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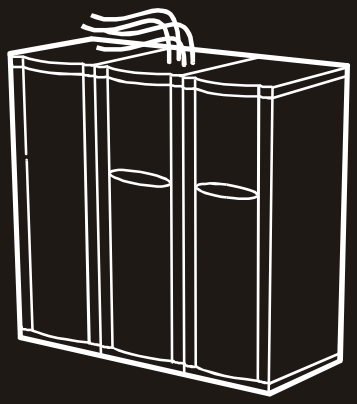
Installation and Start-Up

40kW InfraStruXure™ System

Medium Data Centers
400/230V



This manual is available in English on the enclosed CD.

Dieses Handbuch ist in Deutsch auf der beiliegenden CD-ROM verfügbar.

Deze handleiding staat in het Nederlands op de bijgesloten cd.

Este manual está disponible en español en el CD-ROM adjunto.

Ce manuel est disponible en français sur le CD-ROM ci-inclus.

Questo manuale è disponibile in italiano nel CD-ROM allegato.

Instrukcja Obslugi w jêzyku polskim jest dostêpna na CD.

ИНСТРУКЦИЯ ПО ИСПОЛЬЗОВАНИЮ НА РУССКОМ ЯЗЫКЕ ПРИЛАГАЕТСЯ НА ДИСКЕ (CD).

您可以从包含的 CD 上获得本手册的中文版本。

About this Manual

This manual is intended for APC Field Service Engineers or APC-trained installers of a 40kW InfraStruXure system. It covers basic installation and start-up.

For additional information about installing the InfraStruXure system, see *Certified Electrician's Instructions* (990-1595A), which provides specific instructions for the electrician connecting mains to the InfraStruXure PDU.

For information about installing specific components in your InfraStruXure system, see the documentation included with each component. Before installing or operating any component, refer to the safety instructions in the component's manual.

The illustrations of products in this manual may vary slightly from the products in your InfraStruXure system.

You can check for updates to this manual by clicking on the **User Manuals** link on the **Support** page of the APC Web site (**www.apc.com**). In the list of InfraStruXure manuals, look for the latest letter revision (A, B, etc.) of the part number on this manual.

Contents

Safety

Overview

Save these instructions

This manual contains important instructions that must be followed during installation, operation, and maintenance of the InfraStruXure System.

Safety symbols used in this guide

Indicates an electrical hazard, which, if not avoided, could result in injury or death.

Indicates a hazard, which, if not avoided, could result in personal injury or damage to product or other property.

Indicates a potential hazard which could result in damage to product or other property.

Indicates important information.

Indicates a heavy load that should not be lifted without assistance.

Indicates a standby state. When in standby, the unit is not operating, but it may still contain hazardous voltage. It is not safe to service until the equipment is disconnected from all sources of electrical power.

Cross-reference symbols used in this manual

Indicates that more information is available on the same subject in a different manual.

Indicates that more information is available on the same subject in a different section of this manual.

Warnings

Installation/Maintenance

Only a certified electrician can:

- Connect the InfraStruXure PDU to Mains
- Connect a switch to the EPO interface on the InfraStruXure PDU

Only a certified electrician or an APC Field Service Engineer can:

- Connect the InfraStruXure PDU to the Symmetra PX UPS
- Perform maintenance of the InfraStruXure PDU

When you connect the InfraStruXure PDU to Mains, you must install a 100A (minimum) circuit breaker to protect the InfraStruXure PDU against over-current. This circuit breaker must have a CE Mark and a certification mark by a certified body such as VDE, SEV, BSE, KEMA, or Semko.

Maintenance performed while the PDU is receiving input power

APC does not recommend that you perform maintenance of the PDU while it is receiving input power. However, due to the critical nature of data center loads, this may occur. If you must perform maintenance while the PDU is receiving input power, observe the following precautions to reduce the risk of electric shock:

1. Never work alone.
2. Perform the maintenance only if you are a certified electrician who is trained in the hazards of live electrical installation.
3. Know the procedure for disconnecting electricity to the PDU and the data center in case of an emergency.
4. Wear appropriate personal protective equipment.
5. Use double-insulated tools.
6. Always follow local and site regulations when working on the PDU.

Total power off procedure

1. Set the Symmetra PX UPS **System Enable** switch to **Standby**.
2. Set the Symmetra PX UPS **DC Disconnect** switch to **Off**.
3. Set the InfraStruXure PDU **Main Input** switch to **Off**.
4. Set the **DC Disconnect** breaker of each XR Battery Enclosure to **Off**.
5. Set the upstream **Mains** circuit breaker to **Off**.
6. Disconnect the batteries in the UPS by pulling them out approximately 25 millimeters from their normal position.
7. Disconnect the batteries in the XR Battery Enclosure by pulling them out approximately 25 millimeters from their normal position.

DANGER—Risk of Electric Shock!

Hazardous, live parts inside the Symmetra PX UPS are energized from the battery supply even when the AC power is disconnected.

Hazardous, live parts may exist inside the InfraStruXure PDU because of the Symmetra PX UPS inverter even when the AC power is disconnected. Test any electrical parts before touching them.

Emergency Power Off (EPO)

This InfraStruXure PDU and Symmetra PX UPS are provided with an Emergency Power Off switch connection. When this EPO switch is energized, electrical power to the units are de-engergized and the system will not transfer to on-battery operation.

EPO can be achieved with either a contact closure or application of an external 24 VAC or 24 VDC from a SELV or PELV source. It's important to note that hazardous voltage from the Mains voltage must be isolated from the contact closure or 24 VAC, 24 VDC. The EPO circuit contact closure, the 24 VAC or the 24 VDC are considered a SELV circuit as defined in EN 60950 *Safety of Information Technology Equipment* or PELV circuit as defined in IEC 60364-4-41 *Electrical Installations of Buildings, Protection for Safety—Protection Against Electric Shock*. SELV is an abbreviation for Safety Extra Low Voltage. PELV is an abbreviation for Protective Extra Low Voltage. SELV and PELV circuits are isolated from the Mains through a safety isolating transformer, and are designed so that under normal conditions the voltage is limited to 42.4 Vpeak or 60 VDC.

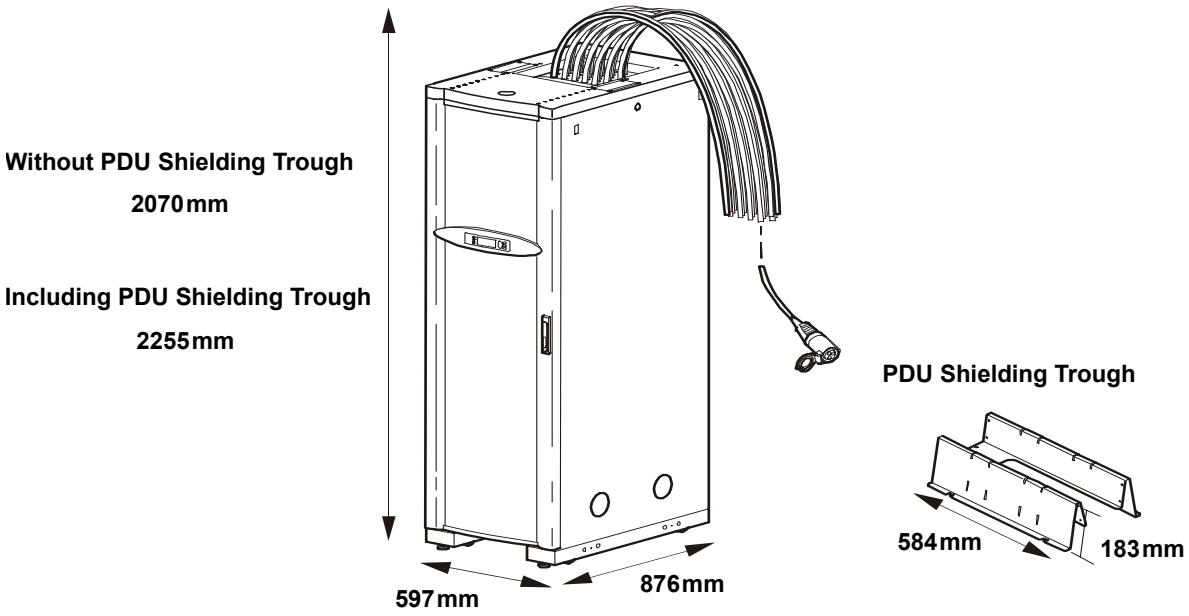
EMI

WARNING –- This is a Class A product. In a domestic environment, this product may cause radio interference in which case, the user may be required to take adequate measures. This equipment has been tested and found to comply with EN55022 (1998) and EN55024.

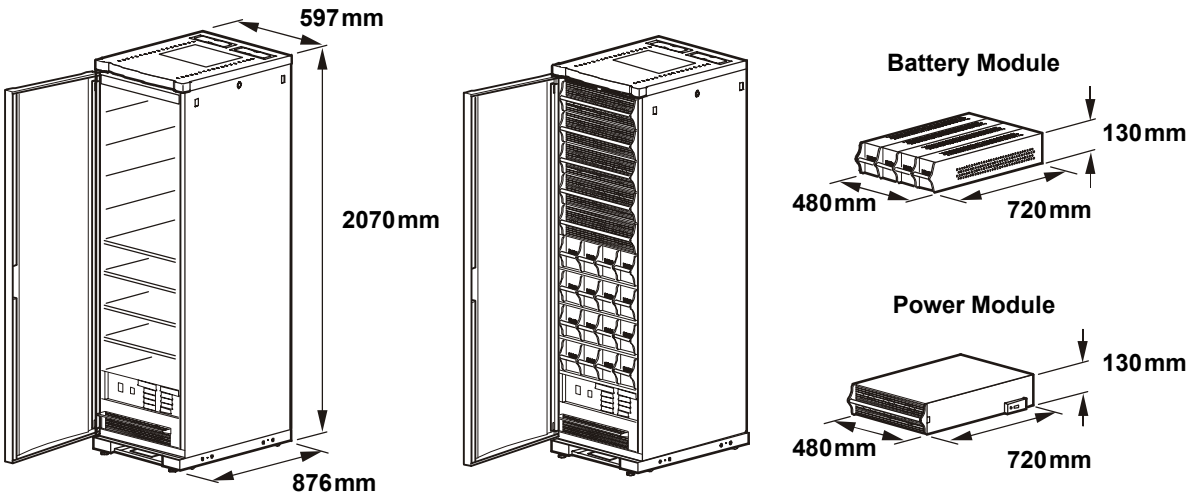
Site Planning

Dimensions

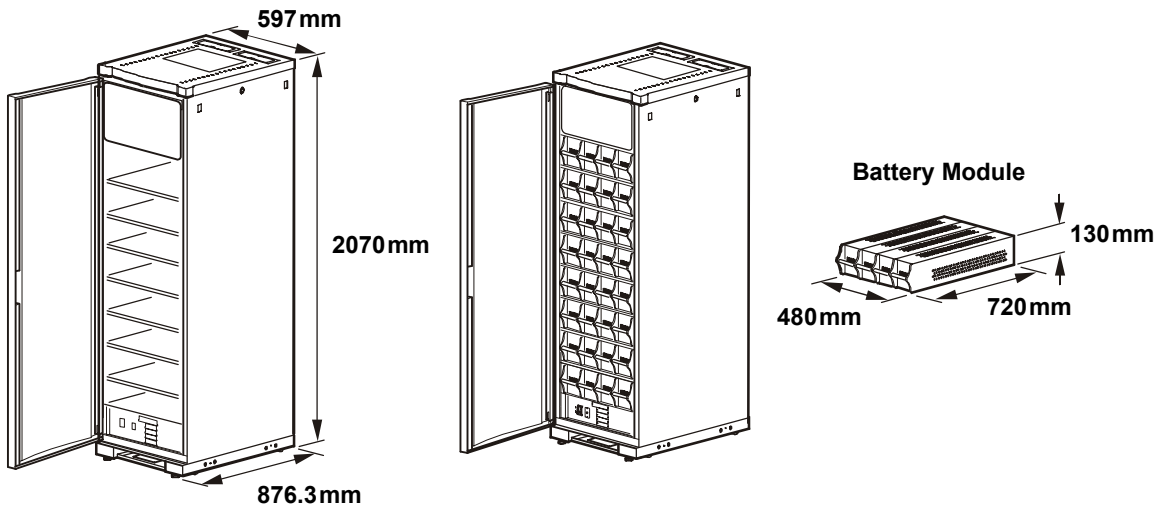
InfraStruXure PDU



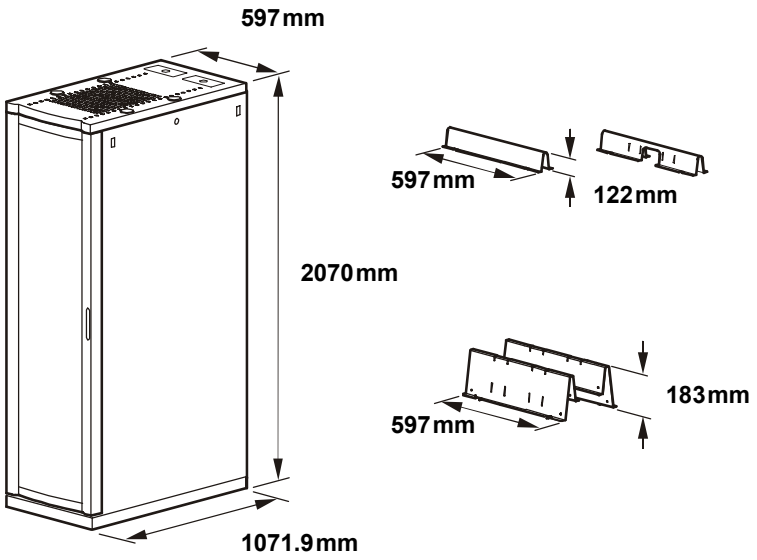
Symmetra PX UPS



XR Battery Enclosure

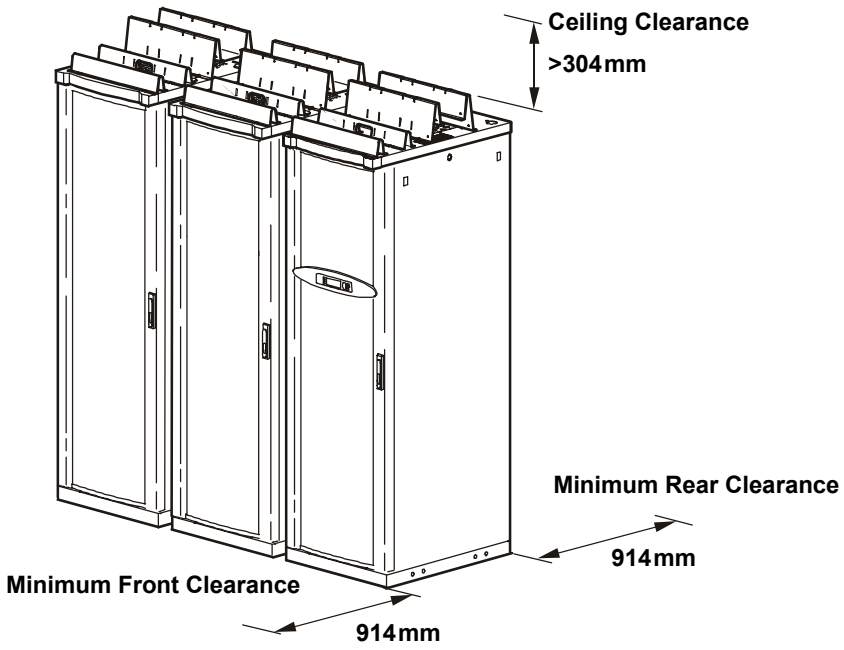


NetShelter VX Enclosure



Space Considerations

Study the figure below to determine your space requirements for installing the InfraStruXure PDU, Symmetra PX UPS, and XR Battery Enclosure. Consult your local and national codes for additional requirements.



Weight Considerations

Ensure that the floor and sub-floor can support the total weight of the configuration when concentrated on the leveling feet. If you are placing equipment on a raised floor, consult the flooring manufacturer for loading requirements before installing equipment.

Component	Maximum Weight
InfraStruXure PDU	
With a transformer	844kg
Without a transformer	590kg
Symmetra PX UPS	773kg
XR Battery Enclosure	986kg
NetShelter VX Base Enclosure (empty)	160kg

Heat Output

Consider the heat dissipation ratings of equipment to determine cooling requirements. Additional cooling equipment may be required. Heat output of the InfraStruXure PDU and Symmetra PX UPS is shown below.

	400V input
InfraStruXure PDU	1.7kW

	Load	**Batteries fully charged**	**Batteries charging**
Symmetra PX UPS	100%	3.4kW	3.5kW
	75%	2.5kW	3.0kW
	50%	1.7kW	2.5kW

The heat output is higher while batteries are charging. Under normal operating conditions, battery recharging periods are infrequent.

Electrical Requirements and Specifications

Procedures requiring a licensed electrician

Procedures requiring a licensed electrician include:

- **Connection of utility conductors**
- **Installation of a 100-amp circuit breaker**
- **Connection to the main input switch**
- **Wiring under the floor**

To connect mains, see *Certified Electrician's Instructions* (990-1595A) included with your PDU documentation.

Electrical requirements

Service distribution breaker †	100 A (125 A if upstream selectivity is required)
Conductors to Main Input switch†	Transformer: L1, L2, L3, N, PE No Transformer: L1, L2, L3, N, PE
Recommended wire sizing‡	
L1, L2, L3, N PE	35 mm², 90° C, XLPE or 50 mm², 70° C, PVC insulation

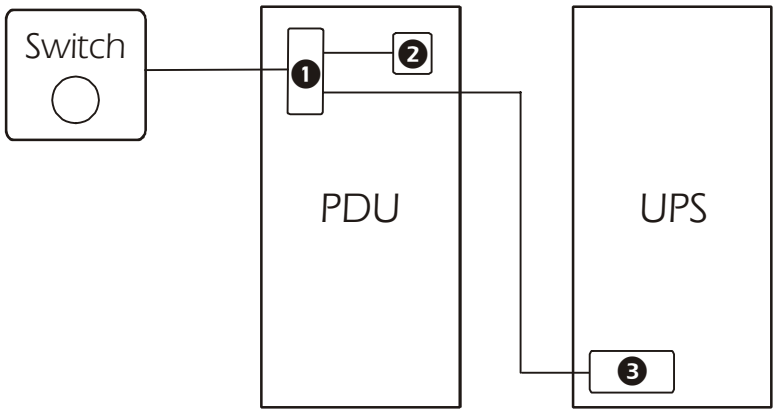
† Provided by customer.

‡ The specifications are recommendations. Consult national and local codes for requirements specific to your installation.

Emergency Power Off (EPO)

Overview

To provide a mechanism for emergency power off, attach a remote switch (not included) to the EPO interface on the PDU monitoring unit. The EPO interface (❶) is connected to the PDU Main Input switch (❷) and to the UPS internal EPO switch (❸). (Control wires from the PDU to the UPS are connected during installation of the InfraStruXure system.)



When the EPO is activated, the main input breaker to the PDU transformer is opened, the UPS DC Disconnect breaker is opened, and the UPS System Enable switch is turned off. In this sequence, there is no power from the PDU transformer and there is no power from the UPS inverters and batteries.

Note

APC offers an optional InfraStruXure EPO system (EPW9). Contact your APC sales representative, or visit the APC website **(www.apc.com)** for more information.

See “Connect an Emergency Power Off Switch” on page 29 for instructions on how to connect an EPO switch to the PDU.

Basic Installation Procedure

This section provides the basic steps that you need to perform when installing InfraStruXure power and rack components. Follow the references provided with each step for detailed instructions.

Do not begin installing your InfraStruXure system without an APC Field Service Engineer present.

1. Unpack the components according to the unpacking instructions included on the outside of the packaging or in the component's manual.

   Search all boxes and packaging to make sure that they are empty before discarding.

2. Determine the correct placement of your system components by studying your InfraStruXure Configure-To-Order (CTO) report. Move the Symmetra PX UPS, InfraStruXure PDU, XR Battery Enclosure, and NetShelter VX Enclosures to their final location.

   If installing InfraStruXure on a raised floor, make sure that the raised-floor structure has a lb/in^2 rating that will support the full weight of the InfraStruXure installation. See "Weight Considerations" on page 8.

3. Level the PDU, UPS, NetShelter, and XR Battery Enclosures, using the 13/14-mm wrench included with each unit.

   See page 15 for detailed instructions.

4. Exchange side panels and run battery communication cables, if applicable.

   See page 16 for detailed instructions.

5. Join adjacent enclosures.

   For instructions on joining the PDU, UPS, and XR Battery Enclosure see page 18.

   For instructions on joining adjacent NetShelter VX Enclosures, see the installation manual included with your enclosures.

6. Ensure total power off.

   See page 19 for detailed instructions.

7. Connect Mains to the PDU

   A licensed electrician must connect Mains.

   
   See also

   For instructions, see *Certified Electrician's Instructions* included with your PDU documentation.

8. Connect AC power and control wiring.

   See page 22 for detailed instructions.

9. Connect DC power wiring, if applicable.

   See page 26 for detailed instructions.

10. Connect an EPO switch to the PDU monitoring unit.

    See page 29 for detailed instructions.

11. Install Shielding Troughs, Shielding Partitions, and Cable Ladders.

    
    See also

    For instructions, see the manuals included with your Shielding Troughs, Shielding Partitions, and Cable Ladders.

12. Install the Rack Automatic Transfer Switches (ATS), Rack Power Distribution Units, and other InfraStruXure rack-mount devices.

    
    See also

    For instructions, see the manuals included with your Rack ATS, Rack PDU, or other InfraStruXure rack-mount devices.

13. Route and attach power cables to each Rack ATS and/or Rack PDU.

    See page 36 for detailed instructions.

14. Route and attach communication cables to the InfraStruXure Manager hub (or switch).

    See page 41 for detailed instructions.

15. Start the system.

    Only qualified, APC-trained personnel may perform a system start-up.

    See page 43 for detailed instructions.

16. Configure the InfraStruXure Manager.

    
    See also

    For instructions, see the manual included with your InfraStruXure Manager.

Tools Required

The following tools are required to perform the procedures in this manual. Additional tools may be required for components not covered in this manual.

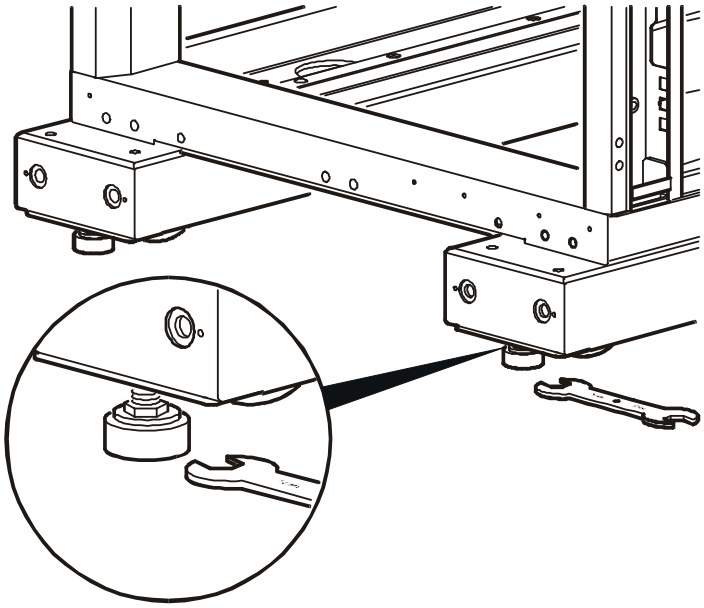
Tool	Supplied?
13-mm socket wrench	No
17-mm socket wrench	No
T-20 screwdriver	No
Standard screwdriver	No
Level	No
Open-ended wrench (14 mm) for adjusting the leveling feet	Yes
Step ladder	No
Crimper	No
Volt-meter	No
Phase-rotation meter	No

Installation Procedures

Level the PDU, UPS, NetShelter, and XR Battery Enclosures

Leveling feet are attached under the enclosure at each corner. The leveling feet can help provide a stable base if the selected floor space is uneven, but they are not intended to compensate for a badly sloped surface. To level the enclosure:

1. Fit the 14-millimeter end of the open-ended wrench (provided) to the hex head just above the round pad on the bottom of the leveling foot. Turn the wrench clockwise to extend the leveling foot until it makes firm contact with the floor.

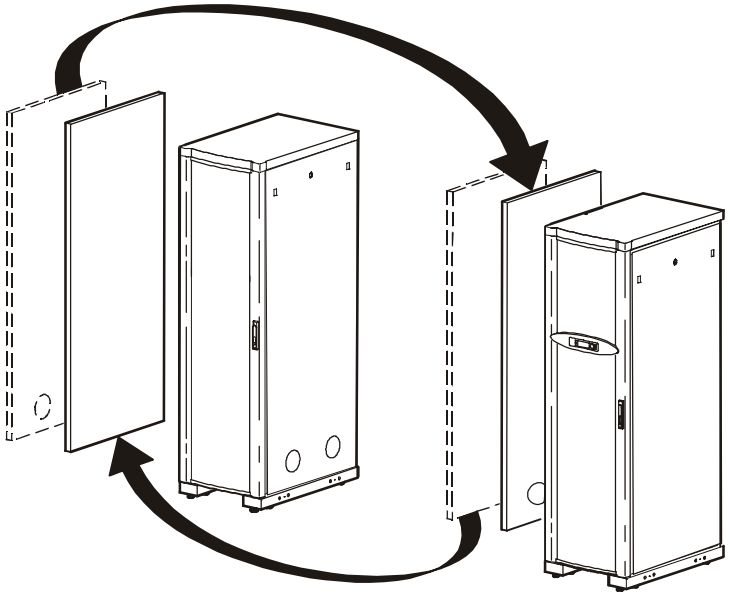


2. Repeat step 1 for each of the remaining leveling feet.
3. Use a level to determine which feet need further adjustment to level the enclosure. Adjust as necessary.

Exchange Side Panels

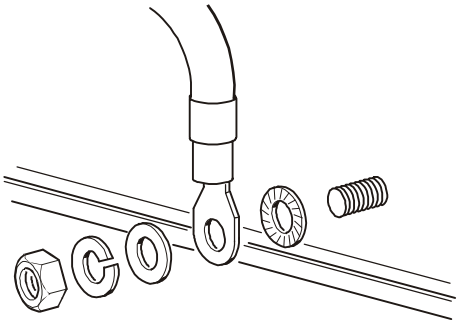
Before installing the InfraStruXure PDU, Symmetra PX UPS, and XR Battery Enclosure, you will need to exchange side panels so that the **adjacent** panels will have matching holes for joining the enclosures together and for routing input and output wiring between them. The following side panels will need to be exchanged:

- Adjacent side panels of a PDU and UPS
- Adjacent side panels of a XR Battery Enclosure and a UPS
- Adjacent side panels of two XR Battery Enclosures

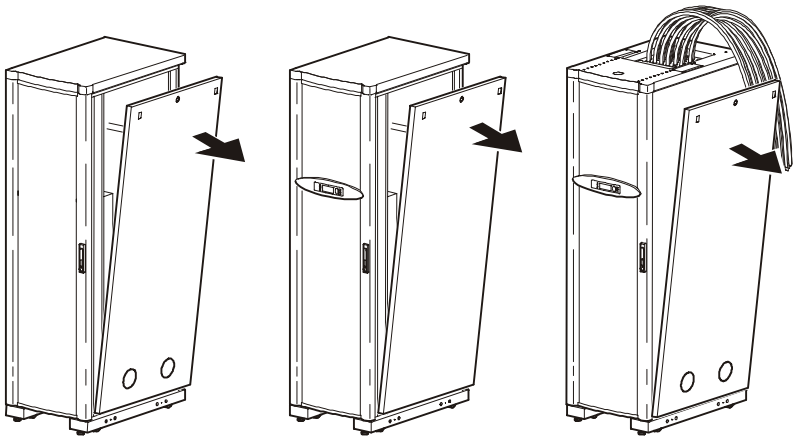


To exchange side panels:

1. Detach the PE wires from the side panels that you will be exchanging.



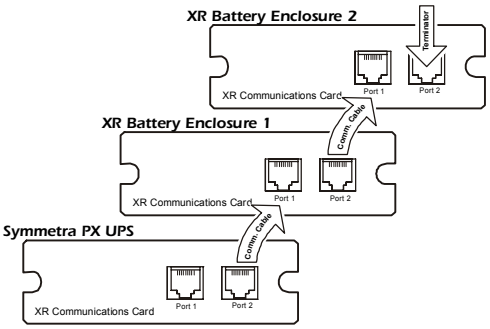
2. Remove the solid side panels from the sides of the UPS that will be adjacent to the PDU and the XR Battery Enclosure in your planned configuration.
3. Remove the side panels from the sides of the PDU and XR Battery Enclosure that will **not** be adjacent to the UPS.



4. Remove the rear hole covers from the panels that you removed in step 3.

Connect Battery Enclosure communication cables:

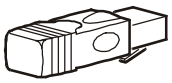
5. Route the communication cable through the hole between the UPS and the XR Battery Enclosure. Route the cable from the side of the UPS to which it is attached, around the back of the UPS, and through the hole on the other side of the UPS to the front of the XR Battery Enclosure.
6. Connect the cable to **Port 1** on the first adjacent XR Battery Enclosure's XR Communication Card.
7. Connect **Port 2** on the first XR Battery Enclosure to **Port 1** on the next XR Battery Enclosure. Route the cable the same way as described in step 5. Continue until all XR Communication Cards are connected.



8. Locate the XR Communication Card terminator and insert it into the open port of the last XR Battery Enclosure in your configuration.

Note

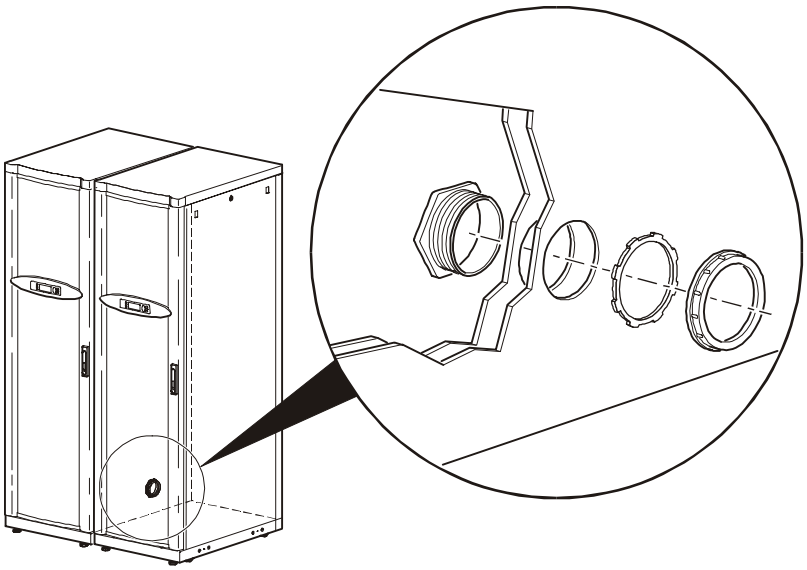
The terminator is in **Port 1** of the UPS XR Communication Card and in **Port 2** of the XR Battery Enclosure XR Communication Card.



9. Install, on the UPS, the side panels that you removed from the PDU and the XR Battery Enclosure in step 3 and reattach the PE wires.
10. Install, on the PDU and the XR Battery Enclosure, the solid side panel that you removed from the UPS in step 2 and reattach the PE wires.

Attach the PDU, UPS, and XR Battery Enclosure

1. Move the PDU, Symmetra PX UPS, and XR Battery Enclosures into position, aligning the holes in the adjacent side panels.
2. Level the PDU, Symmetra PX UPS, and XR Battery Enclosure by using a level and adjusting the leveling feet on each enclosure.
3. Thread the chase nipple (p/n: 820-0071) through the opening in the adjacent side panels of the enclosures. The following enclosures will need to be attached:
   - An adjacent PDU and UPS
   - An adjacent XR Battery Enclosure and UPS
   - Adjacent XR Battery Enclosures



4. Tighten the lock-nut and the bushing on the chase nipple.

Ensure That All Power is Off

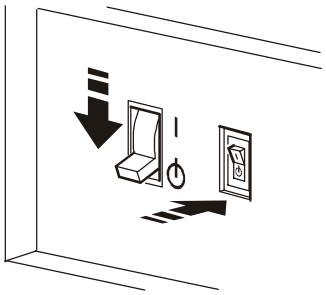
Electrical Hazard

Before you proceed, ensure that power is off by following the procedure in this section.

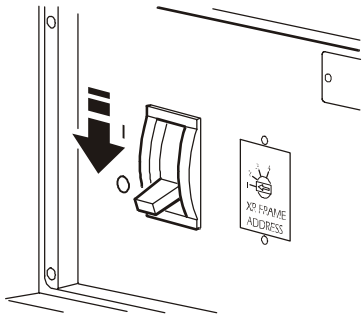
Warning

Do not install any batteries into the XR Battery Enclosure or power modules into the Symmetra PX UPS until instructed to do so.

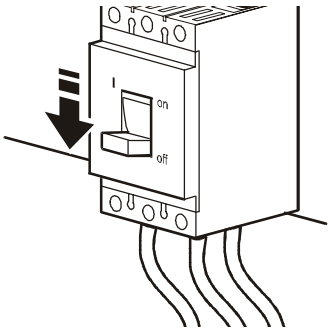
1. Set the UPS **DC Disconnect** breaker and **System Enable** switch to OFF.



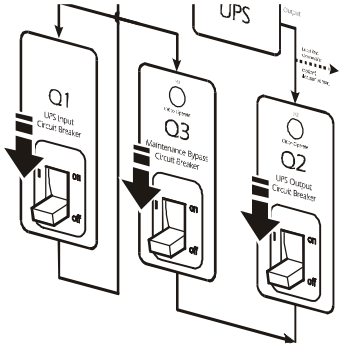
2. If applicable, set the XR Battery Enclosure **DC Disconnect** breaker to OFF.



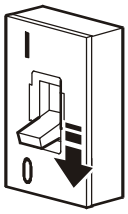
3. Set the PDU **Main Input** breaker (or switch) to OFF.



4. Open (turn OFF) the **Q1**, **Q2**, and **Q3** breakers on the PDU.



5. Set the upstream input Mains circuit breaker to the OFF or Locked Out position.



Connect Mains to the InfraStruXure PDU


Warning

Only a certified electrician can connect mains to the InfraStruXure PDU.


See also

For detailed instructions, see *Certified Electrician's Instructions* (990-1595A), which was included with your PDU documentation.

Connect AC Power and Control Wiring

Before you connect AC power and control wiring, connect Mains to the PDU. For instructions, see *Certified Electrician's Instructions* included with your PDU documentation.

Only Field Service Engineers or qualified personnel trained by APC may connect the AC power and control wiring.

Connect AC power and control wiring to the UPS. The power wires are coiled in the bottom of the PDU. There are five input wires and four output wires coiled on the floor of the PDU. Each set of wires is labeled. The control wires for the UPS Maintenance Bypass control board and the UPS EPO control board are also coiled in the PDU. The diagram on the next page provides an overview of the connections that you will make between the PDU and the UPS.

To make the connections, remove the rear lower panel of the UPS and the rear panel of the PDU. Use the opening in the side panels of the enclosures to run the wires.

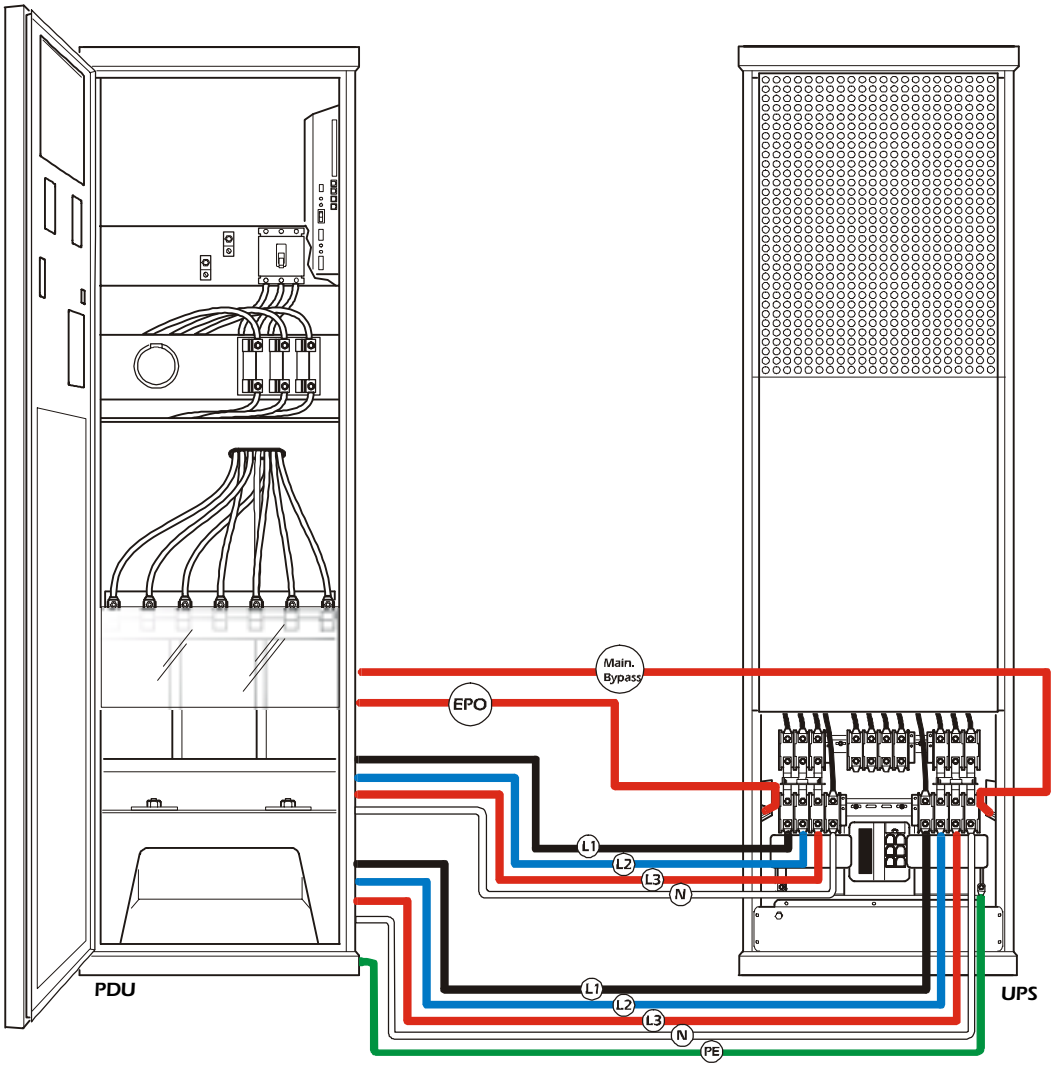
Connect AC power wiring.

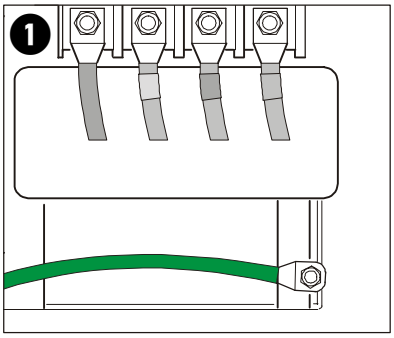
❶ Attach the input PE wire to the PE lug marked ⏚ to the right of the input terminals.

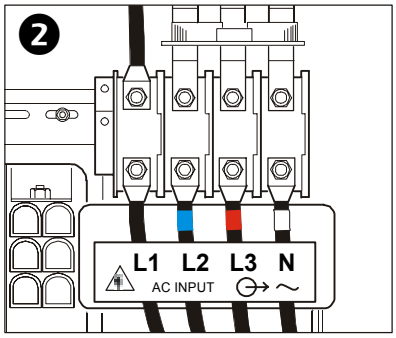
❷ Attach the **input** wires (**L1**, **L2**, **L3**, **N**) to the four UPS input terminals with corresponding labels.

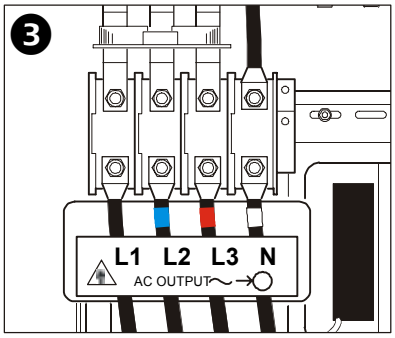
❸ Attach the **output** wires (**L1**, **L2**, **L3**, **N**) to the four UPS output terminals with corresponding labels.

The conductors are not interchangeable, and must be terminated in the correct location to prevent damage to the system and connected equipment.


Main. Bypass
EPO
L1
L2
L3
N
PDU
UPS
L1
L2
L3
N
PE

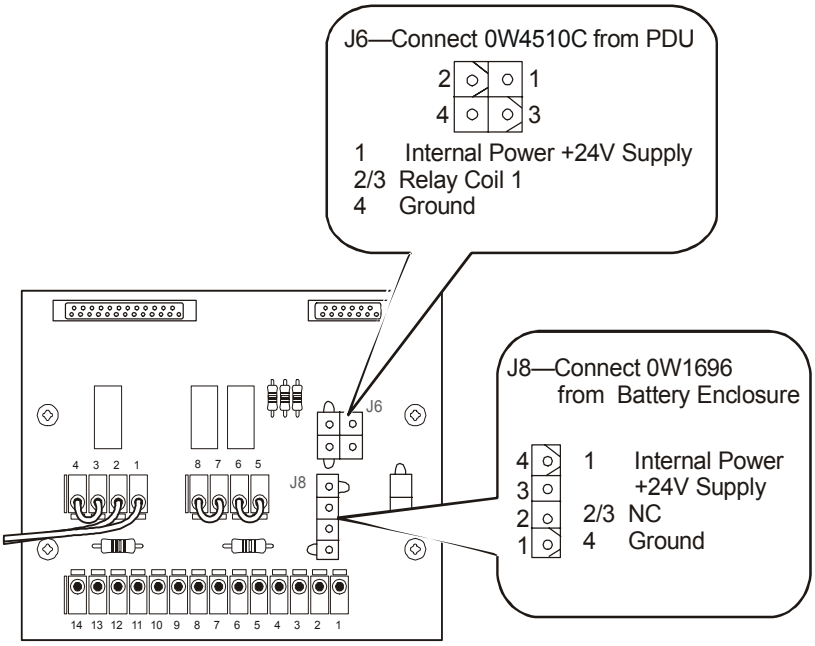

1


2
L1 L2 L3 N
AC INPUT

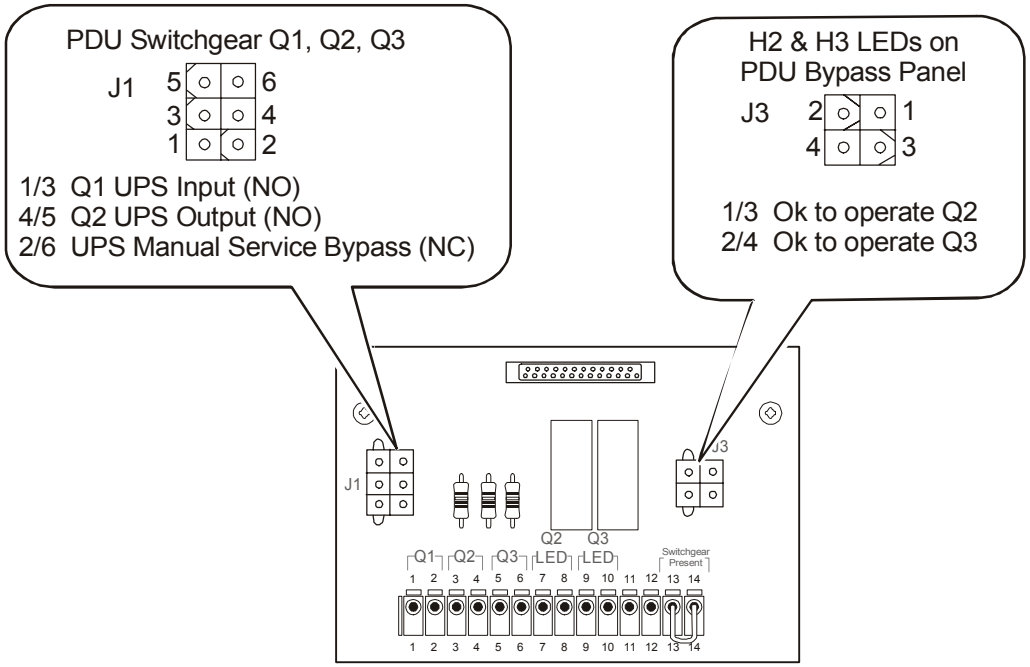

3
L1 L2 L3 N
AC OUTPUT

Connect control wiring.

1. Connect the EPO control wires from the PDU and the XR Battery Enclosure (if applicable) to the EPO board on the UPS. The control wires are harnessed and coiled in the floor of the PDU and the XR Battery Enclosure. The PDU harness connects to **J6** and the XR Battery Enclosure harness connects to **J8**.



2. Connect the Maintenance Bypass control wire harness from the PDU to the Maintenance Bypass interface board of the UPS. There are two wire harnesses coiled and secured in the PDU. One is a 6-wire harness and the other is a 4-wire harness.



Note A jumper wire must be installed in position 13 and 14.

Connect DC Power Wiring, if Applicable

Only Field Service Engineers or qualified personnel trained by APC may connect the XR Battery Enclosure to the Symmetra PX UPS or to another XR Battery Enclosure.

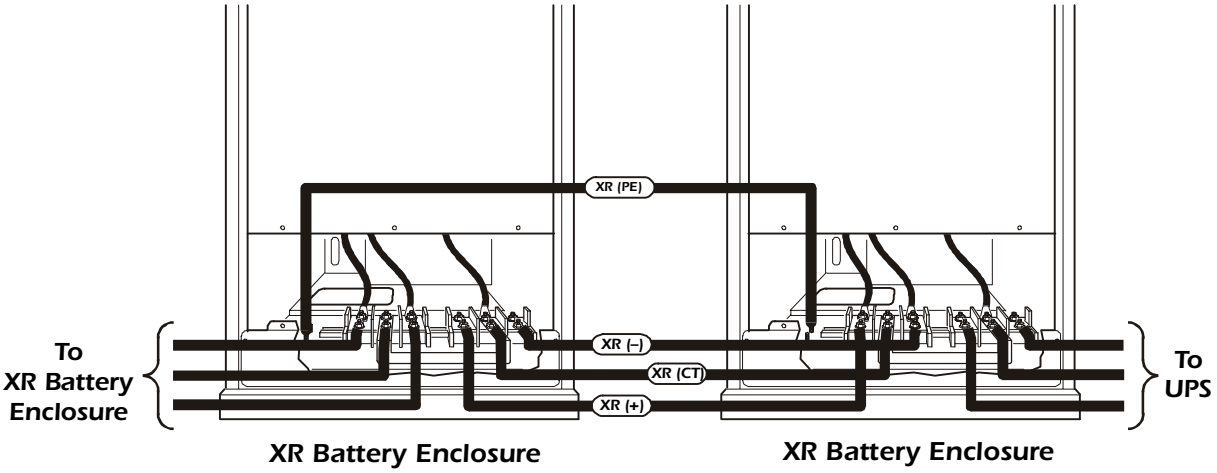
The supplied power and PE wires are for internal side-panel wiring only. These wires are not for use in external conduits.

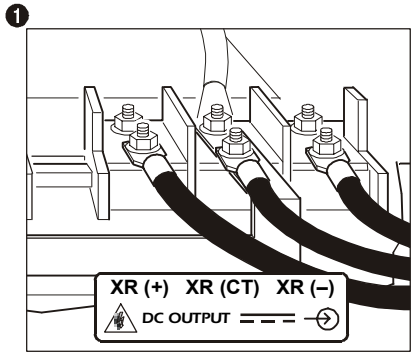
Before you begin connecting the DC power wiring, ensure that there are no battery units installed in the XR Battery Enclosures. Do not install battery units until instructed to do so.

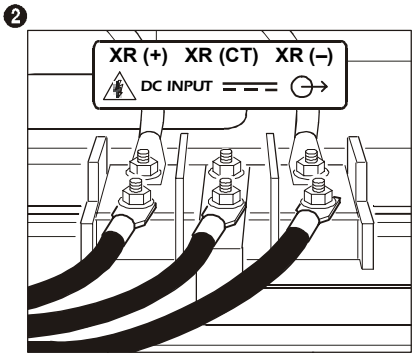
Cascade XR Battery Enclosures

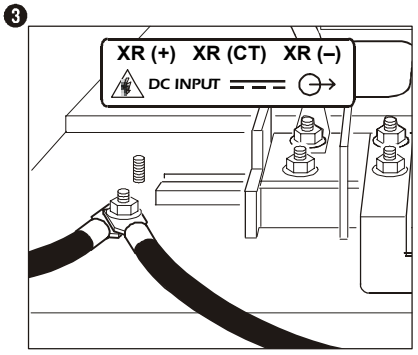
If you have multiple XR Battery Enclosures as part of your InfraStruXure system, you can cascade XR Battery Enclosures to form a "daisy-chain" to a Symmetra PX UPS. Starting with the XR Battery Enclosure furthest away from the UPS:

1. Route DC output cables and the PE cable (coiled on the floor of the enclosure) from one XR Battery Enclosure to the next XR Battery Enclosure through the adjacent holes in the side panels of the enclosures.
2. Connect the DC output cables from one XR Battery Enclosure to the DC Input Breaker of the next XR Battery Enclosure [(+) to (+), (CT) to (CT), (–) to (–)].
3. Connect the PE wire from one XR Battery Enclosure to the PE stud on the next XR Battery Enclosure.









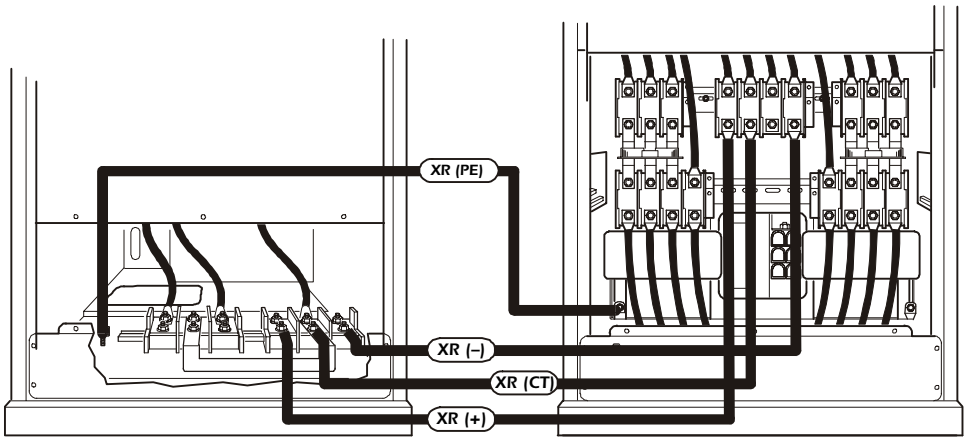
Connect power cables from the XR Battery Enclosure to the Symmetra PX UPS

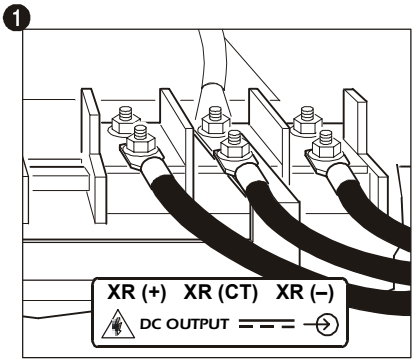
1. Route the XR Battery Enclosure DC output cables to the Symmetra PX UPS through the hole in the adjacent side panels.
2. Connect the XR Battery Enclosure DC output cables to the Symmetra PX UPS DC input terminal [(+) to (+), (CT) to (CT), (–) to (–)].

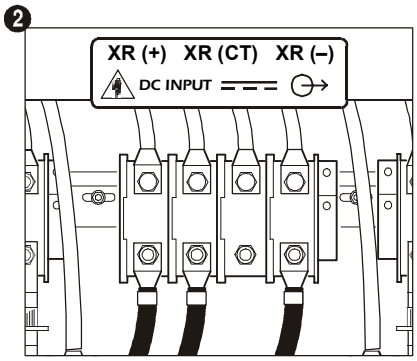
   Warning

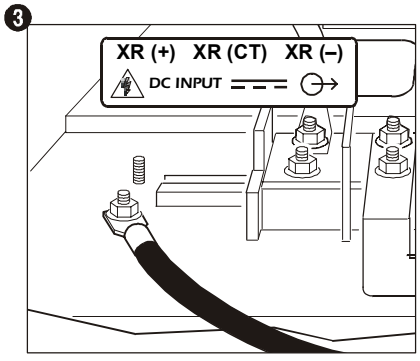
   Tighten the lugs on the terminals only to the torque specified: the power terminal lug diameter is 8 mm with a torque value of 6Nm.

3. Connect the XR Battery Enclosure PE cable to the Symmetra PX UPS ground stud.







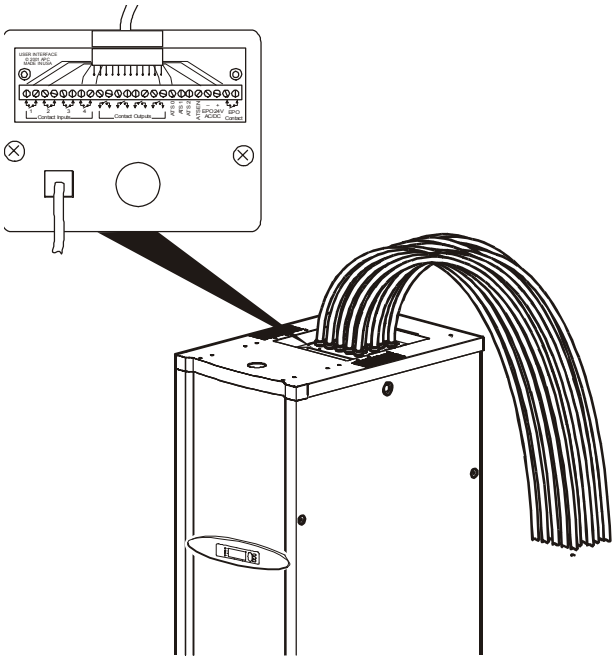


Connect an Emergency Power Off Switch

Overview

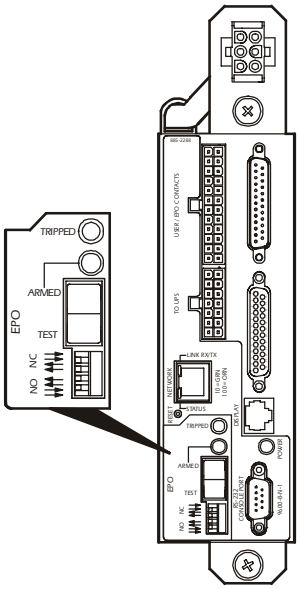
Connecting the switch. The Emergency Power Off (EPO) switch connects to the PDU user connection plate. The figure on the right shows the location of the user connection plate on the roof of the PDU. Connect a switch using one of three following connections:

- Contact closure
- 24 VAC
- 24 VDC



Note Contact closure is recommended.

Configuring and testing. Configuring and testing of the switch is done through the EPO interface on the PDU monitoring unit. The figure to the right shows the PDU monitoring unit and the location of the EPO LEDs and switches.

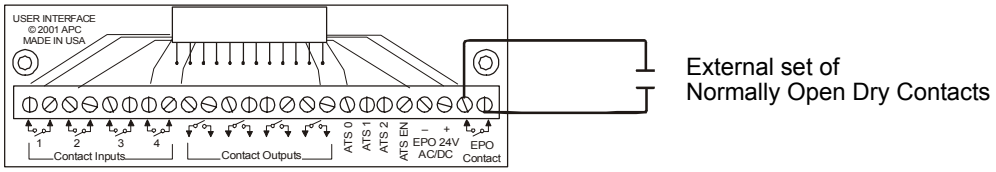


Note APC offers an optional InfraStruXure EPO System (EPW9). Contact your APC sales representative, or visit the APC Web site **(www.apc.com)** for more information.

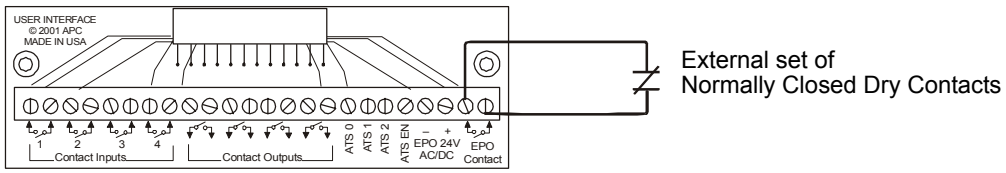
Connect an EPO switch to the user connection plate and test the switch

1. Connect the switch to the EPO connection point terminals located on the bottom side of the PDU user connection plate. Read the label next to the terminal block to determine which terminals to connect to for the signal type you are using:

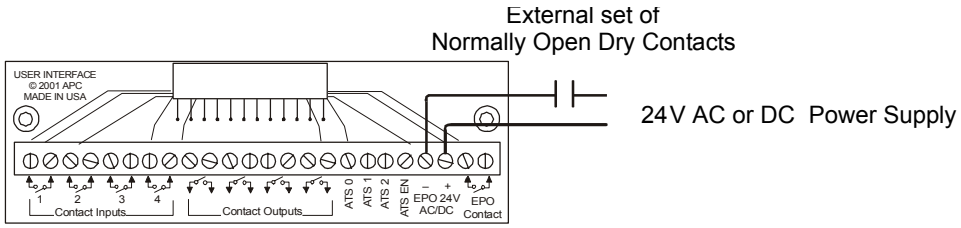
   – Contact Closure—Normally Open



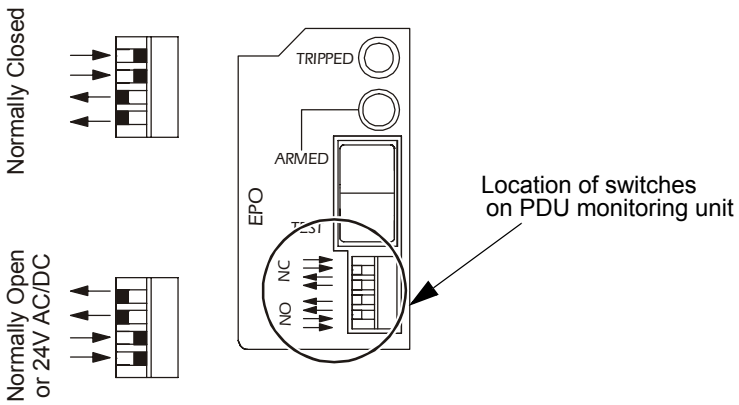
   – Contact Closure—Normally Closed



   – 24VAC/VDC—Normally Open



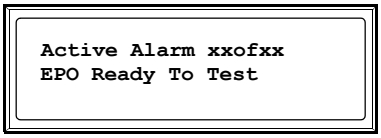
2. Verify that the EPO DIP switches on the PDU monitoring unit are configured properly for the signal type you are using. The labels above the switches and the figure below show the correct settings for both the Normally Open (NO) and Normally Closed (NC) position.



Note

The default setting on the EPO interface on the PDU monitoring unit is for a **Normally Open (NO)** switch.

3. Test the EPO switch to ensure that it is wired and working correctly:
   a. Place the Arm/Test rocker switch in the **Test** position. The EPO state LEDs will be off and the PDU display interface will show the following alarm (in addition to any other active alarms):



   b. Engage the EPO switch. (If your switch is momentary, engage it with one person watching the EPO state LEDs, and another at the EPO switch.)
   c. Observe the EPO LEDs. If the switch is wired and working properly, when the switch is engaged, both of the EPO state LEDs are red.
   d. If the test was successful, place the Arm/Test rocker switch back to the **Arm** position. The PDU display interface will clear the EPO test mode alarm. If the test was not successful, see the troubleshooting chart:

Problem	**Action**
Neither state LED was red when EPO switch was engaged	• Check the wiring to your EPO switch. • Check to make sure the EPO DIP switch configuration is correct for your switch (NO or NC). See step 2 on the previous page for proper configuration instructions.
Only one of the state LEDs was red when EPO switch was engaged	• Check to make sure the EPO DIP switch configuration is correct for your switch (NO or NC) and test again. See step 2 on the previous page for proper configuration instructions. • If the switch is configured correctly and both LEDs are not red after testing again, contact customer support at a number on the back cover of this manual.

   e. Repeat this test for each EPO switch installed.
4. Ensure that the Arm/Test rocker switch is in the **Arm** position on the monitoring unit.

Safety warnings

This InfraStruXure PDU and Symmetra PX UPS are provided with an Emergency Power Off switch connection. When this EPO switch is energized, electrical power to the units are de-energized and the system will not transfer to on-battery operation.

EPO can be achieved with either a contact closure or application of an external 24 VAC or 24 VDC from a SELV or PELV source. It's important to note that hazardous voltage from the Mains voltage must be isolated from the contact closure or 24 VAC, 24 VDC. The EPO circuit contact closure, the 24 VAC or the 24 VDC are considered a SELV circuit as defined in EN 60950 *Safety of Information Technology Equipment* or PELV circuit as defined in IEC 60364-4-41 *Electrical Installations of Buildings, Protection for Safety—Protection Against Electric Shock*. SELV is an abbreviation for Safety Extra Low Voltage. PELV is an abbreviation for Protective Extra Low Voltage. SELV and PELV circuits are isolated from the Mains through a safety isolating transformer, and are designed so that under normal conditions the voltage is limited to 42.4 Vpeak or 60 VDC.

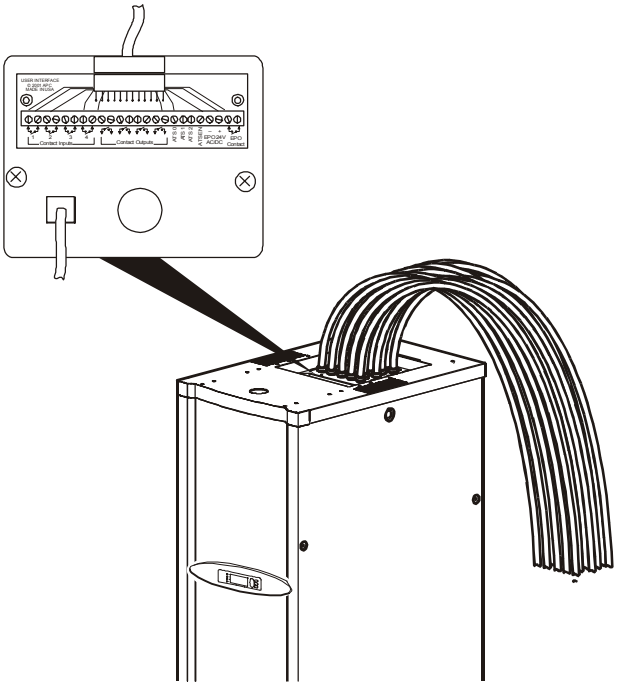
Connect User Input Contacts and Relay Outputs to the User Connection Plate

Overview

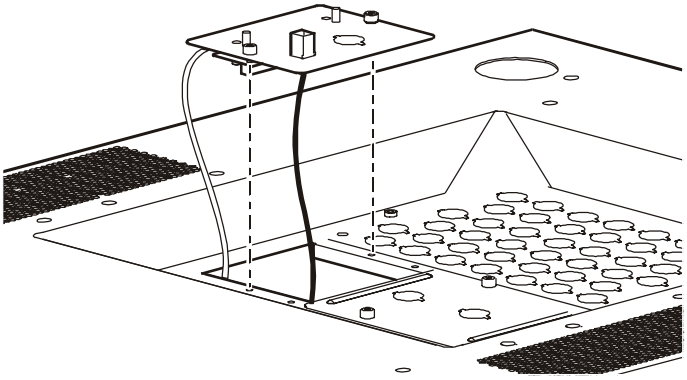
Make contact closure connections (NO or NC) at the user connection plate to monitor dry contacts. You can make eight connections—four input contacts and four relay outputs.

The figure at the right shows the location of the user connection plate on the roof of the PDU enclosure.

You can make connections from inside the enclosure, or you can remove the user connection plate and make your connections.



Remove the plate using a Phillips or standard screw driver to loosen the two captive screws. Use the knockout in the plate to route cables to and from the user connection on the plate. If you remove the plate, make sure that you do not disturb the existing connections.



How to connect contacts to the PDU monitoring unit

To connect and monitor your contacts:

1. Choose one or more contact numbers on the user connection plate to which you will connect the contacts. The user connection plate connects is connected to the **User/EPO** port on the PDU monitoring unit.
2. From the PDU display interface:
   a. Press the ESC or ENTER key to go to the top-level menu screen.
   b. Select **Contacts** on the top-level menu screen and press the ENTER key.
   c. Press the ENTER key to select the number of the contact you are connecting. The continue arrow ↕ will appear next to the contact number.
   d. Press the Up or Down arrow key to select the appropriate contact number and press the ENTER key.
   e. Press the Down arrow key to enter a unique **Name** for the contact and to configure the **Normal** state of the contact (Open or Closed). The default **Normal** state is Open. Press the ENTER key to select the item you wish to configure.

You will be prompted for your password to configure these items.

3. Connect contact wires (300 V-rated cabling required) to the terminal block on the user connection plate. You will need a 2.5-mm standard screwdriver.
4. Run the wires from the terminal block out the roof or under the floor of the PDU to your contact's location.

Ensure that the wires are properly retained and away from high voltage lines and breakers.

Relay output specifications

Nominal switching capacity	1 A at 30 VDC
Maximum switching power	30 W
Maximum switching voltage	60 VDC
Maximum switching current	2 ADC
Maximum carrying current	2 ADC
Surge ratings	2 kV per Bellcore TA-NWT-001089 1.5 kV per FCC part 68

Install Shielding Troughs, Shielding Partitions, and Cable Ladders

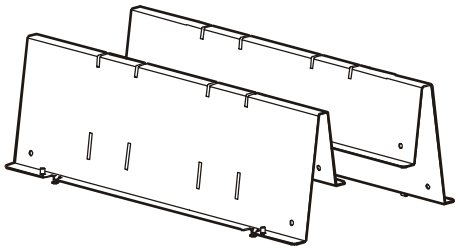
Shielding Troughs and Shielding Partitions for overhead wiring along rows

If you ordered APC Shielding Troughs, Shielding Partitions, and Cable Ladders to route overhead wiring for your system, assemble the Shielding Troughs and the Shielding Partitions along the rows of enclosures and assemble the Cable Ladders between rows.

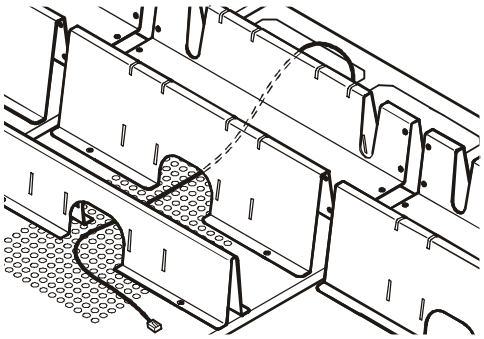
See also For information on grounding the Shielding Troughs and Shielding Partitions, see the instruction sheet (990-1393B) included with the Shielding Troughs and Shielding Partitions.

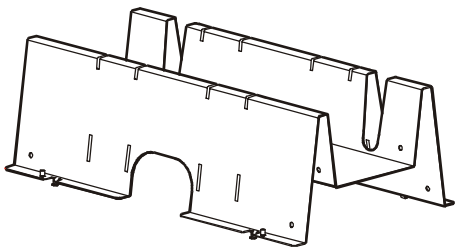
Shielding Troughs. There are two types of Shielding Troughs:

- The PDU Shielding Trough is 610 mm in length and is not adjustable. The trough sits on top of the InfraStruXure PDU and accommodates power cables as they exit the roof of the PDU.



- The NetShelter Shielding Trough is 610 mm in length and is not adjustable. The Shielding Troughs have an opening in each side through which you route data cables to the Shielding Partitions.



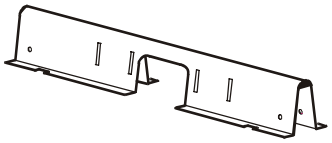


Shielding Trough accessories. APC offers the following accessories for Shielding Troughs:

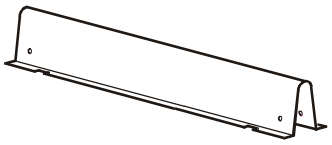
- Shielding Trough Covers for both 600-mm wide (AR8174BLK) and 750-mm wide (AR8175BLK) enclosures. Contact APC for more information.
- Shielding Trough End Caps (AR8167BLK) to place on the side of a Shielding Trough at the end of a row. Contact APC for more information.

Shielding Partitions. There are two types of Shielding Partitions, each of which forms a side wall of a trough for data cables. You can customize the width of the trough for each row of your system — wider for rows carrying many data cables, narrower for rows carrying fewer.

- As the back wall, use a Shielding Partition that contains an opening for routing data cables.



- As the front wall, use a solid Shielding Partition to hide data cables for a clean appearance.



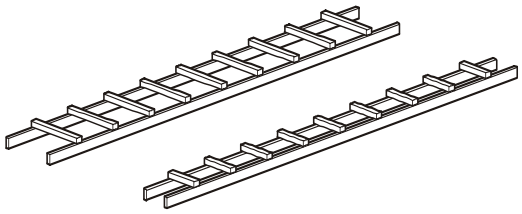
Cable Ladders for overhead wiring across rows

After installing the Shielding Troughs and Shielding Partitions, install the Cable Ladders between rows of enclosures. You can also run Cable Ladders across Shielding Troughs in the same row, using the hardware provided in the ladder kit.

See also

For more information on installing the Cable Ladders see the instruction sheet included with the cable ladders (990-1576).

Use wide Cable Ladders (305 mm) where many power cables or data cables will run between rows; use narrow Cable Ladders (152 mm) where few power cables or data cables will run between rows.



The Cable Ladders are 2946 millimeters long. You can adjust the length of the Cable Ladders in the following ways:

- Cut the ends with a hacksaw to shorten them.
- Insert the connectors only partially into the side rails to extend them.

Note

Do not change the spacing between rows or the length and position of the Cable Ladders from the layout you planned with your APC representative when you placed your order. For overhead wiring, each PDU power cable is provided at a pre-determined length. Changes to the physical configuration of your system could cause some PDU power cables to be too short or too long.

Install InfraStruXure Rack-Mount Devices

Install the Rack Automatic Transfer Switches (ATS)

Install a Rack ATS in the top of each enclosure for overhead wiring, and in the bottom of each enclosure for wiring under the floor.

See the installation instructions in the manual included with your Rack ATS.

The Rack ATS is an optional component and not all InfraStruXure systems will include them.

Install the Rack Power Distribution Units (PDU)

Install Rack PDUs in the rear of the NetShelter VX enclosure, in the channel directly behind the rear vertical mounting rails. For overhead wiring, make sure that the power cord is pointing toward the roof of the enclosure. For under the floor wiring, make sure that the power cord is pointing toward the floor.

See the installation instructions in the manual included with your Rack PDU.

Install the InfraStruXure Manager and Hub (or Switch)

Install the InfraStruXure Manager in the enclosure closest to the InfraStruXure PDU. The CAT-5 data cables included with your configuration are of varying lengths. The components will be installed from the InfraStruXure PDU.

See the installation instructions in the manual included with your InfraStruXure Manager.

Install the Environmental Monitoring Unit or Environmental Management System

Install the Environmental Monitoring Unit or Environmental Management System according to the installation instructions included with the device. The Environmental Monitoring Unit and Environmental Management System are optional components and not all InfraStruXure systems will include them.

Route and Attach Overhead Wiring

Route and attach power cables to equipment racks

If you ordered overhead wiring, connect the prewired power cables of the InfraStruXure PDU as follows:

1. Install the Shielding Troughs, Shielding Partitions, and Cable Ladders so that you can route power cables from the PDU to the NetShelter VX Enclosures.

   
   See also

   For installation instructions, see the manual included with your Shielding Troughs, Shielding Partitions, and Cable Ladders.

2. Find the numbers that indicate the enclosure to which each power cable will supply power. These numbers appear on the roof of the PDU where the power cables exit, and on the ends of each power cable.

   
   Note

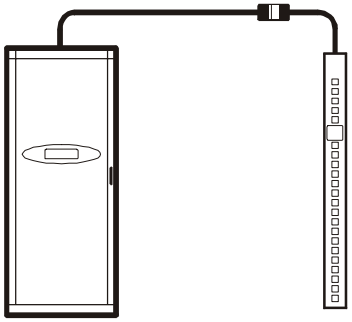
   The enclosures are not numbered. Consult your APC InfraStruXure Configure-To-Order (CTO) report to determine the enclosure associated with each power cable.

3. Beginning with the power cables for the enclosures farthest from the PDU, run each power cable within the Shielding Trough along the row and, if necessary, across one or more Cable Ladders to the enclosure to which it will provide power.

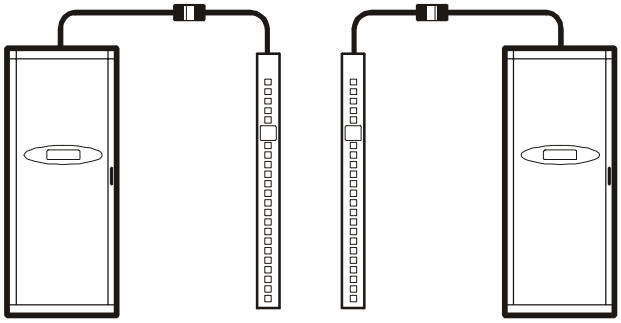
   
   Note

   Ensure that the connector at the end of each power cable always lies on top of any longer power cables in the Shielding Trough.

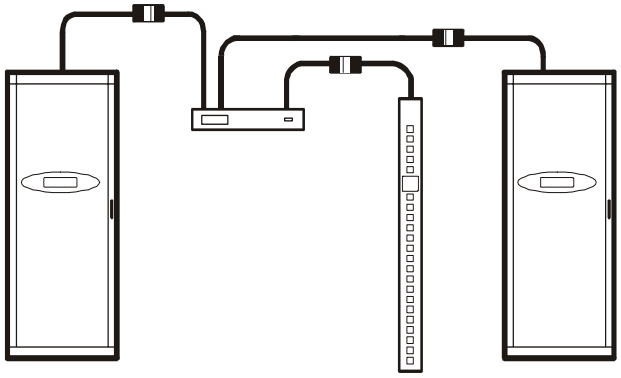
4. Connect the appropriate power cable to APC power management equipment in the enclosure in one of the four following ways:
   – *For single-feed devices without redundancy*: attach a power cable directly to a Rack PDU installed in a NetShelter VX Enclosure.



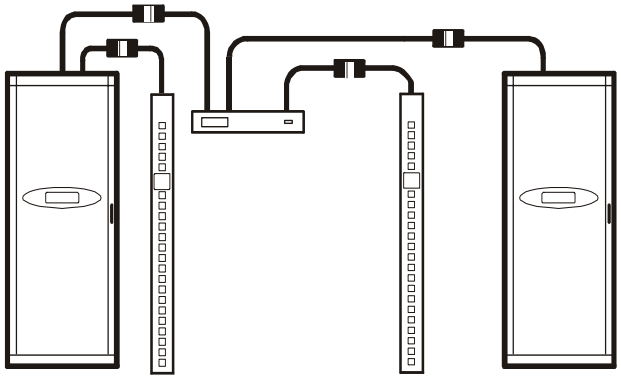
– *For dual-feed devices within a redundant system*: attach a power cable from each PDU into two different Rack PDUs in the NetShelter VX Enclosure.



– *For single-feed devices within a redundant system with an Automatic Transfer Switch*: connect a power cable to the Automatic Transfer Switch (A and B feeds) and connect the Automatic Transfer Switch power cord to a Rack PDU in the NetShelter VX Enclosure.

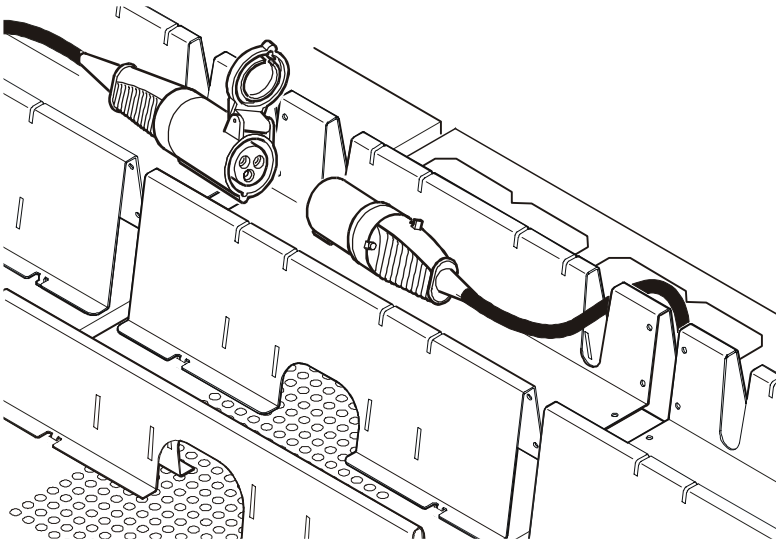


– *For dual-feed devices in a redundant system with an Automatic Transfer Switch*: connect a power cable from each PDU to the Automatic Transfer Switch's A and B feeds, and another power cable from one PDU to a Rack PDU, and the Automatic Transfer Switch's power cord to a second Rack PDU in the NetShelter VX Enclosure.



Note Lay the cables neatly in the Shielding Trough to minimize cable build-up.

5. From each NetShelter VX Enclosure, run the power cable of the appropriate APC power management device out the roof of the enclosure, through the notch in the rear side of the Shielding Trough, to the connector of the appropriate power cable from the PDU. Plug the two connectors together.



Wiring Under the Floor

Electrical Hazard

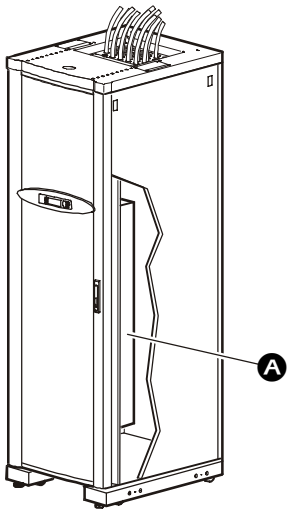
A licensed electrician must route and connect the power cables for under-floor wiring.

Warning

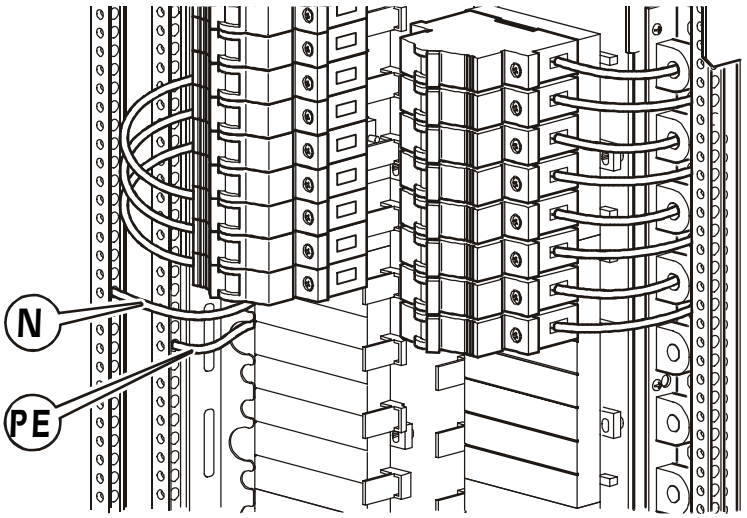
Make sure all wire connections and circuit breaker connections are properly torqued.

If you are routing power cables to the enclosures under a raised floor, you must provide the appropriate power cables and equipment for installation, and a licensed electrician must route and connect the power cables to the PDU circuit breakers. To wire each power cable to an enclosure:

1. Push out a knock-out filler in the floor of the PDU to create an opening for the cable.
2. From the Rack PDU or Rack ATS in each enclosure, thread the appropriate power cable (for your application) from the enclosure to the PDU.
3. At the PDU, route the cable through the opening you created in step 1 and then up through the wireway (Ⓐ) at either side of the PDU. This will allow you to connect cable to the circuit breaker panel.



4. At the circuit breaker panel, cut the wires to the proper length, and connect the power cable's individual wires:
   a. If you have branch current monitoring installed, route each phase conductor through a current sensor. If it is a three-phase cable, route the L1, L2, and L3 wires through a separate current sensor.
   b. Connect the L1, L2, and L3 wires to the circuit breaker(s). The illustration below shows a single-phase cable connecting to a single-pole breaker; however, you can also connect a three-phase cable to a three-pole breaker.
   c. Connect the neutral wire to the closest open termination point on the Neutral Bar (N).
   d. Connect the PE wire to the closest open termination point on the PE Bar (PE).

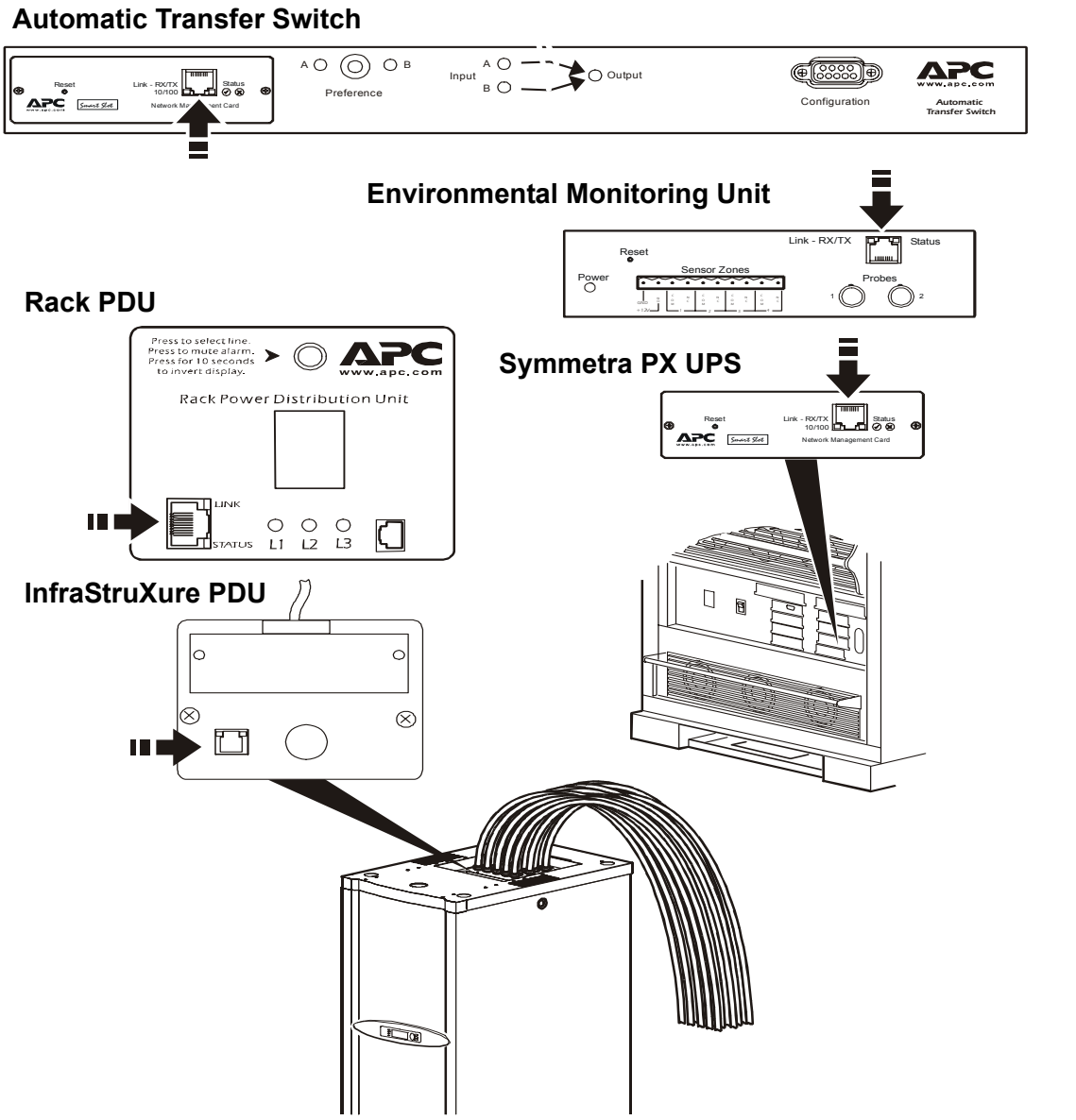


Caution

Any multi-circuit power cable that is installed by an electrical contractor must be installed with a 3-pole circuit breaker.

Route Data Cables to the InfraStruXure Manager Hub (or Switch)

1. Connect a Cat-5 network cable (provided) to the network or 10Base-T ports on your APC InfraStruXure devices. The following devices need to be connected:



2. Run the connected Cat-5 network cables through the data cable troughs to the InfraStruXure Manager Hub (or Switch).
3. Connect each device's network cable to any available station port in the InfraStruXure Manager Hub (or Switch). Station ports are those with an *x* after the number (e.g., 2x).

Start-Up Procedure

Safety warnings

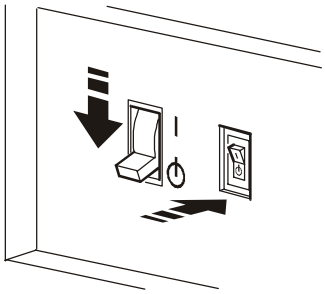
This section provides instructions on how to perform a system start-up. Do not skip any steps in this procedure.

Only APC Field Service Engineers or qualified, APC-trained personnel may perform a system start-up.

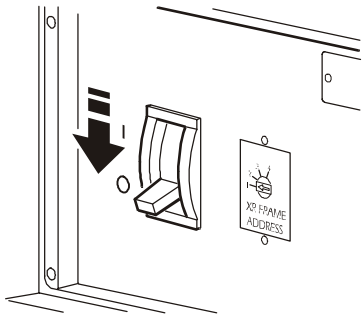
Do not install any batteries into the XR Battery Enclosure or power modules into the Symmetra PX UPS until instructed to do so.

Ensure that all power is off

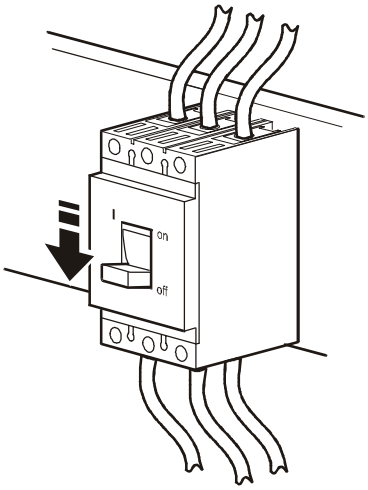
1. Set the UPS **DC Disconnect** circuit breaker and **System Enable** switch to OFF.



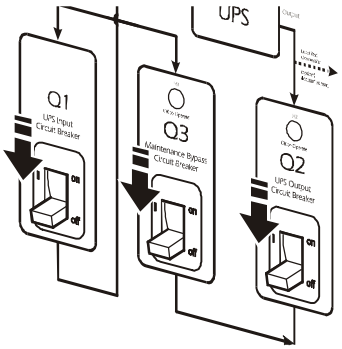
2. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to OFF.



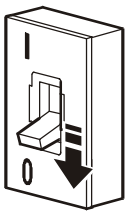
3. Set the PDU **Main Input** switch to OFF.



4. Open (turn OFF) the **Q1**, **Q2**, and **Q3** circuit breakers on the PDU.

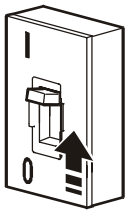


5. Set the upstream Mains circuit breaker to the OFF or Locked Out position.

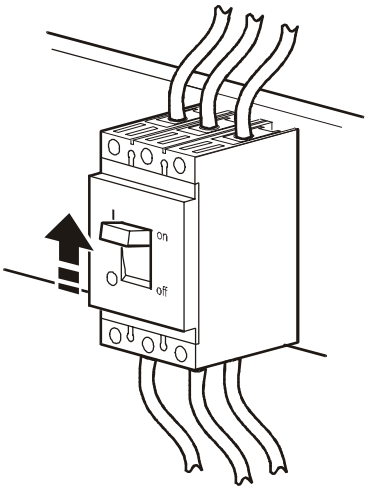


Apply power to the system

1. Set the upstream Mains circuit breaker to ON.



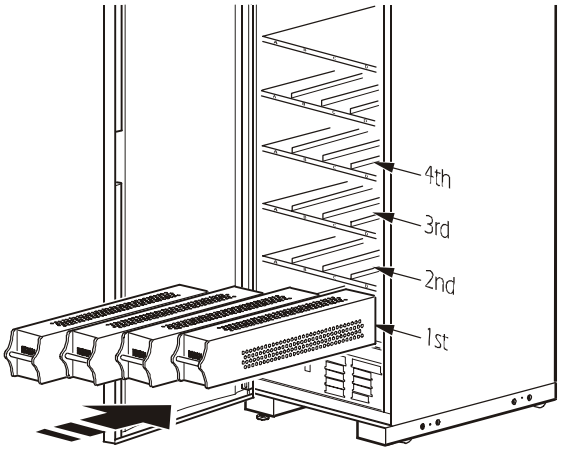
2. Ensure A-B-C clockwise phase rotation at the top of the **Main Input** switch on the PDU, using a phase rotation meter.
3. Set the **Main Input** switch on the PDU to ON.



4. If applicable, verify A-B-C clockwise phase rotation at the top of the primary winding of the transformer, using a phase rotation meter.
5. If applicable, verify that the proper voltage is present on the secondary winding of the transformer (400 V, metered phase-to-phase), using a true RMS voltmeter.
6. Install at least one battery module (four battery units) in the Symmetra PX UPS. Install battery modules, starting in the lowest available shelf. Position the battery unit between the grooves, and slide it completely into the enclosure.

Use two people to lift and install battery units.

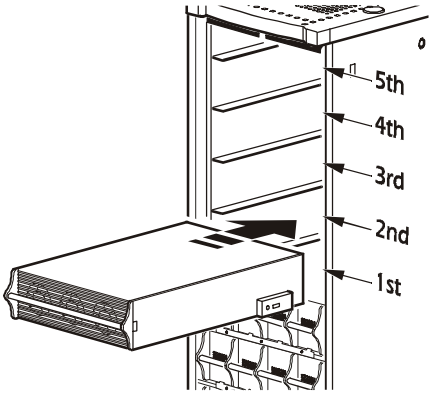
The DC bus in the Symmetra PX UPS is energized when battery modules are installed, even when the DC Disconnect circuit breaker is open.



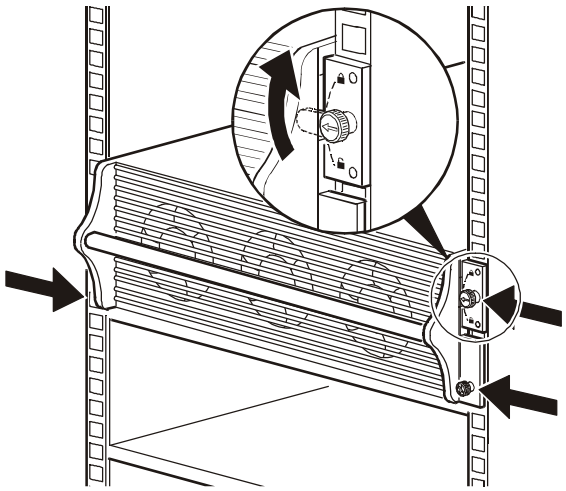
7. Install at least one power module in the Symmetra PX UPS.

   Install power modules starting from the lowest available shelf. Push each module completely into the enclosure.

Use two people to lift and install power modules.

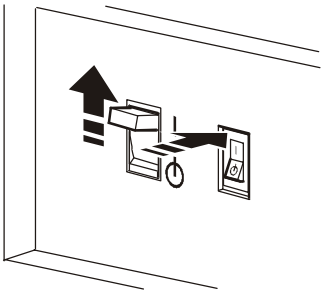


8. Secure the power module:
   a. Tighten the screws on each side of the power module.
   b. Turn the locking latch clockwise until the arrow on the knob faces the power module.

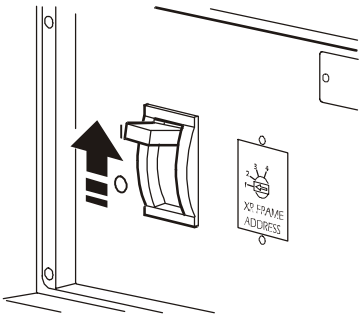


The power module will not start unless the locking latch is engaged.

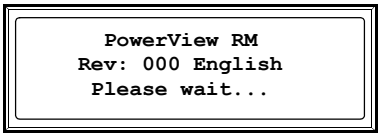
9. Set the UPS **DC Disconnect** circuit breaker to ON, and then set the UPS **System Enable** switch to ON.



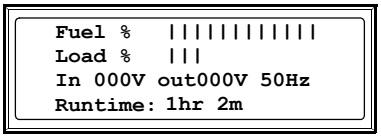
10. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to ON.



When the **System Enable** switch is in the ON position, the UPS is running on battery. The Startup screen appears on the display interface of the Symmetra PX UPS.



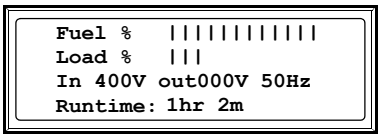
Then, the top-level status screen appears on the display interface. This may take up to 40 seconds.



Verify UPS battery operation

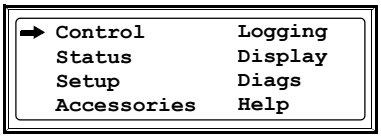
1. Read the messages displayed on the Symmetra PX UPS display interface:
   Note any alarms and verify that they are appropriate for start-up conditions.

Top-Level Status Screen



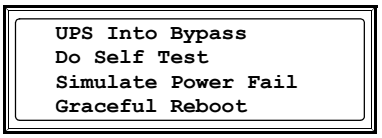
2. Command the UPS to apply power to the load:
   a. Press the ESC key to open the top-level menu.
   b. Select **Control**, and press the ENTER key.

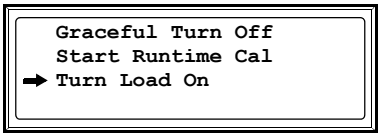
Top-Level Menu



   c. Select **Turn Load On** from the **Control** menu, and press the ENTER key.

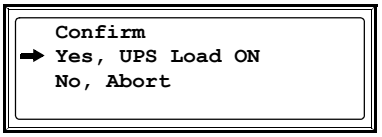
Control Menu



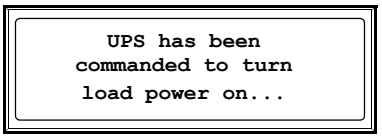


   d. On the next screen: select **Yes, UPS Load ON**, and press the ENTER key.

Confirmation Screen

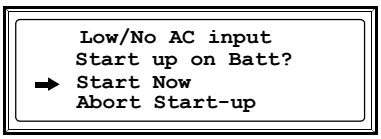


   The interface will display the following screen:

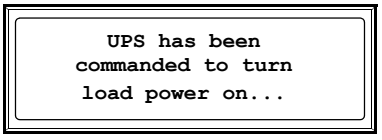


   The interface will display the following fault message:

   e. Select **Start Now**, and press the ENTER key.



   The interface will display the following screen:



The LOAD ON LED illuminates and the interface displays the following screen:

```
UPS load is on

Press any key...
```

After you have verified that the UPS operates correctly in on-battery operation, shut down the UPS:

3. Command the UPS to turn off power to the load:
   a. Press the ESC key at the top-level status screen to open the top-level menu and have access to eight submenus.
   b. Select **Control**, and press the ENTER key.

Top-Level Menu

```
➡ Control       Logging
  Status        Display
  Setup         Diags
  Accessories   Help
```

Control Menu

```
  UPS Into Bypass
  Do Self Test
  Simulate Power Fail
  Graceful Reboot
```

   c. Select **Turn Load Off** from the **Control** menu, and press the ENTER key.

```
  Graceful Turn Off
  Start Runtime Cal
➡ Turn Load Off
```

Confirmation Screen

```
  Confirm
➡ Yes, UPS Load OFF
  No, Abort
```

   d. On the next screen: select **Yes, UPS Load OFF**, and press the ENTER key.

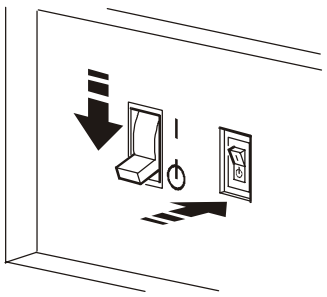
The LOAD ON LED turns off and the interface displays the following two screens:

```
UPS has been
commanded to turn
load power off...
```

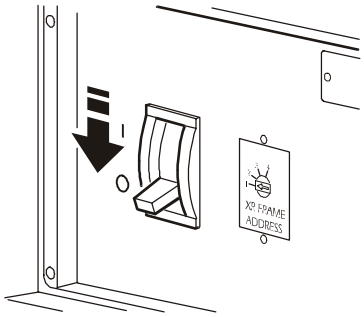
```
UPS load is off

Press any key...
```

4. Set the UPS **System Enable** switch to OFF, and then set the UPS **DC Disconnect** circuit breaker to OFF.

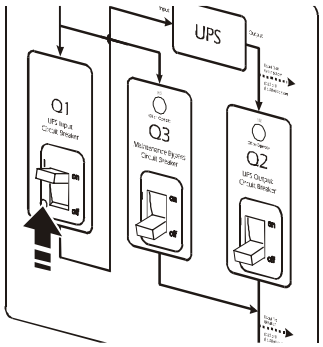


5. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to OFF.



Verify proper voltage and phase rotation at the UPS

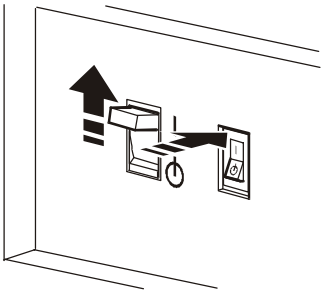
1. Close (turn ON) the **Q1** circuit breaker on the PDU to apply power to the UPS.



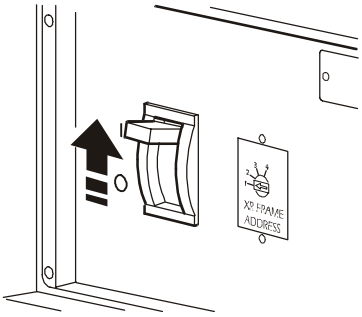
2. Ensure A-B-C clockwise rotation at the UPS input terminal block, using a phase rotation meter.
3. Verify proper voltage is present at the UPS input terminal block (400 V, metered phase-to-phase), using a true RMS voltmeter.

Start the UPS

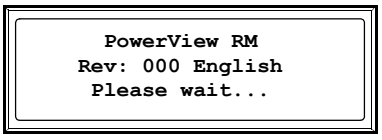
1. Set the UPS **DC Disconnect** circuit breaker to ON, and then set the UPS **System Enable** switch to ON.



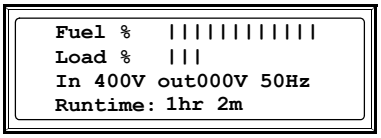
2. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to ON.



When the **System Enable** switch is in the ON position, the Startup screen appears on the display interface of the Symmetra PX UPS.



Then, the top-level status screen appears on the display interface. This may take up to 40 seconds.



3. Read the messages displayed on the Symmetra PX UPS display interface:
   Note any alarms and verify that they are appropriate for start-up conditions.

Top-Level Status Screen

```
Fuel %   ||||||||||||
Load %   |||
In 400V out000V 50Hz
Runtime: 1hr 2m
```

4. Command the UPS to apply power to the load:
   a. Press the ESC key to open the top-level menu.
   b. Select **Control**, and press the ENTER key.

Top-Level Menu

```
→ Control        Logging
  Status         Display
  Setup          Diags
  Accessories    Help
```

   c. Select **Turn Load On** from the **Control** menu, and press the ENTER key.

Control Menu

```
  UPS Into Bypass
  Do Self Test
  Simulate Power Fail
  Graceful Reboot
```

```
  Graceful Turn Off
  Start Runtime Cal
→ Turn Load On
```

   d. On the next screen: select **Yes, UPS Load ON**, and press the ENTER key.

Confirmation Screen

```
  Confirm
→ Yes, UPS Load ON
  No, Abort
```

   The interface will display the following screen:

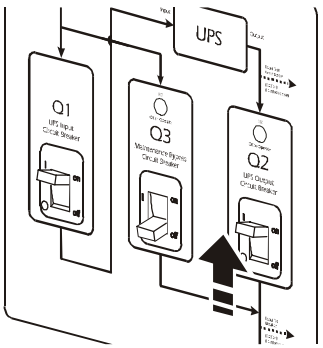
```
UPS has been
commanded to turn
load power on...
```

   The LOAD ON LED illuminates and the interface displays the following screen:

```
UPS load is on

Press any key...
```

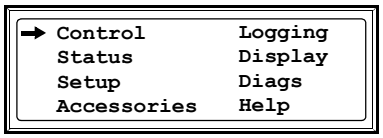
5. Close (turn ON) the **Q2** circuit breaker on the PDU.



Verify bypass operation

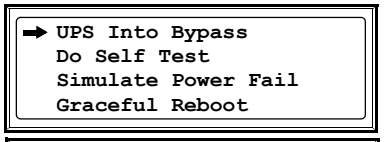
1. Command the UPS into static bypass operation through the UPS display interface:
   a. Press the ESC key to open the top-level menu.
   b. Select **Control** on the top-level menu, and press the ENTER key.

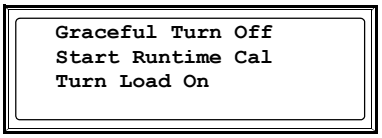
Top-Level Menu



   c. Select **UPS Into Bypass** on the **Control** menu, and press the ENTER key.

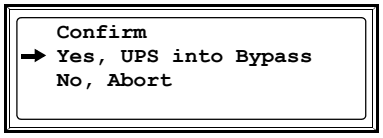
Control Menu



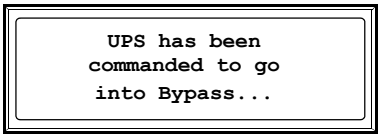


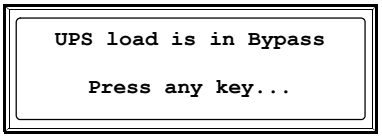
   d. On the next screen: select **Yes, UPS into Bypass**, and press the ENTER key.

Confirmation Screen



The BYPASS LED illuminates and the following screens appear:





Note

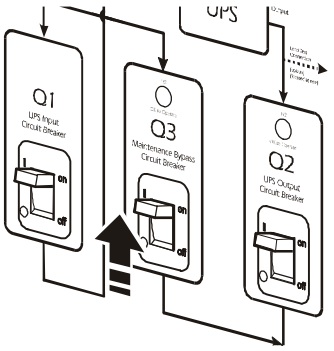
The **H3** LED above the **Q3** circuit breaker illuminates, but do not operate the circuit breaker.

2. Use a true RMS voltmeter to make sure that there is no difference in potential between L1 IN and L1 OUT, L2 IN and L2 OUT, and L3 IN and L3 OUT on the **Q3** circuit breaker. The **Q3** circuit breaker must be in the OFF position. The top side of **Q3** will be utility voltage and the bottom side of **Q3** will be the voltage from the UPS in static bypass. Voltage should be less than 2 volts.

Note

Q3 is a 4-pole circuit breaker. Be sure to measure L1 to L1, L2 to L2, and L3 to L3.

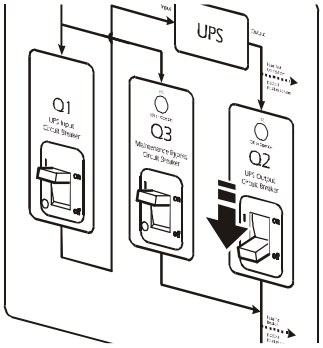
3. Close (turn ON) the **Q3** circuit breaker on the InfraStruXure PDU.



Note

The **H2** LED above the **Q2** circuit breaker illuminates, indicating that it is safe to operate the **Q2** circuit breaker.

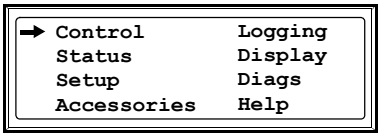
4. Open (turn OFF) the **Q2** circuit breaker on the InfraStruXure PDU.



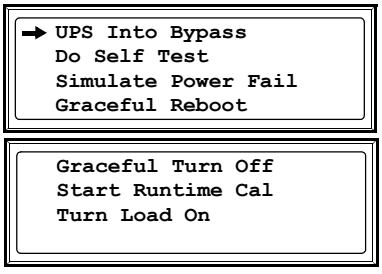
The UPS will display a Forced Bypass message on the display interface and the Fault LED will be red.

5. Command the UPS into static bypass operation through the UPS display interface:
   a. Press the ESC key to open the top-level menu.
   b. Select **Control** on the top-level menu, and press the ENTER key.

Top-Level Menu



Control Menu



   c. Select **UPS Into Bypass** on the **Control** menu, and press the ENTER key.

d. On the next screen: select **Yes, UPS into Bypass**, and press the ENTER key.

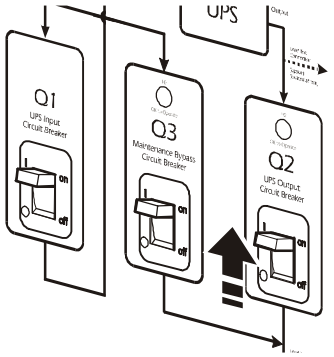
Confirmation Screen

```
   Confirm
➡  Yes, UPS into Bypass
   No, Abort
```

Note

The **H2** LED above the **Q2** circuit breaker illuminates, indicating that it is safe to operate the **Q2** circuit breaker.

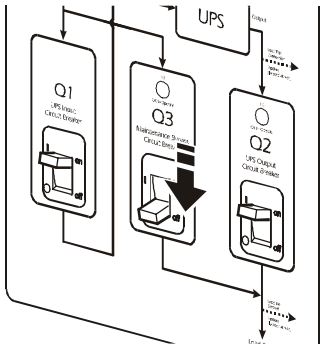
6. Close (turn ON) the **Q2** circuit breaker on the InfraStruXure PDU.



Note

The **H3** LED above the **Q3** circuit breaker illuminates, indicating that it is safe to operate the **Q3** circuit breaker

7. Open (turn OFF) the **Q3** circuit breaker on the InfraStruXure PDU.



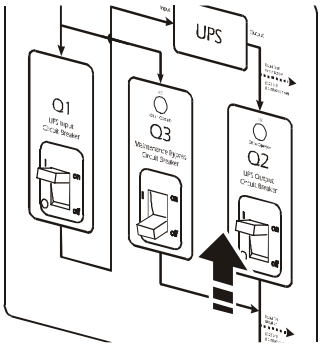
The UPS automatically returns from Static Bypass.

Power the PDU Distribution circuit breakers

1. Ensure that the **Q2** circuit breaker on the PDU is closed (ON).

Note

When **Q2** is closed, the PDU distribution panel is energized.



2. Close (turn ON) the PDU **distribution panel** circuit breakers.

Note

When the distribution panel circuit breakers are closed, the PDU power cables and connected equipment are energized.

Configure the InfraStruXure Manager

Once all equipment is installed, the network cables are connected to the InfraStruXure Manager hub (or switch), and start-up of the system is complete, configure the InfraStruXure Manager.

See also

For instructions, see the *InfraStruXure Manager Installation and Quick-Start* manual included with your InfraStruXure Manager.

Note

If you use PowerChute Network Shutdown (PCNS) software with your InfraStruXure UPS, your UPS must have a connection to the "User LAN" (public network) for PCNS to function correctly. If the Network Management Card installed in your UPS is connected to the InfraStruXure Manager's "APC LAN," you must install a second Network Management Card in your UPS and connect it to the "User LAN" (public network) to use PCNS.

Appendix A: System Operation

How to Transfer the UPS into Maintenance Bypass Operation

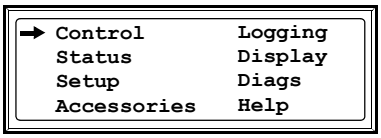
Note

Select **Help** from the top-level menu screen of the PDU display interface and select the first help topic, **Putting the PDU into Maintenance Bypass**, or follow the procedure below.

When servicing the System, transfer the System into maintenance bypass operation. When the System is operating in maintenance bypass, input power flows directly to the PDU and out to the load equipment.

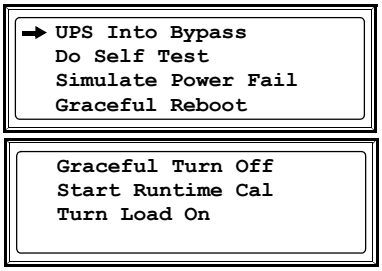
1. Command the UPS into static bypass operation through the UPS display interface:
   a. Press the ESC key at the top-level status screen to open the top-level menu.
   b. Select **Control** on the top-level menu, and press the ENTER key.

Top-Level Menu



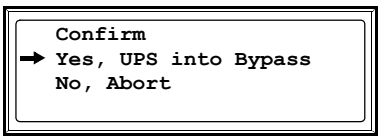
   c. Select **UPS Into Bypass** on the **Control** menu and, press the ENTER key.

Control Menu

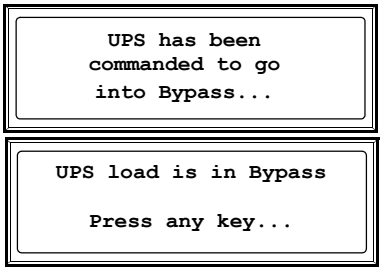


   d. Confirm the selection on the next screen: select **Yes, UPS into Bypass** and press the ENTER key.

Confirmation Screen



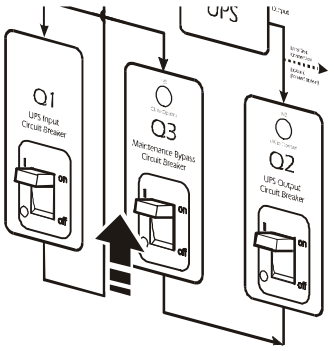
The UPS BYPASS LED illuminates and the following screens appear:



Note

The **H3** LED above the **Q3** circuit breaker illuminates, indicating that it is safe to operate the **Q3** circuit breaker.

2. Close (turn ON) the **Q3** circuit breaker on the PDU.

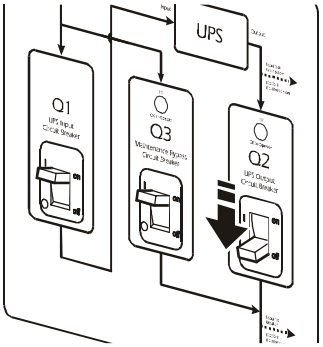


Note

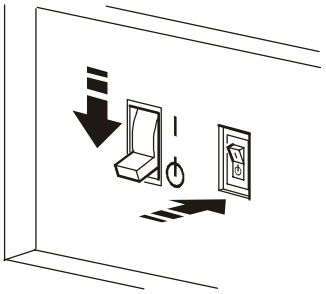
The **H2** LED above the **Q2** circuit breaker illuminates, indicating that it is safe to operate the **Q2** circuit breaker.

3. Open (turn OFF) the **Q2** circuit breaker on the PDU.

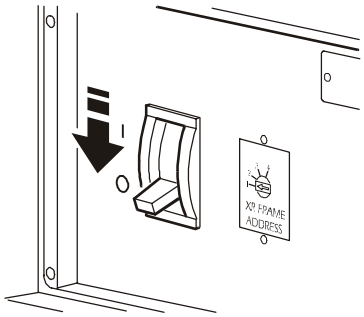
   The UPS will show a **Forced Bypass** message on the display interface, and the Fault LED will be red.



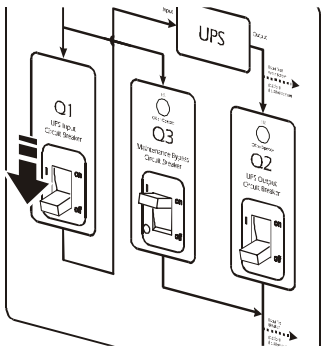
4. Set the UPS **System Enable** switch to OFF and then, set the UPS **DC Disconnect** circuit breaker to OFF.



5. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to OFF.



6. Open (turn OFF) the **Q1** circuit breaker on the PDU.



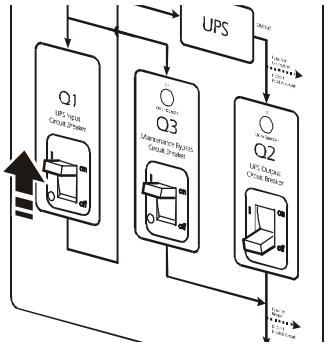
The UPS is now in maintenance bypass operation.

How to Return from Maintenance Bypass Operation

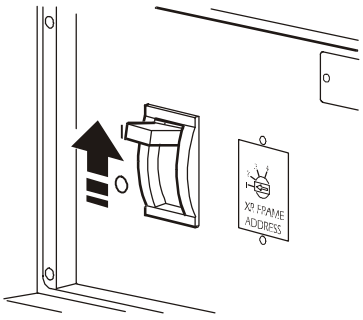
Note

Select **Help** from the top-level menu screen on the PDU display interface and select the second help topic, **Returning from PDU Maintenance Bypass**, or follow the procedure below:

1. Close (turn ON) the **Q1** circuit breaker on the PDU.

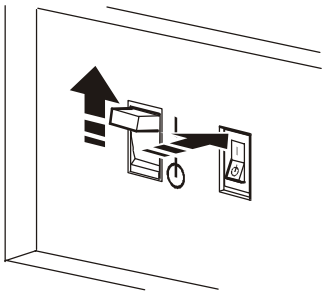


2. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to ON.



3. Set the UPS **DC Disconnect** circuit breaker to ON and then, set the UPS **System Enable** switch to ON.

   The UPS will show a **Forced Bypass** message on the display interface, and the Fault LED will be red.

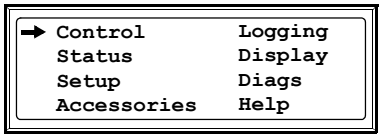


4. Command the UPS to apply power to the load:

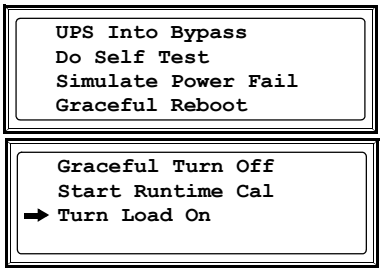
   a. Press the ESC key at the top-level status screen to open the top-level menu and have access to eight submenus.

   b. Select **Control**, and press the ENTER key.

Top-Level Menu

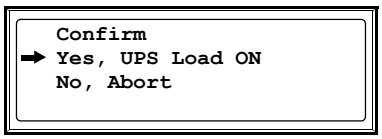


Control Menu



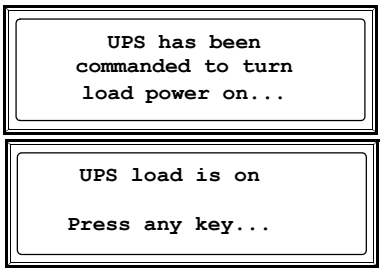
   c. Select **Turn Load On** from the **Control** menu, and press the ENTER key.

Confirmation Screen



   d. On the next screen: select **Yes, UPS Load ON**, and press the ENTER key.

The LOAD ON LED illuminates and the interface displays the following two screens:

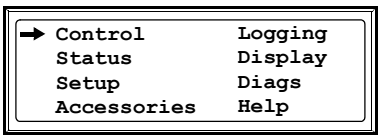


5. Command the UPS into static bypass operation through the UPS display interface:

   a. Press the ESC key at the top-level status screen to open the top-level menu.

   b. Select **Control** on the top-level menu, and press the ENTER key.

Top-Level Menu



Control Menu

```
➡ UPS Into Bypass
  Do Self Test
  Simulate Power Fail
  Graceful Reboot
```

```
  Graceful Turn Off
  Start Runtime Cal
  Turn Load On
```

c. Select **UPS Into Bypass** on the **Control** menu, and press the ENTER key.

Confirmation Screen

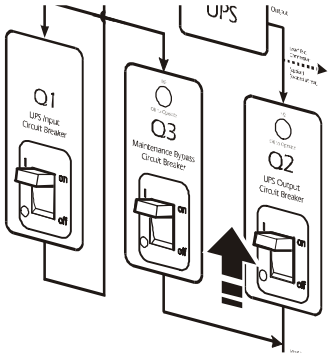
```
  Confirm
➡ Yes, UPS into Bypass
  No, Abort
```

d. Confirm the selection on the next screen: select **Yes, UPS into Bypass**, and press the ENTER key.

Note

The **H2** LED above the **Q2** circuit breaker illuminates, indicating that it is safe to operate the **Q2** circuit breaker.

6. Close (turn ON) the **Q2** circuit breaker on the PDU.

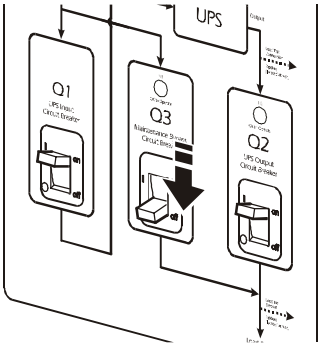


Note

The **H3** LED above the **Q3** circuit breaker illuminates, indicating that it is safe to operate the **Q3** circuit breaker.

7. Open (turn OFF) the **Q3** circuit breaker on the PDU.

   The UPS automatically comes out of Static Bypass operation.



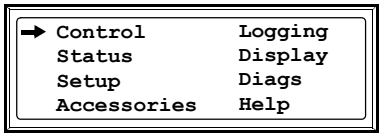
How to Ensure Total Power Off

1. Command the UPS to turn off power to the load:

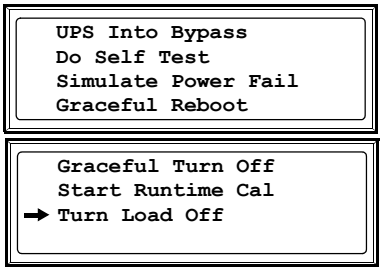
   a. Press the ESC key at the top-level status screen to open the top-level menu and have access to eight submenus.

   b. Select **Control**, and press the ENTER key.

Top-Level Menu

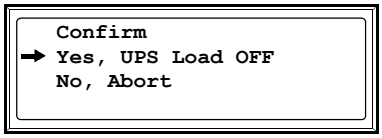


Control Menu



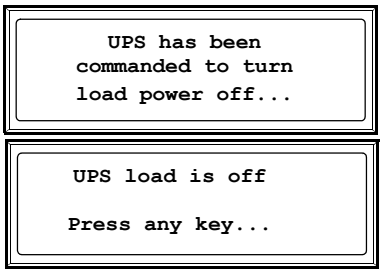
   c. Select **Turn Load Off** from the **Control** menu, and press the ENTER key.

Confirmation Screen

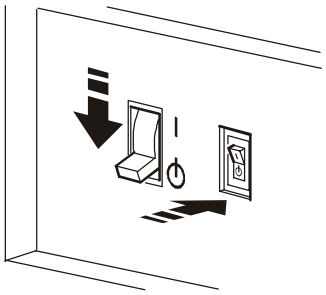


   d. On the next screen: select **Yes, UPS Load OFF**, and press the ENTER key.

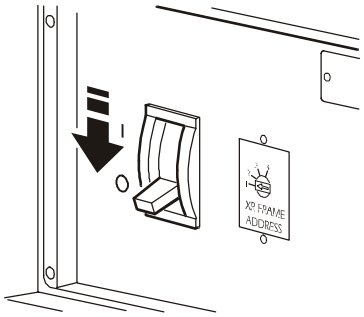
   The LOAD ON LED turns off and the interface displays the following two screens:



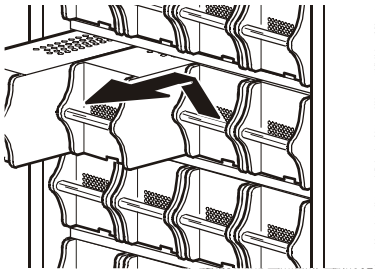
2. Set the UPS **DC Disconnect** circuit breaker and **System Enable** switch to OFF.



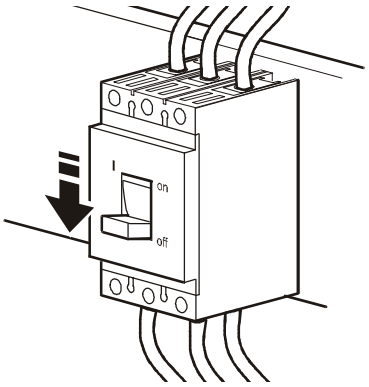
3. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to OFF.



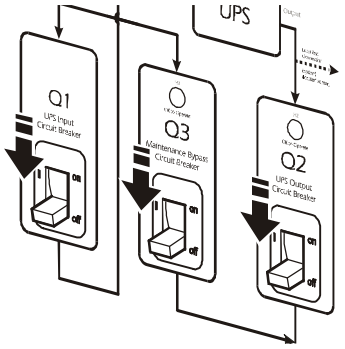
4. Pull out all battery units in the UPS and XR Battery Enclosures to the red battery disconnect line.



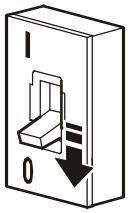
5. Set the PDU **Main Input** switch to OFF.



6. Open (turn OFF) the **Q1**, **Q2**, and **Q3** circuit breakers on the PDU.



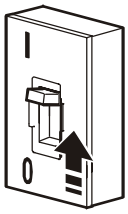
7. Set the upstream input mains circuit breaker to the OFF or Locked Out position.



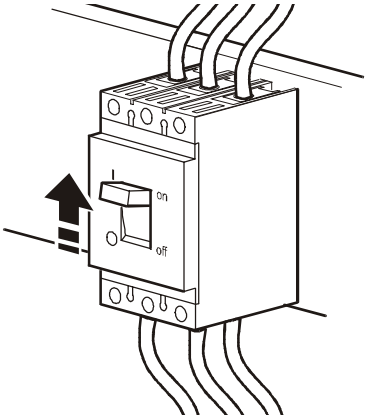
How to Apply Power to the System

This procedure instructs on how to apply power to a system that has already been installed. For initial start-up instructions, see the Start-up section of this manual.

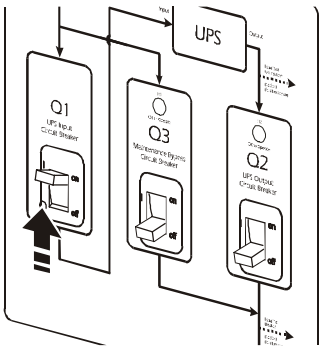
1. Set the upstream mains circuit breaker to ON.



2. Set the **Main Input** switch on the PDU to ON.

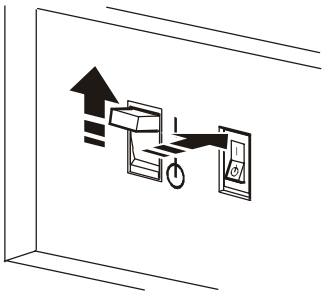


3. Close (turn ON) the **Q1** circuit breaker on the PDU to apply power to the UPS.

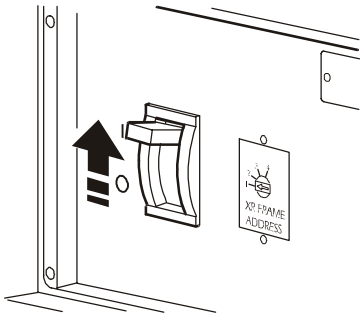


4. Ensure that all battery units are pushed all the way into the Symmetra PX UPS and XR Battery Enclosures and locked into position.

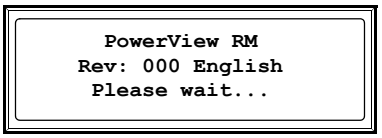
5. Set the UPS **DC Disconnect** circuit breaker to ON and then, set the UPS **System Enable** switch to ON.



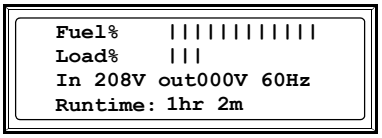
6. If applicable, set the XR Battery Enclosure **DC Disconnect** circuit breaker to ON.



When the **System Enable** switch is placed in the ON position, the Startup screen appears on the display interface of the Symmetra PX UPS.



The top-level status screen appears on the display interface. This may take up to 30 seconds.

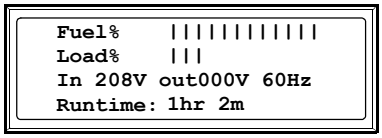


7. Read the messages displayed on the UPS display interface:

   a. Note any alarms, and verify that they are appropriate for start-up conditions.

   b. Verify that the UPS accepts the input.

Top-Level Status Screen

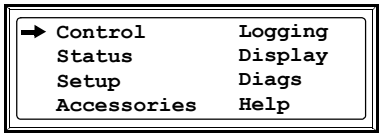


8. Command the UPS to apply power to the load:

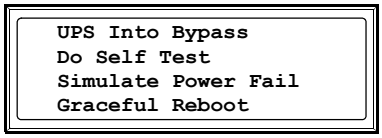
   a. Press the ESC key at the top-level status screen to open the top-level menu and have access to eight submenus.

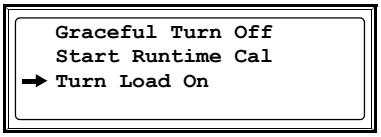
   b. Select **Control**, and press the ENTER key.

Top-Level Menu



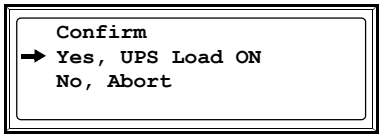
Control Menu





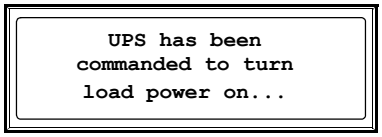
   c. Select **Turn Load On** from the **Control** menu, and press the ENTER key.

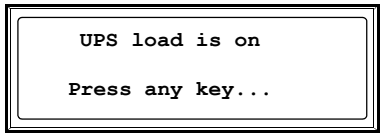
Confirmation Screen



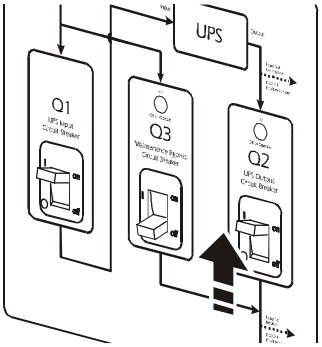
   d. On the next screen: select **Yes, UPS Load ON**, and press the ENTER key.

The LOAD ON LED illuminates, and the interface displays the following two screens:

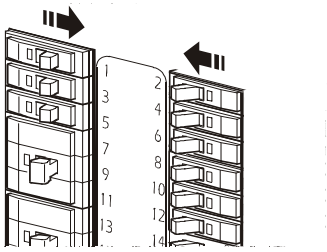




9 . To apply power to the PDU distribution panel, close (turn ON) the **Q2** circuit breaker on the PDU.



10. To apply power to the PDU power cables and connected equipment, close (turn ON) the distribution panel circuit breakers.



Appendix B: Changes in This Manual

Overview

The following list references the specific changes made to this manual since its last release (990-1593).

General changes

- Product name changed from PDU with System Bypass to InfraStruXure PDU.
- Updated mention of breaker(s) to circuit breaker(s).
- An index was added to the end of this manual. See pages 75–76.

Changes by page number

Page 1	Updated overview of "Safety symbols used in this guide."
Pages 5–7	Updated system dimensions.
Page 21	Added section referencing *Certified Electrician's Instructions.*
Pages 29–32	Updated section on connecting the EPO switch to the user connection plate.
Pages 33–34	Added "Connect User Input Contacts and Relay Outputs to the User Connection Plate" instructions.
Pages 35–36	Updated "Install Shielding Trough, Shielding Partitions, and Cable Ladders" section.
Pages 55–66	Added Appendix A, "System Operation."

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Customer support for this or any other APC product is available at no charge in any of the following ways:

- Visit the APC Web site to access documents in the APC Knowledge Base and to submit customer support requests.
  - **www.apc.com** (Corporate Headquarters)

    Connect to localized APC Web sites for specific countries, each of which provides customer support information.
  - **www.apc.com/support/**

    Global support searching APC Knowledge Base and using e-support.
- Contact an APC Customer Support center by telephone or e-mail.
  - Regional centers:

APC headquarters U.S., Canada	(1)(800)800-4272 (toll free)
InfraStruXure Technical Support	(1)(877)537-0607 (toll free)
Latin America	(1)(401)789-5735 (USA)
Europe, Middle East, Africa	(353)(91)702020 (Ireland)
Japan	(0) 35434-2021

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990-1593A-001

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