor mounting brackets only attach to the main cabinet. The sidecars are stabilized by their leveling screws.

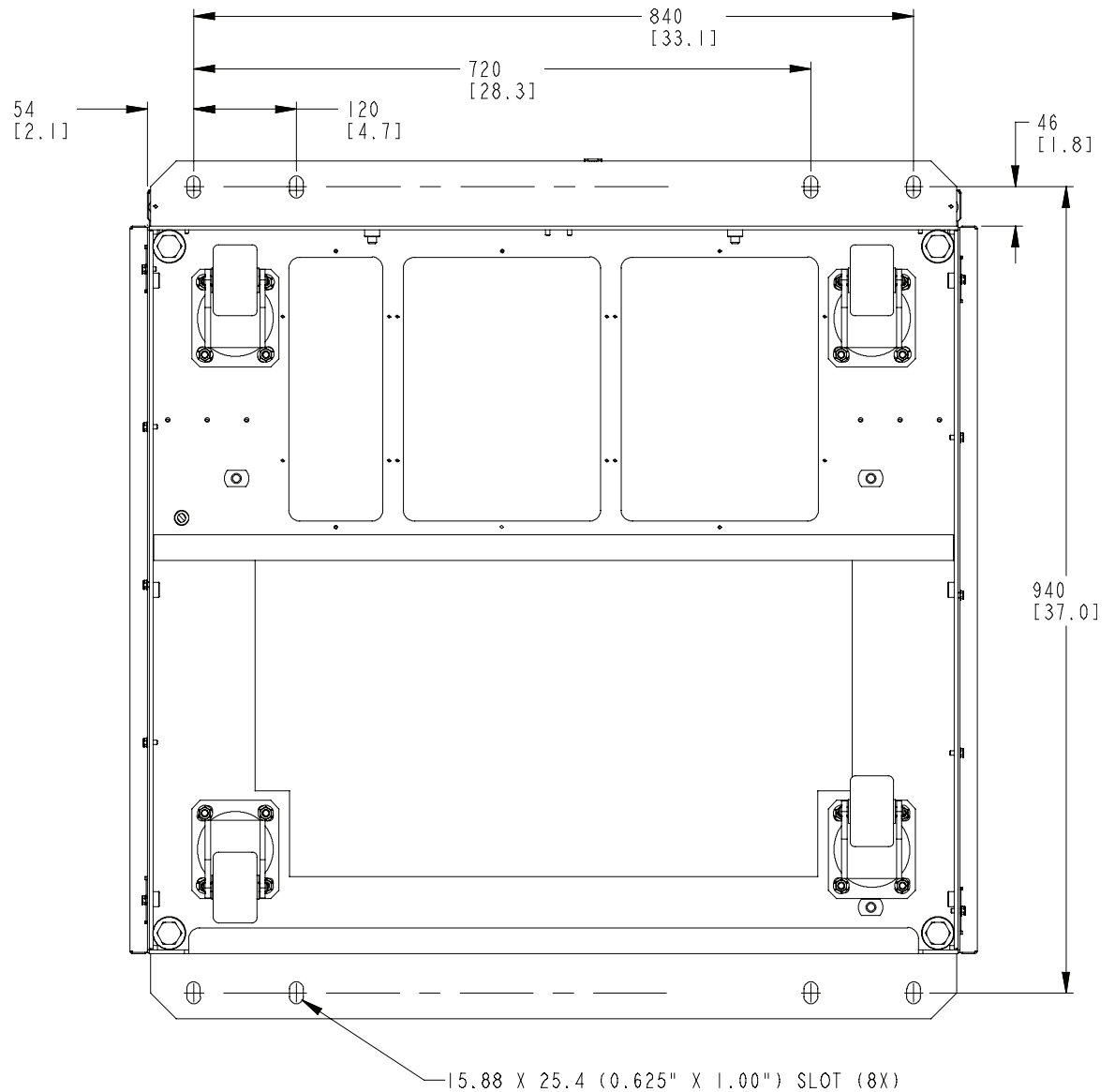


Figure A-63. Optional Floor Mounting Bracket Dimensions

A.9 Optional Floorstand

A floorstand can be used to support the PDU when installed in facilities with raised floors that will not support the weight of the PDU directly (see Figure A-64 through Figure A-66). The floorstand supports only the main cabinet. Because the sidecars are not weight bearing items they are supported on the floor by their attached leveling feet.

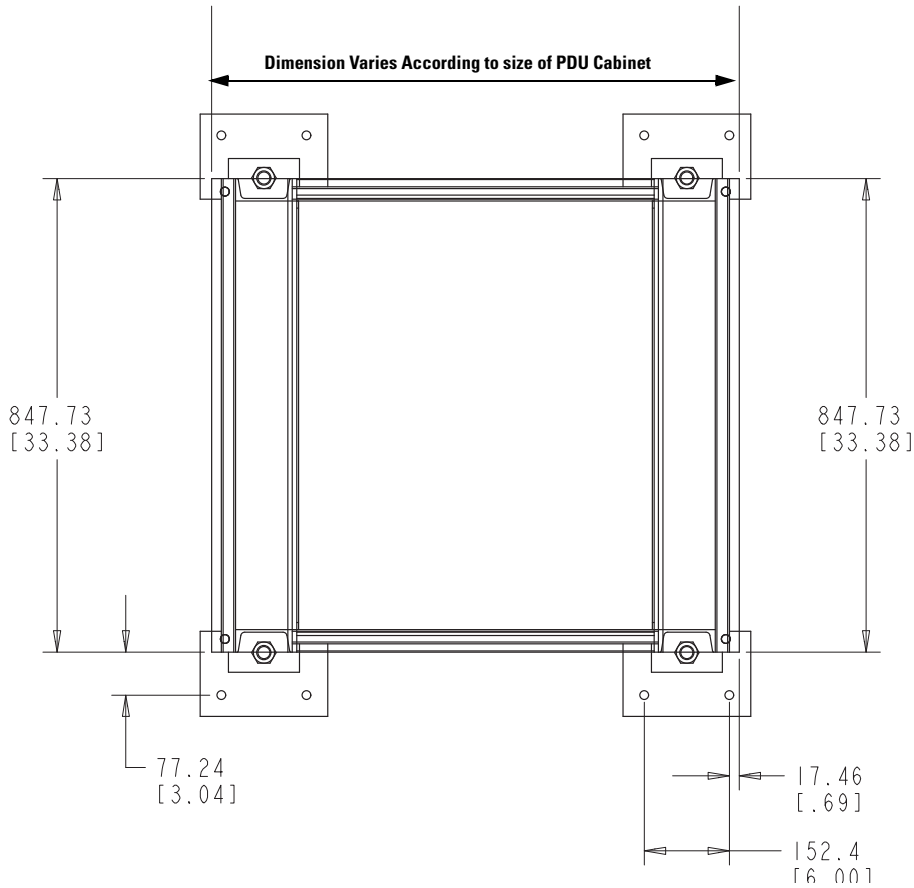
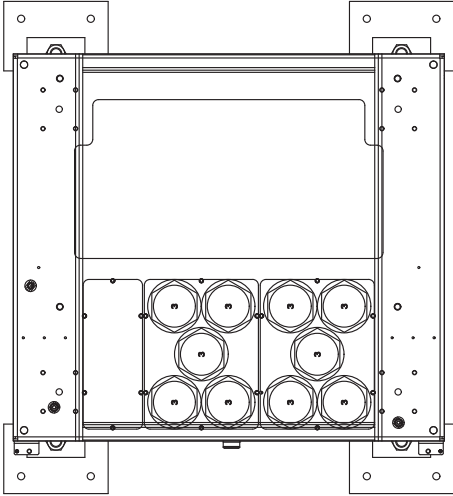


Figure A-64. Optional Floorstand Dimensions



**Top View of PDU
Base Mounted
on Floorstand**

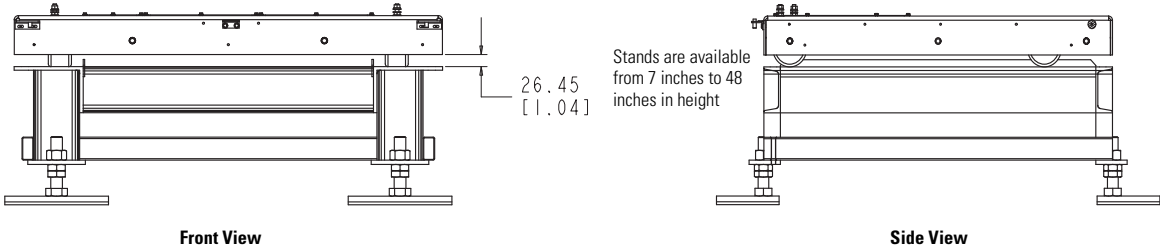


Figure A-65. Optional Floorstand Mounting Views

Installation Reference

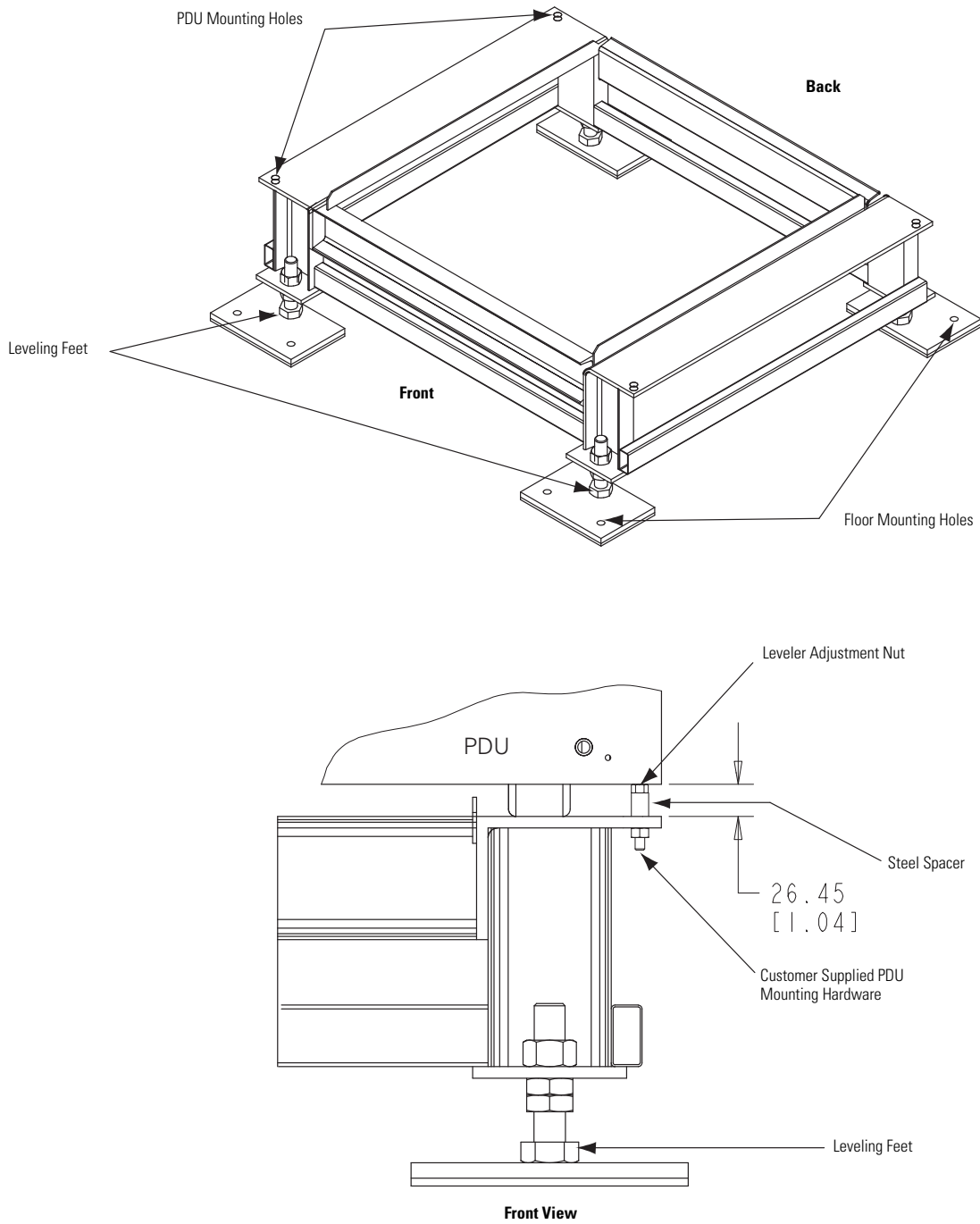


Figure A-66. Optional Floorstand Mounting Features

A.10 Optional Air Skirt

An air skirt can be installed around the perimeter of the PDU Main Unit and any sidecars installed with the PDU. An air skirt helps contain air flow under the PDU. See Figure A-67 and Figure A-68 for air skirt installation illustrations.

⚠ CAUTION

Because the PDU uses bottom to top convection cooling, use air skirts **ONLY** when the PDU is installed on a raised floor where the raised floor acts as a plenum and provides adequate air flow to the PDU. The air skirts are used to keep forced air from escaping, but will block intake cooling air if installed on a concrete or similar non-raised flat floor. Inadequate intake air flow will cause the PDU to overheat

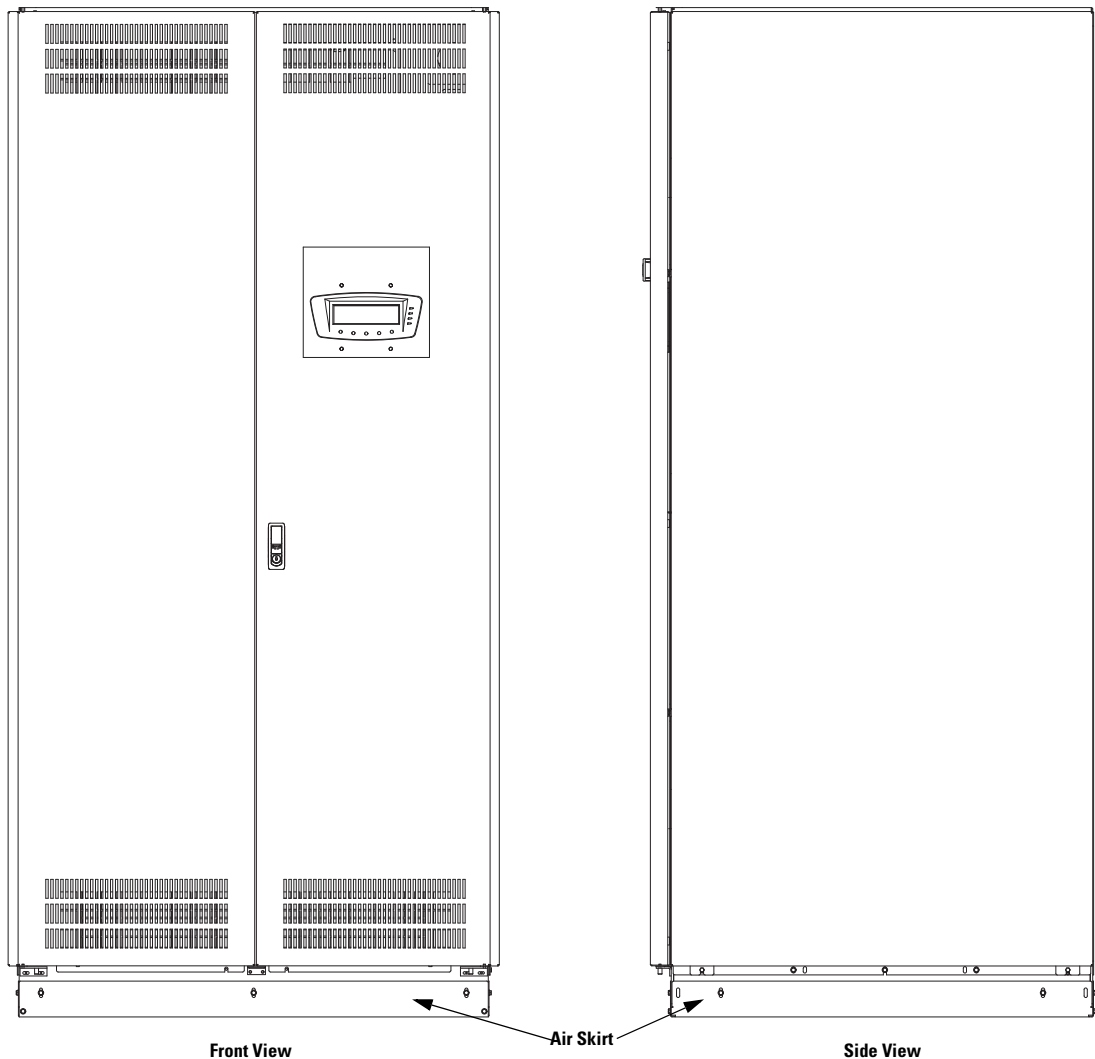


Figure A-67. 150 kVA PDU Main Unit with Optional Air Skirt Installed (Front and Side View)

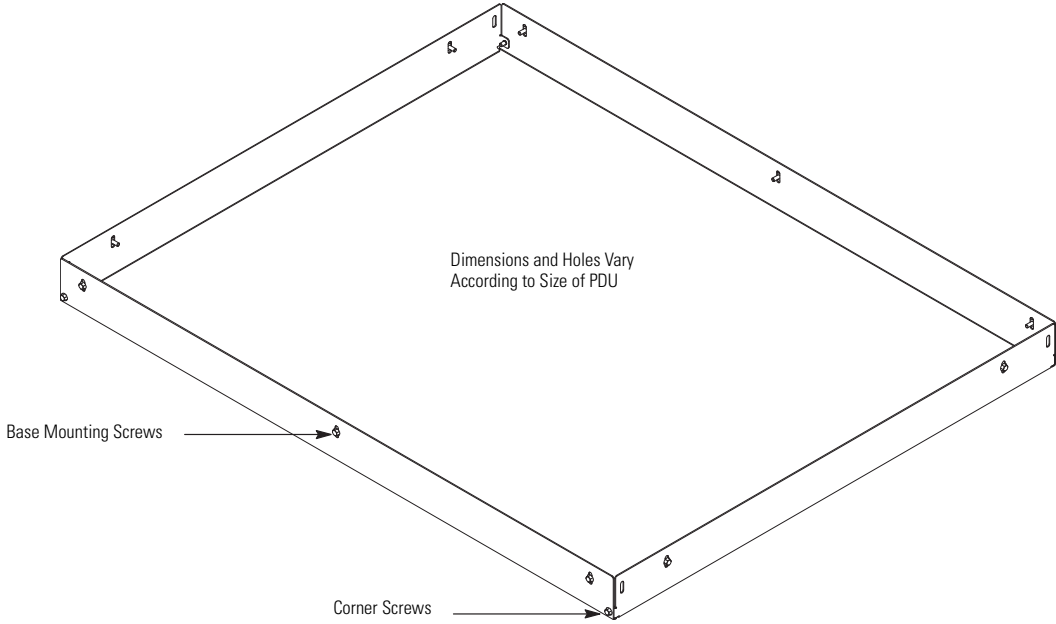


Figure A-68. Typical Air Skirt for 150 kVA PDU



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