Eaton® BladeUPS®

DoS Installation Instructions
Eaton® BladeUPS®

DoS Installation Instructions
Help Desk Numbers

United States  1-800-356-5737 or 1-800-843-9433
Canada        1-800-461-9166 ext 260
All Other Countries  Call your local service representative

Web sites:
- www.eaton.com/powerquality

NOTE: On the Web site opening page, click Support and select the Customer Service link for more information.

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Section 1  Introduction

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase, and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

System Components

The equipment components of the BladeUPS system are shipped as follows:

- 1 palletized BladeUPS Cabinet (see Figure 1)
- 1 palletized Transformer (not needed if you are using an existing transformer or not using a transformer; see Figure 1)

![BladeUPS Cabinet and Transformer](image)

Figure 1. BladeUPS Cabinet and Transformer (if ordered)

- 2 BladeUPS shipping cartons (see Figure 1 and Figure 2 for more information)
<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BladeUPS Module Chassis (delivered with Electronics Module installed)</td>
</tr>
<tr>
<td>1</td>
<td>Electronics Module</td>
</tr>
<tr>
<td>4</td>
<td>Battery Packs</td>
</tr>
<tr>
<td>1 package</td>
<td>UPS Documentation and Software Tools:</td>
</tr>
<tr>
<td></td>
<td>• IPSS Software Suite CD and Firmware CD</td>
</tr>
<tr>
<td></td>
<td>• Installation instructions and a standard BladeUPS User’s Guide</td>
</tr>
<tr>
<td>2</td>
<td>Door Keys</td>
</tr>
</tbody>
</table>
Table 1. Shipped in Each Shipping Carton (Continued)

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Hot Sync CAN Bridge Cards</td>
</tr>
<tr>
<td>1</td>
<td>CAN Bridge Card Cable</td>
</tr>
<tr>
<td>1</td>
<td>Redundant Signal Cable</td>
</tr>
<tr>
<td>1</td>
<td>Input-Output Wire</td>
</tr>
<tr>
<td>2</td>
<td>Blue Terminating Plugs</td>
</tr>
<tr>
<td>1</td>
<td>Bypass Switch Contact Cable</td>
</tr>
</tbody>
</table>
Section 2 Tools

To assemble the components, you may need the following tools:

- Forklift or pallet jack
- Flathead (short and long)
- Short- and long-handled medium flat-bladed screwdriver
- Short- and long-handled #2 Phillips® screwdriver
- Ratcheting socket wrench and socket for 9/16” screws
- 7 mm wrench or socket
- Utility knife
- Adjustable pliers
Wire cutter for tie wraps

Note: You may find it useful to use a magnetized screwdriver when removing or replacing mounting screws.

Section 3 Moving the System and Battery Pallets

The BladeUPS cabinet is bolted to a wooden pallet and shrink-wrapped for traveling. If you are installing a new transformer, it is also bolted to a separate wooden pallet. The batteries and the BladeUPS modules are packed in two separate boxes with other accessory boxes within larger containers on a separate pallet.

WARNING

The forklift jacks must be inserted between the skids at the front of the pallet. If unloading instructions are not closely followed, moving the pallets may cause serious injury.

To move the equipment and boxes on the pallets:

1. Verify that the forklift or pallet jack you will use is rated to handle the weight of the equipment or loaded boxes and the pallet.
2. If not already moved, use a forklift or pallet jack to move the pallets to the installation area, or as close as possible.

Note: Insert the forklift jacks between the skids at the front of the pallet.

Note: Do not park the pallet in a location that will interfere with installing the system.

Section 4 Unpacking

Note: Some setups will be retrofitting their transformer configuration with a BladeUPS cabinet instead of another type of Eaton UPS. If so, make sure the Eaton UPS bolted to the top of the transformer is removed per your facility practice before unpacking the BladeUPS shipping cartons.

To unpack the equipment:

1. Remove the shrink wrap from the BladeUPS cabinet.
2. Cut the carton tie wraps with the wire cutters and open the two BladeUPS shipping cartons by lifting off the top containment (see Figure 3).
Figure 3. Unpacking a BladeUPS Shipping Carton

3. Check each shipping carton to identify the contents.

Note: Some of the boxes are empty. They are in the stack to prevent voids inside the shipping carton that would allow the contents to shift. Discard per your practice, or store for future use.

Section 5 Unloading the System

Note: Front and rear stabilizing bolts are bolted through the floor of the cabinet into the pallet to secure the system for shipping. The bolts must be removed before unloading the system.

1. Unlock the BladeUPS cabinet and place the key in a secure place so it will be available to you when you need it.
2. Open the BladeUPS cabinet front door.
3. Ensure the UPS/Service/Bypass switch dial is turned to UPS (see Table 2 and Figure 4).

Table 2. UPS Bypass Switch Positions

<table>
<thead>
<tr>
<th>Switch Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS</td>
<td>Connects the UPS output to the load.</td>
</tr>
<tr>
<td>SERVICE</td>
<td>Connects the load directly to AC input power and disconnects UPS output. AC input power is still connected to the UPS input.</td>
</tr>
<tr>
<td>BYPASS</td>
<td>Like the SERVICE position, BYPASS connects the load directly to AC input power and disconnects UPS output. However, because BYPASS also disconnects AC input from the UPS, this is the appropriate position for UPS maintenance or repair.</td>
</tr>
</tbody>
</table>
4. Verify utility power is switched off to the distribution point where the UPS system will be connected.

**CAUTION**

Be absolutely sure there is no power.

5. In the floor of the front of the cabinet, unbolt the two bolts that secure the cabinet to the pallet with a 9/16" socket. Remove the bolts along with the associated lock washers and flat washers (see Figure 5).

6. Use a 7 mm socket to remove the back cabinet top and back covers (see Figure 6). Retain the covers and the hardware you removed to replace them after the wiring is completed.

7. After the back covers are removed, locate the back bolts that secure the cabinet to the pallet. Use a 9/16" socket to remove the bolts and retain the hardware you removed.

**Note:** If you are using a transformer in your BladeUPS system configuration, make sure the transformer is at the final installation location.
8. Move and secure the BladeUPS cabinet:
   
a. **If you are using a NEW or an EXISTING transformer:** Lift the BladeUPS cabinet on top of the transformer and align it without overhang (see Figure 7). With a 9/16” socket, secure the cabinet to the transformer with the same bolts, locking washers, and flat washers that previously secured the cabinet to the pallet.

b. **If you are NOT using a transformer:** Bolt the cabinet to the floor.

![Figure 7. Lift BladeUPS Cabinet on Top of the Transformer](image)
Section 6  Equipment Setup

To set up the BladeUPS system, you will need to locate and open both boxes for the two BladeUPS modules, the two Electronics Modules (EM), the eight battery packs, and the two installation kits.

1. Locate accessory boxes and remove the installation kits. Verify that the following items are in each installation kit:
   - UPS documentation and software tools:
     - IPSS Software Suite CD and Firmware CD
     - Installation instructions and a standard BladeUPS User's Guide
   - (2) Door keys
   - (2) Hot Sync CAN Bridge Cards, and wiring accessories:
     - (1) CAN Bridge Card Cable
     - (1) Redundant Signal Cable
     - (1) Bypass Switch Contact Cable
     - (1) Input-Output Wire
     - (2) Blue Terminating Plugs
     - (2) Two-screw brackets
     - (2) Ferrite Cores

2. Use a 7 mm socket to remove the two screws in the middle of the two frame crossbars. Locate the battery chassis support brackets in the installation kit, position brackets over the crossbar mounting screw holes, and reinstall the screws (see Figure 8).

   ![Figure 8. Install Battery Chassis Brackets on Crossbars](image)

   **Note:** Lifting the BladeUPS module chassis is a two-person job.

3. **For the first BladeUPS module.** With one man on each side, use the handled cardboard frame to lift the module out of the box and set it on a stable surface (see Figure 9).

4. Use a Phillips screwdriver to remove the screw that secures the EM.

5. Set the EM on a stable surface.

6. Carry the first BladeUPS module to the cabinet and insert it into the bottom bay of the cabinet.
Figure 9. Lifting the BladeUPS Module into the Cabinet

7. **For the second BladeUPS module.** Repeat steps 3-6 for the second BladeUPS module.

8. Remove the eight screws on the bottom battery cover plate. Repeat to remove the top battery cover plate. Retain the plates and the screws (see Figure 11).

Figure 10.

Figure 11. Remove Top and Bottom Battery Covers

9. On each BladeUPS back panel, verify that input circuit breakers (CB1 and CB2) on both BladeUPS back panels are in the OFF position. The OFF position is down and a small OFF label is visible on the circuit breaker switch (see Figure 12).

**Note:** On both BladeUPS back panels, CB2 is above the Input-Output Wire and CB1 is below the Input-Output Wire.

Figure 12. CB1 and CB2 in OFF Position
Section 7   Install the Equipment Modules and Batteries

To install the EMs and batteries in the BladeUPS modules:

Note: Always remove batteries first, before replacing or removing EM.

1. Hold the first EM horizontally and insert it tabs up, fan side first, into the bottom EM bay of the cabinet. Replace the holding screw that secures the EM in the frame mounting hole of the cabinet.

2. Repeat to install the EM in the top EM bay of the cabinet.

3. Locate and unpack the battery packs.

Note: Always install the batteries in the bottom bays first, then install them in the top bays.

4. Hold the battery packs horizontally with the connector end positioned ready to insert into the open battery bay.

5. Align the battery slots on the chassis with the shape of the battery pack. Insert the battery pack with the connector end in first.

6. When a tray is fully installed, tuck the plastic handle on the end of the tray into place.

7. Reinstall the battery cover plates. Secure them with the screws you retained, four on the left and four on the right of each plate (see Figure 13).

Figure 13. Reinstall Battery Covers
8. Connect the front control panel display cable for each BladeUPS to its RJ-45 connector on the EM (see Figure 14).

Figure 14. Connect Display Cables
Section 8  Wiring and Cabling

CAUTION

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation.
Risk of electrical shock. Always verify utility power is switched off to the distribution point.

Note: Ferrite cores for wires are provided to meet EMI requirements. The input wires should pass through the core from the transformer wire connections to the input of the UPS (see Figure 15).

Note: You will need a #2 Phillips screwdriver and an Allen wrench.

1. Remove the back panel of the transformer.
2. Tap the line for the proper voltage.
3. Route the wiring from the transformer through the cut-out channel hole provided (see Figure 15).

Figure 15. Tap the Line

4. At the BladeUPS cabinet back panel, install the following for each BladeUPS module (see Figure 16 through Figure 20):
Input-Output Wire
For each UPS, connect the Input-Output Wire (see Figure 16).

Hot Sync CAN Bridge Cards
a. Unpack the Hot Sync CAN Bridge Cards and verify that the cards were not damaged during shipment.
b. Install the first Hot Sync CAN Bridge Card into the open X-Slot communication bay on the top UPS (see Figure 17).
c. Install the second Hot Sync CAN Bridge Card into the open X-Slot communication bay on the bottom UPS (see Figure 17).

Blue Terminating Plugs
a. Install a blue terminating plug in the CAN IN port on the top UPS (see Figure 17).
b. Install a blue terminating plug in the CAN OUT port on the bottom UPS (see Figure 17).
**CAN Bridge Card Cable**

a. Install a CAN Bridge Card cable between the UPSs, connecting the CAN OUT port (on the top UPS) to the CAN IN port (on the bottom UPS). See Figure 17.

![Figure 17. CAN Bridge Card Connections](image)
When you connect the cables between the UPS units make sure that you route them through the grommets in the UPS lower brackets (see Figure 18).

**Figure 18. Cable Grommets**

**Redundant Signal Cable**

- a. Install a redundant signal cable between the Standalone/Parallel terminal on the top UPS and the COM For Parallel Use Only terminal on the bottom UPS (Figure 19).
- b. Be sure to check correct polarity when installing the cable.

---

**CAUTION**

If polarity or wiring is not correct, the parallel system does not operate normally. For example, when shutting down one UPS, the remaining UPS transfers the load to bypass instead of supporting the load. Verify that all wiring is correct for proper operation.
Figure 19. Redundant Signal Card Connections

**Bypass Switch Contact Cable**

a. Install the Bypass Switch Contact cable between the two UPSs, connecting signal input 1 on the top UPS to signal input 1 on the bottom UPS.

**Note:** There is a second wire set attached to the connector for the bottom UPS. These wires are connected in Step C that follows (see Figure 20).

b. Route wires down left rear upright of UPS frame, from UPS section to the wiring section, with other wiring that is located in the same wire channel.

c. Connect the labeled TB11 and TB12 wires to the terminals labeled “11” and “12” on terminal wiring strip in the wiring section (see Figure 20).

Figure 20. Attach TB11 and TB12 to the Terminal Wiring Block

5. Replace the back panel of the transformer.

6. Replace all the cover plates on the back of the BladeUPS cabinet.
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Section 9 System Startup

CAUTION

Only qualified service personnel (such as a licensed electrician) shall perform the electrical installation. Risk of electrical shock.

CAUTION

Make sure to wear proper safety gear.

To start up the BladeUPS system:

1. Verify that the total equipment ratings do not exceed the system capacity to prevent an overload alarm.

2. Verify that all UPS circuit breakers are in the OFF (down) position.

3. Switch on utility power where the UPS is connected.

4. Remove the breaker ties from the circuit breakers on the back of each UPS module and switch on the UPS circuit breakers labeled CB1 INPUT BREAKER.

5. Go to front of the BladeUPS cabinet and switch on both input circuit breakers labeled CB4 and CB5 located next to the UPS/Service/Bypass switch dial.

6. Wait for the front panel display on each UPS to illuminate.

   The Δ indicator flashes on each UPS.

7. Check each UPS front panel display for active alarms or notices (other than “Batteries Disconnected”). Resolve any active alarms before continuing.

   Note: See “Service and Troubleshooting” in the Eaton BladeUPS User’s Guide (Preassembled and Standard Systems) For use with Eaton BladeUPS 5 kVA to 60 kVA (N+1) systems.

8. Switch on the CB2 UPS battery circuit breakers labeled CB2 INPUT BREAKER on the BladeUPS module back panels.

9. Verify that the “Batteries Disconnected” alarm on each UPS has cleared. Verify that no other alarms appear on any UPS front panel display.

   Note: Each UPS should be in the factory set operating mode. This mode operates in High Efficiency and can be changed in the user settings through the front display.

10. To energize loads connected through the load connectors (RPM ports), switch all load connector circuit breakers on the BladeUPS module back panels to the ON position.

    Note: The load connector breaker controls the load connector only, not the output power cord.
Section 10 Specifications

This chapter provides the following specifications:

- Model list
- Weights and dimensions
- Electrical input and output
- Environmental and safety
- Battery

Table 3. Model List

<table>
<thead>
<tr>
<th>UPS Model Number</th>
<th>Power Levels (Rated at Nominal Inputs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>xxx</td>
<td>12 kVA or 12 kW at 208V See Note</td>
</tr>
<tr>
<td>EBM Model Number</td>
<td>BladeUPS EBM</td>
</tr>
</tbody>
</table>

**NOTE** Derated for line cord and nominal line voltage

Table 4. Weights and Dimensions

<table>
<thead>
<tr>
<th>Cord Model Number</th>
<th>Description</th>
<th>Input Plug Type</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPS CordPUL</td>
<td>12 kW UL input/output</td>
<td>Anderson See Note</td>
<td>0.5m (1.5 ft)</td>
</tr>
</tbody>
</table>

**NOTE** Customized Anderson connector for use with Eaton Dual BladeUPS

Table 5. Electrical Input

<table>
<thead>
<tr>
<th>xxx Model</th>
<th>xxx Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>120/208V three-phase</td>
</tr>
<tr>
<td>Nominal Frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>45–65 Hz</td>
</tr>
<tr>
<td>Default Frequency</td>
<td>Auto-detected</td>
</tr>
<tr>
<td>Rated Input Current</td>
<td>36A</td>
</tr>
<tr>
<td>Connections</td>
<td>IEC 309-60A power cord</td>
</tr>
</tbody>
</table>

For paralleling, a single Anderson input/output cord connects to the BladeUPS Bar (see Table 3 on page 21).
### Table 5. Electrical Input (Continued)

<table>
<thead>
<tr>
<th>xxx Model</th>
<th>xxx Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Noise Filtering</strong></td>
<td>MOVs and common mode line filter</td>
</tr>
</tbody>
</table>
| **Input Power Factor** | High Efficiency setting: load dependent  
                          | Standard setting: >0.99 |
| **Input Mode** | Three-phase |

### Table 6. Electrical Output

<table>
<thead>
<tr>
<th>xxx Model</th>
<th>xxx Model</th>
</tr>
</thead>
</table>
| **Nominal Output Voltage** | 120/208 Vac three-phase  
                            | 230/400 Vac three-phase |
| **Output Voltage Variation** | 104–132 Vac phase to neutral,  
                              | 180–229 Vac phase to phase  
                              | 207–253 Vac phase to neutral,  
                              | 358–438 Vac phase to phase |
| **Connections** | IEC 309-60A power cord  
                    | IEC 309-32A power cord |
| For paralleling, a single Anderson input/output cord connects to the BladeUPS Bar (see Table 3 on page 21). | |
| **Short Circuit Capability (Battery Mode)** | 84A, <300 ms  
                                           | 44A, <300 ms |
| **Short Circuit Capability (Normal Mode)** | Limited by 50A input breaker  
                                             | Limited by 25A input breaker |
| **Nominal Output Frequency** | 50–60 Hz auto-detection (Normal mode)  
                               | 50 or 60 Hz (Battery mode) |
| **Output Frequency Variation** | Synchronized (Normal mode)  
                                | ±0.1 when not synchronized with source (Battery mode) |
| **Output Overload** | 100–110%: load transfers to Bypass mode after 10 minutes  
                    | 110–125%: load transfers to Bypass mode after 1 minute  
                    | 125–150%: load transfers to Bypass mode after 5 seconds  
                    | >150%: load transfers to Bypass mode after 300 ms |
| **Voltage Waveform** | Standard mode and Battery mode: Sine wave;  
                         | <2% THD with linear load;  
                         | <5% with nonlinear load |
| **Full Output** | Three-phase |

### Table 7. Environmental and Safety

<table>
<thead>
<tr>
<th>xxx Model</th>
<th>xxx Model</th>
</tr>
</thead>
</table>
| **Surge Suppression** | ANSI C62.41 Category B3  
                       | EN 61000-4-6 |
| **Safety Conformance** | UL 1778 4th edition; CSA C22.2, No. 107.3  
                         | UL 1778 4th edition, EN and  
                         | IEC 62040-1-1 |
| **Agency Markings** | cULus, ICES, CE  
                      | cULus, CE |
| **EMC (Class A)** | FCC Part 15  
                     | EN 62040-2 |
| **Operating Temperature** | 0°C to 40°C (32°F to 104°F)  
                           | Optimal battery performance: 5°C to 25°C (41°F to 77°F) |
| **Storage Temperature** | 0°C to 25°C (32°F to 77°F) |
| **Transit Temperature** | -25°C to 55°C (-13°F to 131°F) |
| **Relative Humidity** | Operating: 5–95% noncondensing  
                         | Non-operating: 5–95% relative humidity;  
                        | 38.7°C (101.7°F)  
                        | Maximum wet bulb temperature with no cosmetic damage |
| **Operating Altitude** | Up to 1,000 meters (3,300 ft) above sea level;  
                        | up to 2,000 meters (6,600 ft) with 1% derating per +100 meters (330 ft) |
### Table 7. Environmental and Safety (Continued)

<table>
<thead>
<tr>
<th></th>
<th>xxx Model</th>
<th>xxx Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transit Altitude</td>
<td>Up to 15,000 meters (49,000 ft) above sea level</td>
<td></td>
</tr>
<tr>
<td>Heat Dissipation</td>
<td>1432 BTU/hr maximum at 100% rated load (High Efficiency mode)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4094 BTU/hr maximum at 100% rated load (Standard mode)</td>
<td></td>
</tr>
<tr>
<td>Audible Noise</td>
<td>Less than 58 dBA at 1 meter typical (Normal mode)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Less than 64 dBA at 1 meter typical (Battery mode)</td>
<td></td>
</tr>
<tr>
<td>Leakage Current</td>
<td>&lt;3.5 mA</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>DB-9: 1200–19200 baud</td>
<td></td>
</tr>
</tbody>
</table>

### Table 8. Battery

<table>
<thead>
<tr>
<th>UPS Internal Batteries</th>
<th>+1 EBM</th>
<th>+2 EBMs</th>
<th>+3 EBMs</th>
<th>+4 EBMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration</td>
<td>(40) 12V, 5 Ah</td>
<td>(20) 12V, 9 Ah</td>
<td>(40) 12V, 9 Ah</td>
<td>(60) 12V, 9 Ah</td>
</tr>
<tr>
<td>Type</td>
<td>Sealed, maintenance-free, valve-regulated, lead-acid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monitoring</td>
<td>Advanced monitoring for earlier failure detection and warning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charging (in minutes)</td>
<td>8–10 times the discharge time</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE** Charging times are approximate and are to 80% usable capacity at nominal line voltage after full load discharge.

### Table 9. Standalone UPS Battery Runtimes at Full/Half Load (in Minutes)

<table>
<thead>
<tr>
<th>Model</th>
<th>kW</th>
<th>UPS Internal Batteries</th>
<th>+1 EBM</th>
<th>+2 EBMs</th>
<th>+3 EBMs</th>
<th>+4 EBMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>xxx</td>
<td>12/6</td>
<td>4.7/13.6</td>
<td>9.5/27</td>
<td>17/42</td>
<td>27/60</td>
<td>34/76</td>
</tr>
<tr>
<td>xxx</td>
<td>12/6</td>
<td>4.7/13.6</td>
<td>9.5/27</td>
<td>17/42</td>
<td>27/60</td>
<td>34/76</td>
</tr>
</tbody>
</table>

**NOTE** Battery times are approximate and vary depending on the load configuration and battery charge.

### Table 10. Parallel UPS System Battery Runtimes at Full/Half Load (in Minutes at Capacity)

<table>
<thead>
<tr>
<th>Number of UPSs</th>
<th>kW</th>
<th>UPS Internal Batteries</th>
<th>+1 EBM</th>
<th>+2 EBMs</th>
<th>+3 EBMs</th>
<th>+4 EBMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>24/12</td>
<td>4.7/13.6</td>
<td>9.5/27</td>
<td>17/42</td>
<td>27/60</td>
<td>34/76</td>
</tr>
<tr>
<td>3</td>
<td>36/18</td>
<td>4.7/13.6</td>
<td>9.5/27</td>
<td>17/42</td>
<td>27/60</td>
<td>34/76</td>
</tr>
<tr>
<td>4</td>
<td>48/24</td>
<td>4.7/13.6</td>
<td>9.5/27</td>
<td>17/42</td>
<td>27/60</td>
<td>34/76</td>
</tr>
<tr>
<td>5</td>
<td>60/30</td>
<td>4.7/13.6</td>
<td>9.5/27</td>
<td>17/42</td>
<td>27/60</td>
<td>34/76</td>
</tr>
</tbody>
</table>

**NOTE** Battery times are approximate and vary depending on the load configuration and battery charge.

### Table 11. Parallel UPS System Battery Runtimes at Full/Half Load (in Minutes with N+1)

<table>
<thead>
<tr>
<th>Number of UPSs</th>
<th>kW</th>
<th>UPS Internal Batteries</th>
<th>+1 EBM</th>
<th>+2 EBMs</th>
<th>+3 EBMs</th>
<th>+4 EBMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>12/6</td>
<td>14/30</td>
<td>27/56</td>
<td>42/89</td>
<td>60/128</td>
<td>76/165</td>
</tr>
<tr>
<td>3</td>
<td>24/12</td>
<td>8.7/23</td>
<td>18/42</td>
<td>28/66</td>
<td>43/94</td>
<td>55/120</td>
</tr>
</tbody>
</table>

**NOTE** Battery times are approximate and vary depending on the load configuration and battery charge.
<table>
<thead>
<tr>
<th>Number of UPSs</th>
<th>kW</th>
<th>UPS Internal Batteries</th>
<th>+1 EBM</th>
<th>+2 EBMs</th>
<th>+3 EBMs</th>
<th>+4 EBMs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>36/18</td>
<td>7.3/20</td>
<td>15/37</td>
<td>24/57</td>
<td>38/82</td>
<td>48/105</td>
</tr>
<tr>
<td>5</td>
<td>48/24</td>
<td>6.7/19.2</td>
<td>13/34</td>
<td>23/54</td>
<td>35/77</td>
<td>44/98</td>
</tr>
<tr>
<td>6</td>
<td>60/30</td>
<td>6.2/18.4</td>
<td>13/33</td>
<td>22/52</td>
<td>33/74</td>
<td>42/94</td>
</tr>
</tbody>
</table>

**NOTE** Battery times are approximate and vary depending on the load configuration and battery charge.