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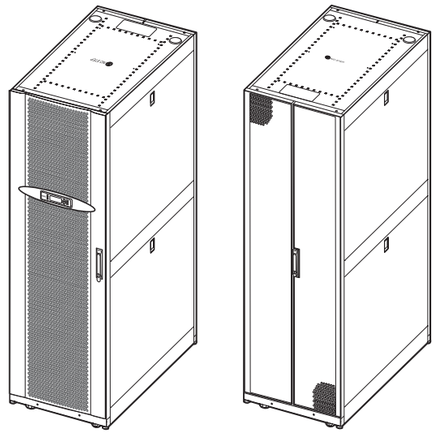
Smart-UPS® VT ISX Installation

Important Safety Instructions – SAVE THESE INSTRUCTIONS



Note — Always read the separate Safety sheet (990-2822) prior to the installation.

Warning — **Always carry out the Total Power Off procedure prior to the installation. Refer to the Safety sheet (990-2822) for details.**

Warning — **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.**

1 Preparing for Cabling

Note — Make sure the UPS is in its location of use before wiring begins.

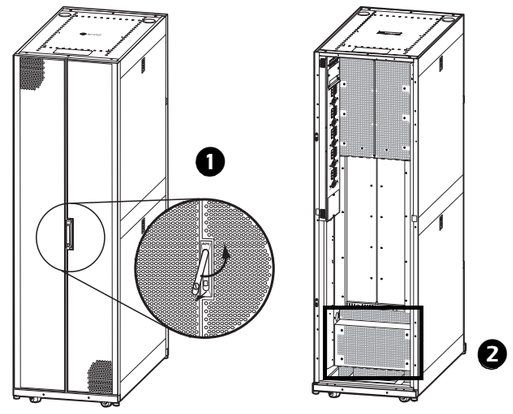
Warning — **The UPS must be supplied from a: 480Y/277V 4W + GND or 480V 3W + GND 60Hz source.**

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

Caution — The installation must comply with all national codes.

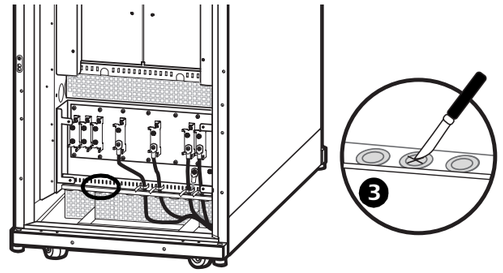
Note — Power terminal lug diameter: minimum 6 mm.
Torque value: 45 lbf·in/5 Nm.

Preparing for cabling (general)



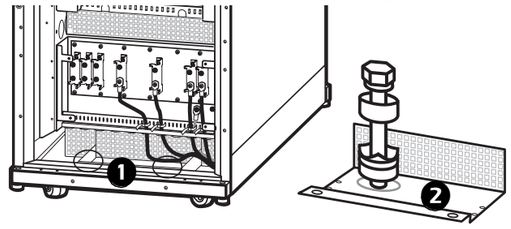
❶ Pull out the lower end of the handle and turn the handle counterclockwise to a horizontal position to open the door.

❷ Using a torx screwdriver, loosen the 12 M4 screws from the cable landing covers and remove.



❸ Cut crosses for cable access in the required number of the 6 blanking plugs (use top blanking plugs for top entry, bottom blanking plugs for bottom entry). Line hole(s) with grommets.

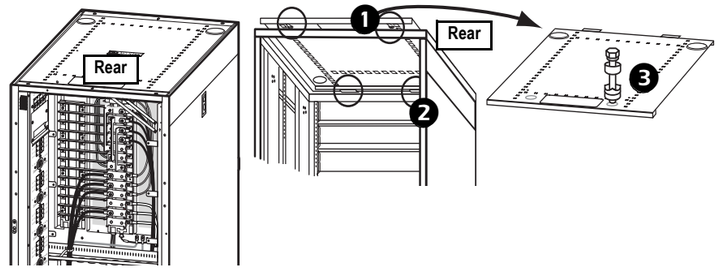
Preparing for bottom entry cabling



❶ Remove the 2 M4 screws from the bottom plate and remove plate.

❷ Punch holes in the labeled area of the bottom plate for conduits as required. Line hole(s) with grommets.

Preparing for top entry cabling



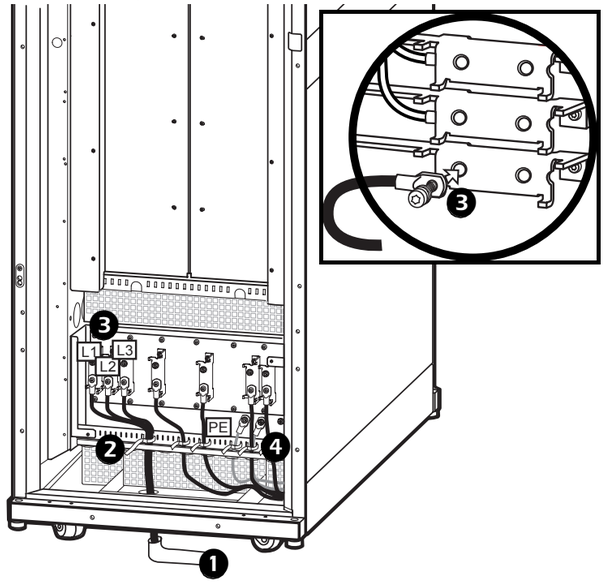
❶ From the rear of the inside of the UPS push the two top cover spring locks backwards to lift up rear end of top plate.

❷ Slide out the top plate (mind the wing on either side of the plate).

❸ Punch holes in the top plate for conduits in labeled area as required. Line hole(s) with grommets.

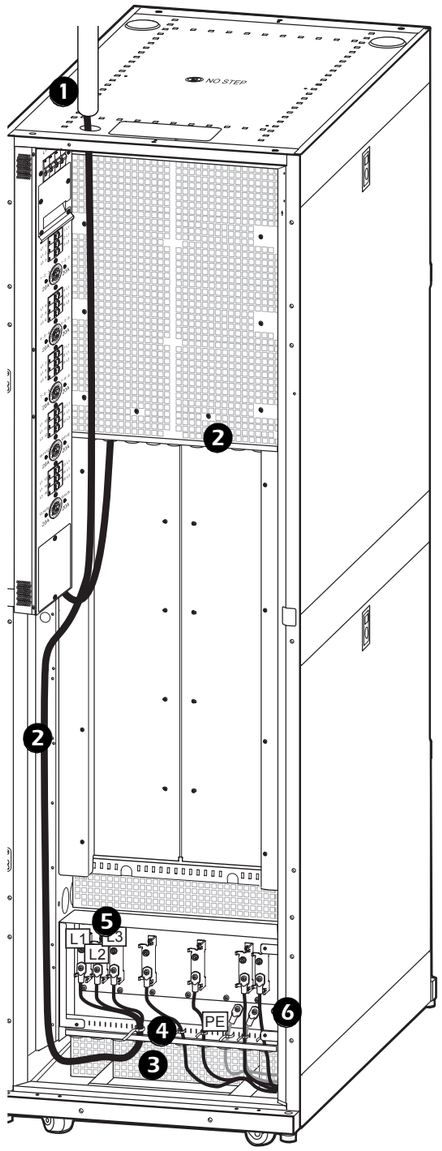
2 Input Cabling

Bottom entry



1. Feed the input cables in conduits through holes in the bottom entry.
2. Guide the input cables through the blanking plugs and use cable ties to attach the cables to the slotted plate.
3. Connect the input cables (L1, L2, L3) to the cable landings using a torx screwdriver.
4. Connect the PE cable using the provided earth screw (earth symbol beneath the applicable screw).

Top entry



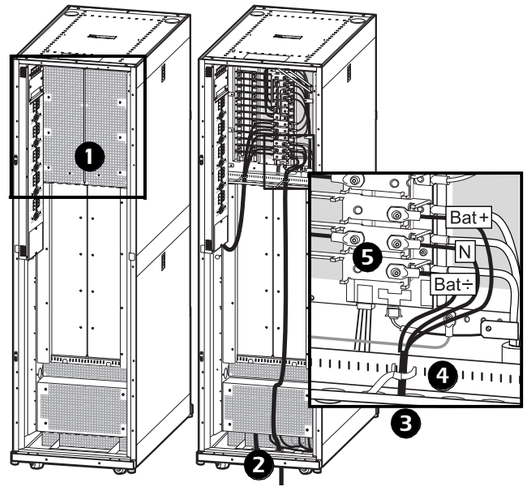
1. Feed the input cable in conduits through the punched holes in the top.
2. Attach the cable to the side panel using cable ties
3. Guide the input cable through the blanking plugs.
4. Attach to slotted plate.
5. Connect the input cables (L1,L2,L3) to the cable landings using a torx screwdriver.
6. Connect the PE cable using the provided earth screw (earth symbol beneath the applicable screw).
7. Reinstall the bottom cable landing plate.

3 Battery Cabling

Note

The UPS may ONLY be connected to the APC SUVTBXR Battery Enclosure.

Bottom cabling entry



1. Remove the top cable landing plates.
2. Feed the battery cables through the punched holes in the bottom plate.
3. Guide the cables through the blanking plugs.
4. Use cable ties to attach the cable to the slotted plate.
5. Connect the battery cables Bat+ and Bat– and the N cable in the designated areas (indicated on the PCB behind the cable landing area).

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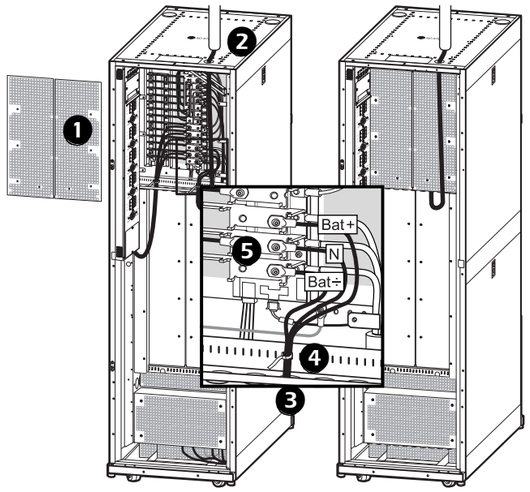
Top cabling entry



1. Remove the top cable landing plates.
2. Feed the battery cables through the punched holes in the top plate.
3. Guide the cables through the blanking plugs.
4. Use cable ties to attach the cables to the side panel and slotted plate.
5. Connect Bat+ and Bat– and N as described under bottom cabling.

See also

For configurations including customer-supplied external batteries, refer to manufacturer's battery installation and maintenance instructions.

4 Communication to EPO, Batteries, and Options

Note

EPO switch must be connected to a NEC Class 2 wiring.

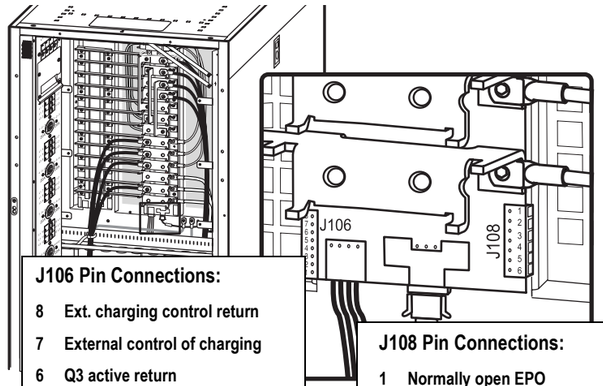
Note

Use only 28-16 AWG copper wire for the connection of the Emergency Power Off (EPO) and other optional equipment. Keep all other wiring and uninsulated live parts separate of other NEC Class 2 circuits.

Note

Do not connect any circuits to the EPO terminal block unless it can be confirmed that the circuit is a NEC Class 2 circuit.

EPO switch wiring – pin connections J108 (for EPO wiring options)



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 Enclosures

J108 Pin Connections:

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

Note

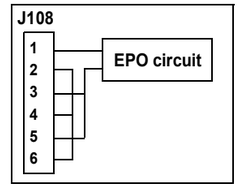
The UPS must be connected to either a dry contact or a 24 V_{DC} Emergency Power Off (EPO) switch.

Connect the EPO cable, using one of the following 4 wiring configurations.

Note

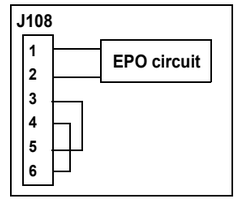
Always follow the pin connection procedures from the top and work down: J106 (8-1), J108 (1-6).

1: Dry Contracts Normally Open



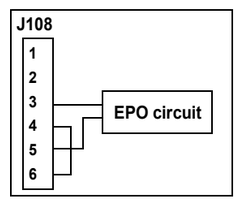
EPO is activated when pin 1 is connected to pins 3 and 5.

2: +24V Normally Open



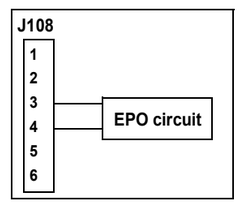
EPO is activated when an isolated SELV $24V_{DC}$ voltage is supplied on pin 1 with reference to pin 2.

3: Dry Contacts Normally Closed



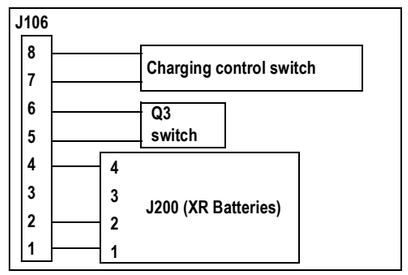
EPO is activated when a connection from pin 3 to pin 5 is opened.

4: +24V Normally Closed



EPO is activated when a SELV $24V_{DC}$ voltage removed from pin 3 with reference to pin 5.

Pin connections J106 (UPS)



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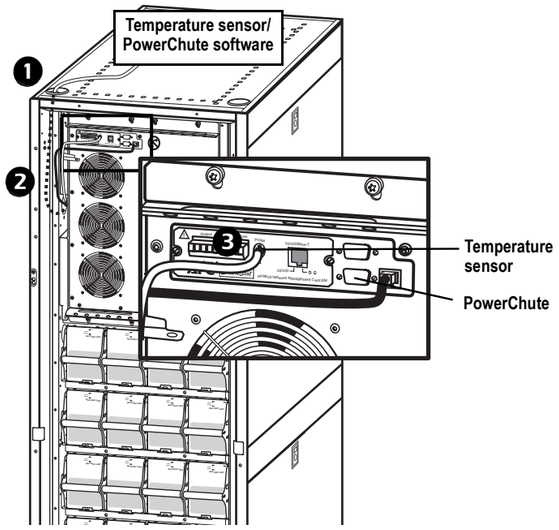
Pins 1 to 4 are for battery measurement (only applicable to APC XR Enclosures).
Pins 5 and 6 are for external maintenance bypass Q3 (auxiliary switch N/C type). When Q3 is closed, signals are fed back to the UPS controller.
Pins 7 and 8 are for external charge control. When 7 and 8 are closed, the UPS 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 requires control of charging.
When Q3 is closed, signals are fed back to the UPS controller.

Note

When connecting the Q3 auxiliary signal, use gold-plated N/C auxiliary switch on Q3.

Connection of APC communication options (PowerChute software and temperature sensor)



1. Feed cables from optional communication equipment through the opening in the top cover.
2. Guide the cables along the inside of the left side panel down to the opening in the power module frame.
3. Attach communication equipment where shown.

Note

The APC communication options are provided at the front of the UPS.

5 Specifications

UPS ratings	20 kVA	30 kVA
Input voltage / Bypass voltage (V) per phase	480	480
Input current (nominal) (A)	25.5	36.8
Input frequency (Hz) range	60	60
Output voltage (on line). (V) Minimum and maximum values (± 1%)	3x208	3x208
Output current (nominal, per phase) (A)	55.5	83.3
Maximum output current (in bypass only at 110% overload per phase)	61.1	91.6
Neutral output current (with 100% switch mode load) (A)	37.5	56.7

Recommended current protection

To ensure the correct functionality of the PDU and to avoid unintentional tripping of the bypass input protection device follow the following recommendation:

Use the SUVTOPT114 (20kVA version) or the SUVT115 (30kVA version) as input protection.

Output protection is included in the PDU of the unit.

Note: Be aware that for single mains this is also the mains input protective device.

Note: Using a solution solely based on breakers, selectivity for load short circuit currents higher than 2kA cannot be assured for the 3-phased output. If this is required, use fuses to protect the bypass.

UPS size	Fuse type
20 kVA version 208 V input voltage	40 A Class J time delay fuse
30 kVA version 208 V input voltage	50 A Class J time delay fuse

If fuses are preferred, the following can be used:

UPS size	Breaker/fuse
20 kVA version 480 V input voltage	40 A
30 kVA version 480 V input voltage	50 A

Ensure that the short-circuit current on the UPS input is less than 20AiC sym RMS. Also take into consideration the below breaker settings to ensure correct functionality during overload operation.

Note

Breakers/fuses other than APC SUVTOPT need complete selectivity assessments.

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Minimum breaker settings

20kVA	Internal fault	800% overload bypass operation	150% overload normal/ battery operation	125% overload normal/ battery operation	Conti-nuously
Mains input	4kA	–	–	–	68A
Bypass input	2.3kA	444A	–	–	62A
Output	14kA	444A	84A	70A	62A
Duration	<10ms	500ms	30 s	60 s	∞
Notes	1				

30kVA	Internal fault	800% overload bypass operation	150% overload normal/ battery operation	125% overload normal/ battery operation	Conti-nuously
Mains input	5kA	–	–	–	102 A
Bypass input	4.2k A	444 A	–	–	92 A
Output	14k A	444 A	125 A	105 A	92 A
Duration	<10 ms	500 ms	30 s	60 s	∞
Notes	1				

Note 1: the short-circuit level is indicated for the output value.

Recommended phase-conductor sizes [AWG] for a 86°F (30°C) temperature environment

UPS/AWG sizes	Mains input [AWG]	AC output [AWG]	DC input [AWG], 75°C Wire
20 kVA	6	4	4
30 kVA	4	1	1

Cable Size [AWG]	Cable Lug Type	Crimping Tool	Die	Terminal Bolt Diameter
6	YA6CL2TC38	MD7-34R	W5CVT	0.2 in/6 mm
4	YA4CL2TC38	MD7-34R	W4CVT	0.2 in/6 mm
1	YA1CL2TC38	MD7-34R	W1CVT	0.2 in/6 mm

Note

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

Warning

At 100% non-linear load (EN50091-3 standard), the neutral shall be rated for 200% phase current.

6 Wiring Verification

- Do not connect batteries in the UPS.
- If an XR Enclosure is installed make sure that the DC breaker is in the OFF position and that both 125A fuses are removed from the XR Enclosure.
- Check that the power wiring is torqued to 45 lbf·in/5 Nm.
- If your installation includes an XR Enclosure, remount the 125A fuses in the XR Enclosure and check that the DC breaker on the XR Battery Enclosure is in the ON position.
- Make sure the cable landing cover plates are installed.
- Leave a wiring diagram on site for service personnel.
- If a problem occurs, phone Customer Support at (1) (800) 800-4272 (US and Canada). Refer to Contact Information for contact numbers in other countries.
- For any optional equipment, refer to product-specific manuals.

7 Load Connection

At the rear, the UPS contains at least one Distribution Units (PDU). As standard, one PDU is installed on the left side seen from the rear. In addition, a second PDU may be installed on the right side. The PDU has 6 breaker sets. The top breaker set operates as a unit and protects any 3-phased equipment that may be connected to the PDU. This breaker unit (must be toggled) will switch ON/OFF all 3 phases when operated (may supply several loads). Each of the 5 other breaker sets protects the 5 single-phased outlets (L1, L2, L3) beneath the actual breaker set. The top breaker in each of these 5 single-phased outlets protects L1, the middle breaker protects L2, and the bottom breaker protects L3.

Connecting the load to the PDUs

Note

Connect the load equipment evenly between the 3 phases to avoid overloading one particular single phase. The total output capacity of the PDU is approximately twice the output capability of the UPS. This means that UPS would be over-loaded if all PDU outlets were loaded to their rating. Load status on the individual phases can be found through the UPS display or through the web interface.

Note

Equipment connected to the 3-phased output may require overcurrent protection with a lower rating than the 3-phased output.

Note

For 3-phased output, the highest current may be in the Neutral conductor at non-linear loads (up to 173%) and may trip the breaker.

Note

The UPS can support a 3-phase load if that load is connected to the 3-phase terminal in order to ensure correct connection/ disconnection of the load across all 3 phases simultaneously

Note

ONLY single-phased Phase to Neutral loads may be connected to the five L21-20 outlets as per NEC05. The outlets have individual breakers for each phase for maximum availability.

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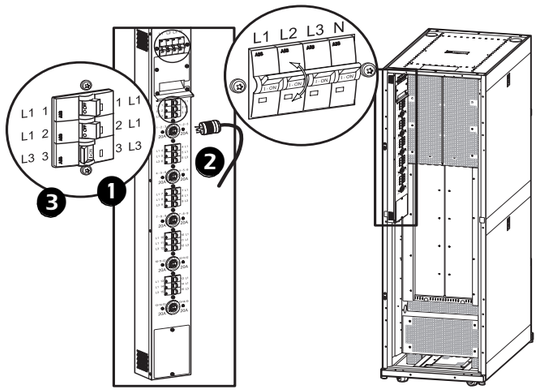

1. Set the applicable breaker to the OFF position (make a note of which outlet supplies which load).
2. Insert the plug from the load into the outlet. Secure the plug by turning it clockwise approximately 45°.
3. Set the applicable breaker to the ON position to supply the load.

Disconnecting the load from the PDU(s)

To disconnect the load, set the applicable breaker, or breaker unit, to the OFF position.

PDU output breaker ratings

		Nominal rating of breaker		
Rear of unit	**Ambient temperature in front of unit ºC**	**20**	**50**	**63**
Free exhaust	20	17	42.5	53.55
Free exhaust	30	16	40.0	50.40
Free exhaust	40	15	37.5	47.25
Hot aisle exhaust	25	16	40.0	50.40

8 Contact Information

If a problem occurs, phone Customer Support at (1) (800) 800-4272 (US and Canada). For local country-specific centers: go to www.apc.com/support/contact. Web Support: support@apc.com.

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