

Eaton® Three-Phase Power Distribution Unit (PDU)

400-500 kVA

Installation and Operation Manual



Powering Business Worldwide

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400-500 kVA

Installation and Operation Manual

Includes all 400-500 kVA PDU Models



Powering Business Worldwide

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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.

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Chapter 1 Introduction

The Eaton® 400-500 kVA Three-Phase Power Distribution Units (Eaton 400-500 kVA PDUs) 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. Figure 1-1 through Figure 1-2 show the Eaton 400-500 kVA PDUs.

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 startup service is quoted as a separate item on 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 standard 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.

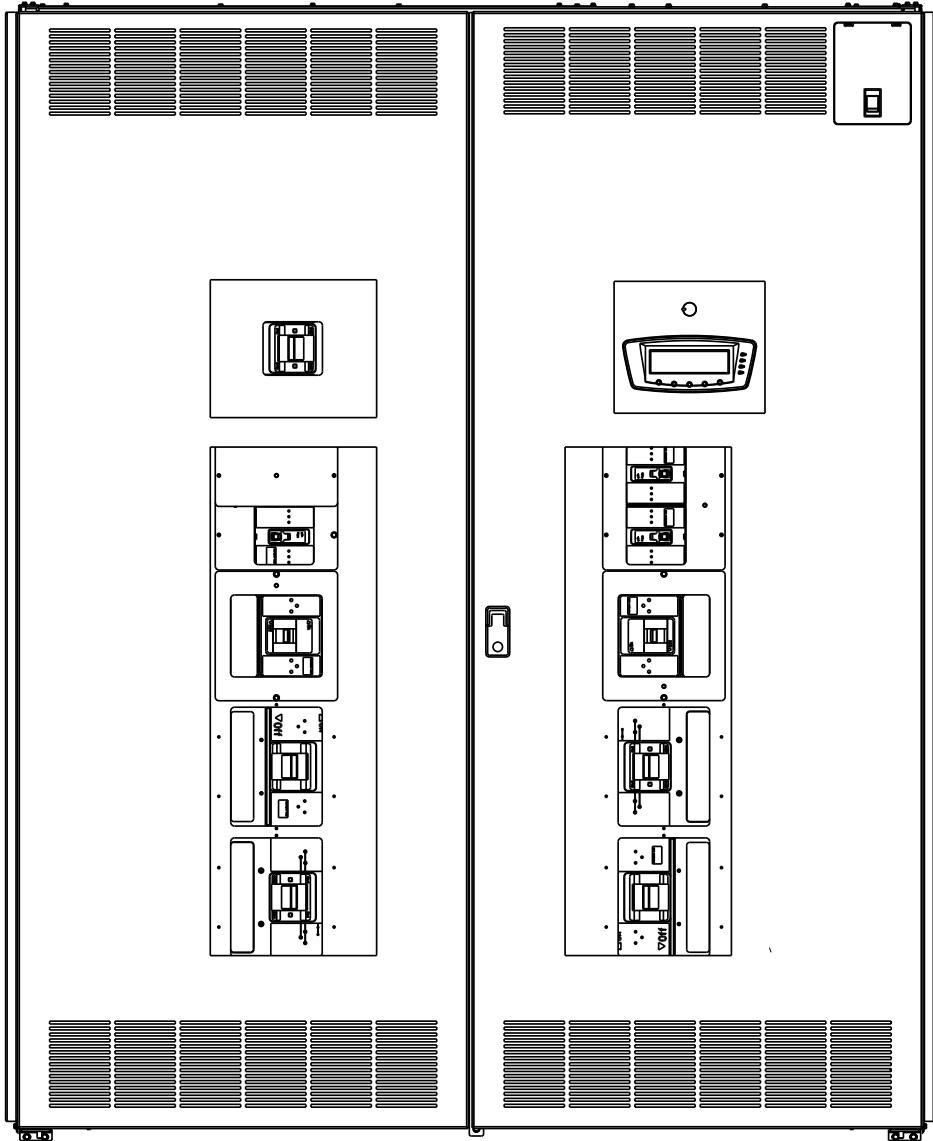


Figure 1-1. Eaton 400-500 kVA PDU Cabinet

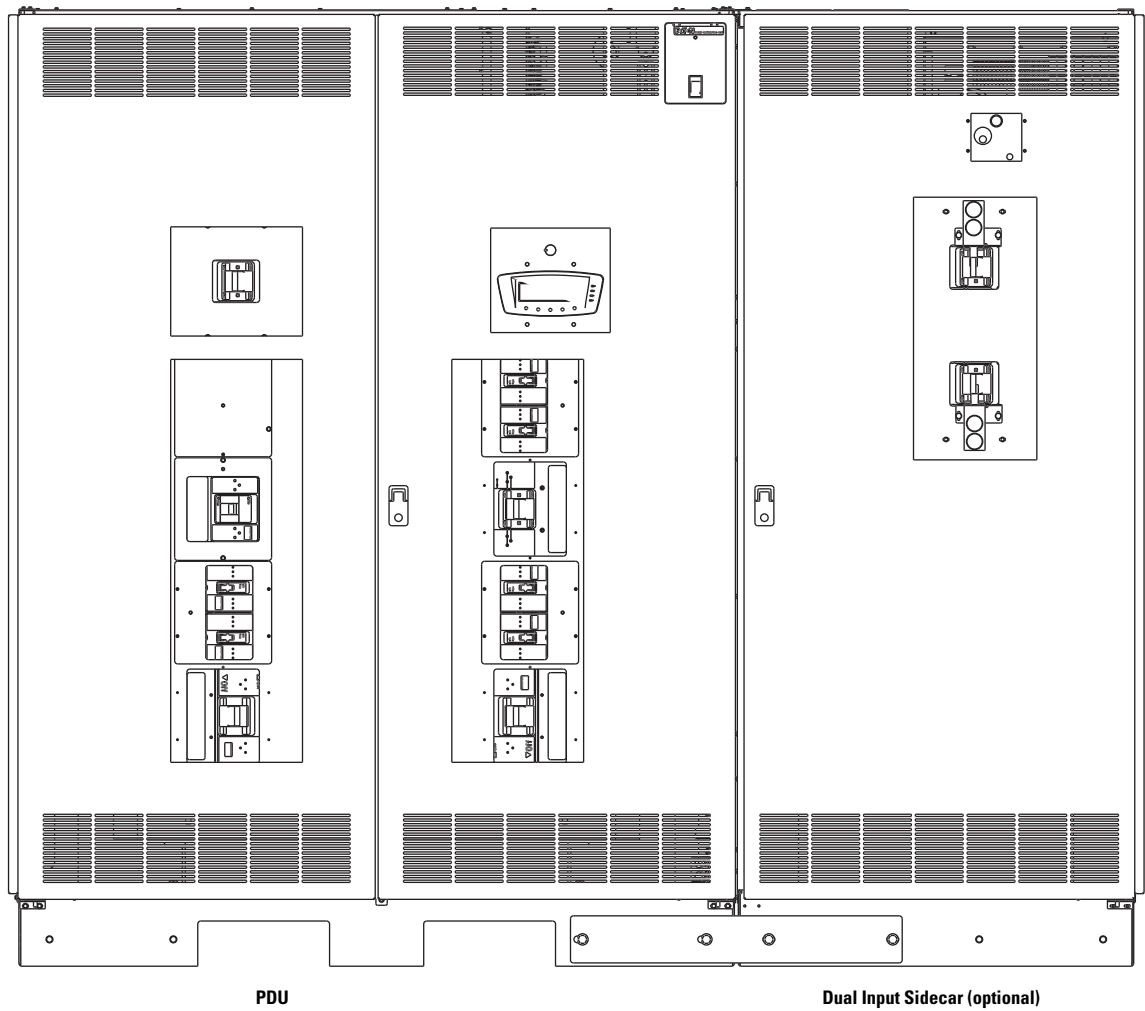


Figure 1-2. Eaton 400-500 kVA PDU Cabinet with Dual-Input Sidecar

1.1.3 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 480 Vac input for use with the distribution 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.

1.1.4 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.

1.1.5 Fault Monitoring

The following conditions can initiate a PDU shutdown and trip the PDU main input breaker CB1 (or CB2 if installed). 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.

1.1.6 Installation Features

Cabinets can be permanently bolted to the floor or left standing on its base.

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.

1.1.7 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 Subfeed Breakers

Subfeed output circuit breakers distribute the output power from the output transformer to the loads or remote power panels. The output distribution will accommodate breaker frame sizes of 225A, 400A, 600A and 800A.

1.2.2 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.

1.2.3 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.

1.2.4 Lightning Arrestor

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

1.2.5 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.

1.2.6 Subfeed Circuit Monitoring

The Eaton Energy Management System (EMS) Premium metering (EMS Premium metering) is designed to provide circuit monitoring features for Eaton PDUs. The unique benefits include the following:

- Monitors voltage and current for subfeed breakers.
- Eaton EMS is designed to measure and store the energy parameter for each of the outputs delivered to the customer's load.

1.2.7 Optional X-Slot Cards

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

1.2.8 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.

See Chapter 6, “PDU Operating Instructions,” for REPO operation.

1.2.9 Floor Mounting Brackets

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

1.3 Configurations

The following PDU configurations are possible for an output range of 400-500 kVA with K13 and K20 transformers:

- 480V Input and 208/120V output:
 - 100A to 225A breakers (16 max)
 - 250A to 400A breakers (8 max)
 - 450A to 600A breakers (8 max)
 - 600A to 800A breakers (6 max)
 - combinations of the previously listed breakers

1.4 Using This Manual

This manual describes how to install and operate the Eaton 400-500 kVA PDUs. 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.7, Figure A-1 through Figure A-20, and Table A through Table H 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. 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.

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 in excessive humidity (95% non-condensing 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.
 - Observe all DANGER, CAUTION, and WARNING notices affixed to the inside and outside of the equipment.
-

 **DANGER!**

Des TENSIONS MORTELLES circulent dans ce système UPS. Toute réparation et tout entretien doivent être effectués par un PERSONNEL DE SERVICE AGRÉÉ UNIQUEMENT. L'onduleur UPS ne contient AUCUNE PIÈCE POUVANT ÊTRE RÉPARÉE PAR L'UTILISATEUR.

 **AVERTISSEMENT!**

- Pour réduire les risques d'incendie ou de choc électrique, installez ce système UPS dans une salle dotée d'un système de contrôle de la température et de l'humidité et dépourvue de contaminants conducteurs. La température ambiante ne doit pas dépasser 40° (104°F). Ne pas utiliser dans un environnement excessivement humide (95% maximum sans condensation). Ce système n'est pas prévu pour fonctionner à l'extérieur.
 - Pour réduire les risques d'incendie ou de choc électrique, installez ce système UPS dans une salle dotée d'un système de contrôle de la température et de l'humidité et dépourvue de contaminants conducteurs. La température ambiante ne doit pas dépasser 40° (104°F). Ne pas utiliser dans un environnement excessivement humide (95% maximum sans condensation). Ce système n'est pas prévu pour fonctionner à l'extérieur.
 - Assurez-vous que toute alimentation est débranchée avant d'effectuer des opérations d'installation ou d'entretien.
 - Du fait des charges connectées, un courant de fuite élevé est possible. Une mise à la terre est nécessaire pour des raisons de sécurité et un fonctionnement adéquat du produit.
 - Placez l'onduleur UPS sur une dalle de béton ou uniquement sur des surfaces non combustibles.
-

 **ATTENTION!**

- Gardez la porte de l'UPS fermée et les panneaux avant installés pour assurer une circulation d'air de refroidissement adéquate et pour protéger le personnel des tensions dangereuses existant à l'intérieur de l'unité.
 - N'installez pas et ne faites pas fonctionner le système UPS près de sources de chauffage au gaz ou électrique.
 - Le milieu de fonctionnement doit être maintenu dans les plages de paramètres indiqués dans ce manuel.
 - Assurez-vous que les environs ne sont pas encombrés, sont propres et dépourvus de toute humidité excessive.
 - Respectez tous les avis de DANGER, MISE EN GARDE et autre AVERTISSEMENT apposés à l'intérieur et à l'extérieur de l'équipement.
-

1.8 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:

1-800-356-5337

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

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 paragraphs A.1 through A.7, Figure A-1 through Figure A-20, and Table A through Table H 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-3 through Figure A-7.

The PDU uses natural convection cooling to regulate internal component temperature. Air inlets are in the front, base, and door of the cabinet and outlets are in the top and door (see Figure A-3 through Figure A-7). Provide clearance free of any obstructions in front of and above the PDU for proper air circulation. See Table B 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.

 **AVERTISSEMENT!**

Du fait des charges connectées, un courant de fuite élevé est possible. Une mise à la terre est nécessaire pour des raisons de sécurité et un fonctionnement adéquat du produit.

Wiring requirements for the PDU, including the minimum AWG size of external wiring, can be found in Table D.

2.3 Inspecting and Unpacking the PDU

2.3.1 Standard Pallet Unpacking Procedure

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

1. Carefully inspect the outer packaging for evidence of damage during transit.
2. Use a forklift to move the packaged cabinet to the installation site, or as close as possible, before unpacking. Insert the forklift forks under the pallet on the bottom of the unit.



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.

 **ATTENTION!**

Ne penchez pas l'armoire de plus de 10° par rapport à l'axe vertical pour éviter qu'elle ne se renverse.

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.

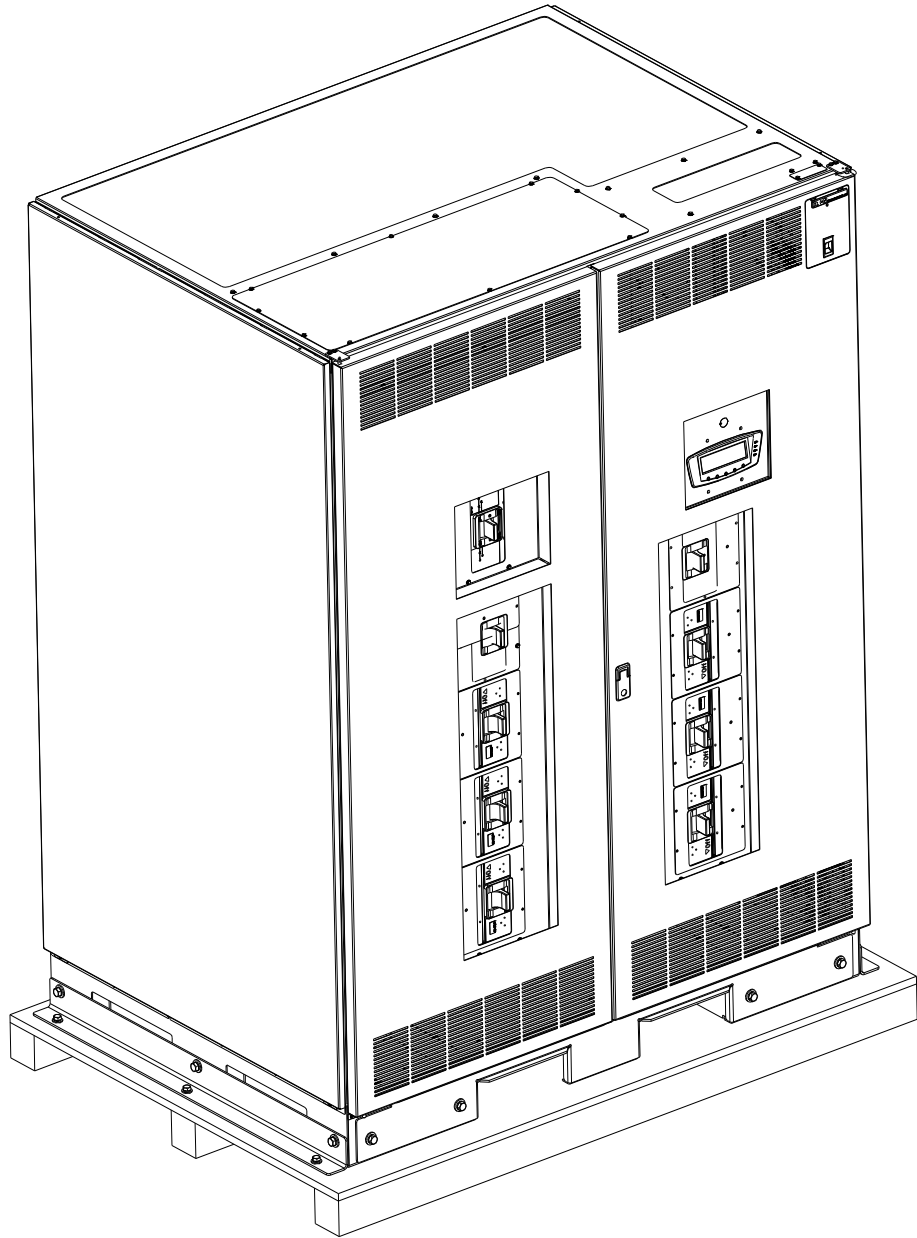


Figure 2-1. Eaton 400-500 kVA PDU on Standard Shipping Pallet

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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.7, Figure A-1 through Figure A-20, and Table A through Table H 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.



AVERTISSEMENT!

L'installation doit uniquement être effectuée par un personnel qualifié.

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 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 in Appendix A “Installation Reference,” at the back of this manual for equipment weight and point loading.

3.2 Unloading the PDU from the Pallet

3.2.1 Standard Pallet Unloading Procedure

The PDU cabinet is bolted to a pallet by two angle metal supports, one on each side.



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.

 **AVERTISSEMENT!**

- L'UPS est lourd (voir tableau A). Si les instructions de déchargement ne sont pas respectées attentivement, l'armoire peut engendrer de graves blessures.
 - N'installez pas une armoire endommagée. Signalez tout endommagement de l'armoire au transporteur et communiquez immédiatement avec un.
 - Ne penchez pas l'armoire de plus de 10° par rapport à l'axe vertical pour éviter qu'elle ne se renverse.
-



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 the pallet (see Figure 3-1).
-

 **CAUTION**

CABINET MAY TIP. Only raise the PDU cabinet as high as necessary to remove it from the pallet.

 **CAUTION**

CABINET MAY FALL. Do not loosen the hardware attaching the side supports to the cabinet base, or pallet, at this time.

 **ATTENTION!**

L'ARMOIRE POURRAIT BASCULER. Ne soulevez l'armoire de l'UPS qu'à la hauteur nécessaire pour l'enlever de la palette.

 **ATTENTION!**

L'ARMOIRE POURRAIT TOMBER. Ne desserrez pas la quincaillerie attachant le support avant à la base de l'armoire.

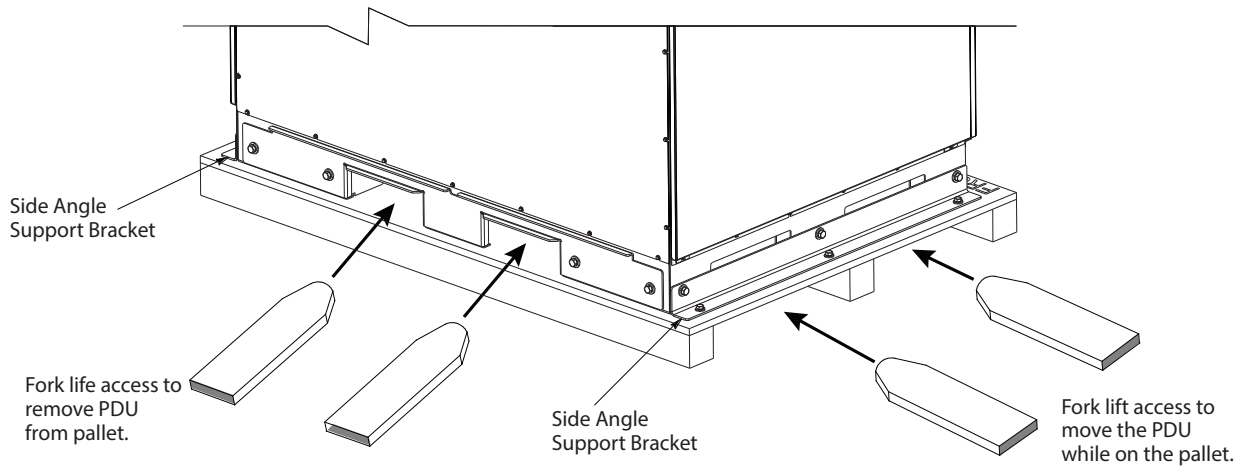


Figure 3-1. Locating Shipping Support Brackets on Standard Pallet

2. Remove the hardware holding the side angle support brackets to the cabinet base. Recycle the hardware and support brackets in a responsible manner.

NOTE Make sure that the shipping brackets are removed before final installation.

3. Remove the PDU from the pallet with a forklift and move the cabinet to the permanent installation location.
4. Is the PDU being installed with a dual input sidecar or onto a floorstand or in a permanent location?
 - If the PDU is being installed with a dual input sidecar, go to section 3.3.
 - If this is a floorstand installation, go to section 3.4.
 - If this is a permanent installation, go to Step 5.
5. Install the optional front and rear floor mounting brackets (see Figure A-20) according to the instructions provided with the floor mounting bracket kit.
6. Continue to section 3.4.

3.3 Installation with a Dual Input Sidecar

This section describes the standard unloading procedure and the procedure for routing internal wiring between the PDU and the Dual Input Sidecar.

3.3.1 Standard Pallet Unloading Procedure

The Dual Input Sidecar cabinet is bolted to a pallet by two angle metal supports, one on each side.

1. If not already moved, use a forklift to move the cabinet to the installation site, or as close as possible before unloading the pallet (see Figure 3-2).

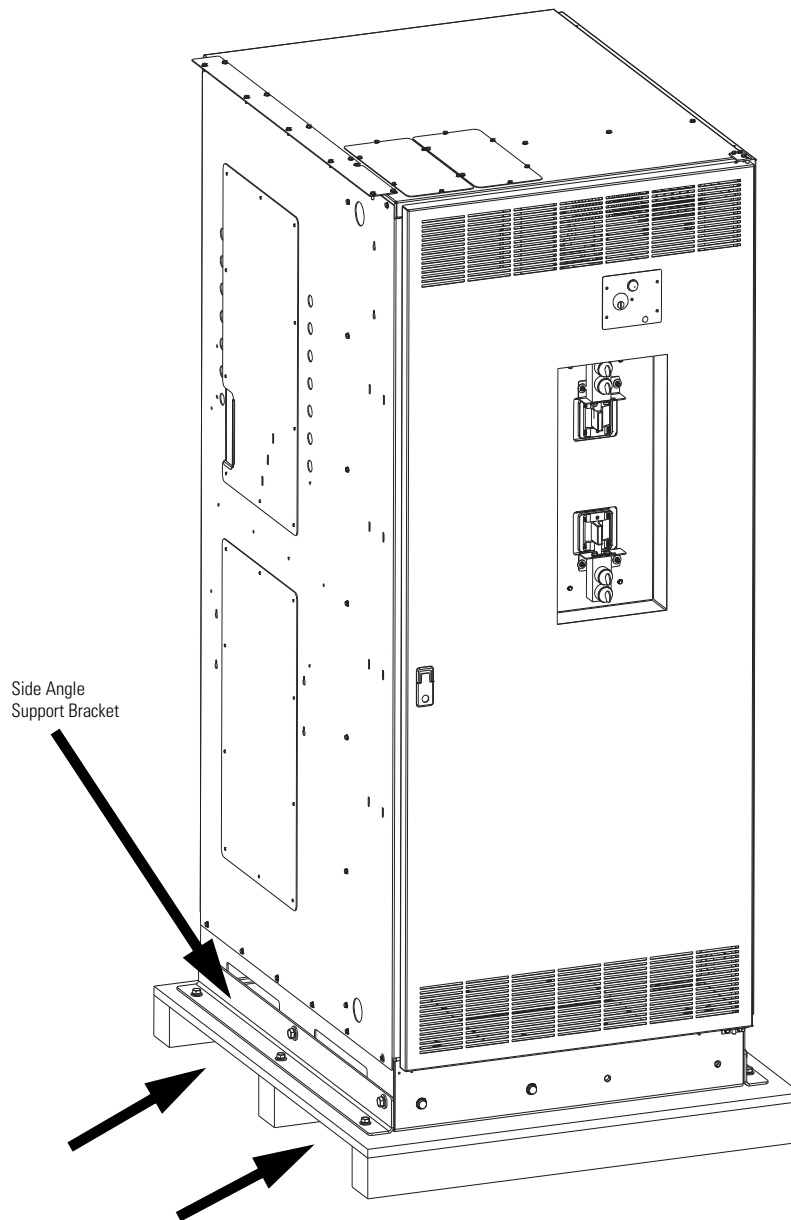


Figure 3-2. Dual Input Sidecar on Pallet (Front View)


 **CAUTION**

CABINET MAY FALL. Do not loosen the hardware attaching the side supports to the cabinet base, or pallet, at this time.

 **ATTENTION!**

L'ARMOIRE POURRAIT TOMBER. Ne desserrez pas la quincaillerie attachant le support avant à la

2. Remove the hardware holding the side angle support brackets to the cabinet base and pallet. Recycle the hardware and support brackets in a responsible manner.
3. Remove the Dual Input Sidecar from the pallet using the fork lift access from the side.
4. Position the PDU near the permanent installation site. Remove the right side skin from the PDU and save the side skin for installation later.
5. Position the Dual Input Sidecar cabinet on the right side of the PDU.

 **NOTE** Joining the cabinets requires front and rear access to attach the bottom joining plates. If rear access is not available in the permanent location then join the cabinets together before moving them to the permanent location.

6. Join the two cabinets together using the joining plates provided, two plates at the bottom (front and back) and one plate at the top (See Figure 3-3).

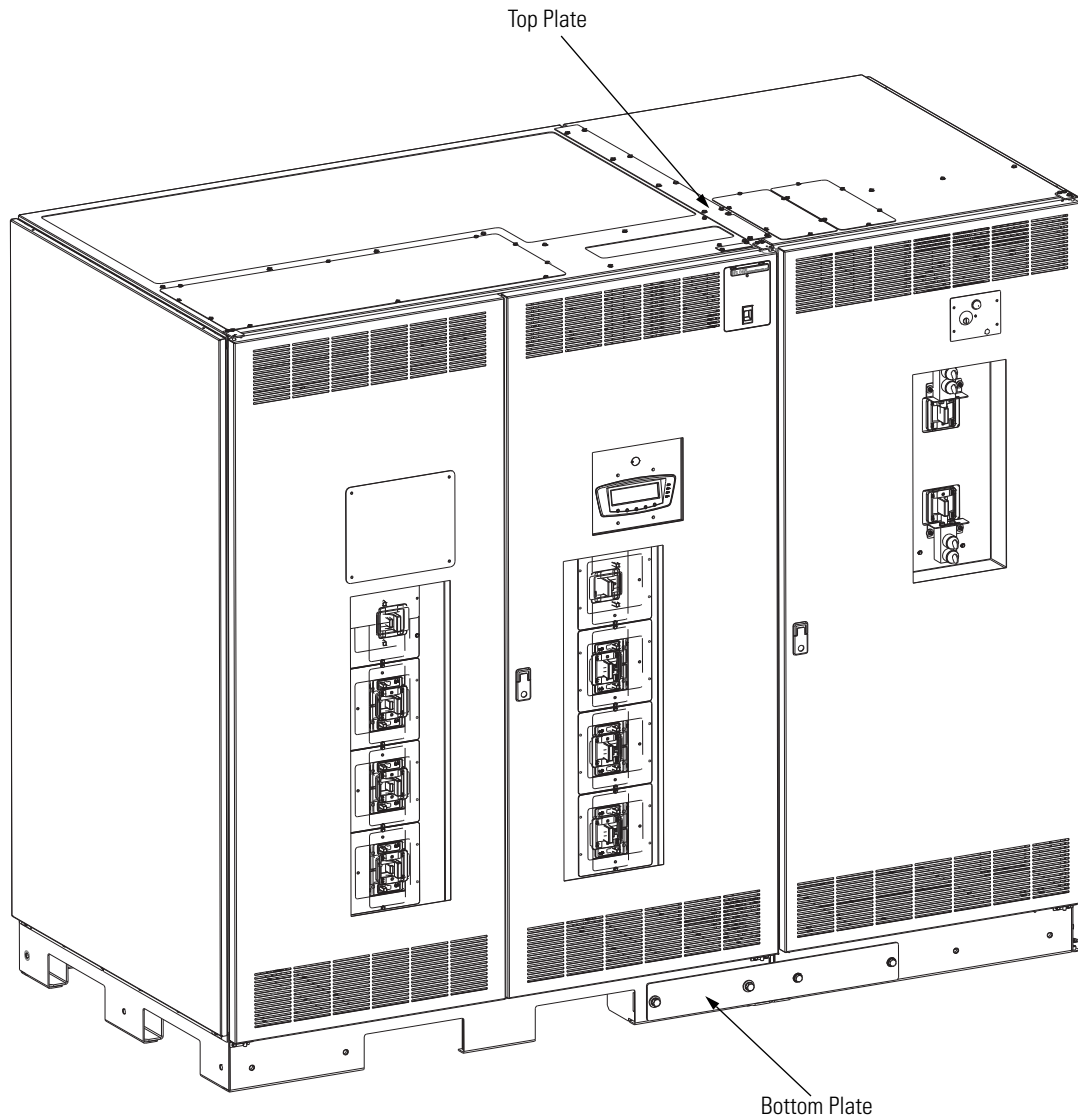


Figure 3-3. PDU and Dual Input Sidecar (Top and Bottom Plate)

3.3.2 Internal Wiring Between the PDU and Dual Input Sidecar

1. Route the power wires attached to the side car through the side opening between the PDU and Dual Input Sidecar.
2. Attach the power wires to the landing on the transformer busses (see Figure 3-4).

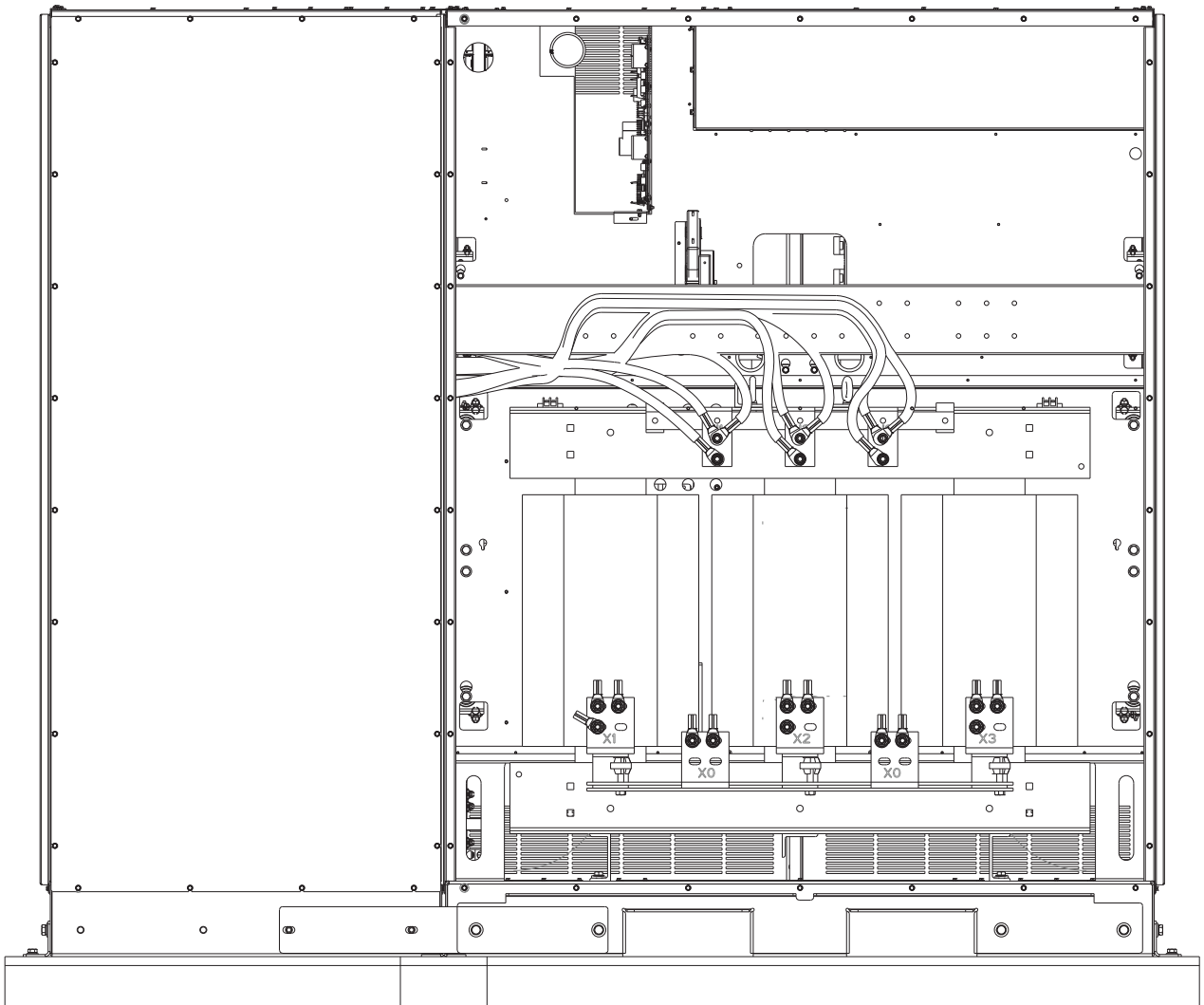


Figure 3-4. Dual Input Sidecar Tie Bus (Back View)

3. Route the control wires from the Dual Input Sidecar control section to the PDU control section through the round opening at the top front between the cabinets. Plug the control wire connectors from the PDU and sidecar together.
4. Attach the side skin removed earlier to the right side of the Dual Input Sidecar.
5. If not already in the permanent location move the joined and wired PDU and Dual Input Sidecar to the permanent installation location using the fork lift access on the PDU cabinet to lift and move the cabinets.



NOTE Do not lift the assembly any higher than necessary to move into the permanent location.

6. Continue to the next section.

3.4 Installing PDU Power Wiring



NOTE 1 The PDU is shipped with debris shields covering the ventilation grills on top of the cabinet (see paragraph A.3). 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 (see section A.3).

 **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 F through Table G.

 **AVERTISSEMENT!**

Du fait des charges connectées, un courant de fuite élevé est possible. Une mise à la terre est nécessaire pour des raisons de sécurité et un fonctionnement adéquat du produit.

 **ATTENTION!**

NE PAS TROP SERRER les languettes du terminal afin d'éviter d'endommager les cordes. Serrez les languettes à la valeur du couple indiquée dans le tableau F jusqu'au tableau G.

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. To review the wiring and termination requirements, see paragraph A.2.
4. If installing a PDU with the optional dual input sidecar, proceed to Step 5; otherwise, proceed to Step 8.
5. If not already open, open the dual input sidecar 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.
6. 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.4 for wiring access and terminal locations. See paragraph A.3 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.

7. Proceed to Step 9.
8. 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 section A.4 for wiring access and terminal locations. See section A.3 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 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.

9. 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.4 for PDU terminal locations.
10. Connect phase A, B, and C, power wiring between the AC source and the PDU main input breaker. See Table F through Table G for termination requirements.



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

11. 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.4 for wiring access and terminal locations. See Table G for termination requirements.
12. Reinstall all inside terminal cover plates removed in previous steps.
13. If wiring interface connections, proceed to paragraph 3.5; otherwise, proceed to Section 3.6.
14. Close the outside doors and secure the latch.

3.5 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.



ATTENTION!

Les contacts du relais d'alarme ne doivent pas être utilisés au-delà de 30 Vca à 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. To review the wiring and termination requirements, see section A.2.
4. Route the PDU interface wiring through either the top or bottom of the cabinet to the PDU interface terminals. See section A.5 for wiring access and terminal locations. See section A.3 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.

5. Route and connect the wiring.
6. Close the outside doors and secure the latch.

3.6 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.

3.7 Completing the Installation Checklist

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

After the installation is complete, a service representative will be able to verify the operation of the 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 and the cabinet is level.
- The PDU cabinet is installed and secured the floorstand. (Optional)
- All conduits and cables are properly routed to the PDU.
- A ground conductor is properly installed.
- All power cables are properly sized and terminated.
- Distribution subfeed circuit breakers are installed and wired to load. (Optional)
- 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)
- Any debris shields covering the PDU cabinet top 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 Eaton Customer Service Engineer (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 Power Distribution Unit (PDU) is installed. Figure 4-1 shows an Eaton REPO switch.

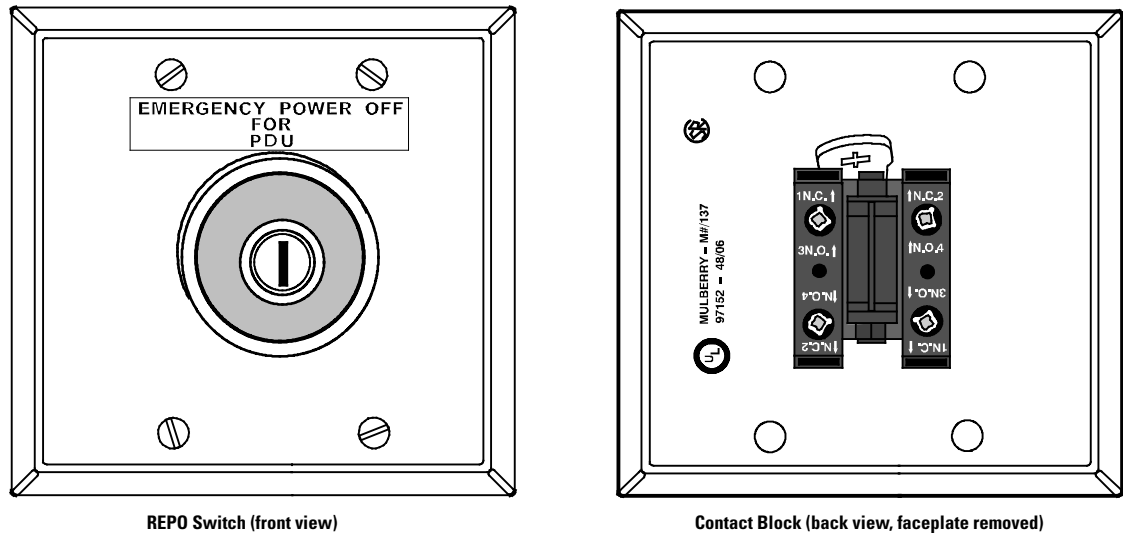



Figure 4-1. Eaton REPO Switch

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- 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 Electrical Code® (NEC®) Article 725 Class 2 requirements.
-

To install a REPO station:

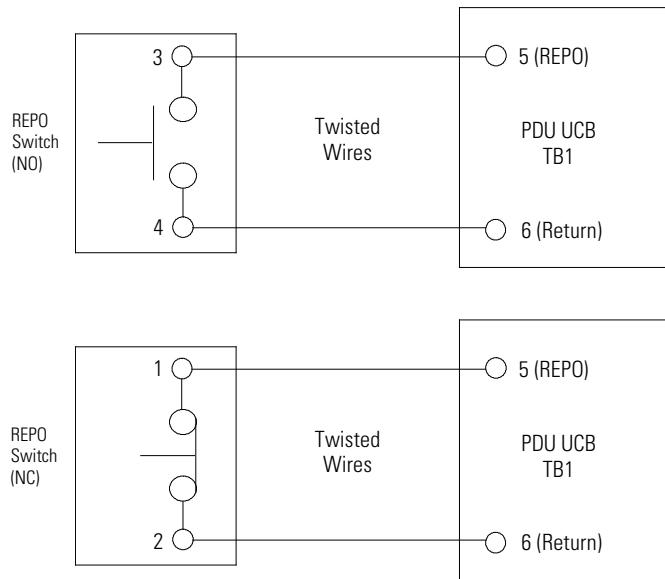
1. Verify the PDU is turned off and all power sources are removed. See Chapter 6 “PDU Operating Instructions,” for shutdown instructions.
2. Securely mount the REPO station. Recommended locations include operator’s consoles or near exit doors. See Figure A-19 for enclosure dimensions and wiring knockouts.
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.

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.3).
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.5 and A.6.
8. Route and connect the wiring as shown in Table 4-1 and Figure 4-2.

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 4-2. 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, close the inside distribution panel doors and secure with screws.
12. Close the outside doors and secure the latch.

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Chapter 5 Understanding PDU Operation

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

5.1 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 subfeed breakers as detailed in paragraph 5.2. Power is then distributed to the critical loads through or the subfeed breakers.

5.2 Subfeed Breaker Configurations

The main cabinet PDU can be configured with subfeed breakers as follows:

- 100A to 225A breakers (16 max)
- 250A to 400A breakers (8 max)
- 450A to 600A breakers (8 max)
- 600A to 800A breakers (6 max)
- combinations of the previously listed breakers

The subfeed breaker configurations are illustrated in Figure 5-1 (single source) and Figure 5-2 (dual source).

Understanding PDU Operation

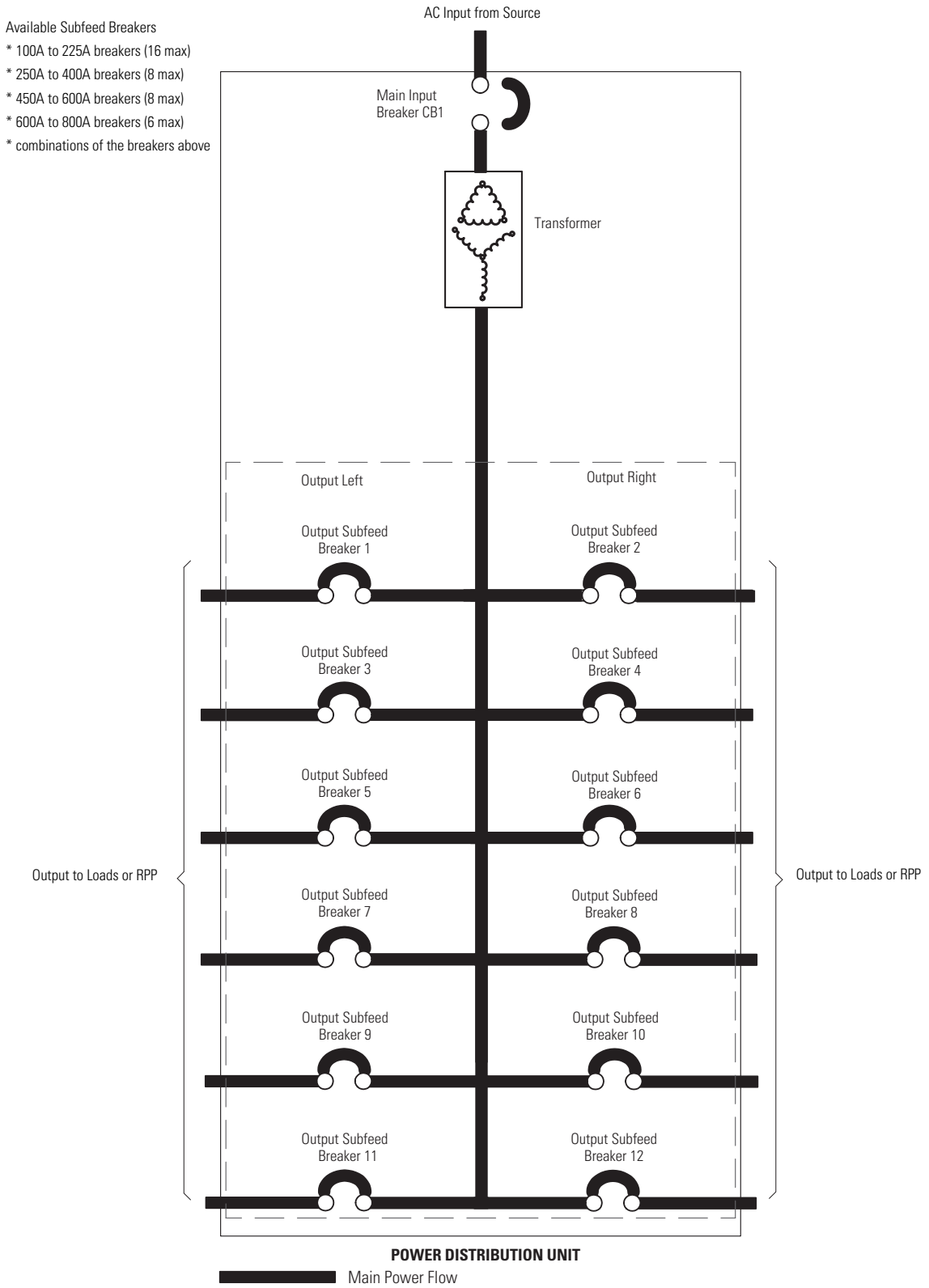


Figure 5-1. Current Path Through the PDU with Subfeed Breakers (Single Source)

- Available Subfeed Breakers
- * 100A to 225A breakers (16 max)
 - * 250A to 400A breakers (8 max)
 - * 450A to 600A breakers (8 max)
 - * 600A to 800A breakers (6 max)
 - * combinations of the breakers above

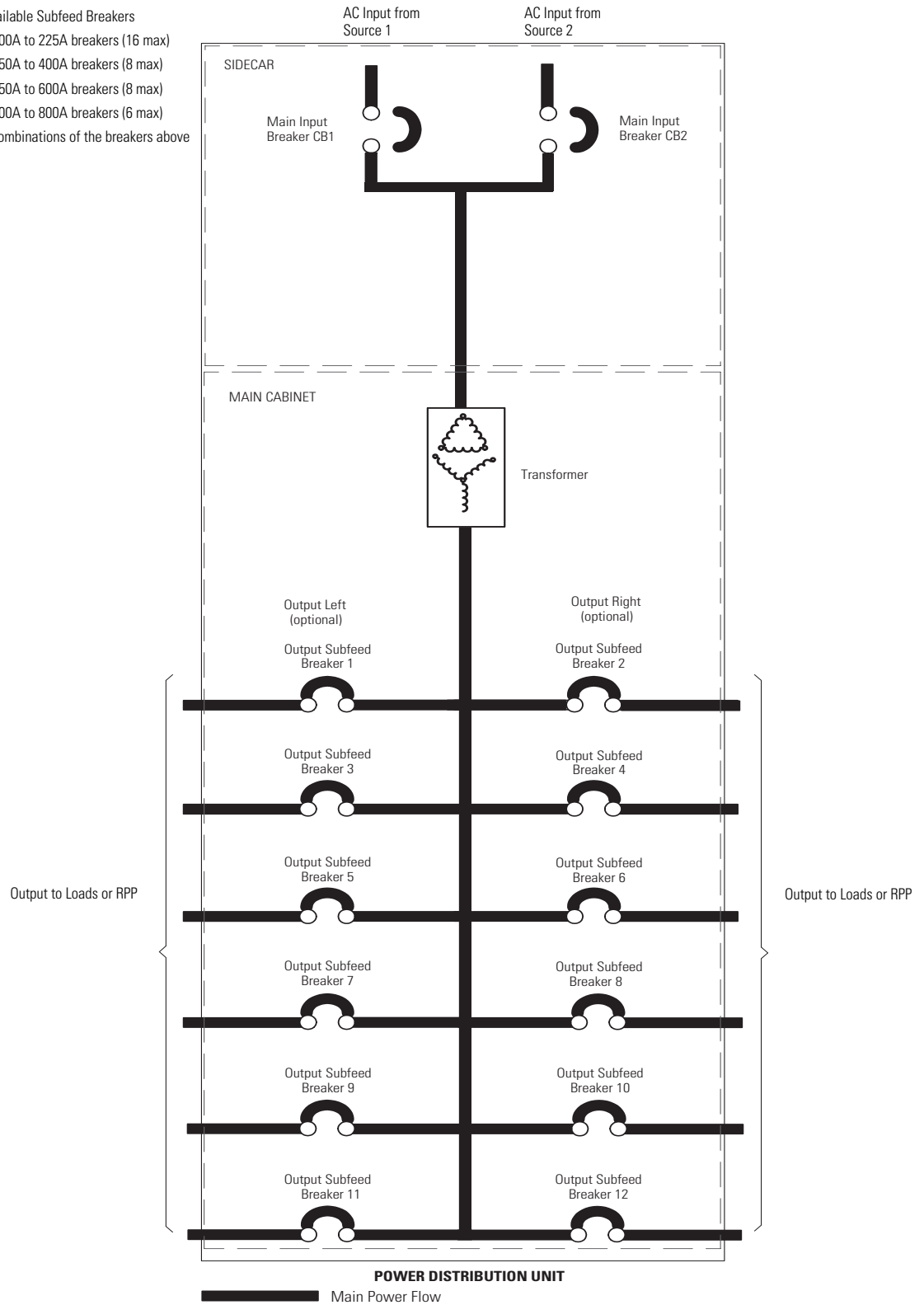


Figure 5-2. Current Path Through the PDU with Subfeed Breakers (Dual Source)

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Chapter 6 PDU Operating Instructions

This section describes how to operate the Power Distribution Unit (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 6-7 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
- Control panel
- Subfeed breakers per PDU configuration

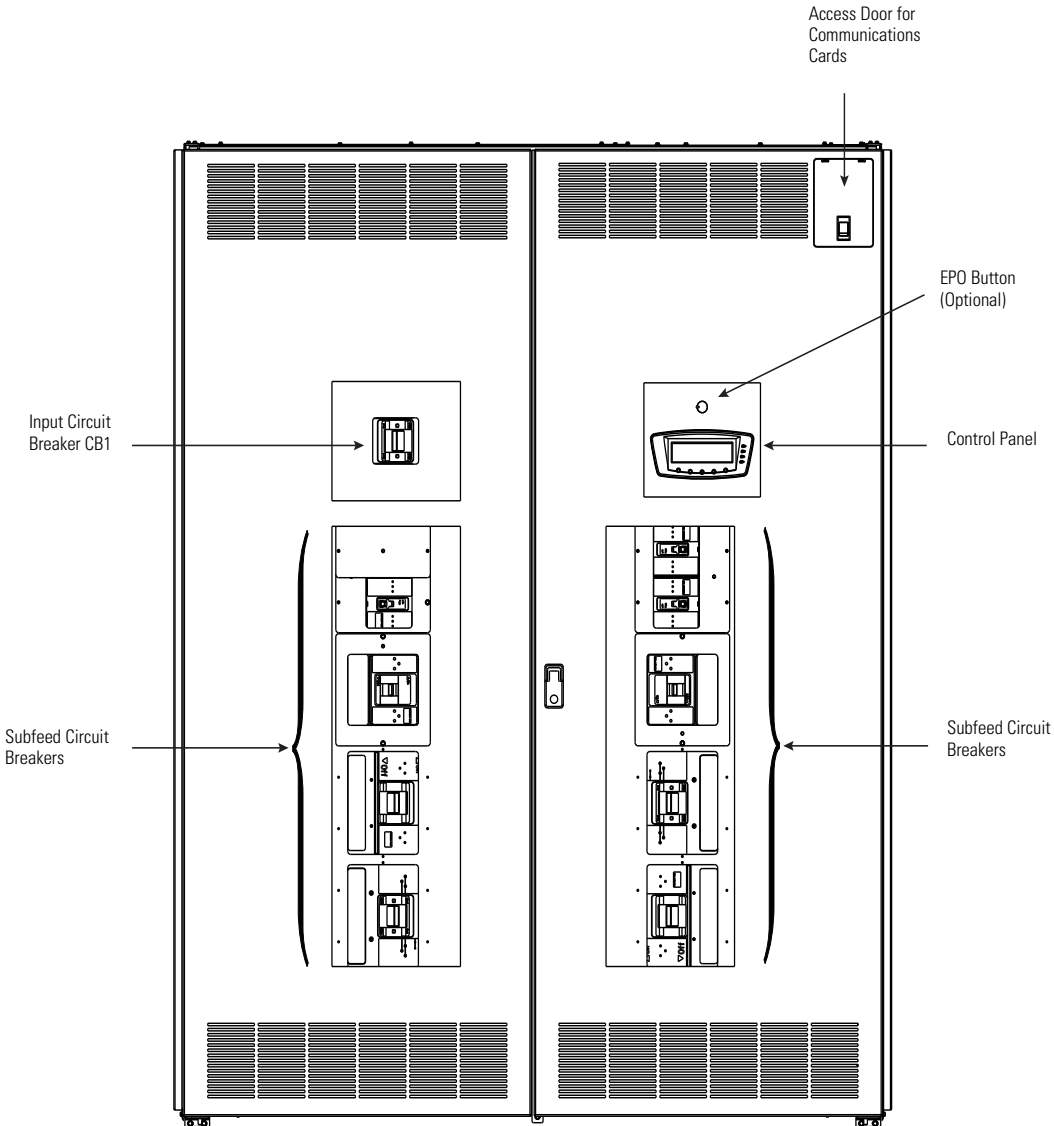
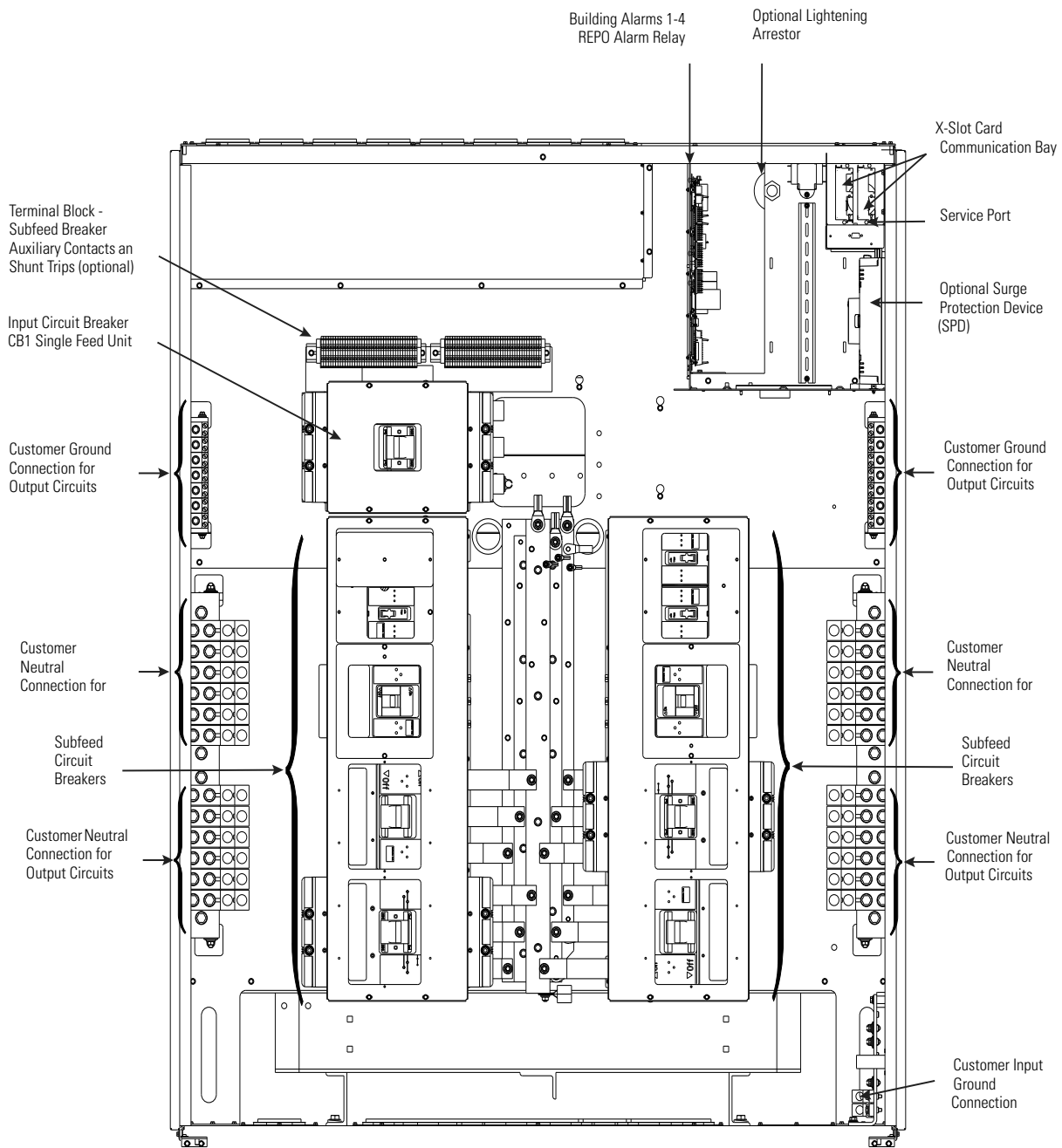


Figure 6-1. Eaton 400-500 kVA PDU Controls – Doors Closed (Front View)



NOTE The PDU is shown with twelve 225A subfeed breakers. However, the installed configuration may contain one to twelve 225A subfeed breakers, one to five 400A subfeed breakers, or one to three 800A subfeed breakers.

Figure 6-2. Eaton 400-500 kVA PDU - Doors Removed (Front View)

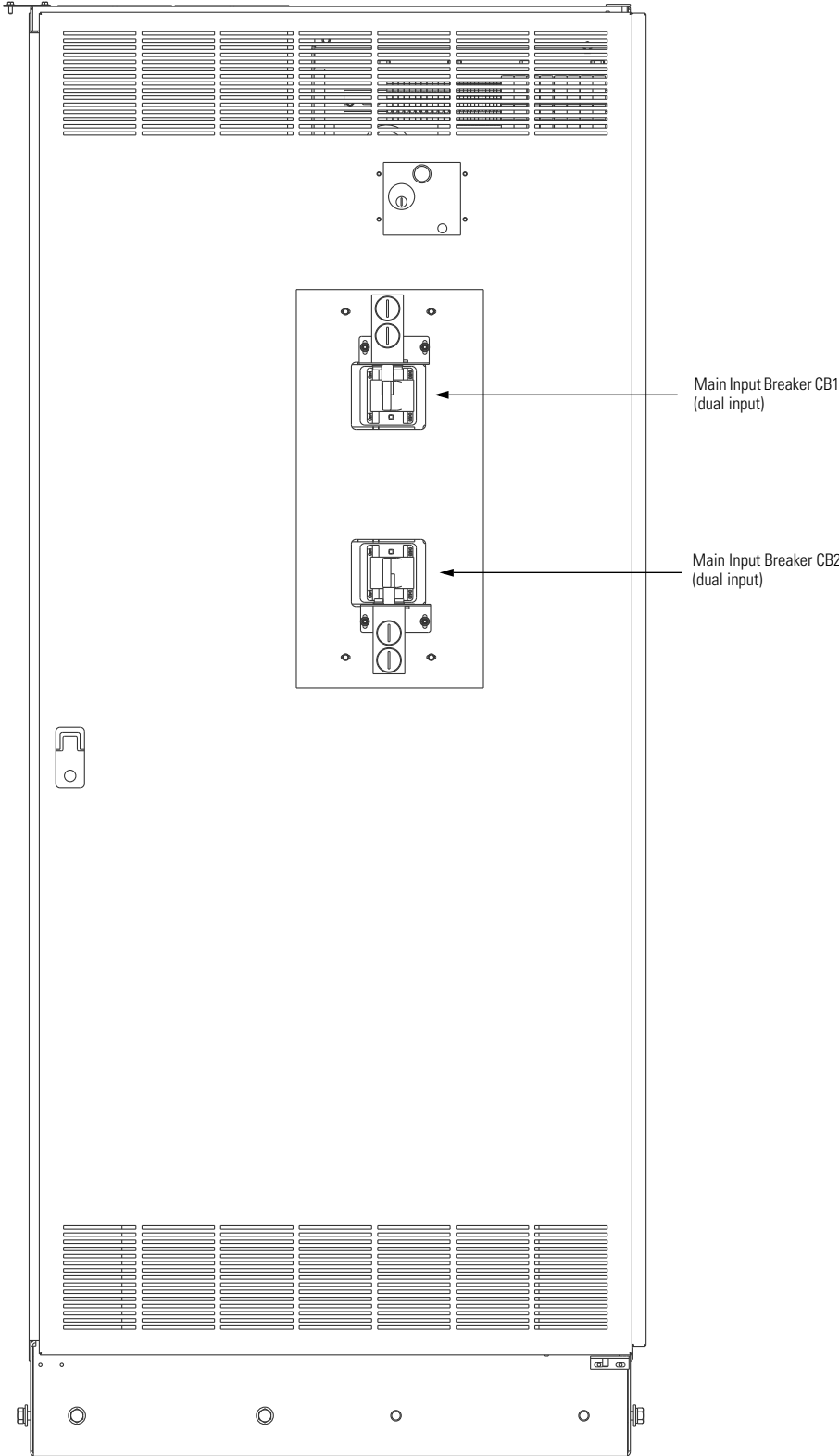


Figure 6-3. Basic Dual Input Sidecar Controls and Breakers – Door Removed with Input Breakers

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 6-4) is located on the front door of the PDU.

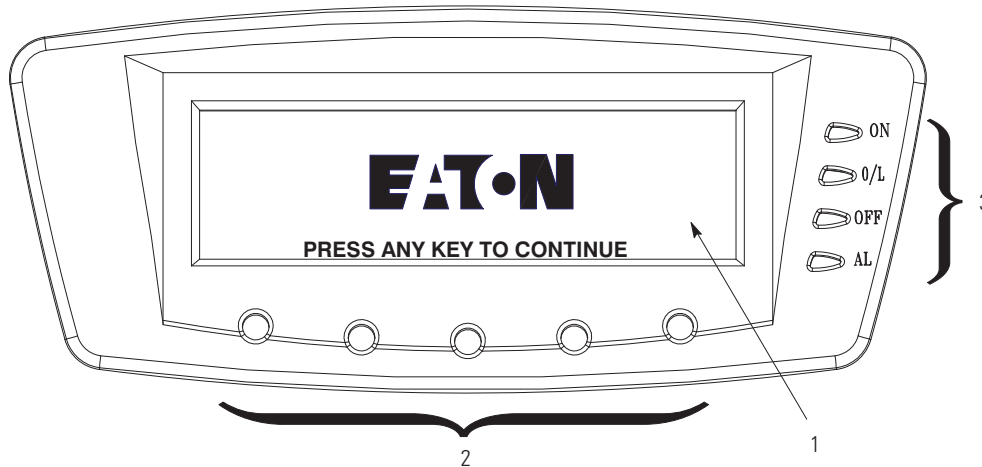


Figure 6-4. Eaton 400-500 kVA PDU Control Panel

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 6-4. 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 6-5 identifies the display areas.

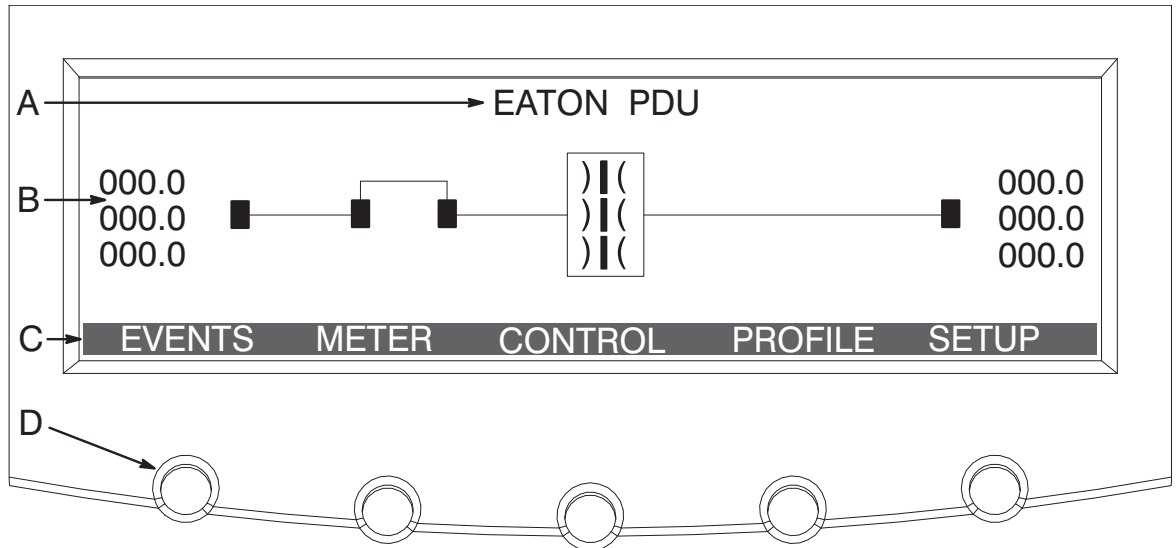


Figure 6-5. Parts of the LCD

- 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 6-6 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.

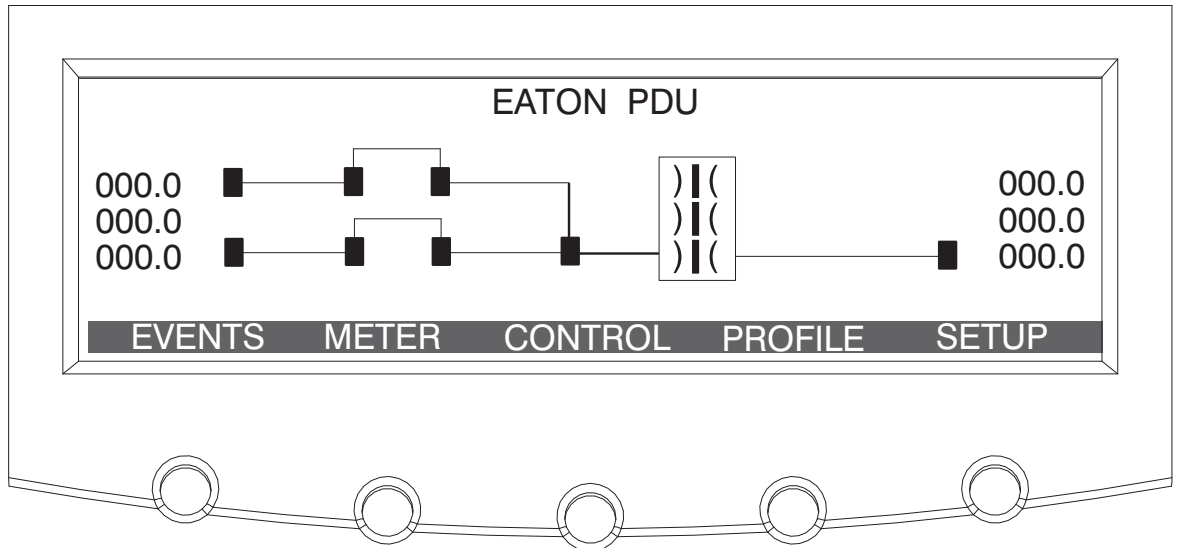


Figure 6-6. Main Menu and Mimic Screen with Dual Input Breaker

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 Monitoring 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
		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.
		Building Alarm Name
		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.
		Building Alarm Name (save)
		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 .
		<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)	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.
		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.
	Reset All Lower Level Passwords	This selection resets the Level 1 password to the default setting. Press RESET or CANCEL . <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)	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 . <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

The optional Surge Protective Device (SPD) is equipped with eight indicators to provide the working status of the SPD (see Figure 6-7). For the location of the SPD, see Figure 6-2. For specification details, see section 9.5.




Figure 6-7. Status Indicator Display for Non-EMS monitored SPD

6.4 Single Input PDU Operating Instructions

6.4.1 Starting the Single Input PDU

1. Verify that the front doors are closed and securely latched.
2. Verify that the PDU circuit breakers and switches are set as follows:

PDU Main Input Breaker CB1	OPEN
PDU Subfeed Breakers	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 subfeed breakers.

6.4.2 Restarting the Single Input PDU

To restart the PDU after an unscheduled shutdown (main input breaker shunt trip or REPO):

 **CAUTION**

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

 **ATTENTION!**

N'essayez pas de redémarrer le système tant que la cause de l'arrêt n'a pas été déterminée et validé.

1. If shutdown occurred because of a REPO trip, follow the REPO resetting procedure in paragraph 6.7.
2. 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.

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

6.4.3 Single Input Shutdown

To shut down the PDU:


1. 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.
2. Turn off all subfeed breakers.
3. Open main input breaker CB1 or use the control panel.
4. To remove power from the PDU completely, turn off utility power to the PDU.

6.5 Basic (Single Key) Dual Input PDU Operating Instructions

6.5.1 Starting the Basic Dual Input PDU


1. 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

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

2. 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.

3. Apply AC source power to the PDU Main Input Breaker CB1 or CB2.
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 the PDU main input breaker CB1 or CB2 and turn key "A" to extend bolt and lock CB1 or CB2 in the closed position.
11. 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.
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 subfeed breakers.

6.5.2 Restarting the Basic Dual Input PDU

To restart the PDU after an unscheduled shutdown (main input breaker shunt trip or REPO):

 **CAUTION**

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

 **ATTENTION!**

N'essayez pas de redémarrer le système après une Mise Hors Circuit d'Urgence à Distance (MHCUD) tant que la cause de l'arrêt n'a pas été déterminée et validée.

1. If shutdown occurred because of a REPO trip, follow the REPO resetting procedure in paragraph 6.7.
2. 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.

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

6.5.3 Basic Dual Input Shutdown

To shut down the PDU:

1. 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.
2. Turn off all subfeed breakers.
3. Open the upstream feeder breaker for main input breaker CB1 (or CB2 if the PDU was powered through CB2).
4. If not already accomplished, turn off utility power to the PDU to remove power from the PDU completely.

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.



ATTENTION!

N'essayez pas la séquence de transition lorsque les deux sources de courant ne sont pas synchronisées.

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

1. Verify that the PDU main input breakers are set as follows:

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

2. 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.

3. Ensure that the two power sources are synchronized.

 **CAUTION**

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

 **ATTENTION!**

Ne maintenez pas la séquence de transition lorsque les deux sources de courant ne sont pas synchronisées.

4. Close main input breaker CB2 and turn key "A" to extend bolt and lock CB2 in the closed position.
5. 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.
6. Open the main input breaker CB1.

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.

 **ATTENTION!**

N'essayez pas la séquence de transition lorsque les deux sources de courant ne sont pas synchronisées.

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

1. Verify that the PDU main input breakers are set as follows:

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

2. 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.

3. Ensure that the two power sources are synchronized.

 **CAUTION**

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

 **ATTENTION!**

Ne maintenez pas la séquence de transition lorsque les deux sources de courant ne sont pas synchronisées.

4. Close main input breaker CB1 and turn key "A" to extend bolt and lock CB1 in the closed position.
5. 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.
6. Open the main input breaker CB2.

6.6 Premier Dual Input PDU Operating Instructions

6.6.1 Starting the Premier Dual Input PDU

1. 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 Subfeed Breakers	OPEN



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

2. 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.

3. Apply AC source power to the PDU Main Input Breaker CB1 or CB2.
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 the PDU main input breaker CB1 or CB2.
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 subfeed breakers.

6.6.2 Restarting the Premier Dual Input PDU

To restart the PDU after an unscheduled shutdown (main input breaker shunt trip, EPO, or REPO):


 **CAUTION**

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

 **ATTENTION!**

N'essayez pas de redémarrer le système après une Mise Hors Circuit d'Urgence à Distance (MHCUD) tant que la cause de l'arrêt n'a pas été déterminée et validée.

1. If shutdown occurred because of a REPO trip, follow the REPO resetting procedure in paragraph 6.7.
2. 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.

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

6.6.3 Premier Dual Input Shutdown

To shut down the PDU:

1. 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.
2. Turn off all subfeed breakers.
3. Open main input breaker CB1 (or CB2 if the PDU was powered through CB2), or use the control panel.
4. To remove power from the PDU completely, turn off utility power to the PDU.

6.6.4 Premier Dual Input PDU CB1 to CB2 Transition

 **CAUTION**

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

 **ATTENTION!**

N'essayez pas la séquence de transition lorsque les deux sources de courant ne sont pas synchronisées.

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

1. Verify that the PDU main input breakers are set as follows:

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

2. 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.

3. Apply AC source power to PDU main input breaker CB2.
4. Verify SKRU indicator is on.
5. On SKRU, depress key release pushbutton and turn key "A." Remove key from SKRU and release pushbutton.
6. 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.

 **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.

 **ATTENTION!**

Ne maintenez pas la séquence de transition lorsque l'indicateur de l'unité de déverrouillage à électroaimant (SKRU) ne reste pas allumé. L'indicateur du SKRU reste allumé si les deux sources de courant sont synchronisées et prêtes à être reliées.

7. Ensure that the two power sources are synchronized.
8. Close main input breaker CB2.
9. Open main input breaker CB1.
10. 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.
11. 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.

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.

 **ATTENTION!**

N'essayez pas la séquence de transition lorsque les deux sources de courant ne sont pas synchronisées.

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

1. Verify that the PDU main input breakers are set as follows:

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

2. 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.

3. Apply AC source power to PDU main input breaker CB1.
4. Verify SKRU indicator is on.
5. On SKRU, depress key release pushbutton and turn key "A." Remove key from SKRU and release pushbutton.
6. 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.

 **ATTENTION!**

Ne maintenez pas la séquence de transition lorsque l'indicateur de l'unité de déverrouillage à électroaimant (SKRU) ne reste pas allumé. L'indicateur du SKRU reste allumé si les deux sources de courant sont synchronisées et prêtes à être reliées.

7. Ensure that the two power sources are synchronized.
8. Close main input breaker CB1.
9. Open main input breaker CB2.
10. 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.
11. 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.

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

ATTENTION!

Toute l'alimentation de la charge critique est interrompue lorsque le commutateur est activé au cours de la procédure suivante. Vous ne devez avoir recours à cette fonction que lorsque vous souhaitez mettre la charge critique hors tension.

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

To activate the REPO pushbutton switch:

12. Firmly push the red pushbutton until it locks into place. The switch latches into the activated state (see Figure 6-8).

The PDU main input breaker trips, and the PDU turns off immediately, without asking for verification. If a UPStream feeder breaker is connected to the REPO, 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 until the cause of the shutdown has been identified and cleared.

AVERTISSEMENT!

Un courant électrique parcourt l'armoire UPS jusqu'à l'ouverture du disjoncteur d'alimentation d'entrée en amont.

ATTENTION!

N'essayez pas de redémarrer le système après une Mise Hors Circuit d'Urgence à Distance (MHCUD) tant que la cause de l'arrêt n'a pas été déterminée et validée.

- 13. To restart the PDU after activating the REPO, deactivate the REPO switch by inserting the supplied key and rotating clockwise until the red pushbutton releases (see Figure 6-8). To remove the key, rotate the key back to the vertical position and follow the procedure in paragraph 6.4.2, 6.5.2, or 6.6.2.

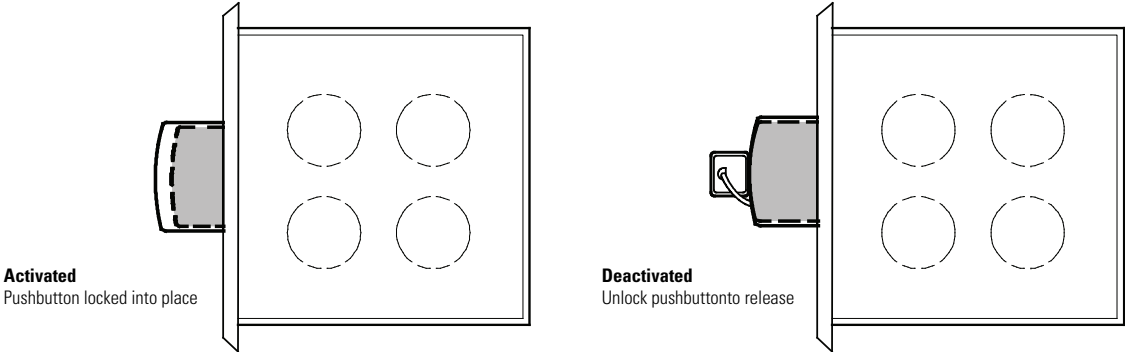


Figure 6-8. REPO Operation

Chapter 7 Communication

This chapter describes the communication features of the Eaton 400-500 kVA PDUs 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. The PDU is compatible with the following X-Slot cards (see Figure 7-1):

- Modbus Card – provides direct integration of the Eaton 400-500 kVA PDUs’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.

- Eaton 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 Card TCP support provides direct integration of the 400-500 kVA PDUs’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 “Getting Help” on page 10). Refer to the manual supplied with the X-Slot card for user instructions.

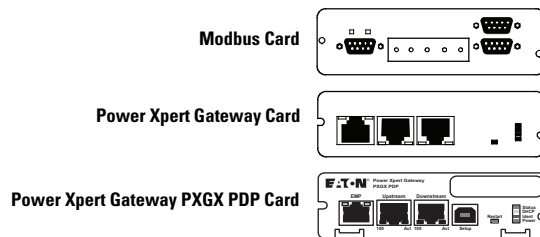


Figure 7-1. Optional X-Slot Cards

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
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

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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.
-

 **AVERTISSEMENT!**

- Tout entretien et toute réparation doivent être effectués par un personnel de service qualifié uniquement.
 - LE SYSTÈME EST PARCOURU PAR UNE TENSION MORTELLE. Cette unité ne doit pas fonctionner avec les portes de l'armoire ouvertes ni sans ses panneaux de protection.
-

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 on front of cabinet) 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.
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.

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 400-500 kVA Three-Phase Power Distribution Unit	400-500 kVA	60 Hz

9.2 PDU Input

Operating Input Voltage (Nominal +5/-10%)	480 Vac nominal (432–504 Vac) at 60 Hz
Input Wiring: 3W + G Operating Input Frequency Range	60 Hz ± 5 Hz
Operating Input Current	See Appendix A, Table D.

9.3 PDU Output

Operating Output Voltage (Nominal +10/ 15%)	208/120 Vac nominal
Output Wiring: 4W + G Operating Input Frequency Range	60 Hz ± 5 Hz
Output Current	See Appendix A, Table D.

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 to +60°C (-13 to 140°F)
Relative Humidity (operating and storage)	10% to 95% maximum non-condensing
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) –Immunity Air Discharge Dielectric Strength	Meets IEC 61000-4-2 specifications. Exposed contacts on ungrounded connectors may be exempt from testing.
Agency Marking	US Domestic/Canadian: UL/CSA 60950-1-Ed2

9.5 Optional Surge Protective Devices

Platform	Thermally protected, MOV surge suppressor
Capacity	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
Relay Contact	Form C relay contact (EMS monitored)

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Appendix A Installation Reference

The information in this appendix will help you plan for and install the Eaton 400-500 kVA Three-Phase Power Distribution Unit (Eaton 400-500 kVA PDUs). This appendix contains the following information:

- Physical features and requirements, including dimensions
- Online 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 floor mounting brackets

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. Table A provides the maximum weight cabinet configurations. Your cabinet may weigh less due to your selected configuration.
5. The PDU equipment operating environment for the installed PDU configuration must meet the weight requirements shown in Table A and size requirements shown in Figure A-3 through Figure A-7.

Table A. Equipment Weight - PDUs

Component	Rating kVA	Weight kg (lb)	
		Shipping	Installed
PDU	400	1998 (4405)	1964 (4330)
PDU with dual input sidecar	400	N/A	2419 (5333)
PDU	500	2338 (5155)	2304 (5080)
PDU with dual input sidecar	500	N/A	2759 (6083)
Dual input sidecar	400 or 500	478 (1054)	455 (1003)

NOTE The PDU and dual input sidecar ship separately and are joined at installation.

NOTE Shipping weights of the PDU with dual input sidecar are not shown because the units ship separately.

6. The recommended clearances around the PDU cabinet are shown in Table B. 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 B. Clearances for PDU Cabinet

Top	Front	Rear
18" for ventilation	36" working space	none

7. 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%, noncondensing

The PDU cooling requirements are shown in Table C.

Table C. PDU Cooling Requirements During Full Load Operation

Rating		Voltage		Heat Rejection		
kVA	K-factor	Input	Output	Watts	BTU/hr	Kg-cal/hr
400	13	480	208/120	6504	22193	5596
400	20	480	208/120	5680	19379	4887
500	13	480	208/120	8130	27741	6995
500	20	480	208/120	7099	24224	6108

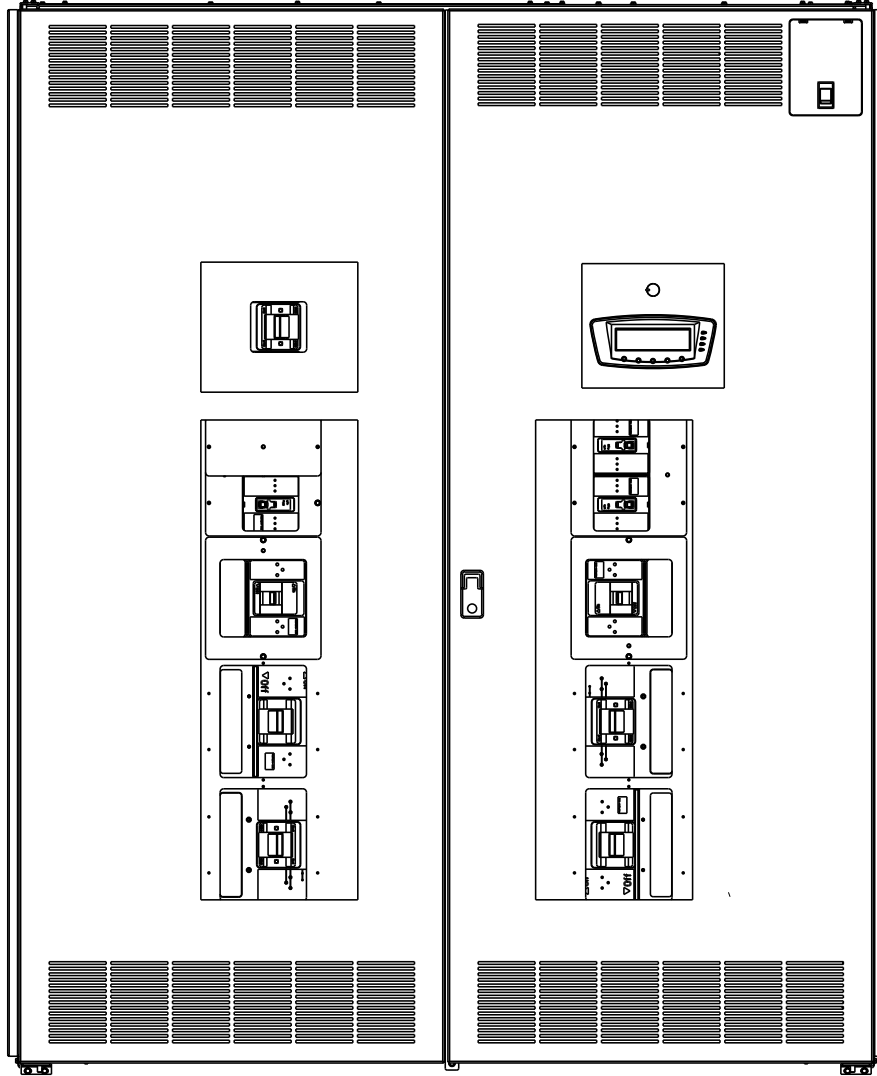
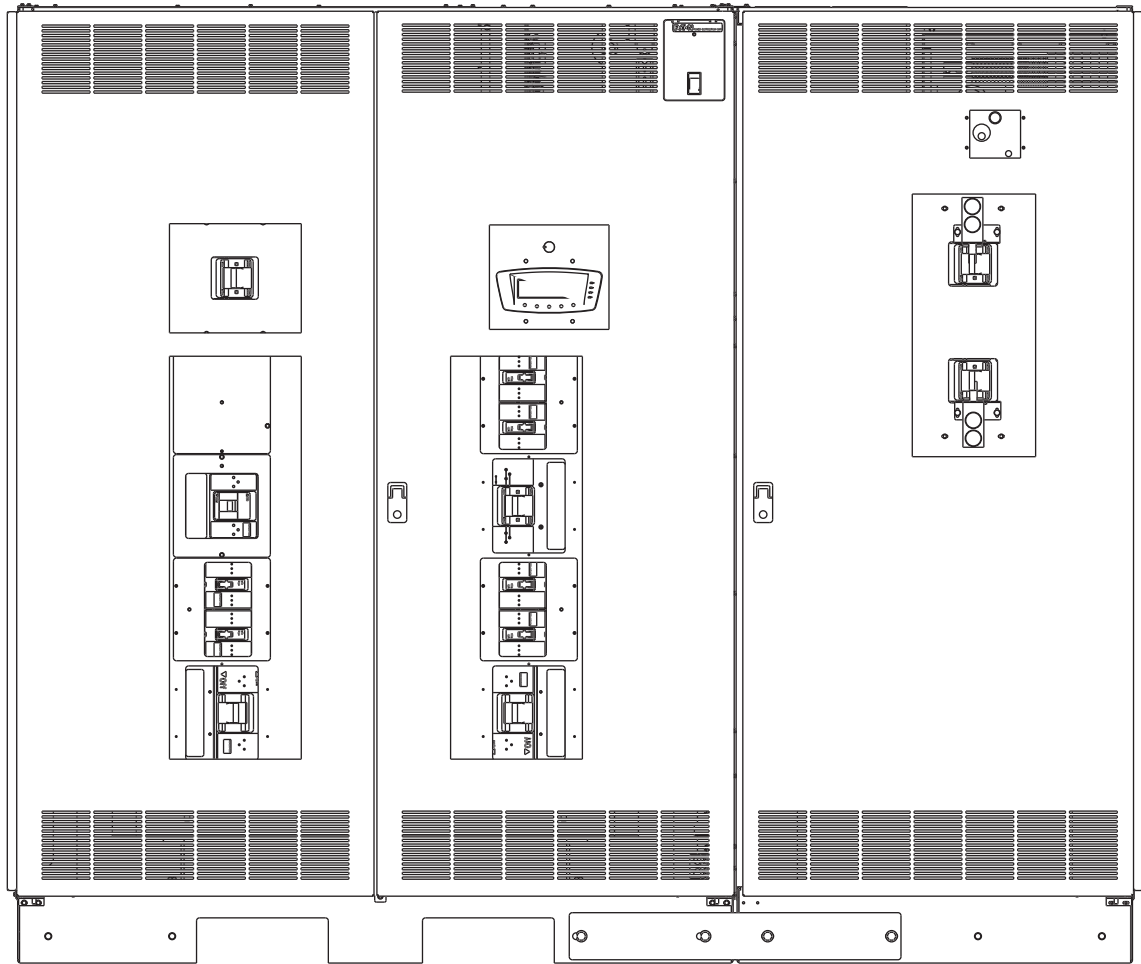


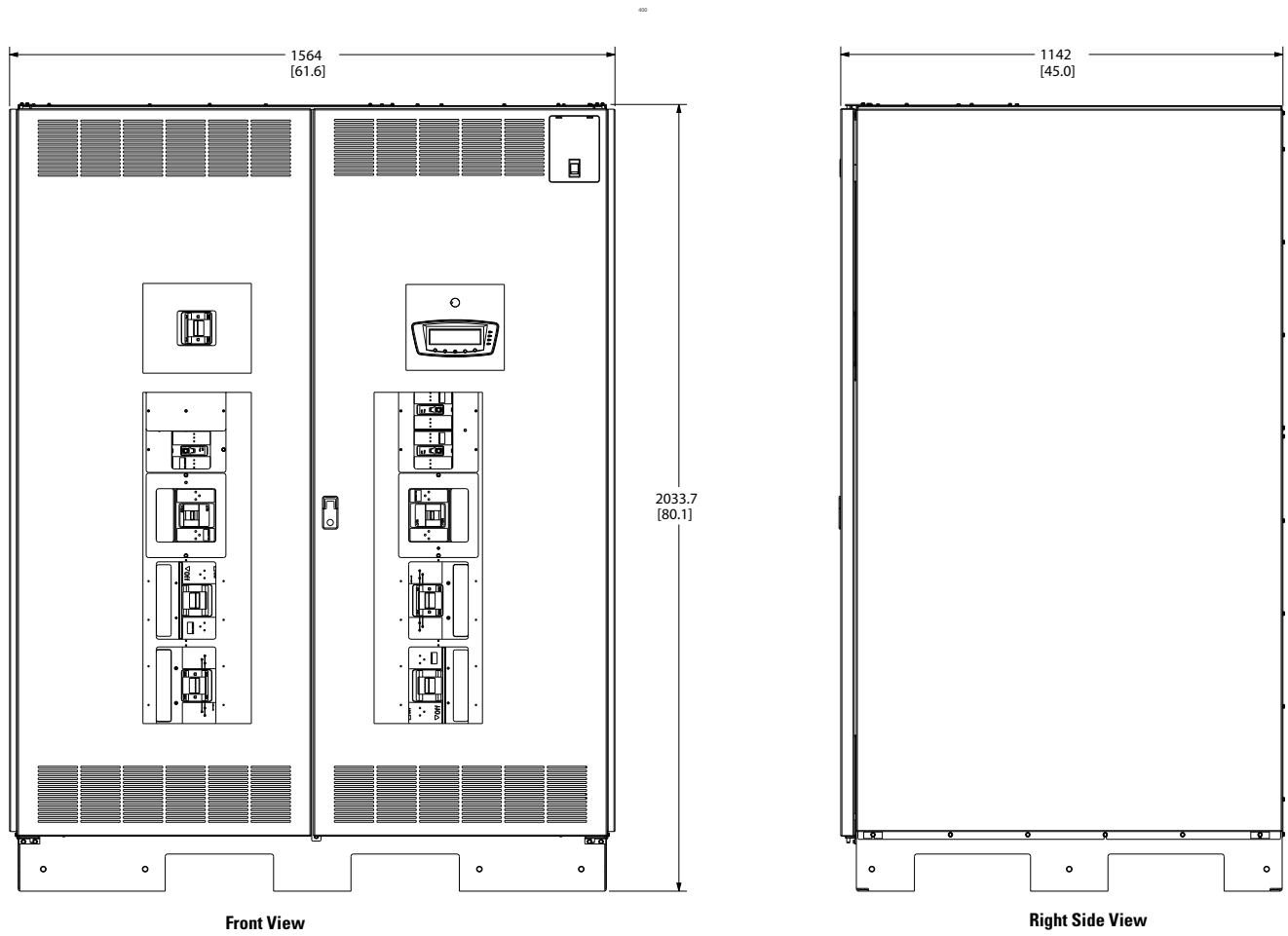
Figure A-1. Eaton 400-500 kVA PDU



PDU

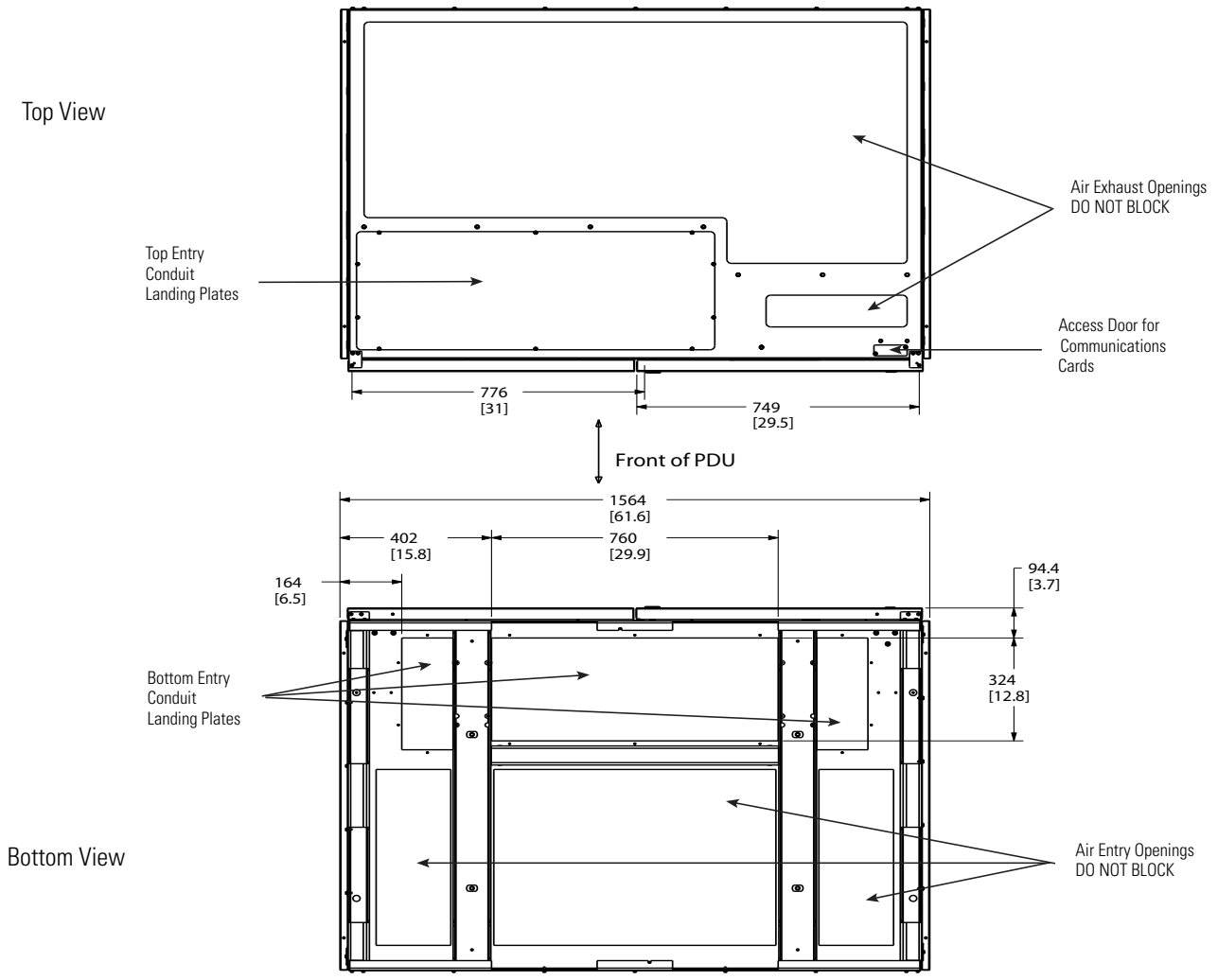
Dual Input Sidecar (optional)

Figure A-2. Eaton 400-500 kVA PDU with Dual Input Sidecar



Dimensions are in millimeters (inches).

Figure A-3. Eaton 400-500 kVA PDU Dimensions – Front and Right Side View



Dimensions are in millimeters (inches).

Figure A-4. Eaton 400-500 kVA PDU Dimensions – Top and Bottom Views

PDU Rear View

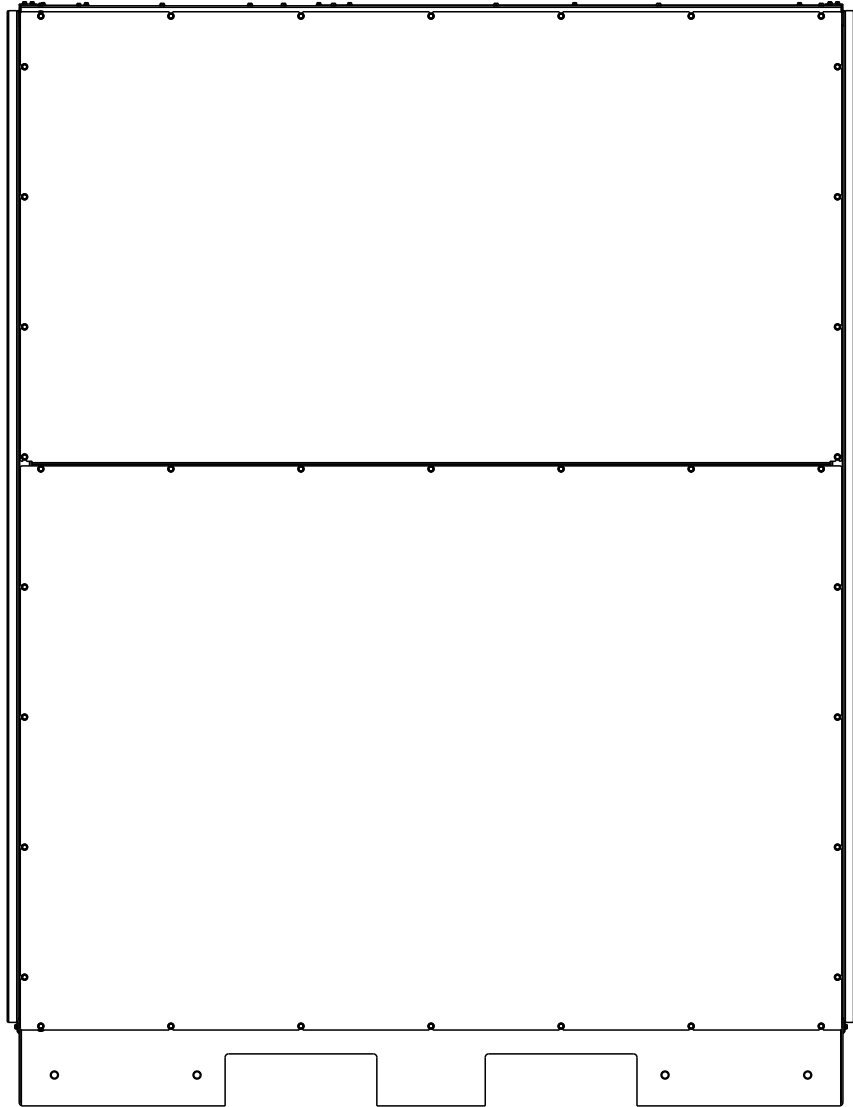
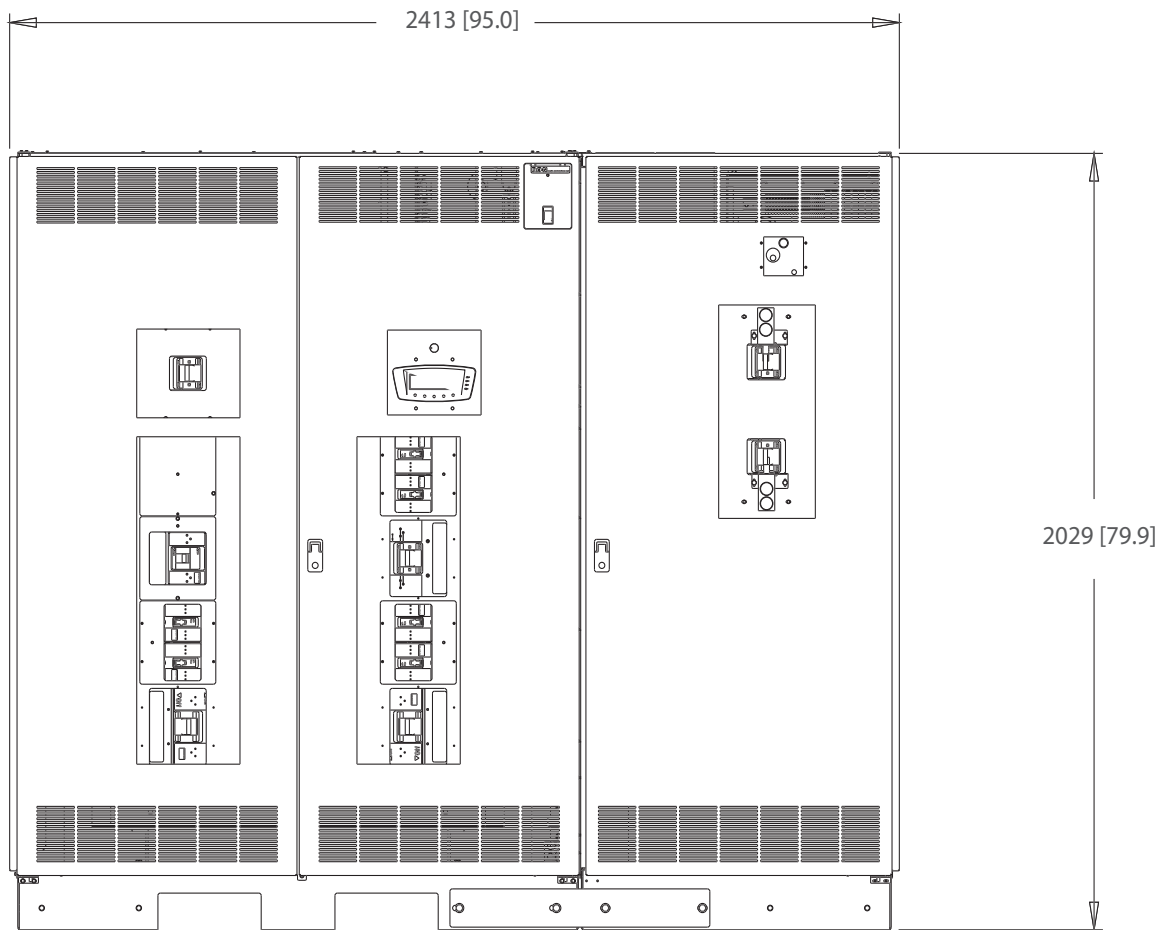


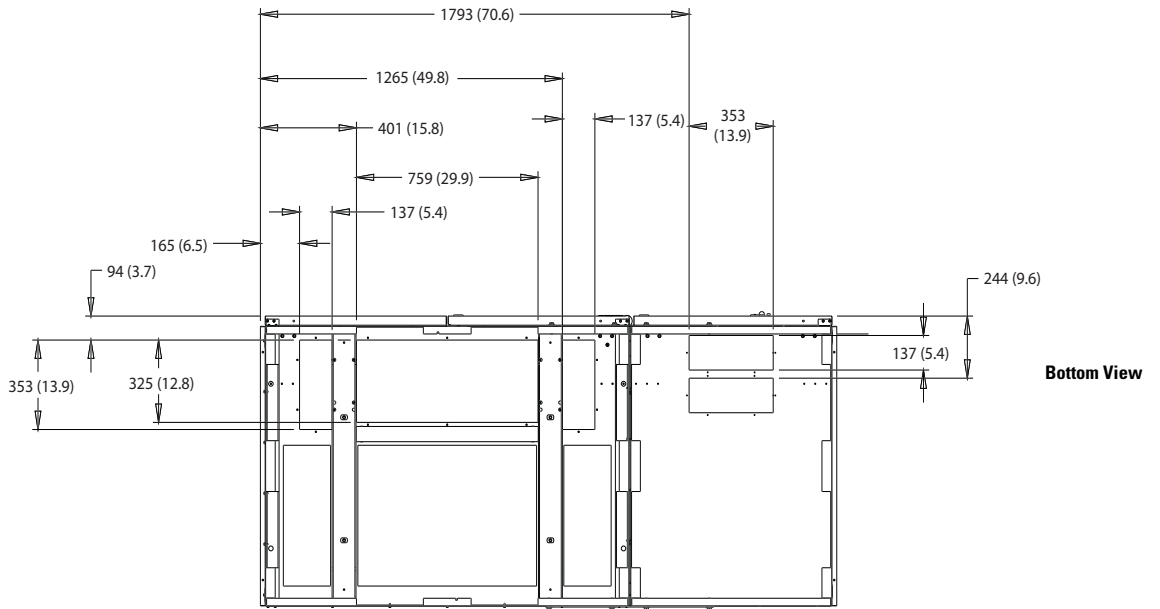
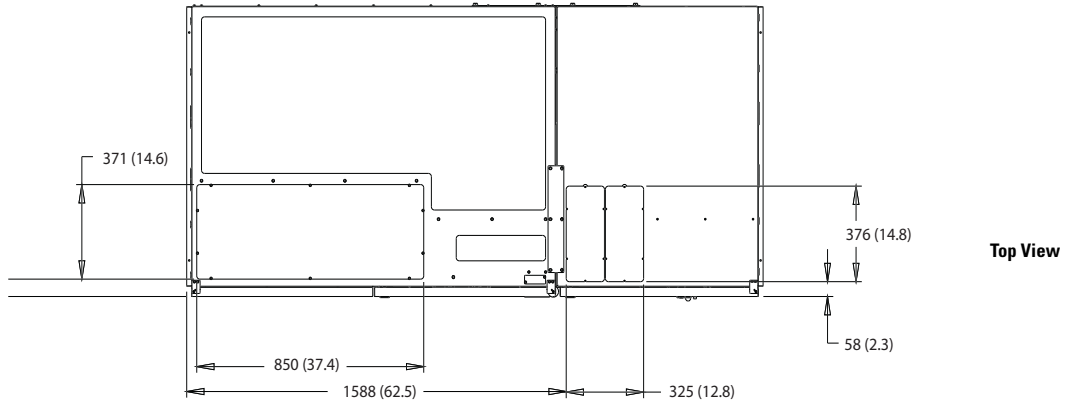
Figure A-5. Eaton 400-500 kVA PDU – Rear View



Front View

Dimensions are in millimeters (inches).

Figure A-6. Eaton 400-500 kVA PDU with Dual Input Sidecar Dimensions – Front View



Front of PDU

Dimensions are in millimeters (inches).

Figure A-7. Eaton 400-500 kVA PDU with Dual Input Sidecar Dimensions – Top and Bottom Views

A.2 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.

 **AVERTISSEMENT!**

Du fait des charges connectées, un courant de fuite élevé est possible. Une mise à la terre est nécessaire pour des raisons de sécurité et un fonctionnement adéquat du produit.

1. Wire ampacities are chosen from Table 310.15 (B)(16) of the National Electrical Code (NEC).
2. For external wiring, see the appropriate column in Table D.
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. Output neutrals are rated for up to 200%.
6. 100% rated adjustable subfeed breakers must be wired for maximum rated current.
7. 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.
8. Refer to section 1 of this manual for installation instructions.
9. If installing with a UPS, refer to the applicable UPS Installation and Operation manual for UPS cabinet wiring requirements, and conduit and terminal locations.
10. Per NEC Article 300.20(a), all three-phase conductors must be run in the same conduit. Neutral and ground must be run in the same conduit as the phase conductors.
11. Conduit is 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 (200%) neutral.

Table D. Input/Output Ratings and External Wiring Requirements for the Eaton 400-500 kVA PDUs (480V)

Basic Unit Rating	Units	Rating 60 Hz	
	kVA	400	500
Input/Output Voltage	Volts	480/208	480/208
AC Input to PDU (3) Phases, (1) Ground	A Maximum Amps	491	614
		Minimum Conductor Size (Phase A, B, and C) Number per Phase	AWG or kcmil [CSA – mm ²] (each)

Table D. Input/Output Ratings and External Wiring Requirements for the Eaton 400-500 kVA PDUs (480V)(Continued)

Minimum Conductor Size (Ground) Number per Phase	—	AWG or kcmil [CSA – mm ²] (each)	1 [123] 1	1/0 [143] 1
AC Output	—	Maximum Amps	1110	1388
AC Output from Subfeed Breakers to the Critical Load (3) Phases, (1) Neutral, (1) Ground	B	Wire circuits in accordance with circuit breaker manufacturer's ratings, power cable termination sizes listed in Table G, 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.		

12. See Table E for PDU input circuit breaker ratings.

Table E. PDU Input Circuit Breaker Ratings

Input Voltage	kVA Rating	FLA	Main Breaker Size
480	400	491	600
	500	614	800

13. DO NOT overtighten the terminal lugs to prevent stripping the threads. Tighten lugs to the torque values in Table F.

Table F. Eaton 400-500 kVA PDUs 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)	400	600	M	A (Black)	Phase A	3 3/0 - 400 kcmil	42.4 (375)	3/8" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
	500	800	M	A (Black)	Phase A	3 3/0-400 kcmil	42.4 (375)	3/8" Hex
				B (Red)	Phase B			
				C (Blue)	Phase C			
Customer Ground	All	All		G (Green)	Ground	2 – #14–1/0	5.6 (50)	Slotted

14. See Table G for output power cable terminations.

15. DO NOT overtighten the terminal lugs to prevent stripping the threads. Tighten lugs to the torque values in Table G.

Table G. Eaton 400-500 kVA PDUs Output Power Cable Terminations for Subfeed Breakers

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)	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 -250 – 350 kcmil	31 (275)	5/16" Hex
		B	Phase B			
		C	Phase C			
	(M-Frame)	A	Phase A	3 3/0 – 400 kcmil	42.0 (375)	3/8" 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 A.3 below.	Slotted

Wire circuits in accordance with circuit breaker manufacturer's ratings and instructions and national and local electrical codes.

A.3 Location of Conduit Landing and Wire Entry Plates

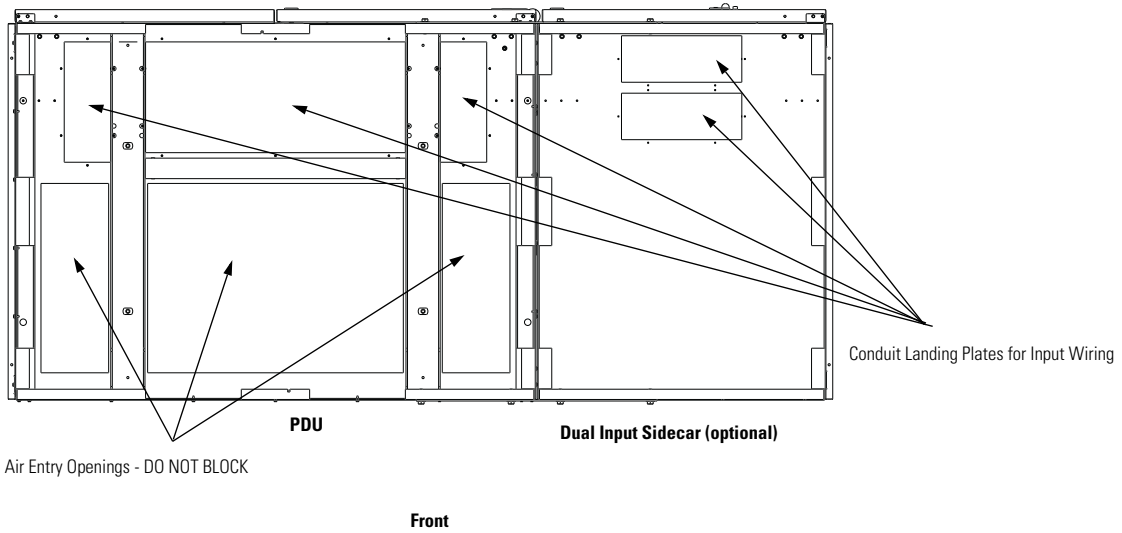


Figure A-8. Eaton 400-500 kVA PDU with Dual Input Sidecar Conduit Landing Plate Locations – Bottom View

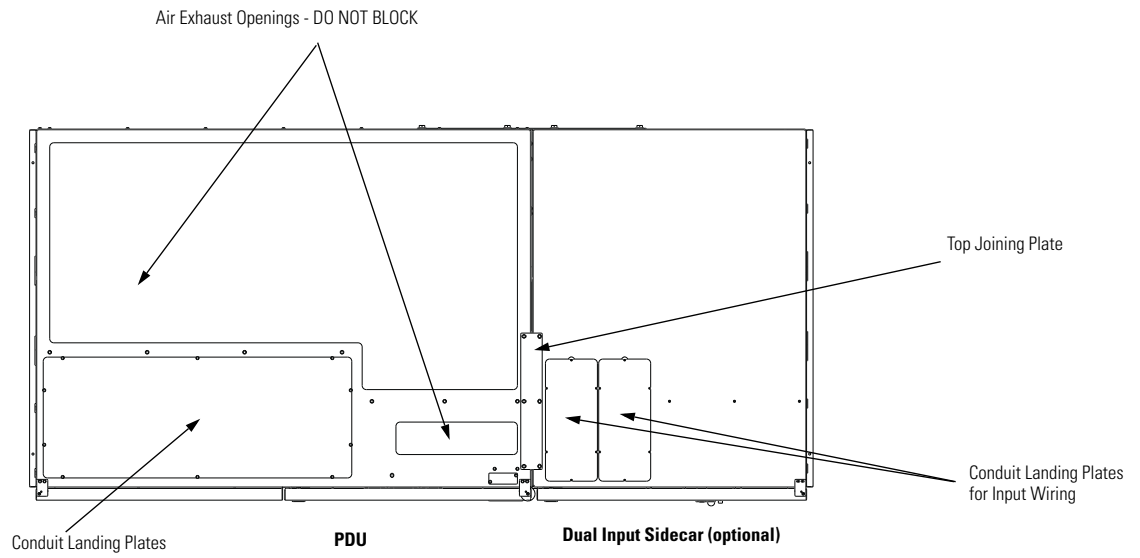
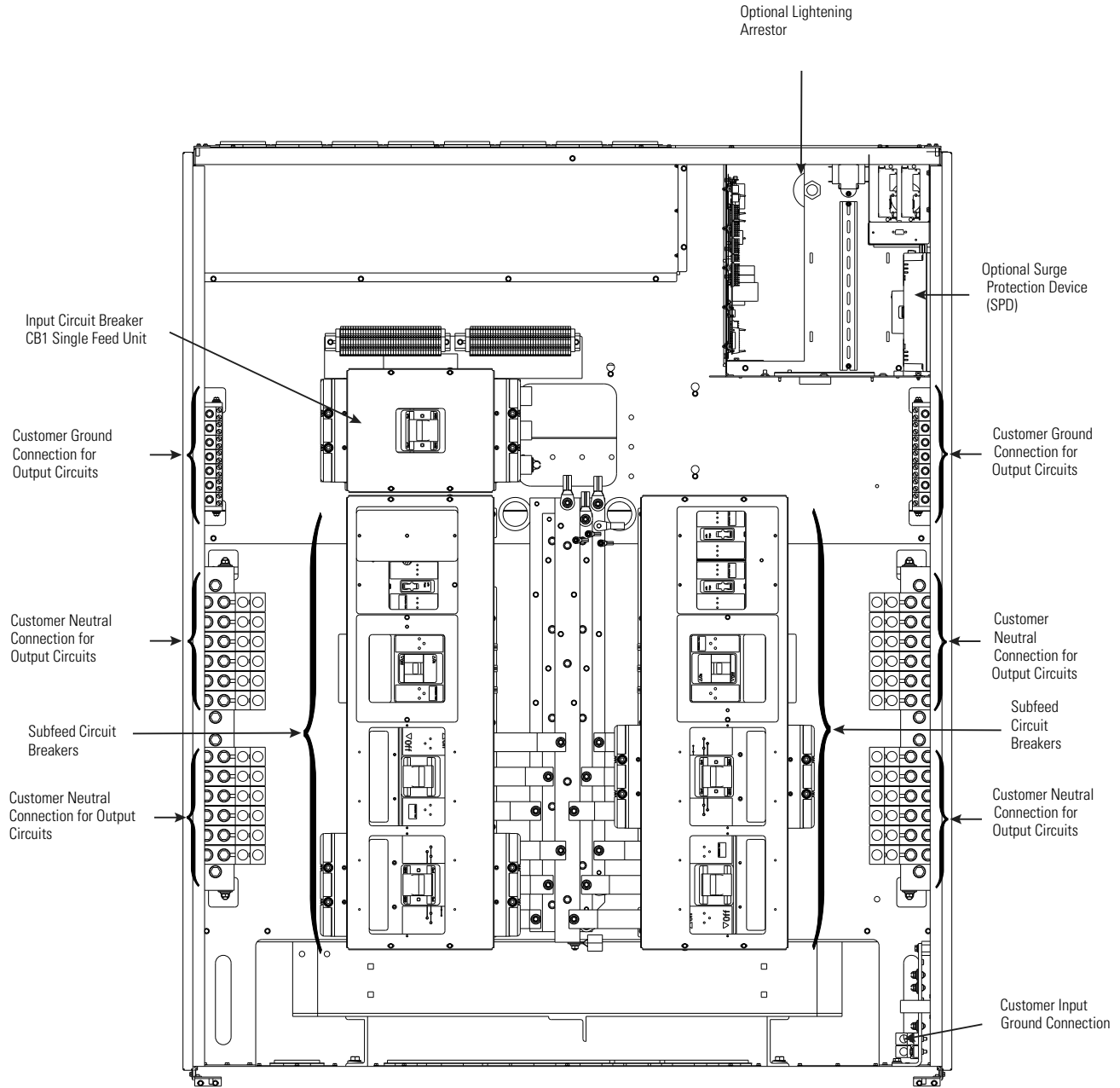


Figure A-9. Eaton 400-500 kVA PDU with Dual Input Sidecar Conduit Landing Plate Locations – Top View

A.4 Location of Power Terminals



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

Figure A-10. Eaton 400-500 kVA PDU Power Terminal Locations

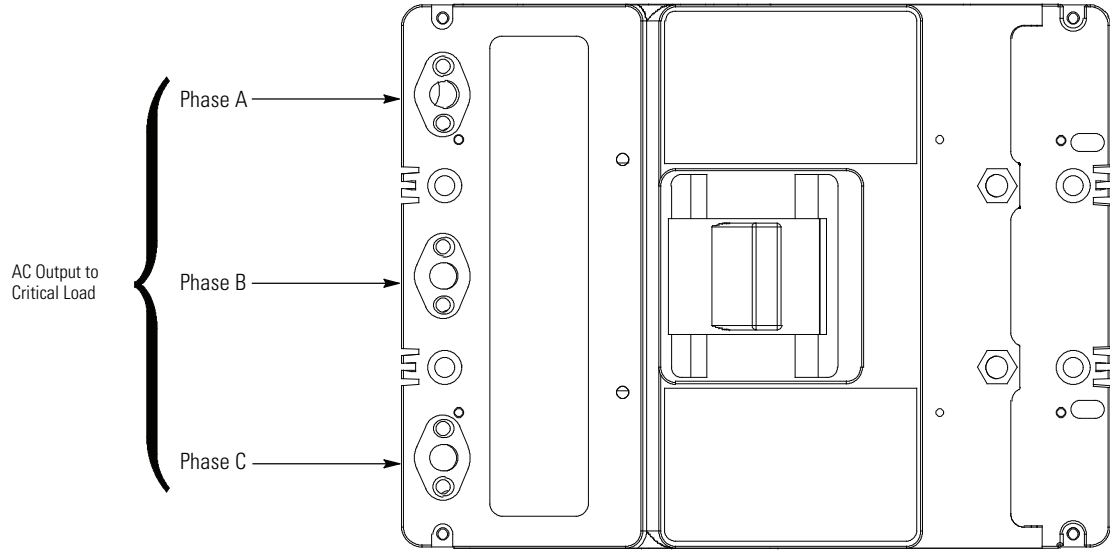


Figure A-11. "L" Frame Output Subfeed Breaker Terminal Detail

A.5 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.

⚠ CAUTION

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

⚠ AVERTISSEMENT!

Ne connectez pas directement les contacts de relais aux circuits branchés sur le secteur. Un isolement renforcé par rapport au secteur est nécessaire.

⚠ ATTENTION!

Les contacts du relais d'alarme ne doivent pas être utilisés au-delà de 30 Vca à 5A maximum.

1. Use Class 2 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 1 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 shielded 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 H, Figure A-12 through Figure A-16, 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 H. 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	
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 contacts. Set by default to signal when a panelboard or subfeed breaker overload occurs.
2	Alarm Relay NO	
3	Alarm Relay NC	

NOTE "Return" indicates connection to electronics circuit ground. Common indicates connection to common side of isolated relay contact.

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

Terminal Function	Rating	Size of Pressure Termination	Tightening Torque Nm (lb in)	Type Screw	Comments
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.

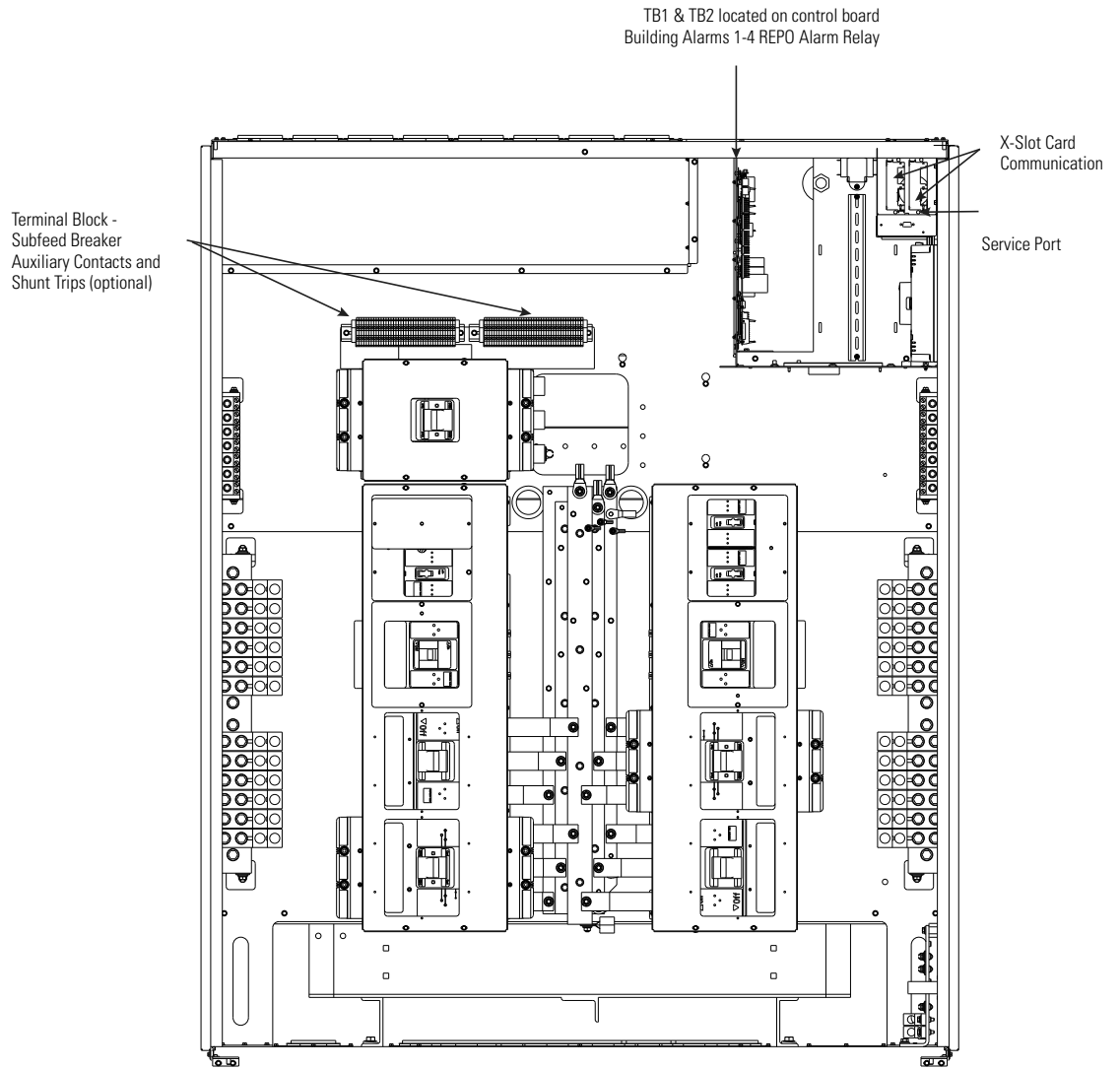


Figure A-12. Eaton 400-500 kVA PDU Interface Terminal Locations for Output Breaker Monitoring

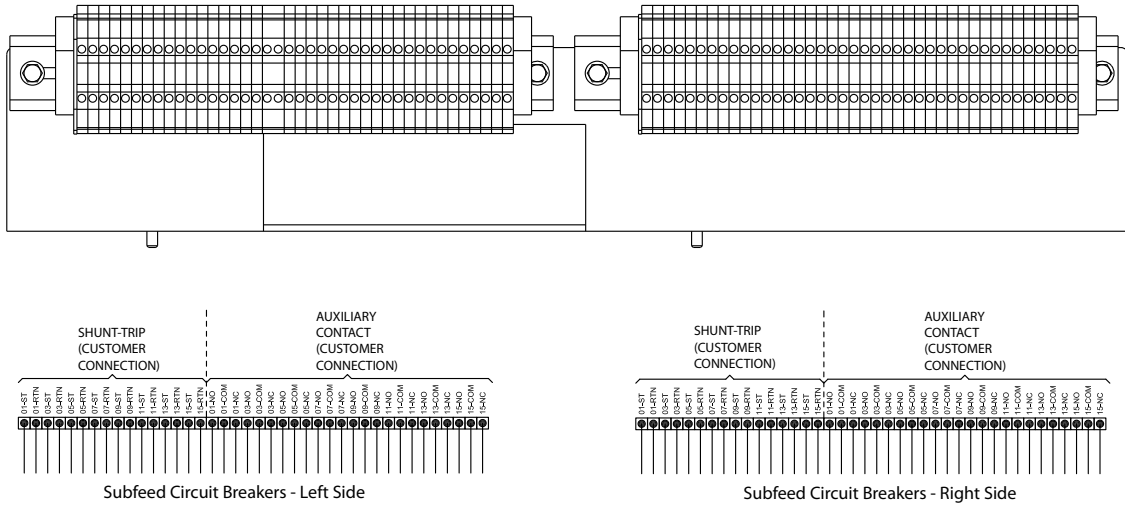
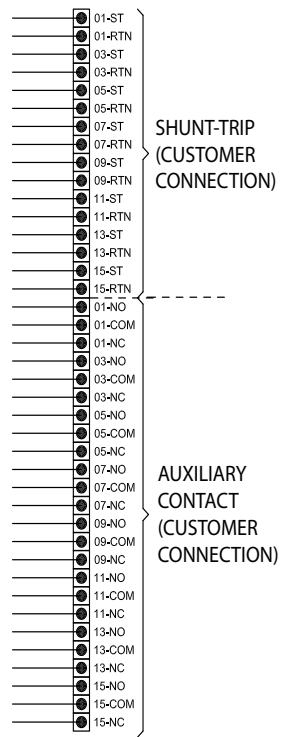
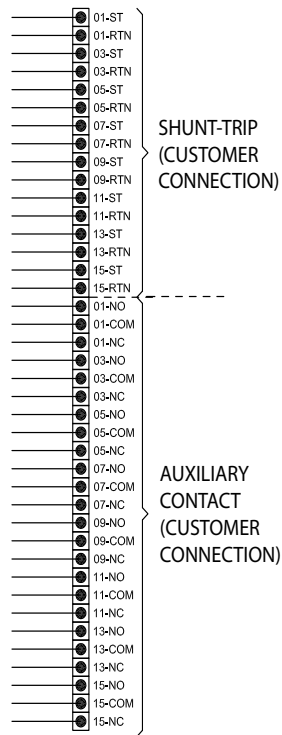
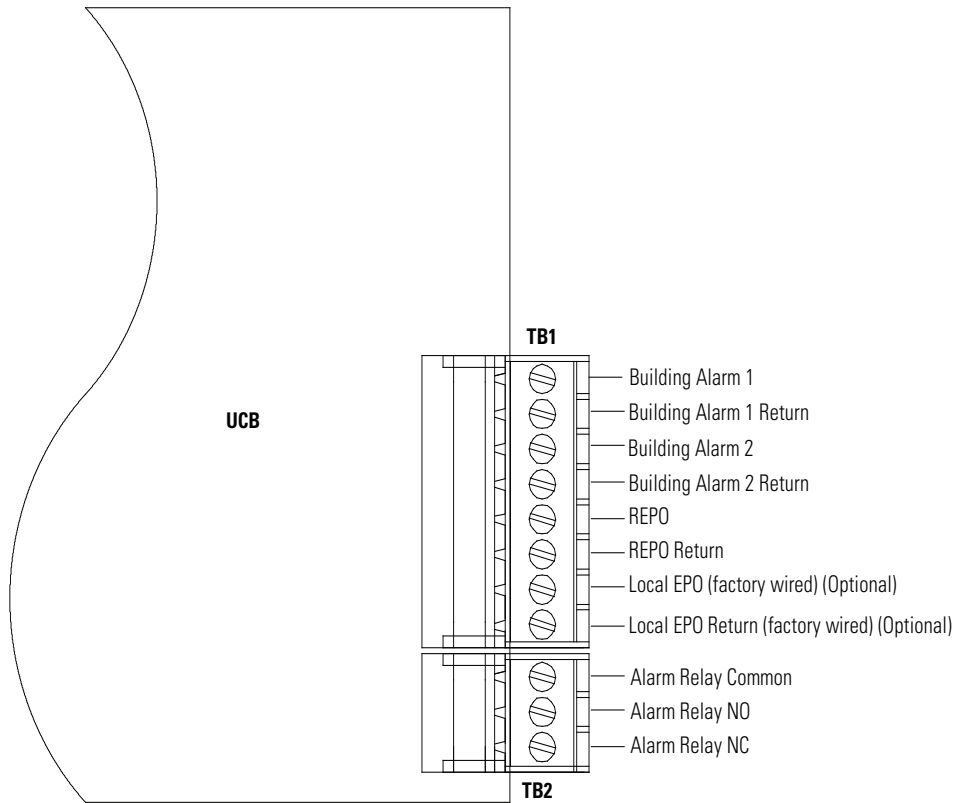


Figure A-13. Subfeed Breaker Terminal Blocks - Auxiliary Contacts and Shunt Trips



NOTE Numbers in terminal designation indicate PRL4 panelboard breaker number as shown in Figure A-13.

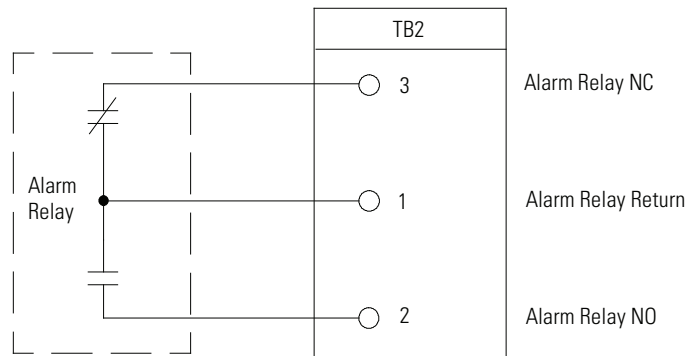
Figure A-14. Subfeed Breaker Terminal Block Detail



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.

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

Figure A-15. Customer Input 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-16. Typical Alarm Relay Connection

A.6 Optional Remote Emergency Power-off

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 H, Figure A-17 or Figure A-18, and Chapter 4 for REPO interface wiring.
7. See Figure A-19 for the optional Eaton REPO switch.

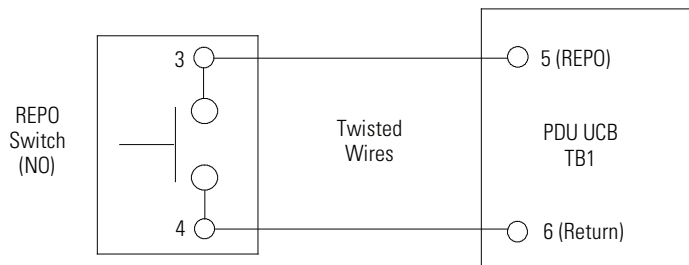


Figure A-17. REPO Wiring – Normally Open Switch

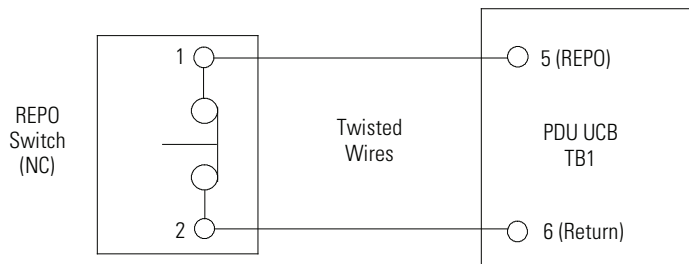
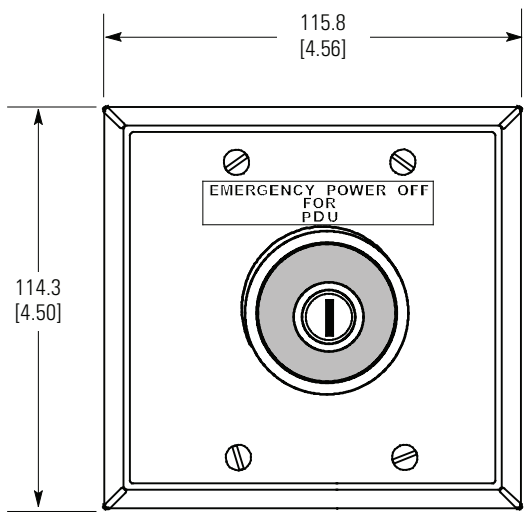
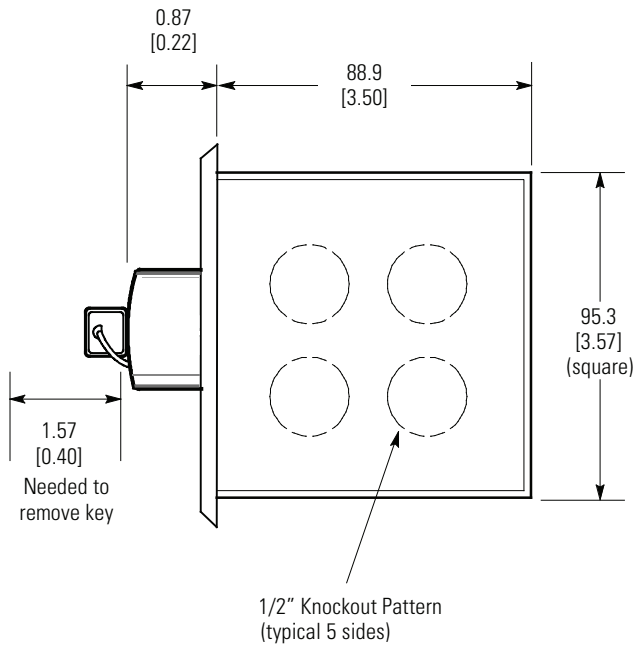


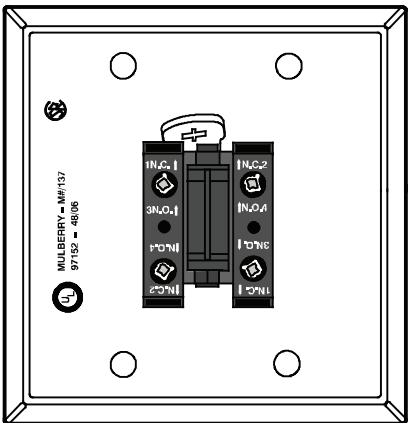
Figure A-18. REPO Wiring – Normally Closed Switch



Front View



1/2" Knockout Pattern (typical 5 sides)



Contact Block (back view, faceplate removed)

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-19. Optional Eaton REPO Switch

A.7 Optional Floor Mounting Brackets

Front and rear floor mounting brackets can be installed to permanently secure the PDU to the facility floor.

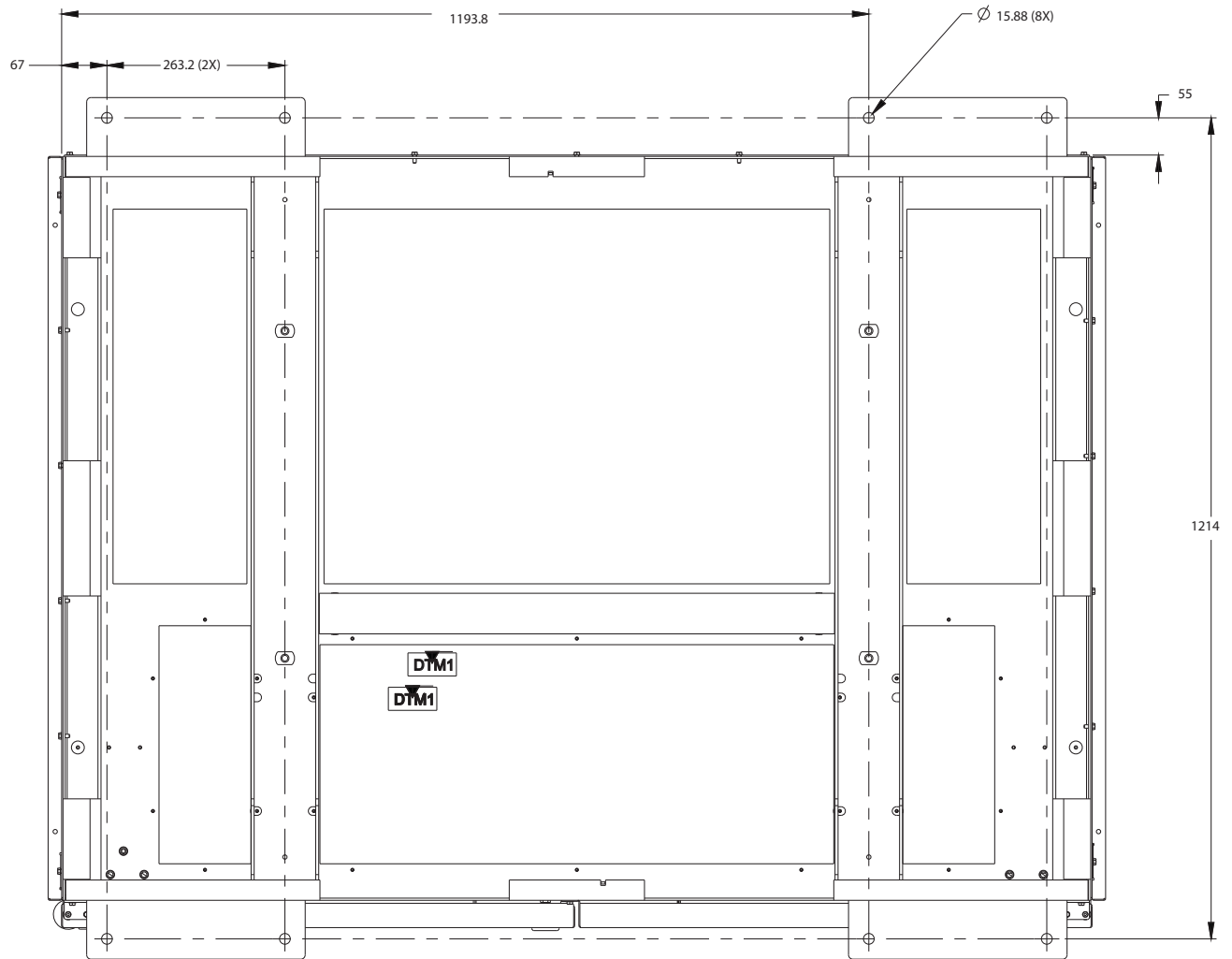


Figure A-20. Optional Floor Mounting Bracket Dimensions

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Warranty

Limited Factory Warranty for Eaton Three-Phase Products

Three-Phase Products

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton ("Eaton").

LIMITED WARRANTY: This limited warranty (this "Warranty") applies only to the original End-user (the "End-user") of the Eaton three-phase UPS Products (the "Product") and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Eaton for resale to an End-user.

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

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

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation, including the "trickle charge" of batteries no later than the date indicated on the packaging; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, 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 USA) or Agent (outside of 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 USA) or Agent (outside of USA); or (c) if the Product's serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof. Labor warranty is not provided for Product located outside of the fifty (50) United States or the District of Columbia. Any equipment, parts or materials included in the Product and not manufactured by Eaton are warranted solely by the manufacturer of such equipment, parts or materials and are not included as part of this warranty. Batteries are not warranted by Eaton.

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

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

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

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

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

OBTAINING WARRANTY SERVICE: In the USA, call the Customer Reliability Center 7x24 at 800.843.9433. Outside of the USA, contact your local Eaton product sales or service representative for units purchased from those countries, or call the Customer Reliability Center in the USA at 919.845.3633 for units purchased in the USA that were shipped overseas. For comments or questions about this Warranty, write to the Customer Quality Representative, 8609 Six Forks Road, Raleigh, North Carolina 27615 USA.



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