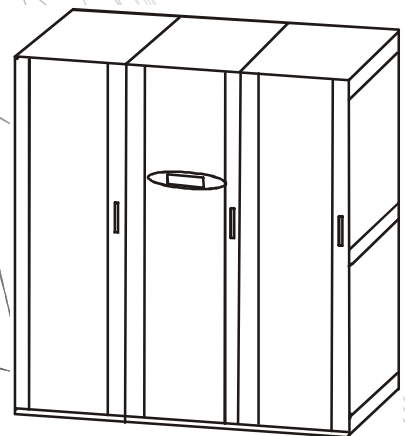


Installation

Symmetra[®] PX UPS, Power Distribution Unit, and XR Battery Enclosure 160 kW 400 V

SY160K160H
PDUM160H-B
SYCFXR9



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Safety

IMPORTANT SAFETY INSTRUCTIONS - SAVE THESE INSTRUCTIONS

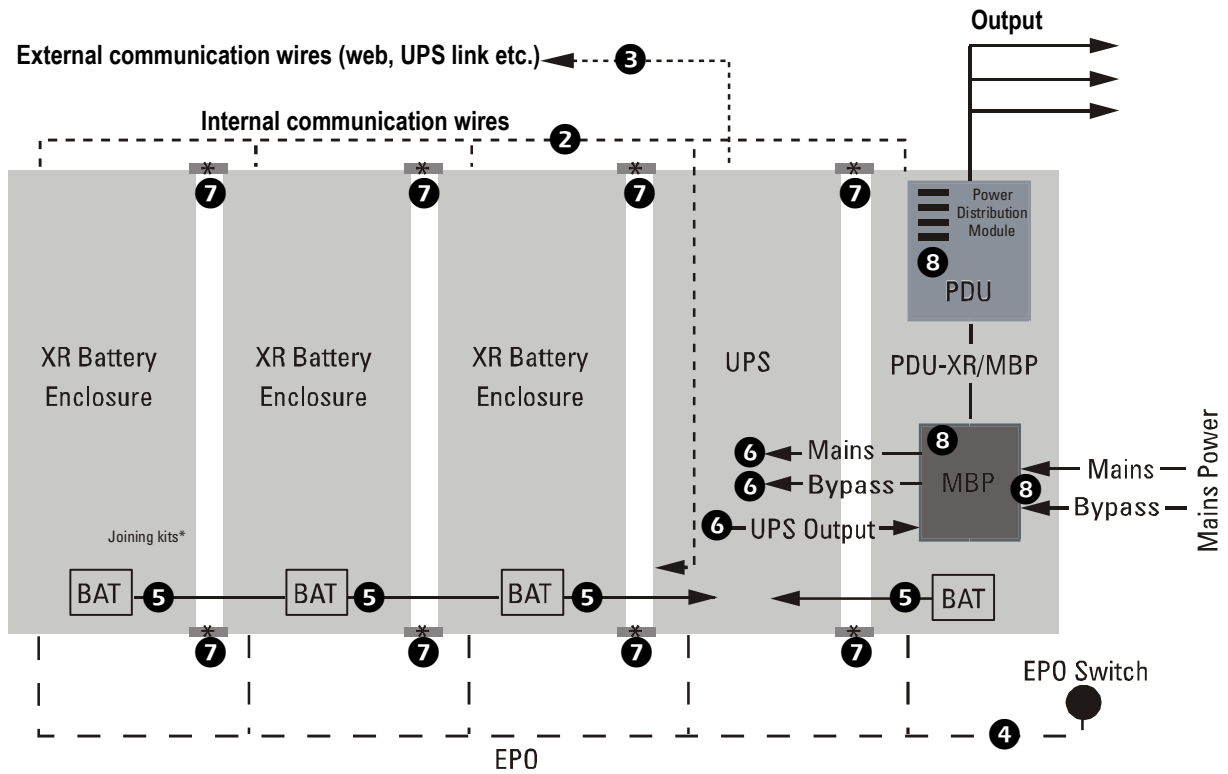


Warning:

- **ALL safety instructions in the Safety sheet (990-2984) shall be read, understood, and followed when installing the UPS system. Failure to do so could result in equipment damage, serious injury, or death.**
- **The UPS system does not have built-in disconnection devices for AC input/output and DC input. The customer must provide AC input/output over-current protection and AC output disconnect device.**
- **After the UPS has been electrically wired, do not start it. Start-up is commissioned to APC-authorized personnel only.**

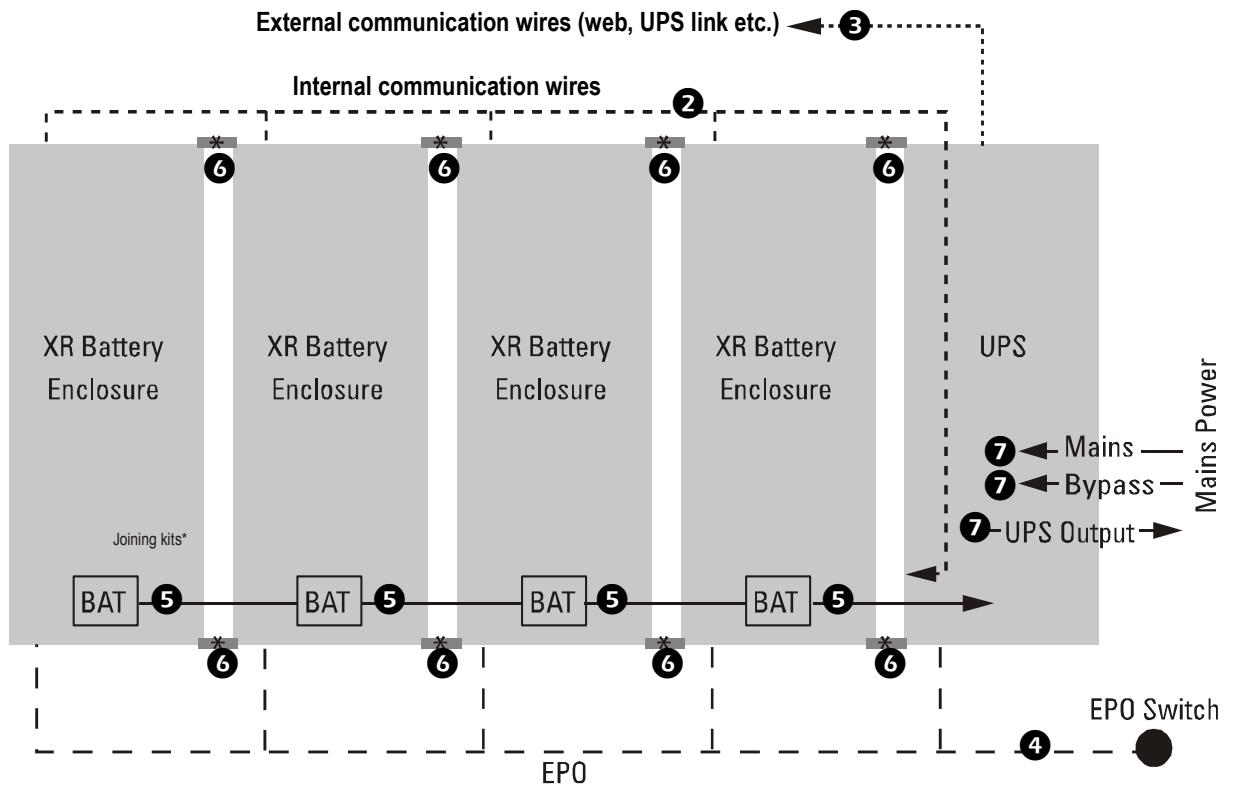
Installation Procedure

Installations with PDU-XR



| Step | Description | Page Number |
|------|--|-------------|
| 1 | Mechanical assembly | 4 |
| 2 | Connect the communication cables | 7 |
| 3 | Connect the Network Communication Cable | 12 |
| 4 | Connect the EPO | 13 |
| 5 | Connect the battery cables | 16 |
| 6 | Connect the cables between the UPS and the PDU | 20 |
| 7 | Interconnect and level the enclosures | 23 |
| 8 | Connect the input and output cables to the PDU | 25 |

Installations without PDU-XR



| Step | Description | Page Number |
|------|---|-------------|
| 1 | Mechanical assembly | 4 |
| 2 | Connect the communication cables | 9 |
| 3 | Connect the Network Communication Cable | 12 |
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Mechanical Assembly

How to Re-Arrange the Side Panels

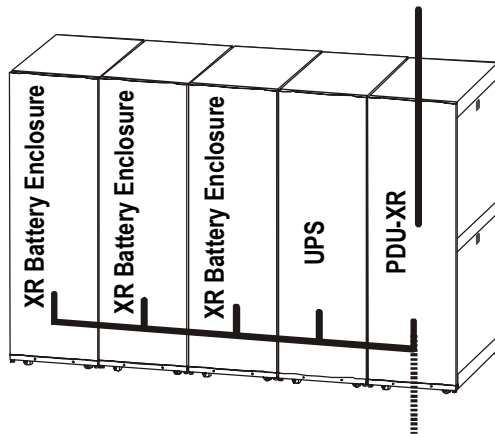


Note: The type of installation determines the need to re-arrange the side panels.



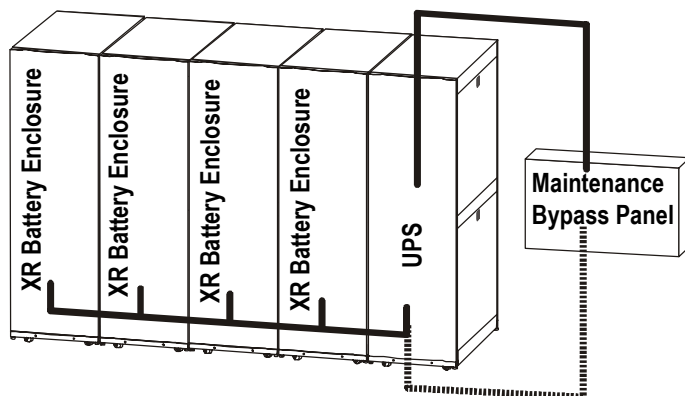
Note: Only systems installed on a raised floor may use bottom cable entry.

Installation with PDU-XR



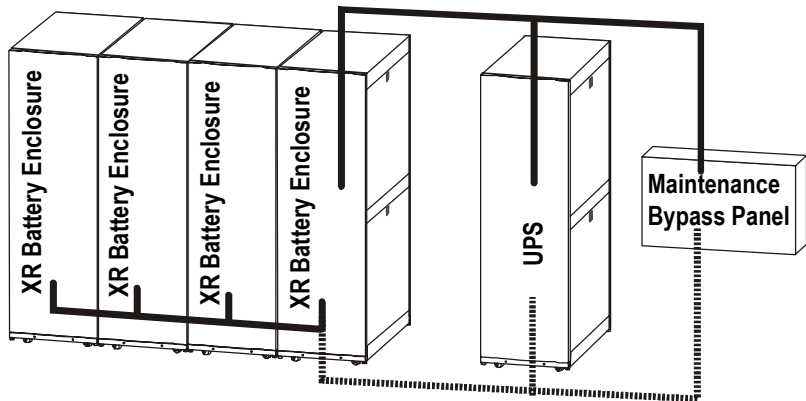
Remove the side panels on both sides of the UPS and install one of the side panels on the last XR Battery Enclosure in the row, and the other side panel on the open side of the PDU-XR.

Installation without PDU-XR



Remove one side panel from the UPS, install it on the last XR Battery Enclosure in the row.

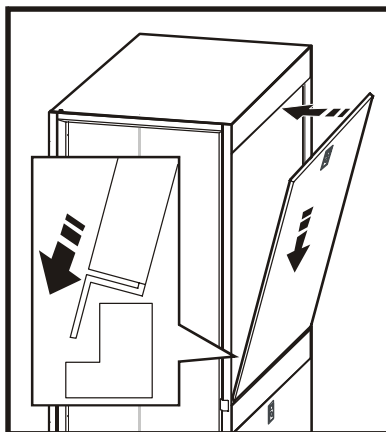
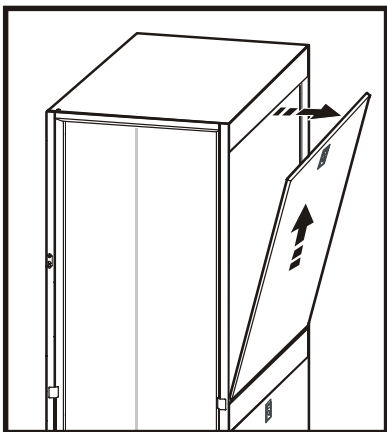
Installation without PDU-XR and detached UPS



Leave the side panels on the UPS. The extra side panels are needed for the open sides of the XR Battery Enclosure(s).

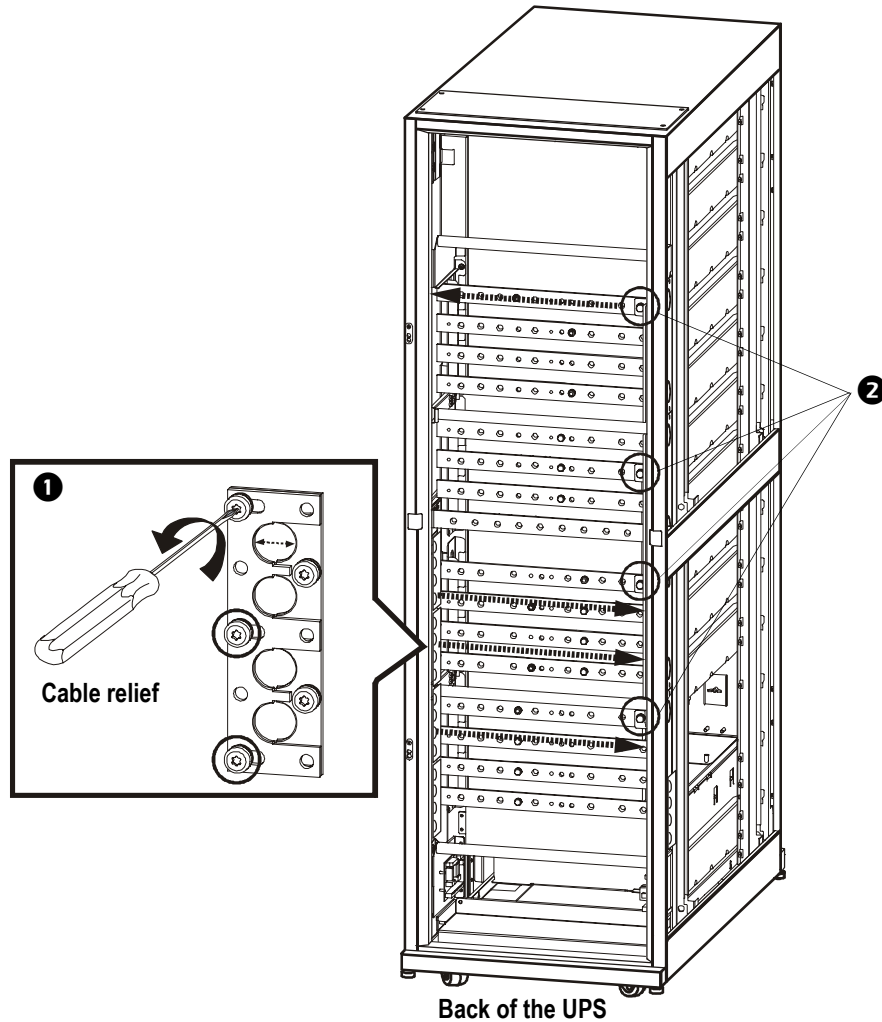
How to remove and install the side panels

- 1 To remove the side panels, unlock the side panels with the key (provided). Press down on the lock and pull out and up.
- 2 To install the side panels, push the panel down and in. Lock the side panels with the key.



How to Prepare the UPS for Cables when the PDU-XR is placed to the left of the UPS

If the PDU-XR is on the right side of the UPS (seen from the back) follow the below procedure.



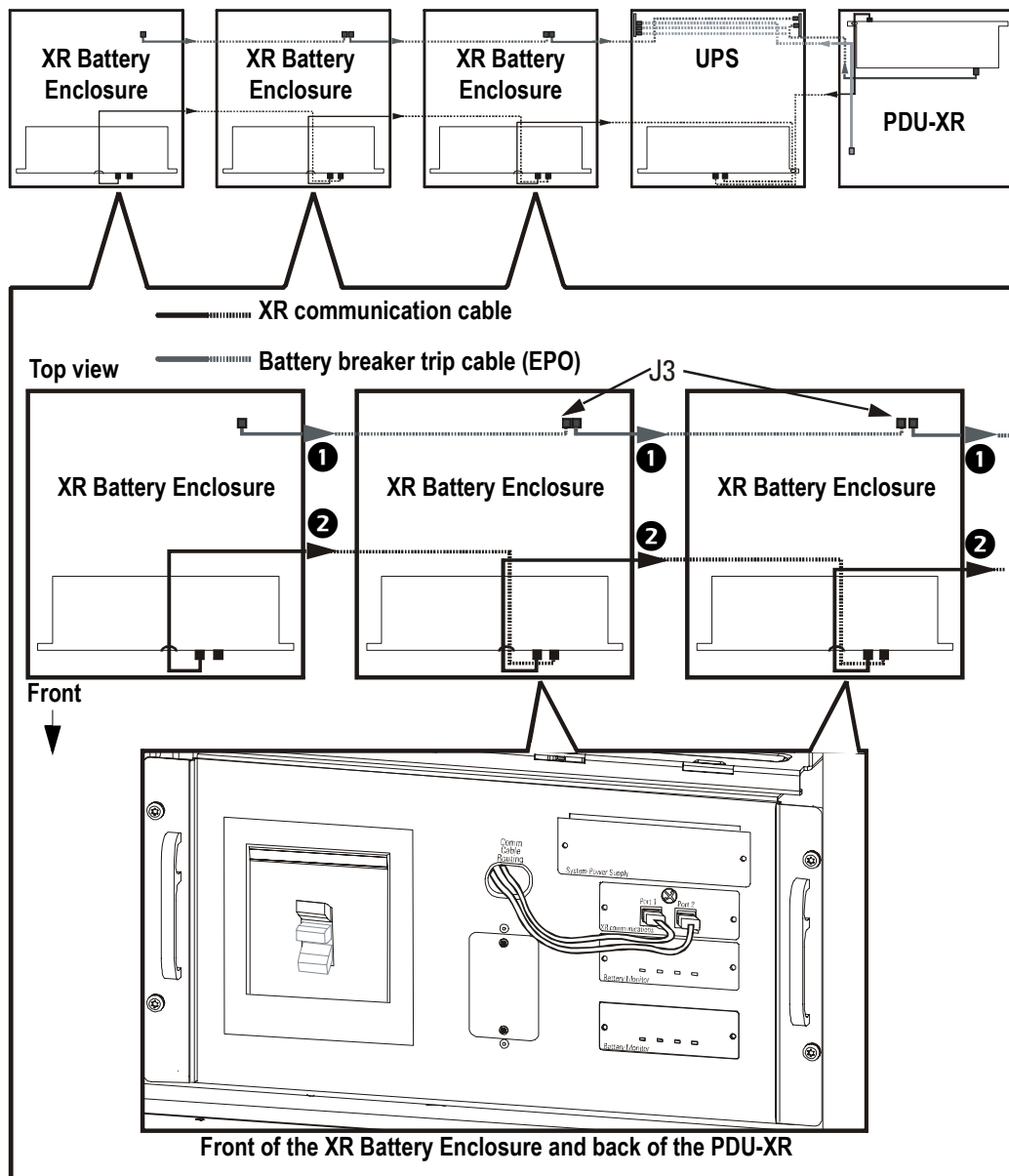
- 1 Remove the three cable reliefs from the left side and save for step 3.
- 2 Remove the neutral busbar from the right side of the UPS by loosening the four bolts, and mount the busbar on the left side of the UPS.
- 3 Mount the cable reliefs from step 1 in the right side.

Communication Cables

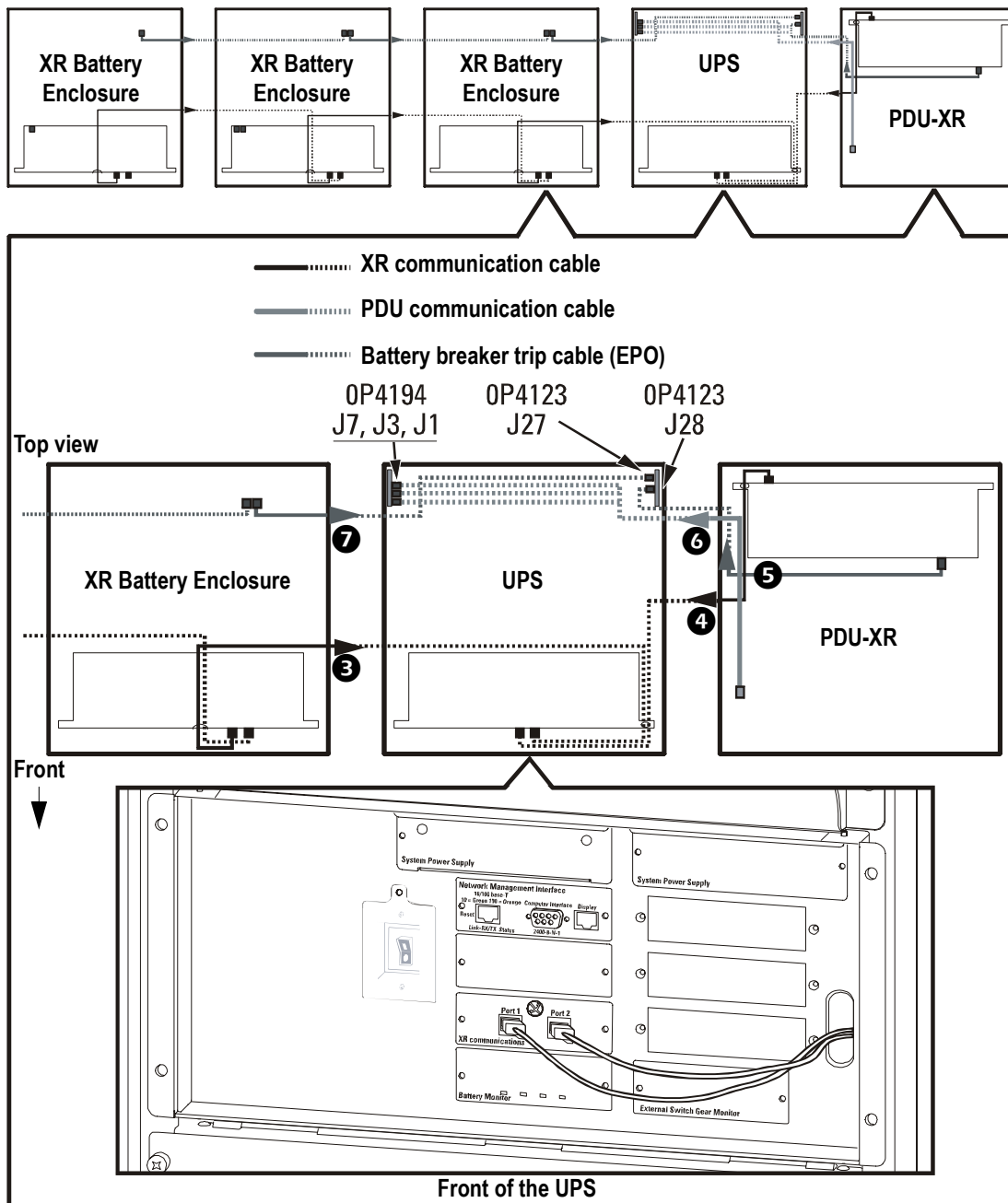
Communication Cables in Installations with PDU-XR

Move the enclosures together so that the communication cables can reach from one enclosure to another. Do not place them close against each other. The extra space is needed to complete the wiring.

- 1 Plug the battery breaker trip cable into the J3 connector of each XR Battery Enclosure.
- 2 Cascade the communication cable from each XR Battery Enclosure port 1 to port 2 in the next XR Battery Enclosure. Remove the terminator when necessary.



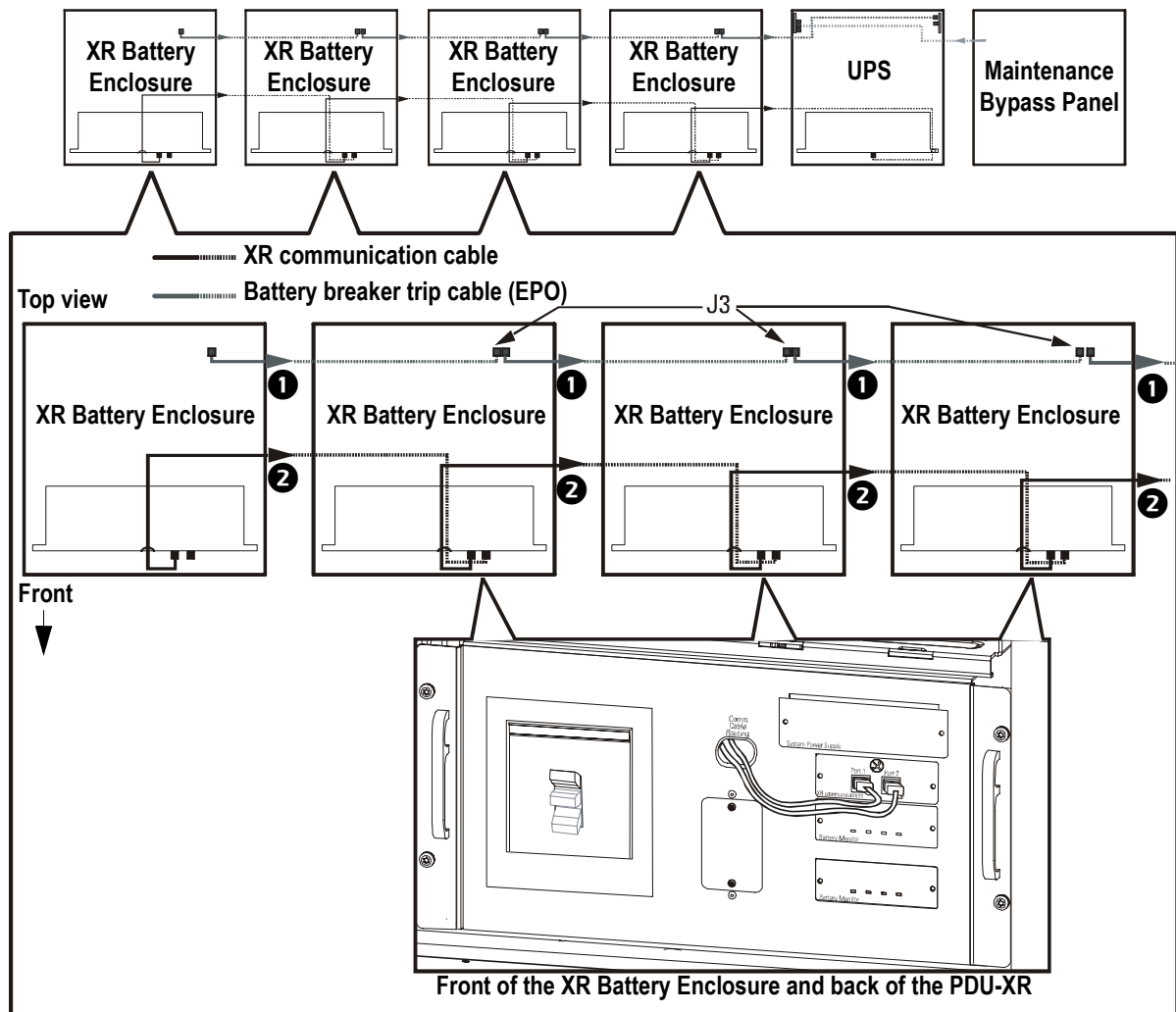
- 3 Route the communication cable from last XR Battery Enclosure in the row to the UPS XR Communications port 2.
- 4 Route the communication cable from the PDU-XR to the UPS XR communications port 1.
- 5 Route the battery breaker trip cable from the PDU-XR to the EPO/ancillary interface board (0P4123) and plug it into connector J28.
- 6 Route the three PDU communication cables from the PDU-XR enclosure to the maintenance bypass interface board (0P4194) and plug them into the J7, J3, and J1 connectors.
- 7 Route the battery breaker trip cable from the last XR Battery Enclosure to the EPO/ancillary interface board (0P4123) and plug it into the J27 connector.



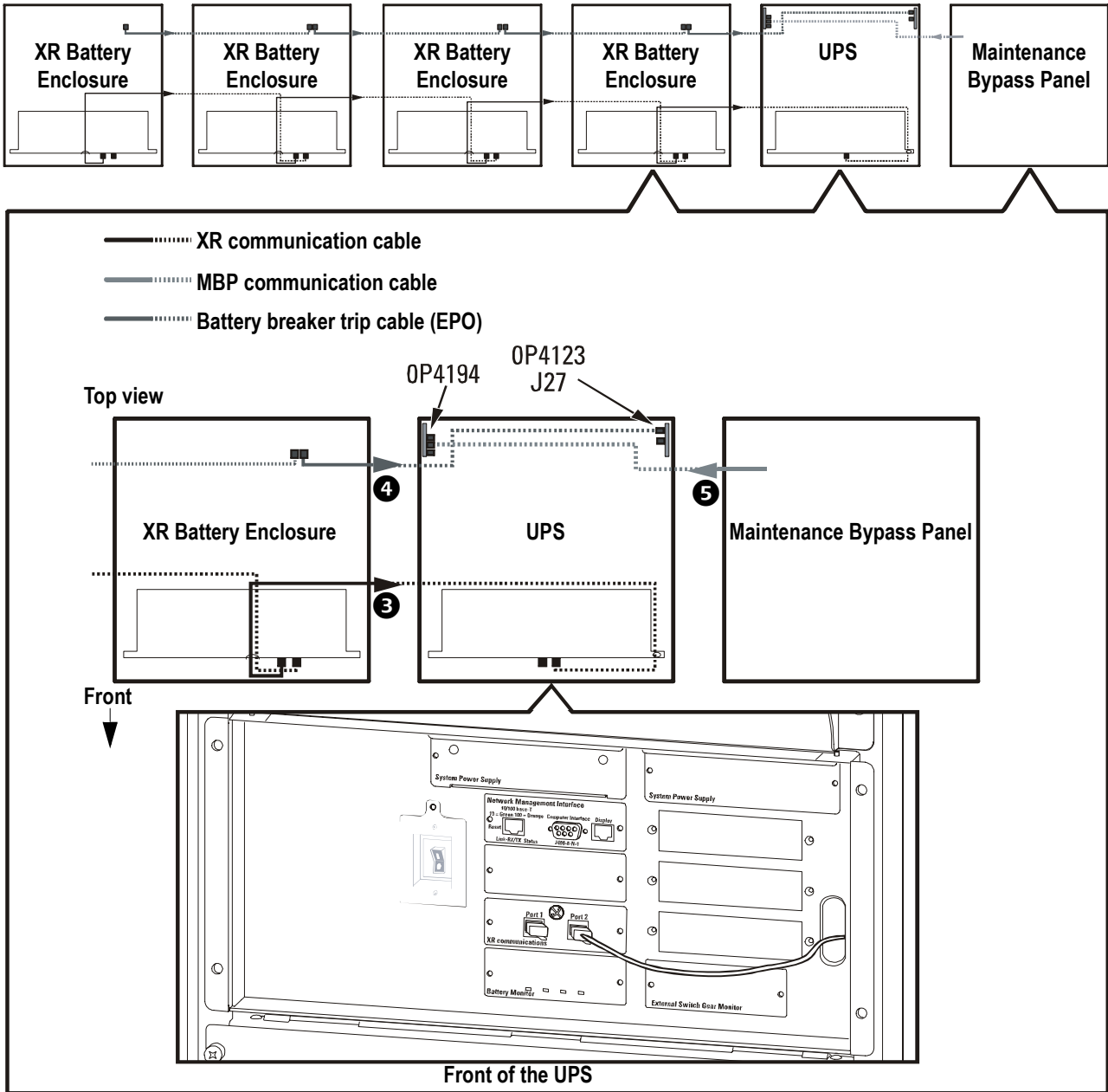
Communication Cables in Installations without PDU-XR

Move the enclosures together so that the communication cables can reach from one enclosure to another. Do not place them close against each other. The extra space is needed to complete the wiring.

- 1 Plug the battery breaker trip cable into the J3 connector of each XR Battery Enclosure.
- 2 Cascade the communication cable from each XR Battery Enclosure port 1 to port 2 in the next XR Battery Enclosure. Remove the terminator when necessary.



- 3 Route the communication cable from the last XR Battery Enclosure in the row to the UPS XR communications port 2.
- 4 Route the battery breaker trip cable from the last XR Battery Enclosure to the EPO/ancillary interface board (OP4123) and plug it into the J27 connector.
- 5 Install the communication cables from the Maintenance Bypass Panel into the maintenance bypass interface board (OP4194). Refer to the wiring diagram on the next page for more information.

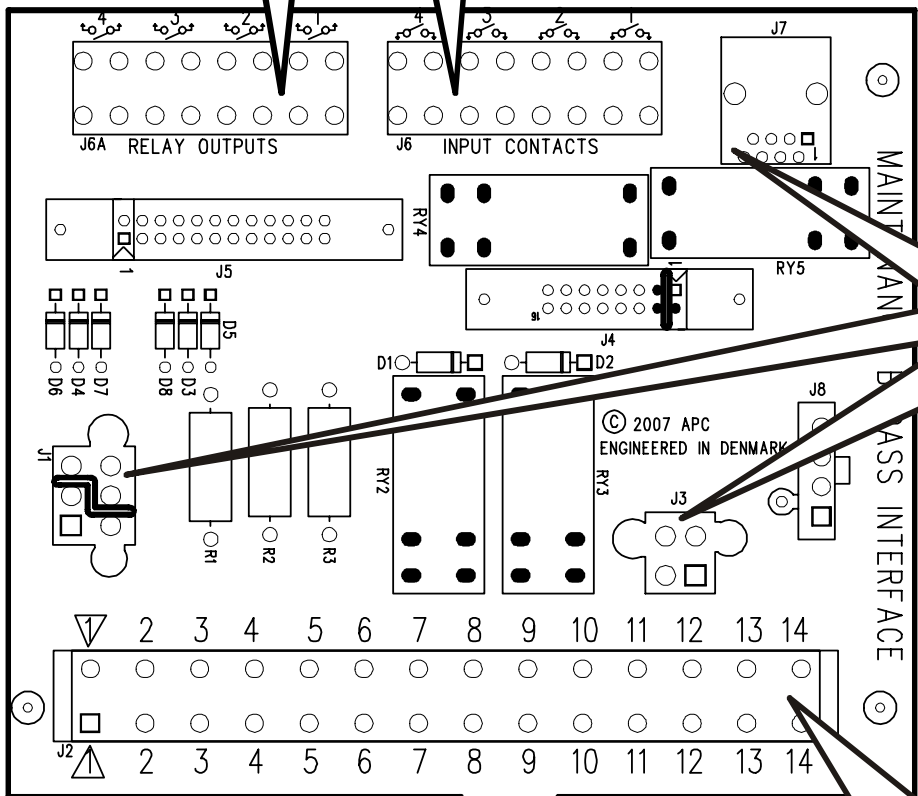


Maintenance Bypass Panel wiring diagram

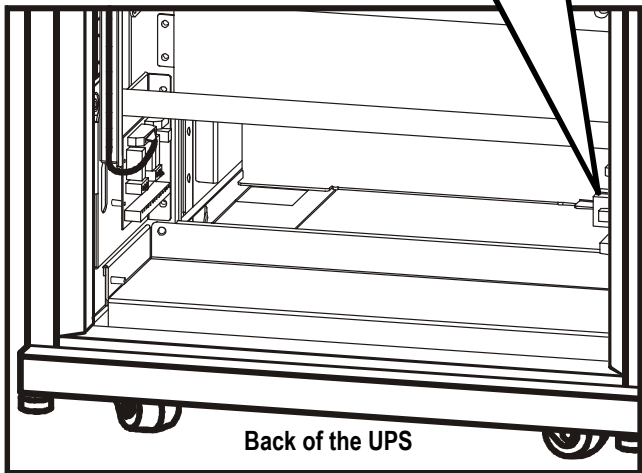


Warning: Ensure the wires are properly retained and kept away from high-voltage lines and breakers.

Make contact closure connections (NO or NC) to monitor dry contacts. Up to eight connections can be made - four input contacts and four output relays



J7, J1, and J3 are only used in systems with PDU-XR. See "Communication Cables in Installations with PDU-XR" on page 7 for more information.



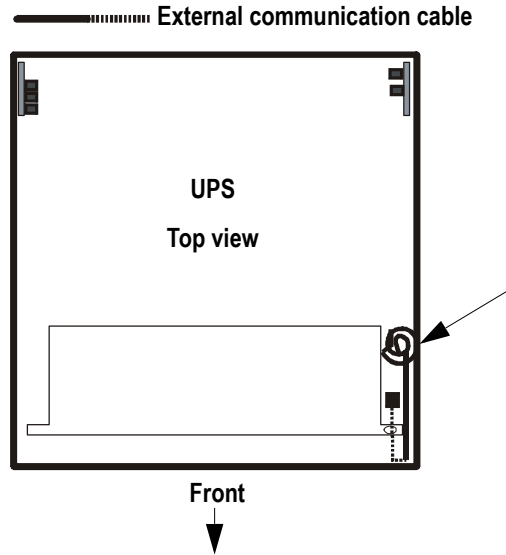
Output Relays:
240V/8A 0.3VA/1.9kW

Input signals: Contact load: TTL

| | |
|-------|---|
| 1/2 | Q001 UPS input switch (N/O position) |
| 3/4 | Q002 UPS output switch (N/O position) |
| 5/6 | Q003 UPS service bypass switch (N/C position) |
| 7/8 | OK to operate UPS Output switch Q002 |
| 9/10 | OK to operate service bypass switch Q003 |
| 11/12 | Not used |
| 13/14 | External Switch Gear present |

Network Communication Cable

The network communication cable (provided) is located on the top of the UPS. Connect the cable to your local area network.



Emergency Power Off Switch

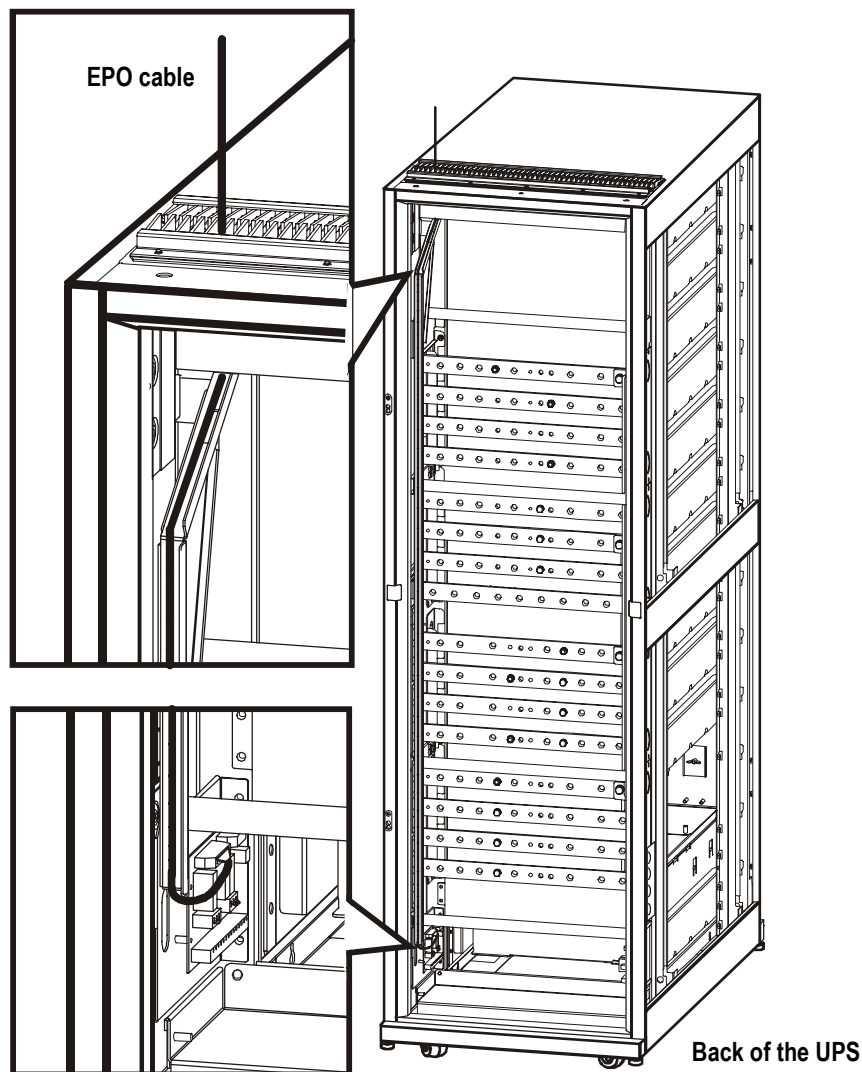
How to connect the Emergency Power Off (EPO) switch

The UPS must be connected to either a dry contact or an external 24 Vdc source.

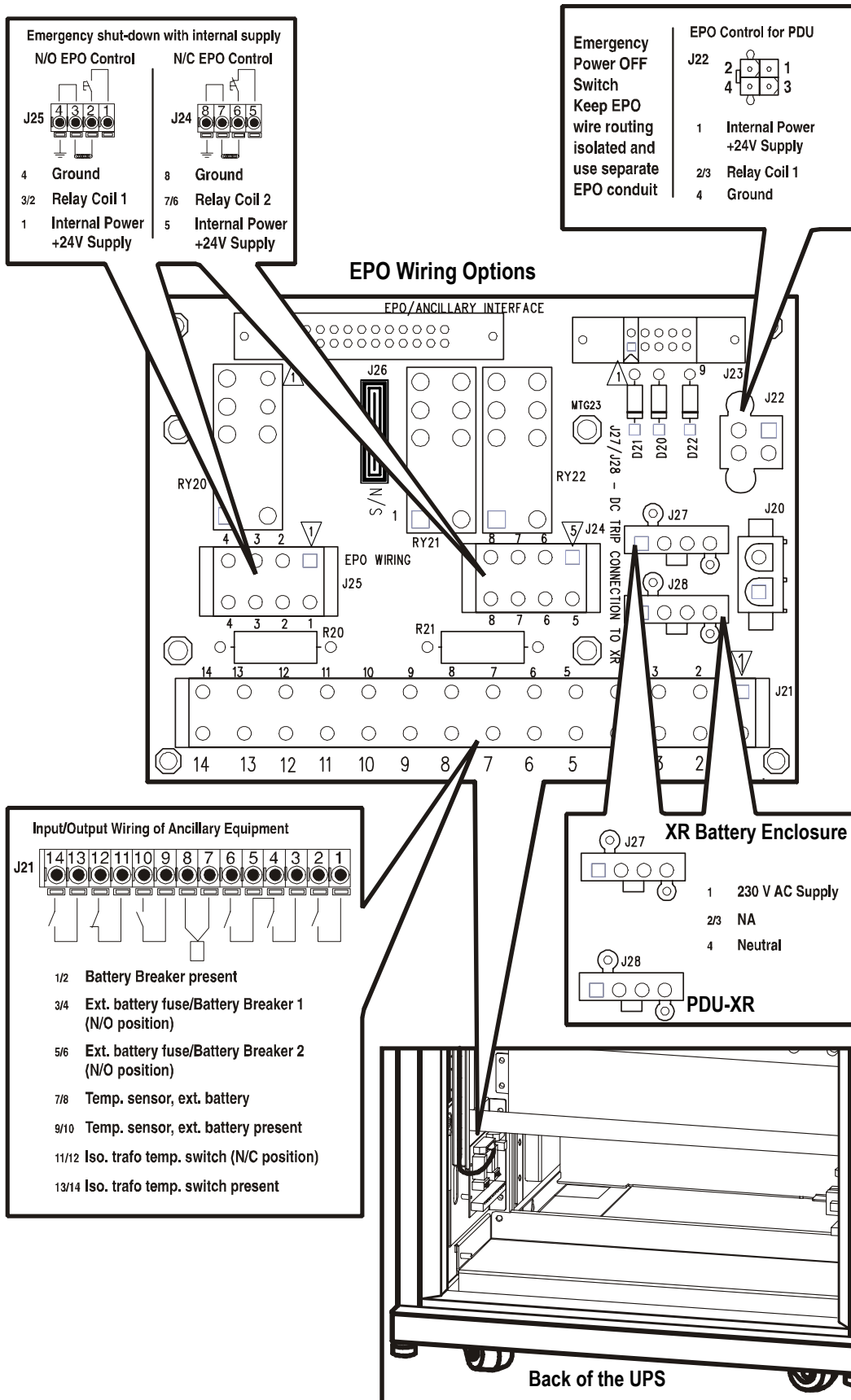
The EPO can be achieved with either a contact closure or application of an external 24 Vac or 24 Vdc from a SELV (Safety Extra Low Voltage) source. It is important to note that hazardous voltage from the mains voltage must be isolated from the contact closure or 24 Vac/24 Vdc. The EPO circuit contact closure, the 24 Vac or 24 Vdc is considered a SELV circuit as defined in EN60950 “Safety of Information Technology Equipment”. SELV circuits are isolated from the mains through a safety isolating transformer, and designed so that under normal conditions, the voltage is limited to 42.4 V peak or 60 Vdc.



Note: EPO switch wiring must comply with local and national electrical wiring rules.



EPO switch wiring diagram



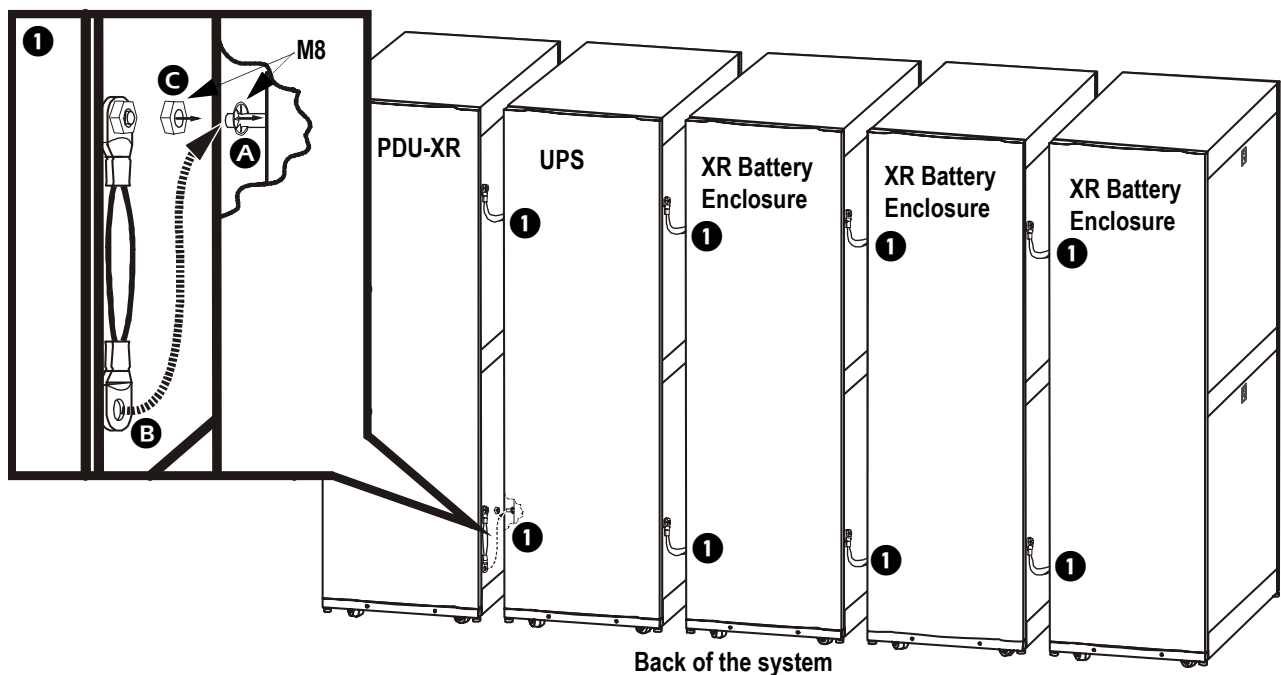
Bonding Wire

How to Connect the Bonding Wire



Note: It might be necessary to move some of the bonding wires to fit your system.

- 1 Connect the two bonding wires between all enclosures in the system. The bonding wires are connected to the PDU-XR and the XR Battery Enclosures. The M8 bolt and star washer are in the kit.



Battery Cables

How to Install the APC Battery Solution

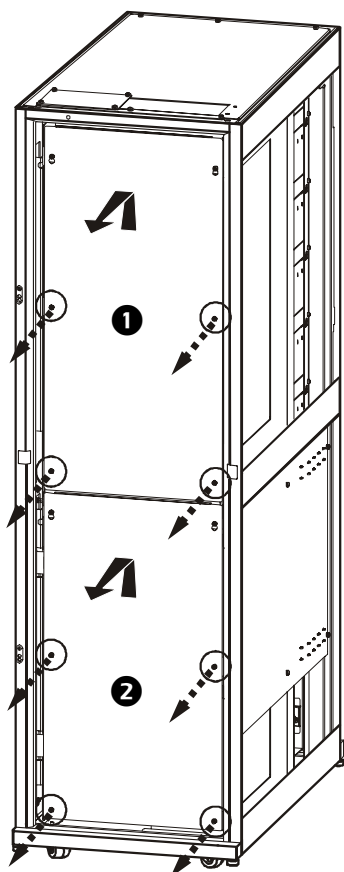
The Symmetra PX 160 kW UPS can monitor up to three APC XR Battery Enclosures in systems with PDU-XR and up to four APC XR Battery Enclosures in systems without PDU-XR.



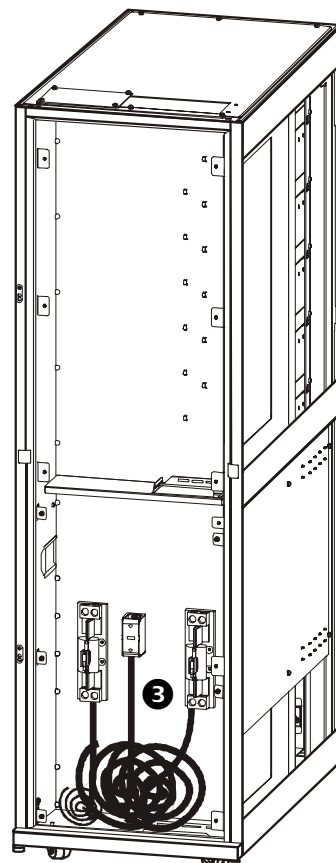
Note: In installations with non-apc batteries, follow the documentation provided with the batteries.

How to connect the battery cables in the XR Battery Enclosure

- 1 Remove the four bolts from the upper cover plate and remove the plate (only in top entry systems).
- 2 Remove the four bolts from the lower cover plate and remove the plate.
- 3 Take the cables included in each XR Battery Enclosure. Remove the cable lugs from the cables that will be used to connect the XR Battery Enclosures. For the cables that connect to the UPS, cut off only the cable lug on the end that will be mounted in the XR Battery Enclosure.

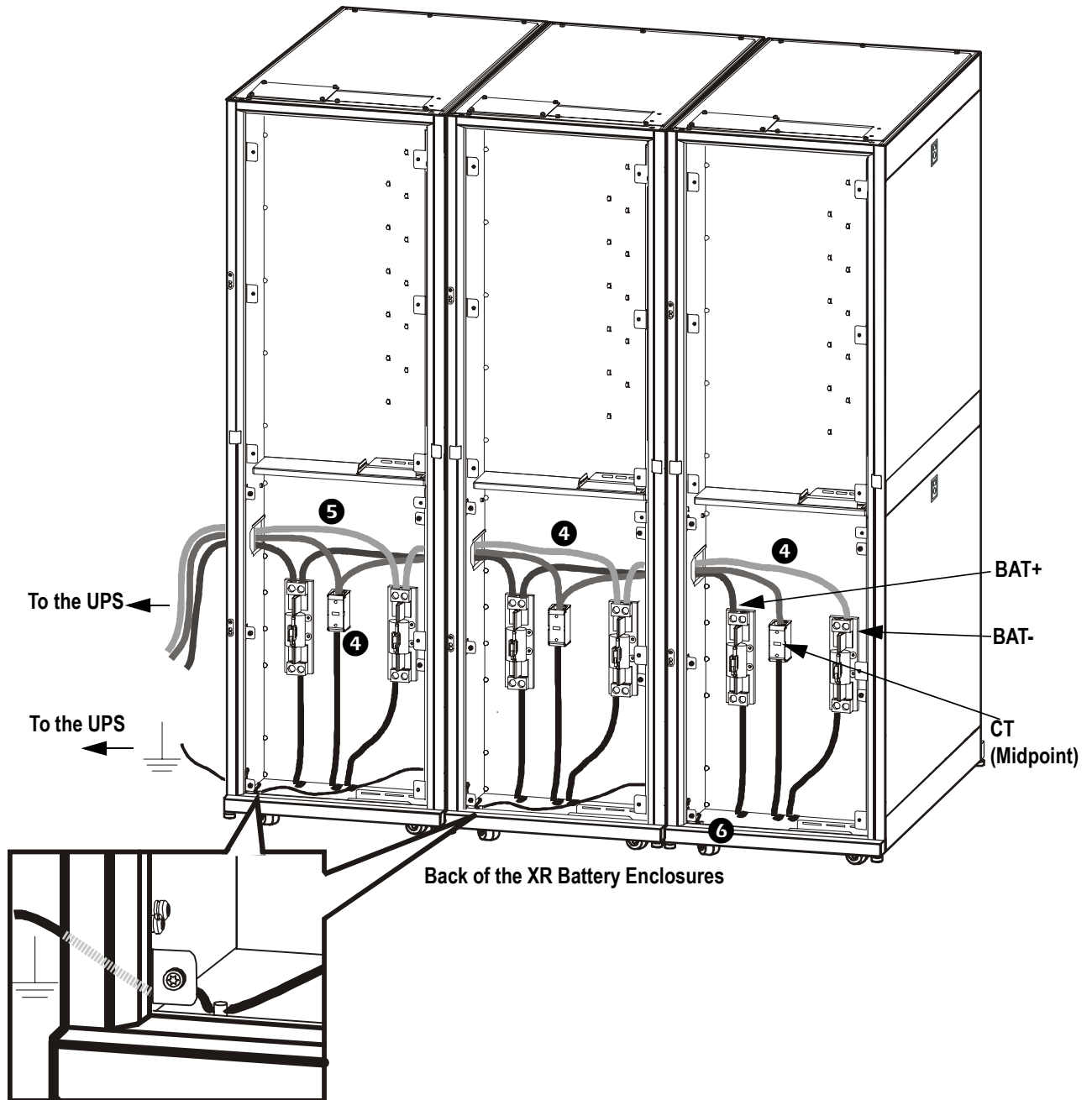


Back of the XR Battery Enclosure



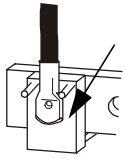
Back of the XR Battery Enclosure with plates removed

- 4 Mount the BAT+, BAT-, and CT (midpoint) cables between the XR Battery Enclosures.
- 5 Route the BAT +, BAT-, and CT (midpoint) cables from the XR Battery Enclosure to the UPS through the side, top, or bottom.
- 6 Mount the PE cable in the XR Battery Enclosure that is farthest from the UPS. Route it through each XR Battery Enclosure and return it to the UPS.



How to connect the battery cables in the UPS

The cables can be connected through the side, top, or bottom.



APC recommends installing a 45° cable lug. If you do not use a 45° cable lug, install a busbar safety bracket between each busbar and cable lug to ensure a safe distance with straight cable lugs. The brackets are provided with the UPS.



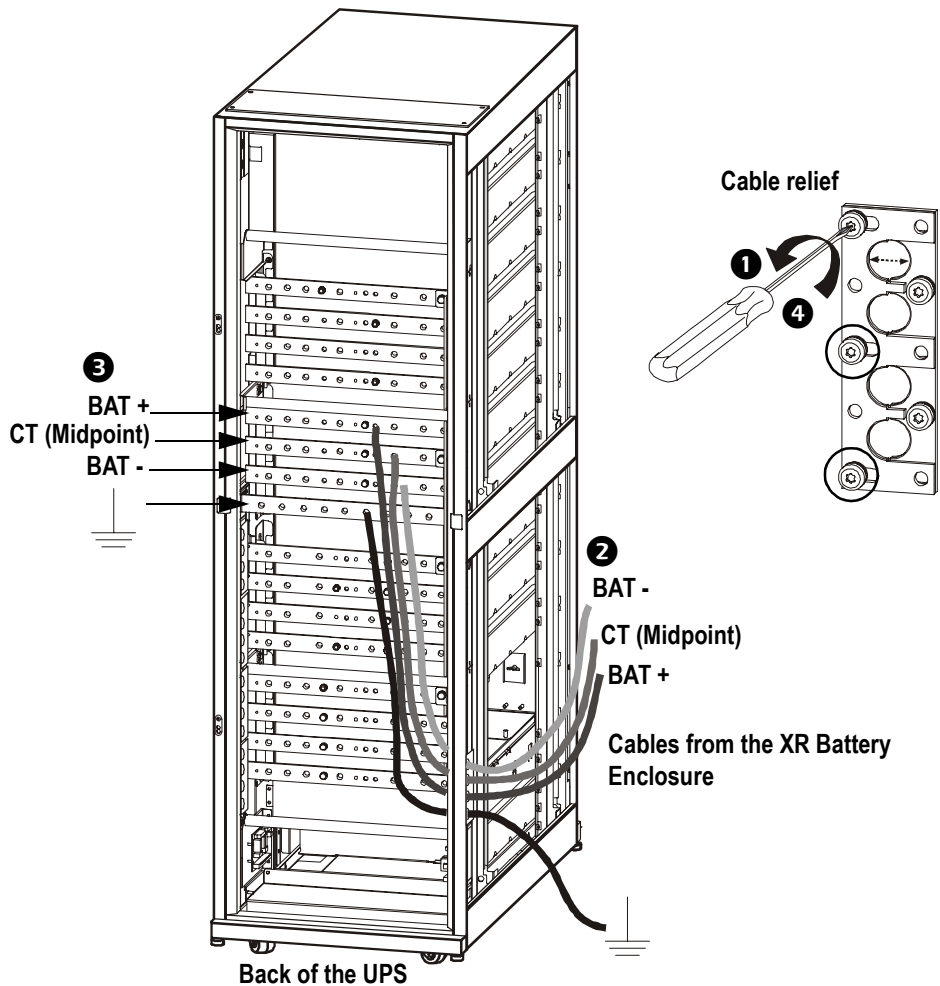
Note: Do not remove the 12 pcs M10 nylon hex bolts from the busbars. Mount the cables in the open holes.



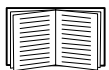
Caution: The power terminal bolt diameter is 10 mm. The required torque value is 26 Nm.

Side cable entry.

- 1 Before running the cables through the side, loosen the three bolts on the cable relief next to the XR Battery Enclosure.
- 2 Route the battery cables to the UPS through the holes in the cable relief.
- 3 Mount the cables to the busbars according to the labels.
- 4 Tighten the three bolts on the cable relief.



Top or bottom entry.

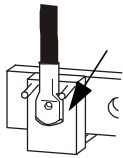


See “How to prepare for cables” on page 32 for information on how to prepare for cables.

- 1 Run the cables through top or bottom.
- 2 Mount the cables to the busbars according to the labels.

Power Cables

How to Connect Cables between the UPS and the PDU-XR



APC recommends installing a 45° cable lug. If you do not use a 45° cable lug, install a busbar safety bracket between each busbar and cable lug to ensure a safe distance with straight cable lugs. The brackets are provided with the UPS.

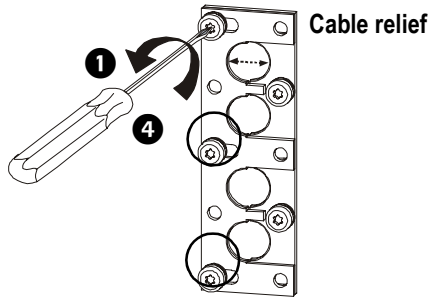


Note: Do not remove the 12 pcs M10 nylon hex bolts from the busbars. Mount the cables in the open holes.



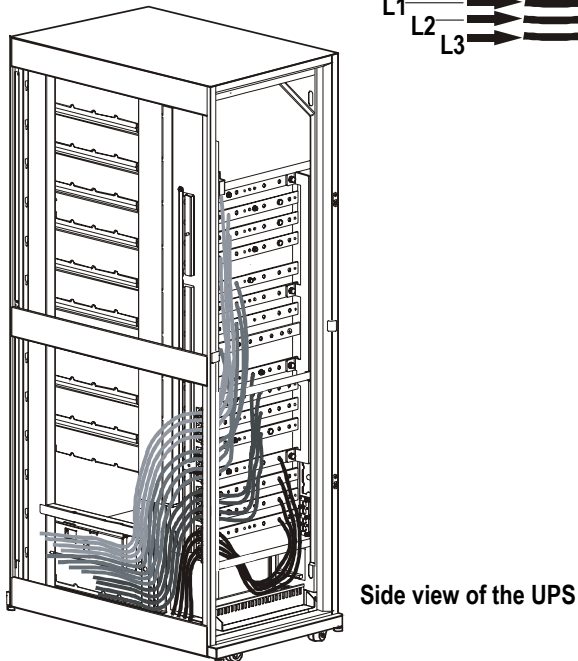
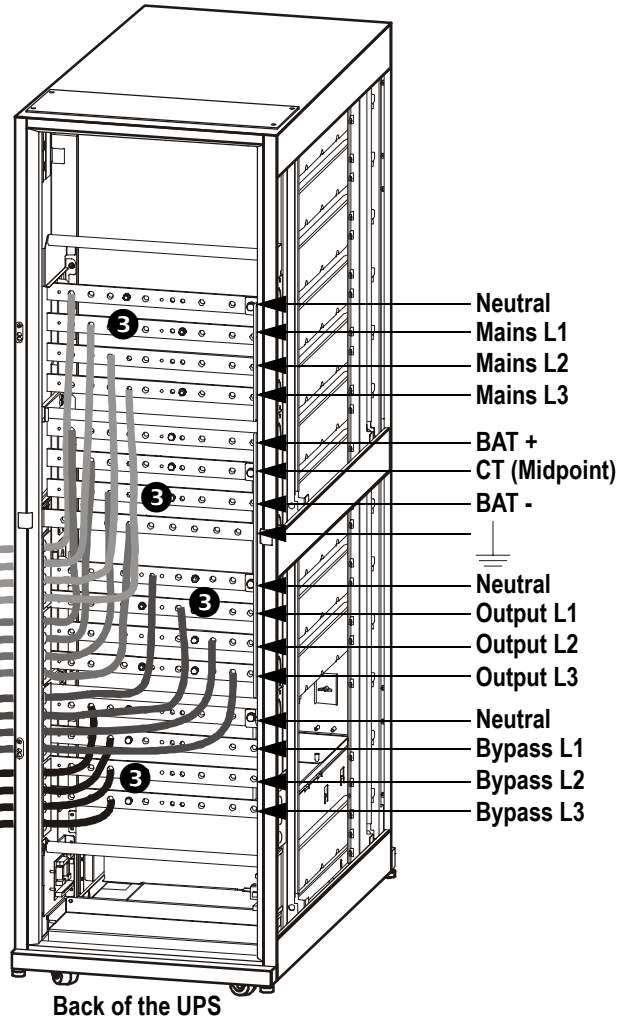
Caution: Ensure clockwise phase rotation and neutral location. The power terminal bolt diameter is 10 mm. The required torque value is 26 Nm.

- ❶ Before running the cables, loosen the three bolts on each cable relief next to the PDU.
- ❷ Route the cables to the UPS through the holes in the cable relief on the side of the enclosure starting from the bottom with the bypass L3 and then working your way up. Lay the cables neatly to minimize cable build-up. Do not tie the cables up.
- ❸ Mount the cables to the busbars according to the labels.
- ❹ Tighten the three bolts on each cable relief.



Cables from the PDU-XR

- ❷ Mains: Neutral L1 L2 L3
- ❷ BAT: BAT + CT (Midpoint) BAT -
- ❷ Output: Neutral L1 L2 L3
- ❷ Bypass: Neutral L1 L2 L3



How to Interconnect and Level the Enclosures

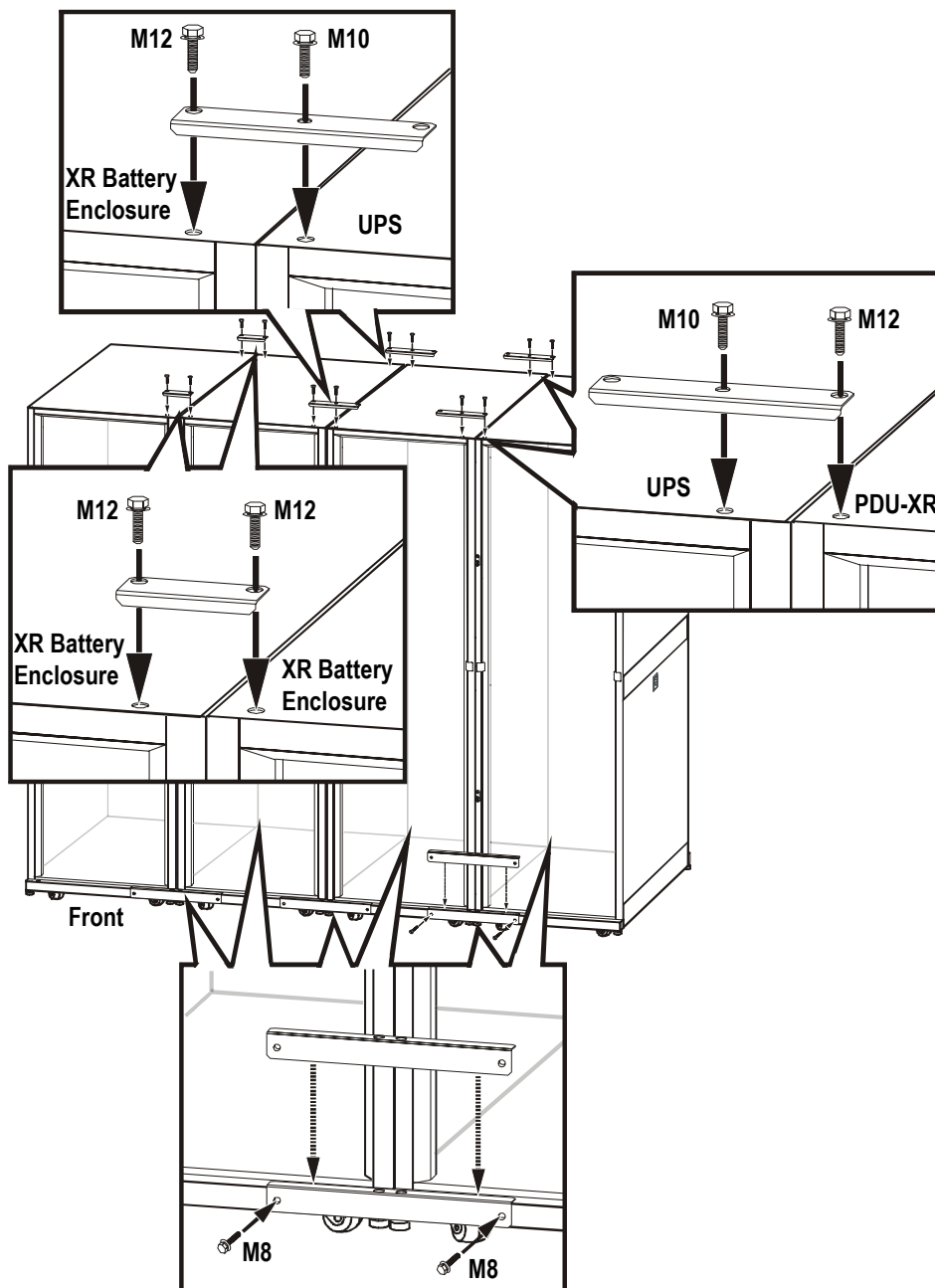


Warning: The system must be installed on a level floor. The leveling feet will stabilize the enclosure, but will not account for a badly sloped floor.

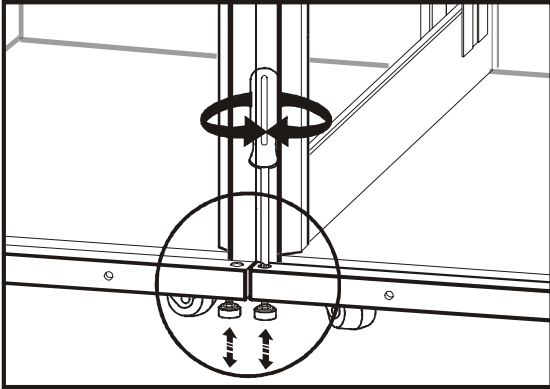


Note: The communication and power cables cannot be installed once the enclosures are installed side by side. Follow the procedure under “Installation Procedure” on page 2.

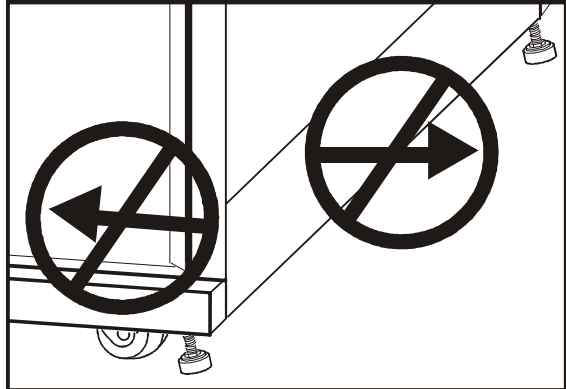
- 1 Align the enclosures.
- 2 Connect the exterior joining brackets (provided) to secure the enclosures together.



- ③ Use a screw driver to lower the leveling feet at the front of the enclosure.



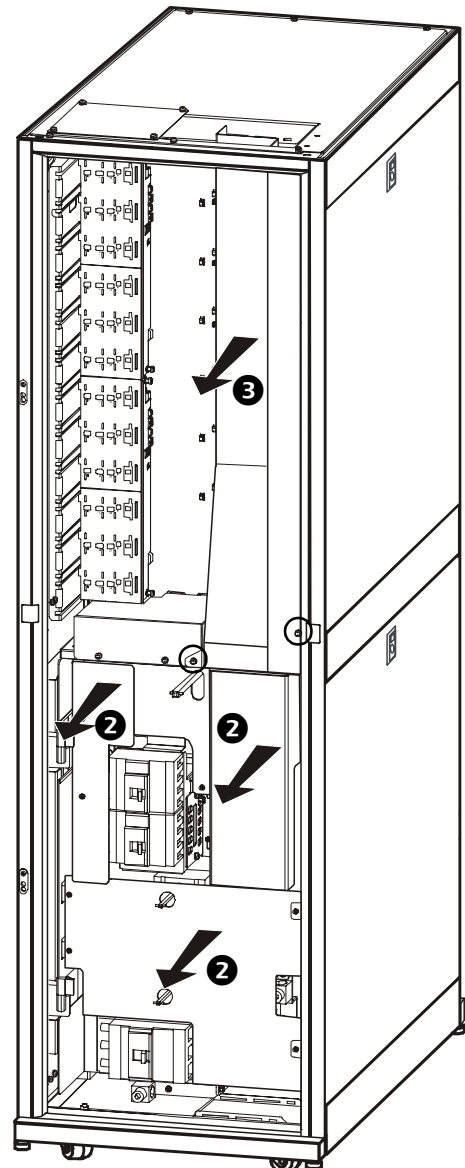
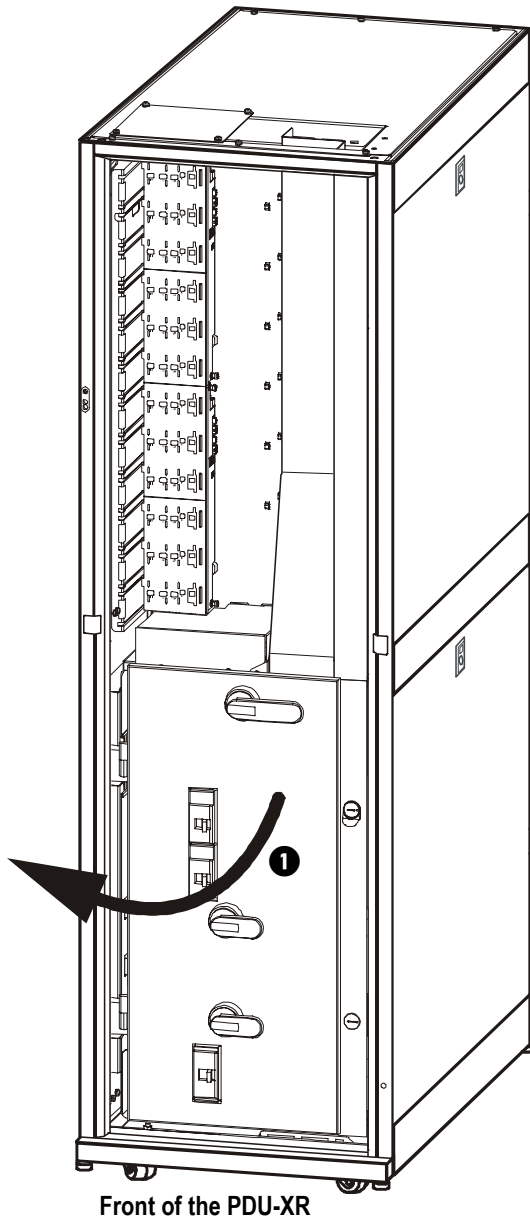
- ④ **Warning: Do not move the enclosure after the leveling feet have been lowered.**



PDU-XR Input and Output Cables

How to get access to the cable connection area

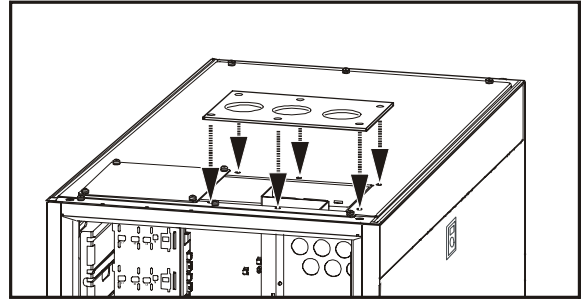
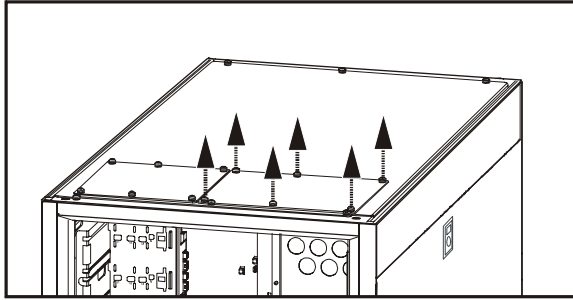
- 1 Open the inside door at the front of the PDU-XR.
- 2 Remove the three blanking panels.
- 3 Remove the two bolts at the bottom of the cable channel and remove the cable channel.



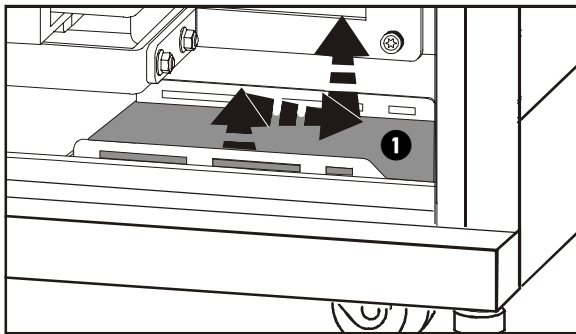
How to prepare for cables

Top cable entry without or with conduits.

- 1 Remove the connection plate. Go to step 2 if conduits needs to be intalled.
- 2 Drill holes in the plate for conduits. Re-install the plate with the conduits installed.

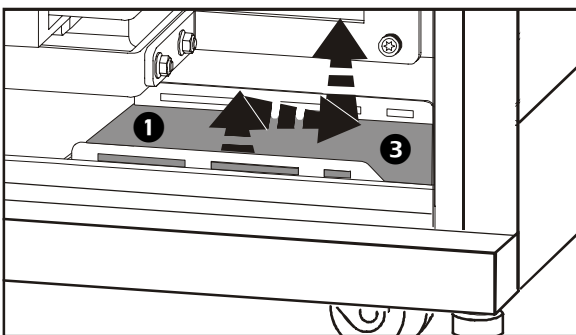


Bottom, front cable entry without conduits.



- 1 Loosen the bolts and remove the plate by lifting it up and to the right.

Bottom, front cable entry with conduits.



- 1 Remove the bolts. Remove the plate by lifting it up and to the right.
- 2 Drill holes in the plate for cables.
- 3 Re-install the plate with the conduits installed.

How to connect the cables in the PDU-XR



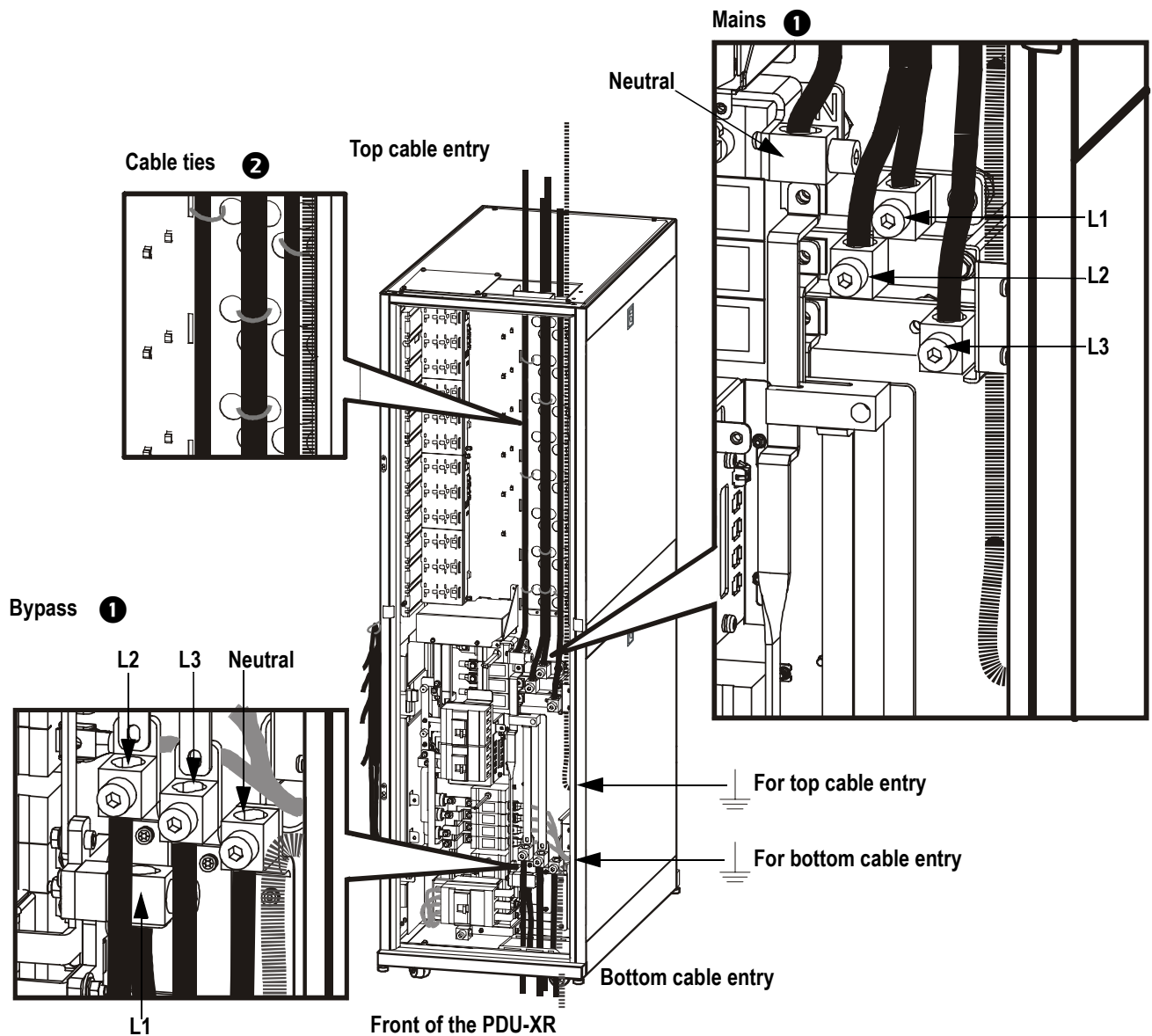
Caution: Ensure clockwise phase rotation and neutral location of the power terminal bolt. The required torque value is 62 Nm.



Note: The neutral wire from the AC mains input and AC bypass input is hardwired in the UPS, do not install a jumper between the two neutral connections in single mains installations.

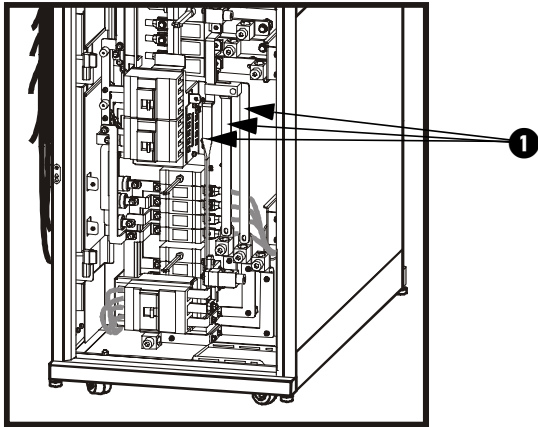
Single mains installation.

- 1 Route the cables from the top or bottom. Use the bypass terminals for mains connection in bottom entry systems.
- 2 In top entry systems, secure the cables to the cable tray using cable ties with a minimum loop tensile of 80 kg.



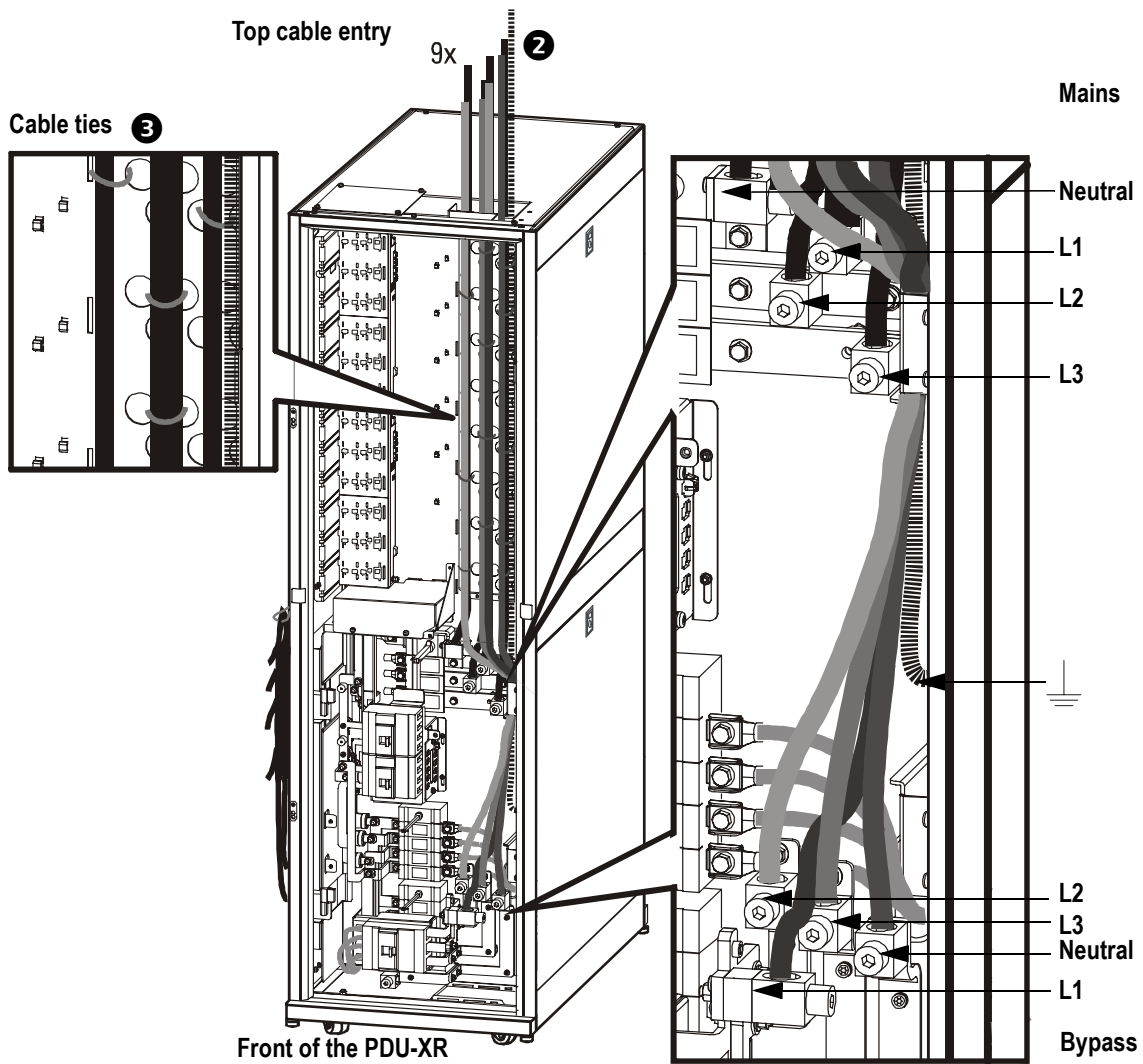
Dual mains top or bottom entry.

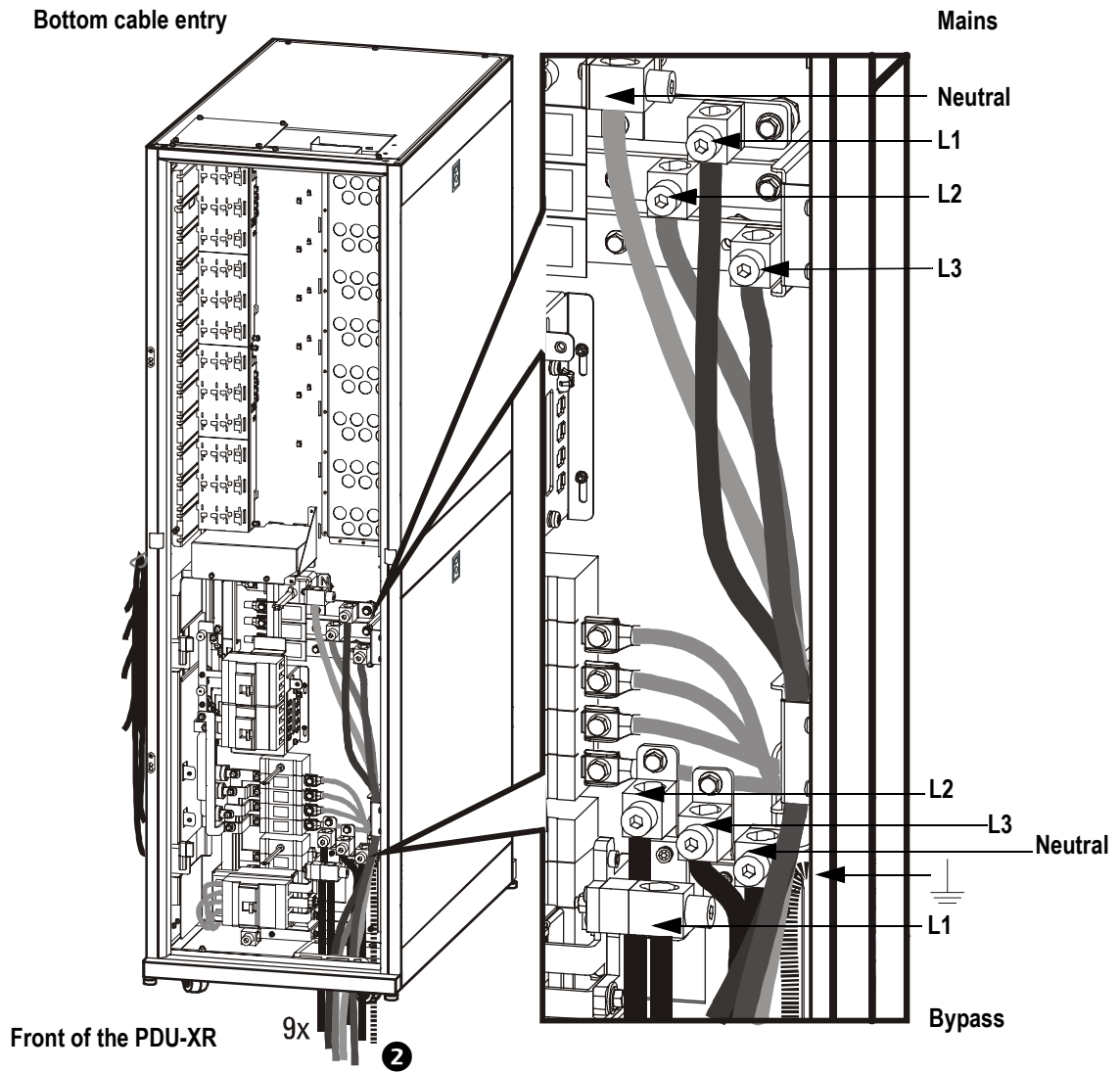
- 1 Remove the three busbars.



- 2 Route the cables through the top or bottom.

- 3 In top cable systems, secure the cables to the cable tray using cable ties with a minimum loop tensile of 80 kg.

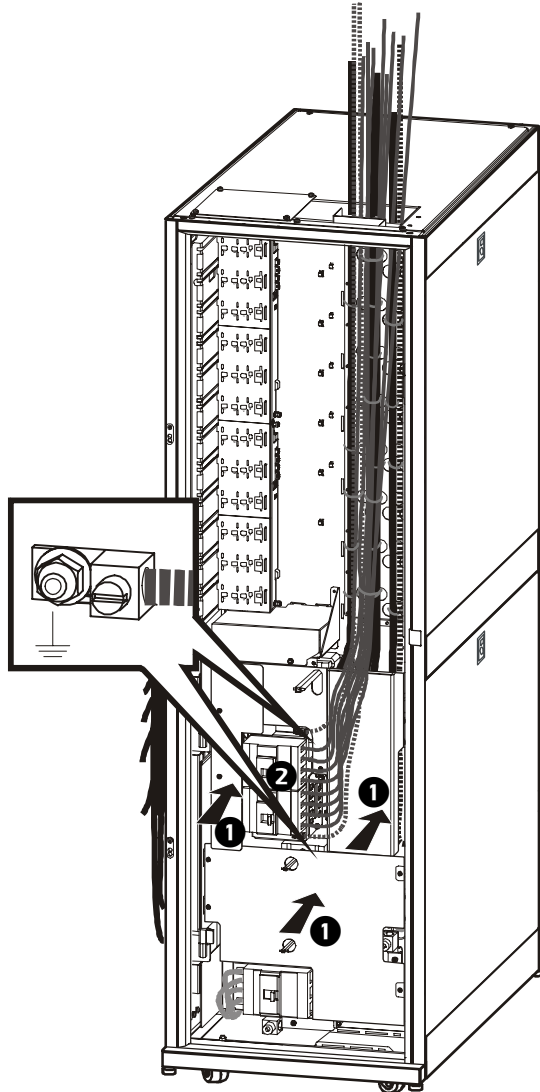




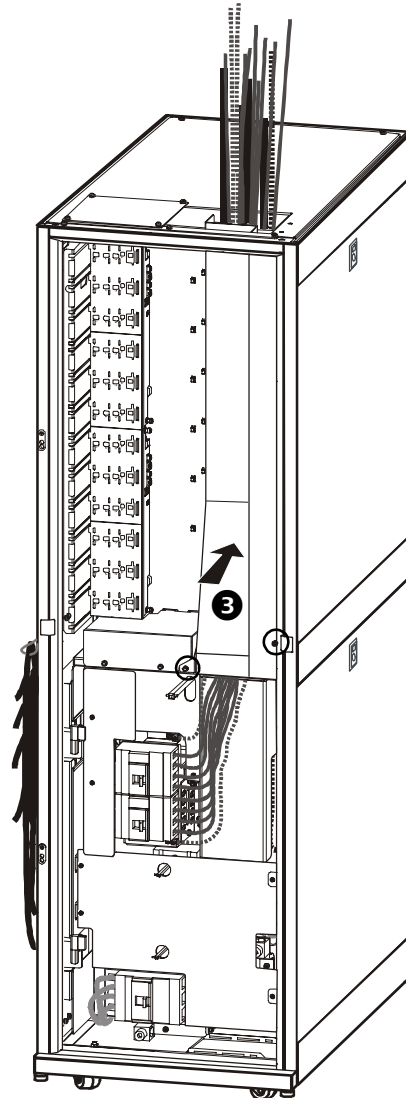
How to connect the subfeed breakers

Each subfeed breaker is rated for a maximum of 160 A.

- 1 Re-install the three blanking panels.
- 2 Mount the cables to the subfeed breakers (cables are not supplied).
- 3 Re-install the cable channel.



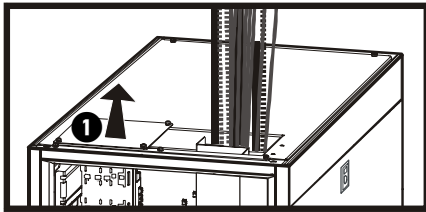
Front of the PDU-XR



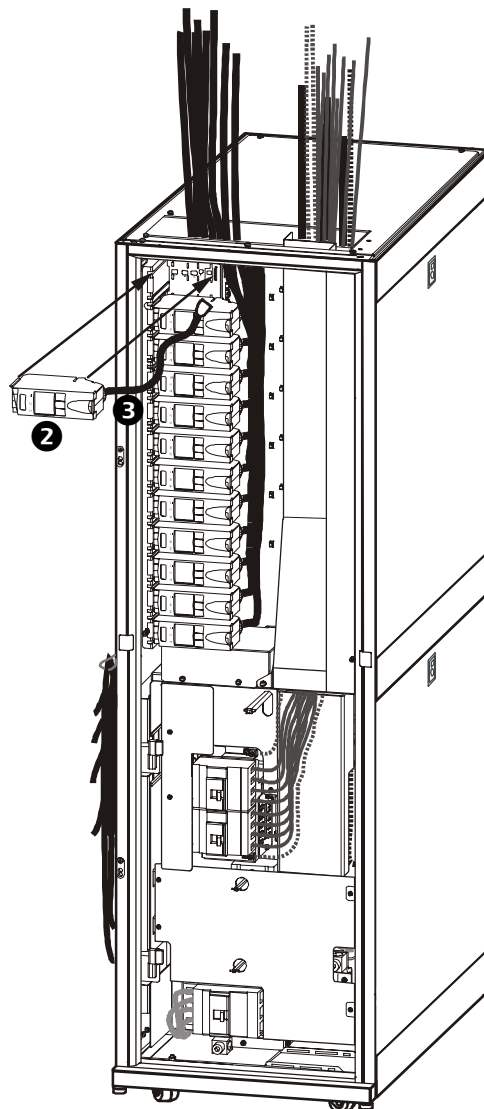
Front of the PDU-XR

How to install the power distribution module

- 1 Remove the left top plate.



- 2 Install the power distribution module by sliding the module into the enclosure and securing the latch to lock the module into place.
- 3 Route the power cables through the top.



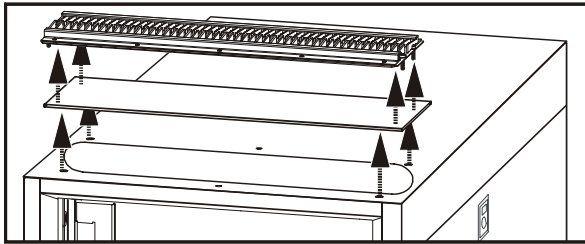
Front of the PDU-XR

UPS Input and Output Cables in Installations without PDU-XR

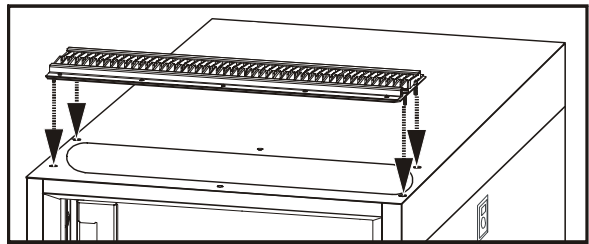
How to prepare for cables

Top cable entry in the back without conduits.

- 1 Remove the brush slot plate and the solid plate.

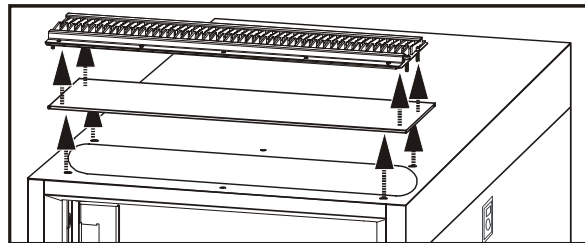


- 2 Re-install the brush slot plate.

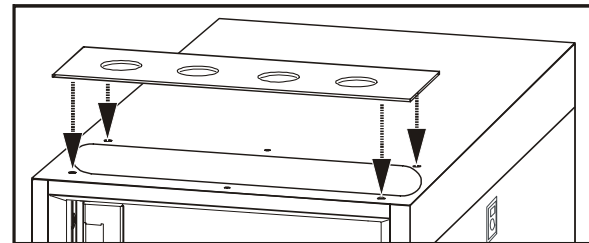


Top cable entry in the back with conduits.

- 1 Remove the brush slot plate and the solid plate.

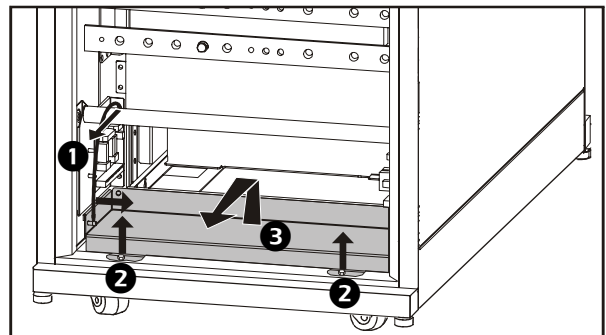


- 2 Drill as many holes as necessary in the solid plate and install the conduits. Re-install the plate.



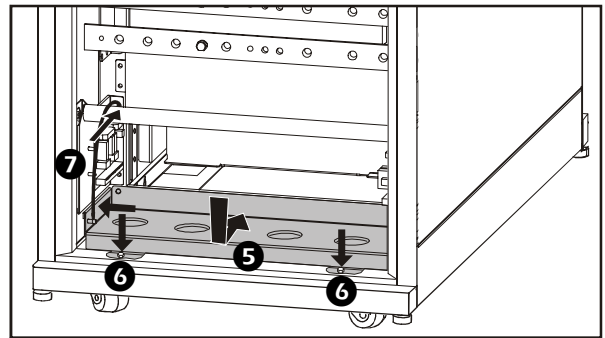
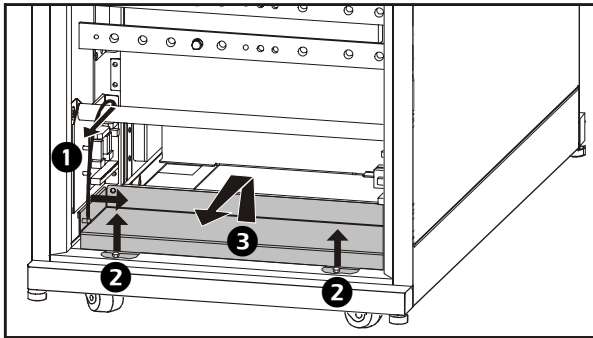
Bottom cable entry in the back without conduits.

- 1 Remove the grounding cable.
- 2 Remove the screws in front of the bottom plate.
- 3 Remove the plate by lifting it up.

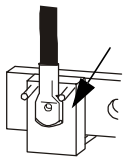


Bottom cable entry in back, with conduits.

- ❶ Remove the grounding cable.
- ❷ Remove the screws in front of the bottom plate.
- ❸ Remove the plate by lifting it up.
- ❹ Drill holes in the plate and install the conduits.
- ❺ Re-install the plate.
- ❻ Re-install the screws in front of the plate
- ❼ Re-install the grounding cable.



How to connect the cables in the UPS



APC recommends installing a 45° cable lug. If you do not use a 45° cable lug, install a busbar safety bracket between each busbar and cable lug to ensure a safe distance with straight cable lugs. The brackets are provided with the UPS.



Note: Do not remove the 12 pcs M10 nylon hex bolts from the busbars. Mount the cables in the open holes.

Dual mains installation—top or bottom cable entry

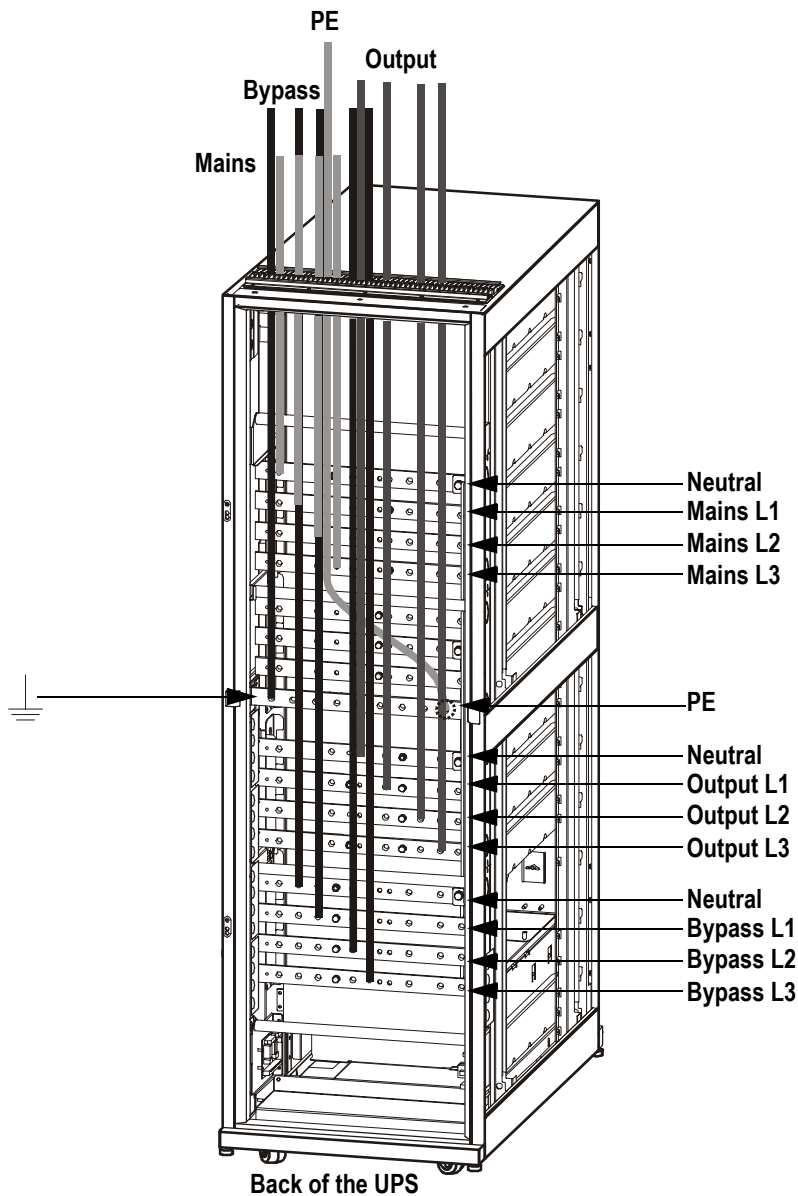


Note: Install the PE cable in the UPS according to the symbol on the grounding rail.



Caution: Ensure clockwise phase rotation and neutral location. The power terminal bolt diameter is 10 mm. The required torque value is 26 Nm.

- 1 Route the cables through top or bottom of the enclosure, and mount the cables to the busbars according to the labels.



Single mains installation—top or bottom cable entry



Note: As the neutral from AC mains input and AC bypass input is hardwired internally in the UPS, it is not necessary to install a jumper between the two neutral connections in single mains installations.

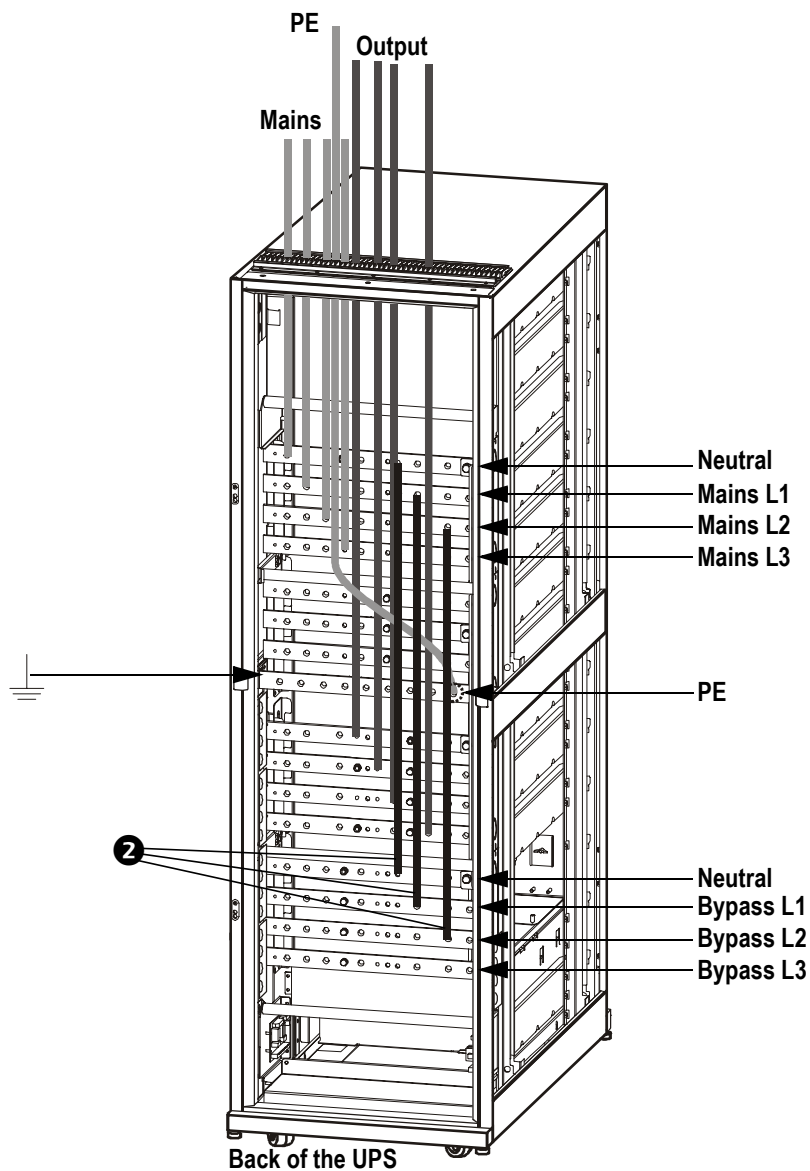


Note: Install the PE cable in the UPS according to the symbol on the grounding rail.



Caution: Ensure clockwise phase rotation and neutral location. The power terminal bolt diameter is 10 mm. The required torque value is 26 Nm.

- 1 Run the cables through top or bottom of the enclosure and mount the cables to the busbars according to the labels.
- 2 Install the three cables (0W3617) included with the unit.



Specifications

Symmetra PX UPS



Caution: All electrical power and power control wiring must be installed by a qualified electrician, and must comply with local and national regulations for maximum power rating.



Note: All current values are based on 160 kW maximum configuration of the UPS.

| Input | 380 V | 400 V | 415 V |
|--|--------------|--------------|--------------|
| Nominal input current (A) | 256 | 243 | 234 |
| Maximum input current (continuous, at 340 V mains voltage) (A) | 290 | 290 | 290 |
| Maximum bypass current (continuous, at nominal load) (A) | 243 | 231 | 223 |
| Input frequency (Hz) | 50/60 | 50/60 | 50/60 |

| Output | 380 V | 400 V | 415 V |
|---|-----------------------|--------------|--------------|
| Nominal output current (A) | 243 | 231 | 223 |
| Neutral output current (with 100% switch mode load) (A) | 421 | 400 | 386 |
| Maximum overload current (in bypass at 125% overload) (A) | 304 | 289 | 279 |
| Output frequency (on line, in bypass) | Synchronized to Input | | |
| Output frequency (on battery) (Hz) | 50/60 | 50/60 | 50/60 |
| Maximum short circuit withstand level (kA) | 30 | 30 | 30 |

Overcurrent device and disconnect switch for external safety

| | |
|---|---------|
| DC bus voltage (nominal) (V) | 2 x 192 |
| DC voltage rating of the battery supply breaker (VDC) | 250 |
| Maximum available battery supply fault current (kA) | 10 |

Required source connections

- Required mains supply is L1, L2, L3, N, and PE. Contact APC for information about other configurations
- Ensure a clockwise voltage phase rotation (L1, L2, L3 or RST)

Required upstream current protection (dual mains configuration)

- Mains input: 315 A gL type fuse
- Bypass input: 250 A gL type fuse

Required upstream current protection (single mains configurations)

- Mains input: 315 A gL type fuse

Recommended output current protection (single and dual mains)

- 250 A gL type fuse or a 250 A 3-pole AC circuit breaker

Required wiring for installation

- Input and output neutral wires must be rated for 173% of phase load if feeding switch mode power supply loads without input power factor corrections
- Copper wiring must be used for input/output wiring

Full load heat loss at nominal mains

- Full load heat loss at nominal mains: 8,38 kW (28619.2 BTU/hr)



Warning: This is a Class A UPS product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

Post-Installation Checklist

- If XR Battery Enclosure are installed make sure that all DC breakers are in the OFF position and that both 300 A fuses are removed from the XR Battery Enclosures.

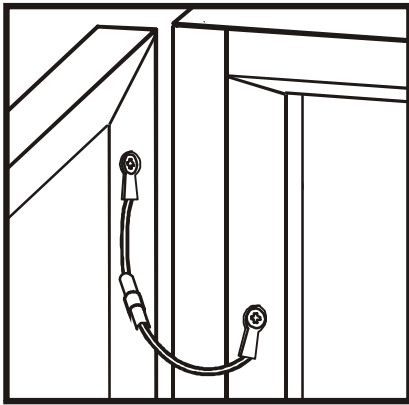
- Check that the power wiring is torqued to: UPS 230 lbf in/26 Nm, PDU-XR 549 lbf in/62 Nm, and XR Battery Enclosure 274 lbf in/31 Nm.

- Verify clockwise phase-rotation (L1, L2, L3) and make sure a neutral connection is present.

- Leave a wiring diagram on site for service personnel.

- Re-install all wiring access panels on the UPS.

- Re-mount the doors on all enclosures and connect the ground cables between the front doors and the frames.



- For any optional equipment, refer to product-specific manuals.



APC Worldwide Customer Support

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)
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 - **www.apc.com/support/**
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- Contact an APC Customer Support center by telephone or e-mail.
 - Regional centers

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- Local, country-specific centers: go to **www.apc.com/support/contact** for contact information.

Contact the APC representative or other distributor from whom you purchased your APC product for information on how to obtain local customer support.

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