

**APC Smart-UPS® VT ISX Enclosure**

**20-30 kVA 208V for 5 Battery Modules and with Power Distribution Unit and Isolation Transformer**

**Installation**

**IMPORTANT SAFETY INSTRUCTIONS**

SAVE THESE INSTRUCTIONS

---

**1 Cable entry**

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

Cable entry takes place from the rear of the UPS. Open the rear doors by pulling 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 loosen the four M4 screws from the cable landing cover, and remove.

**Preparing for bottom and top entry**

1. Use a hammer to punch out knockouts and line holes with grommets (not supplied). Reinstall the top plate.

**2 AC Input and Ground Cable Landings**

**Bottom cable entry**

1. Feed the input cables in conduits (not supplied) through the punched holes in the bottom plate.
2. Use cable ties to attach the cables to the slotted plate.
3. Connect the input cables (L1, L2, L3), and N to the cable landings.
4. Connect the ground cable using the provided screw (earth symbol beneath the applicable screw).
5. Reinstall bottom cable landing cover.

---

**WARNING**

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 60Hz source.

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

---

990-2869B 07/2006
Top cable entry

1. Feed the input cables in conduits (not supplied) through the punched holes.
2. Run the cables in the side panel.
3. Guide the input cables through the punched holes in the bottom plate up to the cable landing.
4. Use cable ties to attach the cables to the slotted plate.
5. Connect the input cables (L1, L2, L3), and N to the cable landings.
6. Use cable ties to attach the cables to the slotted plate.
7. Reinstall bottom cable landing cover.

3 Battery Cable Landings

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

Bottom cable entry

1. Use a torx screwdriver to remove top cable landing covers.
2. Feed the battery cable through the bottom of the UPS. On the outside of the bottom cover, run the cable in conduits (not provided) to the conduit box.
3. Connect the battery cables Bat+ and Bat− and the N cable in the designated areas.
4. Use a torx screwdriver to attach the cable to the slotted plate.
5. Guide the cables through the punched hole in the top cover and down to the cable landings.
6. Connect Bat+ and Bat− and N in the designated areas.

4 Connecting Load to the PDU

Preparing to connect the load to the PDU(s)

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.

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

For 3-phased 4-pole 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, 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 hole 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.
3. Secure the plug by turning it clockwise approximately 30°.
4. Set the applicable breaker to the ON position to supply the load.
5 Communication Cables

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

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.

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

Remove top cable landing covers as described under Battery Cable Landings, top entry.

The UPS must be connected to either a dry contact or a 24 VDC EPO switch.

### PDU output breaker ratings

<table>
<thead>
<tr>
<th>Rear of unit</th>
<th>Ambient temperature in front of unit °C</th>
<th>Nominal rating of breaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free exhaust</td>
<td>20</td>
<td>42.5, 53.55</td>
</tr>
<tr>
<td>Free exhaust</td>
<td>30</td>
<td>40.0, 50.40</td>
</tr>
<tr>
<td>Free exhaust</td>
<td>40</td>
<td>37.5, 47.25</td>
</tr>
<tr>
<td>Hot aisle exhaust</td>
<td>25</td>
<td>40.0, 50.40</td>
</tr>
</tbody>
</table>

### 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 and 1

2. **+24V Normally Open**
   - EPO is activated when a +24V SELV 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 voltage removed from pin 3 with reference to pin 4.

### Connection of APC communication options – PowerChute software and temperature sensor (identical cable routing)

1. Open front door.
2. Feed 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

Minimum breaker settings

<table>
<thead>
<tr>
<th>Ups ratings</th>
<th>20 kVA</th>
<th>30 kVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>208 V</td>
<td>220 V</td>
</tr>
<tr>
<td>Input voltage / Bypass voltage (V) per phase</td>
<td>208</td>
<td>220</td>
</tr>
<tr>
<td>Input current (nominal) (A)</td>
<td>54.2</td>
<td>51.2</td>
</tr>
<tr>
<td>Input frequency (Hz)</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Output voltage (on line) (Vac)</td>
<td>3x208</td>
<td>3x220</td>
</tr>
<tr>
<td>Minimum and maximum values (%1%)</td>
<td>55.5</td>
<td>52.5</td>
</tr>
<tr>
<td>Output current</td>
<td>61.1</td>
<td>57.7</td>
</tr>
<tr>
<td>Maximum output current (in bypass only at 110% overload per phase)</td>
<td>96.2</td>
<td>90.9</td>
</tr>
<tr>
<td>Neutral output current (with 100% switch mode load) (A)</td>
<td>96.2</td>
<td>90.9</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>UPS sizes</th>
<th>AC input [AWG]</th>
<th>AC output [AWG]</th>
<th>DC input [AWG], 75°C Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 kVA</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>30 kVA</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

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

Warning

At 100% non-linear load (ENS5091-3 standard), the neutral shall be rated for 173% phase current.

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 SUVTOPT112 (20kVA version) or the SUVT113 (30kVA version) as input protection.

Output protection is included in the PDU of the unit.

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

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

<table>
<thead>
<tr>
<th>Cable Size [AWG]</th>
<th>Cable Lug Type</th>
<th>Crimping Tool</th>
<th>Die</th>
<th>Terminal Bolt Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>YA6CL2TC38</td>
<td>MD7-34R</td>
<td>W5CVT</td>
<td>0.2 in/6 mm</td>
</tr>
<tr>
<td>4</td>
<td>YA4CL2TC38</td>
<td>MD7-34R</td>
<td>W4CVT</td>
<td>0.2 in/6 mm</td>
</tr>
<tr>
<td>1</td>
<td>YA1CL2TC38</td>
<td>MD7-34R</td>
<td>W1CVT</td>
<td>0.2 in/6 mm</td>
</tr>
</tbody>
</table>

If fuses are preferred, the following can be used:

<table>
<thead>
<tr>
<th>UPS size</th>
<th>Breaker/fuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 kVA version 208 V input voltage</td>
<td>100 A</td>
</tr>
<tr>
<td>30 kVA version 208 V input voltage</td>
<td>125 A</td>
</tr>
</tbody>
</table>

Ensure that the short-circuit current on the UPS input is less than 14 kA 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/contact. Web Support: write to support@apc.com.