

# Single and Parallel Installation

Smart-UPS™ VT  
10–40 kVA 380/400/415 V

with Batteries



## **American Power Conversion Legal Disclaimer**

The information presented in this manual is not warranted by the American Power Conversion Corporation to be authoritative, error free, or complete. This publication is not meant to be a substitute for detailed operational and site specific development plan. Therefore, American Power Conversion Corporation assumes no liability for damages, violations of codes, improper installation, system failures, or any other problems that could arise based on the use of this Publication.

The information contained in this Publication is provided as is and has been prepared solely for the purpose of evaluating data center design and construction. This Publication has been compiled in good faith by American Power Conversion Corporation. However, no presentation is made or warranty, either express or implied, as to the completeness or accuracy of the information this Publication contains.

NO EVENT SHALL AMERICAN POWER CONVERSION CORPORATION BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, PUNITIVE, SPECIAL, OR INCIDENTAL DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS, CONTRACT, REVENUE, DATA, INFORMATION, OR BUSINESS INTERRUPTION) RESULTING FROM, ARISING OUT, OR IN CONNECTION WITH THE USE OF, OR INABILITY TO USE THIS PUBLICATION OR THE CONTENT, EVEN IF AMERICAN POWER CONVERSION CORPORATION HAS BEEN EXPRESSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. AMERICAN POWER CONVERSION CORPORATION RESERVES THE RIGHT TO MAKE CHANGES OR UPDATES WITH RESPECT TO OR IN THE CONTENT OF THE PUBLICATION OR THE FORMAT THEREOF AT ANY TIME WITHOUT NOTICE.

Copyright, intellectual, and all other proprietary rights in the content (including but not limited to software, audio, video, text, and photographs) rests with American Power Conversion Corporation or its licensors. All rights in the content not expressly granted herein are reserved. No rights of any kind are licensed or assigned or shall otherwise pass to persons accessing this information.

This Publication shall not be for resale in whole or in part.

# Table of Contents

<b>IMPORTANT SAFETY INSTRUCTIONS — SAVE THESE INSTRUCTIONS</b> .....	1
<b>Specifications</b> .....	2
<b>AC Input</b> .....	2
3:3 380/400/415 V .....	2
<b>AC Bypass</b> .....	2
3:3 380/400/415 V .....	2
<b>AC Output</b> .....	3
3:3 380/400/415 V .....	3
<b>Battery Specifications</b> .....	3
<b>Fuses and Breakers</b> .....	4
Single Utility/Mains System .....	4
Dual Utility/Mains System .....	4
Parallel System .....	5
Fuse and Breaker Sizes in Single System .....	5
Fuse and Breaker Sizes Parallel System .....	5
Minimum Breaker Settings .....	6
<b>Mechanical Installation</b> .....	7
<b>Clearance</b> .....	7
<b>Level the Cabinet</b> .....	7
<b>Remove the Front Panel</b> .....	8
<b>Floor Anchoring</b> .....	8
Hole Positions for a Stand-alone UPS Enclosure with L-shaped Anchoring Brackets .....	9
Hole Positions for Up to Four UPS Units in Parallel with U-shaped Anchoring Brackets .....	9
Connect Floor Anchoring Brackets to the UPS and XR Battery Enclosure for Stability .....	10
Remove the Battery Modules .....	11
Install the Baying Kit (Optional) for Interconnection of Enclosures and Seismic Anchoring .....	12
<b>Install XR Battery Enclosures (Option)</b> .....	15
<b>Remove the Cable Landing Cover and Bottom Plates</b> .....	15
<b>Connect Battery Power in Installations with Busbars</b> .....	16
Isolator Installation Principle .....	16
Install Busbars in 523 mm (20.59 in) UPS System with the UPS Placed to the Left (seen from the front) .....	17

Install Busbars in 523 mm (20.59 in) UPS System with the UPS Placed to the Right (seen from the front) .....	18
Install Busbars in 352 mm (13.85 in) UPS System with the UPS Placed to the Right (seen from the front) .....	19
Install Busbars in 352 mm (13.85 in) UPS System with the UPS Placed to the Left (seen from the front) .....	20
<b>Connect Battery Power in Installations with Cables</b> .....	21
Connect Power Cables Between the UPS and the XR Battery Enclosure .....	21
Connect Power Cables between Two XR Battery Enclosures .....	22
<b>Connect the Power Cables to the UPS</b> .....	24
Single Mains without MBP .....	24
Dual Mains without MBP .....	25
Single Mains with MBP .....	26
Prepare for Cables .....	27
Bottom Cable Entry .....	27
<b>Connect the AC Input and AC Output Cables</b> .....	28
Single Mains .....	28
Dual Mains .....	28
Connect the DC Battery Cables (if applicable) .....	29
<b>Connect the Communication Cables</b> .....	30
Prepare for Communication Cables .....	30
Overview of Pin Connections .....	31
J106 .....	31
EPO in Single Systems .....	32
EPO in Parallel Systems .....	33
<b>Connect Communication Cables between UPS and XR Battery Enclosure</b> .....	34
<b>Connect APC Communication Options</b> .....	35
<b>Connect Communication Cables in Parallel System</b> .....	36
Overview of the PBus Cables .....	36
Prepare for Cables .....	37
UPS Units Apart without Conduits and Interconnection .....	38
UPS Units Bayed Together without Conduits .....	39
UPS Units Apart or Bayed Together with Conduits .....	40
<b>Final Mechanical Installation</b> .....	42
<b>Connect Battery Securing Brackets for Stability</b> .....	42

<b>Reinstall the Top Cover and the Front Panel .....</b>	<b>43</b>
----------------------------------------------------------	-----------



# IMPORTANT SAFETY INSTRUCTIONS — SAVE THESE INSTRUCTIONS

---



**WARNING:** ALL safety instructions in the Safety Sheet (990-2822) must be read, understood and followed when installing the UPS system. Failure to do so could result in equipment damage, serious injury, or death.



**WARNING:** After the UPS has been electrically wired, do not start it up. Start-up is commissioned to APC authorized personnel only.



**WARNING:** When the UPS input is connected through external isolators that, when opened, isolate the neutral, or is connected to an IT power distribution system, a label must be fitted at the UPS input terminals by the UPS supplier, and on all primary power isolators installed remote from the UPS area and on external access points between such isolators and the UPS by the user, displaying the following text (or equivalent): "Risk of voltage backfeed. Before working on this circuit, isolate the UPS and check for hazardous voltage between all terminals including the protective earth."



**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.



**Caution:** Wait until the system is ready be powered up before installing batteries. Failure to do so can result in a deep discharge of the batteries and cause permanent damage (the time from the battery installation time till the UPS is powered up should not exceed 72 hours or 3 days).



**Note:** The system is designed for connection to an IT power distribution system.



**Note:** The parallel cables must be run by the electrician but not attached. The field service engineer from Schneider Electric will install the parallel communication box and attach all cables to the UPS units.



**Note:** Ensure that the unit is in its final location prior to installation.



**Note:** Battery and utility power must not be connected until all other wiring has been completed.

# Specifications



**WARNING: The UPS must be supplied from a 380/220 V, 400/230 V or 415/240 V L1, L2, L3, N, PE, 50 Hz.**

## AC Input

### 3:3 380/400/415 V

kVA	10			15			20			30			40		
V	380	400	415	380	400	415	380	400	415	380	400	415	380	400	415
Connection type	3PH + N + PE														
Input frequency (Hz)	40-70														
THDI	< 5% at full load														
Nom input current (A)	13.0	12.3	11.9	19.4	18.5	17.8	26.0	24.7	23.8	38.6	36.7	35.3	51.7	49.1	47.3
Max input current (A)	14.3	13.5	13.1	21.4	20.3	19.6	28.6	27.2	26.2	42.5	40.3	38.9	56.8	54.0	52.1
Input current limitation (A)	18			26.7			35.5			53			70.6		
Input power factor correction	0.98 at load > 50%														
Maximum Short Circuit Withstand (kA)	30														

## AC Bypass



**Note:** The UPS is capable of running with a bypass input frequency of 50 Hz or 60 Hz. The frequency setting can be configured via the UPS display (Setup > Settings > System > Frequency).

### 3:3 380/400/415 V

kVA	10			15			20			30			40		
V	380	400	415	380	400	415	380	400	415	380	400	415	380	400	415
Connection type	3PH + N + PE														
Input frequency (Hz)	50 +/- 10 or 60 +/- 10														
Nom input current (A)	15.2	14.4	13.9	22.8	21.7	20.9	30.4	28.9	27.8	45.6	43.3	41.7	60.8	57.7	55.6



# AC Output

## 3:3 380/400/415 V

kVA	10			15			20			30			40		
V	380	400	415	380	400	415	380	400	415	380	400	415	380	400	415
Connection type	3PH + N + PE														
Output capacity	150% for 1 minute (normal operation) 125% for 10 minutes (normal operation) 150% for 1 minute (battery operation) 110% continuous (bypass operation) 800% for 500 ms (bypass operation)														
Voltage tolerance	+/- 20% (304-477 V) at full load														
Nom output current (A)	15.2	14.4	13.9	22.8	21.7	20.9	30.4	28.9	27.8	45.6	43.3	41.7	60.8	57.7	55.6
Output frequency (sync to mains)	47-53 Hz for 50 Hz nominal														
Slew rate (Hz/Sec)	0.25-1														
THDU	< 1.5% linear < 3.5% non-linear														
Output power factor	0.8														
Dynamic load response	+/- 5%														
Output voltage regulation	+/- 1%														

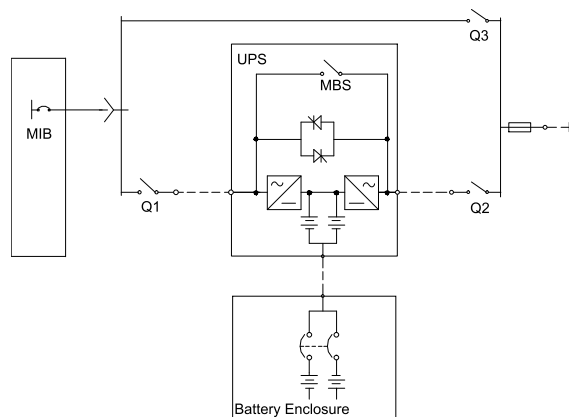
## Battery Specifications

Type	VRLA
Nominal voltage (VDC)	+/- 192
Float voltage (VDC)	+/- 219
End of discharge voltage (VDC)	+/- 154
Battery current (at full load)	87.9 A at +/- 192 V
Max. current (at end of discharge)	110.1 A at + 154 V
Max. charging power	10 kVA: 1600 W 15 kVA: 2400 W 20 kVA: 3200 W 30 kVA: 3200 W 40 kVA: 3200 W
Max. charging current	10 kVA: 4.2 A 15 kVA: 6.3 A 20 kVA: 8.4 A 30 kVA: 8.4 A 40 kVA: 8.4 A
Typical re-charge time	5 hours
End voltage	1.6-1.75 V/cell (automatic, depending on load)

# Fuses and Breakers

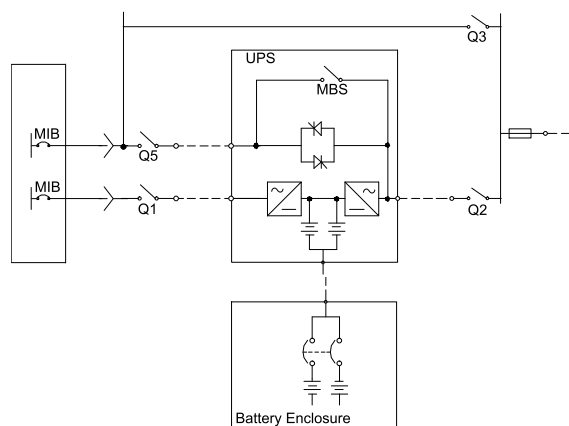
## Single Utility/Mains System

- Q1: Utility/mains input
- Q2: UPS output
- Q3: Manual bypass
- MBS: Mechanical bypass switch



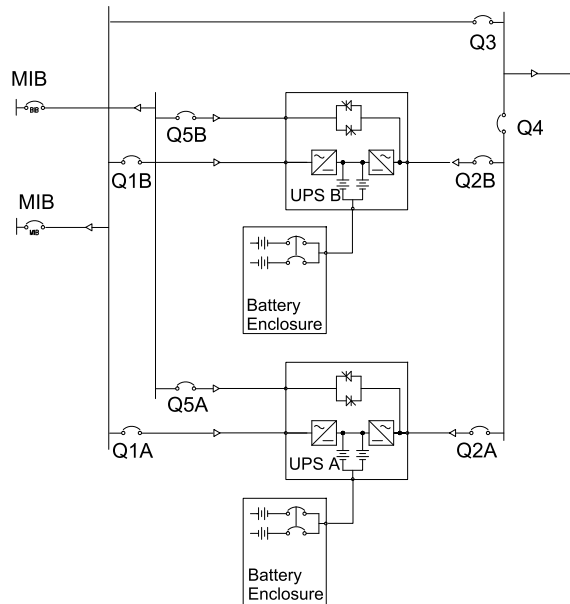
## Dual Utility/Mains System

- Q1: Utility/mains input
- Q2: UPS output
- Q3: Manual bypass
- Q5: Static bypass input
- MBS: Mechanical bypass switch



## Parallel System

- Q1: Utility/mains input
- Q2: UPS output
- Q3: Manual bypass
- Q4: System output
- Q5: Static bypass input



## Fuse and Breaker Sizes in Single System

### 3:3 400 V

	10 kVA	15 kVA	20 kVA	30 kVA	40 kVA
Mains input Q1 (A) <sup>1</sup>	16	25	35	50	63
Static bypass input Q5 (A)	16	25	35	50	63
UPS output Q2 (A)	16	25	35	50	63

<sup>1</sup> Required upstream current protection: gL type fuse

## Fuse and Breaker Sizes Parallel System

### 3:3 400 V – Q3 and Q4 in Parallel Capacity Systems

Units in parallel	10 kVA	15 kVA	20 kVA	30 kVA	40 kVA
2 (A)	35	50	63	100	125
3 (A)	50	80	100	160	200
4 (A)	63	100	200	200	250

### 3:3 – Q3 and Q4 in Parallel Redundant Systems (n+1)

Units in parallel	10 kVA	15 kVA	20 kVA	30 kVA	40 kVA
2 (A)	16	25	35	50	63
3 (A)	35	50	63	100	125
4 (A)	50	80	100	160	200

## Minimum Breaker Settings

### 3:3 380/400/415 V

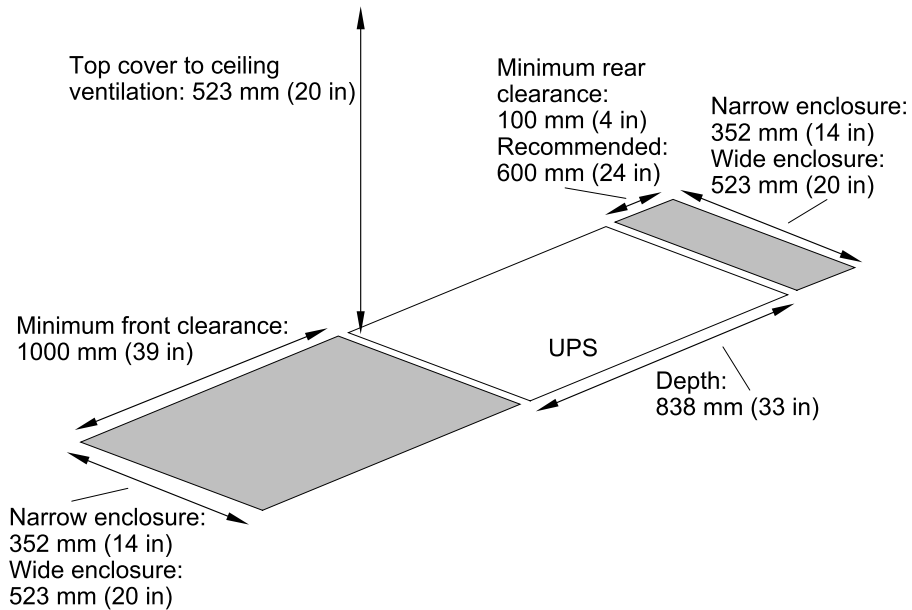
		<b>800% overload bypass operation</b>	<b>150% overload normal/battery operation</b>	<b>125% overload normal/battery operation</b>	<b>Continuously</b>
	<b>Duration</b>	<b>500 ms</b>	<b>60 s</b>	<b>10 min</b>	
<b>10 kVA</b>	Mains input	- <sup>1</sup>	-	-	18.0 A
	Static bypass input	121.5 A	-	-	16.7 A
	UPS output	121.5 A	22.8 A	19 A	16.7 A
<b>15 kVA</b>	Mains input	- <sup>1</sup>	-	-	26.7 A
	Static bypass input	182 A	-	-	25.1 A
	UPS output	182 A	34.2 A	25.4 A	25.1 A
<b>20 kVA</b>	Mains input	- <sup>1</sup>	-	-	35.5 A
	Static bypass input	244 A	-	-	33.4 A
	UPS output	244 A	45.6 A	38 A	33.4 A
<b>30 kVA</b>	Mains input	- <sup>1</sup>	-	-	53.0 A
	Static bypass input	364 A	-	-	50.1 A
	UPS output	364 A	68.4 A	57 A	50.1 A
<b>40 kVA</b>	Mains input	- <sup>1</sup>	-	-	70.6 A
	Static bypass input	487 A	-	-	66.9 A
	UPS output	487 A	91.2 A	76 A	66.9 A
<sup>1</sup> For single mains systems, use the higher value of mains and static bypass					

# Mechanical Installation

## Clearance



**Note:** Clearance dimensions are published for airflow and service access only. Consult with the local safety codes and standards for additional requirements in your local area.

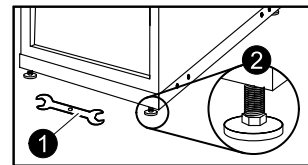


## Level the Cabinet

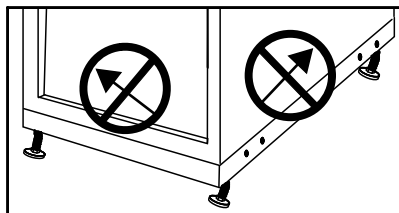


**WARNING:** The system must be installed on a level floor. The leveling feet will stabilize the cabinet, but will not account for a badly sloped floor.

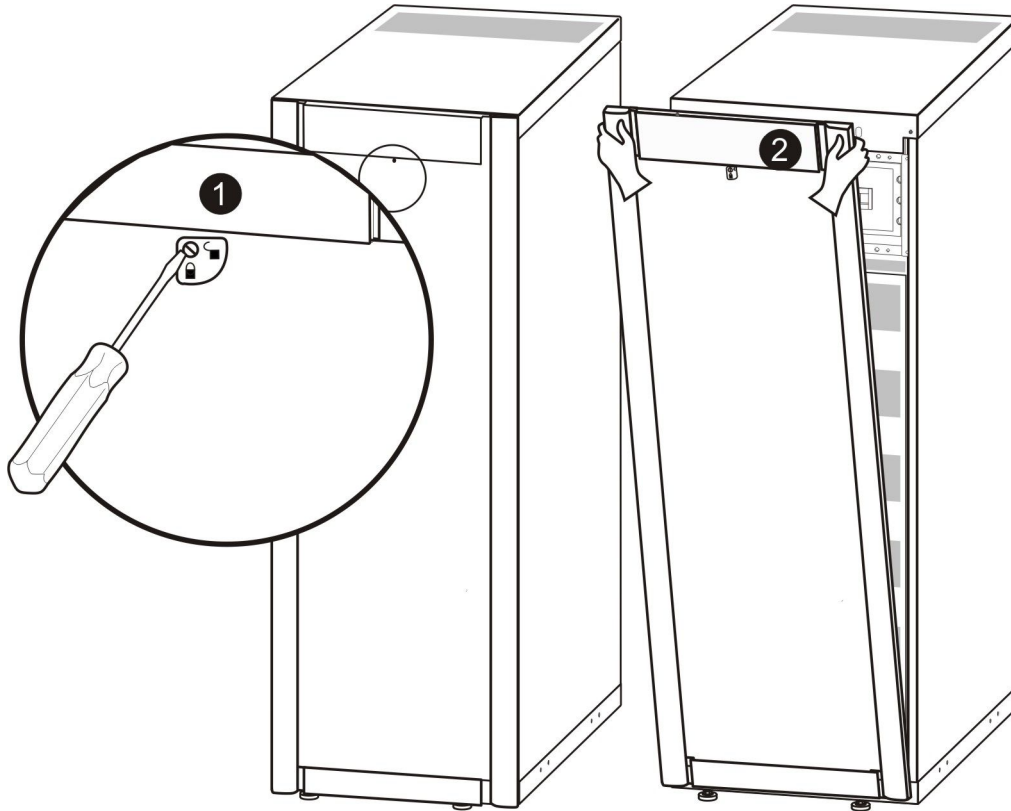
1. Take the 13/14 mm wrench attached to the pallet.
2. Adjust the four leveling feet and ensure that the system is level.



**Note:** Do not move the cabinet after the leveling feet have been lowered.



## Remove the Front Panel



1. Turn the screw to the right to the unlocked position.
2. Pull the top of the front panel away from the UPS.
3. Lift the front panel free of the two slots at the bottom of the enclosure.
4. Lift the battery compartment cover free of the two slots at the bottom of the enclosure (only applicable in Japanese configurations).

## Floor Anchoring

There are two floor anchoring options that can be used depending on the requirements in the installation area:

- For stability: Reuse the L-shaped brackets that secured the enclosure to the pallet during shipment for a stand-alone UPS.
- For seismic anchoring: Use a baying kit that includes U-shaped seismic anchoring brackets.



**Note:** Allow for enough working space behind the enclosure for electrical work to be carried out (e.g. if you want to install an XR Battery Enclosure at a later stage). Minimum rear clearance is 100 mm (3.93 in) and must comply with applicable national and local codes. 600 mm (23.6 in) is recommended.



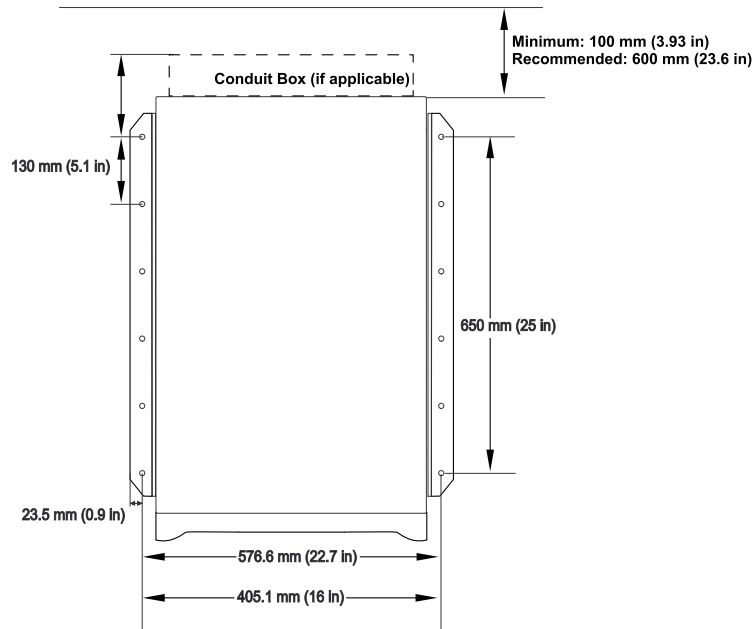
**Note:** Hole positions are guidelines only.

## Hole Positions for a Stand-alone UPS Enclosure with L-shaped Anchoring Brackets



**Note:** Recommended minimum number of screws per enclosure for the L-shaped brackets is four; one in each corner. Recommended floor bolt size: M8.

**Model Width: 352 mm (13.85 in) and 523 mm (20.59 in)**

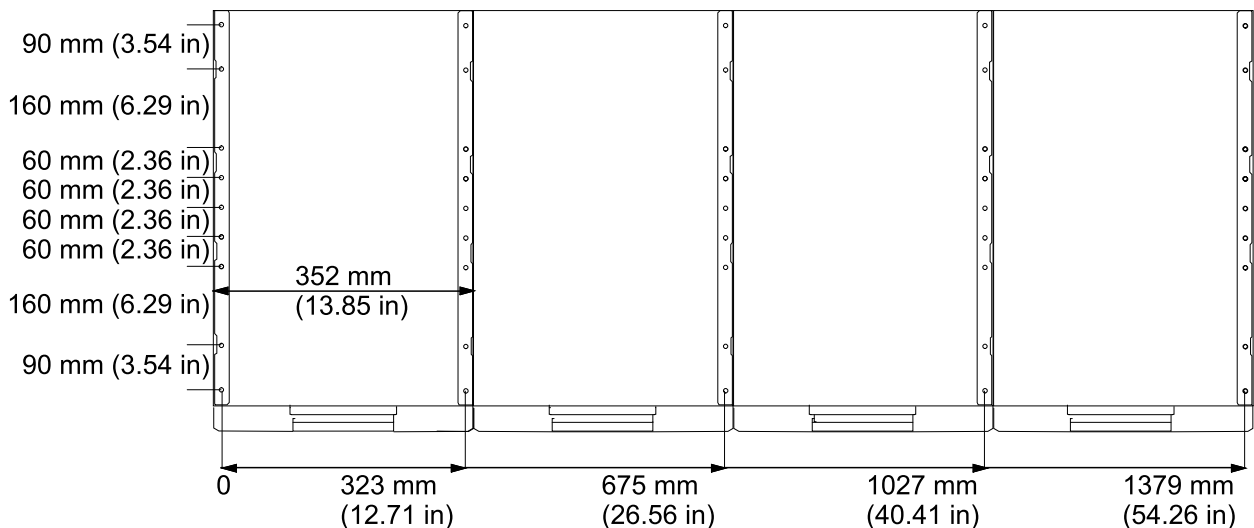


## Hole Positions for Up to Four UPS Units in Parallel with U-shaped Anchoring Brackets

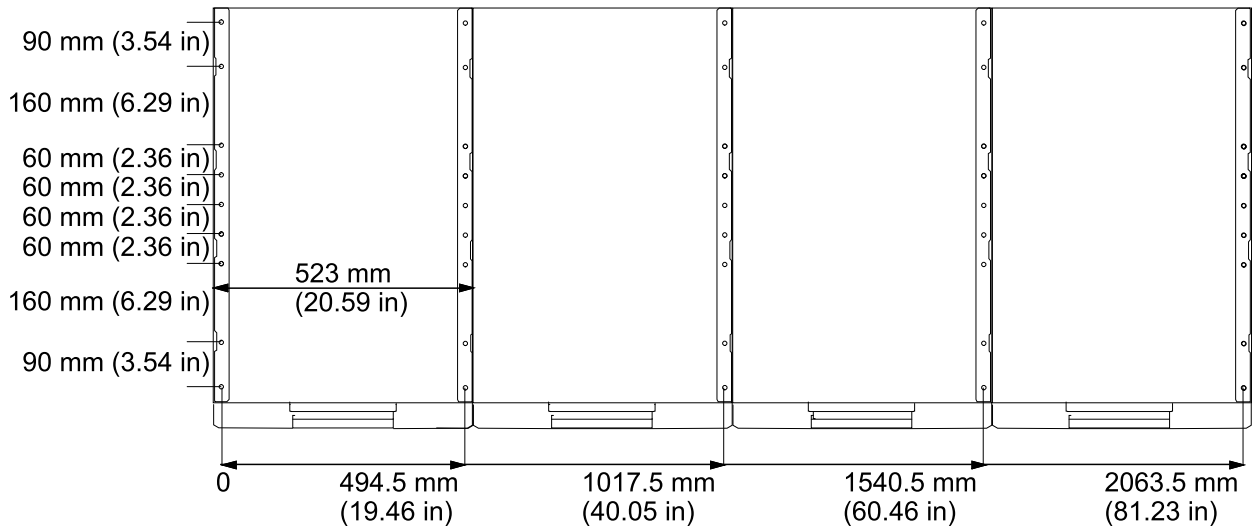


**Note:** Recommended minimum number of floor screws for the two configurations below is 10.

**Model Width: 352 mm (13.85 in)**



## Model Width: 523 mm (20.59 in)

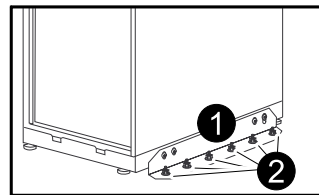


## Connect Floor Anchoring Brackets to the UPS and XR Battery Enclosure for Stability



**Note:** Floor anchoring bolts are not provided with the UPS. Purchase the bolts locally (minimum size: M8). Follow the specifications given by the manufacturer of the floor anchoring system when bolting the UPS system to the floor.

1. Install the L-shaped floor anchoring brackets (reuse the two transport brackets) and secure with the M6 screws and nuts (provided).
2. Drill two to six holes in the floor for each bracket and attach these with bolts.





## Remove the Battery Modules



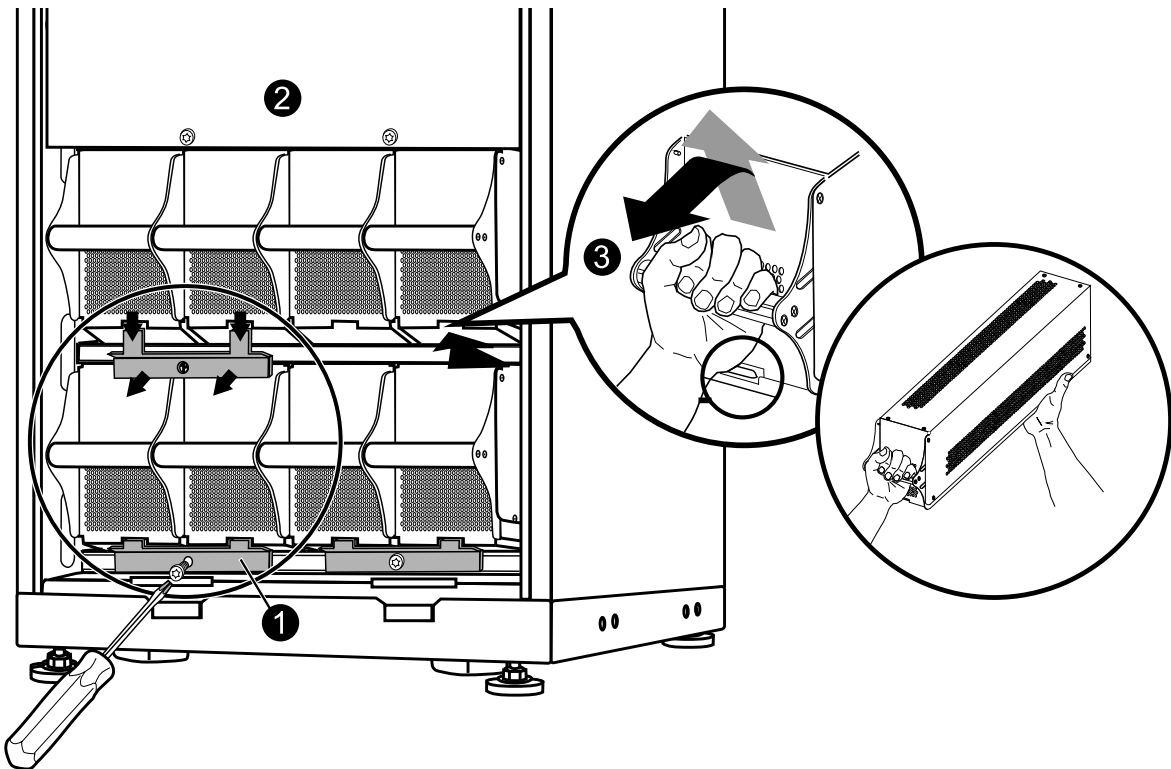
**Note:** Two people are needed to lift the battery modules.



**Note:** The XR Battery Enclosures ship with two battery modules. All battery modules in the UPS and the XR Battery Enclosure(s) must be removed before interconnecting these enclosures.



**Note:** When you remove battery modules, start from the highest row and work your way down.



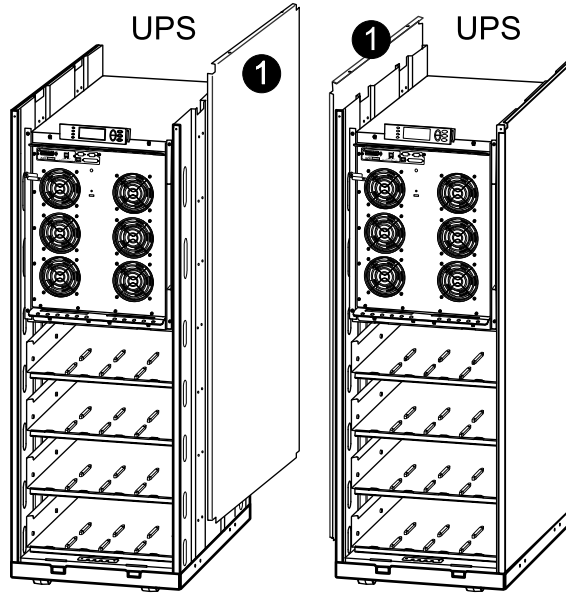
1. Remove all battery securing brackets (used to secure the batteries during transport) by removing the M6 Torx screws.
2. Remove the blind plate.
3. To release the battery from its lock mechanism, gently push the battery upwards and then pull it out while supporting the battery with your other hand.

# Install the Baying Kit (Optional) for Interconnection of Enclosures and Seismic Anchoring



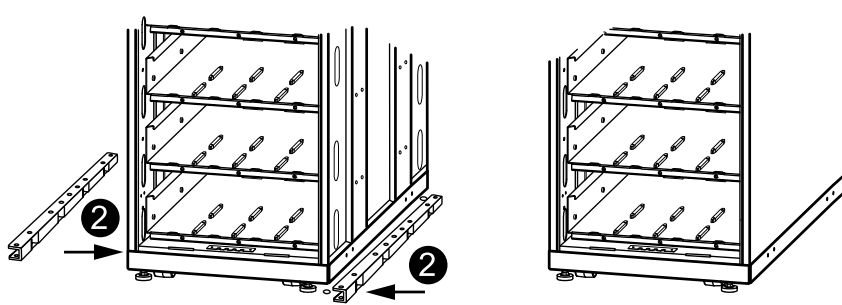
**Caution:** Baying kits are required in seismic areas.

1. Remove the side panels from the enclosure(s) to get access to the holes in the bottom frame.



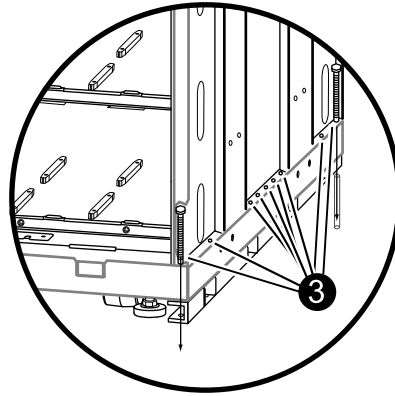
**Note:** Make sure that the enclosures are level so that they can be anchored to each other.

2. Position two U-shaped floor anchoring brackets under one enclosure; one on each side.

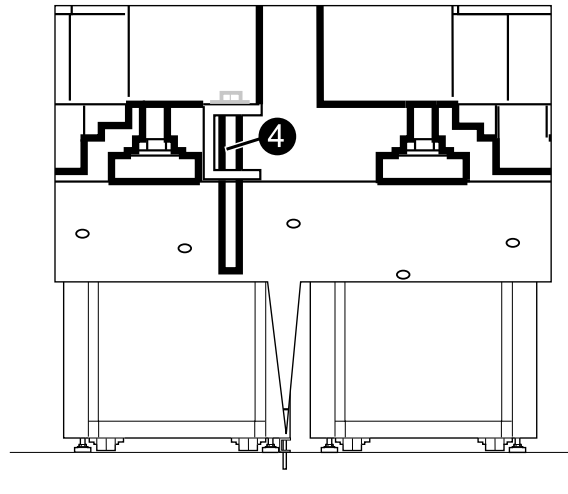


**Note:** The U-shaped anchoring brackets are 1-2 mm higher than the opening below the enclosure to inactivate the casters. Therefore, the enclosure must be tilted when placing the U-shaped anchoring brackets under the enclosure.

3. On each side of the same enclosure insert a maximum of nine and a minimum of two M8 screws (not provided) through holes in the bottom of the enclosure and through holes in the U-shaped floor anchoring brackets, and into the pre-drilled floor holes.



4. Fasten the screws.

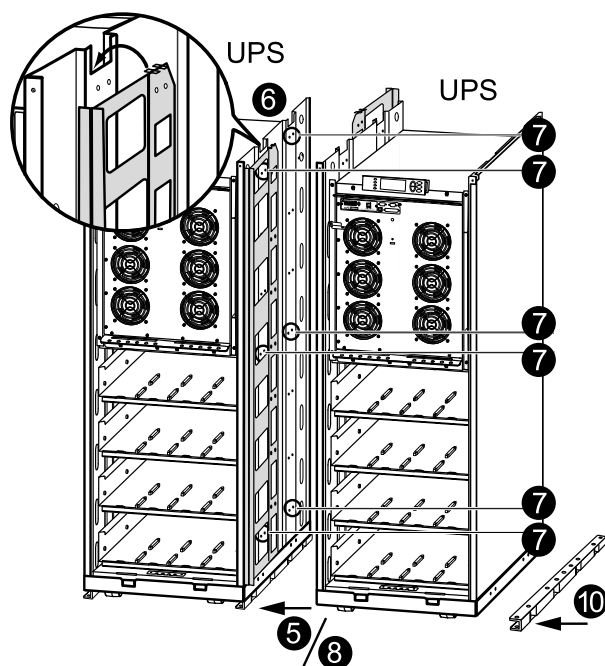


5. Move the adjacent enclosure on its casters close to the enclosure with the U-shaped floor anchoring brackets.

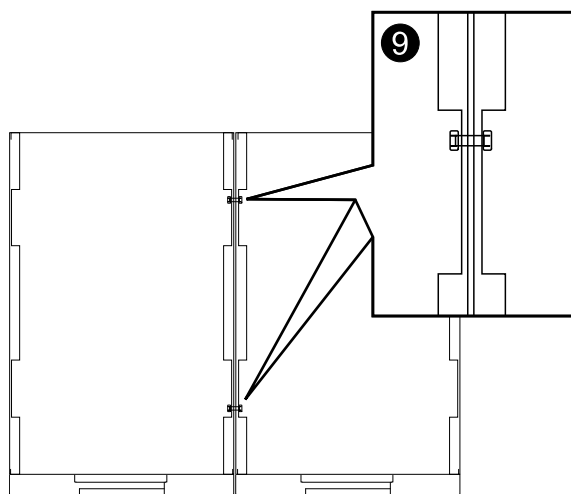


**Note:** If the adjacent enclosure is on its leveling feet, use a forklift or pallet jack to move it into position to avoid damaging the leveling feet.

6. Insert the interconnection plates between the two enclosures. One is positioned toward the front and the other toward the rear. Notice how the “wings” on the interconnection plates rest in slots at the top of the inner panel.



7. Align the two enclosures and level the three marked rows of bolt holes in UPS 1 with the holes in UPS 2.
8. Push the two enclosures firmly together.
9. Bolt the two enclosures together using the six M6x25 mm screws and nuts supplied in the kit; join one hole at the front and one hole at the rear of the enclosures on three levels.



10. Position the third U-shaped floor anchoring bracket under the adjacent enclosure (see previous graphics) and insert a minimum of two floor anchoring M8 screws (not provided) through the holes in the bottom of the enclosure and through the holes in the U-shaped floor anchoring bracket, and into the predrilled floor holes, and then fasten the screws.

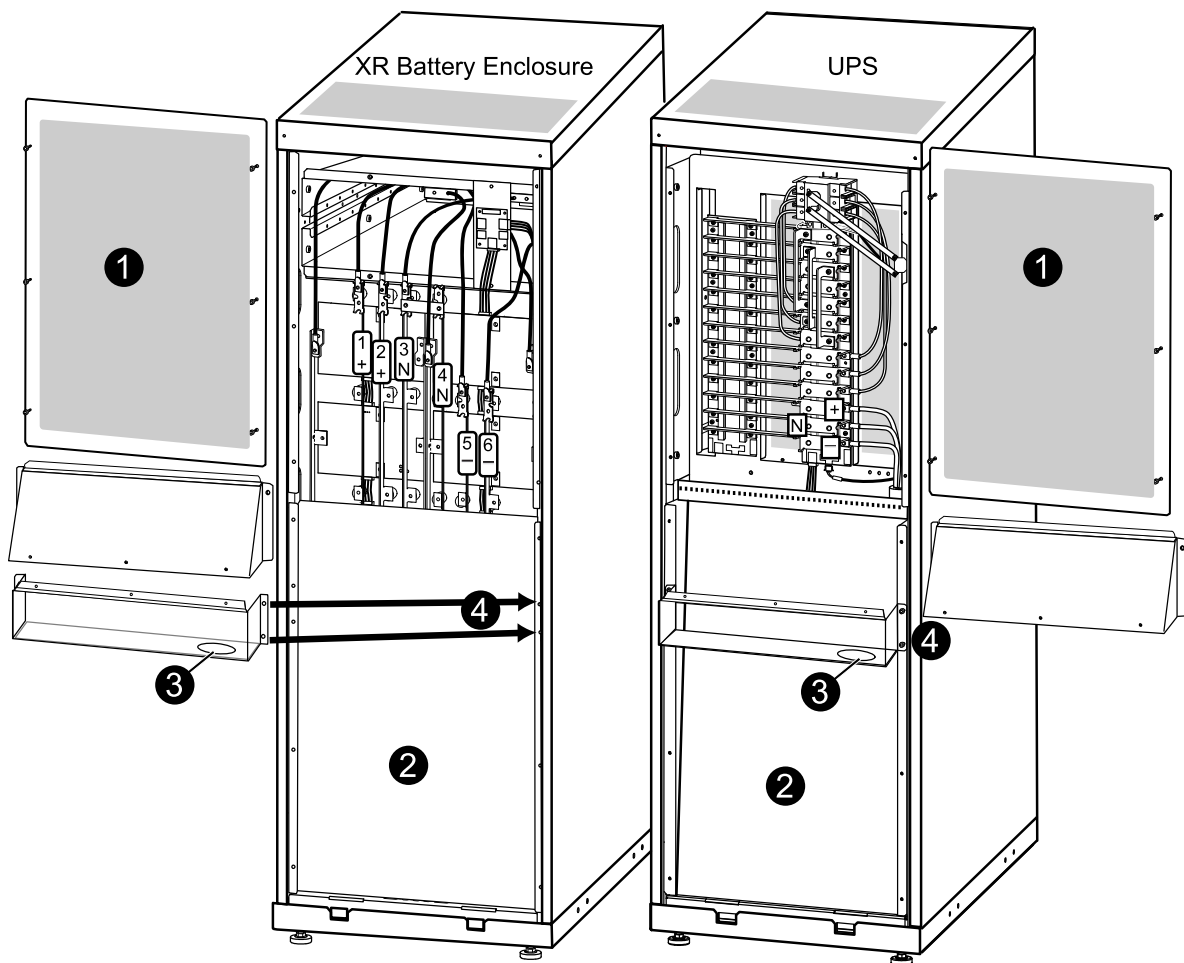
# Install XR Battery Enclosures (Option)

## Remove the Cable Landing Cover and Bottom Plates



**WARNING:** Before carrying out the steps below, the system must be in total power off and the batteries must be removed.

To access the cable landing area in the UPS and the XR Battery Enclosure(s), follow this procedure:



1. Loosen the six M4 screws from the cable landing cover plate on the UPS and the XR Battery Enclosure(s) and then remove the plates.
2. In installations with busbar connections, remove the screws from the bottom plate on the UPS and the XR Battery Enclosure(s) and then remove the plates.
3. Punch holes in the bottom of the conduit boxes to fit the size of the conduit pipes.
4. Attach the bottom part of the conduit boxes to the back of the UPS and to the back of the XR Battery Enclosure with four screws each (if applicable).

# Connect Battery Power in Installations with Busbars

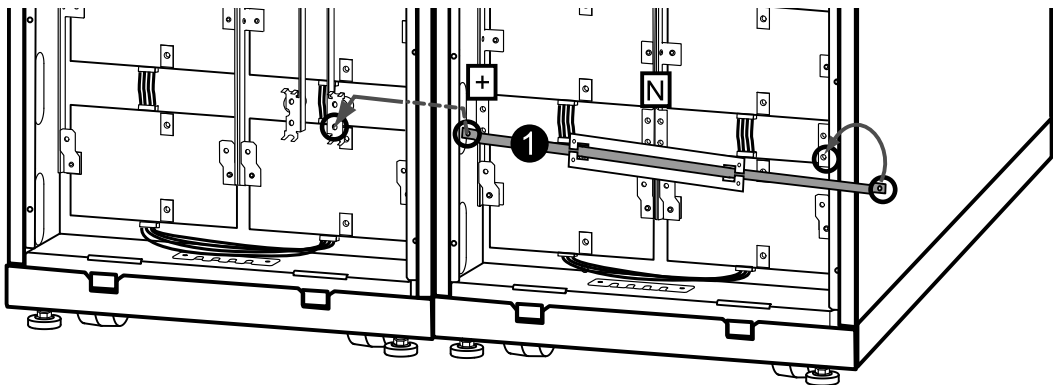


**WARNING:** Before carrying out the steps below, the system must be in total power off and the batteries must be removed.

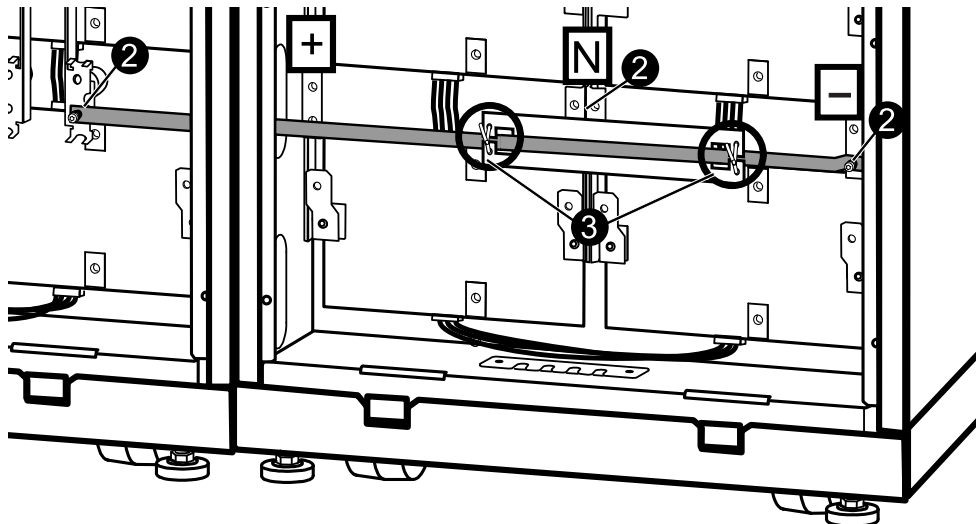
## Isolator Installation Principle

The isolators separate the baying kit busbar from the six vertical busbars in each XR Battery Enclosure, and the (+), N, and (-) busbars in the UPS.

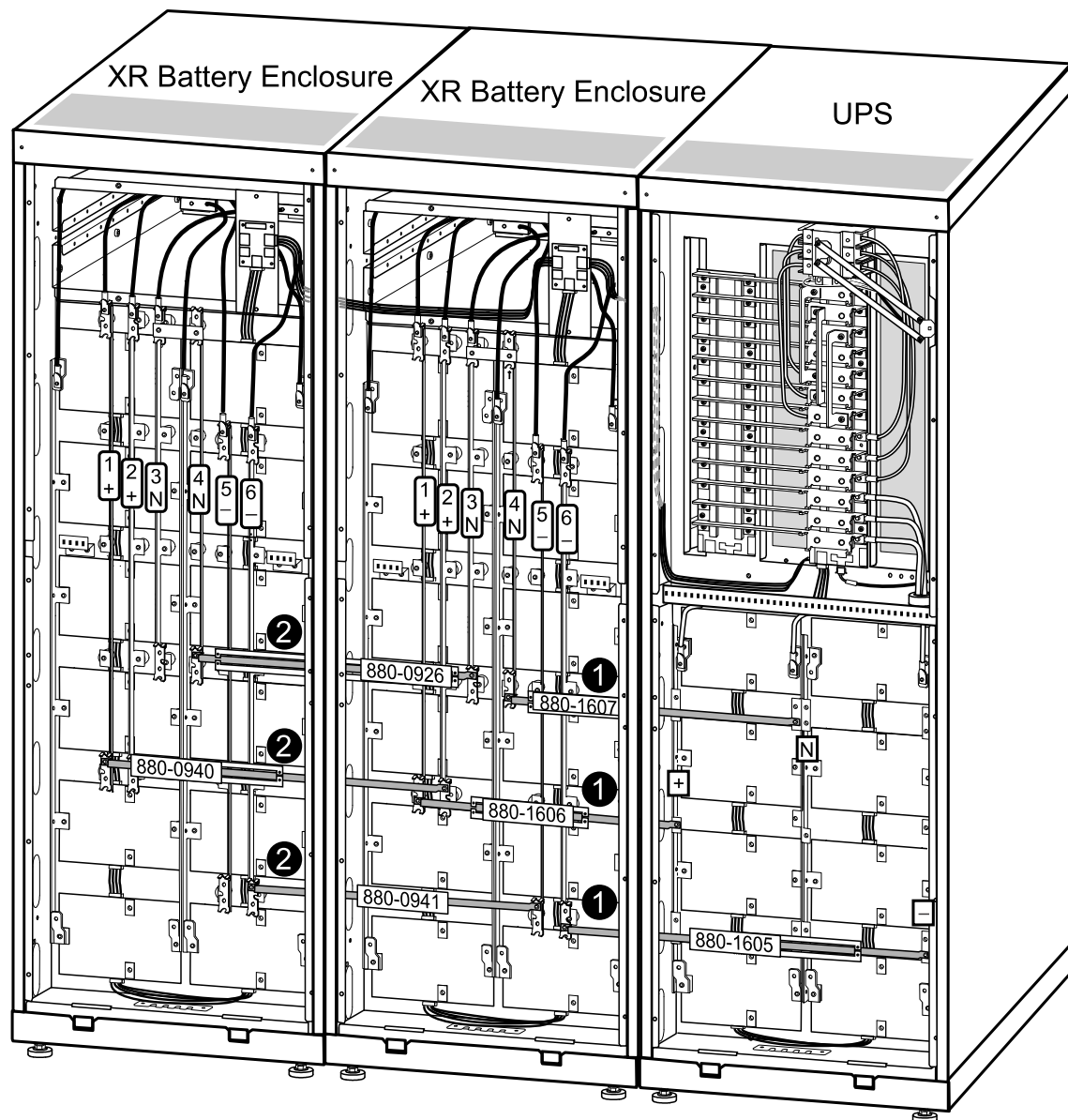
1. Guide the busbar with isolator through the adjacent side panels.



2. Position the isolators across the vertical busbars (N in this example) and then fasten the isolator busbar by using the provided M5 Torx screws.
3. Secure the isolator to its busbar with cable ties.

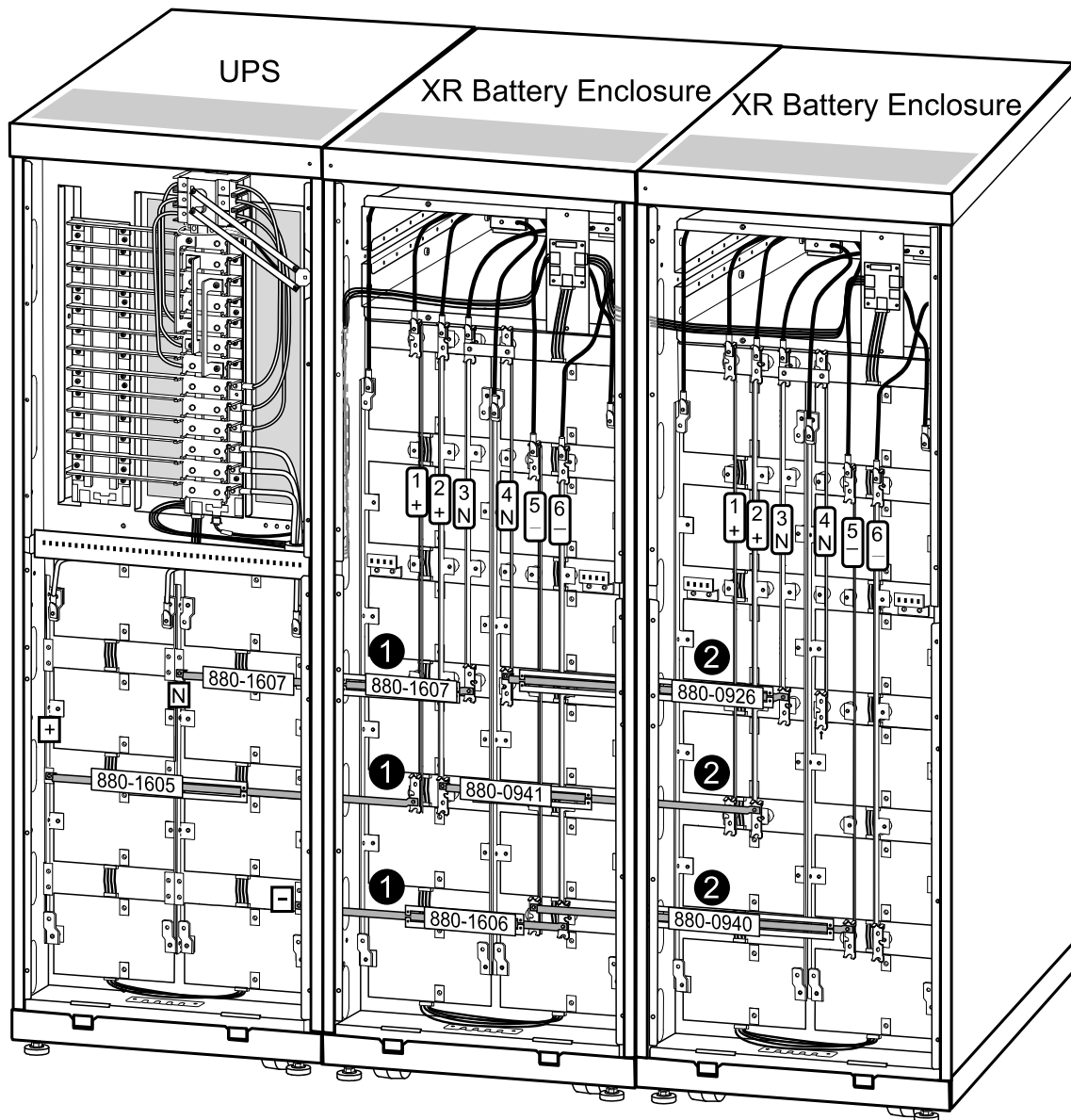


## Install Busbars in 523 mm (20.59 in) UPS System with the UPS Placed to the Left (seen from the front)



1. Install the following buying kit busbars between the UPS and XR1:
  - 880-1607 between vertical busbar N on the UPS and busbar 4 on XR1
  - 880-1606 between vertical busbar (+) on the UPS and busbar 1 on XR1
  - 880-1605 between busbar (-) on the UPS and busbar 6 on XR1
2. Install the following buying kit busbars between the two XR Battery Enclosures:
  - 880-0926 between vertical busbar 3 on XR1 and busbar 4 on XR2
  - 880-0940 between vertical busbar 2 on XR1 and busbar 1 on XR2
  - 880-0941 between vertical busbar 5 on XR1 and busbar 6 on XR2

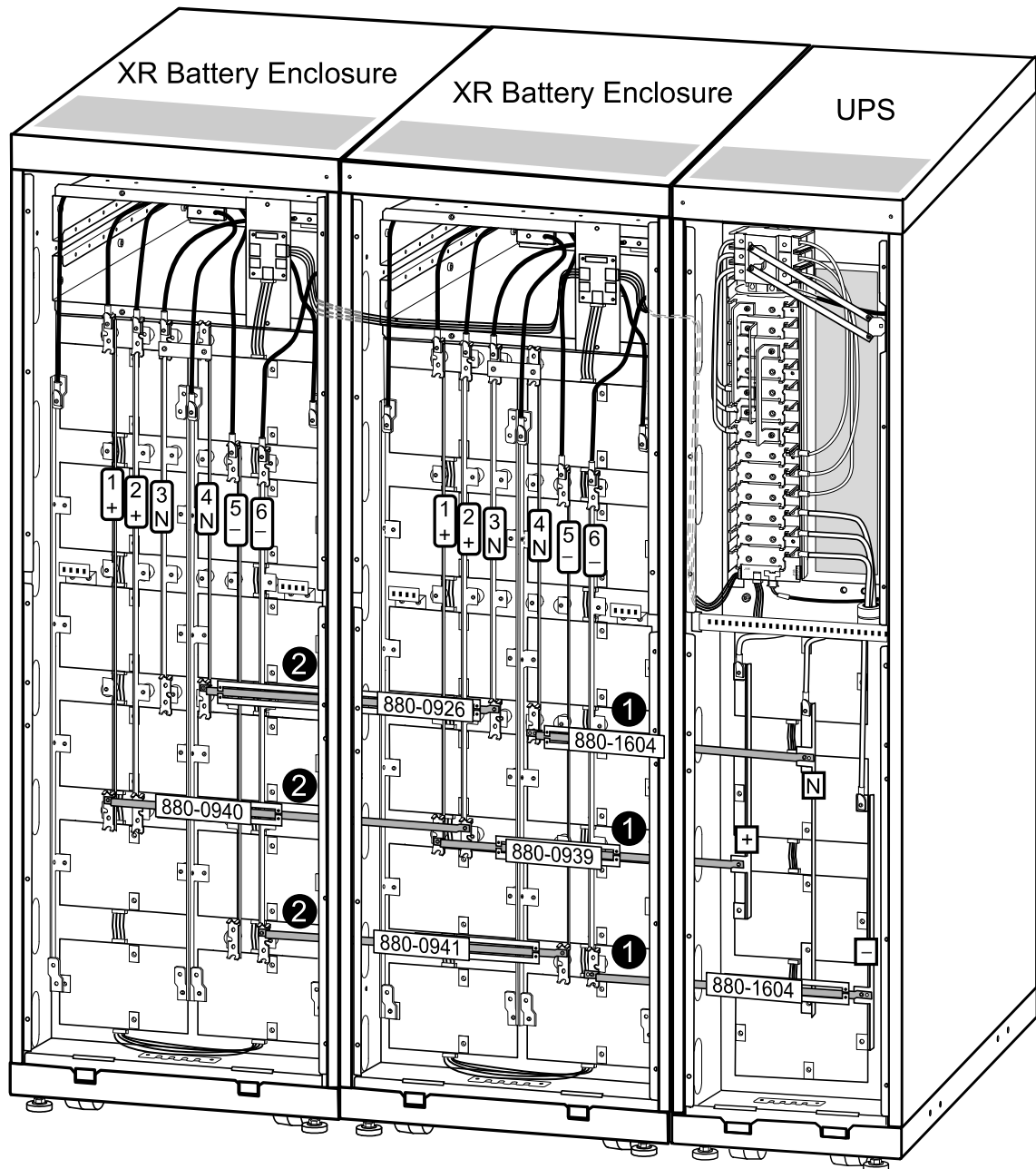
## Install Busbars in 523 mm (20.59 in) UPS System with the UPS Placed to the Right (seen from the front)



1. Install the following buying kit busbars between the UPS and XR1:
  - 880-1607 between vertical busbar N on the UPS and busbar 3 on XR1
  - 880-1605 between vertical busbar (+) on the UPS and busbar 1 on XR1
  - 880-1606 between vertical busbar (-) on the UPS and busbar 6 on XR1
2. Install the following buying kit busbars between the two XR Battery Enclosures:
  - 880-0926 between vertical busbar 4 on XR1 and vertical busbar 3 on XR2
  - 880-0941 between vertical busbar 2 on XR1 and vertical busbar 2 on XR2
  - 880-0940 between vertical busbar 5 on XR1 and vertical busbar 5 on XR2

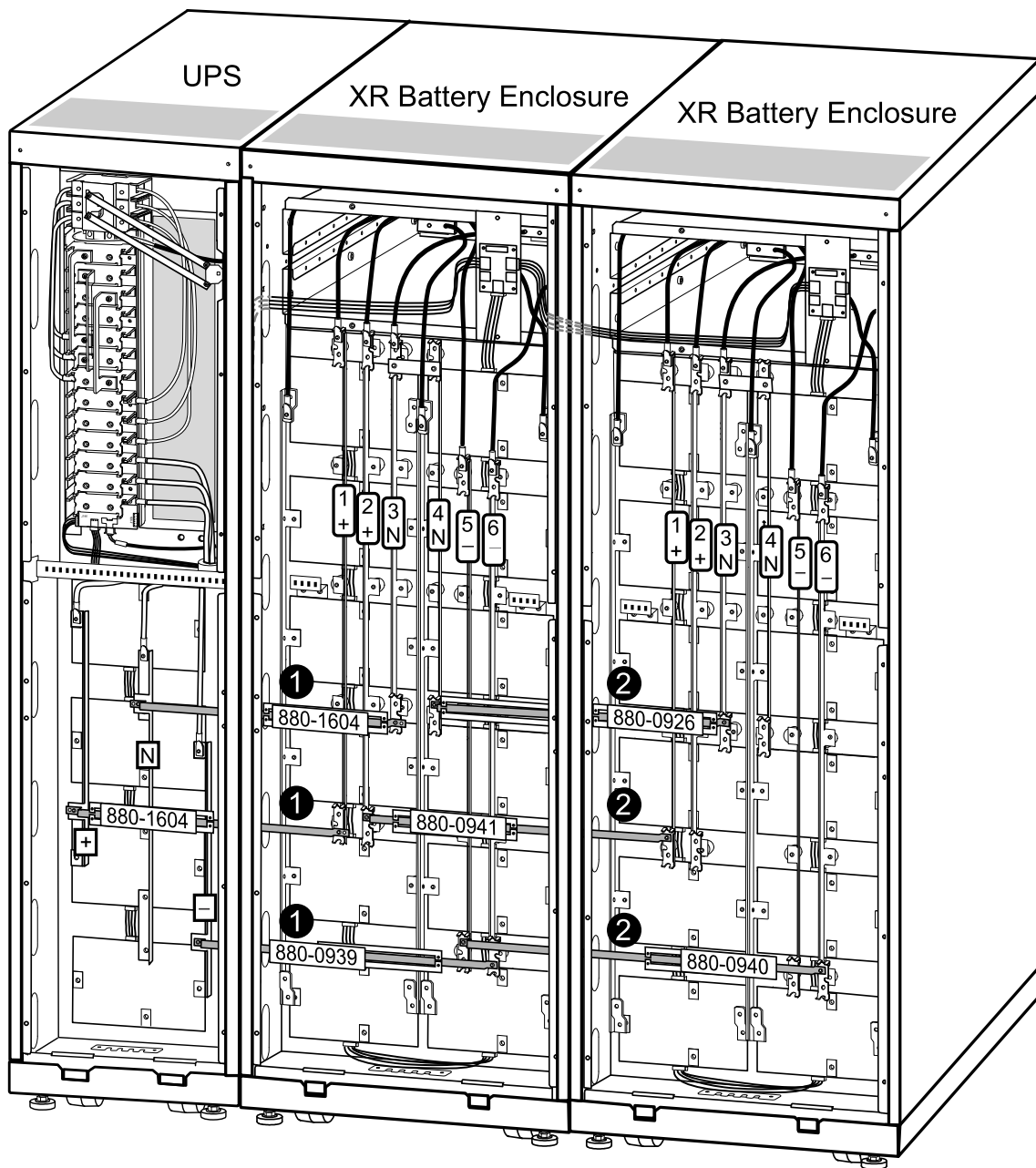


## Install Busbars in 352 mm (13.85 in) UPS System with the UPS Placed to the Right (seen from the front)



1. Install the following buying kit busbars between the UPS and XR1:
  - 880-1604 between vertical busbar N on the UPS and busbar 4 on XR1
  - 880-0939 between vertical busbar (+) on the UPS and busbar 1 on XR1
  - 880-1604 between vertical busbar (-) on the UPS and busbar 6 on XR1
2. Install the following buying kit busbars between two XR Battery Enclosures:
  - 880-0926 between vertical busbar 3 on XR1 and busbar 4 on XR2
  - 880-0940 between vertical busbar 2 on XR1 and busbar 1 on XR2
  - 880-0941 between vertical busbar 5 on XR1 and busbar 6 on XR2

## Install Busbars in 352 mm (13.85 in) UPS System with the UPS Placed to the Left (seen from the front)



1. Install the following buying kit busbars between the UPS and XR1:
  - 880-1604 between vertical busbar N on the UPS and busbar 3 on XR1
  - 880-1604 between vertical busbar (+) on the UPS and busbar 1 on XR1
  - 880-0939 between vertical busbar (-) on the UPS and busbar 6 on XR1
2. Install the following buying kit busbars between two XR Battery Enclosures:
  - 880-0926 between vertical busbar 4 on XR1 and vertical busbar 3 on XR2
  - 880-0941 between vertical busbar 2 on XR1 and vertical busbar 1 on XR2
  - 880-0940 between vertical busbar 5 on XR1 and vertical busbar 6 on XR2



1. In the UPS, feed the cable up through the conduit box or through the transparent cable route bracket (not shown).
2. Connect the BAT+, BAT-, N, and ground cables to the busbars in the UPS.
3. Secure the cables to the perforated bracket with cable ties.
4. Equip the cable with conduits (if applicable).
5. In the XR Battery Enclosure, feed the cable up through the conduit box (if applicable) to the cable landing area.
6. Connect the (+) cable to busbar no. 1 (+), connect the N cable to busbar no. 4 (N), the (-) cable to busbar no. 6 (-), and the ground cable to the terminal in the top of the cabinet. Bundle the cables using the supplied cable ties.
7. Secure the cable to the perforated bracket with cable ties.
8. Attach the top part of the conduit box (if applicable).

## Connect Power Cables between Two XR Battery Enclosures



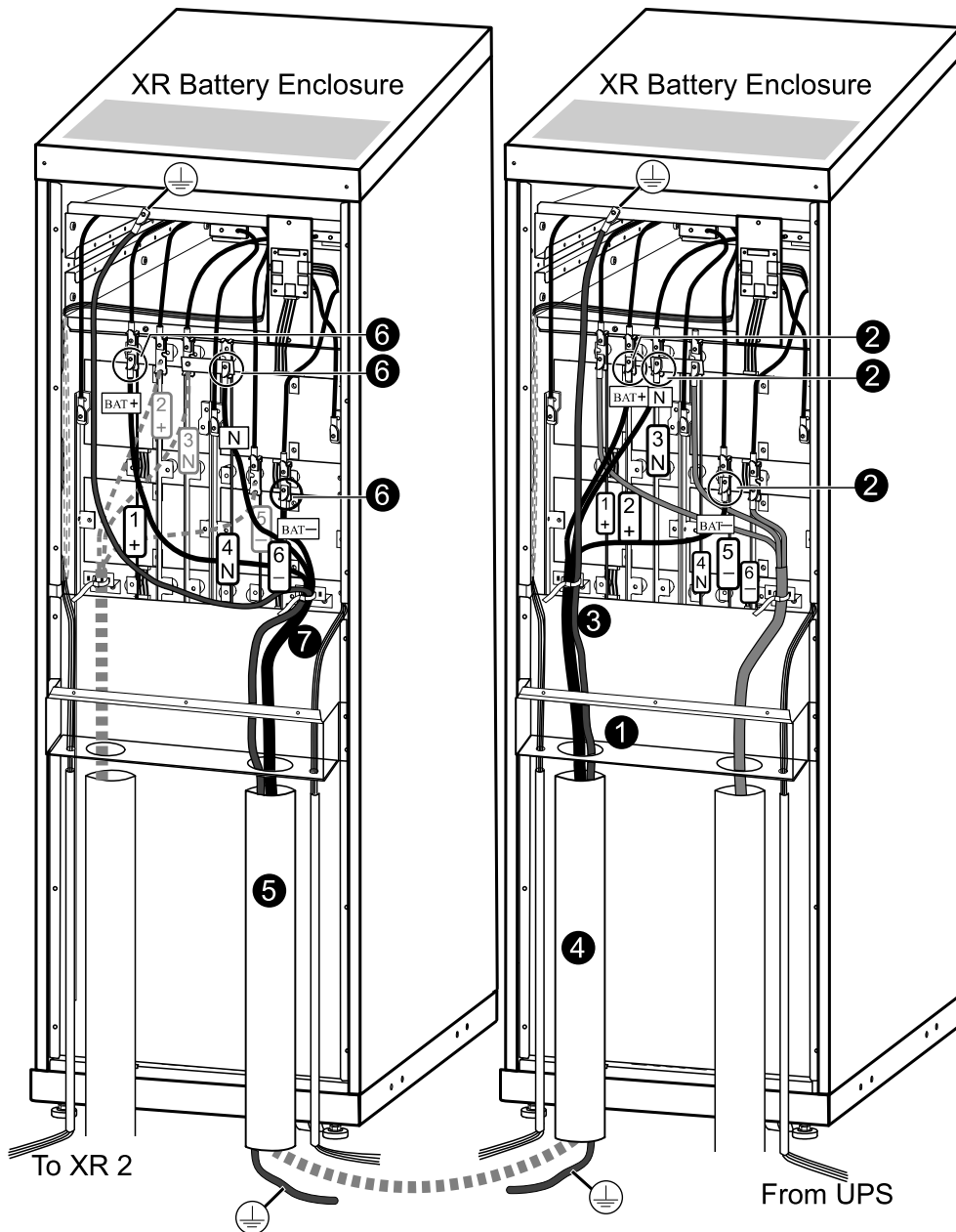
**WARNING:** Before carrying out the steps below, the system must be in total power off and the batteries must be removed.



**WARNING:** Each freestanding cabinet must be separately connected to the equipotential bonding system (protective earthing).



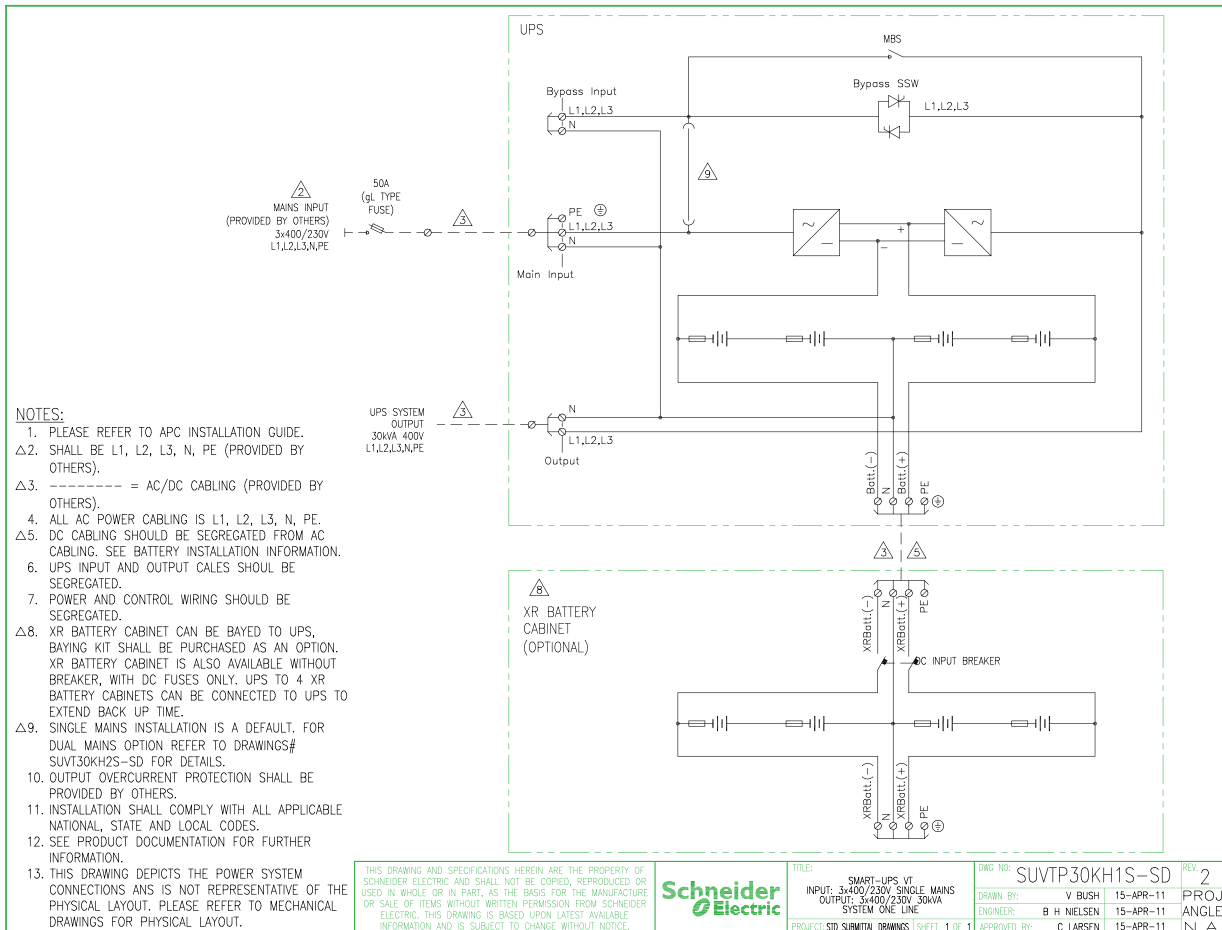
**Note:** The terminals are only suitable for connection of copper cables.



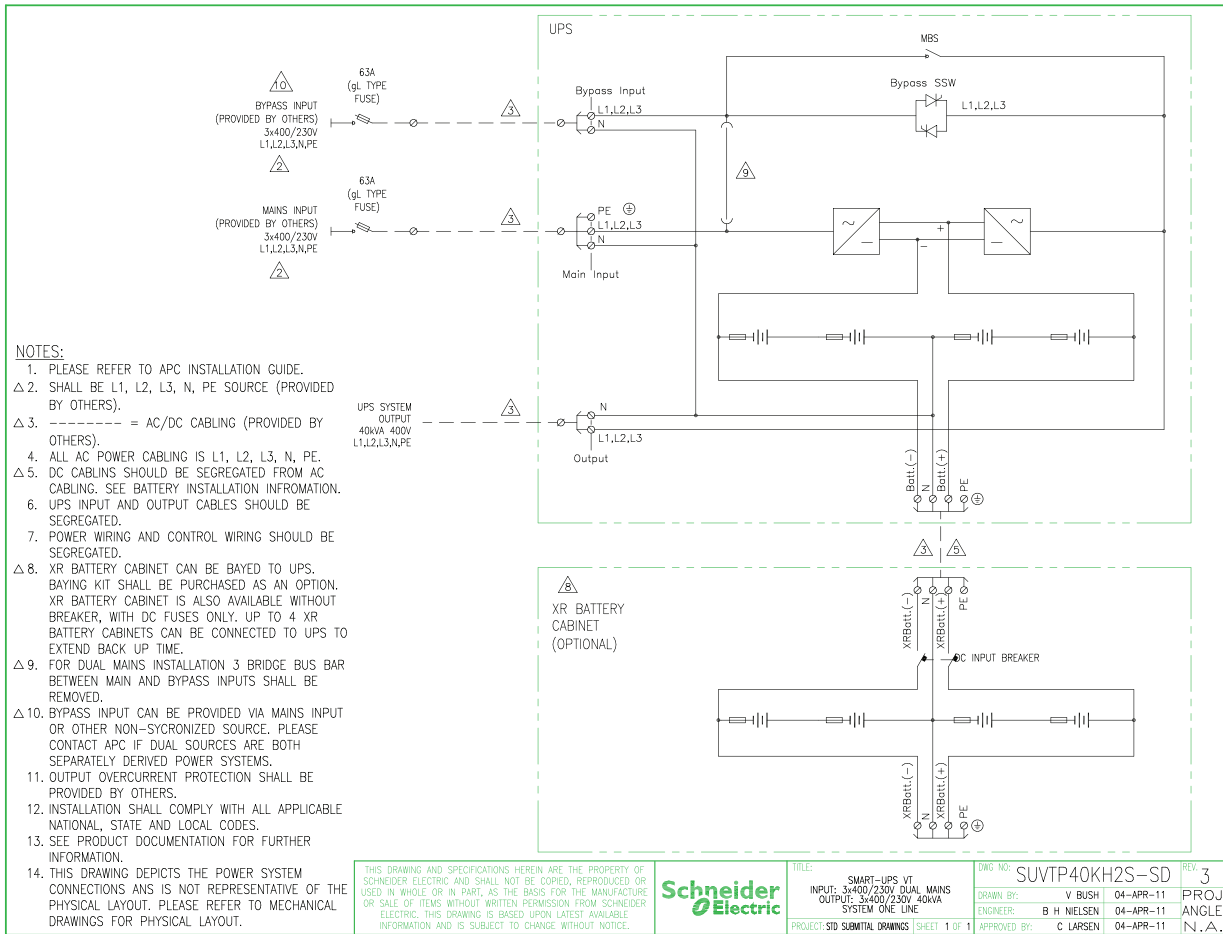
1. Feed the cable up through the conduit box on XR1 or through the transparent cable route bracket (not shown) to the cable connection area.
2. Connect the (-) cable to busbar no. 5 (-), the N cable to busbar no. 3 (N), the (+) cable to busbar no. 2 (+) in XR1, and the ground cable to the terminal in the top of the cabinet.
3. Secure the cable to the perforated bracket with cable ties.
4. Equip the cable with conduits (if applicable).
5. Feed the cable up into the conduit box (optional for 400 V versions) on XR2.
6. Connect the (-) cable to busbar no. 6 (-), the N cable to busbar no. 4 (N), and the (+) cable to busbar no. 1 (+) in XR2, and the ground cable to the terminal in the top of the cabinet. Bundle the cables using the supplied cable ties.
7. Secure the cable to the perforated bracket with cable ties.
8. Attach the top part of the conduit box (if applicable).

# Connect the Power Cables to the UPS

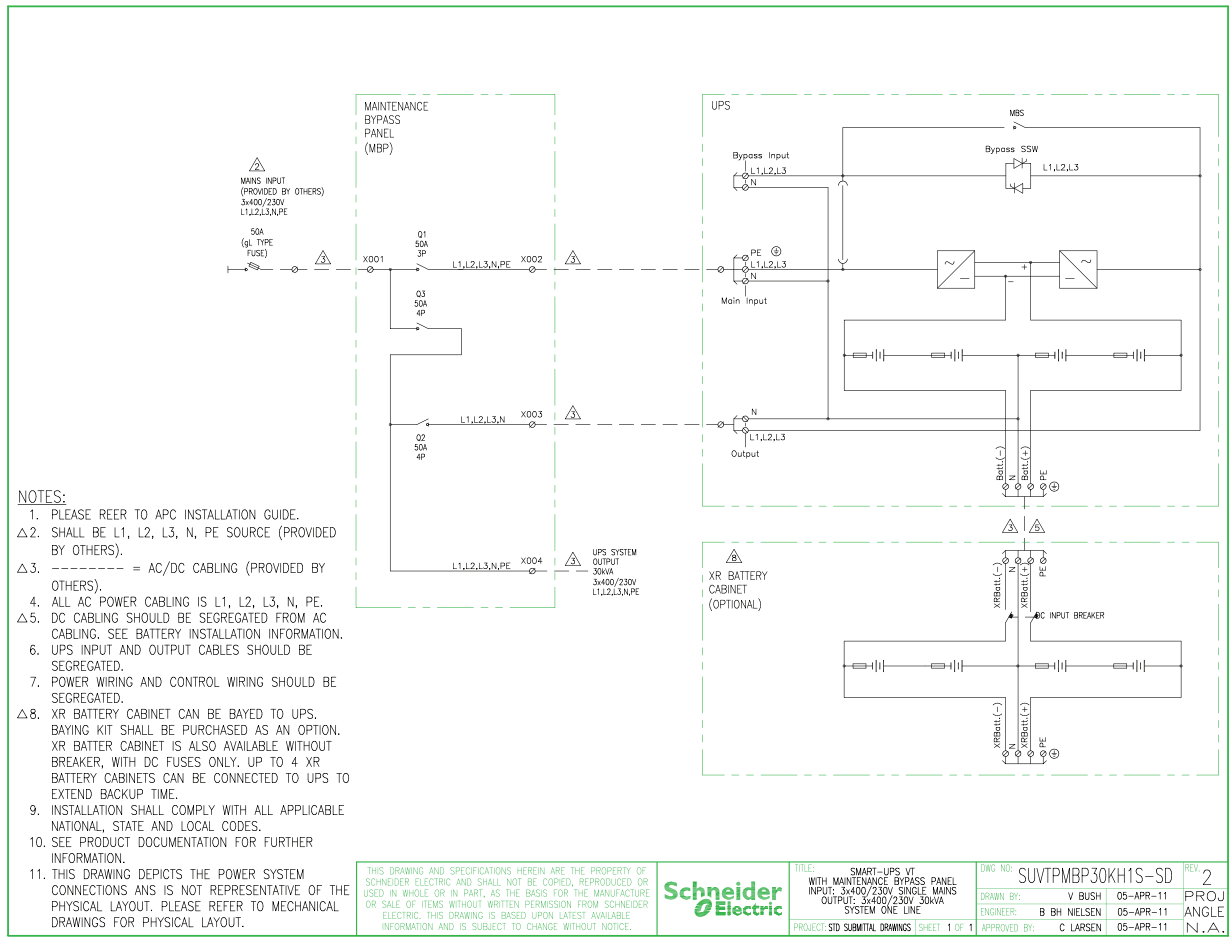
## Single Mains without MBP



# Dual Mains without MBP



# Single Mains with MBP

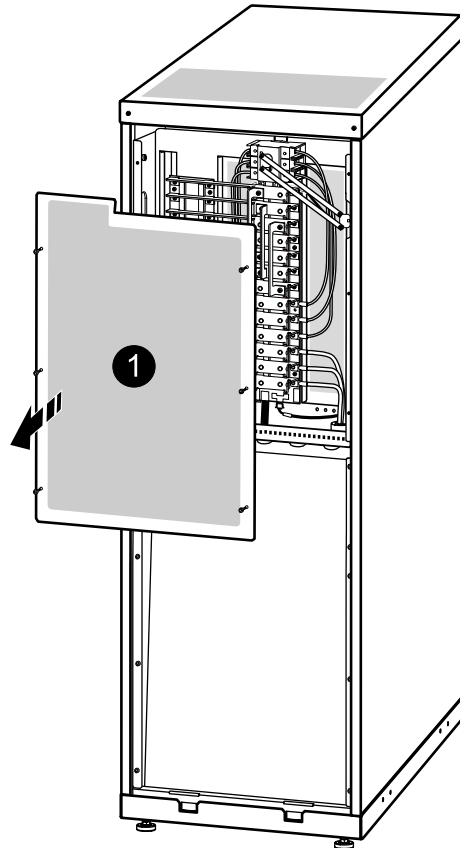




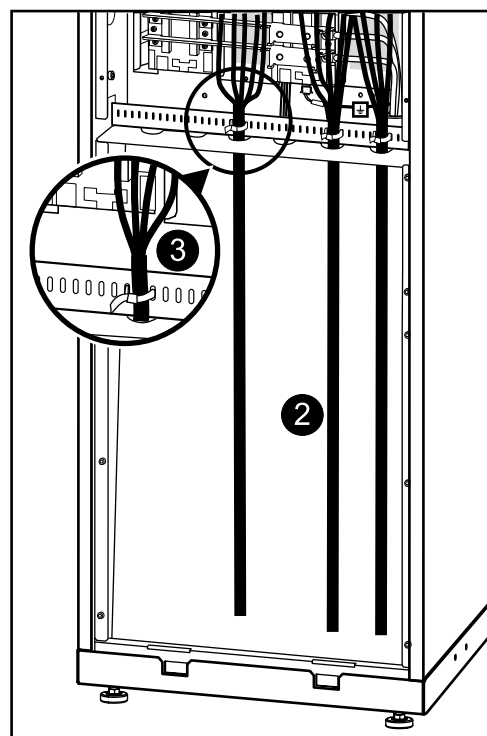
# Prepare for Cables

## Bottom Cable Entry

1. From the rear of the UPS, loosen the six M4 screws from the upper cover (the cable landing area) on the back and remove.



2. Route the cables from the slanted back plate, up through the punched bracket, and into the cable landing area.
3. Fasten the cables with cable ties.



**Note:** A conduit box (part no. SUVTOPT001 or SUVTOPT002) is available as an option.

# Connect the AC Input and AC Output Cables



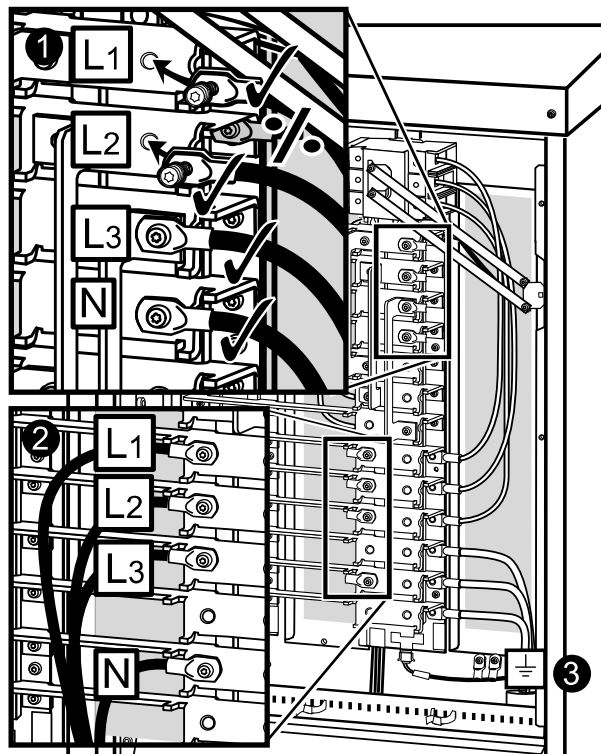
**WARNING:** Use **ONLY** compression type lugs. Do not loosen or add cables to any factory preinstalled cables on busbars. Use the upper front part of busbar for connection only.



**Note:** The terminals are only suitable for connection of copper cables.

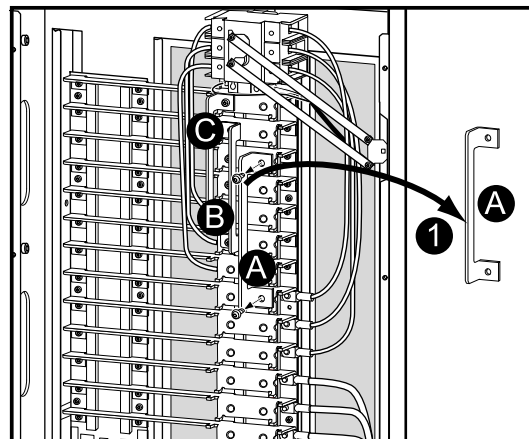
## Single Mains

1. Connect the AC input cables and the neutral to the input cable landings.
2. Connect the AC output cables and the neutral to the output cable landings.
3. Connect the ground cables to the studs (earth symbol beneath) using a screw.

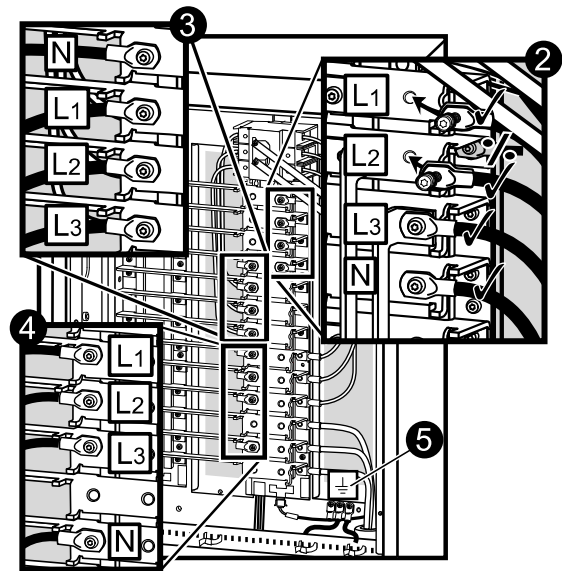


## Dual Mains

1. Remove the three busbars A, B, and C by removing two M6 screws from each busbar.

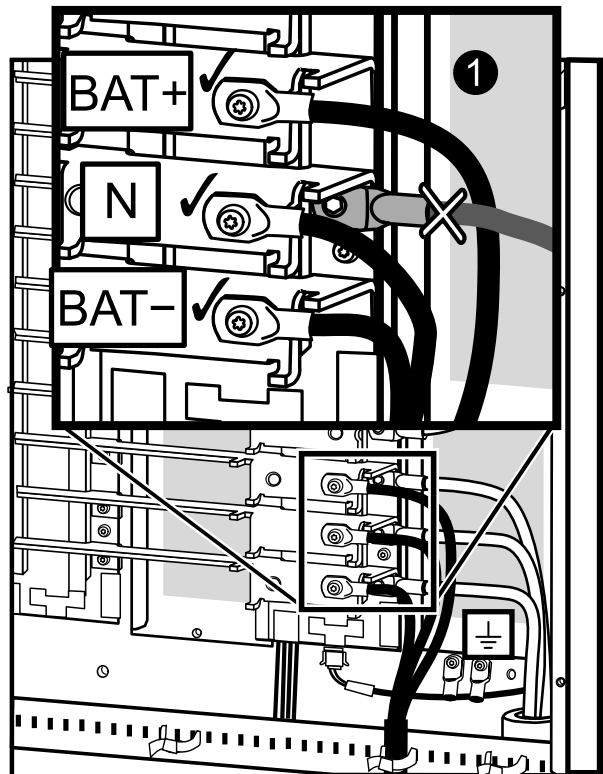


2. Connect the AC input cables and the neutral to the input cable landings.
3. Connect the bypass cables and the neutral to the bypass cable landings.
4. Connect the output cables and the neutral to the output cable landings.
5. Connect the ground cables to the studs (earth symbol beneath) using a screw.



### Connect the DC Battery Cables (if applicable)

1. Connect battery cables BAT+, BAT-, and N to the battery cable landings. Bundle the cables using the supplied cable ties.



# Connect the Communication Cables

---

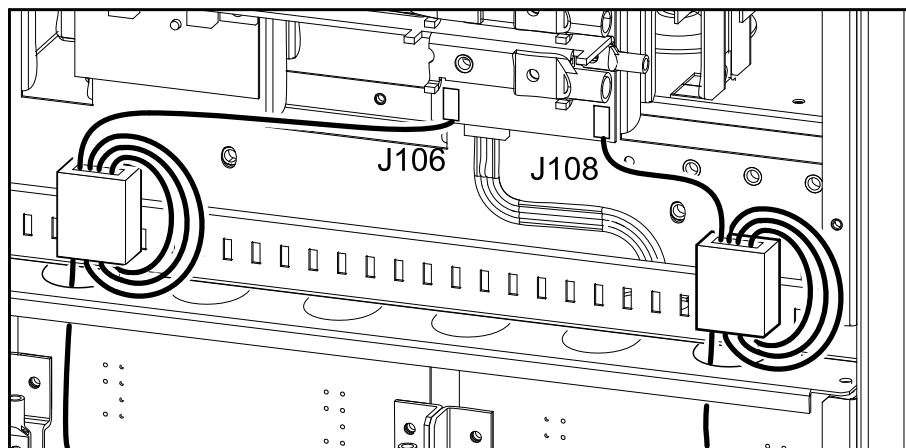
## Prepare for Communication Cables



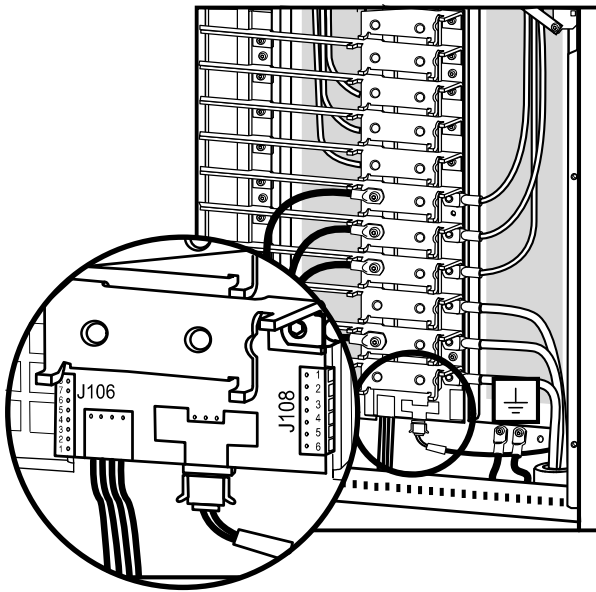
**WARNING:** Make sure that the UPS is completely OFF as the connectors are very close to the power busbars.



**WARNING:** Before connecting the communication cables, place the two supplied ferrites over the communication cables. Run the cable three times through the ferrite to reduce noise.



# Overview of Pin Connections



## J108 pin connections:

- 1: Normally open EPO
- 2: Normally open EPO return
- 3: Normally closed EPO
- 4: Normally closed EPO return
- 5: +24 V SELV supply
- 6: SELV ground

## J106 pin connections:

- 8: Ext. charging control return
- 7: External control of charging
- 6: Q3 active return
- 5: Q3 active
- 4: Battery measurement supply\*
- 3: Battery unit quantity\*
- 2: Max. battery temperature\*
- 1: Battery measurement return\*

\* Should be used with APC XR Battery Enclosures

## J106

Pins 1 to 4 are for battery measurement (only applicable to MGE Galaxy 3500 XR Battery Enclosures).

Pins 5 and 6 are for external maintenance bypass Q3 (auxiliary switch N/C type). When Q3 is closed, signals are fed back to the UPS controller.

Pins 7 and 8 are for external charge control. When 7 and 8 are closed, the UPS charges batteries with a pre-defined percentage (0–25–50–75–100%) of the maximum charging power. To be used in generator applications, or if special codes require control of charging. When Q3 is closed, signals are fed back to the UPS controller.

# EPO in Single Systems

Connect the EPO cable using one of the following four wiring configurations.



**Note:** Use only 1-1½ mm<sup>2</sup> copper wire for the connection of the Emergency Power Off (EPO) and other optional equipment.

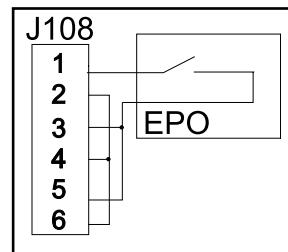


**Note:** The UPS must be connected to either a dry contact or a 24 VDC EPO (Emergency Power Off) switch.

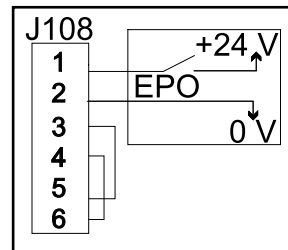


**Note:** The external EPO +24 VDC, 1500 mA circuit can be supplied through other vendors.

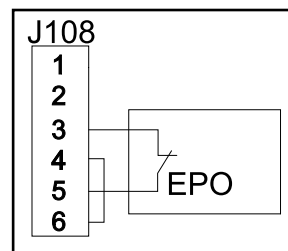
1. **Dry Contacts Normally Open:** EPO is activated when pin 1 is connected to pins 3 and 5. Connections: 2-4-6, 3-5, and 1 (Normally Open).



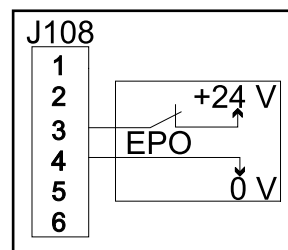
2. **+24 V Normally Open:** EPO is activated when an isolated SELV 24 VDC voltage is supplied on pin 1 with reference to pin 2. Connections: 3-5 and 4-6.



3. **Dry Contacts Normally Closed:** EPO is activated when a connection from pin 3 to 5 is opened. Connections: 4-6.



4. **+24 V Normally Closed:** EPO is activated when a SELV 24 VDC voltage is removed from pin 3 with reference to pin 4.



# EPO in Parallel Systems

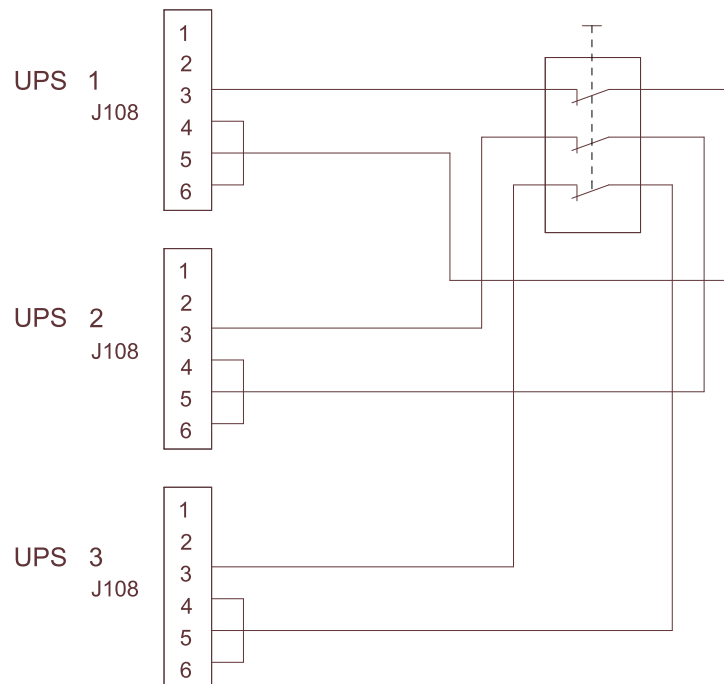
In parallel systems each UPS unit must have its own dry contact (voltage free) connected to J108. The drawing below shows a “Normally Closed” installation of three UPS units in parallel.



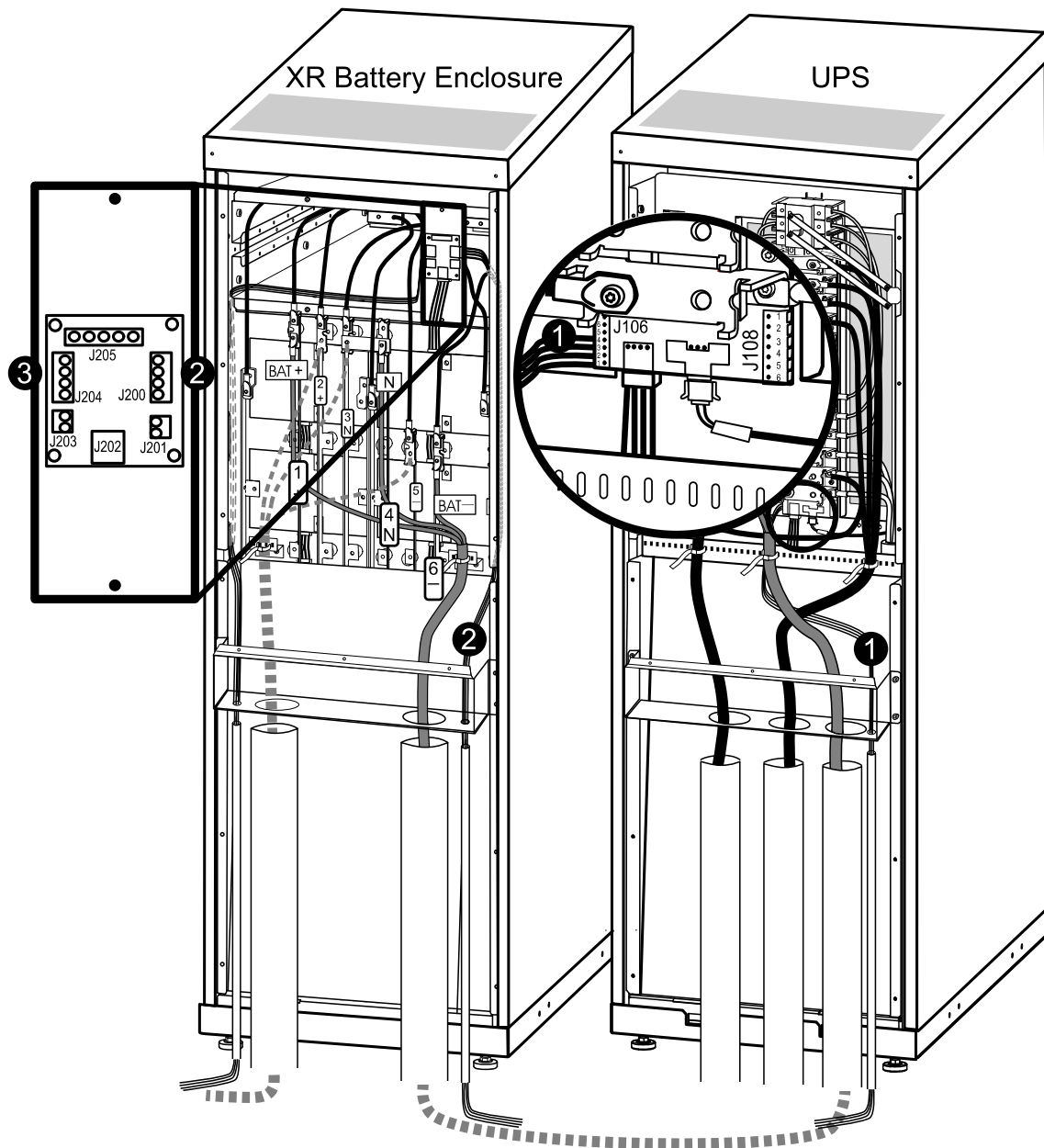
**WARNING: For parallel and separate systems with common EPO, each UPS unit must be connected to a separate dry contact.**



**WARNING: Parallel EPO wiring between more UPS units can result in critical UPS malfunctioning.**



# Connect Communication Cables between UPS and XR Battery Enclosure



1. Feed the cable from pin connection J106 in the UPS down through the conduit (if applicable).
2. Run the cable up into the XR conduit and connect it to pin connection J200 in the XR Battery Enclosure.
3. If you use a second XR, run the cable from pin connection J204 in XR1 to pin connection J200 in XR2.



# Connect APC Communication Options

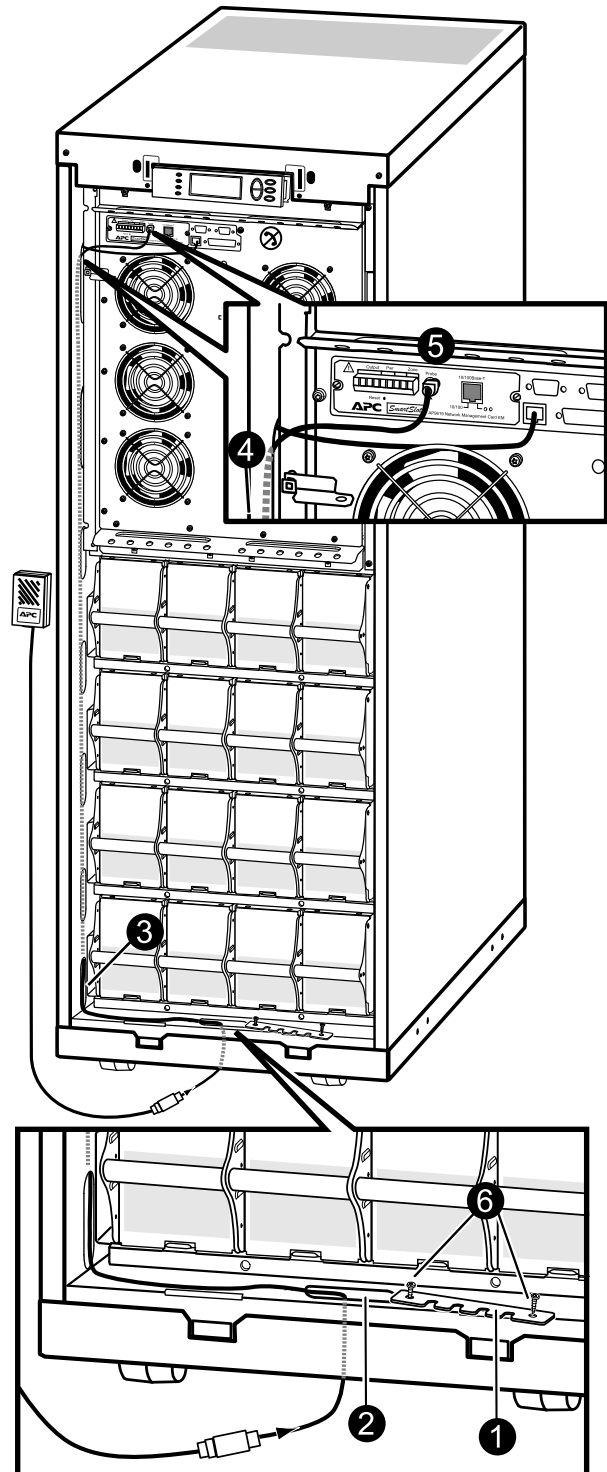


**Note:** The cable routing of the power chute software and the temperature sensor is identical.



**Note:** The temperature sensor is provided in a plastic bag attached to the front of the UPS behind the front panel.

1. Remove the two screws from the cable-inlet at the front and remove the cable-inlet plate.
2. Guide the cable through the hole in the bottom plate and up through the cable-inlet.
3. Guide the cable through the side panel hole and run the cable upwards inside the panel.
4. Pull the cable out of the side panel through the hole closest to the Network Management Card area.
5. Plug the cable into the probe socket / PowerChute inlet.
6. Reattach the cable-inlet plate.



# Connect Communication Cables in Parallel System



**Note:** The cables must be run by the electrician but not attached. The field service engineer from Schneider Electric will attach all cables to the UPS unit(s) and install the parallel communication box. The below is for overview only.



**Note:** The PBus cables run from UPS 1 to UPS 2 to UPS 3 and UPS 4 if your configuration consists of 4 UPS units.



**Note:** The PBus cables are labelled PBus 1 and PBus 2.

## Overview of the PBus Cables



**Note:** The cables must be run by the electrician but not attached. The field service engineer from Schneider Electric will attach all cables to the UPS unit(s) and install the parallel communication box. The below is for overview only.



**Note:** The PBus cables run from UPS 1 to UPS 2 to UPS 3 and UPS 4 if your configuration consists of 4 UPS units.



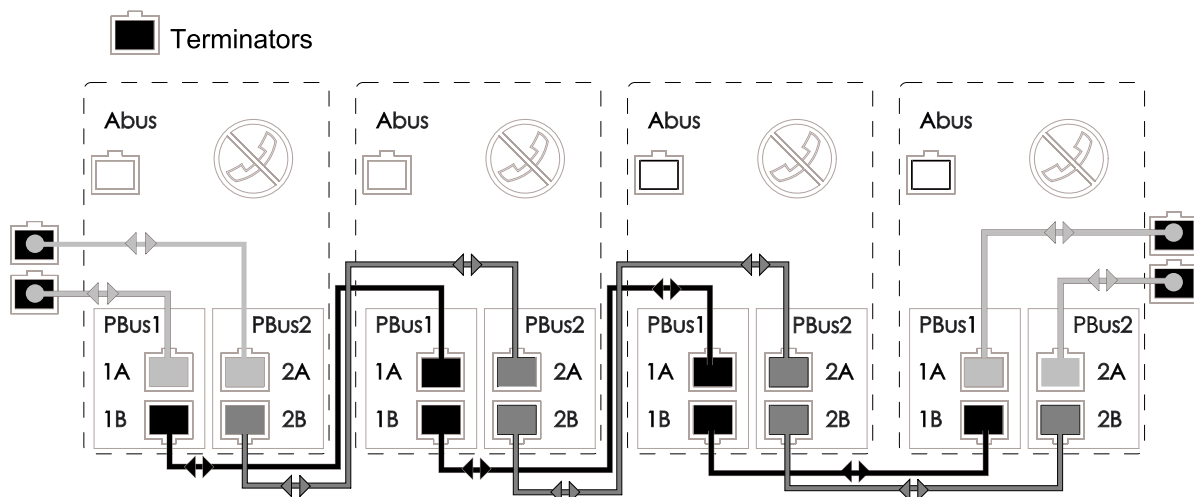
**Note:** The PBus cables are labelled PBus 1 and PBus 2.



**Note:** PBus 1 cables must be kept together, and PBus 2 cables must be kept together. If you by mistake run a cable between a PBUS1 terminal and a PBUS2 terminal, you will be notified by the display.



**Note:** If the configuration consists of only two UPS units, the terminators must be installed in UPS 1 and 2. With three UPS units, the terminators must be installed in UPS 1 and 3.



## Prepare for Cables

### Remove the Batteries



**Note:** See “*Remove the Battery Modules*“ for information on how to remove the batteries.

### Run the Communication Cables

Three different ways of routing cables

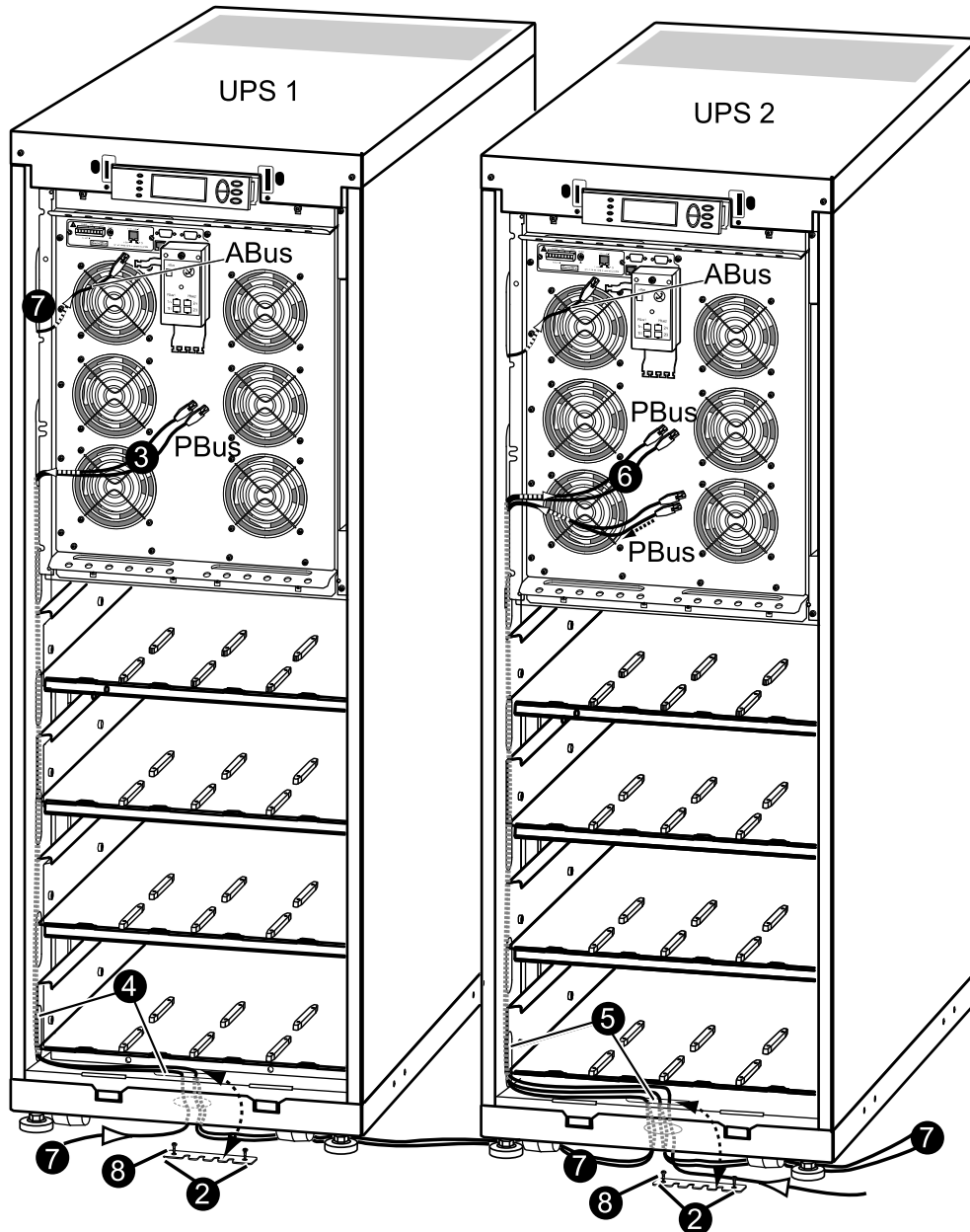


**Note:** The enclosures in a parallel system can be kept apart, or they can be assembled with interconnection plates. If the enclosures are kept apart, the communication cables can be run in conduits (if applicable).

The routing of cables between the UPS units can be done in three different ways.

- UPS units apart (without conduits and without interconnection plates)
- UPS units bayed together (without conduits and with interconnection plates)
- UPS units apart or bayed together (with conduits and optional interconnection plates)

## UPS Units Apart without Conduits and Interconnection

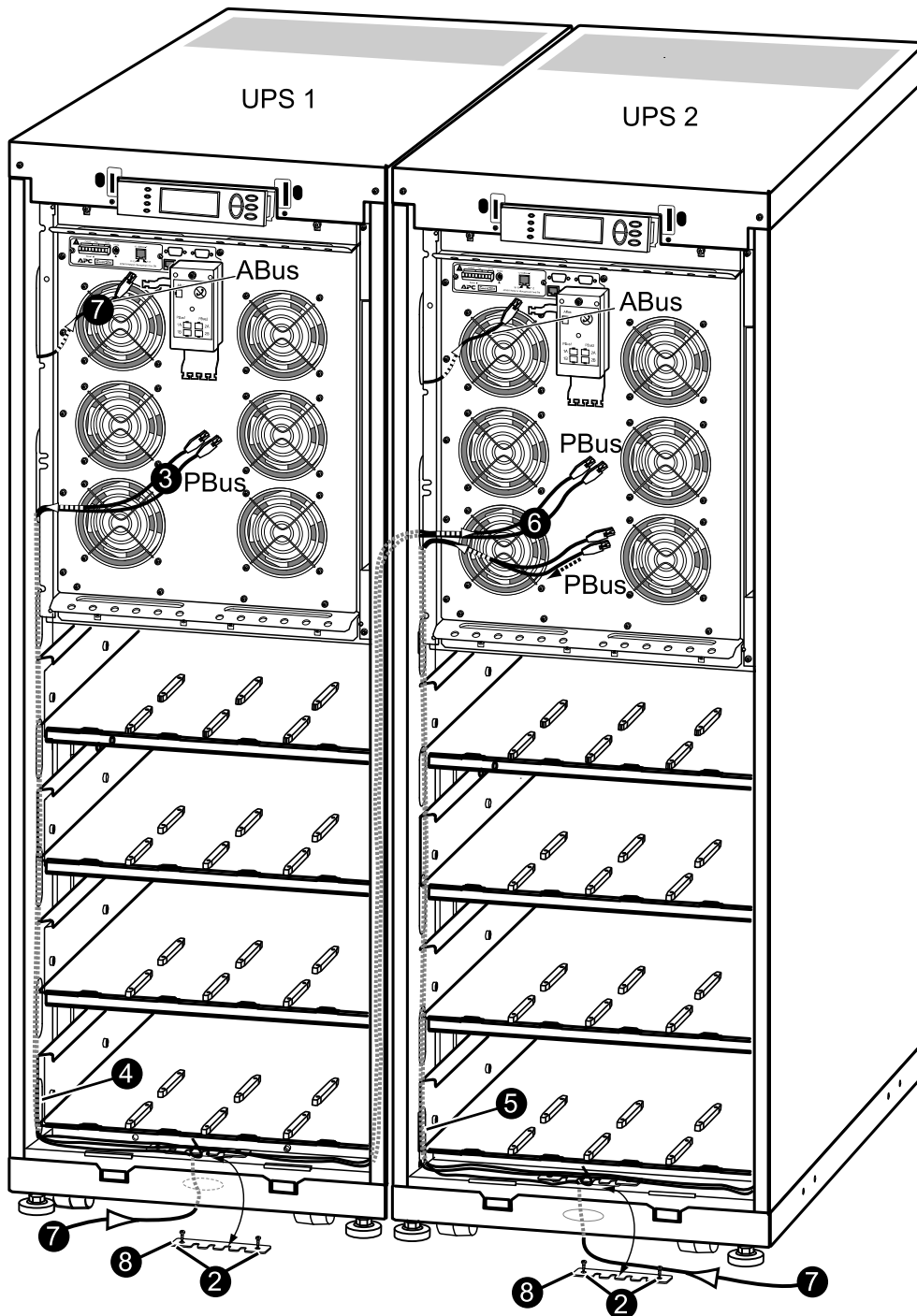


1. Remove the front panel (not shown).
2. Loosen the two screws from the cable-inlet plates at the bottom plate of UPS 1 and UPS 2 and then remove the plates.
3. From UPS 1: Run the two PBus cables to the slots on the left side of the enclosure and down inside the panel.
4. From the lowest slot, fish out the cables from the side panel and run these down through the cable inlet and through the round hole at the bottom.
5. Run the PBus cables to UPS 2 and to the slots on the left side of the enclosure and up inside the panel.
6. Take out the PBus cables and leave these unattached to the parallel box.
7. Run the ABus cable from the maintenance bypass panel to the slots on the left side of the enclosure and up inside the panel the same way as for the PBus cables.
8. Reattach the cable-inlet covers.
9. Fasten the cables with cables ties.



**Note:** Proceed the routing of cables into UPS 3 and UPS 4, if applicable.

### UPS Units Bayed Together without Conduits



1. Remove the front panel and the top cover (not shown).
2. Loosen the two screws from the cable-inlet plates at the bottom plate of UPS 1 and UPS 2 and then remove the plates.
3. From UPS 1: Run the two PBus cables to the slots on the left side of the enclosure and down inside the panel.
4. From the lowest slot, take out the cables from the side panel, run the cables across and through the cable inlets of the two side panels.

5. From the bottom of UPS 2, run the PBus cables to the slots on the left side of the enclosure and up inside the panel.
6. Take out the PBus cables and leave these unattached.
7. Run the ABus cable from the maintenance bypass panel to the slots on the left side of the enclosure and up inside the panel the same way as for the PBus cables.
8. Reattach the cable-inlet cover plates.
9. Fasten the cables with cable ties.



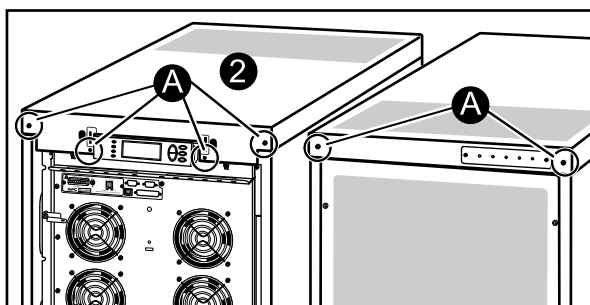
**Note:** Proceed the routing of cables into UPS 3 and UPS 4, if applicable.

## UPS Units Apart or Bayed Together with Conduits

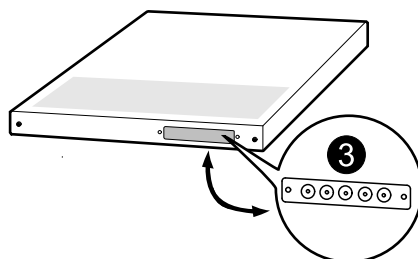


**Note:** When enclosures are assembled with interconnection plates and bolted together, the PBus cables can be run inside the enclosures and then only the ABus cable has to be run in a conduit (if applicable).

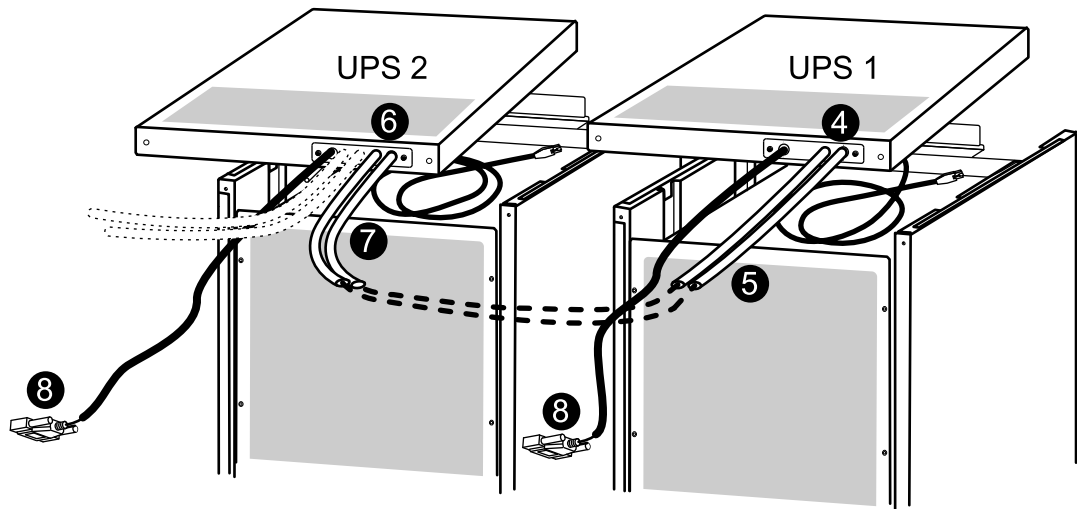
1. Remove the front panel (not shown).
2. Remove the top cover:
  - A. Loosen the six screws of the top cover (four at the front and two at the back).
  - B. Lift up from the back and push forward to free the cover.
  - C. Leave the cover unattached on top of the UPS.



3. Remove the conduit plate at the back of the UPS cover and drill holes centered in the small pre-drilled holes. 2 cm (3/4 in) is recommended for conduits.



4. Run the ABus and the PBus cables through the conduit holes into the inside of the top cover on UPS 1. Leave the cables on top of the UPS.
5. Attach conduits with 2 cm (3/4 in) fittings (not supplied).
6. Run conduits with PBus cables to UPS 2. Pull the cables through the top cover conduit plate and leave the cables on top of the UPS as shown.
7. Attach conduits to UPS 2 with 2 cm (3/4 in) fittings (not supplied).
8. Run the ABus cables (in conduits if applicable) to the maintenance bypass panel.



9. Reinstall the top cover.



**Note:** Proceed the routing of cables into UPS 3 and UPS 4, if applicable.

# Final Mechanical Installation

---

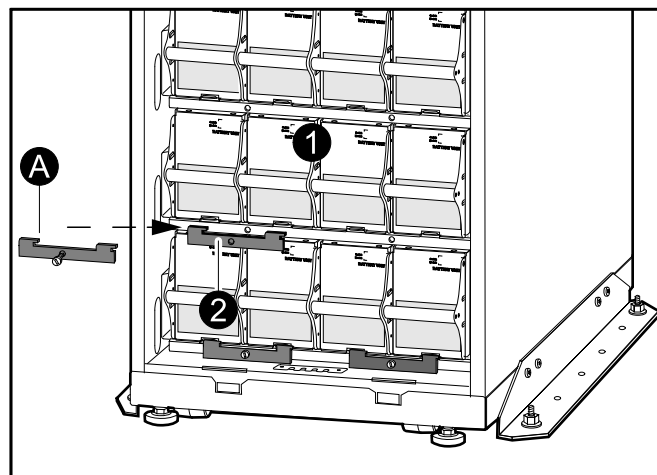
## Connect Battery Securing Brackets for Stability



**Caution:** Wait until the system is ready to be powered up before installing batteries. Failure to do so can result in a deep discharge of the batteries and cause permanent damage (the time from the battery installation time till the UPS is powered up should not exceed 72 hours or 3 days).



**Note:** The battery securing brackets are only used in non-seismic areas for stability, and when seismic battery locks are not part of the installation.



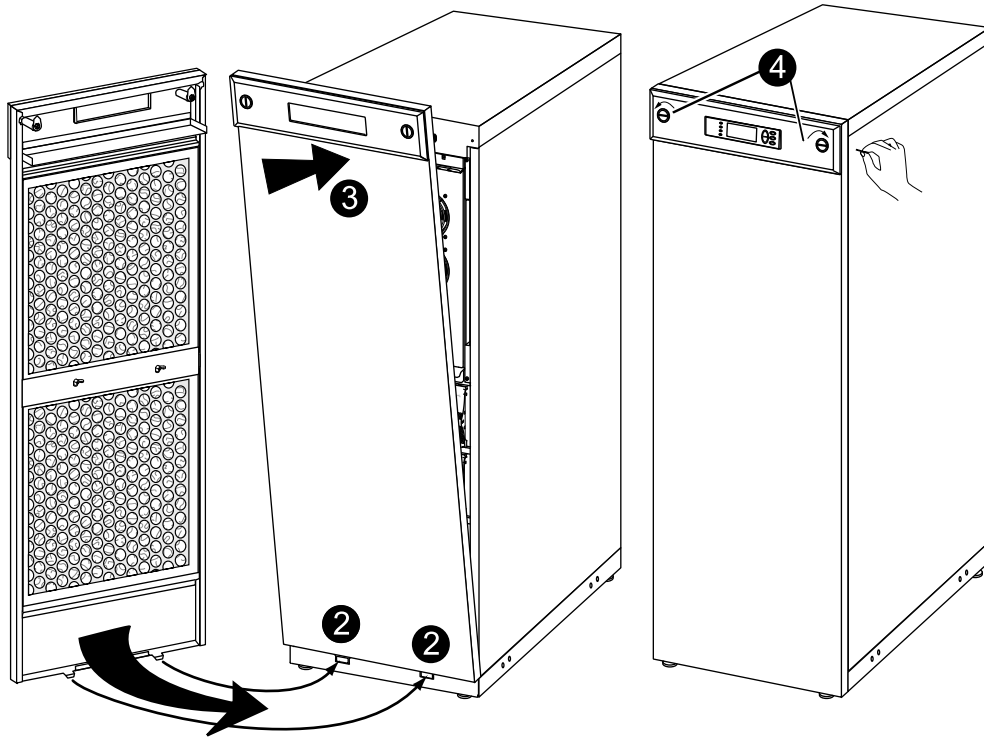
1. Install the batteries by pushing them all the way into the enclosure.
2. If required, install the battery securing brackets (A) to hold the batteries firmly in place. **NOTE:** Do not install the brackets the same way they were positioned when the enclosure arrived. Rotate the brackets 180° and reinstall.



**Note:** Battery securing brackets are delivered with the UPS and XR Battery Enclosure and installed in front of the batteries. Battery securing brackets for additional batteries can be purchased. Refer to option SUVTOPT003: APC Smart-UPS VT Battery Lock Kit for one Battery Module (two batteries).



## Reinstall the Top Cover and the Front Panel



1. Reinstall the top cover by fastening the four screws at the front and the two screws at the back.
2. Insert the two tabs at the bottom of the front panel into the two slots at the bottom of the enclosure.
3. Push the front panel forward until it engages the locking devices at the top of the enclosure.
4. Use a screwdriver to set the lock mechanism to the locked position.





## **Worldwide Customer Support**

Customer support is available at no charge via e-mail or telephone. Contact information is available at [www.apc.com/support/contact](http://www.apc.com/support/contact)

© APC by Schneider Electric. APC and the APC logo are owned by Schneider Electric Industries S.A.S., American Power Conversion Corporation, or their affiliated companies. All other trademarks are property of their respective owners.