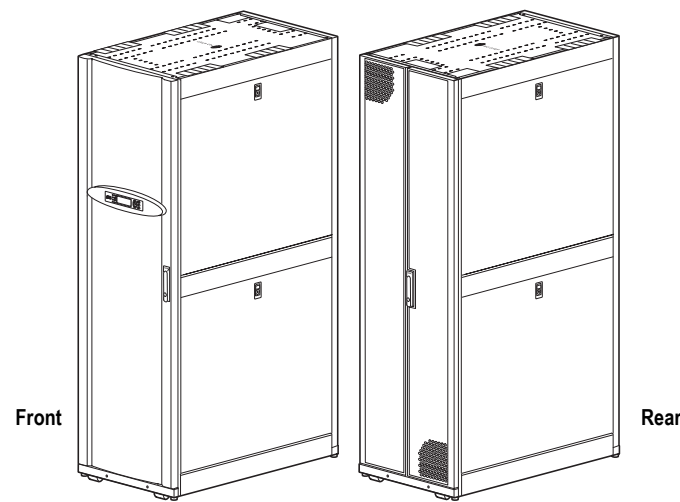




# APC Smart-UPS® VT ISX Enclosure 20-30 kVA 208V for 5 Battery Modules with Power Distribution Unit (PDU)

## Installation

**IMPORTANT SAFETY INSTRUCTIONS  
SAVE THESE INSTRUCTIONS**



Always read the separate Safety Sheet 990-2822 prior to the installation.



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.



The UPS must be supplied from a: 208Y/120V or 220Y/127V 4W+ GND 60 Hz source.



Power terminal lug diameter: minimum 6 mm.  
Torque value: 62 lbf in/7 Nm.

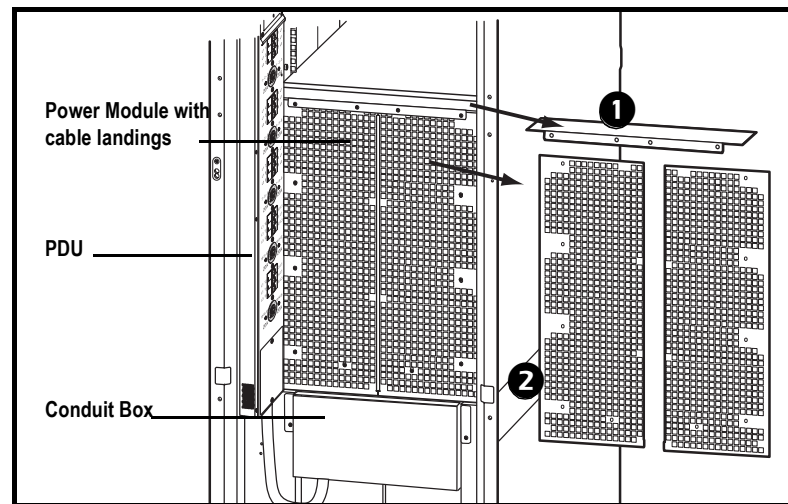
# 1 Cable Entry



Make sure that the UPS is in its location of use before you start the cabling.

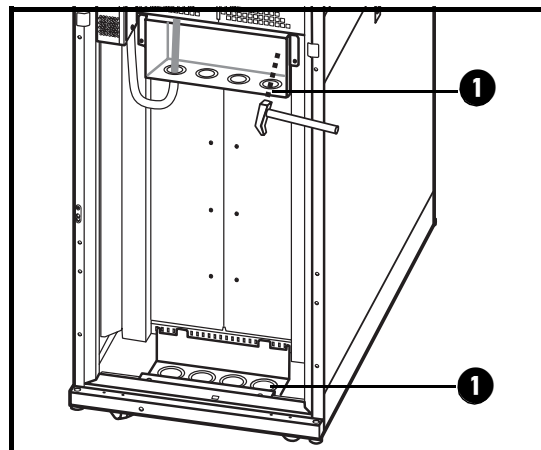
Cable entry takes place from the rear of the UPS. Pull out the lower end of the handle and turn it counterclockwise to a horizontal position to open the door.

### Preparing for cabling (general)

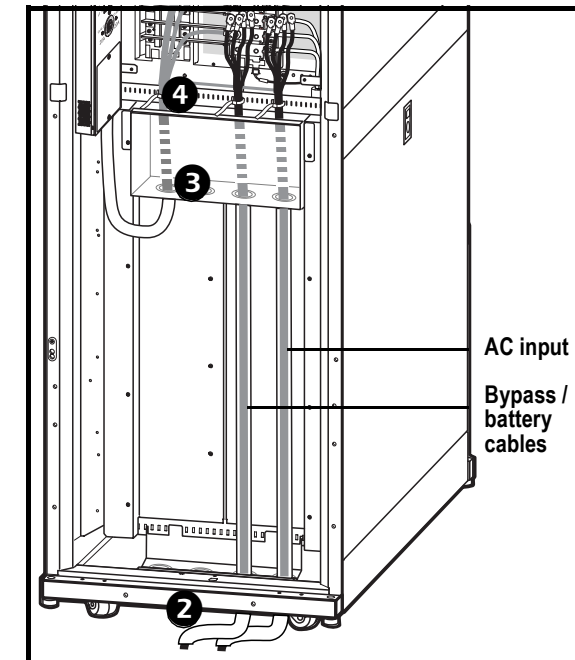


- 1 Use a torx screwdriver to remove the four M4 screws from the top cable landing cover, and remove. If you are wiring the UPS from the top, punch holes for cable entrance in the top cable landing plate now.
- 2 Use a torx screwdriver to remove the remaining eight M4 screws from the cable landing covers, and remove.

### Bottom cable entry

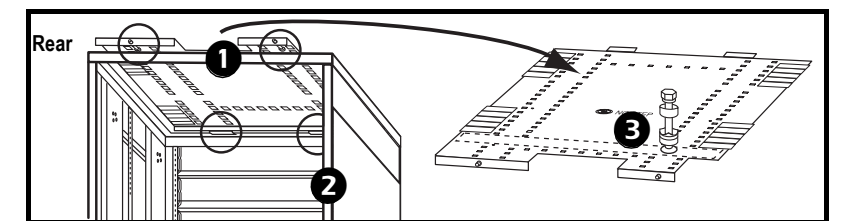


- 1 Use a hammer to punch out knockouts, and line the holes with grommets (not supplied).

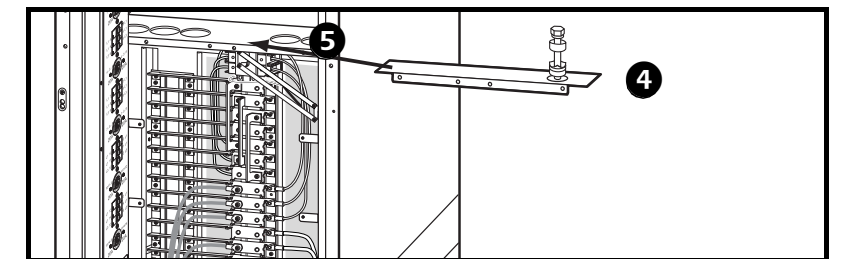


- 2 Guide the cables through the bottom holes and attach conduits (not supplied).
- 3 Feed the cables through the conduit box.
- 4 Pull cables up into the cable landing area. Attach the cables to the slotted plate using cable ties.

### Top cable entry

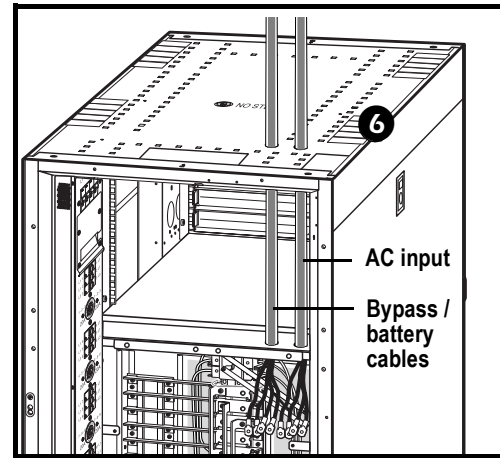


- 1 From the rear of the inside of the UPS push the top cover spring locks backwards to lift up the rear end of the top cover.
- 2 Slide out the top cover (mind the wing on either side of the plate).
- 3 Punch holes in the area between the two rails on the rear of the top cover for conduits in labeled area as required. Line hole(s) with grommets (not supplied). Reinstall the plate.



- 4 Punch holes in the top cable landing plate as required.
- 5 Reposition the top cable landing plate (do not fasten).

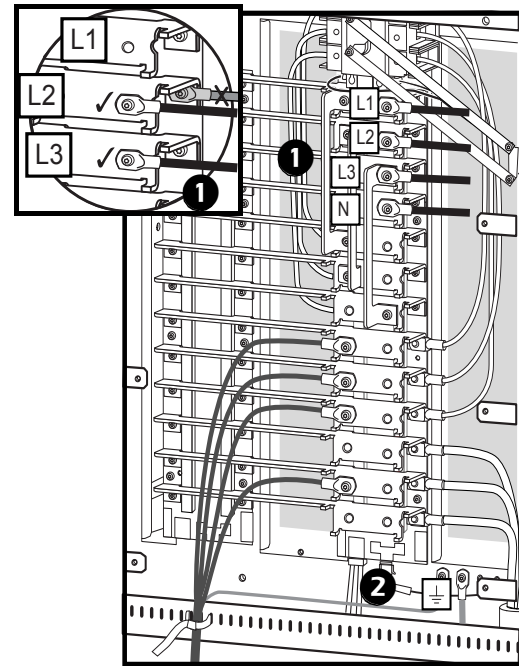




- 6 Feed cables through the holes in the top cover, install the conduits (not supplied), and guide the cables through the punched holes into the cable landing area.

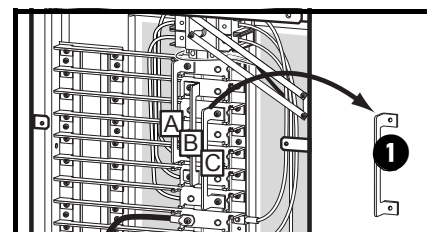
## 2 AC Input and Ground Cable Landings

### Single mains

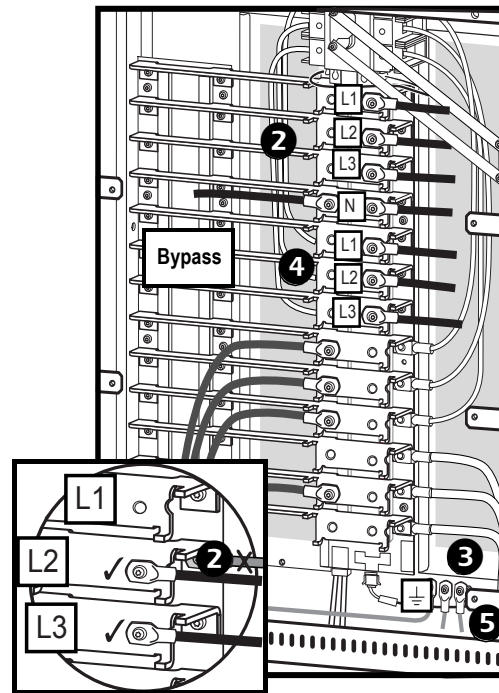


- 1 Connect the AC input cables (L1, L2, L3), and N to the cable landings using a torx screwdriver.
- 2 Connect the ground cable using the provided screw (earth symbol beneath).

### Dual mains

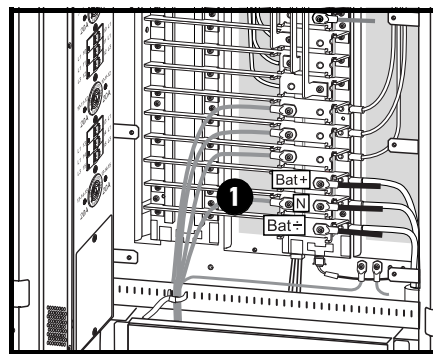


- 1 Remove the two M6 screws from brackets A, B, and C to make the busbars available for dual mains.
- 2



- 2 Connect the input cables (L1, L2, L3), and N to the cable landings using a torx screwdriver.
- 3 Connect ground cable.
- 4 Connect the bypass cables (L1, L2, L3), and N to the cable landings.
- 5 Connect bypass ground cable.

## 3 Battery Cable Landings



- 1 Run the cables as shown under *Bottom cable entry/ Top cable entry*. Connect the battery cables Bat+ and Bat- and the N cable in the designated areas. Connect ONLY APC SUVTRBXR2B6S battery enclosure to the UPS.

## 4 Connecting Load to the PDU

### Preparing to connect the load to the PDU(s)



Note

Connect the load equipment evenly between the 3 phases to avoid overloading the PDU. 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

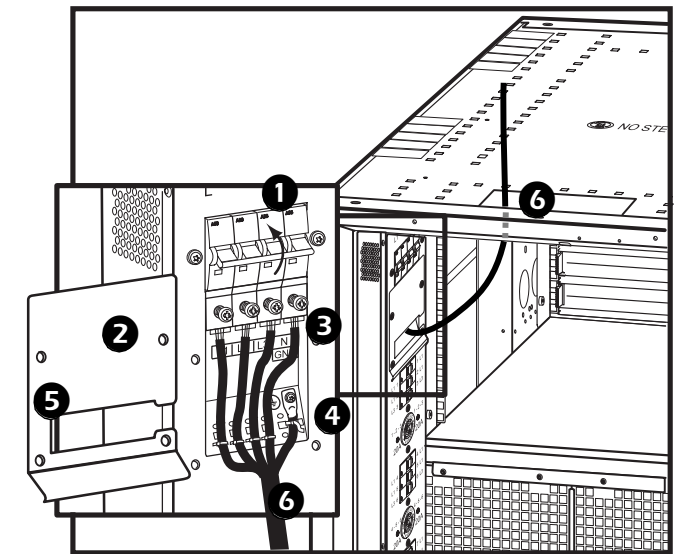
Equipment connected to the 3-phased output may require overcurrent protection with a lower rating than the 3-phased output.



Note

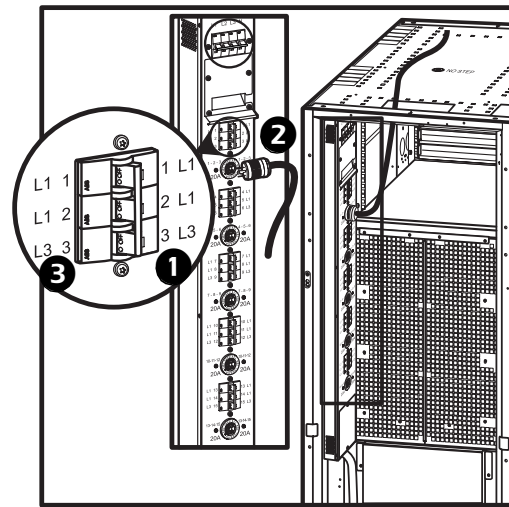
For 3-phased output, the highest current may be in the Neutral conductor at non-linear loads (up to 173%).

### Connecting load to the 4-pole breaker



- 1 Set the top PDU breaker to the OFF position.
- 2 Using a torx screwdriver, remove the four M4 screws from the top plate of PDU. Remove plate.
- 3 Connect the L1, L2, L3 and N to the terminals and tighten the M6 screws firmly. Fasten cables with cable ties.
- 4 Attach the ground cable to the ground stud (labeled Earth) and fasten with cable tie.
- 5 Use a torx screwdriver to reinstall the top plate removed in step 2.
- 6 Feed the cable through the cable outlet in the top cover.

## Connecting load to the 3-pole breaker(s)



- 1 Set the applicable breaker to the OFF position.
- 2 Insert the plug from the load into the receptacle. Secure the plug by turning it clockwise approximately 30°.
- 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 to the OFF position.

## PDU output breaker ratings

Rear of unit	Ambient temperature in front of unit °C	Nominal rating of breaker		
		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

# 5 Communication Cables

**Note** Emergency Power Off (EPO) switch must be connected to a NEC Class 2 circuit.

**Note** Use only 28-16 AWG copper wire for the connection of the EPO switch 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.

### 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\*

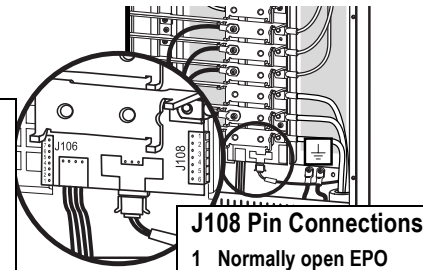
\* Should be used with APC XR Enclosures



The UPS must be connected to either a dry contact or a 24 V<sub>DC</sub> EPO switch.



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

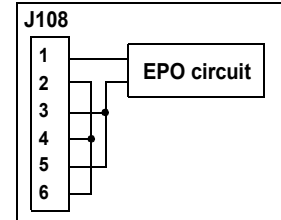


### J108 Pin Connections:

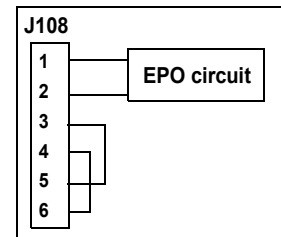
- 1 Normally open EPO
- 2 Normally open EPO return
- 3 Normally closed EPO
- 4 Normally closed EPO return
- 5 +24V SELV supply
- 6 SELV ground

## EPO (Emergency Power Off) switch wiring – pin connections J108 (for EPO wiring options)

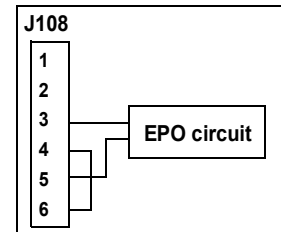
Connect the EPO cable, using one of the following 4 wiring configurations:



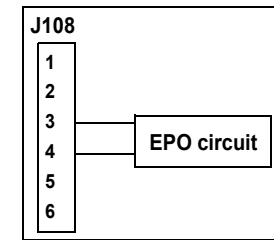
**1: Dry Contracts Normally Open**  
EPO is activated when pin 1 is connected to pins 3 and 5.  
Prewired connection 2-4-6, 3-5 and 1 =>



**2: +24V Normally Open**  
EPO is activated when an isolated SELV 24V<sub>DC</sub> voltage is supplied on pin 1 with reference to pin 2.  
Prewired connection 3-5 and 4-6

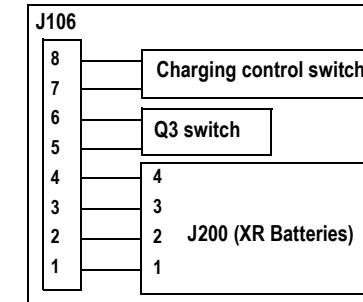


**3: Dry Contacts Normally Closed**  
EPO is activated when a connection from pin 3 to pin 5 is opened.  
Prewired connection 4-6.



**4: +24V Normally Closed**  
EPO is activated when a SELV 24V<sub>DC</sub> voltage removed from pin 3 with reference to pin 4.

## Pin connections J106 (UPS)



Pins 1 to 4 are for battery measurement (only applicable to APC 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 requires control of charging. When Q3 is closed, signals are fed back to the UPS controller.

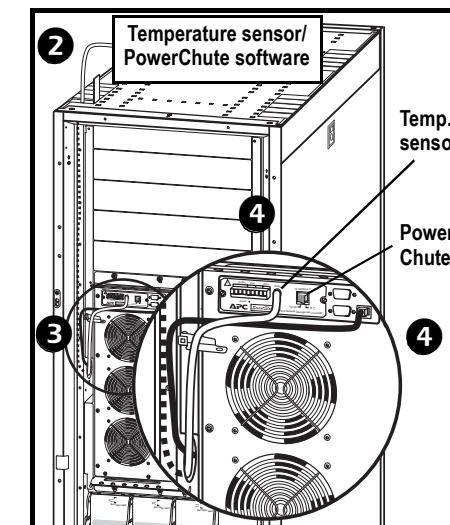


When connecting the Q3 auxiliary signal, use gold-plated N/C auxiliary switch on Q3.



Reinstall cable landing covers.

## Connection of APC communication options – PowerChute software and temperature sensor



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



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

## 6 UPS Specifications

UPS ratings	20 kVA		30 kVA	
	208 V	220 V	208 V	220 V
Input voltage / Bypass voltage (V) per phase	208	220	208	220
Input current (nominal) (A)	54.2	51.2	83.1	76.9
Input frequency (Hz)	60	60	60	60
Output voltage (on line) (Vac) Minimum and maximum values (±1%)	3x208	3x220	3x208	3x220
Output current (nominal, per phase) (A)	55.5	52.5	83.3	78.7
Maximum output current (in bypass only at 110% overload per phase)	61.1	57.7	91.6	86.6
Neutral output current (with 100% switch mode load) (A)	96.2	90.9	144.2	136.4

### Minimum breaker settings

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

30kVA	Internal fault	800% overload bypass operation	150% overload normal/battery operation	125% overload normal/battery operation	Continuously
Mains input	5 kA	–	–	–	102 A
Bypass input	4.2 kA	444 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	AC input [AWG]	AC output [AWG]	DC input [AWG], 75°C Wire
20 kVA	4	4	4
30 kVA	1	1	1



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

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



At 100% non-linear load (EN50091-3 standard), the neutral shall be rated for 173% phase current.

### Recommended current protection

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

Dual/single mains con-figuration	Connection	20 kVA	30 kVA	Notes
Single	Mains/Bypass	SUVTOPT112	SUVTOPT113	
Dual	Mains	SUVTOPT112 or 100A breaker/fuse (30kAIC)	SUVTOPT113 or 125A breaker/fuse (30kAIC)	1, 2
Dual	Bypass	SUVTOPT112	SUVTOPT113	

Output protection is included in the PDU of the unit.

**Note 1:** Be aware that for single mains this is also the mains input protective device.

**Note 2:** 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 as follows to protect the bypass:

UPS size	Fuse type
20 kVA version 208 V input voltage	100 A Class J time delay fuse
30 kVA version 208 V input voltage	125 A Class J time delay fuse

If another input protection is required select one with a maximum rating as follows:

UPS size	Breaker/fuse
20 kVA version 208 V input voltage	100 A
30 kVA version 208 V input voltage	125 A

Ensure that the short-circuit current on the UPS input is less than 14 kA<sub>iC</sub> sym RMS. Also take into consideration the below breaker settings to ensure correct functionality during overload operation.



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

## 7 Checklist

- Do not apply electricity to the UPS.
- Do not connect batteries in the UPS.
- If an XR Battery Enclosure is installed make sure that the DC breaker (if available) is in the OFF position and that both 125A fuses are removed from the XR Battery Enclosure.
- Check that the power wiring is torqued to 62 lbf in/7 Nm.
- Verify clockwise phase-rotation (L1, L2, L3) and make sure a neutral connection is present.
- If the installation includes an XR Battery Enclosure, remount the 125A fuses in the XR Battery Enclosure and check that the DC breaker (if available) on the XR Battery Enclosure is in the ON position.
- Leave a wiring diagram on site for service personnel.
- Close the rear door.
- For any optional equipment, refer to product-specific manuals.

## 8 Contact Information

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