Installation

Smart-UPS™ VT
10-40 kVA 380/400/415 V

APC™
by Schneider Electric

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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 Schneider Electric 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%														

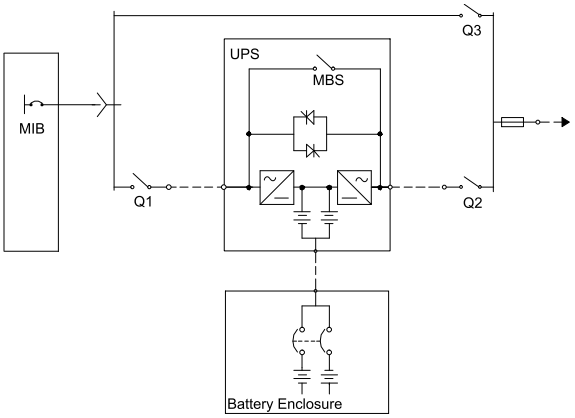
Battery Specifications

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

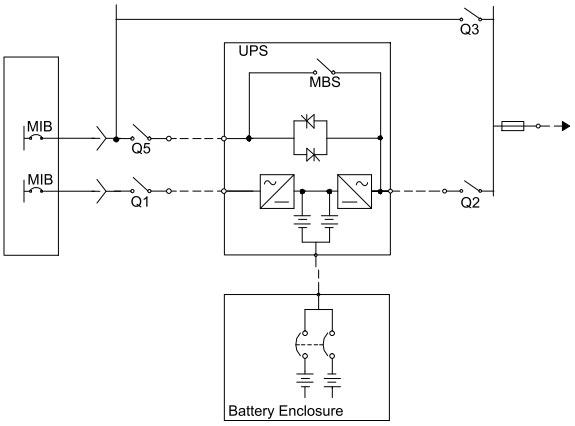
Single Utility/Mains System

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



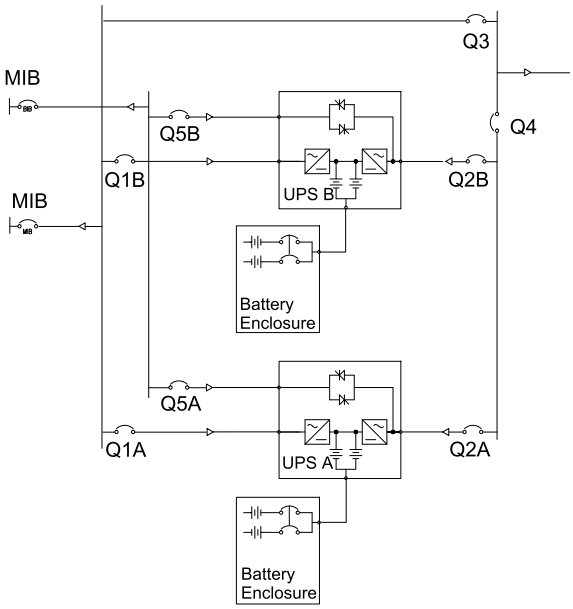
Dual Utility/Mains System

- 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
Utility/mains input Q1 (A)[1]	16	25	35	50	63
Static bypass input Q5 (A)	16	25	35	50	63
UPS output Q2 (A)	16	25	35	50	63
Manual bypass Q3 (A)	16	25	35	50	63
External Battery Fuse	Fuse fast 125 A 660 VDC 100 kA				
[1] Required upstream current protection: gL type fuse					

Fuse and Breaker Sizes Parallel System

3:3 400 V – Manual bypass Q3 and System output 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 – Manual bypass Q3 and System output 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

		800% overload bypass operation	150% overload normal/battery operation	125% overload normal/battery operation	Continuously
	Duration	**500 ms**	**60 s**	**10 min**	
10 kVA	Utility/mains input	-[1]	-	-	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
15 kVA	Utility/mains input	-[1]	-	-	26.7 A
	Static bypass input	182 A	-	-	25.1 A
	UPS output	182 A	34.2 A	25.4 A	25.1 A
20 kVA	Utility/mains input	-[1]	-	-	35.5 A
	Static bypass input	244 A	-	-	33.4 A
	UPS output	244 A	45.6 A	38 A	33.4 A
30 kVA	Utility/mains input	-[1]	-	-	53.0 A
	Static bypass input	364 A	-	-	50.1 A
	UPS output	364 A	68.4 A	57 A	50.1 A
40 kVA	Utility/mains input	-[1]	-	-	70.6 A
	Static bypass input	487 A	-	-	66.9 A
	UPS output	487 A	91.2 A	76 A	66.9 A

[1] For single utility/mains systems, use the higher value of utility/mains and static bypass
[2] For the output value, the short-circuit level is indicated

Recommended Cable Sizes

WARNING: At 100% switch mode load, the neutral must be rated for 200% phase current.

Note: The recommended cable sizes are based on an environment with an ambient temperature of 30°C.

Note: Use Molex lug type or equivalent, and crimp to manufacturer's specifications.

	AC Input (mm^2)	AC Output (mm^2)	Battery Input (mm^2) 70°C wire	AC Bypass (mm^2)
10 kVA	2.5	2.5	50	2.5
15 kVA	6	6	50	6
20 kVA	10	10	50	10
30 kVA	16	16	50	16
40 kVA	25	25	50	25

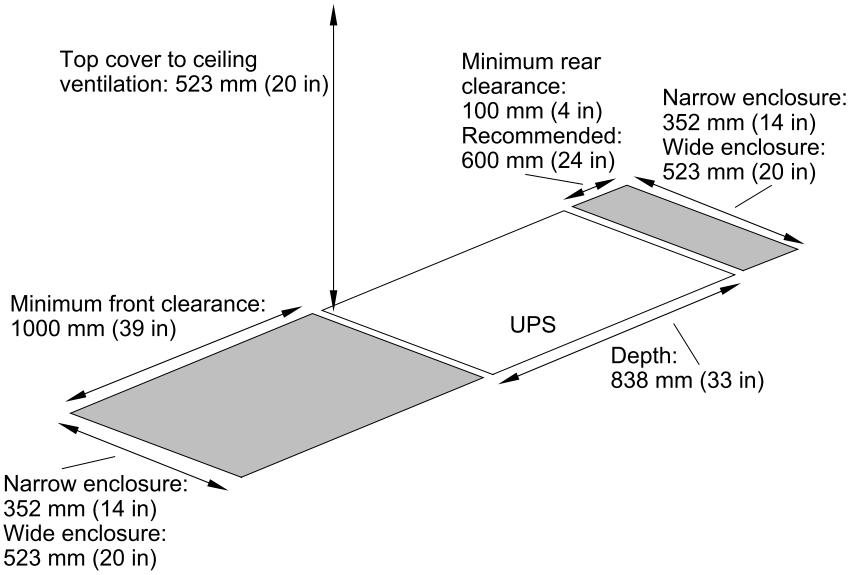
Recommended Lug Size and Torque Value

Note: Power terminal lug diameter: 6 mm.Torque value: 7 Nm.

Mechanical Installation

Clearance

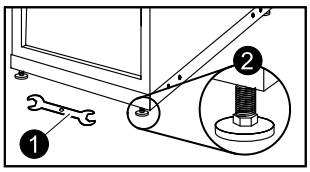
Note: Clearance dimensions are published for airflow and service access only. Consult with the local safety codes and standards for additional requirements in your local area.



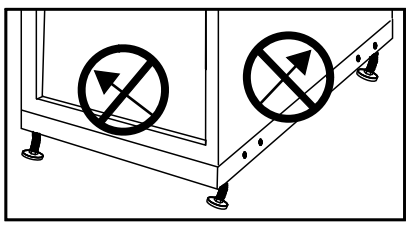
Level the Cabinet

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.

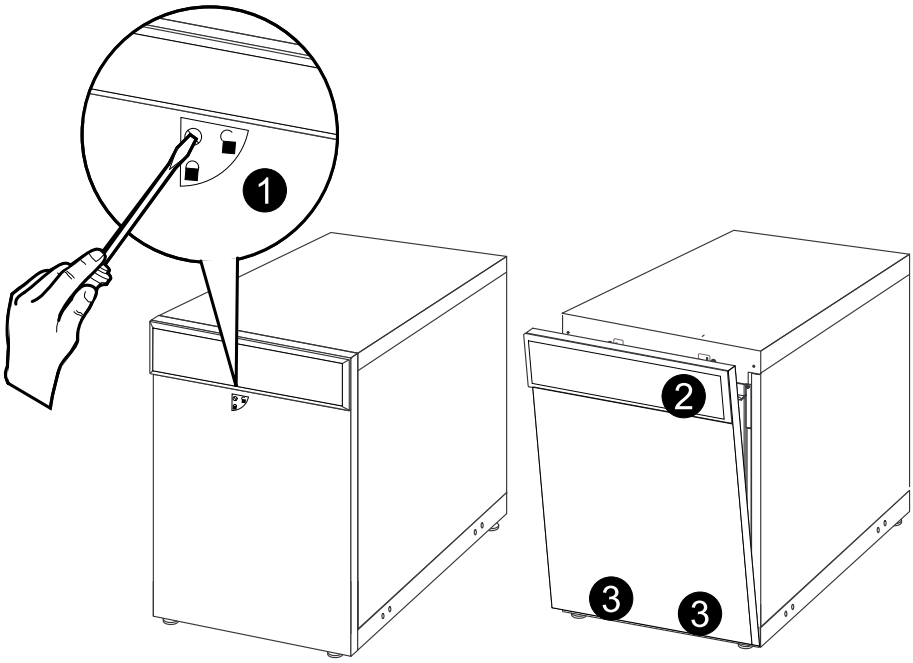


Note: Do not move the cabinet after the leveling feet have been lowered.



Remove the Front Panel

Front view



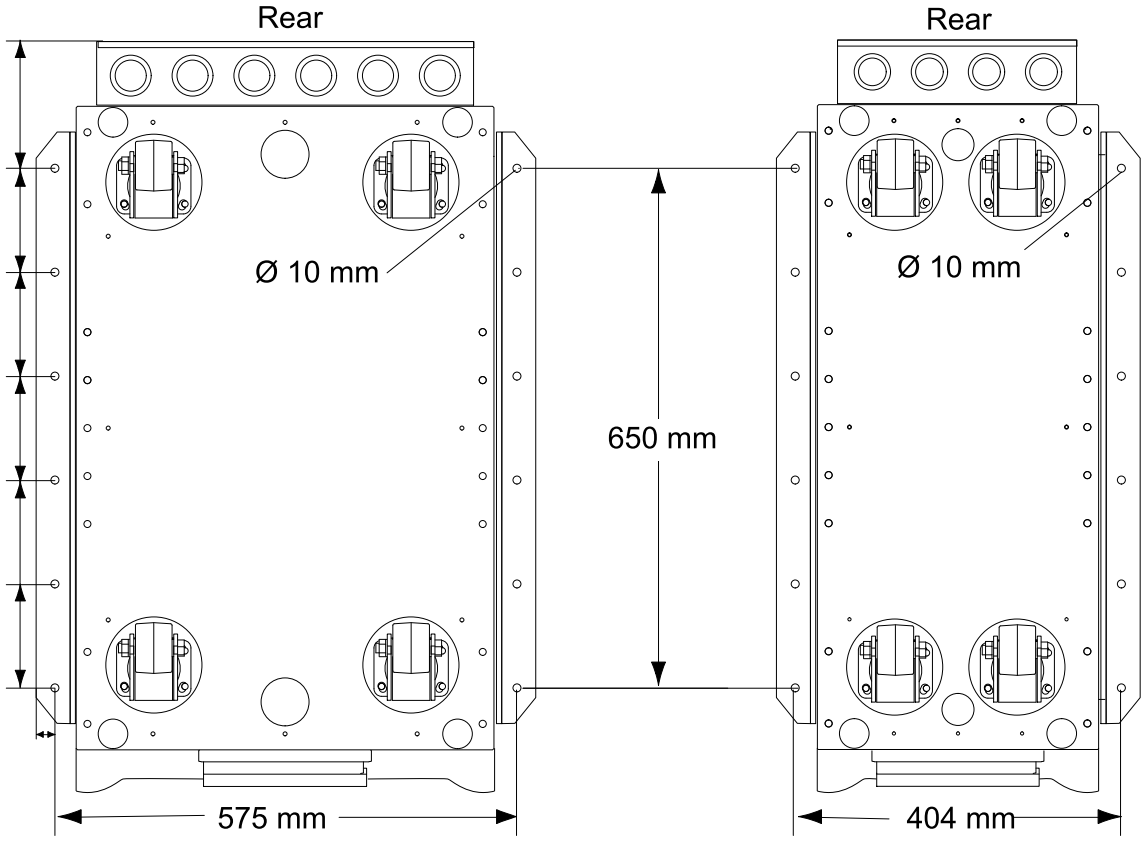
1. Turn the screw to the right to the unlocked position.
2. Pull the top of the front panel away from the UPS.
3. Lift the front panel free of the two slots at the bottom of the enclosure.

Floor Anchoring

Hole Positions for Floor Anchors

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

Top View of Bottom Plates

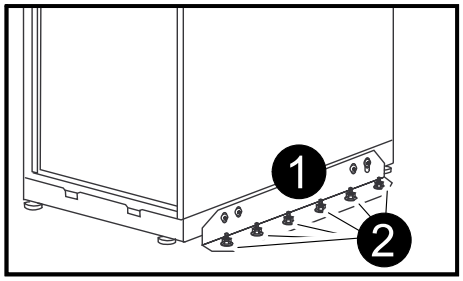


Connect Floor Anchoring Brackets to the UPS and XR Battery Enclosure for Stability

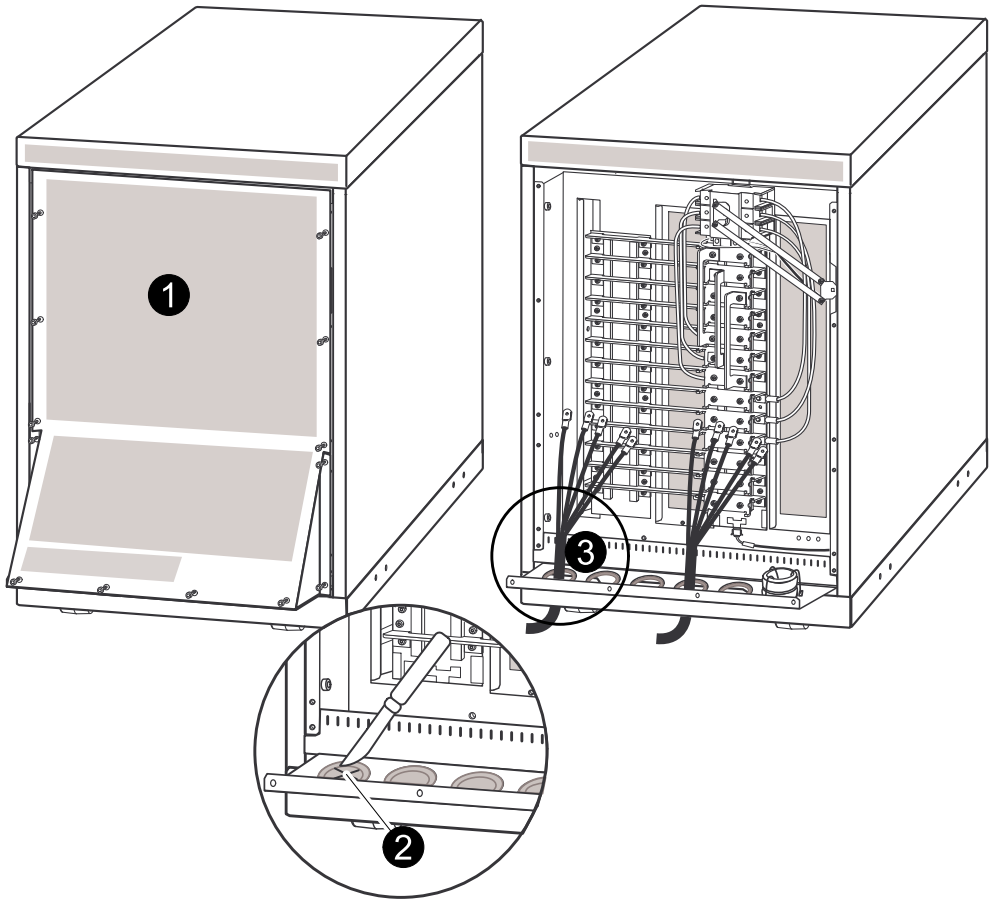
Note: Floor anchoring bolts are not provided with the UPS. Purchase the bolts locally (minimum size: M8). Follow the specifications given by the manufacturer of the floor anchoring system when bolting the UPS system to the floor.

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.

Side view



Prepare the UPS for Cables



Rear view of the UPS

1. From the rear of the UPS, loosen the 14 M4 screws (13 M4 screws in narrow cabinet) from the cover (cable landing area) with a torque screwdriver and remove the cover.
2. Cut a cross in the blanking plugs.
3. Route the cables through the blanking plugs and into the cable landing area.
4. Attach the bottom part of the conduit boxes to the back of the UPS with four screws each (if applicable).

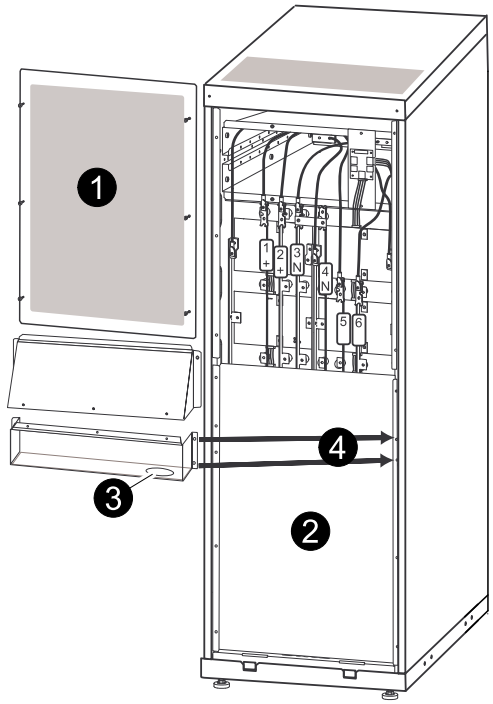
Install XR Battery Enclosures (Option)

Remove the Cable Landing Cover and Bottom Plates on XR Battery Enclosure and UPS

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, follow the procedure described in ***"Prepare the UPS for Cables"***.
To access the cable landing area in the XR Battery Enclosure(s), follow this procedure:

Rear view of XR Battery Enclosure



1. Loosen the six M4 screws from the cable landing cover plate on 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 XR Battery Enclosure with four screws each (if applicable).

Connect Battery Power in Installations with Cables

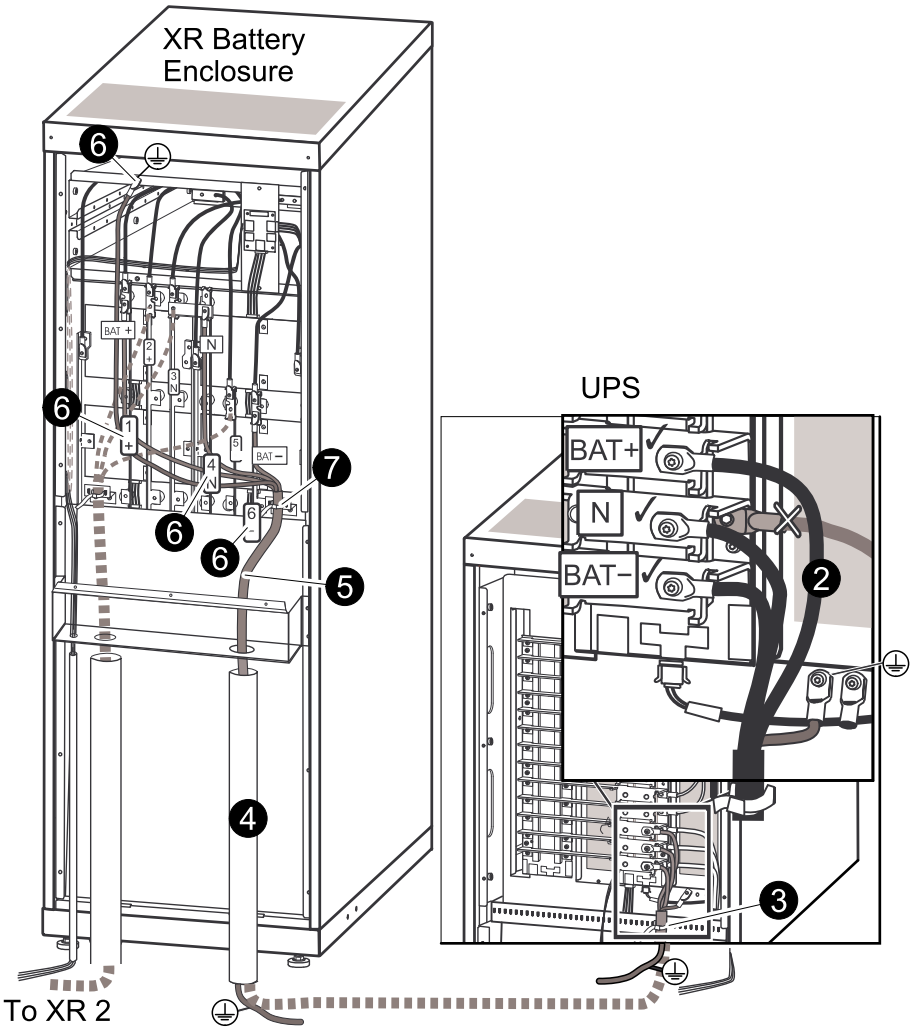
Connect Power Cables Between the UPS and the XR Battery Enclosure

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 (not supplied).

Rear view



1. In the UPS, feed the cable up through the conduit box (if applicable) and through the blanking plugs into the cable landing area.
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).

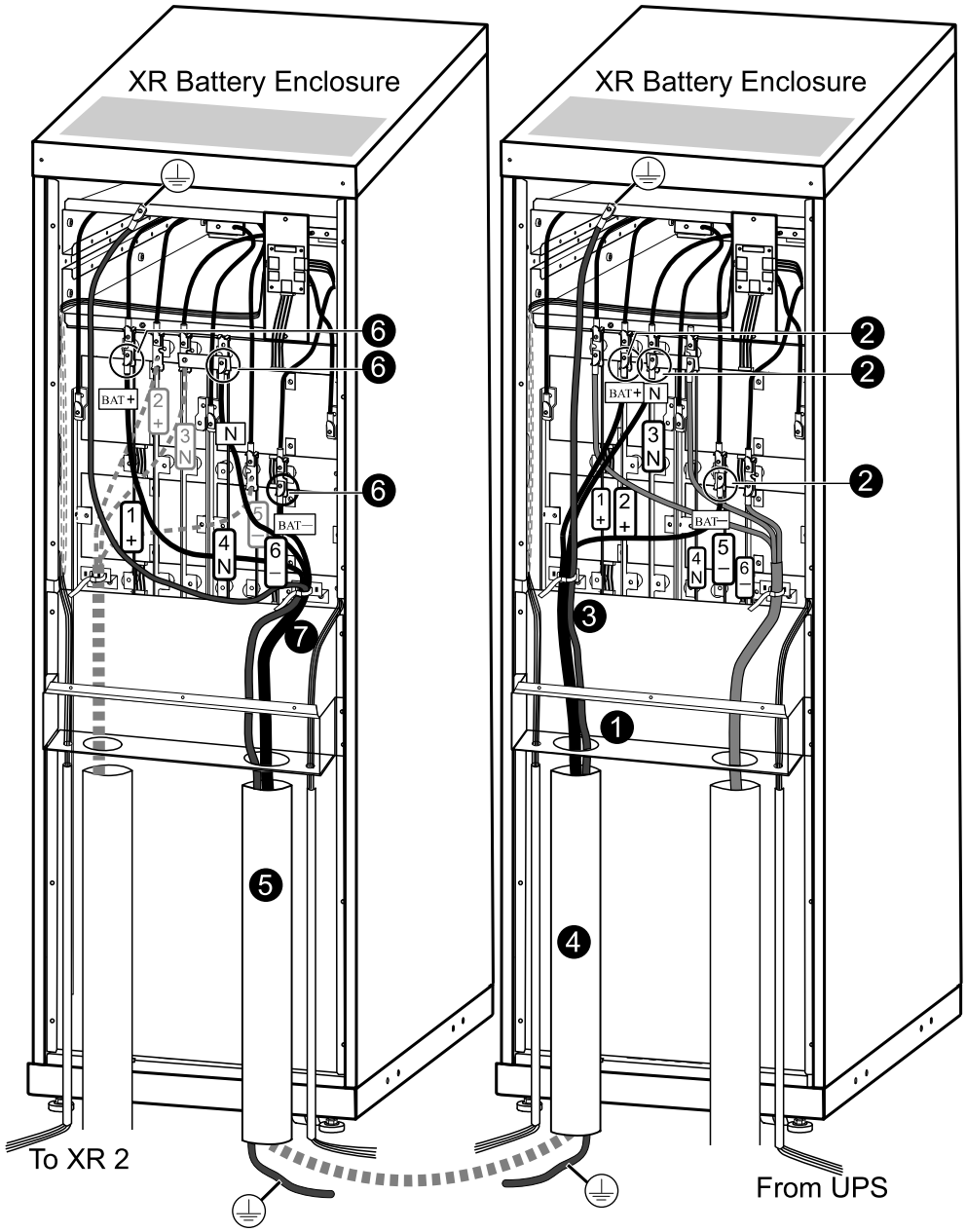
Connect Power Cables between Two XR Battery Enclosures

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 (not supplied).

Rear view



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

Connect the AC Input and AC Output Cables

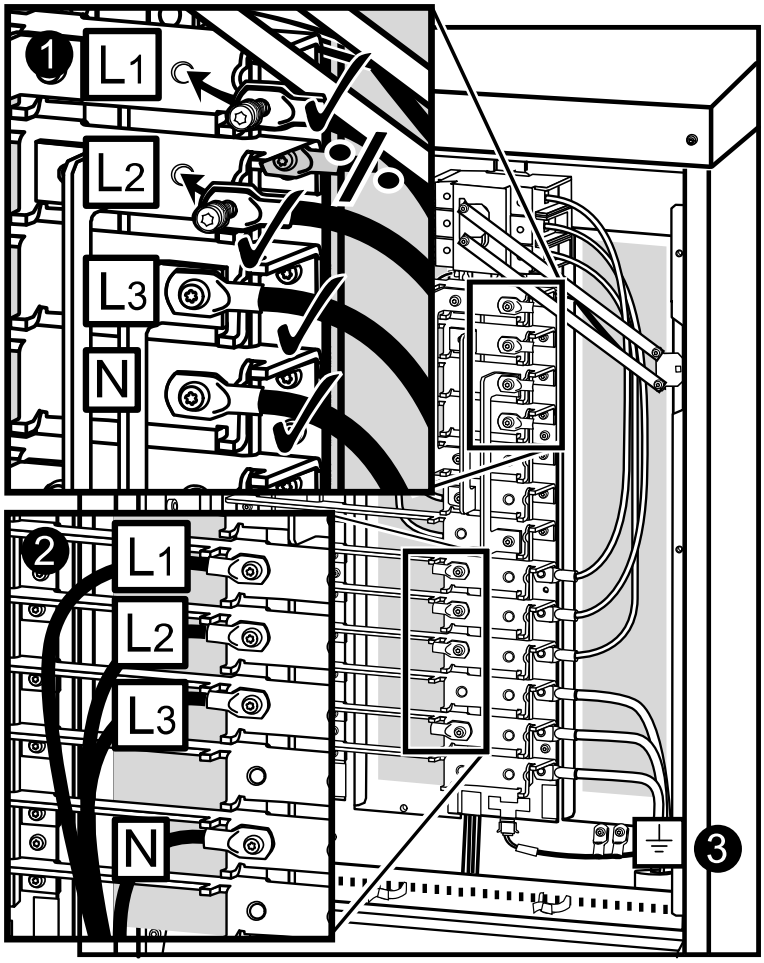
WARNING: Use ONLY compression type lugs. Do not loosen or add cables to any factory preinstalled cables on busbars. Use the upper front part of busbar for connection only.

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

3:3 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.

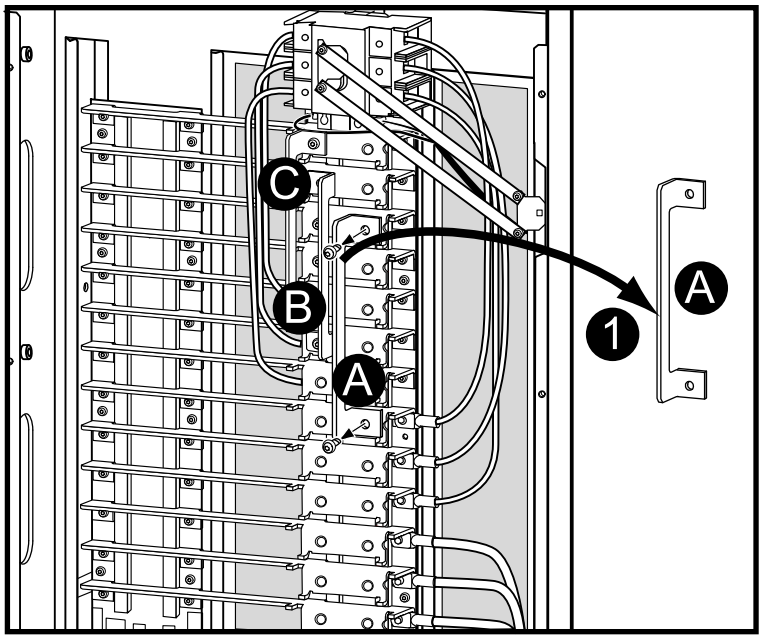
Rear view



3:3 Dual Mains

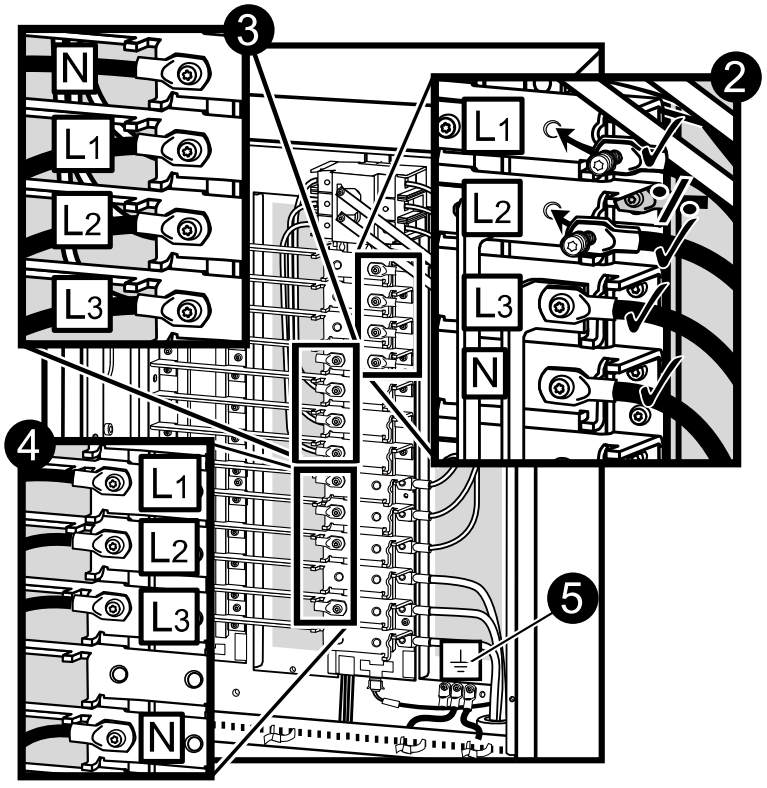
1. Remove the three busbars A, B, and C by removing two M6 screws from each busbar.

   Rear view



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.

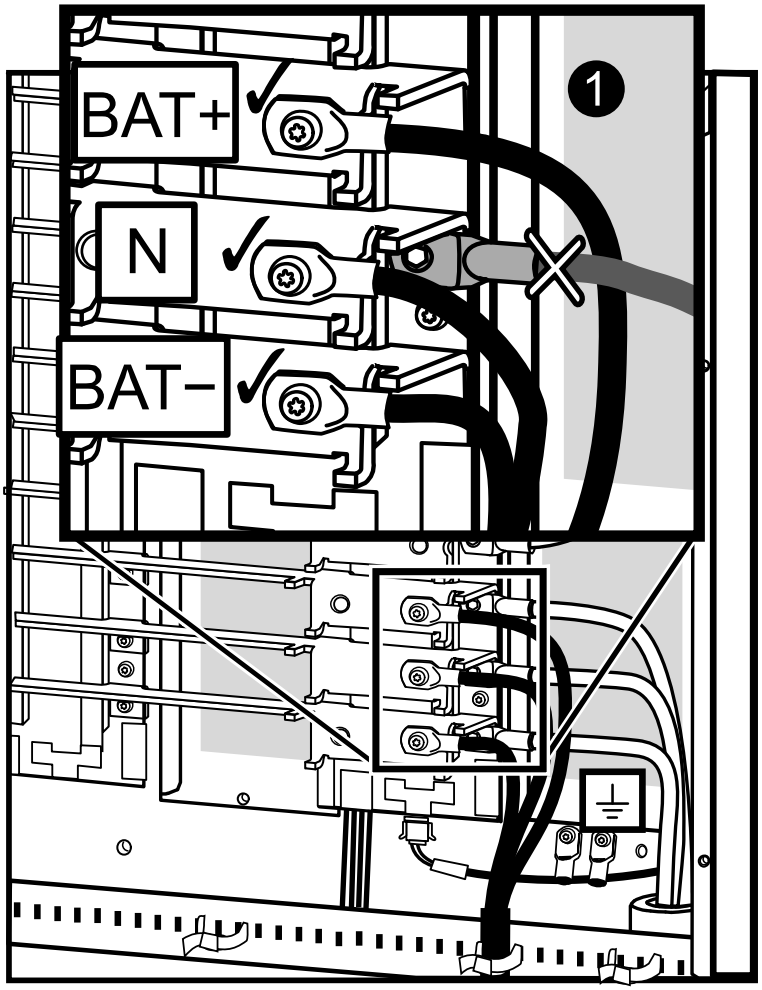
   Rear view



Connect the DC Battery Cables to Third Party Batteries (if Applicable)

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

Rear view

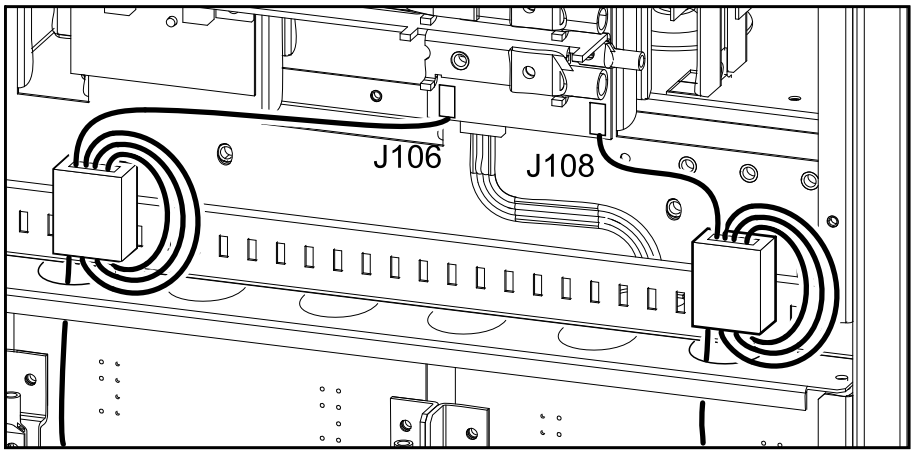


Connect the Communication Cables

Prepare for Communication Cables

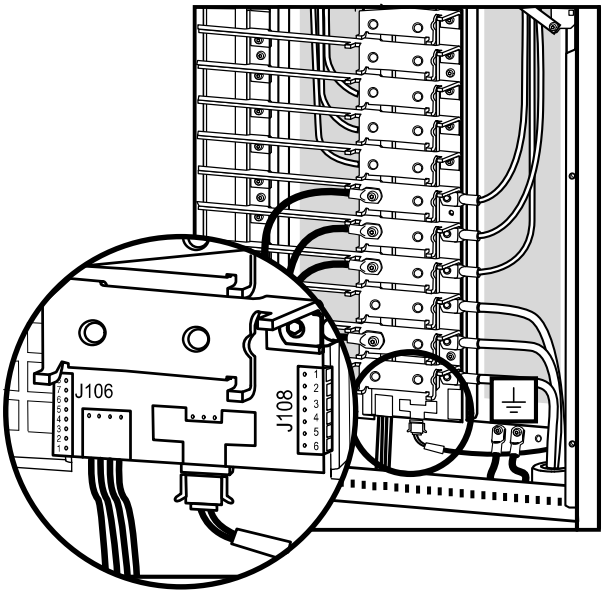
WARNING: Make sure that the UPS is completely OFF as the connectors are very close to the power busbars.

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

Rear view



J108 pin connections:
1: Normally open EPO
2: Normally open EPO return
3: Normally closed EPO
4: Normaly 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 Schneider Electric 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

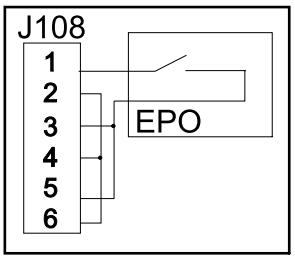
Connect the EPO cable using one of the following four wiring configurations.

Note: Use only 1-1½ mm² copper wire for the connection of the Emergency Power Off (EPO) and other optional equipment.

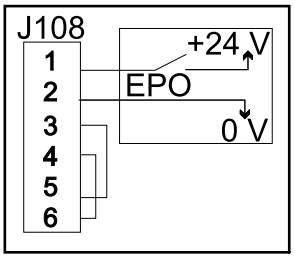
Note: The UPS must be connected to either a dry contact or a 24 VDC EPO (Emergency Power Off) switch.

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

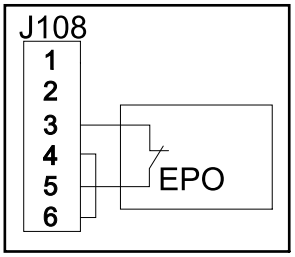
1. **Dry Contacts Normally Open**: EPO is activated when pin 1 is connected to pins 3 and 5. Connections: 2-4-6, 3-5, and 1 (Normally Open).



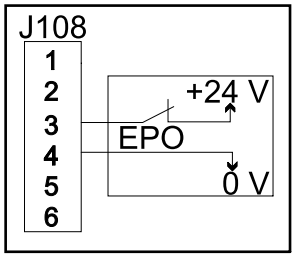
2. **+24 V Normally Open**: EPO is activated when an isolated SELV 24 VDC voltage is supplied on pin 1 with reference to pin 2. Connections: 3-5 and 4-6.



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.

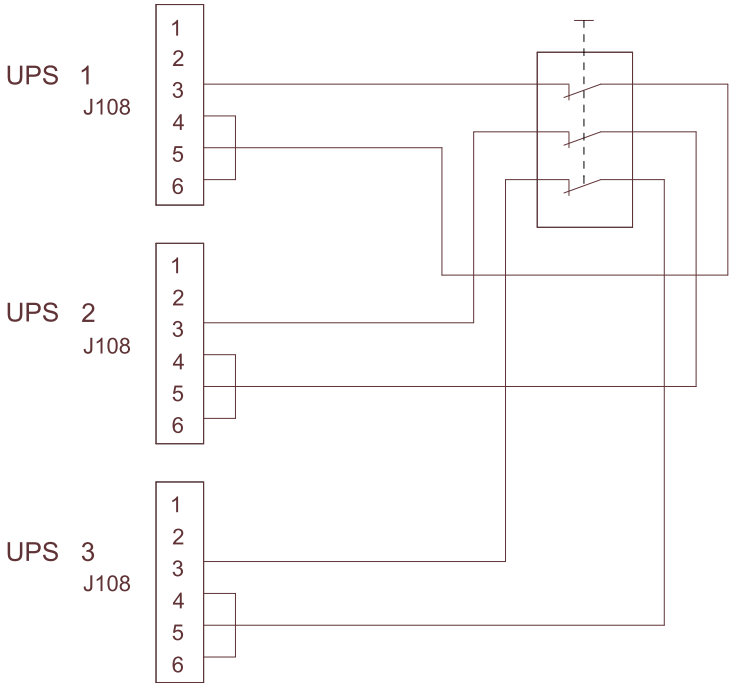


EPO in Parallel Systems

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.

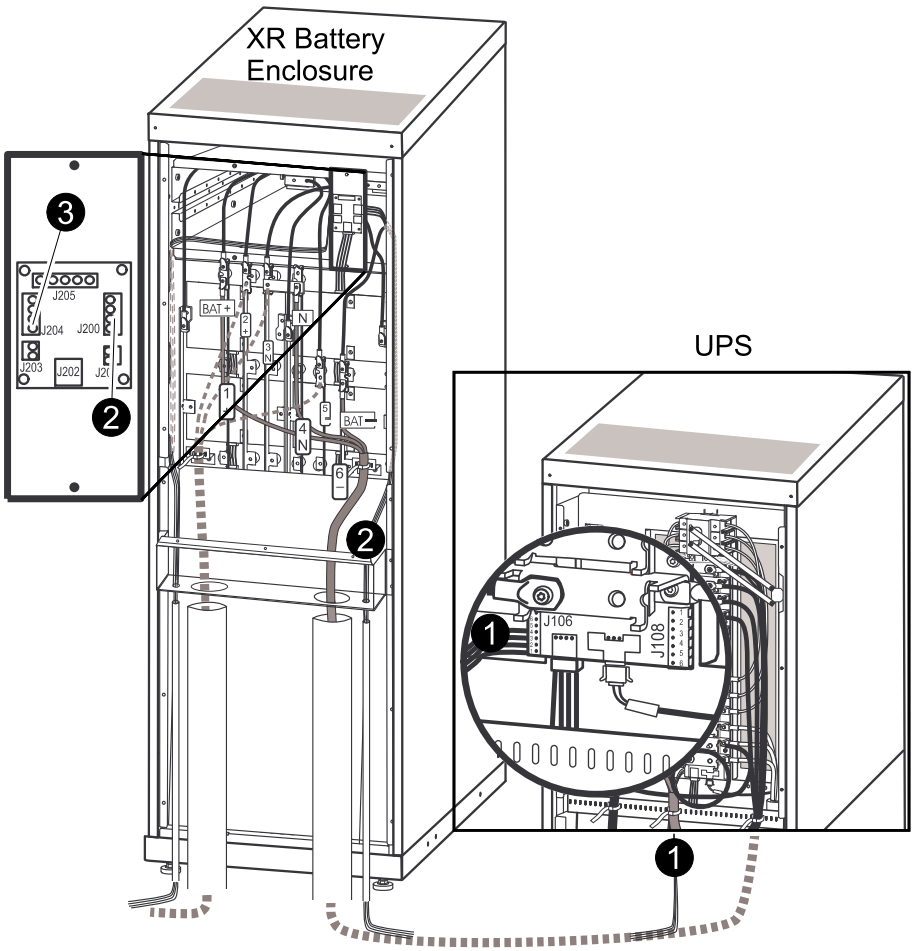
WARNING: For parallel and separate systems with common EPO, each UPS unit must be connected to a separate dry contact.

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



Connect Communication Cables between UPS and XR Battery Enclosure

Rear view



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.

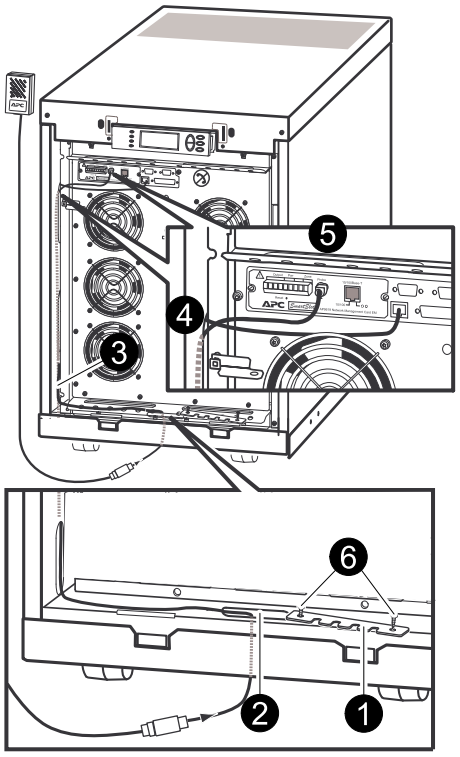
Connect Schneider Electric Communication Options

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.

Front view of UPS



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

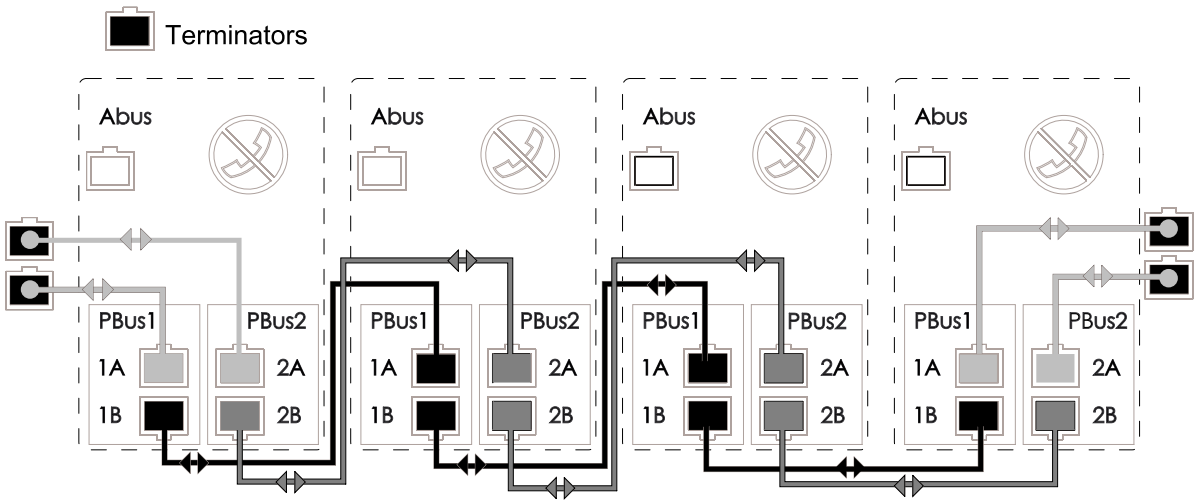
Note: The cables must be run by the electrician but not attached. The field service engineer from Schneider Electric will attach all cables to the UPS unit(s) and install the parallel communication box. The below is for overview only.

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

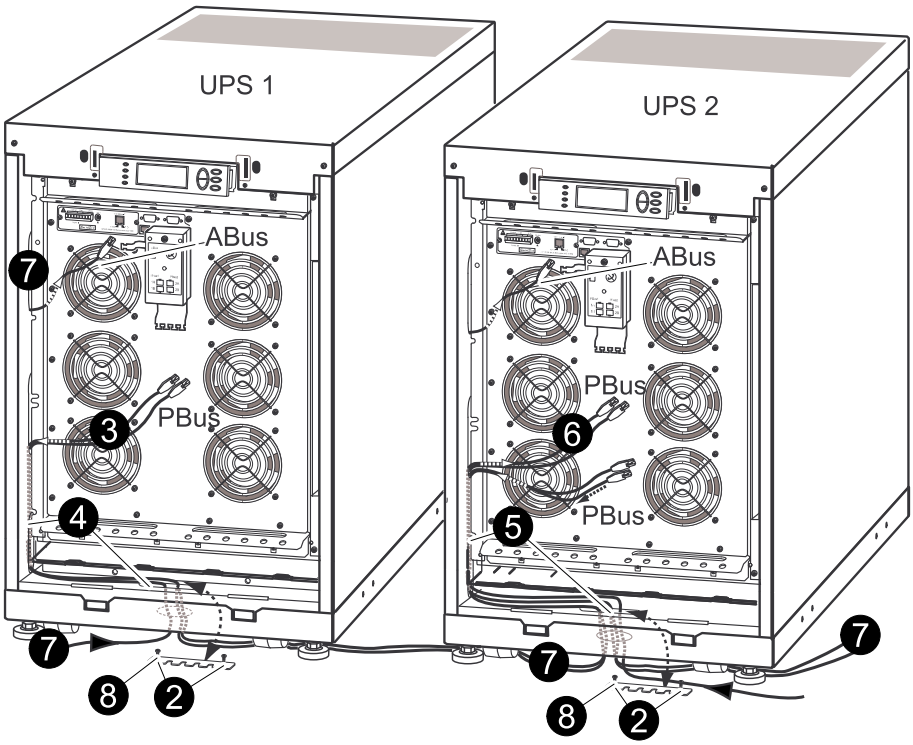
Run the Communication Cables

The routing of cables between the UPS units can be done in two different ways:

- ***"UPS Units without Conduits"***
- ***"UPS Units with Conduits"***

UPS Units without Conduits

Front view of UPSs



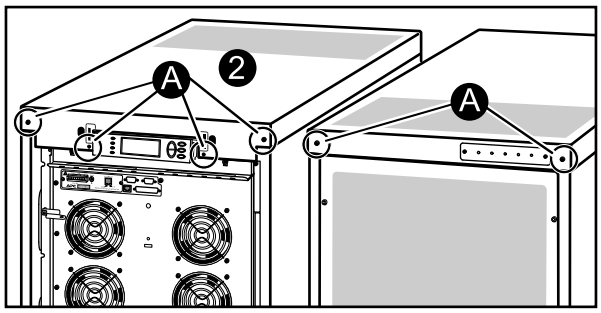
1. Remove the front panel (not shown).
2. Loosen the two screws from the cable-inlet plates at the bottom plate of UPS 1 and UPS 2 and then remove the plates.
3. From UPS 1: Run the two PBus cables to the slots on the left side of the enclosure and down inside the panel.
4. From the lowest slot, fish 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 with Conduits

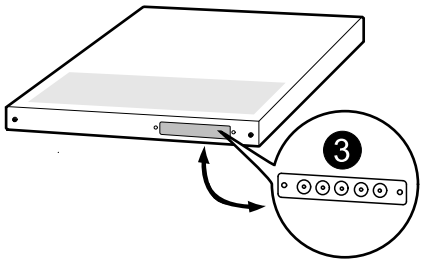
1. Remove the front panel (not shown).
2. Remove the top cover:
   A. Loosen the six screws of the top cover (four at the front and two at the back).
   B. Lift up from the back and push forward to free the cover.
   C. Leave the cover unattached on top of the UPS.

Front and rear view of UPS



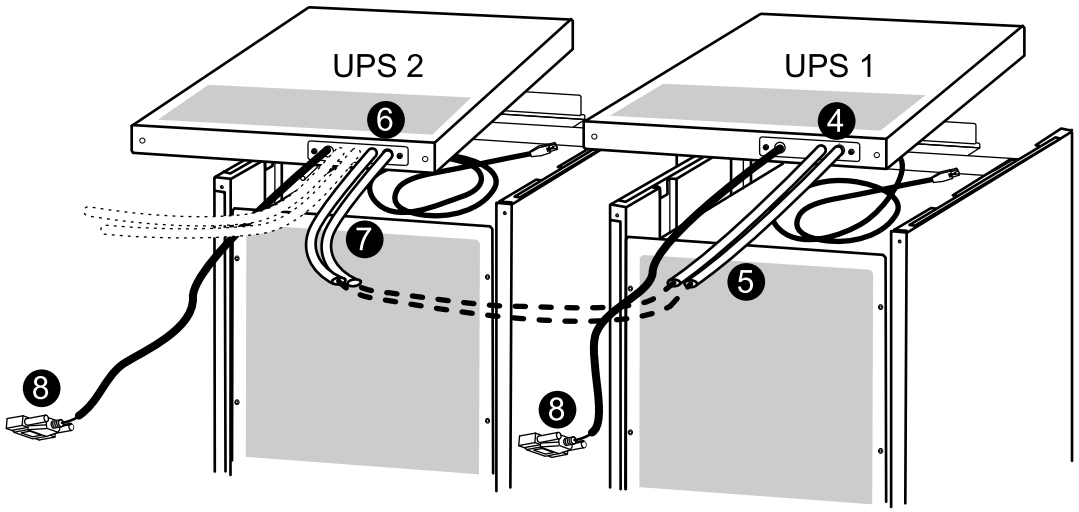
3. Remove the conduit plate at the back of the UPS cover and drill holes centered in the small pre-drilled holes. 2 cm (3/4 in) is recommended for conduits.

Rear view of top cover



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.

Rear view of the UPSs



9. Reinstall the top cover.

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

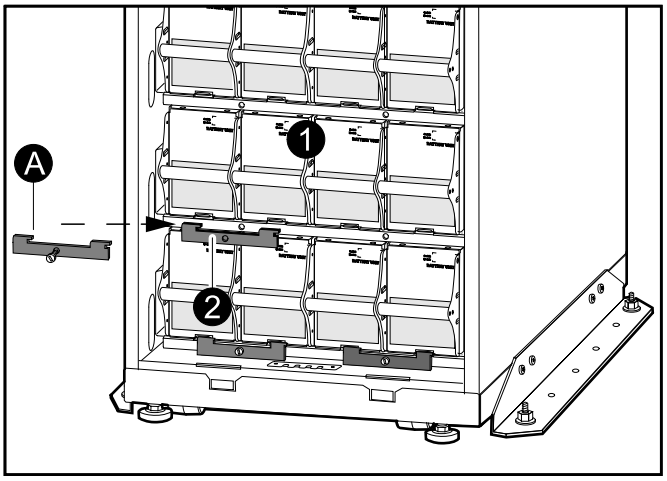
Final Mechanical Installation

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.

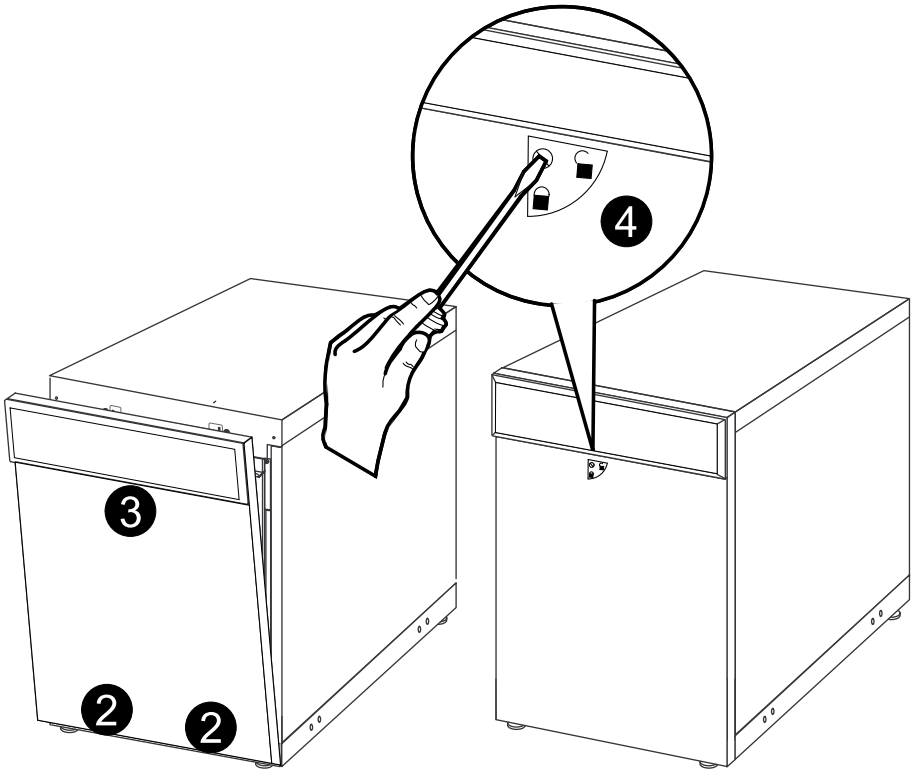
Front view



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



Front view

1. Reinstall the top cover by fastening the four screws at the front and the two screws at the back.
2. Insert the two taps 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

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